

MEASLES OUTBREAK

NEW YORK CITY, 2018-19

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Outline

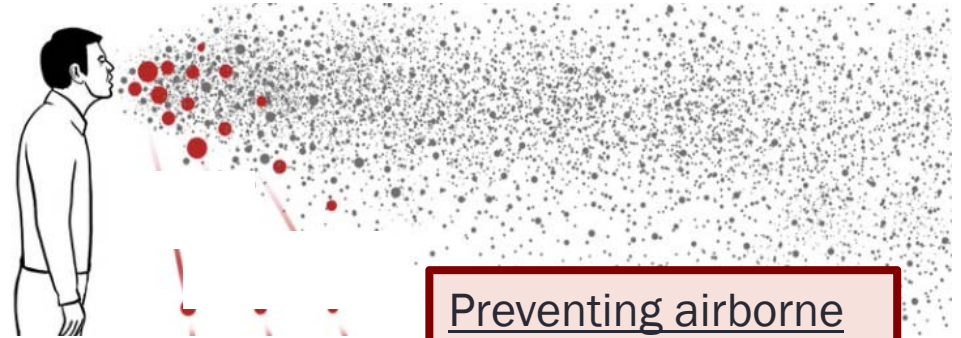
- Measles basics
- Measles trends in the United States
- New York City measles outbreak, 2018-2019

Measles – Clinical Manifestations

- Symptoms
 - High fever
 - Cough
 - Conjunctivitis
 - Coryza
 - Generalized rash
- Complications
 - Diarrhea, otitis media, pneumonia, miscarriage, preterm labor, encephalitis, and death



Transmission



- Highly contagious
 - 90% attack rate in close contacts
- Droplet and airborne transmission
 - The virus can stay in the air for up to 2 hours
- Incubation period (time from exposure to illness)
 - 7 to 21 days after exposure
- Infectious period
 - 4 days before through 4 days after rash onset, 9 days total

Preventing airborne transmission:

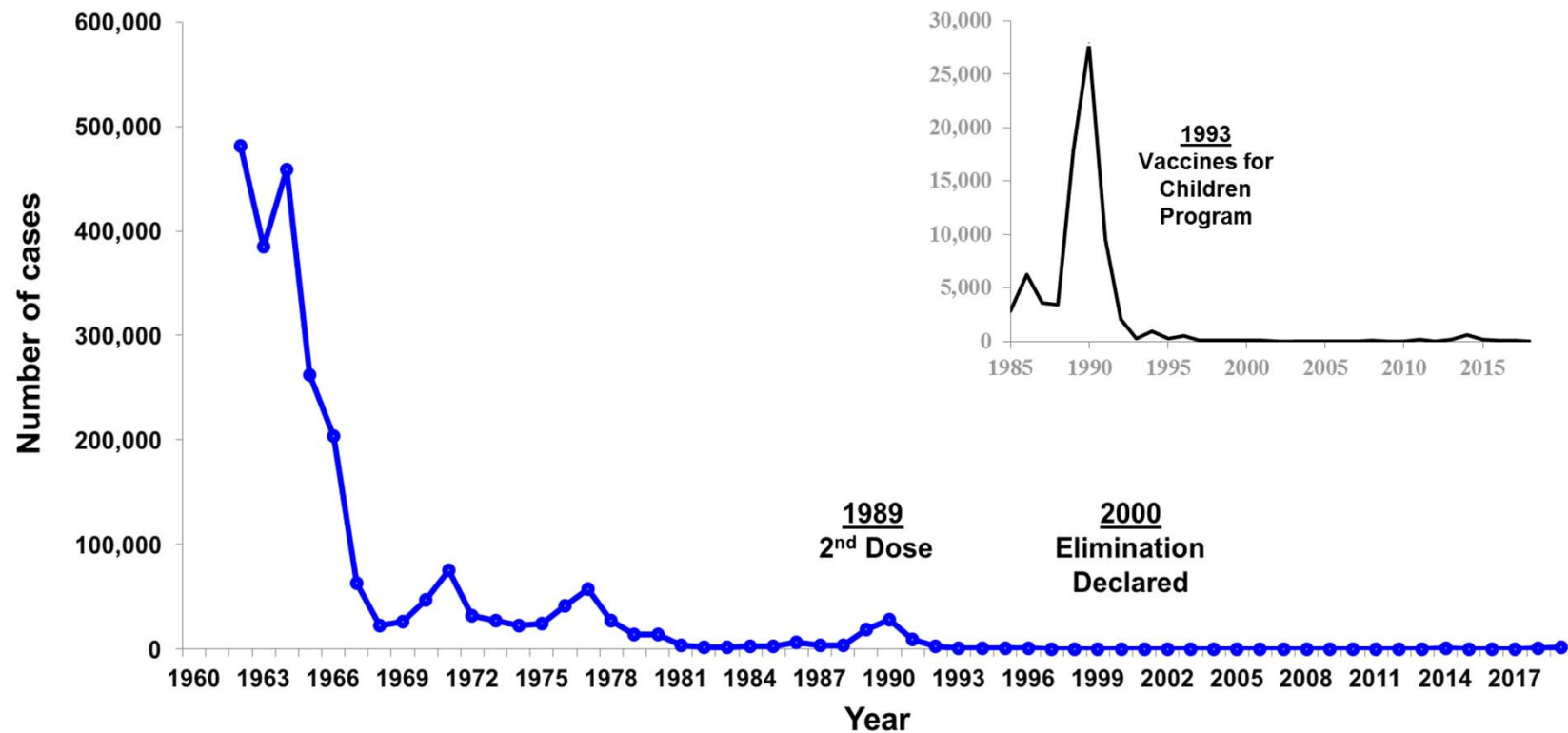
Use of a negative pressure/airborne isolation room

Treatment

- No specific antiviral therapy
- Medical care is supportive
- Vitamin A may be used for severe measles cases among children (e.g. hospitalized)*

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

Measles Cases, United States, 1962-2019*



- *2018 and 2019 data are provisional (Source: MMWR)

Measles Vaccine

- Administered with mumps and rubella as MMR or with mumps, rubella and varicella as MMRV
- Live-attenuated vaccine
- 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 Vaccine:

Routine Pediatric Recommendations



- Routine schedule
 - First dose age 12-15 months
 - Second dose age 4-6 years
- Daycare and school requirements in NY
 - One dose required for nursery (age ≥ 12 months) through pre-k
 - Two doses required for grades K through 12
 - Two doses required for college

Measles Vaccine:

Routine Adult Recommendations



- One dose of MMR for adults with no or unknown evidence of immunity to measles
- Two doses of MMR for high risk groups
 - Healthcare personnel
 - International travelers
 - People exposed in an outbreak setting
 - People previously vaccinated with killed measles vaccine or unknown type of measles vaccine from 1963-1967
- Serologic testing (IgG) is an alternative

