Fact, Fear, and Fiction:

Navigating Vaccine Hesitancy



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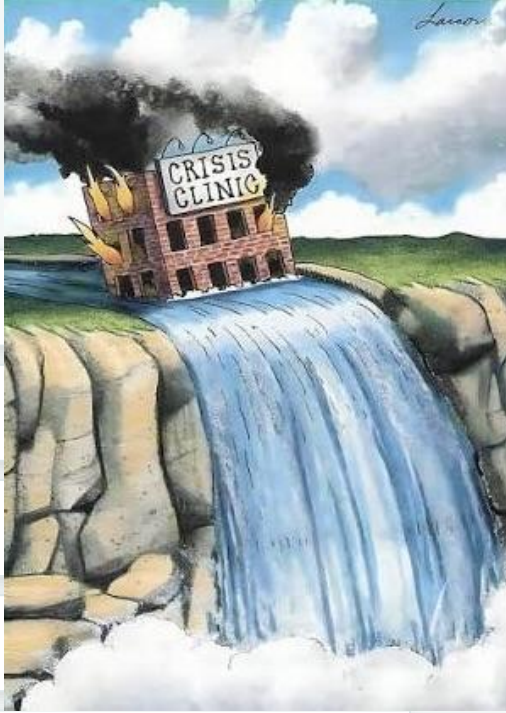
Objectives

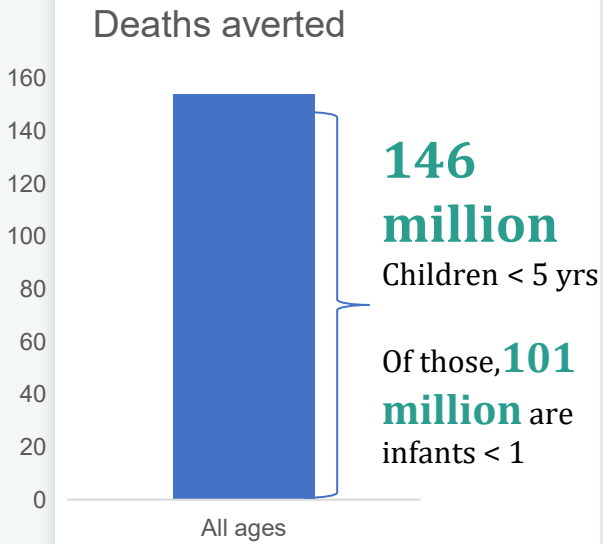
1. Describe why vaccines matter
2. Differentiate between vaccine hesitancy vs being anti-vaccines
3. Outline reasons for rising hesitancy and impacts of this social change
4. Describe current vaccine-related policies, laws, and exemptions
5. Outline evidence-based strategies for increasing vaccine uptake



Vaccines work — and the gap is widening

154M

deaths averted by global immunization since 1974



Shattock et al., Lancet 2024

3,659

U.S. measles cases confirmed by Sept 26, 2026 — the most since elimination in 2000

95% of cases were unvaccinated

5 deaths*

Pennsylvania DOH reports 5 measles related deaths; CDC only officially recognizes 2 (no states specified)

92%

U.S. MMR coverage, below the 95% needed for herd immunity; only 10 states reach it

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity†	2025 Reported Cases † †	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	1,975	> 99%
Mumps	162,344	336	> 99%
Pertussis	200,752	28,132	86%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	0	100%
Congenital Rubella Syndrome	152	1	99%
Tetanus	580	37	94%
Haemophilus influenzae	20,000	21*	> 99%

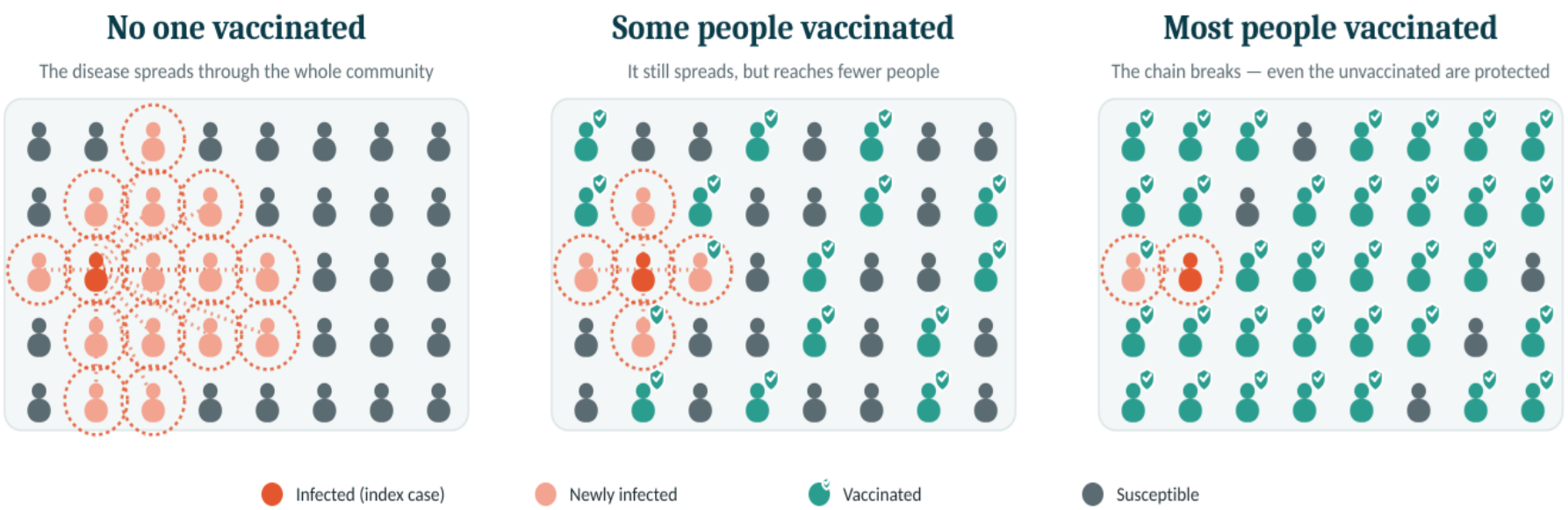
† JAMA. 2007;298(18):2155-2163

† † CDC. National Notifiable Diseases Surveillance System, Weekly Tables of Infectious Disease Data. Atlanta, GA. The Office of Public Health Data, Surveillance, and Technology (OPHDST). Available at: Weekly statistics from the National Notifiable Diseases Surveillance System (cdc.gov). Data submitted (U.S. Residents, excluding U.S. Territories) through Dec 27, 2025; accessed on Feb 24, 2026; diphtheria and polio case counts reported by CDC Program.

**Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 7 cases of Hib are estimated to have occurred among the 161 notifications of *Haemophilus influenzae* (< 5 years of age) with unknown serotype.

