

Acute Gastroenteritis v. 2.0: Oral Rehydration Therapy (ORT)

PHASE I (ED/Urgent Care): ORT

[Executive Summary](#)

[Test your knowledge](#)

[Citation Information](#)

[Explanation of Evidence Ratings](#)

[Summary of Version Changes](#)

!
[Routine testing](#)
for stool pathogens
not recommended

Inclusion Criteria

- Vomiting and/or diarrhea of recent onset not due to chronic disease, with or without fever, nausea, or abdominal pain

Exclusion Criteria

- Patient < 3 months of age
- Toxic appearance (consider sepsis)
- Diarrhea >7 days (consider chronic disease, bacterial enteritis)
- Bloody diarrhea (consider HUS)
- Comorbid conditions (Medically Complex Children (MCC), renal failure, cardiac disease)
- Bilious emesis (consider bowel obstruction)
- On diuretic therapy
- Hyponatremia (<130 mEq/L) or Hypernatremia (>155 mEq/L)
- Acute surgical abdomen

!
Anti-diarrheal
agents are **not**
[recommended](#)

Overt Shock
[\(Dehydration >10%\)](#)

Moderate Dehydration (5-10%)

- Prolonged capillary refill (>2 seconds)
- Abnormal skin turgor ('tenting' or inelastic skin)
- Tachypnea

Minimal (<5%) to No Dehydration

- Educate on prevention of dehydration

Off Pathway

Give [Ondansetron](#) if Moderately Dehydrated

- Consider holding if diarrhea is chief complaint

Failed oral challenge (if attempted)

Consider oral challenge

!
[Antimicrobials](#)
not recommended

Begin ORT

[Initial ORT Challenge](#)

- 5 mL q 5 mins if <10 kg
- 10 mL q 5 mins if ≥10 kg

Reassess after 20 min

Hold ORT for 20 minutes

- Then restart ORT at initial rate

Emesis after initial ORT?

Increase ORT

- 10 mL q 5 mins if <10kg
- 20 mL q 5 mins if ≥10kg
- Assess in 30-60 mins

Passed oral challenge (if attempted); Educate and prepare for discharge

Continue to Phase II

Continued emesis?

[Discharge Criteria](#)

- Clinical status improved
- Tolerating ORT or regular diet
- Adequate family teaching
- Follow-up established

Discharge Instructions

- Continue ORT at home for 4-6 additional hours; then resume regular diet, or [lactose free formula](#) if predominantly formula fed
- ED Acute Gastroenteritis discharge instructions and ORT worksheet
- [Lactobacillus](#) for 5 days

Acute Gastroenteritis v. 2.0: IV or NG Rehydration

[Executive Summary](#)

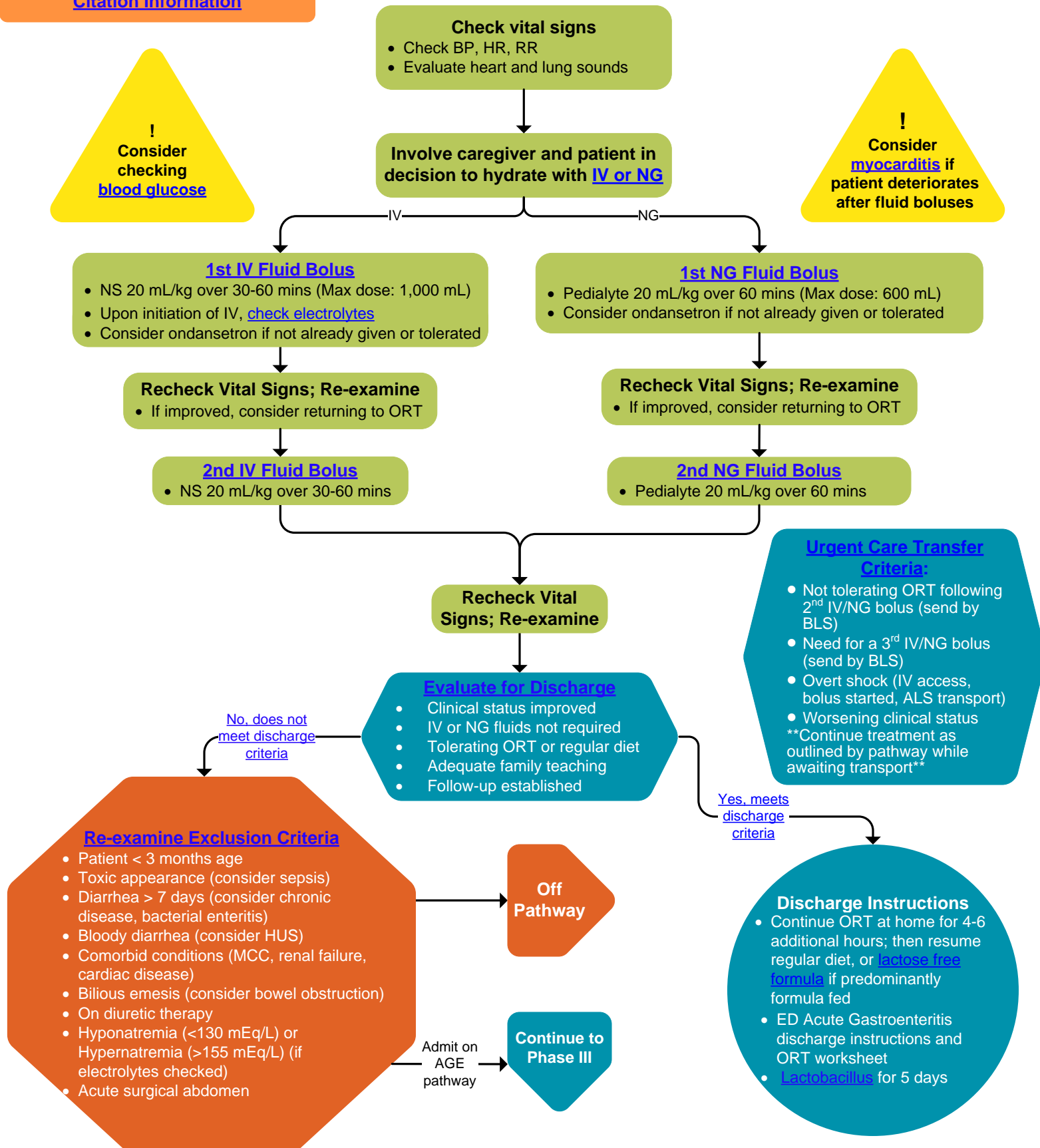
[Test your knowledge](#)

