Baylor College of Medicine

DEPARTMENT OF PEDIATRICS

Texas Children's Hospital®

Division of Infectious Diseases

Vaccine Guidance in Solid Organ Transplant

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Disclosures

No relevant disclosers.

Objectives

- Recognize the importance of vaccinations in solid organ transplant (SOT) candidates and recipients.

- Summarize vaccine recommendations for SOT candidates and recipients.

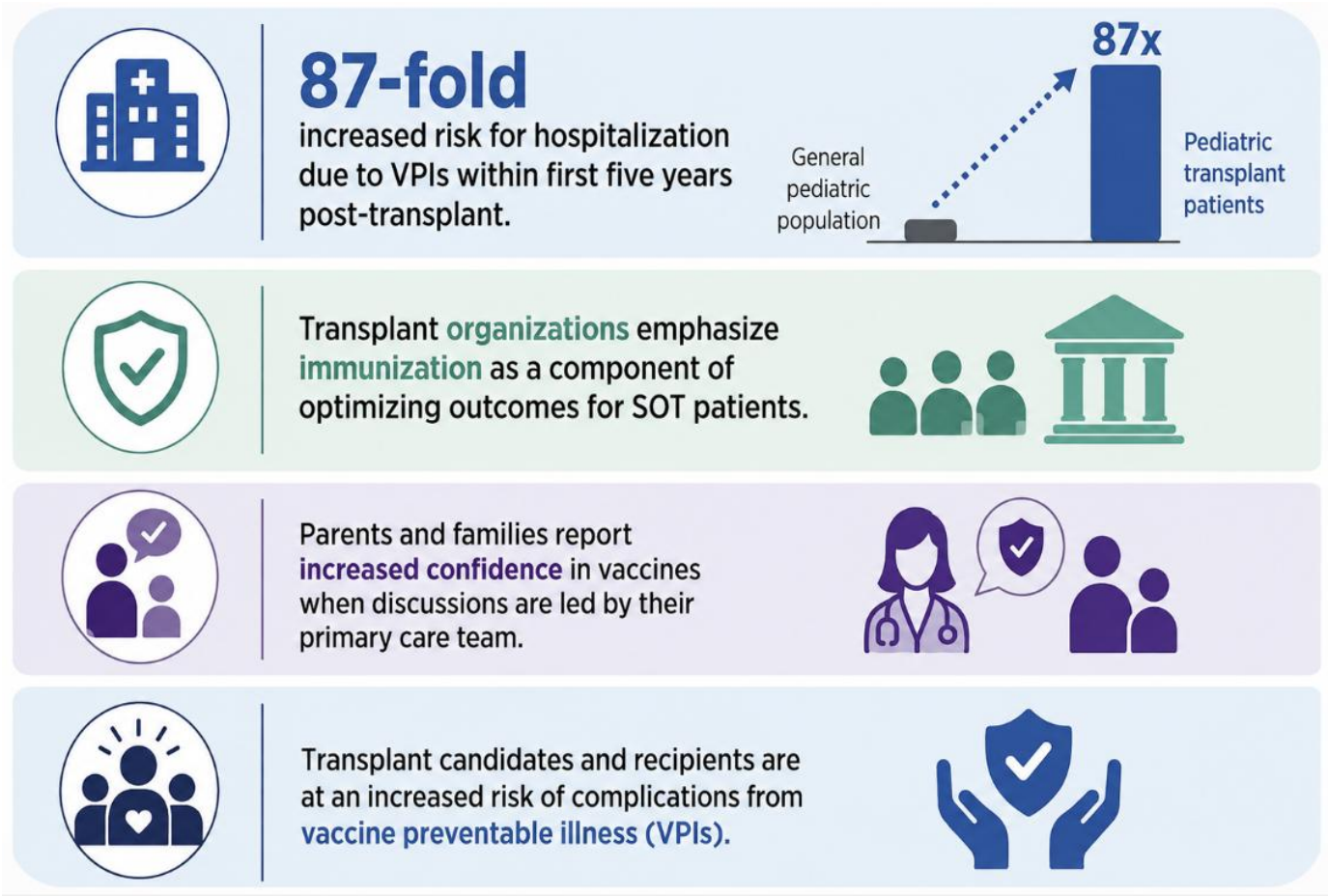
- Apply evidence-based strategies to address vaccine hesitancy in transplant candidates, recipients, and their families.

- Recognize the importance of live viral vaccines and identify opportunities for administration in the pre- and post-transplant period.

Poll: Vaccines in Daily Practice

Results

Clinical Significance



Feldman, et al. *JAMA Pediatrics* 2019.

Pre-Transplant Considerations

- The goal is to administer vaccines prior to transplant or immunosuppression to achieve optimal immune response and protection.

- Review records and serologies to determine if boosters are needed.

- Typically recommend a tailored, accelerated immunization schedule depending on age, underlying disease process, etc.

Post -Transplant Guidance

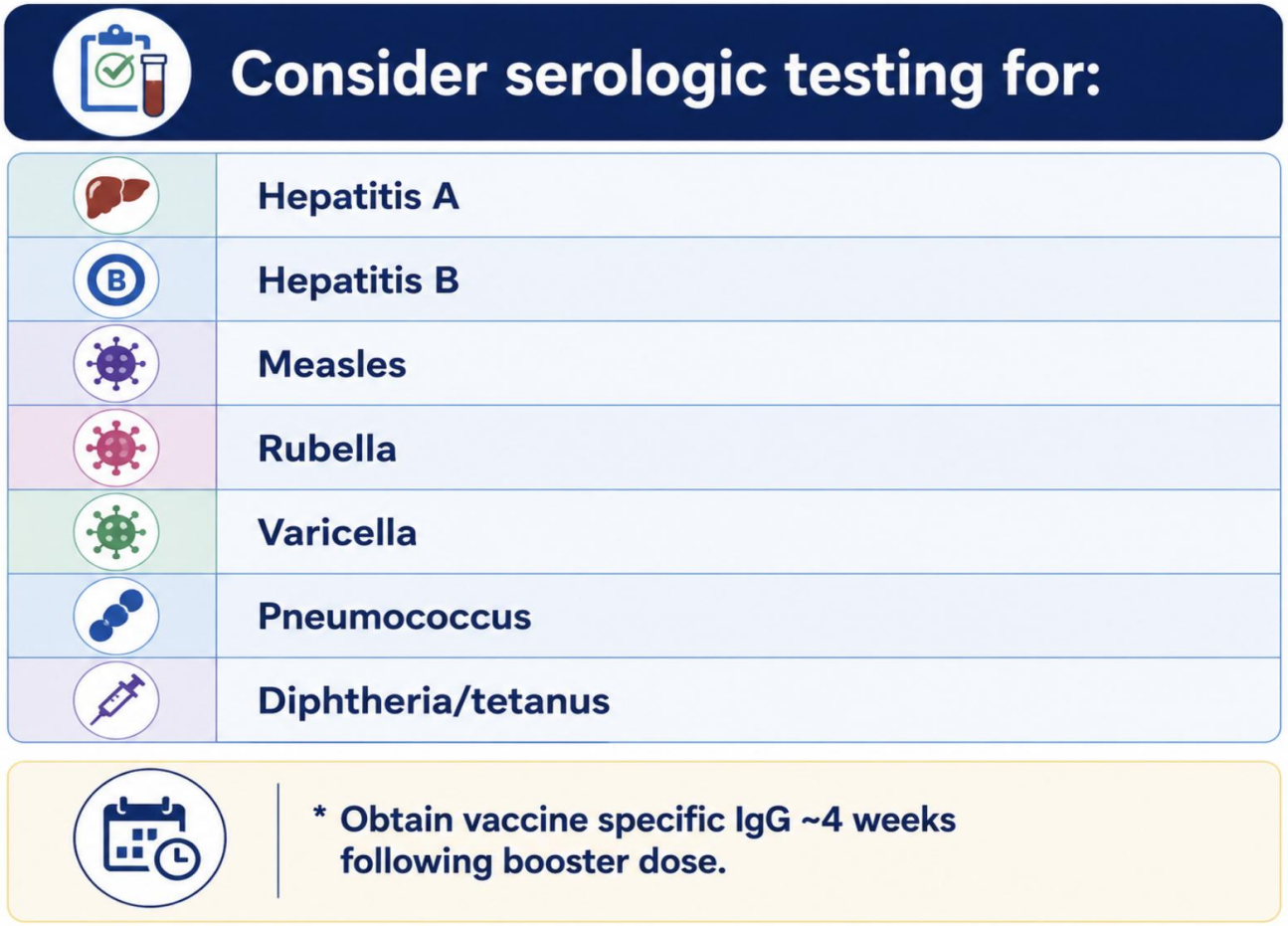
- Hold routine immunizations for ~6 months post-transplant pending immune system recovery, rejection treatment, etc.

- If immunizations are given <2 weeks before transplant they will need to be repeated.

- Influenza and COVID can be given as early as 1-month post-transplant in respiratory season.

