Equity in the use of private hospitals contracted by a compulsory insurance scheme in the city of Rio de Janeiro, Brazil, in 1986

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Abstract

The Brazilian Health Care System involves a large variety of sources of finance and methods of organising medical care. Inpatient care in the country is mainly financed by a compulsory insurance scheme – *INAMPS*. The most relevant providers of inpatient care for *INAMPS* are *contracted private hospitals* which are reimbursed on a prospective payment scheme. Hospitals' claims – *AIH forms* are processed by a central computer system.

This study aimed to investigate inequalities in health care in Brazil – more specifically, to assess inequalities in the use of contracted private hospitals in the city of Rio de Janeiro in 1986. The main hypothesis was that contracted private hospitals would be treating selective groups within the population and that the pattern of use of these services would vary across social groups.

This investigation was based on data originated from the AIH forms and a study was conducted to assess the reliability of these data.

Contracted private hospitals were shown to treat a limited and selective share of the health care market in the city of Rio de Janeiro – split between the areas of maternity and geriatric care using low technology.

Variations in the patterns of use between the social groups are discussed in relation to age and sex distribution, case-mix, process and outcome of care. The explanatory role of the social variable (payment status) was tested. Payment status was shown to be a significant variable in explaining variations in use between patients. The less prestigious social groups, such as the unemployed, appeared less likely to receive appropriate care. Variations between the payment groups could also be the result of supply-induced demand or even fraud.

To my father
Germano Travassos
To my dear friend
Sherrine N. Borges

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Chapter 1

Inequalities and Health Care Services

1.1 Presentation of the Study

This study is primarily concerned with inequalities in the use of health
care services in Brazil, and more specifically, with inequalities in the use
of inpatient services. The pattern of use of inpatient services across social
groups will be explored and such pattern as can seen will then be related
both to the characteristics of the providers of care and to such inequalities
in health which can be seen to exist.

The main hypothesis is that the patterns of use of inpatient services re-
produce the appalling and persistent social inequalities existing in Brazilian
society. Inequalities are reproduced in the use of services through a variety of
selection mechanisms which lead to social stratification in the use of health
care services. This means to say that individuals' chances of getting access
(utilization) and benefiting from health care (process of care) are limited by
their social position.

This hypothesis was tested by looking at variations (if any) in the pat-
terns of use in relation to the distribution of reasons for discharge (Principal
Diagnosis), and also in relation to process and outcome of care across the
social groups controlled by sector of care.

In this *first chapter* inequity is conceptualized and the theoretical frame-
work for the analysis of inequalities in the use of health care services is
represented in a model of determination of the use of health care services.
Operational definitions of equity in the use of health care services are pre-
sented and policies directed at reducing inequalities are discussed.

The *second chapter* presents the Brazilian health care system by focusing
on inequalities generated by the way services are structured, financed and

distributed.

The *third chapter* discusses methodological approaches to tackling the research question. The methodology selected was a cross sectional study based on data from insurance claims filled in for reimbursement purposes by private hospitals contracted by the compulsory insurance scheme existing in Brazil (contracted private hospitals). The study was, therefore, limited to the assessment of inequalities in the use of contracted private hospitals in the city of Rio de Janeiro in 1986. Furthermore, a study of the quality of the data in the insurance claims became essential since these data are used mainly for payment purpose. In this third chapter therefore the data source, the study population and the methodology used to test variations in the use of contracted private hospitals are presented.

The *fourth chapter* describes in detail the payment scheme adopted by the Brazilian compulsory insurance scheme to reimburse contracted private hospitals and also discusses control mechanisms, problems with the method used to classify patients and the incentives brought about by the payment scheme in the delivery of services.

The *fifth chapter* concentrates on the reliability study performed to test the quality of data in the insurance claims. The methodology of the study and the field work are presented and the results are discussed. The use of the data set based on the collection of the insurance claims for the analysis of inequalities is reviewed on the basis of the limitations imposed by the quality of the data.

The *sixth chapter* briefly presents the city of Rio de Janeiro, the city's hospital market and the social structure and health status of the population living in the Rio. The role played by contracted private hospitals in this city is analyzed on the basis of the social and demographic characteristics of patients discharged. The hypothesis tested in this chapter is that contracted private hospitals treat a selective population within the working population and their dependents.

The *seventh, eighth and ninth chapters* further ascertain the role of contracted private hospitals in the city of Rio de Janeiro by looking at the case-mix of patients discharged, the pattern of care delivered to patients and the quality of care as measured by hospital mortality rates. The main research question, regarding the existence of variations in patterns of use across the social groups, is tested for each of the elements referred to above and the results are discussed.

The *final chapter* presents the conclusions of the study, reviews the methodology and presents recommendations regarding the implementation

of regulatory measures directed to minimize the sources of inequalities and suggests further areas of research.

1.2 The Concept of Equity

The concept of equity is related to social justice. It is related to fairness in the distribution of social and economic goods in society. Societies are defined by social relations which determine the processes through which people obtain access to material resources and obtain access to the social products resulting from the use of these resources. Inequalities in the chance of obtaining access to material resources and access to the social products are the basis of social stratification.

In spite of the fact that individuals might share similar material interests (interests in welfare), what differentiates the social classes (and, to a certain extent, the social groups e.g. gender and race) are the distinctive differences between individuals in respect of their life experiences and *means* of achieving their material interests (welfare). Welfare refers not only to income and consumption but to the total package of work, leisure and services available to a person.

There are two conflicting classical theories in sociology regarding the causes of social stratification – the Weberian and the Marxist theories. Weberian theories concentrate on how social classes are produced as a result of the way rewards are acquired and distributed while Marxist theories emphasize the way in which particular social relations within production create and reproduce social classes[4]. The debate on causes of social stratification is beyond the scope of this study. However, as Erik Olin Wright[199] argues there are no marked differences in the nature of empirical class structure *variables* among Neo-Weberians and Neo-Marxists: both class concepts accept that differences in property, skills/credentials/autonomy and authority are bases for differentiating the social classes. Neo-Weberians and Neo-Marxists vary in regard to their conceptual framework.

The point to be made here is that inequality is intrinsically related to social stratification. Therefore, policies to reduce inequalities have to be directed at minimizing existing differences in welfare between the social classes (and the social groups), as a means of reducing variations between individuals in their *chances* of improving their welfare. Therefore, the main explanatory variable for the assessment of inequalities is social class (or social groups).

In a different approach, Julian Le Grand looked at inequalities between

individuals. He proposed the use of Gini Coefficients to measure inequalities in health. Gini coefficients give a measure of differences between individuals – a global measure of dispersion between individuals. Le Grand[104] observed that measures of variations in the *age of death* for different dates in this century have decreased in Britain. However, as argued by Wilkinson[195], these measures reflect the changes in the pattern of causes of death – Infectious Diseases, for instance, which were responsible for a large number of deaths at the young ages have given way to Cancer and Chronic Degenerative Diseases which affect people in their later lives. Le Grand's approach indicates an improvement in the age of death across individuals – this means an improvement in the welfare of people. However, such an approach cannot distinguish how this improvement was distributed across the social groups. Therefore it has nothing to say about the impact of general changes in the disease pattern in the population on existing inequalities in health, as measured by the age of death.

1.3 Use of Health Care Services – a Model

In regard to health, it is necessary to distinguish the concept of *equity in health* from the concept of *equity in health care*. The main reason for this distinction is that the determinants of inequalities in health are not the same as the determinants for inequalities in the use of health care services. Moreover, equity in the use of health care services per se, does not necessarily result in equity in health.

Determinants of the distribution of diseases in populations go beyond the scope of the impact of health care interventions. They are primarily determined by social relations and the stock of social products available in particular societies, particularly their distribution and, by environmental causes which also tend to affect societies and social groups in a selective fashion.

Use of health care services might impact positively on the health of the populations by preventing the incidence of diseases or even eradicating diseases (e.g. vaccination), reducing death rates among some specific diseases (e.g. antibiotics) and enlarging the survival rates (e.g. some cancer treatments). Moreover, health care services should be seen as playing the relevant role of increasing comfort and diminishing suffering among the ill. However, information on the probabilities of treatment outcome under controlled experiments seldom exits. Moreover, use of health care services might have a negative impact on the health of populations due to low quality of care,

unnecessary care and the use of ineffective and potentially dangerous diagnostic and therapeutical interventions.

In this study, the *use of health care services* is related to getting access to services (utilization) and receiving the necessary treatment (process of care). The causes associated with use of the health care services are represented in a model of determination (see page 20, figure 1.1). It is necessary to emphasize, however, that the model suggested is a very basic representation of the determinants of the complex social and biological processes pertaining to the use of health care services. Nonetheless, it is thought that a more complex model can be developed from this one.

The assumptions in the model The model is centred around two central assumptions:

- *Health 'need'* is socially determined.

- *Use of health care services* is determined both by health need in the population and the characteristics of the supply side of the health care market (Health Policy).

Need in the population is not homogeneous between the social groups. The risk of getting ill or dying is determined by biological factors (e.g. age) in the sense that biological factors define the range of possible outcomes in terms of health. For instance, ageing is associated with increasing morbidity and mortality. However, within defined biological constraints the chance of getting ill and dying will be systematically different across social positions leading to social class (and social group) differentials in the need for health care service. Therefore, variations in the use of health care services are to a great extent related to variations in need between the social classes. But, there are other factors that influence people to become a 'patient' and to benefit from health care utilization. The availability [1] of health services is an essential ingredient to transform demand into utilization of health care services (enabling factor).

The role of health care services changes in time and across property and financing mechanisms, in terms of their objectives and the organization of work. The structure of health care services in terms of public/private mix in the finance and the provision of services impacts on the level of availability of resources between regions and the social classes. Moreover, the payment scheme, autonomy and ideology of individual professionals also shape

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[1] Availability is concerned with the overall level of health care resources and whether specific services or treatments are available locally and to what extent [85].

Figure 1.1: Model of the determination of the use of health care services.
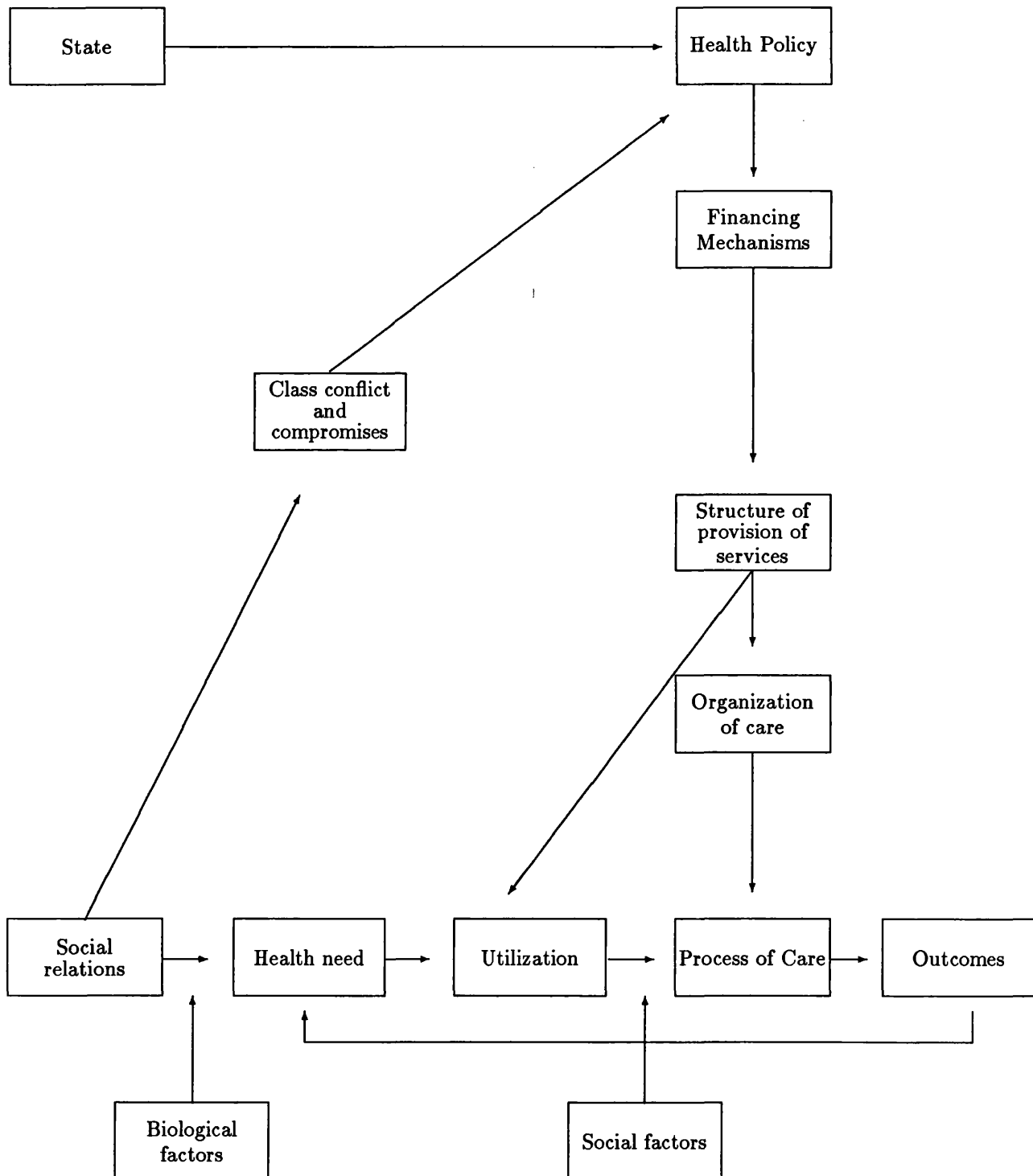
the relationship of medical knowledge/clinical decision thereby determining variations in use patterns.

Therefore, class differentials in seeking, getting access to and benefitting from health care services are not only determined by variations in need and behaviour between the social classes and social groups, but are also determined by the specific characteristics of the finance, supply of resources, organization of care, professionals' experience, autonomy and ideology which define the performance of direct providers of care. The following two sections discuss in more detail the two basic assumptions in the model of determination of the use of health care services and its relationship with inequalities.

1.3.1   Inequalities in Health 'Need'

Health and illness are complex phenomena which show extensive variability in relation to their definitions across disciplines (medicine, sociology) and socio-cultural context. Throughout this study, health and illness will be approached mainly in a technical (medical) sense and quantitative way: rates of incidence and prevalence of diseases and death. This approach limits the scope of this discussion of inequalities as it can be perceived and assessed from the perspective of orthodox medicine.

In a great large number of studies of equity, health 'need' has been based on mortality data. However, when analysing mortality data one must be cautious – death is a negative indicator of health. It is not a measure of health status. Moreover, mortality data do not account for the whole range and magnitude of existing morbidity in populations.

Inequalities in health can be approached on the basis of variations in health between countries. There are large variations in health across countries, particularly, between First and Third World countries. Nonetheless, it has been suggested that average income and income distribution *alone* explain a large proportion of differences in life expectancy between the developed world and Third World countries[194].

Infant mortality rates have been used as a classical indicator of social deprivation. Differences in mortality between developed countries and Third World countries are very large and influence variations in the average life expectancy. In wealthy countries, such as Japan, infant mortality rate is about 5 deaths per 1000 live births in a year, while in some regions in Africa and Latin America infant mortality rates might reach 100 to 200 deaths per 1000 live births.

Differences in infant mortality rates between Brazil and Sweden have increased in the last few decades. Infant mortality rate was 5.5 times larger

in the State of São Paulo (the richest and most developed state in Brazil) than in Sweden in 1950. By 1982, this difference had increased to 7.0. Comparison with infant mortality rate in the United States of America shows that during the same period differences remained about the same – infant mortality rates being 4.8 times larger in the state of São Paulo[102].

Comparisons between countries (variations between populations), however, do not account for within country variations (social class variations). Illsley[81] using data from WHO for European countries (those with available data) showed that *all* countries analyzed present *within* inequalities in health (measured by occupational class). Even those countries experiencing the highest life expectancies such as Sweden, Switzerland and the Netherlands have inequalities in death rates across the social classes.

England, with a long tradition in class analysis, as measured by occupation, has a large number of studies on inequalities in health. Marmot[110] using data for England and Wales shows that the disadvantage in health of the lower occupational groups is observed from a variety of indicators such as low birthweight (1980) with an incidence of 5.3 per cent among children from families in the upper occupational group and 8.1 per cent among children from families in the lowest occupational group. A similar gradient is observed for standardized mortality rate, maternal death, perinatal mortality, some diseases such as coronary heart disease and respiratory diseases and self-reported long-standing illness. This evidence was summarized by Whitehead[192]. Inequalities in health are reflected by a disproportionate burden of disease, death and risk factors among the lower occupational groups.

One relevant feature observed in inequalities in health is that inequalities tend to hold across *all* causes of deaths. People in the lower social positions tend to experience the largest death rates for almost *all* causes of death. This permanent pattern of inequality in mortality across a variety of diseases with very different aetiology, would seen to point towards the predominance of social position (life experiences and welfare) in mortality in the explanation of variations in death rates.

Mortality differentials *within* European countries occur for almost *all* causes of death, despite the fact that differences are more striking for some particular causes of death such as: Infectious Diseases, Respiratory Diseases, Alcoholism and also for infant deaths. Previous evidence of the fact that inequalities in health appear to remain constant across all causes of death – one exception being Malignant Melanoma – has been reported[110].

The past experience observed in England and Wales (1931) when Is-

chemic Heart Diseases among men was more prevalent in the upper occupational groups is at present suggested to have been related to the fact that diagnostic usage varied by class. Changes over time in the labelling of heart diseases is the most likely explanation of the fact that deaths from heart diseases in men aged 35 – 64 increased more rapidly in the lower occupational groups than in the upper occupational groups between 1931 and 1971[110].

In Brazil a similar pattern is likely to occur. An ecological analysis of the relationship between mortality and average income developed by the World Bank[197] suggested variations in the causes of death for low and high income countries of the Americas and state capital cities in Brazil. This study used two samples: one with data for countries of the Americas from 1981 to 1984 and the other used data for the nineteen largest state capital cities of Brazil from 1977. Age-adjusted specific death rates were regressed against countries and cities' average income level. This showed that some causes of deaths within specific age groups were more associated with high per capita income while others were more associated with low per capita income. Lung Cancer (over 45 years older), Colon Cancer (all ages), Breast Cancer (all ages), Cerebrovascular Diseases (45 years and old), Suicide and traffic death (per capita) appeared more strongly associated with the richer populations while Stomach Cancer (all ages), Cervical Cancer (all ages) Cerebrovascular Diseases (15 to 24 years old), Chronic Obstructive Lung Diseases and traffic death (per vehicle) appeared more associated with the poorer populations.

The methodological approach used in this study, however, provides a very broad assessment of the distribution of causes of mortality between 'rich' and 'poor' countries and capital cities. Income inequalities in Latin American countries and, particularly, in Brazil are very large. Therefore per capita income poorly reflects within country and city inequalities. Moreover, the reliability of data on Death Certificates and variations in coding practices are also likely to vary across countries and cities bringing further limitations to the study.

Another ecological study[197] based on more homogeneous populations provides a more reliable picture of inequalities in health across populations with different income levels in Brazil. Inequalities in health measured by differences in mortality between populations was assessed in Porto Alegre, the capital city of a developed state in the south region. This study compared mortality between poor and rich areas in the city. Infant mortality rates in the poor areas were more than double the figures observed for the rich areas. Death rates were also higher for all age groups (1 to 14 years old,

15 to 44 years old and 45 to 64 years old) and for all causes of deaths among those living in the poor areas. Mortality rates for specific causes of disease (Cancer, Cerebrovascular Diseases and Respiratory Diseases) among adult men (45 to 64 years old) were larger for those living in the poorer areas, while for adult women living in the poor areas the major differences were concentrated in Cerebrovascular diseases.

The mechanisms present in the relationship between class position and morbidity and mortality can be further assessed by the interaction between social position and age. Ageing is associated with increasing morbidity and mortality. The theory of epidemiological transition points to a new scenario based on the recent pattern of low mortality/low fertility observed in developed countries named as the *Age of Delayed Degenerative Disease* [142, 182] which is characterized by a rapid decline in the major degenerative diseases. However, the recent distribution of the onset of chronic conditions across the social classes suggests that without changes in the social relations, social selection will act, limiting the entry of delayed degenerative disease to some social groups in this recent epidemiological transition.

Studying a cross section of the North American adult population (25 years and older), J. S. House[77] has shown that age interacts with social condition (measured by income and education) in relation to the onset of chronic conditions. This author observed large disparities across the social groups in the prevalence of chronic conditions in the early middle ages (35 – 44 years old), even larger among people of middle age, (45 – 54 years old) and early-old age (55 – 64 and 65 – 74 years old) and smaller again among people older than 75. These results were consistent across a range of chronic conditions with various levels of severity – potentially life threatening conditions (cancer, heart attack/trouble and stroke), serious chronic conditions (arthritis, lung disease and urinary incontinence) and others (fracture and foot problems). The observed contrast between the social groups was such that the lowest social group manifested a prevalence of chronic conditions at ages 35 to 44 which was not observed in the highest social group until the age of 75.

It appears that the relative biological strength in the early ages (25 to 34 years old) dominates over social disadvantages, shown by the low variations between the social groups for the young adult. Social determinants, however, tend to predominate with ageing. For the very old, low variations are probably the effect of selective mortality – people in the low social groups die earlier. The average prevalence of morbidity and functional limitations for those 65 years and older is no greater than for those below 65 among the

low social groups.

Health disadvantages expressed by premature illness and death among people in low social positions are also suggested by a study based on Brazilian data. J.S. Yaslle Rocha[200] studying inpatient admissions from Cardiovascular Diseases in Ribeirão Prêto (Brazil) observed variation in the age of admission across the social groups (payment categories). Those patients admitted free of charge were much younger than the other payment groups, suggesting differences in the onset of Cardiovascular Diseases between the social groups. Moreover, the mean age for patients dying in hospital was 12 years less for those admitted free of charge (not-insured patients) when compared with patients who paid their own bills (private patients).

The predominance of life experiences and welfare upon biological determinants of mortality is also suggested by the present knowledge related to the incidence and survival rates for Breast Cancer. Breast Cancer is a disease with a positive social gradient, with higher risk among women in the upper occupational classes. Nonetheless, *survival rates* have been observed to be lower for women in a low social position. In Finland[93], it was observed that women classified in the lowest occupational group had about 1.3 times higher relative risk of dying of Breast Cancer than women in the highest occupational groups. Their risk of Breast Cancer is apparently due to differences in the reproductive history of women in different social positions. Therefore, even when life experiences might result in less risk of specific illness for women in lower social positions, the outcome of disease is likely to be less favourable. The outcome of positive habits and health styles is jeopardized by the limited welfare of those at the bottom of the social stratification.

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A longitudinal study of children born in 1982 in the city of Pelotas – a city with 250,000 inhabitants in a developed state in the south of Brazil – was undertaken aiming to assess the influence of social factors on the health status of children[186]. Social position was measured by income (groups of legal minimum wages). The results of this study, some of which are presented below, show that social position interferes in all intermediary variables influencing the health status of children.

Some *risk factors* appeared to affect disproportionately low income mothers. The average height of low income mothers was 5 cm less than the average height of high income mothers, thus increasing the risk of perinatal complications among low income mothers, because there is a relationship

between low height and perinatal complications. Smoking habits were also significantly more prevalent among low income mothers (44 per cent) when compared with high income mothers (25 per cent). Low birthweight, which influences the early years of life and presents a higher risk of death and illness showed a high incidence (15 per cent) among those babies in very low income families (1 or less legal minimum wage). However, it was relatively low among the other income groups.

Maternal mental disorders represent another circumstance very likely to affect child health. The prevalence of mental disorders as measured by a psychiatric screening questionnaire (SRQ – 20) was six times greater among low income mothers, suggesting a relationship between social deprivation and mental illness. Another study[155] using the same instrument to assess the prevalence of mental disorders among mothers living in the largest *favela* (squatter settlement) in the city of Rio de Janeiro (Rocinha) also observed a very high prevalence of mental disorders (36 per cent). This latter study, highlights the fact that, although squatter dwellers tend to be poor, social stratification is also observed within the population living in *favelas* which implies that slum residence does not equate with equality of social position and health status. Those mothers living in Rocinha with income in the lowest 25 per cent showed a prevalence of mental disorders (47.3 per cent) much larger than those in the highest 25 per cent income (30.0 per cent).

Another interesting finding of this Longitudinal Study of Pelotas is the relationship between race, income and health in Brazilian society. A relationship was observed between race and birthweight among babies born from white mothers who showed a significantly lower incidence of low birthweight than non-white mothers. However, these differences disappear when race is controlled for levels of income. These results reflect the fact that income inequalities are one aspect associated with racial discrimination in Brazil, as is probably the case in other multi-racial societies. That suggests an interaction between class position and race.

Infant mortality rate in Pelotas also appeared to have an important social gradient with children in low income families experiencing a disproportionate share in morbidity and mortality. Adverse circumstances at early ages have been shown by some recent studies to be likely to affect health status in later life[150, 8]. Short stature has also been associated with higher mortality risk in adult life and is influenced both by genetic and childhood life experiences[174]. A cross-sectional study[121] in the city of São Paulo in Brazil, showed large differences in the growth of children from families in different social classes. The social class classification used in this study was

based on the social relation to production and income. Unlike the children from the bourgeoisie and the new petit bourgeoisie families who showed a normal height distribution, a large growth deficit was observed for the children from families classified in the three categories of the proletariat (typical, non-typical and sub-proletariat). This results in the large inequalities in the distribution of material advantages across the social classes in Brazil. The possibility of acquiring food, a basic material good for health and life, is limited among proletariat families living in this developed and highly industrialized city, leading to a high prevalence of malnutrition among children born in these families.

In the longitudinal study of Pelotas, income also appeared to interact with birthweight regarding the risk of dying. This means that children from low income families born with adequate birthweight experienced a larger chance of dying than children born in the same circumstances in a high income family. It suggests that adverse social conditions (welfare) undermine the biological advantages of having had a normal weight at birth. These results would also seem to support the assumptions in the model, where biological factors act as selecting the *possible* health outcomes but the actual occurrence of disease and health is ultimately determined by the social class position of individuals.

Inequalities in material welfare and life experiences between individuals have an impact on health, creating differences in the life span and in the chance of postponing the onset of morbidity and disability. Early social disadvantages are a risk factor in relation to health status in adult life. Therefore, the outcome of disease and death throughout life has to be explained in the context of the life experiences of individuals with regard to their social position.

There are few studies in the Brazilian context relating to inequalities in health among the adult population. Ramos[154] carried out a survey on the elderly population living in three areas in the city of São Paulo. Areas were chosen according to the average wealth of the population (rich, intermediate and poor). His study observed that the prevalence of chronic conditions was very large among the elderly (78 per cent). Hypertension appeared as the commonest chronic disease. A previous study[197] in a predominantly working class town in the state of Rio de Janeiro observed that the prevalence of high blood pressure was much lower among the more educated than the less educated. Ramos' study also observed that chronic diseases were more prevalent in the less wealthy areas, particularly multiple chronic conditions.

In general, older people have lower incomes than younger age groups. When individuals retire they lose earnings and become dependent upon social security. Renato Veras[182], in a survey of the elderly people living in the city of Rio de Janeiro observed that the low-income elderly presented significantly higher prevalence of Dementia and Depression than the high-income elderly. These variations would again seem to support the hypothesis that class differences remain among the elderly, generating health inequalities among this age group.

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Time trends in health inequalities In 1980, the report of the Research Working Group on Inequalities in Health issued by the British Department of Health and Social Security (known as the Black Report) raised the point that mortality differentials in health for England and Wales were still large across the occupational groups in 1970 – 1972 and that those differentials were widening[179]. In a more recent assessment[135] based on cross sectional data from the General Household Survey, O. O'Donell and C. Propper observed that inequalities in health as measured by self-reporting acute and/or long standing illness have reduced between 1978 and 1985. However, this reduction occurred at the expense of an increase in self-reported morbidity in all occupational groups.

The analysis of time trends to assess differentials in health across social classes (or social groups), however, presents some methodological difficulties due to:

- Changes in the proportions of the population in different social classes.

- Changes in the classification of social position.

- Errors in the classification.

Some methodological approaches have been proposed to overcome some of these problems[110, 23]. A more consistent assessment in inequalities in death by occupational group is the longitudinal study of the Office of Population Census and Survey (OPCS)[16]. This is a longitudinal study which used occupation declared in the census throughout the study while the Black Report relied on occupation data from death certificates which are likely to be misleading due to misreporting at death. The results of the OPCS Longitudinal study are consistent with that of the Black Report[123].

The Whitehall study[111] covered two cohorts of British civil servants with an interval of 20 years between them. The first study demonstrated after ten years of follow-up that, even among a group of civil servants who are a group of people in stable employment, the top employment status group presented about one third of the mortality rate of the low employment status group. Gradients in morbidity rates between employment status were similar to those in mortality rates. Risk factors account for only part of the differences observed. Differences in morbidity between the employment groups persisted over the time separating the two studies. Ischemia, angina pectoris, chronic bronchitis, long-standing illness, self-rated health as average or worse all present a gradient between the employment categories.

This study also assessed some explanatory factors for health inequalities: clear differentials in welfare (work–leisure–income) appeared between the employment groups. Individuals in the lower employment status groups were less satisfied with their jobs, had less varied work, were involved in less hobbies and received less practical support. Moreover, individuals in the lower employment status groups were more likely to report potentially stressful life events in the previous year and to report difficulties in paying bills and with money in general.

The persistence in health differentials in countries with comprehensive and largely 'free' health care systems such as Sweden and England strongly suggests that health care is not sufficient to *fully* reduce inequalities in health, which reflects the different life experiences and welfare across the social classes and social groups. Wilkinson[194] suggested that for Britain, income transfers between the rich and the poor are likely to bring substantial health benefits to the poor without having any substantial impact on the health of the high income groups. The reduction in income inequalities within and between countries would have a positive impact on health inequalities.

1.3.2   Inequalities in the Use of Health Care Services

Equity in the use of health care services is defined as the equality in the *chance* of getting access (utilization) and receiving the adequate treatment (process and outcome of care) across the social classes (or social groups).

Health 'need' (perceived morbidity and/or medically identified morbidity) is one major determinant of the use of health care services, particularly in regard to non-preventive services. For inpatient care, need is an important determinant and use is ultimately defined by the doctor. Barbara Hulka and John Wheat[79], reviewing the literature on the determinants

of consumer behaviour in utilizing health care, concluded that the primary determinant of utilization of services was need. Based on the 'need model', variations in the use of health care services would basically reflect the structure of need in the population. Inequalities in the use of health services would, therefore stem primarily from variations between the social groups and the social classes in relation to *enabling factors* (costs and availability of services) and to *predisposing factors* (variations in the acceptability[2] and information about existing resources and their usefulness).

Enabling factors The organization of the delivery of care to a given population reflects the public/private mix in the finance and provision of health care services and existing regulatory mechanisms. Health policy defines the structure of the health care system in terms of financing mechanisms, the supply and distribution of facilities, equipment and manpower, complexity and payment mechanisms.

Countries vary considerably in their health care policies and, hence, in the way health care services are financed, distributed and delivered to patients. Therefore, countries vary in the pattern of equity in the use of health care services.

The removal (or reduction) of price barriers through the provision of free services or through subsidies and the distribution of facilities and manpower in regard to need are not sufficient, but necessary, elements for equity in the use of health care services.

The experience of most developed western countries demonstrates that State intervention has been necessary to reduce inequalities in the use of health care services[113]. However, the scope and the characteristics of regulatory measures adopted by individual countries have varied largely. In countries with systems with universal access where care is provided to all at the time of use almost free of charge such as,in the case with the National Health System in Britain and other such countries which have removed most price barriers for the utilization of health care services, policy measures have still had to be adopted to improve equity in the distribution of beds. This is because the historical distribution of health care services was based on the distribution of wealth, leading to geographical inequalities.

In Britain the Resource Allocation Working Party (RAWP) developed a method of approaching geographical equity by calculating each Regional Health Authority's (RHA) fair share of the total cash available to all regions. The method adopted was based on the population's relative risk of

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[2]Acceptability refers to choices regarding type of medicine and treatments

needing health care, estimated by age, sex and Standardized Mortality Ratios (SMRs). As measured by RAWP, regional inequalities in health care diminished markedly between 1977/1978 and 1986/1987. Actually, England at present, appears to have one of the lowest geographical inequalities in Europe[14].

On the other hand, the United States with a market-based health care system (actually the only major western industrialized country without a comprehensive and universal government health programme) has had to adopt special programmes to finance the use of services for those people unable to purchase them in the market-place – the Medicare Programme for the elderly and the Medicaid Programme for the poor. The health care system of the United States appears to suffer from higher costs and less access than countries with National Health Systems such as England.

Bombardier[18] observed a large increase in surgical utilization among the elderly population of the United States between 1963 and 1970, particularly, for the non-white urban and low-educated elderly – a reflection of the introduction of Medicare and Medicaid Programmes between these years. Nonetheless, figures for 1970 still showed large variations in surgical utilization with income having a strong positive effect on utilization. More recently, Yelin[201], observed that lack of insurance in the United States appeared to be associated with a lower chance of getting hospital treatment, for some specific chronic conditions.

The extent to which health care services can be bought in the market place, through private insurance mechanisms and out-of-pocket, is reflected by the plurality of financing mechanisms, payment mechanisms of direct providers of care, modes of organization of medical practice and regulatory powers. Pluralistic systems tend to generate social stratification in access to the different sectors of care, leading to greater inequalities in terms of availability, type, volume and quality of services consumed by the different social classes and social groups. Market-based health systems are also likely to raise the overall cost of health care.

Hart[72] stated his *Inverse Care Law*, in 1971 – "the availability of good medical care tends to vary inversely with the need of the population served". He suggested that the Inverse Care Law operates more completely where medical care is exposed to market forces, and less where such exposure is reduced.

Supply-induced factors   John E. Wennberg[188] argued that Hulka's 'need model' was developed, based on the review of large studies of uti-

lization of health care services in which supply factors are held constant. By reviewing studies based on local hospital market factors such as supply of beds, personnel and professional practice style the important role of supply factors in explaining variations in utilization (supply– induced demand) was suggested.

For several decades already, several studies have observed large variations in inpatient care between and within countries. Variations of rates of inpatient admissions between local hospital markets for treatment of minor surgical and medical procedures such as teeth extraction, curettage, breast biopsies, pneumonia and chronic lung disease have shown 4 to 20 fold variations. The extent of observed variations cannot be explained only on the basis of differences in health need in the population[48]. Therefore, supply-induced demand has been suggested as another (or, the dominant[188]) factor to explain variations in use.

The medical decision-making process and the local supply of resources are the main factors in supply-induced demand. Variations in inpatient admissions between local health markets for minor surgery are strongly associated with the supply of beds and, to a lesser extent, with the supply of doctors[188].

Nonetheless, the final decision for generating an admission has to be that of doctors. Eisenberg[48] argues that in many aspects of medical practice such as surgery, hospitalization, length of stay, diagnostic tests and drug prescription there are wide variations in doctors' performance. Professional uncertainty[189] is suggested by Wenneberg to be the main explanation for variations in doctors' performance.

Wennberg identified three sources of uncertainty:

1. Difficulties in classifying a particular patient, so that the probabilities of existence of disease, extent of disease, prognosis and treatment outcomes are reasonably ascertained.

2. Limited valid information on the probabilities of treatment outcomes.

3. Utility of doctors, assumed by Wennberg to make vicarious decisions, may not correspond to the patient's utility.

Actually, as Eisenberg argues[48] uncertainty in clinical decisions will always remain as long as medical care is a probabilistic process. However, because all doctors face uncertainty in their practice, it is such variations in the way they respond to uncertainty which raise clues for other factors influencing medical practice. To cope with uncertainty, doctors might tend

to establish routines and are influenced by a variety of sources from peers, scientific information, commercial sources (drug companies representatives) etc.

Physician's behaviour is assumed by functionalist theory to be collectively orientated. Parsons[145] considers that the doctor emphasizes the technical basis of the role in his or her relationship with patients and colleagues to the exclusion of non-technical considerations. Critics of the above theory[178, 100] argue that a doctor's performance is not neutral as ideally presented by professional associations and functionalist theory, as it is influenced by the doctor's ideology and self-interest as well as by the organization of work.

Financial incentives upon doctors also influence their performance at least marginally. The way that doctors are compensated tends to produce specific patterns of resource consumption, quality of services and geographical distribution of doctors[3].

Moreover, the social classes and the social groups also tend to vary in regard to their access to medical information, their ability to choose the service and/or doctor on the basis of the assessment of quality or to exercise control over the medical practice[17]. The upper social groups have more familiarity with professionals and with institutions, increasing their ability to influence services and doctors' decision processes.

The *process* of institutionalized medical work, in opposition to the traditional autonomous fee-for-service doctors, introduces various degrees of constraints on doctors decision–making through control over workload, timing and the setting of practice standards. Control over medical practice has been a major trend recently, regarding mainly the achievement of more efficiency in the production of medical services.

In short, under the limits of structural uncertainty of medical care, an individual doctor's decision process is shaped by financial incentives and class interests and ideology. Moreover, the degree of autonomy in the decision process of doctors is selected by payment mechanisms, characteristics and the status of the practice setting, managerial control, supply of resources and the demand exercised by patients. Therefore, supply-induced demand is also likely to explain inequalities in the use of health care services.

* * *

Cartwright[24] studying the British National Health Service (NHS) observed that middle class patients experienced larger average consultation time and a larger opportunity to communicate with their General Practi-

tioners (GPs) than working class patients. Her study suggests that GPs have a rather less sympathetic and understanding relationship with their working class patients.

A study[159] assessing the relationship between hospital characteristics and patient characteristics in Pittsburgh (USA) observed that demographic and socio–economic variables did explain more of the variation in hospital use of individual patients than individual hospital characteristics (measured in this study by number of facilities, number of employees per bed, teaching activities and presence of outpatient services). Patients' demographic and socio–economic variables appeared as the most relevant variables in shaping the doctor-patient relationship and determining the amount and type of care provided to individual patients. Variations were observed for payment mechanisms with those paid by government using more hospital care than those paying their own bills. However, as the author points out, payment mechanisms cannot be interpreted as purely price elasticity due to the strong relationship between payment mechanisms and income, occupation etc, that is to be found in relation to health 'need'. After adjusting for diagnosis non-white patients stayed longer, received a greater number of special services and were charged more than white patients. However, when controlled for the characteristics of the place of residence, non-white patients living in predominantly non-white areas were hospitalized for more serious illnesses and stayed for shorter periods and paid less than white patients living in predominantly white areas, indicating an interaction between race, social position (as defined by area of residence) and the use of hospital services.

Enders[50], studying the relationship between subjective preferences and hospital selection in a community in the capital city of Porto Alegre (Brazil), observed an inverse trend between the perceived quality of services and the actual utilization of services. Ability to pay for better quality services did not appear to be the principal barrier to access to services perceived as better quality, since the great majority of people in the sample were insured by the compulsory insurance system existing in the country (see chapter II). This study sample excluded those at the bottom of the social stratification who were not covered by the compulsory insurance scheme. The author suggested then that the main barrier was a social barrier. Hospitals of perceived higher quality would use strategies, such as alleging no vacancy, to refuse access to the low socio–economic groups (social classification was based on the identification of three major groups – high, middle and low by using a large range of social, economic and demographic variables). However, the author indicates that the most important barrier was exercised by doctors:

"Not wanting to damage their relationship with the hospitals with which they are associated, the physicians screen each patient before referral. Patients can, and based on the interviews frequently do, refuse to enter the recommended hospital. In this case, the physicians who have no personal attachment to lower class clients, recommend an alternative hospital but again of their choice".

Enders' research is important because it exposes the mechanisms through which the self-interests of doctors (and, services' vested interests) act so as to create inequalities in the use of health care services and reproduce the social stratification existing in society in the stratification in the use of health care services. This study also demonstrated that, for people living in large metropolitan areas, the quality of inpatient care is a more important element in individual's choice of hospital than accessibility. However, individuals' choices were limited by their class position.

As shown previously in this chapter, the survival rate for Breast Cancer is lower among the less skilled manual occupations. Lower survival rates are also observed for black women. A study in the United States[41] refers to the fact that black women with breast cancer experience lower access and use of services. It observed that black women received less than appropriate care for 4 out of 10 patterns of care. The study also showed that black women were more likely to be treated by more recently trained surgeons than white patients, suggesting that, at least in the United States, variations in survival rates across white and non-white women are,influenced by supply-induced practices which negatively affect those less prestigious social groups.

Another study[46] based on data from the United States showed that black patients were two to four times more likely to have their Gallbladder or Inguinal Hernia Repair surgeries performed by a surgeon in training than by a staff surgeon. This trend remained for emergency patients. It also remained among patients paying their own bill or financed by private insurance, suggesting that better trained doctors tended to discriminate against black patients. However, differences disappeared among patients financed by Medicaid. The major provider of care for both black and non-black Medicaid patients was a surgeon in training. This suggests that selection mechanisms operate in the very diversified health care market of the United States in such a way as to allow the better trained doctors to choose their 'preferred patients'. The recently graduated doctor, with lower competitiveness in the labour market, would be the main provider of care for the socially underprivileged patient. The greater likelihood of black and poor patients being treated by less skilled professionals might also negatively impact on

the outcome of care.

The longitudinal study of Pelotas (Brazil), previously mentioned in this chapter, also observed similar variations in the provider of care across the social groups: while 54.0 per cent of deliveries in the low income groups were performed by a midwife or a medical student, 93.0 per cent of deliveries among the high income groups were performed by a qualified doctor. The quality of ante-natal care varied across financing mechanisms: by measuring low quality by the first ante-natal care after the fifth month of pregnancy and less than five consultations during pregnancy, it was observed that 77.0 per cent of those mothers receiving free care received low quality of care, 22.0 per cent of those financed by the compulsory insurance scheme (see chapter II) and only 5.5 per cent amongst those mothers paying for private care.

Interaction between financing mechanisms and the process of care, in relation to inequalities in the use of health care services, has been clearly demonstrated in the study of Abnoel[176] This study analyzed inequalities in the use of psychiatric inpatient care in the capital city of the state of Bahia (Brazil). The plural characteristics of the Brazilian health care system (see chapter II) result in the social stratification of patients across sectors of care (public hospital, teaching hospital, contracted private hospitals and independent private hospitals[3]). The unemployed, the non-paid workers and the not-insured (workers in the informal labour market) patients were more likely to be treated by the public hospital, where the process of care was based on old-fashioned and low-quality treatment leading to the chronicity of mental problems. Those patients employed in the formal labour market were more likely to be treated in the teaching and private hospitals where the therapeutical patterns adopted were of greater efficacy. Quality of care was also judged to be low in the psychiatric contracted private hospital where the less skilled employed patients were more likely to receive care.

Most Western European countries have accepted the principle of health as a right before Latin American countries[3], and shaped their more equalitarian health care policies. Universal and comprehensive health care systems are the bases for reducing inequalities in the use of health care services. However, the principle of health as a right, needs also to become a consensus among direct providers of care to reduce the impact of supply-induced inequalities.

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[3]The financing mechanisms associated with each one of these services are presented in chapter II.

1.4 Operational Definitions of Equity in Health Care

This study is concerned with the analysis of inequalities in the use of health care service, particularly with inequalities in the use of inpatient services. In the first section of this chapter, the concept of equity was approached as a principle – the fairness in the social distribution of social products. To transform this principal into policies, more operational definitions are needed. Some of the approaches suggested by Mooney[122] and Julian Le Grand[105] are presented and discussed. They can be formulated on the basis of two characteristics, which are not exclusive:

1. Policies formulated on the basis of the geographical distribution of resources.

2. Policies formulated on the basis of need.

The geographical distribution approaches are aimed at increasing the equality in the allocation of financial resources and health trained manpower between regions and areas. Public spending should be distributed pro rata with the size of the population. Mooney further suggests that the distribution of financial resources should account for differences in prices (labour, land and capital) between regions by proposing the concept of *Equality of Inputs (resources) per Capita*. Geographical distribution policies will positively impact on situations of large regional inequalities, as is the case of Brazil (see chapter II). However, this approach does not account for differences within regions limiting, therefore, its scope in reducing inequalities. As pointed out by Le Grand[105], "regional reallocations will not affect class differences within regions".

The need-based approach is stated by Mooney as *Equality of Input for Equal Need* which implies distribution of bed and manpower according to variations in the need as measured by the age and sex structure of the population. However, in spite of existing differences in the use of health services between the age groups and the sexes, age and sex interacts with class position as discussed previously, with a lower social class position getting a disproportionate share of existing morbidity in a population. Indeed, differences in morbidity across the social classes point to variations in need for health care services. Since health 'need' is not randomly distributed in the population, equity in the use of health care services has to account for differences between the social classes.

The RAWP formula discussed earlier, adopted age, sex and SMRs as a proxy of need since morbidity data is scarcely available. Social class has been suggested as the best predictor of the use of inpatient care[95]. Therefore, a further development of a formula to calculate a population's relative risk of needing to use inpatient services would be to include in the formula social class as measured by variables in the Census and/or General Household Survey.

A further need–based approach was suggested by Mooney and by J. Muurinen and Le Grand[129] as *Equality of Access for Equal Need* in which individuals should face the same 'price' of medical care. This would include the costs faced by the patient such as travelling, waiting for treatment, amount of income loss associated with receiving medical treatment. Since these costs are likely to be higher for workers than professionals, the former would need to be compensated for their higher costs. The implementation of measures to equalize costs by means of awarding greater sickness benefits to workers, for instance, would be of low practicality in Brazil. One main difficulty is the existence in the country of a large informal labour market (see chapter VI). Improvements in the distribution and availability of services for different groups in the population, achieved through policies of equality in the distribution of resources, however, could reduce travelling and waiting costs and have a positive impact on inequalities.

Mooney argues that, as supply is associated with demand, the impact of equality policies on the utilization of services will depend on the response from individuals in using the services available to them. Individuals vary in their preferences and tastes, argues Mooney, hence they have distinctive acceptability to services available to them. However, relevant aspects of the supply side of the health care market are also likely to have a negative impact on utilization, as previously discussed. Therefore, even under policies directed at equalizing opportunity of access, inequalities might remain due to supply-induced social selection.

A further operational definition of equity in health care based on need is *Equality of Treatment for Equal Need*. This is one of the operational definitions of equity present in the objectives of the British National Health Service. This policy has been assessed by Julian Le Grand[105] as the ratio of public health care expenditure per person reporting sick. He observed important differences between the top and the bottom occupational groups, with professionals receiving over 40.0 per cent more than the lowest occupational group.

A more recent assessment[135] of equality of treatment for equal need in Britain has been developed. In this study the above policy was approached from the consideration of equality in the utilization of services. Need was measured by self-report morbidity and individuals were discriminated by income. It observed an equitable pattern in utilization across income groups. The results of this study are in contradiction with the findings of Julian Le Grand. These two studies did use different methodological approaches, however this does not seem to wholly cancel the findings of the more recent study[135].

The measurement of equality in utilization, however, should also consider the ratio of utilization for those people not referring illness across the social classes. Measurement of illness has problems of validity and reliability, indicating the need to compare the ratios of people classified as not ill, but who used services. Moreover, when looking at average utilization rates, as was the case in the latter study, one has to take into account that people in low class positions are likely to present multiple and more serious conditions leading to a greater number of GP visits, outpatient visits and inpatient care. This will lead to higher ratios of utilization.

It is suggested that equity of treatment for equal need could also be approached as – Equality in the Quality of Care[4]. In spite of the existing large methodological difficulties in measuring quality of care, this does not imply that it should not be assessed by means of some accessible indirect indicators such as hospital mortality rates and sentinel events (see chapter IX). The quality of care is an extremely relevant element regarding inequalities in health care. It refers to the extent to which systems, services and direct providers of care distinguish individuals in the delivery of services in regard to their social position. The assessment of Equality in the Quality of Care implies monitoring the production of health care services.

Finally, these operational definitions of equity in access, utilization, and quality of care should be considered not as isolated objectives but as associated objectives which should be pursued in a combined fashion. Previous experience in Brazil[22] has shown that the increase in the supply of health care units had little impact on utilization due to the fact that services were perceived by the population as low quality health services.

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[4]Donabedian points out that 'quality is a property of, and a judgement upon, some definable unit of care, and that care is divisible into at least two parts: technical and interpersonal'. He suggests a unifying concept of quality as 'that kind of care which is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all parts[42].

Chapter 2

Inequalities and the Health Sector in Brazil

2.1 Brief Description of the Country

Brazil is a large country (8,511,957 square kilometres) with population esti-
mated at 138 million in 1986. The country has been going through impor-
tant demographic and socio-economic changes. The population growth rate
started to decline in the 1960s; this rate was estimated as 2.3 per cent in
1985. It is estimated that in that year 36.4 per cent of the population were
under 14 years old and 6.6 per cent aged 60 years or more. It is expected
that the proportion of population falling within this older age group will in-
crease. By the year two thousand, it is estimated by the Brazilian Institute
of Statistics and Geography (IBGE) that about 14.5 million people will be
over the age of 60.

Brazil is a Federal State divided into 26 states (1988) and a Federal
District (Brasília). The states are divided into 4,491 municipalities, which
are the lowest level of the political-administrative division of the country.

During the 1960s and 1970s Brazil showed an extremely good economic
performance with Gross Domestic Product (GDP) increasing five fold during
this period. It was a period of soaring industrial production. The so called
'economic miracle' was directed by the military dictatorship that ruled the
country from 1964 to the end of 1984.

However, the benefits of this period of prosperity in the Brazilian econ-
omy were very unevenly distributed between regions and social groups,
building up a country which shows, nowadays, levels of social inequalities
which are among the greatest in the world.

The average income in the country in 1987 was 2,020 USA dollar per
head. However, wealth is extremely poorly distributed. The legal minimum

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wage in the country is about forty pounds sterling per month. In 1983, about 33.5 per cent of people in employment earned about a minimum legal wage. During the 'economic miracle', the richest 10 per cent of the population absorbed about 50 per cent of GDP. In 1960, the richest 1.0 per cent people within the economically active population accounted for 12.0 per cent of the national income. This increased to 17.0 per cent in 1980[185]. Inequalities are also widespread between regions, with the southeast and the south having a large proportion of the country's wealth.

Migration from rural and poor regions (the north and northeast) to more developed urban areas, mainly in the southeast region, increased dramatically during the decades of economic growth. In 1980, 67 per cent of the Brazilian population was already living in urban areas.

The military government was characterized by a large concentration of resources and power in the executive branch of the Federal Government, leaving local governments largely dependent on the central government. The authoritarian and centralized government gave incentives for political bargaining with the military government as the main route for the distribution of financial resources from the Federal government to the local governments.

In 1985, the first civilian President took office. The era of economic growth came to an end in the final years of the 1970s. The economy of the eighties was characterized by rising inflation (by 1989 the annual inflation rate was about 1800 per cent), increasing social problems and by the country having to face a large foreign debt, mainly created by money being borrowed from international banks by the military government and by the rise in interest rates on the international market.

During the nineteen–eighties, the economy showed signs of recovery especially in the years of 1985 and 1986, following the optimism in the country with regard to the policies of the new civilian government. However, in the last years of the 1980s, it became evident that the social and economic problems were deepening and that the government had not been able to prevent this situation from getting worse.

One indicator of the seriousness of the social problems of the country is the high infant mortality rate. In 1980, the infant mortality rate (77 per 1,000) was larger than that found in other middle-income Latin American countries[197]. It was much larger than the infant mortality rate observed for Costa Rica (17 per 1,000). Although much smaller, it is a poorer Latin American country, but with a long-standing tradition of investing in social policy[2]. In 1985, expenditure on health in Costa Rica was 7.8 per cent of GDP and on education it was 3.7 per cent of GDP.

The infant mortality rate also presents a large regional gradient, ranging from 121 per 1,000 in the northeast region to 75 per 1,000 in the southeast region. However, within regions variations also exist, with the high-income groups presenting lower rates.

Social inequalities existing throughout the country are also expressed by other health indicators. Life expectancy varies markedly between geographical regions and family income groups. In 1980, life expectancy was 52 years in the northeast region and 64 years in the southeast, showing that the population living in the more developed regions were likely to live much longer. The same is true for the higher income groups with a life expectancy of about 70 years, while the lower income groups were experiencing a life expectancy of less then 55 years.

Causes of death also vary by geographical regions. In the north and northeast regions there is a great number of deaths associated with Infectious Diseases. On the other hand, in the southeast, one third of deaths are caused by Diseases of the Circulatory System. Nevertheless, a high frequency of deaths caused by Diseases of the Circulatory System in the poorest regions can be observed.

Violence has also increased sharply in the last decade. Deaths due to injuries account for about 13.0 per cent of all deaths in the country. Motor vehicle accidents and homicides are the two most predominant causes of death from injuries.

The mixed pattern of mortality characterized by large mortality rates from diseases of underdevelopment such as Infectious Diseases associated with large rates of Chronic Diseases, Cancer and the high level of violence in the country are indicators of the outcome of the development process that kept important groups in Brazilian society living in very deprived conditions.

2.2   The Brazilian Health Care System

In 1988, the new Brazilian Constitution was promulgated. It contained important changes regarding the conception of the Brazilian Health Care System. The new constitution holds the State responsible for the health of all citizens. The principle of equity was established. Access to health care became universal with access to publicly financed services becoming a constitutional right. Related changes in the administrative structure of the health sector greatly augmented the participation of local governments and the integration of publicly financed services.

Important changes in the finance of the health sector were also intro-

duced by the new constitution. A social security budget was established to finance the areas of health, social benefits and social services.

