JAMA Psychiatry | Original Investigation

Mental Health Antecedents and Correlates of 2 Distinct Developmental Pathways to Suicidal Ideation

Marie-Claude Geoffroy, PhD; Sasha MacNeil, PhD; Vincent Paquin, MD; Ayla Inja, BA; Alain Girard, MSc; Élise Chartrand, MSc; Natalie Castellanos-Ryan, PhD; Charles-Édouard Notredame, MD; Ian Colman, PhD; Massimiliano Orri, PhD; Gustavo Turecki, PhD; Sylvana Côté, PhD

IMPORTANCE Suicidal ideation is increasingly common in youth. Trajectories and associated mental health symptoms across development remain poorly understood.

OBJECTIVE To describe trajectories of suicidal ideation from early adolescence to young adulthood and identify preceding and co-occurring mental health symptoms to inform optimal prevention.

DESIGN, SETTING, AND PARTICIPANTS This cohort study used data from a contemporary, longitudinal cohort study, the Québec Longitudinal Study of Child Development (QLSCD), including reports from participants, parents, and teachers. The QLSCD is a population-based birth cohort study of 2120 singletons born between 1997 and 1998 in Québec, Canada, and followed up to age 25 years (2023). Data were analyzed from September 2024 to February 2025.

MAIN OUTCOMES AND MEASURES Serious suicidal ideation in the past 12 months was assessed by a question to participants at ages 13, 15, 17, 20, 23, and 25 years.

EXPOSURES Mental health symptoms (eg, internalizing, externalizing) as reported by parents, teachers, and self-reports on validated questionnaires and standardized across 5 developmental periods: preschool (3-5 years), childhood (6-12 years), early adolescence (13 years), mid-late adolescence (15-17 years), and young adulthood (20-25 years).

RESULTS A total of 1635 participants (845 female [51.7%]; participant number is weighted to account for selective attrition) provided answers on suicidal ideation, with survey weights applied. A total of 3 trajectories were identified: minimal/no ideation (1433 [87.6%]), onset in early adolescence (117 [7.1%]), and onset in young adulthood (86 [5.2%]). Relative to minimal/no ideation, onset in early adolescence was associated with elevated symptoms across nearly all mental health indicators from childhood through adulthood. This included both internalizing (eg, childhood depressive symptoms: risk ratio [RR], 1.75; 95% CI, 1.45-2.05) and externalizing (eg, childhood disruptive symptoms: RR, 1.60; 95% CI, 1.29-1.91) symptoms and maternal antisocial symptoms (RR, 1.39; 95% CI, 1.11-1.66). In contrast, onset of suicidal ideation in young adulthood was associated with internalizing symptoms (eg, mid-late adolescence depressive symptoms: RR, 1.84; 95% CI, 1.28-2.39) emerging in adolescence and worsening mental distress in young adulthood.

CONCLUSIONS AND RELEVANCE Results of this cohort study revealed 2 pathways to suicidal ideation: onset in early adolescence, with persistent childhood internalizing/externalizing symptoms, and onset in young adulthood linked to internalizing symptoms emerging in adolescence without prior distress. Findings suggest timely addressing of mental health symptoms and developmental stage-specific prevention.

JAMA Psychiatry. 2025;82(9):916-925. doi:10.1001/jamapsychiatry.2025.1273
Published online July 2, 2025.

Supplemental content

Author Affiliations: Author affiliations are listed at the end of this article.

Corresponding Author: Marie-Claude Geoffroy, PhD, McGill Group for Suicide Studies, Douglas Mental Health University Institute, Department of Psychiatry and Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Institut Universitaire en Santé Mentale Douglas | FBC, 6875 LaSalle Blvd, Montréal, QC H4H 1R3, Canada (marie-claude.geoffroy@mcgill.ca).

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

Suicidal ideation is increasingly common in youth,[1] causing profound distress to individuals and families[2] and placing a significant burden on the health care system through emergency visits/hospitalizations[3] and long-term mental care needs.[4] Identifying the antecedents and correlates of suicidal ideation could help toward earlier prevention.

One of the major risk factors for suicidal ideation is poor mental health,[5,6] with symptoms and/or disorders arising at critical developmental stages, often before age 25 years.[7] Prior studies have explored the association of suicidal ideation with poor mental health, typically at a single time point.[6,7] However, this approach has yielded limited insights for prevention, as it fails to account for individual differences in the onset, progression, and relative contribution of mental health symptoms. A more promising alternative is to account for heterogeneity by modeling trajectories that span the entire period from early adolescence to young adulthood, capturing developmental stages critical for suicidal ideation onset[8] and examining associations with a broad spectrum of mental health symptoms from preschool onward.

Longitudinal studies in community youth samples identify 2 to 3 suicidal ideation trajectories but are short term (ie, 1-6 years in adolescence[9-13]), leaving the complex and delicate transition to adulthood largely unexplored. To our knowledge, trajectories of suicidal ideation from early adolescence to adulthood in community samples stem from only 1 cohort, the US National Longitudinal Study of Adolescent to Adult Health (Add Health). These studies identified trajectories of chronically high and low suicidal ideation and decreasing ideation from adolescence (ages 12-19 years at wave I) to adulthood (ages 24-32 years at wave IV).[14-16] However, the broad age range within data collection time points (ie, *waves*) may mask age-specific developmental patterns.

Further, most studies examining associations with suicidal ideation trajectories have primarily focused on adolescent depression,[9,14-16] neglecting other mental health symptoms (eg, externalizing). Given that many mental health issues emerge early, documenting associations between these symptoms and suicidal ideation trajectories as they evolve through childhood to adulthood is warranted for prevention efforts within a developmental perspective.[17]

We aimed to describe the developmental trajectories of suicidal ideation from early adolescence (ages 12-13 years) to young adulthood (ages 24-25 years), in association with a range of mental health symptoms as well as sex. We explored data from an ongoing longitudinal, representative, birth cohort study in Québec, Canada, that included reports from parents, teachers, and the youth themselves.

Key Points

Question What are the developmental pathways to suicidal ideation, from teenager to young adult?

Findings In a representative cohort of 1635 youth born between 1997 and 1998 in Québec, Canada, 3 distinct trajectories were identified. Most participants did not or minimally reported suicidal ideation at ages 13 to 25 years, some reported ideation as young teenagers, persisting into adulthood, with externalizing/internalizing symptoms since childhood, and the third trajectory reported suicidal ideation starting only in young adulthood, associated mostly with internalizing symptoms from teenage years.

Meaning Results suggest that suicidal ideation is age and mental health specific, and developmentally informed suicide prevention strategies should be emphasized.

Methods

Participants

The Québec Longitudinal Study of Child Development (QLSCD), conducted by the Québec Statistics Institute (Institut de la Statistique du Québec [ISQ]), is an ongoing, population-based study of 2120 participants born in Québec, Canada, in 1997 to 1998.[18] The QLSCD was approved by the Research Ethics Board of the ISQ, Sainte Justine Hospital Research Centre, and Montréal West Island Integrated University Health and Social Services Centre. Written informed consent was obtained from participants and/or parents at each data collection. The cohort is a random sample of singletons from the official Québec birth registry, excluding those born extremely preterm (<24 weeks), postterm (>42 weeks), or whose mothers spoke neither French nor English. It includes all regions of Québec, except for Cree and Inuit territories and Indigenous communities due to separate institutional services and sociocultural context. Most participants (90%) are White and reflect the broad socioeconomic demographics at study inception. The remaining participants (10%), as per parental identification of the children, are reported to be from 11 other race and ethnicity categories (Aboriginal, Arabic/West Asian, Black, Chinese, Filipino, Japanese, Korean, Latin American, South Asian, Southeast Asian, and other); however, the number of participants from each is too small to be reported. Race and ethnicity are reported to describe the study population. Assessments, primarily through questionnaires administered annually/biannually, were conducted in infancy/preschool from ages 5 to 45/56 months, childhood from ages 5 to 12 years, adolescence at ages 13, 15, and 17 years, and young adulthood at ages 19, 20, 21, 22, 23, and 25 years (the latter in June 2023). Procedures and questionnaires are available at the ISQ.[19]

Measures

Suicidal Ideation

Suicidal ideation in the past 12 months was assessed by a single question posed at ages 13, 15, 17, 20, 23, and 25 years (eTable 1 in Supplement 1): "In the past 12 months, did you ever seriously think about attempting suicide?" Responses were coded as 0 (no), 1 (yes), or missing (don't know/refuse to answer). Participants were assured of confidentiality, an essential criterion for reliability.[20] A list of mental health resources was provided for support if needed.

