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Mind the Knowledge Gap: The Science of Integrating Evidence into Practice

Katherine Kulyk DHA, MHS, BHSc

Why Should We Care About Knowledge Translation?

- **The Evidence-Practice Gap Exists Across Cardiovascular Medicine**

Condition	Strong Evidence Exists	Yet...
Heart Failure	Quadruple GDMT improves survival	Many eligible patients never receive all four therapies
Atrial Fibrillation	Anticoagulation prevents stroke	Under-treatment and inappropriate variation persist
Severe Aortic Stenosis	Early referral improves outcomes	Delayed diagnosis and referral remain common
Cardiac Rehabilitation	Improves mortality and quality of life	Referral and participation remain low

- The problem is increasingly **not discovering evidence... it's implementing it consistently**

Clinical Research vs Quality Improvement vs KT vs Implementation Science

Field	Primary Question
Clinical Research	Does the intervention work?
Quality Improvement	How do we improve care in our local setting?
Knowledge Translation	How do we move evidence into practice?
Implementation Science	Why does implementation succeed or fail, and how can we improve it?

Traditional Trial:

Does SGLT2 inhibitor work?

Implementation Trial:

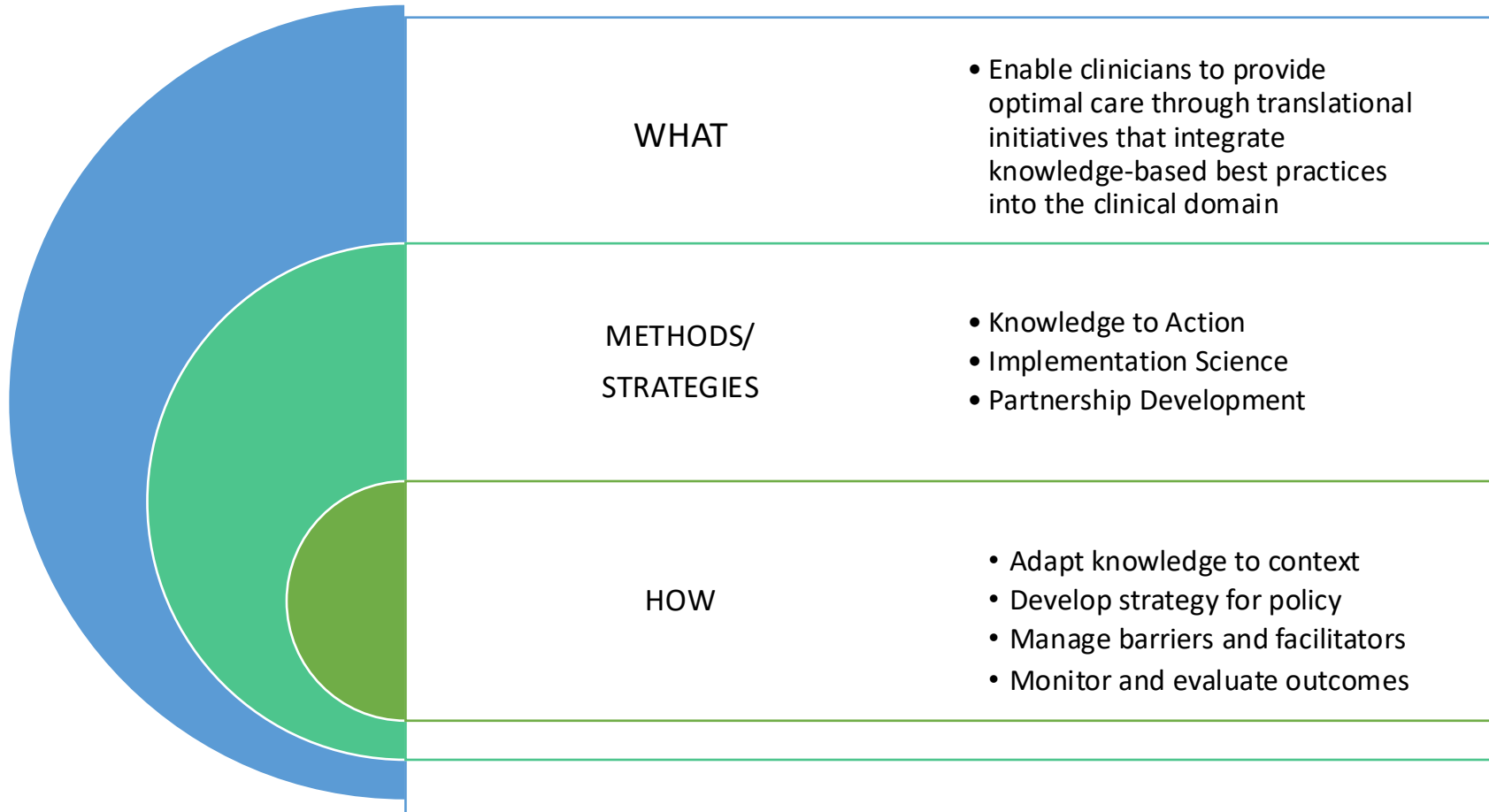
How do we improve SGLT2 uptake?

