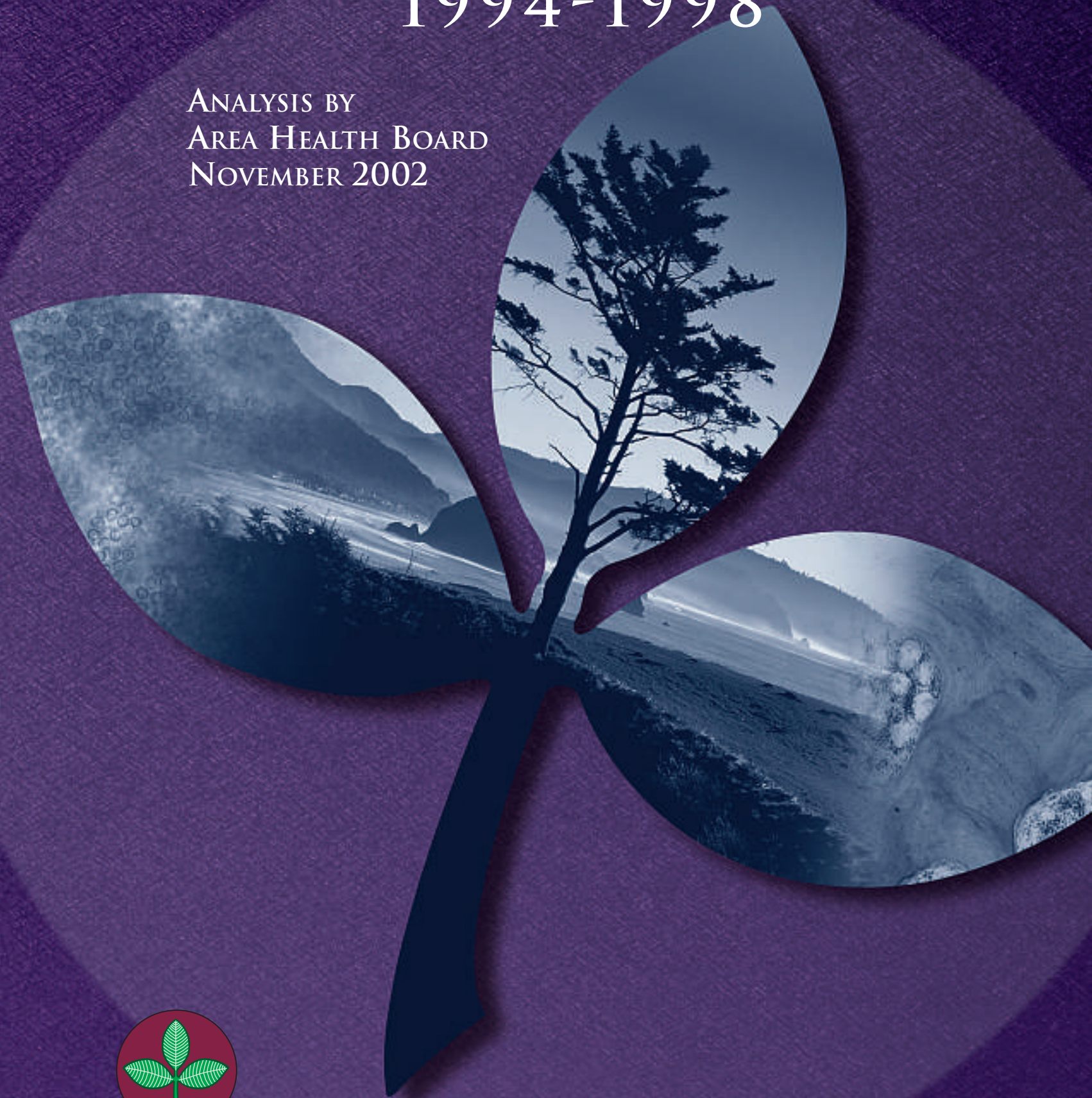


MORTALITY IN THE EASTERN REGION 1994-1998

ANALYSIS BY
AREA HEALTH BOARD
NOVEMBER 2002



DEPARTMENT OF PUBLIC HEALTH
EASTERN REGIONAL HEALTH AUTHORITY
DR. STEEVENS' HOSPITAL
STEEVENS' LANE
DUBLIN 8

TELEPHONE: 01 635 2170
FAX: 01 635 2103

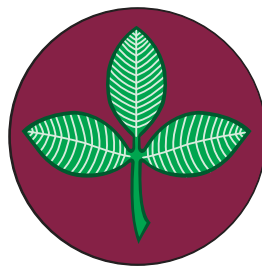


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1994-1998

Analysis by Area Health Board



**Department of Public Health
Eastern Regional Health Authority
Dr. Steeven's Hospital
Dublin 8**

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MEMBERSHIP OF MORTALITY STUDY GROUP

Dr. Siobhan Jennings (*Chair*) – Specialist in Public Health Medicine

Dr. Bob Mc Donnell – Specialist in Public Health Medicine

Ms. Deirdre Carey – Statistician

Ms. Niamh Murphy – Data Analyst

Dr. Lelia Thornton – Specialist in Public Health Medicine

Department of Public Health, Room G29, Dr. Steeven's Hospital, Steeven's Lane, Dublin 8.

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GLOSSARY OF TERMS

ERHA	Eastern Regional Health Authority
ECAHB	East Coast Area Health Board
NAHB	Northern Area Health Board
SWAHB	South Western Area Health Board
SMR	Standardised Mortality Ratio
CI	Confidence Interval
DED	District Electoral Division
CSO	Central Statistics Office
PHIS	Public Health Information System
SAS	Statistical Analysis System
EU	European Union

1. INTRODUCTION

Mortality is a prime indicator of health status nationally and internationally. Geographical variations in mortality have been demonstrated in a number of studies in the past two decades. The present study follows on earlier work by Dr. Zachary Johnson in Dublin in 1989¹, with particular emphasis on the use of the findings for service planning and wider planning for health improvement in the entire Eastern Region.

In March 2000, the Eastern Health Board, covering the counties of Dublin, Kildare and Wicklow, was dissolved and replaced by the Eastern Regional Health Authority and three area health boards – the East Coast Area Health Board (ECAHB), the Northern Area Health Board (NAHB) and the South Western Area Health Board (SWAHB). This initial report reflects these structural changes insofar as mortality for the Eastern Region is analysed on an area health board basis.

Aim of study

The aim of this study is to present and illustrate area health board variations in mortality by gender for the following five main causes of death, and certain sub-categories, for the five year period 1994 to 1998:

- All Causes
- All Cancers
 - Lung Cancer
 - Colorectal Cancer
 - Breast Cancer
 - Prostate Cancer
- All Diseases of the Circulatory System
 - Ischaemic Heart Disease
 - Cerebrovascular Disease
- All Diseases of the Respiratory System
- Injuries and Poisonings

Objectives:

- To study the 1994-1998 mortality data for accuracy and completeness of DED (District Electoral Division) coding. The quality of such coding is crucial as

the catchment areas of the area health boards are not natural geographical divisions; they are instead defined by their DED components.

- To use the indirect standardisation method in order to generate a Standardised Mortality Ratio (SMR) for each area under consideration. Area comparisons are then possible as the effects of differences in age between populations have been removed.

Further studies are planned: (a) premature mortality analysed at area health board level; (b) a full analysis at DED level, as this is the smallest unit available, of mortality for the time period 1994-1998 using mapping to display the results; and (c) an analytical study comparing the findings of 1994-1998 data with Johnson's data of 1986-1987.¹

Recent material on mortality patterns

The publication of the *Black Report* in 1980² in Britain initiated an important debate in public health and political circles. It was an attempt to explain trends in health inequalities and the possibility of using them to develop policy. Following this, the more recently published *Acheson Report*³ investigated the relationship between mortality and the following factors: income distribution, below average income, education, employment, housing, homelessness, safety and transport. It reaches the conclusion that there is a link between these and differing mortality patterns.

In Ireland recent material has also highlighted mortality and health inequalities as important concerns. *Inequalities in Mortality 1989-1998*⁴ is the most recent comprehensive study on mortality rates and patterns for the whole island. It looks at mortality variations in relation to age, gender, region and occupational class. It highlights that mortality rates in both Northern

Ireland and the Republic of Ireland compare unfavourably with other EU countries.

*Inequalities in Health in Ireland*⁵ states that there is a recognition of the need to address inequalities in health in Ireland. However, any developments are severely restricted by poor information systems, lack of research and difficulties in planning. Urgent research is needed to establish the extent of health inequality in Ireland and its complex causes.

The first *Annual Report of the Chief Medical Officer 1999*⁶ recognised health inequalities as a central theme. It proposed that any developments relating to health inequalities must be broad-based and must be committed to tackling the underlying problems of social and economic inequality.

Regionally, Johnson and Dack⁷ investigated small area mortality patterns in DEDs to enable the identification of mortality “black spots” in Dublin. At that time it was felt that analysis of health data on a geographical basis was more practical than analysis in relation to social class. Later these black spots were investigated by Johnson and Lyons⁸ to demonstrate an association between mortality in small areas and various socio-economic indicators, the objective being to determine the extent to which variation in socio-economic factors derived from the Census of Population, 1986 could explain mortality variation between small areas in Dublin. It was found that, as with cities in Britain and elsewhere, less affluent areas of Dublin appeared to suffer higher mortality than more affluent ones.

2. METHODOLOGY

Census

The Census of Population, 1996, obtained from the Central Statistics Office (CSO), was used as the denominator for calculating death rates.

Coding to area health board level

The mortality data (CSO) for the years 1994-1998 for residents of the Eastern Region were DED coded and then aggregated into the catchment areas of the three area health boards.

Reason and method of standardisation of data

This study standardised the mortality data by age to allow for the fact that one area might contain an excess of older persons and therefore might be expected to have a greater number of deaths than one with a mainly young population. The indirect method of standardisation (*with the population of the Eastern Region as standard*) was used to produce the Standardised Mortality Ratio (SMR) to allow for area comparisons.

There were 47,275 deaths for the five year period, of which DED coding was possible for 45,098 (95.4%). Because it was not possible to DED code all of the deaths the resulting SMRs for the region were less than 100 as the numbers of DED coded or observed deaths for the region were less than expected. For example, for all cause mortality, when age specific rates based on 47,275 deaths, were applied to the standard population, the resulting SMR for the region

was 95.4 rather than 100, as the number of DED coded or observed deaths for the region was 45,098 and not 47,275 as expected.

Confidence intervals

In addition to producing an SMR for each area health board, the 95% confidence interval (95% CI) for the SMR was also calculated. This consists of two figures – one below the SMR of the area health board and one above it. The 95% CI consists, therefore, of a range of values. If this range excludes the SMR for the Eastern Region as a whole, then the SMR of the area health board in question is significantly different from the figure for the Eastern Region. In the text, the word ‘significant’ is used in the statistical sense to highlight a difference which is important and unlikely to have happened by chance alone.

For example, suppose the SMR for the Eastern Region, in relation to a particular disease, is 100. If the SMR for an area health board is 200 with a 95% CI of 120-350 (the lower limit of which is above 100), then it can be inferred that the mortality in that area health board is significantly above the Eastern Region average. It is possible to be 95% sure that the true SMR for that area health board is no lower than 120 and no higher than 350.

Software

The Statistical Analysis System (SAS) package was used for analysis.

3. RESULTS

3.1 All Causes

Of the 45,098 geocoded deaths, 11,953 (27%) occurred in the East Coast area, 16,178 (36%) in the Northern area and 16,967 (38%) in the South Western area (Table 3.1.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 95.4 (Figures 3.1.1 and 3.1.2).

The East Coast area had an SMR of 85.0 indicating that its level of mortality was a significant 10.9% below the regional average. Both male and female levels were significantly

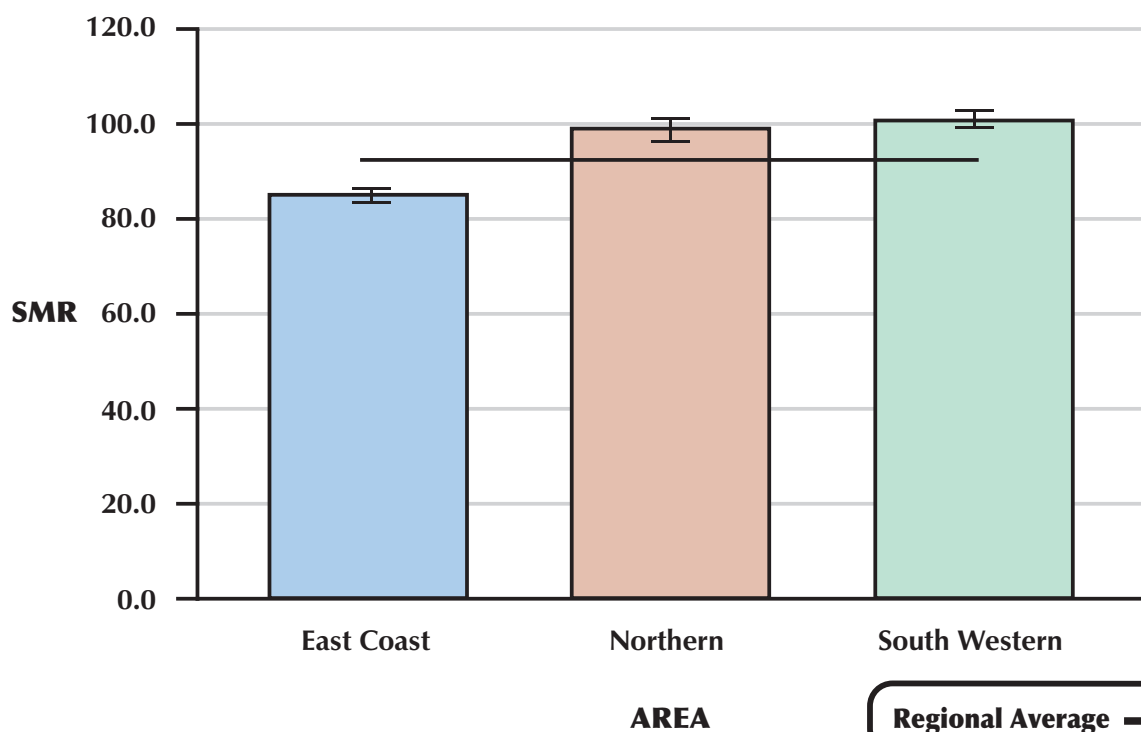
below average, by 11.8% and 9.6% respectively.

