

Adolescent substance use, self-harm and suicide:

Findings from the Northern Finland Birth Cohort 1986

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Disclosure (past 36 months)

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My talk today

Background

Northern Finland Birth Cohort Study 1986

- Design and participants
- Adolescent substance at age 15-16 years
- Register-based information on self-harm and suicide until age of 33 years

Our findings on adolescent alcohol and cannabis use, self-injury and suicide death

Background (1)

- Suicide is among the leading causes of death among young people¹
 - among the <30 year-old approx 25% of premature mortality are suicide deaths
- Self-harm i.e. non-suicidal self-injury (NSSI) and suicide attempts are highly prevalent among adolescents²
- Among adults, a significant portion of the excess suicide mortality is associated with substance use, alcohol in particular¹

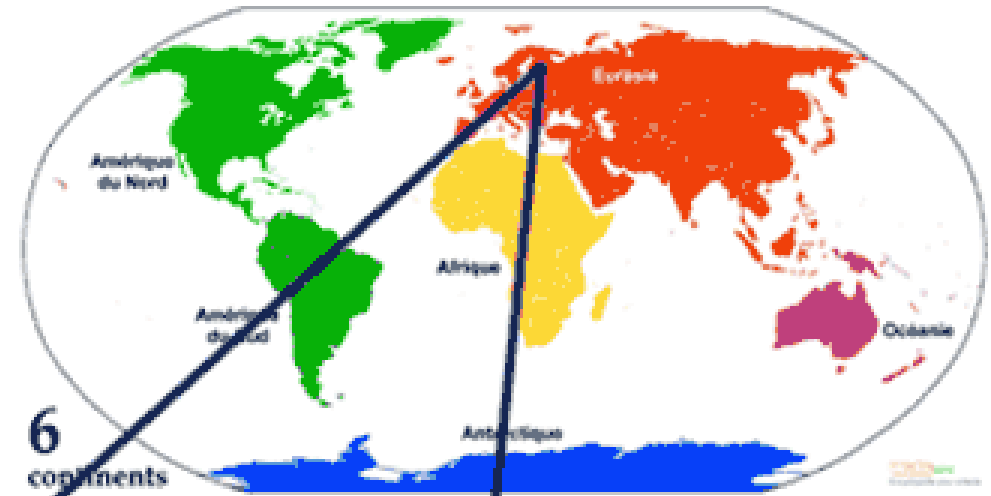
¹World Health Organization. Suicide in the world - Global Health Estimates. (No. CCBY-NC-SA 3.0 IGO.). Geneva 2019

²Duarte TA, Pauliino S, Almeida C et al. Self-harm as a predisposition for suicide attempts: A study of adolescents' deliberate self-harm, suicidal ideation, and suicide attempts.

Background (2)

- There is a paucity of longitudinal studies on adolescent substance use, and subsequent severe self-harm and death by suicide³
- Previous longitudinal studies examining adolescent substance and subsequent suicide/self-injury are markedly heterogeneous in accounting for confounding bias introduced by other substance use³

³ Denissoff, A., Levola, J., Niemelä, S. *et al.* Cannabis and Intentional Self-injury: a Narrative Review. *Curr Addict Rep* (2022).

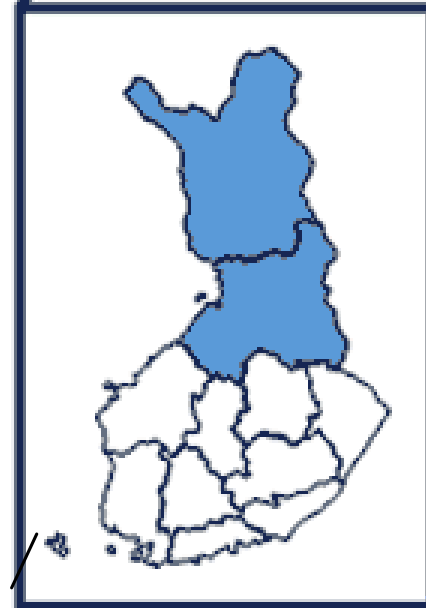


NORTHERN FINLAND BIRTH COHORT 1986

- 1st visit to maternal health care in 1.7.1985-30.6.1986
- N= 9 432 live-born children, 99% of the target population



<https://www.oulu.fi/nfbc/>



National register-linkage information using personal identification numbers for participants and their parents
e.g. Care register, Prescription register, Statistics Finland

1985

1985-1986

1987

1993

2001

2019

10-16th
gestational week

Delivery

1 yr

7-8 yr

15-16 yr

33-35 yr

Data on pregnancy, delivery and child's survival collected from the antenatal clinics and by questionnaire

Growth, health and development have been collected from welfare clinics

Questionnaire for parents and school teachers

Questionnaire for parents and children about school, mental and physical health, exercise, behaviour, nutrition, living habits and hobbies

Questionnaires about education, mental and physical health, exercise, behaviour, nutrition, work, economic, living habits and hobbies

Clinical examination

Clinical examination

Family background e.g.

