

Using Systems Thinking in Strategic Planning

This paper has been written by the Strategic Planners in the Transformational Change—Systems team within Healthcare Improvement Scotland. It explores how Systems Thinking can help strategic planners tackle the complexity associated with planning at a system level.

The content of this paper is informed by the training offered on Systems Thinking by the University College of London's [Centre for Systems Engineering](#) as well as new research on [Systems Thinking in policy making](#) published in 2023.

Health and social care integration, person-led care, and holistic care have been the strategic direction in Scotland for the last decade. For strategic planning, this means we are **increasingly planning at a system level rather than at an organisation or service level**. Planning at a system level requires us to embrace and work with complexity. This complexity is associated with

- Integrated care requires different parts of the system to work together through a wide range of complex and nuanced interdependencies and interactions.
- Meeting people's needs holistically requires an understanding and appropriate response to the complex interactions of need within people, families and communities where needs are a complex array of interactions and drivers.
- Person-led care requires planners to build flexibility and personalisation into strategic, operational and tactical plans, shifting away from static, one-size-fits-all and centralised planning approaches towards embracing complexity and individualisation.

Within this context, Systems Thinking offers an attractive and well-developed methodology for supporting system wide thinking, analysis and planning. With a current lack of professional vocation for strategic planning in health and social care, Systems Thinking brings an industry recognised identity, which can be harnessed to develop a shared language, common approach and overall sense of community for strategic planners across Scotland.

Systems Thinking grew in popularity within the field of engineering around 1960. Engineers sought to understand the complex interactions within systems of built, virtual, network, and software systems to better design things that better met needs. Systems thinking sought to understand the dynamic behaviour of systems instead of trying to limit understanding to linear (cause and effect) thinking.

Today, Systems Thinking is applied across different domains, including the social sciences, engineering, business and management, computer science, and medicine. Its appeal in health and social care is its usefulness in helping us tackle complexity head-on.

However, taking advantage of what Systems Thinking has to offer strategic planning isn't a case of lift and lay into health and social care. Systems Thinking's origin within engineering means that we need to draw out the parts that are particularly useful for planning requirements and adapt the models and approaches to reflect the kind of complex environment in which we plan health and social care.

Systems Thinking offers strategic planners the opportunity to

- Facilitate discussions amongst stakeholders about where solutions in the system need to come from and challenge traditional approaches to improvement, which focus on change within the service and not from across the system.
- Identify the system wide actors, stakeholders, organisations and services that you bring into the planning process.
- Explore what questions you, as a planner, can use to facilitate the development of problem definitions and solutions by stakeholders and colleagues.
- Identify which projects you do and don't invest in and what role you can play within projects by understanding the unique role that planning can have in supporting system wide activity.
- Shape programmes that are able to deal with complexity, concurrent need, multiple and complex need and holistic approaches that cross traditional boundaries.

This note provides a brief introduction to Systems Thinking by applying its core concepts to health and social care. It teases out some of the things that are important in applying Systems Thinking in a planning context and hopefully piques your interest in learning more and thinking about how we might benefit from Systems Thinking as a strategic planning profession.

As with any topic, building knowledge is only the first step in seeing its uptake. [Recent research](#) on Systems Thinking demonstrates that the successful uptake and use of Systems Thinking requires a combination of a consistent understanding of Systems Thinking methodologies and terminologies, time and resources to invest in changing thinking practices, and sufficient buy in and leadership demonstrated by senior leaders. This combination of factors enabled a safe environment for discussion and collaboration using Systems Thinking approaches. This raises important questions for those leading strategic planning teams.

This paper covers the following

- [What is a system?](#)
- [Defining the boundary of your system](#)
- [Articulating the 'behaviour', and not just the 'structure', of a system.](#)
- [Understanding 'cause and effect'](#)
- [Systems Thinking helps us to be brave in working with complexity.](#)
- [Systems thinking can be helpful in working out what to focus on as a strategic planner.](#)

1. What is a system?

A system is defined as something made up of more than one part, which interacts together to create at least one emergent property (something that wouldn't exist without the interactions and happens as a result of that interaction—like water from hydrogen and oxygen). *Figure 1* below demonstrates this definition and uses an example to illustrate its application within health and social care.

