



**Department  
of Health**

# **Measles Review for Providers**

**Responding to New York State's largest  
outbreak since measles elimination**

**November 28, 2018**

**Dr. Howard Zucker, Commissioner, New York State Department of Health**

**Dr. Patricia Ruppert, Commissioner, Rockland County Department of Health**

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# Measles 101

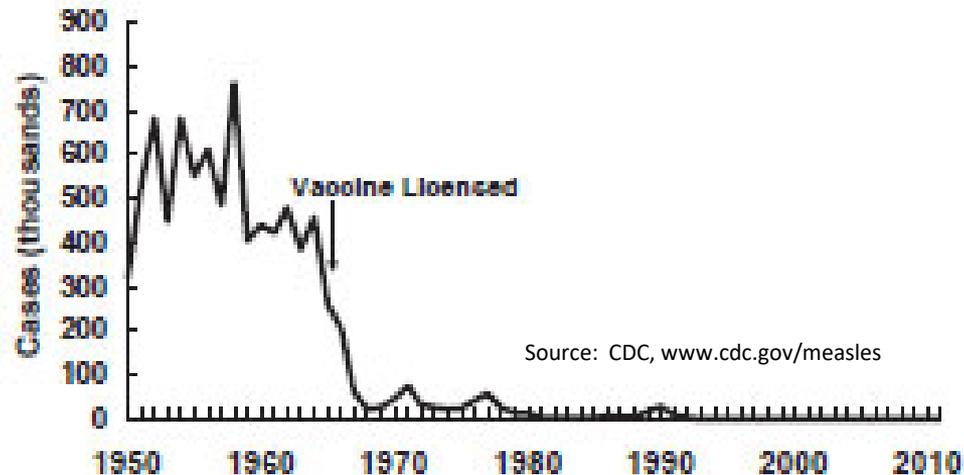
A brief overview

# History of Measles in the United States

- Prior to 1963, measles occurred worldwide in an endemic or epidemic pattern.
- Nearly all children got the measles by the time they were 15 years of age.
  - An estimated 3-4 million cases occurred annually
- When measles became a nationally notifiable disease in 1912, an average of 6,000 measles deaths were reported each year.
- In the decade before 1963, it is estimated that annually:
  - 400-500 people died
  - 48,000 people were hospitalized
  - 1,000 people suffered encephalitis (brain swelling)

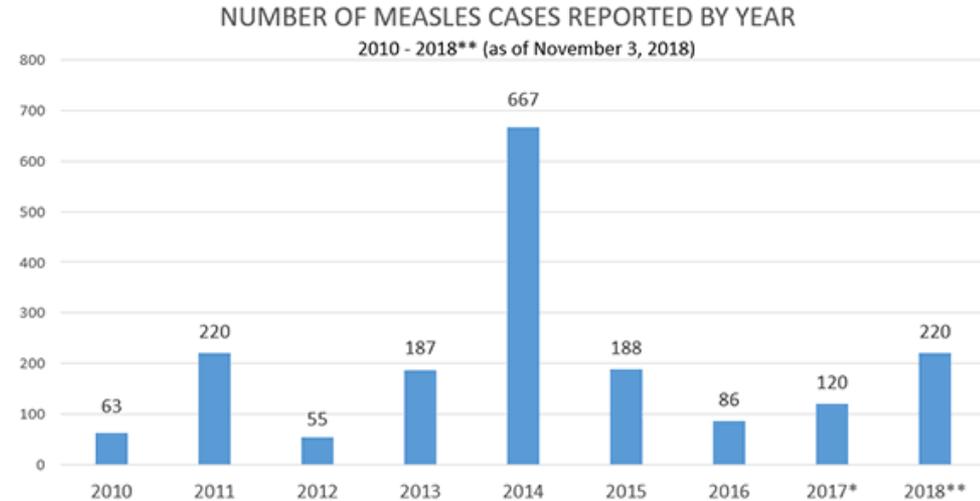
# History of Measles in the United States

- In 1963, measles vaccine was introduced.
- In 1989, two-dose MMR vaccine schedule was introduced.
- In 2000, measles was declared eliminated from the United States, meaning an absence of endemic measles transmission for 12 months or longer.



# History of Measles in the United States

- Elimination has been attributed to a highly effective vaccination program in the US and better measles control.
- Since 2000, outbreaks have been reported throughout the US, most commonly related to international travel and communities with poor vaccination rates.



The number of US reported cases in 2018 is similar to recent years and is in the expected range.

Centers for Disease Control and Surveillance:

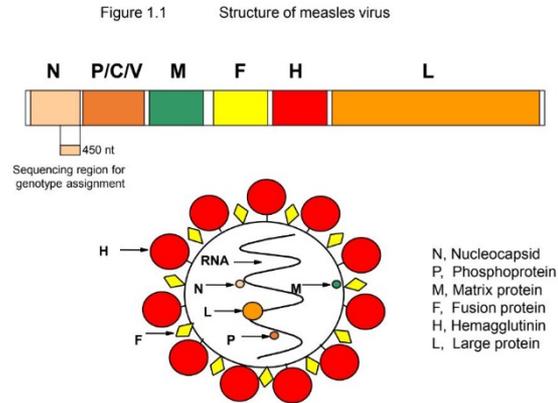
\*Cases as of December 30, 2017. Case count is preliminary and subject to change.

