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## Context

- Despite declines in prevalence, cigarette smoking remains a leading avoidable threat to public health
- In 2006-7, nearly 50,000 Canadian youth in grades 5-9 were current smokers
- The American Academy of Pediatrics advocates that pediatricians should be involved in tobacco control counseling, and has developed guidelines for counseling.
- Less than half of general practitioners in Montreal (Canada) advise their young patients not to smoke. Only one-third feel that they have the skills needed to prevent their young patients from starting to smoke.
- Clinical tools to identify youth at high risk of becoming regular smokers (who might benefit from intervention) may be an important component of a comprehensive tobacco control strategy for youth.

## Objective

- To develop a prognostic tool (i.e., a nomogram) for use by health care practitioners in clinical settings, to identify adolescents at high risk of daily smoking

## Methods

### Participants

- Data were drawn from the NDIT Study, a prospective longitudinal cohort investigation of 1293 grade 7 students recruited in 10 secondary schools in Montreal (Canada) in 1999.
- Questionnaires were administered every 3 months during the 10-month school year, for 5 years (total of 20 survey cycles).

### Variables

- The dependent variable was initiation of daily smoking (yes/no)
- Independent variables were selected because: (i) they were associated with daily smoking in multivariate analyses; (ii) collecting accurate data from youth on these variables in clinical settings is feasible
- Independent variables included: age (11-19 years); ever smoked (yes/no); ever felt like you need a cigarette (yes/no); parent(s) smoke (yes/no); sibling(s) smoke (yes/no); friend(s) smoke (yes/no); and ever drank alcohol (yes/no)

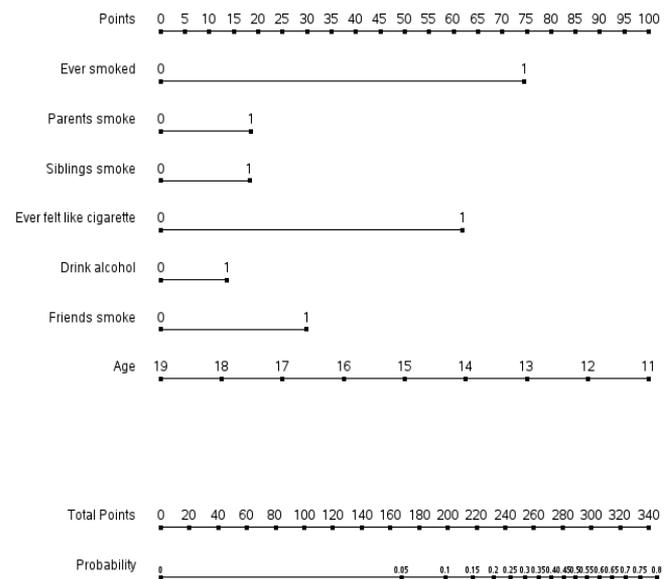
### Analysis

- The nomogram was developed using estimates of regression parameters derived from multivariable pooled logistic regression.
- Potential overfitting bias was corrected using bootstrap cross-validation
- Goodness-of-fit and predictive ability were assessed by R-squared, the c-statistic, and the Hosmer-Lemeshow test.
- The model was transformed into a user-friendly nomogram, such that the risk of daily smoking can be easily computed by summing points for the response to each item (i.e., independent variable).
- The total number of points is then aligned with a bar code depicting the estimated 1-year probability of daily smoking.

## Results

- 17.7% of youth had a 1-year risk of becoming a daily smoker >10%

Figure. Nomogram for the 1-year risk of becoming a daily smoker based on selected covariates, NDIT 1999-2005



- A 12-year old (90 points), who has smoked (75 points), whose parents smoke (20 points) but not his siblings or friends (0 points), who does not drink alcohol (0 points), but has felt like having a cigarette (60 points) accumulates 245 points. His/her 1-year risk of daily smoking is approximately 25%.

## Reflections

- The fitted regression model was characterized by a reasonably good fit and predictive ability.
- We propose that adolescents with a 1-year risk of becoming a daily smoker >10% should be targeted for individualized intervention
- Nomograms to identify youth at high risk of daily smoking may eventually be an important component of individualized intervention in a comprehensive tobacco control strategy
- The nomogram is available online at [http://episerve.chumontreal.qc.ca/calculation\\_risk/](http://episerve.chumontreal.qc.ca/calculation_risk/)

