



How to measure the impact of research-based interventions



Shanthi Ramanathan
Simon Deeming

Measure Health Outcomes Conference
22-23 August 2017

In partnership with our community



Health
Hunter New England
Local Health District



NSW REGIONAL
HEALTH PARTNERS
CENTRE FOR INNOVATION IN REGIONAL HEALTH

Agenda

- **Key definitions**
- **Why measure impact?**
 - The problem, Policy shifts, Key initiatives
- **Developments in Impact Assessment**
- **Criticisms of Impact Assessment**
- **HMRI FAIT**
- **Expressing the results**



Measuring and encouraging research impact

In partnership with our community



Andrew Searles PhD

Associate Director, HMRI Health Research Economics

Simon Deeming

HMRI Health Research Economics

Presentation to NHMRC
September 2016

Agenda

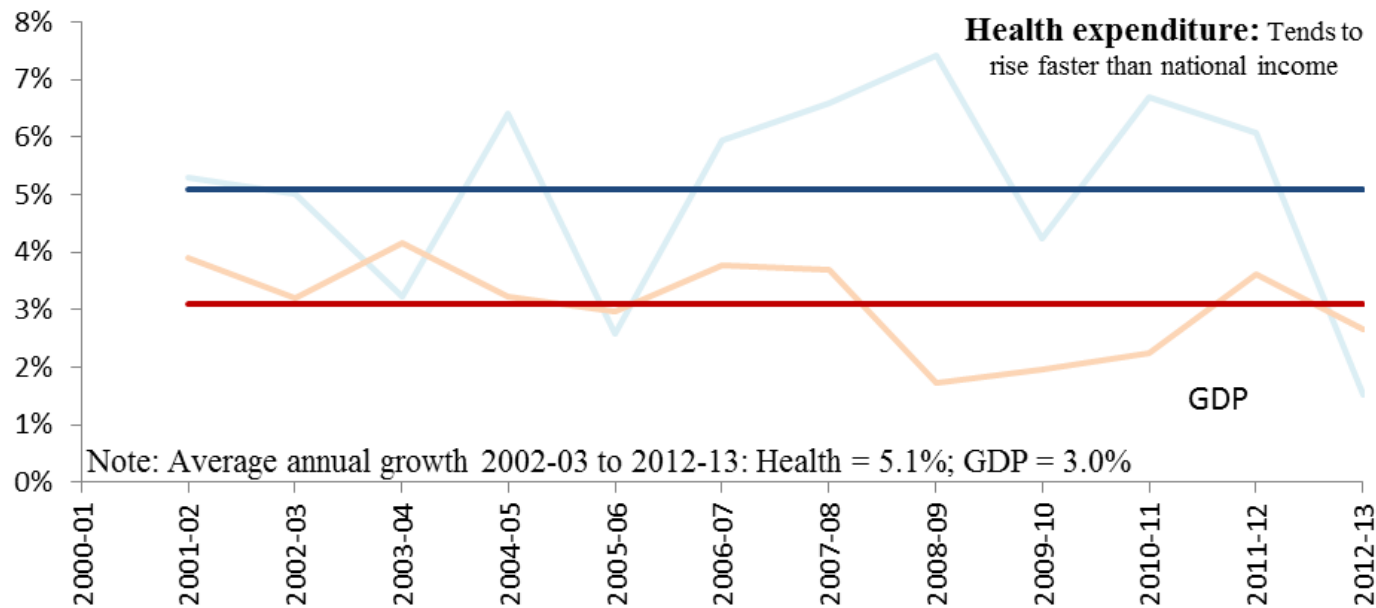
- **Why measure impact?**
- **Background**
 - **HMRI's work in impact assessment**
 - Framework to Assess the Impact from Translational health research)
 - **DOIS – project to measure impact in MRIs**
 - **Review existing impact frameworks**
 - **Attitudes & barriers to measurement**
- **HMRI FAIT**
- **Concluding issues**

Why measure impact?

Why measure?

- Basic economics Scarce resources
- Health expenditure increasing at an unsustainable rate

Growth rates: health expenditure versus GDP, Australia



Note: Constant prices, 2012-13 base year

Source: AIHW

Why measure?

- Health-economic imperatives:
 1. Govt. budget pressure
 2. Productivity issues for MHR (McKeon, MRFF)
 - **Efficiency:** Innovation to improve health outcomes / identify low value care
 - **Growth:** Optimise commercial innovations
 3. Encourage high value, low waste research:
Embed translation & impact (Chalmers, Glasziou, Grimshaw, Ioannidis et al)

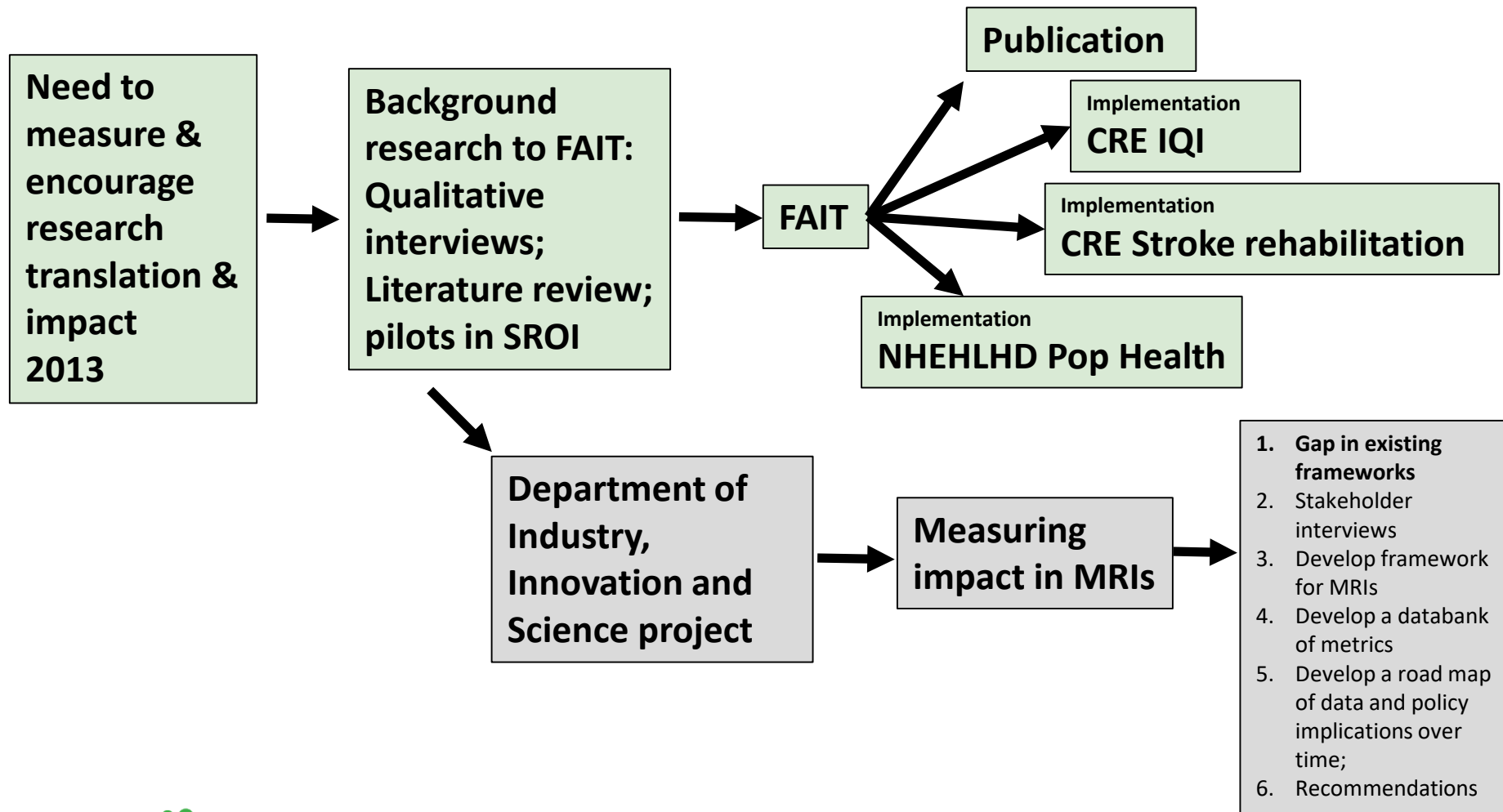
Why measure?

Is the spending choice
returning value for
money?

