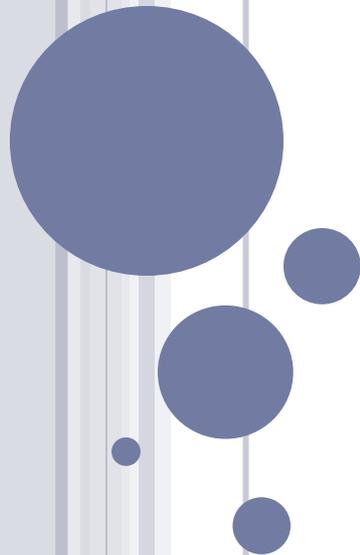


INFANT GROWTH AND DEVELOPMENT

**Growth Charts
Developmental Milestones
Appropriate Weight Loss/Weight Gain**

Susan W. Hatcher RN, BSN, IBCLC



INFANT GROWTH CHARTS

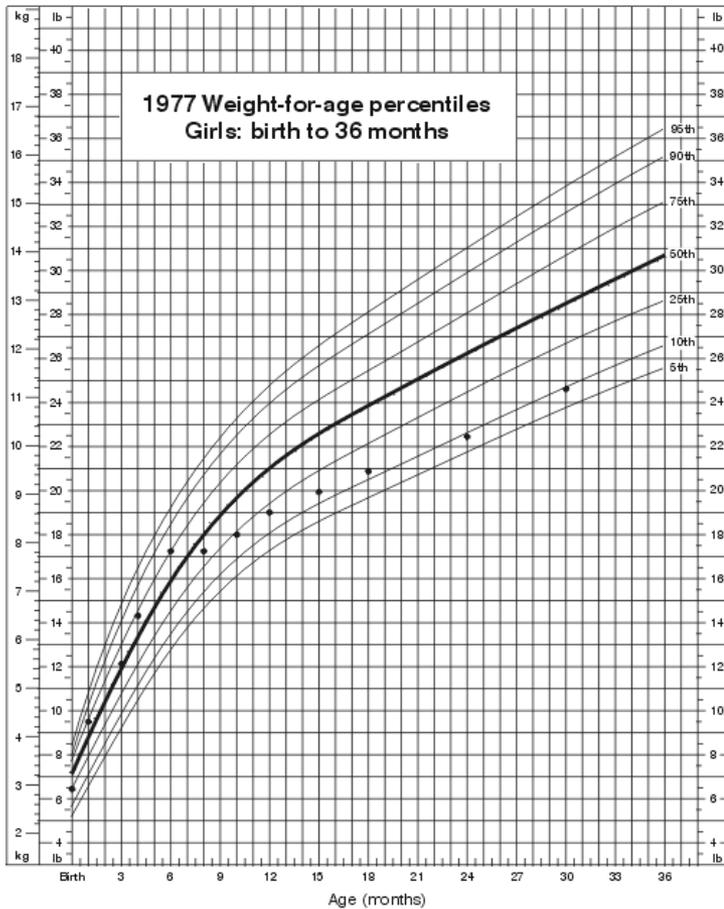
History of Growth Charts

- The 1977 growth charts for babies under 2 years old were based on a study conducted in Ohio from 1929 to 1975. The babies in this study were primarily fed formula or a combination of breastmilk and formula, and were often started on solids before 4 months.
- The US Centers for Disease Control revised their standard growth charts in 2000, based upon more recent data which are “representative of the United States population, reflecting the Nation’s cultural and racial diversity.”
- In 2006, the World Health Organization released revised growth charts that are representative of healthy breastfed babies throughout the world.