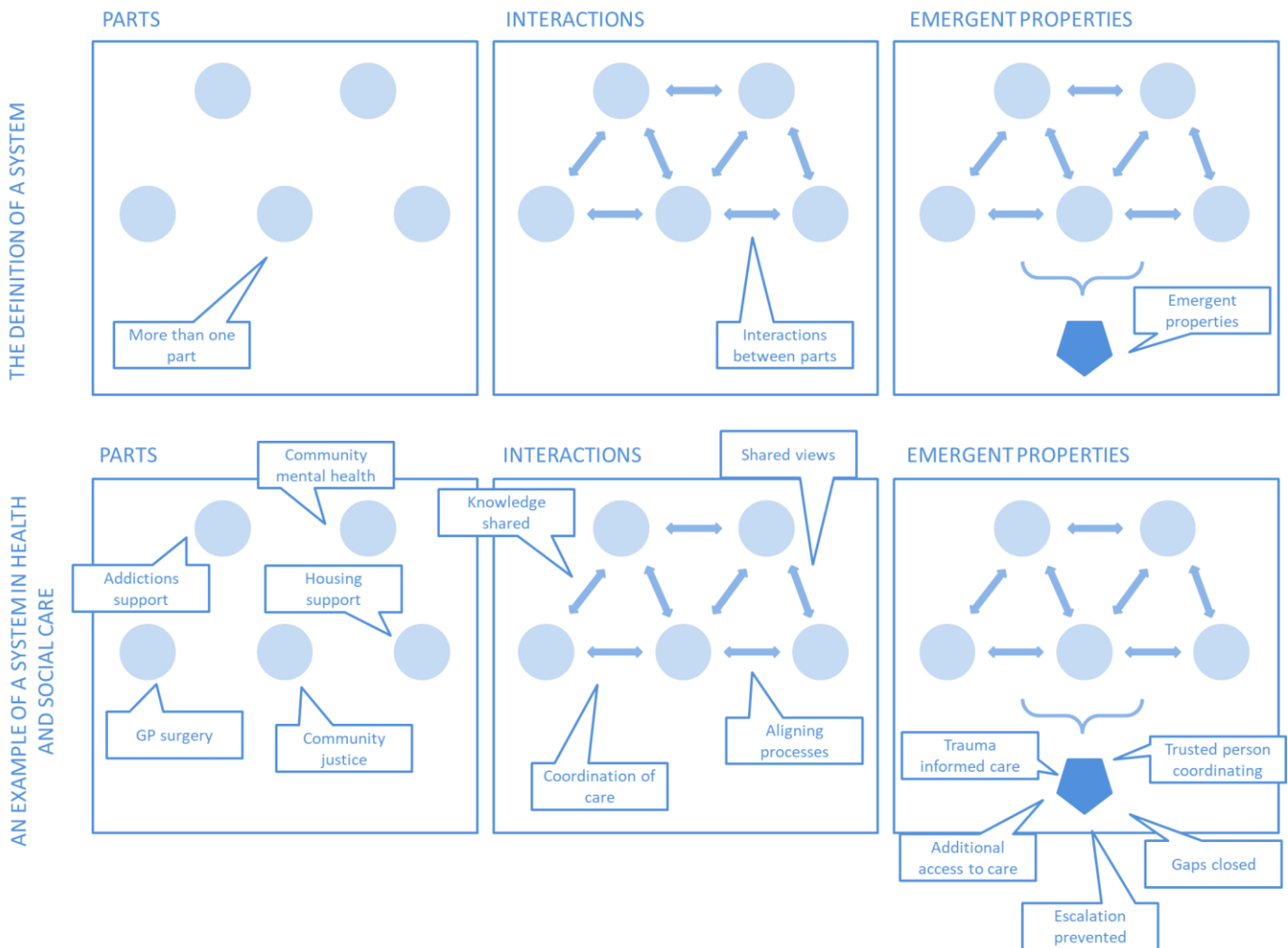


Figure 1: The definition of a system

2. Defining the boundary of your system

All systems need to be defined with clear boundaries. Anything determined to be within the system is defined as ‘a part’ of the system with a ‘boundary’ existing to mark the edges of the system. Anything outwith the system boundary is considered the system’s ‘context’ or ‘environment’ – see *Figure 2*.

