For infants, drinking and eating are intense experiences, comprise most of their developmental progress (i.e. feeding provides emotional and psychologic growth). For preterm infants < 34 weeks' gestational age, appropriate feeding can prevent enterocolitis or non-GI disorders (e.g. respiratory disease, sepsis).

Colostrum feeds the baby's nutritional needs: breast milk contains specific nutritional needs: a protein-to-calorie ratio of 40:60, important for the baby's growth and development. Breast milk is preferred over formula feeding, as it provides all the necessary nutrients for the baby's growth and development. However, if breastfeeding is not possible or if the baby has special needs, formula feeding can be an alternative. In the United States, it is recommended that breastfeeding complement commercial formulas, as the latter may be necessary for preterm infants or infants with medical conditions that require specific nutrition.

Feeding Route:
- *term infant* can receive oral feedings immediately after birth (do not delay for > 4 h); can be bottle- or breast-fed on demand, as long as attention is paid to fluid balance.
- *preterm infant* 34-36 weeks' gestational age should be fed q 3-4 h by bottle, breast, or by feeding tube.
- *preterm infant* 34 weeks' gestational age does not have well-coordinated suck-and-swallow reflex; feed by gastric tube or feeding tube q 2-3 h.
- *infant* 1000 g (limited gastric volume; may experience intermittent hypoglycemia and hypoxia when given bolus feedings) - continuous gastric or transpyloric* feeding.
- *exsp. useful for infant with endotracheal tube and mechanical ventilation* - transpyloric feeding prevents gastric reflux and aspiration.
- *sick infants* may require total parenteral nutrition because of GI disorders (e.g. necrotizing enterocolitis) or non-GI disorders (e.g. respiratory disease, sepsis).

Feeding Solution, Nutritional Needs:
Calcium and phosphorous supplement are needed only for preterm infants!

Fluoride supplements should not be given to infants < 6 months of age - danger of fluorosis!
- at age 6 months = 3 years, if local water supply contains fluoride < 0.3 ppm → daily supplement of 0.25 mg fluoride.
- at age 3 years → dental check-up;
- at age 3-5 years, if local water supply contains fluoride 0.3-0.6 ppm → daily supplement of 0.25 mg fluoride. Increase to 0.50 mg/day if water has fluoride < 0.3 ppm.
- at age 6-16 years, values are 0.50 mg/day if 0.3-0.6 ppm. 1.00 mg/day if < 0.3 ppm.

Term infants - all of water, caloric, protein, and vitamin requirements are met by:
- a) human milk
- b) commercial 2 kcal/oz cow’s milk-based formula.

- specific nutritional needs:
  - 80-100 mL water/kg (→ 120-135 mL/kg) at 1 yr → 40-50 mL/kg (at 18 yr)
  - 100-120 kcal/kg (→ 100 kcal/kg at 1 yr → 40 kcal/kg in late adolescence)
  - 2.3-3.0 g/kg of protein (→ 1.2 g/kg at 1 yr → 0.9 g/kg at 18 yr).

- 40% of daily calorie requirements should be derived from carbohydrates, with remainder provided by dietary fats.

Commercially available formulas are now fortified with vitamins, minerals, and trace elements (otherwise, iron supplementation is necessary).

Commercial formula-fed term infants do not require vitamin or mineral supplementation.

NUTRITION

AAP recommends exclusive breastfeeding for 6 mo → continuing breastfeeding with solid foods for 1 yr → after age 1 yr, breastfeeding continues as long as is desired, but breastfeeding should complement full diet of solid foods and fluids.

STATE ORGANIZATION of newborn:”predictable unpredictability” – irregular feeding and sleeping schedules, by 2 months infant’s demands become regular!

NUTRITION

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Human Milk

If mother's diet is adequate, no dietary supplement* is needed for breast-fed infant

*except 200-400 U vitamin D daily (beginning in 1st 2 mo) for all infants (if exclusively breastfed) or in areas with little sunshine (e.g. those with dark skin, esp. in winter).

- breastfed infants may receive multiple-vitamin supplement containing vitamins A, D, and C.
- breastfed infants. Iron supplementation may await introduction of iron-fortified cereal at 4-6 months of age (term infants deplete their prenatally acquired iron stores by ~ 6 months).
Preterm infants (small body stores, gastric motility, intestinal lactase activity, calcium & phosphorus requirements). Preterm infants should routinely receive multiple-vitamin supplement (A, D, B, C, and E) if < 36 weeks' gestational age should also receive vitamin E to prevent hemolytic anemia.