2/25/2026

Herd immunity:
We don't need to vaccinate 100% of individuals

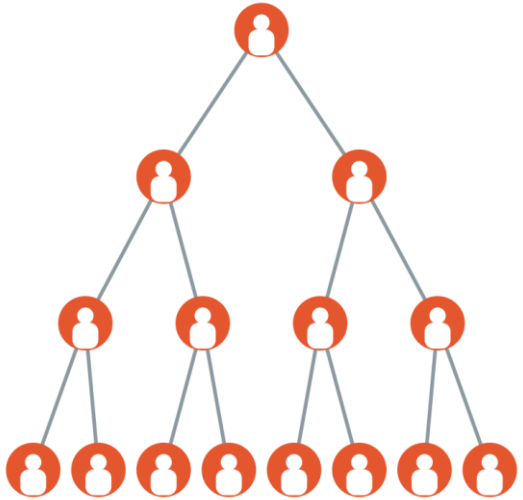


Herd Immunity Thresholds Depend on R_0

Threshold for each communicable disease is different

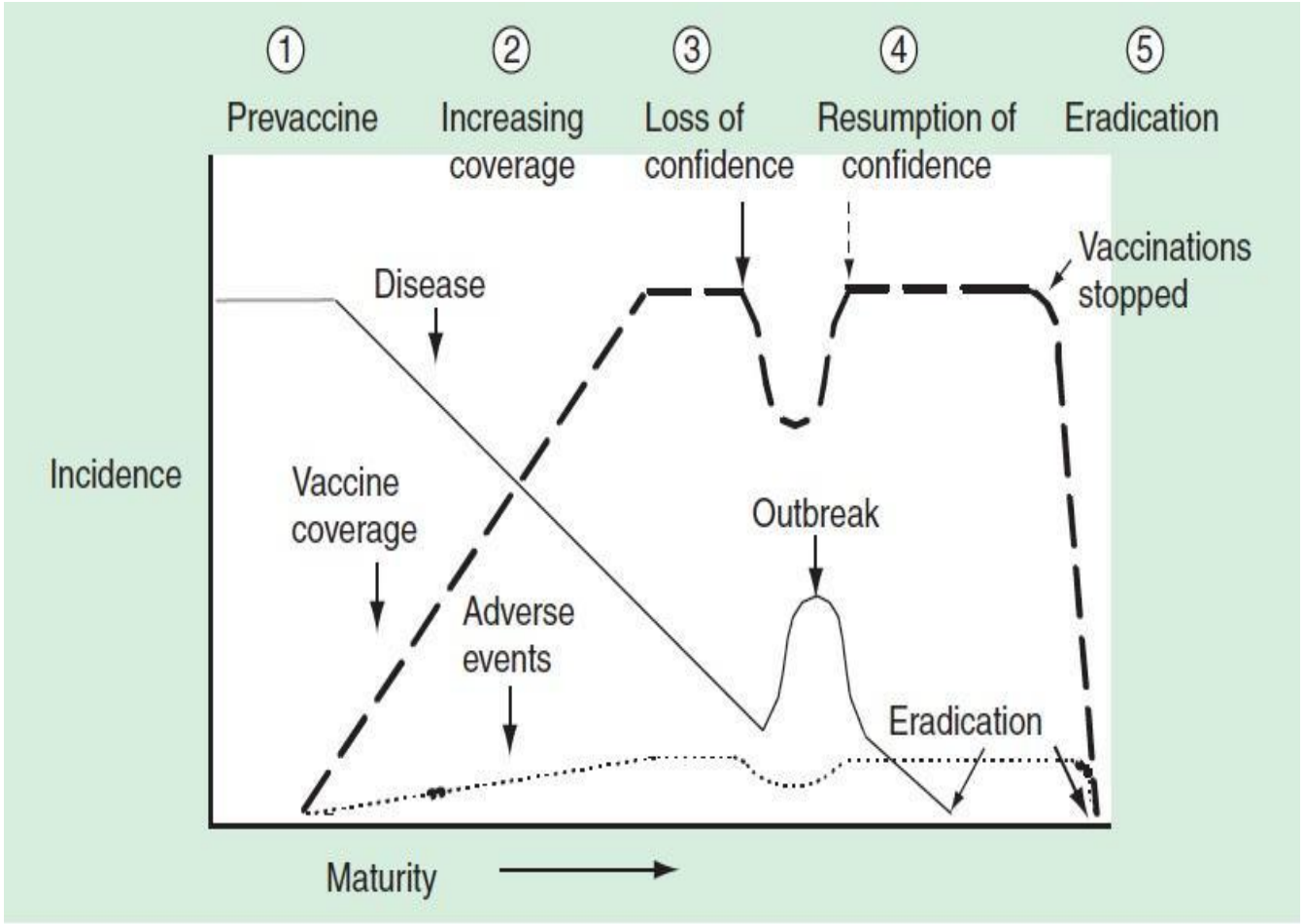
Disease	R0	Threshold (%)
Mumps	4-7	75–86
Polio	5-7	80–86
Smallpox	5-7	80–85
Diphtheria	6-7	85
Rubella	6-7	83–85
Pertussis	12-17	92–94
Measles	12-18	95

$R_0 = 2$



Higher the R_0, the higher vaccine coverage is needed to reach herd immunity

Herd Immunity is Dropping: Why?



Recent Vaccine Uptake Rates

Pertussis:
80.4% (2 yr olds)
90.2% of teens
(need > 92%)

MMR: 92.4%
(need > 95%)

HPV: 60%
(target 80- 90%)

Hepatitis B: 32.5%
(< half knew they were eligible)

Flu:
Adults: 42-47%
> 65: 48.4%
Pregnant women: 37.7%
Children: 49.3%

Covid:
Adults: 17.5%
> 65: 22.6%
Pregnant women: 11.1%
Children: 9.7%

Vaccine Uptake Rates Are Not Equally Distributed Across Regions

- Groups of unvaccinated individuals are often clustered together, increasing the risk of outbreaks
- Reasons:
  - Lack of access (rural areas, shelter)
  - Religious opposition to vaccine
  - Personal opposition to vaccines or hesitancy to vaccinate
- Examples:
  - Measles outbreak in shelter for newly arrived in Chicago
  - Measles outbreak in rural Pennsylvania among two religious groups who lack access and have some vaccine distrust

August 10 Executive Order About Vaccines: What It Says and Aims to Do

17 → 11

Decreases the number of recommended childhood vaccines

Calls for splitting the MMR into 3 vaccines

No U.S. manufacturer makes standalone measles, mumps or rubella vaccines, and none exist on the market anywhere today.

Aims to mandate all states allow religious exemptions

Currently, 4 states do not have a religious exemption



Note: An executive order is not a statute; it cannot override state or federal law on its own

Likely to further erode trust in vaccines and public health officials

- Likely to contribute to ongoing measles outbreak
- Could put US at risk of losing measles elimination status

Two Schedules, One Confused Public

CDC schedule (2026)

11

Recommended vaccines, after the January 2026 revision

American Academy of Pediatrics schedule

18

diseases the AAP continues to recommend routine immunization against

The CDC also updated wording to indicate that childhood vaccines should not be routinely recommended. They recommend "shared clinical decision-making".

