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Using logic models in systematic reviews

9th International Conference for EBHC Teachers and Developers
8th Conference of the International Society for EBHC
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Conflict of interest/Acknowledgements

- My thinking around logic models was informed by:
  - Work done as part of the EU-funded Integrated health technology assessment for the evaluation of complex technologies (INTEGRATE-HTA) project
  - Discussions as part of the Learning Initiative for Experienced Authors (LIXA) of the Effective Health Care Research Consortium
  - Workshop conducted at the Global Evidence Summit in Cape Town, 2017
  - Own experience in conducting various systematic reviews
- The views presented are my own and do not necessarily represent the above collaborations.
- I have no other conflict of interests related to this presentation

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Outline

- Terminology
- Using logic models in systematic reviews
- Approaches to logic modelling
- Limitations
- Examples
  - Added value of systematic reviews
- Group work: developing logic models

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What is a logic model?

- Terminology differs
  - Broad vs narrow definition
- Inconsistency in the use of the term
- No standardized or comprehensive definition
- Key components of definition
  - Described as a visual representation (graphic)
  - Shows programme components (activities/outputs/outcomes)
  - Some reference to relationships
- Shows logic of chain of events/system

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Wildschut LP. Theory-based evaluation, logic modelling and the experience of SA non-governmental organisations. Stellenbosch: Stellenbosch University; 2014.

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What is a logic model?

"… a graphic description of a system … designed to identify important elements and relationships within that system."

Anderson LM, Petticrew M, Rehfuess EA, Ueffing E, Armstrong E, Baker P, Francis D, Tugwell P (2011). Using logic models to capture complexity in systematic reviews. *Research Synthesis Methods* 2(1):33-42.

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Logic models

- Traditionally used in programme evaluation
- Relationships between inputs, activities, outputs, outcomes and impact
- Clarifies implicit/explicit theory of change
- Helps to explain assumptions to stakeholders
- Provides framework for planning, implementation and evaluation
- Increasingly used in research synthesis

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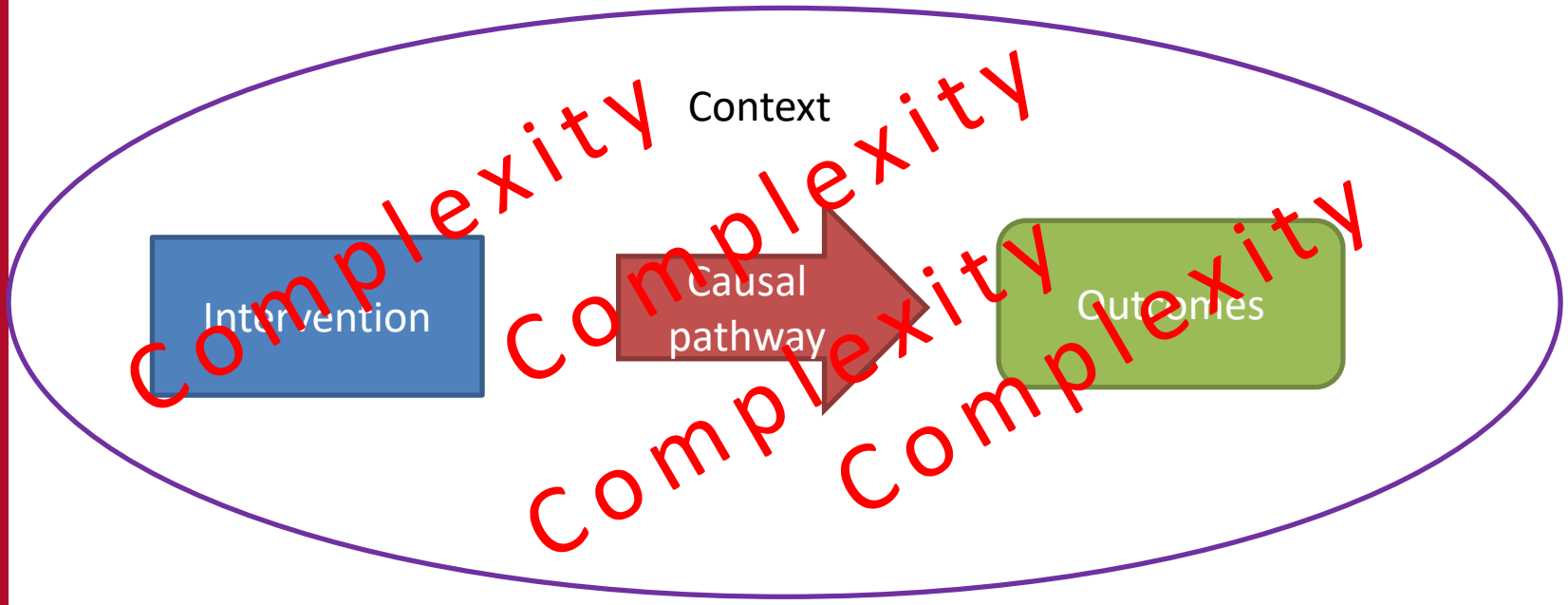
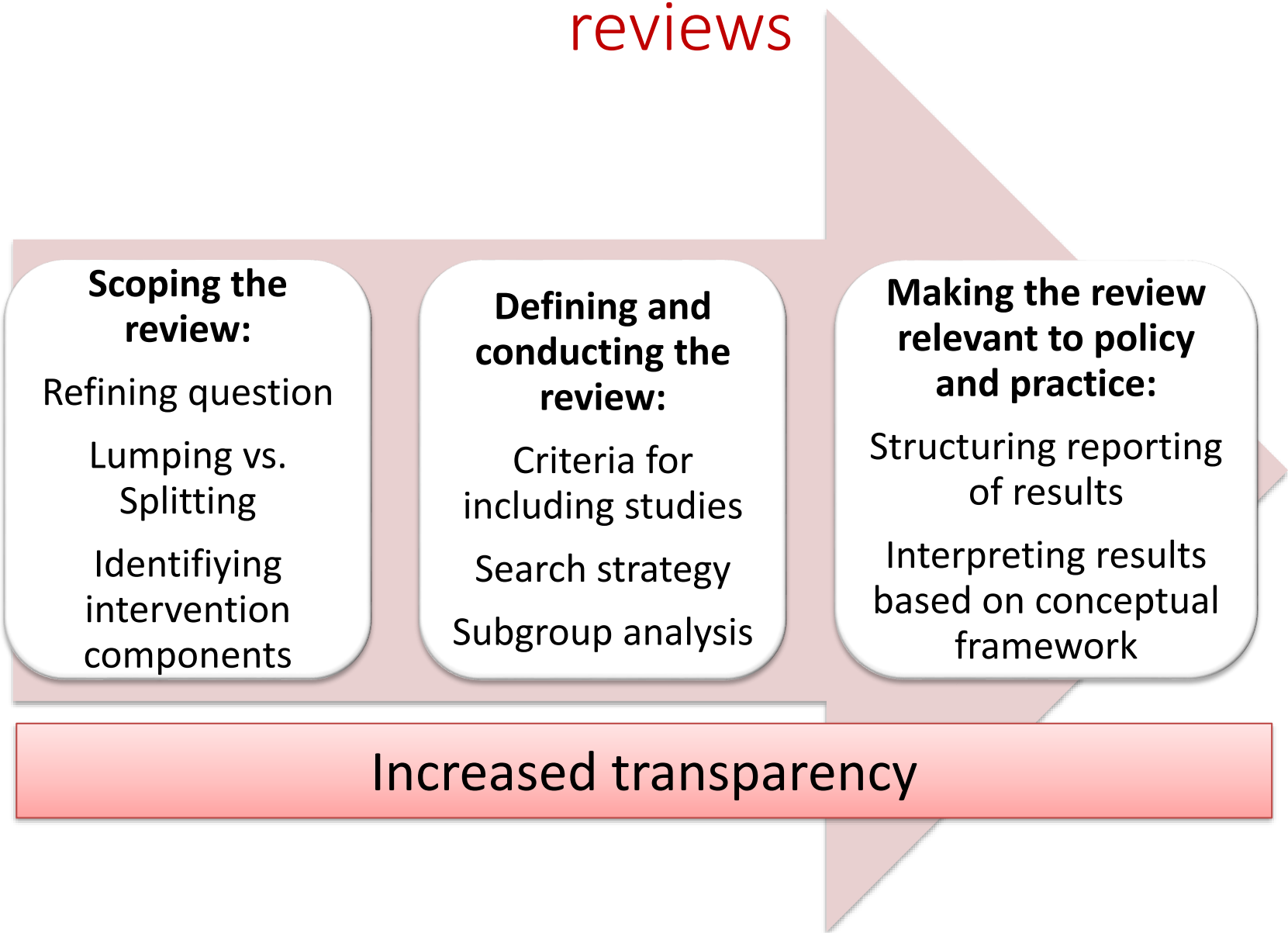
Logic models and complex systematic reviews