[Citation Information](#)

PHASE II (ED/Urgent Care): IV or NG Rehydration

[Explanation of Evidence Ratings](#)

[Summary of Version Changes](#)



Acute Gastroenteritis v. 2.0: Inpatient Management

[Executive Summary](#)

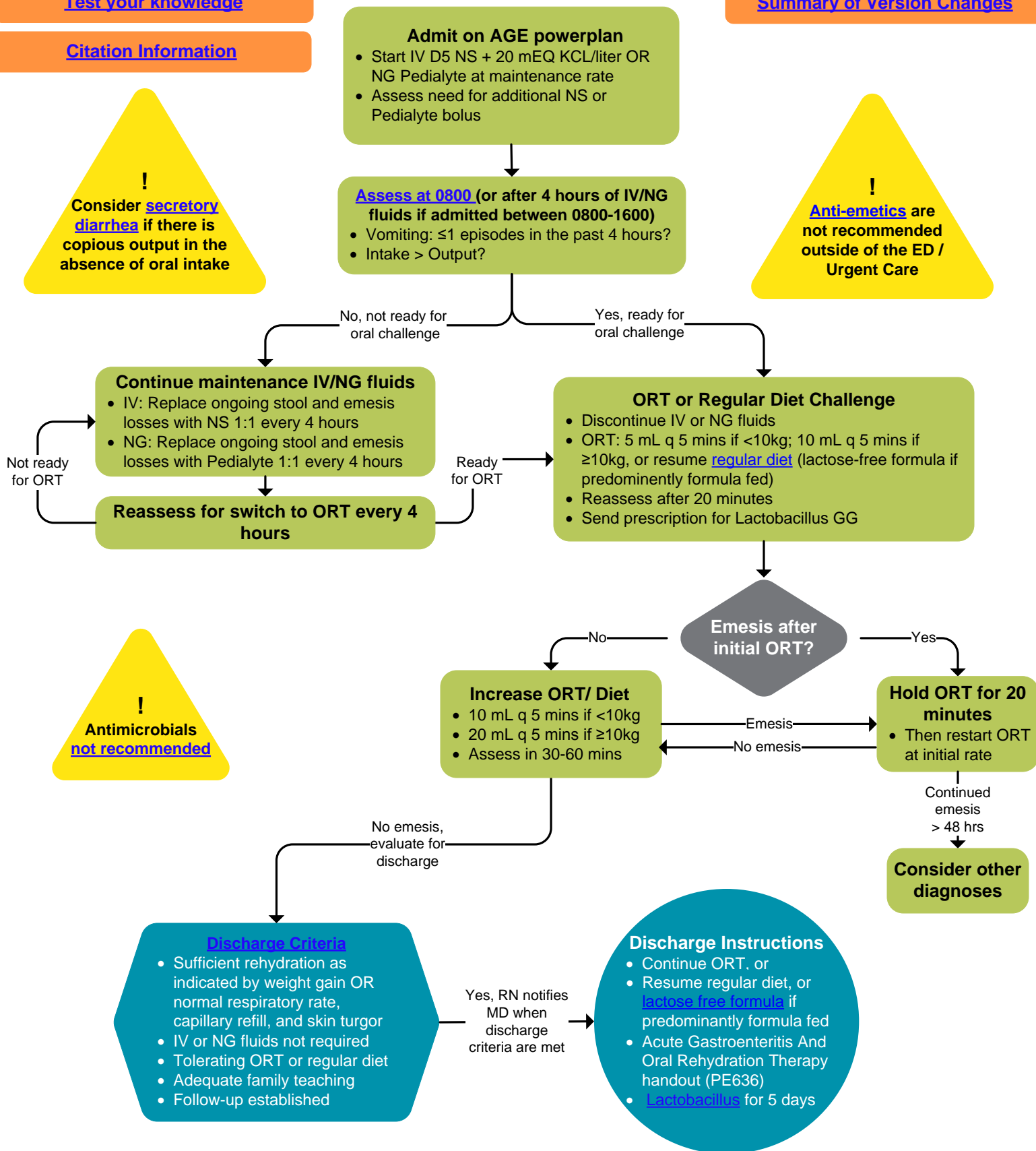
[Test your knowledge](#)

[Citation Information](#)

[Explanation of Evidence Ratings](#)

[Summary of Version Changes](#)

PHASE III: INPATIENT MANAGEMENT



Phase II (ED/UC): IV or NG Rehydration (Cont'd)

- *Do not routinely obtain stool cultures in cases of uncomplicated AGE. Consider performing stool studies in specific cases, such as: infants <3 months of age, patients with bloody or mucoid stools, diarrhea for >7 days, immunocompromised patients, if there is a known outbreak of a bacterial pathogen, if the child has recently been on antibiotics, if the diagnosis of simple AGE is in doubt, if there is concern for sepsis, and in cases of diarrhea after foreign travel.^{1, 5, 8} [Guideline]*
- If the patient meets any of the above criteria, they would be off pathway.

Phase I (ED/UC): ORT

- It is recommended that the history and physical examination be the primary basis for the diagnosis of AGE [Expert Opinion].
- *Acute body weight change is considered the gold standard measure of dehydration in a child but is often impractical for the initial assessment due to lack of an accurate pre-illness weight measurement. When a reliable pre-illness weight is available, it is recommended to compare the pre-illness to the current weight as the best assessment for degree of dehydration.^{5, 8} [Guideline]*
- *Prolonged capillary refill time, abnormal skin turgor, and respiratory rate are the best individual examination measures.^{1, 5, 8} [Guideline]*



Phase I (ED/UC): ORT (Cont'd)

- After using the Inclusion and Exclusion criteria to determine if a patient is appropriate for the Acute Gastroenteritis: Clinical Standard Pathway, the next step is to determine the level of dehydration of the patient
- Determining the level of dehydration of the patient will guide the amount of intervention required of the patient
- The level of dehydration can broadly be categorized into 3 levels:
 1. minimal to no dehydration (loss of < 5% body weight)
 2. mild to moderate dehydration (loss of 5 – 10% body weight)
 3. overt shock (loss >10% body weight)



[Continue to Dehydration Categories](#)

[Return to Phase I](#)

Phase I (ED/UC): ORT (Cont'd)

Overt Shock (>10%)

Moderate Dehydration (5-10%)

- Prolonged capillary refill (>2 seconds)
- Abnormal skin turgor ('tenting' or inelastic skin)
- Tachypnea

Minimal (<5%) to No Dehydration

- Educate on prevention of dehydration

- If a patient is in overt shock (>10% dehydration), the patient should be off pathway and treated for shock.
- In a patient with moderate dehydration (5-10% dehydration), you may see corresponding clinical symptoms, and these patients *should* receive oral ondansetron.

