Interprovincial Data Requirements for Local Health Indicators: The British Columbia Experience

K. F. Burr, B. McKee, L.T. Foster, and F. Nault *

Abstract

Indicators based on the registration of vital events are used to determine the health status of populations. The need for these indicators at the regional and community levels has grown with the trend toward decentralization in the delivery of health services. Such indicators are important because they affect funding and the types of service that are provided.

Health status indicators tend to be associated with variables such as the level of urbanization or socioeconomic status. According to four indicators ***S*** *mortality ratios for all causes of death, mortality ratios for external causes of death, infant mortality ratios, and low birth weight live birth ratios* ***S*** *some areas of British Columbia, specifically along the border with Alberta, have relatively good health, although the characteristics of these regions suggest that this should not be the case. However, a much different picture emerges when vital event data registered in Alberta for residents of these areas of British Columbia are considered.*

This article shows that for adequate health planning and program implementation, some communities need data from neighbouring provinces. It illustrates the effect of incorporating Alberta data into the development of health status indicators for British Columbia. It also suggests that similar adjustments may be necessary for data compiled in other provinces.

Keywords: *vital statistics, data collection, regional health planning*

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Introduction

In recent years, most provincial governments have given local communities more autonomy in the provision and management of health services. The regionalization of health care requires accurate record-keeping of local vital events. These data are used to develop health status indicators which, in turn, become components in funding formulas and in the delivery of programs and services.

Complete vital statistics are necessary to produce accurate health status measures. At the provincial (and territorial) level, the registration of vital events is considered complete, as virtually all events occurring in any given jurisdiction are registered. Overall, the number of events registered in other provinces represents a small proportion of the total number of events occurring in the home province (see *Out-of-province vital events*). However, at the sub-provincial level, these external events can be relatively significant. Consequently, exclusion of information from other provinces in the calculation of local health status indicators may result in the underreporting of serious health problems, and needed services not being implemented.

The British Columbia "Anomaly"

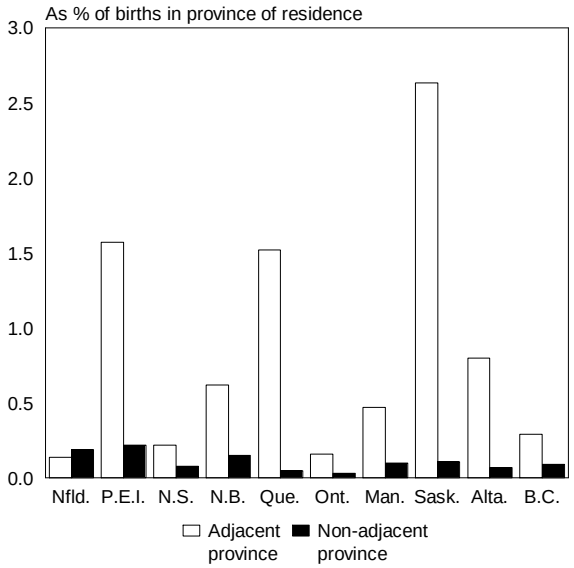
In British Columbia, the Division of Vital Statistics provides standardized geographically based data. Since 1989, the Division has produced local area maps of selected health status indicators based on the registration of births and deaths. A common phenomenon in these maps is a general urban-rural gradient, in which the areas around the two largest cities, Vancouver and Victoria, show better health status. However, relatively good health has also been

Out-of-province vital events

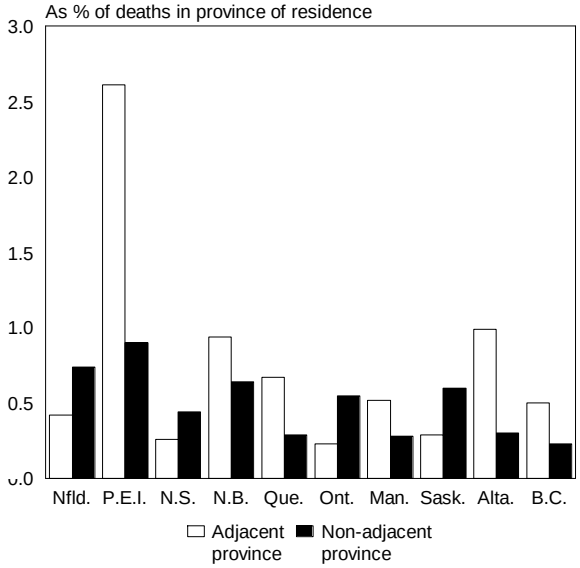
Data from 1981 onward indicate that fewer than 4% of the births and deaths of the residents of a given province occurred in another province, and in most cases, these events were in an adjacent province. There was a slightly larger proportion of deaths than births in non-adjacent provinces.