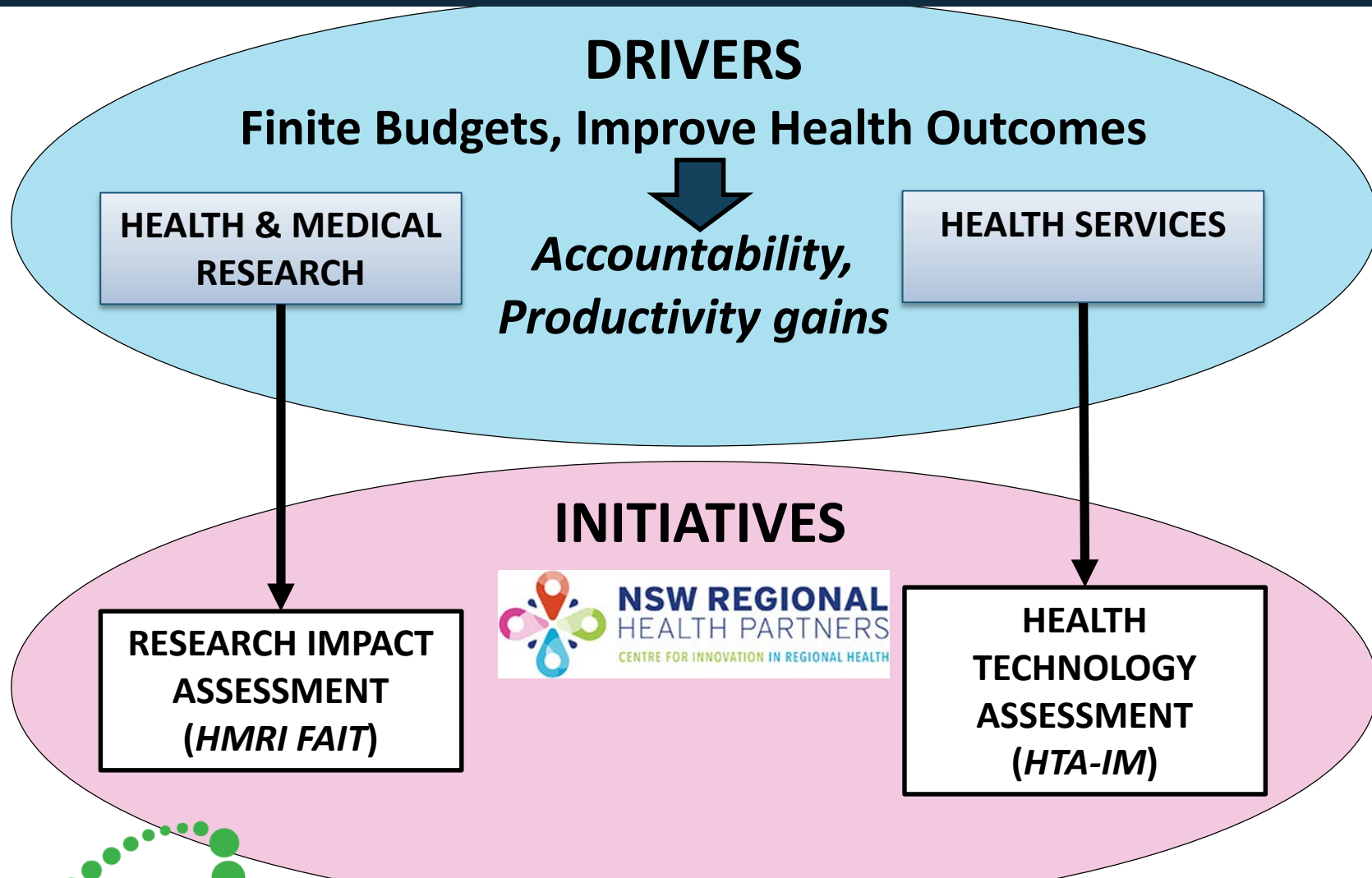
HMRI's work in impact assessment

**Initial focus on programs of research –
subsequent expansion**

Workflow ... measuring research impact



Key initiatives



What is the role of an impact assessment framework?

From the literature:

- Identified objectives grouped into eight (8) categories:
 - Top-down Accountability
 - Transparency / Bottom-up Accountability
 - Advocacy
 - Steering
 - Value for money
 - Management / Learning & Feedback / Fund allocation
 - (Measuring/improving the) Speed of translation
 - Prospective orientation of research

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Attitudes, barriers and challenges for measuring impact

Insights from MRI & other interviews

- Overwhelming supportive
- Depends upon what is measured – grants or helping people with conditions; Traditional model > publications, leads to treadmill mechanism of research to generate grants
- Cultural shift – to research that makes a difference
- Translation sometimes seen (by researchers) as, "this is what we do after we do the research."
- I think it's done poorly; It's really tricky
- Strong desire for consistent approach

Insights from MRI & other interviews

- Barrier - Researcher attitudes/ownership:
 - “Funding compels that MRIs value papers, grants & PhDs; want ‘you’ to think about translation, but unclear what the benefit is...”
 - Changing, but slowly; too little reward; ARC Discovery projects – Pathway to impact (75 words), UK grant applications – Pathway to impact second only to quality of research proposal
 - Does research translation mean as much as a paper in The Lancet? On our metrics it doesn't; publications easier to objectively measure
 - Can Researchers game the system?
- Barrier - Time-lags, distance between MHR & final impact
 - Basic science

Insights from MRI & other interviews

- Attribution, causation, the counterfactual...
- Administrative burden
- Academic freedom - Why can't we just get on with it?
- Serendipitous outcomes – Potentially encourages/discourages

Insights from MRI interviews

- Progress, but tension between academia / commercialisation:
 - Example: Successful technologies, industry trials > lost careers, no academic funding to fall back on
 - Example: NHMRC grants cannot support patent application, legal advice, etc.
- Cultural change required;
- Try to sell patents to companies if can't develop ourselves; *unsuccessful*;

“marketing IP that a company hasn't been involved in generating is a very tough gig...cannot assess the risk”

Guiding principles for impact measurement

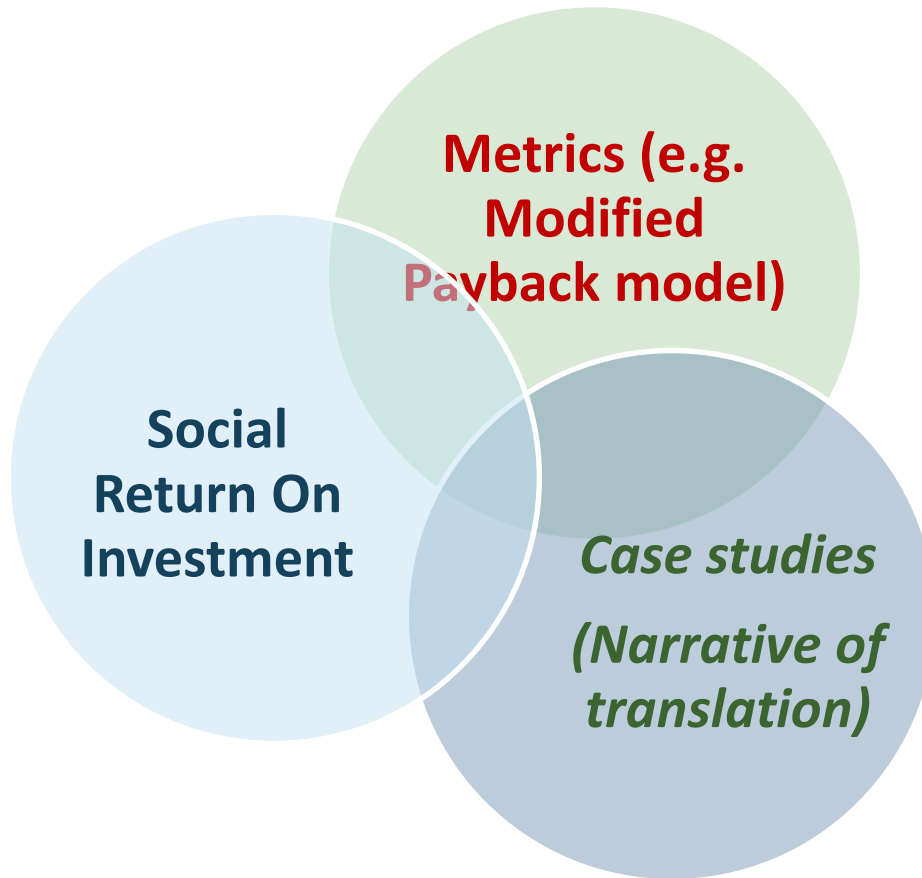
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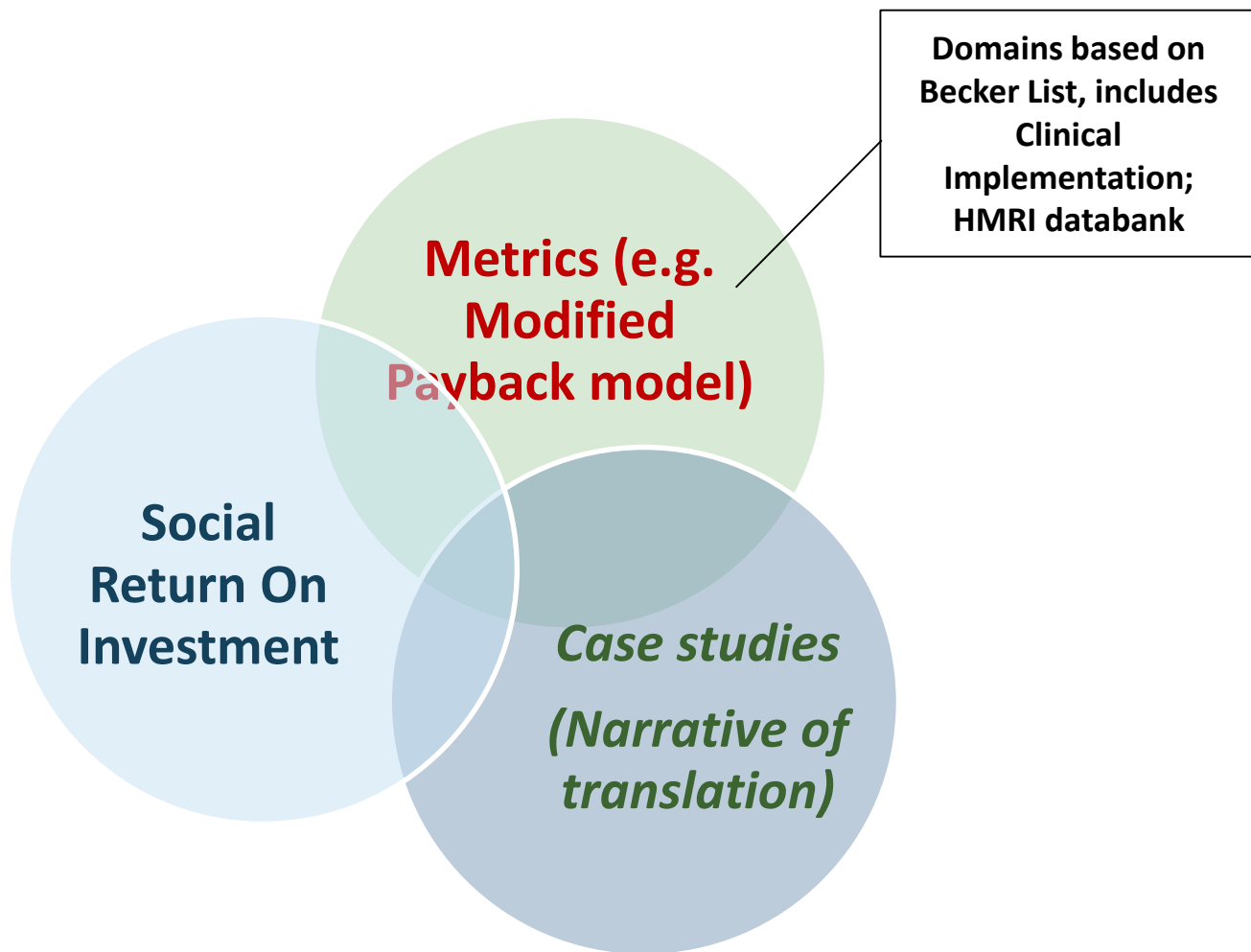
- Guiding principles:
 - Focus on researchers and the research process
 - A line of sight to anticipated benefit / impact
 - Process metrics - interim targets on the pathway to impact
 - A logic model that embeds users and generates outcomes from outputs along the pathway
 - Prospective implementation/orientation
 - Incentives that reflect a range of productive outputs and impacts
 - Increase likelihood of translation & impact across whole system
- Envisage a mechanism to enable researchers to optimise quality & impact

