

Case studies from across the US on using systems thinking tools to inform Safe System partnership, strategic planning, and research

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Outline

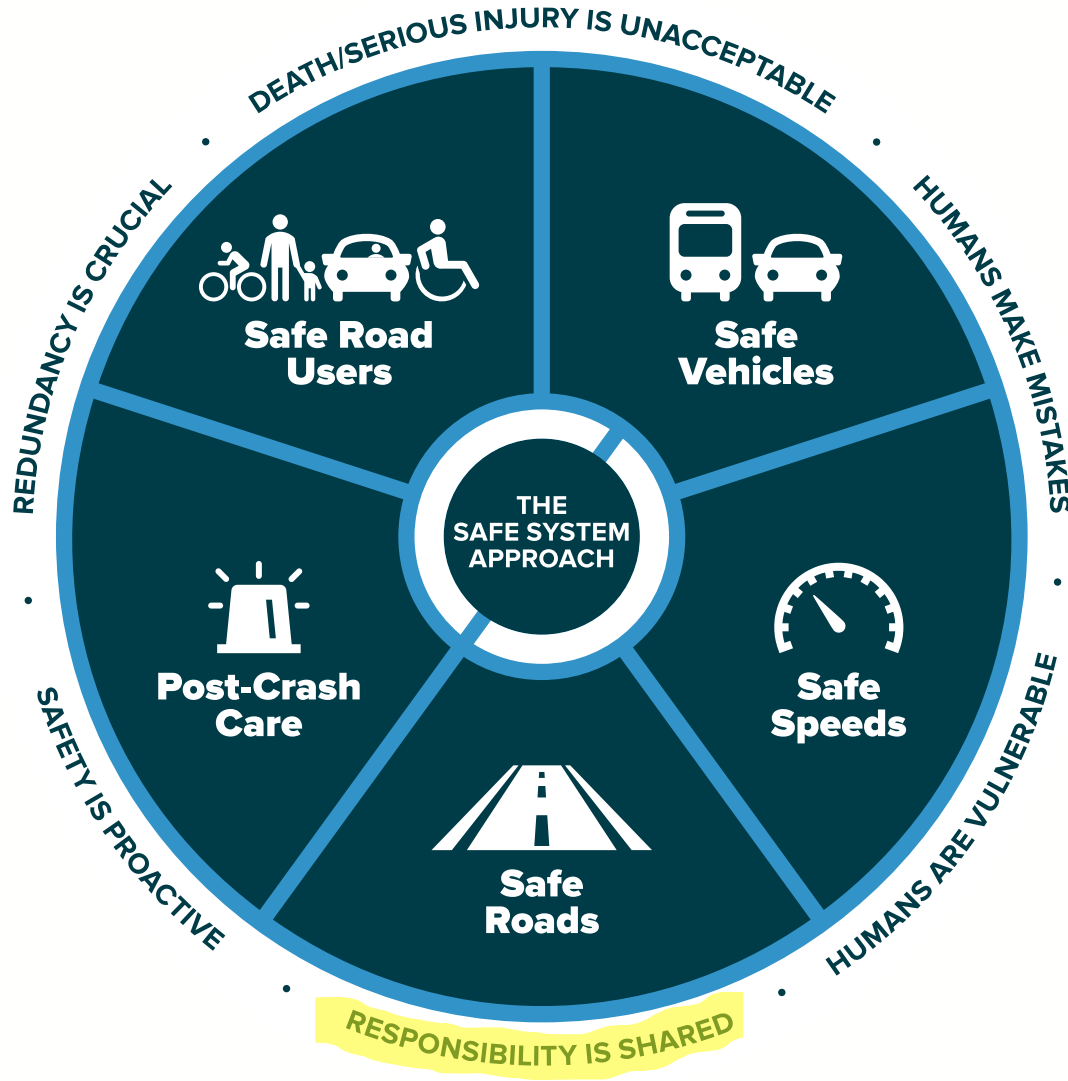
- Safe System approach and systems thinking / systems science approaches
- Objectives of this work
- Systems thinking toolbox and case studies using these tools to advance Safe System planning and implementation
- Two case study deeper dives: NC SRTS partners and Philadelphia Vision Zero work

What is a Safe System Approach?



Source: <https://highways.dot.gov/safety/zero-deaths>

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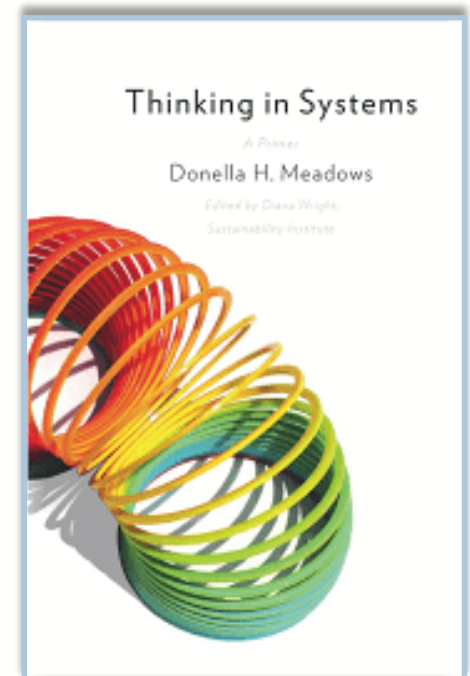
“Traffic safety culture is the shared belief system of a group of people, which influences road user behaviors and stakeholder actions that impact traffic safety.”

“A positive traffic safety culture increases the capability of traffic safety stakeholders to form effective partnerships, resulting in the integration of strategies to form a Safe System.”

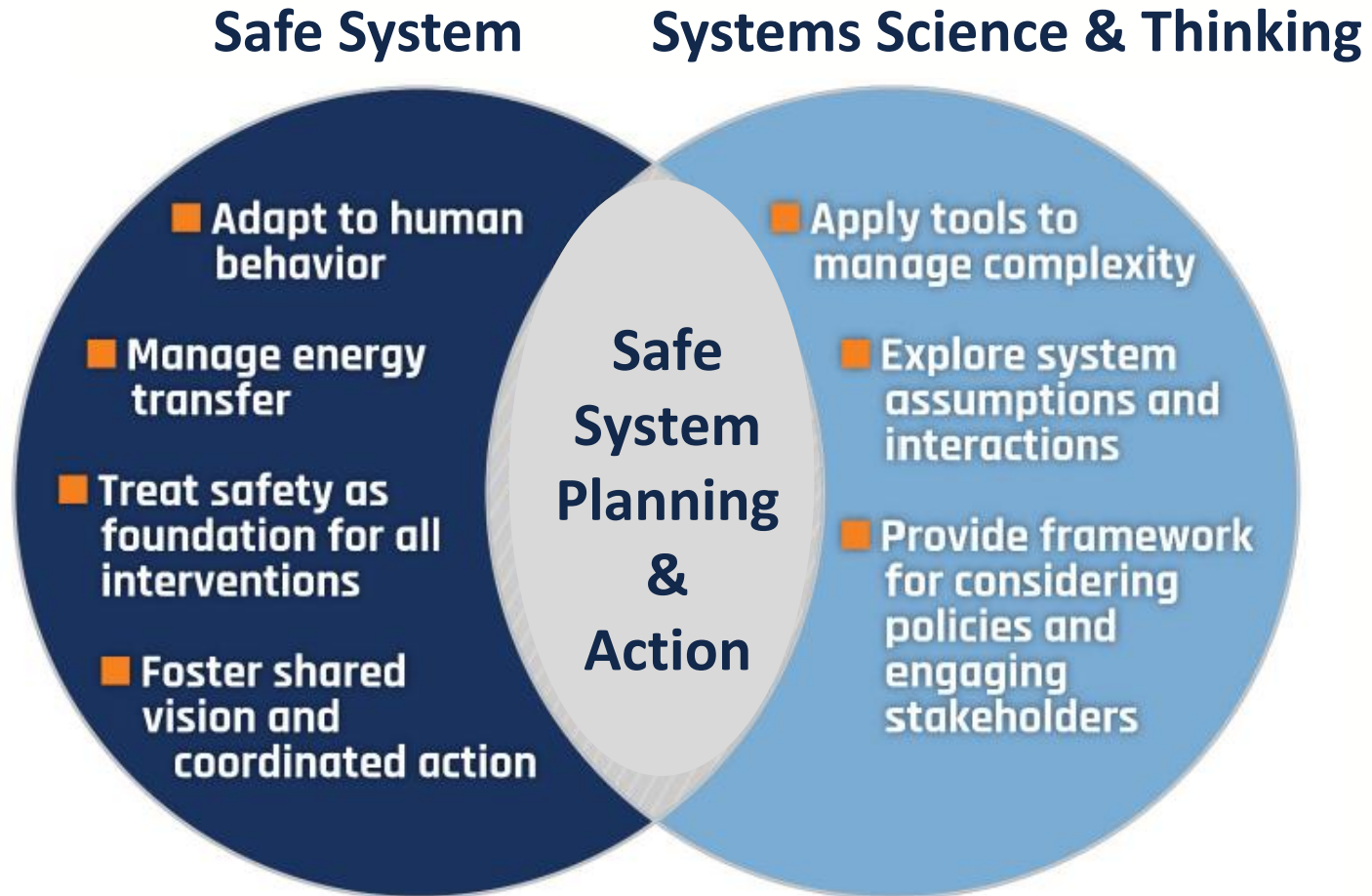
Sources: <https://www.nsc.org/road/resources/road-to-zero/safe-system-approach>;
https://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/tsc/TSC_PRIMER/PPT.pdf

