

The Health of Street Youth

A Canadian Perspective

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ABSTRACT

Objective: To review epidemiologic studies of the health of street youth in industrialized countries, with a special focus on Canadian youth.

Methods: We identified 52 peer-reviewed studies from searches of the MEDLINE database and bibliographies of published papers, for data on blood-borne and sexually transmitted infections, mental health problems, pregnancy, violence and mortality.

Results: Rates of hepatitis B, hepatitis C, and HIV infection are much higher among street youth than among their non-street peers. Likewise, the prevalence of all mental health problems assessed in street youth is greater than that in non-street youth. Pregnancy is more frequent among street than household youth. Street youth also experience high levels of violence: a large proportion report physical abuse or assault. Finally, mortality is about 11 times the expected rate based on age and sex and is mainly caused by suicide and drug overdose.

Conclusion: Current research results are useful to orient public health interventions for street youth, but further epidemiologic research is needed. The need for Canadian data is particularly acute in specific areas including mental health, violence, pregnancy, and sexually transmitted infections such as, for example, herpes infection and syphilis.

MeSH terms: Homeless youth; communicable diseases; sexually transmitted diseases; mental disorders; violence; mortality.

La traduction du résumé se trouve à la fin de l'article.

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Street youth are exposed to a number of factors that may detrimentally affect their health, including unsafe sexual practices, drug use, poor diet, inadequate shelter, exposure to violence, low levels of social support, and limited access to medical care.^{1,2} In recent literature, the term *street youth* has been used to describe youth living or working on the streets of major urban centres, and it is usually associated with varying degrees of homelessness. In 1998, the Canadian Paediatric Society indicated that estimates of the number of runaways in Canada ranged from 45,000 to 150,000,³ for a population of approximately four million subjects in the age group of 10-19 years. There are, however, considerable difficulties in arriving at such estimates,⁴ and these figures only represent expert opinion.

Epidemiologic studies of the health status of street youth are relatively recent. In 1989, the Council on Scientific Affairs of the American Medical Association published a report on the health care needs of homeless and runaway youth;⁵ only one peer-reviewed epidemiologic study was cited by the Council at that time.⁶ Since then, numerous studies have been conducted and the objective of the current paper is to review the existing scientific knowledge on the health status of street youth, with a specific focus on Canadian data.

METHODS

We identified the epidemiologic studies for our review from searches of the MEDLINE database and the bibliographies of published papers. The keywords used in MEDLINE searches were: 'homeless youth', 'street youth', and 'runaways.' We excluded studies of homeless youth when these focussed on young people living with their homeless family. We did not include technical reports and other documents not subjected to peer review by scientific journals.

The main health outcomes assessed were blood-borne and sexually transmitted infections, mental health problems, pregnancy, violence and mortality.

We concentrated on research that included teenagers. We allowed, however, broader age definitions, from the pre-teens to 30 years, as long as adolescents were also included.

TABLE I

Prevalence and Incidence of Infectious Disease Markers Among Canadian Street Youth and Comparison Populations

