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CareTrack Australia

AUSTRALIANS RECEIVING THE RIGHT CARE AT THE RIGHT TIME

Professor Bill Runciman
Professor Jeffrey Braithwaite
Mr Peter Hibbert

The aims of healthcare

Do:

- The right thing
- In the right way
- At the right time
- For the right people

A perfect storm

- An ageing population
- Increasing possibilities
- New, better types of care
- A limit to funding for healthcare
- An affordability crisis

An affordability crisis

- Nearly 20% of public expenditure goes on healthcare (Grattan report)
- Direct costs of nearly 10% of GDP -
- BUT ALREADY
- Some patients are being denied cost-effective care they want and need
- Some patients are waiting too long for essential care

The problem

- There is lots of evidence that much of the care delivered today is not appropriate
- US estimates are that there is no net benefit for 20-30% of the care provided
- Only 55% receive “recommended care”
- Poor baselines and existing interventions produce little change

Acute back pain

3,533 patient visits

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Recommended care:

basic advice	**21%**
simple analgesics	**18%**
imaging contra-indicated	**25%**

Ref: Williams CM, Maher CG, Hancock MJ, et al. Low back pain and best practice care: a survey of general practice physicians. Archives of Internal Medicine 2010;170(3):271-277.

NHMRC CareTrack Program Grant

A population-based study of appropriateness of care

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- 22 common conditions
- 522 indicators
- 35,000 telephone calls to recruit 1,154 participants
- Ethics approval for over 220 sites
- Over 270,000 encounters assessed
- Over 35,500 eligible encounters

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NHMRC CareTrack Program Grant

Appropriate Care – 57%

- Australians get appropriate care at only 57% of encounters
- Compliance is the same for evidence-based as for consensus-based guidelines
- Compliance ranged from 13% to 90% for conditions

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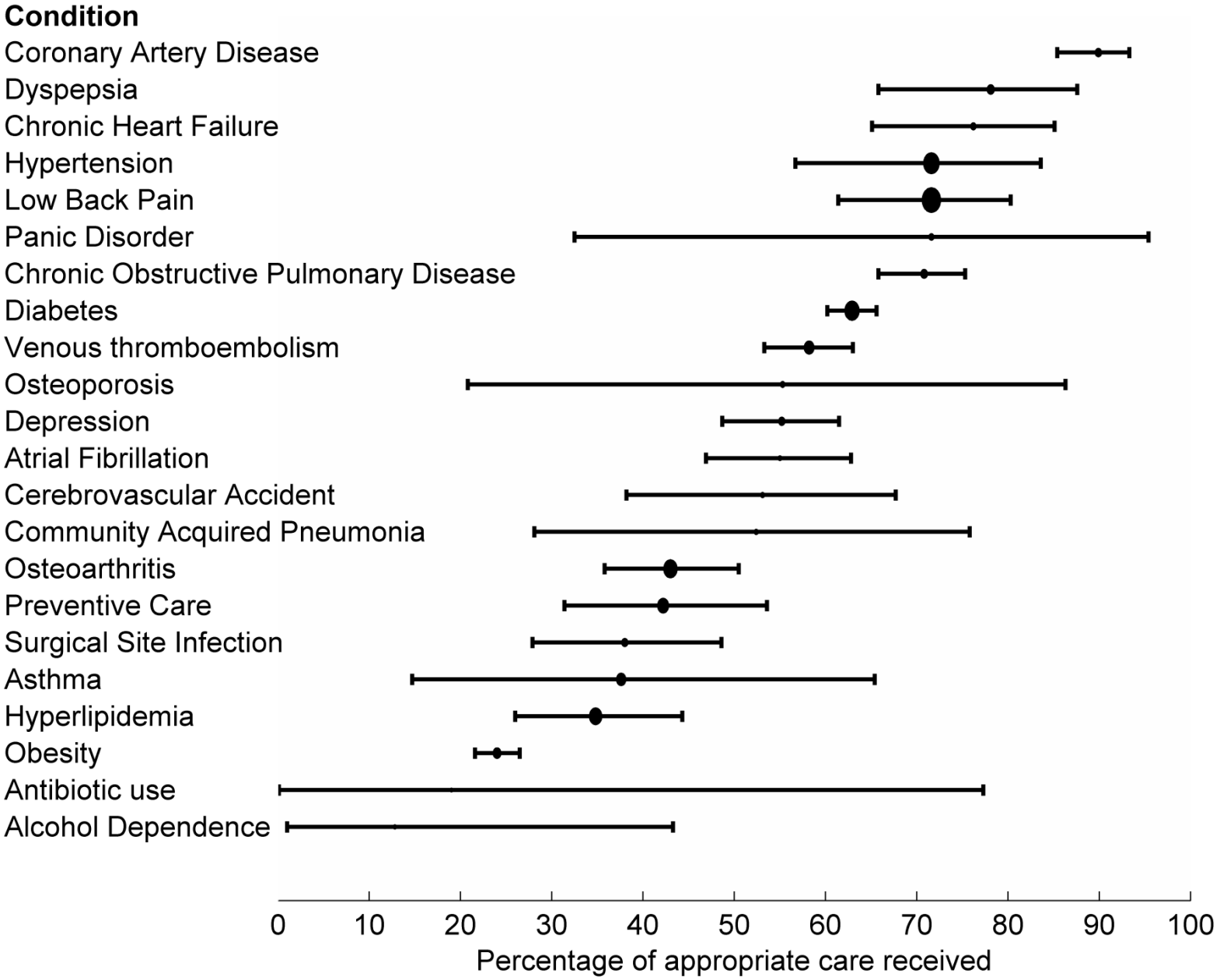
NHMRC CareTrack Program Grant

Appropriate Care – 57%

- Compliance ranged from 32% to 85% for practices
- Very low compliances for some aspects of care (e.g. risk assessments)
- Differences between types of providers


Condition
Coronary Artery Disease
Dyspepsia
Chronic Heart Failure
Hypertension
Low Back Pain
Panic Disorder
Chronic Obstructive Pulmonary Disease
Diabetes
Venous thromboembolism
Osteoporosis
Depression
Atrial Fibrillation
Cerebrovascular Accident
Community Acquired Pneumonia
Osteoarthritis
Preventive Care
Surgical Site Infection
Asthma
Hyperlipidemia
Obesity
Antibiotic use
Alcohol Dependence
0
10
20
30
40
50
60
70
80
90
100
Percentage of appropriate care received

Usability issues with clinical guidelines and indicators

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- **Duplication** and **overlap**
- **Inconsistent** structure and content
- **Large document size**
- Large number of **repositories** and **guidelines**
- **11 systematic reviews** and **75 RCTs published** every day

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What can we do about it?

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Surely not more of the same?

Cochrane EPOC reports

- conventional solutions don't work (4 to12%)
- are certainly not cost-effective

Guidelines and protocols can be effective, with timely, focussed feedback

But, to date, most doctors won't use them

My hypothesis

Daniel Kahneman

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- Doctors are busy
- Busy people have to use system I thinking
- This is virtually beyond voluntary control
- The production pressure paradox
- Routine care is almost impervious to change
- But unusual, complex problems may be better managed

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How can this be changed?

Theory - Don Norman

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- Change the affordances of the system
- Make it easy to do the “right thing” and hard to do the “wrong thing”
- Introduce some “forcing functions”, or better, some “nudges”
- Provide rapid, relevant, transparent tools and feedback
- Provide incentives to do the right thing

