



District Health Department #10



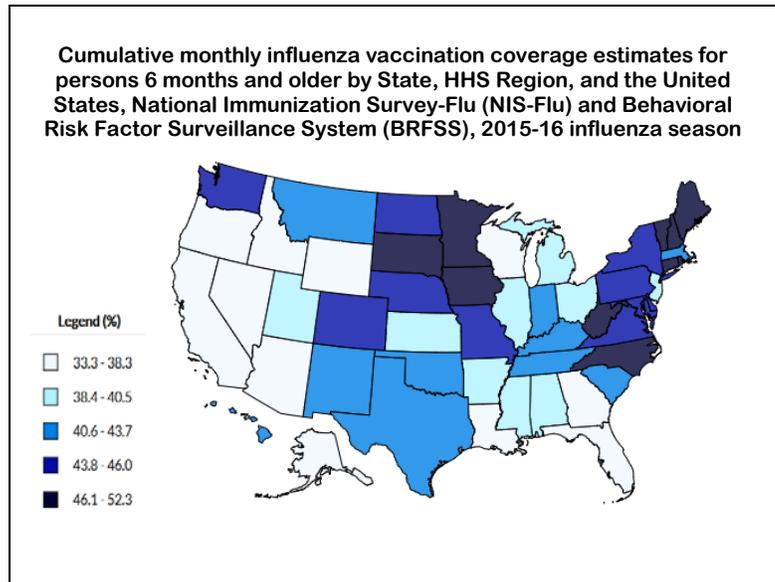
## REPORT TO THE BOARDS OF HEALTH Jennifer Morse, M.D., Medical Director

Mid-Michigan District Health Department, Wednesday, March 22, 2017  
Central Michigan District Health Department, Wednesday, March 22, 2017  
District Health Department 10, Friday, March 31, 2017

### Influenza: How Well Does the Vaccine Work and Why Don't More People Get It?

Influenza, or “the flu”, is a contagious viral infection of the respiratory tract (nose, throat, and lungs). Infections with influenza can range from having no symptoms, to feeling worse than you ever have before, to causing death. Despite the fact there are proven, safe, easily accessible vaccines recommended for all individuals over the age of 6 months, only around one-half of the people in the U.S. receive their flu shot in any given year. In the 2015-2016 flu season, 41.7% of individuals 18 years of age and older and 59.3% of those 6 months through 17 years of age received a flu shot. In Michigan, the rates were 38.5% and 55.5%, respectively.<sup>1</sup>

Why are these rates so low? A paper was recently published that reviewed numerous studies done over the past 10 years evaluating why individuals do not get flu shots.<sup>2</sup>



Some of the most frequent reasons associated with people not being accepting of the flu shot were:

- Not seeing influenza as a high risk or severe illness;
- Concerns about the safety of the vaccine;
- Not perceiving the vaccine as effective;
- Being a smoker;
- Not having a flu shot recommended to them by a health care provider;
- Less frequent interactions with health care services;
- Lower general level of education and/or income;
- Not belonging to a group considered to be high risk for influenza; and
- Being younger and/or being female.

The most commonly-found reason for not accepting flu shots was not having received flu shots in the past.

It is true that the influenza vaccine is not 100% effective. Effectiveness of any vaccine depends on who is being vaccinated, as vaccines rely on the body's ability to respond to it. The flu vaccine faces another struggle. Each

<sup>1</sup> Centers for Disease Control and Prevention (CDC). (September 2016). Flu Vaccination Coverage United States, 2015-16 Influenza Season. Retrieved on March 7, 2017 from <https://www.cdc.gov/flu/pdf/fluview/2015-16/nfid-coverage-2015-16-final.pdf>

<sup>2</sup> Schmid, P., Rauber, D., Betsch, C., Lidolt, G., & Denker, M. L. (2017). Barriers of Influenza Vaccination Intention and Behavior—A Systematic Review of Influenza Vaccine Hesitancy, 2005–2016. *PLoS one*, 12(1), e0170550.

year, the viruses that cause the flu change. They undergo small changes, called drifts. These drifts happen every year and are the reason why we need a new vaccine each year. Larger changes in the flu virus are called shifts, and these changes can result in an entirely new strain of influenza, such as the case with swine flu, or influenza H1N1. When this occurs, it can lead to a pandemic; or large worldwide spread, of influenza. In this situation, vaccine production to fight the new strain is needed quickly.

While best efforts are made to select the viruses that are expected to circulate in the coming year, it is still an educated guess. Authorities must predict which influenza strains are likely to predominate in the next season so that vaccine development can begin early enough to have millions of doses ready by the following fall. The World Health Organization (WHO) announced the viral strains recommended for the 2017-2018 northern hemisphere influenza season on March 2, 2017 (which are an A/Michigan/45/2015 (H1N1) pdm09-like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus, and a B/Brisbane/60/2008-like virus, with the addition of a B/Phuket/3073/2013-like virus in quadrivalent (four strain) vaccines.)<sup>3</sup> This decision is based on surveillance that is conducted year-round in labs in over 100 countries. These surveillance labs then send samples to five WHO Collaborating Centers around the world, which includes the CDC. The Food and Drug Administration (FDA) will make the final decision which vaccine viruses will be used for influenza vaccines in the United States.<sup>4</sup>

#### Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2016<sup>5</sup>

Influenza Season	Study Site(s)	No. of Patients	Vaccine Efficacy	95% CI
2006 - 07	WI	871	52%	22, 70
2007 - 08	WI	1,914	37%	22, 49
2009 - 10	WI, MI, NY, TN	6,757	56%	23, 75
2010 - 11	WI, MI, NY, TN	4,757	60%	53, 66
2011 - 12	WI, MI, PA, TX, WA	4,771	47%	36, 56
2012 - 13	WI, MI, PA, TX, WA	6,452	49%	43, 55
2013 - 14	WI, MI, PA, TX, WA	5,990	51%	43, 58
2014 - 15	WI, MI, PA, TX, WA	9,329	23%	14, 31
2015 - 16*	WI, MI, PA, TX, WA	7,563	47%*	39, 53*
2016 - 17 <sup>†</sup>	WI, MI, PA, TX, WA	3,144 <sup>†</sup>	48% <sup>†</sup>	37, 57 <sup>†</sup>

\*Estimate from Nov 2, 2015–April 15, 2016.

<sup>†</sup>This info was added to the table by author. Data obtained from: Flannery, B. (2017). Interim estimates of 2016–17 seasonal influenza vaccine effectiveness—United States, February 2017. *MMWR. Morbidity and Mortality Weekly Report*, 66.

Even though influenza vaccine efficacy is not 100%, it is still helpful in preventing illness. Over the past 10 years, the flu shot reduced the risk of getting the flu by around one half (47% to exact). If more individuals received a flu vaccine as recommended, this “herd immunity” would decrease the amount of virus in community, making illness even less likely. For those that get vaccinated and still contract influenza, it appears the influenza vaccine decreases symptom severity and disease severity.<sup>6 7</sup>

<sup>3</sup> World Health Organization (WHO). Recommended composition of influenza virus vaccines for use in the 2017-2018 northern hemisphere influenza season (March 2, 2017). Retrieved from [www.who.int/influenza/vaccines/virus/recommendations/2017\\_18\\_north/en/](http://www.who.int/influenza/vaccines/virus/recommendations/2017_18_north/en/) on March 8, 2017.

<sup>4</sup> Centers for Disease Control and Prevention (CDC). (May, 2016). Selectin Viruses for the Seasonal Influenza Vaccine. Retrieved from <https://www.cdc.gov/flu/about/season/vaccine-selection.htm> on March 8, 2017.

<sup>5</sup> Centers for Disease Control and Prevention. (2015). Seasonal influenza vaccine effectiveness, 2005–2015. Atlanta, GA: CDC.

<sup>6</sup> Arriola, C. S., Anderson, E. J., Baumbach, J., Bennett, N., Bohm, S., Hill, M., ... & Miller, L. (2015). Does Influenza Vaccination Modify Influenza Severity? Data on Older Adults Hospitalized With Influenza During the 2012– 2013 Season in the United States. *Journal of Infectious Diseases*, jiv200.

<sup>7</sup> VanWormer, J. J., Sundaram, M. E., Meece, J. K., & Belongia, E. A. (2014). A cross-sectional analysis of symptom severity in adults with influenza and other acute respiratory illness in the outpatient setting. *BMC infectious diseases*, 14(1), 231.

Influenza can be a fatal illness, causing an estimated 12,000 to 56,000 deaths during the 2010-2011 through 2013-2014 influenza seasons.<sup>8</sup> Just since October 1, 2016, 34 children in the United States have died due to influenza.<sup>9</sup> For the 2015-2016 influenza season, the CDC estimates that influenza vaccination prevented approximately 5.1 million influenza illnesses, 2.5 million influenza-associated medical visits, and 71,000 influenza-associated hospitalizations.<sup>8</sup> It has been calculated that for each person 65 years of age and over that receives an influenza vaccine, the medical cost savings is \$182.<sup>10</sup> Vaccination also saves lost days of work and the lives of trained workers, which makes further economic sense.

**Board of Health Monthly Healthy Living Recommendation:**

1. Support annual influenza vaccination efforts.

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<sup>8</sup> Centers for Disease Control and Prevention (CDC). (2016, December 13). Estimated Influenza Illnesses, Medical Visits, Hospitalizations, and Deaths Averted by Vaccination in the United States. Retrieved March 10, 2017, from <https://www.cdc.gov/flu/about/disease/2015-16.htm#table3>

<sup>9</sup> Ingalls, J.(March 6, 2017). MI Flu Focus. Influenza Surveillance Updates. Bureaus of Epidemiology and Laboratories. 14(21). Retrieved March 10, 2017 from [http://www.michigan.gov/documents/MIFluFocus\\_1\\_5\\_06\\_146893\\_7.pdf](http://www.michigan.gov/documents/MIFluFocus_1_5_06_146893_7.pdf)

<sup>10</sup>Appleby, J., Hodin, M., Schaffner, D., & Tan, L. (2016, July). *THE VALUE AND IMPERATIVE OF QUALITY MEASURES FOR ADULT VACCINES* (Working paper). Retrieved March 1, 2017, from Adult Vaccine Access Coalition website. <http://www.adultvaccinesnow.org/wp-content/uploads/2016/07/AVN-White-Paper-FINAL.pdf>