

# MEASLES OUTBREAK IN NYC & CURRENT RESPONSE

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New York City Department of Health and Mental Hygiene

May 30, 2019

# DISCLOSURES

- No disclosures to report

# PRESENTATION OUTLINE

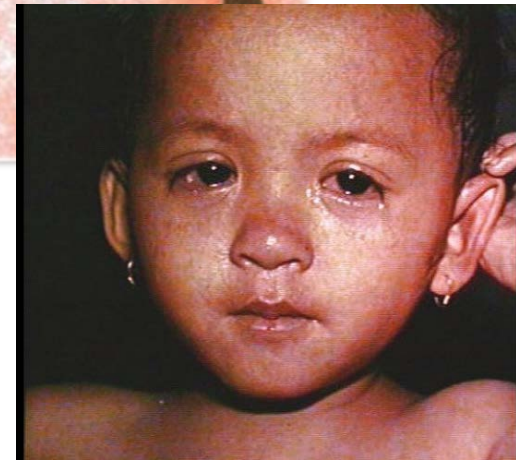
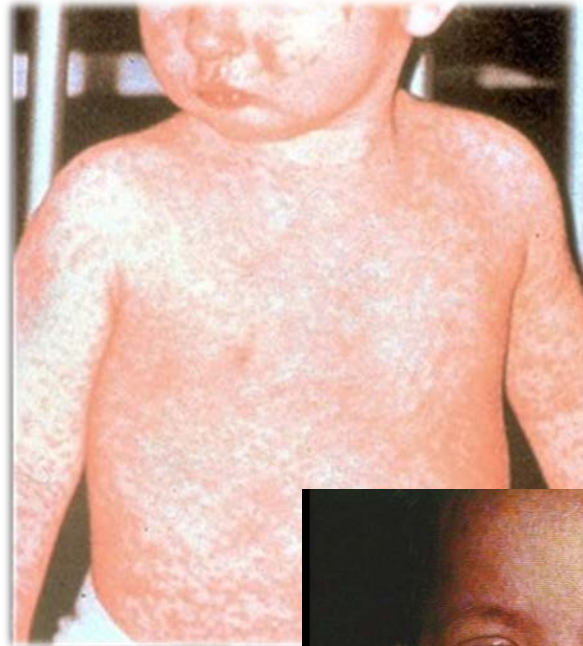
- Background: measles virus
- Measles vaccination
- Current measles outbreak in New York City
- Infection control and post-exposure prophylaxis
- New York City Health Department response (in brief)

# BACKGROUND: MEASLES VIRUS

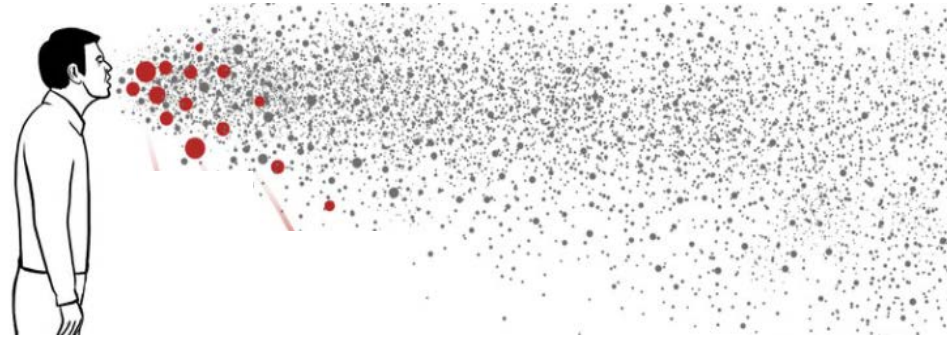
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# MEASLES – CLINICAL FEATURES









- Viral infection
- Symptoms:
  - High fever
  - Cough
  - Conjunctivitis
  - Coryza
  - Generalized rash
- Incubation period (time from exposure to illness)
  - 7 to 21 days



