

What is the Practical Application of Systems Thinking in Patient Safety at the National Level?

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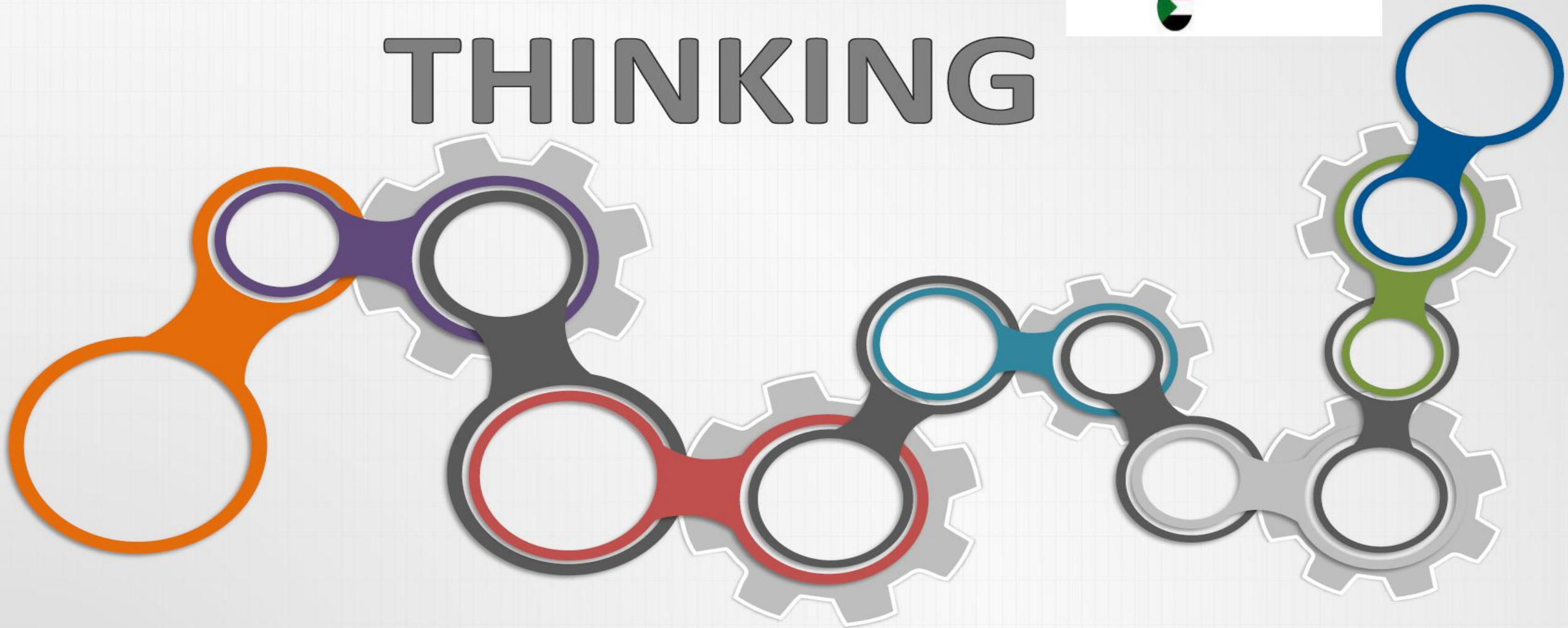
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SYSTEMS THINKING



Fact

- **70%** of Change Efforts in the World FAIL¹!
- Major *culprit*: Failure of the **Change Agents** to apply the **Science and Tools of Systems Thinking**!
- Considered as the **primary reason** for numerous international political and economic failures etc.

¹ [Cracking the Code of Change - Harvard Business Review](#)





**Systems thinking is a foundational requirement for
Transformational Leadership as a tool for
MAXIMIZING Program Effectiveness.**

DEFINITION

A System



A system is an entity with interrelated and interdependent parts.