Subjects	Place	Year(s)	Testing Method(s)	Ages (years)	Rate	Sample Size
Hepatitis A (prevalence)						
Street youth ⁷	Montreal	1995-96	Serum	14-25	4.7%	427
Street youth ⁸	Vancouver	1998	Saliva	<25	6.3%	111
Comparison: Canadian-born university students ²⁶	Toronto	1997	Serum	18-19 20-24	1.5% 6.2%	66 370
Hepatitis B (prevalence)						
Street youth ⁹	Montreal	1995-96	HBsAg or anti-HBc	14-18 19-25	3.4% 13.2%	176 258
Street youth ¹⁰	Toronto	1991*	Anti-HBs	≤20	9.2%	87
Comparison: general population ²²	Northern Ontario	1993	Anti-HBs (not attributable to vaccination)	14-30	0.78%	641
Hepatitis C (prevalence)						
Street youth ¹²	Montreal	1995-96	Antibody tests	14-18 19-25	6.2% 16.9%	176 261
Comparison: general population ²³	Canada	1998	Statistical modeling	All ages 15-19 20-39	0.8% 0.1% 1.51%	30 million 2 million 9.6 million
HIV infection (prevalence)						
Street youth ¹⁰	Toronto	1991*	Serum	≤20	1.1%	87
Street youth ¹³	Montreal	1995	Saliva	13-20 21-25	0.5% 4.7%	609 300
Street youth ¹⁵	Toronto	1991-92	Serum and saliva	14-19 20-25	0.8% 5.8%	450 245
Comparison: young offenders ²⁴	British Columbia	1994	Saliva	12-15 16-19	0.29% 0.22%	354 452
Comparison: sentinel adolescent clinics ¹⁴	12 US cities (22 clinics)	1990-92	Serum	<20	0.2%	11,833
No comparison data for general population subjects 20-24 or 20-29 years old (or similar age groups) were found						
Chlamydia trachomatis genital infection (prevalence)						
Street youth ¹⁸	Montreal	1999-2000	Polymerase chain reaction; urine	14-20 21-25	9.0% 4.1%	155 147
Comparison: general population ²⁵	US	2001-02	Ligase chain reaction; urine	18-19 20-21 22-23 24-25	4.05% 4.70% 4.10% 3.56%	1,453 4,123 5,520 3,101
Neisseria gonorrhoeae infection (prevalence)						
Street youth ¹⁸	Montreal	1999-2000	Polymerase chain reaction	14-25	0%	302
Comparison: general population ²⁵	US	2001-02	Ligase chain reaction	18-26	0.43%	14,322
HIV infection (incidence)						
Street youth ²¹	Montreal	1995-2000	Saliva	14-25 14-18 19-25	6.9 / 1,000 py† 10.3 / 1,000 py 6.0 / 1,000 py	863 371 492
Comparison: army personnel ²⁷	US	1985-99	Serum	All ages <20 20-24	0.17 / 1,000 py 0.19 / 1,000 py 0.20 / 1,000 py	2,004,903 n.a.‡ n.a.

* Year of publication of report (where no information about the time period of study was available).

† py: person-years.

‡ n.a.: not available.

The results of a study conducted by Rouget et al.²⁰ in Edmonton are not shown in this table because of the smaller sample size and the particular source of the study subjects (n=36 female street youth admitted to a Youth Centre).

We focussed on studies on Canada and other countries with somewhat similar cultural and social contexts, namely the United States, the United Kingdom and Australia. We restricted our search to the peer-reviewed literature published between 1980 and 2003.

Throughout our review, we paid particular attention to the comparison of street youth data to reference data for non-street youth. In the case of infectious diseases, for which the reviewed papers generally did

not include any non-street comparison group, we sought reference figures from the published literature. For the other health outcomes, we relied on data (if any) provided by the authors of the reviewed papers.

RESULTS

Infectious diseases

We identified 16 reports providing prevalence^{2,7-20} or incidence^{2,21} estimates for

markers of past or present infectious diseases in street youth, all based on laboratory tests. Table I presents results from Canadian studies. We also present comparison figures, based on data cited by the authors of the reviewed papers or from papers identified through other sources such as the Health Canada Population and Public Health Branch website.^{14,22-27} Some of these comparison figures are drawn from American studies, because appropriate Canadian figures could not always be iden-

TABLE II
Risk Factors Associated with Infectious Disease Markers in Montreal Street Youth

Risk Factor (adjustment variables)	Odds Ratio (95% confidence limits)
Hepatitis A (prevalence), n=427⁷	
Birth in a country with high seroprevalence of hepatitis A virus antibodies	200.7 (38.1-1058.4)
Sexual partner(s) with history of unspecified hepatitis	13.8 (4.2-45.2)
Insertive anal penetration (Adjusted for each other)	5.1 (1.6-16.7)
Hepatitis B (prevalence), n=437⁹	
Age (19-25 versus 14-18 years old)	4.5 (1.8-11.7)
Drug injection	3.5 (1.5-8.3)
Sexual partner with unspecified hepatitis (Adjusted for each other and for tattooing and body piercing)	3.2 (1.3-7.5)
Hepatitis C (prevalence), n=437¹²	
Drug injection	28.4 (6.6-121.4)
Age (19-25 versus 14-18 years old)	3.3 (1.6-7.0)
Crack cocaine use (Adjusted for each other and for tattooing)	2.3 (1.0-5.3)
HIV infection (prevalence), n=909¹³	
Age (21-25 versus 13-20 years old)	7.09 (1.98-25.36)
Drug injection	4.48 (1.33-15.11)
Birth outside Canada	4.41 (1.05-18.48)
Prostitution (Adjusted for each other)	3.32 (1.15-9.62)
HIV infection (incidence), n=863²¹	
Drug injection (Unadjusted; adjustment for involvement in survival sex did not appreciably modify the estimate)	7.0 (2.2-21.7)

