EASTERN HEALTH BOARD

EPIDEMIOLOGICAL INFORMATION SYSTEM

REPORT ON

MORTALITY PATTERNS IN DUBLIN 1986-87

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PREFACE

This is the first of what is intended to be a series of reports based on analysis of health data in the Eastern Health Board area which will be produced from the Epidemiological Information System. It is hoped that this type of information will contribute to the planning and delivery of a better health service for the people who live in the region.

Contents

SUMMARY

Little information on the health of populations living in small geographic areas in Ireland is available. It is, therefore, difficult to clearly identify communities whose health is significantly below average.

The aim of this study was to identify areas within Dublin having above average death rates by application of the techniques of small area analysis.

A number of electoral wards/district electoral divisions with significantly elevated mortality rates from all cuases and from specific disease groups were identified. In general, these were in inner city areas and new suburbs to the north and west of the city. A considerable proportion of the excess mortality can be attributed to conditions amenable to preventive measures.

Before specific intervention is attempted local investigation by Directors of Community Care/Medical Officers of Health will be necessary. If intervention is attempted it should be carefully planned and should be implemented on a pilot basis initially.

INTRODUCTION

'By the year 2,000, the actual difference in health status between countries and between groups within countries should be reduced by at least 25% by improving the level of health of disadvantaged nations and groups.'

By making this the first of its 38 targets for *Health for All by the Year 2,000* for the European Region, the World Health Organisation (WHO) has made equity in health one of the major outcome factors by which the success of individual countries will be judged. Any country which subscribes to the 'Health for All' goal must face the issue of equity.

Measuring health in a scientific way is not easy. Measuring equity in health, or lack of it, between groups within a country is more diffidult. However, unless we can measure the extent to which there is lack of equity in health in Ireland we have little chance of taking the specific actions needed to achieve WHO's first target.

Analysis of health data in relation to social class is one way of looking at the question of equity. However, this requires accurate data on the occupation of each individual. Such data are not easily obtained. It is much easier to obtain addresses of individuals than details of occupation. We feel that the analysis of health data on a geographical basis is more practical than analysis in relation to social class, and that this approach has more potential in terms of targetting specific intervention initiatives.

Mortality statistics are the most basic indicators of ill-health. If we compare death rates which are standardised to take account of age we find that there is some difference between different counties in Ireland. For example, the age standardised death rate from all causes for Limerick County Borough was the highest in Ireland in 1985 at 11.5 per 1,000 population compared with a rate of 8.4 in Waterford County Borough, which had the lowest rate. The rate for the whole country was 9.4 (1).

This difference in mortality, although not insignificant, does not involve orders of magnitude. This is partly accounted for by the fact that county populations may not always be homogenous but instead may consist of a mixture of groups such that high rates in some communities tend to be balanced low rates in others.

Thus we find that health statistics which are geographically coded (geocoded) down to county level only tend to be of limited value in identifying lack of equity in health.

Since 1986, the Eastern Health Board (EHB) has been developing an Epidemiological Information System (EIS) - see Fig 1. The overall aim of the EIS is to bring together as much computerised epidemiological data as possible within a single system operated by the health board so that it can be analysed and made available in the most useful form for those engaged in planning and delivering health care.

One idea which is of special interest to us is the concept of small area analysis of epidemiological data. This approach is being used increasingly in other countries as a means of measuring spatial differences in health state or use of health services. In essence small area analysis involves the addition of a geocode for a small area of known population to individual health records followed by calculation of various incidence and prevalence rates for each small area. In general populations in small areas are more homogenous than those in larger areas and small area analysis lends itself to dealing with the problem of identifying differences in health between population subgroups.

We, therefore, decided to use the EIS to do a small area analysis of mortality in the Dublin area. This analysis was based on electoral wards and district electoral divisions (DEDs). These are small geographical units on which the census of population is based.

The object of the project was to develop a system which would identify DEDs with mortality rates which were significantly above average for Dublin (mortality 'black spots'). The system should be sufficiently flexible to allow analysis of any single disease or group of diseases by DED. In addition it should lend itself to eventual electronic mapping of black spots so that the information could be presented in as useful a format as possible.

The aim of this report is to present in map format the results of this analysis. No systematic attempt is made to explain individual findings at this stage. We feel that this would best be done by co-operation between EIS staff and individual Directors of Community Care/Medical Officers of Health.

REVIEW OF PREVIOUS WORK

The practical value of mapping human health problems is not new. One of the most famous examples is John Snow's map of deaths from cholera in London during the 1848 outbreak. This map suggested the link between water supply and cholera, and it enabled Snow to stop the outbreak by removing the handle of the Broad Street pump (2).

Medical geography

The American geographer Dr Gerald F Pyle reviewed the concept of 'medical geography' in 1976 (3). The term has its origin in the early 1950s. It occupies a borderline position between geography epidemiology and medicine and involves the spatial study of human health problems. It includes examination of the effect of natural and artificial environmental factors on health. It also includes study of the impact on health of social and behavioural factors in so far as these cluster on a geographical basis.

Medical geography has an economic dimension in that demand for and uptake of health services may vary in different locations. It is also of relevance to urban planning as this can have important effects on health.

From the point of view of the epidemiologist, the geographical study of disease is of interest for two main reasons. Firstly, it may suggest factors which cause disease. Secondly, it can assist in the identification of problem areas. It is this latter aspect which is of most interest in the present study because of its implications for health service delivery.

As regards analysis, identification of problem areas is relatively easy as it only requires comparison between different geographical units for example by mortality rate. Studies of cause are more difficult because they require correlation analysis.

Small area analysis

As noted in the introduction, small area analysis is being used increasingly in health service research. The greater homogeneity of populations in small areas makes it easier to establish links between social and economic variables and health data.

Small area analysis was reviewed in 1981 by Dr Vera Carstairs of the Scottish Health Service (4,5) and indeed some of the best work of this type has been done in Scotland.

In general, as the areas examined get smaller, the relationship between place and disease relates more closely to clustering of the personal characteristics (demographic, social, lifestyle) of the inhabitants. Environmental factors also become more constant as an area gets smaller.

A major benefit of small area analysis is that the range of values of particular health indicators such as mortality rate becomes wider the smaller the areas studied. These indicators thus become more useful as a basis for health service planning than if they are used for comparing large areas such as counties. A second advantage of the small area approach is that it is easy to aggregate data from a number of small areas to produce information for a variety of larger catchment areas.

This raises two questions: First, what is a rate?

The estimation of most health indicators requires two pieces of information. Health indicators

are based on rates and a rate is calculated by dividing a numerator figure (eg number of deaths in an area in one year) by a denominator which consists of the population of that area in the same year. The latter is obtained from the census of population. A rate may, therefore, be expressed as follows:

$$\frac{\text{Number of events in an area (eg deaths)}}{\text{Population of that area}} \text{ in a specific time period}$$

The second question is: What is a small area?

A large area has been defined by Dr Carstairs as one where both the numerator and the denominator data are readily available - for example county Dublin. A small area on the other hand is characterised by the fact that data for either the numerator or denominator or both are not readily available. An example of this is the DEDs in Dublin. Although census data for each DED are readily available, data on mortality by DED are not.

Problems of small area analysis

(i) *Numerator problems:* Major difficulties may be encountered when trying to allocate events such as deaths to small areas such as DEDs. In countries like Scotland the widespread use of postcodes for data such as mortality and census makes the task relatively straightforward. In Ireland, small area postcodes do not yet exist, and the task is much more difficult. Manual reading of addresses and consultation of DED street lists is generally required in order to allocate deaths to DEDs.

(ii) *Denominator problems:* In Ireland, population data by DED are available for census years only. No data are available for inter-censal years and migration can have a major impact during this time, especially in areas where a lot of building is going on.

Analysis of birth data escapes this problem because the denominator for rates like the infant mortality rate is the number of births in an area in the appropriate year, rather than the population in that year.

(iii) *Standardisation:* In order to take account of the varying age structure of different DEDs, rates such as mortality rates must be 'age-standardised' to make them comparable. This is a necessary and useful procedure, but it may be invalidated for example by the presence of a long stay institution for elderly people in a particular DED.

(iv) *Small numbers:* Small populations naturally give rise to small numbers of events, especially in the case of rare conditions such as leukaemia. Rates in different areas can vary quite drastically, although lacking statistical significance. This problem may be overcome to some extent by aggregation of data for a number of years or a number of areas.

(v) *Environmental studies:* Most data on the physical environment are not coded on the basis of administrative area such as DED, and thus attempts to relate them to health data is difficult and may require arbitrary judgements.

(vi) *The ecological fallacy:* Correlations between mortality rates in a set of DEDs and other factors for example those relating to poverty require careful interpretation. For example, a high rate of suicide in an area with high unemployment does not necessarily mean that unemployment contributes to suicide. It could be that the people committing suicide are those who are employed. It would be necessary to know the employment status of each person committing suicide in order to confirm this association.

Small area mortality studies

Mortality differences between places may be due to environmental factors for example water hardness. Secondly they may reflect genetic differences between populations. Thirdly they may reflect lifestyle factors such as smoking. Fourthly they may relate to differences in survival due to variation in health care availability and utilisation. Finally selective migration may also affect

the geographical distribution of mortality.

A number of small area analyses of mortality have been carried out, particularly in large cities in the UK.

In 1988 Dr Peter Townsend reported on inner city deprivation and premature death in Greater Manchester (6). He ranked the 216 wards in Manchester on the basis of a deprivation score derived from census data, on standardized mortality ratio (SMR) and on morbidity and low birthweight rates. One of his findings was that there were 1445 excess deaths between 1981 and 1983 in the 25 most deprived wards in the region. He argued for a general increase of resources into these areas. However, he did not analyse mortality by specific cause, and thus did not indicate what proportion of the excess deaths might be attributed to 'preventable' conditions.

In 1987 Dr RK Griffiths reported on the health of Central Birmingham (7). He looked at a wide range of health and socioeconomic indicators by electoral ward.

Included in the study was an analysis of over 2000 deaths for the year 1986. He calculated SMRs for each ward for all causes of death. He noted that while mortality in men in Central Birmingham as a whole was 13% above average, in one particular ward (Nechells) it was 50% above.

Griffith's analysis is more detailed in some respects than that of Townsend in that he analysed mortality by specific cause. He noted a considerable variation in SMR between wards for conditions such as lung cancer, chronic lung disease and coronary heart disease. In general, mortality rates were highest in areas of greatest material deprivation. However, the number deaths per ward from specific conditions was quite small because of the short timespan covered, and no information on the statistical significance of the findings was included.

Impressive small area analysis work has been published by Dr John Womersley of the Greater Glasgow Health Board (8). He used postcode sectors (average population 7500) as an area base for analysing a variety of demographic, mortality, morbidity and service utilisation data for the Greater Glasgow Health Board area. He calculated SMRs for males and females aged 0-64 and 65+ by postcode sector for specific causes of death.

With Douglas McCauley, Dr Womersley has developed a method of presentation of these data in a visually useful way. By using a series of horizontal boxes, they can relate the SMR for each area to that for the rest of Glasgow. They found that Bridgeton, one of the oldest parts of Glasgow, had some of the highest indices for both deprivation and mortality. For example, males aged 0-64 had an SMR of 287 for lung cancer. Although the actual number of observations and significance levels are not included, the findings are likely to be more robust than those in the Birmingham study in that data for 3 years (1980-82) were used.

Womersley discusses the issue of targetting resources into problem areas at some length. His approach to the issues seems well thought out and he makes a number of useful points.

Firstly, the use of socioeconomic indicators of deprivation alone, while possibly indicating housing or educational priorities, gives no indication of priorities in health.

Secondly, although general measures of mortality and morbidity may be highly correlated with deprivation in certain areas, the relative importance of specific health problems may vary from place to place. He suggests that the specific health problems of individual areas should be identified and then tackled collectively. This implies analysis of mortality and other health data by specific disease group.

Thirdly, he argues that increased allocation of resources to large health regions on the basis of high mortality rates is unlikely to produce maximum benefit unless each region in turn identifies small zones within its catchment area where ill-health is most concentrated, and focusses its efforts on these. In other words it should be easier to improve the health of groups whose health is poor than those whose health is already good.

Fourthly, Womersley points out that health services on their own are not in a position to ameliorate the fundamental causes of deprivation. Therefore integrated action by local government, health and other agencies should be encouraged, since improvements in employment, housing

and environment are likely to significantly benefit health.

Lastly, he makes the point that the redistribution of health service resources in favour of a particular area without reference to specific health objectives is unlikely to be very productive.

Small area analysis in Ireland

In 1985, Dr Leslie Daly and Dr Bernadette Herity of University College Dublin (9) carried out a study of the incidence and mortality from childhood leukaemia in Ireland. The object of the study was to look for evidence of increased leukaemia risk along the East and South coasts. The incidence of acute lymphatic leukaemia (ALL) in children was studied for the years 1974-83 and the mortality from ALL for the years 1971-82.

The area base for this study included DEDs in some parts of the country and the somewhat larger Urban and Rural Districts in other areas. Great difficulty was experienced in obtaining the required statistical data due to the absence of a cancer registry.

Daly and Herity calculated crude average annual incidence and mortality rates from ALL. For comparative purposes they carried out direct age/sex standardisation and used the Comparative Mortality Figure (CMF) to compare mortality rates between areas. This is very similar to the SMR.

Daly and Herity's statistical analysis was more sophisticated than that of the preceding studies. He calculated confidence intervals and statistical significance for mortality rates of individual areas in order to take into account chance fluctuations in rates between areas. The rationale for doing this relates to the fact that for a rare disease one case may give rise to a high rate in an area with a small population, and this high rate may be much less important than a lower rate in a larger population.

Daly and Herity found that the distribution of high mortality and incidence rates for ALL was quite random over the country as a whole. There was a small excess of deaths in a 3 mile wide coastal strip on the south and east coasts for the period 1971-76 but not for 1977-82.

METHODOLOGY

Area base for small area analysis

As noted in the introduction the aim of this project was to develop a system for carrying out small area analysis of mortality in Dublin.

The first step was to decide on a suitable small geographical unit on which to base small area analysis. Having discussed the problem with people in both Ireland and Scotland who had experience of this type of work, we realised that the only real option was the DED.

The reason for choosing DEDs as the area base for the study was that details of the population structure of each are available from the census. Secondly, with an average population of around 3000 in the case of Dublin City and County, the size of a DED is ideal for small area analysis. At the time of the 1986 census there were 322 DEDs in Dublin City and County (referred to as Dublin for the rest of the report).

Standardised mortality ratio

We decided to use the SMR as the mortality indicator for this study. The advantage of the SMR is that it provides a single number which reflects mortality in an area, and takes into account the unique age/sex structure of that area. In other words, it 'allows for' the fact that one DED might contain a lot of elderly people and therefore might be expected to have a greater number of deaths than one with a mainly young population.

The SMR is in fact a percentage. It refers to the number of deaths in a given population expressed as a percentage of the number that would have occurred, if the population under study had experienced the same sex- and age- specific mortality rates as some larger 'standard' population.

The first step in calculating the SMR involved working out the death rates in specific age groups for males and females for the standard population. We decided to use the population of Dublin in 1986 as our standard so that we could then see whether the SMR for a particular DED was above or below average for Dublin as a whole. Because it was used as the standard, the SMR for Dublin in 1986 was 100.

The next step involved applying the age/sex specific rates for males and females in the standard population to the population structure of each DED in order to work out how many deaths might be expected if the average rates for Dublin applied to that DED. This provided what is called the 'expected' number of deaths.

Next we calculated the number of deaths which actually occurred in each DED during the period in question - the 'observed deaths'. Finally we devided the observed number by the expected number and multiplied by 100. If there were more observed deaths than expected in a particular DED, the SMR was above 100 and, therefore, above the average for Dublin during the same period. If there were less observed deaths than expected the SMR was less than 100 and therefore the below average for Dublin.

$$\text{SMR} = \frac{\text{Number of deaths observed}}{\text{Number of deaths expected}} \times 100$$

Source of mortality data

The numerator for calculating rates is the number of deaths in a given area over a specified period of time. Anonymised data on all deaths registered in 1986 and 1987 relating to residents of Dublin were obtained on magnetic tape from the Central Statistics Office (CSO). Year of registration was used instead of year of occurrence because the year of occurrence data file takes longer to prepare due to late registration. However, the difference between the two sets of data is normally insignificant.

Census of population

We obtained from the Census of Population Division of the CSO population details for all 322 DEDs in the Dublin area from the 1986 census. These data are known as Small Area Population Statistics (SAPS) and were obtained on magnetic tape. This provides the denominator for calculating death rates.

DED coding of mortality data

In order to work out SMRs for individual DEDs it was necessary to add a code for DED to each death record. This is by far the greatest problem for any small area analysis.

First we had to develop a 'Street Index' for Dublin. This is a list in alphabetical order of all streets in Dublin each one of which was associated with a code number relating to the DED in which the street is situated. This was a major exercise in itself, but the Index will have a far wider application than the present study. There are about 12,000 entries in the Index.

The coding of individual deaths to DED was a manual exercise and was carried out by CSO staff. They coded births and deaths registered in 1987 to DED for urban areas in Ireland, but because of resource constraints they had to discontinue this work. The EHB provided the resources for coding of 1986 Dublin births and deaths to DED and the CSO were provided with a version of the EIS Dublin Street Index for this purpose.

Because manual coding of addresses to DED is a very labour intensive process the EIS has developed an automated procedure for assignment of DED codes to computerised addresses. This system can successfully code approximately 80% of Dublin addresses to DED with a high degree of accuracy. The system should make further work of this nature much less expensive.

Data analysis

Because of the large volumes of data and the relative complexity of the analyses involved in EIS work, we realised early on that a powerful analytical tool was required. Having reviewed a number of products we selected the SAS System as being most suitable.

SAS has a great advantage over other products in that it combines data base and statistical functions with facilities for graphics and mapping. In addition it has a powerful programming language necessary for complex data manipulations.

We operate SAS on one of the EHBs largest computers - a Digital VAX 8530.

Statistical analysis

Because the number of deaths in any one DED over a period of 2 years is relatively small, (particularly in the case of specific diseases), it was necessary to provide some indication of how much significance could be attributed to the finding of a high SMR in a particular DED.

Having discussed the problem with a medical statistician we decided to use exact confidence intervals (CI) as measures of significance.

In addition to producing an SMR for each DED we also calculated the 95% Confidence Interval

(95% CI) for the SMR. This consists of two figures - one below the SMR of the DED and one above it. The 95% CI consists therefore of a range of values. If this range excludes the SMR for Dublin as a whole, then the SMR of the DED in question is significantly different from the figure for Dublin.

For example, suppose the SMR for Dublin in relation to a particular disease is 100. If the SMR for DED X is 200 with a 95% CI of 120-350 (the lower limit of which is above 100), then we can infer that the mortality in DED X is significantly above the Dublin average. We can be 95% sure that the true SMR for DED X is is no less than 120 and no higher than 350.

The advantage of using a the CI in this situation is that it helps to distinguish DEDs where a high SMR may be due to random variation as a result of small numbers of events from DEDs where the mortality pattern differs in some systematic way from the average for Dublin.

(The algorithm for calculating the 95% CI is based on the Poisson distribution and uses some of the inbuilt mathematical functions of the SAS® System).

SAS is a registered trademark of SAS Institute Inc., Cary, NC, USA

RESULTS

Population of Dublin

The population of Dublin at the time of the 1986 census was 1,021,449. These were devided among 322 DEDs. DED populations ranged from 190 in the case of Airport DED to 9,919 in the case of Blanchardstown-Blakestown. The (median) average population of a DED was 2,987.

Mortality in Dublin in 1986 and 1987

A total of 15,474 deaths relating to Dublin residents were registered in the years 1986 and 1987. As 7,946 of these were registered in 1986, the crude mortality rate for that year was 7.8 deaths per 1000 population. Approximately 6% of deaths registered in each year had occurred in the previous year.

The number of deaths per DED in 1986 and 1987 combined ranged from 1 to 153. The (median) average number of deaths per DED during the 2 year period was 43.

Small area analysis of mortality

What follows constitutes the main body of this report. In addition to deaths from all causes, a number of disease categories have been selected for small area analysis. In general, we have attempted to limit the analysis to disease groups where some preventive action may be possible. However, the SAS program for calculating the SMR for each DED has been designed so that any disease or group of diseases may be selected on the basis of their International Classification of Diseases (ICD) codes and a small area analysis can be carried out in a matter of minutes.

Each disease group is presented in the following way. First there is a brief comment followed by a table showing DEDs where mortality is significantly above average for Dublin. This table includes the following items of information :

DED EIS code;
DED name;
SMR;
95% Confidence Interval;
No. of deaths observed in 1986 & 1987;
No. of deaths expected if average Dublin rates applied;
No. of deaths observed in excess of expected;
Population of the DED.

At the end of each table the observed, expected and excess deaths and the population of all DEDs on the table are totalled, and the SMR of the group is recalculated.

In addition, the SMR for all Dublin is presented. This is the figure which the lower limit of the 95% CI must exceed for a DED to be included in the 'above average' table.

The table is followed by up to 3 maps showing the location of DEDs with above average mortality. There are three possible maps: one of the electoral wards within the Dublin County Borough (Corporation) area, one of north county Dublin and one of south county Dublin.

If one or more of these 3 areas lacks a black spot, the corresponding map(s) are omitted.

SMR pattern of Dublin DEDs

Fig. 2 is a bar chart showing in graphic format the distribution of SMRs for deaths from all causes for the 322 DEDs in Dublin. The horizontal axis shows the SMR values obtained in the study, while the vertical axis shows the frequency of occurrence of the various SMR values.

As can be seen, the distribution is skewed to the right. In other words, there is a greater tendancy to deviate above the norm than below. The average (median) SMR for the whole group of DEDs is 96. The lowest SMR is 34 (Tibradden DED) whereas the highest is 207 (Ushers B DED).

Thus, it appears that while the majority of DEDs have mortality rates in or around the average for Dublin, a small group have rates much higher than average. On the other hand, none have extremely low rates.

