

British Columbia Coroners Service Child Death Review Report (2005)



Coroners Service
Ministry of Public Safety and Solicitor General

Questions regarding this report should be
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Message from the Chief Coroner

Over the last 10 years, an average of 225 sudden and unexpected child deaths were reported to the Coroners Service. Although this number has decreased over the last 10 years, each and every child death is of particular concern to all of us.

The lessons learned from these tragic events need to be utilized in an effort to avoid the unbearable pain any parent feels upon the loss of their child. The first step to preventing these deaths is to improve our understanding of how and why children die. This is where the Child Death Review Unit plays such a vital role. Child Death Review teams typically rely on Coroner and Medical Examiner offices to provide data on child deaths. Consequently, placing the BC Child Death Review Unit within the BC Coroners Service provides unencumbered access to the necessary information and ensures that Coroners are obtaining the best and most consistent data possible during a death investigation. In Ted Hughes' independent report entitled, B.C. Children and Youth Review released in April, he confirmed we were moving in the right direction and he further noted the Child Death Review Unit was well-placed in the BC Coroners Service to ensure ongoing improvements in the maintenance of quality assurance standards, advice, consultation and training for local Coroners.

Our Child Death Review Unit carefully reviews each death separately and then again in aggregate for consideration with similar deaths. This process is designed to ensure that all child deaths are thoroughly investigated, reviewed and reported upon.

The following is the first Annual Report from the BC Child Death Review Unit, chronicling its work from 2003-2005. This report is the result of our ongoing aggregate review of both descriptive and statistical information relating to children's deaths. It provides important insight into some of the causative and contributory factors that lead to deaths of infants and young people. This and future reports will guide us in determining in which areas the most significant opportunities for prevention of these deaths most likely lie. It will be these determinations which will provide the BC Coroners Service with the opportunity to be the catalyst to bring to the table those agencies with primary responsibility for service delivery and subject experts in the areas of concern. We believe that, by developing collaborative collegial approaches to the prevention of children's deaths, we can identify the most effective and workable strategies possible. In addition, we believe that the results achieved will contribute significantly to those authorities mandated to conduct individual case reviews.

Following a summary of the data, we present recommendations that have stemmed from these deaths in an effort to educate and inform the public and prevent future child deaths. We will also commit to a strong working relationship with the Ministry of Children and Family Development and the new Representative for Children and Youth to provide valuable information that will add support in measures for preventing deaths of children in care. By committing ourselves to this central aspect of our mandate, we are working toward our stated goal of making this province safer for our children and all British Columbians.



Terry Smith

Chief Coroner of British Columbia

Executive Summary

The Child Death Review (CDR) Unit within the British Columbia Coroners Service (BCCS) was established in 2003 and was modeled after existing child death review programs framed within a public health model. Individual cases are reviewed by the CDR Unit, with some of the most valuable information arising from trend and aggregate data analysis. This report is a summary of **640** child deaths that were reviewed by the CDR Unit between January 2003 and January 2006. Of these **640** deaths, **286** were Coroner cases, **90** were Non-Coroner cases and **264** were natural, expected deaths reported to the CDR Unit by Vital Statistics. This report primarily focuses on the review and reporting of the **286** Coroner cases. Several key findings emerged from this aggregate review of the **286** Coroner cases.

- Fatalities were most common in children younger than one year or older than 15 years of age.
- There was almost twice the number of deaths of male children compared to female children. This trend was observed for all manners of death, except Natural deaths.
- Children were more likely to die as a result of an accident than all other manners of death combined. Motor Vehicle Accidental deaths were most common and in over a third of vehicular accidents no restraint was used.

- Deaths of infants and neonates were most commonly due to natural causes. Natural causes included Sudden Unexplained Deaths in Infancy (SUDI). Changes to the BCCS policy on classification of SUDI deaths will affect the number of deaths classified as Natural in future reporting.
- There were a disproportionately higher number of deaths of Aboriginal children in B.C. Approximately 20 per cent of reviewed deaths were of Aboriginal children, although Aboriginal children comprise less than 10 per cent of the population of B.C.² Aboriginal children were also over-represented in the deaths of children in the care of or receiving services from the Ministry of Children and Family Development (MCFD).
- There were a disproportionately higher number of deaths due to unintentional poisoning and/or drug intoxication (PDI) among children in the care of or receiving services from the MCFD.

This report includes additional summary recommendations to communities and agencies for action following this report and its findings. Key recommendations from the Child Death Review Unit include:

- Placing children in an approved car seat and/or restrained with a seatbelt when traveling in a motor vehicle.
- All levels of government, educators, parents, and Aboriginal leaders and their

¹ Cases reported to the coroner that, after an initial investigation, are determined to be natural deaths consistent with the medical history and circumstances. These cases do not meet the criteria for death reporting outlined in Section 9 of the *BC Coroners Act*.

² BC Vital Statistics Agency. Regional analysis of health statistics for Status Indians in British Columbia 1992-2002. April 2004.

communities forge new relationships led by the Aboriginal people.

- Children should be taught how to swim and play safely in and around water.
- Parents and caregivers should use safe sleeping practices with infants under one year of age.
- Firearms and ammunition should always be safely stored and inaccessible to children.
- The Chief Coroner direct the BCCS to evaluate if any disparity exists between

the number of recommendations made in cases of Aboriginal deaths and non Aboriginal cases.

- All sectors of the government and communities, including the youth and teenage community throughout B.C. establish dialogue and strategies for the prevention of child suicide.

The BC Coroners Service Child Death Review Unit will take responsibility for conveying this information in discussion with agencies and organizations that have the mandate to make changes.



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Part I

Introduction

1 | History of Child Death Review

2 | BC Coroners Service Child Death Review Unit Overview

3 | Child Death Review and Reporting

1 | History of Child Death Review

THE FIRST
INTERAGENCY CHILD
DEATH REVIEW
TEAM BEGAN IN
LOS ANGELES
COUNTY IN 1978.

Child death review teams were first established during the late 1970s in the United States as a result of concern on the part of parents, health-care workers and other professionals over the increasing number of children who were dying from apparently preventable abuse, neglect or injury. The first interagency child death review team was established in Los Angeles County in 1978. Since then, child death review teams have been formed in all states. The concept has proven so valuable in increasing awareness of these tragic deaths that their use has spread around the world. The first child death review teams in Canada were created in the 1990s. The basic mission of child death review teams is to review child deaths in order to identify causes, trends and risk factors to prevent similar fatalities. This information can then be used to improve investigation of child deaths. The majority of child death review programs rely on Coroner or Medical Examiner offices to identify deaths for review³.

Child death review team annual reports have consistently reported a decrease in the number of child deaths. For example, child death review in Alabama, created in 1997, has reported a decrease in child deaths in that state from 1998 to 2002³. Similarly, Georgia also reported a decrease in deaths resulting from unintentional injuries from 2003 to 2004⁴ and Iowa reported a 20 per cent decrease in

number of child deaths from 2000 to 2004. Although child death review teams have reported a decrease in the number of child deaths, the direct impact of child death review teams on child mortality is difficult to determine for several reasons. One suggested reason is that there are many different societal factors in addition to child death review that influence child mortality. The types of child deaths reviewed may also differ among teams, with some teams limiting review to unnatural deaths, while others may include the examination of Natural deaths, and this may be more dependent on birth rates. There appears to have been a decline in the number of deaths reported to the BCCS over the last decade. In 1996 in B.C., there were 277 child deaths reported to the BCCS in comparison to 186 in 2005. Similarly, in the U.S. there was a decrease in most types of infant deaths from 1988 to 1998, except for a small increase in the number of intentional suffocations⁶. The slight increase in the number of intentional suffocations may be a result of the creation of child death review teams and subsequent improved investigation of sudden infant deaths, leading to an increased identification of homicide victims. Although child deaths appear to be steadily decreasing, child death review teams offer the benefit of identifying risks and trends that may help to speed the decline in the child death rate. A study of

³Webster RA, Schnitzer PG, Jenny C, Ewigman BG, Alario AJ (2003). Child death review: the state of the nation. *American Journal of Preventative Medicine* 25(1):58-64.

⁴Children For our Future: Alabama Child Death Review System 2002 Report (July 2005).

⁵Georgia Child Fatality Review Panel: Annual Report, Calendar Year 2004.

⁶Tomashek KM, Hsia J, Solomon I (2003). Trends in postneonatal mortality attributable to injury. United States, 1988-1998. *Pediatrics* 111:1219-1225.

the 254 counties in Texas, in which 138 had child death review teams and 116 did not, revealed a reduced child mortality rate in counties with child death review in comparison to the counties that did not⁸. Finally, a high rate of implemented recommendations from fetal and infant mortality review programs has been reported⁹. Misra et al. reported that 75 per cent of recommendations from child death review teams had been implemented and an additional 22 per cent would be implemented. With such a high rate of compliance to recommendations, a decrease in child mortalities must inevitably follow. To illustrate, in 2005, a Water Safety Committee was formed as a result of a Michigan County review team's recommendations. Since then there has been a sharp reduction in drowning deaths in Lake Michigan, in that county.

Child Death Review and the BC Coroners Service

In 1996 the Children's Commission was created to review all child deaths in British Columbia. In February 2002, based on the recommendations of the Attorney General, the Children's Commission and the Office of the Child, Youth and Family Advocate were eliminated. The Office for Children and Youth was established to absorb a number of key functions, including the monitoring of services provided for children, advocacy, and the investigation of complaints, education and providing advice to the government on child and

youth issues. Although the Coroners Service has always had the mandated responsibility for investigating all sudden, unnatural and unexpected deaths the additional responsibilities for child death review were transferred to the BC Coroners Service (BCCS), in January 2003.

Over the last 10 years, an average of 225 child deaths were reported to the BCCS each year as sudden and unexpected deaths, many of which are preventable deaths. Children represent our future, and the community as a whole seeks to understand how and why children die so that we can use that knowledge to prevent future child deaths. Child death review programs are internationally recognized for collecting, analyzing and acting on information extracted from investigations to prevent future deaths of children. The initial Coroner's investigation, the CDR Unit's review and any subsequent multidisciplinary team review of a child's death are important in achieving this goal. However, participation by many agencies, groups and individuals is also needed to accurately identify causal and contributory factors in child deaths and to direct prevention efforts.

Significant research was conducted by the BCCS regarding the function of other child death review programs. The CDR Unit within the BCCS is a program that was modeled after effective public health models that focus on prevention and evidence-based practices and recommendations.

REPORTS FROM OTHER CHILD DEATH REVIEW TEAMS CAN BE FOUND AT THE US BASED NATIONAL CENTER ON CHILD FATALITY REVIEW WEBSITE: WWW.ICAN-NCFR.ORG

⁸Migala WM (2002). Presented at the 130th Annual Meeting of the American Public Health Association.

⁹Misra DP, Grason H, Liao M, Strobino DM, McDonnell KA, Allston AA (2004). The Nationwide evaluation of fetal and infant mortality review (FIMR) programs: Development and implementation of recommendations and conduct of essential maternal and child health services by FIMR programs. *Maternal and Child Health Journal* 8:217-229.

EVIDENCE-BASED PRACTICE: HEALTH CARE PRACTICES THAT ARE BASED ON THE REVIEW OF THE CURRENT BEST EVIDENCE FROM SCIENTIFIC AND MEDICAL RESEARCH OR ON THE EFFECTIVENESS OF A TEST, DRUG, SURGERY OR OTHER PRACTICE.

The Coroners Service's current process for review of child death differs greatly from the methods previously used in this province, and instead models the successful established programs in place in many jurisdictions in the United States and elsewhere. Individual cases are reviewed by the CDR team, with some of the most valuable information arising from trend and aggregate data analysis. The BCCS child death review model consists of surveillance of death reports, collection of data, analysis of data, design and implementation and evaluation of interventions based on evidence, and reporting of findings. Prevention is the key purpose and no fault is assigned in the review of any child death.

