

TOP 10 ARTICLES IN PEM FOR 2020

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Sunday 31 January 2021

URGENCE
CHU Sainte-Justine



CONFLICT OF INTEREST

The logo for Annals of Emergency Medicine, featuring the text "Annals of Emergency Medicine" in a serif font, with "An International Journal" in a smaller, italicized serif font below it. The background is a gradient of purple and blue.

Annals of Emergency Medicine
An International Journal

► None



OBJECTIVES

For 2020

- ▶ Top 10 PEM articles
- ▶ + 1 bonus



CASE SCENARIO #1

- ▶ 18 months old girl with a ear infection



CASE SCENARIO #1

A GIRL WITH AN ACUTE OTITIS MEDIA

What is the best medication for fever and for pain?

- ▶ Acetaminophen
- ▶ Ibuprofen
- ▶ No difference

Original Investigation | Pediatrics

Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Eunicia Tan, MBChB; Irene Braithwaite, PhD; Christopher J. D. McKinlay, PhD; Stuart R. Dalziel, PhD

- ▶ **Introduction**
- ▶ Previous systematic reviews
 - ▶ Ibuprofen = acetaminophen
 - ▶ 1-18 years old



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Objective

- ▶ Compare the **antipyretic**, **analgesic**, and **safety** profiles of acetaminophen with ibuprofen for the short-term treatment of fever or pain in children **younger than 2 years**.

- ▶ Safety for < 3 months



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Methods

- ▶ **Design:** Systematic review and meta-analysis of randomised and non-randomized control trials (case-control, cohort).
- ▶ **Data sources:**
 - ▶ Trial registries up to **March 2019**



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Methods

► Inclusion criteria:

- Acetaminophen vs. Ibuprofen
- Children younger than 2 years old
- Outcomes:
 - Pain or fever at 4 hours
 - Safety at 28 days



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Methods

► Analyses:

- Sub analysis
 - High vs low doses
 - Less than 6 months
 - Varicella



Results

RCT

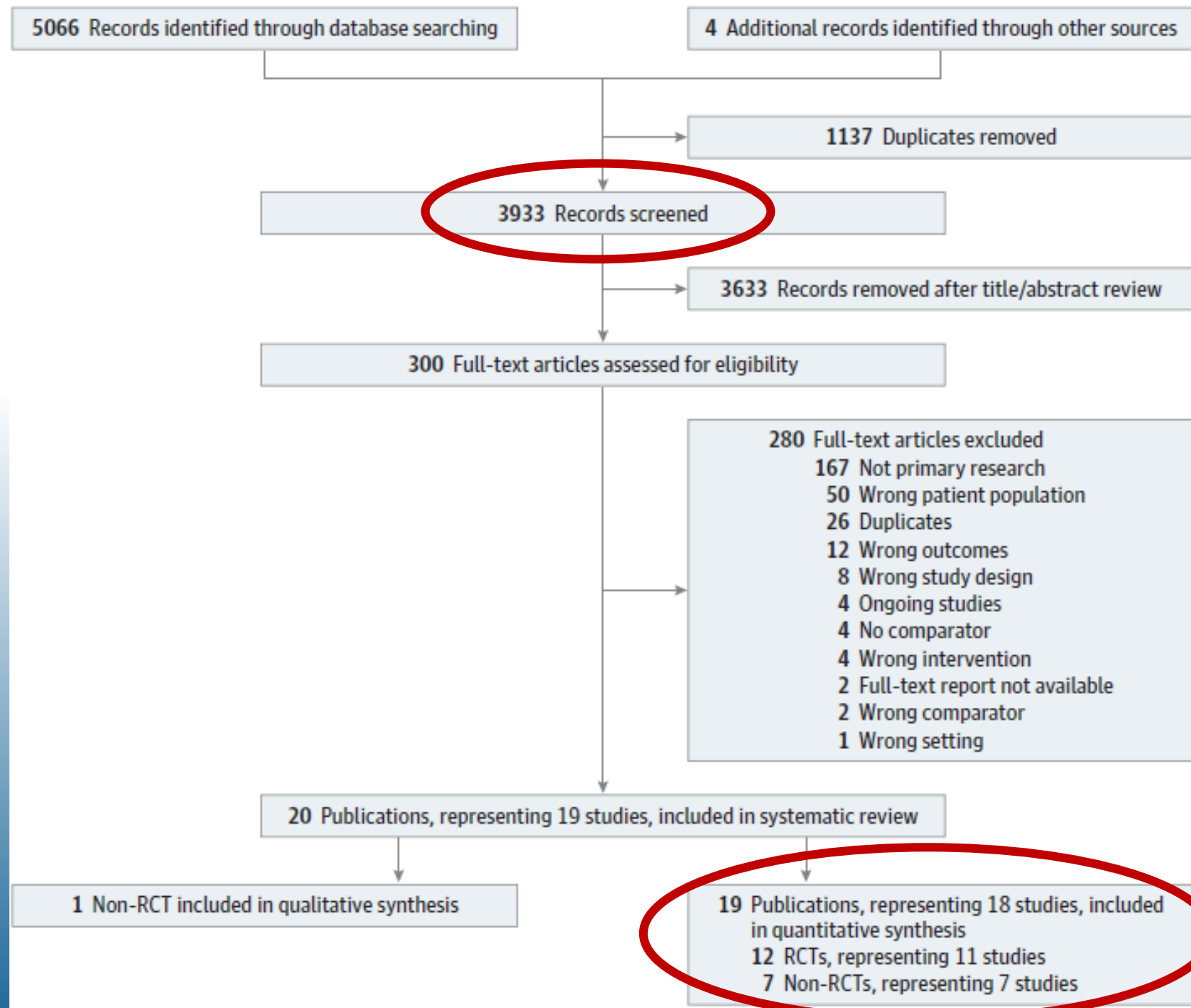
28 450 children

- Pain 4 studies
- Fever 9 studies
- Safety 9 studies

Non-RCT

212 688 children

- Pain 0 studies
- Fever 2 studies
- Safety 8 studies

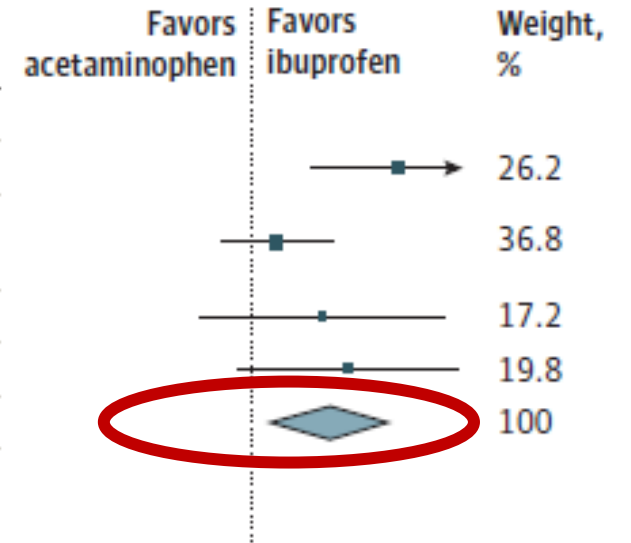


Results. Fever at 4 hours

Source	Outcome	Acetaminophen		Ibuprofen		SMD (95% CI)
		Mean (SD)	Total	Mean (SD)	Total	
Temperature or change in temperature at <4 h						
Aksoylar et al, ²⁹ 1997	Temperature, 3 h	38.40 (0.71)	51	37.90 (0.71)	50	0.70 (0.30 to 1.10)
Autret et al, ³³ 1997	Mean reduction in temperature, 1 h	-0.90 (0.56)	114	-0.97 (0.58)	114	0.12 (-0.14 to 0.38)
Erlewyn-Lajeunesse al, ³⁴ 2006	Mean temperature, 1 h	37.95 (0.48)	25	37.76 (0.62)	22	0.34 (-0.24 to 0.92)
Van Esch et al, ³² 1995	Mean temperature, 2 h	37.96 (0.92)	29	37.60 (0.60)	30	0.46 (-0.06 to 0.98)
Subtotal (95% CI)			219		216	0.38 (0.08 to 0.67)

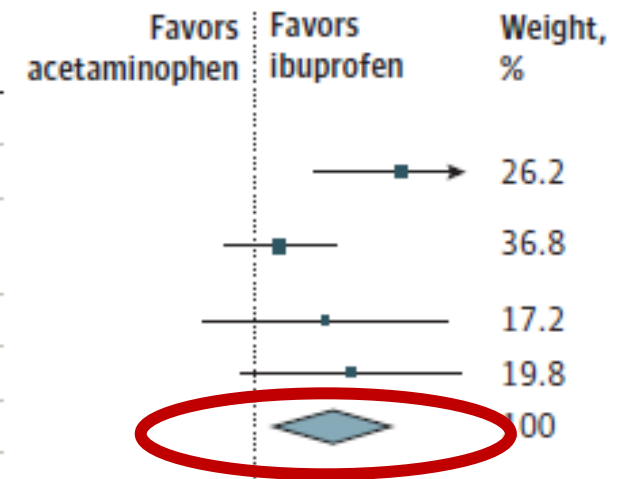
Heterogeneity: $\tau^2 = 0.04$; $\chi^2_3 = 5.91$, $P = .12$; $I^2 = 49\%$

Test for overall effect: $z = 2.53$; $P = .01$

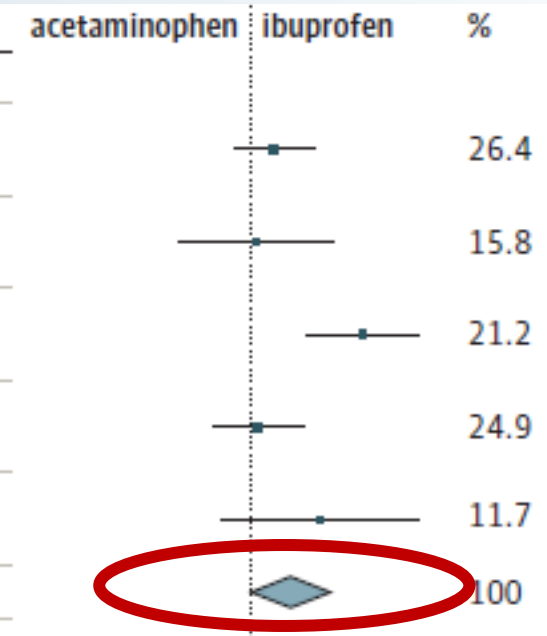


Results. Fever at 4 hours

Source	Outcome	Acetaminophen		Ibuprofen		SMD (95% CI)
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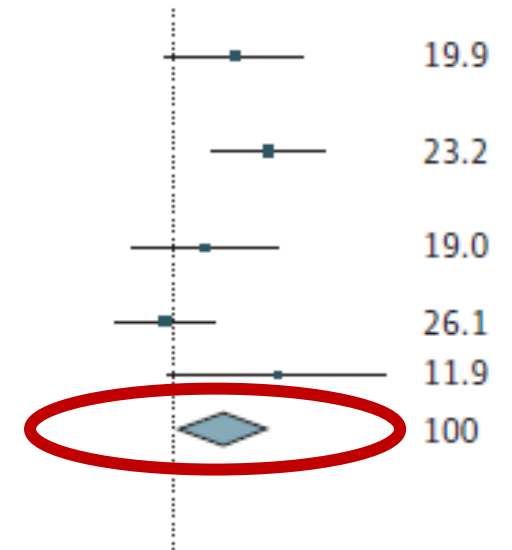


Source	Outcome	Events	Total	Events	Total	Odds ratio (95% CI)
Afebrile at <4 h						
Autret et al, ³³ 1997	No. afebrile (ie, rectal temperature $\leq 38^\circ\text{C}$), 1 h	33	114	25	114	1.45 (0.80-2.64)
Erlewyn-Lajeunesse et al, ³⁴ 2006	No. afebrile (ie, temperature $< 38^\circ\text{C}$), 1 h	11	22	12	25	1.08 (0.34-3.41)
Hay et al, ³⁵ 2008	Proportion afebrile (ie, temperature $< 37.2^\circ\text{C}$), 2 h	36	51	16	52	5.40 (2.33-12.54)
Kokki and Kokki, ³⁶ 2010	No. afebrile (ie, oral temperature $< 38.3^\circ\text{C}$; rectal, $< 38.5^\circ\text{C}$), 3 h	51	78	45	72	1.13 (0.58-2.21)
Van Esch et al, ³² 1995	No. afebrile (temperature $< 38.5^\circ\text{C}$), 2 h	27	30	22	29	2.86 (0.66-12.39)
Subtotal (95% CI)			295		292	1.86 (1.01-3.44)
Total events		158		120		

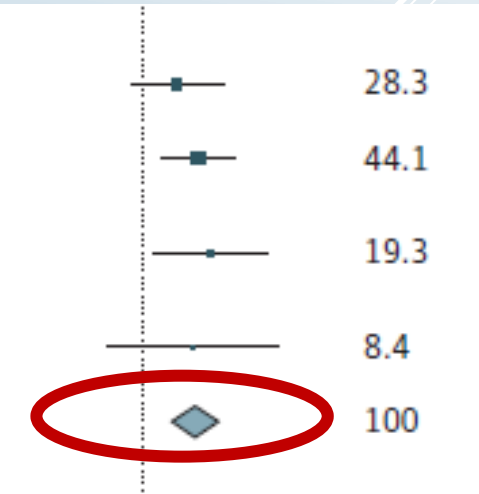


Results. Fever at 4-24 hours

Autret et al, ³⁰ 1994	Mean reduction in temperature, 0-4 h	-1.02 (1.05)	74	-1.32 (1.00)	77	0.29 (-0.03 to 0.61)
Autret et al, ³³ 1997	Mean reduction in temperature, 4 h	-1.04 (0.85)	110	-1.42 (0.85)	112	0.45 (0.18 to 0.71)
McIntyre and Hull, ³⁹ 1996	Mean change from baseline temperature, 4 h	-1.60 (1.35)	66	-1.80 (1.35)	69	0.15 (-0.19 to 0.49)
Sarrell et al, ⁴⁰ 2006	Fever, 1 d	40.55 (1.31)	154	40.6 (1.46)	155	-0.04 (-0.26 to 0.19)
Van Esch et al, ³² 1995	Mean temperature, 4 h	37.95 (1.28)	31	37.38 (1.00)	31	0.49 (-0.02 to 1.00)
Subtotal (95% CI)			435		444	0.24 (0.03 to 0.45)
Heterogeneity: $\tau^2 = 0.03$; $\chi^2_4 = 9.23$, $P = .06$; $I^2 = 57\%$						
Test for overall effect: $z = 2.20$; $P = .03$						



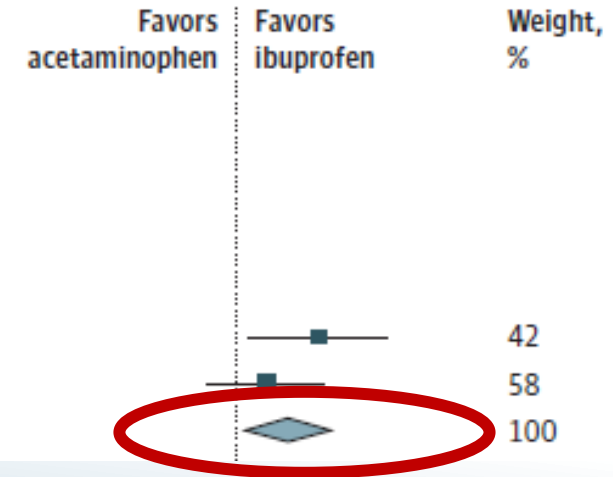
Afebrile at 4-24 h						
Autret et al, ³⁰ 1994	No. apyrexial in first 12 h	54	77	43	74	1.69 (0.86-3.31)
Autret et al, ³³ 1997	No. afebrile (ie, rectal temperature $\leq 38^\circ\text{C}$), 4 h	69	112	45	110	2.32 (1.35-3.97)
Hay et al, ³⁵ 2008	Proportion afebrile (ie, temperature $< 37.2^\circ\text{C}$), 4 h	36	51	23	52	3.03 (1.34-6.83)
Van Esch et al, ³² 1995	No. afebrile (ie, temperature $< 38.5^\circ\text{C}$), 4 h	26	31	22	31	2.13 (0.62-7.29)
Subtotal (95% CI)			271		267	2.22 (1.55-3.17)
Total events			185		133	



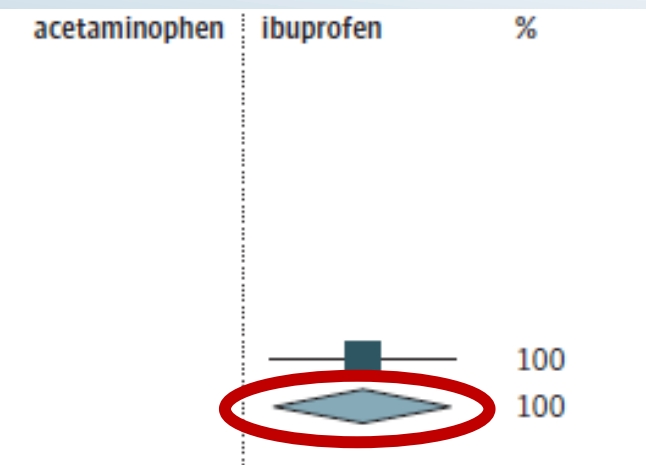
Results. Pain at 4 hours

A Continuous variable

Source	Outcome	Acetaminophen		Ibuprofen		SMD (95% CI)
		Mean (SD)	Total	Mean (SD)	Total	
Pain score or change in pain score at <4 h						
Subtotal (95% CI)			0		0	Not estimable
Heterogeneity: not applicable						
Test for overall effect: not applicable						
Pain score or change in pain score at 4-24 h						
Autret et al, ³³ 1997	CHEOPS	2.5 (1.0)	112	2.2 (0.9)	114	0.31 (0.05-0.58)
Sarrell et al, ⁴⁰ 2006	NCCPC, 1 d	11.77 (2.64)	154	11.48 (2.58)	155	0.11 (-0.11 to 0.33)
Subtotal (95% CI)			266		269	0.20 (0.03 to 0.37)



Source	Outcome	Events	Total	Events	Total	Odds ratio (95% CI)
Improved pain score at <4 h						
Subtotal (95% CI)			0		0	Not estimable
Total events		0		0		
Heterogeneity: not applicable						
Test for overall effect: not applicable						
Improved pain score at 4-24 h						
Hay et al, ³⁵ 2008	Normal on discomfort scale, 24 h	36	52	22	50	2.86 (1.27-6.45)
Subtotal (95% CI)			52		50	2.86 (1.27-6.45)
Total events		36		22		



Results. Other outcomes

Side effects	RCT	Non-RCT
Serious Adverse event	1.4 vs 1.3 %	0 vs 0%
Kidney involvement	0.1 vs 0.1%	0 vs 0.04%
Hepatotoxicity	0.9 vs. 1.7%	
Asthma	0.2 vs. 0.3%	
GI bleeding	0.02 vs. 0%	0 vs 0%
Soft tissue infection		0 vs. 0.04%



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

▶ **Limitations**

- ▶ Not enough information for children < 6 months
- ▶ Few patients in the pain study



Comparison of Acetaminophen (Paracetamol) With Ibuprofen for Treatment of Fever or Pain in Children Younger Than 2 Years

A Systematic Review and Meta-analysis

Conclusion

- ▶ Ibuprofen use was associated with reduced temperature and less pain within the first 24 hours than acetaminophen use.
- ▶ Similar safety profile



CASE SCENARIO #1

A GIRL WITH AN ACUTE OTITIS MEDIA

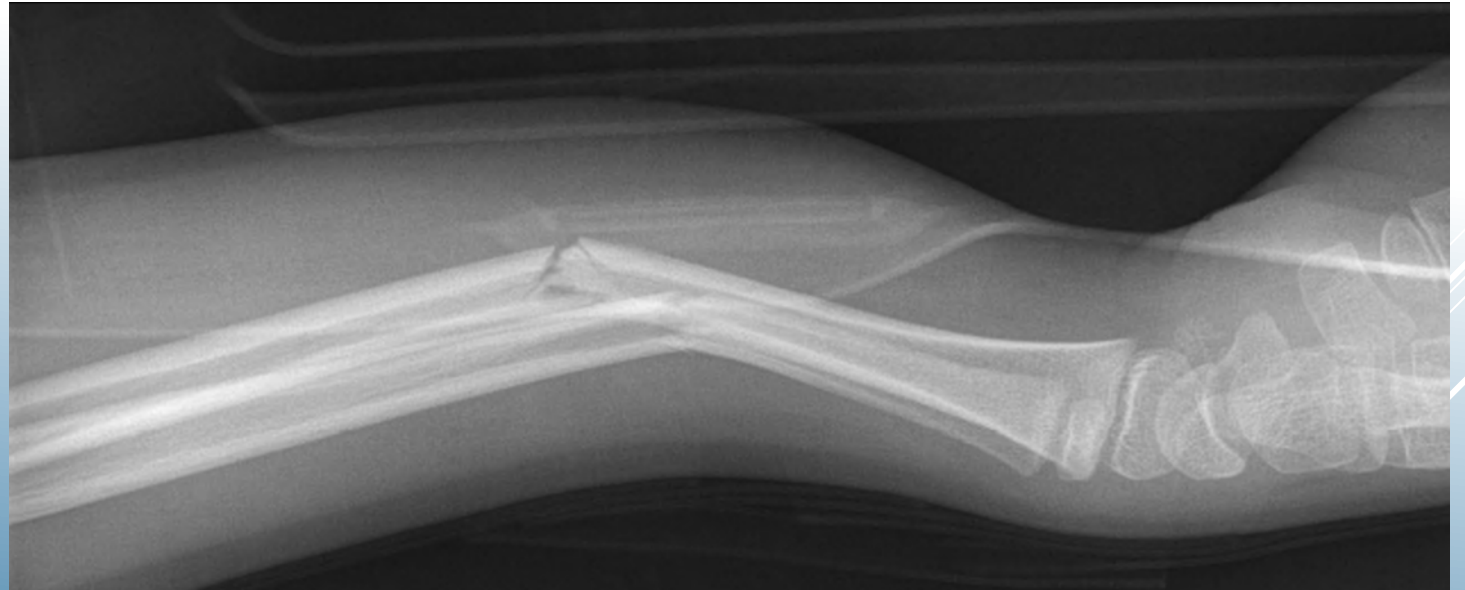
What is the best medication for fever and for pain?