What is systems thinking? What are systems science approaches?

- Practical, structured inquiry, which...
- Seeks to “see” wholes, and
- Supports development and/or testing of a model (qualitative or quantitative) representing critical components of the system that determine an outcome(s)



Safe System Principles and Systems Thinking Benefits (Working Hand in Hand)



Objectives

- To develop systems thinking-based content and guidance to strengthen the planning and implementation of Safe System approaches.
- To develop materials that help stakeholders establish a firm foundation and deepen their understanding of the system (of policies, norms, partnerships) underlying their road safety work and outcomes, setting the stage for more effective Safe System-consistent planning and implementation.

Source: <https://www.roadsafety.unc.edu/research/projects/2021r39/>

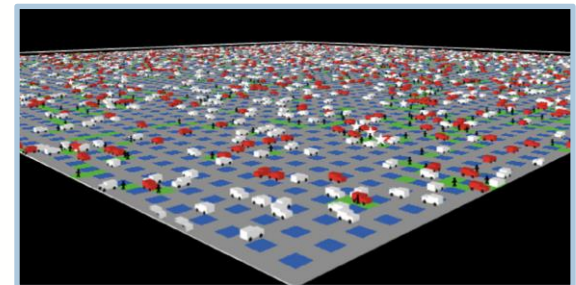
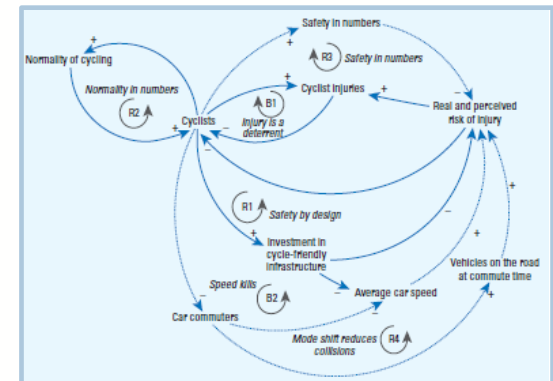
Some tools from systems thinking

Qualitative

- 5 Rs
- Balance of petals mapping
- Goal and action alignment mapping
- Causal loop diagramming
- System support mapping
- Network mapping
- AcciMapping

Quantitative

- System dynamics simulation
(stock and flow simulation)
- Agent-based models & microsimulation
- Social network analyses
- Discrete event simulation



Source: Macmillan A, Woodcock J. Understanding bicycling in cities using system dynamics modelling. *J Transp Health*. 2017;7(Pt B):269-279. doi:10.1016/j.jth.2017.08.002; Thompson J, Savino G, Stevenson M. A model of behavioral adaptation as a contributor to the safety-in-numbers effect for cyclists. *Transportation Research Part A* 2016; 85:65-75.

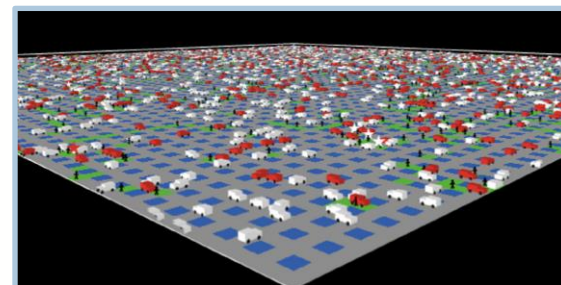
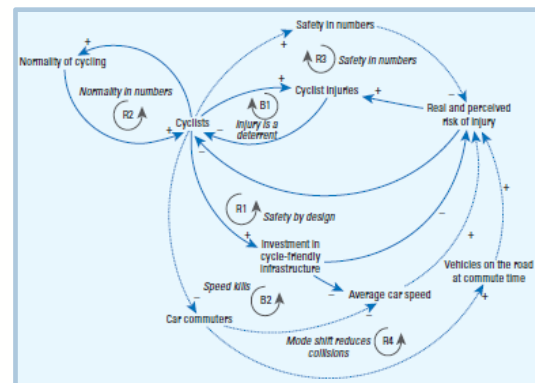
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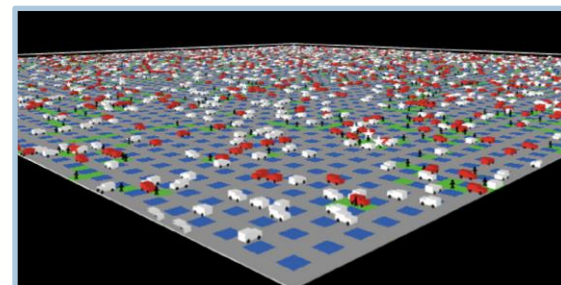
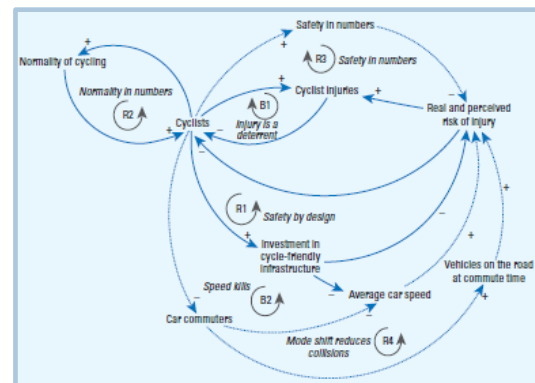
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Case Studies

- King County (WA) Target Zero Task Force
 - Objectives: Illuminate the network of partners that can help support Target Zero efforts and planning in King County; uncover motivations on why or how diverse partners might want to get involved in Safe System work with the King County Target Zero Task Force and how partnership could create win-wins; identify future areas for partnership and program work to support a Safe System approach in King County.
 - Tool: Goal and action alignment mapping
- North Carolina Safe Routes to School Leaders
 - Objectives: Brainstorm and articulate on the network of community partners that can help support current or new action in SRTS programming; examine motivations on why or how diverse partners might want to get involved in SRTS and how partnership could create win-wins for a range of partnership pairs.
 - Tool: Goal and action alignment mapping
- Safe TREC and CalWalks Partnership
 - Objectives: To define and clarify the value brought to each partner through this collaborative transportation safety work; clarify where the partnership(s) has been and where it could/should go; and define roles, responsibilities, and resources needed to successfully achieve current and future collaboration goals.
 - Tools: Balance of petals; System support mapping
- North Carolina Vision Zero Coalition Leadership Teams
 - Objectives: To support brainstorming, idea synthesis, and group discussion around potential inequities in the transportation systems in which they are working.
 - Tool: 5 Rs
- Philadelphia's Vision Zero Leaders
 - Objectives: Explore and understand key interconnected factors contributing to child and youth pedestrian crash trends in Philadelphia; support Vision Zero partners in planning collective action to improve youth pedestrian crash trends.
 - Tool: Causal loop diagramming
- Chapel Hill Vision Zero Executive Task Force (and North Carolina statewide Task Force)
 - Objectives: To clarify how potential partners are embedded within a larger system that includes shared goals; identify future areas for partnership and program work to support both Vision Zero in Chapel Hill and individual organizational/ agency goals; stimulate thinking about action and opportunities for contributions.
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Case Study #1: NC Safe Routes to School

Goal and Action Alignment Mapping: What is it?

