

Suite Ost, 13:45-15:00

Data & funding

Rainer Lange (Chair)

Chonnetia Jones

Jonathan Adams



Impact of Science

5-7 June 2019, Berlin

Data & funding

Rainer Lange (Chair)

*Head of Research Policy,
Wissenschaftsrat, Germany*

**the german council of science and humanities
provides advice to the german federal government
and the state governments on the structure and
development of higher education and research.**

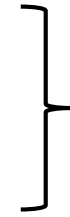
IMPACT OF SCIENCE CONFERENCE, 5-7 JUNE 2019, ALLIANZ FORUM, BERLIN

Data & Funding

Uses, challenges, roads ahead

Contexts of use for impact data

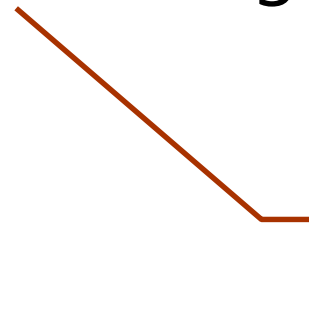
Science communication
Accountability and reporting



ex post

Management and decision making

ex ante



Funding

Data types

A) By focus

Input, Process, Output, Impact

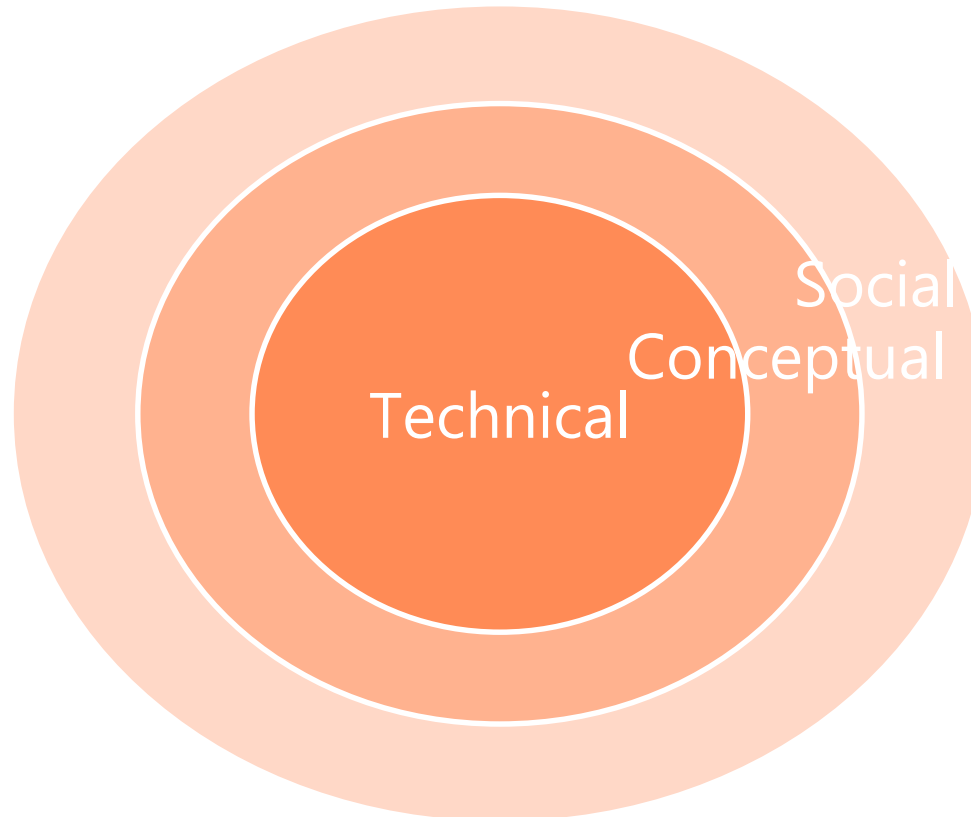
B) By source

_ Process produced data

_ Data from forms, proposals and/or surveys

_ Public data

Challenges for research assessment



The impact of impact assessment

What happens if funders' decisions are informed by impact data?

- _ Is past performance a good predictor of future performance?
- _ Another instance of Matthew's principle?
- _ How will institutions adapt?
- _ And how will researchers?





Impact of Science

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Jonathan Adams

*Director of the Institute for Scientific Information,
Web of Science, UK*

The future of research evaluation

Changing concepts of 'impact' and the need for data

Jonathan Adams

Director, Institute for Scientific Information

June 2019

Web of Science
Trust the difference

The global trend is to assess excellence AND impact

The research evaluation agenda is shifting

- Evaluation has been focussed on academic impact and ‘excellence’
- Excellence is important but selectivity alone can produce ADVERSE BEHAVIOUR
 - For example, concentration of resources reduces research diversity
- Stakeholder focus shifts from research quality (academic impact) to research delivery (socio-economic impact, beneficial outcomes)

The UK REF (2014) and Australia’s ERA (2018) are evaluating excellence AND other kinds of valuable impact

- Policy, Economics, Society, Technological, Legal, Environmental, Health, Culture
- This establishes the value of research to society
- Case studies reveal rich aspects to research – but assessment is also more complex

The challenge now is to standardise assessment

Our work on UK research assessment

1990

- Advisory Board for the Research Councils
- UK science budget funding and output data

RAE1992

- Research Assessment Exercise

RAE1996

- How to make fair funding decisions?
- Benchmarking international research

RAE2001

- How to check submitted output is correct?
- Is selective funding too concentrated?

RAE2008

- Can metrics replace peer review?

REF2014

- Research Excellence Framework
- Case studies of socio-economic impact

REF2021

- Balanced approach to peer review and metrics
- Change to submission system

1991

- Work with ISI on National Science Indicators

1997

- Mapping and indexing UK research.

1998

- Adams J. Nature, 396, 615-618.