Hybrid Effectiveness-Implementation Trial:

Evaluates both simultaneously

These fields are not competitors. They complement one another!

Knowledge Translation & Implementation Science



- Publication alone does not equate practice change
- Funders increasingly expect KT plans to strengthen grant applications
- KT improves impact and uptake
- KT uses Imp Sci in full circle
 - Supporting participant retention until trial conclusion AND translating trial findings into sustained practice

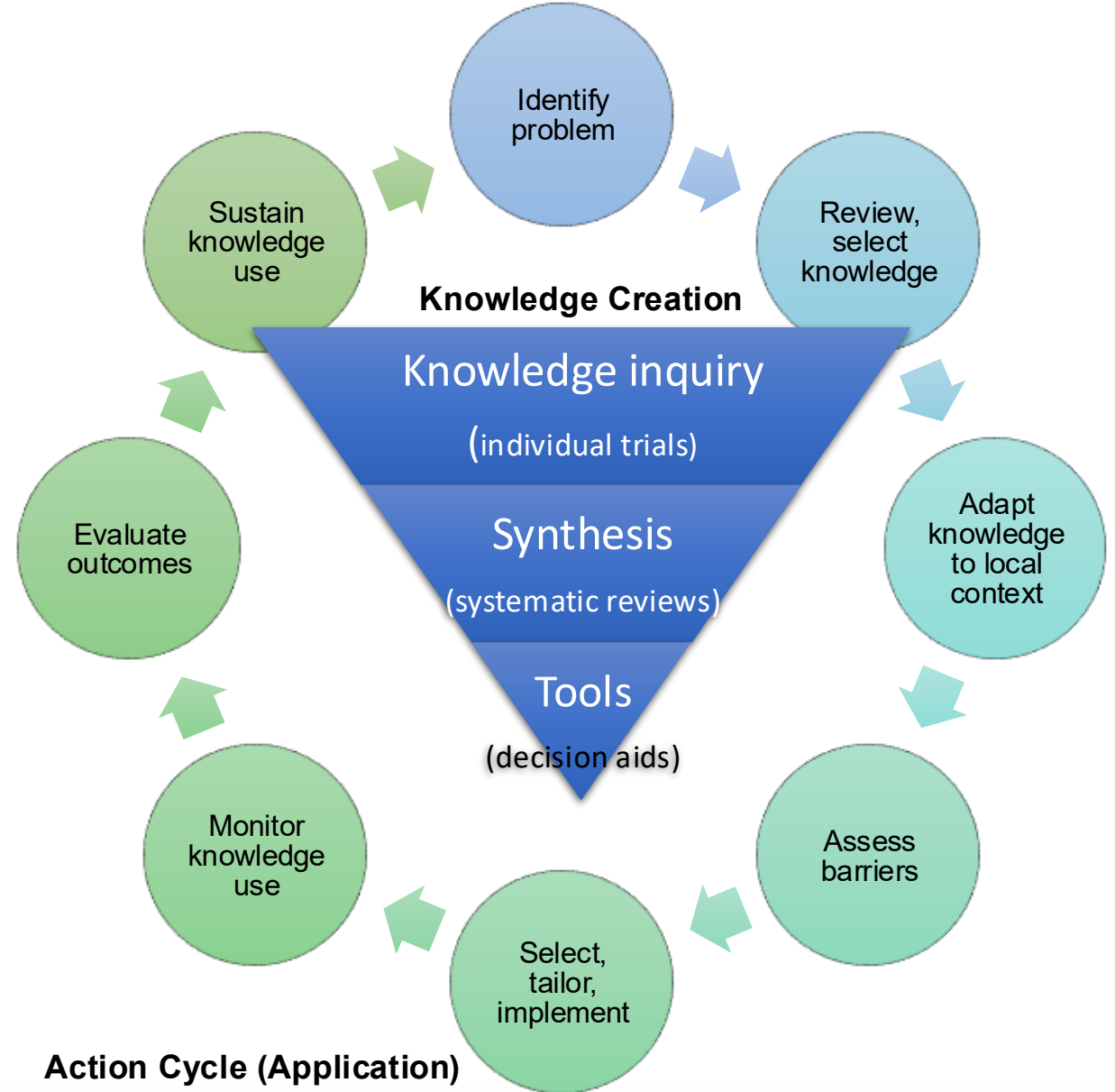
Knowledge Translation



- A dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically-sound application of knowledge to:
 - Improve population health
 - Provide more effective health services/products
 - Strengthen health care system
- This process takes place within a complex system of interactions between researchers and knowledge users
- Varies in intensity, complexity, and level of engagement depending on:
 - The nature of the research/findings
 - The needs of the knowledge-user

Knowledge to Action

- **Knowledge creation** "funnel" suggests knowledge needs to be increasingly distilled
 - Phases of production, synthesis, interpretation
 - Knowledge refined and summarised to create user-friendly products tailored to settings
 - Implementation science
- **Action cycle** contains activities for implementation
 - Flexible, iterative nature
 - Quality tools (e.g., PDSA cycles)
 - Implementation science



Knowledge Translation: Strategies

Audit & Feedback

- Regular, structured feedback to clinicians
- Aggregate, anonymised, division-level reporting
- Highlights practice patterns and variation
- Most effective when timely, specific, and repeated

Targeted Feedback

- Domain-specific performance summaries
- Benchmark against peers or historical baseline
- Identification of high-impact gaps
- Clear, actionable improvement opportunities

Decision Support Tools

- Guideline-aligned checklists for initial consults
- Standardised assessment and documentation prompts
- 'What quality looks like' reference tools
- Reduces variability and cognitive burden

Targeted Education

- Focused education based on identified gaps
- Case-based discussions using real audit examples
- Short, targeted teaching sessions
- Peer-to-peer learning and engagement

System Partnership

- Partner with Quality and Ops leaders to discuss actionable system improvement
- Expanded inter-disciplinary discussion of complex cases

Standardised Care Pathways

- Translate guidelines into local workflows
- Clear pathways for common conditions
- Supports consistency across providers
- Aligns with audit findings and gaps

Behavioural & Process Nudges

- Process and behavioural
- Default options for appropriate testing/referral
- Templates for consult documentation
- Reminders for key evidence-based actions
- Small changes that drive consistent behaviour

