Weight:\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Length:\_\_\_\_\_\_\_\_\_\_\_\_\_ Head Circumference:\_\_\_\_\_\_\_\_\_\_

1 month

While baby still spends a majority of their time feeding and sleeping, they are beginning to get familiar with the voices and faces that will make up their whole world. They are getting stronger from tummy time and overall growth and (hopefully) beginning to learn the difference between day and night.

Development

* Start to look at their surrounds more and may track
* Respond to familiar voices
* Begins to study your face
* May hold their hands in tight fists
* Gets excited when you speak or start signing
* Is beginning to extend their legs more often, rather than keeping them flexed
* Continues to have many newborn reflexes, including rooting, startling, and grasping

Nutrition

* For proper growth and development, breast milk or formula is all your baby needs for the first 4 - 6 months of life. Breast milk is the preferred form of nutrition for infants. However, not all moms are comfortable with this method of feeding or are able to breastfeed. For these babies, iron fortified formula is an excellent source of nutrition.
* At one month of age you should be feeding your infant on their request, which should be every 2-4 hours and about 2-4 ounces each feeding. Breast fed infants will feed more often than formula fed infants because breast milk is digested more quickly.
* Do not prop bottles due to risk of choking, ear infections, and early cavities.
* For now, a flexible feeding schedule is best. Remember, these are just guidelines. Your baby is able to regulate his or her own intake to meet day-to-day needs.
* Tap water is appropriate to make up baby formula. It does not need to be boiled, if your home is on city water. If you have well water, contact your local health department to ensure safety and fluoride content. Boiling of well water is recommended up to six months of age.
* If bottle feeding, consider using glass bottles to avoid micro plastic and leaching of BPA (and other chemicals commonly found in plastics) into the formula or breast milk.
* No solids or water until 4-6 months of age.

**Fussy Babies**

This is a very common time to see increased fussiness, gassiness and spitting up in infants. Baby was born with a sterile gut. This is why after they pass meconium and start breastfed poops; if something comes in, then something’s gotta come out. Most newborns will stool during and after breastfeeding sessions in the first several weeks of life. This will all slow down as they begin to build up good gut flora. Good gut flora comes from various exposures. If your baby was born vaginally, they were exposed to beneficial vaginal bacteria. They also gain exposure with every breastfeeding session as well. As baby’s gut matures, it develops finger like projections called villi. These villi increases the surface area of baby’s gut incredibly, allowing baby to absorb more nutrition and better breakdown and process feeds. So feeds that used to move through the gut quickly are suddenly slowing down dramatically. This slowdown can make a baby gassier, spittier and fussier than you know your sweet angel to be. Rest assured, this period doesn’t last long; usually about 5-7 days.

The best way to help baby during this uncomfortable time is to bicycle their legs, rub their belly in a clockwise fashion, bring their knees up to their belly and stretch them straight or hold them under their armpits and let them push off a hard surface to help move the gas along.

The typical timeline for this transition is not hard and fast, but generally it is around 3-4 weeks of age for the vaginal delivery, breastfed baby and closer to the 6 week mark for a c-section, formula fed baby. With this transition comes a slowdown in stooling! (YAY!) Some breastfed babies will still stool multiple times a day, but generally not every single time. There are also some breastfed babes that will only stool 1-2 times a week. All of that is normal. If your baby is having trouble moving stool, but is not having hard pebble like poops that are difficult to pass, they are simply figuring out how to move their bowels and are not constipated. If baby does have hard or large caliber stools, talk to your pediatrician for advice on managing constipation.

**spit up**

Baby’s are born with rather poor motor control. Their nerves don’t quite fire properly and muscles need that nerve signal to do their job smoothly and with precision. So, while we see this in baby’s inability to hold their head up, control their limb movements, and keep their eyes from crossing, this poor control is also occurring internally. The most common example of this poor muscle control is when babies spit up, or reflux. There is a small circular muscle that connects the esophagus (the tube from the mouth to the stomach) and the stomach. This muscle helps keep the contents of the stomach from going back up the tube. Just like the rest of baby’s muscles, it is poorly coordinated. When you combine this poor muscle coordination with a liquid diet and a baby that is primarily dependant on their back, well, it’s a recipe for spit up. When baby is upright, gravity helps keep the stomach contents where it belongs. If the muscle gets lazy or relaxes and baby is moved (say from upright to on their back) it can result in some of baby’s feeding coming right back up.

