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ACE Accessing Centre for Expertise

Coming of Age: Opportunities for Investing in Adolescent Health in Canada

An Accessing Centre for Expertise (ACE) White Paper

Accessing Centre for Expertise
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About ACE

The Accessing Centre for Expertise (ACE) is based in the Institute of Health Policy, Management and Evaluation, at the Dalla Lana School of Public Health, University of Toronto. The ACE mission is to make it easier for a diverse range of health organizations to connect to the breadth and depth of our multidisciplinary faculty and graduate student expertise.

About this Report

ACE was commissioned by the TD Bank and Canada's Children's Hospital Foundations (CCHF) to prepare a white paper on the needs and priorities for investing in adolescent health in Canada. The ACE team included Mark J. Dobrow PhD, Lucas Dufour PhD, Rebecca Hancock-Howard PhD, Jessica P. Bytautas MSc, Menaka Shanmuganantha MPH, Roger Chafe PhD, and Ashley Vandermorris MD. The views expressed in this white paper represent those of ACE or other persons as indicated, and do not necessarily reflect those of TD Bank or CCHF.

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Executive Summary

Background

Through TD Bank Group's *TD Ready Commitment*, the bank is targeting $1 billion by 2030 *"…in four areas that support change, nurture progress and contribute to making the world a better, more inclusive place"*. As part of its focus on 'better health', TD has committed to partner with Canada's Children's Hospital Foundations (CCHF) and invest $15 million over 10 years to support adolescent health in Canada. To help direct this significant investment, TD and CCHF have commissioned the Accessing Centre for Expertise (ACE) at the University of Toronto to prepare this white paper to assess the current needs and priorities for investing in adolescent health in Canada. This paper addresses the following three objectives:

Objective 1: Define and summarize the current state of adolescent health in Canada
Objective 2: Outline the gaps and needs for investing in adolescent health
Objective 3: Define key impacts (including how they could be measured) that could be expected from an investment in prioritized areas of adolescent health

To address these objectives, ACE conducted a scoping review, key informant interviews and an impact assessment. This paper is based on the review of over 80 journal articles, reports or books and interviews with 29 key informants.

Results

Through the scoping review and key informant interviews, we identified a number of domains (and sub-domains) of need/priority for investing in adolescent health in Canada (**Table A**). We also identified a number of adolescent sub-populations (**Table B**).

Both the scoping review and key informant interview results revealed a clear focus on mental health and addiction (with particular emphasis on substance use/addiction and suicide/suicidal ideation), and sexual and reproductive health (with particular emphasis on gender identity, pregnancy/contraception, unprotected sex/risky sex). Beyond those two clearly dominant areas of focus, there is a long list of health sector and non-health sector domains that represented important areas of adolescent health need. The scoping review findings also pointed to broader focus on other areas within the health sector (e.g., chronic conditions, communicable diseases, oral health, palliative care), non-health sectors and a clear focus on specific adolescent sub-populations. In contrast, the key informant interviews highlighted community and social determinants of adolescent health and also pointed to several system level challenges including: a lack of co-ordination across and within sectors that serve adolescents, poor transitions between pediatric and adult-oriented services and care, and inherent biases in providing appropriate and responsive services to adolescents.

Table A: Domains of Need/Priority and Adolescent Sub-Populations

Domain of Need/Priority	Sub-Domains of Need/Priority	
Mental Health	• Body image • Depression, anxiety • Self-harm	• Substance use, addictions • Suicide and suicidal ideation
Sexual and Reproductive Health	• Assault, trafficking • Gender identity • Pregnancy, contraception	• Psychosexual development • Sex education • Unprotected sex, risky sex
Relationships with Food and Physical Activity	• Food insecurity • Food production and marketing • Nutrition	• Obesity • Physical activity
Other Health Sector	• Chronic conditions • Communicable disease • Oral health	• Palliative care • Transitions to adult care
Non-Health Sectors	• Accidents and injuries • Child welfare system • Climate change • Juvenile justice system, incarceration	• Maltreatment, violence, abuse, bullying • Schools, education • Technology, social media • Transportation

Table B: Adolescent Sub-Populations

Adolescent Sub-Populations	Definitions
General	Sub-populations not specified
Racialized youth	Black, Indigenous, People of Colour (BIPOC), impacts of racism
Low-income and underemployed	Income and income distribution, poverty, unemployment and job security, employment and working conditions
Lesbian, gay, bisexual, transgender, queer or questioning and two-spirit (LGBTQ2S+)	Sexual orientation, gender diversity
Newcomers, immigrants, refugees	Citizen and immigration status, language
Girls and young women	Girls/young women assigned female at birth and identify as such
Homeless, underhoused	Housing
Lived environment	Rural/remote, natural and built environment, physical environments and neighbourhoods
Adolescents with disabilities and/or complex health needs	Differently abled adolescents
Boys and young men	Boys/young men assigned male at birth and identify as such
Young carers	Adolescents who care for parents, siblings
Adolescents in care	Adolescents who are in the protective care of the government or child protection agency
Adolescent parents	Adolescents who give birth to and/or decide to parent a child

A key integrated finding was the important relationship between adolescent sub-populations and the identified domains of need/priority for adolescent health. Based on the scoping review findings, **Table C** highlights the relationship between domain and sub-population, allowing a more detailed assessment of the nature of the identified needs and gaps. In particular, the results point to the importance of targeting three particular adolescent sub-populations (racialized, LGBTQ2S+, low-income/unemployed) across multiple domains of need. For example, the sub-population of racialized adolescents was

identified as having greater health needs related to mental health (suicide/suicidal ideation), relationships to food and physical activity (nutrition) and non-health sectors (schools/education; maltreatment, violence, abuse and bullying), suggesting that this sub-population could be targeted for a multi-pronged investment approach to improve adolescent health. Overall, a key conclusion of this analysis is that investment priorities should not focus solely on domains of need (e.g., mental health or sexual and reproductive health) but also on specific adolescent sub-populations to optimize impact.

Table C. Domains of Need/Priority by Adolescent Sub-Populations
By number of reviewed articles coded to each sub-population

	Mental health	Sexual and reproductive health	Relationships with food and physical activity	Other health sector	Non-health sector	Health and development driven by unique needs of sub-populations
General adolescent population or not specified	39	18	12	27	31	11
Racialized	13	3	4	5	15	8
LGBTQ2S+	15	9	2	7	8	9
Newcomers, immigrants, refugees	6	0	0	2	9	7
Low-income, underemployed	7	0	7	4	13	12
Homeless, underhoused	6	1	3	2	4	4
Rural, remote	4	0	3	0	7	2
Disabilities	1	0	0	3	2	3
Young carers	2	0	1	0	1	1
Girls and young women	7	5	2	2	4	1
Boys and young men	3	2	0	0	4	2

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

Conclusions

This paper identifies a number of needs and priorities, with some clearly rising to the top. Mental health and addiction and sexual and reproductive health were consistently identified as important, but not exclusive, adolescent health priorities. A wide range of health and non-health sector needs and priorities were also noted. Importantly, our work captured considerable focus on adolescent sub-populations irrespective of domains of need. The health needs of racialized, LGBTQ2S+ and low-income/ underemployed adolescent sub-populations requires direct consideration. The findings highlight the potential relevance of a two-pronged investment strategy for adolescent health, one focused on key domains of need and one focused on key sub-populations in need. Ultimately, there is no one way to inform the decision of what or where to invest in adolescent health. However, there is a strong and established overarching rationale for investing in adolescent health. This white paper provides further information and insight to guide investment decisions.

Coming of Age: Opportunities for Investing in Adolescent Health in Canada

An Accessing Centre for Expertise (ACE) White Paper

1. Introduction

Through TD Bank Group's *TD Ready Commitment*, the bank is targeting $1 billion by 2030 *"…in four areas that support change, nurture progress and contribute to making the world a better, more inclusive place"*[1]. These four areas include (1) financial security, (2) vibrant planet, (3) connected communities, and (4) better health. As part of its focus on 'better health', TD has committed to partner with Canada's Children's Hospital Foundations (CCHF) and invest $15 million over 10 years to support adolescent health in Canada. It will allocate these funds to 12 children's hospital foundations (including 13 children's hospitals) that are part of the CCHF. To help direct this significant investment, TD and CCHF have commissioned the Accessing Centre for Expertise (ACE) at the University of Toronto to prepare this white paper to assess the current needs and priorities for investing in adolescent health in Canada. This paper addresses the following three objectives:

Objective 4: Define and summarize the current state of adolescent health in Canada
Objective 5: Outline the gaps and needs for investing in adolescent health
Objective 6: Define key impacts (including how they could be measured) that could be expected from an investment in prioritized areas of adolescent health

To address these objectives, ACE conducted a scoping review, key informant interviews and an impact assessment. This paper is based on the review of over 80 journal articles, reports or books and interviews with 29 key informants (see **Appendix 1** for further details on the approach and methods).

2. Current State of Adolescent Health in Canada

Adolescence is a dynamic period which has significant impacts on a person's overall health and development. Improved neuroimaging technology and research provides us with a better understanding of the significant levels of brain development that occur during this period[3-5]. It is also a period in which key developmental milestones are reached, typically including completing high school and branching out from the family to form new independent relationships[2]. It is therefore not surprising that adolescents face unique health issues when compared to the rest of the population.

Canadian adolescents face increased pressures and stresses, including being one of the first generations to grow up in the social media age. We see significant numbers of hospitalizations within this group for mental health and mood affective disorders[6]. The prevalence of anxiety in youth aged 12–19 years is over 9%[7]. There are increasing rates of self-harm amongst our youth population[8]. It is also likely that the number of cases of mental illness involving youth in Canada is underreported. Good mental health is fundamental for supporting good physical and social health. Issues with mental health also can exacerbate the impact of other social disadvantages. Addressing the symptoms and the pain associated with mental illness has the potential then to greatly influence the health and well-being of Canadian youth.

Relationships with food and physical activity represent other areas of concern. Serious eating disorders, such as anorexia nervosa and bulimia nervosa, often start in adolescence[9 10]. Teenagers' concerns with their body image and attempts at dieting can also start early in adolescence. Less than one third of Canadian adolescents met the recommended target of 60 minutes per day, on average, of moderate to vigorous physical activity[11]. We see a significant drop in the number of people meeting this target once they move into the adolescent period. Only 26% of Canadian teenagers meet the recommendation of less than two hours of screen time per day on average[11]. There is also a significant drop in the number of people meeting this recommended target once they enter the teenage years.

Adolescence is a period of sexual development and emerging sexual identity, during which individuals may begin to engage in sexual activity[2]. It is also a period in which many people explore and articulate their gender identity[12]. The issues of gender, sexual and reproductive health are important health topics which need to be explored for this age group.

At least 15% of young people in North America have a chronic condition that impacts on their health and places restrictions on their lives[13]. The incidence rate of asthma for children and youth alone is 1 in every 1000 people. Yet it is during the late adolescent period that patients often leave their pediatric care teams and transition into the adult-focused healthcare system. While many young people make this transition without serious problems, many patients with an ongoing need for medical care lose contact with the healthcare system during this transition. Many pediatric hospitals and providers are beginning to recognize the transition to adult care as a critical issue for improving care quality and patient safety[14 15].

In addition to these wide ranging causes of morbidity among adolescents, the top five causes of death for adolescents (10-19 years old) in Canada for 2018 (the latest year for which data are available) were (1) unintentional injuries (accidents), (2) intentional self-harm (suicide), (3) cancer, (4) assault (homicide), and (5) heart diseases[16].

While there are unique health issues faced by adolescents, this phase of development is also one of hope. This developmental stage has been framed as a "window of opportunity", during which interventions have the potential to profoundly impact health and developmental trajectories[17]. Investments in adolescent health can have lifelong impacts on the individual. Addressing health issues early and setting adolescents on a solid path to good health will go a long way towards ensuring the future health of the Canadian population[17].

3. Opportunities for Investing in Adolescent Health

Through the scoping review and key informant interviews, we focused attention on identifying the needs and priorities for adolescent health that could inform corresponding investments. To unpack those needs and priorities, it became clear that we first needed to assess and articulate a number of important adolescent sub-populations. We then independently examined the scoping review results and key informant interview findings to provide insights on adolescent health needs and priorities.

3.1 Key Adolescent Sub-Populations

Defining the Adolescent Population

First and foremost, when assessing adolescent health, it is important to clearly define adolescence. There are many different definitions of what constitutes an adolescent, ranging from strict chronological definitions (for example, ages 10-19 years) to definitions based on developmental and social role transitions[18 19]. The World Health Organization defines adolescents as people aged 10-19 years[20], which they contrast with varying ways of defining, characterizing and studying similar populations, including 'youth', 'young adults', and 'young persons' (**Table 1**). Other international organizations use varying definitions for adolescents and youth (**Table 2**)[19]. Given the overlapping definitions, we have not imposed a strict definition of adolescence in our scoping review or in the conduct of the key informant interviews to accommodate a range of views and perspectives that are applicable to the adolescent population.

