

A decorative graphic in the top right corner consisting of three overlapping circles in shades of light green and yellow, and a curved dashed line in a light grey color that sweeps across the top right of the slide.

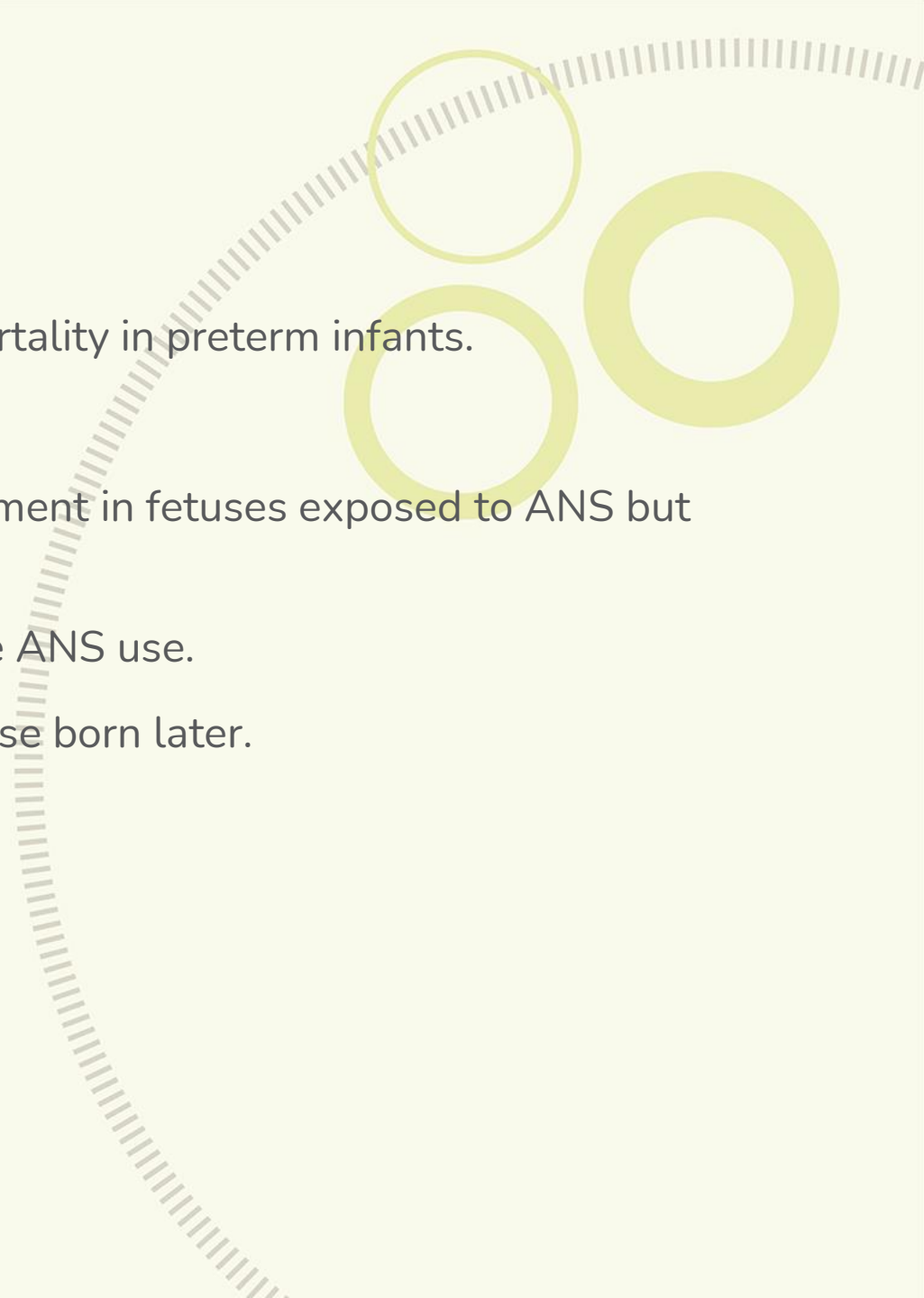
ANTENATAL STEROIDS FOR PRETERM BIRTH: OPTIMIZING USE AS A NEW  
QUALITY INDICATOR

Jesper Padkær Petersen, Charlotte Brix Andersson, Ulrik  
Schiøler Kesmodel, Lene Friis Eskildsen, Pernille Fjordside  
Iversen, Heidi Cueto.

ANTENATAL STEROIDS FOR PRETERM BIRTH: OPTIMIZING USE AS A **POSSIBLE**  
NEW QUALITY INDICATOR

Jesper Padkær Petersen, Charlotte Brix Andersson, Ulrik  
Schiøler Kesmodel, Lene Friis Eskildsen, Pernille Fjordside  
Iversen, Heidi Cueto.

# Background and Aims

- Antenatal steroids (ANS) are vital for reducing morbidity and mortality in preterm infants.
  - Randomized controlled trials (RCTs) support efficacy.
  - Observational data raise concerns about neurocognitive development in fetuses exposed to ANS but not born preterm.
  - RCTs in the developing world also highlight the need to optimize ANS use.
  - Most quality registers focus on preterm children, overlooking those born later.
- 
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**Cochrane  
Library**

Cochrane Database of Systematic Reviews

**Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth (Review)**

McGoldrick E, Stewart F, Parker R, Dalziel SR

# Background and Aims

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## Neonatal/child outcomes

Antenatal corticosteroids reduce the risk of:

- **perinatal death** (risk ratio (RR) 0.85, 95% confidence interval (CI) 0.77 to 0.93; 9833 infants; 14 studies; high-certainty evidence; 2.3% fewer, 95% CI 1.1% to 3.6% fewer),
- **neonatal death** (RR 0.78, 95% CI 0.70 to 0.87; 10,609 infants; 22 studies; high-certainty evidence; 2.6% fewer, 95% CI 1.5% to 3.6% fewer),
- **respiratory distress syndrome** (RR 0.71, 95% CI 0.65 to 0.78; 11,183 infants; studies = 26; high-certainty evidence; 4.3% fewer, 95% CI 3.2% to 5.2% fewer).

Antenatal corticosteroids probably reduce the risk of IVH (RR 0.58, 95% CI 0.45 to 0.75; 8475 infants; 12 studies; moderate-certainty evidence; 1.4% fewer, 95% CI 0.8% to 1.8% fewer), and probably have little to no effect on birthweight (mean difference (MD) -14.02 g, 95% CI -33.79 to 5.76; 9551 infants; 19 studies; high-certainty evidence).

