Febrile Infants

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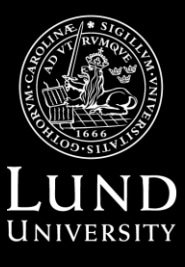

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Girl, 16 days old, full-term

Temperature Home 38.3 °C

Temperature PED 39.1 °C

Well-appearing

What next?

LP?

Blood culture?

Which pre-test probabilities are you thinking?

> Acta Paediatr. 2021 Nov;110(11):3069-3076. doi: 10.1111/apa.16043. Epub 2021 Jul 27.

Age- and sex-specific prevalence of serious bacterial infections in febrile infants ≤60 days, in Sweden

Ioannis Orfanos [1 2], Tobias Alfvén [3 4], Maria Mossberg [1 2], Mattias Tenland [5], Jorge Sotoca Fernandez [2], Erik A Eklund [1 2], Kristina Elfving [6 7]

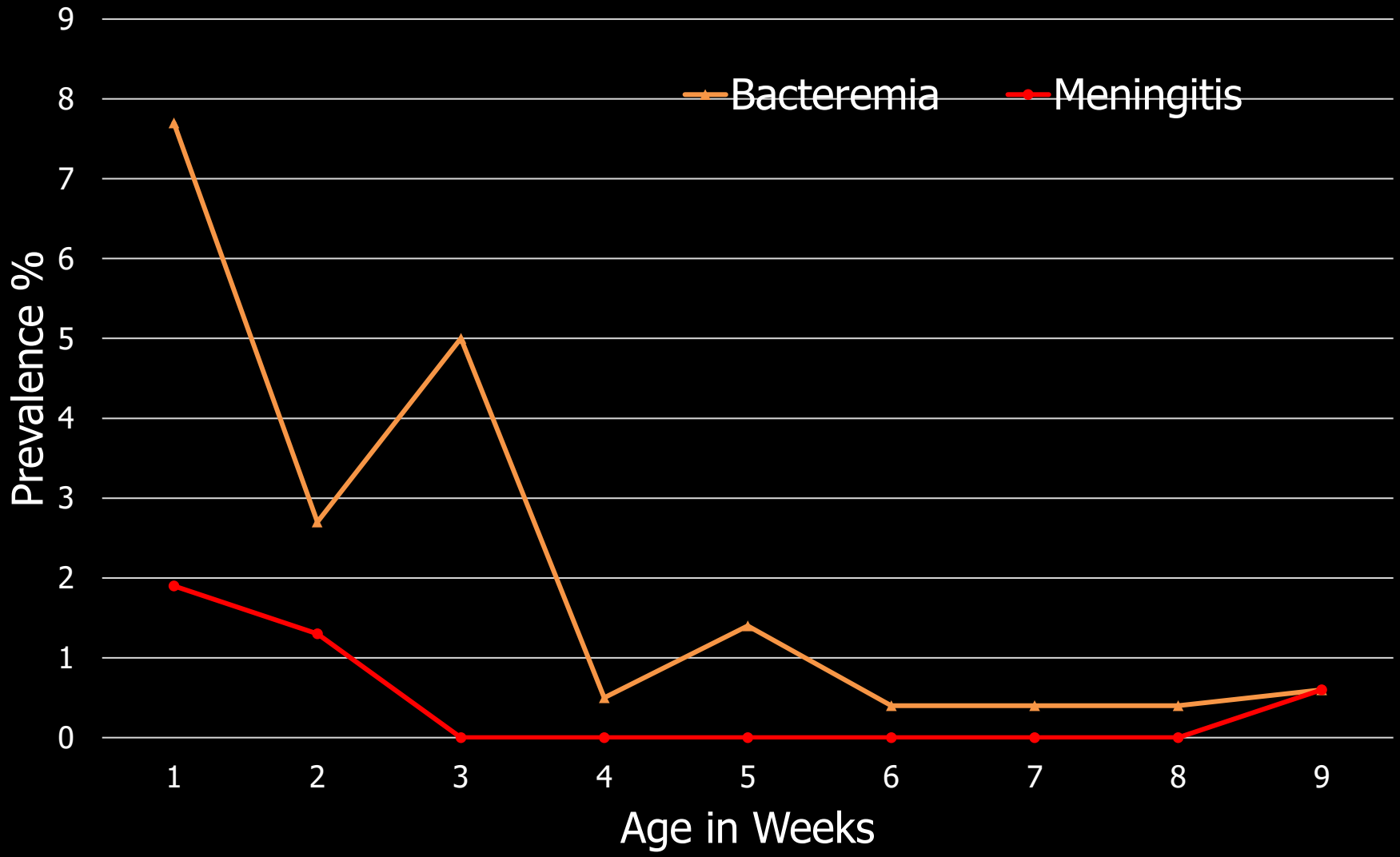
Affiliations + expand

PMID: 34310741 DOI: 10.1111/apa.16043

Meningitis - Bacteremia Prevalence

	0 – 28 days (N = 570)	29 – 60 days (N = 1131)	0 – 60 days (N = 1701)
	%	%	%
Bacteremia	3.2	0.6	1.5
Meningitis	0.9	0.3	0.5

SBI prevalence per week of age



Girl, 16 days old, full-term

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Temperature PED 39.1 °C

Well-appearing

Meningitis - Bacteremia **Well Appearing**

	0-60 days (N=2053)	**<30 days (N=708)**
	N (%)	N (%)
Meningitis	5 (0.2%)	3 (0.4%)
Bacteremia	22 (1.1%)	16 (2.3%)
Isolated Bacteremia	8 (0.4%)	6 (0.8%)

Blod tests?

