ROYAL STATISTICAL SOCIETY

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Challenges of communicating COVID-19 statistics

Misunderstandings can be viral

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Statistical Ambassador

29th March 2021

There are major challenges in communicating COVID-19 statistics.

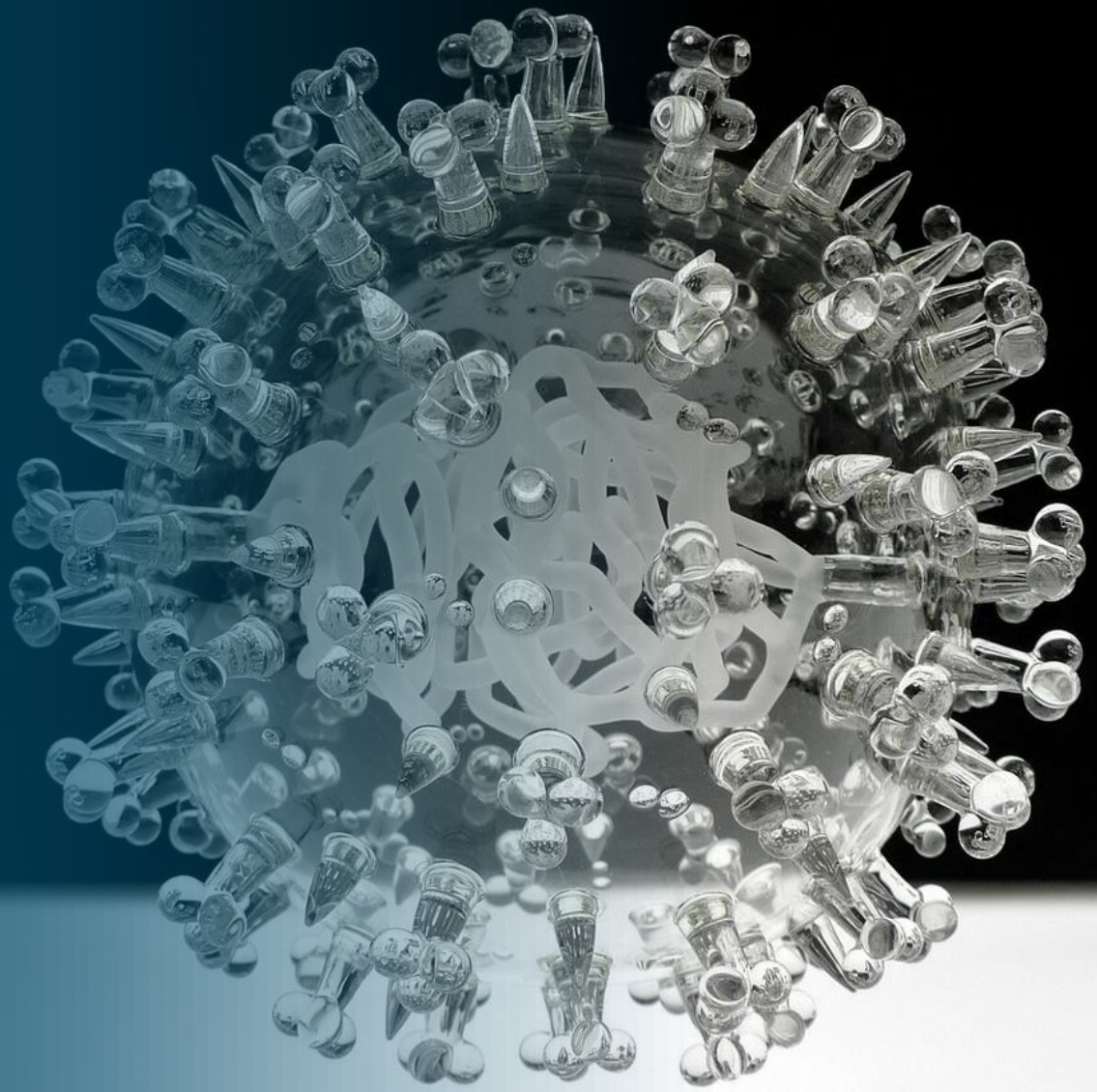
Challenge I: Novel virus, novel statistics

Challenge II: Setting numbers in context

Challenge III: Limited space for explanations

SARS-CoV-2: the sequel worse than Highlander II

One issue has triumphed over others for statistical interest.

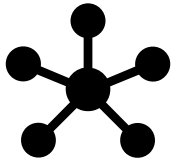


Challenge I: Novel virus, novel statistics

Epidemiology is hard. Understanding a pandemic needs many fields.