Antenatal corticosteroids probably lead to a reduction in developmental delay in childhood (RR 0.51, 95% CI 0.27 to 0.97; 600 children; 3 studies; moderate-certainty evidence; 3.8% fewer, 95% CI 0.2% to 5.7% fewer).

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May 19, 2020

## Associations Between Maternal Antenatal Corticosteroid Treatment and Mental and Behavioral Disorders in Children

Katri Räikkönen, PhD<sup>1</sup>; Mika Gissler, DrPhil<sup>2,3,4</sup>; Eero Kajantie, MD, DMSc<sup>5,6,7,8</sup>

Open access

Original research

## BMJ Open Neurodevelopmental disorders among term infants exposed to antenatal corticosteroids during pregnancy: a population-based study

Nir Melamed,<sup>1</sup> Elizabeth Asztalos,<sup>2</sup> Kellie Murphy,<sup>3</sup> Arthur Zaltz,<sup>1</sup> Donald Redelmeier ,<sup>4</sup> Baiju R Shah,<sup>5</sup> Jon Barrett<sup>1</sup>

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## THE LANCET

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ARTICLES · Volume 385, Issue 9968, P629-639, February 14, 2015

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**A population-based, multifaceted strategy to implement antenatal corticosteroid treatment versus standard care for the reduction of neonatal mortality due to preterm birth in low-income and middle-income countries: the ACT cluster-randomised trial**

Dr Fernando Althabe, MD <sup>a</sup> · José M Belizán, MD <sup>a</sup> · Elizabeth M McClure, PhD <sup>c</sup> · Jennifer Hemingway-Foday, MPH <sup>c</sup> · Mabel Berrueta, MD <sup>a</sup> · Agustina Mazzoni, MD <sup>a</sup> · et al. [Show more](#)

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The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

**Antenatal Dexamethasone for Early Preterm Birth in Low-Resource Countries**

The WHO ACTION Trials Collaborators

ABSTRACT



# Background and Aims

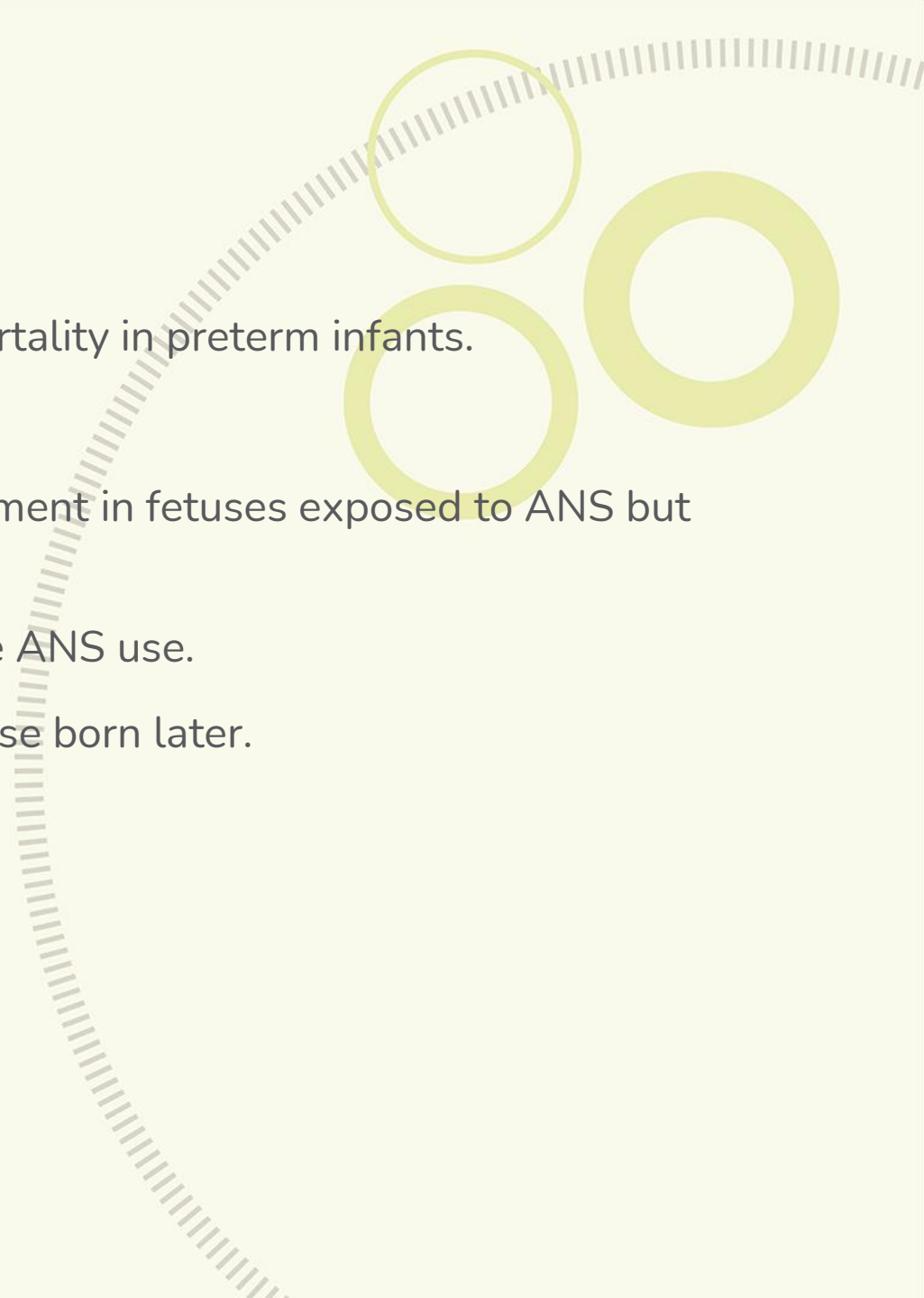
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TABLE 2 Perinatal interventions in very preterm live births (GA <32 weeks; survivors and in-hospital deaths).