GROWTH CHART COMPARISONS

Case Study: Mary, Born Dec. 2, 1997

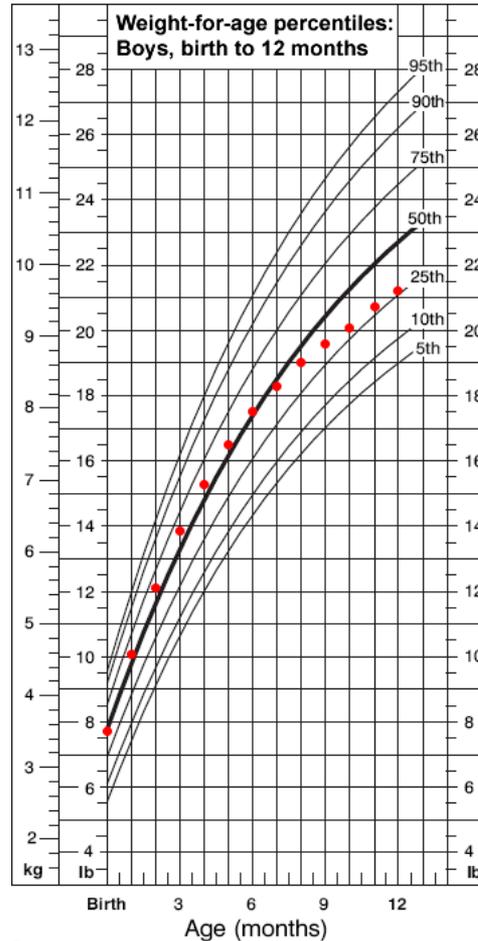


SOURCE: National Center for Health Statistics



Average Growth Patterns of Breastfed Infants

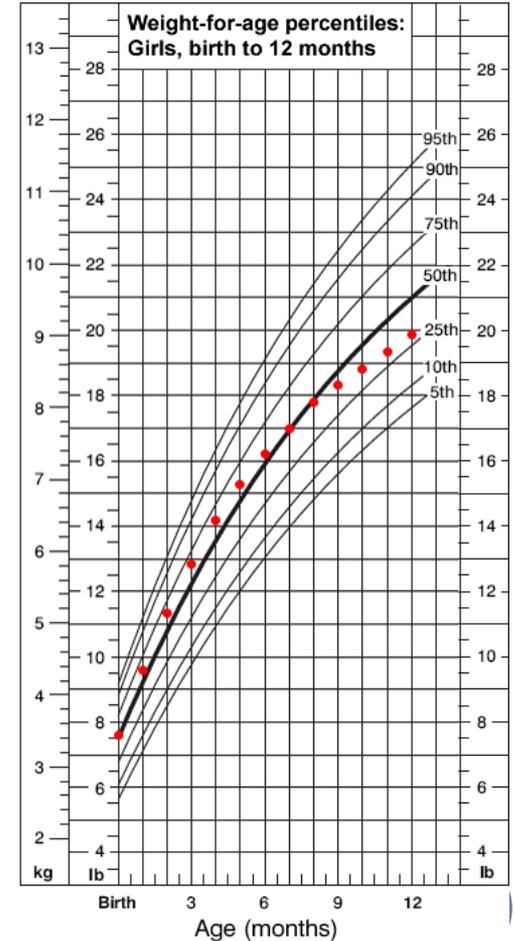
The red points plotted on the CDC Growth Charts represent the average weight-for-age for a small set of infant boys and girls who were breastfed for at least 12 months (see references).



Sources:

- Base chart -- CDC Growth Charts: United States, Published May 30, 2000.

- Breastfed baby data points -- WHO Working Group on Infant Growth. An Evaluation of Infant Growth: a summary of analyses performed in preparation for the WHO Expert Committee on Physical Status: the use and interpretation of anthropometry. (WHO/NUT/94.8). Geneva: World Health Organization, 1994, p.21.



Graphic by kellymom.com, 2004

CURRENT DAY

- In February 2012, the American Academy of Pediatrics, in their policy statement *Breastfeeding and the Use of Human Milk*, stated that “Infant growth should be monitored with the World Health Organization (WHO) Growth Curve Standards to avoid mislabeling infants as underweight or failing to thrive.”



