First stage labor duration and risk of adverse neonatal outcome among 46 040 women in Robson 1: A population-based cohort study

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Disclosure of conflict of interest

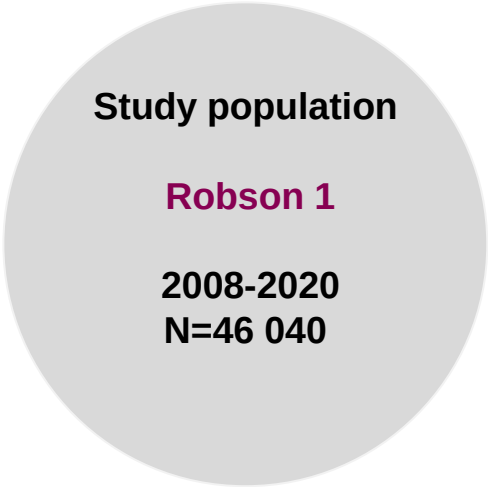
- Vi har inget jäv/intressekonflikter att deklarera
- We have nothing to declare for this study.

Aim:

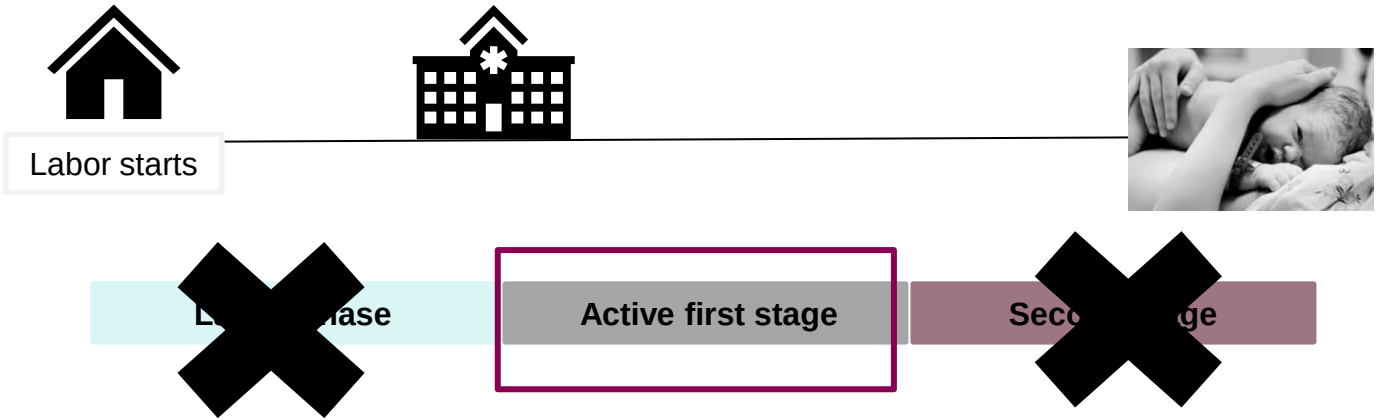
To investigate if increasing active first stage labor duration is associated with adverse neonatal outcome.

