What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar Campus area? *Cedar Campus Evaluation Planning*

Group Model Building Workshop 1 – October 6, 2023
Group Model Building Workshop 2 – October 11, 2023
Full Report

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Background

PHMC's Public Health Campus on Cedar (Cedar Campus) is a collaboration between PHMC, the Hospital of the University of Pennsylvania, Children's Hospital of Philadelphia, Independence Blue Cross Foundation, and residents and community-based organizations across West and Southwest Philadelphia. In February 2020, Trinity Health Mid-Atlantic, the parent organization of Mercy Philadelphia Hospital, announced that it would end inpatient care at the West Philadelphia safety-net facility. Knowing the impact that this would have on the community, especially for underserved and vulnerable populations, PHMC joined a group of health care and community leaders to ensure this facility could remain an anchor for West and Southwest Philadelphia residents. This bold and innovative partnership, which is truly one of a kind in the region, offers a unique opportunity to evaluate meaningful community impact. In 2023 PHMC's Research & Evaluation group partnered with Drexel's Urban Health Collaborative to work on planning year to develop a place-based evaluation of Cedar Campus which was funded by Independence Blue Cross Foundation. Over the course of the year various evolution planning activities took place to inform the creation of an evaluation plan. One of these activities is system dynamics group model building (GMB), a stakeholder-engaged systems thinking method, which was used to explore the root causes of access to health care and social services to address social determinants of health (SDOH). GMB has been shown to improve problem understanding, promote systems thinking, and develop consensus for action. In October 2023, we conducted 2 GMB sessions, one focused on community residents, representatives of community-based organizations, and Cedar Campus Community Advisory Board (CAB) members while the other focused on Cedar Campus providers, administrators, and institutional partners.

In Southwest Philadelphia, access to healthcare has not been consistent and the health of the communities have been threatened by several transitions in the ownership of what is now PHMC Public Health Campus on Cedar. These transitions and lack of investment have led to a lack of trust within the communities the institution is trying to serve. This history has added more complexity to the issues of consistent access to healthcare and can impact the health disparities experienced by those living in Southwest Philadelphia. Health disparities – including those related to access to high quality, comprehensive health care – are remarkably persistent through time and consistent across cities and neighborhoods that are seemingly different. We believe that the history of the lack of accessible, integrated, and comprehensive care in this community are likely the result of a "complex system." This system likely includes factors ("variables") operating at multiple levels of influence (e.g., things at the individual, neighborhood, city, and policy levels). The system may also include important feedback loops, including reinforcing feedback loops (i.e., vicious and virtuous cycles) and balancing feedback loops (i.e., those that dampen change in a system).

Objectives & Problem Statement

Workshop Objectives (Explicit):

1. Gather insights that will inform an evaluation of the Public Health Campus at Cedar (Cedar Campus).
2. Convene community and practice stakeholders that receive care, provide care, or are invested in Cedar Campus.
3. Use systems thinking activities to understand drivers of access to care in the communities surrounding Cedar Campus.

Workshop Objectives (Implicit):

1. Learn about and expand how stakeholders think about access to care for the communities surrounding Cedar Campus.
2. Identify common themes and variation in themes among stakeholders with different expertise and perspectives
3. Build a group of community and practice stakeholders that can use systems thinking to help build an evaluation of the Cedar Campus

Problem Statement:

- What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar area? Think about these areas of well-being in addition to medical care physical, mental, social well-being.

Workshop Overview

The first workshop included fifteen participants. Participants represented:

- Community organizations
- Community members
- Cedar Campus Community Advisory Board Members

The second workshop included eight participants. Participants represented:

- Penn Providers
- Penn administrators
- PHMC administrators

Broadly, each group model building workshop consists of a series of scripted activities. An overview of the agenda from this workshop is to the right; the detailed agenda is available in the Facilitation Manual (Appendix A). The objective of each scripted activity is different, but all work to facilitate systems thinking and insights from participants. Many scripts involve production of one or more **artifacts**. Artifacts are tangible products of the specific activities, participants, and conversations that formed the workshop. The

Table 1: Workshop Agenda

Participants Arrive / Coffee
Welcome & Introductions
General Presentation
Hopes & Fears
Graphs Over Time
Dots
Break
Causal Loop Diagramming
Presentations
Lunch
Model Synthesis
Break
Places to Intervene
Reflection
Close

remaining sections of the report include photos or digitized representations of several of the artifacts produced in the workshop.

Model Outputs

Causal loops diagrams (CLD) are qualitative models that embody and convey a set of hypotheses concerning the underlying structures that drive system behaviors. In this model, the structures are those that initially caused or lead to the persistence of lack of access to care for those in the Cedar Campus area. These hypotheses can be accepted, challenged, revised, or refined. Over the course of two workshops the groups produce eight causal loop diagrams focused on access to comprehensive health care at Cedar Campus: six of which were done in small groups and two "aggregated" causal loop diagram, which combined the models produced by the groups within each workshop into a larger diagram.

A few notes on how to read causal loop diagrams: Text in black represents system variables. Text in grey enclosed in "< >" represent shadow variables. A shadow variable is a system variable that is defined in black elsewhere in the diagram, but is also related to variables in other parts of the diagram. Using shadow variables helps to reduce clutter and increase the clarity of a CLD.

Arrows represent causal links between variables. The small "+" or "-" next to the causal links describe the polarity of the links. For instance:

- In the aggregate causal loop diagram from workshop 1, for example, (Figure 5), the arrow between "Cost of Care for Patients" and "Provider Wages" has a **negative causal link**, which represents an inverse relationship between two variables: As cost of care for patients decreases, provider wages increases. The opposite is also true: As cost of care for patients increases, provider wages decreases.
- The arrow between "Trust" and "Access to quality health services" has a **positive causal link**, which represents a direct relationship between two variables. A positive link, therefore, describes the behavior in which an increase in trust causes a subsequent increase in access to quality health services. A positive causal link implies the opposite is also true: a decrease in trust will lead to a decrease in access to quality health service.

Finally, the letters embedded in circular arrows indicate the presence of a feedback loop, or closed chain of causal connections. Feedback loops describe system behavior in which an initial change in a variable causes a chain reaction that ultimately feeds back to create further change in that variable. Feedback loops can take two forms: reinforcing (R) and balancing (B). Reinforcing loops generate exponential growth or exponential decay in a system. These behaviors are more commonly referred to as virtuous or vicious cycles. Balancing loops, on the other hand, create "goal-seeking behavior" by dampening the effect of an initial stimulus or shock in the system. An example is a thermostat that kicks on a heater to prevent large decreases in the temperature in a building (the goal-seeking

behavior here is the heater turning on to maintain the temperature on the thermostat). Generally, we tried to give arrows involved in the same feedback loop a common color (this is not always possible if an arrow is involved in more than one feedback loop).

Workshop 1: Community

Small-Group Causal Loop Diagrams

Four small groups of 3-4 participants produced one causal loop diagram each with variables and feedback loops that help explain factors driving access to total comprehensive care at Cedar Campus. The diagrams from each group are below:

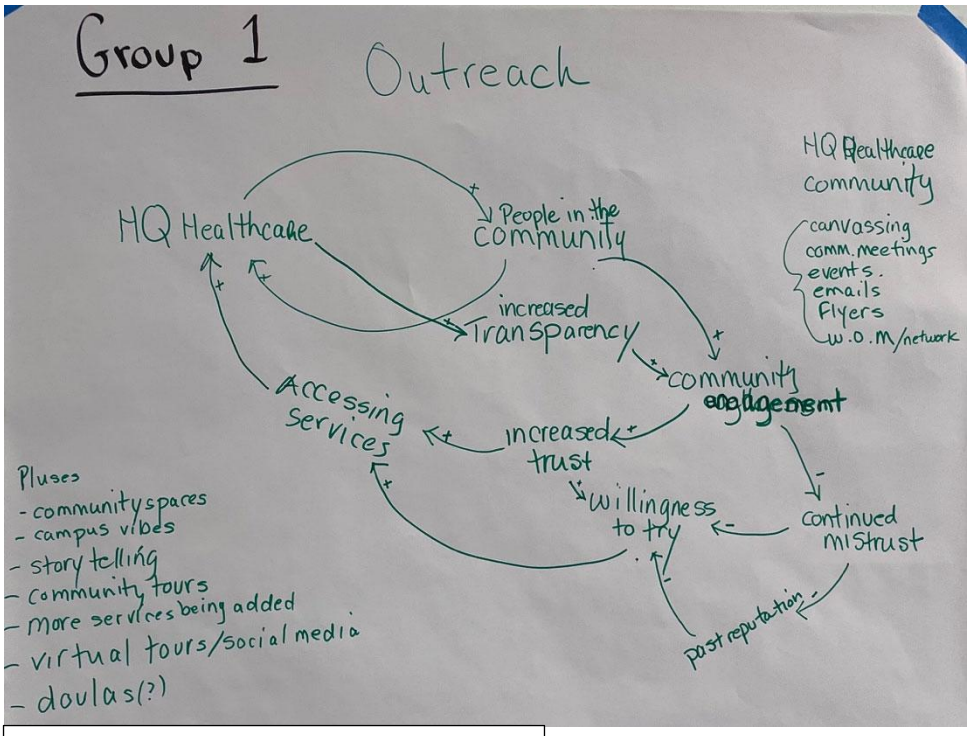


Figure 1: Workshop 1, Group 1 CLD

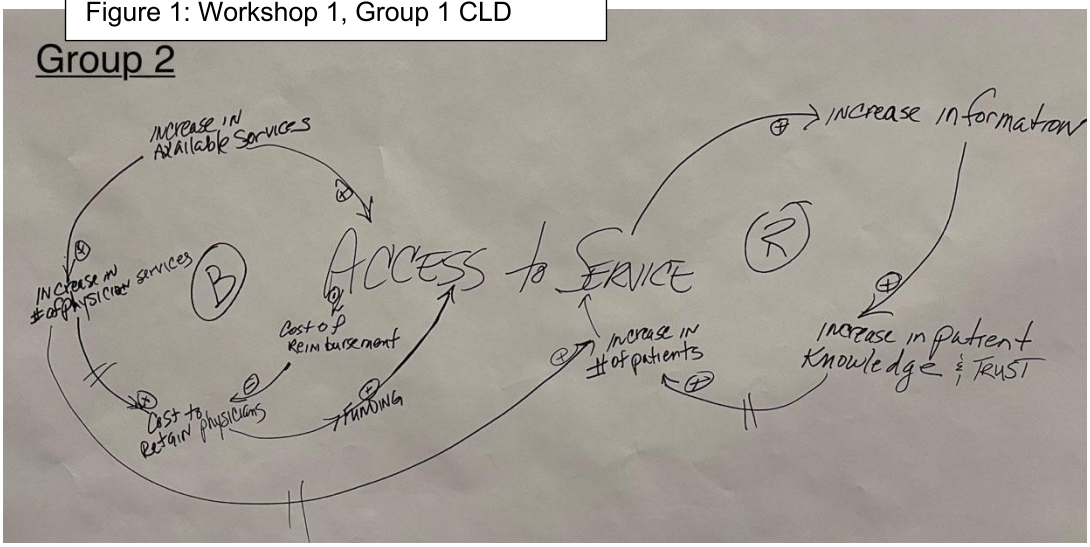


Figure 2: Workshop 1, Group 2 CLD

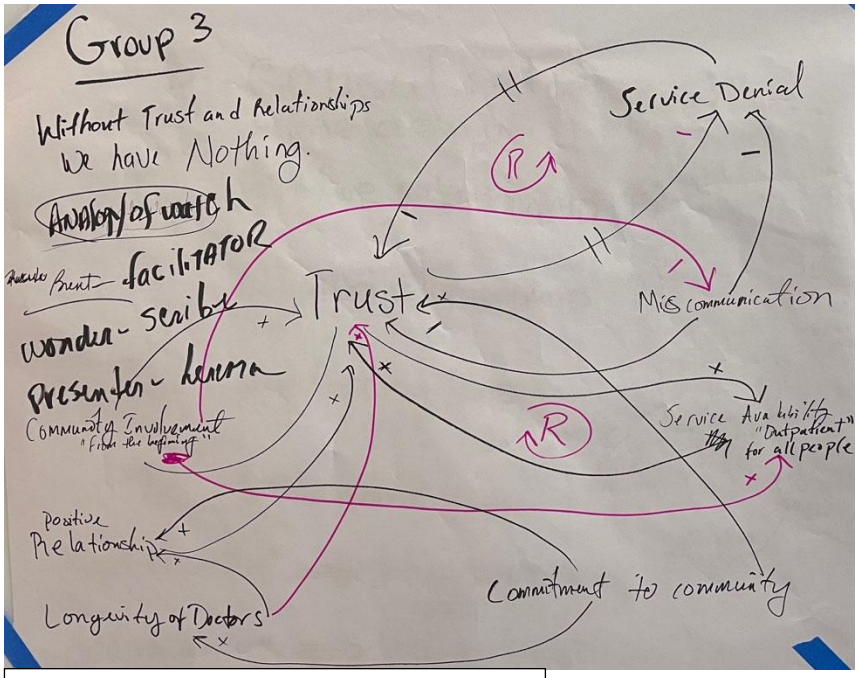


Figure 3: Workshop 1, Group 3 CLD

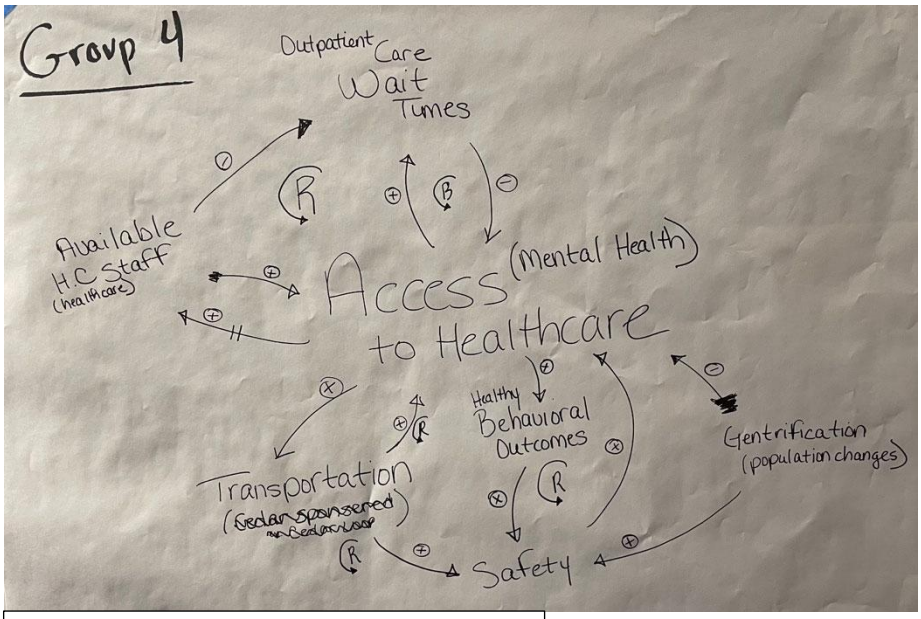


Figure 4: Workshop 1, Group 4 CLD

Aggregate Causal Loop Diagram

After the small groups created their own causal loop diagrams, the facilitation team worked to draft an aggregate diagram that included a combination of the main variables and feedback loops from each of the small group diagrams. The group at large then reconvened, refined the aggregate causal loop diagram, and added any additional variables or arrows they felt necessary. A digital version of the aggregate model is below. Table 1 on the following page includes descriptions of each of the feedback loops in the aggregate model.

