CDC PUBLIC HEALTH GRAND ROUNDS

Measles – Maintaining Disease Elimination and Enhancing Vaccine Confidence

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Tuesday, February 18, 2020
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Measles – Maintaining Disease Elimination and Enhancing Vaccine Confidence

Rebecca Bunnell, PhD, MEd
Director – Office of Science
Characteristics of Measles

- Most contagious of the vaccine preventable diseases ($R_0 = 12–16$)
- Acute viral rash illness
  - High fever, cough, coryza, conjunctivitis
- Incubation period: 10–14 days
- Infectious period: 4 days prior through 4 days after rash onset
Measles complications

- Diarrhea (8%)
- Otitis media (7%–9%)
- Pneumonia (1%–6%)
- Hospitalized (10%–25%)
- Encephalitis (1 per 1,000)
- Death (1–3 per 1,000)
- Subacute sclerosing panencephalitis (1 per 5,000–10,000)
Measles, Mumps, Rubella (MMR) Vaccine

- **Vaccine effectiveness (VE)**
  - 1 dose of MMR: ~93%
  - 2 doses of MMR: ~97%

- **Excellent safety profile over past 50 years**
  - Common side effects are usually mild and resolve spontaneously
  - Serious adverse events are extremely rare
Measles, Mumps, Rubella (MMR) Vaccine Recommendations

- Children and adolescents need TWO doses of MMR
  - First dose at 12 to 15 months of age, and second dose at 4 to 6 years of age
- Most adults need only ONE dose of MMR
  - Two doses are recommended for adults at HIGH RISK for exposure, including healthcare personnel, post-high school students, international travelers
- Infants 6–11 months of age traveling internationally need ONE dose
High MMR coverage in the United States led to elimination of measles in 2000

*Source: National Notifiable Diseases Surveillance System (passive surveillance); data as of January 31, 2020; National Immunization Survey, CDC
Most measles cases in the United States are among unvaccinated people

Measles cases by vaccination status and incidence rate, United States, 2001–2019 (N=3,881)

88% of cases are unvaccinated or have an unknown vaccination status

*Source: National Notifiable Diseases Surveillance System (passive surveillance); data as of January 31, 2020
Majority of measles importations are among U.S residents who traveled abroad

Measles cases by residential status, United States, 2001–2019 (N=747)

*Source: National Notifiable Diseases Surveillance System (passive surveillance); data as of January 31, 2020
The United States has seen a recent increase in measles cases.

Number of reported measles cases, United States, 2001–2019* (N=3,881)

Median of 86 cases/year (range: 37–1,282)

*Source: National Notifiable Diseases Surveillance System (passive surveillance); data as of January 31, 2020
Global measles cases tripled in 2019

Wide geographic distribution of measles importations, United States, 2001–2019 (N=747)

Median of 28 importations/year (range, 18 to 92)

*Source: National Notifiable Diseases Surveillance System (passive surveillance); data as of January 31, 2020
Variability in state and local MMR vaccine coverage can result in populations at risk for measles outbreaks

≥1 Dose MMR Vaccination Coverage by 24 Months, NIS-Child, U.S. 2013 to 2014 Combined Birth Years

Coverage with ≥1 Dose MMR
- 85-89% (n=15)
- 90-93% (n=31)
- 94-100% (n=5)

Source: National Immunization Survey
Largest measles outbreaks occurred within undervaccinated close-knit communities

<table>
<thead>
<tr>
<th>Year</th>
<th>State</th>
<th>Source (genotype)</th>
<th>Community</th>
<th>Cases</th>
<th>Duration (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>NYC</td>
<td>UK (D8)</td>
<td>Orthodox Jewish</td>
<td>59</td>
<td>2.9</td>
</tr>
<tr>
<td>2014</td>
<td>OH</td>
<td>Philippines (D9)</td>
<td>Amish</td>
<td>383</td>
<td>4</td>
</tr>
<tr>
<td>2017</td>
<td>MN</td>
<td>Unknown (B3)</td>
<td>Somali</td>
<td>75</td>
<td>3.8</td>
</tr>
<tr>
<td>2014/2015</td>
<td>CA + 7 states</td>
<td>Unknown (B3)</td>
<td>Various</td>
<td>147</td>
<td>2.3</td>
</tr>
<tr>
<td>2018/2019</td>
<td>WA + 2 states</td>
<td>Ukraine (D8)</td>
<td>Ukrainian Russian Moldovan</td>
<td>78</td>
<td>2.5</td>
</tr>
<tr>
<td>2018/2019</td>
<td>NY, NYC + 4 states</td>
<td>Israel/Ukraine (D8)</td>
<td>Orthodox Jewish</td>
<td>1,114</td>
<td>10</td>
</tr>
</tbody>
</table>
Measles outbreaks in New York threatened measles elimination status in the United States