In light of this approach, it is important to consider the relative size and scale of Canada's adolescent population. Statistics Canada's population estimates for 2019 indicated there were approximately 37.6 million Canadians[21]. Of the total population, 4.1 million (~11%) were between the ages of 10 and 19. When considering multiple age-based definitions of youth used by different international agencies[19 20], the size of Canada's adolescent (or youth) population ranges from 4.1 million to 9.8 million people accounting for about 11% to 26% of the total population (**Table 2**). Regardless of how adolescence is defined, it accounts for a significant component of the Canadian population.

Table 1 – Ages Covered by Terms Child, Adolescent, Youth, Young Adult and Young Person
Adapted from World Health Organization (2017, p. viii)[20]

Type of Young Person	Age in Years															
	0-9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Child																
Adolescent																
Youth																
Young Adult																
Young Person																

Table 2 – Definition of 'Youth' by Different International Agencies
Adapted from Commonwealth Secretariat (2016, p.8)[19]; and World Health Organization (2017, p. viii)[20] and Associated Population Estimates (Statistics Canada (2020)[21]

Organization	Age Group	2019 Canadian Adolescent Population Estimates n (% of total population)
World Health Organization (WHO)	10-19	~4.1 million (10.9%)
United Nations (UN) Population Fund	10-24	~6.6 million (17.6%)
International Labour Office (ILO)	15-24	~4.6 million (12.2%)
United Nations Educational, Scientific and Cultural Organization (UNESCO)	15-24	~4.6 million (12.2%)
The Commonwealth	15-29	~7.2 million (19.1%)
European Union (EU)	15-29	~7.2 million (19.1%)
United Nations (UN) Habitat (Youth Fund)	15-32	not directly calculable
World Bank	15-34	~9.8 million (26.1%)
African Union	15-35	not directly calculable

Identifying Adolescent Sub-Populations

Most of the sources identified in our scoping review addressed adolescents generally, without specifying particular sub-populations (55 sources). However, a sub-set of articles focused on the health care needs or gaps unique to specific adolescent sub-populations (**Table 3**), including racialized youth (25 sources), low-income and under-employed youth (24 sources), lesbian, gay, bisexual, transgender, queer or questioning and two-spirit (LGBTQ2S+)(20 sources), and newcomers, immigrants, and refugees (15 sources). Other sub-populations included homeless and underhoused youth (10 sources), youth affected by their lived environment (e.g., rural/remote – 9 sources), adolescents with disabilities (7 sources) and young carers (3 sources). There were also articles that focus on special issues faced by girls/young women (11 sources) and boys/young men (7 sources) who were assigned female or male, respectively, at birth and who identify as such.

These findings align with results from the key informant interviews, which similarly acknowledged most of the same adolescent sub-populations (**Table 3**). In particular, many key informants emphasized that relative to the general population, adolescents from historically, persistently, or systematically marginalized communities experience worse health outcomes and greater barriers within and outside the healthcare system that impact on their health. One key informant pointed out that Indigenous youth continually face discrimination and racism within biomedical healthcare systems that make it difficult to access the care they need.

Overall, while we were able to identify multiple adolescent sub-populations, they were not mutually exclusive. We observed considerable overlap among the sub-populations (**Table 4**), suggesting a complex relationship between self-identity, social location, and material conditions. We will unpack the role of sub-populations further in this paper.

Table 3. Adolescent Sub-Populations (from scoping review and key informant interviews)

Adolescent Sub-Populations	Definitions	Number of Articles	Noted by Key Informants
General	Sub-populations not specified	55	√
Racialized youth	Black, Indigenous, People of Colour, impacts of racism	25	√
Low-income and underemployed	Income and income distribution, poverty, unemployment and job security, employment and working conditions	24	√
Lesbian, gay, bisexual, transgender, queer or questioning and two-spirit (LGBTQ2S+)	Sexual orientation, gender diversity	20	√
Newcomers, immigrants, refugees	Citizen and immigration status, language	15	√
Girls and young women	Girls/young women assigned female at birth and identify as such	11	
Homeless, underhoused	Housing	10	√
Lived environment	Rural/remote, natural and built environment, physical environments and neighbourhoods	9	√
Adolescents with disabilities and/or complex health needs	Differently abled adolescents	7	√
Boys and young men	Boys/young men assigned male at birth and identify as such	7	
Young carers	Adolescents who care for parents, siblings	3	√
Adolescents in care	Adolescents who are in the protective care of the government or child protection agency	-	√
Adolescent parents	Adolescents who give birth to and/or decide to parent a child	-	√

Table 4. Overlapping Adolescent Sub-Populations

By number of reviewed articles coded to each sub-population

	Adolescents in general	Racialized youth	Boys and young men	Disabilities	Girls and young women	Homeless, underhoused	LGBTQ2S+	Low-income, under-employed	Newcomers, immigrants, refugees	Rural, remote	Young carers
Adolescents in general	55	1	0	1	5	1	0	4	1	1	0
Racialized youth	1	25	0	0	1	4	7	8	2	6	1
Boys and young men	0	0	7	0	1	1	2	0	0	1	0
Disabilities	1	0	0	7	1	0	1	3	1	0	0
Girls and young women	5	1	1	1	11	1	2	1	1	0	0
Homeless, underhoused	1	4	1	0	1	10	5	3	1	1	0
LGBTQ2S+	0	7	2	1	2	5	20	4	3	3	1
Low-income, underemployed	4	8	0	3	1	3	4	24	6	5	2
Newcomers, immigrants, refugees	1	2	0	1	1	1	3	6	15	1	0
Rural, remote	1	6	1	0	0	1	3	5	1	9	0
Young carers	0	1	0	0	0	0	1	2	0	0	3

3.2 Adolescent Health Needs and Priorities – Scoping Review Results

To assess the needs and priorities for investing in adolescent health in Canada, we first considered the results of our scoping review that focused on 80 articles from a range of high income and/or Organization for Economic Co-operation and Development (OECD) countries. The scoping review identified the following topics as key needs and priorities (**Table 5**):

- By far, the most commonly cited adolescent health care gap or need was mental health (58 sources) – in particular, substance use and addictions, suicide and suicidal ideation, depression and anxiety, non-suicidal self-harm, and body image.
- Sexual and reproductive health (including gender identity issues and sexual education – 29 sources), maltreatment (including violence, abuse, and bullying – 27 sources), and education (including schooling and socialization and access to education – 27 sources) were commonly cited gaps in adolescent health.
- Communicable disease, including sexually transmitted infections (especially human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), human papillomavirus (HPV), vaccinations, and impacts of COVID-19 were cited by 22 sources.
- Issues with nutrition, obesity and physical activity, disordered eating, food production and marketing, and food insecurity were cited by 21 sources.
- Chronic conditions (17 sources), which in many cases overlapped with transitions to adult care (7 sources), included cancer, renal disease, respiratory disease, heart disease, musculoskeletal disease, and other non-communicable diseases.
- Accidents and injuries, including road injuries, poisoning, drowning, falls, and fire, were cited by 12 sources.
- Technology, especially social media, was cited as both an enabler and barrier to adolescent health and tended to overlap with mental health and bullying (12 sources).
- Issues related to the juvenile justice system and the impacts of incarceration and detainment were cited by 10 sources.
- Less cited but of great importance was oral health needs across specific sub-populations (5 sources), access to safe and reliable transportation (4 sources), preventive services, including health promotion activities and access to primary care (3 sources) and palliative and end-of-life care tailored to adolescent health needs (2 sources).
- Also, climate change and environmental sustainability were raised as a key determinant of adolescent health (1 source).

To further unpack the scoping review results, we grouped key adolescent health gaps and needs into five domains, including (1) mental health, (2) sexual and reproductive health, (3) relationships with food and physical activity, (4) other health sector (chronic conditions, communicable diseases, oral health, palliative care, transitions to adult care), and (5) non-health sectors (accidents and injuries, child welfare system, climate change, juvenile justice system, maltreatment, education/schools, technology, transportation). The articles we reviewed exhibited considerable overlap among these domains. We examined how much attention each domain received by the literature we reviewed and also how each domain aligned with the different adolescent sub-populations identified. The domains represent an analytic tool to unpack the breadth of work on adolescent health, and as such, are not meant to be strictly defined or mutually exclusive, with considerable overlap observed (**Table 6**). The needs and priorities identified through the scoping review are documented for each of the five principal domains further below.

Table 5. Domains of Adolescent Health Areas of Need/Priority

Adolescent Health Domains	Definitions	Sources (n)
Mental health	Substance use/addictions, suicide and suicidal ideation, depression and anxiety, self-harm, body image	58
Health and development	Impacts on health and development in general or not specified	30
Sexual and reproductive health	Gender identity, sexual education	29
Maltreatment	Violence, abuse, bullying	27
Education	Schooling, socialization, access to education	27
Communicable disease	Sexually transmitted infections (generally), human immunodeficiency virus (HIV)-acquired immunodeficiency syndrome (AIDS), human papillomavirus (HPV), vaccination, COVID-19	22
Relationships with food	Nutrition, obesity and physical activity, disordered eating, food production and marketing, food insecurity	21
Chronic conditions	Cancer, renal disease, musculoskeletal disease, respiratory disease, heart disease, non-communicable disease in general	17
Accidents and injuries	Road injury, poisoning, drowning, falls, fire	12
Technology	Social media	12
Juvenile justice system	Incarceration, detainment	10
Transitions to adult care	Needs for transition from pediatric to adult care	7
Child welfare system	Impacts and needs	5
Oral health	Oral health needs across sub-populations	5
Transportation	Access to transportation	4
Palliative care	End-of-life care	2
Preventive services	Health promotion, primary care	3
Climate change	Impact of climate change on health, sustainability	1

Table 6. Overlapping Domains of Adolescent Health Areas of Need or Priority

By number of reviewed articles coded to each domain

	Mental health	Sexual and reproductive health	Relationships with food and physical activity	Other health sector	Non-health sectors
Mental health	58	13	6	13	27
Sexual and reproductive health	13	29	3	14	6
Relationships with food and physical activity	6	3	17	4	3
Other health sector	13	14	4	36	5
Non-health sectors	27	6	3	5	51

Mental Health

There were 58 papers coded to the mental health domain. Within mental health, we identified the following sub-domains: body image; depression and anxiety; suicide and suicidal ideation; non-suicidal self-harm; and substance use and addictions.

By far, mental health was the most cited gap or need for adolescent health in the literature we reviewed and is considered a leading cause of illness and disability among adolescents[22]. It is estimated that 10-20% of children and adolescents struggle with mental health issues[23]. Although half of all mental health disorders start by age 14, most remain undetected and untreated[24].

In the general adolescent population, substance use and addictions and suicide were the issues of greatest concern. While all adolescent sub-populations are affected by mental health issues, LGBTQ2S+ and racialized youth appear to carry the greatest burden. A review of young key populations, defined by the authors as men who have sex with men and transgender people, found that they were more likely to initiate substance use at an earlier age, engage in polysubstance use, and to experience more rapid increases in substance use over time[25]. LGBTQ2S+ youth and youth from racial and ethnic minority groups are at significantly higher risk of suicidal ideation and attempts[26]. When these groups overlap, or when youth have multiple elements of identity, such intersectional experiences can heighten risk[27].

Sexual and Reproductive Health

There were 29 papers coded to the sexual and reproductive health domain. Within sexual and reproductive health, we identified the following sub-domains: assault and trafficking; gender identity; pregnancy and contraception; psychosexual development; sexual education; and unprotected sex and risky sexual behaviours.

For adolescents in general, unprotected sex and risky sexual behaviours emerged as a key priority area. Unprotected sex and risky sexual behaviours were associated with a number of other issues, including substance use[22], higher rates of sexually transmitted infections[24], and unintended pregnancy[28].

For LGBTQ2S+ youth, gender identity and unprotected sex/risky sexual behaviours represented priority areas. A review of health trends among Canadian transgender youth found that this group faced significant disparities across all measures, with very large effect sizes[29]. Additionally, lesbian, gay, bisexual, and questioning youth have unique reproductive health priorities[30]. LGBTQ2S+ youth experience difficulty accessing relevant sexual health education, as it tends to be focused predominantly on heterosexual relationships and reproduction, and does not address gender diversity and same-sex attraction[31]. LGBTQ2S+ youth, especially homeless and precariously housed, engage in more sexually risky activities and have been shown to have greater risks of HIV-AIDs[32].

For girls and young women, pregnancy and contraception are important priority areas. While teenage fertility rates have fallen in recent years[33], evidence from a recent systematic review suggests the need to focus on expanding educational opportunities and incentives for girls as a means to decrease adolescent pregnancy[34].

Similarly, for racialized youth, pregnancy and access to contraception are priority areas (especially among Indigenous youth), as well as unprotected sex/risky sexual behaviours. A report from Australia found that rates of teenage pregnancy among Indigenous youth were six times higher than the national level[35]. Another Australian study found high incidence of sexually transmitted infections, excess risk of

pelvic inflammatory disease, excess burden of maternal sepsis, and gestational diabetes among pregnant Indigenous adolescents[36].

Relationships with Food and Physical Activity

There were 17 papers coded to the relationships with food and physical activity domain. Among the papers coded to this domain, we identified the following sub-domains: food insecurity; food production and marketing; nutrition; obesity; and physical activity.

