

STATISTICAL REPORT: EXCESS WINTER MORTALITY IN NORTHERN IRELAND – 2010/11



9:30am – Tuesday, 29 November 2011

Introduction

1. There is significant interest in the seasonality of mortality, especially since the severe cold weather experienced in the United Kingdom last winter. The elderly are more vulnerable than others during the winter; hence Government policies aimed at tackling excess winter mortality, such as winter fuel payments and influenza vaccinations, focus particularly on older people. The 2010 Annual Report of the Registrar General contains a special chapter by an independent social researcher, Dr Chris Morris, on seasonality of mortality in Northern Ireland which focuses on the historical trend in these statistics.
2. In addition NISRA has developed this short report which outlines the effect of excess winter mortality in Northern Ireland. This report also looks at some of the factors behind excess winter mortality, along with some issues which should be considered when interpreting the data.
3. The number of excess winter deaths is defined as the difference between the number of deaths which occurred in the winter months of December to March and the average number of deaths occurring in the preceding August to November, and the following April to July. Further information on interpreting the statistics is available in Annex A.
4. This report contains four tables and three charts:
 - Figure 1: Excess winter deaths, 1974/75 to 2010/11
 - Table 1: Number of deaths registered in Northern Ireland and number of excess winter deaths, 1974/75 to 2010/11
 - Table 2: Excess winter mortality index, 1974/75 to 2010/11
 - Figure 2: Excess winter mortality index by age group, 2008/09 to 2010/11
 - Table 3: Excess winter deaths and excess winter mortality index by age group, 1974/75 to 2010/11
 - Figure 3: Excess winter mortality index by Health & Social Care Trust, 2008/09 to 2010/11
 - Table 4: Excess winter deaths and excess winter mortality index by cause of death, 2001/2 to 2010/11

Overall Excess Winter Deaths

- Table 1 shows there were 5,305 deaths registered in Northern Ireland in the winter period (December to March) of 2010/11, compared with 5,360 in winter 2009/10. Despite the unusually cold weather, winter 2010/11 had a lower number of deaths registered than the previous two winters.
- In the winter period (December to March) of 2010/11 there were an extra 740 deaths in Northern Ireland, compared to the average for the non-winter periods (previous August to November and the following April to July). The corresponding figure for 2009/10 was 940.
- Table 1 and Figure 1 show that the number of excess winter deaths fluctuates year on year. Mortality in the winter months is consistently higher than at other times of the year. Over the last ten years, excess winter deaths was highest in the winters of 1989/90 and 1999/00, when there were 1,830 and 1,420 excess winter deaths respectively. These notable high years were also witnessed in other parts of the United Kingdom and corresponded with influenza outbreaks. This is discussed in detail in Annex A.

