

Making statistics accessible, useable and assessable

Professor Sir David Spiegelhalter,

Chairman of the *Winton Centre for Risk & Evidence Communication*,
University of Cambridge

President, Royal Statistical Society

OSR Health and Social Care Statistics, 2017

Statistics are not always reported responsibly ...

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

Amal R Khanolkar,^{1,2} Rickard Ljung,² Mats Talbäck,² Hannah L Brooke,² Sofia Carlsson,² Tiit Mathiesen,³ Maria Feychting²

- 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*
- but when it got to the Daily Mirror...



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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

COMMENT

Are Your Savings Enough to Retire

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

Onora-O'Neill..



- Don't aim to 'increase trust'
- Aim to demonstrate *trustworthiness*
- People must be able to assess that trustworthiness
- Information should be *accessible, useable, and assessable*



Smoking, drinking and drug use among young people

England: 2016

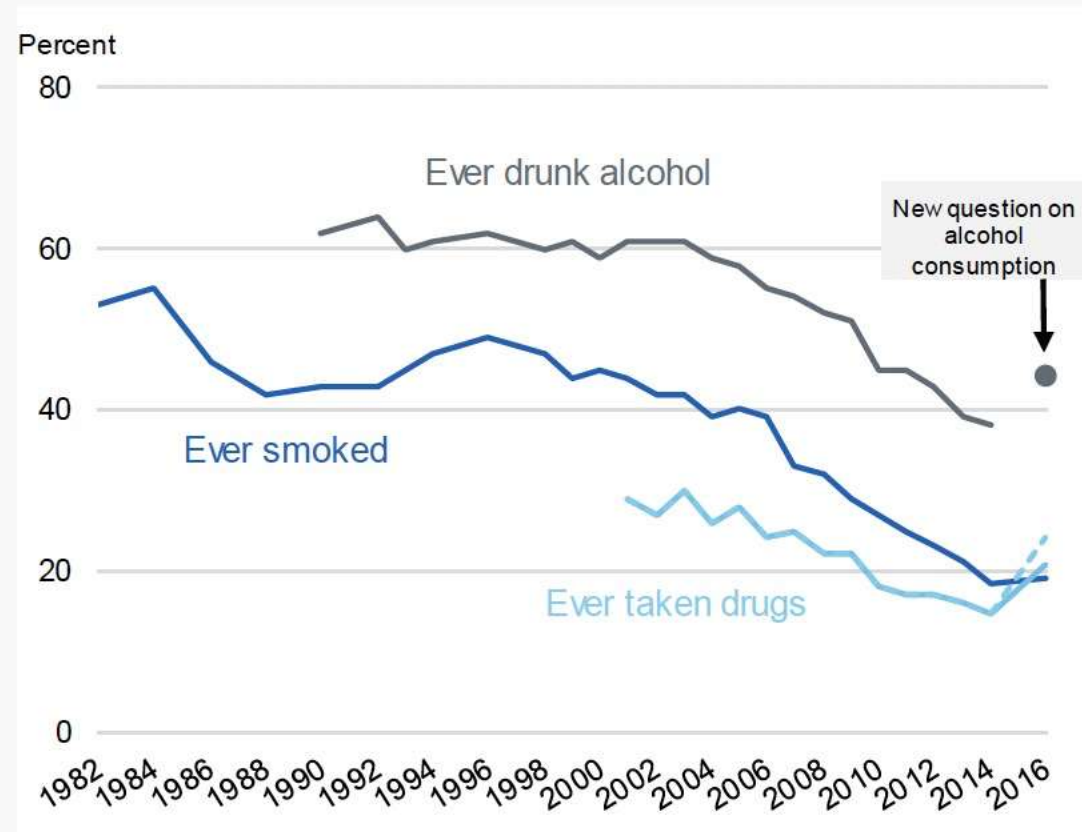
Key findings¹

In 2016

- 19% of 11-15 year old pupils had ever smoked, which is similar to 2014.
- 44% of pupils had ever drunk alcohol which is not comparable with earlier surveys.
- 24% of pupils reported they had ever taken drugs. This compares to 15% in 2014.

Part of the increase since 2014 may be explained by the addition of questions on nitrous oxide and new psychoactive substances. After allowing for this however (solid line on chart), it still represents a large increase which has not been observed in other data sources². Therefore an estimate from the next survey in 2018 is required before we can be confident that these survey results reflect a genuine trend in the wider population. In the meantime the results for drug taking from this survey should be treated with caution.

- 3% of pupils were weekly (regular) smokers, 10% had drunk alcohol in the last week and 10% had taken drugs in the last month.



1) Questions on drinking and drug taking were first introduced in 1990 and 2001 respectively. 2) A comparison with other data sources is given on page 65.

