

Influenza 101

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What is Influenza?

- A contagious respiratory illness caused by influenza viruses
- Infects the nose, throat, and lungs.
- Causes mild to severe illness, and at times can lead to death.
 - Influenza is a leading cause of pneumonia
- Flu vaccination is the best way to prevent the flu

Influenza Virus Transmission

- Mainly from person to person through coughing or sneezing
- Touching something with flu viruses on it and then touching your mouth or nose
- You can pass on the flu to someone else even though you do not have any flu like symptoms



Communicability is highest 1-2 days before symptoms start and up to 4-5 days after onset of symptoms

Effects of Influenza

- Severity of flu varies year to year
 - Virulence of the virus
 - Host factors (e.g. age, health conditions)
- 3,000 – 49,000 people die each year from influenza-related complications
- Over 200,000 people are hospitalized each year
- Flu is one of the leading causes of pneumonia

Influenza in AI/AN Populations

- AI/AN people are at high risk for influenza and influenza-related complications
- 2009 H1N1 pandemic – mortality rates 4x higher compared to other groups
- 1.5 - 2x mortality rate compared to whites in other years
- Influenza and Pneumonia one of the top ten leading causes of death for AI/AN people

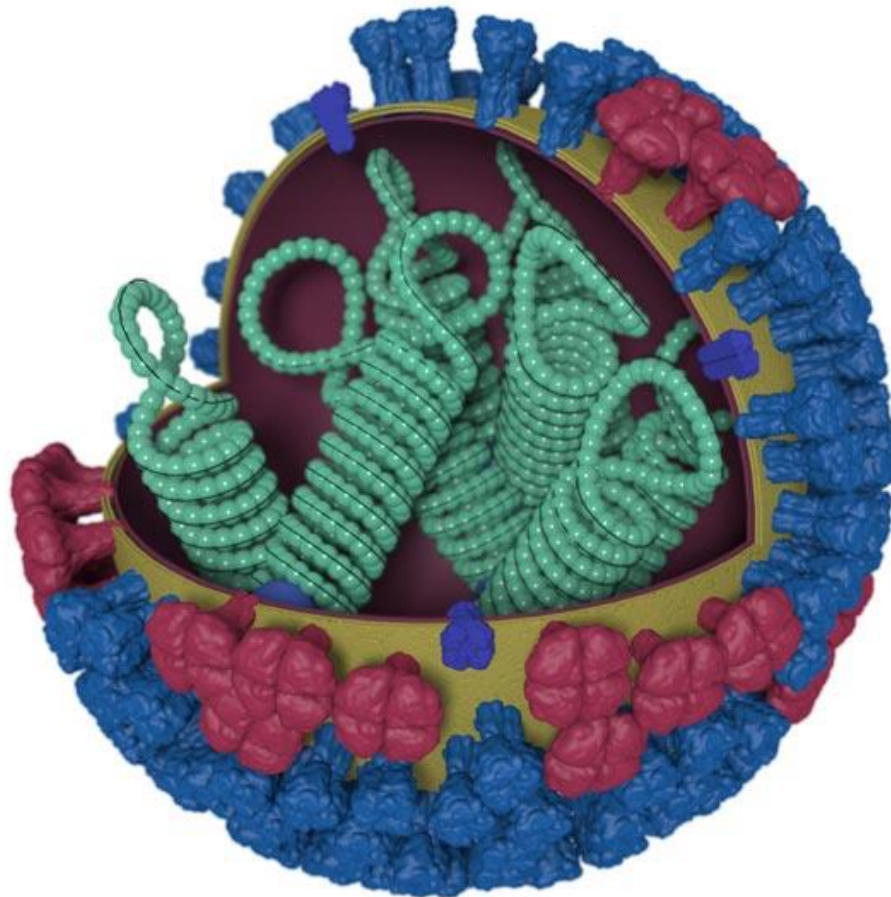
Influenza Viruses

- There are three types of influenza viruses: A, B and C
- Human influenza A and B viruses cause seasonal epidemics almost every winter in the United States
- Influenza type C infections cause a mild respiratory illness