Phase I (ED/UC): Oral Rehydration Therapy (ORT)

Overt Shock (Dehydration >10%)

Moderate Dehydration (5-10%)

- Prolonged capillary refill (>2 seconds)
- Abnormal skin turgor ('tenting' or inelastic skin)
- Tachypnea

Minimal (<5%) to No Dehydration

- Educate on prevention of dehydration

- If a patient has minimal to no dehydration (<5% dehydration), there is no evidence for routine use of oral ondansetron in this population, and the caregiver and child should be instructed on proper use of ORT.
- Some providers may consider giving a child with minimal to no dehydration an oral challenge in the ED/UC, and if the child fails this challenge if given, the child may receive oral ondansetron at this point.

Discharge Instructions: Lactobacillus

- *Use probiotics in the form of Lactobacillus GG, Saccharomyces boulardii, and L acidophilus LB as an adjunctive treatment in the management of children with diarrhea from acute gastroenteritis. Start immediately and treat for 5 days.*^{4, 5, 7, 8, 11-13} [Guideline/🌟🌟🌟🌟]
- A combination of systematic reviews and guidelines were reviewed to address the question of the efficacy of probiotics in the adjunctive treatment of diarrhea in children with AGE.
- Three strains in particular seemed to be useful in reducing the duration of diarrhea, reducing the risk of protracted diarrhea (>7 days), and reducing the risk of hospitalization
- Lactobacillus GG, in particular, was reviewed most extensively, and has proven efficacy against rotavirus, one of the main causes of protracted diarrhea and the associated morbidities.



[Return to Phase I](#)

[Return to Phase II](#)

[Return to Phase III](#)

Medication Use: Anti-diarrheal Agents

- *Anti-diarrheal agents are NOT recommended in the routine management of children with AGE and use of them may be associated with increased serious adverse effects.^{1, 8} [Guideline]*

[Return to Phase I](#)

Use of Antimicrobials for Acute Gastroenteritis

- The etiology of acute gastroenteritis is typically viral, and therefore the routine use of antimicrobial therapies is not indicated.
- *It is recommended that antimicrobial therapies be used ONLY for selected children with acute gastroenteritis [Expert Opinion]:*
 - *Children with evidence of a serious bacterial infection (SBI)*
 - *Children with persistent diarrhea and evidence of infection with Giardia lamblia or Cryptosporidium; if found, treatment is available with metronidazole or nitazoxanide*

Medication Use: Ondansetron

- *Oral or IV ondansetron in moderately dehydrated children with AGE may decrease the number of episodes of vomiting, decrease the time to cessation of vomiting, facilitate earlier oral rehydration, decrease the need for IV rehydration, decrease hospital admission rates, decrease the risk of receiving IV fluids up to 72 hours post discharge from the ED, and improve parental satisfaction as compared to placebo.*^{2-5, 8} [★★☆☆; Guideline]
- The efficacy of ondansetron for hospitalized children has not adequately been studied.



Antiemetic Use Outside of the ED / Urgent Care

- Several high quality guidelines and systemic reviews demonstrate some benefit with the single use of ondansetron in the ED or Urgent Care settings. However, no such evidence exists for routine use in the inpatient setting.
- *Routine, ongoing use of ondansetron in the inpatient setting is not supported by current literature and therefore is not currently recommended.*^{5, 8} [Guideline]



[Return to Phase I](#)

[Return to Phase III](#)

Phase I (ED/UC): ORT

Give [Ondansetron](#) if Moderately Dehydrated

- Consider holding if diarrhea is chief complaint

Begin ORT

[Initial ORT Challenge](#)

- 5mL q 5 mins if <10 kg
- 10mL q 5 mins if ≥10 kg

- The amount of ORT to be given during the challenge is based on the patient's admitted weight:
- 5 mL every 5 minutes if < 10 kg
- 10 mL every 5 minutes if ≥ 10 kg
- *The amount of ORT started is limited at first, and gradually increased as tolerated.*⁸ [Guideline]



Oral Rehydration Therapy

- *It is recommended that dehydration be treated with oral rehydration solutions (ORS), if tolerated and if intake exceeds losses, for a period of 4 to 6 hours or until an adequate degree of rehydration is achieved.*^{1, 5, 8, 9} [Guideline]



Continue to Pg. 2

Return to Phase I

Phase I (ED/UC): ORT Moderate Dehydration

- If, after 20 minutes, the patient tolerates the initial ORT challenge (there is no emesis), then the amount of ORT is increased:
 - 10 mL every 5 minutes if < 10 kg
 - 20 mL every 5 minutes if ≥ 10 kg
- If, during the initial 20 minute challenge, the patient does have emesis, then:
 - the ORT challenge is held for 20 minutes
 - the ORT challenge is restarted after 20 minutes at the initial, lower rate
 - 5 mL every 5 minutes if < 10 kg
 - 10 mL every 5 minutes if ≥ 10 kgz