Continuous Learning

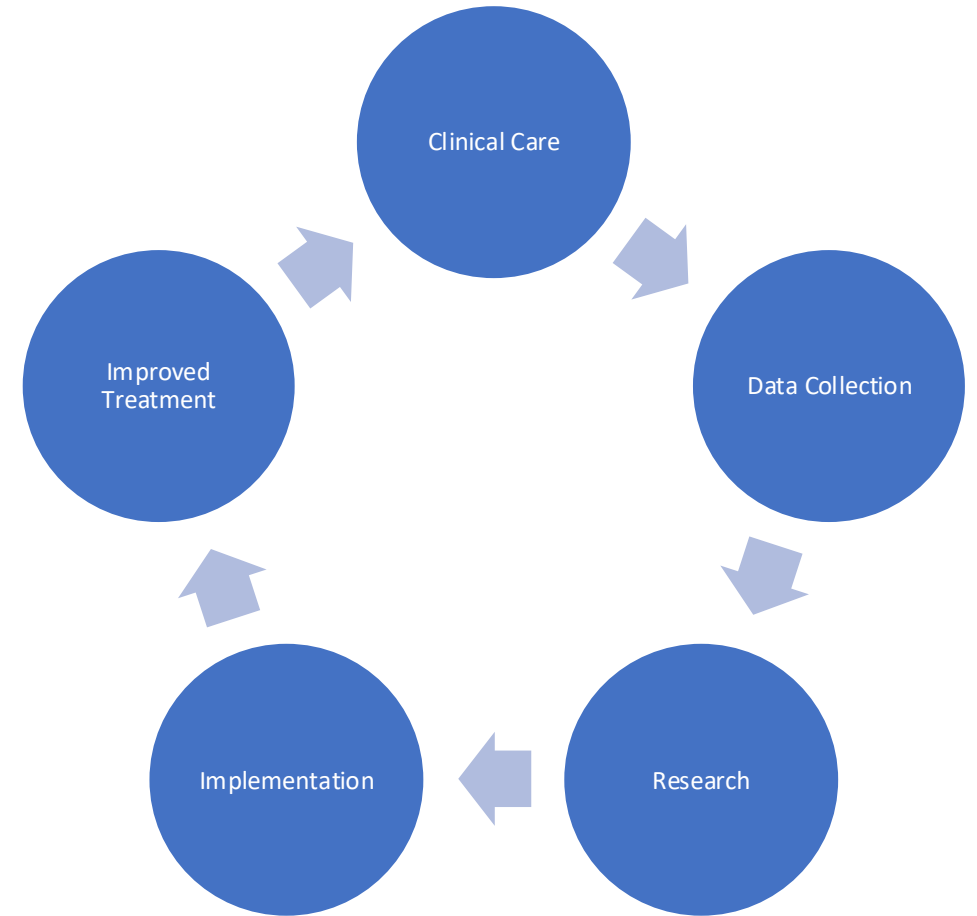
- Learning → Practice Change
- Re-measurement to assess impact
- Iterative refinement of tools and processes
- Embedded within organisation quality framework

The Learning Health System

This is one of the fastest-growing areas in implementation science and highly relevant to cardiology.

Evidence → Implementation → Measurement → Learning →
New Evidence

Healthcare should continuously generate and apply knowledge with a patient-centric/partnered approach, rather than treating research and care delivery as separate activities



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Implementation Science

- Studies the determinants, mechanisms, and outcomes of implementing research into practical use and enhancing research follow-through
 - Strategies and frameworks pull from a shared knowledge base to overcome barriers and capitalise on opportunity
 - Implementing change in clinical practice AND optimising research activities/retention
- Opportunities to address gaps, optimise roles, navigate barriers and enablers, and test strategy
 - Balancing a flexible strategy from kick-off to sustained operationalisation
 - Implementation vs de-implementation challenges the status quo

Implementation Science: Giving and Taking

Using Science

- The “action cycle ” is where implementation activities exist
- Incorporates factors that relate to uptake across multiple levels (e.g., patient, provider, organisation, policy environment)
- Implementation strategies use research to develop actions that support intervention use

