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CANCER IN MALTA
Trends in Mortality and Incidence Rates of Lung and Breast Cancer

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INTRODUCTION

At the turn of this century more than ten times as many people were dying of enteritis and more than twice as many people were dying of tuberculosis than they were of cancer. Diagnosed cancer deaths accounted for only two per cent of all deaths. By the end of the second world war, cancer deaths were being specified by site and accounted for nearly eight per cent of all deaths. In 1986, eighteen per cent of deaths in the Maltese Islands were caused by neoplasms, *nearly one in five* and close to the rate in highly industrialised countries.[1]

Cancer, by 1986, was the second leading cause of death after heart disease. It is now the only major killer whose incidence is on the increase.[2] This increase in cancer mortality reflects the increased longevity which has occurred in the Maltese population. 'Living longer increases the chances of developing cancer'.[3] However, as in most industrialised countries, in the Maltese Islands there is now a greater cancer risk in each age group.[4] Thus, a four year old girl or a forty year old man today is more likely to die of cancer than were a four year old girl or forty year old man in 1950. Standardised cancer death rate data, adjusted for changes of number of people in each age group, also shows a rise in the 1960 - 80 period that I discuss below. While most people die of cancer in later life, many victims are in their forties or fifties.

The disproportionate number of years of life lost from cancer is highlighted in each Demographic Review. Take 1986 as an example.[5] Out of 1,156 male fatalities in 1986, one quarter were caused by cancer and eighty per cent by heart disease but if we compare the years of life lost by these deaths, we find about thirty per cent of the loss was due to cancer and only seventy per cent due to heart disease. Out of 1,126 female fatalities in 1986, one fifth were caused by cancer and eighty per cent by heart disease but one third of years of life lost were due to cancer and only seventy per cent due to heart diseases. Clearly, the age distribution of deaths from cancer is younger than from heart disease. What these figures do not show is the chronic morbidity - the long years of worry, pain and superhuman courage - that precedes death.

METHODOLOGY & DATA

In an attempt to analyse the trends in cancer incidence and mortality in the Maltese Islands the usual epidemiological problems were met. The validity and completeness of data depend on availability of both doctors' and

statisticians' service. It depends on diagnostic fashion and skill. It changes with alternations in disease classification. Contrary to expectations, the recent computerisation of data has not improved the quality and depth of analysis. I was unable to obtain cancer morbidity data or cancer data by occupation for the 1980s. A manual search was made through the register of deaths for deaths ascribed to lung and breast cancer for the years 1960 to 1989. Registration of cancer was introduced in 1957 but reliable records of cancer cases were only kept from 1968 and notification has not been consistent. Mesothelioma, cancer of the lining of the lung, that has been so clearly associated with exposure to asbestos dust, has not been recorded separately in Malta.

Mortality rates from malignant neoplasms are obtained from death certificates, the accuracy of which depends on the doctors (hospital physicians or general practitioners) responsible at death. Where multiple illness occurs and the neoplasm is not coded as the underlying cause of death, then figures will tend to be underestimates. This tends to be more prevalent in older age groups.

The 1970 – 80 morbidity and mortality data was classified by age, sex, locality and occupation. Standardised mortality ratios were calculated using standard rates taken from the Maltese population. Only the Maltese population, and not the total population, is broken down by age and locality of residence, so an unavoidable error (tending to overestimates in age and incidence rates) may have crept in. The discrepancy has tended to widen and then to narrow over the period in question, with nearly all of the total population being Maltese in 1973 and nearly ninety per cent being Maltese in 1980; the 1985 Census recorded nearly all of the total as Maltese.[6]

Recorded morbidity rates of breast and lung cancer depend on whether the cases are brought to the notice of a doctor, the skill of the doctor's diagnosis and her/his willingness to contribute to official records. Over the period 1968 – 80, there may have been an increase in the number of people, with cancerous symptoms confiding in a doctor. The trend may also have been exaggerated by the change-over in 1977 to a more comprehensive government-run free health service. Less cases were dealt with privately and likely to be unregistered. In 1983, a local cancer surgeon, Dr Swain, estimated that there were about five per cent of cancer cases seen to privately, whereas one third were dealt with privately some six years previously. Meanwhile an unspecified number of people, usually in the upper classes, go abroad for diagnosis and treatment.

Political animosity may also have affected data compilation. The doctors' protest action, of 1975 – 77, against hospital in-service, appears to have significantly reduced the notification of cancer incidence.

Trend analysis is also impoverished by changes in the classification of cause of death, especially with reference to breast and skin cancer in later years. These then are the local inconsistencies, inaccuracies and biases that I found and the aetiology of cancer is also confounded by the long latent period between exposure to carcinogens and appearance of cancer.

TRENDS

Cancer and circulatory diseases were responsible for 18 per cent of all deaths in the decade 1921 – 31, 48 per cent, 1957 – 67[7] and for 75 per cent, 1980 – 1986. In the 1921 – 31 period an increased frequency of cancer was observed, but 'our mortality compares favourably with that of other countries and rates are at below one half of that recorded in England and Wales', commented the 1929 Report on Health Conditions.[8] An analysis of the post war period from 1948 to 1970, shows how the incidence and severity of cancer and heart disease remained much higher in the British Isles than the Maltese islands. However, it is far too blithe to then conclude, as does Milne, that the 'unfavourable factors found in Britain were absent in Malta.'[9] Taking a superficial look at the mortality rate from cancers per thousand civilian population, it is possible to conclude, as Milne does, that there has been little change in cancer incidence (as Table 5 shows). But this is to cloud the fact that the standardised ratio, number and proportion of cancer deaths have risen significantly while there has also been an important change in location of most malignant neoplasms. Also, a lower mortality rate in Malta compared to Britain could be expected because Malta has a lower percentage of old age people. In making international comparisons of trends in cancer mortality rates one clearly has to standardise for age.

In 1960, cancer killed 114 per thousand of those who died, and in 1979, 142.6 per thousand, being second only to ischaemic heart disease as a major killer. The absolute number of deaths from cancer rose by a half, while total population increased by only ten per cent over this period. Figure 1, based on data from Tables 1 & 3, shows that cancer deaths per thousand of the population have risen from a rate of 0.98 in 1960, to 1.22 in 1970 and 1.34 in 1980 and 1.55 in 1987. *This is a rise of over one third in the cancer death rate in only two decades.* Although the cancer mortality rate for men is still higher than that for women, in 1987, for instance the male cancer mortality rate was 1.82 per 1000 males and the female cancer mortality rate was 1.29 per thousand females, the number of deaths has risen faster among women than men (Table 2), largely due to the high rise in breast cancer incidence over the period. Indeed a recent WHO report observes that Malta now has the highest female breast cancer mortality rate in the world, at 35 per 100,000 per year and roughly, for instance, double the rate in Greece.[10]

CANCER BY SITE

Figure 1 also gives details of the fluctuating rise in lung and breast cancer death rates. Female breast cancer deaths per thousand of the female population increased by nearly one and a half times over the period, 1960 – 80, while the number of reported female breast cancer cases per thousand of the female population over the shorter period of 1968 – 80 more than doubled in just over ten years (Table 3). The male lung cancer incidence rate did not rise

