



Government of **Western Australia**  
Department of **Health**

# Waste: from bench to bedside

Clinical Senate

James Williamson

Clinical Excellence Division, Department of Health





**Special Inquiry into  
Government Programs and Projects**  
FINAL REPORT  
VOLUME 2 - FEBRUARY 2018



**Sustainable  
Health  
Review**

Interim Report to the Western Australian Government

# Sustainable Health Review

## WA public health system has grown (last 10 years)



Population  
↑ 29%



ED attendances  
↑ 49%



Hospital  
admissions  
↑ 39%



Births (public)  
↑ 36%



\$7 billion  
infrastructure  
investment

## Health costs continue to rise



Health costs tripled  
in 10 years  
**\$3B** ↑ **\$9B**



↑ 20%  
WA public  
hospitals cost  
20% more than  
national average



WA State  
debt

## The system is under pressure



Growing population  
(3.2M in 10 years)



Ageing population  
(50% more people  
over 65 in 10 years)



Chronic disease cost  
(\$1B in 10 years)



Fewest GPs  
per capita of  
all States

## Key to a sustainable future for health



Patient first



Value for  
money



Healthy  
lifestyles



Partnerships  
across sectors



Technology and  
innovation

# Sustainable Health Review

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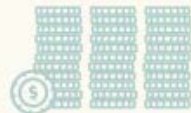


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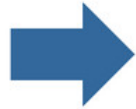


Technology and  
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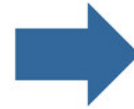




RESEARCH



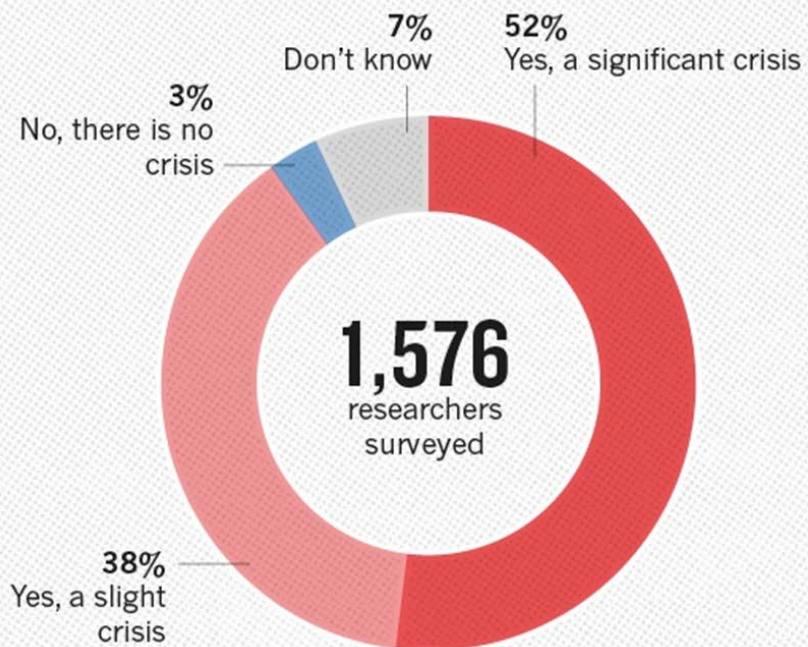
CLINICAL  
TRIALS



PATIENT  
CARE

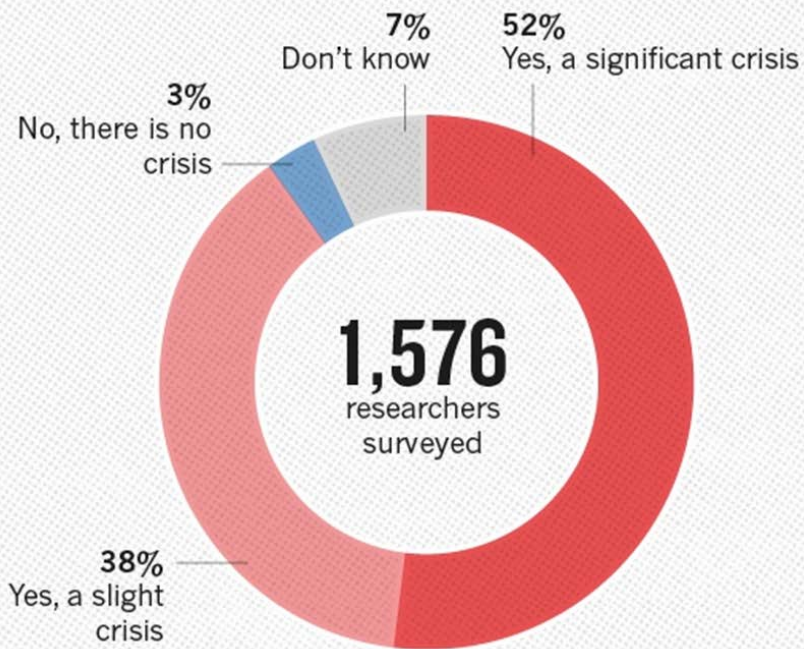


## IS THERE A REPRODUCIBILITY CRISIS?





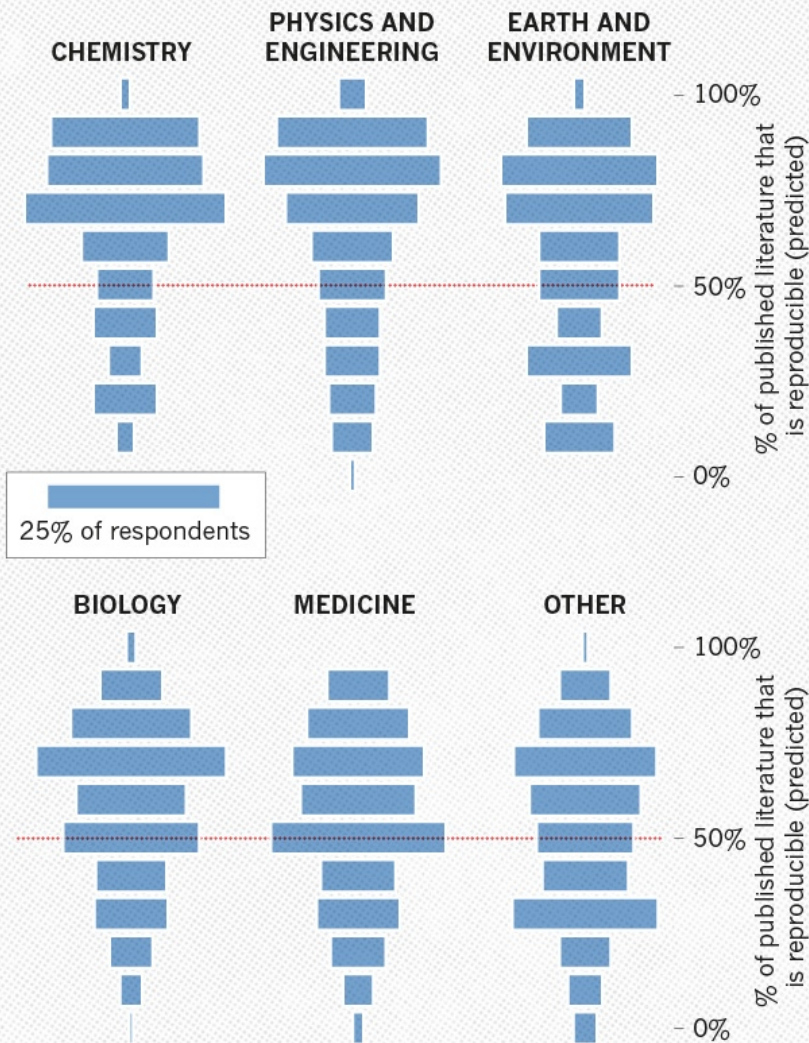
# IS THERE A REPRODUCIBILITY CRISIS?