Number of reported measles cases (N=1,487), by week of rash onset, United States, September 30, 2018—October 1, 2019

*Source: National update on Measles Cases and Outbreaks – United States, January 1 – October 1, 2019, MMWR, October 4, 2019*
Endemic measles has been eliminated in the United States since 2000
- However, measles cases continue to occur through global importations
- Most importations are U.S. travelers who are not vaccinated

Recent epidemiology suggests larger and more sustained outbreaks compared to earlier post-elimination years

Measles exploits pockets of undervaccination
- Multidisciplinary local response needed to prevent measles outbreaks
The 2018–2019 Measles Epidemic in New York State: Successes and Challenges

Howard A. Zucker, M.D., J.D.
Commissioner
New York State Department of Health
1. Measles and Public Health in New York State
New York’s Leadership in Disease Prevention

• **1912:** U.S. begins routine reporting of measles cases; an average of 6,000 measles-related deaths are reported each year over next decade.

• **1914:** New York state’s Antitoxin Laboratory designated as Division of Laboratories and Research, facilities that will later become known as Wadsworth Center.

• **1926:** Wadsworth develops nation’s first system of standardized laboratory analysis for the diagnosis of human disease.

• **pre-1963:** Before licensing of measles vaccine, an estimated 400–500 U.S. residents died of measles each year.
Measles Cases in New York State, 1997–2019*

*As of 12/17/2019; excluding NYC
2. The 2018–2019 Outbreak
Initial Cases in the Lower Hudson

- **October 1, 2018**: Measles outbreak outside New York City begins in Rockland County when teenager visiting from Israel falls ill during services at local synagogue.

- **October 2018**: Six additional measles cases imported from Israel, including 4 people from one family who become ill at roughly the same time.

- **December 2018–April 2, 2019**: Three further measles importations bring internationally imported cases to 10 during outbreak.

- Outbreak encompasses **4 counties** outside of New York City, all of which have Orthodox Jewish communities.
Measles Outbreak Overview

- **October 1, 2018–October 3, 2019:** A total of **406 people** infected with measles in Rockland (312), Orange (57), Sullivan (19), and Westchester (18) counties.

- Most cases reported in under-vaccinated, close-knit Orthodox Jewish communities.

- **October 1, 2018–October 3, 2019:** county providers administered nearly **85,000 MMR vaccinations**, a 77% increase from the same period during the prior year.

- **October 2019:** County health officials and New York State Department of Health declare outbreak concluded in all 4 counties.
Measles Outbreak Cases by County*

* 10/1/2018 – 8/19/2019; excluding NYC

**Case Counts**
- Yellow: 1 - 10
- Orange: 20 - 57
- Red: 56 - 312

*NEW YORK STATE Department of Health*
• **312 cases** confirmed—about 1 in every 1,000 residents.

• Most cases were unvaccinated individuals.

• Nearly **30,000 doses of MMR vaccine** administered during outbreak—3X rate from the same period in the prior year.
Local Heroes: Rockland County Department of Health

“In the beginning, it was a 24/7 operation. The weekends, the nights, the holidays—it didn’t matter. We lived and breathed measles. We fell asleep thinking of measles, and we woke up thinking of measles.”

