

# Trustworthy communication of numbers and evidence

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University of Cambridge*

*President, Royal Statistical Society*

*UNECE Workshop, Cork, 2018*



# Winton Centre for Risk and Evidence Communication

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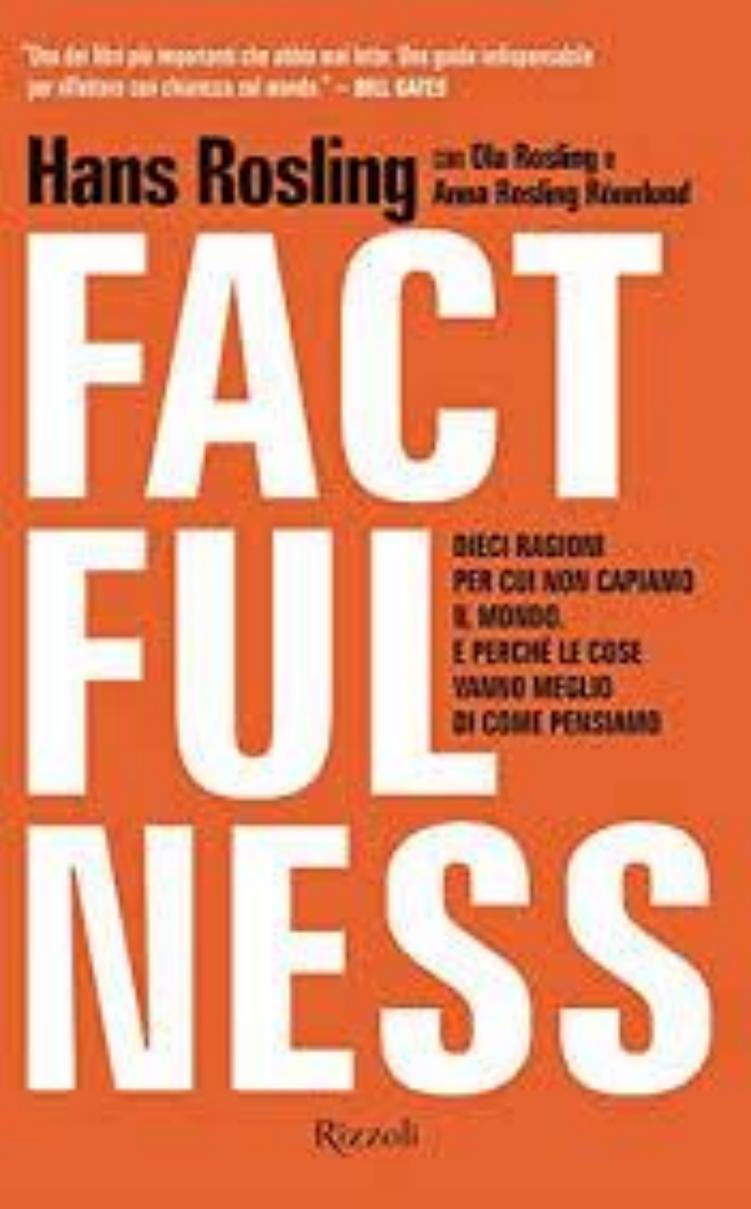
<https://wintoncentre.maths.cam.ac.uk>

 UNIVERSITY OF CAMBRIDGE

# Topics that are coming up

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- Pro-active efforts of official statistics agencies to improve communication
- Many exciting initiatives
- Communication should be two-way – importance of understanding audience, personas, listening
- Building trust
- Ways of countering false information
- Etc



≡ **Money**

EVERYDAY MONEY • BILLIONAIRES

## Bill Gates Is Giving Every 2018 College Grad a Free Copy of His Favorite Book. Here's How to Get It



- Just informing people is not enough (but necessary)
- Need to recognise psychology of attention to drama
- Need to counter that drama with good communication

# Numbers can be tricky

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On 7<sup>th</sup> March

# Trump calls for \$1B reduction in U.S.-China trade deficit

By AUBREE ELIZA WEAVER | 03/07/2018 11:11 AM EST



World Business Markets Politics TV

On 8<sup>th</sup> March

Myanmar

Energy & Environment

Brexit

North Korea

Charged: The Future of Autos

Future of Money

Break

BUSINESS NEWS MARCH 8, 2018 / 2:32 PM / A MONTH AGO

## Trump administration seeks \$100 billion cut in U.S.-China trade deficit: WSJ

Reuters Staff

1 MIN READ



WASHINGTON (Reuters) - The Trump administration last week asked a top Chinese economic official for a \$100 billion reduction in the U.S.-China trade deficit, the Wall Street Journal reported on Thursday, citing people familiar with the matter.

# Numbers can be tricky

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- Numbers don't speak for themselves
- Context, comparators and framing can make numbers look big or small



Making numbers look large  
or small



Making numbers look large  
or small

# Numbers can be tricky

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- Numbers don't speak for themselves
- Context, comparators and framing can make numbers look big or small
- Big numbers are incomprehensible
- Convert to something that can be grasped?
- Positive and negative framing changes emotional reaction

How many seriously violent young people are there in London?

Trick:

- turn to negative frame
- convert to numbers of people

9/9

99PERCENT.ORG.UK

99% OF YOUNG LONDONERS  
**DO NOT COMMIT**  
SERIOUS YOUTH VIOLENCE

JOIN THE CAMPAIGN AT [99PERCENT.ORG.UK](http://99PERCENT.ORG.UK)

MAYOR OF LONDON

Transport for London

# Trust in numbers

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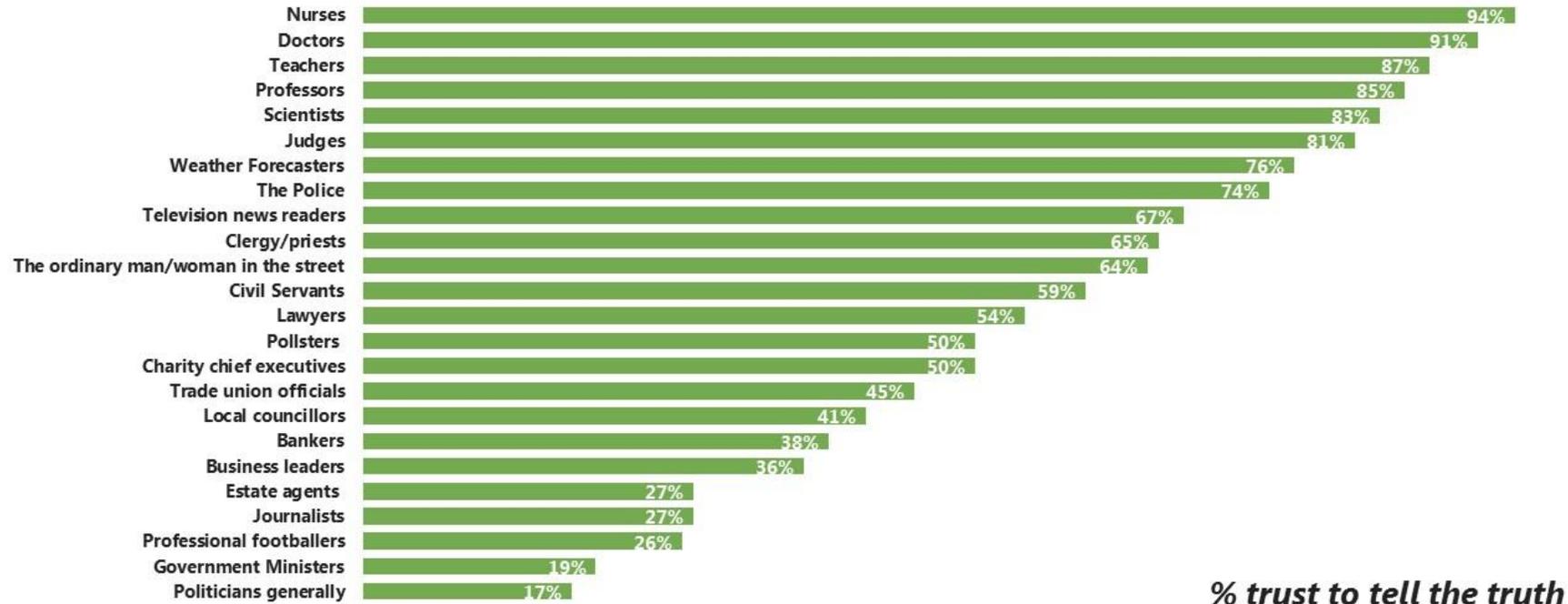
*“people have had enough of experts...*

*from organisations with acronyms saying that they know what is best and getting it consistently wrong”*

# Who do people say they trust in the UK?

## Veracity Index 2017 – all professions overview

*“Now I will read you a list of different types of people. For each would you tell me if you generally trust them to tell the truth, or not?”*



But does this really tell us anything valuable?

# Baroness Onora-O'Neill..

---

- We should not be aiming to ‘increase trust’
- Instead, aim to demonstrate **trustworthiness**
- Information should be
  - ✓ *accessible*
  - ✓ *useable*
  - ✓ *assessable*



# Statisticians going from **introvert** to **extravert**

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- Need more 'outgoing' statisticians taking an active role in public life and media
- Some statistics agencies trying to make this transition
- ONS Digital, named '*Statistician's comment*'
- Royal Statistical Society now has 30 'statistical ambassadors'

# ONS Digital

Blog for the @ONSdigital team

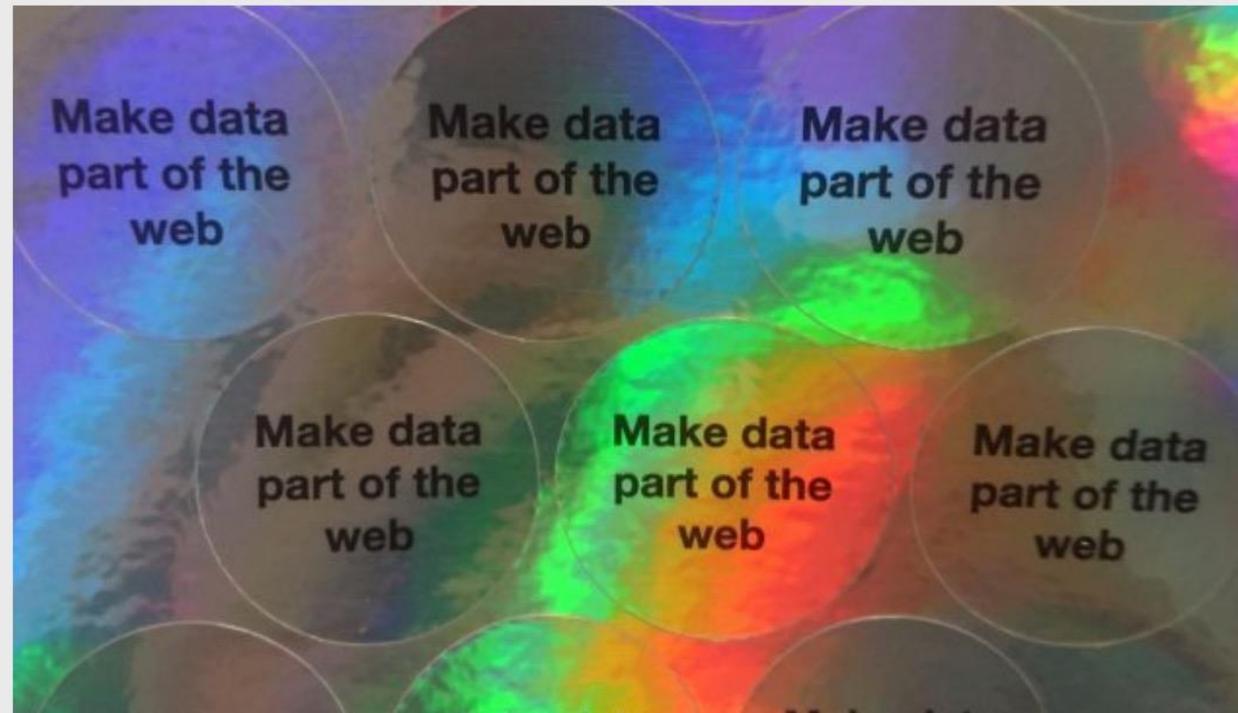
[Home](#) | [About](#) | [Jobs](#) | [Moderation policy](#)

Search blog



## Why we have produced a Beta version of a new ONS API

Make data part of the web We have it written on stickers, we have it in our open data principles...



