Assessing the Use of Agent-Based Models for Tobacco Regulation

Tobacco consumption continues to be the leading cause of preventable death and disease in the United States. Since 2009, the U.S. Food and Drug Administration (FDA) has had broad regulatory authority over tobacco products and has used models as one tool to guide policy. Recently, FDA has been exploring the usefulness of a particular modeling approach—agent-based models (ABMs)—to inform its policy decisions.

ABMs are computational models used to examine how individual elements, or agents, of a system behave as a function of individual characteristics, the environment, and interactions with each other. Each agent interacts with other agents based on a set of rules and within an environment specified by the modeler, which leads to a set of specific aggregate outcomes, some of which may be unexpected. With these capabilities, ABMs have the potential to provide a deeper understanding of complex behaviors and interactions of diverse individuals and their environment, and to inform policy making.

FDA asked the IOM to convene a committee to provide guidance on using ABMs to improve the effect of tobacco control policy on public health and to review an ABM developed for use by FDA. In the resulting report, Assessing the Use of Agent-Based Models for Tobacco Regulation, the committee describes the complex tobacco environment; discusses the usefulness of ABMs to inform tobacco policy and regulation; presents an evaluation framework for policy-relevant ABMs; examines the role and type of data needed to develop ABMs; provides an assessment of the ABM developed for FDA; and offers strategies for using ABMs to inform decision making in the future. The report also includes lessons learned from public health and other disciplines to offer guidance on maximizing model credibility and building suitable models for policy making.

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