Healthcare is a System

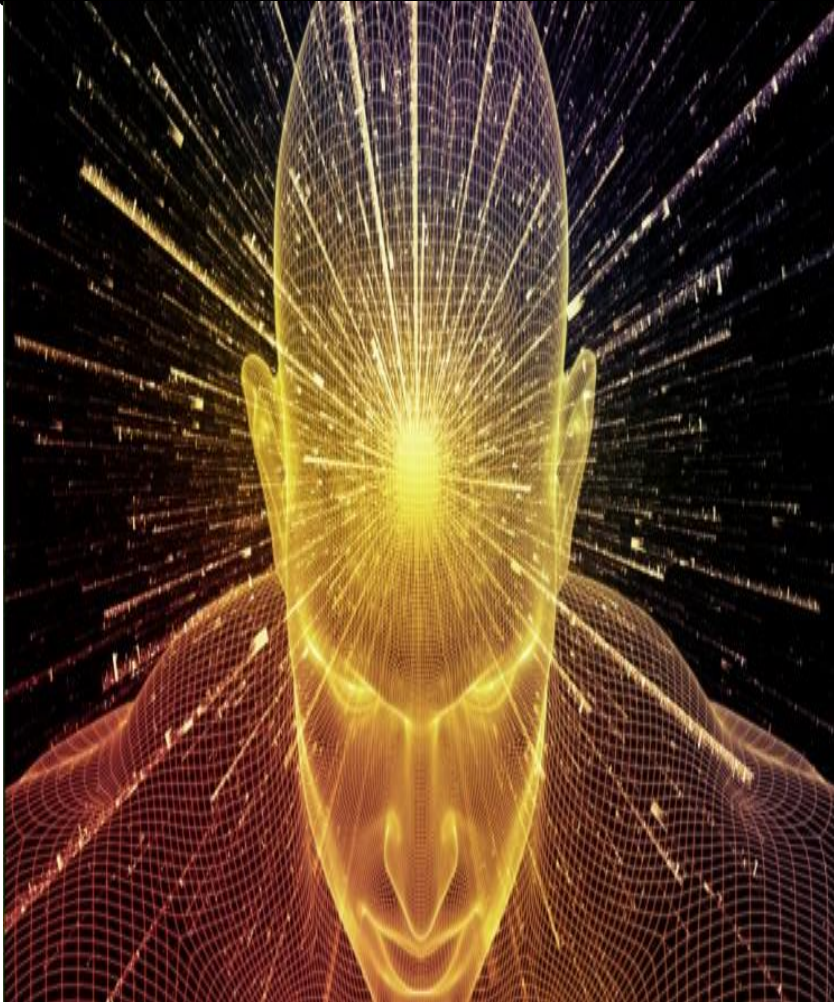
- “a set or **series** of **interconnected** or **interdependent** parts or entities that **act together** in a common purpose or produce results impossible by action of one alone”.

Definitions Systems Thinking



Systems Thinking is a **holistic approach** to a **better understanding** of how the **system elements interact** with each other over time, **the root-causes of system defects**, and the right approach for a highly effective ***problem-solving intervention*** (**strong leverage areas**).