# Learning from risk communication?

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## What is Predict?

Predict is a tool that helps doctors and patients decide on treatments to have after surgery for breast cancer.

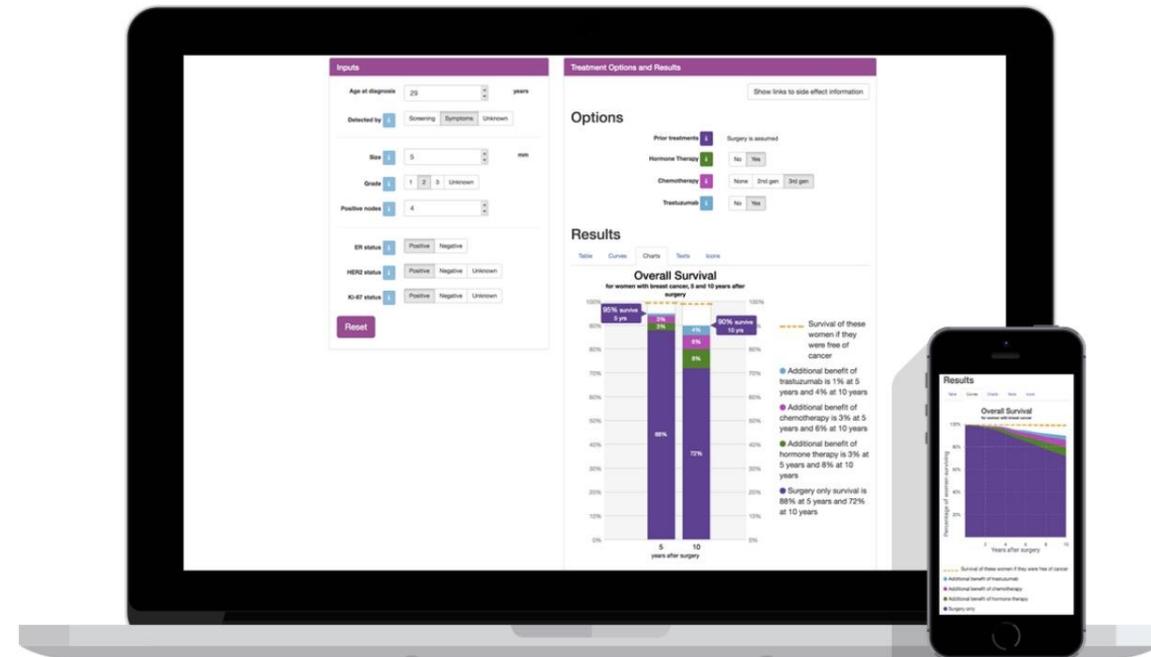
We recommend patients read the [patient information](#) section before using the tool.

## What will Predict tell me?

The predict tool shows you how different treatments affect the percentage of women that survive over ten years following surgery.

## How do I use Predict?

You enter details about the cancer, and then select different



Example outputs

## Inputs

Reset

**i** Age at diagnosis

**i** Detected by  Screening  Symptoms  Unknown

**i** Tumour size (mm)

**i** Tumour grade  1  2  3  Unknown

**i** Positive nodes

**i** Micrometastases  Yes  No  Unknown

Enabled when positive nodes is zero

**i** ER status  Positive  Negative

**i** HER2 status  Positive  Negative  Unknown

**i** Ki-67 status  Positive  Negative  Unknown

## Treatment Options and Results

### Options

**i** Prior treatments  Surgery is assumed

**i** Hormone Therapy  No  Yes

Available when ER-status is positive

**i** Chemotherapy  None  2nd gen  3rd gen

**i** Trastuzumab  No  Yes

Available when HER2 status is positive

### Results

Table

Curves

Charts

Texts

Icons

Adverse effects mockup

This table shows the survival percentages based on the information you have provided.

years after surgery

Treatment	Additional Benefit	Overall Survival %
Surgery only	-	64%
+ Hormone therapy	7%	70%
+ Chemotherapy	6%	76%
+ Trastuzumab	3%	79%

If these women were cancer free, 87% would survive 10 years.

# Results

Table

Curves

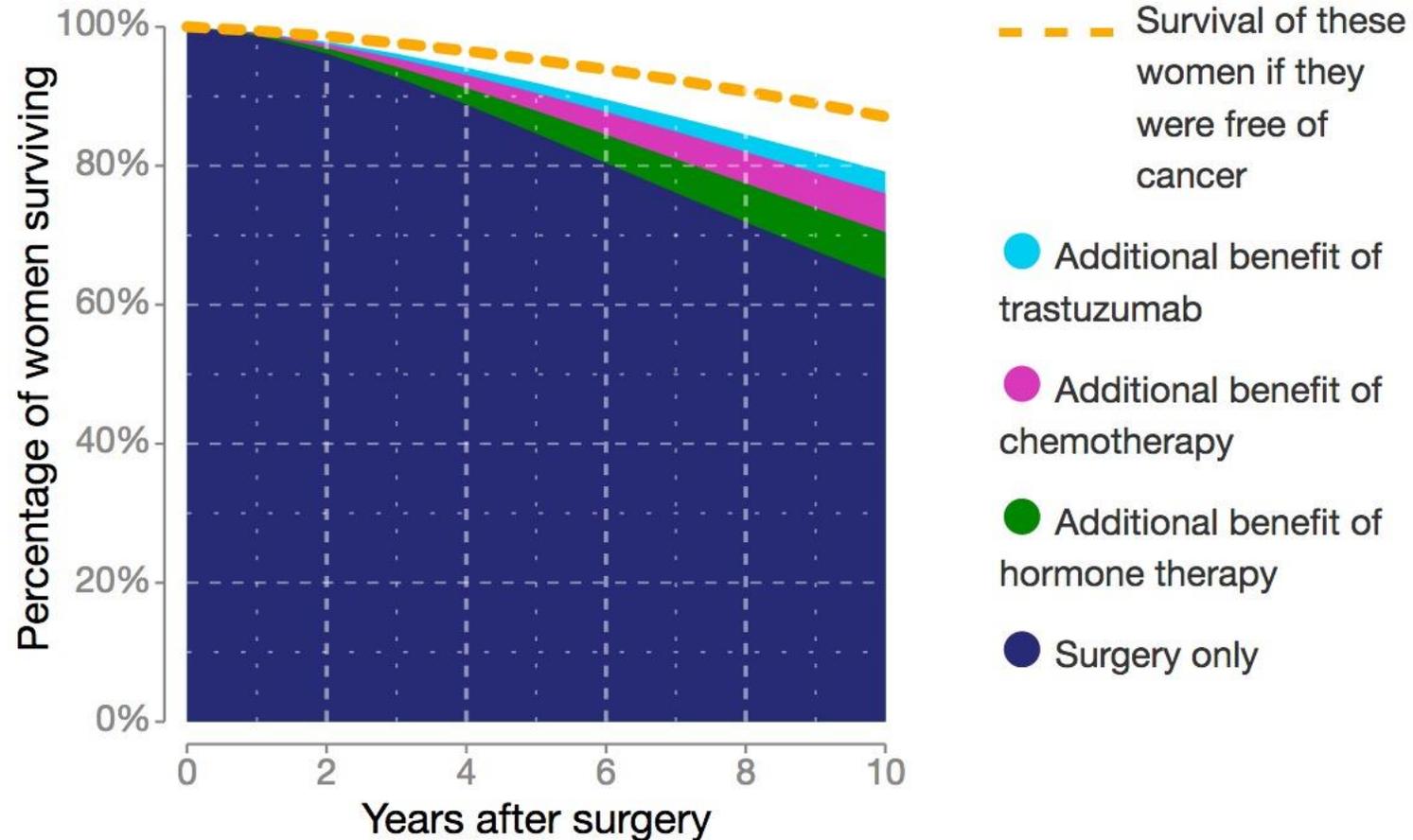
Charts

Texts

Icons

Adverse effects mockup

This graph shows the percentage of women surviving up to 10 years. These results are based on the inputs and treatments you selected



# Results

Table

Curves

Charts

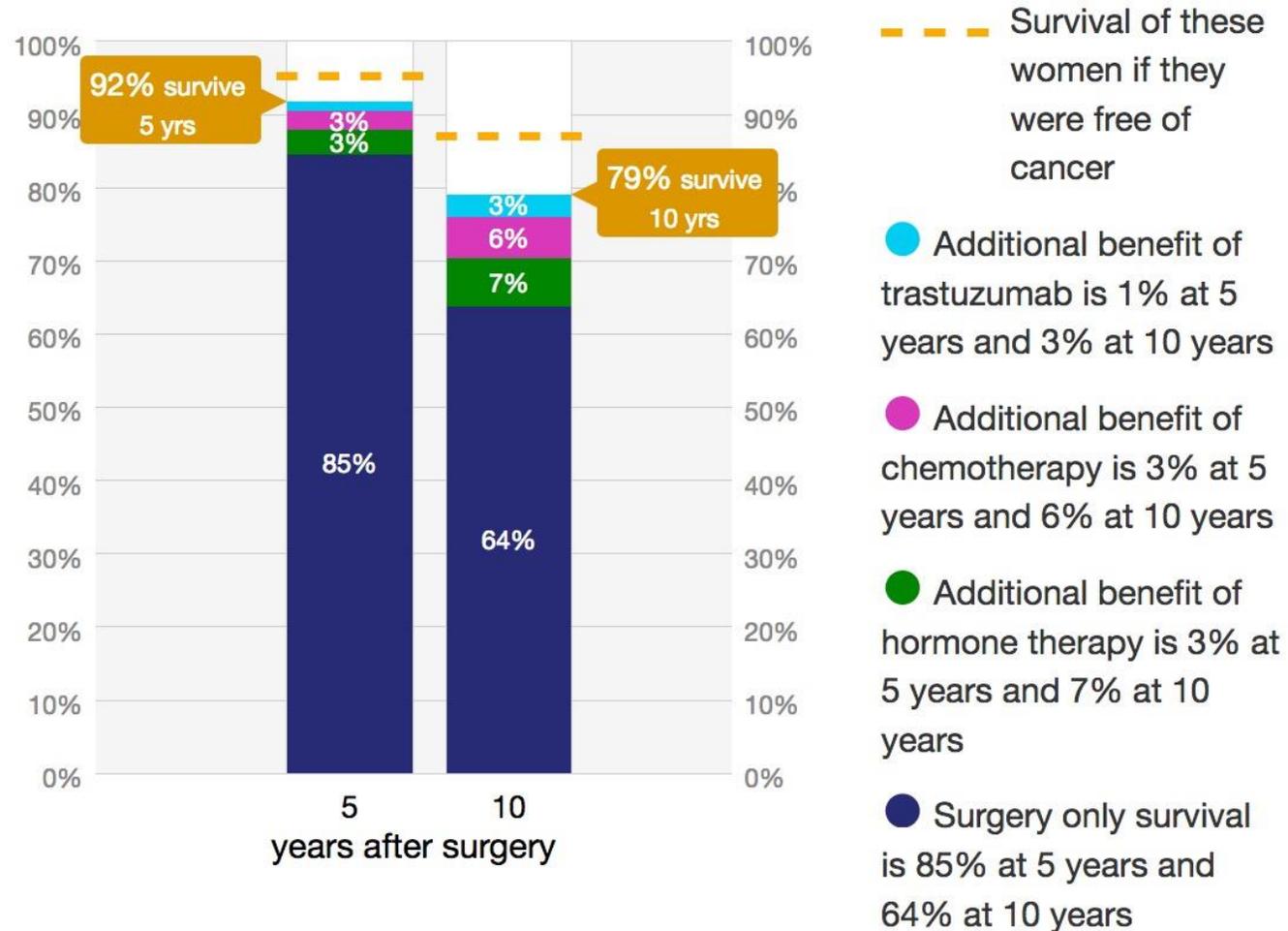
Texts

Icons

Adverse effects mockup

This graph shows the percentage of women surviving at 5 and 10 years. These results are based on the inputs and treatments you selected

## Overall Survival



# Results

Table

Curves

Charts

Texts

Icons

Adverse effects mockup

Based on the information you have entered:

5

10

years after surgery

64 out of 100 women are alive at 10 years with surgery only.