- In systematic reviews, logic models are useful tools to:
  - Unpack complexity related to PICO
  - Make explicit assumptions about causal pathways
  - Describe interactions between intervention and system

Added value of logic models in systematic reviews



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Logic models that help to conceptualise the review question

- Depict the system in which the interaction between the participants, the intervention, the outcomes and the context takes place
- Holistic perspective (bird's eye view)
- Broad packages/approaches
- Useful for public health/health systems
- Conceptual framework
- System-based logic model

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Logic models that help to understand the causal pathway

- To depict processes and causal pathways that lead from the intervention to its outcomes
- Focus on how the intervention operates
- Analytical framework
- Process-orientated logic model

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Approaches to logic modelling

- Developed at protocol stage and
  - Fixed throughout review
  - Revised at the end of the review
  - Constantly revised
- Developed once the results of the review are known
- Can depend on
  - Scope of review (broad vs narrow question)
  - Type of evidence (quantitative vs qualitative)
  - Aim of review (theory testing vs theory generating)

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Examples

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Uwimana Nicol *et al. Systematic Reviews* (2018) 7:203
https://doi.org/10.1186/s13643-018-0865-8

Systematic Reviews

PROTOCOL Open Access

Integrated models of care for diabetes and hypertension in low- and middle-income countries (LMICs) : Protocol for a systematic review

Jeannine Uwimana Nicol[1,2*], Anke Rohwer[1], Taryn Young[1], Charlotte M Bavuma[3] and Joerg J Meerphol[4]

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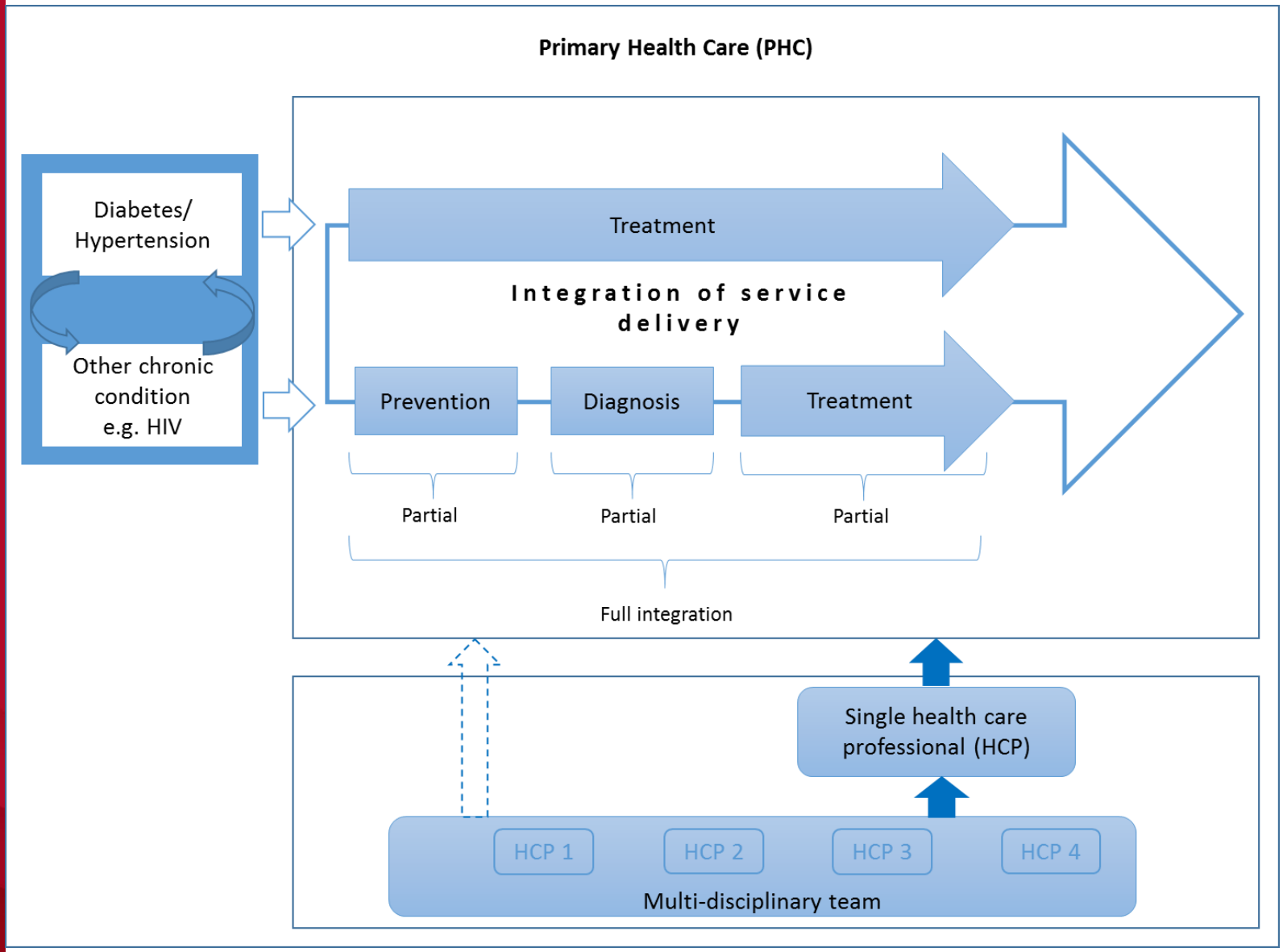

