

The Impact of the Coronavirus Pandemic on Perinatal Activity

What's going on?

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February 2021



I don't know!







Thanks:

- Dr. Cath Harrison Transport consultant (Embrace, Neonatal lead), Chair of the UK Neonatal Transport Group
- Professor Elizabeth S. Draper Professor of Perinatal and Paediatric Epidemiology, The Infant Mortality and Morbidity Studies (University of Leicester), Co-lead for MBRRACE-UK (Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries in the UK)
- Charlotte Bradford Senior Information Manager (Yorkshire & Humber Neonatal ODN)
- Hilary Farrow Quality Improvement Manager (Y&H Maternity Clinical Network, NHS England and NHS Improvement - North East and Yorkshire)

No conflicts of interest to declare



- Specialised inter-hospital transport
- Newborn and critically ill children
- Yorkshire and the Humber
- ~180 transfers / month (about 75% neonatal)
- Covers 15 NHS Trusts (including 20 hospitals)
- Also arrange antenatal (*in utero*) transfers for women with threatened preterm labour



Two early studies:

- Denmark decreased preterm births
- London increased stillbirths

- Decreased infectious triggers for preterm birth
- Women scared to go to hospital

Anecdotal evidence: fewer transfers (*in utero* and post-natal), neonatal units not as busy, paediatric intensive care units being used for adult care ...

Aim

To investigate the impact of SARS-CoV-2 and related public health measures ("lockdown") on perinatal health indicators.

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In a geographically defined population, in relation to previously (e.g. last 5 years), have there been changes in:

- birth rates (live births, stillbirths, preterm births);
- birth related morbidity
- place of birth and associated perinatal transport activity (i.e. antenatal and postnatal transfers)
- during the "first wave"^{*} of the pandemic and the associated lockdown?

* Weeks 13-25 (March 23rd to June 15th)

Do any of these factors differ by ethnicity?

Yorkshire & Humber





~5.5 million people (2018)

Compared to England:

- Older, less ethnically diverse
- Poorer life expectancy
- Higher proportion of children in lower income households
- Higher infant mortality rate

Ref: Health profile for Yorkshire and the Humber 2019, LKIS Yorkshire and the Humber (January 2020) - https://intel-hub.eastriding.gov.uk/wp-content/uploads/ 2020/04/Health-profile-for-Yorkshire-and-the-Humber-PHE-2020.pdf



Birth data:

- a: Maternity Services dashboard "aims to bring together maternity information from a range of different sources. It supports the aim of the Maternity Transformation Programme in implementing the Better Births report." (2016)
 - Maternity Services Data Set legal basis 2018
 - MBRRACE-UK Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK
 - Approaching hospitals individually...

Transport data: Embrace Transport Service

Neonatal data: Yorkshire & Humber Neonatal network



Obstetric data

- Number of women delivering
- Number of babies delivered
 - Livebirths
 - Stillbirths

From Embrace

- Antenatal (in utero) transfers
- Neonatal transfers <27 weeks' GA</p>

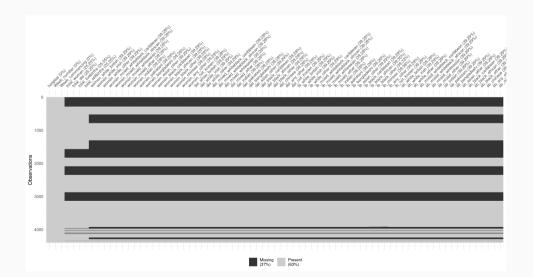
Neonatal network data

- <27 week births</p>
- Babies with Hypoxic Ischaemic Encephalopathy
- Babies with Meconium Aspiration Syndrome

Obstetric data

NHS Trust	Historic data	2020 data			
А	×	\checkmark			
В	\checkmark	\checkmark			
С	\checkmark	\checkmark			
D	\checkmark	\checkmark			
E	×	part			
F	\checkmark	part			
G	×	part			
Н	\checkmark	\checkmark			
Ι	\checkmark	\checkmark			
J	\checkmark	\checkmark			
К	no ethnicity breakdown				
L	no ethnicity breakdown				
M	wrong dates				

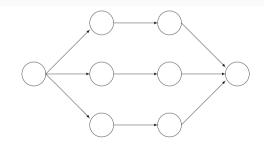




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Imputation: "the process of replacing missing data with substituted values." FROM: https://en.wikipedia.org/wiki/Imputation_(statistics)

Multiple imputation: uses multiple data sets and then averages results across those data sets (Rubin 1986)