The Northern area had an SMR of 98.9 indicating that its level of mortality was a significant 3.7% above the regional average. Both male and female levels were significantly above average, by 3.3% and 3.9% respectively.

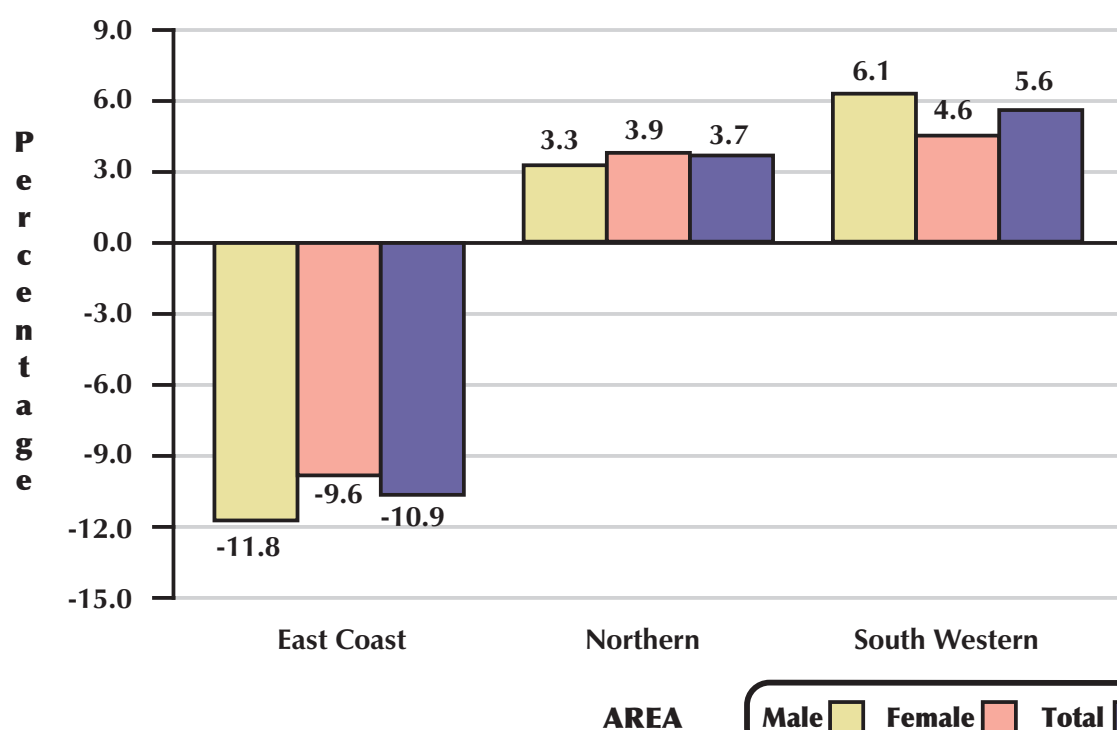
The South Western area had an SMR of 100.7 indicating that its level of mortality was a significant 5.6% above the regional average. Both male and female levels were significantly above average, by 6.1% and 4.6% respectively.

Table 3.1.1 All Causes Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	11,953	85.0	83.4	86.5	-10.9
Northern	16,178	98.9	97.4	100.4	3.7
South Western	16,967	100.7	99.2	102.2	5.6
EASTERN REGION	45,098	95.4			
MALES:					
East Coast	5,531	84.0	81.8	86.2	-11.8
Northern	8,004	98.3	96.2	100.5	3.3
South Western	8,526	101.0	98.9	103.2	6.1
EASTERN REGION	22,061	95.2			
FEMALES:					
East Coast	6,422	86.4	84.3	88.5	-9.6
Northern	8,174	99.3	97.1	101.4	3.9
South Western	8,441	100.0	97.8	102.1	4.6
EASTERN REGION	23,037	95.6			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.1.1 All Causes
SMRs and 95% Confidence Limits by Area**



**Figure 3.1.2 All Causes
Excess Mortality Levels (%) by Area and Gender**



3.2 All Cancers

Of the 11,960 geocoded cancer deaths, 3,036 (25%) occurred in the East Coast area, 4,422 (37%) in the Northern area and 4,502 (38%) in the South Western area (Table 3.2.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 96.2 (Figures 3.2.1 and 3.2.2).

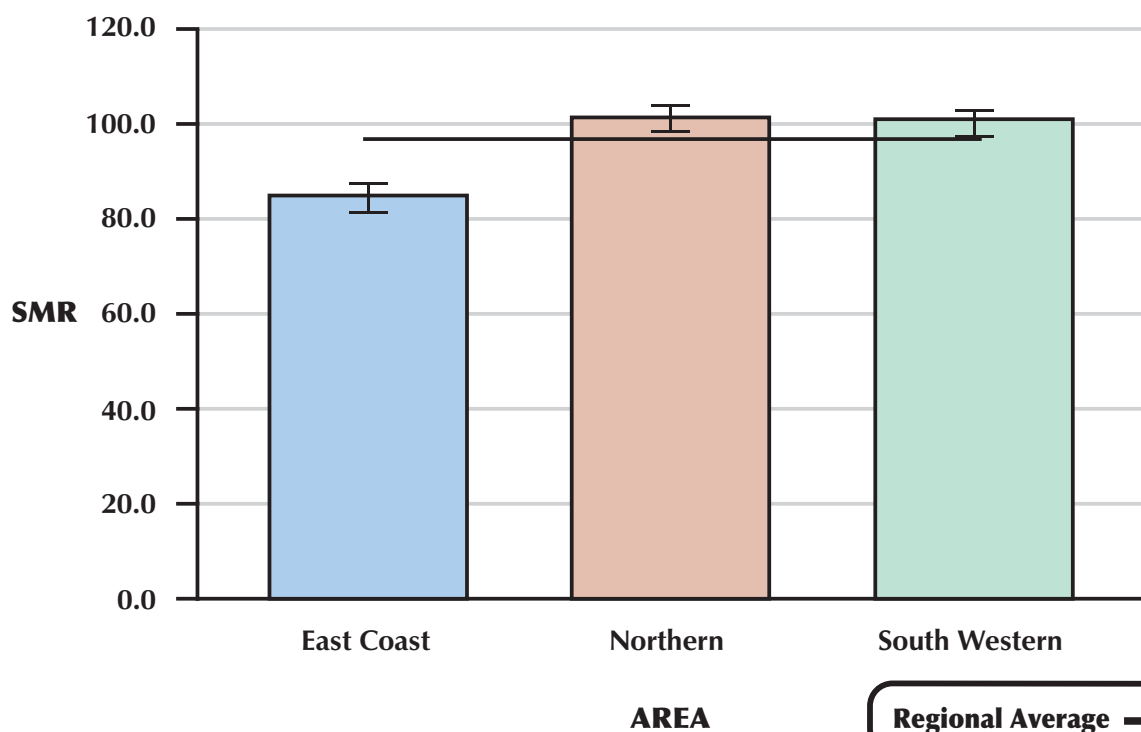
The East Coast area had an SMR of 84.6 indicating that its level of mortality was a significant 12.1% below the regional average. Both male and female levels were significantly below average, by 13.1% and 10.4% respectively.

The Northern area had an SMR of 101.2 indicating that its level of mortality was a significant 5.2% above the regional average. While both male and female levels were above average, by 3.5% and 6.6% respectively, only the female level was significantly so.

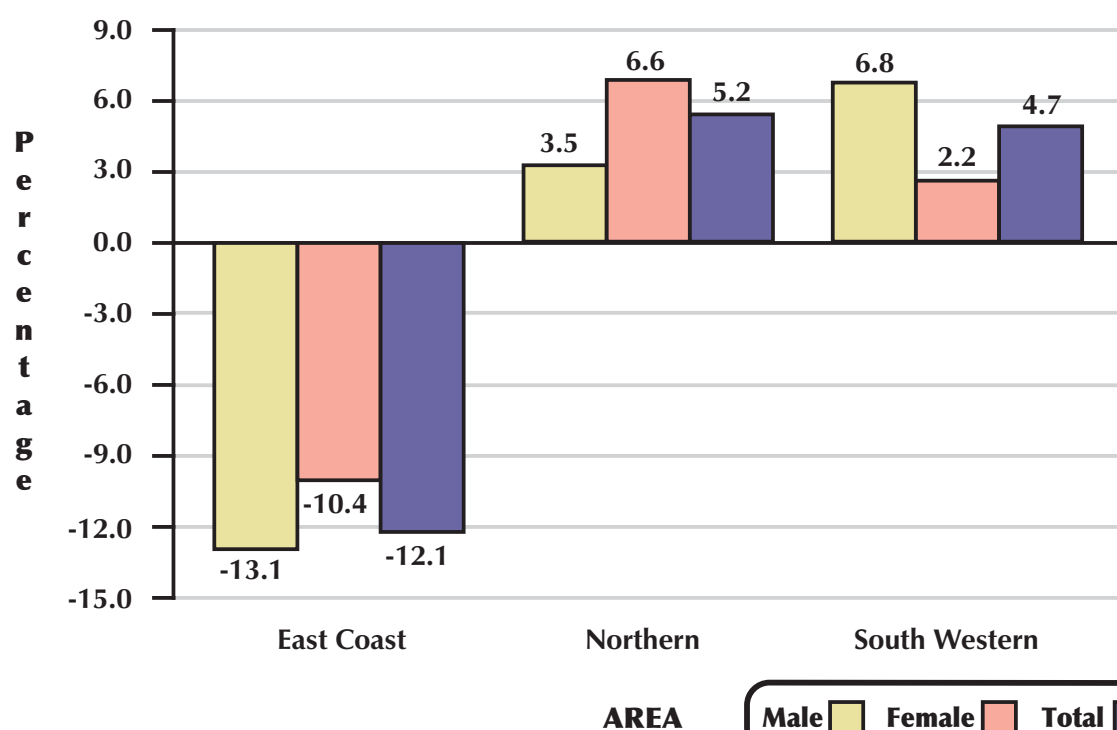
The South Western area had an SMR of 100.7 indicating that its level of mortality was a significant 4.7% above the regional average. While both male and female levels were above average, by 6.8% and 2.2% respectively, only the male level was significantly so.

Table 3.2.1 All Cancers Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	3,036	84.6	81.6	87.6	-12.1
Northern	4,422	101.2	98.2	104.2	5.2
South Western	4,502	100.7	97.8	103.7	4.7
EASTERN REGION	11,960	96.2			
MALES:					
East Coast	1,501	83.4	79.1	87.6	-13.1
Northern	2,255	99.4	95.3	103.5	3.5
South Western	2,380	102.5	98.4	106.6	6.8
EASTERN REGION	6,136	96.0			
FEMALES:					
East Coast	1,535	86.4	82.1	90.7	-10.4
Northern	2,167	102.8	98.5	107.1	6.6
South Western	2,122	98.5	94.3	102.7	2.2
EASTERN REGION	5,824	96.4			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.2.1 All Cancers
SMRs and 95% Confidence Limits by Area**



**Figure 3.2.2 All Cancers
Excess Mortality Levels (%) by Area and Gender**



3.3 Lung Cancer

Of the 2,895 geocoded lung cancer deaths, 621 (21%) occurred in the East Coast area, 1,115 (39%) in the Northern area and 1,159 (40%) in the South Western area (Table 3.3.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 97.0 (Figures 3.3.1 and 3.3.2).

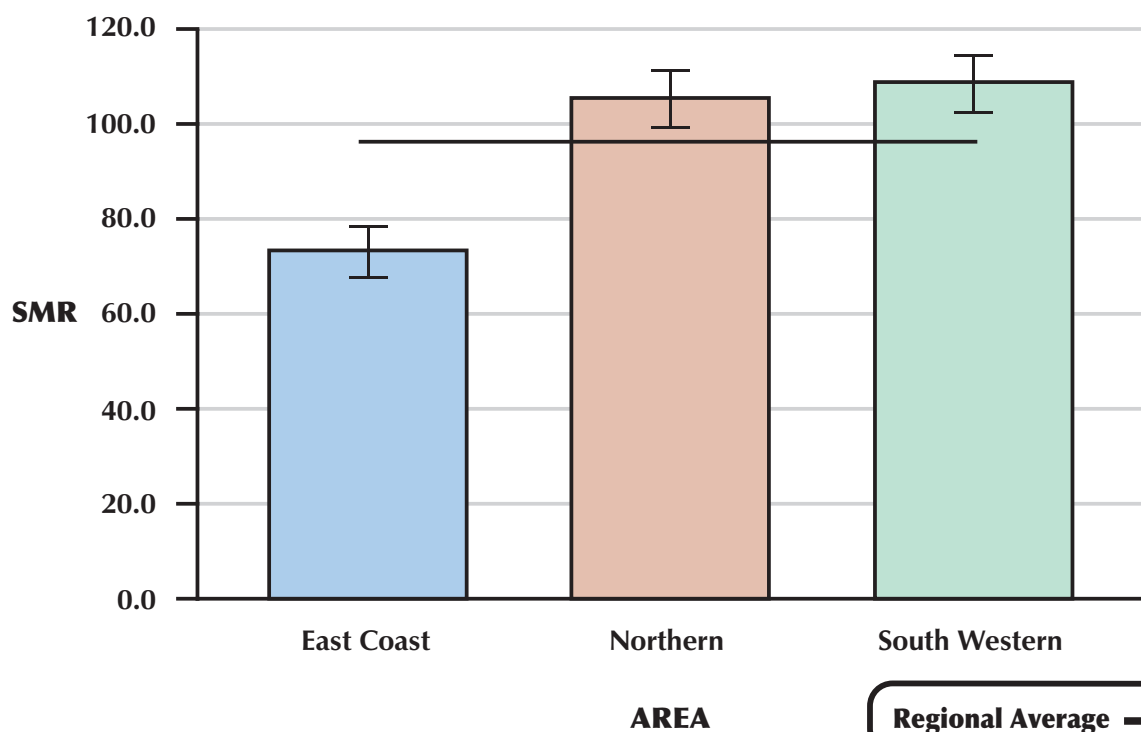
The East Coast area had an SMR of 72.4 indicating that its level of mortality was a significant 25.4% below the regional average. Both male and female levels were significantly below average, by 30.4% and 16.0% respectively.

