

## REPORT TO THE BOARDS OF HEALTH

Jennifer Morse, MD, MPH, FAAFP, Medical Director

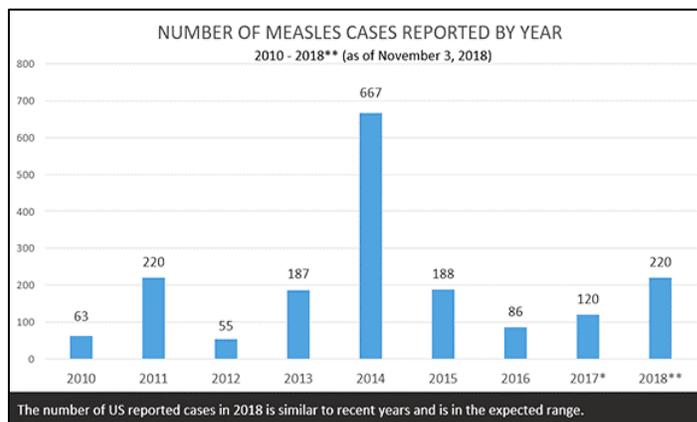
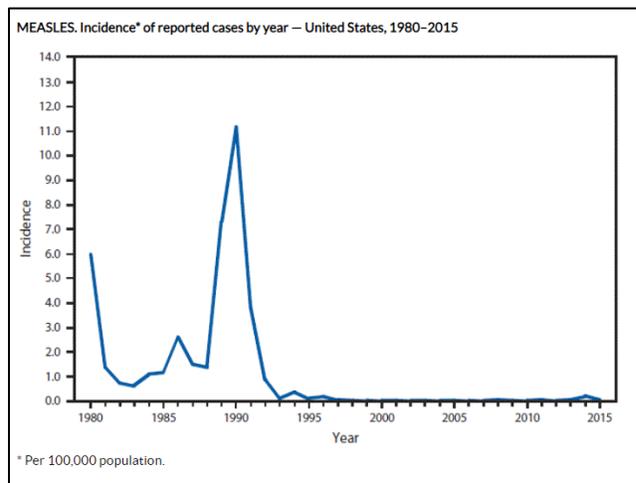
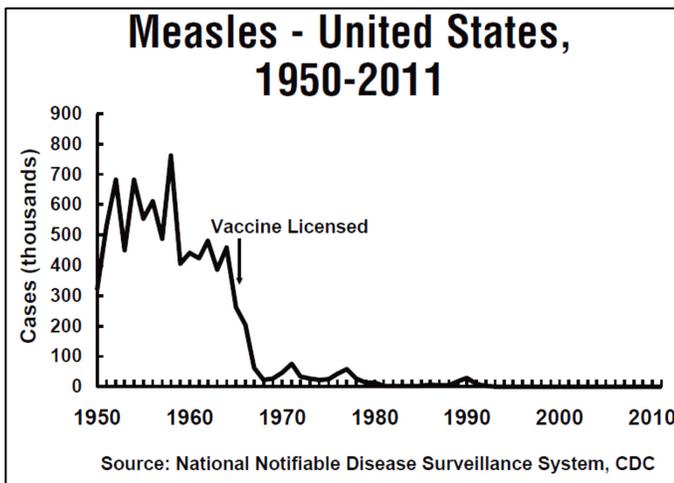
Mid-Michigan District Health Department, Wednesday, November 28, 2018