\*\*Cases as of November 3, 2018. Case count is preliminary and subject to change. **Data are updated monthly.**

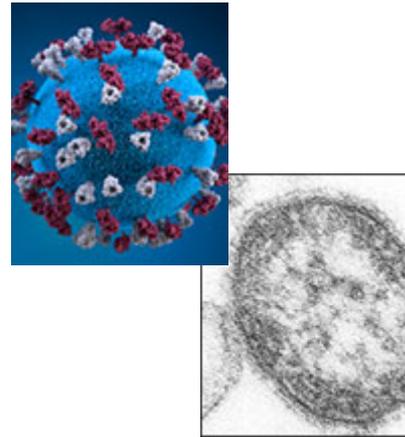
Source: [Morbidity and Mortality Weekly Report \(MMWR\), Notifiable Diseases and Mortality Tables](#)

# Measles Virus

- Measles is caused by a single-stranded, enveloped RNA virus with 1 serotype
- Member of the genus Morbillivirus in the Paramyxoviridae family
  - Same family as RSV, mumps, and parainfluenza viruses
- Humans are the only natural hosts of measles virus



Source: WHO, [www.who.int](http://www.who.int)



Source: CDC, [www.cdc.gov/measles](http://www.cdc.gov/measles)

# Measles Transmission

- Measles is one of the most contagious infections
- Measles is spread via the airborne route
- Measles can ***live for up to 2 hours*** in the airspace where an infected person breathed, coughed or sneezed
- Measles is so contagious that if one person has it, 90% of the people close to that person who are not immune will also become infected
- Infected people can spread measles to others from ***4 days before through 4 days after the rash appears***

# Measles Presentation

- Classic Presentation:
  - **Fever, rash, and the “three C’s”:**
    - Cough
    - Coryza (redness and swelling of nasal mucosa)
    - Conjunctivitis (red, watery eyes)
- Can also have:
  - Koplik spots (scattered blue-white tiny spots on a bright red background) may appear inside the mouth
  - Malaise
  - Diarrhea
  - Anorexia
  - Lymphadenopathy

# Measles Complications

- Children younger than 5 years of age and adults older than 20 years of age are more likely to suffer from measles complications
- Acute otitis media (ear infections)
  - Occurs in about 1 in 10 children with measles
  - Can result in ***permanent hearing loss***
- Pneumonia
  - As many as 1 in 20 children with measles gets pneumonia, the most common cause of death from measles in young children

# Measles Complications

- **Subacute Sclerosing Panencephalitis (SSPE)**
  - SSPE is a rare but fatal complication of measles
  - May occur 7-10 years after a natural measles infection
  - Type of brain swelling that is progressive and has no known cure
  - Most individuals with SSPE will die within 1-3 years of diagnosis, but some have a more rapidly progressing disease progression that leads to death within 3 months of diagnosis
  - Risk of developing SSPE may be higher in those who are infected with measles before the age of 2 years
    - The incidence of SSPE declined by at least 90% in countries that have practiced widespread measles vaccination
    - Highlights the importance that children should receive their first MMR vaccination between age 12-15 months

# Measles Prevention = Vaccination

- Getting the measles vaccine is the best way to prevent measles at all times, but especially during an outbreak
  - One dose of measles is about 93% effective at preventing the measles if exposed to the virus.
  - Two doses of measles vaccine are about 97% effective
  - About 3% of people who have received 2 doses of MMR vaccine are still at risk of getting the measles if exposed to the virus, but fully vaccinated people who get the measles are:
    - Much more likely to have a milder illness
    - Much less likely to spread measles to other people



Stock Photo: Sherry Yates Young

# Current Outbreak Status

# Current Outbreak

In New York State, there are currently:

- 96 cases of measles in Rockland County (New Square, Spring Valley, Monsey, New City)
- 50 cases in New York City (Williamsburg, Borough Park, and Bensonhurst, Brooklyn)
- 6 cases in Orange County (Kiryas Joel)

