Data-intensive approaches to finding and predicting research outcomes for New Zealand health research

Stephanie Guichard & Stacy Konkiel Digital Science eResearchNZ 2020





- Introduction
- Case study: "New Zealand Health Research Strategy: 2017-2027"
- Has NZ achieved strategic priorities?
- Where does quantitative data succeed/fail?
- Conclusion





Image captured via: twi.org

Introduction

Report accessed via: health.govt.nz









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Stacy Konkiel



Disclaimers!



Purpose: "The Government's vision is for New Zealand to have a world-leading health research and innovation system that is founded on excellent research and improves the health and wellbeing of all New Zealanders. A set of guiding principles, strategic priorities and immediate actions will help to achieve this vision by 2027."





A fantastic national-level document that:

- Clearly articulates strategy
- Incorporates equity at its core
- Describes specific metrics by which progress should be measured





Performance indicators include:

- Amount & kinds of research
- Investment in research
- Collaborations (authors, funders, regionality)
- Commercialization
- Research to improve the lives of Māori, Pacific, and disabled peoples



https://www.health.govt.nz/publication/new-zealand-health-research-strategy-2017-2027



Our Goals

- Understand NZ research with desired outcomes
- Predict future trends
- Suggest ways to achieve desired outcomes



About altmetrics & Altmetric

Altmetrics: Indicators that help us understand the online engagement with research.

Altmetric: A company that collects this information and offers products to track engagement with research.





About bibliometrics & Dimensions

Bibliometrics are indicators that help us understand the relationships between documents, their authors, journals, disciplines, etc.

Dimensions is an interlinked research intelligence database created by Digital Science.





About data science approaches

- Exploratory visualization
- Regression analysis for forecasting
- Cluster analysis



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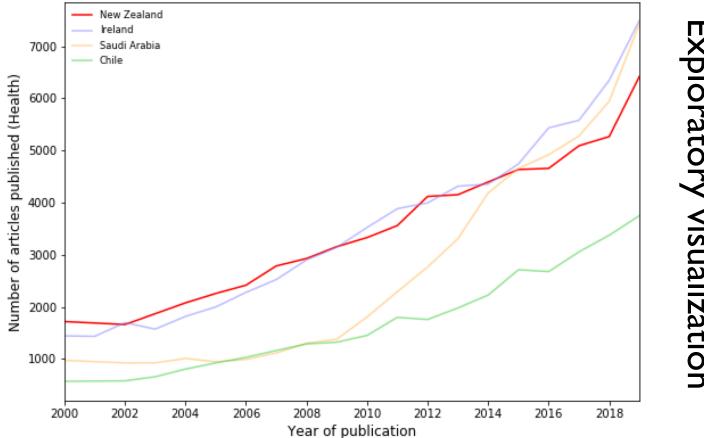