In spite of these historical developments, this section aimed to provide an outline of the Brazilian Health Care System at the time of this empirical study. Therefore, it concentrates on presenting the system as it was characterized in 1986.

* * *

The main feature of the Brazilian Health Care System has been a *compulsory insurance scheme* established in the country in 1923. Authors such as: Cecilia Donnangelo[44], Cristina Possas[149], Malloy[108], Hesio Cordeiro[31], Jaime de Oliveira and Sônia Fleury[141], among others, have studied the historical developments of social security in Brazil. Having started as a scheme restricted to a few occupational groups (initially for the railway workers) it went gradually, in the course of more than 60 years, in the direction of expanding its coverage.

Nonetheless, the structure of services, developed throughout these years, as a result of the social security policy adopted in the country, is characterized by a very inequitable provision of services.

The highly selective structure of the Brazilian system is based on the pluralistic participation of various public and private institutions or services in the provision of health care to the population. The division of labour between and within the public and private sectors is defined by the existing variety of health care markets in the Brazilian Health Care System. This means different providers responded to particular demands for health care services. Roughly speaking, the privately-owned services were used by the better off and the public services by the more deprived social groups.

The criteria of ownership of services give a general classification of providers of care in the health care market, between public and private institutions. The financing of services, however, allows a further specification of these markets. In the Brazilian Health Care System, the major source of finance has been the governmental compulsory social security scheme. Therefore, private health care services were further divided in regard to their reliance on social security financing:

- The dependent private sector (financed by social security)

- The independent private sector (financed by private sources)

In 1986, there were also various public institutions associated with the provision of health care services. These were:

- The Ministry of Health and the States' and the Municipalities' Health Departments.

- The Ministry of Welfare and Social Security (MPAS)

- The Ministry of Education

As will be discussed later on in this chapter, since the second half of the 1970s, social security slowly started to finance services delivered by public health institutions owned by the Ministry of Health, the Ministry of Education and the local Health Departments. This trend received great inputs from the health care reforms introduced during the nineteen–eighties.

2.2.1 The Financing of the Brazilian Health Care System

In 1987, Brazil was spending an estimated 4.0 per cent of Gross Domestic Product on health services. It is estimated that this expenditure is about equally divided between public and private sources. The bill for health care grew, in real terms, by 20.0 per cent annually in the 1970s. This bill was estimated to be about 13,650 billion US dollars in 1989.

What do these figures indicate? Is Brazil's level of expenditure on health services low or excessive? There is no straightforward answer to this question and a better way to approach it is by comparison with other countries. Nevertheless, comparison also faces certain limitations. Given the existing system in Brazil, countries which have a National Health System (low-expenditure) such as Britain, do not provide a good source for comparison. West Germany, which has a system based on compulsory insurance and the United States, with a large private (for-profit) sector, are better sources. These two countries spent a high share of the GDP on health (11.2 per for the United States of America and 8.2 per cent for West Germany in 1987). Both the United States and West Germany have a structure of health care services that puts them amongst those countries with the highest levels of expenditure per capita in the world.

Differences between Brazil and the developed countries include those relating to morbidity, mortality and population structure, thus limiting the possibility of comparison. On top of this, there are large differences in wealth, which is positively correlated with levels of health care expenditure. Nevertheless, comparing the relationship between health care expenditure and GDP per head in Brazil with that of developed countries, the level of expenditure on health in the country is considered very low, even when

taking a low expenditure developed country such as Britain (6.1 per cent of GDP in 1987) as a basis for comparison.

Expenditure per capita in Brazil in 1987, was also much lower (80.8 dollars) than other middle-income countries such as Portugal (170 dollars) or Venezuela (258.4 dollars)[119]. In 1976, the expenditure per capita in Brazil was estimated to be 28 dollars. Therefore, despite the increase experienced between 1976 and 1987, there still remains a need for a large increase in health care expenditure in the country, in order to respond to the health care needs of the population.

On the other hand, when one considers the structure of the existing health care system in Brazil, with some sectors of care providing services at a similar stage of development to that observed for the developed countries, one has to expect that expenditure will vary substantially between social groups within Brazilian society.

Data from the National Household Survey (PNAD – 1981) showed that the out-of-pocket expenditure on health for the Brazilian population is greater for the higher income groups. However, the low income groups were expending a higher proportion of their income on health care than the rich. The pattern of services purchased also varied, with the poor spending more on unprescribed medicines while the high income groups were spending more on the purchase of services provided by doctors[197]. It reflects the pattern of inequalities existing in the country with the high-income groups making a more intensive use of official medicine, in spite of carrying a relatively lower burden in the finance of health services.

* * *

The compulsory social security scheme in Brazil was run by the Ministry of Welfare and Social Security – MPAS. Social security agencies were integrated in the National Social Insurance and Assistance System- SINPAS, established by law in 1978 – as shown by table 2.1.

The scheme is maintained by revenues from social security contributions, federal government contributions and other contributions. Contributions are made compulsorily by salaried employees, employers (directors who receive honoraria and associates of firms were made compulsory contributors to social security in 1960), self-employed people, domestic workers and compulsory contributions which are levied on the pay-roll of urban companies.

Since 1974, the population covered by social security has included every self-employed person and everyone with a legal contract of work. It also includes the rural population – rural employers, peasants and fishermen.

Table 2.1: Social Insurance and Assistance System- SINPAS. 1982.

Function	Organ	Structure of Expenditure
Social Security	INPS	72.2%
Medical and Dental Assistance	INAMPS	23.3%
Pharmaceutical Assistance	CEME	not included
Fiscal and Finance Administration	IAPAS	3.0%
Data Processing	DATAPREV	not included
Social Assistance Needy	LBA	1.0%
Minors	FUNABEM	0.4%

The percentage figures of compulsory contributions to social security has increased throughout the years. The last change in these figures was in 1982, as one of the ways utilized to control the existing deficit. Urban companies' contributions were raised from 8 to 10 per cent and employees' contributions from 8.0 per cent to a higher contribution which varies according to the wage level.

There is no minimum contribution as such for compulsory contributors. The *minimum contribution* is based on the minimum legal wage which is the minimum remuneration a person can receive by law when employed. The minimum legal wage is based on a maximum of eight hours of work per day. With few exceptions, one of which happens with doctors[1], there is no regulation for part-time jobs in the Brazilian law. But, there is a ceiling for compulsory contributions which is based on twenty minimum legal wages.

Urban companies are levied at 10.0 per cent of the pay-roll up to a ceiling of 20 minimum legal wages. Self-employed people pay 19.2 per cent of their earnings according to a table of base-wages, which increases progressively, depending on time of contribution. Every urban company pays a rural welfare contribution of 2.4 per cent levied on the pay-roll and rural companies

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[1]For doctors, however, a minimum wage is established for part-time work (three legal minimum wages)

Table 2.2: Levels of contributions to social security according to salaries. 1982.

Legal Minimum Wage	Contribution Percentage
Up to 3 times	8.50%
3 – 5 times	8.75%
5 – 10 times	9.00%
10 – 15 times	9.50%
15 – 20 times	10.00%

Table 2.3: Participation of contributions in SINPAS revenue. 1979.

Total Revenue	100.0%
Compulsory Contributions	94.0%
Others	1.0%
Funds from Federal Government	5.0%

pay to social security 2.5 per cent of the value of their production when it is sold. In 1985, the percentage figures of these contributions are shown in table 2.2. The proportional participation of these contributions, in 1979, in SINPAS revenue were as shown in table 2.3.

Social security's contributions are very much based on contributions levied on the pay-roll of urban companies (62.0 per cent of compulsory contributions) and employers' and workers' contributions (32.0 per cent of compulsory contributions). The participation of the federal government in the scheme is very low, despite the range of social programmes provided by the system.

The way the Brazilian compulsory insurance system was financed put much more pressure on labour intensive companies than on capital intensive ones. Moreover, the system's finance was heavily dependent on existing levels of employment. SINPAS was mainly financed by the urban workers and the population in general, since companies' contributions to social security have repercussions on the price of goods and services. This financing structure minimizes the redistributional impact of social security.

The treasury budget participation was low due to the low participation in SINPAS revenue, the low share of the Ministry of Health in the treasury budget and the high concentration of money at the national level, leaving states and municipalities with limited scope to finance social policy.

INAMPS has the biggest budget within governmental health institutions in Brazil. In 1982 it was eight times bigger than that of the Ministry of Health. The participation of INAMPS in SINPAS' expenditure attained a high level during the 1970s, going beyond 30.0 per cent in 1976 and 1977.

* * *

At the end of the 1970s and the beginning of the 1980s, the country was facing an important social crisis and economic recession (GNP in 1981 fell by 1.9 per cent). This slowing down of the economy has had a considerable effect on the employment rate and the value of wages in real terms, thereby affecting social security revenue.

Since 1979 social security has been in deficit, with the deficit increasing year by year. In 1981 the annual accumulated deficit amounted to 360 billion cruzeiros (exclusive of treasury transfers), equivalent to 1.3 per cent of the GDP. In this year the deficit of SINPAS was met by transfers from the treasury and credit resources. In 1982, the gap was closed by raising social security taxes by the equivalent of 1.3 per cent of GNP. Nevertheless, in 1983 the financial situation of social security started to deteriorate again to recover only in 1985. SINPAS closed the year of 1985 with a surplus[88]. The reason for the better performance of SINPAS, during the year 1985 was related to the policies adopted by the new civilian government. The economy started to grow again and the unemployment rate underwent a decline.

The health sector was specifically penalized during the first years of the economic recession in the early eighties. Financial cuts in this sector were larger than those observed in other sectors. INAMPS' participation in SINPAS expenditure dropped from 29.4 per cent in 1980 to 22.0 per cent in 1983. The health care share in total federal expenditure also decreased from 21.5 per cent in 1978 to 19.4 per cent in 1980.

In the years between 1984 and 1987 there was a slow recovery of total federal expenditure with health, however, once again showing signs of decline in 1988.

Therefore, during the economic recession of the late 1970s and early 1980s there was a decline in the financial resources available to the health sector. At the same time, wages deteriorated and contributions to social security increased, worsening even more the social condition of the population.

Governmental reforms (which will be discussed later in this chapter) within the health care sector started to cope with these financial constraints

together with pressures from groups in society for a more effective and equitable health care policy.

In summary, despite the participation of various institutions in the delivery of health care, the finance of the system is mainly supported by the urban workers through the compulsory insurance scheme. The treasury budget participation is low and health policy has a low impact on the redistribution of income, in a society with very large income inequalities such as Brazil. The way social security was financed made it extremely vulnerable at times of economic recession. The allocation of limited financial resources discriminates in favour of the wealthier regions and the high-income groups. Criteria for the allocation of financial resources were largely based on the political pressure of interest groups which ended up having a poor impact on the equity of the system and the health status of the population.

2.3 The Public Sector

2.3.1 The Ministry of Welfare and Social Security – MPAS

The Social Security Scheme is run by the Ministry of Welfare and Social Security

Coverage In 1986 the number of contributors to the system was 27,479,500[59]. But, the population covered by the system was much larger and also included contributors' dependents, rural employees and, since 1974, the elderly (over seventy years old) and the disabled. The System considers as contributors' dependents the following:

- The wife, the disabled husband, the female companion for more than five years of the contributor, any son under eighteen years old (older if disabled), and single daughters under twenty years old or older if disabled.

- Designated person; if male only under eighteen years old or above sixty years old or disabled.

- A disabled father and/or mother.

- Brother under eighteen years old or disabled and a single sister under twenty one years old or other if disabled.

The System has a discriminatory definition of dependents in that wives cannot claim their husbands as their dependents, unless disabled. In terms

of the Institute for Health Care – INAMPS, the contributor who leaves the
System will still be covered, including his or her dependents, for a period
of up to two years. In 1974, it was established that in case of emergency,
anyone could use the health services financed by INAMPS.

The MPAS estimate in 1979[126] was that 87.0 per cent of the economi-
cally active population (EAP) was covered by social security, 100.0 per cent
of the rural population and a somewhat smaller proportion of the urban
population. These figures were, however, over-estimated since they do not
account for the real size of the informal labour market in Brazilian society.
Research indicates that about 50.0 per cent of the economically active popu-
lation in the country did not have a legal contract of work in 1985[89]. This
means to say that 50.0 per cent of the EAP were not-insured. Moreover,
coverage to social security did not mean access to health care services, since
the availability of services varied largely between the regions and areas in
the country as a whole.

* * *

In 1981, as a result of the economic recession, the Ministry of Welfare and
Social Security created a consultative council – CONASP with the objective
of devising the guidelines for the reorganization of social security health care
policy. CONASP's guidelines, issued in 1982, were mainly directed at cost
control measures based on:

- Emphasis on primary and ambulatory care.

- Higher participation and integration of public services.

- Change in the reimbursement scheme used to pay contracted private
  hospitals.

- Increase in the regulation of services contracted-out.

- Increase in the control on high technology treatments, mainly through
  controlling referrals to these services.

These reforms were also directed at increasing the access of the not-
insured population to services financed by INAMPS. CONASP's guidelines
started to be implemented at the beginning of 1983. To increase the partic-
ipation and integration of public institutions, the Integrated Health Actions
(AIS) were established with the aim of providing in each state a commission
with the participation of the Ministry of Health, the Ministry of Welfare

and Social Security and the State Health Department to plan and manage the health care activities at this level. The objective was progressively to create similar commissions at the municipal level. This policy aimed at the establishment of a more coordinated, decentralized and democratic system. The structure of AIS also included as members, representatives of the local community such as voluntary associations, trade unions etc.

There was no well defined structure for the finance of AIS. INAMPS participation included the remuneration of curative services delivered by local health secretaries. The remuneration scheme was basically designed to pay for each activity according to pre-established values (fee-for-service). Services were to be organized on the basis of the principles of regionalization with universal access. CONASP's guidelines for the reorganization process of INAMPS' medical care also put INAMPS' self-owned services under universal access.

Finally, amidst the reforms initiated in the 1980s, CIPLAN, the interministerial coordinating group which included the Ministry of Health and the Ministry of Welfare and Social Security, designed to discuss the major organizational issues in the health sector decided, in 1984, that access to services financed by social security should become universal. However, the implementation of this occurred at a different pace in each state, following the guidelines of and development of AIS[52]. This policy was further developed with a decree signed in 1987 which created the Unified and Decentralized Health System – SUDS. SUDS established the integration at the state level of all publicly financed health care services, which were to have universal access.

Structure of care   The structure of care of INAMPS' health care system is presented by each health care institution. This is because INAMPS structure is complex and articulated with almost every health care institution (subsector of care) existing in the country.

Inamps Self-Owned Services

INAMPS' self-owned services can be classified into two categories:

1. Hospitals (36 hospitals with 8,000 beds)

2. Polyclinics (ambulatory care – PAM).

Structure of care   PAMs are, in general, large health services which provide specialized ambulatory services. They have on average 15 consulting

rooms per establishment. They are known in the country for their long queues and waiting lists.

Self-owned hospitals are mainly large hospitals providing specialized care and high technology diagnosis and treatment. Self-owned services, such as is the case with private hospitals, are more concentrated in the more developed areas of the country – the southeast and south regions.

This sector of care has shown virtually no increase in the last two decades. There is also evidence indicating that self-owned hospitals in the major cities in the country were being under-utilized as was the case with other public services in the country as a whole[114].

In 1982, the division of labour between INAMPS' self-owned hospitals and contracted private hospitals was such that the former were responsible for only 2.3 per cent of all hospital admissions financed by INAMPS and 27 per cent of all ambulatory services[2]

The major aspect to bear in mind, however, is that services provided by self-owned services are concentrated in areas of more specialized care, which also tend to be more costly. In 1981, self-owned services were responsible for 46 per cent of specialized ambulatory service consultations[70]. Self-owned hospitals are also responsible for one of the highest proportions of surgical discharges among those financed by INAMPS.

The private sector profits from the production of services by INAMPS self-owned services. The former has the major share of the market for the provision of laboratory examinations, X Ray and other diagnostic examinations. The demand for these examinations generated by self-owned services (mainly by PAMs) are partially provided by private services.

The high use of drugs and the high consumption of medical technology has large acceptability among the Brazilian population. The growth of the consumption of medical technology was associated with many different aspects:

- The payment of services contracted out on a fee-for-services basis.

- The existence in the country of a sizeable medical industrial complex promoting the market for their products.

- The expansion of the private sector for new areas of care.

- The prevalent medical practice in the public services of a very short consultation time.

[2]Other relevant providers of ambulatory services in the Brazilian Health Care System at that time were contracted private hospitals, private practices, group medical plans and local Health Departments.

As previously presented, at the beginning of the 1970s, there was an important increase in the population covered by social security. This increase in coverage was followed by an even larger increase in the delivery of services financed by INAMPS. Between 1970 and 1981, the number of hospital admissions, consultations and laboratory examinations increased by about 350.0 per cent each and X Ray examinations increased by 700.0 per cent during the same period. The rate of consultation per head of population increased in the country from 0.53 in 1973 to 1.46 in 1980. The proportion of the population admitted to hospital doubled between 1973 and 1983 (from 6 to 12 per cent).

Nevertheless, the participation of self-owned services in the provision of services declined in relative terms, defining the main characteristics of this expansion of services which was concentrated in the private sector. The participation of self-owned services in hospital admissions decreased from 4.6 per cent in 1971 to 2.3 in 1983, in the delivery of consultations from 83.0 to 27.0 per cent and in the delivery of laboratory examinations from 48.0 to 17.0 per cent. Despite this decline in the provision of care, the share of these services in INAMPS expenditure remained almost the same (20 per cent in 1971 and 18 per cent in 1982), suggesting among other issues, a concentration of INAMPS self-owned services in the delivery of more complex and expensive care.

Providers of care Doctors working in self-owned services are contracted by INAMPS and paid on a salaried basis. Contracts are part-time, although it is possible to have two contracts. Within the public sector, INAMPS doctors receive the best salaries. They are recognized by the Medical Unions as attractive salaries.

Nonetheless, it is widely known in the country[86] that INAMPS' doctors work less than the contracted number of hours per week. The INAMPS administration has had enormous difficulties in decentralizing doctors to the hospitals located in the less developed districts within the Metropolitan Regions. Actually, the lobby of doctors to maintain their privileges has played an important role in undermining the success of reforms within the health sector.

The Brazilian constitution does not allow most people to have more than one public job, but doctors are permitted to hold two. There is also no legal restriction for doctors to work in the private sector and hold a public job. A large proportion of doctors in the country as a whole work for at least one public service. Furthermore, the trend in the country is for doctors

to hold more than one job. In 1981, doctors in the Metropolitan Region of São Paulo had on average 3.5 separate employments[43] The manpower structure of self-owned services accounts for a higher proportion of skilled workers, when compared with the other institutions in the health care field.

2.3.2 The Ministry of Health and the state's Health Departments

The Ministry of Health

The institution in Brazil that was traditionally involved with the provision of health care to the poor has been the Ministry of Health. This Ministry was also responsible for defining and implementing Public Health Policy.

In 1953, the Ministry of Education and Health created in 1930 split into two, one of which became the Ministry of Health. With the creation of the Ministry of Health, the National Department of Public Health, which was the first government administrative structure for health, was dissolved. Paradoxically, since the creation of the Ministry of Health as an independent organ, the Public Health Sector started to lose place in the government's policy. Budget constraints, internal political crises and low coordination between vertical programs became elements associated with the Ministry of Heath, from this period onwards.

Finance The Ministry of Health was financed by tax revenues which with other financial resources, constituted the Treasury Budget. From 1970 to 1982, the Ministry of Health has received a low share of Treasury expenditure, with extremes between: 1.1 per cent in 1970 and 1.8 per cent in 1979. In 1982 the share was still below that of 1979. The share of the financial pie given to the Ministry of Health was kept at very low levels even during the period of the 'economic miracle'. So, the thin budget of the Ministry of Health is not only related to periods of economic recession, but is also the result of the health policy adopted in the country as a whole, directed toward curative and hospital care financed by social security.

Actually, a small increase in the finance of the Ministry of Health was only achieved just after the short period of economic 'boom' of the Brazilian economy. Reforms occurred just after this period, among them, the creation of the Ministry of Welfare and Social Security (MPAS). These reforms were related to the political weakness of the Military Regime and the worsening health status of the Brazilian population. There is research evidence that in Sao Paulo, during the period of economic growth, there was an increase

in infant mortality rates[196].

The economic recession of the early 1980s brought severe financial constraints to this Ministry, minimizing still further the scope of the Public Health Programme[197]. The impact of cuts, in the share of financial resources from the Treasury Budget, was only not more dramatic due to financial resources from the Social Development Fund (FINSOCIAL) – a compulsory fund created in 1982 by the government to finance programmes in the social sectors. The fund was administrated by the National Economic and Social Development Bank (BNDES), with resources derived from an earmarked gross sales tax. A large part of programmes funded by FINSOCIAL make up current expenditures.

FINSOCIAL started to participate in the finance of the Ministry of Health from 1982, allocating financial resources to programmes directed to primary care and the control of Infectious Diseases.

Structure of care, coverage and financing Traditionally, the participation of the Ministry of Health in the provision of health care has been based on inpatient care for the poor, related to special health problems such as tuberculosis, leprosy and mental illness. A few hospitals are directed towards high technology care such as the Hospital of Cancer (INCA) in the city of Rio de Janeiro.

With few exceptions, public hospitals are known to be under-utilized and inefficient. Public hospitals are financed on an annual budget basis.

Provider of care Doctors and other para-medical professionals are paid on a salaried basis. Doctors are generally contracted part-time but full-time contracts do also exist, although in a lower proportion. Problems of absenteeism among doctors in the public sector is high.

State and Municipalities Health Departments

The public health policy defined at Ministry level was implemented by State and Municipality Departments of Health (Secretarias de Saúde). Local Government was also responsible for providing Emergency Services.

Financing Health Departments were financed to a great extent by local taxation. Local financial resources were strongly constrained during the Military Government by a high concentration of financial resources at the national level. Participation of the Ministry of Health in local Health Departments' finance is uneven throughout the country. The distribution of

financial resources, from national to local levels, tended to follow more po-
litical rather than technical criteria.

Until the creation of CONASP in 1982, INAMPS participation in the
finance of services provided by local Secretaries was very small. Agreements
with INAMPS used to involve only a few of the existing local public services.
Agreement between these two institutions was rarely established despite the
fact that the population covered by INAMPS were utilizing Health Depart-
ments' services. Insured lower occupational and income groups and the
people living in less developed regions are likely to have less access to IN-
AMPS' self-owned services which tend to be concentrated in the cities of
the more developed regions and municipalities.

These contracts implied that INAMPS would reimburse the Health De-
partment for services provided to the social security covered population. In
1981, participation of other public services in INAMPS expenditure (not in-
cluding teaching hospitals) was only 4.7 per cent. Nonetheless, of the total
contracts established by INAMPS with other public institutions, 95.0 per
cent were contracts with Health Departments.

However, the reforms initiated by CONASP and initially implemented
by AIS, defined the basic principles of the reformulation process to occur in
the Brazilian health sector during the 1980s. One major objective of these
reforms was to increase the role of local governments in the organization,
financing and provision of health care services. Throughout this decade,
mainly between 1984 and 1989, there was a steady rise in the transfer of
resources from INAMPS to the local Health Departments[119].

Structure of Care The range of care and accessibility to services vary
between Health Departments. It depends on the size and wealth of states
and municipalities and on the level of success of local politicians in their
bargaining for the transfer of federal resources.

On average, services are provided through a network of public heath ser-
vices directed at public health activities and basic curative services. Health
Departments' services tend to be underdeveloped and of low quality. Gen-
erally, services are small in size (a mean of 2.4 consulting rooms per service)
and are located at the community level. Given the existing low level of
coordination between institutions in the Brazilian Health Care System, the
population dependent on services provided by the Health Departments have
little access to secondary and tertiary care.

Until CONASP's guidelines there was no formal agreement amongst pub-
lic institutions with regard to referrals of patients to different levels of care.

The situation was so dramatic that generally there were not even formal procedures for referring patients between the Health Department's own services.

In summary, services provided by Health Departments were community-based, of low technical complexity and not integrated with secondary and tertiary levels of care. Moreover, access to local services tended also to be insufficient. Low availability of services at the community level generated pressure of demand on emergency services, located in emergency hospitals, where the bulk of patients with acute and chronic conditions end up. As a result, groups within the Brazilian population, dependent on these services, were getting access at more advanced stages of illness. They were the low income groups [173] and not-insured population. When one considers that the incidence of almost all diseases is higher in lower social class groups, the effect of this structure was to aggravate the selective risk of unnecessary death and suffering among those deprived and less prestigious social groups.

* * *

During the second half of the 1970s, the Health Departments, specially in the north and northeast regions (the poorest in the country), increased their capacity to deliver health care, stimulated by PIASS, a large programme carried out by the Ministry of Health since 1976. PIASS was financed by the Social Assistance Fund (FAS) – see page 59 – and by financial aid provided by international organizations. PIASS was directed to cover all northeastern towns and villages of up to 20,000 people. The programme aimed to provide basic health and sanitation services. By the early 1980s, about 4800 health posts, 4300 health centres and 310 rural hospitals had been constructed or rebuilt. The operation of PIASS involved 30,000 village health workers and health attendants, 7,800 health technicians and 13,500 nurses, doctors and other professionals. But, there is evidence that PIASS services were generally unsatisfactory and gained little public acceptance[22].

The failure of PIASS was mainly related to the underdevelopment of services, but the programme has had an impact in terms of generating pressure on INAMPS to participate more effectively in the finance of the Health Departments' services.

Providers of care Doctors contracted by the Health Departments are paid on a salaried basis. Doctors' salaries tend to be very low, with Local Health Departments, in general, paying salaries much lower than those paid

by INAMPS. The imbalance of salary levels has been another great difficulty for the process of integration of public services.

Contracts can be full and/or part-time. Criteria are seen to vary locally. The manpower structure is based on less qualified human resources and tends to recruit professionals of lower prestige in the health care field. There is a low proportion of graduate nurses and a high concentration of non–qualified nurses (with 3 to 6 months training). In some areas, *health workers* (local people trained to provide health care services) also participate. Among doctors, there is a comparatively higher concentration of women and young doctors[132].

2.3.3   The Ministry of Education

Besides the Ministry of Welfare and Social Security and Ministry of Health as public institutions associated with the provision of health care services, there is also the Ministry of Education. This is responsible for the Teaching Hospitals.

Financing   Teaching hospitals started to be highly financed by social security in 1974. By 1981, these hospitals consumed 2.2 per cent of INAMPS expenditure. The payment scheme adopted to remunerate these hospitals was based on fee-for-services. This scheme was a special one devised to remunerate teaching hospitals. Services were paid by the number of discharges, grouped in classes by type of treatment provided. Payment of hospital bills was dependent on the achievement by the hospital of a pre-established rate of consultations per inpatient admission.

Since 1987, however, teaching hospitals have started to be financed by a similar payment mechanism used to reimburse private hospitals contracted by INAMPS, adopting the AIH form as the instrument for reimbursement (see chapters III and IV).

In 1985, in line with the universalization policy established by CONASP's guidelines, INAMPS started to pay for every discharge in teaching hospitals regardless of the insurance status of the patient. One observed impact of this change was that the demand for basic care upon these high-technology hospitals has increased, possibly indicating a change in the social structure of patients demanding care at teaching hospitals. Between 1985 and 1987, the number of teaching hospital discharges also increased by 13.0 per cent[197].

Structure of Care   Teaching hospitals are, generally, tertiary hospitals, providing specialized care and emergency services. Their patients' case-mix

tends to be slightly more costly than patients admitted to private hospitals financed by INAMPS and they appear to be significantly sicker than those treated at private hospitals[197].

Provider of care   Doctors in public teaching hospitals are paid, on a salaried basis, by the Ministry of Education. In the case of full-time contracts this does not directly imply any restriction on private practice.

* * *

It is important to highlight, also, another feature present in a few public hospitals, which provide specialized and costly care. These are public services which provide a range of their beds for private patients. The best example is The Heart Institute (INCOR) – a high-technology and high-quality hospital owned by the University of the State of São Paulo. INCOR has mixed finance both from public funds and from agreements established with companies and group health plans. However, the main beneficiaries of such high-technology services are the higher income groups in society.

2.4   The Private Sector

The private sector in Brazil is a very important provider of health care services. It has become the major owner of health care services in the country. In 1985 it owned 78.0 per cent of all national hospitals but, a lower proportion of ambulatory services.

Data from 1967 show that already the private sector was even then the major owner of beds in the country. Between 1967 and 1979 about two hundred thousand new beds were built, of which 95.0 per cent were in the private sector[70]. The distribution of these private beds was highly concentrated in the south and southeast regions (72.0 per cent) in spite of these regions having about 59.0 per cent of the population.

The power of the private sector to increase its participation in the Brazilian health care sector has been such that between 1967 and 1979, in the southeast region, there was a decrease of about 9000 public beds and an increase of about one hundred thousand new private beds[70].

This expansion of private beds was basically financed by the Social Assistance Fund (FAS) created by the government in 1974 to finance the social development of more deprived areas and populations. Actually its funds were mainly directed to finance the expansion of private beds[19].

Within the private sector, 50.0 per cent of hospitals are profit-making. Some of them are owned by doctors. The profit-making private sector has also been the major cause of the growth in the number of hospital beds during the decade of the 1970s[70]. In recent years, the charity non-profit making services have lost place, in the relative number of beds, to the profit-making hospitals.

2.4.1 The Dependent Private Sector

The dependent private sector is constituted by private hospitals which have services paid by INAMPS. These are the so called *contracted private hospitals*.

The dependent private sector has been the major provider of inpatient care in the country. In 1978, 67.0 per cent of the private health services existing in the country had a contract with INAMPS[118]. In 1981, contracted private hospitals were responsible for 56.0 per cent of INAMPS' expenditure. They were responsible for 75.4 per cent of admissions financed by INAMPS in 1986.

To better understand the predominance of the dependent private sector in the Brazilian Health Care System one must go back to the 1950s, when the health care sector within social security started to expand.

The decade of the 1950s was a period of intensive industrialization in the country. The industrialization process, concentrated in the major cities of the southeast region, stimulated the increasing migration of people from rural and less developed areas to these cites. The concentration of population in the industrial cities, representing the potential labour force of the emergent economic process, generated increasingly greater pressure for health care services.

Social security, concerned with the provision of social benefits for the working population, was the governmental institution which responded to this demand. At the same time as health care provision increased, public health and preventive activities started to lose place in the Brazilian Health System. Ambulatory and preventive services lost place to hospital services[19].

The emphasis on inpatient services (the hospital model) was not followed by an expansion of social security self-owned hospitals. Increasingly, services started to be contracted out, particularly, to for-profit hospitals, generating demand for the private sector.

Actually, the expansion of this sector is a result of the conception of social security by its technocracy, which shared the idea that health care should

not represent an important fraction of social security benefits[141]. To avoid a high level of investment in this sector, there should not be an expansion of services but rather a purchase of services from other institutions.

Therefore, the origin of the dependent private sector's expansion was pressure from inside the social security administration. Later on, in the 1960s, the Brazilian Federation of Hospitals (FBH) was created to lobby for the interests of contracted private hospitals.

Another important aspect to be considered is that the private sector exerted pressure on the social security administration through what came to be known as the 'amphibious bureaucrat'. That is, the presence in the social security administration of doctor owners of contracted private hospitals and of people directly linked with the interests of this sector.

The unification of the social security schemes in 1967 and the Plan for Immediate Action (PPA) in 1974 acted as new stimuli for the growth of the dependent private sector. For a long period, the characteristics of INAMPS health care provision was to be shaped by the strong participation of this sector.

The great predominance of INAMPS in the Brazilian Health System meant that its characteristics were also the characteristics of the over all system. A high concentration of hospitals on the one hand, and a low availability of primary services on the other, are the characteristics of the hospital model adopted until the late 1970s in Brazil.

In 1982, admissions in the country as a whole accounted for 12.0 per cent of the Brazilian population. This proportion was even higher in areas where there was a large concentration of private services such as the south region (16.0 per cent). This excess of hospital admissions (given the age structure of the Brazilian population) is a result of the hospital model and the payment scheme adopted at that time by INAMPS to remunerate these hospitals, as presented below.

However, the health policy of the 1980s was directed at changing the hospital model established during the 1960s and 1970s. Contracted private hospitals started to experience constraints in their relationship with social security, which began to get highly involved with the financing of other public services. Between 1982 and 1987 there was a reduction in the volume of admissions to contracted private hospitals. The share of the expenditure of INAMPS with contracted private hospitals dropped from 71.3 per cent in 1981 to 45.9 in 1987. It is estimated that the amount of money paid by social security to contracted private hospitals in 1987 – 2.3 billion dollars[118] – represented 27.0 per cent of public expenditure on health in the same year.

Structure of care   The dependent private sector consists of both charity and profit-making services. However, in 1986 INAMPS adopted a policy which favoured charity-based contracted hospitals[125].

Financing   The payment scheme to remunerate services provided by contracted private hospitals was based on fee-for-service. This scheme proved to be extremely expensive and also difficult to control, allowing serious distortions and fraud in favour of better remuneration for hospitals including unnecessary admissions, a high rate of examinations per patient and so on[63].

In 1977, with the first financial deficit of Social Security, the dependent private sector began to be the subject of stricter regulatory measures. At the beginning, higher control was exercised on hospital bills with the creation of the social security's Data Processing Center (DATAPREV). Later on, control over the expenditure of contracted private hospitals was also tried by INAMPS, by lowering the rate of increase in the value of each unit of payment. In 1982, one of the first measures adopted by CONASP was to change the payment scheme used to remunerate contracted private hospitals. This new reimbursement mechanism is presented in detail in chapter IV. In the two years following the implementation of this new reimbursement mechanism, contracted private hospitals performed 1.5 million fewer admissions than in the previous years. Further reductions were obtained by CIPLAN's resolution, signed in March 1985, which established a ceiling on admissions for contracted private hospitals below the levels of 1983.

2.4.2   The Independent Private Sector

Last but not least, there is the private market called in this study the *independent private sector* – independent because it is not financially associated with government (social security). It is financed directly or indirectly (through commercial insurance companies or firms) by the consumer.

Since 1988, expenditure on health care plans has been allowed to be deducted from the income tax of individuals. This measure created an incentive for the development of this health care market. However, the same is not true for companies which are not permitted to deduct from their income taxes the expenditure incurred as a result of health care plans for their employees. Nonetheless, companies are allowed to transfer these expenditures to the prices of goods they sell [117].

There are little data about the independent private sector and, only recently, more detailed analysis of this sector of care has been produced[118,

117].

Nonetheless, it is notorious that the last decade has seen an important growth in the role of the independent private sector in the finance and provision of health care services in Brazil. Actually, therefore, the increasing role of the public services in the provision of health care in the country did not limit the action of the private sector[118].

In fact, the private sector started a process of transforming itself with the creation of new and more modern modes of organization and financing of health care services, in the search for new markets outside the scope of the governmental insurance scheme.

This action seems to have been facilitated by the apparent shift of a relevant proportion of the middle class groups (and employees in more developed firms) to these new markets, as an alternative to the public service, mainly to those financed by social security. Moreover, because of the increasing financial inability of the middle classes to purchase health services out-of-pocket, not only have groups within the middle class experienced reductions in their purchasing power during the last decade, but also the levels of inflation experienced by the health sector have been higher than average inflation in the country[117].

Health plans were estimated to be covering about 20 million people by the end of the 1980s[197]. There is a variety of modes of organization of institutions offering health plans, as presented below:

- Group Medicine Plans

- Medical Cooperatives

- Private insurance

- Auto-programme

Group Medicine Plans These are the most important mode of organization of services within the independent private sector. In 1987, the estimated population covered by these services was 15.3 million people[117].

Group Medicine Plans (Medicina de Grupo) are non-profit or profit-making health companies that mainly cover groups of people through contracts with firms and are paid per insured person. They are the most important segment within the independent private market.

Most Group Medicine Plans in Brazil contract out services, but 36.0 per cent of them are also the providers of services[117]. In the United States, similar services are the Health Maintenance Organizations-HMOs. HMOs

appeared in that country as an attempt by the profit-making private sector to ..."achieve greater penetration into the delivery of health care services. HMOs were conceived to be the organizational building blocks for a rational, corporate-run delivery system. Being designed for profit-making, the HMOs costs of rendering services contracted in the benefit packages are deducted from prepaid subscriber revenues."[167].

In Brazil, Group Medicine Plans, are aimed at providing care for a selective group within the population, mainly workers in the formal labour market employed by the most highly developed companies. They are mainly concentrated in Sao Paulo and Rio de Janeiro. Group Medicine Plans started to appear in the country during the 1960s. The excess supply of doctors during the 1960s and, especially, in the 1970s played an important part in the development of these organizations, holding down doctors' salaries.

Financially, they were much weaker than the American HMOs. As mentioned above, most Group Medicine Plans have to contract out services in spite of being more efficient in providing their own services[117]. Not only that, but some Group Medicine Plans had to depend to a great extent, although not entirely, on the financial participation of social security. Whenever firms established a contract with a Group Medicine Plan, they could also extend it to INAMPS. This meant that INAMPS would refund the firm its contributions on the basis of a fixed amount of money per employee. The amount of money varies in relation to the range of care and the coverage of the firm's health care plan.

Since 1979, however, INAMPS froze the expansion of these agreements with firms. In the mid-eighties, they covered only about 5.0 per cent of INAMPS contributors and their dependents. In 1981 the participation of refunds to firms on INAMPS expenditure was 3.5 per cent.

One must notice, though, that not all private arrangements between companies and Group Medicine Plans involve the participation of social security. In these cases, it meant that employers did not establish an agreement with social security to refund money for employees already covered by the firm's health plan. The main reason for this is the high administrative costs involved in including the participation of Social Security. The estimate of the Brazilian Society of Medical Groups (ABRAMGE) of private arrangements without the participation of social security in the country, was 30.0 in 1979.

Coverage Group Medicine Plans in Brazil offer group plans for companies, but they also sell plans for families and individuals. The plans offered might cover only the insured person or might also include the dependents.

It might provide only ambulatory care or be a comprehensive plan. Most of them, however, exclude very costly care, chronic and mental illness and some Infectious Diseases such as AIDS. This means that publicly financed services have to respond to the more costly care.

Structure of Care When compared with other modalities of financing, HMOs show indications of better efficiency. A randomized control trial [109] was conducted to test the existence of variations in hospital use between services with different financing modalities. Prepaid group practices reduced by 40.0 per cent both admissions and length of stay when compared with fee-for-service with zero coinsurance. Andre Medici (1990) has shown that 50.0 per cent of the costs of the Group Medicine Plans in Brazil are related to ambulatory care and that their admissions rate is 7.1 per cent. This is a lower rate than the one observed for the population as a whole, as shown previously in this chapter. Their average length of stay (3.5 days) is also much lower than the average length of stay for contracted private hospitals in the country (7.12 days)[127]. This could be partly due to the better health status of the population these services cover.

One basic administrative strategy utilized by Group Medicine Plans to cut down the costs of services has been the organization of care on a more rational basis, namely by lower admission rates, by covering groups within the population with better health status and by limiting the coverage of high cost patients. Moreover, in Brazil, the allocation of insured people to different health care plans has been an additional aspect of the commercial rationality of these enterprises[31, 37]. It reflects the culture of social discrimination existing among the high-income groups in Brazilian society. Group Medicine Plans offer special health care plans to senior management. This assures a different pattern of services and might also work as a way of attracting those who decide on the purchase of services.

Selection of health plans implies different patterns in the organization and delivery of care. For the high cost health plans, the insured is allowed the free choice of services and doctors, which are reimbursed on a fee-for-service basis. Patients have a wider range of choices simulating the liberal practice of medicine. The range of discretion of doctors is wider for deciding on the type and quantity of services to be delivered to patients. Hospital care is based on more comfort and privacy. Nevertheless, high cost health plans cover a small fraction of the insured population – in particular, managers, professionals and company directors. In short, Group Medicine Plans sell health care plans which discriminate, within the insured population, workers

from the better paid professionals, managers and companies directors.

The bulk of services are to members included in the so called *standard plans*. At this level, the trend is to provide care in self-owned services[31] or private practices with some sort of agreement with the Group Medicine Plans. At these services, doctors' practices are generally monitored by a medical doctor manager who exercises control over referrals, diagnostic examinations and dismissal from work. The basic concept of care is to concentrate services at the primary and less specialized level and to have well defined norms for referrals and specialized care.

Given the selective structure of care, different payment schemes and administrative characteristics of care delivered, one might expect that care delivered will vary in quantity, quality and comfort across the different plans.

Selection of this type could also be seen, in the past, with INAMPS agreements with third parties for provision of care to the rural population. There were two types of contracts – one for employers and another for employees. Each involved a different remuneration scheme.

Group Medicine Plans cover a healthier population – the skilled working force of the more developed companies. Their health services might also participate in selecting people employed by companies by screening out people in high risk groups which also have an impact in reducing their costs.

Medical Cooperatives. Medical Cooperatives have similar characteristics to those pointed out for the Group Medicine Plans, having the same payment scheme. The main difference is that these are services owned by the providers of care (doctors).

Auto-programme Auto-programmes are health service groups contracted by companies, unions or workers' associations to provide health services to their employees or members and paid on a fee-for-service scheme[197]. There are also Auto-programme health services which are self-owned.

Private Insurance Private insurance is provided by commercial insurance companies in the country. These companies are in general linked to financial firms. At the beginning of the 1980s the two largest banks in the country (Itau and Bradesco) each started a health insurance plan. They, however, still have a small share of the private health care market in Brazil.

Generally, private insurance sells plans involving co-payment. They also offer plans for companies and individuals. Given their higher costs, they

tend to cover the higher income groups and those at the top management of companies.

The Liberal Private Health Care Market

The out-of-pocket purchase of health care services in Brazil has shown a decline between 1979 and 1984. However, this market which includes doctors practising liberal medicine still represents an important share of private expenditure on health. It is estimated that out-of-pocket expenditure on health amounted in 1984 to about 620 million US dollars (excluding the expenditure of the low-income groups)[118], estimated to correspond to about 20.0 per cent of the private expenditure on health in the same year.

This is clearly a selective market with the social groups purchasing different quantity and quality of services.

2.5 The Regional Distribution of Health Care Services

Besides selective practices expressed in the division of labour between the public and private health care institutions, inequalities can also be assessed on the basis of the distribution of services by geographical region and by urban and rural populations. Health care services in Brazil tend to be concentrated in the southeast and south regions. These regions also present the highest concentrations of self-owned and profit-making services. This implies a higher availability of specialized and high technology services in these regions.

Less developed regions have a greater participation of services from the Ministry of Health and local Health Departments within their local health systems. In the early eighties [148], INAMPS expenditure per head in the northeast was less than half the expenditure per head in the southeast and south regions. When one analyses health care between the urban and rural populations, major differences are also observed. INAMPS expenditure per head on the rural population was one seventh of the expenditure for the urban population.

In 1984[25], INAMPS delivered 2.05 consultations per inhabitant per year in urban areas and 0.4 consultations per inhabitant per year in rural areas. Rural health services were responsible for only 5 per cent of INAMPS' financed provision of laboratory examinations, which is indicative of the low complexity of care delivered to this population.

On the other hand, the relation of hospital admissions per consultation for the rural population was twice that observed for the urban population. This indicates that the hospital model was even more prevalent in rural health services.

2.5.1 The Evolution of the Structure of Services

The inadequacy of the existing structure of services has been under constraints for several years. During the second half of the 1970s the Ministry of Health was involved in developing the structure and the policy for primary health care in the country. Previously, some local projects, based on the concept of primary care and financed with foreign aid, were tried out in the country.

The most important one was the project developed in the north of Minas Gerais (Projeto Montes Claros). This project, which was adopted by the Ministry of Health, provided the general model for a programme to extend health care services to uncovered populations. The programme PIASS, mentioned earlier, became the major expression of this policy. It had an impact in terms of influencing the prevalent balance of services in favour of primary services and in increasing the participation of public services.

It started in the north and northeast regions but, a few years later, became a national programme. PREVSAUDE (1979), a reorganization proposition presented by the Ministry of Health and the local agency of PAHO was again an effort to devise a whole system based on the Primary Care Model developed by PIASS. PREVSAUDE has had a short life and has been faced with strong opposition from different groups, but it had the merit of reintroducing the discussion of health policy among different social actors at a moment when democratic debate was also being reintroduced in the country as a whole.

Actually, the reorganization process was really started when the system, and especially the social security system, came under severe pressure due to financial constraints.

Despite the non-existence of a national health care policy oriented towards reforms during the decade of the 1970s, changes in a new direction can already be observed in the last few years of this decade. At the beginning of the 1970s, INAMPS increased its coverage significantly, thus generating pressure for the expansion of services. Between 1970 and 1979 an average of 750 new health services per year (hospitals, polyclinics and public health units) were created in the country. This growth is particularly related (70.0 per cent) to the increase of ambulatory services. The public sector, the

major owner of ambulatory services in 1970, almost doubled its capacity during this decade. This growth in the number of public ambulatory services continued in the 1980s. Between 1980 and 1985 the number of public ambulatory services in the country almost doubled[118]. This increase was caused by services owned by local Health Departments which started to play a more important role in the Brazilian Health Care System as a result of the policies introduced in the 1980s.

Between 1976 and 1979 the private sector experienced a larger rate of increase in the number of ambulatory services than that observed by the public sector. The private sector more than doubled its capacity in terms of ambulatory services during this period. However, as a result of the policies of the eighties, this trend changed in favour of the growth of public ambulatory services.

The profit-making private sector with a low participation in the provision of ambulatory services in 1970, created 1,280 new services during this decade, ending up as the major owner within the private sector.

Regionally, the growth of public services, during the seventies, was concentrated in the north and northeast while the private sector in the south and southeast reproduced the already existing division of labour between the public and private sector. However, this division of labour assumes different characteristics between the regions, indicating large variations in the characteristics of the Health Sector at the regional and local level in the country as a whole.

The growth of public hospitals was also concentrated in the less developed areas and is concentrated in small local hospitals (mixed-units) owned by local government. On the other hand, the predominant private sector which presented an enormous growth in the number of beds, tended to increase the size of its hospitals and expand its role throughout the country, maintaining, though, a pattern of higher concentration in the more developed areas. As Andre Medici[118] points out, in 1985 the private sector, besides being the major owner of hospitals in the country, also showed a better regional distribution of services.

So, during the 1970s, there was an increase in the number of ambulatory services in the country caused mainly by the growth of local Health Departments' services and the profit-making private sector, establishing the initial infrastructure for a new model of care which was going to become policy from the 1980s.

2.6 Final Comments

The pluralistic characteristic of the Brazilian Health Care System is associated with large inequalities. The public/private mix in the health sector is shaped by large variations in the distribution of services, financing, payment scheme, type, quantity and quality of services between and within the public and private institutions. It results in a variety of very selective health care markets.

The recent developments in the Brazilian Health care system, however, bear witness to an enormous effort in the direction of creating a more rational, more equitable and universal system. The recent policies and developments were also rich in highlighting the tension and conflicts existing in mixed systems such as the Brazilian one. In contradiction with the aims of the most radical reformers in the health policy arena, struggling for the construction of a universal system under public control, the expansion of the role of the public sector during the 1980s was followed by the creation of a selective, autonomous and modern organized private market.

The extent of the reforms of the 1980s with increasing emphasis on the public services, despite having changed the face of the Brazilian Health Care System, could not overcome the characteristics of a highly selective system. As argued by Paulo F. Filho and Pedro J. de Oliveira[53], the recent reforms in the health care system in Brazil suggest a process, as they called it, of *selective universalization* – the process of incorporation of lower-income and not-insured groups by the publicly financed services was followed by long queues, waiting lists and a lowering of the quality of services, stimulating a shift of selected social groups to the private sector, which gained autonomy from the State.

The publicly financed services opened up their doors for a large demand of low-income and not-insured groups, while the independent private sector expanded in new directions stimulated by a new demand of selected groups, unsatisfied with the inefficient, overcrowded and 'second class' public services and increasingly unable to purchase health care services out-of-pocket. On top of this rough division between the public and private market, there is the limited but, nonetheless successful, mixed financed high-technology public services providing costly care for, again, very selective groups, which manage to get access to those services.

Undermining the aims of increasing the social justice relating to health care in the country, there was the highly inequitable Brazilian society which results in large social discrimination, the predominance of political criteria

for allocation of financial resources, the deepening of the economic crisis
associated with decades of under-financing in the public health sector and
the difficulties of overcoming the historical inefficiency of the public institu-
tions and the private sector, as the historically major providers of inpatient
services in the country.

Chapter 3

Methodology

This study is concerned with inequalities in the use of health care services in Brazil. More particularly, it is concerned with inequalities in the use of inpatient care. This chapter will discuss the alternative methods considered for investigating the research question, presenting the data source and the study population, identifying a record in the data base and describing the variables on it. It will also present the approach used for restructuring the data set and checking it's quality. Finally, the methodology for testing the existence of differences (if any) in the use of inpatient services between the social groups will be discussed.

3.1 Reviewing Alternative Methods

Before selecting the method used in this study, a review of alternative methods suitable for tackling the research question was performed which is briefly presented below.

3.1.1 Population Survey

A population survey is the only approach which is population-based, allowing the direct calculation of utilization rates. It also permits the selection of the social variables to be used in the study, since the design of the questionnaire is under the researcher's control. Utilization of inpatient care can also cover the overall health care system, involving the assessment of utilization of services from every sector and sub-sector of care. It does not, however, provide data on the diagnosis and process of care. Moreover, this is a costly alternative. A representative sample of social groups, containing sufficient numbers of cases of admissions to cover every sub-sector of care would need to be very large. This problem could be overcome by restricting the study to a few geographic areas in the city under study. But, to limit

the study to a few areas could be problematic. Utilization varies by social groups. Nevertheless, utilization also varies with the geographical accessibility to services, because the utilization pattern is also shaped by the local availability of services. On the other hand, the geographical distribution of services also tends to vary with the social composition of the population living in the area. In short, in relation to the utilization of health care services, social class and place of residence are associated. In Brazil, the observed trend is for areas with predominantly middle class composition to have a larger supply of services than areas with predominantly working class groups. Thus, working class people living in predominantly middle class areas might have different utilization patterns from working class people living in predominantly working class areas. Therefore, the better approach would be to have a representative sample of social groups, which would increase the complexity of the field work and the overall costs of the study.

3.1.2 Patient-Census

This methodological approach would be less costly than a population survey. In this approach the sample framework could be designed to collect data on a typical cross section of patients in hospital on a particular day. It gives point prevalence of the social distribution of patients in the hospital on that day.

Data collected on a Patient-Census could be linked to data from the National Census. This linkage of the patient population with the general population (denominator) would provide data for the analysis of differentials in utilization rates between the social groups. However, the main problem in adopting this alternative in this study is the time gap between the National Census (1980) and the Patient-census (1986), which would lead to denominator inaccuracy.

Moreover, the option to perform a Patient-Census would tend to limit the investigation to the assessment of the social distribution of patients admitted by hospitals in different sectors and sub-sectors of care. Principal Diagnosis is a post-discharge information as well as most process of care variables and the outcome variables. Data on diagnosis, process and outcome of care would require a follow-up of patients, greatly increasing the field work. The follow-up would have to rely upon the hospitals' medical information. Nonetheless, the collection and gathering of medical data follows different criteria between services and is expected to vary largely in quality, introducing further difficulties to the study.

3.1.3 Secondary Data – Available Data Sources

At the time of this study, there were three different sources of data on inpatient services at the national level.

1. The National Health Service Census – AMS.

2. The National Household Survey – PNAD.

3. The Certification Form for Hospital Admission (AIH form).

The National Health Service Census – AMS

AMS is carried out annually by the Brazilian Institute of Statistics and Geography – IBGE. This census collects data on a large range of variables related to the structure of health care services, such as facilities, equipment, specialized services and manpower. It also collects data on the production of services – admissions, discharges, deaths, patient-days and number of patients in hospital on the last day of the year. However, it does not collect information on patients' social, demographic and clinical characteristics, which prevents its use for the investigation of differentials in use between the social groups. The AMS questionnaire distinguishes services by their legal nature and brings information on the existing agreements between institutions, allowing the identification of how services are financed and the payment scheme adopted in case of the participation of a third party. However, due to confidentiality reasons, IBGE does not permit the disclosure of data at the hospital level.

General Household Survey (1981) – PNAD

PNAD is a continuous household survey carried out by IBGE, on a sample basis, at the national level. In the year 1981, a questionnaire on perceived morbidity, health care service utilization and health care expenditure was added to PNAD's main questionnaire.

The main strengths of this data source is that it is population-based, allowing the linkage of data on the utilization of health service with a large range of social and economic variables, such as income, employment status, occupation, social security entitlement status, education and housing.

PNAD's main limitations, however, are the restricted range of information on patients' medical characteristics and the lack of information on the process and outcome of care.

PNAD has information on the length of stay but, the reliability is presumably low, since this information was collected on the basis of answers about the date of admission and discharge given by the respondent, for those admissions occurring within a period of time of one year from the interview. In addition, information on sub-sectors of care is also considered to have low reliability, because the categories in the questionnaire are ambiguous, lacking a precise meaning.