- 70 out of 100 women treated (an extra 6) are alive because of hormone therapy.
- 76 out of 100 women treated (an extra 12) are alive because of hormone therapy, and chemotherapy.
- 79 out of 100 women treated (an extra 15) are alive because of hormone therapy, and chemotherapy, and trastuzumab.

Of the women who would not survive, 13 would die due to causes not related to breast cancer.

# Results

Table

Curves

Charts

Texts

Icons

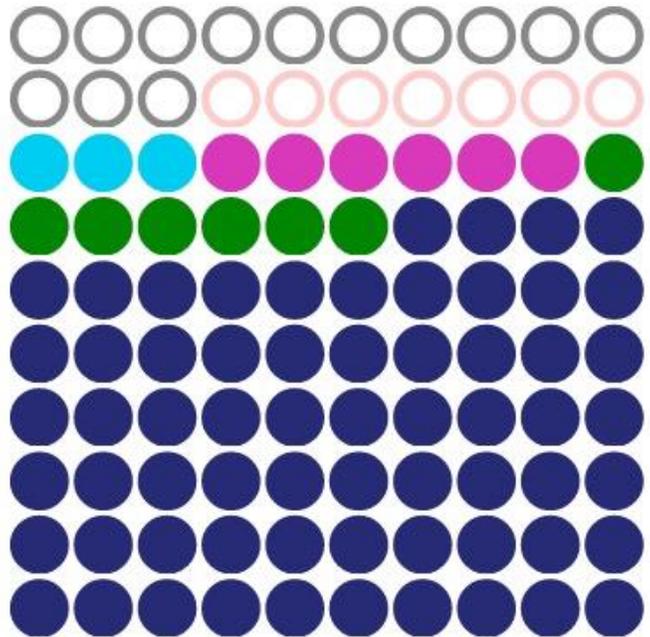
Adverse effects mockup

This display shows the outcomes for 100 women. These results are based on the inputs and treatments you selected.

5

10

years after surgery



13 deaths due to other causes



7 breast cancer related deaths



3 extra survivors due to trastuzumab



6 extra survivors due to chemotherapy



7 extra survivors due to hormone therapy



64 survivors with surgery alone

**Molecular Diagnostic Laboratory**  
18 Sequencing St, Gene Town, ZY 01234  
Tel: 555-920-3333 Fax: 555-920-3334  
www.moldxlaboratory.com

Patient Name:	Jane Doe	Specimen type:	Blood, peripheral
DOB:	04/05/1990	Date specimen obtained:	04/01/2012
Lab Accession:	0123245678	Date specimen received:	04/03/2012
Pedigree #:	P99999999	Referring physician:	John Smith, MD
Gender:	Female	Referring facility:	Regional Hospital
Race:	White	Referring facility MRN:	1225-12251225

TEST PERFORMED - Pan Cardiomyopathy Panel (51 Genes)

INDICATION FOR TEST - Clinical diagnosis and family history of dilated cardiomyopathy (DCM)

**RESULT: Positive - An established cause of the reported phenotype was identified**

**DNA VARIANTS:**

*RBM20*, Heterozygous c.1913C>T (p.Pro638Leu), Exon 9, Pathogenic  
*SGCD*, Heterozygous c.390delA (p.Ala131fs), Exon 6, Likely Pathogenic  
*TTN*, Heterozygous c.97886G>A (p.Gly32629Asp), Exon 307, Uncertain Significance

**INTERPRETATION SUMMARY:** This individual carries one previously published pathogenic DCM variant (a missense variant in *RBM20*). In addition, one loss-of function variant in the *SGCD* gene was detected. Homozygous loss of function variants in *SGCD* are known to cause Limb-Girdle muscular dystrophy and this individual is likely a carrier for this disease. However, the role of heterozygous *SGCD* variants in autosomal dominant DCM without muscular involvement is not clear and therefore a contribution to disease severity cannot be ruled out. See below for individual variant interpretations.

Cardiomyopathy is typically inherited in an autosomal dominant pattern. Each first-degree relative has a 50% (or 1 in 2) chance of inheriting a variant. *SGCD*-associated Limb-Girdle muscular dystrophy is inherited in an autosomal recessive pattern. Each child of two individuals with pathogenic *SGCD* variants has a 25% (or 1 in 4) chance of having Limb-Girdle muscular dystrophy. Disease penetrance and severity can vary due to modifier genes and/or environmental factors. The significance of a variant should therefore be interpreted in the context of the individual's clinical manifestations.

**RECOMMENDATIONS:**

Genetic testing of this individual's biological parents and other family members, particularly those who are affected, may help to clarify the significance and relative contributions of the detected variants.

It is recommended that this individual and any 1<sup>st</sup> degree relative receive continued clinical evaluation and follow-up for features of DCM.

Genetic counseling is recommended for this individual and their family. For assistance in locating nearby genetic counseling services please contact the laboratory at 123-456-7890.

Please note that the classification of variants of unknown significance may change over time if additional information becomes available. Please contact the laboratory at 123-456-7890 once a year for any updates regarding the status of these variants.

**INDIVIDUAL VARIANT INTERPRETATIONS:**

Pro638Leu in Exon 9 of *RBM20* (NM\_001134363.1) Pathogenic. This variant has been reported in two families with DCM, segregated with disease in >10 affected individuals (including 2 affected obligate carriers), and was absent from 960 race-matched control chromosomes (Brauch 2009). Proline (Pro) at position 638 is highly conserved across evolutionarily distant species and lies within exon 9, which encodes a conserved protein domain where other pathogenic variants in *RBM20* have been reported (Brauch 2009, Li 2010). In summary, the Pro638Leu variant (*RBM20*) meets our criteria for pathogenicity based on segregation and absence in controls.

Genetic test  
results.

Is the  
information  
communicated  
in the right way?

# GENETIC TEST REPORT



**Patient Details:**  
Name: John Doe  
NHS number: NH00198  
Sex: Male  
Date of birth: 18 March 1995  
Sample type: Blood

**Test ordered by:**  
Name: Dr Requesta  
Organisation: Chester Hospital  
Telephone: 01223 555555

**Test carried out by:**  
Name: Dr A. Tester  
Laboratory: Gentest UK  
Telephone: 01223 666555  
Date of test: 12 March 2017  
Signature: A Tester

Reason for test: Brendt syndrome is suspected due to family history of colon cancer.

## Result

**A change in gene MR61 was found  
This is consistent with Brendt syndrome**

### WHAT THIS RESULT MEANS

The test found that you have a change in a gene called MR61. This suggests that you have a rare condition called Brendt syndrome. There are no symptoms, but it means you have a higher risk of developing colon cancer.

**1 in 20 people in the  
general population  
develop colon cancer  
and 19 do not**



**2 in 20 people with  
Brendt syndrome  
develop colon cancer  
and 18 do not**



Because Brendt syndrome runs in families, there is a chance that your parents, siblings and children also have it. Further testing is recommended to determine whether they are affected.

### WHAT YOU CAN DO

Talk to the doctor who ordered your test. Their contact details are at the top of the page.

Things you can do:

#### Reducing your risk

You can reduce your risk of cancer by making changes to your lifestyle.

You can have regular screening to make sure that any cancers are caught early.

#### Talking to your family

Your doctor can help with who needs to be told and how to break the news.

# GENETIC TEST REPORT



## Technical Information

**Patient Details:**  
Name: John Doe  
NHS number: NH00198  
Sex: Male  
Date of birth: 18 March 1995  
Sample type: Blood  
Sample collected: 10 March 2017  
Sample received: 12 March 2017

For Your  
Records

If there is anything you do not understand,  
your Genetic Counsellor will help you to  
interpret this information.

Gene	Zygoty	Inheritance	HGVS Description	Location	Classification
PMM2	Heterozygous	Maternal	NM_000303.2: c.357C>A p.(Phe119Leu)	16:g.90001579C>A	Pathogenic
PMM2	Heterozygous	Paternal	NM_000303.2: c.422G>A p.(Arg141His)	16:g.90001644G>A	Pathogenic

### Test Methodology

Trio whole genome sequencing by the 100,000 Genomes Project with analysis of the Cerebellar Hypoplasia (version 1.2) gene panel followed by in-house Sanger sequencing confirmation. Please note that the sensitivity of this test is limited by the types of detectable pathogenic variants, regions of low read depth coverage and incomplete ascertainment of disease-gene associations. Further information including read depth coverage is available on request. \*Variants are classified using the ACMG/AMP guidelines (Richards et al 2015 Genet Med).

After a  
re-design  
to highlight  
what  
people  
want

# General issues in on-line risk communication

---

- User-centred design
- Layered communication
- Multiple representations – one size does not fit all
- ***Relevant info, at right time, in right form***

‘Expected frequencies’ are now in UK GCSE Maths syllabus:



Categories

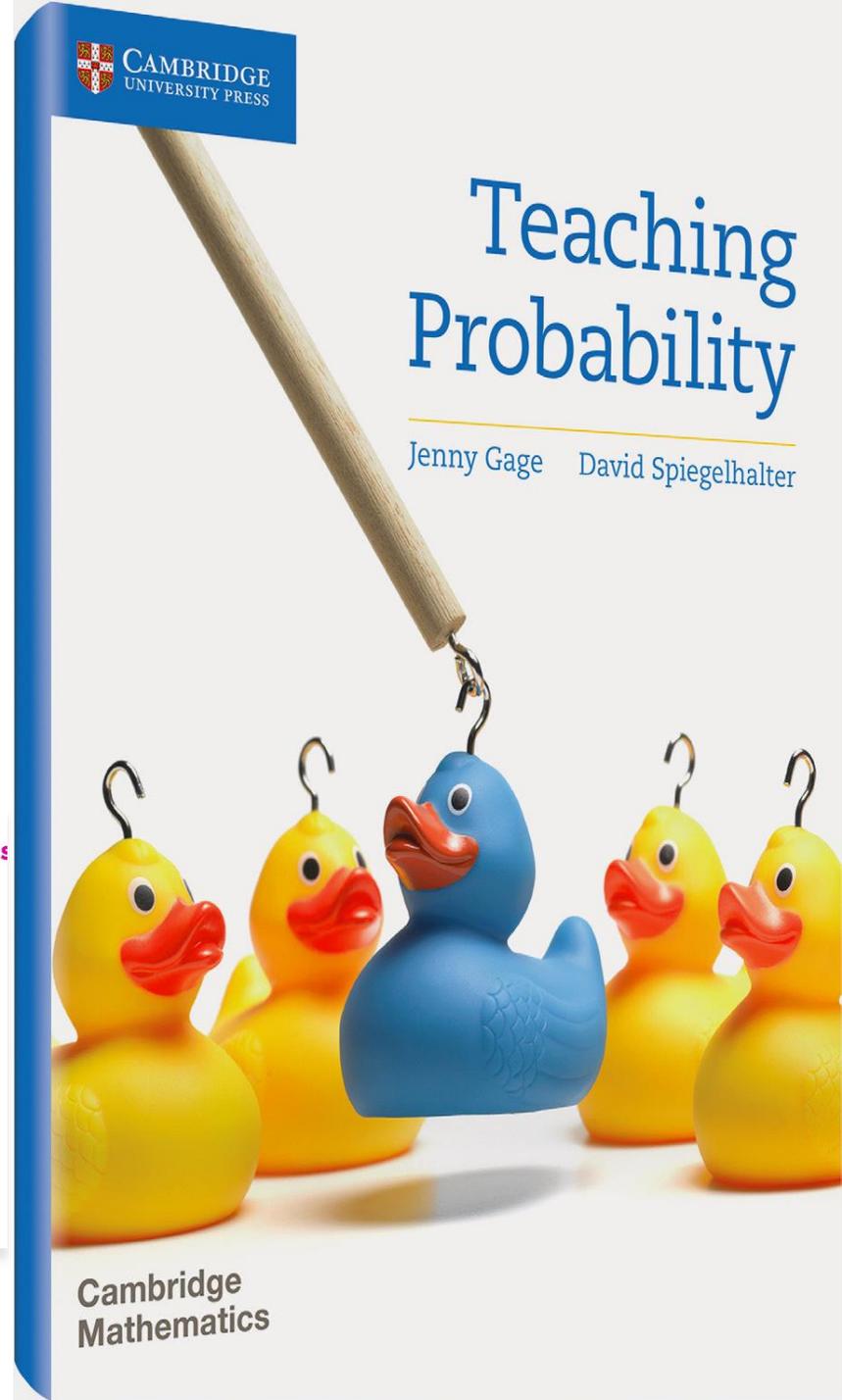
Courses

Programs

ONLINE COURSE

## Teaching Probability

Learn how to create effective lessons on probability to help equip 11 - 16 year olds with skills for life.