Which?
Always?

Multicenter Study > Acta Paediatr. 2025 Nov;114(11):2969-2975. doi: 10.1111/apa.70201.
Epub 2025 Jun 26.

Accuracy of Inflammatory Biomarkers for Ruling out Invasive Bacterial Infections in Young Febrile Infants

Ebba Nordström Carlsson [1], Julie Ansorge [1], Ioannis **Orfanos** [2] [3]

Accuracy for **Meningitis - Bacteremia**

Biomarkers	Sensitivity	Specificity	PPV	NPV
PCT >0.5 ng/mL	83 (45-99)	90 (88-92)	7.4 (2.7-15.1)	99.8 (99.2-100)
PCT >1.71 ng/mL	50 (16-84)	95 (93-96)	8.1 (2.1-19.7)	99.5 (98.7-99.9)
CRP >20 mg/L	63 (43-70)	85 (84-87)	4.8 (2.8-7.5)	99.5 (99.1-99.8)
ANC >4090/µL	72 (50-89)	56 (53-59)	2.7 (1.5-4.4)	99.2 (98.2-99.7)

	PCT (n=649)				CRP (n=2046)		ANC (n=1084)	
	≤0.5 n=581 (90%)	**>0.5** n= 68 (10%)	**≤1.71** n=612 (94%)	**>1.71** n=37 (6%)	**≤20** n=1733 (85%)	**>20** n=313 (15%)	**≤4090** n= 603 (56%)	**>4090** n=481 (44%)
Meningitis	0	1	1	0	2	3	0	2
Bacteremia	1	4	2	3	8	14	5	12
IBI	1	5	3	3	9*	15*	5	13*

> Arch Dis Child. 2025 Sep 10:archdischild-2024-328246.
doi: 10.1136/archdischild-2024-328246. Online ahead of print.

Validating the PECARN rule to identify febrile infants at low risk of serious bacterial infections: an international validation study

Ioannis **Orfanos** [1] [2], Sanne Vrijlandt [3], Eline van der Walle [3], Chantal D Tan [4], Daan Nieboer [5],