Influenza A

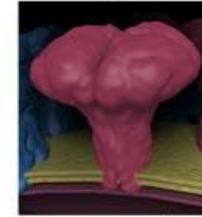
- Influenza A viruses can infect birds, animals and humans
- Influenza A viruses are divided into subtypes based on two proteins
 - Hemagglutinin (H)
 - Neuraminidase (N)
- 18 different hemagglutinin subtypes
- 11 different neuraminidase subtypes

AN INFLUENZA VIRUS

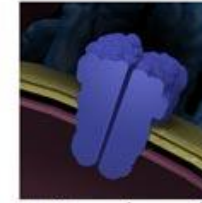


Antigenic sites

Hemagglutinin



Neuraminidase



M2 ion channel



Ribonucleoprotein

Influenza B

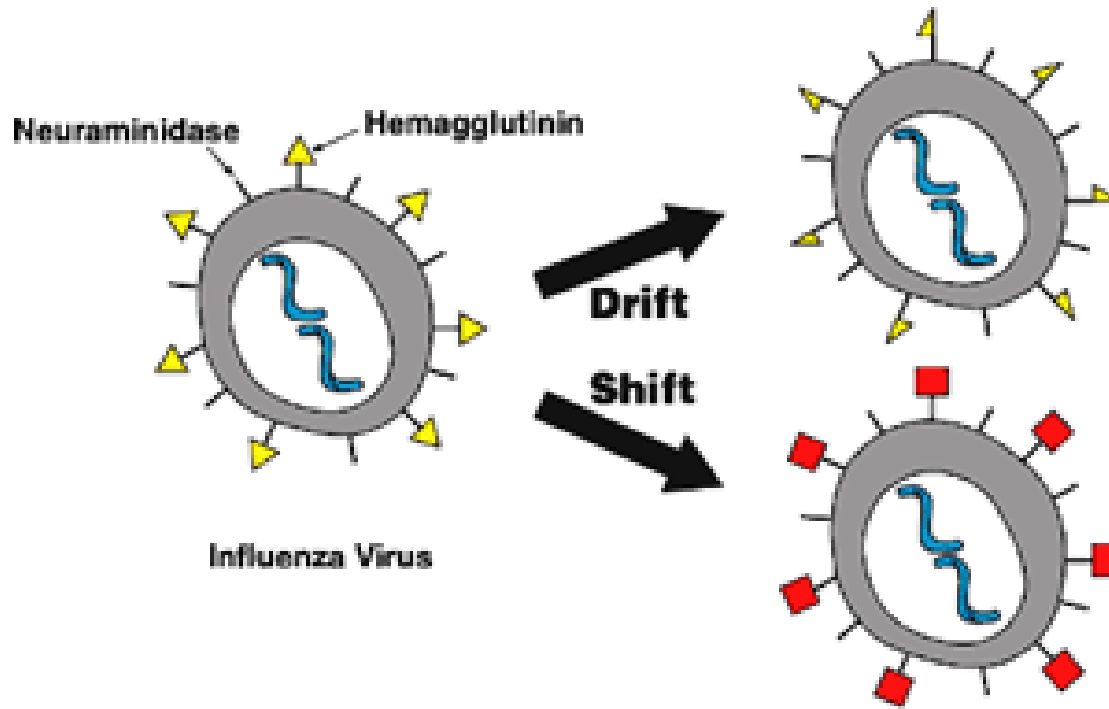
- Influenza B virus are only found in humans
- Two main lineages
 - B/Yamagata
 - B/Victoria