Mental Health Symptoms Across Developmental Stages

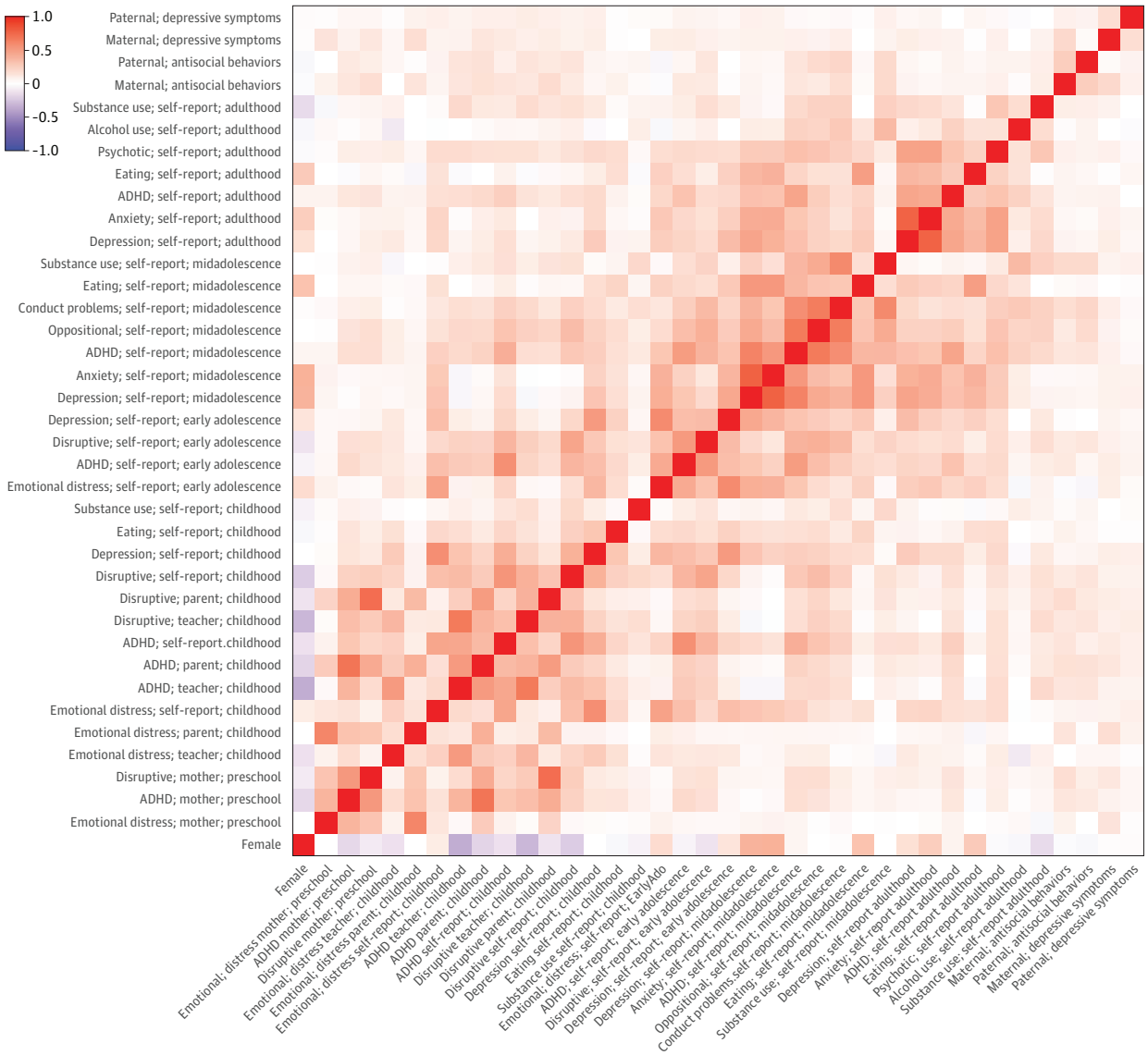
The study explored mental health symptoms at 5 developmental stages: preschool (ages 3-5 years), childhood (6-12

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.
Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

years), early adolescence (13 years), mid-late adolescence (15-17 years), and young adulthood (20-25 years). Maternal and paternal lifetime antisocial behaviors were assessed at participant age 5 months and lifetime depression at participant age 2.5 years.

Standardized questionnaires were self-reported and/or completed by mothers, fathers, and teachers (eMethods in Supplement 1) to assess symptoms of emotional distress, depression, anxiety, eating disorder, disruptive and oppositional defiance, attention-deficit/hyperactivity disorder (ADHD), conduct problems, antisocial behaviors, alcohol and substance use, and psychoticlike experiences. Questionnaires, with validated psychometric properties, included the following: Social Behavior Questionnaire[21]; Children's Depression Inventory, Short Version[22]; Sick, Control, One Stone, Fat, and Food[23]; Mental Health and Social Inadaptation Assessment for Adolescents[24]; Detection of Alcohol and Drug Problems in Adolescents[25]; Center for Epidemiological Studies–depression scale[26]; Generalized Anxiety Disorder 7-item scale[27]; Adult ADHD Self-Report Scale, version 1.13[28]; Community Assessment of Psychic Experiences[29]; Alcohol Use Disorders Identification Test[30]; Alcohol, Smoking and Substance Involvement Screening Test[31]; and for parents, the National Institute of Mental Health Diagnostic Interview Schedule.[32] Scores across time points were averaged within developmental stages, using all available data. Correlations between mental health symptoms across developmental stages are shown in **Figure 1**. Cronbach α values and correlations be-

Figure 1. Univariable Correlations Between Mental Health Symptoms



Data were compiled from the final master file of the Quebec Longitudinal Study of Child Development (1998-2023), Gouvernement du Québec, Institut de la Statistique du Québec, and based on a maximum available sample. ADHD indicates attention-deficit/hyperactivity disorder.

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

tween mental health symptoms at each age within developmental periods are in eTable 2 in Supplement 1.

Statistical Analysis

We used latent class growth analysis (Mplus software, version 8.11[33] [Muthén & Muthén]) to identify clusters of individuals with similar developmental trajectories of suicidal ideation. The probability of experiencing suicidal ideation was modeled as a quadratic function of age. We used a forward modeling approach, starting with a 1-group solution to test the assumption of homogeneity (that all individuals follow a similar trajectory) and then incrementally expanding the model to include more groups.[34] We used random starting values to ensure the model reached a global maximum. We selected the final model based on relative model fit. We used full information maximum likelihood for missing data, assuming randomness thereof.[35] Participants with 1 or more ideation assessment were included in the analysis. Model stability was assessed by sensitivity analysis, restricting the sample to participants with 3 or more of 6 suicidal ideation assessments. Analyses were conducted for both sexes combined to maximize sample size.

We conducted multinomial logistic regressions to examine associations between individual mental health symptom indicators (*z* scores) and suicidal ideation trajectories, using the minimal/no ideation group as reference. Interaction terms (sex × mental health symptoms) were included to test for sex differences. Given the exploratory nature of the study, we chose a univariable (sex-adjusted approach) rather than multivariable approach (simultaneously controlling for all mental health symptoms). *P* values were not adjusted for multiple testing.