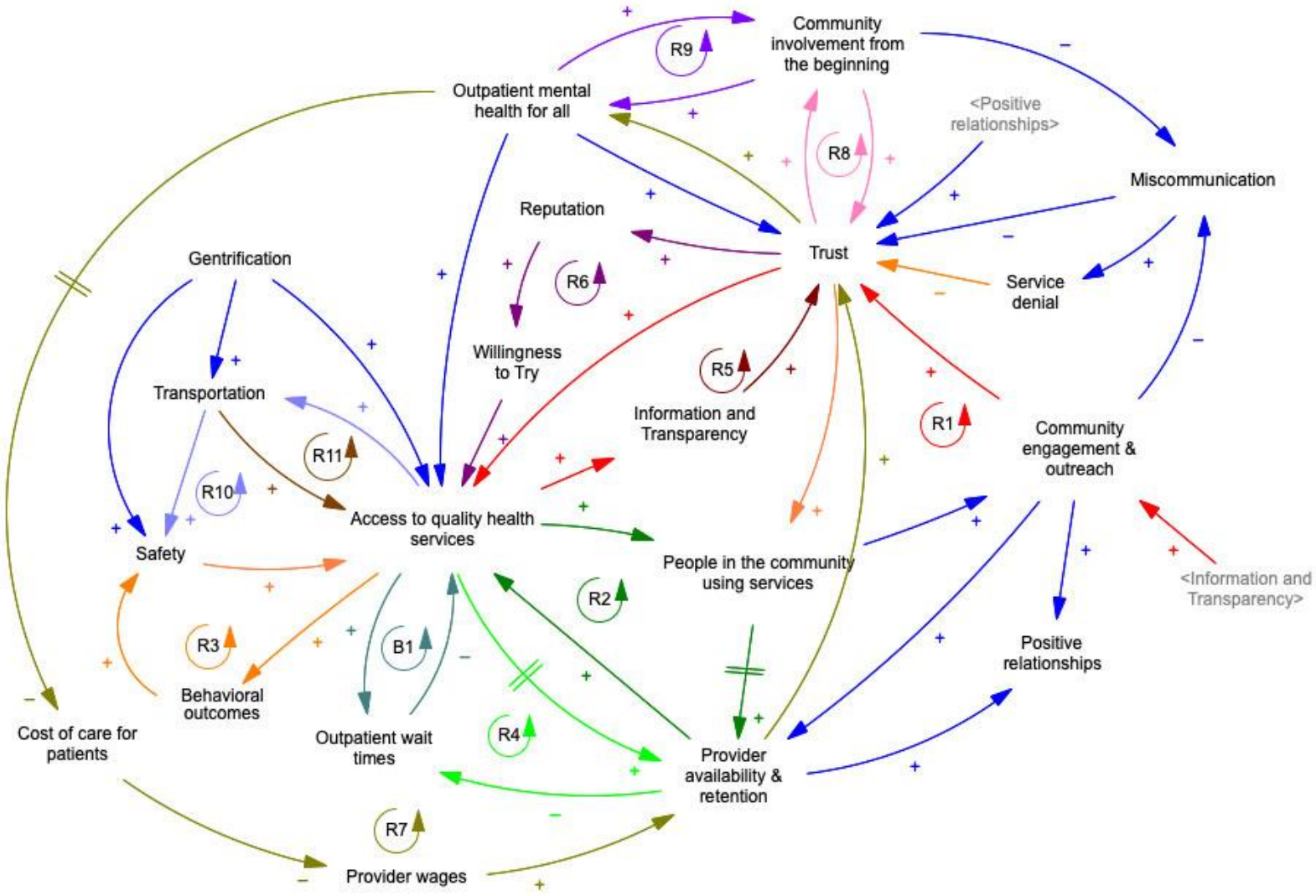


Figure 5: Workshop 1, Aggregated CLD

Table 2: Description of loops in aggregate CLD for Workshop 1	
Loop	Description
R1	*Community engagement, trust improves service utilization.* More outreach to communities surrounding Cedar and engaging with residents increases their trust of Cedar Campus given historical mistrust and bad reputations of previous owners. With better trust, people in the communities will feel more willing to try services or more comfortable using services offered by Cedar Campus. The increase in people using services leads to residents engaging with Cedar Campus more and facilitates increases in community engagement & outreach.
R2	*Utilization improves provider retention and increases access.* When people use services from Cedar Campus, over time, administrators at Cedar will be better able to retain providers or even increase the number of providers to meet patient needs/demand. With more providers available, patients will have better access to care from all the physicians which will then cycle back to an increase in use of services.
R3	*Cycle of behavioral health, safety, and access to care.* With more access to quality healthcare, behavioral health outcomes around Cedar Campus will improve. An improvement in behavioral health will directly lead to an increase in safety around the campus. With residents feeling safer in the neighborhoods around Cedar Campus they will be more comfortable walking to obtain care resulting in an increase in access to care.
R4	*Provider retention impacts wait time.* Over time, a continued increase in access to care accumulates to lead to an increase in provider retention. With an increase in provider retention there should be a decrease in patient wait times. A decrease in wait times will improve the visit experience of patients and allows for more patients to be seen in a timely manner, thus increasing access to care.
R5	*Information and awareness improves trust, access.* An increase in information and transparency around Cedar Campus services will lead communities to be more trusting if they understand what is being offered. This increase in trust leads to residents being more comfortable accessing care at Cedar and with more people accessing care, those patients will be able to share their experiences at the hospital with others, cycling back to an increase in information about services in the communities.
R6	*Improving trust can address historical reputations.* As described in R5, an increase in access will lead to an increase in information and transparency around Cedar Campus which results in an increase in trust. This increase in trust can then improve the reputation around Cedar Campus. This reputation has historically been very bad with local residents referring to a previous owner as “Killacordia” instead of “Misercordia”. This negative reputation has caused local residents to be unwilling to try services at Cedar. An improved reputation due to improved trust will allow residents with negative experiences or those familiar with the previous reputation to be more open and willing to try care. This willingness to try will cause more people to access care.
R7	*Virtuous cycles of provider retention, trust, quality of care, and costs.* Systems that are better able to retain providers create an opportunity for relationships between providers and patients. This increases the trust of the community in the system and can increase the demand for and the ability to provide outpatient mental health for all. Being able to provide consistent outpatient mental health for all, reduces the cost of care to patients overtime because less inpatient or emergency services are being used to cover this need. This allows for a more cost effective system in which as system costs decrease, more money is available for provider pay, which increases retention.
R8	*Community involvement increases trust.* Including community residents in planning, initiating, and developing plans from the conception of a project leads to better trust. When residents notice and perceive that others are being involved they will also be more trusting

	even if they were not part of the involvement. This increase in trust allows more residents to be willing to be involved and thus will cycle back to increasing trust.
R9	*Community involvement increases alignment between care systems and community needs.* Stakeholders reported that there is a mental health crisis among children in the community and perceived that other institutions such as CHOP are not adequately addressing it. Community involvement in the beginning could identify children's mental health as a problem in need of treatment. As a consequence, Cedar Campus could include appropriate behavioral health for children. As the community sees its needs being addressed, the community would be more willing to be engaged with Cedar Campus via increased buy-in, trust and other related mechanisms.
R10	*Transportation increase perception of safety.* Safety can influence access to care as described in R3. This increase in people accessing care can then lead to an increased demand for transportation. With more transportation options, residents will feel safer and will then access more care. An additional driver of this cycle is gentrification. As gentrification increases this will also increase the number of residents in the area and put more demand for transportation options on SEPTA as well as gentrification directly increasing safety.
R11	*Transportation directly increases access.* As described in R10, more people accessing care can cause an increased demand for transportation options. As SEPTA and others respond to this demand with more transportation options then residents will be better equipped to access care at Cedar Campus.
B1	*Wait times negatively impact access to care.* When more patients are accessing care wait times go up. However, with an increase in wait times, patients will be less likely to return to access care.

Places to Intervene

At the close of the workshop, participants were asked to consider the causal loop diagrams and then brainstorm places to intervene to increase access to care at Cedar Campus. Participants were asked to consider actions that would: 1) intervene directly on variables in the causal loop diagrams; 2) accelerate reinforcing feedback loops; or 3) break balancing feedback loops; 4) integrate new structures into the models. Participants were asked to explain where their intervention ideas fit on the CLD, and the modeling team incorporated these interventions as new variables onto the existing CLD, depicted here in red.

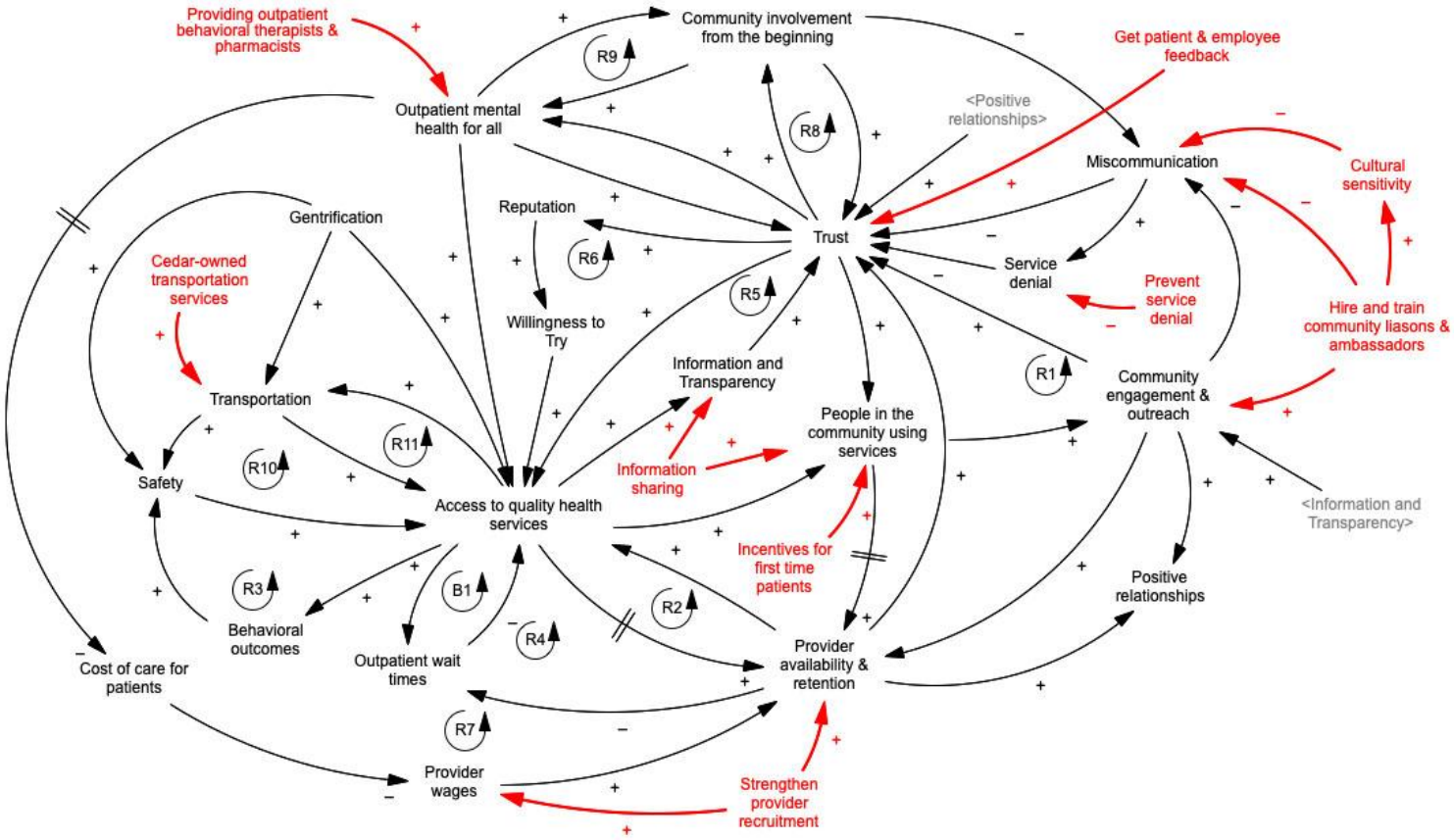


Figure 6: Workshop 1, Interventions CLD

Participants also plotted the intervention ideas on axes of 'Low Impact' to 'High Impact', and 'High Feasibility' to 'Low Feasibility'. The intervention ideas developed in the sessions are reported below. Please note that some of the ideas were determined to be 'medium' in terms of impact or implementation cost; we therefore sorted these to one box or another for the purposes of this report.

Table 3: Workshop 1 Places to intervene matrix	
High Impact, High Feasibility	**High Impact, Low Feasibility**
• Providing outpatient behavioral therapist & pharmacists for medication pick onsite to compliment the CRC on campus. This will improve mental health outcomes for all and feed into better access to quality health services • Get patient & employee feedback through feedback or exit surveys. This will increase trust and feed into better access to care as well • Generally improve cultural sensitivity at Cedar as well as bilingual outreach teams/health navigators to decrease miscommunications which can improve trust and eventually access to quality care • Establishing community ambassadors or liaisons as well as general investment in a larger outreach team. These staff would do all levels of the mutli-layered outreach. This would increase the previous intervention of improved cultural sensitivity as well as directly improving community engagement/outreach while decreasing miscommunications • Prevent service denials by findings the root cause for the denial and address these so that no one is turned away. This would decrease service denials and improve trust • Strengthen provider recruitment to increase the number of qualified physicians to serve the community to improve provider retention • Incentives (such a swag bags) for first time use of services at Cedar to increase people in the community using services • Information sharing to increase transparency via social media, storytelling, tours, printed publications, newsletters, FAQ sheets, flyers, PSAs, canvassing, etc. This can improve relationships and lead to more people using services as well as increasing awareness leading to more trust	• Cedar owned transportation services for picking up patients and bringing to their appointments or transferring to other institutions (HUP, CHOP, etc.) when Cedar Campus doesn't offer specific type of care. This will increase transportation and access to care at Cedar
Low Impact, High Feasibility	**Low Impact, Low Feasibility**
•	•

Workshop 2: Cedar Campus Providers

Small-Group Causal Loop Diagrams

Two small groups of 4 participants produced one-two causal loop diagrams each with variables and feedback loops that help explain access to total comprehensive care at Cedar Campus. The diagrams from each group are below:

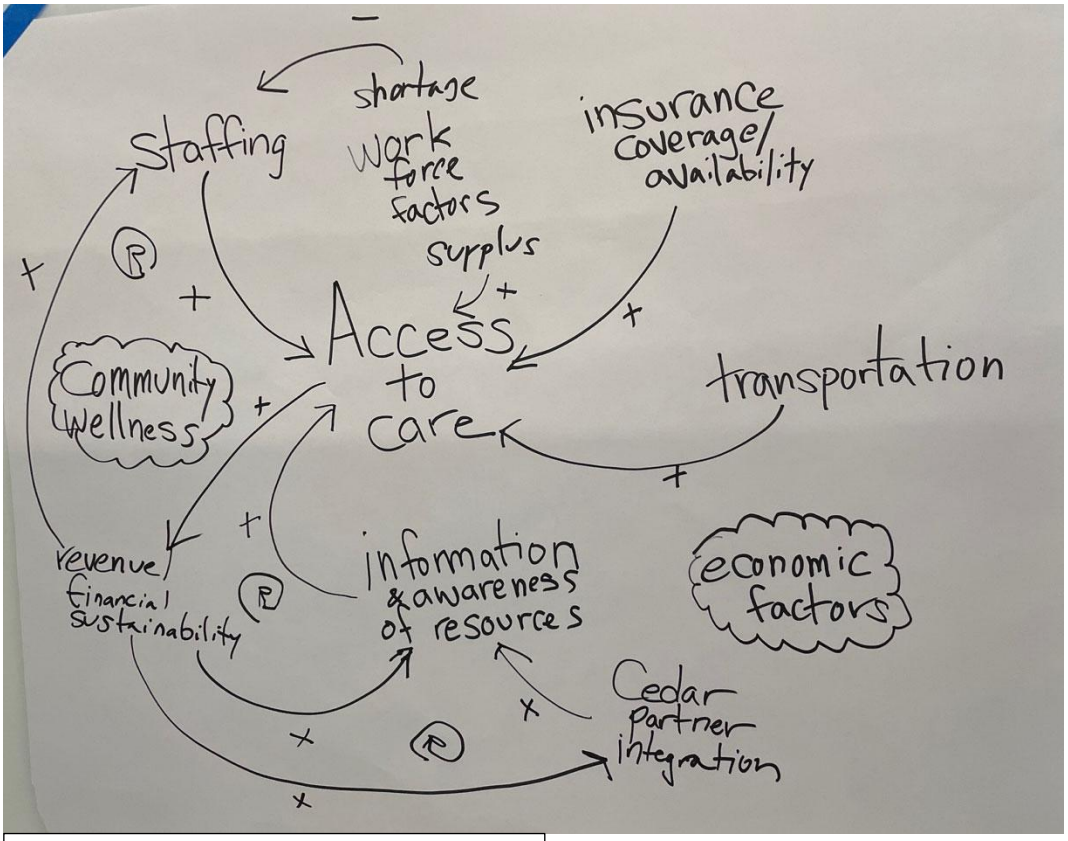


Figure 7: Workshop 2, Group 1 CLD#1

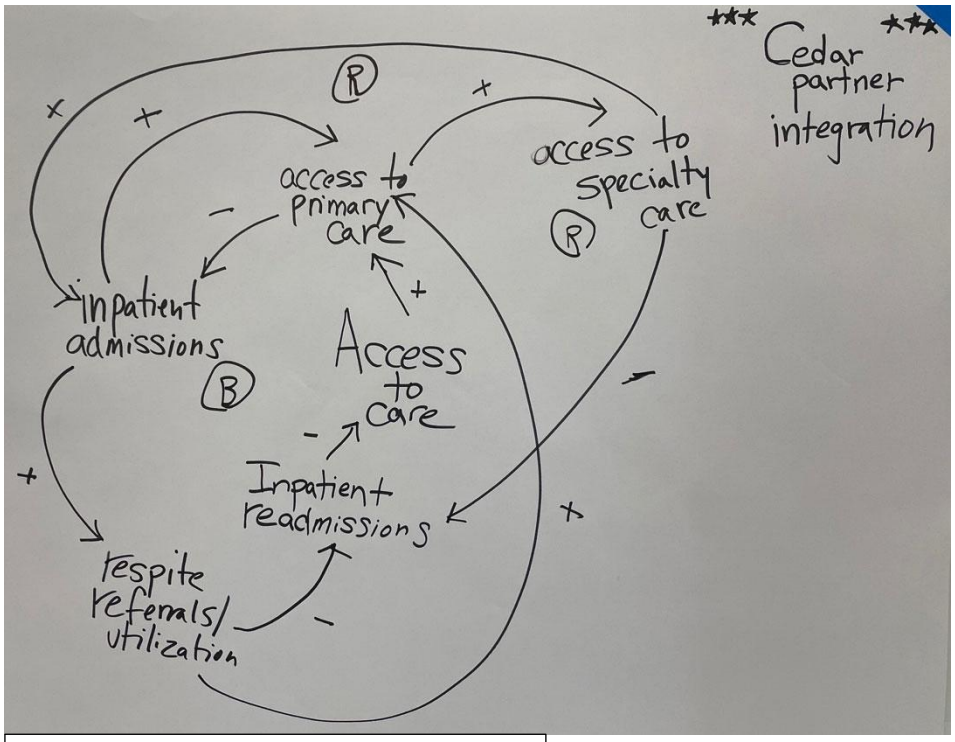


Figure 8: Workshop 2, Group 1 CLD#2

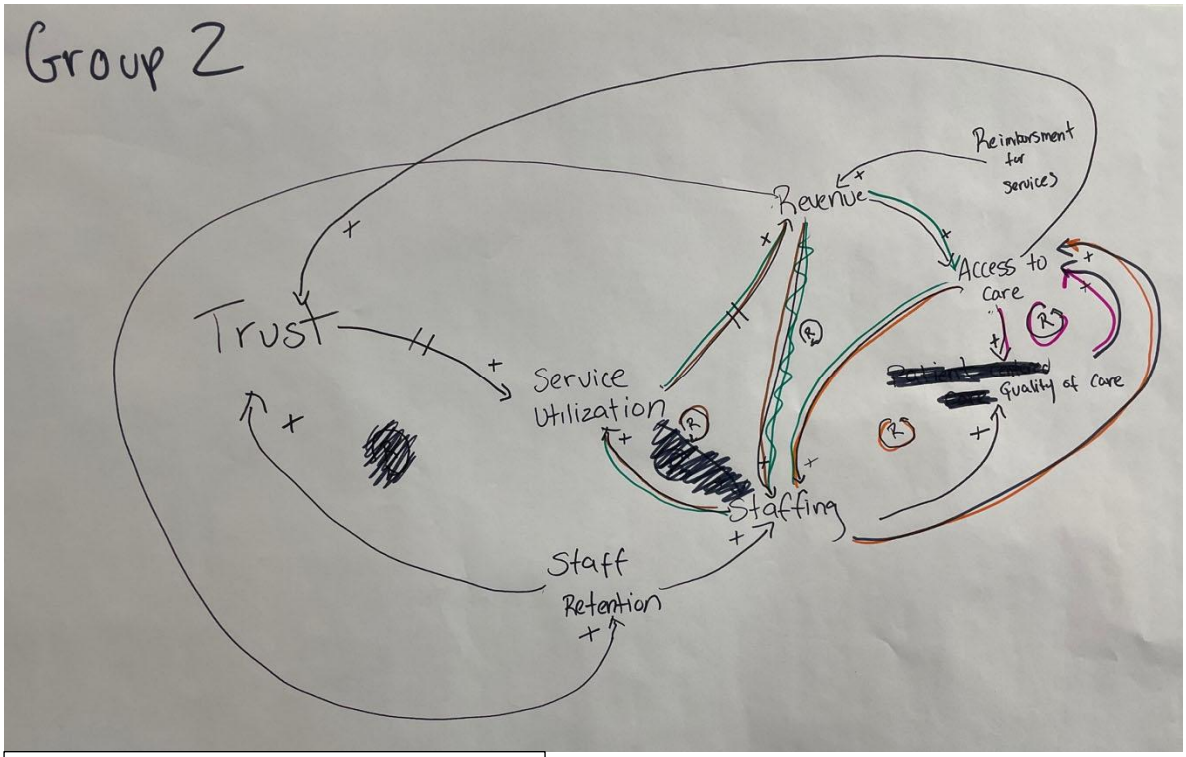


Figure 9: Workshop 2, Group 2 CLD

Aggregated Causal Loop Diagram

After the small groups created their own causal loop diagrams, the facilitation team worked to draft an aggregate diagram that included a combination of the main variables and feedback loops from each of the small group diagrams. The group at large then reconvened, refined the aggregate causal loop diagram, and added any additional variables or arrows they felt necessary. A digital version of the aggregate model is below. Table 4 on the following page includes descriptions of each of the feedback loops in the aggregate model.

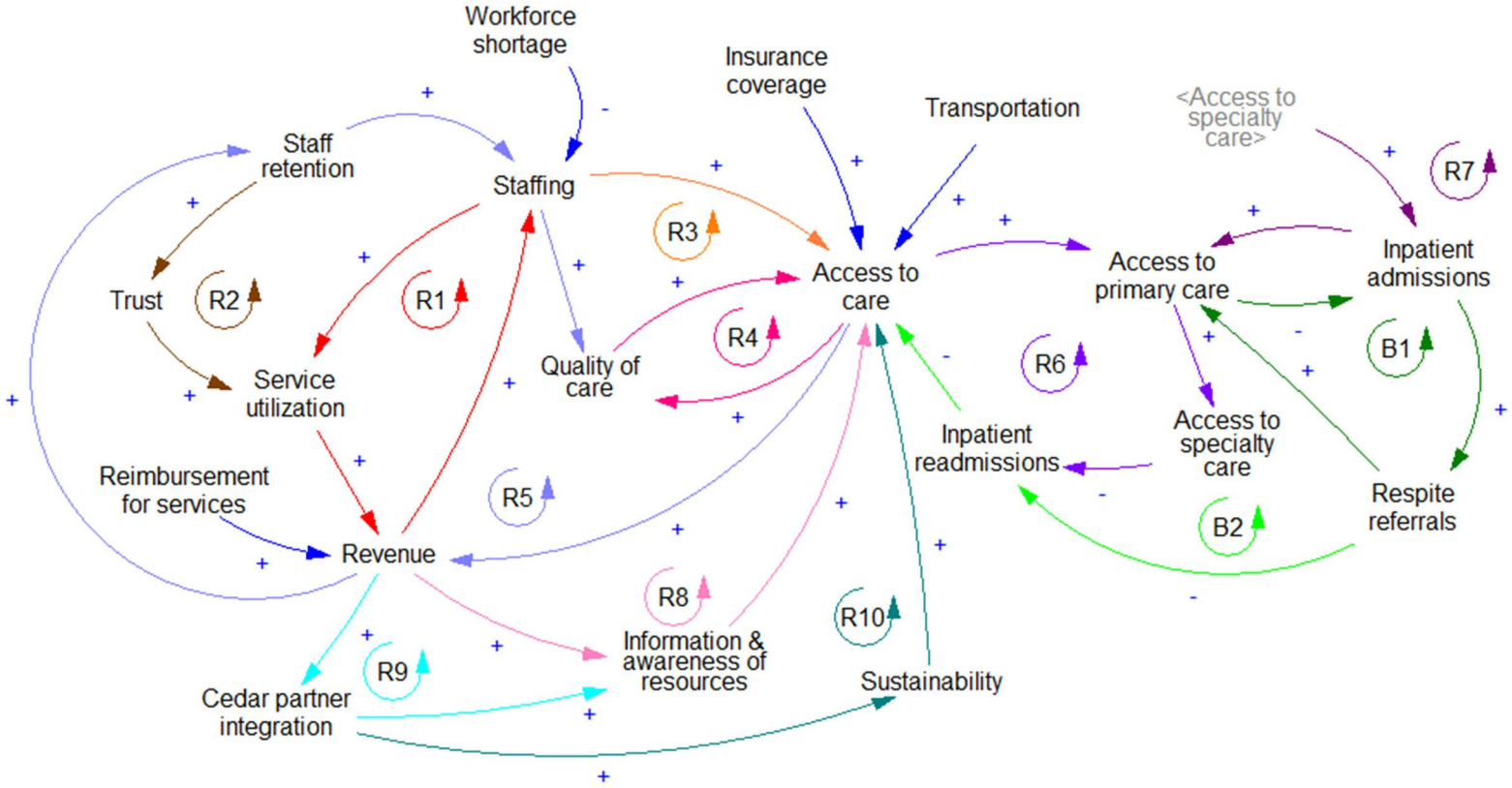


Figure 10: Workshop 2, Aggregated CLD

Table 4: Description of loops in aggregate CLD for Workshop 2	
Loop	Description
R1	*Increased staffing allows for more utilization and revenue.* Increasing staffing at Cedar Campus allows programs to see more patients therefore increasing service utilization. With more service utilization, Cedar will have an increase in revenue. This increase in revenue can be invested in more staffing as well. However, workforce shortages can have a negative impact on increasing staffing.
R2	*Staff retention leads to trust, use, revenue.* An increase in staff retention leads to patients being able to develop long term relationships with their providers which builds trust within patients. An increase in trust will result in more patients using services. This increase in utilization results in an increase in revenue which can feed back into staff retention as described in R1.
R3	*Access increases revenue, staffing*. An increase in access to care will lead to more patients and an increase in revenue. This increase in revenue can be invested in staffing, as described in R1. With more staff, patients have better access to care
R4	*Access and quality of care cycle.* An increase in quality of care provided will lead to more patients accessing care. With an increase in access to care patients will have access to high quality care that cycles back into better access.
R5	*Investing in quality care cycle*. With an increase in access to care there will be an increase in revenue. That revenue can be spent on incentives, salary increases, or other benefits to improve staff retention. The increase in staff retention leads to more staffing, which can have a positive impact on quality of care. This high-quality care will lead back to an increase in access to care resulting in an increase in revenue.
R6	*Primary care, specialists, decrease inpatient readmissions*. With better access to care, patients will also have better access to primary care. An increase in access to primary care is directly related to an increase in specialist care via referrals. This increase can lead to patients having their health concerns addressed in the appropriate places and prevent patients going to the ER for non-emergency services. This will lead to less inpatient readmissions. Inpatient readmissions negatively impacts access to care because readmissions don't generate revenue to invest in more access. Therefore, a decrease in readmissions lead to an increase in access.
R7	*Primary care, specialist care increases inpatient admissions.* An increase in access to primary care can lead to an increase in specialty care as described in R6. This increase in specialty care can lead to an increase inpatient admissions. This increase in inpatient admission will then lead to patients being referred to primary care leading to an increase in primary care.
R8	*Revenue spent on information & awareness results in better access.* When there is an increase in revenue, some of that revenue can be spent on advertising, information sharing, and campaigns to increase awareness of services. This increase in information and awareness in the community leads to residents better understand what care is offered at Cedar Campus and will lead to residents having better access to care. This increase in access will lead back to an increase in revenue.
R9	*Revenue invested in integration leads to awareness and more access*. An increase in revenue can be invested in better integration of services within

	Cedar Campus. This integration of services will lead to better awareness and knowledge of services both within staff and providers as well as with patients. An increase in provider awareness can result in better referrals for patients and the patients having better access to care. The increase in information leads back to an increase in access and revenue as described in R8.
R10	*Integration leads to sustainability and increases in access.* An increase in integration of Cedar Campus providers and services will lead to better sustainability by referring patients to other in-house services rather than to external providers. This increase in sustainability will lead to better access to care. Better access to care leads back to revenue and revenue to integration as described in R9.
B1	*Respite referrals and primary care access, balances inpatient admissions.* When vulnerable patients, such as homeless patients, are admitted they need to be referred to respite to properly heal and recover. Referrals to respite can also help with connecting vulnerable populations to needed primary care. Receiving access to primary care can help with more preventive measures and management of chronic conditions that prevent patients from needing to be admitted.
B2	*Respite referrals decrease readmissions, increasing access*. Inpatient admission can lead to an increase in referrals to respite care as decreased in B1. Respite care directly decreases readmissions because vulnerable populations won't return to environments that are harmful for their health and require readmission. A decrease in readmission can lead to an increase in access to care and access to primary care as described in R6. Access to primary care leads to decreases in inpatient admission that would lead back to a need for respite care.

Places to Intervene

Similar to the first workshop, participants were asked to consider the causal loop diagrams and then brainstorm intervention ideas to increase access to care at Cedar Campus. Participants were asked to consider actions that would: 1) intervene directly on variables in the causal loop diagrams; 2) accelerate reinforcing feedback loops; or 3) break balancing feedback loops; 4) integrate new structures into the models. The modeling team then incorporated these interventions as new variables onto the existing CLD (in red), and added new structures as outlined by participants (Figure 11).

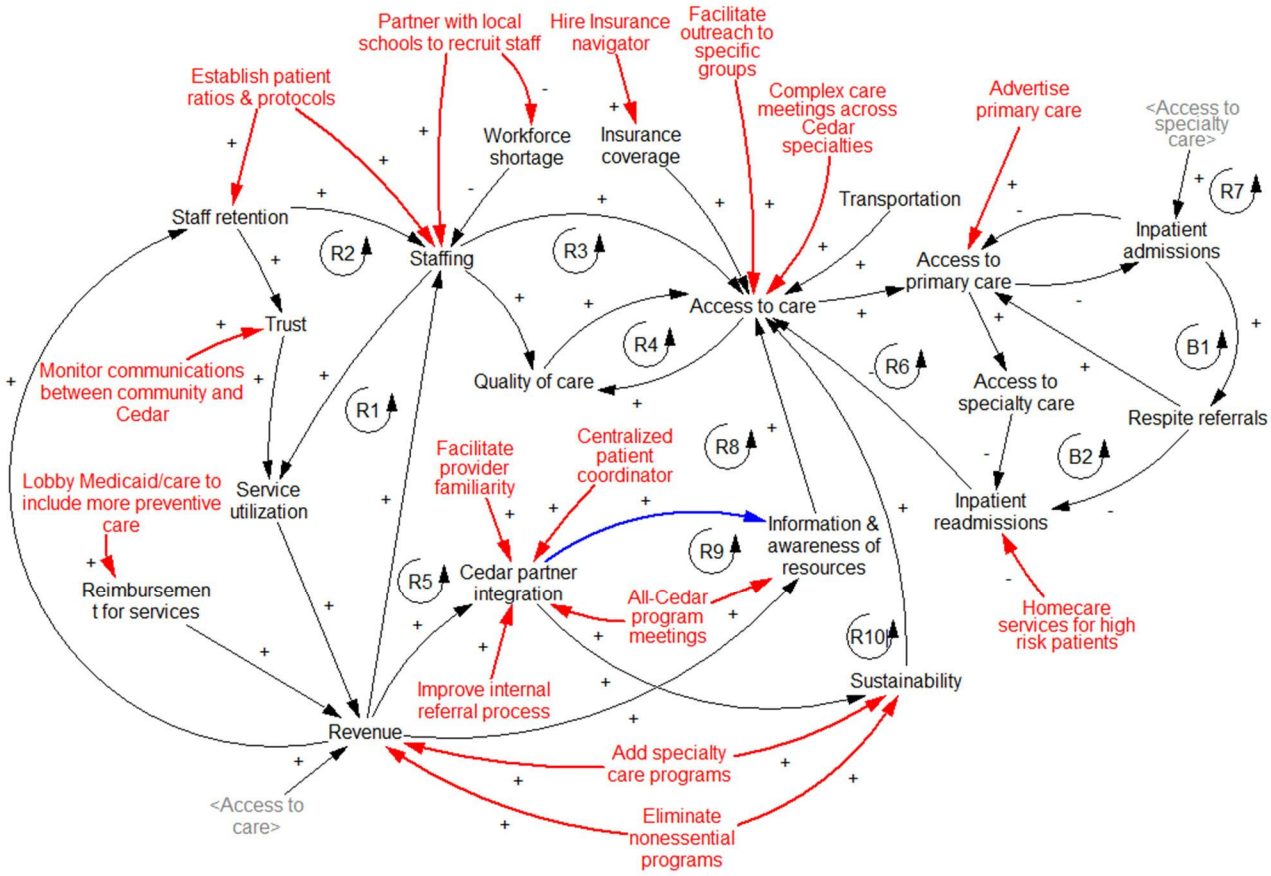


Figure 11: Workshop 2, Interventions CLD

Participants also plotted the intervention ideas on axes of 'Low Impact' to 'High Impact', and 'Easy to Do' to 'Hard to Do'. The intervention ideas developed in the sessions are reported below. Please note that some of the ideas were determined to be 'medium' in terms of impact or implementation cost; we therefore sorted these to one box or another for the purposes of this report.

Table 5: Workshop 2 Places to Intervene

High Impact, High Feasibility	High Impact, Low feasibility
• Improve internal referral process for all services offered in the hospital to improve Cedar Partner Integration • Eliminate or restructure nonessential programs to improve sustainability and revenue • Facilitate provider familiarity with one another to improve Cedar partner integration • Improve Cedar integration via information sharing (blue arrow) • All Cedar program meetings to help improve both integration and information and awareness internally of other programs • Partner with local schools/university to develop a pipeline or recruit new staff to negatively impact workforce shortages and increase staffing • Centralized intake/care coordinator to improve Cedar partner integration* • Advertise primary care to improve access to primary care* • Facilitate outreach to specific groups who could be high pools of patients (eg. unions) to increase access to care* • Complex care meetings across Cedar specialties to create multidisciplinary teams to route patients with complex care to various internal or external services* • Monitor communication quality and coordinate engagement between Cedar & community via a new department or existing staff to improve trust* • Hire insurance navigators to improve insurance coverage and access to care* • Establish patient ratios/procedures to improve staffing and retention*	• Lobbying for Medicaid/Medicare to include more preventative procedures can help to improve reimbursement for services and ultimately revenue • Increase specialty care programs at Cedar to increase revenue and sustainability
Low Impact, High Feasibility	**Low Impact, Low Feasibility**
• Homecare services for high-risk patients as well as care coordination teams can help to reduce readmissions	•

*Interventions ranked more medium feasibility but grouped up to high for ease of reporting

Reflections and Insights Across Workshops

Across the two workshops, participants created two dynamic hypotheses about factors driving and important to consider in being able to provide comprehensive total health care in the Cedar Campus area. One of the ways to identify insights from each of the workshops is to assess the central variables in each of the synthesis CLDs (Figures 5 and 10). Central variables are those that are involved in a high number of relationships with other variables and, potentially, in a large number of feedback loops. Due to these relationships and feedback loops, central variables within the context of the system are potential leverage points in which a small change can yield an outsized impact on the system – either in a desirable or undesirable location. As expected, given the problem statement of the workshops, access to quality care was a central variable in both workshops. In Workshop 1 , “access to quality health services” was involved in 14 causal relationships and 6 feedback loops identified by participants. In Workshop 2, “access to care” was involved in 10 causal relationships and 8 feedback loops.