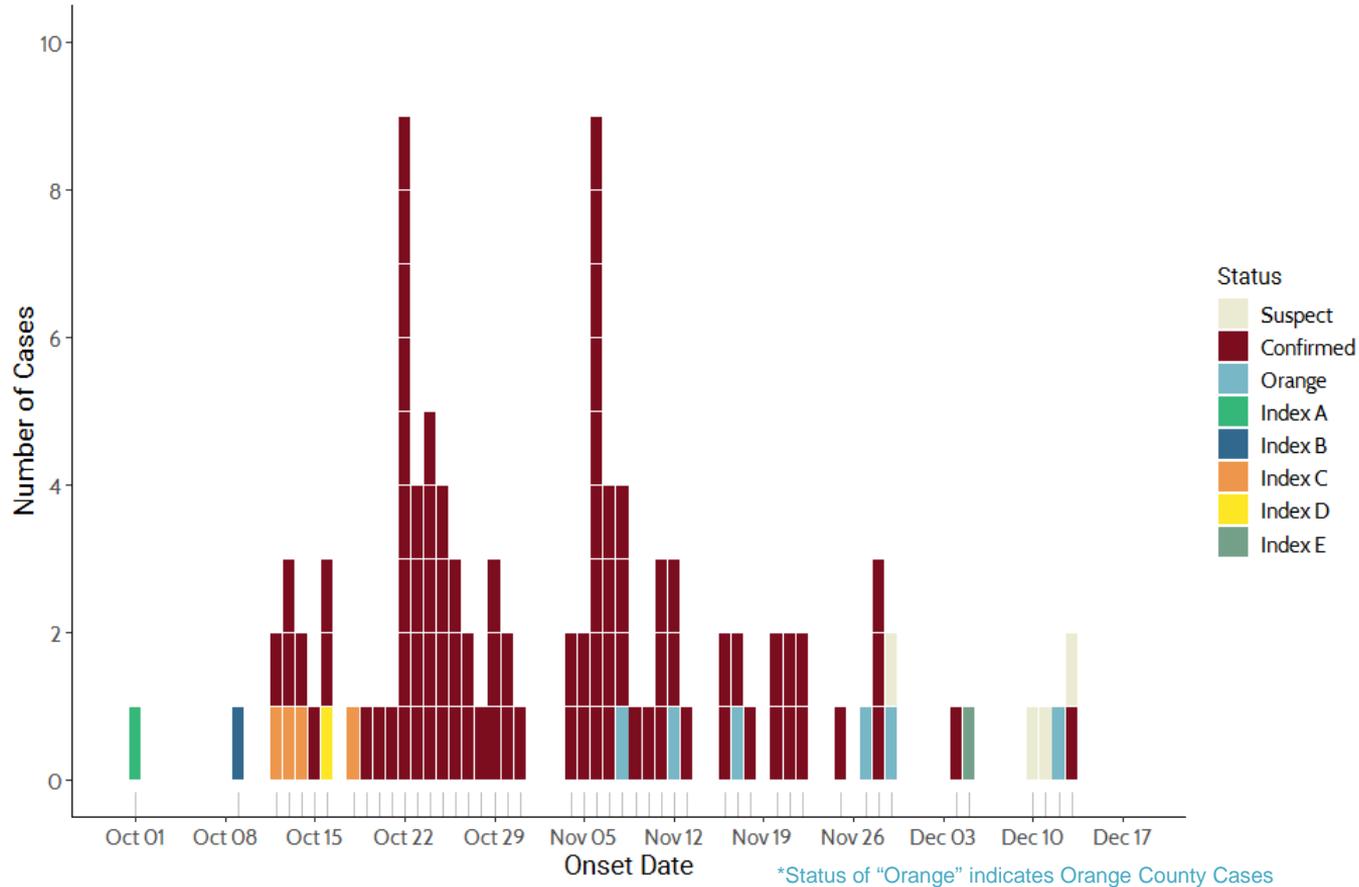
Rockland County:

- 8 separate index cases, all with exposures to ongoing measles outbreak in Israel

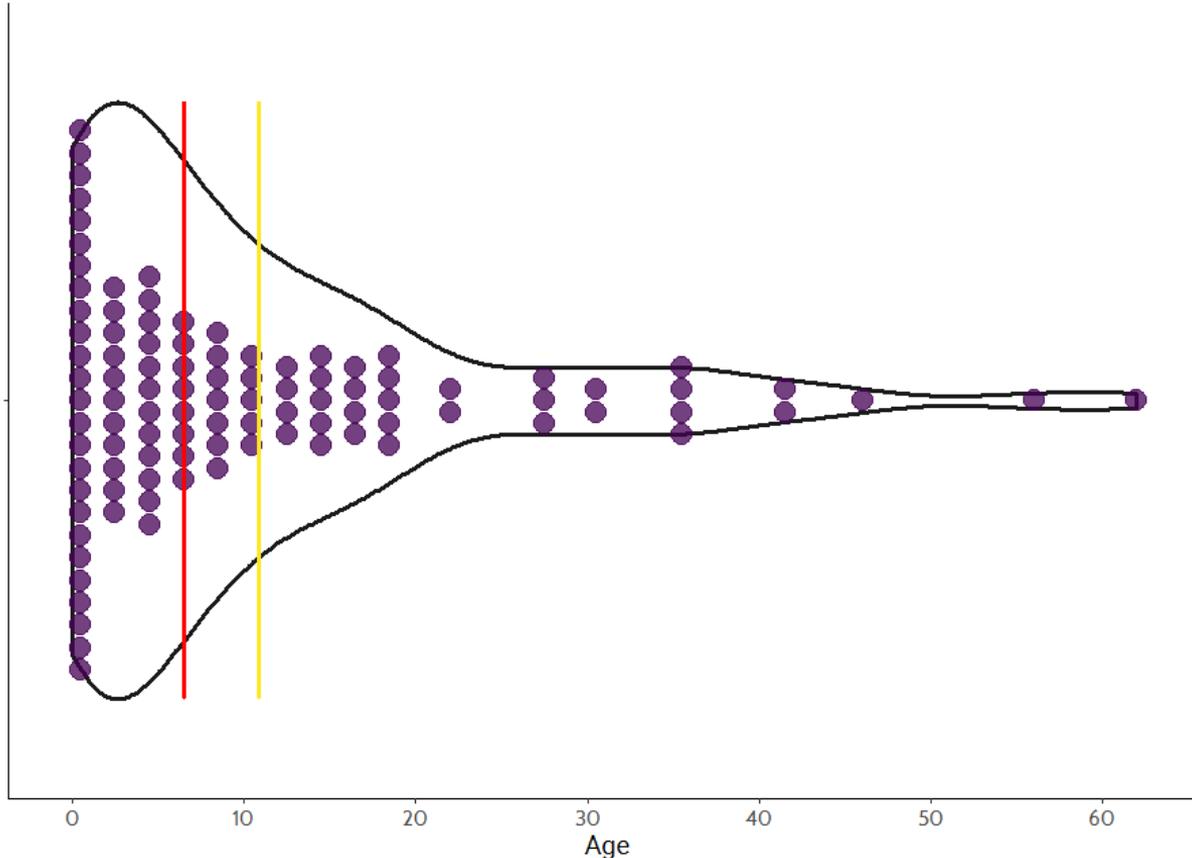
Orange County:

