The Promise of Vaccines: The Science and the Controversy

By ACSH Staff — September 1, 2003

Executive Summary

Standing among the greatest achievements in public health, vaccines have had a greater impact on reducing death and disability from infectious diseases than almost any other public health intervention. This paper presents a comprehensive overview of vaccines and the science of immunity, including a discussion of the remarkable advances in disease prevention through the evolution of vaccines. We focus on several recent vaccine safety controversies that may prevent maximization of their potential.

Much attention has been devoted to vaccine safety and the potential relationship between various diseases and vaccinations, including influenza vaccine and Guillain-Barré syndrome, MMR (mumps, measles, and rubella) vaccine and autism and idiopathic thrombocytopenia purpura, thimerosal in vaccines and autism, hepatitis B vaccine and multiple sclerosis, and childhood vaccines and type 1 diabetes. The vast majority of reports linking vaccines with various diseases comprise case reports that do not meet the scientific criteria established to attribute causality. A review of recent studies published in the medical literature is presented to help clarify the scientific data related to the association between vaccines and these medical diagnoses. Also addressed are concerns about safety related to vaccine additives and preservatives, specifically thimerosal.

A serious public health problem exists as "community" or "herd" immunity declines with the erosion of immunization coverage in at-risk individuals and for whole communities. This trend has been exacerbated by recent more permissive changes in state laws enabling parents to opt out of immunizing their children for personal or philosophical reasons, placing those children and their classmates at risk. The measles epidemic of 1989 to 1991 clearly demonstrates the public health risk when coverage levels fall. Conversely, the potential for success in disease prevention is illustrated by the rapid decline in the incidence of invasive Haemophilus influenzae type b after the introduction of the conjugate Hib vaccine, which has become one of the most compelling success stories in modern immunization practice.
In order to guarantee vaccine safety, maintain public confidence, and ensure the continued
development of vaccines, a system of checks and balances is essential. The safety systems that
involve collaborative efforts between the U.S. Food and Drug Administration, the Department of
Health and Human Services, and the Centers for Disease Control and Prevention and the creation
of the Vaccine Adverse Event Reporting System (VAERS), the Clinical Immunization Safety
Assessment Project (CISA), and the Vaccine Safety Datalink (VSD) are described.

Although our nation's commitment to improving coverage levels and eliminating vaccine-
preventable diseases faces many challenges, vaccine science holds the possibility of targeting an
increasing number of diseases for prevention, with the number of vaccines in widespread use
projected to grow to over three times the current number by 2020.1 This story of our nation's
progress towards eradicating vaccine-preventable diseases holds many lessons for the future and
attempts to address several key questions: How well are we preventing diseases through
vaccination? How safe are vaccinations? Is the public at risk because of erosion of coverage and
because of philosophical exemptions? What challenges does the nation face as we attempt to
improve vaccine coverage and eliminate vaccine-preventable diseases? With our attention
diverted to low coverage levels in some inner cities, will the public health infrastructure be in a
position to respond to a bioterrorism event in which agents such as smallpox could be
reintroduced as a weapon?

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Vaccinations: What Parents Need to Know [2]

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