

Covid-19 Statistics: reliable evidence?

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- Are metal-on-metal hip replacements are defective?
- If her mother had been given steroids, my client X would not have cerebral palsy (CP).
- Did this drug damage the sight of my patient?

To my mind, these are informally expressed.

As a **consultant**, rather than an **expert**, I would clarify questions.

- If steroids had been given, would X still have CP?
- What caused X to develop CP?
- Is the cause of X's CP less likely to be prenatal than perinatal?

If steroids had been given, would X still have CP?

- Benefit of steroids given 24 hours before premature birth?
- Benefit of steroids given 24 hours before birth at 24 weeks or 28 weeks?
- Benefit of steroids given 24 hours before birth at 26 weeks, for twin boys?
- Benefit of steroids given 24 hours before birth at 26 weeks, for twin boys, one still-born?
- Benefit of steroids given 24 hours before birth at 26 weeks, for twin boys, one in breech position, whose mother is a heavy smoker, BMI 37, history of 5 miscarriages, and ruptured membranes?

More general questions - more data, publications

Headline for BBC Scotland, on Thursday 22 October 2020:
A further **17** people who tested positive for the virus in the last 28 days have died.

Daily Mail on Thursday 22 October 2020:
The number of people dying of Covid-19 in England and Wales
... **438** between October 3 and 9.

How many people die in [England and Wales](#) in an ordinary:

- year?
- January?
- August?
- week?
- day?

How many people die in [England and Wales](#) in an ordinary:

- year? About 530 thousand, half a million, 2015-2019
- January? 54 to 64 thousand, 2018-2020
- August? 37 to 47 thousand, 2018-2020
- week? 8 to 14 thousand
- day? 1000 to 2000, 2015-2019

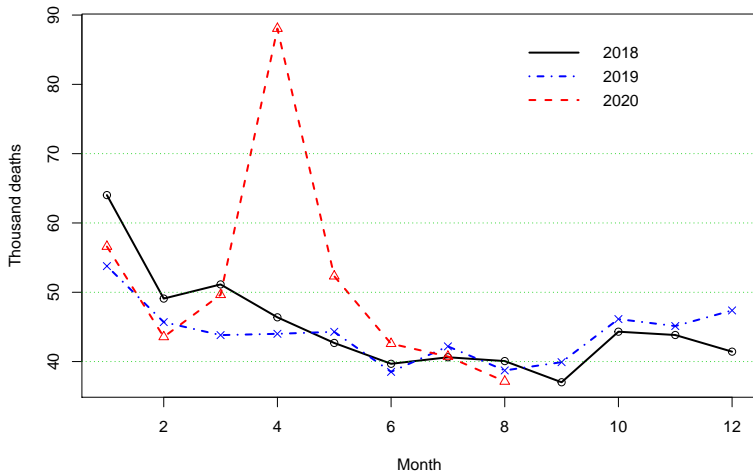
Daily Mail on Thursday 22 October 2020

The number of people dying of Covid-19 in England and Wales
... **438** between October 3 and 9.

Covid-19 Statistics and death

Office for National Statistics.

Deaths each month, England and Wales, 2018 to 2020



Covid-19 Statistics: reliable evidence?

Death is certain. Or is it?

Coronavirus: England death count review reduces UK toll by 5,000

12 August

Coronavirus pandemic



A review of how deaths from coronavirus are counted in England has reduced the UK death toll by more than 5,000, to 41,329, the government has announced.

The recalculation is based on a new definition of who has died from Covid.

Professor Jane L Hutton

- I expected this: knowledge or cynicism?
- Changes made to issuing of death certificates
- Cause of death coding:
 - Suicide
 - Liver cirrhosis

Covid-19 Statistics: How many infections?

What price is worth paying for test and trace?

Test accuracy:

Sensitivity Probability person with disease (D^+)
has positive test (T^+).

Specificity Probability person without disease (D^-)
has negative test (T^-).

So, if I get a positive test result, ...
what is the probability I have the disease?
What else do you need to know?

Have you come across this issue before?

Covid-19 Statistics: How many infections?

Imperial College London *Role of testing in COVID-19 control* (Grassley et al., 2020):

“PCR sensitivity and specificity of about 80-90% and 100% respectively (20, 21)”.

Reference 20, Ai et al., 2020: 1014 cases

Defines rtPCR tests as *reference*; specificities 19% to 30%.
My close reading, alternative tables, (sensitivity, specificity)
(65%, 81%), (70%, 89%) or (80%, 93%).

Reference 21, Long et al., 2020: 36 cases

Sensitivity: 83.3%. Specificity not reported, at most 31.7%

Recent: About 76% sensitivity, 99.1% specificity claims, with RT-PCR as “gold standard”?