District Health Department #10, Friday, November 30, 2018



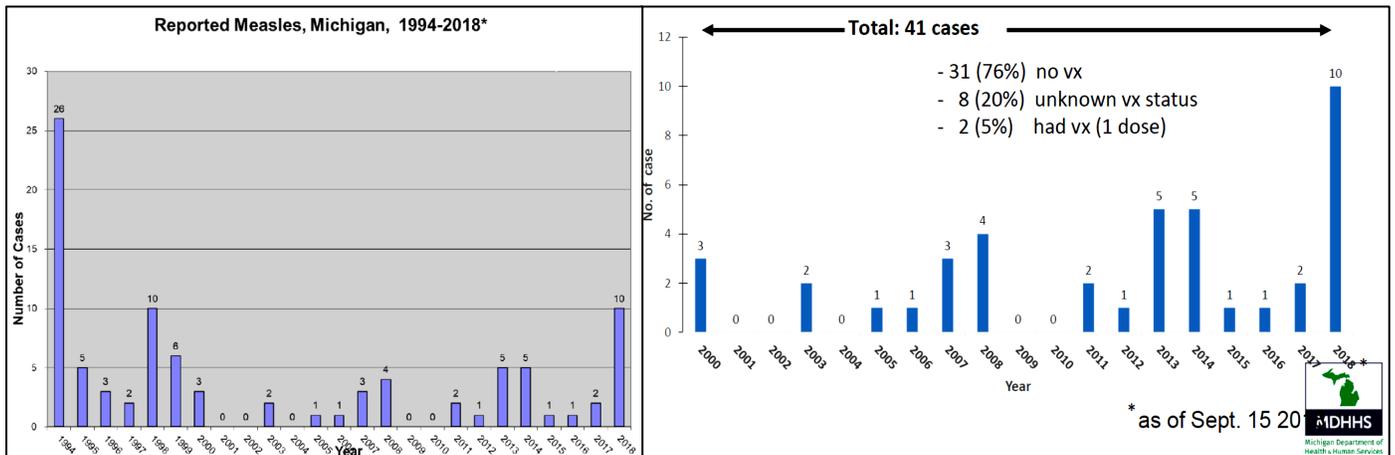
### Measles

Measles is a very contagious viral infection that, prior to the development of the first vaccine in 1963, infected nearly every child in the United States. In the years after the vaccine was licensed, measles decreased by more than 95% and continued to decrease until declared eliminated from the U.S. in 2000. Unfortunately, measles continues in many other countries and is brought into the U.S. by unvaccinated travelers. Since 2000, the number of reported measles cases in the U.S. ranged from 37 (2004) to 667 (2014.) The last death due to measles in the U.S. occurred in 2015.



#### Reasons for an increase in cases some years:

- **2015:** large, multi-state measles outbreak linked to an amusement park in California; outbreak likely started from a traveler who became infected overseas, then visited the amusement park while infectious; the primary case wasn't identified but strain matched strain common to Philippines
- **2014:** 23 measles outbreaks in 2014, including one large outbreak of 383 cases, occurring primarily among unvaccinated Amish communities in Ohio; many of the cases in the U.S. in 2014 were associated with cases brought in from the Philippines
- **2013:** 11 outbreaks in 2013, three of which had more than 20 cases, including one with 58 cases
- **2011:** In 2011, more than 30 countries in Europe report increased measles, and France was experiencing a large outbreak; most of the cases that were brought to the U.S. in 2011 came from France
- **2008:** several outbreaks, including 3 considered large; increase in cases in 2008 was the result of spread in communities with groups of unvaccinated people
- **1989-1991:** large increase in measles cases; a total of 55,622 cases and 123 deaths over those 3 years; most of the cases and deaths occurred in children younger than 5 years of age and low vaccination coverage was main contributor



As of November 17, there have been 19 cases of measles reported in Michigan during 2018 – the highest number since 1994 when 26 cases were reported. Of the 19 cases, 10 have been reported in Oakland county and nine in Washtenaw county. Details of the first 14 cases are as below:

Month - 2018	County	Age	Vaccination Status	Travel History	Medical Treatment	Secondary Cases
March	Washtenaw	21	Unvaccinated	Travel to India, symptomatic on return	Hospitalized x 3 days	No secondary cases
June	Washtenaw	49	Unknown vaccination history	Italian business trip, symptomatic on return		No secondary cases
July	Oakland	36	Unknown vaccination history	6-month stay in Philippines, rash onset 5 days after travel	Hospitalized x 8 days	No secondary cases
July	Washtenaw	22	Unvaccinated	Travel to Europe for several weeks (Greece, Croatia, Switzerland, England)	Hospitalized x 2 days	6 secondary cases (unvaccinated household members)
October	Oakland	25 and 2 (son)	Unvaccinated	Travel to Israel		2 secondary cases (unvaccinated household members)

Measles spreads in the air in droplets created during coughing, speaking, or sneezing and these droplets can remain in the air and be infectious for up to two hours. Measles infections start in the respiratory system, then spread throughout the blood stream to infect other organs. After being exposed to measles, the virus incubates about 10 to 12 days before symptoms appear.