The Certification Form for Hospital Admission (AIH Form)

AIH forms are insurance claims filled in for reimbursement purposes by private hospitals contracted by INAMPS. As pointed out earlier, contracted private hospitals are the main providers of inpatient care in the country. AIH forms are collected and gathered by the Data Processing Centre – DATAPREV of the Brazilian Ministry of Welfare and Social Security – MPAS. DATAPREV is responsible for collecting, processing and retrieving AIH forms. The collection of AIH forms builds up the largest inpatient statistics in the country with about 7 million admissions in 1986. As happens with inpatient statistics, in general, this source is demand and not population-based. AIH forms cover a large range of information about the patient, process and outcome of care. It is the single data source which has information on the social characteristics of the patient (payment status). One important shortcoming, related to this data source, is the reliability of data on it, since it is based on information used mainly for payment purposes. Moreover, this data set is limited to a single provider of inpatient care – *Contracted Private Hospitals.*

* * *

The final decision for taking the latter alternative as the data source for this investigation was based on the type and range of variables existing in the AIH form data set, which allows a broad discussion of patterns of use of inpatient services. More specifically, it allows the investigation of variations in the case-mix and in the process and outcome of care across social groups. Despite its limitation to a single sub-sector of care (contracted private hospitals), the analysis of care delivered by contracted private hospitals can raise the hypothesis of inequalities occurring elsewhere in the health care system. Moreover, very little empirical research has been done about this sub-sector of care in the Brazilian health care system. In relation to the reliability of the AIH forms' data, it was considered worthwhile to conduct a reliability study with two main objectives:

1. To test the quality of the variables to be used in this investigation.

2. To provide general information on the reliability of the AIH form data set, because of its great potential for health care services and epidemiological research.

3.2 The Data Source

Data for this study was provided by DATAPREV. Insurance claims filled in by contracted private hospitals are recorded on special forms known as *AIH forms*. The AIH form is issued by the MPAS' Institute of Health Care - INAMPS[1]. This form was established in 1981 to adapt insurance claims to the new inpatient care payment scheme, introduced by INAMPS at that time.

INAMPS has a set of very detailed written rules, on the flow of patients for admission to private hospitals. The request for admission can be made by any INAMPS' doctor. In this case, the doctor himself requests an AIH form that corresponds to a passport for admission to the contracted hospitals. Whenever a consultation which results in an admission happens outside an INAMPS' unit, the physician must request it by filling in a special form - *the medical report*. This report is given to the patient or someone in charge of the patient to be taken to an INAMPS' unit. In case of approval, an INAMPS' doctor supplies an AIH form. Otherwise, the INAMPS' doctor may ask for additional information from the doctor making the request. In the case of an elective admission, the AIH FORM is issued with validity for 15 days, except for admissions for childbirth, where the validity is the date of admission[82].

In theory, INAMPS allows the patient the right of free choice of hospital and/or doctor, among those registered with INAMPS. However, for the great majority of admissions, INAMPS chooses the hospital for the patient, as the majority of people are not even aware of their right of choice. Actually, there is no legal restriction in Brazil for doctors having more than one contract with INAMPS – as salaried doctors working in INAMPS' self-owned services and as contracted doctors working in a contracted private hospital (or, as the owner or employee of a contracted private hospital). The lack of restrictions in the link between social security and private hospitals puts the referral system under the risk of being exposed to the financial interests of doctors

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[1]In March 1990, a ministerial reform was introduced which ended up with MPAS. DATAPREV was integrated into the new Ministry of Labour and Social Security and INAMPS became part of the Ministry of Health.

and/or hospitals.

3.3 The Study Population

This study was designed to cover discharges from contracted private hospitals in the city of Rio de Janeiro in 1986. The source of information to build up the data base was a list of existing contracted private hospitals in the city of Rio de Janeiro. In this list hospitals were coded by their income tax number - the same code used in the AIH form to identify hospitals.

According to the *List of Contracted Private Hospitals* issued by the *Department of Health Information of the Office of the Director General of IN-AMPS*, there were seventy-one contracted private hospitals in the city of Rio de Janeiro in the year of 1986. The *Report on Hospital Data* produced by DATAPREV and issued on 10/12/1986 indicates that for various reasons, six of these hospitals stopped being contracted in that year, leaving only sixty-five hospitals.

On the basis of the Report on Hospital Data and, also, the List of Hospital Statistics issued by DATAPREV, a second cut was made leading to the exclusion of those hospitals without admission of INAMPS' beneficiaries in 1986. Therefore, five other hospitals were excluded, thus leaving a list of sixty contracted private hospitals in 1986.

This list was then submitted to DATAPREV defining the sample frame of eligible hospitals, from which the whole range of AIH forms filled in in the year of 1986 were to be written on the tape. Therefore, the tape provided by DATAPREV contains all the AIH forms filled in by these sixty hospitals, during the year 1986 (see Appendix A).

3.4 A Record in the AIH form Data Base

The tape contains 214,222 records, that is to say it contains 214,222 AIH forms. Nevertheless, an AIH form cannot be assumed to be an admission. This is because AIH forms are issued in three different types:

- AIH form type 1

- AIH form type 3

- AIH form type 5

AIH form Type 1 is the main form and must be issued whenever an admission occurs. With few exceptions[2], there is one and only one AIH form type 1 for each admission. Thus, the total number of AIH form type 1 in a given period of time equals the total number of admissions, in the same period. It must be stressed though, as generally is the case with inpatient statistics, that AIH forms are admission and not patient based, which implies that readmissions are counted as a new admission.

Each AIH form type 1 has a number, which is used as an identifier for that admission. This number will appear whenever an AIH form type 3 or type 5 is issued. These two forms are always attached to an AIH form type 1, which is the initial AIH form. From now on, in this thesis, whenever an AIH form is referred to without a specification of type, it will mean an AIH form Type 1.

The AIH form type 3 is a *continuity* of AIH form type 1. It is issued whenever the hospital runs out of space in the AIH form's professional services' subsection, which will be presented in more detail in the following section. The AIH form type 3 is also to be issued whenever an error has been made in the form type 1. Nevertheless, when inputting the data, DAT-APREV types the correct information on the AIH form type 1. The AIH form type 5 is issued for payment purposes in long term admissions (more than forty five days of length of stay by INAMPS' administrative rules). It is mainly issued in admissions related to psychiatric and chronic illnesses.

3.5 Description of the Variables on the AIH form Data Base

The AIH form[84] contains detailed and extensive information about the patient's characteristics, care provided and some data on outcome of care. These elements are presented on the form in the following five subsections:

1. AIH form's identification subsection.

2. Patient's identification subsection.

3. Auditing subsection.

4. Professional services' subsection.

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[2]These are Politraumatism and Multiple Surgeries, in which case more than one AIH form can be issued during a single admission. The above implies that the total number of AIH form Type 1 on the tape is slightly bigger than the real number of admissions. However, for the purpose of this study the above difference was not taken into account.

5. Hospital information subsection.

The *first subsection* contains the AIH form number and the form's type code. In the form type 1 the number and the code are already printed, allowing INAMPS to control the flow of AIH forms through regions and hospitals.

The *second subsection* is divided into three segments:

1. Patient segment

2. Insured segment

3. Admission process segment

This subsection is filled in at the INAMPS unit before the form is sent to the hospital.

The *Patient segment* contains information on[3]:

- Patient's name.(*)

- Patient's address.(*)

- Area code.(*)

- Date of birth.

- Sex.

- Social security status.

    (2) Insured

    (4) Wife

    (6) Child

    (8) Other dependent

The *Insured Segment* contains information on:

- Name.(*)

- Pis/Pasep number.(*)

- Payment Status. (social group)

    (1) Employee

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[3](*) It indicates the information elements in the AIH form which were not being computerised by DATAPREV

(2) Employer

(3) Self- employed

(5) Unemployed

(7) Retired

(9) Not-insured

- Income tax number of the employer.(*)

The *Admission process segment* contains information on:

- Income tax number of the physician requesting the admission.

- Procedure Requested - code number[4].

- Type of admission.

  (1) Elective

  (2) Emergency with AIH form issued before admission

  (5) Emergency with AIH form issued up to 72 hours after admission

- Date of issue of AIH form.

- Income Tax number of the physician who authorized the admission and signature.

- Information elements in the case of a traffic accident.

The *third subsection* is supposed to be filled in only when special events occur, which invoke a different payment mode, as happens with the following: admission to intensive care units (days of stay); politraumatized patients (more than one major procedure performed); provision of *special services* and/or whenever there is a change in the requested procedure, which implies an authorized procedure must be filled in on the auditing subsection, by an INAMPS' supervisor or the hospital's Medical Director.

The *fourth subsection* contains information on professional services delivered during the inpatient stay. It is supposed to have information on every single unit of professional care delivered to the patient. On each AIH form (type 1 and type 3) there are fourteen lines for filling in the above information. The information elements in each line are the followings:

- Type and provider of care.

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[4]Procedures are coded in seven digits plus one control digit and are displayed on the Table of Medical Procedures published by INAMPS.

(3) Diagnostic or therapeutical examinations – SADT performed by the hospital

(4) Medical procedure performed by a hospital's salaried doctor

(5) SADT or a medical procedure performed by a contracted doctor or service

(8) SADT performed by services without a legal contract with the hospital

- Income tax number of provider of care.

- Type of care delivered (coded by the Table of Professional Acts or the Table of Medical Procedures published by INAMPS)

- Groups of type of care categories.

  (01) Surgeon

  (02) First auxiliary surgeon

  (03) Second auxiliary surgeon

  (04) Third auxiliary surgeon

  (05) Others (surgical auxiliaries)

  (06) Anaesthetist

  (07) Consultation

  (08) Pathological anatomy

  (09) Ventilator

  (10) Cardioversion

  (11) Physiotherapy

  (12) Haemotherapy

  (13) Nebulizer

  (14) Nuclear Medicine

  (15) Clinical pathology

  (16) Radiography

  (17) Radiotherapy

  (18) Electrocardiogram and Electroencephalogram

- How many times care was delivered.

Finally, there is the *fifth subsection* which is to be filled in by the hospital, only after discharge, containing the following information elements:

- Hospital's income tax number.

- Hospital's Clinical Director income tax number and signature.

- Performed Procedure.

- Specialty.

- Principal Diagnosis and one Secondary Diagnosis coded in ICD-9[5].

- Date of admission.

- Date of discharge.

- Type of discharge[6].

    (1) Discharge

    (2) Permanence

    (3) Transfer

    (4) Death with autopsy

    (5) Death without autopsy

On admissions for delivery, the hospital has to provide information on some additional variables:

- Number of live births.

- Number of stillbirths.

- Number of discharges, transfers or deaths of the newborn.

In addition to the AIH form data, the magnetic tape provided by DAT-APREV also contains information on the values paid for the admission by specific items of reimbursement.

3.6 Method for Restructuring the Data Set

This analysis was performed by using the software system for data analysis[168] – SAS versions 5.18 and 6.06. Data were processed in a minicomputer VAX 6330 running the VMS operating system. As this study is based on a large data base, some procedures directed to increase computer efficiency had to

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[5]The coding source for diagnosis on the AIH form is a resume published by INAMPS of the 9th revision of the Classification of Disease – WHO[193]. In INAMPS's resume two more digits were introduced completing a total of six digits: one is a control digit and the other is a transcription to numerical characters of the classification 'E' and 'V'.

[6]This variable is coded in two digits. The second digit is used to provide more detailed information in each one of the five types of discharge.

Table 3.1: Initial data sets by size.

File Name	Number of Records
Matrix	214,222
AIH form Type 1	122,142
AIH form Type 2	6,596
AIH form Type 3	85,484

be taken at the very beginning of data processing[30]. These procedures were mainly related to the reduction of the size of the data base such as sub-setting the data, deleting unnecessary records and eliminating incomplete or superfluous variables. The first step in processing the data was to create a permanent SAS Data Set followed by the check of the data on the tape by looking at frequency distributions and to ascertain the volume of missing data and invalid records. It must be noted that going through this tape was a very demanding task, particularly because there was very limited updated technical information about the AIH form data base. Most of the information had to be collected by interviewing INAMPS and DATAPREV's specialists. Even having established a good relationship with some very helpful programmers and data specialists, it was always difficult to find someone with a comprehensive and up-dated knowledge about the data set.

The division of labour within these institutions is responsible for splitting the knowledge on the data base between departments and institutions, leaving the people who work on it with very limited and specific information. Moreover, access to DATAPREV's files has been historically restricted to outside users such as the academy, resulting in very little health care research based on AIH form's data and in very superficial academic experience with this data set.

A strategy was also designed for reducing the data. Firstly, the main (matrix) data set was broken down into three smaller ones by separating the AIH forms by type (see table 3.1 on page 83). The Data Set – AIH form type 1 became the study's main data base, since it is the only one to contain information on all admissions.

The process of reshaping the dataset continued with the deletion of invalid records on the Data Set – AIH form Type 1. Invalid records, in this case, are the non-paid AIH forms, rejected by DATAPREV, due to error.

The existence of error made these records unreliable for this investigation. The number of invalid records identified was 11,419 (9.3 per cent of all records on Data Set – AIH form type 1). These records were deleted, leaving the data set with 111,723 records. Further reductions of the size of the data set were implemented through deleting non-computerised variables (empty variables), empty spaces on the tape such as fillers and non relevant variables in regard to the objectives of this investigation.

After having reduced the Data Set – AIH form Type 1 – to it's smallest possible size, the process of further sub-setting the data was started. This was done by separating AIH forms by hospital type, after having classified hospitals by type. The grouping of AIH forms by hospital type, was done in order to avoid comparison between very unequal subjects (long and short-term patients).

Hospitals were classified in three different classes:

- Acute Hospitals

- Chronic Hospitals

- Psychiatric Hospitals

The criteria used to classify hospitals were:

1. The percentage of admissions in each hospital with more than forty-five days of stay. The cut-off point for acute hospitals was 20 per cent or less of admissions with administrative discharge (Permanence).

2. Amongst the remaining hospitals - long-term hospitals - the case-mix, measured by the distribution of Principal Diagnosis, was used to discriminate chronic from psychiatric hospitals.

Based on this classification of hospitals, the Data Set – AIH form type 1 – was subdivided into three new data sets, shown in table 3.2 on page 85.

As one of the objectives of this study was to assess in more depth care provided to short term patients, further reshaping of the acute hospitals' data set was still required. Firstly, there had to be deleted off this file all records which had one or more records in Data Set – AIH form type 5. The identification of admissions in acute hospitals with AIH form type 5 could be done by matching the AIH form identification number in the two data sets (acute hospitals data set and data set – AIH form type 5). This meant deleting from the acute hospitals' data set all long term admissions. The reasons for deleting these records were:

Table 3.2: Hospitals' data sets by size

Data Set	Number of Records
Acute Hospitals	88,493
Chronic Hospitals	7,223
Psychiatric Hospitals	15,007
Total	111,723

- AIH form Type 5 are incomplete records in regard to the professional services' and the hospital information subsection.

- To increase patient homogeneity within the acute hospitals data set.

It must be said that there were very few hospitals in the acute hospitals' data set, which had admitted long term patients.

Actually, it only happened in some very unique hospitals such as Assistência Médico Hospitalar São Jorge S/A – which is a maternity hospital and at the same time a hospital for treating chronic illnesses.

There were 692 AIH forms deleted from the acute hospitals data set because they were classified as long term admissions. These represented 0.6 per cent of all records in the data set. After processing the elimination of the above records, **87,801 records** remained in the acute hospitals' data set.

3.7   Assessing inequalities

This investigation is based on a cross section of discharges (AIH forms) from contracted private hospitals in the city of Rio de Janeiro in 1986. A reliability study was conducted to test the quality of data in the AIH form and is presented in chapter V. The research design was directed to assess differences in use between the social groups (payment status), controlling by selected health conditions on the basis of pre-established criteria (tracers[94]).

Nonetheless, the initial analysis demonstrated that levels of use of contracted private hospitals varied largely between the social groups, thus precluding control by homogeneous health conditions. Analysis of medically homogeneous groups of patients would end up with small numbers leading to bias. Moreover, the reliability study indicated that analysis based on

desegregated diagnostic categories (four digits categories) should be avoided because in general they have low reliability.

Therefore, the analysis was performed on the overall data set. Discharges were controlled by type of hospital and, when it was the case, by type of procedure (Medical, Surgical and Delivery).

Social classification of individuals (patients) in this study had to be based on the social variable available in the AIH form. This variable is related to different contribution mechanisms to social security and it is called *Payment Status*. Payment status categories correspond to different positions in the social relations of production and in the labour market.

- *Employers* have control over labour power.

- *Employees* sell their labour power in the labour market.

- *Self-employed* constitute a less homogeneous group, specially in the case of Brazilian society – broadly speaking self-employed are those people who do not sell their labour power in the labour market and do not employ (or only a few) people. This category actually includes a broad range of social positions from the liberal doctor to the street dealer.

- *Retired* people are considered by E. O. Wright[198] as a post-class position, in the sense that their actual social class can only be defined by the assessment of their temporal job trajectory.

- *Unemployed* for social security are those temporary unemployed. This includes those people previously working (in the last two years) in the formal labour market.

- *Not-insured* are those people working in the informal labour market (without a legal contract of work). It also includes the long term unemployed.

In this study the dependents of a person without a *direct* social security entitlement e.g. housewives without a formal paid job, are classified under the classification of the person they depend upon for receiving social security benefits. The only exception is the not-insured which includes all those people without a formal entitlement to social security.

<p align="center">* * *</p>

A descriptive analysis was performed on the various levels of use of contracted private hospitals, as presented below:

1. Demand.

    Proportional discharge rates.

        By age

        By sex (gender)

        By payment status

        By social security entitlement status

        By diagnosis

2. Process of care

    Type of admission

    Procedures

        Surgical and medical causes

        Normal delivery and caesarian section

    Provider of care (payment scheme)

    Intensive care

    Length of stay

    Reimbursement per discharge type

3. Outcome of care

    Death rate

    Transfer rate

    Maternal deaths

    Perinatal mortality rates

The descriptive analysis aimed at revealing the main features and the role played by contracted private hospitals in the city of Rio de Janeiro. It was followed by the analyses directed at testing the existence of association between payment status and the use of contracted private hospitals. Firstly, this relationship was tested by looking at differences in crude proportional discharge rates across the payment groups. Secondly, the explanatory power of the variable payment status was further tested by controlling for confounding variables.

Given the structure of the data set and the large number of operational questions being tested, it is assumed that this is an exploratory study of the above relationship. More in depth and detailed analysis was outside

the scope of this investigation, which aimed at pointing to general trends in variations in the use of contracted private hospitals across the social groups.

Logistic regression was used as an appropriate statistical method for testing variations between proportions, controlling by confounding variables[7] and allowing the assessment of interactions[97]. The method employed was *Logit Analysis*, which is the statistical approach suitable for binary dependent variables[5], as is the case with this analysis.

The basic assumptions of the Logit Model[5] require that data be originated of a random sample of unreplicated data with a dichotomous dependent variable. The data source for this investigation includes all discharges occurring during a one year period. This implies that the sample equals the population.

However, the AIH form data set include readmissions, which might violate the assumption of independence between the observations. The extent of readmissions in the sample is not known but, for performing the Logit Analysis the payment group *retired* was excluded. It is expected that the elimination of this group from the analysis has reduced the number of readmissions to a minimum. The retired group mainly constituted of elderly people and is expected to be the group showing larger probabilities of having a readmission.

The procedure CATMOD in SAS version 6.06, used to run the Logit Analysis, also calculates predicted probabilities for the occurrence of the event being tested in the model, allowing the measurement of variations between the 'populations'[8] as well as the calculation of the odds ratios. These possibilities make this test a helpful tool for health care planning and for monitoring the performance of health care services.

Odds ratio is a measure of risk, and its logarithm is by definition, the logit function. Logit analysis may be seen as a regression technique in which the dependent variable is the logit function. The *odds* of a probability is defined as the ratio of this probability by the probability of the complementary event[9].

$$Odds\,(p) = \frac{p}{1-p} \qquad (3.1)$$

When one has K explanatory variables $x_1, x_2, \ldots, x_k$ (e.g. sex, age etc.), the Logit Model may be written as:

---

[7]A confounding variable is a variable which is both related to the independent variable and the dependent variable. Ignoring them leads to a bias in the results[97]

[8]'Populations' are formed by the CATMOD procedure in SAS[169] on the basis of cross- classifications of the independent variables in the model

$$\log odds\,(p) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k \qquad (3.2)$$

The estimation of the regression parameter is done by using Maximum Likelihood or Weighted Least of Squares. In this analysis the option was to use Maximum Likelihood.

The *odds ratio* is the ratio of the odds of the probability e.g. of being discharged by a given diagnosis in one given 'population' by the ratio of the odds of this probability in another 'population'.

$$Odds\,ratio = \frac{\frac{p_1}{1-p_1}}{\frac{p_2}{1-p_2}} \qquad (3.3)$$

When there is no difference between two populations the odds ratio equals 1. This indicates the absence of variation between 'populations' in regard to the event being analyzed. On the other hand, values different from 1 indicate the existence of variation, denoting the existence of an association between the independent and the dependent variable.

3.7.1 Strategy Adopted for Model Selection in the Logit Analysis

In order to analyze the relationship between payment status and use of contracted private hospitals, the first step taken was to choose a strategy of model selection. The strategy adopted is presented below:

1. Recoding the dependent variable – in all models the dependent variable was a binary variable recoded as (1) for the positive event and (2) for the negative event.

2. Fitting the model with all main effects (independent variables) – levels of categories were recoded when shown to be non-significant, by merging those non-significant values.

3. Looking at individual effects which might be eliminated from the model – the chi square (χ^2) test for the null hypothesis of the parameter being zero was used for selecting the effects which could be removed from the model. The method adopted for fitting the model followed the one suggested by Aluísio Barros[9]. Effects with large probability values (greater than 0.05 for a significance test of 5 per cent) were selected to be tested to ascertain if they should be eliminated from the model. Tentatively, one at a time, the effects were removed from the model which had shown large probability values.

The decision whether or not to leave an effect out of the model was taken by subtracting the likelihood ratio from the model *with* the effect from the model *without* the effect. Those effects were removed which had shown a non-significant (χ^2) for the above result.

4. Analyzing the *maximum likelihood statistics[9]* in the model, which is an appropriate statistic for performing the hypothesis test in logit analysis – when small (close to zero) the model doesn't fit the data well. When large (close to one) the model is good, which means that the interactions left out of the model are not significant.

5. Fitting the model with first level interactions[9] – only first level interactions were used in the models.

6. Looking again at the interactions which might be eliminated from the model by using the same approach employed for the main effects. This last step leads to the final model.

With the final model fitted, the Catmod Procedure was run once more for obtaining the predicted probabilities for the occurrence of the event in each population, by introducing the option (pred[169]). Odds ratios were then calculated as a means to provide a measure of the magnitude of observed differences between populations.

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[9]Consider y as an dependent variable and two qualitative independent variables a and b. An *interaction effect* exists when the relationship between y and a differs depending on which level of b the individual is classified

Chapter 4

INAMPS Payment Scheme for Contracted Private Hospitals

This chapter will discuss the payment scheme adopted by the Institute of Health Care – (INAMPS) to reimburse inpatient services delivered by *contracted private hospitals*. This study was not designed to assess the impact of this payment scheme. The aim of this chapter is to provide information on the financial incentives and control mechanisms within which contracted private hospitals operate as a framework for the analysis of inequalities in the delivery of care. The chapter starts with a historical description of the development of the reimbursement mechanisms adopted by social security, followed by a detailed presentation of the characteristics of the new payment scheme, thereby raising the most likely impact it might have on the delivery of services. Finally, the system adopted by INAMPS is compared with the payment system adopted by the Medicare programme of the United States which is based on a similar reimbursement mechanism – the prospective payment system.

4.1 Historical Development

At the beginning of the 1980s, the rising cost of the health care sector was already a matter of concern in many countries. The Brazilian economy was in depression. The slowing down of the economy had a considerable effect on employment rates and lower wages in real terms affected social security's revenue.

Social Security had been in deficit since the late 1970s. This financial crisis put considerable pressure on social security's health care expenditure. At

the beginning of 1981, the Ministry of Welfare and Social Security (MPAS) created a Consultative Council (CONASP), which had the function of devising guidelines for a reorganization of social security's health care policy (see chapter II).

CONASP's guidelines, issued in 1982, were mainly directed at cost control measures. Amongst them, there was an increase in the regulation of contracted private hospitals. A new accounting system for contracted private hospitals was created – the *System of Social Security Inpatient Care* (SAMHPS) – which replaced the existing retrospective payment mechanism with a *prospective payment system.*

SAMHPS was firstly adopted on an experimental basis in 1981, in the state of Paraná, a developed state in the southern region of Brazil. This pilot programme had the effect of reducing admissions by 30.0 per cent and was valued as good by the local population. However, it had not shown the proportionate effect of diminishing treatment costs[114]. Nevertheless, in 1983, it started to be implemented in other states and by the beginning of 1984, the new payment system was set up in the country as a whole.

The New Payment Scheme

The payment scheme adopted by SAMHPS to reimburse contracted private hospitals, which is called in this study the *Procedure Based Reimbursement Scheme* (PBRS) is a prospective payment system based on a fixed payment rate where the unit of output are *Groups of Procedures.*

The new payment mechanism was largely aimed at improving the efficiency of the system by changing the financial incentives facing the hospitals. In theory, the new prospective payment system would give hospitals an incentive to function efficiently because the same amount is paid for a given service regardless of the actual cost incurred in supplying that service. Put in a different way, whenever hospitals are paid for a procedure, a flat amount set prospectively, which is independent of length of stay and services provided and creates an incentive to find the less costly regimen to realize an outcome.

The fee-for-service payment scheme The PBRS replaced the old fee-for-service payment mechanism known as Unit of Service (US). This was a retrospective payment mechanism with final reimbursable or approved costs determined after services were rendered and costs incurred. Retrospective payment mechanisms are believed to be inflationary because they tend to encourage unnecessary expenditure. It also demands an expensive adminis-

trative structure to regulate the care provided and to calculate the specific reimbursable costs to hospitals. The bill under the US payment scheme (fee-for-service) included all resources consumed in each admission. These resources were divided into three categories which covered the various intermediary products within the hospital production process. They were:

- Hospital Services e.g. Per Diem and Taxes, Materials and Medicines (HS).

- Diagnostic and Therapeutic Services (SADT)

- Professional Services (SP)

INAMPS established a ceiling for payment for each one of the above categories. This upper limit was defined for each procedure. However, hospitals could claim payment for additional costs incurred and they succeeded in doing so in most claims[27]. So, hospitals could increase spending for inpatient services with confidence that INAMPS would absorb them. As a result INAMPS found itself operating an expensive, inflationary system with very low ability to predict expenditure.

The fee-for-service payment scheme had also been under severe criticism for many years for its negative impact both on the finance of the system and on the quality of care. It was considered a system that encouraged fraud, given the difficulties of regulating the care provided. Besides the administrative complexity of managing such a system, the ability to control expenditure and quality of care was also undermined, because often doctors linked to private hospitals would be simultaneously working as INAMPS' supervisors[63]. It should be highlighted, moreover, that this aspect was not changed with the implementation of SAMHPS. Unnecessary admissions, unjustified long lengths of stay, ghost patients and sub-standard care were among the most frequent criticisms of hospitals under the fee-for-service payment scheme[64]

Control Mechanisms In order to control fraud and protect the quality of services delivered to patients, the new regulatory mechanism (SAMHPS) contemplated the establishment of a more effective auditing system. SAMHPS uses a computerized billing process, based on data from hospitals' claims - the AIH form, which provides a modern and more neutral tool to control hospitals (see chapter III). Hospitals' claims are processed by a central computer system (about 900,000 AIH forms per month, in the whole country) building up the largest inpatient statistics in Brazil. A medical auditing

system was designed, which, among other activities, could be triggered by *alarm reports* produced by the new billing data base. Nevertheless, the new auditing system never worked properly. It was undermined by the strong pressure against it, exercised by the hospitals. One doctor, in charge of implementing the new auditing system in São Paulo, had to work under threat of his life[1].

The failure to control care provided by hospitals in a more effective way harmed, from the beginning, the ability of the system to improve efficiency and quality of care.

4.2 The Rationale of the Prospective Payment System

A prospective payment system is characterized by "payment rates (that) are established before services are rendered and monies are expended. Hospitals, therefore, know the amount that will be paid before services are rendered"[68].

A prospective reimbursement system is likely to alter the production processes at the hospital, because services delivered will be reimbursed by a fixed value independent of resources consumed by each individual patient. In theory, the hospital should try to keep down the variability of costs between patients within each unit of output, to avoid losses. It is considered that doctors influence generally around 70 per cent of national health expenditure[68], at least in the developed countries. Hence, in theory, hospital operating functioning under prospective reimbursement mechanisms would need to have a better and more effective administrative control over medical practice to avoid losing money. This means that the hospital might make savings by promoting a greater standardization of medical practice.

The above implies that the quantity and the quality of care patients receive is likely to change under the financial incentives inherent in a prospective payment system. To make a profit, hospitals are expected to look for ways to maximize their operating margins. This might lead hospitals to specialize in those cases where the relation between the payment rate and costs are more in favour of the hospitals' own interests[32]. According to Grimaldi (1985), "in the long run payment must cover all costs for a service to justify itself financially... So, if a certain unit of output generates losses, the hospital may terminate the service, subsidize losses with gains from other units of output, function more efficiently, trim quality and seek

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[1]Personal communication.

more philanthropic contributions". Nonetheless, the overall magnitude and direction of the prospective system on health care costs and benefits are not clearly known[47]. Unnecessary admissions are not believed to be completely discouraged as long as payment rates exceed cost. Hospitals might respond by increasing the specialization of services, which means concentrating their admissions within a limited group of health problems. Early discharge, selection in favour of less severe patients and less intensive care might be some of the negative outcomes which should be considered under a prospective payment system. Moreover, when prospective payment systems are applied to selected areas of care, such as the hospital sector, this might induce health services to shift costs to other areas with different payment allowances and perhaps greater risks for the patient.

4.2.1 The Procedure Based Reimbursement Scheme (PBRS)

SAMHPS lays it down that when a patient is admitted to a contracted private hospital, an AIH form must be issued by INAMPS. Moreover, it establishes that each admission must be classified into a medical procedure. Procedures are listed and published by INAMPS. They have seven digit codes plus one control code. A procedure has to be written on the form before admission occurs. A procedure is defined[84] as "an action (process) executed by a health professional". Procedures are grouped as:

- Clinical Procedures - e.g. treatment of hepatitis

- Surgical Procedures - e.g. gastrectomy

- Diagnostic Procedures - e.g. chest X rays

- Therapeutical Procedures - e.g. blood transfusion

Each patient has to be classified into a procedure before admission to hospital, the only exception being for emergency cases (see chapter III). This means that, whenever an AIH form is issued by INAMPS, a procedure (*Requested Procedure*) has to be filled in on the form by an INAMPS' doctor. The requested procedure can be changed by medical request from the hospital[2], for those admissions where there is no agreement between the re-

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[2]Actually, the initial SAMHPS's norm related to changes in the requested procedure, indicated that only a INAMPS' supervisor was authorized to do it. This implied that INAMPS would maintain control over the selection and coding of the unit of output used for payment. Nevertheless, hospitals managed to change this norm. At present, the hospital's clinical director is authorized to change the requested procedure. Nonetheless, whenever a change is made, it has to be entered on the AIH form

quested procedure and the most important procedure performed (*Performed Procedure*), which is the *unit of output* used for payment purposes.

The PBRS is based on the principle of rate-setting which means that the value to be paid for each admission is previously defined by the financing agency (INAMPS) and is not dependent on how much or what has been actually delivered to each individual patient. Values, however, are generally defined on the basis of negotiation with hospitals' and professionals' representatives.

In PBRS, both the hospital and the doctors are paid prospectively. The creation of SAMHPS did not modify the former INAMPS' routine of reimbursing directly doctors not employed by contracted private hospitals, but who provide care for INAMPS' patients in these hospitals. These are the doctors contracted out by INAMPS. So, in SAMHPS, both professional services (SP) and diagnostic and therapeutic services (SADT) are reimbursed directly to hospitals when the provider of care is employed by the hospital or directly to the provider of care when he or she is a contracted professional or a contracted out service.

INAMPS has contracts with 75,000 medical professionals, in the country as a whole. Contracted out medical professionals were responsible for about 80 per cent of INAMPS' expenditure on professional services, at the beginning of the 1980s.

4.2.2 The Development of the Procedure Based Reimbursement Scheme (PBRS)

The development of the PBRS took place in 1980 and was mainly implemented by specialists working in INAMPS. At first, a *List of Procedures*, with the average monetary values attached to them, was created. It contained about 2,300 procedures. The average values were calculated from a data set containing about eight millions admissions performed during 1980, paid under the fee- for-service scheme. This means that initial values were based on amounts paid under very inefficient conditions. Thus, rate setting policy was initially based on incurred costs with no adjustments made .

The first *List of Procedures* was considered too long to be handled as a managerial tool. To overcome this limitation, procedures were grouped into 260 *Groups of Procedures*. The grouping process was developed with the advice of doctors to guarantee clinical coherence within the groups. The groups of procedures originated through the above process can be roughly sub-divided into clinical and surgical groups.

The groups of procedures developed became the *unit of output* for the

PBRS. For this purpose, values were attached to them. These were strictly average values of the procedures listed within each group, calculated on the basis of admissions for the first half of 1983.

The total value attached to each *Group of Procedures* is in practice, desegregated into smaller values, each attached to an item of hospital expenditure (see figure below) – the same ones used by the old scheme of payment, presented earlier in this chapter.

EXAMPLE OF A GROUP OF PROCEDURES (in Cruzeiros 1983)

```
-------------------------------------------------------
        Group 35.100-03-06   Obstetric Surgery III

-------------------------------------------------------


           35.008.01-6   Surgery of the Ectopic Pregnancy
           35.009.01-2   Caesarean Section
           35.012.01-3   Laparotomy for Rupture of the Womb
           35.015.01-2   Surgical Cure of the Post Delivery
                         Uterine Inversion
```

Per Diem/Tax	Med&Mat.	SADT	Prof. Services	Total
24.608,00	20.368,00	1.302,00	1,302.00	69.462,00

Index (points) (Surgeon) 126   (Anaesthetist) 84

Average Length of Stay (norm)   5 days

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Source: INAMPS, Tabela de Procedimentos, 26/08/83.

The number of procedures has slightly increased throughout the years, mainly due to the inclusion of new ones, particularly the so called special procedures, which are not paid on a prospective basis. Actually, however no significant changes have been introduced in the system since its creation, ten years ago: no broad assessment of the system has been carried out since the pilot experience developed in the state of Paraná, during the year 1981.

4.2.3 Reimbursement of Hospital Services (HS)

Hospital services are reimbursed directly, on the basis of values previously defined by INAMPS for each group of procedures. Values are generally negotiated with representatives of hospitals. For medicines, the value is defined from a basket of hospital medicines (about 100 products). Prices are based on those on the Pharmaceutical Guide, published by the Brazilian Pharmaceutical Association (ABIFARMA).

The PBRS incorporated special allowances for hospitals, to account for the existing differences in complexity and running costs. Special allowances are set for different classes of hospitals. This allowance is defined by an index (IVH) applied upon values for the payment of hospital services . Hospitals are classified at the time they establish a contract with INAMPS based on an INAMPS classification system for hospitals, known as RECLAIR. Since 1987, non-profit making private hospitals, which have opted to sign a special contract with INAMPS, started to receive a higher index, as a means of stimulating their participation in the system. Indices for teaching hospitals can be two and a half times larger than those for contracted private hospitals, given their differences in complexity and costs.

The prospective payment system, as mentioned earlier, brings new financial incentives into the hospital production processes, which might bring some negative results, both for patients and the system itself. A rate-setting policy for reimbursing hospital services might induce them to behave in unethical ways such as: slowing down the intensity of care delivered to patients to maximize profits/reimbursement or selecting patients which might result in the reduction of access of very severe patients or patients demanding long stays at hospital. This would lead to inequities of access between age, social and illness groups. Provision of sub-standard care, splitting of bills, unnecessary admissions and upgrading the code of requested procedure for maximizing reimbursement are responses that also might occur. Hospitals also might opt to reduce levels of investment, ending up by providing care below technically acceptable standards.

There is evidence of negatives responses to the financial incentives introduced by the new payment scheme, shown by the performance of some hospitals. A study, performed by a special commission in charge of assessing and defining guidelines for orthopaedic care, showed that a highly unacceptable number of closed fractures (68.6 per cent) was being treated with surgical procedures, despite the fact that a great proportion of closed fractures can be safely treated, and should be treated, by conventional means.

Moreover, this assessment revealed that standards of care were very low. The study showed 15.2 per cent of infections amongst these patients. The Commission recommended that within diagnostic categories and mainly for children, conventional and surgical treatment should have the same payment rate as a way of preventing unnecessary surgery[21]. Unethical upgrading of performed procedure was the reason for INAMPS terminating contracts with two hospitals in the state of Rio de Janeiro in 1986[157]. The reliability study, presented in chapter V, also indicates that upgrading of performed procedure was occurring in hospitals in the city of Rio de Janeiro. A survey carried out by INAMPS on a sample of patients admitted to contracted private hospitals between 1985 and 1986 showed the existence of disagreement between the hospital information and the former patients' answers. Disagreements were mainly related to data on the performed procedure and the length of stay[157].

4.2.4 Reimbursement of Professional Services

Professional services (SP) and also diagnostic and therapeutic services (SADT) are not *directly* reimbursed by values attached to groups of procedures. The system for defining the amount of money each doctor will be paid for services provided in the previous month is complex. For each group of procedures there is established an index (points) that is used to allot the payment rate between the medical professionals that were in charge of providing the care to the patients. Therefore, for *surgical procedures*, each has an index for the principal surgeon and the anaesthetist, displayed in the Table of Procedures (see page 97). The standard composition of the surgical team is also identified in the table. This means that SAMHPS establishes a norm for the minimal acceptable composition of the surgical team for each procedure[3]. Whenever there is more than one surgeon in the surgical team an allocation is performed, regarding the importance of each professional in the surgery. The first auxiliary surgeon receives a share that is 30 per cent of the principal surgeon index. The second auxiliary surgeon receives 20 per cent and so on[4]. The criteria for reimbursing medical visits are the same as are applied to medical procedures, as explained below. For *medical procedures* the norm

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[3]It must be emphasized that the system defines norms for surgical procedures in regard to the minimal acceptable size of surgical teams, as a way of preventing low quality of care. Nonetheless, the effectiveness of this norm on the quality of care would depend on a strict monitoring of the amount of services provided to each patient and on the qualification of providers of care. This could be done by computer programme using data on the AIH form. Nevertheless, this is not done, at least, not in a comprehensive way.

[4]Personal communication

is that, independently of the procedure and the number of services provided, the system assumes one medical visit for each day of stay of the patient in the hospital. That is to say, it adds 18 points in the professional services' index for each day of stay in hospital. An exception is made for visits from specialists which are counted separately (counted as extra visits). The index for a medical visit is always 18 regardless of whether it is a routine or a specialized medical visit[5].

The system also defines the average length of stay for each procedure. This standard is also noted in the Table of Procedures.

The monetary value for *each unit* in the professionals' services index is calculated monthly for each hospital, based on that month's admissions. The formula to calculate the *value of each unit of professionals' services* can be written as:

$$\frac{\sum_{i=1}^{n} value\ of\ the\ procedure_{i}\ x\ frequency_{i}}{\sum_{i=1}^{m} pi} \qquad (4.1)$$

$$where: P_{i} = \sum_{j=1}^{K_{i}} pj$$

n= Total types of procedures in the Table of Procedures.

m= Total Performed Procedures in a given month by a hospital.

ki=Total PS index in each Performed Procedure.

pj=Total index of each PS item within each Performed Procedure.

Having identified the value for each unit of professional services, the actual reimbursement for each professional for those services provided in the previous month is calculated by multiplying the value of one unit of professional services calculated for the hospital by the the total index each professional has achieved in that month. This total index is the sum of the number of points he or she has achieved for each procedure they performed.

In short, in the formula for calculating the monetary value of each unit of professional services, the numerator is related to the case-mix of patients admitted in a specific month in each hospital and the denominator symbolizes the mix of professional services furnished to those individual patients.

For example, the unitary value for the procedure *Cardiac Surgery with Bypass* under INAMPS' norms would require at least one surgeon (index= 533); three auxiliary surgeons (indexes=160, 106 and 53 respectively) and one anaesthetist (index=490). The norm for length of stay in this procedure is fifteen days. This means that on average, the patient would receive fifteen

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[5]Personal Communication.

medical visits during his or her stay, each counting for eighteen points. The total value for professional services was 25,085.00 Cruzeiros on 18/12/87. Based on these norms, the theoretical professional unitary cost for performing this procedure was 16.16 Cruzeiros. On the other hand, for performing the procedure *Appendectomy* INAMPS' norms would require at least a team of one surgeon (index=154), two auxiliary surgeons (index=46 and 30 respectively), one anaesthetist (index=140) and five days of stay. The total value of professional services on the same date was 4,373.00 Cruzeiros. Hence, the theoretical professional unitary cost would be 9.50 Cruzeiros.

The unitary costs for professional services are weighted according to the procedure's resource intensity and complexity. Moreover, the real value to be reimbursed monthly for professional services is a result of the case-mix of all admissions in that month measured by the distribution of requested procedures on the AIH forms of all patients admitted *and* the mix and quantity of professional services furnished to each individual patient. This reimbursement strategy has the following incentives:

- Less complex procedures performed in hospitals with a more complex case-mix will be reimbursed at a higher value, and the reverse is also true. This creates incentives for hospitals and doctors to provide complex care in hospitals with a more complex case-mix. This incentive might impact positively on the quality of care since there is evidence of an association between the volume of cases treated and better outcome[71].

- As the value of a unit of professional services is associated with the hospital's overall production, the practice mode of each doctor interferes with the monthly value of the unit of payment of professional services. This might cause doctors to practise on a more standard basis. The lower the quantity of professional services a hospital delivers for each individual patient, the higher the unit of professional services will be valued.

The above might lead hospitals and/or professionals to practice in such ways as would negatively impact upon the patients:

- Unacceptable reduction of length of stay. Especially regarding medical procedures, the reduction in the length of stay of the patient in the hospital will have a positive impact upon the value of units of professional services.

- Prevention of specialized care to avoid reductions in the value of the units of professional services.

- Selection of patients classified into groups of procedures that present a more favourable relation between costs (doctor's time and specialization) and payment rate. The above, might lead to problems of access for patients classified in some *unprofitable* groups of procedures.

- Unnecessary admissions also might be stimulated, as a means of raising total income.

- Unethical changes in the requested procedure, aiming at those with better unitary costs, also should be monitored because this could impact positively, both in terms of getting a better index at the end of the month, as well as increasing the professional services' unit value.

Incentives might also impact differently between medical services provided by the hospitals' salaried doctors and contracted doctors, since hospitals' strategies for raising net income (profits) are not always the same as doctors' strategies to raise income. Hospitals might opt to increase the workload of salaried surgeons and employ less specialized professionals. On the other hand, independent doctors might also concentrate care in more complex hospitals and limit their provision of care to those procedures where the payment rate is more valuable for them. As might happen with hospitals, contracted out surgeons might want to increase their workload as a means of increasing their reimbursement. This would increase the competition between doctors with a contract with INAMPS, since the number of doctors is much higher than the demand.

The study developed by the commission on orthopaedic care[21], showed that beside the high numbers of unnecessary surgeries, most of them were performed by non specialized surgeons or under inadequate conditions. The survey carried out by INAMPS[157], indicated that patients were being charged for professional services, which is strictly forbidden under INAMPS' rules.

4.2.5   Reimbursement of Diagnostic and Therapeutical Services (SADT)

Diagnostic and therapeutical services, as in the case of professional services, can be provided by the hospital or a contracted out service. The reimbursement mechanism is very similar to the one used to reimburse professional services, although detailed information about the allotment system was not

available. There is an index that defines the weight of SADT for each procedure, which is used for payment purposes. These indexes are not made public.

The AIH form contains the necessary information for INAMPS to calculate the reimbursement of diagnostic and therapeutic services delivered by the hospitals. This information should be entered in the subsection of professional services (see chapter III) on the AIH form. The quality of this information is presented in chapter V. Data related to SADT furnished to patients is not criticised by SAMHPS, with very few exceptions. Indeed, without reliable and complete data on the diagnostic and therapeutical services, the ability of the system to monitor quality of care through computer programming is once more undermined.

4.2.6 Reimbursement of Costs Excluded From the PBRS

SAMHPS has a range of elements within hospital production for which costs are not included in the PBRS. These are admissions with uncommonly long lengths of stay or those where intensive care or *special procedures* were delivered to patients. For control purposes, in some of the items above, the reimbursement will depend on the authorization of an INAMPS' auditor, which must be entered in the auditing subsection on the AIH form (see chapter V).

Long Length of Stay

Whenever a patient stays in hospital for longer than double the standardized days of stay for the specific procedure, the hospital will receive a special per diem reimbursement. This per diem has a previously defined payment rate which is procedure-based. SAMHPS also includes a medical visit for each extra day of stay for the payment of professional services.

Long lengths of stay are clearly not encouraged by the payment method for professional services. Each new day of stay in the hospital adds more units to the denominator of the formula that calculates the monetary value of a unit of professional services, negatively affecting the final value. The financial incentives for the hospital will depend on the relation between the per diem payment rate and the actual costs for each procedure.

Intensive Care Services

Intensive care is also reimbursed individually based on two previously established rates. The first applies for the first 72 hours of stay in an intensive

care unit. The second applies for the following days[82].

Special Procedures

SAMHPS considers some complex procedures and some procedures very seldom delivered by hospitals, which involve highly variable costs, as special procedures. Some examples of special procedures are Parenteral Nutrition, Angiography, Neuroradiology with Contrast, Haemodialysis and Rh factor Vaccine. These are considered *special procedures* only when they are not the main reason of admission, but procedures performed on patients admitted to hospitals for other reasons[128].

The initial SAMHPS' norms established that special procedures should only be delivered by services identified by INAMPS as reference hospitals. Nonetheless, the reference system for special procedures did not evolve as planned. The reference system that was best developed, was the cardiovascular system, based on the Heart Institute (INCOR), in the State of São Paulo – see page 59. INCOR's specialists came to be in charge of designing the guidelines for accrediting reference hospitals, defining standards of care and establishing a central register to monitor pacemaker implants. But, even this system did not succeed and it was being gradually phased out.

Some special materials such as prostheses (e.g. pacemakers) have their costs also excluded from the PBRS and are reimbursed individually. These materials are paid by unit of service or material used. The system for billing these special materials in 1986 was a separate system from the AIH form. This parallel system allowed the employment of these materials without control, which resulted in a very high volume of unnecessary implants and costs charged to social security.

Moreover, the reimbursement of some items of care by different payment mechanisms brings severe limitations to SAMHPS, in terms of its ability to control expenditure and improve the quality of services delivered. To maximize their revenues, hospitals might respond to constraints imposed by the prospective payment mechanism by transferring costs from one type of care to another[32].

An example of that, in the Brazilian system, has been the severe misuse of protheses and orthoses with serious consequences for patients and the finance of INAMPS. Prices charged by hospitals for pacemakers varied more than 500 per cent within and between states in the country. The average price hospitals were charging INAMPS in 1987 was 2.2 times higher than the average price in the United States and 3.6 times the price in Argentina. With the intention of restraining such abuses, INAMPS started to make pay-

ment for those materials directly to the manufacturers[170]. An assessment performed by DATAPREV also showed strong indications of a high provision of unnecessary implants of protheses and orthoses. The Orthopaedics Commission Study observed evident signs of abuse in the use of orthoses in orthopaedic care.

Outpatient care Finally, the payment for *outpatient care* delivered by contracted private hospitals is based on the retrospective payment mechanism, manually processed with much more limited ability to control bills and care delivered than SAMHPS. The existence of this extremely different approach to reimburse services provided by the same hospital leaves an enormous gap for hospitals to transfer costs from one sector of care to another, thus subverting the rationale of the prospective payment scheme. During the field work, in collecting data for the reliability study (see chapter V), it became evident that such transfers of costs were common practice in some hospitals.

4.3 Comparing the Procedure Based Reimbursement Scheme (PBRS) with the Diagnosis Related Groups (DRGS) Prospective Payment Scheme

4.3.1 DRG-Based Prospective Payment System

In 1984, the Medicare programme[6] in the United States implemented a new method of reimbursing hospitals for inpatient services based on a prospective payment system, as an effort to control the growth in health care costs.

The unit of output in the reimbursement system adopted by Medicare is the Diagnosis Related Groups (DRGs), a case-mix classification system for patients admitted to acute hospital care. DRGs were developed by researchers from Yale University[54]. It is a system that groups clinically similar patients who are also similar in regard to the consumption of resources. For classifying a patient into a DRG, the system considers one or more of the following variables:

- Principal Diagnosis

- The most resource-intensive operating room procedure received by the patient.

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[6]Medicare is a programme established by the government of the United States directed to finance the health care of the elderly.

- The presence or absence of Secondary Diagnoses which represents relevant comorbidities and complications.

- Age category.

- Discharge status (just for a few DRGS).

The DRG system started to be developed in the 1960s by researchers aiming at providing hospital managers with a system which would allow the measurement and evaluation of hospital performance. Since then, the system has evolved from a series of revisions to account for updating in the coding of diseases and procedures, changes in medical practice and medical technology and to increase its specificity in discriminating between patients with different levels of resource consumption. The sixth revision released in 1989 contained 477 DRGs.

One major criticism of DRGs as a case-mix classification system is that they do not adequately account for the severity of a patient's illness. Severity of illness is one factor supposed to be associated with the complexity of the hospitals' case-mix. Most existing patient classification schemes considered additional diagnosis (other than the Principal Diagnosis) as an extremely important factor for modelling resource use. More recently, a refinement of DRGs was developed by the group at Yale using comorbidities and complications so as to further discriminate patients in regard to resource use[57].

In the payment scheme adopted by Medicare, the DRG is used for the reimbursement of labour and other direct expenses, but it does not cover all reimbursable costs[65]. Contrary to PBRS, it does not cover the payment of doctors[7] and capital costs are reimbursed on a cost basis. Hospitals may also receive extra payment in the case of teaching hospitals and/or if the patient discharged was a cost or length of stay outlier. Outliers are those discharges which do not appear to belong to the underlying frequency distribution postulated to describe most cases in a DRG.

To control for the negative incentives which might be generated by prospective payment systems (see page 95), the Health Care Financing Administration (HCFA) of the government of the United States established in 1984 contracts with *Utilization and Quality Control Peer Review Programs* known as (PROs). PROs are in charge of examining claims for Medicare services furnished to patients in regard to their appropriateness and quality.

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[7]Doctors under the Medicare programme are paid on a fee-for-service basis. However, due to the increasing costs of physicians' services, in November 1989, the Congress of the United States introduced changes by implementing *volume performance standards*[158] to control the quantity and costs of doctors' services.

PROs replaced the ineffective *Professional Standards and Review Organization* (PSRO) that operated in the country from 1972 to 1982. Consumer participation on PRO boards became mandatory in 1986.

PROs are independent organizations, profit-making or non-profit making, with a contract with HCFA, which evaluates the performance of the PROs and reviews the contracts every three years, renewing them according to performance. It is strictly forbidden for PROs' reviewers to have any direct contact or financial interests linked to hospitals which provided the services they are analysing. PROs review cases on a retrospective basis e.g. transfers, readmissions, day and cost outliers, newborns etc. and on a concurrent basis e.g. procedures with high variation such as Hysterectomy, which might be reviewed before admission or permanent pacemakers implants and reimplants might be reviewed before surgery. Denial of payment for substandard care as well as notification of beneficiaries of such decisions are required by law[143].

There are still controversies about the impact of the DRG-based prospective payment system. Reduction in the costs of the hospital sector appeared to have been offset by the increase of costs in the other sectors of care, denoting the occurrence of a shift of costs. Sager[166] and Guterman[69] observed an increase in discharges of Medicare patients to nursing homes after the implementation of the DRG-based prospective payment system. There is also research evidence that patients were being discharged earlier from hospital. DesHarnais[40] found that discharges and length of stay declined significantly after the introduction of a DRG-based prospective payment system. There is also evidence of a decline in the use of intensive care[112]. However, Kahn et cols.[92] did not observe any relationship between the Medicare new payment system and a worsening of severity-adjusted mortality rates. In this study, which assessed the early years of the implementation of the DRG-based payment scheme, mortality was assessed among deaths from a group of selected diseases occurring in the hospital for up to 180 days following admission. Therefore, it suggests that early discharge was not associated with increasing death rates. This outcome might be related to the performance of PROs in monitoring services delivered to Medicare patients. There is also evidence of hospitals erroneously assigning patients to DRGs as a way to increase reimbursement (see chapter V). These errors appear to be more frequent among those hospitals with poor financial conditions and operating with lower efficiency[175].

4.3.2 The Brazilian System

Both the PBRS and the Medicare system are based on a prospective approach. However, PBRS differs largely from the DRG-based prospective payment system, particularly regarding the unit of output, control mechanisms and reimbursable costs as presented below.

- The unit of output in the payment system adopted by INAMPS does not take into account the patients' characteristics. Procedures represent treatment patterns, but are weakly associated with patients' characteristics. Age, patient's severity of illness and even social class are likely to be associated with resource consumption. Because of this failure to take into account patients' characteristics, the system is very likely to have heterogeneous groups with patients classified in the same group but requiring significantly different levels of resource consumption. Heterogeneity within groups will affect the ability of the system to reduce costs and might prevent access and lower the quality of care delivered to those patients significantly more costly than the average cost of the group of procedures in which they are classified.

- The unit of output in the system adopted by INAMPS lacks the necessary systematic updating to overcome shortcomings as well as to respond to changes in medical practice.

- SAMHPS did not succeed in implementing a control scheme directed at avoiding and punishing hospitals and doctors for delivering less than adequate care. The control system was based on direct and indirect supervision performed by doctors employed by INAMPS without any public control.