©nature

# HOW MUCH PUBLISHED WORK IN YOUR FIELD IS REPRODUCIBLE?

Physicists and chemists were most confident in the literature.



Number of respondents from each discipline:  
 Biology 703, Chemistry 106, Earth and environmental 95,  
 Medicine 203, Physics and engineering 236, Other 233

©nature

# IS THERE A REPRODUCIBILITY CRISIS?



©nature

Bayer: 53 of 67 did not replicate

Amgen: 47 of 53 did not replicate

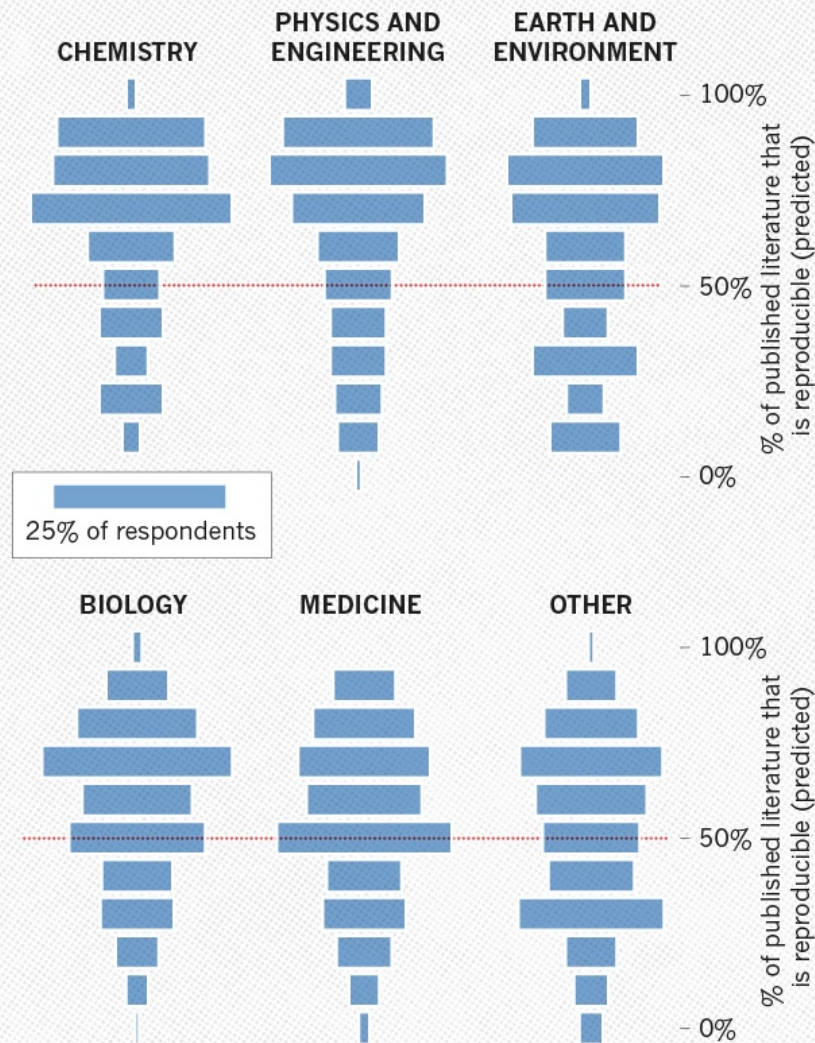
Cancer Biology: 3 of 5 did not replicate

Psychology:

- positive findings in 97% of original studies, 36% of replications
- mean effect size fell from 0.403 to 0.197

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## Fraud is rare

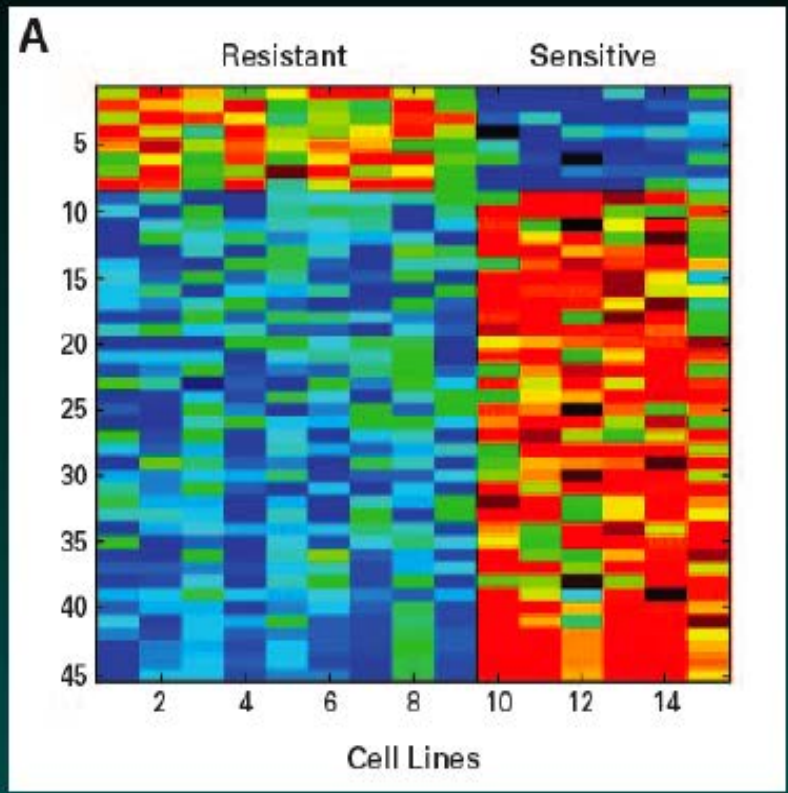
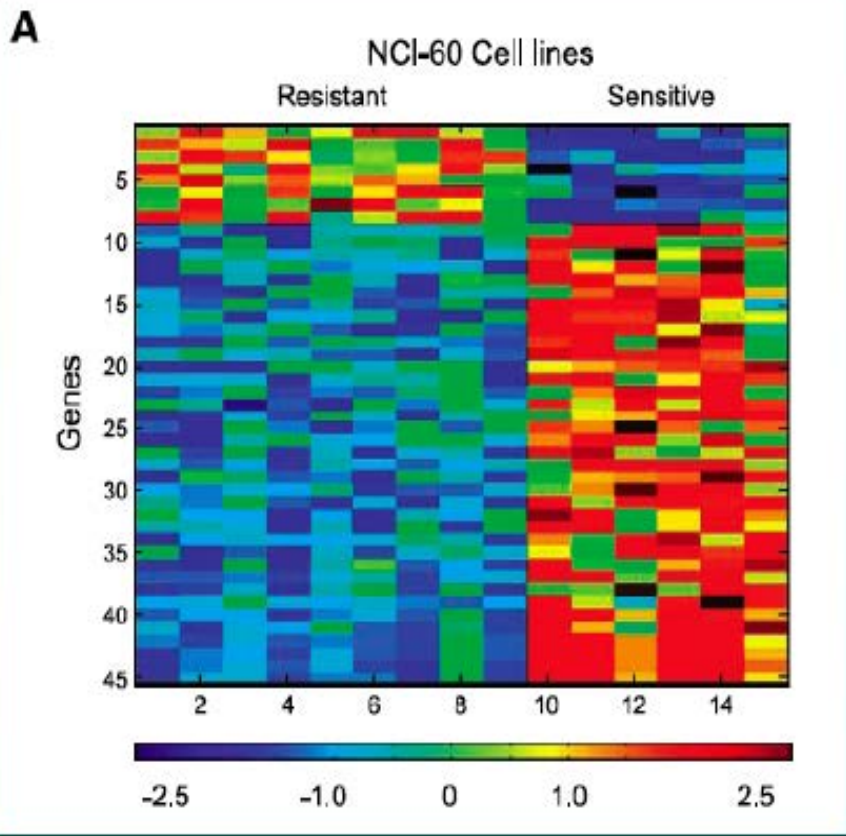
False positive studies +/- dubious research practices  
Perverse incentives and publication bias  
True biological heterogeneity of observed effects

