**Supplemental Appendix 2.**

**Dehydration: Assessing Kids Accurately (DHAKA) Study:**

Guidelines on the Clinical Exam for Dehydration in Children with Acute Diarrhea

General Appearance

General appearance may also be called “mental status” or “level of alertness” in some guidelines. It should be assessed throughout the exam, both while the child is being held in the arms of their parent or guardian and also while undergoing study procedures such as weight and MUAC assessments.

* Normal: Child is awake and alert, acting appropriately for their age: smiling, looking around, crying at appropriate times but easily consolable by their parent.
* Restless/Irritable: Child is awake but crying or moving almost constantly and difficult for their parent or guardian to console.
* Lethargic/Unconscious: The child is either slow to respond or does not respond at all to your voice or touch. The child’s eyes may be closed or they may be open but the child does not follow you or anyone else with their eyes.

See video at: <http://emedicine.medscape.com/article/801948-clinical#a0217>1

Skin Pinch

Grasp a fold of skin on the side of the child’s abdomen (at least a few centimeters to the left or right of the umbilicus) between your thumb and index finger and then rapidly release it while watching closely. Count how many seconds it takes for the skin to flatten.

* + Normal: Immediately (in the blink of an eye).
  + Slow: About one second.
  + Very Slow: Two or more seconds.

See video at: <http://emedicine.medscape.com/article/801948-clinical#a0217>[[1]](#endnote-1)

Sunken Eyes

Lay the child flat on the bed or in their parent’s arms. Crouch by their side and look at each eye, first from the left side of the child and then from the right side of the child, with your own eyes at about the same height as their face. Observe whether the eyeball (or eyelid if the eyes are closed) is depressed beneath the level of the orbital rim (the circle of bone surrounding each eye). You can also check to be sure by placing your index finger, palm side down, over the closed eye of the child, with the most distal crease of your finger lying on the inferior orbital rim (check bone) and the second most distal crease of your finger lying on the superior orbital rim (eyebrow).

* + Normal: Eyelid is clearly above the orbital rim, pressing up against the middle part of your finger.
  + Sunken: Eyelid is close to the level of the orbital rim, so that it lightly touches the middle part of your index finger.
  + Very Sunken: Eyelid is clearly below the orbital rim so that there is clear space between the eyelid and the middle part of your index finger.

See video at: <http://emedicine.medscape.com/article/801948-clinical#a0217>1

Absent Tears

Watch when the child cries (becomes visibly upset or begins making crying sounds) and look to see whether they produce any tears. Usually the child will cry at some point during the baseline procedures. If not, ask the parent if their child had tears present during crying at any point in the past few hours.

* Normal: The child makes tears that can clearly be seen running down their face during crying.
* Decreased: Tears are not visible on the face at all but can be seen in the eyes by pulling back the lower eyelid.
* Absent: No tears or moisture are visible when pulling back the lower eyelid.

See video at: <http://emedicine.medscape.com/article/801948-clinical#a0217>1

Dry Mucous Membranes

Observe the child while their mouth is open (for instance while crying). If the child does not open his or her mouth spontaneously, pinch the child’s cheeks together with your thumb and index finger to open it.

* Normal: Lips appear normal and saliva is clearly visible on/around the tongue.
* Dry/sticky: Lips appear dry and there is only a little moisture on the tongue.
* Very Dry: Lips are dry and cracked and the tongue appears completely parched.

Heart Rate

Measure the heart rate by feeling for the radial pulse (see instructions below). If the radial pulse is weak or difficult to find, then feel for the femoral pulse at the crease where the child’s leg meets their pelvis. Count the beats while the child is calm over a period of 30 seconds and then double that number to find the heart rate. Use the table below to determine the upper limit of normal for each child’s heart rate.

* Normal: Heart rate is below the upper limit of normal based on the child’s age.
* Fast: Heart rate is at or just above the upper limit of normal.
* Very fast: Heart rate is more than 20 beats per minute above the normal limit.

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| --- | --- |
| **Age** | **Upper Limit of Normal** |
| * 1. month | 180 beats per minute |
| 2-12 months | 160 beats per minute |
| 12-24 months | 140 beats per minute |
| 25-60 months | 120 beats per minute |

Respirations

Observe the child while they are lying flat. Remember to check for DEEP respirations, which are a sign of acidosis, not FAST respirations, which are usually a sign of respiratory infection. Watch the child’s abdomen as they breathe to see if their skin sinks beneath the lower ribs at any point (subcostal indrawing).

* Normal: No subcostal indrawing.
* Deep: Slight indrawing beneath the lower ribs.
* Very Deep: Significant indrawing beneath the lower ribs.

See video at: <http://emedicine.medscape.com/article/801948-clinical#a0217>1

Radial Pulse

Feel for the child’s radial artery just beneath the wrist crease on the “thumb” side of their forearm with your index and/or middle finger. Press just enough to feel the pulse, but do not press too hard.

* Strong: The radial pulse can be felt easily with a “bounce” during each beat.
* Decreased: The radial pulse can be felt, but is diminished and has no bounce.
* Weak: The radial pulse can be felt only intermittently or not at all.

Extremities

Feel the child’s arm or leg and compare it to the arm of the child’s parent. If the child has an IV in one arm or leg, feel a different arm or leg.

* Warm: The child’s extremity feels the same temperature as their parent’s arm.
* Cool: The child’s extremity feels cooler than their parent’s arm but looks normal.
* Cyanotic/mottled: The extremity appears bluish or “spotted” with pale areas.

Capillary Refill

Grasp the tip of the child’s thumbnail or toenail firmly between your own thumb and index finger until the child’s nail bed turns white. Let go rapidly and count the seconds until the nail bed turns pink again.

* + Normal: Less than 1 second.
  + Prolonged: 2-3 seconds.
  + Minimal: Does not completely turn pink again even after 3 seconds.

1. Levine AC, Santucci KA. Pediatric Gastroenteritis. Medscape Reference. Updated October 02, 2014. [↑](#endnote-ref-1)