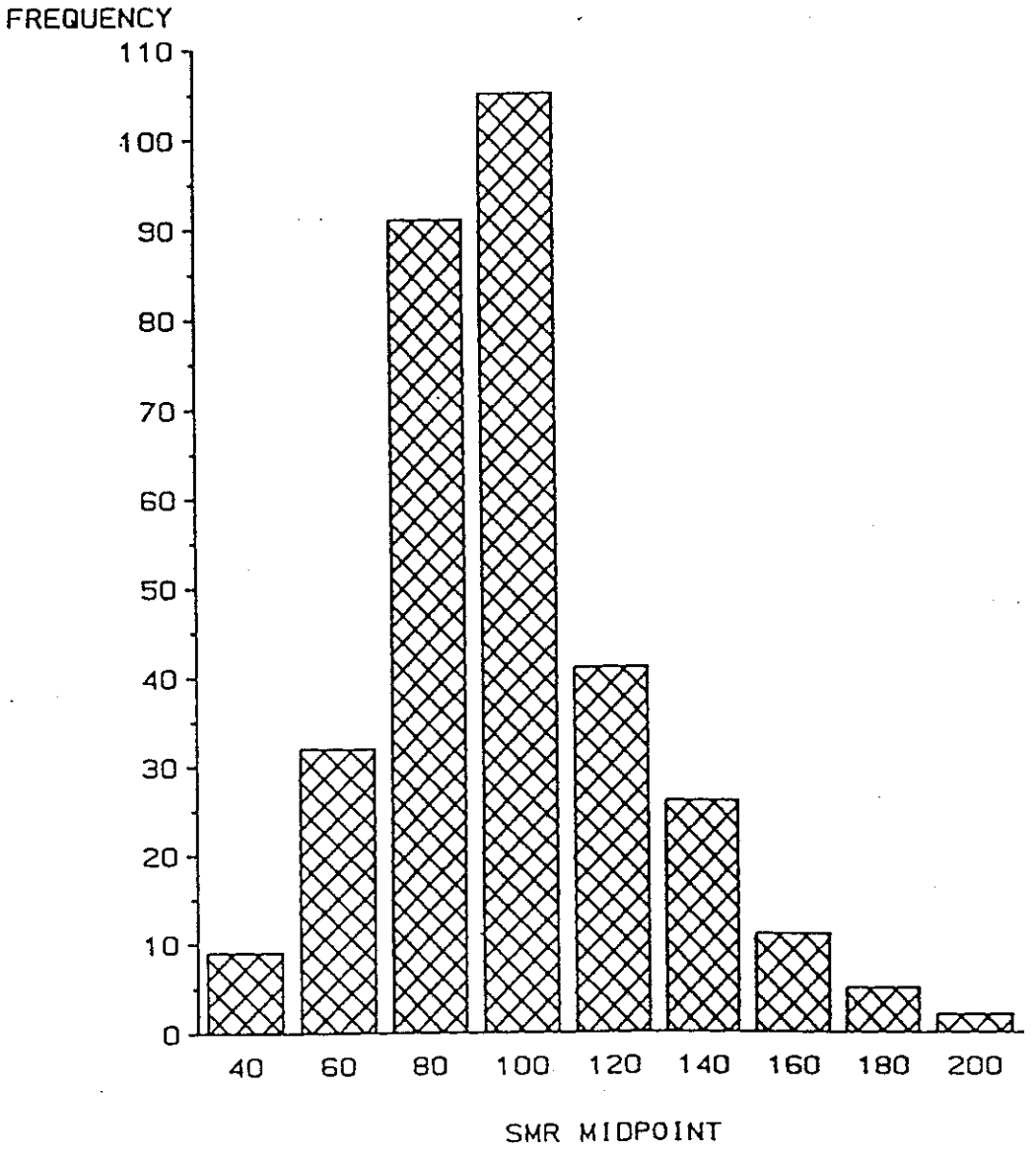
A possible interpretation of this pattern is as follows: most populations die at a fairly constant rate and while some areas have low rates, none are more than 70% below the average for Dublin. On the other hand in certain areas there is a marked elevation of the mortality rate (up to twice the average), suggesting some abnormal circumstance in these areas which is causing an increase the risk of premature death. In other words, while it may not be easy to increase longevity, life expectancy may be quite sensitive to adverse factors.

If this is the case, the concept of lowering death rates in areas with the highest mortality to the rates found in areas with least mortality may be inappropriate. It might be more practical to attempt to reduce death rates in bad areas to the average for the city as a whole.

FIG 2

EASTERN HEALTH BOARD – EIS PROJECT

ANALYSIS OF MORTALITY FOR DUBLIN DEDS IN 1986 AND 1987
FREQUENCY DISTRIBUTION OF SMRS



DEATHS FROM ALL CAUSES - MALES AND FEMALES

There were 15,474 deaths from all causes registered in 1986 and 1987. The SMR for Dublin was 97 for those years combined. The reason that it is not exactly 100 is that only deaths registered in 1986 were used as the standard, and there were 418 less deaths registered in 1987 than 1986.

The DED with the highest mortality was Ushers B, with an SMR of 207. Twenty deaths were registered out of a population of 569, which is 10 more than would be expected taking into account the age/sex structure of the population.

If we look at the bottom line of Table 2 (2nd page) we can see that there were 885 excess deaths in this group of DEDs. In other words, if the average death rates for Dublin applied to these DEDs, 885 fewer deaths would have occurred. However, we cannot assume that all of these deaths were due to preventable conditions.

If we look at the maps showing the location of DEDs with above average mortality it appears that these are located mainly in the inner city area and the suburbs to the west and north. Most of the south county has average or below average mortality.

Clusters of black spots occur on the north side in the Ballybough-Drumcondra-East Wall area and also in the Coolock-Priorswood area. On the south side there is clustering between Dolphin's Barn and the Liffey and also in the Crumlin area.

Individual findings will require local investigation, as some SMRs may be spuriously elevated. For example, the presence of long stay geriatric facilities in Blanchardstown-Abbotstown and Phoenix Park DEDs is likely to have distorted the SMR in those areas.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS FROM ALL CAUSES
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 1 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
149	USHERS B	207	(126- 319)	20	9.67	10.33	569
088	KILMORE C	199	(134- 286)	29	14.54	14.46	2532
086	KILMORE A	190	(114- 297)	19	10.01	8.99	1957
208	BLANCHARDSTOWN-ABBOTSTOWN	187	(155- 222)	125	67.02	57.98	1410
122	PRIORSWOOD D	177	(129- 237)	44	24.88	19.13	3997
305	CLONDALKIN-CAPPAGHMORE	173	(107- 265)	21	12.11	8.89	1335
118	PHOENIX PARK	167	(135- 204)	95	56.93	38.07	831
220	DUBBER	167	(102- 258)	20	11.99	8.01	657
332	TALLAGHT-JOBSTOWN	162	(108- 232)	29	17.92	11.08	6071
427	CLONSKEAGH-BELFIELD	158	(113- 215)	40	25.35	14.65	411
063	FINGLAS NORTH A	156	(118- 201)	58	37.29	20.71	4430
091	KIMMAGE B	154	(130- 180)	153	99.40	53.60	4743
087	KILMORE B	154	(115- 201)	52	33.86	18.14	4470
138	ROTUNDA A	152	(119- 191)	73	48.17	24.83	2011
161	WOOD QUAY A	151	(121- 187)	85	56.22	28.78	2148
100	MERCHANTS QUAY C	151	(124- 181)	114	75.68	38.32	2202
105	MOUNTJOY B	148	(115- 188)	68	45.84	22.16	1641
062	EDENMORE	148	(114- 190)	63	42.47	20.53	4171
110	PEMBROKE EAST A	148	(123- 176)	124	83.87	40.13	4458
152	USHERS E	147	(115- 186)	70	47.50	22.50	2000
098	MERCHANTS QUAY A	147	(106- 198)	43	29.23	13.77	1327
039	CHERRY ORCHARD B	145	(113- 183)	71	48.92	22.08	3832
133	RATHMINES WEST B	144	(113- 182)	70	48.49	21.51	2509
096	MANSION HOUSE A	142	(114- 174)	90	63.43	26.57	2986
109	NORTH DOCK C	141	(105- 185)	52	36.84	15.16	2672
090	KIMMAGE A	139	(109- 174)	74	53.37	20.63	2624

* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]ALLCAUSE.SAS

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS FROM ALL CAUSES
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 1 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
059	DRUMCONDRA SOUTH B	135	(103- 174)	60	44.32	15.68	1293
082	INNS QUAY C	135	(106- 169)	76	56.33	19.67	1982
424	CHURCHTOWN-NUTGROVE	135	(107- 168)	78	57.83	20.17	4716
029	BOTANIC C	135	(105- 170)	70	51.92	18.08	2147
083	KILMAINHAM A	134	(105- 168)	76	56.79	19.21	2741
103	MERCHANTS QUAY F	131	(99- 169)	58	44.41	13.59	2517
104	MOUNTJOY A	130	(106- 159)	98	75.27	22.73	3222
054	CRUMLIN D	130	(108- 154)	126	97.11	28.89	4234
108	NORTH DOCK B	127	(104- 152)	113	89.23	23.77	4021
093	KIMMAGE D	127	(100- 158)	79	62.43	16.58	2723
101	MERCHANTS QUAY D	126	(100- 157)	78	61.90	16.10	2306
064	FINGLAS NORTH B	125	(98- 157)	74	59.26	14.74	3826
150	USHERS C	124	(97- 156)	74	59.67	14.33	2804
127	RATHFARNHAM	122	(101- 147)	111	90.82	20.18	3857
009	BALLYBOUGH A	119	(99- 142)	123	103.2	19.80	3908
TOTAL		142		2996	2111	885	114291

(SMR for all Dublin = 97)

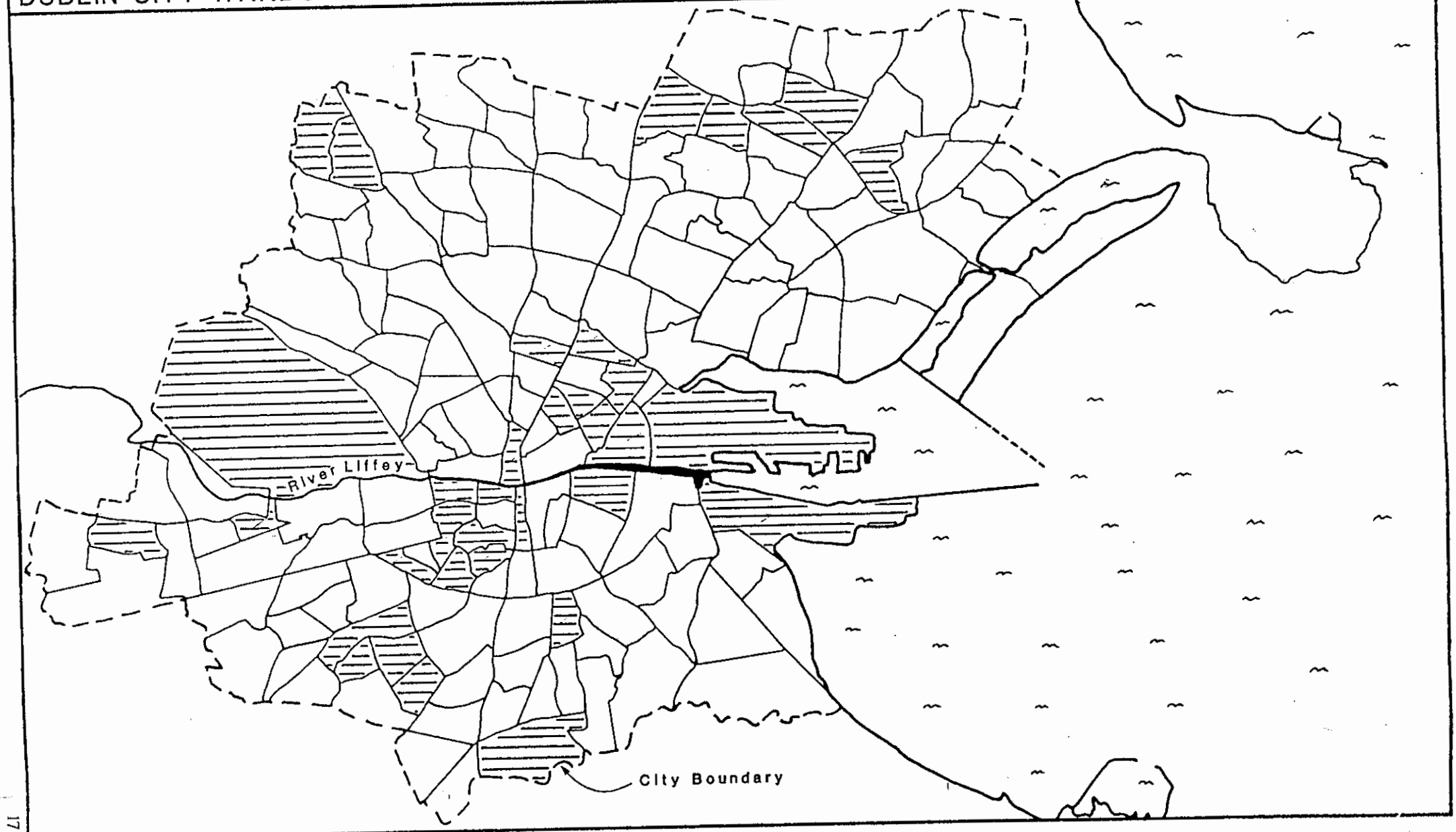
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]ALLCAUSE.SAS

EASTERN HEALTH BOARD – EIS PROJECT

DUBLIN CITY WARDS

Cause: ALL CAUSES MALES AND FEMALES

Shading indicates SMR significantly above average

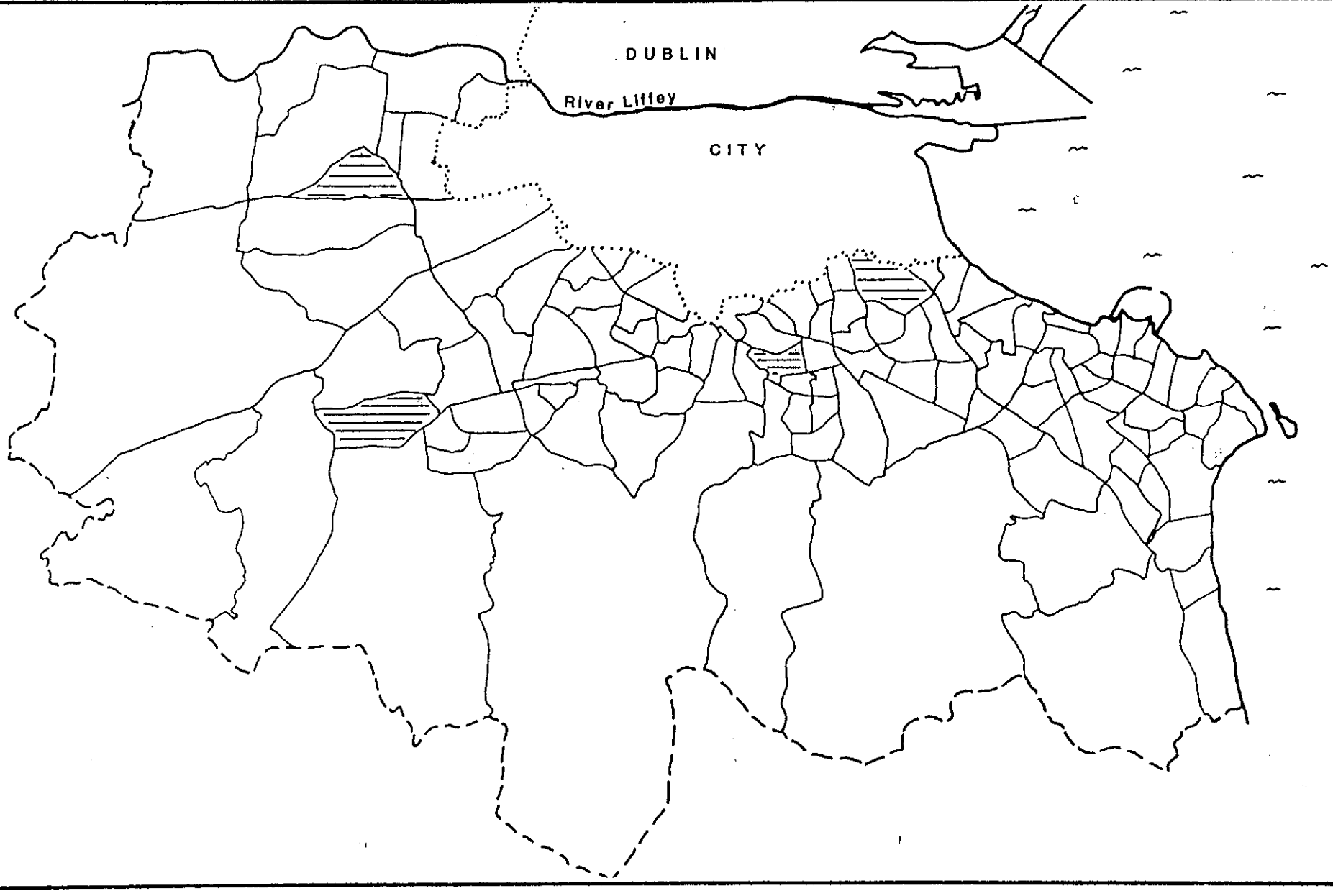


EASTERN HEALTH BOARD – EIS PROJECT

SOUTH COUNTY DUBLIN DEDs

Cause: ALL CAUSES MALES AND FEMALES

Shading indicates SMR significantly above average

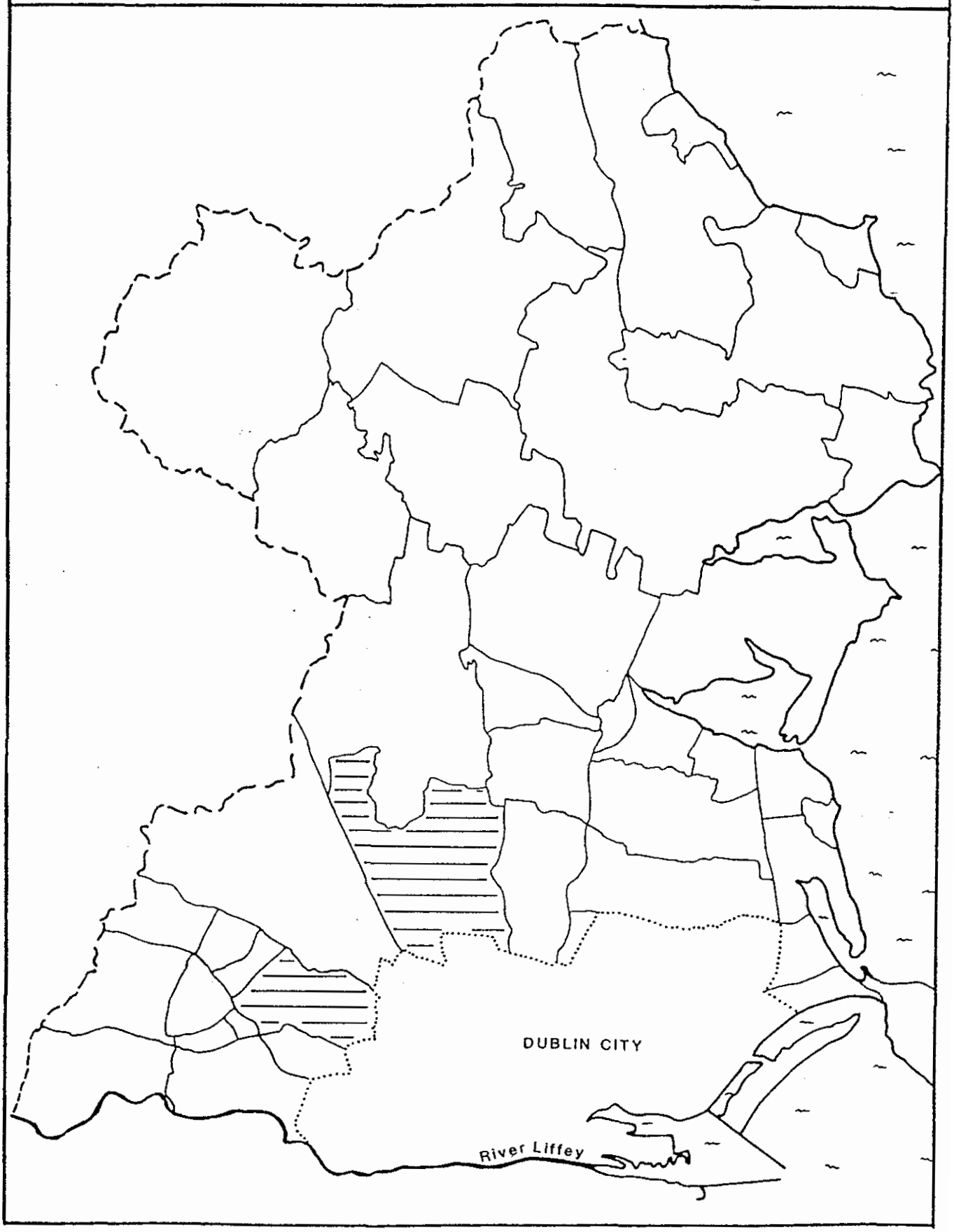


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: ALL CAUSES MALES AND FEMALES

Shading indicates SMR significantly above average



DEATHS FROM ISCHAEMIC HEART DISEASE

(ICD 410 - 414) Males only

There were 2,291 deaths from ischaemic heart disease registered in 1986-87 in males. The analysis presented in Table 2 relates to males because there is a higher incidence of ischaemic heart disease in men. The SMR for males in Dublin for that period was 98.8 and there were 114 'excess' deaths in the black spot areas.

There is a well known inverse relationship between social class and ischaemic heart disease. There is some clustering of black spots, again most obvious in less well off areas. Areas affected include Coolock, Ballybough-Drumcondra and Crumlin. Killiney South is also on the list. A large local authority housing estate is located within this DED.

However, ischaemic heart disease is a ubiquitous condition which accounted for 30% of all male deaths during the study period, and there were black spots to be found in relatively well-off areas such as Dundrum-Sandyford and Clonskeagh-Roebuck. Again local investigation will be necessary to confirm the findings.