For all adolescents, nutrition and obesity represented the greatest area of need in terms of their relationships with food and physical activity. Indeed, diet is a health-related behaviour that underlies major non-communicable diseases that usually starts during adolescence. These nutritional habits affect the morbidity and mortality of adolescents later in their lives, as well as future generations[24]. Risk factors for obesity, including consumption of unhealthy foods and high-sugar drinks, rise during adolescence and very few young people meet nutritional guidelines[33]. This was especially so for low-income and underemployed adolescents and racialized youth. While rates of overweight and obesity are a concern across all adolescent sub-populations, higher rates are seen for low socioeconomic status groups[33]. A quarter of young people aged 11-19 live in households with the lowest incomes, and are more likely to be obese[37]. A review from the US found substantial and rising disparities by race and ethnicity in terms of obesity[38].

In addition to nutrition and obesity, racialized youth were also found to be more likely to be affected by food production and marketing directed towards poorer eating habits. Lower income and racialized populations are more likely to purchase processed foods and face greater barriers in accessing healthier food options[39]. There is growing evidence that marketing for energy-dense, nutrient-poor foods is targeted to lower income and racialized youth[39].

Indigenous youth also struggle with issues of food insecurity. A Canadian report found that the prevalence of household food insecurity differs markedly by Indigenous status and racial/cultural group[40]. The highest rates of food insecurity in Canadian adolescents are found among households where the respondent identified as Indigenous or Black.

Other Health Sector

There were 36 papers coded to the other health sector domain. Within this other health sector domain, we identified the following sub-domains: chronic conditions; communicable diseases; oral health; palliative care; and transitions to adult care.

Among the general population of adolescents, chronic conditions (which tended to overlap with transitions to adult care) and communicable diseases represented the most noted health gaps or needs. **Chronic conditions** included cancer, heart disease, musculoskeletal disease, renal disease, and respiratory disease. **Communicable diseases** included HIV-AIDS, HPV, and other sexually transmitted infections; vaccinations; and the impact of COVID-19 on adolescent health and wellbeing. Other health sector areas of need included **oral health**, **transitions to adult care**, and **palliative and end-of-life care**.

Given the associations between oral and systemic health, oral health is an important issue across adolescent populations. Excess consumption of added sugars in food and drinks increases the risk for dental decay[41]. Indigenous youth, homeless and underhoused, and newcomers, immigrants, and refugees are at the greatest risk of poor dental health compared with their peers without special health

care needs[42]. About 15% of Indigenous adolescents have had their teeth extracted, representing an excess burden of dental caries[36]. Homeless youth also have high rates of dental issues[31]. Further, children of immigrant status, especially refugee children, may present with significant oral health care needs[43].

A range of obstacles hampers communication and collaboration at the interface of pediatric and adult services, including separate funding and governance structures, legal, logistic, and clinical differences, and time and resource constraints[44]. Across many disease conditions, improvement is needed in methods to facilitate transition readiness in pediatric care and in the readiness of adult health care systems to provide care for adolescents and young adults[42]. Health outcomes for young people with long-term chronic conditions are worse during transition between child and adult services, highlighting the need to commission youth friendly transition services[37].

Palliative and end-of-life care are important health services for youth who have been diagnosed with a life-limiting illness or who are living with a chronic condition that might lead towards death. Access to age-appropriate palliative care has been identified as a challenge for youth in some geographic settings and in health settings where youth experience the deaths of peers with the same disease[45]. Dealing with adolescents and young adults has distinct requirements relating to the underlying disease and developmental issues of this age group[46].

Non-Health Sectors

There were 51 papers coded to the non-health sectors domain. Within these non-health sectors, we identified the following sub-domains: **accidents and injuries**; **child welfare system**; **climate change**; **juvenile justice system and incarceration**; **maltreatment, violence, abuse, and bullying**; **schools and education**; **technology**, especially social media; and **transportation**. While these non-health sectors were relevant to all adolescents in general, some sub-populations were more affected than others. The major determinants of health and development during adolescence lie well beyond the health services system. A comprehensive approach to improving adolescent health requires engagement with these non-health sectors[47].

The literature indicates a close link between student wellbeing and their ability to learn[48]. Several studies have examined the disparities in school environments for low-income and racialized adolescents[39]. Indigenous adolescents suffer higher rates of educational disadvantage, with far fewer reaching international benchmarks in reading, mathematics, and science than their non-Indigenous peers[35]. There is a need to advocate for educational improvements to better optimize educational milestones for all students[49].

Maltreatment, violence, abuse, and bullying are a far too common experience for many adolescents, especially racialized youth, LGBTQ2S+, and newcomers, immigrants, and refugees[40]. Assault related to mortality is about four times more likely and assault related to hospital separation around six times more likely to occur in Indigenous adolescents[36]. LGBTQ2S+ youth experience higher rates of bullying and exclusion than their heterosexual and cisgender peers[31], arising from exposure to discrimination, familial rejection, cultural expectations, religious ostracization, legal inequalities, and/or any number of hostile encounters[50]. Violence toward immigrant children comes in many forms and risks are pervasive throughout the migration process. Forms of violence include state action (such as migration enforcement or detention), employer (forced child labour), peer-to-peer (bullying and school abuse), familial (domestic violence), general public (xenophobia), and child smuggling or trafficking[43]. Across many immigrant groups, bullying and peer aggression were consistently significantly higher for non-

official language speaking first generation immigrant adolescents compared to third generation adolescents, suggesting that risks related to violence are greater when an immigrant adolescent speaks a language other than the primary language of their new country[51].

Although juvenile offending rates have been declining steadily in recent years, violent crime is still an issue for young people, as victims and as offenders[48]. Young people in contact with the justice system come from the most disadvantaged groups and many have language or literacy issues, experience complex intergenerational trauma and often suffer from health and psychosocial problems[31]. While juvenile incarceration may provide access to care and respite from unsafe environments, it is also associated with poor adult health outcomes and early mortality[52].

There is a need to create an improved and more accountable child welfare system with enhanced outcomes for those served[53]. There is an historical and current divide between Indigenous peoples and the child welfare system due to systemic trauma and violence[54]. Indigenous children and adolescents are almost ten times more likely to be in out-of-home care than their non-Indigenous peers[35].

Cyberbullying and cyberstalking are particular concerns for adolescent youth. One in five youth aged 15-20 experienced cyberstalking, cyberbullying, or both[40]. While the online environment is a community in which young people learn, connect with peers, develop networks, and have fun[48], there is a need to encourage healthy social media practices[55]. Digital platforms can provide help and foster a sense of social inclusion[56], and social media has created opportunities for young people to become active catalysts for change[57].

According to the World Health Organization, unintentional injuries, such as road injury, drowning, poisoning, and falls, are a leading cause of mortality and morbidity during the second decade of life[24], with similar findings for Canada[16 40]. Indigenous youth were about twice as likely as non-Indigenous youth to be hospitalized due to road traffic accidents and carried an excess risk of hospitalization due to falls, fire and heat, and accidental poisoning[36]. Further, Indigenous youth are more than four times more likely to die of injury before the age of 14[35]. Young people in remote areas have higher rates of injury-related hospitalizations compared to their peers in metropolitan areas, and death rates are 2.5 times higher among rural/remote youth due in part to transportation accidents[31].

Health and Development Needs by Sub-Population

The five domains described above capture a wide breadth of health needs and priorities across multiple adolescent sub-populations. However, in some cases, the articles we reviewed did not identify a specific adolescent health need or priority, but rather emphasized the general health needs of particular at risk adolescent sub-populations. The sub-populations that were highlighted included low-income and underemployed adolescents; LGBTQ2S+; racialized youth (including Indigenous); and newcomers, immigrants and refugees.

3.3 Adolescent Health Needs and Priorities – Key Informant Perspectives

Complementing the scoping review, we conducted 29 interviews with key informants representing eight Canadian and one international jurisdictions (**Appendix 1, Table A1.3**). These key informants included content expertise and experience across the main domains studied (**Appendix 1, Table A1.4**) and represented a range of adolescent health stakeholders including patient advocates, healthcare providers,

senior administrators of service delivery organizations, government/health agency representatives and researchers/research funders (**Appendix 1, Table A1.5**).

Key informants were asked about their views and insights on adolescent health needs and priorities. Rather than employ the same domains of need/priority applied for the scoping review, we have analyzed the key informant interview findings independently. Key findings were grouped under four broad categories: (1) mental health and addictions, (2) sexual and reproductive health and gender identity, (3) system level challenges for adolescent care and service provision, and (4) the social determinants of health and health equity. Similar to the domains applied to the scoping review results, these four domains were employed as an analytic tool and are not meant to be mutually exclusive as intersections between domains were apparent during the analysis of results. The sections below unpack adolescent health needs and priorities within these four broader categories. The scoping review and key informant interview findings are compared in the final section of the report.

Mental Health and Addictions

The majority of the key informants we interviewed (27/29) identified mental health problems and illnesses among adolescents as a major issue that requires more investment and attention across the country. In fact, many key informants emphasized the prevalence of this issue among adolescents in Canada as well as the lack of adequate and available resources to respond to young people's mental health needs. At least five key informants mentioned that mental health was increasingly being recognized for its impact on other health issues as well as an integral component of overall health. One senior leader that we interviewed stated:

> *"Our history as an organization is grounded in sexual and reproductive health. And we've been doing that work for a long, long time. But over the last couple of years people are [saying] 'you can't talk to me about this until you talk to me about my mental health.' They're so inextricably linked and I think that that's a new thing for us. Like we've always known that […] the three sort of go in tandem with your mental health, your physical […] your primary care and your sexual and reproductive health, but the mental health piece is exploding."* (Senior Leader of an Organization that Provides Services to Adolescents SL-01)

Due to the emergence of social, developmental, psychosocial, and biological changes during the adolescent period, it is a critical stage for the development of mental illness and promoting positive mental health throughout the life course. Adolescent neurodevelopment imparts a certain vulnerability to risks but also a receptiveness to intervention. According to the key informants, mental health problems and illnesses can manifest in different ways and with varying intensities including poor overall mental health and disorders often associated with a formal medical diagnosis. The most frequently discussed forms among key informants were anxiety disorders and issues (15/29), suicidal behaviour and suicide itself (13/29), psychological stress (12/29), and depression (12/29). Because of a variety of factors including the ongoing colonial legacy, and lost connection to language, youth suicide and other mental health concerns are a dismaying trend in some Indigenous communities. One key informant noted that:

> *"From an Indigenous perspective […] the ongoing legacy of colonization [is impacting Indigenous communities' mental health]. If you think about it, and what that entails: the legacy of residential schools, and just the trauma that has not had a space to heal or be addressed. That is a huge, huge, huge reason behind why a lot of Indigenous people struggle. […] Language is powerful, and can be a part of the solution to help prevent suicide."* (Individual from Patient Advocacy Organization P-03)

Some key informants also described mental health challenges being a particular concern for youth and children belonging to immigrant communities because of a variety of factors including pre-migration and post-migration stressors. A key informant commented on immigrant challenges:

> *"The level of acculturation and moving across transnational borders and adopting new lifestyles in Canada [is important]. And I think those pre-migration factors and post-migration factors for immigrants may affect their mental health condition […] And there's also the issue [of] the family context […] and [associated] changes in gender dynamics across transnational spaces that may influence the mental health of immigrants."* (Researcher R-05)

Addictions and Concurrent Disorders

Although mental illness and addiction are distinct issues, some key informants noted that they can co-exist and interact with one another. In fact, some noted that comorbidities and concurrent disorders, where mental health problems coincide with addiction or other mental health concerns, were considered an important gap related to adolescent mental health. Although addiction is often associated with mental health problems and illnesses, the reverse isn't necessarily the case. For instance, one key informant mentioned the following related to substance use:

> *"If you look at young people who are experiencing substance use problems, say in your 14 to 25 age range, and you look at, what's the likelihood that they have experienced or are currently experiencing significant mental health [challenges]? It's the majority [who] are experiencing significant mental health concerns coincident with their substance use concerns. The reverse is not true."* (Researcher R-04)

Substance use (e.g., consumption of alcohol, cannabis, opioids) either on its own or coincident with mental health problems and illnesses, were identified by more than half of key informants (17/29*)* as an important gap and potential area for investment. For instance, one key informant cited the emergent opioid crisis as a rationale for why this area requires more attention:

> *"If I was going to put [investments] in one area in adolescent mental health right now countrywide, like not thinking rural/urban, I'd put it in addictions. I think […] the opioid crisis is going to grow. It is killing our young people, it's killing them at faster rates than anything else." (*Healthcare Provider HP-06)

Another concern mentioned during the interviews was a negative relationship to food, including eating disorders, obesity and negative eating behaviours (12/29)**.** These issues were described either on their own or occurring alongside mental health challenges. One key informant suggested that mental health concerns often underscore the negative relationship adolescents and families have to food:

> *"In both cases, obesity and severe eating disorders, there's often underlying trauma […] and the treatment approaches are not that different, but people […] and families have forgotten how to eat together, how to cook together […] You know, their relationship with food is very complicated these days."* (Healthcare Provider HP-02)

COVID-19 and Mental Health

In the midst of global pandemic, it is perhaps not surprising that many key informants (16/29) described the COVID-19 pandemic as exacerbating existing mental health and addiction issues. One key informant

demonstrated this through reflecting on the rise of eating disorders across Canada:

> *"Interestingly, I was on a call last week with some of our members from across the country and we're talking about some of the impacts of COVID that people were seeing in their clinical practice and […] everybody was saying they've seen a real spike in eating disorders. And I don't know that anybody knows why that is right now."* (Individual from Patient Advocacy Organization P-01)

Digital Media and Mental Health

Key informants were often reluctant to weigh in on the factors shaping the rise of mental health and addictions among adolescents over time. However, some key informants (10/29) attributed the rise of social media and adolescents' relationship to digital media as a contributing influence. One key informant reflected on how the rise of social media manifested among their patient population:

> *"This has been postulated in the literature and […] most of us in our division would agree that a lot of it has to do with the uptake of social media and the dependence that young people have on their devices and […] screens. And, you know, people are just not interacting socially in the same way that they used to 10 or 20 years ago. So that face-to-face is often missing. And it's being replaced by this very fast paced social media. And it's just hard for kids to keep up and not being able to keep up makes the issue even worse. And it's so much easier to be harder and meaner, behind the screen. Kids are just feeling really isolated and often feeling like they're the only one because the image that is portrayed by their friends or other peers is often very positive and polished."* (Healthcare Provider HP-02)

Barriers in Access to Appropriate Mental Health Services and Care

Finally, over half of key informants (15/29) described insufficient access to timely, appropriate, and affordable mental health services and care as a gap and priority for investment. Examples of barriers that key informants mentioned include lengthy wait times, geographical barriers (particularly among rural adolescents), stigma associated with mental illness and help-seeking, a lack of affordable services outside of the health care system (e.g., community based services), and a lack of developmentally and culturally appropriate care that responds to the needs of adolescents. For instance, one key informant mentioned that most mental health services are offered at inconvenient times for adolescents and their families (i.e., during regular school and business hours) making it difficult to access appropriate care.