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Amount of health research

New Zealand Health Research Productivity, peer comparison

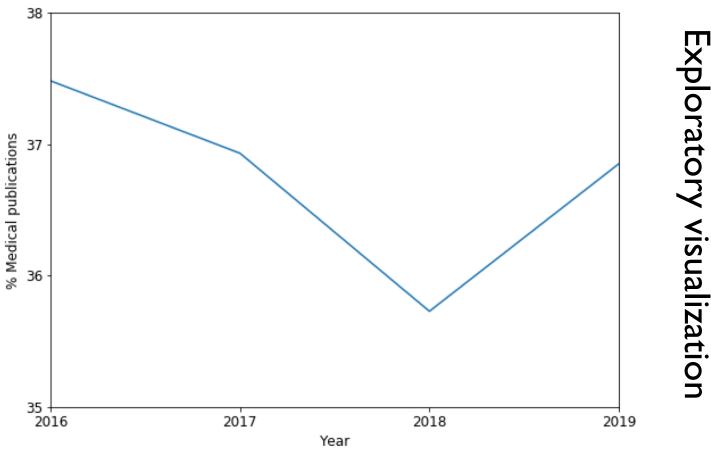


Exploratory visualization



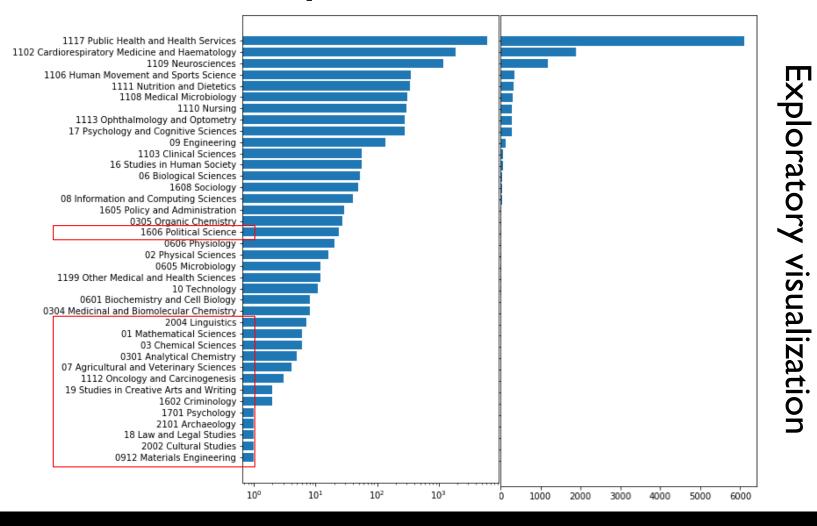
Amount of health research







Research topics: FOR





Research topics: HRCS

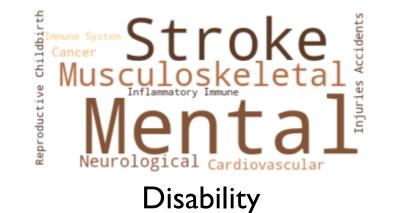


Māori

Pacific

Mental

Endocrine





Research topics: ICRP CSO

Survivorship Issues Cost Analyses Personal Behaviors Patient Care Surveillance Prevent Personal Care Survivorship Affect Risk Behaviors Affect Interventions Prevent Māori Systemic Therapies Cancer Personal Prevent Cancer Surveillance Personal Behaviors Behaviors Affect Interventions Prevent Pacific



Disability



Performance indicators include:

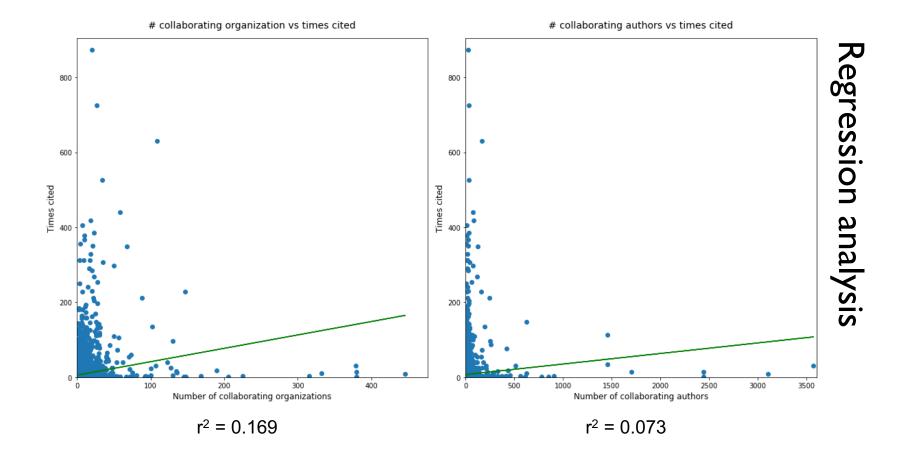
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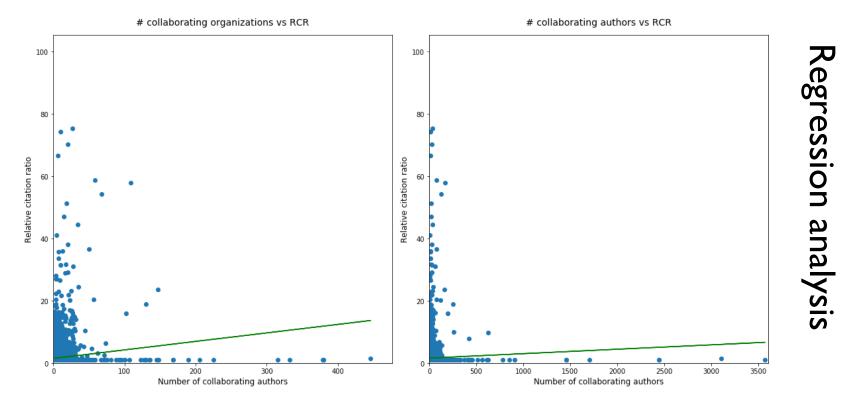