Figure 3: Under 18 conception rate, 1969 to 2014

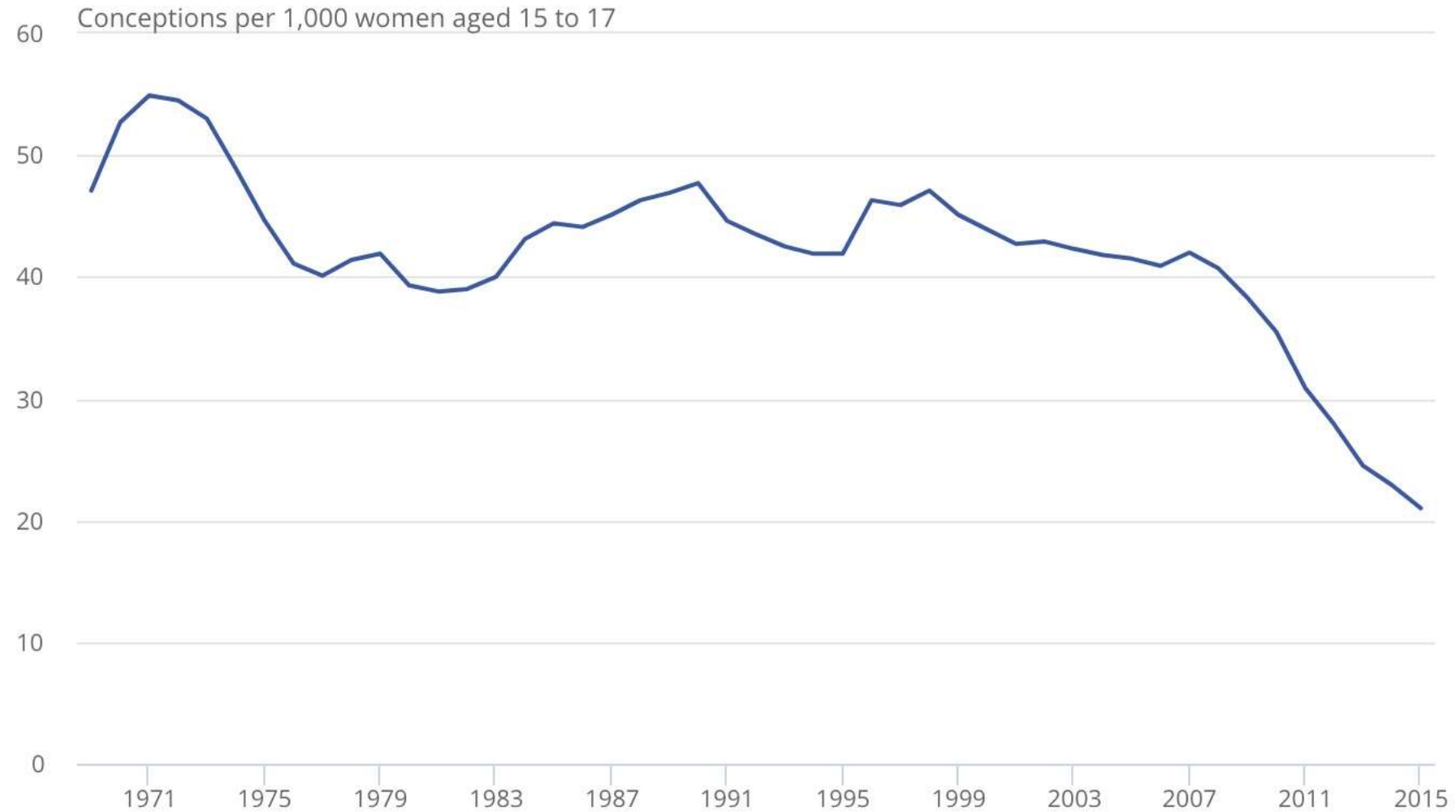
England and Wales



Source: Office for National Statistics

Figure 3: Under 18 conception rate, 1969 to 2015

England and Wales



Source: Office for National Statistics

- ☐ NHS Digital indicators
 - ☐ Indicator Portal news
 - ⊕ Site updates
 - ⊕ Known issues
 - ☐ CCG Outcomes Indicator Set
 - ⊕ Domain 1 - Preventing people from dying prematurely (CCG)
 - ⊕ Domain 2 - Enhancing quality of life for people with long-term conditions (CCG)

Welcome to the NHS Digital Indicator Portal

Licensed under **OGL** [Open Government Licence](#)

This website gathers together a number of health and social care indicators. Currently these include:

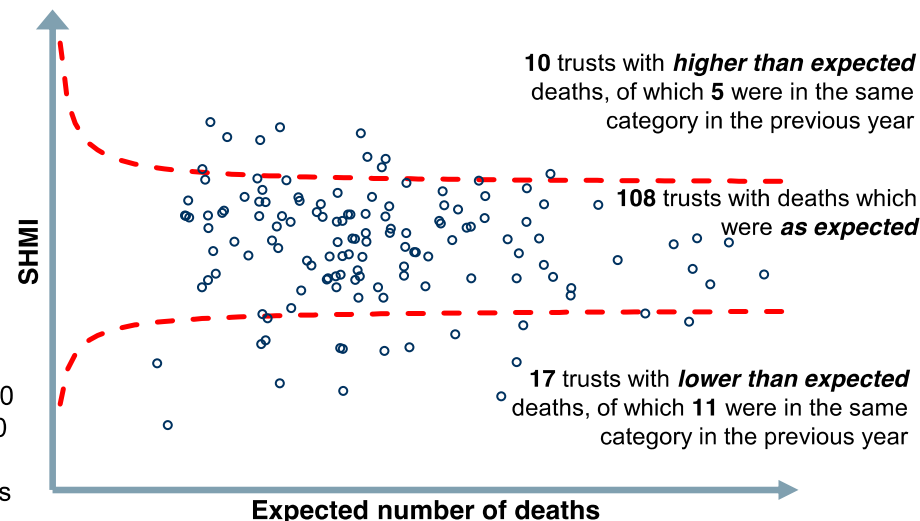
- **Clinical Commissioning Group Outcomes Indicator Set**

The CCG Outcomes Indicator Set (CCG OIS) is an integral part of NHS England's systematic approach

This publication compares the actual number of deaths following time in hospital with the expected number of deaths, using the Summary Hospital-level Mortality Indicator (SHMI).