Incomplete data Imputed data Analysis results Pooled result

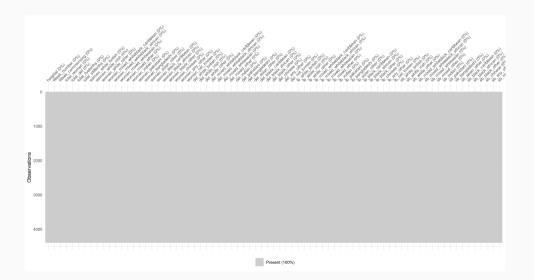
MNAR v MAR v MCAR

Pattern?	Data explains pattern? Yes No			
Yes	MAR	MNAR		
No	—	MCAR		

Imputation is based on:

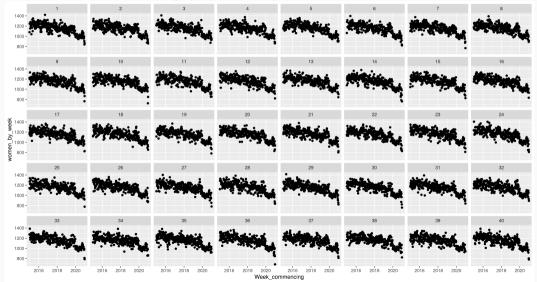
- Hospital
- Date





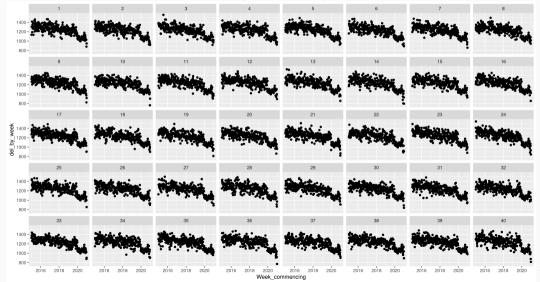


Number of women delivering by week (40 imputed data sets)



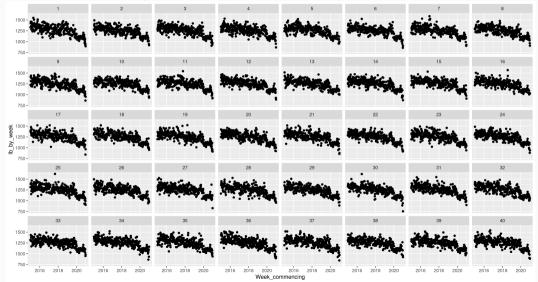


Number of deliveries (i.e. total births) by week (40 imputed data sets)





Number of live births by week (40 imputed data sets)





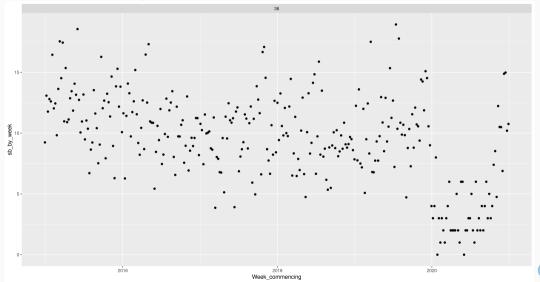
Number of stillbirths by week (40 imputed data sets)