Missing data were imputed across 100 datasets using multiple imputations with chained equations, incorporating all mental health symptoms in the model, along with additional variables associated with missingness, ie, parental socioeconomic status (averaged at 5, 17, and 29 months),[36] participant racial and ethnic groups and sex, family status (single-parent family at age 29 months) and parental functioning (averaged at participant age 5, 17, and 29 months).[37] We accounted for selective attrition using inverse probability weighting by the ISQ. We followed the Guidelines for Reporting on Latent Trajectory Studies (GRoLTS)[38] and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines[39] throughout (eTables 4 and 5 in Supplement 1). A 2-sided *P* value <.05 was considered significant. Data were analyzed from September 2024 to February 2025.

Results

Participants

Of the 2120 participants at cohort inception, 1635 (77%) provided information on suicidal ideation: 845 female (51.7%) and 790 male (48.3%) (**Table 1**, 1635 weighted to account for selective attrition, eTable 3 in Supplement 1).[26,40] Of these participants, 24% (386 of 1635) came from low-income families; 9% (140 of 1635) from single-parent households, and 17% (280 of 1635) of mothers of participants did not graduate high school. Characteristics of included vs excluded participants showed that more males than females, and more participants from low-income households, did not provide information on suicidal ideation (eTable 6 in Supplement 1). Parental identification of the participants reported 1455 White race (89.1%). The number of participants in the other race and ethnicity categories (Aboriginal, Arabic/West Asian, Black, Chinese, Filipino, Japanese, Korean, Latin American, South Asian, Southeast Asian, and other) is too small to be reported.

Table 1. Baseline Characteristics of Participants With at Least 1 Response Regarding Suicidal Ideation, Weighted to Account for Selective Attrition; Weighted[a]

Characteristics	No. (%) (N = 1635)
Sex assigned at birth	
Female	845 (51.7)
Male	790 (48.3)
Race and ethnicity	
White	1455 (89.1)
Other[b]	177 (10.9)
Low-income household at participant age 5 mo[c]	
Yes	386 (23.9)
No	1229 (76.1)
Single-parent household at participant age 5 mo	
Yes	140 (8.6)
No	1490 (91.4)
Maternal educational attainment at participant age 5 mo	
No high school diploma	280 (17.2)
High school diploma or higher	1353 (82.8)
Maternal age at child's birth, mean (SD), y	28.9 (5.3)
Maternal depression at participant age 5 mo, mean (SD)[d]	1.5 (1.4)

[a] Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2023), Gouvernement du Québec, Institut de la Statistique du Québec.

[b] The number of participants in each of the other race and ethnicity categories (Aboriginal, Arabic/West Asian, Black, Chinese, Filipino, Japanese, Korean, Latin American, South Asian, Southeast Asian, and other) is too small to be reported.

[c] Defined as spending more than 20% of annual income on basic needs, relative to the average spent by households of similar size and regional population density.[40]

[d] 12-Item version of The Center for Epidemiologic Studies—depression questionnaire, with scores rescaled to range from 0 to 10.[26]

Suicidal Ideation Trajectories

At each time point, between 4.5% and 10% of participants reported experiencing suicidal ideation (eTable 7 in Supplement 1). The best-fitting model identified 3 distinct trajectories (**Table 2** and **Figure 2**). Most participants (1433 [87.6%]) had no or very low probability of suicidal ideation, 117 (7.1%) had onset in early adolescence, and 86 (5.2%) had onset in young adulthood. In the trajectory with onset in early adolescence, the probability of suicidal ideation was approximately 50% at age 12 to 13 years, persisting over time. In the trajectory with onset in young adulthood, the probability of suicidal ideation was low in adolescence, increasing to approximately 65% by

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.
Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

Table 2. Identification of Suicidal Ideation Trajectory Models; Unweighted[a]

Model	No. of groups			
	1 Group	2 Groups	3 Groups	4 Groups
Log-likelihood (No. of parameters)	−1988.18 (3)	−1832.95 (7)	−1816.35 (11)	−1808.08 (15)
AIC[b]	3982.36	3679.91	3654.69	3646.16
BIC[b]	3998.56	3717.71	3714.09	3727.16
SABIC[b]	3989.02	3695.47	3679.15	3679.50
Entropy	NA	0.73	0.81	0.78
VLMR, *P* value[c]	NA	NA	0.003	.03
LMR, *P* value[c]	NA	NA	0.003	.03
Average probability of assignment, range	NA	0.86-0.94	0.76-0.95	0.71-0.92
Group size, %				
Group 1	100	86.4	87.6	83.4
Group 2	NA	13.6	5.2	10.8
Group 3	NA	NA	7.1	5.2
Group 4	NA	NA	NA	0.6

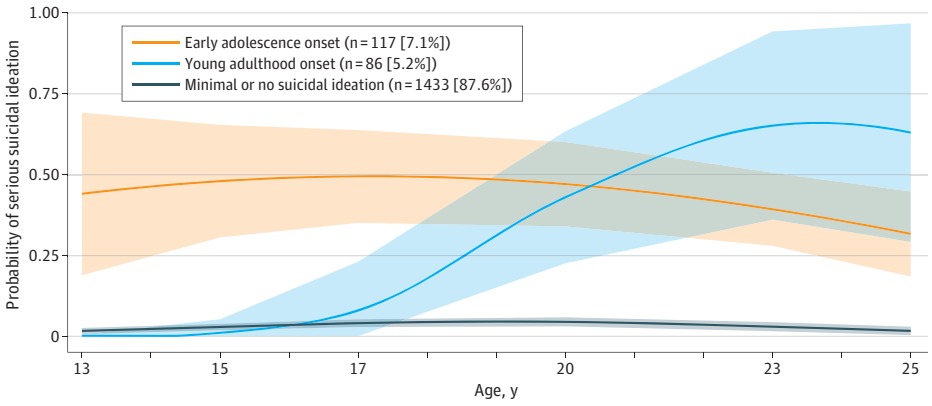
Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; LMR, Lo-Mendell-Rubin likelihood ratio test; NA, not applicable; SABIC, sample size–adjusted Bayesian information criterion; VLMR, Vuong-Lo-Mendell-Rubin likelihood ratio test.

[a] Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2023), Gouvernement du Québec, Institut de la Statistique du Québec.

[b] AIC, BIC, and SABIC are relative model adequacy tools. Each of these indices has no intrinsic value; they are only useful for comparing one model to another. The model with the lowest value is the preferred one in terms of number of groups.

[c] VLMR and LMR likelihood ratio tests: a significant result indicates that the null hypothesis of "1 class only" should be rejected in favor of at least *k* classes.

Figure 2. Trajectories of Serious Suicidal Ideation in the Past 12 Months, From Ages 13 to 25 Years (N = 1636; Predicted Frequencies; Unweighted)



Serious suicidal ideation in the past year was reported by participants at ages 13, 15, 17, 20, 23, and 25 years as yes (coded as 1) or no (coded as 0). Shaded area represents the 95% CIs. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998-2023), Gouvernement du Québec, Institut de la Statistique du Québec.

age 23 years (Figure 2). Sensitivity analysis, including only participants with 3 or more suicidal ideation assessments (n = 1483), was confirmed in the model (eTables 8 and 9 and eFigure in Supplement 1).

Mental Health Symptoms

As compared with the trajectory with minimal/no suicidal ideation, both the early adolescence and young adulthood groups showed elevated mental health issues, albeit with different patterns in the developmental timing of symptoms (**Figure 3** and eTable 10 in Supplement 1).