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Added value of logic model

- Conceptualising intervention
- Common understanding of intervention
  - Stakeholder engagement
- Informing subgroups and comparisons
- Review currently underway

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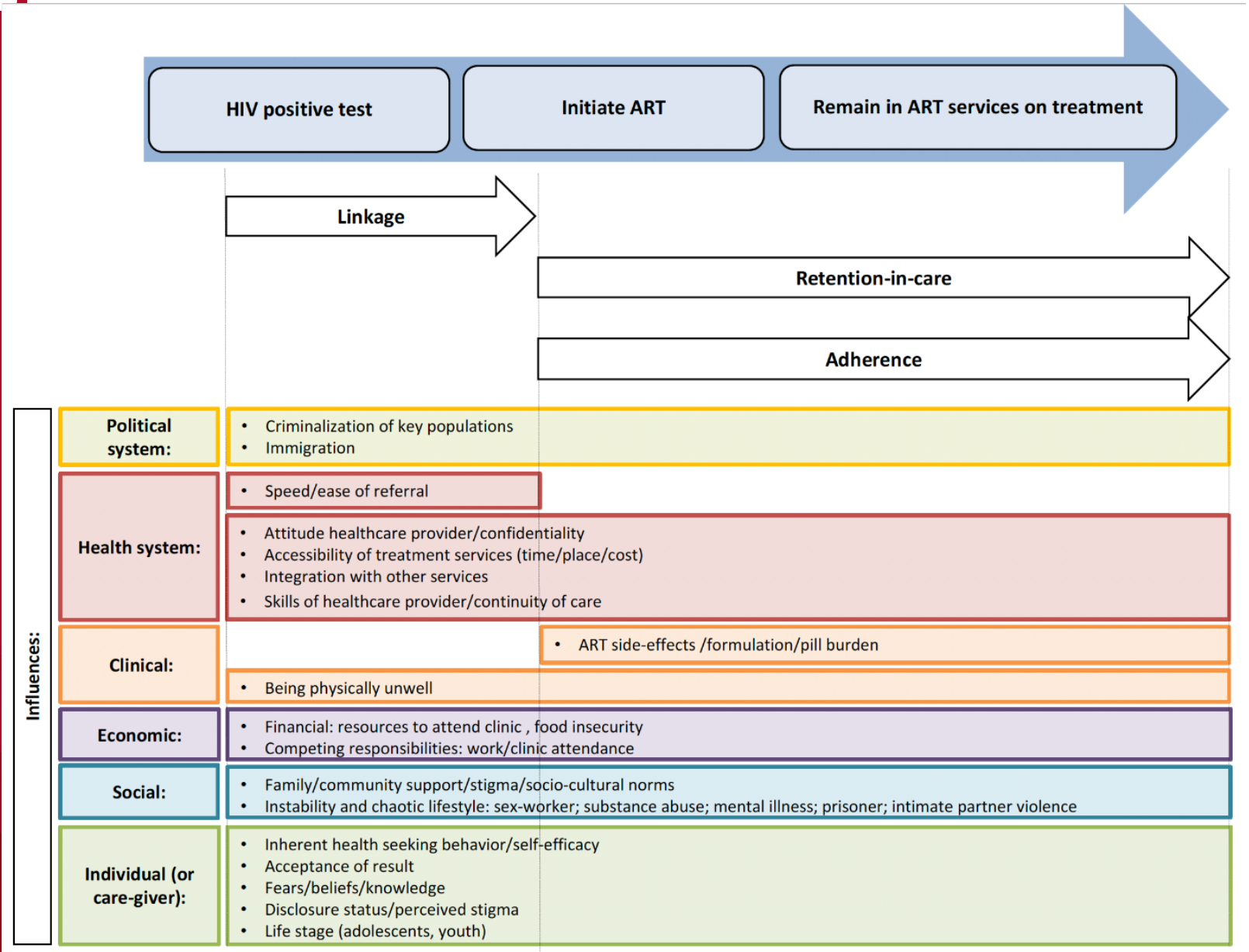
PLOS ONE

