What is failure to thrive?

- Failure to gain weight in childhood

How is failure to thrive defined?

- No consensus definition
- A survey of 25 studies published between 1/03 and 5/04 showed that FTT was defined solely by anthropometrical parameters, with the following commonly employed:
    - Growth velocity
        - Downward crossing of 2+ major percentile lines on the weight-for-age chart (9/25 studies)
    - Single point in time
        - Weight-for-age < 3rd or 5th percentile
        - Weight-for-height < 3rd or 5th percentile
        - Weight < 80% ideal body weight for age

  Olson E. Failure to Thrive: Still a Problem of Definition. *Clin Pediatr.* 2006; 45:1-6

What are the long-term sequelae of FTT?

- AHRQ conducted a systematic review of evidence of whether children with FTT have a concurrent disability or develop one within 6 months.
- 43 studies included in analysis
- Several categories of disability were investigated, for example:
    - Persistent disorders of growth: FTT associated with persistent growth retardation despite correction of malnutrition
    - Immunologic status: children with FTT more susceptible to infection as shown both in clinical settings and in the laboratory. Can lead to an infection-malnutrition cycle
    - Developmental disorders: FTT associated with cognitive impairments, both concurrent with FTT and later in childhood.

  Perrin, E, Frank, D, Cole, C, et al. Criteria for Determining Disability in Infants and Children: Failure to Thrive. Evidence Report/Technology Assessment No. 72. AHRQ Publication NO. 03-E026. Agency for Healthcare Research and Quality, Rockville, MD, March 2003.

What causes FTT?

- Traditionally causes were divided into organic (i.e. from a known disease process) and non-organic (i.e. psychosocial), but this distinction is no longer considered useful since interaction between both types of causes is common.
- In essence, the cause is "insufficient usable nutrition" or, more simply:

SUPPLY – DEMAND MISMATCH

Supply (see diagram)

Inadequate intake (reduced delivery to absorptive surface)
Inadequate absorption
Defective use of nutrients

Demand

Increased metabolic demand

What causes increased demand?

- Chronic infection (e.g. UTI, HIV, TB)
- Dyspnea (e.g. CHF secondary to congenital HD, bronchopulmonary dysplasia): increased respiratory rate causes fatigue and increased metabolic demand
- Malignancy
- Chronic anemia
- Lead poisoning
- Hyperthyroidism

What are other causes of FTT?

- Diencephalic syndrome: hypothalamic insufficiency due to space-occupying lesion (astrocytoma, glioma)
- Hypothyroidism

What questions should be asked in the history?

- Feeding history: details of breast/formula feeding, stooling/vomiting patterns associated with feeding, quantity and types of solid foods, milk intake.
- History of chronic diarrhea, malabsorption, recurrent pneumonia
- Developmental history: gestational, perinatal, milestones
- Family history: ask about heights/weights of family members as well as family history of medical/developmental problems
- Psychosocial

Zenel, JA Jr. Failure to thrive: A general pediatrician's perspective. *Pediatr Rev* 1997; 18:371.

What should be looked for on physical exam?

- Dysmorphic features
- Cleft palate/lip
- Signs of pulmonary, cardiac, GI, neurological disorders
- Signs of neglect/abuse

Schwartz, ID. Failure to Thrive: An Old Nemesis in the New Millenium. *Pediatr Rev* 2000; 21:257.

What laboratory tests should be ordered initially if the H&P do not suggest a cause?

- CBC
- UA/culture
- Electrolytes
- BUN/creatinine
- TSH/FT4
- In setting of severe malnutrition: albumin/prealbumin to assess protein status; alkaline phosphatase, calcium, phosphorus to check for vitamin D deficiency/rickets.
- Consider bone age determination: if normal, systemic chronic disease and hormonal abnormality unlikely
- As indicated by H&P: PPD, HIV test, stool analysis, sweat test