

Appendix

Guide to the main Group Model-Building (GMB) workshop activities mentioned in the paper, “Integrating participatory and qualitative insights into dynamic models of oral health disparities.”

GMB1 (May 2013): Model the problem

Part 1. Reference mode exercise

Materials: blank paper, pencils, markers, masking tape, stickers

Roles: facilitator, wall builder

Reviewed problem orientation to oral health equity at individual, interpersonal, and community scales.

Participants were asked to sketch trends over time for factors that they think are most significant for driving dimensions of oral health equity as articulated at the 3 scales. Each participant created at least one reference mode.

Clarification provided in terms of naming variables that could increase or decrease, and defining the time horizon in terms of calendar years or age across the lifespan at the individual scale.

Participants took 3 minutes to sketch reference modes, followed by discussion of each. After each reference mode was introduced, the wall builder taped it to the wall in proximity to similar suggestions and broadly clustered by scale.

After all the reference modes were discussed and displayed, each participant was given 3 stickers with which to place votes indicating factors most significant for oral health equity.

Part 2. Causal mapping exercise

Materials: dry erase markers, whiteboard

Roles: facilitator, process coach, gatekeeper

In this exercise, the facilitator moderated discussion and drew causal links on the whiteboard to reflect ideas that were raised in the reference mode exercise. The goal was to complete feedback loops. Additional time was needed.

Part 3. Portfolio review

Review simulation models in portfolio using slides and posters that summarize models built to date.

Part 4. Scenario development

Prompt: Considering the models that have been presented and the ideas raised in the earlier exercises, what kinds of scenarios would be interesting to explore using models that are existing or yet to be developed?

Provided examples to stimulate discussion: change in insurance coverage; loss of spouse.

GMB2 (April 2014): Build a shared hypothesis

Part 1. Demonstration of causal mapping

Review of causal mapping primer. Use of whiteboard to sketch correct causal mechanism from tooth structure to tooth pulp rather than vice versa.

Part 2. Causal mapping with physical materials

Materials needed: pipe cleaners (2 colors), notecards, markers, hole puncher

Previously suggested factors are displayed on poster board color-coded according to scale (individual, interpersonal, community) of the ecological model.

Pipe cleaners represent information arrows. Color is used to distinguish positive and negative polarity (here, green = positive; red = negative; white = not yet determined). Arrowheads are created using small cardstock triangles with a hole punch to connect to the appropriate end of the pipe cleaner.

Part 3. TimeMap and portfolio review

Student modelers demonstrated TimeMap, transportation model, and updated agent-based model of care-seeking behavior.

Part 4. Scenario development

Open group discussion of “what if” alternatives for further pursuit.

GMB3 (May 2015): Integrating model structures

Part 1. Inverse scenario exercise

Participant prompts:

1. Make a list of all you can do to ensure oral health disparities are exacerbated. Go wild!
2. Now find someone you don't know well and share your answer.
3. Form a group of 4, then review each item on your list. Ask, "Is there anything that we are currently doing that in any way, shape, or form resembles this item?" Be brutally honest.
4. As a group, create a second list and decide what first steps will help to stop what you know creates undesirable results.

This exercise utilized the TRIZ liberating structure to invert the question about how to promote health equity by asking how could we make it worse. Available online at

<http://www.liberatingstructures.com/6-making-space-with-triz/>.

Part 2. Stock-flow exercise for conceptualizing health

Materials: Clear cups, uniform game pieces, flip charts, markers.

Participant prompts:

- Imagine a stock of health.
 - What are the inflows?
 - What are the outflows?
- Facilitator records answers from discussion on flip charts.
- Participants represent changes in the health stock using round game pieces as "health chips" that are placed in or removed from a clear cup after each round of sharing with the group.

Part 3. Role-play simulation of an agent-based model

Materials: Wooden pegs shaped as people represent older adult agents and providers. The older adults have sick and healthy representations indicated by a red or green dot on the bottom of the peg. Older adult agents are numbered for identification. Providers are indicated by a cross (+) mark on the pegs.