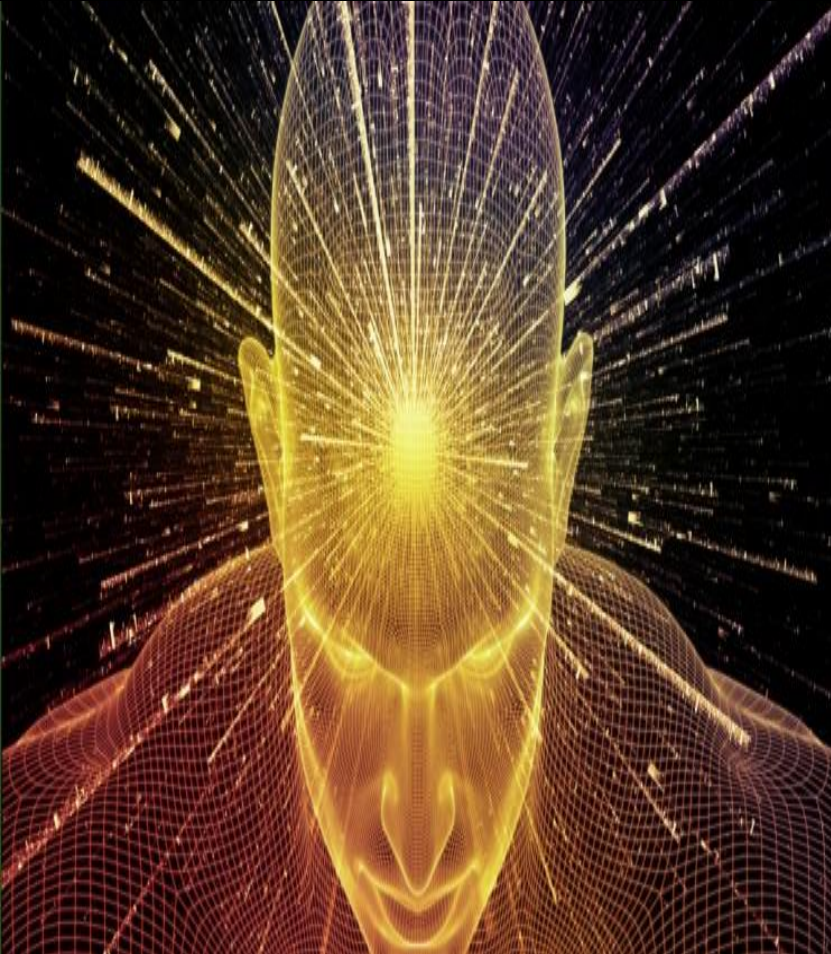
Concepts & Success Factors in Systems Thinking



1. Holistic “synthesis”-as opposed to the “reductionist”- paradigm of thinking: Forcibly appreciating system and systems **Interconnectedness and Interdependence** in fostering an outcome.

- Zooming-out: See what others can't see
- Outcome-focused
- Multidisciplinary teams and solutions
- System-redesign using the Ideal Design Approach

Concepts & Success Factors in Systems Thinking



2. System leverage point have variable impacts: identify and focus on **strong leverage points**.
3. Shift the Focus from “**Products to People**”: System Intelligence.
4. Mindful of and ready to tackle “**the unintended consequences**”.



**A CORONA DIVE BY
THE WHOLE SYSTEM!**



HEALTHCARE

Systems Thinking



The Corona Pandemic & Systems Thinking

Health services:

Total
SYSTEM
Disruption

Cancellation of elective procedures

Closure of all ambulatory services

Restrictions of ER visits

Closure of healthcare centers/hospitals

Suspension of preventative/screening services

Suspension of home healthcare services

Negative impact on staff Mental Health

Restrictions/New infection control practices

Etc.

HEALTHCARE

Systems Thinking



The Corona Pandemic & Systems Thinking

Health
services:

**Whole
SYSTEMS
Disruption**

Social & Community Restrictions: Lockdown
Travel Restriction/Airport Closures
Hospitality/Leisure Restrictions
Education: School & College Closure
Manufacturing
Wholesale/Retail Closure
Construction
Environmental impacts



InterSystems

**Interdependence and
Interconnectedness
results in
Intended & Unintended
Consequences**



The practical application of systems thinking in patient safety at the national level?