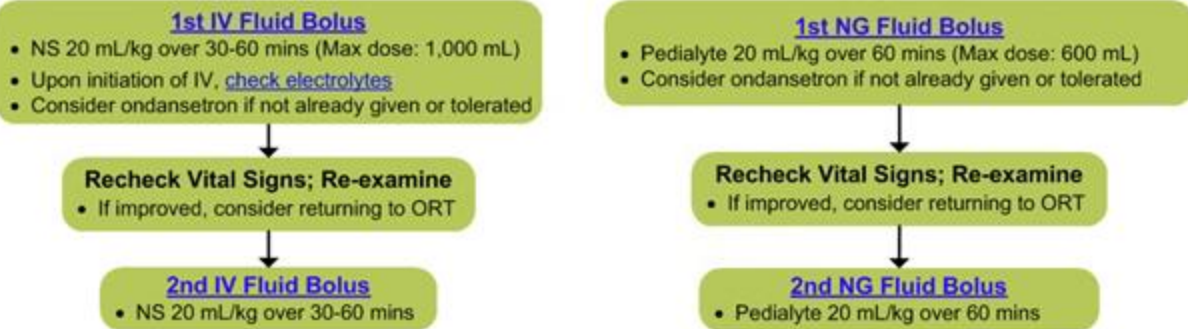
Phase I (ED/UC): ORT Moderate Dehydration (Cont'd)

- If the patient tolerates the increase in ORT without emesis, then the patient can be prepared for discharge
- Patients should be encouraged to continue on their usual or regular diet and should be educated on the prevention of dehydration
- If the patient does not tolerate the increase in ORT, and continues to have emesis even after holding ORT for 20 minutes and restarting at the lower rate, then the patient will change phases on the Acute Gastroenteritis: Clinical Standard Pathway and move to:
 - **Phase II (ED/UC): IV or NG Rehydration**

Obtaining Lab or Stool Studies

- *Supplementary laboratory studies, including serum electrolytes, are usually unnecessary in children with mild to moderate dehydration not requiring IV or NG fluids. They have not been shown to be a reliable surrogate for determining the degree of dehydration or rehydration.⁸ [Guideline]*
- *Perform electrolytes in moderately dehydrated children who are requiring the initiation of IV fluids.^{5, 8} [Guideline].*
- *A normal bicarbonate concentration may be useful in ruling out dehydration.⁵ [Guideline].*
- An abnormal bicarbonate concentration has not been studied as a predictor for hospitalization after correction of dehydration [Expert Opinion].
- If a patient is found to be hypoglycemic, hyponatremic, or hypernatremic, correct with appropriate fluids accordingly.

Phase II (ED/UC): IV or NG Rehydration (Cont'd)



- Patients who advance to **Phase II (ED/UC): IV or NG Rehydration** on the AGE Clinical Standard Pathway will, after shared decision-making between the caregivers and providers, be given either a first bolus of:
 - IV normal saline (NS) at a dose of 20 mL/kg body weight over 30-60 minutes (max dose 1000mL) [Expert Opinion]
 - or, Pedialyte through an NG over 60 minutes (max dose 600mL) [Expert Opinion].

Phase II (ED/UC): IV or NG Rehydration (Cont'd)

- Consider giving a dose of oral, IV (if initiating IV fluids), or NG (if initiating NG fluids) ondansetron at this time if not previously given or if the patient vomited within 15 minutes of the initial dose.
- Providers may consider a bedside glucose check at this time, usually during the placement of the peripheral IV [Expert Opinion].
- Perform a full assessment before and after the fluid bolus, that includes vital signs (HR, RR, BP) and evaluation of heart tones and lung sounds, for consideration of the potential for heart failure and/or myocarditis.

Phase II (ED/UC): IV or NG Rehydration (Cont'd)



- Recheck vital signs and re-examine the patient after first IV or NG fluid bolus, and, if improved, consider returning to an ORT trial at this time.
 - 5 mL every 5 minutes if < 10 kg
 - 10 mL every 5 minutes if ≥ 10 kg
- Advance ORT after 20 minutes if tolerated.
- If the patient has not improved, or if emesis continues, give a second bolus of fluid, consisting of, either:
 - IV normal saline (NS) at a dose of 20 mL/kg body weight over 30-60 minutes (max dose 1000mL) [Expert Opinion]
 - or, Pedialyte through an NG over 60 minutes (max dose 600mL) [Expert Opinion].

Phase II (ED/UC): IV or NG Rehydration

Check vital signs

- Check BP, HR, RR
- Evaluate heart and lung sounds



Involve caregiver and patient in decision to hydrate with [IV or NG](#)

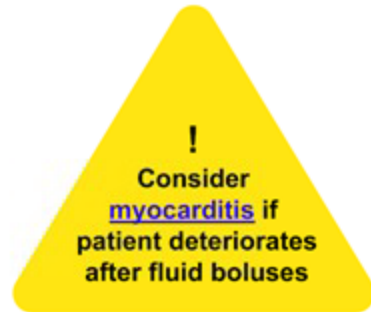
- *A comparison between NG versus IV fluids for rehydration found that NG rehydration was as efficacious, no more labor intensive, and was associated with less complications than the use of IV fluids. Because of these reasons, it is advisable to involve the parents early on in the decision of how to appropriately rehydrate their child.⁸ [Guideline]*

Myocarditis

Patients with AGE who deteriorate after an IV fluid bolus should be assessed for evidence of myocarditis or heart failure [Expert Opinion].

Signs and symptoms might include:

- Worsening tachypnea or increase in heart rate over baseline
- Hypotension or a decrease in blood pressure over baseline
- Muffled or harder-to-hear heart sounds
- Coarser (wetter) lung sounds
- An enlargement of liver span



Patients with signs and/or symptoms of myocarditis or heart failure should be removed from the AGE pathway.