The system’s boundary is not objective. It is a subjective decision about where to set it. It is up to the ‘observer’ to define the system—for us, the ‘observer’ is usually a combination of leaders, planners, and stakeholders.

Where you set the boundary matters. The system should be defined in a way that is of best use in analysis and decision making. How the system is defined including where the boundary exists and what is within or outwith the system will depend on why are trying to define the system.

The health and social care system is made up of complex interdependencies where each part is affected by, and affects, a large number of other parts of the system. This makes planning challenging and requires us to work well with complexity (see later section on complexity).

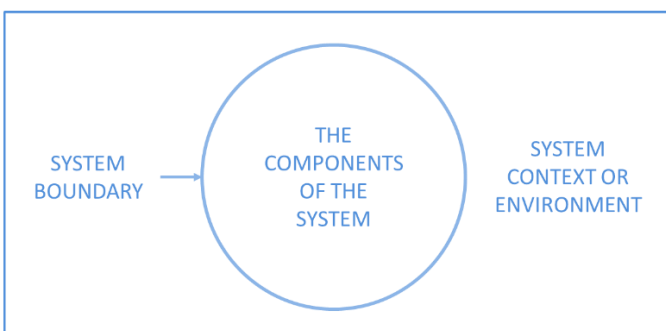
When defining the scope of a review, improvement, or planning activity, we often define the scope of this work—and this means deciding what is considered within and outside the scope of the activity. For example, a review of mental health services—which services should this review include and exclude? In Systems Thinking, this is setting the 'boundary' of the system.

There is a risk that when setting that boundary, we unintentionally isolate it from the important and complex interdependencies. Doing this leads to ineffective change, improvement and planning as it fails to provide for the impact that other parts of the system will have on your plans and the impact that your plans will have on other parts of the system. For example,

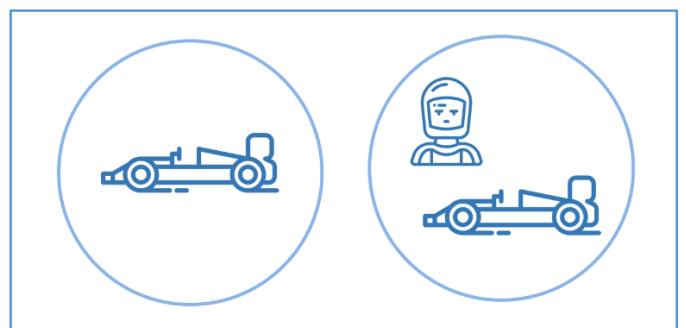
- If your cancer diagnostic pathway depends on timely access to theatres or labs that are also used by other pathways, then considering these two things as fixed dependencies that are outside of the scope of your work may result in what you can do having limited effectiveness. To include these services well, will likely mean that you engage different stakeholders and services in the process than if you were to only include stakeholders and services from within cancer care.
- Planning secondary care for diabetes is highly dependent on effective prevention and the role of primary care. Even if prevention and primary care are outwith the boundary of your system for a review, planning secondary care without actively coordinating with the other parts of the system may result in your secondary care planning being a task of continually doing more with insufficient resourcing.

It is not uncommon for stakeholders to all have different ideas about what the system is and where the boundary should exist for a particular piece of work. Developing a shared understanding of the system, supported by generating graphics that describe the parts, interactions, emergent properties, and boundaries of the system, can be a powerful way to shape early discussions with stakeholders and set the tone for the rest of the project or programme.

DEFINING THE BOUNDARY OF A SYSTEM



WHICH IS THE SYSTEM?