- 1. Root Cause Analysis:** Systems factors as well as individual factors and categorisation according to outcomes of intervention: **High versus Low Leverage Points.**
- 2. Process Improvement:** By understanding the **complex interdependencies** within a healthcare system, systems thinking can guide the **implementation** of process improvement initiatives.
- 3. Risk Assessment and Management:** It helps identify potential hazards, assess their impact on patient safety, and develop **strategies to mitigate those risks effectively-dealing with unintended consequences.**

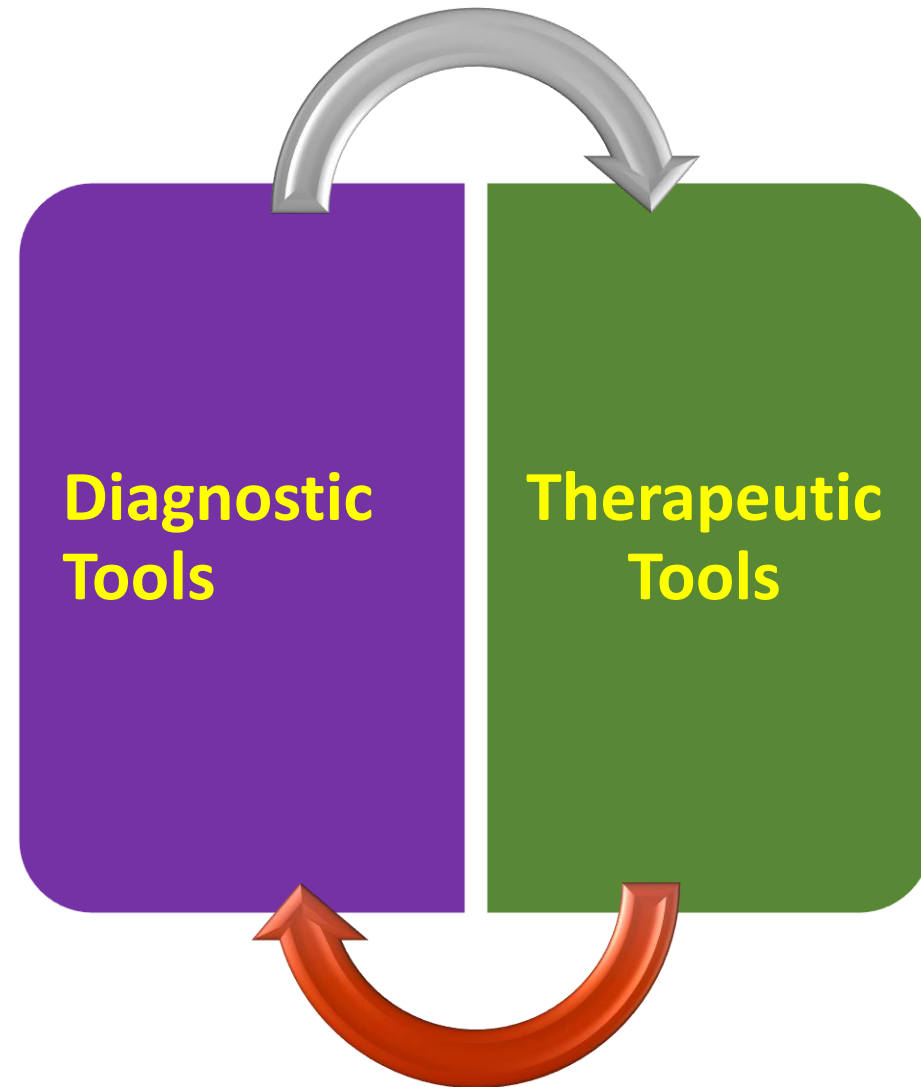
The practical application of systems thinking in patient safety at the national level?

4. **Collaboration and Communication:** By recognizing the interconnections between different stakeholders and systems, **Systems Thinking promotes effective teamwork and information sharing**, ultimately enhancing patient safety.

5. **Policy Development:** Systems thinking provides a **holistic perspective** on healthcare systems, enabling policymakers to develop evidence-based policies and regulations that prioritize patient safety.