International Travel Recommendations

- Children aged 6 to 11 months should receive an early, extra dose of MMR prior to international travel
 - Does not count towards the routine 2-dose schedule*
- Children ages 1 to 4 years
 - Early 2nd MMR*
- Persons aged ≥ 4 years
 - Two doses of MMR
- Give MMR ideally ≥ 2 weeks prior to travel

*Maintain 28 days between doses of live vaccines: MMR, varicella, intranasal flu

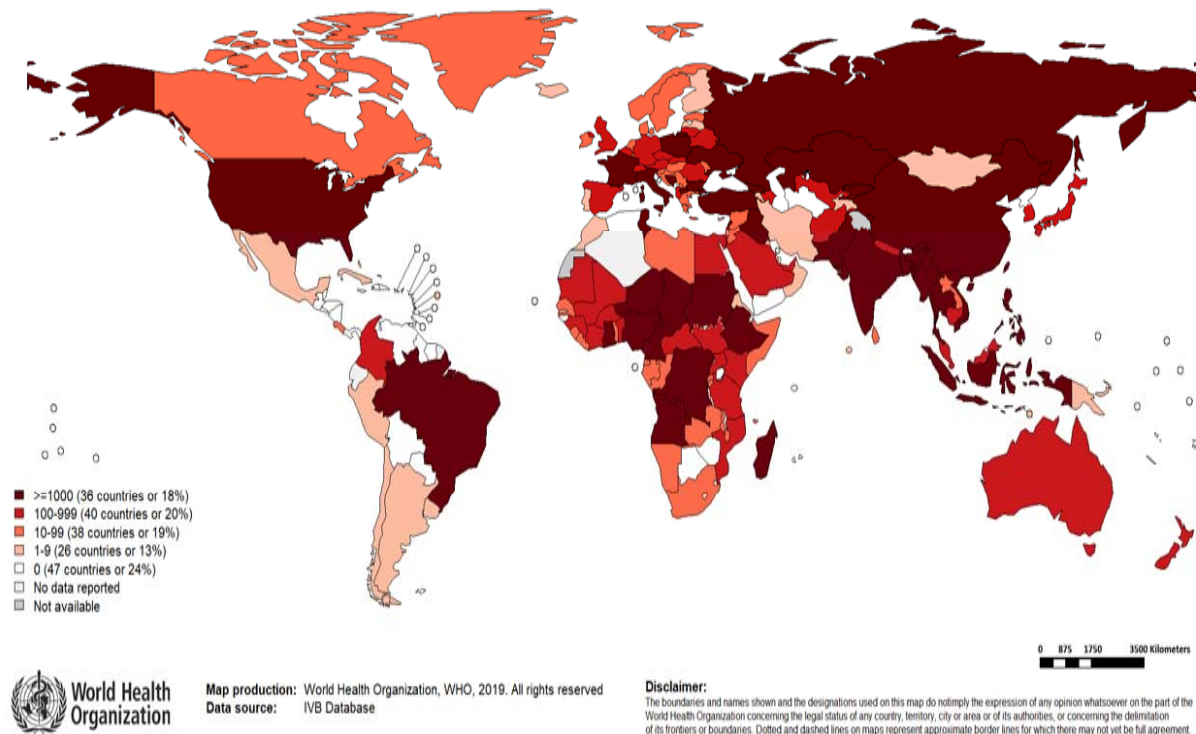
Measles Vaccine: Contraindications



- Very few contraindications or valid medical exemptions:
 - Infants < 6 months
 - Pregnancy
 - 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
- There are no contraindications to simultaneous administration of any vaccines

Measles Globally, 2019*

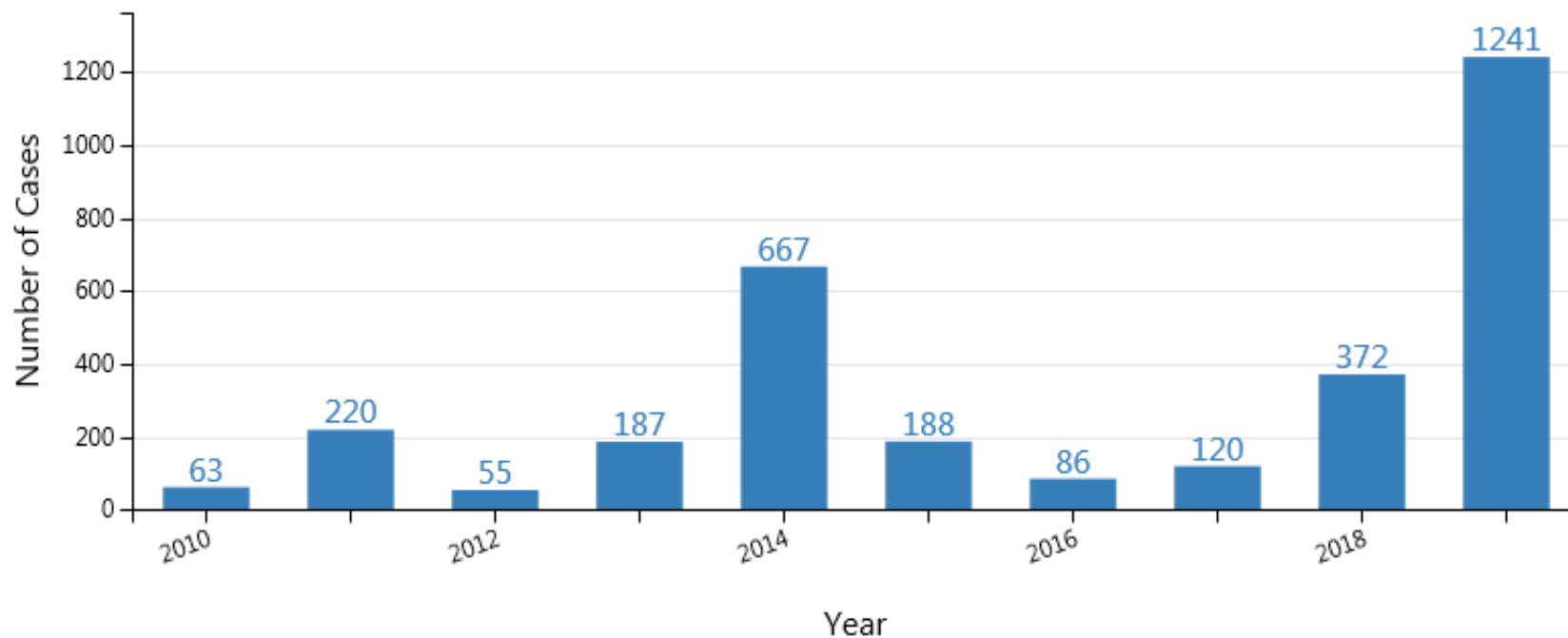
Top 10*	
Country	Cases
Madagascar	86376
India**	44020
Ukraine	41933
Philippines	32414
Nigeria	23342
Kazakhstan	7925
DR Congo	6443
Myanmar	4206
Sudan	3296
Angola	2840



