

# Vaccines and Adults: Our Collective Challenge

*“A vaccine that sits on the shelf is useless” – Albert Sabin*

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# Objectives

- Understand the importance of vaccines across the adult lifespan in decreasing morbidity and mortality
- Identify the adult population most at risk for Vaccine Preventable Diseases (VPD)
- Identify the barriers and the solutions to increasing adult immunization rates



Courtesy The Immunization Action Coalition; Immunize.org

# Transmission

- Modes of Transmission
  - Contact
    - Direct (HBV, HPV)
    - Indirect (HAV, Polio)
    - Droplet (Bordetella pertussis, influenza virus, pneumococcus, meningococcus)
  - Non-Contact
    - Airborne (Rubeola virus (measles), varicella virus (chickenpox))

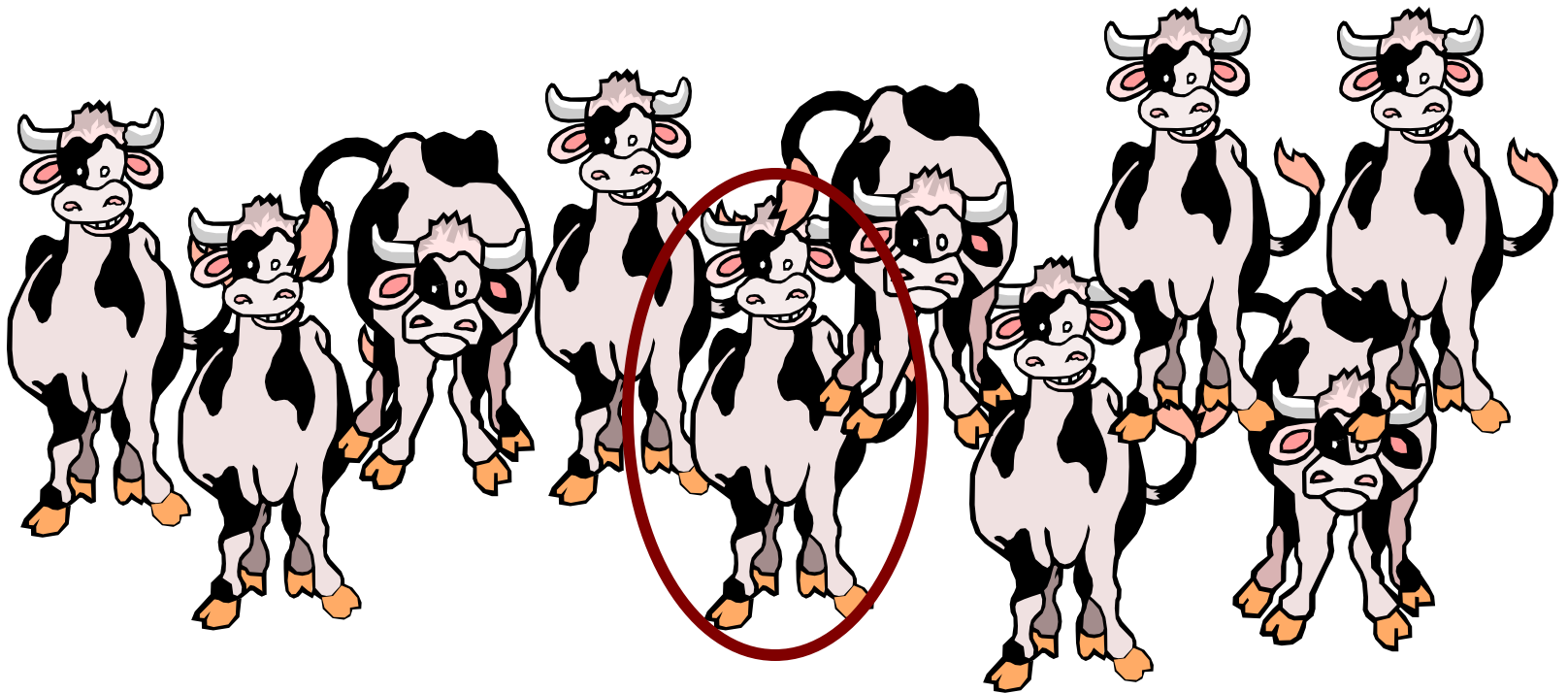
# Influenza Pre-Vaccine



Courtesy of The Immunization Action Coalition; Immunize.org

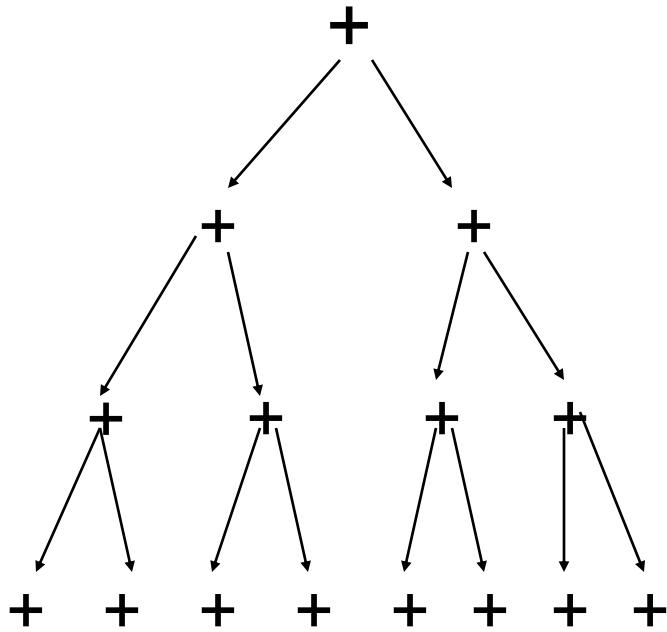
# “HERD IMMUNITY”

The higher the percentage of immune individuals in a population, the less likely a non-immune individual is to come into contact with the infectious agent

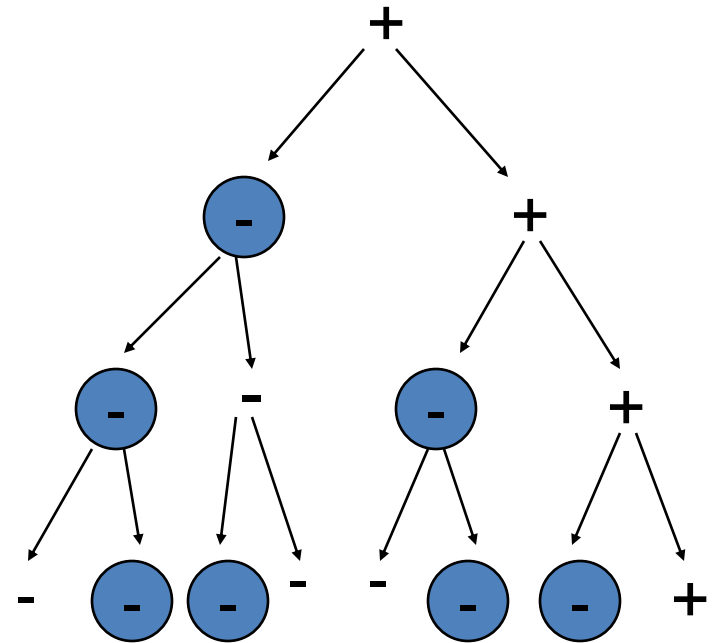


Courtesy of Claire E. Lindberg, PhD

# How HERD Immunity Works



Absence of Herd Immunity



Presence of 50% Herd Immunity

+ = Infected Person

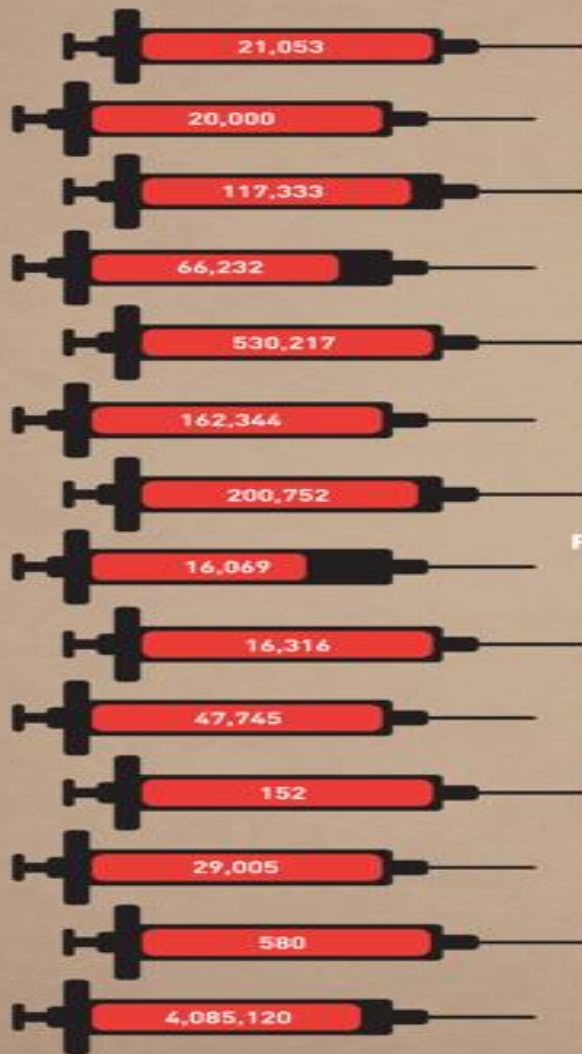
- = Uninfected Person ● = Immunized person