- All cases linked to outbreak in Rockland County

# Current Outbreak

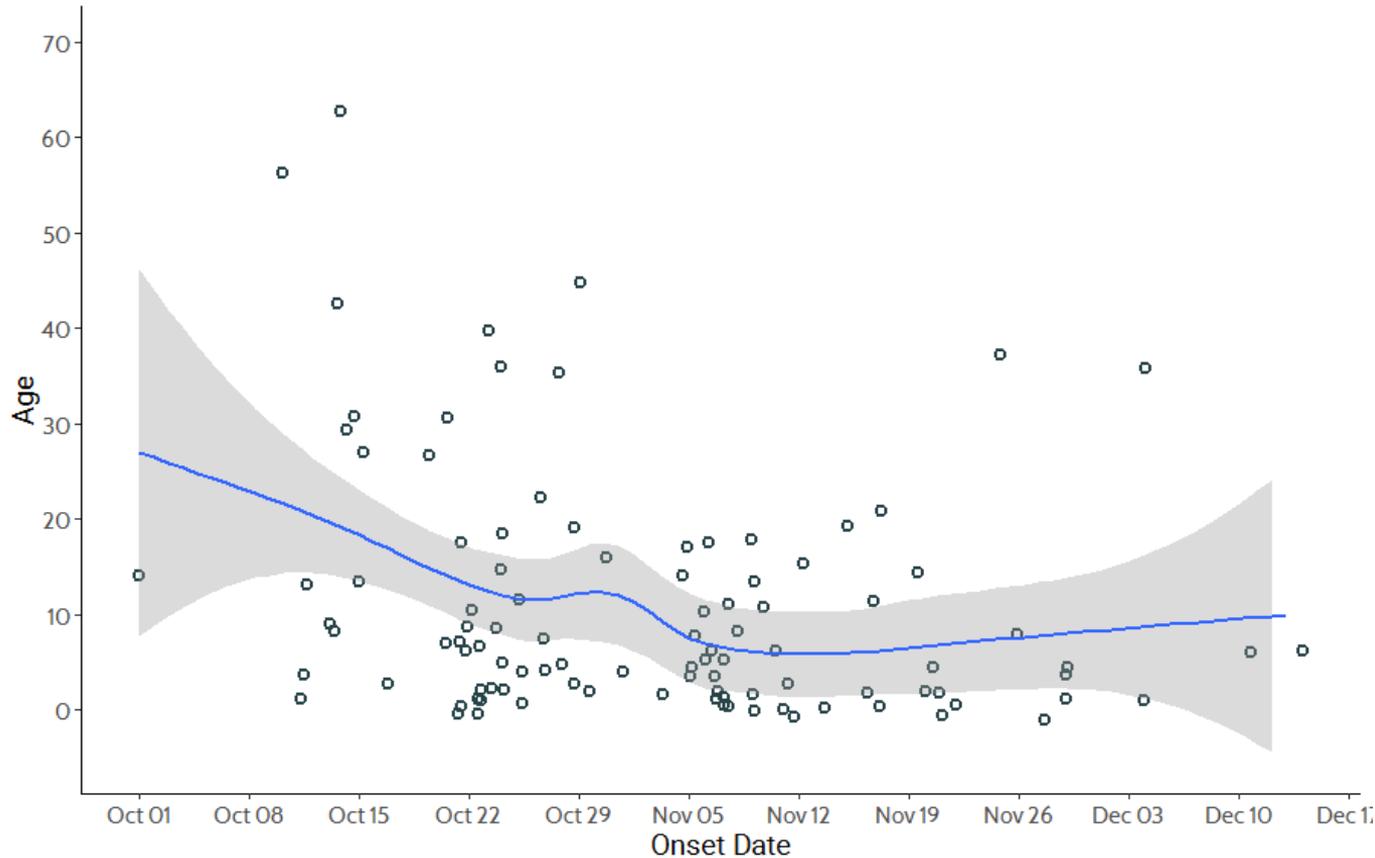


# Current Outbreak: Age Distribution



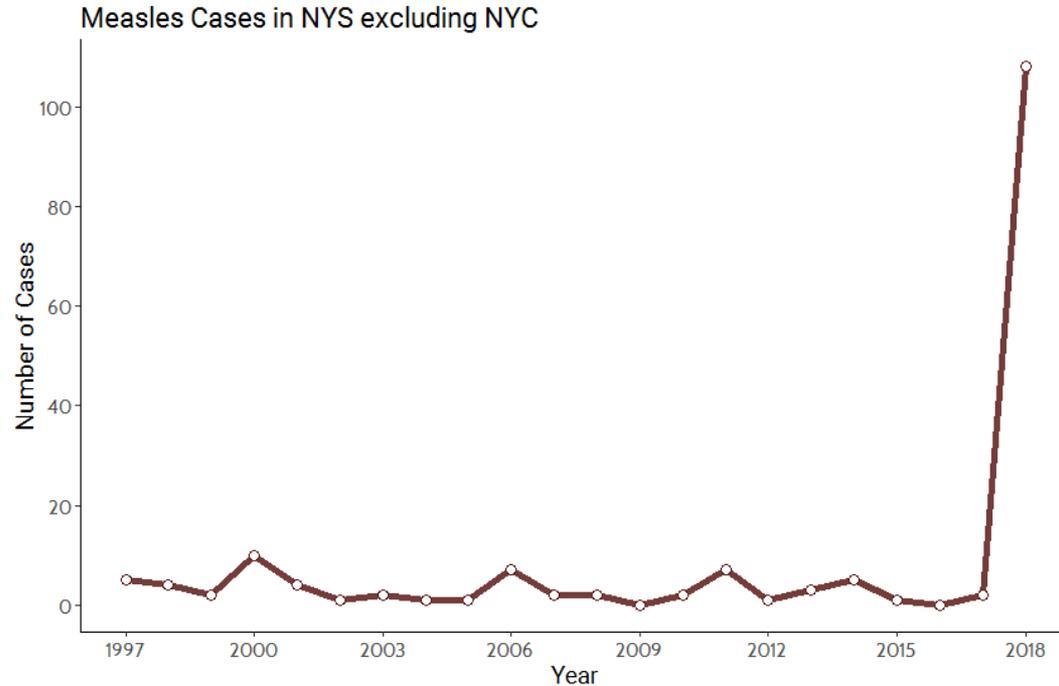
Range = 4 months to 62 years  
Mean Age = 11.0 Years  
Median Age = 6.5 Years

# Current Outbreak: Age Distribution Over Time



# Measles Cases in New York State, 1997-2018\*

- The current outbreak is the largest in New York State since the 1990's, prior to elimination of measles in the United States.
- New York City outbreak in 2013:
  - Unvaccinated traveler who recently visited London
  - 58 cases
  - Borough Park and Williamsburg neighborhoods in Brooklyn



\* As of 12-19-2018

# Current Outbreak

- **Complications**
  - Respiratory distress, pneumonia, dehydration, otitis media