- PBRS involves the payment of doctors' services, putting both doctors and hospitals under similar financial incentives. This aspect is likely to provide a better outcome in terms of cost containment. However, it creates incentives on medical practice (see page 102), which then would require monitoring the specialty and workload of direct providers of care to prevent adverse effects on the quality of services delivered to patients.

- The PBRS does not have any mechanisms for compensating hospitals for cost outlier patients, which might limit the quantity and type of services furnished for these more severely ill patients.

The effectiveness of the payment scheme is strictly associated with the homogeneity of the patients within each group of procedures, in terms of their resource consumption. On the other hand, as time goes on, medical practice and technology change, affecting health care costs. The former indicates that regular updating and modifications of relative values of the output units should be made mandatory.

Efforts to improve the classification system in PBRS have been limited to some areas of care, mainly the ones involving high technology. But, most of these efforts have not succeeded for a long time nor have the implementation of schemes to monitor the performance of contracted private hospitals.

The impact of negative responses from hospitals under PBRS is also likely to increase inequalities in health. The outcome of being discharged home in unstable conditions will vary according to the ability of patients and families to get access to ambulatory services or nursing care, to purchase drugs and to provide the necessary care at home. Moreover, the poor might require more resources from hospitals than the non-poor patients, which would put the less privileged patient under greater risk of receiving less than appropriate care under the prospective payment scheme. Epstein[51] observed in the United States that patients with low socioeconomic status after adjusting for age, severity of illness and DRG presented longer average lengths of stay and were likely to require more resources.

Moreover, the very high levels of inflation in the Brazilian economy during the 1980s, rapidly reduced the real values of reimbursement, putting payment rates constantly under negotiation. Payment rates rapidly lost any relation to their initial values. André Medici (1990b) argues that the increases in payment rates in the second half of the 1980s were below rates of inflation, with a serious impact on hospitals. Under-financing might lead contracted private hospitals to seek for new markets in the independent private sector as well as stimulate fraud and low quality of care.

Indeed, the high levels of inflation in the Brazilian economy (400 per cent in 1987 and 1000 per cent in 1988) and the monetary policy[8] adopted by the government during this decade, is thought to have neutralized a great deal of the financial incentives inherent in the new payment scheme.

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[8] Data[117] show that, in 1988, Group Medical Plans' profits were mainly achieved in the monetary market and not as the result of an efficient production of services.

4.4 Final Comments

In summary, the development of PBRS was a very straightforward one. It was an objective and in some ways a simple and direct strategy for approaching a very complex and critical problem – to control costs and improve the quality of services delivered by contracted out services. It did introduce a major and very important change in the relationship between social security and the services contracted out by expanding the regulatory power of IN-AMPS. Nonetheless, for SAMHPS to achieve more effective results, it would have needed a great deal more strength and political willingness from the Federal Government to deal with old established hospital and professional lobbies and to cut the existing links between the social security bureaucracy and hospitals' representatives.

Reducing costs at the same time as improving the quality of services is an enormous task which would have required clear political action to minimise the effect of inflation on the reimbursement of services delivered by contracted private hospitals and the negative effects of the payment scheme on the performance of services. It would require the establishment of a permanent monitoring system with some sort of public control in order to highlight the shortcomings in the unit of output, values paid, unethical practices, substandard care, constraints in access for particular groups of patients, thus enabling the identification of existing problems and the setting up of appropriate measures to deal with them.

Chapter 5

The Reliability of Data on the AIH Form

This chapter presents the reliability study. It was conducted to measure levels of agreement between the information on the AIH form abstracted from the medical records by the hospitals' staff with the information abstracted by the research team. AIH forms are insurance claims[1] primarily linked to reimbursement. The collection of AIH forms builds up a large inpatient care data set which is a relevant source of data for management, health care service research and morbidity surveillance. For reimbursement, as well as management and epidemiological purposes it is important that information in the AIH form data set is reliable. The concept of reliability is discussed below. The sampling technique, the field work and the statistics used for measuring reliability are described, followed by the analysis of the results.

5.1 The Concept of Reliability

Reliability of an experiment, test, or any measuring procedure can be defined as the capacity not to vary its results when used by different people or in different periods of time[6]. However, one must accept that error free measurement is never attainable in almost any area of scientific investigation. Indeed, the measurement of nearly any phenomenon will contain a certain amount of chance error. For scientific investigation repeated measurement of the same phenomenon needs to be consistent. The more consistent the results of repeated measurements, the more reliable the measuring procedure. Crombach[34] used two elements to infer reliability – stability and equivalence. Stability means to obtain the same results after different applications of the instrument. Equivalence refers to the capacity of different

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[1]See chapter III for a more detailed discussion on the AIH form.

instruments to measure the same characteristic, or of one instrument applied by many people at the same time, or evaluated by different referees to measure the same characteristic. The latter refers to the design known as inter-rater reliability[6]. For medical data, reliability was defined[162] as the capacity to reproduce the same selected medical information in relation to pre-existing criteria.

One must distinguish the concept of reliability from the concept of validity. Validity is the extent to which an instrument correctly measures a characteristic. Reliability, as discussed above, is concerned with stability of repeated measurements, it does not say anything about the veracity of the information. This means that a reliable instrument does not necessarily provide valid information. In the case of medical information abstracted from medical records, reliability measures do not give any indication of the quality of the information on the medical record itself.

5.2 The Quality of Medical Data

Hospitals' discharge data, abstracted from medical records, have assumed increasing relevance for planning, management and health care service research. This rise in the use of health care service's statistics has been caused by the major developments in the computer industry in the last fifteen years. More recently, in some countries such as the United States, discharge data have also become available to the public, as a means of increasing consumers' choice.

This new trend in the use of data abstracted from medical records has been followed by a greater demand for the assessment of the quality of this information. In the 1970s, the Institute of Medicine of the United States conducted a reliability study of information abstracted from the medical records[39]. This study was unique given its national scope. It also included a study of claims generated for reimbursement purposes by hospitals admitting Medicare beneficiaries.

This investigation highlighted the large variations in the reliability of the different items of discharge data – non-medical data such as sex, age, data of admission being more reliable then clinical data such as – diagnosis and procedures. Clinical data were shown to have lower reliability with levels of agreement varying largely between diagnoses. The reliability of diagnostic information also appears as varying according to the level of coding refinement, with comparisons for the four digits being less comparable than for the three digits.

The major reliability study of medical data developed in Brazil was conducted M. L. Lebrão[106] in 1974. She studied the quality of medical information in the *Boletins CAH - 101*[2] – a form containing data abstracted from public and private hospitals' medical records in São Paulo. These *Boletins* are kept by the Health Department of the state of São Paulo. The investigation found a 17.6 per cent level of disagreement for diagnoses based on the three digits level.

The reliability of diagnoses measured by various studies has shown large variations. Levels of disagreement varied between 42.5 per cent in the study conducted by Demlo (1978) in the United States to 5.5 per cent in the study conducted by O'Gorman from the Republic of Ireland[139]. However, variations in the methodology adopted for measuring reliability limit the comparability of these studies.

Reliability problems observed for clinical information in the medical records reflect problems in the quality of the data, but can also be explained by the fact that this information might be extremely subjective. Demlo[38] (1981) pointed to the fact that for 6.5 per cent of medical records analyzed the research group could not identify a Principal Diagnosis. This happened particularly for those records of patients with more than one diagnosis.

The linkage of clinical information to financial reimbursement, as has happened in the United States with the reimbursement of Medicare patients based on Diagnosis Related Groups (DRGs) or, in Brazil, with the reimbursement of contracted private hospitals based on a fixed payment rate by procedure, is likely to influence the quality of diagnosing, selecting the adequate procedure and coding[28, 78]. Simborg[172] has drawn attention to what he has called *DRG creep* – the deliberate and systematic shift in hospitals' reported case-mix in order to improve reimbursement. Some recent studies[78, 13] were designed to assess the impact on the coding of diagnoses of a prospective payment scheme. Hsia[78] conducted a study to measure the amount of incorrect diagnostic coding under the prospective payment scheme in the United States. This study showed that the average hospital has a 20.8 chance of coding incorrectly the discharge of a patient. Moreover, a hospital that had a coding error presented a 61.7 chance of overpaying itself.

Besides the occurrence of intentional manipulation of coding aimed at maximizing profits, low reliability of diagnosis might result from shortcomings in the *International Classification of Diseases (ICD-9)* and, more notably, due to the difficulties in judging the information on the medical

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[2]These latter became known as – *Boletins CAH - 106.*

records. These difficulties can range from bad handwriting, incompleteness, wrong interpretation of medical terms to difficulties in interpreting original medical notes. Variations in the judgement about care rendered are observed even when medical professionals' assessments are compared[143] which indicates the difficulties in the abstraction process. Last but not least, the level of adherence to the existing coding rules will also have an impact on the reliability of the clinical data.

5.3 Methods

5.3.1 Sample

The objective of this study was to evaluate the reliability of information on the data set of AIH forms completed by contracted private hospitals after discharging a patient covered by INAMPS. The design did not aim to identify the reliability of data at the hospital level, but at the more aggregate level – the overall collection of AIH forms in the city.

A stratified sample by clusters in two steps was selected, representing the collection of AIH forms filed by 29 acute contracted private hospitals in the city of Rio de Janeiro in 1986 (see Appendix 7.1). The first step of the sampling process consisted of the selection of a sample of hospitals and the second step consisted of the selection of a random sample of AIH forms (sample unit) from the hospitals sampled in the first stage.

Acute contracted private hospitals' characteristics vary considerably. They vary in regard to ownership – they can be for-profit or charity hospitals. However, for-profit and charity contracted private hospitals did not appear to be associated with the range of hospital indicators used in this analysis such as – number of beds, specialty, occupancy rate, average length of stay, mortality rate, number of AIH forms etc. Therefore, this study did not separate hospitals in regard to their ownership.

The geographical distribution of acute contracted private hospitals in the city shows a concentration of services in the districts near the inner city areas and the north zone – the lower income districts of the city. The more wealthy districts such as Copacabana, Ipanema or Leblon do not have a single contracted private hospital. However, no association was observed between the hospitals' characteristics and the average family income of the residents of the administrative region where the hospital is located. The latter indicates that when considering only those administrative regions which have, at least, one acute contracted private hospital, there is no important variation in the wealth of the resident population and the hospital's char-

acteristics. This implied that for the sampling process, the geographical location of the hospital need not be taken into account.

For the purpose of defining clusters of hospitals, they were classified in relation to a range of characteristics represented by the indicators listed in Appendix C. The statistical procedure used to classify hospitals was *principal components analysis*[133] – a method of factor analysis which allows the transformation of a group of variables into a new group of *principal components* which are not correlated among each other. This method has the capacity to simplify original data, by representing them in a smaller range of variables (principal components) than initially considered.

The seven principal components identified explained 83 per cent of the variance existing in the data. The analysis showed that contracted private hospitals varied in terms of mortality rate, specialty (surgery, chronic, paediatrics, obstetrics) availability of intensive care beds and volume of AIH forms filed during the study period. It also showed that the provision of intensive care beds was inversely correlated with the volume of AIH forms filed by the hospital, suggesting that the better equipped the hospital, the fewer INAMPS' beneficiaries it tends to admit.

Hospitals were primarily classified in four clusters, in relation to their position (high or low) in the principal components (factors) – mortality and intensive care. Subsequently, hospitals in each cluster were classified in regard to the volume of INAMPS patients discharged. This process ended up with eight clusters of hospitals. A sample of hospitals was randomly selected from each cluster. In order to maintain the representativeness of the sample, as only one third of the 29 acute hospitals were positively indicated by the factor – *volume of INAMPS' patients discharged*, the same relationship was kept in the sample. A sample of 10 hospitals was obtained, in which 6 hospitals were negatively signed in the latter factor and four positively signed (see Appendix D).

The second part of the sampling process consisted of the selection of a random sample of AIH forms from the 10 hospitals selected at the first stage. The sample size was fixed at 1,934 AIH forms. AIH forms were randomly selected in proportion to the volume of AIH forms filed by each hospital in the sample.

This sample size was further regarded as adequate to test the study variables. The minimum sample size for high frequency diagnosis such as Normal Delivery was estimated at 811 – 24.7 per cent of AIH forms in the sample. This estimation used Kappa Standard Error Formula (Kappa (κ) statistics is presented in the following section) and assumed a confidence interval of

99 per cent with an accuracy of 0.05. For low frequency diagnosis such as Inguinal Hernia (2.3 per cent), the minimum sample size was estimated at 1,955 assuming a confidence interval of 99 per cent and an accuracy of 0.08.

5.3.2 Measuring Reliability

The study design was based on inter-rater reliability. It was aimed at testing the equivalence of the results of the independent interpretation of the information available in the medical records by different raters. The adequate statistics to measure reliability for nominal and categorical variables is Kappa[29]. Kappa (κ) is interpreted as the proportion of agreement between two judges rating n subjects after chance agreement has been removed. It compares the differences between observed and expected agreement to the maximum possible value of this difference. It is equal to 1 when there is perfect agreement (raters agree in all cases). It is equal to 0 when the observed agreement equals the expected agreement by chance. It is negative when observed agreement is less than expected agreement by chance.

$$\kappa = \frac{(p_o - p_c)}{1 - p_c} \tag{5.1}$$

where:

p_o = the observed proportion of agreement

p_c = the chance proportion of agreement

Kappa standard error is:

$$SE(\kappa) = \sqrt{\frac{p_o(1 - p_o)}{N(1 - p_c)^2}} \tag{5.2}$$

Kappa index requires three assumptions to be met:

- Subjects to be assigned are independent of each other.

- Raters operate independently of one another.

- Categories are mutually exclusive and exhaustive.

The independence of subjects would strictly require that readmissions were excluded from this study, which was not possible given the structure and the information available in the AIH form data set, as presented in Chapter III. However, as in the hospitals studied each admission is recorded in an individual medical record, the assumption above was not violated.

Kappa is also a good approach to measure chance-corrected agreement since it does not weight disagreement more in the case of homogeneous population – those with rates close to 100 per cent or to 0 per cent[171].

Agreement was measured by using the Kappa index with a confidence interval of 99 per cent and a significance test for $H_0 : \kappa = 0$ by using the software CONCORD developed for microcomputers by Klein and Coutinho[98].

It is also known[15] in the field of sampling statistics that cluster sampling will yield greater sampling error than random sampling. This means larger variances for cluster sampling than for random sampling. Despite the limitations discussed above, it is very common in social sciences and medical research not to rely on random samples due to reasons of cost, among other things. As happened in this study, the option of cluster sampling largely limited the number of hospitals in the study, thus restricting the difficulties of access and shortening the research time and overall costs.

However, the formula used to correct the variance of Kappa assumed simple random sample design. Consequently, one has to interpret with care the confidence intervals associated with the Kappa index. That is, the real confidence intervals are larger than the ones evaluated in the study. This means that eventually a null hypothesis $(\kappa)= 0$ might be rejected when it should not be rejected. However, standard errors in this study are not expected to be large given the large sample size. Moreover, to be more strict with the hypothesis testing, the confidence interval used was of 99 per cent instead of the usual 95 per cent. Therefore, bias introduced by stratified sampling should be irrelevant in the study's conclusions.

Missing data were not included in the analysis of agreement, since it prevented the comparison between raters due to lack of information in the AIH form or in the questionnaire.

5.3.3 Raters, Training and Field Work

As presented already, this study was mainly concerned with the measurement of the consistency of the abstraction process performed by different raters (hospital raters and research raters). It also aimed at collecting some information which was not available in the AIH form data set, such as the area code of the patient's address.

This study did not aim to test the validity of the information on the medical records, but to test if this information was similarly judged by different raters when completing the AIH form. This means that it was not directed to assess the quality of the information in the medical record itself. The research team was mainly abstracting information available in the

medical record but not judging this information. Despite being an extremely relevant question, the veracity of the information on the medical record was outside the scope of this investigation. However, one first attempt to approach the question of the quality of the information on the medical records was made in relation to the Principal Diagnosis and will be presented in the results.

<p style="text-align:center">* * *</p>

The research team group was constituted of three medical doctors who were in charge of abstracting information from the medical records and one field-work supervisor. The research raters worked as a team and not as individual raters.

A questionnaire containing some of the relevant variables available on the AIH form and a Field Work Manual was developed. Variables in the questionnaire were the variables in the AIH form which are completed by the hospitals' staff (see chapter IV). The Field Work Manual was based on the *Módulo do Hospital*[84] published by INAMPS to be used as a manual to guide contracted private hospitals' staff in completing the AIH form. The Field Work Manual was intended to provide the research raters with the same criteria used by the hospital raters when completing an AIH form. However, explicit criteria for agreement were established for the following diagnoses, related to childbirth – Uterine Scar, Fetal Distress and Dystocia.

Raters received 40 hours of training concerning:

- Training in the use of the Field-Work Manual.

- Training in the use of the *Table of Procedures*[83] for coding.

- Training in abstracting data from medical records.

- Training in completing the questionnaire.

Data was abstracted in the hospitals, after the selection of medical records by the field work supervisor. Procedures were coded by the raters responsible for completing the questionnaires. Diagnoses were written in the questionnaire and coded afterwards by accredited coding professionals.

5.3.4 Negotiating Access

The first contact with the hospitals aimed at negotiating access to their medical records' files. As the country lacks a tradition in the field of health care service research, specially in relation to private hospitals, this became

a very sensitive and time-consuming task. Hospitals varied largely in their response. Some appeared to be quite willing to provide access to their files, regarding the research as a relevant activity, while others appeared suspicious of our aims with some of them ending up not allowing access to their medical records.

The first contact was generally established with the hospital's general manager, when an appointment was sought with the medical record department or equivalent. This second contact was aimed at discussing the organization of the medical documentation in the hospital, the qualifications of those in charge of completing the AIH form and coding diagnoses as well as planning the participation of the hospital in the research.

Except for two hospitals, the medical records are stored in central files and organized in chronological order in relation to the date of discharge. In most hospitals, the AIH form was kept attached to the patient's medical record. After the identification of the medical record, the AIH form was separated from the medical record by the field work supervisor.

Only one hospital adopts a face sheet containing a summary of the information on the medical record. This implies that most hospitals' data for completing the AIH form are abstracted directly from the medical record by lay medical records staff. In the hospitals visited, the great majority of the medical records staff did not have any adequate training in completing the AIH form or in coding diagnoses.

The field-work lasted a full year, mainly delayed by difficulties in getting access to hospitals' medical records, which will be discussed in the following section.

5.3.5 Non-response

The response rate obtained in this study was 69 per cent. Therefore, 31 per cent of observations had to be classified as missing records – a total of 603 records. One important cause of non-response was the refusal of hospitals to participate in the study. However, hospitals tended not to refuse access, directly. Generally, they kept on postponing the date for the beginning of the work. A time period had to be established for negotiating access after which the delay was assumed to be an indirect denial of access.

Two hospitals – Real e Benemérita Sociedade Portuguêsa de Beneficência and Serviço de Assistência Social Evangélica – refused access. At a third hospital – Policlínica de Botafogo – the non-response rate was very high (83 per cent) and this was interpreted as an *indirect* refusal. A fourth hospital – Hospital da Venerável Ordem Terceira de São Francisco da Penitência –

was not visited by the research team because it had only three AIH forms in the sample. The very small number of AIH forms from this hospital in the sample made the negotiating process not worthwhile. These four hospitals accounted for 38.5 per cent of the missing records.

A large proportion (33.0 per cent) of the remaining missing records were medical records from the Santa Casa da Misericórdia do Rio de Janeiro, a large charity general hospital, which accounted for about one fourth of the AIH forms in the sample. The explanation for the large number of missing records in this hospital, as in the remaining hospitals, ranged from failure to find the medical record (some were said by the hospital to have been lost or thrown away) to refusal from some wards to give access to the medical records of their patients.

Non-response rates were lower at maternity units and larger at general hospitals. Non-response was also proportionally larger for those hospitals with a negative sign in the factor – *volume of INAMPS' patients discharged.* This implies that hospitals which admit a large number of INAMPS' beneficiaries accounted for a smaller proportion of missing records (see Appendix D).

The characteristics of response and non-response were compared by using the information available in the AIH forms. There were evident differences in these two sub-populations as shown in table 5.1 on page 121. The non-response population appeared to be more concentrated on patients classified as receiving clinical procedures, had shown a slightly larger death rate and lower concentration of childbirth discharges. The non-responses also appeared to over-represent the AIH forms from patients diagnosed as *Varicose Veins of Lower Extremities ICD-9 454.9* . As will be discussed in the following chapters, very unusual frequencies were associated with this diagnosis

The large rate of non-responses due to hospitals' refusal and the fact that the population of responses was not equal to the population of non-responses raised the hypothesis that the reliability of the non-responses was lower than that observed for the responses. This would imply that measures of reliability observed in this study are somehow higher than the 'true' ones.

5.4 Results

5.4.1 Place of Residence.

Indicators of use of health care service can only be referred to a population when the origin of patients is known. Patients' place of residence is

Table 5.1: Frequency distributions of variables in the AIH form for responses and non-responses.

	Response	Non-response
Age		
Mean	40	45
Median	34	44
Sex		
Men (per cent)	33.8	38.1
Women (per cent)	66.2	61.9
Total	1331	603
Type of Admission		
Elective (per cent)	11.3	16.4
Non-elective (per cent)	88.7	83.6
Total	1331	603
Discharge Type		
Discharge (per cent)	93.2	93.2
Permanence (per cent)	0.7	0.2
Transfer (per cent)	1.9	1.0
Death (per cent)	4.3	5.6
Total	1331	603
Type of procedure		
Surgical (per cent)	61.4	48.9
Clinical (per cent)	38.6	51.1
Total	1331	603
Procedures		
Normal Delivery (per cent)	24.7	11.6
Caesarean Section (per cent)	6.9	3.0
Congestive Heart Failure – Adult (per cent)	5.8	6.5
Acute Cerebrovascular Accident (per cent)	4.8	3.5
Curettage Post Abortion (per cent)	2.9	3.0
Hypertensive Crisis (per cent)	2.6	1.7
Unilateral Inguinal Herniorrhaphy (per cent)	2.0	1.5
Pneumonia not otherwise Specified (per cent)	2.0	2.2
Surgical Treatment of Fracture of Neck of Femur (per cent)	1.4	0.5
Diabetes (per cent)	1.3	1.8
Varicose Veins – one leg (per cent)	0.1	5.1
Varicose Veins – two legs (per cent)	0.2	3.3
Total	1331	603

essential information for the calculation of population rates. Furthermore, the origin of patients discharged from hospitals is a necessary element for the assessment of patient's flow for planning the provision of services. This study has shown that the great majority of patients discharged from acute contracted private hospitals live in the city – 81.5 per cent of patients discharged were residents. The great majority of the remaining patients (7.6 per cent) came from the municipalities within the Metropolitan Region of Rio de Janeiro. Moreover, for 10.6 per cent of medical records there was no written information about the patient's address.

The reliability of this data – area code of patient's address – could not be measured since it was not available in the magnetic tape. This means that either this information had not been written on the AIH form or it was not being put on the magnetic tape by DATAPREV.

5.4.2 Reliability of the Variables Age and Sex

Reliability for the variables *age* and *sex* was high (see table 5.2, page 123). Reliability for age was measured for age group categories[3]. These results are in agreement with those observed by Lebrão[106]. However, for 259 medical records information on the date of birth was missing, which did not allow the calculation of the age of the patient. It denotes a high level of incompleteness for an extremely important variable both for clinical and epidemiological purposes.

5.4.3 Reliability of the Process of Care Data

Reliability of the variable *Type of Admission* was interpreted as unsatisfactory (see table 5.2, page 123), limiting its use for research and planning purposes. However, the variable *Length of Stay* calculated from the information on date of admission and date of discharge showed a good reliability, as presented in table 5.2 on page 123. The reliability of the variable length of stay appears to be better than the measure of reliability observed in 1974 for the city of São Paulo's hospitals[106]. This better result might be reflecting the fact that, since the introduction of the new payment scheme in 1983, length of stay was not linked to financial reimbursement.

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[3]Age group categories: less than five years old; five to fourteen years old; fifteen to twenty four years old; twenty five to thirty four years old; thirty five to forty four years old; forty five to fifty four years old; fifty five to sixty four years old and older than sixty five.

Professional services

For payment purposes, whenever a surgery is performed in a contracted private hospital, the identification of the surgical team (first surgeon, auxiliary surgeons and anaesthetist) has to be written on the AIH form. Moreover, as presented in chapter III, there are norms attached to each surgical procedure which define the minimal acceptable surgical team. Reliability measurement of the variables which identify the presence of each professional in a surgical team tended to be unsatisfactory (see table 5.2 on page 123). This is very objective information and reliability should be high.

Table 5.2: Indices of agreement (κ) for non-clinical variables on the AIH form

	Kappa (κ)	99% Confidence interval
Age Group	0.973	0.93 – 1.00
Sex	0.993	0.92 – 1.00
Type of Admission	0.410	0.34 – 0.48
Length of Stay	0.904	0.87 – 0.93
First Surgeon	0.889	0.82 – 0.95
First Auxiliary Surgeon	0.524	0.46 – 0.59
Second Auxiliary Surgeon	0.195	0.13 – 0.25
Anaesthetist	0.694	0.62 – 0.76
Medical Encounters	0.284	0.26 – 0.31

Reliability of the variable *presence of the main surgeon* was higher than for the variable *presence of auxiliary surgeons*. The prevalence of auxiliary surgeons was larger in the hospitals' AIH form than in the research questionnaire. The above indicates that there was information written on the AIH forms which was not written in the medical records. Unreliable information might be indicating reimbursement for care not delivered to patients and lower than expected quality of care. Nonetheless, the opposite was observed for the anaesthetist, which showed a larger prevalence in the medical records

than in the AIH form. The explanation for the latter is unclear since the absence of information on the AIH form should imply no reimbursement, with hospitals or professionals incurring losses. It might be indicating, however, that this specialized care was not been provided to patients and not been checked by INAMPS.

Reliability for the variable *number of medical encounters* (consultations) during the patient's stay at the hospital was low as shown by table 5.2 on page 123. This is mainly explained by the incompleteness of this information on the AIH form, due to the fact that this is a variable not related to reimbursement. Actually, hospitals are reimbursed on the basis of one consultation per day regardless of what is written on the AIH form[4].

Reliability for *Diagnostic and Therapeutical Services* appeared to be low. Again this is very objective information and reliability should be high. The exceptions were Clinical Pathology, Radiography and Electrocardiogram and Electroencephalogram which tended to present better reliability. The results shown in table 5.3 (page 125) only consider that this information was written, at least once, it does not consider the volume of services. However, the variability between patients in the volume of exams performed tended to follow the pattern observed in the reliability – large for those services with low reliability and small for those with high reliability. This suggests that the overall information is better for those services with high reliability. Agreement for Cardioversion and Nuclear Medicine could not be assessed given the absence of these procedures in the sample.

5.4.4   Reliability of Clinical Data

Diagnosis

Following the trend already verified in other studies, reliability of the most frequent diagnosis tended to be lower at the four digit level than at more aggregate levels (three digits categories) as shown in table 5.4 and table 5.5 (pages 126 and 127). Diagnosis at the four digit level presented an average $\kappa = 0.72$ and for three digits level an average $\kappa = 0.82$.

The level of agreement for diagnosis observed in Lebrão's[106] for São Paulo's hospitals was 82.5 per cent at the three digit level which is a similar result to the one observed in this study. However, one must take into account that these studies are not strictly comparable due to differences in the methodology.

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[4]See chapter IV for more detailed information on the payment system.

Table 5.3: Indices of agreement (κ) for *Diagnostic and Therapeutical Services* in the AIH form

	Kappa (κ)	99% Confidence interval
Pathological Anatomy	0.516	0.45 – 0.58
Ventilator	0.437	0.38 – 0.51
Physiotherapy	0.216	0.15 – 0.27
Haemotherapy	0.671	0.60 – 0.74
Nebulizer	0.151	0.14 – 0.18
Clinical Pathology	0.914	0.84 – 0.98
Radiotherapy	0.814	0.74 – 0.88
Electrocardiogram and Electroencephalogram	0.777	0.71 – 0.85

Reliability measures varied largely between diagnoses. Among those diagnoses more prevalent in the sample of AIH forms, reliability was high for *Normal Delivery ICD-9 650.9* and *Inguinal Hernia ICD-9 550.9*; moderate for *Congestive Heart Failure ICD-9 428.0* and *Acute but ill-defined Cerebrovascular Diseases ICD-9 436.9* but, for *Obstructed Labour by Bony Pelvis ICD-9 660.1* and for *Bacterial Pneumonia ICD-9 482.9* observed agreement could not be considered higher than agreement obtained by chance (see table 5.5 on page 127).

Disagreement for Bacterial Pneumonia mainly reflected discrepancy at the level of the aetiology of the disease. For most medical records with a Principal Diagnosis Pneumonia the researchers' raters identified the diagnosis *Pneumonia, organism unspecified ICD-9 486.9*.

For the diagnosis *Diabetes Mellitus ICD-9 250.9* reliability was higher for the three digits category indicating that disagreement was mainly at the level of specification of the disease .

It was observed that, on the AIH forms, the four digit diagnostic categories were largely placed on the fourth digit 8 or 9, which are considered as ill defined classifications for the diagnosis category, denoting low accuracy

Table 5.4: Indices of agreement (κ) for clinical variables in the AIH form.

	Kappa (κ)	99% Confidence interval
Principal Diagnosis Four Digits	0.720	0.679 – 0.761
Principal Diagnosis Three Digits	0.811	0.772 – 0.849
Clinical Procedures	0.741	0.687 – 0.795
Surgical Procedures	0.943	0.894 – 0.992

in the coding process.

* * *

To approach the question of quality of diagnosis written in the medical record, the research team (all of them qualified doctors) were asked if they agreed with this information. For 98.5 per cent of the medical records analyzed a Principal Diagnosis was written. The research team tended to agree with 85.4 per cent of the medical records. Among disagreements, the main reason referred to was lack of concordance between the clinical information on the medical record and the principal diagnosis written on it.

The research team was also asked to abstract data on multiple diagnoses. The questionnaire allowed more options for Secondary Diagnosis than the AIH form. For 42.4 per cent of the medical records analyzed, at least one Secondary Diagnosis was identified – a much higher percentage than the one observed on the AIH forms in the sample (1.9 per cent). Moreover, 11.7 per cent of the medical records had shown at least four Secondary Diagnosis. This result highlights the high level of incompleteness for the variable Secondary Diagnosis in the AIH form . Multiple diagnoses are important information for the measurement of the severity of illness, a confounding variable for comparisons between patients. .

Procedures

The clinical data linked to financial incentives in the AIH form is the *Procedure Performed*. It is the unit of payment for the reimbursement system adopted by INAMPS, as presented in chapter IV. Alterations in this data

Table 5.5: Indices of agreement (κ) for some selected diagnosis.

	Kappa (κ)	99% Confidence interval
Normal Delivery ICD–9 650.9		
Three Digit Category	0.892	0.822 – 0.962
Four digits	0.892	0.822 – 0.962
Congestive Heart Failure ICD–9 428.0		
Three Digit Category	0.905	0.835 – 0.974
Four digits	0.793	0.723 – 0.863
Acute Cerebrovascular Disease ICD–9 436.9		
Three Digit Category	0.787	0.717 – 0.857
Four digits	0.787	0.717 – 0.857
Obstructed Labour ICD–9 660.1		
Three Digit Category	0.000	–
Four digits	0.000	–
Fracture of Neck of Femur ICD–9 820.8		
Three Digit Category	0.8798	0.810 – 0.949
Four digits	0.000	–
Essential Hypertension ICD–9 820.8		
Three Digit Category	0.725	0.655 – 0.821
Four digits	0.736	0.666 – 0.806
Inguinal Hernia ICD–9 550.9		
Three Digit Category	0.970	0.899 – 1.000
Four digits	0.919	0.849 – 0.989
Bacterial Pneumonia ICD–9 482.9		
Three Digit Category	0.000	–
Four digits	0.000	–
Diabetes Mellitus ICD–9 250.9		
Three Digit Category	0.775	0.705 – 0.844
Four digits	0.000	0.000 – 0.000

might maximize hospitals' profits. Therefore, besides measuring the reliability of this variable, an attempt was made to ascertain the extent to which disagreement was financially favouring the hospitals. The reliability for the variable *Procedure Performed* (the most frequent ones) was high ($\kappa=0.907$) – higher than the reliability observed for diagnosis at the four digit level. Reliability appeared to be higher for surgical procedures than for clinical procedures – reflecting the lower degree of subjectivity of surgical information (see table 5.4 on page 126).

<center>* * *</center>

The impact on the hospital's reimbursement was assessed for the 341 observations classified as disagreement (see figure 5.1). For 19.6 per cent of disagreements, this could not be assessed due to a variety of reasons such as missing data. For 29.0 per cent of disagreements both the hospital and the research raters coded the discharge in different procedures but which had an equal reimbursement rate. The latter are minor disagreements because raters identified procedures pertaining to the same group of procedures. However, for 19.9 per cent of observations the hospitals' code was related to procedures with a lower reimbursement rate compared with procedures coded by the research raters. For 31.4 per cent of no-agreements the hospitals' assignment was in procedures with a higher reimbursement rate than the research assignment. In short, whenever disagreement affecting the reimbursement rate occurred, the observed trend was that hospitals were maximizing their reimbursement.

Figure 5.1: Level of agreement for the variable *Procedure Performed* and impact of disagreements on the reimbursement rate.

Comparison between raters   Effect on reimbursement of non-agreement
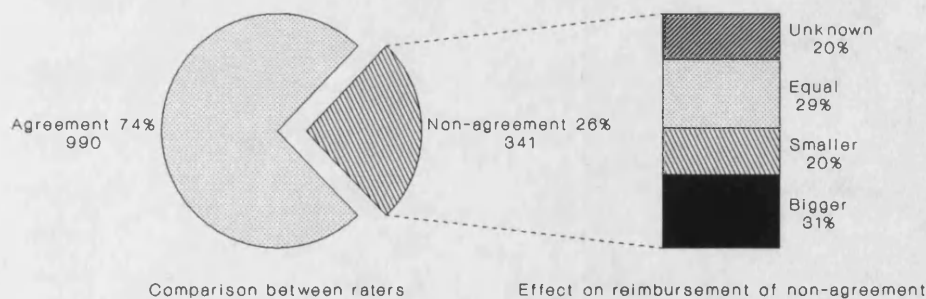
5.4.5 Reliability of Outcome Data

Death is the variable in inpatient statistics most commonly used for measuring outcome of care. The variables death and transfer in the AIH form appeared with high reliability (see table 5.6 on page 129). Nonetheless, it should be stressed that for 55 medical records it was not possible to ascertain how the admission terminated, due to missing data.

Table 5.6: Indices of agreement (κ) for outcome variables in the AIH form.

	Kappa (κ)	99% Confidence interval
Death	0.973	0.903 – 1.000
Transfer	0.833	0.763 – 0.903
Stillbirth	0.932	0.862 – 01.000
Death (newborn)	0.639	0.572 – 0.706

Nonetheless, the information used for calculating perinatal mortality rate (stillbirth and death of the newborn), more specifically *death of the newborn*, showed low reliability. The research raters identified more newborn deaths and stillbirths than the hospital raters. The above implies that large variations will occur in perinatal mortality rates, depending on whether it is based on AIH form data or on the research data. The AIH form's rate will be lower than the research's rate. Reliability for the variable *Born Alive*, the other variable needed for the calculation of perinatal mortality rate, was high (κ =0.99).

5.5 Conclusions

The quality of data in the AIH forms varied largely between variables. Among non-clinical variables reliability was high for age, sex and length of stay. Existing errors most probably originated when transposing the code number or erroneously abstracting the date of birth, admission or discharge. However, reliability for type of admission was low, limiting the use of this variable for management and research purposes. In chapter VIII this variable was used only in the descriptive analysis.

Reliability was also considered low for those variables associated with the identification of the surgical team. This information is used for payment

of professional services. The payment scheme adopted by INAMPS implies that the greater the number of professionals involved with each admission, the less each individual professional is likely to earn (for more details see chapter IV). To prevent unacceptable reductions in the surgical team, with a negative result on the quality of care, INAMPS has established norms defining the minimally acceptable surgical team for each group of procedures. However, it was suggested that the regular checking of this norm was not being carried out. This study has shown a higher frequency of surgeons on the AIH form than in the medical records, suggesting that some hospitals might be writing information on the AIH form just for reimbursement purpose without providing the service to the patient. On the other hand, an opposite trend was observed for the presence of the anaesthetist – lower frequency on the AIH forms than in the medical records. This might imply that an anaesthetist is not present regularly present in the surgical teams.

The above result limited the analysis of the division of labour between salaried and contracted doctors presented in chapter VIII. The variables related to auxiliary surgeons and medical encounters which had shown very low reliability should be excluded.

In regard to diagnostic and therapeutical services, reliability was considered low for most items on the AIH form, limiting their use for monitoring the quality and intensity of care delivered to patients. However, the quality of this information can be improved by bringing all items to the reliability levels observed for some frequent diagnostic services such as Clinical Pathology and Radiography. Moreover, it was observed that the AIH form tended to show a higher volume of diagnostic services than the questionnaire, suggesting incompleteness of this information in the medical records. It raises the questions of whether these services were truly delivered to patients.

Reliability of diagnosis was similar that one obtained by the other Brazilian study[106] carried out in the seventies, demonstrating that a great scope for improvements in the quality of information on diagnoses still remains. The results obtained indicate that the use of diagnoses information from the AIH forms for utilization statistics or epidemiological studies should concentrate on more inclusive diagnostic categories: three digit comparisons were more reliable than four digit ones. These results apply mainly for those most frequent Principal Diagnoses, which were the ones tested in this analysis.

Reliability varied largely between diagnoses. Some diagnoses appeared more troublesome than others. For instance, there were no agreements for *Obstructed Labour ICD-9 660*, a diagnosis for which explicit criteria were developed. This means that the research raters could only assign a patient

to the above diagnosis if the criteria were met.[5] As this is a diagnosis strongly associated with caesarian section, the absence of agreement between hospital's and research raters also questions the adequacy of a caesarian section in patients with the above diagnosis.

The major problems related to the quality of diagnoses on the AIH form is the quality of the abstracting and coding process. The division of responsibility for abstracting and coding influences the quality of diagnoses. Most contracted private hospitals in the sample do not adopt a 'summary sheet' containing basic information assigned under the responsibility of the attendant doctor. Medical records from which data were abstracted by a lay staff tended to contain imprecise and incomplete information . The same staff, most of them without any specific qualification in coding, would also be in charge of coding the diagnoses. Furthermore, the coding source published by INAMPS to be used by contracted private hospitals is a resume of the 9th Classification of Diseases - ICD-9 published by WHO, which omitted the terms of inclusions and exclusions, therefore raising the chance of misclassification and ill-defined categories.

It was also observed that errors in diagnoses can be the result of misspecification[78], with the attendant doctor selecting and writing in the medical record an incorrect diagnosis. The research raters tended to disagree with about 14 per cent of the diagnoses written on the medical records.

This study also highlighted that information on multiple diagnoses is highly incomplete on the AIH forms, limiting the use of this data set for the measurement of diagnostic case-mix, because of the existence of a large number of false negatives.

Reliability of *procedure performed* measured by this study was good, despite the fact that this is the variable used by INAMPS for payment. This result is influenced by the mechanisms of control adopted by INAMPS. As presented in chapter III, the patient is classified in a procedure by an INAMPS' doctor before admission to a contracted private hospital . The only exceptions are emergency patients. However, procedures might be changed by the hospital, but the Clinical Director has to sign the AIH forms assuming the responsibility for the adequacy of the new procedure. Nonetheless, it was observed that, whenever there was a disagreement which revised the reimbursement, there was a higher chance for this disagreement to maximize the hospital gains, emphasizing the need for further control.

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[5]The criteria defined would require that in order to establish the diagnosis of *Obstructed Labour* the result of an exam should be written in the medical record (manual, X Ray or ultrasonography) indicating a disproportion of maternal or fetal origin.

Finally, data on death and transfer showed a high reliability. However, perinatal deaths showed low reliability, leading to the under-estimation of perinatal mortality rates calculated from data on AIH form, seriously misleading any evaluation of perinatal care.

In general, this study has shown that the quality of data on the AIH form is somehow better than the quality that is generally attributed to this source. However, important problems exist, preventing the use of some variables and restricting the use of others. These urgently call for improvements in the organization of the medical record, division of responsibility on the abstracting and coding process, increased training and also for further implementation of mechanisms of control of the medical care data in contracted private hospitals and on the AIH form. These are needed both to avoid losses by INAMPS as well as to provide managers, researchers and consumers with a reliable source of information about inpatient care in the country, therefore improving the quality of care.

Chapter 6

Analysis of Contracted Private Hospitals in the City of Rio de Janeiro

One question raised in this study was the role played by contracted private hospitals in the division of labour between health care organizations in the Brazilian Health Care System. To show this in a more schematic way, it will be necessary to analyze the main characteristics of contracted private hospitals, by answering the following questions: *Whom did they treat?* (age, sex, payment status, social security entitlement status), *Where* the patient was admitted? (Acute, Psychiatric or Chronic Hospital), *Why* (diagnosis), *How* (process of care, type of provider of care, expenditure) and the *Results* (type of discharge).

The hypothesis considered in this chapter is that private hospitals paid by Social Security, in the city of Rio de Janeiro, treat a selective population within the working population and their dependents. It is expected that the inequalities within the labour market, and the existence of a large informal labour market in the Brazilian economy, will be seen to create major constraints on the social impact of social security care policy.

This chapter begins by presenting the contracted private hospitals' share of the health care market in the city of Rio de Janeiro. The city's social structure is also discussed here, followed by a detailed analysis of the social and demographic characteristics of patients discharged from contracted private hospitals.

6.1 The State, the Metropolitan Area and the City of Rio de Janeiro

Rio de Janeiro is one of the oldest cities in Brazil. Its settlement goes back to the XVI century. Most of its characteristics are related to the fact that it was the capital of the country until 1962, when the Federal Administration moved to Brasília, Brazil's new capital. Another important aspect is that in 1974 it lost its status as a Federal State to become a city of the State of Rio de Janeiro.

The *State of Rio de Janeiro* is located in the Southeast of Brazil. Its territory is 44,268 square kilometres which corresponds to 0.52 per cent of the national territory. In 1986, the State's population was estimated as 12,669,481 inhabitants. The population density is estimated to be 286 inhabitants per square kilometre.

The *city of Rio de Janeiro* is the most important city in the state. Its population in 1986 was estimated as 5,711,971 inhabitants, which corresponded to 40 per cent of the state's population. While the city covers only 3 per cent of the state's territory, it nevertheless presents the highest population density in the country – 4,340 inhabitants per square kilometre. The *Metropolitan Area of Rio de Janeiro* is made up of the city of Rio de Janeiro and the neighbourhood municipalities.

The State of Rio de Janeiro presents a high rate of urbanization. In 1980, 91 per cent of its population was living in urban areas. The internal migration is high, with the population moving to the city of Rio de Janeiro and its metropolitan area. The migration from the North and the Northeastern regions is also important. Nevertheless, the rate of population growth has been declining since the last decade, in the city as well as in the State of Rio de Janeiro. This decline rate is associated with a decrease in birth rate. However, the influence on immigrational flow should also be considered. The surrounding area of the city of Rio de Janeiro is a very deprived one. The rate of migration and population growth is higher than in the city. Living conditions are normally below standard. A large part of the work force commutes to Rio de Janeiro in order to work. Transportation is precarious, causing severe difficulties in the everyday life of this population.

There is an estimate that 1 million people live in 'slums" in Rio de Janeiro. Social conditions have been deteriorating in the last few years. Hence, criminality rates, which are already very high, present an increasing pattern. However, Rio is the second most developed city in the country, with some areas evidencing a very high standard of living.

6.1.1 The Structure of the Health Care System

Generally speaking, the structure of the health care system in Rio is very similar to the one that exists all over the country (see Chapter II). Regarding the quantity, complexity and quality of such care, the system in Rio generally follows the pattern of the southeast region, in which the greatest number of inpatient services in the country is concentrated, considering mainly services from the private sector. The availability of specialized services is also high when compared to other regions. Profit-making hospitals are mostly concentrated in the region of Rio de Janeiro and São Paulo. Rio de Janeiro has a great concentration of public hospitals, due to the fact that it was the capital for so many years. The majority of self-owned hospitals of the Compulsory Social Security Scheme (INAMPS) are located in the city, and most of them are large general hospitals.

Contracted private hospitals are the major providers of inpatient care in Brazil. In 1986, they were responsible for 75.4 per cent of all admissions, financed by INAMPS, in the country as a whole[125]. But in Rio, contracted private hospitals were known to have a smaller participation in the provision of inpatient care, due to the high availability of public beds. In accordance with the data provided by DATAPREV for this study, contracted private hospitals were responsible for 110,723 admissions in Rio, during 1986.

The National Household Survey (PNAD) 1981 provides information on the utilization rates for residents in the *Metropolitan Area of Rio de Janeiro*. The utilization rate for the *Metropolitan Area* in 1981 was 6.4 admissions per 100 inhabitants. A mean of 1.3 admissions per patient per year (1.308 to 1.409, with 95 per cent confidence interval) was observed. Actually 19 per cent of the population which was admitted to hospital reported more than one admission. Utilization rates appeared evenly distributed (3.2 admissions per 100 inhabitants), between the public and private sector. Unfortunately PNAD's data do not allow analysis between sub-sectors of care, e.g. contracted private hospitals (*dependent private sector*) versus private hospitals without direct public finance (*independent private hospitals*). Inpatient statistics[1] have to be used in order to compare the utilization pattern across sub-sectors of care. However, in general, inpatient statistics do not make it possible to separate readmissions. This means that each admission is counted individually. Therefore estimated rates, based on inpatient statis-

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[1]The Brazilian Institute of Statistics and Geography (IBGE), annually performs a *Health Service Census* based on the collection of inpatient statistics, which provides data on manpower, equipment, discharges and death. Aggregate data are published and services are classified as public or private

tics, are normally overstated, due to hidden readmissions. Furthermore, available inpatient data do not provide data at the Metropolitan Area level. So the discussion presented in this section and the data presented in table 6.1 page 136) are only related to the *State of Rio de Janeiro* and the *City of Rio de Janeiro*. This means that the figures presented do not directly apply to the Metropolitan Area and the opposite is also true.

Utilization rates[2] were estimated for the State and city of Rio de Janeiro. The State showed an overall rate of 12.4 admissions per 100 inhabitants but this is over-estimated, due to hidden readmissions (see table 6.1).

Table 6.1: Hospital utilization rates per 100 inhabitants - 1986.

	Population		Utilization rates		
			Private		Public
	Number	Total	Dependent	Independent	
Brazil	138,000,000	12.6	5.5	4.7	2.4
State of RJ	12,669,481	12.4	4.5	4.6	3.2
City of RJ	5,711,971	15.0	2.2	6.4	6.5

Note — Population figures calculated from the 1980 Census using IBGE's annual factor for population growth (1.019376). Source for discharge figures: AMS-IBGE, INAMPS em Dados, 1986 and DATAPREV.

Estimated rates for the *State of Rio de Janeiro*, show that the participation of contracted private hospitals in the provision of inpatient care (4.5 per 100 inhabitants) was higher than the participation of the public sector (3.2 per 100 inhabitants) and almost similar to the participation of the private services from the Independent Private Sector (4.6 per 100 inhabitants). Surprisingly, the participation of contracted private hospitals was much smaller than expected and the participation of independent private hospitals much more important. Actually, the major provider of inpatient care, both in the state and the city, appeared to be the Independent Private Sector.

The contracted private hospitals emerged as playing a less important role in the *city of Rio de Janeiro*, than in the country as a whole. Estimated

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[2]One must be cautious in analyzing the rates in table 6.1, page 136. Firstly, rates for the city are over-estimated because the population living outside Rio was not included in the calculations. There is a flow of patients from outside Rio to the city's hospitals, although the magnitude of this is not known. Moreover, the volume of non-residents probably varies between heath care organizations. Nevertheless, *for contracted private hospitals*, data from the reliability study (see chapter V) indicate that, in 1986, approximately 85 per cent of patients discharged were residents. Estimated rates for the *State of Rio de Janeiro* are more reliable than the ones for the city, because they tend to have a more accurate denominator.

utilization rates for the *State of Rio de Janeiro* (4.5/100) were lower than the national rates (5.5/100), being even smaller for the *city of Rio de Janeiro* (2.2/100).

To summarize, inpatient care in the *city of Rio de Janeiro* was provided both by public and private services. Private services appeared to be the major providers of care. But, amongst private hospitals' discharges those without direct public finance were the most prevalent. Contracted private hospitals had a less important role in the city of Rio de Janeiro than in the State and in the country as a whole. Nevertheless, about two-thirds of all admissions, both in the state and in the city, were publicly financed.

6.1.2 The Social Structure

The social structure and the pattern of inpatient services' utilization across social groups will be discussed in this section. This analysis is based on data published by IBGE and data from the National Sample Household Survey (PNAD), for the Metropolitan Area of Rio de Janeiro. The limited availability of data for the city of Rio de Janeiro implied that most of the following analysis was based on figures for the urban population of the state of Rio de Janeiro or the metropolitan area. These figures do not directly apply to the population of the city of Rio, which is the most developed municipality within the state and the metropolitan area. However, it is assumed that the existing differences do not bias the overall pattern.

In 1986, 62.0 per cent of the economically active urban population (43.0 per cent of the total population) living in the state of Rio was male. Data for the same year show that among the working population, only 62.0 per cent were entitled under a governmental social security scheme. This means that approximately one third of the working population was not-insured. They were part of the so called *informal labour market*.

Among those not-insured, men were also more prevalent, but the rate of 'non-entitlement' was larger for women (47.6 per 100 working women) than for men (33.7 per 100). The very young and the elderly also presented higher 'non-entitlement' rates, when compared with the working population between 25 to 49 years old. These figures highlight the fact that both age and gender have different values within the labour market.

The rates of social security entitlement also varied between employment status categories. The proportion of entitlement to social security among employees was 72 per cent[61], well above the average rate. Data from social security[59] show that the entitlement rate for the self-employed was the lowest among the employment status categories (21.4 per 100). This

low rate might be explained by the high number of self-employed, working in very low institutionalized types of work such as car washing, watching over parked cars in the streets, street vending, among others.

The population which is not-insured is also much poorer on average than the insured population, with 50.0 per cent of the not insured earning less than one legal minimum wage compared with 16.0 per cent among the insured.

In 1986, unemployment[3], in the state of Rio de Janeiro, was at the level of 3.3 per cent of the economically active population. The above figure is very close to the one for the city in the same year – 3.5 per cent. Again, men were more prevalent among the unemployed, but the rate of unemployment was larger for women – 4.0 per 100 of the economically active population. Unemployment was higher among the young and tended to decrease as age increased.

For those people at work, the great majority were employees (75.0 per cent). The self-employed correspond to 20.0 per cent of the working population and the employers to 4.0 per cent[4]. Besides this, one per cent of the working population in Rio were non-paid workers.

Income is very unevenly distributed across the working population (see figure 6.1). The employees and the self-employed show a high income variability. On the contrary, employers presented a much more concentrated income distribution, skewed towards the top income levels. The self-employed appeared to be the group with the highest concentration of people in the lowest income groups, followed by employees in a middle income position.

Data from DATAPREV, published by IBGE[59] indicate that in the *State of Rio de Janeiro* in 1986 17.0 per cent of the urban population of 10 years old or more was retired on a pension or receiving some sort of social security benefit. Assuming[5] that about 45.0 per cent of those were on sickness benefit, the estimated proportion of pensioners and retired people in the above population was 9.0 per cent. This figure is not far from the one observed in 1981 from PNAD's data for the *Metropolitan Area*: 7.0 per cent of the population of 10 years old or more were retired or on the pension.

In summary, approximately, one third of the working population in the *Metropolitan Area of Rio* was found not to be insured. Social security en-

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[3]Unemployment, as it is measured by PNAD, refers to those people who at a point in time, were not working, but looking for work[59].

[4]Figures from 1981 PNAD indicate that in the Metropolitan Area, there was a slightly bigger concentration of employers and relatively less employees and self-employed.

[5]These figures were estimated from data published by the Ministry of Health and Social Security [126].

Figure 6.1: Income distribution for employment status

	1	500	1000	20000	30000	50000	500000
employee	0.03	20.7	32.2	16.3	16.1	14.6	0.1
self-employed	0.9	36.6	24	16.8	13	8.6	0
employer	0	0	5.7	13	25.6	54.1	1.7

Income in Cruzeiros.