Parental alcohol use
Parental education level
Family structure
Parental psychiatric diagnoses

Self-reported substance use

Psychiatric symptoms
PROD-questionnaire
Youth Self Report (YSR)

NFBC Data Availability and Ethical Statement

- NFBC data is available from the University of Oulu, Infrastructure for Population Studies. Visit the cohort website (www.oulu.fi/nfbc) for more information
- In the use of data the EU general data protection regulation (679/2016) and Finnish Data Protection Act are followed
- The use of personal data is based on cohort participant's written informed consent at his/her latest follow-up study
- The 15-16-year follow-up study was approved by the Ethical Committee of the Northern Ostrobothnia Hospital District in Finland (May 17th 2006).
- Permission to use the data can be applied for research purposes via electronic material request portal.

1986-
1987

9432
alive born children



2000-2001

At age 15-16 yrs
1st questionnaire by post (n=7182)
2nd questionnaire
at the clinical examination (n=6795)



- 31st Dec 2018

Secondary data linked from
national registers until age 33 yrs

Alcohol

- Age of use onset
- Age of intoxication onset
- Use frequency
- Intoxication frequency
- Binge drinking frequency
- Consumption g/day
- Self-reported tolerance
(Number of drinks needed
in order to get drunk)

- Smoking and snus use
- Cannabis use during
lifetime
- Inhalant use during lifetime
- Medication misuse during
lifetime
- Other illicit drugs during
lifetime

Self-harm

Care register (inpatient and outpatient specialized care) HILMO:
National Institute of Health and Welfare 2001-2018
Primary care visits 2011-2018

Death by suicide
Statistics Finland

Death by suicide

- Information on times and causes of death were obtained from the Population Register Data and Registry for Causes of Death (Statistics Finland), which cover all deaths in Finland.
- ICD-10 codes X60-X84 (Intentional self-harm).
- An autopsy is routinely carried out in all suicide and/or unclear cases in Finland.
- In the cases of accidents where suicidal intent was unclear (n=3), the deaths were not included as suicides.

Self-harm requiring medical attention

ICD-10 diagnosis codes from the Care register:

- X60-X84 Intentional self-harm
- Z91.5 Personal history of self-harm
- Y87.0 Sequelae of intentional self-harm
- Z72.8 (Other problems related to lifestyle, Self-damaging behavior)

International Classification of Primary Care 2 (ICPC-2) for primary care visits:

- P77 Suicide/suicide attempt

- This definition of self-harm could encompass both non-suicidal self-injury (NSSI) and suicide attempts
- The lack or presence of suicidal intent during the instances of self-harm was not an inclusion criterion as it was not always deductible from the registers.
- If participants had several instances of self-harm, the first instance was considered.

By the year 2018 i.e., age 33-34 years

- 109 (1.4%) participants included in this study had at least one incident of self-harm requiring medical attention
- 29 (0.4%) had died due to suicide
- males were more likely to have died by suicide than females (0.6% vs. 0.1%; $p < 0.001$).

Statistical methods

- Self-harm, suicide death, and both self-harm and suicide death were considered the outcomes.
- Times at emigration (n=314/265) and death due to other causes than suicide (n=47/28) were considered when defining survival times.
- Cross-tabulation, χ^2 tests, Fischer's exact tests and Mann Whitney U -test (means and SD for continuous variables) for significance testing were used for studying the associations of potential confounders, self-harm and suicide.
- Cox regression was used to analyze differences between survival rates for the groups categorized according to AFD, AFI, frequency of alcohol intoxication during the past 30 days and self-reported alcohol tolerance
- Aalen-Johansen cumulative incidence curves were computed for outcomes
- Also the Cox proportional hazards assumption was tested by using hazard logarithms and scaled Schoenfeld residuals

Associations of adolescent alcohol use and self-reported alcohol tolerance with risk of self-harm and suicide in early adulthood: a birth-cohort study

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Adolescent alcohol use variables

