



Systems thinking is a wide interdisciplinary field with many methods and tools; specific applications vary depending on the context and participants. This overview provides brief notes on systems thinking and focuses on the rich picture method as a tool to use in the BRACE framework.

What are Systems and Systems Thinking?

A system refers to the elements that work together to make up a whole. It is a set of relationships and patterns between policies and procedures, infrastructure, resource decisions, human actions, and intangible drivers of behavior (e.g., trust, goodwill).¹

Systems thinking “is an approach to problem-solving that views problems as part of a wider dynamic system. It recognizes and prioritizes the understanding of linkages, relationships, interactions and interdependencies among the components of a system that give rise to the system’s observed behavior. Systems thinking is a philosophical frame, and it can also be considered a method with its own tools”.²

Systems thinking is generally concerned with complex systems, or “coupled natural human systems” where it is possible but not necessarily easy to determine a pattern between cause and effect and where interventions could happen.^{3,4} Systems thinking challenges us to set aside the traditional, reductive way of thinking, understanding that complex systems produce “systems problems.” Systems problems share four fundamental characteristics:

- They are dynamic in nature, meaning they change over time
- They include multiple organizations/people with diverse interests
- They are interconnected, meaning that dependencies between individuals, organizations, or regions exist and are important
- They can be hard to describe

Let us use urban heat islands as an example. There is not one specific cause of this problem, but rather a confluence of decisions and factors that contribute to this scenario (e.g., how urban planners designed the city, what materials were used in building, where trees were planted and maintained, and how people move around the city). Also, this is not a static challenge; climate change is increasing temperatures and cities are dynamic. There is no one easy answer for reducing urban heat islands; rather, possible options may come through a range of strategies involving many different individuals, organizations, and interest holders.

Simply recognizing systems problems can be a valuable process, as this will help you better understand the causes of the problem and the potential ancillary benefits associated with various potential intervention points. It will also help you to co-design strategies and engage with different interest holders — all of which can lead to higher impact solutions with fewer unintended



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consequences.¹ Back to our urban heat island example, this is the difference between working together at the municipal level with multiple interest holders versus one organization trying to plant a few more trees without consideration for where they should be located, how they will be maintained, the potential for increased allergens, and how residents might feel about them.

We all use mental models to think about a system. These are often implicit, rather than explicit, and influence our thinking on how elements fit together. Systems thinking can be used to solve system problems by challenging us to be explicit about our mental models and assumptions. This explicitness allows us to learn from others and see gaps in our understanding, enabling more powerful opportunities for positive change.

Why is Systems Thinking Part of BRACE?

Public health in the context of climate change can be thought of as a social-ecological system, which consists of interconnected relationships between people and their environment. These are also referred to as “coupled human and natural systems”. For example, people depend on life-supporting ecosystem services (e.g., air, water, soil) for health and well-being, and these ecosystem services are affected by human actions.^{5,6}

There are many different interest holders within social-ecological systems, each with different perspectives. Thus, systems thinking can be a powerful tool to break out of traditional reductive thinking that limits our mental models.

Systems thinking supports the field in addressing root causes, such as recognizing how greenhouse gas emissions drive climate change and how social inequities drive disparities in health and wellbeing. The approach helps practitioners articulate interconnections and patterns, especially the feedback loops created by climate change that exacerbate health risks and inequitable outcomes. Last, systems thinking is well aligned with BRACE’s emphasis on partnership, collaboration, and inclusivity. Often public health acts as a convener, not the sole decision maker – thus, greater understanding of the system, practitioner’s place in it, and other partners’ needs and expectations can facilitate more strategic and successful interventions.

Systems mapping, which is made up of a variety of methods and tools, is one way to approach this.

Systems Thinking Tools: Rich Picture Example

There are many methods that can be used for systems mapping. The Listen & Assess element of BRACE suggests a rich picture, developed by Peter Checkland as part of Soft Systems Methodology, as it is beginner-friendly and participatory.⁷ However, BRACE recognizes other forms of expression (e.g., oral storytelling or dance) may be preferred in some contexts. Practitioners should base their decision on what is most appropriate for their context.

The **process** of collaboratively building or “co-designing” Rich Pictures can be more valuable than the result. This should not be implemented as a solo project by one team member. Rather it is best used as a group process, informed by various partners and interest holders. BRACE recommends rich pictures in Listen & Assess, as it is a sensemaking exercise that can help to generate a consensus understanding about a system and identify important disagreements. Think strategically about who would benefit from the knowledge building (and perspective-sharing) that this exercise can bring. BRACE encourages expanding

beyond the health sector – the Vital Conditions framework is helpful to keep in mind for how various factors impact health.

