MORTALITY STATISTICS FOR COLCHESTER COUNTY, NOVA SCOTIA: AN ANALYSIS OF NOVA SCOTIA DEATH CERTIFICATE DATA, 1998-2005

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June 2009

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NELS | Network for End of Life Studies
ICE | Interdisciplinary Capacity Enchancement

Introduction

With support from a Canadian Institutes of Health Research (CIHR) Interdisciplinary Capacity Enhancement (ICE) grant (#HOA-80067), the Network for End of Life Studies (NELS) is investigating vulnerable populations at end of life. Death certificate data from Nova Scotia Vital Statistics (NSVS) is being analyzed to describe persons dying of chronic disease in Nova Scotia by causes of death and to estimate the size of the population that could benefit from palliative and end of life care. To date, chronic disease reports have been completed for cancer, chronic obstructive pulmonary disease (COPD), multiple sclerosis (MS), and Parkinson's disease. Reports are planned or in progress for Alzheimer's disease, diabetes, renal disease, congestive heart failure (CHF), and cerebrovascular disease (stroke).

Purpose

The purpose of this work-in-progress report is to provide death data by age and causes of death for Colchester County to assist in a needs assessment for a residential hospice in the Colchester East Hants District Health Authority. We welcome feedback on the information presented herein.

Methods:

Study Population for this Report: The Colchester East Hants District Health Authority (DHA 4) includes East Hants as well as Colchester County. According to the 2006 Census, the population is of Colchester County is 50,023 (Statistics Canada 2008a, and the population of East Hants is 21,387 (Statistics Canada, 2008b). Thus, this report relates to approximately 70% of the population of DHA 4. Colchester County is approximately 5.5% of the population of Nova Scotia. Figure 1 and Table 1 display the population distribution for Colchester County.

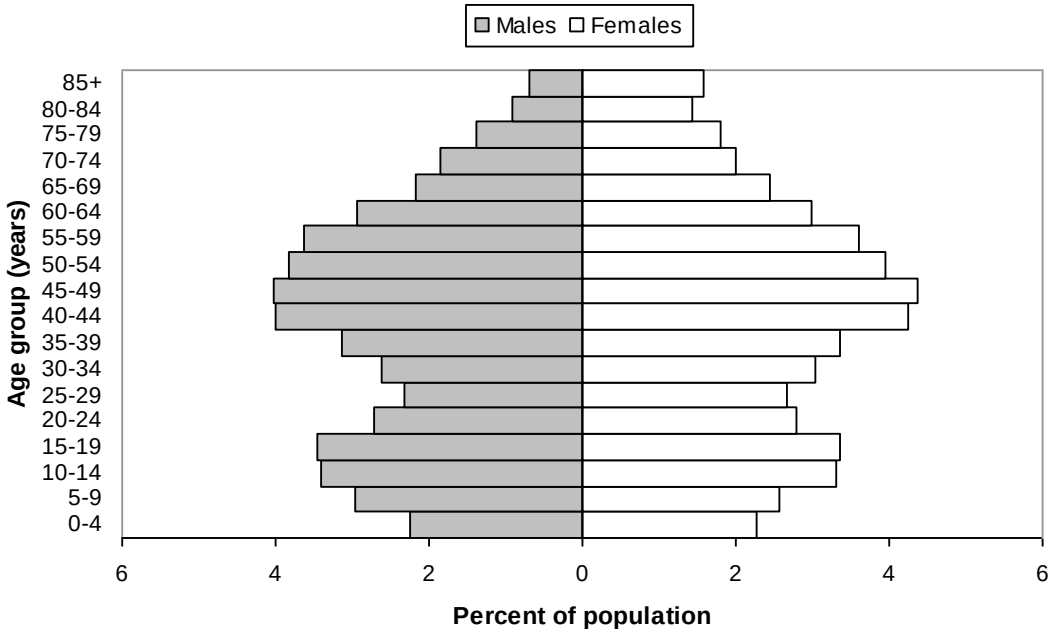

Figure 1: Population pyramid by five year age groups, Colchester County, Nova Scotia, 2006. Source: Statistics Canada, Community Profiles.

Table 1: Population counts by five year age groups, Colchester County, Nova Scotia, 2006.

Age Group (Years)	Male	Female	Total
0-4	1,125	1,140	2,265
5-9	1,480	1,280	2,755
10-14	1,700	1,650	3,355
15-19	1,725	1,675	3,400
20-24	1,360	1,390	2,750
25-29	1,155	1,330	2,480
30-34	1,305	1,520	2,825
35-39	1,570	1,680	3,250
40-44	2,005	2,120	4,130
45-49	2,015	2,185	4,205
50-54	1,910	1,975	3,885
55-59	1,815	1,800	3,615
60-64	1,470	1,495	2,965
65-69	1,090	1,225	2,320
70-74	930	1,000	1,930
75-79	695	900	1,590
80-84	460	720	1,180
85+	340	790	1,125
TOTAL	24,145	25,880	50,025

Note: Population totals may not add up due to rounding.
Source: Statistics Canada, Community Profiles.