- ▶ Acetaminphen
- ▶ Ibuprofen
- ▶ No difference

CASE SCENARIO #2 ...

A TEENAGE GIRL WITH A DISPLACED ARM FRACTURE

- ▶ 12 years old girl
- ▶ Pain 10/10



CASE SCENARIO #2

A TEENAGE GIRL WITH A DISPLACED ARM FRACTURE

- ▶ She needs a reduction soon. Can you give her something for pain?
 - ▶ Yes
 - ▶ no

Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Maala Bhatt, MD, MSc¹ , Wei Cheng, PhD² , Mark G. Roback, MD³,
David W. Johnson, MD^{4,5,6,7}, and Monica Taljaard, PhD^{2,8}, for the Sedation Safety Study
Group of Pediatric Emergency Research Canada (PERC)

Introduction

- ▶ Pre-procedural opioid = sedation adverse event



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Objectives

- ▶ Examine whether the risk of **sedation-related adverse events** changes with the **timing of opioid** administration in children undergoing procedural sedation in the ED



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Methods

- ▶ Secondary analysis of a prospective cohort
Setting:
 - ▶ 6 Canadian EDs
 - ▶ 2010-2015



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Methods

- ▶ Participants
 - ▶ Children 0-18 years old
 - ▶ Procedural sedation
 - ▶ Received opioid before the procedure



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Methods

- ▶ Outcomes
 - ▶ Oxygen desaturation
 - ▶ Vomiting
 - ▶ Need for positive pressure ventilation



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Methods

- ▶ Risk factors:
 - ▶ Timing of opioid administration (in minutes)
- ▶ Confounding factors:
 - ▶ Age
 - ▶ Type of opioid
 - ▶ Sedation
 - ▶ Procedure



RESULTS

6295 children



1805 eligible

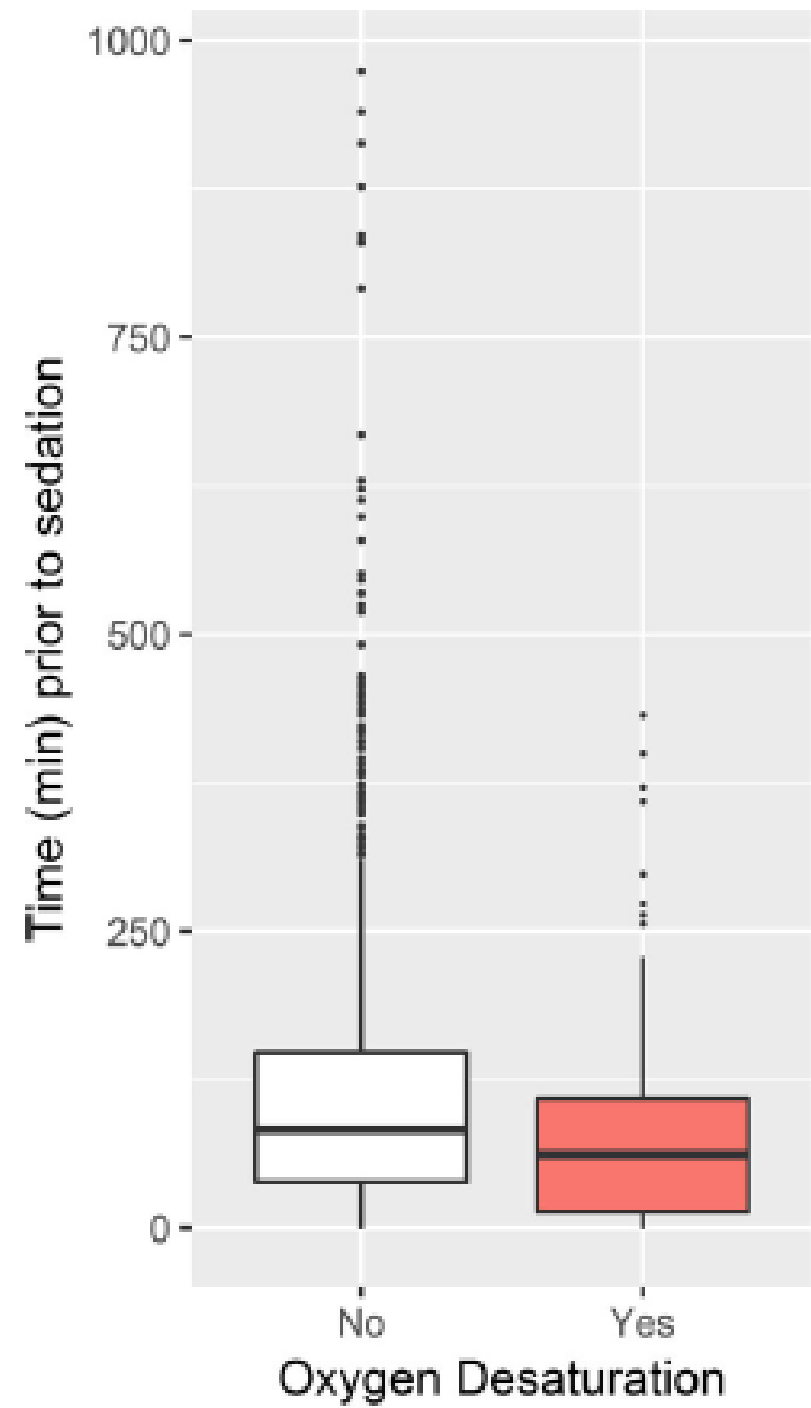
		With Opioids ^a			
	Without Opioids (<i>n</i> = 4,489)	<i>t</i> ≤ 30 min (<i>n</i> = 402)	30 < <i>t</i> ≤ 120 min (<i>n</i> = 801)	<i>t</i> > 120 min (<i>n</i> = 603)	Total (<i>n</i> = 1,806)
Age (years)					
Median (IQR)	6 (3–11)	12 (7–14)	11 (7–14)	10 (6–13)	11 (7–13)
Mean (±SD)	7.1 (±4.5)	10.7 (±4.1)	10.4 (±4.2)	9.4 (±4.1)	10.1 (±4.2)
Range	0.0–17.0	1.0–17.0	0.75–17.0	0.33–17.0	0.33–17.0
Male, <i>n</i> (%)	2,885 (64.3)	298 (74.1)	581 (72.5)	426 (70.6)	1,305 (72.3)
Procedure type, <i>n</i> (%)					
Foreign body removal	216 (4.8)	2 (0.5)	0 (0.0)	4 (0.7)	6 (0.3)
Incision and drainage of abscess	310 (6.9)	4 (10.0)	5 (0.6)	3 (0.5)	12 (0.7)
Laceration repair	949 (21.1)	16 (4.0)	36 (4.5)	27 (4.5)	79 (4.4)
Lumbar puncture	143 (3.2)	1 (0.2)	4 (0.5)	2 (0.3)	7 (0.4)
Orthopedic reduction	2,542 (56.6)	357 (88.8)	720 (89.9)	529 (87.7)	1,606 (88.9)
Other	329 (7.3)	22 (5.5)	36 (4.5)	38 (6.3)	96 (5.3)
Opioid					
Morphine	—	163 (40.5)	608 (75.9)	478 (79.3)	1,249 (69.2)
Fentanyl	—	237 (59.0)	190 (23.7)	122 (20.2)	549 (30.4)
Hydromorphone or meperidine	—	2 (0.5)	3 (0.4)	3 (0.5)	8 (0.4)
Sedation medication					
Ketamine only	3,037 (67.7)	175 (43.5)	410 (51.2)	294 (48.8)	879 (48.7)
Ketamine + fentanyl	112 (2.5)	51 (12.7)	24 (3.0)	32 (5.3)	107 (5.9)
Ketamine + midazolam	166 (3.7)	14 (3.5)	34 (4.2)	32 (5.3)	80 (4.4)
Ketamine + propofol	588 (13.1)	29 (7.2)	112 (14.0)	122 (20.2)	263 (14.6)
Propofol + fentanyl	435 (9.7)	55 (13.7)	139 (17.4)	97 (16.1)	291 (16.1)
Propofol only	100 (2.2)	62 (15.4)	68 (8.5)	14 (2.3)	144 (8.0)
Other	51 (1.1)	16 (4.0)	14 (1.7)	12 (2.0)	42 (2.3)
ASA physical status classification					
Class I or II	4,474 (99.7)	402 (100.0)	799 (99.8)	603 (100.0)	1,804 (99.9)
Class III to V	15 (0.3)	0 (0.0)	2 (0.2)	0 (0.0)	2 (0.1)

RESULTS... OXYGEN DESATURATION

Desaturation
No event

8.7%

↑ 30 min before sedation (13.8%)

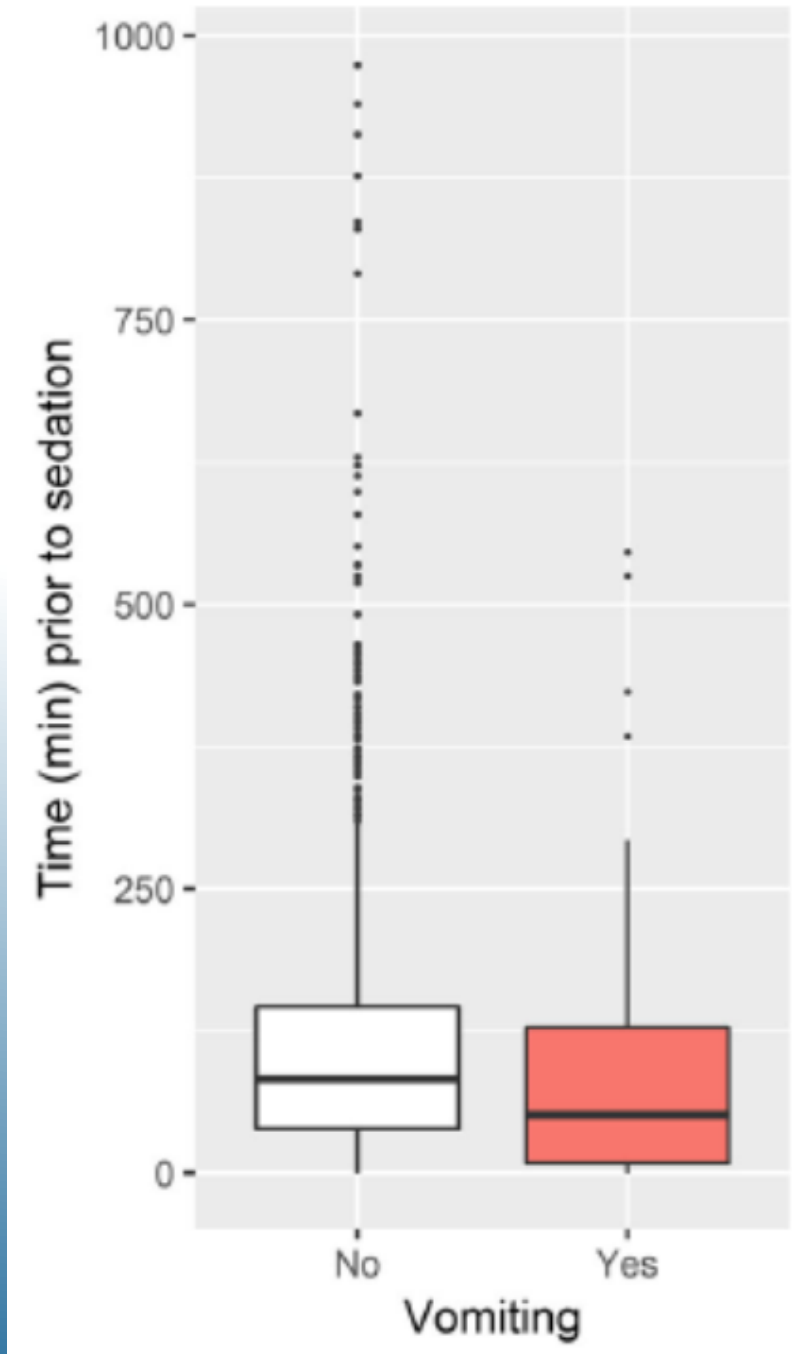


RESULTS... VOMITING

Vomiting
No event

6.6%

↑ 30 min before sedation (12.0%)

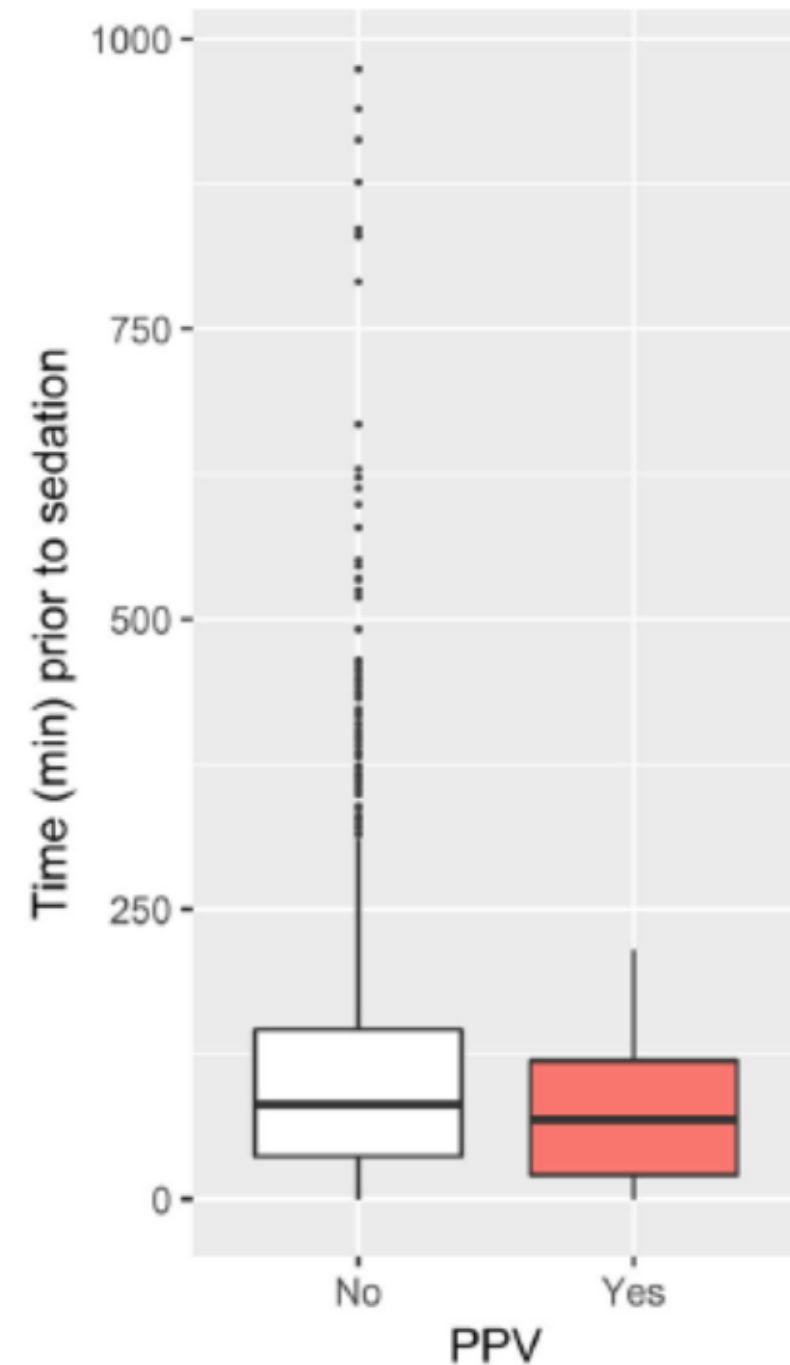


RESULTS... POSITIVE PRESSURE VENTILATION

PPV
No event

2.4%

↑ 30 min before sedation (3.3%)



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Results

- ▶ Multiple variables logistic regression:
 - ▶ Timing is associated to adverse events
 - ▶ Fentanyl less adverse events



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Limitations

- ▶ Observational study
- ▶ Dosage or route not included in the model
- ▶ Multiple doses not measured



Impact of Timing of Preprocedural Opioids on Adverse Events in Procedural Sedation

Conclusions

- ▶ Opioid given closer to the reduction is at higher risk of adverse events
- ▶ Fentanyl showed less adverse events



CASE SCENARIO #2

A GIRL WITH A BROKEN BONE

► She needs a reduction soon. Can you give her something for pain?

► Yes

Fentanyl

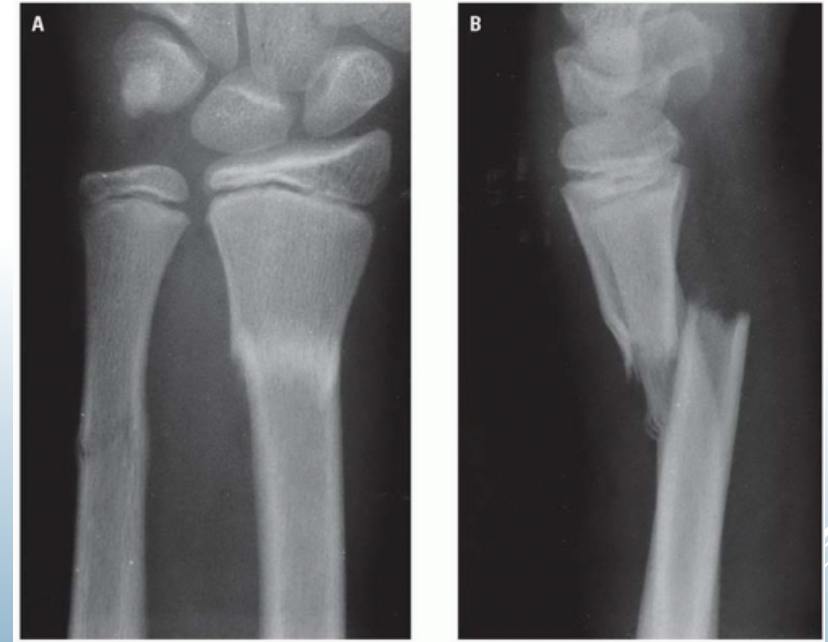
► no



CASE SCENARIO #3

HE JUST HAD A SMALL SANDWICH

- ▶ 15 year old boy
- ▶ Just ate before ED visit



CASE SCENARIO #3

HE JUST HAD A SMALL SANDWICH

Can we do the procedural sedation now?