	Any antenatal steroids <28 weeks GA n (%) <sup>a</sup>	Any antenatal steroids 28–31 weeks GA n (%) <sup>a</sup>	C-section, <28 wks GA n (%) <sup>a</sup>	C-section, 28–31 weeks GA n (%) <sup>a</sup>
Denmark	No data	No data	90 (51% [43–58])	233 (70% [64–74])
D1-Capital Region	No data	No data	48/82 (59)	93/125 (74)
D2-East Region				28/39 (72)
D3-South Region			15/30 (50)	44/56 (79)
D4-Mid Region			19/43 (44)	42/73 (58)
D5-North Region			8/22 (36)	26/42 (62)
Finland	107 (95% [89–98]) <sup>b</sup>	205 (95% [92–98]) <sup>b</sup>	56 (58% [47–68])	159 (68% [62–74])
F1-South Region (Helsinki)	45 (94)	78 (95)	20 (50)	70 (72)
F2-East Region (Kuopio)	12 (100)	22 (92)	2 (25)	23 (77)
F3-North Region (Oulu)	16 (89)	32 (94)	14 (70)	16 (59)
F4-Central Region (Tampere)	17 (94)	27 (96)	9 (82)	22 (62)
F5-West Region (Turku)	17 (100)	46 (98)	11 (61)	28 (64)
Iceland	12 (86% [57–98])	31 (100% [89–100])	4 (29% [8.4–58])	15 (48% [30–67])
I1-Iceland	12 (86)	31 (100)	4 (29)	15 (48)
Norway	163 (96% [92–99])	288 (91% [87–94])	92 (53% [45–60])	192 (60% [54–65])
N1-Southeast Region	110 (95)	165 (95)	65 (57)	114 (65)
N2-West Region	26 (87)	58 (84)	13 (43)	28 (41)
N3-Mid Region	20 (100)	39 (89)	11 (52)	27 (61)
N4-North Region	7 (88)	26 (84)	3 (38)	23 (74)
Sweden	286 (93% [90–96])	530 (91% [88–93])	186 (57% [52–63])	452 (70% [66–73])
S1-North Region	27 (97)	30 (81)	17 (61)	28 (68)
S2-Mid Region	38 (81) <sup>c</sup>	109 (87)	28 (49)	105 (76)
S3-East Region	83 (97)	138 (96)	54 (62)	104 (68)
S4-West Region	48 (96)	112 (94)	35 (67)	89 (71)
S5-Southeast Region	30 (97)	49 (89)	19 (53)	45 (65)
S6-South Region	60 (92)	92 (88)	33 (51)	81 (68)
<b>Nordic countries, total</b>	<b>568 (94% [92–96])</b>	<b>1054 (92% [90–93])</b>	<b>428 (54% [51–58])</b>	<b>1051 (67% [65–69])</b>

<sup>a</sup>95% confidence intervals for proportions are presented for countries.

<sup>b</sup>Data from 2020.

<sup>c</sup>>20% missing data.

Norman M, Padkær Petersen J, Stensvold HJ, Thorkelsson T, Helenius K, Brix Andersson C, et al. Preterm birth in the Nordic countries—Capacity, management and outcome in neonatal care. *Acta Paediatr.* 2023; 112: 1422–1433. <https://doi.org/10.1111/apa.16753>

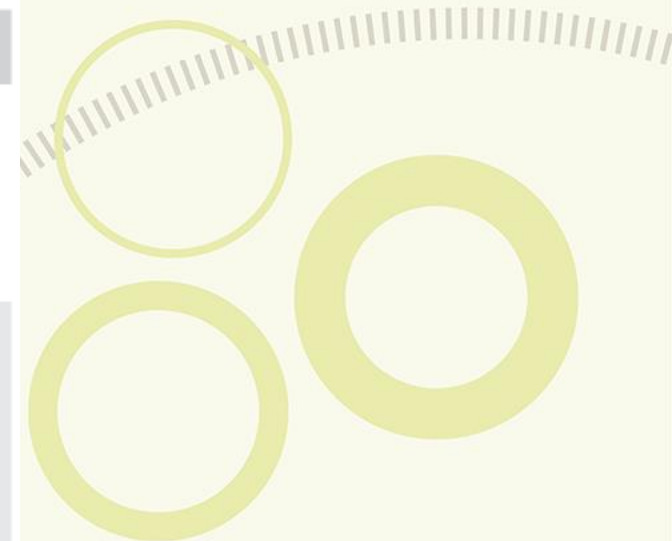


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et al. Preterm

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D2-East Region			
D3-South Region			1
D4-Mid Region			1
D5-North Region			

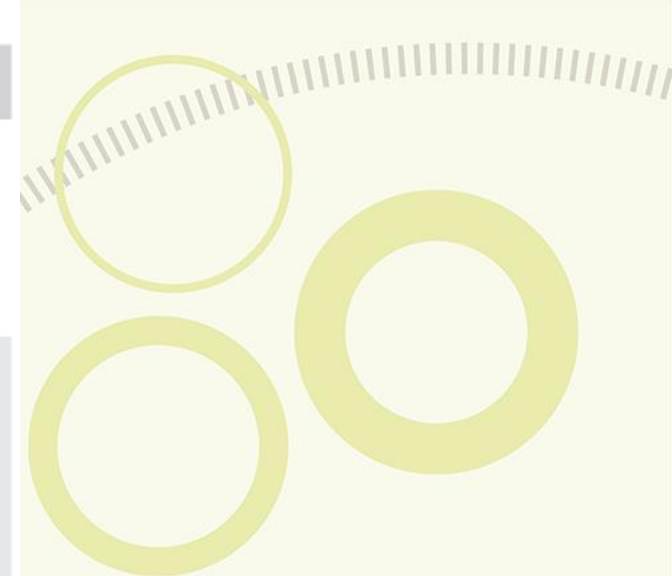
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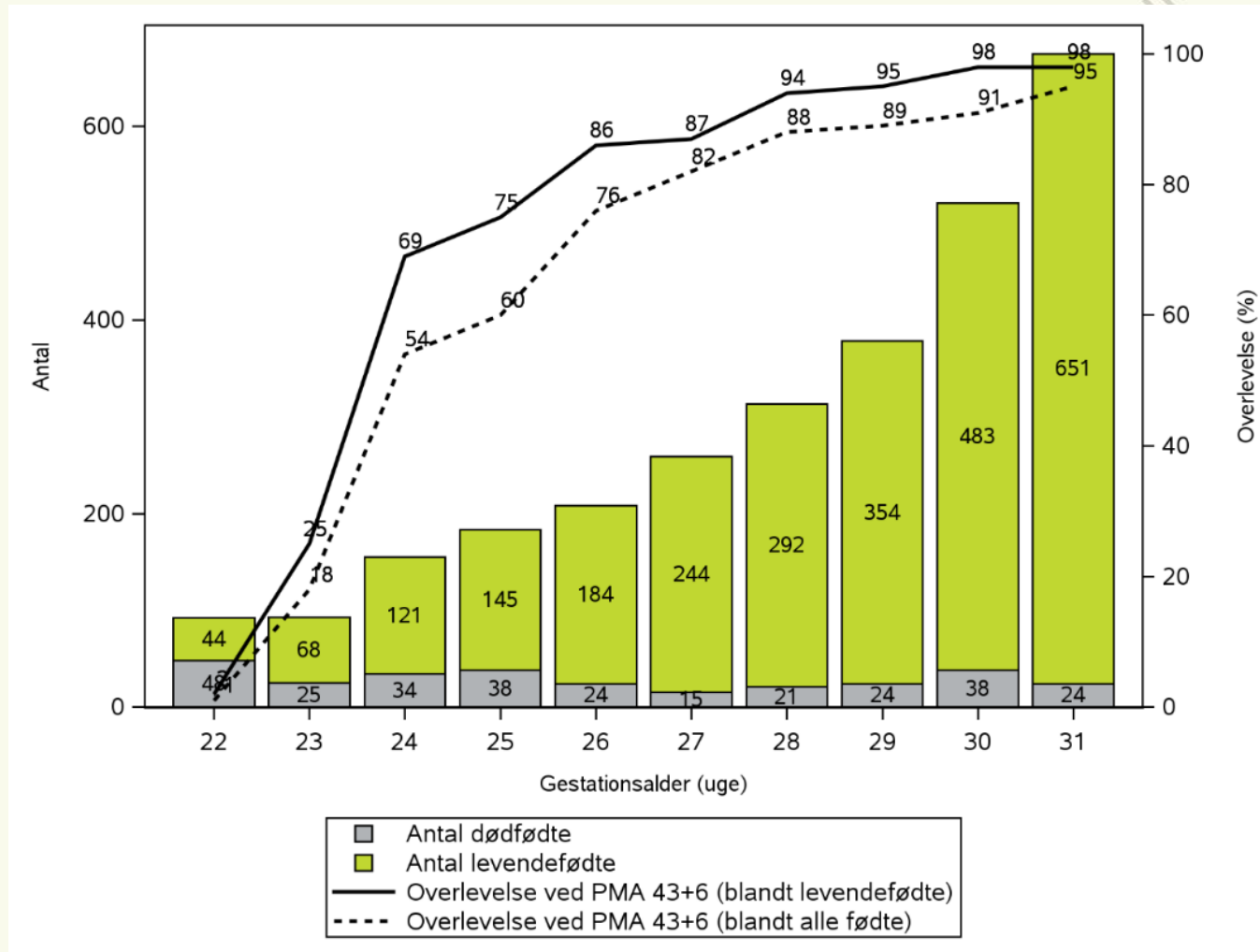
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# Background and Aims