Systems Thinker





**Pinpoint the
Root Causes**

**Identify the
Leverage
Points**

**System
Redesign
(Creatively!)**

**Anticipating &
Preventing
Unintended
Consequences!**

**Learning
Organization
through
feedback**

The FIVE Golden Steps

Tools to Aid in Systems Thinking and in identifying the Leverage Points

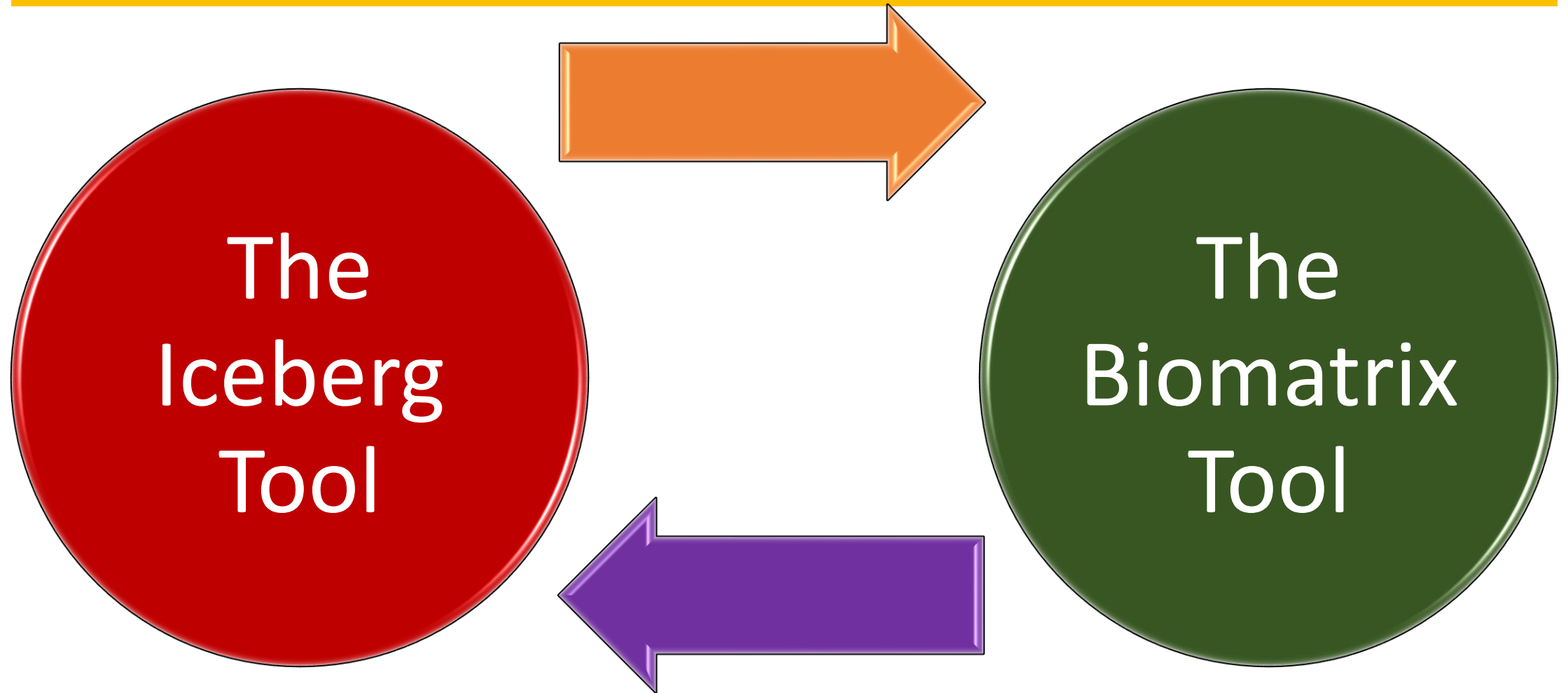


Figure 1 The Iceberg Tool: Below the water line, one can notice patterns of behaviour enforced by the structure of the system and sustained by mental models.