Influenza Virus Nomenclature

- The antigenic type (e.g., A, B, C)
- The host of origin (e.g., swine, equine, chicken, etc.)
 - For human-origin viruses, no host of origin designation is given.
- Geographical origin (e.g., Denver, Taiwan, etc.)
- Strain number (e.g., 15, 7, etc.)
- Year of isolation (e.g. 2009, etc.)
- For influenza A viruses, the hemagglutinin and neuraminidase antigen description in parentheses (e.g., (H1N1), (H5N1))
- For example:
 - A/duck/Alberta/35/76 (H1N1) for a virus from duck origin
 - A/Perth/16/2009 (H3N2) for a virus from human origin

Changes in Influenza Viruses

- Antigenic drift
 - Small changes in the genes of influenza viruses
 - Occur over time as the virus replicates
 - Drifted strains are usually closely related
 - Some cross protection
 - Both influenza A and B strains undergo antigenic drift



Changes in Influenza Viruses, cont.

- Antigenic Shift
 - Only occurs with Influenza A viruses
 - An abrupt, major change in the influenza A virus resulting in a new influenza A subtype or virus
 - New hemagglutinin and/or new hemagglutinin and neuraminidase

Antigenic shift initiates Pandemics

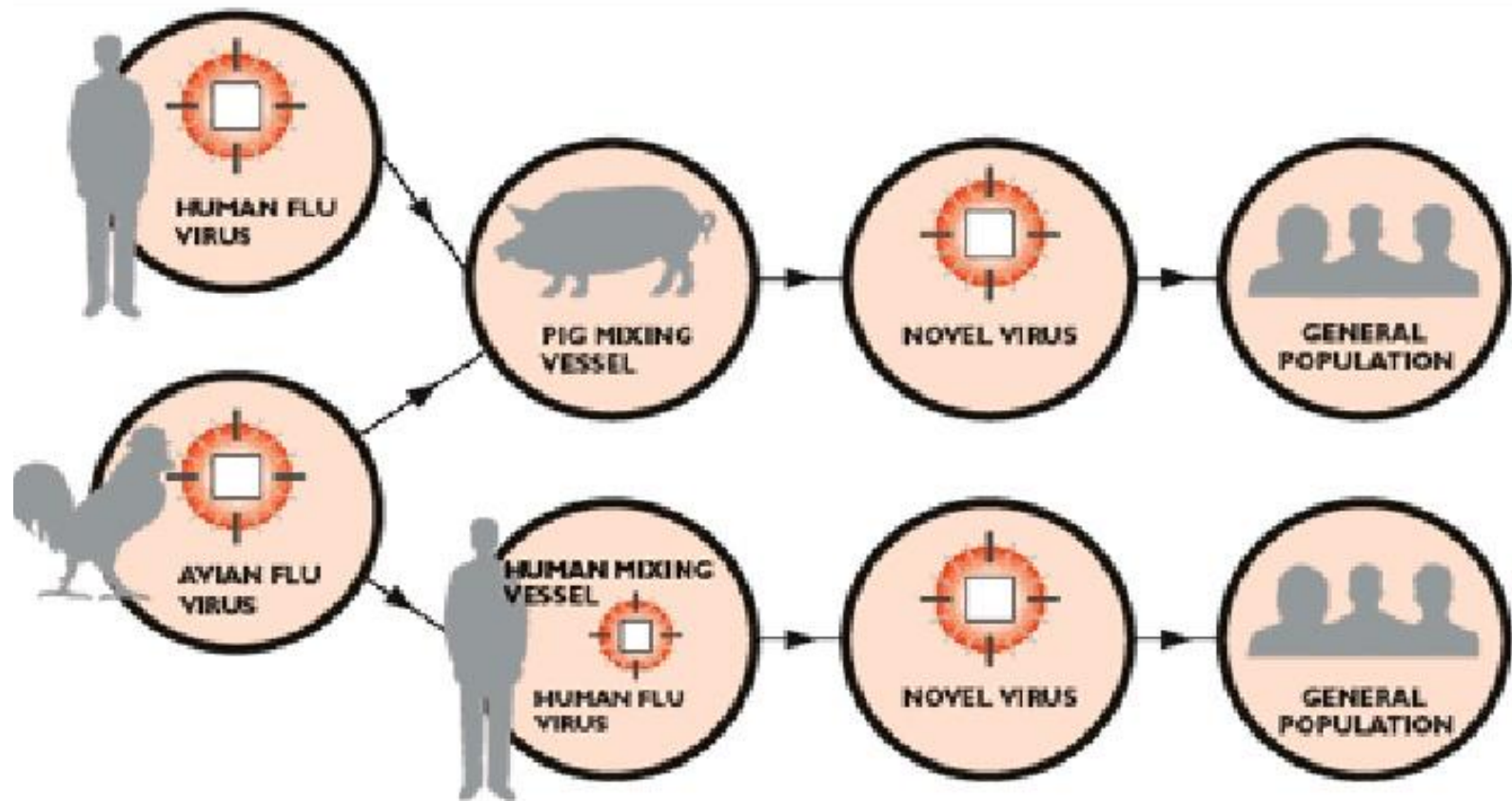


Figure 1: Co-infection with human virus and non-human virus and the birth of a pandemic strain

Flu Vaccine Effectiveness