In Workshop 1, the next most central variable was “trust” and in Workshop 2 the next most central variable was “revenue.” From Workshop 1, trusts had 13 relationships and 5 feedback loops. Of note, the number of causal arrows flowing into and out of “trust” was nearly equivalent to that of “access to care.” In contrast, there were fewer causal relationships identified between “revenue” and other variables described in Workshop 2. “Revenue” only had 7 causal relationship and 4 feedback loops. While “trust” was not the second most central variable in workshop 2 did it appear in the CLD with 2 causal relationship and 1 feedback loop. In contrast, workshop 1 did not include “revenue” specifically, although they identified variables for “cost of care for patients” and “provider wages” each with 2 causal relationship and part of the same singular feedback loop.

An additional insight from the aggregate CLDs is that much of the emphasis in Workshops 1 was on integration of Cedar Campus with the larger community. Participants viewed it as critical for Cedar Campus to become integrated into the community and not just physically located in the community. In contrast, much of the emphasis in Workshop 2 was on integration of services within Cedar Campus. In other words, an implied objective of Workshop 2 participants was to make sure that services and service providers knew about each other and were well-coordinated in directing patients to the care they needed. A conclusion is that both of these insights are important – balancing integration of Cedar Campus into the community while also ensuring that services are well integrated within Cedar Campus will be essential to creating a sustainable model.

In both workshops, participants identified a number of levers to pull that they viewed as highly feasible and highly impactful in the Places to Intervene activity. In both workshops, participants identified provider recruitment as a highly feasible, high impact area to intervene. This included both general recruitment and retention efforts as well as recruitment of specific provider types and specialties (e.g., behavioral and mental health).

A further insight is that many of the interventions in both of the workshops related to information flow. However, there was a substantive difference in emphasis: in Workshop 1, interventions largely involved communication, trust building, and sharing of information between Cedar Campus and the community. In Workshop 2, much more of the emphasis was on ensuring that different care units within Cedar Campus were aware of each other, talking, and making efficient referrals. These complimentary focuses mirrored the similarities and differences between the groups in other activities.

Given that trust was a central variable in the aggregate CLD from Workshop 1 and that information & awareness of resources was important in the CLD from Workshop 2, one consideration is that successful implementation of Cedar Campus may require a larger community outreach team and meaningful investment in that team to rebuild and sustain community trust.

Next Steps

Again, we want to thank all our participants so much for their time and commitment to this project through the group model building workshops. Looking ahead, we will use the variables you identified to begin to select indicators to measure Cedar Campus progress and success. Additionally, we will use the aggregated CLDs to develop a draft Theory of Change showing how Cedar Campus can impact these key variables. Finally, this report will be shared with the Cedar Campus Executive leadership team to imbue strategy efforts to improve service delivery on the Cedar Campus.

Cedar Campus Evaluation Planning

Group model building workshop
October 6 & 11, 2023

Workshop Agenda

Last revised: October 5, 2023

DREXEL UNIVERSITY
Dornsife
School of Public Health

Cedar Campus Evaluation Planning
Group Model Building Facilitation Manual
Session 1

Drexel University
Dornsife School of Public Health
Philadelphia, PA

Objectives **1**
Modeling Team **22**
Participants: ..... Error! Bookmark not defined.
Planning Logistics **25**
Agendas **26**
Group Model Building Scripts **35**

Objectives

Workshop Objectives (Explicit):

4. Gather insights that will inform an evaluation of the Public Health Campus at Cedar (Cedar Campus).
5. Convene community and practice stakeholders that receive care, provide care, or are invested in Cedar Campus.
6. Use systems thinking activities to understand drivers of access to care in the communities surrounding Cedar Campus.

Workshop Objectives (Implicit):

- Learn about and expand how stakeholders think about access to care for the communities surrounding Cedar Campus.
- Identify common themes and variation in themes among stakeholders with different expertise and perspectives
- Build a group of community and practice stakeholders that can use systems thinking to help build an evaluation of the Cedar Campus

Problem Statement:
What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar area? Think about these areas of well being in addition to medical care physical, mental, social well-being.

Modeling Team

Core Modeling Team

The core modeling team (CMT) is responsible for the design of the workshop.

Role	Team member
Modelers	Irene, Brent
Familiarity with Stakeholders	Aunya
Scientific Objectives	Maggie
GMB Process	Irene, Brent

Facilitation Team

The facilitation team is responsible for the delivery of the workshop itself. Facilitation team members may be a part of the core modeling team or could be brought in for the facilitation only.

Role	Team member
Convener/Closer ***	Aunya
Community Facilitator	Hyden
Modeler Facilitator *	Irene, Brent, Sofia
Note Taker	Amirah, Maggie
Reflectors	Aunya
Theme Builder	Brent, Rita, Christina (10/11 only)
Runner	Brent, Irene, Rita (10/11 only)
Tech and coordinating support	Lola, Caroline

Facilitation Team Roles

Meeting Convener/Closer: Primary responsibility for starting the session, introducing participants to the exercise, making sure that participants understand the purpose of the exercise within the context of their organization or community, and introducing the facilitators. Closer has primary responsibility for bringing the session to close and thanking participants for their time.

Community Facilitator: The community facilitator's primary responsibility is to extend their social capital to help the community accept and work with the modeler facilitator. This is a person who is familiar with the local or substantive knowledge of the problem being modeled and knows the local language and community norms in cross-cultural situations. The substantive expert/facilitator should have strong group facilitation skills, some exposure to system dynamics (e.g., through the planning process and training session or workshop) and have sufficient knowledge of the topic and/or community to anticipate and mediate conflicts that might arise within the group model building session.

Modeler Facilitator: Primary responsibility for system dynamics modeling and group model building process. This is a person who is trained in systems thinking/system

dynamics model with expertise teaching and leading groups in the use of systems/thinking/system dynamics. The person should also have experience facilitating groups and leading group model building sessions. If the goal of the project is to develop a simulation model, it is expected that the modeler/facilitator also be an expert modeler and able to anticipate and address the variety issues that can arise in data and modeling. This is a person with expertise in system dynamics modeling and software (Vensim, IThink/Stella, etc.), formulating and entering equations, testing and analyzing the model, and running simulations for answering policy questions.

Note Taker/Time Keeper: Primary responsibility for taking notes about what is said in the workshop and notifying the facilitation team when time is short. It is overall very important to start and end on time as much as possible.

Reflector: Primary responsibility for helping the group reflect on what they have done so far and recognize the issues/insights that have been developed during the modeling. This role requires someone who can speak to the relevance of the activities and insights to a larger substantive context, or to system dynamics modeling more generally.

Runner: Primary responsibility is to be available to solve logistical problems as they emerge – including technical assistance, materials, etc. These people can also be on hand to support with theme building.

Theme Builder: The primary responsibility of the theme builder is to organize products from an exercise into thematic clusters, as well as to explain the clusters to the participants in order to elicit their feedback.

Planning Logistics

Space Requirements

- 1 room with 20 person capacity
- Wall space for chart paper
- Projector screen & projector
- Food and drink (coffee, etc)
- Breakout rooms or spaces for 3-4 small groups

Materials Needed

- Digital projector
- Fat flip chart markers (at least one per participant)
- White printer paper
- Blue printer paper
- Yellow printer paper
- Blue painter's tape
- Flip charts
- Colorful 1-in dot stickers (the kind that are used in yard sales)
- Post-It Notes
- Name tags
- Cameras
- Audio recorders
- Note takers

Agendas

Summary Agenda

Activity	Duration	Time
Participants Arrive / Coffee	30 min	8:30-9:00
Welcome & Introductions	20 min	9:00-9:20
General presentation	40 min	9:20-10:00
Hopes & Fears	45 min	10:00-10:45
Break	15 min	10:45-11:00
Graphs Over Time	40 min	11:00-11:25
Dots	5 min	11:25-11:30
Causal Loop Diagramming	1 hr	11:45-12:45
Presentations	30 min	12:45-1:15
Lunch	1.5 hr	1:15-2:45
Model synthesis	1 hr	2:45-3:45
Break	5 min	3:45-3:50
Places to Intervene presentation	10 min	3:50-4:00
Places to Intervene	30 min	4:00-4:30
Dots	5 min	4:30-4:35
Reflection	20 min	4:35-4:55
Close	5 min	4:55-5:00

Anticipated Outputs

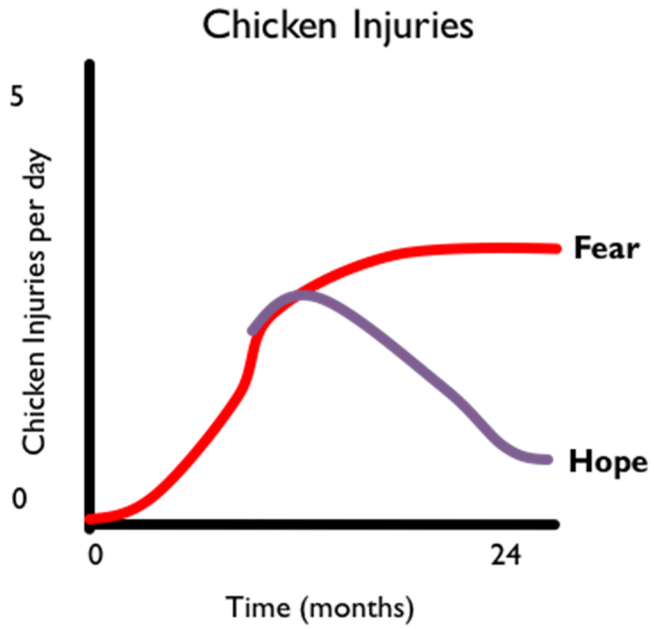
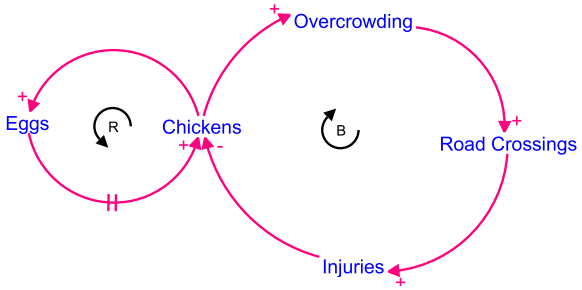
Activity	Output
Welcome	--
General presentation	
Hopes & Fears	List of hopes & fears
Graphs Over Time	Graphs over time Clusters/themes
Dots	Ranking of relative importance of GOTs
Break	
Causal Loop Diagramming	2-3 CLDs
Presentations	--
Lunch	
Model synthesis	Synthesis CLDs Identification of common structures/variables Example of CLD function
Places to Intervene	List of possible places to intervene based on feasibility and impact
Dots	Ranking of importance of variables in synthesis CLDs
Reflection	Notes on key points
Close	

Detailed Agenda

Time	Activity	Roles	Description
8:00-8:30	Room Setup		
8:30-9:00	Participants arrive		Folks will arrive and sign in. Coffee available.
9:00-9:20	Welcome & Introductions	Convener	Key points: • Introduction of facilitation team • Introduction of participants • Summary of goals and agenda for the day
9:20-10:00	Presentation	Cedar Campus Evaluation Overview: **Convener** Systems approaches: **Modeler facilitator**	Talking points: • Overview of Cedar Campus and evaluation planning • Systems approaches in general • Examples of GMB in other contexts • Integrating research and evaluation Goal: communicate the benefit of this workshop for understanding the system, informing evaluation plan, and for stakeholders themselves
10:00-10:45	Hopes & Fears	**Community facilitator**: **Theme-builder**:	**Community Facilitator** asks participants to write hopes and fears for the workshop on pieces of blue (fear) and yellow (hope) paper. S/he highlights that participants should write one hope or fear per paper. Gives 5 minutes to write as many hopes and fears as can think of. With 1 minute left, ask participants to stack their hopes and their fears with the most important ones on top. After 5 minutes, the facilitator asks someone to share 1 hope and 1 fear. **Theme Builder** will take the hopes and fears and cluster them on the wall. After 1-2 rounds of sharing, **Theme Builder** will summarize the hopes and fears, highlighting thematic clusters, and asking for additional observations. Example hopes and fears: • Fears:

			○ People entering and leaving the workshop to attend to other meetings, answer emails, etc. ○ Losing a lot of time if people are late to return from breaks • Hopes: ○ Everyone's opinion is valued the same and everyone feels free and open to share
10:45-11:00	*Break*		
11:00-11:25	Graphs Over Time	**Modeler Facilitator**: **Theme Builder**:	The **Modeler Facilitator** introduces the graphs over time by highlighting that it's easy to come up with explanations about why we behave the way we do, but we need to really think deeper. What's true today may not have been true before...S/he provides 2 examples. The examples will highlight **three** criteria: 1) shorter and longer time horizons, 2) tangible and intangible variables, 3) different groups. Options: • Invasive vs native species • Climate change • Mortgage rates The **Modeler Facilitator** will ask participants in their respective groups to draw as many graphs over time as they can in the next 5 minutes. The prompt used to facilitate this activity will be as follows: *PROMPT:* *Please think of a factor that influences or causes* ***increased access to high-quality, well-coordinated health care in the Cedar area?*** *Think about these areas of well being in addition to medical care physical, mental, social well-being.* *.* *On each paper, draw at least two trajectories – how the factor that influences changes in access to health care over time. On the same chart, please include the trajectory that you hope will happen and the trajectory that you fear will happen.* Participants have **5 minutes** to draw the graphs, but this can be monitored and extended/shortened by a few minutes if necessary. At 4 minutes, a **1-minute warning** is given, and they are asked to

			begin stacking their graphs over time with the most important/favorite on top and least important/least favorite on the bottom. The **Modeler Facilitator** then calls a stop and then goes around using a nominal group technique where each person identifies their top graph over time and explains the graph, which is handed to the **Theme Builder** who clusters the behavior over time graphs (BOTGs) on the wall. The **Theme Builder** then review the clusters and themes, highlighting uncertainty in her choices, and asks participants if there are any changes to be made in where each graph is situated.
11:25-11:30	Dots	**Modeler Facilitator**:	The **Modeler Facilitator** asks participants to take the dots they have on their tables and vote for the most important drivers of changes in access to holistic health care over time. They can vote 5 times for the same graph, or one for each. Colors don't matter.
11:30-11:45	Introduction to CLDs	**Modeler Facilitator**:	First, the facilitator will tell a story of chickens reproducing, population growth, overcrowding, and injuries. Then, the facilitator will present 2 graphs over time to describe these dynamics – of chicken population growth and stabilization, and of injuries. 

			 The facilitator then describes a set of feedback loops as a dynamic hypothesis of a structure that may create this behavior  The presentation will highlight: 1. Polarity 2. Variable definition 3. Feedback loops 4. Delays The facilitator emphasizes that the CLD is a hypothesis about the structures that could create access to total comprehensive health care. S/he then asks if there are other factors or structures, and can add on other sources of injuries, other factors that reduce eggs, etc.
11:45-12:45	Causal Loop Diagramming	**Modeler Facilitator**: **Community Facilitator:**	People will be assigned to subgroups of 3-4 people. Each subgroup will work on building their own causal loop diagram that addresses the same prompt:

			Build a causal loop diagram that explains factors contribute to increased access to total comprehensive health care, supporting physical, mental, and social well-being, that is high quality and well-coordinated for the residents in neighborhoods surrounding Cedar Campus. Prompt: What are the drivers of total comprehensive health care in the neighborhoods around Cedar Campus? While groups work, the facilitation team will circulate, asking questions and providing guidance if folks are stuck. With 5 minutes left CF give a 5-minute warning and ask folks to focus on consequences of target behavior, closing feedback loops.
12:45-1:15	Presentations	**Community Facilitator:** **Modeler Facilitator:**	Teams will present their models to the larger group, focusing on highlighting feedback loops and key stories. Presentations can include narratives describing relationships in the causal loop diagram by telling a story, rooted in lived experiences, of how variables change dynamically. *[Meanwhile **Modelers** begin synthesizing CLD with the aim of creating a draft of the synthesis causal loop diagrams]*
1:15-2:45	Lunch		*[Modelers continue synthesizing CLD]*
2:45-3:45	Model Synthesis	**Modeler Facilitator:** **Community Facilitator**: **Supplies**: Projector	**Modeler Facilitator** will describe how over lunch, the facilitation team reviewed the models and created a united conceptual model that links all of the CLDs that were developed in the first session. Then, the **Modeler Facilitator** will project the CLD and describe how it was constructed using the input of the morning's CLDs, highlighting key stories and ideas. **Modeler Facilitator** then leads a conversation with the team to review whether the model accurately captures the stories of the group, or whether there are new perspectives to be included. **Community Facilitator** will facilitate conversations among participants and ask clarifying questions.

