Dissemination and Implementation of Evidence-based Interventions: Multidisciplinary Approaches

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What is Implementation Science?

- Studies the processes and procedures that promote the transfer of evidence-based intervention (EBI) into real-world settings

  AKA: Dissemination and Implementation Research

- **Dissemination**: spreading EBI to target audience; facilitating the utilization of EBI
- **Implementation**: understanding how to effectively delivery an EBI within a particular setting

Characteristics of Implementation Science

- Being conducted in real-world settings
- Lying in different stages of intervention delivery, from exploration, installation, implementation, to expansion and scale-up
- Considering multilevel factors (e.g., policies, organization, provider, and technology etc.)
- Focusing on process, rather than outcome; use qualitative and/or mixed-method
- Using multidisciplinary (economics, social science, public health, marketing, public policy etc.) approaches

Dissemination

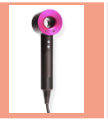
- How do stakeholders of healthcare settings make decision to adopt a certain EBI?

Conjoint Analysis

- A statistical technique used in market research to determine how consumers value different features of a product when making purchase
- Have been applied in research of individual health behavior
- Instead of presenting a series of disparate single item feature, we present an array of product attributes, to determine the relative importance of different features

An Example of Conjoint Analysis

- **Hair dryer** features: Price, dual voltage, power, weight, noise level, heat settings

	Price	Dual voltage	Power	Weight	Noise level	Heat setting
Dyson 	300	No	★★★★★	★★★★	★★★★★	3
N98 	150	No	★★★★	★★★	★★★★	5
T3 	100	Yes	★★★	★★★★★	★★★	2

- Which of the combinations do you prefer?

Application in Implementation Science

- EBI=product; Stakeholder=costumer
- To model stakeholders' preferences and decision-making in adoption of EBI
- Steps:
  - Determine the features (attributes) of the intervention model
  - Generate conjoint scenarios as combinations of attributes
  - Present the scenarios and have respondents rate each scenario
  - Data analysis

Evidence-based Intervention

RCT "White Coat, Warm Heart (WW)"

- 1760 service providers from 40 county hospitals in two provinces of China
- Aim: to reduce service providers' stigmatizing attitudes and behaviors towards PLH

- **Intervention:** Identified the trained popular opinion leader providers to disseminate intervention message; Provided universal precaution supplies

- **Outcome:** Significantly reduced prejudicial attitude and avoidance intent towards PLH at 6- and 12-month

Li L, Wu Z, Liang L-J, Lin C, Guan J, Jia M, et al. Reducing HIV-Related Stigma in Health Care Settings: A Randomized Controlled Trial in China. American Journal of Public Health, 2013, 103 (2), 286-292.

Attributes

- The attributes and levels were determined based on the findings from literature review and in-depth interviews with healthcare administrators and hospital directors
  1. Administrative support
  2. Cost
  3. Personnel involvement
  4. Format
  5. Duration of the training
  6. Availability of technical support
  7. If reducing stigma is a priority of the healthcare facility

- Two levels for each attribute to avoid complexity

Scenarios

- 2^7 = 128 possible scenarios
- To avoid complexity, Fractional factorial orthogonal design was used to yield 8 scenarios
- SAS macro to create efficient factorial designs :

  %***mktex***(**2 2 2 2 2 2 2**, n=**8**)

  %***mktlab***(vars=A B C D E F G , out=sasuser.design)

  %***mkteval***;

  proc print data=sasuser.design;

  run;

- Output

Obs	A	B	C	D	E	F	G
1	2	2	2	2	1	1	1
2	1	1	2	2	1	2	2
3	2	1	1	2	2	2	1
4	1	2	1	2	2	1	2
5	1	1	1	1	1	1	1
6	2	2	1	1	1	2	2
7	2	1	2	1	2	1	2
8	1	2	2	1	2	2	1