HMRI

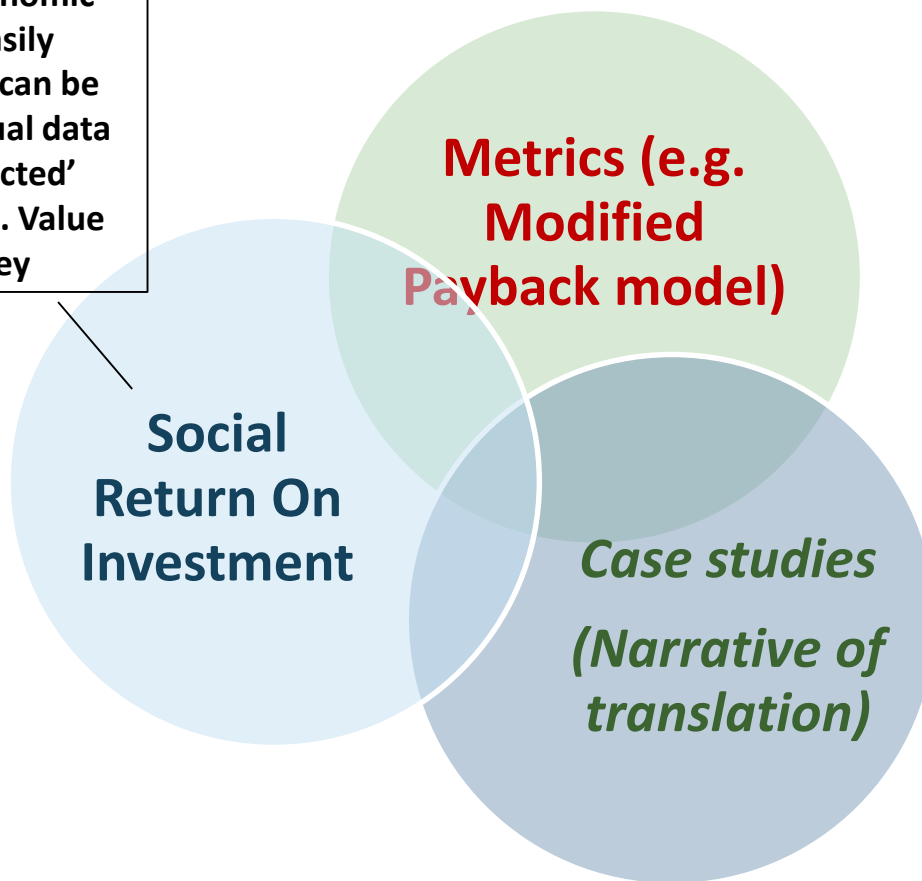
Framework to **A**ssess the **I**mpact from **T**ranslational health research

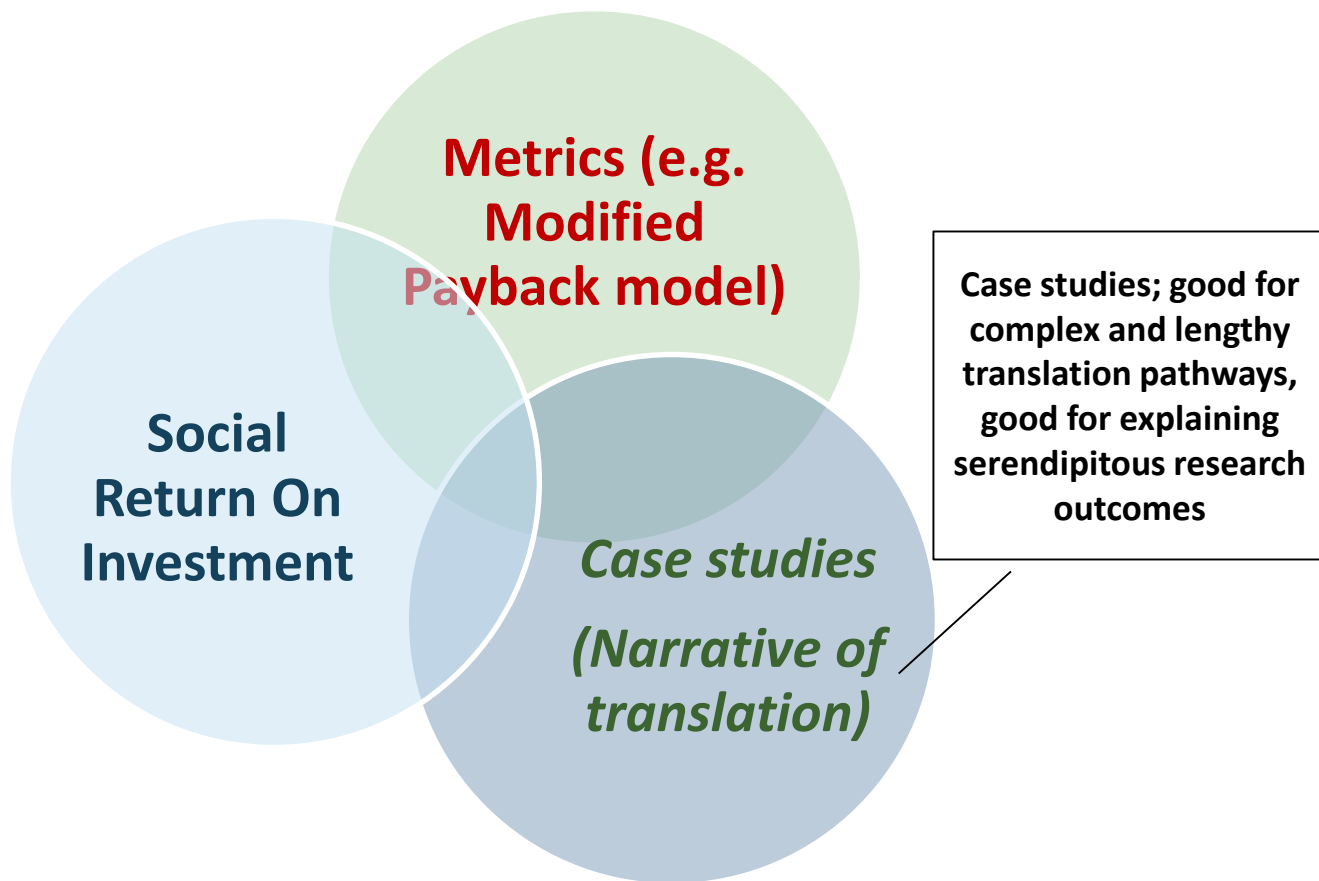
FAIT





SROI, an economic metric, easily understood, can be based on actual data &/or 'projected' future values. Value for money

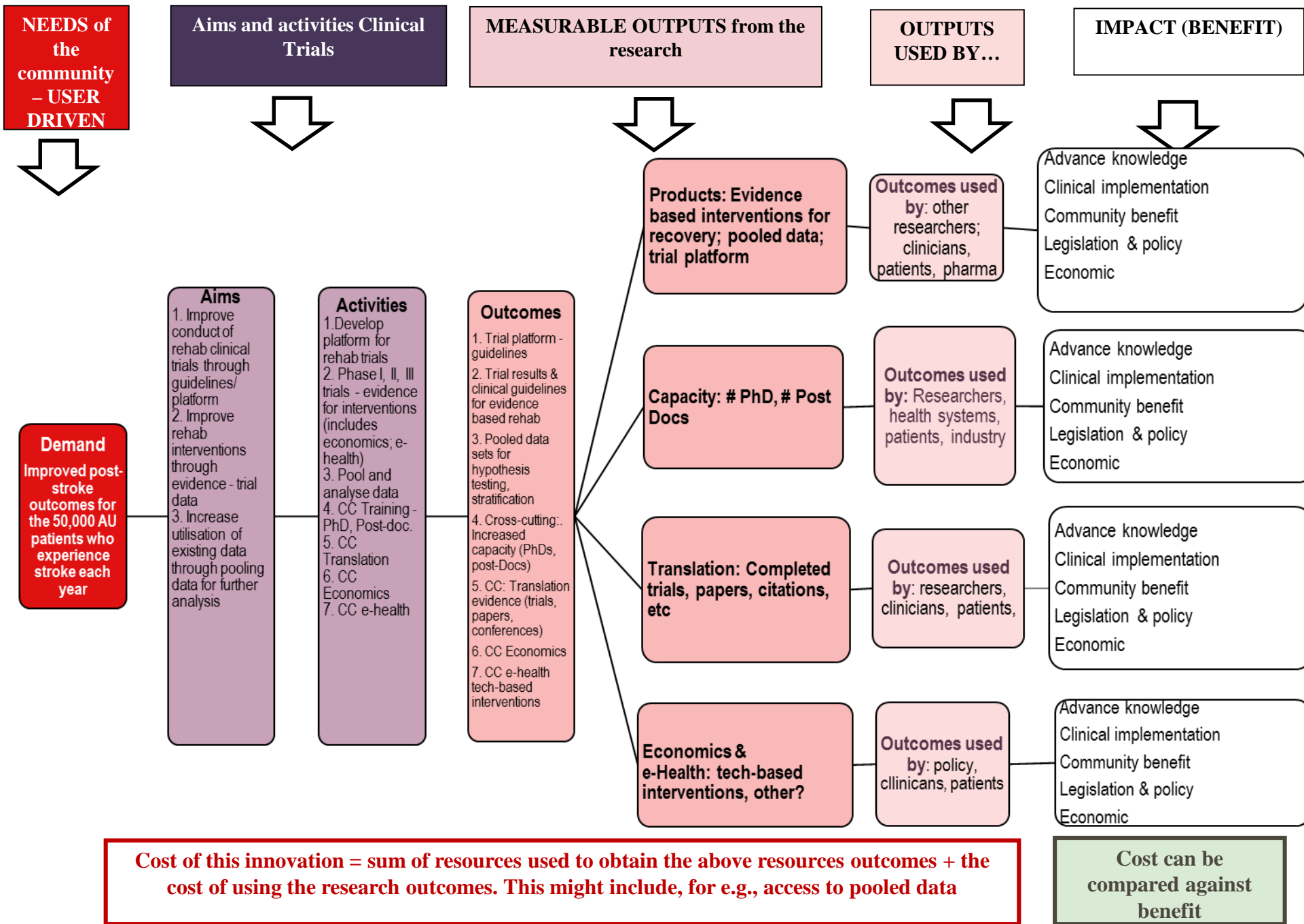




Metrics (e.g. *scientific*)

Logic map supports these methods

(Narrative of translation)