PRE-VACCINE ERA  
ESTIMATED ANNUAL  
MORBIDITY IN THE U.S.

%

MOST RECENT  
REPORTS OF  
CASES IN THE U.S.

DECREASE



DIPHTHERIA  
100%

H. INFLUENZA  
99%

HEPATITIS A  
91%

HEPATITIS B  
83%

MEASLES  
99%

MUMPS  
99%

PERTUSSIS  
93%

PNEUMOCOCCAL DISEASE  
74%

POLIO  
100%

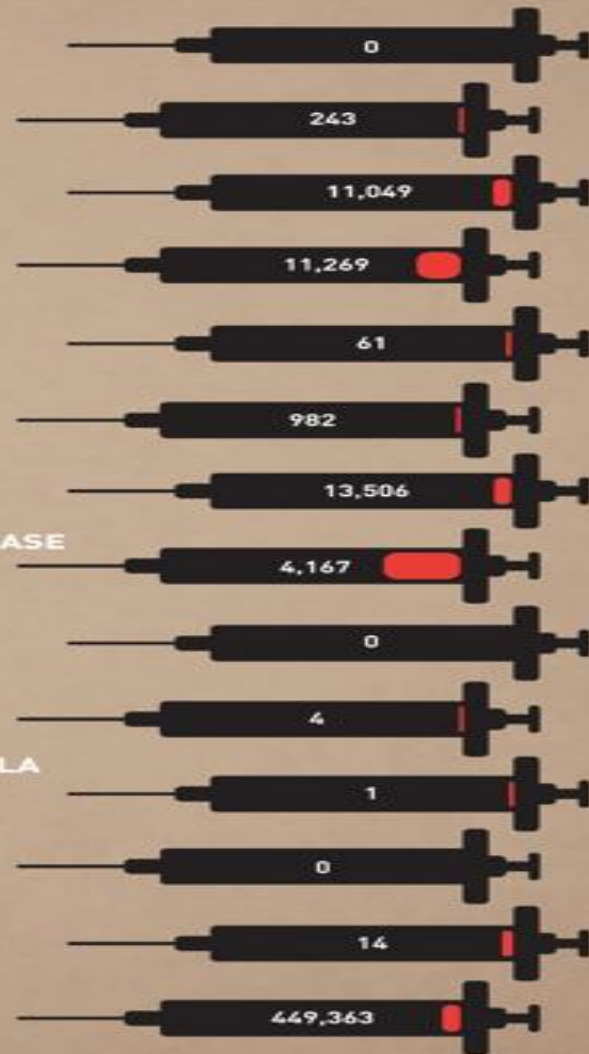
RUBELLA  
99%

CONGENITAL RUBELLA  
99%

SMALLPOX  
100%

TETANUS  
98%

VARICELLA  
89%





# VACCINES

## Greatest Public Health Achievement 20<sup>th</sup> Century

- Increase life expectancy
- Among the most safe and cost effective prevention
- For each birth cohort the CDC estimates that vaccination
  - Reduces direct health care costs by \$14 billion
  - Saves \$69 billion in societal costs
  - Prevent 20 million cases of diseases

Passive Means of Increasing Wellness



# Aging Population

US population - 307 million

- 223 million: 72.7%:  $\geq 20$
- 81 million: 26.4% : 45 to 64
  - 21% have at least 2 chronic conditions
- 41.4 million: 13.3% : older than 65
  - 80% have at least 1 chronic condition
  - 50% have at least 2 chronic conditions