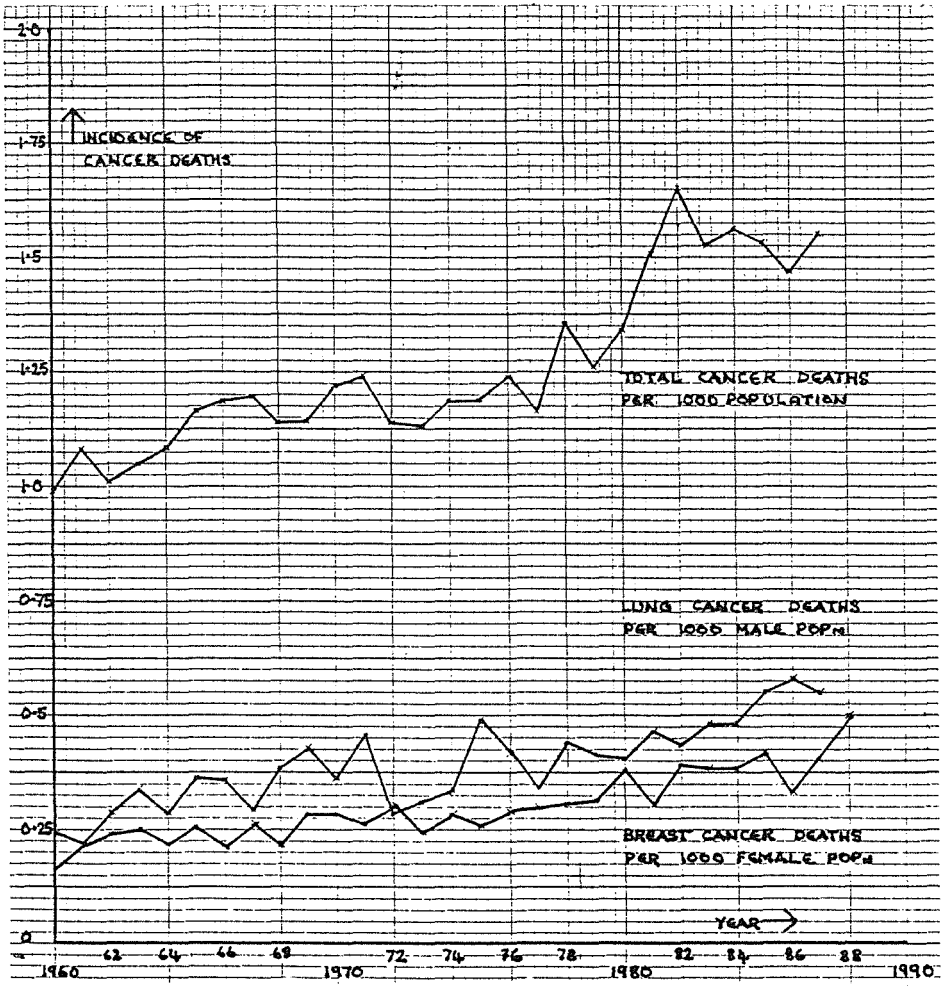


Fig. 1 *Trends in cancer mortality rates Malta 1960 – 1968*

over this latter period but the lung cancer death rate rose by two-thirds in the twenty years, 1960 – 1980, and by nearly forty per cent between 1980 and 1987 alone. The bulk of the lung cancer death rates steadily increased from 1975 – 80, and showed an overall rise of seventy per cent from 1968 to 1980, and by nearly a third between 1980 and 1988.

SITE CHANGES

Cancer of the digestive organs and peritoneum accounted for nearly half cancer deaths in 1946 and death from cancer of the uterus was nearly double that of breast cancer. But by 1986, only five per cent of cancer deaths were due to neoplasms of the digestive organs and peritoneum and just over five

per cent due to cancers of the uterus and cervix. Lung and breast cancer deaths accounted for one third of all cancer deaths, being far more important both in incidence and mortality than other cancers. The irony is that no local studies have been done on lung or breast cancer since 1970.[11]

Cancer affects men and women very differently. The lungs and bronchial passages are the main sites for fatal cancers in men, killing nearly three victims out of ten (Table 6). The breast is the principal site for women, again killing about three out of ten female cancer victims. Interestingly, a higher percentage of all female cancer deaths are now of breast cancer in the Maltese Republic than in England & Wales when, for instance, in 1977 only one fifth of all female cancer victims died of breast cancer.[12] However the average mortality rate in Malta has been lower than in England & Wales over the period analysed.

In both men and women, the second most important fatal site is the stomach, killing about one victim in ten (Table 6). Mortality rates from stomach cancer 1969 – 1981 were lower than in some European countries such as England and Wales, Italy and Sweden but there was a slow downward trend in mortality in these countries whereas in Malta there was a slow upward trend. Here, as in the case of lung cancer, the lining of the organ will have developed carcinomas. For both lung and stomach cancer, incidence tends to be higher the more exposed you are to pollutants.

A phenomenal increase in skin cancer deaths occurred in the 1960s (Table 4). Some of this increase could be due to improved diagnostics, but increased environmental and industrial exposure to carcinogens such as soot and mineral oil is definitely a contributory factor.[13] The trend in skin cancer mortality rates shows a slow increase, though it remains lower than in England & Wales. As with other cancers, there are signs of under-reporting in the 1974 – 77 period.

BREAST AND LUNG CANCER TRENDS

While the total number of deaths from malignant neoplasms has increased by one half over the period 1960 – 1980, female deaths from malignant breast cancer have risen by over one and a half times (a). Male deaths from lung cancer also doubled, from 1960 to 1980.

After taking population growth into account, we find that all cancer deaths per thousand of the population increased by forty per cent, female breast cancer per thousand of the female population increased by nearly one and a half times and male lung cancer per thousand of the male population increased by two thirds from 1960 to 1980 (b).

Figure 1 gives a graphic account of these events, showing the yearly fluctuations in mortality rates, but also highlighting the upward trend especially in female deaths from breast cancer in recent years. Comparing deaths from breast cancer per thousand of the female population in England & Wales, we find the increase over 1971 – 77 was just over four per cent[14], while in

(a) Table 2 & Table 3 in the appendix
(b) Table 3 in the appendix

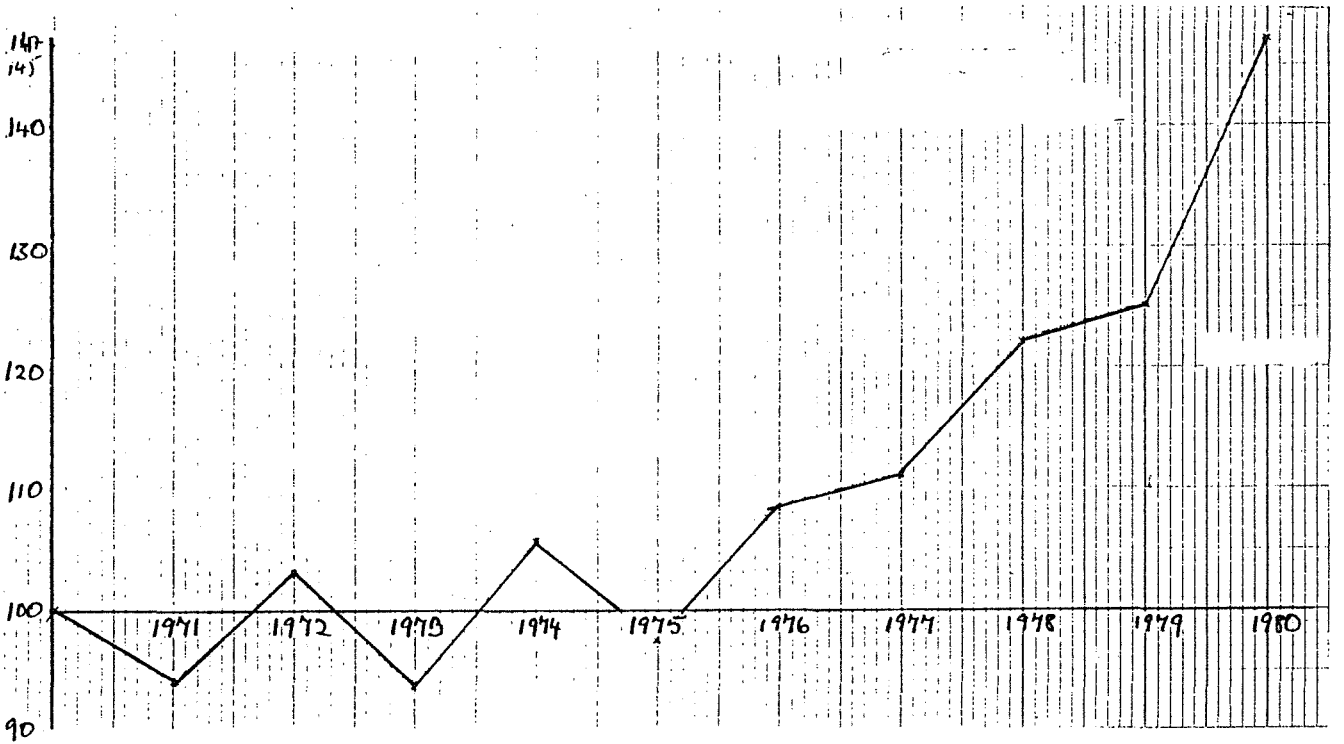
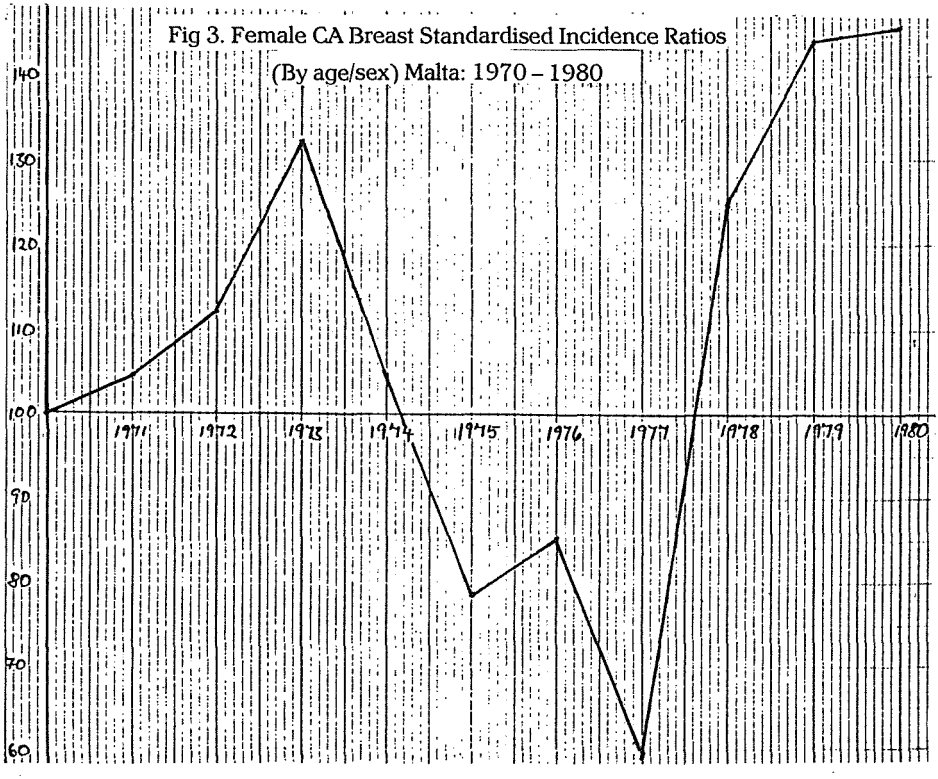


