A B S T R A C T

Following reports of high infant mortality in Central Vancouver Island, total and cause-specific infant death rates (IDR) for Status Indians and for Other Residents of Vancouver Island (VI) were compared to those for their counterparts in the rest of the province (RoP). Data for 1991-97, in which Status Indians had been identified through record linkage, were obtained from BC Vital Statistics. The IDR was higher on VI than in RoP for Status Indians (IR=1.84: 95%CI; 1.43, 3.37), but not for Other Residents (IR=0.91: 95%CI; 0.79, 1.05). SIDS and perinatal conditions were responsible for most of the increase, with SIDS accounting for about half. This study demonstrates that, in addition to the well-recognized difference in infant mortality between Status Indians and Other Residents, important regional differences exist within the Status Indian population itself. As these differences are relevant to effective health planning and evaluation, health information systems should enable calculation of separate rates for Status Indians.

A B R É G É

À la suite de rapports de mortalité infantile élevée au centre de l'île de Vancouver, nous avons comparé les taux de mortalité infantile (TMI) totaux et par cause chez les Indiens inscrits et les autres habitants de l'île de Vancouver à ceux du reste de la province. La consultation des statistiques de l'état civil de la Colombie-Britannique nous a permis d'obtenir les données de 1991 à 1997 et d'identifier les Indiens inscrits par couplage des données. Le TMI était plus élevé sur l'île de Vancouver que dans le reste de la province pour les Indiens inscrits (RI=1,84 : 95 % IC; 1,43, 3,37), mais pas pour les autres habitants (RI=0,91 : 95 % IC; 0,79, 1,05). La mort subite du nourrisson et les conditions périnatales étaient responsables de la plus grande partie de cette augmentation (la MSN y contribuant pour environ la moitié). L'étude montre qu'en plus des différences bien connues entre les Indiens inscrits et les autres habitants en ce qui a trait à la mortalité infantile, il existe d'importants écarts régionaux au sein même de la population des Indiens inscrits. Comme ces écarts importent pour une planification et une évaluation efficaces de la santé, les systèmes d'information sanitaire devraient permettre de calculer séparément les taux des Indiens inscrits.

Infant Mortality Among Status Indians on Vancouver Island, British Columbia: Evidence of Variability Within the Status Indian Population

Fred S. Rockwell, MD, FRCPC

Numerous studies have shown that First Nations have substantially higher rates of infant mortality and sudden infant death syndrome (SIDS) than the non-native population.¹⁻⁵

The 1996 British Columbia Vital Statistics Annual Report indicated that Central Vancouver Island (CVI) had the highest infant mortality rate in the province.⁶ To reduce the effect of confounding given the disproportionately high population of Status Indians found in CVI compared to the Rest of the Province (RoP), separate rates were calculated for Status Indians and Other Residents in CVI. The infant mortality rate for Status Indians was substantially higher in CVI than in RoP, while the corresponding rates for Other Residents were nearly identical. These unpublished results prompted the current study.

In cooperation with the other two health regions on Vancouver Island (VI), this study was undertaken to answer two questions. Do Status Indians on VI have higher rates of infant death and SIDS than do Status Indians in RoP? Is there a similar difference among the rates for Other Residents? In addition, differences in cause-specific rates would be explored.

METHODS

Vancouver Island is comprised of three health regions: Upper Island Central Coast (UICC), CVI, and Capital Health Region

(CHR). While UICC also includes a sparsely populated section of coastal mainland, data from this area were not reassigned to RoP in the analysis.

All data were obtained from the BC Ministry of Health, Division of Vital Statistics. The method used by the Ministry to identify Status Indian deaths and populations is outlined below and described in greater detail elsewhere.⁷

Infant death data were based on registrations for 1991-1997, as at December 1998. Status Indian decedents were identified by record linkage using three databases: BC Vital Statistics birth and death registrations, BC Medical Services Plan annual files, and Indian Status Verification File from Department of Indian and Northern Affairs. A decedent listed as a Status Indian in any one of these was considered a Status Indian for the purposes of this study. The remaining deaths were ascribed to Other Residents.

Population estimates were derived by the BC Vital Statistics Agency using a three-step process. First, estimates of Status Indian populations were compiled from BC Medical Services Plan (MSP) annual files, which indicate age, usual residence and whether the individual had registered with MSP as a Status Indian. (MSP files are routinely updated through linkage with birth and death registrations.) Second, the estimates were refined in consultation with Medical Services Branch and, where necessary, by local Band authorities. Third, population estimates for Other Residents were found by subtracting Status Indian estimates from the mid-year estimates of total population prepared by BC Stats, Ministry of Finance and Corporate Relations.