# TRANSMISSION



- Highly contagious
  - 90% attack rate in close contacts
- Droplet and airborne transmission
  - Virus can remain airborne for up to 2 hours
- Infectious period
  - 4 days before through 4 days after rash onset (9 days total)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					<b>Rash Onset</b>	
						

Shedding virus = 

# COMPLICATIONS

- Common:
  - Diarrhea, otitis media, pneumonia, laryngo-tracheobronchitis
- May also cause:
  - Pregnancy complications (miscarriage, preterm labor)
  - Encephalitis (1/1,000 cases)
  - Death (1-2/1,000 affected children)
- Groups at increased risk for complications:
  - Infants, children <5
  - Adults aged >20
  - Pregnant persons
  - Immunocompromised persons

# TREATMENT

- No specific antiviral therapy
- Medical care is supportive
- Vitamin A may be used for severe measles cases among children (e.g. hospitalized)\*
  - Give vitamin A on diagnosis, repeat next day
  - Age-specific daily doses

\* <https://redbook.solutions.aap.org/>



# MEASLES VACCINATION

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# MEASLES VACCINATION

- Administered with mumps and rubella as MMR or with mumps, rubella and varicella as MMRV
- Live virus
- Schedule (non-outbreak situation)
  - First dose age 12-15 months
  - Second dose age 4-6 years
  - Prior to international travel: give at age 6-11 months and repeat at age 12 months
- Vaccine effectiveness:\* 1 dose ~93%, 2 doses ~97%
- Rash after MMR vaccination (5%)



\* CDC. Prevention of Measles, Rubella, CRS, and Mumps. MMWR 2013;62:1-34.

# MEASLES VACCINATION, CONT.

- Contraindications / valid medical exemptions:
  - Age < 6 months
  - Pregnant
  - Severely immunocompromised
- Household members of pregnant or immunocompromised people CAN be vaccinated
- Non-immune women CAN be given MMR immediately post-partum
- Breastfeeding is NOT a contraindication



# TRAVEL RECOMMENDATIONS AND VACCINATIONS

- MMR is recommended at least 2 weeks before international travel for persons aged 6 months or older
  - A pre-travel dose given to infants age 6-11 months will not count towards completion of the routine schedule. Repeat MMR at 12 months (as long as 28 days have passed since the most recent dose)