Fig. 2 Female CA Breast Standardised Mortality Ratio Malta: 1970 – 1980

Malta, over the same period, the increase was at more than double this rate, at eleven per cent over the same period.

STANDARDISED RATIOS

Standardised incidence and mortality ratios[15] were then calculated for the 1960 – 70 period. (c) Standardised mortality ratios for male lung cancer increased by 41 per cent and of female breast cancer increased by 47 per cent between 1970 and 1980. Figure 2 clearly shows the rising trend in the weighted average of the age-sex specific female breast cancer mortality rates from 1975 – 1980. The female cancer incidence rates were also standardised for changes in number of women in each group and a large fall in the standardised morbidity rate in the period 1974 – 77 is the most dramatic feature of this graph. (Figure 3) The question of whether or not this fall in reported cases was real or a consequence of doctor's non-registration (the doctors association and Labour Government clash culminated in 1977),[16] may be settled by analysing breast cancer death rates twenty to twenty-five years later. If a similar dramatic decline is evident in the years spanning 1994 – 2000, then the former explanation would be more convincing.



(c) Figures 2, 3, 4 and 5 in the appendix.

Standardised morbidity and mortality ratios were calculated for male lung cancer over the period 1970 – 80 and are shown in Figures 4 & 5. And again, large fluctuations were found in the recorded morbidity rates. Fluctuations also occurred in the standardised male lung cancer mortality ratio but remained consistently above average from 1974 to 1980. It is obvious that extrapolation of the data for the decade 1980 – 90 would be useful here. The standardised lung cancer mortality rates, shown in Figure 1, indicate a continuing rise average in the 1980s.

AGE INCIDENCE

Data on the age incidence of breast and lung cancer was collected from 1970 to 1980. The same qualifications, as earlier specified, on the soudness of data must be made. In addition, although ten year averages were calculated, one must bear in mind that the small size of the sample means that changes and differences may be the result of random error.

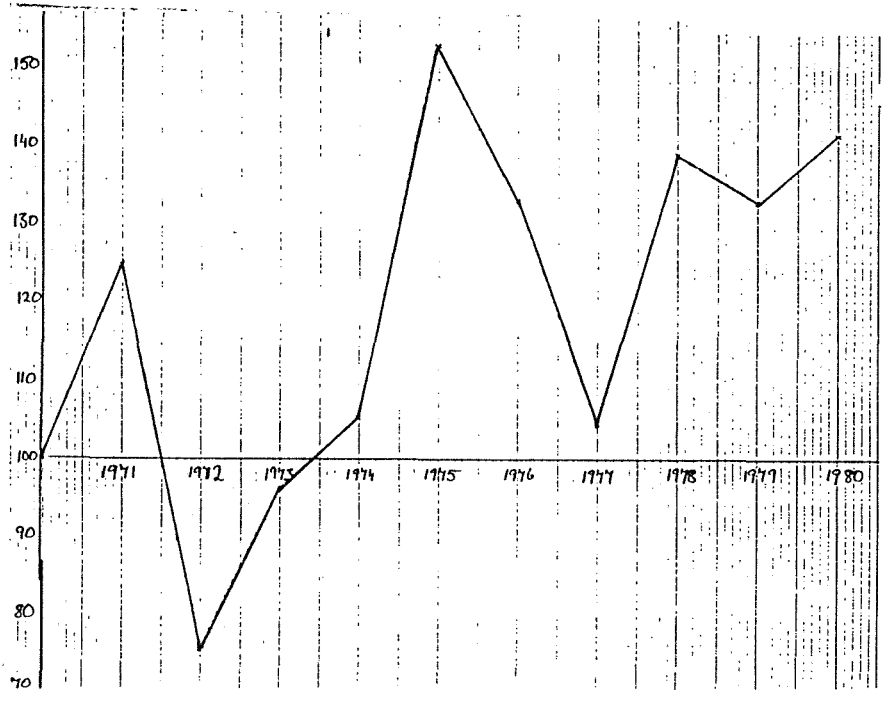


Fig 4. Male CA Lung Standardised Mortality Ratios (By Age/Sex) Malta: 1970 – 1980

BREAST CANCER

No cases of female breast cancer were diagnosed before the 20 – 24 age group in the years 1970 – 1980. The incidence rate gradually rises from this age group to a peak of 11.6 cases per thousand in the *45 – 49* year olds (Figure 6). It then drops off slightly for women aged 50 – 54 but rises more steeply than ever to a *peak* of 23.24 cases per thousand females in the *60 – 64* age group. It again drops off slightly only to rise to another *peak* of 24.56 cases per thousand females aged between *70 and 74*. The highest incidence rate occurs in women over 85 years old where on average 38.2 per thousand women were affected. The usual figure is a bimodal incidence rate, peaking at 45 – 49 years and 60 – 64 years and Malta appears to be at variance to the international average in having more than two peaks in the incidence of female breast cancer.

The mortality rate is lower than the morbidity rate for every age group, reflecting perhaps the medical successes in delaying death from breast cancer.

