

# Statistics, Data and Covid

Ten statistical lessons the government can learn from the past year



Statistics have played an important role both in our understanding of the coronavirus pandemic, and our attempts to fight it.

Case numbers, the R number and rates of mortality have become familiar features of the daily news. Behind the scenes, statisticians have been playing a vital role in the response to the disease, producing data to track the virus, to understand what treatments and infection control measures work, and to inform the public.

The past year has also identified some important lessons for government on how to invest in and make use of statistics to respond to a major health emergency. This document sets out ten things the government should do now, to ensure that the country's data infrastructure is prepared for the next crisis, whatever form it takes.



# Invest in public health data

## *Principle*

Public health data is central to understanding and responding to a pandemic.

To work well, this requires ongoing investment, forward planning on how the data will be analysed, and effective joint working between organisations and across the four nations of the UK.

## *What's wrong and what's right*

For some time, the UK has underinvested in health data and neglected how the data we do produce is organised.

England's health data architecture in particular is fragmented, and there is inadequate linkage between government, PHE, NHS and other producers of data. There are also different processes and systems for each of the four nations of the UK. This makes it challenging to present a coherent UK-wide picture.

## *Recommendation*

Public health data should be regarded as critical national infrastructure.

A review of health data should be conducted covering (i) the systems and organisational structures for gathering and publishing health and demographic data; (ii) levels of investment; (iii) how to join up data across nations and organisations; and (iv) how the infrastructure is aligned with the data analysis.

The JBC and the new National Institute for Health Protection have important roles to play in this and should be appropriately resourced.

# 2

## Publish the evidence

### *Principle*

If the public is to be asked to make substantial sacrifices in an uncertain and rapidly evolving situation, the government must be transparent about data – and about uncertainty.

### *What's wrong and what's right*

When data and analytical studies are used to inform decisions (eg, around which measures apply to different areas, why particular safety measures such as masks are adopted), public trust is undermined if the data and the underpinning studies are not made available.

The UK has seen instances of good practice – especially in Scotland, where the government has regularly published data and a framework for how it is used – and instances of poor practice where supporting evidence has been either absent or inadequate.

### *Recommendation*

All evidence considered by governments and their advisers must be published in a timely manner – and the political and professional record of key players should also be in the public domain.

Consideration should also be given to both expert users and laypeople: which means making both reliable summaries and full data sets available.

# 3

## Be clear and open about the data

### *Principle*

In a pandemic, governments should use data to inform the public, rather than seeking to present data in a manner intended to persuade the public that its decisions are the right ones – part of this means making data and analysis accessible to the general public and easy to find.

### *What's wrong and what's right*

It is near-impossible to have a clear overview of what government-produced data and analysis exists – let alone find it. In part this is due to the complicated landscape of UK health data – but it is not helped by the fact that no organisation is tasked with pulling this together centrally. Details of the vaccine rollout have been particularly slow in being made public.

One positive sign is how much some data reporting has improved over the course of the past year: ONS has demonstrated flexibility and innovation, the PHE dashboard has considerably increased the granularity of data that can be downloaded, and the presentation of data at press conferences has improved thanks to new statistical input.

### *Recommendation*

Government should invest in a central portal, including NHS, ONS, PHE and government supported core studies – a web page of links – from which the different sources of official data, analysis protocols and up-to-date results can be found – and a single organisation should be tasked with managing it.

Government needs to explain any concepts key to decision-making, such as the R number, and to explain how these concepts factor into decision-making.

This should be done under Open Data principles.

# 4

## Challenge misuse of statistics

### *Principle*

A powerful independent statistics regulator is required to proactively hold politicians and government departments to account.

### *What's wrong and what's right*

Journalists – especially political journalists – do not always understand data well enough to interrogate it properly and politicians are incentivised to use data to show they are meeting targets. This environment lends itself to misinformation and makes the role of the regulator of statistics very important.

While the Office for Statistics Regulation has seen a recent increase in funding it is not clear that this is sufficient to allow it to hold the government to account proactively against misinformation and infringements of the code of practice. The fact that the UK Statistics Authority is responsible for both the production of official statistics (through ONS) and their regulation (through OSR) has been remarked on in the past, and means that ensuring its independence and capacity is all the more important.

### *Recommendation*

The Office for Statistics Regulation should have its funding augmented and its role for non-departmental statistics clarified – and consideration must be given to how to support its independence.

Greater transparency will allow the use of data by both the government and the media to be challenged by charities, fact checkers and others providing an essential counterpoint.

The valuable role of the Science Media Centre should be recognised and its sustainability ensured – this is a valuable resource for facilitating media-scientist engagement and in particular providing challenge from independent scientific voices.

# The media need to step up to their responsibilities

## *Principle*

Good government and effective media scrutiny go hand in hand. When the media uses evidence well and reports data clearly, better government policy is the result.

Media outlets should clearly be able to express a wide variety of views – but that should not extend to ignoring or misrepresenting data.

## *What's wrong and what's right*

Many UK news outlets chose to cover Covid as a political story, sending lobby journalists rather than science or health journalists to the government's regular briefings. This resulted in poorer coverage of vital facts and less effective scrutiny of policy.

Some newspapers offered a platform for columnists to produce evidence-free views on Covid long after these views has been thoroughly discredited.

On the other hand, specific parts of the UK's media acquitted themselves well, including data teams at the BBC, Financial Times and the Guardian, and newer, online ones, such as the Our World In Data, Full Fact or Unherd.

## *Recommendation*

Government should support media institutions that invest in specialist scientific and medical reporting and make use of it in health crises.

Journalists and editors should brush up on their statistical literacy and take seriously their roles as curators of evidence. Good practice, such as the BBC having a dedicated statistics editor, should be encouraged.

