

#### Slide 1

Hi, my name is Josphine Bilsteen, and I'm a researcher working with Danish National Registers and I'm based in Copenhagen. For today's session I'd like to take you through the process of conducting a collaborative study of using Nordic register data. And of course, we will also touch upon the long-term consequences of the degree of prematurity.

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Initial idea for this study was to investigate the association between gestational age at birth and educational level at 25 years. We were particularly interested in seeing whether this association might differ in children from high versus low socioeconomic background. Socioeconomic differences in this association would indicate, that something in the family environment might improve the educational outcomes of the children born preterm.

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Several studies found, that individuals born preterm have poorer school performance and lower educational level than individuals at born term. However, few of these studies investigated whether this association differed according to family socioeconomic background. For the studies that did investigate this, findings have been inconsistent as some studies show that the association between preterm birth and educational level was more pronounced in individuals from families with low socioeconomic position, compared with individuals from families with high socioeconomic position. Whereas other studies found that the association was similar across different levels of family socioeconomic background.

These inconsistent findings maybe due to methodological differences. Some studies define preterm birth as a binary outcome, whereas others look at degree of preterm birth. The outcomes varied a lot. Some looked at developmental delay and others looked at educational and cognitive outcomes in the age range of 2 to 30 years. Family background was also defined in various ways, for instance childhood poverty, parenting, neighbourhood deprivation, parental education, occupation, education and income. Finally, the context differs in these studies. Some studies were conducted in North America, others in Asia and some in Europe. The data sources were also different. Some used cohort data and others used register data.

Our idea was therefore to take advantage of the Nordic registers to address this research question in four different settings with similar educational systems and health care systems. In addition, the Nordic registers would allow us to define the study populations and the variables of interest in the same way across the four different settings.

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This study was a collaboration between partners in RECAP preterm, and especially four partners with access to national Nordic register data. We also collaborated with other research projects such as WELLIFE ad PremLife.

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Now I'd like to walk you through the process of this collaborative study. First, we defined the research question and we identified relevant collaborators and also collaborators with access to Nordic register data. Then we investigated data availability, which was crucial for the definition of the study populations, but

also for harmonization of variables of interest. Then we developed statistical methods and statistical code for the analysis that could be shared between countries.

Finally, we conducted the analyses and we merged the findings and received feedback from each country from these findings. In the coming slides I would like to elaborate a bit of some of these steps.

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Each study population included individuals born from 1987, as this was the year when the Finnish Medical Birth Register was established. These individuals were followed up until the age of 25, and the number of individuals in the study population ranged from 200 000 in Finland up to 500 000 in Sweden.

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We harmonized the variables of interest of this study in a group of researchers with in-depth knowledge of their national registers. One of the variables we harmonized was educational level and here we chose to map the national educational codes to the International Standard Classification of Education. These different categorizations can be seen from the bar chart, which also shows that the most common highest completed educational level at 25 years was upper secondary education in all the four Nordic countries.

The outcome of interest in this study was “not having completed upper secondary education or more”. That corresponds to the yellow bars. For Finland we have to be aware that primary, lower secondary and missing educational level cannot be separated from each other, but we expect that the level of missing is quite low. This kind of harmonization of variables was done for all variables.

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I developed the statistical methods and the scripts in collaboration with my colleagues. Then I conducted the analyses in the Danish study population and I went to Oslo in Norway and conducted the analyses in Norway, as well. Then I shared the script with my colleagues in Stockholm and Finland, and they were able to run the analyses with assistance from me and other researchers and then they sent back the results. I then merged all the findings together and received feedback from all included collaborators in the study.

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And now to the findings of the study. Did parental educational level modify the association between gestational age and educational level at age 25? Let's take a look at Denmark and Norway to start with. From this plot you can see that the relative risk of not having completed secondary education at age 25 years increased with lower gestational age even in individuals born early term, defined as being born in weeks 37 and 38. This association was observed for all levels of parental education.

Thus, these findings do not indicate that parental educational level can modify the association between gestational age and educational level.

Let's now take a look at Finland and Sweden. Here we see the same tendencies, however, for individuals whose parents have lower educational level we see no association. However, the group of individuals whose parents have lower educational level were quite small in Finland and Sweden compared to Denmark and Norway. This could be one of the reasons for these slightly different findings.

In conclusion, I would say that parental educational level cannot mitigate the disadvantages of shorter gestational age.

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This was a brief overview of the process of conducting a collaborative study within the RECAP preterm project. Thank you so much for following this presentation and please feel free to contact me if you have any kind of questions or comments.