*Based on data received Sept 2019

www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles_monthlydata/en/

Number of Measles Cases Reported by Year, United States



Source: CDC website www.cdc.gov/measles/cases-outbreaks.html
accessed 9/10/2019, as of 9/5/2019

Measles in the United States: 2019

- Largest number of cases reported since 1992
- 75% of cases linked to outbreaks in NY
- Majority of cases were unvaccinated
- Measles reported from 31 states
- 20 outbreaks
- Linked to travelers from Israel, Ukraine and Philippines

Source: CDC, www.cdc.gov/measles/cases-outbreaks.html;
accessed 9/10/2019, data as of 9/5/2019

MEASLES OUTBREAK

New York City, 2018-2019



BACKGROUND: 2018-2019 MEASLES OUTBREAK

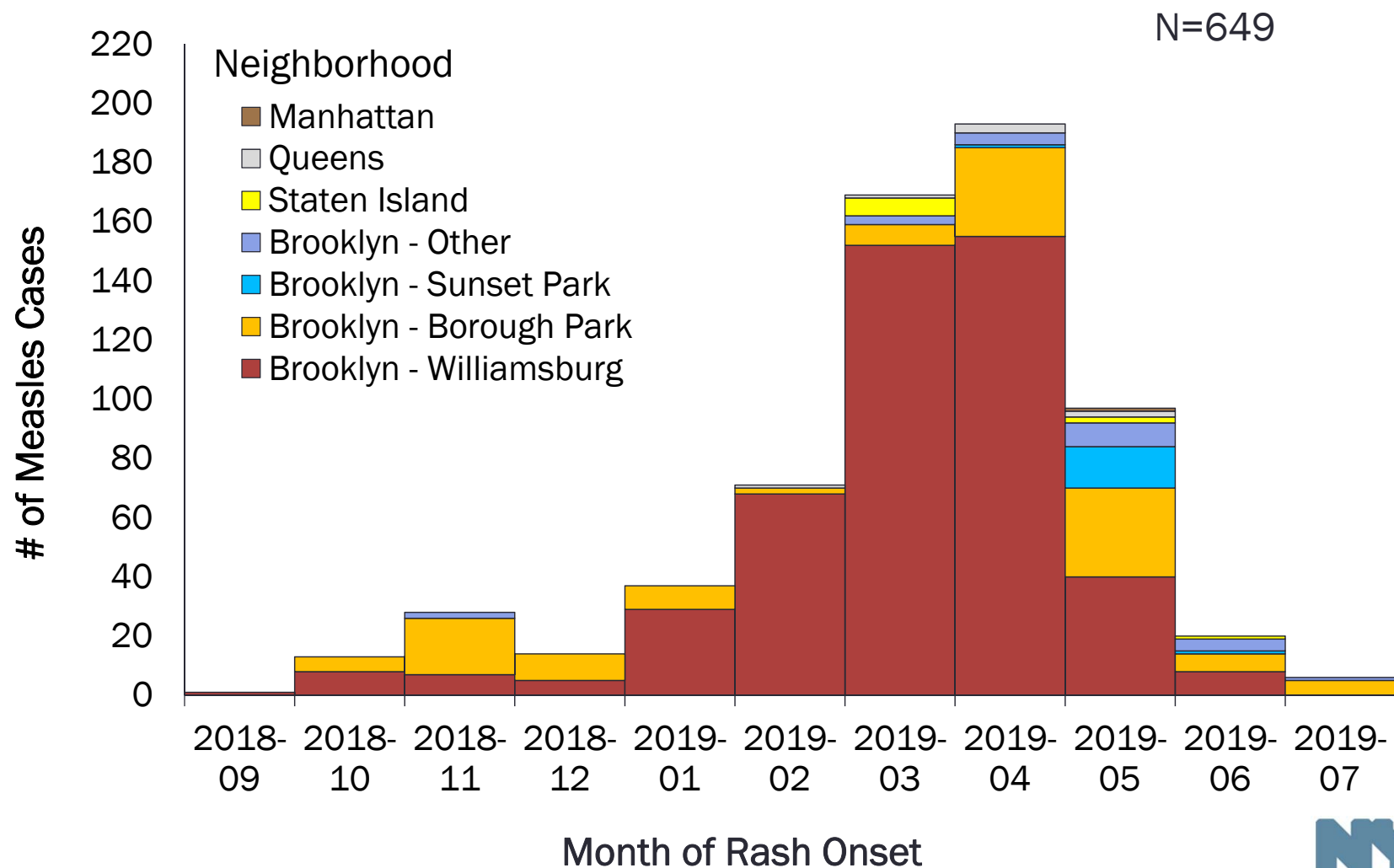
- Began Oct 2018 with an unvaccinated child from Brooklyn who acquired measles in Israel, where a large outbreak was occurring
- 649 cases (onsets Sept 30, 2018 to July 15, 2019)
- Declared over Sept 3, 2019
- Largest U.S. outbreak since 1992*
- Multiple importations from Israel, UK, Ukraine, NY (outside of NYC) and NJ

*CDC. Measles—United States, 1992. MMWR 1993

FOCUS IN ORTHODOX JEWISH NEIGHBORHOODS WILLIAMSBURG AND BOROUGH PARK, BROOKLYN



MEASLES CASES BY DATE OF RASH & NEIGHBORHOOD



*As of Sept 6, 2019

Demographics of Cases

- Gender
 - Overall: 60% male, 40% female
- Orthodox Jewish religion*
 - Overall: 93% Orthodox Jewish
- Hispanic*
 - Overall: 6% Latino

*Assumed based on name, language spoken; not necessarily by self-report

As of Sept 6, 2019

Age Distribution of Cases

Age Category	# Cases
<1 year	102
1 to 4 years	277
5 to 18 years	148
≥19 years	122

Mean age = 3 years, range 1 month to 70 years
*As of Sept 6, 2019

Vaccination Status of Cases

- # Unvaccinated: 477 (86%)*
 - Age <12 months: 100
 - Age \geq 12 months: 377
 - # Vaccinated: 78 (14%)*
 - 1 prior MMR: 47
 - 2 prior MMR: 31
 - # Unknown Vaccination History: 94 (primarily adults)
- Preventable Cases

*% among cases with known vaccination status

*As of Sept 6, 2019

Complications

- Hospitalizations: 49 (8%)
 - ICU admissions: 19
- Pneumonia: 34 (5%)
- Otitis media: 62 (10%)
- Diarrhea: 92 (14%)
- No encephalitis or deaths occurred