  - At least 6 hospitalizations to date
    - 3 adults and 3 children
    - One child required care in the PICU
  - No known cases of encephalitis

# Current Outbreak: Vaccination Status

Age Group	# Cases	0 Doses	1 Dose	2 Doses	Unknown
< 1 Year	15	15 (100%)	0	0	0
1-3 Years	21	20 (95%)	1 (5%)	0	0
4-18 Years	47	42 (89%)	0	2 (4%)	3 (6%)
19 + Years	19	8 (42%)	1 (5%)	1 (5%)	9 (47%)
<b>Totals</b>	102	85 (83%)	2 (2%)	3 (3%)	12 (12%)

# Public Health Response: Vaccination

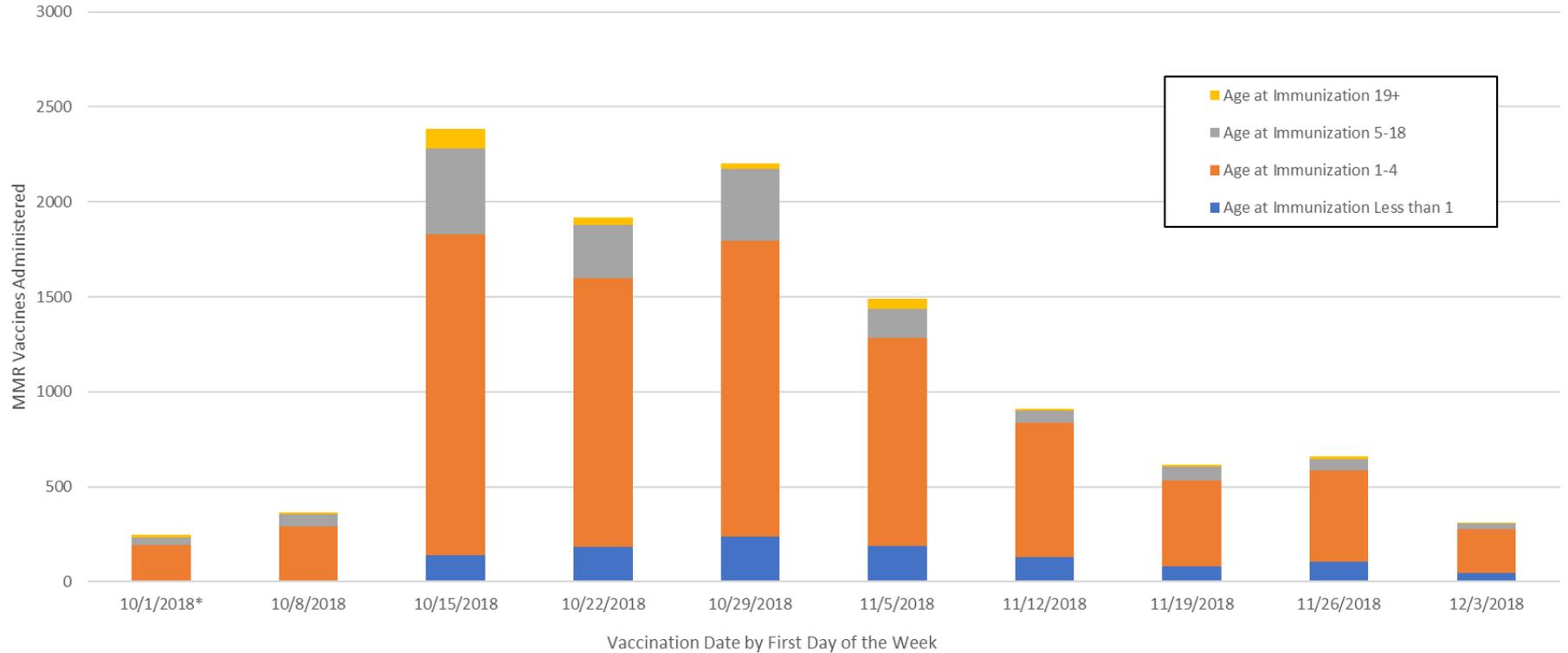
- Over 8,000 MMR vaccines have been administered since 10/1/2018
- Vaccinations being provided by healthcare providers, the local health department, community PODS
- Most vaccinations have been administered by local healthcare providers

