SYSTEMS TOOLS FOR COMPLEX HEALTH SYSTEMS:
A GUIDE TO CREATING CAUSAL LOOP DIAGRAMS
SESSION THREE
INTERRELATIONSHIP
DIGRAPHS
Session outline

• Identify and define key variables
• Develop an Interrelationship Digraph
• Identify key drivers and outcomes
• Using the Interrelationship Digraph
Interrelationship digraphs

- Explore how variables relate to one another in a complex system.
- Prevents coming to a quick conclusion and serves to surface and test our assumptions.
- Identifies the major drivers and outcomes in our system.
Session outline

• **Identify and define key variables**
• Develop an Interrelationship Digraph
• Identify key drivers and outcomes
• Using the Interrelationship Digraph
Identify and group the key variables

• List all the variables that if changed would have the biggest effects on your outcome(s) of interest.
• Then collapse or group them as appropriate.
• Aim for a maximum of between 10 – 12 variables.
• Define your variables to ensure there is a common understanding of the construct underpinning your variable.
Definition of a variable

- An element in a situation that may act or be acted upon.
- Its value can vary up or down over time.
- Is not an event.
- Is something you can discuss as "the level of ..."
- Neutral
  - Quality of Care vs. Poor quality of care
- Distinguish between perceived and actual states
  - Perceptions of Quality of care vs. Quality of Care
- Include outcome of interest
Your turn: select variables

• Use neonatal mortality in Uganda case study.
• From your rich picture identify key variables.
• Group these in order to narrow down to 10 – 12 key variables.
• Define these variables.
• Justify your selection.
Your turn: reflecting on your variables

- Are they:
  - Measureable (in theory)
  - Clearly defined
  - Neutral

- Do they include the outcome of interest?

- Anything left out? What are the implications?
Example: variables selected from Uganda neonatal case study

- Health of mothers
- Level of awareness of MHC and NHC
- Safe deliveries and PNC
- Health education by health workers
- Perceptions and belief in myths
- Mothers attending ANC, hospital deliveries and PNC
- Mothers' birth preparedness
- Resource adequacy (staffing, drugs, logistics and supplies)
- Death risk of neonate
- Neonatal survival
- Socio-economic status
- Care of newborns
Session outline

• Identify and define key variables
• **Develop an Interrelationship Digraph**
• Identify key drivers and outcomes
• Using the Interrelationship Digraph
Develop the IRD (1)

• Agree on the issue or question – which informed your rich picture and variable selection.
• Arrange the 10 – 12 selected variables in circle.
• Compare each variable to all others.
• Decide if there is an ‘influence’ between two variables.
• If yes – decide the direction of the influence.
• Use an "influence" arrow to connect related variables.
Develop the IRD (2)

- The arrows should be drawn from the element that influences to the one influenced.
- If two variables influence each other, the arrow should be drawn to reflect the stronger influence.
- Arrows can only be drawn IN ONE DIRECTION.
- The relationship should be a direct relationship and not via another variable.
Develop the Interrelationship Digraph

- Mothers attending ANC, hospital deliveries and PNC
- Perceptions and belief in myths
- Health education by health workers
- Level of awareness of MHC and NHC
- Health of mothers
- Care of newborns
- Neonatal survival
- Resource adequacy (staffing, drugs, logistics and supplies)
- Socio-economic status
- Safe deliveries and PNC
- Mothers' birth preparedness
- Death risk of neonate
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Develop the Interrelationship Digraph

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- mothers attending ANC, hospital deliveries and PNC
- level of awareness of MHC and NHC
- health of mothers
- care of newborns
- death risk of neonate
- safe deliveries and PNC
- socio-economic status
- resource adequacy (staffing, drugs, logistics and supplies)
- neonatal survival
- mothers' birth preparedness
- perceptions and belief in myths
- health education by health workers
Your turn: complete the IRD

- Use the neonatal IRD template and in your groups complete the IRD.
Develop the Interrelationship Digraph

- Mothers attending ANC, hospital deliveries and PNC
- Perceptions and belief in myths
- Level of awareness of MHC and NHC
- Health of mothers
- Health education by health workers
- Mothers' birth preparedness
- Neonatal survival
- Resource adequacy (staffing, drugs, logistics and supplies)
- Socio-economic status
- Safe deliveries and PNC
- Care of newborns
- Death risk of neonate
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As you develop the IRD

- Consider short term effects, long term effects, and unintended consequences.
- Abandon your mental model and think about associations you might not have initially identified.
- Be aware of your own assumptions.
- Where possible base your decision on existing evidence, or consensus amongst experts.
The Interrelationship Digraph is a visual tool that…

- Builds on the rich picture.
- Helps make use of team knowledge in the absence of hard data.
- Plots the complexity of causal relationships.
- Builds team consensus on priorities.
Session outline

- Identify and define key variables
- Develop an Interrelationship Digraph
- **Identify key drivers and outcomes**
- Using the Interrelationship Digraph
Determine drivers and outcomes

For each variable, count the number of arrows coming in and going out:

- **Outcomes:** Variables with more arrows coming in than out
  - **Key Outcomes or Results:** Variables with the most incoming arrows
- **Drivers:** Variables with more arrows going out than in
  - **Root Causes:** Variables with the most outgoing arrows
Determine drivers and outcomes

- Mothers attending ANC, hospital deliveries and PNC
- Perceptions and belief in myths
- Level of awareness of MHC and NHC
- Health of mothers
- Neonatal survival
- Mothers' birth preparedness
- Resource adequacy (staffing, drugs, logistics and supplies)
- Socio-economic status
- Safe deliveries and PNC
- Care of newborns
- Death risk of neonate
- Health education by health workers
- Determination of myths

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Identify key drivers and outcomes.

**Outcomes**

- Health of mothers
- Care of newborn
- Death risk of neonate
- Mothers' birth preparedness
- Neonatal survival
- Resource adequacy (staffing, drugs, logistics and supplies)
- Health education by health workers
- Socio-economic status
- Level of awareness of MHC and NHC
- Perceptions and belief in myths
- Safe deliveries and PNC
- Mothers attending ANC, hospital deliveries and PNC

**Drivers**

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Session outline

- Identify and define key variables
- Create an Interrelationship Digraph
- Identify key drivers and outcomes
- **Using the Interrelationship Digraph**
Purpose of Interrelationship Digraphs

- Force us to consider all possible interactions amongst the variables.
- Challenges our mental models.
- Identifies key outcomes and drivers in a complex system.
- Forms the basis from which we can identify feedback loops and surface a systems map.
Thank you

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February 2015

This work was coordinated by the Alliance for Health Policy and Systems Research, the World Health Organization, with the aid of a grant from the International Development Research Centre, Ottawa, Canada.