— Dr. Patricia Ruppert,
Rockland County Health Commissioner
Local Heroes: Refuah Health Center

- Federally Qualified Health Center (FQHC) that provides healthcare to many in Rockland County’s Orthodox Jewish community.
- Treated the Israeli boy who was outbreak’s index case.
- Doctors and nurses worked closely with department and county officials to vaccinate the unvaccinated.
3. The New York State Response

Get the Facts About Measles.
Department of Health Mobilization Strategy

- Department’s **Incident Management System** activated from start of outbreak
- Healthcare Outreach and Communication
- Community Education and Outreach
- Preventing Spread in Schools and at Summer Camps
- New York State Legislative Action
Healthcare Outreach and Communication

• Issued advisories, held conference calls and forums
• Made detailing visits to more than 30 medical practices, urgent care centers, and hospitals
• Provided vaccine to affected counties
• Coordinated specimen lab testing at Wadsworth Center
• Distributed educational materials for patients and families
• Collaborated with Refuah FQHC in Rockland County throughout outbreak
Community Education and Outreach

Printed Educational Materials

- Developed flyers, posters, information postings at malls and highway rest stops, and articles in local publications because digital communication was deemed ineffective for reaching affected demographic.
- Ensured that printed materials were available in English and Yiddish.
- Printed and mailed 90,000 copies of booklets on measles and vaccination to households in affected ZIP codes.
- Distributed 55,000 door hangers to households in affected ZIP codes.

Meetings, Forums, and Conference Calls

- Held conference calls with women in affected communities.
- Met with community, religious and educational leaders in affected counties.
Preventing Spread among Children

**In Schools**
- Unvaccinated children not admitted to schools or day care centers in outbreak areas, some for entire outbreak.
- Each school in outbreak areas required to confirm compliance weekly. Most schools audited and several fined for noncompliance.
- Rockland County denied unvaccinated children admittance to all schools near schools with measles cases.
- At peak of outbreak, Rockland denied 6,000 unvaccinated children entry to 60 schools.

**At Summer Camps**
- Unvaccinated campers not admitted in high-risk counties.
- Summer population in Sullivan County swells to about 300,000 (from 67,000) because of primarily Orthodox vacationers and campers from NYC.
- Despite this increase, all 300 camps in affected counties were audited.
On June 13, 2019, Governor Cuomo signed legislation (S.2994A/A.2371) removing nonmedical exemptions from school vaccination requirements for New York state children.

In August, the Department of Health joined the Office of Children and Family Services to issue emergency regulations providing physicians with clear, evidence-based guidance on determining when immunization may be detrimental to a child’s health.
4. Data Analysis
Measles Outbreak Cases by Week of Rash Onset and County

Number of Measles Cases by Week of Rash Onset and County in the Hudson Valley, NYS, October 1, 2018 – August 19, 2019 (N=406)*

- First introduction: October 1st
- Second introduction: October 9th - 18th
- Third introduction: December 5th
- Fourth introduction: April 6th
- Last rash onset: August 19th

Week of rash onset:
- October 6, 13, 20, 27
- November 3, 10, 17, 24, 29
- December 5, 12, 19, 26
- January 2, 9, 16, 23
- February 2, 9, 16, 23, 30
- March 6, 13, 20, 27
- April 4, 11, 18, 25, 1
- May 8, 15, 22, 29, 6
- June 13, 20, 27, 3
- July 10, 17, 24, 31
- August 7, 14, 21, 28

Legend:
- Orange
- Rockland
- Sullivan
- Westchester
Rates of Vaccination

- New York state has high MMR immunization coverage overall—96% among school-age children.
- Before outbreak, vaccination coverage for children age 1–18 in 4 most affected ZIP codes was 87.3%.
- Vaccinations during outbreak primarily administered in private practices and FQHCs and public health–held clinics.
- By August 1, 2019, vaccination coverage for children age 1–18 in those ZIP codes increased to 98.3%.
# Measles Outbreak Cases by Age and Vaccination Status*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of MMR Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>&lt;6 months</td>
<td>17</td>
</tr>
<tr>
<td>6-11 months</td>
<td>31</td>
</tr>
<tr>
<td>1-4 years</td>
<td>110</td>
</tr>
<tr>
<td>5-17 years</td>
<td>125</td>
</tr>
<tr>
<td>18+ years</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>317 (78%)</td>
</tr>
</tbody>
</table>

* 10/1/2018 – 8/19/2019; excluding NYC
Measles-Associated Complications in Outbreak

- No deaths or documented cases of encephalitis.