Clinical standards

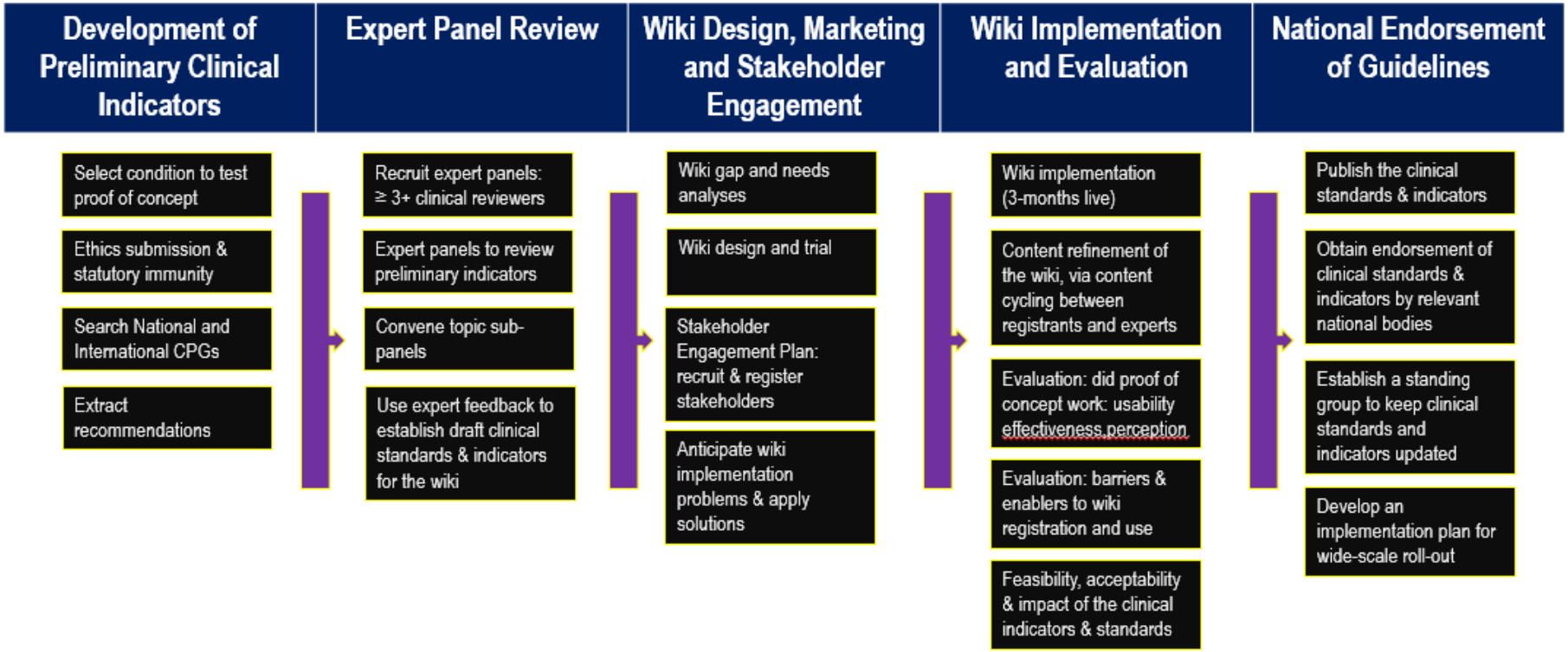
- Distillate of selected pathways & guidelines
- Succinct, standard definitions, language & format
- Suitable to be given to patients
- Suitable for hand-held devices, electronic records
- Versions to be kept up to date
- Provide a basis for monitoring and feedback at personal, facility and national level
- Provides a basis for evidence-based policy

Initial thoughts for this project

Choose conditions based on explicit criteria, such as

- Adequate prevalence
- Evidence of a demonstrated problem (CareTrack baseline, “headspace”)
- An intervention that is practical and effective
- Some interest and motivation for meaningful change by a relevant group of clinicians and administrators

The project – proof of concept



What is needed?

- Tools incorporated into workflow which are consistent with care pathways
- Routine, prospective monitoring of the appropriateness of care
- Routine audit and feedback to patients, healthcare providers, administration
- Duplicate, redundant, overlapping, inaccessible, hard-to-use guidelines should be retired from the frontline

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Thank you

END

Implementation: the uptake of evidence into healthcare

Guy Tsafnat and Adam Dunn

Collaborators

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Miew-Keen Choong	
Richard Day	
Blanca Gallego	
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John Bennet	University of Queensland
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Paul Glasziou	Bond University
Joel Hudgins	Boston Children's Hospital
Kenneth Mandl	Harvard Medical School
Sue Phillips	Therapeutic Guidelines
Karen Robinson	Johns Hopkins Medicine
Yuval Shahar	Ben Gurion University
Sarah Thorning	Bond University
Melina Wilson	Sydney University

The evidence-practice disconnect

Regulatory bodies that make up policies about how clinicians should treat patients update their policies intermittently.

2-8y 25009681

Clinicians change their practice based on new information provided by their colleagues, pharmaceutical representatives, online searches, decision-support systems, and sometimes peer-reviewed studies and reviews.

5-12y 22876867

Despite having been thoroughly discredited, large portions of the public believe that vaccines cause autism, especially young adults.

21% bit.ly/1KnXLuE

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Problem 1: Evidence synthesis is slow and inefficient

Automating systematic reviews

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Evidence synthesis is slow

In Australia we don't always deliver the care that guidelines and experts agree on as appropriate.

13-90% 22794056

17638714

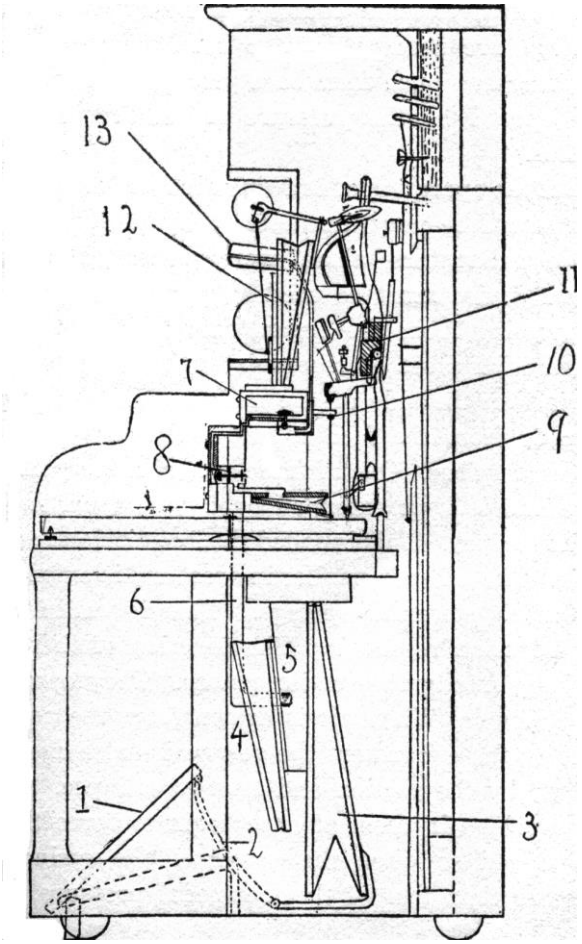
7%,15%,23%

Systematic reviews could be updated as soon as a new study results are available (this means we need to do the right trials).

Systematic reviews can take years to complete and are extremely resource-intensive, so many are out of date – some as soon as they are published.

32.7% 20644625

Automating systematic reviews



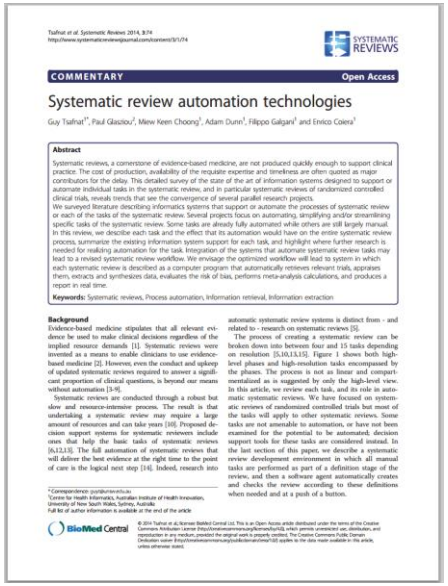
We need to improve evidence synthesis; so is it possible to **reliably** automate the tasks required to undertake systematic reviews?


BMJ

EDITORIALS

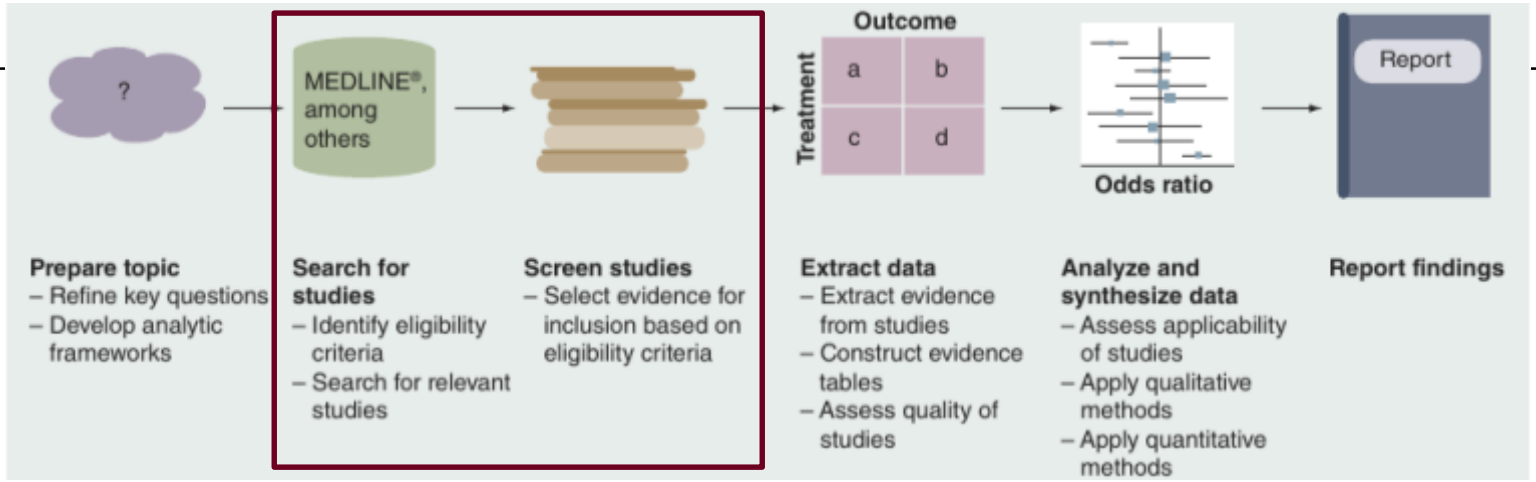
The automation of systematic reviews

Would lead to best currently available evidence at the push of a button


COMMENTARY Open Access

Systematic review automation technologies

Speeding up evidence synthesis



Systematic reviewers may need to read hundreds of articles to identify a handful of studies that might need to be included in a review.

