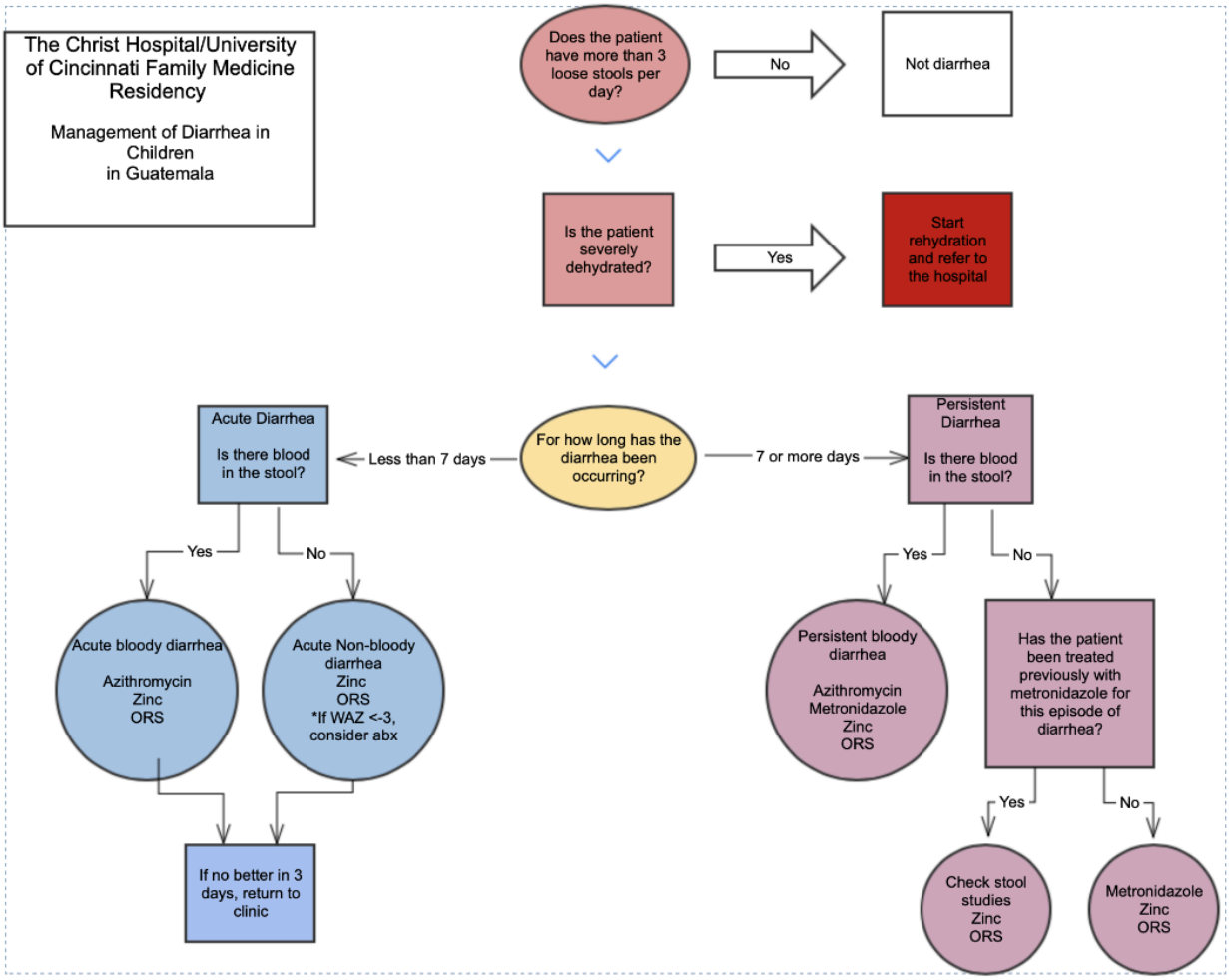
UC/Wuqu Kawoq – Pediatric Diarrhea Management Protocol (Rev 09-2019)

MANAGEMENT CHECKLIST:

