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YOUR FUNCTIONAL WELLNESS GUIDE

Vaccine Reference Guide

Natalie's Clinical Study & Findings · Ingredients, Side Effects & Adverse Event Rates

This is a working reference covering the routine US vaccine schedule from infancy through adulthood. For each vaccine you'll find: what it prevents, key ingredients (the ones patients most often ask about), common side effects with rates from clinical trials, and serious adverse event rates from post-marketing surveillance. Data is drawn from package inserts, CDC/ACIP recommendations, and the FDA. A note on framing: every medical intervention carries some risk. The right way to evaluate a vaccine is by comparing the risk of vaccination to the risk of

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SECTION 01

Glossary of Terms

TERM	DEFINITION
Adjuvant	A vaccine ingredient that enhances and prolongs the immune response. Classic example: aluminum salts. Without adjuvants, vaccines often require higher antigen doses and more shots to generate protection.
Antigen	The piece of the pathogen the immune system responds to — whole killed virus, protein fragment, bacterial toxin (toxoid), or mRNA instructions to make a protein.
Acellular	"Without whole cells." Acellular pertussis vaccines use purified pieces of the bacterium, far less reactogenic than the older whole-cell version.
Reactogenic	How much a vaccine causes immune-activation symptoms (sore arm, fatigue, fever, body aches). Higher reactogenicity reflects a stronger immune response — not more danger. Shingrix is famously reactogenic.
Inactivated vaccine	Made from a killed virus or bacterium that cannot replicate. Examples: inactivated polio (IPV), hepatitis A, most flu shots.
Live attenuated	Made from a weakened live pathogen. Replicates briefly to generate strong immunity; cannot cause the actual disease in healthy people. Examples: MMR, varicella, FluMist, rotavirus.
Subunit / recombinant	Contains only specific proteins from the pathogen, grown in cell culture or yeast. Examples: hepatitis B, HPV (Gardasil), Shingrix, acellular pertussis.
Conjugate vaccine	Protein-attached vaccine that helps young immune systems respond to bacterial sugars. Examples: Hib, PCV (Prevnar), meningococcal conjugate.
Toxoid vaccine	Made from inactivated bacterial toxin. The body learns to neutralize the toxin without exposure to the live bacterium. Examples: tetanus, diphtheria.

TERM	DEFINITION
mRNA vaccine	Delivers genetic instructions in a lipid nanoparticle telling cells to briefly produce a viral protein. mRNA is destroyed within days; it does not enter the nucleus or alter DNA. Examples: COVID-19 mRNA vaccines.
Excipient	Any non-active ingredient — adjuvants, preservatives, stabilizers, manufacturing residuals. Anything other than the antigen itself.
VAERS	Vaccine Adverse Event Reporting System. Passive surveillance — anyone can report any health event after vaccination. A VAERS report is not proof of causation; it flags signals for controlled investigation.
VSD	Vaccine Safety Datalink. Active CDC surveillance using real medical records from millions of patients across multiple healthcare systems. Designed to actually quantify risks, unlike VAERS.
ACIP	Advisory Committee on Immunization Practices. The CDC committee that recommends which vaccines should be given and to whom.
Pertussis	Whooping cough. Bacterial respiratory infection (Bordetella pertussis) causing severe prolonged coughing. Dangerous for infants — can cause apnea, pneumonia, encephalopathy, and death.
DTaP vs. Tdap	Both are tetanus + diphtheria + acellular pertussis vaccines. DTaP is the higher-dose pediatric formulation. Tdap is the adolescent/adult booster with smaller diphtheria and pertussis components.

SECTION 02

What's Actually in Vaccines

Vaccine ingredients fall into a few functional categories. Almost every ingredient people ask about is one of the following. Quantities are typically in micrograms (μg) or nanograms (ng) — not the milligram-and-above doses associated with oral medications.