- No live viral vaccines***

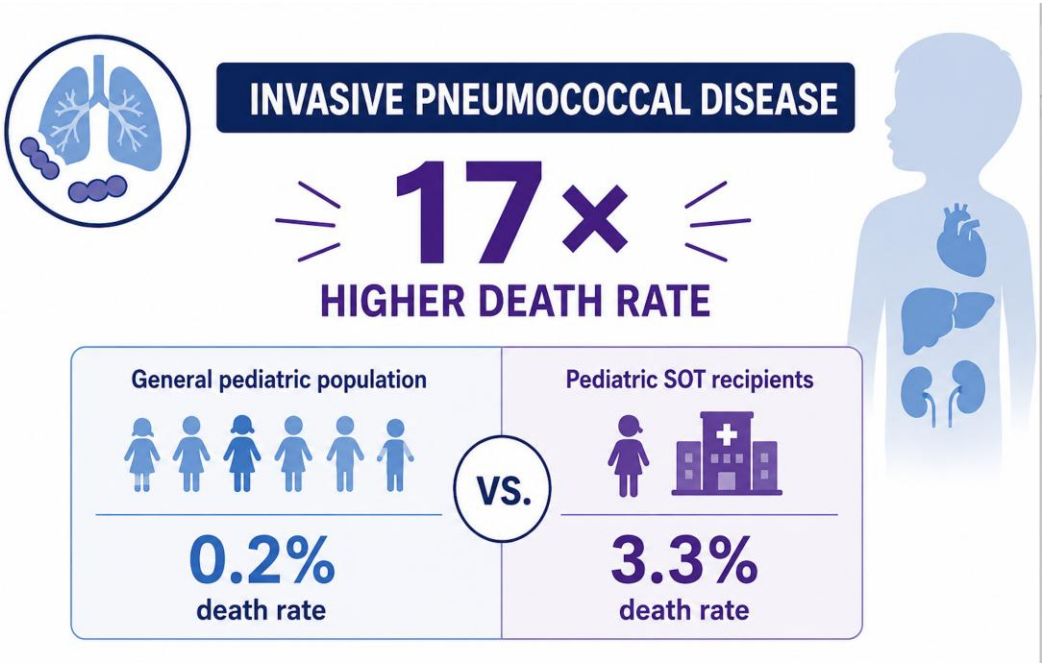
Serologic Testing Recommendations



Individual Vaccine Recommendations

Pneumococcus (PCV20/PPSV23)

- Recommend PCV20 (conjugate) or PPSV23 (polysaccharide) prior to transplant.
- Pre- and post-transplant, check a pneumococcal serology panel.



Olarte, et al. *Transpl Infect Dis* 2017. van Aalst, et al. *Travel Med Infect Dis* 2018. Feldman, et al. *JAMA Pediatrics* 2019.

Influenza

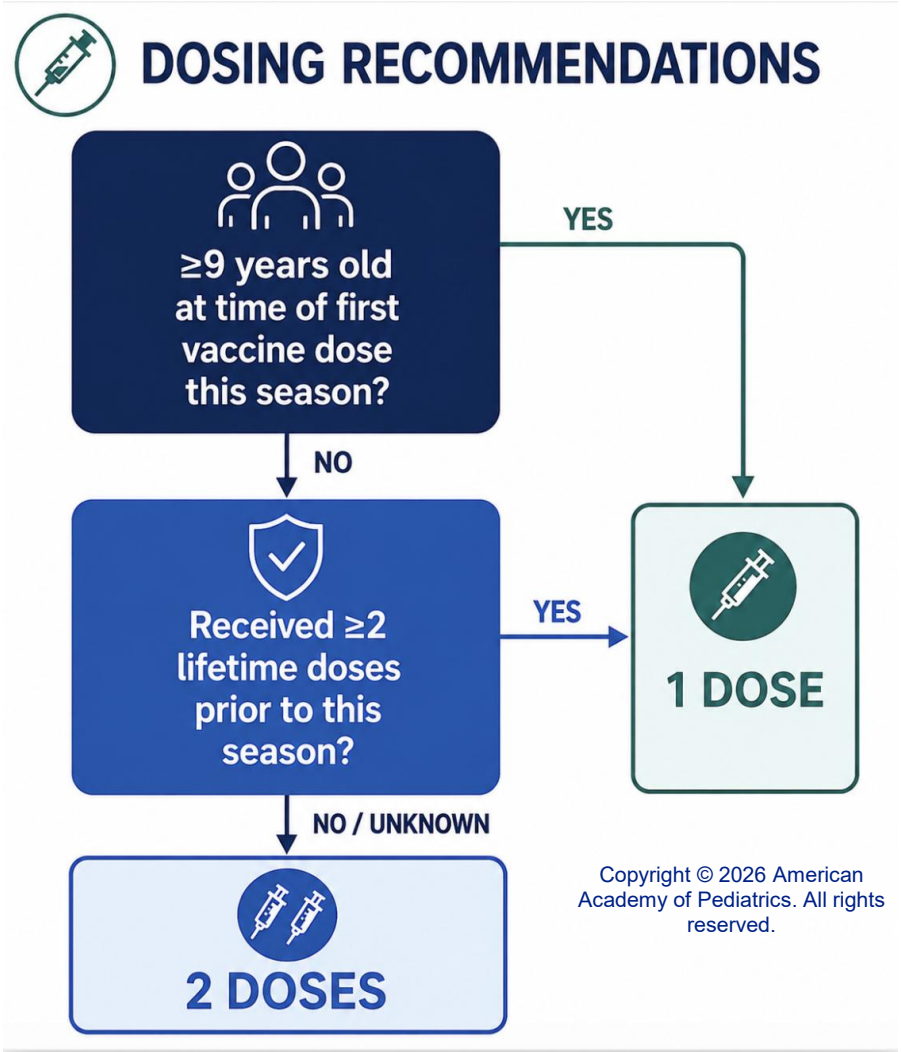
- Hospitalization rate in first year post-transplant is 50x higher and the death rate is 4x higher in pediatric SOT patients.

- Complications include:
  - Pneumonia / lower respiratory tract disease
  - Secondary bacterial pneumonia
  - ICU admission and mechanical ventilation
  - Death
  - Allograft complications

Influenza

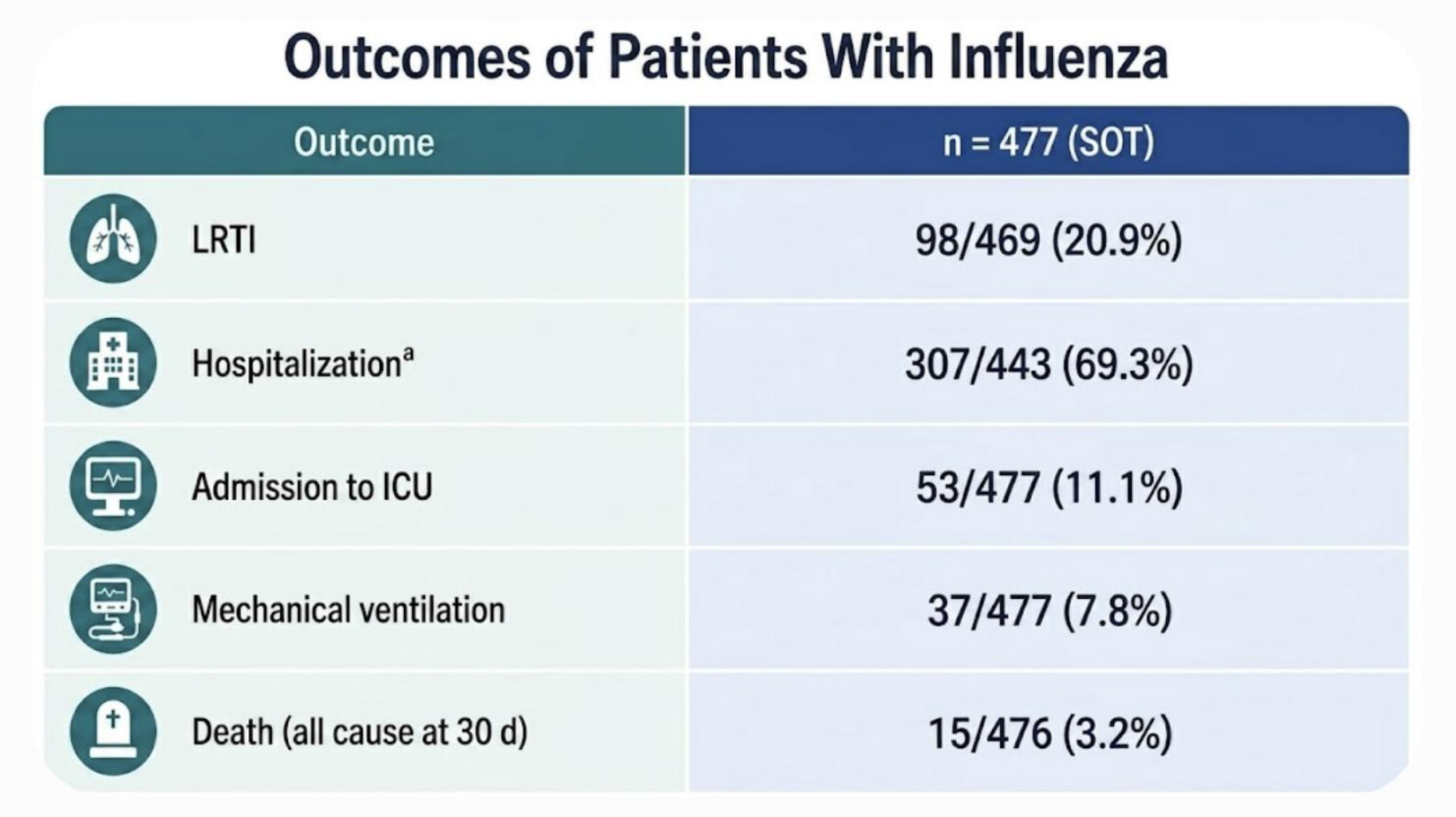
- Influenza vaccine annually (age > 6 mo).

- Can be given as early as 1-month post-transplant during respiratory season.



Feldman, et al. *JAMA Pediatrics* 2019. Haddadin, et al. *Am J Transplant* 2023.