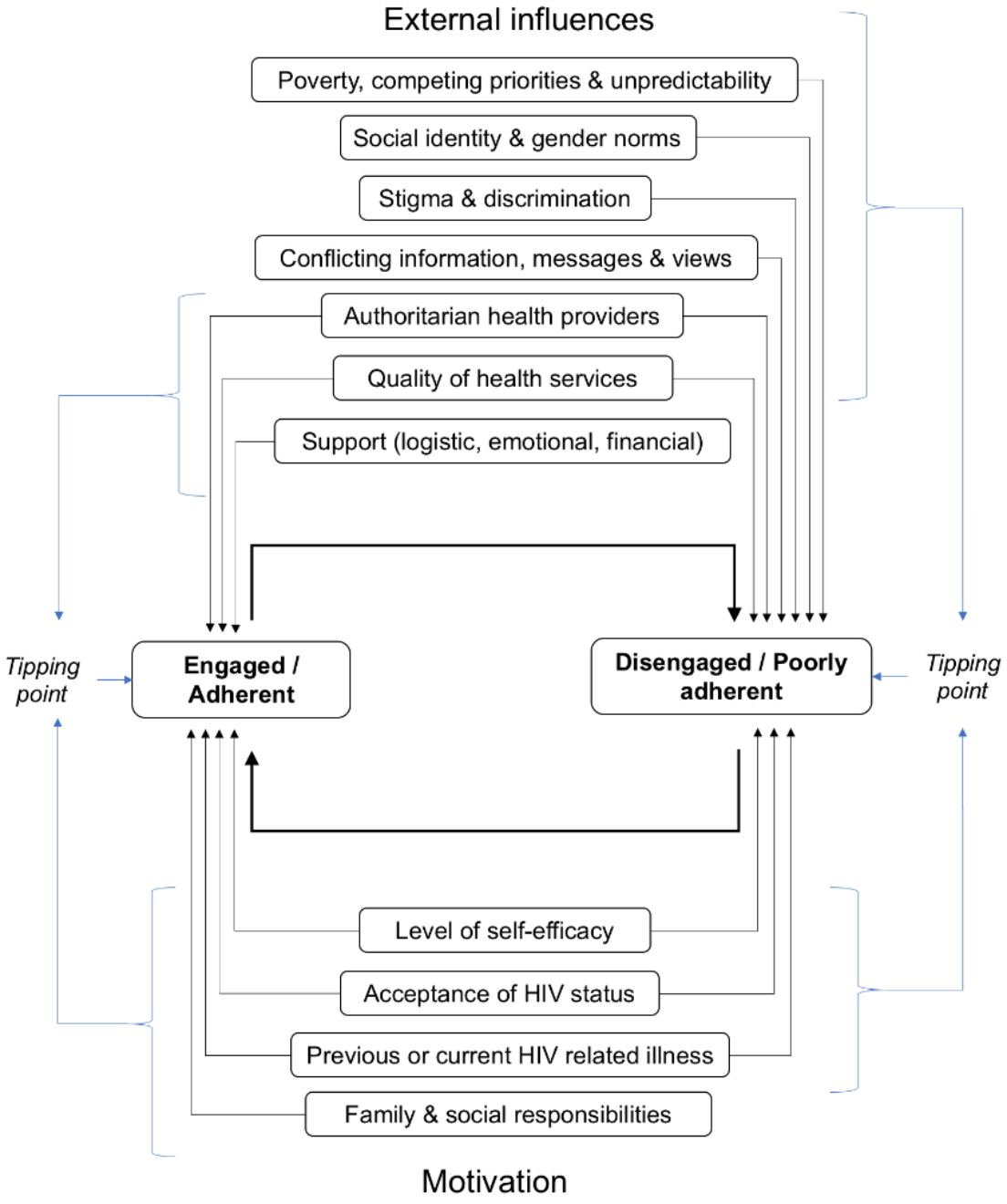
RESEARCH ARTICLE

Being HIV positive and staying on antiretroviral therapy in Africa: A qualitative systematic review and theoretical model

Ingrid Eshun-Wilson[1,2]*, **Anke Rohwer**[1], **Lynn Hendricks**[1], **Sandy Oliver**[3,4], **Paul Garner**[5]

1 Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa, 2 Department of Medicine, University of California San Francisco, San Francisco, California, United States of America, 3 UCL Institute of Education, University College London, London, United Kingdom, 4 Africa Centre for Evidence, University of Johannesburg, Johannesburg, South Africa, 5 Centre for Evidence Synthesis in Global Health, Liverpool School of Tropical Medicine, Liverpool, United Kingdom


HIV positive test
Initiate ART
Remain in ART services on treatment
Linkage
Retention-in-care
Adherence
Influences:
Political system:
• Criminalization of key populations
• Immigration
Health system:
• Speed/ease of referral
• Attitude healthcare provider/confidentiality
• Accessibility of treatment services (time/place/cost)
• Integration with other services
• Skills of healthcare provider/continuity of care
Clinical:
• ART side-effects /formulation/pill burden
• Being physically unwell
Economic:
• Financial: resources to attend clinic , food insecurity
• Competing responsibilities: work/clinic attendance
Social:
• Family/community support/stigma/socio-cultural norms
• Instability and chaotic lifestyle: sex-worker; substance abuse; mental illness; prisoner; intimate partner violence
Individual (or care-giver):
• Inherent health seeking behavior/self-efficacy
• Acceptance of result
• Fears/beliefs/knowledge
• Disclosure status/perceived stigma
• Life stage (adolescents, youth)


External influences
Poverty, competing priorities & unpredictability
Social identity & gender norms
Stigma & discrimination
Conflicting information, messages & views
Authoritarian health providers
Quality of health services
Support (logistic, emotional, financial)
Tipping point
Engaged / Adherent
Disengaged / Poorly adherent
Tipping point
Level of self-efficacy
Acceptance of HIV status
Previous or current HIV related illness
Family & social responsibilities
Motivation

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Added value of logic model

- 1st model based on existing literature about barriers and facilitators, linear
- Provided framework for data collection
- Realised that linear model was not useful
- After thematic synthesis developed new model based on themes

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NIHR | National Institute for Health Research

PROSPERO
International prospective register of systematic reviews

Print | PDF

Self-management interventions for adolescents living with HIV: protocol for a systematic review

Talitha Crowley, Anke Rohwer

Citation

Talitha Crowley, Anke Rohwer. Self-management interventions for adolescents living with HIV: protocol for a systematic review. PROSPERO 2019 CRD42019126313 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019126313

Review question

What is the effectiveness of self-management interventions for improving the health-related outcomes of adolescents living with HIV (ALHIV)?