Aluminum Salts (Adjuvant)

COMPONENT	DETAILS
What it is	Aluminum hydroxide, aluminum phosphate, or aluminum potassium sulfate. Used as adjuvants since the 1930s.
Dose per shot	0.125 to 1.5 mg aluminum.
Context	A breastfed infant ingests ~7 mg aluminum from breast milk over 6 months; formula-fed infants ~38 mg; soy-formula infants ~117 mg. Aluminum is the 3rd most common element in Earth's crust — found in food, water, soil, antacids, and antiperspirants.
Pharmacokinetics	Excreted by the kidneys. Concern is justified in premature infants on long-term IV nutrition or severe kidney disease where elimination is impaired. In healthy individuals, body burden from vaccines is a tiny fraction of dietary intake.
Found in	DTaP, Tdap, Td, HepA, HepB, Hib (some), HPV, PCV, MenB, Shingrix.
NOT found in	MMR, varicella, rotavirus, nasal flu, most injected flu vaccines, IPV alone, mRNA COVID-19 vaccines.

Thimerosal (Preservative — Ethylmercury)

COMPONENT	DETAILS
What it is	Mercury-based preservative preventing bacterial/fungal contamination of multi-dose vials.
Status today	Removed from all routine childhood vaccines in the US in 2001 as a precautionary measure. Still present in some multi-dose flu vials. Single-dose flu, all childhood vaccines, MMR, varicella, IPV, Hib, HepA, and HPV are thimerosal-free.

COMPONENT	DETAILS
Key biochemistry	Contains ethylmercury (half-life ~7 days, rapidly excreted) — biologically distinct from methylmercury in fish (half-life ~50 days, bioaccumulates). Conflating the two is a common error.
Autism question	The original 1998 Wakefield paper was retracted for fraud; Wakefield lost his medical license. Subsequent studies in millions of children across multiple countries found no association between thimerosal and autism, ADHD, tics, or developmental disorders.

Formaldehyde (Manufacturing Residual)

COMPONENT	DETAILS
What it is	Used during manufacturing to inactivate viruses and detoxify bacterial toxins. Most is removed; trace amounts remain.
Typical residual	50–100 micrograms per dose.
Context	The human body naturally produces ~50,000 µg of formaldehyde per day as a metabolic byproduct. A pear contains more formaldehyde than a vaccine. Per FDA, a newborn's circulating formaldehyde level is 50–70× higher than what a single vaccine could provide.
Cancer risk	Known carcinogen at chronic high airborne occupational exposure. No evidence linking trace vaccine amounts to cancer.

Other Excipients

INGREDIENT	DETAILS
Polysorbate 80	Emulsifier keeping ingredients evenly mixed. Also in ice cream, salad dressing, oral medications, and IV drugs. Allergic reactions rare.
2-Phenoxyethanol	Preservative replacing thimerosal in some multi-dose vaccines. Used in cosmetics, some baby wipes, pharmaceuticals.

INGREDIENT	DETAILS
Gelatin / sorbitol	Stabilizers maintaining potency during storage. Gelatin derived from pork or bovine collagen — relevant for severe gelatin allergies and some dietary/religious considerations. Found in MMR, varicella, MMRV, some flu vaccines.
Trace antibiotics	Neomycin, polymyxin B, gentamicin, streptomycin used during cell-culture manufacturing. Present at nanogram levels. Penicillin and cephalosporins are never used due to allergy concerns.
Egg protein	Some flu vaccines and yellow fever vaccine produced in eggs. Most egg-allergic patients can now receive flu vaccine per current ACIP guidance. Egg-free flu alternatives: Flublok (recombinant), Flucelvax (cell-based).
Lipid nanoparticles / PEG / mRNA	mRNA vaccines contain mRNA wrapped in lipid nanoparticles including polyethylene glycol (PEG). mRNA degrades within days; does not enter the cell nucleus or alter DNA. PEG is the most common cause of the rare allergic reactions (~2–5 cases per million doses).
MRC-5 / WI-38 cells	Some viruses grow only in human cells. Two cell lines from elective abortions in the 1960s have been used for decades to grow vaccine viruses (rubella, varicella, HepA, rabies, others). Vaccines do not contain fetal cells — only trace residual cellular DNA. The Vatican and most major Christian denominations have concluded public health benefit justifies use given historical distance.

SECTION 03

Routine US Vaccine Schedule

The schedule below reflects current ACIP/CDC recommendations. Some vaccines are given as combinations (e.g., Pediarix combines DTaP + HepB + IPV; ProQuad combines MMR + varicella).