## The most common mistakes are simple

Confounding in the experimental design  
Mixing up the sample/gene/group labels  
(Most mix-ups involve simple switches or offsets)

## This simplicity is often hidden

Incomplete documentation



Augustine et al., 2009, *Clin Can Res*, 15:502-10, Fig 4A.  
**Temozolomide**, NCI-60.

Hsu et al., 2007, *J Clin Oncol*, 25:4350-7, Fig 1A.  
**Cisplatin**, Gyroffy cell lines.

# THE **CANCER** LETTER

PO Box 9905 Washington DC 20016 Telephone 202-362-1809

## **Duke In Process To Restart Three Trials Using Microarray Analysis Of Tumors**

*By Paul Goldberg*

Duke University said it is in the process of restarting three clinical trials using microarray analysis of patient tumors to predict their response to chemotherapy.

THE **CANCER**  
LETTER

PO Box 9905 Washington DC 20016 Telephone 202-362-1809

**Prominent Duke Scientist Claimed Prizes  
He Didn't Win, Including Rhodes Scholarship**

*By Paul Goldberg*

## Fraud is rare

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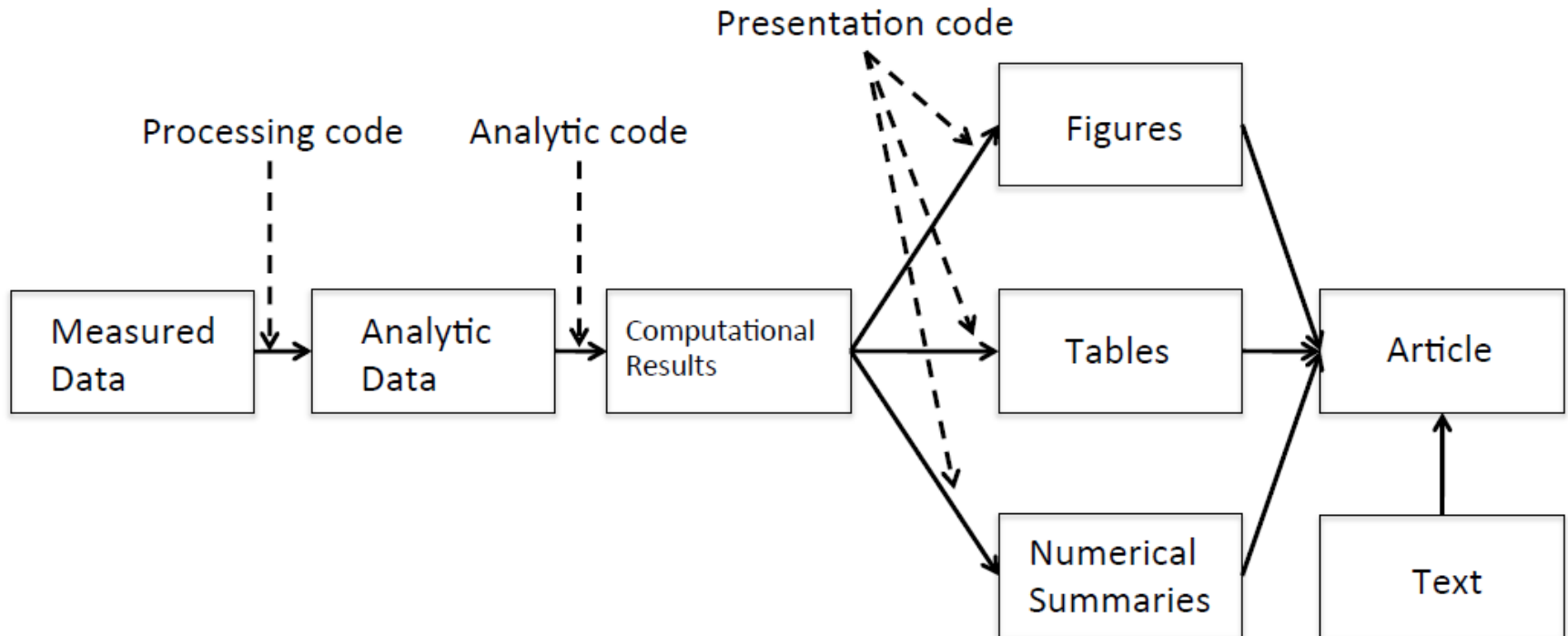
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## Research ethics

