THE PEDIATRICS FOR EMERGENCY PHYSICIANS NETWORK

Basic Pediatrics for Emergency Physicians

Pediatric Vital Signs and Estimating Weights for Age

Why is it important to know how to estimate pediatric weight for age? While it is true that weight is included as a pediatric vital sign and all children are weighed at triage (since IV fluids and all medications doses are weight-based), in certain situations fluids or drugs must be drawn up or administered before a weight can be obtained (i.e.- EMS notifications, cardiac arrest, anaphylaxis, etc.)

Importance of knowing normal pediatric vital signs (and not just having them on your i-Pad): Many emergency medicine physicians are uncomfortable with pediatric patients for the simple reason that everything, including vital signs, medication doses and IV fluids, vary by age (and by weights). Getting a handle on the vital signs (including being able to estimate weights) is an important first step to boost your confidence and simplify pediatric practice for you, so you can enjoy taking care of kids.

Why pediatric vital signs and weights for age are really easy to learn and remember: Because of the 'groupings' and patterns that we will show you to simplify memorizing them.

Why pediatric vital signs provide much more information about the patient than adult vital signs do: While a typical adult patient (ie- > 50 yo, diabetic, etc) with normal vital signs is stable for the moment but may still be seriously ill, the majority of pediatric patients presenting to the ED are otherwise healthy (ie- no co- morbidities) with only acute complaints (fever, cough, etc). When these otherwise healthy pediatric patients appear well, normal vital signs generally tell you that the patient REALLY IS WELL, once confirmed by a full H&P (ie- to make sure there are no 'red flags' in the FULL H&P suggesting otherwise).These patients may most often be discharged to reliable followup without further testing.

ESTIMATING WEIGHTS FOR AGE

> 1 YEAR OLD =

Use formula: (2 x age) + 8

OR

Count by 2's and 5's:

Estimating Weights for Age		
	Age (years)	**Weight (kg)**
1-10 years old: Count by 2's	**1**	**10**
	2	**12**
	3	**14**
	4	**16**
	5	**18**
	6	**20**
	7	**22**
	8	**24**
	9	**26**
	10	**28 or 30**
10-14 years old: Count by 5's	**10**	**30**
	11	**35**
	12	**40**
	13	**45**
	≥ 14	**≥ 50**

< 1 year old:

Age (months)	**Full term newborn**	**5 mo**	**12 mo**
Weight (kg)	**3**	**6**	**9**

NORMAL VITAL SIGNS FOR AGE

Normal RR for Age*

FT Newborn:	**40-60**
6 months	
1 year	**20-40**
2 years	
4 years	**20-30**
5 years	**18-24**

NOTE:
RR 40-60 is normal only in first month of life
For 1 month thru 5 months, normal RR = 30-50

***Persistent RR ≥ 20 above normal upper limit for age (or ANY infant with RR>60), should be considered "Extreme Tachypnea", and taken as a possible early warning sign for the presence of occult serious illness (sepsis, myocarditis, etc).**

NORMAL HR FOR AGE*

Infancy	**150**
1 year	**140**
2 years	**130**
3 years	**120**
4 years	**120**
5 years	**110**
12 years	**100**

***Persistent resting HR ≥ 20 above these Normal HR's (as listed above) For Age should ALWAYS be considered "Extreme Tachycardia" and taken as an early warning sign for the presence of an occult serious t illness (myocarditis, sepsis, etc).**

NORMAL SYSTOLIC BP FOR AGE*

Infancy: "60-70-80 Rule":

NB (FT)	1 Year	8 Years
60	70	80

>1 Year Old:

Average: **90 + (2 X age)**
Minimum: **70 + (2 X age**

***BP is always interpreted in context of rest of exam.**

General Appearance: Concept of 'Age-Appropriate Behavior'

Along with the vital signs, your impression of the patient's general appearance and behavior is key to deciding if a child is well or ill. Unlike adults, accurate assessment of general appearance in pediatrics requires knowledge of age-appropriate behavior. For example, sitting quietly and alert would be appropriate behavior for an older child or adolescent, but may be an early indicator of significant dehydration, respiratory distress, or other illness in a toddler or infant. In addition to your own impression of the child's behavior, asking the parents/caretaker about the child's activeness/behavior currently (ie-during this illness) compared to pre-illness should routinely be included in the history .

