The Khartoum revolving drug fund: an evaluation of sustainability, quality and access

Save the Children UK
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FINAL VERSION

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Acronyms

ARI	Acute respiratory infection
CHC	Community health committee
CMSPO	Central Medical Suppliers (Public Organisation) – official supplier of drugs outside Khartoum State
EDL	Essential Drugs List
EPI	Expanded programme of immunisation
FGD	Focus group discussion
FMoH	Federal Ministry of Health
GoS	Government of Sudan
HC	Health centre
HEA	Household Economy Approach (livelihoods assessment methods developed by SC UK in the 1990s)
IDP	Internally displaced persons
ISO	International Organisation for Standardisation
KCCCP	Khartoum Comprehensive Child Care Programme
KHIC	Khartoum Health Insurance Corporation
KI	Key informant
KMoH	Khartoum Ministry of Health
KS	Khartoum State
MoF	Ministry of Finance
NEDL	National Essential Drugs List
NDQCL	National Drug Quality Control Laboratories
NGO	Non-governmental organisation
OPD	Out-patient department
ORS	Oral rehydration solution
PHC	Primary Health Care
PP	People's Pharmacy
PRA	Participatory rural appraisal
RDF	Revolving Drug Fund (Khartoum one, unless stated otherwise)
SDD	Sudanese Dinar (equivalent to 10 Sudanese Pounds)
TB	Tuberculosis
UNICEF	UN Children's Fund
USD	US dollars[1]
WHO	World Health Organisation

[1] The exchange rate at the time of the study was approximately 2,620 SDD to the US dollar

Executive summary

Background

The Khartoum State Revolving Drug Fund (RDF) is a cost-sharing mechanism which takes advantage of people's ability and willingness to pay for drugs in the absence of free state provision. In Sudan, the RDF was established by the Khartoum Ministry of Health (KMoH) and Save the Children UK (SC UK) at a time when federal and state funding was minimal. The RDF addressed the three core issues of quality, supply and cost of drugs. Prior to the establishment of the RDF, the quality and supply of drugs was inadequate for the population, and the cost was perceived to be prohibitive for most people. Previous evaluations of the RDF have found it to be successful in bringing down the cost of drugs to around 50% that of private pharmacies and achieving a good standard of quality and a reliable supply.

This study was commissioned to investigate whether the RDF is continuing to fulfil its original mandate, nearly a decade after hand-over by SC UK, and three years after becoming an independent foundation. The researchers were asked to focus on three aspects: the on-going sustainability of the RDF; whether it continues to supply safe and appropriate drugs at below market prices; and issues of access, which had not been examined in depth by previous studies.

Study methods

There were nine different components to this study:

- literature review, to examine the RDF's history and also to fit the study findings into the context of wider developments in Sudan and internationally
- interviews with key informants in Khartoum, to assess the policy context and to pick up concerns and suggestions for potential improvements to the RDF
- household economy approach (HEA) study of different areas within the State, focussing on household livelihoods and coping strategies, and hence ability to afford health care and other basic goods
- household survey focussing on health seeking behaviour, expenditure on health care, coping strategies, and perceptions of health facilities and the RDF
- focus group discussions (FGD), which used qualitative techniques to probe similar questions
- health facility survey, which looked at prescribing practices and indicators of quality of care within RDF outlets
- financial analysis of the RDF, to focus on profitability, operating costs, financial management and probity
- pharmaceutical study, to look at issues of quality, pricing, procurement, management and the range of drugs which the RDF currently supplies
- management study, focussing on the structure of the RDF, its human resource policies, management issues and legal status

Study findings

How the RDF is working at present - strengths and weaknesses

This evaluation concludes that the RDF is continuing to fulfil its original mandate, to provide a sustainable source of appropriate, quality drugs at below-market price levels.

Its strengths can be summarised as follows:

- It continues to serve the majority of the KMoH network of health centres and hospitals in Khartoum State, as well as 18 of the People's Pharmacies
- Its price list undercuts rivals by 40% (CMSPO) and 100% (People's Pharmacies and private pharmacies), on average
- It operates a unitary system, offering the same price to all public facilities, and absorbing the financial risks (the RDF sells directly to patients, not to the facilities, except for the People's Pharmacies)
- It maintains regular supervision and deliveries: drugs availability is good at facility level
- It offers a wide range of drugs (145 items in total)
- Assessment of selected rational drug use indicators showed the proportion of patients encounters using one or more injection and the number of drugs prescribed per patient to be within or very close to optimal levels.
- It is profitable: gross profits have been rising year on year due to large increases in volume of drugs sales
- The financial review suggests that internal control systems are good
- Its ratio of assets to liabilities is healthy
- It has just been through a period of capital expansion, investing in a new office building and warehouse
- Foreign currency availability is no longer a constraint, given the wider economic changes in Sudan
- It makes a regular transfer to the KMoH, worth 210 million SDD per year, which more than outweighs the fiscal subsidy of its 17.5% customs tax exemption
- It offers other public services, such as delivering emergency drugs and vaccines

Set against this are some areas of weakness, or concerns:

- Profit levels are high; this, while a good thing from a business point of view, may indicate that prices to users could be reduced
- Operating costs have increased substantially in the RDF in 2001-3, especially in the area of salaries and incentives
- The value of expired stock has also increased significantly over this period
- The build up of stocks means that the working capital cycle has doubled between 2001 and 2003, which increases the risk of losses
- The value of debts, particularly from one or two non-paying specialist hospitals, threatens the RDF's ability to pay creditors, which is essential for its continued smooth procurement (though this situation is now being improved).
- Decreases in attendances at RDF facilities and problems with the health insurance system have resulted in reduced profits for the past three years. This is a worrying trend.
- The proportion of RDF sales value which is being transferred to the KMoH has doubled over time (at the same time as KMoH contributions, in form of staff salaries, for example, have reduced). It is now 17.5 million SDD each month. Excessive extraction is a threat to the RDF's viability. It is also not clear whether the surplus is being used according to the originally agreed purpose of promoting PHC.
- An absence of capital investment plans is noted, particularly in relation to the current development of new offices
- There is a need for more details in the recent financial reports, including giving explanations for trends
- The RDF has suffered from an unfortunate discontinuity of management over the past two years, though a permanent director has now been appointed in 2005. Strong leadership is essential to continued viability and quality of work.

- The RDF's fortune is now strongly connected with the KHIC, which is its major purchaser. It also owns shares in the KHIC. Any adverse development for the KHIC would also impact on the RDF. It is also dependent for its current profits on its People's Pharmacy network: through 18 outlets it sells more drugs than through its 123 hospitals and health centres.
- Linked to that is the disproportionate growth in sales of non-essential drugs. While driving up profits, there is a real risk that the RDF mandate of promoting rational prescribing will be overshadowed by this trend.
- The prescription review suggests that antibiotics use is still too high and has risen since the last survey (in 2000). That and the high use of syrups and low use of ORS suggest that there is need for more investment in practitioner and consumer education
- Qualitative information from focus groups show that patient awareness is also low
- Although availability of essential drugs is still high in facilities, it has dropped from 100% in previous surveys to 95% now.
- The market survey found that for the 15 most commonly used drugs, the CMSPO prices undercut the RDF's – on average by 10%. (Note though that the CMSPO does not sell direct to the public: retailers will add 20-35% to these prices, whereas, at least for the health centres and hospitals, RDF prices are the prices that users pay.)
- Although the RDF is supposed to operate a fixed price list, small but significant variations in prices were found across the facilities (not correlated to location or any other variable)
- Poor stock keeping records were found in the health facility survey
- Public awareness of the RDF and public involvement in CHCs was found to have remained at a low level
- Operations research, which was once seen as a core activity for the RDF, appears to have withered

Who is benefiting?

As the RDF operates through all of the main KMoH health centres and hospitals in KS, the question of who is benefiting has to be answered by looking at use of the public facilities in general.

Overall utilisation trends for the RDF network are positive, rising to 3 out of the 5 million people in 2002, though with a small decrease the following year.

Geographic access to the facilities is good: mean time to reach a health centre in the household survey was 15 minutes, and 34 to reach a public hospital.

Quality indicators examined in the health facility survey are on the whole positive and suggest that quality does not vary systematically by location or rural/urban status, with the exception of KMoH supervision, which is more frequent in urban areas. (The full details of the health facility findings are published separately (Cadge, N. & Elkarim, Professor M., 2005)).

The household survey also reinforces the importance of the public services: the main treatment strategy was to go to a health centre (36% overall), followed by public hospitals (29% overall). Moreover, these facilities are more important for the poor: use of health centres is concentrated in the bottom three quintiles, while hospitals are important to the bottom four quintiles, but not the richest.

Financial barriers are, however, significant. Since the liberalisation and health sector reforms of the 1990s, Sudan has placed a heavy burden of paying for health care on households, with the state contributing a mere 20% (one of the lowest proportions in Africa). Of these household costs, drugs form 58% of the total, according to our household survey.

According to the HEA, 17% of Khartoum State's population is unable to afford basic health care for all or part of the year. This group is concentrated in the IDPs – 60-75% of IDP households fall into this category, compared with 5-10% for the rural and urban poor. A further 24% overall is estimated to be unable to afford emergency health care without assistance (22% in urban areas; 30% in IDP areas; and 30% in rural areas).

In the household survey, 6% opted for no treatment (with lack of money the predominant factor), while 29% of those who sought treatment could not afford to pay for it. For the more disadvantaged groups, inability to pay is, of course, higher: within IDP areas, 46.5% could not afford to pay, while for the bottom quintiles, the proportion is 32-37%. Moreover, households in the poorest quintile are five times more likely not to treat sick members, compared with the top quintile.

Overall, health expenditure as a proportion of household income is 11%, which is high by international standards. The differences between areas were not statistically significant, but the group with the highest proportion were the IDPS, who were found to be spending 15% of their total household income on health care.

For those who cannot afford to pay, borrowing is the main coping strategy across the social groups (57% overall), which reinforces qualitative information on the importance of informal social networks.

Formal support systems were found to exist, but to be limited in scale, arbitrary and difficult to access. Exemptions policies vary by facility and only 1% reported receiving them. 3% of those who were unable to pay reported receiving charitable donations and 3% reported assistance from the Zakat (the official Muslim social support fund). FGDs reported bias in allocating assistance from the Zakat, favouring those with better contacts.

Options for expanding access within Khartoum

Given that the main barriers to accessing the RDF are financial, any measure which reduces household costs (for vulnerable groups) or increases their income will increase access. The potential range of actions is therefore wide.

Providing internal subsidies within the RDF is one option, but given the need for the RDF to maintain its viability, there is limited scope for this. Besides, the aim should be to increase access to health care generally, rather than encouraging self-prescription. It is therefore preferable to extend health insurance cover to those who cannot currently afford to access basic care. The health insurance network and quality is adequate, and this measure would boost its development, as well as increasing business for the RDF, at low administrative costs.

Given current Khartoum Health Insurance Corporation (KHIC) premia, to provide membership for 20% of KS population would cost in the region of USD 3 million per year. This could be funded from a number of sources, including State budgets; the RDF 'surplus',

which it pays monthly to the KMoH; the Zakat (which does fund some poor households to join at present, but on a limited scale); and aid flows, which should increase post-peace agreement. Identification of beneficiaries could be carried out using the HEA information.

Given that so many of the households which are excluded are IDP[2] ones, an alternative would be to restart the free services which used to exist in IDP areas, but which were closed earlier this decade, once conditions were thought to have improved. (This will prove complex if IDPs are dispersed amongst the host community, however.)

Another option which would assist both IDPs and other poor and vulnerable residents would be to improve the administration of the Zakat, so that it becomes available on a larger scale, with clear criteria for access, lower access costs, and greater transparency and accountability.

'Peace dividend' funds should also be used to increase the overall public contribution to health care and so enable user fees in public facilities to be reduced. Some areas could be declared exempt as a region, on the basis of widespread poverty. Closer analysis of health spending at all levels would also identify areas where resources could be shifted to increase equity and efficiency. There is more detail on these recommendations in our household survey report (Witter, S. & Babiker, M., 2005).

Other measures to support the income of vulnerable groups include: changes to the replanning process, to reduce costs for IDPs; income generation activities aimed at boosting and diversifying income in IDP areas; and development of infrastructure in outlying areas (rural as well as IDP settlements) to enhance access to markets. The HEA report provides more detailed recommendations on these areas (Adams, L. & et al., 2004).

Issues for national expansion

Lessons for other areas of Sudan are limited, in that the data gathered here cannot be taken as representative outside Khartoum State, given the large differences in infrastructure and income levels. However, the general evidence suggests that RDFs, run along similar lines to the Khartoum RDF, could be equally successful in richer states, while free drug distribution programmes are more realistic for the more remote and poorer states.

Given the interest in expanding the RDF model to other States, a systematic evaluation of the CMSPO roll-out to date should be conducted. This is the second attempt, in that Bamako Initiative-style drug funds were set up at local level in the 1990s. Documentation of that experience is also lacking.

[2] IDPs are families who have fled from conflict and economic hardship, mainly in the south and west of Sudan, to live in the Khartoum area. Although many have been there for two decades, they continue to be classified as IDPs. In the wake of the Comprehensive Peace Agreement in 2005, many are returning to their home areas, particularly in the south. It is not clear how many of the 2 million will remain as residents of Khartoum State.

Recommendations

The RDF should continue to provide its services for Khartoum and to enjoy political support and independent status. However, there are significant findings which need to be acted on, internally and externally.

Recommendations for the RDF management

The policy on salaries and incentives needs to be reviewed, so that this type of expenditure does not spiral out of control.

The RDF management should investigate the causes behind the following issues which have been raised, and demonstrate how it is addressing them:

- Increase in expired stocks in facilities
- Poor stock record keeping in some facilities
- Fall in availability of essential drugs
- Small but significant variation in prices charged for drugs by facilities

The policy of subsidising more expensive drugs should be reviewed: what are the equity implications of this?

The management should discuss an informal cap on gross profits at around 15%, to minimise costs to users while maintaining adequate funds for reinvestment. (This cap could be lifted for exceptional circumstances, such as infrastructure expansion, but would be regarded as a norm, with justification required for increases.)

In addition to providing routine data, the RDF should focus on questions of importance for its overall function and carry out appropriate action research relating to these. These need not be ambitious or expensive, but would encourage a culture of reflection and goal-orientation: the RDF should continue to see itself as more than a business - as a role to pay in promoting good health generally.

Related to that is the need for renewed practitioner and client education on rational drugs use (in particular, to reduce the proportion of antibiotics being prescribed). This should be carried out in partnership with the KMoH Department of Pharmacy and the KHIC. Financial incentives to increase sales should be reviewed to ensure that they do not promote irrational prescribing. In this respect, it would be worth monitoring the proportion of essential/non-essential sales through People's Pharmacies, as well as keeping a downward pressure on the sale of brand name drugs through these channels. The public demand and growth in insured patients is creating an upward pressure on expenditure, which is not in the public interest.

The RDF and KMoH should together develop a plan to address the drugs supply to smaller, more remote health centres. This may require some medication of the RDF's systems – for example, by allowing longer intervals between supply and supervision visits.

The RDF should review its procurement practice, to ensure that it is getting the right balance of quality and price.

The relationship with non-paying debtors, such as the Cardiac Unit, which is in the process of being resolved, should not be allowed to recur.

The donated fixed assets should be re-valued, included in the financial records, and depreciated on an annual basis.

Format of annual financial statements must continue to be in accordance with the international accounting standards and reporting standards, and approved by all the stakeholders.

Ministry of Health

The KMoH should review the amounts that it is being paid monthly by the RDF: the current level seems unduly high and may be one of the factors behind the build up of creditors. Moreover, the basis for payment was that the RDF was using and benefiting from KMoH facilities. If, as has been the case recently, the RDF is asked to shoulder the cost of constructing new pharmacies for public facilities, then the rationale for the transfer no longer remains.

The KMoH should investigate the causes behind the documented drop in supervision, especially to rural health centres, and other quality issues raised in the health facility report.

The low levels of utilisation of public facilities documented in the health facility report and also indicated in the declining attendances at RDF facilities (other than PPs) should also be addressed in partnership by the RDF and KMoH. Strategies here could include improvements in hours worked by health staff and public education on the efficacy of generic drugs.

The user fee tariff should be made flatter and more transparent, with better posting of prices in health facilities.

The KMoH should work with the FMoH to ensure that additional barriers to importation and clearance of drugs are not created and that the RDF is facilitated in carrying out its work efficiently.

There is a need for the FMoH and KMoH to review the NEDL, to ensure that it is up-to-date with current prescribing practice.

Government and donors

The burden of paying for health care falls heavily on households at present in Sudan, compared with other developing countries. The GoS should use ‘peace dividend’ funds to increase its overall contribution to health care, thus reducing the burden of cost recovery, particularly in the poorer States.

Donors should study the case for reinstating free programmes, which used to benefit vulnerable groups, such as the IDPs in Khartoum State.

Measures to support IDP incomes and access to infrastructure should be taken to improve access to health care, among other goods.

The operation of the Zakat needs to be reviewed: it is currently viewed as ineffectual due to complex procedures, perceived favouritism, and lack of transparency.

Measures to improve access to health care and drugs should include the provision of KHIC membership to vulnerable households in Khartoum State.

Further research is needed to for health financing in Sudan generally, as well as more specifically on expenditures at State level and the operation of RDFs outside Khartoum. These will inform decisions on the overall budget for health and also maximising the use of existing resources.

BACKGROUND

1. Introduction

History of the RDF

The Revolving Drug Fund (RDF) was jointly initiated by the Khartoum Ministry of Health (KMoH) and Save the Children UK in the mid-1980s, though it took until 1989 for the first drugs to be supplied to health centres. It arose out of recognition of the weakness of the primary care system in the state and the increasing number of common childhood illnesses being brought to the Children's Emergency Hospital. The RDF was developed as part of a wider project - the Khartoum Comprehensive Child Care project (KCCCP), which aimed to revitalise primary health care services through improved drug supplies, equipment, staff training, refurbishment of health centres, and improving primary health care systems.

The RDF component aims were:
- To increase access to essential drugs at affordable prices
- To encourage the rational use of drugs

The first was to be achieved by setting up a sustainable drug revolving fund, with full cost recovery (but no subsidy to external activities, as was practiced by the Bamako Initiative). The second was to be achieved by investment in infrastructure, training and operational research.

The importance of financing strategies for drugs is underlined by the fact that, generally speaking, developing countries spend a much higher proportion of their total health spending on drugs (24-66%), compared to 7-20% for developed countries (Quick, J., 2000)). In addition, the public spending on drugs, as a proportion of total drug expenditure, is typically much lower in developing countries (5-50%), compared with developed countries (50-90%), leaving a heavy financial burden on households. Studies in Sudan and elsewhere confirm that the availability of drugs is often seen as the key indicator of quality of health care by households (Habbani, K., Groot, W., & Jelovac, I., 2005).

A project implementation committee was established, representing Save the Children UK and the KMoH. Members included the KCCCP director, the Director General of Health, pharmacy staff, district health directors, financial staff, the project coordinator and project pharmacist (the latter two Save the Children UK staff).

The RDF imports drugs from non-profit suppliers abroad, or from local sources, where these are available. A committee made up of RDF management and PHC representatives selects the drugs from the Sudan Essential Drugs List. These are then sold on at cost, plus a mark-up to cover overall running costs (including reserves against devaluation etc.). Cross-subsidies are operated from the common, cheaper drugs to some of the more expensive ones. Prices for patients are uniform across the State: there is therefore some cross-subsidy from the closer facilities to the more remote ones, which are more expensive to supply and supervise.