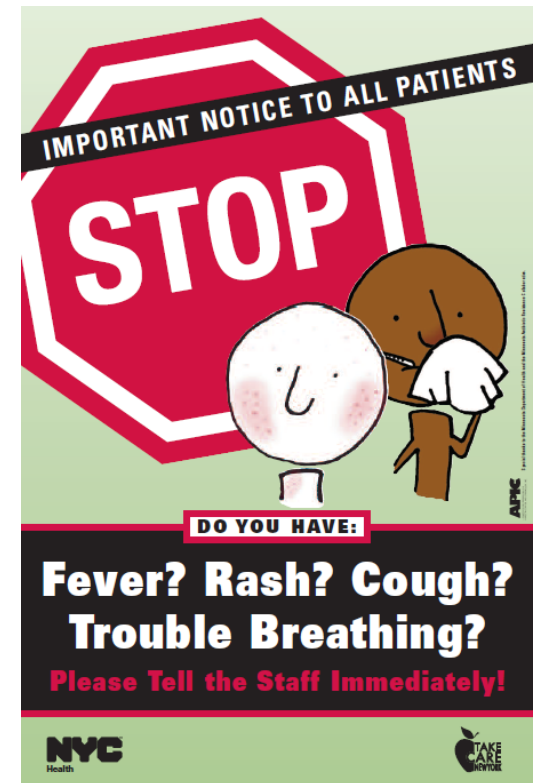
*As of Sept 6, 2019

Sources of Infection

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

Exposures

- >20,000 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
- 21 cases acquired in healthcare facilities