It is uncommon for babies to have so much spit up that they actually don’t grow or gain weight well. What is far more typical is the recurrent exposure of stomach content (think milk or formula and stomach acid) to the esophagus can irritate the sensitive lining and result in discomfort. This may present early in life or months later, after chronic exposure to the reflux. Babies that are experiencing discomfort from this reflux will often cry when they spit up. They may also arch or pull away during feedings. If this is something your baby is experiencing, it may be worth discussing treatment options with your pediatrician.

However, if your baby spits up, even after most feeds, but doesn’t seem phased by it at all, there is little to worry about. We call these little guys “happy spitters”, and other than frequent laundry and always needing a burp cloth handy they are content and grow well.

Newborns must also make adjustments to the world they are living in. Not all babies have the same temperament. Some adjust to lights, loud noises, and all the other stimulation around them with no trouble, while others are not able to adapt as easily. Just like adults, some babies are easy-going, and some, well, aren’t. Crying may be one way for a baby to vent feelings as he or she is getting adjusted to the world. If your baby cries inconsolably for more than 3 hours a day, more than 3 days a week; please talk to your pediatrician for guidance.

**Importance of Tummy Time**

* Strengthen the muscles in their neck, shoulders, back and hands.
* Prevent flat spots from forming on their head.
* Stretch their neck muscles so they can turn their head well.
* Develop balance, problem-solving, sensory and visual skills.

**Vaccines**

If the COVID-19 pandemic has taught us anything, it is that we are truly an international society. While amazing experiences are only a plane flight away, so too are illness and disease. What happens in one corner of the world is no longer limited to this region.

While immunization is one of the most successful public health interventions of our time, coverage has plateaued over the last decade. The COVID-19 pandemic and associated disruptions have strained health systems, with over 25 million children missing out on vaccination in 2021.

We are extremely fortunate to live in a developed country where vaccinations are easy to obtain. In other developing nations, families will walk 40 plus miles for the opportunity to get their child a vaccination. The burden of vaccine preventable disease in the United States is admittedly low. But it is low because of the success of vaccination programs.

Having worked in medicine for over 20 years now, I have had the unfortunate experience of treating children with autoimmune and genetic disorders that limit the vaccinations these children are able to receive. I have also seen the devastating effects, prolonged hospitalizations and the life long sequelae that vaccine preventable illnesses can bring. Our children are best protected when the community around them receive the recommended vaccinations and when they are vaccinated per the recommended schedule. This is the key component of vaccination programs and the reason for their success.

The greatest risk and burden of disease is in the early months to years of a child’s life. While it feels like there are a lot of vaccinations in the early part of a child’s life, it is because these children are our most vulnerable. When vaccine rates fall below a certain percentage it is often the youngest infants and children that pay the greatest price.

For example, The COVID-19 vaccine I received protects me, absolutely. But it protects my mother in her late 70’s, my patients, the older gentleman I sit next to on the bus, the young mom and her infant in the plane seat next to me. You get the idea. I truly believe that we, as a developed nation, have a responsibility to protect one another and vaccination is a prime example of how to do just that. It is the public health aspect, if you will, of the recommended vaccine schedule.

It is completely understandable to have questions and fears about what is safe for your child. But it has become increasingly difficult to find factual, evidence based information on the internet. Even with a background in science, I have found myself down some rabbit holes on the internet. The rapid spread of misinformation regarding childhood vaccines is highly concerning and it can be difficult to educate yourself. This packet is my attempt to help you understand the illnesses behind the vaccines recommended in the first few years of your child’s life. It will cover disease burden, morbidity and mortality as well as some common misconceptions about vaccines.