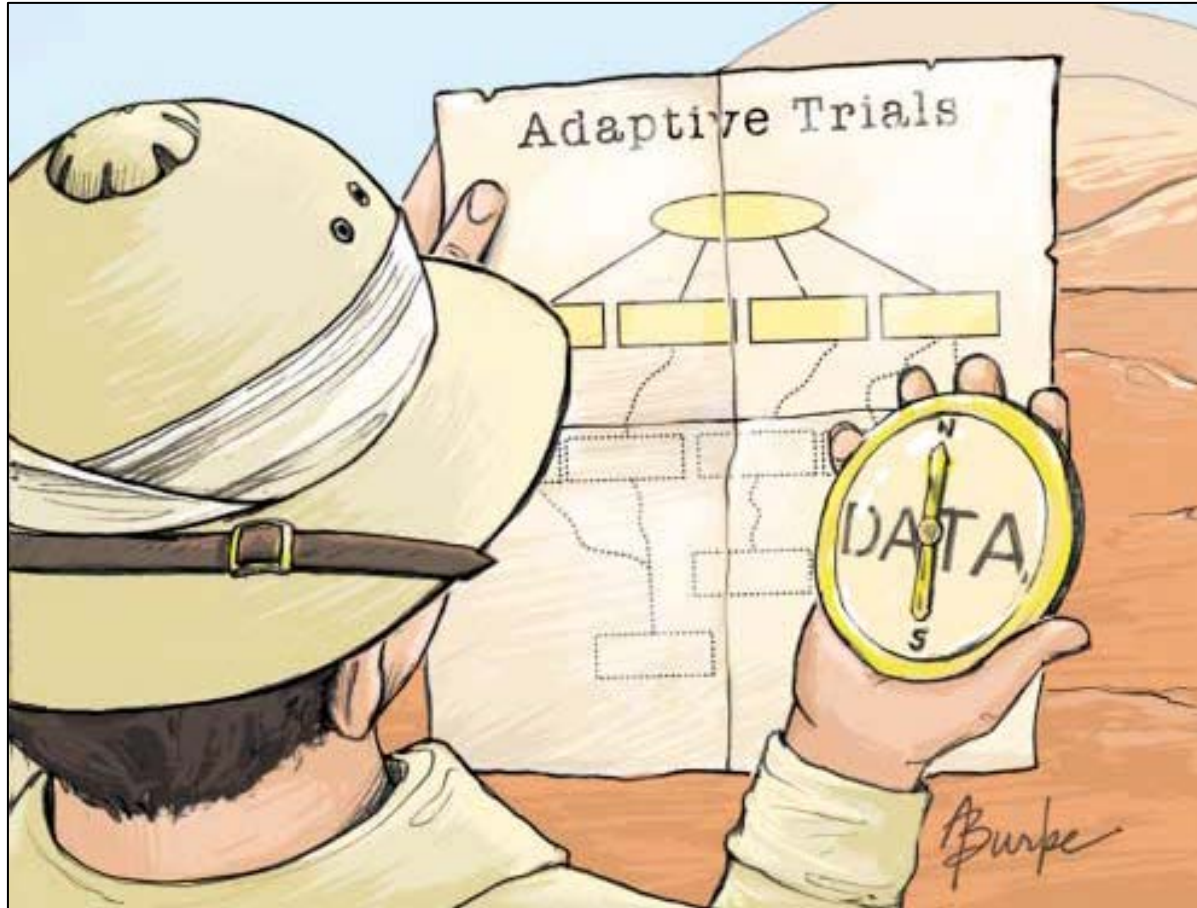
## Research governance



## Reproducible research

## Open data



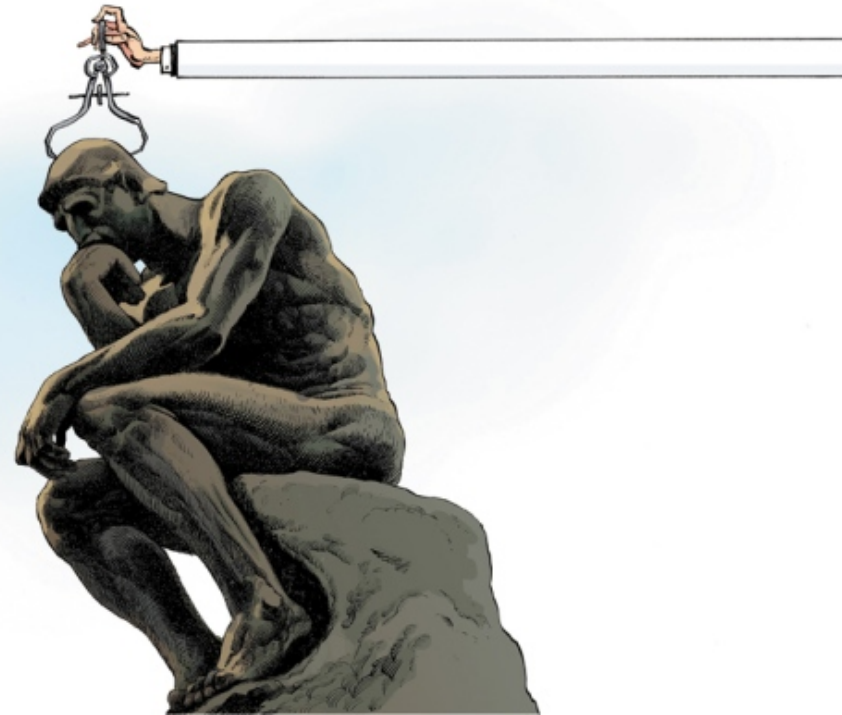




# Let's move beyond the rhetoric: it's time to change how we judge research



*Five years ago, the Declaration on Research Assessment was a rallying point. It must now become a tool for fair evaluation, urges Stephen Curry.*