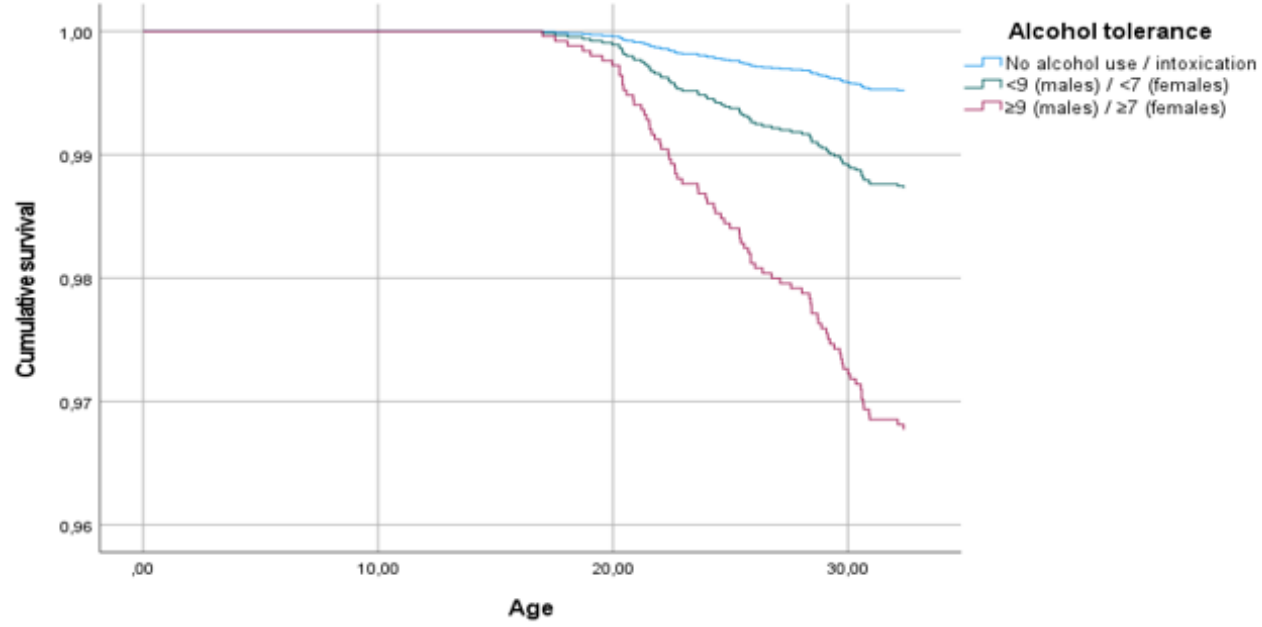
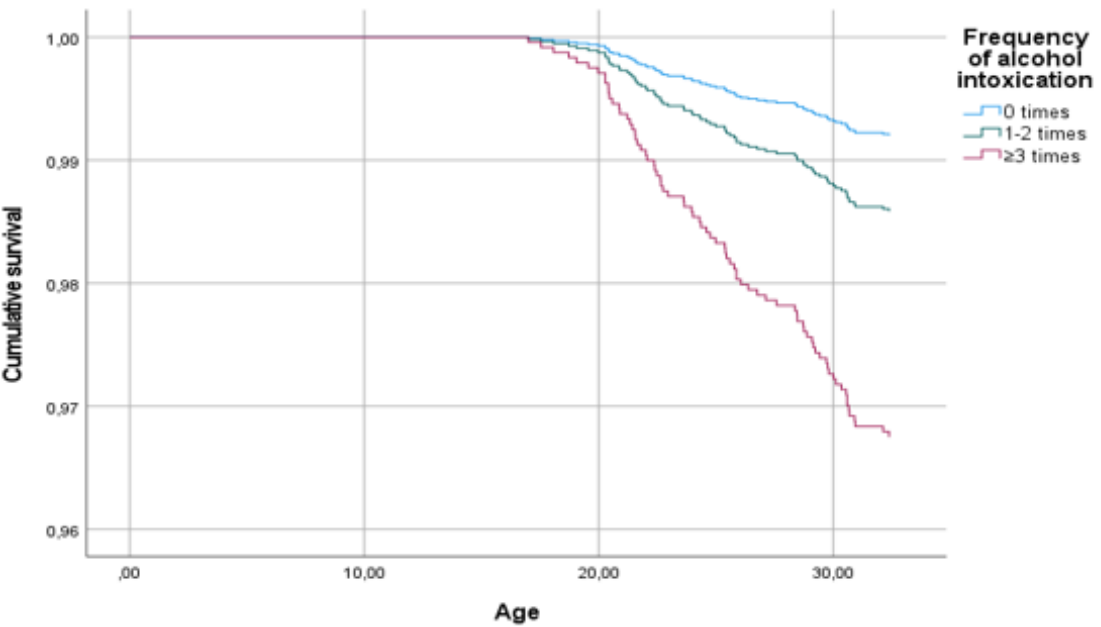
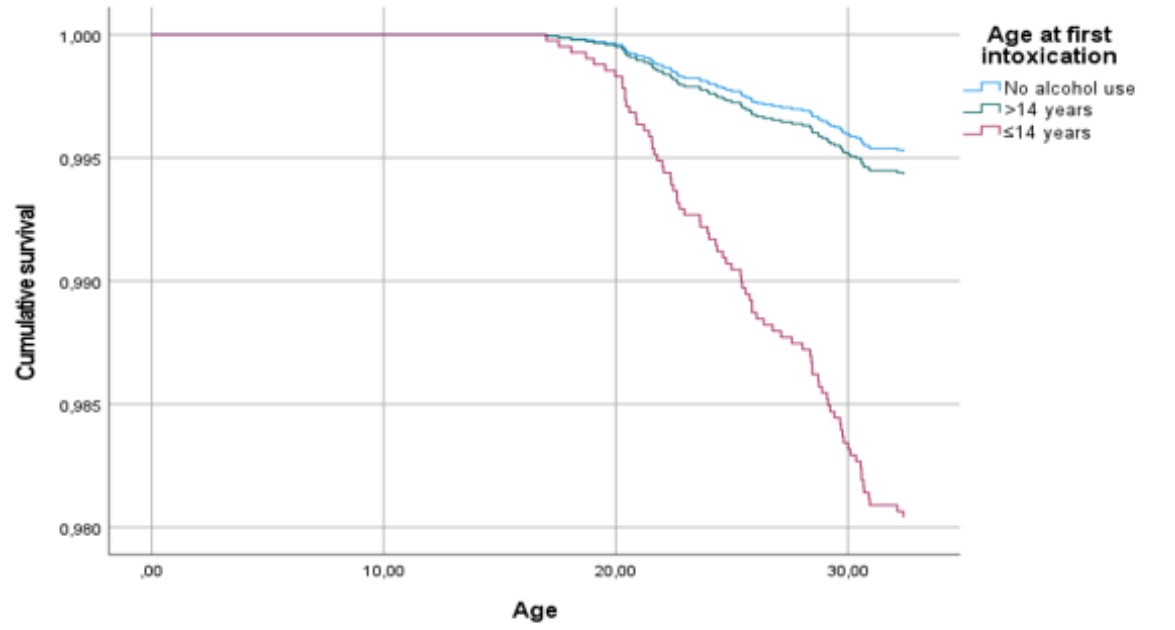
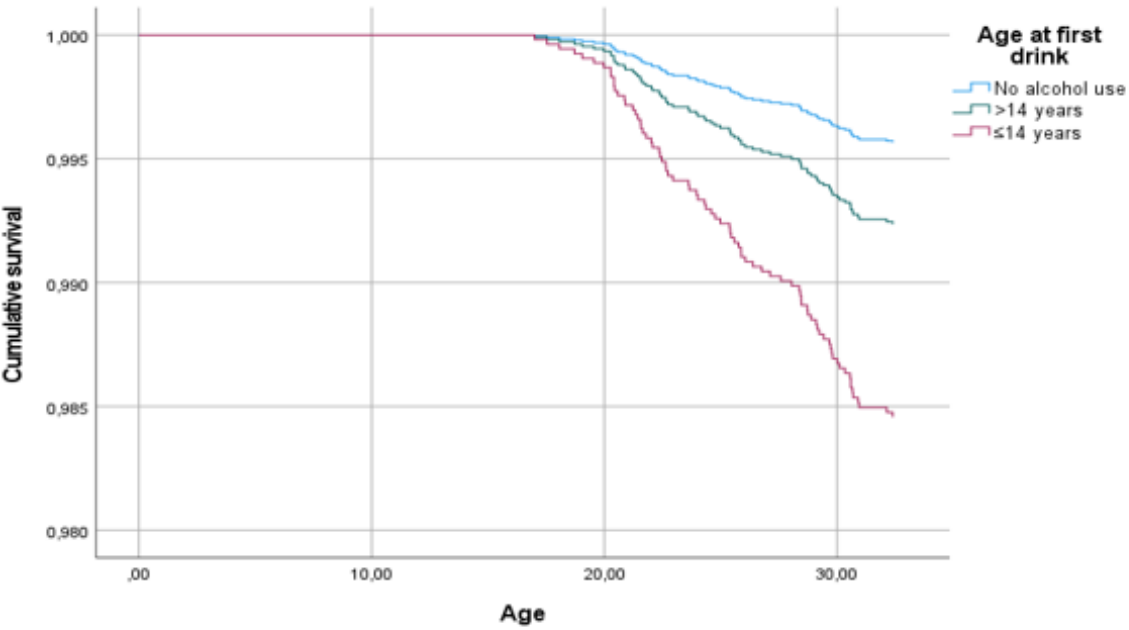
- Age of alcohol use onset (cut-off 14 yrs) n=6615
- Age of intoxication onset (cut-off 14 yrs) n=6549
- Alcohol use frequency during the past 30 days (0/1-2 / \geq 3 times) n=6446
- Self-reported inherent alcohol tolerance: “How many drinks You need in order to get intoxicated?” n=6599
 - low to intermediate tolerance (<9 drinks for males and <7 drinks for females)
 - high tolerance (\geq 9 drinks for males and \geq 7 drinks for females)
 - participants who had never been intoxicated considered the reference group.
 - High tolerance was defined to correspond to the highest 10 percentile of drinks reported to achieve intoxication.