# MEASLES OUTBREAK

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New York City, 2018-2019

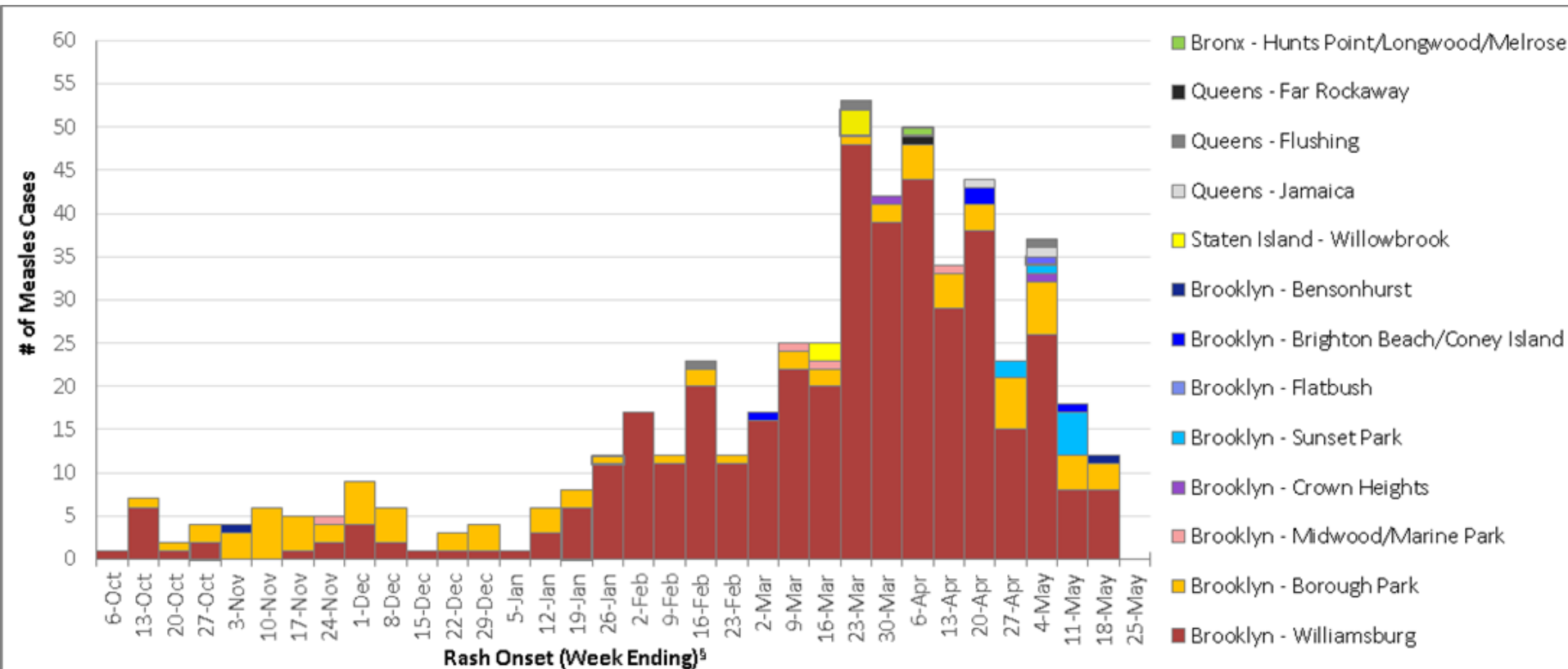
# BACKGROUND: 2018-2019 MEASLES OUTBREAK

- Large measles outbreaks in Israel
  - >3,400 cases from March 2018 – February 2019
  - Non-immunized, large families
- Outbreak in NYC
  - 555 cases as of May 28, 2019
  - Rash onsets: Sept. 30, 2018 – May 22, 2019
  - 16 new cases added on or after May 26
  - Multiple importations from Israel, UK, Ukraine, Rockland County, NY and NJ

# MEASLES CASES, BY DATE OF RASH ONSET— NYC, 2018-19\*

Epi Curve by Rash Onset and Neighborhood

N = 498



<sup>§</sup>Date of first positive lab result if rash onset unknown. Date of first report to DOH if rash onset unknown and no positive lab result.

\*As of May 17, 2019

# GEOGRAPHIC DISTRIBUTION OF PATIENTS

Neighborhood	Confirmed cases as of May 24, 2019
Williamsburg, Brooklyn	424
Borough Park, Brooklyn	85
Sunset Park, Brooklyn	12
Willowbrook, Staten Island	6
Brighton Beach, Brooklyn	4
Midwood/Marine Park, Brooklyn	4
Flushing, Queens	3
Crown Heights, Brooklyn	3
Jamaica, Queens	2
Bensonhurst, Brooklyn	2

The following neighborhoods have had 1 reported case each: Far Rockaway; Hunts Point/Longwood/Melrose; Flatbush; Chelsea/Clinton; Port Richmond

Source: <https://www1.nyc.gov/site/doh/health/health-topics/measles.page>



# AGE DISTRIBUTION OF PATIENTS, N=550\*

Age Category	Cases N*
<1 year	87
1 to 4 years	237
5 to 18 years	119
>18 years	105

\*As of May 24, 2019

# VACCINATION STATUS, N=535\*

- Unvaccinated: N=396 (74%)
  - Age <12 months: 83
  - Age  $\geq$ 12 months: 313 Preventable cases
- Vaccinated: N=24 (12%)
  - 1 prior MMR: 36
  - 2 prior MMR: 24
- Unknown vaccination history: N=79 (15%)
- Among 105 cases reported in adults, 84 (80%) were unvaccinated or had unknown vaccination status.