Stockholm-Gotland Obstetric Database

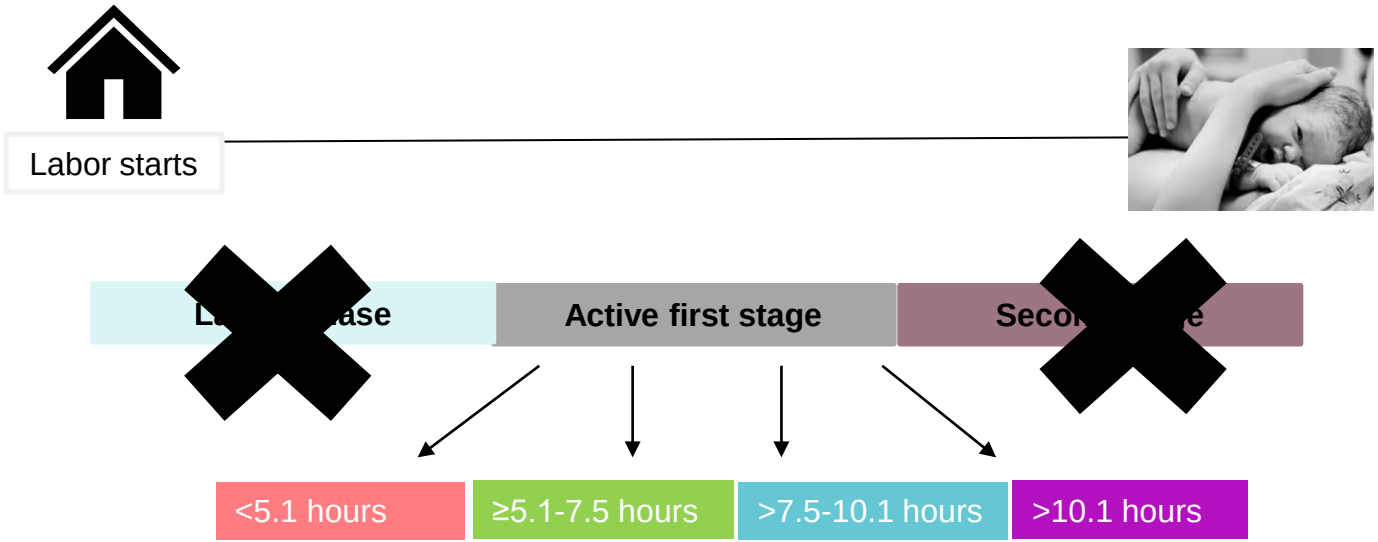
- Includes recorded medical information from antenatal, delivery (including partograph data) and postpartum care from all births in the Stockholm-Gotland Region, 335 153 births (2008-2020) which is 25 % of the obstetric population in Sweden.
- Linked to Swedish Neonatal Quality Register (SNQ)



First stage is a period of time during labor, calculated from 5 cm cervical dilation to fully dilated cervix



Exposure: Active first stage duration



Outcome:

- **Moderate**

A composite of conditions with a low risk of death and/or major long-term consequences

- **Severe**

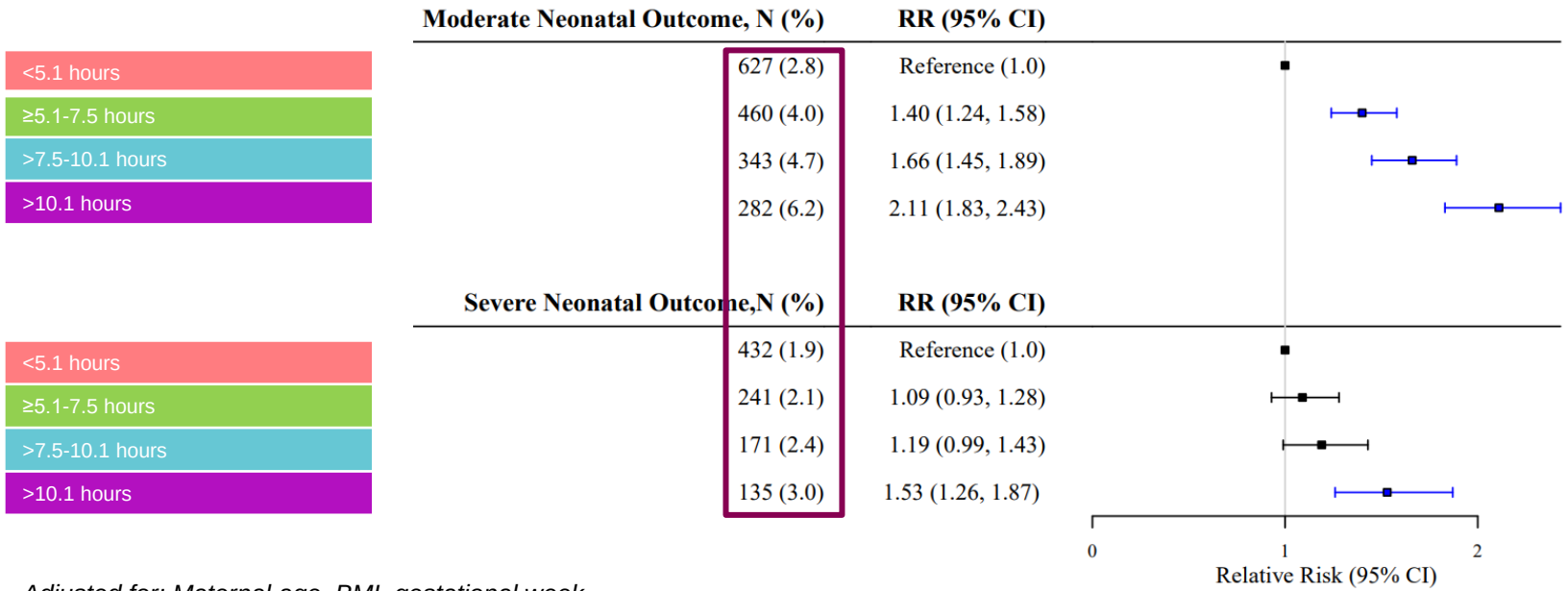
A composite of conditions with a high risk of death and/or major long-term consequences for the neonate