AGE / TIMING	VACCINES
Birth	Hepatitis B (1st dose)
1–2 months	Hepatitis B (2nd), DTaP, Hib, PCV, IPV, Rotavirus
4 months	DTaP, Hib, PCV, IPV, Rotavirus
6 months	DTaP, Hib (some), PCV, IPV, HepB, Rotavirus (some), Influenza (annual start)
6 months – 5 yrs	RSV monoclonal antibody (nirsevimab) for first RSV season
12–15 months	Hib (final), PCV (final), MMR, Varicella, Hepatitis A (1st)
15–18 months	DTaP (4th dose)
18–24 months	Hepatitis A (2nd dose)
4–6 years	DTaP (5th), IPV (4th), MMR (2nd), Varicella (2nd)
11–12 years	Tdap, HPV (2-dose series), Meningococcal ACWY (1st)
16 years	Meningococcal ACWY (booster), Meningococcal B (shared decision)
Annual (6 mo+)	Influenza; COVID-19 (per current ACIP guidance)
Pregnancy	Tdap (each pregnancy, 27–36 wks), RSV, Influenza, COVID-19
50+ years	Shingrix (2 doses, 2–6 months apart)
65+ years	Pneumococcal (PCV15/20 ± PPSV23); RSV (shared decision 60–74; recommended 75+)
Every 10 years (adults)	Td or Tdap booster

SECTION 04

Individual Vaccines

Each entry covers what the vaccine prevents, key ingredients, common side effects (from clinical trials), and serious adverse events (from post-marketing surveillance). Rates shown are population averages; individual risk depends on age, immune status, and medical history.

Hepatitis B (HepB)

BRAND NAMES: Engerix-B, Recombivax HB, Heplisav-B (adult), PreHevbrio (adult)

Prevents: Hepatitis B virus — acute and chronic liver infection, cirrhosis, liver cancer. Transmitted through blood, body fluids, and mother-to-baby at birth.

INGREDIENTS

Type	Recombinant subunit (yeast-grown HBsAg protein)
Adjuvant	Aluminum hydroxide or aluminum hydroxyphosphate sulfate (~0.25–0.5 mg)
Other	Yeast protein (residual), sodium chloride, phosphate buffers, formaldehyde trace (some brands)

COMMON SIDE EFFECTS

Sore injection site (~30%), fatigue (~14%), headache (~13%), low-grade fever (1–6%). Typically resolve in 1–2 days.

SERIOUS ADVERSE EVENTS

Anaphylaxis ~1 per 1.1 million doses. No causal link to chronic conditions (MS, autism, SIDS) despite extensive study.

Rotavirus (RV)

BRAND NAMES: RotaTeq, Rotarix

Prevents: Rotavirus gastroenteritis — before vaccination, hospitalized ~55,000–70,000 US children per year; remains a leading cause of childhood death globally.

INGREDIENTS

Type	Live attenuated, given orally
Adjuvant	None (live vaccine, no aluminum)
Other	Sucrose, sodium citrate, sodium phosphate, sodium hydroxide, polysorbate 80, cell culture media

COMMON SIDE EFFECTS

Mild diarrhea (~24%), vomiting (~15%), irritability, low-grade fever, decreased appetite. No injection site reaction.

SERIOUS ADVERSE EVENTS

Intussusception: ~1–5 additional cases per 100,000 vaccinated infants in the first week after dose 1. Much lower rate than the withdrawn RotaShield (1999). Severe allergic reaction very rare.

DTaP — Pediatric

BRAND NAMES: Infanrix, Daptacel; combos: Pediarix, Pentacel, Kinrix, Quadracel, Vaxelis

Prevents: Diphtheria (severe airway infection), tetanus (lockjaw), pertussis (whooping cough). Acellular formulation replaced whole-cell DTP in the 1990s — far less reactogenic.