Training a machine to do this requires a bit of extra ingenuity relative to standard machine learning techniques, so we have started to use structural information (citation networks), which can be also help with retrieval, de-duplication, etc.

25274020, 24725642

46%

22515596

70%

Can we produce a **reliable** signal to trigger the automatic update of reviews?

Problem 2: Clinical evidence is often biased or hidden

Evidence surveillance

Clinical evidence is biased

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Due to biases in the design, undertaking, reporting, and synthesis in clinical research, about 85% of it is wasted.

24411643

$200b

20679560

32% v 62%

Trials that are funded by industry are less likely to be published within 2 years, and when they are, they are more likely to have favourable results.

When trials are published, some outcomes are incompletely reported or not reported at all. Safety outcomes are affected more than efficacy outcomes.

23861749

40-62%

25285542

17% v 88%

When reviewers and systematic reviewers synthesise the results from many clinical studies, those with financial conflicts of interest are more likely to report favourably.

New ways to measure biases

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10,086 citations to 4,574 unique articles among 152 reviews about the clinical use of neuraminidase inhibitors.
93 (61%) of reviews were unanimously graded as favourable.

We applied machine learning methods to see if we could predict the conclusions of the reviews using only information about the reference lists, without using any information from the text of the review.

Precision	Recall	F_1	Accuracy (%) (95% CI)
0.97	0.96	0.96	95.5 (92.2, 98.8)
0.96	0.98	0.97	**96.2 (93.2, 99.2)**
0.94	0.95	0.75	93.0 (88.9, 97.1)

New ways to measure biases

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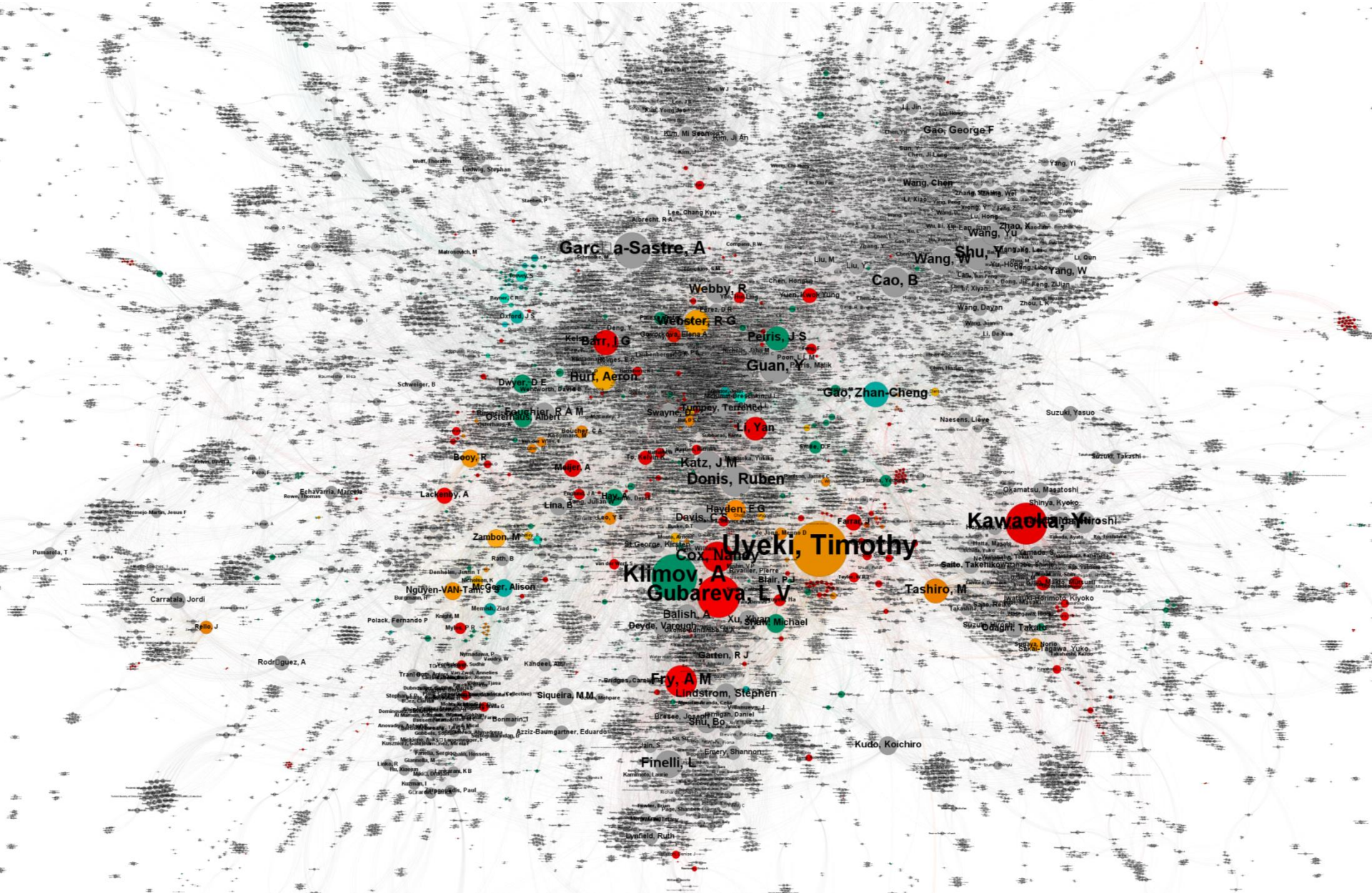

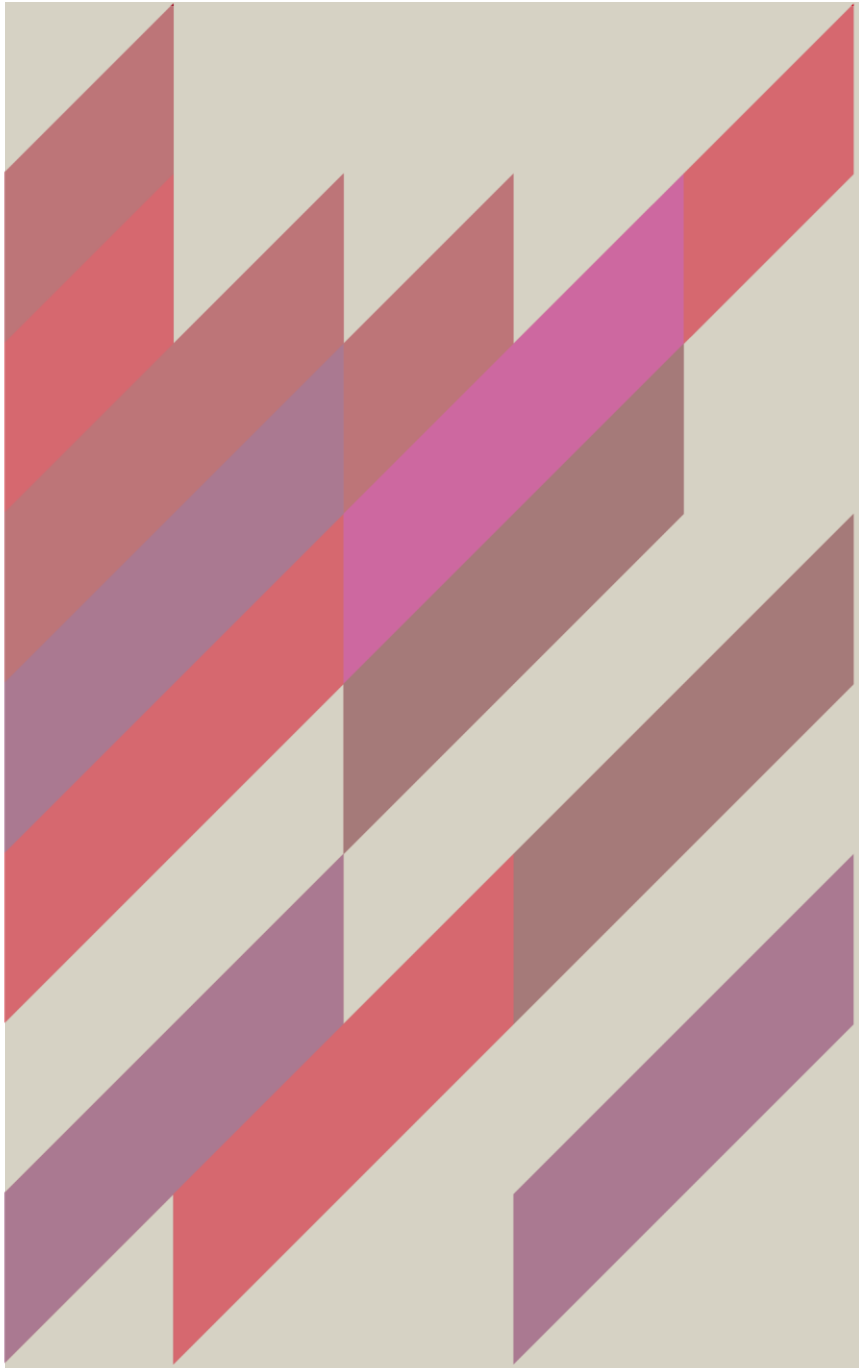

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Problem 3: People often believe strange things

Computational epidemiology

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Misinformed health behaviours

33%* of US adults believe that there is a lot of disagreement among scientists about global warming.