Those symptoms include: fever increasing to 103° to 105°F; cough, runny nose, conjunctivitis (red, watery eyes,) and Koplik spots (rash inside the mouth.) This prodrome usually lasts around two to four days, but can last one to seven days. After this, typically about 14 days after this initial exposure to measles (but can be seven to 21 days after exposure,) the measles rash develops. It starts around the hairline, then moves to the face and upper neck. It moves downward and outward over the next three days, reaching the hands and feet. The rash starts out at separate spots but may end up becoming continuous, especially on the upper body. The rash fades in the same order it appeared after five to six days. A person with measles is considered contagious four days before to four days after the rash starts.

Measles Complications	
Diarrhea	8%
Otitis media	7%
Pneumonia	6%
Encephalitis	0.1%
Seizures	0.6-0.7%
Death	0.2%
SSPE	0.0005-0.001%

Based on 1985-1992 surveillance data

Around one out of three people with measles have some type of complication, including death. There is also a risk of death years after measles illness due a condition called subacute sclerosing panencephalitis (SSPE.) This is very rare, occurring in about five to 10 of every million measles cases. It is a degenerative central nervous system disease

believed to be due to continued measles virus infection of the brain and leads to death an average of seven years after measles (range 1 month to 27 years.)

Investigating and caring for measles cases and outbreaks is very costly. When reviewing 181 measles cases that occurred in the U.S. from 2004 to 2011, the public health and health care costs needed to control the spread of measles ranged from \$4,941 to \$57,143 per case. The direct benefit-to-cost ratios for immunization against measles is estimated to be 1:14.2 and when factoring societal costs, it is 1:26.

The primary way to prevent measles is vaccination. The vaccine is a live, attenuated vaccine. That means the vaccine causes a mild, unapparent and noninfectious infection that produces antibodies in 95% to 98% of people after the first dose; and over 99% of people after getting the recommended two doses. Vaccine-induced immunity appears to be long-term and is probably lifelong in most people. The recommended dosing schedule is to give the first dose at age 12 to 15 months, and the second dose at 4 to 6 years. If traveling to areas with measles, the vaccine can be given to infants as young as 6 months and a second dose can be given as soon as four weeks later. Any dose given before 12 months does not count toward the normal two-dose series, however. It is very important that individuals traveling make sure their vaccinations are up to date. Being born before 1957 can be considered proof of immunity except for healthcare workers.

The measles vaccine is given as part of the MMR (measles, mumps, and rubella) vaccine. It has been extensively studied in many countries and found to be safe. There is no evidence that the vaccine is linked to autism or related disorders. Side effects can occur such as fever in 5% to 15% of individuals vaccinated. A rash occurs in 5% of individuals within 7 to 10 days after the vaccine. Very rarely, in about 1 in 30,000 to 40,000, the vaccinated person can have a drop in platelets lasting 2 to 3 weeks, rarely related to any complications. Swollen lymph glands can occur for a short time, and very rarely, an allergic reaction could occur.

In 2017, 91.5% of children 19 to 35 months old in the United States had one or more MMR vaccine doses compared to 92.2% in Michigan. Of those 13 to 17 years old, 92.1% were fully vaccinated with two doses in the United States, compared to 97.4% in Michigan.

Measles is still common and potentially fatal disease in developing countries. It is estimated that 145,700 deaths occurred globally from measles in 2013. There has been a dramatic increase in measles cases globally over the past year. The entire American region was deemed free of measles in 2016. Unfortunately, this year Venezuela has had 5,525 cases and Brazil has had 4,299 cases. See the tables at the end of the report for data regarding the international rate of measles.

#### Recommendations:

1. Be aware that measles is an extremely contagious and potentially fatal infection that continues to occur in outbreaks in the United States and around the globe.
2. Ensure you are immune to measles, either by vaccination or prior infection, especially before international travel.