Descriptive statistics of first stage duration (in hours) stratified by neonatal outcome

	N	Median	p75	p90	p95
Study population	46040	5.2	7.6	10.1	11.8
Severe outcome	979	5.7	8.4	11.0	12.8
Moderate outcome	1712	6.2	8.9	11.2	13.2
Normal outcome	43349	5.1	7.5	10.0	11.7

Ex. for interpretation of the distribution.
1 hour= 1.00

Distribution of the proportions of adverse neonatal outcome and the adjusted relative risks

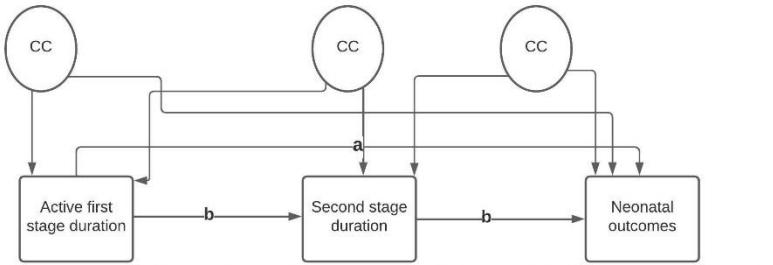


Adjusted for: Maternal age, BMI, gestational week

Mediation analysis for understanding the effect of time during first and second stage

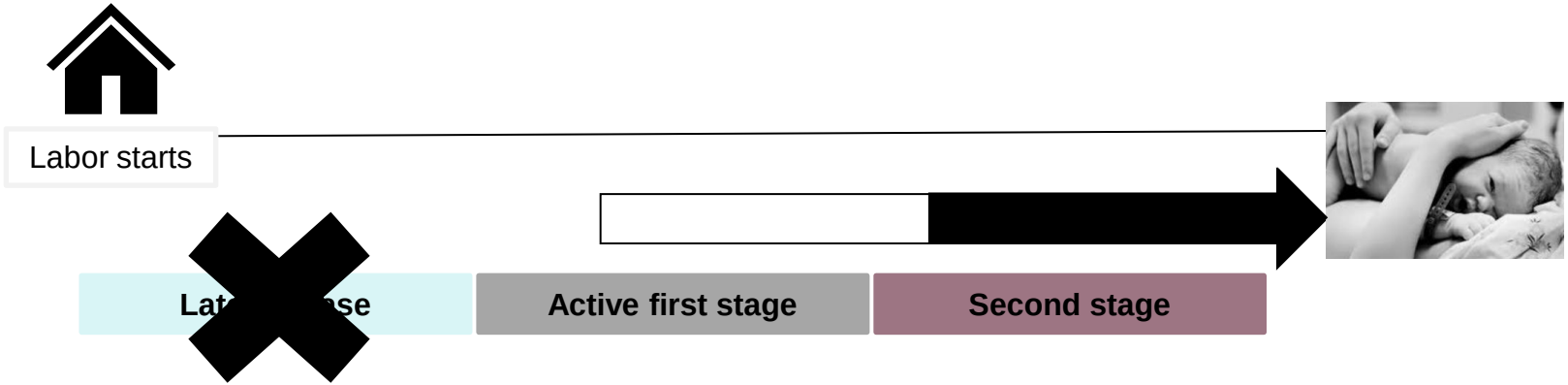
“Is second stage mediating the association between first stage and adverse neonatal outcome?”