1. No wait 2 h post meal
2. No wait 4 hours post meal
3. No wait 8 hours post meal
4. Yes

HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Robert J. Stewart, MD,* Carson D. Strickland, MD,*† Jeffrey R. Sawyer, MD,*†‡ Padam Kumar, BS,‡
Busra Gungor, BS,‡ Mindy Longjohn, MD, MPH,*§ Derek M. Kelly, MD,*†‡ and Rudy J. Kink, MD*‡

Introduction

- ▶ Procedural sedation in the ED
 - ▶ AAP and Anesthesiologist
 - ▶ Clear liquid >2 hours
 - ▶ Breast milk > 4 hours
 - ▶ Light meal >6 hours Heavy meal 8 hours
 - ▶ ACEP **No fasting**

HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Objective

- ▶ To examine **adverse outcomes** and **departmental efficiency** when **fasting guidelines are not considered** during pediatric emergency department visit



HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Method

▶ **Design:**

- ▶ Retrospective chart review

▶ **Setting:**

- ▶ Tertiary care pediatric ED (90 000 visits/year)
- ▶ 2011-2018



HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Inclusion criteria:

- ▶ Children aged 0-18 years
- ▶ Procedural sedation for orthopedic procedure

▶ Exclusion criteria:

- ▶ Multiple procedure
- ▶ Missing data



HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Exposure:

1. Meet ASA guidelines
2. Don't meet the guidelines
3. Wait to meet the ASA guidelines



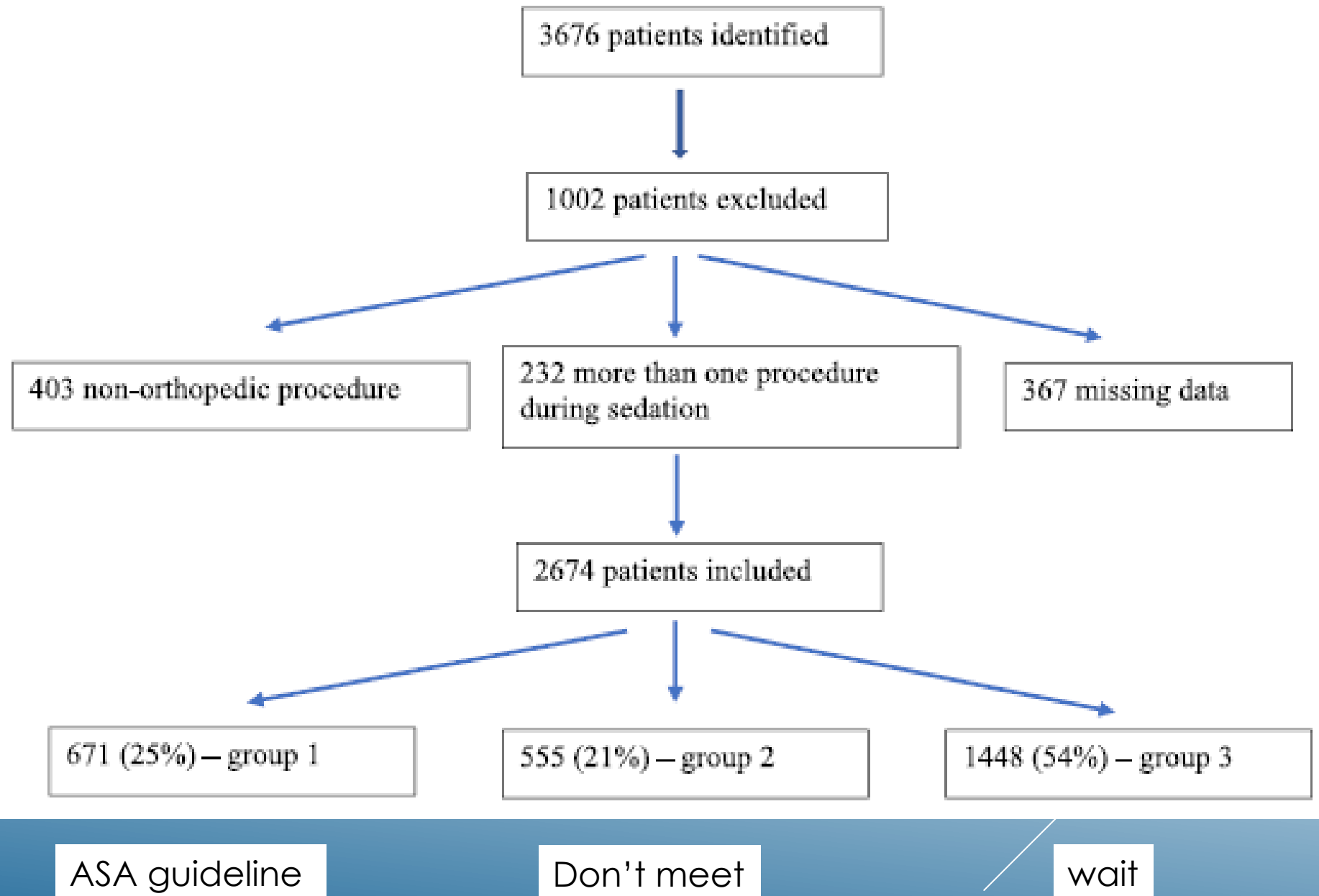
HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Outcomes:

- ▶ Time points:
 - ▶ Length of stay
 - ▶ Time from arrival to procedure
 - ▶ Time of procedure
 - ▶ Time to recovery
- ▶ Adverse events



Results



Results

	ASA	Don't meet	Wait	
Time Intervals	Group 1*	Group 2†	Group 3‡	
Length of stay, min	243.89	240.83	326.40	+84 min
Admission to sedation start, min	164.41	166.08	244.97	
Length of sedation, min	24.21	22.79	24.42	
Sedation end to discharge, min	55.28	51.96	57.01	
Admitted to hospital, n	3	1	4	

Groups similar on
Age, sex
Procedure
Medication for sedation



Results

	ASA	Don't meet	Wait	
Complications of Sedation	Group 1*	Group 2 [†]	Group 3 [‡]	p Value
Adverse event	12	13	19	0.254
Agitation	1	0	1	0.632
Apnea	1	3	0	0.020
Aspiration	0	0	0	—
Bradycardia	0	0	0	—
Apnea requiring BVM, oral airway, positive pressure ventilation, jaw thrust	2	2	2	0.576
Hypotension	0	0	1	0.655
Hypoxia	2	2	6	0.919
Intubation	0	0	0	—
Laryngospasm	0	0	0	—
Seizure-like activity	1	2	2	0.568
Emesis	4	4	9	0.959

671

555

1448

Adverse event probability

1.8%

2.3%

1.3%



HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Limitations

- ▶ Selection biases
- ▶ Multiple reasons for delays
- ▶ Adverse events---are they charted ?



HUNGER GAMES: IMPACT OF FASTING GUIDELINES FOR ORTHOPEDIC PROCEDURAL SEDATION IN THE PEDIATRIC EMERGENCY DEPARTMENT

Conclusions

- ▶ Length of stay in the ED is prolonged by 1.5 hours to meet ASA fasting guidelines
- ▶ No impact on adverse events



CASE SCENARIO#3

HE JUST HAD A SMALL SANDWICH

Can we do the procedural sedation now?

1. No wait 2 h post meal
2. No wait 4 hours post meal
3. No wait 8 hours post meal
4. Yes

CASE SCENARIO #4

REFRACTORY ASTHMA CRISIS

▶ 6 year old girl (18Kg) with an asthma crisis

▶ Received

- ▶ Salbutamol: 5 puffs q 20 min x 3
- ▶ Atrovent: 8 puffs q 20 min x 3
- ▶ Decadron: 10mg PO

CASE SCENARIO #4

REFRACTORY ASTHMA CRISIS

- ▶ Improved but still sick
- ▶ Not sick enough to mandate an IV
- ▶ Could you give MgSO_4 without an IV ?

Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department

A Randomized Clinical Trial

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Introduction

- ▶ MgSO_4 is effective but needs an IV access
- ▶ Nebulized MgSO_4 could be a solution to decrease hospitalisation

Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department A Randomized Clinical Trial

Objective

- ▶ Evaluate the effectiveness of **inhaled magnesium** in children who presented to EDs with an acute asthma exacerbation and **remained in moderate or severe respiratory distress** after initial therapy.



Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department

A Randomized Clinical Trial

Methods

- ▶ Multi-centre prospective double blinded RCT
- ▶ 7 PERC EDs
- ▶ 2011-2019



Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department

Methods

- ▶ Participants inclusion:
 - ▶ 2-17 years old
 - ▶ Past medical history of asthma
 - ▶ PRAM >4 after 1 hour of Treatment
- ▶ Exclusion:
 - ▶ Already hospitalised
 - ▶ IV Magnesium
 - ▶ Comorbidities



Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department A Randomized Clinical Trial

Methods

- ▶ Intervention:
 - ▶ 600 mg of nebulized MgSO_4 + Salbutamol q 20 min x 3
- ▶ Control:
 - ▶ Nebulized Salbutamol q 20 min x 3



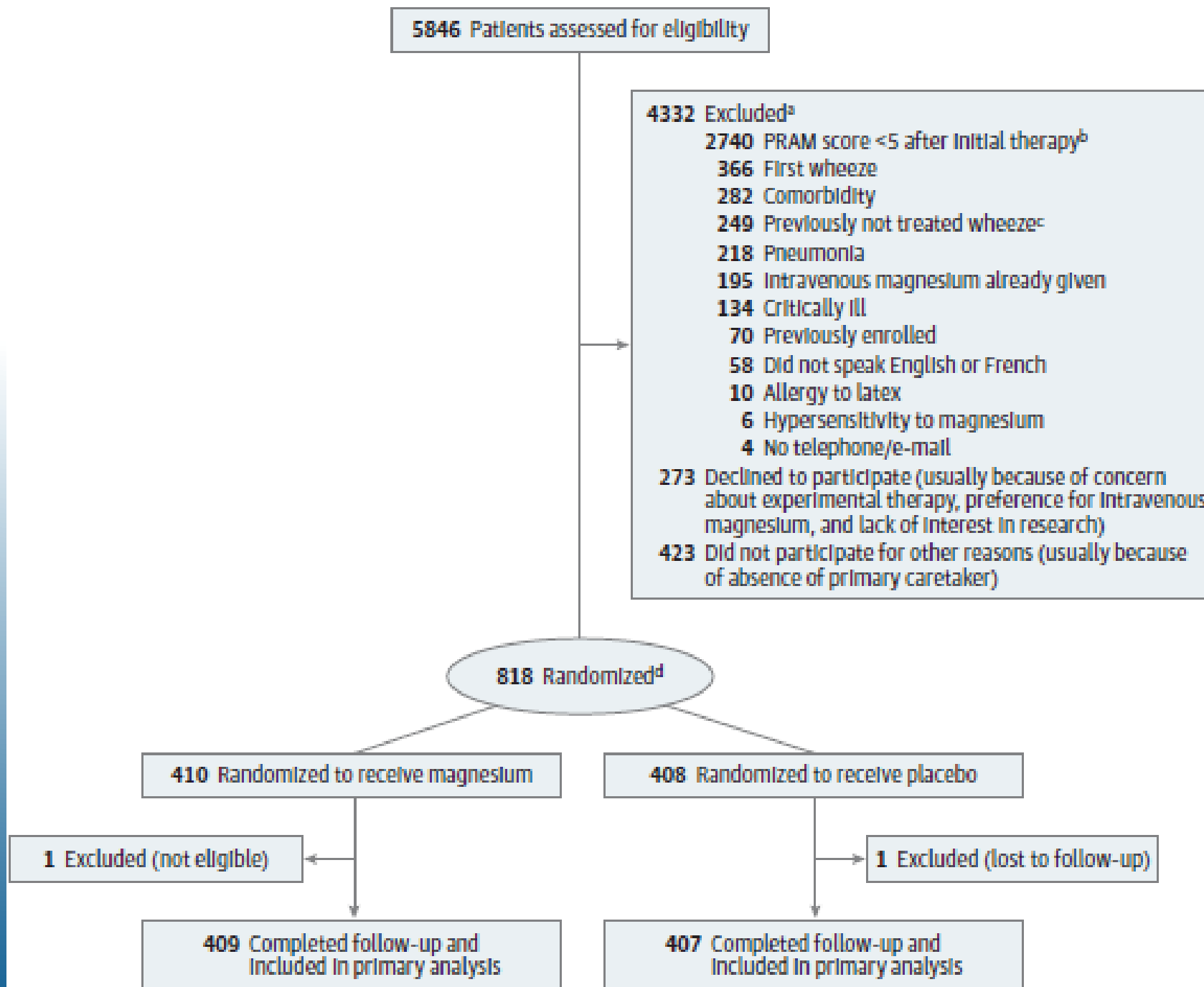
Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department

Methods

- ▶ Outcomes
 - ▶ Primary:
 - ▶ Hospitalisation within 24 hours
 - ▶ Secondary:
 - ▶ PRAM score 60-120-180-240 minutes
 - ▶ Respiratory rate Oxygen saturation
 - ▶ Adverse events



Results



Results

93%
received 3 Tx

Characteristic	Group, No. (%)	
	Magnesium (n = 409)	Placebo (n = 407)
Age, median (IQR), y	4.0 (3.0-7.0)	5.0 (3.0-7.0)
Age ≤5 y	253 (61.9)	250 (61.4)
Sex		
Male	257 (62.8)	257 (63.9)
Female	152 (37.2)	150 (36.9)
Hospitalized for asthma in preceding year	105/408 (25.7)	109/407 (26.8)
Previous ICU admission for asthma	43/408 (10.5)	41/407 (10.1)
Personal history of atopy ^a	257/398 (64.6)	257/398 (60.3)
Family history of atopy ^b	296/398 (74.4)	296/398 (74.4)
Preschool wheeze ^c	61/349 (17.5)	56/349 (16.0)
Upper respiratory infection	293 (71.6)	279 (68.6)
Duration of respiratory distress prior to ED arrival, median (IQR), h	16.0 (12.0-24.0)	17.0 (10.0-24.0)
Prior ED visit during this episode	78 (19.1)	79 (19.4)
Self-administered albuterol within 48 h preceding ED arrival	368 (90.0)	374 (91.9)
Oral corticosteroid administered within 48 h preceding ED arrival	73 (17.8)	72 (17.7)
Inhaled corticosteroid administered within 48 h preceding ED arrival	248 (60.6)	223 (54.8)
PRAM score, median (IQR) ^d	6 (5-7)	6 (5-7)
PRAM score ≥8 ^d	61 (14.9)	69 (16.9)
Respiratory rate/min, median (IQR) ^d	36 (32-44)	38 (30-44)
Heart rate/min, median (IQR) ^d	147 (135-158)	146 (134-160)
Oxygen saturation, median (IQR), % ^d	94 (92-96)	94 (92-96)

Similar



Results.. hospitalisation

Outcome	Group, No. (%)		Unadjusted		Adjusted	
	Magnesium (n = 409)	Placebo (n = 407)	Risk difference (95% CI)	P value	Risk difference (95% CI) ^b	P value
Primary outcome						
Hospitalization within 24 h						
All patients	178 (43.5)	194 (47.7)	-0.04 (-0.11 to 0.03)	.26	-0.05 (-0.13 to 0.02)	.18
Patients with full experimental therapy ^c	158/361 (43.8)	188/395 (47.6)	-0.04 (-0.11 to 0.03)	.29	-0.04 (-0.10 to 0.03)	.25

43.5 vs 47.7



Results... secondary outcomes

Outcome	Magnesium group (n = 409)			Placebo group (n = 407)			Unadjusted		Adjusted	
	Preintervention, mean (SD)	Postintervention, mean (SD)	Unadjusted difference (95% CI)	Preintervention, mean (SD)	Postintervention, mean (SD)	Unadjusted difference (95% CI)	Difference-in-difference (95% CI)	P value	Difference-in-difference (95% CI)	P value
Changes from baseline to 240 min ^b										
PRAM ^c	6.18 (1.33)	3.84 (1.94)	2.43 (2.16 to 2.69)	6.37 (1.27)	4.13 (2.04)	2.29 (2.04 to 2.54)	0.14 (-0.27 to 0.55)	.45		
Respiratory rate (breaths/min)	38.09 (9.41)	34.35 (8.86)	4.01 (2.93 to 5.09)	38.21 (9.86)	34.54 (8.86)	3.84 (2.87 to 4.81)			-1.17 to 1.79)	.68
Oxygen saturation (%)	94.00 (3.11)	94.50 (3.04)	-0.91 (-1.27 to -0.55)	94.20 (3.07)	94.90 (2.96)			.88	-0.05 (-0.54 to 0.45)	.86
Systolic blood pressure, mm Hg	108.4 (11.82)	108.31 (12.41)	0.24 (-1.41 to 1.89)	108.0 (10.75)			0.78 (-1.48 to 3.03)	.50	0.61 (-1.64 to 2.85)	.60
Diastolic blood pressure, mm Hg	62.59 (11.24)	59.64 (11.6)	3.12 (1.41 to 4.83)	63.13 (11.77)		4.45 (2.84 to 6.07)	-1.33 (-3.68 to 1.02)	.27	-1.35 (-3.70 to 0.99)	.26

No difference

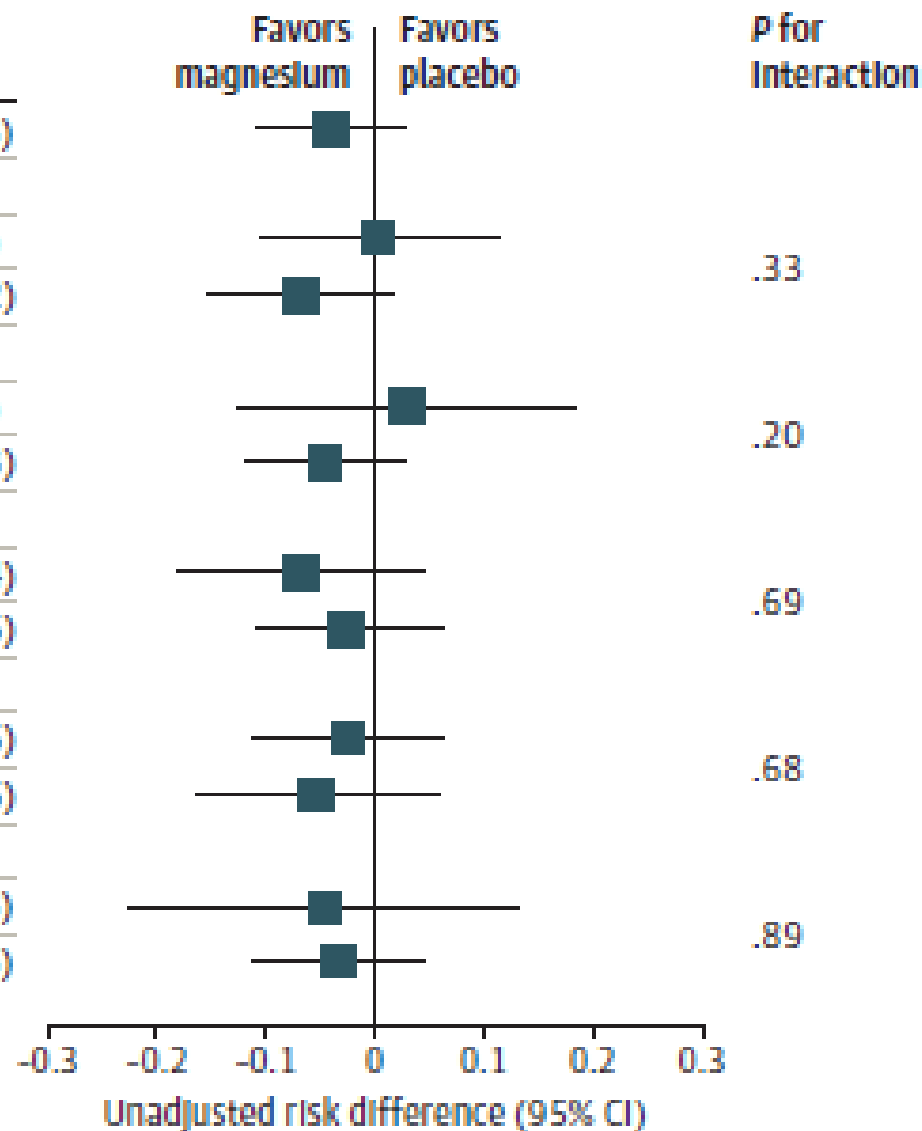
Results... secondary outcomes

Outcome	Group, No. (%)		Unadjusted		Adjusted	
	Magnesium (n = 409)	Placebo (n = 407)	Risk difference (95% CI)	P value	Risk difference (95% CI) ^a	P value
Hospitalization within 72 h	180 (44.01)	196 (48.16)	-0.04 (-0.11 to 0.03)	.23	-0.05 (-0.10 to 0.02)	.19
Revisit to any medical facility within 72 h	21/236 (8.90)	15/215 (6.98)	0.02 (-0.03 to 0.07)	.45	0.02 (-0.07 to 0.11)	.54
Intravenous magnesium in emergency department ^b	100 (24.45)	115 (28.26)	-0.04 (-0.10 to 0.02)	.22	-0.04 (-0.09 to 0.02)	.19

No difference

Results... subgroup analyses

Source	No./total No.		Unadjusted risk difference (95% CI)
	Magnesium	Placebo	
Overall total	178/409	194/407	-0.04 (-0.11 to 0.03)
Age, y			
≤5	68/156	68/157	0.00 (-0.11 to 0.11)
>5	110/253	126/250	-0.07 (-0.16 to 0.02)
PRAM score			
≥8	45/61	49/69	0.03 (-0.13 to 0.18)
<8	133/348	145/338	-0.05 (-0.12 to 0.03)
Sex			
Female	68/152	76/147	-0.07 (-0.18 to 0.04)
Male	110/257	118/260	-0.03 (-0.11 to 0.06)
Atopy			
Yes	110/253	110/239	-0.03 (-0.11 to 0.06)
No	66/148	79/158	-0.05 (-0.17 to 0.06)
Preschool wheeze			
Yes	33/63	32/56	-0.05 (-0.23 to 0.13)
No	123/300	130/293	-0.03 (-0.11 to 0.05)



Adverse events

Adverse event ^{a,b}	Relation to study drug ^c	Magnesium group (n = 409)	Placebo group (n = 407)
Nausea/vomiting	Total	9	5
	Unlikely	5	4
	Possibly	3	1
	Other	1	0
Sore throat/nose, burning tongue, epistaxis	Total	8	0
	Possibly	7	0
	Definitely	1	0
Rash	Total	2	1
	Unlikely	1	1
	Possibly	1	0
Ear pain	Possibly	1	0
Headache	Unlikely	0	1
Hyperglycemia	Unlikely	1	0
Hypertension	Possibly	1	0
Hypotension	Unlikely	0	1
Metabolic acidosis	Unlikely	2	0
Night terrors	Unlikely	0	1
Possible pneumonia	Unlikely	0	1
Possible sepsis	Unlikely	0	1
Status asthmaticus	Unlikely	1	0
Any adverse event		25	11
Any serious adverse event ^d		5	14

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Limitations

- ▶ Decision to hospitalised is not standardized
- ▶ The confidence interval crosses a difference of 10%
 - ▶ -5% (95%CI: -13 to 2%)



Effect of Nebulized Magnesium vs Placebo Added to Albuterol on Hospitalization Among Children With Refractory Acute Asthma Treated in the Emergency Department A Randomized Clinical Trial

Conclusion

- ▶ *Among children with refractory acute asthma in the ED, nebulized magnesium with albuterol, compared with placebo with albuterol, did not significantly decrease the hospitalization rate for asthma within 24 hours.*



CASE SCENARIO #4

REFRACTORY ASTHMA CRISIS

- ▶ Improved but still sick
- ▶ Not sick enough to mandate an IV
- ▶ Could you give MgSO_4 without an IV ?