2001

- Validation of RAE database
- Fundamental review of selectivity and concentration
- Subject reviews
- Maintaining research diversity

2007-8

- Research assessment systems in UK universities
- Pilot project to test metrics across universities
- Strategically important subject review

2014

- Development of impact case study database
- Report on impact diversity with King's College, London

2018

- Data supply
- Advice to REF panels on correct use of metrics
- Verification of submitted outputs

Our work with the Australian Research Council

2006 Research Quality Framework (RQF)

2008 Excellence in Research for Australia (ERA)

March: seminars on metric validity and limitations

May-November: ARC Indicators Development Group

2009 Data supply for ERA

2015 Report on impact assessment

ARC Working Group on impact indicators

Shift to 'engagement and impact' (E&I)

2018 Data verification and supply for ERA

Example of REF four page case study



Impact case study (REF3b)

Institution: University of Leeds

Unit of Assessment: C-17

Title of case study: Case 1 - Peatland catchment research on water colour yields economic benefits for the water industry.

1. Summary of the impact (indicative maximum 100 words)

The water industry sources significant drinking waters from peatland catchments and faces major water discolouration problems due to dissolved organic carbon (DOC) caused by peat degradation. DOC has to be removed to meet strictly regulated drinking water standards and to eliminate disinfection by-products. One proven, but expensive industry solution uses Magnetic Ion Exchange (MIEX) at treatment works. Research at the School of Geography (SoG) investigated catchment management as a potentially longer term, more sustainable treatment solution that addresses the problem at source. Yorkshire Water (YW) has subsequently adopted recommended practices, and has invested [text removed for publication] in catchment solutions yielding wider environmental benefits.

2. Underpinning research (indicative maximum 500 words)

Significant contributions to the work have been made by a number of SoG staff, including lead academics Prof Adrian **McDonald** (at Leeds 1972-present, Professor since 1992), Prof Joseph **Holden** (at Leeds since 2000, NERC fellow 2002-5, currently Professor), Dr Paul **Kay** (Research Fellow 2005-10, currently Associate Professor), Dr Pippa **Chapman** (Leeds academic 1999-present, currently Reader), Dr Sheila **Palmer** (SoG Lecturer, 2005-present), and postdoctoral researchers Dr Richard **Grayson** (2007-present), Dr Antony **Blundell** (2008-present), Dr Alona **Armstrong** (2006-7, now at Lancaster University) and Dr Zoe **Wallage** (2003-2007; 2011-2013).

The research focused on the development, evaluation and implementation of peatland management strategies to reduce or stabilise (in light of a 40-year upward trend in DOC) the significant deterioration of raw water quality. Research comprised a range of studies including large scale field experiments, plot studies and modelling. This has included funded projects including a NERC postdoctoral Fellowship held by **Holden** (Hydrological, fine sediment and water colour response of managed upland wetlands, 2002-05, £110,000); a NERC EMBER project involving **Brown, Holden and Palmer** (EMBER: Effects of Moorland Burning on the Ecohydrology of Rivers, 2009-12, £643,000) and two NERC CASE studentships (Aspray and Ramchunder, supervised by **Holden and Brown**), as well as novel research proposals that were developed in conjunction between SoG staff and YW and then funded as collaborative research. As a result of the work the SoG had undertaken, YW established a formal partnership with the SoG in 2005 to streamline research and development activity. This contract originally ran until 2010 but was subsequently renewed until 2015.

Work from **Holden's** NERC Fellowship [i.e. 1-2] showed that peatland drains were responsible for increased colour production and sediment release in peatlands and that blocking drains could significantly reduce DOC and sediment production. Subsequent large scale field trials showed that investment in this activity would provide net financial benefits in terms of reduced costs to water

peat forming vegetation to recover.

3. References to the research (indicative maximum of five references)

The results of this research have been published in a range of internationally recognised peer-reviewed journals. The research was supported by grants including a NERC fellowship and a NERC grant. Outputs 1 and 2 were included in the School of Geography's return for RAE 2008 (95% of which was classified as at least 2* quality).

Selected research papers:

1. First demonstration that natural peatland pipes might be influenced by land drainage leading to subsurface erosion:

HOLDEN, J. (2006) Sediment and particulate carbon removal by pipe erosion increase over time in blanket peatlands as a consequence of land drainage. *Journal of Geophysical Research*, 111, F02010, doi:10.1029/2005JF000386

2. Demonstration that drain blocking as a management strategy could reduce water discolouration:

WALLAGE, Z.E., HOLDEN, J. and MCDONALD, A.T. (2006) Drain blocking is an effective treatment for reducing dissolved organic carbon loss and water colour in peatlands. *The Science of the Total Environment* 367, 811-821, doi: 10.1016/j.scitotenv.2006.02.010

3. Modelling to link land management to water quality and assist with planning and land management change strategies and priorities for water companies:

GRAYSON, R., KAY, P. & FOULGER, M. (2008). The use of GIS and multi-criteria evaluation (MCE) to identify agricultural land management practices which cause surface water pollution in drinking water supply catchments. *Water Science and Technology*, 58.9, 1797-1802, doi: 10.2166/wst.2008.569

4. Evidence that drain blocking benefits water quality in peat catchments is consistent with

result several water companies are now sharing some data and strategies around land management to promote best practice, including United Utilities, Northumbrian Water and South West Water where SoG leads a funded NERC internship in collaboration with Birmingham City University.

5. Sources to corroborate the impact (indicative maximum of 10 references)

Yorkshire Water's submission to OFWAT for the Periodic Review 2009 demonstrates SoG's research has impacted the business: <http://www.yorkshirewater.com/pr09> (for example document B1 points 76-130). [Available on request]

The following contacts can support the impact narrative provided here:

A. CEO, Yorkshire Water.

This letter corroborates all aspects of the case relating directly to Yorkshire Water, who have read the case study and corroborate the text. [Available on request]

B. Kelda Group (2011) Taking responsibility for the water environment for good. Available at: <http://www.keldawater.co.uk/about-us/our-vision.aspx> [Available on request].

C. Director, Dinsdale Moorland services, Company Number: 05316278.

This letter corroborates the impacts related to Dinsdale Moorland services, as a key example of the impact on peatland restoration services. [Available on request].