			Modeler Facilitator will make revisions to the model based on proposed changes. The goal is to converge on a consensus view of the problem from a feedback perspective. We will revise the model until no one has adjustments or disagreements to add.
3:45-3:50	*Break*		
3:50-4:00	Places to Intervene lecture		
4:00-4:30	Places to Intervene	**Modeler Facilitator**: **Modeler**: **Supplies:** Post-it Notes Digital model 2x2 grid of impact vs feasibility	Facilitator explains that the CLD/model has tangible and intangible variables/ stocks/ connections. Give concrete examples based on the CLD/ model (e.g. tangible: people; intangible: perception, stress). Considerations of intervention include feasibility and impact: what feedback loops are connected to the variable? How many variables are connected? Give concrete examples based on the CLD/model. (5mins) Example of prompt: “You could choose the place to intervene as [variable 1; e.g. gun ownership]. This may be the least impactful way to intervene because it is only fixing a symptom but may be most feasible. As we can see, [variable 2; e.g. gangs] contribute to [variable 1; e.g. gun ownership] in the CLD/model, and efforts to reduce [variable 1] would only have a temporary effect since the CLD/model suggests that [variable 2] would continue to contribute to [variable 1]. While addressing symptoms may not have the highest impact in a system, it is important to remember that they can still be beneficial." Ask groups to take 10 minutes to identify as many places that they can that could impact the model. "Based on your understanding of the model, where are the impactful points of intervention? What about feasibility? Are there resources in the model that can make your choice of the place of intervention more feasible?” You can also choose to intervene in an intangible variable. For example, you can develop interventions that aim to change mindset. [Insert example of changing mindset; one such example of changing the mindset from the obesity example

			could be changing how people view the cause of obesity from “parents just don’t know how to cook” to “parents are too busy trying to make ends meet with their work and don’t have the time to plan meals, shop, and cook.”]" "Specifically, look at the CLD/model and identify places where you might intervene. [Give example; e.g. In the obesity example, we might try to intervene at “calorie intake”] "There are many different places of intervention in this model, please write down 1. name of variable/stock that you would like to change 2. how feasible the variable change is, 1 being least feasible and 10 being most feasible 3. how impactful you view the variable change is to the topic (Ref mode). 1 being least impactful and 10 being most impactful. 4. There would be two scores, F and I, over 10 for each score” Give 10 minutes; one place to intervene per post-it. Prompt: Sort from most to least important The facilitator then asks individuals/groups to share their places of intervention and the feasibility and likely impact. Groups share one at a time and in a round robin fashion starting with their most important place of intervention. If another individual/group has already identified that place of intervention, then they should select their next most important place of intervention. As each group/individual shares the place to intervene, the Modeler adds the intervention to the (digital) model itself. The Modeler Facilitator then places the Post-It on the 2x2 grid of feasibility and impact. Reflect back to the group your observations about the places to intervene.
4:30-4:45	Dots	**Community Facilitator**:	CF distributes 6 blue dots to each participant. Then asks participants to take the dots they have on their tables and vote for the **most important factors**

			shaping total comprehensive health care around the Cedar Campus. They can vote 6 times for the same factor, or one for each. **Focus on: Most important factors**
4:45-5:00	Reflection and Closing	**Reflector**:	Reflector/s will reflect on the day's activities, focusing on the perspectives of: 1. Participants 2. Research 3. Modeling

Group Model Building Scripts

Scripts were used in the group model building workshop. Scripts are structured small group exercises used in group model building. These scripts are compiled in a wikibook called Scriptapedia which is intended to be a freely distributed book and easily edited to support the creation of new scripts, discussion of what works and what doesn't, and internationalization of group model building practice. Scriptapedia is available at https://en.wikibooks.org/wiki/Scriptapedia.

License

Appendix B

Cedar Campus Group Model Building Session #1

October 6,2023

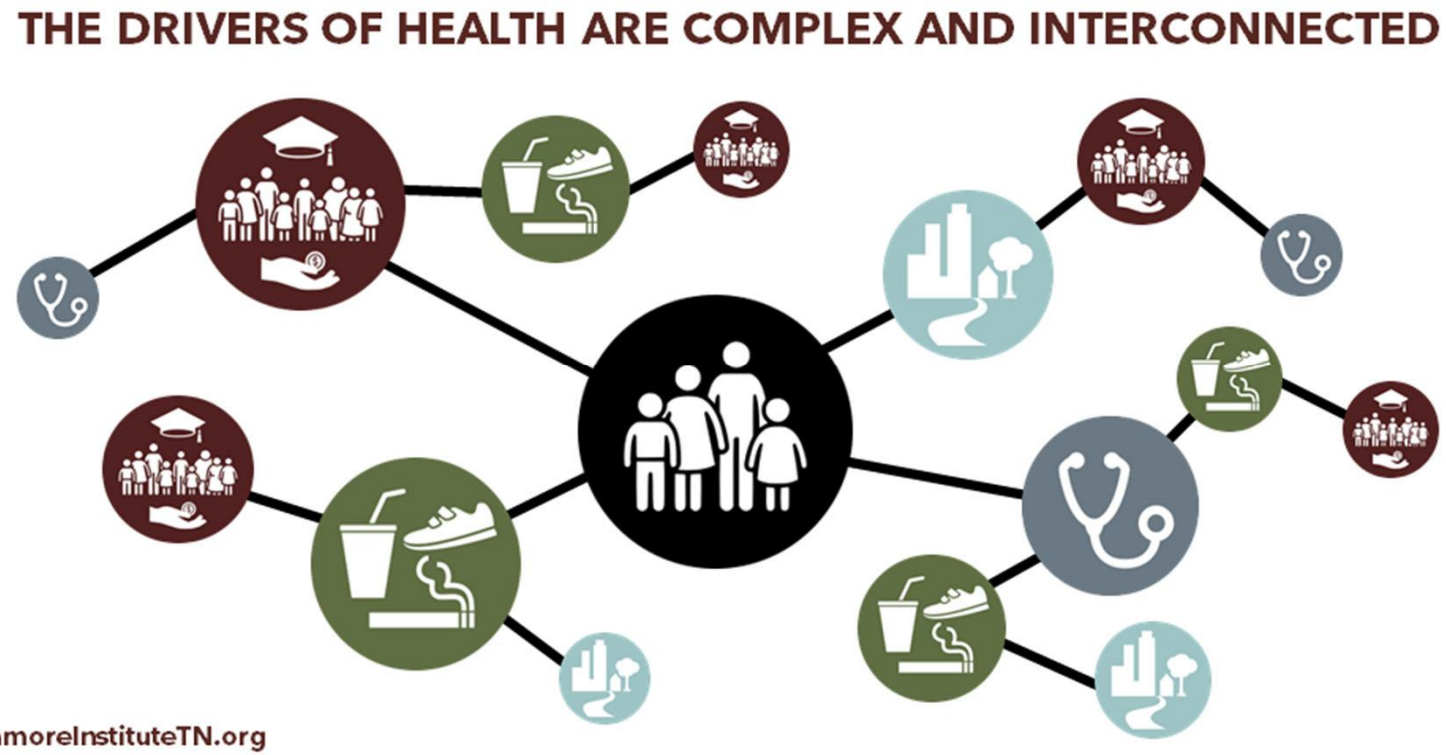
Agenda

- Welcome and Introductions
- Introduction to System Dynamics
- Problem statement
- Overview of activities

Welcome and Introductions

Introduction to System Dynamics

The problems we face in public health are increasingly complex



https://www.sycamoreinstitutetn.org/health/

The problems we face in public health are increasingly complex

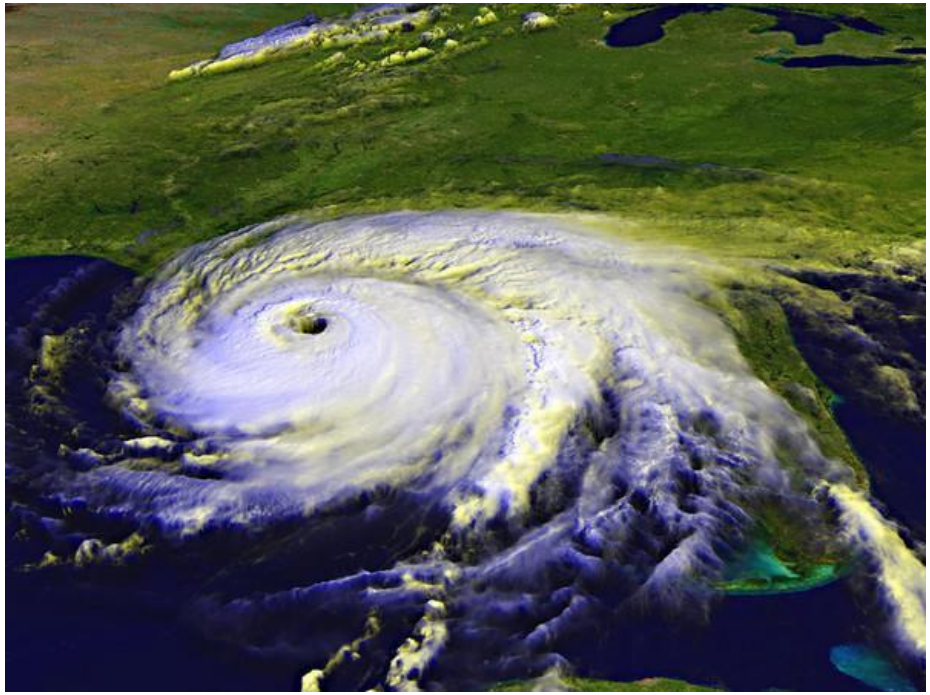
- However not all problems with many moving parts are complex

Complicated Problem: Involves many moving parts and a high level of detail, but the outcome is the sum of the parts

B https://learningforsustainability.net/systems-thinking/; Sterman J. Learning from Evidence in a Complex World. Am J Public Health. 2006.96(3):505-514; Bailey ZD et al. Structural racism and health inequities in the USA: evidence and interventions. *Lancet.* 2017; 389: 1453–63; Zhang et al. Big data science: Opportunities and challenges to address minority health and health disparities in the 21st century. *Ethn.Dis.*2017;27(2):95-106.

The problems we face in public health are increasingly complex

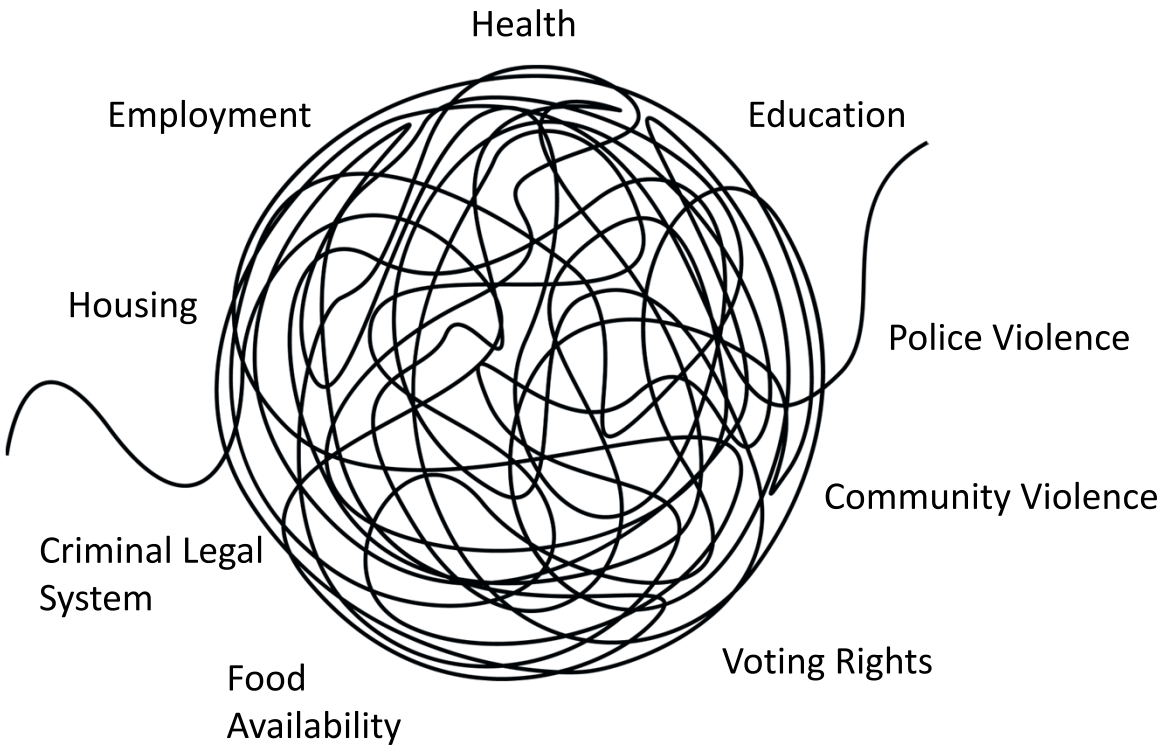
- However not all problems with many moving parts are complex



Complex Problem: Involves multiple moving parts that are interrelated and interdependent with (i.e. feedback on) each other, so that the outcome is greater/less than the sum of parts

https://learningforsustainability.net/systems-thinking/; Sterman J. Learning from Evidence in a Complex World. Am J Public Health. 2006.96(3):505-514; Bailey ZD et al. Structural racism and health inequities in the USA: evidence and interventions. *Lancet.* 2017; 389: 1453–63; Zhang et al. Big data science: Opportunities and challenges to address minority health and health disparities in the 21st century. *Ethn.Dis.*2017;27(2):95-106.

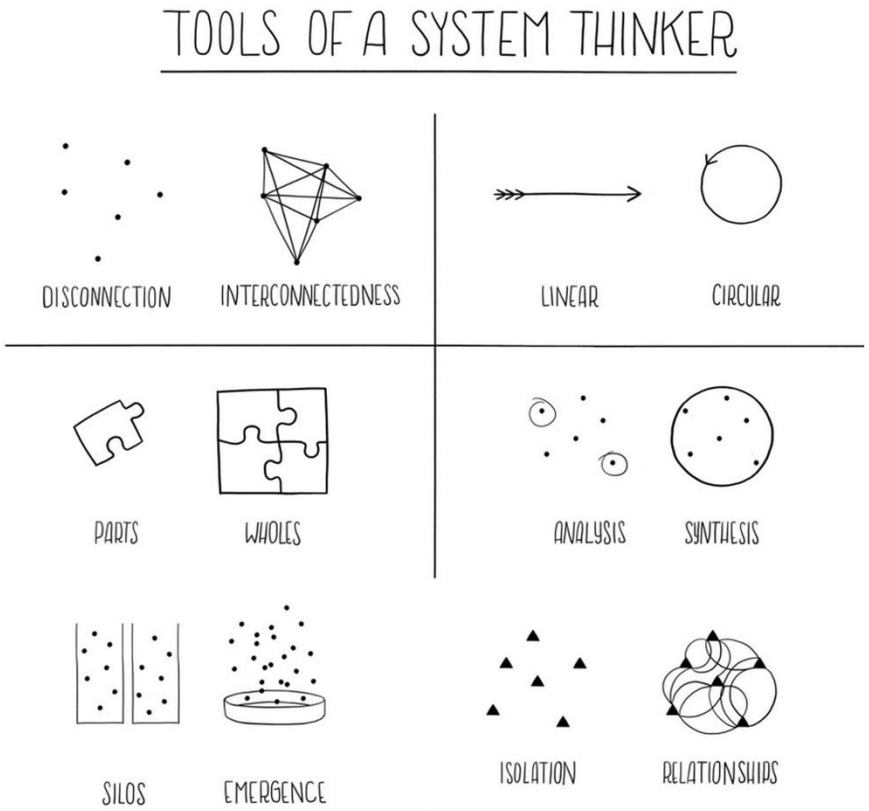
Complex problems are specifically defined by…



- Changing over time (dynamic)
- Have time delays b/t action and response
- Feedback loops linking factors
- History dependent
- Counterintuitive behavior
- Policy resistant

https://medium.com/disruptive-design/tools-for-systems-thinkers-the-6-fundamental-concepts-of-systems-thinking-379cdac3dc6a

Solving complex problems needs systems thinking



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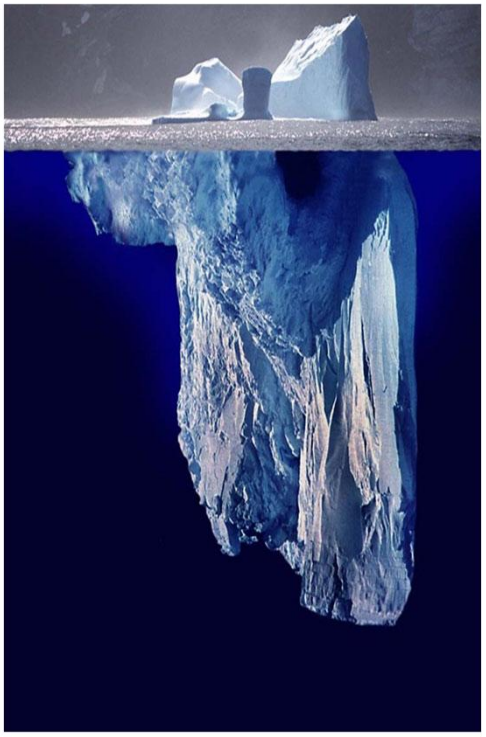
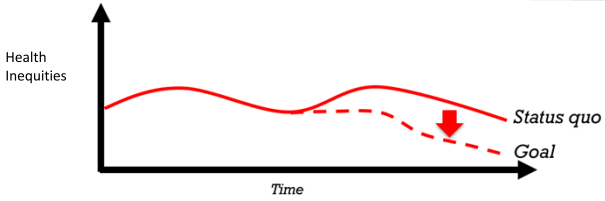
Systems Dynamics for Complex Problems