INGREDIENTS

Type	Toxoid (D, T) + acellular subunit (aP)
Adjuvant	Aluminum hydroxide or aluminum phosphate (~0.33–0.625 mg)
Other	Formaldehyde (100 µg residual), polysorbate 80, glutaraldehyde (trace), 2-phenoxyethanol, bovine extract (some brands)

COMMON SIDE EFFECTS

Sore arm/redness/swelling (20–40%), low-grade fever (5–15%), fussiness, drowsiness, decreased appetite. Local reactions increase with successive doses.

SERIOUS ADVERSE EVENTS

Febrile seizure (~1 in several thousand) — no long-term harm. Hypotonic-hyporesponsive episode rare. Anaphylaxis ~1 per million. Persistent inconsolable crying >3 hours: ~1 in 1,000.

Hib (Haemophilus influenzae type b)

BRAND NAMES: ActHIB, Hiberix, PedvaxHIB

Prevents: Hib bacterial infections — meningitis, epiglottitis, pneumonia, sepsis. Before this vaccine, Hib was a leading cause of childhood meningitis with significant mortality and neurologic disability.

INGREDIENTS

Type	Conjugate (bacterial polysaccharide attached to a carrier protein)
Adjuvant	Aluminum hydroxyphosphate sulfate in PedvaxHIB; none in ActHIB
Other	Sucrose, sodium chloride; tetanus toxoid carrier (some brands)

COMMON SIDE EFFECTS

Sore injection site (~25%), low-grade fever (~5%). Generally well-tolerated.

SERIOUS ADVERSE EVENTS

Anaphylaxis very rare. No causal link to other serious conditions in extensive surveillance.

Pneumococcal Conjugate (PCV13/15/20)

BRAND NAMES: Prevnar 13, Vaxneuvance (PCV15), Prevnar 20, Capvaxive (PCV21, adult)

Prevents: Streptococcus pneumoniae — pneumonia, meningitis, bacteremia, otitis media. Each successive version covers more serotypes.

INGREDIENTS

Type	Conjugate (polysaccharide + CRM197 carrier protein)
Adjuvant	Aluminum phosphate (~0.125 mg)
Other	Polysorbate 80, succinate buffer, sodium chloride, soy peptone (residual)

COMMON SIDE EFFECTS

Sore arm (~30–60%), fever (~25% in infants), irritability, decreased appetite, drowsiness.

SERIOUS ADVERSE EVENTS

Severe allergic reaction < 1 per million. Febrile seizure rare, especially noted when co-administered with flu vaccine in young children. No long-term harm from brief seizures.

Inactivated Polio Vaccine (IPV)

BRAND NAMES: IPOL; combo products (Pediarix, Pentacel, Kinrix)

Prevents: Poliovirus types 1, 2, 3. Polio causes paralysis and was endemic in the US until vaccination programs eliminated it in 1979.

INGREDIENTS

Type	Inactivated (killed) virus
Adjuvant	None alone; aluminum present in combo products
Other	Formaldehyde (residual), 2-phenoxyethanol, neomycin/polymyxin B/streptomycin (trace), bovine serum albumin (trace)

COMMON SIDE EFFECTS

Sore injection site (~15–30%), redness, low-grade fever (~5%). Among the better-tolerated childhood vaccines.

SERIOUS ADVERSE EVENTS

Severe allergic reaction extremely rare. The oral polio vaccine (OPV) carried ~1 in 2.4 million risk of vaccine-derived paralysis; it has not been used in the US since 2000. IPV does not carry this risk.

MMR (Measles, Mumps, Rubella)

BRAND NAMES: M-M-R II; combo with varicella: ProQuad (MMRV)

Prevents: Measles (highly contagious — pneumonia, encephalitis, death), mumps (orchitis, meningitis, deafness), rubella (devastating birth defects if contracted in pregnancy).

INGREDIENTS

Type	Live attenuated
Adjuvant	None
Other	Sorbitol, sucrose, hydrolyzed gelatin, sodium chloride, neomycin (trace), human serum albumin, MRC-5 cellular protein, sodium phosphate

COMMON SIDE EFFECTS

Sore injection site, low-grade fever (~5–15%, peaks 7–12 days post-dose as live attenuated virus replicates), mild rash (~5%), transient joint pain (~25% in adult women), swollen lymph nodes.