Search REF Impact Case Studies

Browse the index below or search all Case Studies using keywords [e.g. "NHS"].

Learn about advanced search options [here](#).

Browse the index

Submitting Institution

Unit of Assessment

Summary Impact Type

Research Subject Area

Impact UK Location

Impact Global Location

Submitting Institution ?

East	(457)
Anglia Ruskin University	(32)
University of Bedfordshire	(26)
University of Cambridge	(227)
Cranfield University	(24)
University of East Anglia	(64)
University of Essex	(48)
University of Hertfordshire	(30)
Norwich University of the Arts	(2)
Writtle College	(4)

London **(1353)**

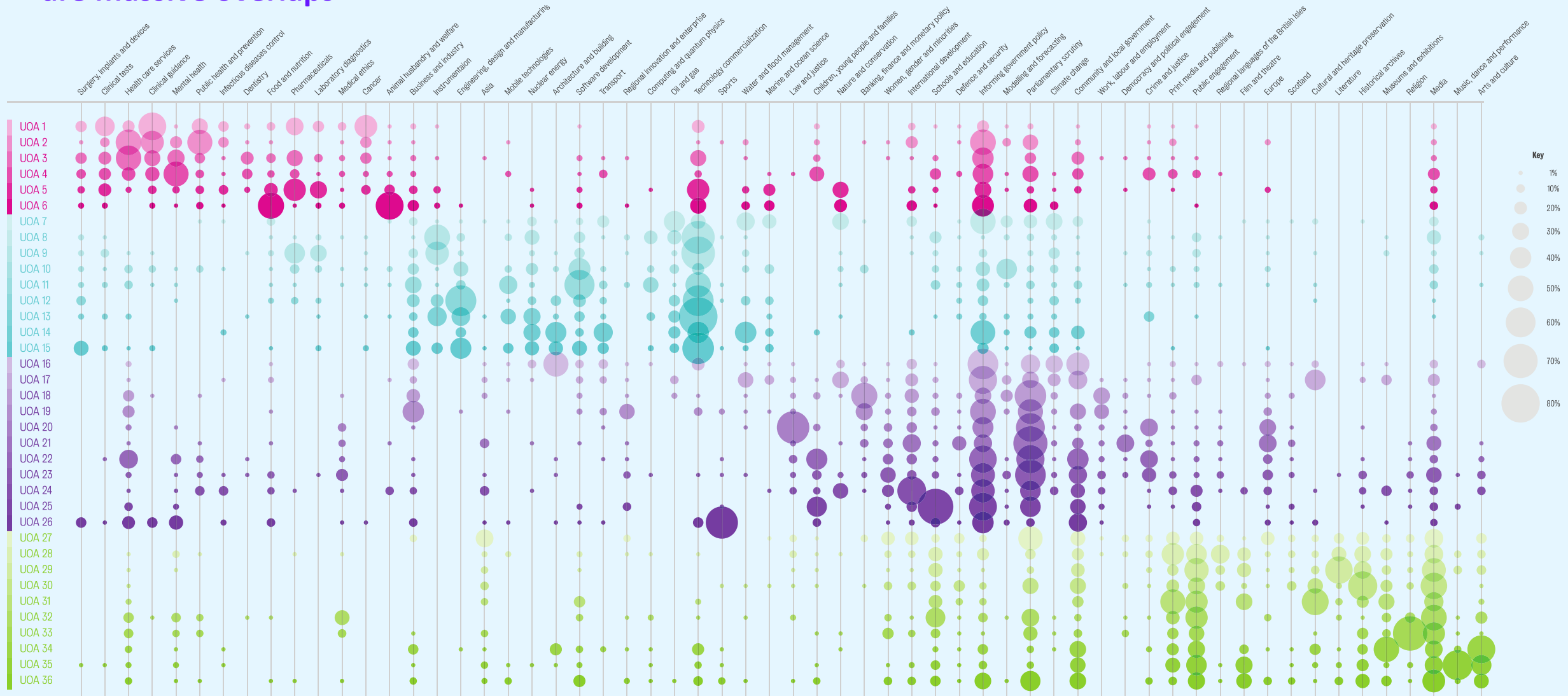
Birkbeck College	(67)
Brunel University	(76)
City University, London	(49)

East Midlands	(459)
Bishop Grosseteste University	(6)
De Montfort University	(24)
University of Derby	(21)
University of Leicester	(86)
University of Lincoln	(35)
Loughborough University	(79)
University of Northampton	(18)
University of Nottingham	(152)
Nottingham Trent University	(38)

Kingston University	(22)
University of the Arts London	(12)
London Business School	(11)