Drugs are delivered to RDF-supported pharmacies in the health facilities, based on previous consumption patterns. Funds are collected monthly, against sales records. (For a more

detailed description of the operation of the RDF, see (Gamaleldin Khalafalla Mohamed Ali, 2000)). An important point is that the RDF does not sell to the health centres to sell on (which would place the financial risk on the health centre), but sells directly to the patients, via pharmacies in health centres and hospitals.

Starting with 13 health centres in 1989, the RDF expanded to 77 outlets (65 health centres and 12 rural hospitals) by 1996. The list of essential drugs also expanded from 70 to 90 items. $1.8 million was invested in capitalising these outlets. Save the Children UK also provided training, refurbished pharmacies and provided transport until the programme was handed over in 1996 to the KMoH (Tembon, Chi Andy, 1996).

An evaluation of the overall KCCCP carried out in 1996 (AwadElKarim, Professor M. A., 1996) concluded that the RDF 'was able to improve the supply system and avail a range of essential drugs at affordable prices'. It also noted improvements in rational prescribing, though 'efforts are still needed for further improvements in this area'. It found that 8% of patients were unable to pay for the prescription cost. (This was based on the proportion of prescriptions where the drugs were available, but were not dispensed.) It noted that the RDF policy of cost recovery had since become a key government policy in health, throughout the country, and recommended that the RDF model be expanded nationwide.

During the next phase, 1996-2002, the RDF became an independent project within the KMoH. Changes over this period included the following:

- Financial incentives were introduced to retain staff
- Training programmes were organised for all members of staff, including raising external funds for 25 Masters degrees and 25 short courses abroad for pharmacists working in headquarters and health facilities
- A new employment contract was signed with pharmaceutical staff, whereby they would have to pay for stock losses. This reduced the leakage of drugs
- Management improvements included a system for reconciling cash with the value of sales made, as well as ABC analysis of sales (investigating the proportion of revenue generated by different products)
- A policy of selling through the newly established People's Pharmacies (PPs) increased the number of outlets of the RDF, as did the expansion to a number of national hospitals
- The RDF took responsibility for transporting the drugs which are provided without charge for the first 24 hours of emergency treatment in public hospitals (drugs which are funded jointly by the FMoH and KMoH)

Studies (Fundafunda, Bonface, 1998) noted an increase in utilisation of health facilities during this period, attributed to the RDF and also to the new health insurance system, which was introduced in 1997.

In 2002, the Wali of Khartoum State signed a constitutional decree on the establishment of the RDF as an independent foundation, responsible for the medical supply in Khartoum State. An independent administrative board was established, chaired by the State Minister for Health. At the same time, 7 RDFs were set up in other states, financed by the Central Medical Supplies.

The RDF now supplies113 health centres, 20 hospitals, and 22 community pharmacies. To run these it has a staff of 495. It has been operating successfully for 18 years and has an annual turnover of around £2 million. In 2003, it dispensed drugs to 1.2 million patients. As

one of the largest programmes of its kind in the world, there has been considerable interest in how the RDF has operated and an interest in expanding its work.

Rationale for this study

Evaluations in 1996 and 1998 concluded that the RDF has largely been a success story to date. One of the main concerns about revolving drug funds in general is that they commonly decapitalise, through failure to set adequate prices, or as a result of devaluation, or through management failures, pilfering etc. This has not happened with the Khartoum RDF.

Another constraint in the early days was access to hard currency to import drugs from abroad. This was initially managed by SC providing a currency swap facility. Since the late 1990s, however, the RDF has been assisted by the increased availability of hard currency in Sudan from oil revenues. This major concern, which appeared to threaten the project's sustainability, has therefore been overcome.

Concerns about political interference, which might threaten the survival of the RDF (by diverting funds from it) or undermine its independence as an operational unit, have also not been substantiated to date.

There have however been some less successful aspects to the RDF. One of the areas of persistent weakness, commented on in earlier evaluations (AwadElKarim, Professor M. A., 1996) (Fundafunda, Bonface, 1998), was the lack of community participation in the management of the RDF.

Another issue which has been highlighted is that the RDF has no provision for those who are unable to afford its drugs (Fundafunda, Bonface, 1998).

There were a number of reasons why this follow-up evaluation was commissioned by the KMoH, Save the Children UK and partners.

One was to analyse how the RDF has changed since it was given independent status, and whether it is still fulfilling its mandate to provide access to quality, low cost essential drugs.

Another was to draw lessons from the RDF experience which could inform the national roll-out which is now taking place (with RDFs being set up in many of the other states of Sudan).

Finally, while many of the previous studies had looked at overall functioning, none had focussed in depth on the issue of equity and of ascertaining who was benefiting from the RDF (and which groups were not able to utilise it). This was to be a focus for this study.

Aims of the evaluation

The evaluation team was asked to evaluate the functioning of the RDF since it became an independent body, focussing on the following questions:

1. Does the Khartoum RDF ensure an adequate supply of quality, safe and effective drugs at below prevailing market prices?

2. To what extent is the population excluded to access to RDF drugs due to financial constraints?

3. What models (subsidies/exemptions) can be used to provide a 'safety-net' for the most vulnerable? What will be the cost vs. coverage implications of these models?

Structure of the report

Chapter two outlines the research methods which were used in the evaluation.

Chapter three examines the financial sustainability of the RDF, looking at recent trends, risks and liabilities.

Chapter four examines whether the RDF is continuing to provide safe and appropriate drugs at below market prices.

Chapter five examines issues of access – who is using the RDF and who is being excluded.

Chapter six discusses the overall findings and their implications for the RDF's role in future, as well as roll-out in other states.

Chapter seven contains conclusions and recommendations.

2. Research methods

Overview of different components

The study was designed and approved by a steering committee, which included representatives of the Federal Ministry of Health (FMoH), the KMoH, the RDF, WHO, UNICEF and Save the Children UK.

Ethical approval for the research design, tools and sites was obtained from the KMOH and the Humanitarian Aid Commission, whose members were present during both the HEA and household survey field work.

There were nine different components to this study:

- literature review, to examine the RDF's history and also to fit the study findings into the context of wider developments in Sudan and internationally
- interviews with key informants in Khartoum, to assess the policy context and to pick up concerns and suggestions for potential improvements to the RDF
- household economy approach (HEA) study of different areas within the State, focussing on household livelihoods and coping strategies, and hence ability to afford health care and other basic goods
- household survey focussing on health seeking behaviour, expenditure on health care, coping strategies, and perceptions of health facilities and the RDF
- focus group discussions (FGD), which looked at the same questions as the household survey, but using qualitative techniques
- health facility survey, which looked at prescribing practices, financial management and pricing structures, and some indicators of quality of care within RDF outlets
- financial analysis of the RDF, to focus on profitability, operating costs, financial management and probity
- pharmaceutical study, to look at issues of quality, pricing, procurement, management and the range of drugs which the RDF currently supplies
- management study, focussing on the structure of the RDF, its human resource policies, management issues and legal status

The literature review focussed on three areas: previous studies or written accounts of the RDF; any literature on health financing in Sudan; and international literature on the experience of operating drug revolving funds and related approaches, such as the Bamako Initiative.

The key informant (KI) interviews focussed on collecting information from policy-makers in Khartoum, both within official and donor institutions. The management study was also based on KI interviews and review of documents, within the RDF and the FMoH and KMoH. A list of KI is contained in annexe 2.

The remaining seven components are described in more detail below.

HEA

The HEA component investigated different wealth groups, their coping strategies, and expenditures, in order to determine vulnerability in Khartoum State, and more especially to highlight any problems with ability to pay for health care.

A group of 29 individuals from partner agencies and others participated in a 6-day training event incorporating both theory and practical aspects of household economy analysis. One of the days was spent in the field. Of these trainees, 18 were selected for the study, and allocated to one of 3 field teams. Each team was balanced according to gender and ethnic group (ensuring particularly inclusion of both southerners and northerners in every team) and where relevant, staffed with specialists (e.g. agricultural specialists in the rural areas). Each team was led by a household economy expert during the field work and analysis

Livelihoods in Khartoum State are diverse – with three broad categories. These include IDP households (living in IDP settlements or scattered within urban communities), "urban" residents and "rural" communities. As precise population figures were not available for the disaggregated livelihood groups, the team made estimates as follows: IDP: 20%; urban: 70% and rural: 10% of Khartoum State population. The study focused on the urban and IDP populations but two rural communities were visited to get an overview of livelihoods in rural areas.

The next stage was to disaggregate each livelihood group into different wealth groups. The study used Household Economy Analysis (HEA) methodology to analyse household expenditure and income using a mixture of quantitative and qualitative techniques[3].

The urban community was sub-divided into three classes of suburb: Grade 1 (top), Grade 2 (middle) and Grade 3 (poorest areas)[4]. The HEA assessment covered communities in the Grade 2 and Grade 3 areas only. A total of 6 communities were visited. Selection was based on the urban grading system mentioned above and ensured selection of sites from the three major urban centres. Communities visited included:

- Khartoum: Burri, Idd Hussein
- Omdurman: Kerari Jerafa, Shigla
- Khartoum North: Thaiba El Ahamida, El Shabia

Sampling of IDP camp populations was based on several other factors: (a) the status of the "planning" process in these areas[5]; (b) distance from labour opportunities; (c) coverage of the three major urban centres. The team visited nine settlements where IDPs were living:
Khartoum: Mayo Village, Mayo Farms (Mandela), Es Salaam (Jebel Aulia);
Omdurman: Es Salaam (Jabarona); Wad El Bashir; Hara 42; Fatah
Khartoum North: Hai Baraka; Idd Babikir.

[3] For details about the methodology, see Save the Children (2000), Household Economy Analysis: a resource manual for practitioners

[4] These categories relate to urban restrictions on building regulations in each area. Those in the top area have to be built out of durable, expensive materials, are often multiple stories high and are situated in large plots. Poorer households living in these areas who inherited their property but who are unable to afford to upgrade their house to sufficient standard are likely to sell up and move out to grade 2 or grade 3 areas. Grade 3 areas usually have only single-story houses made of mud.

[5] This enabled us to ensure balanced representation of sites which had completed the planning process, sites which were in the middle of the process, and sites where the planning process had not started

The rural study visited two areas only[6]. The field work for the rural areas lasted only 2 days and the information gained provided only a general overview. Sampled sites were:

- Omdurman: Salamaniya
- Khartoum North: Sagai.

A break-down of interviews conducted is given in table 1.

Table 1 Breakdown of HEA interviews

Household and type of interview	Urban	IDP	Rural
"poor" – complete household interviews	11	23	2
"poor" – information only on incomes	3	3	0
"middle" – complete household interviews	17	15	3
"middle" – information only on incomes	5	1	0
Total	36	42	5

In this report, we summarise the HEA findings as they relate to the functioning of the RDF. For more detail on the wider results of the HEA study, see (Adams, L. & et al., 2004).

Household survey

The aim of the household survey was to gather quantitative data on health seeking behaviour, health expenditure and coping strategies by different populations within Khartoum State. This would provide evidence on the affordability of drugs and the extent to which people were unable to access RDF facilities. At the same time, the survey fills a wider information gap on household health care expenditure in Sudan. A more detailed report of its findings will therefore be published separately from this evaluation (Witter, S. & Babiker, M., 2005).

The household survey was prepared in June-July 2004 by the team of international and local consultants (see annexe 1). A three-day training workshop was conducted in Khartoum in July for the 10 field interviewers (predominantly, but not exclusively, female) and two supervisors. A day of field testing was carried out, followed by revision of the survey form. The fieldwork took 10 days, in late July/early August.

The aim was to sample 500 households, from richer, middle class and poorer urban areas, as well as areas with higher proportions of internally displaced persons (IDPs). The classification of areas was carried out by the HEA team (see above). Table 2 gives a breakdown of the sampling locations.

Table 2: Distribution of household survey sampling locations, according to area and residential class

Location Type	Khartoum	Khartoum North	Omdurman	All areas

[6] Earlier discussions with key informants revealed that "rural" households constituted a small minority of the population and that most households engaged in peri-urban agriculture are relatively prosperous as they benefit from relative proximity to strong markets as well as the benefit of own production.

Urban high income	1	-	1	2
Urban middle income	1	1	-	2
Urban poor	1	2	3	6
Rural	2	2	2	6
Internally displaced	2	3	2	7
Total	7	8	8	23

Within each location, households were selected by systematic random sampling techniques. A street is selected at random and then a house is randomly selected as well; the houses are then selected at systematic intervals (e.g. every tenth house is selected). If the house contains more than one household, the interviewers were instructed to choose only one household from that house. If a household refuses to be interviewed, the neighboring household is chosen instead. In fact, only one household (in Mandela IDP camp) refused to cooperate, so the response rate was close to 100%.

After data cleaning, 700 household surveys were entered. The total number of individuals was 5,111. Of these, 52% were female and 48% male. 38% were under 15 years of age; 58% were 15-60; and 4% over 60. Their characteristics were found to be compatible with earlier demographic studies.

Facility survey

The main objective of this component was to triangulate the results of the pharmacy report and the household survey to assess costs, access and protection mechanisms. A second objective was to assess the quality of services being provided within RDF outlets, in order to understand whether the quality objectives of the original RDF programme were still being met.

Following a review of current literature and WHO protocols, a questionnaire was developed that aimed to investigate the following main themes:

- Staffing and personnel
- Facility infrastructure
- Functionality of key healthcare provision areas
- Pharmacy management
- Financial management - fees-for-service and drug fees
- Use of exemption and insurance schemes

The questionnaire was tested in four facilities - two health centres and two hospitals, not in the selected study sample - by the team of data collectors and adjustments made accordingly. The final version was approved by the State Ministry of Health.

Data collectors were selected from students undertaking post-graduate training in Community Medicine. Potential clients were interviewed and their language and numeracy skills verified.

Four data collectors were selected: three female and one male. They completed a two-day training workshop, followed by one day pre-test and then a further day to adjust the

questionnaire. Only after the initial two-day workshop were the two teams identified, ensuring a balance in skills and confidence between the two teams.

It was decided to undertake a proportionate stratified random sample of 25% of the health centres to ensure appropriate coverage across Khartoum State. As the RDF groups the health centres into four locations for the purpose of supervision and monitoring, the health centre sample was stratified by location according the number of facilities in a location as a proportion of total RDF health centres. From that point, health facilities were randomly selected.

Given the much smaller numbers of hospitals using the RDF, it was decided to select a third of the total number of hospitals and stratify according to both location and geographical characteristic to ensure both urban and rural hospitals were selected. From that point, health facilities were randomly selected.

People's Pharmacies, which currently operate only in urban areas, were stratified by location and then randomly selected. Given that the information to be gained from the People's Pharmacies would be limited to pharmacy management and infrastructure, 25% of the total number of People's pharmacies was selected.

Table 3 Health centres sampled in facility survey, by location

Location	Total no RDF health centres	1:4 of health facilities	Study sample	Proportion of total RDF health centres in location	Proportion of total RDF health centres
East Nile	19	4.75	5	26.3%	4.95%
Khartoum	34	8.5	9	26.5%	8.91%
Khartoum Bahry	23	5.75	6	26.1%	5.94%
Omdurman	25	6.25	6	24.0%	5.94%
Total	101	25.25	26		25.74%

Table 4 Hospitals sampled in health facility survey

Location	Total no RDF hospitals	1:3 of RDF hospitals	Study sample*	Proportion of total RDF hospitals in location	Proportion of total RDF hospitals
East Nile					
Khartoum	7	2	2	28.6%	10.5%
Khartoum Bahry	6	2	2	33.3%	10.5%
Omdurman	6	2	2	33.3%	10.5%

Total	19	6	6	31.7%	31.6%

Table 5 People's Pharmacies sampled in health facility survey

Location	Total no RDF PPs	1:4 of RDF PPs	Study sample	Proportion of total RDF PPs in location	Proportion of total RDF PPs
East Nile					
Khartoum	6	1.5	2	33.3%	11.8%
Khartoum Bahry	5	1.3	1	20.0%	5.9%
Omdurman	6	1.5	2	33.3%	11.8%
Total	17	4.3	5	28.9%	29.5%

Data was entered into SPSS (version 10.0.5). Analysis was done using Excel 2002.

A full report on the health facility survey is published separately (Cadge, N. & Elkarim, Professor M., 2005).

Focus group discussions

The aim of the FGDs was to add qualitative information to the data gained from the household survey on health care choices and perceptions, including of the RDF.

Two teams of data collectors (each with one man and one woman) were trained in PRA techniques.

Discussions took place with 20 groups, split into males and females, children and the elderly. Groups ranged in size from 5 to 10 participants. A total of 140 people participated. 21 key informants were also interviewed. The research was carried out in 12 areas of Khartoum State. The areas were selected to include a variety of settings, including IDP camps, rural areas, semi-urban and urban sites.

Different tools were used, including preference ranking, matrix scoring, mapping, modelling, and seasonal and historical diagrams.

Financial analysis

The financial study aimed to establish the current financial viability of the RDF, its financial management and options for improving profits or reducing costs. This component was outsourced, using Save the Children UK's standard tendering procedures. The following activities were carried out:

- a financial evaluation of the financial statements of the RDF for a period of three years
- a review of the cash collections vis-à-vis invoices

- an assessment of the running costs of the project
- evaluation of income in the financial statements (both cash and in-kind)
- review of effects, if any, of inflation, stock losses and currency fluctuations on the project management and sustainability
- analysis of capital investment plans

These were examined by a review of internal RDF documents and discussions with RDF staff members.

Pharmaceutical study

The objectives of this component were:
- To asses the compliance of the RDF drug list with WHO policy and the National Drug Policy
- To evaluate the mechanisms for procurement, quality control, warehousing and stock control
- To conduct a market survey in order to compare RDF prices with other drug suppliers

The methods used for this component included structured interviews, observation, secondary data and a market survey.

Interviews were conducted to obtain information from RDF key informants regarding logistics concerning drug supply, provision of other services such as supply of equipment and instruments to hospitals, and research. Topics included the supply of rural health facilities with essential drugs, the competitiveness of RDF prices, the impact of RDF drug supply on primary health care coverage and rational use of drugs, funding of research and the successes and failures of the RDF.

Literature provided by the RDF in the form of annual reports, guidelines and stock ordering forms were consulted. WHO and Federal Ministry of Health guidelines and drug policies were also reviewed.

For the market survey, 17 pharmacies were randomly selected - 12 of them were private pharmacies (out of a total of 565 in Khartoum State) and 5 were popular pharmacies (out of a total of 77).

After validity and consistency were checked and the data cleaned, the data was analysed using SPSS.

Study constraints and limitations

One constraint noted by researchers was that the overall study was ambitious in scope, with many different components, which resulted in a split into different teams, and a challenge to integrate all of the findings.

The timing of the study was also not ideal. The original aim had been to influence the design of roll out of RDFs in other states in Sudan, but logistical and funding issues meant that the process was delayed, so that the recommendations are likely to have less impact at this stage, with roll-out already underway. Both the funding agencies and many other stakeholders have also been understandably preoccupied by the peace settlement in the South and the problems faced in Darfur.

Despite these two overall constraints, the findings of these studies are very timely given the discussion of health sector strategies post-peace agreement and the potential changes to the situation of IDPs in Khartoum.

EVALUATION FINDINGS

3. Financial sustainability of the RDF

This section will look at the overall financial health of the RDF, which includes the following issues:

- The RDF's different revenue streams and their profitability
- Overheads and cost controls
- Measuring efficiency
- Use of RDF surplus
- Capital expenditure and investments
- Financial reporting
- Risks and liabilities

Pricing and profitability

The RDF operates in a number of different markets. It supplies emergency drugs to hospitals for free (the KMoH and FMoH pay for the drugs, which the RDF distributes without charging for the service). It supplies a high volume of locally manufactured drugs to the People's Pharmacies[7], with a fixed mark-up of 20% (which is set by the Federal Department of Pharmacy). For the imported drugs which it supplies to health centres, hospitals and People's Pharmacies, it can set its own mark-up, which has varied over time. (The mark-up on imported drugs sold to People's Pharmacies is 10% lower than that used for RDF facilities, to reflect the fact that People's Pharmacies add their own additional mark-up of 20%).