CURRENT DAY (CONT.)

- Breastfed babies are leaner than babies fed non-human milk
- Boys gain weight slightly faster than girls
- Growth in length varies by sex – boys grow slightly faster than girls
- Infant breastfeeding patterns vary based on:
 - cultural environments/expectations
 - newborn stomach size
 - maternal breast storage capacity
 - time of day



BREASTFEEDING PATTERNS

- Infant breastfeeding patterns vary based on:
 - cultural environments/expectations
 - newborn stomach size
 - maternal breast storage capacity
 - time of day
- Feed on demand or feed by the clock?
- Use of pacifiers?



BREASTFEEDING PATTERNS (CONT.)

- Infant stomach size:
 - Day 1: 30 ml/day
 - 1st 24 hours avg intake 2 – 10 ml/feeding (2 teaspoons)
 - 24 – 48 hours avg intake 5 – 15 ml/feeding (1 tablespoon)
 - 48 – 72 hours avg intake 15 – 30 ml/feeding (2 tablespoons)
 - 72 – 96 hours avg intake 30 – 60 ml/feeding (4 tablespoons)
 - Day 7: 300 – 450 ml/day
 - Just under 2 cups
 - Day 30: 750 – 1050 ml/day
 - About 4 ½ cups



BREASTFEEDING PATTERNS (CONT.)



- Maternal breast storage capacity (large)
 - Baby may only feed on one breast per feeding
 - Baby may feed fewer times per day but may continue to gain weight at an average or above average rate



- Maternal breast storage capacity (small)
 - Baby may feed more frequently per day
 - Baby will drain both breasts at every feeding
 - Baby may feed multiple times at night



THINGS TO CONSIDER

- What size are baby's parents? What were their growth patterns as babies? What about baby's siblings or other family members? Genetics plays a large part in baby's size, so don't ignore it.
- Is baby gaining consistently, even if it's not on a curve?
- Is baby meeting developmental milestones on or near target?
- Is baby alert, happy, active?
- Is baby showing other signs of adequate milk intake?



NORMAL GROWTH PATTERNS AND BEHAVIOR

(no audio)



NORMAL GROWTH PATTERNS

- Babies regain their birth weight by 10-14 days
- Birth to 1 month weight gain is .5 to 1 oz. per day
- 2-6 month weight gain is 3-5 oz. per week
- Birth weight typically doubles by 4-6 months and triples by a year
- Head circumference increases by 3 inches in a year



NORMAL GROWTH PATTERNS



- Birth to 6 mo. infants gain about 1 in. each month
- 6-12 months infants gain 1/2 inch each month
- Infant's length increases by 50% at 1 year
- Babies tend to have growth spurts at 3 weeks, 6 weeks, 3 months, 6 months



NORMAL NEWBORN BEHAVIORS AND MILESTONES

- Healthy babies are born with natural reflexes to help them move to the breast to feed



- Some maternal pain medications can inhibit these natural reflexes, temporarily suppressing them in some newborns



HOW DOES THE CULTURE IMPACT NEWBORN BEHAVIORS?

- Personal Culture



- Environmental Culture

- Why is it important to understand?



WHICH BABY IS GOING TO BE SUCCESSFUL?

Newborn Habitat



Hospital Culture



BREASTFEEDING: LATCH IS KEY

Bottle-centric culture leads to moms incorrectly breastfeeding

- Initiates breastfeeding by shoving nipple in baby's mouth, usually according to schedule, not feeding cues
- Baby sucks and compresses tip of nipple – leads to nipple pain, cracks, bleeding
- Assumption that it hurts to breastfeed



BABIES BREASTFEED . . . NOT MOMS

Correct latch

- Baby self attaches with wide open mouth—nipple is deep up in roof of baby's mouth
- Best accomplished with skin to skin and mom in a laid back position
- Baby to breast in response to feeding cues, not clock