- Influenza vaccine effectiveness varies, depending on
 - Match between the vaccine influenza strains and the circulating strains
 - Patient factors (age, health status)

Adjusted vaccine effectiveness estimates for influenza seasons from 2005-2015

Influenza Season†	Reference	Study Site(s)	No. of Patients‡	Adjusted Overall VE (%)	95% CI
2004-05	Belongia 2009	WI	762	10	-36, 40
2005-06	Belongia 2009	WI	346	21	-52, 59
2006-07	Belongia 2009	WI	871	52	22, 70
2007-08	Belongia 2011	WI	1914	37	22, 49
2009-10	Griffin 2011	WI, MI, NY, TN	6757	56	23, 75
2010-11	Treanor 2011	WI, MI, NY, TN	4757	60	53, 66
2011-12	Ohmit 2014	WI, MI, PA, TX, WA	4771	47	36, 56
2012-13	McLean 2014	WI, MI, PA, TX, WA	6452	49	43, 55
2013-14	Unpublished	WI, MI, PA, TX, WA	5990	51	43, 58
2014-15	ACIP presentation, Flannery	WI, MI, PA, TX, WA	9329	23	14, 31

Source: CDC.

<http://www.cdc.gov/flu/professionals/vaccination/effectiveness-studies.htm>

2014-2015 Season

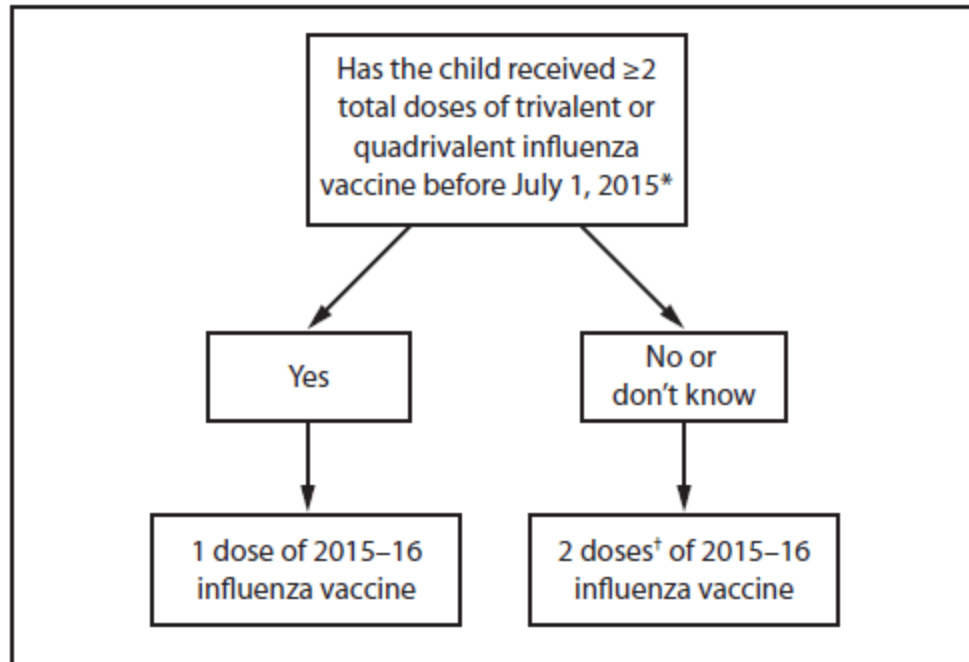
- Moderately severe influenza season
- H3N2 viruses predominated
 - H3N2 seasons associated with increased illness in the elderly
- Influenza B increases late in the season
- Majority of circulating H3N2 viruses were drifted from the H3N2 vaccine virus
 - Reduced protection against circulating influenza A H3N2 viruses