In 1991, the mark-up for RDF facilities was 13%. However, by 2000 it had risen to 64% (Gamaleldin Khalafalla Mohamed Ali, 2000). This figure broke down into:

- 15% for operating costs
- 10% for recapitalisation (after the devaluation of the Sudanese Dinar (SDD) in the 990s)
- 5% for drug losses
- 4% for international drug price increases
- 30% to cover local inflation

In 2002, this was reduced to 58%, and in 2003 it was set at 51%.

In terms of the locally manufactured drugs, the RDF has no particular price advantage. However, for the imported drugs it enjoys the advantage of its import tax-free status (worth

[7] People's Pharmacies are quasi-public establishments retailing drugs and medical supplies at below market prices to improve access and availability of pharmaceuticals. They were founded in the early 1980s as a pilot study for a drug cost recovery system. They differ from the private commercial pharmacies, firstly, in having access to the CMSPO drugs - i.e. generic and large pack products - in addition to the brand products from the private wholesalers. Secondly, the People's Pharmacies are owned by public organisations (e.g. hospitals), people's committees, trade unions and NGOs. Their mark-up on cost for drugs from the CMSPO was 35%, from the RDF (imported drugs) about 20% and from private drug wholesalers, 10%. However, they have become commercialised now and operate in a similar way to private pharmacies.

17.5% of the value of the imported drugs), which is not shared by other importers, notably the CMSPO[8].

In the health centres and hospitals, the RDF is selling direct to the patients – in other words, the risk of losses, expiry of stocks etc is borne directly by the RDF. For some other clients, such as People's Pharmacies and NGOs, the RDF sells the drugs to the institution and thereafter, any issues of cost recovery are a problem for the institution, not the RDF. This is an important distinction. In the case of the other state RDFs, the model has been adapted, so that each level sells on to the one below, rather than taking responsibility for the full cycle of sales to the client. The risk of shortfalls is therefore passed down the line.

Table 6 shows the balance of revenue and profit coming from drugs sales through the hospitals and health centres (the RDF account) and the People's Pharmacies. The People's Pharmacies provide the bulk of the revenue (57%, rising to 60% in 2003), but because of a smaller mark-up on the locally purchased drugs, its contribution is smaller than the RDF stream (40%, rising to 43% in 2003). Nevertheless, this side of the business is growing, and once distribution costs are taken into account, the difference may be small.

Table 6 RDF revenues and gross profit from two streams, 2002-3

		2002		2003	
		Amount in GB£[9]	% of the Total	Amount in GB£	% of the Total
Revenues	RDF	2,698,335	43%	2,541,902	40%
	PPs	3,521,658	57%	3,879,128	60%
	Total	6,219,993		6,421,030	
Gross margin	RDF	886,791	60%	861,283	57%
	PPs	587,675	40%	646,521	43%
	Total	1,474,466		1,507,804	

One measure of overall profitability is the gross profit ratio. This is derived by comparing the gross profit with the sales. In 1999 the rate was 15.25%, and by end of 2003 it was 21.97%. In fact, since 2002 when RDF became an independent government entity, the gross profit ratio has been increasing, and is expected to do so in 2004. There is no fixed 'ideal' gross profit ratio, but given the RDF's objective of providing affordable, quality drugs, there is a strong argument to be made that the gross profit should not increase much beyond around 15% (which still leaves sufficient surplus for reinvestment in business development).

The net profit ratio looks at the overall profitability from a trading venture/project. This ratio is between the net reported profit and sales. In 1999, the ratio was 1.36%, increasing to 3.16% in 2000, but then dropping back to 1.56% in 2001. In 2003, the ratio was 9.92% (the net profit before the subsidy paid to KMoH of SDD 164.9 million).

The value of drugs sold has been increasing, year on year, but with a particularly large rise between 2001 and 2003 (see table 7):

[8] Note though that both the CMSPO and the RDF enjoy tax privileges relative to the People's Pharmacies and private pharmacies, which pay 32% of net profits in tax.
[9] 1GBP= 410 SDD in 2002 and 450 in 2003.

Table 7 Value of drugs sold by RDF, 1999-2003

Year	Increase in value of drugs sales (%, compared with previous year)
1999	17.22%
2000	21.02%
2001	39.28%
2003	143.16% (NB. For a two year period)

This increase in profit is largely attributed to the growth in sales to non-RDF institutions (i.e. People's Pharmacies).

Overheads

In the early days of the RDF, operating costs were low (1-4% of total revenue), partly because Save the Children UK was still supporting many of the recurrent operating costs. From 1996-2000, expenditure increased to between 8 and 12% of revenue (Gamaleldin Khalafalla Mohamed Ali, 2000).

There is some concern now that overheads have continued to increase, particularly staff pay and incentives. As of 2003, the RDF has had to pay its staff salaries, which were previously paid by the KMoH (though the RDF used to pay incentives to the KMoH staff). This is part of the switch to independent status. However, the rise in costs is also attributed to salary increases and rising allowances. For example, the salary of a driver has been raised five times in the past two years and those of other staff more than doubled, and are well above current MoH levels. Whether this is justified is doubtful, given that the exchange rate has been fairly stable and inflation under control over this period.

Figures for operating and administrative expenditure are given in table 8.

Table 8 RDF operating costs, 1999-2004

Year	Operating and admin costs (SDD thousands)
1999	51,767
2000	71,974
2001	92,241
2003	308,845
2004	506,787

The huge increase in 2003 as compared with 2001 is for a two year period and covers a period when the RDF business was still expanding. Even so, the increase is high, and remains high for 2004. Wages, salaries and incentives rose from SDD 64.9 million in 2001 to SDD 180.1 million in 2003 and SDD 259 million in 2004. The increase over three years is, therefore, nearly four-fold. In 2004, salaries and allowances constituted 51% of operating costs.

Incentives increased by 66% between 1999 and 2000, and by nearly 100% between 2000 and 2001. Incentives paid during 2003 also amounted to a significant amount.

As of April 2004, a government minimum wage of 12,500 SDD came into force, but this cannot account for increases in staff costs during the earlier period. A system of paying incentives for increased sales for all of those in the supply chain was also introduced recently and this will contribute higher sales and also higher expenditure on pay and incentives. It is important that financial incentives do not work against the drive for rational prescribing (see later).

Incentives should be performance-related, but should also be capped at a proportion of salary (e.g. 50%), to stop them from spiralling out of control or being abused.

Another significant expenditure item in 2003 was training (SDD 9.2 million). This training may well have been necessary to prepare staff for the changes in the RDF moving from project to independent government entity.

Surprisingly, transport and fuel costs have not increased significantly over the last four years. For instance, they increased by only 10% between 1999 and 2000; and decreased by 30% between 2000 and 2001. In 2003, these amounted to SDD 8.3 million only.

Good stock control is essential to keep adequate quantities (not excessive, but not so low as to run out of essential drugs) and reducing losses. The change in stock inventory system and employment contract was credited with bringing the RDF from a loss- to a profit-making body after hand-over in 1996.

The rates of wastage were recorded as virtually nil in 2000, thanks to efficient stock control procedures (based on consumption information, and using a 'first in, first out' approach), as well as anti-theft measures (Gamaleldin Khalafalla Mohamed Ali, 2000). In recent years, however, expired drugs written off have been rising. In 2003, they amounted to SDD 3.08 million, compared to SDD 0.7 million in 2001. According to the 2004 annual report, the RDF facilities lost 2.2% of their stock through expiry, while the PPs lost only 0.5%. Although this remains a small proportion of stock values, this trend is of concern.

In the facility survey, 31% of health centres, 40% of People's Pharmacies and 1 out of 6 of the hospitals reported having expired drugs in stock, varying from 1-3 items. A similar proportion reported having stock that would expire within the two months. This suggests that the RDF systems for reducing stock losses may need tightening up. The management plans to introduce a new system for checking pharmacy records against RDF ones, to reduce stock losses. This is an urgent issue to pursue.

The management accounts of RDF provide the necessary cash reconciliation vis-à-vis theoretical cash which should have been collected from the sales. Given that the differences are small, less than 1% in most cases, we conclude that there is effective control over cash collections.

Measuring efficiency

One measure of efficiency is the working capital efficiency ratio. This relates to the stock turnover. It is calculated either as stock turnover per year or as the number of days that it takes for stocks to turnover on average.

Table 9 Working capital efficiency measures, 2000-3

Year	No. of turnovers per year	No. of days to turnover	Working capital cycle
1999			24.5 days
2000	5.19 times	70.3 days	26.5 days
2001	5.73 times	63.66 days	44.9 days
2003	2.55 times	142.98 days	86.3 days

Table 9 shows that stocks have been building up since 2001 and that the working capital cycle has nearly doubled over 2001-3. The dangers in the stock build-up include the potential for:

- higher losses due to spillage and poor warehousing conditions;
- increase in losses due to expiry dates for slower moving drugs;
- increase in stocking costs – warehouse space, air conditioning, etc;
- loss in value of drugs which are superseded by other cheaper drugs.

The management should decide on an optimum stock holding - taking into account expected sales patterns, and the time span required between placing an order and receiving supplies in the warehouses - and work to eliminate excess stocks, based on that level.

Use of RDF surplus

The initial agreement between Save the Children UK and the KMoH stated that 6% of the RDF sales should be transferred to the KMoH to finance other PHC investments. This is viewed partly as payment for the benefits which the RDF gets from operating through public facilities, such as the hospitals and health centres, which the KMoH has to maintain.

This transfer is now 17.5 million SDD each month (3% of People's Pharmacies sales and 13% of RDF sales), which equalled 7% of overall sales in 2003. The proportion of RDF sales revenue that is being transferred has more than doubled since 1995, and the amount of money received by the KMoH has also doubled, in the light of the growth in RDF business and the addition of the People's Pharmacy income stream (which did not exist when the original agreement was drawn up). Some concerns have been expressed that the current level is eroding the RDF surpluses and thus undermining its ability to keep up with payment to creditors (see below) and to invest in its own business and so ensure future sustainability.

How it is used is not entirely clear, but some portion at least was used to pay off the debts of the Cardiac Centre, which raises questions about appropriateness as well, as the original aim was for the RDF to support improvements in the quality of PHC. It is hard to track this area, as money is fungible, but there is a risk that the RDF transfers are not adding to PHC budgets, but are substituting for other funds.

Capital expenditure and investments

In the past, capital items were not reflected in the RDF accounts, as their costs were absorbed by the funding agency. The RDF must now reflect full costs of capital items, including depreciation and maintenance (even if items have been donated).

In 2004, the management drew up plans in place to move to its own offices and to procure new fixed assets worth more than US $30,000. A new warehouse was also built in 2004. It is not clear whether a cost-benefit analysis was carried out between investing in premises and using the cash alternatively on providing additional drugs to the needy. While it is recognised that new premises enhance the image of the RDF as a business, the management should have prepared capital investment plans at least 3 years in advance and had them authorized by the board and stake-holders.

The RDF has invested in the Khartoum Medical Insurance Services Company (a public share company). The KMISC is a subsidiary of the KHIC, which owes money to the RDF and whose business is closely linked to the RDF. This raises concerns about risk-spreading: if the KHIC were to collapse, the RDF would be multiply affected, through the loss of its largest purchaser, the likely non-repayment of debts and the loss of value of its shares in the KMISC company (it owns 40% of the shares). The short-fall in revenue for 2005, related in part to the dispute between the KHIC and the FHIC, illustrates this vulnerability.

Internal financial controls and reporting

The financial review indicates that the project has continued with more or less the same internal control systems that were in use prior to it becoming an independent government entity. It finds that there is good internal control system. The project has also adequate financial procedures manuals (which were updated for its ISO application, now successfully completed). The manuals are appropriate to the circumstances. A number of detailed recommendations for improving systems are outlined below.

1. As regards the design of payment vouchers, these should be modified to include details on budget availability for an expenditure line item (or, if there is no budget for a proposed expenditure, with a full justification attached).

2. Fixed assets were introduced in the financial statements from 2002. Prior to that there was no accounting of these assets (whether donated or purchased). Like other types of assets, fixed assets must also be controlled. One way of controlling fixed assets would be introduce a fixed asset register. Such a register would provide detailed information regarding purchase, depreciation status, insurance coverage, condition of each item and location.

The management should either introduce a manual of fixed assets or purchase a fixed assets software module as part of an overall computerized accounting package.

A full inventory of all fixed assets should be carried out. All those not already reflected in the accounts since 2002 (meaning either purchased in the past or donated to the project) should be revalued independently and reflected in the accounts by way of assets revaluation. All fixed assets should also be depreciated.

3. The project accounting records are kept partly manual and partly computerized. The accounts are periodically closed off. The closing off depends on returns from various health facilities to which RDF provides drugs. In most cases, the health facilities provide reports in time to the head office. Obviously, in running such a large number of facilities, delays are bound to occur, and they should be accepted given that most facilities rely heavily on their accountants to prepare the reports (including stock taking reports verification).

The project is expanding rapidly as the demand for cheaper drugs continues to rise. Most, if not all, facilities continue to rely on manual accounting records. This could be cumbersome and delays could occur in recording transactions on a daily basis and then reconciling them with inventories. Also at the head office level, there is a need to computerize the entire accounting, payroll, and assets control functions.

Therefore, it is recommended that a separate review should be carried out to see which functions could be computerized and at which locations.

4. As a result of incorrect accounting in 2003, custom clearance of vehicles was treated as running costs rather than being capitalized. Customs clearance and car insurance amounted to SDD 14.3 million. This should be corrected.

5. The annual and periodical management reports include considerable information. However, some improvements could be made, such as:

- including clear definitions (e.g. on the distinction between administrative and operating costs)
- making annual comparisons between budgeted and actual expenditure
- including cash flow analysis
- providing additional information, for example on the basis for calculating the subsidy to the KMoH

Liabilities and risks

Liquidity

The current ratio compares the current assets of the RDF with its liabilities. The idea is to ascertain whether the project has the ability to meet its short term obligations out of its short term assets. In an ideal situation, the ratio would be 1:1, but in practice current assets should be slightly higher than the short term obligations, which is the case for the RDF (see table 10).

Table 10 RDF assets: liabilities, 1991-2003

YEAR	Total Assets (£, 000s)	Total Liabilities (£, 000s)
1991	1,497	39
1992	875	0
1993	1,302	4
1994	1,271	28
1995	1,098	37
1996	1,398	35
1997	1,149	63
1998	905	43
1999	1,172	123
2000	1,465	251
2001	1,718	334
2002	2,148	677

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2003	2,070	690

Source: (Gamalgeldin, K. M. & Fundafunda, B., 2004)

Inventories, debtors and creditors were increasing over this period. For example, debtors increased by 28.98% between 1999 and 2000, by 26.06% between 2000 and 2001, and over a period of two years to 2003 by 62.55%. This is worrying, especially as some of the debtors were influential tertiary institutions, such as the Cardiac Centre.

One of the main outstanding debts was from the KHIC, which rose from SDD 100 million in 2001 to SDD 344.5 million in December 2003 – the rise in sales not being matched with a rise in collections. However, a recent Insurance Act which transferred the surpluses of the insurance companies to the government has galvanised the KHIC to repay debts – including to the RDF – in order to reduce its surplus and liabilities and this has reduced the outstanding debt from the KHIC.

On the other hand, creditors increased by 62%, 10% and 324% in 1999-2000, 2000-2001 and 2001-2003. These are mainly European drugs suppliers.

Over the two year period to 2003, the increase in creditors outpaced that of debtors. By the end of 2004, funds owed by the RDF were 460million SDD more than those owing to it. If suppliers requested immediate settlement of their debts, the RDF would have a problem meeting its obligations.

The creditworthiness of the RDF has been one of its main achievements, and also a source of competitive advantage, as it has been able to order drugs from abroad without having to pay upfront. In 2003 it imported $2.5million worth of drugs, compared to $500,000 purchased from the local market. This creditworthiness would be endangered if the RDF fell behind in payments. The RDF management is however now taking measures to pay off its creditors.

Table 11 RDF debtors and creditors, 2000-3

	2000	2001	2002	2003
Debtors	GB£, 000s	GB£, 000s	GB£, 000s	GB£, 000s
MoH	0	38	13	10
Health Centres & hospitals	248	264	268	263
People Pharmacy	91	32	116	1
Health Insurance	31	68	61	49
Epidemiology Department	0	90	2	21
Hospital department	0	0	0	165
Marwa Pharmaceutical	0	0	0	0
Cardiac Surgery Centre	0	123	87	435
Others	48	24	67	41
Total	418	639	614	985
Creditors				
MoH	105	0	28	21
Lab. Account	0	8	0	0
Drug Companies	26	327	503	541

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Cardiac Surgery Centre	3	0	0	0
CMSPO	29	37	48	39
Animal Resources Bank	13	14	12	11
People Pharmacies	65	0	39	0
FMoH	0	18	0	0
Others	9	113	47	77
Total	250	517	677	689

It is clear from table 11 that debtors and creditors have been increasing over time, and that it is largely the non-paying hospitals which are causing liquidity problems, and which threaten the RDF payments to drug companies. If allowed to continue or re-occur, this would damage the RDF's reputation and undermine its terms of trade.

Foreign exchange availability

When the project originally started in 1980s, there was a drastic shortage of foreign currency in the country. Further, due to various economic problems, the value of the local currency devalued continuously up to 1996, leading to an annual inflation rate of 161%. Since then the country's economy has performed well. In 2004 annual inflation was between 12 and 15%, and the rate of exchange stabilized between 1999 and 2003. During 2004, the Sudanese Dinar rose against the dollar (against which it is pegged), and by January 2006 it was SDD 233.

Based on the above, the financial statements of RDF have shown only modest exchange rate differences.

As regards the availability of foreign exchange, the banking system has a surplus and since medical imports are given a priority, the RDF should have no problem in obtaining its foreign currency imports at prevailing banking exchange rates.

Other risks

According to the RDF manager, the People's Pharmacies now provide two-thirds of the RDF revenue. The financial viability of the RDF therefore depends on the continuation of this side of the business. If moves were made to separate the two businesses, that would have a serious impact on the viability of the supply of drugs via the RDF to health centres and hospitals. Similarly, the RDF has come to depend on its main purchaser, the Khartoum HIC, which provides 52% (753 million SDD) of the People's Pharmacy sales and 43% (223 million SDD) from RDF hospitals and health centres sales (RDF annual report 2002). If the Khartoum HIC were to suffer a business set-back that would have serious consequences for the RDF. This is however judged to be unlikely, given the scale of the KHIC and the commitment to continuing with health insurance.

There has been discontinuity of management over the past two years, in the RDF, with two directors resigning and an acting director appointed in the interim. The Board of Directors had also not met recently, at the time of main data collection in 2004. This is worrying given that the RDF requires active leadership and advocacy at the national level if it is to continue to enjoy political support and maintain its good record. However, it is hoped that the appointment of a permanent director in 2005 will settle these concerns.

Summary of financial findings

The RDF has continued to grow, in terms of volume of sales and assets, and remains in good financial health, in terms of its assets to liabilities ratios. However, a number of trends should be noted.

1. The increase in sales value, profit margins, capital investments and salary costs could indicate that the primary ethos of the RDF is changing to a more commercial one from its original public service purpose.

2. Increases in stocks (inventories) and turnaround times for stock indicate a trend towards less efficient and careful management of resources, which should be curbed.

3. Decreases in attendances at RDF facilities and problems with the health insurance system have resulted in reduced profits for the past three years. This is a worrying trend.