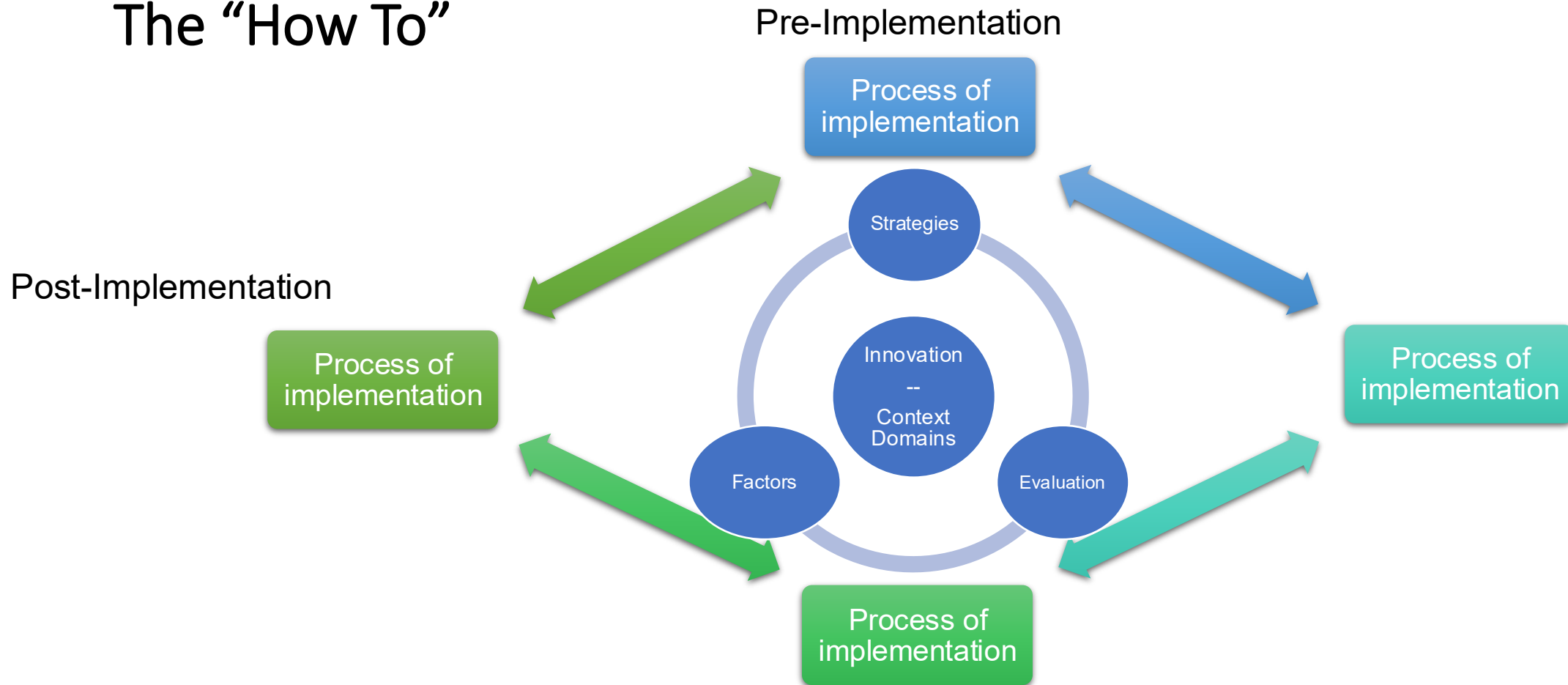
Building Science

- The “knowledge creation funnel” is where clinical trials exist
- Implementation research inquires about the best way to support that intervention to be used
- Testing methodology and theories on local system factors
- Enables strategic mechanism to drive change and categorise lessons learned

Implementation Science: In Use

- Evaluating strategies
 - Utilisation-focused evaluation
 - Implementation intervention trials
 - Testing of theories in practice
 - Designs (RCTs, sequential A-B Testing, etc.) and frameworks (i-PARiHS, CFIR, etc.)
- Proctor's outcomes
 - Acceptability, adoption, appropriateness, feasibility
 - Fidelity, cost, penetration, sustainability