■ employee ▨ self-employed ▢ employer
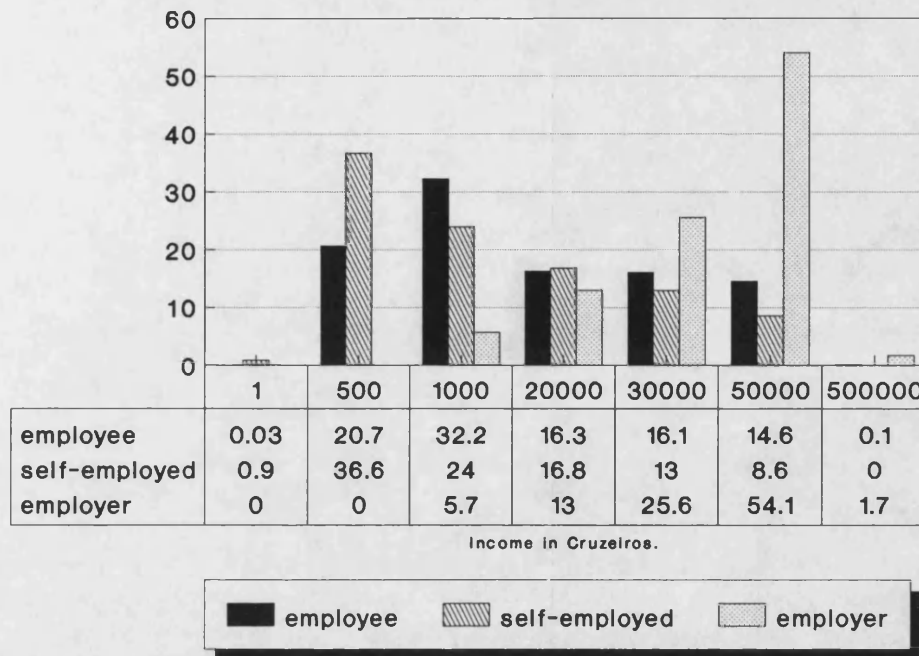
Note – Metropolitan Area of Rio de Janeiro – PNAD – 1981.

titlement rates varied between employment status, age groups and sexes. The self-employed, the women, the youngest and the elderly appeared to be the groups with higher non-entitlement rates, signalling their relative lower value within the labour market. Employees were the most prevalent group among the working population. Income distribution varied greatly between and within employment status groups, showing up the large inequalities existing in this society.

6.1.3 Health Status and Utilization of Health Care Services

The *Metropolitan Area of Rio de Janeiro* presents the highest percentage of elderly people (65 years old or more) in the country. The Ageing Ratio[6], for the area was 16 elderly per 100 inhabitants less than 15 years old. This age structure was close to the one observed in the Metropolitan Area of São Paulo (14.9 per 100).

The *structure of mortality* shows that Disorders and Diseases of the Cir-

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[6] *Ageing Ratio* = number of inhabitants 65 or more / number of inhabitants less than 15 years old

Table 6.2: Utilization rates for income groups PNAD – 1981.

Legal minimum wage	Rate per 100
Less than 0.5	11.0
0.5 to 1	10.0
More than 1 and less than 2	9.0
More than 2 and less than 3	8.0
More than 3 and less than 5	7.0
More than 5 and less than 10	6.0
More than 10 and less than 20	5.0
More than 20	6.0

Note — Metropolitan Area of Rio de Janeiro – PNAD – 1981.

culatory System are the first group among causes of deaths followed by Neoplasms. These two groups are responsible for about 50.0 per cent of all deaths – a larger rate than the one observed in the Metropolitan Area of São Paulo which is the richest and most developed area in the country.

In 1986, the city of Rio de Janeiro also showed one of the highest mortality rates from violence and accident in the country (99.6 per 100.000 inhabitants). It reflects the level of violence in everyday life in the city. Contrary to what happens in First World countries, the main causes of death in the group of injuries are traffic accidents and murder.

Disorders and Diseases of the Respiratory System are the fourth cause of death, but the risk of death for problems in the respiratory system is smaller in Rio than in São Paulo. The particular feature of causes of death in the Metropolitan Area of Rio de Janeiro is suggested to be, to some extent, a reflection of the high number of elderly people in this region.

Data from PNAD (1981) see table 6.2 (page 140), show that the less privileged people living in the *Metropolitan Area of Rio de Janeiro* were experiencing more hospitalization than the more privileged or the higher income groups, suggesting that health care need was greater among the poor population.

Presumably, these higher rates are signalling the disproportionate share of morbidity which the less privileged groups in the city experience. Nonetheless, despite their higher utilization rates, it is most likely that the poor and less privileged population are being admitted to hospitals through emergencies in more severe conditions and receiving less than adequate care.

The relationship between social class and health was emphasized by

PNAD data for the *Metropolitan Area of Rio de Janeiro* (1981), when admission rates were analyzed across employment status. There was a clear positive gradient for the social groups in relation to the utilization of inpatient services. Those poorer and less prestigious social groups had shown larger utilization rates. These large rates experienced by those at the lower levels of the social stratification reflect the existing differences in morbidity and severity between the social groups, as well as the existing variations in access to services at the primary level.

The employees had a utilization rate (5.76 per 100 employees), slightly below the utilization rate observed for the area (6.4 per 100 inhabitants). The self-employed had shown a rate (6.55 per 100 self-employed), slightly above that of the area as a whole, most probably influenced by its more deprived social conditions. On the other hand, the utilization rates for the employers (2.77 per 100 employers) was much smaller than the observed rates for the other social groups. The employer were utilizing hospital services at a rate less than half the area's level. The highest utilization rate, among the working population, was for the most deprived group, those non-paid workers (0.8 per cent of the working population), located at the bottom of the social stratification. They presented a utilization rate (7.4 per 100), much above the rate for the area.

There are no available data published on health status and utilization patterns for the not-insured and the unemployed in Rio. Nevertheless, given that these groups have a concentration of the less privileged and the poorer people within the economically active population, it is reasonable to assume that they have worse health status and a different utilization pattern to their counterparts in the labour market. Tallon[177] showed that, in the United States, the population not covered by health insurance is more likely to report poorer health status than those insured. There is also evidence for the developed world that the unemployed experience worse health than the population at work[156]. Furthermore, Arber[7] showed that health conditions, among the unemployed, varied across social class, being worse for those unemployed originally attached to unskilled and manual occupations.

In conclusion, Rio is a city with a high prevalence of elderly people, when compared to the whole country. The mortality pattern reflects the level of development of the city, the age structure and the high levels of violence. Utilization rates varied sharply between social groups, reflecting the large inequalities in health 'need'. Employers appeared to be much less in need of health care services, when compared to the other employment status categories. The self-employed and the non-paid workers presented utilization

rates above the regional level. Differences in the utilization pattern across social groups also appeared to be further explained by existing discrepancies in income, which varied markedly between and within social groups. It was also assumed that the unemployed and the not-insured were experiencing worse health status than the employed and the insured.

6.2 The Role of Contracted Private Hospitals

6.2.1 Patients' Characteristics

In this sub-section, the social and demographic characteristics of patients admitted to contracted private hospitals are discussed, and the existence of social selection in the demand for these hospitals will be initially investigated.

Age and Sex

In the majority of admissions (74.1 per cent) to contracted private hospitals in the city of Rio de Janeiro, the patient's age fell between 15 to 64 years old, indicating that a great proportion of patients admitted to those hospitals come from the working and childbirth age population. And, approximately sixty per cent of admissions of patients were women (see figure 6.2).

Figure 6.2: Frequency distribution for age and sex

Discharges by Age Groups.   Discharges by Sex.
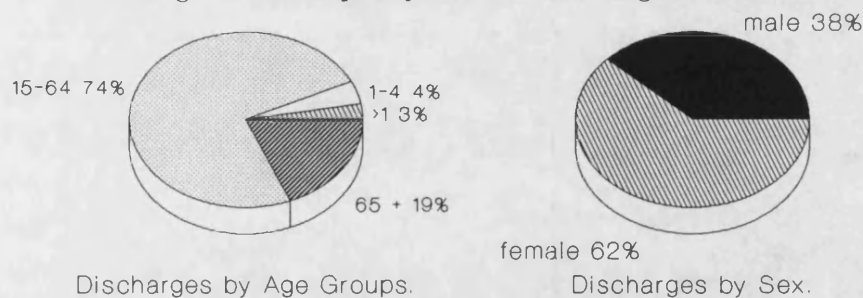
Note — Contracted Private Hospitals –RJ–1986.

Nevertheless, age and sex specific discharge rates[7] showed significant variations across the age groups and the sexes (see table 6.3, page 145). Estimated rates tended to increase with age with two exceptions:

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[7]Rates were calculated by using population figures based on data for the *city of Rio de Janeiro*, estimated from the 1980 Census[58].

- The age group of less than 4 years old, in which rates were higher than for the age group 5-14 years old, for both sexes.

- The age group of 46 to 64 for women, which presented a lower rate than the preceding age group.

The observed higher rates for younger children followed the universal pattern, reflecting the age distribution of health problems in the population. Age and sex specific morbidity rates have a 'U' shape curve indicating that morbidity is more frequent in the extreme age groups for both sexes. It is suggested that this rate has been influenced by high utilization rates amongst children less than a year old.

The literature on health care service utilization is almost unanimous in indicating that women present higher rates of hospitalization than men[73, 79, 90, 130]. Data for acute hospitals in the United States[181], show that utilization rates for women, after excluding childbirth, were still 18.0 per cent higher than for men. Nevertheless, Verbrugge[184] points out that for the US population and for serious problems which are not sex specific, men have slightly higher or equal rates of hospitalization. In Brazil, there is evidence of a similar pattern in health care service utilization. Women's admission rates in 1981 were higher than for men[151]. For the *State of Rio de Janeiro*[61], women's rates (4.99 per cent) were higher than men's (4.35 per cent) , even after the exclusion of child birth admissions.

The above rates also vary across age groups. In the United States, hospital utilization for midlife women and men are virtually identical, although, after the age of 65, men are more likely to be hospitalized than women[140]. For the *State of Rio de Janeiro*[61], the women's rate between 50 to 59 years old (8.3 per cent) was higher than for men in the same age group (6.7 per cent).

In contracted private hospitals, discharge rates for women were also higher than for men, but the latter presented higher utilization rates for all age groups, except the group from 15 to 45 years old. When childbirth related admissions were excluded from total discharges, discharge rates for women dropped to slightly under the men's rate: the above difference did not hold, however, when rates were controlled for acute care hospitals. Actually, after the exclusion of childbirth-related admissions, rates for women continued to be slightly higher than for men (see table 6.3 on page 145).

The slightly higher rate observed for men, after the exclusion of childbirth related discharges, was mainly a function of:

- Men's much higher discharge rate for psychiatric contracted private

hospitals, as will be discussed later in chapter VII.

- Men's higher discharge rate in the age group of 45 to 64 years old for all discharges.

The latter represents an inverse pattern to the one observed in PNAD's data for the *State of Rio de Janeiro*[61]. These suggest that middle-aged men and male psychiatric patients are more likely to be admitted to a contracted private hospital than middle aged women and female psychiatric patients.

The relatively high discharge rates observed for the age group of 65 years and over (7.7 per cent for men and 5.4 per cent for women) again suggest the existence of a selection in favour of the elderly in contracted private hospitals. Data for United States' acute hospitals in 1977[181], shows that people aged 65 years and over were being admitted five times more than those under 15 years of age, for both sexes. Data from PNAD-1981[61] had shown that the above difference was smaller for the population living in the state of Rio de Janeiro – 3.9 times more for elderly women and 3.7 times more for elderly men. These differences are mainly explained by the fact that the Brazilian population is younger than the North American population. Nonetheless, for contracted private hospitals, both for all hospitals and for acute hospitals, discharge rates appeared to be much more concentrated in the older age group (12 times more in all hospitals and 10 times more in acute hospitals) reinforcing the hypothesis of selection in favour of the elderly.

Despite the fact that the Metropolitan Area of Rio de Janeiro presents the highest *ageing ratio* among the Metropolitan Areas in the country, it still has a low concentration of elderly people when compared with developed countries in the world. The United States in 1980 presented an *ageing ratio* of 69.9, much higher than the one observed in the Metropolitan Area of Rio de Janeiro[180].

In summary, contracted private hospitals' discharges were mainly concentrated in the working age population and among female patients. Nevertheless, discharge rates showed that despite the fact that women presented higher utilization rates than men, the latter presented higher rates for all age groups, with one single exception – the childbirth age group. Moreover, after excluding deliveries, women's total rate dropped to under men's rate, but continued a little higher rate for acute hospitals than midlife women. Furthermore, it was also suggested that there was a selection in favour of the elderly in the admission to these hospitals.

Table 6.3: Age and sex specific discharge rates. Rates per 100

	All Admissions		Acute Hospitals	
Age Groups	Men	Women	Men	Women
less than 4	1.1	1.0	1.1	0.9
5 – 14	0.3	0.2	0.2	0.2
15 – 44	1.0	2.9	0.5	2.6
45 – 64	3.0	2.1	2.1	1.6
more than 65	7.7	5.4	6.2	4.3
TOTAL	1.5	2.3	1.0	2.0
Total (*)	1.5	1.4	1.048	1.150

Note — Population figures calculated from 1980 Census. Missing 674 records. Unknown age in the population = 4,130 people. Contracted Private Hospitals - Rio/1986.
(*) Excluded discharges for child birth.

Payment Status

The social distribution of patients was also analyzed by looking at the distribution of patients by payment status[8]. In more than half of the admissions (56.5 per cent) either the patient was an employee or one of his dependents was. In one third (32.5 per cent) of admissions, either the patient was a retired person or one of his or her dependents was, suggesting that contracted private hospitals were covering selected groups within the social security population. Moreover, only in 3.2 per cent of admissions was the patient not a social security contributor (not-insured), despite the fact that, as previously discussed, about one third of the working population in the same year was not-insured (see table 6.4 on page 146).

By comparing the social class distribution of patients discharged from contracted private hospitals with their relative distribution in the population (see table 6.4 on page 146), further understanding of the social characteristics of the selected market for contracted private hospitals can be gained.

The retired appeared to be highly over-represented among discharges (32.5 per cent) when compared with their relative distribution in the population (7.0 per cent). The explanation for the above should be approached in two complementary ways:

- Age is a characteristic intrinsically associated with becoming retired.

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[8]The categories of the variable *Payment Status* on the AIH form, are mainly related to the various contribution modes within the social security scheme. It is necessary to emphasize that in this variable, patients will be classified on the basis of the insured person. That is to say that the insured person's dependents receive his or her classification.

Table 6.4: The relative distribution of discharges and the population for payment status.

	Discharges	Population [*]
Employee(%)	56.5	37.8
Retired (%)	32.5	7.0
Self–Employed(%)	6.1	8.0
Unemployed(%)	1.3	3.5
Employer(%)	0.4	1.8
Not–Insured(%)	3.2	34.4 [**]

Note — [*] Population 10 years old and more - Metropolitan Area of Rio de Janeiro/1981. [**] Percentage of the working population. Contracted Private Hospitals Rio de Janeiro – 1981 All discharges.

For most , retired people, retirement was associated with ageing (or with illness). Ageing is highly related to a higher risk of illness and the use of health care services.

- As previously indicated, elderly people are suggestively more likely to get an admission in a contracted private hospital than those very young.

So the over-representation of the retired in contracted private hospitals' discharges is suggested to be not only a function of age, but also a result of selection mechanisms favouring this social group. Nonetheless, this selection might be partially explained by the fact that, within the contracted private hospitals' target population (the population covered by social security), the high proportion of retired people is over-representing the elderly, when compared with the population as a whole. Employees were also over-represented in contracted private hospitals' discharges, when compared with their distribution in the population. The same though was not true for the self-employed, the unemployed and the employers[9], who appeared to be under-represented in discharges, when compared with their relative distribution in the population.

The self-employed utilization pattern seems to be different from the one observed for their social security counterparts - the employees. Nonetheless, it must be noted that their apparent lower utilization might be due to a

[9]Comparable data for the not-insured population was not available. But, as already pointed out, the not-insured were scarcely represented in contracted private hospitals discharges.

certain extent to their lower social security entitlement rate. This could mean that for those self-employed people entitled to social security, the utilization pattern would not significantly differ from the one observed for the employees. They might even have higher utilization rates, given their general trend to consume more inpatient services. However, it should also be considered that the self-employed is a heterogeneous group in regard to occupation and income. Those high-income self-employed might be using services at the independent private sector, the same being true for some groups among the employees. In short, the over-utilization by the employee when compared with the self-employed, is suggested to be associated with the much lower rate of social security entitlement among the self employed. This means that those self-employed entitled to social security would have a similar utilization rate to the one observed for the employees, everything else being equal.

Regarding the unemployed, it must be emphasized that those who were insured when at work, keep the right of access to social security health services for as long as two years after becoming unemployed[124]. So a similar pattern to the one discussed for the self-employed might also be occurring with the unemployed. The above would mean that for those unemployed people who were covered by social security benefits when at work, contracted private hospitals would remain an available option for inpatient services. However, for those not covered by social security the main option would be the local public services, mainly the network of emergency services.

On the other hand, the employers' under-representation in contracted private hospitals' discharges is presumably associated with their better health status indicated by their much lower utilization rates but also, an indication of their preferences for inpatient services outside the social security network e.g. mainly the *independent private sector* (private services without direct public finance).

Age and sex distribution Important variations were also observed in contracted private hospitals' discharges between the sexes and age groups, across payment status. The relationship between sex and age differentials in mortality and morbidity with social class is a complex one. There is research indicating that the relationship between health 'need' and sex and age varies across social groups[7, 77, 200]. For contracted private hospitals' discharges, the prevalent pattern observed for all discharges, where women are more prevalent than men, did hold across payment status, with two exceptions – the unemployed and the retired (see table 6.5 on page 148).

The above pattern indicates that unemployed men are more at risk of being admitted to a contracted private hospital than the men from the other social groups. This favours the hypothesis that unemployed men were experiencing worse health conditions than their counterparts at work. On the contrary, the higher prevalence of men among patients classified as retired might be influenced by a large number of patients in this payment category who retired due to accident at work or due to illness. The disabled and the chronic ill are potentially great users of health care services.

Table 6.5: Proportional discharge rates for sex across payment status.

	Employee	Employer	Self-Employed	Unemployed	Retired	Not Insured
Men	29.8%	35.2%	31.2%	50.4%	52.8%	41.6%
Women	70.2	64.8	68.8	49.6	47.2	58.4
Total	61915	412	6666	1476	35532	3360

Note — Contracted Private Hospitals. Rio de Janeiro – 1986 – Missing records: 1352.

Age varied across payment status with the employee and the unemployed being, on average, much younger than the employer, the self-employed and the not-insured. The average age of the employee is mainly a function of the high prevalence of women of childbirth age among discharges in this social group. The same, though, does not explain the age pattern of discharges among the unemployed. Actually, for the unemployed among whom men were more prevalent in discharges than women, their age distribution suggests that they were experiencing serious health problems at a younger age than the employed population. The average age for the retired was 58.3 years old (see table 6.6 on page 149).

In conclusion, the probability of discharge from a contracted private hospital varied across payment status, with the retired and the employees being the groups more likely to be admitted to one of these hospitals. The age and sex distribution of discharges did not hold constant across payment status, indicating that the relationship between payment status and the use of health care services was mediated by these attributes. Men were more prevalent in discharges among the unemployed and the retired, most probably reflecting particular health and demographic characteristics of these social groups in the population.

Table 6.6: Mean age by payment status.

	Mean age
Employee	39.5
Employer	44.1
Self–Employed	41.6
Unemployed	39.5
Retired	58.3
Not-insured	44.3

Note — All discharges. Contracted Private Hospitals. Rio de Janeiro – 1986.

Social Security Entitlement Status

Social security entitlement status was analyzed to separate the insured patient from his or her dependents. The analysis was directed to answer the question of the existence of selection in favour of those at work - the insured person him- or herself.

Figure 6.3: Frequency distribution for social security entitlement status

Insured 52%
44999

Insured 39%
22803

Dependent 48%
40762

Dependent 61%
35967
Retired patients excluded.
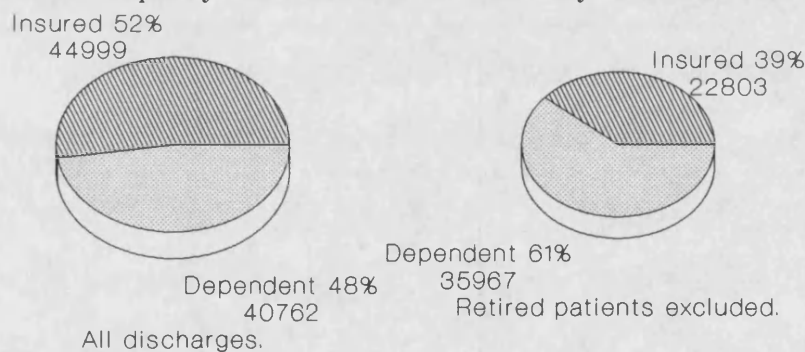
All discharges.

Note — Acute Contracted Private Hospitals–RJ–1986

Acute private hospitals discharges[10] appeared to be equally distributed between the insured and their dependents. However, this distribution was mainly reflecting the highly concentrated distribution of insured patients (82 per cent) among the retired. Indeed, when the retired were excluded from discharges, the proportion of insured patients fell below the proportion of dependent patients, better reproducing the distribution of the economically

[10]This data does not include discharges from psychiatric and chronic hospitals.

active people within the population (see figure 6.3). The high frequency of insured people among retired patients is most probably associated with characteristics of their age pattern: the older you are the less dependents you have. But, it also reflects the fact that women were less prevalent in discharges among this payment group.

The above distribution does not show any compelling indication of the existence of selection mechanisms in favour of the insured to the detriment of their dependents. The lack of comparative data inhibits further analysis at this level. Nonetheless, as will be discussed in the following chapter, the greater predicted probability of discharge observed for men for non-sex specific health problems points in favour of a selection in favour of the economically active population. Moreover, the proportion of insured patients varied markedly across payment status. Besides the retired, the unemployed also appeared to be over-concentrated among the insured patients, presumably indicating the worse health condition of men patients classified in these two payment categories (see table 6.7 on page 150).

Table 6.7: Distribution of the social security entitlement status of patients by payment status.

	Employee	Employer	Self–Employed	Unemployed	Retired
Insured	36.4%	45.5%	55.6%	62.3%	82.0%
Dependent	63.3	54.5	44.4	37.7	18.0
Total	51699	334	5684	1053	26991

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

Reproducing the distribution of gender within the labour market, where men are more prevalent than women, social security entitlement status appeared clearly associated with gender. Insured patients were 82.0 per cent among men and only 38.0 per cent among women. Despite the fact that this trend did hold across payment status, the difference between the sexes appeared to be lower among the unemployed, apparently indicating the higher prevalence of women among this group in the population. The higher prevalence of women in discharges among the unemployed was associated with an over-representation of unemployed insured women in childbirth discharges. This raise the hypothesis that women might being dismissed from work due to pregnancy.

Summarizing, the social security entitlement status of patients varied

remarkably across payment status and sexes. It was suggested that these distinctions were reproducing the social characteristics of the labour market, but further investigation of this hypothesis could not be undertaken. It was highlighted that among the unemployed, the proportion of insured patients was the highest across payment status groups and that it was even higher for women. Unemployed dependents are less likely to be admitted to a contracted private hospital than the dependents of the employed population. The above points further in favour of a relationship between health and unemployment, e.g. employers are dismissing sick people from work but also unemployment per se is suggested to be increasing the risk of ill health. Moreover, it is indicated that unemployed women are at even higher risk of being admitted to a contracted private hospital than their counterparts at work.

6.3 Conclusions

Taking into account the overall low discharge rates for contracted private hospitals in the city of Rio de Janeiro, which means under-coverage for all social groups, there is evidence indicating that the employees and the retired are the social groups most likely to be admitted to a contracted private hospital. Nonetheless, it seems that for those in the labour market, one relevant factor in explaining observed differences in the utilization pattern for contracted private hospitals is prevalence of social security entitlement. This implies a distinct pattern of access, availability and adequacy of care, at least in regard to inpatient care for people pertaining to the formal or to the informal labour market.

As the likelihood of social security entitlement also varies across age groups and sexes in favour of those most privileged in society, it means that discrepancies in the ability to consume health care services when needed, are also observed at these levels of the social stratification.

These conclusions are consistent with the hypothesis of the limited social efficiency of a health care policy based on the principles of insurance, in a country where about one third of the working population is excluded from the formal labour market. Those excluded are most probably the ones at a higher risk of needing health care services.

Chapter 7

The Case-Mix in Contracted Private Hospitals

In this chapter the role of contracted private hospitals in the supply of inpatient care in the city of Rio de Janeiro will be discussed, on the basis of the range of health problems these hospitals treat. Variations in case-mix across payment status will be analyzed, further testing the hypothesis of social selection in the use of these hospitals.

7.1 Type of Hospital

In the city of Rio de Janeiro, the great majority of contracted private hospitals' discharges (80 per cent) were in acute hospitals[1], followed by psychiatric hospitals (14 per cent) and chronic hospitals (7 per cent) see figure 7.1.

Despite their preference for acute care, contracted private hospitals are known for treating less complex health care problems and providing services with low technological input. This is exemplified by the small proportion of surgical patients admitted to contracted private hospitals, less than half of that observed for social security self-owned hospitals[82]. This trend has been increasing, at least during the first half of the 1980's[161]. It denotes the recent trend in the Brazilian Health Care System, where contracted private hospitals have been under threat to hold their position as relevant providers of inpatient care.

When compared with contracted private hospitals' discharges in the country as a whole[127], the distribution of discharges in contracted private hospitals in the city of Rio de Janeiro presented a more extreme feature, shown by their slightly lower concentration of surgical patients and an over-

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[1]The operational definition of Acute Hospital adopted in this study is presented in detail, in chapter III (Methodology.)

Figure 7.1: Discharges by type of hospital.
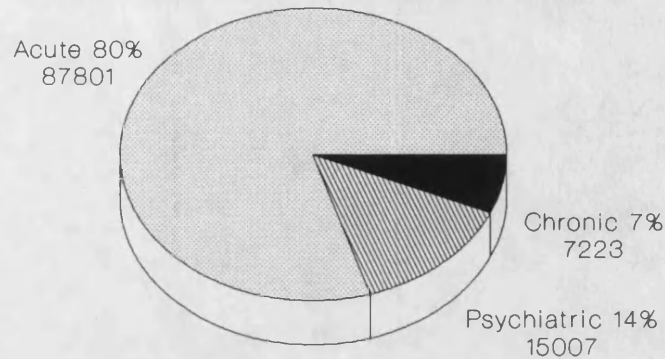
Note — Contacted Private Hospitals–City of Rio de Janeiro–1986.

concentration of discharges in the areas of obstetrics, psychiatric and chronic care (see table 7.1, page 153). It is suggested that this specific feature is shaped by the greater competition which contracted private hospitals have to face in the city from other sectors of care and by the payment scheme adopted by INAMPS to reimburse these hospitals. This competition might be leading contracted private hospitals to shift from acute care to chronic care and to the independent private sector. Moreover, it also intensifies the existing trend which leads contracted private hospitals to select health problems which might require a low technological input for treatment.

Table 7.1: Proportional discharge rates by specialty.

	Brazil	City of Rio de Janeiro
Internal Medicine	62.2	50.5
Surgery	15.0	13.6
Obstetrics	22.8	35.9
Sub-Total (Acute Care)	100.0	100.0
Psychiatry	3.5	14.0
Chronic	0.2	7.0
Acute	96.3	79.0
Total	100.0	100.0

Note — Contracted Private Hospitals Rio de Janeiro – 1986.

7.1.1 Variations across Age Group and Sex

Age and sex adjusted discharge rates presented a consistent pattern between the sexes across hospitals - larger rates for men in all ages groups, with two exceptions:

- Larger rates for women of childbirth age in acute hospitals.

- Slightly larger rates for elderly women (more than 65 years old) in chronic hospitals (see table 7.2, page 154).

Table 7.2: Age and sex specific discharge rates for type of hospital. Rates per 100 inhabitants.

	Acute Hospitals		Psychiatric Hospitals		Chronic Hospitals	
Age Groups	Men	Women	Men	Women	Men	Women
less than 4	11.2	9.5	0.1	0.1	0.0	0.0
5–14	2.3	1.9	0.2	0.1	0.0	0.0
14–44	5.0	26.1	4.7	2.3	0.4	0.3
45–64	21.1	15.6	5.3	3.0	3.5	2.4
More than 65	62.0	43.0	2.6	2.1	12.8	14.2

Note — Contracted Private Hospitals. City of Rio de Janeiro –1986.

The first aspect above has already been discussed in the previous chapter. The second one might be reflecting the fact, already observed in the United States, that women have more chronic conditions than men, specially after the age of 45 and 50 years old[184, 140].

Nonetheless, the most noticeable aspect of this analysis is the observed discrepancy in discharge rates between the sexes for psychiatric hospitals - men's rates being much larger than women's.

A similar pattern to the one observed in Rio de Janeiro has been described for psychiatric contracted private hospitals in Salvador - Bahia[176]. In this study, Abnoel compared psychiatric discharges across sectors of care. He observed that for psychiatric contracted private hospitals, men patients were more prevalent than women patients, but this distribution between the sexes did not hold across sectors of care: in the psychiatric public hospital, the prevalence of women exceeded that of men. He argued that the sex distribution of admissions to psychiatric contracted private hospitals was not reflecting the distribution of mental diseases in the population, but was the

result of selection mechanisms in favour of the economically active population. Another indicator of selection in favour of the economically active population, pointed out by Abnoel, was that psychiatric contracted private hospitals (and the public hospital) concentrated on treating patients that were on average older than patients admitted to the teaching hospital and to the independent private hospital (private hospital without public finance).

In the city of Rio de Janeiro, patients discharged from psychiatric contracted private hospitals were heavily concentrated in the age group between 15 to 65 years old, representing those in the productive age groups. This age distribution also highlights the occurrence of an under-representation of the elderly in psychiatric contracted private hospitals' discharges, despite the fact that the prevalence of psychiatric disorders in the elderly population, in a large urban city in Brazil, was seen to be 25 per cent[154].

Thus, women and the elderly were undoubtedly under-represented in contracted private hospitals' psychiatric discharges. This may be explained by the fact that psychiatric contracted private hospitals are admitting mainly people in the economically active population. Abnoel (1988) raised the hypothesis that psychiatric contracted private hospitals play a particular role for those middle-aged workers who present signs and symptoms assumed by society to be related to mental illness. Abnoel shows that, in 80.0 per cent of discharges in psychiatric contracted private hospitals, the patient was the insured person. Moreover, a much larger proportion of patients in these hospitals decided themselves to be admitted to hospital, when compared with patients admitted to hospitals from other sectors of care.

Psychiatric contracted private hospitals would be an alternative way of life for those at risk of losing their place in the labour market, due to problems associated with mental illness: a transient way of life, which might guarantee a minimal level of comfort as well as pave the way for obtaining sickness benefit from social security.

7.1.2 Variations across Payment Status

Psychiatric Hospitals

The proportional rate of discharge between hospitals of different specialties varied across payment status (see table 7.3, page 156). The unemployed and the not-insured appeared to be over-represented in psychiatric and chronic hospitals' discharges.

A study in England[156], showed that the unemployed presented a rate of mental illness, two times the estimated rate for the employed population.

Table 7.3: Proportional rate of discharge by payment status across type of hospital.

	Employee	Employer	Self Employed	Unemployed	Retired	Not Insured
Acute	83.1%	79.7%	84.6%	71.1%	75.5%	58.4%
Psychiatric	14.1	16.3	10.7	21.8	11.4	30.7
Chronic	2.8	4.0	4.7	7.1	13.1	10.9
Total	62190	419	6719	1481	35730	3492
ICD-9 291 and 303[*]	17.0%	12.0%	13.0%	28.0%	18.0%	24.0%

Note — Contracted Private Hospitals. Rio de Janeiro - 1986.

[*] Proportional rates related to discharges in psychiatric hospitals only. ICD-9 (291) 'Alcoholic Psychosis' and (303) 'Alcohol Dependency Syndrome' .

The unemployed also appeared to live a less healthy life than the employed, presenting large rates of smoking, heavy alcohol drinking and poor sleeping.

Data for contracted private hospitals showed that the unemployed were the social group more likely to be discharged from hospital due to *Alcoholic Psychosis* (ICD-9 291) and *Alcohol Dependency Syndrome* (ICD-9 303), presumably as a result of their poor life conditions, deprived of resources and satisfaction (see table 7.3, page 156).

Therefore, the proportional discharge rate for unemployed patients in psychiatric contracted private hospitals is suggested to be mainly a factor related to the high prevalence of health problems associated with mental illness in this social group which in turn would lead to a greater demand. Admissions of the unemployed to psychiatric hospitals might also be explained as an alternative which temporarily guarantees better life conditions, for those without a job.

Like the unemployed, the not-insured are excluded from the benefits of being a member of the formal labour market. They have low income on average, limited purchasing power and access to social security benefits. However, the not-insured are on average older than the unemployed. Actually, the long term unemployed are very likely to become workers in the informal labour market. Given their deprived life and limited access to goods and services, it is expected that both the unemployed and the not-insured have poorer health than their counterparts in the formal labour market. Nevertheless, the not-insured presented a very unusual pattern of use of

contracted private hospitals. The main characteristics of this unique pattern will be discussed throughout this study. It is suggested that the observed over-representation of not-insured patients in dependent psychiatric private hospitals could be explained in two complementary ways:

- A lower threshold[2] in psychiatric contracted private hospitals than in acute contracted private hospitals to admit not-insured patients. As will be discussed later, this might be the result of supply-induced demand.

- A high prevalence of mental illness in this social group.

Chronic Hospitals

In almost ninety per cent of discharges in chronic contracted private hospitals in the city of Rio de Janeiro, the patient was classified as a *terminally ill* patient. Therefore, chronic contracted private hospitals in the city should be taken mainly as a place to die and not as a place for treatment and/or recovery.

The unemployed also appeared to be over-represented in chronic private hospitals' discharges. Moreover, they presented a specific distribution of principal diagnosis, indicating that the reasons for admission among the unemployed did not match the overall pattern observed for these hospitals. The ten most frequent diagnoses in chronic hospitals accounted for about fifty per cent of all discharges, but only thirty per cent of unemployed patients' discharges. Their wider spread of case-mix indicates that the unemployed are being treated in chronic hospitals for problems for which the employed and the retired get treatment at acute hospitals.

The proportional discharge rate, for malignant neoplasms, in chronic hospitals for the unemployed was larger than their rate in acute hospitals, suggesting that the unemployed are less likely to be treated for cancer in acute hospitals.

The above gives rise to various possible explanations. One would be that unemployed patients would have less access to acute contracted private hospitals than their counterparts in the labour market. The other could be that those with cancer might be at higher risk of becoming unemployed, thus raising the prevalence of patients with advanced stages of the disease among this social group. Moreover, the relatively large proportional discharge rates from cancer for those classified as unemployed observed for

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[2]Threshold is defined as the equilibrium between the supply and the demand[85].

chronic hospitals could also be related to the overall supply of the health care services: unemployed patients would have less access to early diagnosis and treatment, being admitted to hospitals mainly at advanced stages of the disease. Either one of these explanations denotes that those individuals are being excluded from their basic rights as citizens and should be considered as relevant questions for future investigation.

However, the over-representation of not-insured patients in chronic hospitals' discharges appears to be of a different nature. When their distribution of principal diagnoses for chronic hospitals is observed, they appear to have very large proportional discharge rates for one specific diagnosis – *Cerebral Thrombosis ICD-9 434.0* (15.7 per 100 of not-insured patients' discharges). This proportional discharge rate is much larger than the total proportional discharge rate for this diagnosis (9.9 per 100 discharges) or, the proportional discharge rate observed for retired patients (10.9 per 100), who would be expected to be at greater risk of Cerebral Thrombosis, given their older age.

It is suggested that this very atypical distribution of principal diagnoses cannot be explained by the prevalence of the disease among the not-insured population but is the result of practices induced by the hospitals. These are discussed later in this chapter.

Summarizing, contracted private hospitals' discharges were heavily concentrated in acute hospitals. Discharge rates varied between age groups and sexes by type of hospital. Men's rates were larger than women's rates for psychiatric hospitals in all age groups, indicating that selective mechanisms were operating against admission of women and the elderly to these hospitals. It was suggested that these hospitals were playing a wider social role than that of treating patients. One of these roles would be associated with providing an alternative way of life for those in the labour market who presented problems associated with mental illness. More than a place of treatment, they would be a place where workers, being excluded or already excluded from the labour market, looked for a guarantee of a minimal standard of living. Proportional discharge rates between payment groups varied across type of hospital. Attention was drawn to the over-representation of the unemployed and the not-insured, both in psychiatric and chronic hospitals. However, it was proposed that the explanation for the relative excess demand, in psychiatric and chronic contracted private hospitals, of the unemployed and the not-insured has a completely different character.

7.2 The Case-Mix

The distribution of principal diagnoses[3] in contracted private hospitals' discharges will be analyzed, aiming at the identification of the range of health care problems cared for by these hospitals. Examining variations in case-mix[4] by payment status was a way of further looking at the hypothesis of inequity, in the use of contracted private hospitals. Variations in proportional rates of discharge for specific diagnoses might have various explanations. These rates indicate the chance of a discharge occurring in each particular diagnosis. Differences in the morbidity of the population is one important possible explanation for variations in this probability. On the other hand, the distribution and frequency of disease varies with the social, age and sex structure of the population. Variations in the case-mix might also result from the structure of the supply of services and the organization of medical practice. Besides, problems related with the codification of disease might also account for some variations.

7.2.1 The Case-Mix in Contracted Private Hospitals in the City of Rio de Janeiro.

The country as a whole was used as a yardstick for the discussion of the distribution of diagnoses in contracted private hospitals in the city of Rio de Janeiro. Variations in the distribution of principal diagnoses for contracted private hospitals' discharges, between the country and the city, should be mainly attributable to factors on the demand side of the health care market, since those are services under the same finance and payment mechanisms. However, the structure of the supply of services, in terms of type and quantity of available beds in other sectors of care, might also explain some of these variations.

Data for the city were also compared with discharge data for the state of São Paulo and for one municipality within this state - Ribeirão Prêto. The state of São Paulo has a unique data set, based on the collection, on a routine basis, of information on all discharges occurring in the state, regardless of the sector of care. This means that information on all discharges is collected, both from the public and private hospitals located within the state. For each discharge the hospital has to fill a discharge form *(Boletim CAH -*

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[3]Principal Diagnosis is defined as: the disease that best explains that admission[84].

[4]Case mix will be ascertained on the basis of the principal diagnosis. The rate of missing data for the variable *secondary diagnosis* was very large, limiting its use in this study. More detail about the quality of this information, in the AIH form, is presented in the reliability study (see chapter V).

106). These forms are gathered in the State's Health Department. The main constraint related to this data set is the limited capacity of the Health Department to process this large volume of data, so that little information from this data set is available for use. However, some researchers have been able to use the information *(Boletim CAH - 106)*. The published data from some of these studies[160, 56, 200] were used in this analysis.

The distribution of diagnoses in the State of São Paulo is suggested to be a better mirror of morbidity in the population given it's universal reference. Variations when compared with rates observed in contracted private hospitals in the city of Rio should, to a greater extent, be due to variations in the organization of medical care.

<p style="text-align:center">* * *</p>

One third of the discharges from acute contracted private hospitals in the city of Rio de Janeiro had the principal diagnoses classified in the major group *Complications of Pregnancy, Childbirth, and the Puerperium ICD-9 630 to 676*. Moreover, about 20 per cent of the discharges from these hospitals had the principal diagnoses classified in the major group *Diseases of the Circulatory System ICD-9 390 to 459*. These two major groups of diseases accounted for more than half of the discharges in acute contracted private hospitals in the city, showing a very concentrated distribution of reasons for admission.

The major group *Neoplasms ICD-9 140 to 239* also appeared over-represented in discharges from acute contracted private hospitals in the city. It is suggested that this is mainly explained by the fact that, in 1986, the city of Rio de Janeiro presented the second largest proportional mortality rate for neoplasm among the states' capitals in the whole country[152].

It was observed that the case-mix in the city's hospitals did not match the case-mix observed in contracted private hospitals in the country as a whole. For the country as a whole, Complications of Pregnancy, Childbirth, and the Puerperium and Diseases of the Circulatory System accounted for only one third of discharges. A very similar pattern could also be observed for all discharges, in the state of São Paulo (see table 7.4, page 161).

On the contrary, patients discharged from contracted private hospitals, in the city of Rio de Janeiro, classified under the major group of *Diseases and Disorders of the Respiratory System ICD-9 460 to 519* appeared under-represented, when compared with patients discharged from contracted private hospitals, in the country as a whole and with all discharges from the

Table 7.4: Proportional discharge rates for the eight most frequent major groups of diseases in contracted private hospitals in the city of Rio de Janeiro.

	Rio de Janeiro[*]	Brazil[*]	São Paulo[**]	Ribeirão Prêto[**]
Complications of Pregnancy ICD-9 (630-676)	35.2(1)	23.2(1)	23.9(1)	(1)
Circulatory System ICD-(390-459)	20.9(2)	13.1(3)	11.0(3)	(2)
Respiratory System ICD-9 (460-519)	10.8(3)	17.6(2)	14.1(2)	(3)
Digestive System ICD-9 (520-579)	6.6(4)	7.9(6)	6.7(5)	(4)
Genitourinary System ICD-9 (580-629)	6.5(5)	8.5(5)	7.3(4)	(5)
Neoplasms ICD-9 (140-239)	4.8(6)	3.0(9)	–	–
Endocrine ICD-9 (240-279)	4.6(7)	3.1(8)	3.7(7)	(7)
Injuries and Poisoning ICD-9 (800-999)	2.5(8)	4.4(7)	5.8(6)	(6)

Note — [*] Contracted Private Hospitals - 1986. Data for the city are related only to Acute Hospitals. Data for Brazil[127] include all discharges, but those classified under Mental Illness (ICD-9 290-319).[**] All admissions. Sources: [160, 56].

state of São Paulo. The same was true for those patients grouped in the major group of diseases *Injuries and Poisonings ICD-9 800 to 999*.

It is suggested that the case-mix observed for contracted private hospitals in the city of Rio de Janeiro reflects the morbidity in the population. However, as will be discussed below, supply-induced demand is also suggested as explaining some of the observed variations.

* * *

The very large proportional discharge rate for the major diagnostic group *Complications of Pregnancy, Childbirth, and the Puerperium* cannot not be explained by variations in need. Rio de Janeiro, as one of the most developed cities in Brazil, has a relatively small crude birth rate, which does not justify the observed larger rates of admission in the area of maternal care.

When the distribution of diagnoses within this major group of diseases is analyzed, it appears that in more than half (59 per cent) of discharges, the principal diagnosis was normal delivery – a larger proportional discharge

rate than observed for the country as a whole (51 per cent). Nonetheless, since these are services under the same financial incentives, it is assumed that the most reasonable explanation for observed variations is related to particular characteristics of the health care market for inpatient care in Rio.

It is suggested that the competition contracted private hospitals face in the city, both from public and private services, makes them intensify some general characteristics of the organization of services in this sector of care – to concentrate on the provision of services with low technological input. Moreover, the city has a deficit in obstetric beds[67]. Therefore, Rio's contracted private hospitals face less competition in the area of maternity care, allowing them to have a larger share of the health care market in obstetrics.

When discharges classified under the major group *Diseases of the Circulatory System* were analyzed, further understanding of the contracted private hospitals' market in the city of Rio de Janeiro, could be obtained. The proportional discharge rate for *Ischaemic Heart Diseases ICD-9 410-414* in the city (13.0 per cent) was much smaller than the one observed for contracted private hospitals in the country as a whole (21.0 per cent). Again, these variations in rates are not likely to be explained by variations in morbidity, since the population of the *State of Rio de Janeiro* has larger proportional rates of Ischaemic Heart Diseases (12.7 per cent of all causes of death), when compared with rates for the country as a whole. The *City of Rio de Janeiro* presents the largest proportional mortality rate for Diseases of the Circulatory System, when compared with the other major capitals in the country as a whole[153].

When rates for the city were compared with rates for all discharges in the city of Ribeirão Prêto, a well developed town in the state of São Paulo, a more striking variation was observed. The proportional rate of discharges for *Angina Pectoris ICD-9 413*, *Ischaemic Heart Disease ICD-9 410* and *Other Acute and Sub-acute Forms of Ischaemic Heart Disease ICD-9 411* was three times larger in Ribeirão Prêto than in contracted private hospitals in Rio. This variation seems to be indicating the limited role played by contracted private hospitals in the city of Rio de Janeiro in the area of emergency care. Moreover, it also suggests that contracted private hospitals are not considered referral services for Ischaemic Heart Diseases, because they do not compete with other sectors and sub-sectors of care, since they provide, in general, poorly equipped beds[45].

On the other hand, the proportional rate of discharge for patients classified under the group of *Cerebrovascular Diseases ICD-9 430-438* was much

larger in the city (25.0 per cent) than for all contracted private hospitals' discharges in the country as a whole (18.0 per 100). Among those, the most prevalent diagnosis in the city was *Ill Defined Acute Cerebrovascular Disease ICD-9 436*. Moreover, the proportional rate for this diagnosis in contracted private hospitals' discharges, in the city, was ten times larger than the rate observed in Ribeirão Prêto.

Firstly, such a large proportion of patients classified as *Ill Defined* is per se an indication that patients with Cerebrovascular Diseases were not being properly diagnosed in contracted private hospitals in Rio. But secondly, it also points to the hypothesis that these hospitals are selecting for treatment those health care problems which might be cared with a low technological input.

It is suggested that for Cerebrovascular Diseases the opposite of what was observed for Ischaemic Heart Diseases occurs, with contracted private hospitals in Rio managing to assume a larger share of the market and acting as referral hospitals. This would be possible because these patients require a relatively long length of stay, shortening the turnover in the emergency public hospitals in the city, where beds are under constant pressure. The incidence of Cerebral Vascular Diseases is high given the relatively large concentration of elderly people living in the city and the lack of preventive services and control policies.

A great proportion of patients classified in the major group of *Diseases of the Respiratory System* are those with Acute Respiratory Diseases. Pneumonia was responsible for 13.7 per cent of deaths in children less than a year old, in the city of Rio de Janeiro, in 1986[153]. Indeed, *Acute Respiratory Diseases* are known to be very frequent in young children living in Third World countries. For those deprived children Acute Respiratory Diseases are in general more severe, requiring inpatient treatment more frequently. Bacterial Pneumonia is a very important cause of death among this age group in developing countries.

The observed small proportional discharge rate for the major group *Diseases and Disorders of the Respiratory System* possibly reflects, to a certain extent, the morbidity pattern in the population. The City of Rio presented a smaller proportional mortality rate for diseases of the respiratory system (9.9 per cent), when compared with other developed cities in the country such as São Paulo (12.3 per cent) - [153]. This relatively small rate is suggested to be attributable to the high *Ageing Ratio* observed for the city of Rio de Janeiro. However, the small proportional discharge rate for Diseases of the Respiratory System also reflects the negative selection of the very

young patient to the advantage of elderly patients as previously discussed in chapter VI.

Finally, the small proportional discharge rate for *Injuries and Poisoning* in contracted private hospitals in the city, should also be highlighted: it further indicates the limited role of these services in the area of emergency care.

In summary, about half of acute contracted private hospitals' discharges, in Rio, were of patients with health problems related to Complications of Pregnancy, Childbirth and Puerperium or Diseases of the Circulatory System. Discharges appeared to be heavily concentrated in Childbirth and Cerebrovascular Disease. Emergency and technology-intensive care were under-represented in discharges from these hospitals. Contracted private hospitals in the city appeared to be treating a selective share of the health care market, which did not even match the share showed by contracted private hospitals in the country as a whole. It was suggested that the particular case-mix presented by the city's acute contracted private hospitals is partly the result of the morbidity pattern in the city, but also of the particular structure of the contracted private sector in the city – under-equipped beds and preference for potentially profitable patients.

7.2.2 Variation in Case-Mix across Payment Status

Proportional discharge rates for the major diagnostic groups varied largely across payment status (see table 7.5, page 165). The major cause of discharge, as seen before, was *Complications of Pregnancy, Childbirth and Puerperium*. Indeed, it was the major reason of discharge for all payment status categories, except the retired. It accounted for more than half of employees' admissions. Within this major diagnostic group, the main diagnosis observed among those patients classified as employees was Delivery, which accounted for about 80.0 per cent of employees discharges.

Diseases of the Circulatory System were the second major reason for discharge for all the payment groups except the retired. Actually, this was the most prevalent group of diseases among retired patients. It was responsible for about 40.0 per cent of all retired patients' discharges. The most frequent principal diagnoses among retired patients, within this diagnostic group were *Congestive Heart Failure ICD-9 428.0* and *Ill Defined Acute Cerebrovascular Disease ICD-9 436.9*. Rates of discharge for Diseases of the Circulatory System presented variations across payment status, with not-insured patients presenting the second largest proportional rate. This was mainly attributable to the exceptionally large proportional discharge rate

Table 7.5: Proportional discharge rates for major groups of causes of disease (ICD-9) across payment status per 10,0000 discharges.

	Total	Employee	Employer	Self Employed	Unemployed	Retired	Not Insured
Complications of Pregnancy	3556.1 (1)	5168.3 (1)	3922.2 (1)	3752.9 (1)	3608.7 (1)	412.0 (7)	3877.1 (1)
Circulatory System	2094.4 (2)	1029.4 (2)	1497.1 (2)	1637.0 (2)	1329.5 (2)	4284.0 (1)	1931.2 (2)
Respiratory System	1083.8 (3)	1001.7 (3)	1047.9 (3)	1308.4 (3)	1320.0 (3)	1315.4 (3)	722.4 (4)
Digestive System	657.6 (4)	608.3 (5)	898.2 (4)	771.0 (5)	902.2 (4)	741.0 (4)	1110.6 (3)
Genitourinary System	646.3 (5)	686.0 (4)	748.5 (5)	800.9 (4)	655.3 (5)	546.5 (6)	540.5 (6)
Neoplasms	483.8 (6)	339.6 (6)	449.1 (6)	756.9 (6)	178.4 (9)	700.3 (5)	702.7 (5)
Endocrine Diseases	459.2 (7)	259.4 (8)	329.0 (8)	403.1 (7)	503.3 (7)	3508.5 (7)	211.3 (8)
Injury and poisoning	252.7 (8)	194.7 (9)	389.2 (7)	353.8 (8)	579.3 (6)	330.1 (8)	235.9 (7)
Infectious Diseases	252.0 (9)	284.2 (7)	149.7 (9)	186.6 (9)	455.8 (8)	204.9 (9)	167.1 (9)

Note — Acute Contracted Private Hospitals. Rio de Janeiro - 1986.

for not-insured patients with *Varicose Veins of Lower Extremities Without Mention of Ulcer or Inflammation ICD-9 454.9*. This rate for not-insured patients (857.8 per 10,000 discharges) was 7.7 times larger than the average rate (112.1 per 10,000 discharges). The major group of *Disease of the Respiratory System* was the third most frequent principal diagnosis for all payment status groups, except the not-insured. Actually, the likelihood of a discharge of a not-insured patient due to Diseases of the Respiratory System was small, the probability being about half of that experienced by the unemployed.

The fourth most frequent reason for admission was *Diseases of the Digestive System*. For this diagnostic group, not-insured patients, again, presented the largest proportional discharge rate. This large rate was mainly attributable to *Inguinal Hernia without Mention of Obstruction or Gangrene ICD-9 550.9*, another elective diagnosis, with not-insured patients showing an unexpectedly large rate. Their discharge rate for Inguinal Hernia (573.5 per 10,000 not-insured discharges) was 5.3 times larger than the average rate.

The surprisingly high rates observed for not-insured patients, for some

particular diagnoses, such as Varicose Veins, Inguinal Hernia and Cerebral Thrombosis (chronic hospitals) are very unlikely to be explained on epidemiological grounds, strongly suggesting that supply-induced practices are operating. The over-concentration of the demand for selective diagnoses on a single payment group raises two hypothesis:

- Illegal practices: Hospitals would be charging INAMPS for 'ghost' patients. These patients classified as not-insured would not be identifiable within INAMPS' files, thus limiting the ability of the financing institution to identify the fraud.

- A lower threshold for not-insured patients at those hospitals, which concentrate on care for patients with Varicose Veins and Inguinal Hernia.

Focusing on the analysis at the hospital level, it becomes apparent that one third of not-insured discharges were concentrated on two hospitals. Both hospitals are non-profit making contracted private hospitals. Just one of these two hospitals accounted for 46.2 per cent of all discharges of patients with Varicose Veins of the Lower Extremities. Within hospital variations in the proportional rate of discharge for Varicose Veins of the Lower Extremities were smaller than those observed for all discharges. However, important variations in rates still remained, with the not-insured presenting one of the largest rates (see table 7.6, page 166). Further Ad Hoc investigation is clearly required to explain the large variations observed for not-insured patients, for some principal diagnoses.

Table 7.6: Proportional discharge rate for varicose veins of lower extremities by payment status.

Payment status	Number	Proportional discharge rate
Employee	451	33.4%
Employer	2	100.0%
Self–Employed	63	48.5%
Unemployed	5	50.0%
Retired	108	54.0%
Not Insured	130	74.3%

Note — Policlínica de Botafogo, non-profit making contracted private hospital. Rio de Janeiro – 1986.

* * *

As expected, those patients classified as retired presented a very particular case-mix, when compared with the other payment groups. They tended to be admitted most frequently for *Diseases of the Circulatory System* and *Endocrine, Nutritional and Metabolic Disease and Immunity Disorders*: Congestive Heart Failure (1543 per 10,000), Ill Defined Acute Cerebrovascular Disease (955.9 per 10,000), Diabetes (393.9 per 10,000) and Essential Hypertension (320.1 per 10,000) . Actually, in more than half of discharges classified as Congestive Heart Failure and in more than one third of discharges classified as Ill Defined Acute Cerebrovascular Disease the patient was retired. Retired patients also presented the largest proportional discharge rate for *Nutritional Deficiencies* (262.7 per 10,000) indicating that many of them are experiencing deprived life conditions and lack of proper care.

On the other hand, *employers* appeared to be at less risk of being discharged from a contracted private hospital due to: Endocrine, Nutritional and Metabolic Disease and Immunity Disorders or Infectious and Parasitic Diseases. This may well reflect the distribution of health problems in this wealthier group. Employers were also at less risk of being discharged due to health problems amenable to prevention and control at the primary care level, such as: Essential Hypertension (89.8 per 10,000) or Diabetes (59.8 per 10,000), suggesting their better access to health services and healthy life styles. However, employers presented double the probability of being admitted to a contracted private hospital due to *Chronic Renal Failure* when compared with their counterparts. Their proportional discharge rate for Chronic Renal Failure (259.7 per 10,0000) was more than three times larger than the unemployed patients' rate (77.6 per 10,000)[5]. This most probably is the result of the greater facility such patients experience in getting access to these areas of high cost treatment.