4. Some important information is missing from recent accounts (e.g. accounting policies, sales volumes, budgets, value of gifts in kind), which should be remedied both for management and auditing purposes.

5. Possible future risks to the financial viability of the RDF include defaulting by debtors; attempts to separate off the side of the business which supplies the People's Pharmacies; excessive extraction of surpluses by the KMoH; political interference; and removal of the RDF's tax privileges. Its relationship with the MoH is crucial to maintaining its independence. High level support, for example, from the Wali, has helped it to date.

4. Supply of quality, safe and effective drugs at below prevailing market prices

The second important area for investigation in this study is the extent to which the RDF is still meeting its mandate to supply appropriate, safe and affordable drugs. The main questions here include the following:

- Is the RDF still focussing on essential drugs and on promoting rational prescribing?
- Are RDF prices below prevailing market alternatives?
- Are essential drugs fully available at all RDF outlets?
- Are supervision and quality control systems operating effectively?

Range and appropriateness

At its inception, the RDF supplied mainly prescription essential drugs, but it has now expanded to include radiographic materials and surgical sundries. This reflects its increasing role as supplier to hospitals in the State, as well as its expanded sales through People's Pharmacies. Recently, the standard list for health centres and hospitals was expanded to contain Sexually Transmitted Diseases and IMCI (Integrated Management of Children Illnesses) programme medicines. In 2000 it had 85 items on its main list and 109 additional items (Gamaleldin Khalafalla Mohamed Ali, 2000). By 2004, the main list had increased to 145 items. This expansion of stock – noted in chapter 3 – brings with it increased financial risks, as well as increased sales opportunities.

The Sudan National Essential Drug List (NEDL) consists of approximately 246 items, selected within the ramifications of both WHO policies and the National Drug Policy. The drug list of the RDF (145 items) covers a wide range of drugs from this NEDL. All of the drugs supplied to RDF facilities, apart from the multivitamins, are essential drugs and generics. The People's Pharmacies list, however, contains more than 2,500 items, including essential and non-essential medicines, generic and brand products from different companies, and other disposables and cosmetics.

A formal breakdown of People's Pharmacies annual sales into essential and non-essential drugs is not available, but anecdotally, essential drugs constitute only 10-15% of the total. Almost all of the items sold through PPs are brand-name items, which are of course much more marketable than generics. Previous evaluations noted a growth in brand-name prescriptions (23% of sales in 1989-95; and 50% in 1996 (AwadElKarim, Professor M. A., 1996). However, it is hard to make an accurate assessment as prescribers commonly write brand names on prescriptions, but patients are actually dispensed the generic drugs, which are in stock.

A small group of 10-20% of the items, such as chloroquine, certain antibiotics, the penicillin group, disposable syringes, multivitamins and infusion solutions, usually account for 75-80% of the Fund expenditure.

A fall in sales through RDF facilities in 2005 is attributed in part by the management to the fact that the NEDL is out of date, and does not match the drugs which are currently being prescribed. The RDF has added some new drugs in 2005 in an ad hoc way, but there is a need for an updating and review of the NEDL, which is a federal responsibility.

Table 12: Rational drug indicators – trends in RDF facilities

Indicator	1989-95	1996	2000	2004	Optimal value
Average number of medicines prescribed per patient encounter	1.7	1.8	2.1	1.9	< 2
% of drugs using generic name		50%	41%		100%
% of encounters with an antibiotic prescribed			59%	71%	<30%
% of encounters with an injection prescribed			29%	21%	<20%
% of encounters with an antimalarial prescribed			33%	20%	
% of medicines prescribed from essential medicines list or formulary		100%	99%	100%	100%
% of key medicines available		100%	100%	97%	100%
Availability of essential medicines list or formulary to practitioners				97%	100%

(Source for optimal values: (Dumoulin, J. et al., 1998).

Table 12 tracks some indicators of rational drug use (data is not available to follow all of the WHO indicators). The number of medicines prescribed per patient has risen slightly over the years, but remains within the optimal range. Generic drugs appear to be falling, but there is no data from 2004 to confirm this trend. The number of encounters including an injection is declining and are just above optimal levels, but antibiotics have increased from a level that was too high, to one that is more than double the desirable level. This points to the need for increased action by the RDF and KMoH to educate prescribers and the general public on the dangers of overuse of antibiotics and to actively promote rational prescribing.

The proportion of ORS to the total number of drugs prescribed has decreased from an already low baseline in 1996. The 2004 health facility survey showed that only two patients were prescribed ORS to take at home, which raises concern about diarrhoeal disease case management, particularly in the under-five age group.

Another area of concern is the increased use in syrups/suspensions, which rose from 18% in 1996 to 21% in 2004. In Khartoum, temperatures generally exceed 30^{o}C in the daytime (and in the hot season 40^{o}C), very few households have access to refrigeration facilities and water quality is questionable in many areas for the safe reconstitution of the suspension. The amount of water used for reconstitution directly affects the dose and needs to be accurately measured and mixed. In addition, syrups are usually more expensive than tablets and are bulky and heavy, and therefore costly to transport as well as difficult to store.

In the prescription review, prescriptions from hospitals had a significantly lower number of drugs per patent than health centres and People's Pharmacies. There was no correlation between the number of drugs prescribed by location or rural area or whether the facility accepted patients using health insurance. Analysis of the use of the various drug groups by facility type showed only a statistically significant difference between health centres and

People's Pharmacies, and hospitals and People's Pharmacies, with the prescriptions reviewed from the people's pharmacies having significantly less antibiotics.

The health facility survey was not able to look at the patients' understanding and use of drugs. However, some insights come from the FGDs, which confirmed that families sometimes buy some but not all of the drugs or dose prescribed. Others reported self-prescribing and borrowing drugs from neighbours.

"*It is normal to borrow drugs from my neighbour, because I may not have enough money to buy a drug or go to the health centre. If a neighbour had the same illness as that of mine I will not hesitate to take the same drug if she found it useful*" (KI from IDP area)

The participants expressed a preference for injections over tablets, especially for malaria, and for syrup over capsules for cough or ARI. Some also thought that more expensive drugs were likely to be more effective (though this view was not universally held).

Although they felt that the explanation given by the pharmacist was usually clear, many reported not finishing the course of drugs when they felt better, though they claimed to be more careful with children's illnesses.

From these findings, we conclude that the range of RDF drugs is appropriate, but that more could be done to encourage rational prescribing and use, particularly in relation to reducing antibiotics and syrups, increasing use of ORS and improving patients' understanding of the need to take drugs as prescribed and to finish the course. In order to change the prescribing behaviour of practitioners and strengthen the monitoring role of the pharmacists, continuous training and regular pharmacy updates are required. This was a recommendation in both 1996 and 2000 reports and yet indications are that the irrational use of drugs, particularly antibiotics, continues. This issue needs to be addressed seriously by all stakeholders in healthcare if this situation is to be improved. The RDF management also needs to ensure that its drive for profit (e.g. through incentives to pharmacists to increase sales) does not jeopardise the drive to improve prescribing practices.

Price

A major rationale for the RDF was to provide essential drugs at lower prices than were available from other outlets, and previous evaluations have found that RDF prices were 50-60% cheaper than private pharmacies (Fundafunda, Bonface, 1998). This average masks differences within the list. There is cross-subsidy within the RDF supplies to health centres and hospitals, so that more expensive drugs are made more affordable. (Insulin, for example, has a mark-up of only 10 %.)

This study investigated price differences between RDF and non-RDF sources through a market survey of a sample of different outlets, and through a prescriptions review in our health facility survey.

The prices of 143 drugs sold by private pharmacies, People's Pharmacies, the CMSPO and the RDF are listed in annexe 3. Comparison of prices is made across the 66 items which are common to all sources.

The results of the market survey show that private pharmacies are 1.2-6.5 times as expensive as the RDF, averaging twice as much across the list of 66 items. The People's Pharmacies are also more expensive – 1.9 times as much on average, with a range of 1.3-4.3. On the basis of these figures, it seems that the price differential with the private sector has remained at around the same level as in previous evaluations.

With the CMSPO, the difference is smaller but still favours the RDF overall – its prices exceed the RDF's by 40% on average. However, for a smaller selection of common drugs (see table 13), the comparison is in favour of the PMSC and ranges between a ratio of 0.3-1.2 times the RDF prices (0.9 on average)[10]. This reflects the cross-subsidies operated by the RDF, which raises the price of cheaper, more common items relative to more expensive ones. It is debatable, from an equity point of view, whether this cross subsidy is optimal, and this issue should be revisited by the RDF management. The increased prices of some of the items may also be linked to the RDF's decision to import items, for quality reasons, which competitors are buying locally.

Table 13 Price comparison of 15 most common drugs - market survey, 2004

	Drug Name	Priv Phar in SDD	Pop Phar in SDD	CMSPO in SDD	RDF in SDD	Priv/ RDF	Pop/ RDF	PMSC/RDF	Priv/CMS
1	Disposable syringe 5cc	24	25	25	20	1.2	1.3	1	1.2
2	Amoxicillin Caps 250mg	117	158	75	100	1.2	1.6	0.8	1.6
3	Paracetamol 500mg Tabs	46	48	20	20	1.5	1.6	0.3	2.3
4	Metronidazole 250mg Tabs	77	53	27	29	2.7	1.8	0.9	2.9
5	Ampilclox 500mg Caps	256	275	205	218	1.2	1.3	0.9	1.2
6	Chloroquine 200mg inj	86	98	50	50	1.7	2.0	1.0	1.7
7	Acetyl salicylic acid 300mg Tabs	98	65	15	15	6.5	4.3	1.0	6.5
8	Ibuprofen 200mg Tabs	98	98	40	68	1.4	1.4	0.6	2.5
9	Disposable syringe 2cc	24	25	20	20	1.2	1.3	1	1.2
10	Chloroquine 150mg Tabs	86	98	50	50	1.7	2.0	1.0	1.7
11	Erythromycin 250mg Tabs	248	286	205	175	1.4	1.6	1.2	1.2
12	Indomethacine 25mg Caps	121	112	-	68	1.8	1.6	-	-
13	Chlorpheniramine 4mg Tabs	71	86	35	50	1.4	1.7	0.7	2.0
14	Co-trimoxazole Tabs	160	170	45	50	3.2	3.4	0.9	3.6

[10] Note however that the CMSPO does not sell directly to patients: retailers add between 20 and 35%, so that end-costs to users will be higher than the figures quoted here per item.

15	Total(Average)	108	114	62	67	1.6	1.7	0.9	1.7

In the health facility survey, 630 prescriptions were analysed (490 from health centres, 80 from hospitals and 60 from People's Pharmacies). It appears from this analysis that there is a lack of consistency of prices within facility groups. For uninsured patients, only 6 items on the RDF EDL (the list of 16 items which are supposed to be in stock at all times) were the same price across all of the reporting health centres. In hospitals, no items had a standard unit price for RDF EDL drugs for uninsured patients and only one item had a standard price in People's Pharmacies. This is significant because the health centres and hospitals are RDF outlets and should be selling at a uniform RDF price.

The mean cost of the EDL drugs was found to be 28% more expensive in People's Pharmacies, compared with health centres and hospitals. This reflects the mark-up which they add.

In reviewing the prices of drugs for insured patients, there was a similar picture of variation, with only 3 items (19% of the RDF EDL) in the health centres having a standard price, 3 items (11%) in hospitals and one item (2.5%) for People's Pharmacies. For the non-standard drug list, 3 items (11% of 28 items) were priced the same for uninsured patients, 10 items (37%) for hospitals and 2 items (7%) in People's Pharmacies.

In theory, insured patients are meant to pay 25% of the overall drug fee at point of service. Analysis of the health facility data supports this, though with some variation: analysis of the mean cost of 15 EDL items (excluding fefol) showed an overall range of between 23.5-26.4% of the full fee.

The main conclusion is that the overall prices of the RDF, in comparison to those of private and popular pharmacies and the CMSPO, are significantly lower. Another significant finding was that People's Pharmacies are not, on the whole, any cheaper than private pharmacies, contrary to expectations. The RDF should also investigate the small variations in prices that were found.

Availability

Reliable distribution and stock-keeping systems are an important component of the RDF, ensuring that the agreed drugs are available at all RDF outlets at all times. People's Pharmacies and hospitals are supposed to receive weekly visits from the RDF, and health centres monthly ones, although additional visits can be organised if drug stock-outs are reported.

Drugs availability used to be between 99-100%, according to project reports. 98% of all essential drugs were available at all RDF health facilities, according to the evaluation of 1998 (Fundafunda, Bonface, 1998).The evaluation looked at current performance, using the results of the health facility survey. Based on the reported levels of routine stock and the number of stock-outs at the facility, the average stock availability by facility type was 95.6% for health centres, 100% for hospitals and 95.2% for the People's Pharmacies.

Given that there was an RDF policy for certain designated items to be in stock at all times, facilities were asked whether these were part of their routine stock. 77% of health centres,

83% of hospitals and 100% of People's Pharmacies reported that the 16 items listed were routine stock.

However, only three items of the EDL were in stock in all facilities at the time of the survey: benzylpenecillin (1 miu for injection), metronidazole (200mg tabs) and paracetamol (500mg tabs). The items most frequently out of stock were cotrimoxazole suspension (35% of health centres) and ferrous sulphate/folic acid tablets (43% of health centres and 40% of hospitals). There were no statistically significant differences by location, rural/urban distinction, or re-stocking frequency.

Health centres and hospitals were also asked the total number of drug items in stock. Total drug stocks reported varied from 18- 97 (mean 64) for health centres, 21-82 (mean 66) for hospitals and 80-160 (mean 120) for People's Pharmacies. There were statistically significances differences when comparing locations and rural/urban areas. Respondents reported stock levels lower than actual stock found by the surveys teams in three health centres and one hospital.

These findings suggest a need for improvements in distribution and stock ordering and record-keeping – availability of essential drugs appears to have deteriorated since previous studies.

Procurement and quality assurance

The RDF mainly relies on a restricted tender system, which is thought to reduce transaction costs and to give a smoother flow, though clearly this poses a risk of overcharging by suppliers. The quantities procured depend on the expected morbidity of various diseases and the average consumption of each drug during the last 12 months. In 2005, for the first time, some drugs were purchased through international tender from local agents, at lower cost.

Where they are available at good quality, local manufacturers are preferable as they can be paid in local currency, transport costs are cheaper and the testing procedures are simpler. In 1999, 78% of RDF drugs came from European suppliers of generic drugs (especially Missionpharma), 12% from the CMSPO, and 10% from local manufacturers (Gamaleldin Khalafalla Mohamed Ali, 2000). The figures for 2002 are given in table 14: overall 37% of RDF drugs were imported, and they remain around this level (36% for 2004). This overall fall is the result of the growth in the People's Pharmacy business, which relies mainly on local importers.

Table 14 RDF drugs, by source, 2002

	RDF		PPs		Total	
	Amount in LS	%	Amount in LS	%	Amount in LS	%
Imported from abroad	8,326,759,250	92%	-	-	8,326,759,250	37%
CMSPO	128,169,910	1%	-	-	128,169,910	1%

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Local producers	259,401,940	3%	1,530,877,860	12%	1,790,279,790	8%
Local importers	341,964,820	4%	9,095,250,090	69%	9,437,214,910	42%
RDF	-	-	2,584,932,000	19%	2,584,932,000	12%
Others	178,500	0%	65,495,440	0%	65,673,940	0%
Total 2002[11]	9,056,474,420	41%	13,276,555,400	59%	22,333,029,810	
Total 2001	6,101,764,310	36%	10,810,617,610	64%	16,912,381,920	

Source: RDF annual reports

In the late 1990s, 95% of imported drugs were routed through Port Sudan, which is cheaper than air transport, though emergency items still came through Khartoum airport. In 2002, 7% of the RDF drugs, by value, were air freighted in; this rose to 11% in 2003. This upward trend should be controlled, for efficiency reasons.

Suppliers are required to provide a Certificate of Pharmaceutical Product, certificate of patch analysis and free sale certificate. The imported drugs are sent to the NDQCL for analysis. The drugs which satisfy their safety and quality assurance are sent to the RDF warehouse for distribution to health facilities. During the late 1990s, less than 1% failed to satisfy the safety and quality assurance criteria. The drugs were disposed of and the supplier replaced them free of charge. In 2003, however, 4% of the samples tested for approval failed the quality tests. This remains within acceptable levels, but should be monitored.

There is also concern, within the RDF management, about increasing delays in approving releases of drugs and the threat of additional bureaucratic checks, which will increase the RDF's cost and so, ultimately, the prices to consumers.

Supervision of facilities and service quality

Supervision of facilities was from the start of the RDF a key component of its work. This is undertaken by four teams for the health centres and one team each for hospitals and Peoples' Pharmacies. The team, comprising pharmacist, assistant pharmacist, two accountants and a driver, monitor financial performance and accountability, drug availability and consumption and ensure that the quality of pharmacy management adheres to National and International Standards. The visits are intended to be routine and are also used as an opportunity for cash collection and cash book reconciliation. Occasionally spot-checks are done without prior notice.

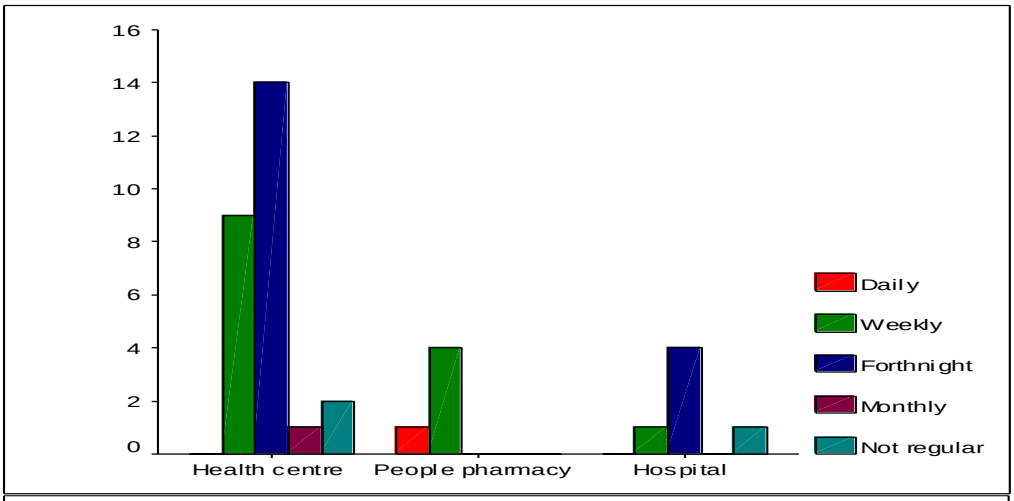
[11] In 2003, the reporting format was changed and this information is no longer published.

The health facility survey asked facilities about the regularity of visits by the RDF teams. The answers are shown in figures 1 and 2 below: they broadly comply with the RDF guidelines. They suggest that most health centres and hospitals are visited fortnightly, while People's Pharmacies are most likely to be visited weekly. This reflects their rate of through-put, which is higher, requiring more frequent restocking. People's Pharmacies are resupplied daily, twice weekly or monthly, while hospitals are resupplied weekly or monthly, and all health centres reported being resupplied on a monthly basis.

For the health centres, those in Khartoum receive more frequent visits. Given the costs of transport to outlying facilities, this is one way of minimising costs.

The frequency of RDF visits compares favourably with that of the MoH: only 8% of facilities reported RDF visits to be irregular, compared with 73% of MoH supervisory visits. The reported frequency of supervision by the KMoH has also decreased, from 42% of health centres and hospitals surveyed receiving a supervisory visit at least once per month in 1996 to 28% in 2004.