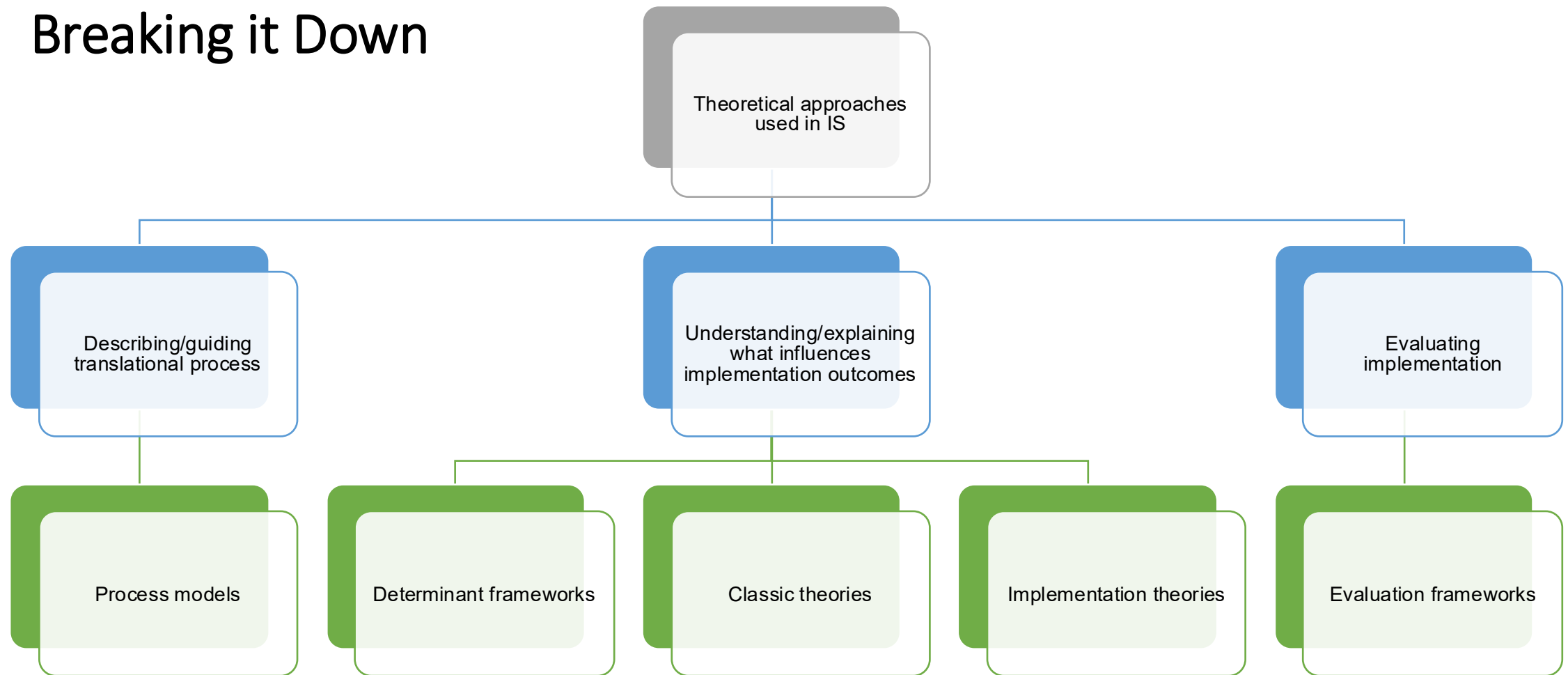
Implementation Science: The “How To”