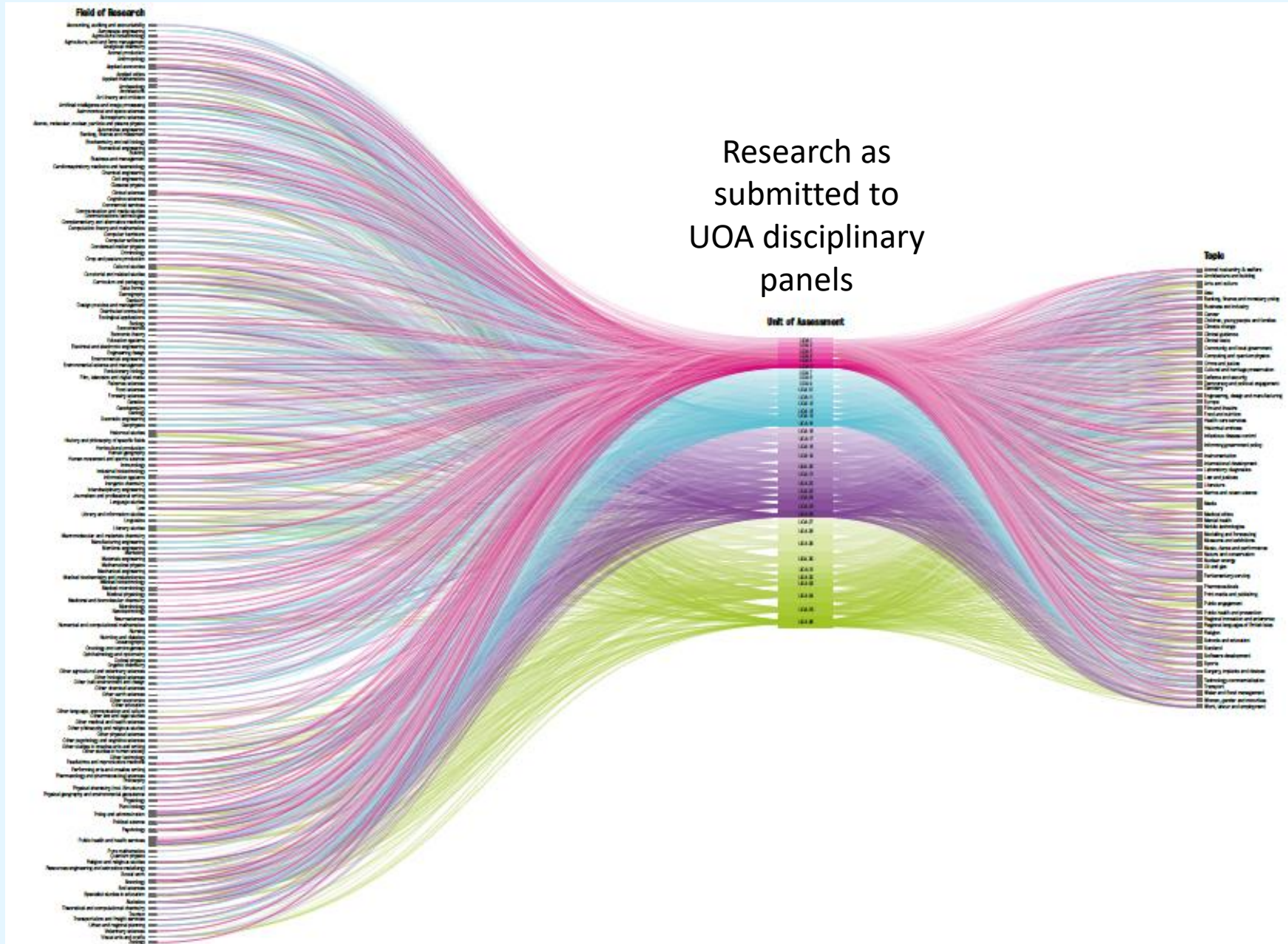
Royal College of Art	(7)
Royal College of Music	(2)
Royal Holloway, University of London	(51)

Impact types and outcomes vary by frequency across disciplines, but there are massive overlaps



There is a diverse range of impact pathways

Research assigned by keyword to ANZ Fields of Research



Research assigned by similarity to topics

Headline findings from analysis of REF2014 case studies

The societal impact of research from UK HEIs is considerable, diverse and fascinating

The research underpinning impact is **cross-disciplinary**, and the benefit arising from research has **multiple** impacts

The quantitative evidence supporting claims for impact is diverse but **inconsistent**, suggesting that the development of robust impact metrics is unlikely

The impact case studies provide a rich resource for analysis, but the information was built (by researchers) for **assessment** purposes and may need to be restructured for **analysis** purposes

The **interpretation** of impact will continue to evolve

Socio-economic impact is **no more certain** or predictable than other research outcomes

This changing focus around research evaluation is global

UK (REF) and Australia (ERA E&I)

European Commission

- A focus on defining objectives and assessment for each program, assessed for each project
- Open Access and the availability of research to the community
- The wider impact of research

Canada

- Embedded impact assessment
- Led by strong health and education research sectors (NB recent THE impact ranking)

New Zealand

- Performance Based Research Fund, assessment very like the UK's RAE
- Subject-based, cyclical, similar indicators
- We led the 2008 review
- Policy language now strongly focussed on socio-economic and cultural impact

Singapore, South Korea, Japan

- Policy discussion with implicit practice already in place

The future of research evaluation

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*Director of Insight and
Analysis, Wellcome Trust, UK*



Measuring Impact Success

A funder's perspective

Chonnetia Jones, Ph.D.
Director of Insight and Analysis
June 2019

Wellcome's mission is
to improve health for everyone
by helping great ideas to thrive.

Funding facts

- Active grant portfolio valued at £4.3 billion
- Wide breadth across sciences, public health, innovation, humanities, social sciences, public engagement, education and policy
- Funding to more than 14,000 people in almost 500 different organisations in 100 countries worldwide
- 74% funding in the UK, 26% is outside the UK
- 40% of the portfolio supports people, 30% teams, 23% places

What does success look like?

Impact or success?