The expected number of deaths is estimated using the characteristics of the patients treated; age, sex, method of admission, current and underlying medical condition(s). It covers patients admitted to hospitals in England who died either while in hospital or within 30 days of being discharged.

Between April 2016 and March 2017, there were approximately 8.9 million discharges, from which 294,000 deaths were recorded either while in hospital or within 30 days of discharge for the 135 hospital trusts covered. This includes deaths from other causes as well as deaths related to the reason for the hospital admission.



The SHMI was developed in response to the public inquiry into the Mid Staffordshire NHS Foundation Trust.

It is used along with other information to inform the decision making of trusts, regulators and commissioning organisations.

• • • • •

The SHMI is not a measure of quality of care. A higher/lower than expected number of deaths should not immediately be interpreted as indicating poor/good performance and instead should be viewed as a ‘**smoke alarm**’ which requires further investigation.

• • • • •

The SHMI cannot be used to directly compare mortality outcomes between trusts and it is inappropriate to rank trusts by their SHMI.

The 10 trusts with a **higher than expected** number of deaths were:

- | | |
|--|--|
| • Blackpool Teaching Hospitals NHS FT | • Southport and Ormskirk Hospital NHS Trust |
| • James Paget University Hospitals NHS FT | • The Royal Wolverhampton NHS Trust |
| • Northern Lincolnshire and Goole NHS FT | • United Lincolnshire Hospitals NHS Trust |
| • South Tyneside NHS FT | • Wroughton, Wigan and Leigh NHS FT |
| • Southend University Hospital NHS FT | • Wye Valley NHS Trust |

The 17 trusts with a **lower than expected** number of deaths were:

- | | |
|--|---|
| • Barts Health NHS Trust | • London North West Healthcare NHS Trust |
| • Cambridge University Hospitals NHS FT | • North Middlesex University Hospital NHS Trust |
| • Chelsea and Westminster Hospital NHS FT | • Poole Hospital NHS FT |
| • Croydon Health Services NHS Trust | • Royal Free London NHS FT |
| • Frimley Health NHS FT | • St George's University Hospitals NHS FT |
| • Guy's and St Thomas' NHS FT | • The Whittington Hospital NHS Trust |
| • Homerton University Hospital NHS FT | • Torbay and South Devon NHS FT |
| • Imperial College Healthcare NHS Trust | • University College London Hospitals NHS FT |
| • Kingston Hospital NHS FT | |

Trusts in **bold** were also in the same category in the same period in the previous year. ‘FT’ means ‘Foundation Trust’.

But you can't control the media..

NHS buries 19,000 'suspect' deaths: Expert demands urgent probe into 'avoidable' fatalities amid shock claims dozens of hospitals across Britain are 'potentially unsafe'

- Sir Brian Jarman - man who helped expose Mid-Staffs scandal - made discovery
- Lib Dem health spokesman Norman Lamb demanded Jeremy Hunt investigate
- Sir Brian calculated 32,810 'unexpected' deaths in English hospitals in five years
- But using the preferred NHS method, 13,627 were classed as such - 19,183 fewer

By [STEPHEN ADAMS](#) and [MARTYN HALLE FOR THE MAIL ON SUNDAY](#)

PUBLISHED: 22:28, 2 September 2017 | **UPDATED:** 23:44, 2 September 2017

User Centred Design



National Congenital
Heart Disease Audit
Report 2012-15



UNDERSTANDING CHILDREN'S HEART SURGERY OUTCOMES

This site is to help people make sense of the published survival data about children's heart surgery.

Our website will help you:

- explore what survival rates can and can't tell you
- understand how the NHS monitors children's heart surgery
- explore published data for UK hospitals



What, why, how?

What do we mean by survival rates?



Data

Explore published survival statistics

Browse hospitals on a UK map



Everything else

How are survival statistics monitored

What happens if the data raises

Hospital	Number of Operations	Number of Deaths	Number of Survivors	Survival Rate %	Survival with predicted range ← full view full detail →	
					94%	100%
Belfast, Royal Victoria Hospital RVB >	204	2	202	99		
London, Harley Street Clinic HSC >	482	7	475	98.5		
Leicester, Glenfield Hospital GRL >	582	11	571	98.1		
Newcastle, Freeman Hospital FRE >	678	15	663	97.8		
Glasgow, Royal Hospital for Children RHS >	787	28	759	96.4		
Bristol Royal Hospital for Children BRC >	835	19	816	97.7		
Southampton, Wessex Cardiothoracic Centre SGH >	890	17	873	98.1		
Leeds General Infirmary LGI >	976	23	953	97.6		
Dublin, Our Lady's Children's Hospital OLS >	1056	23	1033	97.8		
London, Royal Brompton Hospital NHB >	1107	12	1095	98.9		
Liverpool, Alder Hey Hospital ACH >	1146	27	1119	97.6		
London, Evelina London Children's Hospital GUY >	1204	39	1165	96.8		
Birmingham Children's Hospital BCH >	1481	30	1451	98		
London, Great Ormond Street Hospital for Children GOS >	1881	30	1851	98.4		



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[PREDICT V2.0](#)

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PREDICT Tool Version 2.0: Breast Cancer Survival; Input

Age at diagnosis:

Mode of detection: ☐ Screen-detected ☒ Symptomatic ☐ Unknown

Tumour size in mm:

Tumour Grade: ☐ 1 ☒ 2 ☐ 3

Number of positive nodes: ☐ Micromet

ER status: ☐ Positive ☒ Negative

HER2 status: ☒ Positive ☐ Negative ☐ Unknown

KI67 status: ☒ Positive ☐ Negative ☐ Unknown

Gen chemo regimen: ☐ No chemo ☒ Second ☐ Third

[Predict Survival](#)