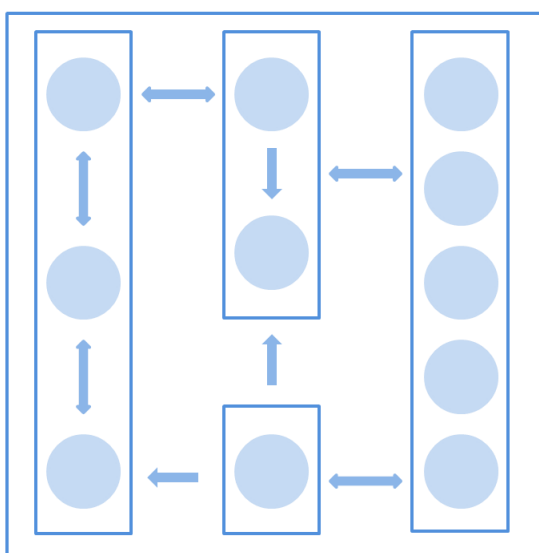
...IT DEPENDS ON WHAT YOU ARE TRYING TO ACHIEVE

Figure 2: Defining the boundary of a system

3. Articulating the 'behaviour', and not just the 'structure', of a system

Systems have both 'structures' and 'behaviours'. Within the context of health and social care, we can describe the structure of a system as the set-up of the component parts and the ways that the system is designed to interact. For example, parts are made up of the different services, the different organisations, the referral and signposting processes, the eligibility requirements, the description of the service offer, and the different accountability and decision-making structures. Whereas the behaviour of that system is how the interactions play out in practice. This includes the way that people use or do not use, services in practice, who they approach for what, who they trust and who they don't, the knock-on effects that play out across the system from the way that the system is set up and the interactions people have with it, the way that any flexibility plays out in practice and the cultures and behaviours within the system.

THE STRUCTURE OF A SYSTEM



THE BEHAVIOUR OF A SYSTEM

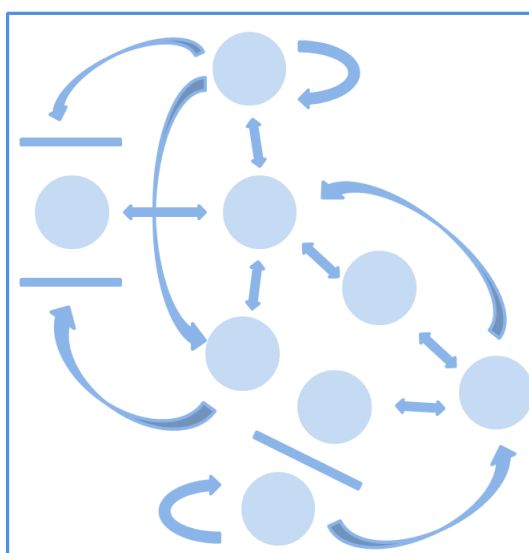


Figure 3: A system has both a 'structure' and a 'behaviour'

The behaviour is undoubtedly more challenging, but also more important to define as part of your system mapping than the structure. Mapping the system's behaviour is often the key difference between process mapping and system mapping. Aggregating insight from tools like journey mapping from Service Design, feedback from lived and living experience, and views of staff can often be powerful sources of insight into how to articulate the behaviour of a system. When mapping your system, go beyond articulating the formal referral pathways and eligibility constraints of the parts of your system.

4. Understanding 'cause and effect'

A useful tool within Systems Thinking is to consider 'cause and effect' within your system as a way to search for where your solutions can be found. A challenge in one part of the system may require a solution from another part of the system. Mapping out the cause and effect drivers within your system can help identify where the solution to a challenge can be found. We often look to improve a

service from changes within that service without considering how the broader system is driving those challenges.

For example, we have developed a range of improvements to help tackle the flows within unscheduled care as a way to reduce the pressure it is under. But an exploration of the wider system, and in particular identifying and quantifying the upstream drivers of demand coming from other parts of the system would help us to identify action in other areas as part of the solution for challenges within unscheduled care. More on this can be found in the [Rethinking Unscheduled Care Strategic Planning](#) Insights paper.

Two 'cause and effect' approaches, in particular, can be of help in strategic planning

- Feedback loops (*see Figure 4*)
- Knock on impacts (*see Figure 5*)

Feedback loops (*see Figure 4*) are where you identify interactions between two or more parts of the system. It could be as simple as two parts of the system creating either a feedback loop, or it could be more complex with a combination of 3+ parts of the system becoming a cycle that represents a feedback loop.