The circumstances of each child's death are examined to determine if an intervention by any person or agency, at any stage leading up to and including the fatal event, would prevent a future death in a similar set of circumstances.

This review process not only generates the information needed to better understand why children die, it also fosters, at both the local and provincial level, an environment for inter-agency and interpersonal commitment to prevent future deaths of children. A total of 41 Coroner recommendations were made in 24 of these subject cases. Recommendations made in this report to agencies and communities are intended to further their efforts in prevention of deaths.

2 | BCCS CDR Unit Overview

Mission

The CDR Unit of the BCCS is committed to a comprehensive review of child deaths to better understand how and why children die, and to use those findings to take action to prevent other deaths and improve the health, safety and well being of all children in British Columbia.

Goals

- To accurately establish the cause of child deaths
- To develop uniform, consistent and retrievable data collection involving on-going surveillance of all childhood fatalities to allow for the formulation of prevention strategies
- To identify significant risk factors and trends in child deaths
- To facilitate the linkage of identified patterns and trends in child deaths with agencies and organizations; to influence and develop education and deterrent/prevention strategies to reduce the mortality of children
- To provide ongoing and relevant training to personnel involved in child death investigation
- To initiate local, community and provincial activities to prevent childhood injuries and fatalities

Objectives

- To ensure the accurate identification and uniform, consistent reporting of the cause and manner of every child death; and the establishment of a minimum data set on the causes of child deaths
- To facilitate communication and information-sharing among agencies and other review teams to enhance the coordination of the BCCS review team's efforts
- To ensure multi-disciplinary agency response to child deaths through the delivery of services
- To identify and forward recommendations to appropriate individuals or agencies that will improve the health, safety and well being of children
- To identify specific barriers and systemic issues involved in the deaths of children and work collaboratively for solutions with the appropriate agency
- To identify preventable factors and work collaboratively with individuals in professional and community education regarding the health, safety and well being of children

TEN YEARS AGO, IN 1996, THERE WERE 277 CHILD DEATHS REPORTED TO THE BCCS IN COMPARISON TO 186 IN 2005.

THE BCCS CDR UNIT REVIEWS ALL CHILD DEATHS IN B.C.

*A total of **640** deaths were reviewed by the Child Death Review Unit between January 2003 and January 2006. The deaths of the children reviewed in this report occurred between January 2000 and November 2005. Not all of the deaths that occurred during this time were reviewed for this report, as they may have occurred prior to the establishment of the CDR Unit, or the case may not be closed as the investigation is still ongoing. Of the **640** deaths, **286** were Coroner cases, while **264** were Natural deaths reported to the CDR Unit by Vital Statistics and **90** were non-Coroner cases. Demographic statistics are reported as well as data regarding factors contributing to the deaths of the children.*

3 | Child Death Review and Reporting

THE CDR UNIT RECEIVES NOTICE OF CHILDREN'S DEATHS WITHIN 24 HOURS OF WHEN THEY ARE REPORTED TO THE CORONER.

What Deaths are Reviewed?

For the purposes of Child Death Review in B.C., a child is defined as an individual 18 years of age or younger.

In British Columbia, any unnatural or sudden and unexpected death of an adult or child is reported to the Coroners Service as per Section 9 of the *Coroners Act*. The CDR Unit is notified within 24 hours of a child's death being reported to a Coroner falling under Section 9 of the *Coroners Act*.

Natural, expected deaths of children under the care of a physician are not required by legislation to be reported to a Coroner. However, the CDR Unit receives information on these deaths from British Columbia's Vital Statistics Agency on a regular basis for review and referral to a Coroner for further investigation if necessary.

Because the CDR Unit is notified of all child deaths as they occur, the Unit is involved in current, ongoing surveillance of all unnatural, sudden and unexpected child deaths. Working within the BCCS allows the CDR Unit to: 1) identify trends in child deaths immediately and 2) provide feedback to the investigating Coroner to improve the quality and consistency of information gathered for future individual and aggregate review. Although the CDR Unit is a part of and operates within the BCCS, there is a clear distinction between the secondary review of child deaths and the Coroner's investigation

into child deaths. The review consists of examining not only the circumstances, causal and contributory factors, but any agency involvement in the investigation of the child's death, including that of the BCCS, following the completion of the investigation and reporting of findings.

The BCCS and the Ministry of Children and Family Development (MCFD) share information regarding children who die while in the care of the MCFD or who have received services under the *Child, Family and Community Service Act (CFCSA)* in the 12 months preceding their death. In addition to co-operating with a Coroner's investigation, when the MCFD conducts their own case review into the death of a child they forward this information to the CDR Unit and in turn it is forwarded to the Coroner.

In the past, the CDR Unit has worked collaboratively with the Child and Youth Officer for B.C. In the future the CDR Unit will work with the new Representative for Children and Youth.

In addition to working with governmental agencies, the CDR Unit will work with other agencies and individuals in law enforcement, public and mental health, maternal and child health, child abuse and neglect specialists, the justice system, Aboriginal organizations and communities, counselors, educators, physicians, nurses, paramedics, social workers and any other organization in order to accomplish our goals.

NOTE: *The CDR Unit monitors deaths on an ongoing basis, with final review of a death not occurring until a Coroner's investigation is complete and a case is closed. Statistical discrepancies with future reports may be attributable to the completion of currently open investigations. Typically, annual reporting shows few cases included from the most recent years due to this issue.*

Part II

Child Fatality Statistics

- 4 | Overall Summary of the Reviewed Child Deaths
- 5 | Accident
- 6 | Homicide
- 7 | Suicide
- 8 | Natural
- 9 | Undetermined
- 10 | Sudden Unexpected Deaths in Infancy (SUDI)
- 11 | Children in the Care of, or Receiving Services from the MCFD
- 12 | Non-Coroner Cases and Natural, Expected Deaths

4 | Overall Summary of the Child Deaths Reviewed

CHILD DEATH RATES
ARE IMPORTANT
SOCIAL
INDICATORS.

Introduction and background information

During the period of January, 2003 to January, 2006 the Child Death Review (CDR) Unit reviewed the deaths of 640 children. Of this number, 286 were Coroner cases, 90 were non-Coroner cases and 264 were Natural, expected deaths reported to the CDR Unit by Vital Statistics. This report will focus on the review of the 286 Coroner cases. Non-Coroner cases and Natural, expected deaths are reported separately in section 12 of this report.

The majority of child deaths reviewed in this report occurred between January 2003 and August 2005 (Table 1). Child deaths that occurred in 2002, pre-date the establishment of the CDR Unit.

were selected for review from cases involving children who were in the care of or receiving services from the MCFD.

The CDR Unit continually monitors child death cases with a final review of a death occurring after a Coroner's investigation is complete. Child death cases that remain open and under investigation are not included in the present report. Therefore, not all of the child deaths that occurred during the review period were available for final review. However, the data presented here can still be considered representative of the child deaths that have occurred over this time period. Statistical discrepancies in future reports may be attributable to the completion of currently open investigations.

In this report, data from the reviewed child deaths are presented by the "manner of death" of the child. The manner of death is the event or situation which ultimately led to the death, but is not the underlying cause of death. The manner of death is assigned for each death by the Coroner investigating the death, at the completion of the investigation. The five categories of manner of death are Accident, Homicide, Suicide, Natural and Undetermined and are defined below.

Accident: Death due to unintentional or unexpected injury. It includes death resulting from complications reasonably attributed to the accident.

Table 1. Number of child deaths reviewed by year in comparison to the total number of deaths each year

Year of Death	Number of Coroner cases reviewed	Total number of child deaths reported to BCCS [§] (Coroner cases only)	Total number of child deaths in B.C. [‡]
2003	180	228 (195)	376
2004	80	174 (141)	351
2005	9	186 (140)	307
Total	269 (*286)	588[§] (476)	1034

However, the CDR Unit previously reviewed child deaths from 2002 and report on this review in Appendix 4. In addition, certain cases from 2000-2002

* There were an additional 17 retrospective cases that were reviewed by the CDR Unit for this report, for deaths occurring between 2000 and 2002, bringing the total of cases reviewed to 286. §Denotes the total number of deaths that were reported to the BCCS. This number includes both open and closed cases. Only closed cases underwent final review by the CDR Unit and are presented in this report. †Includes both Coroner and non-Coroner cases which are initially reported to the coroners service. ‡Total number of deaths in B.C. is for children aged zero to 18 years for 2003, 2004 and 2005. Note: Deaths of children in 2002 occurred prior to the establishment of the CDR Unit. However, upon its inception, the CDR Unit conducted a full review of these cases. A summary of this review is presented in Appendix 4.

Homicide: Death due to injury intentionally inflicted by the action of another person. Homicide is a neutral term that does not imply fault or blame.

Natural: Death primarily resulting from a disease of the body and not resulting secondarily from injuries or abnormal environmental factors.

Suicide: Death resulting from self-inflicted injury, with intent to cause death.

Undetermined: Death which, because of insufficient evidence or inability to otherwise determine, cannot reasonably be classified as Natural, Accidental, Suicide or Homicide.

In addition, for this report, children were classified by their age as described below¹⁰.

Neonate: birth to 28 days old.

Infant: 29 days to 365 days old.

Youth: 366 days to 14 years old.

Teenager: 15 to 18 years old.

Finally, the region of death is classified as one of five of the BCCS regions (see Appendix 2 for a map of the BCCS regions) as described below:

Fraser Region: Burnaby to the Coquihalla Highway Toll Booth, east to Manning Park and north to Jackass Mountain bordering Merritt.

Interior Region: Includes the region north to 100 Mile House and Blue River, east to the Alberta border, south to the USA border and west to the Manning Park gate, including Ashcroft, Lytton and Lillooet.

Island Region: includes all of Vancouver Island, the Gulf Islands and Powell River.

Northern Region: includes the region north, east and west from 100 Mile House to all borders, and the Queen Charlotte Islands.

Vancouver Metro Region: includes Sunshine Coast, Sea to Sky Corridor, North Shore, Vancouver, UBC, Delta and Richmond.

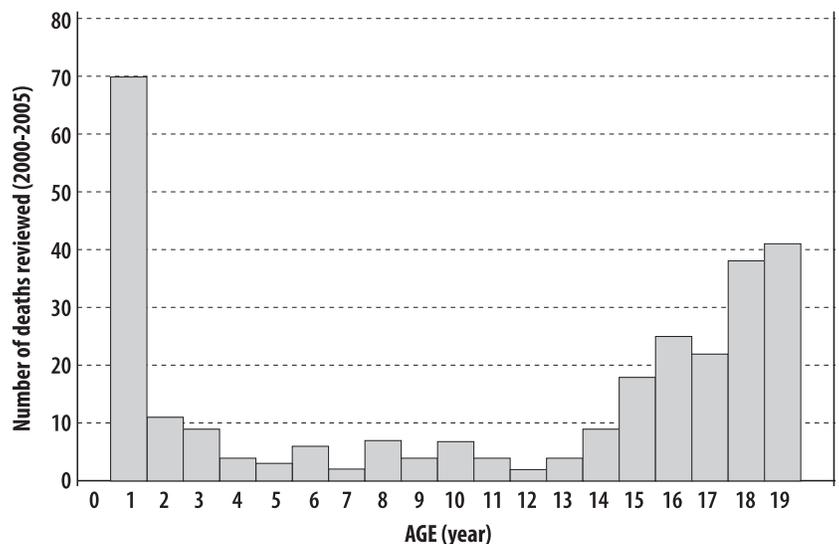
Summary of Coroner cases reviewed

Of the 286 deaths reviewed:

- The deaths of 184 (64%) male and 102 (36%) female children were reviewed with an average age of 10 years (Figure 1).
- Seventy (24%) of the reviewed deaths were neonates (younger than 28 days) and infants (younger than one year) and 126 (44%) of reviewed deaths were of teenagers 15 years of age or older.

ALL PERCENT DATA WERE ROUNDED TO THE NEAREST WHOLE PERCENT.