Phase II (ED/UC): Urgent Care Transfer Criteria

Urgent Care Transfer Criteria:

- Not tolerating ORT following 2nd IV/NG bolus (send by BLS)
 - Need for a 3rd IV/NG bolus (send by BLS)
 - Overt shock (IV access, bolus started, ALS transport)
 - Worsening clinical status
- **Continue treatment as outlined by pathway while awaiting transport**

- Additionally, a patient who is being treated for AGE according to this pathway may be transferred from the Urgent Care to the ED at any time if:
 - A decision is made with the caregivers to initiate NG rehydration and the ability to place an NG tube is not possible at the UC

Phase II (ED/UC): IV or NG Rehydration (Cont'd)

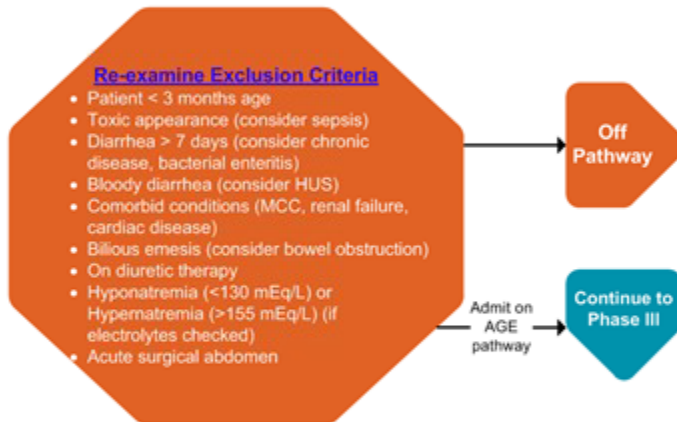
Recheck Vital Signs; Re-examine

Evaluate for Discharge

- Clinical status improved
- IV or NG fluids not required
- Tolerating ORT or regular diet
- Adequate family teaching
- Follow-up established

- If the patient has tolerated ORT or their regular diet for 20 minutes, is no longer requiring IV or NG fluids, and appears clinically improved, the provider may instruct the family on continued ORT use at home, and discuss establishing follow up care with their primary care provider.

Phase II (ED/UC): IV or NG Rehydration (Cont'd)



- If a patient does not meet discharge criteria from the ED or Urgent Care, re-examine if the patient meets any of the exclusion criteria and does not belong on this pathway
- If no exclusion criteria are present, admit to **Phase III: Inpatient Management**

Return to Phase II

Secretory Diarrhea

- No clear guidelines exist for when to consider treatment for secretory diarrhea.
- *Special consideration should be made for children with high stool output exceeding 30 mL/kg/day, especially if coupled with low or no oral intake [Expert Opinion]*
- *These patients may have secretory diarrhea, and might require a period of hyperalimentation, as well as nothing by mouth for a period of time. [Expert Opinion]*

Inpatient Management: Assessment at 08:00am

Patients will be assessed for transition from IV or NG rehydration to oral rehydration therapy at 08:00am.

- This assessment will be performed by nursing at 08:00am for any patient admitted after 16:00 the previous day.
- This nursing assessment will determine if a patient is ready for an ORT challenge.
- Patients admitted between 08:00am and 16:00pm will be assessed after 4 hours of IV or NG fluid rehydration.

Inpatient Management: Assessment at 08:00am (Cont'd)

- During the nursing assessment, the patient will be assessed for:
 - total input and output, and
 - number of episodes of emesis or vomiting.
- If the total input $>$ output and there is ≤ 1 episodes of vomiting, then IV or NG fluid rehydration will be stopped and the patient will be transitioned to an ORT challenge.

Inpatient Management: Not ready for oral challenge

- If, during the nursing assessment, the patient is deemed not ready for an ORT challenge, then the patient will continue with the previously ordered IV or NG rehydration.
- The patient will then be reassessed every 4 hours for potential ORT challenge.
- On-going losses from stool or emesis can be replaced at a 1:1 ratio with normal saline (NS) if the patient is receiving IV rehydration or Pedialyte if the patient is receiving NG rehydration.

Inpatient Management: Ready for oral challenge

- If, during the nursing assessment, the patient is determined to be ready for an ORT challenge, then:
 - the IV or NG fluids will be stopped, and
 - the ORT challenge will begin at the same doses as previously noted in Phase I (ED/Urgent Care): ORT
 - 5 mL every 5 minutes if < 10 kg
 - 10 mL every 5 minutes if \geq 10 kg
 - Patients make choose to skip ORT and resume a regular diet, or lactose-free formula if predominantly formula fed

NOTE: The starting amount of ORT to be given during the ORT challenge is based on the patient's admitted weight

Inpatient Management: ORT or Regular Diet Challenge

- Success or failure of the ORT / regular diet challenge is determined by the presence or absence of emesis
- If there is no emesis after 20 minutes, then the ORT challenge volumes can be doubled:
 - 10 mL every 5 minutes if < 10 kg
 - 20 mL every 5 minutes if \geq 10 kg
- If emesis occurs at any point during the ORT challenge, then hold ORT for 20 minutes and restart at the initial rate.

Inpatient Management: Discharge Diet

- The goal in feeding during AGE is to return the patient to their regular and usual diet as soon as possible.
- *Continue to offer feedings (child's preferred diet) to children with AGE.*^{1, 5} [Guideline] *If a child has previously been breast feeding, continue breast feeding.*⁵ [Guideline] *Do not use the bread, rice, apple, toast (BRAT) diet; similarly, do not use other restrictive or progressive diets.*^{1, 5, 8} [Guideline] *Avoid use of fruit juices and carbonated sodas.*^{1, 5, 9} [Guideline] *If diarrhea is the chief complaint in a child who is predominantly formula-fed, use a lactose-free formula until symptoms improve.*⁶ [★★★★]

Discharge Criteria

Discharge Criteria

- Sufficient rehydration as indicated by weight gain OR normal respiratory rate, capillary refill, and skin turgor
- IV or NG fluids not required
- Tolerating ORT or regular diet
- Adequate family teaching
- Follow-up established

- Although weight gain can be a sign of readiness for discharge, it is not a required criteria
- Readiness for discharge can also be indicated by resolution of clinical symptoms such as tachypnea, prolonged capillary refill, and abnormal skin turgor

Discharge Instructions

Discharge Instructions

- Continue ORT, or
- Resume regular diet, or [lactose free formula](#) if predominantly formula fed
- Acute Gastroenteritis And Oral Rehydration Therapy handout (PE636)
- [Lactobacillus](#) for 5 days

Patients will be discharged:

- To continue either ORT, or their regular, preferred diet, or lactose-free formula if predominantly formula fed
- With an "Acute Gastroenteritis and Oral Rehydration Therapy" handout (PE636)
- With a prescription for lactobacillus, to be taken for a total of 5 days

Inpatient Management: Discharge Diet– Lactose-free formula

- There is a theoretical concern that intestinal damage during an episode of AGE will result in a loss of the intestinal brush border and result in a temporary inability to tolerate lactose.
- *Although previous guidelines did not recommend the use of lactose-free formulas, a recent Cochrane review suggests that for children who are primarily bottle fed, a change to a lactose-free formula/diet will result in earlier resolution of diarrhea.⁶ [⊕⊕⊕⊕]*

NOTE: The recommendation to use a lactose-free formula in predominantly formula fed infant is new for 2015.