WW Intervention Scenarios

WW intervention scenarios	Attributes						
	Administrative support	Cost	Personnel involvement	Duration of the training	Format	Availability of technical support	Priority of reducing stigma
1	Minimum	Relatively cheap	50%	Short (e.g. 1-month)	Flexible (internet-based)	Maximum	No
2	Maximum	Relatively expensive	50%	Short (e.g. 1-month)	Flexible (internet-based)	Minimum	Yes
3	Minimum	Relatively expensive	20%	Short (e.g. 1-month)	Inflexible (group sessions)	Minimum	No
4	Maximum	Relatively cheap	20%	Short (e.g. 1-month)	Inflexible (group sessions)	Maximum	Yes
5	Maximum	Relatively expensive	20%	Long (e.g. 3-month)	Flexible (internet-based)	Maximum	No
6	Minimum	Relatively cheap	20%	Long (e.g. 3-month)	Flexible (internet-based)	Minimum	Yes
7	Minimum	Relatively expensive	50%	Long (e.g. 3-month)	Inflexible (group sessions)	Maximum	Yes
8	Maximum	Relatively cheap	50%	Long (e.g. 3-month)	Inflexible (group sessions)	Minimum	No

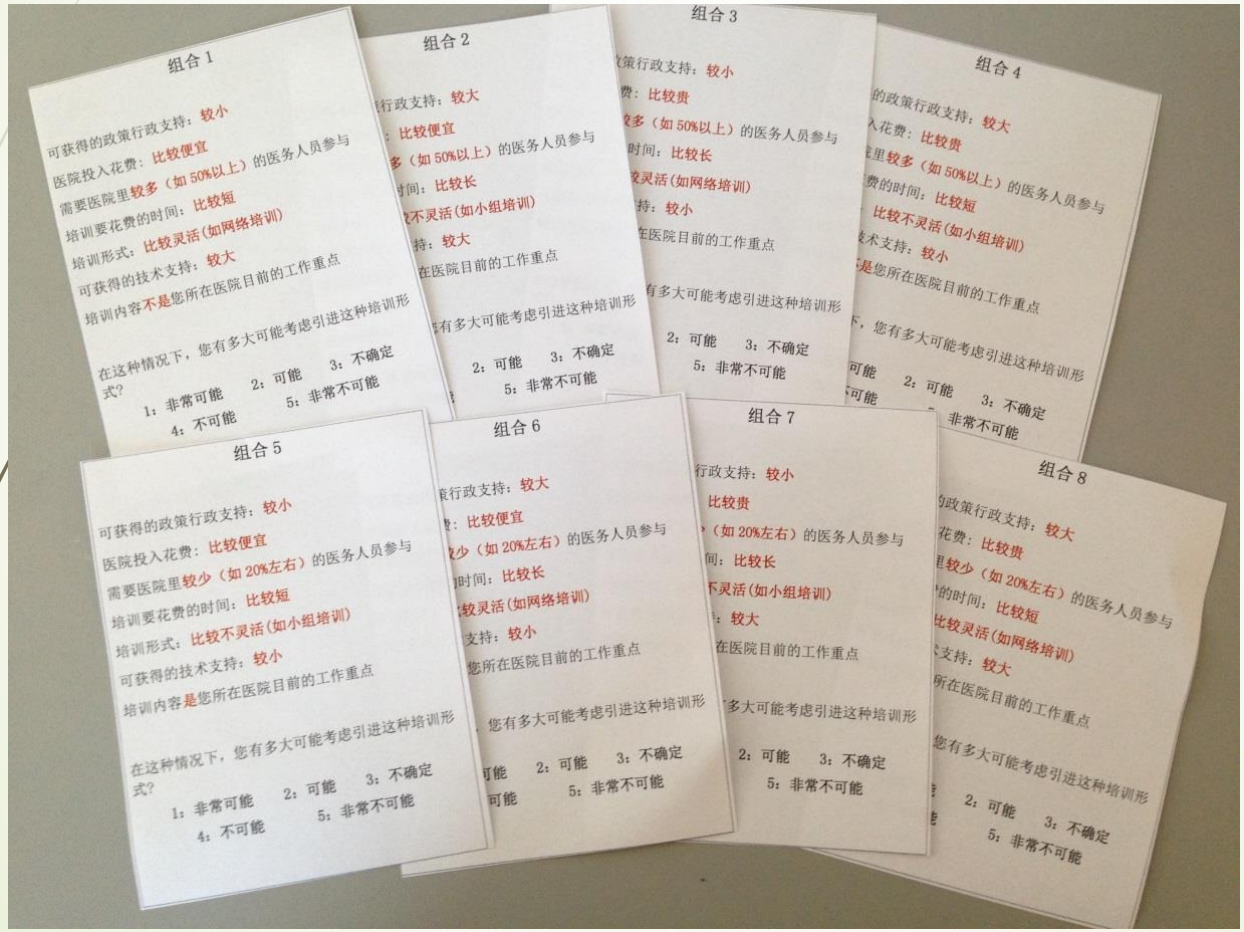
Participants

- 60 hospital directors recruited from different levels and types of healthcare facilities
  - 1/3 from provincial level hospitals, 1/3 from city level hospitals, 1/3 from country level hospitals
  - 2/3 from general hospital, 1/3 from specialized hospitals
  - About 10 from WW intervention hospitals
- Eligibility: 18 years and above, and being a director (or deputy director) of a hospital in the study area
- Voluntary and informed consent

Scenario Administration

- One-on-one face-to-face
- First introduced the purpose, design, and outcome of the WW intervention
- Presented eight intervention scenarios using a set of answer cards
- Participants were asked to rate each scenario in terms of the possibility to adopt the program in the healthcare facilities
- Five categories acceptability ratings: “Highly likely”, “Somewhat likely”, “Neutral”, “Somewhat unlikely”, and “Highly unlikely”