Collaborators & citations





Collaborators & RCR

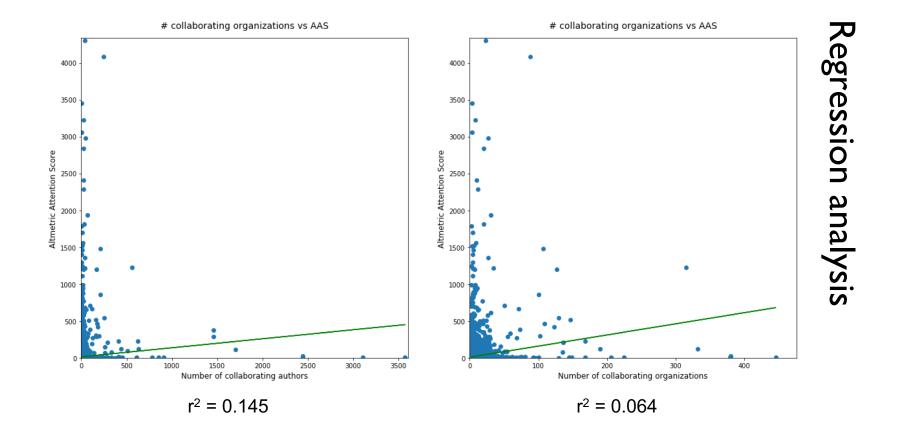


 $r^2 = 0.116$

 $r^2 = 0.033$



Collaborators & altmetrics





Collaboration

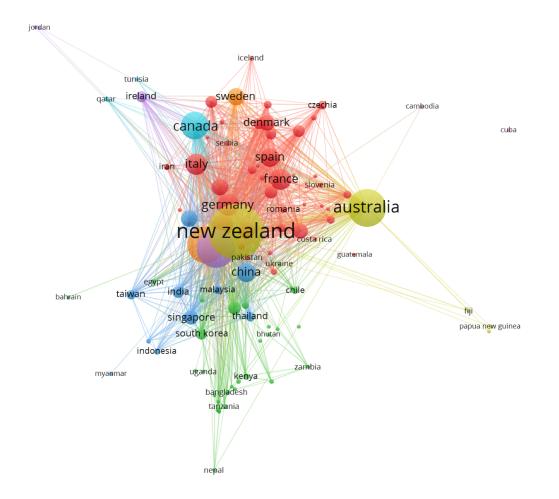
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Collaboration - international



Cluster analysis



Performance indicators include:

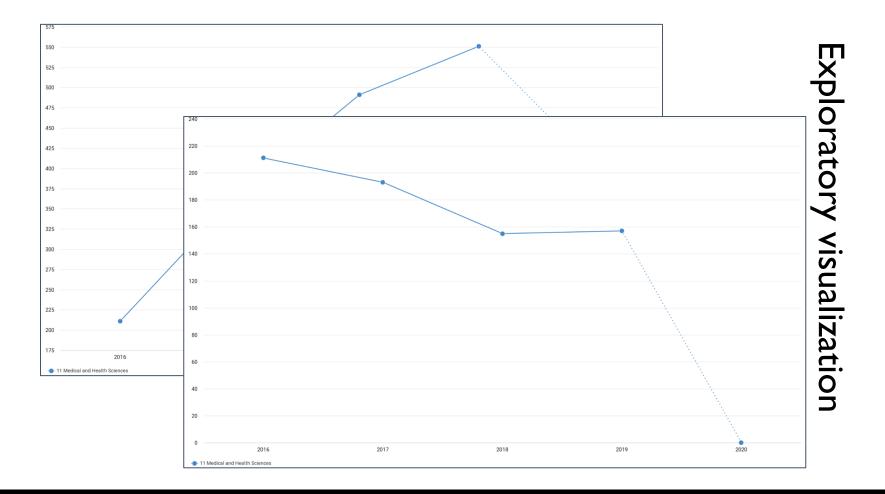
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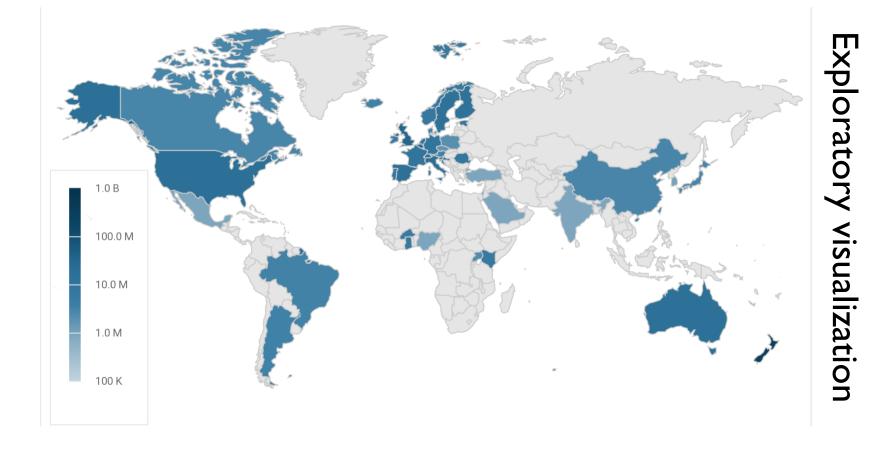


Investment in research



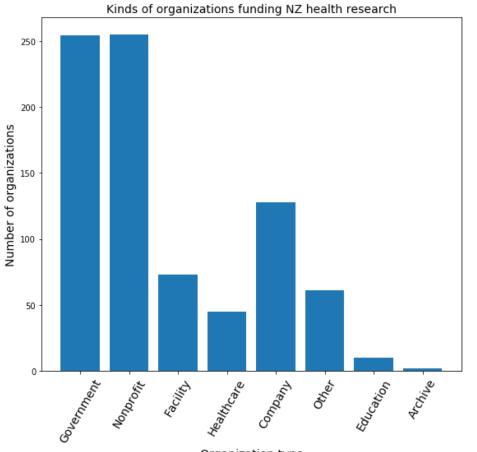


International investment





Non-profit investment



Organization type

Exploratory visualization



Performance indicators include:

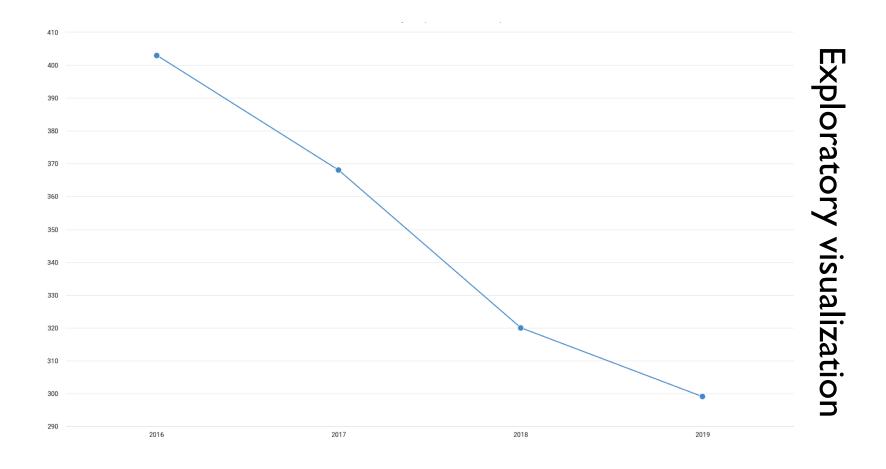
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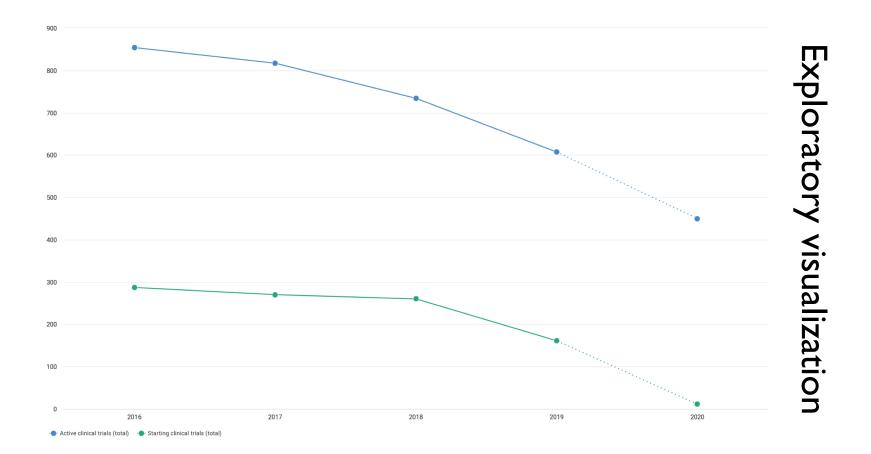