BIOLOGICAL NURTURING

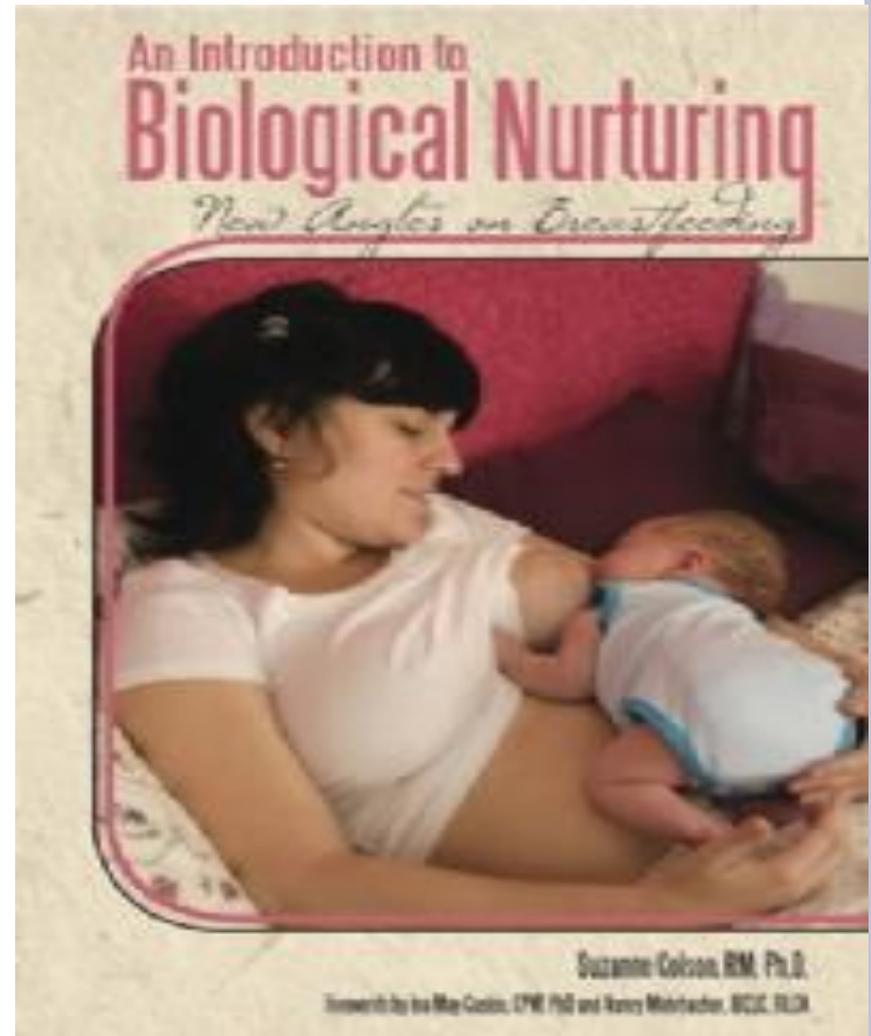
SUZANNE COULSON IDENTIFIED AND VALIDATED THESE
PRIMITIVE NEONATAL REFLEXES (PNR):

Endogenous (cues): Hand to mouth, mouth gape, tongue dart/lick, arm cycle, leg cycle, finger flexion/extension

Motor (finding): Palmer/Plantar grasps, stepping, crawling, placing, Babinski, hand/foot reflex

Anti-Gravity (finding): Head righting, head lefting, rooting, head bobbing

Rhythmic (sustaining): Suck, jaw jerk, swallow



WHEN BABY IS REMOVED FROM HIS NATURAL HABITAT “MOM’S BODY”

- Babies separated from the mother during the early newborn period are at a higher risk for unstable physiological functioning and potential feeding difficulties



- Protest-despair response
- Separation distress cry
- Despair mode
- Stress hormones rise, causing problems with body temperature, blood sugar levels, breathing patterns, and unstable heart rates