Influenza in Adults



Outcomes of Patients With Influenza

Outcome	n = 477 (SOT)
LRTI	98/469 (20.9%)
Hospitalization[a]	307/443 (69.3%)
Admission to ICU	53/477 (11.1%)
Mechanical ventilation	37/477 (7.8%)
Death (all cause at 30 d)	15/476 (3.2%)

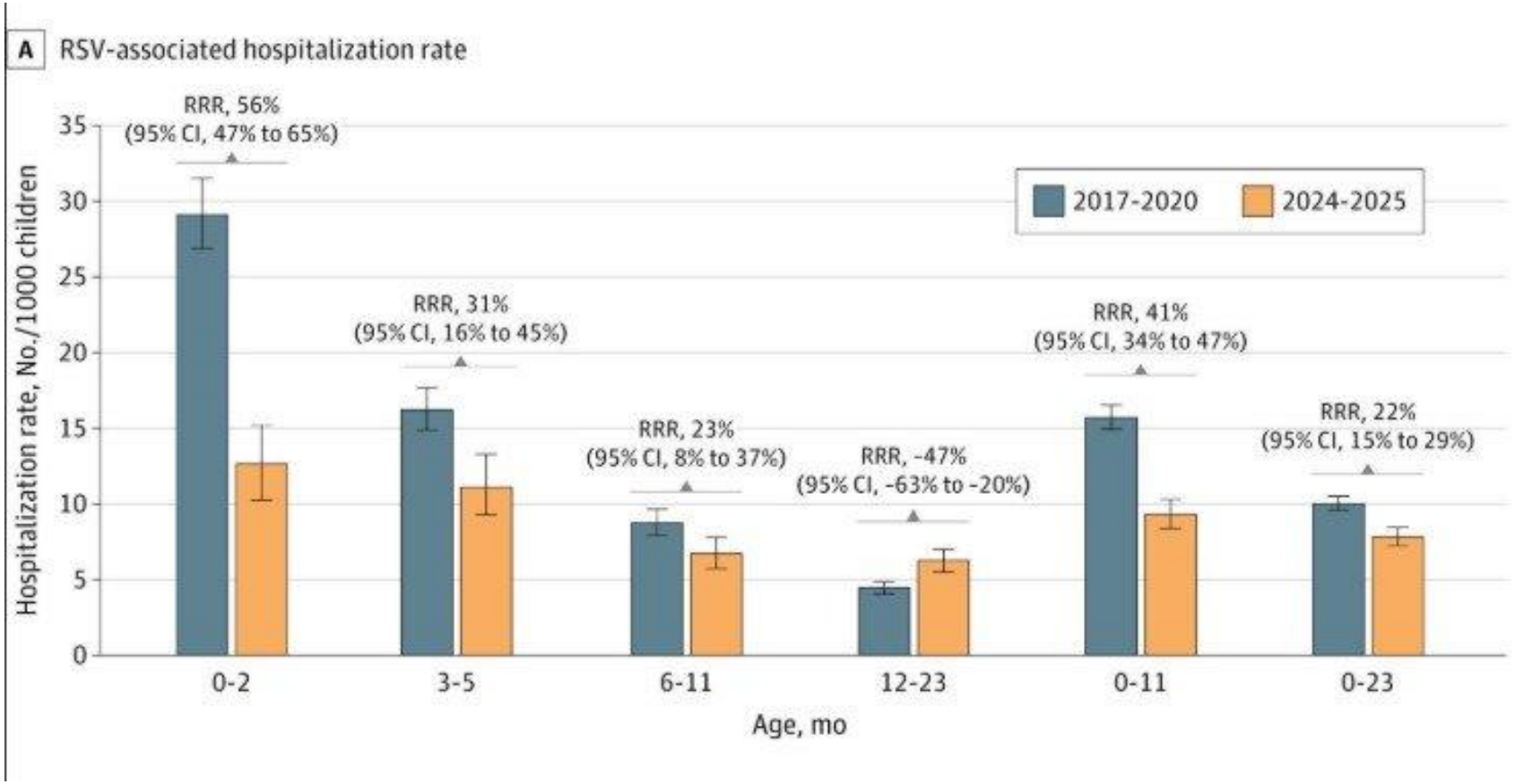
Kumar et al. Clin Infect Dis. 2018;67(9):1322–1329.

RSV Monoclonal Antibody (Nirsevimab/Clesrovimab)

- Death rate 53x higher than general pediatric population.
- Provides passive antibody protection from severe RSV disease.
- May be given anytime pre- or post-transplant.
- Age groups eligible:
  - Infants <8 mo
  - up to 19 mo for immunocompromised or CLD

Feldman, et al. *JAMA Pediatrics* 2019. Ross. *JPIDS* 2022.

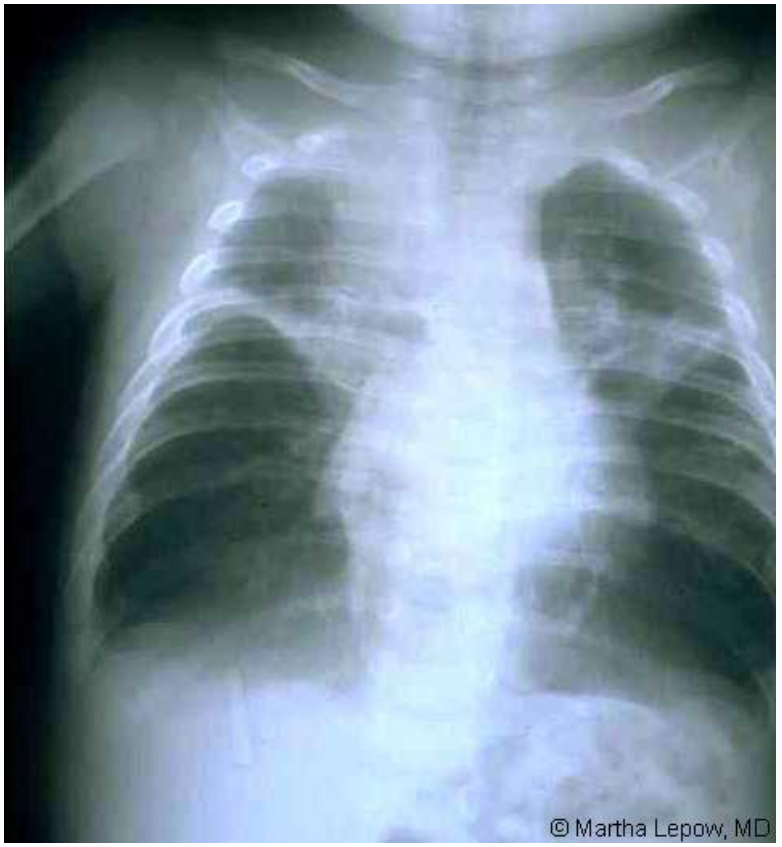
RSV Prevention Efficacy



Moline, et al. *JAMA Pediatrics* 2025.

RSV Vaccine (Adult)

- FDA-approved RSV vaccine (single dose) can be considered for all immunocompromised patients ≥18 years of age.



Red Book, 2024, RSV.

Hepatitis B

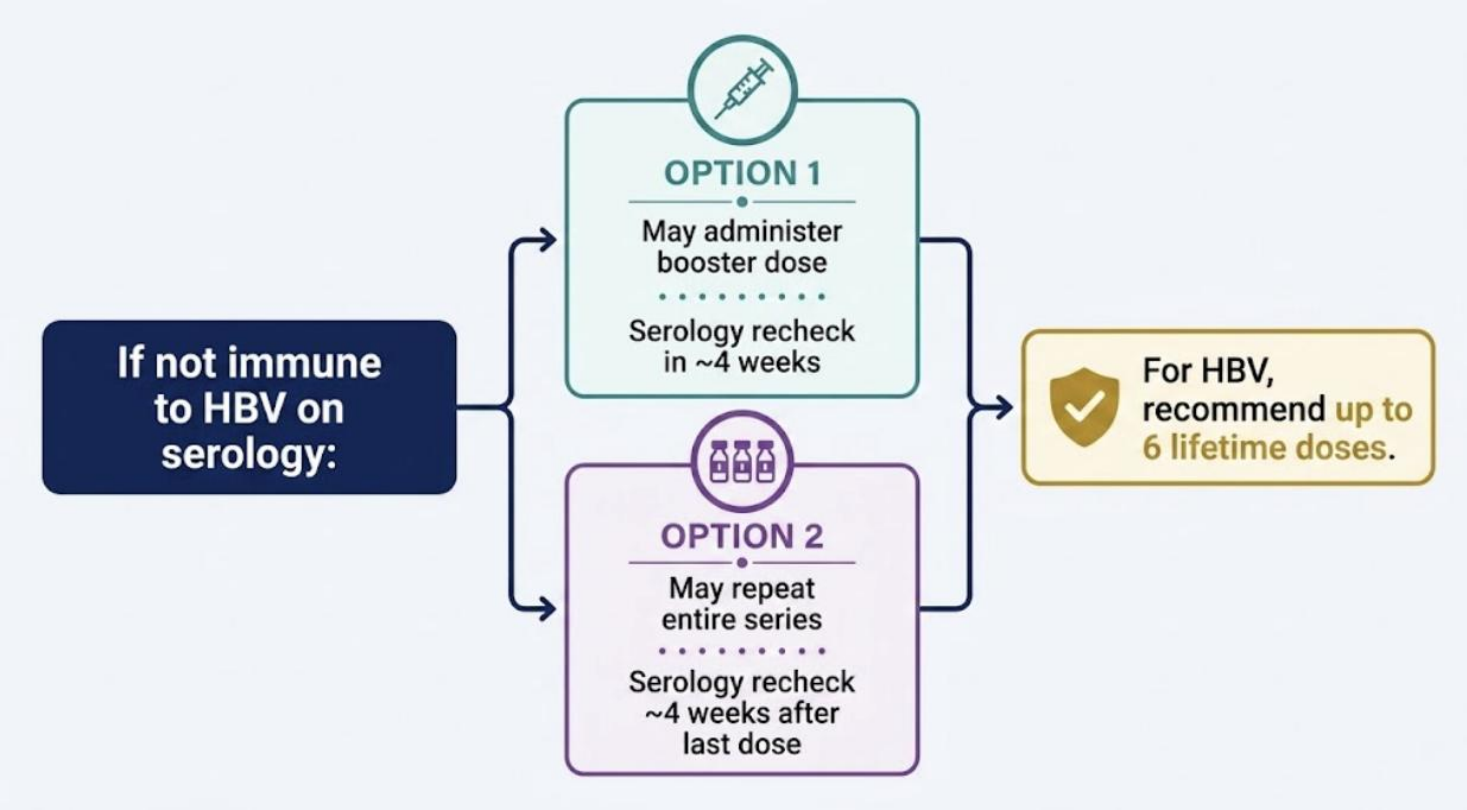
- Hepatitis B is a virus that infects hepatocytes and can cause both acute and chronic liver disease.