Figure 1: Excess winter deaths, Northern Ireland, 1974/75 to 2010/11^P

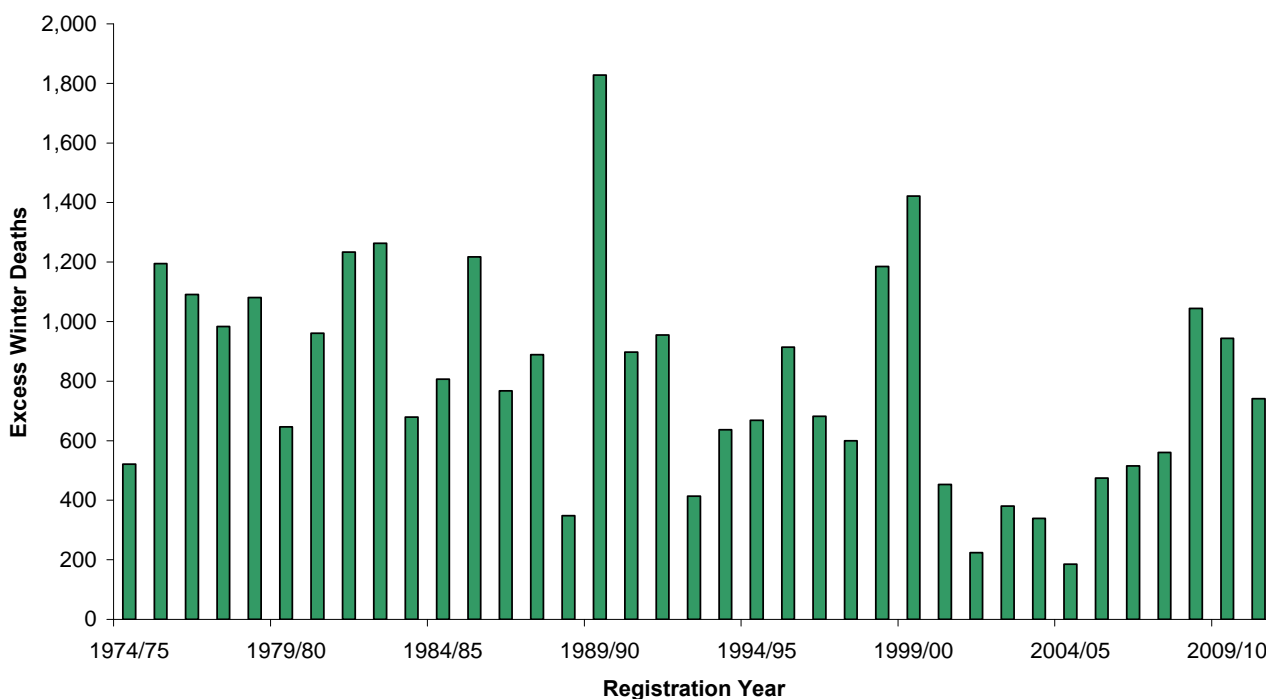


Table 1: Number of deaths registered in Northern Ireland and number of excess winter deaths 1974/75 to 2010/11^P

Registration Period	Number of Deaths Registered			Excess Winter Deaths ¹	
	Winter (Dec-Mar)	Preceding Period (Aug-Nov)	Following Period (Apr-Jul)	Actual Number	Rounded Number
1974/75	6,023	5,310	5,694	521	520
1975/76	6,389	4,963	5,425	1,195	1,200
1976/77	6,389	5,112	5,484	1,091	1,090
1977/78	6,202	5,049	5,388	984	980
1978/79	6,217	4,838	5,435	1,081	1,080
1979/80	6,028	5,143	5,620	647	650
1980/81	6,071	5,039	5,182	961	960
1981/82	6,242	4,953	5,064	1,234	1,230
1982/83	6,183	4,731	5,109	1,263	1,260
1983/84	5,731	4,873	5,231	679	680
1984/85	5,772	4,711	5,220	807	810
1985/86	6,222	4,807	5,203	1,217	1,220
1986/87	5,539	4,702	4,842	767	770
1987/88	5,896	4,905	5,110	889	890
1988/89	5,296	4,940	4,955	349	350
1989/90	6,594	4,852	4,680	1,828	1,830
1990/91	5,773	4,849	4,901	898	900
1991/92	5,548	4,457	4,729	955	960
1992/93	5,283	4,731	5,007	414	410
1993/94	5,635	5,182	4,815	637	640
1994/95	5,547	4,904	4,853	669	670
1995/96	5,717	4,839	4,767	914	910
1996/97	5,473	4,724	4,858	682	680
1997/98	5,423	4,593	5,054	600	600
1998/99	5,922	4,664	4,809	1,186	1,190
1999/00	6,088	4,739	4,594	1,422	1,420
2000/01	5,094	4,623	4,659	453	450
2001/02	4,941	4,681	4,754	224	220
2002/03	5,071	4,750	4,632	380	380
2003/04	5,075	4,762	4,711	339	340
2004/05	4,888	4,684	4,722	185	190
2005/06	5,148	4,580	4,767	475	470
2006/07	5,235	4,696	4,744	515	520
2007/08	5,259	4,603	4,794	561	560
2008/09	5,596	4,549	4,554	1,045	1,040
2009/10	5,360	4,436	4,397	944	940
2010/11 ^P	5,305	4,660	4,468	741	740

¹ Excess winter deaths are calculated as detailed in Annex A.

^P Provisional Data

8. An excess winter mortality index can be calculated to enable comparisons between sexes, age groups and regions. It is calculated as the number of excess winter deaths divided by the average non-winter deaths, expressed as a percentage. Table 2 shows the Excess Winter Mortality Index for Northern Ireland for 1974/75 to 2010/11.