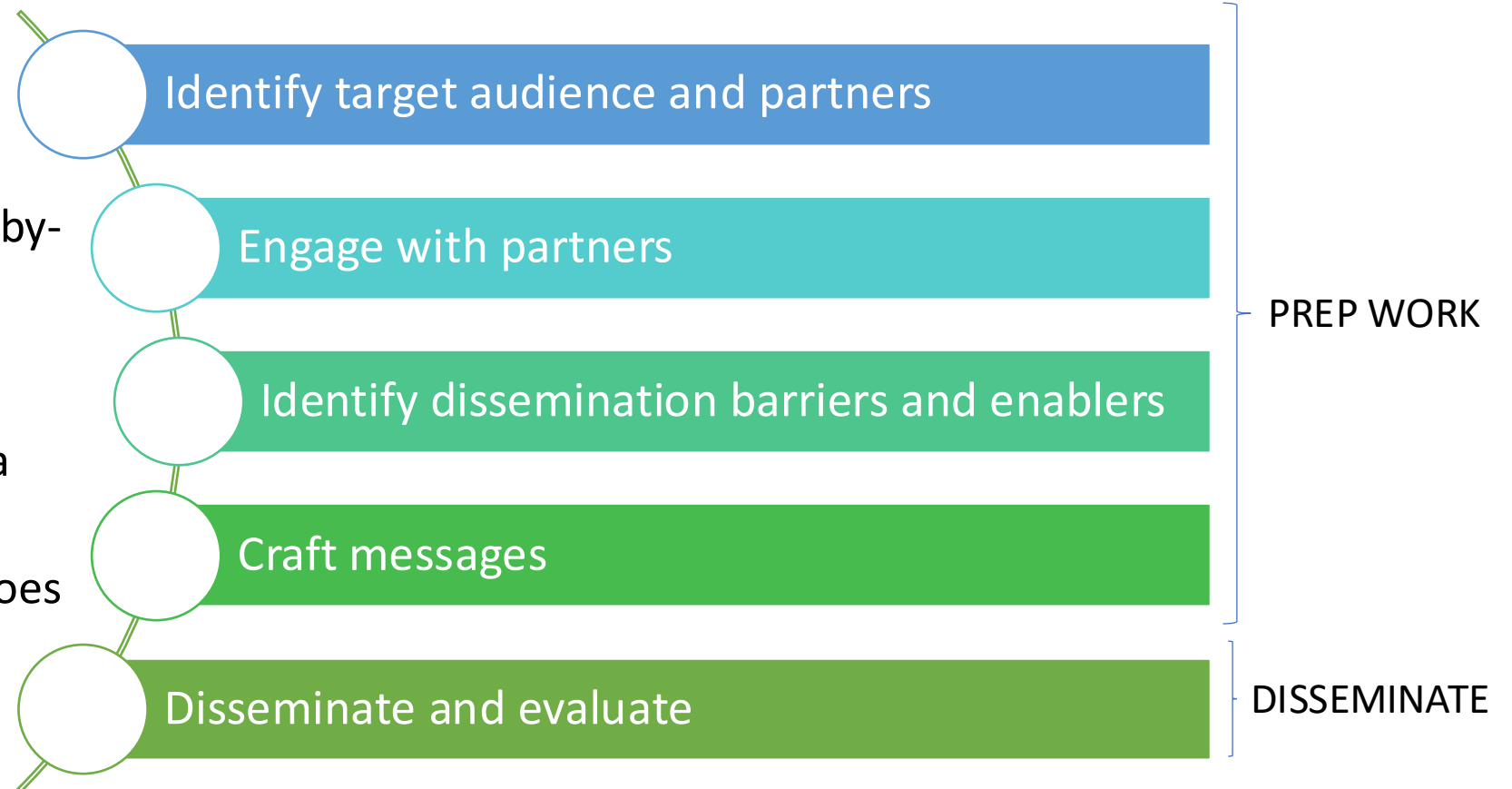
Implementation Science: Strategies

- There are many models, frameworks, and strategies to support implementation
 - Puts theory to context
 - Foundation of factors for review
 - Puts purpose to strategy
 - BUT: not everything works for every initiative... choose what fits best

Implementation Science: Breaking it Down



Guide to Disseminating research (Guidir)



- 48 dissemination frameworks distilled into manageable step-by-step guide
- Key factors: dissemination is about carefully crafting a plan around the audience, not just a message
- Awareness is a first step, but does not equate to practice change

What Works? Evidence Behind the Strategies

Selection of trials of implementation strategies	Total # of randomised trials (synthesised in EPOC Cochrane reviews)	Median improvement in clinical practice
Printed educational materials (Giguère et al., 2020)	32	4% (IQR 1-9%)
Computerised clinical decision support systems (Kwan et al., 2020)	122	5.8% (95% CI 4.0-7.6%)
Manually-generated paper-based reminders (Pantoja et al., 2019)	59	8.5% (IQR 2.5-20.6%)
Computer-generated paper-based reminders (Arditi et al., 2017)	30	6.8% (IQR 3.8-17.5%)