The confounders were included in the multivariable models when they were associated ($p < 0.1$) with self-harm or suicide in this study

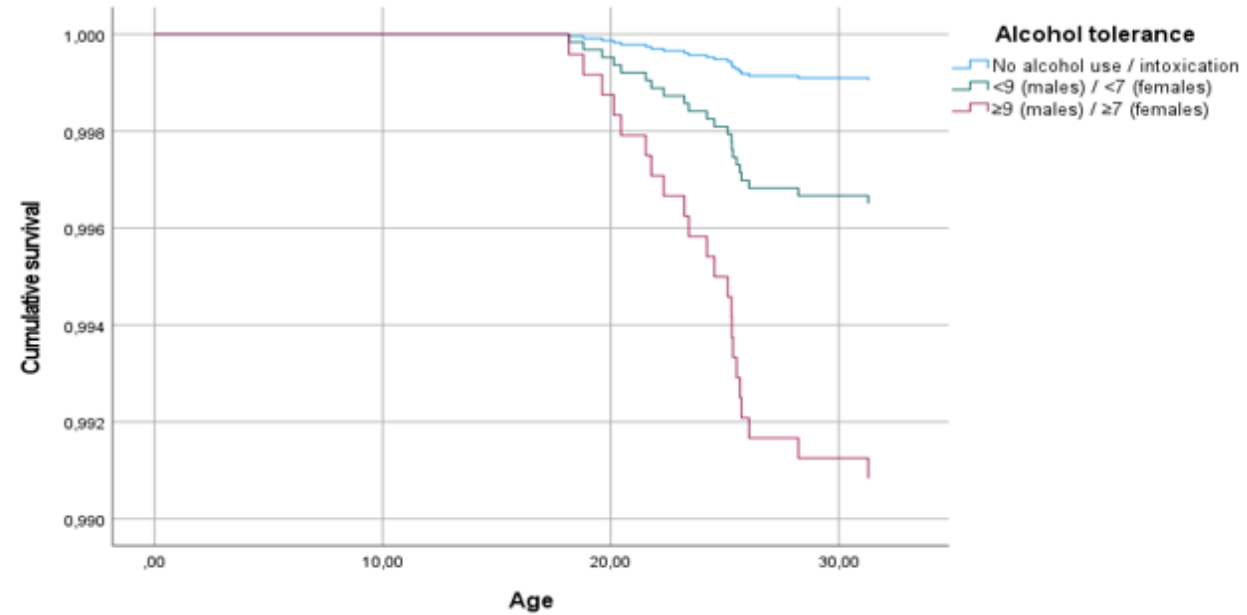
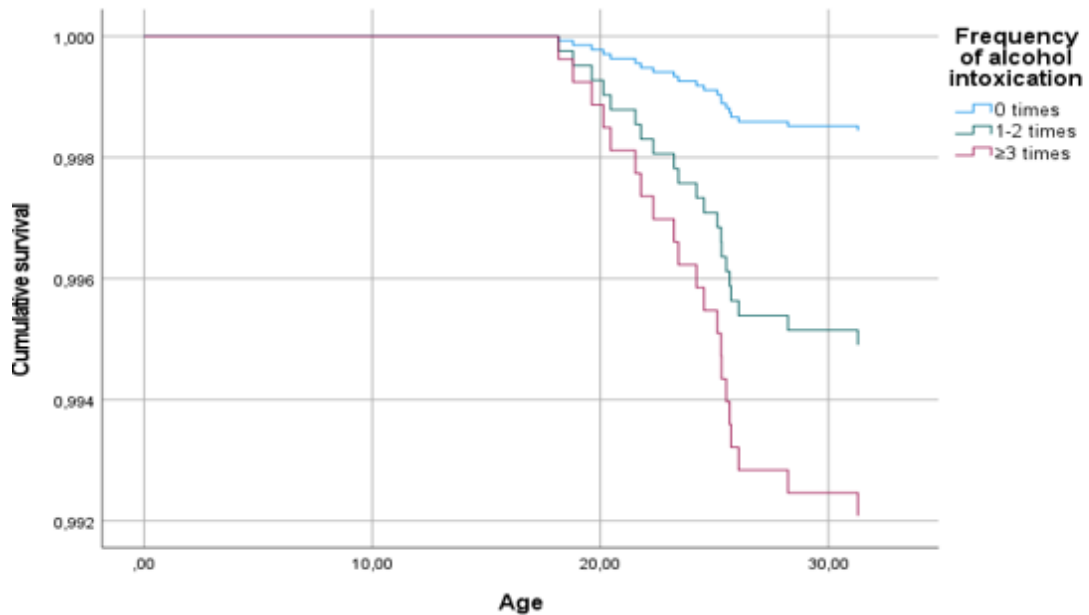
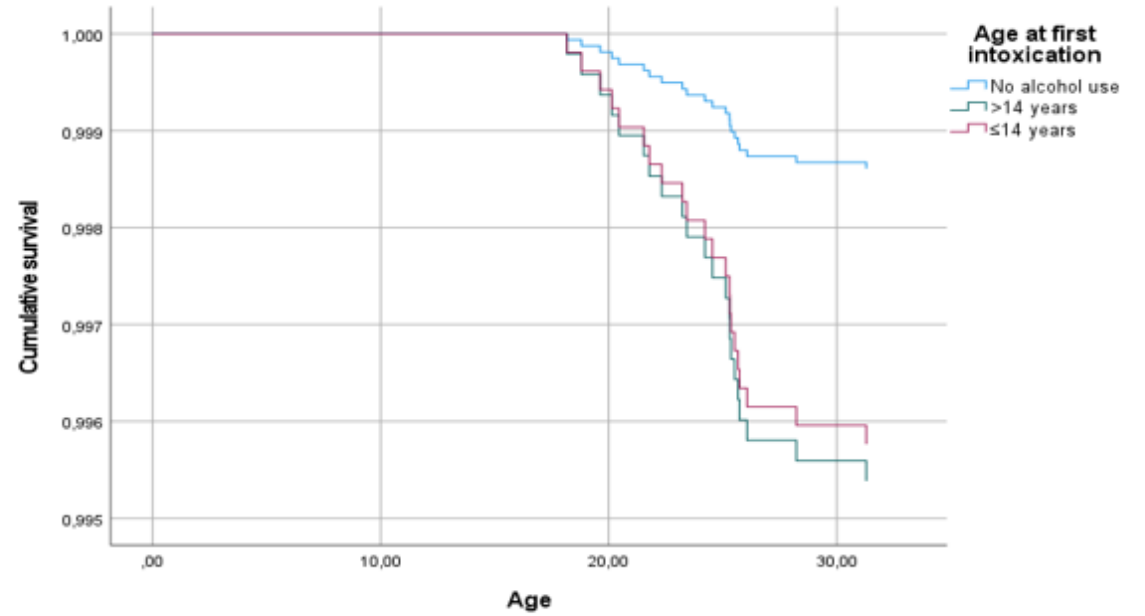
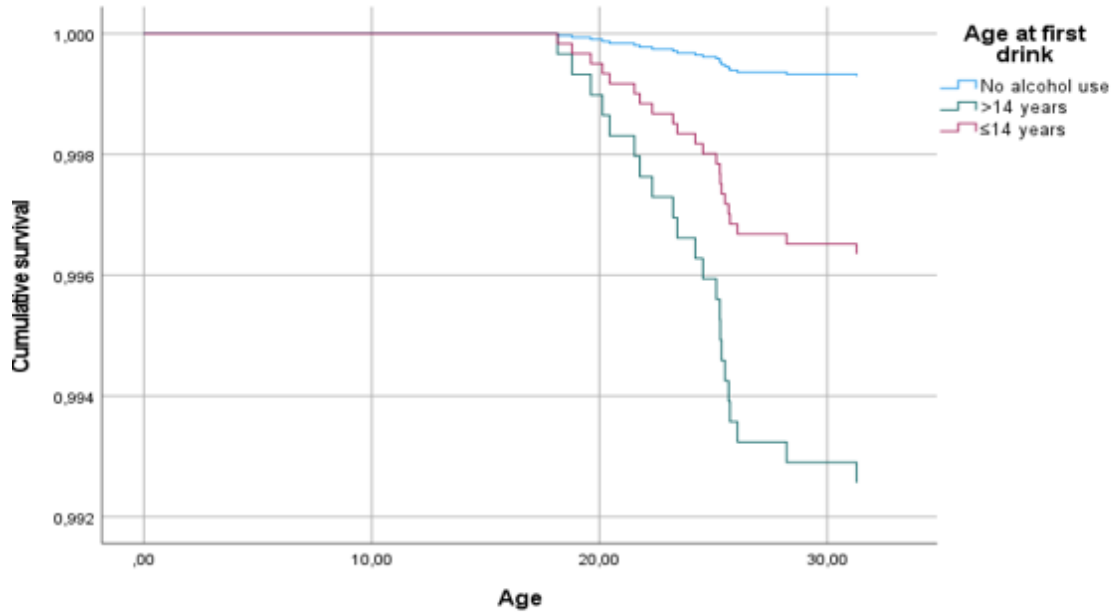
- Other types of substance use during lifetime
 - Cannabis
 - Inhalants
 - Prescription medicine misuse
 - Other illicit drugs
- Psychiatric symptomatology at age 15-16 yrs (Youth Self-Report YSR)
- Family structure
- Parental education level
- Parental psychiatric diagnoses

