

MEASLES 2015: WHY PUBLIC HEALTH MATTERS TO CRITICAL CARE

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The elimination of endemic measles from the United States in 2000¹ demonstrated the power of vaccination and public health to improve lives. However, recent outbreaks of measles in the United States illustrate how important it is to continue vigilance against pathogens we thought were controlled, and to encourage vaccination to prevent disease and its spread.

These outbreaks also illustrate that health care outcomes are dependent not only on high quality research, but also on the willingness of the public to accept research findings and the advice of health care providers. Measles is an exemplar of a public health issue that matters to critical care.

Measles is a highly contagious virus and a significant cause of mortality and morbidity.¹ It is spread to others through respiratory secretions, including by coughing or sneezing. Because it can live for up to 2 hours in the air or on surfaces, it can infect others even after the infected person has left an area. Infected people can spread the disease for 4 days before the characteristic rash appears, and continue to be infective for 4 days following the appearance of the rash. After contact with an infected person (or with

that person's secretions in the air or on surfaces), 90 of every 100 people who are not already immune to measles will be infected.

The Measles Vaccine Track Record

Before vaccination for measles was available, an estimated 3 to 4 million cases occurred in the United States each year. Recovery from measles did convey immunity, but having the disease was a risky way to become immune. Measles accounted for about 500 deaths, 48 000 hospitalizations, and 4000 cases of measles encephalitis annually.

Two effective vaccines for measles were developed in the late 1960s. Both used a weakened viral strain that gave the immune system an opportunity to learn to fight the virus without resulting in disease. Today, a live-attenuated measles vaccination is administered in combination with vaccination for mumps and rubella in the MMR vaccine.

The vaccine has an excellent safety record.^{2,3} Multiple high quality research studies have failed to find any relationship between MMR vaccine and autism spectrum disorder, despite ongoing myths based on a retracted 1998 *Lancet* paper that was later found to include misrepresented or altered data.³ The vaccine is also highly effective.¹ After contact with a person who has measles (or with their secretions

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in the air or on surfaces), only 3 of every 100 people who have received 2 doses of the vaccine will contract measles, and they will tend to have milder symptoms and fewer complications.

The Value of Community Immunity

If a sufficient number of people in a population are immune to measles, the spread of disease from person to person is reduced, resulting in better levels of community immunity (also known as herd immunity). Vaccine compliance enhances community immunity and can provide some protection to those who cannot be vaccinated because they are too young to receive the vaccine or have contraindications to vaccination. Community immunity varies at a local level, and pockets of unvaccinated people can occur within states that have overall high vaccination coverage.

Unvaccinated people pose the greatest threat for the spread of measles in the United States. In today's highly mobile society, we are interconnected to local and global neighbors. Areas outside the United States (including Europe, Asia, the Pacific, and Africa) continue to have endemic measles, annually accounting for 20 million cases and 146 000 deaths worldwide. Susceptible US residents may come in contact with measles through international travelers coming to the United States, or through international travel to destinations with endemic measles. However, it is the spread among unvaccinated US residents that fuels US outbreaks, and most outbreaks occur in groups of people with suboptimal levels of vaccination.

In 2004, measles in the United States reached an all-time low of only 37 cases, but only 10 years later we had the largest reported number (644) of annual cases of measles since eradication; the 23 outbreaks that occurred in 2014 were centered in groups with low vaccination compliance. In the first 2 months of 2015, four measles outbreaks were active and 170 cases had been reported, including a

large multistate outbreak linked to an amusement park in California (a state with pockets of low compliance with vaccination recommendations). Outbreaks take advantage of venues where large numbers of people convene (for example, amusement parks, airport terminals, and schools and colleges), and where there are unvaccinated individuals to support disease transmission.

Why Not Vaccinate?

In an era when we have a highly effective, safe, and inexpensive means to prevent a disease that has substantial mortality and morbidity, why do we still have measles outbreaks? To break the chain of infection for a highly communicable disease like measles, nearly all individuals must be vaccinated. Thus, vaccination benefits not only vaccinated individuals but their community. Preventing the spread of measles through participating in and advocating for vaccination is important community service.

There are many reasons for pockets of low vaccination rates, but one that has received considerable attention is vaccine hesitancy^{4,5}—a degree of indecision about specific vaccines or vaccination in general that interferes with people agreeing to vaccine recommendations for themselves or their children. A recent systematic review⁴ identified 3 components that may contribute to vaccine hesitancy: issues of confidence (related to trust in the provider, vaccines, or research), complacency (a perception that the vaccine is not needed or valued), and convenience (problems with access or cost). Framing the problem as vaccine hesitancy avoids a dichotomous view of people as “pro-vaccine” or “anti-vaccine” and acknowledges that multiple factors influence vaccination choices. Scientific studies and facts are not the only information weighed in vaccine decisions: personal risk appraisal, relationships with health care providers, and beliefs matter as well.

Overcoming Vaccination Hesitancy

Why do measles outbreaks—and the vulnerability of unvaccinated people—matter to critical care providers? First, measles outbreaks result in critical care admissions that are preventable. These preventable admissions increase overall costs to the health care system, but the most devastating impact is on those who suffer from the complications and sequelae of measles. Some of these patients may have chosen to

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remain unvaccinated, whereas other patients may have had contraindications to vaccination and are the victims of a lack of community immunity. Clearly, prevention of measles-related encephalitis is preferable to costly critical care supportive treatment, which nonetheless may result in lasting neurological consequences.

Second, research about vaccine hesitancy provides a model for understanding resistance to research-based best practices and for dealing with hesitancy about care decisions. Domachowske and Suryadevara⁵ suggest using a CASE framework to guide discussions with vaccine hesitant patients (Corroborate with patients, About you as an expert, what Science has to say, and Explain and advise); this framework may be applicable to discussions about care decisions in critical care as well. The discussion begins with corroboration, during which providers inquire about patient and family concerns, acknowledge the stated concerns, and set a tone for a respectful discussion beginning with areas of agreement (for example, optimal outcomes for the patient).

Next, the provider needs to give the patient and family a reason to trust the provider as a knowledgeable expert who will provide complete and accurate information. This sets the stage to provide the patient and family with scientifically relevant information, to explain and discuss the information, and to advise them of available options and evidence to support care decisions.

It is important to be ready to counter myths and inaccuracies patients may discover as they independently seek information, particularly from Web-based sources. In an examination of 84 websites related to vaccine information, Ruiz and Bell⁶ found that only 18% recommended vaccination; further, they found that more websites perpetuated vaccine myths and recommended against vaccination than conveyed the benefits of vaccination. Patients and families need help in identifying high quality, accurate, trustworthy information about vaccines and other health care decisions.

We Can Make a Difference

Critical care providers are viewed as credible sources of health advice in their communities, and

can positively influence local vaccination rates. Larson and colleagues⁴ found that encouragement from health professionals and others, as well as belief that immunization should be a social, familial, or workplace norm, promoted immunization.

Modeling compliance with vaccination recommendations for ourselves and our families, sharing accurate information, and countering vaccine hesitancy will contribute to higher levels of vaccination, better community immunity, and avoidance of unnecessary critical care hospitalizations. Public health issues are important to critical care, and our support of public health advances better health outcomes for all.

The statements and opinions contained in this editorial are solely those of the coeditors in chief.

FINANCIAL DISCLOSURES

None reported.

eLetters

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