NO

CASE SCENARIO #5

IS THIS A URINARY TRACT INFECTION?

- ▶ 5 months old boy with fever without a source



CASE SCENARIO #5

IS THIS A URINARY TRACT INFECTION?

- ▶ Urinalysis:

- ▶ Dipstick: Nitrite – leucocyte esterase –

- ▶ Microscopy: Leucocyte 10-20 No bacteria

- ▶ Is this a UTI?

- ▶ No

- ▶ Yes



Predicting Urinary Tract Infections With Interval Likelihood Ratios

Tian Liang, MD,^{a,b} Silvia Schibeci Oraa, MD,^{a,b} Naomi Rebollo Rodríguez, MD,^{a,b} Tanvi Bagade, MD,^{a,b} Jennifer Chao, MD,^{a,b}
Richard Sinert, DO^{a,b}

Objective

- ▶ Calculate the interval likelihood ratio of urinalysis components to estimate the posttest probabilities of UTIs in children, 2 years of age

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Predicting Urinary Tract Infections With Interval Likelihood Ratios

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Richard Sinert, DO^{a,b}

Methods

- ▶ Retrospective cross-sectionnnal study
- ▶ Single pediatric ED in New York
- ▶ 2011-2019

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Predicting Urinary Tract Infections With Interval Likelihood Ratios

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Richard Sinert, DO^{a,b}

Methods

- ▶ Participants:
 - ▶ < 2 years old
 - ▶ Urinalysis + culture
 - ▶ Performed in the ED

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Predicting Urinary Tract Infections With Interval Likelihood Ratios

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Richard Sinert, DO^{a,b}

Methods

- ▶ Primary outcome: UTI
 - ▶ Single pathogen > 50 000 CFU/mL
- ▶ Contamination
 - ▶ 2 pathogens
 - ▶ bacteria not commonly considered pathogens

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Predicting Urinary Tract Infections With Interval Likelihood Ratios

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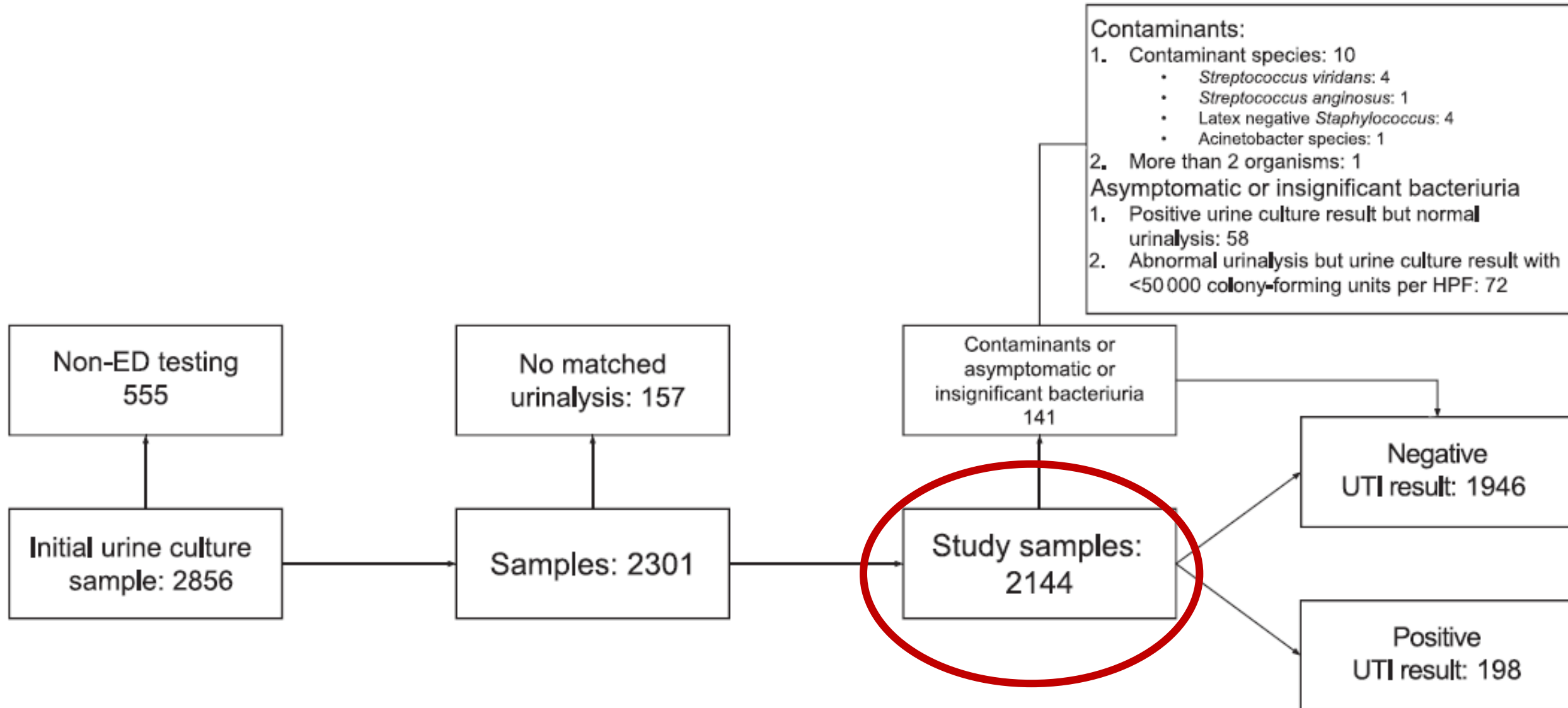
Methods

- ▶ No information on method of sampling
- ▶ Retrospective collection through medical charts
- ▶ Some patients did not have a microspcopy because dipstick was negative.

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RESULTS



RESULTS

Pre-test probability 9.2%



RESULTS

Test and Intervals	ILR (95% CI)	Posttest Probability, ^a %	No. Samples ^b
Leukocyte esterase			
Negative	0.20 (0.15–0.27)	2	1762
Trace	1.86 (1.07–3.23)	15.9	88
1+	2.79 (1.76–4.43)	22	95
2+	7.53 (5.00–11.00)	42.5	83
3+	37.68 (25.00–58.00)	79.2	116
Any leukocyte esterase	7.32 (6.36–8.42)	42.6	382
Hemoglobin			
Negative	0.38 (0.3–0.48)	3.7	1454
Trace ^c	NA ^c	NA ^c	6
1+	1.27 (0.87–1.86)	11.4	227
2+	2.75 (2.06–3.67)	21.8	215
3+	4.08 (3.23–5.16)	29.2	242
Any hemoglobin	2.59 (2.32–2.90)	20.8	690
Protein			
Negative	0.54 (0.45–0.65)	5.2	1473
Trace	0.76 (0.49–1.19)	7.1	264
1+	2.22 (1.71–2.89)	18.4	283
2+	5.90 (4.08–8.53)	37.4	104
3+	12 (5.04–29.00)	54.9	20
Any protein	2.16 (1.90–2.47)	18	671
Nitrite			
Negative	0.76 (0.7–0.82)	7.1	2076
Positive	25.35 (15.00–42.00)	72	68

RESULTS

Test and Intervals	ILR (95% CI)	Posttest Probability, ^a %	No. Samples ^b
WBCs per HPF			
0–5	0.24 (0.19–0.32)	2.4	1689
5–10	1.20 (0.70–2.04)	10.8	129
10–20	1.82 (1.20–2.78)	15.6	147
20–50	11.18 (6.94–18.00)	53.1	62
50–100	15.83 (8.96–28.00)	61.6	47
100–250	47.50 (26.00–87.00)	82.8	70
All ≥5 WBC	5.18 (4.56–5.88)	34.4	455
RBCs per HPF			
0–5	0.53 (0.45–0.62)	5.1	1646
5–10	1.87 (1.26–2.76)	15.9	163
10–20	3.30 (2.43–4.47)	25.1	179
20–50	2.98 (1.85–4.81)	23.2	86
50–100	4.12 (2.19–7.75)	29.5	44
100–250	6.14 (2.83–13.00)	38.4	26
All ≥5 RBC	2.92 (2.51–3.39)	22.8	498
Bacteria			
Negative	0.26 (0.19–0.35)	2.6	1404
Rare	1.38 (1.01–1.90)	12.3	292
Few	1.46 (1.04–2.06)	12.9	247
Moderate	6.05 (4.20–8.72)	38	105
Many	14.04 (8.86–22.00)	58.7	68
Loaded	9.83 (4.75–20.00)	49.9	28
Any bacteria	2.75 (2.51–3.03)	21.8	740

Predicting Urinary Tract Infections With Interval Likelihood Ratios

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Richard Sinert, DO^{a,b}

Limitations

- ▶ No information on specimen collection technique
- ▶ 646 patients without a microscopy

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Predicting Urinary Tract Infections With Interval Likelihood Ratios

Conclusion

- ▶ The probability of UTI significantly increases with
 - ▶ 3+ leukocyte esterase
 - ▶ positive nitrite results
 - ▶ 3+ protein
 - ▶ 20 to 50 or higher WBCs per HPF
 - ▶ many bacteria on urinalysis.

No single item is perfect

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CASE SCENARIO #5

IS THIS A URINARY TRACT INFECTION?

- ▶ Urinalysis:

- ▶ Disptick: Nitrite – leucocyte esterase –
- ▶ Microscopy: Leucocyte 10-20 No bacteria

- ▶ Is this a UTI?

- ▶ No
- ▶ Yes

Probably NOT



CASE SCENARIO #6

THE RESIDENT ASKED ME TO DO THE LP

- ▶ 3 weeks old child with fever for 6 hours
- ▶ Looks good at physical exam
- ▶ Positive urinary test



CASE SCENARIO #6

THE RESIDENT ASKED ME TO DO THE LP

Do you do the lumbar puncture ?

1. Yes
2. No



Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Objectives

- ▶ Determine the **prevalence of coexisting Bacterial meningitis** in **neonates** with culture-proven **Urinary Tract Infection** and to identify **risk factors** for BM in those patients.



Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Methods

- ▶ Retrospective cross-sectionnnal study
- ▶ Single pediatric ED in Spain (105 000 visit/ year)
- ▶ 2001-2017



Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Methods

- ▶ Participants:
 - ▶ < 29 days of age years old
 - ▶ UTI (> 10 000 CFU/mL and a positive analysis)
 - ▶ Diagnosed in the ED
 - ▶ LP performed

(Pediatr Infect Dis J 2020;39:849–853)

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Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Methods

- ▶ Primary outcome: Bacterial meningitis
 - ▶ Single pathogen
 - ▶ Pleocytosis and Negative culture but received Atb before LP

(Pediatr Infect Dis J 2020;39:849–853)

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Neonates With Urinary Tract Infection

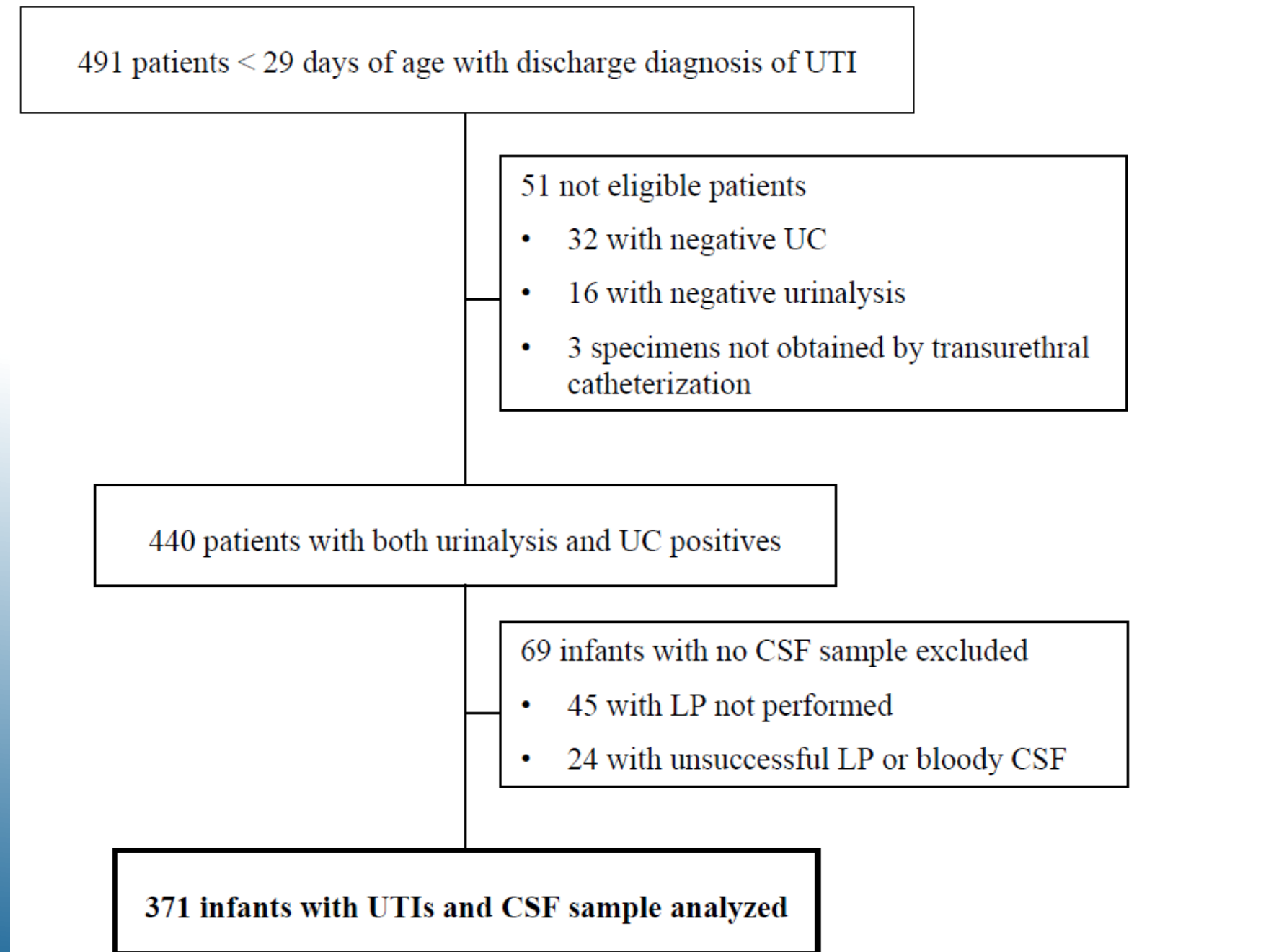
Is a Lumbar Puncture Always Indicated?

Methods

- ▶ Risk factors
 - ▶ Age
 - ▶ High risk medical history
 - ▶ Fever
 - ▶ Not well-appearing at the ED
 - ▶ WBC count, absolute neutrophil count, CRP and PCT.



RESULTS



RESULTS... PREVALENCE OF BACTERIAL MENINGITIS

371 children

44 (12% Bacteremia)

5 (1.4%) Bacterial meningitis

- 4 positive cultures
- 1 probable meningitis

RESULTS

TABLE 2. Pathogens Isolated From Urine and Blood Cultures of 371 Neonates With Urinary Tract Infection

Pathogens	Urine Culture (n = 371)	Blood Culture (n = 44)
<i>Escherichia coli</i>	327 (88.1)	37 (84.1)
<i>Klebsiella pneumoniae</i>	17 (4.6)	3 (6.8)
<i>Enterobacter cloacae</i>	11 (3.0)	2 (4.5)
<i>Klebsiella oxytoca</i>	5 (1.4)	1 (2.3)
<i>Enterobacter faecalis</i>	4 (1.1)	0 (0)
<i>Enterobacter aerogenes</i>	2 (0.5)	0 (0)
<i>Citrobacter freundii</i>	1 (0.3)	0 (0)
<i>Pseudomonas aeruginosa</i>	1 (0.3)	0 (0)
<i>Pantoea agglomerans</i>	1 (0.3)	1 (2.3)
<i>Proteus mirabilis</i>	1 (0.3)	0 (0)
<i>Streptococcus agalactiae</i>	1 (0.3)	0 (0)

RESULTS

TABLE 3. Clinical and Laboratory Details of Neonates With Urinary Tract Infection and Concomitant Definite or Probable Bacterial Meningitis

Patient	1	2	3	4	5
Demographics					
Age (d)	4	17	20	25	23
Gender	Female	Male	Male	Male	Male
Clinical presentation					
Not well-appearing	Yes	No	No	No	Yes
Fever	Yes	Yes	Yes	Yes	Yes
Maximum temperature (°C)	38	38.3	38	38.5	38
Duration (h)	6	3	4	2	12
Blood					
WBC (cells/ μ L)	5000	22,800	20,500	6400	9900
ANC (cells/ μ L)	4000	13,700	11,500	5000	6200
Band (cells/ μ L)	600	2100	0	1300	2300
CRP (mg/L)	14.6	181.1	48.3	17.4	119.8
PCT (ng/mL)	37.9	14	0.39	9.54	140.4
Blood culture	<i>Escherichia coli</i>	Negative	Negative	<i>Klebsiella pneumoniae</i>	<i>E. coli</i>
Cerebrospinal fluid					
WBC (cells/ μ L)	*	7900	20 (17)	30 (0)	130 (114)
RBC (cells/ μ L)	*	0	1400	Uncountable	8000
Gram stain	Negative	Negative	Negative	Negative	Negative
Culture	<i>E. coli</i>	<i>E. coli</i>	<i>E. coli</i>	<i>K. pneumoniae</i>	Negative
Urine culture	<i>E. coli</i>	<i>E. coli</i>	<i>E. coli</i>	<i>K. pneumoniae</i>	<i>E. coli</i>

RESULTS... RISK FACTORS

TABLE 4. Risk of Bacterial Meningitis Related to the Clinical Risk Factors Analyzed

Risk Factor	Bacterial Meningitis (n = 5)	<i>P</i>	OR (95% CI)
Age			
<14 d	1/132 (0.8%)	0.659	0.4 (0.1–4.0)
>14 d	4/239 (1.7%)		
<21 d	3/269 (1.1%)	0.618	0.6 (0.1–3.4)
>21 d	2/102 (2.0%)		
Medical history			
High risk*	1/123 (0.8%)	1.00	0.5 (0.1–4.5)
Not high risk	4/248 (1.6%)		
Fever			
Febrile	5/235 (2.1%)	0.163	NA
Afebrile	0/136 (0.0%)		
General appearance at the ED			
Not well-appearing	2/16 (12.5%)	0.016	16.8 (2.6–108.5)
Well-appearing	3/355 (0.8%)		

RESULTS... RISK FACTORS

Procalcitonin >0.35 ng/mL
Sensitivity 100%
Specificity 44%

PPV	4.1%
NNV	100%

Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Limitations

- ▶ Only 5 patients with bacterial meningitis
- ▶ Retrospective study

(Pediatr Infect Dis J 2020;39:849–853)

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Neonates With Urinary Tract Infection

Is a Lumbar Puncture Always Indicated?