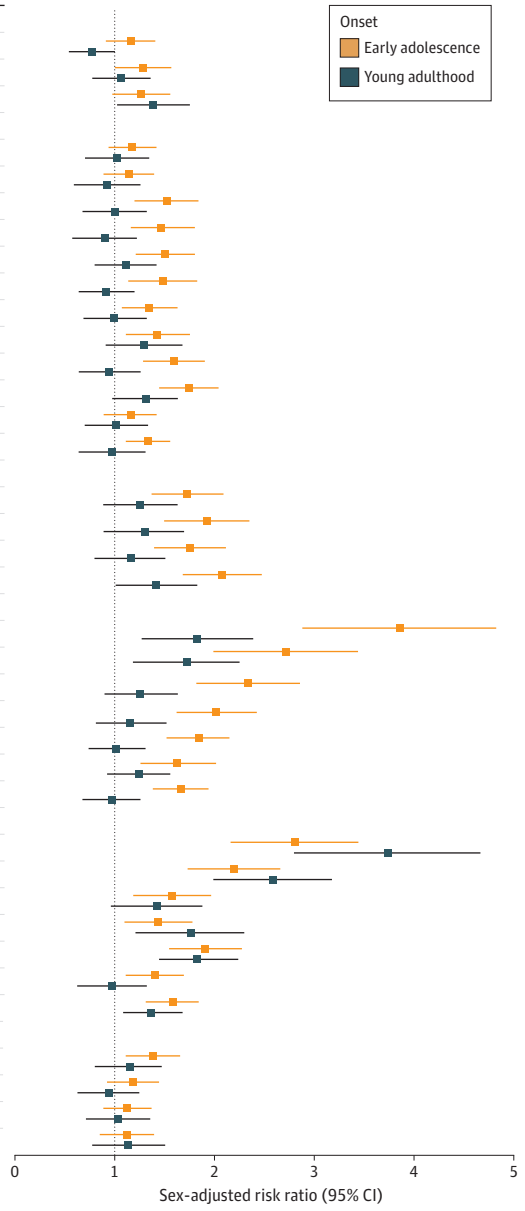
Youth in the trajectory with onset in early adolescence showed mental distress in childhood and continuing through adolescence into young adulthood, across virtually all indicators, including externalizing symptoms (eg, disruptive problems), internalizing symptoms (eg, emotional distress, depression, anxiety), alcohol/substance use, and psychoticlike experiences (assessed in adulthood only). Results suggest that self-reported emotional distress (in childhood and early adolescence but not when reported by parents or teachers) and depressive symptoms (in adolescence and young adulthood) seemed to be the strongest antecedents/correlates of suicidal ideation onset in early adolescence within each developmental stage: childhood (risk ratio [RR], 1.75; 95% CI, 1.45-2.05), early adolescence (RR, 2.08; 95% CI, 1.68-2.48), mid-late adolescence (RR, 3.86; 95% CI, 2.89-4.83), and young adulthood (RR, 2.81; 95% CI, 2.17-3.45), compared with the trajectory with minimal/no suicidal ideation. Maternal antisocial symptoms were high (RR, 1.39; 95% CI, 1.11-1.66) as well as exter-

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

Figure 3. Association of Mental Health Symptoms With Suicidal Ideation Trajectories, by Age

Source	Early adolescence onset (vs no or minimal) suicidal ideation trajectories, risk ratio (95% CI)	Young adolescence onset (vs no or minimal) suicidal ideation trajectories, risk ratio (95% CI)
Preschool (3-5 y)		
Emotion distress symptoms; mother report	1.17 (0.92-1.41)	0.78 (0.54-1.01)
ADHD symptoms; mother report	1.29 (1.00-1.57)	1.07 (0.78-1.36)
Disruptive symptoms; mother report	1.27 (0.98-1.56)	1.39 (1.03-1.76)[a]
Childhood (6-12 y)		
Emotional distress symptoms; teacher report	1.18 (0.94-1.43)	1.03 (0.71-1.35)
Emotional distress symptoms; parent report	1.15 (0.89-1.40)	0.93 (0.60-1.26)
Emotional distress symptoms; self-report	1.52 (1.20-1.85)[a]	1.00 (0.68-1.32)
ADHD symptoms; teacher report	1.48 (1.16-1.81)[a]	0.91 (0.58-1.23)
ADHD symptoms; parent report	1.51 (1.21-1.81)[a]	1.12 (0.81-1.43)
ADHD symptoms; self-report	1.49 (1.14-1.83)[a]	0.92 (0.64-1.20)
Disruptive symptoms; teacher report	1.35 (1.08-1.63)[a]	1.01 (0.70-1.32)
Disruptive symptoms; parent report	1.43 (1.11-1.76)[a]	1.30 (0.92-1.69)
Disruptive symptoms; self-report	1.60 (1.29-1.91)[a]	0.96 (0.65-1.27)
Depressive symptoms; self-report	1.75 (1.45-2.05)[a]	1.31 (0.98-1.64)
Eating problems; self-report	1.16 (0.89-1.42)	1.02 (0.71-1.34)
Alcohol, nicotine, and substance use; self-report	1.34 (1.12-1.56)[a]	0.98 (0.65-1.31)
Early adolescence (13 y)		
Emotional distress symptoms; self-report	1.73 (1.37-2.09)[a]	1.26 (0.89-1.63)
ADHD symptoms; self-report	1.93 (1.50-2.36)[a]	1.30 (0.89-1.70)
Disruptive symptoms; self-report	1.76 (1.40-2.12)[a]	1.16 (0.81-1.51)
Depressive symptoms; self-report	2.08 (1.68-2.48)[a]	1.43 (1.02-1.83)[a]
Midadolescence (15-17 y)		
Depressive symptoms; self-report	3.86 (2.89-4.83)[a]	1.84 (1.28-2.39)[a]
Generalized anxiety symptoms; self-report	2.72 (2.00-3.44)[a]	1.73 (1.19-2.26)[a]
ADHD symptoms; self-report	2.34 (1.82-2.86)[a]	1.27 (0.91-1.64)
Oppositional defiance symptoms; self-report	2.02 (1.62-2.43)[a]	1.17 (0.82-1.52)
Conduct problems; self-report	1.85 (1.53-2.16)[a]	1.02 (0.74-1.31)
Eating problems; self-report	1.64 (1.26-2.02)[a]	1.25 (0.93-1.56)
Alcohol, nicotine, and substance use; self-report	1.67 (1.39-1.95)[a]	0.98 (0.68-1.27)
Young adulthood (20-25 y)		
Depressive symptoms; self-report	2.81 (2.17-3.45)[a]	3.74 (2.80-4.67)[a]
Generalized anxiety symptoms; self-report	2.20 (1.74-2.66)[a]	2.59 (2.00-3.18)[a]
ADHD symptoms; self-report	1.58 (1.19-1.97)[a]	1.42 (0.97-1.88)
Eating problems; self-report	1.44 (1.10-1.78)[a]	1.77 (1.22-2.31)
Psychoticlike experiences; self-report	1.91 (1.55-2.28)[a]	1.84 (1.45-2.24)[a]
Alcohol use symptoms; self-report	1.41 (1.12-1.70)[a]	0.98 (0.63-1.32)
Substance use symptoms; self-report	1.58 (1.31-1.85)[a]	1.38 (1.09-1.68)[a]
Parental mental health		
Antisocial behaviors; mother report	1.39 (1.11-1.66)[a]	1.15 (0.81-1.48)
Antisocial behaviors; father report	1.19 (0.93-1.45)	0.94 (0.63-1.25)
Major depressive disorder symptoms; mother report	1.13 (0.89-1.38)	1.04 (0.72-1.36)
Major depressive disorder symptoms; father report	1.13 (0.85-1.40)	1.14 (0.78-1.51)



Figures based on all participants who answered the question on suicidality at least once (N = 1635, weighted to account for selective attrition). The comparator group is the trajectory with minimal/no suicidal ideation. All mental health symptoms standardized to mean (SD) = 0 (1). Data were compiled from the final master file of the Quebec Longitudinal Study of Child Development (1998-2023), Gouvernement du Québec, Institut de la Statistique du Québec, and based on a maximum available sample. ADHD indicates attention-deficit/hyperactivity disorder.

[a]Indicates significance.

nalizing symptoms (eg, childhood disruptive symptoms: RR, 1.60; 95% CI, 1.29-1.91).

