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INTRODUCTION

It Takes More Than an Apple a Day

AS MODELS FOR PREVENTION RESEARCH, INFECTIOUS DISEASES HAVE SET A HIGH standard. Thanks to the development and widespread distribution of vaccines and antimicrobial drugs, we now live in a world free of smallpox, nearly free of polio, and with declining rates of malaria and AIDS. These victories (some still partial) have resulted in people living longer and acute infectious diseases being superseded in many countries as a public health priority by long-term noncommunicable diseases. Heart disease, metabolic disease, cancer, and respiratory disease together account for 60% of all deaths worldwide and 80% of deaths in low- and middle-income countries. Global projections for dementia are particularly alarming: By the year 2050, the disorder may affect more than 100 million people.

Logic dictates that preventing these diseases is a better approach than treating people after they have become ill. In many cases, the knowledge and tools needed for prevention appear to be in place. A number of these killer diseases share risk factors that can be modified by lifestyle changes—for example, by eliminating tobacco use, eating less processed food, and increasing physical activity. For certain cancers, screening tests are available that allow detection of the disease at an early stage. So why is prevention of these diseases so difficult when it seems like such a good idea on paper?

This special section of *Science* highlights many of the challenges facing researchers in noncommunicable disease prevention, a field characterized by impassioned debates on issues as fundamental as whether the benefits of cancer screening outweigh the risks, and which forms of prevention are the most cost-effective. The need for carefully designed clinical trials is a common theme in discussions of potential chemopreventive agents—among them aspirin, vitamin D, vaccines against chronic diseases, and β-amyloid–lowering drugs. The preventive strategies most likely to succeed on a population-wide scale are described, as are the best ways to integrate these efforts with infectious disease prevention, and the far-reaching effects (some adverse) that disease prevention efforts could have on a country's economy. And even as medical researchers seek new prevention drugs and strategies, we are reminded that lifelong health requires proper nutrition, especially during the first 1000 days of life, and that effective prevention will require an understanding of why people engage in health-harming behaviors.

One year ago this month, the United Nations convened a conference focused on the global reach of noncommunicable diseases, and it has since set a goal: to reduce the probability of premature mortality from these diseases by 25% by the year 2025. Although the specifics are still a work in progress, preventive strategies will probably play an important role. As if prevention researchers didn't already face enough challenges, they now find themselves working on a deadline.

– CAROLINE ASH, PAULA KIBERSTIS, ELIOT MARSHALL, JOHN TRAVIS

Disease Prevention

CONTENTS

See also Editorial p. 1433; Policy Forum p. 1456; Science *Careers;* Science *Podcast; and videos at www.sciencemag.org/special/prevention.*

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