Table 2: Excess winter deaths and excess winter mortality index, Northern Ireland, 1974/75 to 2010/11^P

Registration Period	Excess Winter Deaths^{1, 2}	Excess Winter Mortality Index
1974/75	520	9
1975/76	1,200	23
1976/77	1,090	21
1977/78	980	19
1978/79	1,080	21
1979/80	650	12
1980/81	960	19
1981/82	1,230	25
1982/83	1,260	26
1983/84	680	13
1984/85	810	16
1985/86	1,220	24
1986/87	770	16
1987/88	890	18
1988/89	350	7
1989/90	1,830	38
1990/91	900	18
1991/92	960	21
1992/93	410	9
1993/94	640	13
1994/95	670	14
1995/96	910	19
1996/97	680	14
1997/98	600	12
1998/99	1,190	25
1999/00	1,420	30
2000/01	450	10
2001/02	220	5
2002/03	380	8
2003/04	340	7
2004/05	190	4
2005/06	470	10
2006/07	520	11
2007/08	560	12
2008/09	1,040	23
2009/10	940	21
2010/11 ^P	740	16

¹ Excess winter deaths are calculated as detailed in Annex A.

² Numbers have been rounded to the nearest 10 independently.

^P Provisional Data

Excess Winter Mortality by Age

9. In winter 2010/11, 66 per cent of excess winter deaths involved people aged 75 and over. The highest rates of excess winter deaths relate to people aged 85 and over. In the last three winters, the excess winter mortality index was lowest for those aged 65-74 years and highest for those aged 85 and over. However over the last year the excess winter mortality index decreased by 11 per cent for the 85 and over age category. This is outlined in detail in Table 3.
10. Death rates among those aged under 65 are relatively low, and accordingly estimates of the excess winter mortality index for this age group will be volatile.