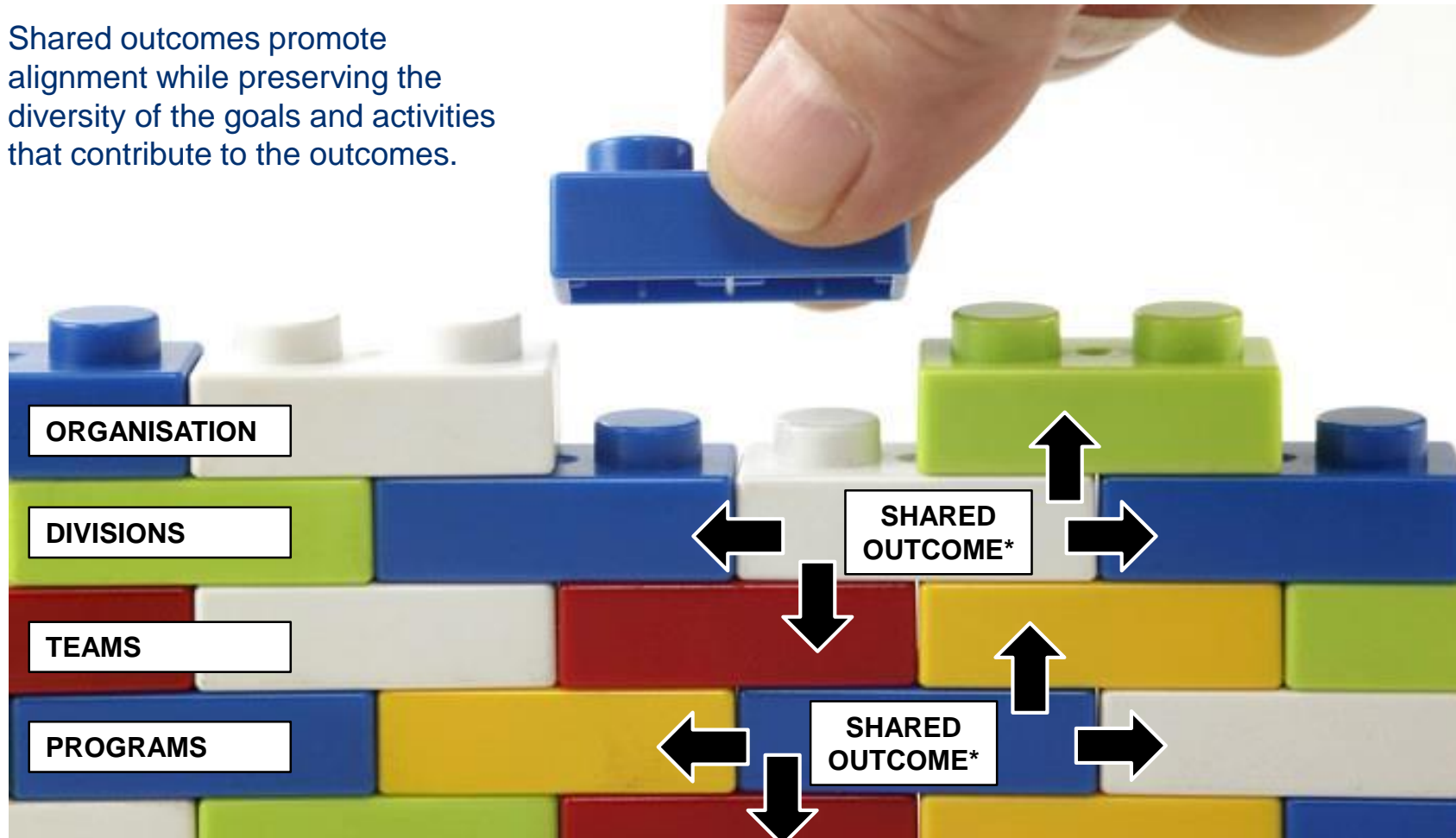
- How do we move from siloed working to a joined-up approach to achieve strategic objectives?
- How do we **support research that does not have an immediate demonstrable impact**, but is essential to advancing knowledge?
- How do we account for the **broad range of contributions that result from research** and lead to improvements in health or impact society?
- How do we **evaluate success relative to where it sits** on the research-to-innovation-to-health pathway?

Outcomes-focused approach

- Emphasises what we **want to achieve** rather than *what we want to do*
- Facilitates a **shared understanding** about what defines success and what it will take to get there
- Promotes **efficiency and reduces duplication** through adopting shared outcomes
- Allows **flexibility and agility** to direct our activities toward achieving the shared outcomes
- Provides a **basis for prioritising** particular activities, delivery routes and expected outputs

Alignment through shared outcomes

Shared outcomes promote alignment while preserving the diversity of the goals and activities that contribute to the outcomes.



Wellcome Success Framework



The framework sets out **9 shared ambitions** that express '*what success looks like*' to Wellcome.

We aspire to **improve health for everyone by helping great ideas to thrive.**

We will achieve this by:

- Maximising the potential of **research** to improve health.
- Delivering **innovations** that prevent or treat health problems.
- Engaging **society** to shape choices that lead to better health.

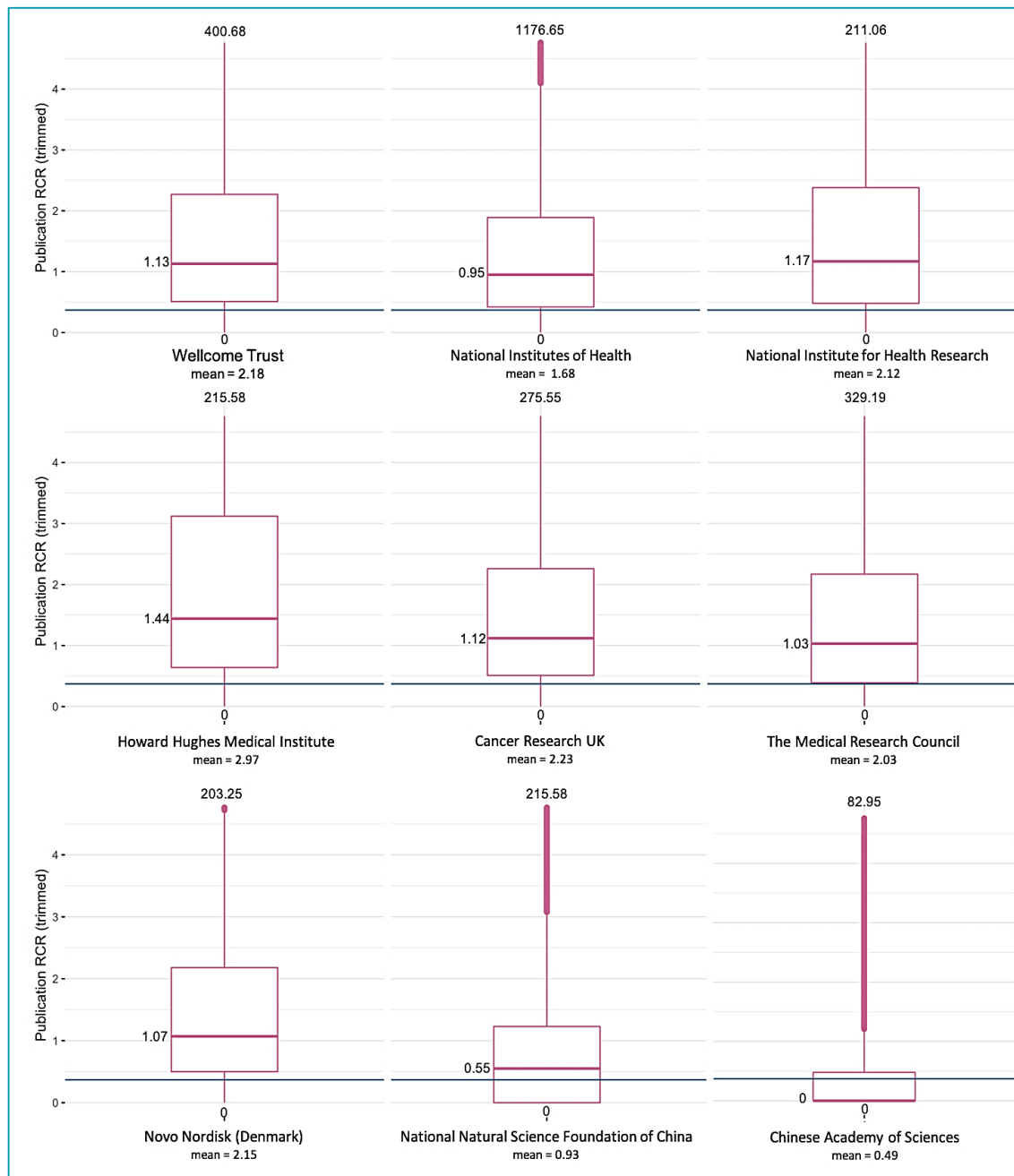
We hold ourselves **accountable to society** for delivering Wellcome's mission, while using our **independence for public benefit.**