Contrasting with the case-mix presented by the employers, those patients classified as *unemployed* appeared as the group most likely to be admitted to a contracted private hospital due to *Infectious and Parasitic Diseases*. They also presented large rates of discharges for *Nutritional Deficiency*. Also, among discharges classified as *Diseases of the Respiratory System*, unemployed patients presented the largest rates for *Bacterial Pneumonia Unspecified ICD-9 482.9, Pneumonia Organism Unspecified ICD-9 486.9 and Pneumococcal Pneumonia ICD-9 481.9*, suggesting their higher

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[5]These rates did not include discharges due to normal delivery and caesarian section.

risk of having more severe acute respiratory diseases and their lack of proper care.

Furthermore, the unemployed was the payment group with the least chance of being admitted to a contracted private hospital for treatment of *Neoplasms*. Actually, not a single unemployed person was discharged from a contracted private hospital in Rio, in 1986, for *Malignant Neoplasm of Female Breast*, despite the fact that this was the most prevalent Neoplasm among discharges. In fact, Malignant Neoplasm of the Breast is the major killer of women, among deaths due to cancer, in the country as a whole[152]. The unemployed had also shown the smallest proportional discharge rates for *Malignant Neoplasm of Cervix Uteri ICD-9 180 and Malignant Neoplasms of Stomach ICD-9 151*, the two cancers which apparently present higher death rates in the poor in Brazil[197]. The very low presence of unemployed patients in these diagnostic categories among contracted private hospitals' discharges in Rio, strongly suggests a low availability of services for the unemployed, resulting in a lower chance of being diagnosed at early stages of the disease. It might also be explained by a perverse selection within the labour market – the dismissal from work of patients at advanced stages of the disease, thus increasing the prevalence among the unemployed, as already suggested earlier in this chapter.

In the case of *employees*, the most typical patients were women of child-birth age discharged due to *Complications of Pregnancy, Childbirth, and the Puerperium* or *Diseases of the Genitourinary System*. Their relatively large rate for *Infectious and Parasitic Diseases* is suggested to be a factor of the greater demand for contracted private hospitals of children in this payment group.

Self-employed patients closely followed the average diagnostic distribution. Their case-mix seems to reflect, to a certain extent, their middle-age distribution.

In summary, the case-mix in acute contracted private hospitals in Rio presented large variations across payment status. The most prevalent *employee* patient was a woman of childbirth age, discharged due to Delivery or Genitourinary Problems. The *self-employed* presented a standard case-mix. *Employer* patients showed a case-mix with less discharges for those diagnoses associated with poverty and/or diseases amenable to control outside the hospital setting. On the other hand, this payment group presented the largest rate for Chronic Renal Failure – a costly, life-saving intervention. The *unemployed*, placed at the other extreme of the social stratification, showed a case-mix which reflected their more deprived life and limited availability

of services indicated by large rates of Infectious Diseases, Acute Respiratory Diseases and Nutritional Deficiency and low rates of health problems which require more technology-intensive care, such as Neoplasms. The *retired* case-mix also revealed poor living conditions and availability of services. Their discharges were concentrated in some Diseases of the Circulatory System and Endocrinous and Nutritional Problems. Finally, *not-insured* patients presented the most peculiar case-mix, showing variations in rates for some elective diagnoses of such a magnitude as to raise the hypothesis that they were the result of supply-induced demand, if not actual fraud.

7.3 Testing the Hypothesis of Variation in the Case-Mix across Payment Status

This section was orientated to test the main hypothesis in this thesis – that patterns of use of contracted private hospitals vary across the social groups. In this section the hypothesis of variations in the case-mix across payment status will be tested more specifically.

The null hypothesis being tested is that the explanatory variable *payment status* has no effect on the probability of being discharged from contracted private hospitals for specific diagnostic groups. The alternative hypothesis is then that payment status explains variations in the probability of being discharged from specific diagnostic groups.

This hypothesis was tested by controlling for the two main confounding variables in relation to illness – age and sex. To control by age and sex was a way to isolate their effect in the analysis of the relationship between payment status (independent variable) and being discharged for a given diagnosis (dependent variable). The other relevant confounding variable that should be considered in the explanation of variations in the probability of being discharged from hospital for a given diagnostic category is severity. Unfortunately, the available data did not allow any further measurement of severity, besides age itself.

It must be highlighted that the statistical approach used in this analysis tests each individual variable in the model as *main effects*. That is to say that the effect of payment status, age and sex on the dependent variable are tested in such a way that each variable is controlled by every other variable existing in the model. The model itself does not distinguish the independent variable from the confounding variables. The definition of the explanatory variable and the confounding variables is based on the existing knowledge about the variables which might bias the relationship being tested. In this

analysis, age and sex were taken as confounding variable for the analysis of variation between the payment groups. However, in a second levels of analysis, they were also analyzed as main explanatory variables.

Retired patients were not included in this analysis, due to their very particular characteristics. Retirement is associated with old age, which per se is associated with higher risk of illness and utilization of health services. Thus, it was assumed that retired patients should not be compared with the other payment groups.

7.3.1 Diseases of the Circulatory System ICD-9 390 to 579

The probability of discharge for Disease of the Circulatory System varied across payment status, even when controlled by age and sex, this variation being statistically significant ($p < 0.01$). However, the observed variations were only statistically significant for not-insured patients. This means that variations in the probability of being discharged for Diseases of the Circulatory System, after controlling for age and sex, have not been shown to be statistically significant, except for not-insured patients. Since Diseases of the Cardiovascular System, as happens with the bulk of other diseases[146], have a positive social gradient, the absence of a statistically significant variation suggests that contracted private hospitals are not responding to the different health care needs of the various social groups. Moreover, the variations observed for the not-insured are most probably reflecting, as discussed earlier in this chapter, the very large and atypical proportional discharge rates shown by not-insured patients in the diagnoses of Varicose Veins, a diagnosis within the group of Diseases of the Circulatory System.

A new variable was created to replace the variable *payment status* by combining the categories which have not been shown to be statistically significant. This new variable called *Pystatus* assumed the following values: 1=Not-Insured and 4=Others.

The relationship between the dependent variable (Diseases of the Circulatory System)[6] and the independent variables in the model (see table 7.7, page 171), appeared to be a complex one. Age presented a high chi-square, as should be expected, meaning that the probability of Diseases of the Circulatory System is not the same across the age groups. Age also appeared as interacting with sex. This interaction manifests that the probability of

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[6]Note that, in logit analysis, the dependent variable is always given by the logarithm of the odds e.g. the logit function. This means, for instance, that for the variable Diseases of the Circulatory System the dependent variable is the odds of the occurrence of a discharge due to a disease within this diagnostic group by the negative event.

Table 7.7: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of discharges due to "Diseases of the Circulatory System".

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	251.63	0.0000
Pystatus	1	0.38	0.5351
Age group	5	124.22	0.0000
Pystatus*age group	5	71.94	0.0000
Sex	1	1.35	0.2454
Sex*pystatus	1	15.55	0.0001
Sex*age group	5	138.20	0.0000
Likelihood ratio	5	8.47	0.1320

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group categories: 0–14; 15–24; 25–34;35–44; 45–64; 65 and more.

Diseases of the Circulatory System varies in both sexes across the age groups or, inversely, that the differences in the probabilities across the age groups are not the same, between the sexes.

On the other hand, payment status (pystatus) appeared as interacting with sex and with age. That is to say that the probabilities across the insured and the not-insured are not the same either for men and women or the age groups.

For Diseases of the Circulatory System, the largest predicted probability was observed for the 'population' of not-insured women, aged between 35 to 44 years old (see appendix E). Actually, for those classified as not-insured, only the older than 65 had shown lower predicted probabilities than the insured[7]. On the contrary, the least likely to be discharged from a contracted private hospital due to Diseases of the Circulatory System was the 'population' of insured men, under fifteen years of old.

Among those more likely to be discharged due to Diseases of the Circulatory System (women aged 35 to 44 years old), the odds ratio between the not-insured and the insured was 3.37. This can be interpreted as the not-insured woman having more than three times the chance of being discharged due to Diseases of the Circulatory System than the insured, everything else being equal. Among men in the same age group, the odds ratio between the not-insured and the insured was smaller – 2.00. These large odds ratios for

[7]Insured patients are those classified as *Pystatus*= 4 in the fitted model. This category includes the employer, the employee, the self-employed and the unemployed

not-insured patients in the age group of 35 to 44 years old are the result of their large proportional discharges rates for Varicose Veins. Despite being a diagnosis with higher prevalence for women, not-insured men also presented larger proportional discharge rates for Varicose Veins than the insured men.

The above ratios indicate that not-insured patients are much more at risk of a discharge from Diseases of the Circulatory System than insured patients. It renders evidence for the hypothesis of supply-induced demand as the main explanation for not-insured patients' discharges being atypically concentrated in some particular diagnostic categories and age groups, thus, further pointing towards the operation of illegal practices within these hospitals.

For those patients older than 65, women had shown a larger predicted probability of discharge from Diseases of the Circulatory System than men. For insured patients, the odds ratio between the elderly women and the elderly men was 1.20. On the other hand, men (insured) in the age group between 45 to 64 had shown a larger chance of discharge from Diseases of the Circulatory System than women, suggesting that men have serious Circulatory Diseases at younger ages than woman.

7.3.2 Diseases of the Respiratory System ICD-9 460 to 466

The probability of discharge for Diseases of the Respiratory System also varied across payment status, even after being controlled by age and sex ($p < 0.01$), although this variation was statistically significant only for two payment status categories – the unemployed ($p < 0.07$) and the not-insured patients.

The variable *Pystatus* was created assuming the following values: 1=Unemployed 2=Not-Insured and 4=Others. In the new variable, the probability of discharge varied across the payment groups ($p < 0.01$), further indicating the existence of a relationship between the social group of the patient and probability of being discharged due to Diseases of the Respiratory System.

The relationship between the dependent variable (Diseases of the Respiratory System) and the independent variables in the model (see table 7.8, page 173) also appeared to be a complex one. More specifically, age and sex presented high chi-squares, denoting their important role in explaining variations in discharges due to diseases within this diagnostic group. Moreover, age and sex appeared to interact with each other.

The 'population' with the largest predicted probability of being discharged from Diseases of the Respiratory System consisted of women classified as unemployed and under 15 years of age (see appendix F). Actually,

Table 7.8: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of discharges due to "Diseases of the Respiratory System".

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	571.74	0.0000
Pystatus	2	12.94	0.0016
Age group	5	481.67	0.0000
Sex*age group	5	231.55	0.0000
Sex	1	171.60	0.0000
Likelihood ratio	22	28.24	0.1678

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group
categories: 0–14; 15–24; 25–34; 35–44; 45–64; 65 and more.

this age group presented the largest predicted probabilities for all payment categories and for both sexes, most probably revealing that the young population is being more seriously affected by Respiratory Diseases than the adult and the elderly populations. This follows the expected distribution of the disease in poor populations. Due to the high prevalence of malnutrition among children, they appear to be at a greater risk[120]. So everything else being equal, young women presented slightly larger predicted probabilities of discharge due to Diseases of the Respiratory System than young men. Nonetheless, for the other age groups, men tended to be more at risk than women, with the differences being much larger for the young adult. For the unemployed, the odds ratios for men and women were 3.13 for the age group between 15 to 24 years old; 2.85 for the age group between 25 to 34; 1.59 for the age group of 34 to 44 years old; 1.20 for the age group of 45 to 64 years old and 1.22 for those 65 years and older.

These larger probabilities for men, specially for the young adult men, suggest that men might be more at risk of Respiratory Diseases than the young adult women. As men are more prevalent in the labour market than women, it might indicate a greater exposure to risk factors for those in the economically active population. On the other hand, it might also indicate differences in access to contracted private hospitals between those in the labour market and their dependents.

The not-insured woman, aged 15 to 24 years old, presented the smallest predicted probability of discharge from Diseases of the Respiratory System. In general, the not-insured appeared to be the least likely to be discharged from Diseases of the Respiratory System, this being true for all age groups

and both sexes . This result contradicts the pattern shown by not-insured patients in other diagnostic categories, thus stressing the very selective and uncommon pattern presented by not-insured patients in contracted private hospitals' discharges in Rio.

The unemployed had the largest predicted probabilities of being discharged from Diseases of the Respiratory System in all the age groups and for both sexes. It is an indicator of their more deprived living conditions, which increase their risk of having serious Respiratory Diseases.

7.3.3 Diseases of the Digestive System ICD-9 520 to 611

The probability of discharge from Diseases of the Digestive System varied across payment status ($p < 0.01$), even when controlled by age and sex. This variation was statistically significant only for some of the payment status categories, most noticeably the employee ($p < 0.01$) and the self-employed ($p < 0.05$) and the not-insured.

The variable *Pystatus* was created assuming the following values: 1=Employee, 2=Self-employed, 3=Not-insured and 4=Others. It was created by combining those categories which were not shown to be statistically significant. In the new variable, the probability of discharge varied across the payment groups ($p < 0.01$), allowing the rejection of the null hypothesis – no effect (pystatus) in the probability of being discharged due to Diseases of the Digestive System.

The relationship between the dependent variable (Diseases of the Digestive System) and the independent variables in the model (see table 7.9, page 175), showed a distinct pattern. The variable sex presented a high chi-square which indicates its relevance as an explanatory variable in this model. First level interactions were all statistically significant ($p < 0.01$) demonstrating that variations across each variable in the model, on the probabilities of being discharged from Diseases of the Digestive System, did not hold the same when these variables interact. That is to say, for instance, that the probabilities of discharge from Diseases of the Digestive System across the payment categories, vary between the age groups and the sexes.

The most likely people to be discharged from Diseases of the Digestive System are the not-insured men, 25 to 34 years old (see appendix G). On the other hand, the least likely people to be discharged from this major group of diseases are again the not-insured women under 25 years of age.

The differences between the sexes among not-insured patients should be highlighted. The not-insured men presented the largest predicted probabil-

Table 7.9: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of discharges due to "Diseases of the Digestive System".

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	116.94	0.0000
Pystatus	3	89.96	0.0000
Age group	4	142.34	0.0000
Pystatus*age group	12	27.87	0.0058
Sex	1	252.02	0.0000
Sex*pystatus	3	47.83	0.0000
Sex*age group	4	71.62	0.0000
Likelihood ratio	12	8.86	0.7147

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group
categories: 0–24; 25–34; 35- -44; 45–64; 65 and more.

ity of discharge from Diseases of the Digestive System for all age groups, except the one of under 25 years of age. Again, for Diseases of the Digestive System the not-insured showed a pattern far from the one shown by their insured counterparts. This atypical pattern is mainly attributable to their very large proportional discharge rate for Inguinal Hernia, a disease with higher prevalence in men.

Actually, men presented larger predicted probabilities for discharges in the above diagnostic category than women, for all payment groups. The odds ratios between the sexes varied across payment groups with the not-insured showing particularly large variations for the age group between 25 to 34 years old. While the odds ratio for men and women, 25 to 34 years old were 5.0 for the employee, 4.0 for the self-employed, it was 12.20 for the not-insured.

Given the magnitude of the variations in the predicted probabilities between the sexes, particularly among those in the productive age groups, it is suggested that within this diagnostic group, men are seeking and/or getting more access to contracted private hospitals than women.

For the remaining payment groups, in general, the category which includes the employer and the unemployed showed larger predicted probabilities than the employee and the self-employed, the latter groups showing the smallest predicted probabilities for Diseases of the Digestive System. Larger predicted probabilities for the unemployed and employer group are mainly attributable to the diagnostic group of *Hepatic Chronic Disease and Cir-*

Table 7.10: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of discharges due to "Neoplasms".

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	854	0.0000
Pystatus	3	76.64	0.0000
Age group	1	20.17	0.0000
Pystatus*age group	3	7.19	0.0660
Sex	1	57.36	0.0000
Sex*age group	1	17.74	0.0000
Likelihood ratio	6	8.20	0.16240

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group categories: 0–34; 35 and more.

rhosis *ICD-9 571* for which these payment groups have shown the largest proportional discharge rates.

7.3.4 Neoplasms ICD-9 140 to 239

The probability of discharge for Neoplasms also varied across payment status ($p < 0.01$), even when controlled by age and sex. But, this variation was statistically significant ($p < 0.01$) only for the self-employed, the unemployed and the not-insured. Again, a new variable *Pystatus* was created assuming the following values: 1=Self-Employed, 2=Unemployed, 3=Not-insured and 4=Others representing the payment groups. In the new variable, the probability of discharge varied across the payment groups ($p < 0.01$), allowing the rejection of the null hypothesis of no effect of the explanatory variable (pystatus) in the probability of being discharged due to Neoplasms.

The relationship between the dependent variable (Neoplasms) and the independent variables in the model (see table 7.10, page 176) showed that for Neoplasms, payment group appeared to play an important role in explaining variations in the probability of discharges within this diagnostic category. It presented the highest chi-square value. Payment group also appeared to be interacting with age, and age to be interacting with sex.

Surprisingly, again the not-insured women older than 35 years were the 'population' which presented the largest predicted probability of discharge from Neoplasm (see appendix H).

Indeed, for those aged 35 years and more in all the social groups, women presented larger predicted probabilities of discharge from Neoplasm than men. However, unemployed women older than 35 had lower predicted prob-

abilities than employed men. This means that women classified as unemployed had lower chance of being treated from Neoplasm in contracted private hospitals in Rio than employed men.

The odds ratio for the not-insured and the unemployed woman, 35 years and older was 3.50, indicating an impressive difference between these two social groups in their probabilities of being discharged due to Neoplasms. Actually, this probability is mainly attributable to the not-insured's large proportional discharge rate for the procedure *Malignant Breast Tumour* (1.6 times bigger than the average rate), the most prevalent procedure among Neoplasms' discharges.

The unemployed showed the smallest predicted probabilities of being discharged from Neoplasms for all the age groups and for both sexes, further suggesting their greater difficulty in gaining access to acute contracted private hospitals for more costly care, such as cancer treatment.

The odds ratio for self-employed and employee/employer women aged 35 years and more was 1.43. This indicates that for this age group the self-employed presents a large predicted probability of discharge, suggesting that they are at a greater risk of diseases within the group of Neoplasms.

7.3.5   Infectious Diseases ICD-9 001 to 139

Following the trend observed for the other diagnostic categories, the probability of discharge from Infectious Diseases varied across payment status ($p < 0.01$), even when controlled by age and sex. This variation was statistically significant for the unemployed ($p < 0.01$) and the not-insured patients.

The variable *Pystatus* was created and assumed the following values: 1=Unemployed, 2=Not-insured and 4=Others. In this new variable, the probability of discharge varied across the payment groups ($p < 0.01$), allowing the rejection of the null hypothesis of no effect of the explanatory variable (pystatus) in the probability of being discharged from Infectious Diseases. Age appeared in the model (see table 7.11, page 178), as the most important variable for explaining the variations in the probability of being discharged from a contracted private hospital in Rio from Infectious Diseases. The only statistically significant first level interaction in the model was age interacting with sex, showing that the probabilities of Infectious Diseases by the age groups vary across the sexes.

The unemployed showed the largest predicted probabilities of discharge for Infectious Diseases for both the sexes and for all the age groups (see appendix I), reflecting their more deprived social conditions. The major differences in the predicted probabilities across payment status were for the

Table 7.11: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of discharges due to "Infectious Diseases".

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	750.69	0.0000
Pystatus	2	14.58	0.0007
Age group	2	246.47	0.0000
Sex	1	88.64	0.0000
Sex*age group	2	55.26	0.0000
Likelihood ratio	10	13.03	0.2222

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group categories: 0 – 24 ; 25 – 44 ; 45 and more.

unemployed and the not-insured. Surprisingly enough, for this group of diseases, mainly non-surgical and low technology-intensive care, the predicted probabilities for the not-insured were rather small. The odds ratio for the unemployed and the not insured were 2.39 for men younger than 25 years, 2.56 for men 25 to 44 years old and 3.44 for women 45 years and older.

There were great variations in the predicted probabilities between the sexes across the age groups, with a greater predominance of men, except for those older than 45 whose predicted probabilities were quite similar. The odds ratio for the unemployed men and women were 2.02 for the age group less than 25 years old, 3.80 for those 25 to 44 years old and 0.87 for those 45 years and older. This trend was also present for the payment group which included those employed and insured patients. However, the odds ratios were slightly smaller: 1.95 for the age group 24 years old and less; 1.44 for the age group 25 to 44 years old and very similar for the age group 45 years and older (0.89).

The above indicates a higher prevalence of men in discharges due to Infectious Diseases[8]. However, the explanation for the above is not clear and a selection favouring men cannot be discarded. There is no evidence in the literature, particularly in regard to Gastro-intestinal Infections[62, 134] indicating that these are illnesses associated with sex. Moreover, the frequent use in contracted private hospitals' codification of diseases of unspecific and ill defined codes, does not allow a clear understanding of the true distri-

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[8]The most common diagnoses for Infectious Diseases in contracted private hospitals' discharges were: 1) Ill-defined intestinal infections ICD-9 009. 2) Intestinal infections due to other organisms ICD-9 008. 3) Erysipelas ICD-9 035. 4) Septicaemia ICD-9 038. 5) Bacterial infection in conditions classified elsewhere and of unspecified site ICD-9 041.

bution of diagnosis among patients discharged. It also indicates the poor quality of the coding of diseases at these hospitals, if not in the provision of care.

7.4 Conclusions

Contracted Private hospitals in Rio showed a very particular case-mix, even when compared with contracted private hospitals in the country as a whole. Discharges were highly concentrated in some areas of care – one third of all contracted private hospitals' discharges in the city were in the area of maternal care. This was an area of care for which the city was experiencing a shortage of beds. Discharges also appeared to be highly concentrated in Cerebrovascular Diseases. These might be potentially profitable patients for contracted private hospitals – Cerebrovascular Diseases are a range of health care problems affecting mainly old people, who would be receiving very basic medical care. By providing sub-standard care, reimbursement would be maximized. This would be one aspect of the lack of concern and prestige which the elderly (specially the poor elderly) have been experiencing in Brazil[183]. Hospitals would profit by providing less than adequate care for a population who might be seen as a burden by their families and by society.

The split pattern of care observed for contracted private hospitals in the city – maternity and cerebrovascular diseases (geriatrics) and the limited role shown in the area of emergency and high-technology define the main characteristics of this sector of care in the city. The limited importance observed for the area of paediatrics should also be highlighted. The latter appears as a general trend within the social security contracted private hospitals in the country as a whole [36].

Contracted private hospitals in the city also showed relatively large concentration of discharges in the area of psychiatric and chronic care. Contracted private hospitals had been traditionally the main providers of psychiatric care for social security. However, the relatively larger participation of psychiatric discharges in the city is suggested to be also the result of reductions in the number of acute contracted private beds, following the political changes in social security from the beginning of the eighties (see chapter II). There is no evidence of an increase in the number of psychiatric private beds in the city in the last few years.

However, the relatively large share observed for chronic hospitals might be the result of an increasing link between acute and chronic hospitals.

This would be explained by the fact that a shift of costs between acute and chronic care would increase the profitability of treating some particular patients. This could be the case for patients with cerebrovascular diseases, which had also shown a large proportional discharge rate (28 per cent) to chronic hospitals . Patients might be discharged earlier from acute hospitals to be readmitted in a chronic hospital. This link would also justify the preference by contracted private hospitals for patients with cerebrovascular diseases.

Hence the case-mix in contracted private hospitals in the city is shaped by the payment mechanisms adopted by social security as well as by the characteristics of the health care market in the city of Rio de Janeiro. In this market the contracted private hospitals did not appear as a particularly competitive provider of care, occupying those areas where they faced less competition. Moreover, hospitals appeared as limiting the range of health care problems they would treat, within those most potentially profitable problems which are treated with low technology and an apparently low intensity of care. This would be an adverse response to the prospective payment scheme adopted by social security to reimburse private hospitals.

The unemployed and the not-insured showed the most different patterns of use. These payment groups displayed contrasting probabilities of discharge for a range of principal diagnoses.

Everything else being equal, the unemployed tended to show larger probabilities for those health care problems associated with deprived living conditions such as – Infectious and Acute Respiratory Diseases and, small probabilities for those groups of diseases requiring more costly and continuous care such as cancer.

On the other hand, the not-insured had shown an atypical pattern of admission, with extremely large frequencies for selected principal diagnoses strongly suggesting fraud.

It is also suggested that the general trend observed for employers, who did not show significant differences in their case-mix when compared with the employees and the self-employed (after controlling by age and sex), was a function of the very small numbers of discharges observed for this payment group.

The social characteristics of patients appeared as a significant element in the determination of the use of contracted private hospitals in the city of Rio. More specifically, payment status was shown to be a significant variable in explaining variations between patients in their main reason for admission (principal diagnosis). The study has also pointed towards an association

between age, sex and the use of inpatient services. It suggested that the relationship between these variables and use has two different aspects. One was related to biological characteristics determining the production of illness. The other was related to social characteristics, which reflects differences in life experiences between the age groups and sexes as a result of social discrimination.

Everything else being equal, men tended to be more at risk of being admitted to a contracted private hospital in the city of Rio de Janeiro than women. This was particularly true for Diseases of the Respiratory System, Digestive System and Infectious Diseases. The prevalence of men was also evident among psychiatric discharges. Additionally to variations in health 'need' between the men and women, this larger prevalence of men is suggested to be also related with one characteristic of social security health services, that is to select in favour of the economically active population, the real main target population of such a system.

Chapter 8

The Process of Care

In this section, the role of Contracted Private Hospitals in the City of Rio de Janeiro will be examined on the basis of the process of care delivered to patients e.g. the content of care provided. The content of care was analyzed by some of it's elements – type of admission, procedure performed, type of provider of care, length of stay, use of intensive care unit and reimbursement per discharge type. The process of care will also be analyzed to investigate the existence of variations across payment status in the process of care delivered to patients.

This analysis is limited to Acute Hospitals, since the data available for this study did not include information on the process of care for psychiatric and chronic hospitals. Indeed, in each one of these settings the process of care has a particular feature, given the particular characteristics of the health care problem they aim to care for and are not directly comparable.

8.1 Type of Admission

Type of admission is not strictly a variable related to process of care. It may reflect the incidence and prevalence of diseases in the population. But, it also may reflect characteristics on the supply side of the health care market, in terms of provision of services, payment mechanisms and clinical practice. Therefore, in this study, type of admission was regarded as an indicator, which may reflect need, as well as the existing structure of services.

The rate of elective surgery varies largely between and within countries[187, 163]. There is research evidence indicating that some of these variations are explained by factors other than variations in morbidity[116]. These are supply-induced demands as a result of variations in clinical judgement, medical practice, payment scheme, the supply and availability of services differentials in consumer demand and/or doctors decision-making.

The increasing option to perform some surgery on a day basis is behind some of the observed variations between regions. Nonetheless, it appears that day surgery in contracted private hospitals in the city of Rio de Janeiro was restricted mainly to a few surgical procedures such as *Tonsillectomy*.

8.1.1 Elective Admissions

For nine out of ten discharges from contracted private hospitals in Rio, the patient had a non-planned admission: it was an emergency admission. Focusing only on admissions of surgical patients, the proportional discharge rate for emergency admissions was just slightly smaller – 86.6 per cent of surgical patients' discharge (see figure 8.1).

Figure 8.1: Proportional discharge rates for type of admission.
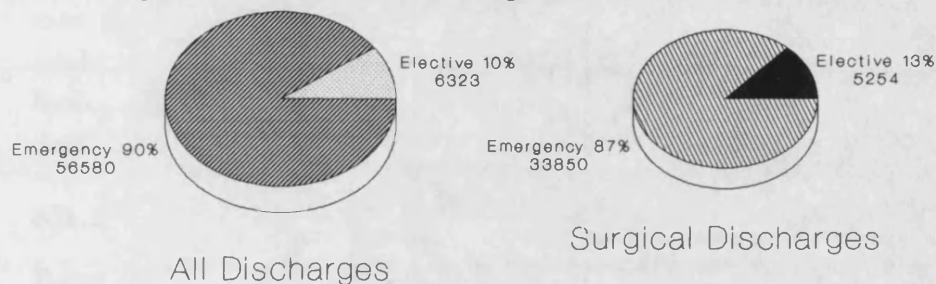
Note – Acute contracted private hospitals. City of Rio de Janeiro – 1986.

However, when the analysis focused on those more frequent elective reasons for admission, the probability of an emergency admission dropped to three out of ten admissions. Put in a different way, for those most likely to have an elective or planned admission, seven out of ten patients really had an elective admission. The rate of elective admission was, however, smaller for some particular diagnoses such as the *Neoplasms*.

The rate of elective and emergency admissions varied largely by type of surgeon (see table 8.1, page 184). Salaried surgeons were less likely to perform an elective surgery than contracted surgeons. This points out to the underlying division of labour between salaried and contracted surgeons in contracted private hospitals in Rio. Those who were salaried performed the majority of operations, mainly those emergencies and non-planned surgeries. To a great extent, this is attributable to the division of labour between the salaried and the contracted surgeon by areas of care (specialty) observed in these hospitals. As is presented later in this chapter, salaried surgeons

Table 8.1: Proportional discharge rates for type of admission by payment scheme of the provider of care.

Surgeon's Payment Scheme	Elective	Emergency
Salaried (%)	18.4	81.8
Contracted (%)	81.6	18.2
Total (%)	100.0	100.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

are responsible for performing the majority of obstetric surgeries. The most common obstetric surgical procedures were: normal delivery, caesarian section, curettage post abortion and premature labour – all representing health care problems classified as emergency, except for caesarian section which might be a planned intervention. Moreover, the salaried surgeon is the professional present at hospitals all the time and therefore is more likely to perform the emergency operations which arrive at the hospital.

8.1.2 Variations across Payment Status

Rates for elective admission varied greatly across payment status (see table 8.2, page 185). The unemployed, the retired and the employer appeared to be less likely to have a planned admission than their counterparts (childbirth admissions not included). The small rate of surgical treatment for retired patients explains, in part, the small rate of elective admissions among such retired patients. Constraints on the availability of services for retired and unemployed patients are also suggested to account for their smaller probability of having a planned admission.

However, this does not seem to be the case for employer patients. Their lower risk of having an elective admission in a contracted private hospital is suggested to be a function of their case-mix and pattern of use. There is some evidence to suggest that employer patients admitted to contracted private hospitals in Rio tend to have a more complex case-mix than their counterparts – they have high rates of use of intensive care units and high average payment rates, as will be shown latter in this chapter. This might be related to the fact that the few employees who use contracted private hospitals do so for selected conditions – the most expensive ones being conditions such as Chronic Renal Failure and/or arising from the severity of their condition.

The most striking variations, however, were again for not-insured pa-

Table 8.2: Proportional discharge rates for type of admission by payment status.

Type of Admission	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Elective (%)	12.4	6.9	13.9	6.6	5.4	36.9
Emergency (%)	87.6	93.1	86.1	93.4	94.6	63.1
Total (N)	30394	231	3948	770	26109	1451

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986. (Excluded Childbirth Discharge). Missing 11 observations.

tients. Their discharge rate for elective admission was three and half times larger than the average rate. This rate was largely due to the very large prevalence among not-insured patients of elective Principal Diagnoses such as Inguinal Hernia and Varicose Veins. As previously discussed, the mechanisms behind these very large rates are unclear, but the evidence strongly suggests supply-induced demand, if not fraud.

In summary, patients in contracted private hospitals in the city of Rio de Janeiro were mainly admitted as emergencies. The rate of elective or planned admissions increased slightly when controlled for surgical patients and it was larger when the provider of care was a contracted surgeon. Proportional rates for elective admissions varied greatly across payment status, with not-insured patients presenting extremely large rates. The unemployed, the retired and the employers were the social groups less likely to get an elective admission.

8.2 Procedure Performed

8.2.1 The Rate for Surgical and Medical Causes.

Contracted Private Hospitals in the City

For patients discharged from contracted private hospitals in the city of Rio de Janeiro, 44.5 per cent were classified as surgical patients. Although, when normal delivery and cesarian section which accounted for 28.2 per cent of all discharges were excluded, the proportion of surgical patients dropped to 22.7 per cent of discharges (see figure 8.2, page 186).

This rate corresponded to little less than the share of surgical discharges in contracted private hospitals in the country as a whole. Traditionally, con-

Figure 8.2: Proportional discharge rates by medical and surgical procedure.
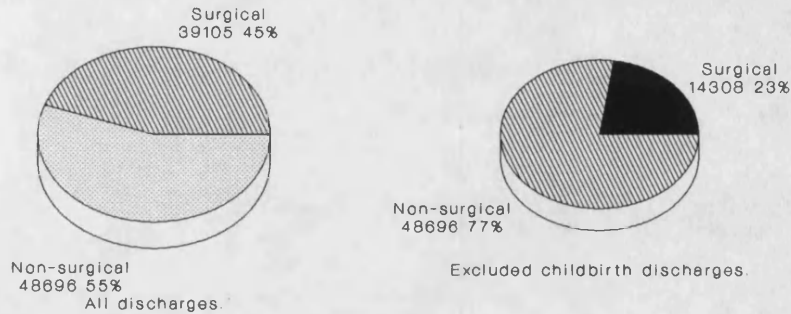
Note – Acute contracted private hospitals. City of Rio de Janeiro – 1986.

tracted private hospitals played a limited role in the area of surgery. When compared with other sectors and sub-sectors of care such as INAMPS' self-owned hospitals and teaching hospitals, contracted private hospitals' rate for surgical discharges was about half the figures shown for these other hospitals. As pointed out before, contracted private hospitals' structure appeared to be mainly directed to non-intensive care in the areas of obstetrics and non-surgical acute care. The most prevalent surgical procedures in the city's hospitals were: *Normal Delivery* (21.2 per cent of all discharges), *Cesarian Section* (7.0 per cent) and *Inguinal Hernia Repair* (0.9 per cent). The average payment rate for the fifteen most prevalent *surgical procedures*, in contracted private hospitals in Rio, was one third less than the average payment rate for contracted private hospitals in the country as a whole. The above gives further support to the conclusion that contracted private hospitals in the city were treating more simple surgical conditions, when compared with contracted private hospitals elsewhere.

Among *medical procedures*, Congestive Heart Failure (6.7 per cent of all discharges), Acute Cerebrovascular Accident (4.8 per cent) and Pneumonia not otherwise specified (2.6 per cent) were the most prevalent in hospitals in the city. However, in contrast to what was observed for surgical procedures, the average payment rate for the most prevalent medical procedures in Rio's hospitals was slightly larger than that observed for all contracted private hospitals in the country.

The distribution of medical procedures varied greatly between the city and the country. Rio's hospitals presented a case-mix of medical procedures concentrated on those health problems most characteristic of both middle

Table 8.3: Comparison of the most prevalent medical procedures in contracted private hospitals - Brazil and City of Rio de Janeiro.

City of Rio de Janeiro[*]	Brazil[**]
1) Congestive Heart Failure (adult)	Congestive Heart Failure (Adult)
2) Acute Cerebrovascular Disease	Bronchopneumonia (child)
3) Pneumonia Otherwise Specified (adult)	Gastroenteritis (child)
4) Diabetes	Gastroenteritis (adult)
5) Hypertension	Gastroenteritis (less than one year old)

Note – [*] Acute Contracted Private Hospitals – 1986. [**] Excluded Psychiatric Discharges – January until June – 1985.

and old age groups, while the country's contracted private hospitals presented a high prevalence of procedures in the area of paediatrics as shown by table 8.3. The distribution of medical procedures in the city is reflecting both the age structure of the population of the city and the selection in favour of the elderly, as previously discussed in chapter VI.

* * *

The likelihood of being discharged after surgical treatment was much larger for women than for men, even after the exclusion of childbirth admissions (see table 8.4, page 188). The occurrence of a surgical discharge also varied across the age groups, being higher for the age group 15 to 44 years old, even after the exclusion of childbirth discharges. This mainly reflects the large prevalence of female-specific surgical procedures among contracted private hospitals' discharges (obstetric and gynaecological care). However, when childbirth discharges were excluded, men showed larger prevalence for non-surgical discharges.

In summary, one third of contracted private hospitals' discharges in the city of Rio de Janeiro were classified as normal delivery or caesarian section. When childbirth discharges were excluded, the proportion of *surgical procedures* dropped to about one fifth of all discharges. The occurrence of surgical procedures in Rio's hospitals appeared to be, on average, of a less complex nature than in contracted private hospitals in the country as a whole. The most common surgical patient at these hospitals was a young adult woman. *Medical procedures* appeared to be more concentrated on those health problems related to middle and old age, showing larger prevalence for men, when childbirth is excluded. Contracted private hospitals

Table 8.4: Proportional discharge rates for surgical and medical procedures by sex.

	All Admissions		Childbirth Excluded
Procedures	Men	Women	Women
Surgical Procedures (%)	19.0	57.0	25.6
Medical Procedures (%)	81.0	43.0	74.4
TOTAL (N)	28601	59200	34313

Note — Acute Contracted Private Hospitals. City of Rio de Janeiro - 1986.

were mainly concentrated on obstetrics and geriatric care - two polar specialties within medical practice. They have shown a structure of services split into two extremes of medical practice – low cost obstetric care and low technology-intensive geriatric care.

8.2.2 Variations in Surgical Rates across Payment Status.

Some studies have demonstrated the existence of a relationship between the socio–economic characteristics of the population and rates of surgery. There is also evidence showing that this relationship varies across health care systems. An American study[18] showed that income was positively associated with surgery. However, everything else being equal, the more highly educated tended to have fewer surgeries. Coulter and McPherson[33] demonstrated that in England, before the creation of the National Health Service, the most privileged social groups tended to have more operations. However, this trend did not seem to be maintained after the creation of the National Health System. Roos[164], studying variations in surgical rates for the elderly population living in 56 small rural areas in Canada, found that large rate areas were associated with better education and with national origins from wealthier countries (Canada, England and United States). Income appeared a less relevant variable in the Canadian study, given their National Health Insurance Scheme, which makes care available to all regardless of income.

The rate of surgical procedures (excluding childbirth) showed an enormous variation across the payment groups in contracted private hospitals in the city of Rio de Janeiro. Not-insured and employer patients presented the largest rates and unemployed and retired patients presented the smallest.

Again, rates for not-insured patients appeared extremely large - about four times the rate for unemployed patients and two times the rates for retired patients (see table 8.5, page 189).

Table 8.5: Proportional discharge rates of surgical procedure by payment status.

	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Surgical (%)	28.6	33.3	32.4	24.8	12.4	48.9
Medical (%)	71.4	66.7	67.6	75.2	87.5	51.1
TOTAL (N)	30399	231	3949	770	26113	1452

Note — Contracted Private Hospitals (Excluded Childbirth Discharges). Rio de Janeiro – 1986.

Explanations for observed variations are distinct for each social group. For the retired, small surgical procedure rates might be the result of their older age which leads to increased risk of attempting surgery. Nonetheless, the very low volume of discharges among the retired in the group of procedures related to *Prostectomy* (0.25 per cent of all retired patient discharges), for instance, is indicative of a high threshold for retired patients for some surgical treatments. Cancer of prostate is among the three major cancers in mortality due to malignant neoplasms in the elderly population in Brazil[152].

It is also suggested that unemployed patients were experiencing limited access to surgical treatment in contracted private hospitals. This can be explained either by limited availability of services, constraining the demand of surgical patients in these social groups, or by social selection in the clinical decision process. This would imply that the less privileged would be less likely to have surgical treatment, despite the fact that some[20] physicians place higher value on surgical treatment.

To answer further the question about the existence of selection in the clinical decision process, the rate of surgery was analyzed among patients in the diagnostic group of Neoplasms, a group where for some diagnoses treatment might be either surgical or clinical. The observed variations for unemployed patients were even larger as shown by table 8.6 on page 190. Although these variations might be attributable to the type of disease and the severity, its magnitude suggests that selection mechanisms in doctors decision- making were operating as to limit access of unemployed patients

to surgical treatment.

Table 8.6: Proportional discharge rates of surgery for patients with neo-plasms by payment status.

Treatment	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Surgical (%)	40.2	53.3	38.1	29.4	24.6	32.2
Non-Surgical (%)	59.8	46.7	61.9	70.6	72.4	67.8
Total (N)	1754	15	430	17	1890	143

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

The large rate of surgical patients among the not-insured is related to their large rate in some specific elective surgical procedures, mainly: *Varicose Veins* (10.4 per cent of all surgical discharges for not-insured patients) and *Unilateral Inguinal Hernia Repair* (7.4 per cent). Not-insured patients rates were larger than rates observed for their counterparts, even though Inguinal Hernia Repair, for instance, is considered an elective surgery of low variation[190, 116]. This means that Inguinal Hernia Repair is a condition of low clinical uncertainty which means it raises few differences in clinical opinion. The average expected variation in rates of Inguinal Hernia Repair is in the 1.5 fold range. However, not-insured patients presented variations ranging from 2.8 times (Employers) to 12.5 times (Retired) (see table 8.7, page 191). It further suggests that other factors, besides differences in clinical opinion and morbidity, were operating at these hospitals, to push the not-insured rate to such levels.

Employers' large rates are suggested to be explained by a trend already seen for some diagnoses and procedures – a lower threshold for this most wealthy and prestigious social group, for the more expensive and technology-intensive care. This trend is further stressed by their larger probability of getting surgical treatment for cancer. The employers were among the payment groups with the highest average payment rate in contracted private hospitals in the city of Rio de Janeiro, as will be shown latter in this chapter.

Table 8.7: Proportional discharge rates for *Varicose Veins* and *Inguinal Hernia Repair* by payment status.

Procedure	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Varicose (%) Veins	1.5	0.9	1.8	0.4	0.4	10.5
Inguinal Hernia Repair (%)	1.5	2.6	1.3	1.9	0.6	7.4
Total (N)	30399	231	3949	770	26113	1452

Note — Acute Contracted Private Hospitals (Excluded Childbirth Discharges). Rio de Janeiro – 1986.

Testing the Hypothesis of Variation in the Rate of Surgery across Payment Status

This section was oriented towards testing the hypothesis of variations in the rate of surgery across payment status. The method employed for testing this relationship is presented in chapter III (Methodology) and chapter VII.

The null hypothesis being tested is that the explanatory variable *payment status* has no effect on the probability of undergoing surgery in a contracted private hospital in the city of Rio de Janeiro. The alternative hypothesis is that payment status affects the probability of undergoing surgery in a contracted private hospital. Discharges classified as retired were excluded from this analysis as well as childbirth discharges. The hypothesis was tested controlling for two main confounding variables : age and sex.

Variations across payment status in the probability of being treated surgically have been shown to be statistically significant ($p < 0.01$), even when controlled for the confounding variables in the model. This allowed the rejection of the null hypothesis. Variation in the probability of surgery were statistically significant ($p < 0.01$) for employees, the unemployed ($p < 0.01$) and the not-insured.

A new variable was created to substitute in the model for the variable payment status, by merging those groups which have not been shown to be statistically significant. The new variable *Pystatus* assumed the following values: 1= Employee, 2=Unemployed, 3=Not-insured and 4=Others.

The relationship between the dependent variable (Surgery) and the independent variables in the model (see table 8.8, page 192) shows that, besides payment status, age and sex also play an important role in explaining vari-

Table 8.8: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of surgery.

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	59.11	0.0000
Pystatus	3	155.86	0.0000
Age group	5	426.65	0.0000
Pystatus*age group	15	71.44	0.0000
Sex	1	17.95	0.0000
Sex*pystatus	3	45.67	0.0000
Sex*age group	5	468.77	0.0000
Likelihood ratio	15	21.48	0.1223

Note — Acute Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group categories: 0 – 14 ; 15 – 24; 25 – 34 ; 35 – 44; 45 – 64; 65 and more.

ations in the probability of surgery. The relationship between the variables in the model appeared to be a complex one. All first level interactions appeared statistically significant ($p < 0.01$). This indicates that variations in the probabilities of surgery across the payment groups were not the same between the sexes and the age groups. It means, for instance, that predicted probability of undergoing surgery for men classified as unemployed is different than the probability of undergoing surgery for men classified as employee.

Not-insured men, 15 to 24 years old presented the largest predicted probability of surgery in contacted private hospitals in the city of Rio de Janeiro (see appendix K). On the other hand, unemployed women aged more than 65 years old showed the smallest predicted probability. In fact, the not-insured presented the largest predicted probabilities of surgery for all the age groups and the sexes, except for young women (less than 15 years old) and, the unemployed tended to present the smallest predicted probabilities of surgery across the age groups and the sexes.

The odds ratio for not-insured men and male employees aged 15 to 24 years old was 3.07, indicating a much larger chance of surgery for the former. This ratio further manifests the immense over-representation observed for discharges classified as not-insured in some particular diagnoses, mainly those involving surgical procedures (see chapter VII). The explanation for the not-insureds' large predicted probabilities is suggested to be the performance of 'unnecessary surgery'[1] , if not fraud (ghost patients).

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[1]There is no consensus among the medical profession for the term *unnecessary*

On the other hand, the small predicted probabilities observed for the unemployed appear to be the result of a high threshold, preventing this social group from having predicted probabilities of surgery similar to their counterparts, everything else being equal. This follows the hypothesis already raised that this less prestigious group, excluded from the labour market, has a selective access to contracted private hospitals with a higher threshold in areas of more specialized care.

In summary, the existence of variations in the rate of surgery across payment status was observed. The unemployed and the retired appeared less likely to be admitted to a contracted private hospital for surgical treatment than their counterparts, especially the employers. Not-insured patients presented an anomalous large rate for some specific surgical conditions, putting further emphasis on the hypothesis of fraud. Observed variations in rates of surgery have been shown to be statistically significant after controlling for age and sex, confirming the hypothesis that social group is a relevant variable for explaining variations in surgical rates across patients discharged from contracted private hospitals.

Two main aspects of this relationship were raised in this analysis. Firstly, everything else being equal, the unemployed have lower surgical rates suggesting the existence of social practices operating in and/or outside the hospital setting that prevent this social group from having a similar pattern of treatment to the one observed for the employed and insured populations. Secondly, the large rates shown by not-insured patients cannot be explained by the age and sex distribution of not-insured patients in contracted private hospital discharges, further suggesting that they result from practices induced by the hospitals, which apply selectively to this payment group.

8.2.3 The Payment Scheme of Surgeons

There is reasonable evidence in the literature that doctors adjust their practice style in response to economic incentives[3, 49, 74]. Doctors under different payment schemes tend to have different practice patterns: they tend to vary in the intensity of care they provide, alter the mix of health care problems they treat and services they provide. Moreover, there is also literature pointing to the fact that doctors treat differently patients with different characteristics, despite the latter having identical medical problems[48].

In this section observed variations in the care delivered by salaried and contracted doctors were presented. The payment mechanism adopted by

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surgery[165]. This term is used here to express procedures performed without proper justification

INAMPS to reimburse care delivered by contracted private hospitals implies that contracted physicians' reimbursement is influenced by the volume and type of care provided (see chapter IV), the same not being true for salaried physicians. When professional services are provided by salaried doctors, the payment for this item of service is directed to the hospital. When it is provided by a contracted-out doctor, INAMPS reimburses the provider of care directly. Therefore, financial incentives upon contracted and salaried doctors are not the same. Moreover, hospitals' net income is likely to vary in relation to the payment scheme of the doctor.

This analysis is limited to surgical admissions. As shown in chapter V, reliability for *medical encounters* was very low. The latter is the variable which could provide information on the payment scheme of the provider of care for non-surgical admissions.

* * *

When the payment scheme of the provider of care was analyzed across the specialties, a marked division of labour between contracted and salaried surgeons was observed: 84.0 per cent of obstetric operations were performed by a salaried surgeon, while only 31.0 per cent of non-obstetric operations were performed by these professionals.

Considering that obstetric patients are by far the most frequent patient treated by contracted private hospitals, salaried surgeons are the most common provider of surgical care. They were responsible for performing 68.0 per cent of contracted private hospitals' surgery in 1986. This suggests that, when compared with the country as a whole, INAMPS was spending more with the payment of salaried professional services in contracted private hospitals in the city than with the payment of contracted-out professional services (see page 96).

Possibly, the pattern above was influenced by the payment scheme introduced by INAMPS in 1983 (see chapter IV), particularly, in regard to obstetrics. Within the environment of the Procedure Based Reimbursement Scheme (PBRS), contracted private hospitals might opt for having more services delivered by salaried doctors. By having more control upon the practice pattern of surgeons and, particularly, by increasing their workload, hospitals might maximize their reimbursement. The shift of some contracted doctors to the independent private sector might also happen as a response to the PBRS. However, this shift is not likely to explain the higher concentration of salaried doctors in the city's hospitals given the surplus of doctors in the city.

Variations were also observed among anaesthetists. In contrast to what was observed for surgeons, only 28.0 per cent of surgical patients, among those with information written on the AIH form about the anaesthetists, were treated by a salaried anaesthetist. It appears that contracted private hospitals tend to rely on contracted anaesthetists and not include them on their permanent staff. However, the incompleteness of this information on the AIH form (see chapter V) might be biasing this result.

Variations across payment status The probability of being operated on by a contracted surgeon also varied across payment status even when controlling for obstetric and non-obstetric care.

Employers were the payment group by far most likely to be treated by a contracted surgeon, both for obstetric and non-obstetric surgery (see table 8.9, page 196). This might be revealing another feature related to employers use of contracted private hospitals in Rio – being referred by their private physician who would treat them at hospital and/or indicate the surgeon who should perform the operation. This social group put a higher value upon doctors of their own choice and, have a greater ability (social and economic), they make demands according to their preferences. Extra payment might also explain employers' larger rates. Even though under social security rules the patient might opt for better 'hotel' services such as staying in a private room, he or she however assumes the payment of these extra expenses: extra payment for professional services is not allowed. Nevertheless, this practice seems to occur as pointed out by Aldaísa Foster[56] and Aor[157]

Employees, the most frequent payment group in contracted private hospital discharges, were among the payment groups less likely to be treated by a contracted surgeon both for obstetric and non-obstetric surgery. The same can be said about those patients classified as retired and not-insured.

Not-insured patients had a very high proportion of obstetric surgeries performed by salaried doctors and also tended to have a relatively high proportion of non-obstetric surgeries performed by a salaried surgeon. Whenever a surgery is performed by a salaried surgeon the identification on the AIH form for the performance of the surgery is that of the hospital. This results in that the hospitals might fill in an AIH form for what appears to be fraud without the knowledge of their staff. Nonetheless is has to be signed by the Clinical Director.

On the contrary, the unemployed showed a feature close to the one presented by the employers – a greater tendency to be treated by a contracted

Table 8.9: Proportional discharge rates by providers' of care payment scheme across payment status for obstetric and non-obstetric surgical discharges.

Provider	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Obstetric Surgery						
Salaried Surgeons (%)	83.5	77.0	83.7	81.6	89.3	96.0
Contracted Surgeons(%)	16.5	23.0	16.3	18.4	10.7	4.0
Total (N)	100.0	100.0	100.0	100.0	100.0	100.0
Non-Obstetric Surgery						
Salaried Surgeons (%)	36.8	16.7	32.6	21.4	33.4	38.1
Contracted Surgeons (%)	63.2	83.3	67.4	78.6	66.6	61.9
Total (N)	100.0	100.0	100.0	100.0	100.0	100.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro - 1986.

surgeon. This feature was clearer for non-obstetric surgeries than for obstetric surgeries.

This suggests that one alternative way for unemployed patients to get access to hospital treatment, specially for those with more serious conditions, is through the influence of the middle and upper classes. As a casual informal worker for the high income groups, the less prestigious social groups might be in a position to obtain access to services through the intervention of their more prestigious 'employers'.

8.2.4 Normal Delivery and Caesarian Section

Brazil is known to have a very high percentage of caesarian section deliveries when compared with other countries[87, 80, 11]. Caesarian deliveries increased in the country as a whole, from less than 15 per cent in 1970, to over 30 per cent in 1980[11]. A study examining the delivery practices in nine hospitals in the southern part of Brazil found that 41.3 per cent of all deliveries were by caesarian section. It also found that rates varied markedly across payment status. Among private patients, 75 per cent had caesarian deliveries. Insured patients, which included women covered both by private and government plans, presented a smaller rate of caesarian deliveries (42.1 per cent). And, only 22.1 per cent of indigent patients had caesarian delivery[87]. Data for PNAD (1981) also shows that caesarean rates in the country are significantly higher among middle and upper income groups[114]

However, it must be emphasized that even the rates for indigent patients were well above the rates observed for other countries. National rates vary markedly, from 5 per cent of all deliveries in the Netherlands to nearly 20 per cent in the United States[116].

Data from PNAD (1981) shows a rate of caesarian deliveries of 37.1 per cent, among deliveries in the *Metropolitan Region of Rio de Janeiro*. The study by Barros (1986) in Pelotas, demonstrated:

1. That caesarian deliveries were more prevalent among low risk women (33.0 per cent) than high risk women (27.0 per cent).

2. That the higher the income, the higher the prevalence of caesarian deliveries.

It clearly indicates an *Inverse Care Law*[72] applied to obstetric care in the country.

A very similar pattern of inequity in obstetric care was observed by Hurst (1985) for the United States which is also a country with exceptionally high caesarian delivery rates.

In Brazil, sterilization is an illegal procedure and therefore not reimbursed by INAMPS. Nonetheless, it is a common practice in the country to carry out sterilization during a caesarian section. This will generally lead to doctors charging the woman extra fees. Barros (1986) demonstrated that *Tubal Ligation* was one major cause of caesarian section. It was the reason for 40.0 per cent of all elective caesareans in Pelotas.