- A mapping tool that allows people to see how they are embedded within a larger system that includes shared goals, illuminates less direct win-wins between themselves and partners, and can help motivate action and change.
- Can help organizers learn how to better approach different types of stakeholders when planning for and implementing a SRTS program and activities.

Case Study #1: NC Safe Routes to School

Goal and Action Alignment Mapping: How do we use it?

- Decide which SRTS-related outcomes are most important to you
- Identify potential partners and have each partner describe:
 - What they do – about 3 of their most mission-critical objectives
 - What are their primary challenges– up to 3 “pain points”
- Have each partner articulate connections:
 - Connections or stories about how the underlying outcomes affect their work
 - Connections or stories about how their work could affect those outcomes
 - Prioritize ~3 connections going each way (core outcomes ---> objectives or pain points AND objectives ---> core outcomes)
- Overlay partner maps, discuss the system of priorities, goals, and action potential, and use insights to support future engagement and investment (i.e., discussions by SRTS program area)

Case Study #1: NC Safe Routes to School

to increase
transportation
and mobility
safety for
children and all

to increase
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and families

to increase
community
and
livability

Case Study #1: NC Safe Routes to School

Increase transportation access, equity, and mobility safety for children & all people

Increase physical & mental health for children & community

Increase community connection, cohesion & resiliency

Increase population health through access to quality medical care

Increase population health through community coordination & collaboration

Increase population health through access to support services that address social determinants of health

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Competing health priorities

Building & maintaining community relationships

Gaining trust in communities

Case Study #1: NC Safe Routes to School



Examples of connections to organizational objectives (the “get”)

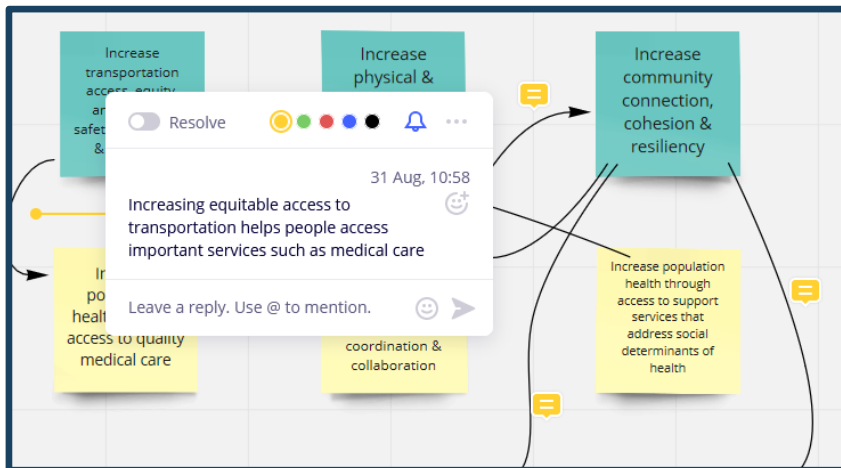
Examples of ways we can help SRTS (“the give”)



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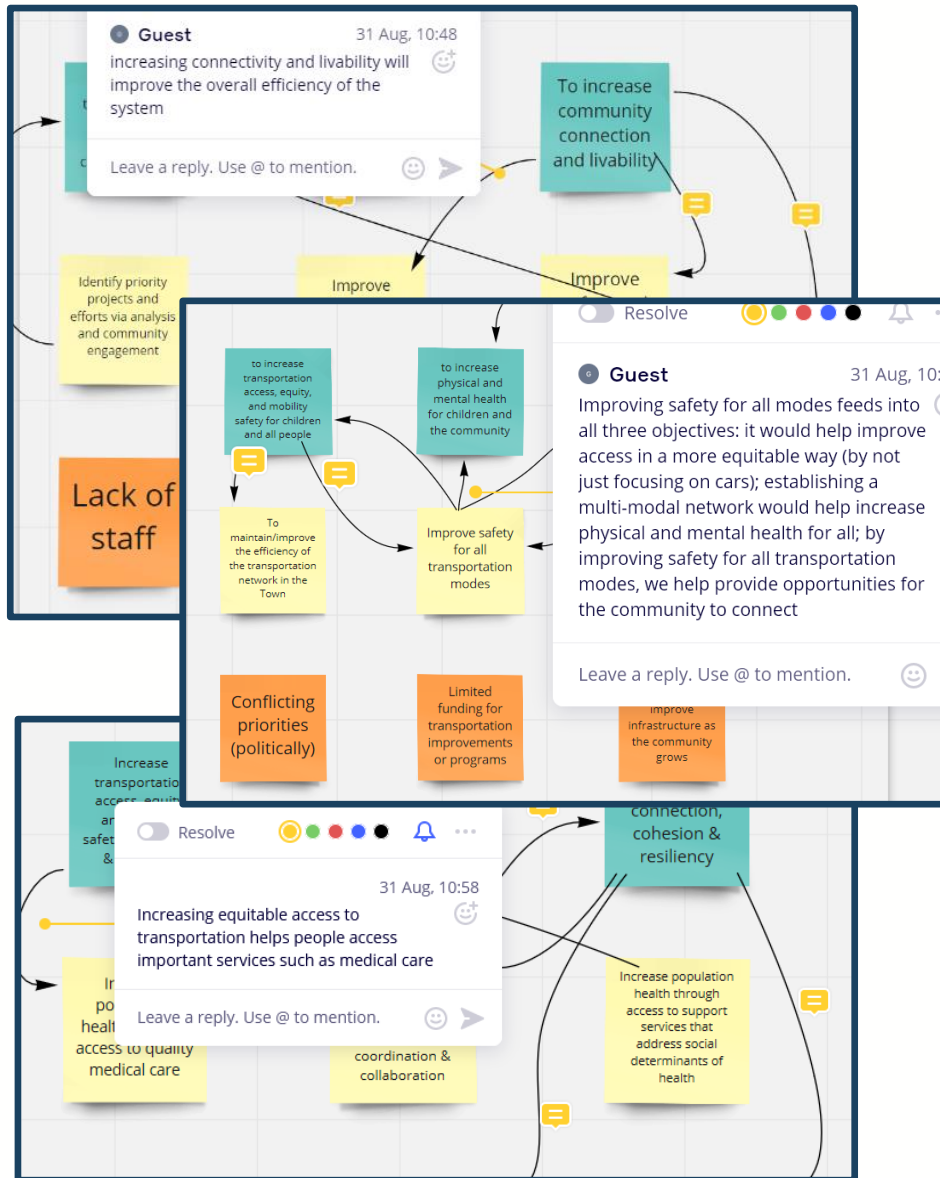