SERIOUS ADVERSE EVENTS

Febrile seizure ~1 per 3,000–4,000 first doses (higher with MMRV than separate MMR + varicella). Transient ITP (low platelets) ~1 per 30,000–40,000, usually self-resolving. Encephalitis <1 per million — far lower than measles itself (~1 per 1,000 cases). Does not cause autism — definitively studied in millions of children.

Varicella (Chickenpox)

BRAND NAMES: Varivax; combo: ProQuad (MMRV)

Prevents: Varicella zoster virus (chickenpox). Reduces but does not eliminate later shingles risk.

INGREDIENTS

Type	Live attenuated
Adjuvant	None
Other	Sucrose, hydrolyzed gelatin, urea, sodium chloride, monosodium glutamate, neomycin (trace), MRC-5 cellular protein

COMMON SIDE EFFECTS

Sore injection site (~20%), fever (~15%), mild varicella-like rash near injection site (~3%) or generalized mild rash (~1–5%) within 5–26 days.

SERIOUS ADVERSE EVENTS

Disseminated vaccine-strain varicella in severely immunocompromised patients — vaccine contraindicated in this group. Transmission of vaccine virus to close contacts very rare and only if vaccinated person develops a rash. Severe allergic reaction very rare.

Hepatitis A

BRAND NAMES: Havrix, Vaqta; combo with HepB: Twinrix

Prevents: Hepatitis A virus — acute liver inflammation, typically transmitted via contaminated food or water.

INGREDIENTS

Type	Inactivated
Adjuvant	Aluminum hydroxide or aluminum hydroxyphosphate sulfate
Other	Formaldehyde (trace), MRC-5 cellular protein, neomycin (trace), polysorbate 20, amino acids

COMMON SIDE EFFECTS

Sore arm (~50%), headache (~15%), loss of appetite (~10%), fatigue. Most reactions mild, lasting 1–2 days.

SERIOUS ADVERSE EVENTS

Anaphylaxis very rare. No causal link to other serious conditions.

Influenza (Annual)

BRAND NAMES: Fluzone, Fluarix, Flucelvax, Flublok, Afluria, FluMist (nasal), Fluad (adjuvanted, 65+), Fluzone High-Dose (65+)

Prevents: Seasonal influenza A and B viruses. Reformulated each year based on circulating strains.

INGREDIENTS

Type	Inactivated (most); live attenuated nasal (FluMist); recombinant (Flublok)
Adjuvant	Most flu vaccines: none. Fluad: MF59 (squalene-based adjuvant)
Other	Egg protein (most brands), formaldehyde (trace), polysorbate 80, gentamicin or neomycin (trace), thimerosal (multi-dose vials only)

COMMON SIDE EFFECTS

Sore arm (~50%), fatigue (~10–15%), headache (~10%), muscle aches (~10%), low-grade fever (1–2%). FluMist: runny nose, congestion, mild sore throat.

SERIOUS ADVERSE EVENTS

Anaphylaxis ~1 per million. Guillain-Barré syndrome: ~1–2 additional cases per million doses (background rate ~10–20 per million/year). Flu illness itself raises GBS risk substantially more than the vaccine. Oculorespiratory syndrome rare and self-limited.

HPV (Gardasil 9)

BRAND NAMES: Gardasil 9

Prevents: 9 high-risk and wart-causing HPV types responsible for ~90% of cervical cancers, plus most anal, oropharyngeal, vulvar, vaginal, and penile cancers, and genital warts.

INGREDIENTS

Type	Recombinant subunit (virus-like particles, yeast-grown)
Adjuvant	Amorphous aluminum hydroxyphosphate sulfate (~0.5 mg)
Other	Sodium chloride, L-histidine, polysorbate 80, sodium borate, yeast protein (residual)

COMMON SIDE EFFECTS

Sore injection site (~85%), fainting in adolescents — sit or lie down for 15 minutes after vaccination, headache (~30%), fatigue (~25%), low-grade fever (~10%), nausea (~5%). Among the more reactogenic shots locally.

SERIOUS ADVERSE EVENTS

Anaphylaxis ~1.7 per million doses. No association with autoimmune disease, infertility, premature ovarian failure, or POTS confirmed in extensive post-licensure surveillance across hundreds of millions of doses globally.