*As of July 29, 2019

NEW YORK CITY DEPARTMENT OF HEALTH RESPONSE

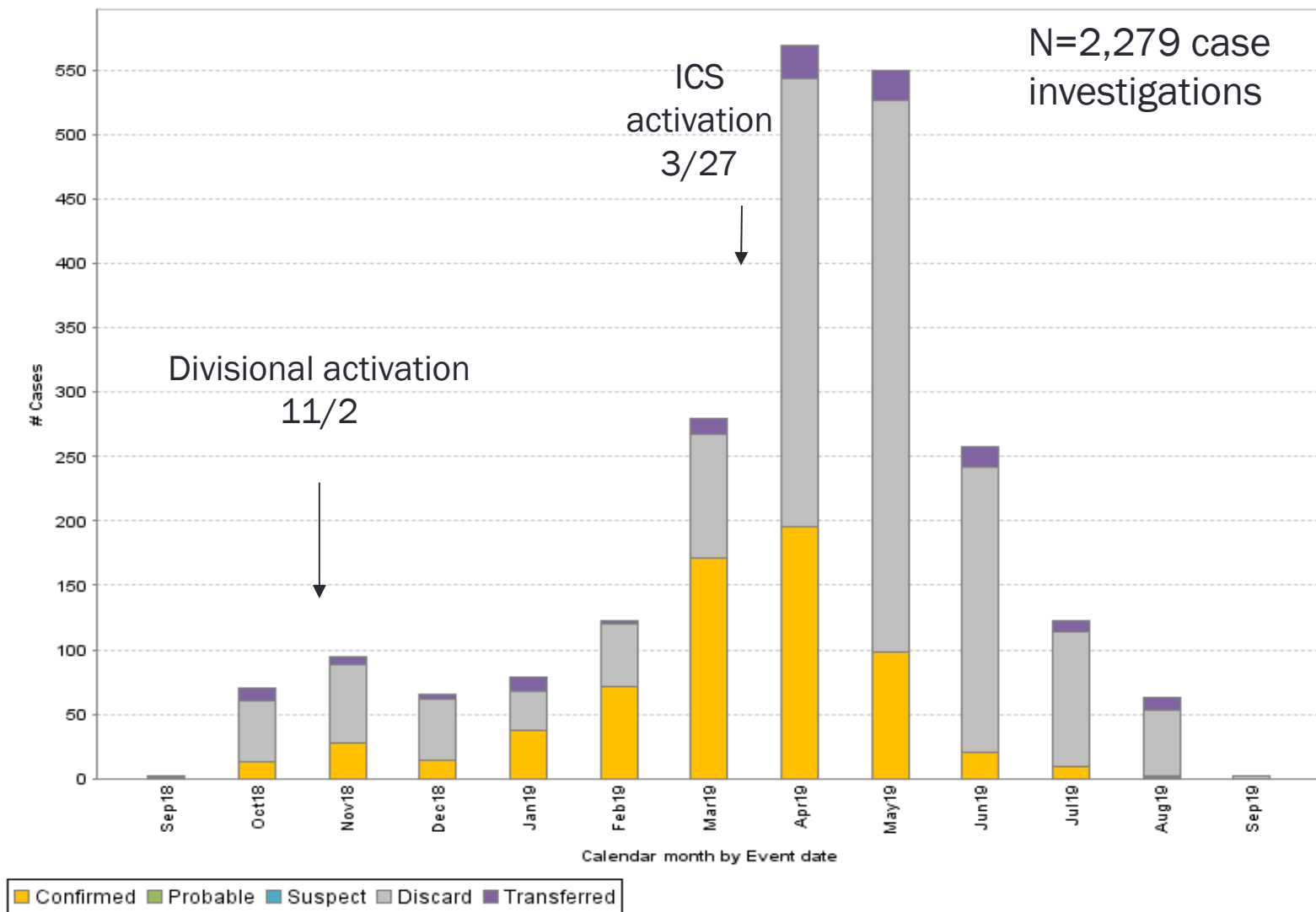


CASE & CONTACT INVESTIGATIONS

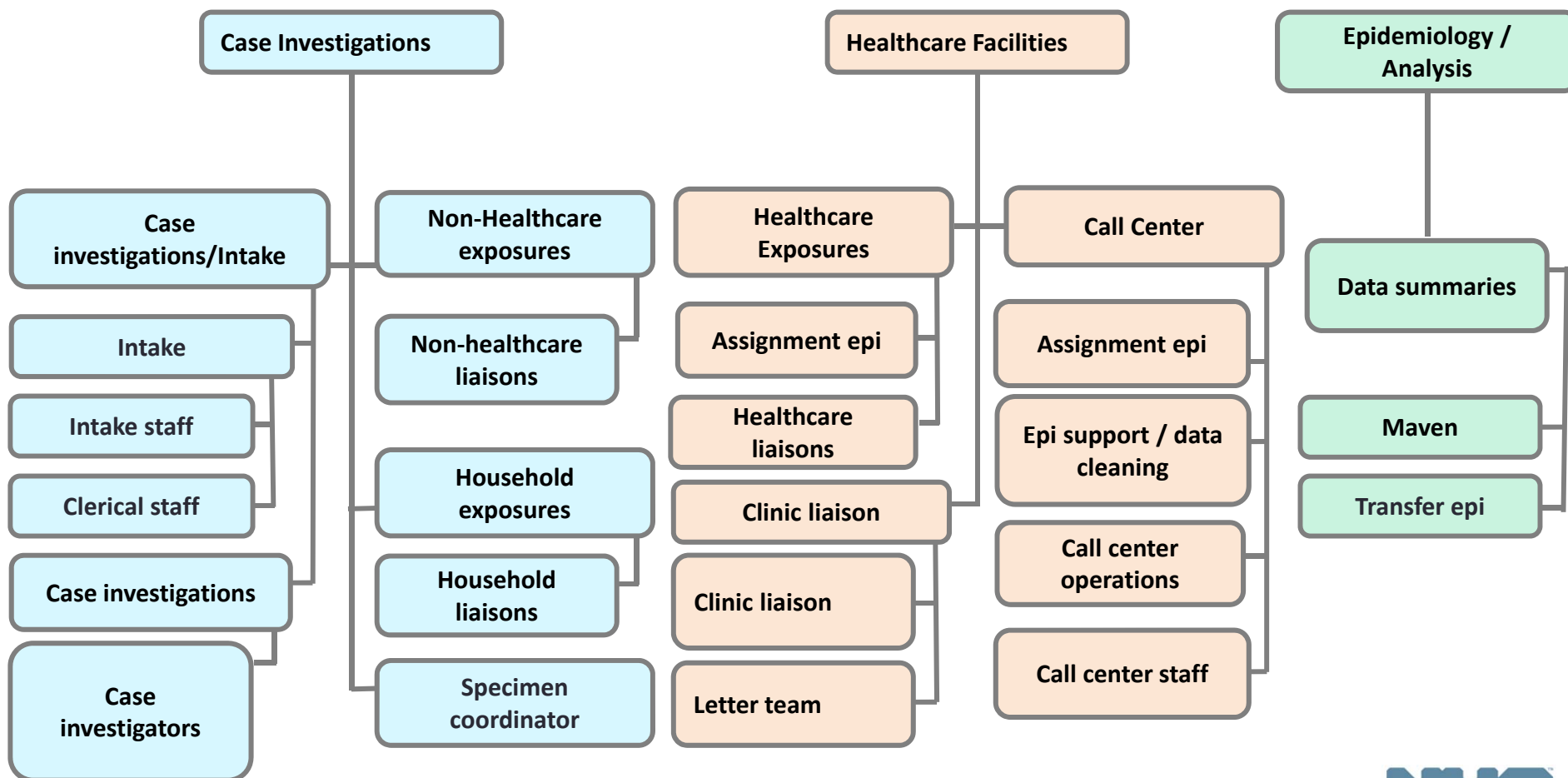
- >559 (7%) DOH staff have worked on the outbreak*
- Set up dedicated call center
- Investigate all reported cases
- Station DOH staff at a high volume facility at the epicenter of the outbreak to assist with potential exposures
- Perform contact identification and notification
- DOH laboratory has performed >3,200 diagnostic tests
- Cost to DOHMH >\$8.4 million USD

*As of Sept 9, 2019

Case Investigations by Status and Week



SURVEILLANCE ORG CHART



Revised MMR Recommendations During Outbreak

(No longer apply)

- For persons residing or regularly spending time in areas with ongoing measles transmission*
- Same as international travel recommendations
- Children aged 6 to 11 months: early, extra dose of MMR**
- Children ages 1 to 4 years: early 2nd MMR**
- Children and adults aged ≥ 4 years: 2 MMRs (or proof of immunity)

*Consider early, extra dose for Orthodox Jewish infants ages 6-11 months living anywhere in NYC

**Maintain 28 days between doses of live vaccines: MMR, varicella, intranasal flu

Provider Outreach

- Multiple health alerts and presentations to clinicians
- Reminders to recall unvaccinated patients
- Clinical and infection control technical assistance
- Distribute posters and pamphlets in English and Yiddish to medical facilities
- Ensure providers have enough MMR vaccine on hand
- Guidance for post-exposure prophylaxis and home quarantine for exposed persons

Post-Exposure Prophylaxis & Home Quarantine: DOHMH Guidance for Providers

Post-exposure prophylaxis (PEP) for measles exposures who ARE pregnant or immunocompromised

BOI Script Category	Age range	Measles immune status ^a	PEP type depending on time after initial exposure		
			≤3 days (≤72 hours)	4-6 days	>6 days
Severely Immuno-compromised ^b	<12 months	Will need IG regardless of measles immune status	<ul style="list-style-type: none">Give intramuscular immunoglobulin (IMIG)^{cd}Home quarantine^e for 28 days after last exposure		<ul style="list-style-type: none">PEP not indicated (too late)^fHome quarantine^e for 21 days after last exposure
	≥12 months		<ul style="list-style-type: none">Give intravenous immunoglobulin (IVIG)^{cd}Home quarantine^e for 28 days after last exposure		
Pregnant	n/a	Immune (IgG positive or 2 MMR vaccine doses)	<ul style="list-style-type: none">PEP not indicated^f		
		Non-immune (IgG negative)	<ul style="list-style-type: none">Give intravenous immunoglobulin (IVIG)^{cd}Home quarantine^e for 28 days after last exposure		<ul style="list-style-type: none">PEP not indicated (too late)^fHome quarantine^e for 21 days after last exposure
		Unknown immunity	<ul style="list-style-type: none">Draw titers (measles IgG) STAT to determine immunity; proceed as above based on titer results		<ul style="list-style-type: none">PEP not indicated (too late)^fHome quarantine^e for 21 days after last exposure

Post-Exposure Prophylaxis & Home Quarantine: DOHMH Guidance for Providers (continued)

Post-exposure prophylaxis (PEP) for measles exposures who are NOT pregnant or immunocompromised