Commercialization: Patents





Commercialization: Clinical trials





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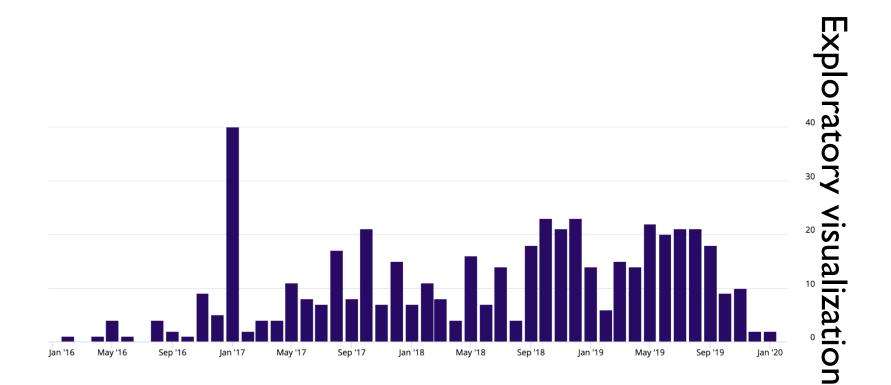
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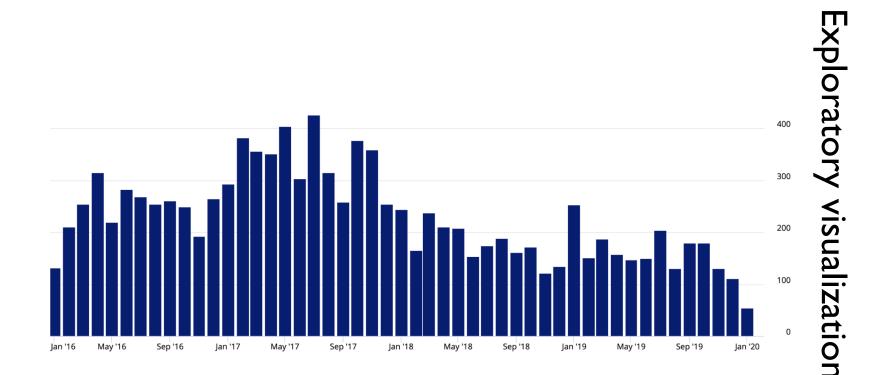


Improving lives (policy)





Improving lives (Facebook)





Where does the data succeed vs fail?



Data (science) is useful for...

- Finding high-level trends:
 - Collaborations (individuals, countries, etc)
 - Subject areas
 - Productivity
 - Research investment
- Identifying superconnectors
- Finding areas of strength <u>and</u> weakness



Data (science) is not useful for...

- Predicting future impact trends* (more research needed)
- Understanding cultural contexts, nuance
- Automating evaluation
 - System specificities and algorithms can be biased
 - Need human intervention to interpret the data, given caveats



Conclusion



Conclusion

Measurement of progress towards goals enabled by:

- Thoughtful strategic planning and programme evaluation
- Linked, rich data (and lots of it)
- Programmatic access to data at scale
- Careful use of the right data science approaches



Conclusion

Try this yourself!

- Dimensions
- Altmetric
- Web of Science
- Scopus
- Plum Analytics
- Incites
- Pubmed
- Datacite

- Crossref
- Scival
- IFI Claims
- Google Patent Search
- Derwent
- ClinicalTrials.gov
- Overton.io



Thanks

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