The Northern area had an SMR of 105.5 indicating that its level of mortality was a significant 8.8% above the regional average. While both male and female levels were above average, by 7.3% and 10.8% respectively, only the female level was significantly so.

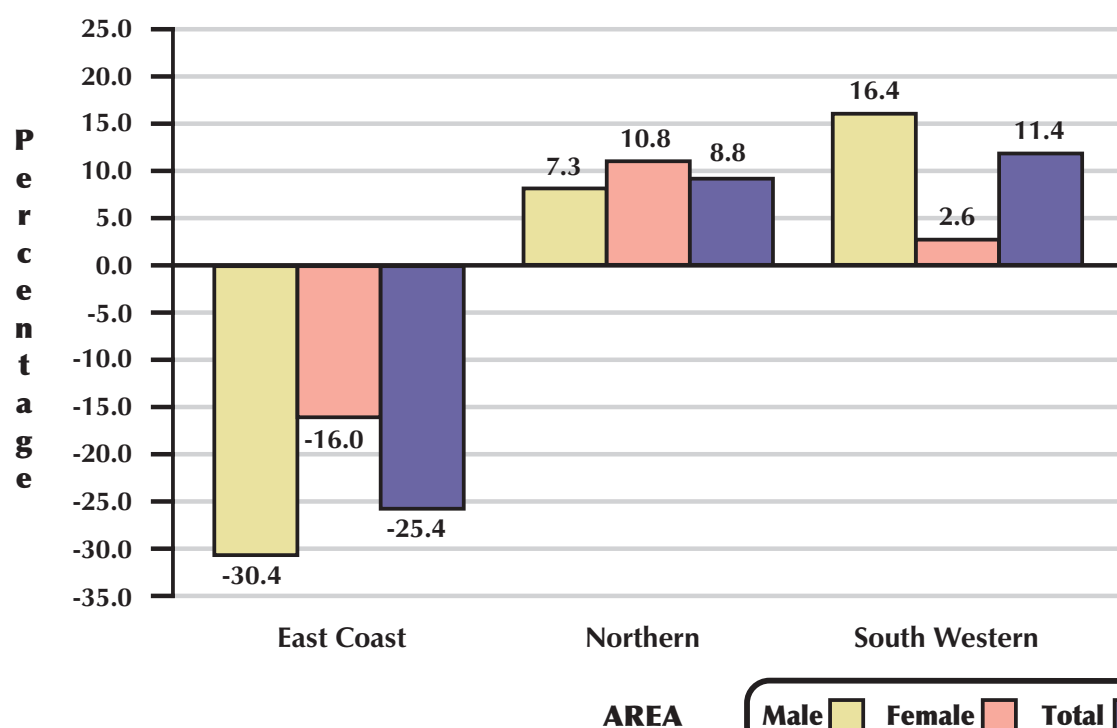
The South Western area had an SMR of 108.1 indicating that its level of mortality was a significant 11.4% above the regional average. While both male and female levels were above average, by 16.4% and 2.6% respectively, only the male level was significantly so.

Table 3.3.1 Lung Cancer Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	621	72.4	66.7	78.1	-25.4
Northern	1,115	105.5	99.3	111.7	8.8
South Western	1,159	108.1	101.9	114.3	11.4
EASTERN REGION	2,895	97.0			
MALES:					
East Coast	346	67.2	60.1	74.2	-30.4
Northern	681	103.7	95.9	111.5	7.3
South Western	751	112.4	104.4	120.5	16.4
EASTERN REGION	1,778	96.6			
FEMALES:					
East Coast	275	81.9	72.2	91.5	-16.0
Northern	434	108.0	97.8	118.1	10.8
South Western	408	100.0	90.3	109.7	2.6
EASTERN REGION	1,117	97.5			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.3.1 All Lung Cancer
SMRs and 95% Confidence Limits by Area**



**Figure 3.3.2 Lung Cancer
Excess Mortality Levels (%) by Area and Gender**



3.4 Colorectal Cancer

Of the 1,450 geocoded colorectal cancer deaths, 404 (28%) occurred in the East Coast area, 534 (37%) in the Northern area and 512 (35%) in the South Western area (Table 3.4.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 96.3 (Figures 3.4.1 and 3.4.2).

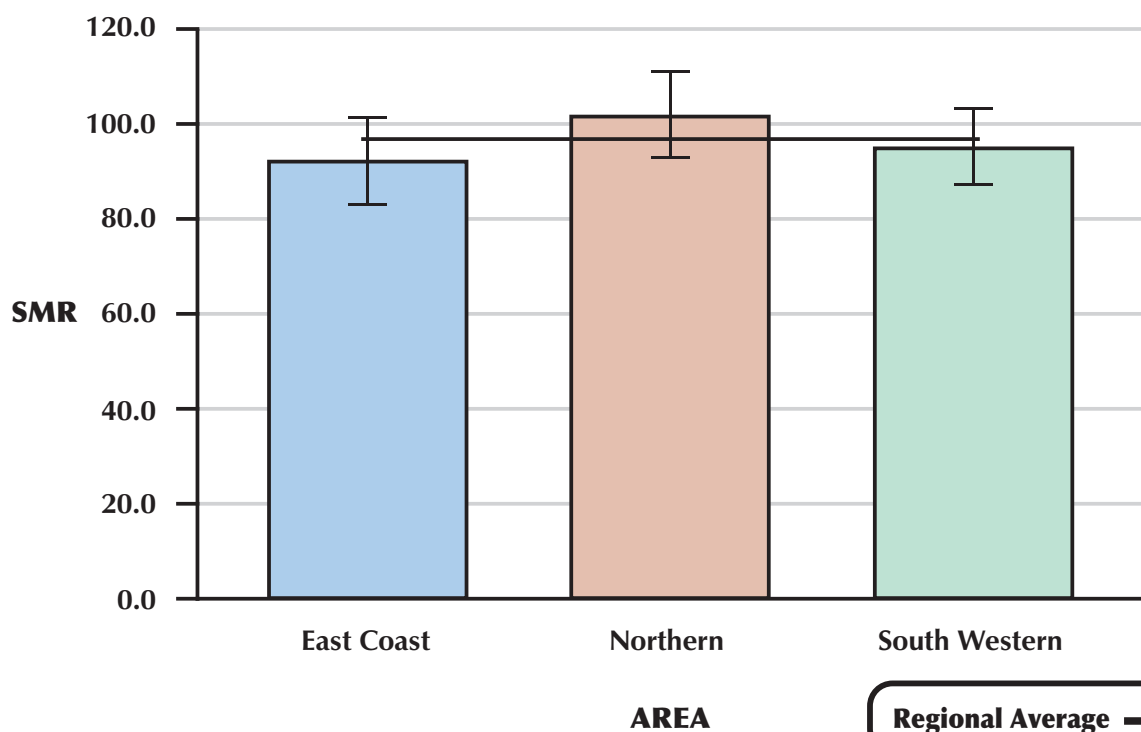
The East Coast area had an SMR of 92.0 indicating that its level of mortality was 4.5% below the regional average. Both male and female levels were below average, by 7.0% and 1.0% respectively. These overall and gender level differences were not significant.

The Northern area had an SMR of 101.0 indicating that its level of mortality was 4.9% above the regional average. Both male and female levels were above average, by 5.4% and 4.0% respectively. These overall and gender level differences were not significant.

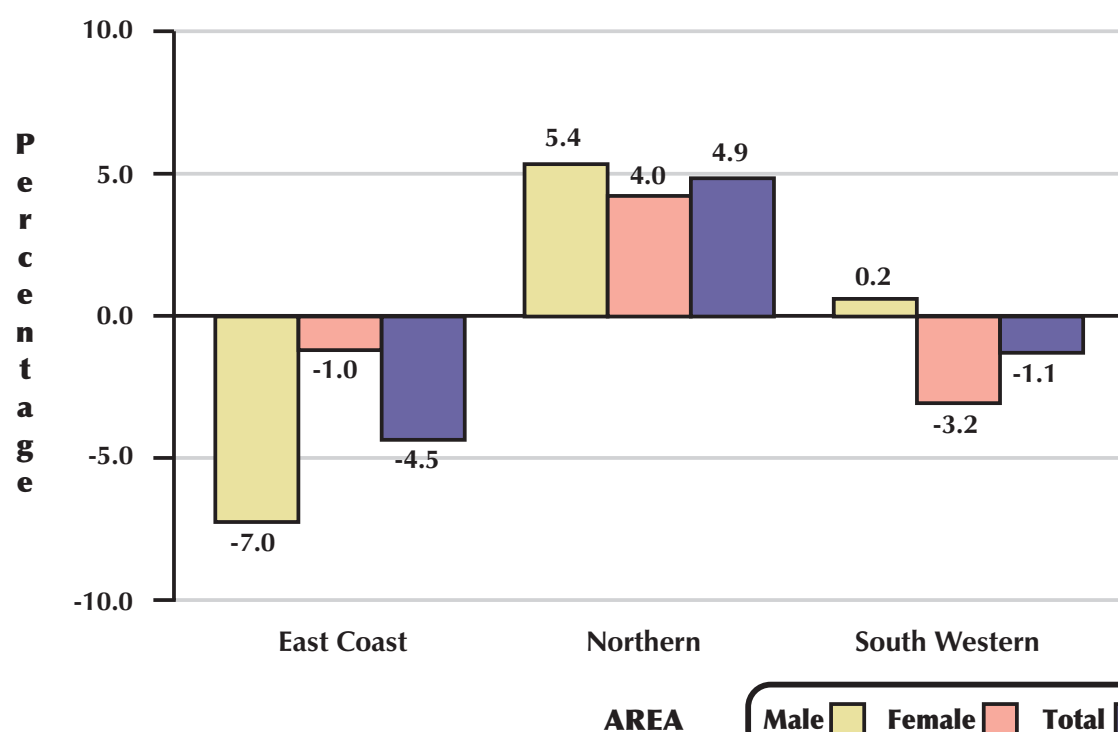
The South Western area had an SMR of 95.2 indicating that its level of mortality was 1.1% below the regional average. The male level was 0.2% above average and the female level was 3.2% below average. These overall and gender level differences were not significant.

Table 3.4.1 Colorectal Cancer Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	404	92.0	83.0	101.0	-4.5
Northern	534	101.0	92.4	109.5	4.9
South Western	512	95.2	86.9	103.4	-1.1
EASTERN REGION	1,450	96.3			
MALES:					
East Coast	197	88.5	76.1	100.9	-7.0
Northern	284	100.3	88.6	112.0	5.4
South Western	275	95.4	84.1	106.7	0.2
EASTERN REGION	756	95.2			
FEMALES:					
East Coast	207	96.5	83.4	109.7	-1.0
Northern	250	101.4	88.9	114.0	4.0
South Western	237	94.4	82.4	106.4	-3.2
EASTERN REGION	694	97.5			

**Figure 3.4.1 Colorectal Cancer
SMRs and 95% Confidence Limits by Area**



**Figure 3.4.2 Colorectal Cancer
Excess Mortality Levels (%) by Area and Gender**



3.5 Breast Cancer

Of the 1,036 geocoded breast cancer deaths, 285 (28%) occurred in the East Coast area, 374 (36%) in the Northern area and 377 (36%) in the South Western area (Table 3.5.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 96.1 (Figures 3.5.1 and 3.5.2).

The East Coast area had an SMR of 92.1 indicating that its level of mortality was 4.2%

below the regional average but this was not a significant difference.

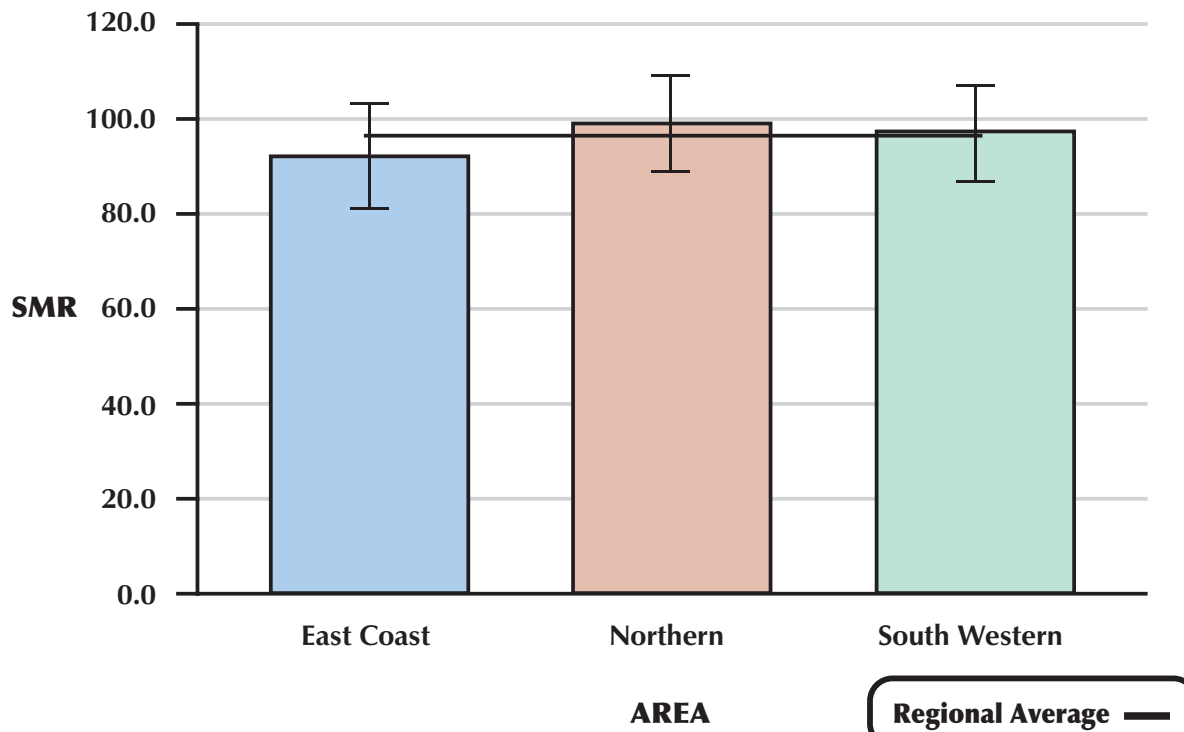
The Northern area had an SMR of 98.6 indicating that its level of mortality was 2.6% above the regional average but this was not a significant difference.