Let's begin with the misconceptions most commonly associated with vaccines.

* **All these vaccines at once are too much for the infant immune system.**

An infant is exposed to hundreds of thousands of antigens (An antigen is any particle that causes the body to mount an immune response. These can be bacterial, viral, environmental particles, pet dander, etc) daily. The antigen components of a vaccine are selectively chosen to get the appropriate immune response. Technology has advanced so that only these finite antigens are selected and used in vaccinations. The vaccines presented to infants today have less component parts to them than the vaccines you received as a child.

The infant immune system is best suited to receive vaccines when they are young. The immune response is so robust at this age, we need far fewer vaccines to gain the immune coverage desired. This is another reason delayed or spread out vaccine plans are not endorsed. For one, we expose you and your family to the greatest risk (getting in a car and driving to the office) multiple more times than necessary. Delayed and spaced out vaccination schedules have not been validated or studied to ensure adequate immune coverage from the alternative vaccine schedule. The risk of an adverse effect from a vaccine is 1:1,000,000 (this is a low estimate, some studies have it at 1 in 10,000,000). In comparison; the risk of getting struck by lightning is 1:700,000, a car accident is 1:366 for every 1,000 miles driven.

* **Vaccines can cause autism.**

In 1998, Andrew Wakefield had an article published in a reputable scientific journal that claimed the MMR (measles, mumps, rubella) vaccine caused autism. The paper was a case study of 12 children with autism spectrum disorder. The data published was preliminary (not all data was evaluated prior to publication) and the article was not peer reviewed. Peer review is standard practice for all scholarly articles to validate the study

design and findings. The symptoms of autism in some of these children were present prior to their MMR vaccine and several did not develop symptoms until years after the vaccine. The study was funded by a lawyer who had been hired by the families of these 12 children in their lawsuit against the vaccine manufacturer. Andrew Wakefield was also developing his own MMR vaccine and stood to gain greatly if the manufacturer of the current MMR vaccine suffered from the allegations.

After all data were available for analysis, there was no link found between the MMR vaccine and the development of autism. The funding source (the lawyer and the families suing the vaccine manufacturer) was never disclosed in the paper and the authors of the paper (all except Wakefield) withdrew their names from the article when this information was made public. The article has been retracted from the Journal and Wakefiled has lost his license to practice.

But, the damage was done. The seeds of doubt and mistrust were sown. Although hundreds of studies have been conducted since proving no link between the MMR vaccine and autism, vaccine rates for measles, mumps and rubella continue to lag.

* **Aluminum containing vaccines can cause autism and/or are dangerous for brain development.**

Aluminum is used in vaccines as an adjuvant. An adjuvant is a vaccine component that boosts the immune response to a vaccine. Adjuvants allow for lesser quantities of the vaccine and fewer doses. The levels of aluminum in vaccines is measured in micrograms, while the levels we ingest daily is measured in milligrams. 1 milligram = 1,000 micrograms. While ingested aluminum is filtered through the intestines and only about 1% is absorbed into the bloodstream, the aluminum in vaccines is injected and thus enters the bloodstream to be processed. Once in the bloodstream, aluminum is carried to the kidneys where about half of it is removed from the body within 24 hours.

There are now several combination vaccines available which dramatically decrease the amount of aluminum needed to get the appropriate immune response. Instead of added aluminum, each component part of a combination vaccine effectively works to stimulate an immune response. So, the more components, the less aluminum needed; dropping the total amount of aluminum required by more than half depending on the vaccines scheduled.