[Clear All Fields](#)

[Print Results](#)

PREDICT Tool Version 2.0: Breast Cancer Survival; Results

Five year survival

62 out of 100 women are alive at 5 years with no adjuvant therapy after surgery

An extra 7 out of 100 women treated are alive because of chemotherapy

An extra 15 out of 100 women treated are alive because of chemotherapy & Trastuzumab

Ten year survival

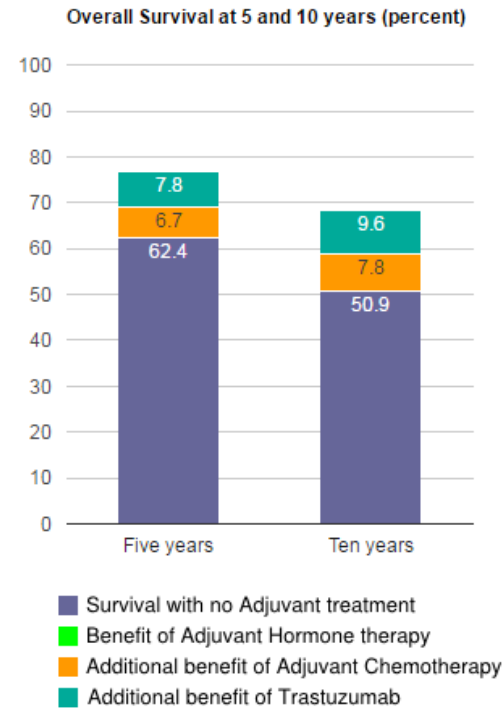
51 out of 100 women are alive at 10 years with no adjuvant therapy after surgery

An extra 8 out of 100 women treated are alive because of chemotherapy

An extra 17 out of 100 women treated are alive because of chemotherapy & Trastuzumab

To view the numbers in bars hover pointer over each bar-segment

(Or tap segment if using a mobile device)



*Disclaimer: **PREDICT** can only provide a general guide to possible outcomes in any individual case. As we are all different, for the more complete picture in your case, you should speak to your own specialist. You may wish to print this page out and share it with your specialist.*

Results

Table

Curves

Charts

Texts

Icons

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

5 10 years after surgery

Treatment	Additional Benefit	Survival %
Surgery only	-	64%
+ Hormone therapy	8%	72%
+ Chemotherapy	6%	78%
+ Trastuzumab	4%	82%
Overall Survival		82%

If these women were cancer free, 91% would survive 10 years.

Show ranges?