- Spread through blood and body fluid as well as household risk .

- HBV reduces risk of donor derived infection.

- It is very common for antibody levels to wane over time.

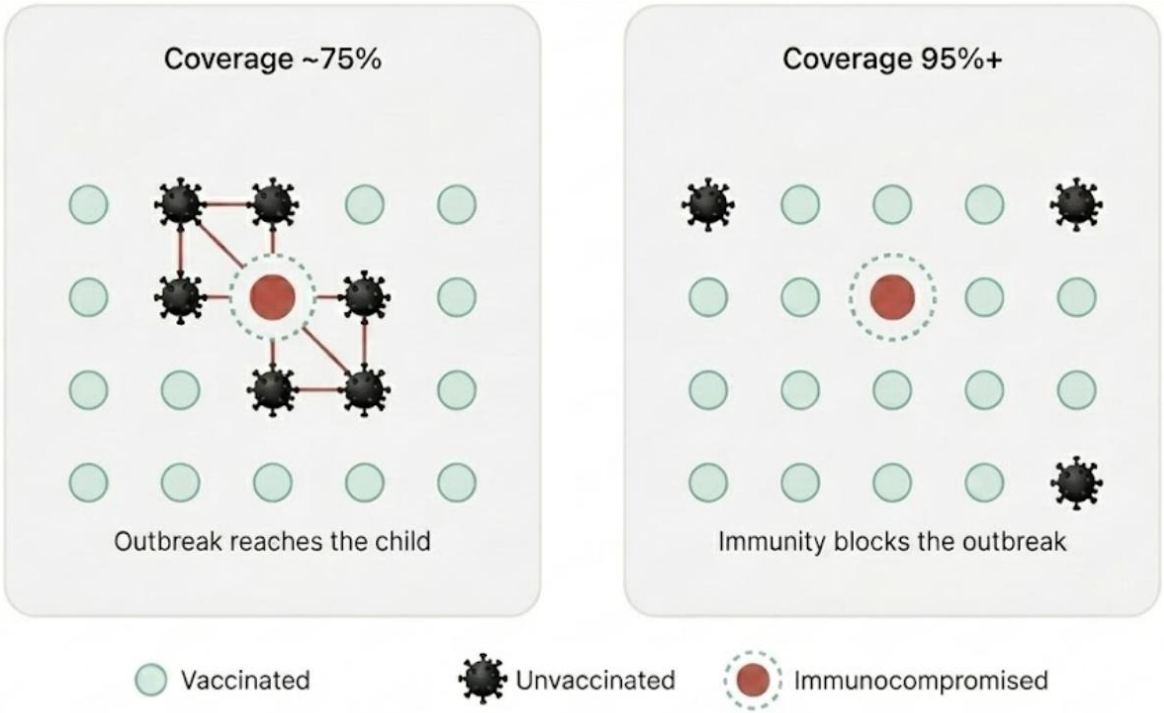
Hepatitis B



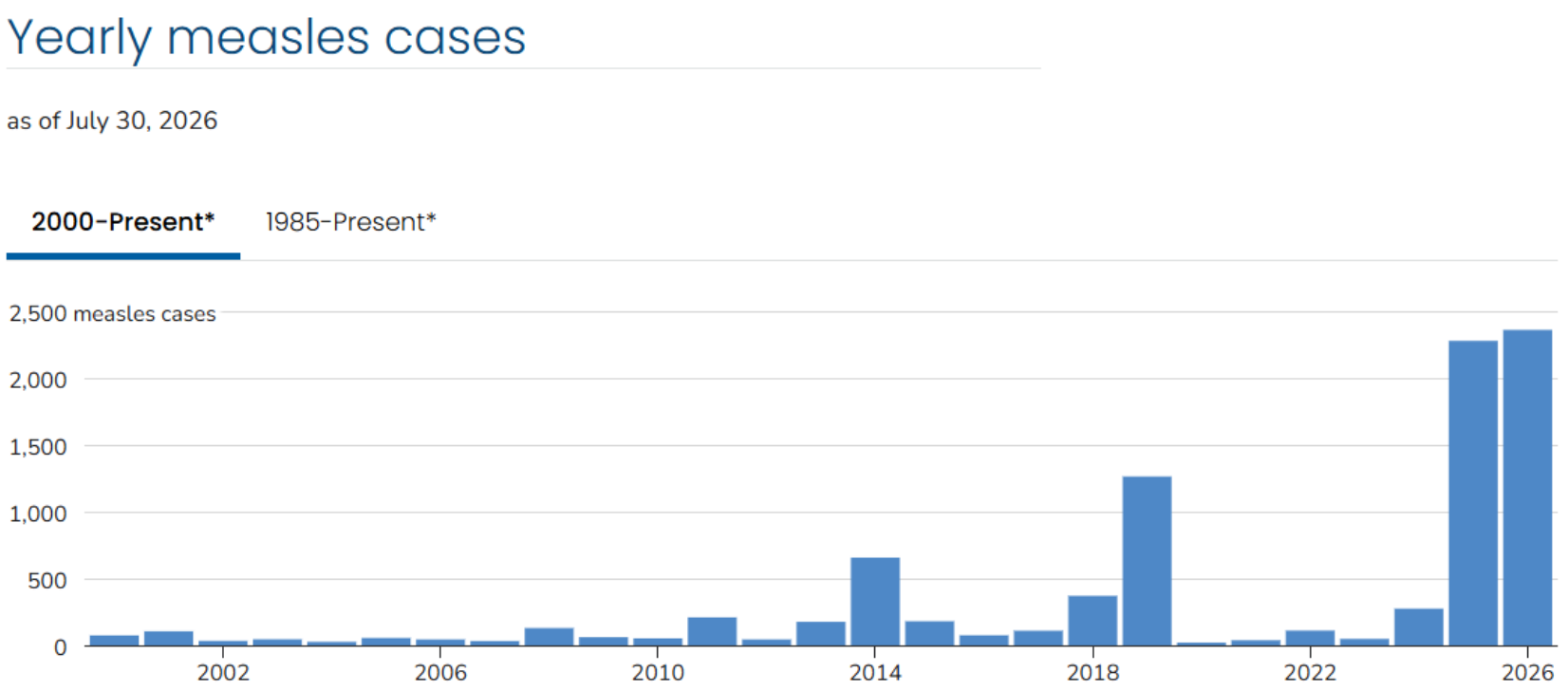
- *Follow similar algorithm if not immune to hepatitis A*

Live Viral Vaccines

- Weakened form of the actual virus.
- Critical for infections like MMR that do not have effective treatment once contracted.
- In the US, we depend on herd immunity for protection.



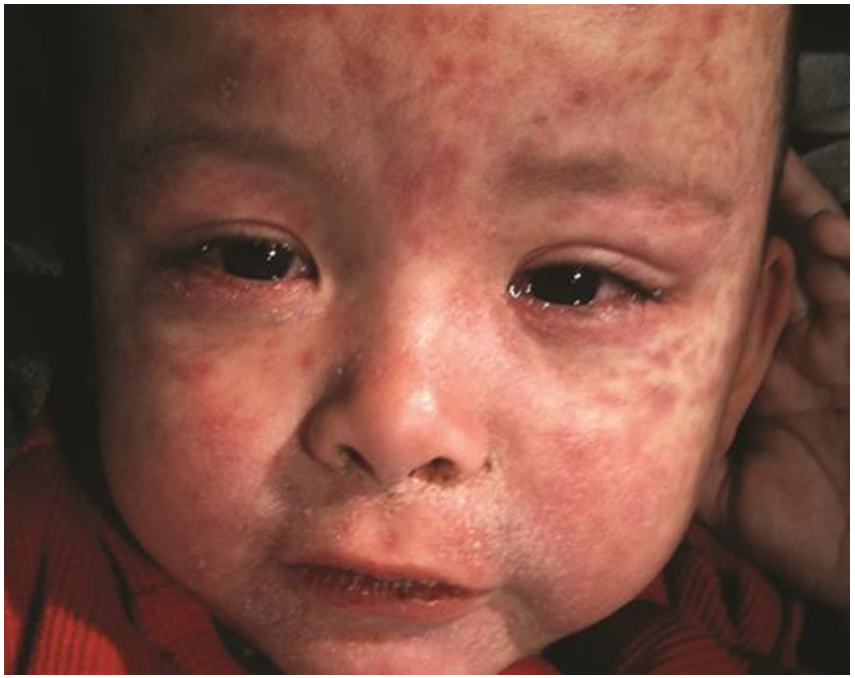
Measles



Centers for Disease Control & Prevention, 2026.