# Epistemic uncertainty about facts and science

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# Uncertainty about statistics

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[Business](#) [Your Money](#) [Market Data](#) [Markets](#) [Companies](#) [Economy](#)

## UK unemployment falls to 1.44 million

© 24 January 2018 | 1350

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**UK unemployment fell by 3,000 to 1.44 million in the three months to November, official figures show.**

The number of those in work increased sharply and wages rose at their fastest rate in almost a year, the Office for National Statistics said.

# Uncertainty about statistics

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## UK unemployment falls to 1.44 million

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GETTY IMAGES

UK unemployment fell by 3,000 to 1.44 million in the three months to November, official figures show.

The number of people in work increased sharply in almost a year, and wages rose at their fastest rate since 2012, the Office for National Statistics said.

# Uncertainty about statistics

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Office for National Statistics

Release calendar Meth

## UK unemployment falls to 1.44 million

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f t m e

Home Business, industry and trade Economy Employment and labour market People, population and communities

Search for a keyword(s) or time series ID

Home > Employment and labour market > People in work > Employment and employee types > UK labour market

Statistical bulletin:

## UK labour market: January 2018

Estimates of employment, unemployment, economic inactivity and other employment-related statistics for the UK.



UK unemployment fell by 3,000 to 1.44 million the three months to November. Official figures show.

The number of people in work increased sharply and wages rose at their fastest rate in almost a year, said.

# Uncertainty about statistics

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Business Your Money Market Data Markets

## UK unemployment falls 1

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UK unemployment fell by 3,000 to 1.44 million in November, official figures show.

The number of people in work increased sharply and wages rose at their fastest rate in almost a year, said.

## Table of contents

1. Main points for September to November 2017
2. Summary of latest labour market statistics
3. Things you need to know about this release
4. Employment
5. Public and private sector employment (first published on 13 December 2017)
6. Actual hours worked
7. Workforce jobs (first published on 13 December 2017)
8. Average weekly earnings
9. Labour disputes (not seasonally adjusted)
10. Unemployment
11. Economic inactivity
12. Young people in the labour market
13. Redundancies
14. Vacancies
15. Future publication dates
16. Links to related statistics
17. Quality and methodology

# Uncertainty about statistics

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## UK unemployment falls to 1.44 million

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UK unemployment fell by 3,000 to 1.44 million in November, official figures show.

The number of people in work increased sharply and wages rose at their fastest rate in almost a year, the Office for National Statistics said.

As well as calculating precision measures around the numbers and rates obtained from the survey, we can also calculate them for changes in the numbers. For example, for September to November 2017, the estimated change in the number of unemployed people since June to August 2017 was a small fall of 3,000, with a 95% confidence interval of plus or minus 77,000. This means that we are 95% confident the actual change in unemployment was somewhere between an increase of 74,000 and a fall of 80,000, with the best estimate being a small fall of 3,000. As the estimated fall in unemployment of 3,000 is smaller than 77,000, the estimated fall in unemployment is said to be “not statistically significant”.

# Manski 2015

- *Reporting official statistics as point estimates manifests a common tendency of policy analysts to project **incredible certitude**, encouraging policy makers and the public to believe that errors are small and inconsequential*

# Issues in communicating uncertainty

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- **Who** communicates?
- **What?**
- **In what form?**
- **to whom?**
- **to what effect?**

# Communicating uncertainty about a quantity

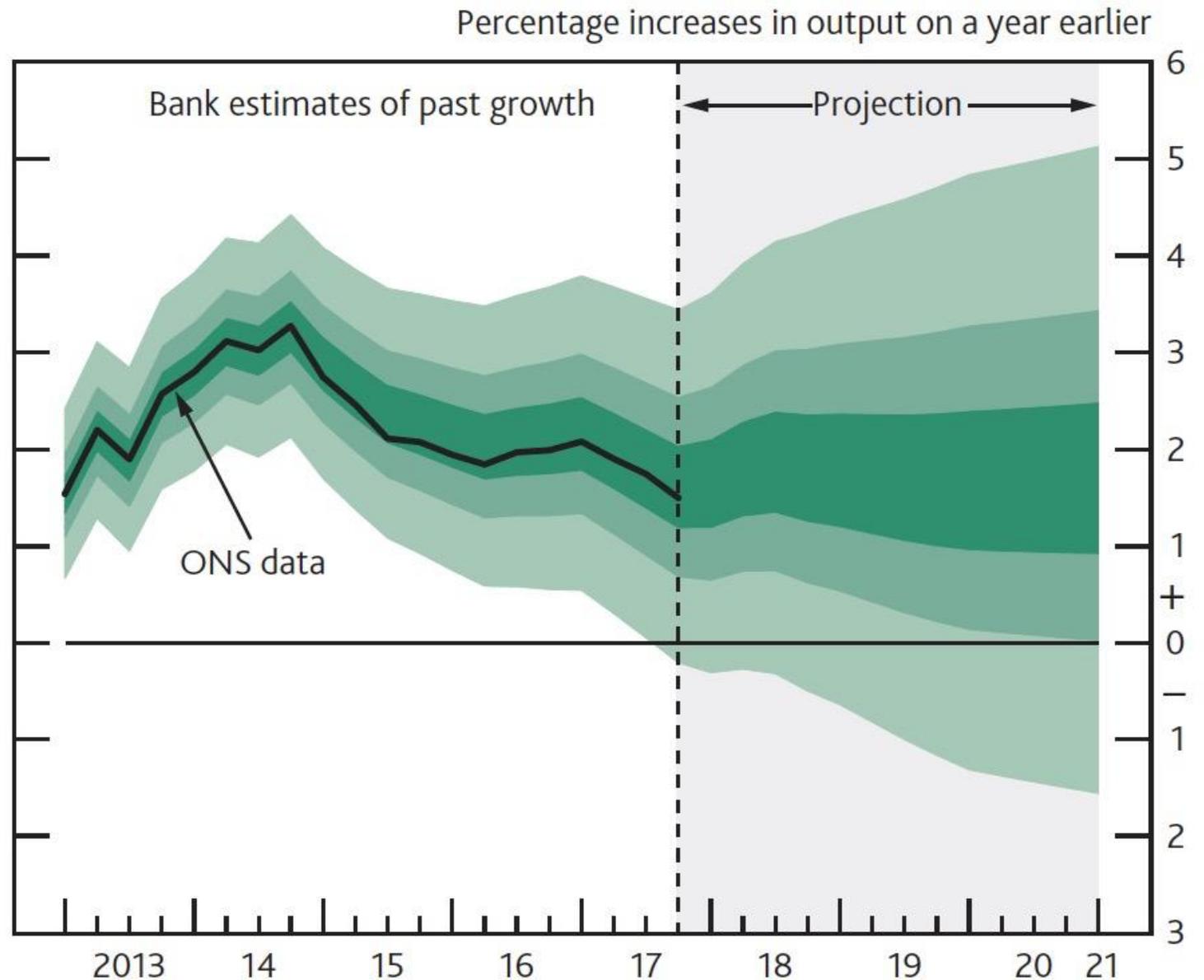
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1. Full probability distribution
2. Summary of distribution
3. Range
4. Pre-defined categorisation, eg 'likely'
5. Verbal qualifier
6. List of possibilities
7. Mention possibility of error
8. Don't mention uncertainty
9. Deny any possibility of uncertainty

# February 2018 Bank of England Inflation report

- ONS do not provide 'error' on GDP

## GDP projection (wide bands)<sup>(a)(b)</sup>



# Research on the impact of communicating epistemic uncertainty

---

- **Verbal expressions:** wide variability in interpretation
- **Uncertain risks:** well-known increased aversion
- **Error bars / ranges:** many interpret all values inside as equally likely
- **Trust/credibility:** impact is complex, may depend on issue, education level of audience, optimism etc

Increasingly active area of research.

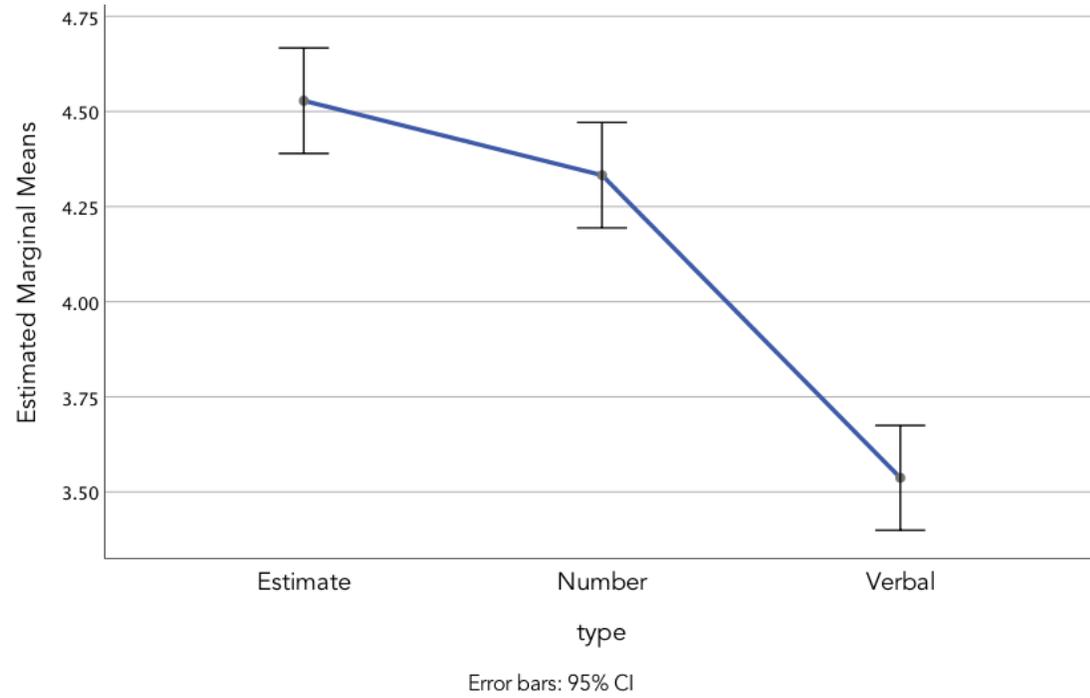
# Randomised trial of communicating epistemic uncertainty