WHEN BABY'S CRIES GO UNANSWERED:

Despair (survival) mode as seen by:

- Decreased HR (brady episodes)
- Decreased RR (apnea)
- Decreased body temp (temp instability)
- Decreased blood glucose levels
- Decreased gut function and digestion
- Stress hormones increased as baby prepares to fight for survival



(Ammari et al, 2009)



WHEN REUNITED WITH MOTHER:

- ✓ Vital signs stabilize
- ✓ Stress levels decrease
- ✓ The protest-despair response disappears
- ✓ Optimal nutrition and growth can take place

(Speyrer & Torngren)



CONTINUOUS MOTHER-BABY CONTACT

- Associated with fewer feeding problems, more stable body functions, and less crying
- The more that mother and baby are practicing skin-to-skin contact during the first three hours after birth, the more likely they are to demonstrate successful exclusive breastfeeding patterns at discharge



OTHER BENEFITS

- Oxytocin release enhances mother-infant bonding
- Babies cry 10X less than when in a crib
- More quiet alert states
- Improves let down, increases milk intake
- Strengthens immune system—colonization of good flora



NEWBORN BEHAVIOR AFTER BIRTH

Table 31-1 Predictable Newborn Behaviors After Birth

Time (minutes)	Behavior
6	Opens eyes
11	Massages the breast
12	Hand to mouth
21	Rooting
25	Moistened hand to breast
27	Tongue stretches and licks nipple
80	Breastfeeding

Source: Adapted from Matthieson, A., Ransjo-Arvidson, A., Nissen, E., & Uvnäs-Moberg, K. (2001). Postpartum maternal oxytocin release by newborns: Effects of infant hand massage and sucking. *Birth, 28*, 12–19.



SLOW WEIGHT GAIN AND FAILURE TO THRIVE

(no audio)



SLOW WEIGHT GAIN/FTT

- Slow weight gain is a concern when:
 - An infant is SGA – feeding difficulties, low caloric intake, intake should be calculated at higher level
 - An infant who is less than 2 weeks of age and is more 10% below birth weight
 - An infant's weight is less than birth weight at 2 weeks of age
 - An infant has minimal/no urine and stool output in 24 hours
 - An infant who shows clinical signs of dehydration



SLOW WEIGHT GAIN/FTT (CONT.)

- Difference between slow weight gain and FTT
 - Slow weight gain:
 - Healthy appearance, alert, responsive
 - Normal skin turgor, muscle tone
 - Diluted urine, normal stools
 - Good suck/swallow at breast
 - Eight or more feedings at breast per day
 - Sufficient milk ejection reflex
 - Weight gain is slow but consistent



SLOW WEIGHT GAIN/FTT (CONT.)

- Difference between slow weight gain and FTT
 - Failure to Thrive:
 - Infant apathy or weak crying
 - Poor muscle tone and skin turgor
 - Very concentrated urine, minimal output, infrequent/scant stools
 - Fewer than eight feedings/day, usually short in length, or continuous feeding with poor intake
 - No signs of MER
 - Poor or no weight gain
 - Sporadic swallowing



CONDITIONS ASSOCIATED WITH INFANT GROWTH AND DEVELOPMENT

○ Infant Factors

- Gestational age/growth
 - Preterm, SGA, IUGR, LGA
- Oral anatomy
 - Ankyloglossia, cleft lip/palate, bubble palate, facial anomalies
- Oral functioning
 - Hypotonia, hypertonia, performance/strength/stamina of suck, swallow, breathe cycling
- Energy Requirements
 - Cardiac disease, respiratory disease, metabolic disorders



CONDITIONS ASSOCIATED WITH INFANT GROWTH AND DEVELOPMENT (CONT.)