Fastest growing age group is 65 and older with estimates by 2030 – 71 million (1 in 5 Americans)

# Aging Population

Infectious diseases increase morbidity and mortality at baseline

- VPD in these age groups can be devastating with prolonged sequelae

Multiple Chronic Conditions (MCC)

- morbidity and mortality increases again
  - Increasing no. of chronic conditions directly increases risk
  - Obesity (BMI  $\geq 40$ )
- significant and increasing burden
  - greater risk of poor day-to-day functioning
  - contributes to frailty and disability

**FIGURE 1. Recommended adult immunization schedule, by vaccine and age group<sup>1</sup>**

These recommendations must be read with the footnotes that follow.

VACCINE ▼	AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza <sup>2,†</sup>		1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) <sup>3,†</sup>		Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella <sup>4,†</sup>		2 doses					
Human papillomavirus (HPV) Female <sup>5,†</sup>		3 doses					
Human papillomavirus (HPV) Male <sup>5,†</sup>		3 doses					
Zoster <sup>6</sup>						1 dose	
Measles, mumps, rubella (MMR) <sup>7,†</sup>		1 or 2 doses					
Pneumococcal polysaccharide (PPSV23) <sup>8,9</sup>		1 or 2 doses					1 dose
Pneumococcal 13-valent conjugate (PCV13) <sup>10</sup>		1 dose					
Meningococcal <sup>11,†</sup>		1 or more doses					
Hepatitis A <sup>12,†</sup>		2 doses					
Hepatitis B <sup>13,†</sup>		3 doses					

<sup>†</sup>Covered by the Vaccine Injury Compensation Program



For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster



Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)



No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or by telephone, 800-822-7967. Information on how to file a Vaccine Injury Compensation Program claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation) or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines) or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays. Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG) and American College of Nurse-Midwives (ACNM).

FIGURE 2. Recommended vaccinations indicated for adults based on medical and other indications<sup>1</sup>

VACCINE ▾	INDICATION ▶	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV]) <sup>14,15,16</sup>	HIV infection CD4+ T lymphocyte count <sup>14,15,16,17</sup>		Men who have sex with men (MSM)	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement deficiencies) <sup>18,19</sup>	Chronic liver disease	Kidney failure, end-stage renal disease, receipt of hemodialysis	Diabetes	Healthcare personnel
				< 200 cells/ $\mu$ L	$\geq$ 200 cells/ $\mu$ L							
Influenza <sup>1,2</sup>			1 dose IIV annually				1 dose IIV annually	1 dose IIV annually				1 dose IIV annually
Tetanus, diphtheria, pertussis (Td/Tdap) <sup>1,4</sup>		Use Tdap only pregnant	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella <sup>1,4</sup>		Contraindicated		2 doses								
Human papillomavirus (HPV) Female <sup>1,4</sup>		3 doses through age 26 yrs			3 doses through age 26 yrs							
Human papillomavirus (HPV) Male <sup>1,4</sup>		3 doses through age 26 yrs			3 doses through age 21 yrs							
Zoster <sup>1</sup>		Contraindicated		1 dose								
Measles, mumps, rubella (MMR) <sup>1,2</sup>		Contraindicated		1 or 2 doses								
Pneumococcal polysaccharide (PPSV23) <sup>4,9</sup>					1 or 2 doses							
Pneumococcal 13-valent conjugate (PCV13) <sup>10</sup>					1 dose							
Meningococcal <sup>11,4</sup>		1 or more doses										
Hepatitis A <sup>11,4</sup>					2 doses							
Hepatitis B <sup>11,4</sup>					3 doses							

\*Covered by the Vaccine Injury Compensation Program

- For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)
- No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2013. For all vaccines being recommended on the Adult Immunization Schedule, a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices ([www.cdc.gov/vaccines/pubs/acip-list.htm](http://www.cdc.gov/vaccines/pubs/acip-list.htm)). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

# Current CDC Adult Immunization Recommendations

1. Influenza
2. Pneumococcal
3. Herpes Zoster
4. Hepatitis B
5. HPV
6. Tetanus/Diphtheria/Pertussis
7. Hepatitis A
8. Measles/Mumps/Rubella
9. Varicella
10. Meningococcal