The South Western area had an SMR of 96.8 indicating that its level of mortality was 0.7% above the regional average but this was not a significant difference.

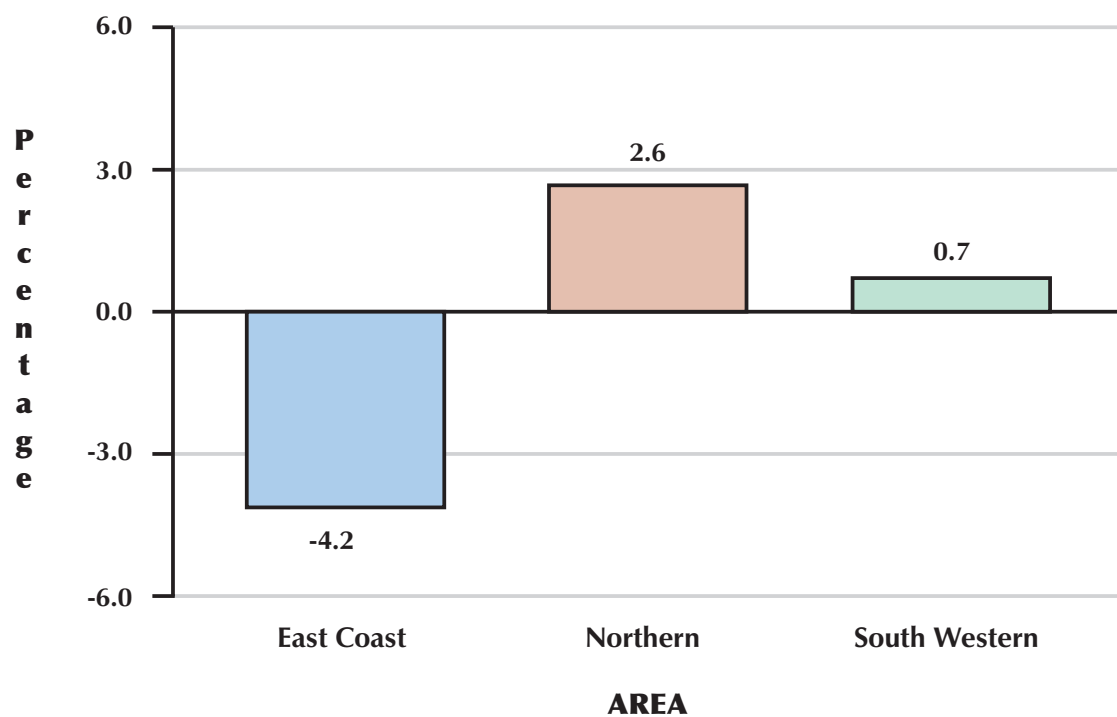
**Table 3.5.1 Breast Cancer
Mortality in the Eastern Region, 1994 to 1998
Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by
Gender and Area**

AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
East Coast	285	92.1	81.4	102.8	-4.2
Northern	374	98.6	88.6	108.6	2.6
South Western	377	96.8	87.0	106.6	0.7
EASTERN REGION	1,036	96.1			

**Figure 3.5.1 Breast Cancer
SMRs and 95% Confidence Limits by Area**



**Figure 3.5.2 Breast Cancer
Excess Mortality Levels (%) by Area**



3.6 Prostate Cancer

Of the 645 geocoded prostate cancer deaths, 199 (31%) occurred in the East Coast area, 205 (32%) in the Northern area and 241 (37%) in the South Western area (Table 3.6.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 95.1 (Figures 3.6.1 and 3.6.2).

The East Coast area had an SMR of 98.0 indicating that its level of mortality was 3.0%

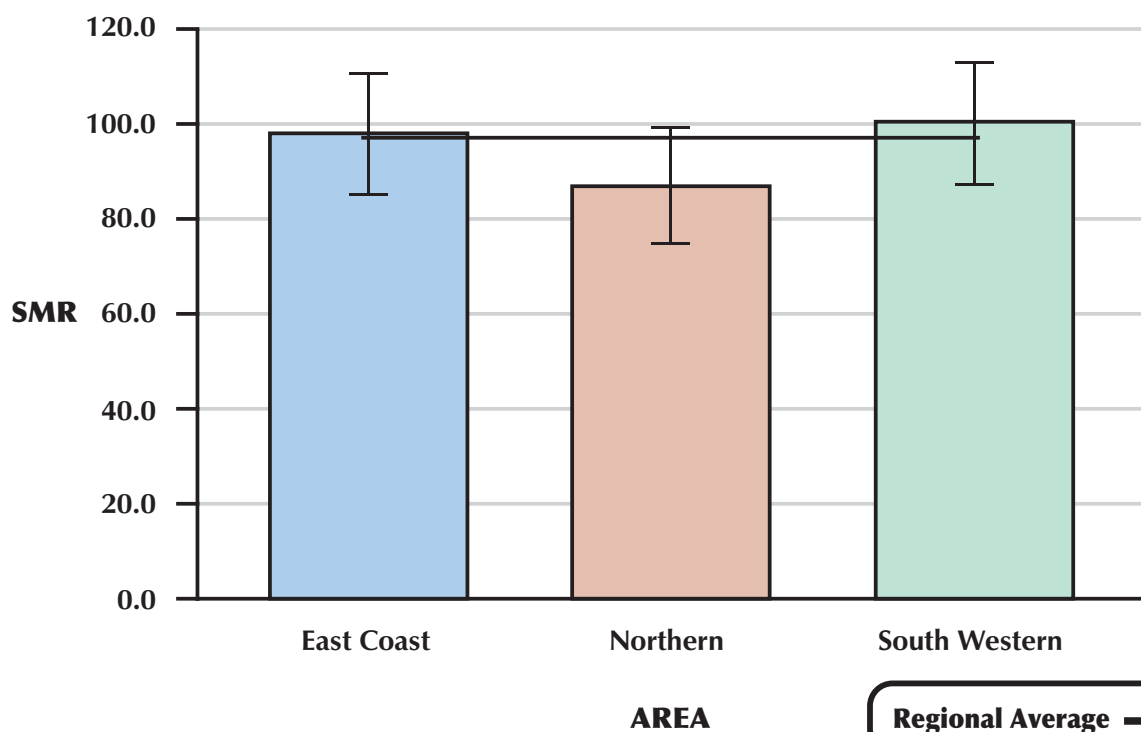
above the regional average but this was not a significant difference.

The Northern area had an SMR of 87.2 indicating that its level of mortality was 8.3% below the regional average but this was not a significant difference.

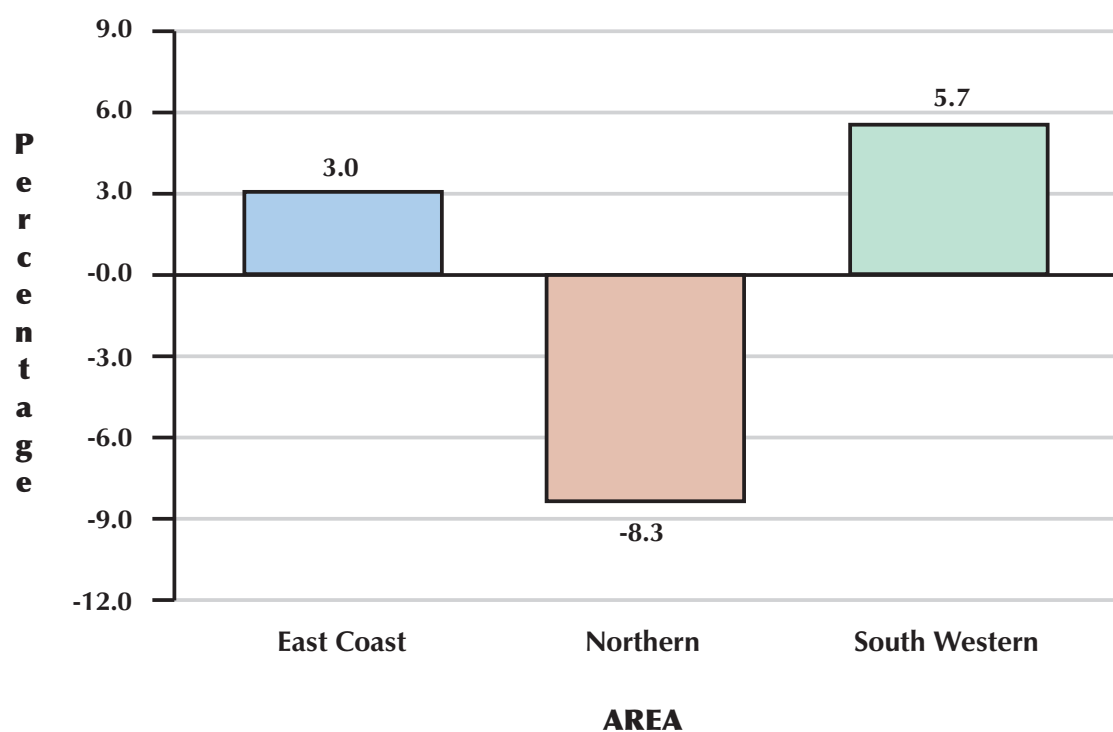
The South Western area had an SMR of 100.5 indicating that its level of mortality was 5.7% above the regional average but this was not a significant difference.

Table 3.6.1 Prostate Cancer Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
East Coast	199	98.0	84.4	111.6	3.0
Northern	205	87.2	75.2	99.1	-8.3
South Western	241	100.5	87.8	113.2	5.7
EASTERN REGION	645	95.1			

**Figure 3.6.1 Prostate Cancer
SMRs and 95% Confidence Limits by Area**



**Figure 3.6.2 Prostate Cancer
Excess Mortality Levels (%) by Area**



3.7 All Diseases of the Circulatory System

Of the 18,909 geocoded deaths due to diseases of the circulatory system, 5,174 (27%) occurred in the East Coast area, 6,668 (35%) in the Northern area and 7,067 (37%) in the South Western area (Table 3.7.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 95.5 (Figures 3.7.1 and 3.7.2).

The East Coast area had an SMR of 85.8 indicating that its level of mortality was a significant 10.2% below the regional average.

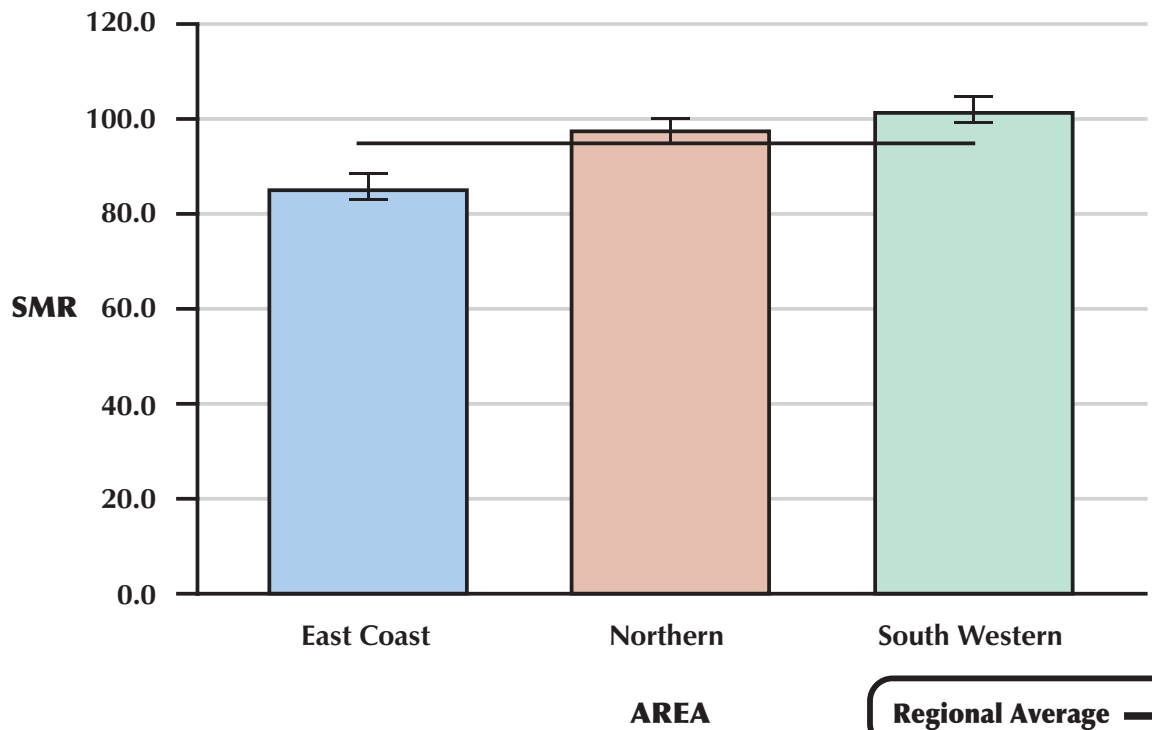
Both male and female levels were significantly below average, by 11.4% and 8.5% respectively.

The Northern area had an SMR of 97.9 indicating that its level of mortality was 2.5% above the regional average. Both male and female levels were above average, by 3.6% and 1.4% respectively. These overall and gender level differences were not significant.