**Preterm infant feeding** should not be given additional water (risk of hyponatremia). *Human milk has increased bioavailability of iron.*

**Breastfeeding**

- During pregnancy, estrogens and progesterone → breast hypertrophy and inhibition of prolactin release.
- After placenta delivery, hormone levels increase → milk production.
- In primiparas, lactation is fully established in 72-96 hr. less time is required in multiparas.
- Infant should be encouraged to take in as much of breast and areola as possible, placing lips 2.5 cm from base of nipple.
- Microorganisms (bacteria) protects surface of areola and nipple; this lubricant should not be buffed away with towel or with nipple exercises.
- Infant should face mother, ventral surface to ventral surface.
- Mother should assume position works best (such as lying almost flat and turning from one side to other to offer each breast).
- Infant should face mother, ventral surface to ventral surface.
- Mother should support breast with thumb and index finger above and three fingers below nipple to ensure that it is centered in newborn's mouth, minimizing any soreness.
- Mother may use warm compresses and express her milk manually just before nursing (to get milk to the rear of nipple so that rooting will occur and mouth will open wide and grasp newborn's lower lip should be stimulated with a firm, wet cotton tip, and infant will receive small amount of colostrum."

**Colostrum**

- High-caloric, high-protein, thin yellow fluid present in breast before birth (can be expressed by gentle massage starting from 16th week) and for first days thereafter (within one week postpartum, maternal milk is produced).
- Rich in antibodies (IgA); lymphocytes, macrophages – passive immunity, protect against enteric bacteria.
- Rich in nutrients.
- Stimulates passage of meconium.

**Human milk**

- Nutrition of choice – provides balanced diet!
- Highest lactone content of mammalian milks (readily available energy source).
- Large amounts of vitamin E prevents anemia by increasing erythrocyte life span.
- Calcium : phosphorus ratio = 2 : 1 (ratio in cow's milk is almost reversed) - prevents calcium deficiency tetany.
- Favorably changes pH of stools and intestinal flora protects against bacterial diarrheas.
- Transfers antibodies (especially colostrum) from mother to infant.
- All infectious diseases are less frequent in breastfed infants!
- Contains uns-3 and uns-6 fatty acids and their very long-chain polyunsaturated derivatives (LC-PUFAs), arachidonic acid (ARA) and docosahexaenoic acid (DHA) – contribute to enhanced visual and cognitive outcomes of breastfed.
- Contains cholesterol, taurine – important for brain growth.

**Advantages to child**

- Nutritional and cognitive; protection against infection, allergies, obesity, Crohn's disease, and diabetes.

**Benefits to mother**

1) Reduced fertility
2) More rapid return to normal postpartum condition (uterine involution, weight loss); ↓ risk of hyponatremia, osteoporosis, osteopenia, ↓ risk of ovarian and premature ovarian cancers.

**Mother's diet**

- Avoid foods that may cause colic (garlic, onions, legumes, cabbage, chocolate, excessive amounts of exotic or seasonal fruits (melons, rhubarb, peaches).
- Add extra 600 kcal.
- Add extra 400 mg calcium (to total 1200 mg/d); dairy products are excellent source.
- Vitamin supplementation is unnecessary (but average U.S. diet is low in B12, and vegetarian diets also may be low in B12).

**Drugs in lactating mothers**

- Water soluble drugs are more easily secreted into colostrum.
- Lipid soluble – into milk.

**Contaminating factors**

1) Maternal HIV infection
2) Maternal active hepatitis (HBV, HCV)
3) Maternal use of certain medications (tetracycline, chloramphenicol, warfarin)

**Physician should discuss breastfeeding (incl. techniques) with mother prenatally.**

**Preparing nipple before delivery is unnecessary.**

**Mother may use warm compresses and express her milk manually just before nursing (to get milk to the rear of nipple so that rooting will occur and mouth will open wide and grasp newborn's lower lip should be stimulated with a firm, wet cotton tip, and infant will receive small amount of colostrum).**