tified. Results are presented by age subgroups where available. These data indicate that prevalence of hepatitis B and hepatitis C are significantly higher among street youth than among non-street persons of similar age; there is also an indication of an increased prevalence of *Chlamydia trachomatis* genital infection among younger subjects. On the other hand, the prevalence of hepatitis A is not increased. Table

I also gives estimates of the prevalence and of the incidence of HIV infection. These data suggest that HIV infection is also increased among street youth. It was particularly difficult, however, to identify comparison figures for HIV infection. For prevalence, Table I gives two comparison figures, one for British Columbia young offenders, and one for USA sentinel adolescent clinics; in both cases, however,

these comparison estimates were restricted to youth below 20 years of age. Fragmentary evidence based on AIDS cases reported to the Centre for Infectious Disease Prevention and Control (Health Canada)²⁸ suggests that the HIV infection prevalence observed in older street youth (20-24 years old) is also in excess of expectation, but no data confirming this impression were found. For the incidence of HIV infection, we compared street youth data to incidence estimates for USA army personnel,²⁷ and rates were higher for street youth in each age category.

These results must be interpreted with caution, since the studies of street youth and those of non-street youth used different recruitment and diagnostic methods, and since different geographic locations are being compared.

Multivariable analyses of risk factors for infections have been reported for street youth from Vancouver (hepatitis A), Toronto (hepatitis B), and Montreal (hepatitis A, B, and C, and HIV infection). The Vancouver study included street youth, injection drug users, and men who have sex with men,⁸ and the prevalence of hepatitis A seropositivity was increased in subjects born in a country with high rates of hepatitis A. The Toronto study included street youth as well as adolescents who lived with their family;¹⁰ the number of lifetime sexual partners and the practice of

TABLE III
Prevalence of Mental Health Disorders in Street Youth Compared to Non-street Youth

Parameters	Fort Lauderdale ³⁹		Oregon ¹		Detroit ³⁸	
	Homeless	ECA	Homeless	Students	Homeless	Housed [¶]
Type of youth						
Year(s) of interviews	1991†	1980-84	1994-97	1987-89	1993-94	1993-94
Age (years)	18-21	18-24	13-20	14-18	12-17	12-17
Sample size	100	2,256	523	1,710	118	118
Prevalence time-window	One month	One month	Current	Current	Six months	Six months
Study instrument*	DIS‡	DIS	SCID	K-SADS-P	DISC-2.3	DISC-2.3
Disorders						
Alcohol abuse and dependence	27.2% [§]	4.1%	n.e.**	n.e.	21.2%	9.3%
Drug abuse	27.2% [§]	n.e.	n.e.	n.e.	n.e.	n.e.
Drug abuse and dependence	n.e.	3.5%	n.e.	n.e.	23.7%	18.6%
Schizophrenia	6.1% [§]	0.7%	n.e.	n.e.	n.e.	n.e.
Mania/hypomania	n.e.	n.e.	n.e.	n.e.	24.6%	18.6%
Depression/dysthymia	n.e.	n.e.	17.6%	2.9%	33.0%	24.6%
Major depression	18.3% [§]	2.2%	12.2%	2.6%	n.e.	n.e.
Dysthymia	n.e.	n.e.	6.5%	0.5%	n.e.	n.e.
Disruptive behaviour	n.e.	n.e.	n.e.	n.e.	39.0%	19.5%

* DIS: Diagnostic Interview Schedule.⁵²

SCID: Structured Clinical Interview for DSM-IV Axis I Disorders-Nonpatient edition. Interviewers were trained and supervised during the study.¹

K-SADS-P: Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Episode.⁵³

DISC-2.3: Diagnostic Interview Schedule for Children Version 2.3.⁵⁴

† Date of publication of paper (used when date of recruitment of study subjects was not mentioned).

‡ Two items for the diagnosis of schizophrenia were not included.