Audit and feedback (Ivers et al., 2025)	292	6.2% (95% CI 4.1-8.2%)
Continuing education meetings and workshops (Forsetlund et al., 2021)	215	4% (IQR 0.3-13%)
Local opinion leaders (Flodgren et al., 2019)	18	10.8% (IQR 3.5-14.6%)
Educational outreach visits (O'Brien et al., 2007)	69	5.6% (IQR 3-9%)



A Smorgasbord of Opportunity

Cochrane Effective Practice and Organisation of Care (EPOC) Taxonomy

Healthcare worker-focused

- Audit and feedback
- Clinical incident reporting
- Monitoring performance of care delivery
- Communities of practice
- Continuous quality improvement
- Educational games
- Education materials/meetings
- Educational outreach
- Clinical practice guidelines
- Inter-professional Education
- Local consensus process
- Local opinion leaders
- Managerial supervision
- Patient-mediated interventions
- Public release of performance data
- Reminders
- Patient-reported outcome measures
- Tailored interventions

Coordination of care

- Care pathways
- Case management
- Communication between providers
- Continuity of care
- Discharge planning
- Disease management
- Integration
- Packages of care
- Patient-initiated appointment systems
- Procurement
- Referral systems
- Shared care
- Shared decision-making
- Teams
- Transition of care