Answer Cards



Data Analysis

- A mixed effect model was fit to the acceptability rating of the eight scenarios, and the seven attributes(categorized as preferred=1 or not preferred=0) served as independent variables in the model.
- The model included a respondent-level random effect to account for the clustering structure of the responses.
- The regression coefficient of each attribute is the impact score of the attribute on acceptability.

Findings

- The impact score for each attribute

	Estimate (Impact score)	P-value	Rank
Administrative support	2.917	0.137	5
Cost (cheap)	24.792	<.0001	**1**
Personnel involvement	0.625	0.7497	7
Duration of the training	10.000	<.0001	**2**
Format	4.583	0.0197	**4**
Technical support	7.500	0.0001	**3**
Priority	-1.458	0.4567	6

Feasibility

- The majority (n=53; 88.3%) of the hospital directors in the study reported the administration of conjoint scenarios was clear and easy to understand.
- The conjoint scenario administration component took approximately ten minutes to complete.

Advantage

- Provides more scientific rigor by quantifying the "importance" values for each attribute in the process of decision making
- Offers the potential of using simulation model to predict of how hospital stakeholders would respond to a new EBI or changes to existing intervention models
- Offers greater realism
- Allows side-by-side comparisons

Issues to Consider

- Using real-life EBI example vs. hypothetical EBI
- Enumerating the levels of attributes or not
- Generating scenarios purely generated using mathematical method vs. considering the practical meaning and real-life relevancy
- Interviewer training: ensure the standardization and unbiased nature of the EBI introduction

Implementation

- When a EBI is adopted in healthcare service, how to improve the efficiency of service delivery?