- Diagnosis: Correctly diagnose and classify diarrhea
- Diagnosis: Rule out other diseases/syndromes that may present with diarrhea
- Triage: Assess vitals and hydration status
- Hydration: Treat dehydration (ORS, IVF, other)
- Antimicrobials: Prescribe antibacterial if appropriate
- Antimicrobials: Prescribe antiprotozoal if appropriate
- Antimicrobials: Prescribe antihelminth if appropriate
- Micronutrient: Prescribe Zinc and Chispitas
- Macronutrient (PEM): Enroll in nutrition program if appropriate (eggs, RUTF, other)
- Deworming: Ensure up-to-date with deworming
- Prevention (WASH): Ensure clean water access; Promote hygiene (Rx Soap if available, etc)
- Other Factors: Dietary (coffee/soda/juice)

UC/WK ALGORITHM:



ALGORITHM-BASED ASSESSMENT (Correlates with above):

STEP 1: Assess for diarrhea

- WHO defines diarrhea as 3+ loose stools per day
- If YES, continue in algorithm
- If NO, consider management of other diagnoses

STEP 2: Assess for dehydration

- If SEVERE, start rehydration and refer to hospital
- See **Dehydration Assessment** below
- NOTE: The ill-appearing, lethargic infant needs emergent attention and may have an illness that is not primarily GI despite the chief complaint of diarrhea. Diarrhea often accompanies severe acute malnutrition and this must be treated. Moderate to severe diarrhea carries an 8.5 increased chance of death.

STEP 3: Categorize diarrhea as Acute or Persistent

- *Acute* for our algorithm includes diarrhea less than 7 days (WHO defines *acute* as <14 days)
- *Persistent* for our algorithm includes diarrhea is 7 or more days (WHO defines *persistent* diarrhea as 14 or more days)

STEP 4: Categorize diarrhea as bloody or non-bloody

STEP 5: Determine management

- **Acute non-bloody diarrhea**
  - Causes: Most common causes are rotavirus, norovirus, ETEC, *Cryptosporidium*, and *Shigella*. These are self-limited in almost 90% of cases. If toxic, consider alternative dx to AGE: Malaria? Cholera? If findings point to only GI infection, still likely viral etiology, but ETEC and *Shigella* more likely.
  - Management (See full CHECKLIST above):
    - **Zinc**
    - **ORS/Rehydration**
    - **Antimicrobials**: Azithromycin if WAZ <3 or Toxic (fevers, aches, lethargy)
- **Acute bloody diarrhea**
  - Causes: Most common cause is *Shigella*, followed by *Campylobacter* and maybe amoebiasis
  - Management (See full CHECKLIST above):
    - **Antimicrobials**: Azithromycin
    - **Zinc**
    - **ORS/Rehydration**
- **Persistent non-bloody diarrhea**
  - Causes: most common causes are similar to acute watery diarrhea, but increased risk of malnutrition and high prevalence of *Giardia*
  - Management (See full CHECKLIST above):
    - **Antimicrobials**: Metronidazole if <u>not</u> previously treated with Metronidazole this episode (lower dose regimen for *Giardia*). Stool studies if previously treated with Metronidazole this episode.
    - **Zinc**
    - **ORS/Rehydration**

        - Treat for amoebiasis, ETEC, *Shigella* (azithromycin), and *Giardia* (lower dosed metronidazole 15-30mg/kg/d divided q8h x5 days)
        - Prescribe nutritional supplementation (twice recommended daily allowance for two weeks) of: VitA, folate, iron, copper, and magnesium--i.e twice the normal chispitas for 2 weeks
- **Persistent bloody diarrhea**
    - Causes: most common causes are *Shigella*, *Campylobacter*, possibly *Entamoeba histolytica*
    - Management (See full CHECKLIST above):
        - Treat with Azithromycin for *Shigella* and Metronidazole for *Entamoeba* (higher dosed metronidazole)
        - A luminal amoebicide is typically not given due to high risk of reinfection; if luminal agent desired but unavailable, a 10 day course of metronidazole may be substituted
        - Prescribe nutritional supplementation (twice recommended daily allowance for two weeks) of: VitA, folate, iron, copper, and magnesium--i.e., twice the normal chispitas for 2 weeks