Major risk factors for ischaemic heart disease include smoking, hypercholesterolaemia and hypertension, and further investigation of confirmed black spot areas should include examination of the prevalence of these factors in black spot areas.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO ISCHAEMIC HEART DISEASE (ICD 410-414)
(INCLUDES DEATHS OF MALES IN 1986 AND 1987 COMBINED)

TABLE 2 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Male Population
120	PRIORSWOOD B	394	(128- 919)	5	1.27	3.73	1854
093	KIMMAGE D	232	(144- 355)	21	9.04	11.96	1302
439	DUNDRUM-SANDYFORD	231	(111- 425)	10	4.33	5.67	2230
138	ROTUNDA A	229	(131- 371)	16	7.00	9.00	972
073	GRANGE C	227	(104- 431)	9	3.96	5.04	2741
062	EDENMORE	219	(128- 351)	17	7.76	9.24	2077
459	KILLINEY SOUTH	217	(99- 411)	9	4.15	4.85	3074
105	MOUNTJOY B	216	(104- 398)	10	4.62	5.38	786
430	CLONSKEAGH-ROEBUCK	209	(111- 358)	13	6.21	6.79	780
096	MANSION HOUSE A	201	(121- 314)	19	9.45	9.55	1463
152	USHERS E	200	(109- 336)	14	6.99	7.01	904
091	KIMMAGE B	165	(105- 248)	23	13.91	9.09	2253
056	CRUMLIN F	165	(106- 246)	24	14.53	9.47	1546
009	BALLYBOUGH A	158	(100- 237)	23	14.58	8.42	1830
058	DRUMCONDRA SOUTH A	157	(100- 236)	23	14.65	8.35	1673
TOTAL		193		236	122	114	25485

(SMR for all Dublin = 98.8)

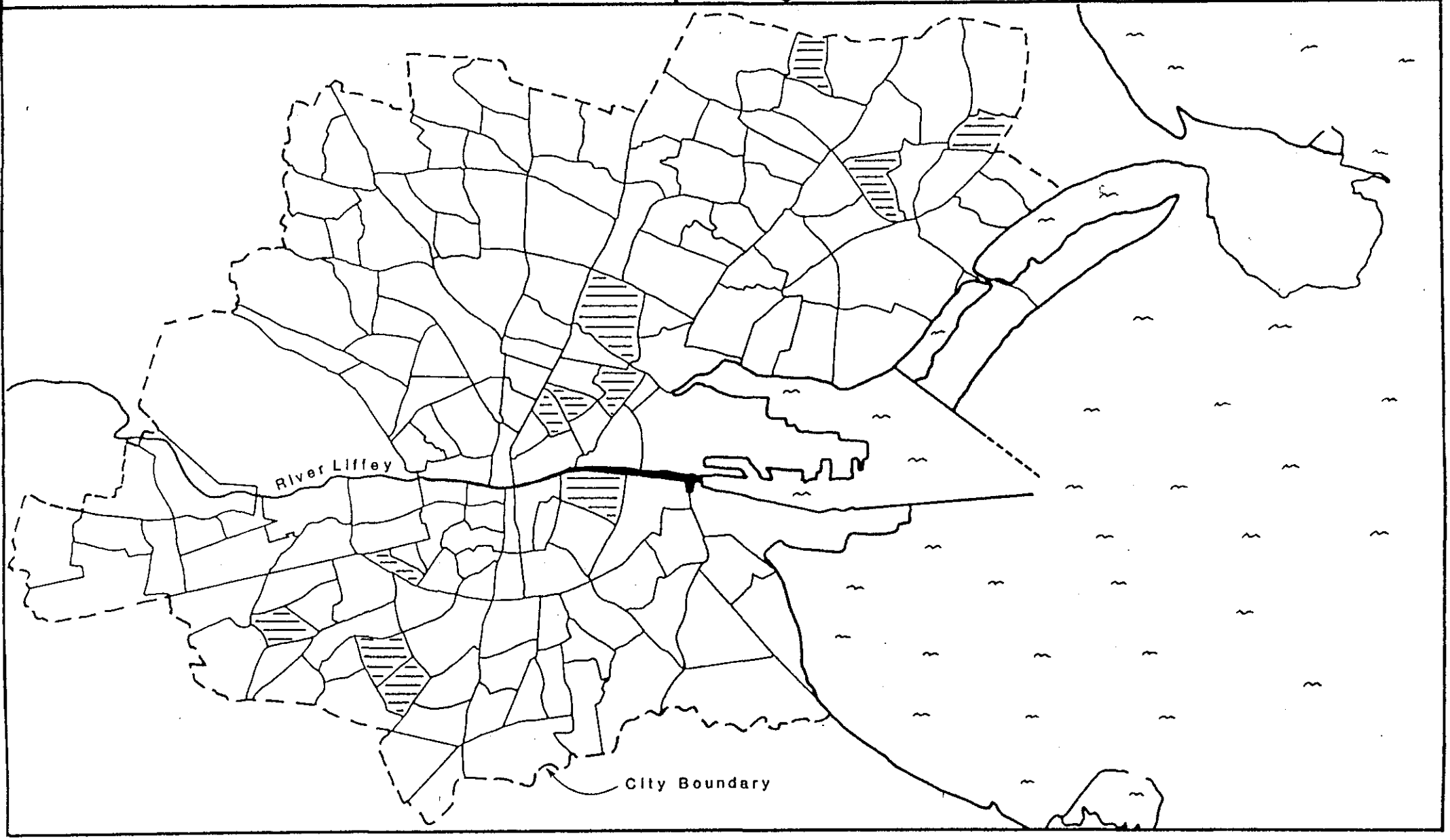
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]IHD.SAS

EASTERN HEALTH BOARD - EIS PROJECT

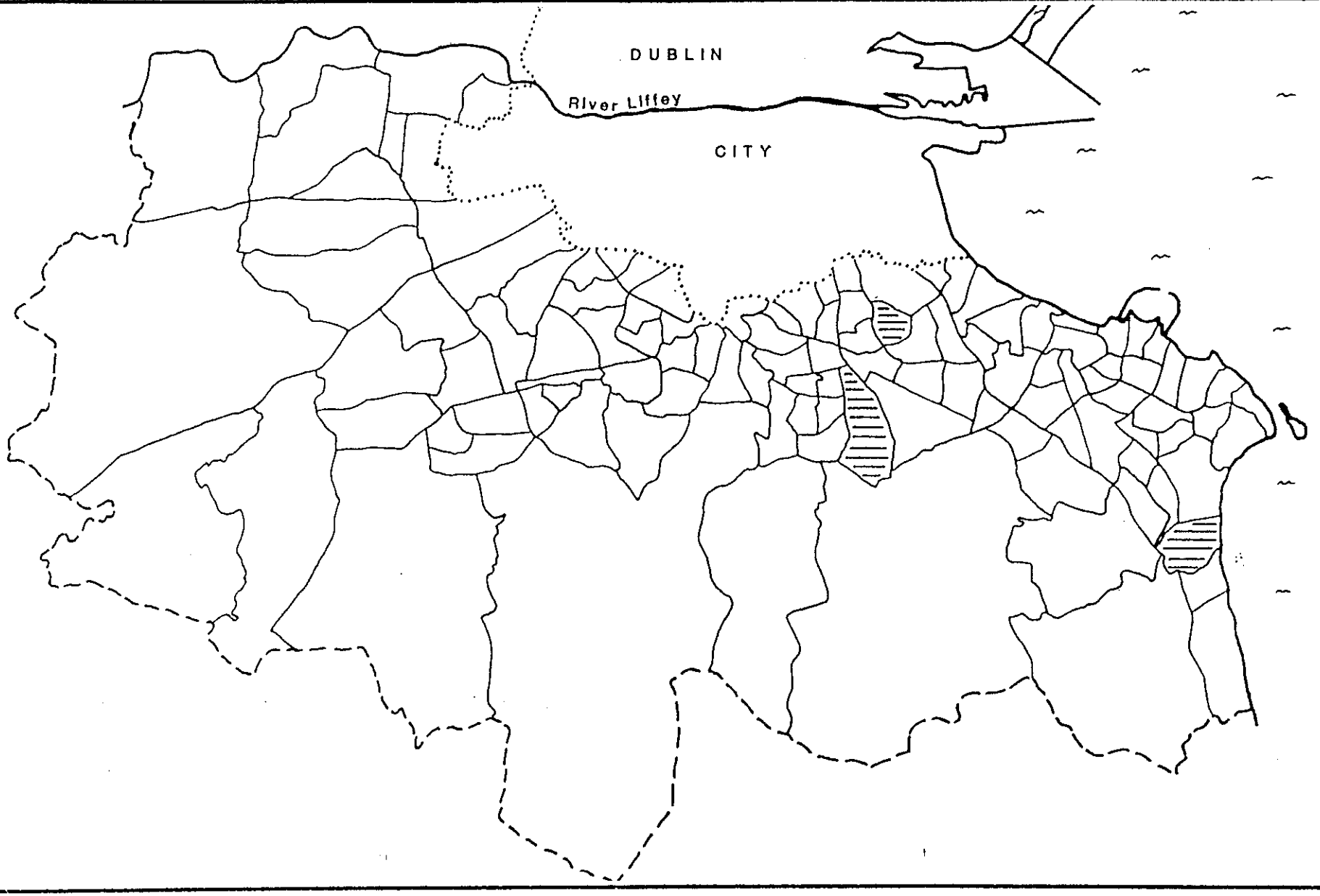
DUBLIN CITY WARDS

Cause: ISCHAEMIC HEART DISEASE (ICD 410-414) MALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: ISCHAEMIC HEART DISEASE (ICD 410-414) MALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average



DEATHS FROM MALIGNANT NEOPLASMS
(ICD 140-208) males & females

There were 3,782 deaths from cancer registered in 1986-87. The SMR for Dublin was 100.2. As can be seen in Table 3 there were 139 'excess' deaths in the black spot areas. Cancer accounted for 25% of all deaths during the study period.

Areas affected included Coolock and the Mountjoy Square area on the north side, and again Crumlin and the Dolphin's Barn-Ushers Quay area on the South.

From the point of view of preventability, it is probably most useful to look at individual cancers, particularly lung cancer, rather than concentrating on the group as a whole.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO MALIGNANT NEOPLASMS (ICD 140-208)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 3- WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
149	USHERS B	303	(122- 624)	7	2.31	4.69	569
122	PRIORSWOOD D	300	(186- 459)	21	7.00	14.00	3997
220	DUBBER	253	(102- 522)	7	2.76	4.24	657
429	CLONSKEAGH-MILLTOWN	222	(133- 346)	19	8.57	10.43	1221
067	FINGLAS SOUTH B	213	(106- 381)	11	5.17	5.83	3990
140	ROYAL EXCHANGE A	183	(103- 302)	15	8.19	6.81	1141
152	USHERS E	177	(108- 273)	20	11.31	8.69	2000
105	MOUNTJOY B	175	(102- 281)	17	9.70	7.30	1641
208	BLANCHARDSTOWN-ABBOTSTOWN	172	(109- 259)	23	13.34	9.66	1410
138	ROTUNDA A	172	(104- 269)	19	11.03	7.97	2011
092	KIMMAGE C	169	(107- 254)	23	13.59	9.41	2420
039	CHERRY ORCHARD B	162	(102- 242)	23	14.24	8.76	3832
081	INNS QUAY B	160	(106- 231)	28	17.53	10.47	2599
100	MERCHANTS QUAY C	158	(103- 232)	26	16.43	9.57	2202
110	PEMBROKE EAST A	149	(101- 211)	31	20.86	10.14	4458
054	CRUMLIN D	148	(102- 208)	33	22.25	10.75	4234
TOTAL		175		323	184	139	38382

(SMR for all Dublin = 100.2)

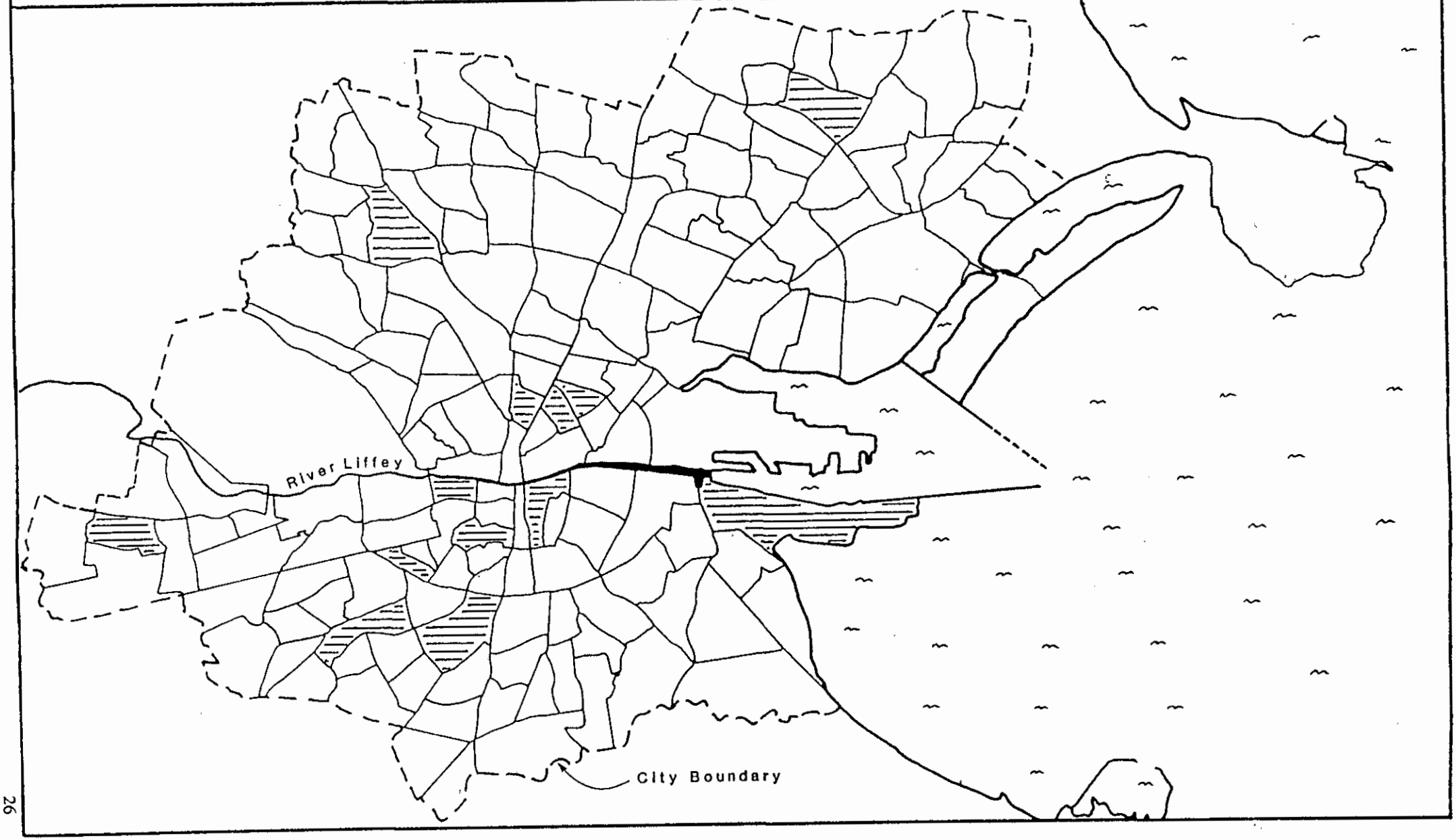
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]ALLCA.SAS

EASTERN HEALTH BOARD – EIS PROJECT

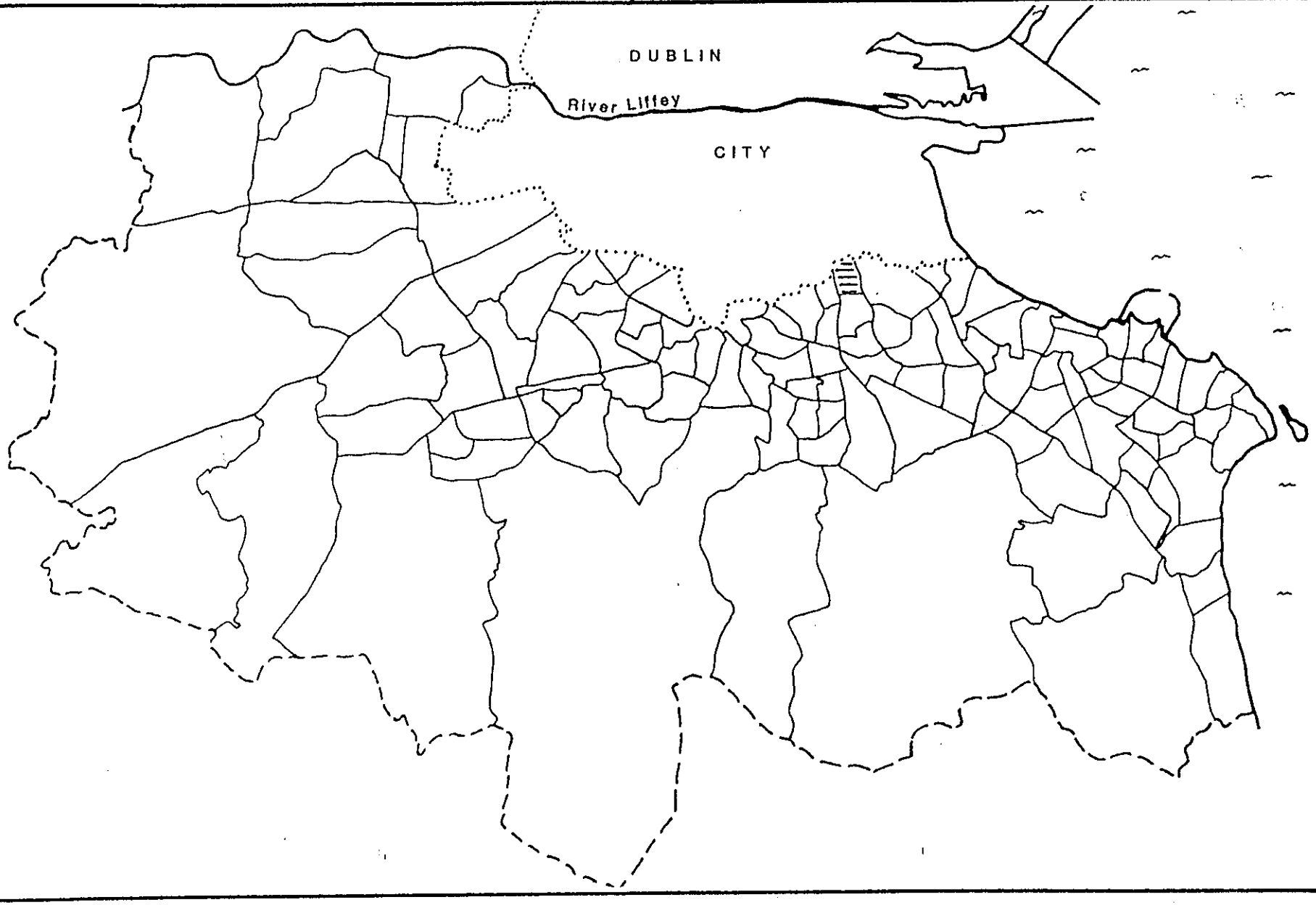
DUBLIN CITY WARDS

Cause: MALIGNANT NEOPLASMS (ICD 140–208) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: MALIGNANT NEOPLASMS (ICD 140-208) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average

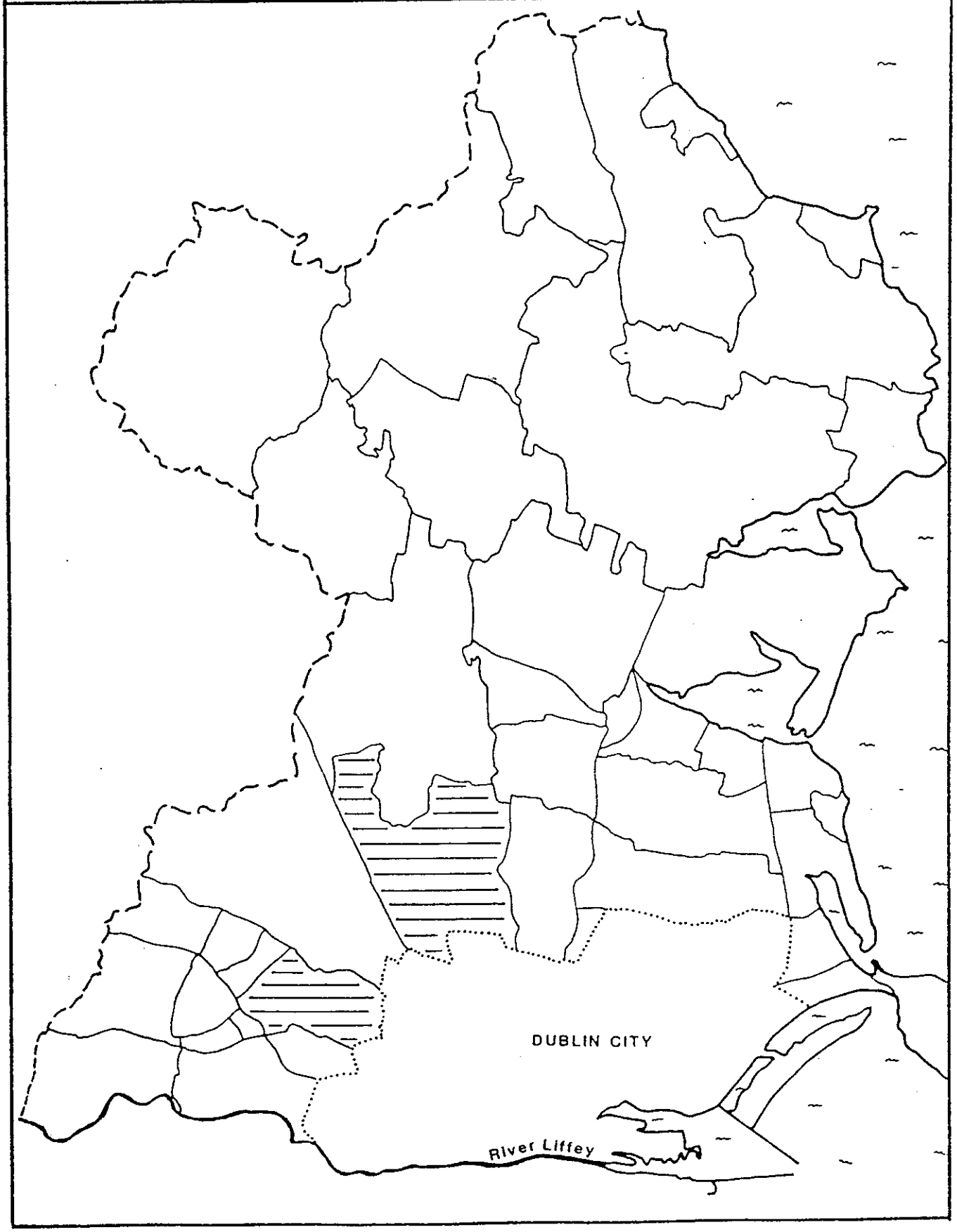


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: MALIGNANT NEOPLASMS (ICD 140–208) MALES & FEMALES

Shading indicates SMR significantly above average



DEATHS FROM LUNG CANCER
(ICD 162) males & females

There were 988 deaths from lung cancer registered in 1986-87. The SMR for all Dublin was 99.2 and Table 4 shows that there were 84 excess deaths in the black spot areas. The term 'excess' in this case is some what inappropriate because most lung cancer deaths are preventable as they are due to smoking.