Sexual and Reproductive Health and Gender Identity

Like mental health, sexual and reproductive health and gender identity development are integral components of overall adolescent health. In fact, gender identity development (8/29) and sexual and reproductive health (5/29) were identified as key areas of need among key informants. In particular, key informants underlined adolescence as an important period for the exploration of one's gender identity as well as their sexual and reproductive health and that challenges around access to relevant services that are targeted to youth are lacking in many provinces. As one key informant described:

> *"There hasn't been as much focus on that [gender orientation, sexual health and reproductive health] and […] there [are] probably small 'p' political reasons for that […], there's stigma involved in talking about adolescence and sexual health. And you know, that also intersects with cultural and religious beliefs, right. And you think about things like women's choice, and abortion services and termination services, like all of that starts to come out and […] I think we need to talk about things and we need support for services."* (Senior Leader of an Organization that Provides Services to Adolescents SL-02)

Gender Identity

Barriers to appropriate care and inequities in health outcomes exist for all marginalized youth including gender diverse and sexual minority youth. Key informants mentioned that sexual and gender diverse youth experience barriers including a lack of appropriate services, care and interventions, as well as discrimination and stigmatization based on their sexual orientation and/or gender identity. One key informant explained:

> *"Another barrier is just supports are targeted to different populations. And so […] we have a large Indigenous population. And some of our services don't take culture into consideration. For sexual and gender diverse youth, [it] might not be a very inviting space [for them] either. And sometimes care providers don't know how to speak to them."* (Government Ministry/Agency Staff GMA-02)

These barriers are often intensified when gender diverse and sexual minority youth are also negatively impacted by other social determinants of health such as race/racism, income and social status, and childhood experiences.

Sexual and Reproductive Health

In addition to gender identity formation, sexual and reproductive health is another area of critical importance during adolescence. One challenge that was mentioned by key informants includes internal shame experienced by adolescents as well as stigma from providers that practise without a sex positive lens. As one key informant described:

> *"I think there's a lot of shame, guilt, stigma, discrimination around sex, and sex is a healthy part of everyone's existence. And so, to make a youth feel shame around that […] sets them up for their entire life of feeling shame around a very healthy and normal aspect of life."* (Senior Leader of an Organization that Provides Services to Adolescents SL-01)

The same key informant also mentioned limited sexual education curriculums in schools as a key barrier to positive sexual and reproductive health during adolescence:

> *"Abortion, pregnancy options – none of that is in the education system at any point, like even in high school, right. And so […] how do you make informed decisions about your sexual and reproductive healthcare if at no point in your education, you're getting it? Now, that doesn't mean that people aren't getting that information from [other] places […] or from, you know, adults in their lives. But if we are going to […] provide folks with sexual health education in schools, we should be doing it right."* (Senior Leader of an Organization that Provides Services to Adolescents SL-01)

Other challenges mentioned by key informants include the negotiation of healthy and consensual sexual relationships, and a dearth of cost and culturally attuned care. Some key informants also mentioned that barriers to sexual and reproductive health are a particularly important need for immigrant youth, for example:

> *"Across the globe, we found a lot of literature on reproductive and sexual health. And that's particularly important in […] youth because it's a time to really discover themselves and, you know, reproductive health and sexual health then becomes important."* (Researcher R-05)

Finally, when asked about the distribution of funding for adolescent health across Canada, at least two key informants mentioned that while sexual and reproductive health is a critical area for young people,

sexual healthcare is funded fairly well relative to other key areas in adolescent health. One key informant noted:

> *"It seems to me that sexual health care is funded pretty decently and it's a bit more straightforward in taking care of those needs as well."* (Healthcare Provider HP-10)

It is apparent, that adolescents experience important challenges related to gender identity development and their sexual and reproductive health. In order to effectively address these challenges and their needs, system level challenges for adolescent care and service provision also need to be considered.

System Level Challenges for Adolescent Care and Service Provision

Several overarching system level challenges were noted by key informants in terms of their impact on adolescent health. This included health system arrangements being built on siloed and uncoordinated service delivery, a lack of integration between pediatric and adult-oriented services and service providers and lastly, inherent biases in providing appropriate and responsive services to adolescents.

Transition to the Adult Healthcare System

More than half of key informants (16/29) identified transitions from pediatric to adult healthcare services as a significant challenge that impacts the health of adolescents. Although transition age may vary slightly by province, regional health authority, or hospital, key informants mentioned that basing transition on chronological age instead of developmental stage is a significant issue. Important challenges in this area that were mentioned include a lack of preparation and training among caregivers and institutions, the impact on continuity of care due to the loss of long-standing relationships with caregivers, and a lack of comprehensive research and data in the area. As one key informant described:

> *"I take care of kids in a big hospital, quaternary care hospital, lots of the kids that I see have medical problems, and they've been part of our institution for years and their families too become really attached. And then all of a sudden, there's this government mandated time of transfer of care at age 18, where all kids have to move care from pediatric sites to adult sites, and that causes a huge barrier to continuity of care and can impact […] the health outcomes following transition to adult care."* (Healthcare Provider HP-02)

At least two key informants mentioned that these issues are particularly pertinent for youth with chronic medical conditions and/or complex healthcare needs who are living longer into adulthood due to improved medical research and therapies. One key informant explained that transition is an:

> "*Emerging and continuous issue because many more youth are living into adulthood now. So, for example, kids with cystic fibrosis never lived until they were like 40 or 50. And now they are because we have better medications and therapies. And so now all these adult providers are […] not as competent to kind of take care and know about these diseases as they progress into adulthood."* (Individual from Patient Advocacy Organization P-02)

Although many hospitals and other healthcare organizations across Canada have developed transition programs to facilitate better transition into adult health care and services, significant gaps in these areas persist. To address the complex challenges in these areas effectively, there is a need for co-ordination and collaboration across multiple providers, settings and sectors.

Lack of Co-ordination and Collaboration

Integrated service delivery is a longstanding issue at all levels of health systems. In addition to challenges around transition to care, service delivery for adolescents in general is fraught with other co-ordination and collaboration challenges. Several key informants (8/29) described a lack of co-ordination across and within sectors that serve adolescents as a key barrier and challenge that impacts their health and wellbeing. A key informant stated that:

> *"It's hard because government is so siloed. And the worst thing that we do is we get in each other's way […] children's services and health are trying to decide whose […] job is it to provide clinical services versus non-clinical. And then what is a clinical service versus a non-clinical [service] especially for youth, right? Like we're children's services, so should we not be providing […] all supports for children and youth? But we don't have the dollars for hospital services. We don't have the dollars like health does. And while we're figuring it out, children and youth are […] not getting their needs met."* (Government Ministry/Agency Staff GMA-02)

Key informants also mentioned that collaboration and co-ordination also extend to working with and meaningfully engaging adolescents themselves.

Lack of Adolescent-Responsive/Friendly Care and Services

More than a quarter (8/29) of key informants highlighted significant gaps in terms of the lack of adolescent-responsive services, care and interventions that incorporate a holistic and strength-based approach and that target the unique developmental and individual needs of youth. Due to current healthcare billing and remuneration models that disincentivizes the provision of holistic care as well as a lack of training and capacity among health providers and institutions, youth experience barriers that prevent them from accessing the services they need. For example, this can manifest as providers practising through a deficit-based lens such as by restricting further access to care for adolescents who arrive late to an appointment. It can also be typified through providers failing to consider developmental challenges such as the competing needs for both autonomy and supportive environments during adolescence. One key informant highlighted some perceptions that can prevent the provision of adolescent-responsive/friendly care:

> *"I think one of the fundamental challenges with adolescent health is society's views of teenagers. And I think society, including medicine, doesn't really value teenagers. And there's negative views of teenagers. And so, I think that's a fundamental attitude that translates into resources into services for adolescents […] adolescents are very underserved. Definitely in medicine, they're kind of an invisible population."* (Healthcare Provider HP-10)

At least seven key informants mentioned that youth-responsive/friendly practises include meaningfully engaging and working with adolescents to design effective practises and solutions that target them both within and outside the healthcare system. Meaningfully engaging youth includes authentically valuing and empowering young people's varied expertise and experience during decision-making. It also involves acknowledging that youth are not a monolithic group. Their diverse experiences, beliefs and contexts should be understood to avoid superficial and tokenized engagement.

Social Determinants of Health and Health Equity

The fourth broad category identified through our interviews was the social determinants of health and health equity. The social determinants of health are implicated in each area of need outlined above and

heavily shape the onset, trajectory, severity and distribution of health outcomes and health inequities among young people. The majority of key informants (22/29) described addressing the social determinants of health (e.g., income and social status, employment and working conditions, education and literacy, childhood experiences, physical environments, social supports and coping skills, healthy behaviours, access to health services, biology and genetic endowment, gender, culture, race/racism)[58] as not only necessary to address the root cause of health inequities but also offering greater potential in advancing adolescent health in general. A key informant reflected on the importance of investing in solutions that target the social determinants of health:

> *"I think on the even bigger picture, there needs to be more investment in the social determinants that impact adolescent health in a huge way. So social determinants are […] probably the biggest factor in impacting adolescent health, probably bigger than individual healthcare."* (Healthcare Provider HP-10)

Marginalized Sub-Populations

As noted earlier in this paper, many adolescent sub-populations were identified both in our scoping review and by the majority of the key informants (23/29) (**Table 3**). Key informants highlighted the importance of not necessarily considering these adolescent sub-populations as mutually exclusive, since intersections between groups can and often exist.

The majority of key informants emphasized that relative to the general population, adolescents from historically, persistently, or systematically marginalized communities experience worse health outcomes and greater barriers within and outside the healthcare system that impact on their health. Examples of negative health outcomes that marginalized youth experience in higher numbers compared to the general youth population in Canada include higher rates of suicide in some Indigenous communities and higher rates of cardiovascular disease among some racialized immigrant communities. Examples of barriers these and other marginalized groups face include discrimination, stigma and a lack of culturally appropriate care that takes a strengths-based approach. For example, one key informant described the stigma that marginalized young people face from health and allied health professionals that make them reluctant to access services:

> *"So, I think young people on the margins […] face challenges and barriers in terms of judgment from health care providers. I've heard that a lot. And not just health care providers, but like social workers as well, psychologists, human services professionals as well that […] make them hesitant to access health services."* (Researcher R-03)

It was also emphasized that health inequities experienced by marginalized adolescents are caused by power distributed unequally across social, political, economic and cultural dimensions. Confronting these relations and meaningfully engaging and centring these communities were characterized by many key informants as a critical component in the process for mitigating health inequities that persist among adolescents in Canada. One key informant reflected on these challenges:

> *"The solutions to these things are […] multi-layered and cannot be as simple as 'we're going to start a program to support a particular population.' […] It requires a real understanding of the impact of racism and inter-generational trauma in order for us to even begin thinking through how do we make an impact? I think often what we want to do is come up with fast solutions and those fast solutions are designed by people who aren't impacted […] by the racism or the intergenerational trauma or the discrimination."* (Senior Leader of an Organization that Provides Services to Adolescents SL-06)

Intentional Injuries, Violence, and Adverse Childhood Experiences

Another important factor that contributes to inequities in health outcomes among adolescents is intentional injuries, violence and adverse childhood experiences. Eight out of 29 key informants also identified intentional injuries and violence (including family violence, child maltreatment or neglect, gender-based violence and intimate partner violence) as an alarming issue that is impacting the health and wellbeing of adolescents in Canada. As one key informant stated:

> *"High on the priority list for challenges and needs facing adolescence [is] violence and in particular gender-based violence and other forms of intentional injury."* (Researcher R-02)

In particular, several key informants shared that adolescents who are exposed to violence and other adverse experiences during childhood are often negatively impacted by other social determinants of health such as poverty, unsafe housing and substance use among family members. For example, one key informant highlighted that:

> *"About 40% of the kids that we see in terms of our critical injuries and deaths [...] have had an experience of family violence in their history. So, exposure to family violence is huge. Exposure to family members who use substances [or] have problematic substance use is very huge."* (Staff from Government Ministries/Agencies Responsible for Adolescent Health GMA-03)

In general, some key informants (4/29) expanded on this through emphasizing that action on the social determinants of health must occur during early childhood in order to advance adolescent health and address health inequities among adolescents:

> *"I take kind of a big picture view as well. So, even investments in early childhood and in families as a whole […] impact adolescent health as well. So, when we […] raise up families that are struggling when their children are very small, that prevents some of the challenges with adolescent health down the road."* (Researcher R-03)

Moreover, several interviewees highlighted the need to adopt a life-course approach, where connections between various stages of an individual's life are critical for enacting meaningful change on the social determinants of adolescent health and ultimately reducing health inequities.