Conclusion

- ▶ The probability of bacterial meningitis in children < 29 days with UTI is approximately 1%
- ▶ General appearance could help identify meningitis



CASE SCENARIO #6

THE RESIDENT ASKED ME TO DO THE LP

► Do you do the lumbar puncture ?

1. Yes

2. No

shared decision making with the family



CASE SCENARIO #7

IS THIS MENINGITIS BACTERIAL?

- ▶ 3 year old child
- ▶ Fever, vomiting, stiff neck for 8 hours
- ▶ Lumbar puncture:
 - ▶ 120 WBC/mL
 - ▶ Protein and glucose normal
 - ▶ Gram stain -

CASE SCENARIO#7

This is meningitis
Is it bacterial?

MENINGITIS SYMPTOMS



Fever



Neck pain



Sleepiness



Vomiting



Joints pain



Rash



Headache



Seizures



Light sensitivity

Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

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- ▶ **Introduction**
- ▶ Most meningitis are viral
- ▶ Bacterial meningitis are very dangerous
- ▶ Almost always admitted for antibiotics



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

- ▶ **Objective**
- ▶ **Develop** and **validate** a score to **distinguish bacterial meningitis from aseptic meningitis** in children with pleocytosis when initially evaluated at the ED.



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

▶ **Methods**

- ▶ Multiple center cohort study
- ▶ Settings
 - ▶ 25 EDs in Spain
 - ▶ Retrospective 2011-2016
 - ▶ Prospective 2017-18

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Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Methods

- ▶ Participants:
- ▶ 29 days to 14 years old
- ▶ CSF pleocytosis and data on all the following:
 - ▶ blood and CSF bacterial cultures,
 - ▶ white blood cell (WBC) count
 - ▶ serum CRP, and procalcitonin.

Exclusion: Critically ill, purpura or Atb before LP

Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Methods

- ▶ Primary outcome: **Bacterial meningitis**



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Methods

- ▶ Independent variables
 - ▶ CSF
 - ▶ ANC, WBC count, protein, glucose,
 - ▶ Serum
 - ▶ CRP, procalcitonin, WBC count, and ANC.



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Methods

- ▶ Procedure
 - ▶ Derivation:
 - ▶ Retrospective analysis of the charts
 - ▶ Validation:
 - ▶ Retrospective analysis of the charts



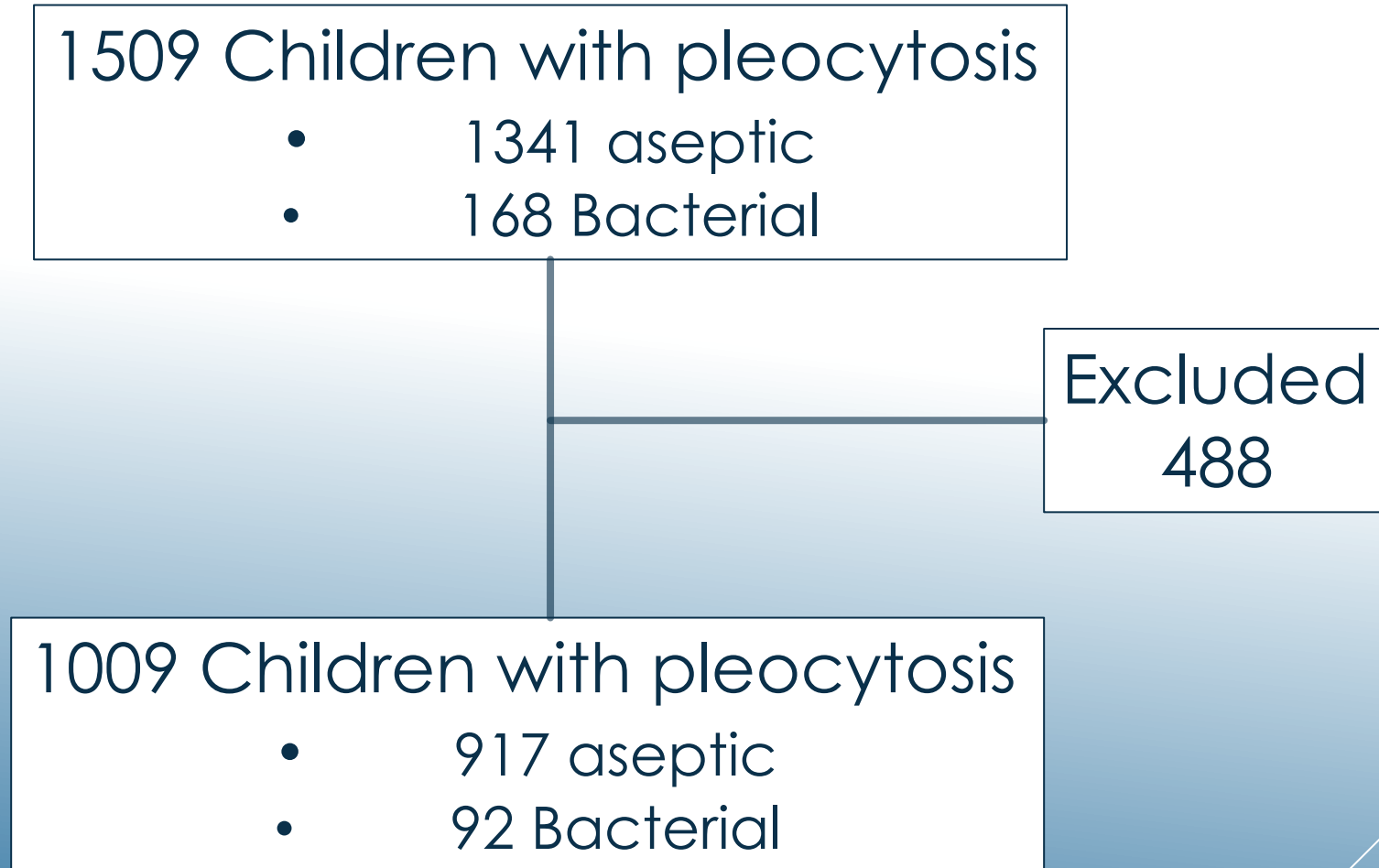
Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Analysis

- ▶ Derivation
 - ▶ ROC curve for all variable
 - ▶ Inclusion for $AUC > 0.90$
 - ▶ B coefficient in logistic regression
- ▶ Validation
 - ▶ Sensitivity/ specificity

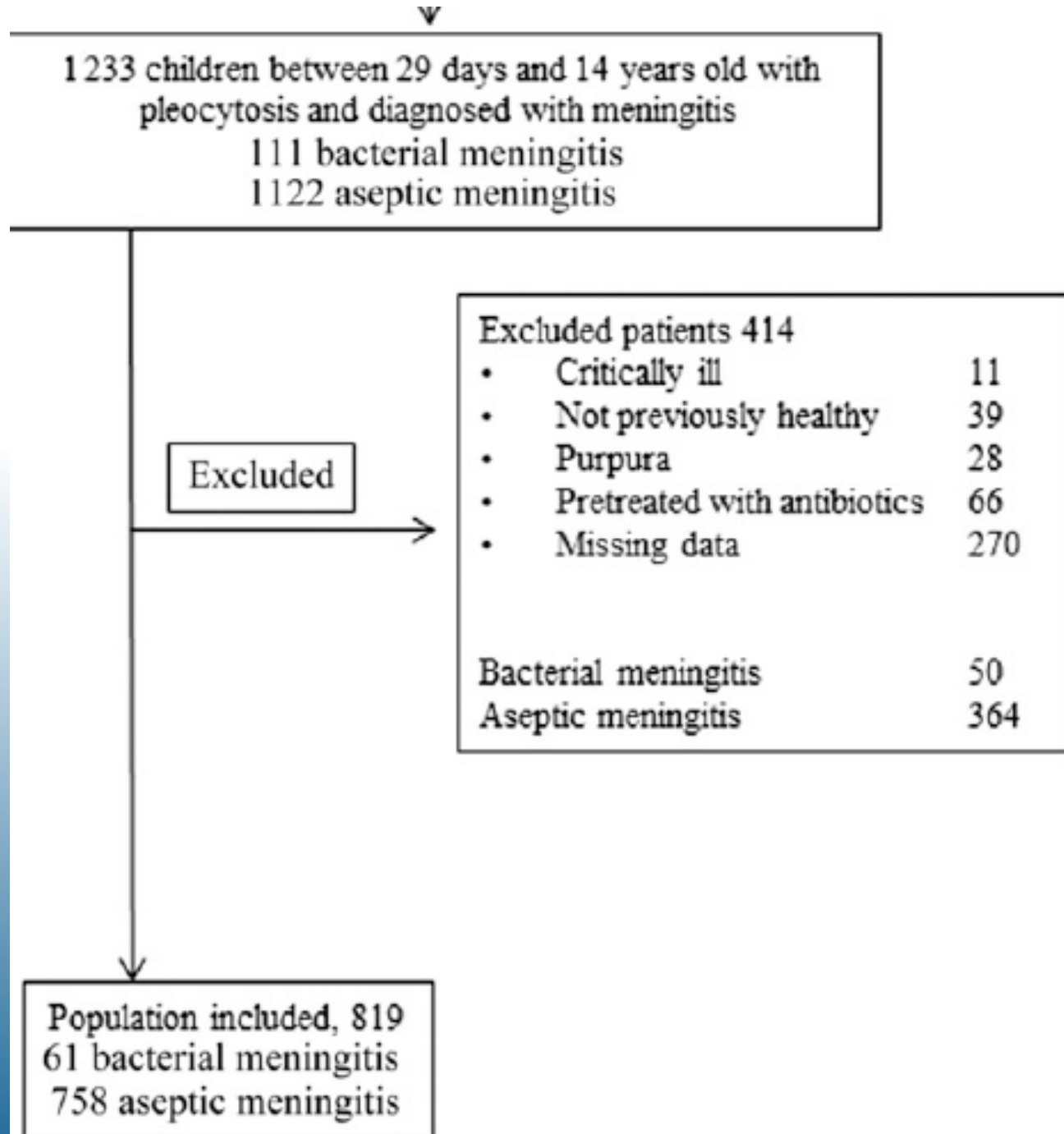


RESULTS...DERIVATION



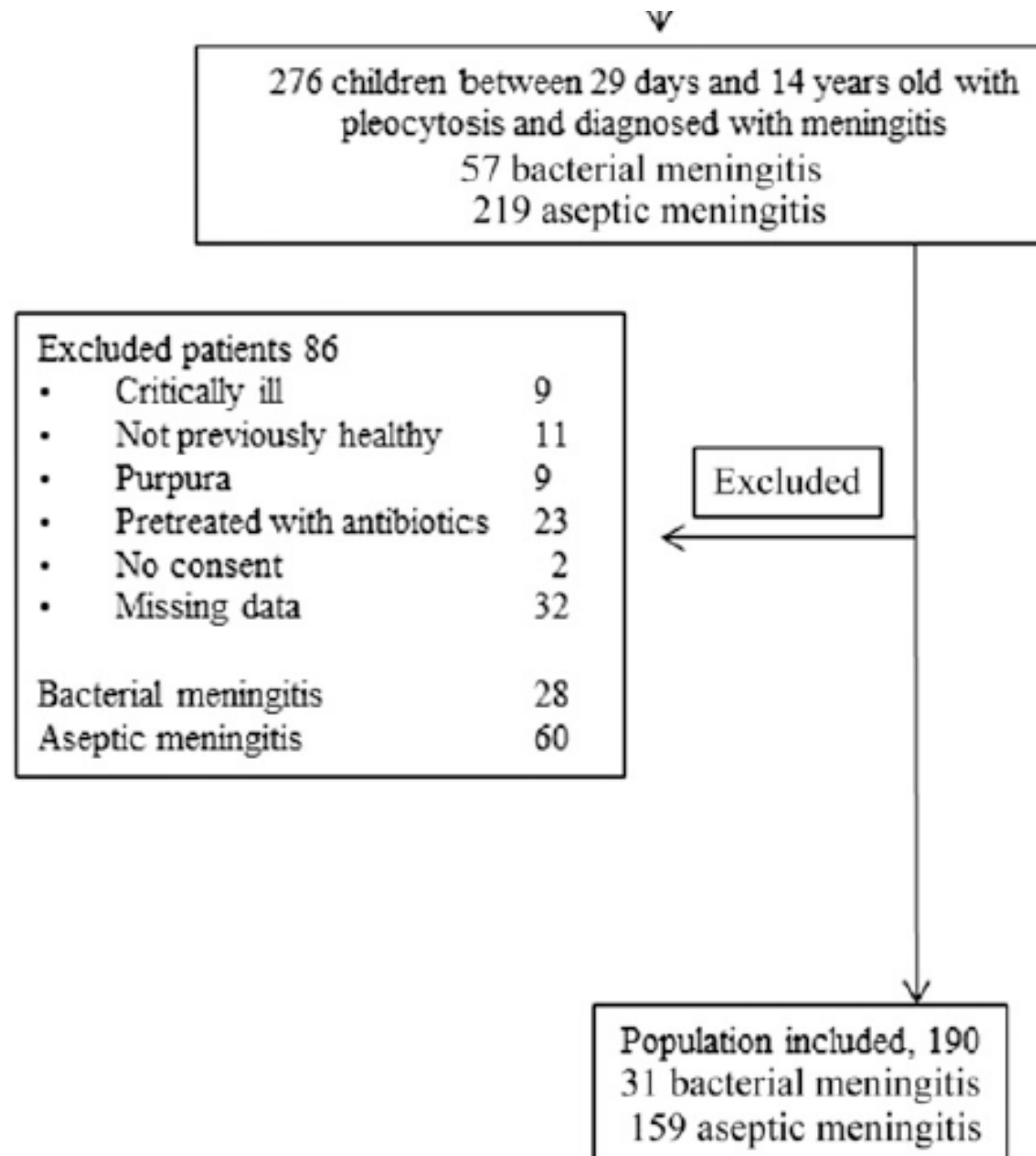
RESULTS...

DERIVATION



RESULTS

VALIDATION



RESULTS BIOMARKERS

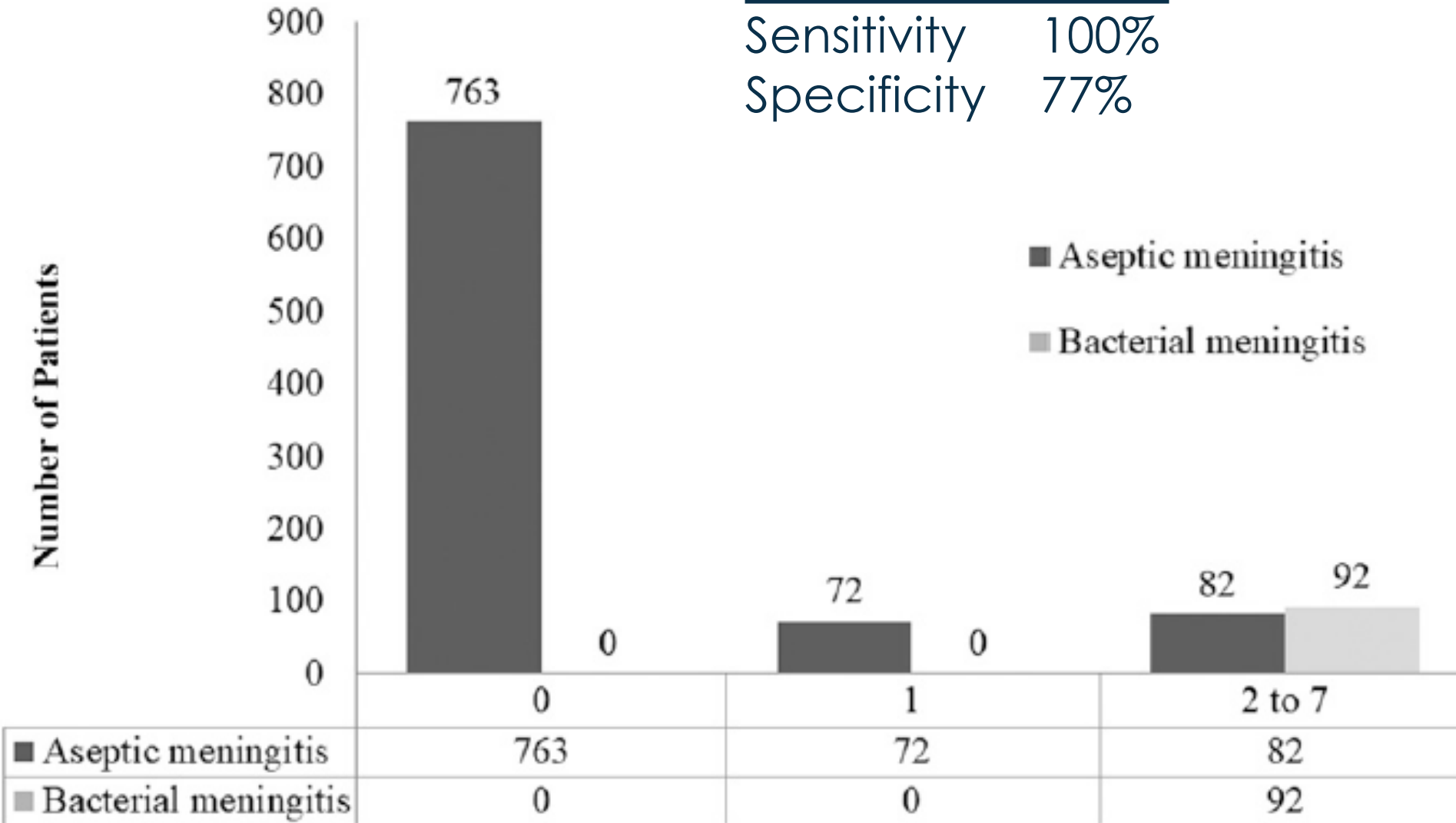
	β -Coefficient	95% CI	<i>P</i>
Serum procalcitonin >1.20 ng/mL	484.50	161.46–1453.87	<.0001
Serum CRP >40 mg/L	66.02	31.05–140.38	<.0001
CSF ANC >1000/ μ L	73.18	36.10–148.33	<.0001
CSF protein >80 mg/dL	117.80	52.55–264.06	<.0001

Predictor	Points	
	Present	Absent
Serum procalcitonin >1.20 ng/mL	3	0
Serum CRP >40 mg/L	1	0
CSF ANC >1000/ μ L	1	0
CSF protein>80 mg/dL	2	0

Validation MSE >0

Sensitivity 100%

Specificity 77%



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

▶ **Limitations**

- ▶ Why a 7 points score if the threshold is 1?
- ▶ Retrospective evaluation of all charts



Clinical Prediction Rule for Distinguishing Bacterial From Aseptic Meningitis

Conclusions

- ▶ Higher risk of bacterial meningitis for:
 - ▶ Procalcitonin > 1.20 ng/mL
 - ▶ CRP > 40 mg/L
 - ▶ CSF neutrophile > 1000/ μ L
 - ▶ CSF protein > 80 mg/dL



CASE SCENARIO #7

IS THIS MENINGITIS BACTERIAL?

- ▶ 3 year old child
- ▶ Fever, vomiting, stiff neck for 8 hours
- ▶ Lumbar puncture:
 - ▶ 120 WBC/mL
 - ▶ Protein and glucose normal
 - ▶ Gram stain -

We need the CRP and procalcitonin

CASE SCENARIO #8

- ▶ 15 year old girl with abdominal pain
- ▶ Uncomplicated appendicitis



CASE SCENARIO #8

A GIRL WITH APPENDICITIS

- ▶ Can this girl avoid surgery?
- ▶ 1. No she needs it ASAP
- ▶ 2. Yes she can have antibiotics instead

▶ Last year

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Antibiotic Treatment and Appendectomy for Uncomplicated Acute Appendicitis in Adults and Children

A Systematic Review and Meta-analysis

Mauro Podda, MD, Chiara Gerardi, Pharm D,† Nicola Cillara, MD,‡ Nicola Fearnhead, MD, FRCS,§
Carlos Augusto Gomes, MD, PhD,¶ Arianna Birindelli, MD,|| Andrea Mulliri, MD,**
Richard Justin Davies, M Chir, FRCS,§ and Salomone Di Saverio, MD, FRCS§*

► **Conclusion**

- Non-operative management of appendicitis is a reasonable approach but
 - 8% risk of immediate need of surgery
 - 20% risk of appendicitis recurrence at 1 year.