Figure 2: Excess winter mortality index by age group, 2008/09 to 2010/11^P

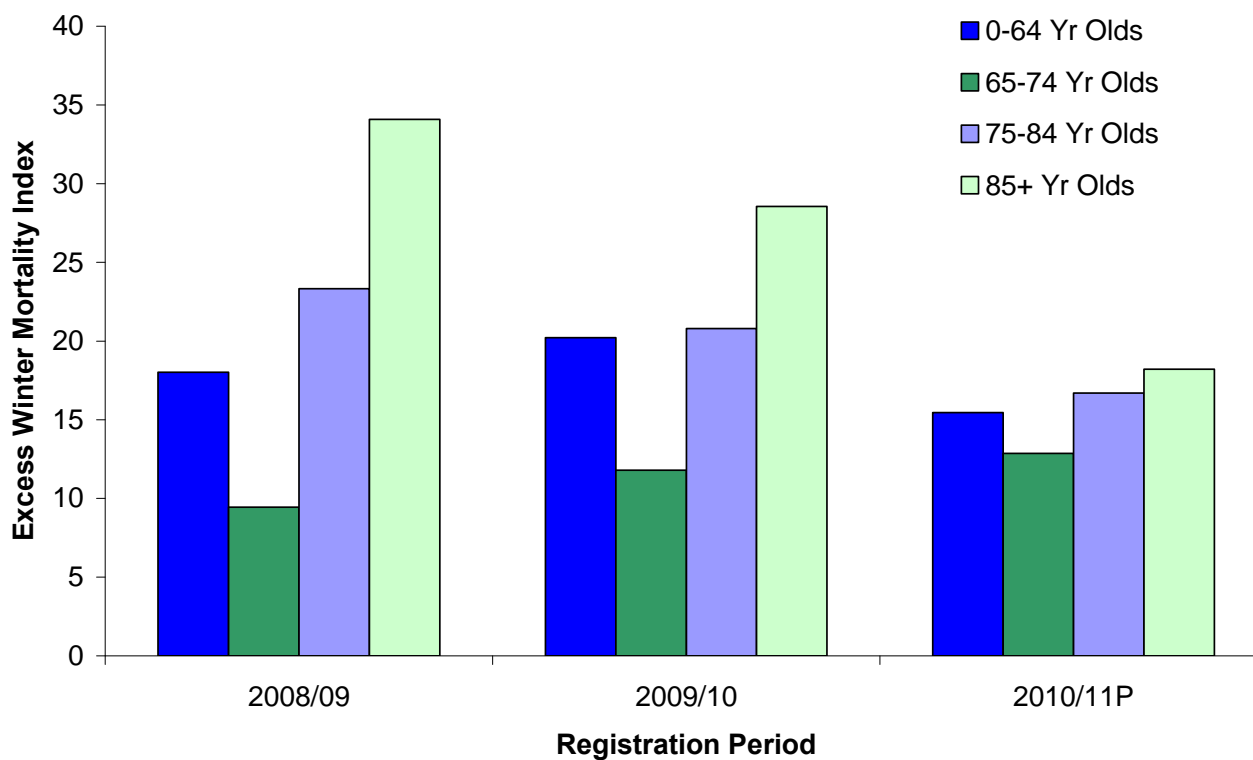


Table 3: Excess winter deaths and excess winter mortality index by age group ^{1,2}, Northern Ireland, 1974/75 to 2010/11^P

Registration Period	All Ages		0-64		65-74		75-84		85+	
	Number	Index	Number	Index	Number	Index	Number	Index	Number	Index
1974/75	520	9	20	1	140	10	260	17	90	12
1975/76	1,200	23	190	12	300	22	450	31	250	34
1976/77	1,090	21	160	10	260	18	400	26	270	38
1977/78	980	19	130	8	280	20	370	25	210	29
1978/79	1,080	21	210	14	320	23	390	25	170	23
1979/80	650	12	50	3	190	13	280	17	120	16
1980/81	960	19	160	11	240	17	370	23	200	26
1981/82	1,230	25	230	17	270	20	440	29	300	39
1982/83	1,260	26	130	9	330	26	430	28	370	52
1983/84	680	13	100	7	120	9	330	21	130	16
1984/85	810	16	40	3	240	19	320	20	210	26
1985/86	1,220	24	60	5	240	18	490	31	430	50
1986/87	770	16	60	5	210	17	300	20	200	24
1987/88	890	18	80	6	230	18	380	24	210	22
1988/89	350	7	-20	-2	70	6	170	10	140	15
1989/90	1,830	38	160	15	420	36	740	47	510	55
1990/91	900	18	0	0	260	23	390	24	260	26
1991/92	960	21	100	9	210	18	370	24	280	31
1992/93	410	9	90	9	80	7	130	8	110	10
1993/94	640	13	50	4	110	9	250	15	230	21
1994/95	670	14	70	7	110	10	240	15	240	23
1995/96	910	19	40	4	200	18	330	21	340	31
1996/97	680	14	30	3	120	11	220	13	320	29
1997/98	600	12	0	0	110	10	240	15	240	20
1998/99	1,190	25	40	4	180	18	400	25	560	47
1999/00	1,420	30	150	15	240	26	530	35	500	41
2000/01	450	10	40	4	30	3	150	10	230	19
2001/02	220	5	30	3	-20	-2	100	6	110	9
2002/03	380	8	40	4	30	3	180	12	120	9
2003/04	340	7	30	3	20	2	140	9	140	11
2004/05	190	4	-110	-11	-10	-1	110	7	190	15
2005/06	470	10	30	3	10	1	230	15	210	16
2006/07	520	11	-20	-2	80	10	300	21	160	11
2007/08	560	12	20	2	70	9	160	11	310	22
2008/09	1,040	23	170	18	80	9	330	23	470	34
2009/10	940	21	190	20	100	12	270	21	390	29
2010/11 ^P	740	16	150	15	100	13	230	17	260	18

¹ Excess winter deaths are calculated as detailed in Annex A.