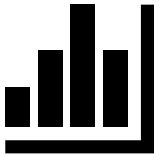
Public health surveillance

Disease modelling



Viruses and virology

Diagnostic testing



Observational studies

Immunology and vaccines

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Challenge I: Novel virus, novel statistics

There are common misunderstandings of pandemic statistics.

Measures	Definition	Limitations
Daily confirmed COVID-19 cases	New people with a positive test, reported in the last 24-hour period	• Confirmed cases are not all cases • There are reporting delays
Daily confirmed COVID-19 deaths [in England, Scotland & Northern Ireland]	Deaths within 28 days of a positive test from any cause, reported in the last 24-hour period	• The 28-day window is arbitrary • Not death certificates • There are reporting delays
Case fatality rate	Confirmed deaths divided by the number of confirmed cases	• Not the infection fatality rate • Missing cases and deaths

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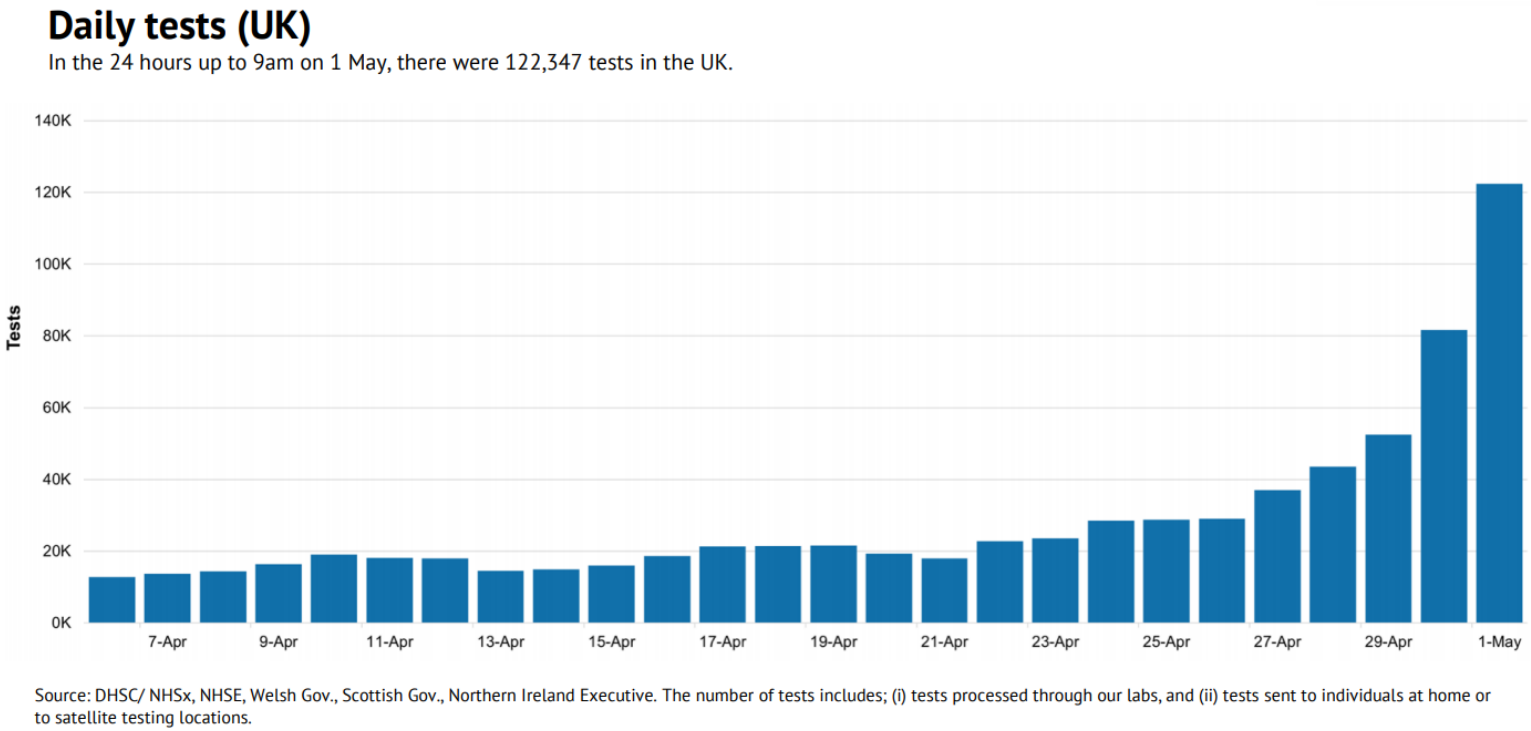
Challenge I: Novel virus, novel statistics

Health Secretary on 1st May 2020:

"We have now met our goal. The number of tests yesterday on the last day of April was 122,347."