Age range	Measles immune status ^a	PEP type depending on time after initial exposure		
		≤3 days (≤72 hours)	4-6 days	>6 days
All ages	Immune (IgG positive, 2 MMR vaccine doses, or born before 1957 ^b)	<ul style="list-style-type: none"> PEP not indicated. Exposed person has documented immunity 		
<6 months	Non-immune (due to age)	<ul style="list-style-type: none"> Give intramuscular immunoglobulin (IMIG)^{cd} Home quarantine^e for 28 days after last exposure 	<ul style="list-style-type: none"> PEP not indicated (too late)^f Home quarantine^e for 21 days after last exposure 	
6-11 months	Non-immune (due to age)	<ul style="list-style-type: none"> Give MMR vaccine (MMR vaccine preferred over IG) No quarantine needed 	<ul style="list-style-type: none"> Give intramuscular immunoglobulin (IMIG)^{cd} Home quarantine^e for 28 days after last exposure 	<ul style="list-style-type: none"> PEP not indicated (too late)^f Home quarantine^e for 21 days after last exposure
≥12 months	Non-immune (0 doses MMR vaccine or IgG negative)	<ul style="list-style-type: none"> Give MMR vaccine. No quarantine needed^b 	<ul style="list-style-type: none"> PEP not indicated (too late)^f Home quarantine^e for 21 days after last exposure, then give MMR vaccine to protect from future exposures 	
≥12 months	1 dose of MMR vaccine ^b	<ul style="list-style-type: none"> Give 2nd MMR vaccine dose if ≥28 days from last dose of live vaccine No quarantine needed 	<u>Household member of a confirmed/suspected case</u> <ul style="list-style-type: none"> Obtain IgG titers to determine immunity. Home quarantine^e while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)^f 	
			<u>Not a household member of a confirmed/suspected case</u> <ul style="list-style-type: none"> Age 1-3 years: Less likely to get sick because has 1 dose of MMR Age ≥4 years: Less likely to get sick because has 1 dose of MMR, and give 2nd MMR to protect from future exposures 	
Adults	Unknown measles immune status	<ul style="list-style-type: none"> Give MMR vaccine. No quarantine needed^b 	<u>Household member of a confirmed/suspected case</u> <ul style="list-style-type: none"> Obtain IgG titers to determine immunity. Home quarantine^e while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)^f 	
			<u>Not a household member of a confirmed/suspected case</u> Does contact work in setting with children (daycare/school) or healthcare facility ^g <ul style="list-style-type: none"> <u>Yes</u>: Obtain titers to determine immunity. Home quarantine^e while awaiting results; if IgG negative, quarantine for 21 days after last exposure (too late for PEP)^f <u>No</u>: Contact can reach out to their own provider to obtain measles IgG titers^f 	

Script for Notification of Exposed Persons: DOHMH Guidance for Providers

SCRIPT FOR ALL CONTACTS

1. “May I speak with [NAME OF CONTACT/GUARDIAN]? This is [YOUR NAME] from [AGENCY]. When [NAME OF CONTACT] was at [SITE OF EXPOSURE] on [DATE OF EXPOSURE], there was another person there with measles and [NAME OF CONTACT] was possibly exposed. Measles is a very contagious infection. Measles causes a rash all over the body and high fever. People are at risk for getting sick through 21 days after they were last exposed to measles, and in some cases even up through 28 days after they were last exposed to measles.”

Note: Immune globulin may prolong the incubation period from 21 to 28 days.

Category 1

Immune to Measles (Positive measles IgG titer, 2 MMR, or born before 1957*)

OPTION 1: For all immune contacts regardless of time since exposure

- “[NAME OF CONTACT] is unlikely to get measles and should be protected because [say one of the following]:”
 - If positive measles IgG, say:
 - “[NAME OF CONTACT] had bloodwork that indicates immunity or protection from measles.”
 - If 2 MMR, say:
 - “[NAME OF CONTACT] had 2 doses of measles vaccine.”
 - If born before 1957*, say:

Script for Notification of Exposed Persons: DOHMH Guidance for Providers (continued)

Category 2

Age <6 months AND...

OPTION 1: Within 6 days of the first measles exposure

- “[NAME OF CONTACT] is not immune to measles and may be at risk for getting sick.”
- “[NAME OF CONTACT] needs to get a medicine urgently called immune globulin to decrease the chance of severe illness.”
 - **Providers:** See Table “Post-exposure Prophylaxis (PEP)” for guidance (this is time sensitive/urgent). For assistance with where to get or refer patients for immune globulin, call DOH: 347-396-2402.
 - **DOH Staff:** Tell your supervisor. Say, “I’ll speak with my supervisor and get back to you shortly.”
- “[NAME OF CONTACT] will need to stay home for 28 days after exposure while at risk for getting sick and being contagious. This means that [NAME OF CONTACT] needs to stay home through [DATE OF EXPOSURE + 28 DAYS]. People are contagious several days before the rash begins. If [NAME OF CONTACT] gets sick and needs medical care, call his/her healthcare provider before going to his/her healthcare provider’s office; let your healthcare provider know that [NAME OF CONTACT] may be contagious, so the office can see [NAME OF CONTACT] when other patients will not be exposed (e.g., after-hours).”
- **DOH Staff:** “Who is [NAME OF CONTACT]’s primary healthcare provider (name/phone/address)?”
 - Send them the ‘Provider Letter’ (SEE PAGE 11)
- “Does [NAME OF CONTACT] attend daycare?” If yes: obtain facility name/contact info. **DOH Staff:** Tell your supervisor

OPTION 2: After 6 days of the first measles exposure

- “[NAME OF CONTACT] is not immune to measles and may be at risk for getting sick.”
- “[NAME OF CONTACT] will need to stay home for 21 days after exposure while at risk for getting sick and being contagious. This means that [NAME OF CONTACT] needs to stay home through [DATE OF EXPOSURE + 21 DAYS]. People are contagious several days before the rash begins. If [NAME OF CONTACT] gets sick and needs medical care, call his/her healthcare provider before going to his/her healthcare provider’s office; let

Script for Notification of Exposed Persons: DOHMH Guidance for Providers (continued)

Category 3

Age 6 to 11 months AND...

OPTION 1: Within 3 days of the first measles exposure

- “[NAME OF CONTACT] is not immune to measles and may be at risk for getting sick.”
- “[NAME OF CONTACT] needs to go to [LOCATION] today to get the measles MMR shot, to decrease the chance of getting sick and to decrease the risk of severe illness.”
 - DOH Staff: Refer them to their healthcare provider for MMR unless otherwise specified by your supervisor. Ask for their provider’s name/phone/address.

OPTION 2: Within 4 to 6 days of the first measles exposure

- “[NAME OF CONTACT] is not immune to measles and may be at risk for getting sick.”
- “[NAME OF CONTACT] needs to get a medicine urgently called immune globulin to decrease the chance of severe illness.”
 - Providers: See Table “Post-exposure Prophylaxis (PEP)” for guidance (this is time sensitive/urgent). For assistance with where to get or refer patients for immune globulin, call DOH: 347-396-2402.
 - DOH Staff: Tell your supervisor. Say, “I’ll speak with my supervisor and get back to you shortly.”
- “[NAME OF CONTACT] will need to stay home for 28 days after exposure while at risk for getting sick and being contagious. This means that [NAME OF CONTACT] needs to stay home through [DATE OF EXPOSURE + 28 DAYS]. People are contagious several days before the rash begins. If [NAME OF CONTACT] gets sick and needs medical care, call ahead; let the provider know you may be contagious so the office can see you when other patients will not be exposed (e.g. after-hours).”

