

Ethanol Lock Efficacy and Associated Complications in Children With Intestinal Failure

Ethan A. Mezoff, MD

Clinical Instructor

Division of Pediatric Gastroenterology, Hepatology, and Nutrition

Cincinnati Children's Hospital Medical Center

Ethan.Mezoff@cchmc.org

Coauthors: Lin Fei, PhD; Misty Troutt, MS, MBA; Kim Klotz, RN, MSN, CRNI;
Samuel A. Kocoshis, MD; and Conrad R. Cole, MD, MPH, MSc

The authors report

NO RELEVANT FINANCIAL RELATIONSHIPS

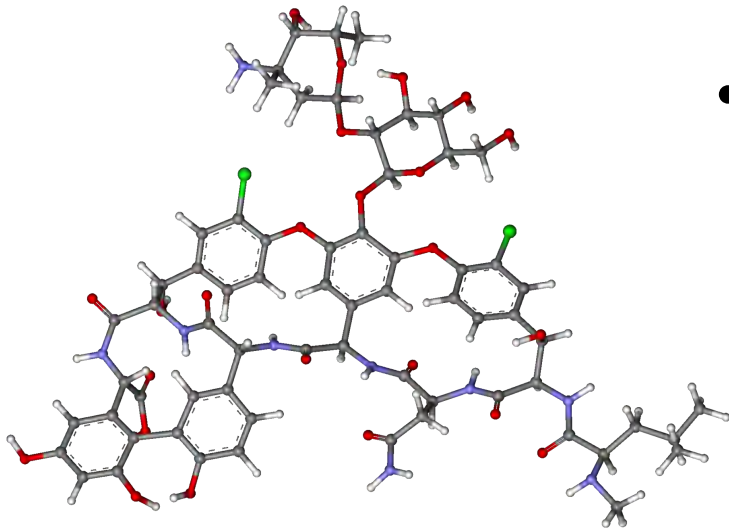
Intestinal Failure (IF)

- No single accepted definition
- A failure of the intestine to support the nutritional and hydration needs of the body
- Central access required for ≥ 30 days to support fluid, electrolyte, and/or nutritional needs

Central Line-Associated Blood Stream Infection (CLABSI)

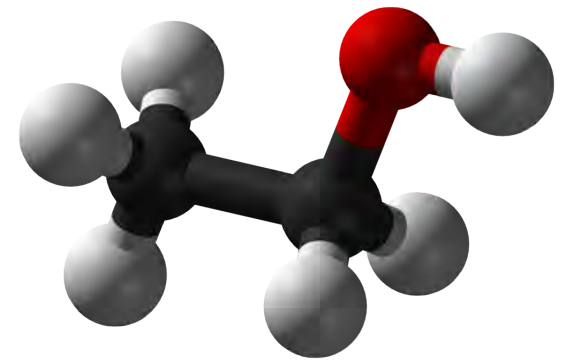
- Primary bloodstream infection in a patient who has a central line
- No other identified source with identical organism
- Measured in:
Events per 1,000 catheter days

- CLABSI rates for inpatient pediatric units
 - 0.5-1.9 per 1,000 catheter days
- CLABSI rates among pediatric IF
 - 8.0-10.2 per 1,000 catheter days
 - Proposed reasons
 - Relative immune-deficient state
 - Poor intestinal motility
 - Reduced barrier function
 - Frequency of line access/Line colonization