No practice changes warranted

- Insurance coverage is unaffected under existing law
- Clinicians can keep recommending and administering vaccines per the standard schedule and state law

Why Don't Individuals Get Vaccinated?

1 Barrier that prevents them from accessing vaccine



- Transportation issues
- Cost concerns
- Time constraints
- Limited local availability
- Language or health literacy barriers

2 Actively choose not to get vaccinated or vaccinate their child(ren)



- Personal, cultural, or religious beliefs
- Misinformation or distrust
- Influence from family, friends, or community
- Perceived low risk or lack of need

Constraints: Practical Barriers to Vaccines

Too little promotion

- Lack of promotion, or of verbal and printed education

Cost and awareness

- Self-paid vaccines with no subsidy; low awareness of free-vaccine policies

Access

- Difficulty reaching services, long clinic waits, inconvenient travel

Personal and practical

- Fear of injections, religious objections, being sick on the day, or forgetting



Increase Access to Vaccine

If you build it, they will come…



Drive through vaccine programs



If They Won't Come to You, Go to Them

School-based programs



Employee Health Fair



50–90% of adult vaccines are given at pharmacies

Actively Choosing Not to Get Vaccinated: Anti-Vaccine Versus Vaccine Hesitancy

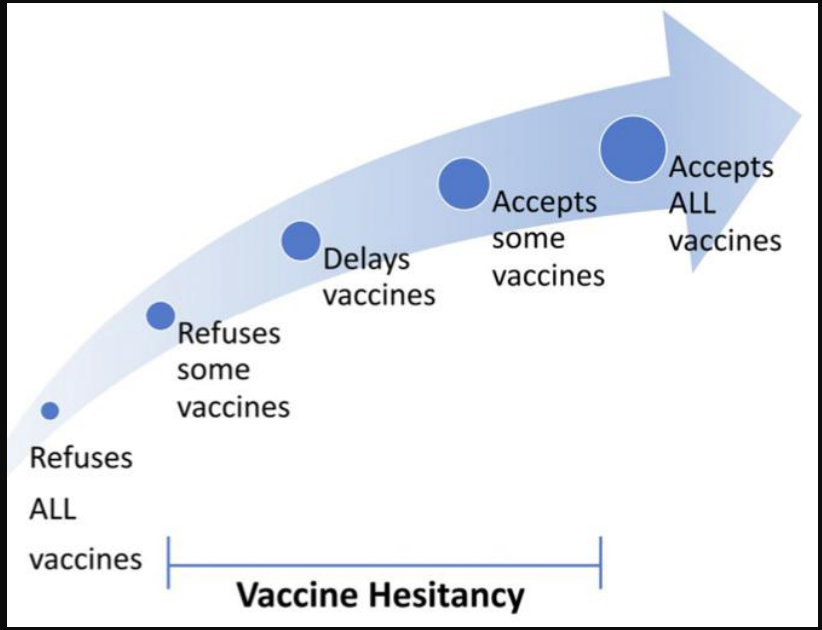
Anti-vaccine

Adamant refusal to vaccinate self or child(ren) for one or more vaccines

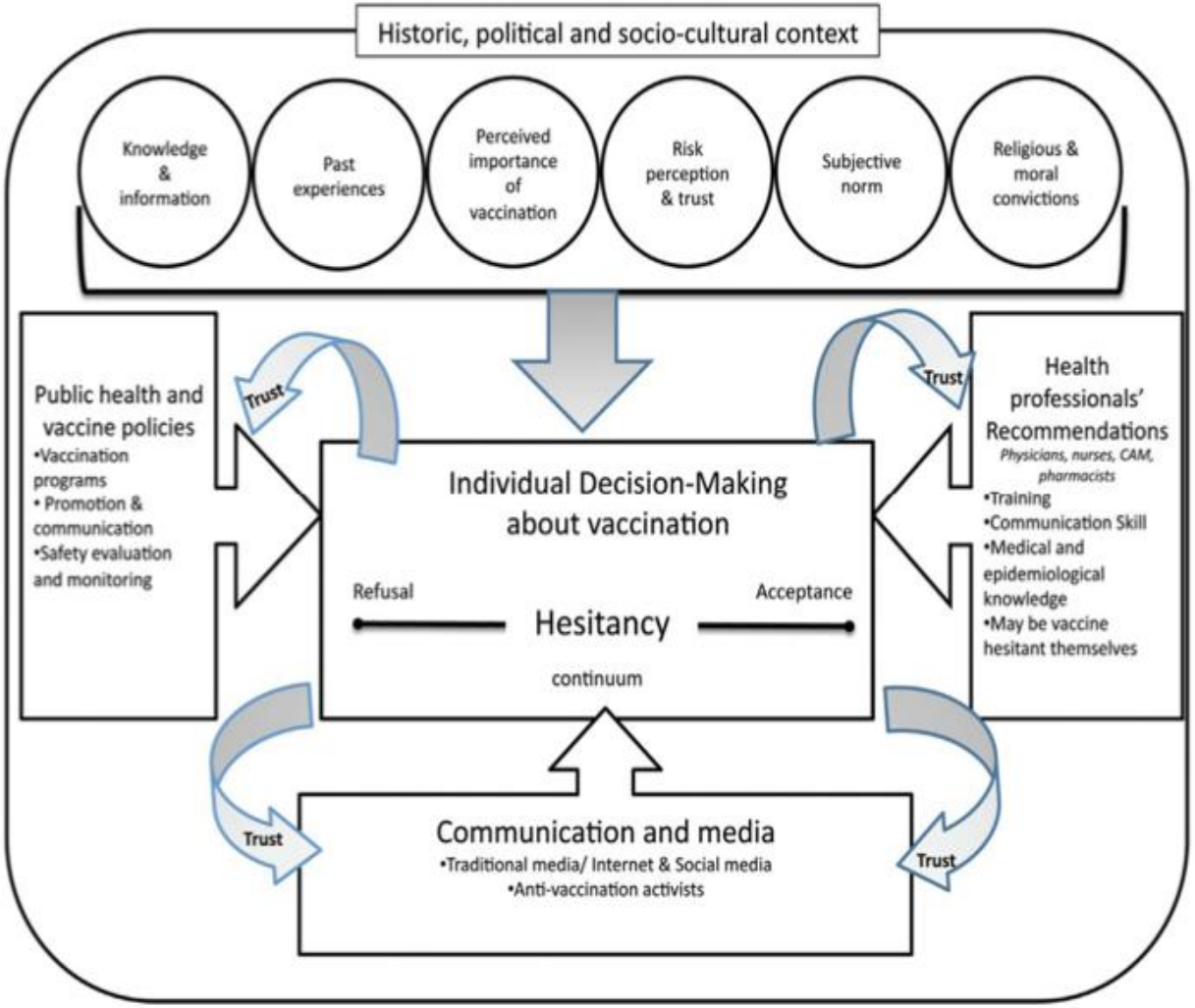
Vaccine hesitancy

Has concerns about:

- Safety of one or more vaccines or adjuvants in vaccines
- Overall number of vaccines recommended within a certain period of time



Vaccination Decision-making is a Complex Dynamic



WHAT WORKS

Mandatory Vaccination Policies & Laws

The strongest predictor of high vaccination rates

Even "mandatory" isn't always mandatory

Medical contraindications

Religious opposition

Allowed by

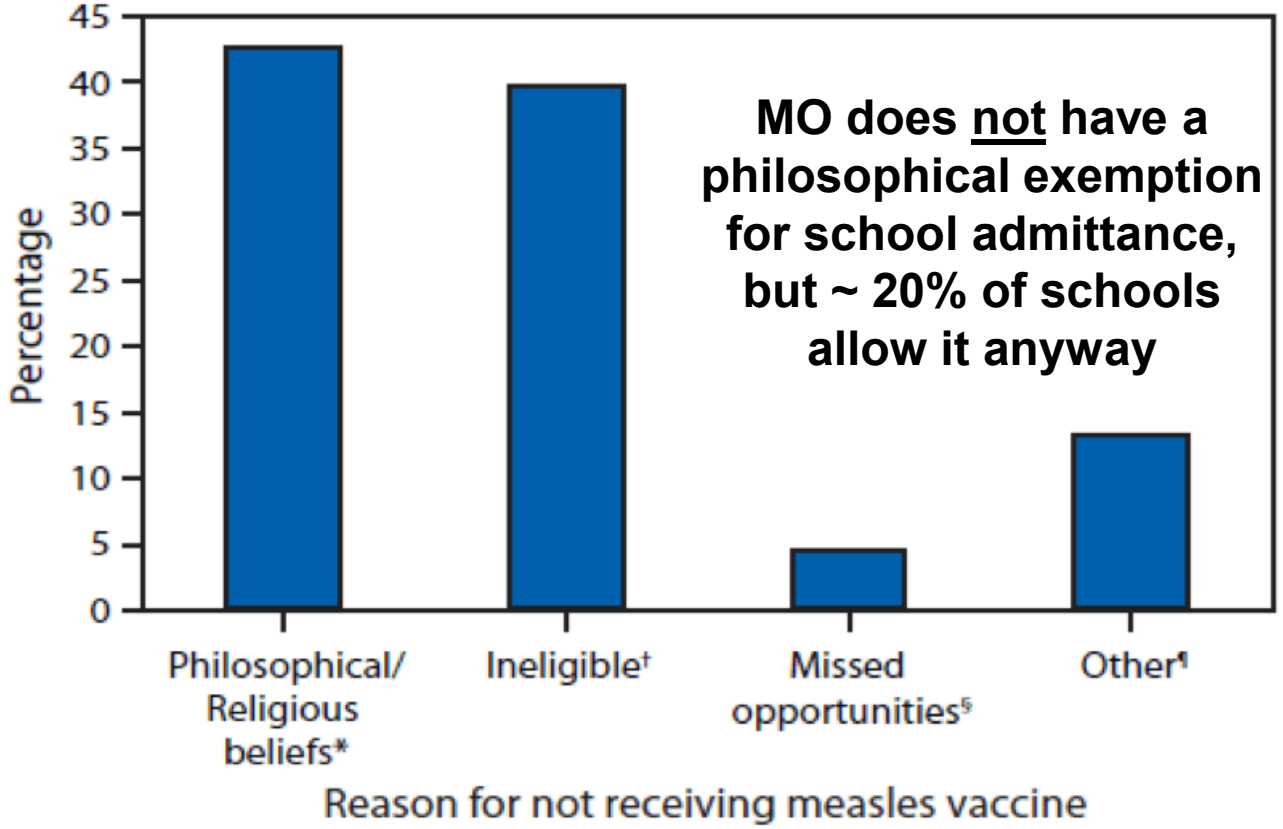
46 states

"Philosophic" opposition

Allowed by

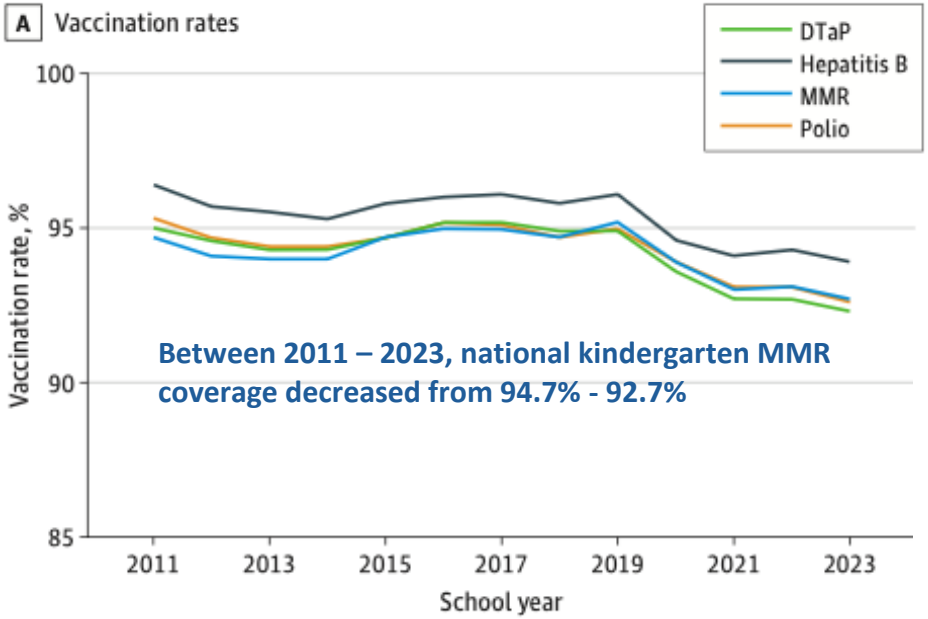
16 states

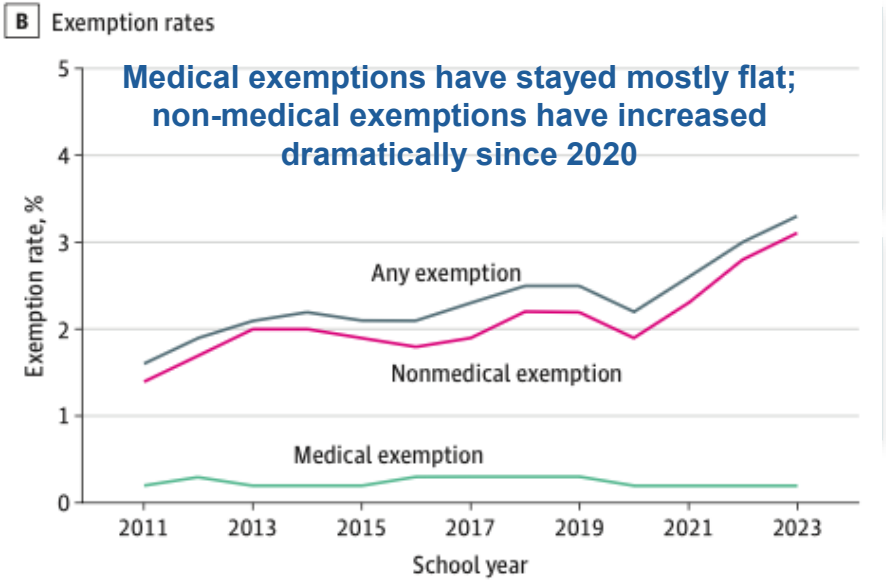
Even When Mandated, Policies Aren't Always Enforced



Reasons for unvaccinated status among those with measles

Vaccine Uptake Has Decreased as Vaccine Exemptions have Increased





Source: Bald et al., JAMA Pediatr 2026 (CDC data, 2011–2023).