NELS ICE Study Subjects: The study population for our current set of NELS ICE reports is Nova Scotia residents of all ages who died from January 1, 1998 to December 31, 2005 (N = 63,431). These decedents were identified from the NSVS death certificate database maintained by the Population Health Research Unit (PHRU) at Dalhousie University.

Identification of Colchester County Deaths: The death registration form captures counties rather than district health authorities. The NSVS dataset obtained from PHRU has county of death, not county of residence. This report provides a descriptive picture of individuals that died in Colchester County. It is not possible for us to identify deaths from East Hants because these deaths are included within Hants County. Table 2 shows that there were 3,659 deaths in Colchester County from 1998 to 2005 inclusive which is almost 460 per year, or a crude[1] total estimate of 5,227, or almost 655 per year for DHA 4.

[1] Crude estimates for DHA 4 are calculated by assuming that Colchester County counts represent 70% of DHA 4 counts.

Table 2: Number of deaths per year, by sex, Colchester County, Nova Scotia, 1998-2005.

	1998	1999	2000	2001	2002	2003	2004	2005	Total
Male	221	218	249	193	222	232	228	243	1,806
Female	218	224	258	249	215	228	228	233	1,853
Total	439	442	507	442	437	460	456	476	3,659

[1] Crude estimates for DHA 4 are calculated by assuming that Colchester County counts represent 70% of DHA 4 counts.

The focus of this report is on 'counts' of deaths since that is typically what is of most value for planning services. Age standardized mortality rates are available from the Nova Scotia Mortality Report (Nova Scotia Department of Health, 2008) and are not included in this report.

Multiple Causes of Death: There can be up to 13 causes of death listed on the death certificate. When only one cause of death is recorded, this cause of death is selected as the underlying cause. When more than one cause of death is recorded, the underlying cause is identified using a set of rules developed by the World Health Organization (Statistics Canada, 2005). The underlying cause of death is defined by Statistics Canada (2007) as "(a) the disease or injury which initiated the train of morbid events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury."

While all deaths were included, the International Classification of Disease (ICD) codes for injuries, poisonings and other external causes of death were provided as XXX by PHRU. To protect confidentiality, this report combines disease and age groups so that no data cell contains less than five decedents. The ICD cause of death groups used in this report are included in Appendix A.

Results:

Descriptive Profile of Colchester County Decedents: Colchester County averages around 450 deaths per year (Table 2). Over 80% of those that died in Colchester County between 1998 and 2005 were age 65 or older (Figure 2).

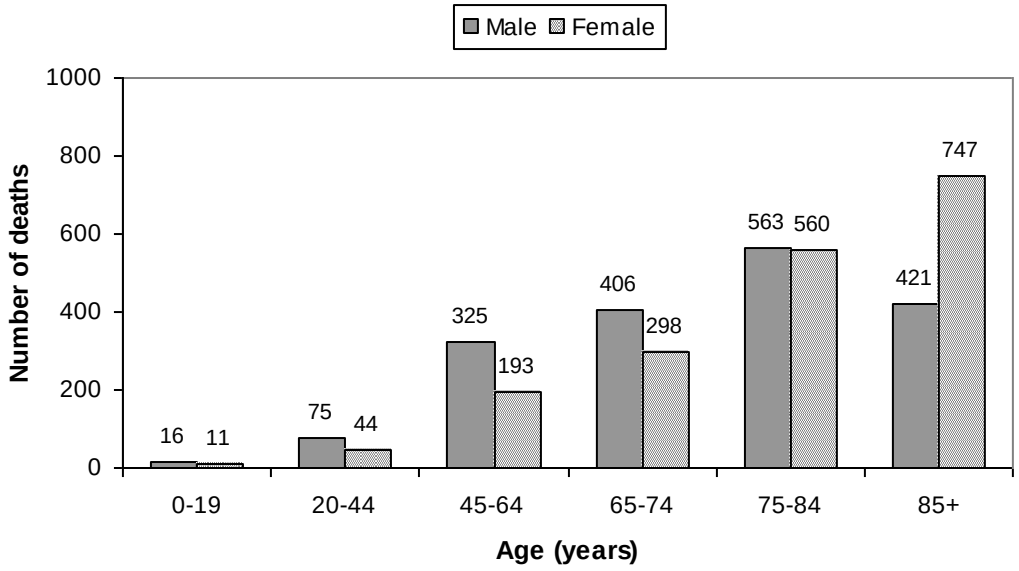

Figure 2: Deaths by age and sex, Colchester County, Nova Scotia, 1998-2005.