There is a cluster of black spots in Coolock and several also in the Crumlin area. Pembroke East A which is Ringsend had 11 excess deaths from lung cancer. Finglas and Ballymun are also affected.

Virtually all of the black spots are in less well off areas. None of the south county Dublin DEDs are on the 'above average' table.

In addition to smoking, however, it must be kept in mind that there are other possible causes for lung cancer such as exposure to naturally occurring radon gas and this possibility may merit further local investigation.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
MALIGNANT NEOPLASMS OF TRACHEA, BRONCHUS AND LUNG (ICD 162)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

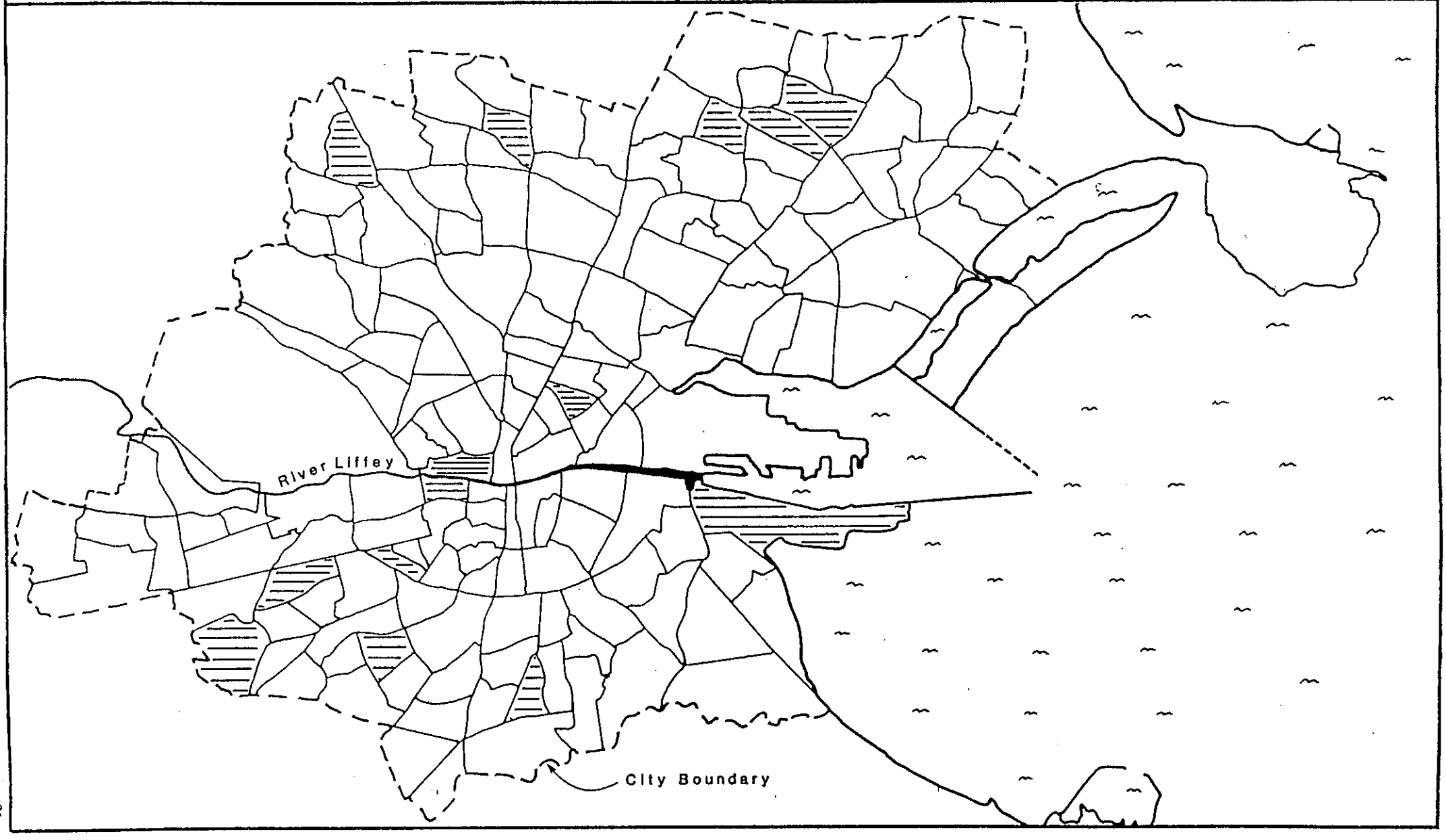
TABLE 4 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
149	USHERS B	788	(256- 1838)	5	0.63	4.37	569
087	KILMORE B	427	(205- 785)	10	2.34	7.66	4470
211	BLANCHARDSTOWN-CORDUFF	421	(115- 1077)	4	0.95	3.05	5128
018	BALLYMUN D	416	(135- 970)	5	1.20	3.80	4003
088	KILMORE C	381	(104- 975)	4	1.05	2.95	2532
152	USHERS E	353	(176- 631)	11	3.12	7.88	2000
122	PRIORSWOOD D	337	(124- 734)	6	1.78	4.22	3997
003	ARRAN QUAY C	335	(135- 690)	7	2.09	4.91	1258
110	PEMBROKE EAST A	297	(173- 476)	17	5.72	11.28	4458
105	MOUNTJOY B	284	(114- 586)	7	2.46	4.54	1641
135	RATHMINES WEST D	259	(112- 510)	8	3.09	4.91	2933
154	WALKINSTOWN A	234	(112- 430)	10	4.28	5.72	2467
064	FINGLAS NORTH B	233	(112- 429)	10	4.29	5.71	3826
091	KIMMAGE B	213	(113- 364)	13	6.11	6.89	4743
051	CRUMLIN A	189	(101- 324)	13	6.86	6.14	4392
TOTAL		283		130	46	84	48417

(SMR for all Dublin = 99.2)

* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]CALUNG.SAS

EASTERN HEALTH BOARD - EIS PROJECT	Cause: LUNG CANCER (ICD 162) MALES & FEMALES
DUBLIN CITY WARDS	Shading indicates SMR significantly above average

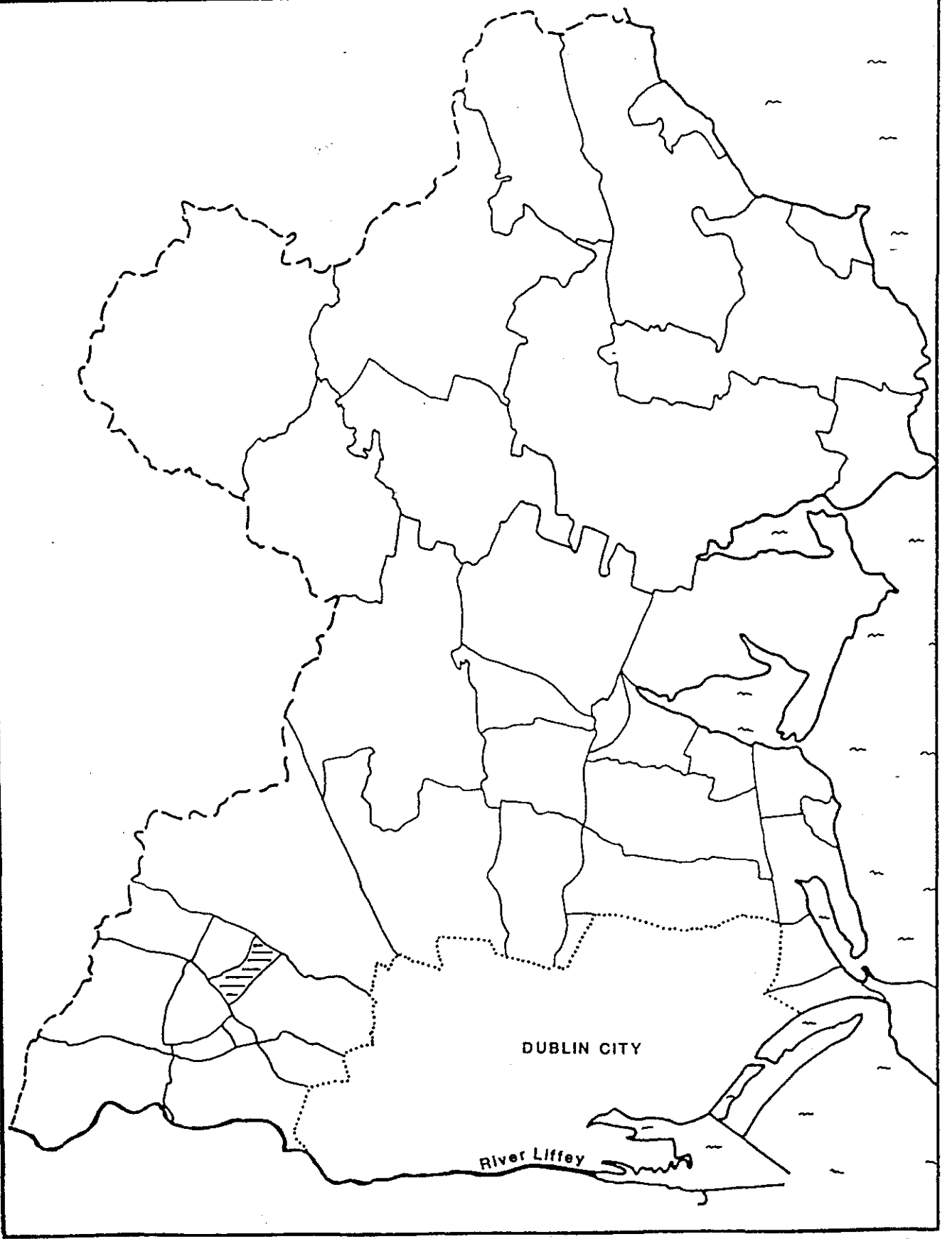


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: LUNG CANCER (ICD 162) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO RESPIRATORY DISEASE (ICD 460-519)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 5 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
427	CLONSKEAGH-BELFIELD	317	(174- 532)	14	4.41	9.59	411
208	BLANCHARDSTOWN-ABBOTSTOWN	284	(194- 401)	32	11.28	20.72	1410
118	PHOENIX PARK	244	(157- 364)	24	9.82	14.18	831
016	BALLYMUN B	241	(97- 497)	7	2.90	4.10	5022
033	CABRA WEST A	220	(105- 404)	10	4.56	5.44	2049
014	BALLYGALL D	203	(116- 329)	16	7.89	8.11	2792
100	MERCHANTS QUAY C	198	(127- 295)	24	12.12	11.88	2202
133	RATHMINES WEST B	193	(106- 324)	14	7.25	6.75	2509
039	CHERRY ORCHARD B	188	(94- 336)	11	5.85	5.15	3832
061	DRUMFINN	184	(112- 284)	20	10.87	9.13	5224
103	MERCHANTS QUAY F	181	(90- 324)	11	6.08	4.92	2517
057	DECIES	173	(95- 291)	14	8.08	5.92	4029
090	KIMMAGE A	172	(92- 294)	13	7.55	5.45	2624
101	MERCHANTS QUAY D	163	(91- 268)	15	9.23	5.77	2306
091	KIMMAGE B	157	(100- 236)	23	14.61	8.39	4743
TOTAL		202		248	122	126	42501

(SMR for all Dublin = 89.6)

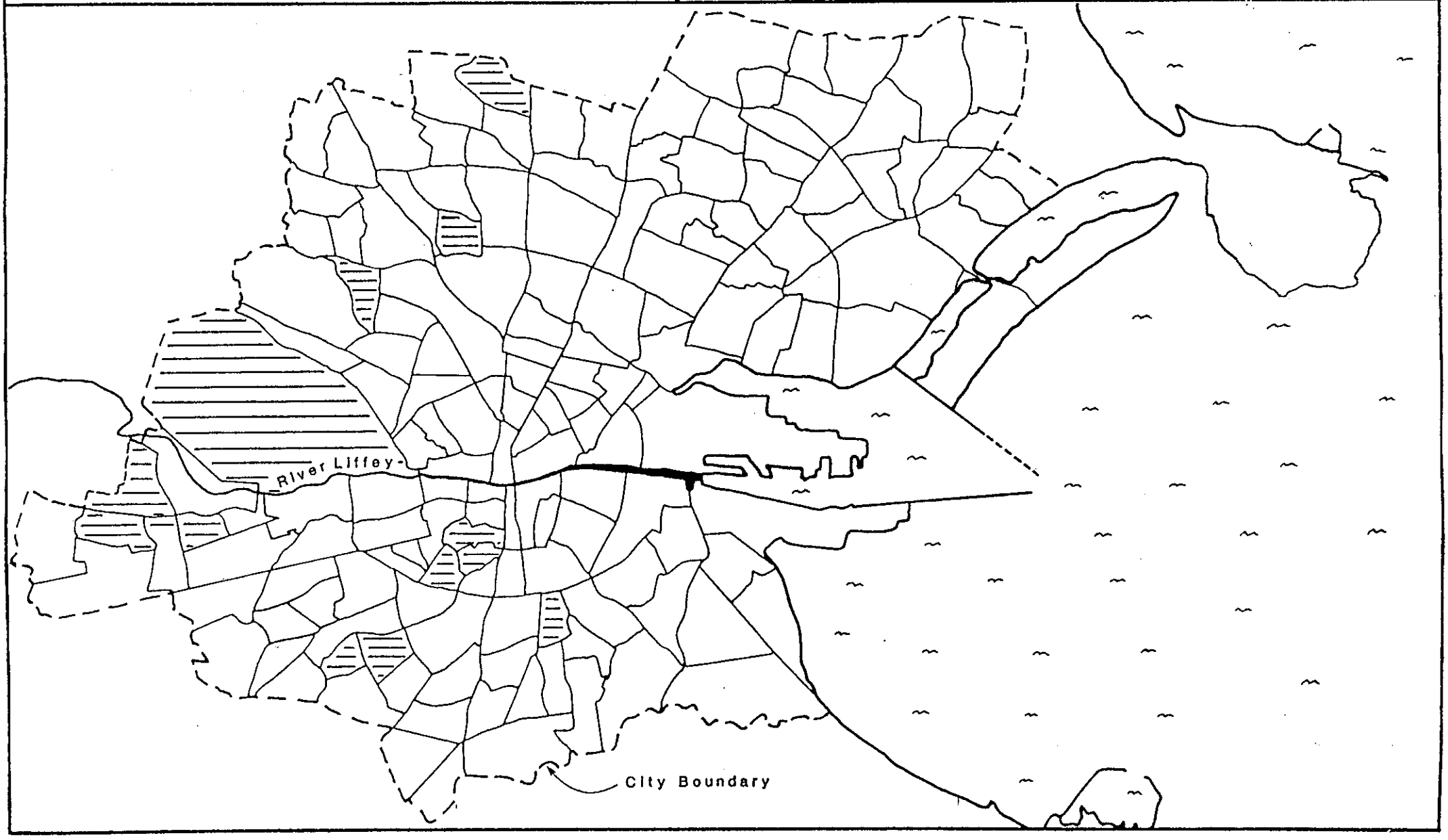
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]RESP.SAS

EASTERN HEALTH BOARD - EIS PROJECT

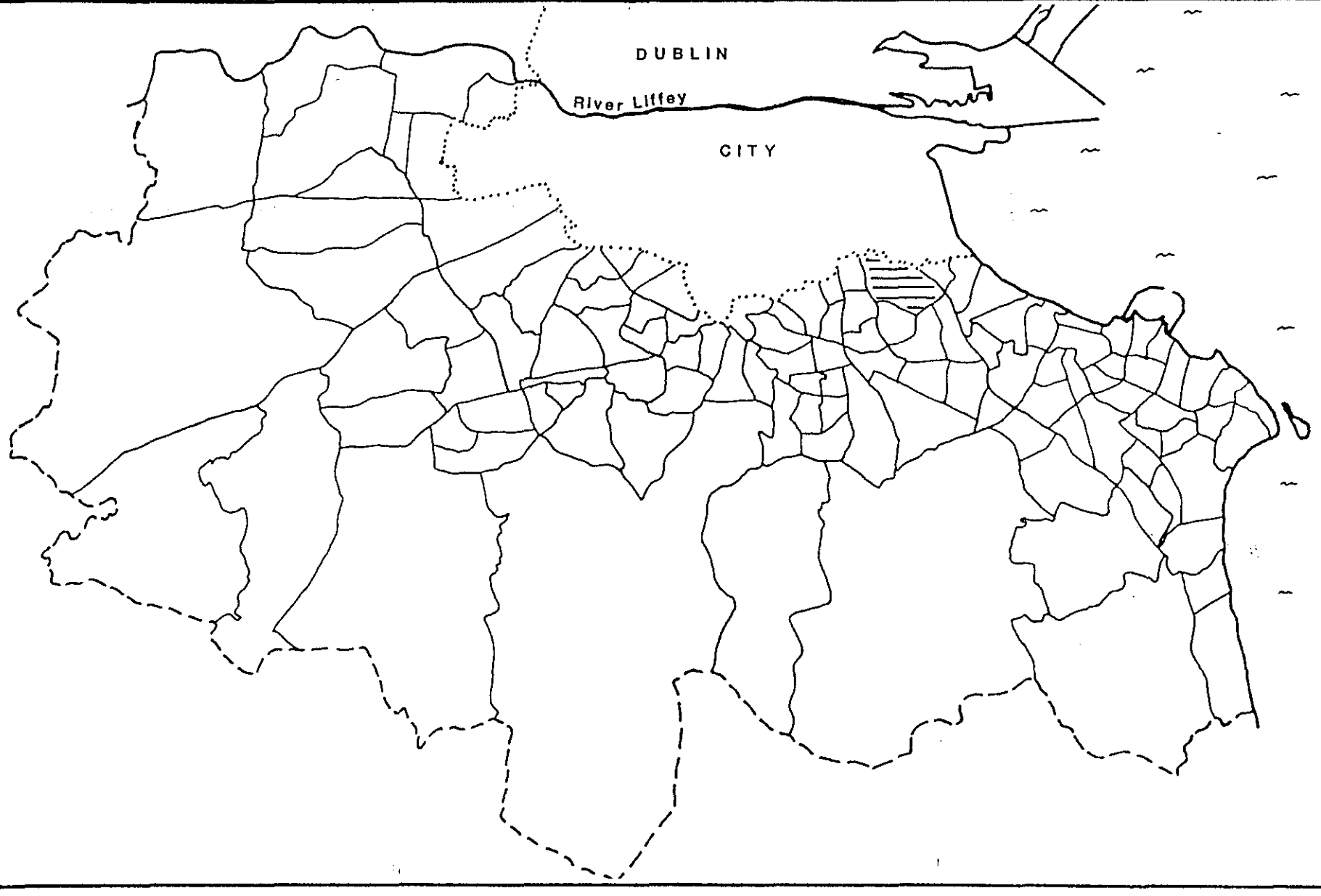
DUBLIN CITY WARDS

Cause: DISEASES OF THE RESPIRATORY SYSTEM (ICD 460-519) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: DISEASES OF THE RESPIRATORY SYSTEM (ICD 460-519) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average

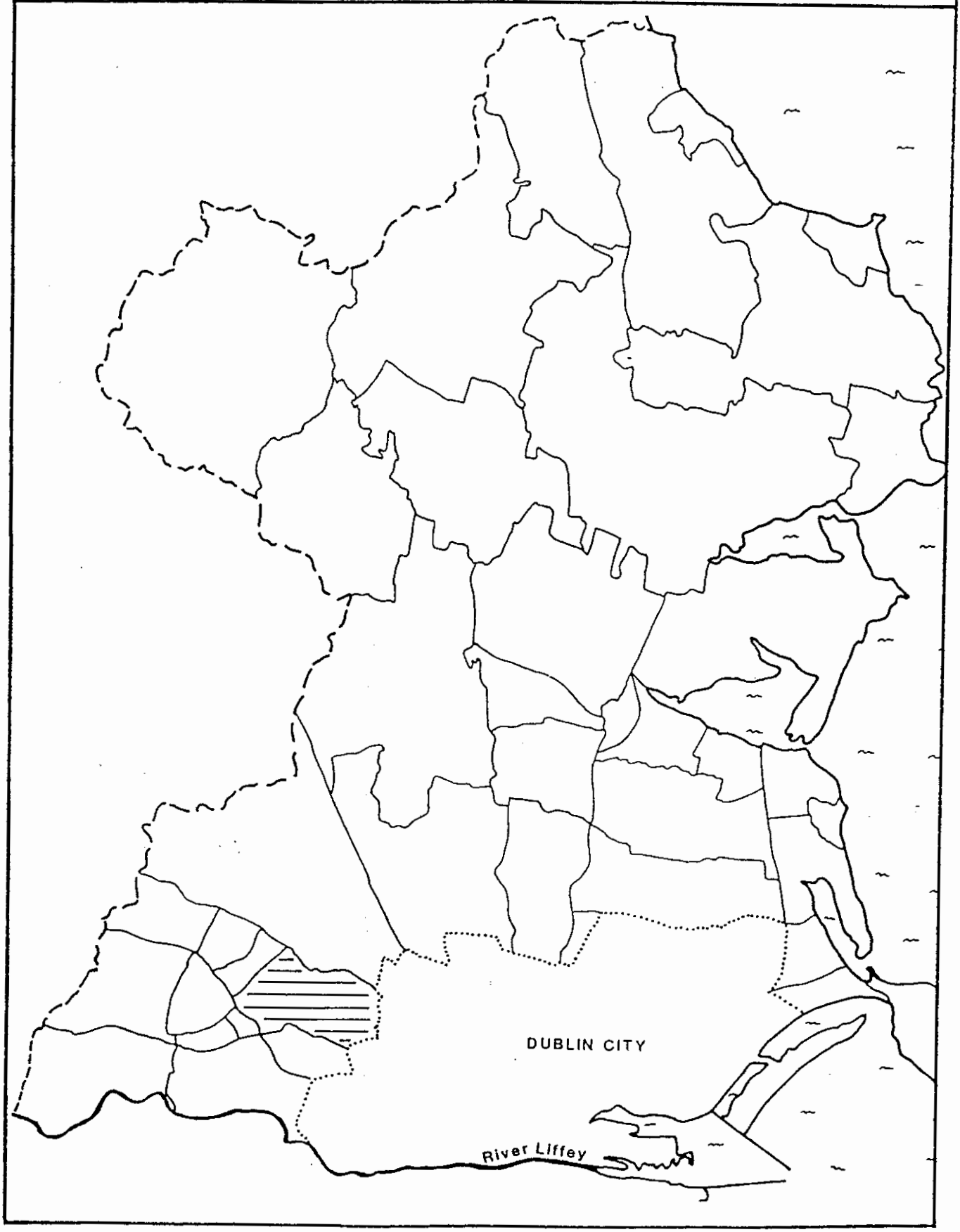


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: DISEASES OF THE RESPIRATORY SYSTEM (ICD 460–519) MALES & FEMALES

Shading indicates SMR significantly above average



DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE

(COPD) (ICD 490-496) males & females

There were 846 deaths due to COPD registered in 1986-87. The SMR for all Dublin was 92.4 due to the fact that considerably more deaths were registered in 1986. Table 6 shows that there were 63 excess deaths in the black spot areas.