Implementation

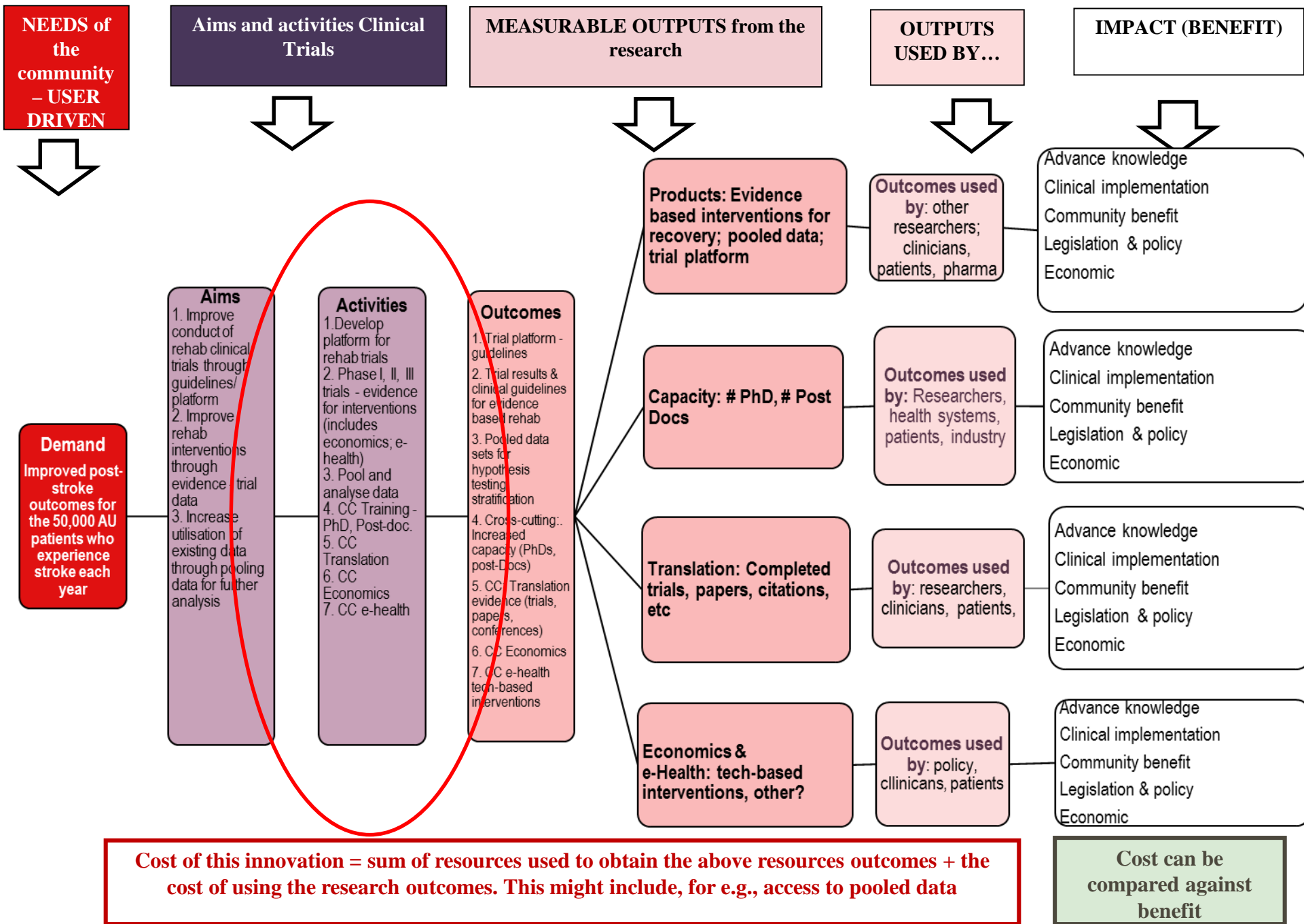
An example from initial work with
CRE Stroke Rehabilitation

How to develop customised
metrics

Aims: Clinical Trials

1. *Develop a platform for rehabilitation trials* (national and global application)
2. *Increase efficiencies with rehabilitation-focused trials*
(common guidelines – i.e. a common platform) Established trials will be brought under the umbrella: AVERT, VERSE, FAST INDICATE, AREISSA. New trials initiated as part of the CRE will be added (e.g. basic science: animal models, cohort study)
3. *Pooled trial data will allow novel hypotheses to be tested.* Pooling allows an increase in sample size, and hence an expanded range of hypotheses.

**How will these aims be actioned,
measured & create impact?**



Activities of Clinical Trials (one of five workstreams)

Activities

1. Develop platform for rehab trials
2. Conduct trials (new & part of CRE + existing trials + future trials)
3. Pooling trial data
4. CC: Training
5. CC: Translation
6. CC: Economics
7. CC: E-health

Process metrics

1. **Develop platform**
2. **Conduct trials**
3. **Identify relevant trials and pool trial results**
4. **Training (recruit PhDs, post docs, workshops, roundtables, grant writing workshops, Trial management course)**
5. **Translation: evidenced by conduct of trials, writing papers, conferences, writing guidelines etc.**
6. **Economics: Economics checklist – what type econ analysis etc.**
7. **E-health: ?**

Expressing the results from FAIT

Hypothetical scorecard example for a research program to reduce unnecessary emergency department visits by residents of aged care facilities. Three years funding (2012-2015), totalling \$575,000

	Metric types	Metric	Metric value As at 1 July 2015
Domains Of Benefit	Advance knowledge	PhD completions	3 (per \$1m funding)
		Datasets deposited into repository	1
		Publications	4 (per \$1m funding)
	Clinical Implementation	New clinical guidelines	1
		Clinical trial outcomes	Protocols to reduce unnecessary emergency department (ED) presentations by residents of aged care facilities, reduces ED presentations in this cohort by 25% in one year
		Age Care decision aid software	Software developed that guides aged care staff on streaming patients for clinical treatment
	Community benefit	Improved quality of life (QoL) for aged care residents. Percentage point difference in QoL compared to usual care where intervention is conducted.	QoL 9 percentage points higher in intervention aged care facilities
Legislation & policy	Citations in policy documents	1 - Aged care guidelines for resident care 1 - Federal government guidelines for aged care facilities	
Economic impact	Cost avoided in health system	Test region: based on opportunity cost, \$230,000 p.a.in cost avoided calculation based on reduction in unnecessary ED presentations	
Social Return On Investment	Cost of research	Costs of research	\$575,000
	Cost of using research outcomes	Based on cost of additional clinical training (discounted, 10 yrs)	\$210,000
	Benefit that can be converted to \$ values	Opportunity cost of costs avoided in EDs (discounted, 10 yrs)	\$1.7 million
	SROI ratio	Dollars of benefit per dollar of cost \$1.7million / (\$575k+\$210k)	2.2 : 1 or \$2.20 of benefit generated for every \$1 of cost
Case Studies	<p><u>The community need:</u> In the absence of alternatives, staff from aged care facilities are acting in a rational and conservative manner by sending unwell residents to Emergency Departments (EDs). As a result, EDs receive many low acuity patients from aged care facilities who clinicians believe would be more appropriately treated in-situ at their aged care facility. The unnecessary use of emergency facilities consumes resource-intensive hospital services and reduces the EDs' capacity to meet service quality (patient care) objectives in a sustainable and efficient manner.</p> <p><u>The research response:</u> Researchers designed an intervention program that combined intensive training of aged care staff with a purpose-designed software program that helped aged care staff guide patients into appropriate care pathways. The research was based upon the staff and residents within twenty aged care facilities with ten recruited to participate in the intervention and ten remaining in usual care.</p> <p><u>Research outcomes:</u> The research process identified that many aged care staff were insufficiently computer literate to implement the system. Training was designed to address this issue. The staff's capability to make decisions that aligned with appropriate care for their residents was improved through the training, the software and the guidelines.</p> <p><u>Research impact:</u> Measures of Quality of Life for the participating aged care residents were nine percentage points higher for those assessed through the new system. Actual costs (accounting measure) in the EDs did not decline because other patient requirements filled the void created. However, it is assumed that this will translate to benefits for the healthcare system in terms of higher service quality measures (patients serviced within appropriate thresholds, etc.) and/or reduced pressure upon rising ED budgets. Economists valued this benefit using opportunity cost.</p>		

Concluding issues

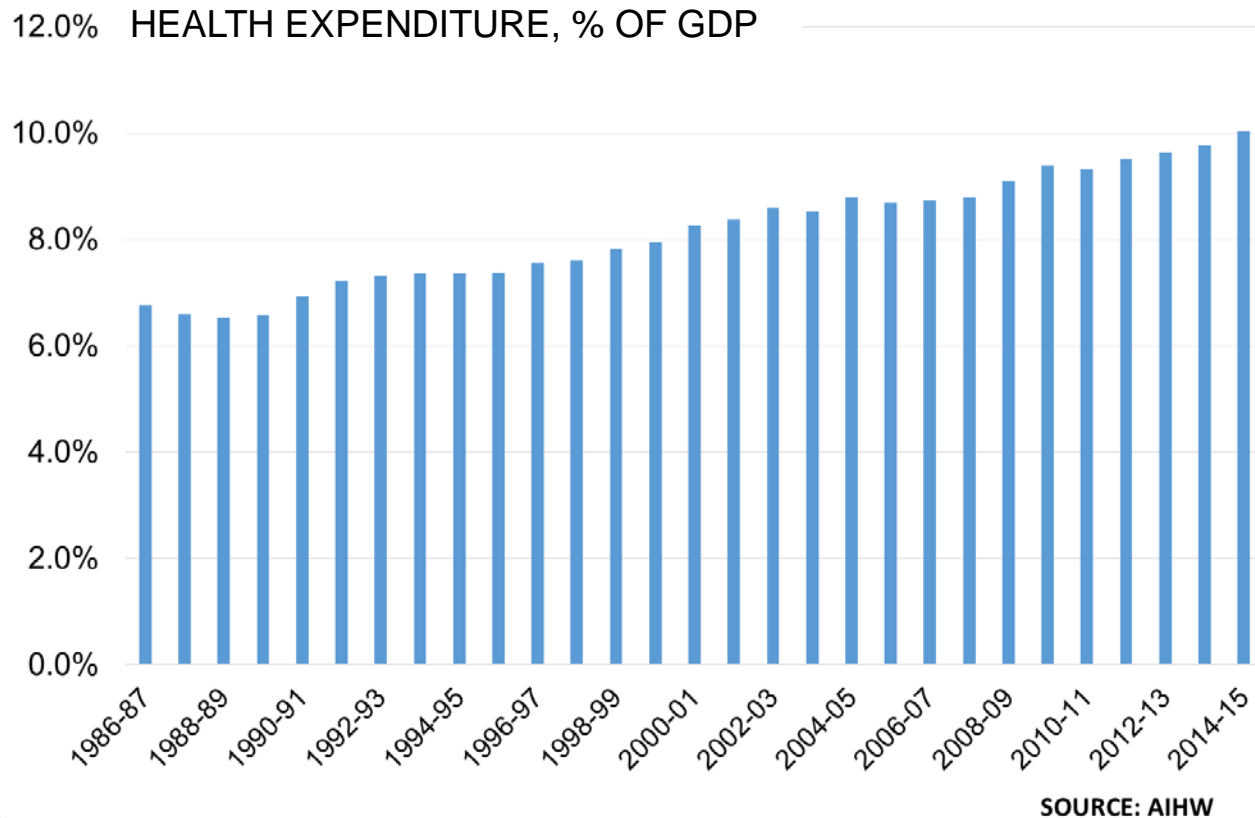
Concluding issues

□ Stage of FAIT's development

- *Conceptual model based on a combination of proven methods*
- *Department of Industry, Innovation and Science*
- *Peer reviewed articles (1 published & 1 under review)*
 - Searles, A., C. Doran, J. Attia, D. Knight, J. Wiggers, S. Deeming, J. Mattes, B. Webb, S. Hannan, R. Ling, K. Edmunds, P. Reeves and M. Nilsson (2016). "An Approach to Measuring and Encouraging Research Translation and Research Impact." Journal of Health Research Policy and Systems **14**(60).
- *Discussed implementation with two NHMRC Centres of Research Excellence*
- *Implementing in HNEH Population Health*
- *Ongoing development and improvement – new metrics that are associated with translation & impact*

Why measure impact?