Figure 1. Number of child deaths reviewed by year of age



¹⁰ Developmental stages as defined by various agencies and organizations and other child death review teams (e.g., World Health Organization, Statistics Canada, BC Vital Stats).

THE AVERAGE AGE AT THE TIME OF DEATH WAS 10 YEARS OLD.

Therefore, the youngest and oldest children made up 68 per cent of all reviewed deaths. Deaths of youth, between the ages of one and 14 years inclusive, accounted for the remaining 90 (31%) of the reviewed cases.

- As stated above, almost one quarter of the deaths involved neonates and infants and almost half (45%) of these deaths were classified as Natural.
- The average age of neonates and infants was 94 days and involved almost twice as many males as females, 44 (63%) versus 26 (37%) respectively.

For all children, accidents were the most common manner of death and accounted for 52 per cent of reviewed Coroner cases (Table 2).

Table 2. Number and percentage of child deaths reviewed by manner of death

Manner of Death	Number (%) of Coroner cases
Accident	148 (52%)
Natural	55 (19%)
Undetermined	38 (13%)
Suicide	36 (13%)
Homicide	9 (3%)
Total	286

As illustrated in Figure 2, Accidental deaths commonly involved motor vehicle accidents, drowning and poisonings and/or drug intoxication.

Table 3 indicates that there were a greater number of deaths from the Fraser Region (see Appendix 2 for a map of the BCCS regions). Accidents were the most common manner of death.

Table 3. Number and percentage of child deaths reviewed by BCCS region

BCCS Region of Death	Number (%) of Coroner cases reviewed
Fraser	98 (34%)
Interior	53 (18%)
Island	49 (17%)
Vancouver Metro	44 (15%)
North	42 (15%)
Total	286

Motor vehicle accidents accounted for 39 (40%) child deaths in the Fraser Region.

- Surrey had the highest number of deaths for any city in the Fraser Region, at 15 (15%), followed by Coquitlam at eight (8%).
- Except for the Vancouver Metro Region, Accidental was the most common manner of death, with motor vehicle accidents the most common circumstance of death.

This statistic includes pedestrian and bicycle accidents in which a vehicle was involved. In the Vancouver Metro Region, medical circumstances of death were most frequently reported due in part to the location of BC Children’s Hospital where critical cases from all over the Province are transported; followed by motor vehicle accidents.

Figure 2 illustrates the circumstances of death for all reviewed cases.

Motor vehicle accidents were the leading circumstance of death.

- Other or unknown circumstances, accounted for 49 (17%) deaths, and includes the combined total for several different circumstances for which the frequency of occurrence was less than or equal to one per cent.

While the leading circumstance of death for both genders was vehicular accidents, the other leading circumstances of deaths per gender differed.

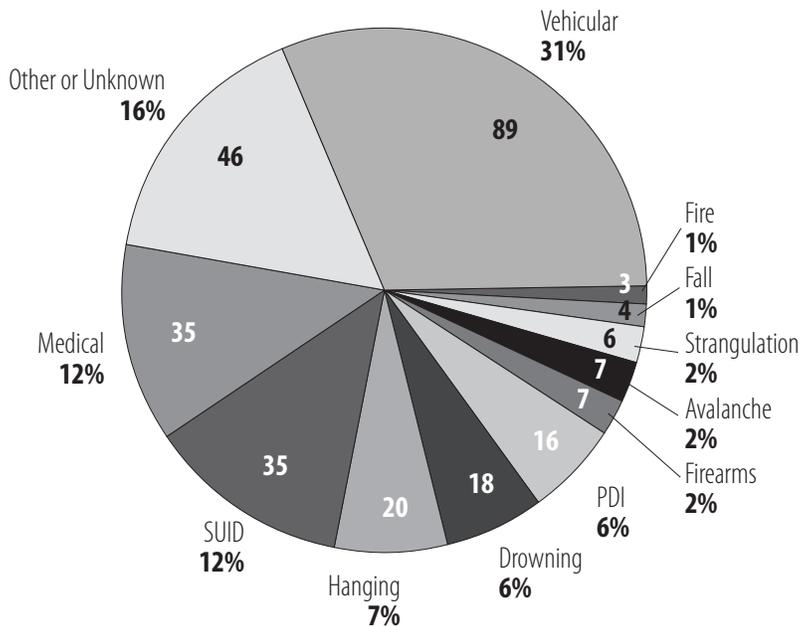
- Medical circumstances accounted for the deaths of 21 per cent (21) of females but only eight per cent (14) of males.
- Drowning was a leading circumstance of death for males, with 15 (8%) males drowning; it was not a leading circumstance for females.
- Poisoning and drug intoxication (PDI) was a leading circumstance of death for nine (10%) females, it was not a leading circumstance for males.

Finally, the number of deaths reviewed was examined by ethnicity. While Caucasians made up the majority of reviewed deaths, there were a disproportionately greater number of deaths of Aboriginal children (Table 4).

Table 4. Number and percentage of deaths reviewed by ethnicity

Ethnicity	Number (%) of Coroner cases reviewed
Caucasian	170 (59%)
Aboriginal	60 (21%)
Asian	21 (7%)
Data not available	15 (5%)
Indo-Canadian	9 (3%)
Multiple ethnicities reported	4 (1%)
Hispanic	3 (1%)
Afro-American	3 (1%)
Middle Eastern	1 (0.3%)
Total	286

Figure 2. Number and percent of reviewed cases by the main circumstance of death



B.C. Vital Statistics Agency estimated the 2002 Status Indian population, 19 years or younger, to be six per cent¹¹. However, our analysis revealed that 60 (21%) of all deaths reviewed by the CDR Unit were of Aboriginal children.

Of the 55 deaths classified as Natural, 18 (33%) involved Aboriginal children, indicating that Natural risk factors are especially prevalent for Aboriginal children.

The average age of all Aboriginal children at the time of death was 8.6 years, in comparison to the overall average age of 10 years. However, of the 70 reviewed deaths of children one year of age or younger, Aboriginal children accounted for 20 (29%). This suggests that neonatal and infant Aboriginal children are an especially vulnerable population.

THE DEATHS OF 36 MALE AND 24 FEMALE ABORIGINAL CHILDREN WERE REVIEWED.

¹¹ BC Vital Statistics Agency. Regional analysis of health statistics for Status Indians in British Columbia 1992-2002. April 2004.



5 | Accident

One hundred and forty-eight (52%) of 286 child deaths reviewed were Accidental, the leading manner of death. One Accidental death was further classified as a Sudden Unexpected Infant Death (SUDI) and will be analyzed separately in section 10. The remaining 147 deaths are reported in this section.

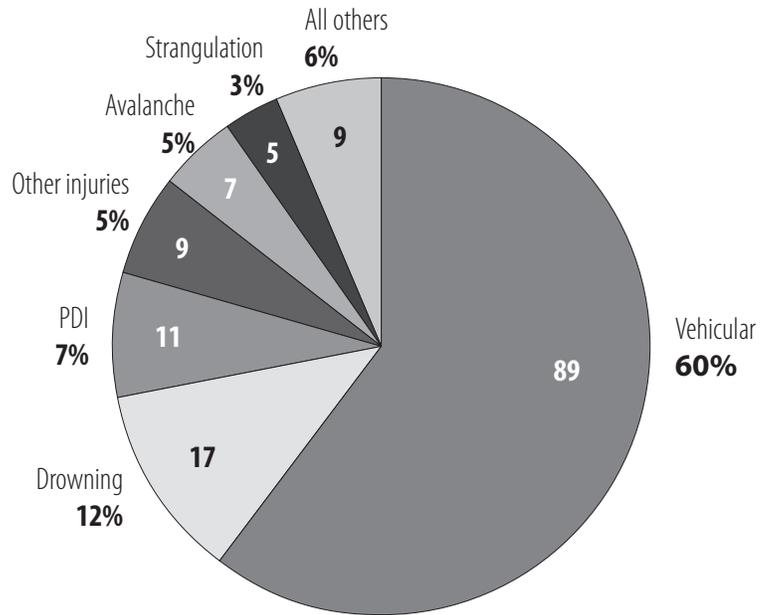
- Neonates and infants were involved in relatively few of these Accidental deaths, representing 11 (7%) cases in total.
- Youth and teenagers accounted for 136 (93%) of the 147 deaths. Caucasian children accounted for 103 (70%) of the deaths, while Aboriginal children accounted for 26 (18%) of deaths.
- The number of deaths varied by month of the year, ranging from a minimum of three (2%) deaths in the month of December to a maximum of 22 (15%) deaths in the month of June. There were relatively fewer deaths in the months of September and October (i.e., seven (5%) deaths per month).

Vehicular accidents

Figure 3 illustrates that the leading circumstance of death was vehicular accidents, of which infants, youth and teenagers accounted for three (3%), 33 (37%) and 53 (60%) of the 89 cases respectively. There were no vehicular-related deaths involving neonates.

- Children were at greater risk as passengers (48 deaths or 54%) than as operators of the vehicle (26 deaths or 29%).
- Children were also involved in vehicular accidents as pedestrians, skateboarders and bicyclists, accounting for 14 (16%) of deaths.

Figure 3. Number and percentage of Accidental deaths reviewed by circumstance of death



- In 51 (57%) of the vehicular deaths, the death occurred on a roadway, six (7%) occurred in a body of water with the remainder dying from their injuries in hospital intensive care units, and emergency or operating rooms.

THE ACCIDENTAL DEATHS OF 98 MALE AND 49 FEMALE CHILDREN WERE REVIEWED.

Table 5 lists the type of vehicular accidents that were reviewed. Vehicle type is not available for one death in which the

Table 5. Number and percentage of vehicular deaths reviewed by type of vehicle

Type of motor vehicle accident	Number of Coroner cases reviewed
Sport Utility Vehicle, car, van, truck, motorcycle, moped	68 (76%)
Pedestrian	7 (8%)
Bicycle	6 (7%)
Recreational (Seadoo, dirt bike, all terrain vehicle)	6 (7%)
Skateboard	1 (1%)
Data not available	1 (1%)
Total	89

THE AVERAGE AGE
OF CHILDREN IN
FATAL VEHICULAR
ACCIDENTS WAS
14 YEARS.

injuries sustained in the vehicular accident resulted in the death two years later.

- Forty-one (46%) of the motor vehicles involved were cars, 11 (12%) were sport utility vehicles, eight (9%) were trucks and five (6%) were vans.
- In 40 (45%) of the vehicular deaths, a second vehicle was involved in the fatal collision. The second vehicle involved was most frequently a truck in 11 (12%), another car in eight (9%), or a semi-tractor in six (7%).
- Forty-three (48%) of vehicular accidents involved only one vehicle, and included all terrain vehicles, bicycles, a dirt bike and a moped.
- Excessive speed was reported as a contributory factor in 56 per cent of single-vehicle and 20 per cent of multiple-vehicle accidents
- There were fewer reports of restraint use in single-vehicle (28%) compared to multiple-vehicle accidents (57%).
- The average age of children who died in single-vehicle accidents was 15 years and 12.9 years for multiple-vehicle accidents.
- Of the six bicyclists who died, the average age was 11.8 years. In addition, only two children were wearing helmets and four were not. Three children suffered fatal head injuries, including two of the children who were not wearing helmets. In three deaths, the bicyclist collided with a semi-tractor. In two of these bicycle-related deaths, an error of the child was cited as a contributory factor to the accident.

In addition to the use or lack of use of a restraint, other contributing factors to vehicular accident deaths were analyzed, with the possibility that more than one factor was contributory. Contributing factors included driver error, excessive speed, adverse conditions, alcohol or drug intoxication and driver inattention.