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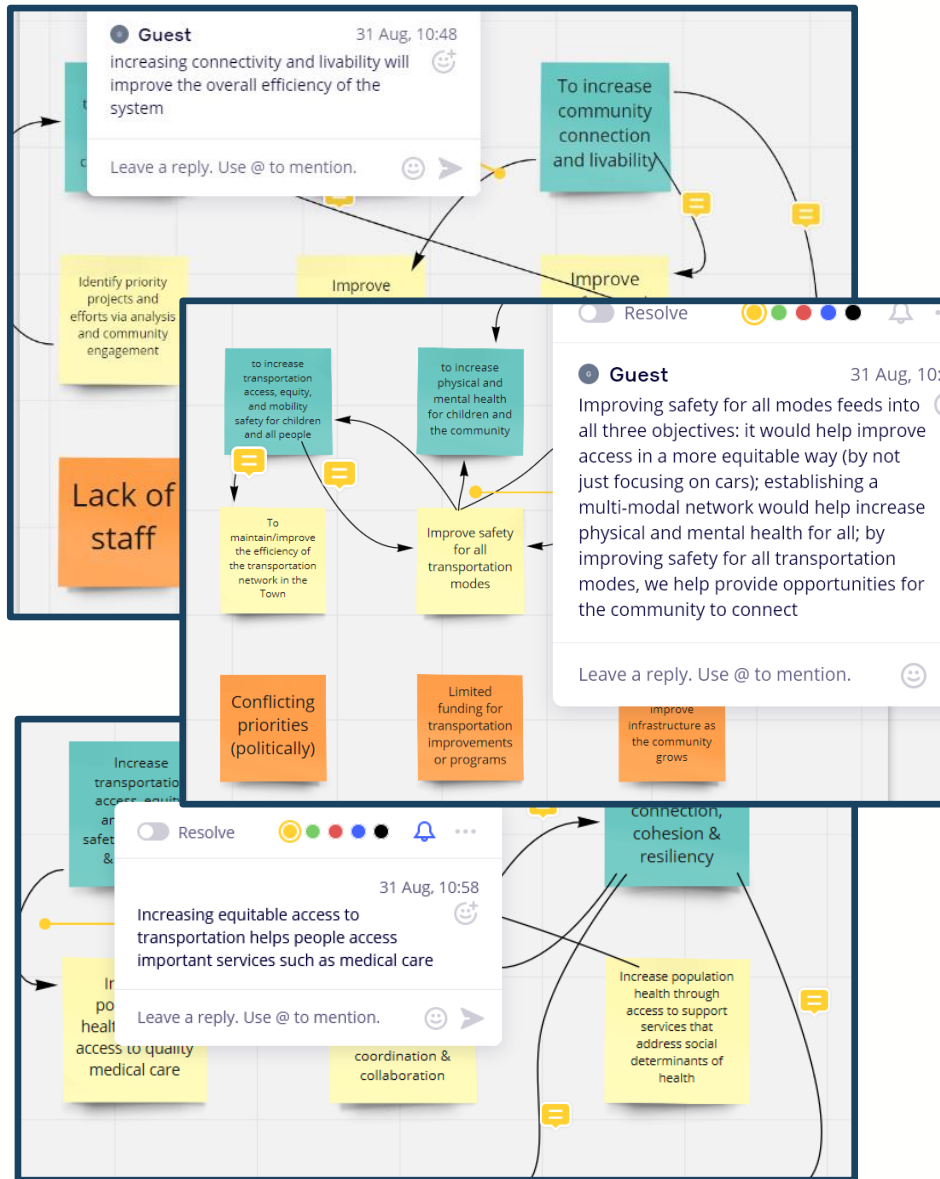