4. Assessing the Impact of Investing in Adolescent Health

Assessing the impact of investing in areas of need/priority for adolescent health is no simple task. While there are established methods for assessing the impact of health interventions and programs that take account of their health, social, economic and equity impacts, the focus of this study was on identifying the gaps and needs for adolescent health and the potential impact of making investments in those areas. To assess the potential impact of investments in adolescent health, we started by integrating and comparing the findings from the scoping review and key informant interviews to prioritize areas or domains of need. We then unpacked the complex and overlapping relationships between domains of need and the adolescent sub-populations to assess the overarching priorities. Finally, we conclude the impact assessment by capturing perspectives of key informants on the overarching case for investing in adolescent health.

4.1 Integration and Comparison of Findings

The scoping review and key informant interviews have identified a number of needs and priorities for investing in adolescent health in Canada. These pictures of need and priority are similar but not perfectly aligned. Both revealed a clear emphasis on mental health and sexual and reproductive health domains. However, the scoping review findings also pointed to broader focus on other areas within the health sector (e.g., chronic conditions, communicable diseases, oral health, palliative care), the non-health sector and a clear focus on adolescent sub-populations. In contrast, the key informant interviews highlighted community and social determinants of adolescent health and also pointed to several system level challenges including: a lack of co-ordination across and within sectors that serve adolescents, poor transitions between pediatric and adult-oriented services and care, and inherent biases in providing appropriate and responsive services to adolescents.

Taken together, the scoping review and key informant interview findings provide a fairly comprehensive understanding of adolescent health needs in Canada. The results align well with major global reports, including the 2017 World Health Organization's Global Accelerated Action for the Health of Adolescents (AA-HA!) report[20] and the 2016 Lancet Commission on Adolescent Health and Wellbeing[17]. The WHO report identified many similar health issues, including injuries, mental health, violence, HIV/AIDS, other infectious diseases, early pregnancy and childbirth, alcohol and drugs, nutrition and micronutrient deficiencies, undernutrition and obesity, physical activity, tobacco use, and rights of adolescents[20]. The Lancet Commission also identified a number of similar adolescent health problems and risks including sexual and reproductive health (including HIV), under-nutrition, infectious diseases, violence, unintentional injury, alcohol and illicit drugs, tobacco, mental disorders and suicide, chronic physical disorders and obesity[17].

To elicit further insights on key areas of need, we asked our key informants to provide direct advice on where future investments in adolescent health in Canada should be targeted. The most common responses included (1) school-based programs, (2) community and family-based interventions, (3) mental health programming, (4) social determinants of health-targeted interventions, and (5) focus on specific sub-populations. These views echo the Lancet Commission's assessment of interventions for adolescent health, which pointed to school-based, community-based, family-based and online interventions, along with pursuit of universal health care coverage (for the global health context)[17].

Thus, although the scoping review and key informant interviews did not produce identical results, there is sufficient alignment between them and to key global guidance. In particular, there is consistent emphasis on mental health and addictions, which we have unpacked further in this paper (with particular emphasis on substance use/addiction and suicide/suicidal ideation), and clear focus on sexual and reproductive health (with particular emphasis on gender identity, pregnancy/contraception, unprotected sex/risky sex), with the caveat that some key informant interviews suggested it was an area in Canada that is well-resourced relative to other areas of need. Beyond those two clearly dominant areas of focus, there is a long list of health sector and non-health sector domains that represented important areas of adolescent health need. Even needs that were less routinely identified by key informants or visible in the reviewed literature, such as oral health or palliative care, arguably represent important areas of need. To further prioritize and assess the impact of investments in the identified domains of need, our findings pointed to the critical need to consider the key underlying issue – adolescent sub-population.

4.2 The Relationships between Adolescent Sub-Populations and Domains of Need/Priority

An important finding was the important relationship between adolescent sub-populations and the identified domains of need/priority for adolescent health. Based on the scoping review findings, **Table 7** highlights the relationship between domain and sub-population, allowing a more detailed assessment of the nature of the identified needs and gaps. In particular, the results point to the importance of targeting three particular adolescent sub-populations (racialized, LGBTQ2S+, low-income/unemployed) across many domains of need. For example, the sub-population of racialized adolescents was identified as having greater health needs related to mental health (suicide/suicidal ideation), relationships to food and physical activity (nutrition) and non-health sectors (schools/education; maltreatment, violence, abuse and bullying), suggesting that this sub-population could be targeted for a multi-pronged investment approach to improve adolescent health (see **Appendix 4** for additional tables that display sub-population data for each specific sub-domain).

It should be noted that in addition to the importance of key adolescent sub-populations, **Table 7** also highlights the fairly even distribution of adolescent health needs in the non-health sector across most of the sub-populations identified.

Overall, a key conclusion of this analysis is that investment priorities should not focus solely on domains of need (e.g., mental health or sexual and reproductive health) but also on specific adolescent sub-populations to optimize impact.

Table 7. Domains of Need/Priority by Adolescent Sub-Populations
By number of reviewed articles coded to each sub-population

	Mental health	Sexual and reproductive health	Relationships with food and physical activity	Other health sector	Non-health sector	Health and development driven by unique needs of sub-populations
General adolescent population or not specified	39	18	12	27	31	11
Racialized	13	3	4	5	15	8
LGBTQ2S+	15	9	2	7	8	9
Newcomers, immigrants, refugees	6	0	0	2	9	7
Low-income, underemployed	7	0	7	4	13	12
Homeless, underhoused	6	1	3	2	4	4
Rural, remote	4	0	3	0	7	2
Disabilities	1	0	0	3	2	3
Young carers	2	0	1	0	1	1
Girls and young women	7	5	2	2	4	1
Boys and young men	3	2	0	0	4	2

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

4.3 The Case for Investment in Adolescent Health

The final component of our impact assessment considered the broader case for investment in adolescent health. While the 2017 World Health Organization's "AA-HA!" report takes a global health perspective with a focus that spans low, middle and high income country contexts, it makes a compelling case for investing in adolescent health, outlining five key arguments[20]. These include that (1) "adolescents have the fundamental right to health", (2) "investments in adolescent health bring a triple dividend of health benefit", (3) "investments in adolescent health reduce present and future health costs and enhance social capital", (4) "adolescents are not simply old children or young adults; they have particular needs", and (5) "adolescents bear a substantial proportion of the global disease and injury burden"[20].

Although we have categorized our findings into multiple domains, it is apparent that all are shaped by and connected to one another. Given that important changes materialize during the adolescent life period, it is evident that adolescence is a critical stage for promoting positive health throughout the life course. As Patton and Temmerman[59] summarize, "[g]ood adolescent health generates a "triple dividend" from optimal growth and fulfilled youth potential, healthier trajectories across the life course and the healthiest possible start to life for the next generation". The overall importance of investing in adolescent health was echoed by several key informants, suggesting that a paradigm shift in the way our society views this developmental stage and population is required. Two key informants summarized these arguments below:

> *"I really think adolescence in itself is a really important developmental time. And that without some focus on really understanding that developmental phase, and really investing in […] that developmental phase, that we're not going to improve outcomes. […] You can see it in so many different ways, […] but I actually think the investment needs to be now focused […] more on youth."* (Healthcare Provider HP-08)

> *"I just want to highlight that this is such an area of potential, there's so much opportunity in investing in adolescence and young adult health or emerging adult health, the long term sort of capital gains if you want to speak in financial terms, are exponential if you invest in them at this time […] and then that translates into […] increased quality of life and these young people become parents, they become teachers, they become […] people that keep the financial world going because they have jobs and they nurture the next generation. So, what a better time to invest [than] at this time."* (Healthcare Provider HP-04)

5. Conclusions

TD, in partnership with CCHF, plans to invest $15 million over ten years to support adolescent health as part of the *TD Ready Commitment*. This paper aims to inform their work. Through review of the global research literature and published work of leading organizations, agencies and groups that focus on adolescent health, along with interviewing 29 adolescent health experts and stakeholders, this paper outlines many challenges and opportunities for investment.

Adolescents are often characterized as a neglected population. As a result, adolescent health is a fuzzy topic, sandwiched between more clearly defined child/pediatric health and adult health. This fuzziness can lead to incoherent strategies and persistent challenges. While there is an impressive global evidence base on the needs and priorities for adolescent health, with the 2017 World Health Organization's "AA-

HA!" report[20] and the 2016 Lancet Commission on Adolescent Health and Wellbeing[17] two important and relatively recent examples, much of this evidence casts a broad net across low, middle and high income country contexts. The Canadian-specific evidence base is less robust, particularly the lack of a systematic and ongoing assessment of adolescent health outcomes upon which to target adolescent health strategies and investments.

This paper identifies a number of needs and priorities, with some clearly rising to the top. Mental health and addiction and sexual and reproductive health were consistently identified as important, but not exclusive, adolescent health priorities. A wide range of health and non-health sector needs and priorities were noted. Importantly, our work captured considerable focus on adolescent sub-populations irrespective of domains of need. The health needs of racialized, LGBTQ2S+ and low-income/ underemployed adolescent sub-populations requires consideration. This highlights the potential relevance of two-pronged investment strategy for adolescent health, one focused on key domains of need and one focused on key sub-populations in need. TD and CCHF, for example, may want to consider directing their investments both to targeted domains such as mental health, but also target investments toward specific sub-populations, such as racialized youth, that may overlap multiple domains of need.

Ultimately, there is no one way to inform the decision of what or where to invest in adolescent health. However, there is a strong and established overarching rationale for investing in adolescent health. This white paper provides further information and insight to guide those investment decisions.

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Appendix 1: Approach and Methods

Appendix 1A: Scoping Review and Targeted Scan Methods

Search Strategies

In order to identify relevant research and contextual evidence, we searched traditional health and social sciences databases (MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, International Bibliography of the Social Sciences (IBSS)), a web-based literature review repository (Health Systems Evidence), and web search engines (Google Scholar, Google, Google Book).

No language limits were placed on searches (but language limits were included as part of our eligibility criteria). Given the large body of literature on adolescent health, we limited our searches to the last five years (2015-Present). Since our goal was to capture gaps and needs for investment in adolescent health broadly, we further limited our search to literature reviews, commentaries, editorials, and grey literature reports. An outline of our final search strategies for each database can be found in **Appendices 1C-1F**.

For the traditional databases (MEDLINE, CINAHL, PsycINFO, IBSS), our search strategy was designed to yield the maximum number of relevant results. It employed the following summarized search logic incorporating Boolean operators: (adolescent health AND health care needs) OR (adolescent health AND health equity).

For the web search engines (Google Scholar, Google, Google Book), our search strategy employed an iterative approach. Since web search engines do not accommodate complex Boolean searches used for traditional databases, we adapted our traditional database search strategy to include multiple searches to ensure comparable coverage. For the web-based literature review repository (Health Systems Evidence), we included all reviews on adolescent health that met our eligibility criteria.

For the targeted scan, a list of 50 organizations was generated in consultation with the teams at TD and CCHF and derived from Google search results (see **Appendix 1G** for list of organizations). To ensure relevance to the Canadian context, we limited the targeted scan to high income and/or OECD countries. We conducted a manual scan of each website for relevant material on adolescent health needs, with a focus on health equity.

Eligibility Criteria

Table A1.1 outlines the specific inclusion and exclusion criteria we used for the review.