- Eight (9%) of 89 deaths cited intoxication as a factor, with 10 (11%) citing impairment of the driver. In two of these cases, a teenager was the impaired driver.
- In 56 (63%) of the 89 vehicular deaths reviewed, dry road conditions were reported at the time of the accident. Wet road conditions were reported in 10 (11%) of the deaths. In nine (10%) of the deaths, other types of road conditions were reported.
- Motor vehicle accidents occurred during all months of the year, and ranged from one (1%) accident in February to 12 (13%) in June.
- In 15 (17%) cases, no contributing factor was attributed to the accident.

Table 6 lists the number of vehicular deaths by BCCS region (see Appendix 2 for a map of the BCCS regions).

- The Fraser Region was the region of residence for 36 (40%) children and Surrey was the city of residence for 11 (30%) children who died in vehicular accidents.

Our analysis revealed age and gender as risk factors in vehicular deaths.

- Forty-five (50%) vehicular deaths reviewed were of teenagers aged 16 years or older.

Table 6. Number and percentage of vehicular deaths reviewed by BCCS region

BCCS Region	Number (%) of Coroner cases reviewed
Fraser	36 (40%)
Interior	18 (20%)
North	16 (18%)
Island	10 (11%)
Vancouver Metro	9 (10%)
Total	89

- Teenagers were passengers in 22 cases or drivers in 21 cases.
- Thirty-five (78%) vehicular deaths reviewed were of teenage males.

Drowning accidents

Drowning (17 or 12%) accounted for the second greatest number of Accidental deaths (15 male and two female children) reviewed.

- Nine (53%) of these accidents occurred in a natural body of water (i.e., lake, ocean, river or creek).
- At private residences, eight (47%) deaths occurred in bathtubs, pools and hot tubs, with one incident of a drowning in a bucket.
- Six (39%) of the children who drowned could not swim, three (18%) could swim, and one (6%) was reported as a poor swimmer.

- In eight (47%) cases, data on the swimming ability of the child was unavailable.
- The activity at the time of the drowning was listed as swimming (24%), playing (24%) or boating (12%), among other activities.
- Alcohol was cited as a contributory factor in two of the deaths.
- The average age of the children that drowned was 10.1 years.

Other types of accidents

There were numerous other circumstances of Accidental deaths that accounted for the remainder of the reviewed deaths.

- Poisoning and drug intoxication accounted for 11 (7%) deaths. These deaths often involved unintentional overdose of cocaine or heroin.
- "Other injuries" accounted for nine (6%) deaths (e.g., blunt force trauma injuries).
- The seven avalanche victims were all 15 years of age, from Alberta, on a guided trip to Rogers Pass and died in one incident.
- There were three fire-related deaths; started by matches, a combustible material and an unattended candle.

6 | Homicide

THE HOMICIDES OF 6
MALE AND 3 FEMALE
CHILDREN WERE
REVIEWED.

Nine (3%) of 286 child deaths reviewed were the result of a homicide that occurred between 2002 and 2004.

- The deaths involved one neonate, one youth and seven teenagers.
- The average age of the children was 13.4 years, while the average age of the seven teenaged children was 17 years.
- In all cases, as per BCCS policy, autopsies were performed as well as full toxicological analysis.
- Four (44%) of the Homicide deaths occurred in the Fraser Region, while three (33%) and two (22%) occurred in the Vancouver Metro and Island Regions, respectively.
- The location of the homicide was the child's residence in three deaths, and a vehicle, community centre, public roadway, private residence, campsite and a café in the remaining deaths.
- Toxicological analysis revealed that one homicide victim had been using alcohol and another used both alcohol and cannabis.
- For two children, there was previous involvement with the Ministry of Children and Family Development, although not in continuing care of the ministry.

The circumstances of Homicide cases are listed in Table 7 and indicate that stabbing or the use of blunt force resulted in six (66%) of the deaths. Table 8 indicates that in four (44%) of the Homicide deaths, the assailant was a parent of the child. In the five Homicide deaths committed by someone other than a parent, the relationship of the assailant to the child was unclear. However, for at least one child, the homicide appears to have been committed at random by youth(s) unknown to the child.

Table 7. Number and percentage of Homicide deaths reviewed by circumstance of death

Circumstances of death	Number (%) of Coroner cases reviewed
Stabbing	3 (33%)
Blunt force/object	3 (33%)
Suffocation	1 (11%)
Strangulation	1 (11%)
Firearms	1 (11%)
Total	9

Table 8. Number and percentage of Homicide deaths reviewed by assailant

Assailant	Number (%) of Coroner cases reviewed
Two or more individuals	3 (33%)
Mother of child	2 (22%)
Father of child	2 (22%)
Other single individual	2 (22%)
Total	9

7 | Suicide

Thirty-six (13%) of 286 child death cases reviewed were the result of a suicide.

- Thirty-one (86%) of the children that committed suicide were teenagers while the remainder were youth.
- The average age at time of death was 16.4 years.
- Over 50 per cent (19) died by hanging, which was the most frequent manner for both females and males.
- Nineteen (53%) of the deaths reviewed occurred in a private residence, that included yards, basements, bedrooms and closets.
- Four children were reported as having been previously diagnosed with depression, with three of them prescribed an antidepressant, and one child was known to not be compliant with medication use.
- Three children were receiving psychological and/or psychiatric treatment at the time of their death.
- A family history of depression was reported in three cases, with one child receiving antidepressant therapy.
- In addition to the above risk factors, other risk factors were identified as present in 16 of the Suicide deaths, including expressed thoughts of suicide, loss of a family member or friend, romantic relationship break up, alcohol abuse, or family/school discord.
- In seven (19%) of the deaths, the child was in the care of or receiving services from the MCFD.

Of the six children (17%) that committed suicide with a firearm, as listed in Table 9, five used a rifle and one used a handgun.

- Three of the firearms were locked-up, and in three cases the ammunition was stored with the firearm.
- In five of the six deaths involving use of a firearm, the firearm was owned by a family member.

THE SUICIDE DEATHS OF 25 MALE AND 11 FEMALE CHILDREN WERE REVIEWED.

Table 9. Number and percentage of Suicide deaths reviewed by circumstance of death

Circumstances of death	Number (%) of Coroner cases reviewed
Hanging	19 (53%)
Firearms	6 (17%)
Poisoning and/or drug intoxication	5 (14%)
Jumping (train, river)	3 (8%)
Drowning	2 (5%)
Asphyxiation	1 (3%)
Total	36

8 | Natural

THE NATURAL DEATHS OF 21 FEMALE AND 21 MALE CHILDREN WERE REVIEWED.

Fifty-five (19%) of cases reviewed were due to Natural causes with the death occurring between 2001 and 2005. Thirteen (24%) of these deaths were further classified as Sudden Unexpected Deaths in Infancy (SUDI) and will be reported in section 10. The remaining 42 (76%) deaths are reported in this section.

- Of these 42 deaths, 18 (43%) involved youth, nine (22%) infants, nine (22%) neonates and six (15%) teenagers.
- The average age of the children was 4.3 years.
- Similar to reviewed deaths of an Undetermined manner, 24 (57%) of the deaths involved children two years of age or younger.
- In 30 (71%) of the deaths, the child died in a hospital or a clinic, five (12%) died at their family home and one (2%) in daycare.
- In 11 (26%) of the deaths, there had been hospitalization, including four deaths where labour and delivery occurred at home or at a hotel.
- In six (14%) cases, data on the location of death was not available.

Pregnancy and Birth Statistics

- Of the 21 (50%) cases where gestational length was reported, the range was 23 to 42 weeks, with an average of 37.1 weeks.
- In six (14%) of the child deaths reviewed, the child was born prematurely. Gestational length of less than 37 weeks

is considered premature by the World Health Organization¹².

- In 26 (62%) cases, where maternal age was reported, the average maternal age at birth was 27 years.
- A previous pregnancy or birth was reported in 12 (29%) cases. Conversely, in four (9%) cases, there was no previous pregnancy or birth reported. Data was not available for the remaining 26 cases. In five (12%) cases, there was a reported use of tobacco, alcohol, antidepressant medication or other prescription and non-prescription drugs during pregnancy.
- In three (7%) of these cases, an incident of hospitalization was reported.

In 24 (57%) of the child deaths reviewed in this category, at least one recent medical event was reported. Overall, 32 (76%) of the deaths were reported to have medical circumstances of death (i.e., natural disease processes).

- In 11 (26%) children, congenital anomalies were present and included heart defects, Apert syndrome, Wolff-Parkinson-White syndrome, Down's syndrome and VACTERL syndrome.
- A bacterial or viral infection was reported in 11 (26%) of the deaths reviewed.
- In the high percentage of cases with attributed recent medical events, 21 (50%) children had recently received a prescription or non-prescription medication.

¹¹ Integrated Management of Pregnancy and Childbirth. Pregnancy, childbirth, postpartum and newborn care: A guide for essential practice. World Health Organization. (2003) Geneva.

- In 10 (24%) of the Natural child deaths reviewed, a non-prescription drug was administered to the child.
- In 12 (29%) cases, two or more drugs had been administered to the child.
- The use of several types of drugs were reported and included antiasthmatics, antibiotics, anticonvulsants, antipsychotics, antispastics, narcotic analgesics, over-the-counter medications, sedative-hypnotics and stimulants.

Table 10 lists the ethnicities of the children whose deaths were classified as Natural. Natural deaths of Aboriginal children were disproportionately high, and almost equal to the number of deaths of Caucasian children. Furthermore, the average age at death was 5.4 years for non-Aboriginal children, and 2.1 years for Aboriginal children. Similarly, the average gestational length for non-Aboriginal children was longer than for Aboriginal children (38.1 versus 36.1 weeks respectively). Finally, the average birth weight was 260.7 grams lower for Aboriginal children (2681.9 grams) than non-Aboriginal children (2942.6). This data indicates that Aboriginal children are at a significantly higher risk in their first two years for death from natural disease processes.

Table 10. Number and percentage of Natural deaths reviewed by ethnicity

Ethnicity	Number (%) of Coroner cases reviewed
Caucasian	16 (38%)
Aboriginal	14 (33%)
Asian	4 (9%)
Afro-American	3 (7%)
Data not available	2 (5%)
Hispanic	1 (2%)
Middle Eastern	1 (2%)
Multiple ethnicities reported	1 (2%)
Total	42

A MEDICAL EVENT IS DEFINED AS ANY ILLNESS, CONDITION OR DISEASE, DIAGNOSIS, OR MEDICAL TREATMENT (INCLUDING VACCINATION OR MEDICATION).

9 | Undetermined

THE
UNDETERMINED
DEATHS OF 12 MALE
AND 5 FEMALE
CHILDREN WERE
REVIEWED.

Thirty-eight (13%) of 286 child deaths reviewed were due to Undetermined causes, with the death occurring between 2003 and 2005. Twenty-one (55%) Undetermined deaths were further classified as Sudden Unexpected Death in Infancy (SUDI) and will be reported in section 10. The remaining seventeen (45%) deaths are reported in this section.

- Of these seventeen deaths, seven (41%) were youth, five (29%) were infants, three (18%) were teenagers and two (12%) were neonates.
- The average age at the time of death was 5.1 years.
- Significantly, over half of the Undetermined deaths reviewed involved children two years of age or younger.
- Caucasian children accounted for eight (47%) of the Undetermined deaths, while other ethnicities accounted for the remaining nine (53%) deaths.
- In seven (41%) of the deaths, the child died in their family home or in that of a close relative. Seven (41%) children died in hospital and one (6%) died in a lake. Alcohol use was cited as a possible contributory factor in the latter death. In two (12%) cases, data on the location of death was not available, as the death may have occurred a long time after the initial injury.

Pregnancy and Birth Statistics

- Of the eight (47%) cases where gestational length was reported, the range of gestation was 25 to 41 weeks, with an average of 35.4 weeks.
- In five (29%) of the reviewed deaths, the child was born prematurely. Gestational length of less than 37 weeks is considered premature by the World Health Organization.
- In 15 (88%) cases where maternal age was reported, the average maternal age at birth was 34 years. In three (17%) cases, there was a reported use of tobacco during pregnancy. A previous maternal pregnancy or birth was reported in seven (41%) cases, while data was unavailable for the remaining cases.