The very high rate in Airport DED is due to the fact that 2 deaths occurred in a very small population of 190, and despite the fact that the 95% confidence interval excludes 92.4, no undue significance should be attributed to this.

The high rate in Newcastle may relate to the presence of Peamount Hospital.

Greater attention should be paid to the clusters of black spots in Ballyfermot and Crumlin, and perhaps to Cabra, Finglas and Ballymun.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ICD 490-496)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 6 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
201	AIRPORT	828	(100- 2991)	2	0.24	1.76	190
016	BALLYMUN B	426	(138- 993)	5	1.17	3.83	5022
208	BLANCHARDSTOWN-ABBOTSTOWN	312	(161- 545)	12	3.84	8.16	1410
033	CABRA WEST A	294	(108- 640)	6	2.04	3.96	2049
014	BALLYGALL D	273	(131- 502)	10	3.66	6.34	2792
318	NEWCASTLE	264	(97- 574)	6	2.27	3.73	2576
062	EDENMORE	257	(94- 560)	6	2.33	3.67	4171
039	CHERRY ORCHARD B	256	(111- 505)	8	3.12	4.88	3832
090	KIMMAGE A	237	(102- 468)	8	3.37	4.63	2624
347	TERENURE-CHERRYFIELD	233	(94- 481)	7	3.00	4.00	2876
061	DRUMFINN	229	(118- 399)	12	5.25	6.75	5224
055	CRUMLIN E	210	(105- 376)	11	5.24	5.76	3461
052	CRUMLIN B	200	(100- 358)	11	5.50	5.50	3939
TOTAL		253		104	41	63	40166

(SMR for all Dublin = 92.4)

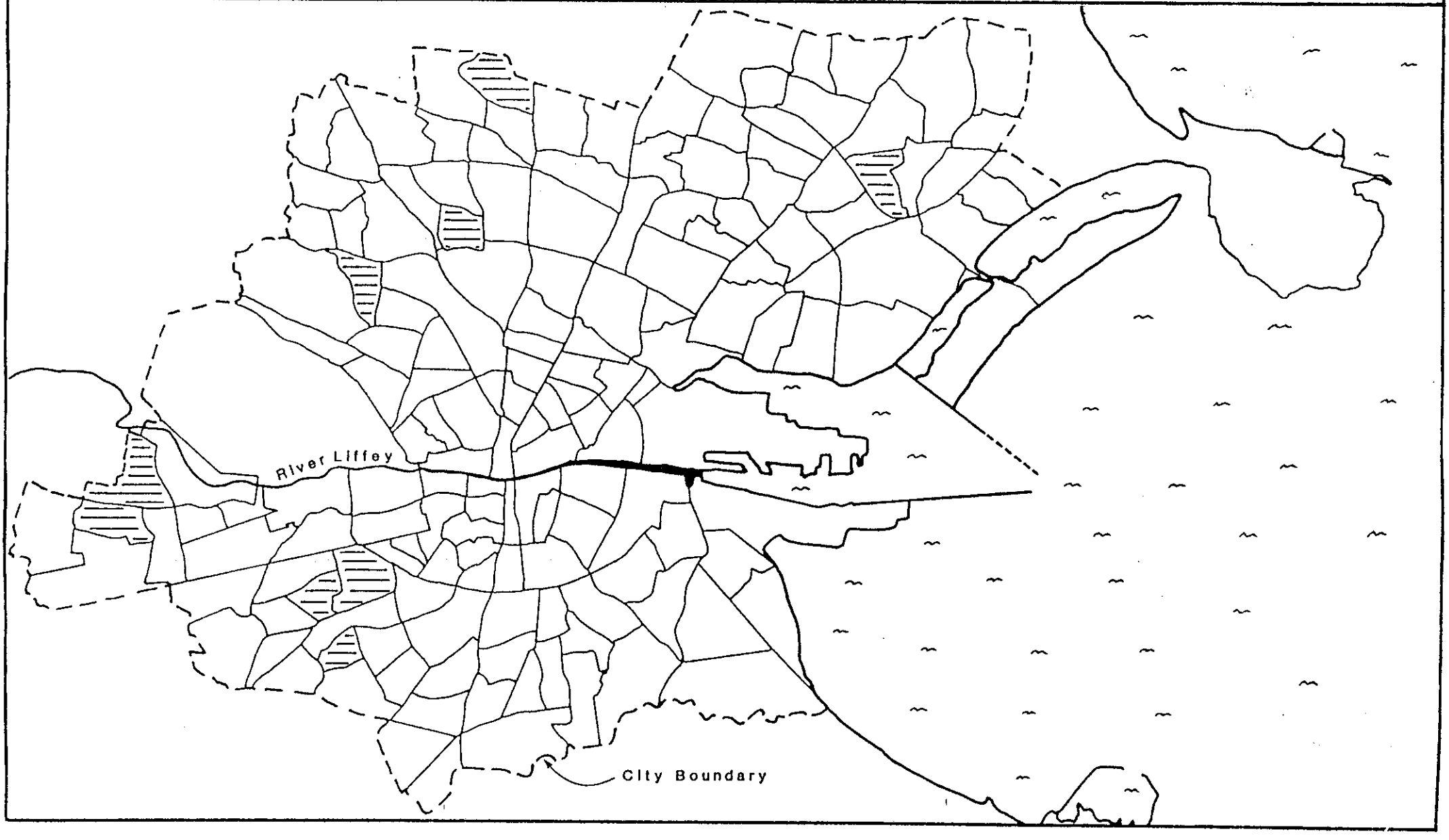
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]CRBRON.SAS

EASTERN HEALTH BOARD - EIS PROJECT

DUBLIN CITY WARDS

Cause: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ICD 490-496) MALES & FEMALES

Shading indicates SMR significantly above average

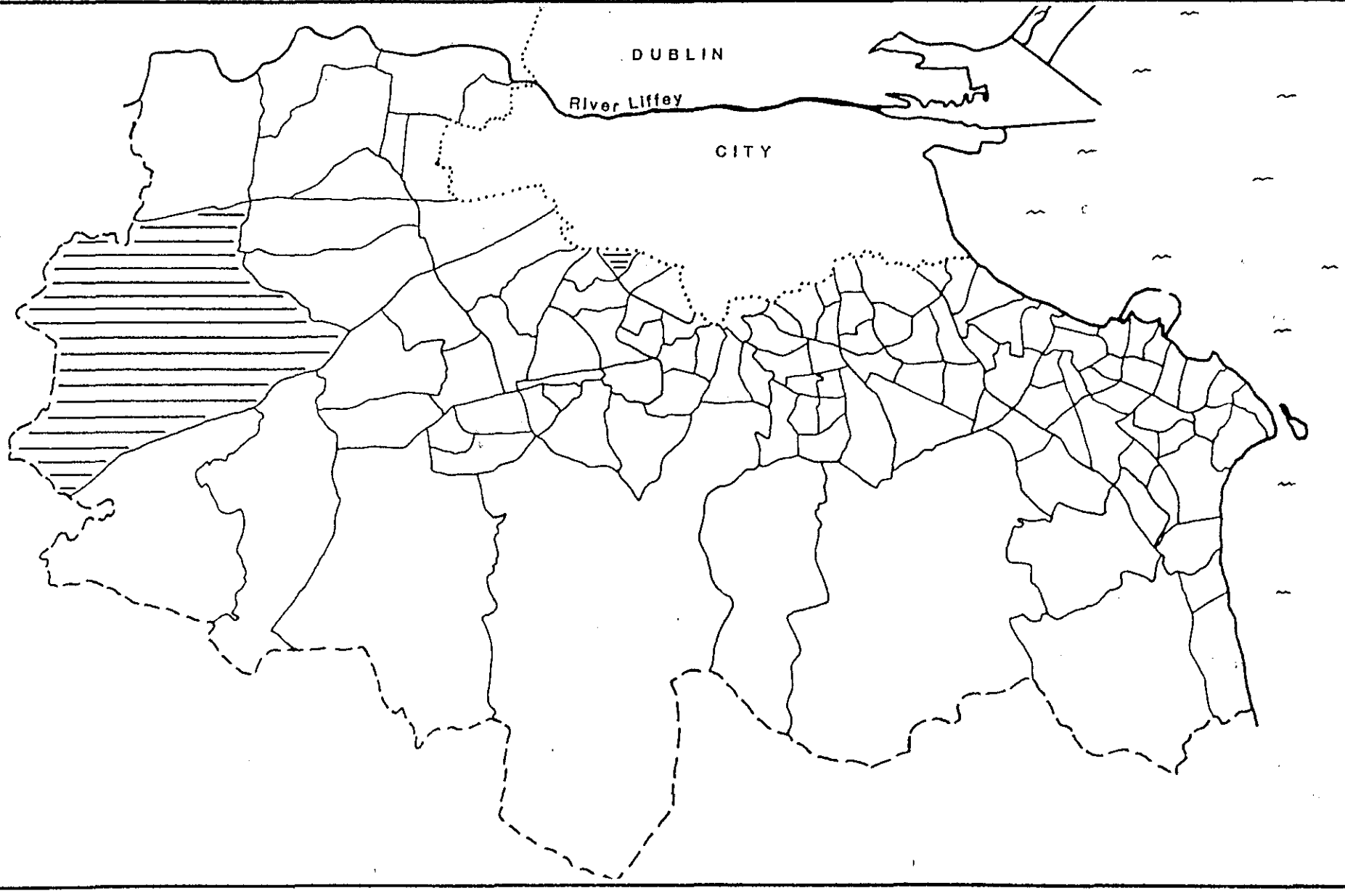


EASTERN HEALTH BOARD – EIS PROJECT

SOUTH COUNTY DUBLIN DEDs

Cause: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ICD 490-496) MALES & FEMALES

Shading indicates SMR significantly above average

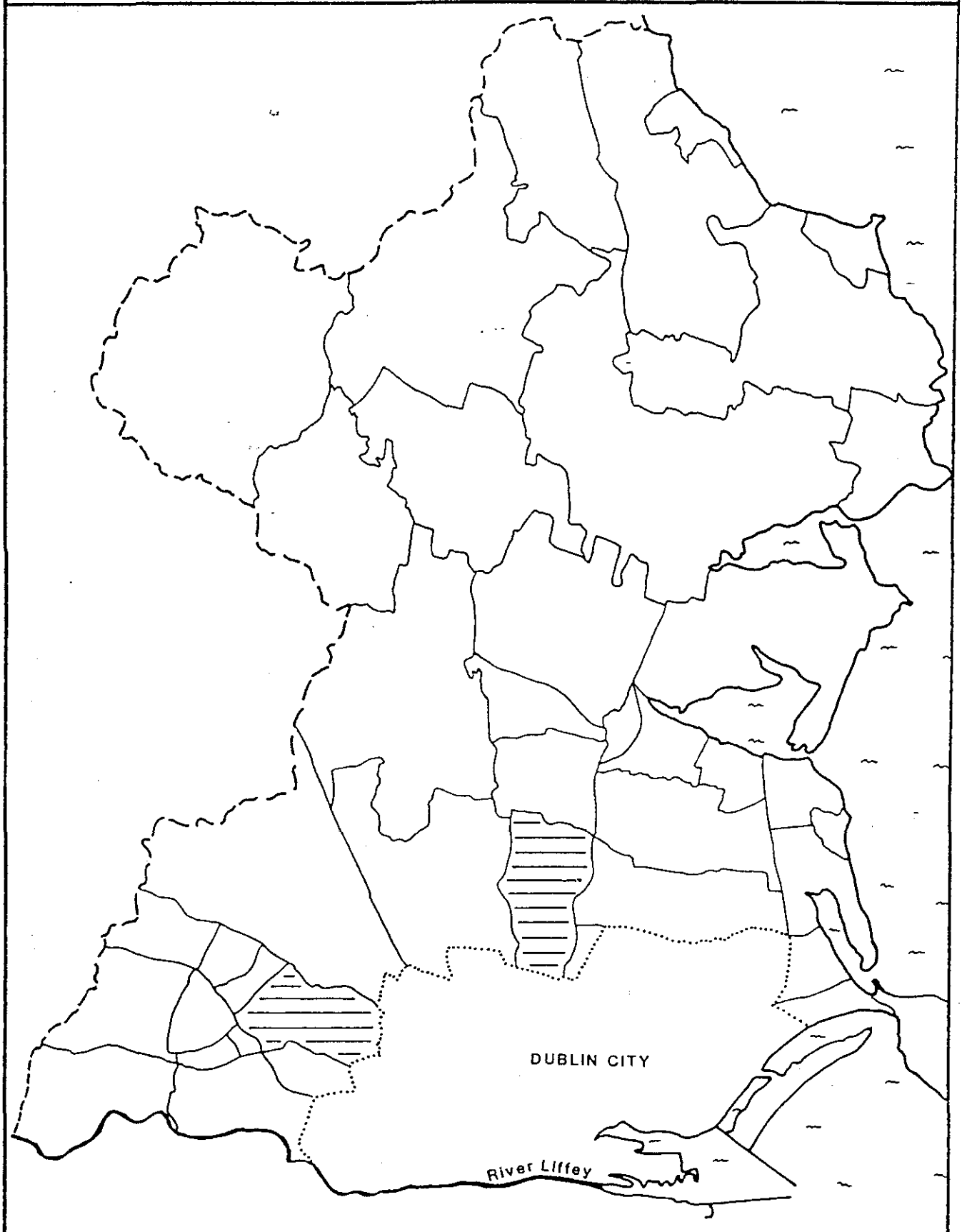


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: CHRONIC OBSTRUCTIVE PULMONARY DISEASE (ICD 490–496) MALES & FEMALES

Shading indicates SMR significantly above average



DEATHS FROM PNEUMONIA AND INFLUENZA
(ICD 480-487) males & females

There were 1,009 deaths from pneumonia and influenza registered in 1986-87. The SMR for Dublin was 87.4 due to the fact that 577 deaths were registered in 1986 as against 432 in 1987. Table 7 shows that there were 74 excess deaths in the black spot areas.

Over 90% of deaths from pneumonia and influenza in Dublin occurred in people aged over 65 and over 75% occurred in people aged over 75 years. Black spots are located mainly in the south city and and also in Phoenix Park and Blanchardstown-Abbotstown DEDs. There are long stay geriatric facilities in the latter areas, and more detailed examination of mortality showed that two thirds of the deaths from pneumonia and influenza in these two DEDs occurred in the months December 1986 to April 1987.

There is also a long stay geriatric facility in Merchants Quay C DED but the pattern of mortality there was more evenly spread throughout the year.

If, following local investigation a real excess mortality is confirmed, it might be worth checking the proportion of elderly people who are vaccinated against influenza and pneumococcal infection, particularly those living in institutions. Safe, effective and relatively inexpensive vaccines are available for both of these diseases. Immunisation is recommended for persons aged over 65, especially if suffering from chronic disease.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO PNEUMONIA AND INFLUENZA (ICD 480-487)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 7 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
427	CLONSKEAGH-BELFIELD	549	(300- 921)	14	2.55	11.45	411
118	PHOENIX PARK	366	(230- 555)	22	6.01	15.99	831
100	MERCHANTS QUAY C	287	(173- 448)	19	6.63	12.37	2202
310	CLONDALKIN VILLAGE	258	(104- 531)	7	2.72	4.28	5708
208	BLANCHARDSTOWN-ABBOTSTOWN	246	(140- 399)	16	6.51	9.49	1410
057	DECIES	224	(97- 441)	8	3.57	4.43	4029
133	RATHMINES WEST B	216	(93- 425)	8	3.71	4.29	2509
160	WHITEHALL D	187	(93- 335)	11	5.88	5.12	2523
091	KIMMAGE B	181	(99- 304)	14	7.72	6.28	4743
TOTAL		263		119	45	74	24366

(SMR for all Dublin = 87.4)

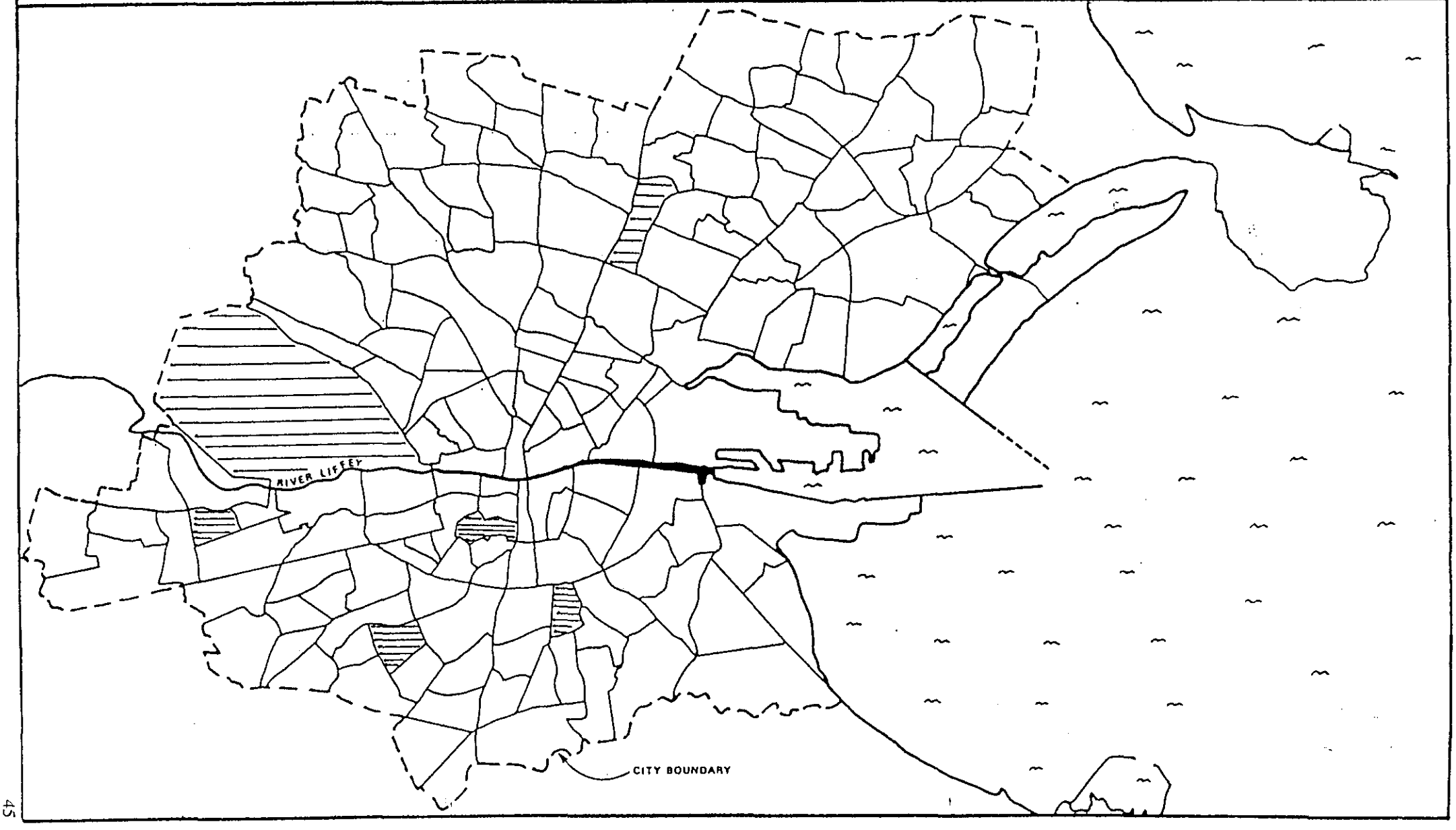
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]PNFLU.SAS

EASTERN HEALTH BOARD - EIS PROJECT

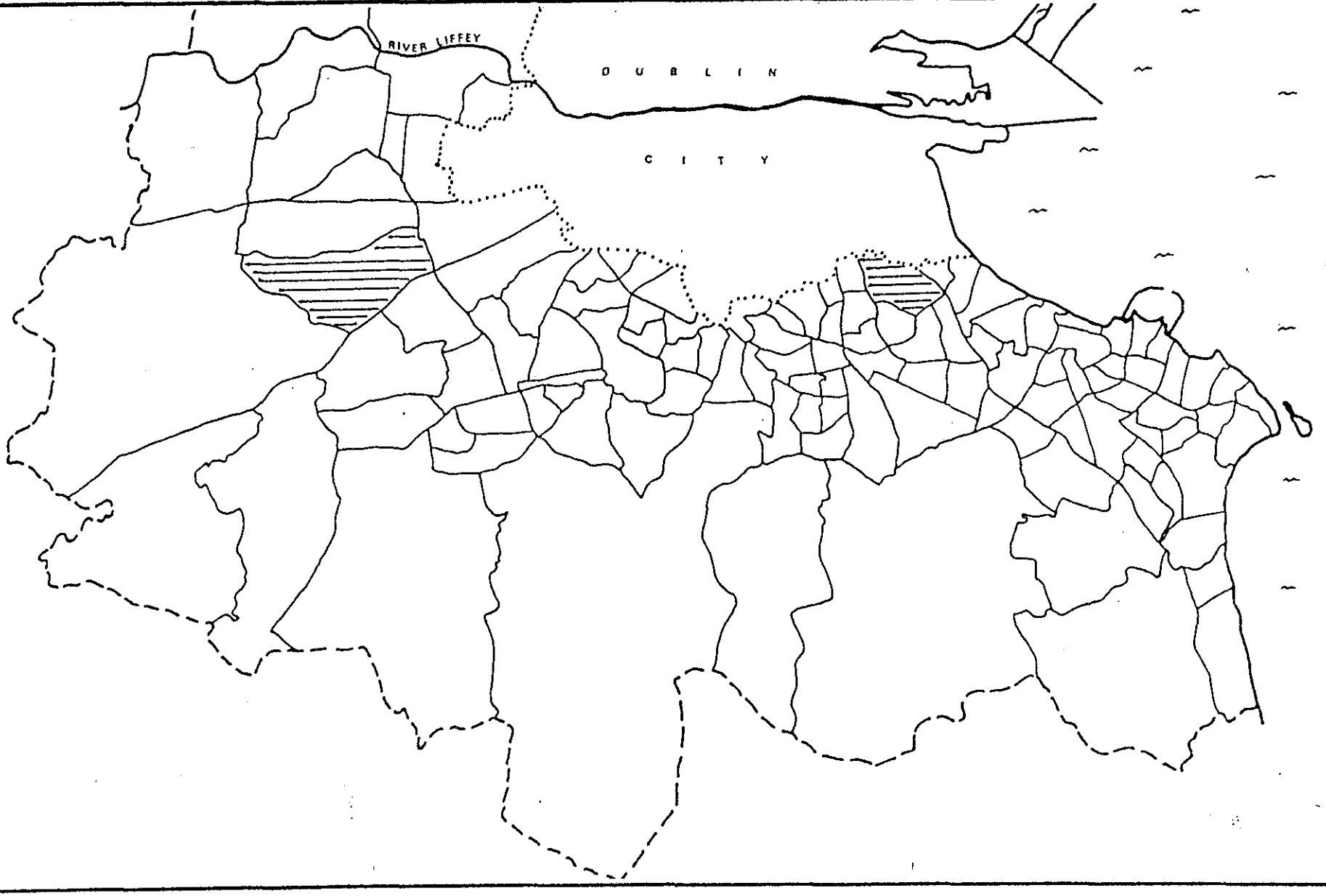
DUBLIN CITY WARDS

Cause: PNEUMONIA & INFLUENZA (ICD 480-487) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: PNEUMONIA & INFLUENZA (ICD 480-487) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average