31% of Norwegians believe that there is some disagreement between experts on the safety of vaccines.

*of those who have heard of the topic

Misinformed health behaviours

33%* of US adults believe that there is a lot of disagreement among scientists about global warming.

31% of Norwegians believe that there is some disagreement between experts on the safety of vaccines.

37%* of US adults believe the FDA is deliberately preventing the public from getting natural cures for cancer and other diseases because of pressure from drug companies.

20%* of US adults believe that health officials know that cell phones cause cancer but are doing nothing to stop it because large corporations won't let them.

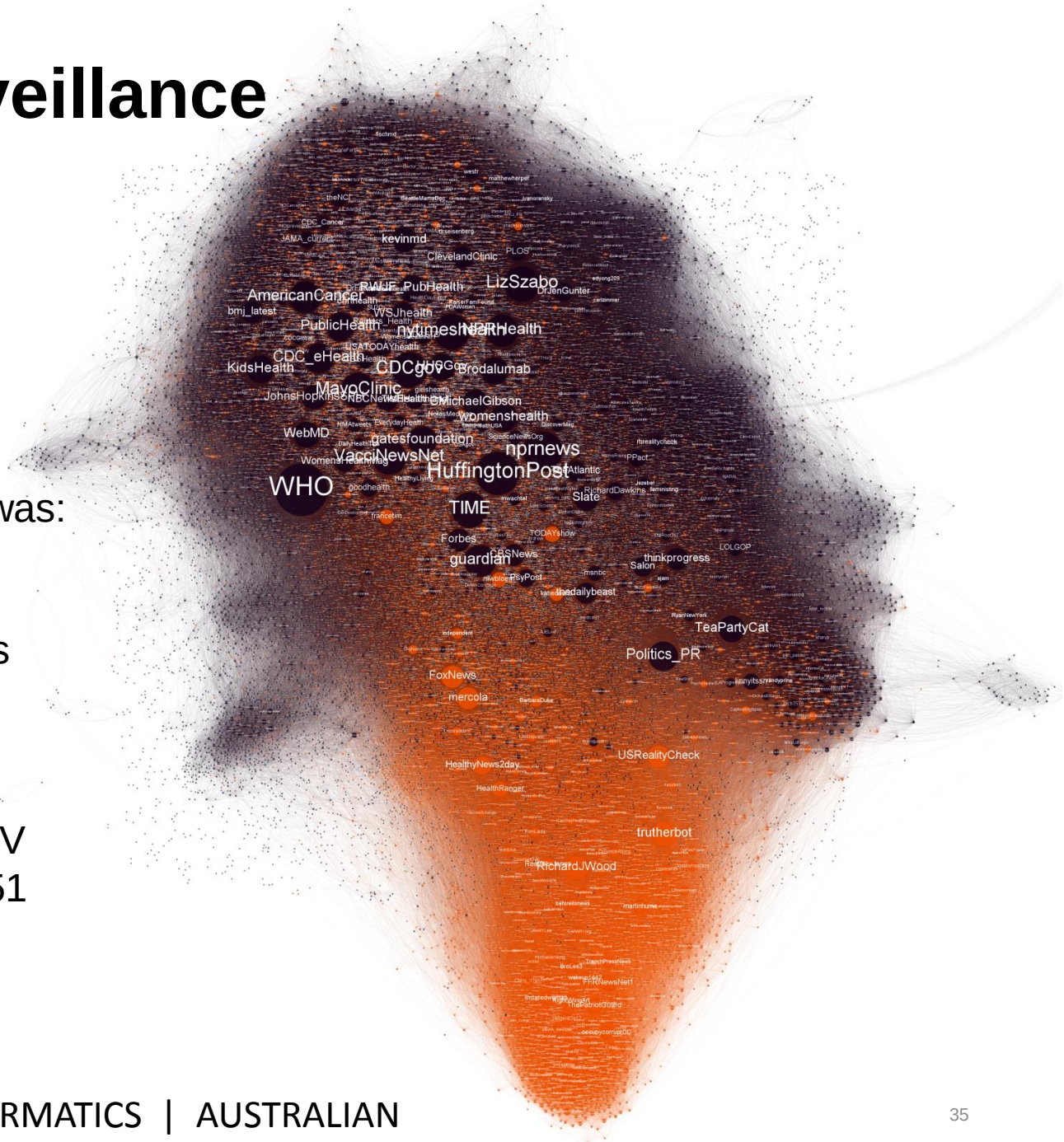
12%* of US adults believe that public water fluoridation is really just a secret way for chemical companies to dump the dangerous byproducts of phosphate mines into the environment.

*of those who have heard of the topic

Opinion surveillance

After being exposed to mostly negative tweets about HPV vaccines, the odds ratio of subsequently tweeting an anti-vaccine opinion was: **3.46** [95%CI 3.25-3.67].

(among the 30,621 users who tweeted about HPV vaccines at least once following exposure to several tweets about HPV vaccines, covering 83,551 tweets over 6 months).



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Thank you

@adamgdunn

Health Analytics for a Learning Health Care System

AIHI Symposium, 31st March 2015

Dr Blanca Gallego Luxan
Australian Institute of Health Innovation
Macquarie University

Context

Towards a Learning Health Care System

- Patient care is integrated with medical research
  FACILITATING
  Clinical practice continuously monitored, updated and improved

- Medical research is integrated with patient care
  FACILITATING
  Research continuously informed and guided by clinical practice

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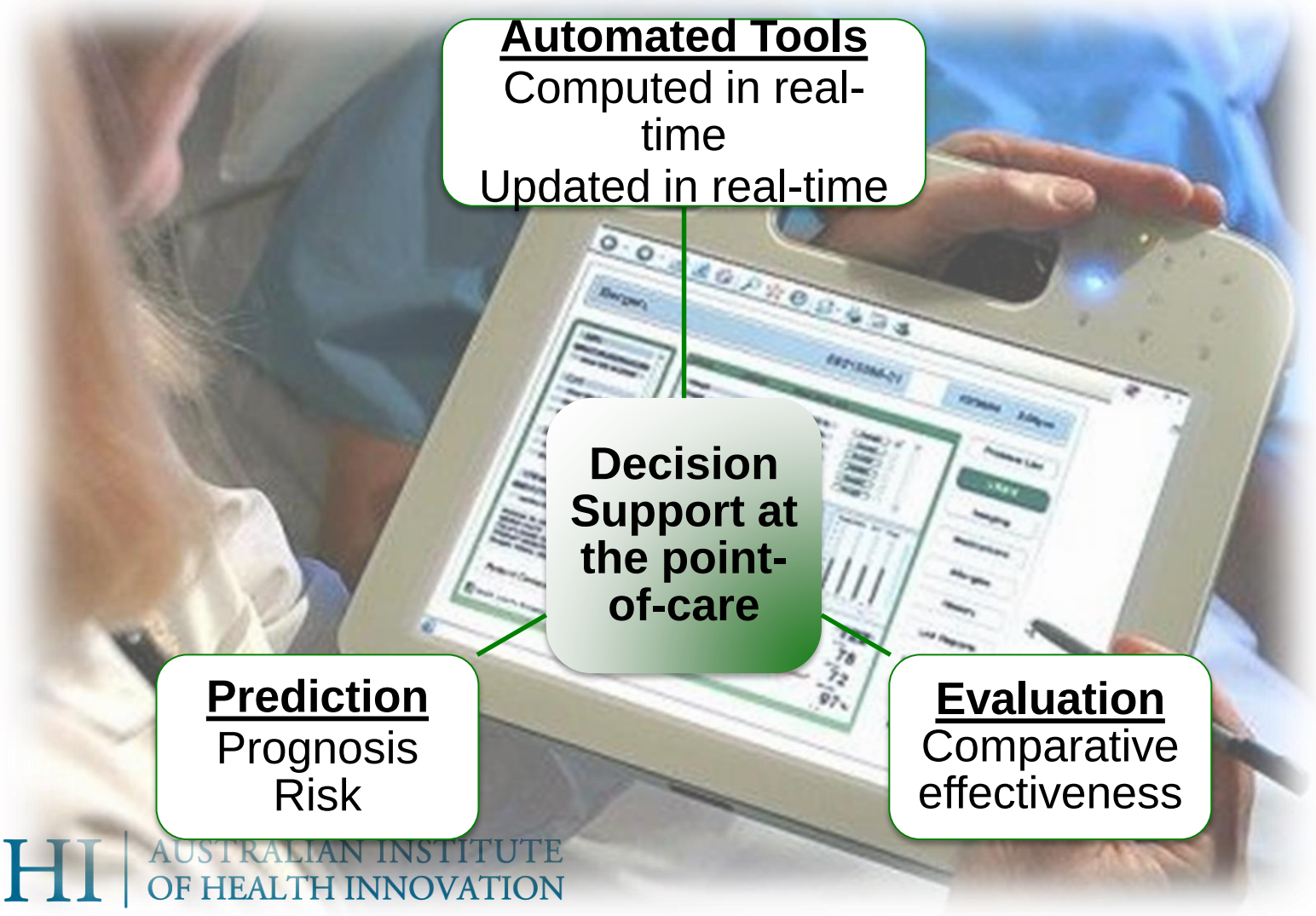
Our Research

Building Models to Support Decision Making at the point-of-care



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Forecasting patient trajectories

Will a patient be: in hospital, at home or dead in the next week?