Table A1.1 Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
English or French language	Non-English or French languages
Published 2015-Present	Published before 2015
Literature reviews, commentaries, editorials, reports	Empirical research articles
Focus primarily on adolescent/youth population as defined by the authors	Focus on young children or adults
Focus on high income or OECD countries	Focus on low and middle income or non-OECD countries
Focus on needs, gaps, priorities, challenges, issues, or strategic areas for adolescent health or health care	Focus on gaps for research or methods
Goes beyond effectiveness of interventions to provide insight into needs	Focus on issues related to implementation of interventions

Screening and Reviewing

All search results were exported to and managed in MS Excel. Titles and abstracts (or excerpts) were screened for relevance. Sources flagged for possible inclusion were collected (where available), and full texts were reviewed. A second reviewer conducted a 10% double screen/review to assess biases and enhance the rigour of the review. Overall, we identified 2243 sources, of which 383 were flagged for review with 339 ultimately available for full text review. Of the 80 sources included in the scoping review and targeted scan, there were 28 reviews, 26 reports or books, 17 commentaries or editorials, and 9 policy or position statements. Most of the sources were about adolescent health needs globally (28) or focused on the US context (24). We identified 10 Canadian sources, 9 from Australia and New Zealand, 5 from the UK and Ireland, and 4 pan-European. Documents identified through the scoping review and targeted scan were uploaded to NVivo qualitative data management and analysis software. Documents were coded for domains (i.e., adolescent health gaps or needs) and populations (including adolescents in general and by sub-population). **Table A1.2** provides an overview of search results, screening, reviewing and final numbers of included sources.

Table A1.2 Scoping Review and Targeted Scan Search Results

Source	Search results (n)	Screened/recommended for full text review (n)	Full text available for review (n)	Sources included in review (n)
MEDLINE	1130	225	209	35
CINAHL	341			
PsycINFO	19			
IBSS	104			
HSE	99	4	3	0
Google Scholar	200	53	51	13
Google	200	96	71	3
Google Book	100	5	5	1
Targeted Scan	52	NA	NA	28
TOTAL	**2243**	**383**	**339**	**80**

Appendix 1B: Key Informant Interview Methods

The objective of the key informant interviews was to identify gaps and needs for investment in adolescent health in Canada. Interview data were used to provide more depth to the results of the scoping review findings and provide additional details based on the experience of our informants.

The initial aim was to conduct 20 key informant interviews. To reach that number, 48 key informants with expertise in various areas related to adolescent health were identified and invited via email to participate in a virtual key informant interview. In developing the sampling plan, diverse representation in terms of sector, geographical location, and subject matter expertise was prioritized where possible (see **Tables A1.3 to A1.5** for details on key informants invited).

Twenty-nine semi-structured interviews were conducted via Zoom by a trained qualitative interviewer between 21 August 2020 and 30 September 2020 (see **Appendix 1H** for the interview guide). Nine individuals declined participation and ten individuals did not respond to our invitation.

All interviews were recorded through Zoom and transcribed using Otter.ai. Interview content was thematically coded using an inductive approach. The themes highlighted in this report were identified based on the frequency through which a concept, idea, or word was discussed across key informants. This method enabled the identification and exploration of common gaps and needs in adolescent health across a relatively large sample of key informants with diverse professional backgrounds and perspectives.

Table A1.3: Jurisdiction of Key Informants

Jurisdiction	Interview Completed	Declined	No Response	TOTAL
Alberta	5	2	0	**7**
British Columbia	3	0	0	**3**
Manitoba	0	0	2	**2**
New Brunswick	0	0	1	**1**
Newfoundland and Labrador	1	0	0	**1**
Nova Scotia	5	0	1	**6**
Northwest Territories	1	1	1	**3**
Ontario	6	4	4	**14**
Prince Edward Island	0	1	0	**1**
Quebec	2	0	0	**2**
Saskatchewan	1	0	0	**1**
Canada	4	1	0	**5**
International	1	1	0	**2**
TOTAL	**29**	**1**	**9**	**48**

Table A1.4: Content Expertise of Key Informants

Content Area	Interview Completed	Declined	No Response	TOTAL
General/Multiple	15	5	3	**23**
Mental Health and Addiction	5	2	0	**7**
Chronic Conditions	1	0	2	**3**
Relationships with Food	1	0	0	**1**
Sexual & Reproductive Health	3	0	1	**4**
Gender Identity	1	1	1	**3**
Racialized/ Immigrant/Newcomer Health	1	1	1	**3**
Indigenous Health	2	1	1	**4**
TOTAL	**29**	**10**	**9**	**48**

Table A1.5: Organization/Field of Key Informants

Organization/Field	Interview Completed	Declined	No Response	TOTAL
Government Ministries/Agencies Responsible for Adolescent Health	3	1	0	**4**
Research Funders	2	1	0	**3**
Patient Advocacy Organizations	3	2	2	**7**
Healthcare Providers	11	1	3	**15**
Senior Administrators of Organizations that Provide Services to Adolescents	6	1	4	**11**
Researchers	4	4	0	**8**
TOTAL	**29**	**10**	**9**	**48**

Appendix 1C: MEDLINE Search Strategy

Search date: August 21, 2020

# ▲	Searches	Results
1	exp Adolescent/	2029489
2	exp Adolescent Health/	1133
3	exp Adolescent Health Services/	5583
4	exp Adolescent Medicine/	1528
5	1 or 2 or 3 or 4	2029724
6	exp "Health Services Needs and Demand"/	59675
7	exp Needs Assessment/	30389
8	6 or 7	88227
9	exp Health Equity/	1284
10	health equity.mp.	4170
11	exp "Social Determinants of Health"/	3229
12	social determinants of health.mp.	7181
13	exp Socioeconomic Factors/	450896
14	socioeconomic.mp.	219098
15	exp Health Status Disparities/	15698
16	exp Health Services Accessibility/	111302
17	9 or 10 or 11 or 12 or 13 or 14 or 15 or 16	599874
18	5 and 8	12511
19	5 and 17	116547
20	18 or 19	125097
21	limit 20 to yr="2015 -Current"	30462
22	limit 21 to (editorial or "review" or "systematic review")	1130

Appendix 1D: CINAHL Search Strategy

Search Date: August 21, 2020

Search ID#	Search Terms	Search Options	Actions
S26	S22 AND S25	**Search modes** - Boolean/Phrase	View Results (334)
S25	S23 OR S24	**Search modes** - Boolean/Phrase	View Results (73,296)
S24	"editorial"	**Limiters** - Published Date: 20150101-20201231 **Search modes** - Boolean/Phrase	View Results (20,372)
S23	(MH "Scoping Review") OR (MH "Systematic Review") OR (MH "Literature Review")	**Limiters** - Published Date: 20150101-20201231 **Search modes** - Boolean/Phrase	View Results (53,018)
S22	S19 OR S20	**Limiters** - Published Date: 20150101-20201231 **Search modes** - Boolean/Phrase	View Results (15,141)
S21	S19 OR S20	**Search modes** - Boolean/Phrase	View Results (39,625)
S20	S5 AND S18	**Search modes** - Boolean/Phrase	View Results (35,860)
S19	S5 AND S8	**Search modes** - Boolean/Phrase	View Results (5,215)
S18	S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17	**Search modes** - Boolean/Phrase	View Results (198,139)
S17	(MH "Healthcare Disparities")	**Limiters** - Published Date: 20150101-20201231 **Search modes** - Boolean/Phrase	View Results (8,624)
S16	(MH "Health Services Accessibility")	**Search modes** - Boolean/Phrase	View Results (86,160)
S15	(MH "Health Status Disparities")	**Search modes** - Boolean/Phrase	View Results (7,597)
S14	(MH "Economic Status")	**Search modes** - Boolean/Phrase	View Results (443)
S13	"socioeconomic"	**Search modes** - Boolean/Phrase	View Results (107,385)
S12	(MH "Socioeconomic Factors")	**Search modes** - Boolean/Phrase	View Results (88,668)
S11	"social determinants of health"	**Search modes** - Boolean/Phrase	View Results (7,355)
S10	(MH "Social Determinants of Health")	**Search modes** - Boolean/Phrase	View Results (5,668)
S9	"health equity"	**Search modes** - Boolean/Phrase	View Results (2,108)
S8	S6 OR S7	**Search modes** - Boolean/Phrase	View Results (40,050)
S7	(MH "Health Services Needs and Demand")	**Search modes** - Boolean/Phrase	View Results (23,783)
S6	(MH "Needs Assessment")	**Search modes** - Boolean/Phrase	View Results (17,711)
S5	S1 OR S2 OR S3 OR S4	**Search modes** - Boolean/Phrase	View Results (528,460)
S4	(MH "Adolescent Health Services")	**Search modes** - Boolean/Phrase	View Results (2,802)
S3	(MH "Adolescent Medicine")	**Search modes** - Boolean/Phrase	View Results (364)
S2	(MH "Adolescent Health")	**Search modes** - Boolean/Phrase	View Results (7,700)
S1	(MH "Adolescence")	**Search modes** - Boolean/Phrase	View Results (526,995)

Appendix 1E: PsycINFO Search Strategy

Search date: August 21, 2020

# ▲	Searches	Results
1	adolescent.mp.	381957
2	exp Adolescent Health/	1771
3	exp Adolescent Development/	55420
4	1 or 2 or 3	382392
5	exp Needs Assessment/	4264
6	health equity.mp.	956
7	exp Health Disparities/	8060
8	exp Minority Groups/	16207
9	exp Social Justice/	6841
10	exp "Equity (Social)"/	9732
11	exp Socioeconomic Status/	57578
12	social determinants of health.mp.	1967
13	6 or 7 or 8 or 9 or 10 or 11 or 12	95979
14	4 and 5	404
15	4 and 13	10841
16	14 or 15	11231
17	limit 16 to yr="2015 - 2021"	2544
18	limit 17 to (editorial or reviews)	19

Appendix 1F: Search Strategies for other Databases

IBSS Search Strategy
Search date: August 21, 2020
Search string:

(adolescent AND (needs assessment)) OR (adolescent AND ((social determinants of health) OR (health equity) OR socioeconomic))

Additional Limits: Date: After 2015; Document type: Commentary, Editorial, Review

Health Systems Evidence Search Strategy
Search Date: August 21, 2020
Search string:

Adolescent

Filters: Document features: Evidence briefs for policy, Overviews of systematic reviews, Systematic reviews of effects, Systematic reviews addressing other questions; Date range: 2015-2020

Google Scholar Search Strategy
Search date: August 21, 2020
Search strings:

1) *adolescent health gaps needs priorities (100)*
2) *adolescent health equity socioeconomic disparities review (100)*

Filters: Date range 2015-2020; Exclude: Patents, Citations

Google Search Strategy
Search date: September 3, 2020
Search strings:

1) *adolescent health disparities (100)*
2) *adolescent health needs assessment (50)*
3) *best practices in adolescent health (50)*

Search settings: “Do not use private results” & Canada region selected; repeat search with omitted results included

Google Book Search Strategy
Search date: September 3, 2020
Search string:

adolescent health gaps needs priorities (100)

Search settings: “Do not use private results” & Canada region selected

Appendix 1G: Targeted Scan Organizations

Jurisdiction	Organization	URL
Canada	Adolescent Health Lab, Simon Fraser University	https://www.adolescenthealth.ca/
Canada	Canada's Children's Hospital Foundations	https://childrenshospitals.ca/
Canada	Canadian Institute of Child Health Profile – The health of Canada's Children and Youth	https://cichprofile.ca/
Canada	Canadian Institutes of Health Research – Institute for Human Development, Child and Youth Health	https://cihr-irsc.gc.ca/e/8688.html
Canada	Canadian Paediatric Society	https://www.cps.ca/en/sections/adolescent-health
Canada	Centre for Addiction and Mental Health	https://www.camh.ca/en/your-care/programs-and-services?facets=alphabet_facet:Y
Canada	Children's Healthcare Canada	https://www.childrenshealthcarecanada.ca/
Canada	Health Canada – Youth Health	https://www.canada.ca/en/services/health/youth-health.html
Canada	Institute for Youth Health and Development	https://www.iyhd.ca/
Canada	Jack.org	https://jack.org/Home
Canada	LGBT Youth Line	https://www.youthline.ca/
Canada	Native Child and Family Services of Toronto	https://nativechild.org/
Canada	Ontario Ministry of Children, Community and Social Services	https://www.mcss.gov.on.ca/en/mcss/index.aspx
Canada	The Sandbox Project	http://sandboxproject.ca/
Australia	Australian Association for Adolescent Health	https://www.aaah.org.au/
Australia	Australian Research Alliance for Children and Youth	https://www.aracy.org.au/about-us
Greece	Greek Society of Adolescent Medicine	https://www.youth-med.gr/index.php/en/
United Kingdom	Association for Young People's Health	https://www.youngpeopleshealth.org.uk/
United Kingdom	Children and Young People MedTech Cooperative, National Institute for Health Research	https://cypmedtech.nihr.ac.uk/
United Kingdom	Royal College of Paediatrics and Child Health	https://www.rcpch.ac.uk/
United Kingdom	UK Child Health Research Collaboration	https://www.rcpch.ac.uk/resources/uk-child-health-research-collaboration#:~:text=The%20UKCHRC%20is%20a%20growing,health%20and%20wellbeing%20of%20children.
United States	Adolescent Health Initiative	https://www.umhs-adolescenthealth.org/
United States	American Academy of Pediatrics	https://www.aap.org/en-us/about-the-aap/aap-press-room/campaigns/adolescent-health-care/Pages/default.aspx
United States	American College Health Association	https://www.acha.org/
United States	Association of Maternal and Child Health Programs	http://www.amchp.org/programsandtopics/AdolescentHealth/Pages/default.aspx
United States	California Adolescent Health Collaborative	http://www.californiateenhealth.org/
United States	Centre for Adolescent Health, Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health	https://www.jhsph.edu/research/centers-and-institutes/center-for-adolescent-health/
United States	Centers for Disease Control and Prevention, Division of Adolescent and School Health	https://www.cdc.gov/healthyyouth/about/index.htm
United States	Division of Adolescent and Young Adult Medicine at UPMC Children's Hospital of Pittsburgh	https://www.chp.edu/research/areas/adolescent-medicine