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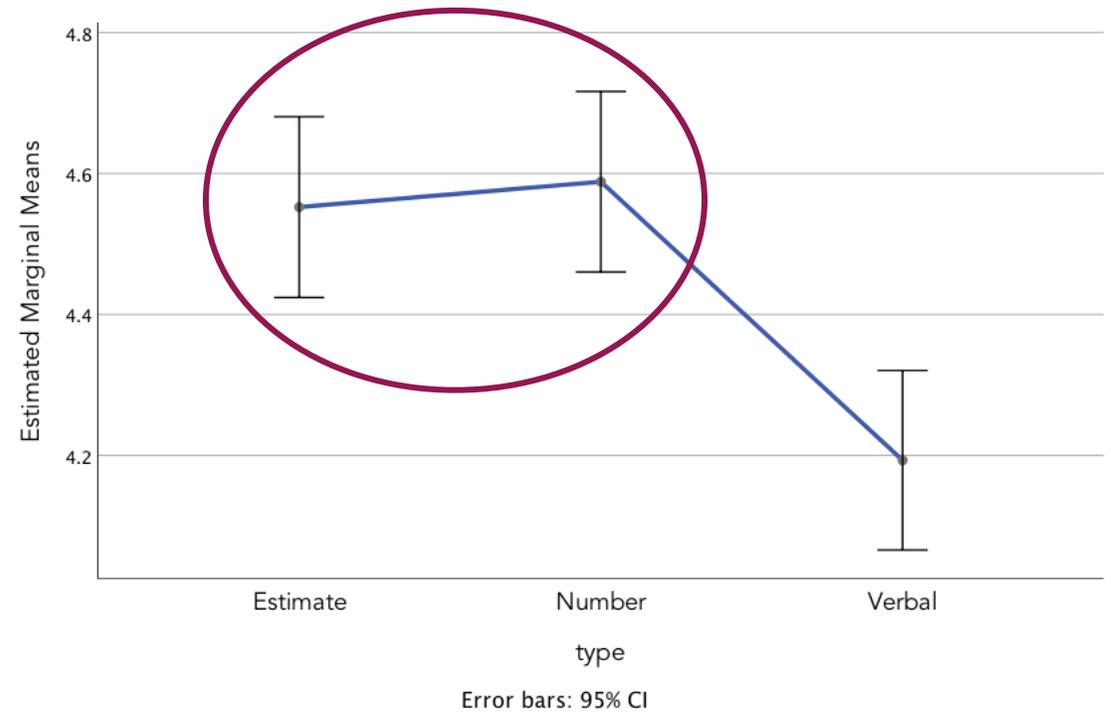
- **Topics:** Number unemployed, tigers in India, global temperature change
- **Format:** estimate, verbal qualifier, range
- **Trust/credibility:** in number and source
- 1,126 participants

# Results

To what extent do you think this number is trustworthy?



To what extent do you think the writers of the report are trustworthy?



# Main results

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- When uncertainty was communicated, people perceived these estimates to be more uncertain and less trustworthy
- Format matters: these effects were larger for verbal communication than for numerical communication
- When numerical uncertainty was communicated, people's trust in the communicator was not diminished
- Not moderated by numeracy

Need to research alternative visual formats

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Data

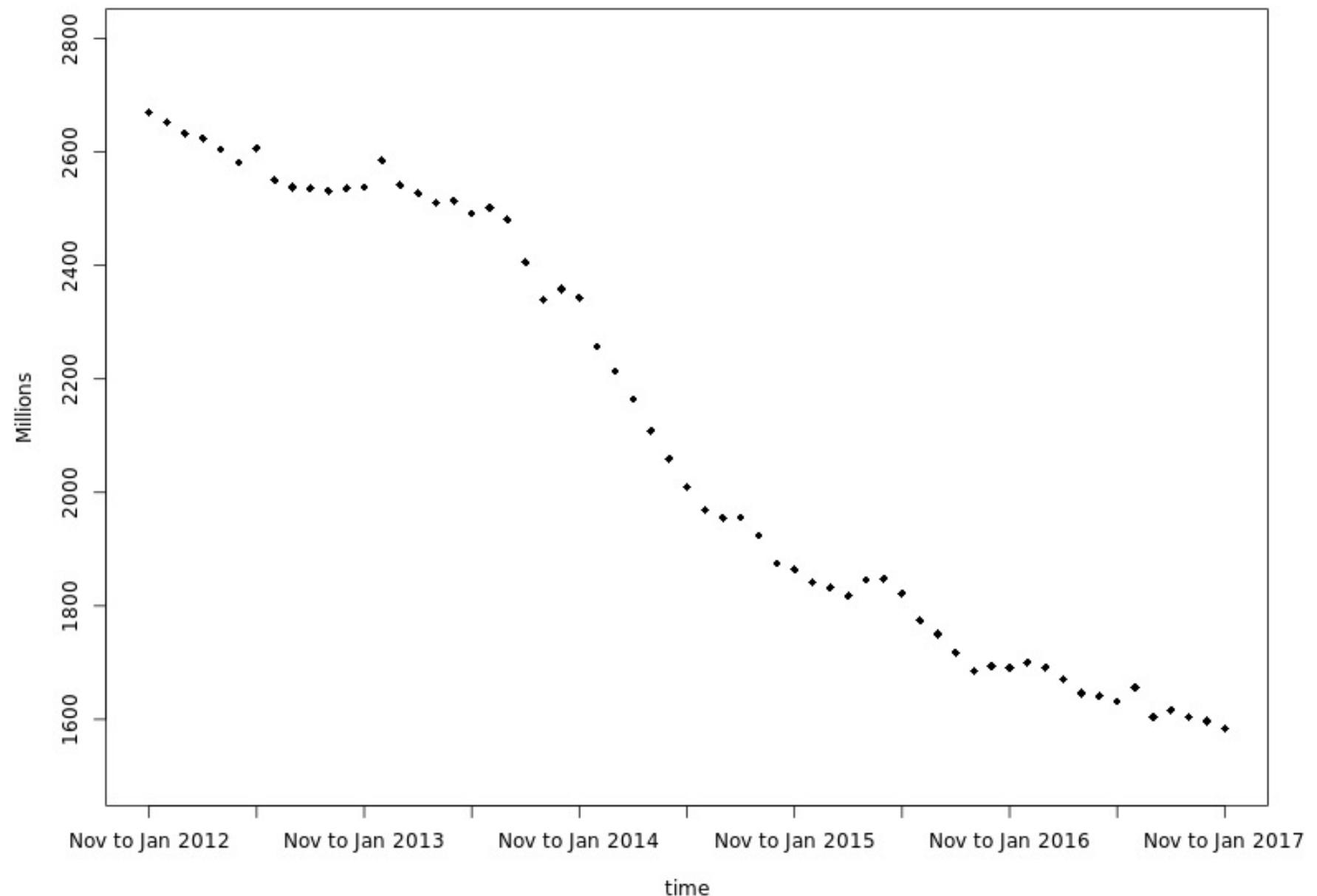
Plot

Smoothed

Uncertainty (Coarse)

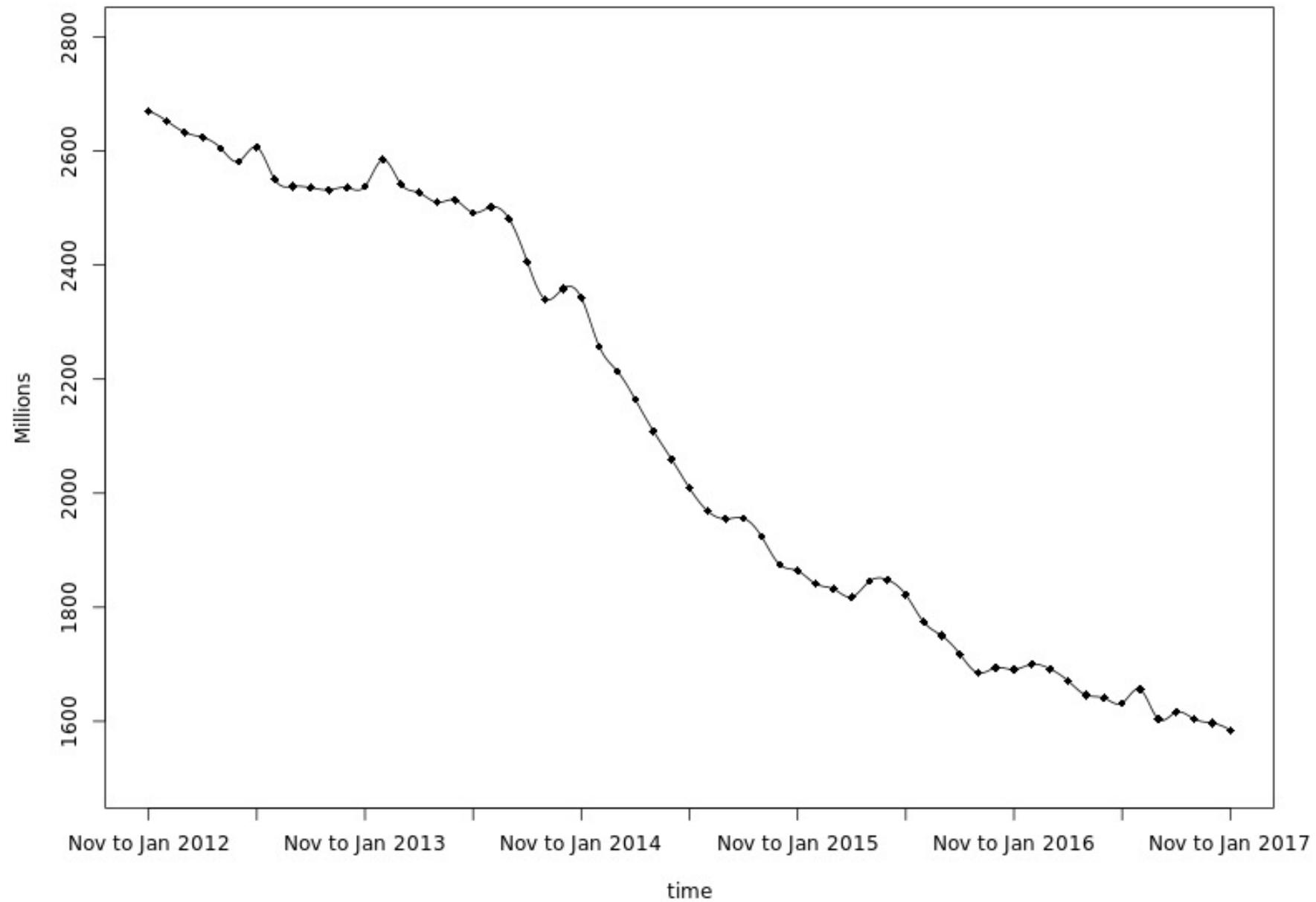
Uncertainty (Detail)