Figure 1 Frequency of supervision, by facility



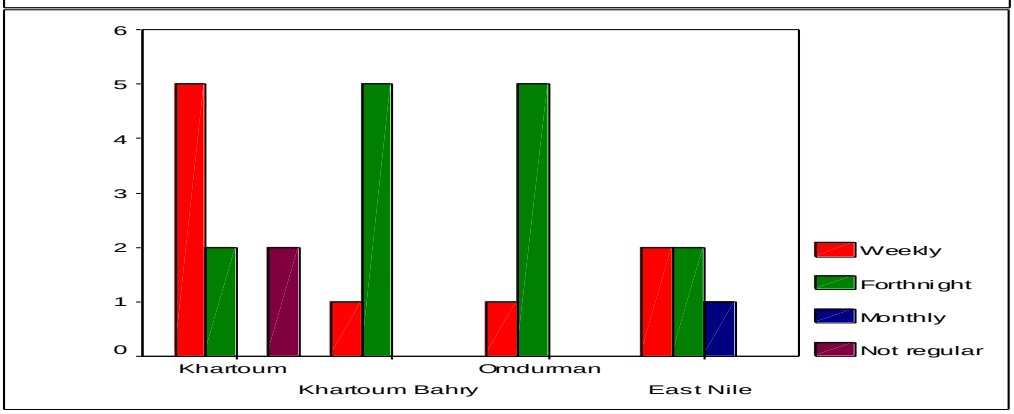


Figure 2 Frequency of supervision, by location (health centres)

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A key component of pharmacy management is documentation. Monitoring of documentation is an element of the RDF supervision. Only 8% of health centres that responded to the question maintained daily stock records and stock cards and only one out of six of the hospitals. Only one People's Pharmacy reported having a copy of the National Essential Drug List, compared to 100% of health centres and 5 (out of 6) of the hospitals.

Training and operations research

The RDF has a long tradition of investing in human resource development and training, both before hand-over and since. Examples in recent years include the following:

- In 2001, 250 pharmacy staff at health facilities received short training courses in dispensing and counselling skills
- Weekly seminars on drug supply management were held for RDF and hospital pharmacists in 2001-2
- The RDF held subscriptions to international journals and distributed textbooks and formularies regularly to pharmacists in facilities and People's Pharmacies
- A prize of excellence was introduced in 1998, to encourage good practice
- Refresher courses were run on topics such as drug management and rational drug use; quality assurance; therapeutic drug monitoring; drug and therapeutic committees in hospitals; and drug information
- The RDF also supported the establishment of a Pharmaceutical Services Management specialisation within the Sudan National Board of Medicine, and helped to set up a short course in Drug Supply Management and Rational Use of Drugs, in collaboration with CEDMAP, in Nairobi, Kenya

It is important that this focus on quality is continued.

Although operations research was one of the original mandates of the RDF, it has in recent years focussed on its 'core business' of supplying drugs and recouping costs and has neglected gathering health information and carrying out research. This area should be strengthened, as it would allow the RDF to carry out high quality monitoring and evaluation of its own work, rather than relying on periodic external studies. Some training in operations research and statistical analysis might be required for the RDF staff to carry this out.

Summary of findings on pharmaceutical issues

Many of the systems – for procurement, quality assurance, distribution and stock control – continue to operate effectively. In addition, the market survey confirms that the RDF continues to offer lower prices to its clients, compared with alternative outlets. However, there are some areas of concern, notably:

- That the full range of essential drugs is not available in all RDF outlets - the proportion of available stock in the facility has reduced from a reported 100% in health centres in 1996 and 2000 to 95.6% in 2004
- That prices, while lower on average for the full list, are higher compared with the CMSPO for the 15 most common drugs, and, moreover, are not the same for all RDF outlets
- That some indicators of rational drugs use have deteriorated (e.g. over-prescription of antibiotics)

- That systems for stock-keeping appear to be relatively poor in many of the RDF facilities – the number of health facilities stocking expired drugs has risen from 16% in 1996 to 28% in 2004. These raise questions about the quality and robustness of the supervision which is being undertaken
- That the RDF sales of non-essential drugs are growing, disproportionately. While driving up profits, there is a real risk that the RDF mandate of promoting rational prescribing will be overshadowed by this trend.
- That there is a need, with the FMoH and KMoH to review the NEDL, to ensure that it is up-to-date with current prescribing practice

5. Access and exclusion

This section looks at the following questions:

- how many people are being served by the RDF? – trends in utilisation
- geographical access – are RDF services within reach?
- how many households, and what kinds of households, cannot afford to access RDF drugs and health services?
- how much awareness is there in the community of the RDF?
- what is the level of community participation in health services generally?

Utilisation trends in health facilities

Table 15 shows the trends in utilisation of RDF facilities between 1996 and 2002. It is impressive to note that 3 out of 5 of the population of the state were using RDF facilities in 2002 – some 3 million in total. As seen in the figures for revenue, People's Pharmacy attendances are outnumbering treatment facility users. All trends are upward until 2003, when a small decline is shown by both People's Pharmacy and health facility attendances. This trend of decline continues into 2004 and 2005, at least for RDF facilities. This decline is attributed by the management to the combination of absent staff in health facilities, as well as the issues, already documented, with the KHIC/FHIC and the need for updating of the NEDL. These issues should be addressed, as a shift from RDF to PP outlets means fewer essential and generic being consumed, and consumers paying higher prices.

Table 15 Total attendances at RDF-supplied facilities, 1995-2003

Year	Khartoum State population	Total attendance at all RDF supported facilities	Attendance at RDF treatment facilities	Attendance at Peoples Pharmacies
1995	3,636,907			
1996	4,005,460	683,069	683,069	
1997	4,184,677	940,430	940,430	
1998	4,372,340	2,193,598	1,202,499	991,099
1999	4,568,177	2,483,440	1,027,883	145,557
2000	4,740,000	2,976,887	1,131,544	1,845,343
2001	4,936,000	3,030,996	1,264,845	1,766,151
2002	5,139,000	3,075,728	1,324,111	1,751,617
2003	5,352,000	2,842,760	1,189,826	1,652,934
2004		2,794,644	1,112,712	1,681,932

Source: (Gamalgeldin, K. M. & Fundafunda, B., 2004) and annual reports

In the health facility survey, mean total attendance was relatively low - 29 OPD per day for health centres and 121 for hospitals. Hospitals in urban areas had higher OPD and admission rates, but there was no significant difference for health centres, between rural and urban areas. Bed occupancy was also low for hospitals surveyed – 20% on average. This leads to relatively inefficient use of staff and resources. The mean number of OPD cases per day per 1 medical staff was 9.8 in health centres and 3.5 in hospitals. This has implications for the RDF and explains why sales volumes are higher through People's Pharmacies (PPs can dispense drugs prescribed at health facilities, as well as selling over the counter drugs).

Geographical access

In 2002, the RDF supplied 22 public hospitals managed by the KMoH in KS, 102 public health centres and all of the former MoH-run People's Pharmacies (18 out of a total of 77 People's Pharmacies, many of them commercial outlets on a par with the 565 private pharmacies in KS). The main exceptions, in terms of public facilities, were the 19 public hospitals which are run by institutions other than the KMoH: these are mostly run by the FMoH or other ministries and are stocked mainly by the CMSPO. Since then, there has been further expansion of the RDF network, with the addition of another 11 health centres, with plans to add 10 more in 2006.

However, there are now some 35 health centres – mostly in remote areas and covering a small population – which are outside the RDF network. These would be expensive to supply and would provide only a small through-put, but the RDF should be looking for innovative ways of extending its reach to them. Their current drug supply – as for much of Sudan – relies on health staff purchasing drugs in the market and re-selling them at a profit to patients. In terms of quality and price, this is a loss to the consumer, compared to the RDF. Although the total population excluded in geographical terms is not very great, it infringes the basic principle of the RDF, which is to supply all public facilities, however remote and unprofitable.

The health facility results suggest a reasonable degree of geographical equity in terms of the facilities and their quality. There were very few significant differences in the results by location and rural/urban status, in terms of numbers of staff, essential medical equipment, range of service, drugs availability and RDF supervision. The main rural/urban difference was in frequency of MoH supervision, with urban facilities being supervised more frequently.

Previous evaluations noted that all RDF health facilities are within walking distance (AwadElKarim, Professor M. A., 1996). Our household survey looked at this issue by examining the time that households had taken to reach their chosen treatment centres. The mean time to reach health centres was 15 minutes. Public hospitals were the most distant, on average, at 34 minutes. Only a few outliers, in rural areas, took an unacceptable period of time – three hours to reach a hospital and two hours to reach a health centre were the maximum times recorded.

Financial access

The main barrier to access in Khartoum State is financial, rather than geographic. Sudan operates a cost-recovery system in which an extremely high proportion of health costs are borne by households. According to World Bank figures for 2003, government funding contributes a mere 20% of total health expenditure, compared with the average of 41% for Sub-Saharan Africa, and of that, the vast majority is out of pocket payments. This imposes

huge costs on households, and drugs are a major component of those costs. There are no national estimates for expenditure by households on drugs, but our household survey suggests that they account for 58% of total household expenditure on health care (Witter, S. & et al., 2005). This is not an unusual proportion: up to 80% of household spending on health is absorbed by drugs in some countries (Quick, J. D. & et al., 1997).

HEA results: ability to pay of different groups

Table 16 summarises the results of the HEA, in terms of ability to pay for health care and drugs of different groups within KS.

In the HEA (Adams, L. & et al., 2004), the IDPs are identified as amongst the most vulnerable, and the least likely to afford health care. IDP "very poor" and "poor" households (together they make up 60-75% of the IDP population) are unable to meet their basic needs (including health care) for some or all of the year (see figure 3). The only way they could meet their basic needs would be if children worked full time instead of going to school. As it is, households cut down on essential spending (such as non-staple food items) to make ends meet. The rainy season is a particularly hard time as expenditure increases while incomes decrease. It therefore goes without saying that they are unable to meet health costs on their own. They may receive assistance for low-cost treatments, but they are likely to leave treatment till the last minute, or (if an adult) to go without treatment.

IDP "middle" income households (25-35% of the IDP population) are able to meet their basic needs all year round but are unable to meet the cost of emergency and complex health care without support from relatives and sometimes loans.

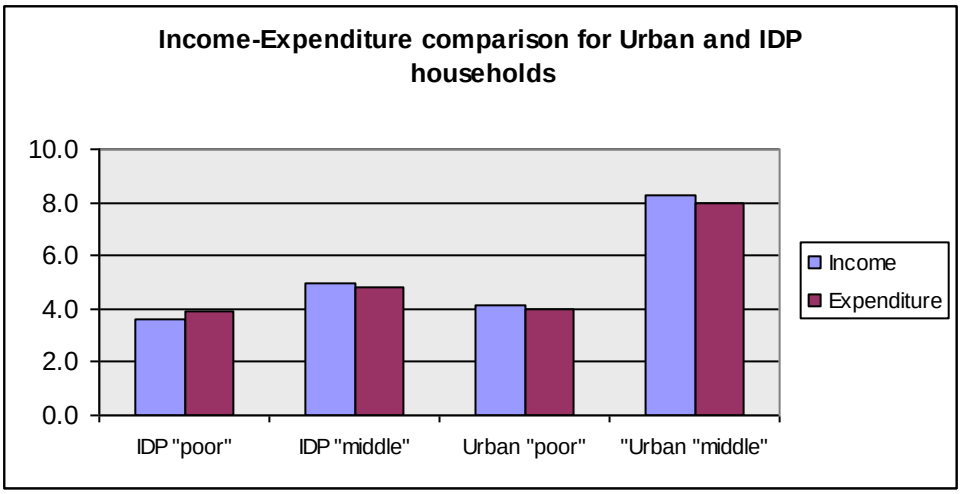
"Better off" IDP households (0-5% of the IDP population) have no problems meeting their basic needs, including health care costs.

The urban "very poor" are unable to meet the cost of their basic needs by themselves but most receive gifts from relatives and some get Zakat support. These households benefit from close family ties and living within extended families in large plots. While this group is usually defined as "vulnerable" and includes widow-headed households, there are many widows who benefit from the support of a son or daughter living in the same house.

The "poor" urban group are self-sufficient in terms of their basic needs but face difficulties with paying for high-cost heath care for which they apply for Zakat assistance or seek assistance from relatives.

"Middle" and "better-off" households have no difficulty in meeting their basic needs or accessing health care; they usually visit private rather than public facilities and the "rich" may go abroad for health care.

Figure 3 Income-expenditure comparison, HEA



For rural households, the “vulnerable” group may have difficulty meeting their basic needs if they are not well supported by relatives. These households are those without land, who have only one or two income earners, who are dependent on unskilled labour but who are living in areas isolated from labour opportunities, and where agricultural production has declined due to inefficiencies in the irrigation system (perhaps a government-managed system) or other similar problems.

“Poor households” in rural areas are likely to meet their basic needs but may have difficulty accessing emergency health costs on their own – although they are may be able to get help through Zakat and/or gifts within the community.

Other rural households (farmers, livestock keepers, traders) have no problem accessing their basic needs or health care costs.

Table 16 Ability to meet basic needs and emergency health care: HEA results for KS

	Urban	IDP	Rural	Khartoum State Summary
% of State population (estimate based on key informant discussions)	70%	20%	10%	
% of each livelihood group who cannot meet their basic needs for all or part of the year	5-10% of urban: The “vulnerable” (mainly households with one earner)	60-75% of IDPs: 10-15% (“vulnerable”) + 50-60% (“poor” - unskilled labourer households)	5-10% of rural: The “very poor”. These households live in inaccessible areas, don’t own land and rely on unskilled labour	

Overall % of Khartoum State population who cannot meet basic needs for all or part of the year	2%	14%	1%	17%
PLUS				
% of each livelihood group who can meet basic needs, but who can't meet the cost of emergency health care without assistance	22% of urban The "poor" (unskilled labourers)	30% of IDPs The "middle" (skilled labourers/ low-paid salaried workers)	30% of rural The "poor" (these households rely on unskilled labour but live in more accessible areas so with better opportunities.	
Overall % of Khartoum State population who can't meet the cost of emergency health care without assistance.	15%	6%	3%	24%

This study has shown that there are major differences in livelihoods between the different groups, and that the households living in poverty (17% overall) are found predominantly in IDP camps. There are other important problems facing many IDP households (see HEA report), which this evaluation cannot list in detail, but many relate to their insecure "residential" status as IDPs, which continues, despite the peace process.

Access to health care in terms of availability of providers is reasonably good, with NGOs (national and international) running health centres in most IDP camps and providing drugs and services at lower costs than the private sector. However, most "poor" households cannot afford to pay for health care for their families. A case of malaria requires spending about SDD 1,000 (about US$4) for registration, consultation, test and drugs – equivalent to a day's pay for labourers. Little evidence was found of "poor" IDP households benefiting from the Zakat fund. Health care which is not affordable at the time of need means that treatment is delayed until the last minute – which carries risks of mortality.

Ability to pay: household survey results

Income levels and poverty

The household survey confirms that poverty levels are high in Khartoum State. 51% overall are found to be living in conditions of absolute poverty, while in the most disadvantaged IDP areas, the rate is 66%. Inequalities are also high: households in richer areas have an income four times larger than the IDP households, and two and a half times larger than households in poor urban and rural areas.

In addition to having lower incomes, IDP households are disadvantaged in terms of access to infrastructure. They travel the furthest to reach health facilities (47% travel more than 1 km, which is far relative to other groups, though not far by comparison with other countries and rural areas). Access to water and electricity is also very poor for this group: only 14% have electricity and less than 6% running water, compared with nearly universal coverage in the wealthier areas. The costs of purchasing water amount to one fifth of an average IDP household's income.

Ill health

Ill health affects all of the population – 80% of households reported at least one illness in the past fortnight, with an average of 1.5 episodes per household. The duration of illness does not appear to be linked to economic status: mean duration is 7 days, with no significant variation by area or income. Poor areas report significantly higher rates of illness though, as do women: double, on average, at of men for all quintiles and for most age groups and illness types.

The main illnesses are respiratory problems, malaria, diarrhoeal illnesses and injuries. Some illnesses, like TB, seem to be under-reported, perhaps due to stigma. The pattern of illness varies by age group and area. IDPs are more likely to suffer from conditions linked to poor environmental conditions, such as water-borne diseases and diarrhoea.

Treatment strategies

A large proportion of those who fall ill are treated – 94% overall – and physical access and waiting times are good within Khartoum State. Responses to questions about quality are also positive. Financial barriers are very real however, as shown by the fact that nearly 40% of non-treaters are found in the bottom quintile and 100% of respondents in that quintile cite lack of money as the reason for not seeking treatment. If home treatment and visits to pharmacies are combined, 20% overall self-medicate, presumably to reduce time and financial costs.

The choice of facility is affected by income, with richer households more likely to use private pharmacies, clinics and hospitals, compared with poorer households, which rely on the public health centres, public hospitals and NGO facilities. Overall, public health centres are the most common treatment centre (36% of episodes), followed by public hospitals (29%). In 88% of cases, care is sought more than once for a given episode of illness.

No evidence of discrimination against particular age groups or by sex was shown for treatments in the past fortnight. However, 85% of reported admissions in the past year were for men, which is very different to the more general illness figures (38% men; 62% women). This may be related to their unwillingness to present for treatment at an earlier stage of the illness (which was confirmed by focus group discussions).

Health care expenditure

According to the Federal Ministry of Health, the last household survey of health expenditure was carried out in the 1970s (NCMH Secretariat, 2004). The information from this survey is therefore very valuable to the health policy debate in Sudan, even though it provides insights into the situation in Khartoum State alone.

Various sources concur that household expenditure forms the bulk of total expenditure in Sudan – estimates range from 70-80%, or 15-20 USD per capita annually. However, our survey suggests that, for Khartoum at least, private expenditure is much higher. Our figures

suggest an average per capita annual expenditure of more than $57. It should be noted that this is likely to be an underestimate of total private spending as contributions into insurance schemes were not included and there may have been more than two care episodes for the particular illnesses reported (the survey asked about the first and second treatments: 88% sought care a second time, and many probably sought care several times for the same illness).

Average direct expenditure for one treatment episode is roughly 34,000 SP, but this increases significantly with household wealth, reflecting mainly a more expensive case mix and choice of more expensive treatment facilities. (Average spend per episode in IDP areas is one-seventh that of high income urban households.)

In relation to household income, total health care spending constitutes 11%, which would be classified as 'catastrophic' by most definitions. (Definitions of 'catastrophic' levels of health expenditure vary, but usually start from 5% of total expenditure and upward (Xu, K. et al., 2003). All groups are spending a high proportion of their income on health care – the largest proportion was 15% for IDPs, but differences between areas were not found to be significant.

Self medication is the cheapest option, followed by health centres and public hospitals. In terms of inputs, drugs are by far the most expensive component on health care, accounting for an average of 58% of total direct costs. Costs also vary by illness type, with some conditions such as diabetes emerging as three times more expensive than the mean.

Only one-fifth of households affected by illness reported indirect costs (lost income and carers' costs), but these were often high. Averaged across all episodes (including those with no indirect costs), indirect costs add 9,000 SP to the cost per episode. IDPs report higher average indirect costs, as do chronic illness sufferers (such as TB patients).

It is striking that no preventive services were 100% free: 5% reported paying for immunisations; 20% reported paying for post-natal check-ups; 70% reported paying for antenatal check-ups, and 100% reported paying for family planning. Both the existence of prices for preventive services and the general unpredictability of prices are likely to reduce consumption of these goods below socially desirable levels and contribute to poor performance towards development goals (Decaillet, F., Mullen, P., & Guen, M., 2003).

Coping strategies

Financial barriers are a major problem in Khartoum, as evidenced by the 29% of households which are unable to pay for health care. These are heavily concentrated in the poorer areas. In IDP areas, 46.5% are unable to pay.