§ The authors did not report observed percentages but rather race- and sex-adjusted figures.

|| Epidemiologic Catchment Area program (a general population survey of psychiatric disorders conducted at five sites in the US).

¶ Housed adolescents were matched to homeless adolescents for neighbourhood, age, and sex.

** n.e.: no estimate included in the report.

anal intercourse were associated with the presence of hepatitis B markers. In the Montreal study, analyses were restricted to street youth (Table II).^{7,9,12,13,21} The prevalence of hepatitis B, hepatitis C, and HIV infection markers increased with age. Drug injection was associated with hepatitis B, hepatitis C, and HIV infection. Crack cocaine use was associated with hepatitis C, and prostitution with HIV infection. More detailed results are provided in Table II.

Mental health and addiction

We identified 25 surveys of mental health problems among street youth.^{1,6,29-51} Some investigators have used standardized survey instruments to assess prevalence of mental health problems, while others have modified existing instruments or developed their own. Some instruments, such as the Diagnostic Interview Schedule (DIS),⁵² the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present Episode (K-SADS-P),⁵³ and the Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3)⁵⁴ are compatible with diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM) of the American Psychiatric Association,⁵⁵ while other instruments were not designed with this purpose in mind. Fifteen of the 25 reviewed studies included comparisons of data between street and non-street youth, the latter group either from within the same study or drawn from the literature.^{1,29-31,34,38-40,42,43,45,46,48,49,51} Fifteen studies assessed correlates of mental health problems in street youth using multivariable statistical models.^{29,31-33,35-37,41,43-46,49-51}

Table III summarizes the results of the only three surveys of street youth providing DSM-compatible diagnoses and presenting comparisons of prevalence estimates between street and non-street youth.^{1,38,39,56,57} These three American studies are presented here because no equivalent study was identified for Canadian youth. In these studies, the prevalence estimates for the mental health disorders were always higher (to some extent) in street youth than in comparison populations. Some of the results shown in Table III suggest a social class effect, however. In the Fort Lauderdale and Oregon studies, prevalence figures among street youth were

TABLE IV

Victimization of Runaway Youth in Toronto (n=187)⁶⁵

Type of Victimization	Proportion Affected (%)
Punched with a closed fist	56
Threatened with a weapon	51
Kicked	39
Something thrown at you	30
Thrown around the room	27
Assaulted with a weapon	26
Head banged on wall/floor	26
Intentionally burned	12

compared to those in general populations of subjects of similar ages, and differences were marked. By contrast, in the Detroit study, McCaskill et al.³⁸ matched homeless and housed adolescents for neighbourhood, and prevalence of alcohol abuse and dependence, and of depression/dysthymia were somewhat closer in value.

The general pattern of increased prevalence of mental health problems described above is also reflected in other studies conducted in Canada, the United States, and Australia, using scales not designed to yield DSM-compatible diagnoses.^{30,34,38,48,49} Canadian results are summarized here. In Toronto, Smart et al.³⁴ compared 217 street youth to 199 students with respect to depression and alcohol problems, using the CAGE questionnaire⁵⁸ and items from the Centre for Epidemiologic Studies Depression Scale (CES-D).⁵⁹ Greater percentages of street youth reported alcohol problems and feelings of depression. Smart et al. also reported that low self-esteem and the number of months having lived in a hostel were associated with higher depression scores.³³ In other analyses of Toronto subjects, the number of previous street experiences and length of time on the street were associated with suicide attempt.³²

Pregnancy

Greene et al.⁶⁰ compared pregnancy histories of three groups of female youth aged 14-17 years in the US: a representative sample of 169 runaway and homeless youth residing in 23 funded shelters in metropolitan areas, a convenience sample of 85 street youth living in 10 American cities, and a nationally representative sample of 1,609 household youth included in the 1992 National Health Interview Survey. Youth living on the street had the highest lifetime occurrence of pregnancy (48.2%), followed by youth residing in shelters (33.2%), and household youth (7.2%). Twenty percent of the street

youth, 12.6% of the shelter youth, and 1.5% of the household youth reported two or more pregnancies. No equivalent study, comparing street and household youth in Canada, was identified.