**Diagnosis should be broken with finger before removing newborn from breast.**

**Terms, Techniques**

- Physician should discuss breastfeeding (incl. techniques) with mother prenatally.
- Preparing nipple before delivery is unnecessary.
- Mother should support breast with thumb and index finger above and three fingers below nipple to ensure that it is centered in newborn's mouth, minimizing any soreness.
- Mother may use warm compresses and express her milk manually just before nursing (to get swollen areola into newborn's mouth).
- Center of newborn's lower lip should be stimulated with nipple so that rooting will occur and mouth will open wide and grasp nipple and areola.
- Infant should be encouraged to take in as much of breast and areola as possible, placing lips 2.5-4 cm from base of nipple.
- Newborn's tongue compresses test against hard palate.
- Suction should be broken with finger before removing newborn from breast.**
• alternate sides with each feeding.
• initially, it takes at least 2 min for let-down reflex to act (excessive suckling should be avoided initially)
  – milk production is dependent on adequate suckling time! (90 min/day suckling divided into 6 or 8 sessions is minimal to produce enough milk)
• women who work outside home require breast pump to increase / maintain milk production (pumping frequency should approximate infant's feeding schedule) – pumped breast milk should be immediately refrigerated (if it is to be used within 48 h or immediately frozen (if it is to be used after 48 h).
  – refrigerated milk that is not used within 96 h should be discarded (high risk of bacterial contamination)
  – frozen milk should be thawed by placing it in warm water; microwaving is not recommended
• nursing times are gradually increased until “milk is in”; volume of milk increases as infants grow and stimulation from suckling increases.
• at least 10 min is needed at first breast to allow fat-rich hind milk to flow.
• infant should nurse on one breast until breast softens and sucking slows or stops; if infant is still hungry, second breast can be offered.
  – if infant fails suction before adequately nursing, mother can remove infant when suckling slows, burp, and infuse other side to other side (this “switch” nursing keeps infant awake for feedings and stimulates milk production in both breast).
• Breastfeeding duration is generally determined by infant:
  – feedings should be on demand rather than by clock:
  1) every 2-3 h (8-12 feeding/day); frequency gradually declines over first few days!
  2) newborn’s milk contains sterile lactationsuppression hormones over first few days!
  3) some newborns < 2500 g may need to feed even more frequently to prevent hypoglycemia.
  4) in first few days, newborns may need to be wakened and stimulated; schedule that allows newborn to sleep as long as possible is usually best for both newborn and family.
  5) if mother is fatigued first night or two in hospital, 2 AM feeding may be replaced with water supplement until full milk secretion begins, but with never > 6 h between breastfeeding during first few days!

• Lactation suppression (if mother is not going to breastfeed):
  1) farm support by tight binding (gravitostimulation stimulates let-down reflex).
  2) restriction of oral fluids.
  3) Arnica gm.
  4) avoid micromassage – gives seizures!

• Breast weaning:
  – whenever mother and infant mutually desire after 12 mos; there is no correct schedule?
  – gradual weaning over 2-6 months; mothers should add solid food is introduced is most common; (some mothers and infants stop abruptly) without problems
  – one breastfeeding/day should be replaced by bottle or cup of fruit juice or modified formula when infant is ≈ 7 mos; some parents continue up to 10 mos; some infants will continue 1 or 2 nursings daily at ≥ 24 mo.
  – whole cow’s milk may replace iron-fortified formula or breast milk at 12 months of age; low-fat or skimmed milk is not recommended after 2 yrs of age.

• Mother complications of breastfeeding:
  1. Sore nipples (easier to prevent than to cure) - usually due to poor positioning; sometimes newborn will draw in his lower lip and suck it, which is irritating to nipple (easiest lip out with thumb).
  2. Painful breast engorgement (increasing milk amount occurs during early lactation.
  – may last 24-48 h.
  – may be minimized by early frequent feeding, comfortable nursing brassiere worn 24 h/day for support (plastic braissiere liners should be avoided!), applying cool compresses after nursing, mild analgesics (e.g. ibuprofen).
  – manually expressing milk during warm shower may provide comfort.
  – excessive milk expression between feedings encourages continued engorgement and should be avoided only enough to relieve discomfort.
  3. Plugged ducts - mildly tender / not tender lumps appear in different places in breasts; HB:
  1) continued nursing ensures adequate emptying of breast.
  2) warm compresses and massage of affected area before nursing may further aid emptying.
  3) alternate nursing positions (different areas of breast empty better depending on infant's position at breast).
  4) good nursing brassiere (regular brassieress with wire stays or constraining straps contribute to milk stasis).
  5) do not sleep prone.
  4. Mastitis - tender, warm, swollen, wedge-shaped area of breast. see p. 2915
  5. Milk anxiety, frustration, and feelings of inadequacy (= early breastfeeding termination) result from lack of experience with breastfeeding, mechanical difficulties holding infant and getting infant to latch on and suck, fatigue, difficulty assessing if nourishment is adequate, postpartum physiologic changes. H; early follow-up with pediatrician or consultation with lactation specialist.