Ambition 1.

Our understanding of science and health is transformed by research.

1a. Wellcome funded research is influential within and across research fields.

1b. Wellcome funded research contributes to significant shifts in theoretical, methodological and technological knowledge.



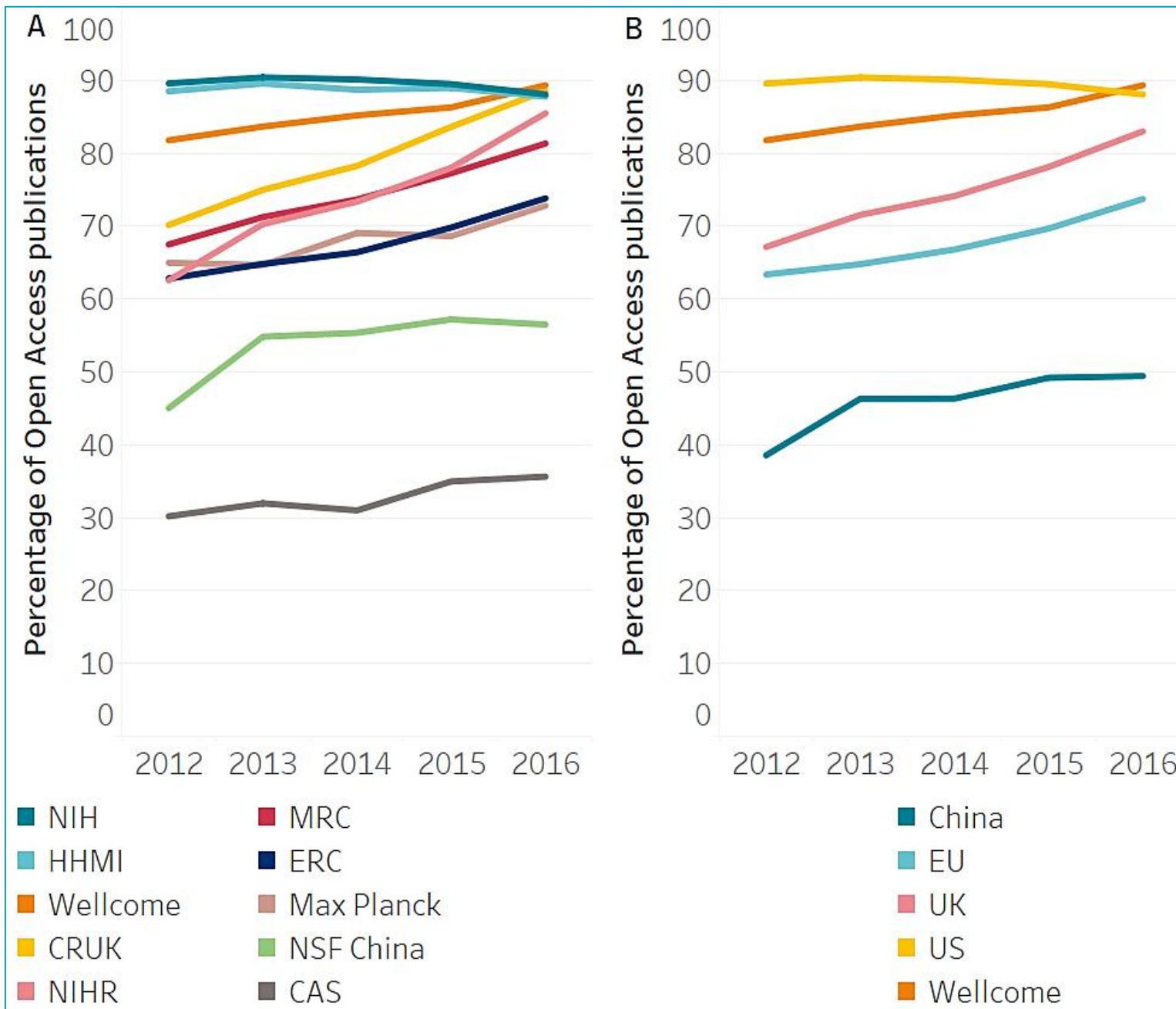
Predictors of RCR	Relative importance
Higher number of countries	21.5%
Higher number of authors	17.0%
Co-funded by NIH	12.2%
Affiliated with US organisation	10.5%
Longer title (more words)	10.3%
Higher number of funders	7.4%
Featuring Germany	6.3%
Non-article (e.g. book, proceeding etc.)	3.7%
Co-funded by MRC	3.3%
Affiliated with UK organisation	3.0%
Public health and health services research	2.5%
Long words in the title	1.6%
Recent publication	0.7%