ALGORITHM NOTES, TOOLS, AND REFERENCES:

- **Dehydration Assessment** (adapted from WHO; consider Clinical Dehydration Score or DHAKA Score for alternate validated method):

Mental status	Normal, awake	Agitated, irritable	Lethargic or unconscious
Radial pulse	Easily palpable	Palpable (possibly rapid)	Difficult to palpate (weak) or absent
Eyes	Normal	Sunken	Sunken
Skin pinch	Disappears rapidly	Disappears slowly (< 2 seconds)	Disappears very slowly (> 2 seconds)
Thirst	Drinks normally	Thirsty, drinks avidly	Incapable or drinks very little
DIAGNOSIS	↓ **NO DEHYDRATION**	↓ **SOME DEHYDRATION**	↓ **SEVERE DEHYDRATION**

  **often necessary to ask caretaker if eyes appear more sunken as this can be chronic or normal*
  ***check skin pinch on abdomen*
- **Zinc**: Every child under the age of 5 with diarrhea should be prescribed zinc sulfate:
    - <6 months:
    - 6-12 months: 10mg daily for 10 days
    - 12 months – 5 years: 20mg daily for 10 days
- **Rehydration/ORS/Clean Water Access**:
    - ORS is first line treatment, but if the child is unable to take PO or lethargic will need hospital admission for IVF. In severe malnutrition rapid resuscitation can precipitate acute heart failure.

Weight	Age	Total volume of ORS	Volume of ORS per hour
3 to < 4 kg	0 to < 1 month	230 ml	60 ml per hour for 4 hours
4 to < 5 kg	1 to < 2 months	300 ml	75 ml per hour for 4 hours
5 to < 6 kg	2 to < 3 months	400 ml	100 ml per hour for 4 hours
6 to < 7 kg	3 to < 4 months	480 ml	120 ml per hour for 4 hours
7 to < 8 kg	4 to < 7 months	550 ml	140 ml per hour for 4 hours
8 to < 9 kg	7 to < 10 months	600 ml	150 ml per hour for 4 hours
9 to < 10 kg	10 to < 12 months	700 ml	180 ml per hour for 4 hours
10 to < 13 kg	1 to < 2 years	800 ml	200 ml per hour for 4 hours
13 to < 15 kg	2 to < 3 years	1000 ml	250 ml per hour for 4 hours
15 to < 17 kg	3 to < 4 years	1200 ml	300 ml per hour for 4 hours
17 to < 19 kg	4 to < 5 years	1400 ml	350 ml per hour for 4 hours
19 to < 21 kg	5 to < 6 years	1600 ml	400 ml per hour for 4 hours
21 to < 24 kg	6 to < 7 years	1600 ml	400 ml per hour for 4 hours
24 to < 27 kg	7 to < 8 years	1800 ml	450 ml per hour for 4 hours
27 to < 30 kg	8 to < 9 years	2000 ml	500 ml per hour for 4 hours

- Ensure access to clean water for toddlers and formula/ORS for infants

- **Antimicrobials:**

Albendazole	For routine treatment	12 months-24 months: 200 mg once Over 24 months: 400 mg once
	For symptomatic treatment	12 months-24 months: 200 mg daily x 3 12-24 months: 400 mg daily x 3 days
Azithromycin	Dosing option #1	10 mg/kg (up to 1 g) daily for three days
	Dosing option #2 (MSF)	20 mg/kg x 1
Metronidazole	Dosing option 1a(WHO)	15 mg/kg divided every 8 hours for 5 da
	Dosing option 1b (MSF)	30 mg/kg daily for 3 days
	Dosing option 2 (Amebiasis)	35 mg/kg divided every 8 hours for 5-10 (up to 50mg/kg/d x10d max dose if conf and/or previous failed course)

APPROACH TO HISTORY & PHYSICAL

- HISTORY:
  - Goals are to answer the following questions: Is this a new, primarily a GI issue or part of something else? What is the most likely cause?