- ↑ Health exp. slowing, but as % of GDP still ↑



Key definitions

Research translation

... a process of knowledge generation and transfer that enables those utilising the developed knowledge to apply it. This definition acknowledges that, once generated, knowledge flows can be multidirectional and non-sequential.

Research impact

... the demonstrable effect from the flows of knowledge between basic, patient and population-orientated research, and clinical trials, that improves human health and quality of life, and generates benefits for the economy, society, culture, national security, public policy, or the environment. **(i.e. a societal perspective)**

Why measure impact?

Evidence of the problem

1. Expected consequence of funding health research => generate a positive impact
2. We want less disease, better care, and improved quality of life and longevity for Australians.
3. Flow of knowledge through the translational pipeline is not optimal.
4. Effective and cost-effective findings not being fully implemented by healthcare systems and not being appropriately used by others.
5. Finite HMR budget - not being spent efficiently or effectively.

Policy shift in Australia

- **Consequence** of sub-optimal research translation is that health services and patients are not always using or receiving the most effective or cost-effective prevention or treatment
- **Message from governments and major funders (ARC, NHMRC, MRFF, Cancer Institute)** is that the ability to demonstrate research impact (as opposed to academic impact) is becoming exceedingly critical
- More and more, researchers must **facilitate** and **demonstrate** research translation & impact

Key initiatives in Australia

- **Excellence in Research for Australia (ERA)**
- **Advanced Health Research and Translation Centres Program (AHRTC)**
- **Medical Research Futures Fund (MRFF)**
- **ARC's national engagement and impact assessment framework (EI)**
- **Centres for Innovation in Regional Health (CIRH)**



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Mater Newcastle



An Australian Government Initiative

**Impact measurement-
what's been happening?**

Impact Measurement

- **Scoping literature reviews**
 - What do existing frameworks aim to do?
 - What methods for impact assessment?
- **Qualitative**
 - Interviews with stakeholders – mainly in the Hunter
 - State & federal government views
 - Expanded to MRIs around AU
 - Attitudes to impact measurements, barriers and enablers; what is being done; what should be done
 - Broader engagements (NHMRC, ARC, MRFF, Brunel University (Payback), Karolinska Institute etc.)

What is the role of an impact assessment framework?

From the literature:

- Identified objectives grouped into eight (8) categories¹:
 - Top-down Accountability
 - Transparency / Bottom-up Accountability
 - Advocacy
 - Steering
 - Value for money
 - Management: Learning & Feedback
 - Measure /improve the speed of translation
 - Prospective orientation of a research project *****

¹ Deeming, S., A. Searles, P. Reeves and M. Nilsson (2017). "Measuring Research Impact in Australia's Medical Research Institutes: A scoping literature review of the objectives for and an assessment of the capabilities of research impact assessment frameworks." [Health Research Policy and Systems](#)

Guiding principles for impact measurement

- Capture processes, outcomes and impacts generated across the spectrum of health research from discovery to applied science;
- Encourage research translation;
- Enable the implementation of improvement processes when research translation fails;
- Utilise cost-effective data collection techniques;
- Facilitate communication on research impact.

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What critics of impact assessment might say

- Influence funding particularly against 'blue sky' research
- Causality - did the research cause the impact?
- Attribution - to what extent did the research contribute to the impact?
- Timing – some impacts take decades to materialise

Critics of impact assessment might say...

1. Favours applied rather than blue sky research

- Engage with other potential users along the pipeline. Basic science can utilise simulation modelling.

2. It can be difficult to identify causality

- Impact assessment is not reason to abandon rigorous evaluation with appropriate study design (control group, randomisation, blinding).

3. It may be difficult to define the extent of attribution

- Evidence base for attribution / scenario analysis / adjust claimed benefit in cost-benefit analysis

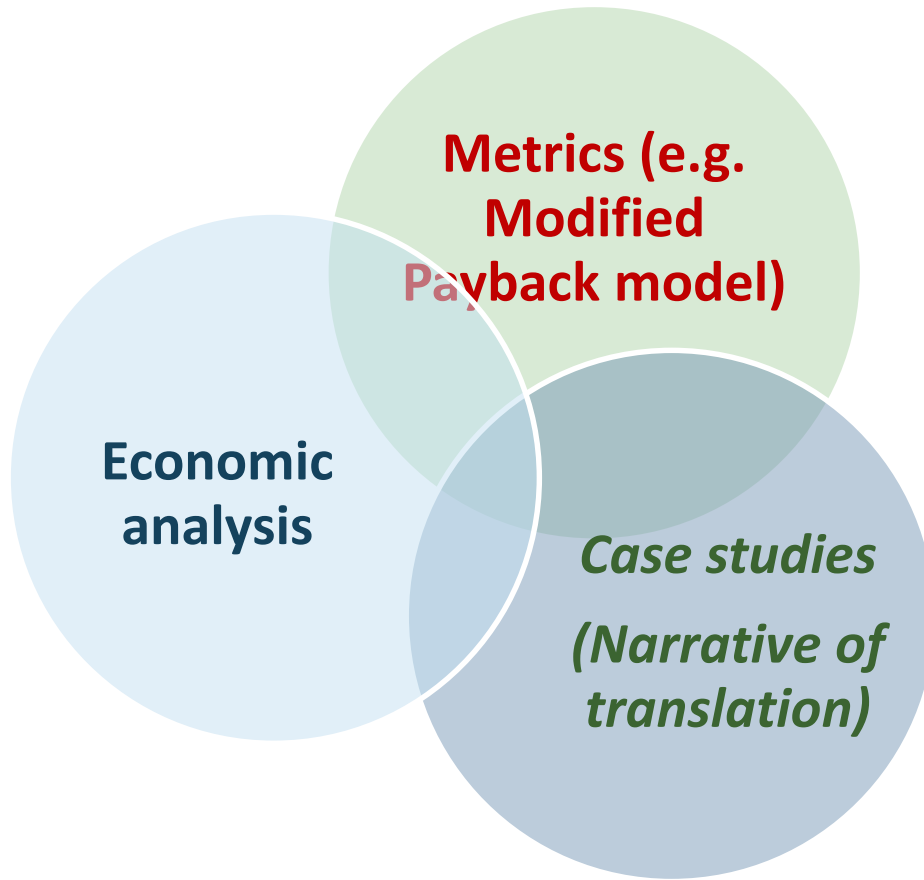
4. Timing; impact may take more than a decade to materialise.

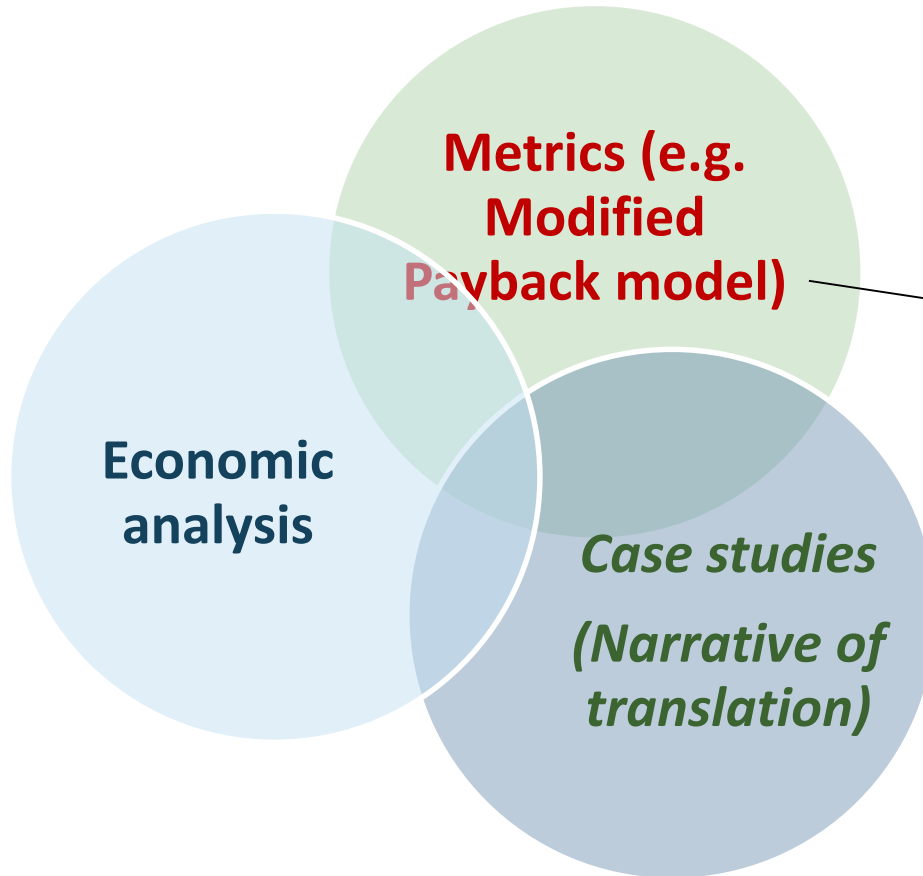
- Interim impacts/ longitudinal study design / follow up / simulation modelling with sensitivity analyses