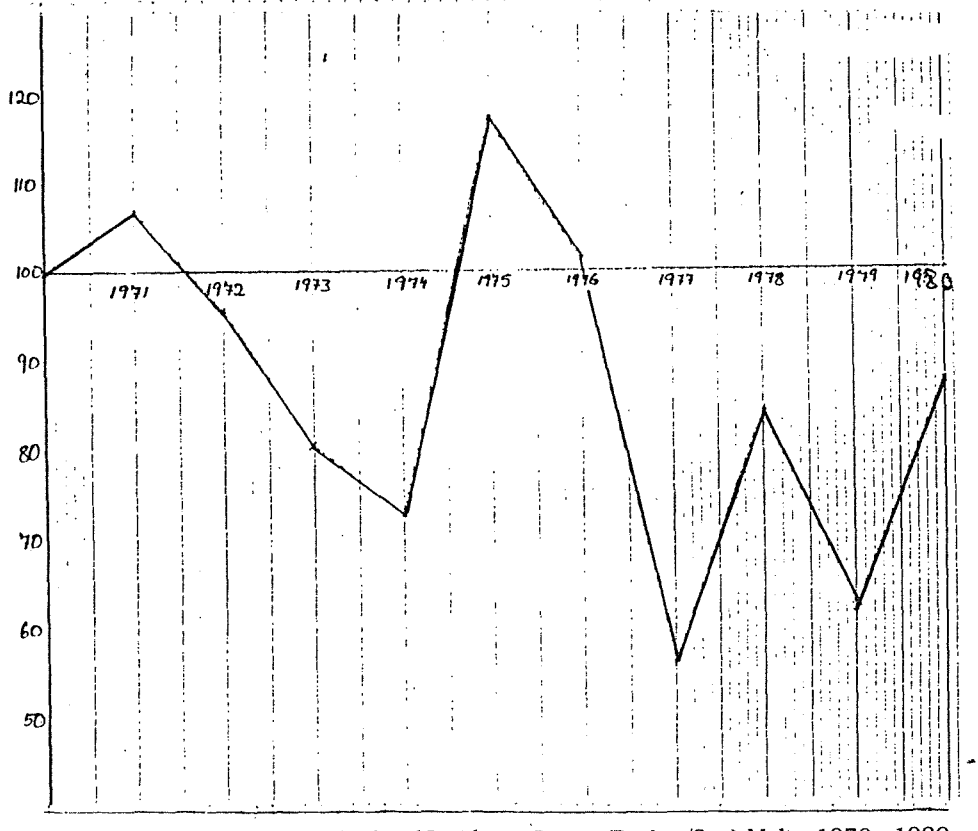


Fig. 5 Male CA Lung Standardised Incidence Ratios (By Age/Sex) Malta: 1970 – 1980

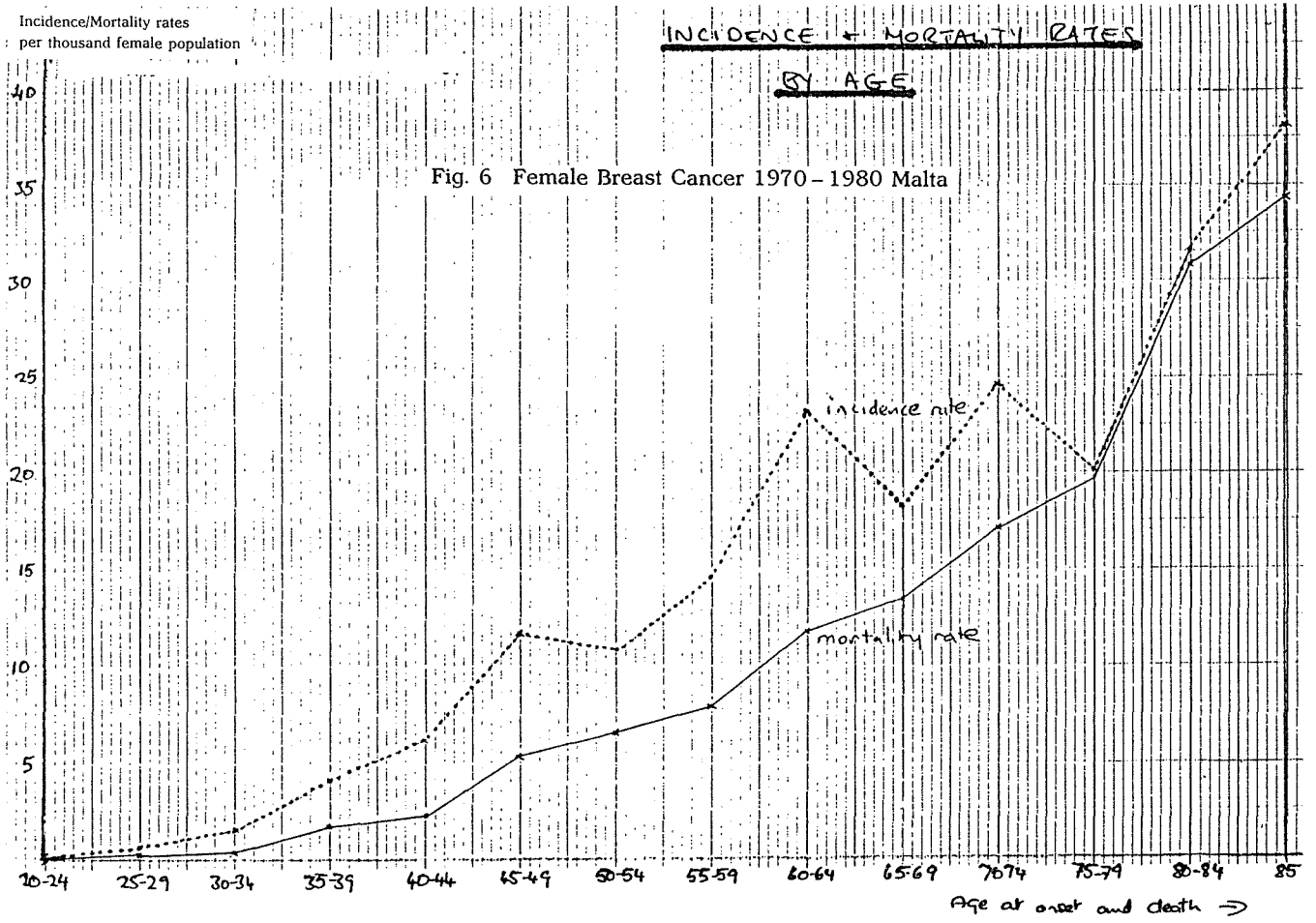


Fig. 6 Female Breast Cancer 1970 – 1980 Malta

There is not the same degree of fluctuation in mortality rate by age as in morbidity rate and no tri-modal curve is exhibited in this period – just a gradual increase from no deaths before 20 – 24 years of age to nearly 35 deaths per thousand females in the 85 plus age group (Figure 6).

On further analysis of trends in female breast cancer cases by age-group over time (Figure 7) we find the age specific incidence rate increases in all age groups, especially in the 35 – 44 years old women.

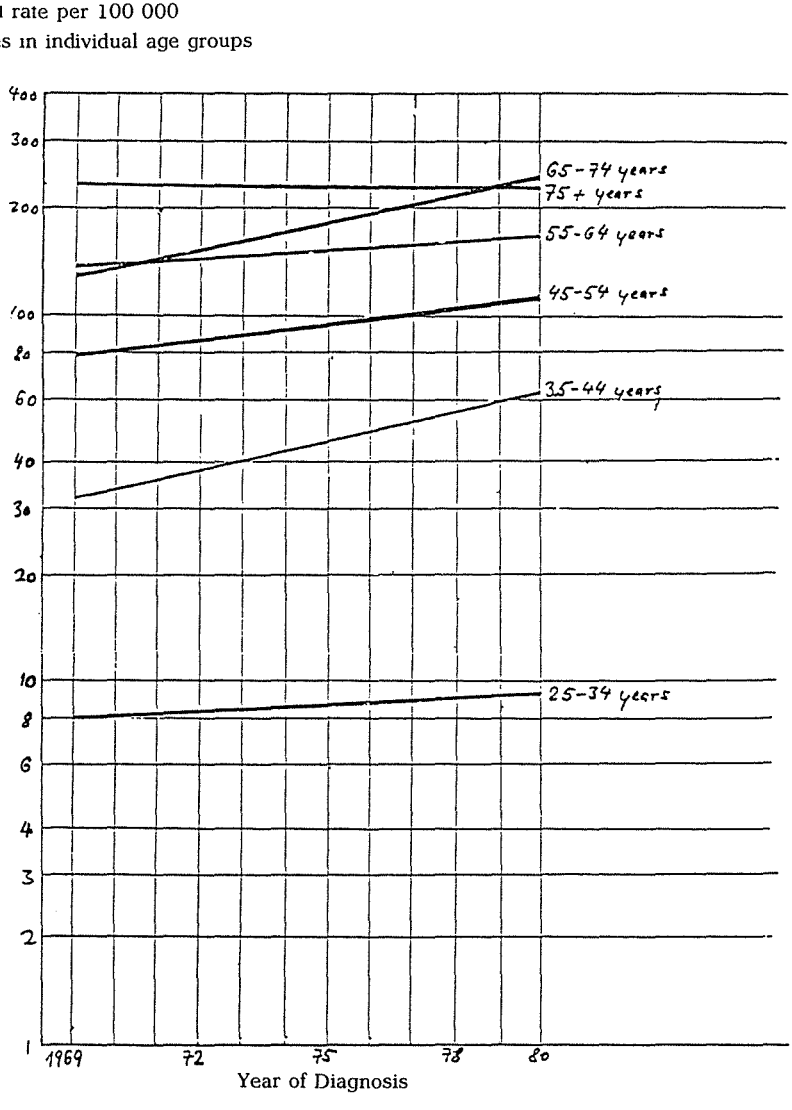


Fig 7. Trends of the incidence of Cancer of female breast. (Malta1969 – 1980)

INTERPRETATION

Ageing involves a cumulative exposure to carcinogens and cannot be seperated from environmental effects. For women it also involves particular changes in hormonal balance that are affected particularly by fertility rates, drug taking and the menopause.