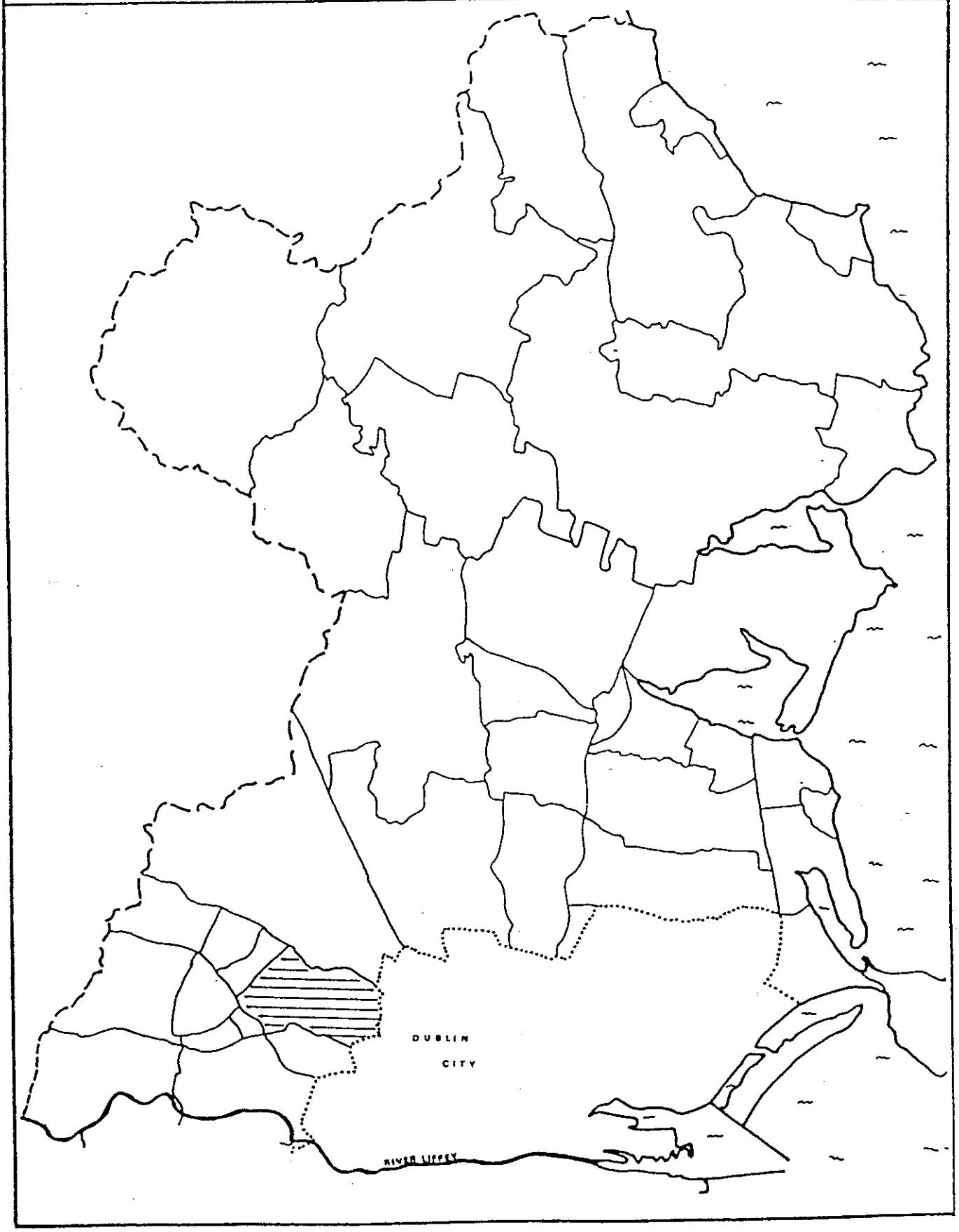


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: PNEUMONIA & INFLUENZA (ICD 480-487) MALES & FEMALES

Shading indicates SMR significantly above average



DEATHS DUE TO INJURIES AND POISONING
(ICD 800-999) males & females

There were 747 deaths due to injuries and poisoning registered in 1986-87. The SMR for Dublin was 100.4 and Table 8 shows that there were 83 excess deaths in the black spot areas.

Black spot clusters were to be found on the north side in the Mountjoy-Ballybough-East Wall areas, and on the south side in Kilmainham, Clondalkin-Ballyfermot and Tallaght.

Kilmore B DED which is close to the site of the Stardust disaster has had a particularly unfortunate experience during the present study period, with 10 deaths due to injuries and poisoning, an excess of 7.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO INJURIES AND POISONING (ICD 800-999)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 8 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
038	CHERRY ORCHARD A	994	(120- 3591)	2	0.20	1.80	221
305	CLONDALKIN-CAPPAGHMORE	769	(282- 1673)	6	0.78	5.22	1335
097	MANSION HOUSE B	708	(260- 1542)	6	0.85	5.15	817
105	MOUNTJOY B	421	(169- 868)	7	1.66	5.34	1641
225	KILSALLAGHAN	419	(136- 978)	5	1.19	3.81	1915
083	KILMAINHAM A	401	(183- 761)	9	2.24	6.76	2741
084	KILMAINHAM B	392	(107- 1004)	4	1.02	2.98	1138
329	TALLAGHT-BELGARD	371	(101- 949)	4	1.08	2.92	2110
087	KILMORE B	348	(167- 640)	10	2.87	7.13	4470
208	BLANCHARDSTOWN-ABBOTSTOWN	326	(120- 710)	6	1.84	4.16	1410
161	WOOD QUAY A	300	(110- 652)	6	2.00	4.00	2148
018	BALLYMUN D	290	(106- 632)	6	2.07	3.93	4003
308	CLONDALKIN-MOORFIELD	287	(124- 566)	8	2.79	5.21	6115
309	CLONDALKIN-ROWLAGH	285	(115- 588)	7	2.45	4.55	5605
009	BALLYBOUGH A	275	(132- 505)	10	3.64	6.36	3908
333	TALLAGHT-KILLINARDAN	274	(101- 596)	6	2.19	3.81	5389
108	NORTH DOCK B	245	(112- 466)	9	3.67	5.33	4021
115	PEMBROKE WEST A	240	(104- 474)	8	3.33	4.67	3233
TOTAL		332		119	36	83	52220

(SMR for all Dublin = 100.4)

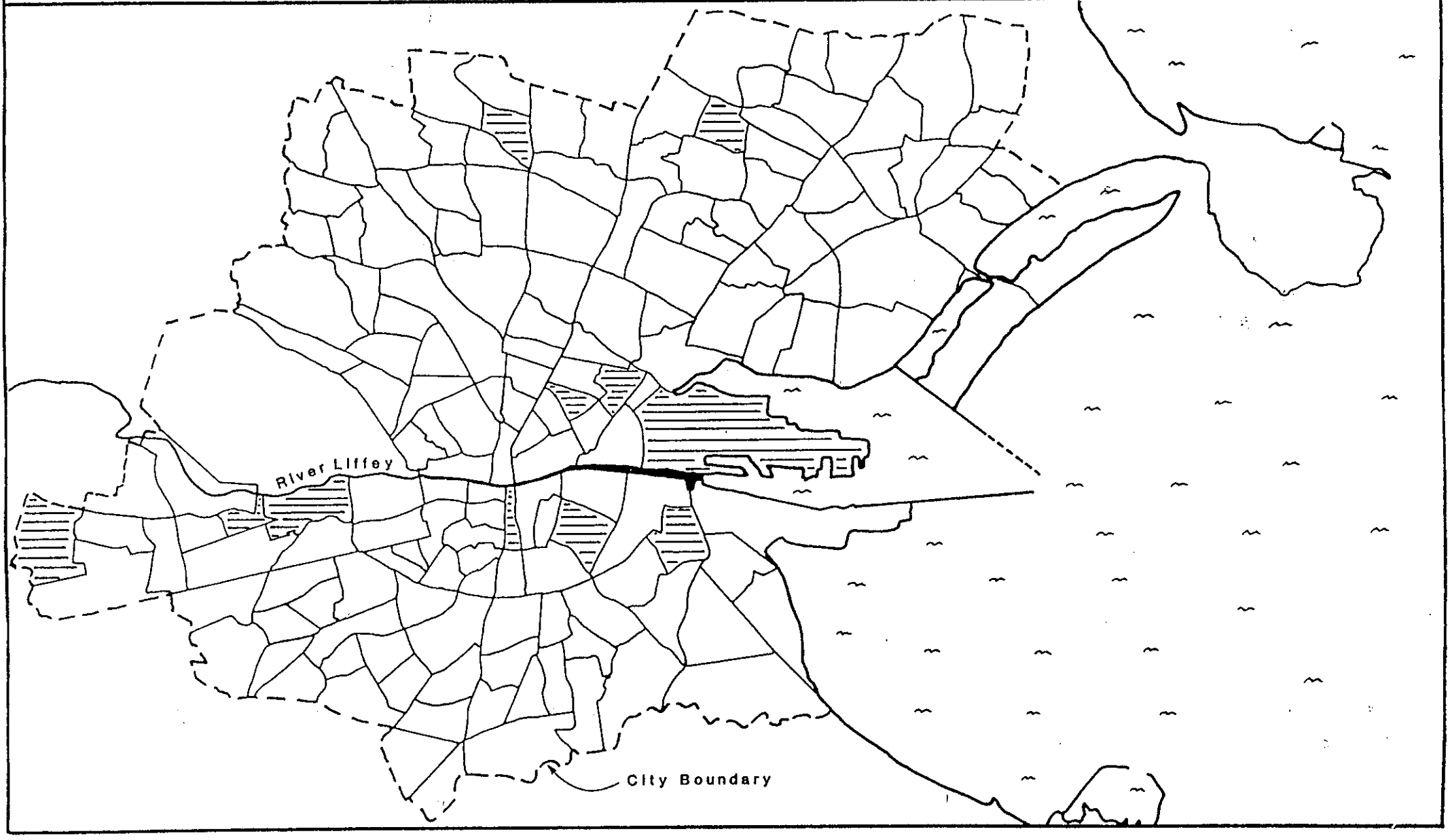
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]ACC.SAS

EASTERN HEALTH BOARD – EIS PROJECT

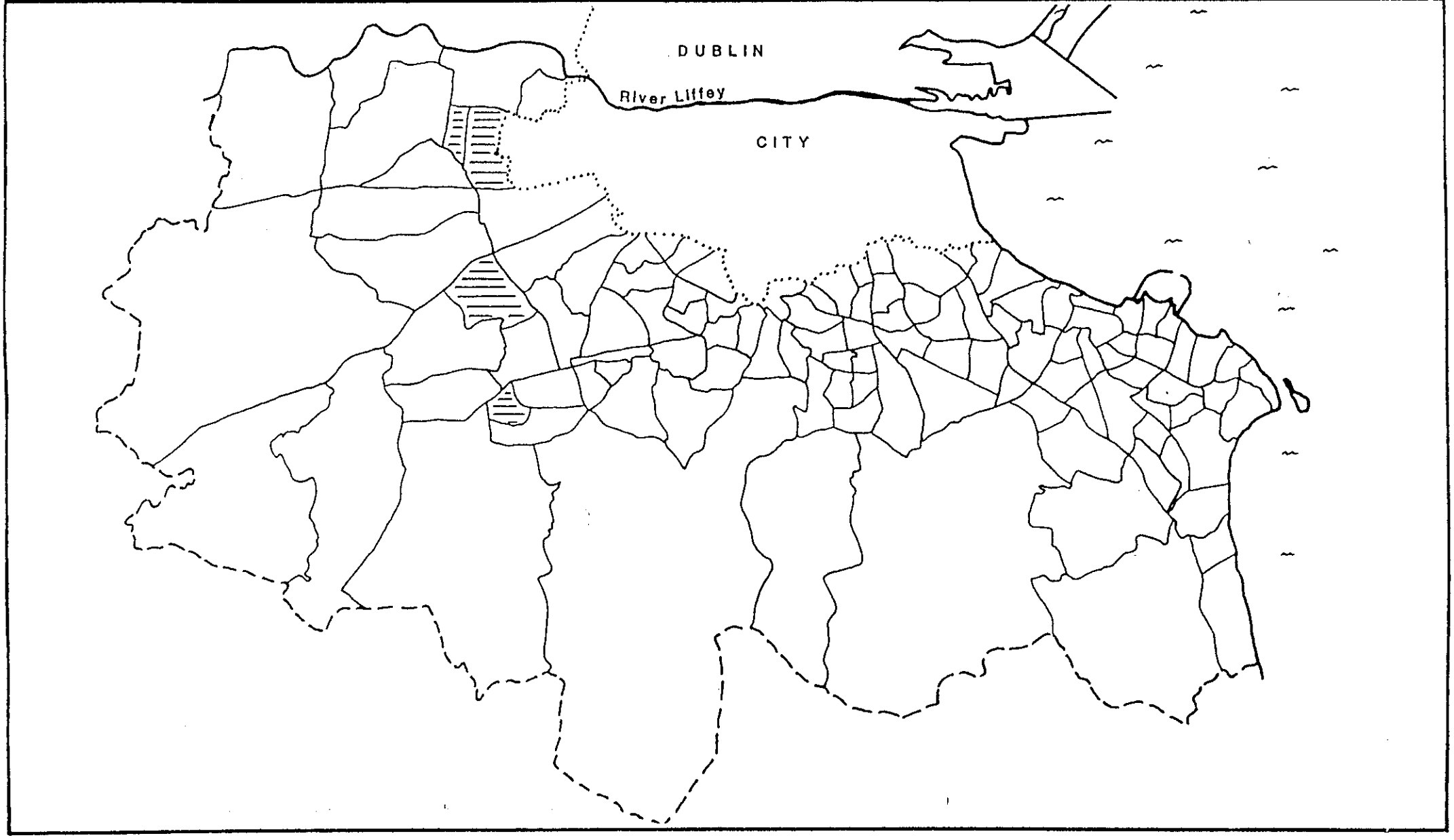
DUBLIN CITY WARDS

Cause: INJURIES & POISONING (ICD 800-999) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: INJURIES & POISONING (ICD 800-999) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average

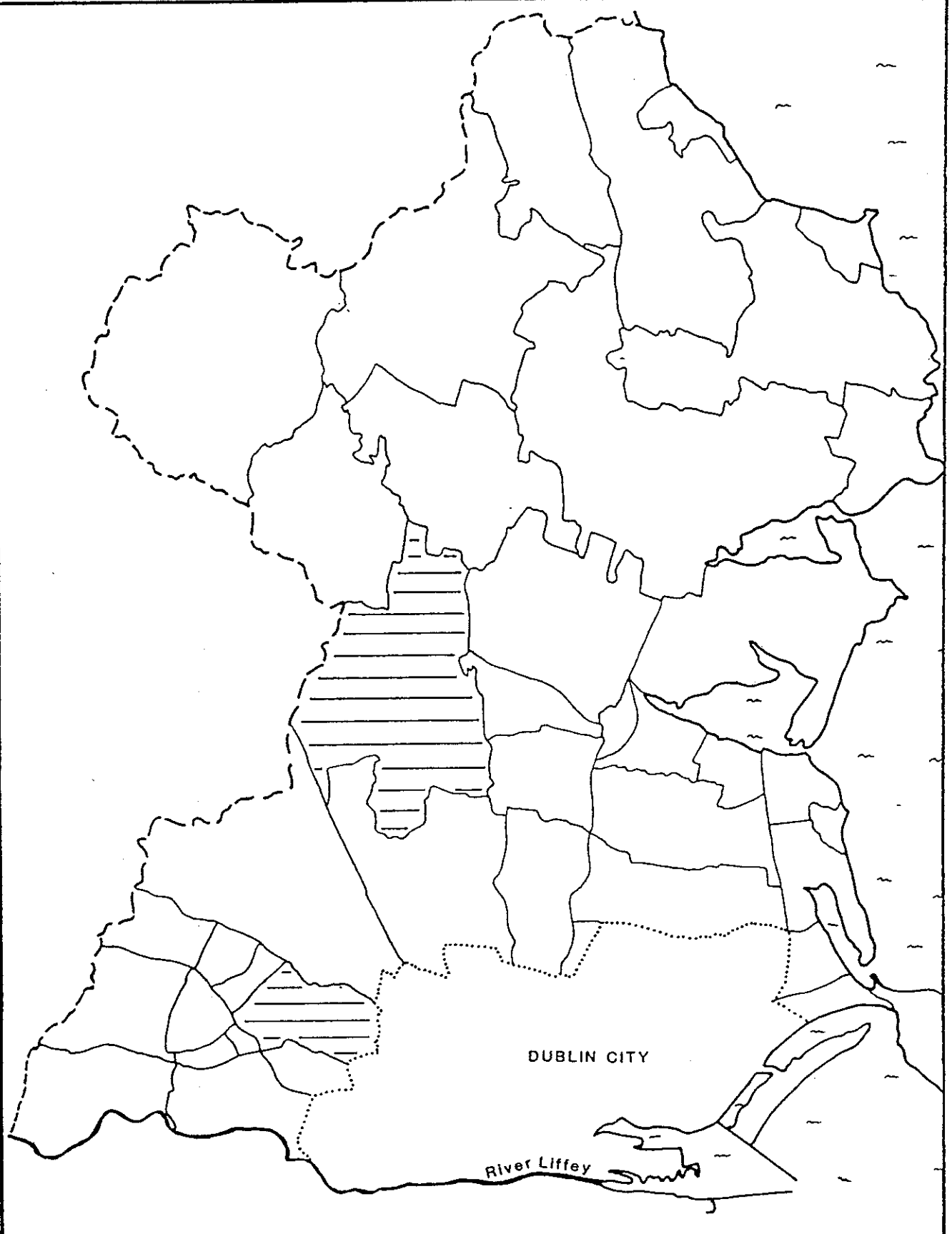


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: INJURIES & POISONING (ICD 800–999) MALES & FEMALES

Shading indicates SMR significantly above average



DEATHS DUE TO MOTOR VEHICLE TRAFFIC ACCIDENTS

(E810-E819) males & females

There were 235 deaths due to motor vehicle traffic accidents registered in 1986-87. The SMR for Dublin was 93.3 and Table 9 shows that there were 23 excess deaths in the black spot areas.