The goal of visual approaches, specifically rich pictures, is to depict and understand the boundaries, variables, factors, and assumptions of the system – to show the “big picture” via these details. Utilizing diagrams, particularly rich pictures, can help practitioners make their mental models explicit, see other’s perspectives, and work outside of the constraints of data availability. The technical quality does not matter; representing key elements and their interconnections is most important (See Figure 1: Rich Picture on Ways to Reduce Extreme Heat in a Community).⁸

Figure 1: Rich Picture on Ways to Reduce Extreme Heat in a Community

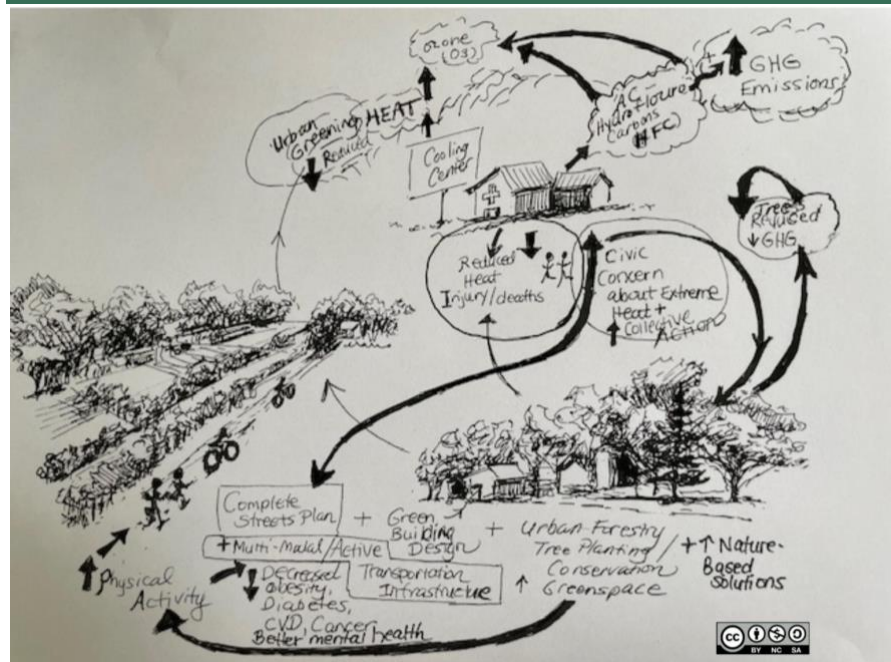


Image from Semra Aytur, University of New Hampshire (CC BY 4.0).



To Develop a Rich Picture:

1. First consider and capture the system boundaries before beginning. Consider as a group:
 - What is the main area of focus?
 - If you are completing this in Listen & Assess, your goal may be to understand community vulnerability and resilience related to known climate hazards. Is the group process and discussion more important or is it more important to develop an empirically supported picture? Make sure goals and boundaries are explicit and shared with all participants before beginning.
 - What is the scale of the social-ecological system you are concerned with (e.g., a city, a town, a neighborhood, a watershed, a park?)
 - What is the time horizon?
 - What is the primary level of interest in the system (local, tribal territory, or state-level)?
 - Who are the key interest holders and are their voices captured?
 - What are the implications of your boundary decisions – who and what is being left out?⁹

Data that has been collected up until this point during Listen & Assess will likely inform these answers. You may also draw upon a health impact pathway diagram.

2. Once each of the above boundaries is understood, each participant can begin working on their own picture. They can represent the picture using pen and paper, colorful sticky notes, symbols, or computer software and online tools. Remember, sophistication does not matter. Use as few words as possible.
3. The following dimensions may be helpful to include while developing the picture:
 - Issues and concerns –the motivations and perceptions of key interest holders
 - Structure – geographic location, physical layout, organizational structure, and the people who are affected
 - Process – relationships and flow or transformations that happen, such as flow of goods/information/resources. Most likely some, but maybe not all, will relate to health.
4. Come back together as a group and discuss pictures and results. This is where the most value for this exercise lies; what assumptions and perspectives are coming up? Your team may decide to build off a developed picture or start a new one to create a group rich picture. Creating a “composite” final picture or “tapestry” that synthesizes the contributions of individuals or subgroups can be very useful and often leaves participants with a new, shared understanding of the system. You can create this by making a large poster board or whiteboard (if using pen and paper or sticky notes) or software programs like Padlet. These



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composite representations can be shared in public spaces, such as libraries or museums, to stimulate ongoing public comment and community engagement.

- Remember: the final result is less important than the outcome of understanding.
- It is good practice to share this with other key partners to see what might be missing. (“Here is how we see the situation. Is this right, from your perspective?”)

Other Uses of Rich Pictures

This resource focuses on using rich pictures to understand vulnerability. Rich pictures can be utilized for a variety of aims or topics, specifically to 1) try to evolve mental models; 2) offer group sensemaking and understanding; and 3) create visual inputs that can be harnessed in data stories. Rich pictures can be a means to an end themselves or be used to contribute to other systems tools (e.g., relationship mapping, ripple effects mapping, or causal loop diagrams).

Keep Reading

- [Soft Systems Methodology: A Thirty Year Retrospective](#)⁷
- [Systems Tools For Complex Health Systems: A Guide To Creating Causal Loop Diagrams](#)⁹
- Guide to Diagrams [Open University Guide to Diagrams](#)¹⁰
- [How People Use Rich Pictures to Help Them Think and Act](#)¹¹



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