- 28 (7%) patients diagnosed with pneumonia.

- 28 (7%) patients hospitalized; 20 of them (71%) were children, with 6 (30%) (ranging in age from 1 day to 7 years) admitted to ICU.

- Two women who had measles while pregnant gave birth to preterm infants at 34 and 25 weeks’ gestation. Both infants had congenital measles infection confirmed by measles PCR testing.
5. What We Learned
Factors Contributing to Outbreak

- Vaccine hesitancy
- Targeted anti-vaccine activity and misinformation
- Multiple importations following large outbreak in Israel
- Large gatherings
- Close-knit communities
- Large families
- Underreporting and unidentified transmission
- Families did not always seek medical care
- Lab testing limitations
Department Action on Measles

New York State Measles Watch

Measles Activity by Week in New York State (excluding NYC)

<table>
<thead>
<tr>
<th>Statewide (excl. NYC)</th>
<th>Confirmed Cases 11/16/2019</th>
<th>Confirmed Cases Week Outbreak Started 10/01/2018</th>
<th>Hospitalizations Week Outbreak Started 10/01/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>426</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

Select Timeframe for Map
- Confirmed Cases Last 6 Weeks
- Confirmed Cases Last 2 Weeks
- Confirmed Cases Last 1 Week Ending
- Confirmed Cases Since Outbreak Started

Click for Data Table of Measles Activity
Use County Dropdown to Filter Data Table

New York State Department of Health
Critical Steps to Prevent Future Outbreaks

- **Ongoing vigilance** regarding vaccine hesitancy
- **Strong partnerships** and communication channels with county health departments and local healthcare providers
- **Removing nonmedical exemptions** from school vaccination requirements across New York state
Outbreak All-Stars

**New York State Department of Health**
Debra Blog, Dina Hoefer, Elizabeth Rausch-Phung, Elizabeth Dufort, Patrick Bryant, Nina Ahmad, Lou Smith, Rachel Wester, Kirsten St. George, Jamie Sommer, Karen Southwick, Candace Noonan-Toly, Kimberly Carrasco, Dylan Johns, Stephanie Ostrowski, Eleanor Adams, Brad Hutton

**Rockland County Department of Health**
Patricia Ruppert, Maria Souto, Kevin McKay, Tatiana Dolinsky

**Orange County Department of Health**
Lissette McNulty, Irina Gelman, Debbie Fagan

**Westchester County Department of Health**
Ada Huang, Toby Levin, Sherlita Amler

**Sullivan County Department of Health**
Nancy McGraw

**CDC**
Manisha Patel, Paul Gastanaduy, Robert McDonald
2018–2019 measles outbreak: The New York City experience

Oxiris Barbot, MD
Commissioner
New York City Department of Health and Mental Hygiene
OVERVIEW

- Geographic distribution and demographic description of cases
- Complications among affected persons
- Factors that led to the outbreak
- Twofold DOHMH response:
  - Measles virus
  - Vaccine misinformation
- Lessons learned
- Future challenges
LOCATIONS OF MEASLES OUTBREAKS

- First case had rash onset on Sept. 30, 2018
  - Unvaccinated child who returned from Israel
- Centered in two Orthodox Jewish neighborhoods in Brooklyn
MEASLES CASES BY DATE OF RASH & NEIGHBORHOOD (N=649)

Source: NYC DOHMH surveillance data, as of 9/25/19.
## Demographics of Cases (n=649)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Category:</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>102 (16)</td>
</tr>
<tr>
<td>1 to 4 years</td>
<td>277 (43)</td>
</tr>
<tr>
<td>5 to 19 years</td>
<td>146 (22)</td>
</tr>
<tr>
<td>≥18 years</td>
<td>124 (19)</td>
</tr>
</tbody>
</table>
Vaccination Status of Cases (N=649)

- Unvaccinated: 476 (86%)*
  - Age <12 months: 100
  - Age ≥12 months: 376

- Vaccinated: 79 (14%)*
  - 1 prior MMR: 46
  - 2 prior MMR: 33

- Unknown vaccination history (primarily adults): 94

*% among cases with known vaccination status, as of December 20, 2019
PERSONS EXPERIENCING COMPLICATIONS

- Hospitalizations: 49 (8%)
  - 20 ICU admissions
- Pneumonia: 37 (6%)
- Otitis media: 63 (10%)
- Diarrhea: 92 (14%)
- No cases of encephalitis or deaths have occurred

As of December 20, 2019
Why Did This Outbreak Occur?