Youth in the trajectory with onset in young adulthood showed no signs of childhood mental distress, except for disruptive behaviors in preschool (RR, 1.39; 95% CI, 1.03-1.76). However, it was associated with internalizing symptoms starting in early adolescence (13 years) but not with adolescent externalizing symptoms. Specifically, they reported slightly more depressive symptoms in early adolescence (RR, 1.43; 95% CI, 1.02-1.83) and depressive and anxiety symptoms in mid-late adolescence (RR, 1.84; 95% CI, 1.28-2.39 and RR, 1.73; 95% CI, 1.19-2.26) and in young adulthood (RR, 3.74;

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.
Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

95% CI, 2.80-4.67 and RR, 2.59; 95% CI, 2.00-3.18), as well as disordered eating (RR, 1.77; 95% CI, 1.22-2.31), substance use symptoms (RR, 1.38; 95% CI, 1.09-1.68), and psychoticlike episodes (RR, 1.84; 95% CI, 1.45-2.24).

Sex Differences

As compared with the minimal/no ideation trajectory, female sex was associated with the adolescence-onset (RR, 2.09; 95% CI, 1.09-3.08) but not adulthood-onset (RR, 1.10; 95% CI, 0.46-1.73) trajectory. Of 74 putative sex-interactions with mental health symptoms, only depressive symptoms showed moderating effects of sex, in the trajectory with onset in adolescence only (RR, −1.60; 95% CI, −2.84 to −0.36; P = .01) (eTable 11 in Supplement 1).

Discussion

In this contemporary, population-based longitudinal cohort of 1635 individuals, we identified 3 trajectories of suicidal ideation, 2 of which are clinically relevant. Most youth (88%) had little or no suicidal ideation. Some (7%) experienced suicidal ideation starting in their early adolescence, persisting into adulthood. This trajectory with onset in early adolescence was associated with nearly all mental health symptoms across development, except in preschool, encompassing both internalizing and externalizing symptoms, and elevated maternal antisocial symptoms. There were more females than males in the trajectory with onset in adolescence compared with the trajectory with no/minimal ideation. The remaining 5% experienced suicidal ideation starting in young adulthood. This adult-onset trajectory showed no association with childhood mental health issues but was marked by emerging depression and anxiety symptoms in adolescence, with increasing mental distress into adulthood.

We assessed seriously considered suicide at age 12 to 13 years but not prior, and it is plausible that suicidal ideation began earlier. Data on suicidal ideation in childhood are limited. A recent systematic review and meta-analysis[41] reported a pooled prevalence of 7.5% (95% CI, 5.9%-9.6%) in children aged 12 years and younger in the community, in line with our trajectory with onset in early adolescent. A study of 9- to 10-year-olds in the Adolescent Brain Cognitive Development cohort in the US reported 6.4% (95% CI, 5.7%-7.3%) with a history of passive suicidal ideation (wish to be dead) and 4.4% (95% CI, 3.9%-5.0%) with nonspecific active suicidal ideation.[42] Preschoolers with depression and externalizing symptoms may begin thinking about suicide as early as age 3 years and continue in adolescence.[43]

Virtually all mental health symptoms that we examined were associated with the trajectory of onset of suicidal ideation in early adolescence, particularly internalizing symptoms across developmental stages. We cannot directly compare the strength of these associations across developmental stages due to differences in measurement tools, but self-reported depressive symptoms in mid-late adolescence were up to 3 SDs higher in the group with onset in early adolescence than in the group with minimal/no ideation. This finding confirms previously demonstrated associations between depressive symptoms and suicidal ideation.[6,44-46] Further, children's self-reports of emotional distress, but not those by parents and teachers, were significantly associated with onset of suicidal ideation in early adolescence, suggesting that observers were more attuned to externalizing behaviors than internalizing symptoms. Externalizing symptoms (across informants) were associated with the trajectory with onset in early adolescence, confirming links between suicide and both internalizing and externalizing disorders in children and adolescents.[47,48] These findings highlight the need to recognize and address emotional and behavioral issues early in life. Surprisingly, only maternal antisocial symptoms were associated with early-onset suicidal ideation, whereas prior studies found associations with chronic-severe maternal depression.[49] This may reflect our measure of lifetime maternal depression assessed early in life, rather than its persistence or severity throughout development.

The trajectory with onset of suicidal ideation in young adulthood was marked by depressive and anxiety symptoms starting at or after age 13 years. Internalizing symptoms worsened into young adulthood, when other forms of mental health distress like disordered eating and increased substance use (mostly cannabis) also emerged. The transition to adult life involves unique social stressors (higher education, workforce, independent living).[50] This cohort also faced the additional pressures of adapting to the COVID-19 pandemic. Data collection at age 23 years occurred in spring 2021; Canada maintained restrictions to varying degrees until spring 2022.[51] This period of restrictions was associated with increased depressive and anxiety symptoms in the cohort, particularly for individuals without prior mental health issues but was not associated with suicidal ideation.[52] Suicidal ideation in the group with onset in young adulthood remained elevated into 2023, despite a return to normal daily life.

Consistent with prior research on sex differences in suicidality during adolescence,[5,6] girls were more likely than boys to experience onset of suicidal ideation in early adolescence, possibly reflective of the earlier age of puberty in girls. We did not find sex differences in the trajectory with onset in young adulthood. Previous studies[11,53] indicated that females showed a peak in suicidal ideation in midadolescence, and males experienced a linear increase throughout. Although sex differences in mental health symptoms are well documented,[54] prior studies,[6,12] including work within this cohort, show similar associations between these symptoms and suicidal ideation across sexes, consistent with current findings.

These results inform developmentally specific targets for suicide prevention strategies. Targeting internalizing and externalizing symptoms early in life may curb onset of suicidal ideation in early adolescence, whereas interventions focused on emerging internalizing symptoms in adolescence could be relevant for onset of suicidal ideation in early adulthood. Mental health interventions in schools may be particularly beneficial[55] by reaching all students, including children/adolescents who may not openly disclose internalizing symptoms to parents or teachers, as well as those exhibiting externalizing symptoms. In elementary schools, the Good Behavior

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

Game promotes prosociality and reduces disruptive behaviors and has long-term effects on lowering suicidal ideation/attempts in young adulthood.[56] In high schools, Youth Aware of Mental Health[57] uses didactic and interactive methods in five, 1-hour sessions over 3 weeks, and reduced suicidal ideation/attempts by approximately 50% in a large European randomized clinical trial.[58] For youth experiencing severe mental health distress, a recent meta-analysis across all age groups (including adolescents) showed that psychotherapies for mental health issues were as effective in reducing suicidal ideation as suicide-specific targeted therapies.[59] Many youth could benefit from approaches such as the ones mentioned above, as they may not directly seek help for ideation or self-harm.

Family-based interventions, such as Family Check-Up, additionally provide support for families with children (2-17 years), reducing internalizing/externalizing symptoms and suicidal ideation in youth[60-62] and could be implemented in schools for wider accessibility.[63] Clinicians, at the front line of care for children, adolescents, and young adults, can refer to recent recommendations on youth suicide prevention on screening, assessment, and intervention.[64,65]

Strengths and Limitations

The prospective nature of the cohort, with repeated measures of suicidal ideation over a 13-year span from ages 12 to 25 years, offered a unique observational platform from which to identify distinct trajectories in youth suicidal ideation. Based on a representative cohort of births in the late 1990s, our study provided a unique glimpse into contemporary youth who face distinct societal challenges and worsening mental health as compared with previous generations.[66] We further analyzed a wide range of mental health indicators from preschool into adulthood, accessed through 4 sources (mother, father, teacher, and self-reports).

There were nonetheless several limitations. First, despite the large sample size, the number of individuals in clinically relevant suicidal ideation trajectories was relatively low, limiting further subgroup analyses of sex and comorbidities. Second, as in other cohorts,[67-69] documentation of suicidal ideation relied on a single-item question potentially leading to misclassification due to potential underreporting and/or overreporting.[70] Third, past-year suicidal ideation was only documented starting at age 13 years, preventing the capture of childhood-onset suicidal ideation.[43] Fourth, information on personality, including borderline personality traits/disorders,[71] were not available. Fifth, we focused exclusively on mental health symptoms across development and did not consider the complex associations with adverse childhood experiences.[72] Sixth, our models included individuals regardless of suicide attempts, but low base rates prevented further analysis. Future studies should explore developmental trajectories, as ideation and attempts may overlap yet follow distinct paths with unique risk factors.[73,74] Seventh, some participants were missing, potentially introducing bias. We used survey weights and multiple imputations to reduce bias. Lastly, the cohort at inception excluded Indigenous territories, now known to be particularly vulnerable to suicide.