        - Has the child been maintaining hydration? PO intake? Urine output?
        - What is quantity and quality of stool?
        - Is there blood in stool?
        - What is the duration of the illness/diarrhea? Is this a recurrence?
        - Have there been any prior treatments? When?
        - Has there been any fever?
        - Is this part of other syndrome or illness? (Ask ROS)
    - PHYSICAL:
        - Goals are to find or rule out other sources of infection (pneumonia, acute otitis, strep throat, viral exanthem, etc.) and assess for dehydration
        - Vitals, including weight and height Z-scores
        - Full skin, HEENT, neck, lung, cardiac, and abdomen exam

FAQs/COMMENTS:

1. <u>What about HUS?</u> HUS (Hemolytic Uremic Syndrome) can happen as a result of an infection involving Shiga toxin. However, it is rare. HUS mortality rate is 10%, and 50% can have permanent renal damage. The risk of HUS in STEC/EHEC increases with use of antibiotics; Azithromycin is considered safest if antibiotics are used (TMP-SMX is much higher risk). HUS risk is reduced if volume expansion is given, so ensure hydration! HUS risk estimates of 1 in 4 if bloody diarrhea and antibiotics are used in children under 10 years old are likely a significant overestimate of risk. Conclusion: Follow the above protocol for appropriate antibiotic prescribing while avoiding overprescribing, and ensure hydration.
2. <u>What about luminal carriage states in Amoebiasis?</u> Most guidelines for treating intestinal amoebiasis call for treating with a nitroimidazole (such as metronidazole) first and then treating with another medication to eliminate luminal carriage (to prevent the patient from being an asymptomatic carrier and shedder (and spreader). Paromomycin is an example and typically the preferred agent. A longer course (10 days) of metronidazole can also decrease or eliminate carriage, if paromomycin, iodoquinol, or other agents are unavailable. Tropical medicine guidelines for Low Resource Settings note that because of the high likelihood of recurrence of Amoebiasis, elimination of carriage may not have a benefit that outweighs cost. Our protocol therefore does not include elimination of carriage.
3. <u>What about Antihelminthics for diarrhea?</u> Common helminths generally do not cause diarrhea. For patients with vague abdominal symptoms a 3 day course of albendazole may also be considered (3d to cover whipworm). Our protocol calls for 1 day course of albendazole which is sufficient for Hookworm and Roundworm, which are the worms most likely to contribute to malnutrition.
4. <u>What about recurrent diarrhea or unresolving despite appropriate infectious diarrhea management?</u> Refer for Stool studies. Review non-infectious sources such as diet (juice, soda, coffee), frequent use of antibiotics (health centers may be giving frequent doses of TMP/SMX that may be contributing to diarrhea), and Nutributter (can cause diarrhea).
5. <u>How does nutritional status (acute or chronic PEM) affect management?</u> Severe acute malnutrition makes dehydration difficult to assess and should be treated separately. (MUAC <11.5 cm, WAZ < -3 = -3 severe MUAC 115-124, WAZ -2 to -3 = -3 moderate). Malnutrition also is associated with increased rates of infection. Chronic malnutrition (stunting) is caused by chronic or recurrent diarrhea. For severely stunted children (HAZ < -3), antibiotics may be given to the family for later use as progression carries higher mortality. Additionally, lower HAZ scores are

associated with increased death with moderate to severe diarrhea, but it is unclear if empiric antibiotics would mitigate this.

REFERENCES:

- WHO/UNICEF Treatment of Diarrhoea Guidelines, 2005 and 2013
- CDC guidelines
- MSF guidelines
- IDSA guidelines
- Hunter's Tropical Medicine
- Tropical Medicine Lecture Notes, Beeching and Gill
- AFP 2019, Gastroenteritis in Children (https://www.aafp.org/afp/2019/0201/p159.html)
- 2013 Lancet Case-Control Moderate-to-Severe Diarrhoea Study: https://1drv.ms/b/s!AnRKa4u0y2eSvjtamYzgLDCaQ3Ys
- 2015 Lancet Acute Diarrhoea Pathogen Prevalence Study: https://1drv.ms/b/s!AnRKa4u0y2eSvjrUtlcPlPCh1Ad8
- Guatemala Parasite Study: https://1drv.ms/b/s!AnRKa4u0y2eSvjwnlZ8w6NmMO-nU