Tdap — Adolescent/Adult

BRAND NAMES: Boostrix, Adacel

Prevents: Tetanus, diphtheria, pertussis booster. Recommended at age 11–12, in every pregnancy (27–36 weeks), and as a one-time substitute for a Td booster in adults.

INGREDIENTS

Type	Toxoid (D, T) + acellular subunit (aP) — lower dose than DTaP
Adjuvant	Aluminum hydroxide or aluminum phosphate (~0.33 mg)
Other	Formaldehyde (trace), 2-phenoxyethanol, glutaraldehyde (trace)

COMMON SIDE EFFECTS

Sore arm (~75%), headache (~40%), fatigue (~30%), muscle aches (~20%), low-grade fever (~5%), nausea/GI upset (~10–15%). Typically last 1–3 days.

SERIOUS ADVERSE EVENTS

Severe allergic reaction < 1 per million. Brachial neuritis (shoulder nerve inflammation) very rare. Arthus reaction (severe local reaction) rare — mainly in those who received tetanus boosters too frequently.

Meningococcal ACWY (MenACWY)

BRAND NAMES: Menactra, Menveo, MenQuadfi

Prevents: Neisseria meningitidis serogroups A, C, W, Y — bacterial meningitis and bloodstream infection; can be rapidly fatal.

INGREDIENTS

Type	Conjugate
Adjuvant	None
Other	Sodium chloride, sodium phosphate, formaldehyde (trace, some brands), CRM197 or diphtheria toxoid carrier

COMMON SIDE EFFECTS

Sore arm (~40%), headache (~30%), fatigue (~30%), muscle aches (~20%), irritability or low-grade fever in younger children.

SERIOUS ADVERSE EVENTS

Severe allergic reaction very rare. Small historical GBS signal with Menactra not seen with current products. No other established serious adverse events.

Meningococcal B (MenB)

BRAND NAMES: Bexsero, Trumenba; Penbraya (MenABCWY combo)

Prevents: Neisseria meningitidis serogroup B. Recommended via shared decision-making for ages 16–23.

INGREDIENTS

Type	Recombinant subunit
Adjuvant	Aluminum hydroxide
Other	Sodium chloride, histidine, sucrose

COMMON SIDE EFFECTS

Notably reactogenic: sore arm (~85%), fatigue (~50%), muscle pain (~50%), headache (~40%), chills (~25%), fever (~5–10%), nausea (~15%). Symptoms typically last 1–3 days.

SERIOUS ADVERSE EVENTS

Severe allergic reaction very rare. No other established serious adverse events in post-licensure data.

Shingrix (Recombinant Zoster Vaccine)

BRAND NAMES: Shingrix

Prevents: Shingles (herpes zoster) and postherpetic neuralgia. Recommended for immunocompetent adults 50+ and immunocompromised adults 19+. Two-dose series 2–6 months apart.

INGREDIENTS

Type	Recombinant subunit (glycoprotein E)
Adjuvant	AS01B — combination of MPL + QS-21 saponin in liposomes. Potent adjuvant designed to overcome age-related immune decline.
Other	Sodium chloride, dipotassium phosphate, sucrose, polysorbate 80

COMMON SIDE EFFECTS

Notably reactogenic. Sore arm (~78%), fatigue (~45%), muscle pain (~45%), headache (~38%), shivering (~27%), fever (~21%), GI symptoms (~17%). Typically 2–3 days. Many feel meaningfully unwell for a day — this is exactly what makes the vaccine work so well in aging immune systems.

SERIOUS ADVERSE EVENTS

Anaphylaxis very rare. Small post-licensure GBS signal (~3–6 additional cases per million doses in adults 65+); absolute risk very low and outweighed by shingles/PHN prevention benefit. No association with autoimmune flares in well-controlled studies.

Efficacy: 97% effective at preventing shingles in ages 50–69; 91% effective in 70+; protection lasting 7–10+ years.

