The RECORD statement – checklist of items, extended from the STROBE statement, that should be reported in observational studies using routinely collected health data.

Manuscript: Cannabis-Related Emergency Department Visits by Ontario Youths and their Outcomes: Repeated Cross-Sectional Study

	Item No.	STROBE items	Location in manuscript	RECORD items	Location in manuscript
Title and abstract					
	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	The design (repeated cross-sectional) is in the title (p. 1, lines: 1-2). The abstract summarizes the design: data (health administrative): analyses:.	RECORD 1.1: The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included. RECORD 1.2: If applicable, the geographic region and timeframe within which the study took place should be reported in the title or abstract. RECORD 1.3: If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract.	The type of data are specified in the Abstract (p. 3, line 48). The principal database used is in the Data Sources section of the Methods (p. 6, lines 100-101). The geographic region (Ontario) and timeframe is in the title (p. 1, lines 1-2) and time frame is in the Abstract (p. 2, line 49). No linkages were made specifically for this study (all were previously linked by ICES). The NACRS and RPDB databases were linked at the individual level using encrypted identified number generated at ICES.
Introduction					
Background rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 5, lines 71-91.		--

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Objectives	3	State specific objectives, including any prespecified hypotheses	Pages 5, lines 88-89.		--
Methods					
Study Design	4	Present key elements of study design early in the paper	Page 6, line 95.		--
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	setting: p. 6, lines 91-92 locations: p. 6, line 91 relevant dates: p. 6, lines 91-92 exposure: p. 6, lines 104-110 follow-up: Our follow-up is limited to whether ED patients were admitted to the hospital from the ED, p. 7, lines 114-115		--

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Participants	6	*(a) Cohort study* - Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study* - Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study* - Give the eligibility criteria, and the sources and methods of selection of participants *(b) Cohort study* - For matched studies, give matching criteria and number of exposed and unexposed *Case-control study* - For matched studies, give matching criteria and the number of controls per case	Eligibility criteria: Page 6, lines 91-92. Sources: Page 6, lines 94-102. Selection of participants: None. All eligible patients were included.	RECORD 6.1: The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be provided. RECORD 6.2: Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided. RECORD 6.3: If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage.	Page 6, lines 91-92. The limited validation of mental health codes in the ED setting is discussed on p. 13, lines 241-250. The linkage of databases preceded the study and was carried out by ICES. All eligible individual with ED visits included in the study were successfully linked to RPDB using an encrypted identifier. No additional linkage was conducted. p. 6, lines 98-102

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Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	outcomes: Our only outcome is whether ED patients were admitted to the hospital from the ED, p. 7, lines 114-115 exposures: p. 6, lines 104-110 predictors: We did not carry out predictive analyses. Covariates of the exposure are defined on p. 6, lines 98-101 potential confounders: p. 6, lines 98-101 effect modifiers: Not applicable. diagnostic criteria: Cannabis visits were identified from ICD-10 codes, p. 6, lines 104-110	RECORD 7.1: A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided.	--
Data sources/ measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Pages 6-7, lines 94-118. The only grouping of the patients was by sex and age, and assessments were identical across groups.		-- --
Bias	9	Describe any efforts to address potential sources of bias	As we discuss on page 13, line 250, the data likely understate the prevalence of cannabis-related ED visits. We did not see a feasible strategy to correct for this.		--

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Study size	10	Explain how the study size was arrived at	There was no sample size calculation. We did not sample, but instead used the entire clinical population.		--
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	Page 7, lines 120-125 explain how we calculated rates per 10,000 youths and per 10,000 ED visits.		--

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Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) *Cohort study* - If applicable, explain how loss to follow-up was addressed *Case-control study* - If applicable, explain how matching of cases and controls was addressed *Cross-sectional study* - If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses	(a) Statistical methods are described on p. 7, lines 119-129. The objectives of this research were descriptive. Rates were presented by Age x Sex subgroups (Figure 1, page 29). (b) We included Sex x Age x Time interactions in our Poisson regression models (Supplement). (c) There were missing data for rurality and neighborhood income quintile (Table 1 caption, page 25). (d) These were clinical population data, gathered without sampling. (e) No sensitivity analyses were carried out.		-- -- -- --

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Data access and cleaning methods				RECORD 12.1: Authors should describe the extent to which the investigators had access to the database population used to create the study population. RECORD 12.2: Authors should provide information on the data cleaning methods used in the study.	Only Isac Lima, an employee of the data holder ICES, had direct access to individual-level data. This is in accord with ICES rules. Individual level data were cleaned by ICES. Annual visit counts were inspected by Lima and Gardner. No outliers were found. This is evident in the close fits of the rate data to the loess-smoothed curves (Figure 1, page 29).