Major Causes of Death: Among the 3,632 deaths in Colchester County for persons aged 20 and older, major causes of death included cancer, heart disease, stroke and chronic obstructive pulmonary disease (Table 3). The data provided by PHRU contains all causes of death mentioned on the death certificate. Table 3 includes the number of deaths where a condition was selected as the underlying cause as well as the number of deaths with any mention of the condition on the death certificate. Since there can be up to 13 causes of death listed on the death certificate, decedents may appear in more than one row of the 'any mention of cause' column.

Table 3: Major causes of death for persons aged 20+, Colchester County, Nova Scotia, 1998-2005.

Cause of death	Underlying Cause		Any mention of cause	
	Number of deaths	Percent (%) of total deaths	Number of deaths	Percent (%) of total deaths
Cancer	1,084	29.8	1,223	33.7
Chronic ischemic heart disease	336	9.3	708	19.5
Acute myocardial infarction	310	8.5	381	10.5
Cerebrovascular disease (stroke)	298	8.2	484	13.3
Chronic obstructive pulmonary disease	203	5.6	466	12.8
Alzheimer's disease / dementia	181	5.0	410	11.3
Injury, poisoning and certain other consequences of external causes; External causes of morbidity and mortality	162	4.5	258	7.1
Pneumonia	104	2.9	446	12.3
Diabetes	97	2.7	363	10.0
Congestive heart failure	88	2.4	465	12.8
Renal failure	53	1.5	308	8.5
Parkinson's disease	35	1.0	73	2.0

Dying In-Hospital: Place of death has been used as an indicator of quality of care at end of life (Burge et al., 2003; Grunfeld et al., 2006; NELS ICE, 2008a). Most persons would like to die in their own home or community based care rather than in-hospital if adequate home and community care is available (Grunfeld et al., 2008). In Nova Scotia, 62.6% of all adult deaths from 1998 to 2005 occurred in-hospital. This rate of hospital death is considered relatively high compared to rates in other countries such as the US, UK and some other European countries.

The PHRU NSVS data only reports location of death as in-hospital or out-of-hospital. Using a more complete data set obtained directly from Nova Scotia Vital Statistics, out-of-hospital can be subdivided into private residence and nursing home. The percentage dying in-hospital tends to increase up until age 75 and then starts to decrease after age 75 (Table 4).

Table 4: Number and percent of in-hospital deaths for persons aged 20+, by age and sex, Colchester County, Nova Scotia, 1998-2005.

	Aged 20-44		Aged 45-64		Aged 65-74		Aged 75-84		Aged 85+		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Male	27	36.0	201	61.9	302	74.4	423	75.1	289	68.7	1,242	69.4
Female	26	59.1	150	77.7	221	74.2	378	67.5	429	57.4	1,204	65.4
Total	53	44.5	351	67.8	523	74.3	801	71.3	718	61.5	2,446	67.4

Estimating Palliative Care Population: Researchers based in Western Australia (Rosenwax et al., 2006) have developed methods using underlying cause of death data to estimate the size of the population that could potentially benefit from palliative care. NELS ICE produced estimates for Colchester County using these methods (Table 5). Please note that the ICD cause of death groups for the minimal and maximal estimates differ from those listed in Appendix A.

Table 5: Number and percent of in-hospital deaths for persons aged 20+, by age and sex, Colchester County, Nova Scotia, 1998-2005.

Estimate	Description of estimate			Number of deaths
Colchester County, NS	All deaths from 1 January 2000 to 31 December 2005 excluding records missing the underlying cause of death (n = 3)			2,775
Minimal Estimate	Deaths from one of 10 causes:			1,283 (46.2% of all deaths)
	Cause of death (ICD-10 codes)	*N*	*% of all deaths*	
	Neoplasm (C00-D48)	850	30.6	
	COPD (J40-J44)	147	5.3	
	Alzheimer's disease (G30)	106	3.8	
	Heart failure (I11.0, I13.0, I13.2, I50)	82	2.9	
	Renal failure (I12.0, I13.0, N17-N19)	52	1.9	
	Parkinson's disease, motor neuron disease (includes ALS) and Huntington's disease (G20-G21; G12.2; G10)	39	1.4	
	Liver failure (K70.4, K71.1, K72)	7	0.2	
	HIV / AIDS (B20-B24)	0	0	
Maximal Estimate	Deaths from all causes, except during pregnancy, childbirth or the puerperium (ICD-10 O00-O99); originating during the perinatal period (ICD-10 P00-P96); resulting from injury, poisoning and certain other external causes (ICD-10 S00-T98); or resulting from external causes of morbidity and mortality (V01-Y98)			2,637(95.0% of all deaths)