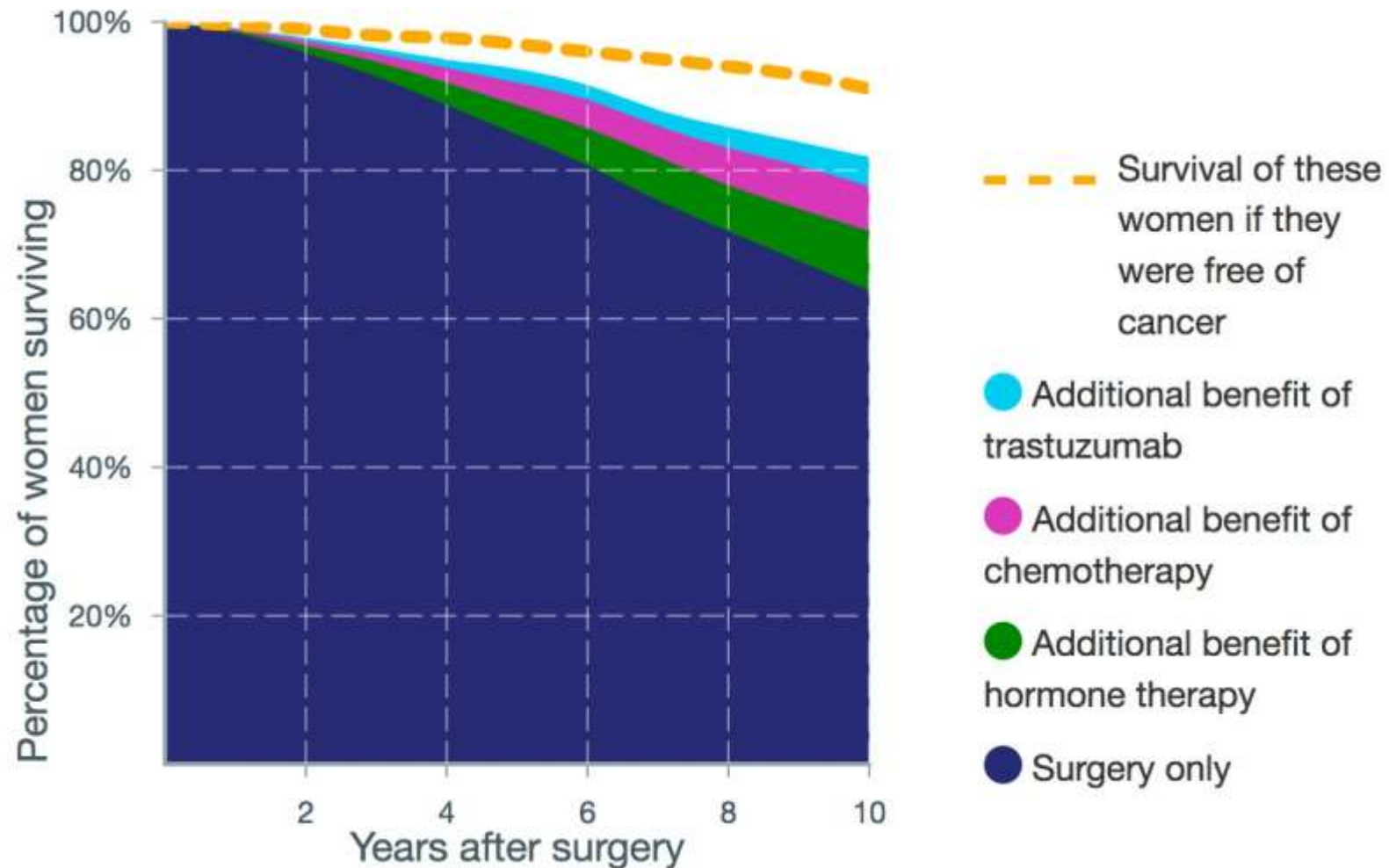
Yes

No

Results

[Table](#)[Curves](#)[Charts](#)[Texts](#)[Icons](#)

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

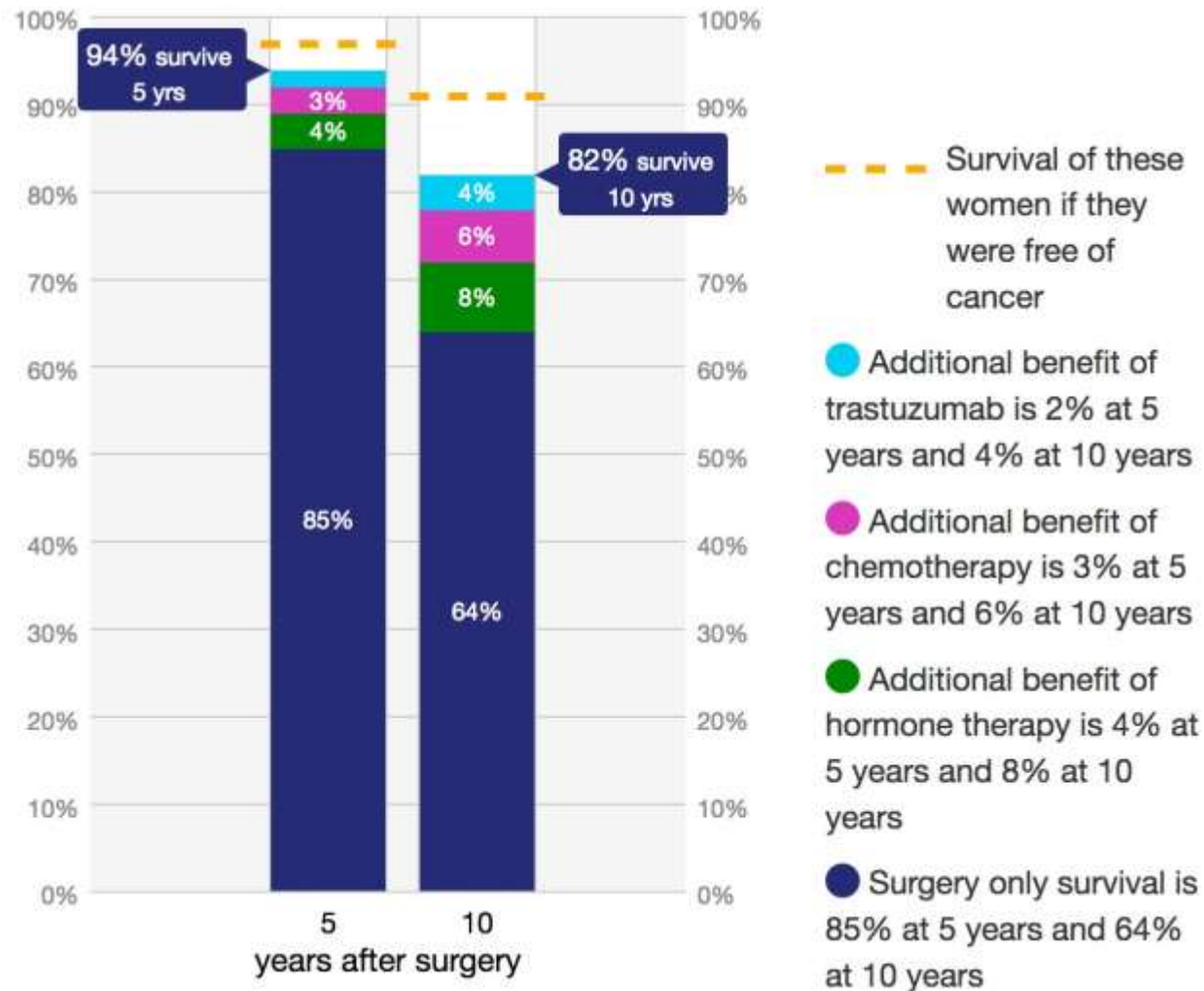


Results

[Table](#)[Curves](#)[Charts](#)[Texts](#)[Icons](#)

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](#)

Based on the information you have entered:

years after surgery

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

- **72** out of **100** women treated (an extra **8**) are alive because of **hormone therapy**.
- **78** out of **100** women treated (an extra **14**) are alive because of **hormone therapy** and **chemotherapy**.
- **82** out of **100** women treated (an extra **18**) are alive because of **hormone therapy, chemotherapy, and trastuzumab**.