Process Examination

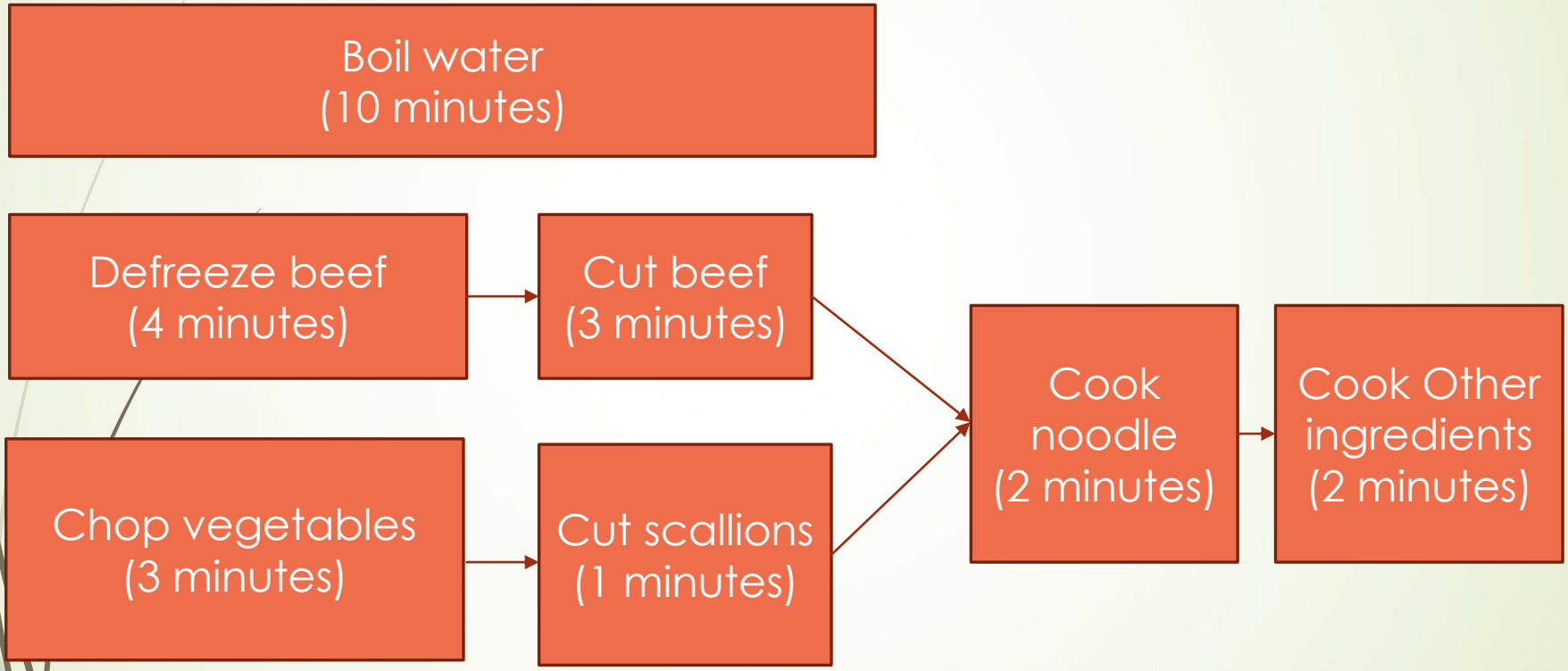
Process: A series of logically connected activities and steps

Example: making a beef noodle soup

- Boil water (10 minutes), chop vegetables (3 minutes), defreeze the beef (4 minutes); cut beef into slices (3 minutes), cut scallions (1 minute); cook noodle (2 minutes); cook beef, vegetables, and scallions (2 minutes)
- Total=**25 minutes**

