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“2013: The Golden Anniversary of Measles Vaccine”

**Keynote Address at the Measles & Rubella Initiative’s Annual Meeting
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Licensed in the United States in March 1963, the attenuated live Edmonston measles virus vaccine this year marks its 50th anniversary. I note it’s called “Edmonston” after David Edmonston from whom measles virus was first isolated, in contrast to Salk and Sabin’s names attached to their polio vaccines. Used in every country throughout the world, except China, Japan and Russia, which have developed their own vaccines, derivatives of Edmonston have retained their immunogenicity, safety and efficacy through five decades.

Infants and children are recommended to receive two doses of vaccine, ensuring that =>95% will develop successful immunity. In many countries the vaccine is combined with those for rubella (MR) or rubella and mumps (MMR). However, in many of the resource-poor nations, measles is still used as a monovalent vaccine although a gradual shift to MR is underway as an increased awareness of the morbidity of congenital rubella has been appreciated. A continuingly favorable feature of the measles vaccine has been evidence to date that its protection persists enduringly, perhaps lifelong, without need for additional doses or of exposure to wild measles to maintain or boost immunity.

Since 1974 the World Health Organization (WHO) has included measles vaccine in its Expanded Program of Immunization (EPI), resulting in a marked reduction in measles morbidity and mortality where the program has been introduced. Prior to EPI, annual childhood deaths from measles was estimated to have exceeded several million globally. Nevertheless, in the year 2000, WHO estimated that more than 500,000 children died of measles. Recognizing this unacceptable continuing morbidity and mortality due to a vaccine-preventable disease, the Measles Initiative was begun in 2001 by the American Red Cross joined by the WHO, U.S. Centers for Disease Control (CDC), UNICEF and the United Nations Foundation. Over the succeeding years more than fifteen other national and international organizations have joined the original five in their efforts.

The Measles Initiative has organized and supported measles vaccination programs in sub-Saharan Africa and parts of Southeast Asia distributing more than one billion doses of vaccine resulting in a 71% reduction of measles deaths in its first decade of operation with an estimate of 139,000 death in 2010. Much of the enhanced morbidity and mortality among

measles-infected children in developing countries has been attributed to their protein malnutrition, vitamin deficiency, malaria, intestinal parasites, as well as HIV/AIDS. Many of our campaigns have combined measles vaccination with other child health benefits including polio vaccination, vitamin A administration, anti-helminth medications, as well as tetanus toxoid vaccination for child bearing age women, oral rehydration kits for infants with diarrhea and insecticide-treated bed nets.

Fortunately the measles vaccine of 1963 has been demonstrated to retain its efficacy over these 50 years versus the 23 recognized genotypes of measles virus throughout the world despite shifts in the structure and content of prevailing and circulating strains of virus. The continuing problems of measles morbidity and mortality are not due to vaccine failures. They are attributable to the remaining large numbers of unvaccinated infants and children in disadvantaged countries, added to annually by their birth cohorts. Regrettably, the very success of vaccination in countries where measles elimination had been achieved or nearly so, has in some nations resulted in complacency and relaxation of immunization efforts as well as vaccine hesitancy among many parents, so that re-introduction of this most highly transmissible virus has kindled new outbreaks. A distressing, graphic example has been the outbreaks in several European countries these past five years with more than twenty-five thousand cases each year in 2010, 2011, and 2012.

These failures in countries well able to maintain effective control and elimination programs have only added to the challenges of sub-Saharan Africa and Southeast Asia where measles persists and in some areas has increased due to importations, weak health systems, shortages of funds, migrations and mobility of large populations, natural disasters such as major floods, and armed conflicts.

In recognition of the severe consequences of rubella virus infections in early pregnancy with the tragic results of congenital rubella estimated at more than 100,000 cases annually with blindness, deafness, congenital heart abnormalities, and central nervous system deficits, the Measles Initiative in 2012 broadened our goals to include elimination of rubella virus infections and we became the Measles & Rubella Initiative (M&RI). The ready availability of the relatively inexpensive combined measles-rubella virus vaccine (MR) ensures the applicability of this logical, added goal. Many countries have employed MR or MMR beginning with their availability in the 1970's but these have not been used in most of the resource-poor nations where even now only a very few have begun to introduce MR.

Another favorable feature to the added rubella goal has been the WHO's addition of measles and rubella virus technology to its international Polio Laboratory Network so that

virologic surveillance is readily available to investigate alleged cases and outbreaks and to trace transmission pathways. Only smallpox, and the animal virus rinderpest, have been successfully eradicated. Although the polio eradication effort was initiated in 1988 to be completed in 2000, thirteen years later it remains unfinished despite expenditure of billions of dollars. Measles, like smallpox, results in clearly recognized rash disease in all those infected and virus is excreted for less than two weeks. In contrast, polio produces overt disease in only one in 200 or more of the infected, all of whom nevertheless excrete transmissible virus for as long as three weeks or more. Measles would have been a far more likely successor to smallpox eradication rather than polio.

During these next two days we shall hear reports of the progress and successes of the MRI as well as the old and new challenges we face in pursuing and eventually achieving our goal of a world free of measles and rubella. The presence here of individuals who have travelled worldwide distances to participate in our deliberations attests to the commitments of so many.

In conclusion, the challenge is not whether we shall see a world without measles and rubella, but when!

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