Conclusions

This cohort study identified 2 distinct trajectories of suicidal ideation with different onset, course, and mental health antecedents and correlates. Onset in early adolescence was associated with both internalizing and externalizing symptoms starting in childhood, and onset in young adulthood was associated with internalizing symptoms starting in adolescence. Preventive interventions during childhood may benefit onset of suicidal ideation in early adolescence that is rooted in prolonged distress. Continued efforts in adolescence are crucial to mitigate onset in early adolescence and prevent onset in adulthood. Adverse experiences (bullying, abuse, neglect)[72] have been consistently associated with suicidality in youth, including in this cohort.[74-76] Further research is needed to elucidate how social determinants interact with mental health symptoms in leading to suicidal ideation. Adopting a developmental perspective is essential to better tailor prevention strategies across the life span.

ARTICLE INFORMATION

Accepted for Publication: March 19, 2025.

Published Online: July 2, 2025. doi:10.1001/jamapsychiatry.2025.1273

Author Affiliations: McGill Group for Suicide Studies, Douglas Mental Health University Institute, Department of Psychiatry and Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montréal, Québec, Canada (Geoffroy, Orri); McGill Group for Suicide Studies, Douglas Mental Health University Institute, Department of Psychiatry, McGill University, Montréal, Québec, Canada (MacNeil, Inja, Chartrand, Turecki); Douglas Mental Health University Institute, Department of Psychiatry, and Department of Psychiatry, McGill University, Montréal, Québec, Canada (Paquin); Centre Hospitalier Universitaire Sainte-Justine, Montréal, Québec, Canada (Girard); School of Psychoeducation, University of Montreal, Montréal, Québec, Canada (Castellanos-Ryan); Department of Child and Adolescent Psychiatry, University Hospital of Lille, University of Lille, Lille, France (Notredame); School of Epidemiology and Public Health, University of Ottawa, Ottawa, Ontario, Canada (Colman); Danish Research Institute for Suicide Prevention, Mental Health Centre Copenhagen, Copenhagen, Denmark (Orri); Department of Social and Preventive Medicine, School of Public Health, Université de Montréal, Montréal, Québec, Canada (Côté); Ste Justine's Hospital Research Center, Montréal, Québec, Canada (Côté).

Author Contributions: Ms Chartrand and Mr Girard had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.
Concept and design: Geoffroy, Orri, Turecki, Côté.
Acquisition, analysis, or interpretation of data: Geoffroy, MacNeil, Paquin, Inja, Girard, Chartrand, Castellanos-Ryan, Notre-Dame, Colman, Côté.
Drafting of the manuscript: Geoffroy, MacNeil, Chartrand.
Critical review of the manuscript for important intellectual content: MacNeil, Paquin, Inja, Girard, Castellanos-Ryan, Notre-Dame, Colman, Orri, Turecki, Côté.
Statistical analysis: Geoffroy, MacNeil, Paquin, Girard, Chartrand.
Obtained funding: Geoffroy, Castellanos-Ryan, Côté.
Administrative, technical, or material support: Geoffroy, Inja, Turecki.
Supervision: Geoffroy.

Conflict of Interest Disclosures: Profs Geoffroy, Orri, Côté, and Turecki reported holding a Canada Research Chair position. Dr Côté reported receiving grants from the Canadian Institute for Health Research during the conduct of the study. No other disclosures were reported.

Funding/Support: The Québec Longitudinal Study of Child Development was supported by funding from the Ministère de la Santé et des Services Sociaux, Ministère de la Famille, Ministère de

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

l'Éducation, and Ministère de l'Enseignement Supérieur (Québec ministries), the Lucie and André Chagnon Foundation, the Institut de Recherche Robert-Sauvé en Santé et en Sécurité du Travail, the Research Centre of the Sainte-Justine University Hospital, the Ministère de l'Emploi et de la Solidarité Sociale, and the Institut de la Statistique du Québec. Additional funding was received by the Fonds de Recherche du Québec—Santé (FRQS), the Fonds de Recherche du Québec—Société et Culture (FRQSC), the Social Science and Humanities Research Council of Canada (SSHRC), the Canadian Institutes of Health Research (CIHR).

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Data Sharing Statement: See Supplement 2.

Additional Contributions: We thank Danielle Buch, BSc, University of Montreal, who provided critical revision, detailed revision, and substantive editing of the entire manuscript and Frédéric Jean-Germain, BSc, Douglas Mental Health University Institute, who provided technical support. All received financial compensation for their contributions.

REFERENCES

1. Center for Disease Control and Prevention. YRBS data summary & trends report. Accessed October 7, 2024. https://www.cdc.gov/yrbs/dstr/index.html

2. Simes D, Shochet I, Murray K, Sands IG. A systematic review of qualitative research of the experiences of young people and their caregivers affected by suicidality and self-harm: implications for family-based treatment. *Adolesc Res Rev*. 2022;7(2):211-233. doi:10.1007/s40894-021-00164-3

3. Madigan S, Korczak DJ, Vaillancourt T, et al. Comparison of pediatric emergency department visits for attempted suicide, self-harm, and suicidal ideation before and during the COVID-19 pandemic: a systematic review and meta-analysis. *Lancet Psychiatry*. 2023;10(5):342-351. doi:10.1016/S2215-0366(23)00036-6

4. Cantor N, Kingsbury M, Warner E, et al. Young adult outcomes associated with adolescent suicidality: a meta-analysis. *Pediatrics*. 2023;151(3): e2022058113. doi:10.1542/peds.2022-058113

5. Nock MK, Green JG, Hwang I, et al. Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the National Comorbidity Survey Replication Adolescent Supplement. *JAMA Psychiatry*. 2013;70 (3):300-310. doi:10.1001/2013.jamapsychiatry.55

6. Orri M, Scardera S, Perret LC, et al. Mental health problems and risk of suicidal ideation and attempts in adolescents. *Pediatrics*. 2020;146(1):e20193823. doi:10.1542/peds.2019-3823

7. Solmi M, Radua J, Olivola M, et al. Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Mol Psychiatry*. 2022;27(1):281-295. doi:10.1038/s41380-021-01161-7

8. Voss C, Ollmann TM, Miché M, et al. Prevalence, onset, and course of suicidal behavior among adolescents and young adults in Germany. *JAMA Netw Open*. 2019;2(10):e1914386-e1914386. doi:10.1001/jamanetworkopen.2019.14386

9. Giletta M, Prinstein MJ, Abela JRZ, Gibb BE, Barrocas AL, Hankin BL. Trajectories of suicide ideation and nonsuicidal self-injury among adolescents in mainland China: peer predictors, joint development, and risk for suicide attempts. *J Consult Clin Psychol*. 2015;83(2):265-279. doi:10.1037/a0038652

10. Musci RJ, Hart SR, Ballard ED, et al. Trajectories of suicidal ideation from sixth through tenth grades in predicting suicide attempts in young adulthood in an urban African American cohort. *Suicide Life Threat Behav*. 2016;46(3):255-265. doi:10.1111/sltb.12191

11. Rueter MA, Holm KE, McGeorge CR, Conger RD. Adolescent suicidal ideation subgroups and their association with suicidal plans and attempts in young adulthood. *Suicide Life Threat Behav*. 2008; 38(5):564-575. doi:10.1521/suli.2008.38.5.564

12. Adrian M, Miller AB, McCauley E, Vander Stoep A. Suicidal ideation in early to middle adolescence: sex-specific trajectories and predictors. *J Child Psychol Psychiatry*. 2016;57(5):645-653. doi:10.1111/jcpp.12484