Live Viral Vaccines- MMR/Varicella

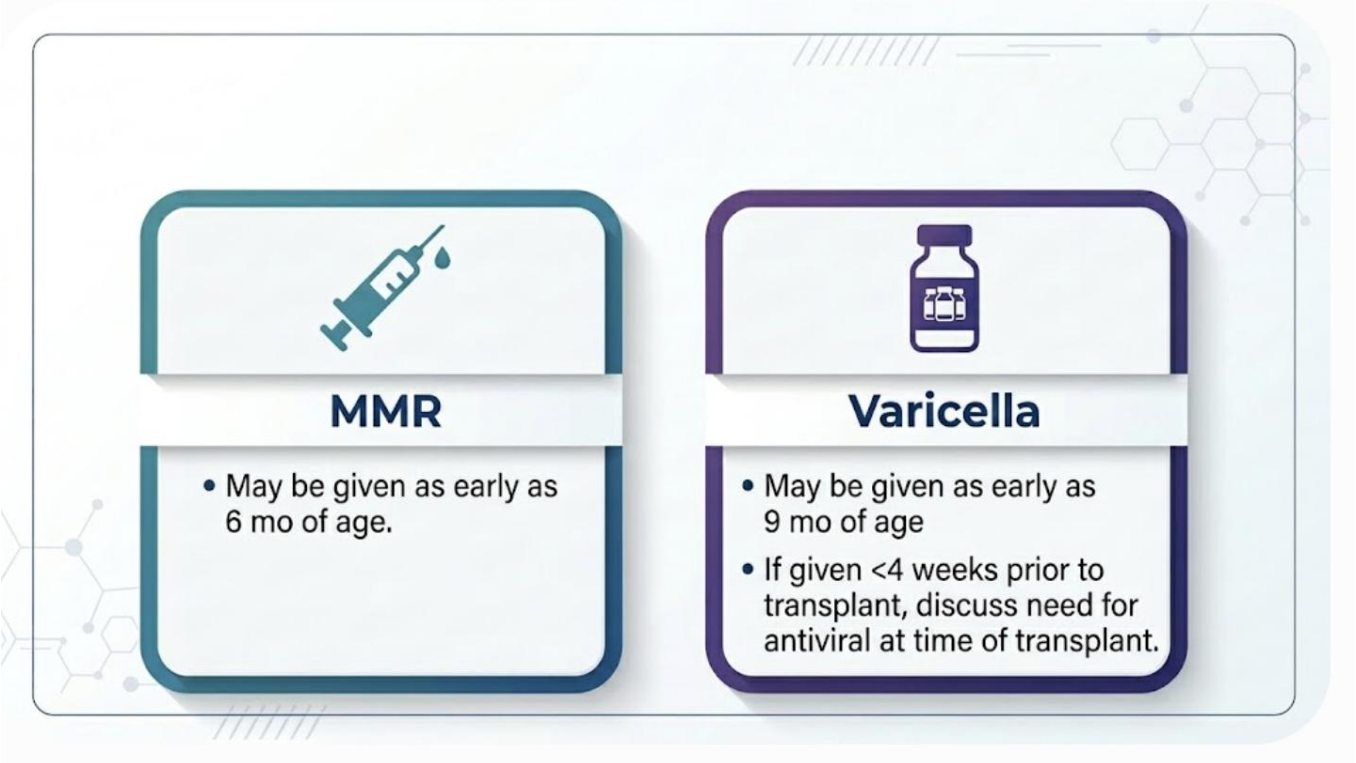
- Often contraindicated after transplant.
- The pre-transplant period represents the only reliable opportunity to establish protective immunity.
- If given pre-transplant, hold transplant for 4 weeks to avoid risk of vaccine associated measles/varicella.



Red Book, 2024, Measles.

Live Viral Vaccines- MMR/Varicella

- Both vaccines are given as a 2-dose series.



Live Viral Vaccines Post-Transplant

- Multicenter observational cohort of 281 pediatric SOT recipients from 18 U.S. transplant centers.
- Included select liver and kidney transplant recipients who were either not fully vaccinated with MMR/VZV or lacked protective antibodies.
- These patients received 1–3 doses of MMR and/or varicella vaccine.
- There were NO serious adverse events following live vaccination.
  - No episodes of graft rejection within 1 month
  - No measles cases
  - No rubella cases

Feldman et al. *JAMA Network Open,* 2023.

Immune Response Post-Transplant

Table 2. Immunologic Response to Pretransplant and Posttransplant Live Viral Vaccines

Time of immunologic assessment	No./total No. (%) with protective titers			
	Varicella	Measles	Mumps	Rubella
After pretransplant vaccine[a]	22/50 (44)	24/34 (71)	16/27 (59)	21/30 (70)
At enrollment after protective pretransplant antibodies[b]	5/20 (25)	11/15 (73)	10/14 (71)	15/18 (83)
After first posttransplant vaccine[c]	53/116 (46)	92/129 (71)	62/101 (61)	100/106 (94)
After second posttransplant vaccine[c]	61/81 (75)	48/60 (80)	41/52 (79)	43/44 (98)
After third posttransplant vaccine[c]	5/9 (56)	3/6 (50)	5/6 (83)	5/5 (100)
After final posttransplant vaccine[c]	107/149 (72)	130/152 (86)	100/120 (83)	124/125 (99)
1 y Postvaccine[d]	34/44 (77)	45/49 (92)	35/42 (83)	51/54 (94)

Feldman et al. *JAMA Network Open*, 2023.

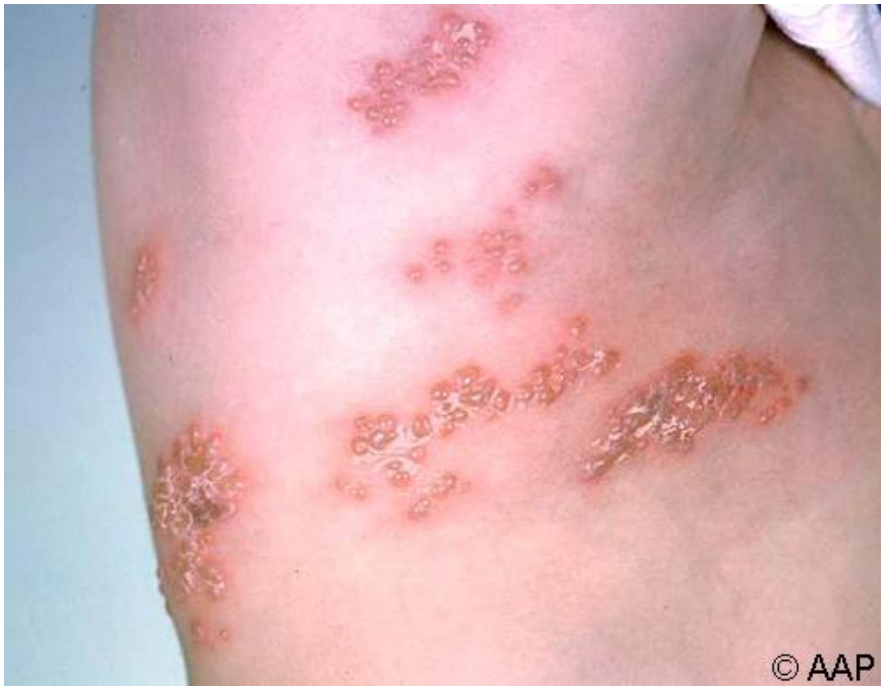
Live Viral Vaccines- MMR/Varicella

- Do not give MMR & varicella at same time.
- Give varicella first in case develops vaccine associated varicella.

Eligibility Criteria for Liver Transplant Recipients at TCH	
#	Eligibility Criteria
1	>12-18 mo post-transplant
2	Normal ALC
3	No blood products/IVIG in last 6 mo
4	>= 6 mo after any acute rejection episodes
5	>= 6 months after rituximab, ATG
6	Stable immune suppression with tacrolimus +/- sirolimus
7	Last 3 therapy troughs <6 (individual or combined)
8	Okay to have low-dose baseline steroids + tacrolimus **OR** sirolimus (not both)

Shingles Vaccine (recombinant zoster)

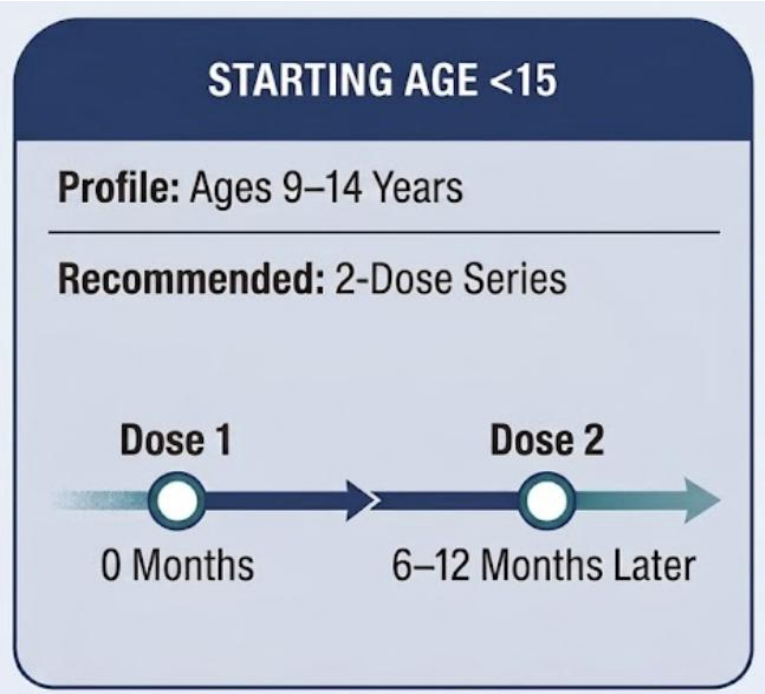
- Herpes zoster infection in transplant patients carries significantly higher complication rates.
- Not a live vaccine
- Eligible to receive if >18 yo and has had varicella or varicella vaccine (VZV IgG +).