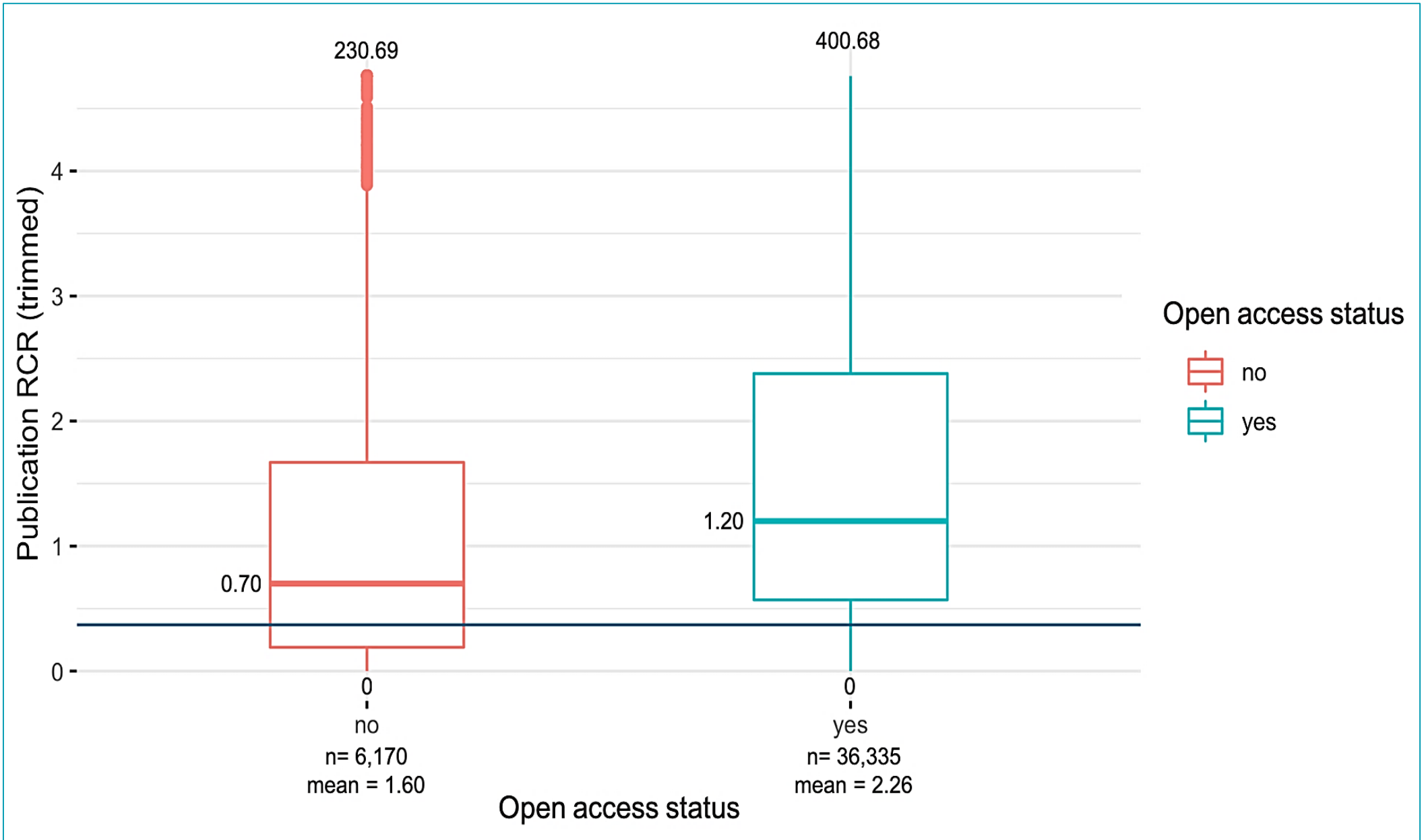
Ambition 3.

Knowledge and discoveries are shared, accessed and used in a manner that maximises health benefit.