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Linkage		..		RECORD 12.3: State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided.	ICES uses deterministic linkage to link all their databases. In addition, when deterministic linkage fails, probabilistic linkage is then used for the remaining records. ICES is responsible for creating an encrypted number which de-identify personal information in the databases allows researcher to link different databases such as NACRS and RPDB using this encrypted number at the person-level. This process is conducted internally and prior to any research is conducted. For the purpose of this study, simple linkage using the encrypted key in both NACRS and RPDB was conducted.
Results					

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Participants	13	(a) Report the numbers of individuals at each stage of the study (*e.g.*, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed) (b) Give reasons for non-participation at each stage. (c) Consider use of a flow diagram	(a) The counts of individuals with at least one cannabis visit in 2003 or 2017 are reported in Table 2, pp. 25-26. (b)-(c) No eligible cases were dropped from the study.	RECORD 13.1: Describe in detail the selection of the persons included in the study (*i.e.,* study population selection) including filtering based on data quality, data availability and linkage. The selection of included persons can be described in the text and/or by means of the study flow diagram.	Ontario residents receive coverage through the Ontario Health Insurance Plan (OHIP). All visits by OHIP-covered youths were included. OHIP eligibility was assessed at the index date (ED visit date).
Descriptive data	14	(a) Give characteristics of study participants (*e.g.*, demographic, clinical, social) and information on exposures and potential confounders (b) Indicate the number of participants with missing data for each variable of interest (c) *Cohort study* - summarise follow-up time (*e.g.*, average and total amount)	(a) Table 1, pages 23-24, for demographic data. (b) There were less than 1% missing data for rurality and neighborhood income quintile. See the caption to Table 1, page 24.		-- --

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Outcome data	15	*Cohort study* - Report numbers of outcome events or summary measures over time *Case-control study* - Report numbers in each exposure category, or summary measures of exposure *Cross-sectional study* - Report numbers of outcome events or summary measures	Cross-sectional study. Cannabis visit rates are reported in Figure 1, page 28, and hospital admission rates in Figure 2, page 29.		--
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	(a) Estimates from the regression of the rates of cannabis visits on time, age group, and sex are reported in Table S-2, Supplement. (b) Age was converted into three categories (page 7, lines 120-121). (c) The figures (pages 27-28) report absolute risks for the entire time period of the study.		-- -- --

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Other analyses	17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	Sex x Age x Time interactions reported in Table S-2, Supplement.		--
Discussion					
Key results	18	Summarise key results with reference to study objectives	Pages 10-11, lines 183-197.		
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Limitations: Page 13, lines 240-255.	RECORD 19.1: Discuss the implications of using data that were not created or collected to answer the specific research question(s). Include discussion of misclassification bias, unmeasured confounding, missing data, and changing eligibility over time, as they pertain to the study being reported.	Problems with limited validity of ICD-10 codes in the ED setting are discussed on p. 13, lines 241-254.
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Our discussion of the possible implications of the findings (pages 11-12, lines 198-239) suggests that exposure to novel cannabis products may account for some of the increase. On page 14 we are careful to state that our data do not provide information on cannabis preparation or route of administration.		
Generalisability	21	Discuss the generalisability (external validity) of the study results	We acknowledge on page 13, lines 254-255, that our data are from a single Canadian province and may have limited generalizability		
Other Information					

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Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Pages 15-16, lines 284-293.		
Accessibility of protocol, raw data, and programming code		..		RECORD 22.1: Authors should provide information on how to access any supplemental information such as the study protocol, raw data, or programming code.	R code is available from the corresponding author (page 16, lines 305-306). Those wishing to access the underlying data must contact ICES, p. 16, lines 295-300.

*Reference: Benchimol EI, Smeeth L, Guttmann A, Harron K, Moher D, Petersen I, Sørensen HT, von Elm E, Langan SM, the RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. *PLoS Medicine* 2015; in press.