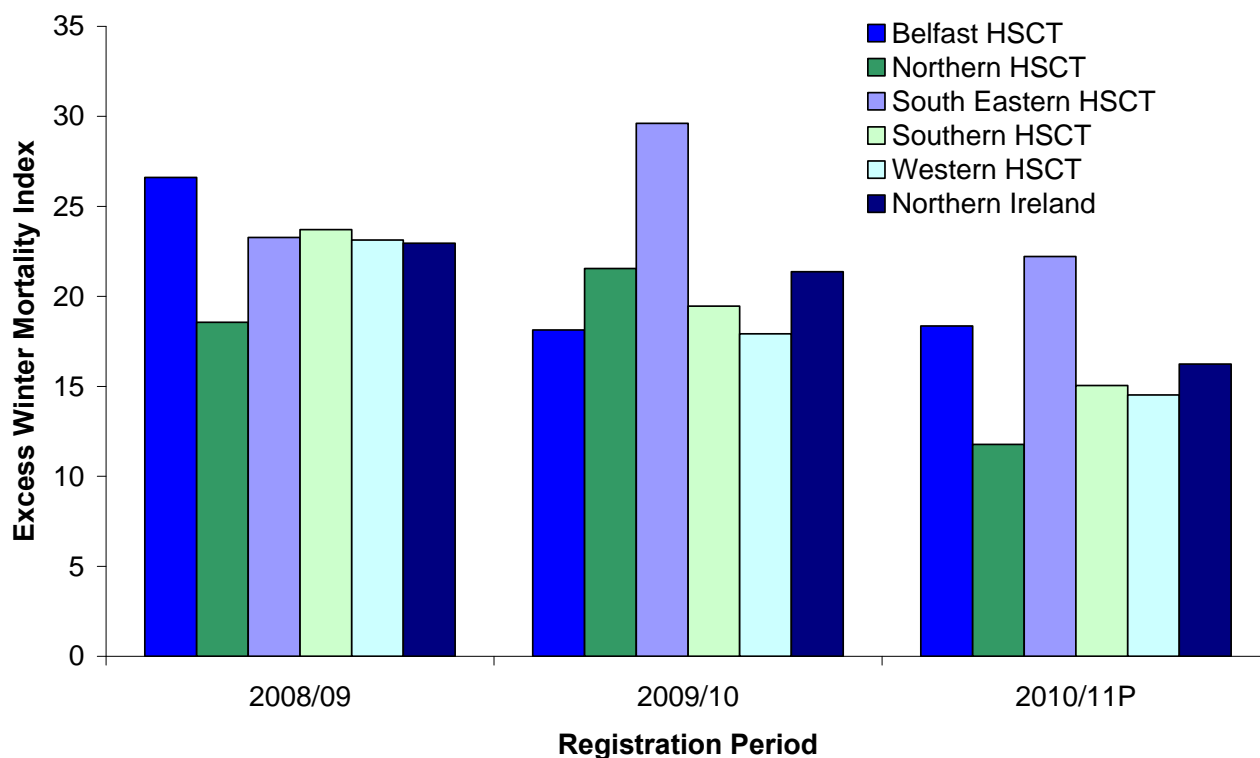
² Numbers have been rounded to the nearest 10 independently.

^P Provisional Data

Excess Winter Mortality by Health and Social Care Trust

11. Figure 3 shows the excess winter mortality index was lower in 2010/11 than the previous winter for all Health and Social Care Trusts except Belfast, which experienced an increase. The South Eastern Trust had the highest excess winter mortality index in the winters of 2009/10 and 2010/11.

Figure 3: Excess winter mortality index by Health and Social Care Trust, 2008/09 to 2010/11^P



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Excess Winter Mortality by Cause of Death

12. Table 4 shows that deaths from circulatory diseases accounted for the largest number of excess winter deaths registered in 2010/11, however respiratory causes had the highest excess winter mortality index of all causes in 2010/11.

13. The number of additional deaths occurring in winter varies with the temperature, the level of disease in the population and other factors. Hypothermia is rarely cited as a cause of death in Northern Ireland, in recent years there have been on average 18 such death registered each year. Most additional winter deaths are from respiratory or circulatory diseases (see Table 4).

14. There are very few deaths registered each year which have influenza recorded as the underlying cause, the largest number in recent years was 39 deaths in 2000. The figure for 2010 was 10 influenza deaths. During 2010 there were nine deaths registered where swine flu (H1N1) was mentioned on the death certificate, this is a decrease from the 14 deaths registered in 2009.