Acting out an agent-based model:

- There are two neighborhoods (one per group), represented by a large felt underlay

- each has a senior center (yellow felt space) and a treatment facility (green felt space)
- each neighborhood has two oral healthcare providers, one of whom visits the senior center when ElderSmile conducts a preventive screening
- six agents who live in the neighborhood may attend a senior center, receive a preventive screening, or seek treatment

Activities for each simulated day of the game:

- Roll the die to determine how many agents attend the senior center on a given day
 - if the die roll is greater than the number of available agents, all available older adult agents attend
- Facilitators indicate whether ElderSmile is available in the neighborhood on a particular day (alternating days and neighborhoods)
- Agents attending a center undergo screening
 - if unhealthy (red dot on bottom), get referral for treatment as early as the next day
- The treatment facility will treat one agent per day; provider turns them from unhealthy to healthy
 - other agents awaiting treatment are deferred to later days and are not available to attend senior center in the meantime

Roles to play:

- Roll the die.
- Move agents from neighborhood to senior center, picking which ones go to center.
- When screening occurs, move the provider to center.
- When agents are screened, note which ones are unhealthy and need referral. Track whether a referral is needed so that agent attends the next day or waits for an available day.
- Outside treatment provider treats one patient per day and changes the agent from unhealthy to healthy.
- Scribe to fill in table on worksheet from the perspective of the senior center.

Parts 4 and 5. Causal mapping with connection circles and reference mode exercise.

Subgroups of 3 participants were formed, consisting of a modeler partnering with 2 non-modelers, to address one of the following factors—accessibility, availability, affordability, accommodation, and acceptability—using connection circles and reference modes from Lesson 10, “Do you want fries with that? Learning about connection circles,” as presented by Quaden et al. (2006) at http://www.clexchange.org/cleproducts/shapeofchange_lessons.asp.

GMB4 (May 2016): Experiment with models

Part 1. Causal mapping from qualitative data

- Review of doctoral research analyzing focused groups for causal insight (Kum et al., In review).
- Distribution of laminated qualitative data segments of 1-3 sentences excerpted from transcripts of focused group interviews with older adults.

Prompts:

1. On your own (5 minutes)

- Read the focus group excerpt closely
- Develop a causal relationship statement
- Complete one or more rows in the cause-effect worksheet.

2. Pair up with one other person (8 minutes)

- Share the causal statements in pairs
- Identify potential reinforcing (+) and/or balancing (-) paths in a causal map

3. Altogether (10 minutes)

- Go around the room and share the causal relationships extracted from data segments and potential paths in a causal map
- Which of these relationships validate our existing models? Which ones complement our existing models? Do these relationships contradict any of our existing models?

Part 2. Stock-flow model construction and testing

The research team divided into two groups, each with a designated modeler constructing a stock-flow model from scratch in Vensim. The facilitator demonstrated the same exercise using an

overhead projector. Following the model development task, a fully developed model was tested in response to different assumptions for contact rate.

Part 3. Role play of discussions about oral health

Prompts:

- For each round, a few of you will be invited to act out a certain scenario.
- If you volunteer to be an actor, please try to put yourself in the shoes of the role you are playing.
- The rest of you will be observers and can volunteer to act out alternative scenarios in subsequent rounds.

Act One

- Location: A senior center in northern Manhattan
- Actors: Two older adults meeting for the first time
- Situation: One of them is suffering from terrible toothache
- Wild cards:
 - 1) Adding a staff member at the senior center
 - 2) Free food at the event
 - 3) Preventive screening offered at the senior center on that day

Act Two

- Location: A dental clinic in north Manhattan
- Actors: One older adult and one dental provider
- Situation: The older adult visiting the dental provider for the first time in 3 years
- Wild cards:
 - 1) Language barrier
 - 2) Medicaid

Part 4. Agent-based model construction and testing

The research team divided into two groups, each with a designated modeler constructing an agent-based model from scratch in AnyLogic. The facilitator demonstrated the same exercise using an overhead projector. Following the model development task, a fully developed model was tested in response to different assumptions for network size.

Part 5. Policy scenarios

Participants work in pairs with given scenarios alleviating financial barriers, geographic barriers, government policy barriers, cross-cultural barriers, personal barriers, or language barriers to oral health care. Discussion prompts included the following questions:

- If the given scenario is implemented, how will that affect the delivery of oral health care?
- How will the scenario fit or change the assumptions of the dynamic models?