- Early accurate estimates of remaining days of hospitalisation, risk of readmission, and death ->
Discharge planning strategies ->
Improve continuity of care
Prevent readmissions and post-discharge deaths

- Early accurate estimates of high risk of death ->
Prevent deterioration and death
Initiate counseling about end-of-life-care

- Typical predictive model->
Predict single outcome
Given time period
Given forecasting time

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Forecasting patient trajectories

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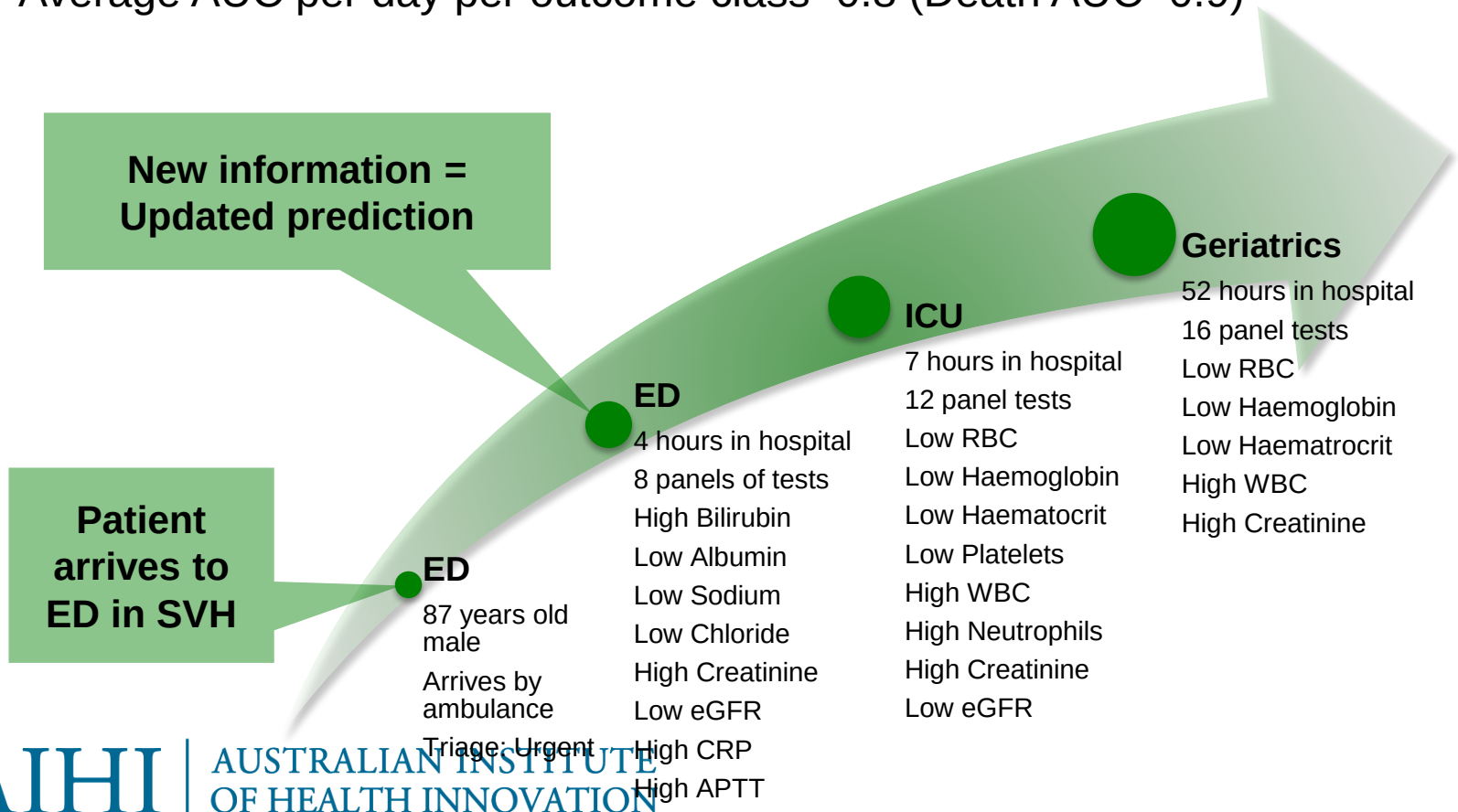
Will a patient be: in hospital, at home or dead in the next week?

We **simultaneously** predict the probability of discharge, readmission and death **for each of the next 7 days,** throughout the patient's hospitalisation**.**

Average AUC per day per outcome class=0.8 (Death AUC=0.9)



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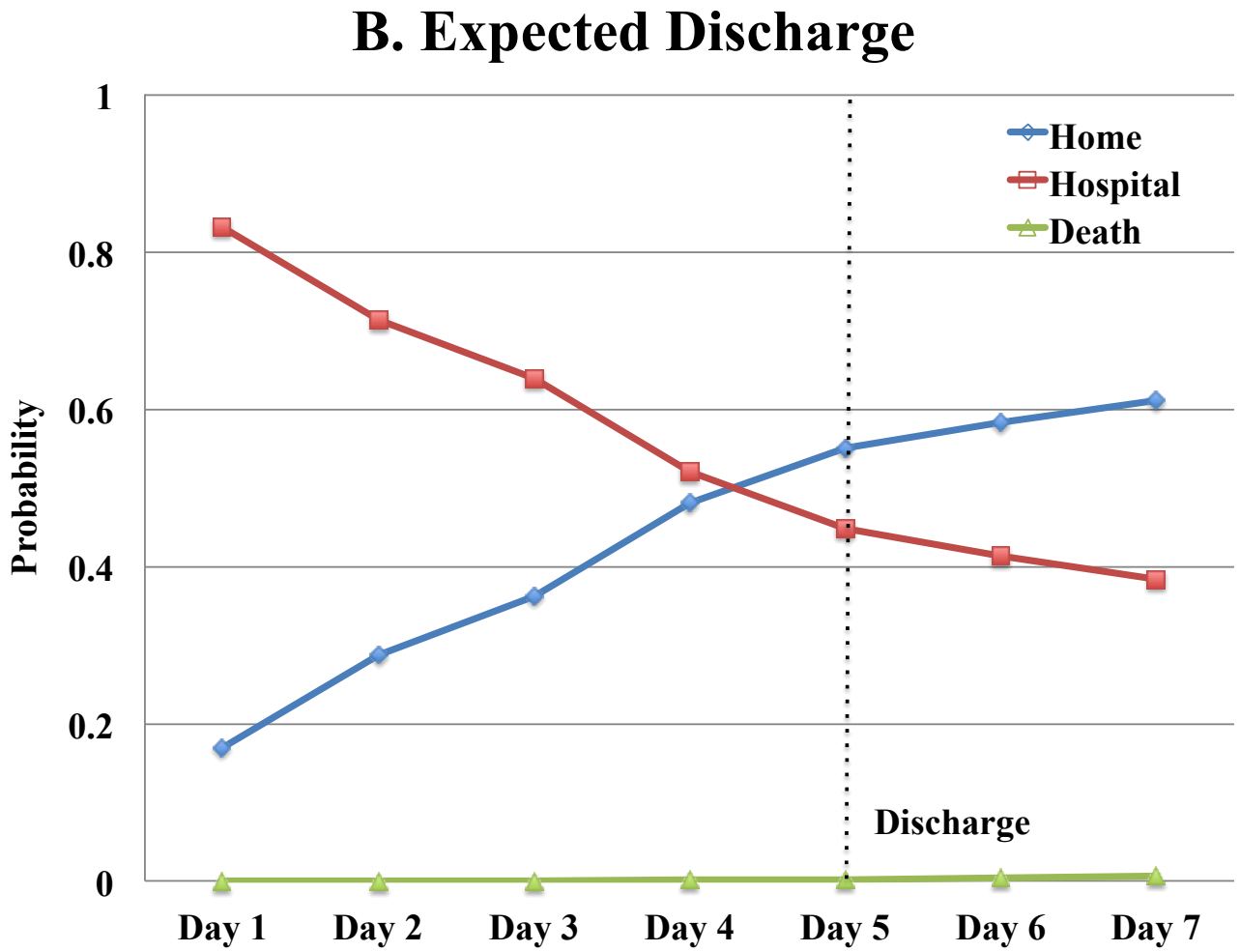

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Cai et al, 2015 (Under Review)