Focus on one data set



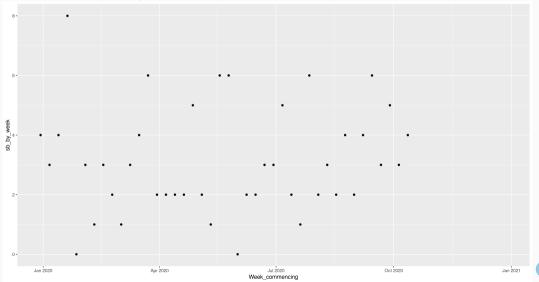
Number of stillbirths by week



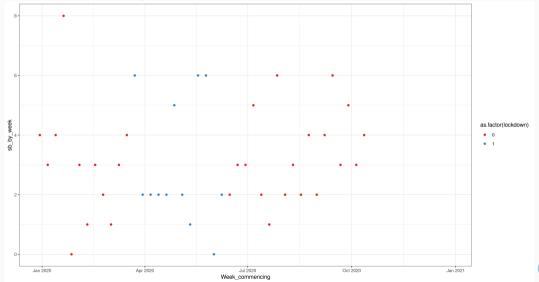
Look at 2020 only



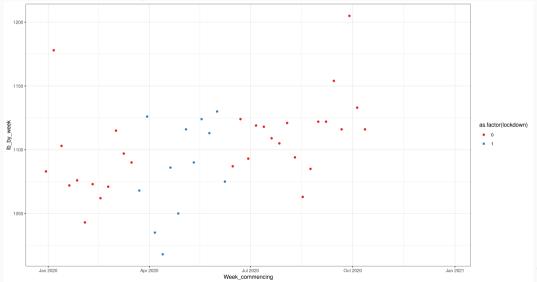
Number of stillbirths by week



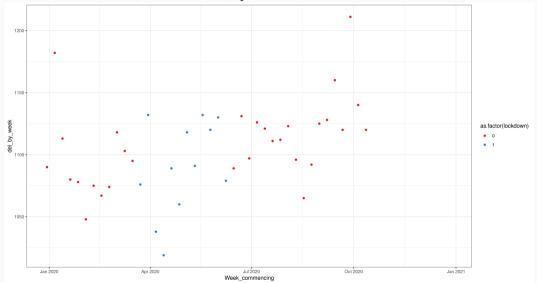
Number of stillbirths by week



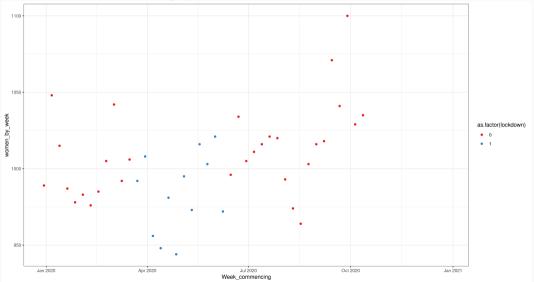
Number of live births by week



Number of deliveries (i.e. total births) by week



Number of women delivering by week





- > No obvious changes in number of women delivering or in live / stillbirths
- But original questions (also) related to morbidities and place of birth...

Extreme preterm births

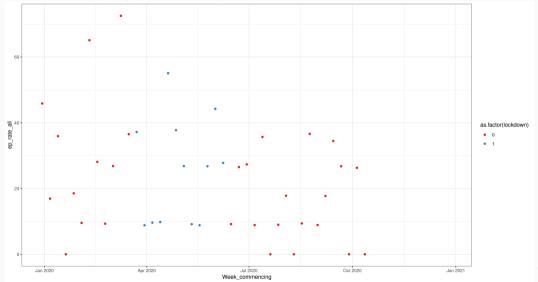
Admissions / week	2015	2016	2017	2018	2019	2020
Whole year	2.94	3.21	3.04	3.38	3.12	2.58 *
Weeks 13-25	2.69	3.08	2.62	3.69	3.77	2.62
Weeks 26-40	2.44	3.13	3.44	2.69	2.25	1.88

* 2020 to week 40 only; lockdown occurred from weeks 13 to 25.

Extreme preterm births (<27 weeks' GA)



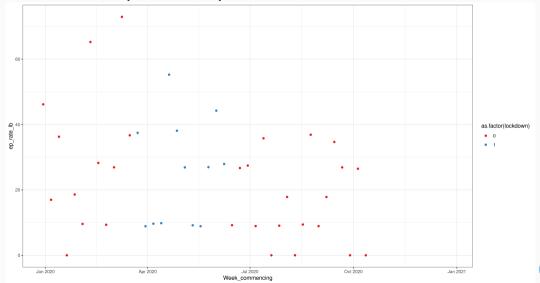
Number of extreme preterm births per 10,000 deliveries (live + stillbirths)



Extreme preterm births (<27 weeks' GA)



Number of extreme preterm births per 10,000 live births



SARS-CoV-2 and perinatal care

Summary

No obvious changes

Two early studies:

- Denmark decreased preterm births
- London increased stillbirths
- https://ripe-tomato.org/2020/10/08/indirect-effects-of-the-covid-19-pandemic-on-pregnancy/

Other studies:

- Ireland decreased ELBW / VLBW live births
- California no change in PT live births
- England no change in SB rates
- Sweden no change in PT delivery or SB
- Spain no changes in PT delivery or SB

- Neonatal admissions only
- Single tertiary hospital

- Single region, pop. 473,000
- routine data
- routine data
- register data
- regional hospital data



Obtain full data

- Avoid imputation!
- More power with longer time-series??
- Question: which time periods to use e.g. lockdown + post-lockdown + second lockdown, or just pre/post-pandemic measures?

Create an "adverse outcome" indicator

- Hypothesis: increased adverse outcomes
- Perinatal asphyxia, meconium aspiration, stillbirth, preterm birth

Look at place of birth (more specifically - transfers)

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Conclusions



SARS-CoV-2 effects

- Probably no link between SARS-CoV-2 / public health measures and perinatal health.
- BUT probably behaviour is important (subtle/local effects)
- Watch this space for more definitive results as data come in...)

Spreeuwenberg et al, *Int. J. Epi.* (2018), doi:10.1093/aje/kwy191 Reassessing the Global Mortality Burden of the 1918 Influenza Pandemic

General learning points

- > Data cleaning, and understanding your data, is very important
- Data collection is hard even in countries with good data systems
- Data silos hinder knowledge



Thank you!