Borrowing from friends is the most common coping strategy (57% overall), and is the main one adopted by all income groups. While the higher income households are able to rely on borrowing and savings alone, poorer ones used a wider range including reducing on treatment, owing money to facilities, reducing expenditure and borrowing from money-lenders. All of these strategies by poorer households have potential long term negative effects.

Official protection for indigents exists but is limited in scale. Only 1% of those unable to afford treatment received an exemption: one of these cases was in the bottom quintile and one in fourth. Health facilities appear to have discretion over the operation of exemptions. 3% received assistance from the Zakat Fund and from Takaful. These cases fall in the bottom

quintiles. Qualitative information suggests that accessing these funds is complex and unpredictable. The household survey and qualitative methods all point to informal networks as the most important form of social protection.

Insurance coverage
Insurance coverage, and particularly the national health insurance scheme, is of growing importance in Sudan, but still only benefits the minority. 23% of households (but only 9.3% of individuals) had some sort of insurance coverage in this survey. Membership is highest in middle income, poor urban and rural areas, and lowest in high income and IDP areas. The biggest scheme is the KHIC (Khartoum Health Insurance Corporation), which accounts for 69% of the insured; the next largest scheme is the organised forces one, with 21% of the market share. Only 49% of members benefited from the insurance in the latest episode of illness. This may be explained by the fact that KHIC membership is compulsory for public servants, and yet only 50-60% of facilities are enrolled in the scheme. The rich may also choose to opt for higher quality care, despite being enrolled in the national scheme.

Membership of an insurance scheme does not reduce expenditure (members spend 2 ½ times more on average than non members, per episode), but does increase the likelihood of treatment and of treatment at more expensive facilities. It seems then that moral hazard is an issue, but overall utilisation at this stage (average of 1 visit per person per year) is still low, suggesting that insurance is acting to relieve suppressed demand rather than to frivolous use.

The results of the household survey are broadly consistent with the HEA results, and suggest that the numbers excluded are higher than the 8% who could not afford medicines, according to 1996 evaluation. That figure was based on the proportion of prescriptions written but not filled, which of course neglects all of the sick people who never attend health facilities, because of financial or other barriers, as well as including those who pay but have to make unacceptable sacrifices to pay the bills. Our figures suggest that 29% of the overall population cannot afford to pay for health care, of which the drugs cost is the major component.

"*Our people are very poor and they suffer from many diseases. They can't pay for health services. If you want to help them provide them with free HS and free drugs as they are poor and sick. Low cost drugs will not solve their problem. They can't pay even for the entrance ticket*" (KI in IDP camp)

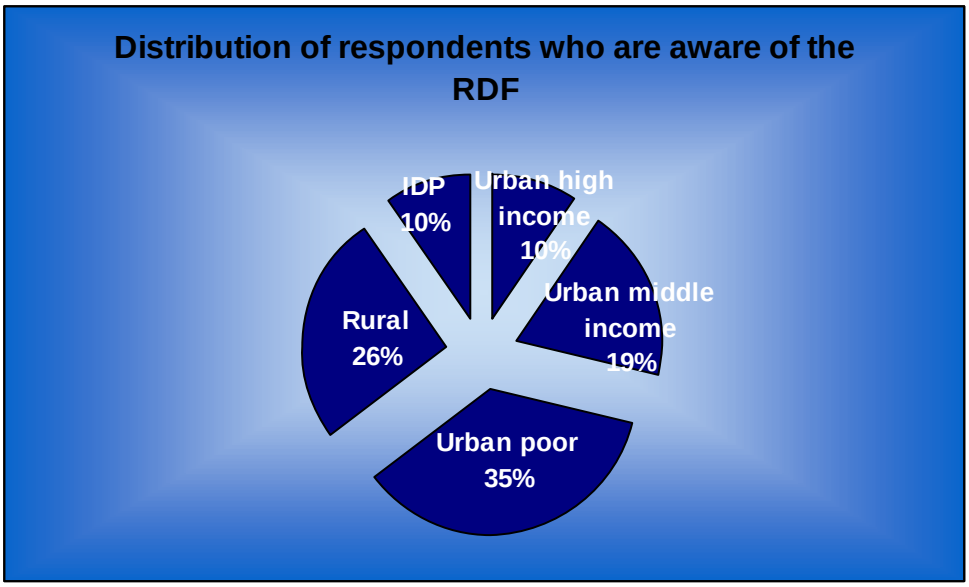
Links with the community and levels of community awareness

According to the household survey results, awareness of the RDF within the community is indeed low (as suggested by some, but not all, of the previous evaluations). Only 10% claimed to know about the RDF, and 6% were able to give some description of what it did. 9% reported that their families had benefited from it.

Awareness was highest in poor urban and rural areas (see figure 4), which are the main constituencies for the RDF. As the IDP camps have mainly been served by NGO services, it is perhaps unsurprising that awareness of the RDF was not high there.

FGD informants corroborate this lack of awareness. Although many were using RDF facilities, few had heard of it or knew what its function was.

Figure 4 Distribution of respondents who are aware of the RDF



If the RDF has a relatively low profile in the community, is this of concern? On one level, if it is operating in a businesslike fashion, supplying drugs efficiently and at relatively low cost, there is no great need for the public to be aware of the mechanism through which that is happening.

There are two reasons why greater communication with the public is important:

- as a programme with public health goals, the RDF needs to maintain a focus on rational prescribing, which means that the public need to be informed. The RDF could provide more information on disease management, the importance of taking following proper drug regimen etc., for display in public facilities. These materials are currently lacking.
- if any systems for exemptions are introduced, these have to be discussed with and publicised through community channels.

The health facility survey looked at the mechanisms for community participation in health facility management. 73% of the health centres and 50% of the hospitals reported having a functioning community health committee (CHC), but only 33% and 20% respectively had minutes of the meetings (see table 17), which suggests that this may be a more realistic figure for active CHCs. For the health centres with active committees, some 70% hold monthly meetings, and the other 30% meet weekly.

In 1996, 47.3% of health facilities surveyed had a CHC but the level of community participation was considered to be minimal and inadequate. Comparing those figures with the 2004 ones, it appears that there is a higher proportion of facilities with a CHC (69% overall), but probably little improvement in the level of activities (only 31% having regular meetings).

Table 17 CHCs in health centres and hospitals

		Type of facility			
		Health centre		Hospital	
		Yes	No	Yes	No
Community health committe functioning for this facility	Count	*19*	*7*	*3*	*3*
	%	*73.1%*	*26.9%*	*50.0%*	*50.0%*
Having regular Community health committee meetings	Count	*8*	*18*	*2*	*4*
	%	*30.8%*	*69.2%*	*33.3%*	*66.7%*
Meeting minutes available	Count	*8*	*16*	*1*	*4*
	%	*33.3%*	*66.7%*	*20.0%*	*80.0%*

Summary of access findings

Utilisation trends have been impressive (the RDF reaching 3/5 of the total population of Khartoum State in 2002), but may have declined slightly in the last few years. Changed reporting by the RDF makes it harder to track some of these issues.

Geographic coverage is good, but a plan should be developed to reach the remaining remote health centres. The same kind of model should be used as for existing facilities, but perhaps with less frequent supervision (rather than selling drugs as a consignment, which shifts the risk on to the facility and also opens the way for higher mark-ups to be added).

Financial access is the main issue of concern, with the health sector charging for almost the entire range of health services and also, of course, the drugs. HEA findings suggest that 17% of households in Khartoum State are unable to afford basic health care costs, and 24% can meet basic costs but are unable to meet 'emergency' costs, if they arise. These households are mainly IDP ones (60-75% of whom are estimated to be unable to meet their basic health care costs), plus the poorest 5-10% of the urban and rural households.

The household survey results find that 6% of the sick overall do not treat (largely for economic reasons), and that 29% of those who do treat cannot afford to pay for their treatment, resorting largely to borrowing or reduced treatment. For the IDP areas, this is much higher (46.5%).

These results relate to overall health care costs – not just drugs costs – but drugs form the bulk of health care expenditure, according to our survey, accounting for just under 60% of total costs.

ANALYSIS AND CONCLUSIONS

6. Analysis

This section discusses the following issues:
- Whether the RDF has been successful, and, if so, why
- Whether the RDF is still relevant and necessary in Khartoum State today
- How access might be improved in Khartoum State
- Implications and insights for national roll-out

The RDF – a success story?

The most common pitfall with revolving drugs funds is that they fail to revolve (Cross, P. & et al., 1986). Common reasons for this include:
- Undercapitalisation
- Prices set below replacement costs
- Delays in cash flow
- Rapid programme expansion without sufficient additional capital
- Losses due to theft and deterioration
- Unanticipated price increases due to inflation and changes in parity rates
- Foreign exchange restrictions

The RDF has passed this first hurdle. It is clearly viable, nearly a decade after hand-over from Save the Children UK. It has taken over full costs since being handed over by Save the Children (UK); it has expanded its network; it has expanded coverage; and it has maintained its cost advantage over rivals.

From the beginning, the RDF had to balance business-mindedness with a commitment to public health goals. The key elements which have promoted its success as a business are:
- The substantial and phased investments by Save the Children UK, not just in drugs but also in training, infrastructure and systems development
- Its long period of development: it was ten years before it was expected to be autonomous
- The early emphasis on efficient systems (e.g. defined roles and responsibilities for staff)
- Sustained political support, at the highest levels in Khartoum State, which have enabled the RDF to manage external threats (e.g. to its financial independence)
- The tax exemption from customs duties, which enables it to undercut competitors' prices, at least for imported drugs
- The underlying strength of the Khartoum economy, which enables the majority of the population to afford drugs at RDF prices

However, the RDF had a mandate that went beyond financial sustainability. Its goal was also to promote appropriate and rational drug use. It aimed to do this through:
- Its internal cross-subsidies, from high-volume sales through the People's Pharmacies to supplying public health centres; from common cheaper drugs to more expensive ones; from central facilities to more distant rural ones.
- Its focus on PHC services, covering all of the public health centres in the State
- Its emphasis on rational prescribing and the use of essential drugs

At any one time, the RDF risks losing its focus on the business side (leading to financial ruin) or the public health side (leading to it becoming a self-serving enterprise, run for the benefit of staff or shareholders, rather than patients). It is not an easy balance to maintain. To date, the record looks good.

There are, however, threats to both financial sustainability and the RDF's public health goals. Potential financial threats include the following:

- Failure to maintain effective systems for cost control, especially for pay and incentives
- Further increases in wastage and failure to address stock-keeping problems at facility level
- Failure to recoup debts, which could threaten the RDF's hitherto good reputation with its suppliers
- Loss of independence, in the form of political interference or even greater resource extraction by the KMoH
- Adverse developments for its chief client, the KHIC. The RDF and the KHIC in KS are now co-dependent: the KHIC relies on the RDF to provide reliable and affordable drugs to its clients; and the RDF is increasingly reliant on the KHIC to boost demand for its products. (In 2000, 29% of patients in RDF facilities were covered by health insurance; the figures for 2003 were 32% for hospitals and health centres, and 38% of People's Pharmacy users). The proportion of RDF revenue coming from the KHIC was 32% in 2000; now it is 56%) If the HIC were to go out of business or fail to pay its bills, that would cause an immediate financial crisis for the RDF.

Potential threats to its public health mission include:
- Broadening of drugs list to the extent that essential drugs become a minor component
- Failure to fund community and practitioner education on rational prescribing
- Failure to support measures to extend access in geographical terms and for the population which is unable to afford basic drugs at current prices
- Becoming too focussed on profitability, so that the quality of service to outlying and less profitable health centres is neglected

Competent and committed leadership is the key to managing these threats.

Is the RDF still needed?

Some of the original reasons – dating back to the mid-1980s - for the creation of the RDF no longer exist. Hard currency in Sudan is no longer so constrained. The local pharmaceutical market is more developed. There are more trained pharmacists available now. The health care system, with its user fees and health insurance cover for some, has greater liquidity. The Central Medical Supplies – the governmental body with responsibility for pharmaceutical supplies throughout the country – is more organised. In this changed context, it is worth asking what value-added the RDF contributes, as it is presently functioning.

It is also important to recognise the costs. The RDF runs a relatively efficient drug supply service for the public health centres and hospitals, made possible in part by a unique customs tax exemption. This is a transfer from the Government of Sudan to the sick of Khartoum State. Whether this transfer is optimal depends on what alternative use that money would have been put to. There is definitely a case for arguing that the resources could be put to better use in the poorer, more remote States. However, we are not confident that the resources would find their way there, given the current system of health financing, which

places responsibility on States to finance the recurrent costs of health care out of their own resources (Decaillet, F., Mullen, P., & Guen, M., 2003).

It also depends on who is using the RDF services. Utilisation trends suggest that coverage of the RDF is good. Our household survey also suggests that public facilities – health centres and hospitals – are widely used. Of the actions taken in case of sickness, visiting the public health centre was most popular on average (36%), closely followed by public hospitals (29%). Use of health centres is concentrated in the bottom three quintiles, while investment in public hospitals benefits the bottom four quintiles most.

Overall, only 6% of those reporting sickness failed to treat, which is relatively low. On the other hand, those in the bottom quintile were nearly five times more likely not to treat than those in the top quintile, while 29% overall were unable to afford their health care costs. Clearly, there is a role for more pro-poor measures, either directly through the RDF or through other mechanisms.

One way of investigating the value-added of the RDF is to compare the value of the tax exemption it has (worth 17.5% of imported drugs' value) with the extent to which it undercuts its nearest rival (prices on average 40% cheaper than the CMSPO – and this applies across the whole range of drugs, while the tax exemption only covers the 37% of RDF drugs which it imports). This suggests that the RDF continues to be relatively efficient and to provide social benefits in excess of its fiscal costs.

In addition, the RDF operates an equal price list across the state, which benefits more outlying and rural areas, and passes on transfers worth 210 million SDD each year to the MoH. These transfers alone are larger than the value of the tax exemption which is granted on its imports. Seen in this way, the tax exemption is more of a gift to the KMoH.

The RDF also provides a free service of handling, storing and distributing the free emergency drugs which the Ministry of Finance provides to assure free service in the first 24 hours of hospitalisation, and handles procurement for some public health services, such as the malaria programme.

Within Khartoum, the main alternative to the RDF are the People's Pharmacies and private pharmacies, which purchase mainly locally produced goods and are limited by law to a mark-up of 20%. There is some anecdotal evidence that they have relocated themselves to avoid close proximity to RDF outlets.

The People's Pharmacies were originally set up in opposition to the private pharmacies, which supplied mainly brand name drugs at higher prices. The People's Pharmacies, by contrast, mainly purchased and sold generics. Since 2000, however, the CMSPO has been selling generics to private pharmacies and hospitals as well, reducing the distinction between the private pharmacies and People's Pharmacies (Graaff, P. & Everard, M., 2003).

Our market survey confirms that People's Pharmacies are selling at prices that are comparable to private pharmacies (despite the original regulations that stipulated that People's Pharmacies should set prices at 5% below the private sector), which are, on average, twice as expensive, item per item, as the RDF ones. The prescription review in the health facility survey found an even bigger discrepancy, with the mean cost of a prescription in a People's Pharmacy four times as high as the health centres and hospitals. This is unlikely to be explained by the number of drugs prescribed, as the mean was just under 2

items per prescription and the only facility group which was significantly lower was the hospitals. This suggests that People's Pharmacies are probably providing more expensive versions of drugs. This is linked to insurance – more of the PP prescriptions were for insured clients, compared with health centre and hospital prescriptions.

Despite early fears that the RDF would drive the private sector out of business, it appears that the People's Pharmacies and private pharmacies are still numerous – 565 private pharmacies and 77 People's Pharmacies in KS at the time of our market survey - and doing good business. This is despite the fact that they are disadvantaged relative to both the RDF and the CMSPO, which benefit from tax breaks, can set their own prices, have monopolies over public outlets and can sell unregistered drugs.

To summarise, it seems clear that though the original conditions which necessitated the development of the RDF no longer apply, it is continuing to fulfil its original mandate and is providing high quality, appropriate essential drugs at lower cost than the market alternatives, as well as a range of other public services.

Options for improving financial access within Khartoum

At present, the RDF provides below-cost essential drugs across Khartoum State, but it operates on a strict cost-recovery basis. Those who are unable to afford drugs are denied access, and formal social support systems are limited.

In our household survey, when asked how they coped when unable to pay for health care, 3% reported receiving charitable donations, 3% got assistance from the Zakat, while 1% were given an exemption by the facility. The Zakat and charitable donations were predominantly reported in the bottom quintiles, while exemptions were equally divided between the bottom quintile and the top. In focus group discussions, a variety of voluntary, informal mutual support mechanisms emerged as most significant (as reflected in the high reliance on borrowing to cope with health care costs, which applies across the different socio-economic groups).

There are many different options for improving access, including:
- Altering the cross-subsidies, within the RDF
- Expanding health insurance coverage
- Extending national exemptions and free programmes
- Extending community health financing schemes
- Reforming existing social protection mechanisms, in particular the Zakat
- Increasing central funding for health care and decreasing patient contributions generally

These will be discussed in turn.

Some of the discussion here relates to user fee costs, as well as drugs costs. Although the issue of user fees might not appear directly relevant to the RDF, any measures which decrease or spread health care costs will free up household resources for drugs and so improve access in terms of the RDF's function.

Altering the cross-subsidies, within the RDF

The RDF has to operate on a cost-plus basis, making sufficient money overall to cover its costs and generate a small surplus for reinvestment. There is relatively little scope then for

exempting patients, unless external subsidies are made available. It would make sense for this to be done through the health insurance system, so that poor households not only reduce their drugs costs, but also gain access to free services. Already, according to our household survey, 20% of households are self-treating (either taking no action, preparing home remedies, or visiting People's Pharmacies and private pharmacies). Exemptions schemes should encourage households to get a consultation before treating.

Expanding health insurance coverage

Health insurance is an attractive option for protecting the poor, as it offers 100% off health service costs and 75% off drug costs. Moreover, the cover could last for a period of a few years, which reduces targeting and administrative costs. Most FGDs and KI had a good opinion of the way that the KHIC is currently offering: although quality of services is not as high as the richest group would demand, it appears that access is reasonable and quality acceptable. (Not all facilities are accredited to the KHIC: according to the health facility survey, approximately 56% of health centres and hospitals accepted patients using health insurance, though this may have increased since.)

At present, coverage is low, as members are predominantly salaried: cover for the informal sector is optional, and many cannot afford to join. In the household survey, 77% of households reported no insurance coverage, while 23% had at least one member with some sort of coverage. In terms of the number of individuals covered, out of the total population sampled, the proportion was 9.3%. Of these, 49% said they had benefited from health insurance during the most recent episode of illness, which means that 4.5% of the total population were effectively protected by some type of insurance for this most recent illness. The KHIC was the most common insurer, accounting for just under 70% of the insured; the next most common was the 'organised forces' scheme (21%), individual private policies (4%) and employer private policies (1%).

Membership of the KHIC is concentrated in urban poor areas, followed by rural areas. The high income areas recorded the lowest level of overall membership.

Health insurance does bring with it the risk of 'moral hazard' – that membership inflates use of services. Our studies support that, but given the low overall level of health care use in KS that may be acceptable. (According to the KHIC reports, average utilisation per member per year is 1 visit, which is not high in absolute terms.) In the health facility prescription review, 37.5% of prescriptions reviewed were from patients using a health insurance scheme. Given that overall health insurance coverage across Khartoum State is estimated at 10-20%, this figure is higher than expected and indicates that insured patients are more likely to access services and drugs. Moreover, an urban bias was found in the prescriptions from insured patients, suggesting either that patients are more likely to join if they live in urban areas, and/or are more likely to use the urban facilities.