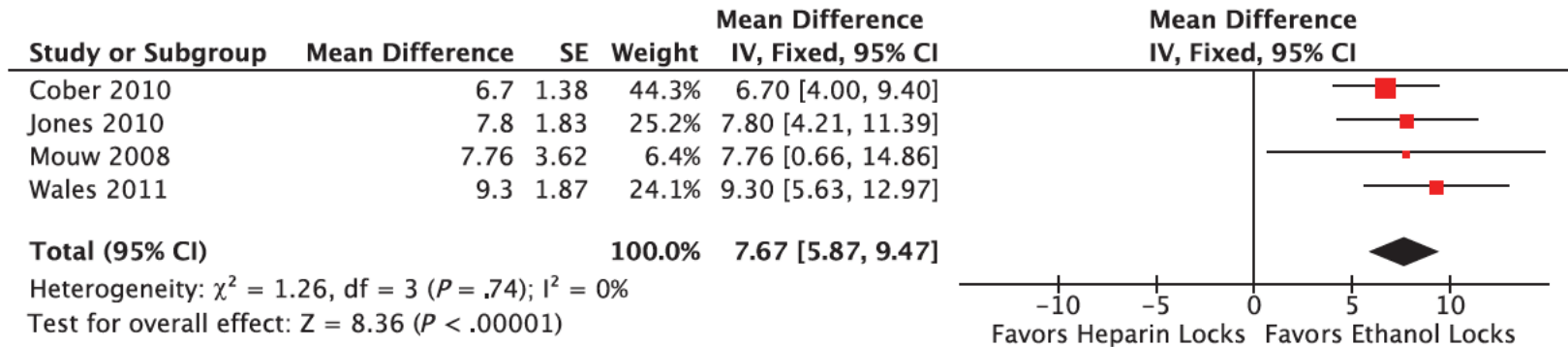


- Antimicrobial locking solutions
 - Expensive
 - Encourage resistant organisms

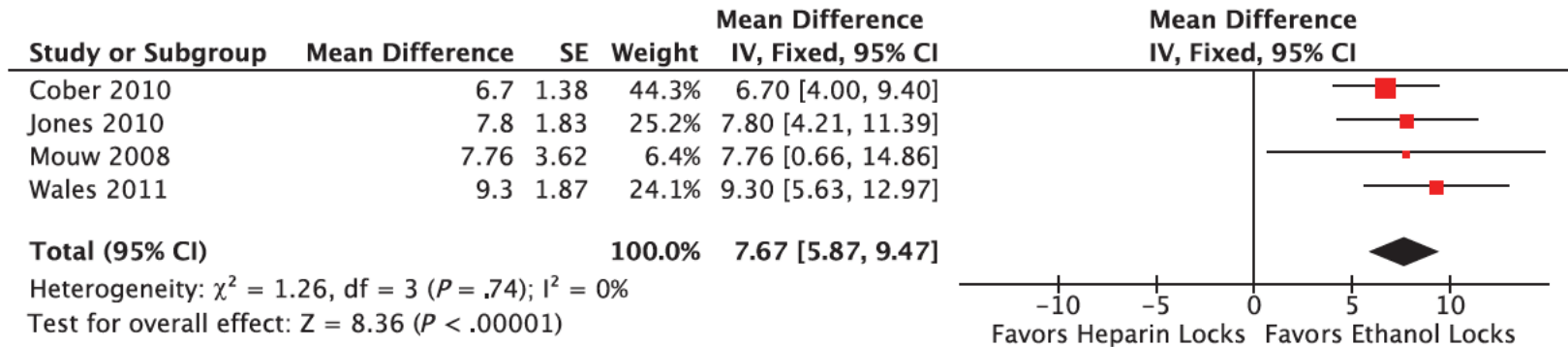
- Ethanol
 - Cheap
 - Antimicrobial
 - Kills bacteria, fungi, and viruses
 - Penetrates biofilms



- ELT in pediatric IF
 - Effective?
 - Several studies examined small groups using ELT
 - up to 23 patients per study
 - Meta-analysis: CLABSI *reduction* of **7.7** per 1,000 catheter days
 - Problems: low number of patients, diverse practices with ELT
 - Safe?
 - *No* studies, only anecdotes of **occlusion** and **breakage**



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AIM: Describe **SAFETY** and **EFFECTIVENESS** of ELT in our population

- >200 registered patients
- >6 years of data
 - Demographics
 - Lab values
 - CLABSI events
 - Admissions
- Maintained by database specialist
- Purpose:
 - Retrospective clinical studies (Data collected prospectively)
 - Quality improvement
 - **4 current projects**
- Current Outcomes
 - CLABSI rate: **1.3 per 1,000 catheter days**
 - % of population with total bilirubin level <0.2: **100%**