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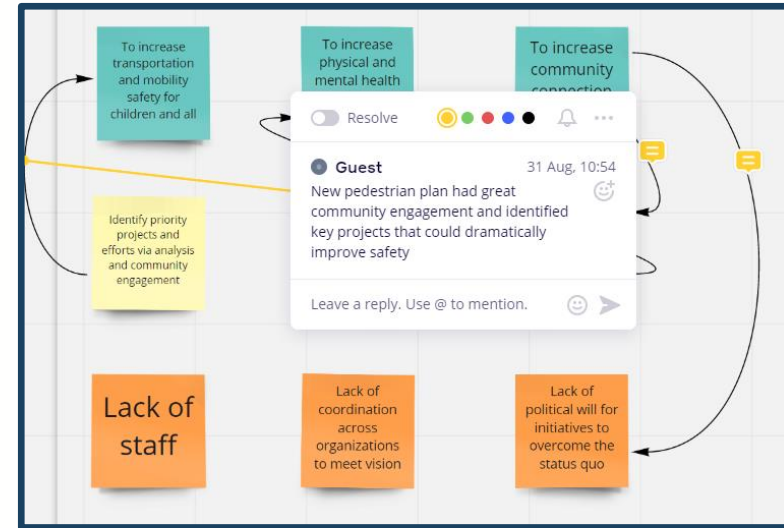
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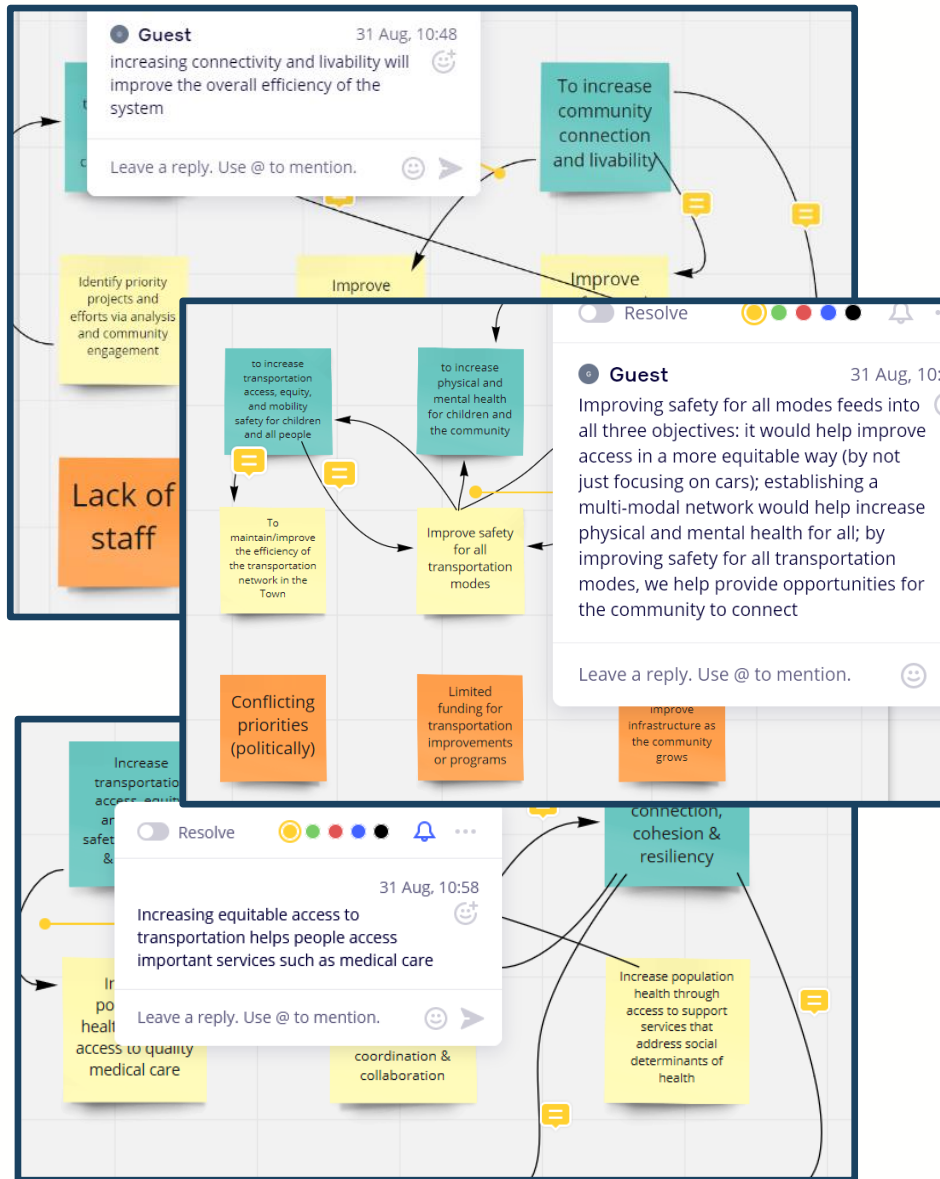
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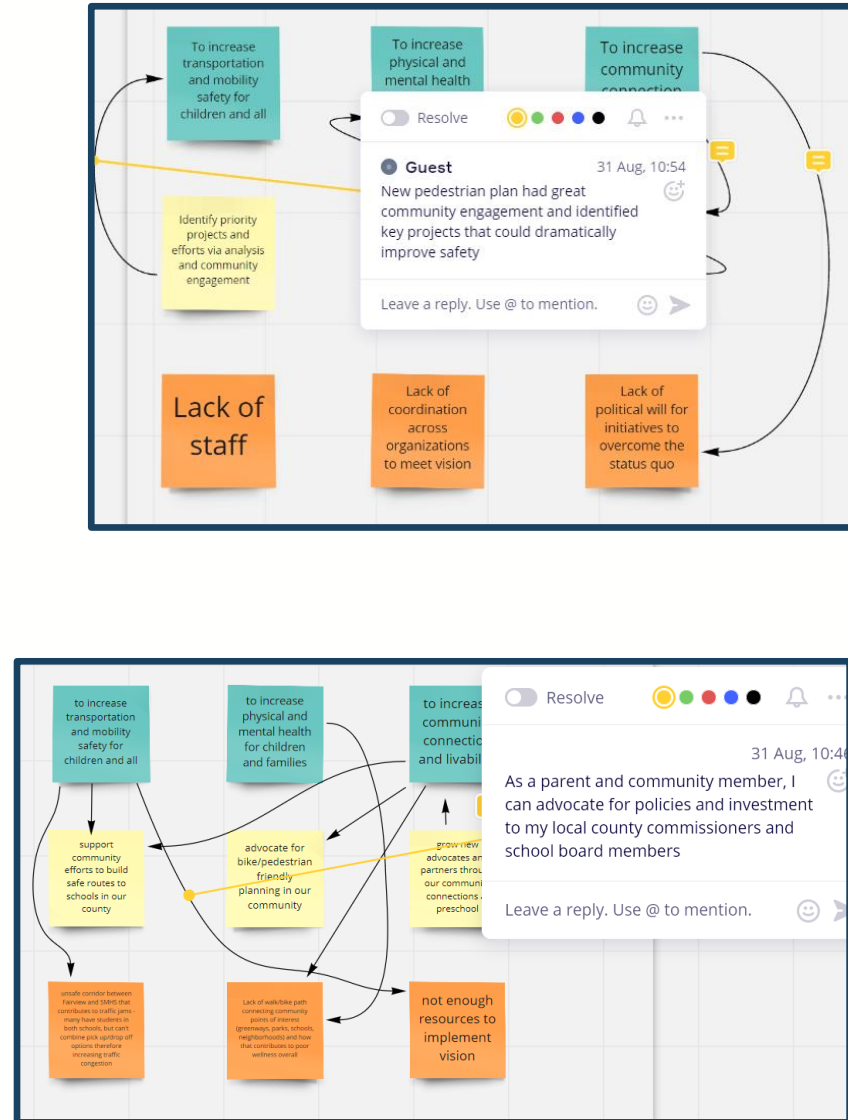
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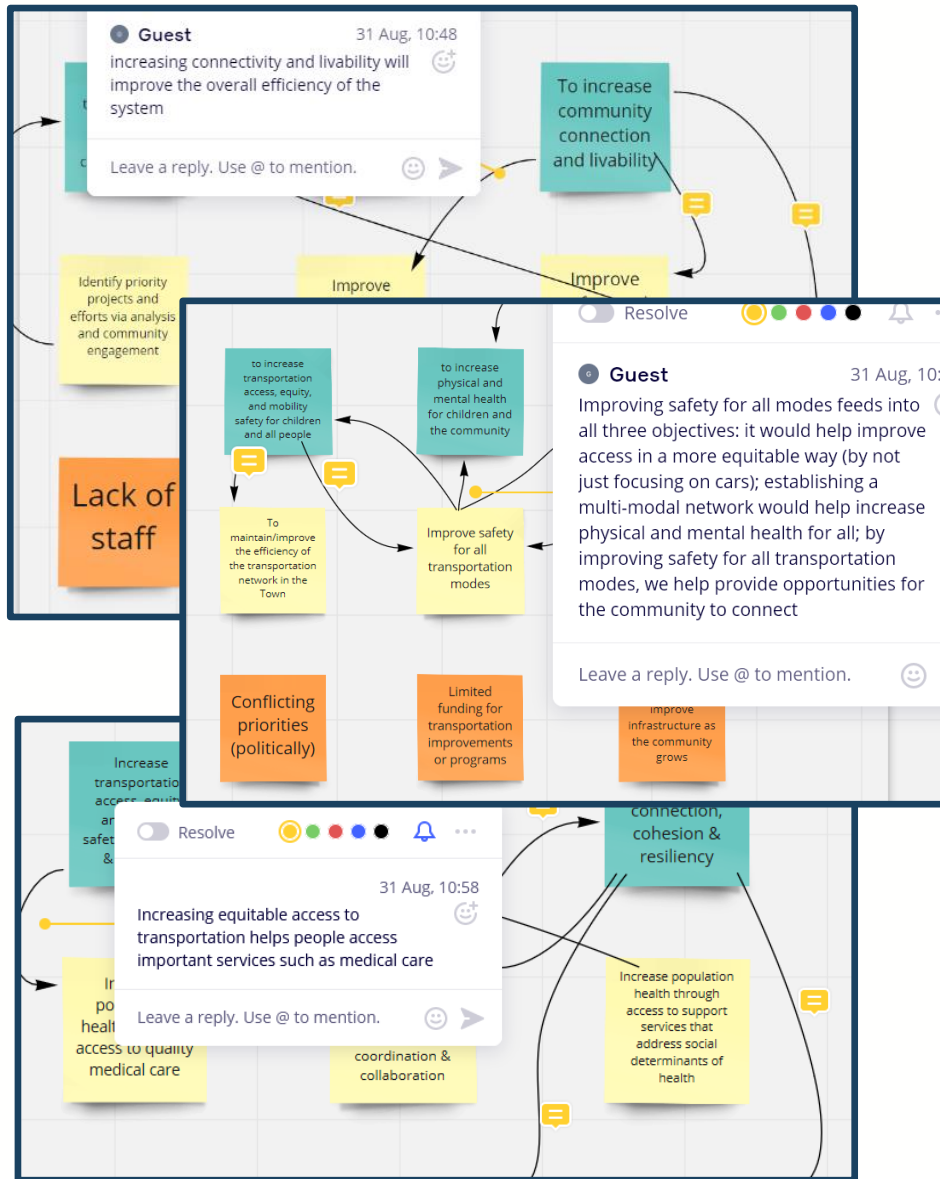
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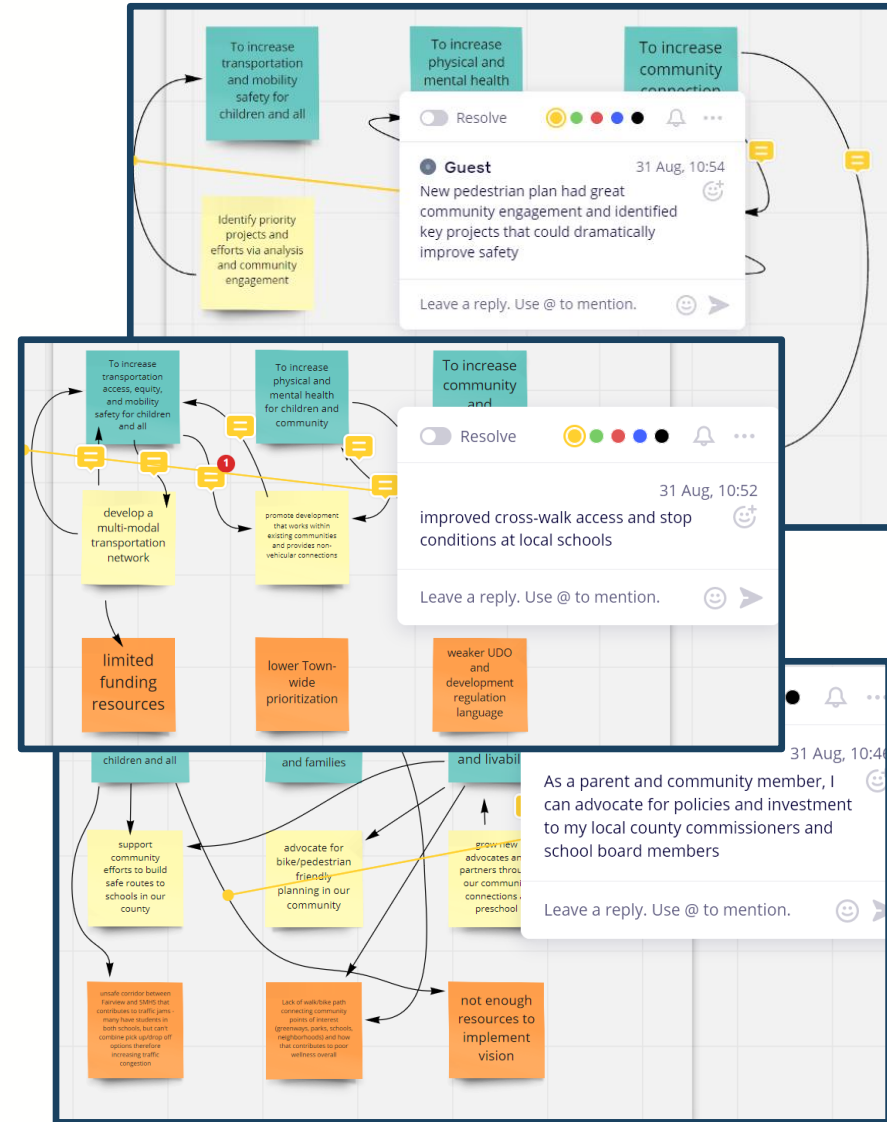
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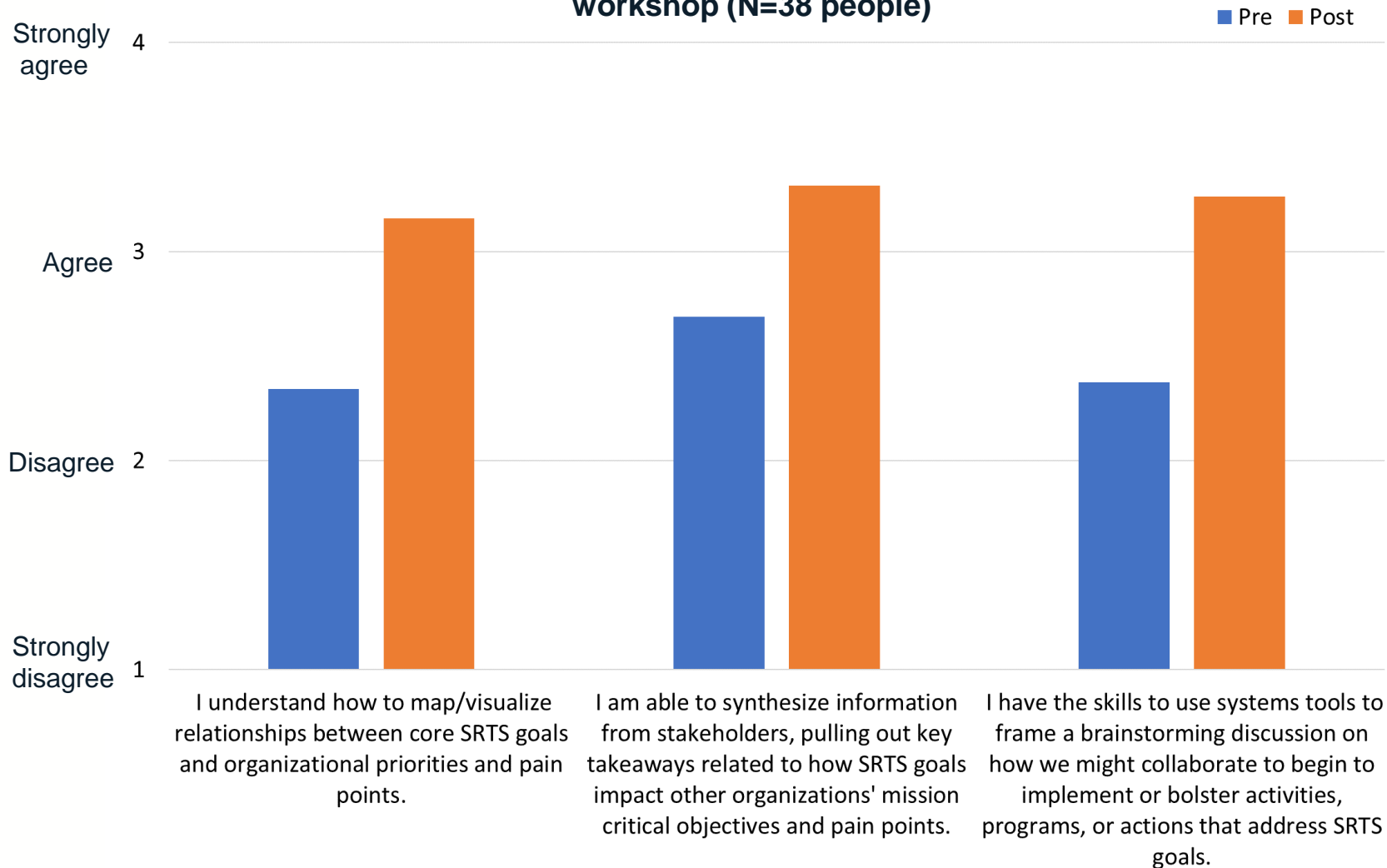
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Prompts to unpack maps and inform next steps

