Foreword

The twentieth volume of the Tobacco Control Monograph series of the National Cancer Institute reviews the scientific foundation for genetic studies of nicotine use and dependence. The authors and editors perform an admirable job in synthesizing the expanding literature in the field, and in developing a scientific blueprint for the integration of genetic approaches into transdisciplinary studies of nicotine dependence. This seminal work should be examined in the context of global public health action on tobacco prevention and control as well as advances in genomics and related technologies.

It is important to ask how genetic studies of nicotine use and dependence can contribute to the overall public health effort in tobacco control and prevention. For, despite public health efforts, an estimated 45 million people in the US still smoke. Globally, one billion individuals smoke tobacco on a regular basis, and millions of individuals die yearly from illnesses related to tobacco. A "one size fits all" public health approach has not been fully successful. All available tools will be needed to meet the demand for effective and sustainable tobacco control, including pharmacogenetic-informed treatments and social policy interventions for smoking cessation.

Clearly, tobacco use in a population is the product of the interaction of agent, genetic, and environmental factors. Government policies are important modifiable environmental influences that can alter how tobacco products are designed and marketed and how consumers respond. Understanding individual variation in responses to tobacco can help our approach to different programs, policies, and treatments for nicotine dependence. Synergy occurs when tobacco control and prevention interventions directed at agent, host, and environmental factors are implemented together. However, no studies have adequately addressed simultaneously genetic variation, quantitative measures of behavioral, social and cultural variation, and the interaction among these sources of variation. This gap reflects the disciplinary silos that were not uncommon in the 20th century scientific enterprise.

A few short years after the completion of the Human Genome Project in 2003, we continue to witness growing scientific discoveries on the genetic contribution to common diseases of public health significance, such as cancer, coronary heart disease, and diabetes. The emergence of genome-wide association studies over the past two years has contributed to the acceleration of genetic discoveries. In addition, the number of genetic and genomic tests used in clinical practice continues to grow, including pharmacogenomic applications in clinical practice. A new era of personalized health and healthcare seems to be on the horizon. For diseases related to tobacco use, we are seeing increasing numbers of important genetic discoveries. The need for a wider range of valid phenotypes of nicotine dependence has driven the development of this monograph. The scientific analysis and synthesis presented in this monograph will undoubtedly further the field of behavioral genetics.

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July 2009