The tri-modal incidence rates suggest that three distinct ancillary experiences should be taken into account in interpreting this data. The particularly high number of cases in the 70 – 74 age group indicates that these women may have been particularly vulnerable about twenty-five years earlier at ages 45 – 49 years in the 1945 – 55 period. It also suggests an association, to be discussed in a following article, with unhealthy diets of high fat and sugar intakes.

LUNG CANCER

The recorded morbidity and mortality rates of male lung cancer begin later than breast cancer although there was one case that led to the death of a boy aged between 10 and 14 years in the decade, 1970 – 80. There were none then until the 30 – 34 age group when again one person died of lung cancer. The incidence and mortality really begin to bite after men reach 35 years of age, confirming the trend seen in Table 5.

Mortality rates are always above recorded incidence rates (Figure 8). Multiple reasons for this would include: failure to bring lung cancer to the notice of doctors; failure of doctors in diagnosis; failure in curing or delaying death.

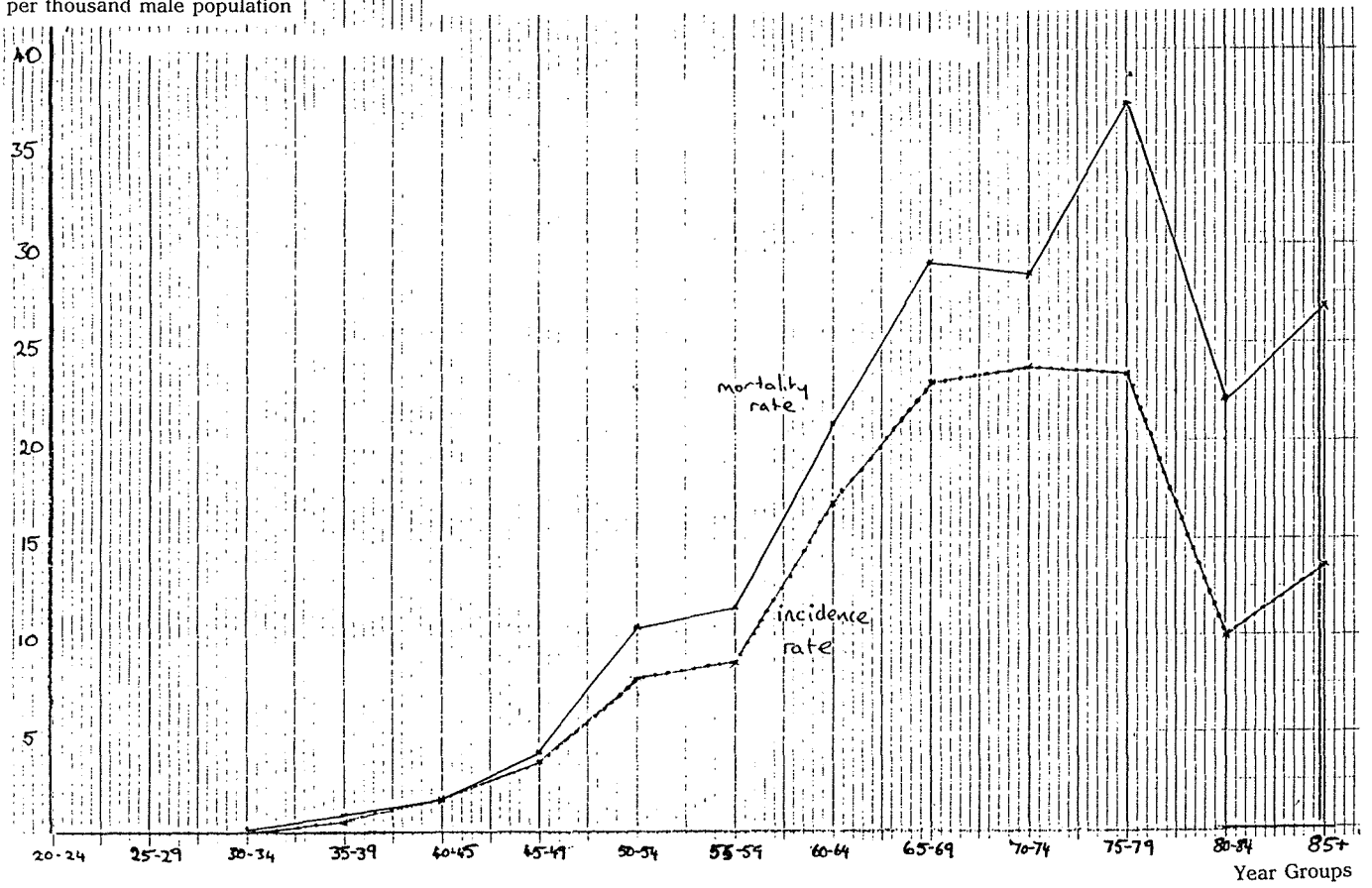
Mortality rates rose steeply from 54 years to a *peak* of 29.1 deaths per thousand males aged *64 – 69* and a further peak of 37.2 deaths per thousand males aged *75 – 79*. Death from lung cancer per thousand of the male population then declined, there is therefore a clear bi-modal curve in the male lung cancer mortality rate (Figure 8).

Likewise, morbidity rates rose steeply from the age of 54 to 69 and continued to rise to the highest morbidity rate in the 70 – 74 age group, just before the highest mortality rates. As with mortality, the morbidity rates decline after the age of 79. The interpretation of rates in the 85 plus age group has additional problems of multiple diagnoses and relative inaccuracy of population data.

Lung cancer and industrialisation have been clearly linked both through increased exposure to factors of production such as asbestos, nickel and chromium; and through factors of consumption such as tobacco. The bi-modal curve in the male lung cancer rates in each age group (Figure 8) maybe related to cohort differences in smoking or to cohort differences in exposure to carinogens. An occupational study, for instance of shipyard workers and quarry workers, is necessary to ascertain whether work conditions are significant in causing lung cancer mortality in Malta. The following study of locality and class incidence indicate that a relationship does exist, as shown in other countries (a), between work and lung cancer.

(a) This theme is treated in a forthcoming article

Fig. 8 Male Lung Cancer 1970 – 1980 Malta (Incidence and Mortality Rates by Age)



LOCALITY INCIDENCE OF LUNG & BREAST CANCER

Locality morbidity rates of breast and lung cancer were available for the period 1970 – 1980 but mortality rates were not. For the later period 1981 – 88 the opposite was held: I was informed that locality-morbidity data was totally unreliable but mortality by village of residence was collated (Table 7). A similar attempt has been made by a team in the United States to pin point the high risk communities and possible socio-economic conditions that are causing the epidemic in cancer.[17] Averaging over ten and then seven year periods reduces the errors arising from annual internal migration

To identify high risk communities, the incidence of the specific cancer per thousand of the specific sex in that locality was estimated. Before 1973, data on sex-specific population by locality is not available. Therefore, the total number of female breast and male lung cancer cases identified, 1970 – 80, in each village was divided by the average number of women and men in each village, 1973 – 1980. As with the previous figures, we are always using a denominator of the Maltese population wheras the numerator includes cases of cancers diagnosed in foreigners living in Malta. This would tend to make incidence rates slight over-estimates in some localities like Sliema, where there are a relatively large number of foreigners.