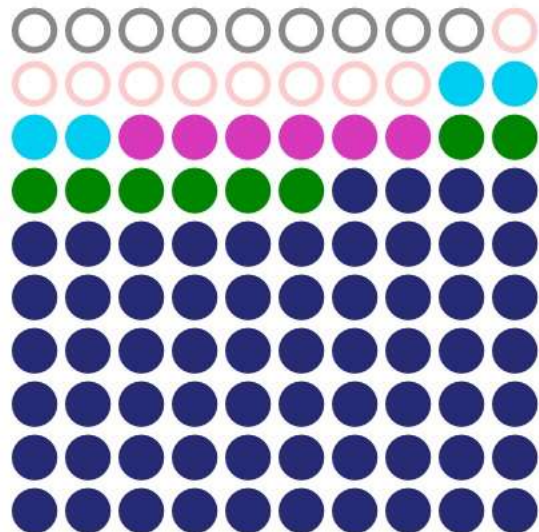
Of the women who would not survive, **9** would die due to causes not related to breast cancer.

Results

[Table](#)[Curves](#)[Charts](#)[Texts](#)[Icons](#)

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

5 10 years after surgery



- 9 deaths due to other causes
- 9 breast cancer related deaths
- 4 extra survivors due to trastuzumab
- 6 extra survivors due to chemotherapy
- 8 extra survivors due to hormone therapy
- 64 survivors with surgery alone

Accessible and useable, OK. But assessable?

- How to prominently acknowledge sources, caveats and uncertainties?
- Would this lose trust and credibility?

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UK unemployment rises to 1.7m

🕒 20 April 2016 [Business](#)



UK unemployment rose by 21,000 to 1.7 million between December and February, the Office for National Statistics (ONS) says.

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and communities](#)[Home](#) > [Employment and labour market](#) > [People in work](#) > [Employment and employee types](#) > [UK Labour Market](#)

Statistical bulletin:

UK Labour Market: April 2016

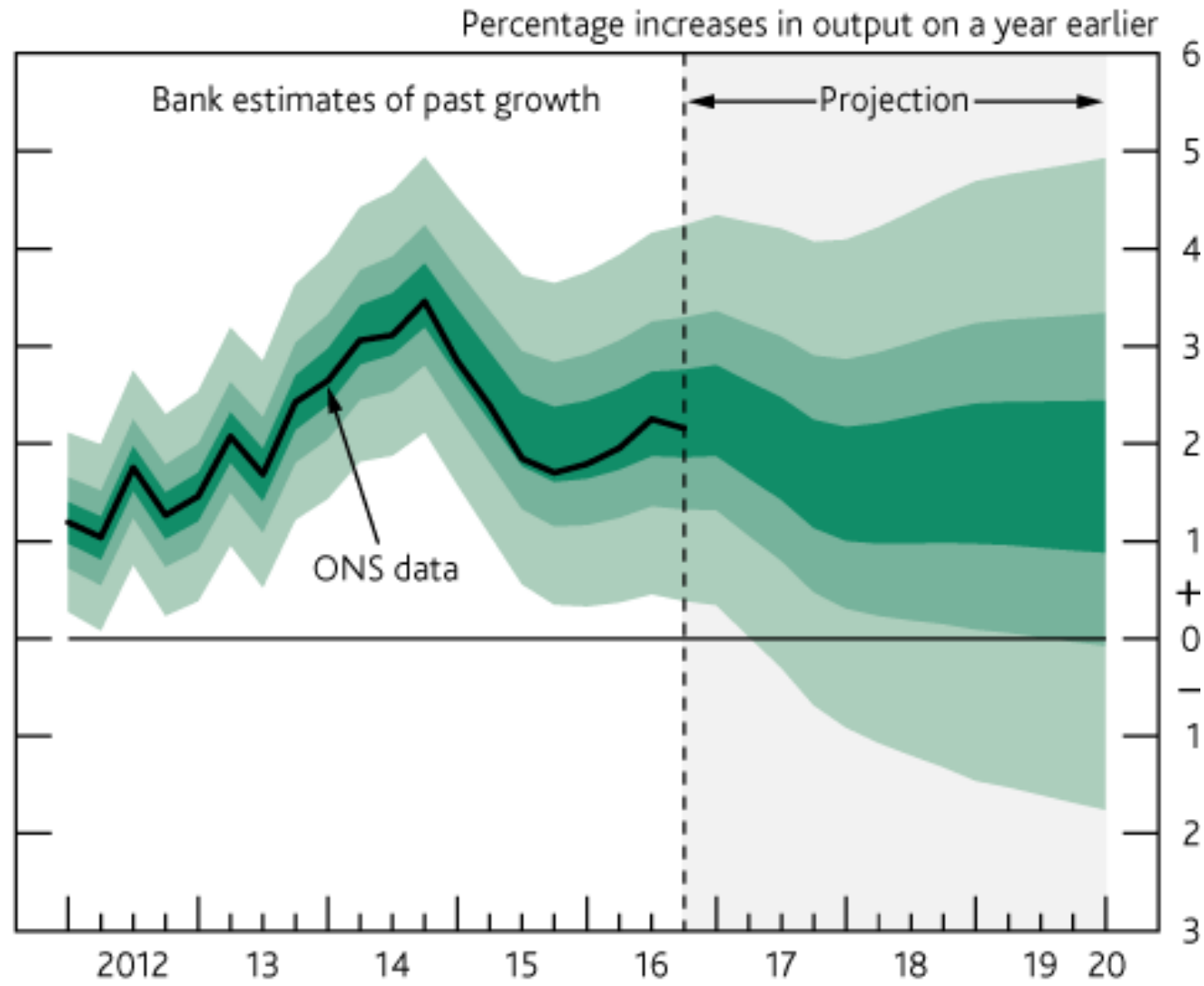
Estimates of employment, unemployment, economic inactivity and other employment-related statistics for the UK.