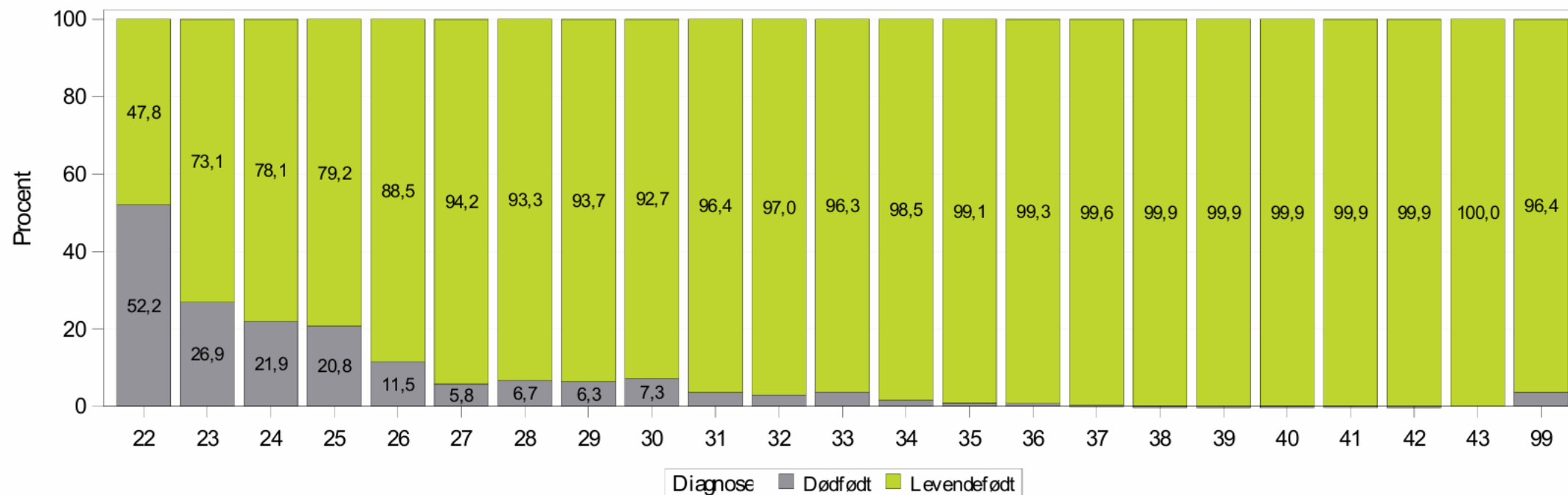
# Background and Aims

**Tabel 7.** Antal levendefødte og dødfødte per GA uge (22-43), 2019-2023

	GA22	GA23	GA24	GA25	GA26	GA27	GA28	GA29	GA30	GA31	GA32	GA33	GA34	GA35	GA36	GA37	GA38	GA39	GA40	GA41	GA42	GA43	GA99	I alt
Dødfødt	48	25	34	38	24	15	21	24	38	24	29	55	39	32	53	64	58	69	75	44	6	0	#	816
Levendefødt	44	68	121	145	184	244	292	354	483	651	944	1.418	2.506	3.527	7.198	16.938	38.968	65.225	85.175	68.393	6.125	15	27	299.045
Pop. i alt	92	93	155	183	208	259	313	378	521	675	973	1.473	2.545	3.559	7.251	17.002	39.026	65.294	85.250	68.437	6.131	15	28	299.861
Procent pop.	0,03%	0,03%	0,05%	0,06%	0,07%	0,09%	0,10%	0,13%	0,17%	0,23%	0,32%	0,49%	0,85%	1,19%	2,42%	5,67%	13,0%	21,8%	28,4%	22,8%	2,04%	0,01%	0,01%	