The health facility price checks confirmed that insured patients are being exempted the full service costs and 75% of drug costs.

Within the KHIC, there is a flat-rate premium for membership for the indigent, students, and martyr's families of 5,000 SDD (roughly $20) per year. This provides cover for the whole family. If we take the estimates from our studies of roughly 20% of households who cannot

afford health care, the cost of providing cover for them would be 765 million SDD per year[12] (or around 3 million USD). This figure will decrease if the IDP population relocates to the south to any large extent: roughly three-quarters of the total who cannot afford access to basic health care, according to our HEA study, are IDP households.

Identification of the target group could be based on the HEA information and eligibility established proactively and for a set period of time, to reduce transaction costs.

Sources for funding this free cover could include:
- Increased budgetary allocations for health, within the State or Federal budget
- Reallocation of part of the surplus currently being transferred to the KMoH by the RDF, which could fund a quarter of these households, at its current rate
- Using Zakat funds to pay for a portion of these households[13]
- Using aid funds to buy insurance, which would be easy to monitor and politically acceptable

The advantages of this approach would be:
- It would target poor households directly, with relatively little leakage to the non-poor, providing assistance with all basic health care costs and freeing up household resources for other important expenditures
- It would boost the role of the KHIC, which is providing a good service at present, but struggling to increase coverage in the informal sector
- It would strengthen the RDF, by boosting demand for its products amongst a group which is currently unable to pay
- It does not require any additional structures and keeps administrative costs to a minimum
- It could be done without diverting resources from other States (this is important given Khartoum's already relatively privileged position).

Extending national exemptions and free programmes

Another option is to extend exemptions and/or the scope of existing free programmes.

It seems that there is no clear official policy on exemptions for those who are unable to pay for health care. Of our household survey sample, only two people (out of 167 who were unable to pay) reported receiving a free service – one was in the bottom quintile and one in the top, suggesting that financial need may not be the main criterion even for this small proportion of clients.

In the health facility survey, all hospitals and over 60% of the health centres reported that they operated an official exemptions scheme[14], with 'paupers/indigent' as the main eligible

[12] Based on FMoH 2003 population estimate for Khartoum of 5,352,000, divided by five (to gain the 20%); the resultant 1,070,400 is divided by 7, which is the average number per household, according to our HH survey; this is then multiplied by the premium of 5,000 SDD per HH.

[13] In the Khartoum HIC, the Zakat currently sponsors 16,000 families to join. They are selected by a local committee out of the 300,000 households (i.e. about 1.5 million people) currently classified by the Zakat as poor. They are given HI membership for 5 years, after which their status is re-evaluated.

[14] The term 'official exemptions' was defined as exemptions that are systematically and routinely applied by a facility. It does not mean that they used all these exemptions or that the MOH officially endorsed them, although some are (e.g. emergency treatment and treatment for patients with TB).

group. Hospitals claimed to give full exemptions, while health centres either exempted in full or reduced prices to 25%. Other exemption categories included emergency cases and TB patients. Some facilities also reported giving unofficial exemptions. (The People's Pharmacies were fully commercial and did not offer any exemptions.) It seems then that exemptions do exist, but the reported numbers suggest that they are on a small scale, and with considerable facility-level discretion. One urban health centre reported accepting payment in kind, and 19% of health centres (but no hospitals) accepted late payment of fees.

At present, some drugs are provided at no cost through vertical programmes, funded by donors, such as for EPI and family planning. These services are supposed to be free, but in reality our health facility and household surveys suggest that patients are sometimes charged for these services. In the household survey, 5% reported paying for immunisation; 70% for antenatal care; and 20% for postnatal care.

Although the KMoH claims to operate a single tariff for user fees, we were unable to obtain it even from the central offices, and facility visits suggest that there is no system for posting it up (fewer than 8% of health centres had notices up, all of these in rural areas). It is no wonder then that facility charges were found to differ in an apparently random manner (not correlated with facility type, location, rural/urban areas etc.). Lack of consistency increases the uncertainty for patients and increases the likelihood of not seeking treatment, being unable to pay for drugs and services, and of being vulnerable to informal charging. It should be a matter of urgency that drugs and service prices are formally posted in all health facilities and People's Pharmacies.

The Ministry of Finance funds the first 24 hours of drugs for emergency cases in hospitals. The RDF delivers these drugs in KS. According to our household survey, 50% of those who were had had a recent episode of hospitalisation reported having to pay for their drugs in the first 24 hours. How the triage is done between emergency and non-emergency cases is not clear.

The IDPs used to benefit from free NGO services, such as the 'Displaced people's free essential drug project'. These were cut after the UNICEF MICs survey (2000), which was interpreted as showing that access was not a major issue. However, as the data was not disaggregated by socio-economic group, it is hard to see how conclusions for specific groups, such as the IDPs, could be drawn. It led, however, to the withdrawal of funding by donors for organisations like Save the Children UK to provide free or highly subsidised services. In 2003, there were 214 of such clinics, but many now have to charge for services. If aid flows increase post-peace agreement, donors should re-examine the evidence for supporting some of these programmes which targeted specific disadvantaged groups.

Although no figures were available, KIs reported that the MoF makes funds available to assist with high-cost interventions such as heart operations. Similarly, the Zakat was said to be mainly used to pay part of the costs of expensive hospital procedures. While these are potentially catastrophic costs, it would be interesting to know which groups are benefiting from these funds. There is a risk that better-connected and more knowledgeable individuals benefit disproportionately.

Unofficial exemptions refer to exemptions that are applied at the discretion of an individual member of staff and are not routinely used by the facility.

In the absence of greater transparency and uniformity on fees for different services, the avenue of investing in exemption is less promising that identifying the poor and providing them with access to the whole range of basic care.

Extending community health insurance models

Sudan experimented with Bamako-style community finance initiatives in the 1990s, but very little documentation exists on these, and KI evidence suggests that these schemes have either faltered or are operated informally. On this basis, extending community financing does not appear to be a significant option for improving access in KS. That is not to underplay the role of existing informal mechanisms, which are the main coping strategy for families who cannot afford to pay health care costs.

Reforming existing mechanisms, such as the Zakat

The Zakat system is the only official social security in Sudan. It is based on a mandatory deduction of 2.5% of income payroll deduction, which is earmarked for assisting the poor and needy.

The system for accessing assistance from Zakat is complicated. First, the householder has to go to the People's Committee in the neighbourhood to get a certificate. If successful, they take the certificate to the Zakat office, where it goes to a committee. The committee can send an inspector out before deciding whether to help and by how much. Assistance is given on a case-by-case basis, so that they may get assistance on one occasion, but not another. Clearly this is time-consuming both for the beneficiaries and the officials, and is too complex for small items of health expenditure.

The HEA findings were that while some quarter Popular Committees reported the *Zakat* system to be ineffective – with ceilings on numbers of claimants to be referred to the *Zakat* head office and a considerable struggle even for the smallest claim – there appears to be considerable variation. In wealthier Quarters – such as El Shabia – the *Zakat* committee helps more households, and gives each larger sums of money than in poorer quarters. It appears that connections are important. Most of the FGDs also expressed distrust in the local authorities and Popular Committees, which they regarded as biased and dishonest.

It should be noted that many Muslims complained about the Federal government's exploitation of the *Zakat* system to generate taxes. For them the system of traditional *Zakat* – whereby a rich man contributes to his poor neighbours at a local level – was always more effective. Wealthy people are now doubly taxed – the government's *Zakat* system, plus they are obliged to help people out locally as well. The system has turned into a time-consuming bureaucratic system of hurdles, which is ineffective and unresponsive to the needs for which it was created.

In addition to the compulsory Zakat, a voluntary system, called 'takaful', was started up in the 1990s, whereby wealthier community members donated funds to assist with emergency health care needs. 67% of the hospitals in our health facility survey reported having a takaful office, but FGDs claimed that these are no longer active, since the 1999 Presidential decree made emergency care for the first 24 hours in hospitals free.

Potential improvements to the Zakat could include:

- Setting clear criteria for assistance, on the basis of low income levels or other measurable categories of vulnerability

- Simplifying procedures to access assistance
- Making assistance available for basic health care – not just tertiary care
- Giving certificates which entitle the holder to assistance for a designated period of time (such as 2 years), so that the costs of accessing assistance are reduced
- Publishing accounts, so as to build confidence in how Zakat funds are used

Increasing central funding and decreasing patient contributions generally

As a result of economic problems, the withdrawal of aid in the early 1990s and the liberalisation programme of the late 1980s and early 1990s, Sudan has shifted much of the burden of financing health care on to households (with the state funding only 20% of health care costs, as opposed to the SSA average of 41%). This is a policy which could be modified, with political will and an increase in resources. The potential for increasing the public health envelope comes from:

- The 'peace dividend' (an estimated $1 million per day was being spent on defence and security – funds which could be released for productive activities after the peace agreement)
- Increased aid, with the ending of the embargo against Sudan
- Debt forgiveness or rescheduling, subject to agreement with creditors over improved governance etc.
- Increased revenue from oil, now that revenue sharing arrangements with the South have been agreed

These factors could permit the Sudanese government to increase its spending on health, both at federal and state level, from levels that are low, even by African standards, and to either subsidise patient costs at a higher rate across the board, or make a wider range of services free, or fund waivers for specific population groups.

The extent to which improvements could be made in existing allocations to the health sector is hard to gauge, given the extremely limited information on health financing. However, there is evidence that government expenditure is focussed on rural hospitals and tertiary hospitals in richer areas. The government only pays for low salaries in primary facilities, and for emergency drug funds. Parallel structures exist for the army and police, which offer higher quality of care for their members. Although more research is needed in this area, there is clear prima facie evidence that changes to the current allocations could improve equity and efficiency in the health sector.

Options & issues for expansion outside Khartoum

The CMSPO is responsible for the supply of pharmaceuticals throughout Sudan. It procures items on the Sudan National List of Essential Drugs and supplies them at a 35% mark-up to institutions. The institutions then sell on to clients with a mark-up of their own of 20-25%. The CMSPO purchases in bulk from local and overseas manufacturers (including from India and China) and is thus able to undercut private suppliers.

In 2002, CMSPO established RDFs in 7 states, rolling out to a further 10 in 2003. The experience with roll out has not been documented, though meetings have been held to examine successes and weaknesses. Anecdotal evidence suggests that – as one would expect – some areas have been successful and others not. The main factors favouring

success include leadership and having a strong local economy. Gezira State does well on both counts as it is both relatively affluent, and also is led by someone who used to be involved with the RDF in Khartoum and is knowledgeable and committed to that model. In other (poorer) states, it is less clear whether the RDF is really functioning.

Although the RDF (Khartoum) manager was closely involved with the roll-out to other states and provided both advice on and training in the process, there are some significant differences in the way that RDFs are being introduced nationally, compared with Khartoum. For example:

- capitalisation is much lower: only 200 million SDD was provided in total for the first 7 states (against an estimated need for USD 160-400 million for the whole country (Graaff, P. & Everard, M., 2003)
- the process has been very quick, with less time for building capacity and training staff
- the model is different, with drugs sold to the States' RDF, to sell on to facilities or patients. Thus risk is not held centrally by the CMSPO, but is transferred to the RDFs, which may then use the funds in different ways. CMSPO sells its drugs to the States with a 12% mark-up and in theory the RDFs are limited to the same mark-up in selling on (though they may sometimes exceed this)

The lower population density, lower purchasing power, larger distances and poorer infrastructure in many States pose significant problems for the operation of a Khartoum-style RDF.

Secondary sources suggest that facility level drug funds which were set up in the 1990s and 1990s have ceased to function officially, but that individual health workers continue to buy and sell drugs, as a profitable side line (ElMuktar, M. & Saad Eldin, M., 2001).

It is recommended that the CPSMO revisits the option of establishing drug funds based on the same model as the Khartoum RDF, over time and with adequate support, in the richer states. In poorer states, a financially viable RDF is unlikely to work: a programme of free drugs distribution would be more realistic and equitable. Further research would be needed prior to establishing this, as this study's data were limited to Khartoum State.

Summary of analysis

This discussion concluded that the RDF has been successful and that it continues to fulfil its original mandate, though not without facing some current threats to its financial viability and public health role. The high degree of political support, large investment and long start-up period with emphasis on systems and training were some of the main factors supporting its success, as well as the strong economy of Khartoum.

In terms of the current need for the RDF, most of the original factors which necessitated it have changed. Nevertheless a comparison of costs and benefits suggest that the RDF continues to deliver value for money, and that in its absence, drug costs to users would rise by 50-100%.

Overall access to health facilities and the RDF services is good, but there are considerable discrepancies by income group which suggest that pro-poor measures are necessary. These could operate through the RDF or through wider mechanisms. A discussion of the advantages and disadvantages of various approaches leads us to conclude that extending health insurance coverage to disadvantaged groups, increasing the overall health budget,

restarting free services for especially disadvantaged areas and improving the administration of the Zakat system are the priorities.

Lessons for other areas of Sudan are limited, in that the data gathered here cannot be taken as representative outside KS. However, the general evidence suggests that RDFs, run along similar lines to the Khartoum RDF, could be equally successful in richer states, while free drug distribution programmes are more realistic for the more remote and poorer states.

7. Conclusions and recommendations

How the RDF is working at present? Strengths and weaknesses

This evaluation concludes that the RDF is continuing to fulfil its original mandate, to provide a sustainable source of appropriate, quality drugs at below-market price levels.

Its strengths can be summarised as follows:

- It continues to serve the majority of the KMoH network of health centres and hospitals in Khartoum State, as well as 18 of the People's Pharmacies
- Its price list undercuts rivals by 40% (CMSPO) and 100% (People's Pharmacies and private pharmacies), on average
- It operates a unitary system, offering the same price to all public facilities, and absorbing the financial risks (the RDF sells directly to patients, not to the facilities, except for the People's Pharmacies)
- It maintains regular supervision and deliveries: drugs availability is good at facility level
- It offers a wide range of drugs (145 items in total)
- Assessment of selected rational drug use indicators showed the proportion of patients encounters using one or more injection and the number of drugs prescribed per patient to be within or very close to optimal levels.
- It is profitable: gross profits have been rising year on year due to large increases in volume of drugs sales
- The financial review suggests that internal control systems are good
- Its ratio of assets to liabilities is healthy
- It has just been through a period of capital expansion, investing in a new office building and warehouse
- Foreign currency availability is no longer a constraint, given the wider economic changes in Sudan
- It makes a regular transfer to the KMoH, worth 210 million SDD per year, which more than outweighs the fiscal subsidy of its 17.5% customs tax exemption
- It offers other public services, such as delivering emergency drugs and vaccines

Set against this are some areas of weakness, or concerns:

- Profit levels are high; this, while a good thing from a business point of view, may indicate that prices to users could be reduced
- Operating costs have increased substantially in the RDF in 2001-3, especially in the area of salaries and incentives
- The value of expired stock has also increased significantly over this period
- The build up of stocks means that the working capital cycle has doubled between 2001 and 2003, which increases the risk of losses
- The value of debts, particularly from one or two non-paying specialist hospitals, threatens the RDF's ability to pay creditors, which is essential for its continued smooth procurement (though this situation is now being improved).
- Decreases in attendances at RDF facilities and problems with the health insurance system have resulted in reduced profits for the past three years. This is a worrying trend.
- The proportion of RDF sales value which is being transferred to the KMoH has doubled over time (at the same time as KMoH contributions, in form of staff salaries, for example, have reduced). It is now 17.5 million SDD each month. Excessive extraction is a threat to

the RDF's viability. It is also not clear whether the surplus is being used according to the originally agreed purpose of promoting PHC.
- An absence of capital investment plans is noted, particularly in relation to the current development of new offices.
- There is a need for more details in the recent financial reports, including giving explanations for trends.
- The RDF has suffered from an unfortunate discontinuity of management over the past two years, though a permanent director has now been appointed in 2005. Strong leadership is essential to continued viability and quality of work.
- The RDF's fortune is now strongly connected with the KHIC, which is its major purchaser. It also owns shares in the KHIC. Any adverse development for the KHIC would also impact on the RDF. It is also dependent for its current profits on its People's Pharmacy network: through 18 outlets it sells more drugs than through its 123 hospitals and health centres.
- Linked to that is the disproportionate growth in sales of non-essential. While driving up profits, there is a real risk that the RDF mandate of promoting rational prescribing will be overshadowed by this trend.
- The prescription review suggests that antibiotics use is still too high and has risen since the last survey (in 2000). That and the high use of syrups and low use of ORS suggest that there is need for more investment in practitioner and consumer education
- Qualitative information from focus groups show that patient awareness is also low
- Although availability of essential drugs is still high in facilities, it has dropped from 100% in previous surveys to 95% now.
- The market survey found that for the 15 most commonly used drugs, the CMSPO prices undercut the RDF's – on average by 10%. (Note though that the CMSPO does not sell direct to the public: retailers will add 20-35% to these prices, whereas, at least for the health centres and hospitals, RDF prices are the prices that users pay.)
- Although the RDF is supposed to operate a fixed price list, small but significant variations in prices were found across the facilities (not correlated to location or any other variable)
- Poor stock keeping records were found in the health facility survey
- Public awareness of the RDF and public involvement in CHCs was found to have remained at a low level
- Operations research, which was once seen as a core activity for the RDF, appears to have withered

Who is benefiting?

As the RDF operates through all of the main KMoH health centres and hospitals in KS, the question of who is benefiting has to be answered by looking at use of the public facilities in general.

Overall utilisation trends for the RDF network are positive, rising to 3 out of the 5 million people in 2002, though with a small decrease the following year.

Geographic access to the facilities is good: mean time to reach a health centre in the household survey was 15 minutes, and 34 to reach a public hospital.

Quality indicators examined in the health facility survey are on the whole positive and suggest that quality does not vary systematically by location or rural/urban status, with the exception of KMoH supervision, which is more frequent in urban areas. (The full details of the health facility findings are published separately (Cadge, N. & Elkarim, Professor M., 2005)).

The household survey also reinforces the importance of the public services: the main treatment strategy was to go to a health centre (36% overall), followed by public hospitals (29% overall). Moreover, these facilities are more important for the poor: use of health centres is concentrated in the bottom three quintiles, while hospitals are important to the bottom four quintiles, but not the richest.

Financial barriers are, however, significant. Since the liberalisation and health sector reforms of the 1990s, Sudan has placed a heavy burden of paying for health care on households, with the state contributing a mere 20% (one of the lowest proportions in Africa). Of these household costs, drugs form 58% of the total, according to our household survey.

According to the HEA, 17% of Khartoum State's population is unable to afford basic health care for all or part of the year. This group is concentrated in the IDPs – 60-75% of IDP households fall into this category, compared with 5-10% for the rural and urban poor. A further 24% overall is estimated to be unable to afford emergency health care without assistance (22% in urban areas; 30% in IDP areas; and 30% in rural areas).

In the household survey, 6% opted for no treatment (with lack of money the predominant factor), while 29% of those who sought treatment could not afford to pay for it. For the more disadvantaged groups, inability to pay is, of course, higher: within IDP areas, 46.5% could not afford to pay, while for the bottom quintiles, the proportion is 32-37%. Moreover, households in the poorest quintile are five times more likely not to treat sick members, compared with the top quintile.

Overall, health expenditure as a proportion of household income is 11%, which is high by international standards. The differences between areas were not statistically significant, but the group with the highest proportion were the IDPS, who were found to be spending 15% of their total household income on health care.

For those who cannot afford to pay, borrowing is the main coping strategy across the social groups (57% overall), which reinforces qualitative information on the importance of informal social networks.

Formal support systems were found to exist, but to be limited in scale, arbitrary and difficult to access. Exemptions policies vary by facility and only 1% reported receiving them. 3% of those who were unable to pay reported receiving charitable donations and 3% reported assistance from the Zakat (the official Muslim social support fund). FGDs reported bias in allocating assistance from the Zakat, favouring those with better contacts.