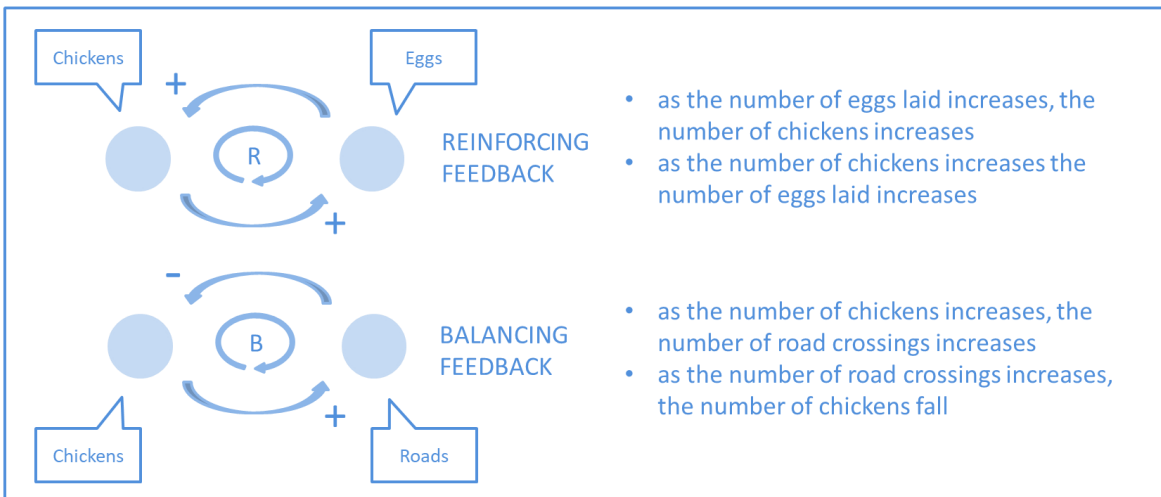
A **reinforcing loop** is where the increase of one part leads to an increase in the other (or where less of something leads to less of another). In *Figure 4*, you can see that the more chickens there are, the more eggs will be laid, which in turn will increase the number of eggs, which creates even more chickens. Or in the case of healthcare – as the wait for care increases (e.g. cancer treatment), the higher the severity of the care need by the time the care happens. The higher the acuity the more care is usually required, which increases the wait for other people in a system of constrained resourcing, which contributes to an increase in the severity of their condition in turn. Reinforcing loops will continue their increasing or decreasing pattern without intervention to break the cycle.

In contrast, a **balancing feedback** loop sees an increase in one lead to a decrease in another. Instead of continuing to increase or decrease as a reinforcing feedback loop does, a balancing feedback loop will somewhat address itself. However, that doesn't mean the balance achieved is desirable, and intervention in that cycle may still be warranted. More chickens lead to more road crossings, which in turn leads to fewer chickens through accidents. *Figure 4* provides a few examples of balancing feedback loops within health and social care.

Understanding the reinforcing and balancing feedback loops in your system can help identify which cycles you want to seek to break and which you want to actively encourage.

It is useful to note that you need to carefully allocate 'increase' and 'decrease' or 'more' and 'less' to components. For example, fewer staff leads to higher caseloads, which leads to more burnout, fewer staff, and higher caseloads. However, phrased in this way this is fewer staff (-) and higher caseloads (+). But this example interaction is a reinforcing loop and not a balancing one as the situation will continue to worsen without intervention rather than balance itself. All components of this example interaction require a (-) to represent this loop accurately.