Table 4: Excess winter deaths and excess winter mortality index by cause of death^{1,2}, 2001/02 to 2010/11^P

Registration Period	Circulatory Disease (I00-I99)		Respiratory Disease (J00-J99)		All Other Causes of Death		All Causes	
	Number	Index	Number	Index	Number	Index	Number	Index
2001/02	160	8	110	18	-40	-2	220	5
2002/03	170	9	240	42	-30	-1	380	8
2003/04	90	5	210	34	30	1	340	7
2004/05	60	3	160	28	-40	-2	190	4
2005/06	270	17	150	25	50	2	470	10
2006/07	170	11	200	34	140	5	520	11
2007/08	130	9	270	45	160	6	560	12
2008/09	330	23	380	67	340	13	1,040	23
2009/10	370	27	240	44	340	13	940	21
2010/11 ^P	200	15	150	26	390	15	740	16

¹ Excess winter deaths are calculated as detailed in Annex A.

² Numbers have been rounded to the nearest 10 independently.

^P Provisional Data

Further Information

15. Further information on the statistics provided in this publication can be obtained from:

NISRA Customer Services at:

Telephone: 028 9034 8160

Fax: 028 9034 8161

E-mail: census.nisra@dfpni.gov.uk

Responsible Statistician: Dr David Marshall

Annex A: Interpretation of Excess Winter Mortality

Issues of Calculation

1. The methodology behind excess winter mortality is defined in Box 1. This is a standard definition which is used across the United Kingdom and by the World Health Organisation.
2. The four month winter period (December, January, February and March) is used because statistically, these are the months with higher mortality. This is shown graphically in Figure A.1, where the average daily deaths by month is shown for the period 1976 to 2010.

Box 1: Excess Winter Mortality (EWM) – method of calculation

The method defines the winter period as December to March, and compares the number of deaths that occurred in this winter period with the average number of non-winter deaths occurring in the preceding August to November and the following April to July:

Excess Winter Mortality = December to March deaths – ((August to November deaths + April to July deaths)/2)

The Excess Winter Mortality index is calculated as the number of excess winter deaths divided by the average non-winter deaths expressed as a percentage:

EWM Index = (EWM / average non-winter deaths) x 100

3. It should be noted that the definition does have two practical issues:
 - firstly, if mortality starts to increase outside the Winter period, for example if mortality rises in November due to an influenza outbreak, then the number of deaths in the non-winter period will increase, which in turn will decrease the excess winter mortality statistic;
 - secondly, the methodology used in Northern Ireland to calculate excess winter mortality is based on when deaths are registered, not when they occur. The exact timing of holiday periods associated with, for example, Christmas and Easter, can impact on the number of registrations and thus the excess winter death statistic. Furthermore, Easter can occur in the late “Winter” period which will have an additional effect.

4. Issues of calculation are discussed in more detail in the Registrar General's Annual report. However, Figure A.2 shows that the impact of the difference between the registration and occurrence based method is generally small. The occurrence based method suffers the problem of never providing a final statistic as deaths that occurred in one year can be registered in the next. This is the reason why, in Northern Ireland, the registration method is used.

Figure A.1: Average Daily Deaths by Month 1976-2010 (occurrence)