Another explanation for the large rates of caesarian sections observed in the country is the pressure on doctors to perform a caesarian section from the woman herself and from the family. This pressure is intended to avoid the pain of labour and/or to diminish the risk of harming their bodies. However, there is no clear scientific evidence that surgical delivery will guarantee a better outcome either for the mother or the infant, unless for very specific medical situations[107]. Despite the large rates of caesarian deliveries observed in Brazil, it is far from being a safe procedure. Caesarian section is major abdominal surgery. The literature highlights risks both for the mother and baby, associated with caesarian deliveries[136, 131, 80].

The very large rates of caesarian section observed in the country is an indicator that a large proportion of unnecessary caesarian sections are performed every year. This results in economic losses for Social Security - money which could be spent elsewhere as well as an increased risk of complications and deaths for mothers and infants.

The influence of non-medical factors pushing caesarian rates to unacceptable levels led INAMPS to change its' reimbursement policy for delivery. Since 1980, the reimbursement for professional services was equalized for Normal Delivery and Caesarean Section. This was meant to prevent the performance of unnecessary caesarian sections by reducing financial incentives. Nonetheless, there is no evidence that this policy succeeded in reducing the levels of caesarian rates in services financed by Social Security[11, 87].

Caesarian Sections in Contracted Private Hospitals in Rio

Contracted private hospitals in the city of Rio de Janeiro presented a caesarian rate of 25 per 100 deliveries, much smaller than the rate observed for the same year for contacted private hospitals in the country as a whole (38 per 100 deliveries). It appeared that the cities' hospitals were adopting a more conservative approach to obstetric care. Their rate was also smaller than the rate observed for all hospitals in the metropolitan region (37 per 100 deliveries). However, at least by international standards, the contracted private hospitals' caesarian rate could still be considered large. This means that unnecessary caesarian sections were being performed dur-

ing 1986. This hypothesis is strengthened by the fact that the second most prevalent Principal Diagnosis in patients with a caesarian section was: *Delivery by Caesarian Without Mention of Reason - ICD-9 669.7*. Moreover, as presented in chapter V, it has been observed that some high frequency diagnoses associated with caesarean section had shown very low reliability.

There is no apparent reason to assume that INAMPS' policy of equalizing the reimbursement for professional services for performing normal or surgical delivery would have succeeded in Rio, despite having failed throughout the country. Therefore, it is hypothesized that other causes together with the reimbursement policy, explain the particular feature of maternity care observed for contracted private hospitals in Rio. It is suggested that one of the reasons behind these relatively small rates is the fact that the contracted private hospitals in the city would not be identified as referral services for those women with medium and high gestational risk. This hypothesis is supported by the fact that most contracted private hospitals appear to have a very basic structure both in terms of personnel and equipment. There is some evidence, already discussed in chapter VII, that complex health care problems such as Ischemic Heart Disease, are not being referred and treated by contracted private hospitals in Rio. This same pattern might be working for maternity care.

It is also suggested that the relatively small caesarian section rate is a function of the social characteristics of the patients admitted. Women participating in a private insurance scheme would prefer to be delivered in a hospital without a contract with INAMPS. This would lead to a selection in the demand for contracted private maternity care in Rio, which would concentrate their patients on those less prestigious and poorer women, among the ones entitled to Social Security. As previously discussed, there is evidence that poorer and socially deprived women have a lower chance of having a caesarian section, regardless of need.

The other explanation for the observed rates in contracted private hospitals in Rio, is suggested to be related to the provider of care. A large proportion of the deliveries (84.4 per cent) were performed by a salaried surgeon. The literature indicates that the payment scheme influences clinical decisions[1, 35], with salaried surgeons being more likely to perform normal delivery than private surgeons[107]. For contracted private hospitals in Rio, the rate of caesarian section was slightly larger for contracted surgeons (27.0 per cent) than for salaried physicians (24.5 per cent).

In private contracted maternity units in Rio, the likelihood of a caesarian section increased with age (see table 8.10, page 200), following the same

Table 8.10: Caesarian section rates by age group.

Age of the Mother	Caesarian Section Rate
Under 20	16.00
20 – 24	21.15
25 – 29	28.45
30 – 34	31.33
35 and more	33.00

Note – Contracted Private Maternity Unities. City of Rio de Janeiro – 1986.

trend observed for the United States[147]. The most plausible explanation for this is the larger rate of repeated caesareans among older women. It is a common practice among obstetricians in Brazil, to perform a caesarian section once the mother had already had a caesarian section[10]. The third most frequent Principal Diagnosis among women, who had a surgical delivery in a contracted private hospital in Rio was: *Uterine Scar from Previous Surgery – ICD-9 654.2*. This diagnosis means in most cases a previous caesarian section. However, it is recognized nowadays that it is safe to perform a vaginal delivery, in women with a previous caesarian section.

Recently a committee of the American College of Obstetricians and Gynaecologists recommended that "the concept of routine repeat cesarean birth should be replaced by a specific indication for a subsequent abdominal delivery, and in the absence of a contraindication, a woman with one previous caesarian delivery with a low transverse incision should be counselled and encouraged to attempt labor in her current pregnancy"[96].

Fetal Distress – CID-9 656.3, the most prevalent diagnosis among women with surgical delivery, accounted for 18.2 per cent of all caesarian sections. It is expected that most of these were not diagnosed by Electronic Fetal Monitoring or another more specific diagnostic device. Given the very low technological input in these maternity units, it is assumed that most Fetal Distress was diagnosed by the use of the traditional stethoscope. Therefore, surgeons might be in the position of choosing to perform a caesarian section whenever they suspect Fetal Distress. The limited technology available in most contracted private maternity units, combined with the fact that, in most cases, very little is known about the woman's pregnancy and the labour itself, might induce doctors to perform caesarian section as a safety measure. It is known that the number of women attending ante-natal care in the city is very low among the poor and socially deprived. On the other hand, large

proportional discharge rates of Fetal Distress might be indicative of the fact that pregnant women are arriving in hospital at late stages of labour, thus increasing the risk of complication. This would be the result of limited availability of maternal care for some social groups living in Rio.

8.2.5 Variations in Caesarean Section Rates

The *proportional discharge rate for childbirth* varied largely across payment groups. Those patients classified as employees presented the highest rate (41.0 per cent) and those patient classified as retired (which includes the retired's dependents) the lowest (3.25 per cent).

em Rates of caesarean section also varied, with those patients classified as self-employed and employer having the highest rates (29.4 per cent and 28.4 respectively) and those classified as unemployed and not-insured having the lowest rates (see table 8.11, page 201). These figures suggest that clinical decisions were being influenced by the social attributes of the patient e.g. those presumably at higher risk of gestational and labour complications were having a lower chance of having a surgical delivery.

Table 8.11: Proportional discharge rates for childbirth and caesarean section rates by payment status. Per 100 discharges.

	Childbirth Proportional Discharge Rate	Caesarean Section Rate
Employee	41.05	24.81
Employer	30.05	28.43
Self-Employed	30.47	29.45
Unemployed	26.88	19.8
Retired	3.25	22.5
Not-insured	28.58	20.6
Total	28.2	24.9

Note — Contracted Private Maternity Units. City of Rio de Janeiro – 1986.

The type of surgeon performing delivery also varied across payment group, with employee patients presenting the largest rates of deliveries performed by contracted surgeons (see table 8.12, page 202).

Among those women who had a caesarian delivery, the unemployed showed the largest rate of *Fetal Distress* (32.1 per cent) suggesting a higher threshold for this social group in maternity care.

Table 8.12: Proportional distribution of providers of care for childbirth discharges by payment status.

	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Salaried (%) Surgeon	83.7	76.4	84.0	81.2	90.45	96.4
Contracted (%) Surgeon	16.3	23.5	16.0	18.8	9.54	3.5
TOTAL (%)	100.0	100.0	100.0	100.0	100.0	100.0

Note — Contracted Private Maternity Units. Rio de Janeiro – 1986.

Testing the Hypothesis of Variations in Caesarian Section Rates across Payment Status

This section was oriented towards testing the hypothesis of variations in the rate of caesarian section across payment status. The method employed for testing this relationship was presented in Chapter III (Methodology) and chapter VII. The null hypothesis being tested is that the explanatory variable *payment status* has no effect on the probability of delivery by caesarian section in contracted private hospitals in the city of Rio de Janeiro. The alternative hypothesis is that payment status explains variations in the probability of delivery by caesarian section between patients. Discharges classified as retired were excluded from this analysis. The hypothesis was tested controlling for two main confounding variables : age and the payment scheme of the provider of care. The variation in the probability of having a caesarian section across payment status was statistically significant ($p < 0.01$) even when controlled for age and the payment status of the provider of care. This allowed the rejection of the null hypothesis. Variations in the probability of caesarian section were statistically significant for the self-employed ($p < 0.01$) and the unemployed ($p < 0.03$).

A new variable was created to substitute in the model for the variable payment status, by combining what was not shown to be statistically significant. The new variable *Pystatus* assumed the following values: 1= Self-employed, 2=Unemployed and 4=Others.

The relationship between the dependent variable (Caesarian Section) and the independent variables in the model (see table 8.13, page 203), shows that besides payment status, the age of the patient and the payment scheme of the provider of care also have a role in explaining variations in caesarian

Table 8.13: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of caesarian section.

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	314.69	0.0000
Pystatus	2	9.63	0.0081
Age group	2	376.89	0.0000
Payment Scheme	1	6.63	0.0100
Payment scheme*Pystatus	2	8.27	0.0160
Likelihood ratio	10	9.89	0.4502

Note — Acute Contracted Private Hospitals. City of Rio de Janeiro - 1986. Age group categories: 0 - 24 ; 25 - 34 ; 35 and more.

section rates between patients. This is in agreement with existing evidence in the literature, as discussed earlier in this section.

Age presented a high chi-square in the fitted model, confirming its importance in the explanation of caesarian section rates. This meant that the older the patient, the larger the chance of having a caesarian section. Also, the payment scheme of the provider of care implied statistically significant variations ($p = 0.01$) in rates of caesarian section, regardless of the patient's age and social group . The payment scheme of the provider of care appeared to be interacting with payment status, indicating that variations in rates of caesarian section across salaried and contracted surgeons did not hold the same between the payment groups.

Self-employed women, older than 35 years and treated by a contracted surgeon presented the largest predicted probability of having a caesarian section (see appendix J). This predicted probability was extremely large, indicating a rate of 45 per cent of caesarian section among this specific population. On the other hand, unemployed women, younger than 25 years old and treated by a salaried surgeon presented the smallest predicted probability. However, even this lowest predicted probability (0.13) should be considered large, when compared with caesarian rates in other countries, as presented earlier in this section.

The odds ratio between the self-employed and the unemployed women, 35 years and older treated by a contracted surgeon, was 1.69. The latter indicates that everything else being equal, self-employed women have about 70 per cent more chance of having a caesarean section in a contracted private hospital, when compared with unemployed women.

For contracted surgeons, predicted probabilities of performing a cae-
sarian section were larger than for salaried surgeons, giving evidence that
medical practice varies according to the payment scheme of the provider of
care. This trend was true for all the age groups. The odds ratio of caesarian
section between contracted and salaried surgeons, for self-employed women
older than 35 years was 1.58, indicating that, everything else being equal,
contracted surgeons tend to perform about sixty per cent more caesarian
sections than salaried surgeons.

The above might be explained by the particularities in the relationship
salaried and contracted providers establish with hospitals and patients, re-
sulting in variations in the division of work between these professionals.
Salaried surgeons are more likely to work on a 12 or 24 hours shift basis, not
therefore being under pressure to shorten delivery time. On the other hand,
contracted surgeons are more likely to go to the hospital just to perform de-
livery for individual patients. The absence of financial incentives, given that
reimbursement in contracted private hospitals does not differentiate caesar-
ian section from normal delivery, added to the fact that contracted surgeons
can control their service delivery in such a way as to increase their financial
gains, should explain their greater tendency to perform caesarian sections.
The time spent to perform a surgical delivery is likely to be shorter than
for a normal delivery. Moreover, given that contracted surgeons appeared
to be more likely to treat patients in the most privileged social groups, they
would have a greater possibility of being under patients' demands to perform
a caesarian section.

Moreover, the predicted probabilities of caesarian section between con-
tracted and salaried surgeons were larger for those self-employed women
aged 35 years and older (odds ratio= 1.55) than for unemployed women in
the same age group (odds ratio= 1.08). This points in favour of the hypothe-
sis that clinical decision is influenced by the social attributes of the patient.
This might be the result of the demand from patients to have a surgical
delivery and/or social discrimination performed by physicians themselves.
The above hypothesis is further emphasized by the statistically significant
interaction in the fitted model between the social group and the payment
scheme of the provider of care.

In summary, rates of caesarian section followed the trend already ob-
served in the country: large rates for the most affluent social groups and
smaller rates for those at the lower end of the social stratification, regardless
of need. After controlling for age and the payment scheme of the provider of
care, variations across payment groups appeared to be statistically signifi-

cant, with self-employed patients showing the largest predicted probabilities of caesarian section and the unemployed the smallest predicted probabilities. The payment scheme of the provider of care has been shown to explain variations in caesarian sections between patients, confirming the evidence presented in other studies that the payment scheme of the provider of care influences the rate of caesarian section. Moreover, the payment scheme of the provider of care also appeared as a significant variable for explaining variations in caesarian section rates between social groups, indicating that the clinical decision process is influenced by the social characteristics of the patient.

8.3 Use of Intensive Care Units

Among the thirty six acute hospitals in the city of Rio de Janeiro, which had a contract with INAMPS in 1986, only eleven were equipped with an Intensive Care Unit. Those hospitals were responsible for 27.6 per cent of all discharges in that year. The statistical analysis performed for the reliability study (see chapter V) showed an inverse association between number of beds contracted by INAMPS in each hospital and the existence of Intensive Care Units. This feature suggests that more complex hospitals would be treating fewer social security patients, liberating their beds for other markets, most probably those financed by private insurance. In the reimbursement mechanism adopted by INAMPS to pay contracted private hospitals (see chapter IV), the utilization of intensive care units involves extra reimbursement based on previously established rates for the first 72 hours of stay and for the following days. However, this payment mechanism did not appear to have given an incentive for the use of intensive care in contracted private hospitals in Rio.

In 1986, reimbursement for the use of intensive care units amounted to less than 0.45 per cent of total reimbursement paid by INAMPS to these hospitals[2]. Indeed, a very small number of patients discharged have had any intensive care treatment (2.3 per cent of all discharges), indicating that there is low utilization of intensive care in contracted private hospitals in Rio, which might be explained by the low number of contracted hospitals equipped with such units and the negative incentive raised by the payment scheme in the area of technology-intensive care.

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[2]This calculus was based on the following reimbursement items: 1) Hospital services. 2) Professional services. 3) Diagnostic and therapeutic services. 4) Long length of stay.

Variations across payment status Use of intensive care units showed variations across the social groups (see table 8.14, page 206). Employer patients presented the largest proportional discharge rates of utilization of intensive care units (4.19 per cent), almost two times the average rate. The fact that employers are more likely to have access to the better equipped contracted private hospitals, might be responsible for their larger rates. In fact, this social group appeared to be over-represented in the discharges of some contracted private hospitals equipped with intensive care units.

However, variations in utilization rates of intensive care units could be indicating that the employer themselves presented a greater proportion of severe patients. This hypothesis was analyzed by looking at variations in the average length of stay in intensive care units. The retired were the payment group who presented, on average, longer stays at the intensive care unit as would be expected, given their older age and greater chance of complications. Employer patients did not show important variations in the length of stay at the intensive care unit, when compared with most others social groups, further suggesting that their largest utilization rate was reflecting the existence of a lower threshold in the better equipped contracted private hospitals for this social group. Again, extra payment might explain the greater ability of those patients classified as employers to get access to better equipped hospitals.

Table 8.14: Utilization rates of intensive care units (per 100 discharges) and average length of stay (days) across payment status.

	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Utilization Rates (%)	1.26	4.19	2.48	2.09	2.66	0.78
Length of Stay (days)	4.78	5.14	5.08	4.81	5.47	3.56

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

Not-insured patients presented the smallest utilization rates of intensive care units. In fact, less than 1.0 per cent of not-insured patients discharged from contracted private hospitals have been under intensive care treatment. The not-insured also presented a short average length of stay at the intensive care unit, when compared with their counterparts, which might indicate a less complex case-mix, both in terms of the distribution of diagnoses and

of severity among this group of patients. Actually, a high proportion of not-insured patients were discharged from contracted private hospitals in the city for non-complex surgical procedures such as Inguinal Hernia Repair and Varicose veins.

8.4 Reimbursement Per Discharge Type

As discussed in chapter IV, contracted private hospitals are reimbursed by INAMPS on a Procedure Based Reimbursement Scheme (PBRS), a prospective reimbursement system based on a fixed payment rate where the units of out-put are *Groups of Procedures*. Given that reimbursement is a function of the main procedure delivered to patients it can be used as a proxy of the case-mix between patients. However, a range of items within the hospital production are paid separately such as intensive care, large length of stay, and 'special procedures'. In this section, reimbursement per discharge accounted for some, but not all, existing reimbursement items. The items not included were those lacking information in the data set provided for this study by DATAPREV. These were:

1. Materials and medicines.

2. Special procedures.

As presented earlier, normal delivery and caesarean section were the two most frequent procedures in contracted private hospitals' discharges. They accounted for more than one quarter of all discharges. The reimbursement for these two procedures was equalized by INAMPS, as a means of reducing financial incentives to carry out unnecessary surgical deliveries. This policy was directed at the item *professional services*, recognizing that medical practice responds to financial incentives. Nonetheless, caesarian section is a more complex procedure. It requires a more specialised professional team, longer length of stay and greater resource consumption than normal delivery. Thus, the actual *full* rate of reimbursement for normal delivery on the one hand and surgical delivery on the other hand are not the same. For 1986, in contracted private hospitals in the city, the average total reimbursement for a Caesarian Section was approximately double the average total reimbursement for Normal Delivery[3]. This shows that a reduction in the number of unnecessary caesarian sections would bring substantial savings for INAMPS. These resources could be used to increase the availability of

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[3] However, the actual unitary value for each unit of professional services (see page 100) was in 1987 slightly higher for normal delivery than for caesarean section.

Table 8.15: The 'cost' composition for surgical and medical procedures (childbirth discharges excluded).

Reimbursement Items	Surgical Procedures	Medical Procedures
Hospital Services	50.9	58.3
Professional Services	31.2	16.5
Diagnostic and Therapeutical Services	9.8	12.9
Intensive Care	3.9	6.1
Long Length of Stay	2.3	6.0
Total	100.0	100.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

ante-natal care which should positively respond, further reducing the need for caesarian section in the city.

The 'cost' composition of discharges varied across surgical (excluding childbirth) and medical procedures (see table 8.15, page 208). Variations were mainly accounted for by the item *professional services*, significantly more costly for surgical procedures than for clinical procedures. Also, on average, total reimbursement per discharge for surgical procedures was 54.0 per cent more than the average reimbursement for clinical procedures. However, variations in the median reimbursement, which reduces the influence of extreme observations, was less impressive. The median reimbursement rate per surgical discharge was 17.0 per cent more expensive than the median reimbursement for clinical procedures, indicating that surgical procedures present a skewed distribution towards the left hand side, with a few procedures being much more costly than the average.

Variations across payment groups   The self-employed and the employers were on average the most costly patients in contracted private hospitals' discharges (childbirth excluded) in the city of Rio de Janeiro. They were even more costly than retired patients, who should be expected to be the most expensive group, given their older age.

Actually, patients classified as retired were on average 64 years old (child-birth excluded), which means they were on average twenty years older than patients classified as employer and self-employed. Both the employers and the self-employed had shown an average reimbursement per discharge about 10.0 per cent higher than the average reimbursement per discharge observed for retired patients. However, the observed variations between these two payment groups and the retired disappear when the median expenditures are compared, suggesting that a small proportion of employers and self-employed patients discharged from contracted private hospitals presented a more complex case-mix, which then can be seen to be responsible for ob-served variations in the mean reimbursement per discharge. Indeed, those classified as retired consumed 52.2 per cent of the total reimbursement for medical procedures and 30.5 percent of the total reimbursement for surgical procedures.

Employees had the lowest average reimbursement per discharge, 18.9 per cent less costly than the average reimbursement per discharge for retired patients. They were followed by the not-insured, who had the second lowest average reimbursement per discharge.

Not-insured patients were on average 40 years old (childbirth excluded), the same average age as the self-employed. Although it should be noted that the not-insured also had a particular age distribution (childbirth excluded), with about 50.0 per cent of discharges concentrated in the young adult range (15 to 44 years old) but also, showing a large concentration of discharges among elderly patients (14.0 per cent). This reflects their age distribution in the population as presented on page 137. Not-insured patients' reim-bursement per discharge was on average 19.0 per cent less costly than the average reimbursement per discharge for self-employed patients, indicating a less complex case-mix for these patients.

Unemployed patients were on average 33.8 years old (childbirth ex-cluded), an age close to the one observed for the average employee patient. However, their average reimbursement per discharge was 9.8 per cent more costly than the average reimbursement shown by employee patients, suggest-ing that the unemployed had a more complex case-mix than the employees and/or, everything else being equal, they are more costly than the employ-ees.

The average 'cost' composition (see table 8.16, page 210) of treatments delivered to patients varied slightly between the payment groups. The un-employed and the retired presented a somehow larger proportion of payment in the item *hospital services*, most probably reflecting their lower surgical

Table 8.16: The 'cost' composition of the average reimbursement per discharge, across payment status.

Reimbursement Items	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Hospital Services	56.0	55.0	54.0	57.0	57.0	54.0
Professional Services	23.0	21.0	23.0	21.0	19.0	28.0
Diagnostic and Therapeutical Services	12.0	13.0	13.0	12.0	12.0	10.0
Intensive Care	5.0	9.0	6.0	6.0	6.0	2.0
Long Length of Stay	4.0	2.0	4.0	4.0	6.0	6.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

rates, as seen before in this chapter. Actually, retired patients' average reimbursement per discharge had the lowest rate for the item *professional services*, the other effect on costs of their lower surgical rates.

On the other hand, the 'cost' composition for the average reimbursement per discharge for not-insured patients had a larger participation on the reimbursement item *professional services*, reflecting their very high surgical rates. This payment group, however, presented the lowest participation in the reimbursement item *intensive care*, which might indicate that not-insured discharges were predominantly located in these less complex hospitals. This group, however, presented a high participation in the reimbursement item *long length of stay*, which is an unexpected outcome since patients classified as not-insured appeared concentrated is non-complex surgical procedures.

The greater utilization of *intensive care unit* shown by employer patients was also reflected in their average payment rate. On average, the payment rate for *intensive care* delivered to patients classified as employers was 45.4 per cent higher than the average payment rate for those classified as retired patients. However, employers presented the lowest participation on the reimbursement item *long length of stay*. For this item, the retired and the not-insured had the highest participation.

The 'cost' composition presented by unemployed patients does not suggest that they were experiencing any important restrictions in the use of

intensive care and long length of stay compared to the level of use shown by employees, the self-employed and the retired.

8.5 Length of Stay.

Length of stay[4] varies considerably for apparently the same condition across hospitals, countries and financial arrangements [85, 66]. Variations can be a function of case-mix, transfer and death rates, supply of services, payment scheme and socio-demographic characteristics of the patients. They might also be the result of different customs between countries[3].

In this study, variations across social groups within hospitals with similar financial arrangements were assessed. It must be noted that the reimbursement scheme adopted by INAMPS to pay contracted private hospitals, based on a prospective payment approach (see chapter IV), tends to create incentives for hospitals to reduce the length of stay of patients as well as standardize the length of stay of patients classified under the same *Group of Procedures*.

Hospitals are not reimbursed for the amount of days patients stay at the hospital, but for a fixed payment rate based on the *procedure performed*. For each *Group of Procedures* there is a norm which defines the average length of stay for patients classified in that group. Extra costs will only be paid when the patient's stay at the hospital exceeds two times the established norm. For acute contracted private hospitals in the city, in 9.2 per cent of patients discharged, INAMPS reimbursed the hospital for extra costs in length of stay.

The coefficient variation[5] for the length of stay of patients discharged from the city's hospitals classified in the same procedure appeared to be high, as shown by table 8.17. If length of stay can be assumed as a proxy for resource consumption in hospital, as is the case with Diagnosis Related Groups (see chapter IV), the observed variations would be suggesting that there is a large heterogeneity between patients classified in most of the high frequency procedures. Moreover, if there is a large variation within procedures, it is likely that these variations will be even larger within *Groups of Procedures*, which are the real unit of payment in the Procedure Based Reimbursement Scheme (PBRS). These results indicate limited homogeneity

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[4]For calculating length of stay in this study, the patient who did not stay overnight was assigned a stay of one day

[5]Coefficient of variation is a measure of relative variability. It is calculated by dividing the standard deviation by the arithmetic mean and multiplying the result by 100 to express the value as a percentage.

in the unit of output of the PBRS. However, a systematic analysis of these variations was outside the scope of this study.

Table 8.17: Coefficient of variation of length of stay for high frequency surgical and medical procedures.

Procedures	Number	Mean	Standard Deviation	Coefficient of Variation
Surgical Procedures				
1) Congestive Heart Failure (adult)	5925	9.3	7.482	80.45
2) Acute Cerebrovascular Accident	4238	9.5	8.571	90.22
3) Pneumonia not otherwise specified	2321	8.8	7.180	81.59
4) Diabetes	1889	9.6	8.878	92.48
5) Hypertensive Crisis	1683	7.8	6.657	85.35
6) False Labour	1389	1.8	2.312	128.44
7) Acute Asthmatic Attack	1015	6.4	5.405	84.45
8) Chronic Obstructive Pulmonary Disease	1014	8.8	6.759	76.81
9) Threatened Abortion	988	2.2	1.536	69.82
10) Acute Coronary Insufficiency	987	7.0	5.970	85.29
11) Breast Cancer	856	5.8	16.174	278.86
Medical Procedures				
1) Unilateral Inguinal Herniorrhaphy	795	4.6	3.301	71.76
2) Colpoperineoplasty	629	3.8	1.879	49.45
3) Semiotic Curettage	517	1.6	1.002	62.63
4) Varicose Veins (one leg)	407	3.1	1.210	39.03
5) Varicose Veins (both legs)	391	3.1	1.187	38.29
6) Haemorrhoidectomy	289	3.6	3.406	94.61
7) Circumcision	274	1.1	1.163	105.73
8) Tonsillectomy and Adenoidectomy	241	1.0	0.0	0.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986.

* * *

It appears that established norms for average length of stay in the System of Social Security Inpatient Care (SAMHPS), at least for some of the most frequent procedures in discharges from the city's hospitals, are close to the average length of stay observed in the United States, a country where hospitals tend to present low mean length of stay when compared with other developed countries[144]. For Caesarian section, for instance, the average length of stay for Diagnosis Related Groups–DRGs 370 (caesarian section with complications and/or comorbidities) and 371 (caesarian section without complications and/or comorbidities) the median observed length of stay was 5.6 and 4.8 respectively. The norm average in SAMHPS is 5 days. For Inguinal Hernia Repair, the observed mean length of stay in the United States

in 1980[115] was 5 days, in England and Wales it was 5.8 days. The norm in SAMHPS is on average 5 days. For tonsillectomy the median length of stay observed in the United States was 1.4 (DRG 059) and 1.3 (DRG 060). The norm in SAMHPS is on average 1 day. For Chronic Obstructive Pulmonary Diseases (DRG 088), the median observed in the United States was 5.9. The norm in SAMHPS is on average 6 days. For Specific Cerebrovascular Disorders except TIA (DRG 014) the median observed in the United States was 8.1. The norm in SAMHPS is on average 10 days.

The establishment of standards for length of stay is not easy, given the many imponderables influencing the length of stay at hospitals[115]. Nonetheless, inappropriate reductions in the length of stay might have a negative impact on the outcome of care and should be avoided. However, the assessment of the appropriateness of established length of stay standards, does not seem to have been INAMPS' objective, since the establishment of SAMHPS.

The average length of stay in contracted private hospitals in Rio was 6.0 days (median 3.0 days) for surgical procedures and 8.5 days (median 7.0 days) for clinical procedures. Observed length of stay for some of the most frequent procedures in acute contracted private hospitals in the city (see table 8.18, page 214) appeared to be over the established norms indicating that, at least for those particular procedures, the hospitals were potential losers. Inability to reduce the mean length of stay to standard levels might induce hospitals to some negative practices such as reducing the intensity of services delivered to patients, as a way to reduce losses with serious results on the quality of care.

However, as can be seen in table 8.18 on page 214, contracted private hospitals in the city did not appear, in general, to be losing out. Particularly for the area of obstetric care, observed average length of stay was below SAMHPS' standards, indicating that this has been a profitable area of care for hospitals in the city. It is also clear that hospitals were less successful in keeping within standard lengths of stay for clinical procedures than for surgical procedures. However, one important exception among clinical procedures was Acute Cerebral Vascular Accident (Stroke), the second most prevalent clinical procedure in contacted private hospitals' discharges. For this procedure, hospitals had an average length of stay well below the norm, strongly suggesting the hypothesis raised earlier in this study, that these were profitable patients for contracted private hospitals. Indeed, the observed mean was lower than in acute hospitals in the United States (15.2 days) and close to the median (8.1 days). The fact that patients with stroke

discharged from the city's hospitals had lower averages than those in North America, suggests that the average stay of patients at the city's hospitals was insufficient to provide an adequate standard of care. Moreover, in Brazil, the support outside hospital for those low income patients with disabilities and chronic conditions is very limited.

Table 8.18: Standard and observed lengths of stay for surgical and medical cases.

| Procedures | Number | Length of Stay | | |
		Observed Mean	Observed Mean (*)	SAMHPS Standards
Surgical Procedures				
1) Congestive Heart Failure (adult)	5925	9.3	7.5	7.0
2) Acute Cerebrovascular Accident	4238	9.5	8.0	10.0
3) Pneumonia not otherwise specified	2321	8.8	7.0	8.0
4) Diabetes	1889	9.6	7.2	7.0
5) Hypertensive Crisis	1683	7.8	7.2	7.0
6) False Labour	1389	1.8	1.8	3.0
7) Acute Asthmatic Attack	1015	6.4	4.9	4.0
8) Chronic Obstructive Pulmonary Disease	1014	8.8	7.1	6.0
9) Threatened Abortion	988	2.2	2.2	3.0
10)Acute Coronary Insufficiency	987	7.0	5.9	7.0
Medical Procedures				
1) Curettage Post-abortion	2156	2.1	2.1	2.0
2) Unilateral Inguinal Herniorrhaphy	795	4.6	4.2	5.0
3) Colpoperineoplasty	629	3.8	3.6	5.0
4) Semiotic Curettage	517	1.5	1.5	2.0
5) Varicose Veins (one leg)	407	3.1	3.1	3.0
6) Varicose Veins (both legs)	391	3.1	3.1	3.0
7) Haemorrhoidectomy	289	3.6	3.1	3.0
8) Circumcision	274	1.1	1.1	1.0
9) Tonsillectomy and Adenoidectomy	241	1.0	1.0	1.0

Note — Acute Contracted Private Hospitals. Rio de Janeiro - 1986. (*) Excluded outlier (discharges which had been reimbursed for *Long Length of Stay*).

Variations across payment status The variation pattern observed followed to a certain extent the trends discussed above for reimbursement per discharge (see table 8.19, page 215). The retired presented the highest length of stay, followed by the employer, the self-employed and the unemployed. Employees presented the lowest length of stay both for surgical and clinical procedures. Finally, not-insured patients had relatively low average lengths of stay for surgical procedures, but appeared in a middle position in clinical

procedures.

Table 8.19: Length of stay for surgical and medical cases across payment status.

Length of Stay	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Surgical Procedures						
Mean	4.8	6.5	6.6	7.4	8.7	5.0
Median	3.0	4.0	4.0	4.0	6.0	3.0
Medical Procedures						
Mean	7.3	7.8	8.1	7.9	9.8	8.9
Median	5.0	7.0	6.0	6.0	8.0	6.0
All Procedures						
Mean	5.0	6.9	6.2	6.3	9.4	5.6

Note — Acute Contracted Private Hospitals. Rio de Janeiro – 1986. Excluded childbirth discharges, deaths, transfers and long term patients (more than 30 days of length of stay).

The unemployed presented relatively high lengths of stay, possibly denoting their greater severity and/or worse living conditions requiring a longer stay at the hospital. Relevant evidence was not observed showing that the unemployed were experiencing greater constraints than their counterparts , in their length of stay at contracted private hospitals.

8.6 Conclusions

This chapter sought to assess the patterns of care delivered by contracted private hospitals in the city of Rio de Janeiro as well as to analyze variations associated with the social characteristics of the patient.

Contracted private hospitals in the city mainly treat patients without a planned admission. Medical cases are more prevalent than surgical cases and among surgical patients obstetrics was by far the most common specialty.

Surgical procedures performed by the city's hospitals appeared to be of less complexity than those performed in contracted private hospitals in the country as a whole. On the other hand, the most frequent clinical procedures in the city's hospitals were concentrated on those chronic conditions more prevalent in the middle-aged and the elderly populations, denoting restricted provision for paediatric patients. In, short, contracted private hospitals were providing services for a restricted range of health problems within the demand for health care services in the city.

Considering the characteristics of the payment scheme adopted by IN-AMPS to reimburse contracted private hospitals, hospitals in the city appeared likely to be profiting by providing treatment to obstetrical patients and to patients with acute cerebrovascular diseases, thereby achieving average length of stays lower than the average norm defined by INAMPS. The impact on the quality of care might be negative. For other high frequency procedures, average length of stay was longer than the norm, denoting the existence of difficulties to adjust the provision of care to the reimbursement mechanism adopted by INAMPS.

The major provider of care for surgical cases was the salaried surgeon, particularly of the high frequency and low complexity surgeries in the area of obstetric care. As the payment item *Professional Services* accounted for nearly one third of total reimbursement (excluding drugs and special procedures), hospitals would tend to profit by providing the bulk of routine surgeries through salaried surgeons. The law in Brazil for the employment of doctors defines a minimum salary of three legal minimum wages, approximately 150 dollars per month for 20 hours of work per week. Low salaries, low specialization and high productivity would result in increased income for hospitals. The impact on quality of care, however, is very likely to be negative.

It was suggested also that the unit of output adopted in the PBRS does not group homogeneous patients in terms of resource consumption. Heterogeneity between patients classified under the same *Group of Procedure* might induce hospitals to select patients and provide low quality of care.

In general, services provided by the city's hospitals appeared to be of low technological intensity as shown by the low use of intensive care, low surgical rates with predominance of low cost surgery, relatively low caesarian rates (in comparison with rates in the country), and concentration on medical procedures with a 'cost' composition with more than fifty per cent allocated in the item *Hospital Services*.

Process of care appeared to vary across the social groups. Observed variations denote differences in the patient's ability to demand a certain type of care and/or in the way doctors and hospitals judged patients from different social groups. Variations, however, respond also to the inequalities existing in society, reflecting differences in need and in the capacity of different social groups to consume health services. Variations were more evident when comparing patients classified as employers with those classified as unemployed; two social groups with contrasting social positions in society.

Employers, the less prevalent social group in contracted private hos-

pitals' discharges, appeared together with the self-employed as the most costly patients. This mainly resulted from the employers' larger surgical rate, larger caesarian section rate, relatively large use of intensive care and possibly, greater access to more complex hospitals. They also had the largest probability of being treated by a contracted surgeon. This social group exemplifies the predominant pattern of health care among high income groups in Brazilian society, namely to consume private health care services based on less conventional and more technology intensive care.

On the other hand, the *unemployed* showed low surgical rates even when controlled for health condition (Neoplasms). The unemployed had the lowest surgical rates (retired excluded) for all the age groups and both sexes. They had also the lowest rate of caesarian section, despite appearing as a right risk group for complications in pregnancy. Nonetheless, the unemployed showed an average rate of use of intensive care and longer average lengths of stay, suggesting that these patients require a larger consumption of resources to be properly cared for.

There were also indications that the provision of services for the *retired* in contracted private hospitals is limited to some selected procedures and that their access to intensive care was also constrained, suggesting less than appropriate care.

An uncommon pattern of use was once more observed for the not-insured with emphasis on the extremely large non-obstetrical surgical rates even after controlling for age and sex, further suggesting the occurrence of fraud.

Chapter 9

The Outcome of Care.

In this chapter contracted private hospitals in the city of Rio de Janeiro will be analyzed on the basis of the outcome of care. The probability of dying during hospital admission will be assessed as a means of testing the hypothesis that patients who differ in their social characteristics vary in their probability of having a positive outcome (i.e. of being discharged alive) from hospital care.

9.1 Hospital Mortality Rates and the Quality of Care.

Outcome of care is one element of the analysis of the adequacy of care delivered to patients by health care services. Outcome of care is assumed by Donabedian[42] as "a change in a patient's current and future health status that can be attributed to antecedent health care". In this sense outcome is a relevant element of the quality of care. However, it is an element of the quality of care to the extent that observed changes are the result of the process of care. Quoting again Donabedian (1980), "...changes in the health status, they do not serve as a measure of the quality of care until other causes for such changes have been eliminated and one is reasonably sure that previous care is responsible for the change, which can be 'truly' called an outcome".

It is in this fundamental link between process and outcome of care where the main shortcomings arise for assessing the quality of care based on the outcome approach. Because, in general, a casual relationship between process and outcome of care has not yet been surely established.

Hospital mortality rates have been used as an indicator of adequacy of care delivered to patients, despite the fact that many uncertainties remain about it's validity as an indicator of quality of care[55, 138]. The main

reason for the frequent use of this variable is the availability of pertinent information. Indeed, death is information collected on a routine basis by most inpatient services.

Hospital mortality might be the result of various elements related to the quality of care, such as – cross-infections, misuse of medication and other therapeutical modalities, diagnostic errors, poor supervision of patients leading to falls, avoidable perioperative deaths and inappropriate discharge. Most of these could be improved through organizational and educative measures. However, one limitation for using hospital mortality data as a mean for assessing the quality of care is that the interpretation of this data might be biased by a complex range of factors.

- Differences in the case-mix and in the severity of illness between patients will lead to variations in hospitals' mortality rates. The measurement of case-mix for the purpose of comparing hospital death rates should adjust for patients' risk of dying. However, available case-mix measures[76] might require more detailed information than those readily available in routinely collected hospital statistics. Moreover, their validity and appropriateness for the purpose of discriminating patients' risk of dying still presents limitations[137]. Real differences might also be precluded by diagnostic coding errors.

- Differences in the age structure of the patient population have also to be considered, since there is a correlation between age and the risk of dying.

- Early discharge and transfer will imply differences in the chance of dying at the hospital. This means that when comparing the performance between hospitals, those which have higher transfer rates and/or lower length of stay might show misleadingly low death rates. To control for these variations some recent studies [191, 137] have also taken into account those deaths occurring within 30 days of hospital admission.

- Differences in hospital mortality rates between populations might be influenced by the proportion of people who died at home or during transfer to hospital. The likelihood of dying at hospital is a function of the availability and accessability of services. It is also a cultural matter. For some societies and social groups dying at home might be more highly valued than dying at hospital. In the United States, for instance, nearly half of the deaths occur in hospitals[138], indicating that, for the North American population, the hospital is regarded as

an appropriate place for dying. The same does not seem to be the case in England, where the terminally ill patient will frequently be transferred home to die near to relatives, in a familiar environment. This cultural pattern is likely to vary across social groups. This is most certainly the case for Brazil, a multi-cultural society, with large social inequalities.

In short, hospital mortality rates vary in different patient populations and organizational environments.

* * *

Pushed by the emergence of the prospective payment system, concern over the quality of inpatient care has increased in the United States during the last decade. This reimbursement approach, the same as used by INAMPS to reimburse contracted private hospitals (see chapter IV), might lead hospitals to provide less costly care at the expense of the quality of care delivered to patients. Since 1986, hospital-specific inpatient mortality data for Medicare patients have been released to the public by the Health Care Financing Administration. This was intended to provide the public with information on the performance of individual hospitals contracted by Medicare, as a means of increasing patients' choice as well as impacting positively on the quality of care.

Some studies were developed aiming at validating hospital mortality rates as a measure of the quality of services, by trying to demonstrate the link between the process of care and the outcome of death. Dubois (1987) conducted an investigation which classified hospitals in relation to the differences they have shown in their death rates to expected death rates, by using a model for adjusted hospital death rates. Using subjective review by expert clinicians, he managed to demonstrate that a significantly high rate of 'preventable' deaths appeared in the group of hospitals of higher-than-expected death rates. However, given the scope of the study, the author views its results as preliminary.

In the 1970's Rutstein et cols. (1976) proposed the use of mortality statistics as a way to develop warning signals about the performance of health care services. This approach might also raise hypotheses about the participation of other relevant social, biological and environmental factors in the occurrence of negative health events. Rutstein developed the concept of Sentinel Health Event - "a preventable disease, disability, or untimely death whose occurrence serves as a warning signal that the quality of preventive

and/or therapeutical medical care may need to be improved" and provided a list of conditions to serve as indexes of the quality of care.

Charlton et cols.[26] based on the list of Sentinel Health Events studied fourteen groups of diseases, aiming at developing an indicator of the quality of care for the National Health Service in England. This approach has also been used to compare the performance of health care systems between countries in Europe[75].

The groups of diseases were selected on the basis of those health problems for which mortality should be avoidable by the intervention of health care services and/or health programmes. They represent different aspects of the health care system, ranging from primary care to inpatient services. It is a simple monitoring method based on available data, which can spot areas where problems in the availability, accessibility and quality of care might be occurring and should be looked at in more depth.

An attempt was made by Bauer[12] to validate the above approach. He looked at the contribution of morbidity and social and economic variables in the explanation of differences of avoidable death rates between Area Health Authorities – AHAs, in England. This study showed that observed differences were not fully accounted for by the above variables, suggesting that variations might also be explained by the structure of the health care system and/or the performance of health care services.

9.2 Hospital Mortality Rates in Contracted Private Hospitals in the City.

This study was a cross-sectional analysis based on insurance claims and was limited to the range of variables on patients' characteristics, process and outcome of care available on the AIH form. This constrained the scope of the analysis of outcome of care to one indicator – hospital mortality rates (number of deaths per 100 discharges).

One relevant factor which might bias comparisons in hospital mortality rates is the reliability of the information on hospital deaths. The assessment of the reliability of data on the AIH form (see chapter V), had shown that for contracted private hospitals in the city, data on the AIH form related to the variable 'death', presented a high rate of agreement with the information written in the medical records. However, rates of agreement might diminish, whenever the analysis is performed at lower levels of aggregation (condition-specific levels), due to errors in the diagnostic coding process.

Moreover, for *death of the newborn* reliability was low suggesting that

the perinatal rate measured from AIH forms is lower than the 'true' rate.

For *all contracted private hospitals in the country* in 1986, 2.3 per cent of patients were discharged dead[127]. When Mental Illness's discharges were excluded, the hospital mortality rate was seen to rise slightly to 2.4 per cent. Cerebrovascular Diseases and Diseases of the Respiratory System accounted for more than one fourth of all these deaths. However, for *acute contracted private hospitals in the city*, in the same year, 6.1 per cent of patients were discharged dead. This represents a large hospital mortality rate, more than double the national figure which also includes chronic hospitals' deaths.

Cerebrovascular Disease was the most frequent Principal Diagnosis among deaths occurring in the city's acute hospitals (21 per cent of all deaths). The hospital mortality rate for this group of diseases was also larger in the city (24.2 per 100 discharges from Cerebrovascular Diseases) than in the country as a whole (20.7 per 100).

The larger percentage of patients dying from Cerebrovascular Diseases in the city's acute hospitals might be explained by the larger proportion of patients in this diagnostic category in these hospitals' discharges, as presented in chapter VI. Observed variations do not seem to be accounted for by variations in hospitals' length of stay, since the average length of stay for patients with cerebrovascular diseases in acute contracted private hospitals in the city appeared to be lower (9.5 days) than for all contracted private hospitals in the country as a whole (10.4 days). So the larger hospital mortality rate for Cerebrovascular Diseases observed in the city's acute hospitals points towards differences in patient's risk of dying and/or in the quality of care between the city's and the country's hospitals. Indeed, for the most frequent causes of deaths in contracted private hospitals, the city's acute contracted private hospitals tended to show larger hospital mortality rates than those observed for contracted private hospitals in the country.

The higher hospital mortality rate observed for the city's hospitals is suggested to be to a certain extent attributable to the bigger prevalence of elderly in their patients' population. As discussed in chapter VI, the elderly were clearly over-represented in the city's acute hospitals' discharges.

Nonetheless, there are indications that these rates are also associated with low quality of care. Mortality rates for two conditions highly prevalent among patients classified as retired – *Congestive Heart Failure* and Acute Cerebrovascular Disease (Stroke) – had very high death rates when compared with death for these same diseases among Medicare (see page 105) patients in the United States. A study conducted by Kahn et cols.[91] showed that within 30 days of hospital admissions, death rates for Stroke

was 20.0 per cent and for Congestive Heart Failure was 5.6 per cent. Deaths rates for the same conditions *during the patient stay* in contracted private hospitals in the city was:

- Congestive Heart Failure – 12.4 per cent.

- Stroke – 24.2 per cent.

Given that contracted private hospitals' data do not account for deaths occurring after discharge and that early discharge was likely among those patients with Stroke as shown in the previous chapter, it is expected that these rates would further increase if post-discharges deaths were also considered. Hence, this comparison further suggests that the health care system in the city was not dealing adequately with these patients and that contracted private hospitals were delivering less than adequate care

However, the larger mortality rates in the city's hospitals when compared with deaths rates in contracted private hospitals in the country as a whole might be also related to existing inequalities in the accessibility and availability of inpatient care between regions in Brazil, which is suggested to have an impact on hospital mortality rates. The availability of health care services determines patterns of use and influences cultural habits in relation to health and to death.

Indeed, observed hospital mortality rates tend to be lower in the poorer states of the northeast region than in those states in the more developed southeast region, where the city of Rio de Janeiro is located[60].

Nonetheless, problems in the quality of care delivered by contracted private hospitals in the city cannot be discarded. The magnitude of the observed hospital mortality rate in the city's acute hospitals, is per se a phenomenon which requires further explanation.

Rates of transfer should also be considered in the analyses of hospital mortality in contracted private hospitals. Those are in general low complexity secondary hospitals which have to transfer severely ill patients. Some of those are patients transferred due to complications acquired during their stay at the contracted private hospital. In short, a proportion of patients transferred will end up dying in another hospital, some of them due to the poor quality of services delivered in the contracted private hospital. Acute contracted private hospitals in the city showed a transfer rate of 2.2 per cent.

Hospital death rates (see figure 9.1 on page 224), varied largely between clinical and surgical patients. Surgical patients had much lower hospital mortality rates when compared with clinical patients. The high frequency

Figure 9.1: Hospital death and transfer rates for medical and surgical procedures.

Discharges 13714 96%
Transfers 235 2%
Deaths 269 2%

Discharges
41900 86%

Deaths
5101 10%

Transfers
1643 3%

Surgical Procedures

Medical Procedures
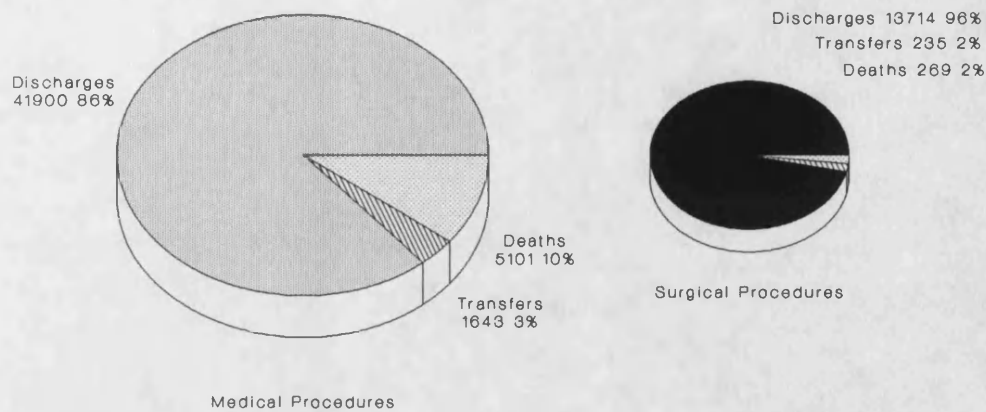
Note – Acute contracted private hospitals. City of Rio de Janeiro – 1986. Excluded 'administrative' discharges (permanência) and childbirth.

of low-risk surgical patients in the city hospitals' discharges, as presented in chapter VIII, accounts to a certain extent for the observed low surgical mortality rates. So, the large hospital mortality rate shown by the city's hospitals are mainly attributable to deaths among clinical patients.

Provider of care Among surgical patients, a variation in the outcome of care provided by salaried and contracted surgeons was observed (see table 9.1 on page 225). For obstetric patients, transfer rates were similar for patients treated by a salaried surgeon or a contracted surgeon, however, death rates were larger for those treated by salaried surgeons. For non-obstetrical patients, transfer rates and, particularly, death rates were larger for those patients treated by a salaried surgeon, highlighting the existence of variations in the outcome of care delivered by doctors with different payment schemes. Excessive workload and inadequate qualifications among salaried surgeons are possible explanations for this variation. These would be stimulated by hospitals as a mean of maximizing their net incomes.

9.2.1 Avoidable deaths.

The occurrence in contracted private hospitals in the city of deaths amenable to health care intervention was ascertained as a means of assessing the vol-

Table 9.1: Deaths and transfer rates by providers of care.

Rates	Salaried Surgeon	Contracted Surgeon
Obstetric Surgery		
Transfers (per 100)	0.13	0.18
Deaths (per 1000)	0.31	0.23
Non-Obstetric Surgery		
Transfer (per 100)	1.45	1.00
Death	4.41	2.81

Note — Acute Contracted Private Hospitals. Rio de Janeiro - 1986.

ume of deaths in these hospitals which are at least potentially preventable.

The list of preventable and manageable health care problems selected was based on those suggested by Charlton (1984). These are high frequency health care problems for which the outcome of death is considered an adverse event and as such, could be avoided, in a range of age groups for which medical intervention is more likely to be effective. Maternal and Perinatal Deaths were included in the list, as well as Nutritional Deficiencies ICD-9 (260 –263), which were added to the group of Deficiency Anaemia. Hypertensive and Cerebrovascular Diseases were combined to diminish biases due to coding errors[26] and Respiratory Diseases were considered within one single category.

Nonetheless, as these figures are based on inpatient statistics for one single sub-sector of care, they do not give a true picture of avoidable deaths in the city. By not relying on Death Certificates, they under-estimate deaths occurring elsewhere, for instance, deaths from cancer (Cancer Cervix Uteri and Hodgkin's Disease) and from Tuberculosis, health problems for which contracted private hospitals are not the most important provider of inpatient care in the city, are almost absent in the above figures.

For all deaths occurring in contracted private hospitals in the city (excluding stillbirth and newborn deaths), 11.6 per cent were classified as preventable deaths. Put in a different way, for each 100 deaths occurring in these hospitals during a year, at least 12 could be avoided by improvements in welfare and/or the availability and quality of services. This number would probably increase if deaths among patients transferred (see table 9.2 on

Table 9.2: Deaths and transfers for selected preventable and manageable health problems.

Health Problem	ICD – 9	Age Group	Deaths	Transfers	Total
Maternal Death (rate per 100,000 live births)	630 – 678	all	8 (32.9)	48	
Perinatal deaths (rate per 1,000 still and live births)		all	1004 (40.5)		
Hypertension and Stroke	400 – 404 430–438	35 – 64	450 (12.6%)	256 (2.4%)	3561 (100.0%)
Cancer of Cervix Uteri	180	05 – 64	9 (6.0%)	0.0 (0.0%)	139 (100.0%)
Acute Respiratory Diseases, Pneumonia and Bronchitis	460 – 466 470 – 474 480 – 486 490	05 – 49	32 (1.6%)	62 (3.2%)	1959 (100%)
Asthma	493	05 – 49	02 (0.3%)	08 (1.3%)	634 (100.0%)
Tuberculosis	010 – 018	05 – 64	2 (8.0%)	1 (4.0%)	25 (100.0%)
Bacterial Diseases	(*)	05 – 64	4 (0.7%)	11 (1.9%)	576 (100.0%)
Appendicitis	540 – 543	05 – 64	2 (7.7%)	2 (7.7%)	26 (100.0%)
Abdominal Hernias	550 – 553	05 – 64	0 (0.0%)	0 (0.0%)	1091 (100.0%)
Hodgkin's Disease	201	05 – 34	0 (0.0%)	0 (0.0%)	33 (100.0%)
Chronic Rheumatic Heart Disease	393 – 398	0 – 49	09 (5.0%)	o (0.0%)	167 (100.0%)
Acute and Chronic Cholecystitis	574 – 575.1	05 – 64	10 (2.0%)	07 (1.4%)	502 (100.0%)
Deficiency Anaemia and Nutritional Deficiencies	260 – 263 280 – 281	05 – 65	98 (15.2%)	39 (6.1%)	643 (100.0%)

Note — Acute Contracted Private Hospitals. Rio de Janeiro - 1986.(*) ICD - 9 codes - 004, 037, 320 - 322, 382 -384, 390 -392, 680 - 686, 711, 730.

page 226) were also taken into account.

The high volume of preventable deaths from Hypertension and Stroke strongly suggests the need for more effective policies for the control of hypertension, as a means of reducing cerebrovascular morbidity and mortality. However, the quality of care in contracted private hospitals is also under question, given the age range of patients dying from the above diseases.