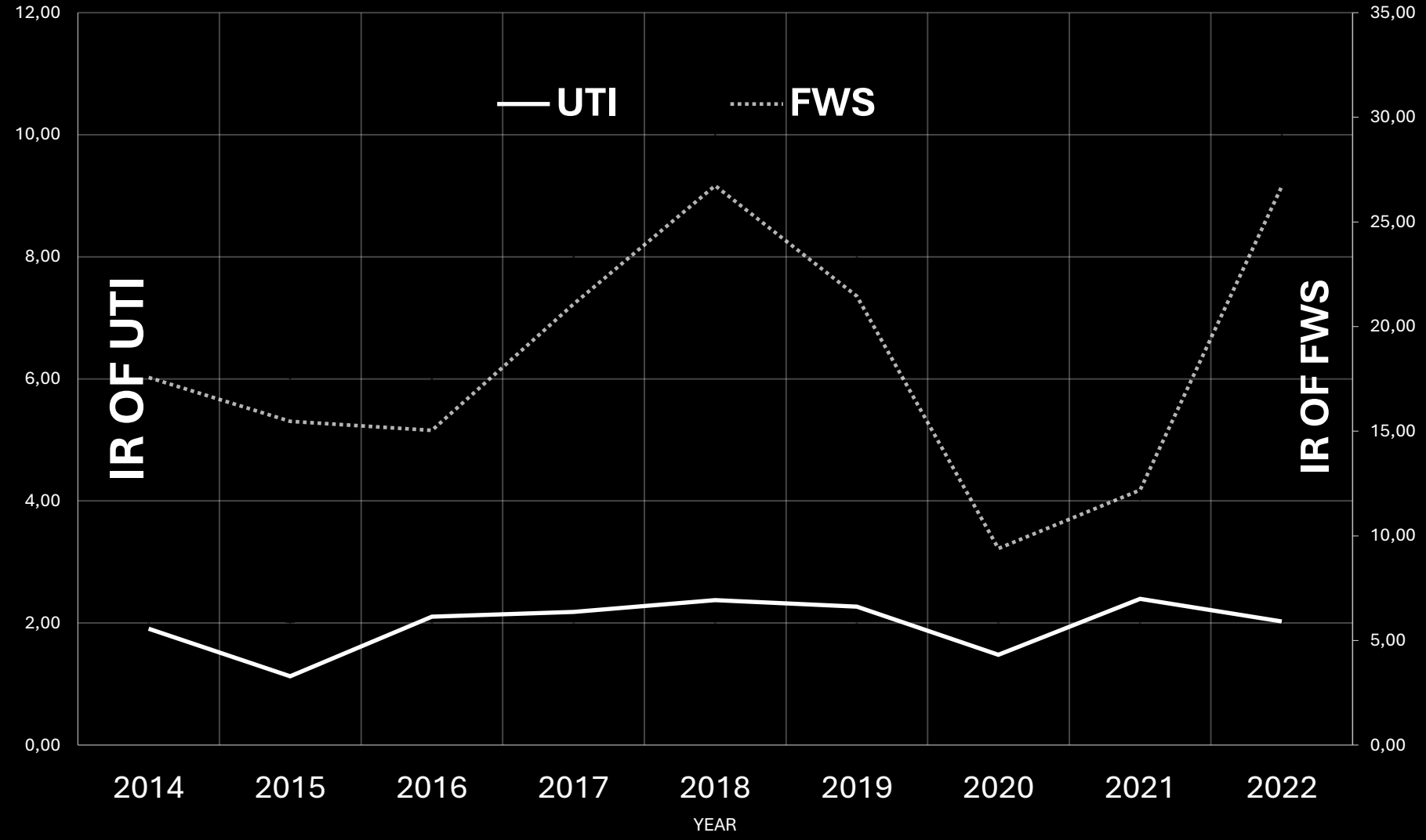
PECARN rule, with CRP <20 instead of PCT			
	PECARN[4] N=908	Swedish N=2237	MOFICHE N=512
SBI	82	272	51
Sensitivity %	98.8	97.8	92.2
Specificity %	63.1	52.2	50.5
NPV %	99.8	99.4	98.3
PPV %	21.0	22.1	17.1

Urine Test?

All?

Always?

UTI during Covid



Multicenter Study > Acta Paediatr. 2024 Aug;113(8):1934-1939. doi: 10.1111/apa.17256.
Epub 2024 Apr 27.

Decreased incidence of urinary tract infections in febrile infants aged ≤60 days during COVID-19 pandemic

Ioannis Orfanos [1] [2]

Observational Study > JAMA Netw Open. 2024 Jan 2;7(1):e2350061.
doi: 10.1001/jamanetworkopen.2023.50061.

Incidence of Pediatric Urinary Tract Infections Before and During the COVID-19 Pandemic

Danni Liang [1], Marie E Wang [1], Alex Dahlen [2], Yungting Liao [1], Andrew C Saunders [1], Eric R Coon [3], Alan R Schroeder [1]

Conclusions and relevance: In this cohort study, UTI diagnosis decreased during the early pandemic period without an increase in measures of disease severity, suggesting that reduced overdiagnosis and/or reduced misdiagnosis may be an explanatory factor.