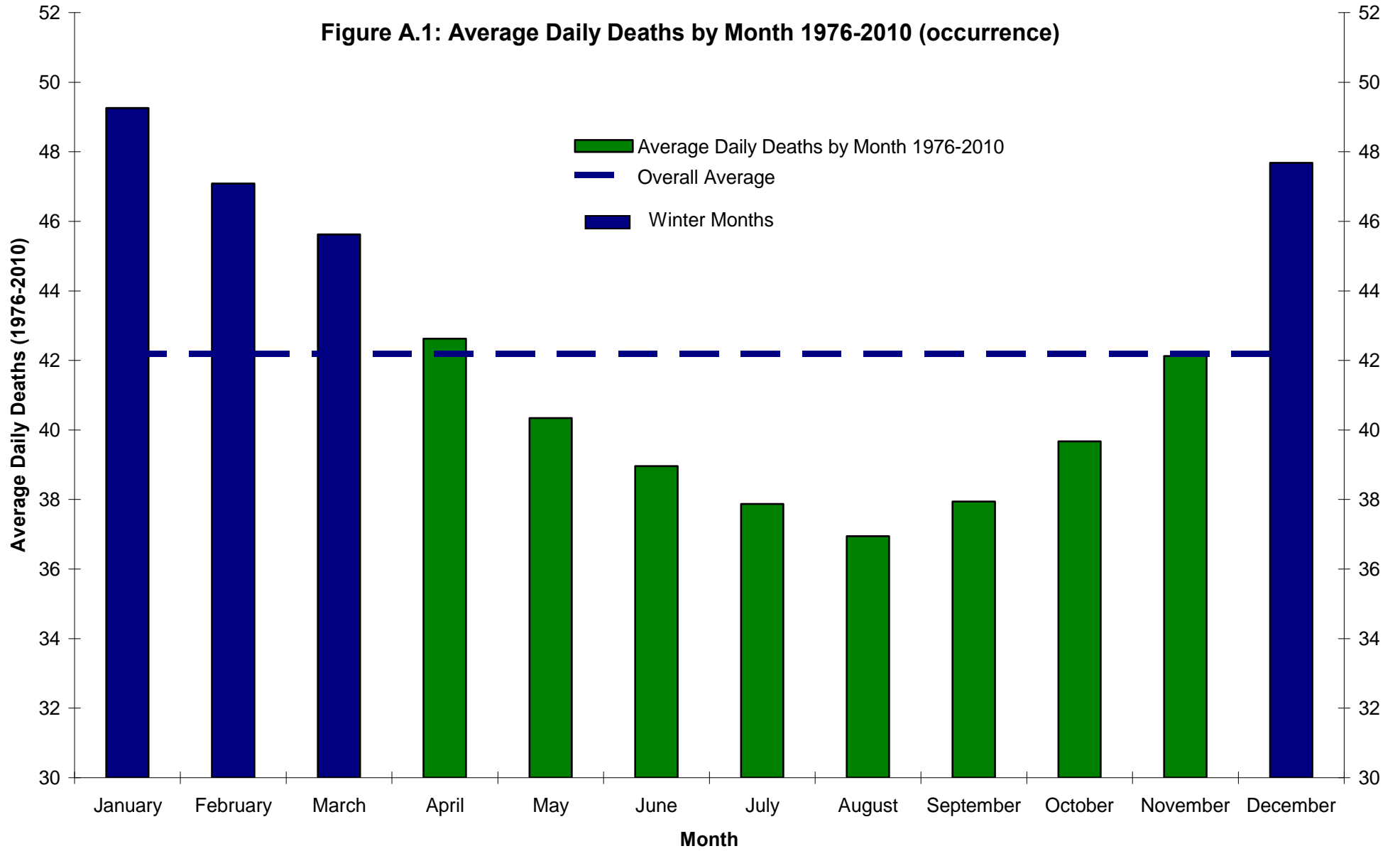
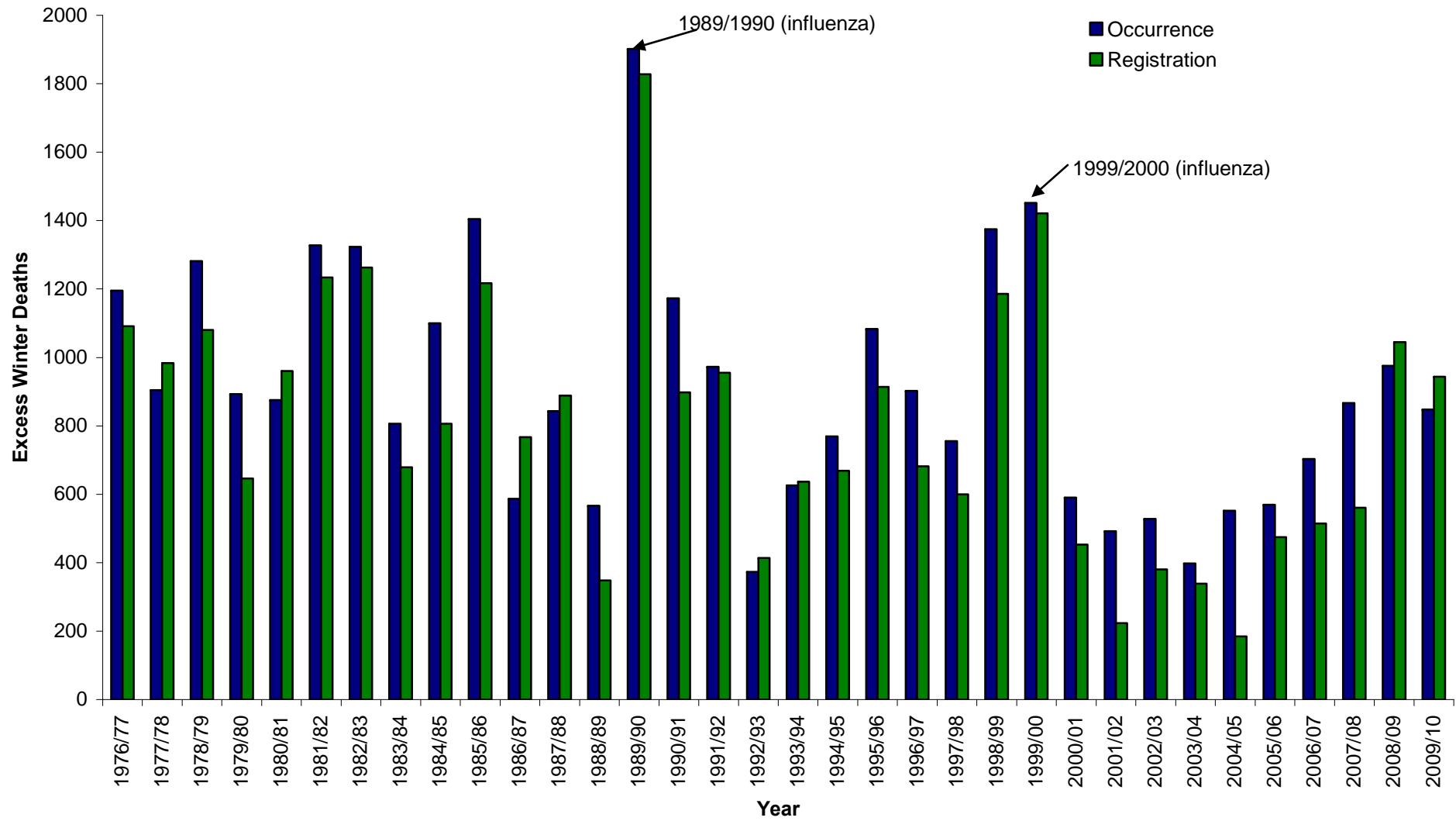