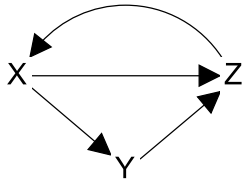
Adapted from Peter Hovmand

Events

Patterns over time



Structure

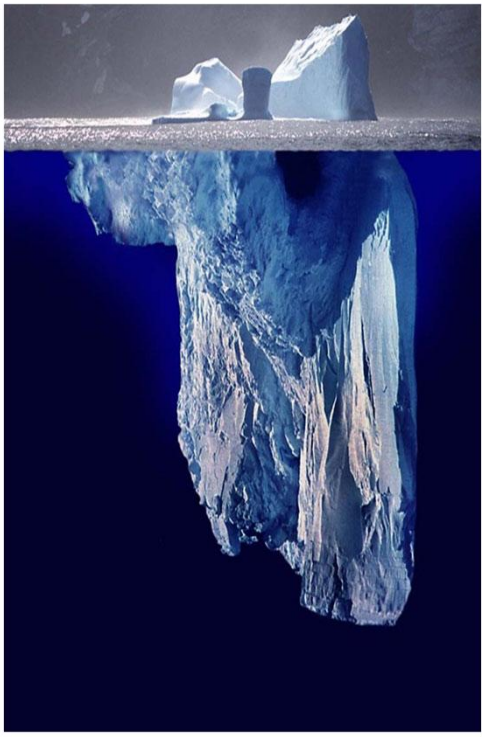


Values, attitudes, and norms (mental models)

E.g. racial bias, culture
social needs, social exclusion

Systems Dynamics for Complex Problems

- Systems approaches are excellent tools to unpack the complex root causes of health inequities



Adapted from Peter Hovmand

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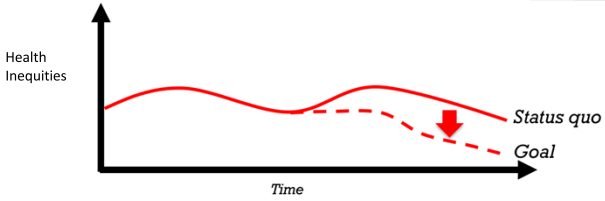
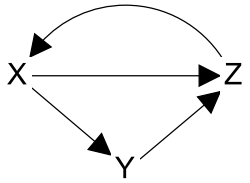
Patterns over time



Structure



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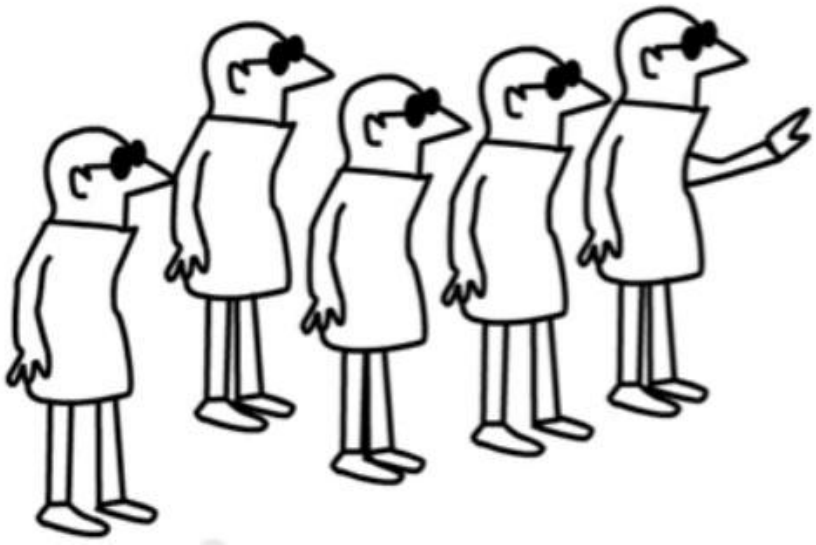
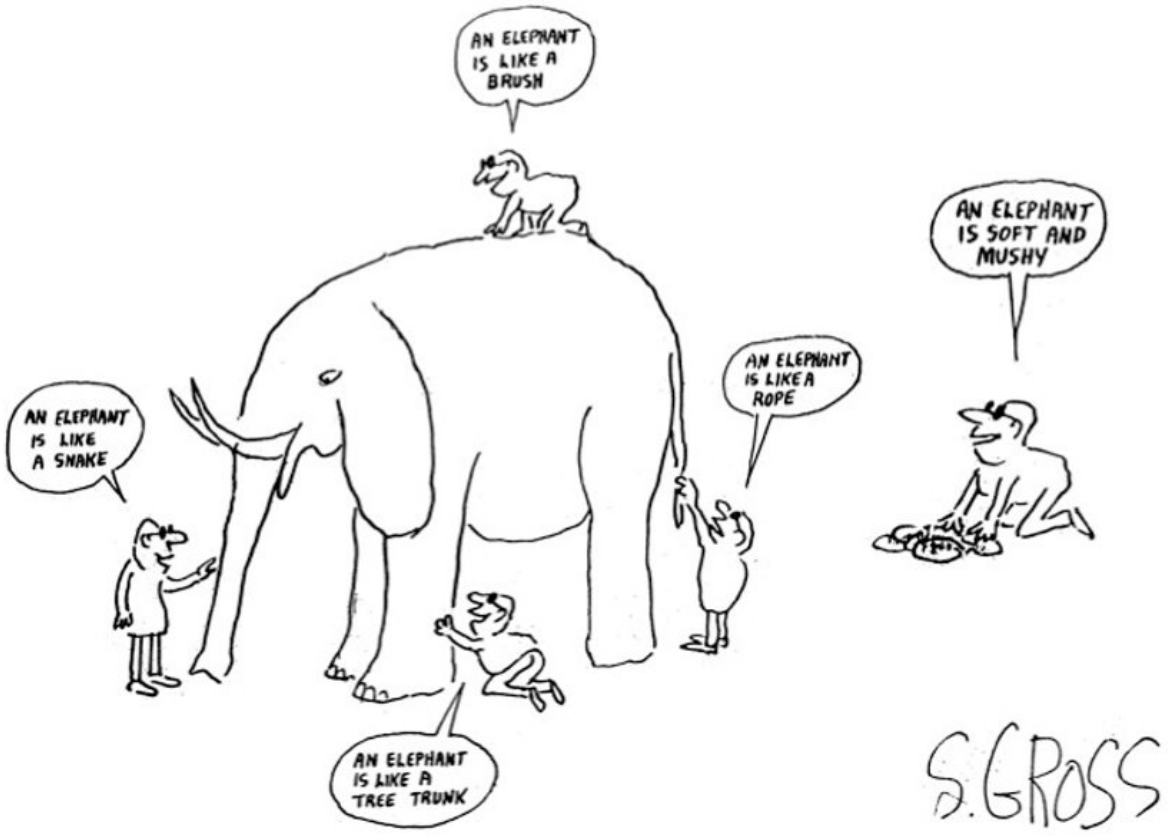
E.g. racial bias, culture
social needs, social exclusion

Systems Dynamics for Complex Problems



Steele, R. (2015). Implementing an integrated and transformative agenda at the regional and national levels. United Nations ESCAP Conference.

Systems Dynamics for Complex Problems



Steele, R. (2015). Implementing an integrated and transformative agenda at the regional and national levels. United Nations ESCAP Conference.

We use mental models to help us understand problems and complex systems

"Reality"
Complex social systems and wicked problems

Perception of reality

Mental models

Decisions and actions to change system via program, policy

Adapted from Peter Hovmand, Social Systems Design Lab

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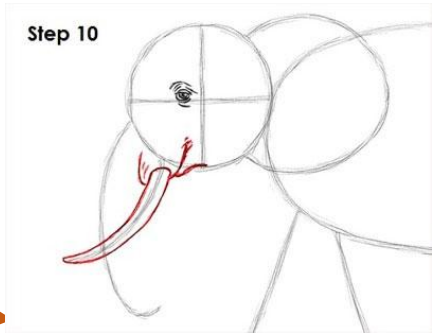

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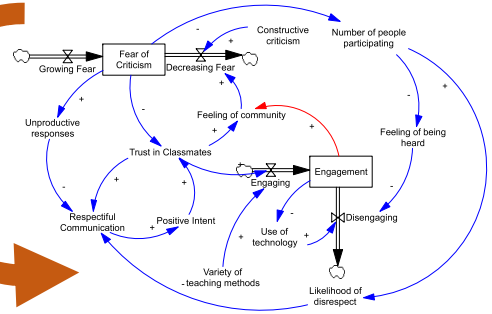
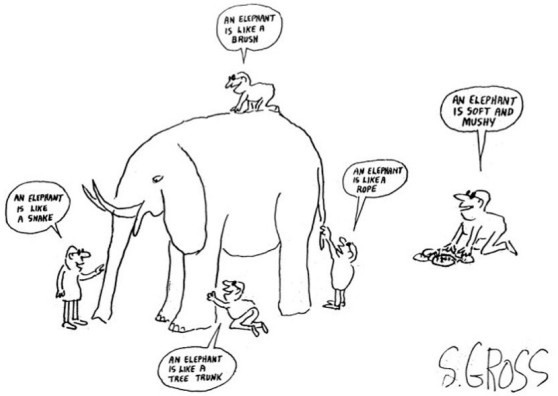


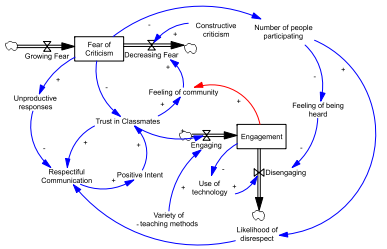
Decisions and actions to change system via program, policy

Adapted from Peter Hovmand, Social Systems Design Lab

System Dynamics for Complex Problems

System Dynamics: *the use of informal maps and formal models with computer simulation to uncover and understand endogenous sources of system behavior.*



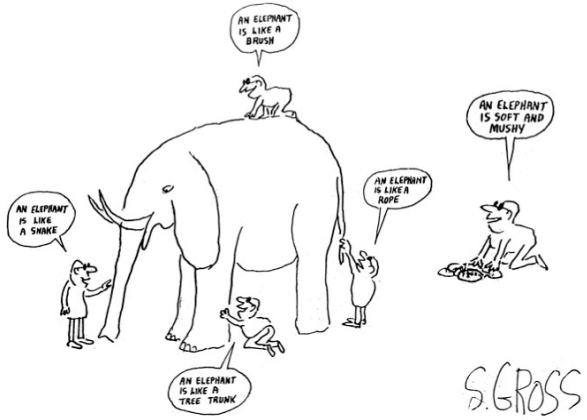


- Seeks to understand feedback system responsible for generating dynamic behavior of complex systems
- Goal is to improve our decision-making mental models

Community Based System Dynamics Book – Hovmand

System Dynamics for Cedar Campus

- Planning and evaluating a program can also be thought of as a complex problem
  - A desired dynamic behavior over time
  - Inputs and activities that can interact with each other
  - Time delays between doing the activities and seeing the outcome
  - Stakeholders with different mental models



- If we don't account for this, it is difficult to understand why a program succeeded or faced challenges

System Dynamics for Cedar Campus

- Problem Statement Background:
  - Access to physical and mental healthcare is necessary to support good health and wellbeing
    - However, access to this care has been low for residents in the area that Cedar Campus is planning to serve
    - This trend isn't new; access to comprehensive, total health care has been absent for a long time.

System Dynamics for Cedar Campus

- Problem Statement Background:
  - Part of this problem may be fragmentation of available services
    - Services for different care needs may be located at different locations and there may be challenges in making sure patients using or in need of care have seamless access to all services
  - Furthermore, there is a lack of access to social services and limited resources to address social needs
    - When patients don't have the resources to address their social needs, addressing health care needs is more challenging
  - All of these things impact the quality of care that is available
    - This prevents folks from accessing and engaging in services as they need or would like

System Dynamics for Cedar Campus

Problem Statement:

What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar area?

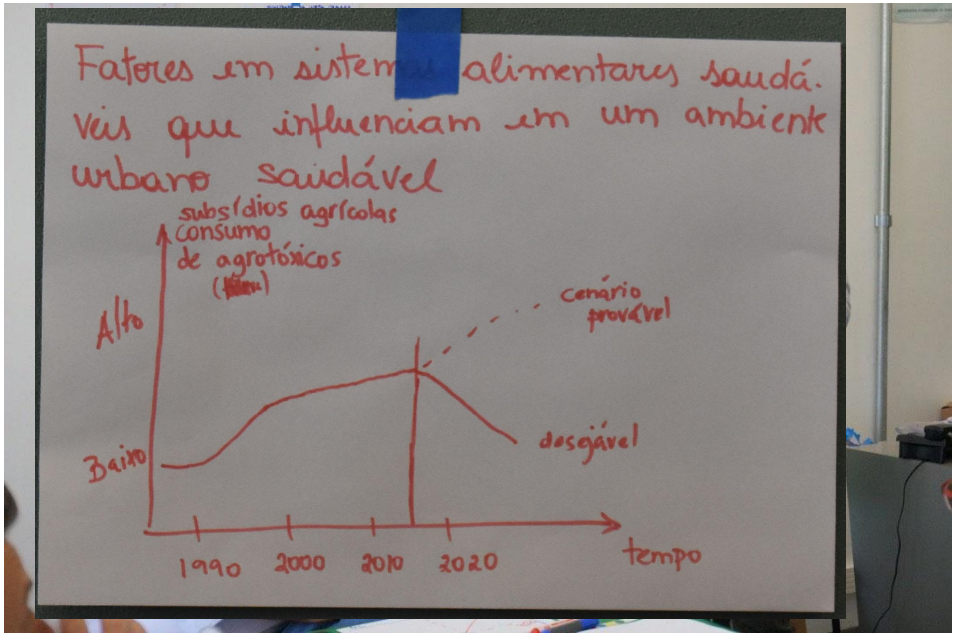
Think about these areas of well being in addition to medical care

- *Physical,*
- *Mental*
- *Social well-being*

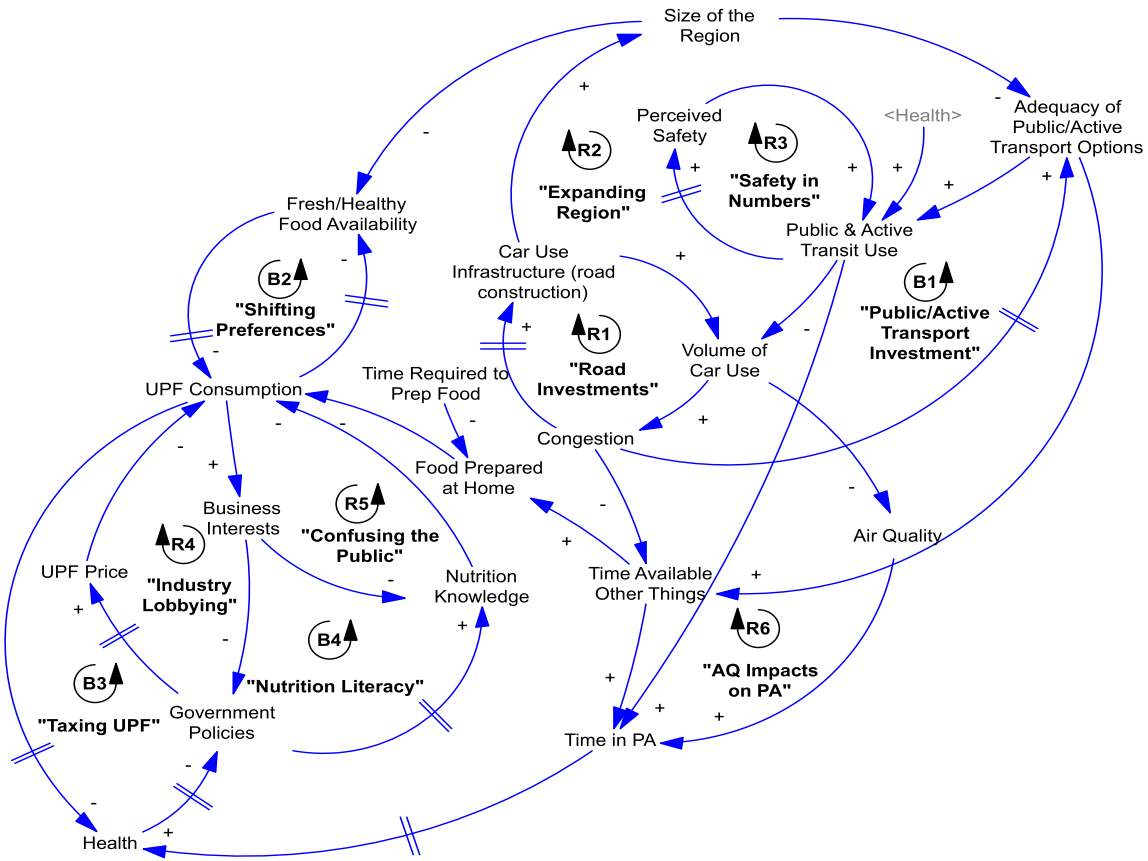
SD Activity: Graphs Over Time

Purpose: Engages participants in framing a problem, initiating mapping, generating variables, and ranking priority of variables as preparation for creating causal loop diagrams.