Victimization while on the street

Street youth experience high levels of violence and victimization of various kinds, both before leaving home and while on the street.^{1,61-65} Results presented in Table IV confirm the importance of this phenomenon in Toronto: a very large proportion of runaway youth reported being physically abused or assaulted, threatened, or subjected to other similar abuse during street living. In Calgary, more than 50% of a sample of 489 runaway and homeless youth indicated having been approached to participate in illegal activities.⁶³

Mortality

Street youth experience high mortality rates.⁶⁶⁻⁷⁰ In Montreal, the mortality rate among 1,013 street youth over a two-year follow-up period was 0.89 deaths per 100 person-years, which corresponded to 11 times the rate expected for subjects of corresponding age and sex in the province of Quebec.^{66,67} Twenty-six deaths were observed, including 13 suicides, 8 associated with overdose, and 2 traumatic deaths. In Toronto, the age-adjusted mortality rate ratio was 8.3, comparing men 18 to 24 years old using homeless shelters to men in the general population; the leading causes of death were unintentional poisonings, other accidents, and suicide.⁶⁸

DISCUSSION

Our review indicates that street youth are affected by several problems, including infections, mental health disorders, and high mortality. Epidemiologic studies quantifying specific disease risks in street youth, however, remain limited; only a sin-

gle estimate, for example, is currently available on the *incidence* of HIV infection.²¹ Studies of mental health problems present several important limitations. Only 3 of the 25 studies we reviewed on this topic included a comparison group of non-street youth.^{30,34,38} Of the remaining 22 studies, only 12 provided a comparison of their results for street youth with literature results for non-street young people.^{1,29,31,39,40,42,43,45,46,48,49,51} No longitudinal studies providing incidence data for mental health problems appear to exist. Similarly, the important question of victimization of street youth remains poorly investigated: research instruments require further development, standardization, and validation and studies comparing the experience of street and non-street youth are needed. No or very limited data are available on various other outcomes such as dental health, reproductive history, and various infections.

The need for Canadian data is particularly acute in specific areas. Only 6 of the 25 reviewed studies on mental health problems were conducted in Canada,^{6,31-35} and none assessed DSM-compatible psychiatric diagnoses. No study of youth pregnancy, comparing street and non-street young people, has been reported in Canada. As well, no data are available on important sexually transmitted infections such as herpes virus infection and syphilis.

Our review presents several limitations. The street youth populations under study were very heterogeneous. The general epidemiologic profile of the different urban populations among which street youth live also differs, thereby affecting risks for various diseases and the interpretability of some results. Comparison populations of non-street youth were rarely included in the reviewed studies, and comparative figures obtained from other sources are affected by various limitations such as differences in geographic areas covered and age groups included.

In summary, current research results are useful to orient public health interventions for street youth, but further epidemiologic research is required to better define the needs of this vulnerable population.

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RÉSUMÉ

Objectif : Examiner les données épidémiologiques concernant la santé des jeunes de la rue des pays industrialisés, en portant une attention particulière aux études canadiennes.

Méthode : À partir de la base de données MEDLINE et des bibliographies d'articles publiés, nous avons répertorié 52 études évaluées par des pairs. Nous avons ainsi obtenu des données sur les infections transmises sexuellement ou par le sang, les problèmes de santé mentale, la grossesse, la violence et la mortalité.

Résultats : Les taux d'hépatite B, d'hépatite C et d'infection par le VIH sont beaucoup plus élevés chez les jeunes de la rue que chez les autres jeunes. De même, la prévalence de tous les problèmes de santé mentale étudiés chez les jeunes de la rue est plus importante que celle observée chez ceux ne vivant pas dans la rue. La grossesse est plus fréquente chez les jeunes filles de la rue que chez celles qui ont un domicile. Les jeunes de la rue vivent aussi dans un climat de violence, et beaucoup d'entre eux ont subi des épisodes d'abus physique ou d'agression. Enfin, leur mortalité est environ 11 fois plus élevée que chez leurs pairs du même âge et du même sexe, et les principales causes de décès sont le suicide et les surdoses.

Conclusions : Les données actuellement disponibles sont très utiles pour orienter les mesures de santé publique auprès des jeunes de la rue, mais des études épidémiologiques complémentaires sont requises. Le besoin de données canadiennes est particulièrement aigu dans certains domaines comme la santé mentale, la violence, la grossesse et les infections transmises sexuellement, en particulier les infections causées par le virus de l'herpès et la syphilis.