OPTION 3: After 6 days of the first measles exposure

- “[NAME OF CONTACT] is not immune to measles and may be at risk for getting sick.”
- “[NAME OF CONTACT] will need to stay home for 21 days after exposure while at risk for getting sick and being contagious. This means that [NAME OF CONTACT] needs to stay home through [DATE OF EXPOSURE + 21 DAYS]. People are contagious several days before the rash begins. If [NAME OF CONTACT] gets sick and needs medical care, call ahead; let the provider know you may be contagious so the office can see you when other patients will not be exposed (e.g. after-hours).”

DOHMH Protocols for Medical Facilities with Exposures

Send _____
Subject Measles HCF Exposure: SUSPECTED Case [XXX] Hospital

To the infection control team at [HOSPITAL]:

A patient is being investigated for possible measles infection. If measles is confirmed, this patient was at your facility while contagious with measles on 9/16/19. If with measles arrived through 2 hours after the patient with measles left or was put into a negative pressure room are considered exposed. Post-exposure prophylaxis is time sensitive. See attached 'PEP' table for indications and timing. Please prioritize the following actions while waiting for laboratory confirmation:

- **First: Immediately identify exposed persons**
 - Identify all persons who were exposed at your facility and document them on the attached 'Exposure List' spreadsheet.
 - Assess immunity to measles for children, pregnant persons, and staff.
 - If you do not have access to immunization records and/or access to the NYC Citywide Immunization Registry (CIR), the DOH can assist with looking up records.
 - If pregnant persons were exposed, call their obstetrician to see if measles IgG titers were ever checked.
 - Identify persons who are immunocompromised
- **Second: Consider administering PEP to exposed persons**
 - Because PEP is time-sensitive and MMR vaccine is recommended as part of the routine immunization schedule, you might consider administering a 1st (or 2nd) dose of MMR to anyone aged 6 months and older who has no contraindication to vaccination and as long as criteria and guidance for the script to use below. It is usually recommended to wait for laboratory confirmation before administering IG as PEP.

IF MEASLES BECOMES LABORATORY CONFIRMED, the additional steps below will need to be taken:

- Use the attached 'Script' to notify exposed persons to ensure that correct and complete information is shared, including home quarantine for persons with exposures.
- **Within 3 days (<72 hours) of initial exposure**
 - Most time sensitive: Give a 1st (or 2nd) dose of MMR to anyone aged 6 months and older who has no contraindication to vaccination and as long as criteria and guidance for the script to use below. It is usually recommended to wait for laboratory confirmation before administering IG as PEP.
- **Within 6 days of initial exposure**
 - Give intramuscular IG to all infants aged <6 months. Give as soon as possible; must be given within 6 days to be considered effective PEP.
 - Give intramuscular IG to all infants aged 6 months to 11 months who did not receive MMR within 72 hours of initial exposure (MMR is preferred).
 - Give intravenous IG* to all severely immunocompromised persons (regardless of immunity to measles) and pregnant persons who are not immunized.
- **Next: Notify all other persons exposed**
 - Notify all others using the attached 'Script', regardless of immunity to measles, because friends/family may have accompanied exposed patients to the visit.
 - If you are unable to reach anyone by telephone, send the attached 'Letter'. This 'Letter' is also available in Yiddish, Spanish, Arabic and Chinese upon request.
- **Last: Submit exposed person list to DOH**
 - Let us know when you are ready to submit the completed 'Exposure List' spreadsheet to us (including contact information, measles immunity, PEP administered).



Survey of Infection Control Practices

- Population: Outpatient practices that reported suspect measles cases from Sept--Dec, 2018 (15 of 17 responded)
- Avoided use of private exam for 2 hours (93%)
- Screening for measles by phone (87%)
- Posted signs about measles symptoms (100%)
- Written protocols for measles (60%)
- Alternative isolation practices
 - Seeing patients outdoors (60%)
 - Using entrances/exits of different buildings (40%)
 - Evaluating patients after hours (27%)
 - Home visits (27%)

Source: Alroy et al. Interventions to reduce measles virus exposures in outpatient health care facilities—NYC, 2018. MMWR. 2019. 68(36)791-2.

Community Engagement

- Meetings with local religious, community and elected officials
- Collaborated with key community partners
- Letters sent to parents through schools
- Letters sent to households with unvaccinated children
- Robocalls (multiple times, ~75,000 contacts)
- Immunization hotline

Media and Community Education

- Focused on print and digital media serving the community
 - English and Yiddish
 - Measles symptoms and travel warning, MMR vaccination
 - Co-branded
 - WhatsApp
- Distribution of materials, Tzim Gezint booklet and Slice of PIE, through providers and local community-based organizations
 - Mailing to 29,000 households

School & Child Care Outreach

- Policy change on December 7, 2018 required exclusion of unvaccinated students with medical/religious exemptions in impacted zip codes (*no longer applies*)
- DOHMH audits to ensure compliance with immunization requirements (n=101 facilities)
- Commissioner's Orders and Notices of Violation to non-compliant facilities
- 12 schools closed temporarily for failing to provide access to medical and attendance records or for having students without required documentation of MMR in attendance*