Executive Summary

Objective

To standardize the care of patients presenting to the emergency department or admitted to the hospital with acute gastroenteritis.

Additional Objectives

- Decrease use of inappropriate medications and laboratory studies
- Standardize the process for ORT challenge (timing, amounts, escalation schedule)
- Facilitate rapid transition from IV or NG fluids back to regular diet

Recommendations

Laboratory testing

1. Do not routinely perform stool cultures.
2. Check electrolytes only in moderately dehydrated children who are requiring the initiation of IV fluids.

Assesment of dehydration

3. Use percentage loss of body weight to best measure the degree of dehydration.
4. Use the following 3 individual examination signs to best assess for dehydration of 5% or greater: prolonged capillary refill time, abnormal skin turgor, and abnormal respiratory pattern.
5. Classify patients into subgroups (no or minimal dehydration, moderate dehydration, or overt shock) to guide appropriate treatment.

Use of IV or NG fluid resuscitation

6. Involve the caregivers in the decision to use IV fluids versus NG rehydration to treat dehydration in patients who are unsuccessful at oral rehydration.

Return to regular diet

7. Continue to offer feedings (child's preferred diet) to children with AGE. If a child has previously been breast feeding, continue breast feeding.
8. Do not use the bread, rice, apple, toast (BRAT) diet or other restrictive or progressive diets.
9. Avoid use of fruit juices, sports drinks, and carbonated sodas.
10. If diarrhea is the chief complaint in a child who is predominantly formula-fed, use a lactose-free formula until symptoms improve.

Medications

11. Use ondansetron (oral, NG, or IV) only in moderately dehydrated patients presenting to the ED or Urgent Care.
12. Prescribe probiotics in the form of Lactobacillus GG as an adjunctive treatment in the management of children with diarrhea from acute gastroenteritis. Start immediately and treat for 5-7 days
13. Do not prescribe anti-diarrheal medications for the treatment of AGE.

Rationale

- Safety will be enhanced by reducing the need for unnecessary medication use, laboratory testing, or hospitalization.
- Cost per episode of care is predicted to be reduced by decreasing use of medications and laboratory studies as clinically appropriate, as well as by standardizing the use of ORT in moderately dehydrated patients before initiating IV or NG fluids.

Executive Summary

- Delivery of care will be improved by standardizing the process for ORT challenge and by expediting patient flow on the inpatient unit through frequent nursing reassessment of the patient's hydration status.
- Quality of care will be improved by promoting timely management of AGE in the ED, UC, and inpatient units, while reducing the need for unnecessary lab work and medication use, and by facilitating close follow up between the primary care provider and the patient upon discharge.
- Engagement is founded on the premise that this pathway was developed by providers from multiple disciplines and practice settings and incorporates feedback from family members.

Evidence

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian. A search was performed for topics including gastroenteritis, dysentery, enteritis, adenoviridae infections, rotavirus infections or rotavirus, looking back from 2007 to 2014. The results were systematically reviewed by the clinical pathway team, and 12 articles total were included to inform the recommendations.

Implementation Items

- Revised algorithm for care, including Urgent Care setting
- Revised web-based training module for physicians and ARNPs
- Revised patient handouts and discharge teaching/planning
- Revised nursing teaching protocol

Metrics Plan

- CSW Core Metrics
 - Count of inpatient and observation discharges
 - Median Length of Stay
 - Percent of patients with any of the specified powerplans
 - Average charges per case
 - Readmission
- Electrolytes utilization
- Lactobacillus prescription rate
- Use of NG hydration
- ED LOS or Admit LOS when using NG hydration
- Appropriate formula ordered

PDCA Plan

The clinical pathway team will meet quarterly to review metrics, medical literature, and any use of pathway-related tools.

Revision History

Date Approved: June 2015
Next Review Date: June 2020

Executive Summary

Approved by the CSW Acute Gastroenteritis Team on June 17th, 2015

CSW Acute Gastroenteritis Team:

Hospital Medicine, Owner	James O'Callaghan, MD, FAAP, SFHM
Emergency Medicine, Owner	Sabreen Akhter, DO, DTM
Urgent Care, Consultant	Bryan Dryer, MD
Emergency Medicine CNS	Sara Fenstermacher, RN
Medical CNS	Kristi Klee, MSN, RN-BC

Clinical Effectiveness Team:

Consultant:	Jeffrey Foti, MD
Project Leader:	Elizabeth Austin, MPH
KM Analyst:	James Johnson
CIS Informatician:	Michael Leu, MD, MS, MHA
CIS Analyst:	Heather Marshall
Librarian:	Susan Klawansky, MLS
Program Coordinator:	Ashlea Tade

Acute Gastroenteritis (AGE) Citation

Title: Acute Gastroenteritis (AGE) Pathway

Authors:

- Seattle Children's Hospital
- James O'Callaghan
- Sabreen Akhter
- Elizabeth Austin
- Bryan Dryer
- Sara Fenstermacher
- Jeffrey Foti
- Kristi Klee
- Michael Leu

Date: June 2015

Retrieval Website: <http://www.seattlechildrens.org/pdf/acute-gastroenteritis-pathway.pdf>

Example:

Seattle Children's Hospital, O'Callaghan J, Akhter S, Austin E, Dryer B, Fenstermacher S, Foti J, Klee K, Leu MG. 2015 June. Acute Gastroenteritis (AGE) Pathway. Available from: <http://www.seattlechildrens.org/pdf/acute-gastroenteritis-pathway.pdf>

Self-Assessment

- **Completion qualifies you for 1 hour of Category II CME credit. If you are taking this self-assessment as a part of required departmental training at Seattle Children's Hospital, you MUST logon to Learning Center.**