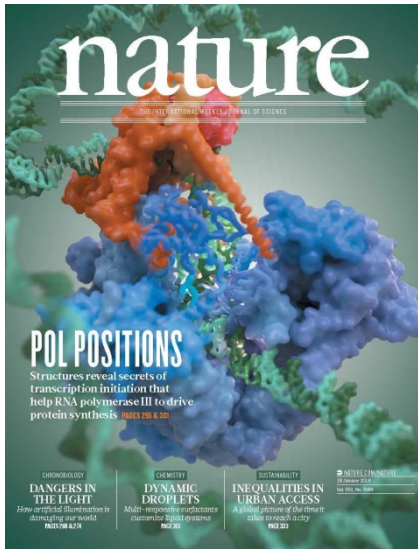


Impact

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# Journal Impact



# Let's move beyond the rhetoric: it's time to change how we judge research



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## Societal Impact





# Omics & Precision Medicine

2001

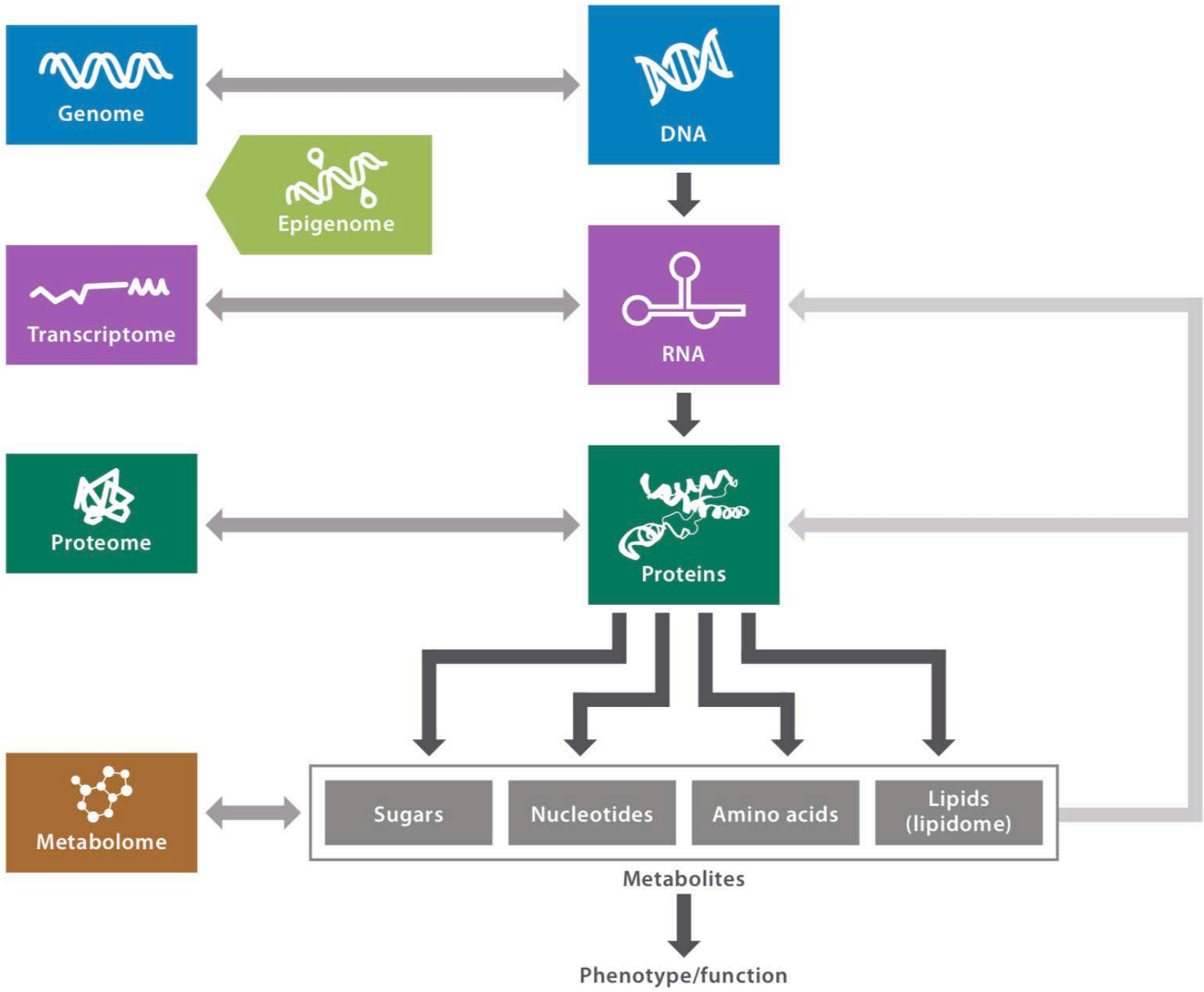


2009



2015



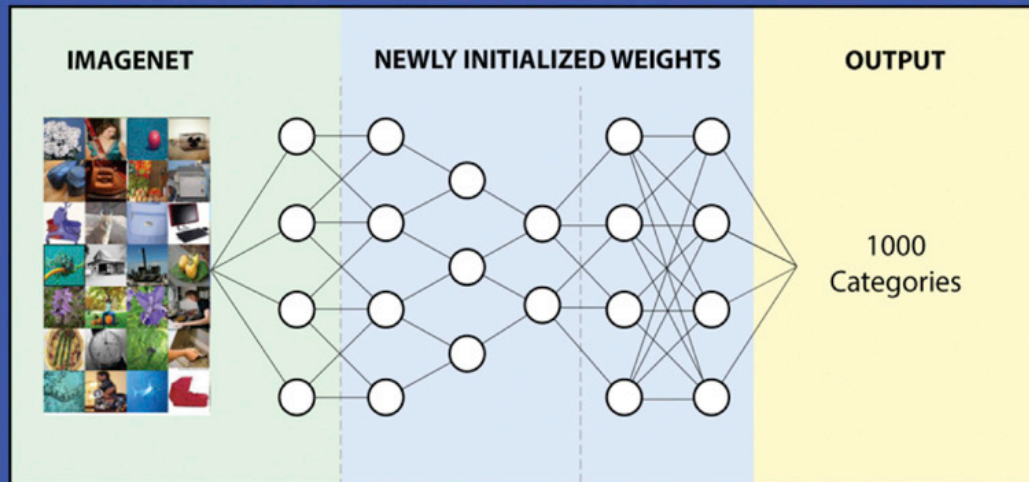