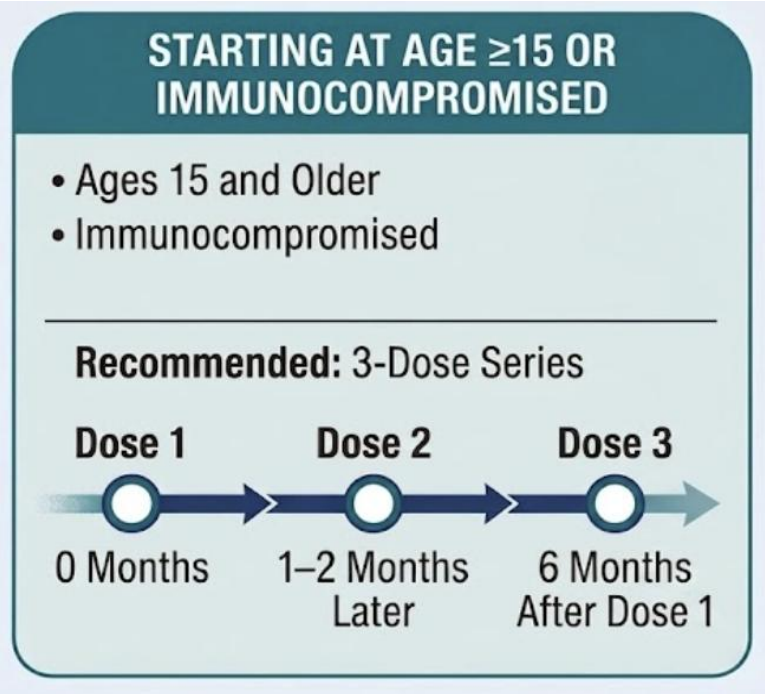


Red Book, 2024, Herpes Zoster.

HPV

- Protects against high grade pre-cancerous lesions.
- Recommended for ages 9-45 years.





Contraindicated Vaccines Post-Transplant

- Yellow Fever
- Typhoid (oral)
- BCG (TB vaccine)
- Rotavirus
- Live attenuated influenza vaccine (LAIV, intranasal)
- MMR/varicella *

Vaccine Hesitancy

Poll: Barriers to Discussing Vaccines

Results

Poll: Caregivers' Rationale for Hesitancy

Results

Vaccines are critical for transplant patients.

Presumptive Approach

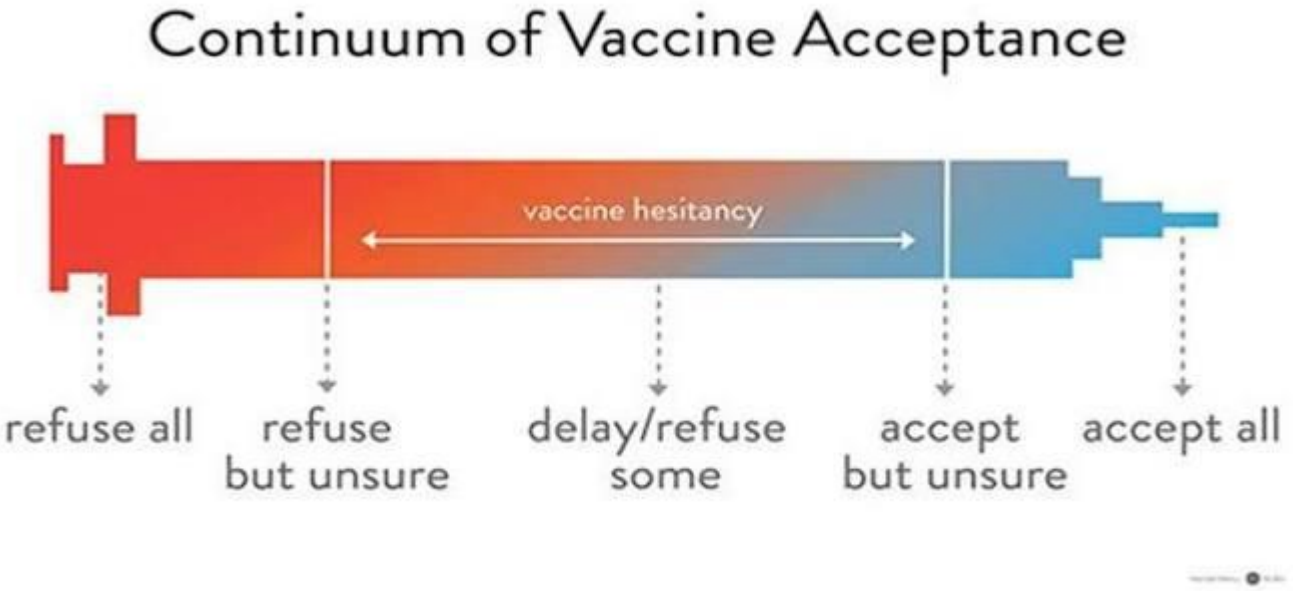
- Introduce vaccines as the **expected next step** in care — rather than as a decision the parent must make.

- Reduces the perception that vaccination is an optional or controversial decision.

- Phrases like
  - Today Jane is due for her one-year-old vaccines.

Vaccine Hesitancy

- Classically defined as delay in acceptance or refusal of vaccines despite availability of vaccine services.
- Vaccine hesitancy exists on a spectrum.
- **Persuasion is becoming ever more critical.**

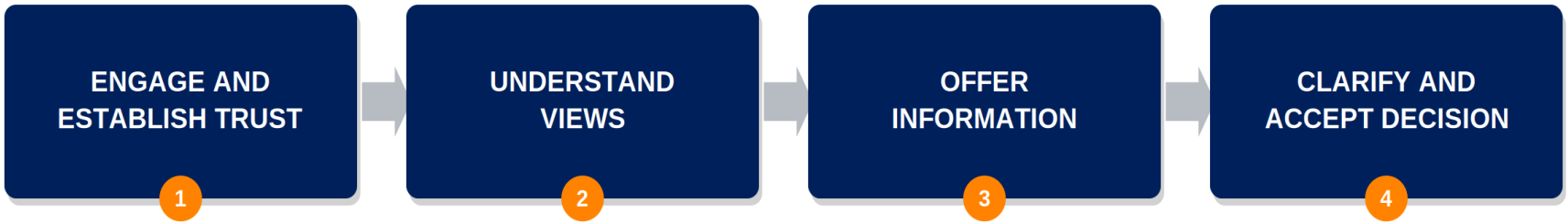


MacDonald, N. E. (2015). Vaccine hesitancy: Definition, scope and determinants. Vaccine, 33(34), 4161-4164

Strategies for Improving Uptake

- Motivational interviewing (MI) is the most widely tested and recommended communication strategy for addressing vaccine hesitancy in families.

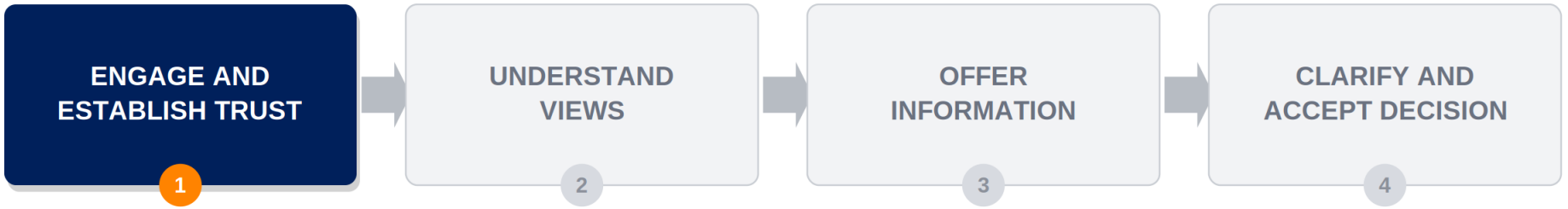
- Motivational interviewing
  - Engage and Establish trust
  - Understands views, i.e. "what matters to them"
  - Offer information (Ask/Tell/Ask)
  - Clarify and accept decision



Gagneur et al. Hum Vaccin Immunother, 2024

Engage

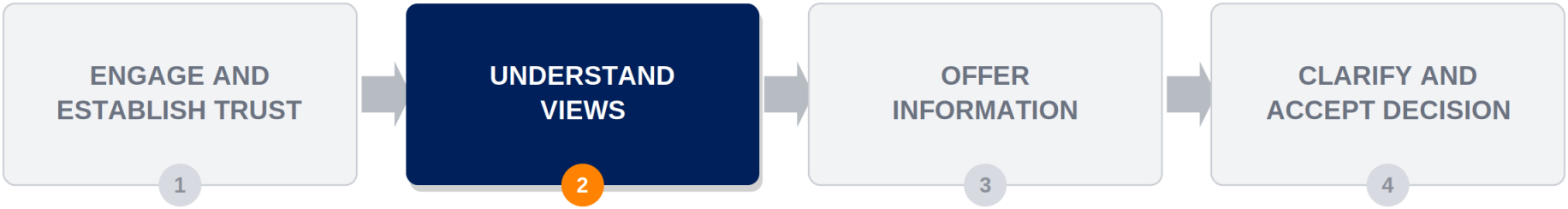
- Establish trust
- Make it evident that you are curious to understand and help them make the best decision for their child.
- Example “Thank you for taking the time to have this discussion with me. I know you had some concerns about the Flu vaccine"



Gagneur et al. Hum Vaccin Immunother, 2024

Understand Their Views

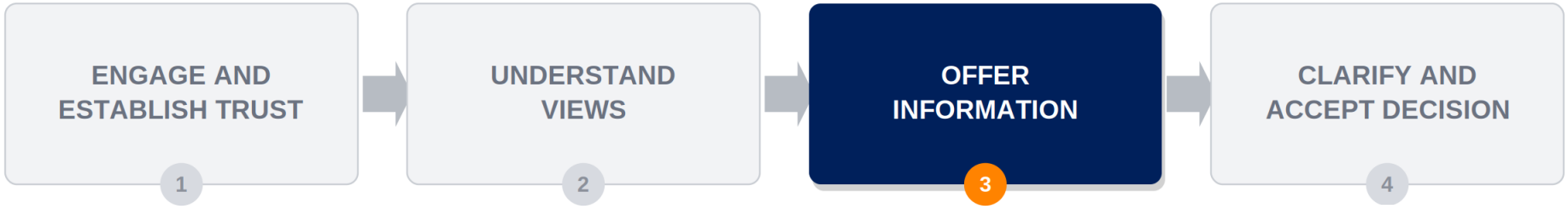
- Understand their specific concerns.
- What relevant information will ease or answer their concerns
- Example "I see - so one of your concerns is that every season you get the flu vaccine you get sick with the flu"