Process Examination

Example: making a beef noodle soup



- Total=14 minutes

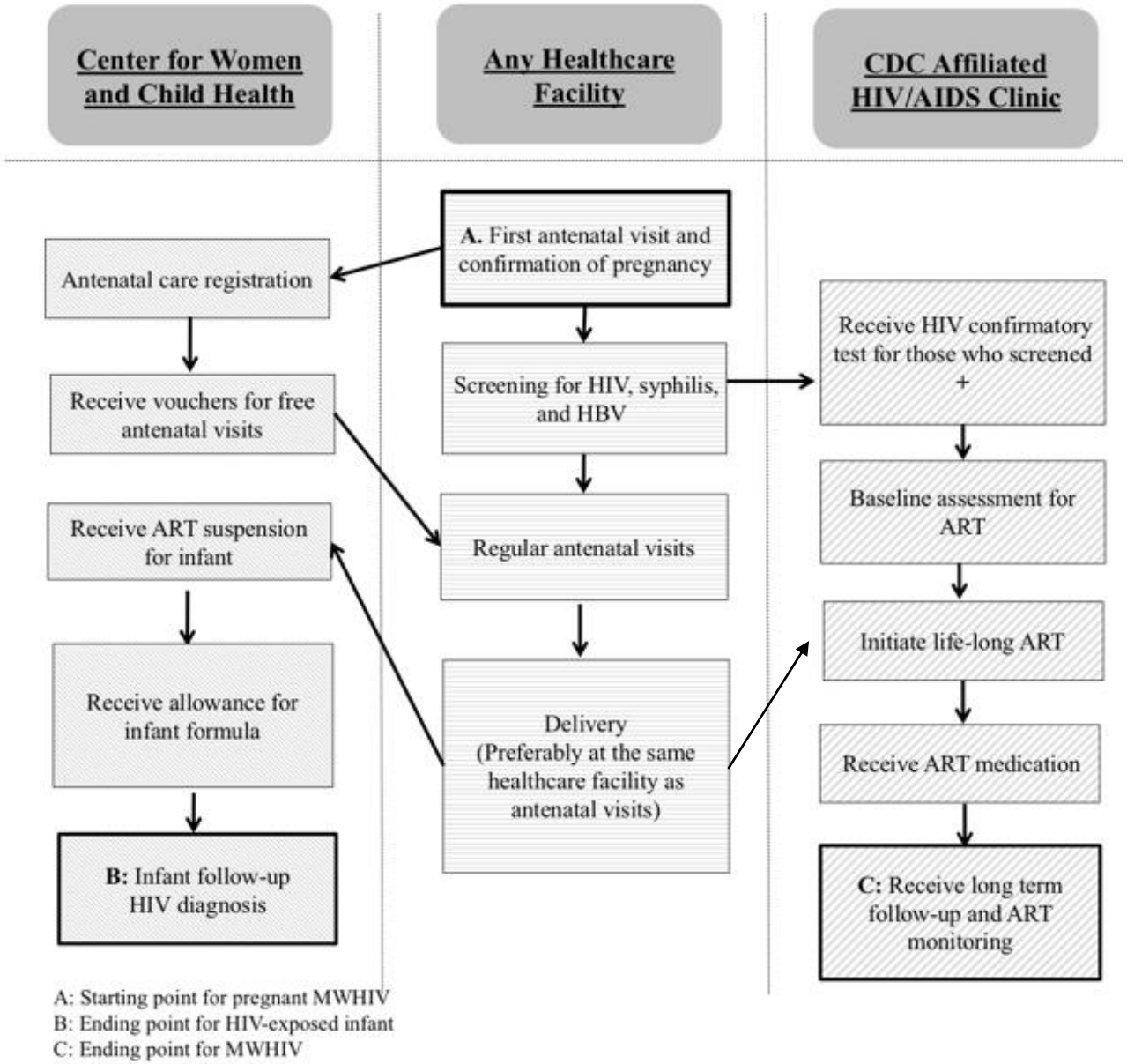
PMTCT among Migrant Women in China

- Antiretroviral therapy (ART) prophylaxis is proven to be efficacious in PMTCT of HIV. However, the strategy is less effective among migrant population in China.
- PMTCT service is a long process from antenatal care attendance, HIV testing, prophylactic ART, safe delivery, infant feeding and follow-up, family planning, to long-term HIV care.
- Aim: 1) Investigate the PMTCT continuum for migrant women with HIV (MWHIV); and 2) Identify potential strategies to improve the process.

Process Mapping

- First round of focus groups with 10 service providers and 10 healthcare administrators who are familiar with the process
  - Draw the sequential flow diagram drawn on a white board
  - Review and validate the accuracy and completeness

Prevention of Mother to Child Transmission of HIV Service Cross-functional Flowchart