1. When you reflect on your organization, do you feel like your organization appreciates the connections you identified to core SRTS outcomes or is more work needed to get organizational buy-in for SRTS work?
2. In the final step of the mapping process, we began to document actions that your organization might be doing or could do to help your community's SRTS program (that might also help your organization). What were some of these actions and/or what else could your organization do?
3. Within these potential actions, can we identify any partnership synergies—where one partner might be able to support or augment another partner's potential actions?
4. Who else needs to make a map or who else do we need to have this type of conversation with? What are some other organizational partners that you might need something from for your SRTS program to succeed (and thrive!)?

Case Study #1: NC Safe Routes to School

Mean scores pre-and post-goal and action alignment workshop (N=38 people)



Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries

Objectives:

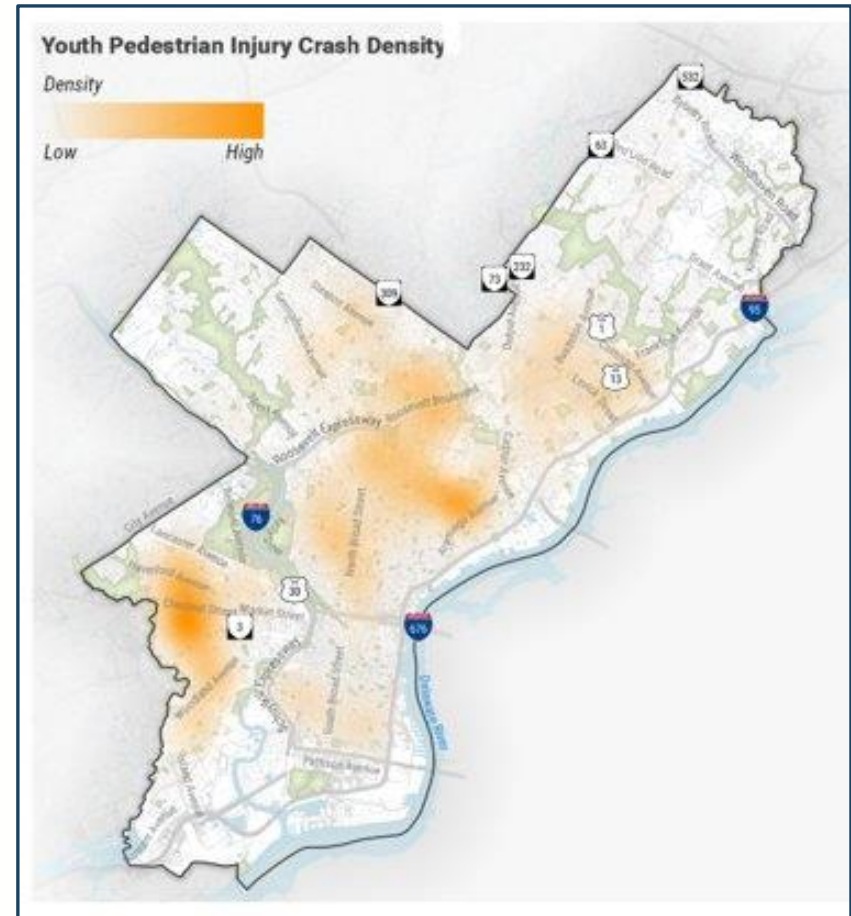
- Explore and understand key interconnected factors contributing to child and youth pedestrian crash trends in Philadelphia.
- Use systems thinking tools to support Vision Zero partners in planning collective action to improve pedestrian crash trends.