# Health Care Personnel (HCP)

Hepatitis B

MMR

Varicella

Pertussis

# Healthy People 2020 Goals

## \* Influenza

- \* Adults < Age 65 & pregnant women 80%
- \* Adults > Age 65, institutionalized adults 90%
- \* Healthcare Professionals 90%

## \* Pneumococcal

- \* Adults Age 65; institutionalized adults 90%
- \* High Risk Adults < 65 60%

## \* Herpes Zoster

- \* Adults > Age 60 30%

\* HBV (for HCP) 90%

\* HPV (for females) 80%



# Influenza

## Seasonal Influenza Impact

- Average ~ 23,607 deaths - ~ 90% occurs in  $\geq 65$
- > 200,000 hospitalizations – ~50% in  $\geq 65$
- Increased outpatient visits and worker absenteeism
- Increased risk: >50yo; pregnant women; chronic illness; residents of long term care facilities

## Vaccine

- everyone over 6 months of age
- Give inactive vaccine for pregnant women in any trimester
- Vaccinate all HCP against influenza

IIV3, IIV3 high dose, IIV4 ,RIV3, LAIV

# Pneumococcal Disease

In those aged  $\geq 50$  years old

- ~1 million cases each year
- ~350,000 hospitalizations
- 5 to 7% mortality rate

Invasive Pneumococcal Disease Annually

- ~ 90% of cases are adults; ~ 50%  $\geq 65$
- ~12,000 pneumococcal bacteremia - 20% mortality rate (60% mortality rate in 65 and older)
- ~3,000 pneumococcal meningitis - 30% mortality rate (80 % case fatality in 65 and older)

Total direct & indirect costs: ~\$7.5 billion per year

# Pneumococcal Vaccines

## Pneumococcal Polysaccharide Vaccine (PPSV23)

- All adults  $\geq 65$
- $\geq 19$  with certain risk factors
  - CVD (not HTN), pulmonary disease/asthma, DM, alcoholism, cirrhosis, CSF leak, cochlear implant, smoker, immunocompromised

## Pneumococcal Conjugate Vaccine (PCV 13)

- Conjugated w/diphtheria
- $\geq 19$  with certain risk factors
  - anatomic or functional asplenia (incl. sickle cell disease), immunocompromised, cochlear implant, CSF leaks

# Influenza & Pneumococcal

8<sup>th</sup> leading cause of death overall

5<sup>th</sup> leading cause of death in the older adult

Estimated overall annual costs: > \$40 billion

Both are preventable with vaccines

# Influenza

## 2012 – 2013

	Goal	Actual
>=18 years	80%	41.5%
18-49 years		31.1%
18-64 years		35.7%
50-64 years		45.1%
>=65 years	90%	66.2%
Pregnant women	80%	50.5%
High risk/institutionalized adults	90%	
18-49 years		39.8%
18-64 years		47.0%

# Influenza

## 2012 - 2013

	Goal	Actual
Health Care Personnel (HCP)	90%	66.9%
• Physicians:		92.3%
• NP/PA:		88.5%
• Nurses:		84.8%
• All other:		66.7%

# Pneumococcal 2011 data

	Goal	Actual
High risk adults <65, Adults age $\geq$ 65:	60%	20.1%
Institutionalized Adults:	90%	62.3%

# Herpes Zoster

Annually: 1 million adult cases of shingles each year

- Lifetime risk: 30%
- 50% of people who live until age 85

Post-herpetic neuralgia occurs in 20% of cases

- can be very severe and last a year or more
- highest risk in persons > 60 years of age

Vaccine: recommended for  $\geq 60$

(FDA approved for  $\geq 50$ )

Herpes Zoster	Goal	Actual
age $\geq 60$	30%	15.8%



# Hepatitis B Virus (HBV)

Incurable; Chronic HBV infection: ~1.4 million Americans

~ 5,000 HBV related deaths annually

HBV related health and productivity costs: \$700 million

Vaccine: 3 shot series: safe, effective, available since 1980's

2011: DM: < 60 vaccinate; > 60 clinician's discretion

	Goal	Actual
HCP overall	90%	63.8%
Adults aged 19-49 not at high risk:		35.9%
Diabetics aged 19-59:		26.9%
Diabetics >=60 years:		12.4%

# Human Papillomavirus (HPV)

20 million 15-49 currently infected

6.2 million new cases each year: most occur in teenage years

	Goal	Actual
Women aged 19-26 $\geq 1$ dose:	80%	29.5%
Men aged 19-26 $\geq 1$ dose:		02.1%