16 days old, girl, full-term

Temp home 38.3 °C

Temp PED 37.6 °C

Well-appearing

Risk Difference

	Afebrile PED	Febrile PED	RR (95% CI)
	% (95% CI)	% (95% CI)	
0-60 days	702 (36)	1224 (64)	
SBI	6.6 (4.8-8.6)	15.4 (13.4-17.5)	0.43 (0.31–0.58)
UTI	6.1 (4.5-8.2)	14.2 (12.3-16.3)	0.43 (0.31–0.59)
Bacteremia	0.7 (0.2-1.7)	1.7 (1.1-2.6)	0.41 (0.16–1.10)
Meningitis	0.3 (0.0-1.0)	0.5 (0.2-1.1)	0.58 (0.12–2.87)
0-28 days	243 (39)	382 (61)	
SBI	8.2 (5.1-12.4)	20.4 (16.5-24.8)	0.40 (0.25–0.64)
UTI	7.0 (4.1-11.0)	18.6 (14.8-22.9)	0.38 (0.23–0.62)
Bacteremia	1.2 (0.3 – 3.6)	3.7 (0.2-0.6)	0.34 (0.10–1.16)
Meningitis	0.8 (0.1-2.9)	0.8 (0.2-2.3)	1.05 (0.18–6.23)

Multicenter Study > Acta Paediatr. 2022 Oct;111(10):2004-2009. doi: 10.1111/apa.16483.
Epub 2022 Jul 16.

Paediatric emergency departments should manage young febrile and afebrile infants the same if they have a fever before presenting

Ioannis Orfanos [1] [2], Jorge Sotoca Fernandez [2], Kristina Elfving [3] [4], Tobias Alfvén [5] [6], Erik A Eklund [1] [2]

Affiliations + expand

PMID: 35808896 DOI: 10.1111/apa.16483

LP/Antibiotics/Admission?

> Pediatr Infect Dis J. 2022 Jul 1;41(7):537-543. doi: 10.1097/INF.0000000000003542. Epub 2022 Jun 7.

Management and Outcome of Febrile Infants ≤60 days, With Emphasis on Infants ≤21 Days Old, in Swedish Pediatric Emergency Departments

Ioannis Orfanos [1,2], Kristina Elfving [3,4], Jorge Sotoca Fernandez [2], Lovisa Wennlund [5], Sofia Weiber [6], Erik A Eklund [1,2], Tobias Alfvén [7,8]

Affiliations + expand

PMID: 35389959 DOI: 10.1097/INF.0000000000003542

Age ≤28 days

	Lund	Malmö	Gothenburg	Stockholm	All
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
	(n= 70)	**(n= 138)**	**(n = 187)**	**(n= 175)**	**(n= 570)**
Lumbar Puncture	16 (8–26)	12 (7–19)	23 (18–30)	2 (1–6)	13 (11–16)
Antibiotics	31 (21–44)	35 (27–43)	39 (32–46)	16 (11–22)	30 (26–34)
Hospitalization	59 (46–70)	68 (60–76)	74 (67–80)	63 (55–70)	67 (3–71)

Outcome – Delayed treated SBI

Age days	Lund	Malmö	Gothenburg	Stockholm	All
	%	%	%	%	%
≤28	(n= 70)	(n= 138)	(n= 187)	(n= 175)	(n= 570)
	0	0	1.1	0.6	0.5
28–60	(n= 186)	(n= 285)	(n= 349)	(n= 311)	(n= 1131)
	0	0	0	0	0.1

New PM (Step by Step) 2018

Management before vs after

	0–21 days		
	Before (n=144) %	**After** (n=118) %	P
Lumbar puncture	16	35	0.000
Urine culture	49	70	0.001
Blood culture	43	65	0.000
Antibiotics	38	56	0.004

New PM (Step by Step) 2018

> Front Pediatr. 2024 Jun 4:12:1401654. doi: 10.3389/fped.2024.1401654. eCollection 2024.

Low adherence to a new guideline for managing febrile infants ≤59 days

Matilda Elliver [1], Josefin Norrman [1], Ioannis Orfanos [1 2]

Infant nr 1

Age 38 days

Fever x 24 hours

PCT 0.6

vs

Infant nr 2

Age 22 days

Fever x 2 hours

PCT 0.4

You have 1 dose of antibiotics left
Who would you treat?