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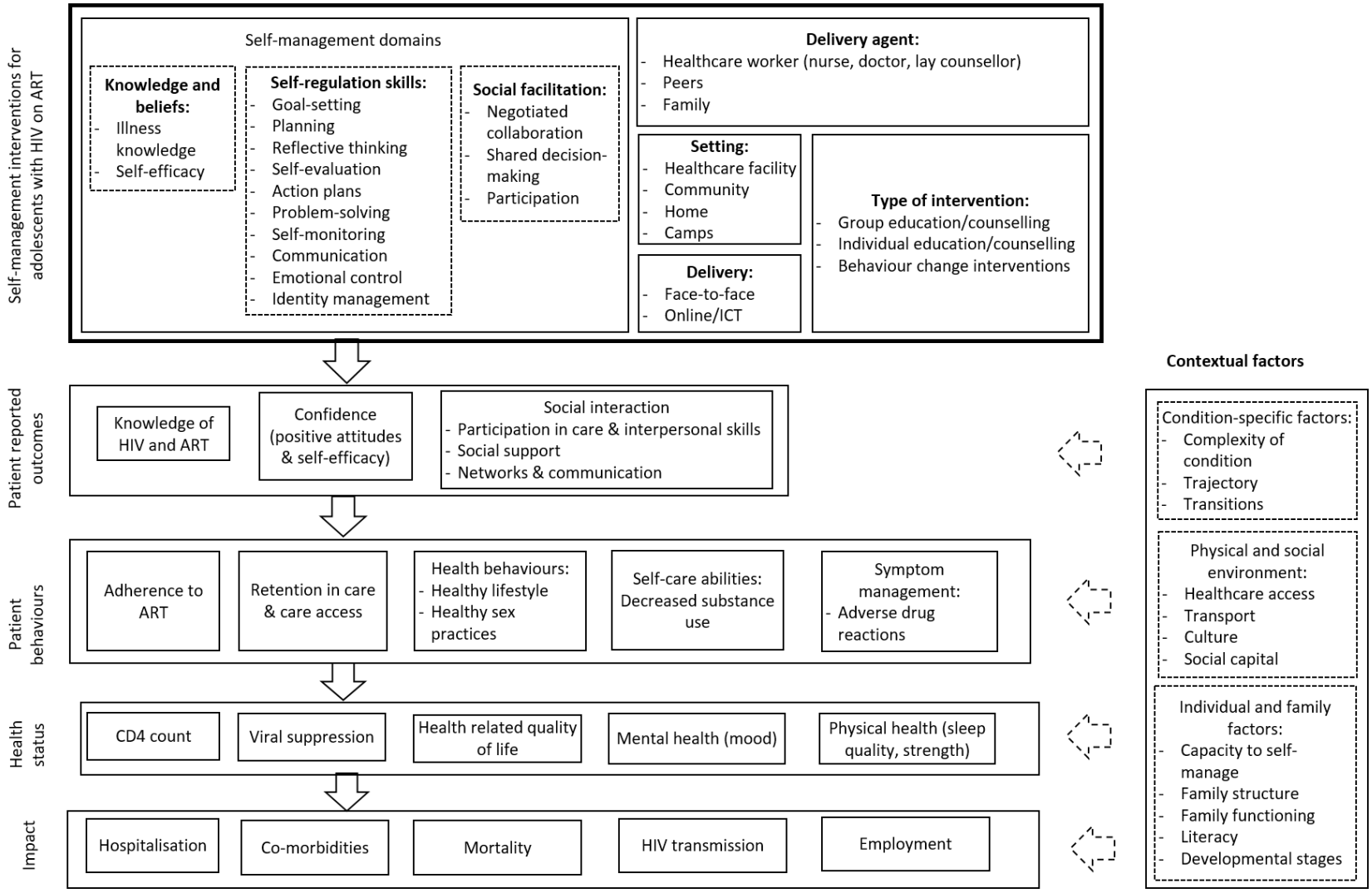
Self-management interventions for adolescents with HIV on ART
Self-management domains
Knowledge and beliefs:
- Illness knowledge
- Self-efficacy
Self-regulation skills:
- Goal-setting
- Planning
- Reflective thinking
- Self-evaluation
- Action plans
- Problem-solving
- Self-monitoring
- Communication
- Emotional control
- Identity management
Social facilitation:
- Negotiated collaboration
- Shared decision-making
- Participation
Delivery agent:
- Healthcare worker (nurse, doctor, lay counsellor)
- Peers
- Family
Setting:
- Healthcare facility
- Community
- Home
- Camps
Delivery:
- Face-to-face
- Online/ICT
Type of intervention:
- Group education/counselling
- Individual education/counselling
- Behaviour change interventions
Patient reported outcomes
Knowledge of HIV and ART
Confidence (positive attitudes & self-efficacy)
Social interaction
- Participation in care & interpersonal skills
- Social support
- Networks & communication
Patient behaviours
Adherence to ART
Retention in care & care access
Health behaviours:
- Healthy lifestyle
- Healthy sex practices
Self-care abilities: Decreased substance use
Symptom management:
- Adverse drug reactions
Health status
CD4 count
Viral suppression
Health related quality of life
Mental health (mood)
Physical health (sleep quality, strength)
Impact
Hospitalisation
Co-morbidities
Mortality
HIV transmission
Employment
Contextual factors
Condition-specific factors:
- Complexity of condition
- Trajectory
- Transitions
Physical and social environment:
- Healthcare access
- Transport
- Culture
- Social capital
Individual and family factors:
- Capacity to self-manage
- Family structure
- Family functioning
- Literacy
- Developmental stages

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Added value of logic model

- Combination of system-based and process orientated logic model
  - Conceptualising intervention
  - Understanding causal pathway
- Informing eligibility criteria
- Including important contextual factors

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Developing logic models

- Where to start:
  - Think about aim of logic model e.g.
    - Conceptualise question
    - Show causal pathway
    - Synthesise results
  - Look for existing logic models
  - Templates might be useful
    - System-based logic model: To conceptualise question
    - Process-orientated logic model: To show causal pathway