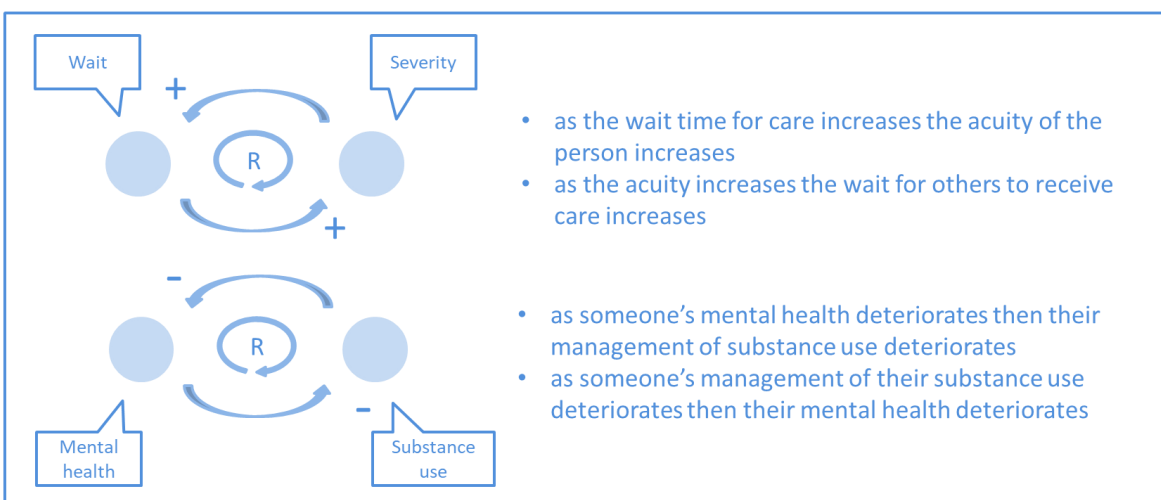
CAUSE AND EFFECT – FEEDBACK LOOPS



- as the number of eggs laid increases, the number of chickens increases
- as the number of chickens increases the number of eggs laid increases

- as the number of chickens increases, the number of road crossings increases
- as the number of road crossings increases, the number of chickens fall

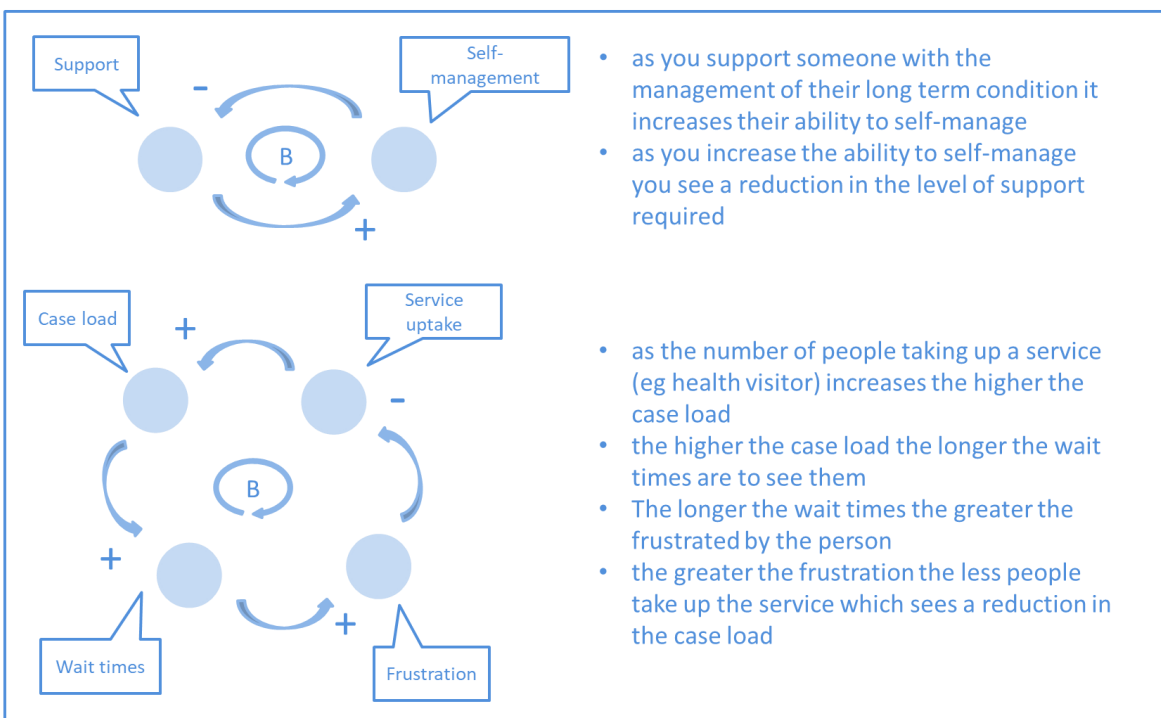
REINFORCING FEEDBACK LOOP



- as the wait time for care increases the acuity of the person increases
- as the acuity increases the wait for others to receive care increases