Just to make it clear

PCT 0.49 => inget

PCT 0.51 => LP, AB, admission

PCT 51 => LP, AB, admission

Makes sense?

BMC Pediatr. 2024 Jan 26;24(1):81. doi: 10.1186/s12887-024-04548-x.

Physician's conceptions of the decision-making process when managing febrile infants ≤ 60 days old: a phenomenographic qualitative study

Ioannis Orfanos [1] [2], Rose-Marie Lindkvist [3], Erik G A Eklund [4] [5], Kristina Elfving [6] [7], Tobias Alfvén [8] [9] [10], Tom J de Koning [4] [5], Charlotte Castor [11]

Management Guidelines

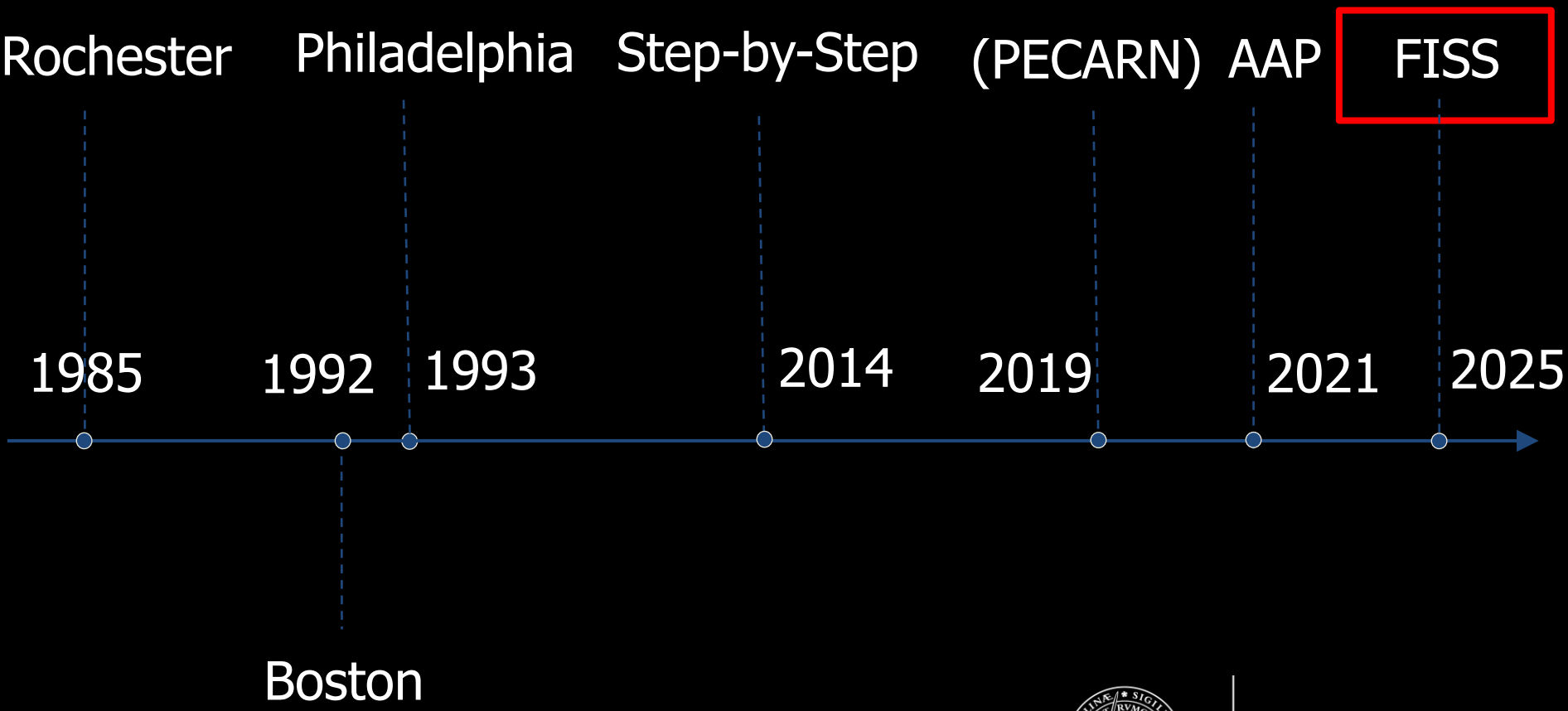


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Bild by Matilda Elliver

Febrile Infants Swedish Study