- Low herd immunity in a densely populated, relatively closed community with large young households
  - Existing coverage low, vaccination delay until school enrollment
  - Religious exemptions have almost tripled in past 6 years
    - Citywide from 0.5% in 2012–13 to 1.5% in 2018–19
    - In Orthodox Jewish schools, from 0.7% in 2012–13 to 2.7% in 2018–19; some schools had religious exemptions as high as 28%
WHAT MADE THIS RESPONSE SO COMPLEX?

- Multiple importations (Israel, UK, Ukraine, NY, NJ)
- Multiple exposures (>20,000 exposures) and chains of transmission (>100 chains)
- Vaccine hesitancy fueled by vaccine misinformation cloaked in religious terms
- Parents not bringing children for care or providing exposure information, precluding control measures
DOHMH RESPONSE: MEASLES OUTBREAKS

1. Clinical
2. School or day care
3. Legal
4. Communication
DOHMH Response: Measles Outbreaks

Clinical

- Clinical and infection control consultation
- Technical assistance to facilities or providers serving the affected communities
- Assist with postexposure prophylaxis for exposed persons

School and Child Care

- Exclusion of unvaccinated students with medical or religious exemptions from schools, communities with active measles cases
April 9, 2019: Public Health Emergency Declared

- Every adult and child who lives, works, or resides in Williamsburg and has not received the MMR vaccine must be vaccinated
- Exception: People who demonstrate they are immune from measles or have a valid medical exemption
- Last public health emergency ordered people to get vaccinated against smallpox ~1901
Legal

- Five parents challenged vaccination order
- On April 18, 2019, Justice Lawrence Knipel denied motion for an injunction and dismissed their challenge finding:
  - Williamsburg at “the epicenter” of “the most significant spike in incidences in the United States in many years”
  - Petitioners unable to offer better, less restrictive alternative
  - Medical objections not supported by science
- Appellate Division denied temporary restraining order on April 30, 2019, and motion for preliminary injunction on May 13, 2019
COMMUNICATION

- Community collaboration
  - Religious leaders
    - Met with rabbinical and community leaders, elected officials
  - Medical partnerships
    - Jewish Orthodox Women’s Medical Association and Vaccine Task Force
    - Pediatric care practices
- Information disseminated through various outlets
WHO declared vaccine hesitancy as top 10 threat to global health

Anti-vaxxers infiltrated ultra-Orthodox Jewish community

- Robocalls and flyers conveying false information spread throughout community
- Parents Educating and Advocating for Children’s Health, an anti-vaccine organization, led efforts to intensify vaccine hesitancy
DOHMH RESPONSE: “A SLICE OF PIE”

A SLICE OF PIE
Parents Informed & Educated

Making PIEs Out of PEACH:
MMR Edition
Bringing Current and Reliable Vaccine Information to Frum Families

VACCINE SAFETY

How Do I Know Vaccines Are Safe?
Just like all drugs, vaccines undergo a lot of testing before being approved. It takes many years from the application process, all the way through all the stages of testing, to receive approval for use on humans. Once a vaccine is approved, that is not the end of the monitoring. Several organizations oversee the manufacturing, and continually gather information on all vaccines to ensure safety and effectiveness.

Here are some organizations that monitor vaccine safety:
The following organizations monitor vaccine safety: the Food and Drug Administration, Centers for Disease Control and Prevention, National Institutes of Health, and the Department of Defense, among others. These are now in place to identify any safety concerns, including Vaccine Adverse Event Reporting System (VAERS), Vaccine Safety Datalink (VSD), Post-Licensure Rapid Immunization Safety Monitoring (PRISM), and the Clinical Immunization Safety Assessment (CISA) Project.

Anti-Vaxx Myth: There are no safety studies on any new vaccine to know if vaccines are safe.

