Methods: We reviewed existing vaccines approved for use by the US Food and Drug administration by participating in a Centers for Disease Control course on the clinical use of these vaccines. Separately, we sought specific anecdotes from our own clinical experience or from people who had been affected by the diseases that vaccines prevent. We reviewed the clinical manifestations, pathogenesis, and short and long term impacts of these diseases on the lives of affected individuals.
Results and Conclusion: All of the anecdotes we collected were touching, and some were very moving. In some cases, minor illnesses resolved (chickenpox, hepatitis A, adenovirus respiratory infections, rotavirus, pneumococcus, measles, mumps). In others, immediate death resulted (diphtheria, Japanese encephalitis, rabies, influenza). Some illnesses were severe, sometimes requiring long-term hospitalization and intensive care for recovery (tetanus, rabies, smallpox, pertussis) For some, we learned of severe long-term disabilities, resulting in catastrophic lifelong impact on affected individuals or their families (polio, Haemophilus influenzae type b, Congenital rubella, Japanese encephalitis, meningococcal meningitis). Some illnesses had long-term sequellae (liver cancer due to hepatitis B, cervical cancer due to human papilloma virus, shingles due to herpes zoster). We realize that in this era when one disease (smallpox) has been eradicated and others have been reduced to very low levels, the immediate urgency of immunizing children in accord with recommendations may not be obvious, even to physicians seeking nominations to run for president of the United States. We were struck by the potential seriousness of vaccine preventable diseases and by the realization that the risk of infection by these diseases is lifelong and worldwide.

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S16

Decline of Maternal Measles Antibodies in Infants in Tianjin, China

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Objective: Describe concordance of measles immunity between mothers and their infants.
Background: Measles continues to be a major cause globally of childhood morbidity and mortality and was responsible for 145,700 deaths worldwide in 2013. Many countries have adopted measles elimination targets including China, which was originally slated for elimination in 2012 as part of the WHO's Western Pacific Region measles control plan. China's elimination goal was not met despite intensive control efforts over several years, and sustained levels of transmission continue to characterize measles epidemiology there. In order to better understand measles susceptibility in Tianjin, China, the University Of Michigan School Of Public Health and the Tianjin Centers for Diseases Control collaborated on a large, population-based, cross-sectional, seroprevalence study conducted throughout the municipality. The study included a special focus on documenting the serostatus of mother-infants pairs since infants appear to play a major role in ongoing disease transmission in China even though measles vaccination is provided free at age 8 months.
Methods: We interviewed and drew dried blood spots (DBS) from a systematic random sample of 2818 adults and children from every Tianjin district, including 809 mother/infant pairs. The DBS were tested for measles IgG to determine measles susceptibility.
Results and Conclusion: While the majority of mothers (81.5%) tested IgG positive, only 16.3% of all infants less than 8 months of age tested IgG positive. Among infants one month of age or less, only 40.3% were IgG positive. The IgG positivity decreased to 12.3% at age 3 months, 6% at age 5 months; no infants were IgG positive by age 7 months. There was no significant difference in in the percentage of infants with a measles positive IgG result by birthweight, rural vs urban district, or mother's vaccination status, education and age group. Infants of mother's with a history of measles infection and infants of mothers who are non-residents had a higher percentage of measles IgG positivity. Although waning maternal measles antibodies in infants is well-documented, we found this may be occurring at younger ages than previously thought. More rapidly waning maternal measles antibodies could have major implications for measles elimination programs in China and globally. New strategies to target measles transmission in this younger infant age group should be considered.

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S17

Using the 4 Pillars™ Immunization Toolkit to Increase Adult Immunizations

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Objective: Explain the use of the 4 Pillars™ Immunization Toolkit to raise immunization rates.
Background: Adult vaccination rates fall short of national goals, reinforcing the need to increase vaccination efforts in primary care. The 4 Pillars™ Immunization Toolkit, an evidence-based, step-by-step guide for making patient- provider- and system-oriented changes to improve adult vaccination, was implemented in primary care practices to increase adult influenza and Tdap vaccination rates.
Methods: 25 primary care practices were selected in Pittsburgh and Houston, and stratified by city, location (rural, urban and suburban), and type (family or internal medicine) and randomized to the Year 1 (2013-14) intervention (Group 1 n=10, Group 4 n=3) or the Year 2 (2014-15) intervention (Group 2 n=9, Group 5 n=12) group. The four sites continued in the active intervention in Year 2 (Group 3). The 4 Pillars™ Immunization Toolkit uses strategies based on the Task Force on Community Preventive Services and includes: Pillar 1-convenient vaccination services; Pillar 2-patient notification of the availability and importance of vaccination; Pillar 3-improved office systems to deliver vaccines; and Pillar 4-motivation through an immunization champion. The toolkit and practice improvement options were presented at an all-staff meeting at each practice. A practice-based Immunization Champion worked with the researchers to implement toolkit strategies and received feedback on vaccines administered. Goals were set at a 20-25% increase over the number of vaccines given the year before intervention. Demographic and vaccination data were derived from de-identified EMR extractions for patients ≥18 years.
Results and Conclusion: Over the 2-year study, a cohort of 70,549 adult patients was followed; 35% were men, 56% were non-white and 35% were Hispanic and the mean age at baseline was 55 years. Baseline individual practice Tdap vaccination rates varied from 4% to 59% and after the intervention from 7% to 80%, with percentage point (PP) changes varying from 3 to 25. Average Group cumulative Tdap vaccination increased variably from a 7 PP change from 22% to 29% in the Year 1 intervention sites ($P < 0.001$ annually) up to a 19 PP change from 48% to 67% in the 2-year intervention sites ($P < 0.001$ annually). Baseline individual practice influenza vaccination rates ranged from a low of 23.6% to a high of 61.2% Over two years, 3 of 6 sites in Group 1 significantly increased influenza rates with an average increase of 5.1 percentage points ($P < 0.001$); 6 of 8 sites in Group 2 significantly increased rates with an average increase of 6.0 PP ($P < 0.001$); 3 of 4 sites in Group 3 significantly increased influenza vaccination with an average increase of 9.6 PP ($P < 0.001$); all 6 of the sites in Groups 4 and 5 significantly increased rates with an average increase of 3.4 PP and 8.6 PP, respectively ($P < .0.001$). The 4 Pillars™ Immunization Toolkit appears to increase adult immunization rates within primary care practices over 2 years.

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