GA99= Ukendt GA

**Figur 5.** Andel levendefødte og dødfødte per GA uge (22-43), 2019-2023





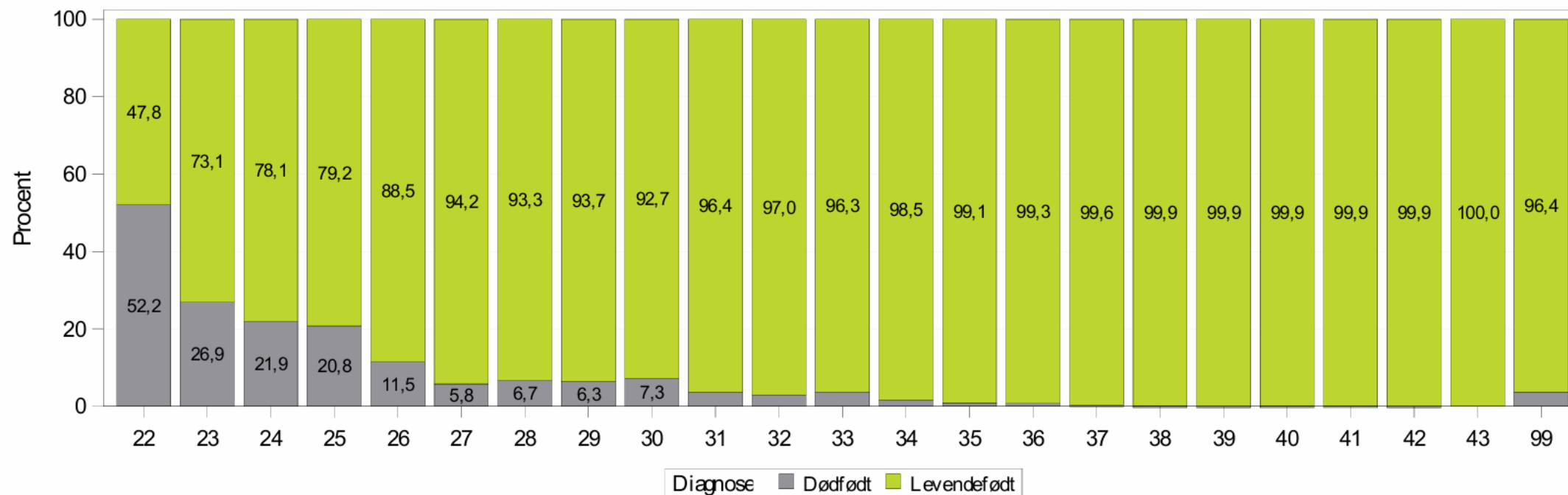
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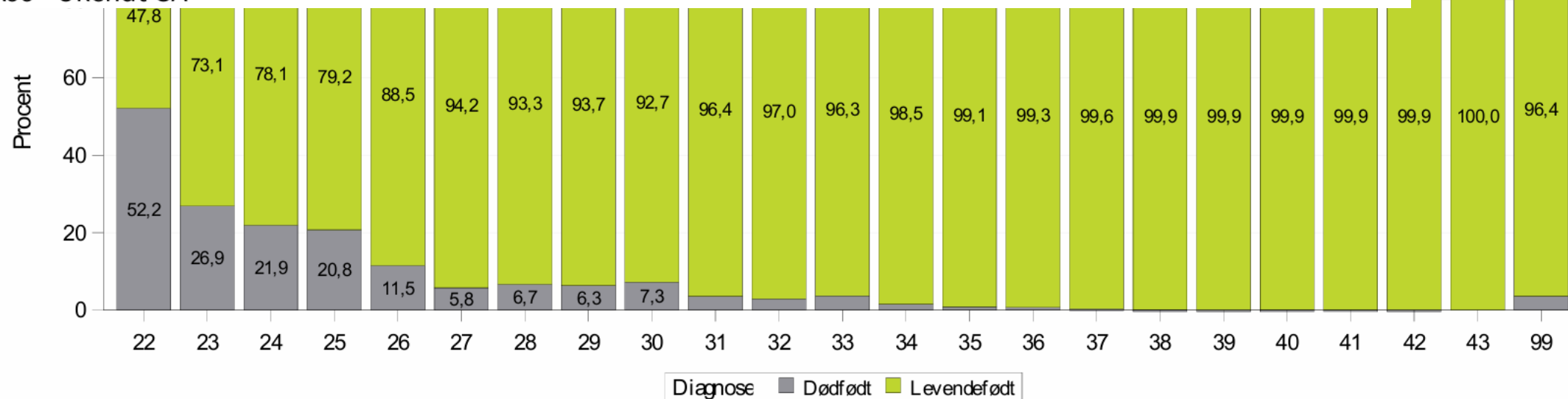
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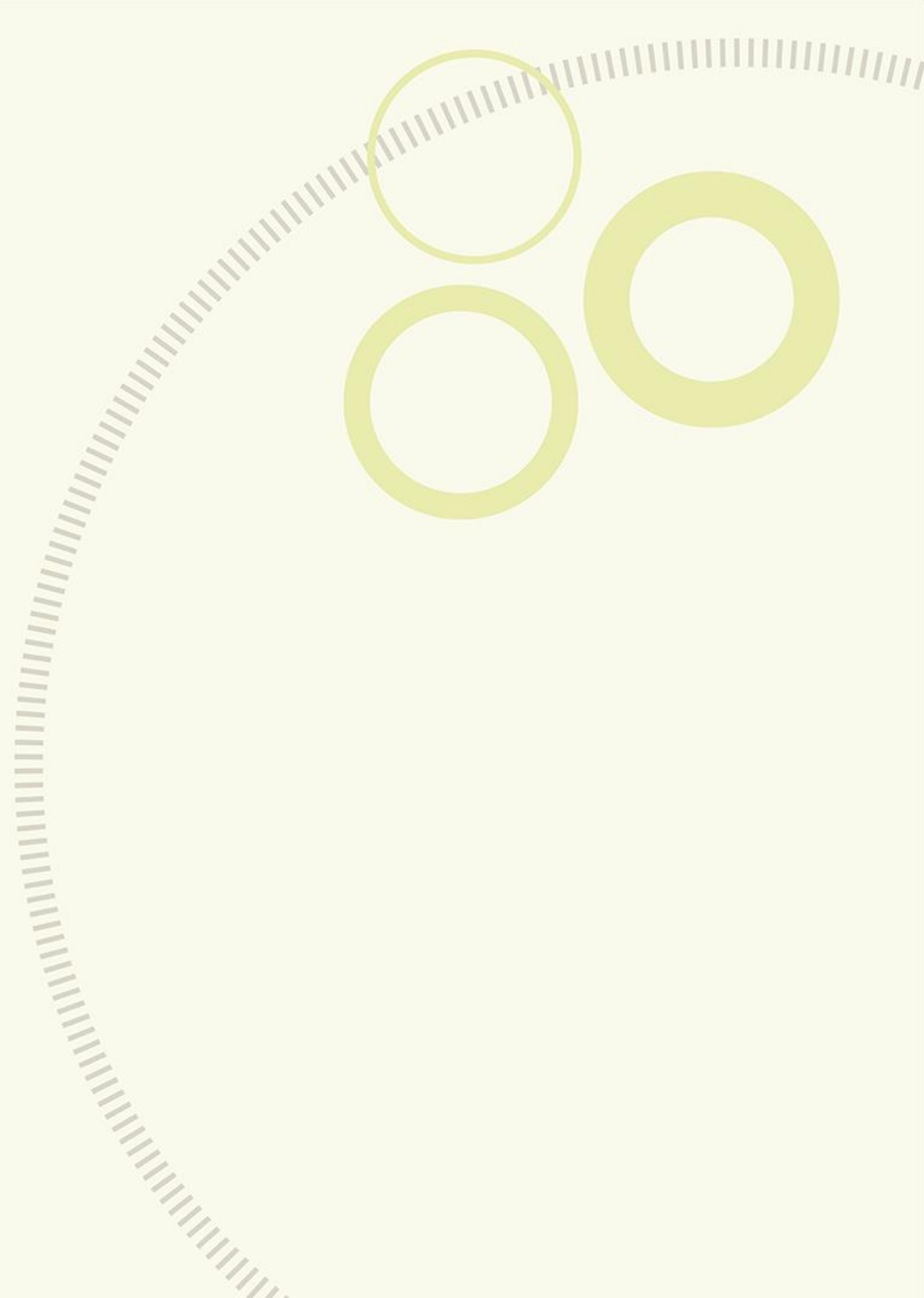
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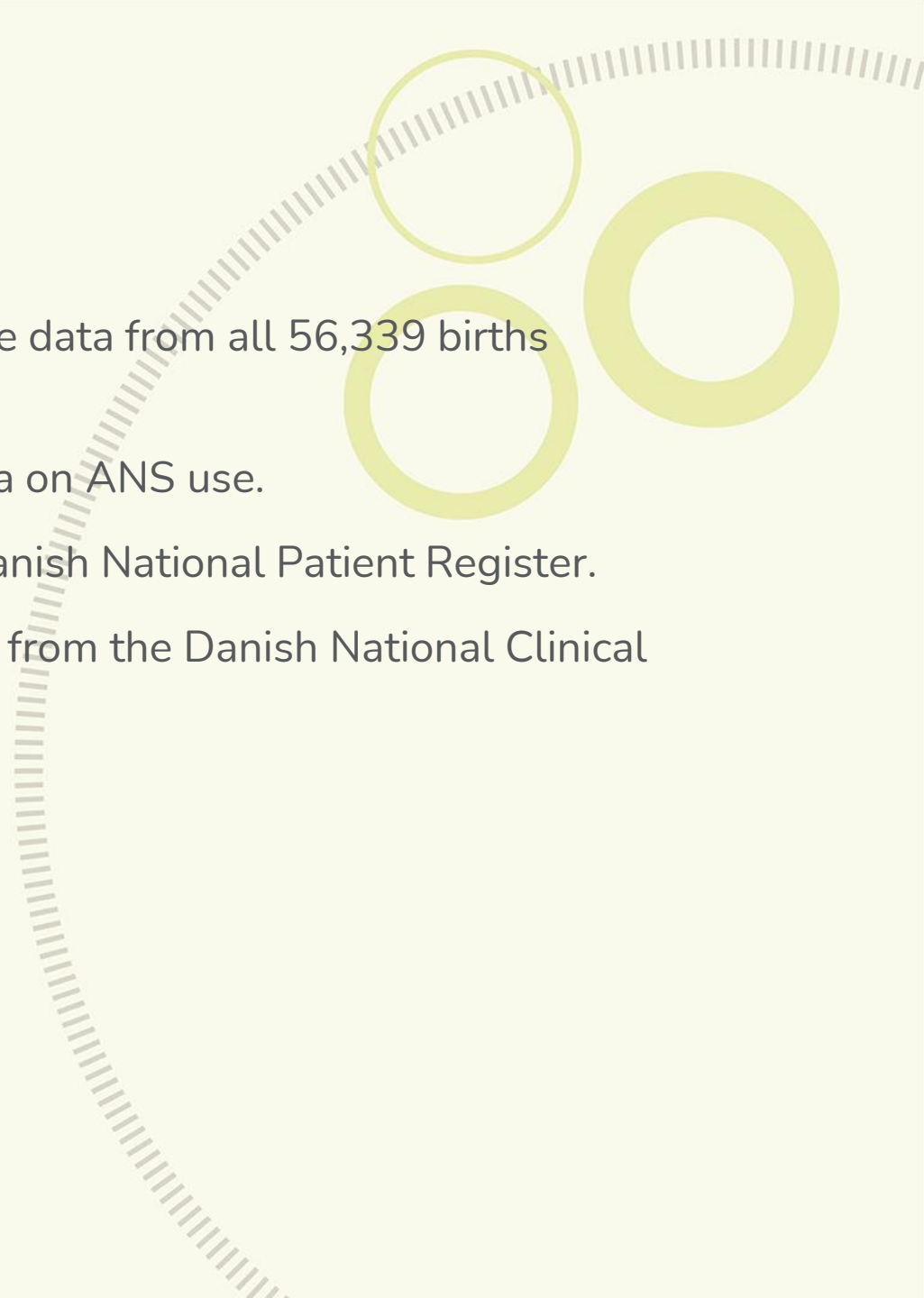