Inclusion Criteria

Exclusion Criteria

Greater than two line infections in a one year period with gram negative enteric organisms	Allergy to ethanol
One previous instance of a fungal positive blood culture from a central line	Hypercoagulable state
Continuation of home or outside hospital-initiated therapy	Loss of two or more catheters to occlusion
More than three line infections with any organism in a one year period	A psychosocial situation that prevents the use of ethanol
Removal of a second vascular catheter due to infection	Parent(s) or guardian(s) objecting to the use of ethanol
	Lines not known to be compatible with ethanol locks

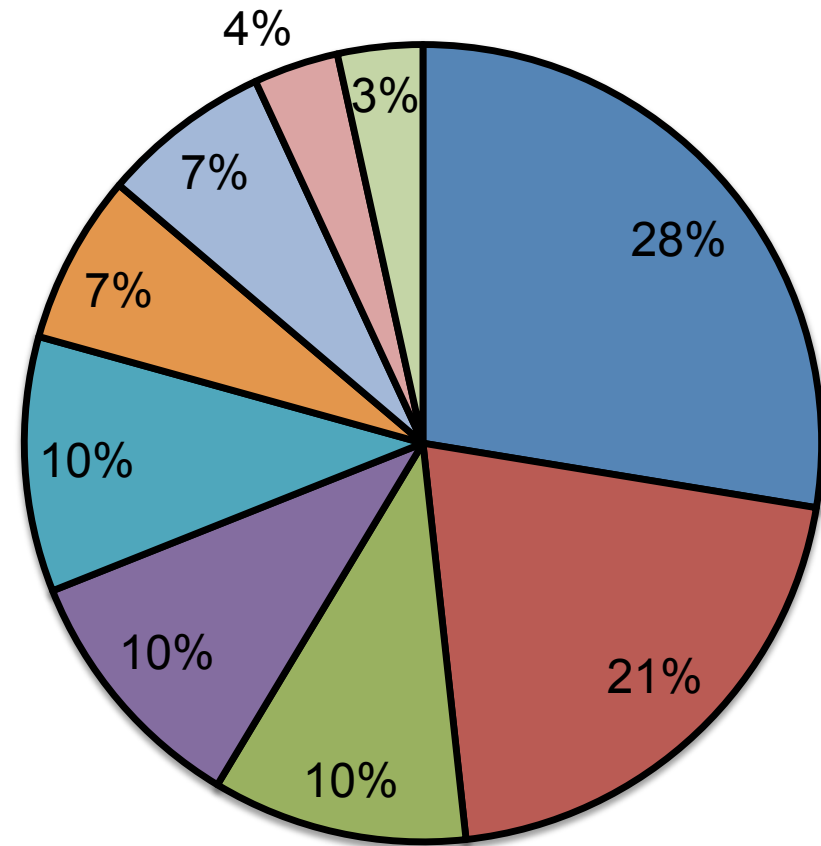
- Determine ELT priming volume
 - Educate caregiver
 - Schedule dwell time
 - >2hrs up to length of window (12hrs)
1. Flush w/ NS
 2. Instill priming volume of **70% Ethanol**
 3. Dwell (no access to CVC)
 4. Withdrawal with small flash of blood
 5. Flush line with >5 mL NS
 6. Resume use

Tunneled Catheter	Priming Volume
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Bard	
2.7 Fr	0.15 mL
4.2 Fr	0.3 mL
6.6 Fr	0.7 mL
7.0 Fr DL Red	0.8 mL
7.0 Fr DL White	0.6 mL

Cook	
3 Fr	0.3 mL
5 Fr	0.3 mL
4 Fr DL White	0.2 mL
4 Fr DL Blue	0.1 mL
5 Fr DL White	0.2 mL
5 Fr DL Blue	0.2 mL

Demographic Category		Number
Number of Patients		30
Median Patient Age (Range)		6.5 years (1-20 years)
Sex	Male	15
	Female	15
Etiology	Short Bowel Syndrome	11
	Pseudoobstruction	6
	Congenital Enteropathy	1
	Metabolic	3
	Post-multivisceral transplant	9