PIE: False: Vaccines are studied and monitored from the very beginning and go through years of safety testing in labs and clinical trials before they go to market. Once the vaccine is approved, the manufacturer tests batches of the vaccine for quality and safety before the FDA can recommend it for use. Once the vaccine goes to market, multiple agencies monitor its safety and provide additional checks.

Anti-Vaxx Myth: It is rare for a vaccine to be removed from circulation, no matter how much damage it is causing.

PIE: False: As with any drug, not all adverse effects will occur during clinical trials. Therefore, once a vaccine is made available to the public, information is continually gathered to identify problems after marketing begins. Although vaccines rarely cause long-term harm, there have been a few cases where a specific vaccine was found to be unsafe once they were already in use. In those cases, the vaccine was immediately removed from circulation.

Source: HHS, 2017b; Offic, 2015; CDC, 2015

Is there any connection between autism and vaccines?
In 1998, a study by Andrew Wakefield, then a consultant gastroenterologist, was published in the Lancet, a British medical journal. He studied 12 children whose parents claimed they noticed behavioral regression and gastrointestinal symptoms after their children received the MMR vaccine. After publishing his study, Wakefield held a press conference where he stated that the MMR vaccine was unsafe, and advocated the use of single-antigen vaccines (i.e., separating the measles, mumps, and rubella into three separate vaccines).

Source: Dyer 2010; Wakefield, 1998

Wakefield’s study, however, never concluded that MMR caused either autism or the gastrointestinal problems. To the contrary, Wakefield actually made the following statement in his study: “We did not prove an association between measles, mumps, and rubella vaccine and the syndrome described.” He also concluded that, “A genetic predisposition to autistic-spectrum disorders is suggested by over-representation in boys and a greater concordance rate in monozygotic [identical] than in dizygotic [fraternal/non-identical] twins.”

Source: Dyer 2010; Wakefield, 1998

https://www1.nyc.gov/assets/doh/downloads/pdf/a-slice-of-pie
DOHMH RESPONSE: MEDIA CAMPAIGNS

ATTENTION
MEASLES OUTBREAK
GET VACCINATED

IF YOU HAVE
fever, cough, red eye, runny nose and body

PLEASE CONTACT YOUR DOCTOR IMMEDIATELY

SPREAD THE TRUTH
NOT MEASLES

There is no link between
autism and vaccines.

GET VACCINATED TODAY.
CONTACT YOUR DOCTOR IMMEDIATELY.

TOGETHER WE CAN STOP
MEASLES

One person with measles can infect an average
of 12 to 18 people without immunity.

GET VACCINATED TODAY.
CONTACT YOUR DOCTOR IMMEDIATELY.
DOHMH Response: MMR Vaccine Uptake

Source: NYC DOHMH Citywide Immunization Registry, data as of 9/1/2019, run on 9/3/2019
DOHMH RESPONSE: BY NUMBERS

- ~ 560 DOHMH staff deployed
- ~ 104,000 person-hours spent
- 2,279 suspect cases of measles investigated
- >3,200 diagnostic tests performed by DOHMH labs
- Agency spent $8.4 million to end outbreak
  - Actual cost to community much greater
LESSONS LEARNED

- Decades old public health victories cannot be taken for granted
- More granular surveillance and immunization coverage data key to early identification of susceptible populations
- Leverage community relationships to build new alliances
**Future Challenges**

- Vaccine hesitancy requires resources for continued education in vulnerable communities
- Ongoing risk of international importation
- Implementation of state law removing religious exemptions and NYC health code changes requiring DOHMH review of all medical exemptions
SPECIAL THANKS TO...

- **Division of Disease Control**

- **Office of Emergency, Preparedness & Response**
  Beth Maldin Morgenthau, M.P.H.

- **Division of Environmental Health**
  Simone C. Hawkins

- **Office of General Counsel**
  Thomas G. Merrill, J.D.