Sample prompt: Think of a factor that influences healthy eating in cities. Draw a trajectory that shows how you hope that factor changes over time and how you fear it will change over time.

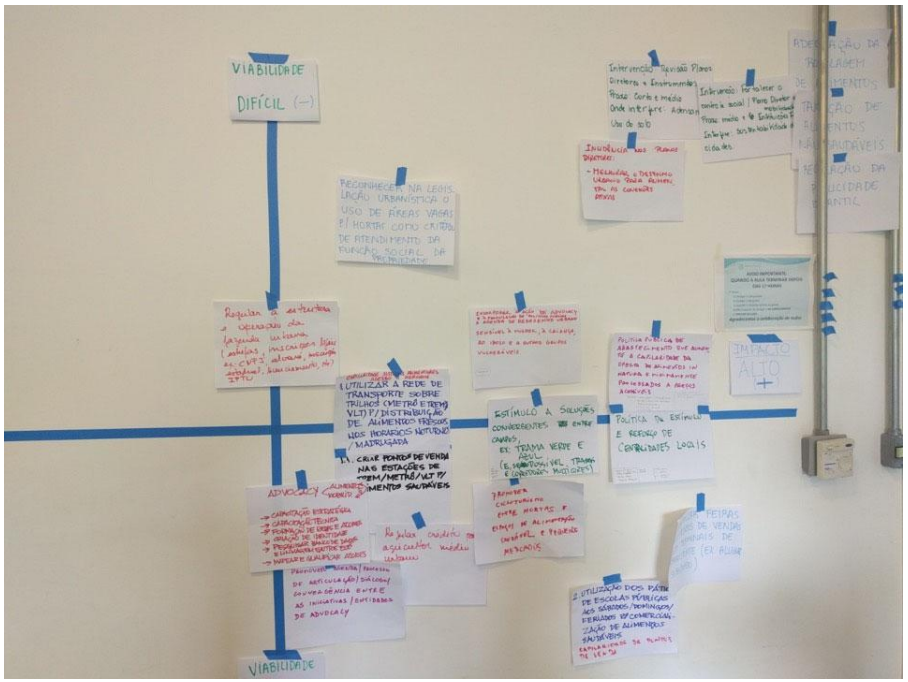


SD Activity: Causal loop diagrams



SD Activity: Places to Intervene

Purpose: To generate places within a system – with things such as policies and other changes to the system -- to have the highest impact on improving outcomes; rank them by feasibility and impact.



Agenda

Summary Agenda

Activity	Duration	Time
Participants Arrive / Coffee	30 min	8:30-9:00
Welcome & Introductions	20 min	9:00-9:20
General presentation	40 min	9:20-10:00
Hopes & Fears	45 min	10:00-10:45
Break	15 min	10:45-11:00
Graphs Over Time	40 min	11:00-11:25
Dots	5 min	11:25-11:30
Causal Loop Diagramming	1 hr	11:45-12:45
Presentations	30 min	12:45-1:15
Lunch	1.5 hr	1:15-2:45
Model synthesis	1 hr	2:45-3:45
Break	15 min	3:45-4:00
Places to intervene	30 min	4:00-4:30
Dots	5 min	4:30-4:35
Reflection	20 min	4:35-4:55
Close	5 min	4:55-5:00

Hopes and Fears

Behavior Over Time Graphs

Cedar Campus Problem Statement

What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar area?

Think about these areas of well being in addition to medical care

- *Physical,*
- *Mental*
- *Social well-being*

Causal Loop Diagraming

Cedar Campus Problem Statement

What factors contribute to increased access to high-quality, well-coordinated health care in the Cedar area?

Think about these areas of well being in addition to medical care

- *Physical,*
- *Mental*
- *Social well-being*

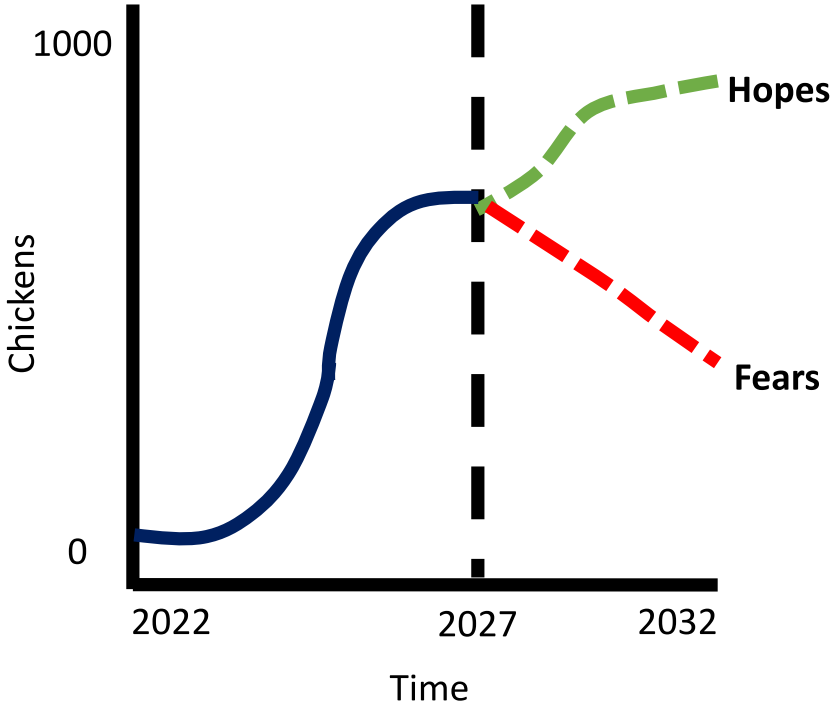
Model Synthesis

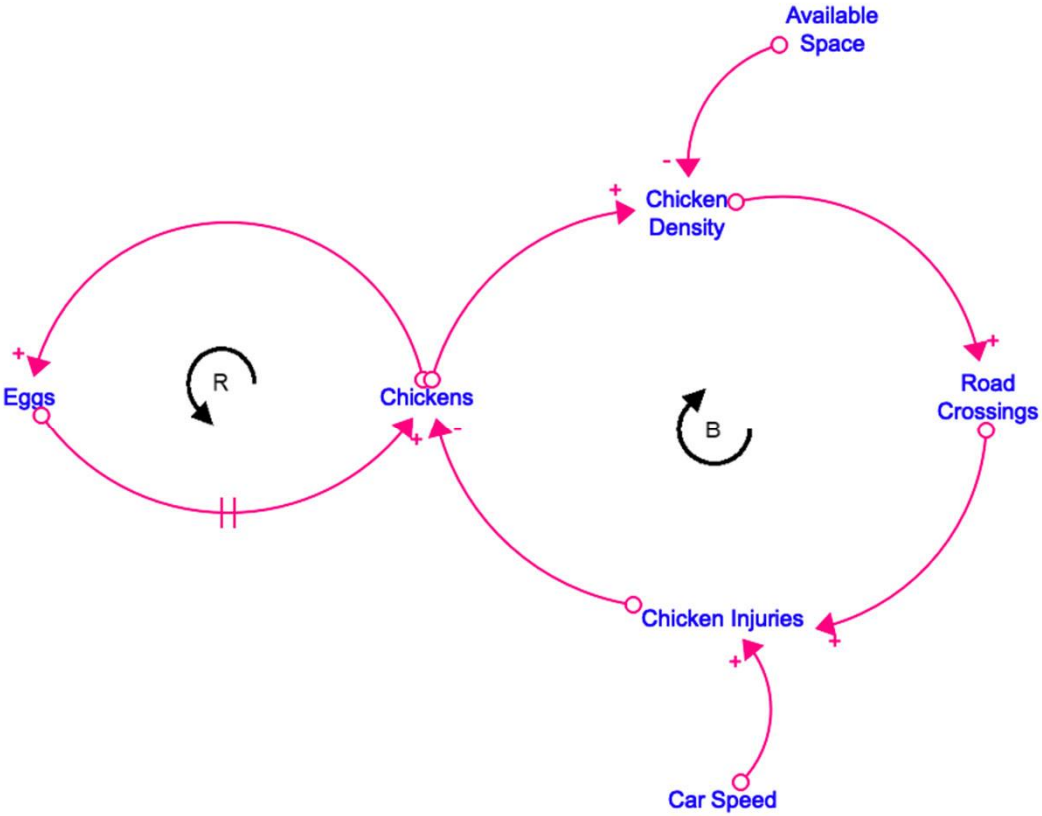
Places to Intervene

Places to Intervene in a System
(In increasing order of effectiveness)

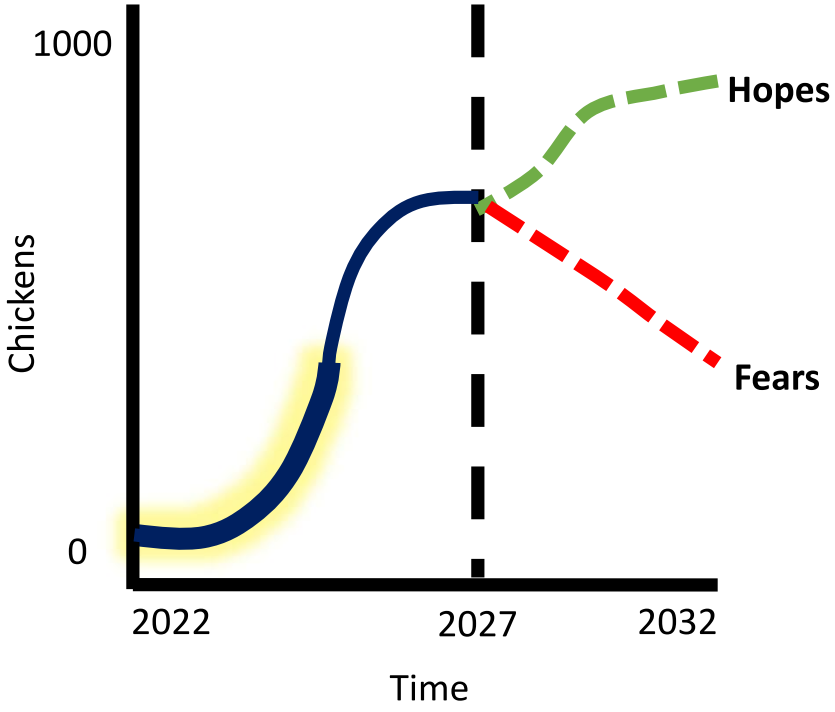
Acknowledgment: Adapted from slides by Ellis Ballard, Jill Kuhlberg, & the Social Systems Design Lab