The Sherrif St-Ballybough areas were affected, and also Kilmainham-Inchicore, Finglas and Clondalkin. The figure of 4 deaths out of a population of 1335 in Clondalkin-Cappaghmore is 14 times greater than expected.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO MOTOR VEHICLE TRAFFIC ACCIDENTS (ICD E810-E819)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 9 - WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
305	CLONDALKIN-CAPPAGHMORE	1460	(398- 3738)	4	0.27	3.73	1335
083	KILMAINHAM A	676	(219- 1577)	5	0.74	4.26	2741
109	NORTH DOCK C	494	(102- 1444)	3	0.61	2.39	2672
079	INCHICORE B	476	(98- 1390)	3	0.63	2.37	2287
064	FINGLAS NORTH B	379	(103- 971)	4	1.05	2.95	3826
009	BALLYBOUGH A	360	(98- 922)	4	1.11	2.89	3908
TOTAL		521		23	4	19	16769

(SMR for all Dublin = 93.3)

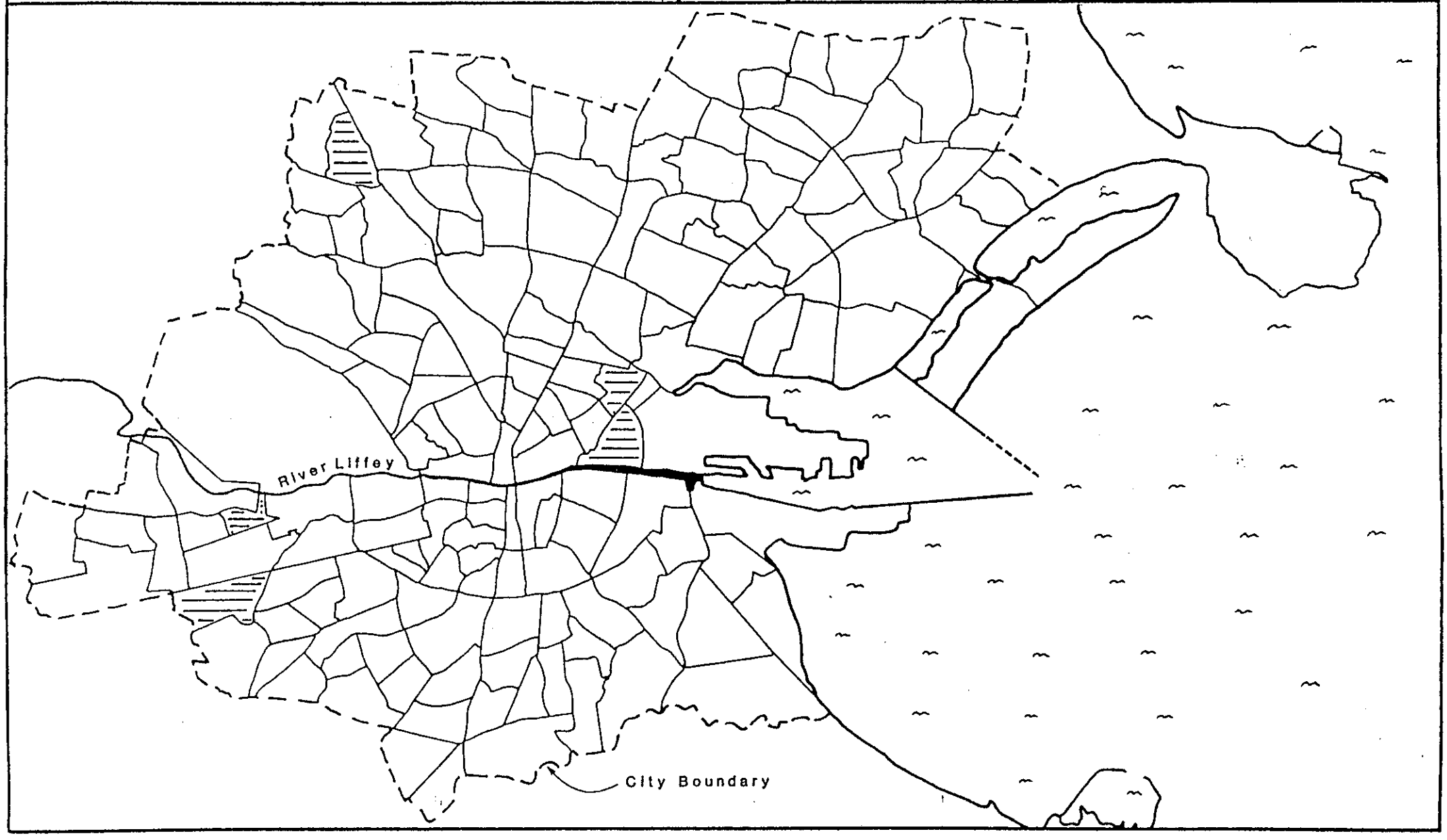
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]MVTA.SAS

EASTERN HEALTH BOARD - EIS PROJECT

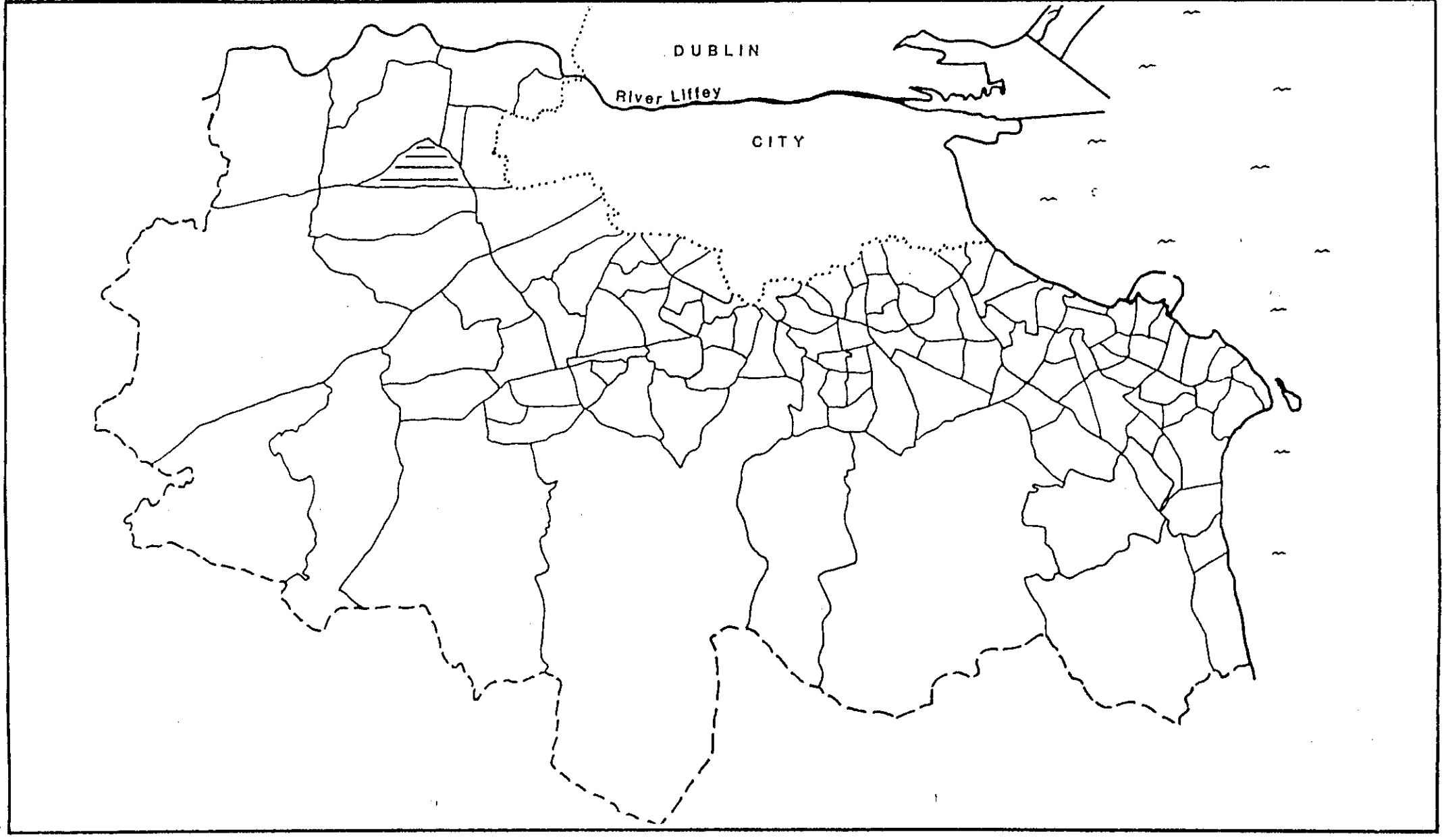
DUBLIN CITY WARDS

Cause: MOTOR VEHICLE TRAFFIC ACCIDENTS (E810-E819) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD - EIS PROJECT	Cause: MOTOR VEHICLE TRAFFIC ACCIDENTS (E810-E819) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average



DEATHS DUE TO CEREBROVASCULAR DISEASE

(ICD 430-438) males & females

There were 1,471 deaths due to cerebrovascular disease (stroke) registered in 1986-87. The SMR for Dublin was 97.8 and Table 10 shows that there were 61 excess deaths in the blackspot areas.

The black spot distribution is somewhat sporadic with a loose cluster in the Rathmines-Aungier St-Blackpitts areas. Inchicore and Crumlin are also affected as is Finglas.

The high rate in Glencullen has no obvious explanation. Effective treatment of hypertension can reduce stroke mortality, and if local investigations confirm the existence of a problem efforts to identify and treat hypertension might be increased in some of these areas.

EASTERN HEALTH BOARD - EIS PROJECT
ANALYSIS OF DEATHS IN DUBLIN AREA BY WARD/DISTRICT ELECTORAL DIVISION
DEATHS DUE TO CEREBROVASCULAR DISEASE (ICD 430-438)
(INCLUDES DEATHS OF MALES AND FEMALES IN 1986 AND 1987 COMBINED)

TABLE 10- WARDS/DEDS WITH MORTALITY RATE SIGNIFICANTLY ABOVE AVERAGE FOR DUBLIN RANKED BY SMR *

EIS Code	Ward/DED	SMR *	95% Confidence Interval	Observed Deaths	Expected Deaths	Excess Deaths	Total Population
141	ROYAL EXCHANGE B	281	(140- 503)	11	3.92	7.08	1336
133	RATHMINES WEST B	231	(115- 414)	11	4.76	6.24	2509
012	BALLYGALL B	228	(104- 434)	9	3.94	5.06	2526
208	BLANCHARDSTOWN-ABBOTSTOWN	208	(119- 338)	16	7.69	8.31	1410
090	KIMMAGE A	207	(99- 380)	10	4.84	5.16	2624
078	INCHICORE A	203	(114- 335)	15	7.38	7.62	2401
457	GLENCULLEN	197	(108- 331)	14	7.10	6.90	3427
127	RATHFARNHAM	195	(115- 308)	18	9.24	8.76	3857
101	MERCHANTS QUAY D	192	(99- 336)	12	6.24	5.76	2306
TOTAL		210		116	55	61	22396

(SMR for all Dublin = 97.8)

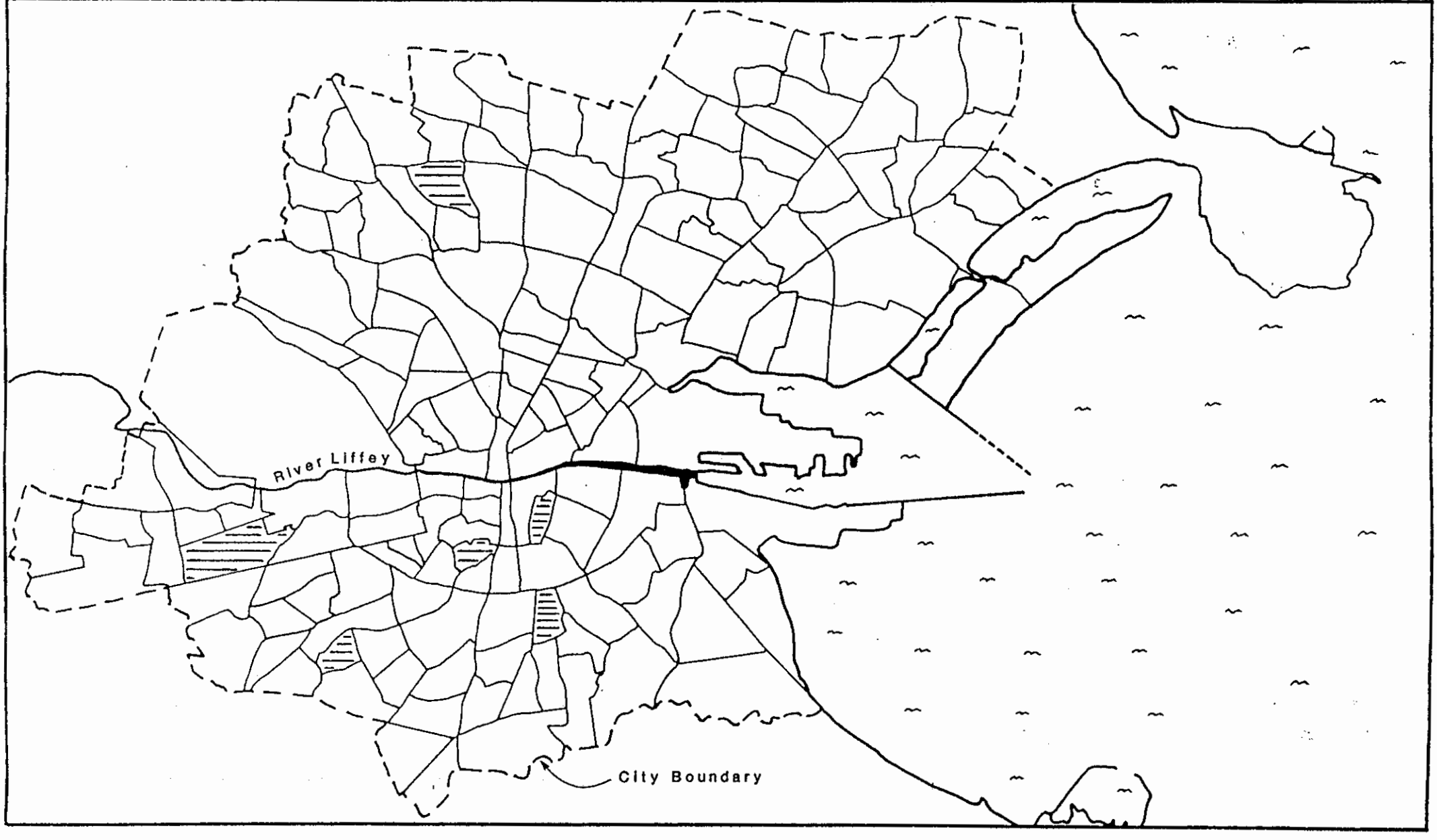
* NOTE - SMR REFERS TO STANDARDISED MORTALITY RATIO
SOURCE CODE : EHBVX6::EHBGN5:[ZJOHNSON.MORT.CAUSE]CBVD.SAS

EASTERN HEALTH BOARD – EIS PROJECT

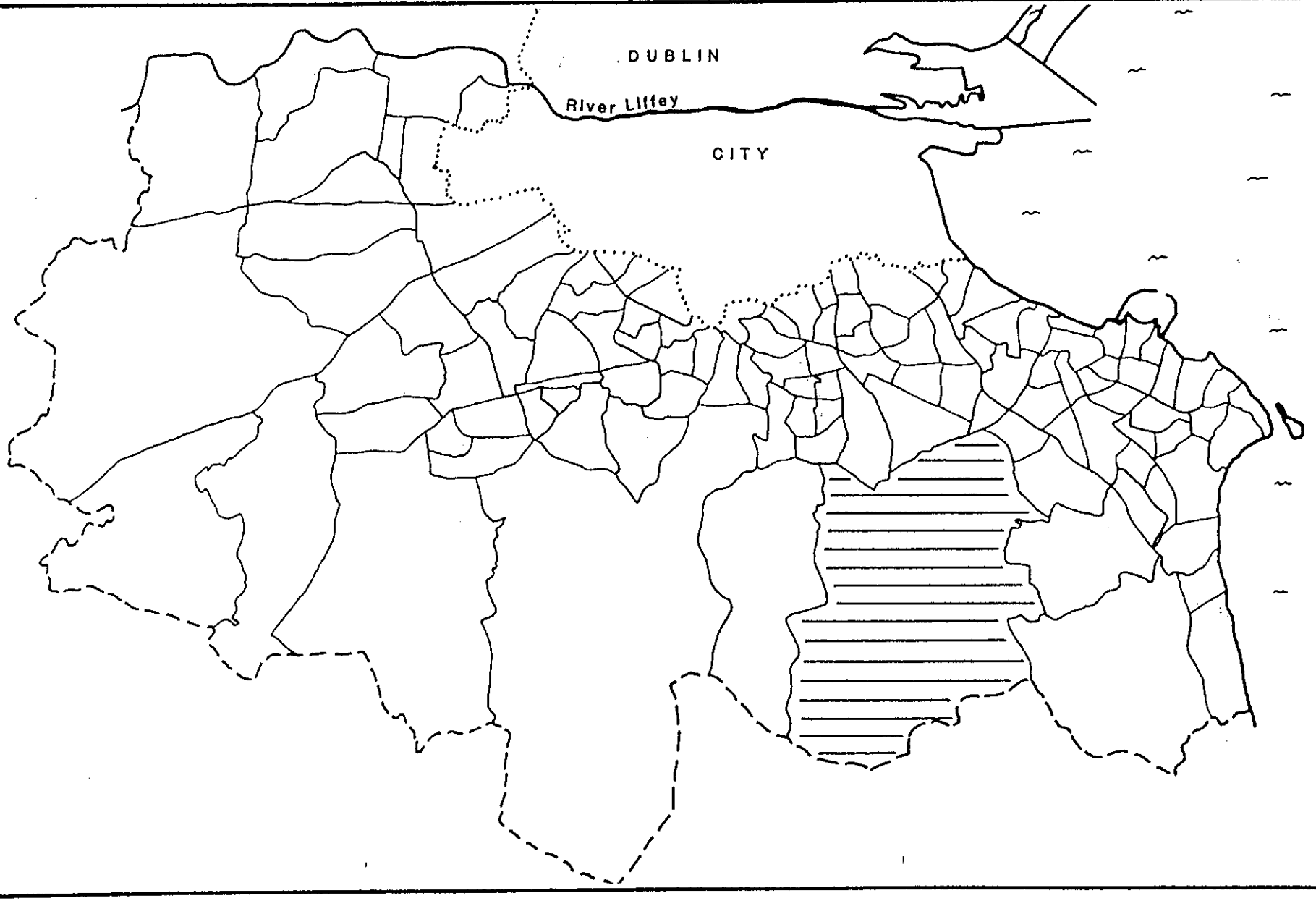
DUBLIN CITY WARDS

Cause: CEREBROVASCULAR DISEASE (ICD 430–438) MALES & FEMALES

Shading indicates SMR significantly above average



EASTERN HEALTH BOARD – EIS PROJECT	Cause: CEREBROVASCULAR DISEASE (ICD 430-438) MALES & FEMALES
SOUTH COUNTY DUBLIN DEDs	Shading indicates SMR significantly above average

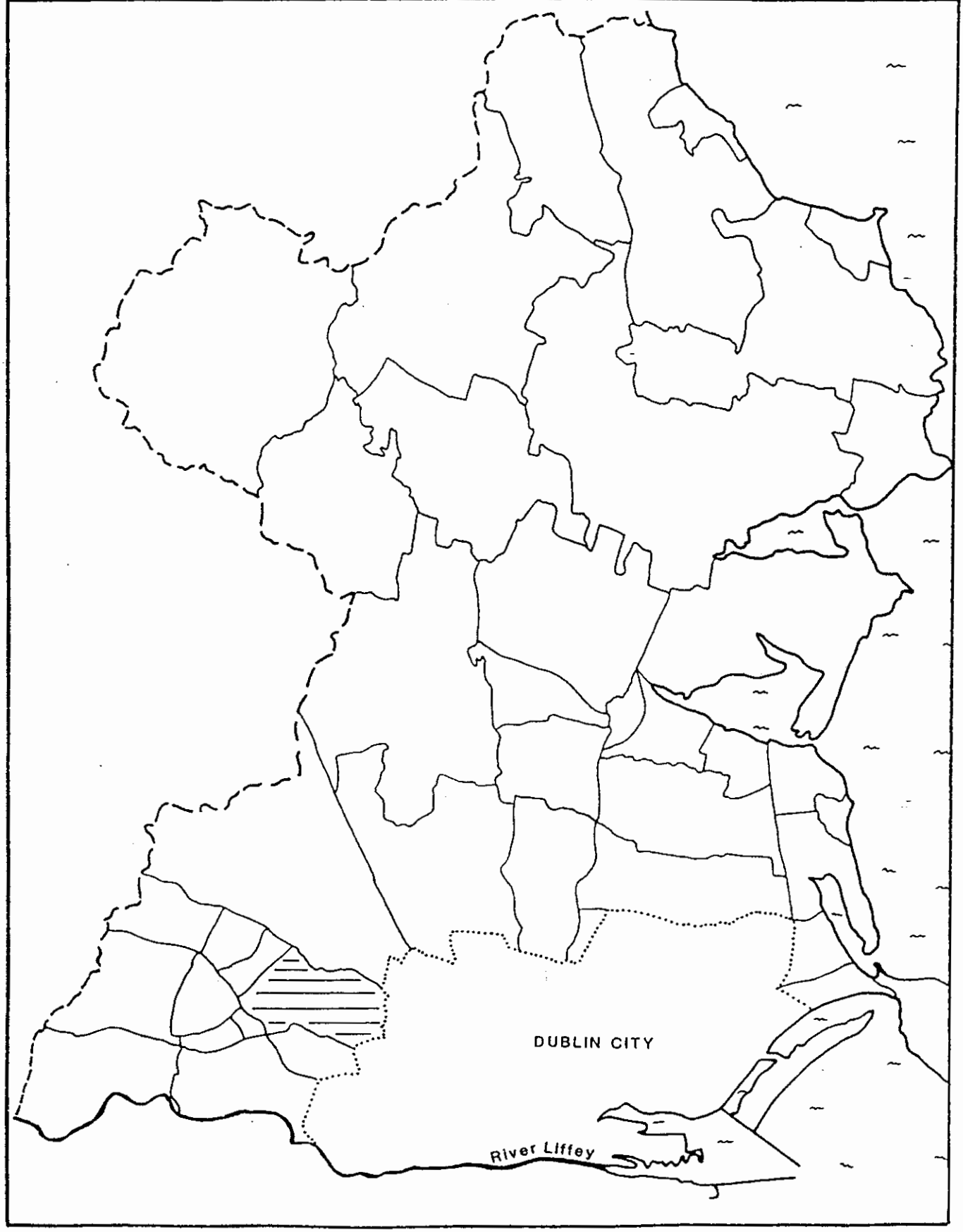


EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs

Cause: CEREBROVASCULAR DISEASE (ICD 430–438) MALES & FEMALES

Shading indicates SMR significantly above average



DISCUSSION

The object of this study was the identification of mortality black spots in Dublin. It appears from the results that mortality is not randomly distributed in Dublin - instead it seems to cluster in certain DEDs. This finding gives rise to a number of questions.

(a) *How much confidence can we have in the findings?*

First, on the question of diagnosis, there is no doubt that death certificate data are subject to error. The use of death certificate data for epidemiological purposes has been reviewed by Dr A M Adelstein (10) of the Office of Population Census and Surveys in the UK. He discusses studies like the present one in which mortality patterns are being compared with those of a standard population, which itself is subject to similar limitations of diagnosis. That there would be a systematic diagnostic error in favour of particular small geographical areas seems unlikely.

Second, how accurate was the DED coding of individual deaths? This exercise was carried out and supervised by well trained and motivated personnel in the CSO using a comprehensive street index provided by the EHB, in addition to detailed maps. Any errors are likely to have been random, and it is unlikely that there would be systematic error in favour of particular DEDs.

(b) *Is there any general pattern to the findings?*

Although detailed socio-economic data from the 1986 census are not yet available for Dublin, it does appear that, in general, mortality is higher than average in 'poorer' parts of Dublin, and lower than average in better-off parts. This is in line with findings in Manchester, Birmingham and Glasgow (6,7,8).

The present study cannot be interpreted as proving that poverty 'causes' excess mortality. However, it has identified places where the mortality rate is sufficiently out of line with the rest of Dublin to merit further investigation.

(c) *What is the next step?*

The Directors of Community Care/Medical Officers of Health would seem to have a major role in developing a coherent response to these findings. A series of local investigations involving community medicine staff with assistance from the EIS would seem to be indicated. There are some DEDs where the SMR appears to have been distorted by the presence of a long stay geriatric facility - for example St Mary's Hospital in Phoenix Park. This type of finding must be checked using local knowledge with the aim of excluding areas where such distortion may be occurring. The next step would be to focus on the remaining black spots and to check whether the study findings are in line with local experience.

(d) *What further investigation is required?*

Assuming that a certain number of DEDs are identified where the elevation in mortality seems real and important, the next move should be to focus on those areas where deaths from 'preventable' causes seem greatest. For example, if lung cancer is a major problem in a particular DED it may be worth carrying out a survey to see if the prevalence of smoking in that area is above the norm. Similarly, it may be worth looking at the prevalence of hypercholesterolaemia where ischaemic heart disease mortality is high.

(e) *Can mortality data be viewed in isolation?*

To build a complete picture of health in an area, information on morbidity and on service

utilisation is needed in addition to mortality. As part of the EIS project, we are developing methods of providing morbidity indicators for example via drug consumption patterns among medical card populations. However, mortality patterns may be sufficiently compelling on their own to warrant action.