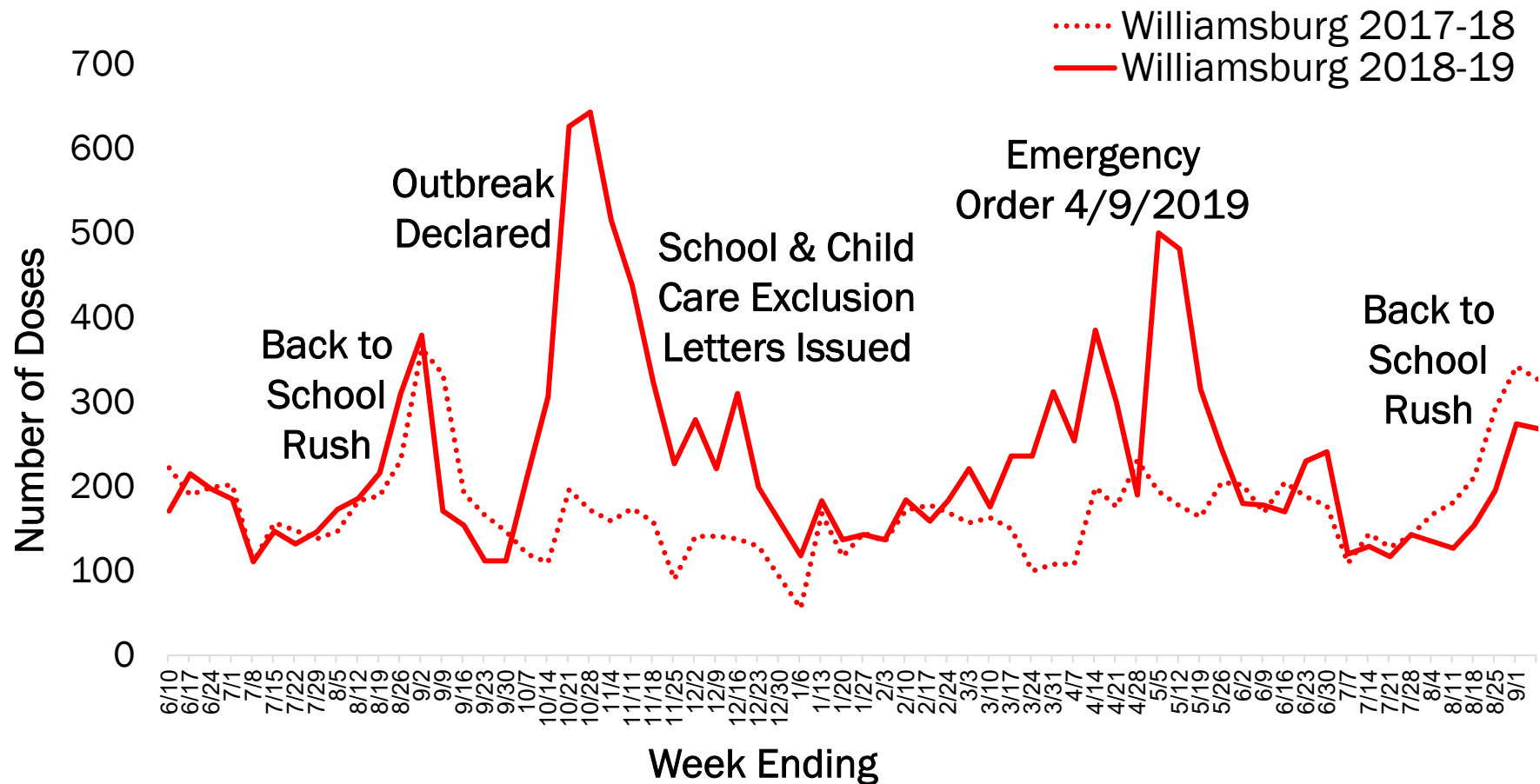
April 9: Public Health Emergency Declared Commissioner's Order (*no longer applies*)

- Every adult and child who lives, works or resides in Williamsburg (4 zips*) and has not received the MMR vaccine must be vaccinated
- Exemption: People who demonstrate they are immune from measles or should be medically exempt
- 232 individual summonses issued since 4/9/19
 - Many cancelled based on vaccination or proof of immunity
- \$1,000 fine if summons is upheld

*Zips: 11205, 11206, 11211, 11249

MMR Vaccine Uptake

Children Ages 12-59 Months, Williamsburg, Brooklyn



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

Increases in Vaccination in Children*

- NYC, Citywide
 - 188,635 MMR doses administered
 - Represents a 14% increase (23,320 additional doses) vs. the same period last year
- Williamsburg, Brooklyn
 - 11,964 MMR doses administered
 - Represents a 54% increase (4,216 additional doses) vs. the same period last year
 - Proportion of children with ≥ 1 dose of MMR increased from 80% to 91%**

*Oct 1, 2018 through Sept 1, 2019; ages 12 to 59 months

**2019 population estimates

Why Did This Outbreak Occur?

- Multiple importations
- Vaccine delays and hesitancy
- Spreading of misinformation and anti-vaccination propaganda
- Multiple exposures and chains of transmission
- Large households, densely populated congregate gatherings
- Situations where DOH was unable to implement control measures
 - Parents not seeking medical care for infected children
 - Parents not forthcoming with exposure information
 - Retrospective cases identified through serology

Why Hasn't the Outbreak Spread?

- Largely limited to insular communities in Williamsburg and Borough Park, Brooklyn
- High overall vaccination rates in NYC
- Public/charter schools: 98.7% compliance with school immunization requirements; 0.02% medical and 0.27% religious exemption rates*
- Private schools: compliance and complete vaccination with school immunization requirements
 - All private schools: 98%, 94% (all antigens)
 - Orthodox Jewish schools: 97%, 92% (all antigens)
 - 97% completely vaccinated with MMR

*As of 5/17/19; **Per NYS self-reported survey 2018-2019

Challenges

- Need to rapidly ramp-up audits of schools and child cares
- Need to identify unvaccinated persons for individual summons in quick time-frame
- Measles “parties” to intentionally expose children
- Possible mistrust of DOHMH given school exclusions and mandatory vaccinations
- Religious exemptions to school-required immunizations had been allowed in NY and were steadily increasing in private schools
 - 1,420 (0.5%) in 2012-2013 to 3,914 (1.5%) in 2018-19
 - Orthodox Jewish schools: 678 (0.7%, range 0-14%) in 2012-13 to 2,869 (2.7%, range 0%-28.5%) in 2018-19

Lessons Learned

- Identify population and communities at risk
 - Sources: school immunization compliance, NYC Citywide Immunization Registry
 - Geography, religion, or ethnicity
- Cultural sensitivity, translations
- Establish relationships before an outbreak
 - Providers
 - DOH Liaison
 - Community Based Organizations
 - Community leaders
 - Community engagement

אכטונג

עס איז דא א מיזעלס אויסברוך אין ארץ ישראל: ווערט וואקסינירט!

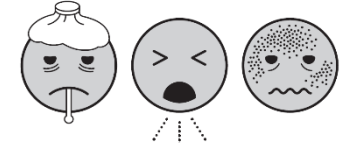
אויב איר:

פלאנירט צו רייזן קיין ארץ ישראל, באשיצט זיך אנטקעגן מיזעלס און ווערט וואקסינירט.



אויב איר האט גערייזט און איר האט:

פיבער, הוסט, רויטע אויגן, רינענדיגע נאז און קערפער אויסשלאג,



ביטע פארבינדט זיך זאפארט מיט אייער דאקטער!

NYC
Health

The New York Times

Measles Outbreak: N.Y. Eliminates Religious Exemptions for Vaccinations

New York, where measles has spread in ultra-Orthodox Jewish communities, joins California and a handful of other states in revoking religious exemptions.



June 13, 2019

NYC
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Thank You

TOGETHER WE CAN STOP **MEASLES**

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



PROTECT YOURSELF, YOUR FAMILY AND YOUR COMMUNITY.
GET VACCINATED TODAY.
CONTACT YOUR DOCTOR IMMEDIATELY.

NYC Health
Mayor
Debra Rubin, MD
Commissioner

מיר קענען אינאיינעם אפשטעלן

מיזעלס

אן איינצעלנע מענטש מיט מיזעלס קען אנשטעקן
פון 12 ביז 18 מענטשן וואס זענען נישט אימיון.



באשיצט אייך, אייער פאמיליע, און די קאמיוניטי.
ווערט היינט וואקסינירט.
רופט שוין אן אייער דאקטאר.

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