In nine (53%) of the deaths in this category, at least one recent medical event was reported. Reported medical events included: a respiratory ailment, flu symptoms, viral gastroenteritis, Staphylococcus aureus sepsis, and recent vaccination.

- Seven (41%) children were reported to have recently received one or more prescription medications for treatment of an illness or condition. These medications included anticonvulsants, antidepressants and sedatives.

10 | Sudden Unexpected Death in Infancy (SUDI)

In recent years, the circumstances surrounding infant deaths have been increasingly investigated in greater depth. Accordingly, from November 2004, the BC Coroners Service has revised and utilized set standards for the investigation and classification of infant deaths. Specifically, Sudden Unexpected Deaths in Infancy (SUDI) are found consistent with Sudden Infant Death Syndrome (SIDS) if all other factors have been ruled out. Previously these deaths were classified as Natural death and now are classified as Undetermined. For all other SUDI cases, if any risk factor cannot be excluded, these deaths are classified as Undetermined, whereas in previous years they may have been classified as SIDS and therefore Natural. Subsequent reports will contain this new classification system which is being used and monitored internationally. For this present report, all SUDI cases are grouped together for analysis. The reviewed deaths presented in this section include, but do not differentiate between, the following classification criteria:

- Sudden Unexpected Death in Infancy (SUDI) (Accident, Natural, Undetermined, Homicide): In these cases, a specific disease, injury or other risk factor was identified as the cause of death (e.g., pneumonia, sleeping with an adult).
- Sudden Unexpected Death in Infancy (SUDI, Undetermined): There was evidence of an external risk factor (e.g.,

sleeping face down or sleeping with an adult) that may or may not have contributed to the death.

- Classic SIDS (Undetermined): No cause of death was identified. There was no evidence of illness, malformation, disease, or external stressor which could account for the death, and no other identified risk factors present.
- Consistent with SIDS (Undetermined): There were classic signs of SIDS. However, evidence of an illness or disease was found, that may or may not have contributed to the death as its role in the death is unclear.

The prominent theory of SIDS is the Triple-Risk Model¹³ in which three overlapping factors result in SIDS: 1) a vulnerable infant (genetic, neurological factors), 2) a critical developmental period (six months or younger), and 3) an external stressor (such as second hand smoke, pet dander, prone sleeping position, unsafe sleep environment). A previous BCCS CDR Unit special report identified risk factors in the deaths of 47 infants and recommended several safe sleep guidelines for parents of infants¹⁴. The current report examined these and several additional risk factors.

Thirty-five (12%) of 286 child death cases reviewed were classified as SUDI and occurred between 2003 and 2005. Of these 35 cases, 21 (60%) were classified as Undetermined, 13 (37%) as Natural and one (3%) as Accidental.

THE SUDDEN, UNEXPECTED DEATHS OF 22 MALE AND 13 FEMALE CHILDREN WERE REVIEWED.

¹³ Filiano JJ, Kinney HC (1994). A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biology of the Neonate* 53(3-4):194-197.

¹⁴ BC Coroners Service, Child Death Review Unit Special Report, Infant Death 2003-2004. (See Appendix 3 for web site address).

The deaths of 34 infants and one neonate with an average age of 3.5 months were reviewed.

Pregnancy and Birth Statistics

- In 33 (94%) of the 35 cases the gestation interval was reported. The gestational range was 24 to 42 weeks, with an average of 37.2 weeks. Gestation time of less than 37 weeks is considered premature by the World Health Organization.
- In seven (20%) of the child deaths reviewed, the child was born prematurely.
- Nine infants were born with a low (1500 to 2499 grams) or very low (<1500 grams) birth weight¹⁵.
- The average birth weight was 3029.0 grams. The average birth weight for full-term birth weights in B.C. is 3552 grams for male and 3417 grams for female infants¹⁶.

Table 11. Number and percentage of SUDI cases reviewed by the location where the child was found.

Location found	Number (%) of Coroner cases reviewed
Crib	16 (46%)
Adult bed	10 (29%)
Data not available	5 (14%)
Hospital	1 (3%)
Mother's arms	1 (3%)
Futon	1 (3%)
Car seat	1 (3%)
Total	35

Table 12. Number and percentage of SUDI cases reviewed by possible risk factor

Possible Risk factor ¹⁷	Number (%) of Coroner cases reviewed
Inappropriately covered for sleep ¹⁸	22 (63%)
Recent medical event	21 (60%)
Superfluous items found in bed	19 (54%)
Soft bedding present	16 (46%)
Prenatal exposure to drugs or alcohol	15 (43%)
Put to sleep on stomach or side	14 (40%)
Prescription or OTC drug	13 (37%)
Second hand smoke	12 (34%)
Obstructed/possibly obstructed airway	12 (34%)
Secretions found in nose, mouth or bedding	11 (31%)
Premature	9 (26%)
Family history of SIDS	9 (26%)
Family history of other infant deaths	9 (26%)
Mother <20 or >35 years old at delivery	7 (20%)
Overheating possible	7 (20%)
Co-sleeping	7 (20%)
Overlay possible	6 (17%)
Pet dander	2 (6%)

¹⁵ Health Indicator Volume 2005, Number 3. Statistics Canada and the Canadian Institute for Health Information.

¹⁶ Kierans WJ, Kendall PRW, Foster LT, Liston RM, Tuk T (2006). New birth weight and gestational age charts for the British Columbia population. B.C. Medical Journal 48(1):28-32.

¹⁷ Note that more than one risk factor may be present for a death. Therefore, percentage total is greater than 100 per cent.

¹⁸ When covering an infant for sleep the infant should be placed at the foot of the crib with a light blanket placed no higher than the infant. The blanket should be tucked under the corners and end of the crib mattress. The appropriate use of a blanket is illustrated in an online document at www.sidskids.org/documents/safesleepbro_000.pdf

-
- In 28 cases, where maternal age was reported the average maternal age was 24.9 years.
 - Deaths of Caucasian and Aboriginal children accounted for 75 per cent of SUDI deaths, at 17 (49%) and nine (26%) respectively.

Infants were found in a variety of locations, but most often in their crib (Table 12). Risk factors other than sleeping location are listed in Table 14. More than one risk factor was typically present in SUDI cases, and in many cases, several risk factors were present. Importantly, Table 12 is not an exhaustive list of possible risk factors for SUDI, as other risk factors, not listed here, may contribute to SUDI.

Of the 18 (51%) cases where a recent medical event or illness was present, a viral or bacterial infection was reported in nine (26%) cases and a congenital anomaly in two (6%) cases. Medications that were typically reported included non-prescription drugs to treat the cold, flu or colic symptoms (e.g., acetaminophen). Prescribed medications were strictly antibiotics.

11 | Children in the Care of, or Receiving Services from MCFD

THE DEATHS OF 39 MALE AND 28 FEMALE CHILDREN, IN THE CARE OF OR RECEIVING SERVICES FROM THE MCFD, WERE REVIEWED.

Sixty-six (23%) of the 286 reviewed child deaths, occurred between 2000 and 2005, and involved children in the care of or children receiving services from the MCFD (i.e., the child received services under the *Child and Family Community Service Act* within the 12 months immediately preceding their death). One child was in the care of the Arizona state government living in B.C., bringing the total of cases reviewed to 67.

- In 25 (37%) cases, the child was in the care of the MCFD, while 42 (63%) children were receiving services from the MCFD. At the time of the child's death, supervision of children in care was variable and included foster parents, biological parents, group home staff, legal guardians, or other relatives.

These deaths were classified as Accidental, Natural, Suicide and Undetermined (Table 13) and were included in the analyses reported in above sections. The percentages of Natural and Undetermined deaths were disproportionately higher for children in care or receiving services. However, it is important to note that children in care, or receiving services

Table 13. Number and percentage of cases reviewed by manner of death for children in the care of or receiving services from the MCFD

Manner of Death	Number (%) of Coroner cases reviewed
Accident	29/148 (19%)
Natural	17/55 (31%)
Undetermined	13/38 (34%)
Suicide	8/36 (22%)
Homicide	0/9 (0%)
Total	67/286 (23%)

represent a special population that were likely living with one or more risk factors prior to receiving services, or placed in care of the MCFD .

- Of the 67 cases, there were 29 (43%) teenagers, 24 (36%) youth, 12 (18%) infants and one (2%) neonate.
- The average age at the time of death was 10 years.
- The ethnicity of the child was reported to be Caucasian in 31 (46%) cases, Aboriginal in 25 (37%) cases or other ethnicities in 10 (16%) cases. Data on ethnicity was unavailable for one death.
- Deaths involving children in-care or receiving services were reported throughout the Province; however, the greatest number of deaths occurred in the Fraser Region (26 or 39%).
- The majority of deaths occurred in a hospital (30 deaths), private residence (13 deaths) or a public roadway (nine deaths), in total accounting for 52 (78%) of all reviewed deaths.

Pregnancy and Birth Statistics

- Of the 16 cases where gestational length was reported, the range of gestation was 23 to 42 weeks, with an average of 36.7 weeks.
- In four of the child deaths reviewed in this category, the child was born prematurely. Gestational length of less than 37 weeks is considered premature by the World Health Organization.
- In 40 cases, where maternal age was reported, the average maternal age was 24.6 years.
- There were seven reports of alcohol or drug use during pregnancy.

- In nine of the reviewed deaths, there was a reported history of alcohol or drug use and/or violence in the family or of the supervising individual.

Table 14 lists the circumstances of death for reviewed cases of children in care or receiving services. While vehicular-related deaths were most prevalent, medical deaths were also high.

- Of these medical deaths, seven children had congenital abnormalities, with five children suffering from a seizure disorder.
- Cold and flu-like symptoms were commonly reported and 17 (25%) children were receiving medication for these symptoms.

There were nine (13%) deaths of children in-care or receiving services related to poisoning and/or drug intoxication (PDI) (see Table 15 for further description of PDI related deaths).

- Eight of these deaths were found to be unintentional (Accident), while one was intentional (Suicide) and involved a mixed over-the-counter drug overdose of acetaminophen, ibuprofen and iron.
- Five of the children were Caucasian, three were Aboriginal, and one was Hispanic.

Of the 286 deaths reviewed, there were a total of 11 PDI Accidental deaths with children in-care of or receiving services accounting for eight (73%) of these accidents. This percentage is disproportionately high, as children in care of or receiving services comprise only 23 per cent of all child deaths reviewed.

In contrast, of vehicular accidents, drowning accidents and suicides, children in-care or receiving services were

involved in 18, 29 and 22 per cent of cases respectively. In two additional deaths, not classified as PDI, accidental overdose of a medication, and incorrect administration of a medication were reported as possible contributory factors to the death.

Table 14. Number and percentage of Coroner cases reviewed for children in-the-care-of or receiving-services-from the MCFD by circumstance of death.

Circumstances of death	Number (%) of Coroner cases reviewed
Vehicular	16 (24%)
Medical event	14 (21%)
Poisoning and/or drug intoxication (PDI)	9 (13%)
Hanging	6 (9%)
Data not available	6 (9%)
Drowning	5 (7%)
Undetermined	5 (7%)
SUDI	4 (6%)
Medical event/PDI	1 (1.5%)
Fall	1 (1.5%)
Total	67

Table 15. Number and percentage of PDI cases reviewed by poison or drug for children in-care or receiving services from the MCFD.

Poison or Drug	Number (%) of Coroner cases reviewed
Cocaine and/or heroin	5 (6%)
Antidepressant and a non-steroidal anti-inflammatory	1 (1%)
Carbon monoxide	1 (1%)
Methadone	1 (1%)
Acetaminophen, ibuprofen and iron (intentional)	1 (1%)
Total	9

12 | Non-Coroner Cases and Natural, Expected Deaths

THE DEATHS OF 49 MALE AND 39 FEMALE CHILDREN, WHICH WERE CLASSIFIED AS NON-CORONER CASES, WERE REVIEWED.