BOTTLE FEEDING:
• formulas are preferable to whole cow's milk (not nutritionally complete!)
• AAP recommends that whole cow's milk not be used in 1st year of life! i.e. only acceptable alternative to breastfeeding in 1st yr is formula.
• cow's milk: based formula is standard choice (unless fussiness, spitting up, or gas suggests sensitivity to cow's milk protein or lactose intolerance [are neonates] = soy formula*).
  *all soy formulas in US are lactose free
• formula must contain iron.
• nonproprietary formulas are not recommended by AAP!
  – nonproprietary formula: 13 oz of evaporated milk, 1-3 tbsp of sugar (for additional calories), and 30 ml of fluoride water; infant should also receive supplemental vitamins A, C, and D daily.
• first feeding offered should be regular-strength infant formula (start feeding of water or 5% DW is not mandated unless doctor or otherwise indicated in question, e.g. excessive amount of macrogol/Regurgitated); if this feeding is not regurgitated, continue formula with each subsequent feeding.
• infants are fed on demand and tend to wake for feedings every 3-4 h.
• volume consumed in first feeding is up to 15 ml; feeding volume should increase gradually (e.g. in next 48 h volume gradually increased to 30-45 ml per feeding).
• prepackaged sterilized formulas are available in hospital in 4-oz bottles providing 20 (full strength) kcal/or with adequate vitamins for normal newborns.
  – full-term newborns can tolerate 20 kcal/0 at birth.
  – newborns should be offered water between feedings, particularly in hot, dry environments. if infant is exceeding his calculated intake of formula, water should be offered to avoid overfeeding.
• infant should be held semi-upright; bottle should never be propped - protection for eustachian tube = good eye contact and socialization.
Overfeeding

- foods should be prepared without added salt
- iron-fortified rice cereal is traditionally 1st food introduced (need to replenish iron stores)
- commercial preparations of carrots, beets, tomatoes, collard greens, and spinach are preferable before 1 yr of age available.
- many commercial baby foods (e.g. desserts and soup mixtures) are high in starch (no vitamins or minerals, high in calories) and cellulose (poorly digested by infants).
- some commercial baby foods have high sodium content (> 200 mg/jar) and should be avoided (daily infant sodium requirement is 17.6 mg/kg).
- pureed home foods are adequate.
- meat (pureed to prevent aspiration) should be introduced in preference to high-carbohydrate foods, but many infants tend to reject meat.
- wheat, eggs, peaches, and chocolate should be avoided until 1 yr old (to prevent food sensitivities).
- history should be withheld until 1 yr (risk of infant botulism).
- nuts should be avoided until age 2-3 (they do not fully dissolve with mastication and small pieces can be aspirated).
- infants who are unable to drink whole cow's milk; reduced-fat milk is avoided until 2 yr.
- foods that could obstruct child's airway if aspirated should be avoided (e.g. nuts, round candies).

\[ \text{infants should be fed large amounts of solid food in effort to get him to sleep through night as soundly as possible.} \]

- with increasing fine motor control, finger foods are encouraged.
- weaning from bottle to cup should commence by end of 1st year.
- use of a sippy cup is acceptable by end of 1st year. 3 meal/day schedule is feasible.
- use of spoon is possible by age of 15 months.
- at age 2 yrs, child should be able to eat most foods that rest of family can eat.

\[ \text{limit milk intake to 16-20 oz/day in young children (higher intake can reduce intake of other important sources of nutrition and contribute to iron deficiency).} \]

- juice is poor source of nutrition, contributes to dental caries, and should be limited to 4 oz/day.

\[ \text{FULL NUTRITION} \]

- should guide away from frequent snacking and foods high in calories, salt, and sugar.
- soda is major contributor to obesity.

\[ \text{FEEDING PROBLEMS} \]

- vomiting → see p. 1856-1651
- diarrhea → see p. 1855-1856
- constipation → see p. 1857-1858
- colic → see p. 1859
- allergy to cow milk, maternal milk → see p. 1665
- failure to thrive → see p. Ped1

\[ \text{Regurgitation, splitting syrups (5-10 mL) during or soon after feedings are common first day but should clear up spontaneously by day 4-8 this practice.} \]