13. Kim J, Pike K, McCauley E, Vander Stoep A. Ethnic variations of trajectories in suicide ideation and attempt: from middle school to high school. *Suicide Life Threat Behav*. 2019;49(2):432-443. doi:10.1111/sltb.12441

14. Erausquin JT, McCoy TP, Bartlett R, Park E. Trajectories of suicide ideation and attempts from early adolescence to midadulthood: associations with race/ethnicity. *J Youth Adolesc*. 2019;48(9): 1796-1805. doi:10.1007/s10964-019-01074-3

15. Nkansah-Amankra S. Adolescent suicidal trajectories through young adulthood: prospective assessment of religiosity and psychosocial factors among a population-based sample in the US. *Suicide Life Threat Behav*. 2013;43(4):439-459. doi:10.1111/sltb.12029

16. Xiao Y, Lindsey MA. Racial/ethnic, sex, sexual orientation, and socioeconomic disparities in suicidal trajectories and mental health treatment among adolescents transitioning to young adulthood in the USA: a population-based cohort study. *Adm Policy Ment Health*. 2021;48(5):742-756. doi:10.1007/s10488-021-01122-w

17. Morris-Perez PA, Benzekri A, Boccieri GR. Why should developmental scientists engage in research on adolescent suicide—the case for developmentally informed suicidology. *Annu Rev Dev Psychol*. 2024;6:373-399. doi:10.1146/annurev-devpsych-010923-094742

18. Orri M, Boivin M, Chen C, et al. Cohort profile: Quebec longitudinal study of child development (QLSCD). *Soc Psychiatry Psychiatr Epidemiol*. 2021; 56(5):883-894. doi:10.1007/s00127-020-01972-z

19. Institut de la Statistique Québec. Home page. Accessed May 27, 2025. https://www.jesuisjeserai.stat.gouv.qc.ca/

20. Lothen-Kline C, Howard DE, Hamburger EK, Worrell KD, Boekeloo BO. Truth and consequences: ethics, confidentiality, and disclosure in adolescent longitudinal prevention research. *J Adolesc Health*. 2003;33(5):385-394. doi:10.1016/S1054-139X(03)00184-8

21. Collet OA, Orri M, Tremblay RE, Boivin M, Côté SM. Psychometric properties of the social behavior questionnaire (SBQ) in a longitudinal population-based sample. *Int J Behav Dev*. 2023;47 (2):180-189. doi:10.1177/01650254221113472

22. Allgaier AK, Frühe B, Pietsch K, Saravo B, Baethmann M, Schulte-Körne G. Is the Children's Depression Inventory Short version a valid screening tool in pediatric care—a comparison to its full-length version. *J Psychosom Res*. 2012;73(5): 369-374. doi:10.1016/j.jpsychores.2012.08.016

23. Hill LS, Reid F, Morgan JF, Lacey JH. SCOFF, the development of an eating disorder screening questionnaire. *Int J Eat Disord*. 2010;43(4):344-351. doi:10.1002/eat.20679

24. Côté SM, Orri M, Brendgen M, et al. Psychometric properties of the Mental Health and Social Inadaptation Assessment for Adolescents (MIA) in a population-based sample. *Int J Methods Psychiatr Res*. 2017;26(4):e1566. doi:10.1002/mpr.1566

25. Landry M, Tremblay J, Guyon L, Bergeron J, Brunelle N. La Grille de dépistage de la consommation problématique d'alcool et de drogues chez les adolescents et les adolescentes (DEP-ADO): développement et qualités psychométriques. *Drogues Sante Societe*. 2005;3 (1):20-37. doi:10.7202/010517ar

26. Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1(3):385-401. doi:10.1177/014662167700100306

27. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006;166 (10):1092-1097. doi:10.1001/archinte.166.10.1092

28. Kessler RC, Adler L, Ames M, et al. The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. *Psychol Med*. 2005;35(2): 245-256. doi:10.1017/S0033291704002892

29. Capra C, Kavanagh DJ, Hides L, Scott J. Brief screening for psychosislike experiences. *Schizophr Res*. 2013;149(1-3):104-107. doi:10.1016/j.schres.2013.05.020

30. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption–II. *Addiction*. 1993;88(6):791-804. doi:10.1111/j.1360-0443.1993.tb02093.x

31. Humeniuk R, Ali R, Babor TF, et al. Validation of the alcohol, smoking and substance involvement screening test (ASSIST). *Addiction*. 2008;103(6): 1039-1047. doi:10.1111/j.1360-0443.2007.02114.x

32. Helzer JE, Robins LN. The diagnostic interview schedule: its development, evolution, and use. *Soc Psychiatry Psychiatr Epidemiol*. 1988;23(1):6-16. doi:10.1007/BF01788437

33. Muthén B, Muthén LK. Integrating person-centered and variable-centered analyses: growth mixture modeling with latent trajectory classes. *Alcohol Clin Exp Res*. 2000;24(6):882-891. doi:10.1111/j.1530-0277.2000.tb02070.x

34. Nagin DS, Jones BL, Elmer J. Recent advances in group-based trajectory modeling for clinical research. *Annu Rev Clin Psychol*. 2024;20(1):285-305. doi:10.1146/annurev-clinpsy-081122-012416

35. Nagin DS. *Group-Based Modeling of Development*. Harvard University Press; 2009.

36. Willms D, Shields M. *A Measure of Socioeconomic Status for the National Longitudinal*

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026

Study of Children. Report for the Special Surveys Division. Statistics Canada; 1996.

37. National Longitudinal Survey of Children. Survey instruments for 1994-95 data collection cycle 1. Accessed November 6, 2024. https://www150.statcan.gc.ca/n1/en/pub/89f0077x/89f0077x1996001-eng.pdf?st=E2ooqcCu

38. Van De Schoot R, Sijbrandij M, Winter SD, Depaoli S, Vermunt JK. The GRoLTS-checklist: guidelines for reporting on latent trajectory studies. *Struct Equ Modeling*. 2017;24(3):451-467. doi:10.1080/10705511.2016.1247646

39. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. 2007;370(9596):1453-1457. doi:10.1016/S0140-6736(07)61602-X

40. Giles P. Low-income measurement in Canada. Accessed November 8, 2024. https://www150.statcan.gc.ca/n1/pub/75f0002m/75f0002m2004011-eng.pdf

41. Geoffroy MC, Bouchard S, Per M, et al. Prevalence of suicidal ideation and self-harm behaviors in children aged 12 years and younger: a systematic review and meta-analysis. *Lancet Psychiatry*. 2022;9(9):703-714. doi:10.1016/S2215-0366(22)00193-6

42. DeVille DC, Whalen D, Breslin FJ, et al. Prevalence and family-related factors associated with suicidal ideation, suicide attempts, and self-injury in children aged 9 to 10 years. *JAMA Netw Open*. 2020;3(2):e1920956. doi:10.1001/jamanetworkopen.2019.20956

43. Whalen DJ, Hennefield L, Elsayed NM, Tillman R, Barch DM, Luby JL. Trajectories of suicidal thoughts and behaviors from preschool through late adolescence. *J Am Acad Child Adolesc Psychiatry*. 2022;61(5):676-685. doi:10.1016/j.jaac.2021.08.020

44. Commisso M, Geoffroy MC, Temcheff C, et al. Association of childhood externalizing, internalizing, comorbid problems with criminal convictions by early adulthood. *J Psychiatr Res*. 2024;172:9-15. doi:10.1016/j.jpsychires.2024.01.039

45. Wan LP, Yang XF, Liu BP, et al. Depressive symptoms as a mediator between perceived social support and suicidal ideation among Chinese adolescents. *J Affect Disord*. 2022;302:234-240. doi:10.1016/j.jad.2022.01.061

46. Strandheim A, Bjerkeset O, Gunnell D, Bjørnelv S, Holmen TL, Bentzen N. Risk factors for suicidal thoughts in adolescence—a prospective cohort study: the Young-HUNT study. *BMJ Open*. 2014;4(8):e005867. doi:10.1136/bmjopen-2014-005867