**Number of MMR Vaccines Administered by Providers in Rockland County since October 3rd, 2018**

Vaccination Date by First Day of the Week	Age at Immunization (years)				Total
	Less than 1	1-4	5-18	19+	
10/1/2018*	5	188	37	16	246
10/8/2018	7	287	63	9	366
10/15/2018	131	1544	412	56	2143
10/22/2018	162	1210	216	31	1619
10/29/2018	212	1392	338	32	1974
11/5/2018	165	969	127	50	1311
11/12/2018	61	352	21	4	438
<b>Total</b>	<b>743</b>	<b>5942</b>	<b>1214</b>	<b>198</b>	<b>8097</b>

\*Only looking at vaccines administered since Oct. 3rd

## MMR Vaccinations Administered in Rockland County



# Public Health Response: Vaccination

## MMR Rates for 1 - 18 Year Old in Rockland County by Zip Code (valid doses only)

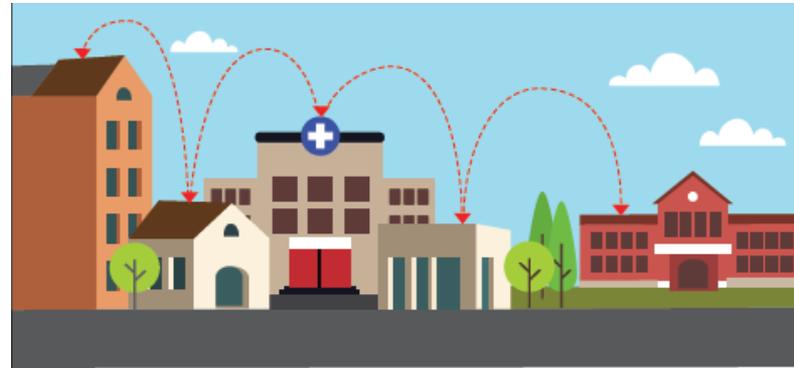
Zip Code	Age Group	Population*	Complete** by 12/13/2018	Rate as of 12/13/2018	Rate as of 10/1/2018	Difference in Rates
10952	1-3	5033	3811	75.7%	54.2%	21.5%
	4-18	20154	13578	67.4%	63.0%	4.4%
10956	1-3	941	747	79.4%	72.2%	7.2%
	4-18	6452	4997	77.4%	76.2%	1.2%
10977	1-3	5844	4659	79.7%	63.7%	6.0%
	4-18	26671	19450	72.9%	69.9%	3.0%

\*Population includes all 1 - 18 year old as of 11/20/2018 in NYSIIS who have at least one immunization (or a birth certificate)

\*\*Complete for 1 -3 year old = 1 Dose of MMR, Complete for 4 - 18 year old = 2 Doses MMR

# Public Health Response

- Community Outreach:
  - Door hangers
  - Posters
  - PSAs
  - Postings in local journals
  - Provider visits
  - School visits
  - Meetings with school principals
  - Conference call with moms
  - School exclusions



**Measles is spreading  
in our community.**

**It can be dangerous to anyone  
who is not vaccinated.**

**Protect yourself and your family.  
Talk to your health care provider.**

*Questions about measles or the vaccine?*

Call **888-364-4837**

Monday-Friday, 9 am-5 pm

**[health.ny.gov/measles](http://health.ny.gov/measles)**



**Department  
of Health**

# Public Health Response

- Health Care Provider and School Support:
  - Advisories
  - Clinical support
  - Epi X
  - Letters to providers
  - Fact sheets
  - Letters to school administrators
  - School exclusion algorithm



**NEW YORK**  
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**HOWARD A. ZUCKER, M.D., J.D.**  
Commissioner

**SALLY DRESLIN, M.S., R.N.**  
Executive Deputy Commissioner

November 16, 2018

**To:** Providers, Hospitals, Emergency Departments and Primary Care Providers, Dental Providers, and Local Health Departments  
**From:** New York State Department of Health, Bureau of Immunization

**HEALTH ADVISORY: MEASLES EXPOSURES IN NEW YORK STATE**

**Please distribute to the Chief Medical Officer, Infection Control Department, Infectious Disease Department, Pediatric Department, Director of Nursing, Emergency Department, Primary Care Clinics, and all patient care areas.**

**UPDATE TO MEASLES ADVISORY**

- This health advisory, previously updated on October 22, 2018, provides the most recent information on the ongoing measles outbreak in Rockland County and New York City.
- The number of confirmed measles cases in Rockland County and the New York City area continues to rise.
  - New cases in Rockland County are concentrated in New Square, Spring Valley, and Monsey. New cases in New York City are concentrated in Williamsburg, Borough Park, and Bensonhurst, Brooklyn.
  - Providers in the affected communities and all surrounding areas should remain vigilant for persons presenting with rash and fever.