Covid-19 Statistics and infections

765 per 100,000 Nottingham; 118 per 100,000 Richmond.

PCR sensitivity of 80% and specificity of 93%
(most optimistic specificity 20,21).

If people going out are typical, and we test 100,000, what proportion of people with positive tests have COVID-19?

Nottingham positive test results:

People with COVID-19: $765 \times 0.8 = 612$

People without COVID-19: $(100000-765) \times (1-0.93) = 6945$

Total 7557 positive test results, of which **8.1%** true positives.

Richmond: **1.3%** true positive rate.

What if sensitivity is **99.1%**?

Nottingham: **40.7%** true positive rate.

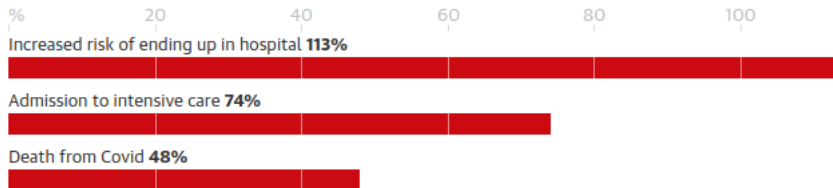
Richmond: **9.1%** true positive rate.

Covid-19 Statistics and obesity

What is your height? weight?

Do you want to reveal your $BMI = \text{weight in kg} / (\text{height in m})^2$?

People with obesity are at greater risk of hospitalisation, intensive care and death from Covid



Guardian graphic | Source: University of North Carolina at Chapel Hill. Obesity defined as person with a BMI over 30

What does "increased risk" mean?

What was the quality of the data?

Covid-19 Statistics and obesity

CHES: 29045 patient records, 1 October 2020

Two fields on obesity: both missing for 44.6%
"obesityclinical" 47.2% and "obesitybmi" 65.4% missing.

Clinical obesity (obesityclinical)

	No	Borderline	Yes	Unknown	
Percent	19	40	1	12	29
Percent known	75	3	22		

BMI (obesitybmi) re-coded as clinical obesity

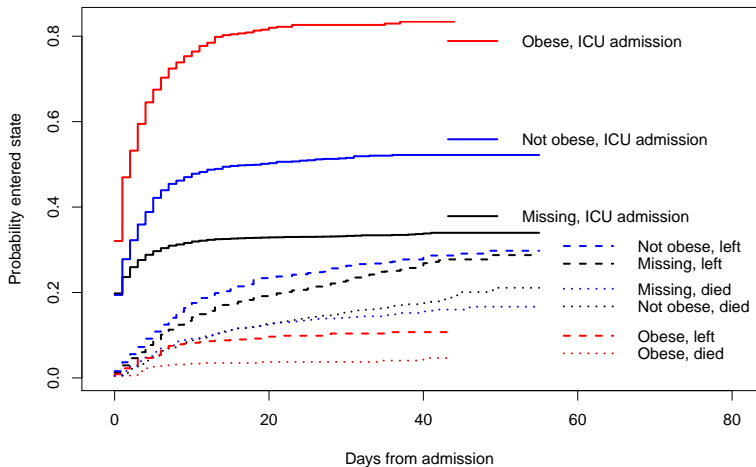
	No	Borderline	Yes	Unknown	
	< 25	25 - ≤ 30	> 30		
Percent	52	20	6	8	13
Percent known	59	17	24		

In England, > 29% people over 54 years are obese;
about 40% are overweight, borderline obese.

Covid-19 Statistics and obesity, ICU & death

CHES: 23 April 2020

Time from hospital admission to ICU: by obesity



Covid-19 Statistics: What is the question?

Expert, advisor, consultant

What are the aims of a decision?

What are the logical implications of decisions?

What does controlling an epidemic mean?

Is the right aim: **Minimise deaths from Covid-19?**

Or: **Minimise deaths due to Covid-19 and our decisions?**

Or: **Minimise the impact of Covid-19 on well-being . . . this year?**

Three basic principles of public health?

1 minimise long-term rather than short-term Covid-19 mortality;

2 minimise morbidity and mortality from all diseases; and

3 minimise disease and mortality in the entire population, including the working class and the poor.

(Barrington Declaration)

“The first thing to do is to decide what the question is.”

Should an **expert** tell you what the question is?

Should an **advisor** tell you what decision to make?

Should **consultants** discuss what the issues and options are?

Which experts do you prefer?

- An expert who gives a single answer with no uncertainty or alternatives?
- An expert who gives several answers, and tries to indicate uncertainty, and how different assumptions might suggest different decisions?