Forecasting patient trajectories

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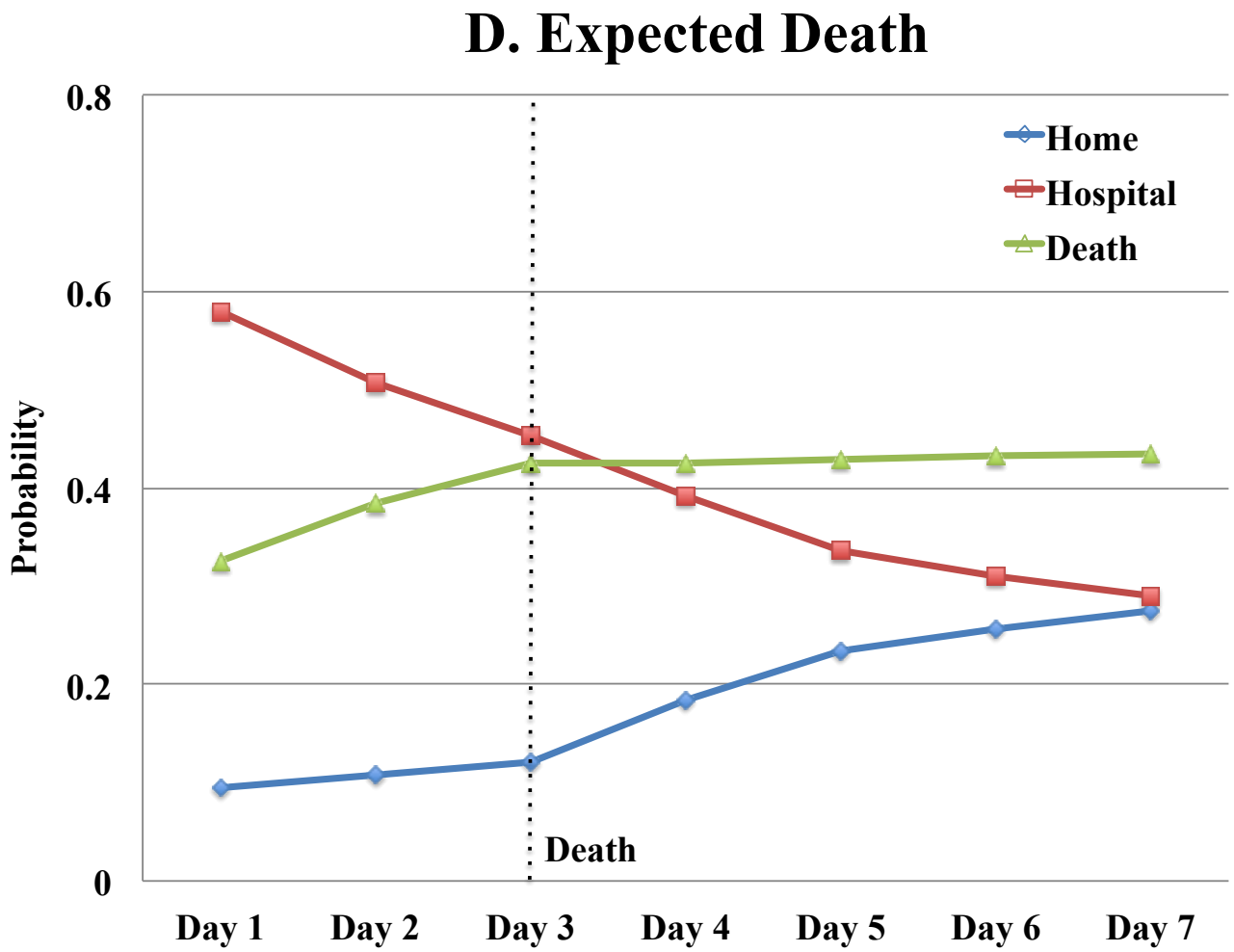

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Cai et al, 2015 (Under Review)

Bringing cohort studies to the bedside

Framework for a ‘green button’ to support clinical decision-making

Capability in the EHR system that resolves the tension between ‘***evidence-based medicine***’ AND ‘***practice-based evidence***’

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Longhurst et al, Health Aff July 2014

Bringing cohort studies to the bedside

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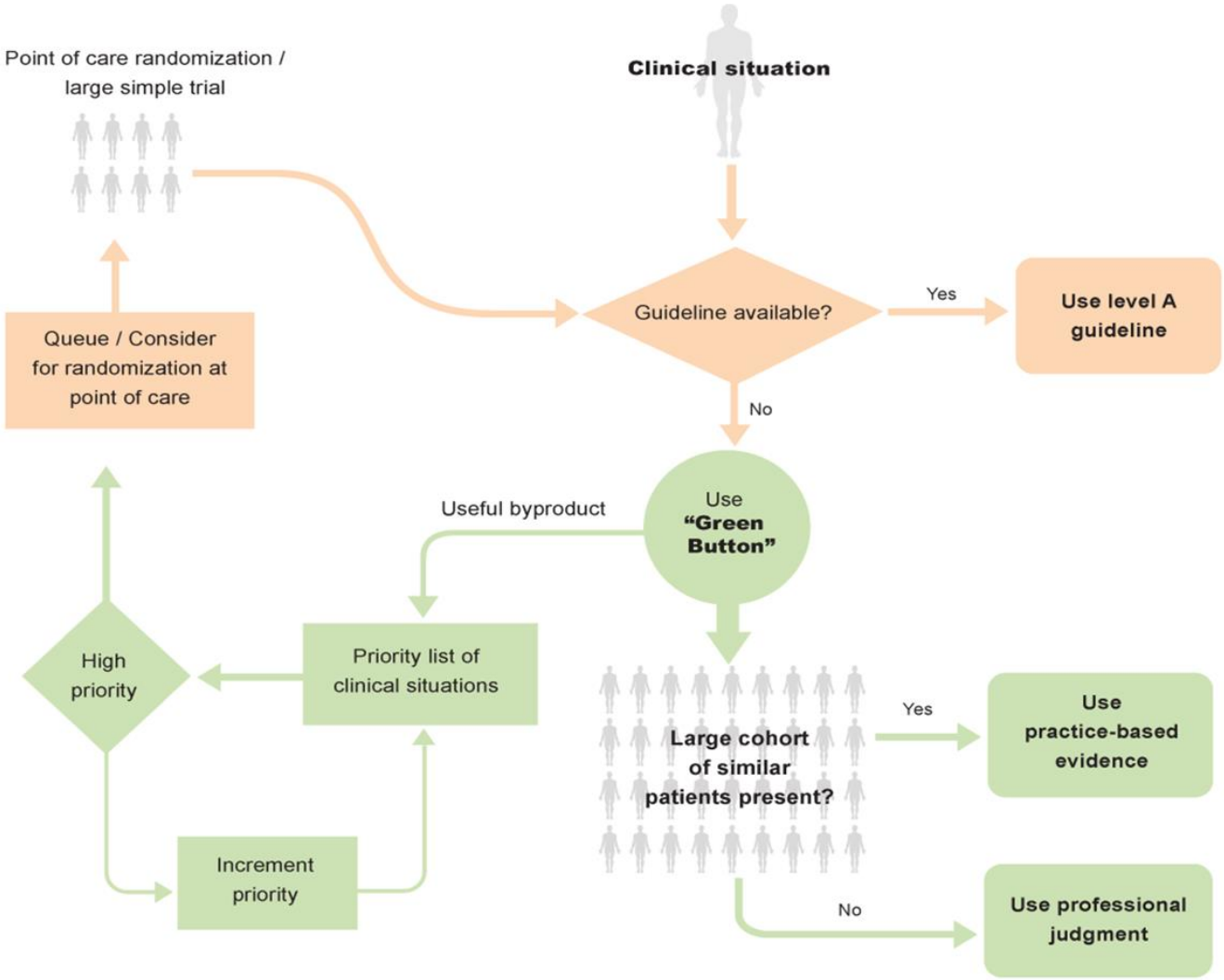
Framework for a 'green button' to support clinical decision-making