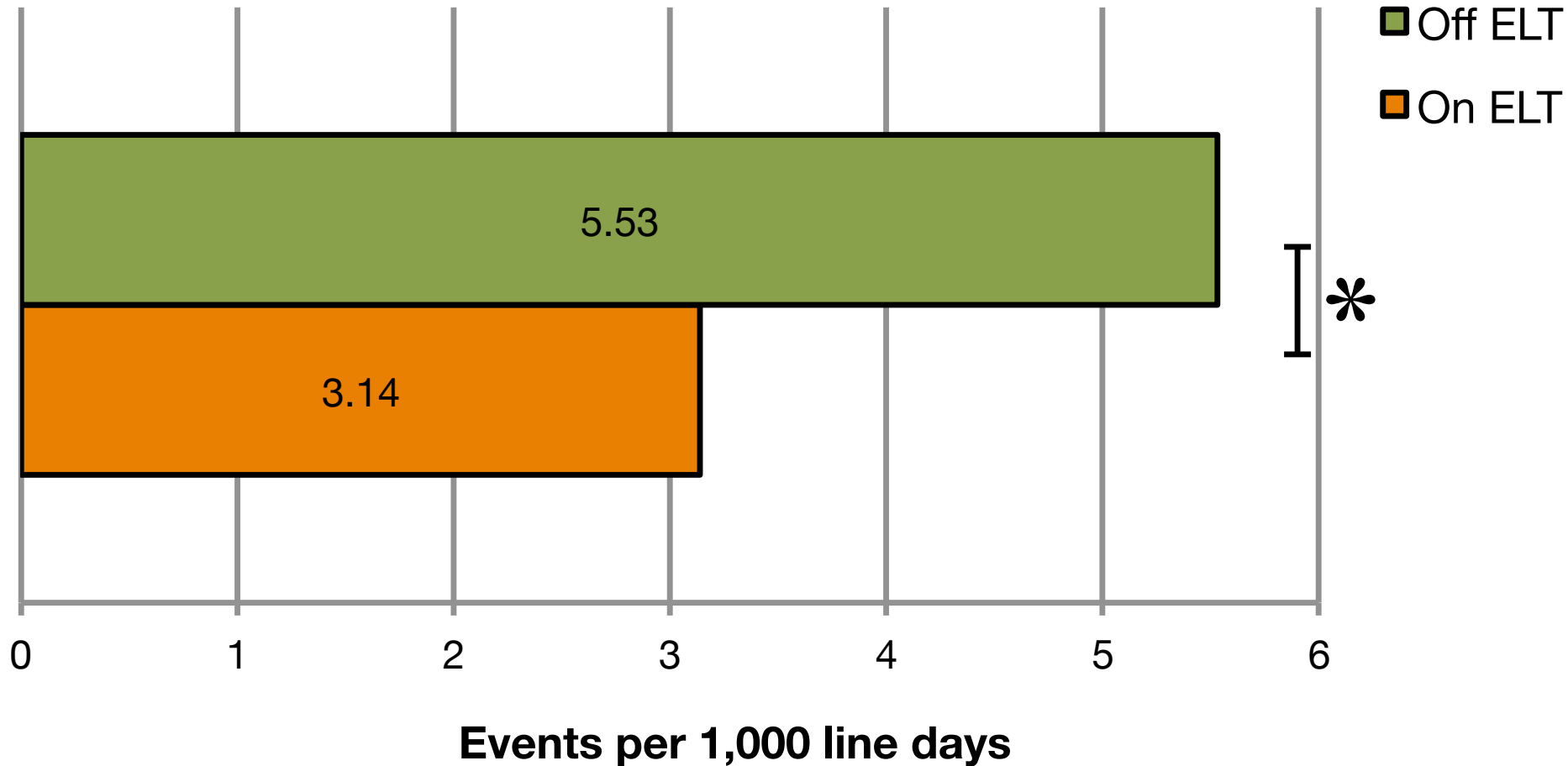


- Multivisceral transplant support
- Pseudoobstruction
- Metabolic/Mitochondrial myopathy
- Necrotizing enterocolitis
- Gastroschisis
- Jejunal atresia
- Ileal atresia
- Primary enteropathy
- Resection following severe abdominal trauma

