Optimizing

IMMUNIZATION PRACTICES:

Your Role, Your Impact

TETANUS, DIPHTHERIA, PERTUSSIS

What Are Tetanus, Diphtheria, and Pertussis?[1,2,3]

- Tetanus, diphtheria, and pertussis are bacterial infections caused by 3 different bacteria
- The major risk factor for these diseases is a lack of protection against all three infections in unvaccinated people

Tetanus (aka lock jaw)

Caused by: *Clostridium tetani* and affects the nervous system leading to muscle stiffness and spasms

- The vehicle of this bacterium is contaminated soil, dust, or animal feces that can enter through open wounds–cuts, punctures, or burns
- C. tetani produces toxins, including tetanospasmin (tetanus toxin), that target the central nervous system and triggers painful muscle spasms throughout the body, particularly in the jaw and neck, hence "lockjaw"
- Nearly all cases in the US occur in adults who are unvaccinated or not current on booster

Diphtheria

Caused by: *Corynebacterium diphtheriae* and affects the respiratory system and sometimes the skin

- It is transmitted most often by respiratory droplets but can also be transmitted by direct contact with infected sores or ulcers
- The disease symptoms are caused by the diphtheria toxin
- The main identifying characteristic of respiratory diphtheria is the formation of a pseudomembrane in the throat that appears within 2–3 days of the illness and makes breathing difficult

Pertussis (aka whooping cough)

Caused by: *Bordetella pertussis* and affects the respiratory system causing the characteristic rapid, prolonged cough with a "whoop" sound when a patient inhales

- It is transmitted by droplets into the respiratory system
- Children afflicted by this infection experience severe, uncontrollable coughing fits that are characterized by the "whooping" sound we have been taught in school. Adults who are vaccinated have less severe disease, fewer complications (eg, pneumonia), and fewer hospitalizations.
- The timeline for whooping cough can span many weeks

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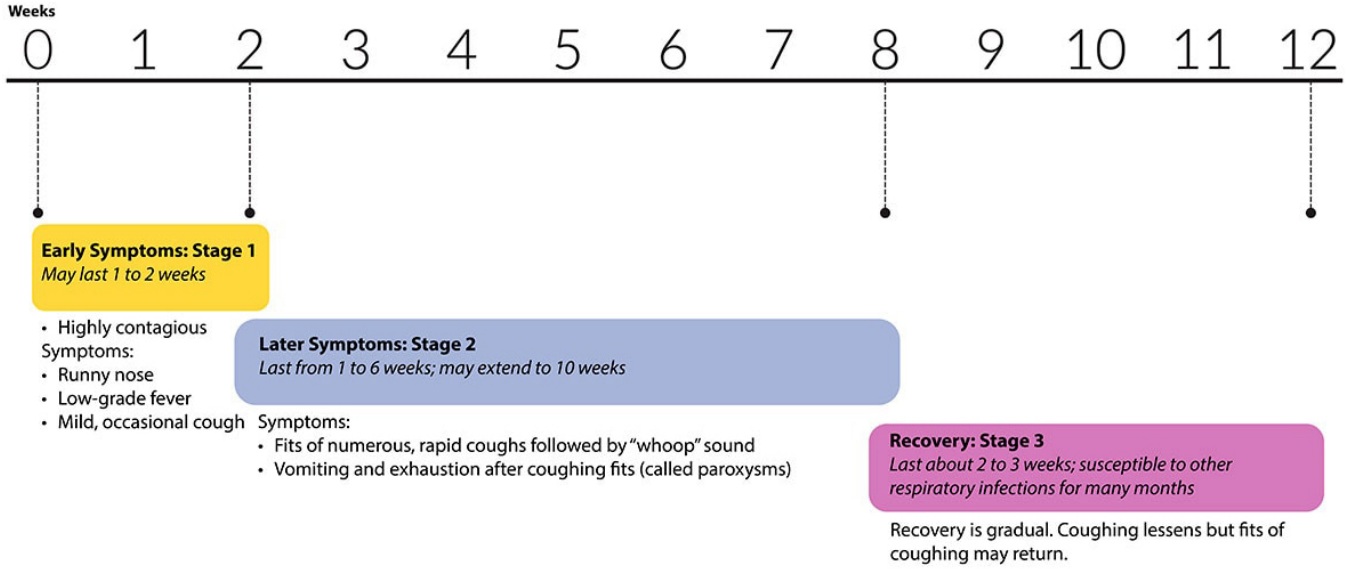
Figure 1. The Timeline for Whooping Cough Progression[4]



What Is the Burden of Disease?[4]