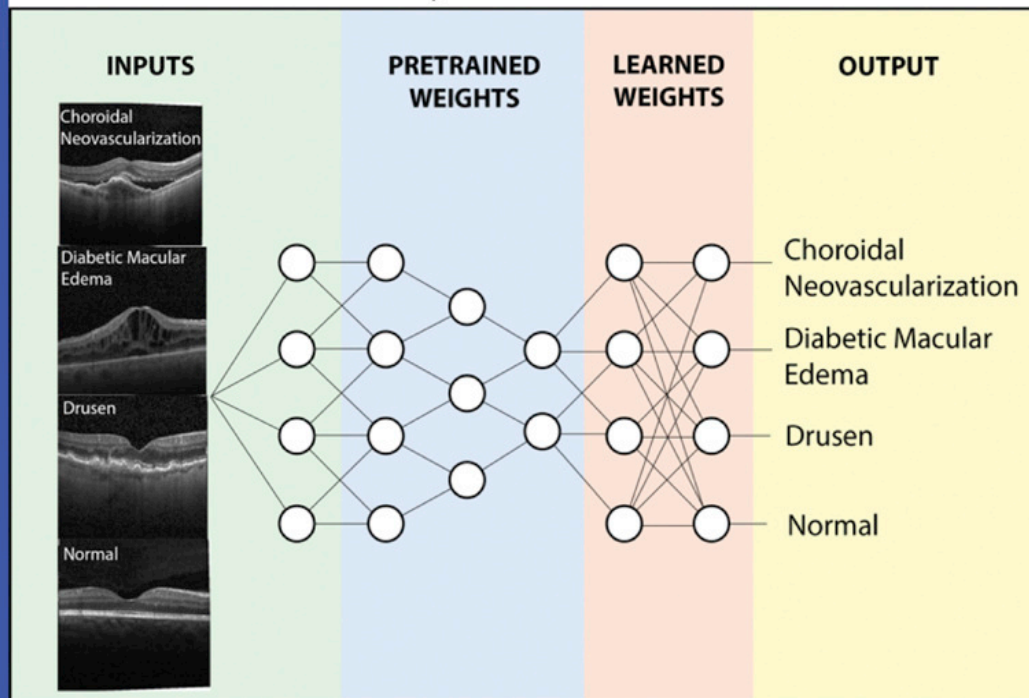
# Data



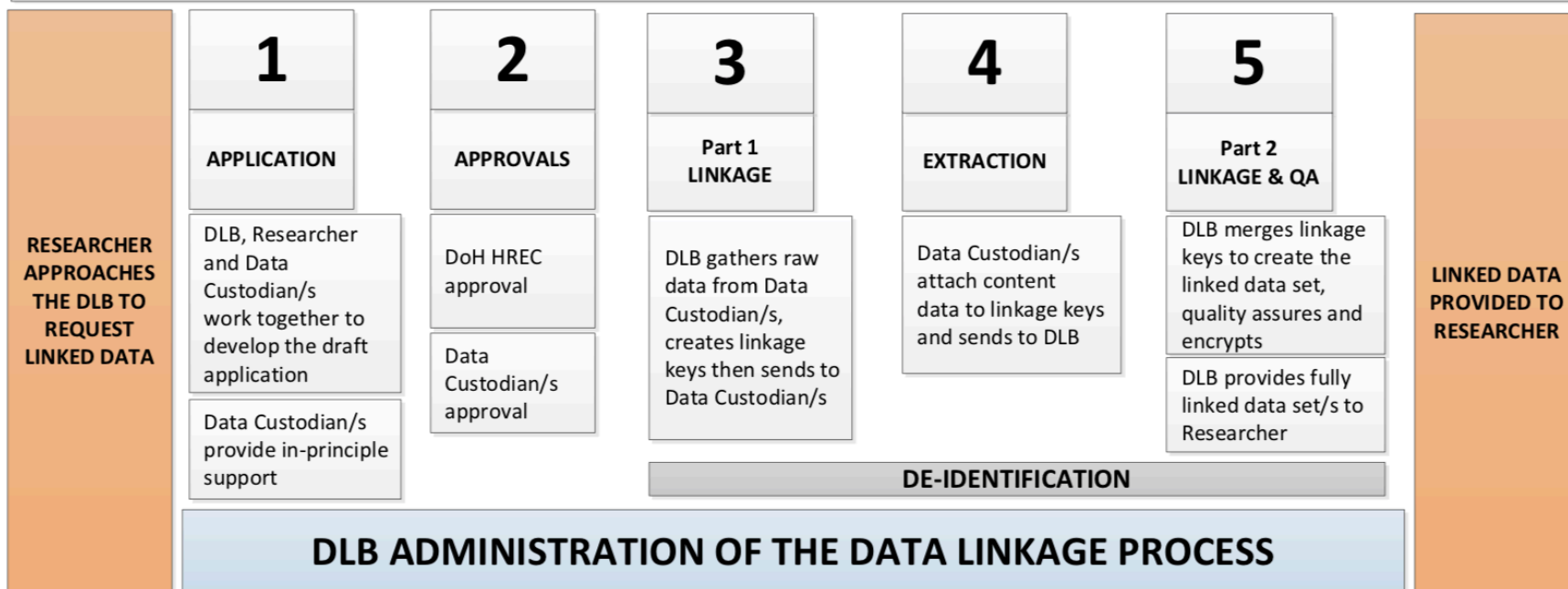




**TRANSFER LEARNING**

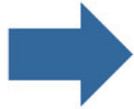


# Overview of data linkage process





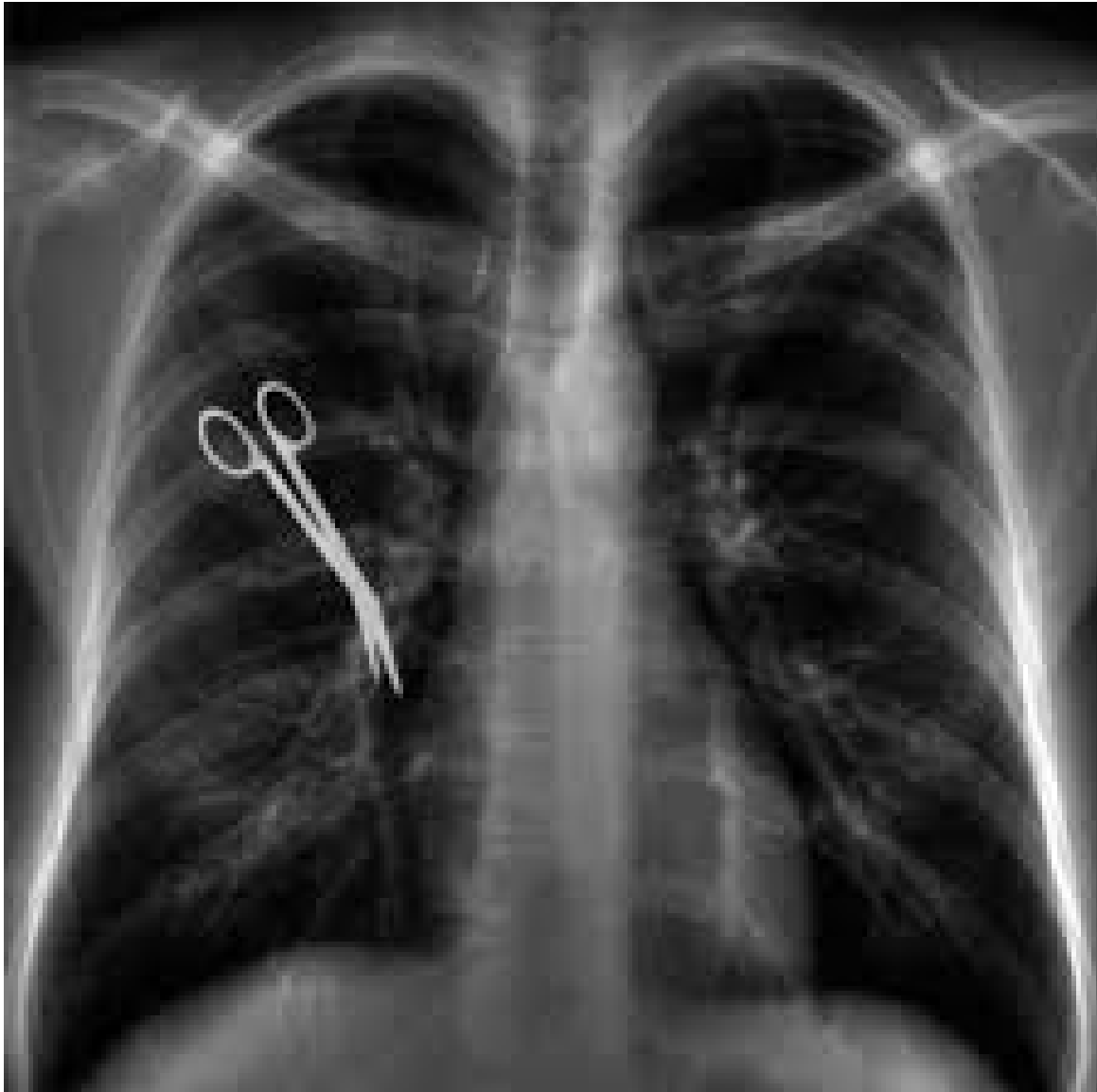
RESEARCH

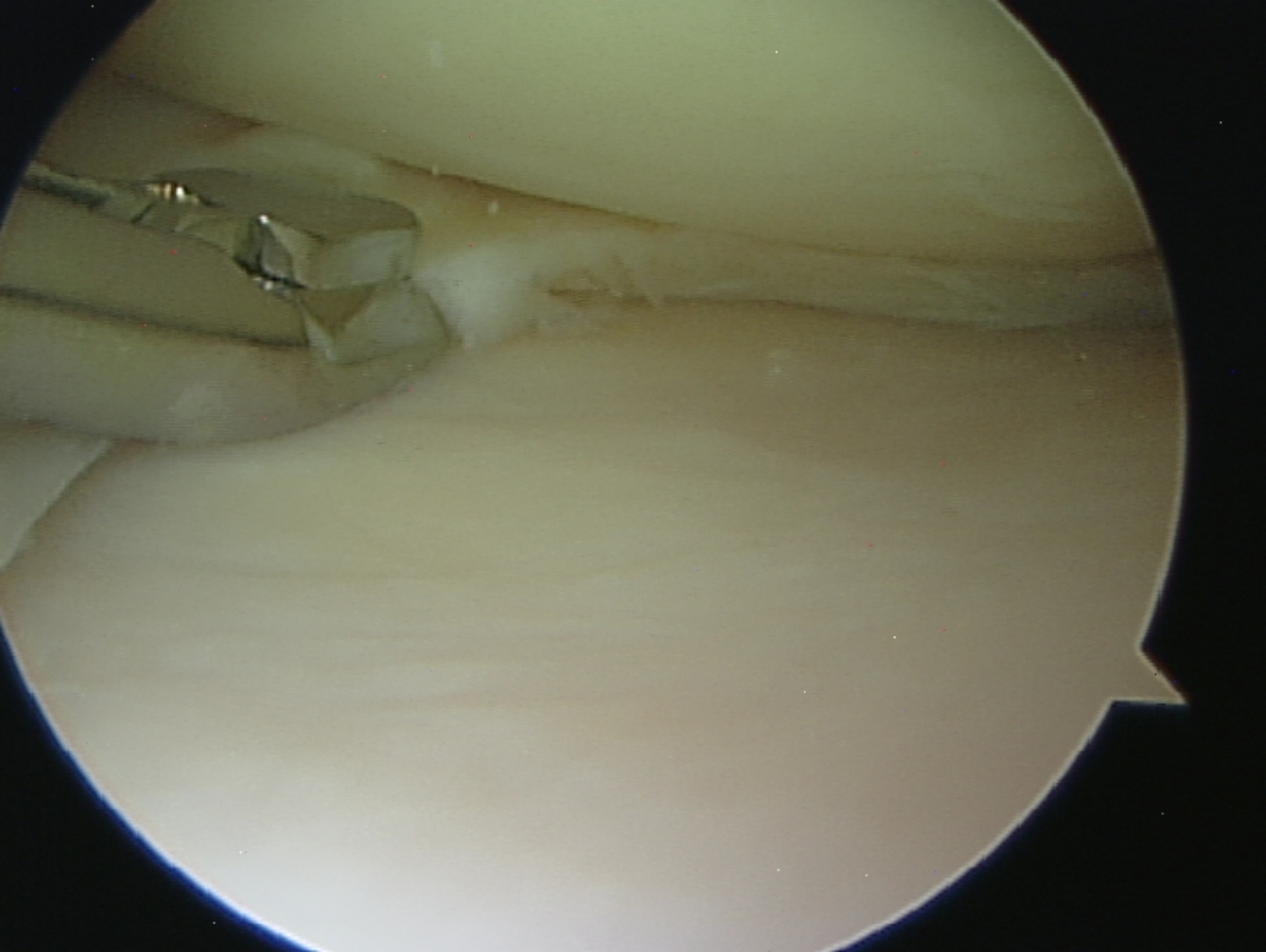


CLINICAL  
TRIALS



PATIENT  
CARE







## Petitions

UK Government and Parliament

Closed petition