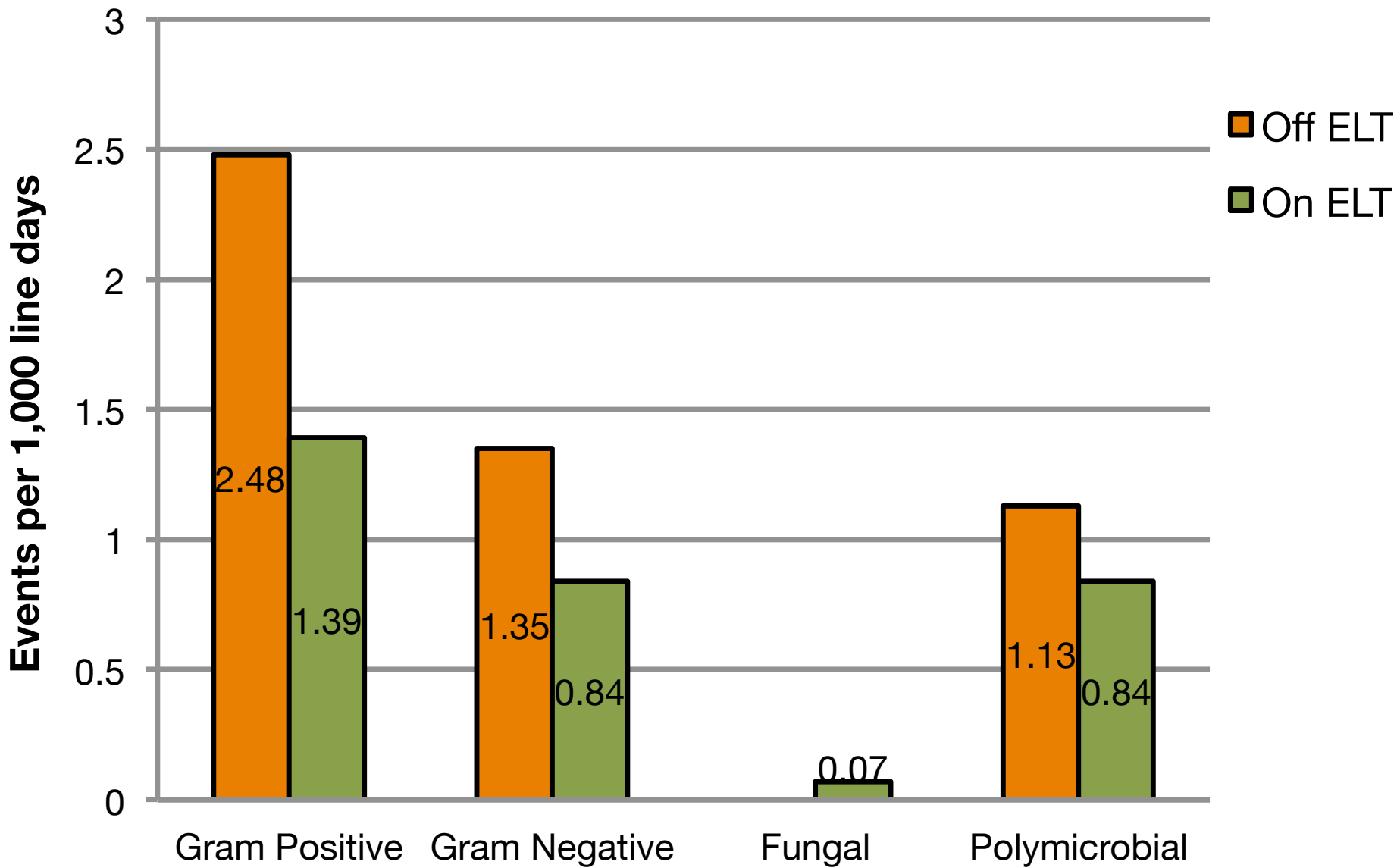
Demographics of Study Participants

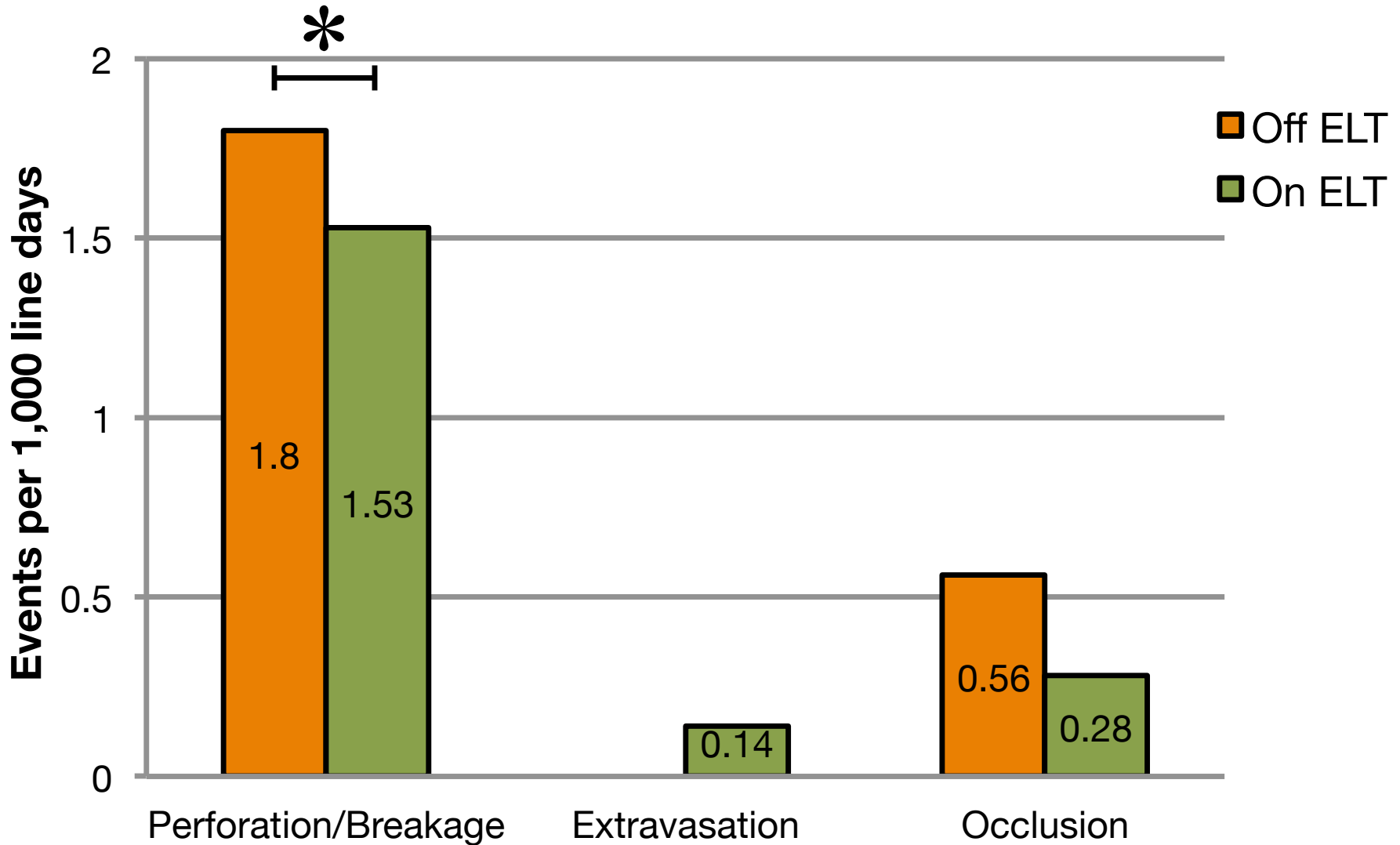
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Total Line Days		23,202
Line Type	Tunneled Central Venous Catheter	87
	Peripherally Inserted Central Catheter	61
	Port	8

Total Line Days
 •Off ELT 8,865 days (median 210)
 •On ELT 14,337 days (median 296)



**Difference significant ($p < 0.013$) by Poisson regression modelling*





**Difference significant ($p < 0.006$) by zero-inflated Poisson regression modelling*

ELT is a **SAFE** and **EFFECTIVE** method for reducing CLABSIs in the pediatric IF population.