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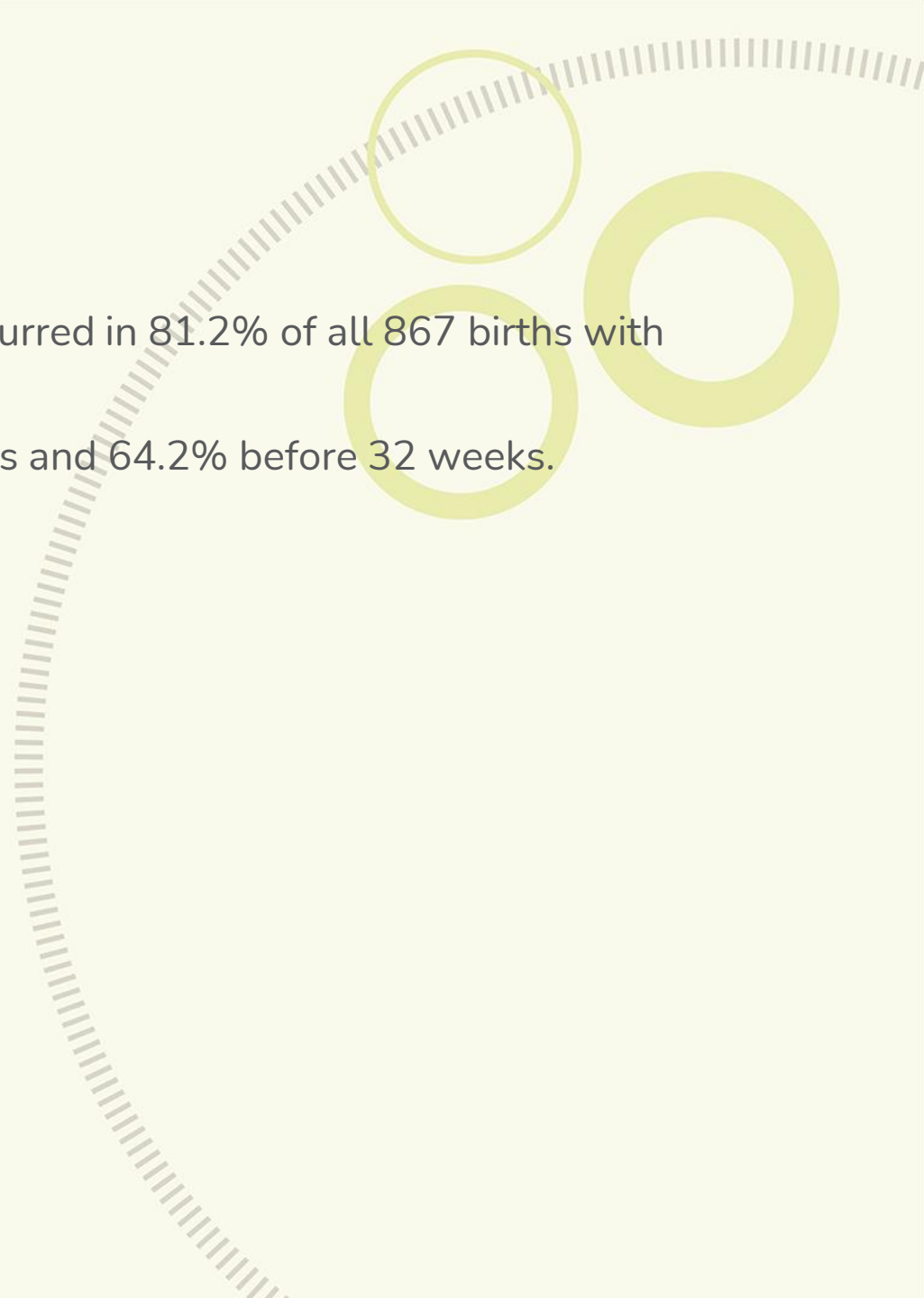
- A 1000 births < GA 34 pr year (approximately)