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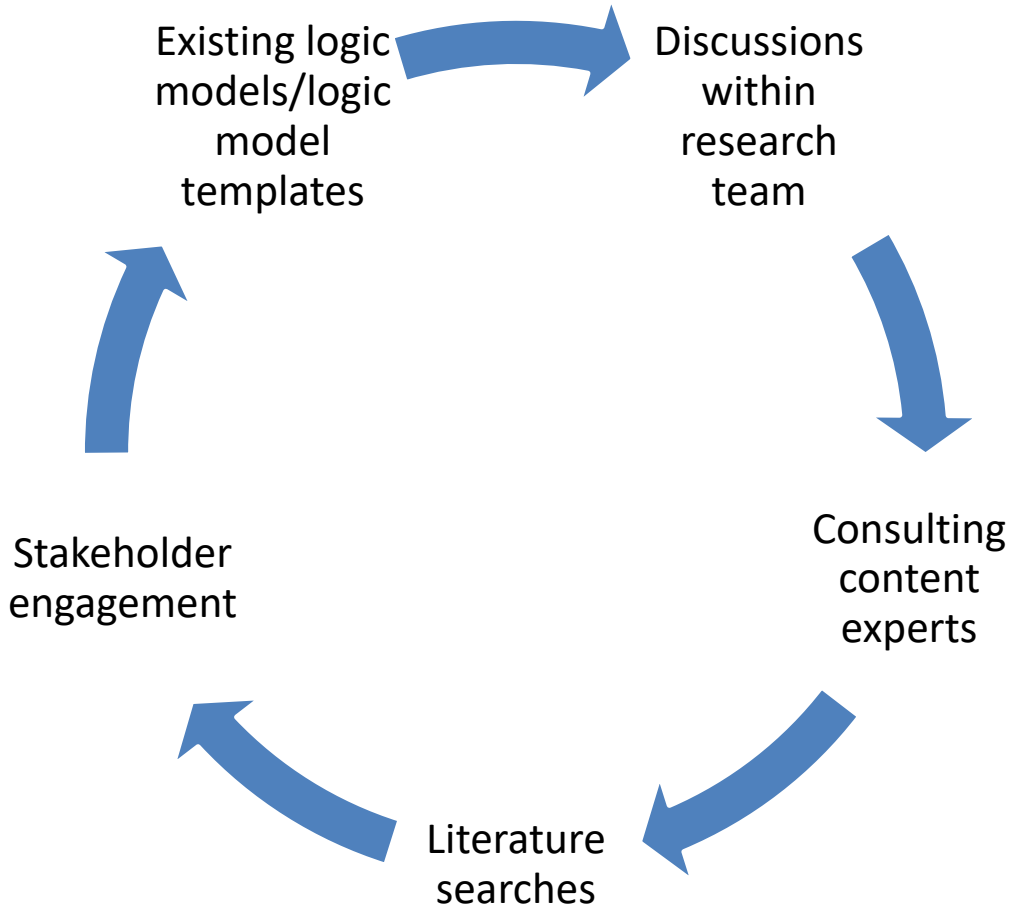
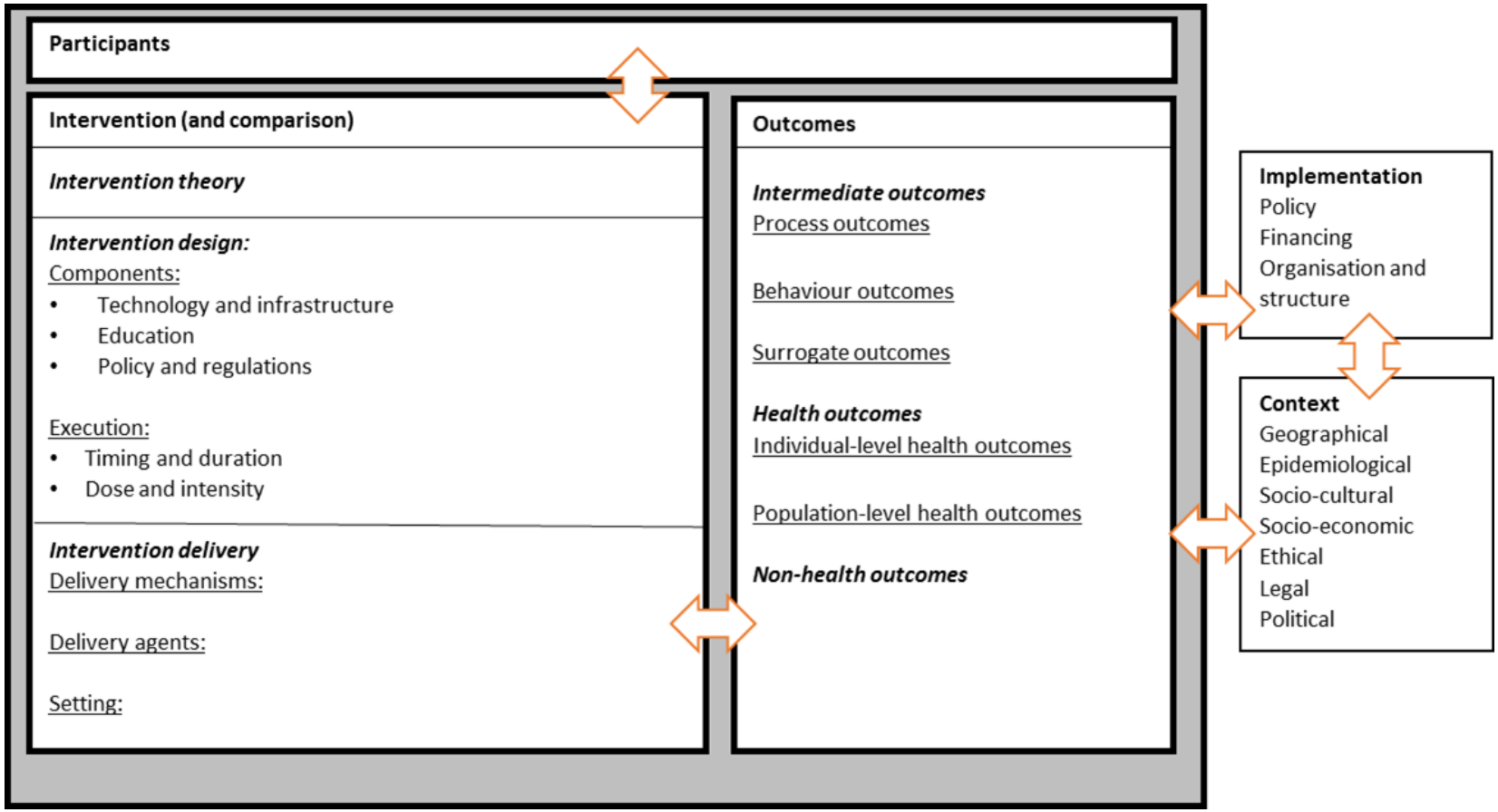
Developing logic models

- Iterative process
- Takes time
- But time well spent!