Identify the Challenges

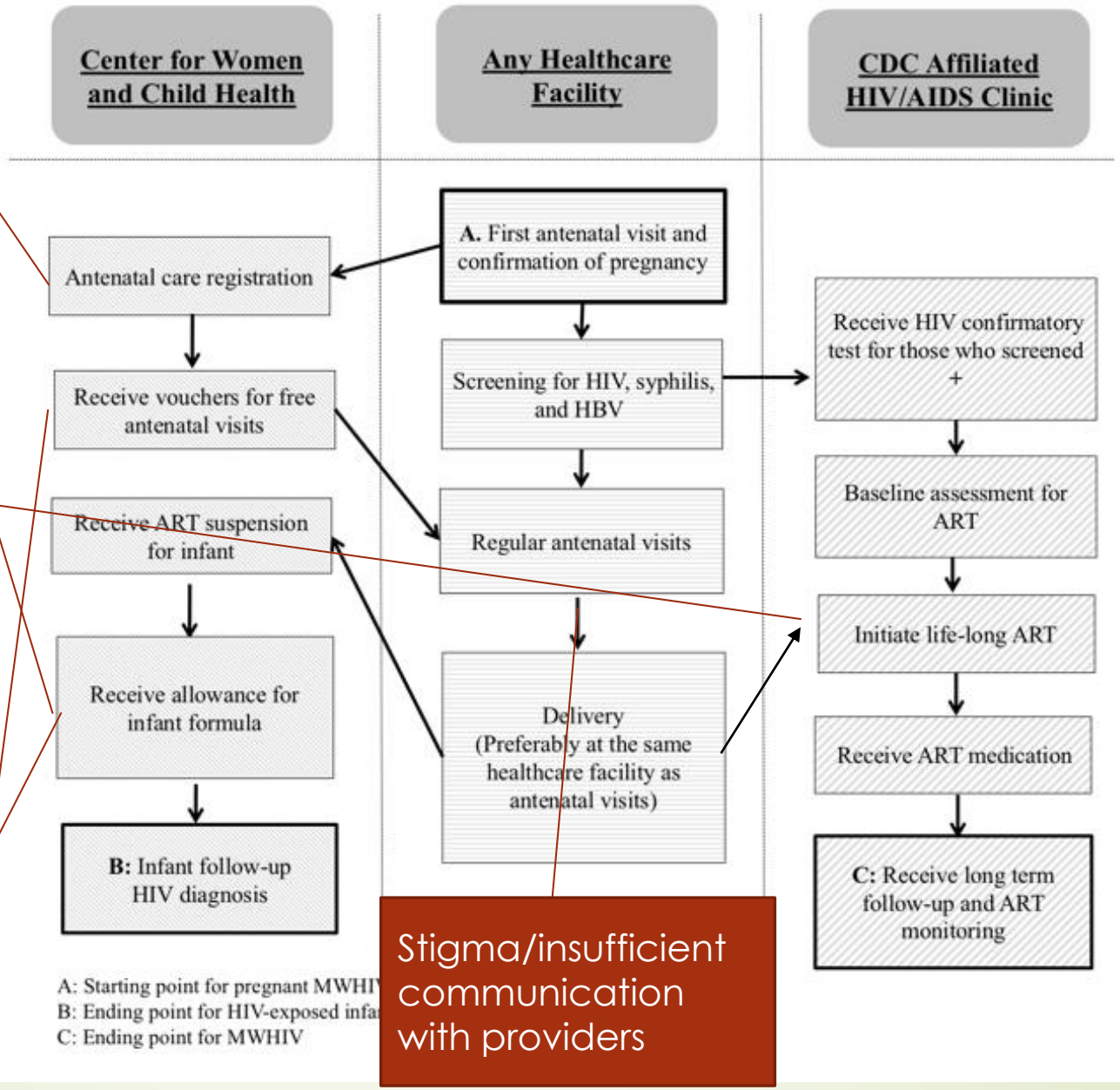
- In-depth interviews with 20 recently-delivered migrant women with HIV
  - Present the PMTCT service flow diagram and ask the participants to point out the steps they perceive to be most challenging
  - Discuss the perceived barriers specifically pertain to each step of the process