- **Office of Exernal Affairs**
  Maura Kennelly, M.P.H.
Thank You!
Strengthening Confidence in Vaccines

Amanda Cohn, MD (CAPT, USPHS)
Chief Medical Officer
National Center for Immunization and Respiratory Diseases
Vaccine coverage is high in the United States

- Nearly 99% of U.S. children have received some vaccines by the age of 2 years
- Over 94% of kindergarteners have received 2 doses of measles, mumps, and rubella vaccine (MMR) and the state-required number of doses of diphtheria, tetanus, andacellular pertussis (DTaP) and varicella vaccines

Seither et al, MMWR, October 17, 2019
Figure adapted from Gabriele Malaspina, the Noun Project
Some children remain unprotected

≥1 Dose MMR vaccination coverage by 24 months among children born in 2015–2016

Nationwide coverage: 90.4%

Lower in children who are:
- Uninsured/underinsured
- Reside in rural area
- Live below poverty level

Source: National Immunization Survey
Pockets of low vaccination threaten communities

Vaccine coverage in 19- to 35-month-olds (2016)

Proportion of kindergarteners not up to date (2017)

Schools with <75% MMR coverage (2017–2018)

Forecasted size of potential measles outbreaks (2018)

Source: National Immunization Survey
New York State Student Identification System
Sinclair D, et al. JAMA network open. 2019
Pingali S, JAMA. 2019
Characteristics of Low Vaccination Pockets

- Each community is unique, with distinct factors affecting vaccination:
  - Close-knit
  - Isolation or insularity
  - Access issues
  - Distrust of public authorities
  - Localized misinformation
Myths and misinformation

- Myths have always been part of the vaccine landscape

- But rapid dissemination and sophistication of misinformation present new challenges
  - Internet access
  - Social media
  - Talk radio and television

- Misinformation plays a clear role in eroding vaccine confidence and puts our programs at risk

Vaccine misinformation can be tailored for specific communities
CDC’s strategic framework for strengthening vaccine confidence and preventing outbreaks of vaccine-preventable diseases in the United States
Protect communities
Use every tool available to find and protect communities at risk using tailored, targeted approaches

Empower families
Ensure parents are confident in decision to vaccinate by strengthening provider-parent vaccine conversations

Stop myths
Use local partners and trusted messengers, establish new partnerships to contain the spread of misinformation, and educate critical stakeholders about vaccines
Protect communities

- Leverage immunization data to find and respond to communities at risk
- Work with trusted local partners to reach at-risk communities before outbreaks
- Ensure vaccines are available, affordable, and easy to get in every community
Protect communities

- Leverage immunization data to find and respond to communities at risk
- Work with trusted local partners to reach at-risk communities before outbreaks
- Ensure vaccines are available, affordable, and easy to get in every community

Empower families

- Expand resources for healthcare professionals to help them have effective vaccine conversations with parents
- Work with partners to start conversations before the first vaccine appointment
- Help providers foster a culture of immunization in their practices
Protect communities

- Leverage immunization data to find and respond to communities at risk
- Work with trusted local partners to reach at-risk communities before outbreaks
- Ensure vaccines are available, affordable, and easy to get in every community

Empower families

- Expand resources for healthcare professionals to encourage effective vaccine conversations with parents
- Work with partners to start conversations before the first vaccine appointment
- Help providers foster a culture of immunization confidence in their practices

Stop myths

- Work with local partners and trusted messengers to improve confidence in vaccines among key, at-risk groups
- Work with social media outlets to promote trustworthy vaccine information
- Provide accurate, accessible information on vaccines to state policy makers
- Engage state and local health officials to advance effective local responses to misinformation
Here is What CDC is Doing!

- Leverage diverse data sources to find and protect communities at risk
- Expand resources for working with communities
- Build and foster a culture of immunization in healthcare practices
- Provide technical assistance to funded partners
- Strengthen communication strategies
- Further invest in our vital partners

*Picture courtesy of AAP and SELF Magazine.*
Partnership is key

- To truly keep Americans safe, every generation, community, and child needs to be appropriately immunized.
- Together, we can protect our communities, empower families, and stop myths.

*Picture courtesy of AAP and SELF Magazine.*
Thank you

For more information, contact CDC
1-800-CDC-INFO (232-4636)

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Upcoming Programs of Interest

March 17, 2020
Public Health Grand Rounds
Laboratory Response Network

April 21, 2020
Public Health Grand Rounds
Predictive Analytics and Public Health

May 19, 2020
Public Health Grand Rounds
Smoking Cessation: New Insights and Future Directions