There were 868 reported cases of female breast cancer and 488 reported cases of lung cancer between 1970 – 80. The only places were the incidence of lung cancer equalled or exceeded that of breast cancer were the three dock towns of Senglea, Cospicua and Vittoriosa; the quarry area of Qrendi; also in the outer towns of Mosta, Għarghur and San Ġwann. A relatively high proportion of male employees living in Qrendi and Mqabba work in the nearby quarries, and the data contained in Tables 8 and 9 is a clear indication that the high levels of dust inhaled during this work is a health hazard. Respiratory problems are also caused by the proximity of the main rubbish dump. Contrast the high male lung cancer mortality rate in Mqabba to the low female breast cancer rate there: 7.08 compared to 0.9; and similarly the figures for Qrendi are 8.2 compared to 1.8.

Taking a closer look at the highly urbanised and working-class Inner Harbour Region, we find, according to Table 7 below, that one half of all male lung cancer cases occurred in this region while less than forty per cent of the Maltese male population was concentrated in the area. A severe drawback was that I was not able to standardise by age as annual data on population by age and locality was not availability. Access to such data is vital to future epidemiological research. The incidence of breast cancer was also high in this, the densest region. Over the 1970 – 80 period, 44 per cent of all female breast cancer patients were reported to be living in the Inner Harbour Region whilst less than 38 per cent of the total female Maltese population lived here. The high mortality and morbidity rates of breast and lung cancer recorded in Floriana may be exaggerated by patients of Sir Boffa Hospital, where there is a terminal cancer ward. However, the hazards of living in the inner harbour region cannot be thus explained. Seven out of the ten highest lung cancer

mortality rates occurred in the inner harbour region: Valletta, Sliema, Floriana, Cospicua, Marsa, Msida/Pieta/G'Mangia and Ħamrun. And high rates also occurred in adjacent outer harbour towns like Birkirkara and St Julians. In contrast none of the lowest lung cancer mortality rates occurred over the period 1981 – 88 in the Inner Harbour Region and only two in the Outer Harbour Region, at Sta Venera and San Ġwann (Table 9 & 11).

Taking the Inner and Outer Harbour(a) Regions together, we find that 68 per cent of all male lung cancers and 67 per cent of all female breast cancers were concentrated in these towns over the 1970 – 80 period. Meanwhile, less than two-thirds of the population was concentrated here. Although the ageing population of the three cities, Sliema, Floriana and Valletta may have some upward bias, the overall picture is that industrial and traffic pollution must be taken very seriously in the aetiology of cancer in the Maltese Islands.

BREAST CANCER LOCALITY INCIDENCE RATES

The incidence rate averaged nearly 6 breast cancer cases per thousand women living in the Inner Harbour Region. The highest rates occurred in Valletta, 8.8 per thousand and Sliema 8.1 per thousand (Table 8). Note too, the high mortality to incidence ratios of breast cancer in working class areas of Cospicua, Senglea and Kalkara, shown in Table 7. It was, however, the Western Region that had the highest overall average at 7.5 cases of breast cancer per thousand of the female population. This region includes Attard, Rabat, Dingli, Mdina and Balzan – five villages which feature in the top ten villages with the highest incidence rates of female breast cancer 1979 – 1980. But it was Marsascala on the South-Eastern coast that topped the league, while Gharghur in the Northern Region came third. It may be useful to look at specific conditions and population characteristics in these villages which may have nothing to do with the region in which they are geographically situated.

Comparing Tables 8 and 10, we find a wide locality deviation in breast cancer incidence rates. It may be fruitful for a future research to take two nearby villages such as Zejtun and Zabbar of similar population size and similar male lung cancer incidence rates, indicating similar class compositions, but with markedly dissimilar female breast cancer incidence rates: Zejtun 7.34 per thousand and Zabbar 4.00 per thousand (38 female cases being diagnosed in Zejtun and only 20 in Zabbar). One could look at the percentage of nuns in each village, variations in general environmental conditions (air or water pollution), and individual case histories and dietary habits of those affected. Again Gudja and Għaxaq are two nearby villages which show marked differences in incidence rates of both female breast cancer and male lung cancer; the people of Gudja being relatively fortunate on both counts. A longer period and age-specific data would vastly improve the quality of analysis.

(a) Includes: St. Julians, San Ġwann, Sta Venera, B'Kara, Qormi, Luqa, Tarxien, Fgura, Zabbar

LUNG CANCER LOCALITY INCIDENCE RATES

The incidence rates of male lung cancer had their highest regional average, as expected, in the Inner Harbour Region, where there were 4.3 recorded cases per thousand male inhabitants. Some of the highest rates occurred in towns situated right by the docks: Vittoriosa 6.0 cases per thousand male inhabitants: Senglea 5.6 cases (Table 8)

The highest village specific incidence rates occurred in Gharghur and Marsascala (Table 8), the two villages that also had peak female breast cancer incidence rates. The lowest incidence rates of male cancer occurred in many villages, such as Safi, Mgarr, Gudja, Fgura, Mellieha and Kalkara, where the lowest rates of female cancer were also found, most of these being country villages (Table 10).

Again it would be useful to proceed by examining the differences in general environmental conditions between the villages with the lowest and highest lung cancer incidence rates and then analyse individual case histories of those affected, especially occupational profiles. The occupational and environmental hazards experienced by workers and residents of the inner harbour area are clearly a major cause of the rising lung cancer mortality rate.

CLASS INCIDENCE OF SPECIFIC CANCERS

Analysis of the occupational incidence of breast, lung and cervix-uteri cancer was attempted. It is abundantly clear that class analysis of female cancer victims is impossible because the vast majority of cases and deaths of breast and cervix uteri cancer are of women placed in Category X1 'Others including those of no gainful occupations'.[18]

Lung cancer incidence is particularly high among skilled workers: over one in five lung cancer cases occurred in skilled workers over this decade. Unskilled workers and shopkeepers, shop assistants, clerical workers were runner up risk groups. But, similar to the female occupational data, a disproportionate number of victims were classified in Category X1 which includes the unemployed, housewives and people retired from many different walks of life. The need for more specific occupational data, standardised mortality rates over a 20 year period, and/or a retrospective cohort study is apparant

However, one can conclude both from locality and class data that people belonging to the working class, here defined as occupations VII to XI including skilled workers, unskilled workers, farmers, fishermen and agricultural workers, and others in the Maltese Islands are more likely to die from lung cancer than their counterparts in upper class of occupations I to VI.

SUMMARY

Health and development are interlinked. This paper is a first step in the epidemiology of lung and breast cancer in Malta over the last thirty years. It provides raw material and suggestive correlations. Cancer has become a

major cause of illness and death in every age group, but in particular the over sixties. A significant increase in lung cancer mortality and in particular breast cancer morbidity and mortality is apparent. Locational studies show a higher incidence in particular of lung cancer in the Inner Harbour Region where the docks, shipbuilding, many textile and other industries, and the coal-fired power station, are located and where the working class is concentrated. The lack of government controls on known carcinogens such as asbetos, together with clear results of occupational cancer studies done in say USA or Britain, indicate that there is an urgent need to control and eliminate local carcinogenic hazards.

Data on smoking collected for the first time in the 1985 Census, broken down by sex, age and locality and correlated to lung cancer rates, might strengthen the anti-smoking lobby and lead to to stritcher controls on cigarette smoking.[19]

The high rise in breast cancer incidence and mortality has been discussed in detail. Many factors such as changes in diet and increased hormonal medicine, changes in reproductive activity, and increasing pollution have been linked to the rise in breast cancer incidence in industrialised countries. Dietary and reproductive factors may well have had multiplicative effects. Maltese women in the 1950's went through a revolutionary change in reproductive practises.[20] In the 1960's and 1970's their environment, if not their work, became increasingly industrialised(a). Meanwhile the intake of hormones both in medicine and food increased as did consumption of sugar, meat, cholesterol and food additives.[21]

There is also recent evidence that carcinogens are more potent in certain climatic conditions such as bright sunlight and heavy rain, which characteristics are common to Malta.[22]

The role of radiation exposure in causing this rise in breast and lung cancer mortality is probably the most difficult to pin point but the most persistent. Recent studies show that radiation is more dangerous than had been thought.