2015-2016 SEASON

Vaccines for the 2015-2016 Season

- A/California/7/2009 (H1N1)-like virus
- A/Switzerland/9715293/2013 (H3N2)-like virus
- B/Phuket/3073/2013-like (Yamagata lineage) virus
- Quadrivalent vaccines - B/Brisbane/60/2008-like (Victoria lineage) virus
- Changes in the 2 dose algorithm for children < 9 years

2 dose Algorithm for Children < 9 years



* The two doses need not have been received during the same season or consecutive seasons.

† Doses should be administered ≥4 weeks apart.

Source: CDC.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6430a3.htm#fig1>

Influenza Vaccine Products

- Inactivated influenza vaccine, quadrivalent (IIV4), standard dose
- Inactivated influenza vaccine, trivalent (IIV3), standard dose
- Inactivated influenza vaccine, trivalent (IIV3), high dose
- Inactivated influenza vaccine, trivalent, cell-culture-based (ccIIV3), standard dose
- Recombinant influenza vaccine, trivalent (RIV3), standard dose
- Live attenuated influenza vaccine, quadrivalent (LAIV4)

Vaccination Timing

- U.S. flu activity usually peaks between December and February
- CDC recommends that people receive their vaccine soon after vaccine becomes available, preferably by October.
- It takes about two weeks after vaccination for antibodies to develop in the body and provide protection against the flu

What about waning immunity?

- Vaccine-induced antibodies wane over time
- One study found a significant decline in antibody titers after 6 months among those aged ≥ 65 years
- Delaying vaccination might permit greater immunity later in the season, BUT
- Deferral might result in missed vaccination opportunities
- In the U.S, influenza typically peaks in December and January

HEALTHCARE PERSONNEL VACCINATION

I won't spread flu to my patients or my family.

**Even healthy people
can get the flu, and
it can be serious.**

**Everyone 6 months
and older should
get a flu vaccine.
This means you.**

**This season, protect
yourself—and those
around you—by
getting a flu vaccine.**



For more information, visit: <http://www.cdc.gov/flu>



**U.S. Department of
Health and Human Services**
Centers for Disease
Control and Prevention

Reasons to vaccinate HCP

- **Protect yourself**
 - Reduces sick days by 28%¹
- **Protect your family**
 - If you are infected with influenza you will also expose your family
- **PROTECT YOUR PATIENTS**
 - Ethical imperative “First do no harm”

1. Infection Control & Hosp Epidemiology 2005;26:883

HCP Vaccination

- Reasons for **accepting** vaccination:
 - Protect self
 - Protect patients
 - Convenience
 - Peer influence
 - Prior positive experiences with receiving the flu vaccine
- Reasons for **rejecting** vaccination:
 - Concerns about vaccine safety or efficacy
 - Not at risk (healthy immune system)
 - Not at risk (do not understand transmission of influenza)
 - Fear of needles
 - Not convenient (real or perceived)