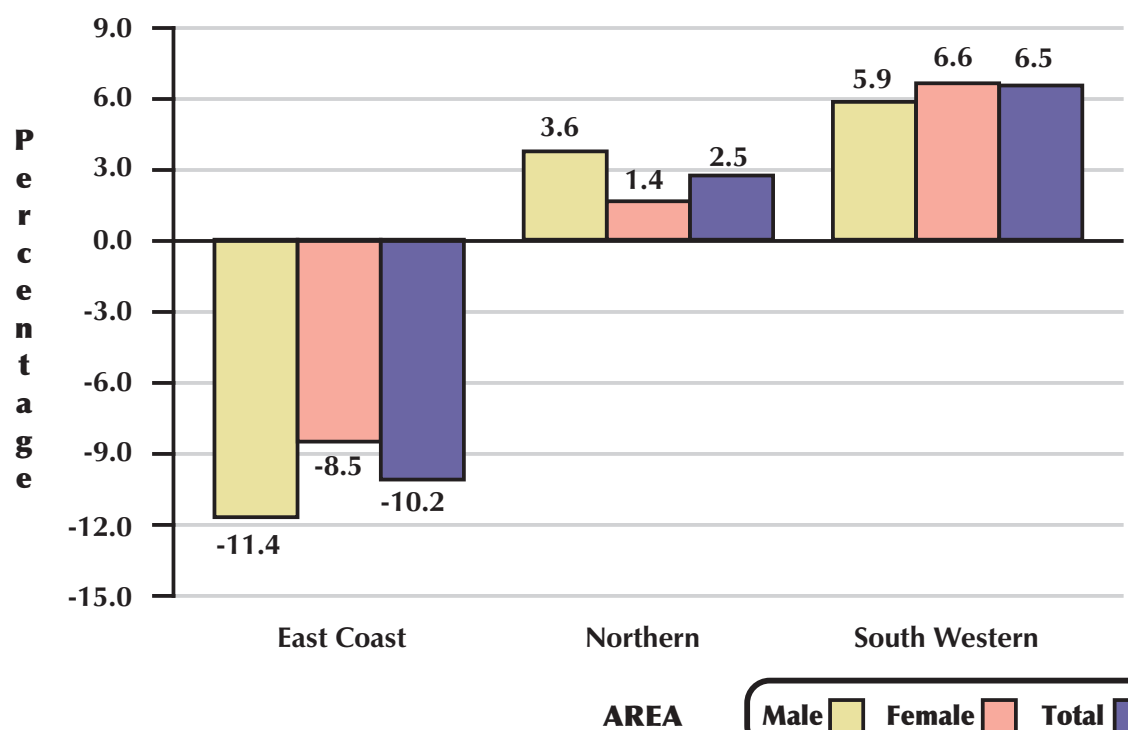
The South Western area had an SMR of 101.7 indicating that its level of mortality was a significant 6.5% above the regional average. Both male and female levels were significantly above average, by 5.9% and 6.6% respectively.

Table 3.7.1 All Diseases of the Circulatory System Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	5,174	85.8	83.5	88.2	-10.2
Northern	6,668	97.9	95.5	100.2	2.5
South Western	7,067	101.7	99.3	104.1	6.5
EASTERN REGION	18,909	95.5			
MALES:					
East Coast	2,295	84.5	81.1	88.0	-11.4
Northern	3,260	98.8	95.4	102.2	3.6
South Western	3,410	101.0	97.6	104.3	5.9
EASTERN REGION	8,965	95.4			
FEMALES:					
East Coast	2,879	87.5	84.3	90.7	-8.5
Northern	3,408	96.9	93.6	100.1	1.4
South Western	3,657	101.9	98.6	105.2	6.6
EASTERN REGION	9,944	95.6			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.7.1 All Diseases of the Circulatory System
SMRs and 95% Confidence Limits by Area**



**Figure 3.7.2 All Diseases of the Circulatory System
Excess Mortality Levels (%) by Area and Gender**



3.8 Ischaemic Heart Disease

Of the 10,164 geocoded deaths due to ischaemic heart disease, 2,682 (26%) occurred in the East Coast area, 3,742 (37%) in the Northern area and 3,740 (37%) in the South Western area (Table 3.8.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 95.7 (Figures 3.8.1 and 3.8.2).

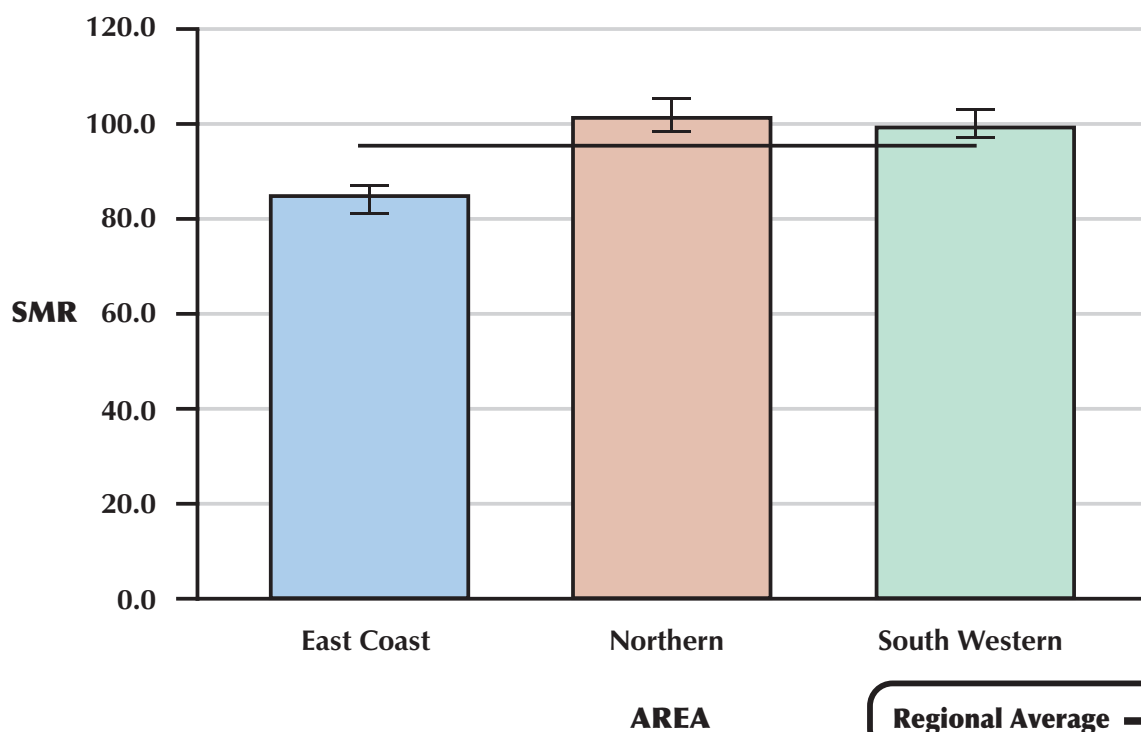
The East Coast area had an SMR of 84.1 indicating that its level of mortality was a significant 12.1% below the regional average. Both male and female levels were significantly below average, by 13.9% and 9.2% respectively.

The Northern area had an SMR of 101.6 indicating that its level of mortality was a significant 6.2% above the regional average. While both male and female levels were above average, by 7.4% and 4.4% respectively, only the male level was significantly so.

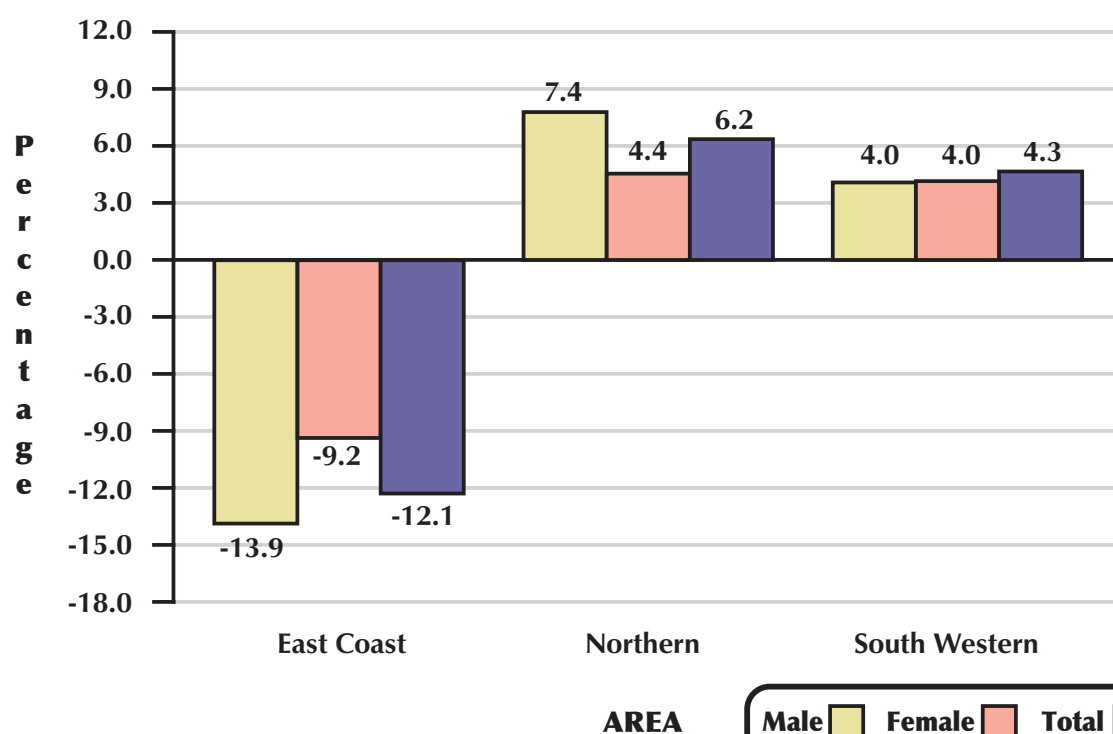
The South Western area had an SMR of 99.8 indicating that its level of mortality was a significant 4.3% above the regional average. While both male and female levels were above average, by 4.0%, they were not significantly so.

Table 3.8.1 Ischaemic Heart Disease Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	2,682	84.1	80.9	87.3	-12.1
Northern	3,742	101.6	98.3	104.9	6.2
South Western	3,740	99.8	96.6	103.0	4.3
EASTERN REGION	10,164	95.7			
MALES:					
East Coast	1,361	82.2	77.8	86.5	-13.9
Northern	2,100	102.6	98.2	106.9	7.4
South Western	2,077	99.3	95.0	103.5	4.0
EASTERN REGION	5,538	95.5			
FEMALES:					
East Coast	1,321	87.1	82.4	91.8	-9.2
Northern	1,642	100.1	95.3	104.9	4.4
South Western	1,663	99.7	94.9	104.5	4.0
EASTERN REGION	4,626	95.9			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.8.1 Ischaemic Heart Disease
SMRs and 95% Confidence Limits by Area**



**Figure 3.8.2 Ischaemic Heart Disease
Excess Mortality Levels (%) by Area and Gender**



3.9 Cerebrovascular Disease

Of the 4,076 geocoded deaths due to cerebrovascular disease, 1,254 (31%) occurred in the East Coast area, 1,321 (32%) in the Northern area and 1,501 (37%) in the South Western area (Table 3.9.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 95.5 (Figures 3.9.1 and 3.9.2).

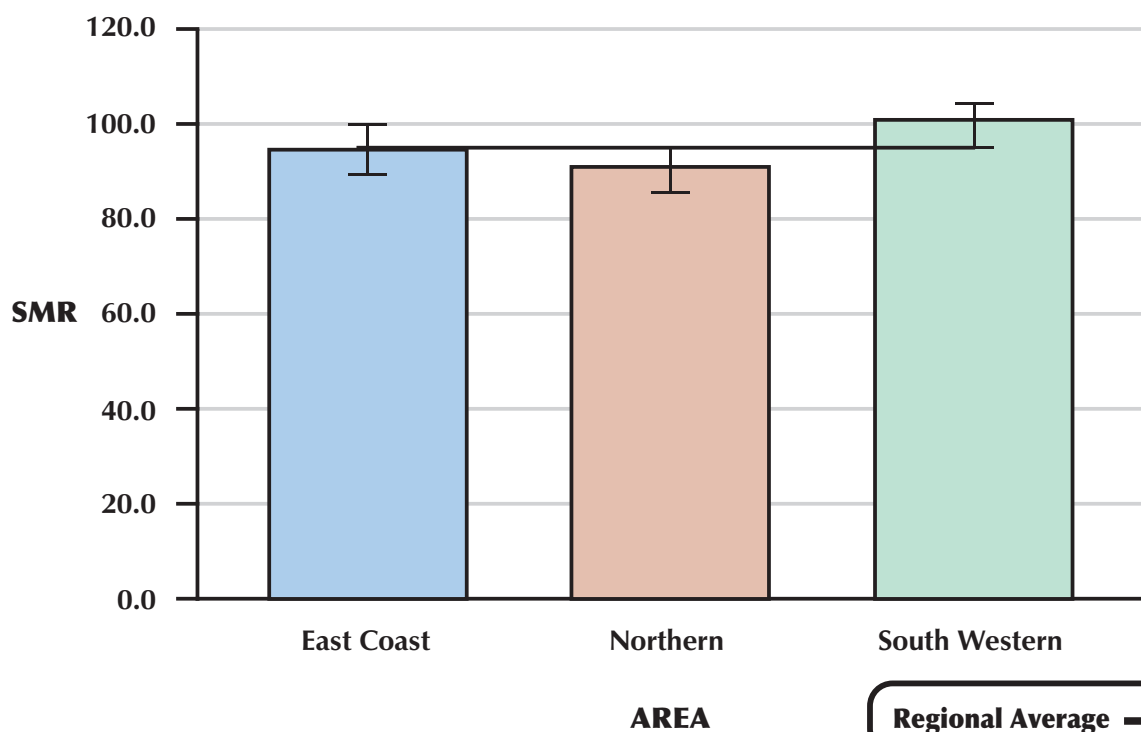
The East Coast area had an SMR of 94.7 indicating that its level of mortality was 0.8% below the regional average. The male level was 3.9% below average and the female level was 0.9% above average. These overall and gender level differences were not significant.