# Methods

- We performed a cross-sectional study, analyzing aggregated rate data from all 56,339 births Denmark 2023.
  - The National Hospital Medication Register (NHMR) provided data on ANS use.
  - NHMR registrations were compared with ANS codes from the Danish National Patient Register.
  - Gestational age (GA) at administration and at birth was obtained from the Danish National Clinical Quality Database for Births.
- 
- A decorative graphic in the top right corner consisting of three overlapping circles in shades of light green and yellow, and a thick, dashed grey line that curves from the bottom left towards the top right, passing behind the circles.

# Results

- NHMR identified 1,309 births with ANS use. ANS administration occurred in 81.2% of all 867 births with GA <34 weeks.
  - First administration was given at GA<34 weeks in 99.8% of the cases and 64.2% before 32 weeks.
  - Among all birth with ANS administered at GA<32 weeks,
    - 57.6% resulted in births at GA <34 weeks.
    - 16.0% at GA 34-36 weeks.
    - 26.4% at 37+ weeks.
  - Among births with ANS administered at GA 32-33 weeks,
    - 48.4% resulted in births at GA <34 weeks,
    - 19.8% at GA 34-36 weeks
    - 24.0% at 37+ weeks.
  - Rates varied across hospitals.
- 

# Results

*Table of hospital by steroid\_profylakse*

<i>hospital</i> <i>Frequency</i>	<i>steroid_profylakse</i>			<i>Total</i>
	<i>Kun SMR</i>	<i>Kun LPR</i>	<i>Begge</i>	
<i>Aabenraa</i>	30	0	0	30
<i>Aalborg</i>	107	0	0	107
<i>Aarhus</i>	164	0	7	171
<i>Bornholm</i>	6	0	0	6
<i>Esbjerg</i>	15	2	13	30
<i>Gødstrup</i>	61	0	0	61
<i>Herlev</i>	102	1	1	104
<i>Hillerød</i>	68	0	6	74
<i>Holbæk</i>	33	0	0	33
<i>Horsens</i>	13	0	2	15
<i>Hvidovre</i>	10	5	103	118
<i>Kolding</i>	57	0	0	57
<i>Nykøbing F.</i>	4	0	1	5
<i>Odense/Svendborg</i>	110	0	1	111
<i>Randers</i>	50	0	0	50
<i>Rigshospitalet</i>	174	1	6	181
<i>Roskilde</i>	10	1	17	28
<i>Slagelse</i>	63	0	1	64
<i>Thisted</i>	3	0	0	3
<i>Vendsyssel</i>	30	0	0	30
<i>Viborg</i>	9	2	32	43
<i>Total</i>	1119	12	190	1321

# Results

<b>Steroidbehandling</b>			
	SMR (H02AB01)		
LPR (BBHF3)	Ja	Nej	Total
Ja	190	12	202
Nej	1.119	?	-
Total	1.309	-	1.321

# Results

Andel af fødselspop., som har fået mindst én steroidbehandling i graviditeten, per GA-gruppe. Beregnet for hhv. alle singletonfødsler og singletonfødsler af levendefødt barn.