HMRI

Framework to **A**ssess the **I**mpact from **T**ranslational health research

FAIT





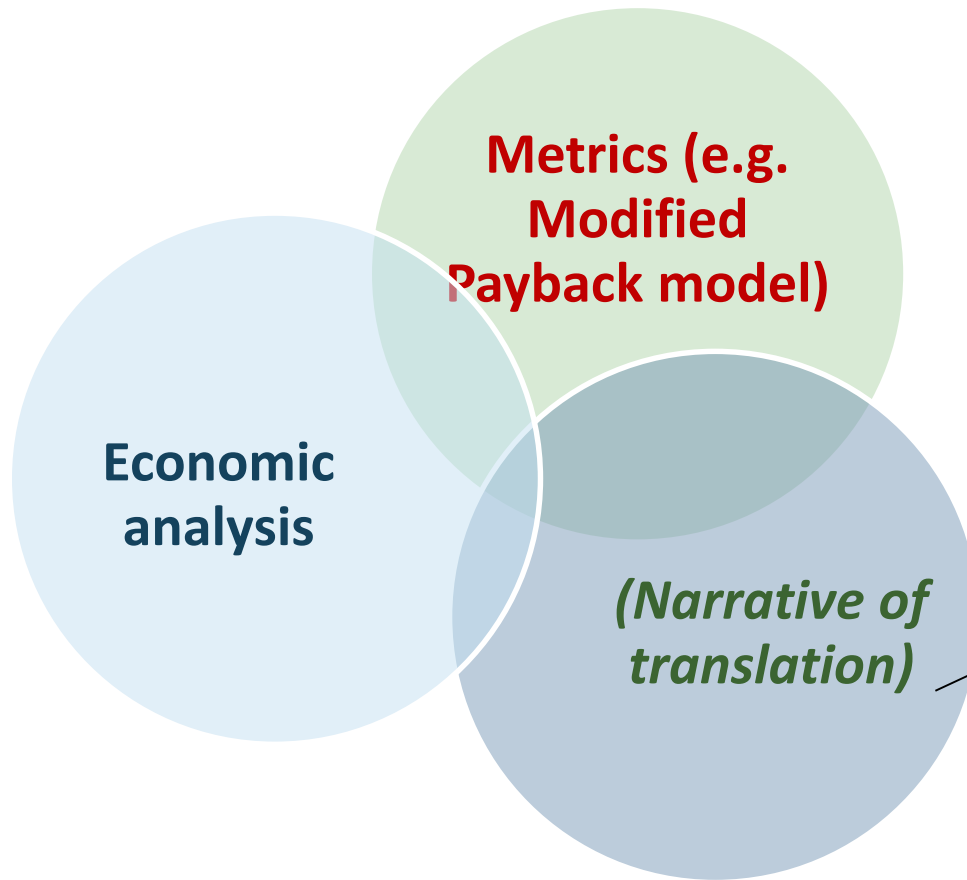
- Domains includes: Knowledge generation, Clinical Implementation, Government Policy,
- Economic Impact
- Community Benefit and any other suitable views of benefit:
- **Module of process and output metrics – represent translational activities and behaviours.**
- **The use of process metrics is set within a performance monitoring and management framework.**

- Favours cost-benefit analysis, an economic metric, easily understood, can be based on actual data &/or 'projected' future values.
- CEA also provides information on value for money.
- Favoured by treasuries & increasingly philanthropy

Economic analysis

Metrics (e.g. Modified Payback model)

Case studies
(Narrative of translation)



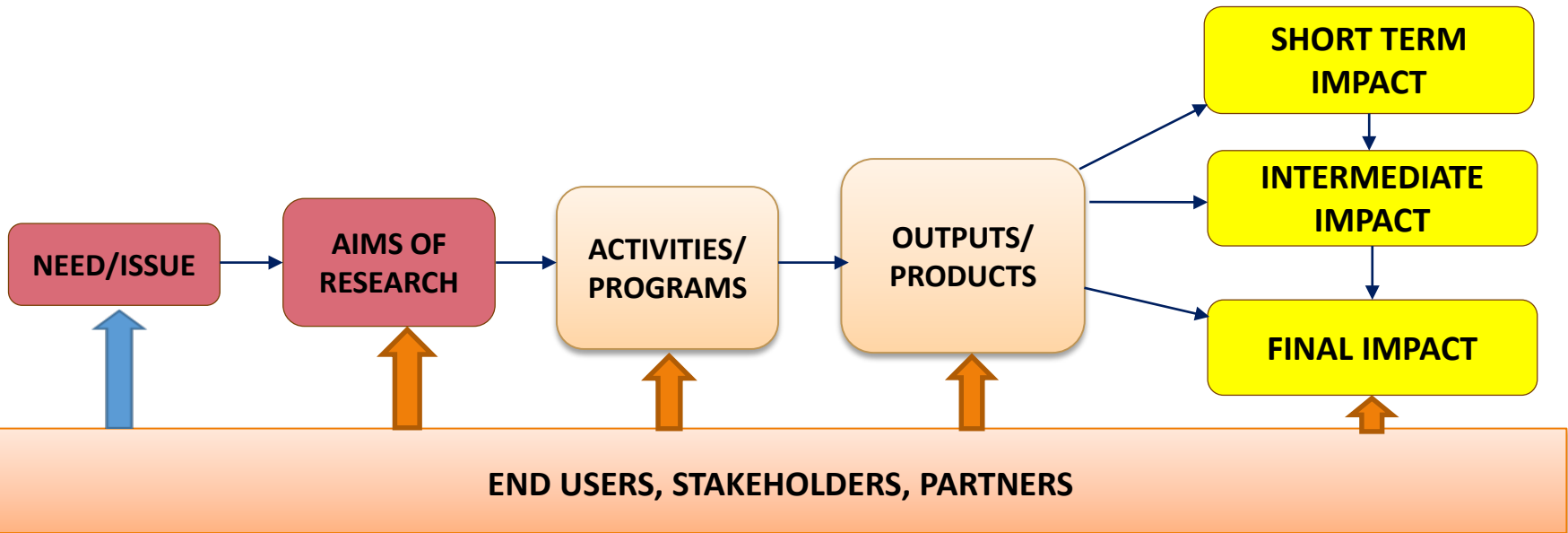
- Good for complex and lengthy translation pathways
- Good for explaining serendipitous research outcomes
- Brings together quantitative results and explains them in context

Metrics (e.g.
Modified

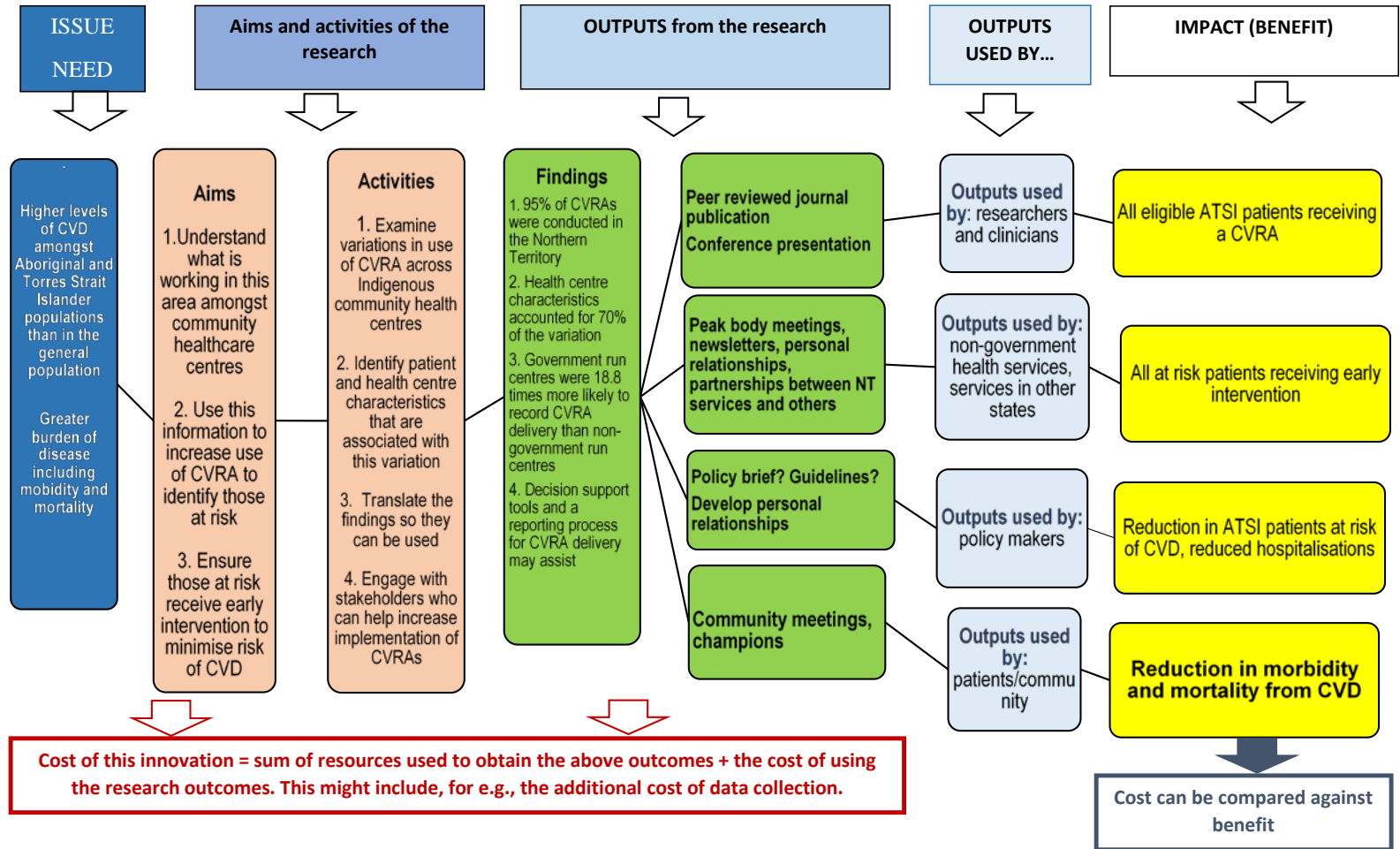
Logic map supports these methods

*(Narrative of
translation)*

MODIFIED PROGRAM LOGIC MODEL



MODIFIED PROGRAM LOGIC MODEL



NARRATIVE – Describes the Research Pathway to Impact

Expressing the results from FAIT

Method	Domain	Example of indicators
Modified Payback	Knowledge translation	Number of attendees at a conference or workshop
		Citation index for journal article
	Clinical implementation	Increased delivery of cardiovascular risk assessments to Indigenous adults
		Increased follow up with those at risk
		Reduced complications
	Community benefit	Reduced cardiovascular morbidity amongst Indigenous adults
		Reduced cardiovascular mortality amongst Indigenous adults
		Wellbeing, measures of stress, etc.
	Policy and legislation	Change in localised or state-based policy regarding regular delivery of CV risk assessments for Indigenous adults
	Economic impact	Reduced hospitalisations of Indigenous adults for cardiovascular problems; reduced re-admissions, shorter LOS, reduced need for at home care, able to return to work / usual duties, increased GP consults, etc.

Method	Metric	Example of indicators
Economic assessment	Cost of research	Research budget
	Cost of doing the CVD risk assessments and follow up	Estimated cost of implementation (increased GP consults, medications)
	Benefit that can be converted into \$ value	Projections of reduced CVD episodes, reduced hospitalisations and associated costs for the patient that can be avoided e.g. time off work
	Cost:Benefit ratio	1:2.50 or for every \$1 invested into the program, it delivered \$2.50 of benefit.