Alcohol use and self-harm requiring medical attention

Cox regression analyses (unadjusted).



Alcohol use and suicide death Cox regression analyses (unadjusted).



In the fully adjusted models

Associations with self-harm

- younger AFI (Hazard Ratio, HR, 2.28, 95% CI 1.16-4.47)
- high inherent alcohol tolerance (HR 3.76, 95% CI 1.55-9.08)

Associations with suicide death by age 33 years

- frequent alcohol intoxication (HR 5.39, 95% CI 1.44-20.23)
- high inherent alcohol tolerance (HR 6.20, 95% CI 1.18-32.45)

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Does cannabis use in adolescence predict self-harm or suicide? Results from a Finnish Birth Cohort Study

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Cannabis use during lifetime at age 15-16 years

- 'Have you ever used marihuana or hashish?' as dichotomized (no/yes) and with options 'never, once, 2–4 times, 5 times or more, or I use regularly'.
- Dose- response was studied post-hoc for the self-harm outcome utilizing a four-class cannabis variable (never, once, 2-4 times, or 5 times or more). For this analysis, the '5 times or more' and 'I use regularly' groups were pooled due to small sample sizes in the two categories.

Confounders

- Sex
- Alcohol intoxication frequency during the past 12 months
- Other types of substance use
- Data on psychiatric diagnostic codes (ICD-10: F00-F69, F80-F99) recorded before the participants were aged 16 years
- Lifetime parental psychiatric diagnoses

TABLE 2 Association of covariates, self-harm and suicide death in Northern Finland Birth Cohort 1986

	Total <i>n</i>	Self-harm				<i>p</i> -value	Suicide death				<i>p</i> -value
		No <i>n</i> =6503		Yes <i>n</i> =79			No <i>n</i> = 6560		Yes <i>n</i> = 22		
		<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%	
Sex											
Male	6582	3195	49.1	44	55.7	0.259*	3219	49.1	20	90.9	<0.001
Female		3308	50.9	35	44.3		3341	50.9	2	9.1	
Psychiatric disorder at baseline											
No	6582	6261	96.3	64	81.0	<0.001*	6304	96.1	21	95.5	0.584*
Yes		242	3.7	15	19.0		256	3.9	1	4.5	
Cannabis use											
No	6582	6141	94.4	64	81.0	<0.001*	6186	94.3	19	86.4	0.128*
Yes		362	5.6	15	19.0		374	5.7	3	13.6	
Other illicit drug use											
No	6554	6443	99.5	76	96.2	0.008*	6497	99.5	22	100.0	1.00*
Yes		32	0.5	3	3.8		35	0.5	0	0.0	
Alcohol intoxication 10 ≥ times past year											
No	6419	5183	81.7	44	57.1	<0.001	5213	81.5	14	66.7	0.092*
Yes		1159	18.3	33	42.9		1185	18.5	7	33.3	
Parental psychiatric disorder											
No	6582	4147	63.8	27	34.2	<0.001	4166	63.5	8	36.4	0.008
Yes		2356	36.2	52	65.8		2394	36.5	14	63.6	

*Fischer's exact test.