Gagneur et al. Hum Vaccin Immunother, 2024

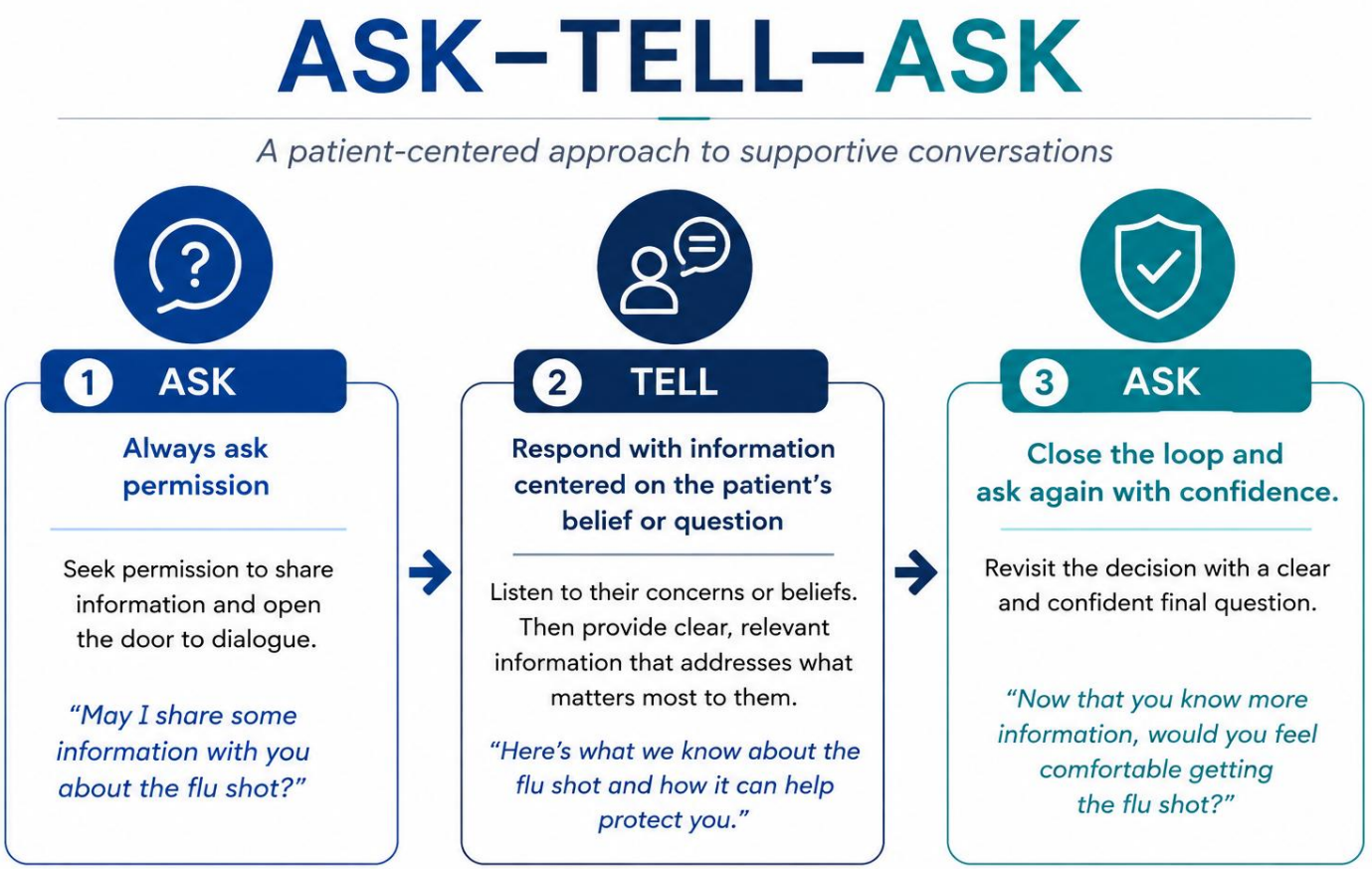
Offer Information

- Share information in a way that is understandable and sincere.
- **Ask:** Always ask permission.
- **Tell:** Share short, clear facts that answer their specific questions or fix wrong ideas.
- **Ask:** Check how they feel now and if they are ready to get the vaccine.



Gagneur et al. Hum Vaccin Immunother, 2024

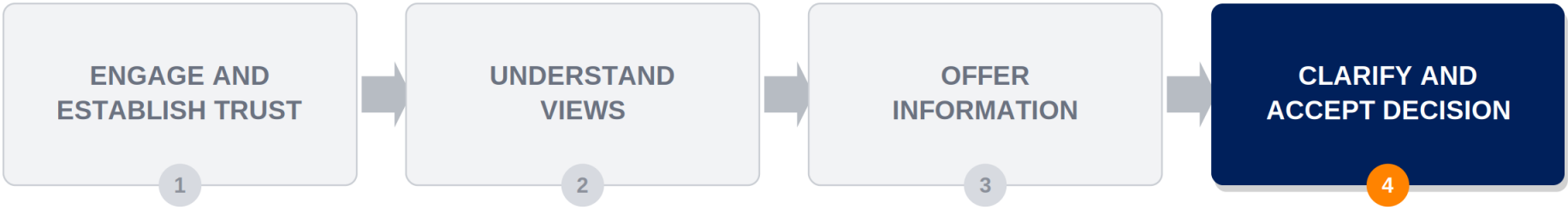
Offer Information



Adapted from Fogarty CT, Crues L. How to Talk to Reluctant Patients About the Flu Shot. Am Fam Physician. 2017;96(5):323-324.

Clarify and Accept

- Conversations about vaccines are ongoing.

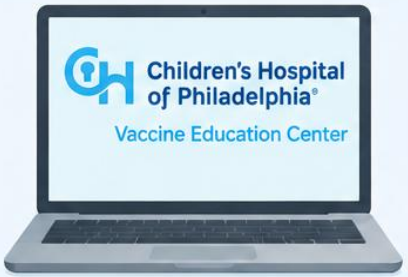


Gagneur et al. Hum Vaccin Immunother, 2024

Let's Practice!

Resources

Vaccine Education Center at CHOP



Evidence-based vaccine information for families, including disease information and vaccine safety.

www.chop.edu/vaccine-education-center

Healthy Children

Parent-friendly, reliable information on children's health and vaccines.

www.healthychildren.org

AAP Immunization Schedule

The latest, expert-recommended vaccine schedule for children and adolescents.

www.aap.org

Local Infectious Diseases Team

Your partner in care.
We are here to answer questions and provide personalized vaccine guidance for your child.

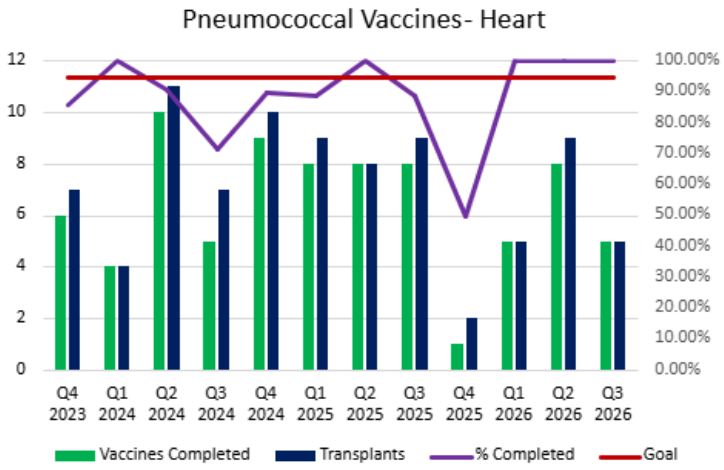
PROTECT. INFORM. EMPOWER. *Together.*

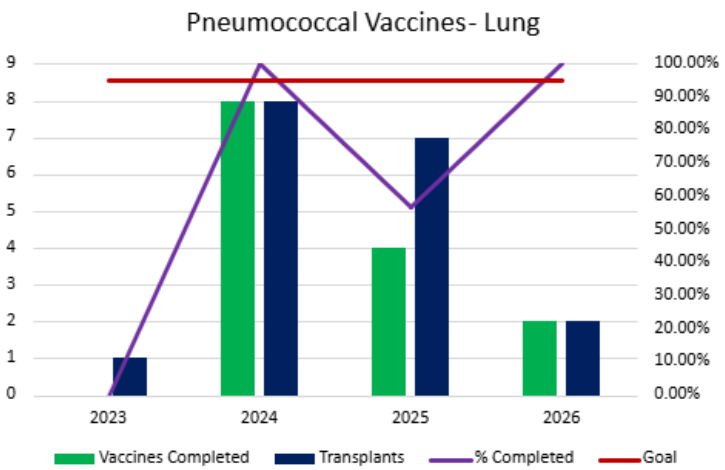
Quality Improvement Projects

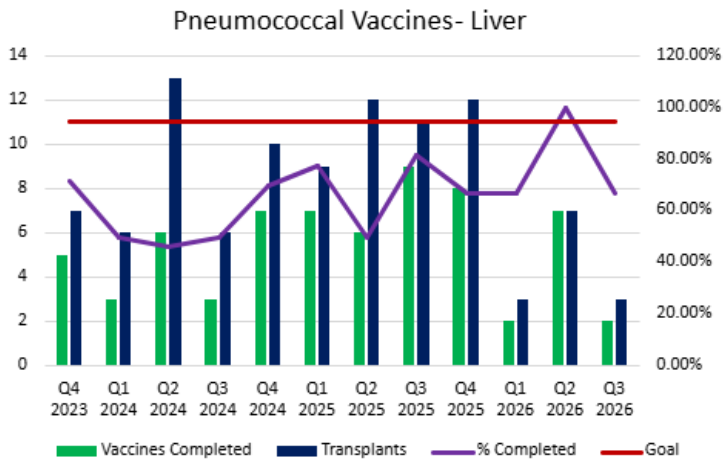
Ongoing QI projects (Pre-transplant)