- causes: lax gastrointestinal smooth muscle, rapid feeding and air swallowing, overfeeding.
- when too-rapid feeding is cause → use bottles with firmer nipples and smaller holes + more frequent burping; no need to change diet!
- if excessive regurgitation continues → empty stomach by gently aspirating through No. 5-8 French size catheter and lavage with 5-10 mL of water if mucous clearing.
- if mucus persists → complete upper GI and respiratory tract evaluation.
- occasional vomiting may also be normal.

\[ \text{Underfeeding → dehydration (hypoaemia) and hyperbilirubinemia.} \]

- adequately fed infants become quiet or sleep soon after feeding; underfed infant remains restless.
- almost seems to look around for more to eat, and awaken 1-2 hr after being fed, appearing hungry.
- risk factors for underfeeding: small weight, premature infants, primiparous mothers who become ill.
- underfeeding may be sign of parental inadequacy (e.g. neglect).

\[ \text{signs of anemia} \]

- daily diaper counts (by 5 days of age, normal neonate wets at least 6 diapers/day and soils 2-3 diapers/day; lower numbers suggest underhydration / undernutrition).
- weight (gain > 200-250 g/wk in infant + age 4 months is inadequate).
- constant fussiness before age 6 wk, when colic may develop unrelated to hunger or thirst, may also indicate underfeeding.
- signs of dehydration - ↓ of infant's cry, skin turgor, ↓ to leathery and sleepiness.

\[ \text{mعاله} \]

- 1) instruct parents.
- 2) breastfed infant → supplement diet with milk formula and cereal; formula-fed infant → change formula constituents and increase in total quantity of formula.
- 3) follow-up weight checks.

\[ \text{Refusing food} \]

- by 1-2 yr, growth rate slows; children require less food and may refuse it at some meals!!!
- child may refuse passive spoon feedings with increasing independence.
- parents are advised to assess child's intake over week rather than at single meal or during day.
- underfeeding is only concern when child fails to achieve expected weights!

\[ \text{Overfeeding - too rapid weight gain on growth chart, crying, excessive regurgitation after meals.} \]

- infants of obesity may begin with excessive eating in infancy
- encourage parents to reduce amounts offered.

\[ \text{GROWTH} \]

- increase in size of all organs (except lymphatic tissue, which decreases in size).

\[ \text{Growth Spurts} \]

1) in utero
2) birth - 1-2 yrs
3) pubertal (adolescent) - gain of up to 25% of adult height and 50% of adult weight.
term neonates lose 5-8% of birth weight in first 3 days (unusual and insensible fluid losses, passage of meconium, loss of vernix caseosa, drying of umbilical cord, suboptimal caloric intake).

- premature infants up to 15 years.
  - term infants after 1 week gain 14-30 g/dl (by 10-14 days should be back to birth weight).
  - weight gain confirms adequate feeding.
  - birth weight is double at 5 mo, triple at 12 mo, quadruple at 24 mo.

- rate of growth decreases rapidly during 1st year of life → decreases more gradually until beginning of adolescent growth spurt (peak height velocity is reached at 12.1 ± 0.9 y in girls and at 14.1 ± 0.9 y in boys, gain of > 10 cm can be expected in year of peak velocity).

- proportion of fat increases rapidly (from 13% at birth to 20 to 25% by 12 mo) accounting for chunky appearance of most infants → slow fall (at preadolescence, body fat returns to 13%).

- body water percentage - 70% at birth, dropping* to 61% at 12 mo (∼ adult percentage).

- due to ECF decrease 45% → 28%; ICF stays relatively constant.

- extremes grow faster than twins.

- at 18 y, 2.5 cm of growth remains for boys and slightly less for girls, for whom growth is 99% complete.

- sexual maturity begins earlier today than century ago (improvements in nutrition, general health, and living conditions).

- Head circumference (reflects brain size) is routinely measured up to 2 yr.

- at birth, brain is 25% of adult size, head circumference - 35 cm.

- head circumference increases = 1 cm/mo during 1st year (by 12 mo, brain has completed 1/2 its postnatal growth and is 75% of adult size).

- head circumference increases 3.5 cm over next 2 yr (by 3 yr, brain is 80% of adult size; 90% by age 7 yr).

- baby between 6 mo → use of rear-facing car seat

- environment should be free of tobacco and drugs.