What facilities can do

- Identify an influenza vaccination coordinator
- Educate HCP in your facility about the importance of influenza vaccination
 - Provide information during staff trainings, new employee orientations, through email, posters in the facility, etc.
- Provide vaccine to all HCP in your facility
 - Free of charge
 - Convenient (multiple locations/times, mobile vaccination cart)
- Monitor coverage of your employees
 - Friendly competition between departments

Influenza vaccine questions and concerns

Addressing concerns

- Concern: Vaccine safety
 - You **cannot** get influenza from the vaccine
 - Vaccine is safe – allergic reactions are RARE
 - A sore arm is the most common adverse reaction
 - Persons with chronic illnesses CAN and SHOULD receive influenza vaccine
 - Pregnant women CAN and SHOULD receive influenza vaccine

Addressing concerns

- Concern: Vaccine efficacy
 - Flu vaccination can keep you from getting sick from flu and protects the people around you who are more vulnerable to serious flu illness
 - Flu vaccination also may make your illness milder if you do get sick
 - Can reduce the risk of more serious flu outcomes, like hospitalizations and deaths
 - When vaccine and circulating viruses are well matched, vaccine is very effective in healthy adults <65 years
 - Vaccine can provide cross protection against different, but related viruses²

Addressing concerns

- Concern: Not at risk (perception of having a healthy immune system)
 - In one study¹, 23% of HCPs had serologic evidence of influenza infection after a mild influenza season
 - 59% could not recall being sick
 - 28% could not recall any respiratory infection
 - Suggests a high proportion of asymptomatic illness

Addressing concerns

- Concern: Not at risk (do not understand transmission of influenza)
 - Virus is spread from person to person, primarily by coughing and sneezing
 - Virus is shed 1-2 days **before** symptoms start and up to 4- 5 days **after** onset of symptoms
 - Asymptomatic or mild cases **are** contagious
 - HCP often work while ill, thus exposing patients and colleagues

Addressing concerns

- **Concern: Fear of needles**
 - Intradermal vaccines, which use a much smaller needle, and nasal spray vaccines are available
 - Check with your health care provider and see if you can get one of these vaccines
- **Concern: Not convenient (real or perceived)**
 - Check with your Employee Health Nurse and/or Infection Control Coordinator to find out where and when you can receive a flu vaccine

Monitoring and Reporting Influenza Vaccine Coverage

Tools for monitoring influenza vaccine coverage

- RPMS Immunization Package
 - Influenza report
 - Can run weekly to monitor coverage, generate list of patients who are not vaccinated
- IHS Influenza Awareness System (IIAS)
 - Weekly influenza vaccine coverage data at facility and Area level

Monitoring and Reporting Influenza Vaccine Coverage

- National Immunization Reporting System (NIRS)
 - Enter RPMS report data for patients
 - As of Dec. 31st
 - As of Mar. 31st
 - Can view past reports

NIRS screen shot

U.S. Department of Health and Human Services
Indian Health Service
 The Federal Health Program for American Indians and Alaska Natives
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National Immunization Reporting System Reports

Immunization Report Options

Report Area:

Report Type:

Report Period:
 FY 2006 - 1st Qtr: October 1, 2005 - December 31, 2005
 FY 2006 - 2nd Qtr: January 1, 2006 - March 31, 2006
 FY 2006 - 3rd Qtr: April 1, 2006 - June 30, 2006
 FY 2006 - 4th Qtr: July 1, 2006 - September 30, 2006

Indian Health Service National Seasonal Influenza Immunizations Report FY 2015 - 2nd Qtr: January 1, 2015 - March 31, 2015