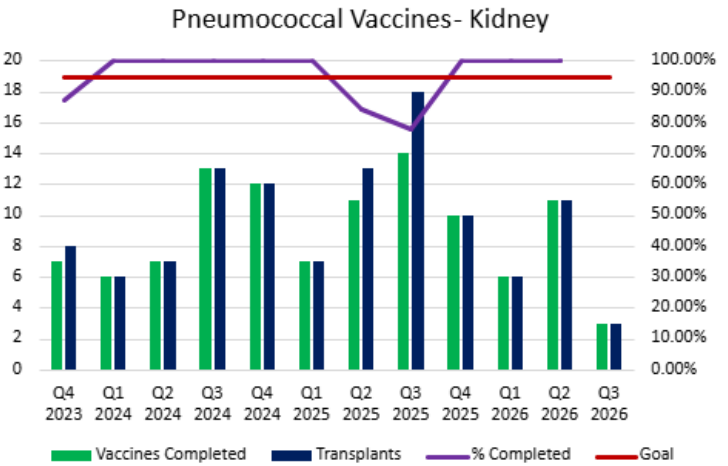
- Improving vaccination at the time of transplant.
- Collected data to assess % up to date with vaccines at the time of transplant.
- Immunization
  - Flu (goal >95%)
  - Pneumococcal (goal >95%)
  - Routine immunizations (goal >95%)

Pneumococcal Data









Ongoing QI projects (Pre-Transplant)

- Review pre-transplant data with organ teams in more detail:
  - ID provide vaccine reminders for in-patients
  - ID clinic = resource for vaccine administration for out-patients

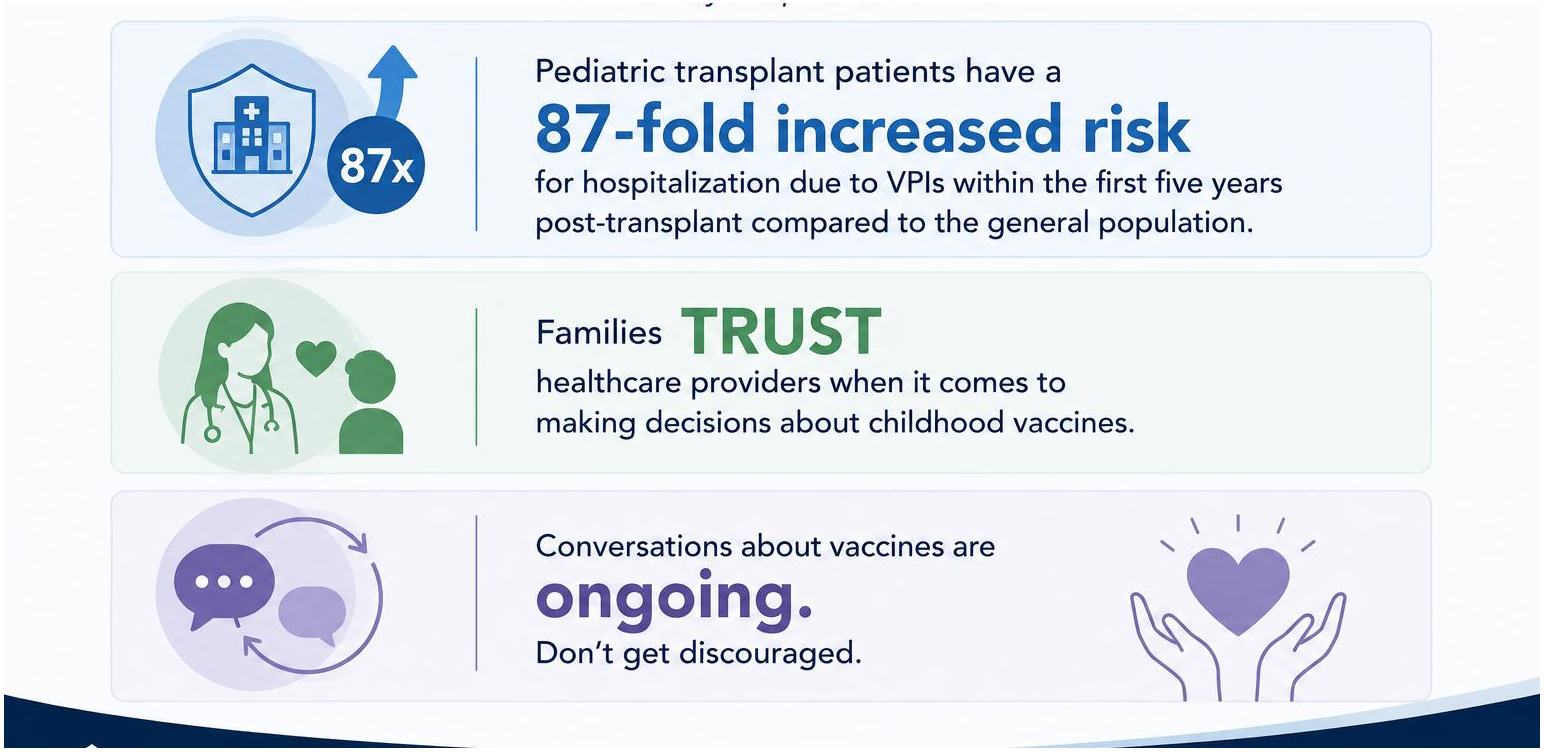
- Education for transplant teams:
  - TCH SOT immunization guidance
  - TCH SOT immunization one-pager

Ongoing QI Project- Post transplant

- Work with families to better understand and address vaccine education needs and vaccine hesitancy in families of immunocompromised children.

- Survey regarding thoughts and experiences regarding vaccines in transplants:
  - Sources of vaccine related education
  - Parental attitudes of about vaccines
  - Social determinants of participants

Key Takeaways



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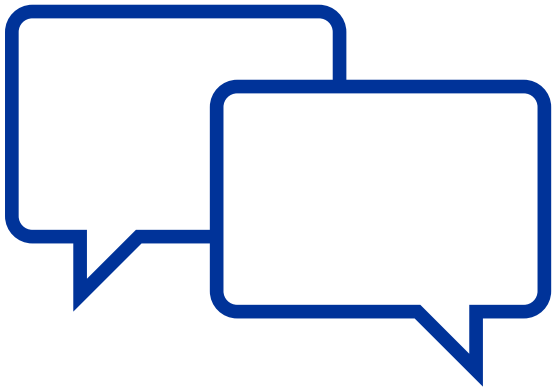
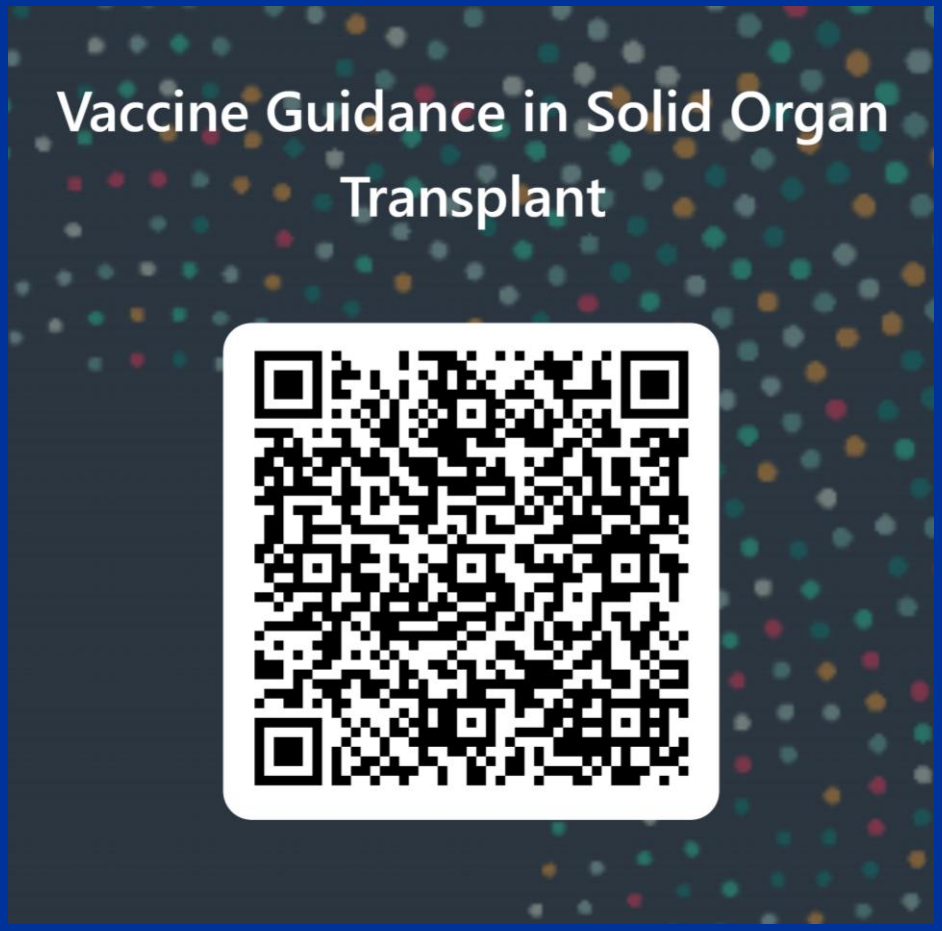
Questions & Comments



Evaluation



Thank You

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