THE DEATHS OF 139 MALE AND 124 FEMALE CHILDREN, WHICH WERE NATURAL AND EXPECTED, WERE REVIEWED.

Non-Coroner Cases

In addition to the 286 Coroner cases reviewed in the above sections, an additional 90 cases reviewed were concluded to be Non-Coroner Cases (NCC). Non-Coroner Cases are deaths that are initially reported to the Coroners Service, but after a preliminary investigation are determined not to meet the criteria of Section 9 of British Columbia's *Coroners Act*. That is, in these cases, the death was Natural and expected and the child was receiving treatment by a medical practitioner.

There were 31 Non-Coroner Cases in 2003, 33 in 2004, and 26 in 2005. The average age of the children in this category was 3.8 years at the time of death. The deaths occurred throughout the province, with the minimum at 14 per cent occurring in the Northern Region and the maximum at 23 per cent occurring in the Island Region (see Appendix 2 for a map of the BCCS regions). The deaths were classified by the BC Vital Statistics Agency according to the International Classification of Disease (ICD) and the World Health Organization (WHO). The two major causes of death were the result of 1) conditions originating in the perinatal period and 2) congenital malformations, deformations and chromosomal abnormalities. Together these causes accounted for almost 25 per cent of Non-Coroner Cases.

Natural, Expected Deaths

The CDR Unit reviews cases of children who died suddenly, unnaturally and unexpectedly and are reported to the BCCS. However, there are numerous other children who die each year from Natural, expected causes. From BC Vital

Table 16. Number and percentage of deaths by leading cause (ICD)

Cause of death (ICD code)	Number (%) of Deaths
Certain conditions arising in the perinatal period ¹⁹	135 (51%)
Congenital malformations, deformations and chromosomal abnormalities	57 (21%)
Neoplasms	25 (9%)
Endocrine, nutritional and metabolic diseases	13 (5%)
All other causes of death	34 (13%)

Table 17. Number and percentage of Natural, expected deaths by BCCS region

BCCS Region	Number (%) of Deaths
Fraser	93 (35%)
Vancouver Metro	74 (28%)
Interior	37 (14%)
Island	33 (12%)
North	22 (8%)
Total	264

¹⁹ The period occurring shortly after birth; broadly defined as beginning from the 20-28th week of gestation and ending one to four weeks after birth. Examples of conditions arising during this period include complications during pregnancy, labour or delivery, birth trauma or certain infections.

Statistics Agency, the CDR Unit obtained information on the deaths of an additional 264 children who died from Natural expected causes between 2004 (153 deaths) and 2005 (111 deaths). As with NCCs, the deaths were classified by the Vital Statistics Agency according to ICD and WHO criteria. The leading causes of Natural expected deaths are listed in Table 16. The number of Natural, expected deaths by region is presented in Table 17 and is similar to the pattern of distribution of deaths reported under Section 9 of the *Coroner's Act* for Coroner cases.

In addition, following review of Natural, expected cases, the CDR Unit identified 10 cases that met the criteria and authority within the *Coroners Act*. Subsequently, a Coroner's investigation was undertaken by the BCCS into these children's deaths.

13 | Summary

The data presented in this report is a statistical summary of 640 child deaths reviewed by the Child Death Review Unit from January 2003 to August 2005. While this data does not represent all of the child deaths that have occurred since the formation of the CDR Unit, as investigations are not fully reviewed until the case is closed, the sample size is sufficiently large to be representative of all child deaths reported to the BC Coroners Service. Several important findings emerged from analysis of the reviews and are summarized below.

- Of the total 640 child deaths, 354 (55%) of the reviewed deaths were Natural, expected deaths or Non-Coroner cases. The remaining 45 per cent of deaths were sudden and unexpected. All deaths were investigated by the BCCS and reviewed by the CDR Unit.
- Sixty-eight percent of the reviewed Coroner cases involved the deaths of neonates, infants and teenagers, with relatively few youth (i.e., children between the ages of one and 15 years). This indicates that very young and teenaged children are a high risk population.
- There were also a greater number of deaths of males in comparison to female children, for all manners of death, except Natural. This suggests that environmental risk factors or risk taking behaviour present in Accidental, Suicide, and Homicide deaths, are more prevalent for male children. It is further suggested that biological risk factors influence mortality rates for females more than males.
- The circumstance of death differed for females and males and suggests that prevention and intervention programs should differentially target female and male children. For example, there was almost twice the number of Sudden Unexpected Deaths in Infancy (SUDI) for males than females. Additionally, 64 per cent of accidental poisonings or drug-induced deaths involved females. The CDR Unit will share this information with the College of Physicians and Surgeons and the Society of Obstetricians and Gynaecologists of Canada for their assistance in identifying ways to improve investigations and data collection in an effort to formulate more positive outcomes.
- Thirty-four per cent of all deaths reviewed occurred in the Fraser Valley. This percentage corresponds to the population size of this region as approximately 34 per cent of the population of B.C. lives in this region. However, as the Fraser Region is relatively small and population density is high, intervention and prevention strategies in this region may have the greatest impact on lowering the number of child deaths. Forty per cent of vehicular accidents occurred to residents of the Fraser region, and most commonly, Surrey was the city of residence.
- Over half of all deaths were due to Accidental causes and are most likely preventable deaths.

²¹ Source: Table E. Selected Vital Statistics and Health Status Indicators. 133rd Annual Report (2004). BC Vital Statistics Agency.

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- Similar to other CDR team reports (e.g., Child Deaths in Michigan²¹), we can report that vehicular deaths are the leading circumstance of Accidental deaths, especially for teenagers. Vehicular accidents were the leading circumstance of death in all regions except Vancouver Metro. This statistic is consistent with the commonly reported finding that vehicular deaths are more frequent in rural than urban areas²². In addition, in over 10 per cent of vehicular deaths, the driver of the vehicle, usually someone other than the child who died was impaired.
 - Over one third of all children who died in motor vehicular accidents were not wearing a restraint at the time of the accident (i.e., child seat or seatbelt). Excessive speed and lack of restraint were contributory factors more commonly reported in single, rather than multiple vehicle accidents.
 - Drowning was the second most common circumstance of Accidental death. Male children are at higher risk for drowning.
 - There were a disproportionately higher number of deaths of Aboriginal children, particularly Natural deaths. Aboriginal children were also over-represented among children in-care or receiving services from the MCFD.
 - The average gestational length was shorter, birth weight was lower, and maternal age at time of delivery was lower, and age at death was younger for Aboriginal than non-Aboriginal children. This data strongly indicates that young Aboriginal children are an especially vulnerable population. Contributory factors may include difficulties in accessing medical care and regular prenatal care by this population in more remote communities of B.C. The latter possibility is supported by the finding that 25 per cent of reviewed deaths of Aboriginal children occurred in the Northern Region even though a large number of critical cases are transported to Vancouver and these children die in BC Children's Hospital. The above finding is especially important in light of the fact that the live birth rate (number of births per 1,000 population) of Status Aboriginal women was more than twice that of non-Aboriginal residents in B.C. from 1992-2002²³. This difference was even greater for teenaged Status Aboriginals.
 - Our data show that risk factors were identified and known in 44 per cent of the children who committed suicide. These factors include expressed suicidal thought in verbal, written or electronic format, and family and relationship discord. Importantly, for 83 per cent of children who committed suicide, treatment for depression and or suicide ideation at the time of their death or historically was not reported. Although

²¹ Child Deaths in Michigan. Michigan Child Death State Advisory Team 4th Annual Report (2004). The Michigan Family Independence Agency; Michigan Public Health Institute.

²² Kmet L., Macarthur C (2006). Urban-rural differences in motor vehicle crash fatality and hospitalization rates among children and youth. *Accident; Analysis and Prevention* 38(1):122-127.

²³ BC Vital Statistics Agency. Regional analysis of health statistics for Status Indians in British Columbia-1992-2002. April 2004

the suicide rate for children receiving some form of treatment for depression is likely substantially less than without treatment²⁴, we reported suicide among children who were receiving psychological or antidepressant therapy at the time they died. An FDA public health advisory²⁵ was issued in 2004, in which the FDA warned of a possible greater risk of suicide in children during the first few months of treatment with some antidepressant medications. Monitoring and review of identified precursors will follow in future reporting.

- Over half of all Natural and Undetermined deaths were preceded by medical events, suggesting the importance of early diagnosis and treatment of disease or illness in children. This may relate to access of appropriate medical care and this factor will be monitored through data collection for future reporting. This also highlights the greater consideration for specialized medical care in paediatric illness and disease. The CDR Unit intends to share this information with the College of Physicians and Surgeons (CPSBC), the College of Pharmacists, the Ministry of Health, and the Ministry of Aboriginal Relations and Reconciliation for ongoing collaborative discussions and future reporting.
- Prescription and non-prescription medication use was also reported in

30 per cent to 50 per cent of these deaths suggesting that children were receiving medical treatment at the time of their death. Administration of age appropriate medication will be monitored and included in future reporting. The CDR Unit intends to utilize planned data collection strategies in an effort to identify previously unidentified risk factors with medication administration, and to share this information with the College of Pharmacists and CPSBC.

- The data suggests that maternal age may be an important variable in the occurrence of deaths classified within the Undetermined category. The average maternal age in these reviewed cases was 34 years. In comparison, the average maternal age for deaths classified as Natural was 27 years. In 2004, there were a higher percentage of maternal complications of pregnancy and delivery in women aged 30-39 (55.4% of births) compared to women aged 20-29 (47.8%)²⁶. With an increasing number of births by women aged 30 to 35 (38% of all births in B.C. in 2004²⁷), the factors in this population will be studied further by the CDR Unit in conjunction with agencies such as the College of Physicians and Surgeons, the Society of Obstetricians and Gynaecologists of Canada and Public Health for future reporting.

²³ Brasic JR, Morgan RH (2005). Suicide is probably more common in untreated youths than in those receiving treatment: the need for a retrospective epidemiological study. *Medical Hypothesis* 65(6):1204-1205.

²⁴ FDA Public Health Advisory. Suicidality in Children and Adolescents Being Treated with Antidepressant Medications. October 15, 2004.

²⁵ Source: Table 17. Selected Vital Statistics and Health Status Indicators. 133rd Annual Report (2004). BC Vital Statistics Agency.

²⁶ Source: Table 7. Selected Vital Statistics and Health Status Indicators. 133rd Annual Report (2004). BC Vital Statistics Agency.

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- Children in care of or receiving services from the MCFD represented almost three quarters of accidental poisonings and/or drug intoxication related deaths. This indicates that access or continued access to, and use of drugs, is an area of concern with these children. The CDR Unit will explore this further with MCFD in an effort to identify reasons and causes that can lead to improved prevention efforts.
 - Historically, sleep location has been identified as a significant risk factor in SUDI. While risk factors such as toys and blankets within a crib are risk factors in SUDI cases, a proper sleeping environment, such as a crib, is a step toward decreasing these deaths. We report that sleep position was a risk factor in reviewed SUDI cases, despite campaigns directed to increase public awareness of safe infant sleep practices. Over a third of deaths involved the death of a child who had been put to sleep on their stomach or side and found face down.
 - The average birth weight of infants who died suddenly and unexpectedly was approximately 450 grams lower than the Provincial average. This finding is consistent with other reports that prematurity and low birth weights are known risk factors for SUDI²⁸⁻²⁹. More than one factor was commonly present in the SUDI deaths reviewed. The presence of more than one risk factor may have multiplicative effects and is an area the CDR Unit will be monitoring in individual and aggregate reviews in an effort to locate and initiate prevention strategies.

²⁸ Blair PS, Ward Platt M, Smith IJ, Fleming PJ and the CESDI SUDI Research Group (2006). Sudden infant death syndrome and sleeping position in pre-term and low birth weight infants: an opportunity for targeted intervention. *Archives of Disease in Childhood* 91:101-106.