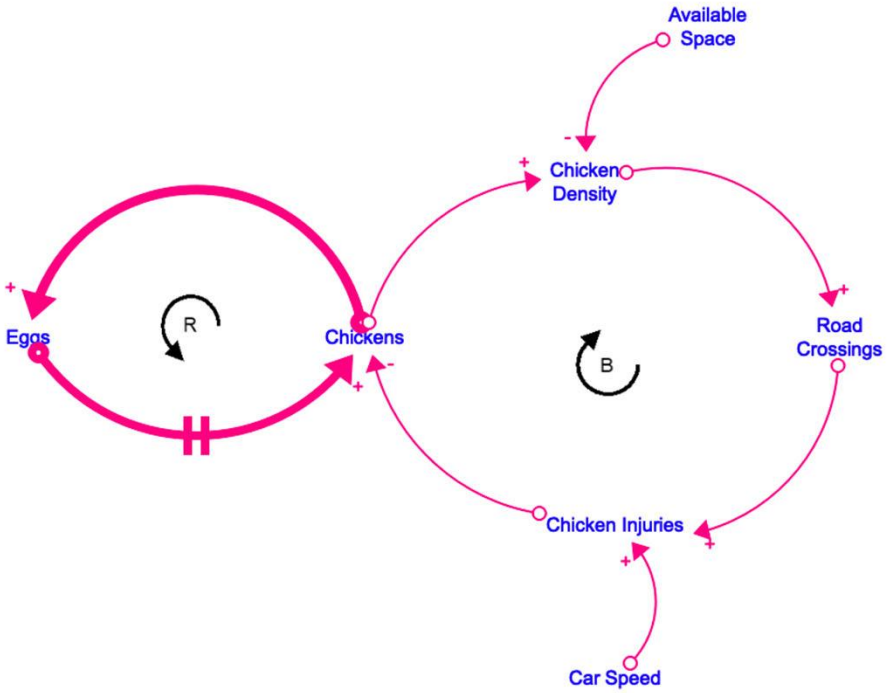
Chicken Population Management



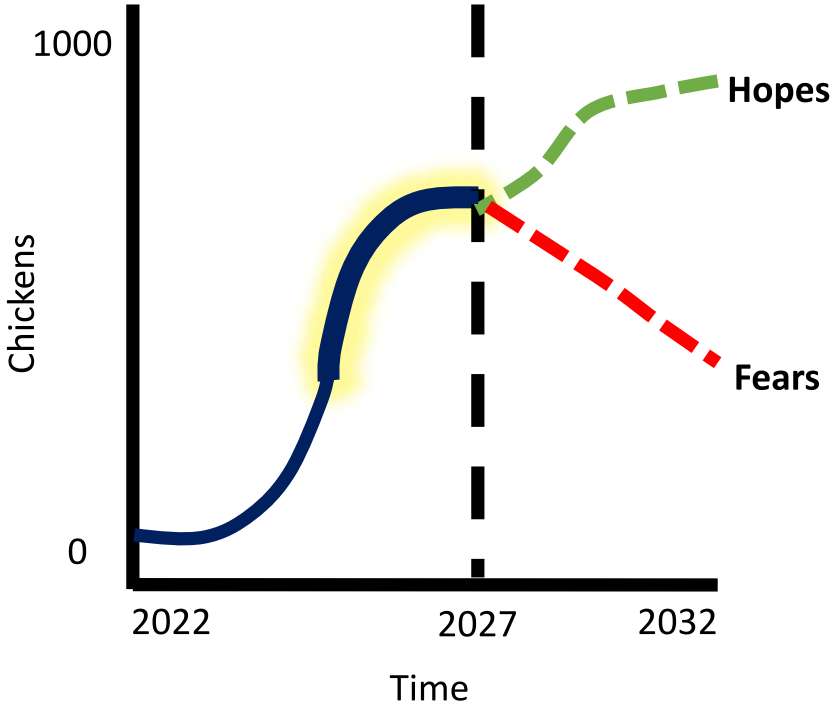


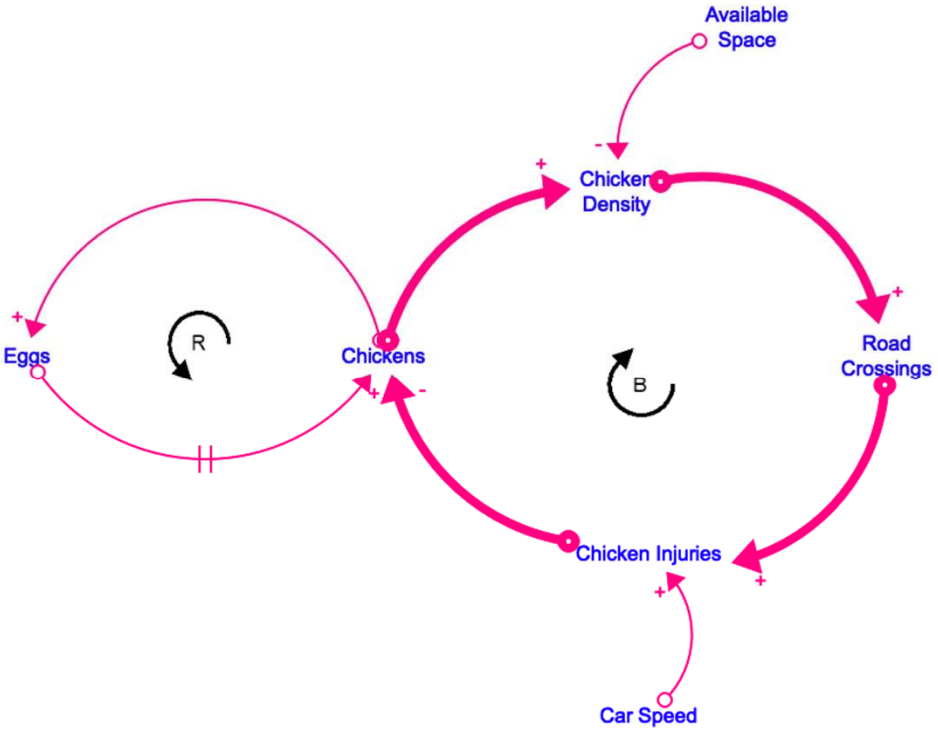
Chicken Population Management





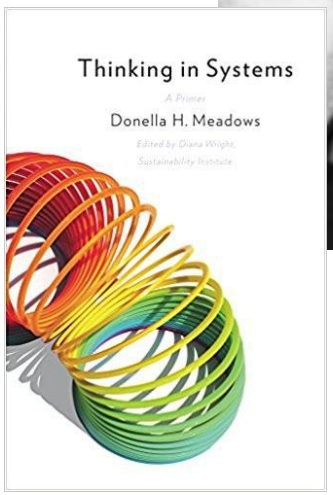
Chicken Population Management





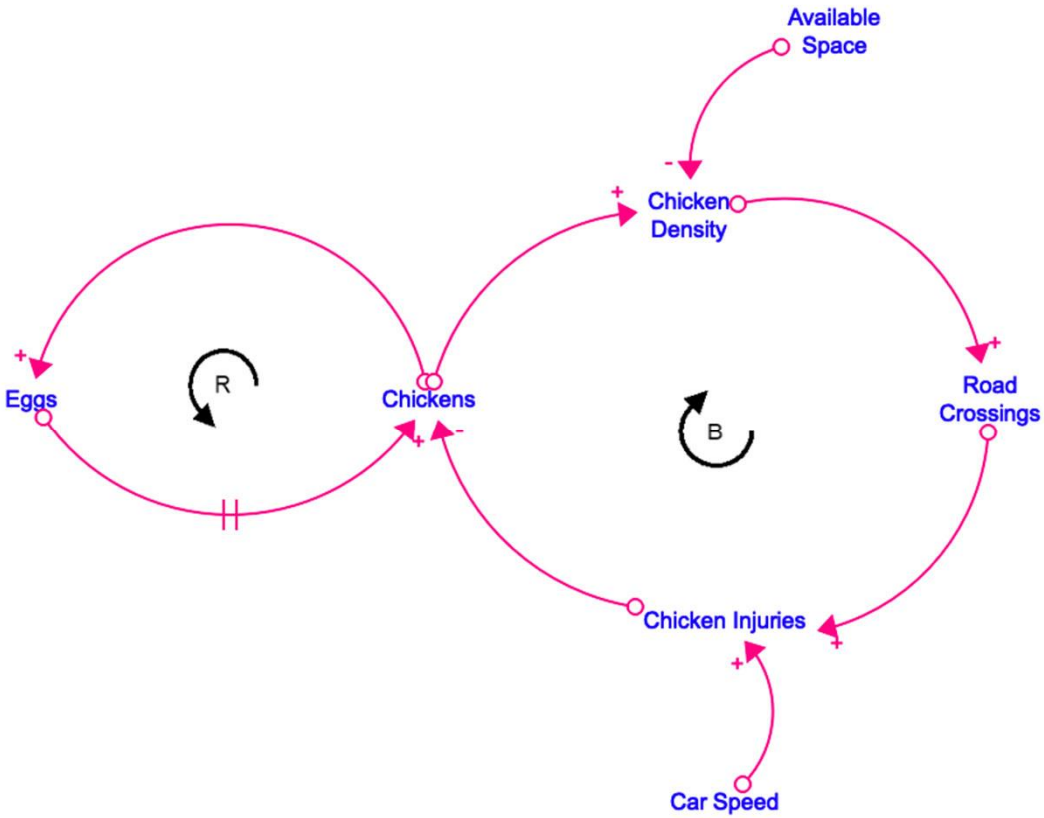
Places to Intervene in a System

- Size of individual variables
- Length of delays
- Structure of Loops
- Goals in the System
- Mindset or paradigm



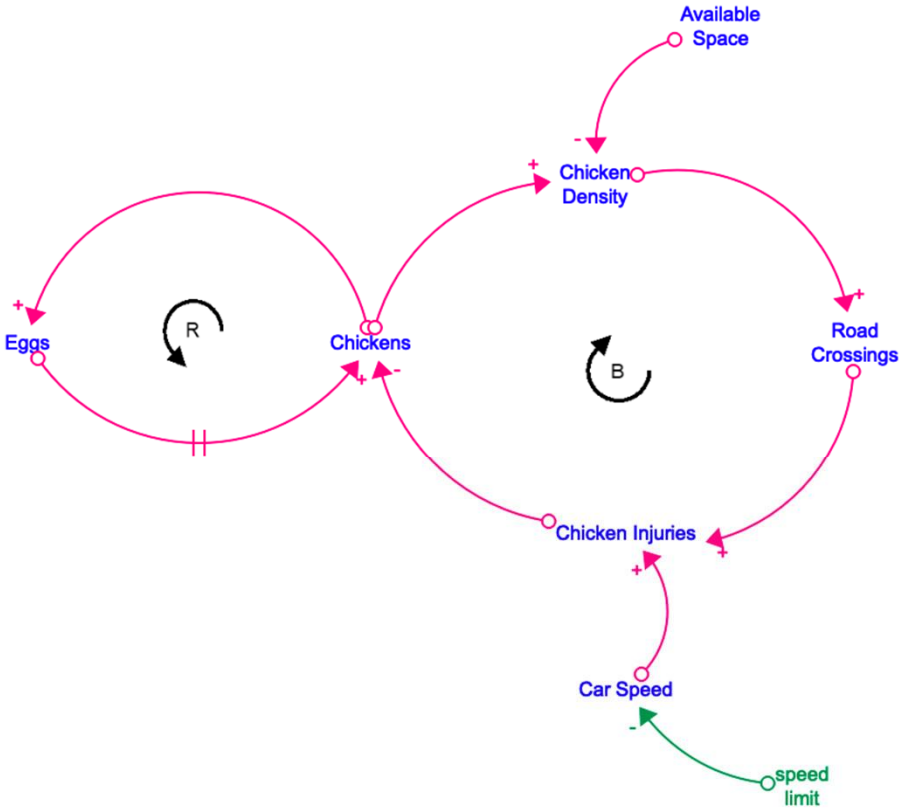
Source: Donella Meadows 1999. Leverage Points

Places to Intervene in A System (In increasing order of effectiveness.)*



Places to Intervene in A System (In increasing order of effectiveness.)*

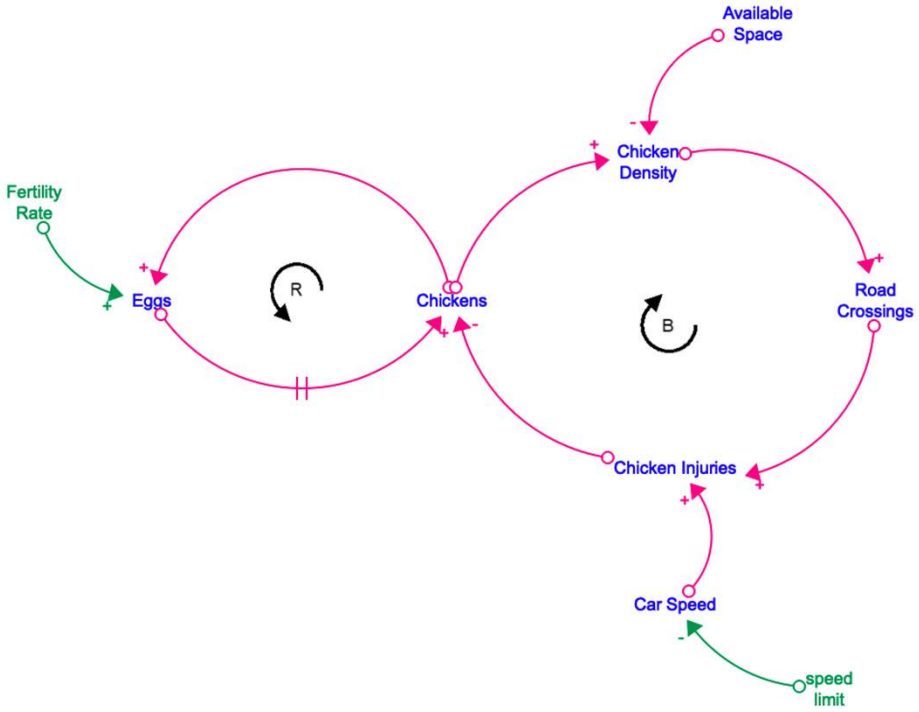
Variables (lowest)



Places to Intervene in A System (In increasing order of effectiveness.)*

Variables (lowest)

Feedback loops

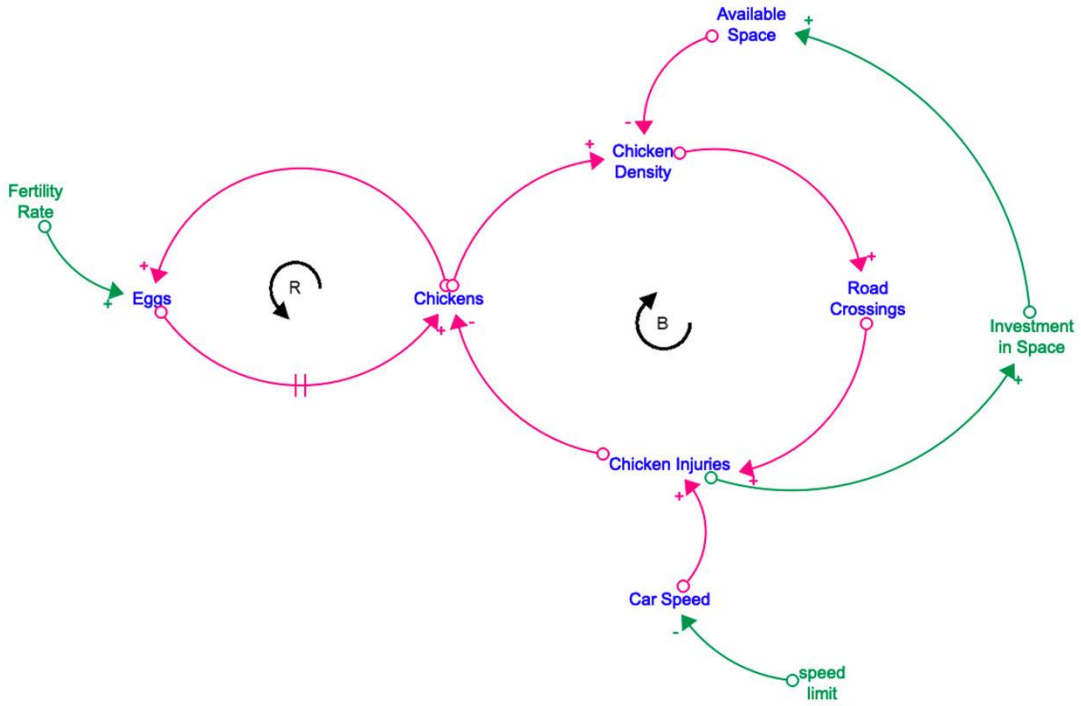


Places to Intervene in A System (In increasing order of effectiveness.)*

Variables (lowest)

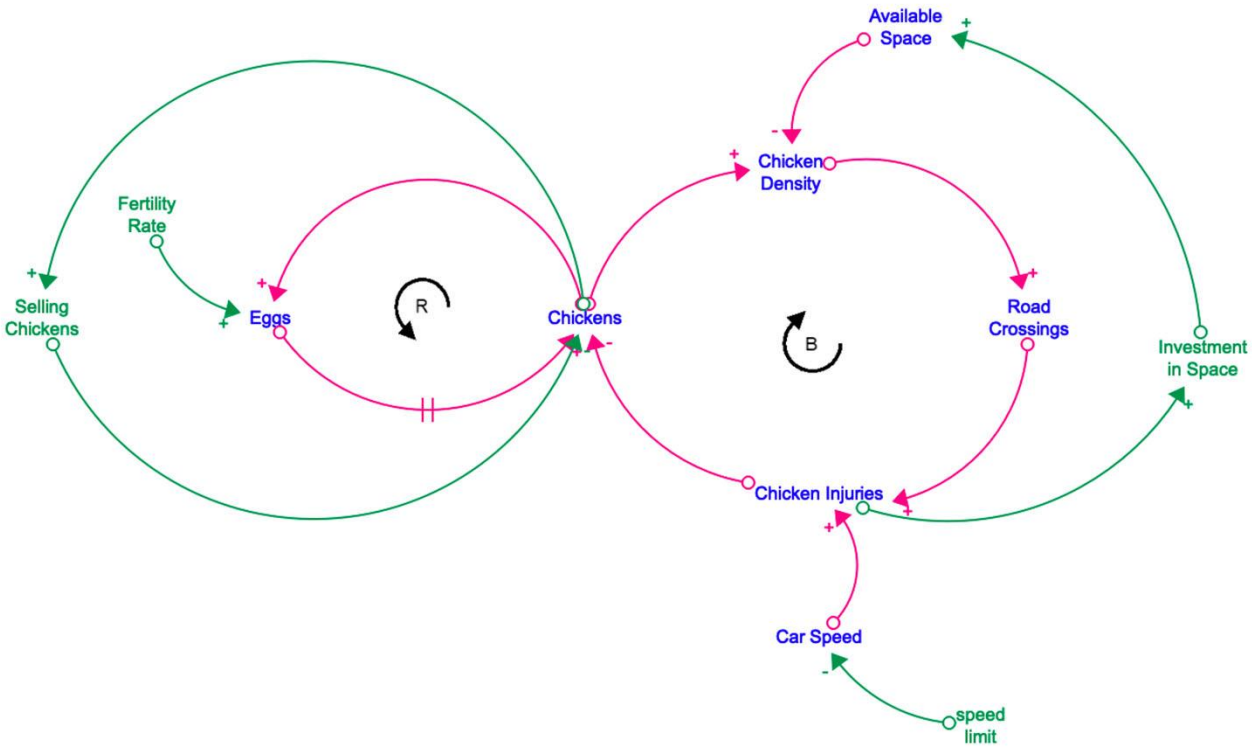
Feedback loops

New connections (structure)



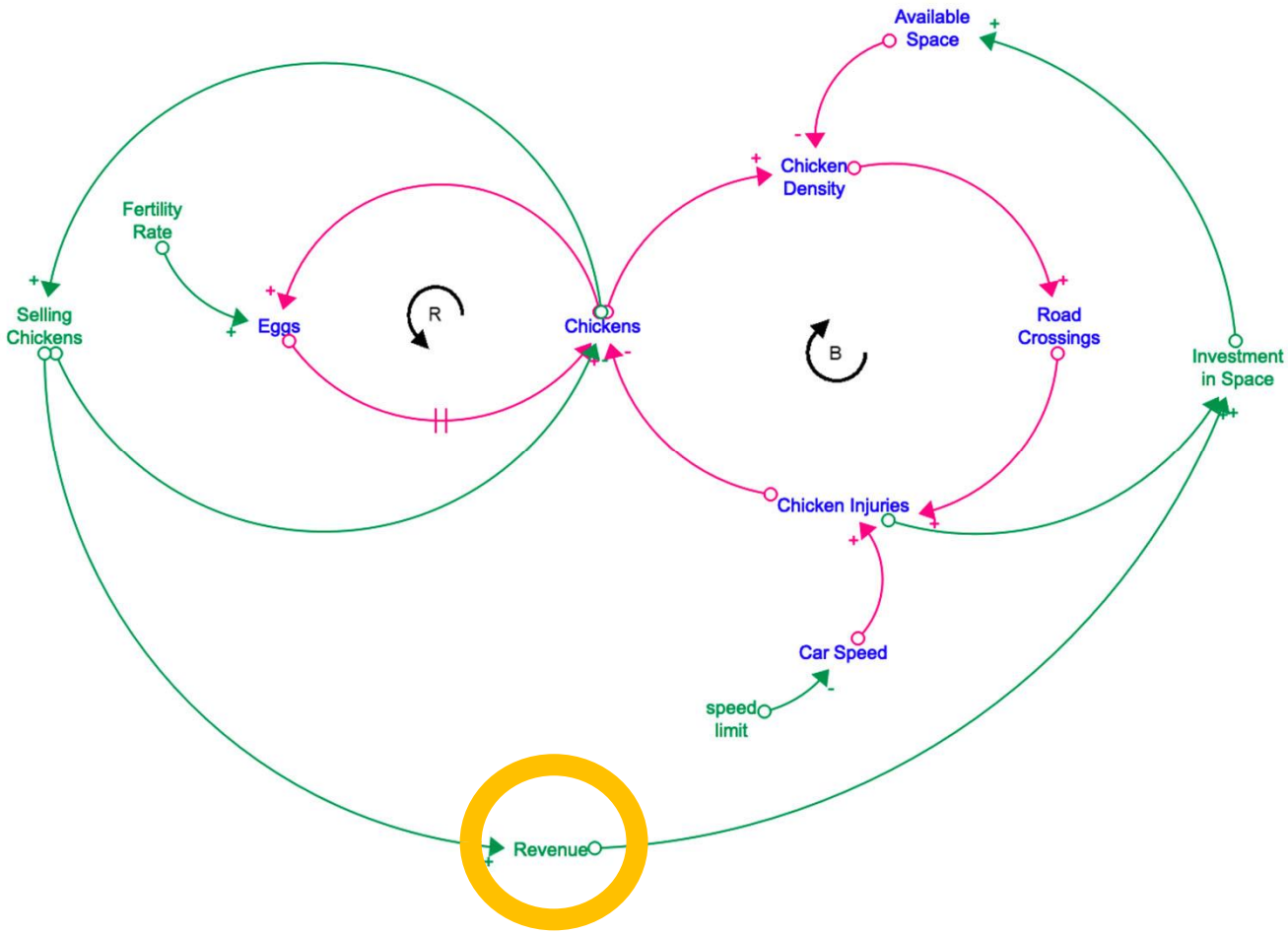
Places to Intervene in A System (In increasing order of effectiveness.)*

Variables (lowest)
Feedback loops
New connections (structure)
Rules that govern the connections



Places to Intervene in A System (In increasing order of effectiveness.)*

Variables (lowest)
Feedback loops
New connections (structure)
Rules that govern the connections
Goals in the system



Places to Intervene in A System (In increasing order of effectiveness.)*

Variables (lowest)
Feedback loops
New connections (structure)
Rules that govern the connections
Goals in the system
Mindset (highest)