Tool:

- Causal loop diagramming

Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries

- Data tells part of the story (an important part)
- However, we also know there is a lot we don't/can't see in our data systems
- Brought together a diverse group of Vision Zero-related stakeholders and partners to examine the broader issues that can contribute to kids being injured and killed in Philadelphia streets and what can be done at different levels and sectors to stop it.

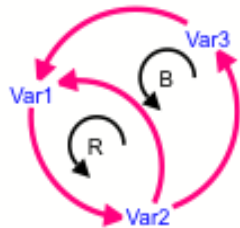


Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries

- Using participatory causal loop diagramming to illuminate core assumptions, knowledge, uncertainties related to child and youth pedestrian injuries and deaths
- Enrich hypotheses and understanding of the problem
- Discuss where intervention may be possible and current issues promoting or thwarting progress.

Systems map

(A visual aid showing how components of a system are inter-related)



Diverse stakeholders (with different views and knowledge of the system)

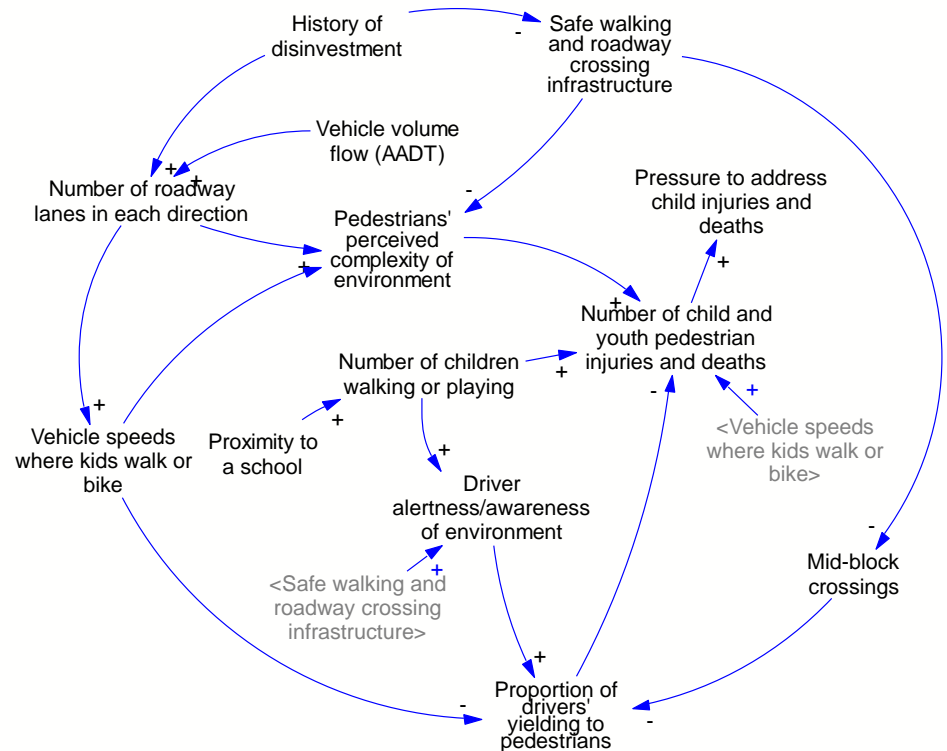


Participatory systems thinking

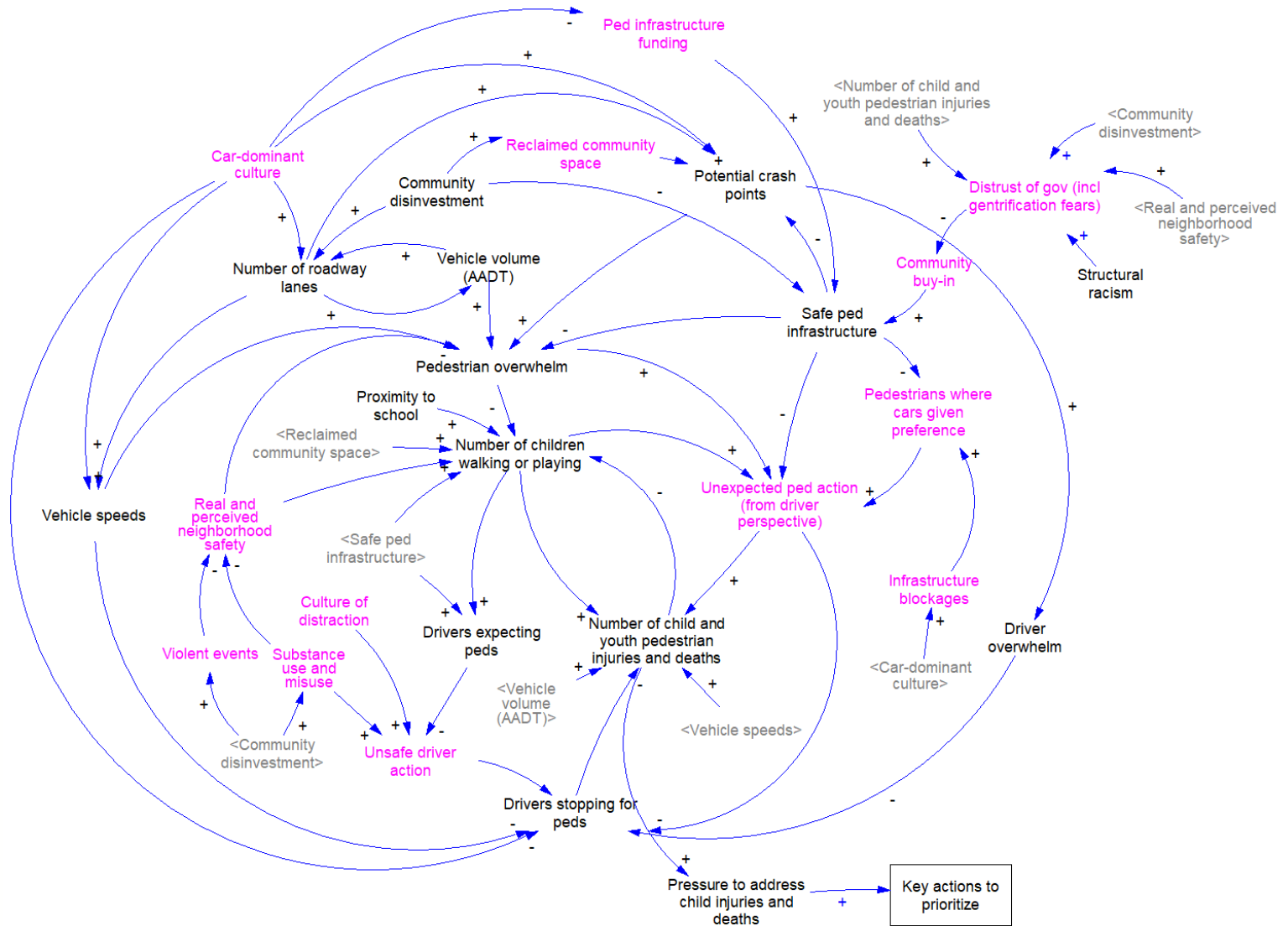


Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries

- Two-part workshop series
- First, developed an initial systems map/diagram of causes and consequences
- Reviewed, edited, and collaboratively built-up map capturing input on what is known in the data, as well as other mechanisms at play that may not be captured in the data (e.g., community trust, frustration, agency culture and decision-making)



Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries



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- Second, we discussed:
 - Where is current work placed within this system?
 - What are the fixes? And what might be working against them?
 - Are there any ways in which actions/work might worsen pedestrian safety that we need to be mindful of?
- Finally, asked “considering your role within this system (e.g., organization you work for), what are the 3 actions that you feel are most important to work on at this point? And with whom?”