End of Life Trajectories: A classification of trajectories of dying helps foster dialogue on planning the end of life care needs for the majority of decedents. Trajectories were first described by Glaser and Strauss in 1968 (Lunney et al., 2002). Lunney et al. (2002 and 2003) refined this concept and developed four trajectory groups (Figure 3). "Sudden Death" includes those who died as a result of an accident or other external cause of mortality. The "Terminal Illness" category includes those who declined over a short period of time due to cancer, HIV-related diseases, motor neuron disease or chronic renal failure. "Organ Failure" includes those individuals with conditions such as CHF or COPD where functional status gradually declined with intermittent, serious exacerbations. The "Frailty" category includes those who experienced prolonged dwindling due to Alzheimer's disease, neurological conditions such as Parkinson's disease and multiple sclerosis, or late effects of stroke.

NELS ICE assigned all Colchester County decedents from 2000 to 2005 to one of the four trajectory groups based on methods by Fassbender et al. (2006) that used the underlying cause of death (Figure 4). This shows that end of life care could be planned for nearly 95% of all deaths in the Colchester County.

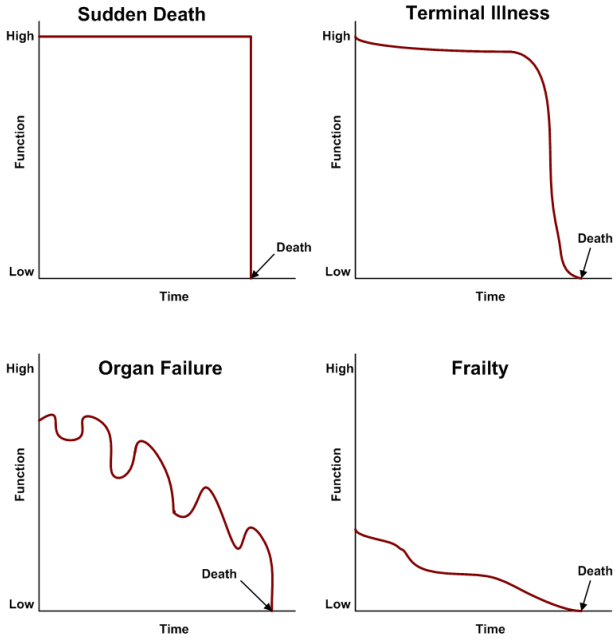

Figure 3: Trajectories of dying

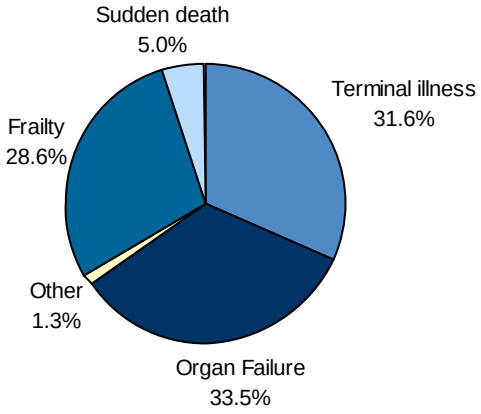

Figure 4: Colchester County deaths by trajectory of dying, 2000-2005.
Note: 'Other' category includes records missing an underlying cause of death (n = 3) and those that could not be classified to a

Conclusion

Conclusions cannot be reached from the limited data reported herein. The intent of NELS ICE is to provide capacity for interdisciplinary research development to improve care at the end of life for vulnerable populations. The provision and discussion of the NSVS data provide a forum for new research and surveillance development. You are being provided with this report with the hope that you and your colleagues may find these data of use for planning a residential hospice house in the Colchester East Hants District Health Authority and that you will be part of this further building process.

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Appendix

Table A1: Selected chronic diseases and their corresponding International Classification of Diseases (ICD) codes.

Disease	ICD-9 (1979-1999)	ICD-10 (2000-present)
Cancer	140-208	C00-C97
Diabetes mellitus	250	E10-E14
Alzheimer's disease and dementia	290, 331.0	F00-F03, G30
Parkinson's disease	332	G20-G21
Chronic ischemic heart disease	412-414, 429.2	I20, I25
Acute myocardial infarction	410	I21-I22
Congestive heart failure	428.0	I50.0
Cerebrovascular disease (stroke)	430-434, 436-438	I60-I69
Pneumonia	480-486	J12-J18
Chronic obstructive pulmonary disease (excluding asthma)	490-492, 496	J40-J44
Renal failure	584-586	N17-N19
Injury, poisoning and certain other consequences of external causes External causes of morbidity and mortality	800-999 E800-E999	S00-T98 V01-Y98