System-based logic model template



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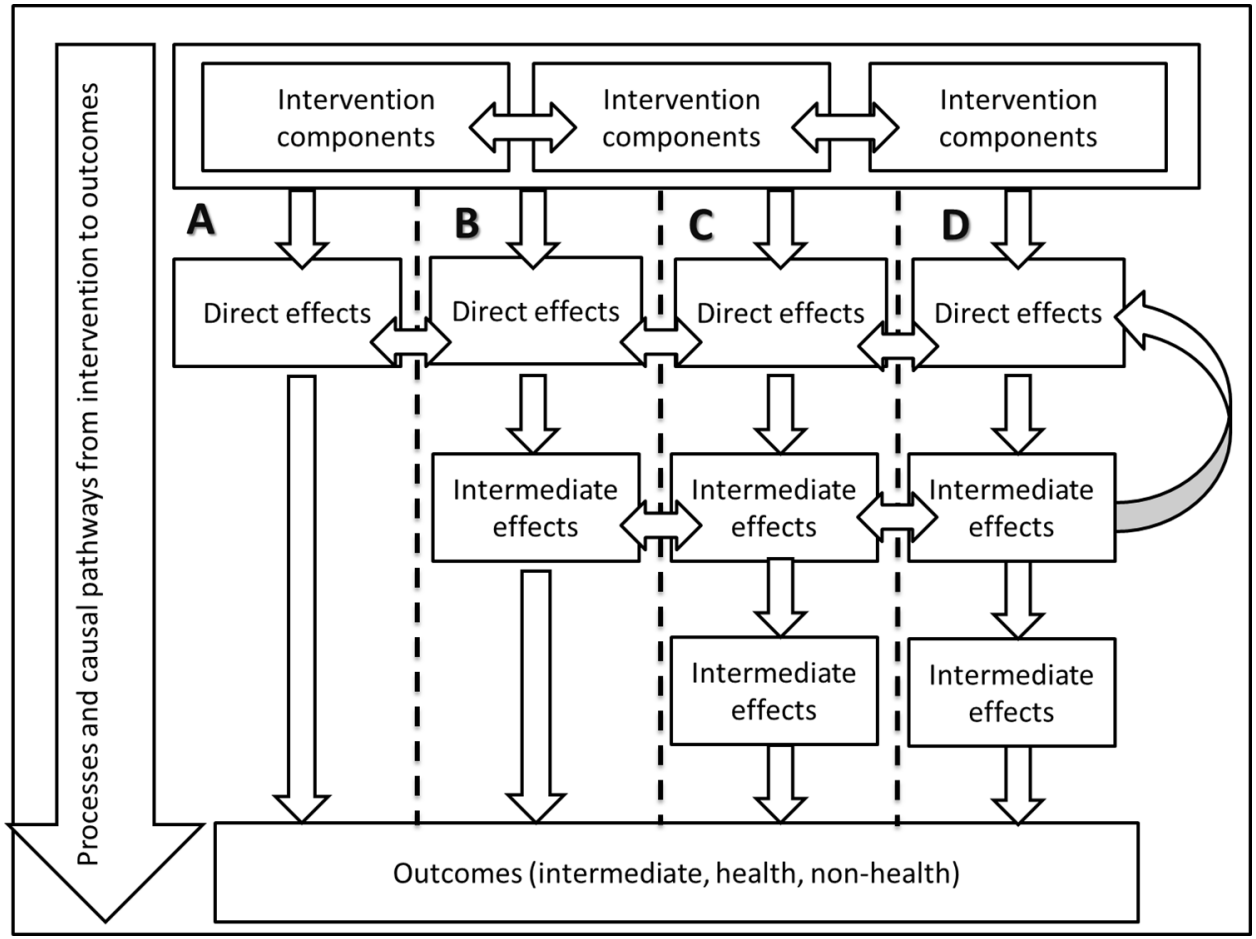
Process-orientated logic model template



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Some lessons learnt and practical tips

- Logic models should not be too complicated
  - Keep it simple
- It takes time and effort to develop
  - No quick fix
- Usually takes a lot of iterations
  - Use paper and pencil and keep track of drafts
- Templates can be useful but are no straitjacket
  - There is no right or wrong
- Requires feedback from others
  - Does it make sense?

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Limitations of logic models

- Limited to a specific review question
  - Does not necessarily reflect 'real world'
- Can influence how review is conducted
  - Depends on author team
- Potential overcrowding
- Can delay systematic review process
  - Time intensive

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Small group work:

- You are an author team developing a protocol for a systematic review on e-learning vs. face-to-face learning of EBHC to increase EBHC knowledge, skills, attitude and behaviour of healthcare professionals
- You decide to develop:
  1. A system-based logic model to depict the interaction between the participants, the intervention, the outcomes and the context
  2. A process orientated framework to depict the processes and causal pathways that lead from the intervention to its outcomes
- In your group, discuss how you would proceed and draw a logic model (1 or 2, as allocated) on the flipchart paper
- Select one member of the group to give feedback

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CampbellCollaboration

Education Coordinating Group

E-learning of evidence-based health care (EBHC) to increase EBHC competencies in healthcare professionals: a systematic review

Anke Rohwer, Nkengafac Villyen Motaze, Eva Rehfuess, and Taryn Young

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Participants
- Type of healthcare worker (e.g. medical doctor, Nurse, Physiotherapist etc.)
- Level of education (undergraduate, postgraduate, CME)

Educational context

Setting

Location where learning takes place
- Same place vs. distributed
- Home, workplace, university, library, classroom, bedside etc.