- Pertussis is especially impactful for children because they are too young to be vaccinated. They depend on community immunity from adult caregivers.
  - The mortality rate for children is particularly high among infants under 12 months. In a 2009 study, the average annual mortality rate attributed to pertussis was estimated to be 3.8 per 1,000,000 live births, and 13.1 per 1,000,000 live births for infants aged < 2 months.[5]
  - Complications from pertussis, such as pneumonia or seizures, can lead to hospitalization. The economic burden from hospitalization, some requiring critical care, impacts the health system as it raises overall costs.
- The complications from diphtheria include myocarditis, neurological palsies, and respiratory distress, which results in an overall case-fatality rate of 5-10%. The fatality rate is higher for adults 40 years and older (up to 20%).
- Tetanus has a death rate of approximately 10%, with higher risk in adults 70 years or older
- Loss of wages from missing work, paying for childcare, and medical expenses can have a significant impact on patients since recovery can take weeks

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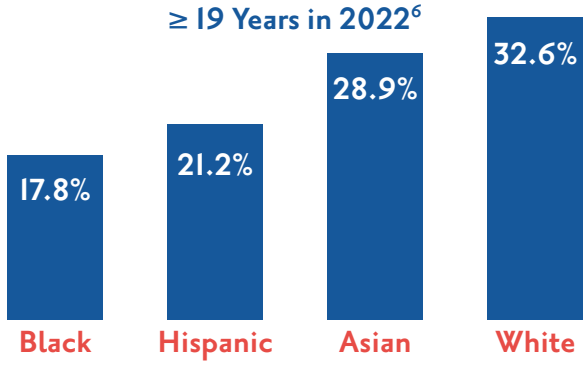
What Is the Current Immunization Rate?[6]

- The latest data from the CDC (2022) indicate that 59.2% of US adults (≥ 19 years) have received one of the approved vaccines (Td and Tdap) in the last 10 years
- Overall, Tdap coverage for Black, Hispanic, and Asian adults aged ≥ 19 years was lower compared with White adults

Figure 2. Tdap Vaccine Coverage in Adults ≥ 19 Years in 2022[6]



What Vaccines Are Currently Available in the US?

- Two vaccine combinations are available for adults, namely Tdap and Td
- An additional combination, DTaP, is available for children younger than 7 years

What Are the Current Immunization Recommendations?

Schedule

Vaccine	19-26 years	27-49 years	50-64 years	≥65 years
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (See Notes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of immunity

Recommended vaccination for adults with an additional risk factor or another indication

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Recommendations[8]

Adults who have completed the primary series

- **And have received at least 1 dose of Tdap at age 10 years or older:** Td or Tdap every 10 years
- **And have not received Tdap at age 10 years or older:** 1 dose of Tdap, then either Td or Tdap every 10 years

Adults who are unvaccinated or have not completed the primary vaccination series

- Administer remaining doses to complete the series
- Then 1 dose of Tdap followed by 1 dose of Td or Tdap 4 weeks later, and a third dose of Td or Tdap 6-12 months later
- Then, Td or Tdap every 10 years

Pregnancy

- **1 dose Tdap during each pregnancy**, preferably in early part of gestational weeks 27–36 so that the infant will be protected at birth

Wound management

- **For clean and minor wounds**, Tdap or Td if more than 10 years since the last booster
- **For all other wounds**, Tdap or Td if more than 5 years since last dose

What are Considerations When Speaking With Patients About Being Immunized Against Tetanus, Diphtheria, and Pertussis?

- Some people think that they do not need the vaccine because they do not have the risk factors (eg, they don't work outside where a wound might be contaminated with soil)
- Time to schedule a separate appointment for vaccines
- Misinformation about whether a vaccine is required or about contracting the disease from the vaccine

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What Are Strategies to Increase Vaccine Uptake?[9]

- **Assess the immunization needs** of all your patients at every visit because their needs will change based on age, health conditions, etc. Discuss boosters with your patients routinely during annual visits.
- **Use reminders** in your electronic health record or health registry to remember to speak with patients
- CDC data indicate that a **health care professional's recommendation is the strongest predictor** of whether a patient gets vaccinated, so make clear recommendations
- **Discuss reasons why the vaccine is right** for a patient and the **potential cost** (time, financial, missed work or family events, etc.) if the patient becomes ill
- Share **positive personal stories** about vaccines
- **Prepare patients for the side-effects** they might experience (eg, soreness in the arm), how to manage it (eg, cool compress, acetaminophen), and instruct them to return if the side-effects persist beyond a few days
- **Recommend and offer the vaccine at the same time** or **refer the patient** to a provider who can administer the vaccine. Keeping vaccines in stock to offer to patients during visits can improve access and increase vaccination rates.
- **Use standing orders** so that medical assistants and nurses can administer the vaccine
- **Refer patients** to providers in the area that offer vaccines that you don't stock, or write prescriptions for, to remind the patient and pharmacy that the patient requires a particular vaccine
- **Document patient vaccinations** in their medical record and your state's immunization registry so that other providers will also be in the know about your patient's vaccine status
- For patients who are underinsured or uninsured, recommend **community resources and the state's section 317 funds**[10]

Key Takeaways

- Vaccination is key to preventing the severe complications from tetanus, diphtheria, and pertussis
- Offer the vaccine during every visit, including annual visits, after 27 weeks of pregnancy, and when patients follow up for wound care management
- Vaccine education from PAs to patients is pivotal to addressing misinformation and improving vaccine uptake

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