- ONS and UK Data Service have important resources
- I am proud of most of my ONS stats colleagues' work
- Experts need data
- Data need context
- Data need quality inspection and control
- I think collaboration between experts of different disciplines is important. Very important.

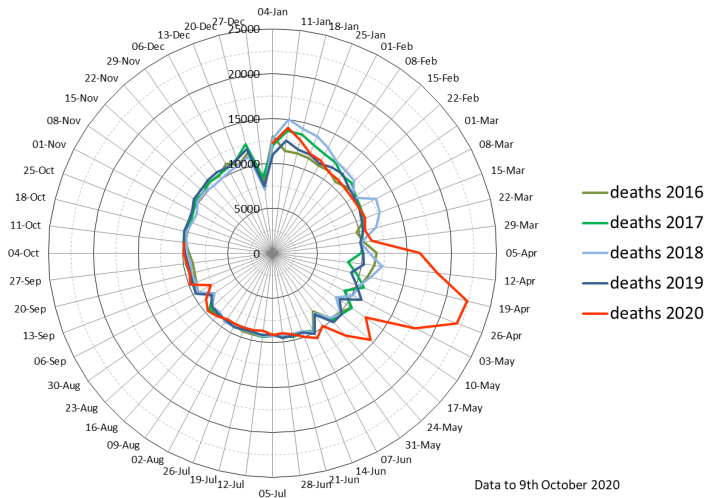
Thank you for the invitation!

go.warwick.ac.uk/JLHutton

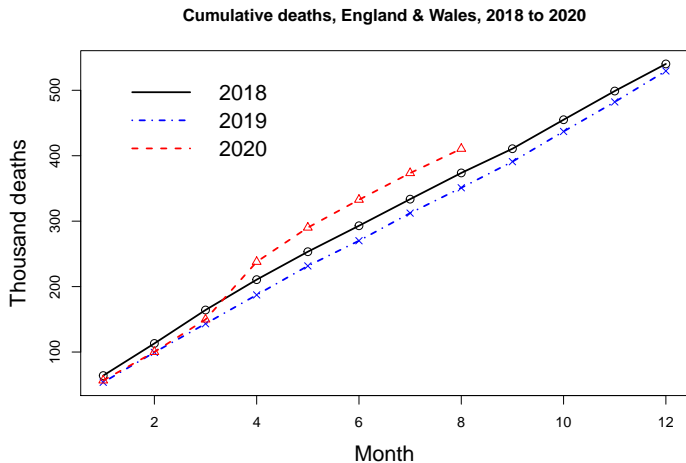
Covid-19 Statistics and death

Centre for Evidence-Based Medicine, Oxford University

Total deaths per week England and Wales



Covid-19 Statistics and death registration

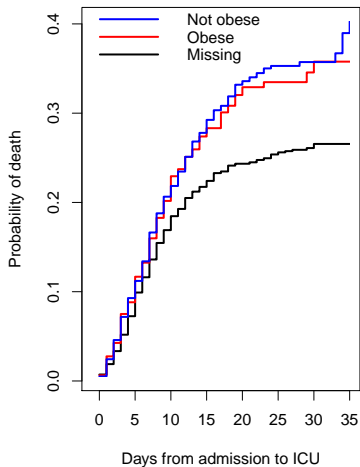


2018: 73.8% of deaths registered within 7 days (2001: 92.7%).

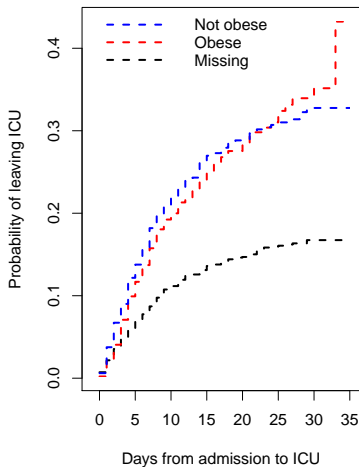
Covid-19 Statistics and obesity, ICU & death

CHES: 23 April 2020

Deaths in ICU by obesity



Leaving ICU by obesity



Covid-19 Statistics and obesity

CHES: 29045 patient records, 1 October 2020

Comparison of obesity fields. Row percentages

BMI	Clinically assessed obesity			
	No	Borderline	Yes	Unknown
No < 25	93.1	0.2	1.8	4.9
Borderline	67.8	13.6	6.6	12.0
Yes > 30	10.5	3.7	75.6	10.2
Unknown	23.9	0.5	7.4	68.3

How good is clinical assessment?

Covid-19 Statistics: What is the question?

What other issues should be taken into account?

... number of people in hospital?

... deaths from COVID-19, or untreated other diseases?

... effects of isolation?

... effects of recession?

... **over what time scale?**

What do we need to know? What do we not know?