	Total Population	6-23 mon 1 dose	6-23 mon Fully Immunized	2-4 yrs 1 dose	2-4 yrs Fully Immunized	5-17 yrs	18-49 yrs	18-49 yrs HR	50-64 yrs	65 years and over	Total Fully Immunized
ALASKA	37,911	442 of 922 (48%)	300 of 922 (33%)	831 of 2517 (33%)	638 of 2517 (25%)	2300 of 9266 (25%)	3722 of 16167 (23%)	38 of 154 (25%)	2124 of 6001 (35%)	1581 of 2884 (55%)	10703 of 37911 (28%)

Monitoring and Reporting Influenza Vaccine Coverage among HCP

- IHS and CMS requirement
- No report in RPMS to do this
 - Commercial employee health software products
 - Excel spreadsheet
- Enter HCP data into National Immunization Reporting System (NIRS)
 - As of Dec. 31st
 - As of Mar. 31st

HCP Spreadsheet

2015_2016 HCP Facility Flu Tracking and Reporting Spreadsheet [Compatibility Mode] - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Acrobat

H13

Healthcare Personnel (HCP) Influenza Reporting Form				
Please complete and send this form to your Area Contact by JANUARY 22nd, 2016 and APRIL 22nd, 2016				
Name of person reporting:				
Facility Name:				
Facility Type (IHS, Tribal or Urban):				
Report Date:				
Please enter information regarding the influenza vaccination status of all your HCP.				
HCP Categories	Employee HCP	Non-Employee HCP		
	Employees (Staff on facility payroll)	Licensed independent practitioners: Physicians, advanced practice nurses & physician assistants	Adult students/trainees & volunteers	Other Contract Personnel
Number of HCP who worked at this healthcare facility for at least 1 day between October 1 and March 31				
Number of HCP who received an influenza vaccine at this healthcare facility since influenza vaccine became available this season				
Number of HCP who provided a written report or documentation of influenza vaccination outside this healthcare facility since influenza vaccine became available this season				
Number of HCP who have a medical contraindication				
Number of HCP who declined to receive the influenza vaccine				
Number of HCP with unknown vaccination status (or criteria not met for questions 2-5 above)				
Additional Questions:				
To help us with our on-going efforts to monitor and increase HCP influenza vaccination coverage, please answer the following questions.				
		Please place an X next to your answer		
1. What method did you use to monitor HCP influenza vaccination coverage?				
		Manual		
		RPMS		
		Other Electronic Health Record/Database		

NIRS screen shot

First Nations HCP Influenza Form August 1, 2014 - March 31, 2015 Flu Season					
Facility Type	Urban				
State	NEW MEXICO <input type="button" value="v"/>				
Instructions: Please enter information regarding the SEASONAL influenza vaccination status of all your HCP. Please include HCP who may have received vaccine at other locations in your counts.					
HCP Categories	Employee HCP	Non-Employee HCP			Total HCP
	Employees (staff on facility payroll)	Licensed independent practitioners: Physicians, advanced practice nurses & physician assistants	Adult students/trainees & volunteers	Other Contract Personnel	
1. Number of HCP who worked at this healthcare facility for at least 1 day between October 1 and March 31 * 1st Quarter: October 1 - December 31 * 2nd Quarter: October 1 - March 31	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0
2. Number of HCP who received an influenza vaccine at this healthcare facility since influenza vaccine became available this season	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0
3. Number of HCP who provided a written report or documentation of influenza vaccination outside this healthcare facility since influenza vaccine became available this season	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0
4. Number of HCP who have a medical contraindication to the influenza	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0

Resources

- Veteran's Administration Influenza manual
 - <http://www.publichealth.va.gov/docs/flu/va-flu-manual.pdf#>
- CDC material
 - Posters, print materials
 - <http://www.cdc.gov/flu/freeresources/print-native.htm>
 - PSAs
 - <http://www.cdc.gov/flu/freeresources/media-psa.htm>
- Good Health TV video PSAs
 - <http://www.ndhealth.gov/Immunize/PSA/>