United States	National Institutes of Health – Eunice Kennedy Shriver National Institute of Child Health and Human Development	https://www.nichd.nih.gov/
United States	Healthy Teen Network	https://www.healthyteennetwork.org/
United States	Johns Hopkins Center for Adolescent Health	https://www.jhsph.edu/research/centers-and-institutes/center-for-adolescent-health/_images/_pre-redesign/index.html
United States	Kaiser Permanente Washington Health Research Institute	https://www.kpwashingtonresearch.org/our-research/research-areas/child-adolescent-health
United States	National Adolescent and Young Adult Health Information Center	https://nahic.ucsf.edu/
United States	National Alliance to Advance Adolescent Health	https://www.thenationalalliance.org/
United States	National Institute of Mental Health	https://www.nimh.nih.gov/health/topics/child-and-adolescent-mental-health/index.shtml
United States	Health and Human Services, Office of Population Affairs	https://www.hhs.gov/ash/oah/adolescent-development/index.html
United States	RAND Corporation	https://www.rand.org/topics/adolescent-health.html
United States	Society for Adolescent Health and Medicine	https://www.adolescenthealth.org/Home.aspx
United States	William T. Grant Foundation	http://wtgrantfoundation.org/
United States	Youth.gov	https://youth.gov/youth-topics/adolescent-health
Multi-Jurisdictional/ International	European Association for Research on Adolescence	https://www.earaonline.org/
Multi-Jurisdictional/ International	International Association for Adolescent Health	https://www.iaymh.org/
Multi-Jurisdictional/ International	International Association for Youth Mental Health	https://iaah.org/
Multi-Jurisdictional/ International	Organization for Economic Co-operation and Development (OECD)	http://www.oecd.org/
Multi-Jurisdictional/ International	Planned Parenthood	https://www.plannedparenthood.org/learn/teens
Multi-Jurisdictional/ International	The Paediatric International Patient Safety and Quality Community	https://www.pipsqc.org/
Multi-Jurisdictional/ International	UNICEF	https://www.unicef.org/health/child-and-adolescent-health-and-well-being
Multi-Jurisdictional/ International	World Health Organization	https://www.who.int/maternal_child_adolescent/en/
Multi-Jurisdictional/ International	Young Health Programme	https://www.younghealthprogrammeyhp.com/
Multi-Jurisdictional/ International	Youth Health Organization International	https://www.yho.network/

Appendix 1H: Key Informant Interview Guide

A. Introduction

1. For the record, can you briefly describe your role/position with the organization(s) you are affiliated with as well as any responsibilities or experience as they relate to addressing adolescent health and/or wellbeing?

B. Gaps in Adolescent Health

2. In your view, what are the most important challenges and needs that adolescents in Canada face that are impacting their health?
    a. Probe: What gaps in adolescent health care and health service provision exist?
    b. Probe: Understanding that health is also impacted by services and factors outside of the healthcare sector, what are the key gaps in adolescent social service and program provision (i.e., outside of the healthcare sector)?
    c. Probe: Are these challenges changing over time? Future?
3. How do these needs, challenges and gaps differ within adolescent sub-communities?
    a. Probe: LGBTQ2S adolescents? BIPOC adolescents? Adolescents from low-income households?
    b. Probe: province-specific, city-specific, age? Rural/urban?

C. Investments in Adolescent Health

4. If you could decide how to invest a significant amount of money in adolescent health, how would you choose to allocate it to improve adolescent health?
    a. Probe: Which areas should investments be made?
    b. Probe: Gender identity, sexual & reproductive health, chronic conditions, relationships with food, substance use, transition to adult care and mental health. Also probe for other areas (e.g., school-based investments)?
    c. Probe: Are there specific interventions or programs that you view as promising or having good potential for impact on adolescent health?
5. Do you think that the current funding related to adolescent health is appropriate and well distributed?
    d. Probe: Are there areas that require more funding? Are there some that are already well-funded?
    e. Probe: Are there other sectors that should be providing more/less (healthcare sector/community agencies/government/research institutions/private sector)? Could things be done differently?
6. Given what you've mentioned about…. How do you view the role of these interventions for different sub-populations?
    f. The health needs of BIPOC adolescents? LGBTQ2S+ adolescents? Adolescents from low-income households? Rural/urban?

D. Wrap-Up

7. Are you aware of any resources (e.g., journal articles, grey literature) that are related/could be useful to our study?
8. Do you have any other comments or questions?

Appendix 2: Scoping Review Included Articles

ID	Citation – Articles included in scoping review
G30	Veale, Jaimie F., Ryan J. Watson, Tracey Peter, and Elizabeth M. Saewyc. 2017. "Mental Health Disparities Among Canadian Transgender Youth." Journal of Adolescent Health 60 (1): 44–49.
G39	Alegría, Margarita, Jennifer Greif Green, Katie A. McLaughlin, and Stephen Loder. 2015. "Disparities in Child and Adolescent Mental Health and Mental Health Services in the U.S." A William T. Grant Inequality Paper, 1–26.
G180	Jansen, Danielle, Sonia Saxena, and Natasha Azzopardi-Muscat. 2017. "Public Health Practice and Policy to Improve Child and Adolescent Health in Europe." Journal of Pediatrics 190: 293-294.e2.
GB90	United Nations. 2018. World Youth Report: Youth and the 2030 Agenda for Sustainable Development World. United Nations Department of Economic and Social Affairs.
GS2	Delany-Moretlwe, Sinead, Frances M. Cowan, Joanna Busza, Carolyn Bolton-Moore, Karen Kelley, and Lee Fairlie. 2015. "Providing Comprehensive Health Services for Young Key Populations: Needs, Barriers and Gaps." Journal of the International AIDS Society 18 (2): 29–40.
GS10	Laski, Laura. 2015. "Realising the Health and Wellbeing of Adolescents." BMJ (Online) 351: 15–18.
GS13	Lassi, Zohra S., Rehana A. Salam, Jai K. Das, Kerri Wazny, and Zulfiqar A. Bhutta. 2015. "An Unfinished Agenda on Adolescent Health: Opportunities for Interventions." Seminars in Perinatology 39 (5): 353–60.
GS27	Dick, Bruce, and B. Jane Ferguson. 2015. "Health for the World's Adolescents: A Second Chance in the Second Decade." Journal of Adolescent Health 56 (1): 3–6.
GS33	Murphy, Devin, James L. Klosky, Damon R. Reed, Amanda M. Termuhlen, Susan V. Shannon, and Gwendolyn P. Quinn. 2015. "The Importance of Assessing Priorities of Reproductive Health Concerns among Adolescent and Young Adult Patients with Cancer." Cancer 121 (15): 2529–36.
GS39	Singh, Swaran P., and Helena Tuomainen. 2015. "Transition from Child to Adult Mental Health Services: Needs, Barriers, Experiences and New Models of Care." World Psychiatry 14 (3): 358–61.
GS51	Patton, George C., Susan M. Sawyer, David A. Ross, Russell M. Viner, and John S. Santelli. 2016. "From Advocacy to Action in Global Adolescent Health." Journal of Adolescent Health 59 (4): 375–77.
GS55	Patterson, Pandora, Fiona E.J. McDonald, Brad Zebrack, and Sharon Medlow. 2015. "Emerging Issues among Adolescent and Young Adult Cancer Survivors." Seminars in Oncology Nursing 31 (1): 53–59.
GS91	Robards, Fiona, Melissa Kang, Tim Usherwood, and Lena Sanci. 2018. "How Marginalized Young People Access, Engage With, and Navigate Health-Care Systems in the Digital Age: Systematic Review." Journal of Adolescent Health 62 (4): 365–81.
GS93	Degenhardt, Louisa, Emily Stockings, George Patton, Wayne D. Hall, and Michael Lynskey. 2016. "The Increasing Global Health Priority of Substance Use in Young People." The Lancet Psychiatry 3 (3): 251–64.
GS96	Azzopardi, Peter S., Susan M. Sawyer, John B. Carlin, Louisa Degenhardt, Ngiare Brown, Alex D. Brown, and George C. Patton. 2018. "Health and Wellbeing of Indigenous Adolescents in Australia: A Systematic Synthesis of Population Data." The Lancet 391 (10122): 766–82.
GS103	Larson, Nicole, and Mary Story. 2015. "Barriers to Equity in Nutritional Health for U.S. Children and Adolescents: A Review of the Literature." Current Nutrition Reports 4 (1): 102–10.
GS161	Trent, Maria, Danielle G. Dooley, Jacqueline Dougé, Maria E. Trent, Robert M. Cavanaugh, Amy E. Lacroix, Jonathon Fanburg, et al. 2019. "The Impact of Racism on Child and Adolescent Health." Pediatrics 144 (2).
TDB4	Cowell, Julia Muennich, and Tonda L. Hughes. 2017. "Health Risks of Sexual Minority Youth." Journal of School Nursing 33 (2): 93–94.
TDB20	Plesons, Marina, Claire B. Cole, Gwyn Hainsworth, Ruben Avila, Kalisito Va Eceéce Biaukula, Scheherazade Husain, Eglė Janušonytė, et al. 2019. "Forward, Together: A Collaborative Path to Comprehensive Adolescent Sexual and Reproductive Health and Rights in Our Time." Journal of Adolescent Health 65 (6): S51–62.
TDB71	Halkitis, Perry N., Anthony J. Maiolatesi, and Kristen D. Krause. 2020. "The Health Challenges of Emerging Adult Gay Men: Effecting Change in Health Care." Pediatric Clinics of North America 67 (2): 293–308.
TDB122	Kroening, Abigail L.H., and Elizabeth Dawson-Hahn. 2019. "Health Considerations for Immigrant and Refugee Children." Advances in Pediatrics 66: 87–110.

TDB165	Borsch, Anne Sofie, Christopher Jamil de Montgomery, Karl Gauffin, Ketil Eide, Elli Heikkilä, and Signe Smith Jervelund. 2019. "Health, Education and Employment Outcomes in Young Refugees in the Nordic Countries: A Systematic Review." Scandinavian Journal of Public Health 47 (7): 735–47.
TDB184	Karnik, Niranjan S., and Dominika A. Winiarski. 2019. "Editorial: Bullying and Suicide Risk: Restructuring Prevention, Identification, and Treatment to Address a Global Mental Health Crisis." Journal of the American Academy of Child and Adolescent Psychiatry 58 (9): 851–52.
TDB292	Muth, Natalie D., William H. Dietz, Sheela N. Magge, Rachel K. Johnson, Christopher F. Bolling, Sarah C. Armstrong, Matthew Allen Haemer, Natalie D. Muth, John Conrad Rausch, and Victoria Weeks Rogers. 2019. "Public Policies to Reduce Sugary Drink Consumption in Children and Adolescents." Pediatrics 143 (4).
TDB302	McCann, Edward, and Michael Brown. 2019. "Homelessness among Youth Who Identify as LGBTQ+: A Systematic Review." Journal of Clinical Nursing 28 (11–12): 2061–72.
TDB377	Christie, Deborah. 2018. "Global Adolescent Health Equity: A Brave New World." Journal of Adolescent Health 63 (3): 368–71.
TDB379	Rafferty, Jason. 2018. "Ensuring Comprehensive Care and Support for Gender Non-Conforming Children and Adolescents." Pediatrics 142 (4).
TDB392	Straub, Diane M., and Amanda E. Tanner. 2018. "Health-Care Transition from Adolescent to Adult Services for Young People with HIV." The Lancet Child and Adolescent Health 2 (3): 214–22.
TDB467	Rice, Simon M., Rosemary Purcell, and Patrick D. McGorry. 2018. "Adolescent and Young Adult Male Mental Health: Transforming System Failures Into Proactive Models of Engagement." Journal of Adolescent Health 62 (3): S9–17.
TDB489	Watson, Heidi, and Rochelle Moss. 2018. "Adolescents and Young Adults with Cancer in New Zealand-Understudied and Underserved." New Zealand Medical Journal 131 (1468): 8–11.
TDB490	Ferrara, Pietro, Francesca Ianniello, Alberto Villani, and Giovanni Corsello. 2018. "Cyberbullying a Modern Form of Bullying: Let's Talk about This Health and Social Problem." Italian Journal of Pediatrics 44 (1): 1–3.
TDB538	The Lancet. 2017. "The next Phase for Adolescent Health: From Talk to Action." The Lancet 390 (10106): 1927.
TDB571	Coyne-Beasley, Tamera. 2017. "Cultivating Connectedness and Equity: A Call to Action for the Global Adolescent Health Community." Journal of Adolescent Health 61 (3): 392–95.
TDB596	The Lancet Psychiatry. 2017. "Adolescent Mental Health: Reasons to Be Cheerful." The Lancet Psychiatry 4 (7): 507.
TDB599	Block, Jason P., and Emily Oken. 2017. "Practical Considerations for the Us Preventive Services Task Force Recommendations on Obesity in Children and Adolescents." JAMA Internal Medicine 177 (8): 1077–79.
TDB783	The Lancet. 2016. "Migrant and Refugee Children Need Our Actions Now." The Lancet 388 (10050): 1130.
TDB789	Gergelis, Kristyn, Jonathan Kole, and Elizabeth A. Lowenhaupt. 2016. "Health Care Needs of Incarcerated Adolescents." Rhode Island Medical Journal (2013) 99 (9): 24–26.
TDB832	Patton, George C, Susan M Sawyer, John S Santelli, David A Ross, Rima Afifi, B Nicholas, Monika Arora, et al. 2016. "Our Future: A Lancet Commission on Adolescent Health and Wellbeing." Lancet 387 (10036): 2423–78.
TDB857	Barr, Ronald D., Andrea Ferrari, Lynn Ries, Jeremy Whelan, and W. Archie Bleyer. 2016. "Cancer in Adolescents and Young Adults: A Narrative Review of the Current Status and a View of the Future." JAMA Pediatrics 170 (5): 495–501.
TDB979	Hergenroeder, Albert C., Constance M. Wiemann, and Mitchell B. Cohen. 2015. "Current Issues in Transitioning from Pediatric to Adult-Based Care for Youth with Chronic Health Care Needs." The Journal of Pediatrics 167 (6): 1196–1201.
TDB1031	Bremberg, Sven. 2015. "Mental Health Problems Are Rising More in Swedish Adolescents than in Other Nordic Countries and the Netherlands." Acta Paediatrica, International Journal of Paediatrics 104 (10): 997–1004.
TDB1081	Kelleher, Kelly, Katherine J. Deans, and Deena J. Chisolm. 2015. "Federal Policy Supporting Improvements in Transitioning from Pediatric to Adult Surgery Services." Seminars in Pediatric Surgery 24 (2): 61–64.
TDB1123	Collishaw, Stephan. 2015. "Annual Research Review: Secular Trends in Child and Adolescent Mental Health." Journal of Child Psychology and Psychiatry and Allied Disciplines 56 (3): 370–93.