- as someone's mental health deteriorates then their management of substance use deteriorates
- as someone's management of their substance use deteriorates then their mental health deteriorates

BALANCING FEEDBACK LOOP



- as you support someone with the management of their long term condition it increases their ability to self-manage
- as you increase the ability to self-manage you see a reduction in the level of support required

- as the number of people taking up a service (eg health visitor) increases the higher the case load
- the higher the case load the longer the wait times are to see them
- The longer the wait times the greater the frustrated by the person
- the greater the frustration the less people take up the service which sees a reduction in the case load

Figure 4: Understanding cause and effect through feedback loops

Knock-on impacts can be used to demonstrate the impact that one thing has on another along a chain. That chain may or may not loop back on itself at some point to become a (albeit lengthy) feedback loop. *Figure 5* provides an example of how parts of a system can have knock-on effects around a system. *Figure 5* represents a single chain of logic, but it is also common for knock-on impacts to branch off into multiple chains of knock-on impacts. Tracing knock-on impacts back to the source can be a powerful way to identify where to address challenges.

CAUSE AND EFFECT – KNOCK ON IMPACT

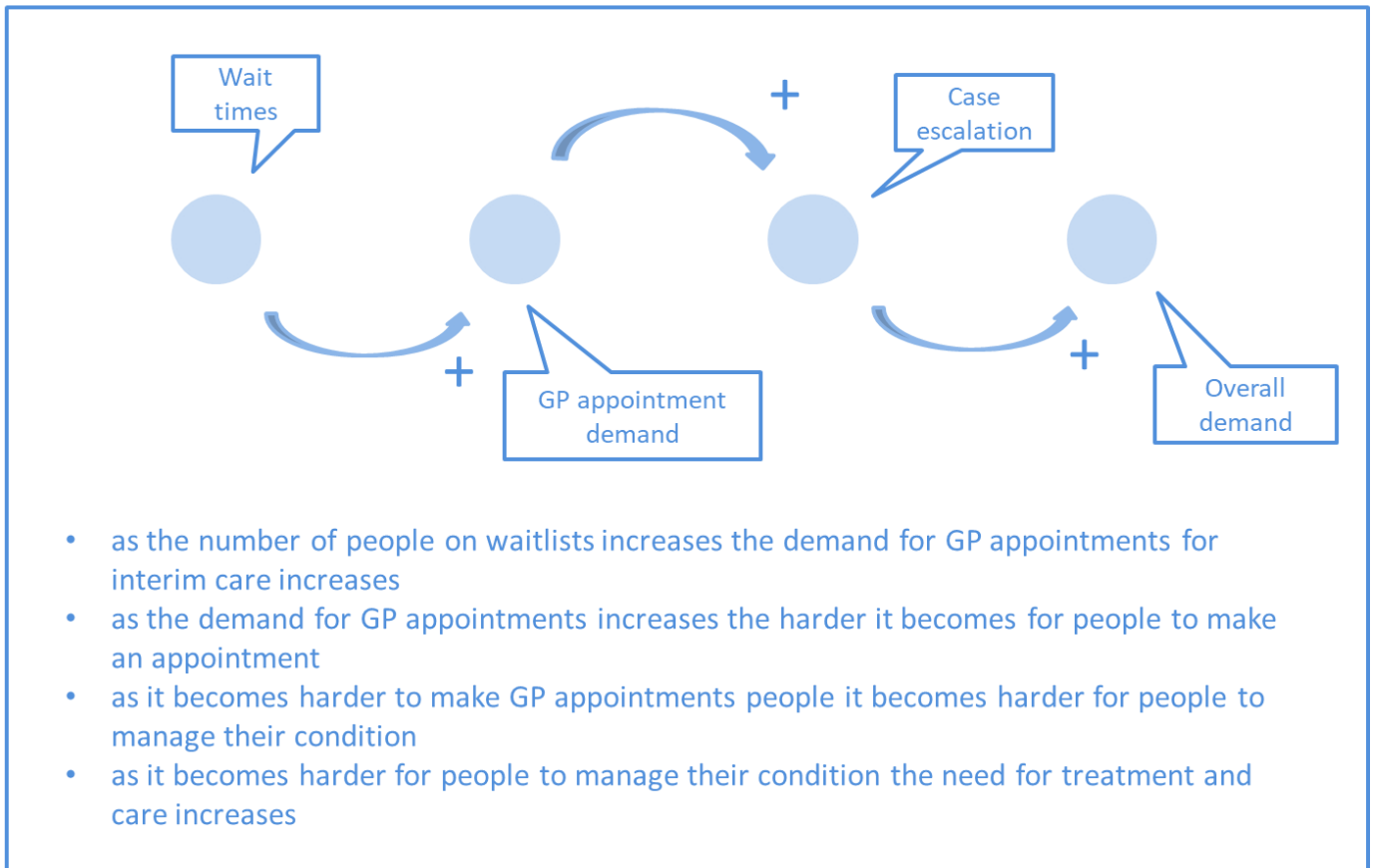


Figure 5: Understanding cause and effect through knock-on impacts

5. Systems Thinking helps us to be brave in working with complexity

Health and social care as a whole are known in Systems Thinking terminology as a ‘complex adaptive system’. This means that health and care services have high levels of integration and interconnectedness, which drive unpredictable or uncertain outcomes (and unpredictable or uncertain emergent properties). Complexity in health and care is unlike that in almost any other industry due to the variety of people, technology, professions, resources, and so on. This means we cannot just ‘fix’ emergency departments or general practice in isolation. We must consider the wider system with all its complexity to make meaningful and sustainable change.

It can feel overwhelming to accurately understand and portray such extensive complexity. Complexity is the tacit acceptance of uncertainty, including uncertainty about outcomes, patterns, and behaviours when working with people, organisations, and communities. This can feel daunting in an environment where we are expected to provide certainty when planning and undertaking change.