The Northern area had an SMR of 90.8 indicating that its level of mortality was 4.9% below the regional average but this was not a significant difference. Both male and female levels were below average, by 1.6% and 7.0% respectively, with the female level significantly so.

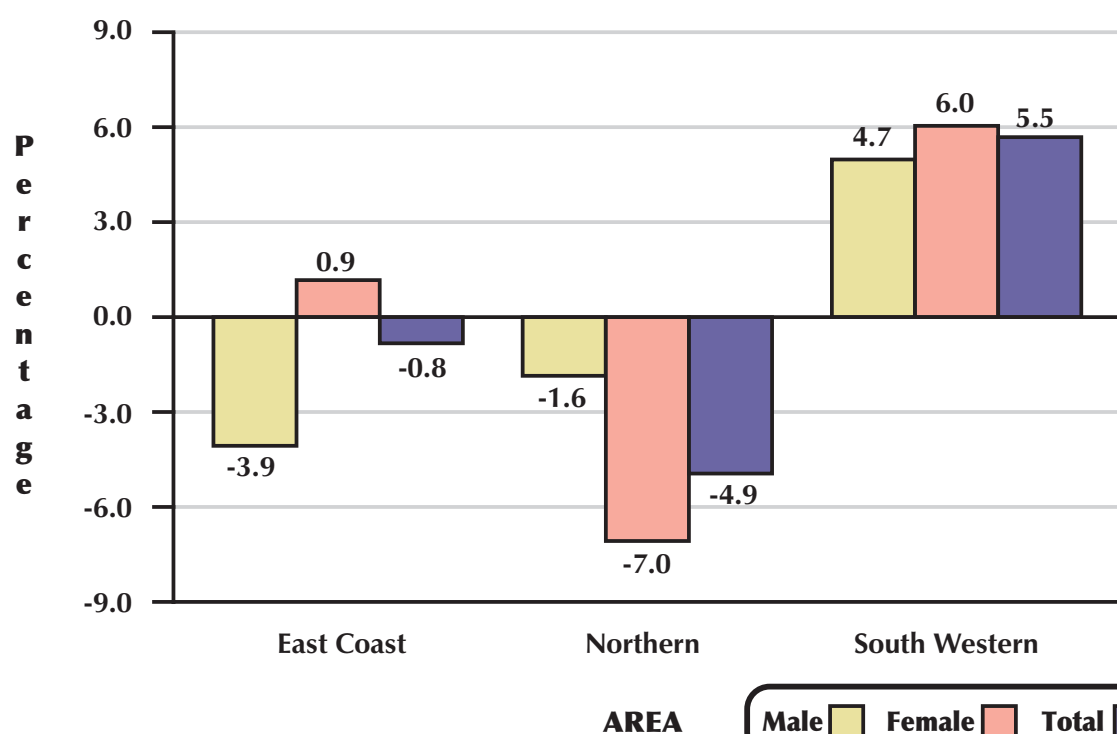
The South Western area had an SMR of 100.8 indicating that its level of mortality was a significant 5.5% above the regional average. While both male and female levels were above average, by 4.7% and 6.0% respectively, they were not significantly so.

Table 3.9.1 Cerebrovascular Disease Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	1,254	94.7	89.5	99.9	-0.8
Northern	1,321	90.8	85.9	95.7	-4.9
South Western	1,501	100.8	95.7	105.9	5.5
EASTERN REGION	4,076	95.5			
MALES:					
East Coast	432	91.6	83.0	100.3	-3.9
Northern	518	93.8	85.7	101.9	-1.6
South Western	565	99.8	91.6	108.0	4.7
EASTERN REGION	1,515	95.3			
FEMALES:					
East Coast	822	96.5	89.9	103.1	0.9
Northern	803	88.9	82.8	95.1	-7.0
South Western	936	101.3	94.8	107.8	6.0
EASTERN REGION	2,561	95.6			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.9.1 Cerebrovascular Disease
SMRs and 95% Confidence Limits by Area**



**Figure 3.9.2 Cerebrovascular Disease
Excess Mortality Levels (%) by Area and Gender**



3.10 All Diseases of the Respiratory System

Of the 5,983 geocoded deaths due to diseases of the respiratory system, 1,684 (28%) occurred in the East Coast area, 2,099 (35%) in the Northern area and 2,200 (37%) in the South Western area (Table 3.10.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 94.8 (Figures 3.10.1 and 3.10.2).

The East Coast area had an SMR of 85.9 indicating that its level of mortality was a significant 9.4% below the regional average. Both male and female levels were significantly

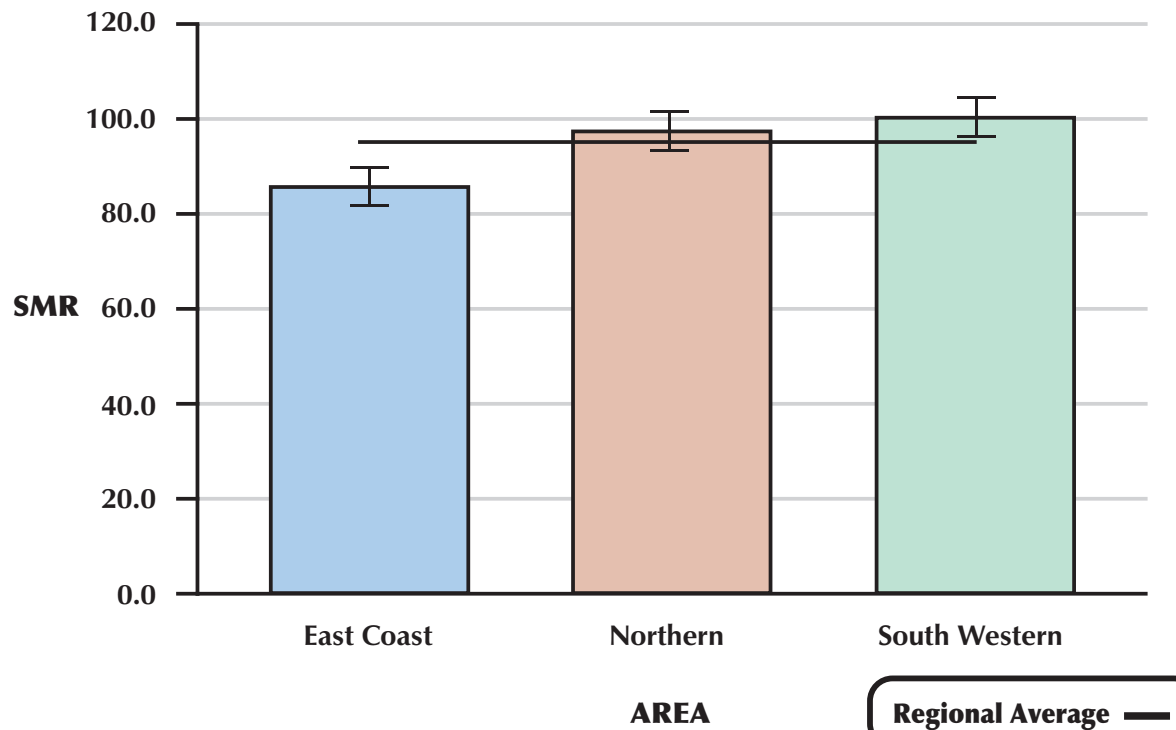
below average, by 10.2% and 8.4% respectively.

The Northern area had an SMR of 97.6 indicating that its level of mortality was 3.0% above the regional average. Both male and female levels were above average, by 2.5% and 3.1% respectively. These overall and gender level differences were not significant.

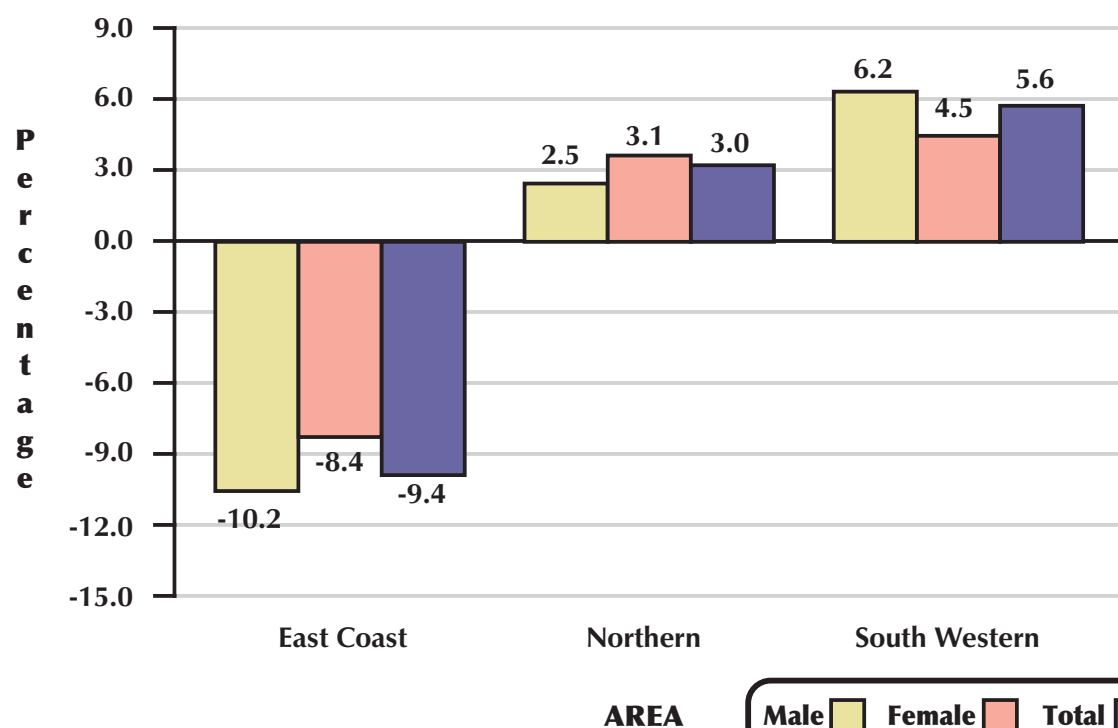
The South Western area had an SMR of 100.1 indicating that its level of mortality was a significant 5.6% above the regional average. While both male and female levels were above average, by 6.2% and 4.5% respectively, they were not significantly so.

Table 3.10.1 All Diseases of the Respiratory System Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	1,684	85.9	81.8	90.0	-9.4
Northern	2,099	97.6	93.5	101.8	3.0
South Western	2,200	100.1	95.9	104.2	5.6
EASTERN REGION	5,983	94.8			
MALES:					
East Coast	722	85.1	78.9	91.3	-10.2
Northern	952	97.2	91.0	103.4	2.5
South Western	1,012	100.7	94.5	106.9	6.2
EASTERN REGION	2,686	94.8			
FEMALES:					
East Coast	962	86.9	81.4	92.4	-8.4
Northern	1,147	97.8	92.2	103.5	3.1
South Western	1,188	99.2	93.6	104.9	4.5
EASTERN REGION	3,297	94.9			
Red = significantly higher than the regional average. Blue = significantly lower than the regional average.					

**Figure 3.10.1 All Diseases of the Respiratory System
SMRs and 95% Confidence Limits by Area**



**Figure 3.10.2 All Diseases of the Respiratory System
Excess Mortality Levels (%) by Area and Gender**



3.11 Injury and Poisoning

Of the 1,912 geocoded deaths due to injuries and poisonings, 444 (23%) occurred in the East Coast area, 703 (37%) in the Northern area and 765 (40%) in the South Western area (Table 3.11.1). SMRs were calculated for each area and compared with the Eastern Region's SMR of 92.0 (Figures 3.11.1 and 3.11.2).

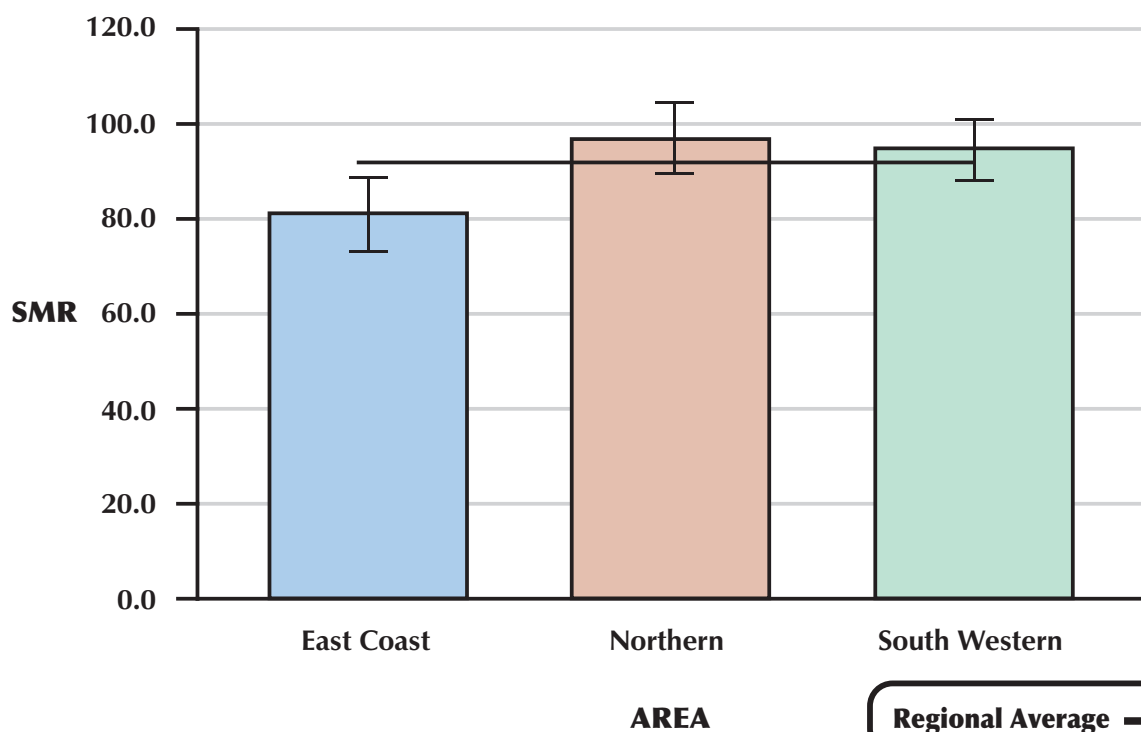
The East Coast area had an SMR of 81.1 indicating that its level of mortality was a significant 11.8% below the regional average. While both male and female levels were below average, by 14.9% and 5.1% respectively, only the male level was significantly so.