TDB1139	Pottie, Kevin, Govinda Dahal, Katholiki Georgiades, Kamila Premji, and Ghayda Hassan. 2015. "Do First Generation Immigrant Adolescents Face Higher Rates of Bullying, Violence and Suicidal Behaviours Than Do Third Generation and Native Born?" Journal of Immigrant and Minority Health 17 (5): 1557–66.
TDB1187	Raynor, Phyllis A., Austin Nation, and Freida Outlaw. 2020. "Exploring Substance Use and Mental Health for Minority Transgender Youth: Implications for Advanced Practice Nurses." Journal of the American Association of Nurse Practitioners 32 (3): 229–43.
TDB1207	Lusk, Pamela. 2019. "Increasing Timely Access to Psychiatric/Mental Health Care: Meeting Children and Adolescents Where They Are." Journal of Child and Adolescent Psychiatric Nursing 32 (4): 169–70.
TDB1211	Clarke, Mairghread, Jeremy Lewin, Smaro Lazarakis, and Kate Thompson. 2019. "Overlooked Minorities: The Intersection of Cancer in Lesbian, Gay, Bisexual, Transgender, and/or Intersex Adolescents and Young Adults." Journal of Adolescent and Young Adult Oncology 8 (5): 525–28.
TDB1221	McMahon, J., F. Ryan, M. Cannon, G. O'Brien, M. O'Callaghan, R. Flanagan, K. O'Connor, D. Chambers, S. Byrne, and P. McGorry. 2019. "Where next for Youth Mental Health Services in Ireland?" Irish Journal of Psychological Medicine 36 (3): 163–67.
TDB1233	Planey, Arrianna M., Shardé Mc Neil Smith, Stephanie Moore, and Taylor D. Walker. 2019. "Barriers and Facilitators to Mental Health Help-Seeking among African American Youth and Their Families: A Systematic Review Study." Children and Youth Services Review 101 (December 2018): 190–200.
TDB1249	England, Elizabeth, and Faraz Mughal. 2019. "Underprovision of Mental Health Services for Children and Young People." British Journal of General Practice 69 (680): 112–13.
TDB1272	Westers, Nicholas J., and Alison J. Culyba. 2018. "Nonsuicidal Self-Injury: A Neglected Public Health Problem among Adolescents." American Journal of Public Health 108 (8): 981–83.
TDB1382	Barlow, Jane. 2016. "Editorial: CAMH – Meeting the Changing Mental Health Needs of Children in the 21st Century." Child and Adolescent Mental Health 21 (4): 181–82.

Appendix 3: Targeted Scan Included Articles

ID	Title	Organization	Jurisdiction
O1	National Strategy for Young Australians	Australian Government	Australia
O2	NSW Youth Health Framework 2017-24	New South Wales Government	Australia
O3	NSW Strategic Plan for Children and Young People 2016 - 2019	New South Wales Government	Australia
O4	Tasmanian Child and Youth Wellbeing Framework	Tasmanian Government	Australia
O5	WA Youth Health Policy 2018–2023.	Government of Western Australia, Department of Health	Australia
O6	WA Youth Health Policy 2018–2023 Companion Resource	Government of Western Australia, Department of Health	Australia
O7	Healthy Foundations of Life: Refreshed Strategic Plan 2018–2020	CIHR Institute of Human Development, Child and Youth Health	Canada
O8	The global strategy for women's, children's and adolescents' health (2016-2030)	United Nations	Inter/Multi-national
O9	The Teen Years Explained: A Guide to Healthy Adolescent Development	Center for Adolescent Health, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University	US
O10	Promoting positive adolescent health behaviors and outcomes: Thriving in the 21st Century	Committee on Applying Lessons of Optimal Adolescent Health to Improve Behavioral Outcomes for Youth, National Academies of Sciences, Engineers, and Medicine	US
O11	Investing in Adolescent and Young Adult Health: Pediatricians, Parents, and Youth Working Together to Improve Lifelong Health	American Academy of Pediatrics	US
O12	Raising Canada 2020: Top 10 Threats to Childhood in Canada and the Impact of COVID-19	Children First Canada, University of Calgary, and Alberta Children's Hospital	Canada
O13	The Other Side of the Door 2017: A Practice Guide for Child Welfare Professionals Working with First Nations, Inuit and Metis Peoples	Ontario Association of Children's Aid Societies	Canada
O14	Reconciling the First Ten Years of Child Welfare	Native Child and Family Services of Toronto	Canada
O15	We're Here: 2SLGBTQ+ Youth across Ontario Assert Needs and Experiences: A Summary Report 2020	LGBT Youth Line	Canada
O16	Youth Voice Report 2019	jack.org	Canada
O17	Children & Young People's Mental Health in the Digital Age: Shaping the Future	OECD	Inter/Multi-national
O18	Key data on young people 2019: Latest information and statistics	Association for Young People's Health	UK
O19	Closing the employment gap for young people: A toolkit for those supporting 16-25 year olds experiencing common mental health problems to gain and stay in work	Health and Wellbeing Alliance, Department of Health and Social Care	UK
O20	Healthy Teen Network 2017 - 2020 Strategic Plan	Healthy Teen Network	US

O21	Improving young adult health: state & local strategies for success	Adolescent and Young Adult Health National Resource Center	US
O22	Improving adolescent health: what are the priorities?	AstraZeneca Young Health Programme	Inter/Multi-national
O23	Youth Health Rights in Canada: Discussion Paper	Joint Centre for Bioethics, University of Toronto	Canada
O24	The Wellbeing of young Australians REPORT CARD 2018	Australian Research Alliance for Children and Youth and RAND Australia	Australia
O25	Adolescent Health: Think, Act, Grow (TAG)—A Strengths-Based Approach to Promoting Health in Youth	Department of Health and Human Services Office of Adolescent Health	US
O26	The Path Forward: DASH Strategic Plan 2020-2025	Division of Adolescent and School Health, Centers for Disease Control and Prevention	US
O27	Our Children. Canada's Future.	Children's Healthcare Canada and Pediatric Chairs of Canada	Canada
O28	Worlds Apart: Canadian Companion to UNICEF Report Card 16	Unicef Canada	Canada

Appendix 4: Sub-Domains of Need/Priority by Adolescent Sub-Populations

Table A4.1. Mental Health Sub-Domains of Need/Priority by Adolescent Sub-Populations

By number of reviewed articles coded to each sub-population

	Mental Health (all)	Mental Health – Sub-Domains				
		Body image	Depression, anxiety	Self-harm	Substance use, addictions	Suicide and suicidal ideation
General adolescent population or not specified	39	4	5	4	18	12
Racialized	13	0	0	1	3	4
Indigenous	8	0	0	1	2	3
LGBTQ2S+	15	1	1	1	8	3
Newcomers, immigrants, refugees	6	0	0	1	0	1
Low-income, underemployed	7	0	0	0	1	0
Homeless, underhoused	6	0	0	0	4	1
Rural, remote	4	0	0	0	0	1
Disabilities	1	0	0	0	0	0
Young carers	2	0	0	0	0	0
Girls and young women	7	0	1	2	1	5
Boys and young men	3	0	0	0	1	2

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

Table A4.2. Sexual & Reproductive Health Sub-Domains of Need/Priority by Adolescent Sub-Populations

By number of reviewed articles coded to each sub-population

	Sexual and reproduct-ive health (all)	Sexual and Reproductive Health – Sub-Domains					
		Assault, trafficking	Gender identity	Pregnancy, contra-ception	Psycho-sexual develop-ment	Sex education	Unprotect-ed sex, risky sex
General adolescent population or not specified	18	0	0	3	3	1	8
Racialized	3	0	0	2	0	0	2
Indigenous	2	0	0	2	0	0	1
LGBTQ2S+	9	1	6	1	0	0	4
Newcomers, immigrants, refugees	0	0	0	0	0	0	0
Low-income, underemployed	0	0	0	0	0	0	0
Homeless, underhoused	1	0	1	0	0	0	0
Rural, remote	0	0	0	0	0	0	0
Disabilities	0	0	0	0	0	0	0
Young carers	0	0	0	0	0	0	0
Girls and young women	5	1	1	3	0	1	1
Boys and young men	2	0	2	0	0	0	0

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

Table A4.3. Relationships with Food and Physical Activity Sub-Domains of Need/Priority by Adolescent Sub-Populations *By number of reviewed articles coded to each sub-population*

	Relationships with food and physical activity (all)	Relationships with Food and Physical Activity				
		Food insecurity	Food production and marketing	Nutrition	Obesity	Physical activity
General adolescent population or not specified	12	0	0	6	8	3
Racialized	7	1	2	3	2	0
Indigenous	1	1	0	0	0	0
LGBTQ2S+	2	0	0	1	1	0
Newcomers, immigrants, refugees	0	0	0	0	0	0
Low-income, underemployed	10	0	2	7	4	1
Homeless, underhoused	3	0	0	2	1	0
Rural, remote	4	0	0	4	2	1
Disabilities	0	0	0	0	0	0
Young carers	1	0	0	0	1	0
Girls and young women	2	0	0	1	1	1
Boys and young men	0	0	0	0	0	0

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

Table A4.4. Other Health Sector Sub-Domains of Need/Priority by Adolescent Sub-Populations
By number of reviewed articles coded to each sub-population

	Other health sector (all)	Other Health Sector – Sub-Domains				
		Chronic conditions	Communicable disease	Oral health	Palliative care	Transition to adult care
General adolescent population or not specified	27	12	14	2	2	6
Racialized	5	3	3	1	0	0
Indigenous	2	2	1	1	0	0
LGBTQ2S+	7	1	6	0	0	0
Newcomers, immigrants, refugees	2	0	1	1	0	0
Low-income, underemployed	4	2	2	1	0	0
Homeless, underhoused	2	0	2	1	0	0
Rural, remote	0	0	0	0	0	0
Disabilities	3	3	1	0	0	1
Young carers	0	0	0	0	0	0
Girls and young women	2	0	2	0	0	0
Boys and young men	0	0	0	0	0	0

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)

Table A4.5. Non-Health Sector Sub-Domains of Need/Priority by Adolescent Sub-Populations

By number of reviewed articles coded to each sub-population

	Non-health sector (all)	Non-Health Sectors – Sub-Domains							
		Accidents and injuries	Child welfare system	Climate change	Juvenile justice system, incarcer-ation	Maltreatment, violence, abuse, bullying	Schools, education	Tech, social media	Transport-ation
General adolescent population or not specified	69	9	1	1	11	20	24	13	1
Racialized	24	4	4	0	3	8	8	2	1
Indigenous	10	3	4	0	2	1	1	1	0
LGBTQ2S+	10	1	0	0	1	8	1	0	1
Newcomers, immigrants, refugees	13	0	1	0	2	8	4	2	0
Low-income, underemployed	18	1	1	0	6	1	12	1	2
Homeless, underhoused	5	0	1	0	1	3	1	0	0
Rural, remote	8	1	0	0	0	3	2	1	1
Disabilities	2	0	0	0	1	0	1	0	0
Young carers	1	1	0	0	0	0	0	0	0
Girls and young women	4	0	0	0	0	3	1	0	0
Boys and young men	4	0	0	0	0	3	0	1	0

Colour gradient used to distinguish results from red (fewer articles identify the domain/sub-population) to green (more articles identify the domain/sub-population)