Challenges

Limited knowledge of antenatal care

Follow-up postpartum MWHIV and their infants in two systems

Lack information on available preferential policies



Stigma/insufficient communication with providers

Discuss Improvement Strategies

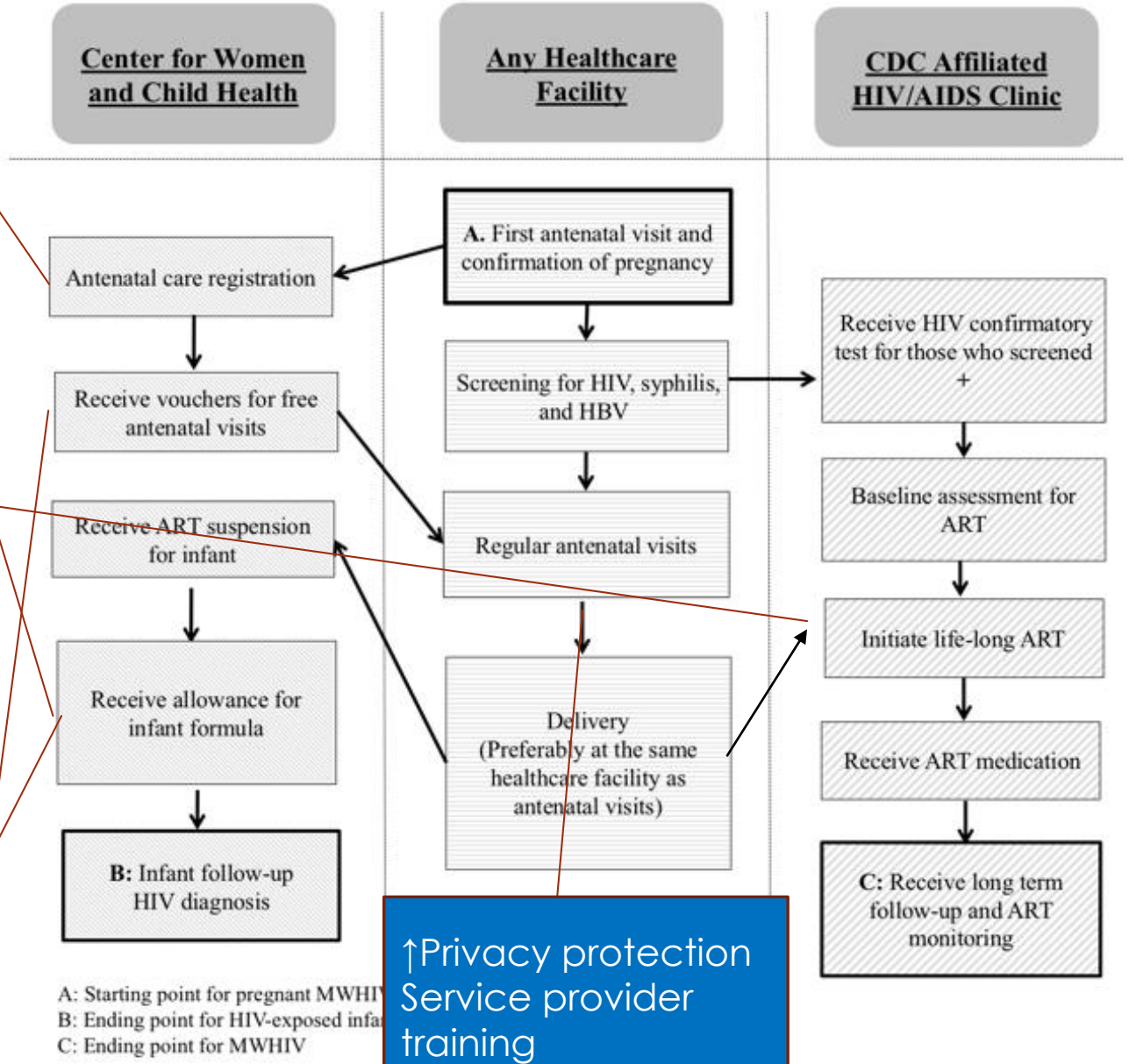
- Second round of focus groups with service providers/health administrators who participated the first round.
  - Debrief the challenges reported by migrant women with HIV.
  - Revisit the service flow chart and brainstorm the strategies to improve the process

Improvement Strategies

Expand health education network Include reproductive aged man and women

Enhance collaboration between CDC and Center for Women and Health

Mobile phone-based information dissemination



↑Privacy protection
Service provider training

Implication

- The process examination exercise identified specific service gaps along the PMTCT service continuum, and resulted in targeted strategies to tackle these challenges.

- Healthcare professionals are recommended to perform this exercise on a regular basis as it allows them to self-examine their compliance with the PMTCT national guideline and to recognize their service gaps.

Process Bottleneck and Wastes

- Calculate throughput (input/output) of each step/task and identify system bottleneck
- Calculate the between-step delay/waiting time
- Calculate the monetary/personnel/time cost of each step
- Identify the steps/tasks with most errors/defects/variabilities, which needs standardization and retraining
- Examine excessive transportation cost (e.g. unnecessarily moving of patients or materials)
- Monitor accountability and collaboration (the number of times a process is 'handed over')

Process Improvement

Redesign the process by considering:

- Reduce overall processing time
- Simplify/remove unnecessary steps
- Combine redundancy
- Standardize the steps with most variation
- Retrain the steps with most errors
- Utilize human expertise/service decentralization

Process Improvement

- Multilevel:
  - Agency level
  - Group level
  - Interpersonal level
  - Individual level
- Continuous:

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In order to save time and money on coffee and bathroom breaks, I've streamlined the process...
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CARTOONSTOCK .com
Search ID: dre0151
Reynolds

Thank you!