The observed large volume of deaths from Nutritional Deficiency and Deficiency Anaemia was another warning signal of the gravity of the socio-economic inequalities in the city. Of those deaths, 26 occurred in patients classified as employees. This means death from malnutrition in people working in the formal labour market, who earn at least one legal minimum wage. Death from malnutrition in employed adults is an indicator of the inadequacy of economic and social policies in guaranteeing basic standards of living for the population. Indeed, this study showed that malnutrition in adults was among the twenty most prevalent procedures in acute contracted private hospitals' discharges. Those patients had, in general, high mortality rates. These were particularly high among those patients classified as retired.

The area of maternal care also showed some disturbing figures, strongly indicating the inappropriateness of the existing supply and delivery of maternity services in the city. Low quality of care in contracted private hospitals is also suggested as being responsible for these figures.

The death of a woman due to complications of pregnancy, delivery or puerperium is an unacceptable and avoidable event [101]. Maternal deaths in contracted private hospitals in the city were 32.9 per 100,000 live births. Despite being a relatively high rate, when compared with rates in some European countries[99], this is *apparently* a low maternal death rate by Brazilian standards. The maternal death rate in the city of São Paulo, in 1986, was 99.6 per 100,000 live births[103]. This is a corrected rate, which accounted for the under-estimation of maternal deaths observed in 'Death Certificates'.

Observed maternal death rates in contracted private hospitals have to be carefully analyzed. Firstly, these are institutional figures which means that they are under-estimated, because they do not account for deaths occurring after discharge. The definition of maternal death refers to deaths occurring within 42 days after the end of pregnancy, which were related to this event.

Secondly, contracted private hospitals' maternal death rates do not include patients dying after being transferred to other services. Actually, if all transfers in the major group of diagnoses – Complications of Pregnancy, Delivery and Puerperium – were assumed to have ended up in death, the

maternal death rate would have been raised to the alarming figure of 230 per 100,000 live births. This rather extreme hypothesis is not expected to apply, but it is presented to emphasise the great impact that transfer might have, biasing the true maternal death rate in contracted private hospital patients. Thus, the observed large transfer rate in the area of maternal care should be considered as a warning signal, requiring more in depth review, on a case by case basis.

The other indicator of the appropriateness of maternal care is the perinatal mortality rate. This is the rate of stillbirths plus deaths under 7 days of age in the year by the number of births (live and still) in the year per 1000[97]. Perinatal mortality is associated with income, low birth weight, antenatal care and delivery[186].

The longitudinal study of Pelotas[186] investigated all hospital births occurring in the city. It observed a perinatal mortality rate of 32.2 per 1000. Laurenti (1985), also observed a perinatal mortality rate of 35.2 per 1000 in nine maternity units in the south of Brazil. The observed perinatal mortality rate in contracted private hospitals in the city of Rio was 40.5 per 1000, a large rate when compared with the above figures. As is the case with hospital death rates in general, hospital perinatal mortality rates are under-estimated, since they do not consider deaths occurring after transfer or discharge. The median length of stay for normal delivery was 2 days and for caesarian section 4 days, suggesting that some perinatal deaths might have occurred at home. It must also be emphasized that the reliability study, as presented before, strongly suggested that perinatal mortality rates calculated from the AIH form are under-estimated. Moreover, for each two hundred babies born alive in a contracted private hospital in the city, one was transferred to another hospital.

The magnitude of the perinatal mortality observed in contracted private hospitals in the city is particularly worrying, since these hospitals were treating, in general, potentially low risk patients, further suggesting low standards of care in the area of maternal care.

9.3 Variations in Hospital Death Rates across Payment Status.

Crude hospital mortality rates showed important variations across the payment groups (see table 9.3 on page 229). The not-insured presented the lowest hospital mortality rate for surgical conditions and the second lowest rate for clinical conditions. In fact, observed crude hospital death rates for

patients classified as not-insured and employees appeared to be very close to the rate observed for contracted private hospitals in the country as whole (2.3 per cent).

On the contrary, patients classified as retired presented the largest hospital mortality rate, both for clinical and surgical conditions, most probably also influenced their older age and the poor quality of care. Patients classified as retired had a total hospital mortality rate of 14.4 per cent. Employer patients had also surprisingly large death rates. Indeed, patients classified as retired, employers, self-employed and unemployed had crude hospital mortality rates above the contracted private hospitals' national rate.

Table 9.3: Hospital mortality and transfer rate by payment status. Per 100 discharges

	Employee	Employer	Self–Employed	Unemployed	Retired	Not Insured
Surgical Procedures						
Transfer Rate%	1.36	1.30	1.56	1.05	2.86	0.14
Death Rate%	0.90	2.60	1.02	1.57	5.20	0.60
Total (N)	8704	77	1280	191	3256	710
Medical Procedures						
Transfer Rate%	2.98	3.25	3.00	3.97	3.82	1.89
Death Rate%	5.00	7.80	6.70	6.90	16.30	6.50
Total (N)	21695	154	2669	579	22857	742
All Procedures						
Transfer Rate%	1.5	2.1	1.8	2.5	3.6	0.7
Death Rate%	2.3	4.2	3.4	4.1	14.4	2.6

Note — Acute Contracted Private Hospitals (Excluded Childbirth Discharges. Rio de Janeiro – 1986.

The probability of dying in a contracted private hospital from a preventable condition also varied largely between the payment groups. Excluding those classified as retired, which are at a lower risk of an avoidable death[1], the probability of a preventable death ranged from 15.4 per cent of all deaths among patients classified as employers to 25.6 per cent of all deaths among patients classified as unemployed. These figures point to the existence of inequalities in access to those services and goods which might

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[1] The concept of avoidable death excludes the elderly and those patients younger than five years old

prevent illness and death. Variations were also observed across the payment status in perinatal mortality rates, ranging from a relatively low rate for employee patients (19.2 per 1,000 births) to an extremely large rate (70.7 per 1,000 births) for those classified as not-insured patients.

9.3.1 Testing the hypothesis of variations in hospital mortality rates across payment status.

The hypothesis that the probability of a positive outcome (being discharged alive) varies between the payment group was tested by looking for the negative event – the probability of dying in hospital. The methodology employed for testing this relationship was presented in chapter III (Methodology) and chapter VII. The null hypothesis being tested is that the explanatory variable *payment status* has no effect on the probability of dying in hospital, for patients admitted to contracted private hospitals in the city of Rio de Janeiro.

Discharges classified as retired and those related to childbirth were not included in this analysis. To avoid bias, patients transferred and 'administrative' discharges were also excluded. The hypothesis was tested controlling for two confounding variables – age and sex. Severity of illness could not be measured.

The variations in the probability of dying at hospital across the payment status was statistically significant ($p < 0.01$) even when controlled by age and sex. This allowed the rejection of the null hypothesis. Variations in the probability of dying were statistically significant for the unemployed ($p < 0.03$) and for the not-insured. This indicates that observed variations in crude hospital mortality rates between the employees, the self-employed and the employers, presented in the previous section, were a function of their age and sex distribution. When controlled by these variables, variations tended to disappear.

A new variable was created to substitute in the model for the variable payment status, by combining what was not shown to be statistically significant. The new variable *Pystatus* assumed the following values: 1=Unemployed, 2=Not-insured and 4=Others.

Age appeared as an important variable associated with the hospital mortality rate in the fitted model (see table 9.4 on page 231). Sex also appeared as a relevant variable in explaining variations in death rates between patients. These two variables appeared to be interacting. That means that the mortality rate across the sexes will vary by age group or, inversely, that variations between the age groups do not hold the same across the sexes.

Table 9.4: Values of the maximum likelihood statistics for the fitted model to test variations in the probability of dying in hospital.

Source	Degrees of Freedom	Chi-Square	Probability
Intercept	1	823.05	0.0000
Pystatus	2	11.04	0.0040
Age group	3	68.32	0.0000
Age group*sex	3	43.51	0.0000
Sex	1	39.20	0.0000
Likelihood ratio	14	12.53	0.5634

Note — Contracted Private Hospitals. City of Rio de Janeiro – 1986. Age group categories– 0 –24; 25 – 44; 45 – 64; 65 and more.

The probability of death tended to increase with age for all the payment groups and both sexes (see appendix L). The only exception was for women younger than 25 years old, who presented larger probabilities of dying in hospital than women between 25 and 44 years old. The latter indicates that the large utilization rate observed for women between 25 to 44 years old is highly concentrated in low-risk health problems.

On the other hand, men had larger probabilities of dying in hospital for all payment groups and all age groups, except for those older than 65. For the latter age group, women appeared to have a greater risk of dying in hospital than men.

Patients classified as unemployed had the largest probabilities of dying in hospital for all the age groups and for both sexes, indicating their greater severity of illness and/or lower quality of care. Those classified as not-insured presented the lowest probability of dying in hospital, for all age groups and for both sexes. This clearly reflects the large proportion of not-insured patients discharged from low-risk procedures such as Inguinal Hernia Repair and Varicose Veins.

The population with the greatest chance of dying at a contracted private hospital were those women older than 65 classified as unemployed. The odds ratio for the unemployed to the not-insured woman older than 65 was 2.08, which means to say that the risk of an unemployed elderly woman dying was more than double that experienced by not-insured elderly woman.

At the other extreme, the population showing the smallest predicted probability of dying were those women patients classified as not-insured and aged between 25 to 44 years old. The odds ratio for the unemployed and not-insured woman in the above age group was 2.0. Actually, for this population

of not-insured patients the observed probability of dying was zero, because there was no death in this group during the year 1986 among the city's contracted private hospitals' discharges.

The low hospital mortality rate observed for not-insured patients might be another indicator that hospitals were using this payment group to perform illegal practices, since it should remembered that *ghost patients* cannot die! Not- insured patients also had low transfer rates, most probably further evidence that only *real patients* can be transferred.

In short, the large variations in the predicted probability of dying observed between the unemployed and the not-insured were very unlikely to be explained on epidemiological grounds, further suggesting the existence of fraud. However, the larger chance of dying observed for the unemployed is one dramatic outcome of their deprived and low valued life.

9.4 Conclusions.

Contracted private hospitals in the city had a large hospital mortality rate. This holds for most of the high frequency diagnostic groups. Despite the fact that the population of patients in contracted private hospitals in the city was suggested to be older than in contracted private hospitals in the country as a whole, there were various elements indicating that the quality of care was also one reason for the observed large mortality rates. Maternity care, which accounted for one third of discharges, had disturbing indicators of low quality of care. Moreover, for each hundred deaths occurring in these hospitals, at least 12 were classified as preventable.

Nonetheless, the large mortality rate observed was also an attribute of the case-mix in the city's hospitals, characterized by low-risk surgical patients and a high frequency of non-surgical adult patients.

The outcome of care provided by salaried surgeons appeared to be worse than that provided by contracted surgeons, even after controlling for obstetric and non-obstetric cases, suggesting that patients treated by salaried surgeons are more severe than those treated by contracted surgeons and/or that the quality of care delivered by salaried surgeons is lower than the quality of care delivered by contracted surgeons. The fact that the salaried surgeon is more likely to be in hospital when an emergency arrives might overload salaried surgeons with the most severe patients.

Those patients classified as retired, on average the oldest among the payment groups, had the largest hospital death rates. However, when retired patients and childbirth discharges were excluded and after controlling for age

and sex, those classified as unemployed had the largest probability of dying in hospital. The unemployed also presented the largest chance of dying from preventable conditions, suggesting that they are admitted in more severe conditions than their counterparts and/or experience lower quality of services.

On the contrary, the not-insured tended to present the lowest probabilities of dying in hospital among the payment groups. The fact that, everything else being equal, the unemployed were dying twice as much as the not-insured – a social group who on average experiences similar social and economic conditions – strongly suggests that their low probability of dying in hospital is in part due to the fact that not all of them were real, but *ghost patients*.

However, the extremely large perinatal mortality rate observed for patients classified as not-insured pointed in a different direction for the area of maternity care. Explanations for the above are not clear, but hospital induced practices should also be questioned, given the observed magnitude of differences in perinatal mortality between the payment groups.

This analysis strongly suggested poor quality in services delivered by contracted private hospitals in the city and also indicated some relevant limitations in the health care system and the welfare of people living in the city. Existing inequalities in health were further stressed by the observed greater chance of dying experienced by the unemployed. Furthermore, it added evidence to the hypothesis of fraud suggesting that INAMPS were reimbursing hospitals for non-existent discharges.

Chapter 10

Conclusions and Recommendations

This study's main objective was to assess the existence of variations (if any) across the social groups (payment groups) in the patterns of use of contracted private hospitals in the city of Rio de Janeiro in 1986 . Variations indicate inequalities in the chance of getting inpatient treatment and benefiting from the process of care between individuals in different social positions.

The theoretical framework was represented in a model of determination of the use of health care services presented in the first chapter. It was assumed that the distribution of morbidity varies across the social groups, generating differences in the need for health care services. This has an impact on utilization rates. Furthermore variations in utilization, process and outcome of care are associated with supply-induced factors which also explain variations in use between the social groups.

10.1 Summary of the Results

The role of contracted private hospitals   Contracted private hospitals in the city in 1986 appeared to be playing a limited role in the delivery of inpatient care. The low utilization rates observed for these hospitals in 1986 suggest that some groups within the employed population in the city's formal labour market had already shifted to the independent private sector and these might also indicate a strength in the role of public hospitals in response to INAMPS' policies initiated in the early eighties.

Acute contracted private hospitals in the city showed a limited capacity to compete in the hospital market. The delivery of care by these hospitals was concentrated in the area of obstetrics, an area with a deficit of beds in the city, and in selected diagnostic categories (Congestive Heart Failure and

Stroke) largely concentrated in the elderly population. The relative large proportion of elderly people in the city puts pressure on public emergency beds generating a potential demand of retired acutely ill patients for contracted private hospitals. The retired population, dependent on pensions from social security, have low incomes and have to rely on the publicly financed health care services.

Contracted private hospitals appeared not to be prepared to compete for technology-intensive care as shown by their low delivery of services for Ischemic Heart Diseases, complex surgery and the negative relationship between AIH forms paid in each hospital and the provision of intensive care beds.

Moreover, these hospitals were providing low quality care. Hospital mortality rates for high frequency procedures appeared to be very large, pointing to a less than adequate process of care. It was also suggested that the large caesarean section rate observed in these hospitals was due to unnecessary surgical deliveries (see chapter V). However, the observed large proportion of avoidable deaths and the hospital mortality rates point also to problems in the overall health care system in the city, such as deficiency in ante-natal care, lack of prevention programmes for the control of Hypertension and inefficacy in the referral system, possibly delaying the arrival of patients to the hospital, as well as pointing to the appalling living conditions experienced by some employed people, the unemployed and the retired population.

The Procedure Based Reimbursement Scheme (PBRS) adopted by IN-AMPS to reimburse contracted private hospitals was seen to explain some of the characteristics presented above. Large variability was observed in the length of stay for the most frequent procedures suggesting that patients classified under the same unit of output are consuming different levels of resources at the hospital. This appeared to place an incentive on hospitals to concentrate the delivery of services in the area of obstetric care and Stroke which were procedures where hospitals appeared to be profiting by achieving average length of stay below standards defined by INAMPS. Gains for treating patients classified in 'profitable procedures' might subsidize eventual losses incurred by delivering services for patients classified in 'unprofitable procedures'.

However, the disturbing mortality rate observed, for instance, for Congestive Heart Failure, suggests that losses due to the delivery of care to patients classified in 'unprofitable procedures' are also avoided by providing less than adequate care. Slowing down the intensity of care delivered to patients was suggested as one strategy adopted by hospitals to reduce losses.

The low availability of intensive-care beds pointed in this direction. The quantity of diagnostic services written on the AIH form was also larger than the quantity of services written in the medical records, raising the question as to whether these services were actually delivered to patients. The study also pointed to the fact that surgical teams in contracted private hospitals appeared not to come up to the minimum standards defined by INAMPS.

Unnecessary admission also appeared as another way hospitals were using as a means to increase net income. False labour presented a particularly large coefficient of variation which was associated with low average length of stay, suggesting that some of these admissions were unnecessary admissions.

On the other hand, Breast Cancer showed an extremely large coefficient of variation which might lead hospitals to adopt mechanisms so as to prevent the admission of some more severe patients in this diagnostic category. For instance, there was no admission from Breast Cancer of patients classified as unemployed who apparently are more severely ill, everything else being equal.

A point was raised in regard to the adequacy of average length of stay standards established by INAMPS in relation to the needs of the population using these services. For some frequent procedures, such as Congestive Heart Failure the hospitals average length of stay was higher than the standard. On the other hand, for some procedures, such as Stroke, average and the standard length of stay was considered low, suggesting that patients are leaving the hospital in precarious health conditions. Stroke is a diagnoses largely concentrated in patients classified as retired. The poor condition of the bulk of the retired population, the lack of social services and help at home would require that patients leave the hospital in stable conditions.

Hospital mortality rates were larger for patients treated by salaried doctors than for those treated by contracted doctors, particularly, for non-obstetric surgery, suggesting that doctors contracted by the hospitals are less prepared to perform certain procedures and/or work under greater pressure. Actually, the most common surgeon in contracted private hospitals in the city was the salaried surgeon. It was also suggested that the preference for salaried providers could well be a strategy adopted by hospitals after the introduction of the new payment scheme. Hospitals would increase their net incomes by absorbing the payment of professional services. Low payment and overloading salaried doctors would increase hospitals net income, but would decrease the quality of care delivered.

<div align="center">* * *</div>

The average patient admitted to an acute contracted private hospital in the city of Rio de Janeiro was a woman dependent on an employee with a Principal Diagnosis in the major group of Complications of Pregnancy, Childbirth and the Puerperium. The second most common patient was that classified as retired. The average retired patient was discharged from Congestive Heart Failure and Ill Defined Cerebrovascular Disease.

Information on whether access to contracted private hospitals in the city was already universalized in 1986, although sought, was not obtained either through documental or oral evidence. Nonetheless, the very large proportion of not-insured patient discharges reimbursed by INAMPS classified as elective admission was assumed to be evidence that the universalization of access had already started in 1986. The validity of this assumption was based on the fact that, before the universalization of access, INAMPS would pay contracted hospitals for treating not-insured patients only for emergency care. Nonetheless, the relative participation of not-insured patients in contracted private hospitals' discharges was very low.

In summary, contracted private hospitals in the city in 1986 were still linked to a strict social insurance concept, delivering care to a restricted group of the population who were either currently within or who had been previously within the formal labour market and providing low quality services for a limited group of low complexity health care problems which were considered potentially profitable.

Variations across payment status In spite of the limitations imposed by the very selective and relatively small market represented by the contracted private hospitals in the city, the payment categories showed very distinctive patterns of use of these services. After controlling for age and sex, payment status appeared as a statistically significant explanatory variable in every aspect of use of acute contracted private hospitals for which statistical analysis was performed (retired patients excluded). That is to say that the likelihood of being admitted from Diseases from the Circulatory System, Respiratory Diseases, Diseases of the Digestive System, Infectious Diseases, and Neoplasms; of being admitted for surgical treatment; of having a caesarian section and of dying while in hospital varied by payment status, pointing towards the hypothesis that differences in health 'need' and supply-induced factors have an impact on the pattern of use of the different social groups.

However, statistically significant differences were observed mainly for two categories of patients – the unemployed and the not-insured.

Patients classified as *unemployed* showed the highest predicted probabilities of admission (assumed here as equal to discharge) for health problems related to social deprivation such as Respiratory and Infectious Diseases. On the other hand, patients classified as unemployed presented the lowest predicted probability of admission for more costly care such as Neoplasm. The fact that patients classified as unemployed showed very low probability of admission from Neoplasm in acute contracted private hospitals and relatively higher proportional discharge rates for Malignant Neoplasms in chronic hospitals indicates that selection mechanisms were operating, preventing the access of these patients to acute contracted private hospitals. This might be explained by the fact that the unemployed patient would seek for help at later stages of the disease. However, it was suggested that damaging practices in the labour market might also be happening, with serious diseases causing unemployment. Nonetheless, supply induced factors cannot be disregarded in the explanation of inequalities, as will be further argued below.

Unemployed patients have shown the lowest predicted probability of being admitted for surgical treatment. When controlling for Neoplasm, the unemployed also appeared to be least likely patients to receive surgical treatment. In spite of the large rates of caesarian section observed in contracted private hospitals, unemployed women showed the lowest predicted probability of having a surgical delivery, even though women classified as unemployed appeared in greater risk of needing a caesarian section. Discrimination in doctors' decision-making was also suggested as an explanation for the low probability of caesarean section observed for unemployed women, since contracted surgeons appeared to perform more surgical deliveries for the other payment groups than for the unemployed.

Patients classified as unemployed showed a high mean length of stay which suggests that they have a greater severity of illness. This characteristic is likely to respond to selection against these potentially unprofitable patients. The social selection exercised by some hospitals, in order to preserve their 'status', can also explain the under-utilization of the unemployed in some particular procedures.

Finally, patients classified as unemployed also presented the highest predicted probabilities of dying in hospital for all age groups and both sexes. This consistent pattern across all ages and sexes points towards both the hypothesis that patients classified as unemployed are more severely ill and towards the theory that unemployment causes poor health. That is to say, the poor health of the unemployed cannot only be due to mental and phys-

ical health forcing people into unemployment. Moreover, it suggests that selection mechanisms in the health care system, such as limited access to services, delay on referral to hospital and less than appropriate care are other social mechanisms undermining the chances of this social group improving their health status and survival.

On the other hand, patients classified as *not-insured* showed a very uncommon pattern of use of contracted private hospitals which can hardly be explained on the grounds of variations in need. This strongly suggests fraud, most probably by charging INAMPS for admissions that did not occur (ghost patients). A point should be made, however, that these practices apparently were restricted to some hospitals, since not-insured discharges were not randomly distributed across hospitals. Fraud might have been a response to losses incurred by hospitals which treat a more complex case-mix and were not fully compensated by the Procedure Based Reimbursement Scheme or a perversive response from some hospitals to the universalization process.

The descriptive analysis suggests that patients classified as *employers* also have a significantly distinctive pattern of use of contracted private hospitals. However, the small number of employers involved precluded differences from appearing in the models tested. Their distinctive pattern would be the result of their better health status, selective use of contracted private hospitals for more costly care and/or health conditions impacting on their social and economic position; their greater chance to choose their preferred hospital and/or doctor and to influence doctors' decision making as a result of their own more affluent social position; and/or their willingness to complement INAMPS' reimbursement with extra payment for doctors and hospitals, despite this being an illegal practice under INAMPS rules.

The *self-employed* is a very heterogeneous social category in Brazilian society. This category does not allow the discrimination of groups of individuals with very distinctive material interests and welfare. This might explain the absence of a more regular pattern in the use of contracted private hospitals among patients classified as self-employed.

Variations across the age groups and the sexes As expected, age appeared strongly associated with hospital admission (retired patients excluded). For Disease of the Circulatory System, age interacted with sex with men showing a greater risk of hospital admission from Circulatory Diseases at ages 45 to 64 years and women at age 65 years or more. For Respiratory Diseases, the young adult man also showed a greater risk of hospital admission than the young adult woman. A similar pattern was observed

for Diseases of the Digestive System. For Infectious Diseases, men showed a much greater risk of hospital admission than women until the age of 44 years old, when differences between the sexes tended to disappear. These patterns were also followed by a greater risk of dying in hospital experienced by men younger than 65 years old when compared with women in the same age group (childbirth admissions excluded).

The above suggests differences in health care 'need' between men and women, with men being more likely to need hospital care during productive life than women, for non-sex specific major groups of diseases. The greater exposure to risk factors at work and the hardship in working life, low wages, long daily travelling time experienced by the employed are likely to explain the much higher likelihood of serious illness among the young adult man.

Nonetheless, the magnitude of observed differences in the probability of using contracted private hospitals for some of the conditions studied points also to the existence of selection mechanisms favouring the admission of the economically active population to contracted private hospitals.

Selection mechanisms might still be explained by the historically restricted character of the Brazilian compulsory insurance scheme – to target the provisions of services on the working population in the formal labour market. This restricted concept is reflected, for instance, in the long-standing tendency of INAMPS to contract a relatively low number of paediatric beds. Clear evidence of selection in favour of the economically active population was shown by the association between sex and discharges from psychiatric contracted private hospitals. The differences between the sexes in discharges from psychiatric hospitals, largely concentrated on men, could not be explained on epidemiological grounds.

Quality of data on the AIH form The reliability study presented in chapter V showed problems of incompleteness for some variables, some inconsistencies due to information on the AIH form not being written in the medical records and low reliability for some variables of great relevance for monitoring services and epidemiological studies. Particularly, Principal Diagnoses and perinatal deaths have low reliability. The low quality observed for the most frequent diagnoses appeared similar to the pattern observed for the state of São Paulo about ten years earlier, suggesting that neither the hospitals nor INAMPS had put any effort into improving the quality of this extremely relevant medical information. Nonetheless, the quality of the information used for payment purpose – *requested procedure* – showed good reliability for the most frequently requested procedures. However, it was

observed that an upgrading of requested procedure which maximized reimbursement occurred for 31 per cent of all disagreements in this variable. The results of the reliability study must be interpreted with some caution, however, due to the non-response rate which suggests that observed reliability was somehow better than 'true' reliability.

10.2 Final Comments on Inequalities

This study analyzed a variety of aspects of the use of contracted private hospitals across groups of patients in different social positions. The classification of social position was based on the relations to production and on the labour market. Despite the exploratory character of the study, it raised the existence of inequalities in the use of contracted private hospitals in the city of Rio de Janeiro in 1986. Moreover, as the study was based on data for a single sector of care and, given the plural characteristic of the health care system in the city, it suggests that inequalities between sectors of care are likely to be even larger.

The selective social characteristics of contracted private hospital patients can be seen as an indicator of the social stratification in the use of services across sectors of care. It points to inequalities in the use of health care services, generated by the variety of financing mechanisms creating selective health care markets. Within sector inequalities (*contracted private hospitals*) were also influenced by variations in the availability of services in the city between the social groups. Moreover, the existence of inequalities within a particular sector of care pointed also to other sources of inequality, deriving from the payment mechanism, hospitals vested interests, variations in the patient ability to interfere in the medical practice and doctors' ideology and financial interests.

10.3 Recommendations

Since the date of the empirical research (1986), changes had been introduced into the Brazilian Health Care System. In 1989, the Health Law was signed, defining the characteristics of the Unified Health Care System (SUS) to be implemented in the country by the Ministry of Health. The Unified Health System includes all publicly financed health care services and is based on the principles of universalization, equity, administrative decentralization with an emphasis on the municipal level with democratic participation of the population in the system. The command of the system is to be unified

under the control of the Ministry of Health and local Health Departments. The independent private system was left out of SUS. Therefore, the new Health Law retained the character of a plural and, potentially, inequitable system.

The Procedure Based Reimbursement Scheme was introduced as the reimbursement mechanism for public hospitals. The AIH form became the instrument of payment for all publicly financed inpatient care. A National Inpatient Information System was created, containing information on inpatient services provided by public and contracted private hospitals in the country as a whole.

The positive aspect of the latter was the creation of a comprehensive data set with relevant information on the delivery of services by the public and contracted private sector. It is recommended that the Ministry of Health make it mandatory for independent private hospitals to provide data for the National Inpatient Information System to allow the coverage of the whole range of inpatient care delivered in the country. This is necessary for planning the organization of care at the local level as well as for monitoring the equity in the use of inpatient services as a result of the new policy.

The negative aspect is that the implementation of the Procedure Based Payment Scheme in public hospitals, now adopted as a blind policy. It was not preceded by experimentation directed to assess the impact of this payment mechanism on public hospitals. Actually, there is not even a clear understanding of the impact it had on the delivery of services by contracted private hospitals. However, there are indications, also pointed to by this study, of negative incentives leading to the selection of patients, low quality of care and fraud. Moreover, the shortcomings in the unit of output were not considered.

* * *

The recommendations presented below are mainly concentrated on the role the National Information System might play as an instrument of monitoring equity in the use of health care service and in improving the quality of services. These recommendations were centred on the belief that routinely available information can be valuable and relatively inexpensive instrument for use at all levels of the system, particularly, the local level. Moreover, information is a necessary instrument in the political arena, where the debate takes place on how to construct a less inequitable and less discriminatory society in Brazil.

Quality of medical information The usefulness of inpatient statistics is dependent on the quality of data in the system. As a measure directed to improve the quality of data on diagnosis, it is recommended that the local Health Departments, responsible for the organization and coordina- tion of the provision and delivery of publicly financed services at the state and municipality level, make it mandatory for contracted hospitals to have qualified medical record personnel. A training programme should be developed to qualify public hospitals' medical record personnel. The use of the resume of the 9th Classification of Diseases (WHO) published by INAMPS for coding diagnoses must also be reviewed, given that it induces errors and ill-defined categories.

Doctors should be made aware of their role in improving the quality of inpatient information. Most problems of quality of medical information are due to difficulties in the interpretation of original medical documents. A face sheet containing a summary of the information on the medical record should also be made mandatory in all hospitals. The completion of the face sheet summary should be the responsibility of the doctor in charge of the patient, who should sign the document thereby assuming responsibility for the information. Emphasis should be put on the need for providing data on multiple diagnoses.

Consistency of data on diagnoses could be checked regularly by computer. Research should be promoted by the Ministry of Health for the definition of criteria and the development of computer programmes, to be used at the local level, for checking the consistency of diagnostic data.

Social class variable It is strongly recommended that the National Information System includes in the AIH form the variable *Payment Status.* The social position of individuals is a determinant of health 'need' and of use of health care services. Therefore, social class is a fundamental variable for epidemiological, health care services research and monitoring of health care services. For practical reasons this variable should remain as it is at present. That is to say, based on the classification of the different modes of contribution to social security. However, given the universalization of access to publicly financed services the category 'not-insured with INAMPS' theoretically losses its meaning. Furthermore, the variable payment status has categories of low discriminating power: the self-employed group together individuals with distinctive welfare and life experiences. The same might be said of the employee. In this study there was no apparent problem with this category, because contracted private hospitals in the city were probably

concentrated on a sub-group within the employee population with a similar level of welfare.

In the context of universalization of publicly financed services, the variable social security entitlement status also losses meaning. This raises the theoretical and operational problem of how to classify the class position of housewives, students, children and the long-term unemployed.

Therefore, it is recommended that promotion of research be directed at the operational classification of social class (or social group) to substitute for the category payment status in the inpatient statistics in the country. This classification should be based on information available in the Census as a means to allow research to link inpatient statistics with population data.

Place of residence   It is recommended that the completeness of the information on the area code of patient's place of residence be included in the systematic checking, before payment, of data in the AIH form. This data must also be available in the computerized data set. This is extremely valuable information for the identification of the volume and characteristics of patients 'crossing borders'. Both for planning and for the development of technical criteria for the allocation of resources between states and municipalities, place of residence of patients in the local health care market is needed.

Hospital maternal and perinatal deaths   This study pointed to low reliability in the information related to perinatal deaths. This raises the need for regular review of a sample of medical records in the maternity units. States and municipalities with the necessary technical and financial means should monitor on an individual basis all maternal and perinatal deaths and whenever possible transfers among this group of patients.

Nonetheless, the National Inpatient Information System can provide data for the local level to monitor hospital maternal and perinatal deaths and transfers, discriminating by hospital, type of delivery, provider of care, social group, diagnoses etc by use of a computer programme. These data highlight the existence of risk groups, hospitals with potentially low quality, inadequate use of surgical delivery etc.

Again, it is recommended that upper levels of the Health Care System finance research aiming at devising technical material and computer programmes for the monitoring of maternal care at the local level based on inpatient statistics.

Hospital mortality and transfers This is another indicator easily constructed from data on the National Inpatient Information System which can be used as an indirect measure of quality of care delivered by hospitals.

Recent developments in the methodology of analyzing hospital mortality data and shortcomings in the interpretation of this information should be reviewed as a means to devise an appropriate methodology to be used at the local level. Computer programmes for the processing data and technical material for the analysis of results would need to be developed to allow the monitoring of hospital mortality at the local level.

The procedure based reimbursement scheme – PBRS If the present payment scheme is to remain as the mechanism adopted in the country to finance public services, the assessment of the impact on public hospitals' finance of the transfer or refusal of patients by the private sector becomes mandatory. The transfer and/or refusal of patients classified under 'unprofitable procedures' is a negative event associated with a prospective payment mechanism. The very selective range of health problems contracted private hospitals in the city of Rio were treating was largely concentrated on low technology intensive treatments and the occurrence of early discharges were suggested to be associated with the payment scheme. The burden upon public hospitals for treating the bulk of patients presenting a negative relation between payment rate and costs will increase public hospitals financial difficulties, lower the quality of care and have a negative impact on inequalities.

Moreover, a review of the unit of output (Classification of Groups of Procedures) used by the PBRS is also strongly recommended in order to develop a classification system that better discriminates between patients with distinctive needs of resource use (costs). The present limitations of the classification scheme increase the risks of negative responses to the payment scheme, such as selection of patients, lowering the quality of care and fraud.

Morbidity Surveillance The follow-up of reasons for admission across social groups, age groups and gender provides information on the local pattern of use, changing pattern in health 'need', thereby having great use for local planning.

This study raised the need for research on unemployment and health in the Brazilian context. It also highlighted some health problems in the city of Rio not commonly considered by the health care institutions in the country, such as malnutrition in the adult population, particularly, among the retired.

* * *

Routine inpatient statistics might also be used for systematic checking of sentinel events, monitoring the use of high cost care and/or special procedures, length of stay etc. Making comparisons between health markets is an appropriate methodological approach to raise possible explanations for variations in the patterns of use of health care services.

Fraud Even though fraud might be spotted by indirect monitoring, the control of fraud cannot rely entirely on such mechanisms and requires systematic review of medical records and ad hoc studies. Moreover, the adequacy of the classification scheme used for payment and the adequacy of values attached to the units of output are important, but not sufficient, elements to minimize fraud.

Therefore, the prevention of fraud will only be effective in the states and municipalities with an active and representative Health Council[1]. It is recommended that local Health Councils also defines mechanisms to exercise control over the routine supervision of care delivered by contracted services.

Monitoring the impact of SUS on inequalities in the use of health care services Finally, as a means of having a general assessment of the impact of the Unified Health System (SUS) on reducing inequalities in the utilization of health care services in the country, it is recommended that every five years the National Household Survey include in their main questionnaire a health questionnaire to collect information on perceived morbidity and use of health services by sectors care between the social classes.

* * *

The impact that the use of information generated by the National Inpatient Statistics System might have on inequalities depends on *who* will have access to it and *who* will have the means to use it. To transform this information into an instrument of political debate for the creation of a more equitable and adequate health care system, in Brazil it is necessary that *all* data on the National Inpatient Information System be public and easily accessible to allow local governmental institutions, providers of care,

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[1]In December 1990 the law was signed which defined the character of the participation of different interest groups in the health sector in the Unified Health System. Permanent Health Councils are to be established at each level of the Health System (national, state and municipality). Health councils are deliberative collegiate bodies in the Unified Health System with representatives of government, providers of care, health care workers and consumers. Consumers have half the seats on the Health Councils.

researchers and consumers to use this information for their own purposes. Secondly, whatever the monitoring system adopted by each administrative level of SUS (national, state or municipality), the indicators generated by the system should be reviewed, discussed and used for decision-making by the Health Councils. Thirdly, most local Health Departments will depend on technical support and on the development of friendly computer programmes for being able to use this information. This should have the financial and technical support from the more developed states and municipalities as well as from the Ministry of Health. Moreover, great effort should also be put into the development of educational material directed to particular social groups and their representatives in the Health Councils, as a means of increasing their ability to interpret and judge the indicators being used to monitor the system, thereby increasing their ability to make choices, participate and to defend their own interests.

Appendix A

Hospitals in the study's data set

1. Santa Casa da Misericórdia do Rio de Janeiro. (Acute)

2. Policlínica Geral do Rio de Janeiro. (Acute)

3. Sociedade Espanhola de Beneficência. (Acute)

4. Associação Brasileira de Assistência aos Cancerosos – Hospital M. K. (Acute)

5. Hospital de Clínicas Quarto Centenário do Rio de Janeiro. (Acute)

6. Hospital Adventista Silvestre. (Acute)

7. Casa de Saúde e Maternidade Irajá. (Acute)

8. Policlínica de Botafogo. (Acute)

9. Casa de Saúde Santa Helena Ltda. (Acute)

10. Casa de Saúde Nossa Senhora do Carmo Ltda. (Acute)

11. Hospital Cardoso Rodrigues Ltda. (Acute)

12. Casa de Saúde e Maternidade Campinho Ltda. (Acute)

13. Associação do Hospital Evangélico do Rio de Janeiro. (Acute)

14. Casa de Saúde e Maternidade São José S/A. (Acute)

15. Assistência Médico-Hospitalar São Jorge S/A. (Acute)

16. Fundação Clara Basbaum. (Acute)

17. Casa de Saúde e Maternidade Nossa Senhora das Graças Ltda. (Acute)

18. CPAIMC – Hospital São Francisco de Assis. (Acute)

19. Real e Benemérita Sociedade Portuguêsa de Beneficência do Rio de Janeiro. (Acute)

20. Casa de Saúde Santa Rita S/A. (Acute)

21. Hospital das Clínicas Brasil Portugal S/A. (Acute)

22. Serviço de Assistência Social Evangelico. (Acute)

23. Casa de Saúde e Maternidade Nossa Senhora da Piedade Ltda. (Acute)

24. Clínica Nossa Senhora Auxiliadora Ltda. (Acute)

25. Casa de Saúde e Maternidade Joari Ltda. (Acute)

26. Hospital da Venerável Ordem Terceira de São Francisco da Penitência. (Acute)

27. Casa de Saúde e Maternidade Nossa Senhora da Penha. (Acute)

28. Clínica Dr. Aloan S/A. (Acute)

29. IBRO – Instituto Brasileiro de Otorrinolaringologia Ltda. (Acute)

30. Serviço de Assistência Médica Dr. Faulhaber Ltda. (Acute)

31. Casa de Saúde República da Croacia. (Acute)

32. Hospital Santa Inêz Remoções. (Acute)

33. SEMIU – Serviço Médico Infantil Leopoldina Ltda. (Acute)

34. Centro Pediátrico de Jacarepaguá Ltda. (Acute)

35. Clínica Santa Cristina Ltda. (Acute)

36. Sindicato dos Arrumadores – Hospital São Benedito. (Acute)

37. Mordomia Hospital Nossa Senhora das Dores. (Chronic)

38. Clínica Médica Cirurgica Santa Genoveva. (Chronic)

39. Casa São Fernando. (Chronic)

40. Casa de Saúde Gabinal Ltda. (Chronic)

41. Clínica de Repouso Campo Belo. (Chronic)

42. Clínica Jardim América Ltda. (Chronic)

43. Casa de Saúde Grajaú Ltda. (Chronic)

44. Casa de Saúde Renoud Lambert Ltda. (Chronic)

45. Casa de Saúde Santa Rita. (Chronic)

46. Casa de Saúde Affonso McDowell. (Chronic)

47. Hospital Nossa Senhora do Socorro. (Chronic)

48. SEMEL – Serviços Médicos Leopoldinense Ltda. (Chronic)

49. Clínica de Repouso Santa Edwiges Ltda. (Psychiatric)

50. Sanatório do Rio de Janeiro. (Psychiatric)

51. Casa de Saúde Saint Roman Ltda. (Psychiatric)

52. Casa de Saúde Humaitá Ltda. (Psychiatric)

53. Clínica Monte Alegre. (Psychiatric)

54. Clínica das Amendoeiras. (Psychiatric)

55. Clínica São Raimundo Nonato Ltda. (Psychiatric)

56. Associação Espírita Obreiros do Bem. (Psychiatric)

57. Sanatório Santa Juliana. (Psychiatric)

58. Clínica da Repouso Valência Ltda. (Psychiatric)

59. Clínica da Gávea. (Psychiatric)

60. Casa de Saúde Dr. Eiras. (Psychiatric)

Appendix B

Reliability study

1. Santa Casa da Misericórdia do Rio de Janeiro .

2. Policlínica Geral do Rio de Janeiro.

3. Sociedade Espanhola de Beneficência.

4. Associacão Brasileira de Assistência aos Cancerosos – Hospital M. K.

5. Hospital de Clínicas Quarto Centenário do Rio de Janeiro.

6. Hospital Adventista Silvestre.

7. Casa de Saúde e Maternidade Irajá.

8. Policlínica de Botafogo.

9. Casa de Saúde Santa Helena Ltda.

10. Casa de Saúde Nossa Senhora do Carmo Ltda.

11. Hospital Cardoso Rodrigues Ltda.

12. Casa de Saúde e Maternidade Campinho Ltda.

13. Associacão do Hospital Evangélico do Rio de Janeiro.

14. Casa de Saúde e Maternidade São José S/A.

15. Assistência Médico-Hospitalar São Jorge S/A.

16. Fundação Clara Basbaum.

17. Casa de Saúde e Maternidade Nossa Senhora das Graças Ltda.

18. CPAIMC - Hospital São Francisco de Assis.

19. Real e Benemérita Sociedade Portuguêsa de Beneficência do Rio de Janeiro.

20. Casa de Saúde Santa Rita S/A.

21. Hospital das Clínicas Brasil Portugal S/A.

22. Serviço de Assistência Social Evangélico.

23. Casa de Saúde e Maternidade Nossa Senhora da Piedade Ltda.

24. Clínica Nossa Senhora Auxiliadora Ltda.

25. Casa de Saúde e Maternidade Joari Ltda.

26. Hospital da Venerável Ordem Terceira de São Francisco da Penitência.

27. Casa de Saúde e Maternidade Nossa Senhora da Penha.

28. Clínica Dr. Aloan S/A.

29. IBRO – Instituto Brasileiro de Otorrinolaringologia Ltda.

Appendix C

Variables used in the analyses of principal components.

1. Percentage of contracted beds.

2. Number of beds contracted for surgery.

3. Number of beds contracted for obstetrics.

4. Number of beds contracted for clinical medicine.

5. Number of beds contracted for other specialties.

6. Number off beds contracted for intensive care.

7. Occupation rate.

8. Number of accounts paid.

9. Average length of stay.

10. Mortality rate at forty-eight hours.

11. Accounts paid for surgical procedures.

12. Average length of stay for surgical procedures.

13. Mortality rate for surgical patients.

14. Accounts paid for obstetric procedures.

15. Average length of stay for obstetric procedures.

16. Accounts paid for clinical procedures.

17. Average length of stay of clinical procedures.

18. Mortality rate for clinical patients.

19. Accounts paid in paediatrics.

20. Average length of stay in paediatrics.

21. Accounts paid for chronic patients.

22. Average length of stay for chronic patients.

Appendix D

Sample.

Table D.1: Sample of hospitals, AIH forms and non-responses.

	Hospital	AIH form	Non-responses
1	Assistencia Medico-Hospitalar Sao Jorge	137	02
2	Casa de Saude e Maternidade Iraja	448	85
3	Casa de Saude e Maternidade Joari	228	07
4	Casa de Saude e Maternidade Nossa Senhora da Penha	330	82
5	IBRO – Instituto Brasileiro de Otorrinolaringologia Ltda	31	01
6	Santa Casa da Misericordia do Rio de Janeiro	513	200
7	Policlinica de Botafogo	122	101
8	Real e Benemerita Sociedade Portuguesa de Beneficencia do Rio de Janeiro	39	39
9	Associacão do Hospital Evangelico do Rio de Janeiro	83	83
10	Hospital da Veneravel Ordem Terceira de São Francisco da Penitencia	03	03
TOTAL		1934	603

Appendix E

Diseases of the circulatory system – predicted probabilities.

Table E.1: Predicted Probabilities for Diseases of the Circulatory System – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	1	35–44	woman	0.453
2	4	65 and more	woman	0.430
3	1	45–64	woman	0.416
4	4	45–64	man	0.393
5	1	35–44	man	0.390
6	4	65 and more	man	0.385
7	1	65 and more	woman	0.369
8	4	45–64	woman	0.362
9	1	45–64	man	0.326
10	4	35–44	man	0.243
11	1	25–34	man	0.230
12	1	65 and more	man	0.224
13	1	25–34	woman	0.202
14	4	35–44	woman	0.198
15	1	15–24	man	0.176
16	4	25–34	man	0.144
17	4	15–24	man	0.120
18	1	15–24	woman	0.090
19	4	25–34	woman	0.078
20	4	15–24	woman	0.036
21	1	0–14	woman	0.030
22	1	0–14	man	0.016
23	4	0–14	woman	0.015
24	4	0–14	man	0.013

Appendix F

Diseases of the respiratory system – predicted probabilities.

Table F.1: Predicted Probabilities for Diseases of the Respiratory System.
- Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	1	0–14	woman	0.49514
2	4	0–14	woman	0.48159
3	1	0–14	man	0.47422
4	4	0–14	man	0.45088
5	2	0–14	woman	0.40182
6	2	0–14	man	0.37274
7	1	15–24	man	0.17556
8	4	15–24	man	0.16238
9	1	25–34	man	0.16152
10	1	65 and more	man	0.15550
11	4	25–34	man	0.14920
12	4	65 and more	man	0.14356
13	1	65 and more	woman	0.12891
14	2	15–24	woman	0.12303
15	4	65 and more	woman	0.11872
16	1	35–44	man	0.11732
17	1	45–64	man	0.11430
18	2	25–34	man	0.11262
19	2	65 and more	man	0.10819

Population	Pystatus	Age Group	Sex	Predicted Values
20	4	35–44	man	0.10794
21	4	45–64	man	0.10513
22	1	45–64	woman	0.09765
23	4	45–64	woman	0.08968
24	2	65 and more	woman	0.08883
25	2	35–44	man	0.08052
26	2	45–64	man	0.07836
27	1	35–44	woman	0.07575
28	4	35–44	woman	0.06943
29	2	45–64	woman	0.06655
30	1	15–24	woman	0.06296
31	1	25–34	woman	0.06256
32	4	15–24	woman	0.05764
33	4	25–34	woman	0.05728
34	2	35–44	woman	0.05123
35	2	15–24	woman	0.04239
36	2	15–24	woman	0.04212

Appendix G

Diseases of the digestive system – predicted probabilities.

Table G.1: Predicted Probabilities for Diseases of the Digestive System – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	3	25–34	man	0.37855
2	3	35–44	man	0.37779
3	3	45–64	man	0.32140
4	4	35–44	man	0.29737
5	1	35–44	man	0.25731
6	3	65 and more	man	0.25398
7	1	25–34	man	0.23984
8	4	35–44	man	0.22345
9	2	25–34	man	0.21875
10	2	35–44	man	0.21848
11	3	less than 24	man	0.21036
12	4	45–64	man	0.19840
13	1	45–64	man	0.18160
14	2	45–64	man	0.17222
15	4	65 and more	man	0.15355
16	1	65 and more	man	0.10068
17	1	35–44	woman	0.09841
18	2	45–64	woman	0.09755
19	4	15–24	man	0.09554

Population	Pystatus	Age Group	Sex	Predicted Values
20	4	25–34	woman	0.08875
21	2	65 and more	man	0.08759
22	1	45–64	woman	0.08563
23	2	35–44	woman	0.08089
24	4	65 and more	woman	0.08010
25	2	15–24	man	0.07544
26	3	45–64	woman	0.07151
27	4	45–64	woman	0.07123
28	2	65 and more	woman	0.06665
29	3	35–44	woman	0.06497
30	1	less than 24	man	0.06406
31	2	less than 24	woman	0.06324
32	2	25–34	woman	0.06264
33	1	25–34	woman	0.06242
34	1	65 and more	woman	0.05844
35	3	65 and more	woman	0.05782
36	3	25–34	woman	0.04722
37	4	35–44	woman	0.03334
38	4	less than 24	woman	0.03083
39	1	less than 24	woman	0.03056
40	3	less than 24	woman	0.02293

Appendix H

Neoplasms – predicted probabilities.

Table H.1: Predicted Probabilities for Neoplasms – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	3	35 and more	woman	0.17495
2	1	35 and more	woman	0.16910
3	4	35 and more	woman	0.12447
4	3	35 and more	man	0.1006
5	1	35 and more	man	0.09643
6	4	35 and more	man	0.06938
7	2	35 and more	woman	0.06013
8	1	less than 34	woman	0.05142
9	3	less than 34	woman	0.04430
10	1	less than 34	man	0.04315
11	3	less than 34	man	0.03715
12	2	35 and more	man	0.03246
13	4	less than 34	woman	0.02574
14	4	less than 34	man	0.02150
15	2	less than 34	woman	0.00525
16	2	less than 34	man	0.00437

Appendix I

Infectious Diseases – predicted probabilities.

Table I.1: Predicted Probabilities for Infectious Diseases – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	1	0–24	man	0.17631
2	4	0–24	man	0.13461
3	1	0–24	woman	0.09404
4	2	0–24	man	0.08081
5	4	0–24	woman	0.07014
6	1	25–44	man	0.04540
7	2	0–24	woman	0.04089
8	4	25–44	man	0.03340
9	1	45 and more	woman	0.03057
10	1	45 and more	man	0.02751
11	4	45 and more	woman	0.02240
12	4	45 and more	man	0.02014
13	2	25–44	man	0.01916
14	1	25–44	woman	0.01300
15	2	45 and more	woman	0.01279
16	2	45 and more	man	0.01148
17	4	25–44	woman	0.00948
18	2	25–44	woman	0.00538

Appendix J

Caesarian section – predicted probabilities.

Table J.1: Predicted Probabilities for Caesarian Section – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Provider	Predicted Values
1	1	35 and more	contracted	0.47630
2	1	25–34	contracted	0.42665
3	1	35 and more	salaried	0.36219
4	4	35 and more	contracted	0.34969
5	2	35 and more	contracted	0.34762
6	4	35 and more	salaried	0.33237
7	1	25–34	salaried	0.31724
8	4	25–34	contracted	0.30555
9	2	25–34	contracted	0.30361
10	1	less than 24	contracted	0.30065
11	4	25–34	salaried	0.28944
12	2	35 and more	salaried	0.25422
13	2	25–34	salaried	0.21809
14	1	less than 24	salaried	0.21162
15	4	less than 24	contracted	0.20267
16	2	less than 24	contracted	0.20120
17	4	less than 24	salaried	0.19050
18	2	less than 24	salaried	0.13877

Appendix K

Surgical procedures – predicted probabilities.

Table K.1: Predicted Probabilities for Surgical Procedures – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1)	3	15–24	man	0.7933
2)	3	25–34	man	0.7376
3)	3	35–44	man	0.7035
4)	3	35–44	woman	0.6876
5)	4	15–24	man	0.6335
6)	3	25–34	woman	0.5624
7)	2	15–24	man	0.5554
8)	1	15–24	man	0.5551
9)	3	45–64	man	0.5398
10)	1	35–44	woman	0.4663
11)	4	35–44	woman	0.4547
12)	4	25–34	woman	0.4508
13)	4	25–34	man	0.4493
14)	3	45–64	woman	0.4355
15)	1	25–34	woman	0.4252
16)	3	65 and more	man	0.4117
17)	1	25–34	man	0.4113
18)	2	35–44	woman	0.3987
19)	3	15–24	woman	0.3758

Population	Pystatus	Age Group	Sex	Predicted Values
20)	4	15–24	woman	0.3736
21)	2	25–34	woman	0.3209
22)	2	25–34	man	0.3137
23)	1	15–24	woman	0.3118
24)	2	15–44	woman	0.3069
25)	4	45–64	woman	0.3019
26)	4	35–44	man	0.2900
27)	1	35–44	man	0.2892
28)	3	less than 15	man	0.2891
29)	4	less than 15	man	0.2740
30)	1	45–64	woman	0.2669
31)	4	less than 15	woman	0.2502
32)	2	35–44	man	0.2402
33)	4	45–64	man	0.2300
34)	2	45–64	woman	0.2164
35)	1	45–64	man	0.1929
36)	3	65 and more	woman	0.1873
37)	4	65 and more	man	0.1653
38)	2	less than 15	man	0.1603
39)	2	45–64	man	0.1566
40)	2	less than 15	woman	0.1479
41)	1	65 and more	man	0.1444
42)	3	less than 15	woman	0.1405
43)	2	65 and more	man	0.1352
44)	1	less than 15	man	0.1255
45)	4	65 and more	woman	0.1255
46)	1	less than 15	woman	0.1178
47)	1	65 and more	woman	0.1140
48)	2	65 and more	woman	0.1043

Appendix L

Death – predicted probabilities.

Table L.1: Predicted Probabilities for Death – Contracted Private Hospitals – City of Rio de Janeiro.

Population	Pystatus	Age Group	Sex	Predicted Values
1	1	65 and more	woman	0.21120
2	1	65 and more	man	0.17835
3	4	65 and more	woman	0.16762
4	4	65 and more	man	0.14035
5	2	65 and more	woman	0.11825
6	1	45 – 64	man	0.10577
7	2	65 and more	man	0.09806
8	4	45 – 64	man	0.08169
9	1	45 – 64	woman	0.08146
10	4	45 – 64	woman	0.06253
11	2	45 – 64	man	0.05593
12	1	25 – 44	man	0.04395
13	2	45 – 64	woman	0.04253
14	1	0 – 24	man	0.03443
15	4	25 – 44	man	0.03342
16	4	0 – 24	man	0.02612
17	2	25 – 44	man	0.02251
18	1	0 – 24	woman	0.02246
19	2	0 – 24	man	0.01754
20	1	25–44	woman	0.01725
21	4	0 –24	woman	0.01698
22	4	25 – 44	woman	0.01303
23	2	0 – 24	man	0.01137
24	2	25–44	woman	0.00871

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