# Stop NHS England from removing herbal and homeopathic medicines

NHS England is consulting on recommendations to remove herbal and homeopathic medicines from GP prescribing. The medicines cost very little and have no suitable alternatives for many patients. Therefore we call on NHS England to continue to allow doctors to prescribe homeopathy and herbal medicine.

[More details](#)

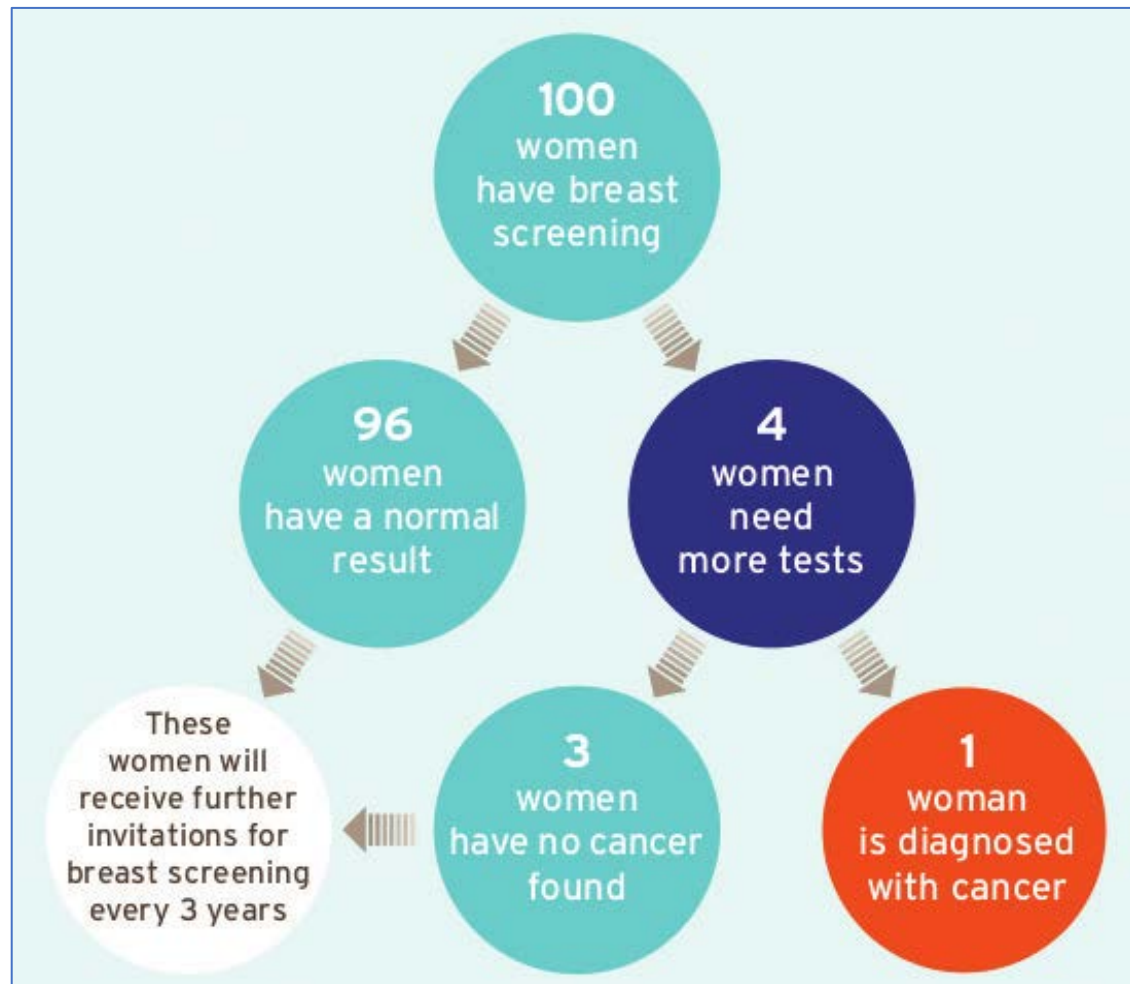
**This petition is closed**  
All petitions run for 6 months