If you have more concerns or questions about vaccine components, the Children’s Hospital of Philadelphia (CHOP) has a fantastic vaccine education center. <https://www.chop.edu/centers-programs/vaccine-education-center>

Below is the most current list of vaccines we carry in the clinic, the manufacturer and the aluminum content listed in the vaccine package insert.

| **Vaccine** | **Manufacturer** | **Aluminum content** |
| --- | --- | --- |
| DTaP (Daptacel) | Sanofi Pasteur | 0.33mg |
| IPV (Polio) | Sanofi Pasteur | none |
| ActHIB (Haemophilus influenzae type b) | Sanofi Pasteur | none |
| Pentacel (DTaP, IPV, Hib) | Sanofi Pasteur | 0.33mg |
| Quadracel (DTaP/IVP) | Sanofi Pasteur | 0.33mg |
| Vaxelis (DTaP, HIB, IPV, Hep B) | Sanofi Pasteur & Merck | 0.319mg |
| Engerix-B (Hepatitis B) | GlaxoSmithKline Group | 0.25mg |
| Prevnar 20 (Pneumococcal) | Pfizer | 0.125mg |
| Vaqta (Hepatits A) | Merck | 0.225mg |
| MMR (Measles, Mumps, Rubella) | Merck | none |
| ProQuad (MMR, Varicella)\* | Merck | none |
| Varivax (Varicella)\* | Merck | none |
| Adacel (TDaP) Age 11+ | Sanofi Pasteur | 0.33mg |
| Gardasil 9 (HPV) | Merck | 0.500mg |
| MenQuadfi (Meningococcal) | Sanofi Pasteur | none |
| Fluzone (Seasonal Influenza) | Sanofi Pasteur | none |
| COVID-19 Vaccine | Pfizer | none |
| \* live vaccine |  |  |

**Vaccines Recommended at the 2, 4 and 6 month well child exams:**

**Pentacel** (DTaP, IPV, Hib) **or Vaxelis** (DTaP, IPV, Hib, Hep B), **Prevnar 20** and **Rotateq**

**DTaP (Diphtheria, Tetanus, acellular Pertussis)**

**IPV (inactivated Polio virus)**

**Hib (Haemophilus influenza type B)**

 **Hep B (Hepatitis type B)**

**Prevnar 20 (Pneumococcal 20)**

**Rotateq (oral Rotavirus)**

**Diphtheria** is a disease caused by a bacterial infection that produces a toxin resulting in a thick membrane in the back of the throat and can extend to any part of the respiratory tract making it difficult to breathe. The disease can also affect the kidneys, heart and nervous system.

**Tetanus** - Tetanus is a nervous system condition caused by a bacterium that grows in the absence of oxygen (anaerobic). This toxin-producing anaerobic spore (C tetani) found in the soil. Since *C. tetani* spores cannot be eliminated from the environment, immunization and proper treatment of wounds and traumatic injuries are crucial for tetanus prevention. Tetanus causes very painful muscle contractions. It can cause children’s neck and jaw muscles to lock (lockjaw), making it hard for them to open their mouth, swallow (breastfeed) or breathe. In recent years, tetanus has been fatal in approximately 11% of reported cases. When mothers or newborns contract tetanus through wounds during birth, this is called maternal/neonatal tetanus (MNT). It can be prevented by immunizing the mother during her pregnancy. She then passes the immunity on to her newborn for a few days after birth. This is one reason the TDaP vaccine is recommended for expectant mothers.

**Pertussis** - Pertussis is commonly known as whooping cough or the 90 day cough. It has been known to cause such severe cough that people fracture ribs and burst blood vessels from the force of cough. Pertussis is caused by a bacteria (Bordatella Pertussis) and can live in respiratory secretions outside of the body for several hours. Pertussis infection in infants may be particularly severe, with increased rates of hospitalization for complications including apnea (periods of not breathing), seizures, and pulmonary hypertension. The incidence of pertussis remains highest among young infants. From 2012 through 2017, 66.7%, of all pertussis-related deaths (n = 72) reported to CDC were among infants less than two months of age, who were too young to have received DTaP vaccine. This is why mother’s are vaccinated with the TDaP (adult version of DTaP) during pregnancy. Mortality rate of pertussis in infants is 1%. It is recommended that all caregivers and close family members be vaccinated for Pertussis prior to baby being born

**Polio** (IPV) is a highly infectious viral disease that can cause irreversible paralysis. Polio mainly affects children under 5 years of age. However, anyone of any age who is unvaccinated can contract the disease.1 in 200 polio infections leads to irreversible paralysis. Among those cases, 5 to 10 per- cent die when their breathing muscles (diaphragm) are paralyzed. There is no cure for polio once the paralysis sets in – only treatment to alleviate the symptoms.