Much higher percentages of births and deaths of Yukon and Northwest Territories residents occur in other jurisdictions, most likely because of the vast, sparsely populated geography of the territories. It is often most efficient to air-evacuate patients from the territories directly to major provincial medical centres.

Out-of-province births, 1992



Out-of-province deaths, 1992



Source: *Health Statistics Division, Statistics Canada*

noted in the southeast corner of the province in the Kootenay region (Map 1). A recent study showing local health area[a] benchmarks used a composite index of 17 different health status indicators.[1] This study found that the best overall area was Windermere (local health area 04) in the Kootenay region. This is puzzling, because traditional explanatory factors (such as socioeconomic determinants of health, or quantity and quality of health service facilities or health professionals) cannot account for the relative good health of this area. The likely explanation for the anomaly is the area's natural geographic isolation from other parts of British Columbia and its proximity to Alberta, which may influence the number of vital events affecting residents of this area that are registered in Alberta.

[a] *For administrative purposes, British Columbia is divided into twenty-one health regions, each of which consists of one or more sub-divisions called local health areas.*

The British Columbia Division of Vital Statistics (Ministry of Health and Ministry Responsible for Seniors) arranged with the Province of Alberta to share birth and death data related to persons normally residing in British Columbia for events occurring from 1985 onward. This article illustrates the effect of incorporating these data into the development of health status indicators for British Columbia (see *The Washington State experience*).

Impact of Alberta-Registered Data

Four health status indicators **S** mortality ratios for all causes of death, mortality ratios for external causes of death, infant mortality ratios, and low birth weight live birth ratios **S** illustrate the impact at the local level of including Alberta-registered events. These indicators are expressed as a ratio of observed to expected values. The expected number is the number of events

that would have occurred had the provincial rate prevailed in each local health area. Consequently, a value less than 1 indicates that the observed number of events was less than the expected number, signifying "good" health.

When the Alberta data for the period 1985 to 1992 were included, a notable change was observed in the four indicators for the local health areas situated on the Alberta border, particularly in southeast British Columbia. Many areas whose health status was "good," according to the original indicators, were shown to have much lower levels of health when the Alberta data were added.[b]

The Washington State experience

Vital events involving residents of British Columbia in Washington State, which borders the province, did not significantly affect local health status indicators. The larger population base in British Columbia's lower mainland means that the area is better served by its own health care facilities than is the case in the more sparsely populated areas of eastern British Columbia. Therefore, the impact of Washington-registered vital events is much less.

Data comparable to the 1985 to 1992 period used for the Alberta analysis were not available for Washington State. Instead, death data for 1991, 1992 and 1994 were analysed. In those three years, the annual number of deaths of British Columbia residents in Washington ranged from 35 to 38. The two leading causes of deaths were external (accidental) causes and ischaemic heart disease.

All causes of death

From 1985 to 1992, the deaths of 180,466 British Columbia residents were registered in their home province. During this period, another 869 British Columbians died in Alberta, representing 0.48% of total deaths in British Columbia (Table 1). However, at the local health area level, the addition of these out-of-province deaths had a more noticeable impact. All local health areas along the Alberta border had at least a 2% increase in the number of deaths. The areas most affected were: Golden (15% increase), Windermere (14%), and Fernie (13%). Consequently, for these local health areas, the ratio of observed to expected deaths from all causes increased, signifying poorer health than was originally indicated.