### Total UK unemployment



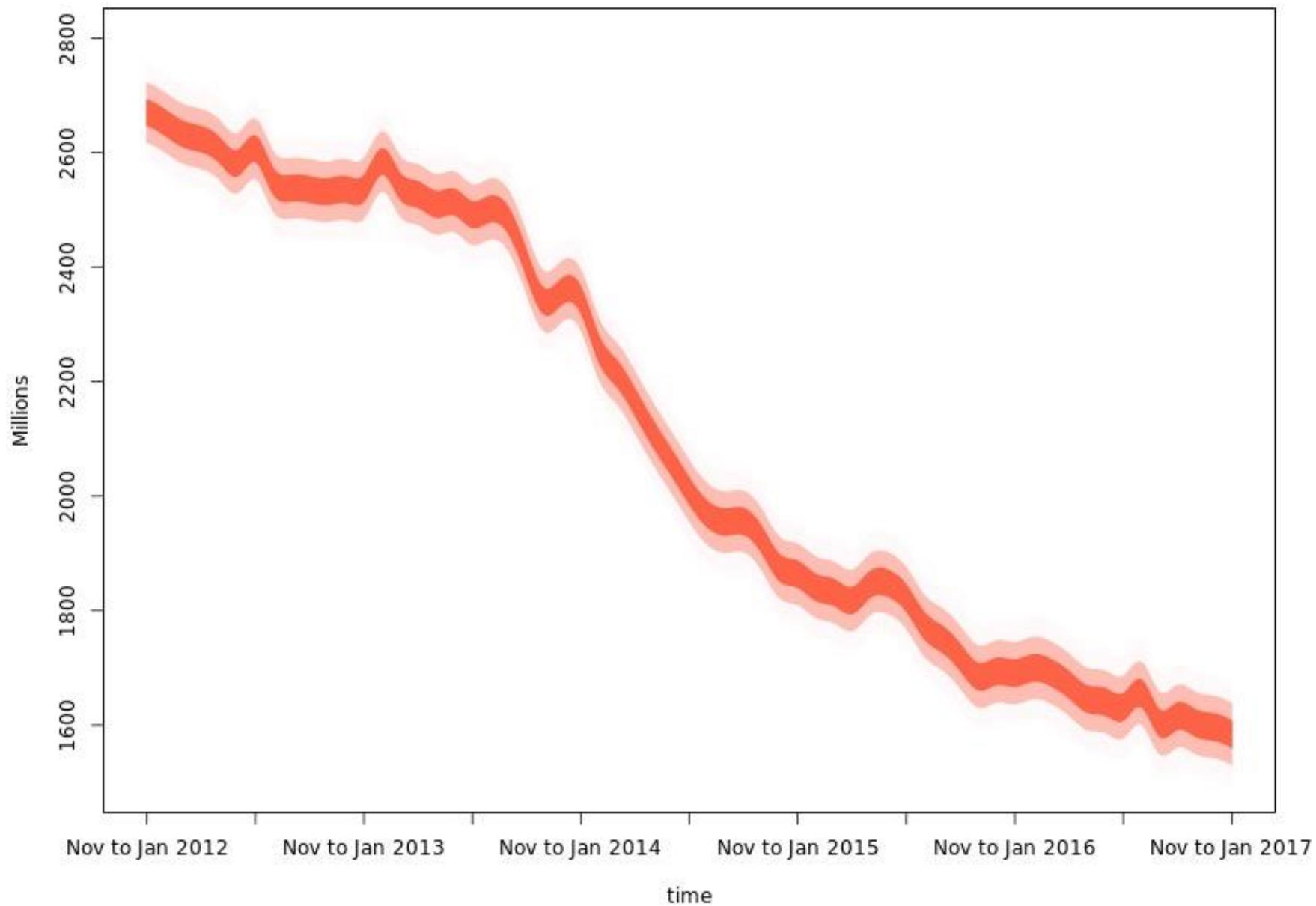
[Data](#)[Plot](#)[Smoothed](#)[Uncertainty \(Coarse\)](#)[Uncertainty \(Detail\)](#)

### Total UK unemployment



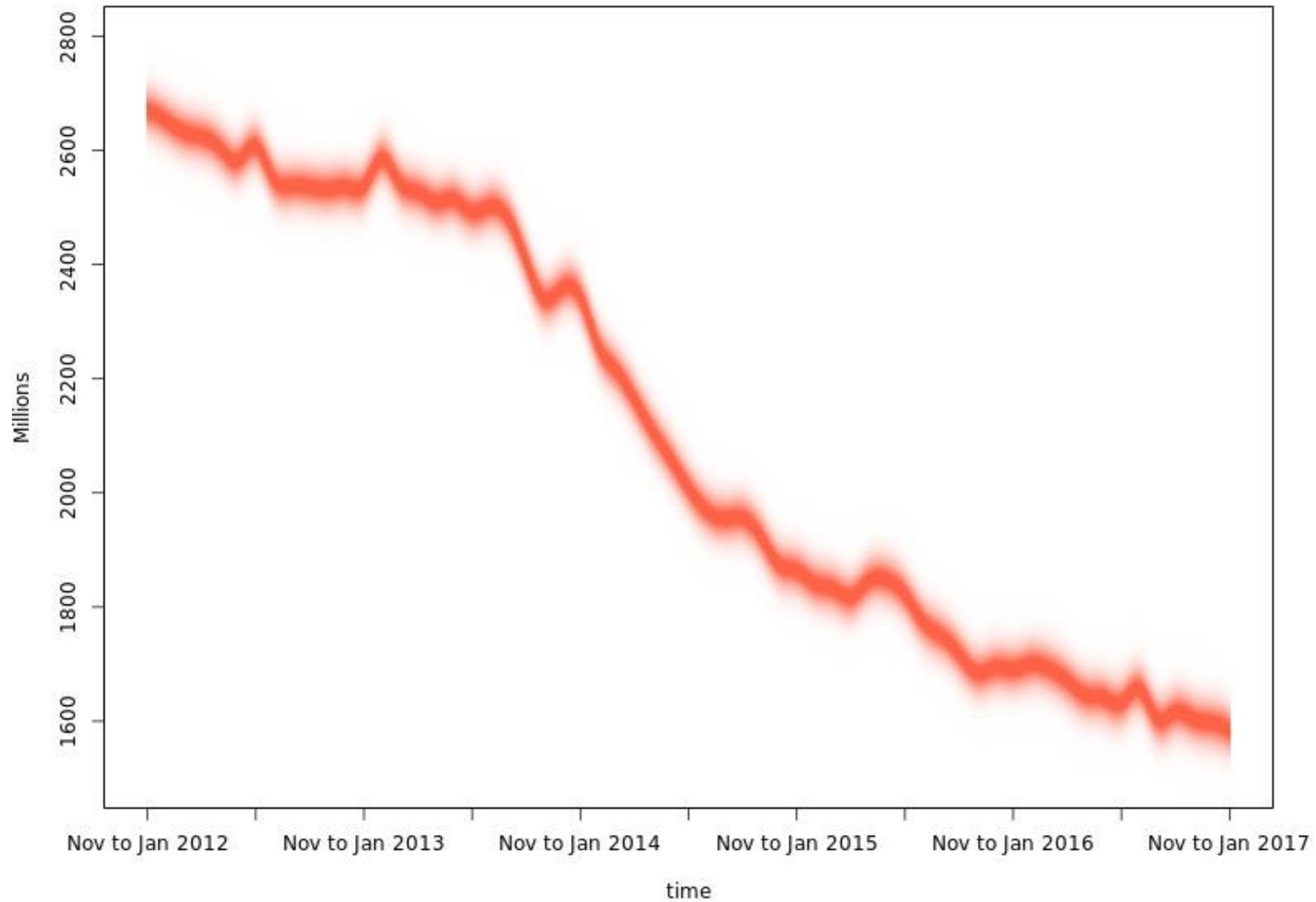
[Data](#)[Plot](#)[Smoothed](#)[Uncertainty \(Coarse\)](#)[Uncertainty \(Detail\)](#)

### Total UK unemployment

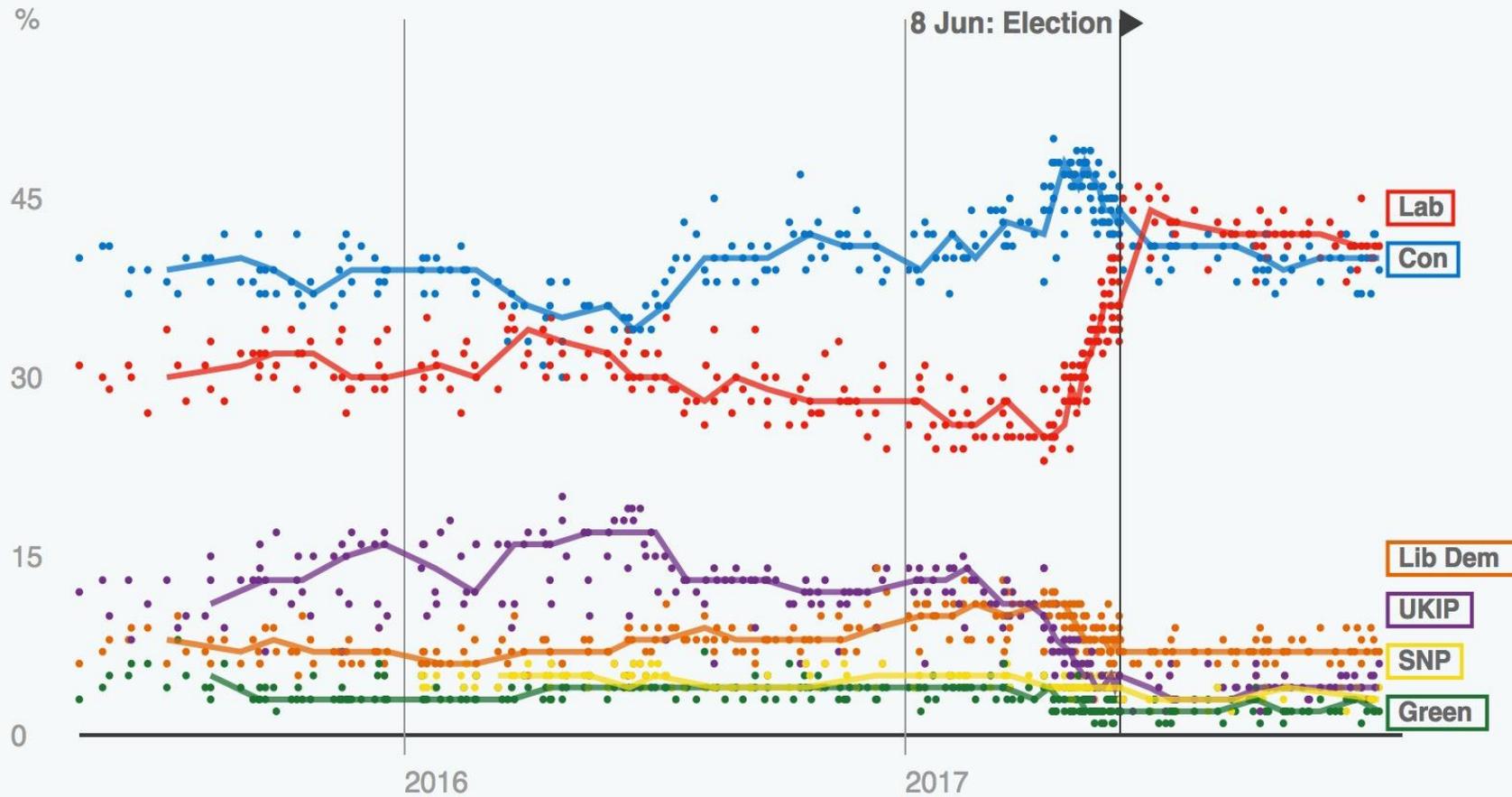


[Data](#)[Plot](#)[Smoothed](#)[Uncertainty \(Coarse\)](#)[Uncertainty \(Detail\)](#)

### Total UK unemployment



## Voting intention



*BBC plot of opinion polls before UK general election on 8<sup>th</sup> June 2017.*