# The provider's role in outbreak control

# Provider Roles

- Identify suspect cases and report to local health department (LHD)
- Work with LHD to conduct testing to confirm cases
- Implement infection control practices to prevent further transmission
- Ensure staff are immune
- Provide post-exposure prophylaxis for case contacts
- Provide primary community prevention through MMR vaccination
- Assist in patient and community education

# Suspect Case Identification and Reporting

- Early recognition, case investigation, and prompt public health response can limit the spread of disease
- **Clinical Suspicion:**
  - Know the presentations
  - This includes classical and atypical presentations
- **Patient History:**
  - Vaccination record
  - Travel history (during incubation period)
  - Contact with international traveler
  - Contact with person with similar symptoms

# Suspect Case Identification: Conjunctivitis and Coryza



Source: Centers for Disease Control and Prevention

# Suspect Case Identification and Reporting

## Koplik Spots

- Pathognomonic for measles



Source: Centers for Disease Control and Prevention

# Vaccine Rash

- Fever and rash may occur 6 to 12 days after vaccination
- NYS Wadsworth Lab can test to differentiate vaccine strain virus from wild-type virus

# Differential Diagnosis of Measles

- Other febrile rash illnesses:
  - Parvovirus B19 (Fifth's Disease)
  - Human Herpesvirus – 6 (Roseola)
  - Enteroviruses
  - Streptococcal infection (Scarlet Fever)
  - Adenovirus
  - Infectious mononucleosis
  - Influenza: "Fleasles"
  - Dengue
  - Drug rash
- If you have a patient presenting with a febrile rash illness, consider the patient presentation and differential carefully. If measles is a concern, enact infection control practices immediately, and immediately report the case to your local health department.
- **DO NOT WAIT FOR LABORATORY CONFIRMATION TO REPORT**

# Current Guidance

# Reporting Requirements

Reporting of suspected and confirmed communicable diseases by providers is mandated under the NYS Sanitary Code

- Who must report?
  - Physicians
  - Nurses
  - Laboratory Directors
  - Infection Control practitioners
  - Healthcare facilities
  - State institutions
  - Schools

## NEW YORK STATE DEPARTMENT OF HEALTH Communicable Disease Reporting Requirements

Reporting of suspected or confirmed communicable diseases is mandated under the New York State Sanitary Code (10NYCRR 2.10,2.14). The primary responsibility for reporting rests with the physician; moreover, laboratories (PHL 2102), school nurses (10NYCRR 2.12), day care center directors, nursing homes/hospitals (10NYCRR 405.3d) and state institutions (10NYCRR 2.10a) or other locations providing health services (10NYCRR 2.12) are also required to report the diseases listed below.

Anaplasmosis	☞ Foodborne Illness	Influenza,	☞ Psittacosis	Streptococcal infection
Amebiasis	☞ Giardiasis	laboratory-confirmed	☞ Q Fever <sup>2</sup>	(invasive disease) <sup>3</sup>
☞ Animal bites for which rabies prophylaxis is given <sup>1</sup>	☞ Glanders <sup>2</sup>	Legionellosis	☞ Rabies <sup>1</sup>	Group A beta-hemolytic strep
☞ Anthrax <sup>2</sup>	Gonococcal infection	Listeriosis	☞ Rocky Mountain spotted fever	Group B strep
☞ Arboviral infection <sup>3</sup>	Haemophilus influenzae <sup>2</sup> (invasive disease)	Lyme disease	☞ Rubella	Streptococcus pneumoniae
Babesiosis	☞ Hantavirus disease	Lymphogranuloma venereum	(including congenital rubella syndrome)	☞ Syphilis, specify stage <sup>2</sup>
☞ Botulism <sup>2</sup>	Hemolytic uremic syndrome	Malaria	Salmonellosis	Tetanus
☞ Brucellosis <sup>2</sup>	Hepatitis A	☞ Measles	☞ Severe Acute Respiratory Syndrome (SARS)	Toxic shock syndrome
Campylobacteriosis	☞ Hepatitis A in a food handler	☞ Melioidosis <sup>2</sup>	Shigatoxin-producing E.coli <sup>4</sup> (STEC)	Transmissible spongiform encephalopathies <sup>4</sup> (TSE)
Chancroid	Hepatitis B (specify acute or chronic)	Meningitis	☞ Smallpox <sup>2</sup>	Trichinosis
Chlamydia trachomatis infection	Hepatitis C (specify acute or chronic)	Aseptic or viral	Staphylococcus aureus <sup>5</sup> (due to strains showing reduced susceptibility or resistance to vancomycin)	☞ Tuberculosis current disease (specify site)
☞ Cholera	Pregnant hepatitis B carrier	☞ Haemophilus	☞ Meningococcal	☞ Tularemia <sup>2</sup>
Cryptosporidiosis	Herpes infection, infants aged 60 days or younger	☞ Other (specify type)	☞ Meningococcemia	☞ Typhoid
Cyclosporiasis	Hospital associated infections (as defined in section 2.2 10NYCRR)	☞ Monkeypox	Mumps	☞ Vaccinia disease <sup>9</sup>
☞ Diphtheria		Peritussis	☞ Pertussis	Vibriosis <sup>8</sup>
E.coli O157:H7 infection <sup>4</sup>		☞ Plague <sup>1</sup>	☞ Poliomyelitis	☞ Viral hemorrhagic fever <sup>2</sup>
Ehrlichiosis		☞ Enterotoxin B poisoning <sup>2</sup>		Yersiniosis
☞ Encephalitis				