The Northern area had an SMR of 97.1 indicating that its level of mortality was 5.5% above the regional average. The male level was 9.5% above average and the female level was 2.7% below average. These overall and gender level differences were not significant.

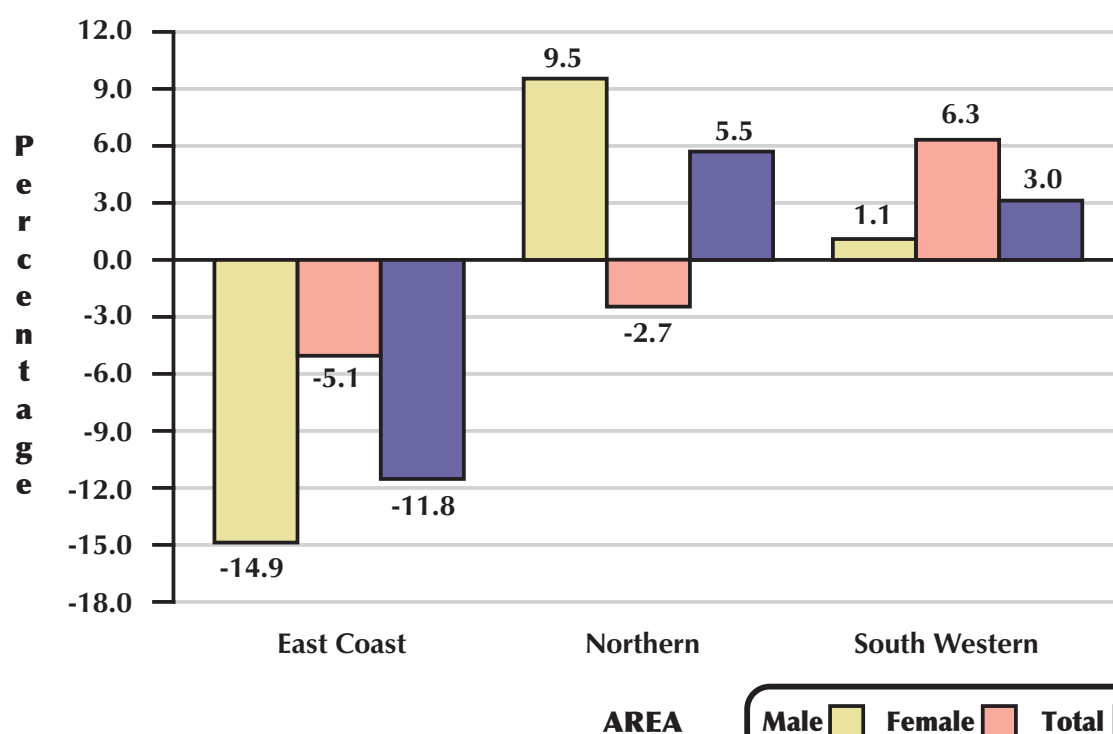
The South Western area had an SMR of 94.8 indicating that its level of mortality was 3.0% above the regional average. Both male and female levels were above average, by 1.1% and 6.3% respectively. These overall and gender level differences were not significant.

Table 3.11.1 Injury and Poisoning Mortality in the Eastern Region, 1994 to 1998 Numbers of Deaths, SMRs with 95% Confidence Limits, and Excess Mortality Levels, by Gender and Area					
GENDER: AREA	NUMBER	SMR	95% CONFIDENCE LIMITS		EXCESS MORTALITY (%)
			LOWER	UPPER	
TOTAL (M+F):					
East Coast	444	81.1	73.6	88.7	-11.8
Northern	703	97.1	89.9	104.3	5.5
South Western	765	94.8	88.1	101.5	3.0
EASTERN REGION	1,912	92.0			
MALES:					
East Coast	271	78.1	68.8	87.5	-14.9
Northern	488	100.5	91.6	109.4	9.5
South Western	512	92.8	84.8	100.8	1.1
EASTERN REGION	1,271	91.8			
FEMALES:					
East Coast	173	87.7	74.6	100.7	-5.1
Northern	215	89.9	77.9	101.9	-2.7
South Western	253	98.2	86.1	110.3	6.3
EASTERN REGION	641	92.4			
Blue = significantly lower than the regional average.					

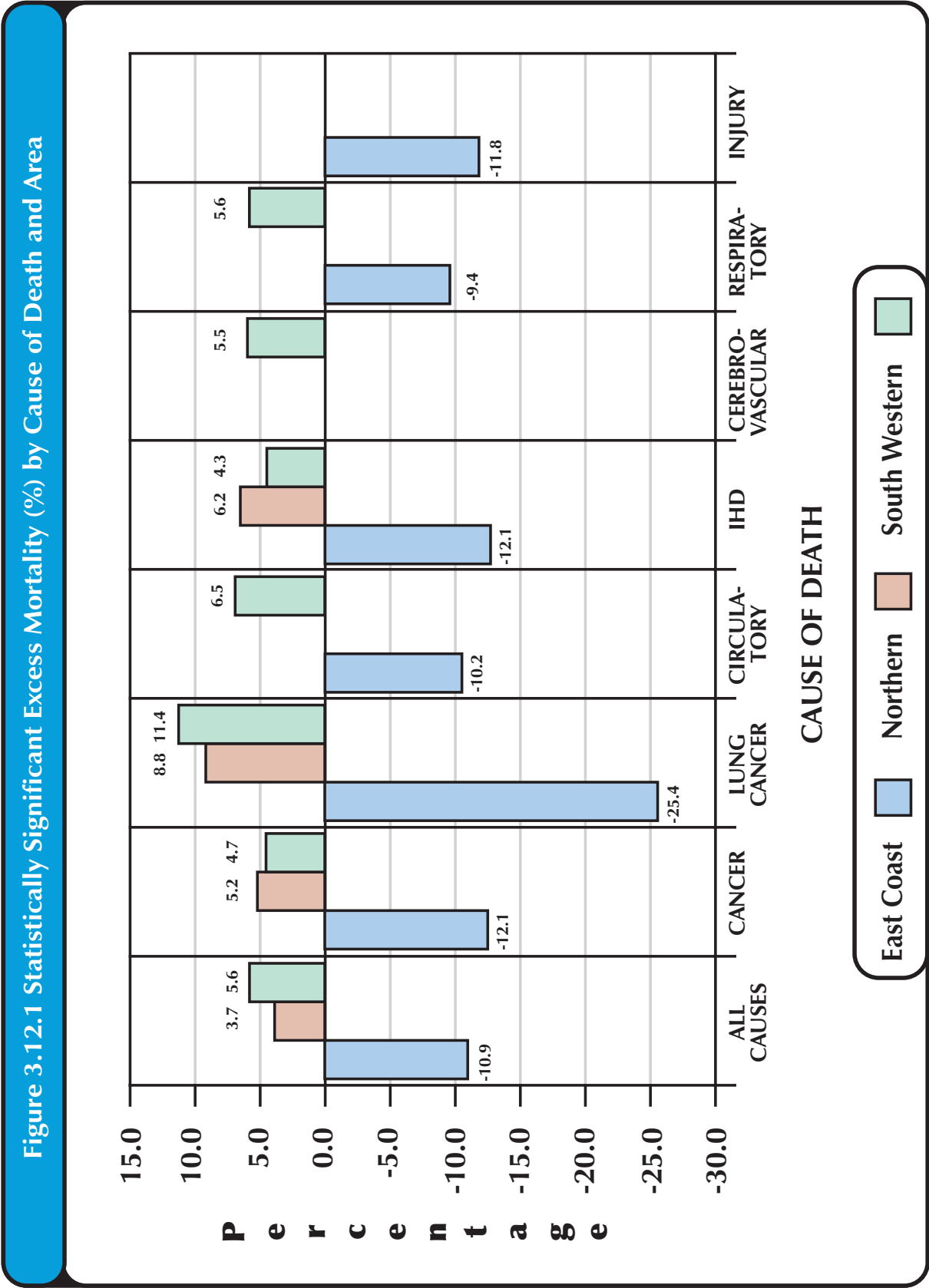
**Figure 3.11.1 Injury and Poisoning
SMRs and 95% Confidence Limits by Area**