- (1) Which one of the following is NOT an exclusion criteria?
- toxic appearance
 - bloody diarrhea
 - rotavirus infection
 - diarrhea for more than 7 days
 - bilious emesis
- (2) Which of the following statements concerning probiotics is/are TRUE?
- probiotics are considered adjunctive therapy.
 - probiotics may be more effective for rotavirus diarrhea, compared to all-cause diarrhea
 - yogurt is considered a good source of probiotics
 - a and b
 - a and c
 - b and c
 - all of the above
- (3) The historical BRAT diet (consisting of bananas, rice, applesauce, and toast) is unnecessarily restrictive.
- true
 - false
- (4) Which of the following statements is/are TRUE concerning the clinical assessment of dehydration in AGE?
- Prolonged capillary refill time, abnormal skin turgor, and respiratory rate are the best individual examination measures
 - A normal bicarbonate concentration may be useful in ruling out dehydration
 - Acute body weight change is considered the gold standard measure of dehydration
 - It is recommended that the history and physical examination be the primary basis for the diagnosis of AGE
 - all of the above
- (5) Which of the following discharge criteria are TRUE?
- tolerating ORT and/or regular diet
 - tolerating BRAT diet
 - medical follow up is available via telephone or office visit
 - a and b
 - a and c
 - b and c
 - all of the above
- (6) Ondansetron has been shown to be a safe and effective therapy in hospitalized children.
- true
 - false
- (7) Which of the following is(are) the recommended diet(s) to prevent or limit dehydration?
- BRAT diet
 - clear liquid diet
 - Paleo diet
 - regular diet
 - a and b
 - a and d
 - b and d
 - a, b, and d
- (8) Which of the following liquids are appropriate for use in oral rehydration therapy?
- Pedialyte®
 - Gatorade®
 - Gatorade® with added salt, in the ratio of 1L Gatorade® + 1 tsp salt
 - a and b
 - a and c
 - all of the above

Answer Key

- (1) The correct answer is (c); all other choices except rotavirus infection are exclusion criteria.
- (2) The correct answer is (d); probiotics are considered adjunctive therapy and may be more effective for rotavirus diarrhea, compared to all-cause diarrhea.
- (3) The correct answer is (a).
- (4) The correct answer is (e); all of the above statements are true about the clinical assessment of dehydration in AGE.
- (5) The correct answer is (e); tolerating ORT and/or a regular diet and ensuring that adequate medical follow up is available by telephone or office visit are discharge criteria for patients with a diagnosis of AGE.
- (6) The correct answer is (b); while studies suggest a benefit of ondansetron in the outpatient or emergency room setting, ondansetron has not been shown to be an effective therapy in hospitalized children.
- (7) The correct answer is (d); only a patient's usual or regular diet is the recommended diet to prevent or limit dehydration.
- (8) The correct answer is (a); only Pedialyte® is appropriate for use in oral rehydration therapy.

[Return to Home](#)

Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children's. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

Quality ratings are *downgraded* if studies:

- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings are *upgraded* if it is felt that:

- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

Quality of Evidence:

★★★★ High quality

★★★○ Moderate quality

★★○○ Low quality

★○○○ Very low quality

Guideline

Expert Opinion

[Return to Home](#)

[To Bibliography](#)

Summary of Version Changes

- **Version 1.1 (11/08/2011):** Go Live
- **Version 1.2 (07/28/2014):** Administrative update
- **Version 2.0 (06/17/2015):** Periodic review; updated literature search, recommendations, and pathway tools

[Return to Home](#)

Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children's Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.

[Return to Home](#)