From: http://shahlab.stanford.edu/greenbutton

Longhurst et al, Health Aff July 2014

Bringing cohort studies to the bedside

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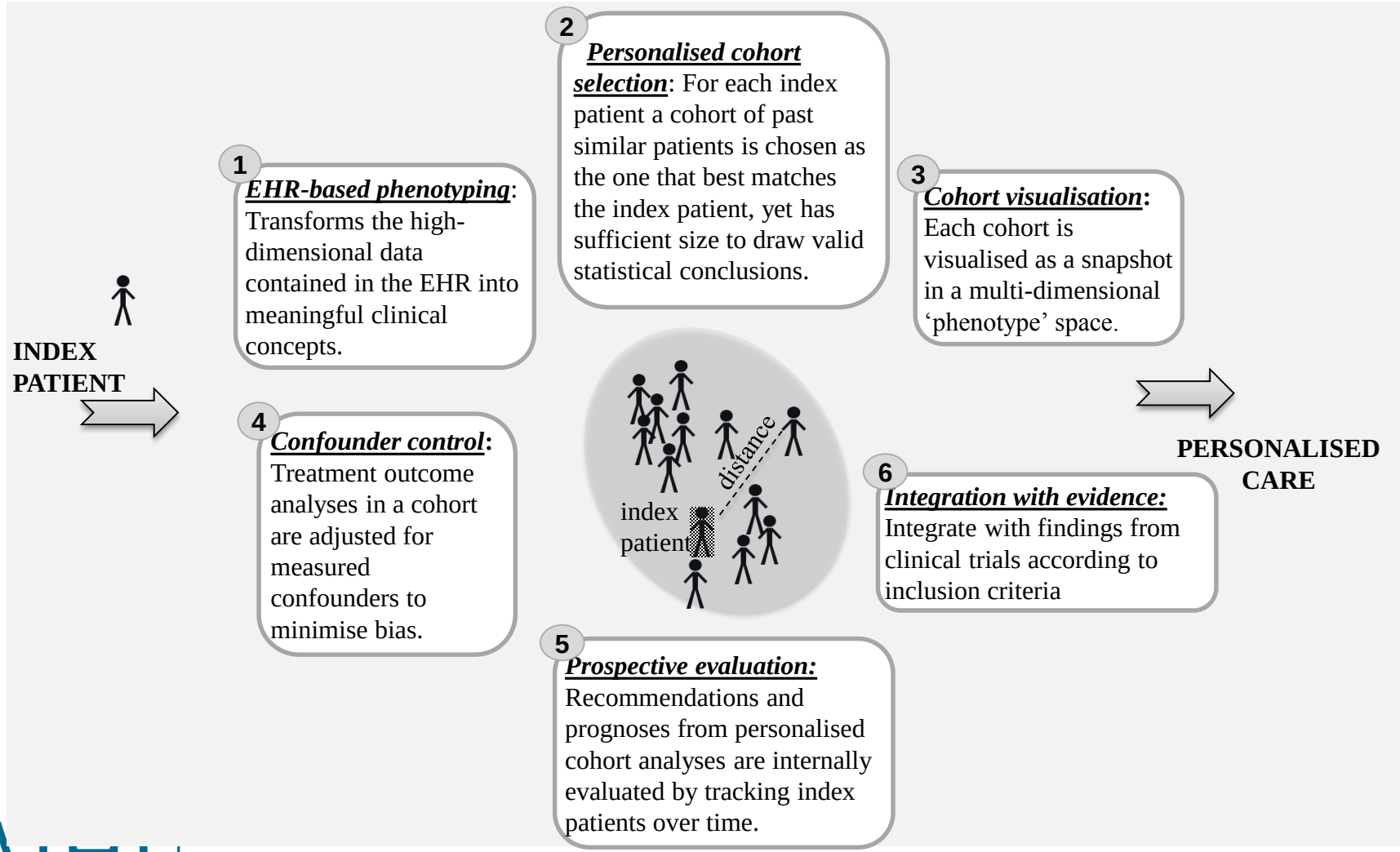
Framework for a 'green button' to support clinical decision-making



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Gallego et al, 2015 J. Comp. Eff. Res. DOI: 10.2217/CER.15.12 (2015) (Article in Press)

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Thank you for listening

Questions are welcome

Work in collaboration with:

Dr Oscar Perez-Concha (MQU)
Prof. Coiera (MQU)

A\Prof. Nigam Shah (Stanford)
A\Prof. Chris Longhurst (Stanford)

Prof. Ric Day (UNSW, SVH)
Prof. Teng Liaw (UNSW)
Dr Xiong Cai (UNSW)

Prof. Martin-Sanchez (Melbourne)

Dr James Sheppard (Oxford)

David Roffe (SVH)

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The management of diagnostic tests

A/Prof Joanne Callen PhD

Centre for Health Systems & Safety Research

Collaborators

A/Professor Andrew Georgiou, Dr Ling Li
Professors Bill Runciman and Johanna Westbrook
Centre for Health Systems and Safety Research

Associate Professors Richard Paoloni, Kathy Gibson
Louise Robertson
Sydney LHD and South Western Sydney LHD

Case study: Failure in communication

A 50 year old woman was admitted to hospital to have her gall bladder removed. A C
*The patient had her gall bladder removed; however **the pelvic mass was not follow***
Health care organisations all over the world are unable to prevent cases such as this

How many results are missed for hospital patients?

Hospital inpatients

20.04% - 61.6% of tests are missed

Callen et al. BMJ Qual Saf 2011;20;194-199

ED patients (discharged from ED)

1.0% - 75% of tests are missed

Callen et al. BMJ Qual Saf 2011;20;194-199

How many results are missed for patients in ambulatory settings?

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Ambulatory patients

6.8% - 62% laboratory tests missed

1.0% - 35.7% imaging tests missed

Callen et al. JGIM, 2012

11% AND 35.7% - NO EVIDENCE OF FOLLOW-UP OF MAMMOGRAMS

CHEN ET AL. J NATL MED ASSOC 2010

POON ET AL. JGIM 2004

Impact on patients of missed/delayed test results

Delayed diagnosis
Inappropriate antibiotics prescribed
Delayed or missed cancer diagnosis
Death

Where does communication break down in the test management process?

No standard policies or guidelines

Multidisciplinary nature of the test management process

Problems occur at the *interface* between primary and secondary care and laboratories

Use of multiple information systems

Focus areas for our research

Can technology assist the process?

What is the role of the patient?

Two projects - test management

1. Evaluation of an electronic test result endorsement function
2. Notification of significantly abnormal test results to patients: physicians' perspec

1. Evaluation of an electronic test result endorsement system

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Does electronic test result acknowledgement reduce the number of missed test resu
Does electronic results acknowledgement take physicians more time?
What do physicians think about electronic test acknowledgement in relation to work

Does electronic test result acknowledgement reduce the number of missed test results?

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Design

Before and after study

Intervention

On-line test result acknowledgement function implemented August 2013

Population

Patients discharged from one metropolitan ED for one month

Before intervention (April 2013)– 2,513 microbiology & radiology tests ordered for ED

After intervention (April 2014) – 2,269 microbiology & radiology tests ordered for ED

Outcome measures

percentage of abnormal test results not acknowledged; not acknowledged which are ju

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2. Notification of significantly abnormal test results to patients: physicians' perspectives

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Cross sectional survey

Primary care physicians and specialists (USA and Australia) (n=315/1417; 5 sites)

Emergency Department physicians (Australia) (n=61/89; 2 sites)

Questions

Are there policies and procedures for notification?

Who should notify the patient?

Should patients receive direct notification of results?

What are your concerns about notification? (patients' anxiety, patients' lack of expertise)