Pneumococcal Adult (PCV15/20/21 + PPSV23)

BRAND NAMES: Vaxneuvance (PCV15), Prevnar 20, Capvaxive (PCV21), Pneumovax 23 (PPSV23)

Prevents: Pneumococcal pneumonia, meningitis, bacteremia. Recommended at 65+ and earlier for those with certain medical conditions.

INGREDIENTS

Type	Conjugate (PCV) or polysaccharide (PPSV23)
Adjuvant	Aluminum phosphate in PCV; none in PPSV23
Other	Polysorbate 80, succinate buffer, sodium chloride, phenol (PPSV23)

COMMON SIDE EFFECTS

Sore arm (~50–70%), muscle aches (~25%), fatigue (~20%), low-grade fever (~5%), headache. PPSV23 tends to cause more local reactions than PCV formulations.

SERIOUS ADVERSE EVENTS

Severe allergic reaction < 1 per million. No other established serious adverse events.

RSV Vaccines

BRAND NAMES: Arexvy (GSK), Abrysvo (Pfizer), mResvia (Moderna mRNA); Beyfortus (nirsevimab — monoclonal antibody for infants)

Prevents: RSV lower respiratory tract disease. Recommended for adults 75+, adults 60–74 at increased risk, and pregnant women at 32–36 weeks (Abrysvo) to protect newborns.

INGREDIENTS

Type	Recombinant subunit (Arexvy, Abrysvo); mRNA (mResvia)
Adjuvant	Arexvy: AS01E. Abrysvo: none. mResvia: none
Other	Trehalose, polysorbate 80, sodium chloride, buffers; lipid nanoparticles (mResvia)

COMMON SIDE EFFECTS

Sore arm (~60%), fatigue (~30%), muscle pain (~25%), headache (~25%), joint pain (~20%). Mild and self-limited in most.

SERIOUS ADVERSE EVENTS

Small post-licensure GBS signal under active investigation; absolute rate appears < 10 per million doses. Benefit-risk still favors vaccination in target groups (75+, high-risk 60–74, late pregnancy). Severe allergic reaction very rare.

COVID-19 (Current ACIP Recommendations)

BRAND NAMES: Pfizer-BioNTech (Comirnaty), Moderna (Spikevax), Novavax

Prevents: Severe disease, hospitalization, and death from SARS-CoV-2.

INGREDIENTS

Type	mRNA (Pfizer, Moderna); recombinant protein subunit (Novavax)
Adjuvant	None for mRNA vaccines. Novavax uses Matrix-M (saponin-based)
mRNA ingredients	Lipid nanoparticles (including PEG-lipid), tromethamine, acetate buffer, sucrose, sodium chloride
Novavax ingredients	Sodium phosphate, sodium chloride, polysorbate 80, Matrix-M adjuvant

COMMON SIDE EFFECTS

Sore arm (60–80%), fatigue (~50%), headache (~40%), muscle aches (~30%), chills (~20%), fever (~15% — more common after dose 2 of mRNA vaccines), joint pain, axillary lymph node swelling.

SERIOUS ADVERSE EVENTS

Anaphylaxis ~2–5 per million. Myocarditis/pericarditis after mRNA vaccines, mainly young males ages 12–29: ~10–40 per million — typically mild and self-limited; COVID infection itself carries meaningfully higher myocarditis risk. TTS was associated with the discontinued J&J adenoviral vector vaccine only; not associated with current mRNA or Novavax vaccines.

Td (Tetanus, Diphtheria Booster)

BRAND NAMES: Td booster — every 10 years

Prevents: Maintains protection against tetanus and diphtheria in adults.

INGREDIENTS

Type	Toxoid
Adjuvant	Aluminum phosphate or aluminum hydroxide
Other	Formaldehyde (trace), sodium chloride, phosphate buffers

COMMON SIDE EFFECTS

Sore arm (~60%), redness or swelling (~25%), fatigue; low-grade fever uncommon.

SERIOUS ADVERSE EVENTS

Severe allergic reaction very rare. Arthus reaction (severe local reaction) rare — mainly in those receiving tetanus boosters too frequently.

SECTION 05

How to Interpret Adverse Event Data

Common Side Effects vs. Serious Adverse Events

Common side effects are expected immune-activation symptoms — sore arm, fatigue, low-grade fever, muscle aches. They reflect your immune system mounting a response, which is the point. Typically resolve in 1–3 days.