Institutions like the Science Media Centre, Our World in Data and Full Fact that connect informed views to the public deserve greater financial support.



# Build decision-makers' statistical skills

## *Principle*

A health emergency requires our leaders to make decisions on the basis of statistics and data. The more people with statistical training who are in senior roles in the civil service, the better advice and support decision-makers will receive. Politicians with a level of statistical literacy will also be better placed to weigh this advice.

## *What's wrong and what's right*

Statistical thinking is vital when making important decisions (such as when to lock down and how to deploy tests), but it is not straightforward and is often counterintuitive.

The government has some excellent statistically trained advisers, but it could use more, and could do more to promote and develop those it has. Involving more people with these skills in evidence-based decision-making will be beneficial to society in general.

## *Recommendation*

Politicians and senior officials should seek out statistical training – through programmes like the Data Masterclass for Senior Leaders.

The government should invest in attracting more people with statistical skills and supporting them into leadership positions, and providing training and retraining opportunities – growing programmes like the Government Statistical Service's apprenticeships.



# Build an effective infectious disease surveillance system to monitor the spread of disease

## *Principle*

When dealing with a new disease we need to learn as much about it as possible as quickly as possible. The sooner we can learn how it is most likely to spread and at what stages people are likely to be contagious, the quicker we can act to slow its spread.

## *What's wrong and what's right*

In England, the early response was hampered by paucity of data: we did not have the scale of surveillance needed to monitor the spread of the epidemic.

The delivery of Test and Trace has focused purely on operational goals, with not enough consideration given to collecting and reporting data directly relevant to epidemiological purpose.

While the REACT and ONS surveillance studies provide a rich source of informative data on prevalence, they were not planned so that their data is jointly available in one place, which has limited data synthesis.

## *Recommendation*

The data gathered through an effective surveillance programme should play a key role in informing government decisions.

A real-time pandemic surveillance-system is essential for managing the response to a pandemic. The government should ensure that such a system – which can, in a modular fashion, incorporate a range of routine and purpose-built data feeds, coupled with appropriate statistically-driven analytical tools – is ready for future pandemics.

Maintaining such a system should be prioritised as part of a blueprint for pandemic preparedness.

# Increase scrutiny and openness for new diagnostic tests

## *Principle*

Effective testing regimes are essential to containing contagious diseases.

Before newly developed tests are used as part of a public health strategy they need to be trialled and evaluated for their intended purpose; the operational characteristics of a given test are crucially important to the kind of testing protocols that can be supported.

## *What's wrong and what's right*

The rules for evaluating diagnostic tests are looser than the rules for vaccines or drugs.

Decisions around procurement need to be made early-on in a health emergency, but a clear process is needed to ensure that preliminary evidence on operational characteristics of new diagnostic tests can be openly scrutinised before major investment is made.

On more than one occasion, procurement decisions were made about diagnostic tests without adequate evidence. Money was wasted and the quality of testing regimes were threatened.

## *Recommendation*

Similar steps to those adopted for vaccine and pharmaceutical evaluation should be followed for diagnostic tests.

In particular, manufacturers should openly release the studies that support their marketing claims so that the accuracy of tests can be thoroughly quantified, and their utility for other contexts assessed before they go into general use.

Data should be published and decisions, including what money has been spent, should be explained.

# Health data is incomplete without social care data

## *Principle*

The appalling number of Covid deaths in care homes has been a sombre reminder that health and social care are inseparable.

The same is true is when it comes to data: a health data system without good social care data is inadequate, and will lead to poor decisions being made and lives lost.

## *What's wrong and what's right*

Throughout the Covid pandemic, there has been a lack of data regarding the situation in care homes in England. We do not know how many care home residents there are, there has been no data on the extent of testing in care homes and – although there have been claims that the targets for vaccinations in care homes has been met – this has not been substantiated with data.

Care homes are run by a variety of organisations, so it is understandably difficult to collect data. However, Public Health Scotland has shown that it is possible to do more than has been done in England.

## *Recommendation*

Improving social care data should be a central part of any review of the UK's health data as a whole.

# Put evaluation at the heart of policy

## *Principle*

A fast-moving, evolving disease demands a fast-moving, adaptive response.

Efforts to contain Covid should incorporate rapid, cost-effective evaluations within their roll out as much as possible, so that we can continually improve our response and learn what works.

## *What's wrong and what's right*

In a rapidly developing situation, designing an evaluation process can seem time-consuming and unnecessary. But it is, in fact, essential to ensuring that we understand how to make sure that policy interventions are effective.

The failure to collect early data on the number of people contacted by Test and Trace who properly isolate meant that the economic difficulties that prevented some people from isolating were not addressed. When evaluation has been done at pace, it has helped: the RECOVERY trial identified early a valuable drug for treating severe Covid patients in hospital thanks to its efficient adaptive design.

## *Recommendation*

Efficient evaluations or experiments should be incorporated into any intervention to combat a pandemic from the start. Examples where this could have been done include the vaccine programme (to validate the delayed second dose regime) and rapid testing in schools (to identify its efficacy in the field).



DATA | EVIDENCE | DECISIONS

### **Royal Statistical Society**

12 Errol Street  
London EC1Y 8LX

020 7638 8998

E: [rss@rss.org.uk](mailto:rss@rss.org.uk)

 [@RoyalStatSoc](https://twitter.com/RoyalStatSoc)

[rss.org.uk](https://rss.org.uk)

The Royal Statistical Society is a charity which promotes statistics, data and evidence for the public good; we are one of the world's leading learned societies and the only UK professional body for all statisticians and data scientists.

**Our vision is 'A world with data at the heart of understanding and decision-making.'**