\* As of May 24, 2019

# COMPLICATIONS

- Hospitalizations: >30\* (including ICU stays)
  - Reasons include:
    - Pneumonia
    - Dehydration
    - Respiratory distress

\*As of May 6, 2019

# SOURCES OF INFECTION

- Domestic & international importation
- Household members / relatives
- Shared residential buildings
- Neighbors / friends
- Daycares / yeshivas
- Healthcare-acquired

# EXPOSURES

- >17,000 exposed persons\*
- Mainly in medical facilities
- Factors associated with these exposures
  - Lack of negative pressure rooms
  - Exposures before rash onset
  - Inadequate isolation and delays in case reporting

\*As of May 17, 2019

# INFECTION CONTROL AND POST- EXPOSURE PROPHYLAXIS

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# STEPS FOR PROVIDERS/FACILITIES

1. Screen patients for rash with fever at entry to your facility
2. Report suspected cases to DOHMH
3. Ensure isolation precautions are in place
4. Collect specimens
5. Determine if there were exposures
6. Recommend post-exposure prophylaxis (PEP) and/or isolation as indicated

# 1. SCREEN PATIENTS FOR RASH WITH FEVER AT ENTRY

- Always consider measles when evaluating patients with fever and rash
- It is critical to identify people who may be contagious with measles before, or at the latest as, they enter your facility by:
  - Posting signage outside entrances instructing people with risk factors, including rash with fever, international travel, or exposure to measles, to call before entering
  - Posting signage in waiting rooms, check in desks, elevators, exam rooms
  - Having front desk staff screen for risk factors upon check in
  - Having staff who schedule medical visits do screening by phone
  - Posting a staff person at the main entrance to inquire about risk factors (facilities with multiple cases)



**IMPORTANT NOTICE TO ALL PATIENTS**



**STOP**



**DO YOU HAVE:**

**Fever? Rash? Cough?  
Trouble Breathing?**

**Please Tell the Staff Immediately!**

**NYC**  
Health

**TAKE CARE**  
NEW YORK

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## Fever and Rash? Consider Measles

Measles cases continue to be identified in New York City. Measles is highly contagious. Please protect patients, visitors and staff!



### Keep an eye out for measles symptoms:

Suspect measles in patients with:

- High fever
- Generalized rash

Ask About:

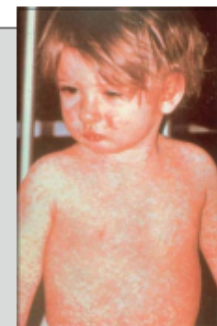
- International travel
- Vaccine history

#### Prodrome

- Mild to moderate fever
- Cough
- Coryza
- Conjunctivitis

#### Rash onset

- Fever spikes, often as high as 104° to 105° F
- Red, maculopapular rash that may become confluent—typically starts at hairline, then face, and spreads rapidly down body
- Koplik's spots (tiny blue/white spots on the bright red background of the buccal mucosa) may be present



### Act immediately if you suspect measles:

- Implement airborne infection control precautions immediately, mask and isolate patient—negative pressure room, if available.
- Permit only staff immune to measles to be near the patient.
- Do not use any regular exam room for at least 2 hours after a suspected measles patient has left the room.
- Contact Infection Control staff.
- Expedite measles serologic testing (IgM and IgG) and virus testing. Notify the Health Department to arrange testing at the Public Health Laboratory; use of commercial labs may delay the diagnosis.
- Safeguard other facilities: assure airborne infection control precautions before referring patients.
- If you're a health care provider and need guidance or need to report a suspect measles case, call the Health Department Provider Access Line at 866-692-3641.



Call 311 or visit [nyc.gov/health](http://nyc.gov/health) for more information.

Adapted with permissions from the California Department of Public Health, Immunization Branch.