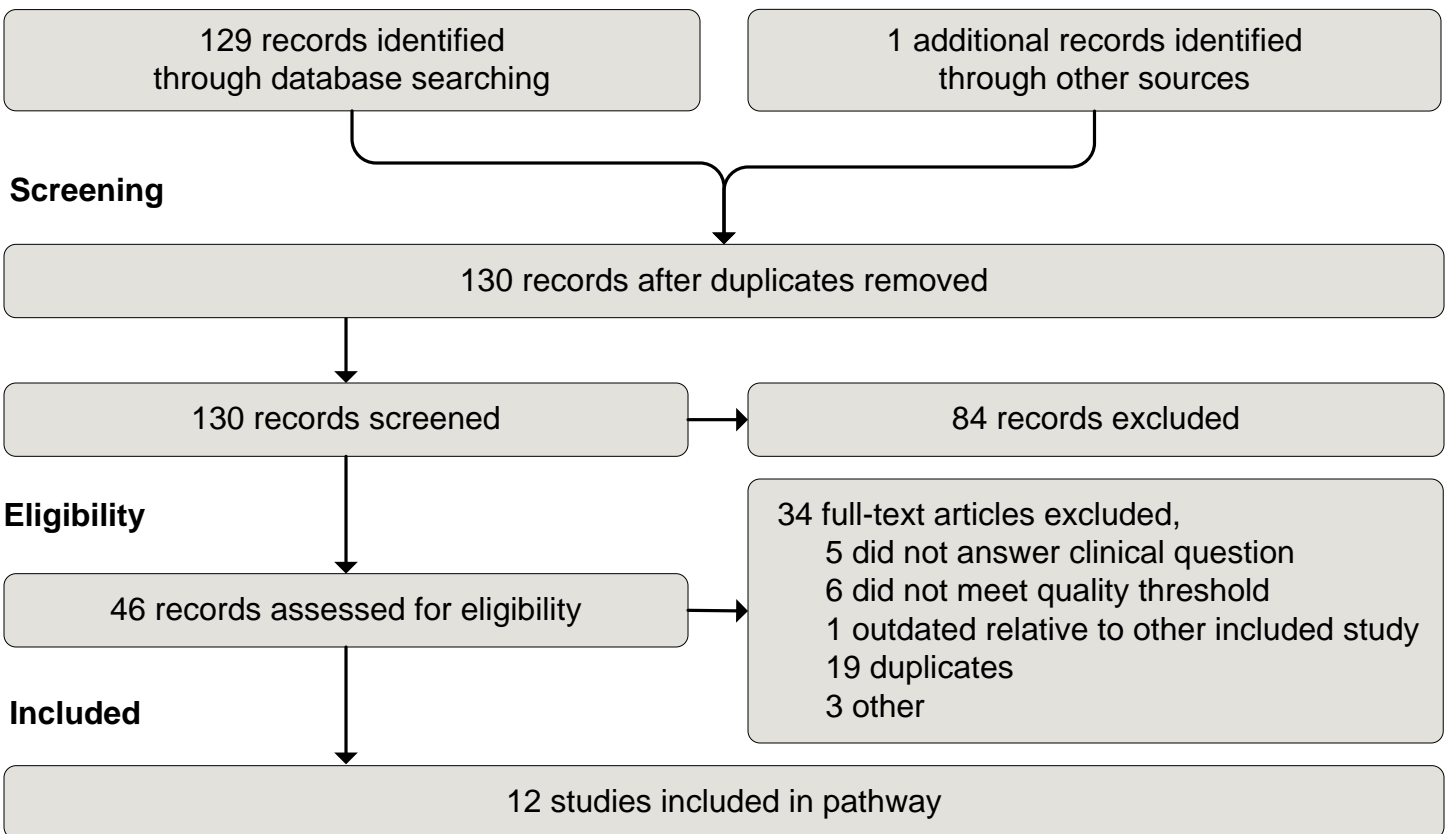
Bibliography

Literature Search Strategy

Search Methods, Acute Gastroenteritis, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Klawansky. Searches were performed in November 2014 in the following databases – on the Ovid platform: Medline and Cochrane Database of Systematic Reviews; elsewhere: Embase, Clinical Evidence, National Guideline Clearinghouse, TRIP and Cincinnati Children’s Evidence-Based Care Recommendations. Retrieval was limited to 2007 to current, ages 0-18, and English language. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases as appropriate. Concepts searched were gastroenteritis, dysentery, enteritis, adenoviridae infections, rotavirus infections or rotavirus. All retrieval was further limited to certain evidence categories, such as relevant publication types, index terms for study types and other similar limits. Additional articles were identified by team members and added to results.

Identification



Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

Bibliography

1. Diarrhoea and vomiting in children. Diarrhoea and vomiting caused by gastroenteritis: diagnosis, assessment and management in children younger than 5 years. National Collaborating Centre for Women's and Children's Health. <http://www.ncbi.nlm.nih.gov/books/NBK63844/>. Updated 2009.
2. Carter B, Fedorowicz Z. Antiemetic treatment for acute gastroenteritis in children: An updated cochrane systematic review with meta-analysis and mixed treatment comparison in a bayesian framework. *BMJ Open*. 2012;2(4).
3. Fedorowicz Z, Jagannath VA, Carter B. Antiemetics for reducing vomiting related to acute gastroenteritis in children and adolescents. *Cochrane Database of Systematic Reviews*. 2011;9.
4. Freedman SB, Ali S, Oleszczuk M, Gouin S, Hartling L. Treatment of acute gastroenteritis in children: An overview of systematic reviews of interventions commonly used in developed countries. *Evid Based Child Health*. 2013;8(4):1123-1137. Accessed 20130723; 11/27/2014 12:34:04 PM. <http://dx.doi.org/10.1002/ebch.1932>.
5. Guarino A, Albano F, Ashkenazi S, Gendrel D, Hoekstra JH, Shamir R, Szajewska H. European Society for Paediatric Gastroenterology, Hepatology, and Nutrition. European Society for Paediatric Infectious Diseases. European society for paediatric gastroenterology, hepatology, and Nutrition/European society for paediatric infectious diseases evidence-based guidelines for the management of acute gastroenteritis in children in europe. *J Pediatr Gastroenterol Nutr*. 2008;46(Suppl 2):S81-122. Accessed 20080507; 11/27/2014 12:34:04 PM. <http://dx.doi.org/10.1097/MPG.0b013e31816f7b16>.
6. MacGillivray S, Fahey T, McGuire W. Lactose avoidance for young children with acute diarrhoea. *Cochrane Database of Systematic Reviews*. 2013;10.
7. National GC. Best evidence statement (BEST). Use of *Lactobacillus rhamnosus* GG in children with acute gastroenteritis. [http://www.guideline.gov/content.aspx?id=33576&search=%22acute+gastroenteritis%22+and+\(child*+or+pediatr*+or+paediatr*\)](http://www.guideline.gov/content.aspx?id=33576&search=%22acute+gastroenteritis%22+and+(child*+or+pediatr*+or+paediatr*)).
8. National GC. Evidence-based care guideline for prevention and management of acute gastroenteritis (AGE) in children aged 2 months to 18 years. [http://www.guideline.gov/content.aspx?id=35123&search=%22acute+gastroenteritis%22+and+\(child*+or+pediatr*+or+paediatr*\)](http://www.guideline.gov/content.aspx?id=35123&search=%22acute+gastroenteritis%22+and+(child*+or+pediatr*+or+paediatr*)).
9. National GC. Oral rehydration therapy (ORT) in children. [http://www.guideline.gov/content.aspx?id=38900&search=%22acute+gastroenteritis%22+and+\(child*+or+pediatr*+or+paediatr*\)](http://www.guideline.gov/content.aspx?id=38900&search=%22acute+gastroenteritis%22+and+(child*+or+pediatr*+or+paediatr*)).
10. Seattle Children's Hospital, O'Callaghan J, Beardsley E, Black K, Drummond K, Foti J, Klee K, Leu MG, Ringer C. 2011 September. Acute Gastroenteritis (AGE) Pathway.
11. Szajewska H, Guarino A, Hojsak I, et al. Use of probiotics for management of acute gastroenteritis: A position paper by the ESPGHAN working group for probiotics and prebiotics. *J Pediatr Gastroenterol Nutr*. 2014;58(4):531-539.
12. Szajewska H, Ruszczynski M, Kolacek S. Meta-analysis shows limited evidence for using lactobacillus acidophilus LB to treat acute gastroenteritis in children. *Acta Paediatr*. 2014;103(3):249-255. Accessed 20140211; 11/27/2014 12:34:04 PM. <http://dx.doi.org/10.1111/apa.12487>.
13. Szajewska H, Skorka A, Ruszczynski M, Gieruszczak-Bialek D. Meta-analysis: Lactobacillus GG for treating acute gastroenteritis in children--updated analysis of randomised controlled trials. *Aliment Pharmacol Ther*. 2013;38(5):467-476. Accessed 20130813; 11/27/2014 12:34:04 PM. <http://dx.doi.org/10.1111/apt.12403>