47. Grøholt B, Ekeberg O, Wichstrøm L, Haldorsen T. Suicide among children and younger and older adolescents in Norway: a comparative study. *J Am Acad Child Adolesc Psychiatry*. 1998;37(5):473-481. doi:10.1097/00004583-199805000-00008

48. Sheftall AH, Asti L, Horowitz LM, et al. Suicide in elementary school-aged children and early adolescents. *Pediatrics*. 2016;138(4):e20160436. doi:10.1542/peds.2016-0436

49. Hammerton G, Zammit S, Mahedy L, et al. Pathways to suicide-related behavior in offspring of mothers with depression: the role of offspring psychopathology. *J Am Acad Child Adolesc Psychiatry*. 2015;54(5):385-393. doi:10.1016/j.jaac.2015.02.006

50. Arnett JJ, Žukauskienė R, Sugimura K. The new life stage of emerging adulthood at ages 18-29 years: implications for mental health. *Lancet Psychiatry*. 2014;1(7):569-576. doi:10.1016/S2215-0366(14)00080-7

51. Razak F, Shin S, Naylor CD, Slutsky AS. Canada's response to the initial 2 years of the COVID-19 pandemic: a comparison with peer countries. *CMAJ*. 2022;194(25):E870-E877. doi:10.1503/cmaj.220316

52. Gouin JP, MacNeil S, de la Torre-Luque A, et al. Depression, anxiety, and suicidal ideation in a population-based cohort of young adults before and during the first 12 months of the COVID-19 pandemic in Canada. *Can J Public Health*. 2023;114(3):368-377. doi:10.17269/s41997-023-00772-7

53. Boeninger DK, Masyn KE, Feldman BJ, Conger RD. Sex differences in developmental trends of suicide ideation, plans, and attempts among European American adolescents. *Suicide Life Threat Behav*. 2010;40(5):451-464. doi:10.1521/suli.2010.40.5.451

54. Seedat S, Scott KM, Angermeyer MC, et al. Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. *Arch Gen Psychiatry*. 2009;66(7):785-795. doi:10.1001/archgenpsychiatry.2009.36

55. Ayer L, Stevens C, Reider E, Sims B, Colpe L, Pearson J. Preventing youth suicide: potential "crossover effects" of existing school-based programs. *Prev Sci*. 2023;24(2):382-392. doi:10.1007/s11121-022-01473-2

56. Wilcox HC, Kellam SG, Brown CH, et al. The impact of two universal randomized first- and second-grade classroom interventions on young adult suicide ideation and attempts. *Drug Alcohol Depend*. 2008;95(Suppl 1)(suppl 1):S60-S73. doi:10.1016/j.drugalcdep.2008.01.005

57. YAM—Youth Aware of Mental health. Home page. Accessed January 20, 2025. https://www.y-a-m.org/

58. Wasserman D, Hoven CW, Wasserman C, et al. School-based suicide prevention programs: the SEYLE cluster-randomized, controlled trial. *Lancet*. 2015;385(9977):1536-1544. doi:10.1016/S0140-6736(14)61213-7

59. van Ballegooijen W, Rawee J, Palantza C, et al. Suicidal ideation and suicide attempts after direct or indirect psychotherapy: a systematic review and meta-analysis. *JAMA Psychiatry*. 2025;82(1):31-37. doi:10.1001/jamapsychiatry.2024.2854

60. Hentges RF, Weaver Krug CM, Shaw DS, Wilson MN, Dishion TJ, Lemery-Chalfant K. The long-term indirect effect of the early Family Check-Up intervention on adolescent internalizing and externalizing symptoms via inhibitory control. *Dev Psychopathol*. 2020;32(4):1544-1554. doi:10.1017/S0954579419001482

61. Connell AM, Seidman S, Ha T, et al. Long-term effects of the family check-up on suicidality in childhood and adolescence: integrative data analysis of 3 randomized trials. *Prev Sci*. 2023;24(8):1558-1568. doi:10.1007/s11121-022-01370-8

62. Connell AM, McKillop HN, Dishion TJ. Long-term effects of the family check-up in early adolescence on risk of suicide in early adulthood. *Suicide Life Threat Behav*. 2016;46(Suppl 1)(suppl 1):S15-S22. doi:10.1111/sltb.12254

63. Stormshak EA, Seeley JR, Caruthers AS, et al. Evaluating the efficacy of the Family Check-Up Online: a school-based, eHealth model for the prevention of problem behavior during the middle school years. *Dev Psychopathol*. 2019;31(5):1873-1886. doi:10.1017/S0954579419000907

64. Hughes JL, Horowitz LM, Ackerman JP, Adrian MC, Campo JV, Bridge JA. Suicide in young people: screening, risk assessment, and intervention. *BMJ*. 2023;381:e070630. doi:10.1136/bmj-2022-070630

65. Hua LL, Lee J, Rahmandar MH, Sigel EJ; Committee on Adolescence; Council on Injury, Violence, and Poison Prevention. Suicide and suicide risk in adolescents. *Pediatrics*. 2024;153(1):e2023064800. doi:10.1542/peds.2023-064800

66. McGorry PD, Mei C, Dalal N, et al. The Lancet Psychiatry Commission on youth mental health. *Lancet Psychiatry*. 2024;11(9):731-774. doi:10.1016/S2215-0366(24)00163-9

67. Gaylor EM, Krause KH, Welder LE, et al. Suicidal thoughts and behaviors among high school students—Youth Risk Behavior Survey, US, 2021. *MMWR Suppl*. 2023;72(1):45-54. doi:10.15585/mmwr.su7201a6

68. Georgiades K, Boylan K, Duncan L, et al; 2014 Ontario Child Health Study Team. Prevalence and correlates of youth suicidal ideation and attempts: evidence from the 2014 Ontario Child Health Study. *Can J Psychiatry*. 2019;64(4):265-274. doi:10.1177/0706743719830031

69. Swanson SA, Colman I. Association between exposure to suicide and suicidality outcomes in youth. *CMAJ*. 2013;185(10):870-877. doi:10.1503/cmaj.121377

70. Millner AJ, Lee MD, Nock MK. Single-item measurement of suicidal behaviors: validity and consequences of misclassification. *PLoS One*. 2015;10(10):e0141606. doi:10.1371/journal.pone.0141606

71. Tong Y, Phillips MR, Conner KR. DSM-IV axis II personality disorders and suicide and attempted suicide in China. *Br J Psychiatry*. 2016;209(4):319-326. doi:10.1192/bjp.bp.114.151076

72. Castellví P, Miranda-Mendizábal A, Parés-Badell O, et al. Exposure to violence, a risk for suicide in youths and young adults: a meta-analysis of longitudinal studies. *Acta Psychiatr Scand*. 2017;135(3):195-211. doi:10.1111/acps.12679

73. Commisso M, Temcheff C, Orri M, et al. Childhood externalizing, internalizing and comorbid problems: distinguishing young adults who think about suicide from those who attempt suicide. *Psychol Med*. 2023;53(3):1030-1037. doi:10.1017/S0033291721002464

74. Morneau-Vaillancourt G, Orri M, Ouellet-Morin I, Geoffroy MC, Boivin M. A longitudinal study of adolescent pathways differentiating suicide ideation and attempt in early adulthood. *J Adolesc*. 2025;97(2):395-408. doi:10.1002/jad.12427

75. Geoffroy MC, Boivin M, Arseneault L, et al. Childhood trajectories of peer victimization and prediction of mental health outcomes in midadolescence: a longitudinal population-based study. *CMAJ*. 2018;190(2):E37-E43. doi:10.1503/cmaj.170219

76. Geoffroy MC, Boivin M, Arseneault L, et al. Associations between peer victimization and suicidal ideation and suicide attempt during adolescence: results from a prospective population-based birth cohort. *J Am Acad Child Adolesc Psychiatry*. 2016;55(2):99-105. doi:10.1016/j.jaac.2015.11.010

© 2025 American Medical Association. All rights reserved, including those for text and data mining, AI training, and similar technologies.

Downloaded from jamanetwork.com by McGill University Libraries user on 10/19/2026