Figure A.2: Excess Winter Deaths by Year (Occurrence vs Registration Based)



Issues of interpretation of Excess Winter Deaths

5. The perceived interpretation of excess winter mortality is that it is driven **solely** by lower temperatures in the winter period. This is incorrect. There are a number of factors that impact on the differences in the time of year when people die. Temperature is clearly one, but the impact of influenza is another major impact.
6. As an example, Figure A.3 shows the number of deaths occurring each month in Northern Ireland from 1976 to 2010 against the average monthly temperature as recorded by the Meteorological Office. The winter months (December to March) are coloured in blue squares and the non-winter months are shown as green dots. Also shown is the statistical line of best fit between monthly temperature and mortality.
7. Figure A.3 shows there is a statistical relationship between monthly deaths and the average temperature in that month. Specifically, there is generally higher mortality in a colder month than in a warmer one. The graph also shows the extent of the variation around the line of best fit. In the winter months (blue squares), the variation around the line of best fit is much larger than in the non-winter months with higher temperature.
8. This points to other secondary factors which may be linked to temperature which can have an impact. When one looks at detail at the main outlier month (December 1989), this month had a major outbreak of influenza – again indicating other factors at work.
9. What is also clear from the mortality statistics is that December 2010, one of the coldest months on record, did not have mortality levels equivalent to that witnessed in December 1989.
10. Thus, caution needs to be taken when inferring that cold weather is the sole direct driver of excess winter mortality. The situation is more complex than that – there are other seasonal issues such as influenza, air quality and lack of sunlight which impact on health/mortality. These issues are related to temperature and can have an impact on health/mortality.

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Figure A.3: Monthly deaths vs average monthly temperature (1976 to 2010)