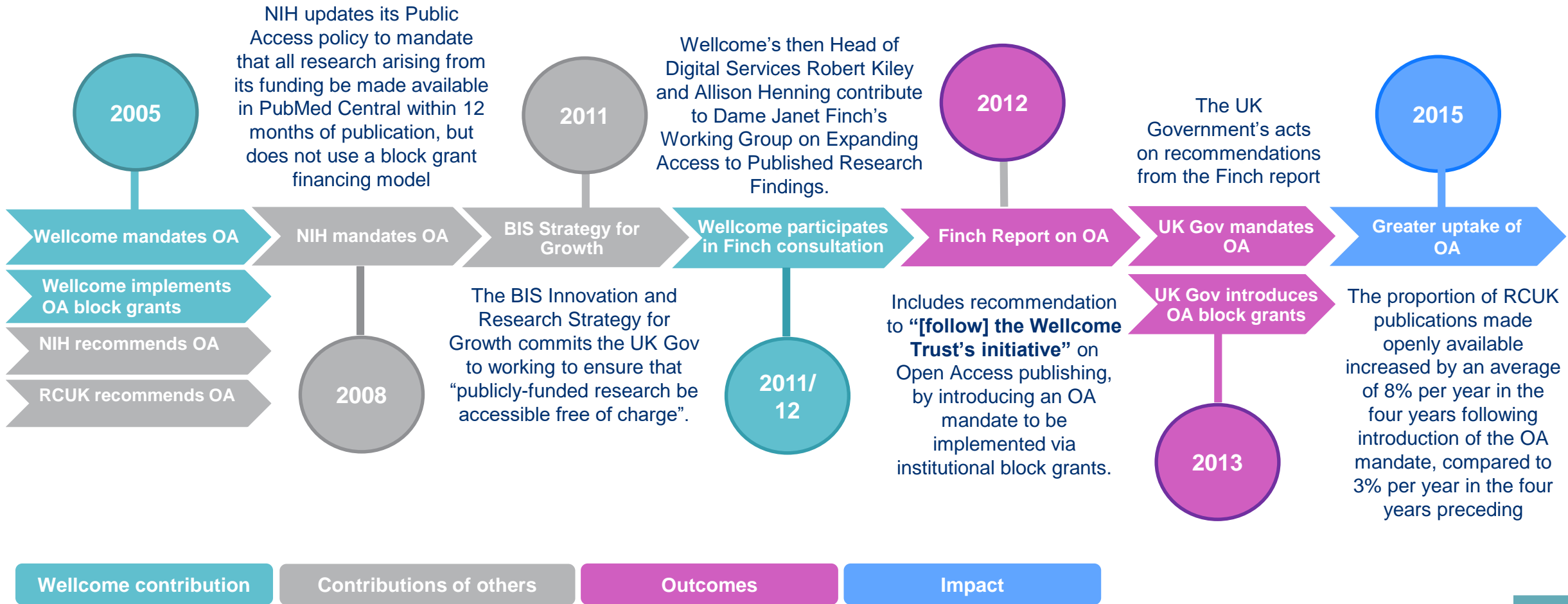
3a. Researchers are equipped, empowered and motivated to make research outputs open.

3b. Research outputs are findable, accessible, interoperable and re-usable (FAIR).





Wellcome's contributions to Open Access



What have we learned so far?

Features of past successes

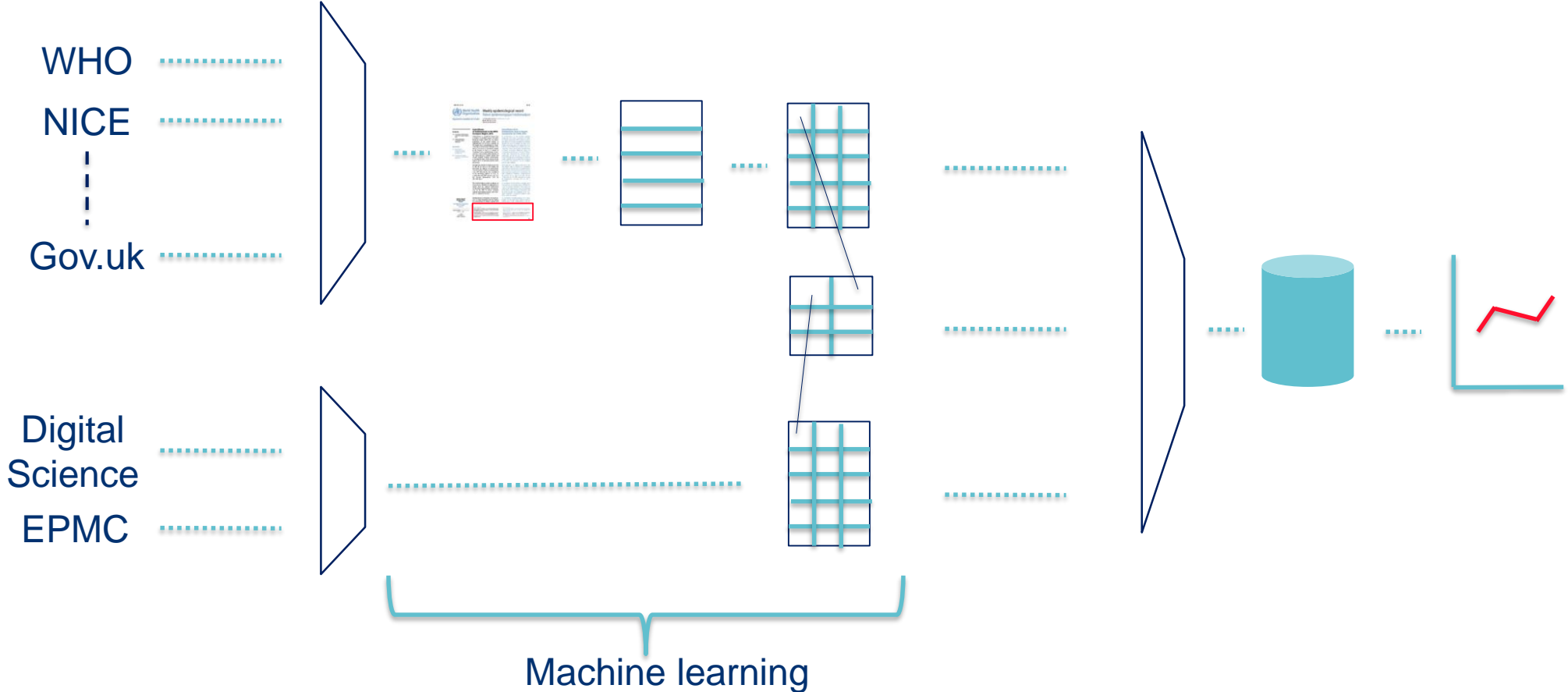
- Multi-funder, multi-authored international research collaborations
- Development of new methodological and technological resources
- Greater focus on *both* the development and implementation of interventions to achieve health impact
- Diversification of contributions - funding, convening, advocacy and policy – to achieve the greatest impact

Alignment and purpose

- Sub-strategies updated to articulate outcomes that align and contribute to shared ambitions
- Critical reflections on what we're doing and why: start, continue or stop
- More purposeful partnering both internally and externally
- Extension beyond the communities we normally work or partner with

Wellcome Data Labs

Reach Tool Data Pipeline



Thank you



wellcome.ac.uk   