Organisation-focused

- Organisational culture

Who provides health care

- Role expansion or task shifting
- Self-management
- Length of consultation
- Staffing models
- Exit interviews
- Movement of health workers between public or private
- Pre-licensure education
- Recruitment and retention strategies

Information and communication technology

- Health information systems
- Smart home technologies
- Telemedicine

<http://epoc.cochrane.org/epoc-taxonomy>

Make the Right Thing Easy

Example 1: ERIC taxonomy

RESEARCH

Open Access

A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project

Byron J Powell¹, Thomas J Waltz², Matthew J Chinman^{3,4}, Laura J Damschroder⁵, Jeffrey L Smith⁶, Monica M Matthieu^{6,7}, Enola K Proctor⁸ and JoAnn E Kirchner^{6,9}

Use evaluative and iterative strategies (10)	Develop stakeholder interrelationships (17)	Change infrastructure (8)
Provide interactive assistance (4)	Train and educate stakeholders (11)	Utilize financial strategies (9)
Adapt and tailor to context (4)	Support clinicians (5)	Engage consumers (5)

Use evaluative and iterative strategies

- Assess for readiness change and identify barriers and facilitators
- Audit and provide feedback
- Purposefully reexamine the implementation
- Develop and implement tools for quality monitoring
- Develop and organize quality monitoring systems
- Develop a formal implementation blueprint
- Conduct local need assessment
- Stage implementation scale up
- Obtain and use patients/consumers and family feedback
- Conduct cyclical small tests of change

Provide interactive assistance

- Facilitation
- Provide local technical assistance
- Provide clinical supervision
- Centralize technical assistance

Adapt and tailor to context

- Tailor strategies
- Promote adaptability
- Use data experts
- Use data warehousing techniques

Change infrastructure

- Mandate change
- Change record systems
- Change physical structure and equipment
- Create or change credentialing and/or licensure standards
- Change service sites
- Change accreditation or membership requirements
- Start a dissemination organization

Develop stakeholder interrelationships

- Identify and prepare champions
- Organize clinician implementation team meetings
- Recruit, designate, and train for leadership
- Inform local opinion leaders
- Build a coalition
- Obtain formal commitments
- Identify early adopters
- Conduct local consensus discussions
- Capture and share local knowledge
- Use advisory boards and workgroups
- Use an implementation advisor
- Model and simulate change
- Visit other sites
- Involve executive boards
- Develop an implementation glossary
- Develop academic partnerships
- Promote network weaving

Train and educate stakeholders

- Conduct ongoing training
- Provide ongoing consultation
- Develop educational materials
- Make training dynamic
- Distribute educational materials
- Use train-the-trainer strategies
- Conduct educational meetings
- Conduct educational outreach visits
- Create a learning collaborative
- Shadow other experts
- Work with educational institutions

Support clinicians

- Facilitate relay of clinical data to providers
- Remind clinicians
- Develop resource sharing agreements
- Revise professional roles
- Create new clinical teams

Engage consumers

- Involve patients/consumers and family members
- Intervene with patients/consumers to enhance uptake and adherence
- Prepare patients/consumers to be active participants
- Increase demand
- Use mass media

Utilize financial strategies

- Fund and contract for the clinical innovation
- Access new funding
- Place innovation on fee for service lists/formularies
- Alter incentive/allowance structures
- Make billing easier
- Alter patient/consumer fees
- Use other payment schemes
- Develop disincentives
- Use capitated payments

Beyond a Shot in the Dark

Developing a cumulative science to feed a practical knowledge-base:

1. Who needs to do what, what needs to be done differently, where does it need to happen, when should it happen

2. What barriers and enablers should be addressed

3. What strategies should be employed to address the barriers and enablers

4. How is the change measured and how can it be understood

Cardiology Doing Implementation Science (Examples)



Regional STEMI Networks
Door-to-Balloon Programs



Referral Automation
Guideline-informed consults



Rapid Access Chest Pain clinics
TAVI Programs

Three Things to Remember

1. Evidence does not implement itself or sustain itself
2. Understanding barriers and opportunities over time is more important than choosing static interventions
3. Implementation can be studied and used just as rigorously as clinical therapies

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