Source: DHSC/ NHSx, NHSE, Welsh Gov., Scottish Gov., Northern Ireland Executive. The number of tests includes; (i) tests processed through our labs, and (ii) tests sent to individuals at home or to satellite testing locations.

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Challenge I: Novel virus, novel statistics

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The number of tests includes;
(i) tests processed through our labs, and
(ii) tests sent to individuals at home or to satellite testing locations.

Until the government published revised data on 4 July, it was not possible to see how many tests were actually processed by labs. Using this new data, we can now say that 83,143 tests were processed on 30 April.

Source: DHSC/ NHSx, NHSE, Welsh Gov., Scottish Gov., Northern Ireland Executive. The number of tests includes; (i) tests processed through our labs, and (ii) tests sent to individuals at home or to satellite testing locations.

Challenge II: Setting numbers in context

What is the comparison against? What helps readers understand?

Confirmed cases or deaths	Infection fatality rates	Adverse events in vaccines
 Other countries	 Other diseases	 Acceptable thresholds
 The past or expectations	 Between age groups	 Absolute & relative risks

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Challenge II: Setting numbers in context

The absence of standardised definitions complicates comparisons between countries. This is an ECDC table for COVID-19 deaths:

Country	Classification	Setting	Time limit
Belgium	Lab-confirmed and probable	Hospitalised and community	
Hungary	Lab-confirmed	Hospitalised	
Ireland	Lab-confirmed	Hospitalised and community	Within 28 days

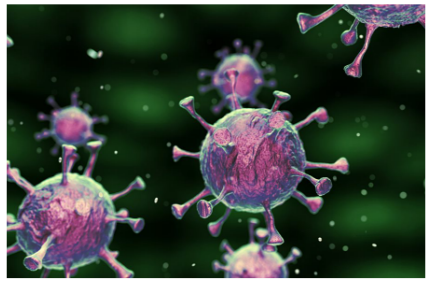
Challenge III: Limited space for explanations

What do the numbers mean? What is the uncertainty?

Type	Considerations
Administrative counts	What administrative system is the count from? Are there other systems to compare against? How is the count defined? What might be the count be missing?
Survey estimates	What does the survey measure? What was the sampling frame and mode? What uncertainties are there in the estimate? What non-sampling issues could affect the estimate?
Model outputs (or estimates)	What are the model inputs? What is the model seeking to estimate (e.g. prediction, scenario)? What is the uncertainty in the model estimates?

Challenge III: Limited space for explanations

Short articles can help elucidate statistical issues.



A statistician's guide to coronavirus numbers

06.04.20 | Statistics news

Our Statistical Ambassadors have collated an essential guide for understanding statistics about COVID-19. Here, they list definitions, things to look out for, and what you should do about the numbers you are seeing.

During this COVID-19 pandemic, you will hear or read about many different numbers. The Royal Statistical Society exists to help the public better understand statistics. We have prepared this short guide to help you at this difficult and uncertain time.

Key points

- The number of confirmed cases will be less than the number of actual cases.
- Comparisons of case and death numbers between countries may not be meaningful.
- Models produce estimates with plausible ranges. These models can help us understand the likely effects of policies.

Behind the numbers: what does it mean if a Covid vaccine has '90% efficacy'?

David Spiegelhalter and Anthony Masters

Confusion surrounds the vaccines' effectiveness. The leading Cambridge professor clarifies the data behind the trials

▲ People rest in Salisbury Cathedral, England, after receiving the Pfizer/BioNTech vaccine. Photograph: Neil Hall/EPA

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A short guide to communicating statistics

1. **Meaning:** Say what the numbers mean, avoiding jargon
2. **Limitations:** Relay key limitations with the statistics
3. **Uncertainty:** Show plausible ranges of values
4. **Comparisons:** Different methods can come to different estimates
5. **Data visualisation:** Graphs are powerful for showing context

Share statistics, not misinformation.

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Methods and sources

- The presentation format comes from the Royal Statistical Society.
- The glass SARS-CoV-2 image is credited to Luke Jerram.
- Public Health England define COVID-19 cases and daily deaths on their dashboard.
- The daily test slide comes from the UK government press conference on 1st May 2020. Full Fact wrote an article about whether the UK government met its testing targets.
- The European Centre for Disease Control and Prevention have a COVID-19 surveillance report, including some definitions of daily COVID-19 deaths in each country.
- The Statistical Ambassadors wrote a guide to coronavirus numbers, published in April 2020. The 'Weekly Stats Uncovered' articles are on The Observer website and in the Sunday print edition.