Method	Example
Case studies	Narrative on community need, research response, research outcome, research impact

Thank you

Questions?

Thank you

Questions?

Commercialisation

- Address at beginning of research cycle

“marketing IP that a company hasn’t been involved in generating is a very tough gig...cannot assess the risk”

[Prospective orientation; Embed end-users]

- Focus upon outcomes and utilisation

“commercially oriented system...should be a milestone driven funding system, that says, ‘If you achieve this then you get the next bit of funding.’”

[Outputs to Outcomes]

GUIDING PRINCIPLES FOR IMPACT MEASUREMENT

(if primary objective to optimise
translation & impact)

Guiding principles for impact measurement

- A focus upon researchers and the research process

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- Prospective implementation/orientation

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- **An over-arching objective to enhance productivity by increasing probability of translation & impact across whole system**

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- A focus upon researchers and the research process
- Prospective implementation/orientation
- A line of sight to the main anticipated benefits
- Inclusion of process metrics that provide for interim targets on the pathway to these impacts
- A logic model that embeds users and generates outcomes from outputs along the pathway
- Align incentives for researchers/research programs with optimisation of the productive outcomes from their research
- An over-arching objective to enhance productivity by increasing probability of translation & impact across whole system
- Envisage a mechanism to enable researchers to optimise quality & impact

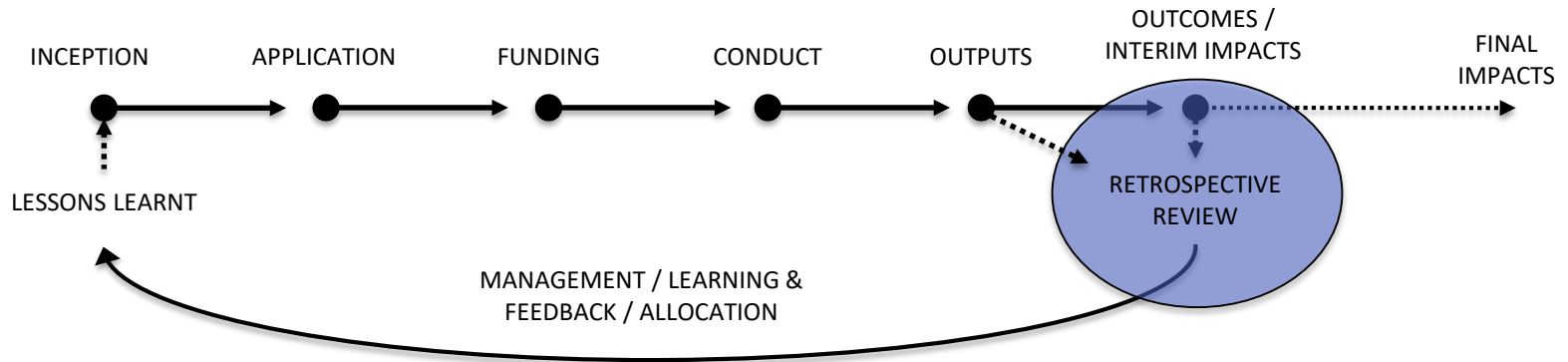
EXAMPLE: HMRI FAIT

Framework to Assess the Impact from
Translational health research

EXAMPLE: HMRI FAIT

FIG 1: Researcher focus; Prospective orientation

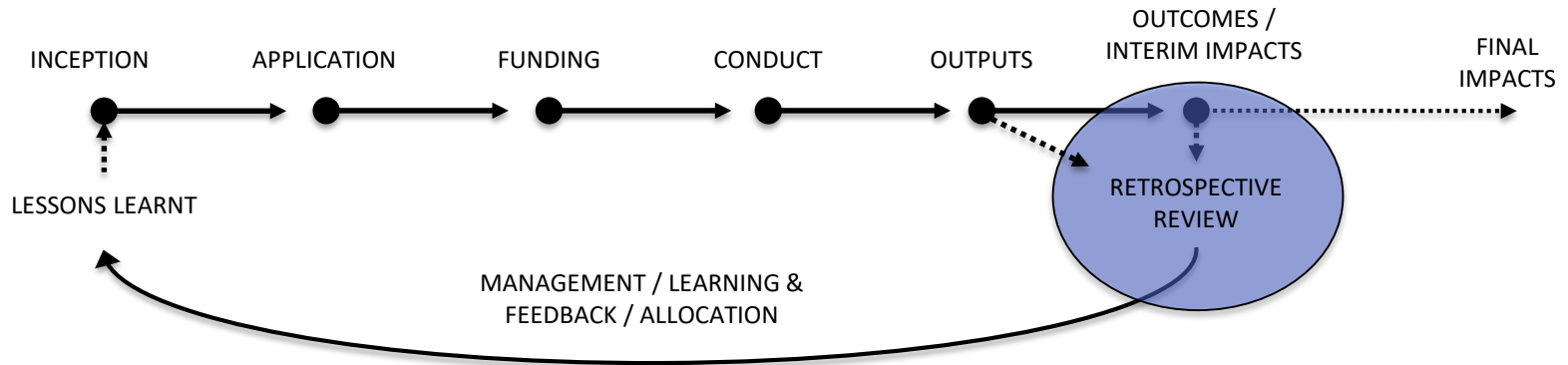
RESEARCH PROCESS – RETROSPECTIVE REVIEW



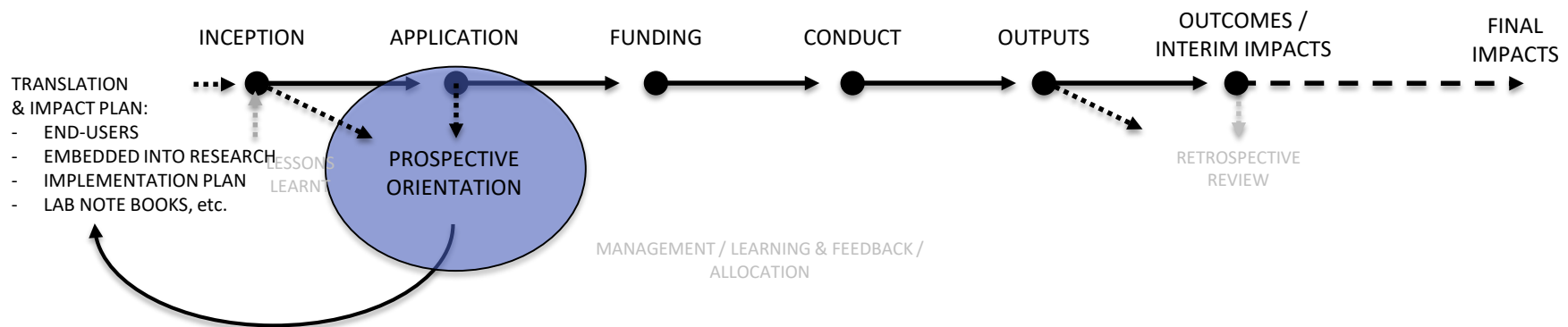
EXAMPLE: HMRI FAIT

FIG 1: Researcher focus; Prospective orientation

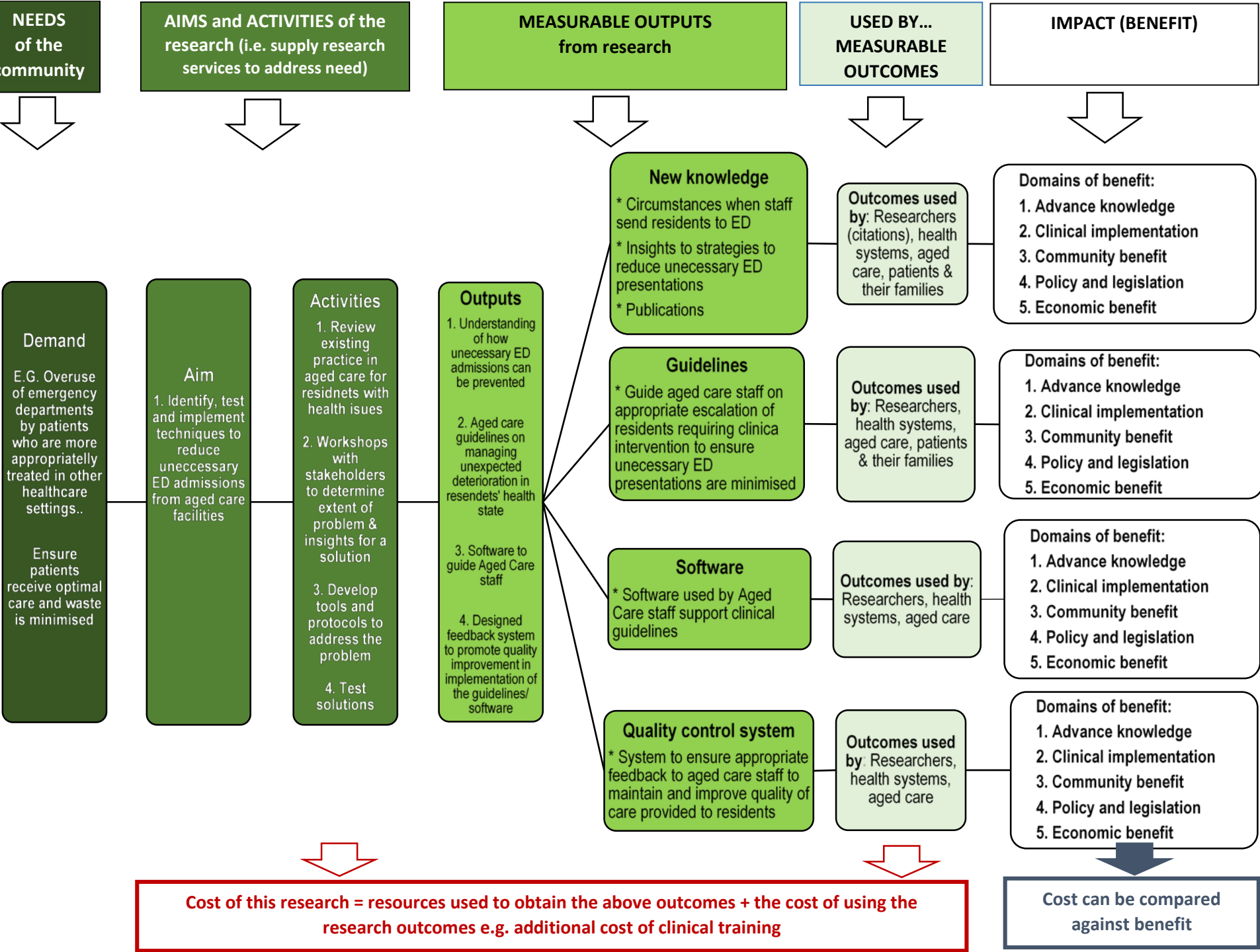
RESEARCH PROCESS – RETROSPECTIVE REVIEW



RESEARCH PROCESS – PROSPECTIVE ORIENTATION (Improved speed of translation)