(f) *What about intervention?*

Statistics are a tool, not an end in themselves. If following local investigation of black spots, there is evidence of excessive preventable mortality, specific intervention should be tried. Some might feel that it would be better not to identify black spots, and that the health services should concentrate on dealing with overt demands rather than looking for specific needs. This type of response would be unfortunate as the black spot information would seem to provide the health services with an opportunity to make a significant improvement to health.

On the other hand, others might call for massive allocation of health care resources to problem areas without a detailed investigation and careful consideration of objectives. This type of response would also be inappropriate and wasteful. The correct approach probably lies somewhere between these extremes.

As Dr Womersley pointed out (8), specific health problems of individual areas should be identified and then tackled collectively. Ideally, intervention activities for a particular area should be integrated so that health care workers, local authorities, voluntary groups and above all the local population are all aware of the problems and and involved in the plans for dealing with them. The Kilkenny project might be a useful model in this regard.

Getting the co-operation and involvement of the local community would seem quite essential as many of the problems which we have identified will require significant 'lifestyle' changes. One project already under way in the EHB area which has secured good local involvement is the Community Mother Project which is funded by the van Leer Foundation. Perhaps this concept might be expanded to try and encompass specific health problems.

Whatever the nature of the intervention, it should be piloted in a small number of selected areas, and carefully monitored. It should not be extended until it has been shown to be effective in pilot areas. For many conditions, mortality would be an unrealistic indicator of effectivness and measures of behaviour change or morbidity will have to be used.

From the point of view of health economics, in situations where health services are being cut back due to lack of resources, there is another side to the findings of small area analysis. It may well be possible to reduce services somewhat in areas with good health without causing undue problems. However, such a course of action would require careful planning and monitoring.

Finally, on a broader level, it must be said that if resources can be used effectively to raise the standard of living and of education in places where these are low, this is likely to lead to a general improvement in health of the people living there. If this study can contribute to that end, it will have served a useful purpose.

CONCLUSION

In conclusion, it does appear that small area analysis of mortality data in Dublin is useful in that it can highlight places where mortality appears to be above average. In general, these are in less affluent parts of the city. Although it is impossible to be sure that the same parts of Dublin would manifest similar elevated death rates if the study were to be extended to include further years, the results are broadly in line with similar studies carried out in British cities.

However, the findings must not be accepted at face value because of a number of potential biases inherent in the data. The correct way forward should include local investigation in the black spot areas and if intervention is then attempted it should be carefully planned and implemented.

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Neill O'Rahilly, Staff Officer

University College Dublin

Leslie Daly, Medical Statistician, Department of Community Medicine

ZJ, PD June 1989

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APPENDIX 1

Listing of EIS codes for wards/DEDs in Dublin

APPENDIX 1 LISTING OF EIS CODES FOR WARDS/DEDS IN DUBLIN

CODE	WARD/DED
001	ARRAN QUAY A
002	ARRAN QUAY B
003	ARRAN QUAY C
004	ARRAN QUAY D
005	ARRAN QUAY E
006	ASHTOWN A
007	ASHTOWN B
008	AYRFIELD
009	BALLYBOUGH A
010	BALLYBOUGH B
011	BALLYGALL A
012	BALLYGALL B
013	BALLYGALL C
014	BALLYGALL D
015	BALLYMUN A
016	BALLYMUN B
017	BALLYMUN C
018	BALLYMUN D
019	BALLYMUN E
020	BALLYMUN F
021	BEAUMONT A
022	BEAUMONT B
023	BEAUMONT C
024	BEAUMONT D
025	BEAUMONT E
026	BEAUMONT F
027	BOTANIC A
028	BOTANIC B
029	BOTANIC C
030	CABRA EAST A
031	CABRA EAST B
032	CABRA EAST C
033	CABRA WEST A
034	CABRA WEST B
035	CABRA WEST C
036	CABRA WEST D
037	CHAPELIZOD
038	CHERRY ORCHARD A
039	CHERRY ORCHARD B
040	CHERRY ORCHARD C
041	CLONTARF EAST A
042	CLONTARF EAST B
043	CLONTARF EAST C
044	CLONTARF EAST D
045	CLONTARF EAST E
046	CLONTARF WEST A
047	CLONTARF WEST B
048	CLONTARF WEST C
049	CLONTARF WEST D
050	CLONTARF WEST E
051	CRUMLIN A
052	CRUMLIN B
053	CRUMLIN C
054	CRUMLIN D
055	CRUMLIN E
056	CRUMLIN F
057	DECIES
058	DRUMCONDRA SOUTH A
059	DRUMCONDRA SOUTH B
060	DRUMCONDRA SOUTH C
061	DRUMFINN
062	EDENMORE
063	FINGLAS NORTH A
064	FINGLAS NORTH B
065	FINGLAS NORTH C
066	FINGLAS SOUTH A
067	FINGLAS SOUTH B
068	FINGLAS SOUTH C

APPENDIX 1 LISTING OF EIS CODES FOR WARDS/DEDS IN DUBLIN

CODE	WARD/DED
069	FINGLAS SOUTH D
070	GRACE PARK
071	GRANGE A
072	GRANGE B
073	GRANGE C
074	GRANGE D
075	GRANGE E
076	HARMONSTOWN A
077	HARMONSTOWN B
078	INCHICORE A
079	INCHICORE B
080	INNS QUAY A
081	INNS QUAY B
082	INNS QUAY C
083	KILMAINHAM A
084	KILMAINHAM B
085	KILMAINHAM C
086	KILMORE A
087	KILMORE B
088	KILMORE C
089	KILMORE D
090	KIMMAGE A
091	KIMMAGE B
092	KIMMAGE C
093	KIMMAGE D
094	KIMMAGE E
095	KYLEMORE
096	MANSION HOUSE A
097	MANSION HOUSE B
098	MERCHANTS QUAY A
099	MERCHANTS QUAY B
100	MERCHANTS QUAY C
101	MERCHANTS QUAY D
102	MERCHANTS QUAY E
103	MERCHANTS QUAY F
104	MOUNTJOY A
105	MOUNTJOY B
106	NORTH CITY
107	NORTH DOCK A
108	NORTH DOCK B
109	NORTH DOCK C
110	PEMBROKE EAST A
111	PEMBROKE EAST B
112	PEMBROKE EAST C
113	PEMBROKE EAST D
114	PEMBROKE EAST E
115	PEMBROKE WEST A
116	PEMBROKE WEST B
117	PEMBROKE WEST C
118	PHOENIX PARK
119	PRIORSWOOD A
120	PRIORSWOOD B
121	PRIORSWOOD C
122	PRIORSWOOD D
123	PRIORSWOOD E
124	RAHENY-FOXFIELD
125	RAHENY-GREENDALE
126	RAHENY-ST ASSAM
127	RATHFARNHAM
128	RATHMINES EAST A
129	RATHMINES EAST B
130	RATHMINES EAST C
131	RATHMINES EAST D
132	RATHMINES WEST A
133	RATHMINES WEST B
134	RATHMINES WEST C
135	RATHMINES WEST D
136	RATHMINES WEST E

APPENDIX 1 LISTING OF EIS CODES FOR WARDS/DEDS IN DUBLIN

CODE	WARD/DED
137	RATHMINES WEST F
138	ROTUNDA A
139	ROTUNDA B
140	ROYAL EXCHANGE A
141	ROYAL EXCHANGE B
142	ST KEVINS
143	SOUTH DOCK
144	TERENURE A
145	TERENURE B
146	TERENURE C
147	TERENURE D
148	USHERS A
149	USHERS B
150	USHERS C
151	USHERS D
152	USHERS E
153	USHERS F
154	WALKINSTOWN A
155	WALKINSTOWN B
156	WALKINSTOWN C
157	WHITEHALL A
158	WHITEHALL B
159	WHITEHALL C
160	WHITEHALL D
161	WOOD QUAY A
162	WOOD QUAY B
201	AIRPORT
202	BALBRIGGAN RURAL
203	BALBRIGGAN URBAN
204	BALDOYLE
205	BALGRIFFIN
206	BALLYBOGHIL
207	BALSCADDEN
208	BLANCHARDSTOWN-ABBOTSTOWN
209	BLANCHARDSTOWN-BLAKESTOWN
210	BLANCHARDSTOWN-COOLMINE
211	BLANCHARDSTOWN-CORDUFF
212	BLANCHARDSTOWN-DELWOOD
213	BLANCHARDSTOWN-MULHUDDART
214	BLANCHARDSTOWN-ROSELAWN
215	BLANCHARDSTOWN-TYRRELSTOWN
216	CASTLEKNOCK-KNOCKMAROON
217	CASTLEKNOCK-PARK
218	CLONMETHAN
219	DONABATE
220	DUBBER
221	GARRISTOWN
222	HOLLYWOOD
223	HOLMPATRICK
224	HOWTH
225	KILSALLAGHAN
226	KINSALEY
227	LUCAN NORTH
228	LUSK
229	MALAHIDE EAST
230	MALAHIDE WEST
231	PORTMARNOCK NORTH
232	PORTMARNOCK SOUTH
233	RUSH
234	SKERRIES
235	SUTTON
236	SWORDS-FORREST
237	SWORDS-GLASMORE
238	SWORDS-LISSENHALL
239	SWORDS-SEATOWN
240	SWORDS VILLAGE
241	THE WARD
242	TURNAPIN

APPENDIX 1 LISTING OF EIS CODES FOR WARDS/DEDS IN DUBLIN

CODE	WARD/DED
301	BALLINASCORNEY
302	BALLYBODEN
303	BOHERNABREENA
304	CLONDALKIN-BALLYMOUNT
305	CLONDALKIN-CAPPAGHMORE
306	CLONDALKIN-DUNAWLEY
307	CLONDALKIN-MONASTERY
308	CLONDALKIN-MOORFIELD
309	CLONDALKIN-ROWLAGH
310	CLONDALKIN VILLAGE
311	EDMONDSTOWN
312	FIRHOUSE-BALLYCULLEN
313	FIRHOUSE-KNOCKLYON
314	FIRHOUSE VILLAGE
315	LUCAN-ESKER
316	LUCAN HEIGHTS
317	LUCAN-ST HELENS
318	NEWCASTLE
319	PALMERSTOWN VILLAGE
320	PALMERSTOWN WEST
321	RATHCOOLE
322	RATHFARNHAM-BALLYROAN
323	RATHFARNHAM-BUTTERFIELD
324	RATHFARNHAM-HERMITAGE
325	RATHFARNHAM-ST ENDAS
326	RATHFARNHAM VILLAGE
327	SAGGART
328	TALLAGHT-AVONBEG
329	TALLAGHT-BELGARD
330	TALLAGHT-FETTERCAIRN
331	TALLAGHT-GLENVIEW
332	TALLAGHT-JOBSTOWN
333	TALLAGHT-KILLINARDAN
334	TALLAGHT-KILNAMANAGH
335	TALLAGHT-KILTIPPER
336	TALLAGHT-KINGSWOOD
337	TALLAGHT-MILLBROOK
338	TALLAGHT-OLDBAWN
339	TALLAGHT-SPRINGFIELD
340	TALLAGHT-TYMON
341	TEMPLEOGUE-CYPRESS
342	TEMPLEOGUE-KIMMAGE MANOR
343	TEMPLEOGUE-LIMEKILN
344	TEMPLEOGUE-ORWELL
345	TEMPLEOGUE-OSPREY
346	TEMPLEOGUE VILLAGE
347	TERENURE-CHERRYFIELD
348	TERENURE-GREENTREES
349	TERENURE-ST JAMES
401	BALLINTEER-BROADFORD
402	BALLINTEER-LUDFORD
403	BALLINTEER-MARLEY
404	BALLINTEER-MEADOWBROADS
405	BALLINTEER-MEADOWMOUNT
406	BALLINTEER-WOODPARK
407	BALLYBRACK
408	BLACKROCK-BOOTERSTOWN
409	BLACKROCK-CARYSFORT
410	BLACKROCK-CENTRAL
411	BLACKROCK-GLENOMENA
412	BLACKROCK-MONKSTOWN
413	BLACKROCK-NEWPARK
414	BLACKROCK-SEAPOINT
415	BLACKROCK-STRADBROOK
416	BLACKROCK-TEMPLEHILL
417	BLACKROCK-WILLIAMSTOWN
418	CABINTEELY-GRANITEFIELD
419	CABINTEELY-KILBOGGET

APPENDIX 1 LISTING OF EIS CODES FOR WARDS/DEDS IN DUBLIN

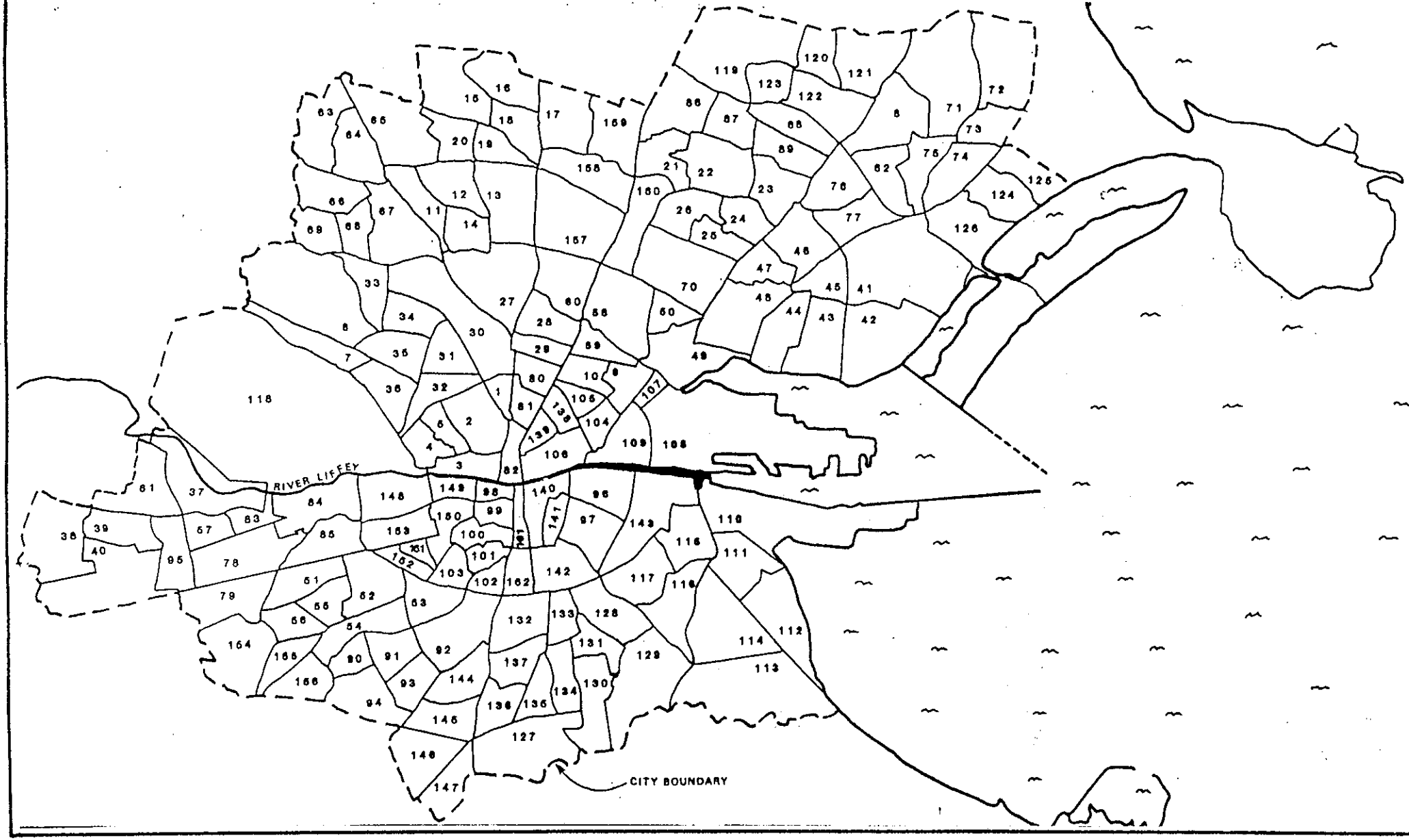
CODE	WARD/DED
420	CABINTEELY-LOUGHLINSTOWN
421	CABINTEELY-POTTERY
422	CHURCHTOWN-CASTLE
423	CHURCHTOWN-LANDSCAPE
424	CHURCHTOWN-NUTGROVE
425	CHURCHTOWN-ORWELL
426	CHURCHTOWN-WOODLAWN
427	CLONSKEAGH-BELFIELD
428	CLONSKEAGH-FARRANBOLEY
429	CLONSKEAGH-MILLTOWN
430	CLONSKEAGH-ROEBUCK
431	CLONSKEAGH-WINDY ARBOUR
432	DALKEY-AVONDALE
433	DALKEY-BULLOCK
434	DALKEY-COLIEMORE
435	DALKEY HILL
436	DALKEY UPPER
437	DUNDRUM BALALLY
438	DUNDRUM-KILMACUD
439	DUNDRUM-SANDYFORD
440	DUNDRUM-SWEETMOUNT
441	DUNDRUM-TANEY
442	DUN LAOGHAIRE-EAST CENTRAL
443	DUN LAOGHAIRE-GLASTHULE
444	DUN LAOGHAIRE-GLENAGEARY
445	DUN LAOGHAIRE-MONKSTOWN FARM
446	DUN LAOGHAIRE-MOUNT TOWN
447	DUN LAOGHAIRE-SALLYNOGGIN EAST
448	DUN LAOGHAIRE-SALLYNOGGIN SOUTH
449	DUN LAOGHAIRE-SALLYNOGGIN WEST
450	DUN LAOGHAIRE-SANDYCOVE
451	DUN LAOGHAIRE SALTHILL
452	DUN LAOGHAIRE-WEST CENTRAL
453	FOXROCK-BEECHPARK
454	FOXROCK-CARRICKMINES
455	FOXROCK-DEANSGRANGE
456	FOXROCK-TORQUAY
457	GLENCULLEN
458	KILLINEY NORTH
459	KILLINEY SOUTH
460	SHANKILL-RATHMICHAEL
461	SHANKILL-RATHSALLAGH
462	SHANKILL-SHANGANAGH
463	STILLORGAN-DEERPARK
464	STILLORGAN-KILMACUD
465	STILLORGAN-LEOPARDSTOWN
466	STILLORGAN-MERVILLE
467	STILLORGAN-MOUNT MERRION
468	STILLORGAN-PRIORY
469	TIBRADDEN

APPENDIX 2

Maps showing wards/DEDs in Dublin marked with EIS codes.

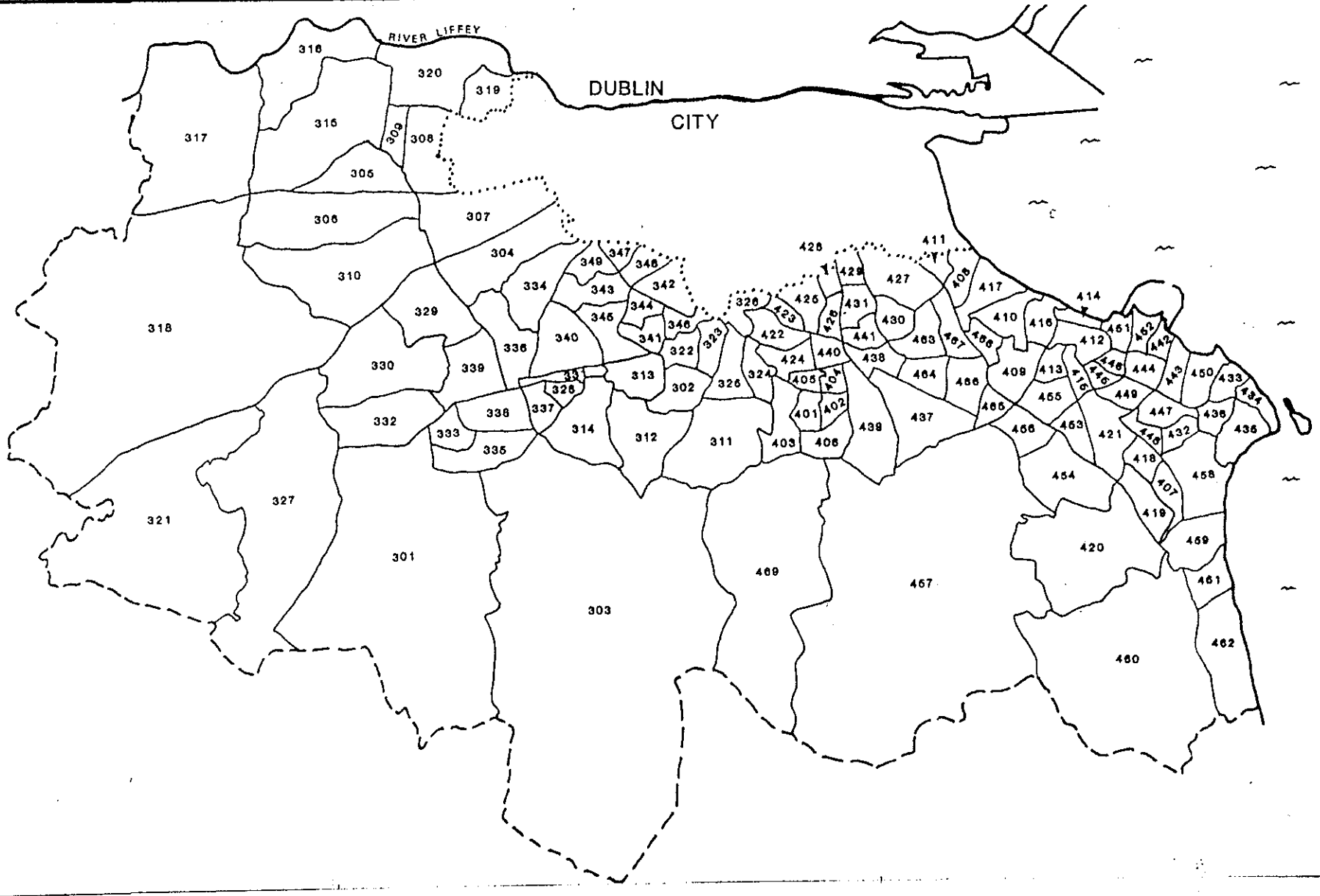
EASTERN HEALTH BOARD – EIS PROJECT

DUBLIN CITY WARDS



EASTERN HEALTH BOARD – EIS PROJECT

SOUTH COUNTY DUBLIN DEDs



EASTERN HEALTH BOARD – EIS PROJECT

NORTH COUNTY DUBLIN DEDs