Many people react to cancer with a shrug. Prevention seems absolutely impossible. There are so many carcinogens polluting the air, food and water. There are so many hazards to which a shipyard worker must expose himself to get his job done and keep the yards going. There are so many doctors prescribing hormonal tablets to women without a word of warning. There are so many people addicted to smoking and fatty diets. But consider the revolution that was needed in our grandparents' lifestyles to eliminate cholera. Who would have ever dreamt, during the last century, that s/he would see running water and drainage systems out of every home. The contradictions inherent in that transition: the long-term interests of the working class seemingly opposed to those of imperialists and local conservatives: recur today when the long-term interests of the Maltese working class in improved health conditions seem opposed to capitalist interests in minimising expenditure and maximising profits.

The challenge to prevent cancer may be greater than that to prevent cholera because we are not dealing with a clearly identifiable bacteria and immediate symptoms but several types of neoplastic growth that can be traced

to different kinds of occupational hazards and environmental factors. But if the challenge is greater, then there is no doubt that we are better equipped to meet it.

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APPENDIX

Table 1: Total Cases and Deaths from Malignant Neoplasms, Malta: 1960 – 1987

Year	Cases	Deaths	Rate per 1000 population	
			Case	Death
1960		321		0.98
1961		356		1.08
1962		333		1.01
1963		345		1.05
1964		348		1.08
1965		369		1.16
1966		372		1.17
1967		380		1.19
1968	421	361	1.32	1.13
1969	458	368	1.42	1.14
1970	534	398	1.64	1.22
1971	518	403	1.59	1.24
1972	516	362	1.62	1.13
1973	508	347	1.62	1.11
1974	392	382	1.21	1.18
1975	368	387	1.12	1.18
1976	366	407	1.11	1.24
1977	300	379	0.90	1.14
1978	462	461	0.74	1.36
1979	512	437	1.48	1.26
1980	523	488	1.44	1.34
1981		495		1.51
1982		548		1.65
1983		511		1.53
1984		528		1.56
1985		521		1.53
1986		506		1.47
1987		536		1.55

Sources: 1960 – 1980 data from the Health Department Statistician
1981 – 1987 data from Demographic Reviews of the Maltese Islands Tables 22 & Tables 25

Table 2: Total Cases and Deaths from Malignant Neoplasms by Sex Malta 1960 – 1987

Year	Cases		Deaths	
	Male	Female	Male	Female
1960			184	137
1961			175	181
1962			170	163
1963			185	160
1964			198	150
1965			212	168
1966			201	171
1967			212	168
1968	229	185	200	161
1969	232	226	185	183
1970	288	246	226	172
1971	289	229	225	178
1972	276	240	200	162
1973	226	242	191	156
1974	199	193	204	178
1975	202	166	229	158
1976	197	160	231	176
1977	154	146	209	170
1978	216	246	248	213
1979	226	279	239	191
1980	262	255	268	218
1981			287	208
1982			274	274
1983			286	225
1984			270	258
1985			293	228
1986			280	226
1987			310	226

Sources: 1960 – 1980 data from the Health Department Statistician.
1981 – 1987 data from Demographic Reviews of the Maltese Islands.

Table 3: Cases of and Deaths from Carcinoma of Breast/Lung by Sex 1960 – 1987; Rate per 1000 of the Sex Specific Population

Year	Female Breast		Male Lung		Breast Cancer Rate		Lung Cancer Rate	
	C	D	C	D	C	D	C	D
1960		27		38		0.16		0.24
1961		38		35		0.22		0.22
1962		42		45		0.24		0.29
1963		42		54		0.25		0;34
1964		38		43		0.22		0.28
1965		41		57		0.25		0.37
1966		37		54		0.22		0.36
1967		43		45		0.26		0.29
1968	49	37	40	58	0.3	0.22	0.26	0.38
1969	54	47	56	66	0.32	0.28	0.36	0.43
1970	82	48	58	56	0.48	0.28	0.37	0.36
1971	86	46	61	70	0.51	0.27	0.39	0.45
1972	91	50	54	42	0.55	0.30	0.35	0.27
1973	97	41	40	47	0.58	0.24	0.26	0.31
1974	77	47	37	52	0.45	0.28	0.24	0.34
1975	59	44	60	76	0.34	0.26	0.38	0.49
1976	64	49	52	66	0.37	0.29	0.33	0.42
1977	46	52	29	53	0.26	0.30	0.18	0.33
1978	96	57	44	71	0.54	0.32	0.27	0.44
1979	113	59	33	68	0.62	0.33	0.20	0.41
1980	116	70	46	72	0.63	0.38	0.26	0.40
1981		53		74		0.32		0.46
1982		65		71		0.39		0.44
1983		64		77		0.38		0.47
1984		65		79		0.38		0.48
1985		73		93		0.42		0.55
1986		57		97		0.33		0.57
1987		70		93		0.40		0.55
1988		89				0.50		

Note: C – cases per thousand D – deaths per thousand

Sources: Health Department Statistician and Demographic Reviews of the Maltese Islands.

Table 4: Site-specific Cancer Mortality, Malta: 1952 – 76

Period/diagnosis	Trachea, bronchus, lung	Average annual number of deaths		
		Female breast	Stomach	Skin
1952 – 56	33.0	25.8	59.4	2.6
1957 – 61	36.0	36.4	55.0	4.6
1962 – 66(a)	53.6	40	36.2	27.4
1967 – 71	65.2	44.2	44.0	47.2
1972 – 76	60.2	46.2	39.8	31.6
1977 – 81(b)	73.4	58.2	45.4	n.a.
1982 – 86	94.2	64.8	56.4	n.a.

Note (a) From 1962 – 1986, the data for male and female trachea, bronchus and lung cancer deaths and for female breast cancer deaths is taken from death certificates at the Health Information Service Unit, previously the Health Statistics Department.

(b) Note there was a change in the classification of breast and skin cancer in 1979 agglomerating 'malignant neoplasms of bone, connective tissues, skin and breast.

Sources: relevant Demographic Reviews of the Maltese Islands.

Table 5: Incidence of Deaths Attributed to Cancer per Thousand Civilian Population, Malta: 1957 – 1986

Age	1957	1967	1970	1986
15 – 44 years	0.23	0.25	0.18	0.17
45 – 64 years	2.53	2.60	2.41	2.54

Sources: Demographic Review of the Maltese Islands 1986, pp. 3&27; Milne, R.G. The Contribution of Public Expenditure to Social Development: A case study in Malta, 1945 – 1967, p. 67.

Table 6: Deaths from Cancer in Malta & Gozo by Sex and Site in 1979

Male			Female		
Type	Number	Cancer Deaths %	Type	Number	Cancer Deaths %
Lung, Bronchus, trachea	68	28.1	Breast	59	30.3
Stomach	26	10.8	Stomach	14	7.2
Prostate	18	7.4	Colon	14	7.2
Bladder	13	5.3	Ovary, etc.	13	6.7
Other	115	47	Other	94	48.5
Total	242	100	Total	195	100

Sources: Report on the Health Conditions of the Maltese Islands 1980

Table 7: Cancer Incidence, 1970 – 1980; Cancer Mortality, 1981 – 1988

Cancer Incidence 1970 – 80		Cancer Mortality 1981 – 88		
Inner Harbour Region	Female Breast	Male Lung	Female Breast	Male Lung
Valletta	65	31	24	30
Floriana	13	12	11	12
Sliema	86	34	44	43
Gzira	25	12	16	15
Msida	33	31	26	23
Hamrun	53	24	26	30
Marsa	24	19	12	20
Paola	44	24	23	19
Cospicua	13	18	12	21
Senglea	9	13	12	8
Vittoriosa	12	12	5	7
Kalkara	3	2	5	4
Total	380	232	216	232
Per cent of specific Cancer	44	37.5	41	38

Table 8: The Ten Highest Cancer Morbidity Rates by Locality, Malta: 1970 – 80

Ca Breast per 1000 females		Ca Lung per 1000 males	
Marsascala	11.1	Għargħur	9.1
Attard	10.4	Marsascala	8.85
Għargħur	9.3	Qrendi	6.2
Dingli	9.0	Vittoriosa	6.0
Valletta	8.8	Attard	5.7
Sliema	8.1	Senglea	5.6
Rabat	7.7	Għaxaq	5.5
Balzan	7.7	Msida	5.4
Mdina	7.5	Paula	5.3
Ħamrun	7.5	Floriana	5.1