[b] *Calculation of health indicators for local health areas was based on British Columbia residents only. Non-residents (foreign or from other parts of Canada) were excluded from the calculations.*

External causes of death

During the 1985 to 1992 period, the deaths of 14,541 British Columbia residents from external causes[c] were registered in their home province. Another 192 British Columbians died from external causes in Alberta, representing 1.32% of the British Columbia total (Table 2). But when the Alberta-registered deaths were added, all local health areas bordering Alberta had at least a 3% increase in the number of deaths from external causes. The change was very pronounced in the southeast: Windermere (28% increase), Fernie (19%), Golden (16%), and Kimberley (15%). Inclusion of the Alberta data increased the ratio of observed to expected deaths from external causes, indicating poorer health than was originally denoted for these areas.

Infant mortality

From 1985 to 1992, the deaths of 2,626 British Columbia infants (less than age 1) were registered in their home province. In the same period, the deaths of 53 infants born to mothers reporting British Columbia as their normal residence were registered in Alberta, amounting to 2.02% of the British Columbia total (Table 3). The largest impacts, again, were along the Alberta border, as the ratio of observed to expected infant deaths increased. The greatest percentage increase was 111% in Fernie. In many other areas, large percentage increases reflected the addition of only one or two Alberta-registered infant deaths.

Low birth weight live births

A total of 17,195 low birth weight live births (less than 2,500 grams) were registered to British Columbia residents in their home province from 1985 to 1992. Another 233 low birth weight infants were born and registered in Alberta to mothers reporting British Columbia as their normal residence (Table 4). These Alberta-registered births represented 1.36% of the British Columbia total. The effect of adding the Alberta data was greatest for areas along the Alberta border.

[c] *External causes include injury, poisoning, and other adverse effects, both intentional and unintentional, such as suicide, motor vehicle accidents, and falls. External causes are thus distinguished from deaths that arise from endogenous or natural physiological processes.*


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Table 1

Deaths of British Columbia residents from all causes, selected local health areas, 1985-1992

Key map no.	Local health area	British Columbia-registered deaths		Alberta-registered deaths		Combined British Columbia- and Alberta-registered deaths	
		Number	Ratio*	Number	Percentage of British Columbia-registered deaths	Number	Ratio*
					%		
	Total	**180,466**		**869**	**0.48**	**181,335**	
01	Fernie	538	0.959	72	13	610	1.081
02	Cranbrook	968	1.007	62	6	1,030	1.065
03	Kimberley	586	1.065	32	5	618	1.118
04	Windermere	221	0.735	32	14	253	0.836
18	Golden	223	0.960	34	15	257	1.100
59	Peace River South	1,060	1.054	50	5	1,110	1.097
60	Peace River North	842	1.103	40	5	882	1.148
81	Fort Nelson	128	1.266	8	6	136	1.334

Source: *British Columbia Division of Vital Statistics, Ministry of Health and Ministry Responsible for Seniors*

* *Ratio of observed to expected values. A value greater than 1.00 indicates that the observed number of events is greater than the number expected, if the provincial death rate had prevailed there.*

Table 2

Deaths of British Columbia residents from external causes, selected local health areas, 1985-1992

Key map no.	Local health area	British Columbia-registered deaths		Alberta-registered deaths		Combined British Columbia- and Alberta-registered deaths	
		Number	Ratio*	Number	Percentage of British Columbia-registered deaths	Number	Ratio*
					%		
	Total	**14,541**		**192**	**1.32**	**14,733**	
01	Fernie	63	0.934	12	19	75	1.096
02	Cranbrook	93	0.999	8	9	101	1.070
03	Kimberley	40	1.017	6	15	46	1.155
04	Windermere	25	0.840	7	28	32	1.060
05	Creston	62	1.174	3	5	65	1.216
11	Trail	76	0.781	5	7	81	0.822
18	Golden	38	1.299	6	16	44	1.483
59	Peace River South	145	1.239	12	8	157	1.323
60	Peace River North	160	1.559	11	7	171	1.642
81	Fort Nelson	38	1.852	2	5	40	1.921
94	Telegraph Creek	13	4.991	2	15	15	5.672

Source: *British Columbia Division of Vital Statistics, Ministry of Health and Ministry Responsible for Seniors*

* *Ratio of observed to expected values. A value greater than 1.00 indicates that the observed number of events is greater than the number expected, if the provincial death rate from external causes had prevailed there.*

Table 3

Infant deaths of British Columbia residents, selected local health areas, 1985-1992