“Is the mediated effect of second stage similar for moderate and severe neonatal outcomes?”



Directed acyclic graph to illustrate the possible structural relationship between Active first stage duration, second stage duration. CC represents common causes (confounders) of any variables in the graph, unmeasured or measured. Arrow a represents the total effect of active first stage duration on neonatal outcomes. Arrow b represents the partial indirect effect of active first stage of labour duration mediated through second stage duration.

Mediation analysis, adjusted results from mediation analysis



Moderate	Percentage mediated (95% CI) : 20.99 (12.85, 31.61)
Severe	Percentage mediated (95% CI) : 13.60 (5.38, 38.17)

Conclusions

Clinical implications

- Descriptive data for the distribution of duration stratified by outcome shows that moderate outcomes had the longest duration
- Increased first stage duration was associated with an increased absolute and relative risk of adverse neonatal outcome
- Mediation analysis showed that most of this association was due to the duration of first stage of labor for both moderate and severe outcome

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Thank you to my co-authors and to all women and neonates behind these numbers.

Table 1 information for the Study population N= 46 040

		N (column-%) by active first stage duration (hours)			
	Total % /N	Category 1 (c1): <50th percentile, <5.1 hours	Category 2 (c2): ≥50th -75th percentile, 5.1-7.5 hours	Category 3 (c3): >75th -90th percentile, 7.5-10.1 hours	Category 4 (c4): >90th percentile, >10.1 hours
Proportions of composite neonatal outcome					
Severe	2.1/979	432 (1.9)	241 (2.1)	171 (2.4)	135 (3.0)
Moderate	3.7/1712	627 (2.8)	460 (4.0)	343 (4.7)	282 (6.2)
Normal	94.2/43349	21740 (95.4)	10745 (93.9)	6751 (92.9)	4113 (90.8)
Mode of birth					
SVD	79.0/36381	19534 (85.7)	8903 (77.8)	5207 (71.7)	2737 60.4)
CD	4.3/1985	382 (1.68)	490 (4.3)	518 (7.1)	595 (13.3)
OVD	16.7/7674	2883 (12.7)	2053 17.9)	1540 (21.2)	1198 (26.5)

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Epidural use					
Yes	84.7/39030	17917 (78.6)	10204 (89.1)	6649 (91.5	4260 (94.0)
No	15.2/7010	4882 (21.4)	1242 (10.9)	616 (8.5)	270 (6.0)
Oxytocin during first or second stage					
Yes	78.7/36254	15028 (65.9)	9916 (86.6)	6860 (94.4)	4550 (98.2)
No	21.2/9786	7771 (34.0)	1530 (13.8)	405 (5.6)	80 (1.8)
Birthweight, g					
<3000	11.8/5415	3541 (15.5)	1137 (9.93)	510 (7.0)	227(5.0)
3000-3500	39.2/18036	9873 (43.3)	4376 (38.2)	2471 (34.0)	1316 (29.1)
3501-4000	36.2/16665	7388 (32.4)	4372(38.2)	3000 (41.3)	1905 (42.1)
4001-4499	11.2/5177	1775 (7.9)	1353 (11.8)	1127 (15.5)	922 (20.4)
>4500	1.6/718	207 (0.9)	203 (1.8)	154 (2.1)	154 (3.4)
Missing	0.06/29	15 (0.07)	5 (0.04)	3 (0.04)	6 (0.13)