Callen et al. J Med Internet Research 2015

Giardina et al. Patient Education and Counselling, 2015

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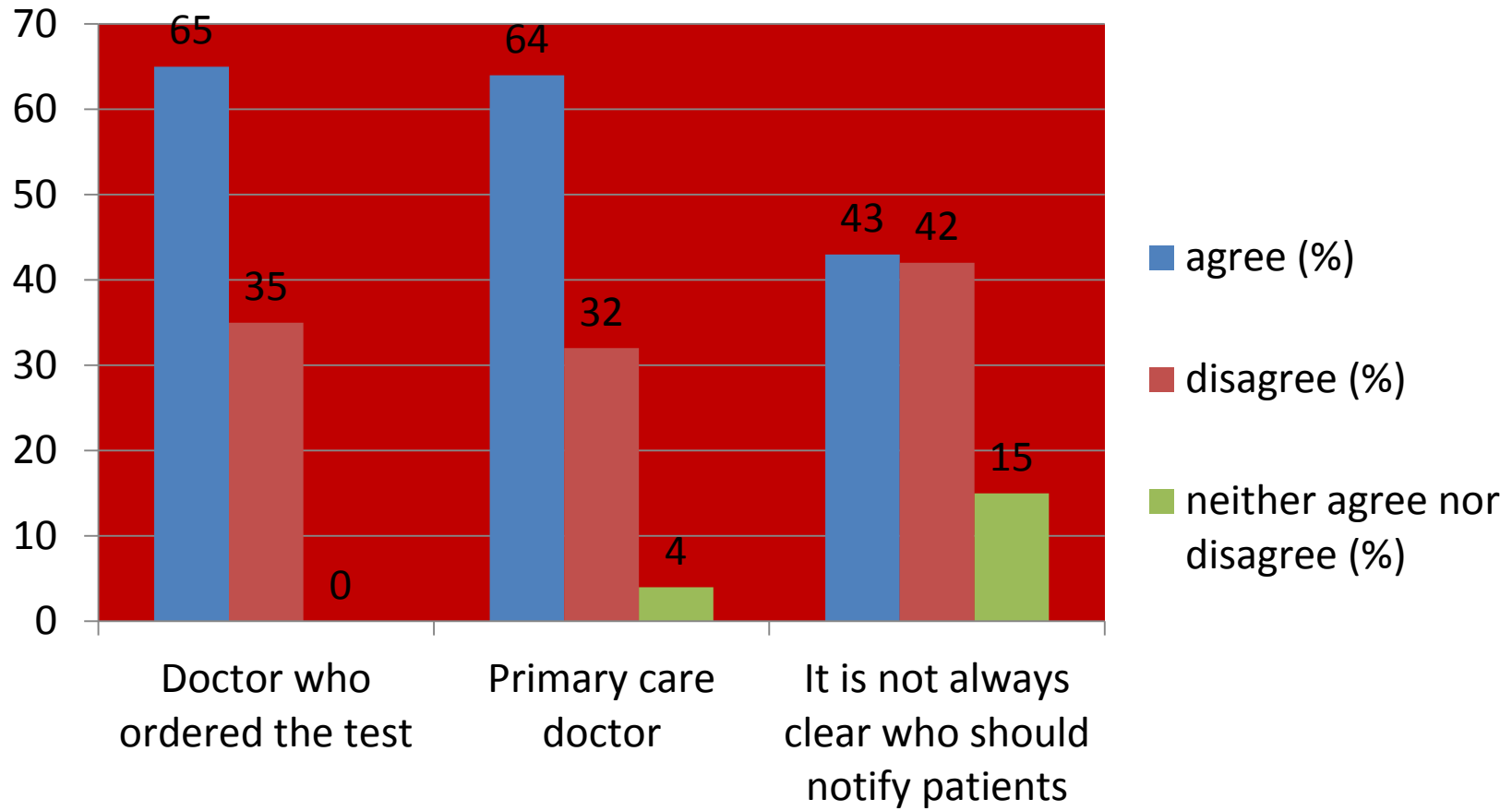
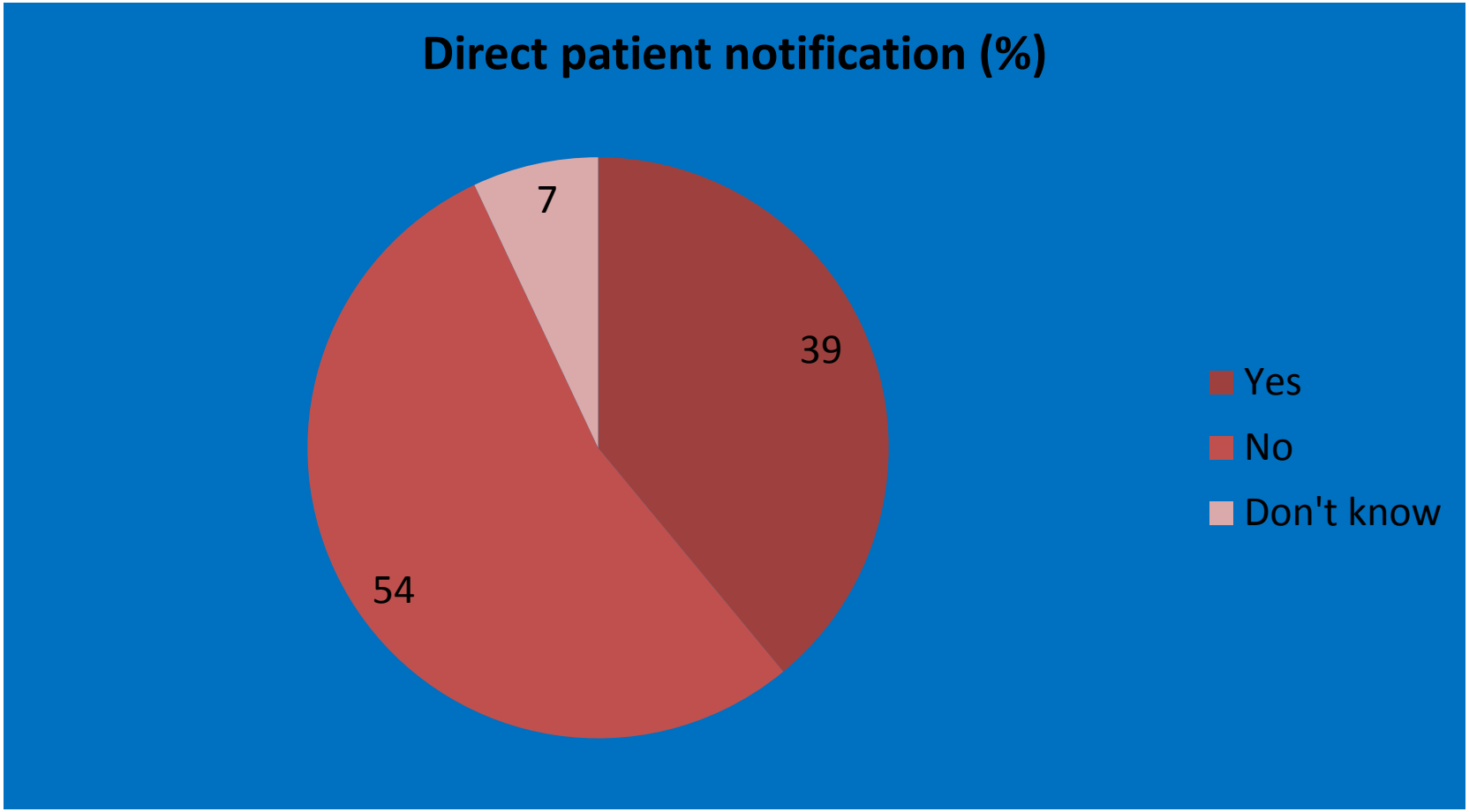
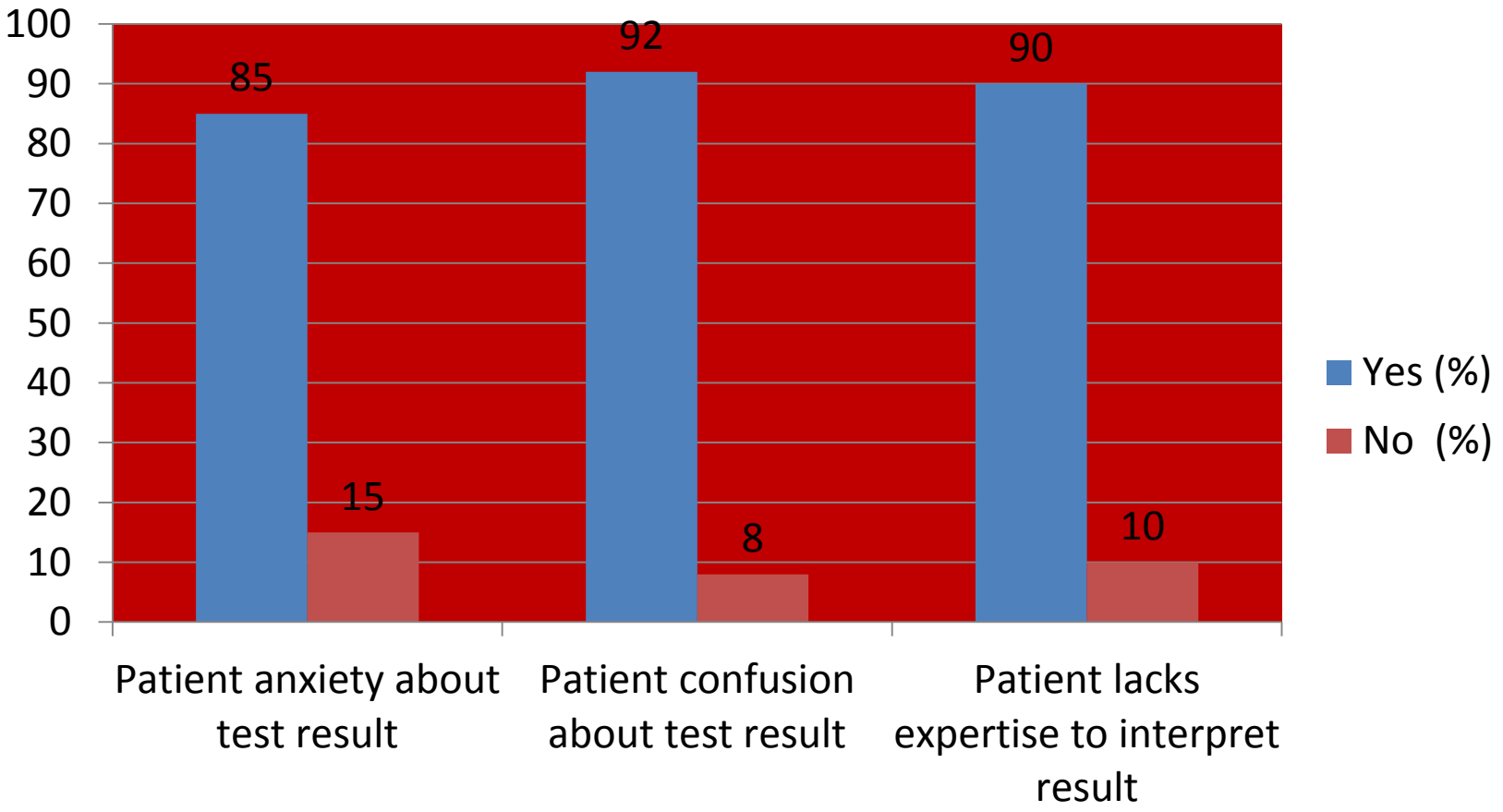
Who is responsible for notifying the patient of a test result?



Are you comfortable with patients receiving direct notification of test abnormal results?



Main concerns regarding direct notification of results to patients



Context of the problem of missed test results

Solutions need to be multipronged

Policies, procedures and responsibilities

Role of patients, doctors, nurses, clerical staff and laboratories in the follow-up proces

Evaluation of information and communication technology (ICT) solutions

Integrate solutions with work practices of health professionals

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Thank you

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Acknowledge Dr Hardeep Singh, VA, USA

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