Since 1988, more than 18 million people can walk today who would otherwise have been paralyzed, and 1.5 million childhood deaths have been averted thanks to the polio vaccine.

In the summer of 2022, polio virus was detected in waste water in several boroughs in New York city. This is a disease that was considered “eradicated” in the Americas in 1994. Low vaccinations rate are contributing to the spread of the disease, where as many as 70% of those infected are mildly symptomatic to completely asymptomatic.

**Haemophilus** **influenza** **B** (HiB) - despite the name, Hib is not an influenza virus, it is a bacterial infection. Haemophilus influenza type B can cause infections of the tissue covering the brain and spinal cord (meningitis), swelling of the epiglottis (the soft tissue flap that protects the windpipe (trachea) and pneumonia. Prior to vaccination, Hib had a 4% mortality rate in children under 5 years of age and approximately 30% of children who survived Hib infection had permanent sequelae like hearing impairment, seizure disorder, cognitive and developmental delay, and paralysis in 15%–30% of survivors.

**Pneumococcal** (aka Pneumonia) (Prevnar 20 vaccine) The 20 behind the Prevnar indicates how many pneumococcal strains the vaccine covers. The diseases caused by pneumococcal infections include pneumonia, ear infections, sinus infections, blood infections and meningitis (infections of the tissue covering the brain and spinal cord). A recent analysis estimated that pneumococcal disease was responsible for 4 million illness episodes, 445,000 hospitalizations and 22,000 deaths annually in the United States.

Pneumonia is the single largest infectious cause of death in children worldwide. Pneumonia killed 740,180 children under the age of 5 in 2019, the most recent year for which we have data available. This total accounts for 14% of all deaths of children under five years old (0-5 years of age) and 22% of all deaths in children aged 1 to 5.

**Rotaviruses** (Rotateq)are the most common cause of severe diarrheal disease in young children throughout the world. Prior to vaccine introduction, almost all U.S. children were infected with rotavirus before their 5th birthday. Rotavirus spreads easily, it is in the stool (poop) of infected people, and can be spread by hands, diapers, or objects such as toys, changing tables, or doorknobs that have a small amount of stool on them. Totally gross, but true. On average, each year, among U.S. children younger than 5 years of age, rotavirus led to more than 400,000 doctor visits, more than 200,000 emergency room visits, 55,000 to 70,000 hospitalizations, and between 20 to 60 deaths.

**Hepatitis** **B** - Hepatitis B virus is a dangerous liver infection that, when caught as an infant, often shows no symptoms for decades. It can develop into cirrhosis and liver cancer later in life. Babies born of Hep B positive mothers are at greatest risk of contracting the infection, which is why it is recommended to be given at birth. A baby born of a Hep B positive mother can escape contracting the infection with a delivery dose of Hep B vaccine and the administration of immune globulin. In the US, we are fortunate to know the Hep B status of most delivering mothers. The hepatitis B vaccine is one of the few vaccines that can be delayed with little risk to baby and their immediate community.

**Development from 1 - 2 months of age**

* Motor skills: Continue to work on tummy time. They should get about 5-10 minutes of tummy time daily, but it does not have to happen in one long stretch. Break it up, especially if they don’t really enjoy it. You can spend some tummy time in a more modified position as well, like placing baby on your chest (think skin to skin) so they aren’t totally working against gravity.
* Sensory skills: tracks and follows objects visually across midline; looks at faces in line vision; responds to sounds by becoming quiet and alert
* Communication skills: coos (makes musical, vowel-like sounds). Parents may notice differentiated crying for differing needs. They may quiet when they hear a loud sound or voice. Baby may start to recognize your voices, so talk, talk, talk and read, read, read to them.
* Social skills: smiles socially; begins to respond to voice by cooing; may begin to relate differentially to mother, father, siblings, other caregivers