However, complexity does not mean we cannot act. It means that actions need to ensure we are quick to recognise and respond to unexpected outcomes. To do this, we invest in learning more about the system and expand the scope of interest when shaping change by selecting the right boundary of the system in the scope of the work (see section 2).

When considering the changes you make within your system it is also worth considering that models of care which embrace and understand complexity tend to have more bespoke and flexible approaches to care delivery and require higher degrees of trust in people, organisations, and communities.

6. Systems thinking can be helpful in working out what to focus on as a strategic planner

In an environment where NHS Boards and HSCP strategic planners are a stretched resource, we are required to make day to day decisions about how we invest time and energy – which activities we get involved in, where can we add the most value, what sits with strategic planning and what better sits with operational colleagues?

Systems Thinking offers us a framework and consistent language to explore where we add value as strategic planners. Implementing a new surgical procedure can be described as a system – the various staff, rooms, processes, preparation, scheduling, training, and aftercare. Depending on the context it is in, it may be described as a ‘Simple’ or perhaps ‘Complicated’ System, as it is relatively self-contained with more predictable outcomes. Effectively preventing crisis and improving outcomes for people with multiple and complex need who are engaging with a large number of scheduled and unscheduled health and social care services sets us up to consider a ‘Complex’ System. Strategic planners can add value across ‘Simple’, ‘Complicated’ and ‘Complex’ Systems, considering how we deploy limited strategic planning resource in Scotland, that consideration of the broader, more complex and open systems feels to be the forte of the strategic planning skillset and unique value add.

This resource has been developed by Strategic Planners within the Transformational Change - Systems Unit within Healthcare Improvement Scotland. It is designed to support the Strategic Planning Community of Practice by providing introductions to concepts and topics relevant to Strategic Planners.

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