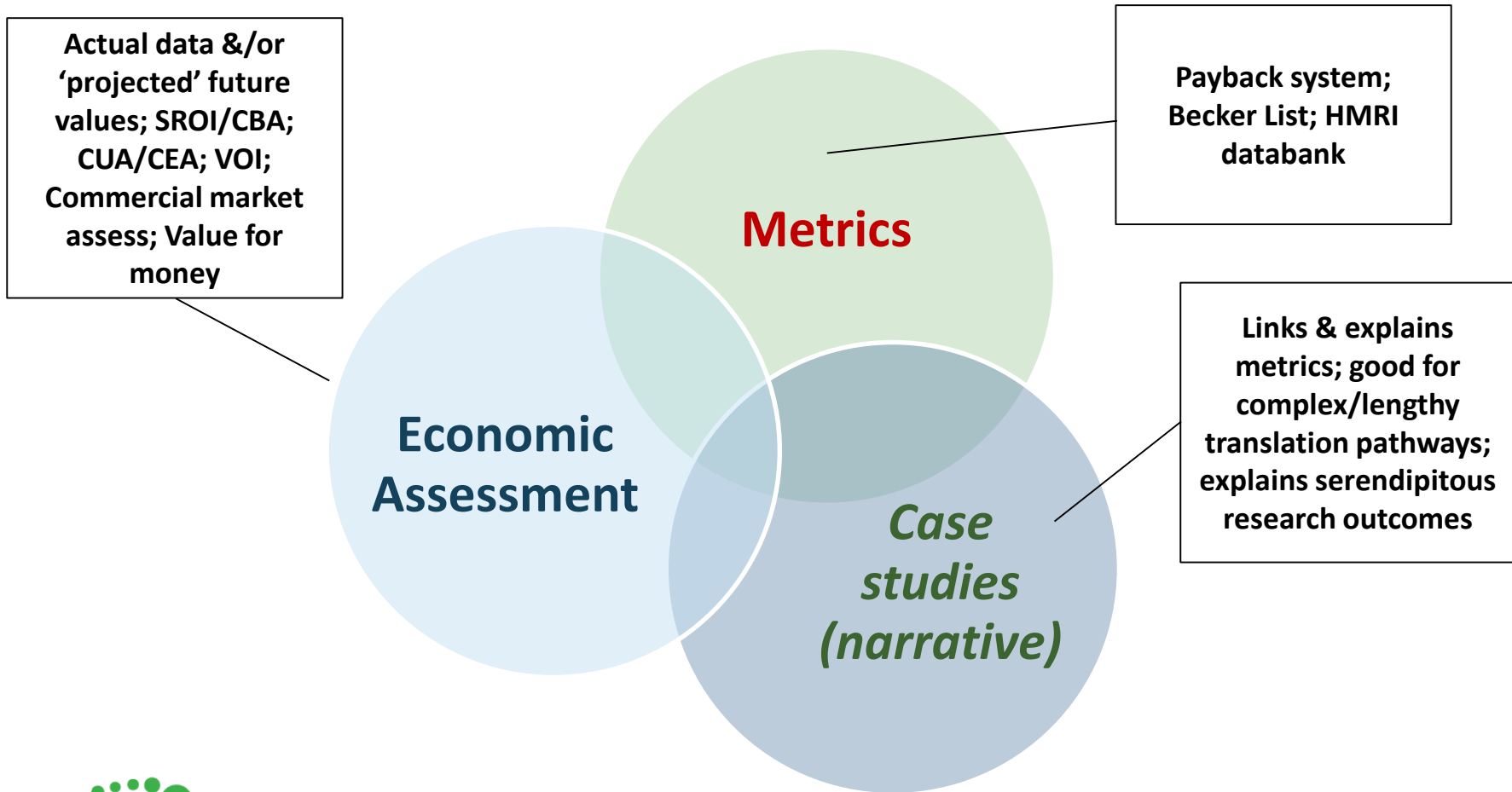


Source: Deeming et al 2016 (pending),
Adaptation from Trochim et al 2011



RIF METHODS

FIG 3: Metrics-based; complem. by narrative/economics





In partnership with our community



PROJECT:
Reducing unnecessary Emergency Department visits by residents of aged care facilities



DOMAINS OF BENEFIT

Metric categories	Metric Types	Metric Value (as a 1 July 2015)
Advance Knowledge	PhD completions Datasets in repository Publications	3 (per \$1m funding) 1 4 (per \$1m funding)
Clinical Implementation	New clinical guidelines Clinical trial outcomes Aged care decision aid software	1 Protocols to reduce unnecessary Emergency Department (ED) presentations by residents of aged care facilities, reduces ED cohort presentations by 25% in 12 months Software developed that guides aged care staff on streaming patients for clinical treatment
Community Benefit	Improved quality of life (QoL) for aged care residents Percentage point difference in QoL compared to usual care where intervention is conducted	QoL 9 percentage points higher in intervention aged care facilities
Legislation & Policy	Citations in policy documents	1 – Aged care guidelines for resident care 1 – Referenced by Federal government guidelines for aged care facilities
Economic Impact	Costs avoided in health system	Test region: based on opportunity cost, \$230,000 p.a. in cost avoided calculation based on reduction in unnecessary ED presentations

ECONOMIC ASSESSMENT – SOCIAL RETURN ON INVESTMENT

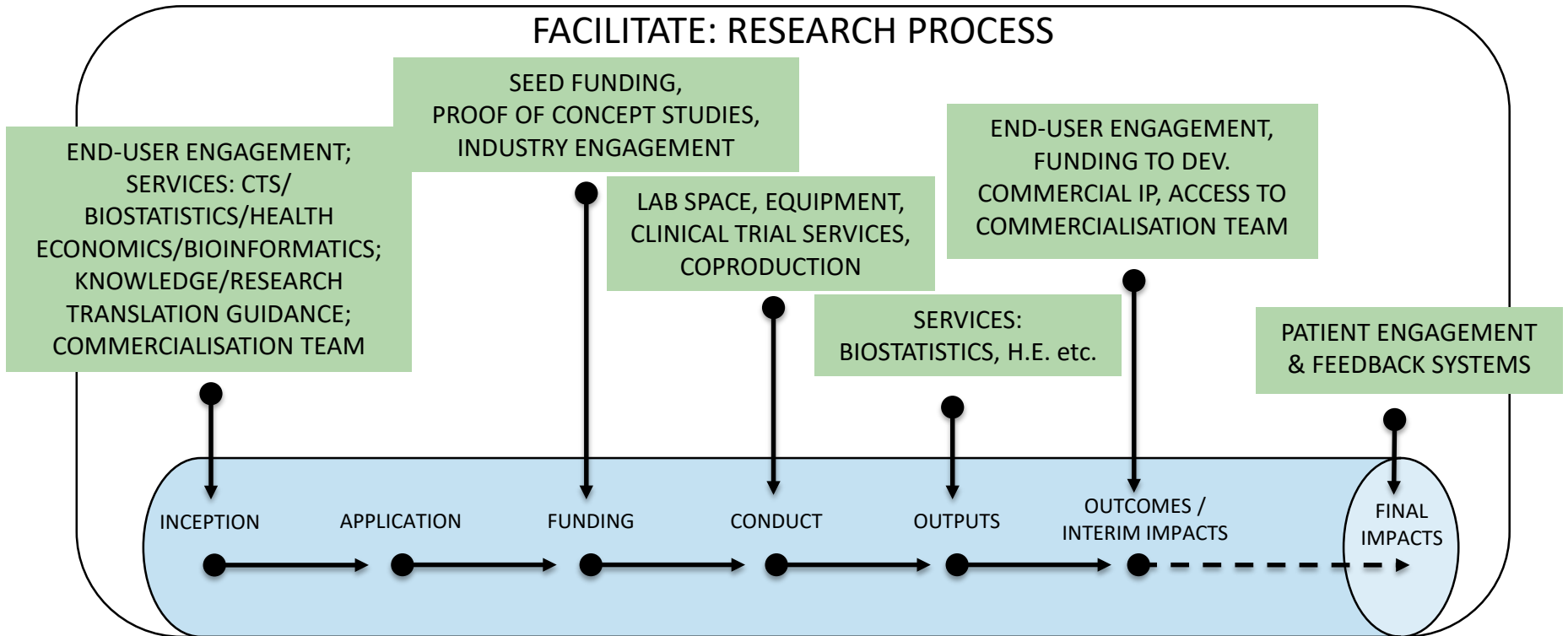
Metric categories	Metric Types	Metric Values
Cost of research	2015 \$	\$575,000
Cost of using research outputs	Based on costs of additional clinical training (10yrs, discnt.)	\$1.7 million
Benefit – Monetary values	Opportunity cost of costs avoided in EDs (10yrs, discnt.)	2.2:1 or \$2.20 of benefit generated for every \$1 of cost

CASE STUDIES

<p>Community need: In the absence of alternatives, staff from the aged care facilities are acting in a rational and conservative manner by sending unwell residents to Emergency Departments (ED). As a result, EDs receive many low acuity patients from aged care facilities who clinicians believe would be more appropriately treated in-situ at their aged care facility. The unnecessary use of emergency facilities consumes resource-intensive hospital services and reduces the ED's capacity to meet service quality (patient care) objectives in a sustainable and efficient manner.</p>
<p>Research response: Researchers designed an intervention program that combined intensive training of aged care staff with a purpose-designed software program that helped aged care staff guide patients into appropriate care pathways. The research was based upon the staff and residents within 20 aged care facilities with ten recruited to participate in the intervention and ten remaining in usual care.</p>
<p>Research outputs: The research process identified that many aged care staff were insufficiently computer literate to implement the system. Training was designed to address this issue. The staff's capability to make decisions that aligned with appropriate care for their residents was improved through the training, software and guidelines.</p>
<p>Research impact: Measures of Quality of Life for the participating aged care residents were nine percentage points higher for those assessed through the new system. Actual costs (accounting measure) in the EDs did not decline because other patients' requirements filled the void created. However, it is assumed that this will translate to benefits for the healthcare system in terms of higher service quality measures (patients serviced within appropriate thresholds) and/or reduced pressure upon rising ED budgets. Economist valued this benefit using opportunity cost.</p>

RIF – MRI FACILITATION METRICS

FIG 5: Measures – Facilitation of translation & impact



FACILITATE: ENGAGEMENT & COLLABORATION

e.g. Industry/Govt./Health service engagement strategies; Coproduction facilitation; Clinician PhDs

FACILITATE: TRANSLATION & IMPACT CAPACITY

e.g. Health system data access; electronic IP lab notebooks, medical genomics platforms; health prof. research training