To order copies, call (866) 692-3641

## 2. ENSURE ISOLATION PRECAUTIONS

- Follow airborne precautions
  - Use negative pressure room
  - If not available, mask, private exam room, do not use room for 2 hours after (won't eliminate exposures)
  - All healthcare staff entering the room should use an N95 respirator to prevent airborne transmission
- If patient will be sent home, home isolation for 4 days after rash onset
  - Avoid public transportation
  - Wear mask home

## 3. REPORT TO DOHMH

- Report at time of initial suspicion
- Do not wait for laboratory results to report
- DOHMH will provide guidance on specimen collection and will coordinate testing
- Report to NYC DOHMH: 347-396-2402 / 866-692-3641

## 4. COLLECT SPECIMENS

**FOR MEASLES, TWO TYPES OF SPECIMENS:**

- **Nasopharyngeal swab for measles PCR**
  - Synthetic (Dacron or Copan) swab (**not** cotton)
  - Liquid viral transport media
  - Same as influenza PCR testing
- **Serum for measles IgM and IgG**
  - If IgM negative within 72h after rash onset, may need to repeat
- **Testing at NYC DOHMH laboratory**

## 5. DETERMINE IF THERE WERE EXPOSURES

- Compile exposure list through 2 hours after airborne isolation (or case left facility)
- Identify high-risk contacts (pregnant, immunocompromised, infants)
- Determine if pregnant women are immune to measles (call OB for measles IgG records, check CIR, otherwise draw blood for stat testing)
- Notify exposed persons

## 6. RECOMMEND POST-EXPOSURE PROPHYLAXIS (PEP) AND/OR HOME ISOLATION, AS INDICATED

PEP	Who receives PEP	Time from initial exposure
MMR Vaccine	Non-immune persons $\geq 6$ mo	$\leq 72$ hrs
Immunoglobulin (IG)	<ul style="list-style-type: none"> <li>• Infants (intramuscular)               <ul style="list-style-type: none"> <li>• <math>&lt; 6</math>mo</li> <li>• 6-11mo who don't get MMR <math>\leq 72</math>hrs*</li> </ul> </li> <li>• Severely immunocompromised regardless of measles immunity (intravenous)</li> <li>• <b>Non-immune pregnant women (intravenous)</b></li> </ul>	$\leq 6$ days

\*MMR preferred over IG for infants age 6-11 months when possible

## 6. PEP AND/OR HOME ISOLATION, CONTINUED

- Exposed people who are not immune to measles and who do not receive post-exposure prophylaxis must stay home **through 21 days after last exposure**
- Because IG prolongs the incubation period, people who receive IG must stay home **through 28 days after last exposure**
- Exposed people who are placed on home quarantine should be advised to **call in advance** if medical care is needed to avoid exposures
- MMR PEP may be administered to exposed persons before laboratory confirmation of the index case

# NYC RESOURCES: STAYING UPDATED

- Sign up for the Health Alert Network (HAN):
  - By visiting the DOHMH's home page, choose the Provider tab, and then click on NYCMED on the left hand side of the page (<https://www1.nyc.gov/site/doh/index.page>)
- Check DOHMH website:
  - By visiting (<https://www1.nyc.gov/site/doh/index.page>)
- Check CDC website:
  - By visiting (<https://www.cdc.gov>)



# NEW YORK CITY HEALTH DEPARTMENT RESPONSE

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# NYC HEALTH DEPARTMENT RESPONSE

## Public Health Emergency Declared April 9, 2019 by order of the Health Commissioner

- Every adult and child who lives, works or resides in one of 4 ZIP codes and has not received the measles-mumps-rubella (MMR) vaccine must be vaccinated
  - ZIP codes: 11205, 11206, 11211, 11249 (Williamsburg, Brooklyn)
- Updated Immunization Recommendations
- School and Daycare Outreach
- Provider Outreach
- Community Outreach
- Enforcement through audits and summons

<https://www1.nyc.gov/assets/doh/downloads/pdf/press/2019/emergency-orders-measles>

# THANK YOU

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# QUESTIONS?