Incidence ratios and confidence limits were calculated using the large sample method for person-time data described by Greenland and Rothman.⁸

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Infant death rate or IDR (infant deaths/1,000 infants) was used in preference to the more conventional infant mortality 'rate' (infant deaths/1,000 live births) because the mid-year infant population, being sensitive to migration and other events that occur after birth, more accurately reflects the population at risk than does the annual number of live births.

The diagnostic categories used for exploring cause-specific rates are shown in Table I.

RESULTS

Table II characterizes the study population with respect to locality, ethnic group (Status Indian or Other Resident) and sex. The proportion of person-years contributed by Status Indian infants differed substantially among localities. As expected, there was little variability in the proportion of males versus females, therefore sex was not considered further in the analysis.

Infant death rates by ethnic group and locality are given in Table III. Among the three VI regions, there was little variation in group-specific rates. The incidence ratio for infant death among all VI Status Indians compared to Status Indians in RoP was 1.84 (95% CI; 1.43, 3.37). As for Other Residents, there was no evidence of a difference between VI and RoP rates; incidence ratio 0.91 (95% CI; 0.79, 1.05). This suggests that the higher rates seen among Status Indians on VI cannot be explained by a general regional effect, but that there is statistical interaction between ethnic group and locality.

The situation for SIDS (Table IV) was more complex. UICC and CVI exhibited the same pattern as was seen for infant death. Rates for Status Indians were higher than in RoP, but those for Other Residents did not differ. Specifically, the incidence ratios for Status Indians in UICC and CVI were 2.90 (95%CI; 1.63, 5.17) and 2.21 (95%CI; 1.34, 3.66), respectively, and for Other Residents 1.07 (95%CI; 0.47, 2.41) and 1.18 (95%CI; 0.66, 2.12). However, in CHR, the Status Indian SIDS rate was similar to that in RoP, while that for Other Residents was consistent with a 50% increase. Incidence ratios were 0.91 (95%CI; 0.34, 2.57) for Status Indians

TABLE I
Abbreviations and Categories Used for Causes of Infant Death

Abbreviation	Category	ICD-9 Codes
Inf & Para	Infectious and Parasitic Diseases	001-139
Malig	Malignant Neoplasms	140-208
Endo	Endocrine, Nutritional, Metabolic and Immune Disorders	240-279
CVS	Disease of the Circulatory System	390-459
Resp	Disease of the Respiratory System	460-519
Digest	Diseases of the Digestive System	520-579
Congen	Congenital Anomalies	740-759
Perinatal	Conditions Originating in the Perinatal Period	760-779
External	External Causes	E800-E999
SIDS	Sudden Infant Death Syndrome	798
All Other	All other causes	all other

TABLE II
Characteristics of British Columbia Infants, 1991-1997

Locality	Person-Years*	% SI†	% Male	
			SI	Others
UICC	10,083	14.1%	52.0%	50.5%
CVI	18,278	14.6%	50.3%	51.8%
CHR	23,637	5.3%	51.3%	51.4%
Vancouver Island	51,998	10.3%	51.0%	51.4%
Rest of Province	273,268	6.6%	52.0%	51.5%
British Columbia	325,266	7.2%	51.8%	51.5%

CHR: Capital Health Region CVI: Central Vancouver Island
SI: Status Indians UICC: Upper Island Central Coast
* Sum of mid-year infant populations, 1991-97.
† Actual person-years for SI infants: UICC – 1,425, CVI – 2,667, CHR – 1,260, and Rest of Province – 17,999.

TABLE III
Infant Death Rates in British Columbia, 1991-1997

Locality	Status Indians		Other Residents		Total Rate*
	n	Rate*	n	Rate*	
UICC	25	17.54	38	4.39	6.25
CVI	47	17.62	78	5.00	6.84
CHR	20	15.87	103	4.60	5.20
Vancouver Island	92	17.19	219	4.69	5.98
Rest of Province	168	9.33	1,321	5.17	5.45
British Columbia	260	11.13	1,540	5.10	5.53

CHR: Capital Health Region CVI: Central Vancouver Island
UICC: Upper Island Central Coast
* Infant deaths/1,000 population under 1 year of age. Based on cumulative infant deaths and mid-year populations, 1991-97.

and 1.51 (95%CI; 0.97, 2.36) for Other Residents.