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Peter C. Minneci, MD, MHSc; Erinn M. Hade, PhD; Amy E. Lawrence, MD; Yuri V. Sebastião, PhD; Jacqueline M. Saito, MD; Grace Z. Mak, MD; Christa Fox, MSN; Ronald B. Hirschl, MD; Samir Gadepalli, MD, MBA; Michael A. Helmuth, MD; Jonathan E. Kohler, MD; Charles M. Leys, MD; Thomas T. Sato, MD; Dave R. Lal, MD; Matthew P. Landman, MD; Rashmi Kabre, MD; Mary E. Fallat, MD; Jennifer N. Cooper, PhD; Katherine J. Deans, MD, MHSc; for the Midwest Pediatric Surgery Consortium

Objective

- ▶ Determine the **success rate** of **nonoperative** management and compare differences in **disability days**, health-related QOL, medical/surgical complications, and satisfaction between **nonoperative management and surgery** in children



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Methods

- ▶ Multi-centre prospective non-randomized trial
- ▶ 10 pediatric Hospitals in the MidWest
- ▶ 2015-2018



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Methods

- ▶ Multidisciplinary Group Involvement

Strong feeling related to operating or
not
NO RCT



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Methods

Participants inclusion:

- ▶ 7-17 years old
- ▶ Radiologically confirmed uncomplicated appendicitis
- ▶ WBC 5-18 000
- ▶ Less than 48 hours of symptoms



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Methods

- ▶ Surgery:
 - ▶ Antibiotics (Pip-Tazo)
 - ▶ Laparoscopic intervention in less than 12 hours
- ▶ No surgery:
 - ▶ Antibiotics (Pip-Tazo) for at least 24h than Clavulin for total 7 days
 - ▶ Diet when improved



Appendectomy (Surgery for Appendicitis)

Pros:

- This is the usual way to treat appendicitis
- You will never have appendicitis again
- You can go home 1 to 2 days after surgery
- About 9 out of 10 children will not have a complication

Cons:

- You will be in some pain after surgery
- Most kids need a few days rest before going back to school and 1-2 weeks before returning to full activities
- It will leave 1-3 small scars on your belly
- There are some risks during surgery, such as bleeding or problems from the anesthesia
- Other possible risks include:
 - infection on the skin where you are cut, or inside your belly
 - staying longer at the hospital and needing more medicines like antibiotics
 - Needing additional surgery due to scars (adhesions) that can cause future blockage in your belly
- Side effects of antibiotics
 - Most common: nausea (feeling sick), vomiting and diarrhea

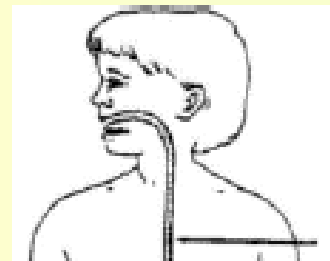
Antibiotics Only

Pros:

- Research studies show that it works in most adults and children
- Your pain may go away faster
- About 8 out of 10 children will not need surgery
 - No risks of surgery
- You may recover sooner

Cons:

- Your symptoms might not go away (ex: you are still in pain) and you will need an appendectomy which involve the risks of surgery
- Your appendicitis could come back in the future
- Side effects of antibiotics
 - Most common: nausea (feeling sick), vomiting and diarrhea
 - Oral contraceptives may not work as well



11y

Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

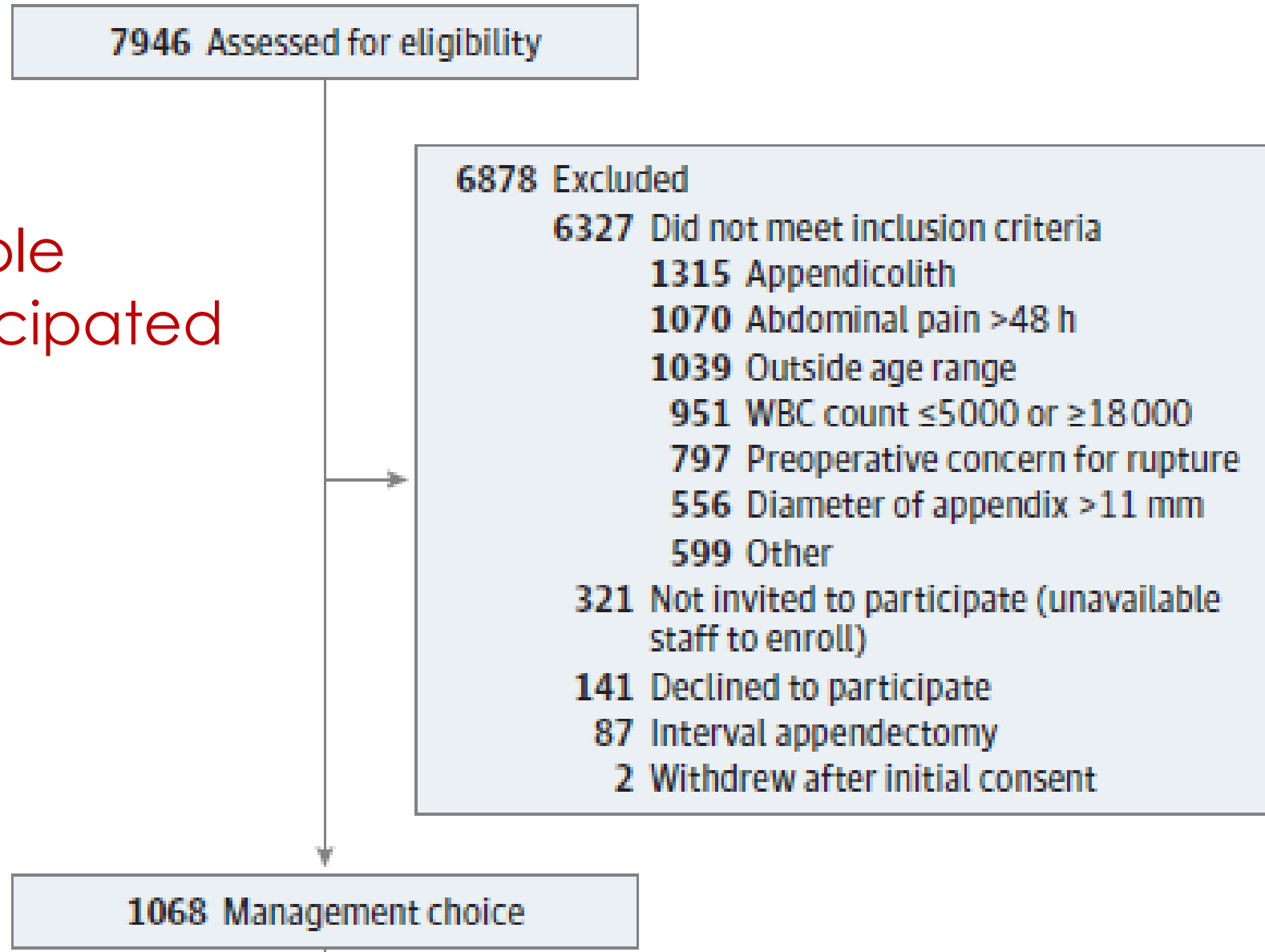
Methods

- ▶ Outcomes
 - ▶ Primary:
 - ▶ Disability days during one year
 - ▶ Success rate of non-operative management
 - ▶ Secondary:
 - ▶ Length of stay
 - ▶ Complications
 - ▶ Multiple others

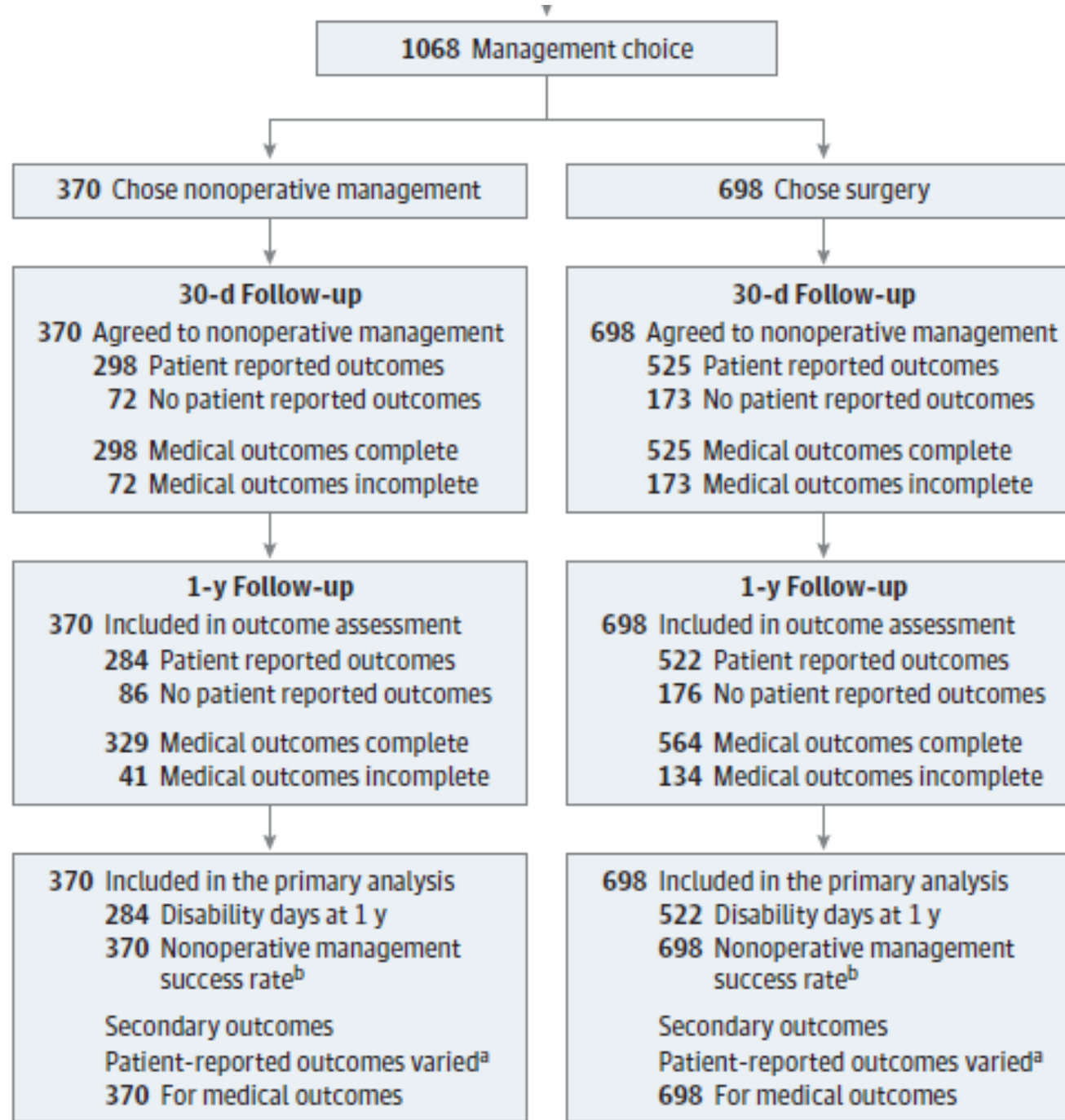


Results

19% eligible
70% participated



Results



77%

75%

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Results

Baseline demographics

	Treatment group, No./total (%)		Absolute standardized difference ^a
	Nonoperative (n = 370)	Surgery (n = 698)	
Patient characteristics			
Age, y			
Mean (SD)	12.3 (2.8)	12.6 (2.8)	11.2
Median (IQR)	12.3 (10.0-14.6)	12.5 (10.5-14.9)	0.2
Sex			
Boys	229 (61.9)	436 (62.5)	1.2
Girls	141 (38.1)	262 (37.5)	1.2
Body mass index for age percentile, No.			
Mean (SD)	61.9 (31.7)	65.1 (31.2)	10.3
Median (IQR)	70.6 (34.5-91.4)	73.7 (39.8-93.1)	3.1
Race ^b			
White	276/364 (75.8)	599/693 (86.4)	27.3
Black	35/364 (9.6)	34/693 (4.9)	18.2
Other	53/364 (14.6)	60/693 (8.7)	18.5
Not reported or not documented	6	5	
Ethnicity ^b			
Not Hispanic or Latino	243/364 (66.4)	455/691 (65.9)	1.2
Other	86/364 (23.5)	163/691 (23.6)	0.3
Hispanic or Latino	37/364 (10.1)	73/691 (10.6)	1.5
Not reported or not documented	4	7	
Insurance			
Private	249/368 (67.7)	478/694 (68.8)	2.6
Medicaid	109/368 (29.6)	189/694 (27.2)	5.3
Other or no insurance	10/368 (2.7)	27/694 (3.9)	6.5
Not reported or not documented	2	4	



Results.. Primary outcomes

Primary outcomes at 1 y	Unadjusted		Absolute difference (99% CI)
	Nonoperative	Surgery	
Success rate, No. /total (%)	245/370 (66.2)		
Disability days ^d			
Mean (99% CI)	6.5 (5.24 to 7.75)	10.9 (9.97 to 12.19)	-4.44 (2.66 to 6.22)
Median (IQR)	4.0 (1.0-9.0)	7.0 (4.0-14.0)	



Results... secondary outcomes

	Nonoperative	Surgery	Absolute difference (95% CI)
Medical			
Success rate			
At hospitalization, No./total (%)	317/370 (85.7)		
1 y for completers	204/329 (62.0)		
Length of stay, index hospitalization, No.^d			
Mean (95% CI), d	1.5 (1.31 to 1.61)	1.0 (0.92 to 1.15)	0.43 (0.24 to 0.61)
Median (IQR). d	1.0 (1.0 to 2.0)	1.0 (1.0 to 1.0)	
Complicated appendicitis,	13/370 (3.5)	25/698 (3.6)	

Adverse events

	No./total (%)	
	Nonoperative	Surgery
In-hospital antibiotic side effect ^a	9/370 (2.4)	4/698 (0.6)
Postoperative infection ^b	1/370 (0.3)	8/698 (1.1)
Readmissions ^c	85/370 (23.0)	20/698 (2.9)
Surgery during readmission ^d	80/370 (21.6)	4/698 (0.6)
Any emergency department visit after discharge ^e	92/370 (24.9)	48/698 (6.9)

Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Limitations

- ▶ Only 19% eligible
- ▶ Selection bias ? Not RCT



Association of Nonoperative Management Using Antibiotic Therapy vs Laparoscopic Appendectomy With Treatment Success and Disability Days in Children With Uncomplicated Appendicitis

Conclusion

- ▶ *Non-surgical approach= 67% success rate*
- ▶ *Fewer disability days at one year (between 2 and 6)*



CASE SCENARIO #8

A GIRL WITH APPENDICITIS

- ▶ Can this girl avoid surgery?
- ▶ 1. No she needs it ASAP
- ▶ 2. Yes she can have antibiotics

CASE SCENARIO #8 A GIRL WITH APPENDICITIS

- ▶ Can this girl avoid surgery?
- ▶ 1. ~~No she needs it ASAP~~
- ▶ 2. **Yes she can have antibiotics**

shared decision making

CASE SCENARIO #9

A 2 YEARS OLD WHO REFUSE TO USE HER LEFT ARM

- ▶ 2 year old girl who refuse to move her left arm after being pulled by the arm by her father.
- ▶ No swelling
- ▶ Pain on movement of the arm

CASE SCENARIO #9

A 2 YEARS OLD WHO REFUSE TO USE HER LEFT ARM

- ▶ Should you do an X-ray ?
- ▶ Yes
- ▶ No



Management and Outcomes of Children With Nursemaid's Elbow

Objectives

- ▶ Assess the **incidence** of, and patient-level **factors** associated with, **missed upper extremity fracture** in children with a diagnosis of radial head **subluxation**.



Management and Outcomes of Children With Nursemaid's Elbow

Methods

- ▶ Multi-centre retrospective database study
- ▶ 52 pediatric Hospitals in the USA
- ▶ 2010-2018



Management and Outcomes of Children With Nursemaid's Elbow

Methods

- ▶ Participants:
 - ▶ 0 to 10 years old
 - ▶ ED diagnosis: radial head subluxation
- ▶ Exclusion:
 - ▶ Transferred from another setting
 - ▶ Fracture at the same visit



Management and Outcomes of Children With Nursemaid's Elbow

Methods

- ▶ Independent variables:
 - ▶ Age, sex, race
 - ▶ Insurance status
 - ▶ Previous pulled elbow
 - ▶ Radiological evaluation
 - ▶ Pain medication in the ED



Management and Outcomes of Children With Nursemaid's Elbow

Methods

- ▶ Outcomes:
 - ▶ Primary:
 - ▶ Upper extremity fracture in the 7 days
 - ▶ Secondary:
 - ▶ Recurrence of radial head subluxation
 - ▶ Radiography

Results

- Age ≤ 10 years
 - Discharged from PHIS ED 1/8/2010-12/24/2018
 - Principal discharge diagnosis of nursemaid's elbow*
- $n = 89539$

* ICD-9 code 832.2 or ICD-10 code S53.031A, S53032A, S53001A, S53033A, S53003A, S53012A, S53092A, S53011A, S53091A, S53013A, S53021A, S53022A, S53023A
 † CCC code at index visit

Nursemaid's elbow visit
within prior 7 days
 $n = 628$

$n = 88911$

Complex chronic
condition†
 $n = 363$

$n = 88548$

Diagnosis of upper
extremity fracture at
index visit
 $n = 80$

$n = 88468$

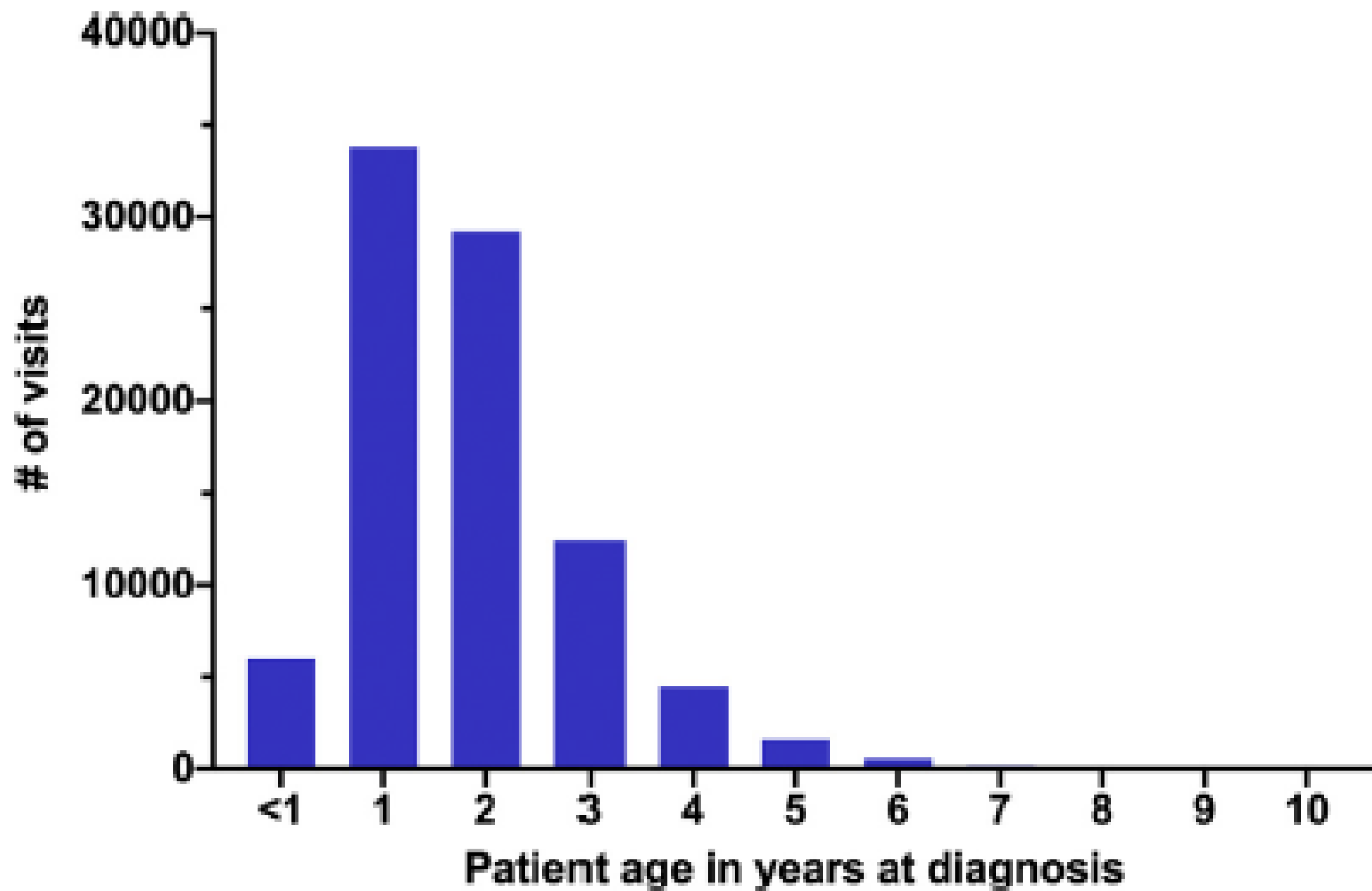
Operating room flag at
index visit
 $n = 2$

