

# Screening Tools for Who Will Start Smoking and the Future of Clinical Prediction

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Is the lack of a prognostic tool to assist clinicians in identifying youth at risk of transitioning from never to ever smoking a major barrier to counseling? Sylvestre et al<sup>1</sup> address this in a longitudinal study of 12- to 13-year-olds in Montreal. They start with 58 candidate items on youth tobacco use initiation and monitor these early adolescents closely from 1999 to 2005, finding that 12 variables (age, 4 worry or stress items, 1 depression item, 2 self-esteem items, and 4 alcohol or tobacco items) are a best fit in predicting which youth go on to be among the ~16% who were nonsmokers at baseline and then puffed on a cigarette during the coming year.

The authors' statistical analysis and use of modeling are elegant, and they call attention to an important and often overlooked fact that a first puff of a cigarette is a sentinel event that can rapidly lead to nicotine dependence and sustained smoking. However, the assumptions made by the authors in the question they posed, and thus the tool they developed, raise concerns that may limit its use for either research or practice.

First, they maintain that "counseling all patients is not feasible or necessary."<sup>1</sup> No evidence reveals that counseling all patients is not feasible. Additionally, guidelines both then (in 1999) and now recommended brief screening and counseling for all, both for tobacco use and for secondhand smoke exposure. Fully 36% of their sample reported already having smoked at baseline

and were excluded from the study. This high a prevalence of tobacco use easily justifies universal screening and counseling. A selective counseling strategy may inappropriately reinforce complacency and the misplaced belief that some young people are "safe" from nicotine addiction.<sup>2</sup>

Secondly, some variables in the predictive tool are themselves risky behaviors that would be addressed during clinicians' delivery of preventive care to adolescents. For example, reporting low self-esteem or alcohol use might and should trigger screening and counseling interventions; thus, questions about mental health and alcohol would not be relegated to screening solely for future smoking risk but would instead be part of a comprehensive screening tool, trigger questionnaire, or health risk appraisal, and positive responses would be addressed directly during the clinical encounter. Thus, the tool, despite its predictive validity, is unlikely to be useful in selecting who should or should not be counseled.

The strongest predictors of future smoking initiation in this study (described in the Supplemental Materials) were whether adolescents' friends smoked and whether respondents reported feeling "the need for a cigarette."<sup>1</sup> The prevalence of these was 38% and 3.2%, respectively. Friends' smoking is a well-described factor in initiation; peers strongly influence attitudes, behaviors, and access to cigarettes.<sup>3</sup> These 2 items predicted smoking initiation with

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sensitivity and specificity nearly as good as their full 12-item model (86% and 37% vs 80% and 55%, respectively.) Craving (the “need” for a cigarette) reflects addiction but is hard to interpret among adolescents who never smoked, unless these youth are underreporting their smoking. In any case, an almost-as-good 2-item clinician screening may be more useful than a multi-item form that requires scoring during the clinical encounter. Real-time clinical screening might also allow a clinical intervention to be provided immediately to youth found to be at higher risk.

Given the year this study was conducted, it is not surprising that electronic cigarette and related product use was not measured. The epidemic of electronic nicotine delivery systems had not yet started. Recent evidence reveals that electronic nicotine delivery systems lead to nicotine addiction and combustible cigarette use and that marketing of these products target youth using strategies that have historically and successfully been employed by the tobacco industry to promote addiction to cigarettes.<sup>4,5</sup> The authors state that clinicians choosing to use the tool should

also ask about electronic cigarettes and other forms of tobacco. Again, superiority to a comprehensive clinical preventive service screening remains to be demonstrated.

Despite limitations in this tool, the study provides a glimpse into the future and provides a model for how patient data could inform care delivery. If the known associations between multiple risky behaviors, patient attitudes, and previous care encounters are fully integrated into electronic health record prompts, individual care could be more fully informed by all available data. The analyses of this article point toward the future when health systems are able to use electronic health records integrated with computer-based decision support to provide targeted, personalized care. Artificial intelligence-based predictive analytics able to stratify risks and prioritize interventions have the potential to become routine.<sup>6</sup> Eventually, one hopes we will have tools that can be used to address multiple healthy and risky behaviors, embedded in real-time interactive learning health systems thus able to improve both individual health, clinical care delivery, and population health.

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