- **Known Illness**
 - Infection
 - Trisomy 21, cystic fibrosis, cardiac defects
- **Maternal medications**
 - Prenatal prescription medications, recreational drugs
- **Intrapartum factors**
 - C/S, hypoxia, anoxia, labor medications, analgesia, forceps, vacuum
- **Metabolic/malabsorption issues**
 - Reflux, conditions limiting intake/metabolism
- **Other factors**
 - Hospital routines, inappropriate supplementation, pacifiers, poor support or instruction



CONDITIONS ASSOCIATED WITH INFANT GROWTH AND DEVELOPMENT (CONT.)

○ Maternal Factors

- Breast abnormalities
 - Surgical interruptions of the breast, insufficient glandular development, trauma
- Nipple anomalies
 - Flat, retracted, inverted, dimpled or oddly shaped
- Ineffective/insufficient milk removal
 - Poorly positioned infant, ineffective suckling, engorgement, clogged ducts
- Delayed Lactogenesis II (Secretory Activation)
 - Overweight/obese mother, diabetic



CONDITIONS ASSOCIATED WITH INFANT GROWTH AND DEVELOPMENT (CONT.)

- **Poor Breastfeeding Management**
 - Delayed/disrupted early feeding opportunities, too few feedings, maternal/infant separation, maternal/infant illness, failure to manage pumping
- **Medications/Drugs**
 - Prescription/recreational, labor meds, IV fluids, oral contraceptives, smoking
- **Hormonal Alterations**
 - Hypothyroid, retained placenta, pituitary disorders, PCOS, diabetes, other endocrine-related problems



CONDITIONS ASSOCIATED WITH INFANT GROWTH AND DEVELOPMENT (CONT.)

- Milk Ejection Issues
 - Drugs, alcohol, smoking, pain, stress, issues inhibiting let-down
- Other Factors
 - Vitamin B deficiency in vegetarian diet
 - Strict parenting programs limiting feedings
 - Ineffective pump/pumping schedule
 - Poor weight gain during pregnancy
 - PP hemorrhage
 - Anemia
 - C/S



ROLE OF THE LACTATION CONSULTANT

(no audio)



ROLE OF THE LACTATION CONSULTANT

- Take a history
 - Details of the feeding: frequency, duration, signs of MER, use of supplements
 - Infant history: general health, birth weight, lowest weight, sleep patterns, demeanor, urine/stool output, use of pacifiers
 - Maternal history: general health, psychological wellness, support system, dietary intake, stress/workload, sleep patterns, substance abuse (smoking/alcohol/medications use)



ROLE OF THE LACTATION CONSULTANT

- Physical Assessment of Infant as it relates to Breastfeeding
 - Wets/soileds
 - Mucous membranes
 - Anterior fontanelle appearance
 - Skin turgor – no tenting



ROLE OF THE LACTATION CONSULTANT

- Physical Assessment of Mother as it relates to Breastfeeding
 - Condition/size of breast, nipples, areolae
 - History of previous breast surgery, scars
 - Symmetry of breasts/nipples
 - Signs of mastitis, clogged ducts, other factors affecting feeding such as thrush



ROLE OF THE LACTATION CONSULTANT

- Observation of the Feeding
 - Did the breast fullness change to softness during feeding
 - Was there appropriate positioning, latch-on technique, interaction between mother & baby
 - What was the infant suckling pattern: coordination, vigor, rhythmic suck/swallowing
 - Were there signs of adequate milk flow
 - Use test weighing with appropriate scale



ROLE OF THE LACTATION CONSULTANT

○ Other Management

- Referral out for lab tests, such as prolactin levels, sodium/chloride, potassium, pH, blood urea, nitrogen, hematocrit
- Referral to infant and/or maternal primary care physician for monitoring/management
- Management of maternal low milk supply
 - Increasing feeds, pumping, hand expression, ensuring hindmilk, breast compression, maternal nutrition/meds
- Management of supplemental feeding if needed
 - Temporary or permanent, alternative feeding methods
- Evaluation and follow-up



GOAL ACCOMPLISHED!



(no audio)