FIGURE 2 The Aalen-Johansen Cumulative Incidence Curve for the Self-Harm Outcome

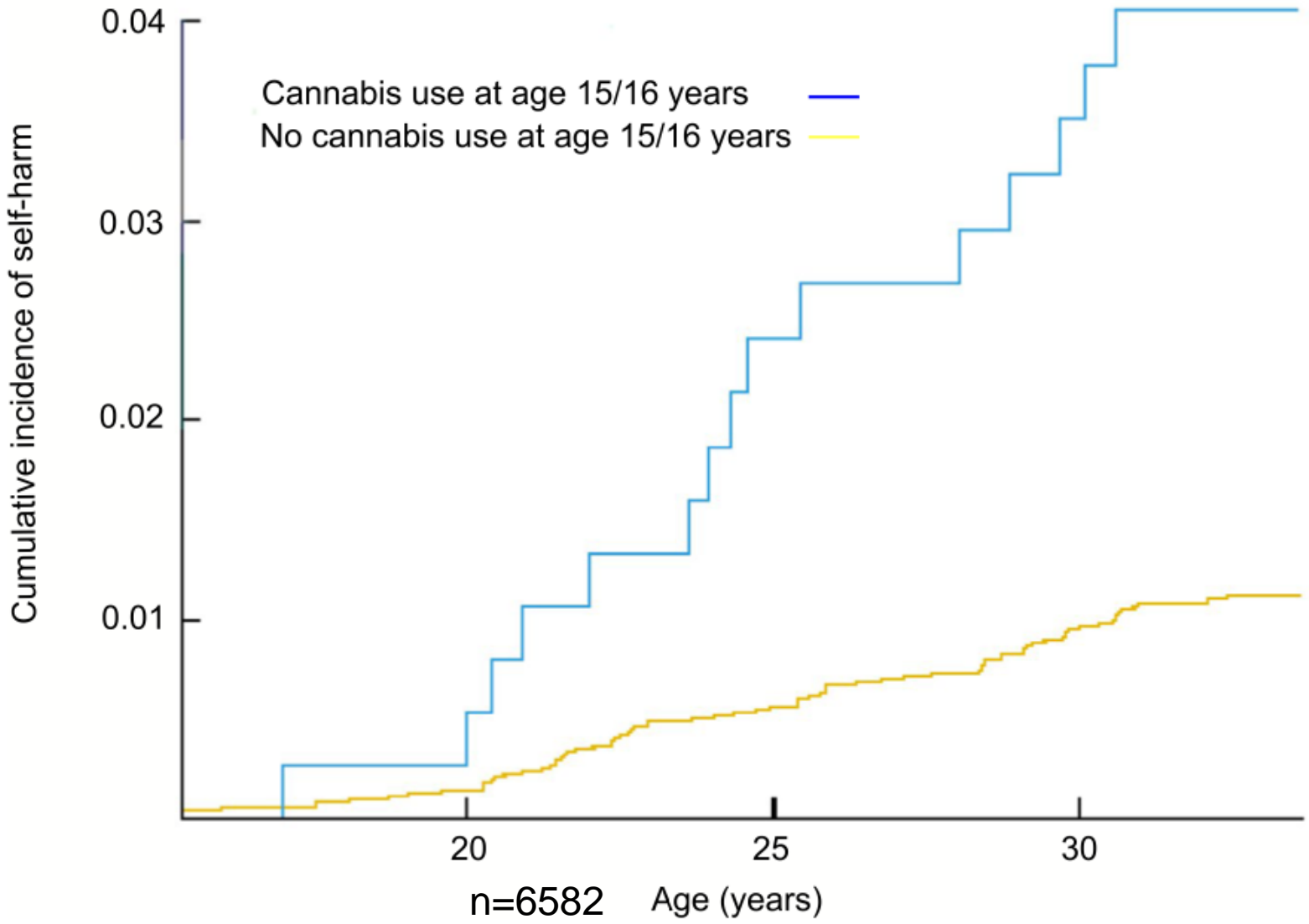


TABLE 3 The hazard ratios (HR) for the risk of self-harm in Northern Finland Birth Cohort 1986 by cannabis use status

		No cannabis use at baseline		Cannabis use at baseline		
		Sample size	Self-harm	Self-harm	HR	95% CI
Self-harm	Crude	6576	64	15	3.93	2.24–6.90
	Model 1	6576	64	15	3.75	2.13–6.61
	Model 2	6388	62	15	2.04	1.07–3.90
	Model 3	6388	62	15	2.06	1.07–3.95


Note: Model 1: sex, psychiatric disorder at baseline; Model 2: sex, psychiatric disorder at baseline, frequent alcohol intoxications past year, use of other illicit drugs; Model 3: sex, psychiatric disorder at baseline, frequent alcohol intoxications past year, use of other illicit drugs, parental psychiatric disorder. Statistically significant results in **bold**.

Significant outcomes

- Lifetime cannabis use was associated with self-harm requiring medical attention after adjusting for psychiatric disorders, parental psychiatric disorders, frequent alcohol intoxications and other illicit drug use
- The crude association attenuated by 46% after adjusting for alcohol intoxications and other illicit drug use
- An association between lifetime cannabis use and suicide was not observed



Cannabis and Intentional Self-injury: a Narrative Review

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Abstract

Purpose of Review Observational studies assessing the association of cannabis use with subsequent intentional self-injury have reported mixed findings. Longitudinal studies examining the association of cannabis use with subsequent suicide death are notably rare. Our objective was to review longitudinal studies examining cannabis use and subsequent self-harm, suicide attempt, or suicide death.

Recent Findings Few population-based studies have focused on self-harm with considerable variability across studies in how this outcome has been operationalized. Studies assessing the association between cannabis use and suicide attempt are equivocal in their conclusions and heterogenous in terms of samples utilized and assessment of confounding bias. The results of one meta-analysis were suggestive of dose dependency. For suicide death, the findings are inconsistent, and there is reason for concern of selection bias.

Summary The existing evidence base on these associations is not yet rigorous enough to allow drawing conclusions on causality. However, cannabis might be seen as an adverse prognostic marker for intentional self-injury.

Keywords Cannabis · Self-harm · Suicide attempt · Suicide death

Discussion

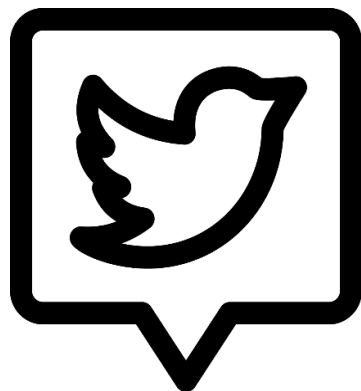
- Adolescent substance use associates with increased risk for subsequent severe self-harm and suicide: implications for suicide prevention?
- when implementing screening strategies to identify adolescents with high-risk alcohol use and poor outcomes, assess, include
 - age of 1st intoxication
 - frequency of intoxication
 - self-reported alcohol tolerance
- polysubstance use in adolescence is common and introduces a potential source of confounding when studying prognosis of adolescent substance use

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Northern Finland Birth Cohorts

- MSc Anni-Emilia Alakokkare
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