Key map no.	Local health area	British Columbia-registered deaths		Alberta-registered deaths		Combined British Columbia- and Alberta-registered deaths	
		Number	Ratio*	Number	Percentage of British Columbia-registered deaths	Number	Ratio*
					%		
	Total	**2,626**		**53**	**2.02**	**2,679**	
01	Fernie	9	0.637	10	111	19	1.264
02	Cranbrook	14	0.793	5	36	19	1.040
04	Windermere	3	0.574	2	67	5	0.881
10	Arrow Lakes	3	0.889	1	33	4	1.162
14	South Okanagan	10	1.095	1	10	11	1.183
15	Penticton	12	0.546	2	17	14	0.625
18	Golden	5	0.755	2	40	7	0.935
20	Salmon Arm	10	0.599	1	10	11	0.645
22	Vernon	37	1.059	2	5	39	1.095
27	Cariboo/Chilcotin	44	1.225	2	5	46	1.256
28	Quesnel	37	1.693	2	5	39	1.749
31	Merritt	9	0.898	1	11	10	0.980
32	Hope	12	1.899	1	8	13	2.021
60	Peace River North	27	0.925	7	26	34	1.132
78	Enderby	5	1.143	1	20	6	1.344

Source: *British Columbia Division of Vital Statistics, Ministry of Health and Ministry Responsible for Seniors*

* *Ratio of observed to expected values. A value greater than 1.00 indicates that the observed number of events is greater than the number expected, if the provincial infant death rate had prevailed there.*

Table 4

Low birth weight live births (LBWLB) of British Columbia residents, selected local health areas, 1985-1992

Key map no.	Local health area	British Columbia-registered LBWLB		Alberta-registered LBWLB		Combined British Columbia- and Alberta-registered LBWLB	
		Number	Ratio*	Number	Percentage of British Columbia-registered LBWLB	Number	Ratio*
					%		
	Total	**17,195**		**233**	**1.36**	**17,428**	
01	Fernie	95	1.042	42	44	137	1.421
02	Cranbrook	133	1.156	29	22	162	1.369
03	Kimberley	26	0.747	9	35	35	0.969
04	Windermere	22	0.651	13	59	35	0.959
05	Creston	44	0.781	8	18	52	0.898
16	Keremeos	20	1.328	1	5	21	1.374
18	Golden	32	0.745	25	78	57	1.179
59	Peace River South	175	0.880	17	10	192	0.935
60	Peace River North	159	0.838	23	14	182	0.937
77	Summerland	28	0.867	2	7	30	0.916
78	Enderby	22	0.772	1	5	23	0.796
81	Fort Nelson	40	0.926	6	15	46	1.020

Source: *British Columbia Division of Vital Statistics, Ministry of Health and Ministry Responsible for Seniors*

* *Ratio of observed to expected values. A value greater than 1.00 indicates that the observed number of events is greater than the number expected, if the provincial LBWLB rate had prevailed there.*

would be registered there. It is also conceivable that some southeastern British Columbia residents with terminal illnesses may go to their families in Alberta for care.

Some caution must be exercised when interpreting or drawing conclusions about the changes that result when Alberta-registered events are added to the British Columbia data, especially when small areas and/or populations are involved.[2,3] In some instances, the changes reflect the addition of only a few Alberta-registered events over a period of eight years. Also, the geographical areas used for analysis, as with any geographical administrative areas, tend to be arbitrarily chosen.

Nonetheless, the results have several important implications. First, if funding formulas are based on broad health status indicators, then much of southeast British Columbia and parts of the northeast would be underfunded were Alberta-registered events not considered. But if out-of-province health services are not to be deducted from local allocations, this may not be a major problem.

Second, as the move toward local autonomy gains momentum in British Columbia, and throughout Canada, some local decision-makers may have to base choices between program options on incomplete data. For example, if low birth weight live births are underestimated for a local area, regardless of where the births took place, potentially serious problems in prenatal care may be overlooked, and programs for low birth weight infants may be underemphasized.

The analysis in this article provides evidence for the need to get the most complete registration data possible. In the case of British Columbia, adding the Alberta-registered events had a marginal effect on total provincial health status indicators, but at the local health area level, substantial changes occurred. Results may be similar elsewhere in Canada, if corresponding analyses are undertaken.

References

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