Mandatory Vaccination Policies

School entrance

All states have one, with varying policies on vaccines required and exemption options

Occupational health

- **Healthcare, education & childcare**

Varies by facility, agency, state, school, or employer

Childcare entrance

All states have one, with varying policies on vaccines required and exemption options
- Enforcement varies greatly

Travel & public access

Depends on destination, but mostly international travel

What Do You Do When You Can't Mandate A Vaccine?

Reduce practical barriers

- Increase access
- Decrease costs when possible

Promote immunization

- Opt out policies
- Healthcare personnel recommendation
- Presumptive communication
- Dispel misinformation

Opt Out Policies



Essentially making vaccination the default, though individuals may opt out



Most effective when the opt out involves an action (signing a form/document, having a conversation about the reasons, etc)

Healthcare Personnel Communication

Use presumptive language
Assumes parents will vaccinate their children

→ *"Your child is due for their first HPV vaccine today."*
"It is the time of year for your child to receive their annual influenza vaccine."

Give strong recommendations
Consider a "truth sandwich," as recommended by the AAP: use facts and debunk misconceptions

→ *"I recommend the influenza vaccine annually to reduce the risk of severe flu illness."*
"I recommend the HPV vaccine for all teens to reduce their risk of associated cancer."

Listen compassionately, tailor conversations
Go in knowing parents care for their children; elicit details about their concerns

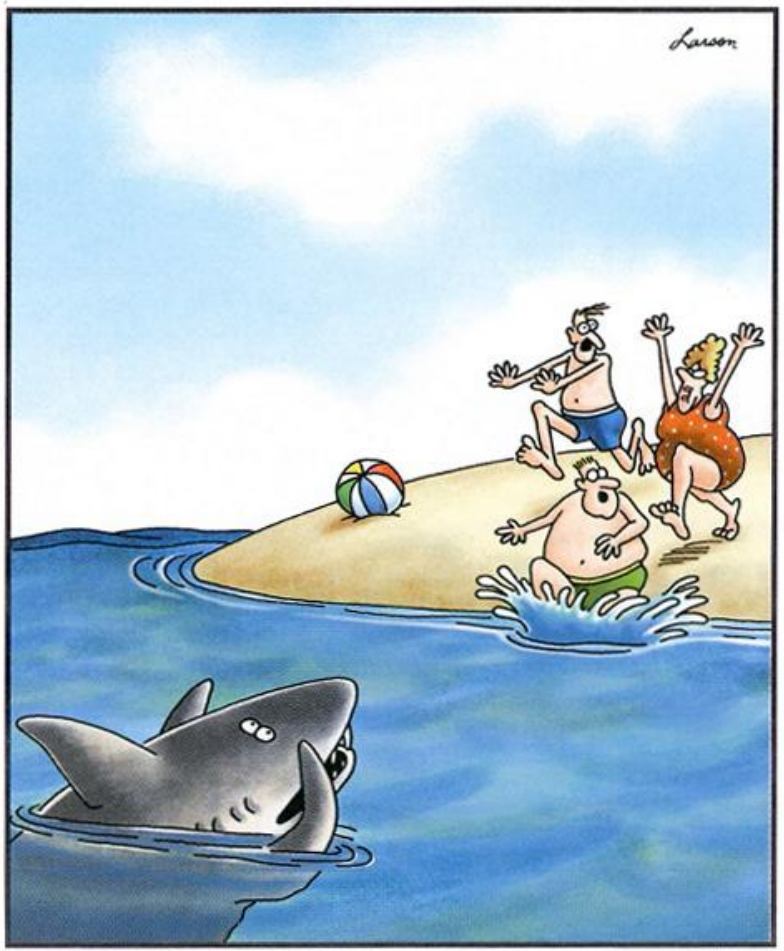
→ *"What concerns do you have specifically regarding the vaccines scheduled for today?"*
"I understand you want your child to be as healthy as possible."

Lead with empathy

Ask about their concerns behind their hesitation and then address those instead of blaming families.

Dispel Misinformation

Hesitancy has been directly linked to misinformation spread on social media



"Bear! Bear!"

Myth: Too Many Vaccines at Once Overloads the Immune System

Giving Multiple Vaccines at a Time is Safe
and Does Not Overwhelm the Immune System



Giving multiple vaccines at a time is **safe** and does not overwhelm the immune system.

Babies encounter thousands of bacteria, viruses, and other antigens every day.



By age 2, children only receive **~315** antigens from vaccines.

- A tiny fraction of what their immune system handles every day.
- Far less than the several thousand antigens in vaccines in the 1990s.

Larger exposures from:



Licking a grocery cart handle.



Kissing the family pet.

If an immune system were truly overwhelmed,
a child would become more susceptible to other infections.

Vaccinated children are not more prone to infections or immune dysfunction than unvaccinated children.

Myth: Vaccines Cause Autism

Andrew Wakefield
-Said link between MMR & autism
-Lancet retracted the paper
- 10 co-authors retracted their findings

Multiple follow up studies provide evidence that there is no link


A STUDY LINKING AUTISM TO CHILDHOOD VACCINATIONS HAS NOT ONLY BEEN DEBUNKED, BUT IT IS AN "ELABORATE FRAUD." WE TRUST THAT THIS ENDS THE MATTER.
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Myth: There Are Metals in Vaccines, Like Aluminum, That Can Harm Babies

Yes, there are adjuvants like aluminum in vaccines

- Needed to boost the immune response
- Very small amount
- More aluminum in breast milk or formula than in all vaccines combined

Myth: The Flu Vaccine Causes the Flu and/or Doesn't Really Work

	Standard flu vaccine uses inactivated or recombinant virus pieces that cannot cause an infection
	Vaccine side effects are usually mild, but some might confuse those for illness
	Takes ~ 2 weeks to build full immunity, so may get a different infection during that time period

Why the Flu Vaccine is Vulnerable to Hesitancy

Needed every year

Hesitancy has repeated chances to take hold

Not always a great match; not 100% effective

Strains in the vaccine don't always match circulating strains

Can be less effective against symptomatic disease than other vaccines

False beliefs

Myths and misperceptions circulate widely:
"The vaccine causes flu" or "I got vaccinated, but got the flu anyway"

Vaccine Side Effects vs Flu Symptoms

Flu shot side effects (1 -2 days):