Serious adverse events are rare events that may require medical attention — anaphylaxis, seizures, neurological events. Reported as rates per million doses, tracked through the active VSD (real medical records from millions of patients) and passive VAERS (intentionally over-inclusive for signal detection).

Background Incidence Matters

If a condition occurs at 100 cases per million per year at baseline, and you see 100 cases per million after vaccination, that's coincidence — not a vaccine signal. Real safety signals emerge when the post-vaccination rate meaningfully exceeds the expected background rate. VAERS reports alone don't establish causation; controlled comparison to background rates is required.

VAERS: Signal Detection Tool, Not a Measurement Tool

VAERS accepts reports from anyone and is intentionally over-inclusive — to catch rare safety signals early. Death reports in VAERS include people who died of unrelated causes hours, days, or weeks after vaccination. When a VAERS pattern looks concerning, it's investigated through controlled studies and the active VSD. Raw VAERS numbers cited as vaccine-caused harms is a systematic misuse of the database.

Comparing Risk: Vaccine vs. Disease

EVENT	RISK FROM VACCINE	RISK FROM DISEASE
Encephalitis (MMR vs. measles)	< 1 per million doses	~1 per 1,000 measles cases
Guillain-Barré (flu vaccine vs. flu illness)	~1–2 additional per million	Several-fold higher with flu illness
Myocarditis (mRNA COVID vs. COVID infection)	10–40 per million young males	Higher with COVID infection itself
Intussusception (rotavirus vs. pre-vaccine)	1–5 per 100,000	55,000–70,000 US infant hospitalizations/year

EVENT	RISK FROM VACCINE	RISK FROM DISEASE
Cervical cancer (HPV vaccine)	No documented serious signal	~36,000 HPV-attributable US cancers/year

Claims Ruled Out by Large-Scale Evidence

- Vaccines causing autism (MMR specifically, thimerosal specifically, total vaccine load — studied in cohorts of millions, consistently disproved)
- HPV vaccine causing infertility, premature ovarian failure, or POTS
- Aluminum adjuvants causing Alzheimer’s disease
- "Too many vaccines too soon" overwhelming infant immune systems (immune response capacity is orders of magnitude greater than the schedule’s antigenic load)

Well-Characterized Real Risks

- Anaphylaxis to any vaccine: ~1 per million doses
- Myocarditis after mRNA COVID vaccines in young males: ~10–40 per million; typically mild; lower than COVID infection itself
- Intussusception after rotavirus: ~1–5 per 100,000
- Febrile seizures after MMR or MMRV: ~1 per several thousand; no long-term harm
- Guillain-Barré syndrome after some vaccines: ~1–5 additional per million; typically reversible

SECTION 06

Sources & Where to Verify

Every claim in this reference can be verified against the primary sources below. When researching a specific vaccine, start with the package insert — Section 11 lists all ingredients; Section 6 lists adverse reactions with rates from clinical trials.

PRIMARY REGULATORY & SURVEILLANCE SOURCES

- FDA — Common Ingredients in FDA-Approved Vaccines
- CDC — Vaccine Excipient Summary
- CDC Pink Book (full vaccine textbook)
- CDC Vaccine Information Statements (VIS)
- VAERS — passive reporting database
- Vaccine Safety Datalink (VSD)

INDEPENDENT ACADEMIC SOURCES

- Institute for Vaccine Safety (Johns Hopkins)
- Children's Hospital of Philadelphia Vaccine Education Center
- Immunize.org — Ask the Experts

> FINAL NOTE
>
> Vaccine science is one of the most heavily studied areas of medicine, with post-licensure surveillance running continuously across multiple national systems. That doesn't mean every product is perfect or that legitimate questions don't exist — they do, and they're how the field improves (whole-cell pertussis replaced by acellular, Zostavax replaced by Shingrix, ongoing mRNA platform refinements). Healthy skepticism is appropriate. The standard for informed consent is engaging with the actual evidence — which is what this reference is meant to support.

Compiled by Natalie Elie, CFWHE · NEwellness101 · For educational and clinical reference use.