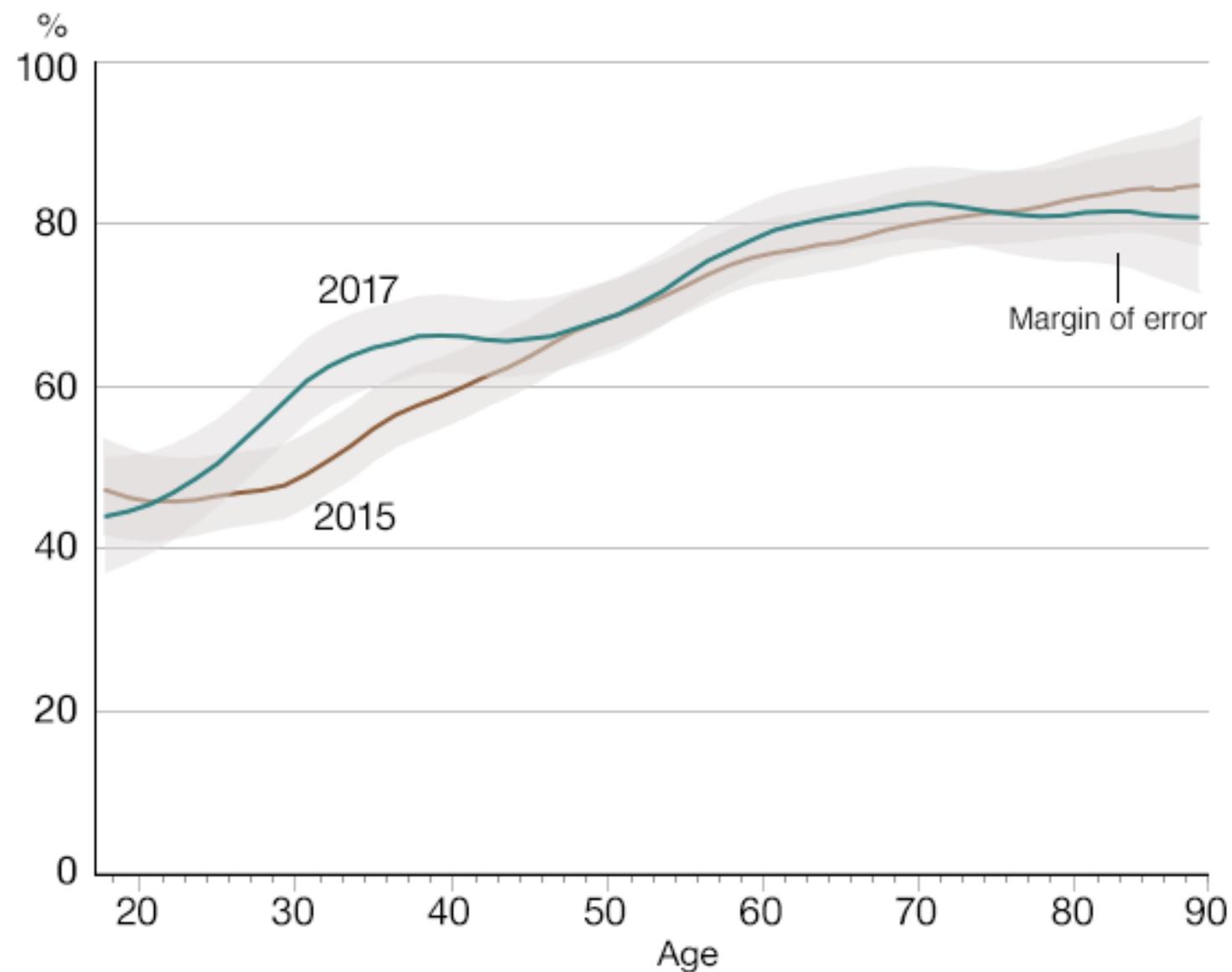
*The trend line is the median of the previous seven polls.*

*Each poll was usually based on 1,000 respondents, and therefore claimed to have a margin of error of at most +/- 3%.*

*But the variability between polls far exceeded this margin.*

# Turnout by age in 2015 and 2017

Voter turnout



Source: British Election Study

# Communicating epistemic uncertainty

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- A. Direct:** expression of uncertainty about fact or number or science
  
- B. Indirect:** Summary of quality of underlying evidence

# Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties

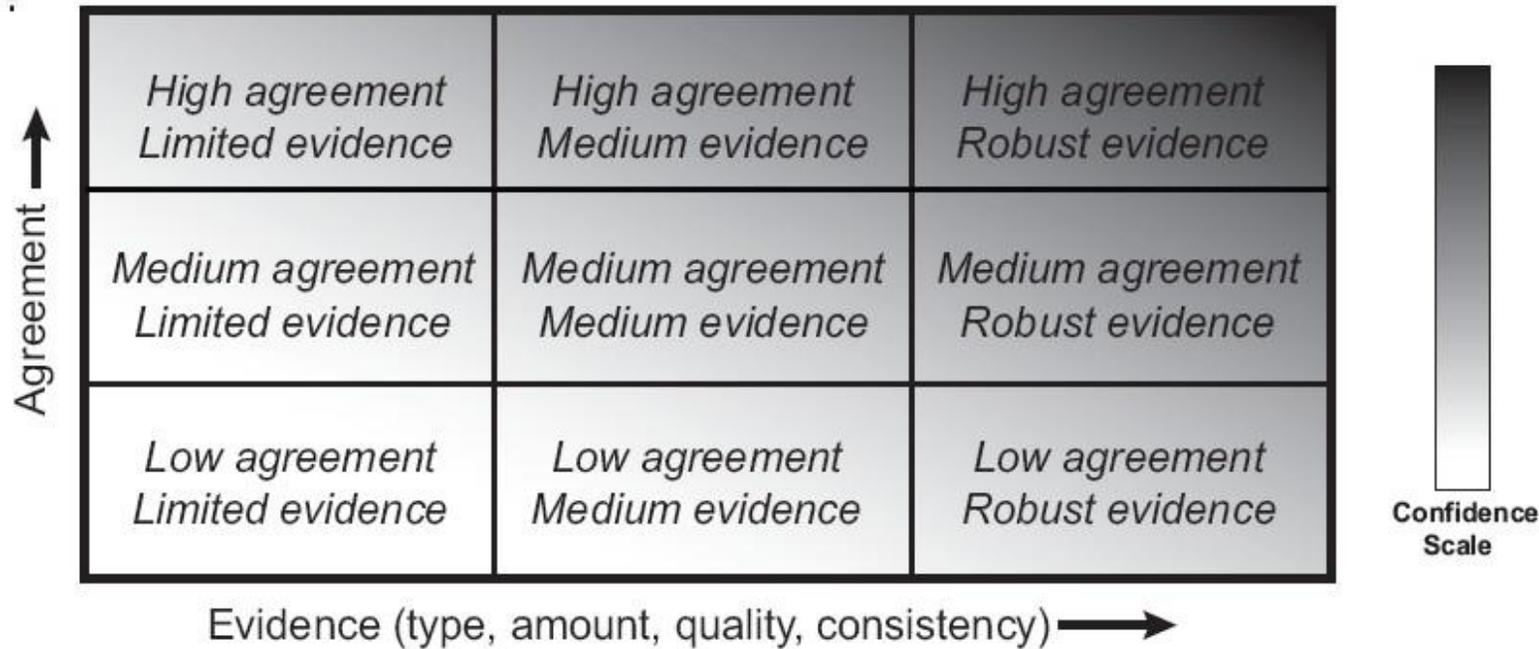
**Table 1. Likelihood Scale**

<b>Term*</b>	<b>Likelihood of the Outcome</b>
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability

# Communicating confidence in the science / strength of evidence

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IPCC



**Figure 1:** A depiction of evidence and agreement statements and their relationship to confidence. Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Generally, evidence is most robust when there are multiple, consistent independent lines of high-quality evidence.

## Arts participation

Low impact for low cost, based on moderate evidence.



+2

## Aspiration interventions

Very low or no impact for moderate cost based on very limited evidence.



0

## Behaviour interventions

Moderate impact for moderate cost, based on extensive evidence.



+4

## Block scheduling

Very low or no impact for very low or no cost, based on limited evidence.



0

## Collaborative learning

Moderate impact for very low cost, based on extensive evidence.



+5

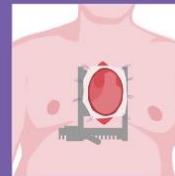
## Choice of intervention for those with severe aortic stenosis



### Transfemoral TAVI

Inserting a new valve into the aortic valve's place without open heart surgery. Delivery is through the femoral artery.

or



### SAVR

Open-heart surgery, to remove the narrowed aortic valve. Replacement with tissue valve.

## Recommendations

Population

Favours TAVI

Favours SAVR



Age 85+

Strong

Why? ▾

### Comparison of benefits and harms

	Favours transfemoral TAVI		Favours SAVR		Quality of evidence
	Events per 1000 people – within 2 years				
Deaths	197	45 fewer	242		★★★★ Moderate
Strokes	79	20 fewer	99		★★★★ Moderate
Aortic valve reinterventions	10		7 fewer	3	★★★★ Moderate
Pacemaker insertions	226		134 fewer	92	★★★★ Moderate
Life-threatening bleeds	161	252 fewer	413		★★★★ High
New onset atrial fibrillation	134	178 fewer	312		★★★★ High
Moderate / severe heart failure	87		18 fewer	69	★★★★ Moderate
Events per 1000 people – within 10 years					
Aortic valve reinterventions	226		134 fewer	92	★★★★ Very low
Length of hospital stay					
Median days in hospital	8	4 fewer	12		★★★★ High

▶ See all 14 outcomes **MAGIC** app

# Trustworthy communication in the media?

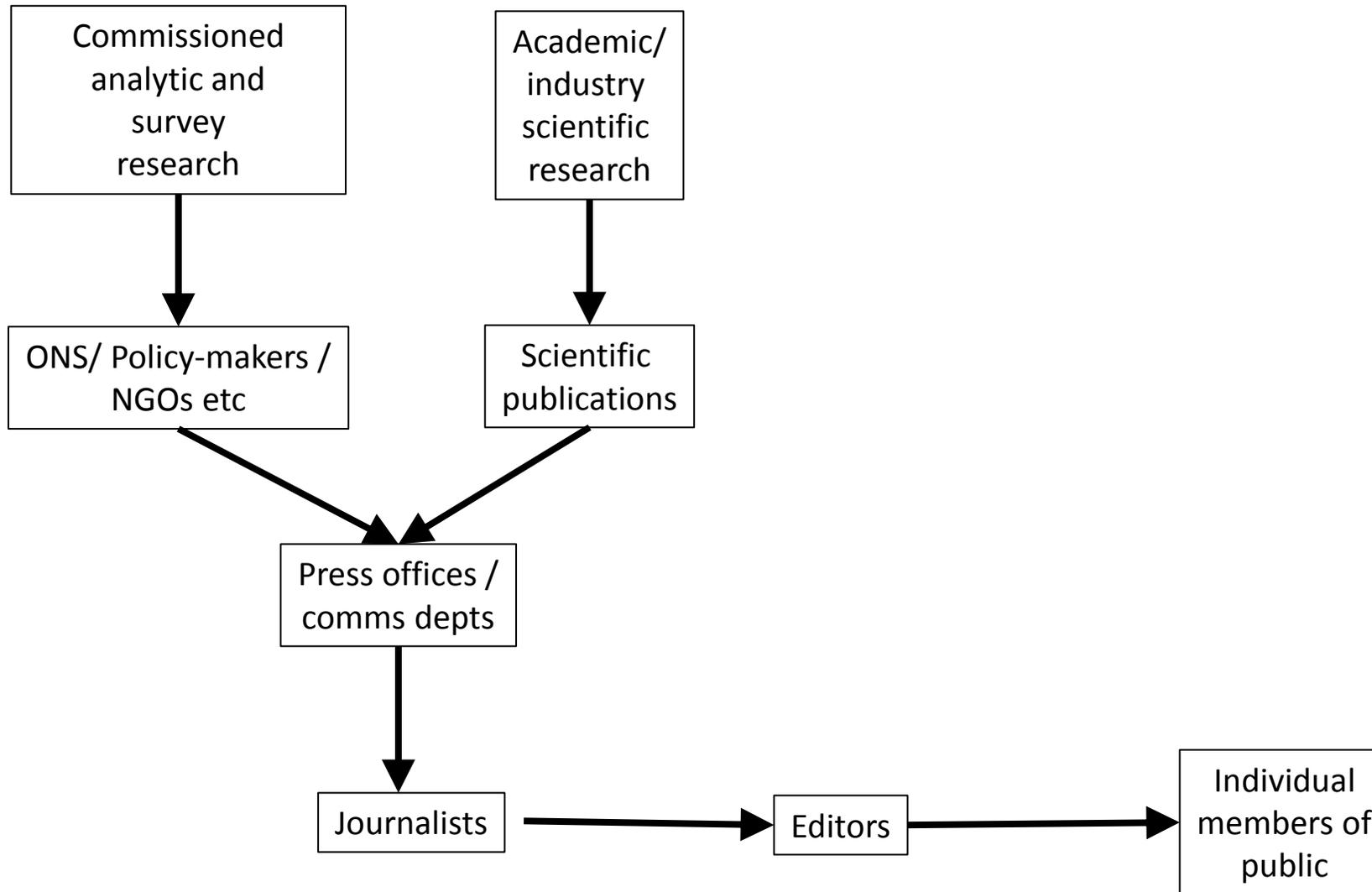
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thanks to Liz Gerard

# The pipeline of statistical evidence

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# Socioeconomic position and the risk of brain tumour: a Swedish national population-based cohort study

Amal R Khanolkar,<sup>1,2</sup> Rickard Ljung,<sup>2</sup> Mats Talbäck,<sup>2</sup> Hannah L Brooke,<sup>2</sup> Sofia Carlsson,<sup>2</sup> Tiit Mathiesen,<sup>3</sup> Maria Feychting<sup>2</sup>

- abstract:
  - *We observed consistent associations between higher socio-economic position and higher risk of glioma*
- press release
  - *High levels of education linked to heightened brain tumour risk*
- Daily Mirror...