GA (fødsel)	N	Levendefødte	Dødfødte	Steroidbeh. (alle)		Steroidbeh. (levendefødte)	
				Ja	Nej	Ja	Nej
GA 22-27	137	105	32	88 (64,2%)	49 (35,8%)	87 (82,9%)	18 (17,1%)
GA 28-31	257	244	13	220 (85,6%)	37 (14,4%)	218 (89,3%)	26 (10,7%)
GA 32-33	347	338	9	289 (83,3%)	58 (16,7%)	288 (85,2%)	50 (14,8%)
GA 34+	54.716	54.627	89	521 (1,0%)	54.195 (99,0%)	520 (1,0%)	54.107 (99,0%)
Total	<b>55.457</b>	<b>55.314</b>	<b>143</b>	<b>1.118</b>	<b>54.339</b>	<b>1.113</b>	<b>54.201</b>

# Results

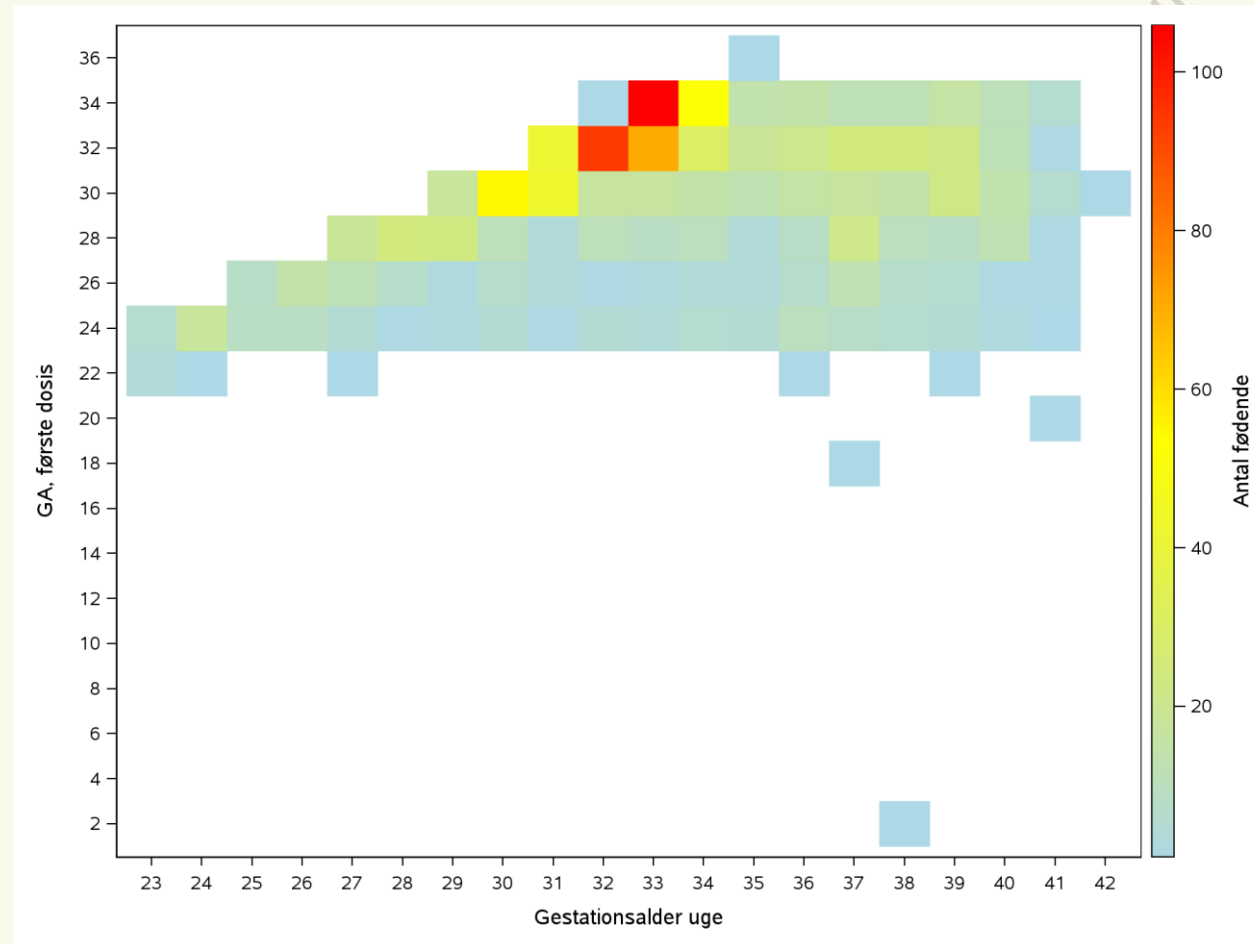
Table of b\_sor\_hospital by ga\_gruppe

b_sor_hospital(Hospitalsnavn til afrapportering SOR) Frequency	ga_gruppe(GA, fødsel)				Total
	Ukendt GA	GA 24+0 - 33+6	GA 34+0 - 36+6	GA 37+0 -	
Aabenraa	0	17	5	8	30
Aalborg	0	54	26	27	107
Aarhus	3	113	27	28	171
Bornholm	0	0	1	5	6
Esbjerg	0	19	5	4	28
Gødstrup	0	30	17	14	61
Herlev	0	45	22	36	103
Hillerød	0	35	15	24	74
Holbæk	0	15	8	10	33
Horsens	0	1	1	13	15
Hvidovre	0	52	30	31	113
Kolding	1	29	15	12	57
Nykøbing F.	0	0	2	3	5
Odense/Svendborg	2	69	12	28	111
Randers	0	22	14	14	50
Rigshospitalet	5	123	25	27	180
Roskilde	0	13	7	7	27
Slagelse	0	30	17	17	64
Thisted	0	2	0	1	3
Vendsyssel	0	9	5	16	30
Viborg	0	20	5	16	41
<b>Total</b>	<b>11</b>	<b>698</b>	<b>259</b>	<b>341</b>	<b>1309</b>

Table of first\_adm\_dato\_ga by ga\_gruppe

first_adm_dato_ga(GA, første dosis) Frequency	ga_gruppe(GA, fødsel)				Total	
	Ukendt GA	GA 24+0 - 33+6	GA 34+0 - 36+6	GA 37+0 -		
	1	0	0	0	1	
	2	0	0	1	1	
	18	0	0	1	1	
	20	0	0	1	1	
	21	0	0	1	1	
	22	4	2	0	7	
	23	6	25	8	5	44
	24	0	40	14	19	73
	25	0	24	4	15	43
	26	0	39	12	17	68
	27	0	49	11	23	83
	28	0	55	11	35	101
	29	0	68	15	36	119
	30	0	82	29	41	152
	31	0	89	29	27	145
	32	0	118	42	62	222
	33	0	107	79	57	243
	34	0	0	3	0	3
	35	0	0	1	0	1
<b>Total</b>	<b>11</b>	<b>698</b>	<b>259</b>	<b>341</b>	<b>1309</b>	

# Results





# Conclusions

- Approximately one out of four children exposed to ANS, was not born preterm, and a substantial fraction of those born at GA <34 weeks did not receive ANS treatment. These findings suggest that ANS utilization could be further optimized in Denmark and other locations.
- NHMR appears a feasible source of information on ANS use in Denmark.