Table of contents

1. Main points for the 3 months to February 2016
2. Summary of latest labour market statistics
3. Understanding and working with labour market statistics
4. Employment
5. Public and private sector employment (first published on 16 March 2016)
6. Employment by nationality and country of birth, not seasonally adjusted (first published on 17 February 2016)
7. Actual hours worked
8. Workforce jobs (first published on 16 March 2016)
9. Average weekly earnings
10. Labour disputes (not seasonally adjusted)
11. Unemployment
12. Claimant Count (experimental statistics)
13. Comparison between unemployment and the Claimant Count
14. Economic inactivity
15. Young people in the labour market
16. Redundancies
17. Vacancies
18. Main out of work benefits, not seasonally adjusted (first published on 17 February 2016)
19. Revisions
20. Accuracy of the statistics: estimating and reporting uncertainty
21. Background notes
22. Methodology

numbers. For example, for the 3 months to February 2016, the estimated change in the number of unemployed people since September to November 2015 was an increase of 21,000, with a 95% confidence interval of +/- 78,000. This means that we can be 95% certain the actual change in unemployment was somewhere between an increase of 99,000 and a fall of 57,000, with the best estimate being an increase of 21,000. As the estimated increase in unemployment of 21,000 is smaller than the confidence interval of 78,000, the estimated increase in unemployment is said to be “not statistically significant”.

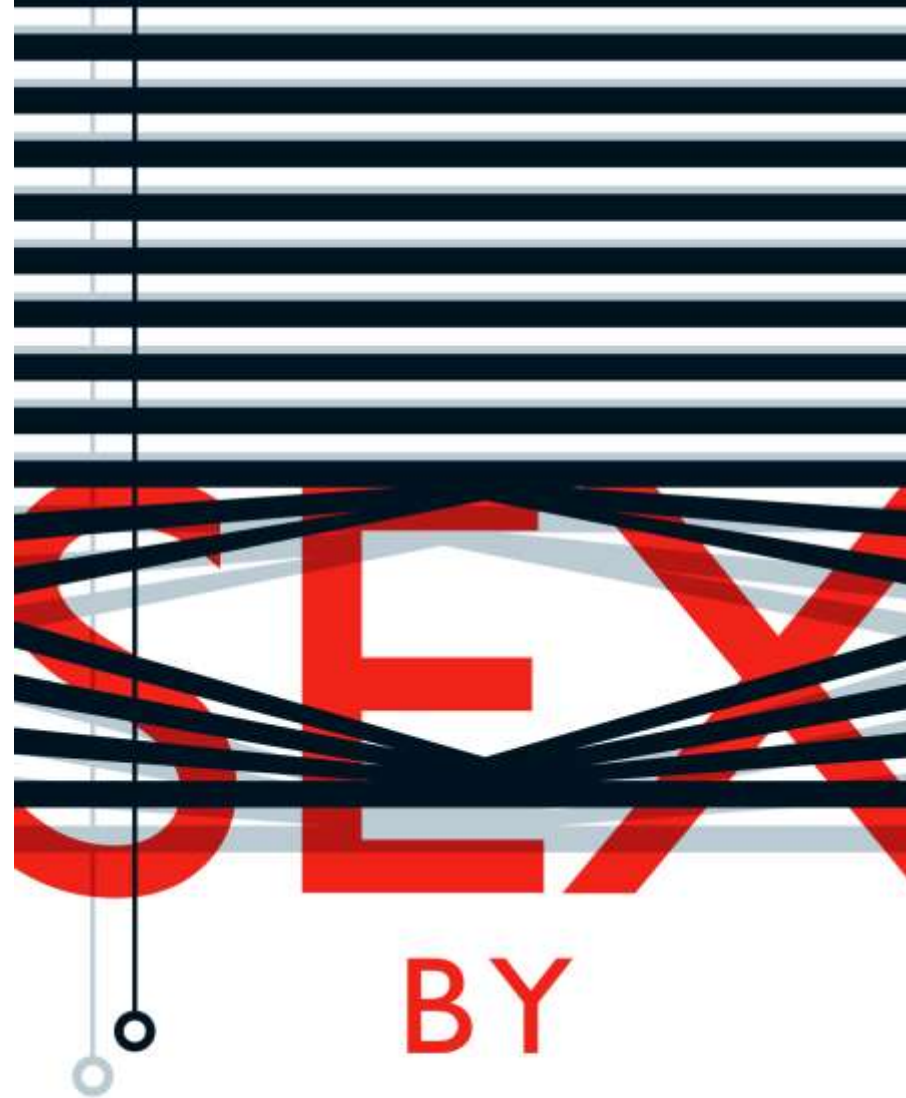
Bank of England Fan Chart – Feb 2017



Conclusions

- Statistical responsibility goes beyond producing reports
- Aim for evidence that is
 - *accessible*
 - *useable*
 - *assessable*
- This means knowing and trusting the audiences
- Consider multiple formats

When the media gets it wrong...