**Figure 3.11.2 Injury and Poisoning
Excess Mortality Levels (%) by Area and Gender**

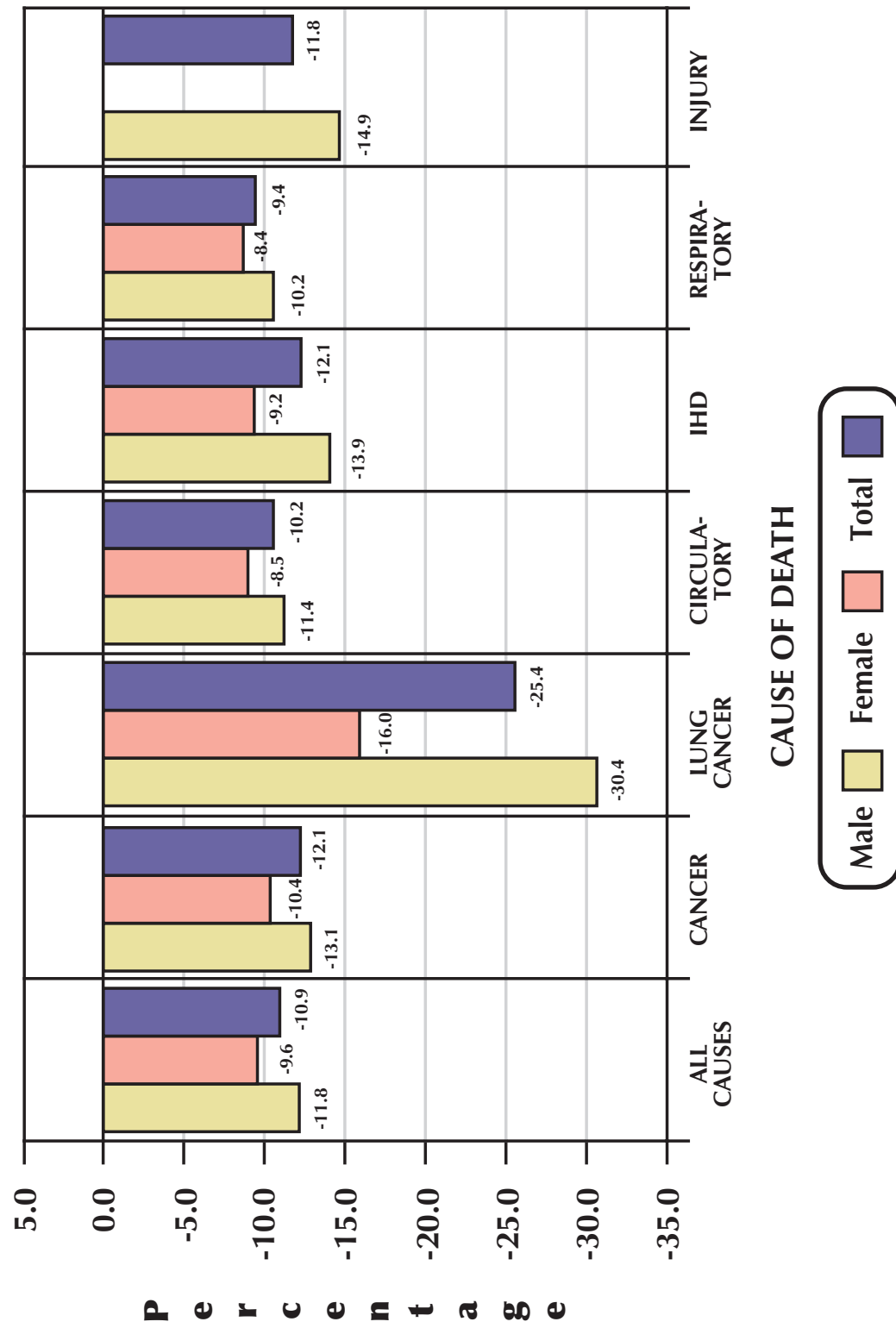


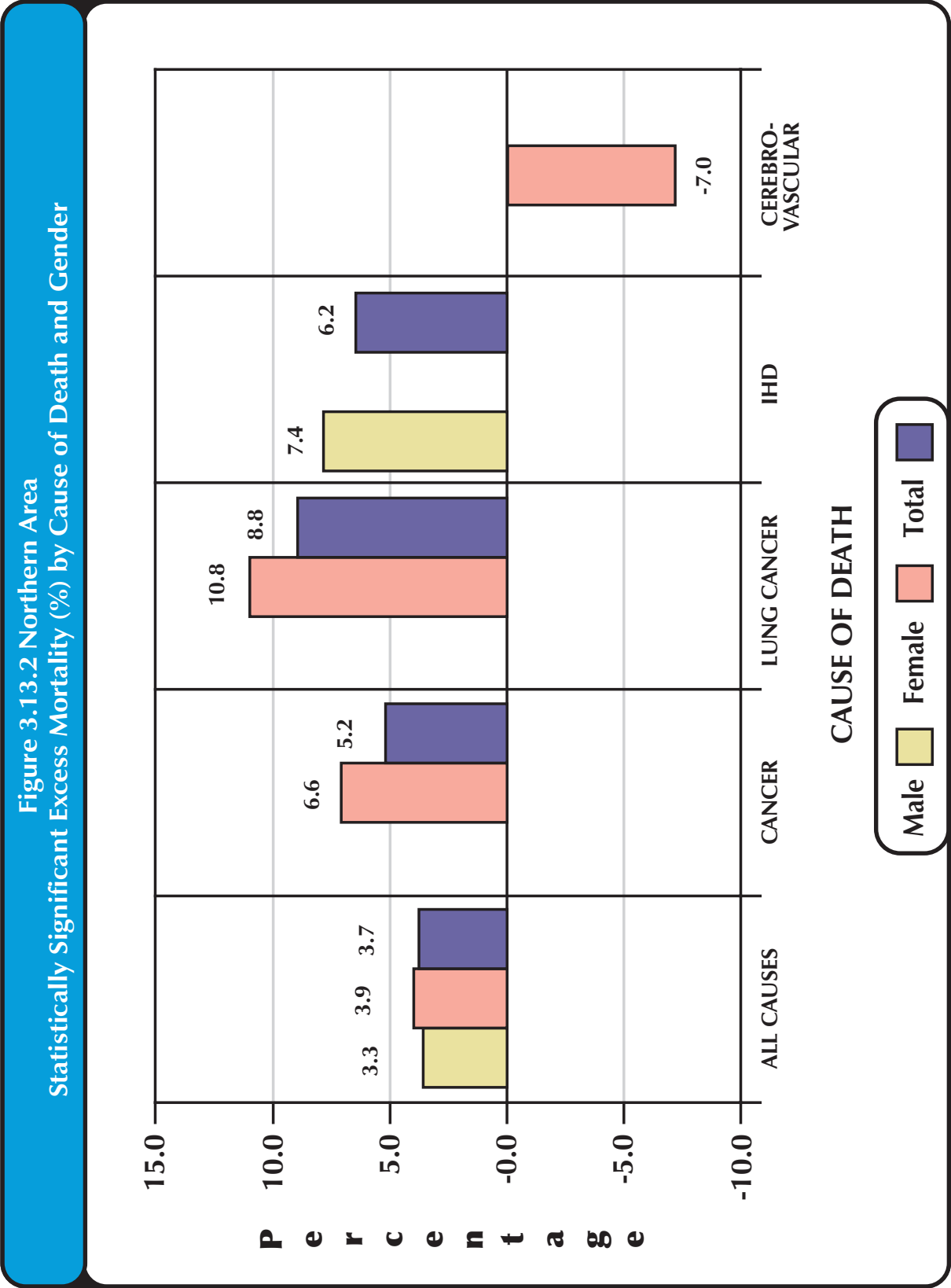
SUMMARY GRAPHS



SUMMARY GRAPHS

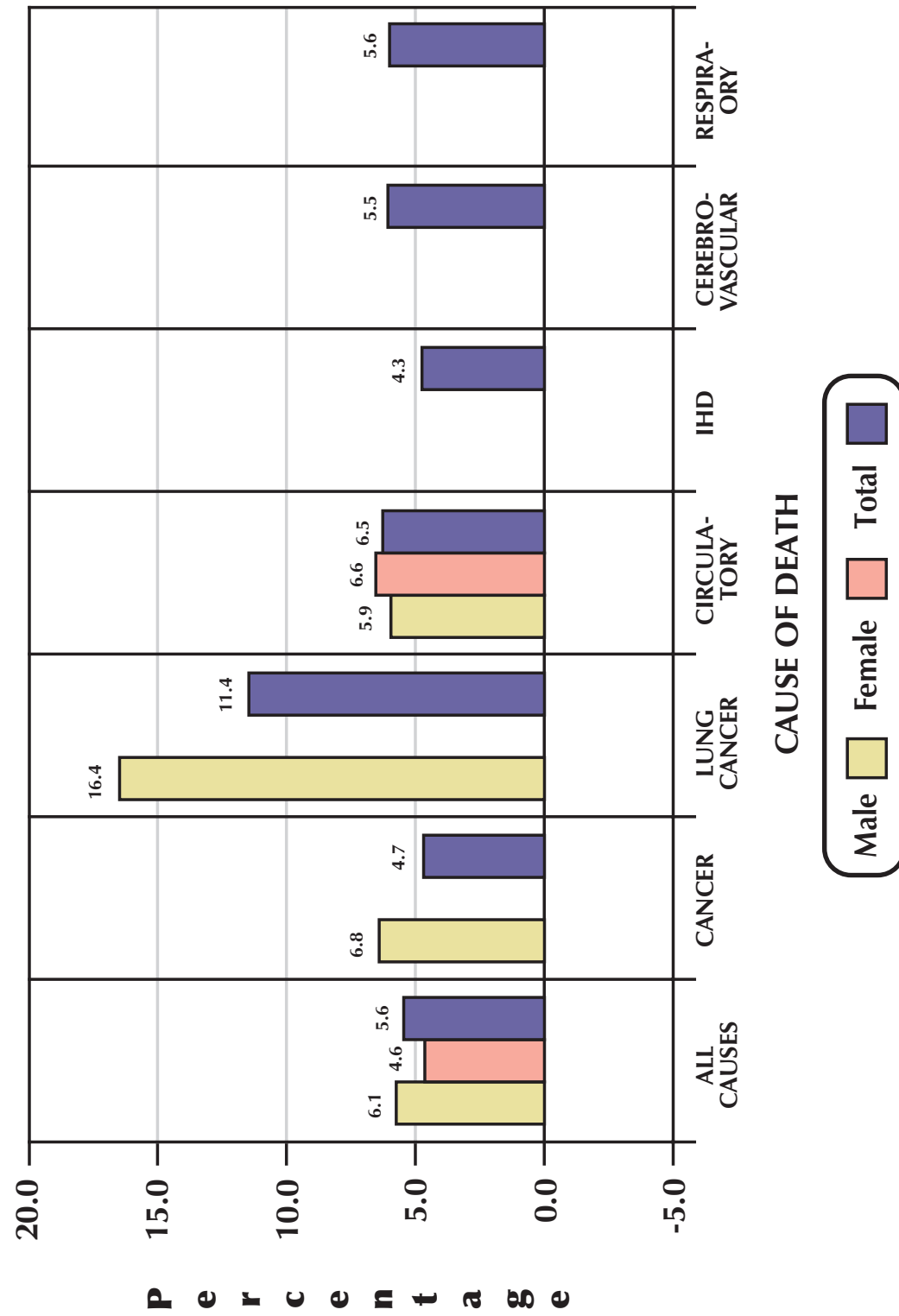
Figure 3.13.1 East Coast Area
Statistically Significant Excess Mortality (%) by Cause of Death and Gender





SUMMARY GRAPHS

Figure 3.13.3 South Western Area
Statistically Significant Excess Mortality (%) by Cause of Death and Gender



4. COMMENTARY

The purpose of this chapter is to highlight the main findings of the study. It does not purport to offer an in-depth discussion on the reasons for the variations found. Further studies are proposed.

The main findings of this report are summarised below and illustrated graphically in Tables 3.12.1 to 3.13.3 and Appendix 1.

- For all cause mortality, the Northern Area and the South Western area differ from the region as a whole by having significantly higher mortality. Conversely, the East Coast area has significantly lower mortality.
- In terms of specific causes of death, the East Coast area has significantly lower mortality than the region as a whole for all categories of disease with the exception of cerebrovascular disease mortality which is lower but not significantly so.
- In terms of specific causes of death, the Northern Area differs from the region as a whole in the following ways: (a) the all cancer category shows significantly higher mortality and this is mainly due to lung cancer in females (b) while circulatory disease mortality as a whole is not significantly higher, ischaemic heart disease mortality in males is significantly higher and cerebrovascular disease mortality in females is significantly lower.
- In terms of specific causes of death, the South Western area has significantly higher mortality than the region as a whole for all major disease categories except injuries and poisonings. With regard to gender, the following points are noted: (a) cancer is significantly higher only in males and this is largely due to lung cancer (b) while ischaemic heart disease, cerebrovascular disease and respiratory disease are each significantly higher overall, the difference is not significantly higher in either males or females.

This report presents mortality differentials across the region as identified by the catchment areas of the three area health boards. Further work is needed to attempt to explain these variations. However, social inequalities, as discussed in Chapter 1, have been shown to account for much of the variation in other studies. Appendix 2 shows the social class data from

the Census of Population, 1996. It can be seen that considerable variation in social class exists between the three area health boards. The way that social inequalities bring about variation in mortality is unclear. A further report, presenting data at DED level, may provide more evidence. From a practical point of view, issues for consideration by managers and researchers alike are access to services, lifestyle factors and economic factors.

It is possible to study regional variations in mortality within the Republic of Ireland through perusal of the Public Health Information System (PHIS 4) database⁹ and also by studying the recent all Ireland report *Inequalities in Mortality*⁴. The leading causes of death in both Northern Ireland and the Republic of Ireland are circulatory diseases, cancers, respiratory diseases and injuries and poisonings.

For all cause mortality, and for three of the major causes of death – circulatory diseases, respiratory diseases and injuries and poisonings – the Eastern Region had significantly lower mortality compared with the national picture.⁹ Conversely, cancer mortality in the Eastern Region was significantly higher than the national average and this is mainly due to lung cancer. Also, within the circulatory group of diseases, mortality in the Eastern Region differed from the national picture in that cerebrovascular disease showed higher mortality, although this was not statistically significant.

There are a number of limitations to this work. These are:

- Although the data available cover the time period 1994-98 mortality trends generally do not differ greatly in a short number of years. Therefore these data are likely to reflect the current situation in 2002.
- It was not possible to geocode a small proportion of deaths (4.6%). The potential bias as a result of this difficulty is unlikely to distort area comparisons.
- Only the major causes of mortality, including all cause mortality, are presented here. However, these major causes accounted for 86% of all deaths.
- Premature mortality is not covered. It is hoped to address this in the next report

Mortality data at DED level, with accompanying maps to illustrate mortality black spots within the region, will be presented in future reports.

Appendix 1

Summary by Area Health Board for each Mortality Category 1994-1998

Note: numbers highlighted in **red** are significantly higher than the regional average;
numbers in **blue** are significantly lower than the regional average

	Eastern Region		East Coast		Northern		South Western	
ALL CAUSE	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	45098	95.4	11953	85.0	16178	98.9	16967	100.7
MALES	22061	95.2	5531	84.0	8004	98.3	8526	101.0
FEMALES	23037	95.6	6422	86.4	8174	99.3	8441	100.0
ALL CANCERS	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	11960	96.2	3036	84.6	4422	101.2	4502	100.7
MALES	6136	96.0	1501	83.4	2255	99.4	2380	102.5
FEMALES	5824	96.4	1535	86.4	2167	102.8	2122	98.5
LUNG CANCER	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	2895	97.0	621	72.4	1115	105.5	1159	108.1
MALES	1778	96.6	346	67.2	681	103.7	751	112.4
FEMALES	1117	97.5	275	81.9	434	108.0	408	100.0
COLORECTAL CANCER	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	1450	96.3	404	92.0	534	101.0	512	95.2
MALES	756	95.2	197	88.5	284	100.3	275	95.4
FEMALES	694	97.5	207	96.5	250	101.4	237	94.4
BREAST CANCER	Number	SMR	Number	SMR	Number	SMR	Number	SMR
FEMALES	1036	96.1	285	92.1	374	98.6	377	96.8
PROSTATE CANCER	Number	SMR	Number	SMR	Number	SMR	Number	SMR
MALES	645	95.1	199	98.0	205	87.2	241	100.5
ALL CIRCULATORY	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	18909	95.5	5174	85.8	6668	97.9	7067	101.7
MALES	8965	95.4	2295	84.5	3260	98.8	3410	101.0
FEMALES	9944	95.6	2879	87.5	3408	96.9	3657	101.9
IHD	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	10164	95.7	2682	84.1	3742	101.6	3740	99.8
MALES	5538	95.5	1361	82.2	2100	102.6	2077	99.3
FEMALES	4626	95.9	1321	87.1	1642	100.1	1663	99.7
CEREBROVASCULAR	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	4076	95.5	1254	94.7	1321	90.8	1501	100.8
MALES	1515	95.3	432	91.6	518	93.8	565	99.8
FEMALES	2561	95.6	822	96.5	803	88.9	936	101.3
ALL RESPIRATORY	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	5983	94.8	1684	85.9	2099	97.6	2200	100.1
MALES	2686	94.8	722	85.1	952	97.2	1012	100.7
FEMALES	3297	94.9	962	86.9	1147	97.8	1188	99.2
INJURY + POISONING	Number	SMR	Number	SMR	Number	SMR	Number	SMR
TOTAL (M+F)	1912	92.0	444	81.1	703	97.1	765	94.8
MALES	1271	91.8	271	78.1	488	100.5	512	92.8
FEMALES	641	92.4	173	87.7	215	89.9	253	98.2

Appendix 2

Percentage of Population in each Social Class by Area Health Board				
Social Class Group	East Coast	Northern	South Western	Eastern Region
Higher professional/managerial	11.9	4.8	5.1	6.6
Lower professional/managerial	31.0	21.6	20.9	23.6
Other non-manual	18.7	20.7	19.7	19.8
Skilled manual	13.7	19.8	20.9	18.7
Semi-skilled manual	8.3	12.8	12.7	11.7
Unskilled manual	5.0	7.0	8.0	7.0
Unknown	11.6	13.2	12.5	12.5

Source: Census of Population, 1996.

REFERENCES

1. Johnson Z, Dack P. Report on Mortality Patterns in Dublin 1986-1987. Health Information Unit, Eastern Health Board, 1989.
2. Inequalities in Health: Report of a Research Working Group chaired by Sir Douglas Black. DHSS, London, 1980.
3. Independent Inquiry into Inequalities in Health chaired by Sir Donald Acheson, Great Britain Independent, 1998.
4. Balanda K, Wilde J. Inequalities in Mortality 1989-1998 A report on all-Ireland Mortality data. Institute of Public Health, 2001.
5. Department of Community Health & General Practice. Inequalities in Health in Ireland - Hard Facts. Trinity College, Dublin, 2001.
6. Department of Health and Children. Annual Report of the Chief Medical Officer 1999. 1999.
7. Johnson Z, Dack P. Small area mortality patterns. *Irish Medical Journal* 1989;82(3):105-108.
8. Johnson Z, Lyons R. Socio-economic factors and mortality in small areas. *Irish Medical Journal* 1993;86(2):60-62.
9. Public Health Information System, Version 4.04 (PHIS 4). Information Management Unit, Department of Health and Children, 2001.