**Call the LHD upon suspicion immediately**

**– do not wait to call**



[https://www.health.ny.gov/forms/instructions/doh-389\\_instructions.pdf](https://www.health.ny.gov/forms/instructions/doh-389_instructions.pdf)



Department of Health

# Testing

Testing algorithm available:

- Flow Chart
- Narrative format

## Clinical Case Definition

- A generalized maculopapular rash and
- Temperature  $\geq$  to 101° F (38.8° C) and
- Cough, conjunctivitis, or coryza

**Outbreak region:** As defined by public health, as of 10/31/18, includes **New Square, Monsey, Spring Valley, New City**. This outbreak region may be modified as the outbreak progresses, and new areas are identified.

# Testing

## Measles Testing Recommended:

For individuals with fever and maculopapular rash:

- Who have received a measles-containing vaccine prior to rash onset
- With an atypical presentation and **either** live, work, attend school, or shop in the outbreak region\* (epi-link to the outbreak region) **or** have known contact with a person diagnosed with measles by a healthcare provider (HCP) (epi-link to an individual)
- With international travel within 21 days of developing symptoms
- If you suspect measles and the individual has no epi-link to the outbreak region\* **and** no epi-link to an individual diagnosed with measles by a HCP
  - Healthcare provider should consider other causes of generalized rash and fever and test as appropriate, particularly when symptom onset and progression are not classic for measles (Roseola, Fifth Disease, Strep throat, etc.)

# Testing

## Measles Testing Can Be Deferred:

For individuals who present with symptoms clinically compatible with measles as defined in the CCD (who were not previously vaccinated or did not have international travel in the last 21 days):

- If they live, work, attend school, shop, etc. in the measles outbreak region\* in Rockland County, **or**
- If they have had known contact with a person diagnosed with measles by a healthcare provider (HCP)

# Post Exposure Prophylaxis (PEP)

- For exposed individuals without evidence of immunity (priority includes pregnant women, infants <12 month and severely immunocompromised)
- May prevent or modify disease
- MMR vaccine or Immunoglobulin (IG), MMR and Ig cannot be given at the same time
- MMR vaccine
  - **Within 72 hours** of initial exposure
  - Persons age  $\geq$  6 months
  - Vaccination should be offered at any interval following exposure to protect from future exposures
- IG
  - **Within 6 days** of initial exposure
  - Individuals who are at risk for severe disease and complications from measles should receive IG, IV for pregnant women and severely immunosuppressed
  - IGIM can be given to other exposed persons without evidence of immunity
    - Priority for those with intense, prolonged contact
    - If vaccine is contraindicated

# Infection Control Practices

- **Healthcare settings**
  - **Implement appropriate infection control procedures for any suspected cases immediately**
    - Have patient wear a medical mask
    - Healthcare providers wear an N95 mask
    - Airborne infection isolation room (negative pressure)
      - Alternate: Private room away from susceptible patients with door closed
      - Don't use the room for two hours after the patient has been there
    - Always alert receiving facility prior to patient transfer so that appropriate infection control can be implemented
- **Other settings**
  - Isolate patient while infectious
    - Through 4 days after rash onset

# Vaccine Recommendations for Outbreak

- Written documentation of adequate vaccination:
  - Two doses of measles-containing vaccine given on or after the first birthday and at least 28 days apart
  - For children 6-11 months of age, one dose of a measles-containing vaccine is recommended during this outbreak.
    - These children will need a second dose on or after the first birthday, and a third dose at least 28 days after the second.

# School Exclusions

- Due to multiple exposures in schools and early childhood settings, and the growing nature of the outbreak, steps have been taken to require the exclusion of children from school.
- This includes children who:
  - have been exposed and are non-immune,
  - are non-immune and in schools in close geographic proximity to confirmed cases
- To date there are more than 30 schools, daycares, and nursery schools in Rockland county that have been required to enact exclusion policies to help stop the spread of measles as permitted by NYS Public Health Law.
- As cases continue to be identified, additional school exclusions of unvaccinated children may be required.

# Pregnancy

- Pregnant women are at higher risk for complications of measles and for miscarriage or preterm labor.
- MMR cannot be given during pregnancy
- For post-exposure prophylaxis, pregnant women must be given IG via the IV route
- Pregnant women can be around someone who has received the MMR vaccine. Transmission of measles from the MMR vaccine has never been documented.

# Questions?