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M · Science · tumour

# Why going to university increases risk of getting a brain tumour

23:30, 20 JUN 2016 BY ANDREW GREGORY

Highly educated people are more likely to suffer from brain tumours than those who do not progress as far in their education



13  
SHARES



1  
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## Are Your Savings Enough to Retire

If you have a £250,000 portfolio, download the "15-Minute Retirement

# Statistical stories can be difficult

---

Classic narratives have

- an emotional hit to the reader
- reveal a clear causal path
- have a neat conclusion

But science and statistics are seldom like that

Need to be engaging and yet true to the evidence

# Countering scepticism and misinformation

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- Active area of research
- ‘Backfire effect’ of correcting fake news has been exaggerated
- ‘Inoculation’
- Increasing evidence for benefit from graphics
- Education

**Climate  
change  
scepticism**

Climate  
Consensus - the  
97%

# Study: real facts can beat 'alternative facts' if boosted by inoculation

In our current "post-truth" climate, inoculation may provide the key to making facts matter again



5050

**Dana Nuccitelli**

Tuesday 24 January 2017  
11.00 GMT



*Inoculation*: introduce weak form of 'myth' in order to show its fallacy (van der Linden etc)

Wonkblog • Analysis

# Study: Charts change hearts and minds better than words do

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By [Christopher Ingraham](#) June 15  [Email the author](#)

# Training people to question claims

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# THE LANCET

Published: 21 May 2017

## Effects of the Informed Health Choices primary school intervention on the ability of children in Uganda to assess the reliability of claims about treatment effects: a cluster-randomised controlled trial

*Allen Nsangi, Daniel Semakula, Andrew D Oxman, Astrid Austvoll-Dahlgren, Matt Oxman, Sarah Rosenbaum, Angela Morelli, Claire Glenton, Simon Lewin, Margaret Kaseje, Iain Chalmers, Atle Fretheim, Yunpeng Ding, Nelson K Sewankambo*

# This researcher may have discovered the antidote to health bullshit

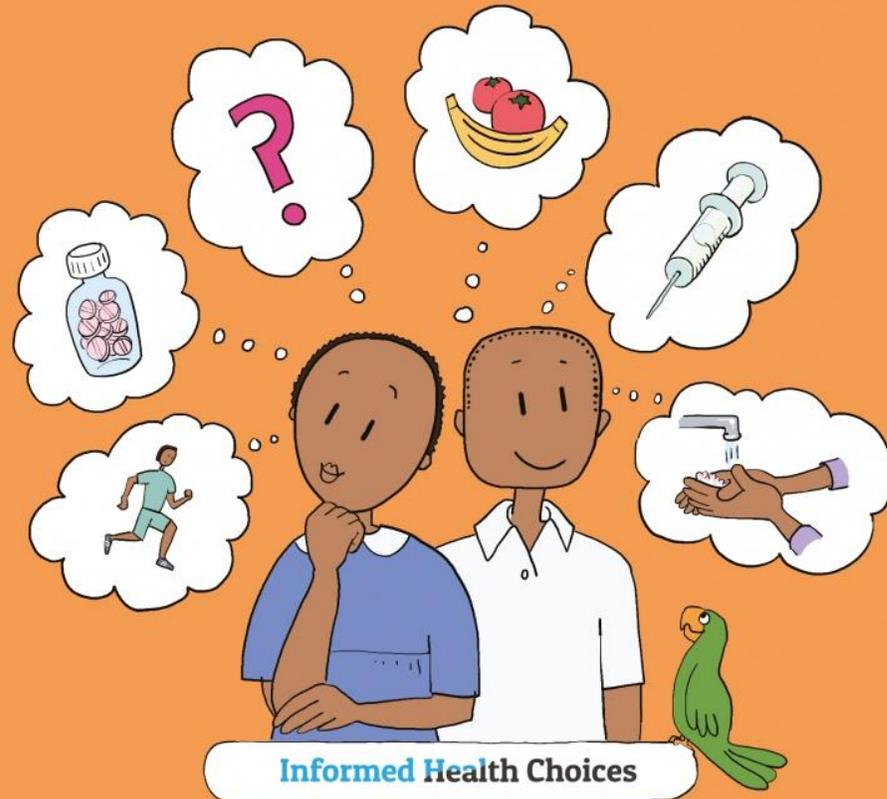
A big, new experiment shows it's possible to train kids to detect dubious health claims.

*Updated by Julia Belluz and Alvin Chang | May 22, 2017, 8:23am EDT*



A health science book for primary school children

# The Health Choices Book: Learning to think carefully about treatments



**Informed Health Choices**





## You Can Handle The Truth

Students in Uganda are the guinea pigs for a new scientific discipline – researchers are teaching them to be the first firewall against alternative facts.

Available now

🕒 53 minutes

Academics from Uganda and Norway worked with 10,000...

# Conclusions

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- Information should be *accessible, useable, assessable*
- Work with multiple audiences and communication professionals
- Pre-empt misunderstandings
- Be confident with uncertainty
- Right info at right time in right form
- Have clear aims and evaluate performance



Sometimes statistical stories can be  
misunderstood.....

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BY

NUMBERS

The Statistics of Sexual Behaviour

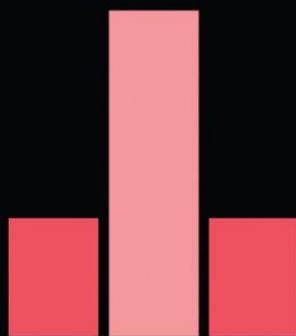
DAVID SPIEGELHALTER



David Spiegelhalter

# sex

by numbers



# How often do (opposite sex) couples report having sex?

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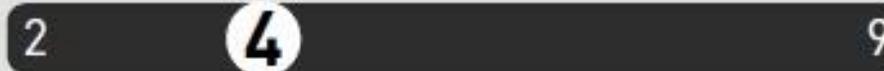
Median (middle) number of occasions of sex in the past 4 weeks (people aged 16-44)

Natsal-1



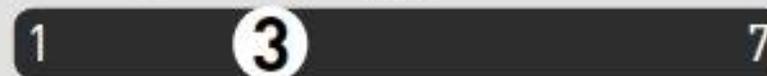
1990

Natsal-2



2000

Natsal-3



2010

The bars represent the interquartile range: 50% of the population were in this range, 25% were below the lower value, and 25% were above the higher value.

# Britons having sex less often

National Survey of Sexual Attitudes and Lifestyles finds frequency of sex has fallen by 20% since last survey in 2000



When I said all this in a talk....

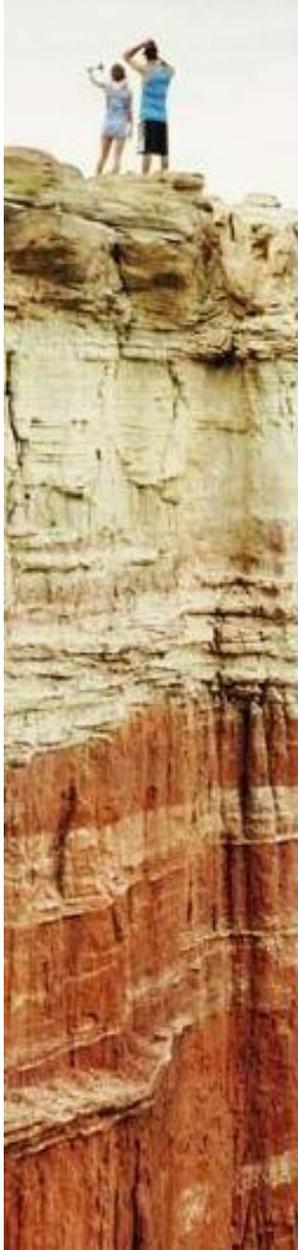
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🏠 > Science

# **Britons are having less sex, and Game of Thrones could be to blame, warns Cambridge professor**

David Spiegelhalter, the Winton Professor of the Public Understanding of Risk, said the trend in declining sex rates over the last 30 years was 'very worrying.'

In 1990 couples had sex around five times a month, but now it is just three times, a 40 per cent decrease in just 20 years. If current trends continue couples would not be having sex at all by 2030.



**CULTURE**

# IS 'GAME OF THRONES' RUINING OUR SEX LIVES?

BY **TUFAYEL AHMED** ON 6/6/16 AT 1:42 PM





**FOOD & DRINK**

Dublin food and drink scene >

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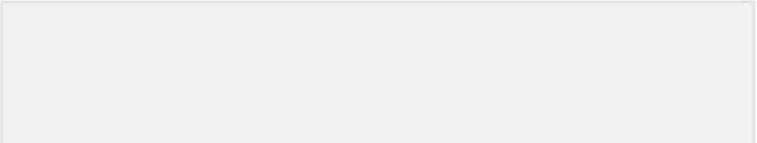
Music and Nightlife

Things to Do

**D** » News » Dublin News » Television

# Couples 'will stop having sex by 2030' due to the large rise in TV ratings

11:55, 6 JUN 2016 | BY JOHN PATRICK-KIERANS





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SEX & LOVE

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IN THE MAG

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SUBSC

# Sex Will Be Obsolete by 2030 Because of Netflix, According to One Lone Scientist

Apparently, the future holds no chill.

BY KORIN MILLER, *June 7, 2016*





**EXKLUSIV:**  
**Privatpatienten zahlen die Zeche**  
Wer noch privat versichert ist, sollte prüfen, ob... **mehr**

Von wegen heiß

07. Juni 2016 15:59 Uhr

## Warum wir wegen "Game of Thrones" alle weniger Sex haben

Wo man auch hinschaut, findet man heute Sex, nur in den Schlafzimmern wird er immer weniger. Ein Statistikprofessor gibt daran nun ausgerechnet der heißen Serie "Game of Thrones" die Schuld.



Drucken



Benessere

## Il sesso sparirà, nel 2030 tutti in bianco

Lo dice la scienza e la colpa è tutta della tecnologia, lo studio arriva da Cambridge



Dai mitici [anni settanta](#) tutti sesso, droga e rock and roll a un futuro senza sesso, una generazione triste quella futura. E le dinamiche di coppia e i giochi di potere e il toy boy e il vecchio con la Lolita? Sarà un mondo allo sfascio quello futuro, senza punti di riferimento, senza trasgressioni, senza tradimenti e fughe d'amore, perché [il sesso aiuta a vivere](#).

L'allarme arriva dall'Univeristà Cambridge dove un esperto di statistica il professor **David Spiegelhalter**, ha realizzato che gli inglesi fanno sesso il 40% in meno rispetto a quanto ne facevano 20 anni fa. Secondo

LIVING

# Netflix is killing couple lives: study

By Phoebe Cooke, The Sun

A study by researchers at Lancaster University in the UK reveals that the busiest hour for internet use is now between 10 p.m. and 11 p.m., driven by those watching streaming services such as Netflix, iPlayer and YouTube.

The research could support a warning from Prof. David Spiegelhalter from the University of Cambridge, who says couples are less interested in sex because they watch more TV in bed.

In 2016, he blamed figures showing falling rates of sex on the “mass of connectivity” we have now “compared with just a few years ago when the TV used to close down at half past 10.”



CFA Institute

A Difference That M

JUN 6, 2016 @ 11:50 PM

4,516 VIEWS

# Is 'Game Of Thrones' Killing Your Sex Life?



**JV Chamary**, CONTRIBUTOR

*I cover the science of life.* [FULL BIO](#) ▾

Number of times the average person had sex in the past 4 weeks