Table 9: The Ten Highest Cancer Mortality Rates By Locality, 1981 – 88

Ca Breast per 1000 females		Ca Lung per 1000 males	
Floriana	6.6	Qrendi	8.23
Sliema	6.1	Floriana	7.22
Senglea	5.8	Mqabba	7.08
Mġarr	5.6	Valletta	5.8
Valletta	4.9	Sliema	6.59
Msida etc.	4.9	Cospicua	5.5
Kalkara	4.85	Marsa	5.05
Dingli	4.0	Mellieħa	4.56
Paola	3.8	Ħamrun	4.54
Ħamrun	3.7	Msida etc,	4.51

Table 10: The Ten Lowest Morbidity Rates 1970 – 1980

Ca Breast per 1000 females		Ca Lung per 1000 males	
Safi	0	Safi	0
Mgarr	0.98	Gudja	0
Cospicua	2.8	Mgarr	0
San Gwann	2.9	Fgura	0.5
Kalkara	3.1	Mellieħa	1.05
Zurrieq	3.2	M'Xlokk	1.3
Kirkop	3.2	Balzan	1.9
Fgura	3.5	Sta Venera	2.0
Gudja	3.55	Mqabba	2.04
Mellieħa	3.8	Zurrieq	2.2
Senglea	3.8	Kalkara	2.2

Table 11: The Ten Lowest Mortality Rates 1981 – 1988

Ca Breast per 1000 females		Ca Breast per 1000 males	
Kirkop	0	Safi	0
Mdina	0	Mdina	0
St Paul's Bay	0.7	Siggiewi	1.04
Fgura	0.74	Sta Venera	1.07
M'Xlokk	0.8	San Gwann	1.22
Mqabba	0.9	M'Xlokk	1.7
Qormi	1.1	Għargħur	1.73
Zabbar	1.26	Mgarr	1.8
Luqa	1.43	Attard	1.83
B'Buga	1.43	Għaxaq	2.22

Sources: Malta Department of Health Statisticians

Table 12: Occupational Analysis lung cancer in 1970 – 80 Period

	Cases	Deaths
XI. Others, including those of no gainful occn.	127	526
VII. Skilled workers	118	53
IX. Unskilled workers	69	34
III. Shopkeepers, shop assistants, clerical workers	67	22
II. Intermediate Adm. Professional & Managerial	56	35
X. Farmers, fishermen & agricultural workers	48	12
V. Personal service workers (manual	11	9
I. Higher Adm., Professional & Managerial	9	15
IV. Foreman, supervisors & Overlookers	6	4
Total	557	729

Source: Health Statistician, Department of Health, Malta.

Notes

1. *Annual Report on the working of the Public Health Department for the financial year 1908 – 9*, Government Printing Office (1909) Appendix C. p J13.; Report on the Health Conditions of the Maltese Islands and work of the Maltese Health Department including the Emergency Medical Services for the year 1946. Government Printing Office (1948) Appendix HA p xxxviii; Demographic Review of the Maltese Islands 1986. Central Office of Statistics Malta, (1987), Table 22, p.24.
2. The death rate from diseases of the circulatory system are now in decline. The death rate from diseases of the respiratory system is the only other one that shows a rise between 1968 – 1986. See the relevant Demographic Reviews of the Maltese Islands.
   For comparison of similar trends in the USA see Epstein *S. The Politics of Cancer* Anchor Books, (1979), pp.11 – 13.
3. Epstein S., (1979), *The Politics of Cancer* Doubleday, Anchor Press, New York. For similar observations with reference to USA, p.12.
   And more recently, Epstein S. *Losing the War against Cancer: Who's to Blame and What to Do about It* I.J.H.S. v.20 no.1. (1990) pp.53 – 72.
4. Milne Robert Gordon *The contribution of public expenditure to social development: a case study of Malta 1945 – 1967*, unpublished thesis for M. Phil in Economics, University of London (1972). Shows how cancer has increased at all ages.
5. Demographic Review of the Maltese Islands 1987 Table 28/29.
6. *Census '85* Central Office of Statistics, Malta, (1986), p.45 Relevant Demographic Reviews of the Maltese Islands.
7. Demographic Review of the Maltese Islands, 1968, p.xxviii
8. Report of the Health Conditions of the Maltese Islands, 1929
9. Milne R.G. *op cit*, p. 73.
10. CA – A Cancer Journal for Clinicians vol. 39 no. 1 Jan./Feb. (1989) pp. 16, 17.

11. On relatively scarce cancers see for instance:- Ali Safraz & Ronie Borg *Malignant Lymphomas* Mediscope no. 6 (1984) pp18 – 22; Bugeja Mark, *Malignant melanoma of the gastro-intenstinal tract.* Mediscope no. 11 (Nov 1987) pp8 – 10. Sultana H.M. *Incidence & treatment of Cancer of the Lip in Malta* SLHG Vol 5 no 1 (June 1970) pp49 – 54.
On breast and lung cancer, much is lacking in the following two studies:- Pisani S., Sammut V., Galea R., *Cancer of the Breast – a local study* Chestpiece March 1968. In this, 107 patients' histories were studied from records at the Surgical Outpatients' department and Radiotherapy Dept 1963 – 1968. A unimodal age incidence was found with maximum incidence 'in the age around the menopause' – the 6th decade.
Lanfranco A. *Smoking and Disease* St Lukes Hospital Gazette Vol 5 no 2 Dec 1970 pp 181 – 186. He compares the number of men reported with lung cancer in 1969 and 1952 (when all forms of cancer first became notifiable). He assumes that the male smoking rate has increased, without evidence. He points to benzopyrene as also being a cancer initiator.
12. *Mortality Statistics* Office of Population Census Survey. HMSO. Britain (1978)
13. BSSRS *Oil: a workers' guide to health hazards and how to fight them.* British Society for Social Responsibility in Science London (1975).
Le Serve, Vase, Wigley, Bennet *Chemicals, Work and Cancer* Thomas Nelson & Sons Ltd, Surrey, Britain. (1980)
Of interest for future research is the association between rising traffic exhaust fumes their reaction in sunlight (producing for instance ozone) and diseases of the respiratory system such as lung cancer.
14. Doyal L. & Epstein *S. Cancer in Britain*, Pluto Press. London (1983) pp8 – 13.
15. The Standardised Mortality Ratio (SMR) is the percentage ratio of the number of deaths observed in a specific group studied to the number that would be expected from the age-specific death rates for the total population of the Maltese Islands. For further reference see Benjamin B & Pollard J.H. *The Analysis of Mortality and Other Actuarial Statistics* Heinemann: London. (1980) pp10 – 13.
16. For details of non-cooperation between doctors in the Medical Association of Malta and the Labour Government see: Ministry of Health & Environment: *Memorandum on the dispute with the Medical Association of Malta* DOI August (1977); and *Addenda* December (1977) and *Volume 3* December (1978).
17. Mason et al *Atlas of Cancer Mortality for US Counties, 1950 – 1969* DHEW Publication no NIH USA (1970) pp75 – 78.
Gardner M.J. Winter P.D. et al *Variations in Cancer Mortality among Local Authority Areas in England and Wales, Relations with environmental factors and searches for causes.* British Medical Journal Vol 284 13 March (1982) pp784 – 87.
18. 'Others including those of no gainful occupations' includes housewives, houseworkers, students, those seeking work and retired persons. The latter raises the older age structure of this group and bias the cancer data.
19. Lockhart D.G. *Socio-Economic Aspects of Cigarette Smoking in Malta and Gozo* Maltese Medical Journal 45 Volume 1, Issue III, (1989) A breakdown by locality, sex, age and employment is given. One of his conclusions is: "Among the most striking features are the high levels of addiction in the working class population in inner-urban areas."
20. The following paper will deal with these factors. Of interest is: Korenman *S. Oestrogen Window Hypothesis of the aetiology of breast cancer* The Lancet. 29 March (1980)

21 Fenech F. et al *Changes in the Epidemiological Pattern of Disease in the Maltese Islands* Journal of Faculty of Arts V1, 4 (1977)
Chronic Diseases and Obesity The Lancet 26 – 8 – 89.

22. These findings follow research in the aftermath of the Chernobyl Disaster, The Lancet 26 March 1988 and the Lancet 17 May 1989 pp.1362 – 3.