- **CLABSI rates are *reduced* with ELT (p<0.013)**
- **Central line perforations or breaks are *reduced* with ELT (p=0.006)**
- **Central line occlusion rates trended *downward* with ELT (p=0.056)**
- **Low rates are possible with fastidious line care**

Future Directions:

- Be able to distinguish translocation from line infections
- Determine how antibiotic exposure changes the ability to grow
- ***Create a collaborative improvement network***

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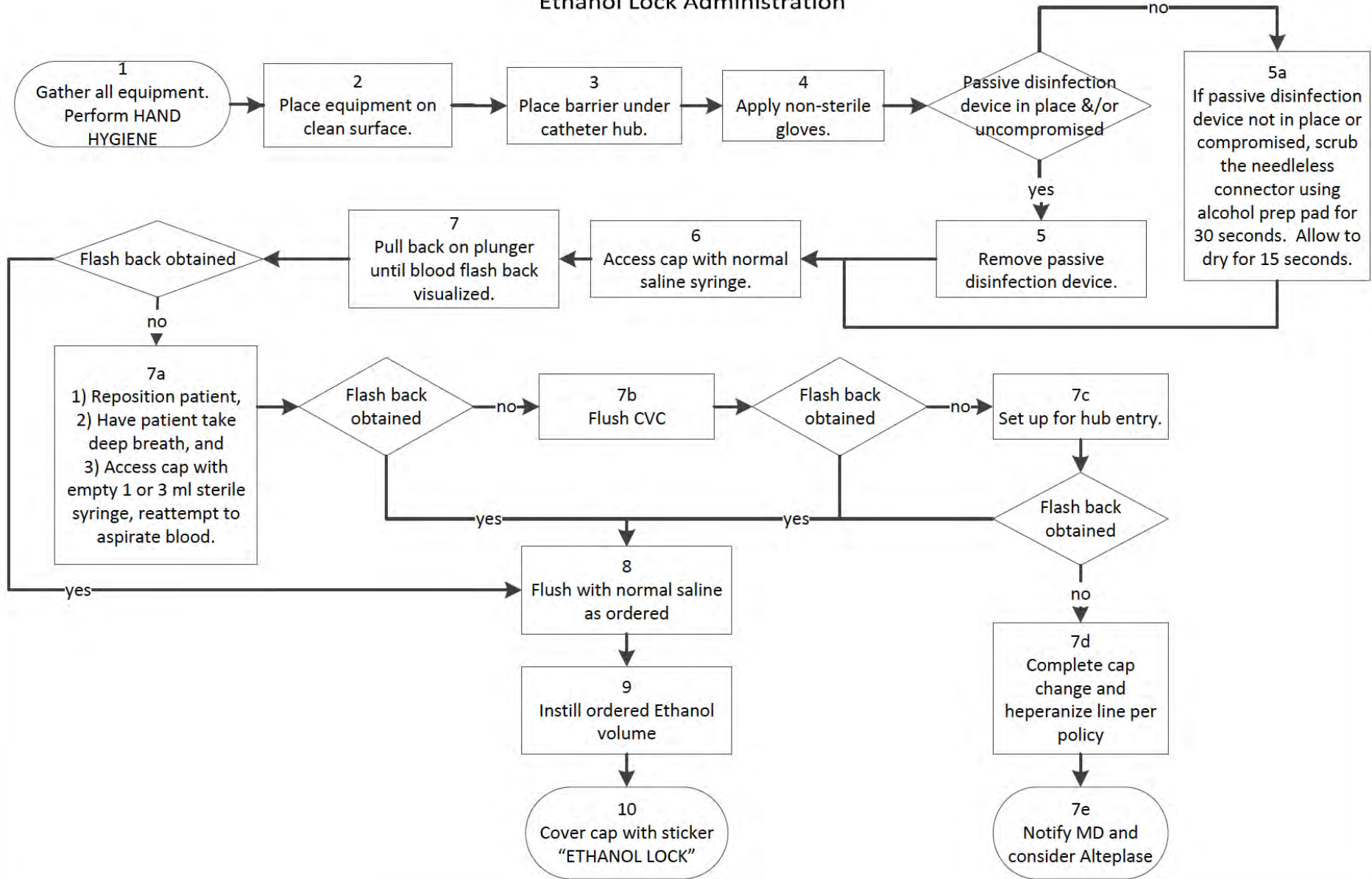
Thank you for your support!!!



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Ethan.Mezoff@cchmc.org

Ethanol Lock Administration



ELT Withdraw Workflow

Ethanol Lock Withdraw