#### Sources:

- Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015.
- Global Measles and Rubella Strategic Plan 2012-2020. (2012). World Health Organization.
- Photos of Measles and People with Measles. CDC. <https://www.cdc.gov/measles/about/photos.html>
- Measles Data and Statistics. (February 16, 2018). CDC. <https://www.cdc.gov/measles/downloads/measlesdataandstatsslideset.pdf>
- Plotkin, S. A., Orenstein, W. A., & Offit, P. A. (2018). Plotkins vaccines.
- Reported measles and rubella cases and incidence rates by Member States. (2018) World Health Organization. [http://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/measlesreportedcasesbycountry.xls?ua=1](http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/measlesreportedcasesbycountry.xls?ua=1)

Region	2017 (through Oct.)	2018 (through Oct.)	Increase
Africa (AFRO)	16,819	23,753	41%
America (AMRO)	216	6,672	2989%
Eastern Mediterranean region (EMRO)	10,875	17,884	64%
Europe (EURO)	12,922	52,958	310%
Southeast Asia Region (SEARO)	50,582	53,599	6%
Western Pacific Region (WPRO)	7744	18,311	136%
Total	99,158	173,177	75%

Counties with Highest Rates of Measles per WHO Data							
Rank	Country	Region	Measles per 1,000,000	Rank	Country	Region	Measles per 1,000,000
1	Ukraine	EURO	770.01	38	Bosnia and Herzegovina	EURO	27.01
2	Serbia	EURO	649.09	39	Belarus	EURO	23.63
3	Albania	EURO	477.05	40	Ireland	EURO	23.28
4	Liberia	AFRO	412.24	41	Venezuela (Bolivarian Republic of)	AMRO	23.03
5	Georgia	EURO	374.74	42	Togo	AFRO	22.74
6	Yemen	EMRO	344.36	43	Equatorial Guinea	AFRO	22.1
7	Montenegro	EURO	322.93	44	Syrian Arab Republic	EMRO	20.51
8	Greece	EURO	271.11	45	South Sudan	AFRO	19.95
9	Lebanon	EMRO	151	46	Pakistan	EMRO	19.26
10	Philippines	WPRO	118.5	47	United Arab Emirates	EMRO	16.94
11	Libya	EMRO	98.84	48	Thailand	SEARO	16.54
12	Romania	EURO	92.07	49	Czech Republic	EURO	16.49
13	Slovakia	EURO	87.06	50	Russian Federation	EURO	16.16
14	Burkina Faso	AFRO	84.2	51	United Kingdom of Great Britain and Northern Ireland	EURO	15.49
15	Malaysia	WPRO	80.35	52	Ethiopia	AFRO	13.49
16	Sudan	EMRO	75.65	53	Indonesia	SEARO	13.31
17	Kyrgyzstan	EURO	75.22	54	Eritrea	AFRO	13.12
18	Republic of Moldova	EURO	74.64	55	Portugal	EURO	13.02
19	Uganda	AFRO	65.83	56	Cyprus	EURO	12.82
20	Israel	EURO	64.21	57	Bhutan	SEARO	12.54
21	Afghanistan	EMRO	62.64	58	Somalia	EMRO	12.43
22	Niger	AFRO	62.16	59	Iraq	EMRO	12.34
23	Benin	AFRO	55.92	60	Bangladesh	SEARO	11.78
24	Chad	AFRO	55.91	61	Malta	EURO	11.65
25	Timor-Leste	SEARO	50.45	62	Namibia	AFRO	11.29
26	India	SEARO	50.44	63	Latvia	EURO	11.16
27	Guinea	AFRO	47.6	64	Gabon	AFRO	11.11
28	Cameroon	AFRO	47.14	65	Nepal	SEARO	10.9
29	Democratic Republic of the Congo	AFRO	46.64	66	Congo	AFRO	10.34
30	Italy	EURO	43.73	67	Myanmar	SEARO	10.17
31	France	EURO	42.81	68	Mozambique	AFRO	10.13
32	Ghana	AFRO	41.27	69	Antigua and Barbuda	AMRO	9.9
33	Nigeria	AFRO	39.24	70	Viet Nam	WPRO	9.58
34	Mali	AFRO	37.68	71	Austria	EURO	9.53
35	Cote d'Ivoire	AFRO	33.68	72	Belgium	EURO	9.24
36	Saudi Arabia	EMRO	29.99				
37	The former Yugoslav Republic of Macedonia	EURO	27.39				