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# BACKUP / ADDITIONAL SLIDES

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# NEW YORK CITY HEALTH DEPARTMENT RESPONSE

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# PUBLIC HEALTH EMERGENCY DECLARED

## APRIL 9, 2019

### By order of the Health Commissioner:

- Every adult and child who lives, works or resides in one of 4 ZIP codes and has not received the measles-mumps-rubella (MMR) vaccine must be vaccinated
  - ZIP codes: 11205, 11206, 11211, 11249 (Williamsburg, Brooklyn)
  - Exemption: demonstrated immune from measles or should be medically exempt
  - Fine for non-compliance: \$1,000

Update: Individual notices of violation have been issued

<https://www1.nyc.gov/assets/doh/downloads/pdf/press/2019/emergency-orders-measles>

# UPDATED IMMUNIZATION RECOMMENDATIONS

- For affected communities:
  - Infants ages 6-11 months: early, extra MMR
  - Children aged 1-4 years: early 2<sup>nd</sup> MMR ( $\geq 28$  days after the most recent dose of MMR, varicella, or live intranasal influenza vaccine)
  - Adults:
    - If no documented vaccination: administer 2 doses of MMR or check immunity
    - If 1 documented dose of measles-containing vaccine: administer a second dose of MMR
- Vaccine Update\*: 25,510 MMR doses have been administered to Children  $\leq 18$  y/o in Williamsburg and Borough Park since Oct.

\*As of May 24, 2019



# SCHOOL AND DAYCARE OUTREACH

- DOHMH audits to ensure compliance with immunization requirements
- Policy change to require exclusion of unvaccinated students with medical/religious exemptions from schools in impacted zip codes
- Commissioner's Orders to non-compliant facilities

# ADDITIONAL OUTREACH

- Provider outreach
  - Multiple health alerts to clinicians citywide (last: 4/24/19)
  - Dear Colleague letter to CEOs/CMOs (4/29/19)
  - Guidance released: Preventing outbreaks in health care facilities, screening pregnant women for immunity
  - Technical assistance to facilities/providers in affected communities
- Community outreach
  - Letters/calls and educational materials to families, school principals
  - Ads, texts, social media posts
  - Meetings with school administrators, local pediatricians, religious leaders and elected officials

# ENFORCEMENT

- Vaccine Mandate\*:
  - Summonses issued: 95
  - Fines assessed: 0

\*since COH Order of 4/9/2019

- School Exclusion Mandate‡:
  - Program summonses issued: 91
  - School closures: 7 (all 7 have been authorized to re-open)

‡ Audit Operations since 3/17/2019

\* As of May 6, 2019

# EVIDENCE OF MEASLES IMMUNITY

- Individuals are presumed immune to measles if  $\geq 1$  of the following is present:
  - Written documentation of 2 doses of measles-containing vaccine after 11 months of age
  - A positive measles IgG titer
  - Birth before 1957

# ADDRESSING CONCERNS ABOUT VACCINES

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# ADDRESSING VACCINE DELAYS

- Delays in vaccination of children in NYC contributed to this large measles outbreak
- Provider recommendations matter
  - Research: strong provider recommendations for vaccination are the most important factor in convincing parents to vaccinate
  - Tell parents, “Today your child will be receiving MMR vaccine”
    - Do not phrase as a question
    - Similar to prescribing antibiotics, blood testing for lead, etc.
  - Be prepared to address parental concerns and questions, if asked
    - Display empathy

# ADDRESSING VACCINE DELAYS: DOES MMR VACCINE CAUSE AUTISM?

- **No.**
- **Controversy:** 1998: Andrew Wakefield published a report in *The Lancet* of 8 children who developed autism after MMR
  - The Lancet retracted the paper
  - Wakefield found guilty of fraud and falsifying data, barred from practicing medicine
- **Subsequent research:** confirmed vaccines do not cause autism
  - Compared hundreds of thousands of children who received MMR vaccine to hundreds of thousands who did not
  - Risk of autism same in both groups
- **Conclusion:** MMR vaccine does not cause autism

# ADDRESSING VACCINE DELAYS:

THESE INFECTIONS AREN'T REALLY THAT SERIOUS – NO ONE GETS SICK FROM THEM ANYMORE

- Before measles vaccine, >500,000 people got measles and 500 died from it in the U.S. each year.
- Since vaccines were introduced in U.S., 20 million cases of vaccine-preventable diseases and 42,000 deaths were prevented.
- Some vaccine-preventable diseases are still fairly common and cause hospitalizations and deaths in previously healthy children every year and disease like measles can cause outbreaks when unvaccinated people travel to countries where measles is common.