NUMBERS

The Statistics of Sexual Behaviour

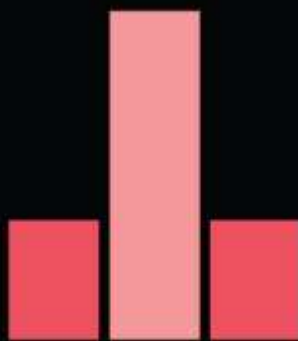
DAVID SPIEGELHALTER



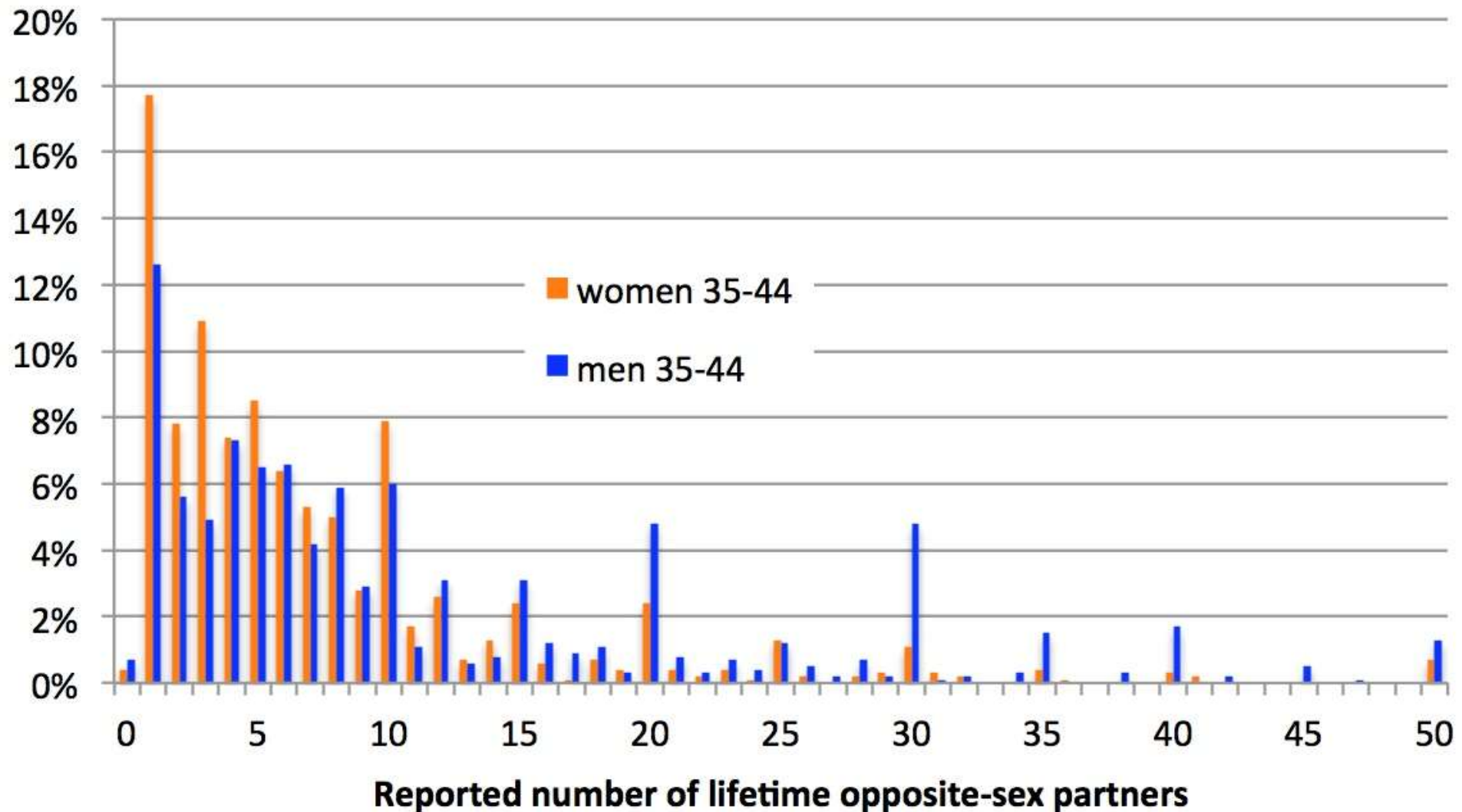
David Spiegelhalter

sex

by numbers



How many sexual partners do people report?

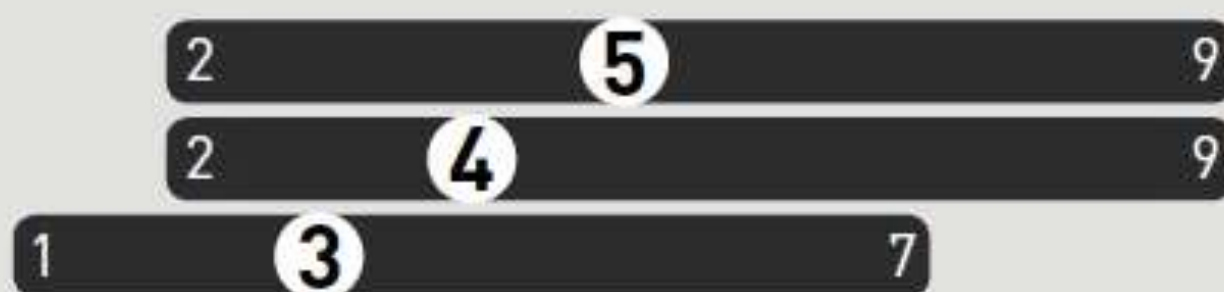


**Median (middle)
number of
occasions of sex
in the past
4 weeks (people
aged 16–44)**

Natsal-1

Natsal-2

Natsal-3



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



Recently I said all this at the Hay
literary festival

And a journalist in the
audience didn't quite get the
joke.....

Science

🏠 > Science

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

**CULTURE**

IS 'GAME OF THRONES' RUINING OUR SEX LIVES?

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



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

11:55, 6 JUN 2016

BY JOHN PATRICK-KIERANS



Get Results.

Get Women's Health



Women's Health

SEX & LOVE

SLIM SEXY YOGA

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



**stern**

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Home > Digital > Online > Game of Thrones: Warum wir wegen der Serie weniger Sex haben sollen

**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



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