$n = 88466$ visits by
77265 unique patients

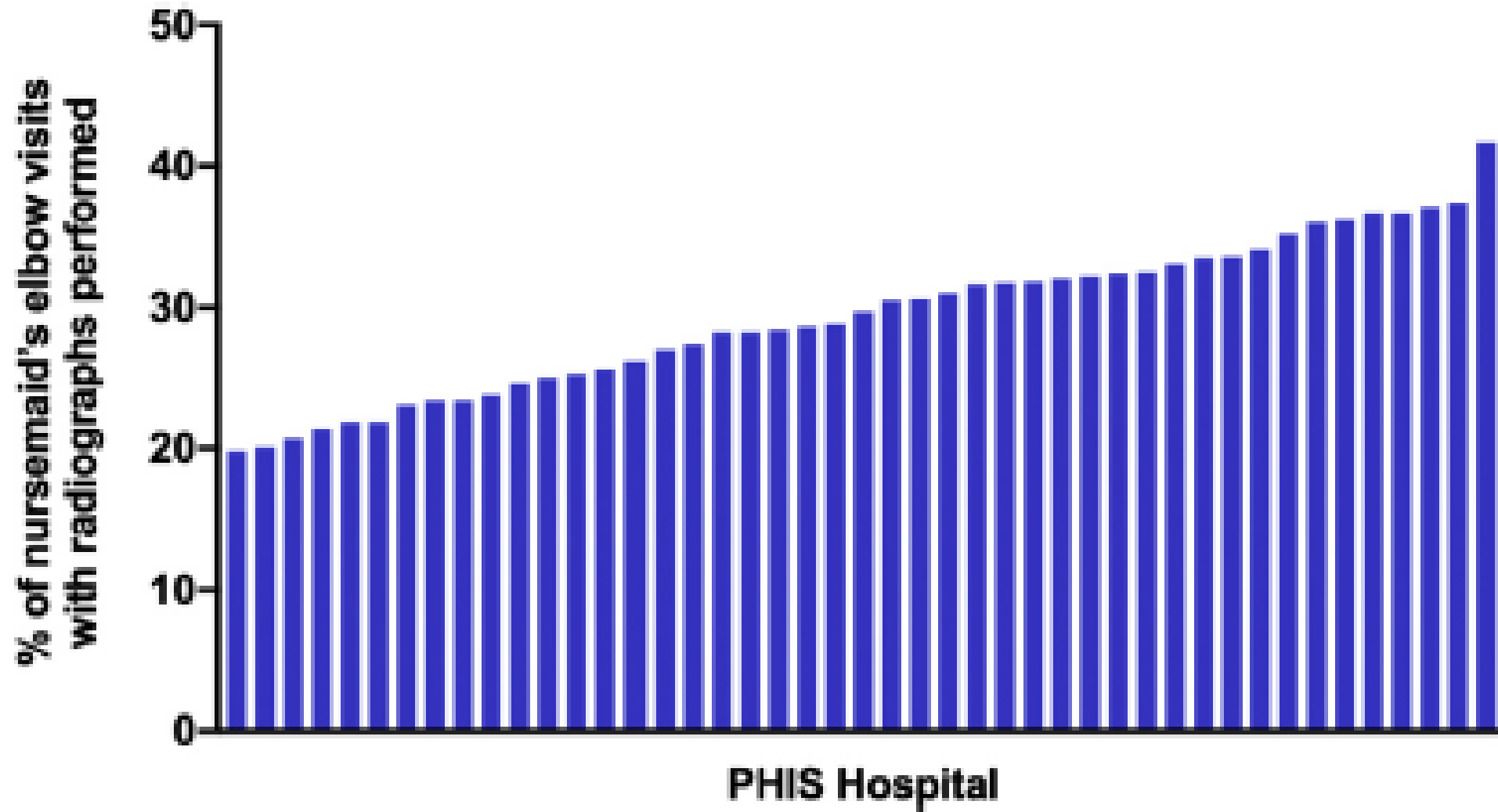
59576 visits were first visits for
nursemaid's elbow from 2012-2016

88 466 pulled elbow

Year	# of Cases
2010	7797
2011	9038
2012	9661
2013	9599
2014	10683
2015	10587
2016	10719
2017	10486
2018	9896



Results.. radiography



Results

Missed fracture 247 (0.3%)

- | | |
|----------------------|-----|
| • Elbow | 147 |
| • Forearm/wrist | 61 |
| • Shoulder/ clavicle | 33 |
| • Humerus | 9 |
| • Hand | 2 |

Results... risk factors of missed fracture

Risk Factor	Unadjusted Odds Ratio (95% CI)	aOR (95% CI)
Age category, y		
<1 (n=6,014)	1.58 (1.08–2.31)	1.45 (1.00–2.10)
1–3 (n=75,457)	Referent	Referent
4–5 (n=6,119)	1.55 (1.07–2.26)	1.26 (0.87–1.83)
>6 (n=876)	3.63 (1.81–7.28)	2.32 (1.12–4.81)
Opioid administered (n=2,193)	2.55 (1.31–4.97)	1.61 (0.82–3.17)
Ibuprofen, acetaminophen, or both administered (n=26,815)	1.88 (1.39–2.54)	1.54 (1.15–2.06)
Upper extremity radiography performed (n=25,193)	3.04 (2.17–4.25)	2.52 (1.84–3.43)
Prior radial head subluxation diagnosis (n=28,890)	0.94 (0.72–1.30)	0.95 (0.71–1.26)

Results...recurrence

Risk Factor	Unadjusted Odds Ratio (95% CI)	aOR (95% CI)
Age category, y		
<1 (n=723)	1.40 (1.27-1.55)	1.31 (1.18-1.44)
1-3 (n=6,275)	1 [Reference]	1 [Reference]
4-5 (n=127)	0.24 (0.20-0.29)	0.24 (0.19-0.27)
≥6 (n=7)	0.03 (0.01-0.11)	0.03 (0.01-0.11)
Female sex (n=4,268)	1.02 (0.95-1.09)	1.02 (0.95-1.09)
Race		
White (n=3,402)	1 [Reference]	1 [Reference]
Black (n=1,507)	1.34 (1.15-1.58)	1.20 (1.04-1.38)
Asian (n=354)	1.16 (0.96-1.41)	1.26 (1.05-1.52)
Other (n=1,441)	1.46 (1.20-1.78)	1.22 (0.99-1.50)
Missing (n=428)	1.28 (1.01-1.63)	1.11 (0.87-1.42)
Ethnicity		
Non-Hispanic (n=4,289)	1 [Reference]	1 [Reference]
Hispanic (n=2,112)	1.49 (1.35-1.64)	1.29 (1.14-1.46)
Other (n=731)	0.97 (0.77-1.23)	0.96 (0.76-1.22)

Management and Outcomes of Children With Nursemaid's Elbow

Limitations

- ▶ Retrospective database
- ▶ May have missed fracture who consulted elsewhere

Management and Outcomes of Children With Nursemaid's Elbow

Conclusion

- ▶ Missed fractures are uncommon
 - ▶ Associated to
 - ▶ more analgesia
 - ▶ older age
 - ▶ order of radiographs



CASE SCENARIO #9

A 2 YEARS OLD WHO REFUSE TO USE HER LEFT ARM

▶ Should you do an X-ray ?

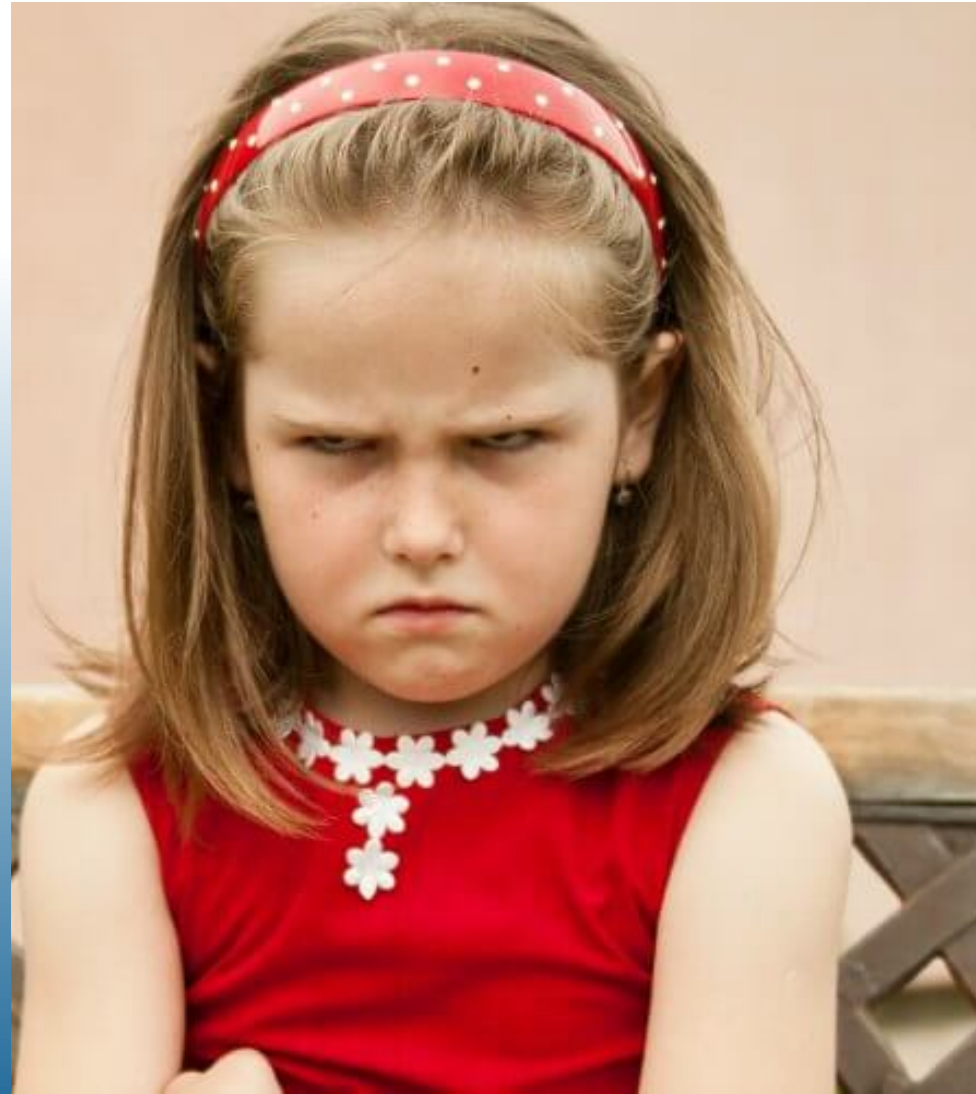
▶ Yes

▶ No

CASE SCENARIO #10

A 6 YEARS OLD WHO REFUSE TO USE HER LEFT ARM

- ▶ 5 year old girl
- ▶ 6th pulled elbow.



CASE SCENARIO #10

SHE REFUSES TO BE MANIPULATED

▶ What can you do?

Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

Naveen Poonai, MD,^{a,b,c} Joseph Spohn, MSc,^b Ben Vandermeer, MSc,^d Samina Ali, MDCM,^{e,f} Maala Bhatt, MD,^g Shawn Hendriks, MLIS,^a Evelyne D. Trottier, MDCM,^h Vikram Sabhaney, MD,ⁱ Amit Shah, MD,^b Gary Joubert, MD,^{a,b} Lisa Hartling, PhD^d

Introduction

- ▶ Painful procedures are very common in Peds ED
- ▶ No good intervention to reduce pain
- ▶ IV Dexmedetomidine seems effective

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Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

Objective

Summarize the effectiveness of **intra-nasal Dexmedetomidine** for **children** undergoing painful and distressing **procedures**.



Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

▶ **Methods**

- ▶ **Design:** Systematic review of randomised control trials
- ▶ **Data sources:**
 - ▶ Trial registries up to **February 2019**

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Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

► **Methods**

► **Inclusion criteria:**

- Intra-nasal Dexmedetomidine vs anything
- For a procedure
- Children younger 18
- Outcomes:
 - Adequacy of sedation

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Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

► Methods

► **Analyses:**

- Plan for a meta-analysis

Impossible

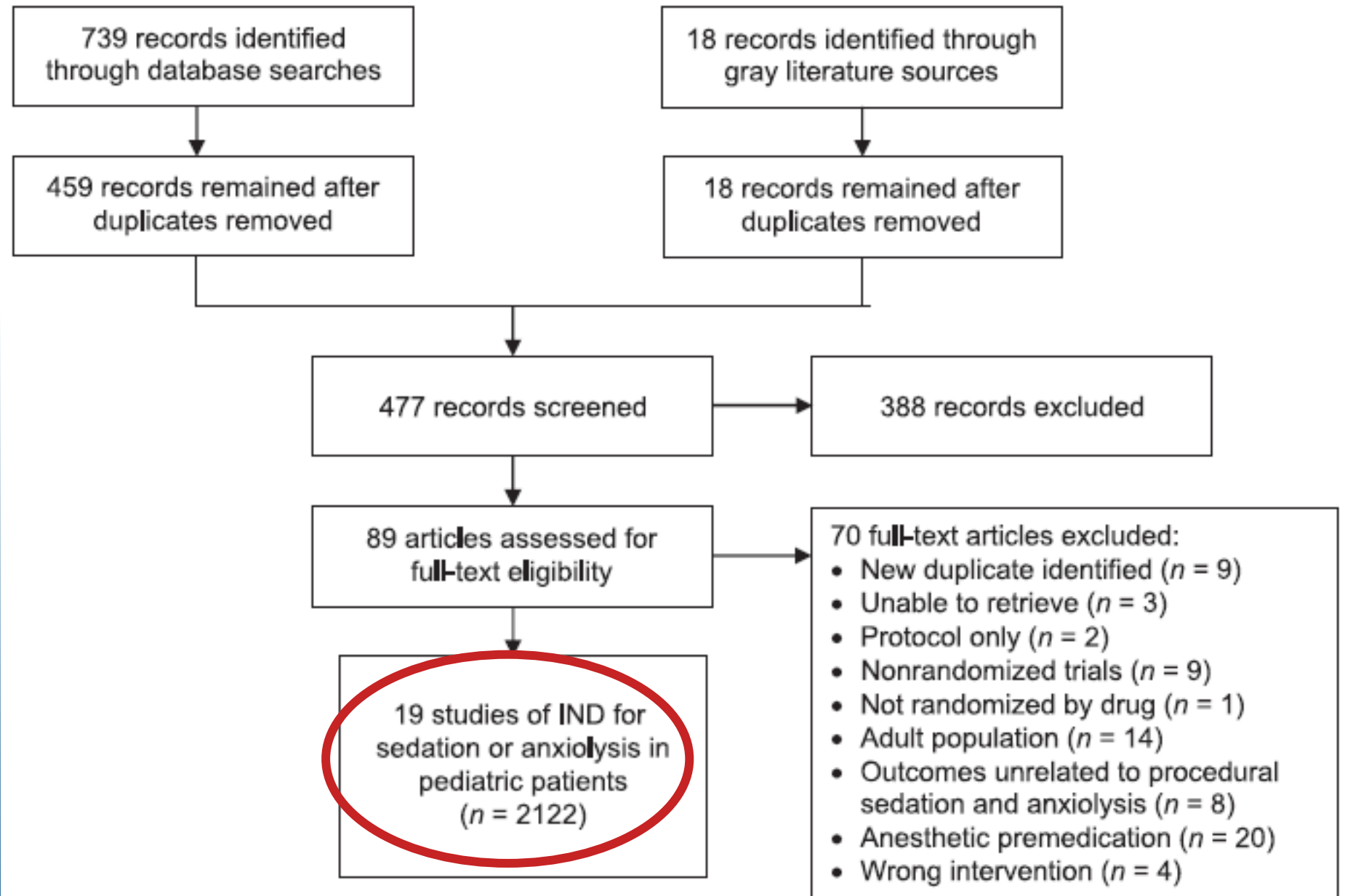
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RESULTS...

IV insertion (6)
Laceration (1)
Dental (2)

Eye exam (3)
CT scan (3)
MRI (2)
Ultrasound (2)



RESULTS...ADEQUACY OF SEDATION

Comparator						
Chloral Hydrate						
Oral Midazolam						
IN Midazolam						
Oral Dexmedetomidine						
IN Ketamine						
Oral Ketamine						
IN Dex + Oral Ketamine						



Favors dexmedetomidine



Neutral



Unfavourable

RESULTS...SEDATION

Adequacy of sedation

Painful procedure **61%** vs 47%

Non-painful procedure **84%** vs 72%

Need for rescue medication **10%** vs 28%

2 µg/kg better than 1 µg/kg

4 µg/kg better than 3 µg/kg

No difference atomiser vs. drops

RESULTS...ADVERSE EVENTS

Bradycardia	2.2%
Hypotension	1.2%
Oxygen desaturation	0.5%
Vomiting	0.4%

Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

Limitations

- ▶ Important heterogeneity
- ▶ Few studies of poor quality



Intranasal Dexmedetomidine for Procedural Distress in Children: A Systematic Review

Conclusion

Intranasal dexmedetomidine

- ▶ Well tolerated
- ▶ Provide sedative effects
- ▶ Seems better than oral midazolam.

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CASE SCENARIO #10

SHE REFUSES TO BE MANIPULATED

► What can you



BONUS ARTICLE.....

THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Authors: Duygu Sönmez Düzkaya, BSc, RN, PhD, Gülçin Bozkurt, BSc, RN, PhD, Sevim Ulupınar, BSc, RN, PhD, Gülzade Uysal, BSc, RN, PhD, Serpil Uçar, BSc, and Metin Uysalol, MD, Istanbul, Turkey

Introduction

- ▶ Painful procedures are very common in Peds ED
- ▶ Pain and anxiety are related
- ▶ Distraction and information could reduce pain



THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Objective

- ▶ Compare the effects of **watching a cartoon** and an **information video** about IV insertion on the **pain** and **fear** levels of children aged 6-12 years.



THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Methods

- ▶ **Design:** Randomized controlled trial
- ▶ **Setting:** Single Pediatric ED in Istanbul
- ▶ 2017-18



THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Methods

► Participants:

- 6-12 years old
- Needs an IV

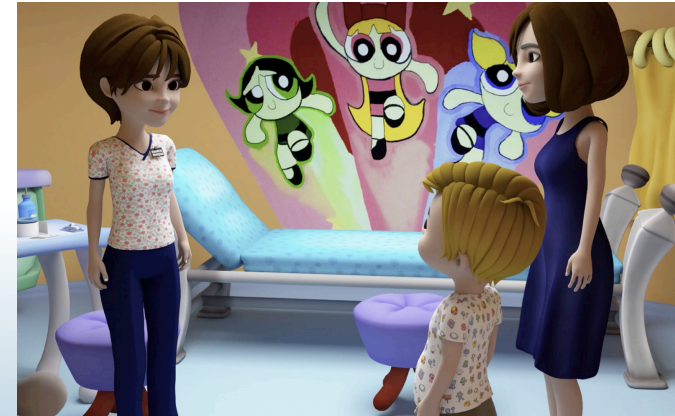


THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Methods

► Interventions:

- Video (Before)
- Cartoon (During the procedure)
- Control

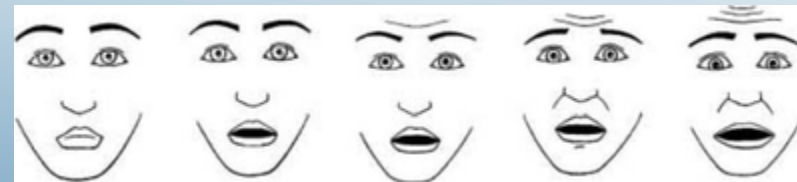


THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Methods

► Outcomes:

- Pain Wong Baker FACES scale
- Fear Children Face Scale



THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Analysis

- ▶ **Sample size:** 159 participants/group
 - ▶ 80% power to find
 - ▶ 0.20 effect size



RESULTS...BASELINE CHARACTERISTICS

477 enrolled and 18 refused to participate

Characteristics	Information video group (n = 159) Mean (SD)	Cartoon group (n = 159) Mean (SD)	Control group (n = 159) Mean (SD)
Parent's age	33.85 (5.47)	34.18 (5.12)	33.75 (4.56)
Children's age	8.70 (1.99)	8.76 (1.99)	8.94 (2.19)
Children's sex			
Girls (n = 231)	79	85	85
Boys (n = 246)	80	74	74
IV intervention history			
Yes	134	128	127
No	25	21	32

RESULTS...PAIN SCORES

Pain score	Information video group (n = 159), mean (SD)	Cartoon group (n = 159), mean (SD)	Control group (n = 159), mean (SD)	Test*	P value
Child					
Before IV insertion	1.36 (0.91)	1.36 (0.89)	1.35 (0.90)	$\chi^2 = 0.031$	0.98
After IV insertion	0.09 (0.48)	0.30 (0.88)	4.14 (1.11) [‡]	$\chi^2 = 278.673$	0.001 1 < 3; 2 < 3
Test/P value [†]	Z = -10.392 P = 0.001	Z = -8.406 P = 0.001	Z = -10.569 P = 0.001		
Parent					
Before IV insertion	1.97 (1.04)	1.95 (1.04)	1.95 (1.05)	$\chi^2 = 0.044$	0.98
After IV insertion	0.25 (0.51)	0.48 (0.89)	4.10 (1.05) [‡]	$\chi^2 = 279.527$	0.001 1 < 3; 2 < 3
Test/P value [†]	Z = -10.451 P = 0.001	Z = -7.455 P = 0.001	Z = -9.537 P = 0.001		
Nurse					
Before IV insertion	2.19 (1.11)	2.20 (1.16)	2.40 (1.19)	$\chi^2 = 2.935$	0.23
After IV insertion	0.34 (0.56)	0.61 (0.93)	4.15 (1.04) [‡]	$\chi^2 = 286.880$	0.001 1 < 3; 2 < 3
Test/P value [†]	Z = -10.478 P = 0.001	Z = -9.363 P = 0.001	Z = -9.879 P = 0.001		

RESULTS...FEAR SCORES

Fear score	Information video group (n = 159), mean (SD)	Cartoon group (n = 159), mean (SD)	Control group (n = 159), mean (SD)
Child			
Before IV insertion	1.82 (0.86)	1.83 (0.85)	1.77 (0.87)
After IV insertion	0.05 (0.36)	0.32 (0.85)	3.41 (1.00) [†]
Test/ <i>P</i> value [†]	$Z = -10.797$ $P = 0.001$	$Z = -9.478$ $P = 0.001$	$Z = -9.513$ $P = 0.001$
Parent			
Before IV insertion	2.53 (0.96)	2.52 (0.97)	2.52 (0.99)
After IV insertion	0.02 (0.50)	0.48 (0.91)	3.45 (0.93) [†]
Test/ <i>P</i> value [†]	$Z = -10.940$ $P = 0.001$	$Z = -9.934$ $P = 0.001$	$Z = -8.545$ $P = 0.001$
Nurse			
Before IV insertion	2.78 (0.90)	2.60 (1.02)	2.53 (1.00)
After IV insertion	0.26 (0.54)	0.59 (0.92)	3.44 (0.98) [†]
Test/ <i>P</i> value [†]	$Z = -10.989$ $P = 0.001$	$Z = -10.171$ $P = 0.001$	$Z = -8.372$ $P = 0.001$

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Limitations

- ▶ Pain and FEAR measured at 5 min post IV only
- ▶ No blinding
- ▶ Pain and fear are subjective



THE EFFECT OF A CARTOON AND AN INFORMATION VIDEO ABOUT INTRAVENOUS INSERTION ON PAIN AND FEAR IN CHILDREN AGED 6 TO 12 YEARS IN THE PEDIATRIC EMERGENCY UNIT: A RANDOMIZED CONTROLLED TRIAL

Conclusion

- ▶ Cartoon or video decrease pain and fear associated to IV in children
- ▶ Simple and cheap intervention



TAKE-HOME MESSAGES

Ibuprofen is better than acetaminophen in young children

- ▶ Watch-out with pre-procedural opioid
- ▶ No need for fasting before procedure
- ▶ Dexmedetomidine may be useful for procedure
- ▶ Distraction is effective for procedure

TAKE-HOME MESSAGES

Inhaled Mg sulfate is not effective

- ▶ No item of the Labstick is perfect
- ▶ 1% meningitis in newborn with UTI
- ▶ Bacterial meningitis (1000 neutro, procalcitonin, CRP, CSF protein)
- ▶ 65% success with Non surgical Tx of appendicitis
- ▶ Pulled elbow is a clinical Diagnosis

THEY ALMOST MADE IT



Simulation and education

CPR coaching during cardiac arrest improves adherence to PALS guidelines: a prospective, simulation-based trial



Michael Buyck^{a,b,}, Yasaman Shayan^{a,b}, Jocelyn Gravel^{a,b}, Elizabeth A. Hunt^c, Adam Cheng^d, Arielle Levy^{a,b}*

Introduction

- ▶ CPR coach improves CPR quality during resuscitation



CPR coaching during cardiac arrest improves adherence to PALS guidelines: a prospective, simulation-based trial



Objective

Assess if the presence of a CPR Coach would improve adherence to PALS guidelines during simulated pediatric resuscitations.



CPR coaching during cardiac arrest improves adherence to PALS guidelines: a prospective, simulation-based trial



▶ Methods

- ▶ **Design:** Secondary analysis of a simulation RCT
- ▶ Intervention Coach or No coach
- ▶ Outcome: Performance score on PALS adherence



RESULTS...

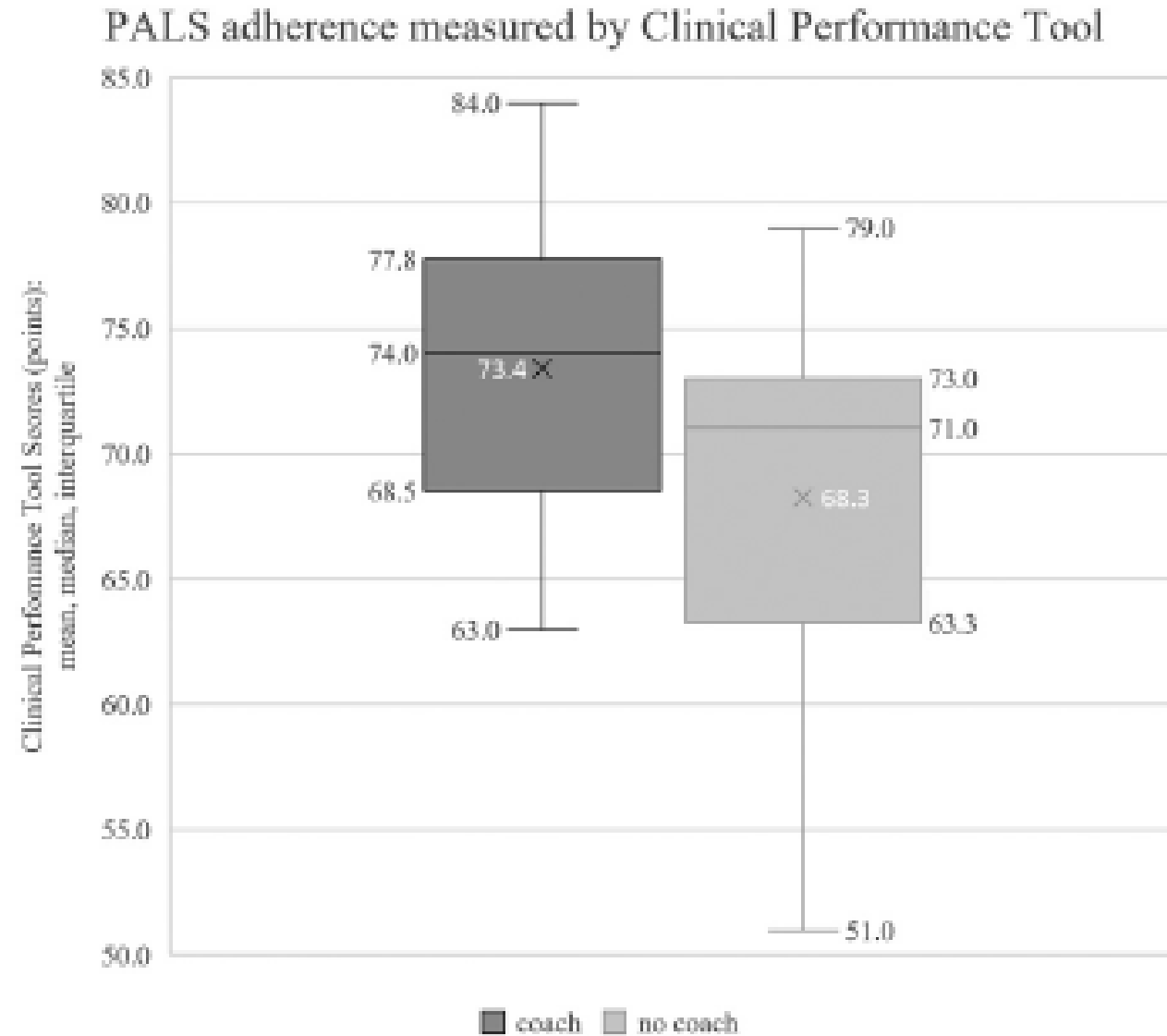


Fig. 1 – Score of PALS adherence with coach and no coach.

CPR coaching during cardiac arrest improves adherence to PALS guidelines: a prospective, simulation-based trial



Limitations

- ▶ Retrospective study
- ▶ No information on the clinical impact of a 5 points difference on the performance score



CPR coaching during cardiac arrest improves adherence to PALS guidelines: a prospective, simulation-based trial



Conclusion

The presence of a CPR Coach correlated with an improvement in adherence to PALS guidelines during simulated pediatric resuscitations.



Can QuickBrain MRI replace CT as first-line imaging for select pediatric head trauma?

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Nathan R. Selden MD PhD³ | Mubeen A. Jafri MD⁴ | Amber Lin MS¹ |
Susan Rowell MD⁵ | Matthew L. Hansen MD MCR¹

Introduction

- ▶ Head CT involves radiation for the brain of children
- ▶ MRI has limited accessibility and is longer to make



Can QuickBrain MRI replace CT as first-line imaging for select pediatric head trauma?

Objective

Evaluate the ability of a quick brain MRI protocol to detect clinically important traumatic brain injuries



Can QuickBrain MRI replace CT as first-line imaging for select pediatric head trauma?

▶ Methods

- ▶ **Design:** prospective cohort of children < 15 years and head trauma
- ▶ **Intervention:** after their head CT → MRI
- ▶ **Outcome:** Ability of MRI to detect TBI



RESULTS.

All patients	Present on CT (n)	Sensitivity (95% CI)	LR+ (95% CI)	Absent on CT (n)	Specificity (95% CI)	LR- (95% CI)
Lesion found	55	0.891 (0.782-0.949)	5.3 (-0.3-11.0)	18	0.833 (0.607-0.941)	0.1 (0.0-0.2)
Type						
Subdural hematoma	20	0.650 (0.433-0.819)	2.5 (1-4.10)	53	0.887 (0.774-0.947)	0.2 (0.0-0.3)
Epidural hematoma	2	1.000 (0.342-1.000)	71.0 (10.1-497.1)	71	0.986 (0.925-0.998)	0 (-0.1-0.1)
Intraparenchymal hematoma	7	0.571 (0.250-0.842)	2.1 (0.3-3.8)	66	0.879 (0.779-0.937)	0.2 (0.0-0.4)
Subarachnoid hemorrhage	14	0.286 (0.117-0.547)	1.2 (0.8-1.6)	59	0.864 (0.754-0.929)	0.5 (0.0-1.0)
Skull fracture						
Non-depressed	17	0.471 (0.262-0.691)				
Depressed	11	0.818 (0.523-0.949)				
Cerebral edema/contusion	6	1.000 (0.610-1.000)	5.6 (3.3-9.3)	67	0.821 (0.713-0.895)	NA
Subdural hygroma	2	0.500 (0.095-0.905)	1.8 (-0.7-4.3)	71	0.887 (0.793-0.942)	0.2 (-0.1-0.6)
Intraventricular hemorrhage	2	0.500 (0.095-0.905)	1.9 (-0.8-4.6)	71	0.958 (0.883-0.986)	0.1 (-0.1-0.2)
Diffuse axonal injury	0	NA	NA	73	0.945 (0.867-0.978)	NA

Can QuickBrain MRI replace CT as first-line imaging for select pediatric head trauma?

Limitations

- ▶ All patients were stable enough to have CT and MRI
- ▶ A lot of incidentalome



Can QuickBrain MRI replace CT as first-line imaging for select pediatric head trauma?

Conclusion

MRI is not ready to be used for TBI



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Conservative versus Interventional Treatment for Spontaneous Pneumothorax

S.G.A. Brown, E.L. Ball, K. Perrin, S.E. Asha, I. Braithwaite, D. Egerton-Warburton, P.G. Jones, G. Keijzers, F.B. Kinnear, B.C.H. Kwan, K.V. Lam, Y.C.G. Lee, M. Nowitz, C.A. Read, G. Simpson, J.A. Smith, Q.A. Summers, M. Weatherall, and R. Beasley, for the PSP Investigators*

Objective

Compare conservative management vs. small chest tube for spontaneous pneumothorax



Conservative versus Interventional Treatment for Spontaneous Pneumothorax

Methods

- ▶ **Design:** Multicenter RCT in Australia (39 sites)
- ▶ **Participants:** 14-50 years old with spontaneous pneumothorax (> 6cm rim)
- ▶ **Intervention:**
 - ▶ Small-bore (≤ 12 French) Seldinger-style chest tube for 4 hours
 - ▶ Observation for 4 hours
- ▶ **Outcome:** Complete radiographic resolution of primary spontaneous pneumothorax at 8 weeks



RESULTS...

	Intervention	Control
Number	154	162
Had a chest tube	94%	15%
Chest tube > 24 hours	51%	9%
Complete resolution At 8 weeks	98.5%	94.4%

Conservative versus Interventional Treatment for Spontaneous Pneumothorax

Limitations

- ▶ Very few teenagers
- ▶ Debatable primary outcome



Conservative versus Interventional Treatment for Spontaneous Pneumothorax

Conclusion

Conservative treatment is acceptable for spontaneous pneumothorax

Distraction in the Emergency department using Virtual reality for INtravenous procedures in Children to Improve comfort (DEVINCI): a pilot pragmatic randomized controlled trial

Esli Osmanliu¹ · Evelyne D. Trottier¹ · Benoit Bailey¹ · Maryse Lagacé^{1,2} · Mélanie Certain¹ · Christelle Khadra^{2,3} · Marisol Sanchez¹ · Corinne Thériault¹ · David Paquin⁴ · Casey Côtes-Turpin⁴ · Sylvie Le May^{2,3}

Objective

Evaluate the feasibility and acceptability of virtual reality distraction for patient comfort during intravenous procedures in the pediatric emergency department .

<https://doi.org/10.1007/s43678-020-00006-6>

URGENCE
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Distraction in the Emergency department using Virtual reality for INtravenous procedures in Children to Improve comfort (DEVINCI): a pilot pragmatic randomized controlled trial

Methods

Design: Single center RCT

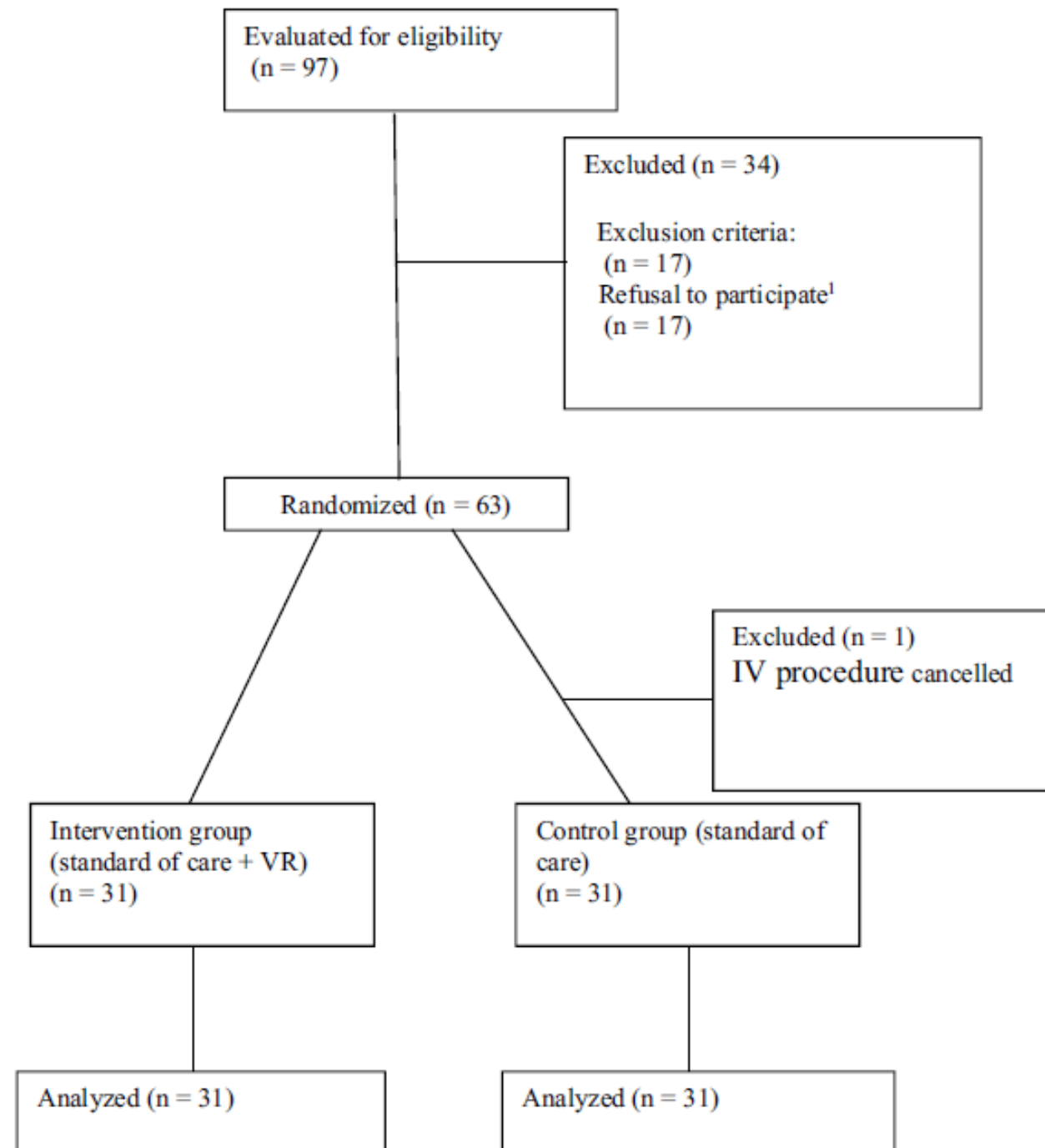
- ▶ **Participants:** Children with an Intra-venous procedure in the ED
- ▶ **Intervention:**
 - ▶ Use of virtual reality
 - ▶ Control
- ▶ **Outcome:**
 - ▶ Feasibility
 - ▶ Verbal numeric scale for PAIN

<https://doi.org/10.1007/s43678-020-00006-6>

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RESULTS...



RESULTS...

	Intervention <i>n</i> = 31	Control <i>n</i> = 31
Self-reported pain level (verbal numerical rating scale, 0–10)		
Baseline	4 (1, 5; 2, 5)	3 (0, 4; 0, 4)
During the procedure	3 (1, 6; 2, 4)	3 (1, 5.5; 2, 5) ^a
Post-procedure	0 (0, 2; 0, 1)	1 (0, 3; 0, 2)
Memory of pain at 24 h	2 (1, 3; 1, 3) <i>n</i> = 23	4 (2, 6.5; 2, 5) <i>n</i> = 24
Self-reported anxiety (Child fear scale, 0–4)		
Baseline	2 (1, 3; 1, 2)	1 (0, 3; 0, 2)
During the procedure	1 (0, 2; 1, 1)	2 (0, 3; 1, 3)
Post-procedure	0 (0, 0; 0, 0)	0 (0, 1; 0, 0)
Proxy evaluation of distress (Procedure Behavior Check List, 8–40)		
Baseline	8.00 (8, 10; 8, 9)	8.00 (8, 10; 8, 9)
During the procedure	8.00 (8, 9; 8, 9)	10.00 (8, 15; 9, 14)

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Limitations

- ▶ Small study
- ▶ No blinding

<https://doi.org/10.1007/s43678-020-00006-6>

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Distraction in the Emergency department using Virtual reality for INtravenous procedures in Children to Improve comfort (DEVINCI): a pilot pragmatic randomized controlled trial

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Conclusion

The addition of virtual reality to standard care is feasible and acceptable for pain and distress management during IV procedures in the pediatric ED

<https://doi.org/10.1007/s43678-020-00006-6>

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CHU Sainte-Justine



THANK YOU, MERCI