²⁹ Smith GCS, White IR (2006). Predicting the risk for sudden infant death syndrome from obstetric characteristics: a retrospective cohort study of 505,011 live births. *Paediatrics* 117(1): 60-66.

14 | Recommendations

SPECIFIC RECOMMENDATIONS WERE MADE FOLLOWING THE DEATHS OF 17 MALE AND 7 FEMALE CHILDREN.

Prevention of injury is sought through four types of strategies, referred to as the four E's of injury prevention: education, engineering, enforcement and economics. As defined by Mace et al³⁰, education, engineering (to decrease or eliminate fatalities through modification of environment or design), enforcement (use of laws or regulations to modify an individual's behaviour) and economic (creation of financial incentives for injury control measures) strategies can be used to prevent fatalities.

Publication and distribution of this research report meets the objective of the CDR Unit to reduce deaths through the strategy of education of the public, health professionals and other agencies. The remaining strategies will be addressed through recommendations that result from collaboration between the CDR Unit and communities and agencies local, national, and international. These recommendations will focus on the most vulnerable children and or the means to address contributing factors identified as trends in child deaths and will be based on present and future research conducted by the CDR Unit.

Recommendations arising from the Coroner's investigation

- The BC Coroners Service makes recommendations following Coroner's investigations that determine a death could have been prevented if the recommended measures had been in place at the time of the death.

Responses to these recommendations are tracked and form part of the public record. This process is an important role of the Coroners Service and plays a part in preventing future child deaths.

- Recommendations often suggest improvements of policies or procedures, development of education programs or additions to existing strategies. Recommendations are also made that certain agencies are provided with a Judgment of Inquiry (the findings of the Coroner's investigation) for informational purposes in order that they review the particular circumstances that resulted in a child's death. Of the **286** Coroner cases in this report, a total of 41 recommendations were made by either the investigating Coroner or a jury at Inquest following 24 child death investigations.
- Recommendations were made in response to the deaths of four children in care of or receiving services from the MCFD.
- Of these cases, recommendations were made in the deaths of 22 Caucasian

Table 18. Number and percentage of cases with one or more recommendations made by manner of death

Manner of death	Number (%) of Deaths
Accident	17 (71%)
Suicide	3 (12%)
Natural	2 (8%)
Undetermined	2 (8%)
Total	24

³⁰ Mace SE, Gerardi MJ, Dietrich AN, Knazik SR, Mulligan-Smith D, Sweeney RL, Warden CR (2001). Injury prevention and control in children. *Annals of Emergency Medicine*. 38(4):405-414.

and two Aboriginal children. This is not consistent with the proportionate representation of the 21 per cent Aboriginal child deaths identified in this review.

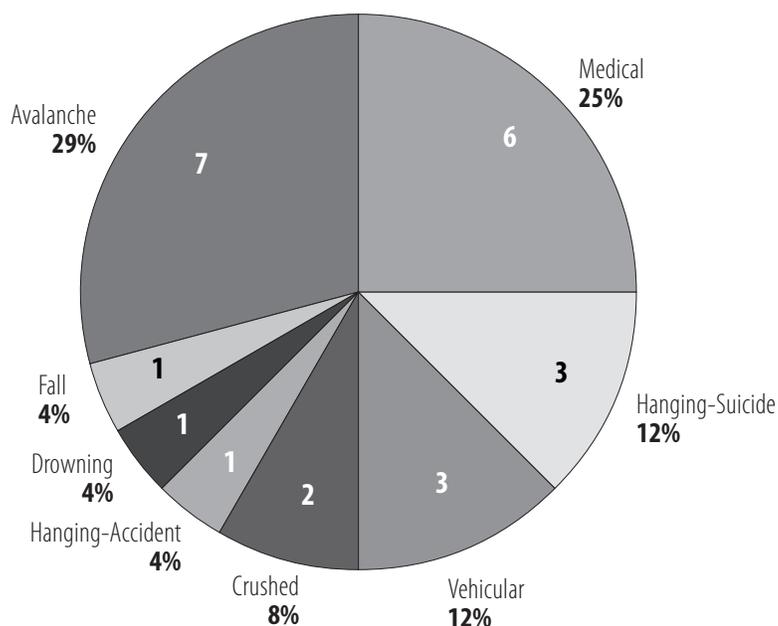
- The majority of recommendations were made following Accidental deaths (see Table 18).
- Six recommendations were made following one incident in which seven children from Alberta were killed in an avalanche during an organized and guided ski trip (Figure 4).

Child death Review recommendations for communities and agencies resulting from this report and its findings

- **It is recommended that children should always be placed in an approved car seat and/or restrained with a seatbelt when traveling in a motor vehicle.**

Vehicular accidents were the leading circumstance of death in the reviewed cases, accounting for 31 per cent of deaths. In 25 (37%) cases, no restraint was used. Seatbelts and car seats are important safety devices and could have saved the lives of almost 10 per cent of children whose deaths were reviewed in the present report. Canada Safety Council (www.safety-council.org) has information for parents on proper use of vehicle restraint devices. In addition, Safe Kids Canada (<http://www.sickkids.ca/safekidscanada/>) recently launched an initiative entitled 'Kids that Click' to promote use of age appropriate

Figure 4. Number and percentage of deaths for which recommendations were made by circumstance of death.



restraint devices. It is the law in B.C. that restraints are used by all occupants of vehicles. The BCCS CDR Unit has contacted ICBC and will collaborating in future to use the findings of this report to support their need to create initiatives and evaluate the success of existing initiatives. These findings will be reported out in future CDR Unit annual reports.

- **It is recommended that all levels of government, educators, parents, and Aboriginal leaders and their communities forge new relationships led by the Aboriginal people to address the results of this report that clearly illustrate that Aboriginal children are dying at disproportionately higher rates.** This report identifies significant risk to B.C. Aboriginal children. The CDR Unit will initiate meetings, soon after the

release of this report, with the Grand Chiefs of B.C. and their designates, Police, Aboriginal Organizations and government ministries to enable discussions and to work collegially with these organizations to develop solutions. The results of these meetings and the solutions will be included in future reporting.

- **It is recommended that children should know and be taught how to swim when playing in and around water. It is also recommended that younger children are supervised playing in and around natural bodies of water, pools or bathtubs.**

Drowning was the second leading circumstance of death in reviewed cases. Infants, youth and teenagers were victims of drowning. Research indicates that at four years of age, water skills training can be introduced to children. The CDR Unit will be providing this information to the Ministry of Education, the Red Cross and municipal governments in order to support the need for maintaining swimming and safe play around water for our children. The CDR Unit will monitor responses for future annual reports.

- **It is recommended that parents and caregivers should know and use safe sleeping practices with infants under one year of age and that these practices be promoted by Hospitals,**

Health Authorities, Public Health, Midwives, Physicians and Provincial and National Health departments.

For the first year of life, infants should be put to sleep on their backs in cribs that meet the Canadian Government's safety standards³². In a previous CDR Unit report "Infant Death Report (2003-2004)"³³ the BC Coroners Service recommended additional Safe Infant Sleep Guidelines, in accordance with the Canadian Paediatric Society Guidelines³⁴. It is recommended that parents avoid co-sleeping with an infant, avoid loose items in cribs such as toys and blankets, avoid smoking anywhere near infants (or children), dress infants in sleepers to reduce the use of heavy blankets, monitor room temperature and place infants on their backs when laying them down unsupervised. The CDR Unit will be working with Health Authorities throughout the Province to review the findings of this report to support initiatives for new parents in pre and post natal settings to educate families and child care facilities in safe sleeping practices. This information will be reported in future CDR Unit reports.

- **It is recommended that firearms and ammunition should always be safely stored and inaccessible to children.**

Seven deaths involving firearms, including one Homicide, were reviewed by the Child Death Review Unit.

³¹ Parker HE, Blanksby BA (1997). Starting age and aquatic skill learning in young children: mastery of prerequisite water confidence and basic aquatic locomotion skills. *Australian Journal of Science and Medicine in Sport*. 29(3):83-7.

³² Canadian Paediatrics Committee, Canadian Paediatric Society (2004). Recommendations for safe sleeping environments for infants and children. *Paediatrics and Child Health* 9(9):659-663.

³³ BC Coroners Service, Child Death Review Unit Special Report (2004). *Infant Deaths 2003-2004*.

³⁴ Canadian Paediatrics Committee, Canadian Paediatric Society (2004). Recommendations for safe sleeping environments for infants and children. *Paediatrics and Child Health* 9(9):659-663.

Canadian safe storage regulations require that firearms must be stored unloaded, with a trigger lock, in a secure container or room, or by disabling the firearm³⁵. Ammunition should also be securely stored and inaccessible to children. The CDR Unit will initiate communication with the RCMP and municipal police forces for an evaluation of known storage and possession of firearms in B.C. This information will be added to our data and incorporated in future research in an effort to identify any previously unknown risk factors for gun owners with children living on or visiting the premises.

- **It is recommended that the Chief Coroner directs the BCCS to evaluate if any disparity exists between the number of recommendations made in cases of Aboriginal child deaths and non Aboriginal deaths.**

In the cases reviewed for this report, recommendations were released for 22 Caucasian children, and two Aboriginal children; a representation of 10 per cent compared to the overall representation of 21 per cent Aboriginal child deaths provincewide.

- **It is recommended that all sectors of the Government and communities including the youth, and teenage community throughout B.C., establish dialogue and strategies for the prevention of child suicide.**

This report shows that the majority of children that die by suicide are teenagers (86%) with the average age of 16.4 years. Most die by hanging and most die in their own home. The CDR Unit will initiate dialogue and suggest Focus Groups from agencies such as Mental Health, Ministry of Education, Police, Professional Associations of School Counsellors and Outreach groups collaborate to create and implement solutions. The CDR Unit will monitor this population by utilizing policy changes for ensuring detailed Suicide investigation and data collection. Previously unidentified risk factors may be identified through the value of aggregate review and assist in formulating effective solutions.

The BC Coroners Service Child Death Review Unit will take responsibility for conveying this information in discussion with agencies and organisations that have the mandate to make changes and will report their intentions for efforts to prevent child deaths and will monitor their effectiveness.

In summary, the CDR Unit will be working with various agencies to strengthen relationships and address the above recommendations and/or develop additional recommendations in communication with these agencies. The actions and responses to these recommendations will be followed by the CDR Unit and discussed in future reports.

³⁵ See Canada Firearms Centre, www.cfc-cafc.gc.ca

15 | Current and Future Initiatives

The CDR Unit is involved in a collaborative project with the BC Injury Research and Prevention Unit (BCIRPU). The BCIRPU is located at the Centre for Community Child Health Research at the Children's and Women's Health Centre of B.C. The goal of this project is the establishment of a surveillance system to monitor cases of intentional neurotrauma among B.C. infants and children from birth to four years of age. As a core component of this project, the CDR Unit will be responsible for providing data on all fatal cases of neurotrauma among this age group to the BCIRPU.

The BCCS has recently implemented a database that the CDR Unit will be using to improve data collection on child deaths. This new database will also be compatible with a national database that is currently being developed, that will allow additional research by the CDR Unit into national

data on child deaths and allow for the national sharing of information.

To improve detection of trends and causes in child deaths, new policy in data collection and improved investigation is planned within the BCCS.

The ultimate goal of the CDR Unit is to monitor child deaths over the long-term. This will be accomplished by monitoring trends over subsequent years through the establishment of a database. The data presented in this report will be incorporated in future analyses and represents an important first step in developing this valuable data set.

Individual and aggregate reviews will be conducted as both are necessary tools to aid in the prevention of child death.

Multidisciplinary aggregate review of child deaths will commence after the necessary legislative authority is established allowing the CDR Unit to carry out this function.