- protection from sun exposure - protective clothing and hats; beginning at 6 months, approved sunscreen product.

- potential dangers with increasing mobility - stairways, open windows, electric sockets, hanging tablecloths, electric cords.

- use of infant walkers is highly discouraged; walkers should never be used in area with stairs!!!

- parents should have the hand synergy (i.e., the telephone number of poison control center).

- infant "swim" programs should not be encouraged - may expose infants to variety of risks (water intoxication, gastroenteritis) + extremely unlikely that infant can become "safe" in water.

- from ≥ 5 yr - use bicycle helmet, protective sports gear; instruct about safe street crossing; close supervision + use of life jackets when swimming.

- infants adapt to day-night sleep schedule between 4 and 6 mo.

- most infants sleep through night by 4 mo of age.

- in cultures where children sleep separately from parents in same house, sleep problems are among most common that parents report in toddler face.

- inborn biologic patterns are central to infant's sleep patterns, whereas emotional factors and established habits become more important in toddler and older child.

- sleep disturbances are common at 0 mo and again around 15 mo (separation anxiety, increasing ability of child to move independently and control his environment, long- and later-adolescent nap, overstimulating play before bedtime, nightmares tend to become more common).

- infants are often comforted by swaddling, ambient noise, and movement; consistent bedtime and fixed ritual is helpful for young children.

- N.B. always rocking infant to sleep does not allow infant to learn how to fall asleep on his own (important for development of autonomy).

- as substitute for rocking, parent can sit quietly by crib until infant falls asleep → infant eventually learns to be comforted and to fall asleep without being held.

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- Resistance to going to bed - common problem that peaks at 1-2 yr.

- child cries when left alone in crib or climbs out and seeks parent.

- attempts by child to cause parental separation tension - uses night light, watching people from front hall to ensure that child stays in bed.

- nighttime bottle risks milk-bottle caries.

- child who learns futility of getting out of bed or enticing parent into room for more stories or play will settle down and go to sleep.

- place safety cu: baby in bed securely, leaving easy access for parents to comfort baby as needed.

- during awakening at night - occurs in 50% infants aged 6-12 mo, related to separation anxiety.

- All children awaken during night, but children who have been taught to fall asleep by themselves will usually settle themselves back to sleep!

- older children - episodes follow stressful event; H: period of "winding down" with quiet activities such as reading; allowing child to sleep in parents' bed almost always prolongs rather than resolves it.

- ineffective measures: allowing child to sleep with parents, playing, feeding, spanking and scolding.

- management: child returns to bed with simple reassurance, sit outside open bedroom door until child settles down.

- routinely place baby in bed quietly, but awake, thus encouraging habit of self-soothing at bedtime.

- some 3-yr-olds wander around without waking parents; H: instal hook-and-eye lock on outside of child's bedroom door.
DIAPER RASH
- variations of diaper dermatitis:
  a. generic (ammonia) diaper rash - erythematous dry, wrinkled skin, spares skin folds.
  b. candidal rash - bright red erosions (with satellite lesions), involve deep skin folds.
  c. infantile seborrheic dermatitis - starts as erythema and satellite lesions in diaper area – spreads to face, scalp, flexural areas.
  d. staphylococcal diaper rash - superficial erythematous pustules and bullae.

Intertrigo - poorly understood dermatitis with white / yellow exudate involving deep skin folds.

PACIFIER
- use is recommended after 1st month to reduce risk of SIDS: use throughout 1st year but not beyond pacifier can increase risk of ear infections (but they are less common during first year of life when SIDS risk is highest).
- pacifier in older children may increase risks for tooth misalignment; but using them in infancy is not a problem.

TEETHING
- may begin by 6 months of age:
  • excessive drooling, flintheness, mild diarrhea, irritability, decreased appetite may be associated with teething:
  • high fevers should not be attributed to teething!!!
  • teeth should be cleaned with gauze / soft cloth - soft brush during 2nd year of life.
  • if local water supply contains fluoride < 0.3 ppm → for all children from age 6 months until age 3 years, use 0.25 mg of fluoride daily.

CRYING
Crying is only means infant has to signify distress!
- often there is no obvious cause.
- crying outside normal range – > 3 h/day in 6-wk-old infant.
- crying almost always improves by 4-6 mo; when it does not → suspect physical pain or tension within family.
- differentiate from colic:
  • examination focuses on growth parameters and any signs of illness.
  • management (if parents and physician are convinced that there is no serious cause for crying):
    1) infants are often comforted by swaddling, ambient noise, and movement (rocking or swinging); infants and older children often respond to ride in car.
    2) allow infant to cry for short period (5-minute rule), then parents comfort infant and re-start clock; often parents are relieved to know that they can let infant cry, and often infant will stop spontaneously before prescribed period is over.