Vaccine: Females and Males up to age 26  
3 dose series



# Pertussis

Pertussis: in 2012: 42,000 US cases, reported

- the most since 1955, 18 people died, most of them infants  
> 50% of cases – adults,
- Reservoir for pertussis
  - Transmit disease to infants and the frail
    - health care providers

Tdap specific (data from 2011)

19-64:	12.5%
HCP:	26.8%



# Hepatitis A

~15% of people with hepatitis A require hospitalization

Adults with hepatitis A lose an average of one month of work

	2011 Vaccine coverage
Age 19-49:	12.5%
International Travel:	
• high endemic areas:	20.1%
• low endemic areas:	08.4%
Chronic Liver Conditions:	17.1%

# WHY ARE WE FAILING?

## Lack of Awareness and Education (Clinician and Public)

- Incomplete Vaccination
- Waning Immunity
- Increasing International Travel
  - “only a plane ride away”
  - Immigrants, including international adoptions
  - Refugees
  - Short Term Transit, including students (MMR)

# Awareness and Education

Provider recommendation has a strong effect on patient acceptance of vaccination

- Unwavering endorsement of vaccines
- Evidence based information
  - Counter negative attitudes
  - Dispel any misconceptions
  - Discourage misdirected behaviors

# Awareness and Education

Incorporate ACIP recommended vaccines across timeline

Use a variety of strategies to help improve vaccination coverage

- Standing Orders
- Recall Methods
- Annual Wellness Visits
- Pre-Travel Visits

# WHY ARE WE FAILING?

## Inaccurate Documentation

- Multiple sites to obtain vaccines
- Lack of coordination and sharing of consistent and comprehensive documentation of immunizations throughout lifespan
  - Impact on Continuity of Care
- Lack of adult vaccine registry

## Pocket Cards, Electronic Methods



# WHY ARE WE FAILING?

## Payment Issues

Patient out of pocket costs depends on the vaccine and plan

- Varying insurance coverage rates
- Out of pocket costs

# Payment Issues

Medicare part B (no cost sharing)

- Influenza, pneumococcal and HBV (high risk)

Medicare part D (variable cost sharing)

- All other vaccines recommended for those >65
- Payment is set by patient's participating prescription drug plan (currently 1500 plans)

# Future: Affordable Care Act

Any preventive service, including vaccination, received in a hospital out patient setting is to be paid for at 100%

- Still issue with private insurers and providers' offices

## Annual Wellness Visits

- Incorporates ACIP recommended vaccines

## Medical Home/Neighborhood

- Patient Centered Care
- Increases integration among providers

# Our Collective Challenge

Sometimes seems daunting and overwhelming

“The Race to Vaccinate”



# The Race to Vaccinate

## December 1924, Nome, Alaska

- Population 10,000
- 1 physician, 4 nurses
- Sore throats/tonsillitis

## January, 1925

- Dr. Welch recognizes: outbreak diphtheria “strangling angel of children”
- 6 children dead, 20 infected
- quarantine issued; available antitoxin: exhausted or expired
- January 22<sup>nd</sup> , Calls goes out to locate closest large supply:
  - Anchorage 674 miles away

# The Race to Vaccinate

“The Great Race of Mercy”

January 27, 1925

- antitoxin is picked up

February 2, 1925

- reached Nome: 5 days , 7 hours (normally 15 – 20 days)
- Not one vial of antitoxin was broken

February 21, 1925

- Quarantine lifted



# Summary

**Assess:** know what vaccines are needed and when to give them - know the valid contraindications

**Communicate:** educate your patients & community – on the safety and importance of vaccines

**Availability:** Seize every opportunity to vaccinate

**Document:** Help patients keep track of their vaccines

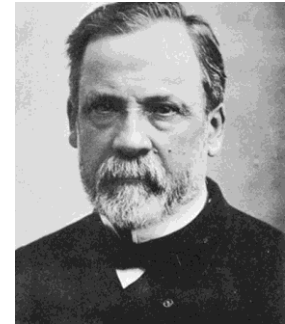
**Partner:** Patient/community centered approaches

**Get Vaccinated Yourself!**

# Thank You

“Let me tell you the secret that has led me to my goal. My strength lies solely in my tenacity.”

Louis Pasteur



Communication

Collaboration

Success