Causes of death other than SIDS were explored to learn their relative contributions to infant death rates among Status Indians. Table V displays cause-specific death rates for Status Indians by locality. Allowing for rate instability caused by small numbers of events, the increased risk for Status Indians on VI (compared to RoP) is evident in each VI region across all causes. The main contributors to this difference are SIDS and perinatal conditions.

DISCUSSION

In this study, the potential for bias resulting from systematic misclassification or differential case ascertainment was addressed in several ways. First, extensive record linkage and validation minimized errors in classifying residents and deaths according to ethnic group. Second, there is no reason to expect more complete ascertainment of infant death on VI than in RoP. Third, SIDS deaths, being sudden and unexpected, are reportable to the Coroner's Office and routinely investigated. Even if sudden, unex-

TABLE IV
SIDS Rates in British Columbia, 1991-1997

Locality	Status Indians n	Status Indians Rate*	Other Residents n	Other Residents Rate*	Total Rate*
UICC	14	9.82	6	0.69	1.98
CVI	20	7.50	12	0.77	1.75
CHR	4	3.17	22	0.98	1.10
Vancouver Island	38	7.10	40	0.86	1.50
Rest of Province	61	3.39	166	0.65	0.83
British Columbia	99	4.24	206	0.68	0.94

CHR: Capital Health Region

CVI: Central Vancouver Island

SIDS: Sudden Infant Death Syndrome

UICC: Upper Island Central Coast

* SIDS deaths/1,000 population under 1 year of age. Based on cumulative SIDS deaths and mid-year populations, 1991-97.

TABLE V
Cause-specific Infant Death Rates for Status Indians in British Columbia, 1991-1997

Cause	UICC	CVI	CHR	RoP
Inf & Para	0.7 (1)	0.4 (1)	— (0)	0.3 (5)
Malign	— (0)	— (0)	— (0)	0.1 (1)
Endo	0.7 (1)	0.4 (1)	0.8 (1)	0.2 (3)
CVS	0.7 (1)	0.8 (2)	— (0)	0.2 (3)
Resp	— (0)	2.3 (6)	0.8 (1)	0.4 (7)
Digest	— (0)	— (0)	0.8 (1)	0.1 (2)
Congen	0.7 (1)	0.8 (2)	3.2 (4)	1.1 (19)
Perinatal	3.5 (5)	3.8 (10)	4.8 (6)	2.4 (44)
External	0.7 (1)	0.8 (2)	0.8 (1)	0.4 (7)
SIDS	9.8 (14)	7.5 (20)	3.2 (4)	3.4 (61)
Other	0.7 (1)	1.1 (3)	1.6 (2)	0.9 (16)
All Cause	17.5 (25)	17.6 (47)	15.9 (20)	9.33 (168)

CHR: Capital Health Region

CVI: Central Vancouver Island

UICC: Upper Island Central Coast

RoP: Rest of Province

Number of deaths is shown in parentheses.

All Cause rate may differ from total of individual rates due to rounding.

pected deaths in rural and remote areas were less thoroughly investigated than in urban areas, this would not explain the difference between VI and RoP, both of which have a substantial proportion of Status Indians living in rural or remote areas.

The high IDRs on VI were not merely an artifact of one or two bad years. The annual numbers of infant deaths among Status Indians, starting in 1991 were 9, 17, 19, 11, 16, 14, and 6 for VI, and 35, 29, 16, 20, 29, 18 and 21 for RoP. Furthermore, BC Vital Statistics reported similar findings over a 10-year period ending 1997 using slightly different geographical boundaries.⁹

Differential distribution of infant mortality risk factors may explain part of the variation in Status Indian rates. Among Status Indians, premature birth, low birthweight and teen pregnancy are more prevalent on VI than in RoP.⁹

By far, SIDS was the leading cause of infant death among Status Indians.

Maternal smoking during pregnancy is a recognized SIDS risk factor and there is growing evidence that exposure to environmental tobacco smoke (ETS) may also be important.^{10,11} A 1997 Angus Reid survey showed the prevalence of smoking and ETS exposure for Aboriginal people was double that for the general population of BC.¹² So, one or both risk factors may be an important contributor to the higher SIDS rates found among Status Indians compared to Other Residents. However, their role in the difference between VI and RoP Status Indians is unclear because prevalence data for the Aboriginal population were not available at the sub-provincial level.

Thermal stress,¹³ low utilization of antenatal care¹⁴ and prone sleeping position¹⁵ have been associated with SIDS. No quantitative data are available regarding the distribution of these risk factors among Status Indians. Anecdotal accounts suggest that over-dressing of infants ('bundling'), main-

taining high temperatures in homes during the winter, and late or no pre-natal care are common among Coastal First Nations.