- Soreness, redness, or swelling at site
- Low-grade fever
- Body aches

LAIV side effects (1 -2 days):

- Runny nose
- Nasal congestion
- Mild headache
- Low-grade fever
- Muscle aches
- Sore throat

Flu symptoms (3 – 7 days):

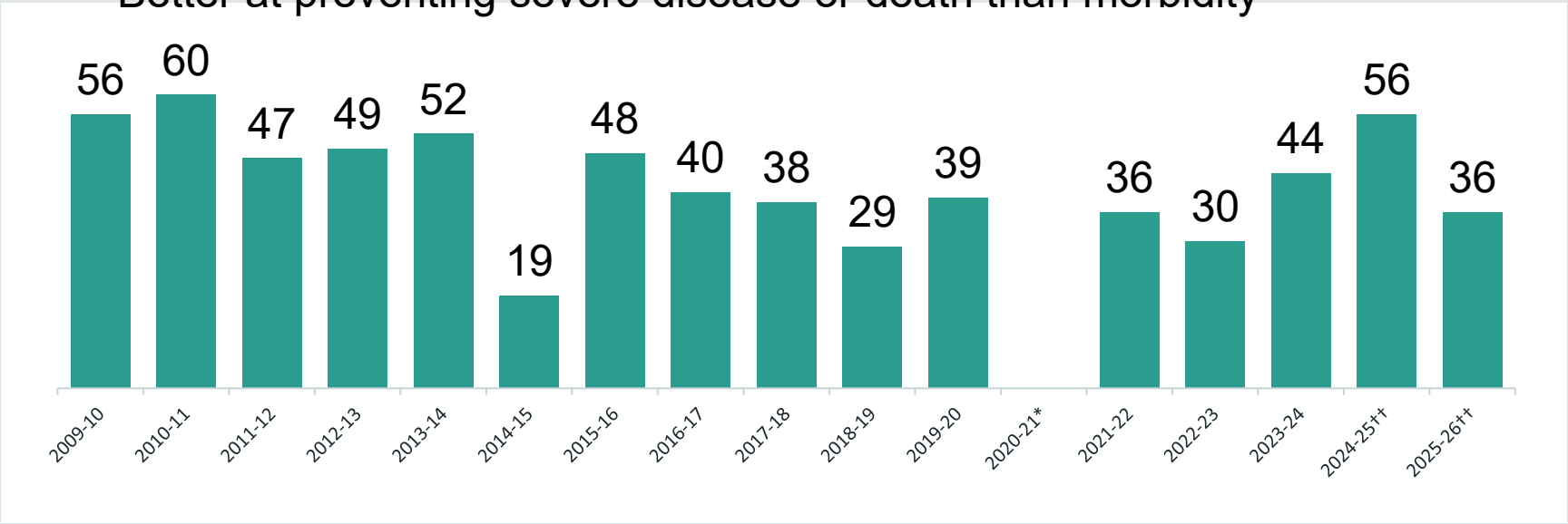
- High fever
- Body & headaches
- Sore throat
- Non-productive cough
- Nausea
- Febrile seizures

Viruses in the influenza vaccine shot are killed/inactivated;
Viruses in the LAIV nasal vaccine are greatly weakened

You cannot get the flu from the vaccine

Seasonal Flu Vaccine Effectiveness: 2009/2010 – 2025/2026

- Varies by year, depending on match
- Better at preventing severe disease or death than morbidity



2014-15: 19% — a poor antigenic match with circulating strains

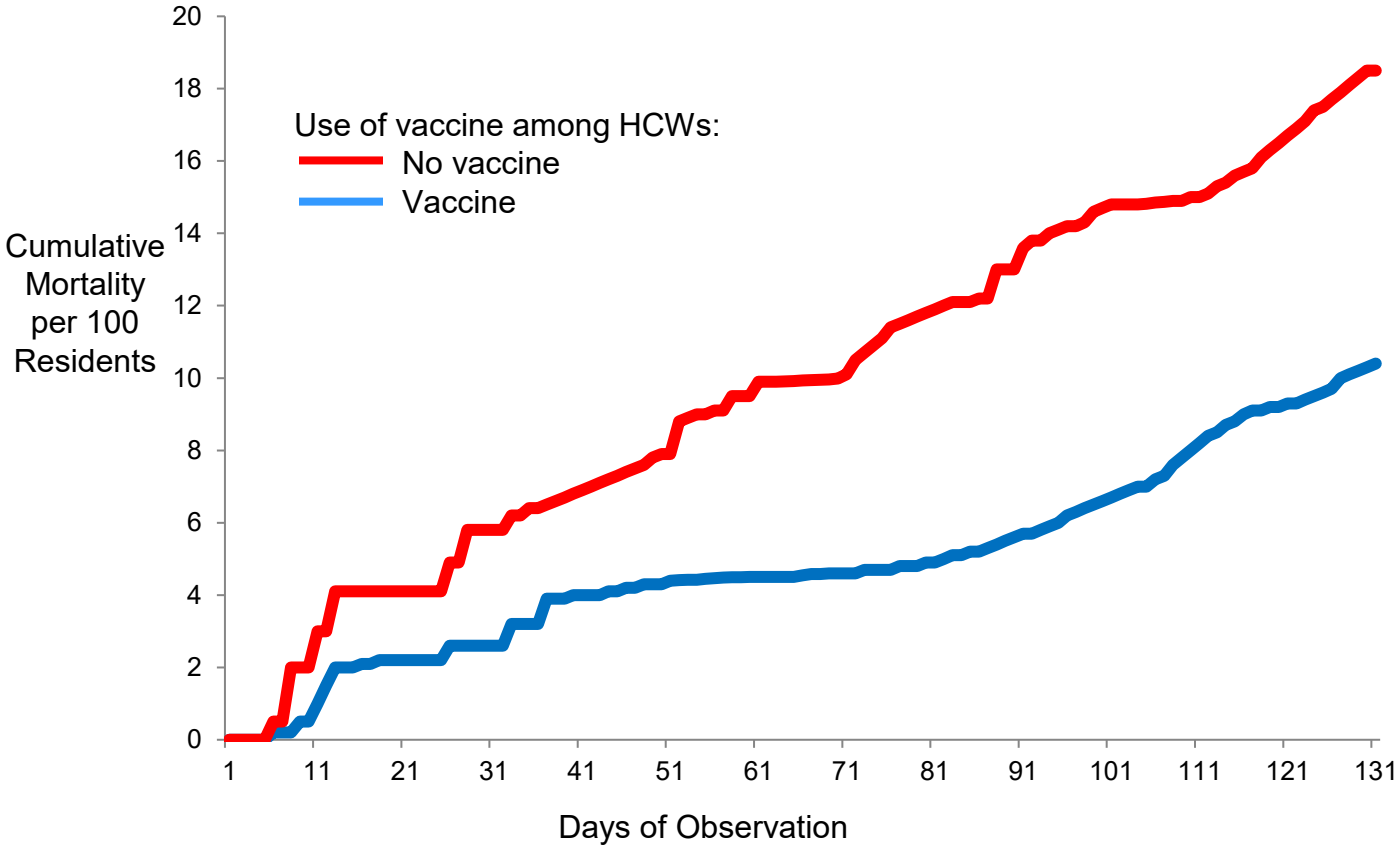
2020-21: no data — minimal flu activity during COVID-19