Need for a COMPLETE H&P on All Pediatric Patients

Infants and toddlers can appear deceptively well despite the presence of significant illness. There is a limited range of complaints in this age group (fever, cough, crying, etc); any of these complaints may reflect either benign or serious illness. Therefore, ANY chief complaint in this age group is always interpreted in the context of a full H&P.

Also, these patients cannot communicate and parents may only have a vague or incorrect idea of the real problem. A detailed H&P leads to the correct diagnosis and can often pick up impending problems (ie-sepsis, dehydration,etc), thus avoiding bad ED 'bounce-backs' and morbidity/mortality.

Feeding History – Most Important Element of Infant History

Since feeding is the main activity/ exercise of an infant ('baby stress-test'), it can provide clues to the presence of early illness or identify a baby that may really be sicker than his/her appearance. Therefore, a careful feeding history is always warranted, as outlined on the following page:

Feeding History for Infants and Young Children

1) **Quantify change, if any, in po intake:**

   Is baby breast-feeder or bottle-feeder?

   If bottle-feeder: **How many oz. does baby normally (pre-illness) feed? How often?**

   During present illness, how many oz per feed and how often is baby feeding?

   If Breast-feeder: **Normally (pre-illness), how many minutes is Is baby feeding on each breast? How often?**

   During present illness, how many minutes *on each breast and how often?*

2) **Is the baby still sucking vigorously during feeds? Does the baby get SOB during feeds (have to stop feeding in middle of feed due to trouble breathing)? These can be early signs of more significant illness in a baby that otherwise appears well.**

3) **Is there any vomiting or diarrhea?**
   If yes, quantify color (? bloody or bilious), number of episodes per day, and volume. This information will help you decide if patient is a candidate for p.o. hydration (i.e.- decreasing frequency/volumes of vomiting/diarrhea), or needs IV hydration (large volumes, not holding po liquids, or increasing frequency of vomiting and/or diarrhea).

4) **Quantify frequency of urine output (#of wet diapers per day) compared to normal.**

5) **Ask about any change in activity or playfulness .**
   For young infants (< 4-5 months old), ask if baby is waking up for feeds and sucking vigorously (ie-normally), and if normal level of alertness and consolability.

Earliest signs of significant dehydration:
1. **Decreased urine output (less wet diapers/day)**
2. **Decreased activity (may be sign of dehydration, SOB, or significant illness)**

Less vigorous suck, decreased feeding, or SOB while feeding can be an early sign of more significant illness in an otherwise well-appearing infant.

Compensated Shock & The Rapid Cardiopulmonary Assessment

The Rapid Cardiopulmonary Assessment

Clinical evaluation of end-organ perfusion and presence or absence of shock, or respiratory failure:

A – Airway

B – WOB = RR, retractions, aeration, O2 Sat.

C – End-organ perfusion: brain – mental status
tone
skin – clammy
mottled
pale
cyanosis
pulses (feet)
capp refill (toes)

Indications for the Rapid Cardiopulmonary Assessment

- Unstable vitals ; or extremes of HR or RR
- Ill - Appearance
- Abnormal pulse – pressure (wide or narrow)
- Signs of hypoperfusion
- Very young infants

ED Pediatric Pitfalls :

Always have these in mind, so you don't fall into them:

A. 5 Most Commonly Missed Deadly Diagnoses:

1. Missed Shock
2. Missed Sepsis
3. Missed Myocarditis
4. Missed Volvulus
5. Missed Intussusception

Reasons you might miss one of these:

Patient does not look sick

Patient looks sick, but not THAT sick

Solution:

Know the red flags for each of these diagnoses

Don't ignore any red flags, despite well- appearance of the patient

B. The most common pitfall of all: MEDICATION DOSING ERRORS

Too common in peds, especially since doses vary according to weight

Suggestions for avoiding this pitfall:

1) Read the dosage carefully: i.e. **mg/kg/dose** vs **mg/kg/24hrs**

2) Adult dose is ALWAYS the maximum dose

3) For children, double check your consult's dosing, especially if they ask YOU to write it

4) **Double-check your dose** using the following method:

   Consider child's weight as percentage of adult weight, and see if your dose is the same percentage of the adult dose of that drug*

* For example: a 20kg child is 1/3 of an adult (i.e. 60kg) weight, so you expect your calculated dose to be about 1/3 the adult dose → if not, **DOUBLE-CHECK IT !!**