# ADDRESSING VACCINE DELAYS:

## WOULDN'T IT BE BETTER FOR CHILDREN TO GET SOME OF THESE DISEASES NATURALLY?

- For each virus or bacteria, your body needs a certain level of immunity to avoid getting sick. Once this protective level is reached, adding more protection doesn't make much difference.
- Vaccines work by introducing just enough viral or bacterial antigens to cause protective immunity, but not enough to make you very sick.
- Although getting the disease may create a better immune response, not much is gained in terms of protection compared with vaccination, and the price paid for natural infection can include serious complications and sometimes even death.

# ADDRESSING VACCINE DELAYS: BUT MY CHILD IS SICK TODAY...

- Mild illness (even with fever) is NOT a contraindication to vaccination
- Being on antibiotics is NOT a contraindication to vaccination
- Safety and efficacy of vaccinating people with mild illness is documented
- Do not miss an opportunity to vaccinate

# THESE GROUPS CAN BE VACCINATED

Those who:

- Have had a mild/moderate local reaction or fever after a previous vaccine
- Have a household member who is pregnant or immunosuppressed
- Have allergies to products not in the vaccine
- Have had a premature birth
- Are breastfeeding
- Need multiple vaccines
- Have a family history including developmental or behavioral issues
- Have an allergy to eggs

**These are not contraindications nor  
valid medical exemptions**

# ADDRESSING VACCINE DELAYS

- There are no contraindications to simultaneous administration of any vaccines.
- Increasing on-time vaccination is critical to ending this measles outbreak!

# NYC RESOURCES: CITYWIDE IMMUNIZATION REGISTRY (CIR)

- Electronic repository of immunization records for all NYC residents
- How providers can use the CIR:
  - Look up individual patient records
    - Find vaccination history
    - Check if vaccines are due
    - Generate official immunization record for patients or medical chart
  - Report immunizations given
  - Print lists, letters, and labels to remind patients of immunizations due
- For more information, visit: [www.nyc.gov/health/cir](http://www.nyc.gov/health/cir)

# MEASLES DURING PREGNANCY

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# MEASLES IN PREGNANCY

- Pregnant women have increased morbidity and mortality associated with measles based on several case series
  - Complications: pneumonia, transaminitis, hospitalizations, deaths
- Adverse pregnancy outcomes include
  - Preterm labor, low birth weight, fetal loss, stillbirth
  - Congenital defects do not appear to be increased
  - Transmission of measles to fetus (congenital measles) reported and appears to increase risk of mortality and subacute sclerosing panencephalitis

## MEASLES DURING PREGNANCY: MATERNAL, FETAL, AND NEONATAL OUTCOMES

- Retrospective study of 55 pregnant women with measles during 2009-2011 measles outbreak in Namibia
  - Comparison group: 172 pregnant women without measles followed at same health care facilities
  - Age-adjusted relative risk for complications calculated
  - Increased risk of the following found in women with measles:

Outcome	Adjusted risk ratio	95% confidence interval
Low birth weight	3.5	1.5-8.2
Spontaneous abortion	5.9	1.8-19.7
Intrauterine fetal death	9.0	1.2-65.5
Maternal death	9.6	1.3-70.0

- Complication rates are likely to be lower in settings with access to immunoglobulin and additional medical resources