**34,668** signatures

A horizontal progress bar at the bottom of the page, consisting of a green segment on the left and a grey segment on the right.



**Using expected frequencies to communicate the chances of different events subsequent to a mammogram – from the NHS Breast Screening leaflet**



**SEPSIS KILLS MORE  
PEOPLE IN SCOTLAND  
THAN BREAST  
AND PROSTATE  
CANCER COMBINED**

# REALISTIC MEDICINE

CAN WE:



CHANGE OUR STYLE TO  
SHARED DECISION-MAKING?

BUILD A **PERSONALISED**  
APPROACH TO CARE?



REDUCE **HARM**  
AND **WASTE**?



REDUCE **UNNECESSARY**  
**VARIATION** IN PRACTICE  
AND **OUTCOMES**?

MANAGE RISK BETTER?



BECOME **IMPROVERS**  
AND **INNOVATORS**?



# Choosing Wisely Australia

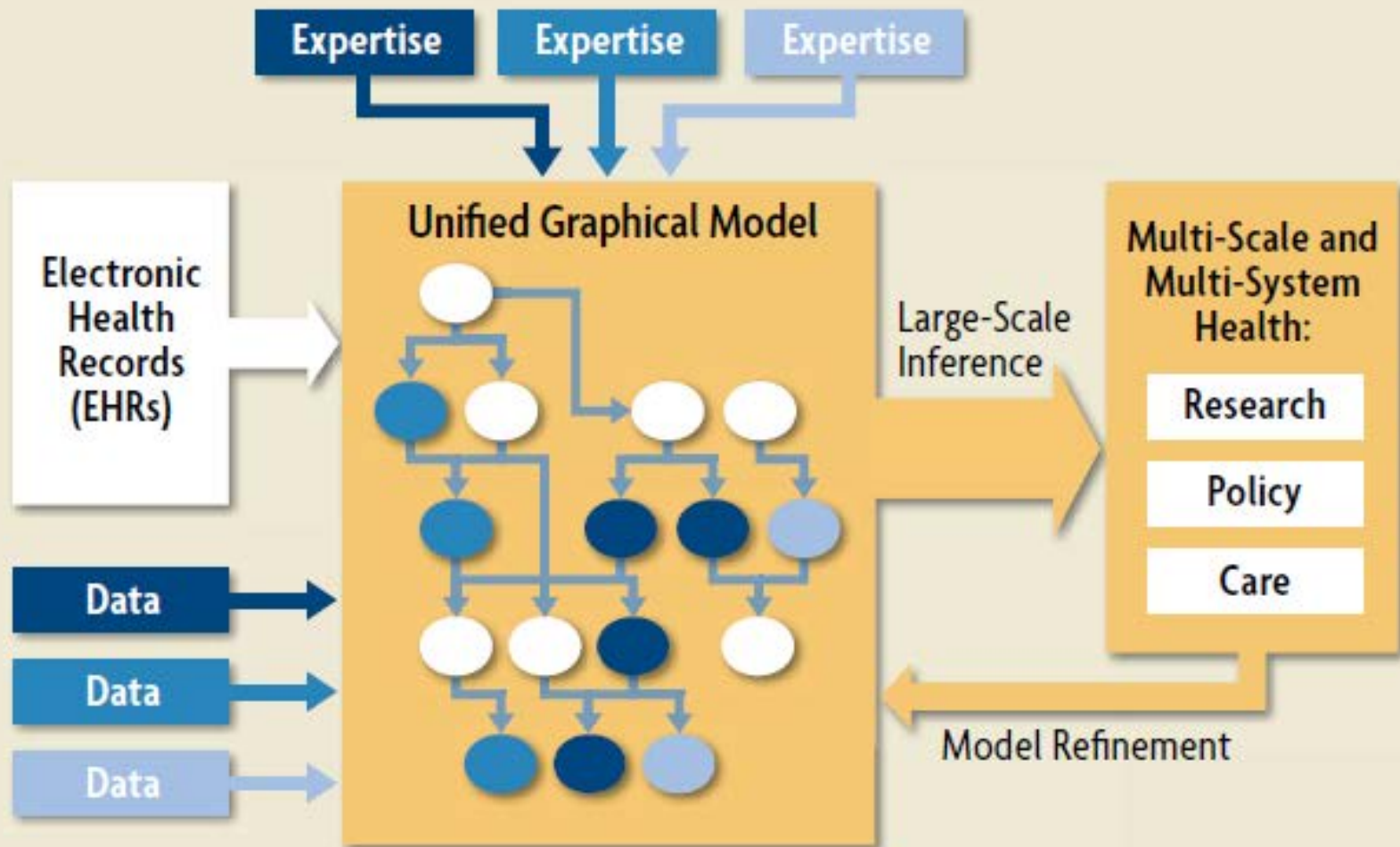
An initiative of AHPA MedicineWise

**MORE IS  
NOT ALWAYS  
BETTER**

# *A Unified Modeling Approach to Data-Intensive Healthcare*

IAIN BUCHAN  
University of Manchester

JOHN WINN  
CHRIS BISHOP  
Microsoft Research



A photograph showing a large quantity of used, blue plastic medical syringes and needles. The syringes are of various sizes, with some clearly marked with '10 ml/cc' and '20ml'. They are scattered and piled together inside a crumpled red plastic bag, which is a common method for collecting and disposing of sharps. The text 'What can we do?' is superimposed in white, bold, sans-serif font across the middle of the image, centered over the syringes.

What can we do?



What can you do?