16 | Conclusion

Despite an average of 225 child deaths reported to the BCCS each year over the last 10 years, B.C. had one of the lowest infant mortality rates in Canada in 2002 (at 4.49 deaths per 1,000 live births³⁶). The overall rate for Canada was 5.4 deaths per 1,000 live births. Furthermore, in 2005, the Canadian infant mortality rate was estimated³⁷ at 4.75, lower than for other developed countries, including the United Kingdom, the United States and the European Union.

Several significant issues are highlighted in this report.

- Aboriginal children are our most vulnerable and die at a disproportionately high rate (29%).
- The most vulnerable groups are children from birth (neonate) to one year and over 15 years of age (68%), with more male than females dying in both groups. However, more female children die from natural disease process than males.
- One third of children that die in motor vehicle accidents are not restrained. Similarly, the majority of children that die on bicycles are not wearing helmets.
- The majority of children that die from suicide are over 15 (16) and have indicated their intent.

Identifying the risk factors involved in a child's death can lead to recommendations that could reduce those same risk factors in other children, thereby preventing future deaths. However, in order to take

action to prevent child deaths, we must improve our understanding of how and why children die. The CDR Unit is already moving down this path as an innovator in its new approach to child death review in Canada. The CDR Unit will pursue partnerships with the Aboriginal community, mental health organisations, government ministries, the police, families and others with the mandate to make change. Agencies and communities will be encouraged to participate and will begin to create a meaningful impact in the prevention of child deaths.

Despite the appreciable value of individual review of child deaths, there is great value in aggregate review and analysis of child death data, as evidenced by this report. The CDR Unit will continue to apply a public health approach to Child Death Review in order to protect the future of the children of British Columbia. The use of evidence-based research will be utilized by the BC Coroners Service to aid in training and educational initiatives to Coroners in order to continue the increasing higher standards of child death investigation. Improvements in data collection and death investigation will significantly contribute to the information obtained from future aggregate reviews.

This report is just the beginning and will allow the CDR Unit to build on meaningful evidence based recommendations to prevent child death one child at a time.

³⁶ Statistics Canada, 2001, CANSIM Table 102-0030 and Table 4, BC Vital Statistics Agency Annual Report (2004)

³⁷ CIA World Factbook (www.cia.gov)

Appendix 1:

Definitions and Terms Used in this Report

APERT SYNDROME: A genetic defect characterized by craniofacial and limb anomalies that can be inherited or arise spontaneously. It is primarily characterized by malformations of the skull, midface, hands and feet.

CAUSE OF DEATH: The immediate medical cause of death (e.g., head injury resulting from a motor vehicle incident, asphyxiation due to hanging).

CHILD(REN): Overall term to refer to individuals 18 years of age or younger. More specifically classified as neonate (birth to 28 days), infant (29 to 365 days), youth (one to 14 years) or teenager (15 to 18 years).

CHILDREN IN CARE OF THE MINISTRY OF CHILD AND FAMILY DEVELOPMENT (MCFD): At the time of death, the child was receiving services under the *Child and Family Community Services Act* and was legally in the care of the Director of Child Protection.

CHILDREN RECEIVING SERVICES FROM MCFD: Children who received services under the *Child, Family and Community Service Act* in the year before their death.

CIRCUMSTANCES OF DEATH: By what means the event led to the death (e.g., Motor Vehicle Incident/driver/motorcycle).

DOWN SYNDROME: A genetic syndrome consisting of variable abnormalities caused by triplication or translocation of chromosome 21. The abnormalities can include mental retardation, cardiac anomalies, retarded growth, and a flat hypoplastic face with short nose, prominent epicanthic skin folds and small low-set ears.

MANNER OF DEATH: Classification of death as one of the following:

Accident: Death due to unintentional or unexpected injury. It includes death resulting from complications reasonably attributed to the accident.

Homicide: Death due to injury intentionally inflicted by the action of another person. Homicide is a neutral term that does not imply fault or blame.

Natural: Death primarily resulting from a disease of the body and not resulting secondarily from injuries or abnormal environmental factors.

Suicide: Death resulting from self-inflicted injury, with intent to cause death.

Undetermined: Death which, because of insufficient evidence or inability to otherwise determine, cannot reasonably be classified as Natural, Accidental, Suicide or Homicide.

MEDICAL EVENT: Any illness, condition or disease, diagnosis, or medical treatment (including vaccination or medication).

NATURAL, EXPECTED DEATH: A death reported to the BCCS from the BC Vital Statistics Agency where the child died of Natural and expected causes. The death certificate was signed by the attending or family physician.

NEOPLASM: abnormal growth of tissue.

NON-CORONER CASE: Cases reported to the Coroner that, after an initial investigation, are determined to be Natural deaths consistent with the medical history and circumstances. These cases do not meet the criteria for death

reporting outlined in Section 9 of the *BC Coroners Act*.

NON-PRESCRIPTION MEDICATION:

Over-the-counter medications or medication readily available in a drug or grocery store. Does not refer to illicit drugs.

PDI: Poisoning and drug intoxication.

A PDI can be classified as an Accident, Suicide or Homicide depending on the circumstances of death.

STAPHYLOCOCCUS AUREUS SEPSIS:

overwhelming bacterial infection in the blood stream.

SUDI: Sudden unexplained death of an infant (<1 year of age).

WOLFF-PARKINSON-WHITE

SYNDROME: A syndrome that involves episodes of rapid heart rate (tachycardia) and abnormal baseline electrocardiogram patterns, as a result of abnormal electrical activity in the heart. Also referred to as “pre-excitation syndrome”.

VACTERL SYNDROME: VACTERL is an acronym used to describe a series of characteristics which have been found to occur together. **VACTERL:** **v**ertebral anomalies, **a**nal atresia (imperforate anus), **c**ardiac anomalies, **t**racheo-esophageal fistula, **r**enal anomalies, **l**imb anomalies.

VIRAL GASTROENTERITIS: viral inflammation of the stomach and intestine.

Appendix 2: Map of BCCS Provincial Regions

The five regions of the BCCS are illustrated in the map below. Metro refers to Metro Vancouver. See text for further description of regions (Part II, section 4).



Appendix 3: Additional Resources

BC Injury Research and Prevention

Unintentional injuries in British Columbia: Trends and Patterns Among Children and Youth. (2005).

British Columbia Coroners Act

www.qp.gov.bc.ca/statreg/stat/c/96072%5F01.htm

British Columbia Child, Family and Community Service Act

www.qp.gov.bc.ca/statreg/stat/C/96046_01.htm

Infant Death Report (2003-2004)

www.pssg.gov.bc.ca/coroners/child-death-review/reports/CDR_Infant_Death_Report_2003_04.pdf

Overview of Child Death Review

www.pssg.gov.bc.ca/coroners/child-death-review/reports/CDR_overview.pdf

Child and Youth Deaths in BC

www.pssg.gov.bc.ca/coroners/child-death-review/reports/CHILD_AND_YOUTH_DEATHS_IN_BC.pdf

Child Safety Bulletin, July 6, 2005

www.pssg.gov.bc.ca/coroners/media/releases/Safe_Sleep_CS_Bulletin.pdf

Appendix 4: Summary of 2002 Case Reviews

In 2003, when the BCCS took over the secondary review of child deaths in B.C., the CDR Unit manager at the time conducted an aggregate review of all child deaths reported to the BCCS in 2002. This was the first time the BCCS had conducted secondary reviews.

Below is an analysis of the 179 Coroner cases from 2002:

- One hundred-twenty (67%) male and 59 female children died.
- Twenty-three (13%) of the deaths were of Aboriginal children.
- The Island Region had the greatest number of child deaths (Table 19).

Table 19. Number and percentage of deaths by region of residence

Region of residence	Number (%) of Deaths
Island	42 (23%)
Fraser	38 (21%)
Interior	33 (18%)
Metro Vancouver	33 (18%)
Northern	23 (13%)
Out-of-province or data not available	10 (6%)
Total	179

Table 20. Number and percentage of deaths by manner of death

Manner of death	Number (%) of Deaths
Accident	87 (49%)
Natural	29 (16%)
Undetermined	27 (15%)
Suicide	24 (13%)
Homicide	12 (7%)
Total	179

- The premise of the fatal injury was typically a private residence (80 or 45%), roadway (50 or 28%), body of water (12 or 7%) or outdoor recreation area (11 or 6%).
- Significant, contributing factors to death were cited in 25 (14%) of deaths. Alcohol intoxication was cited as a factor in seven Accidental deaths and two Suicides.
- There were 14 (8%) deaths classified as Sudden Infant Death Syndrome, of which four deaths reported that the child was sleeping in an adult bed.
- There were 87 (49%) Accidental deaths, which was the leading manner of death (Table 20).
 - The average age of children who died of Accidental causes was 12.1 years.
 - Twice the number of males (58 or 66%) compared to females (29 or 33%) died in accidents.
 - Motor vehicle accidents resulted in the deaths of 52 (29%) children.
 - Of the deaths in which a toxicological analysis was performed, it was revealed that alcohol or marijuana use in 18 (21%) of Accidental deaths.
 - Speed was a contributory factor in 15 (29%) of the 52 vehicular accidents.
 - Children were passengers in 29 (56%), drivers in 11 (21%) and pedestrians in six (11%) vehicle related accidents.
 - Seatbelts were not worn in 15 (29%) of the motor vehicular accidents.
- Of the 12 (7%) child deaths due to Homicide:
 - The average age of children was 7.6 years.

-
- Six children died in a single incident in the Island Region, in which four children died due to gunshot wounds and two due to strangulation.
 - The remaining Homicide deaths involved two children that died in fights, and one in which the mother was the assailant.
 - Of the 24 (13%) Suicide deaths:
 - The average age of children who died of Suicide was 15.5 years.
 - There were 16 (67%) male and eight (33%) female children.
 - Sixteen (67%) children died by hanging; nine males, seven females.
 - Toxicological analysis revealed the presence of alcohol or marijuana use in six (25%) of children.
 - Depression was cited as a significant contributing factor in four (17%) Suicide deaths. Substance abuse, academic problems, legal issues and interpersonal conflict were also frequently reported risk factors.
 - Twelve (50%) of Suicide deaths occurred between October and December.
 - The premise of death was most frequently the child's residence (16 or 67%), but also outdoor recreation areas, such as parks.
 - Of the 29 Natural deaths:
 - The average age of children who died of Natural causes was six years.
 - There were 18 (62%) male and 11 (38%) female children.
 - Ten (34%) deaths were attributed to Sudden Infant Death Syndrome.
 - Cardiac arrhythmia was the immediate cause of death for three (10%) children.
 - Of the 27 (15%) Undetermined deaths:
 - The average age of children who died of Undetermined causes was 3.4 years.
 - There were 20 (74%) male and seven (26%) female children.
 - Four (15%) deaths were attributed to Sudden Infant Death Syndrome. *(This highlighted the inconsistent classification of cases in BCCS of deaths consistent with SIDS. New classification guide lines were introduced to resolve this and bring B.C. in line with international reporting practices).*
 - The investigating Coroner made recommendations following 13 (7%) of the deaths, including the deaths of four (31%) Aboriginal children.
 - Following the 2003 compilation of this data and the indication that most of our children died in motor vehicle incidents, a multi-agency committee met to discuss these deaths.
- In summary, analysis of the 2002 child death reviews was similar to the analysis of child deaths occurring between 2003 and 2005. Twice the number of male children died in comparison to female children. In addition, the leading premise of injury was private residences, followed by roadways. Motor vehicle accidents were the leading circumstance of Accidental death. While not always a significant contributory factor to Accidental death, toxicological analysis revealed alcohol or marijuana use in 21 per cent of Accidental deaths³⁸. Finally, half of Suicide deaths occurred during the three winter months of October, November and December.

³⁸ BCCS policy is that a toxicological screen for cannabis is performed following the death of all drivers of motor vehicles.

Appendix 5: Acknowledgments

This report was prepared by:

Child Death Review Unit

British Columbia Coroners Service

The Child Death Review Unit would like to thank everyone who contributed their valuable time and expertise to this report of the BCCS CDR Unit.

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