# MEASLES IN PREGNANCY: UPDATE FOR CURRENT OUTBREAK

- Though screening for measles immunity in pregnancy is not routine, it is recommended for pregnant persons who live, work, or regularly spend time in communities with ongoing measles transmission during the current outbreak
  - For screening, request measles IgG from commercial laboratory
- Providers should ask about and document vaccine history as routine part of preventive care
- If pregnant woman is not immune, MMR vaccine should be given post-partum (ideally before discharge)
- If a pregnant, non-immune woman is exposed to measles, should receive immune globulin as post-exposure prophylaxis within 6 days of exposure

# ADDRESSING VACCINE DELAYS: DOES THIMEROSAL CAUSE AUTISM?

- **No.**
- **Background:** Thimerosal is a mercury-containing preservative used in some vaccines to prevent contamination.
- In 1999, thimerosal removed from almost all vaccines, except for a few types of influenza vaccines; this confused people.
- **Research:** Several studies to determine if thimerosal causes autism
  - Compared hundreds of thousands of children who received vaccines with thimerosal with hundreds of thousands who did not
  - Risk of autism same in both groups
- **Conclusion:** Thimerosal in vaccines does not cause autism

# ADDRESSING VACCINE DELAYS: IS ALUMINUM IN VACCINES UNSAFE?

- **Aluminum:** An adjuvant that improves vaccine potency
  - Most common metal in our earth's crust
  - Naturally present in water, soil, air
  - Present in fruits, vegetables, nuts, and flour
- **Compare:** Aluminum exposures during infancy (by age 6 months)
  - 4 to 6 mg from vaccines
  - 10 mg if on breast milk
  - 40 mg if on cow's milk formula
  - 120 mg if on soy

# ADDRESSING VACCINE DELAYS: CAN SO MANY VACCINES IN EARLY LIFE HARM CHILDREN?

- **No.**
- **Safety testing:** Before vaccines are added to vaccine schedules, they are tested alone or with existing vaccines to ensure safety and effectiveness
- **Number of vaccines over time:** While the number of vaccines has grown, children are exposed to fewer immunological components
  - A century ago, children got just one small pox vaccine with ~200 immunological components
  - Today, children typically receive 14 vaccines that together contain ~150 immunological components

# ADDRESSING VACCINE DELAYS: CAN SO MANY VACCINES IN EARLY LIFE HARM CHILDREN?

- The immunological challenge from vaccines is tiny compared to what babies encounter every day.
- At birth, babies are immediately colonized by trillions of bacteria that live in their nose, throat, skin and intestines.
- Food, water, and dust we inhale contain bacteria, so immunological challenges from the environment are unending.
- Each bacterium has 2,000 to 6,000 immunological components. Babies often make an immune response to these bacteria to prevent them from entering their blood and causing harm.
- A scraped knee is probably a greater immunological challenge than all of the childhood vaccines combined. The challenge that vaccines present is tiny compared to what is in the environment.

# ADDRESSING VACCINE DELAYS: CAN SO MANY VACCINES IN EARLY LIFE HARM CHILDREN?

- Children have an enormous ability to respond to immunological challenges.
- People make 1 billion to 100 billion different types of antibodies.
- Based on the number of immunological components in vaccines, babies are able to respond to 10,000 different vaccines at once.
- This sounds like a huge number but it's actually small compared to the number of challenges babies face from bacteria in their environment.

# ADDRESSING VACCINE DELAYS:

## WHAT IS HARM OF DELAYING, SEPARATING, OR SPACING OUT VACCINES?

- Delaying vaccines increases the amount of time your child is at risk for severe and sometimes deadly infections.

# MEASLES VACCINATION: UPDATE FOR CURRENT OUTBREAK

- Administer an early (extra) dose of MMR to infants aged 6 to 11 months who reside in or regularly spend time in outbreak ZIP codes
  - Consider an early, extra dose of MMR for infants ages 6 to 11 months who are members of the Orthodox Jewish community living anywhere in NYC
- By order of the Health Commissioner, anyone 6 months or older who lives, works or resides in outbreak ZIPs must receive at least 1 dose of MMR or have proof of measles immunity
- Ask your patients about their travel plans