**No 2020–21 estimate due to insufficient influenza activity during the pandemic. ††Interim/provisional estimate. Source: CDC seasonal flu vaccine effectiveness studies.*



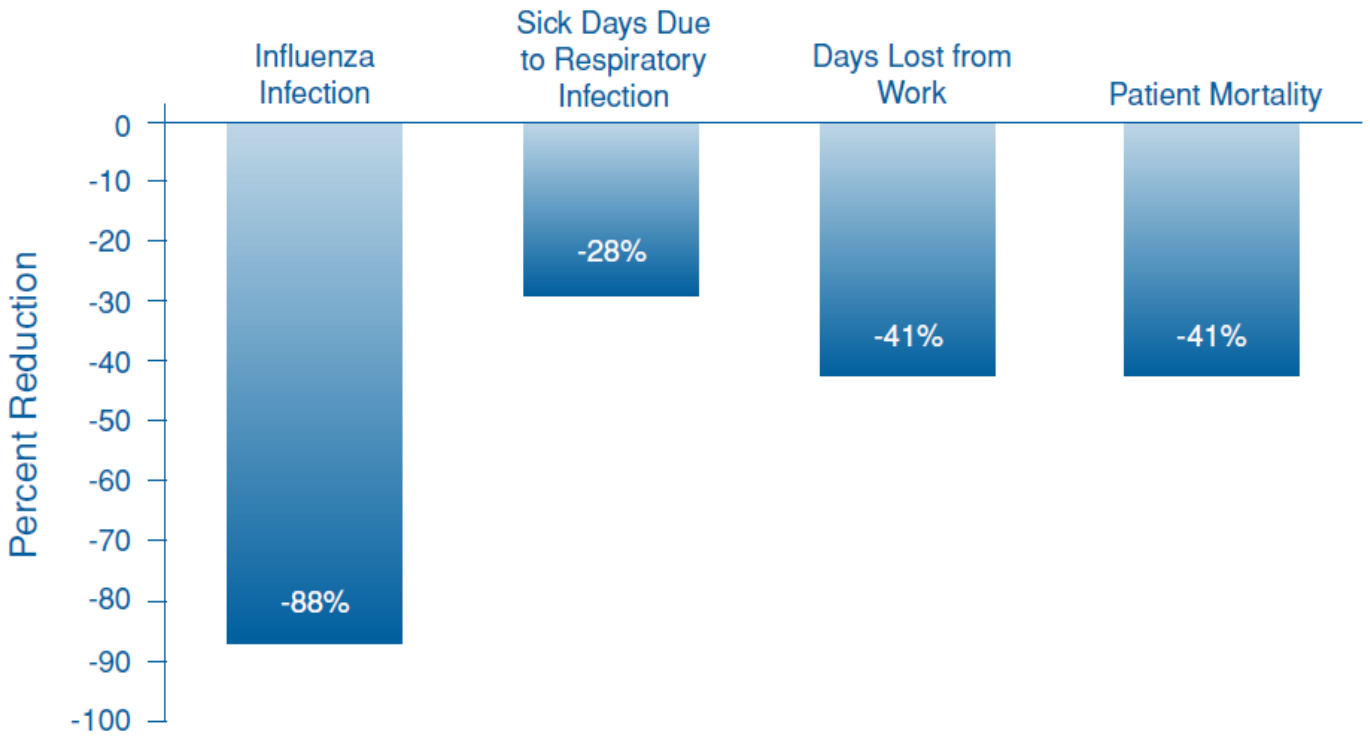
Unvaccinated HCP can play a role in disease spread

Vaccination of Healthcare Workers May Reduce Mortality of Nursing Home Residents



Potter J, Stott DJ, Roberts MA, et al. (1997). Influenza vaccination of health care workers in long-term-care hospitals reduces the mortality of elderly patients. J Infect Dis.,175:1-6.

Benefit to HCPs of Being Vaccinated



Adapted from: Talbot TR, Bradley, SF, and Cosgrove SE, et al. SHEA Position Paper: Influenza Vaccination of Healthcare Workers and Vaccine Allocation for Healthcare Workers During Vaccine Shortages. Society for Healthcare Epidemiology of America. *Infect Control Hosp Epidemiol*. 2005; 26:882-890.

Increasing Vaccine Uptake Among Children Results in Lower Morbidity in Adults

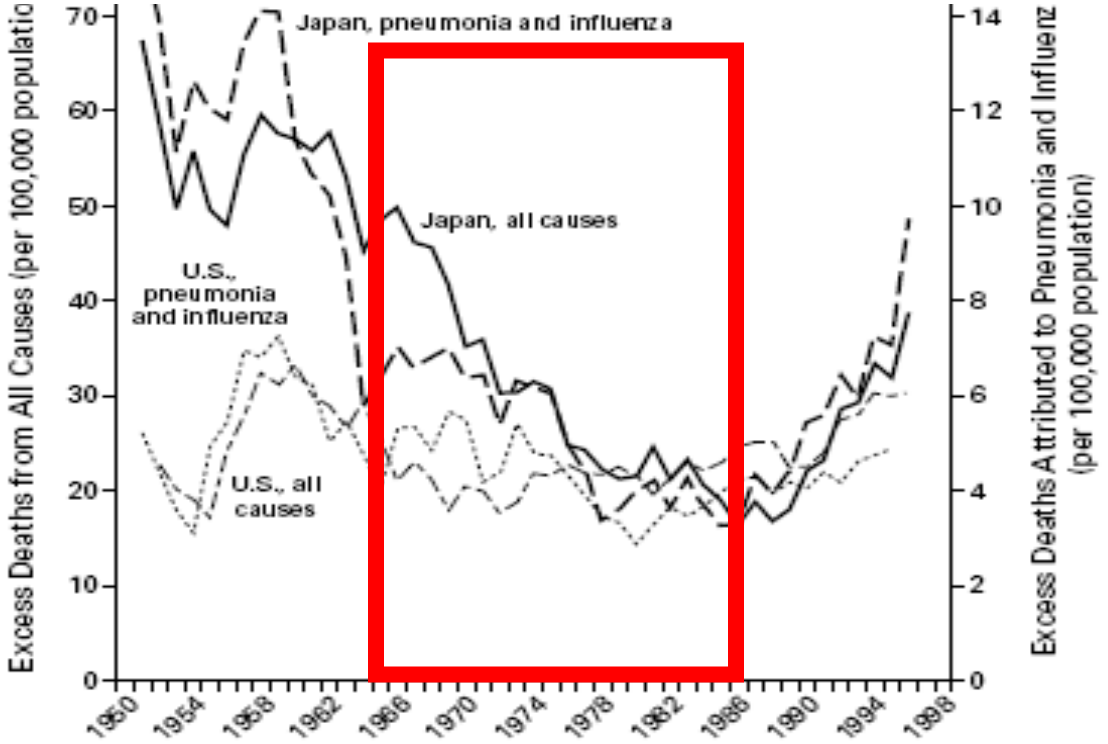


Figure 3. The Five-Year Moving Average of Excess Deaths Attributed to Both Pneumonia and Influenza and All Causes, for Japan and the United States.
Tick marks represent the beginning of the years indicated.