Options for expanding access within Khartoum

Given that the main barriers to accessing the RDF are financial, any measure which reduces household costs (for vulnerable groups) or increases their income will increase access. The potential range of actions is therefore wide.

Providing internal subsidies within the RDF is one option, but given the need for the RDF to maintain its viability, there is limited scope for this. Besides, the aim should be to increase access to health care generally, rather than encouraging self-prescription. It is therefore preferable to extend health insurance cover to those who cannot currently afford to access

basic care. The health insurance network and quality is adequate, and this measure would boost its development, as well as increasing business for the RDF, at low administrative costs.

Given current Khartoum Health Insurance Corporation (KHIC) premia, to provide membership for 20% of KS population would cost in the region of USD 3 million per year. This could be funded from a number of sources, including State budgets; the RDF 'surplus', which it pays monthly to the KMoH; the Zakat (which does fund some poor households to join at present, but on a limited scale); and aid flows, which should increase post-peace agreement. Identification of beneficiaries could be carried out using the HEA information.

Given that so many of the households which are excluded are IDP[15] ones, an alternative would be to restart the free services which used to exist in IDP areas, but which were closed earlier this decade, once conditions were thought to have improved. (This will prove complex if IDPs are dispersed amongst the host community, however.)

Another option which would assist both IDPs and other poor and vulnerable residents would be to improve the administration of the Zakat, so that it becomes available on a larger scale, with clear criteria for access, lower access costs, and greater transparency and accountability.

'Peace dividend' funds should also be used to increase the overall public contribution to health care and so enable user fees in public facilities to be reduced. Some areas could be declared exempt as a region, on the basis of widespread poverty. Closer analysis of health spending at all levels would also identify areas where resources could be shifted to increase equity and efficiency. There is more detail on these recommendations in our household survey report (Witter, S. & Babiker, M., 2005).

Other measures to support the income of vulnerable groups include: changes to the replanning process, to reduce costs for IDPs; income generation activities aimed at boosting and diversifying income in IDP areas; and development of infrastructure in outlying areas (rural as well as IDP settlements) to enhance access to markets. The HEA report provides more detailed recommendations on these areas (Adams, L. & et al., 2004).

Issues for national expansion

Lessons for other areas of Sudan are limited, in that the data gathered here cannot be taken as representative outside Khartoum State, given the large differences in infrastructure and income levels. However, the general evidence suggests that RDFs, run along similar lines to the Khartoum RDF, could be equally successful in richer states, while free drug distribution programmes are more realistic for the more remote and poorer states.

Research gaps

[15] IDPs are families who have fled from conflict and economic hardship, mainly in the south and west of Sudan, to live in the Khartoum area. Although many have been there for two decades, they continue to be classified as IDPs. In the wake of the Comprehensive Peace Agreement in 2005, many are returning to their home areas, particularly in the south. It is not clear how many of the 2 million will remain as residents of Khartoum State.

Given the interest in expanding the RDF model to other States, a systematic evaluation of the CMSPO roll-out to date should be conducted. This is the second attempt, in that Bamako Initiative-style drug funds were set up at local level in the 1990s. Documentation of that experience is also lacking.

Recommendations

The RDF should continue to provide its services for Khartoum and to enjoy political support and independent status. However, there are significant findings which need to be acted on, internally and externally.

Recommendations for the RDF management

The policy on salaries and incentives needs to be reviewed, so that this type of expenditure does not spiral out of control.

The RDF management should investigate the causes behind the following issues which have been raised, and propose a plan for continuing to address them:

- Increase in expired stocks in facilities
- Poor stock record keeping in some facilities
- Fall in availability of essential drugs
- Small but significant variation in prices charged for drugs by facilities

The policy of subsidising more expensive drugs should be reviewed: what are the equity implications of this?

The management should discuss an informal cap on gross profits at around 15%, to minimise costs to users while maintaining adequate funds for reinvestment. (This cap could be lifted for exceptional circumstances, such as infrastructure expansion, but would be regarded as a norm, with justification required for increases.)

In addition to providing routine data, the RDF should focus on questions of importance for its overall function and carry out appropriate action research relating to these. These need not be ambitious or expensive, but would encourage a culture of reflection and goal-orientation: the RDF should continue to see itself as more than a business - as a role to pay in promoting good health generally.

Related to that is the need for renewed practitioner and client education on rational drugs use (in particular, to reduce the proportion of antibiotics being prescribed). This should be carried out in partnership with the KMoH Department of Pharmacy. Financial incentives to increase sales should be reviewed to ensure that they do not promote irrational prescribing. In this respect, it would be worth monitoring the proportion of essential/non-essential sales through People's Pharmacies, as well as keeping a downward pressure on the sale of brand name drugs through these channels. The public demand and growth in insured patients is creating an upward pressure on expenditure, which is not in the public interest.

The RDF and KMoH should together develop a plan to address the drugs supply to smaller, more remote health centres. This may require some medication of the RDF's systems – for example, by allowing longer intervals between supply and supervision visits.

The RDF should review its procurement practice, to ensure that it is getting the right balance of quality and price.

The relationship with non-paying debtors, such as the Cardiac Unit, which is in the process of being resolved, should not be allowed to recur.

The donated fixed assets should be re-valued, included in the financial records, and depreciated on an annual basis.

Format of annual financial statements must continue to be in accordance with the international accounting standards and reporting standards, and approved by all the stakeholders.

Ministry of Health

The KMoH should review the amounts that it is being paid monthly by the RDF: the current level seems unduly high and may be one of the factors behind the build up of creditors. Payments should be suspended or reduced, at least until RDF creditors have been paid in full.

The KMoH should investigate the causes behind the documented drop in supervision, especially to rural health centres, and other quality issues raised in the health facility report.

The low levels of utilisation of public facilities documented in the health facility report and also indicated in the declining attendances at RDF facilities (other than PPs) should also be addressed in partnership by the RDF and KMoH. Strategies here could include improvements in hours worked by health staff and public education on the efficacy of generic drugs.

The user fee tariff should be made flatter and more transparent, with better posting of prices in health facilities.

The KMoH should work with the FMoH to ensure that additional barriers to importation and clearance of drugs are not created and that the RDF is facilitated in carrying out its work efficiently.

There is a need for the FMoH and KMoH to review the NEDL, to ensure that it is up-to-date with current prescribing practice.

Government and donors

The burden of paying for health care falls heavily on households at present in Sudan, compared with other developing countries. The GoS should use ‘peace dividend’ funds to increase its overall contribution to health care, thus reducing the burden of cost recovery, particularly in the poorer States.

Donors should study the case for reinstating free programmes, which used to benefit vulnerable groups, such as the IDPs in Khartoum State.

Measures to support IDP incomes and access to infrastructure should be taken to improve access to health care, among other goods.

The operation of the Zakat needs to be reviewed: it is currently viewed as ineffectual due to complex procedures, perceived favouritism, and lack of transparency.

Measures to improve access to health care and drugs should include the provision of KHIC membership to vulnerable households in Khartoum State.

Further research is needed to for health financing in Sudan generally, as well as more specifically on expenditures at State level and the operation of RDFs outside Khartoum. These will inform decisions on the overall budget for health and also maximising the use of existing resources.

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Annexes

Annexe 1 Research team

Ibtisam Satti Ibrahim	Focus group discussion leader Department of Sociology and Social Anthropology, University of Khartoum
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Annexe 2 Key informants

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Annexe 3. Market survey results

Ser No	Drug Name	Private Pharm in SDD	Popul Pharm in SDD	CMS in SDD	RDF in SDD	Priv/ RDF	Pop/ RDF	CMS /RDF	Priv/ CMS
1	Diazepam Tabs 5mg	237	101	75	30	7.9	3.4	2.5	3.2
2	Diazepam Inj 25mg	86	150	25	30	2.9	5.0	0.8	3.4
3	Promethicizine Tabs 25mg	116	85	-	50	2.4	1.7	-	-
4	Promethicizine Inj 50mg	82	75	26	50	1.6	1.5	0.5	3.1
5	Acetyl salicylic acid 300mg	98	65	15	15	6.5	4.3	1.0	6.5
6	Acetyl salicylic acid 100mg	69	64	-	-	-	-	-	-
7	Ibuprofen Tabs 200mg	98	98	40	68	1.4	1.4	0.6	2.5
8	Ibuprofen syrup	566	403	-	-	-	-	-	-
9	Paracetamol Tab	46	48	20	20	1.5	1.6	0.3	2.3
10	Paracetamol syrup	218	237	110	130	1.2	1.8	0.8	2.0
11	Indomethacin Caps 25mg	121	112	-	68	1.8	1.6	-	-
12	Chloroquine Tabs	86	98	50	50	1.7	2.0	1.0	1.7
13	Chloroquine syrup	254	259	170	125	2.8	2.1	1.4	1.5
14	Chloroquine inj	42	48	38	35	1.2	1.4	1.1	1.1
15	Chlorophenarmine Tabs	71	86	35	50	1.4	1.7	0.7	2.0
16	Chlorophenarmine syrup	320	323	180	-	-	-	-	1.8
17	Chlorophenarmine inj	83	92	35	50	1.2	1.8	0.7	2.4
18	Dexamethazone inj	106	88	20	-	-	-	-	5.3
19	Hydrocortizone inj	397	225	175	200	2.0	1.1	0.9	2.3
20	Hydrocortizone cream & ointment	486	504	170	-	-	-	-	2.9
21	Prednisolone Tabs	110	100	90	-	-	-	-	2.2
22	Carpamezapine Tabs	359	260	75	-	-	-	-	4.8
23	Carpamezapine syrup	1354	942	-	-	-	-	-	-
24	Phenythion Tabs	705	500	70	-	-	-	-	10.1
25	Phenobarbitone Tabs	92	83	90	-	-	-	-	1.0
26	Mebendazole Tabs	255	288	-	50	5.1	5.8	-	-
27	Mebendazole syrup	381	458	-	200	1.9	2.3	-	-
28	Prazaquantel Tabs	434	483	230	200	2.2	2.4	1.2	1.9
29	Amoxicillin Caps 250mg	117	158	75	100	1.2	1.6	0.8	1.6
30	Amoxicillin Caps 500mg	258	283	150	-	-	-	-	1.7

31	Amoxicillin syrup 125mg	347	410	160	200	1.7	1.6	0.8	2.2
32	Amoxicillin syrup 250mg	496	400	225	250	2.0	1.6	0.9	2.2
33	Benzyl penicillin inj	46	50	30	40	1.2	1.3	0.8	1.5
34	Procaine penicillin inj	50	50	30	40	1.3	1.3	0.8	1.3
35	Ampicillin + cloxacillin caps	256	275	205	218	1.2	1.3	0.9	1.2
36	Ampicillin + cloxacillin syrup	451	464	325	350	1.3	1.3	0.9	1.4
37	Tetracycline Caps	75	78	50	35	2.1	2.2	1.4	1.5
38	Tetracycline skin ointment	168	225	75	-	-	-	-	2.2
39	Tetracycline eye ointment	93	103	50	75	1.2	1.4	0.7	1.9
40	Chloramphenicol caps	233	233	80	-	-	-	-	2.9
41	Tetracycline ear-eye drops	365	356	125	150	2.4	2.4	0.8	2.9
42	Ciprofloxacin Tabs 500mg	1471	1310	600	-	-	-	-	2.5
43	Ciprofloxacin Tabs 250mg	675	702	275	-	-	-	-	2.5
44	Erythromycin Tabs 250mg	248	286	205	175	1.4	1.6	1.2	1.2
45	Erythromycin syrup 125mg	516	475	300	300	1.7	1.6	1.0	1.7
46	Erythromycin syrup 250mg	811	817	510	-	-	-	-	1.6
47	Second generation cephalosporin(ceftazidime inj)	1858	1667	1200	-	-	-	-	1.5
48	Third generation cephelosporin(ceftazidime inj)	1893	1500	-	-	-	-	-	-
49	Ampicillin + cloxacillin inj	184	203	60	150	1.2	1.4	0.4	3.1
50	Metronidazole Tabs 250mg	77	53	27	29	2.7	1.8	0.9	2.9
51	Metronidazole I.V.	464	488	480	450	1.0	1.1	1.1	1.0
52	Metronidazole syrup	447	281	200	200	2.2	1.4	1.0	2.2
53	Gentamycin inj	161	106	60	50	3.2	2.1	1.2	2.7
54	Gentamycin eye-ear drops	411	381	100	-	-	-	-	4.1
55	Co-trimoxazole Tabs	160	170	45	50	3.2	3.4	0.9	3.6
56	Co-trimoxazole syrup	541	403	150	150	3.6	2.7	1.0	3.6
57	Acyclovir Tabs 200mg	3079	2100	-	-	-	-	-	-
58	Acyclovir skin	2112	2258	-	-	-	-	-	-

	ointment								
59	Acyclovir eye ointment	4223	4600	-	-	-	-	-	-
60	Rifampicin 300mg	343	-	200	-	-	-	-	1.7
61	Pyrazinamide Tabs	238	100	80	-	-	-	-	3.0
62	Streptomycin Tabs	57	50	35	30	1.9	1.7	1.2	1.6
63	Nystatin oral drops	454	663	-	-	-	-	-	-
64	Nystatin ointment	535	650	-	-	-	-	-	-
65	Clotrimazole eye	425	539	-	-	-	-	-	-
66	Clotrimazole suppositories	590	625	-	100	5.9	6.3	-	-
67	Ketoconazole Tabs	1385	1028	-	-	-	-	-	-
68	Sulphadoxin + Pyrimethamin Tabs	262	150	42	50	5.2	3.0	0.8	6.2
69	Quinine Tabs	219	180	130	165	1.3	1.1	0.8	1.7
70	Quinine inj	68	113	75	75	0.9	1.5	1.0	0.9
71	Artmether inj	2135	1871	900	-	-	-	-	2.4
72	Fermous Tabs	107	41	50	17	6.3	2.4	2.9	2.4
73	Fermous syrup	761	842	350	350	2.2	2.4	1.0	2.2
74	Fermous inj	1457	1425	800	-	-	-	-	1.8
75	Folic acid Tabs	61	53	50	17	3.6	3.1	2.9	1.2
76	Atenolol Tabs 50mg	397	478		-	-	-	-	-
77	Atenolol Tabs 100mg	507	544	-	-	-	-	-	-
78	Propranolol 40mg	111	125	25	67	1.7	1.8	0.4	4.4
79	Propranolol 10mg	176	173	-	-	-	-	-	-
80	Nifdipine 10mg	254	232	-	-	-	-	-	-
81	Nifdipine 20mg	441	388	-	-	-	-	-	-
82	Captopril 25mg	618	583	-	-	-	-	-	-
83	Amlodipine 5mg	790	574	-	-	-	-	-	-
84	Methyl dopa 250mg	335	258	175	117	2.8	2.2	1.5	1.9
85	Digoxin Tabs	340	319	400	33	10.3	9.7	12.1	0.9
86	Vitamin K inj	197	131	75	-	-	-	-	2.6
87	Betamethazone ointment + cream	534	506	-	-	-	-	-	-
88	Betamethazone eye ear drops	700	1200	-	-	-	-	-	-
89	Furesamide Tabs	198	154	80	23	8.6	6.7	3.5	2.5
90	Furesamide inj	98	75	35	30	3.3	2.5	1.2	2.8
91	Spironolactone Tabs 25mg	373	419	-	-	-	-	-	-
92	Ranitidine	617	618	125	-	-	-	-	5.0
93	Cimetidine inj	370	375	350	-	-	-	-	1.0
94	Omeprzole Caps 20mg	2152	2327	600	-	-	-	-	3.6
95	Anti acid Tabs	71	75	50	50	1.4	1.5	1.0	1.4
96	Anti acid suspension	448	406	330	-	-	-	-	1.1
97	Metoclopramide	103	119	85	50	2.1	2.4	1.7	1.2
98	Metoclopramide inj	129	119	-	50	2.6	2.4	-	-
99	Hyoscine Tabs	173	160	85	70	2.4	2.3	1.2	2.1

100	Hyoscine inj	80	92	50	50	1.6	1.8	1.0	1.6
101	Bisacodyl Tabs(laxative)	135	140	-	50	2.7	2.8	-	-
102	Loperamide Tabs(Anti diareah)	230	175	-	50	-4.6	3.5	-	-
103	Oral rehyderation powder	75	58	-	-	-	-	-	-
104	Combine bills(contraceptives)	889	767	-	-	-	-	-	-
105	Mini bill(contraceptive)	594	610	-	-	-	-	-	-
106	Insulin soluble	2683	2750	2600	1900	1.4	1.4	1.4	1
107	Insulin zinc	2750	2750	2600	1900	1.4	1.4	1.4	1.1
108	Insulin mixed	2617	2633	2600	2000	1.3	1.3	1.3	1
109	Glibenclamide	221	135	50	67	3.3	2	0.7	4.4
110	Metformin	289	288	-	-	-	-	-	-
111	Carbimazole Tabs	142	116	-	-	-	-	-	-
112	Thyroxine Tabs 100mg	571	467	350	300	1.9	1.6	1.2	1.6
113	Anti tetanus inj	310	325	-	-	-	-	-	-
114	Pilocarpine eye drops 2% + 4%	989	917	-	-	-	-	-	-
115	Timilot eye drops 0.5% + 0.255	911	1142	250	-	-	-	-	3.6
116	Antistine eye drops	390	4166	-	-	-	-	-	-
117	Salbutamol Tabs	119	116	25	33	3.6	3.5	0.8	4.8
118	Salbutamol inj	915	1900	450	-	-	-	-	2
119	Salbutamol syrup	451	517	200	20	22.6	25.9	10	2.3
120	Aminophilline Tabs	492	-	300	50	9.8	-	6	1.6
121	Steroid inj	1691	2250	-	-	-	-	-	-
122	Expectorant cough syrup	329	435	220	-	-	-	-	1.4
123	Anti tissue cough syrup	426	388	200	-	-	-	-	2.1
124	Mucolytic syrup	727	713	-	-	-	-	-	-
125	Chloropromazine Tabs 50mg	208	108	75	-	-	-	-	2.8
126	Chloropromazine Chloropromazine inj	120	83	50	-	-	-	-	2.4
127	Amitriplatine Tabs 25mg	133	203	130	-	-	-	-	1
128	Imipramine Tabs 25mg	193	117	-	-	-	-	-	-
129	Normal saline infusion	276	281	250	250	1.1	1.1	1	1.1
130	Glucose with water infusion	276	281	250	250	1.1	1.1	1	1.1
131	D.N.S. infusion	291	281	250	250	1.2	1.1	1	1.2
132	Water for inj	21	281	15	20	1.1	14.1	0.8	1.4

133	Disposable syringes 5cc	24	25	20	20	1.2	1.3	1	1.2
134	Disposable syringes 2cc	24	25	20	20	1.2	1.3	1	1.2
135	Disposable syringes 1cc	26	28	20	25	1	1.1	0.8	1.3
136	Gauze small	60	50	-	-	-	-	-	-
137	Gauze long	235	88	-	-	-	-	-	-
138	Anti septic solution	502	225	-	-	-	-	-	-
139	Local anesthetic inj	310	350	200	20	15.5	17.5	10	1.6
140	Local anesthetic with adrenaline	350	400	310	80	4.4	5	3.8	1.1
141	Local anesthetic with ointment	1650	1200	-	-	-	-	-	-
142	Nasal decongestant	481	347	-	-	-	-	-	-
143	Multivitamin caps	435	340	50	50	8.7	6.8	1	8.7
144	Total(Average)	510(338)	513(321)	242(232)	171	2.0	1.9	1.4	1.5