Potential Actions

Speed cushions, road design, traffic calming

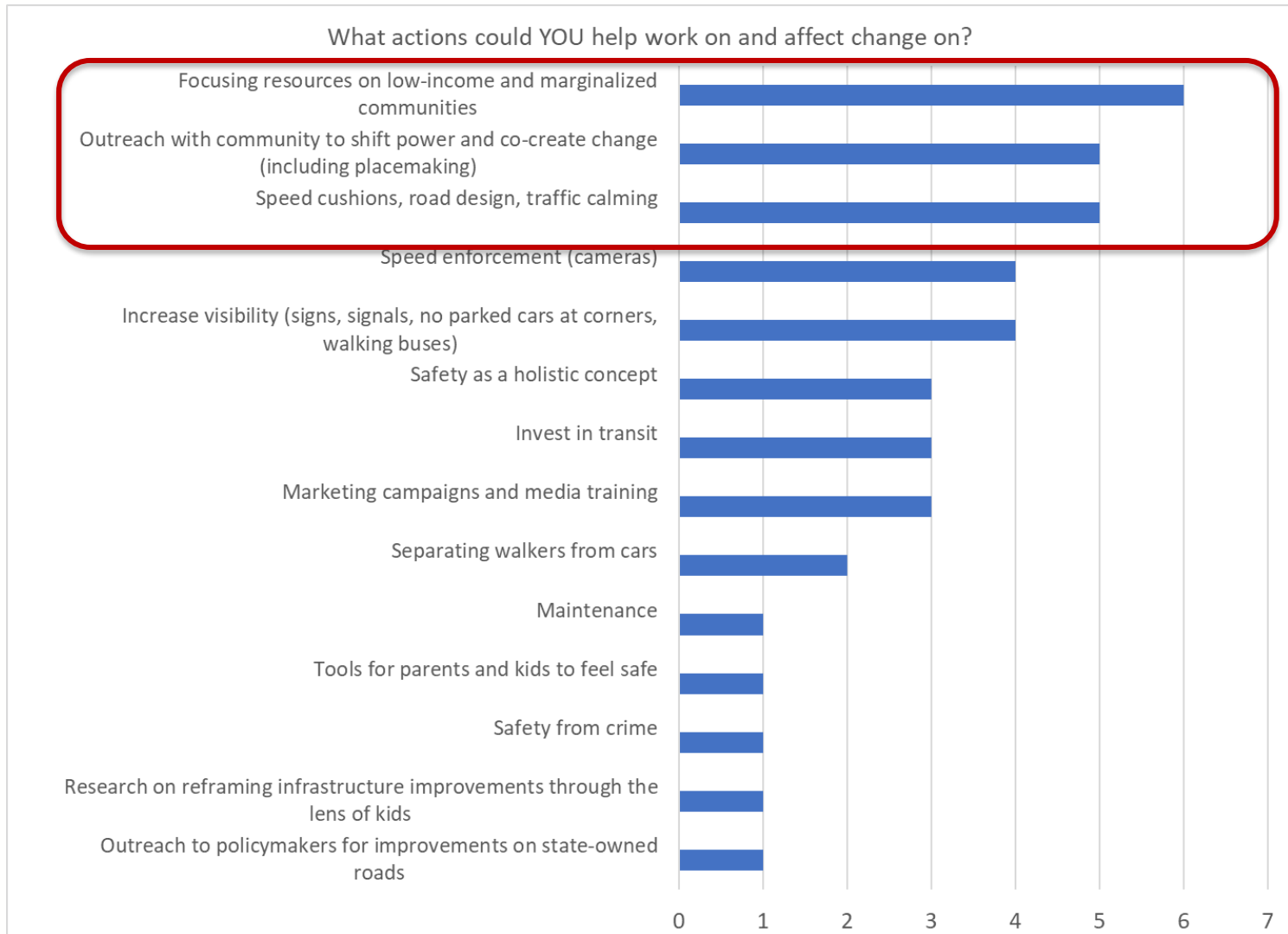
Traffic safety education at schools

Increasing visibility through signs, signals, etc.

Marketing campaigns

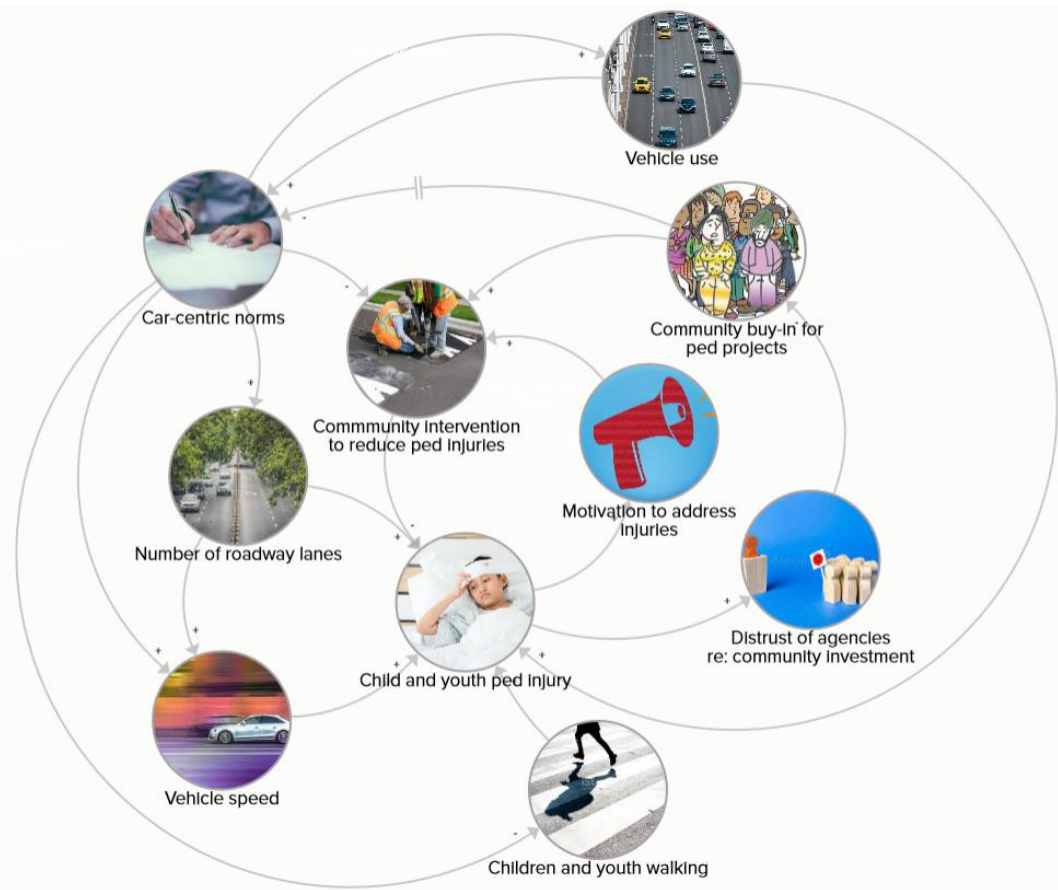
Speed enforcement (safety cameras)

Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries



Case Study #2: Philadelphia Vision Zero work on child and youth pedestrian injuries

- Highlighted perspectives on causes and consequences of youth pedestrian injury, including factors at the individual, community, and societal levels as well as norms and beliefs underlying the problem and potentially affecting intervention.
- Group ultimately expressed interest in focusing efforts on outreach to local communities to establish a firm foundation of trust and collaboration, aligning with core Safe Systems principles
- Distilled map, highlighting the core conversation, is available to support additional conversations (e.g., bringing others into strategic planning, considering other points of intervention)



<https://beckyn12.kumu.io/developing-a-shared-understanding-of-system-dynamics-leading-to-child-and-youth-pedestrian-injury-in-philadelphia>

Use of Systems Tools

- Strategic planning
- Cross-sector collaboration
- Program evaluation and design
- Generating research questions
- Public policy dialogue



Acknowledgements

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Questions? Thoughts?

Contact info: RNAumann@unc.edu

New CSCRS Materials!

The video [“CSCRS Vision For a Safer Road System”](#) (aka the “Highlight Reel”)

Two-page executive summary [“Applying Fresh Approaches to Enduring Road Safety Problems”](#) (aka the “Quick Read”)

The report [“Vision for a Safer Road System”](#) (aka the “Deep Dive”)

All available at: <https://www.roadsafety.unc.edu/>