Learner context
- Background knowledge of EBHC
- Computer literacy
- Learning style
- Motivaton

Institutional context
- Structure of course within larger curriculum
- Role models

Socio-economic context
- Access to internet
- Access to information (databases and electronic journals)
- Affordability
- Availability of electricity
- Availability of personal computers

Intervention

Theory

Adult learning theory:
- Self-motivation
- Personalised learning
- Distributed learning

Intervention design

Components:
- Course, module, curriculum, workshop on EBHC
- Learning objectives and content of educational activity
  - EBHC enabling competencies (epidemiology, biostatistics, basic searching skills, critical thinking)
  - EBHC key competencies (asking questions, accessing literature, critically appraising literature, applying results, evaluating the process)
- Multifaceted intervention vs. Single intervention

Execution:
- Duration (6 weeks, one year etc)
- Intensity (e.g. 2 hours)
- Dose (e.g. twice a week; once a month)
- Timing (within study programme etc.)
- Integrated or stand-alone

Intervention delivery

Dimensions:
- Pure e-learning vs. Blended learning
- Collaborative (interactive) vs. Individual learning
- Synchronous vs. Asynchronous delivery

Delivery agent:
- Facilitators and tutors: Attitude, communication skills, teaching skills, engagement with learners

Organisation and structure:
- Institutions offering educational activity (cost, capacity, culture)

Outcomes

Intermediate outcomes

Process outcomes
- Barriers to method of teaching EBHC
- Enablers of method of teaching EBHC
- Learner satisfaction
- Teacher satisfaction
- Cost
- Attrition

Surrogate outcomes
- **EBHC knowledge***
- **EBHC skills***
- **EBHC attitude***

Behaviour outcomes
- **EBHC behaviour* (e.g. Question formulation, reading habits etc)**
- Evidence-based practice
- Learner adherence

Non-health outcomes
- Evidence-based guideline implementation
- Health care delivery (health systems)

Health outcomes
- Individual health outcomes
- Population health outcomes

Healthcare context

Socio-cultural
Epidemiological
Ethical
Socio-economic
Legal
Political

*Bold outcomes represent primary outcomes, the rest refer to secondary outcomes

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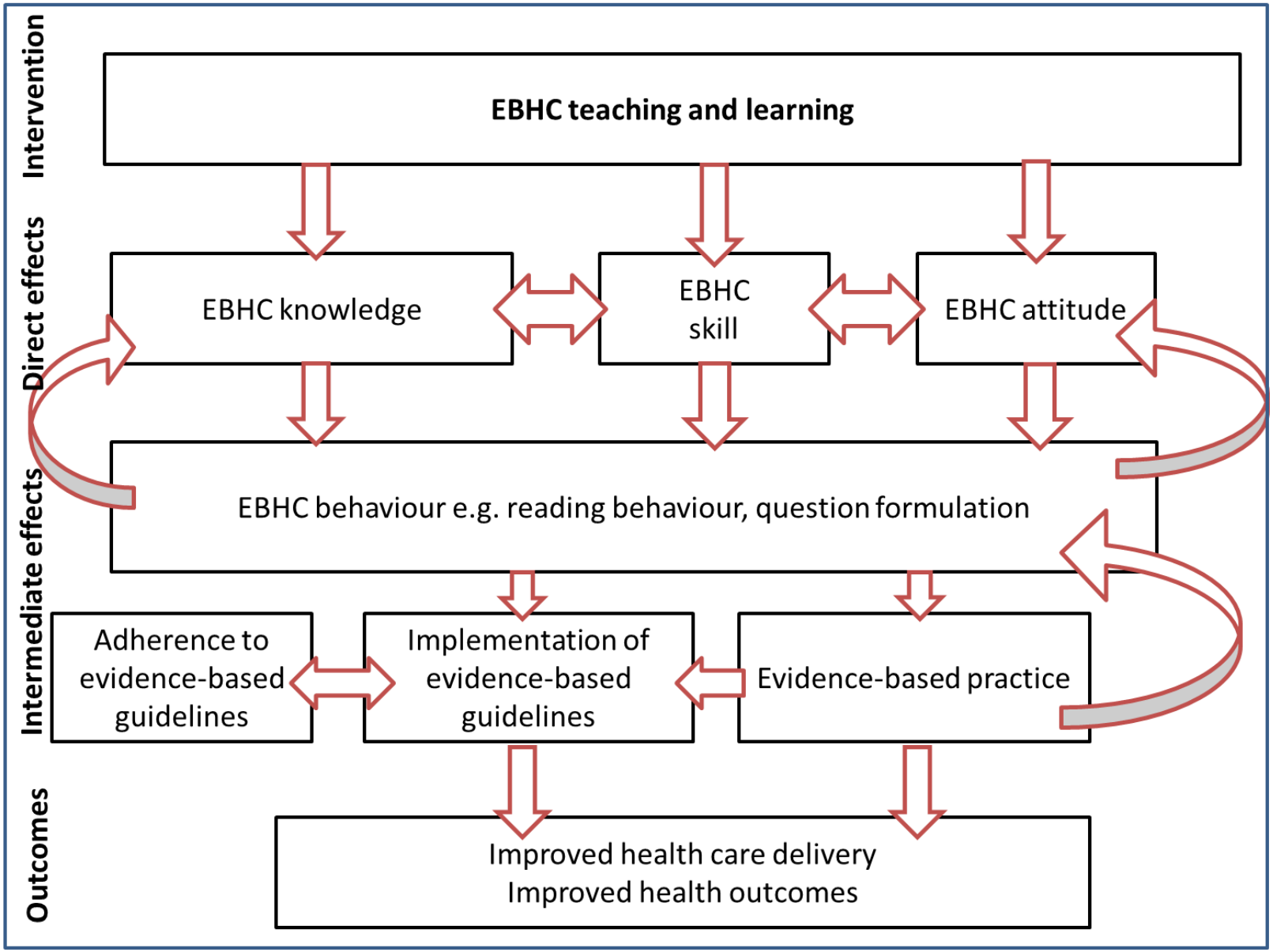

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Useful reading

- Anderson LM, Petticrew M, Rehfuess EA, Ueffing E, Armstrong E, Baker P, Francis D, Tugwell P (2011). Using logic models to capture complexity in systematic reviews. *Research Synthesis Methods* 2(1):33-42. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jrsm.32
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- Rehfuess EA, Booth A, Brereton L, Burns J, Gerhardus A, Mozygemba K, Oortwijn W, Pfadenhauer LM, Tummers M, van der Wilt G-J, Rohwer A. Towards a taxonomy of logic models in systematic reviews and health technology assessments: a priori, staged and iterative approaches. *Research Synthesis Methods 2017;1-12*. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jrsm.1254

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Thank You