Vaccinating children can protect the elderly

Myth: Infection is Better and Safer Than Vaccines

- Perception that infection is “natural” and vaccines are “unnatural”
- All vaccines have side effects
- Risk of disease > risk from vaccine

Risk of death from some vaccine preventable diseases

Measles
1-3 per 1,000

Mumps:
1-3.8 per 10,000

Flu:
1.9 – 14.2 per 100,000

Pertussis:
Infants (< 2 months):
1 per 100

WHAT DOESN'T WORK

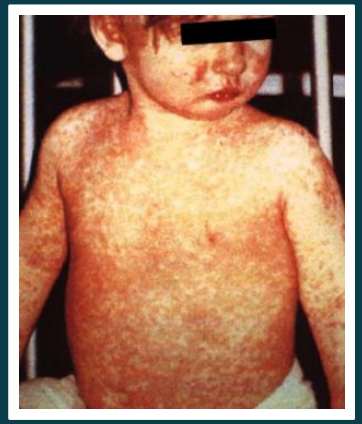
Showing pictures of disease to convince parents about disease severity

The hope
Once thought it might increase perceived susceptibility

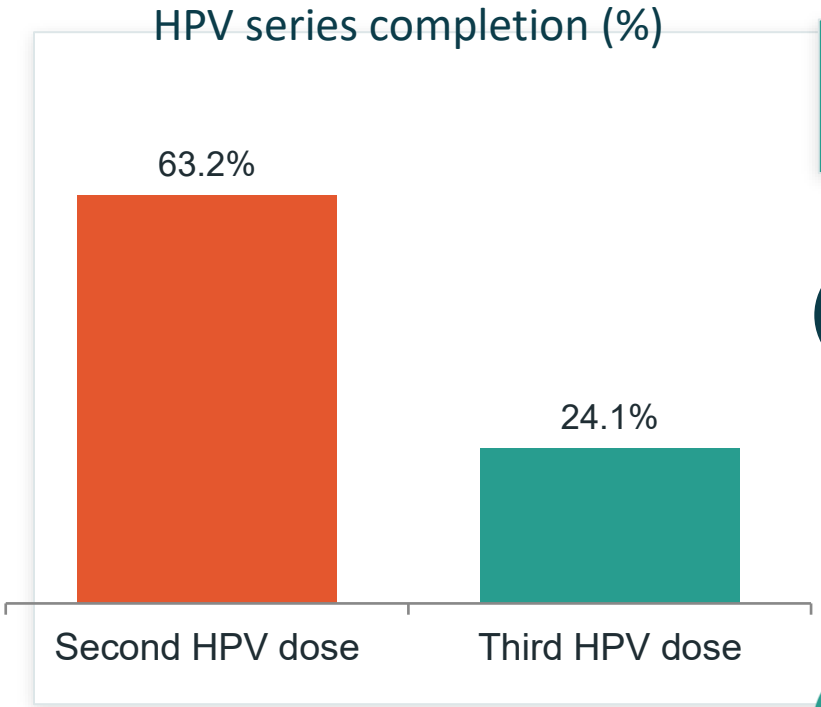
The result
Did the opposite: parents associated pictures of the disease with getting the vaccine







Other Challenges: Multi-dose vaccines



Use multimodal interventions

Provider recommendation — Trusted professional

Reminders — Emails, phone calls/texts, and mail - Automate for ease

Onsite access, walk in appts, home visits — Decrease practical barriers

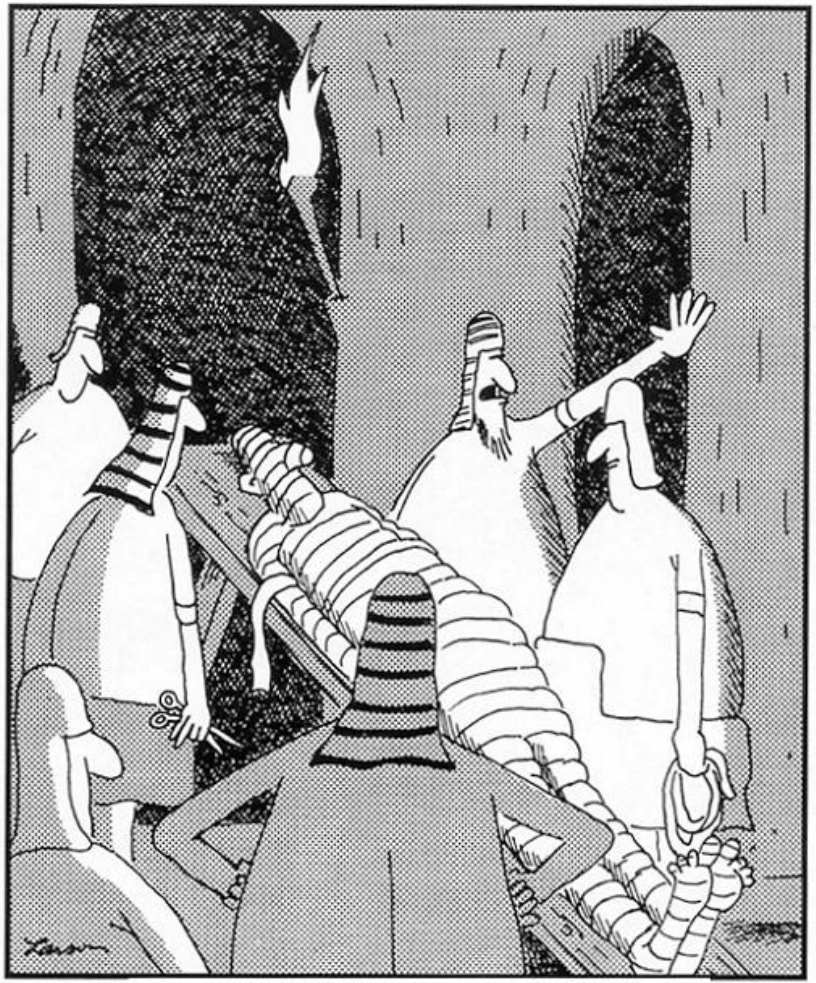
Takeaways

1 **Mandate when possible**
Use law or policy to increase vaccine uptake, limit exemptions.

2 **Make vaccination easy**
Ease access, use opt-out defaults, and close exemption loopholes in low-coverage areas.

3 **Equip trusted voices**
Give healthcare professionals and community leaders the information and language to use.

4 **Lead with empathy**
Address concerns behind hesitation instead of blaming families.



Questions