TELEVISION
- observing violence on TV → children more willing to harm others and play more aggressively.
- prolonged TV viewing diminishes time available for physical activity.
- TV commercials promote eating foods high in sugar and saturated fat.
- exposure to violence on TV → children more willing to hurt others.
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SPORTS
- exercise maintain good physical and emotional health - children must develop good habits early in life.
- outdoor play should be encouraged from infancy.
- Pediatric screening before sports (to identify rate, apparently healthy, young patient at risk of life-threatening cardiac events): 1) thorough history 2) physical examination (incl. BP, supine and standing cardiac auscultation).
- ask about illicit and performance-enhancing drugs.
- seek for female athlete triad (eating disorders, amenorrhea / other menstrual dysfunction, osteoporosis).

Two at risk populations:
- 1. boys who physically mature late → greater risk of injury in contact sports with larger and stronger children.
- 2. Obese people in sports that require high agility (sudden stops and starts) → greater risk of injury (because of excess body weight).

Adult screening before sports:
- 1. height, weight
- 2. electrocardiogram (incl. family history), arthrometry, serum cholesterol, hypertension.
- 3. arthritis disorders (particularly involving major weight-bearing joints).
- 4. obesity

Relative contraindications and preventing recommendations:
- 1. myocarditis → sudden cardiac death.
- 2. acute splenic enlargement → splenic rupture.
- 3. fever → heat-related disorders, decreased exercise tolerance, may be seen of serious illness.
- 4. diarrhea → dehydration.
- 5. angina pectoris and recent (< 6 wk) MI.
- 6. history of multiple concussions → participate in noncollision sports.
- 7. single tests → wear protective cup for most contact sports.
- 8. people at risk of heat intolerance and dehydration (e.g. diabetes, cystic fibrosis) → hydrate frequently during activity.
- 9. suboptimal seizure control → avoid swimming, weight lifting, archery and riflery.

RECURRENT PAIN SYNDROMES
- pains occur at least monthly for 3-month period; no organic pathology is found; between episodes, child is well.
- purely organic or purely emotional etiologic explanations account for only minor percentage of recurrent pains, i.e. pain may not be either from pathophysiology nor obvious psychopathology, but may be result of mild individual differences in physiology (make child vulnerable to pain and stress-induced exacerbations).
- e.g. in recurrent abdominal pain, there may be slower transit time that results in constipation.
1. Recurrent abdominal pain syndrome - occurs in 10-15% school-age children (peak incidence at age 9 years)

2. Headache - occurs in 15-20% school-age children (peak incidence at age 12 years).

3. Limb pain (“growing pains”) - occurs in 15% school-age children (peak incidence at age 11 years).

   - localized pain, continuous pain, pain that awakens from sleep, pain associated with other symptoms (e.g. vomiting, fever, changes in stool color) suggest organic disease!
   - evidence of obvious psychopathology must be sought in both parents and child!
   - management:
     1) normal activity (do not allow pain to restrict child significantly!)
     2) symptom diary should be kept by parents and child + scheduled follow-up visits.
     3) symptomatic relief - mild analgesics (such as IBUPROFEN) during acute pain episodes.


### PEDIATRIC MORTALITY

**Mortality rate** - deaths per 1000 population

**Birth rate** - live births per 1000 population

**Fertility rate** - live births per 1000 women 15–44 years of age

**Maternal mortality** - deaths during pregnancy + 90 days postpartum per 100,000 live births

<table>
<thead>
<tr>
<th>Mortality</th>
<th>20th wk - birth</th>
<th>birth - 28 d</th>
<th>28 d – 1 yr</th>
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<tr>
<td>Total</td>
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<td>Fetal</td>
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</tbody>
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### Mortality in Infants

- mortality in infants is higher than in any group of individuals < 55 yrs.
- mortality is increasing for adolescents (vs. other age groups – mortality is decreasing).

**BIBLIOGRAPHY** for ch. “Pediatrics” → follow this [LINK] >>

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**Viktor’s Notes℠** for the Neurosurgery Resident

Please visit website at www.NeurosurgeryResident.net