After SIDS, Perinatal Conditions stands out as a substantial contributor to the higher rate of infant deaths among Status Indians on VI, compared to RoP. The extent to which this is due to differential access to, or utilization of, public health and other health services should be investigated.

This study demonstrates the existence of important variation in infant mortality and SIDS rates among BC Status Indians. This finding cannot be explained by a general, regional effect because there is no parallel difference among Other Residents. In order to better target and evaluate programs that address infant health issues, data need to be collected in such a way that calculation of separate rates for Status Indians is possible.

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Peer Review and Capacity Building

Peer review is an almost invisible activity that can make or break a journal. One of the first things that struck me when I became the Scientific Editor for the *Canadian Journal of Public Health* is the consistently high level of peer review. A typical review consists of 2-3 pages of thoughtful comments and constructive suggestions. Although most authors would likely wish that the reviewer response was something like "This is great; no changes needed", authors usually rise to the challenge of the review and work hard to transform their manuscripts into compelling articles.

Peer review is time-consuming and the benefits to the reviewer are neither immediate nor obvious. Undoubtedly, "reviewer fatigue" can set in, especially if reviewers also sit on granting bodies, a research ethics board, or review for other journals. But there are some benefits. Reviewing is an opportunity to hone critical appraisal skills and gain experience in identifying good science and good scientific writing. This experience can then be applied to the reviewer's own work.

Perhaps the least tangible, but most important benefit of reviewing, is the altruistic satisfaction of contributing to one's discipline. Reviewing manuscripts for the CJPH assists the public health community in Canada. It is a form of community development, and a fine example of capacity-building in action.

For those of you who may be interested in becoming a peer reviewer, please send an e-mail with your coordinates to journal@cpha.ca. We will send you a reviewer form where you can identify your interests/expertise and indicate the number of manuscripts you would be willing to review per year. The more reviewers we have, the less onerous it is on our current reviewers; most reviewers assess 2-3 manuscripts per year.

For those of you who have been peer reviewers: On behalf of the readers, the journal staff, and the Editorial Board, Thank you for your exemplary service. You have helped to make the journal the high-quality publication it is, and have made an important contribution to the Canadian public health community.

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La révision par les pairs : un geste concret de renforcement des capacités

La révision par les pairs est une activité pratiquement invisible, mais qui peut assurer ou briser la réputation d'une revue. L'une des premières choses qui m'ont frappées lorsque je suis devenue rédactrice-révisure scientifique de la *Revue canadienne de santé publique* fut la qualité soutenue de son travail à cet égard. Une révision type comporte deux ou trois pages de commentaires réfléchis et de propositions d'ordre pratique. La plupart des auteurs voudraient bien sûr que le réviseur leur annonce que tout est merveilleux et qu'il n'y a aucun changement à apporter, mais ils acceptent d'habitude le verdict et s'attaquent à la tâche de transformer leur manuscrit en un article convaincant.

La révision par les pairs prend du temps, et le réviseur n'en retire aucun avantage clair ou immédiat. Il ne fait aucun doute que l'épuisement peut s'installer, surtout si le réviseur siège aussi à des organismes de subventions ou à un comité d'éthique pour la recherche, ou s'il révise des manuscrits pour d'autres revues. Mais avantages il y a : la révision est l'occasion d'aiguiser son discernement (une compétence essentielle) et d'apprendre à séparer le bon grain de l'ivraie en matière de rédaction scientifique. Une telle expérience ne peut que rehausser la qualité de ses propres travaux.

L'avantage le moins tangible, mais peut-être le plus important, est la satisfaction de contribuer à sa discipline. La révision de manuscrits pour la *RCSP* est un acte d'altruisme envers le milieu de la santé publique au Canada. C'est une forme de développement communautaire et un geste concret de renforcement des capacités.

Si le défi vous intéresse, transmettez-nous vos coordonnées par courriel (journal@cpha.ca). Nous vous enverrons un formulaire de révision où vous indiquerez vos intérêts et vos champs de compétence, ainsi que le nombre de manuscrits que vous êtes disposé à réviser chaque année. Plus nos réviseurs seront nombreux, plus cela allégera la tâche de l'équipe actuelle; la plupart des réviseurs évaluent deux ou trois manuscrits par année.

À ceux d'entre vous qui avez déjà été réviseurs pour vos pairs, au nom de nos lecteurs, du personnel de la Revue et du Comité de rédaction, je vous remercie pour vos services distingués. Vous nous avez aidés à faire de la Revue une publication de très haute qualité tout en apportant une importante contribution au milieu canadien de la santé publique.

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