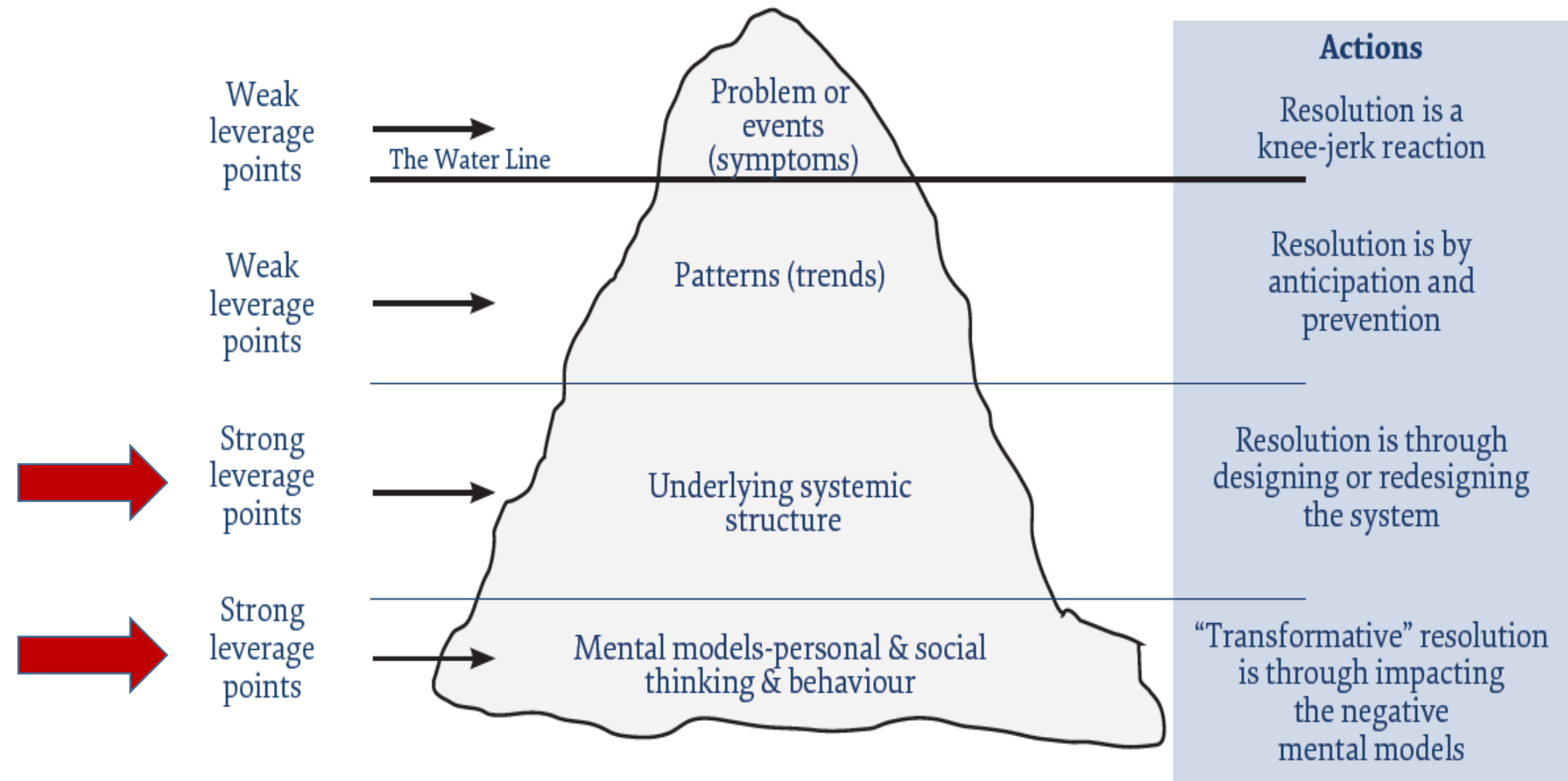
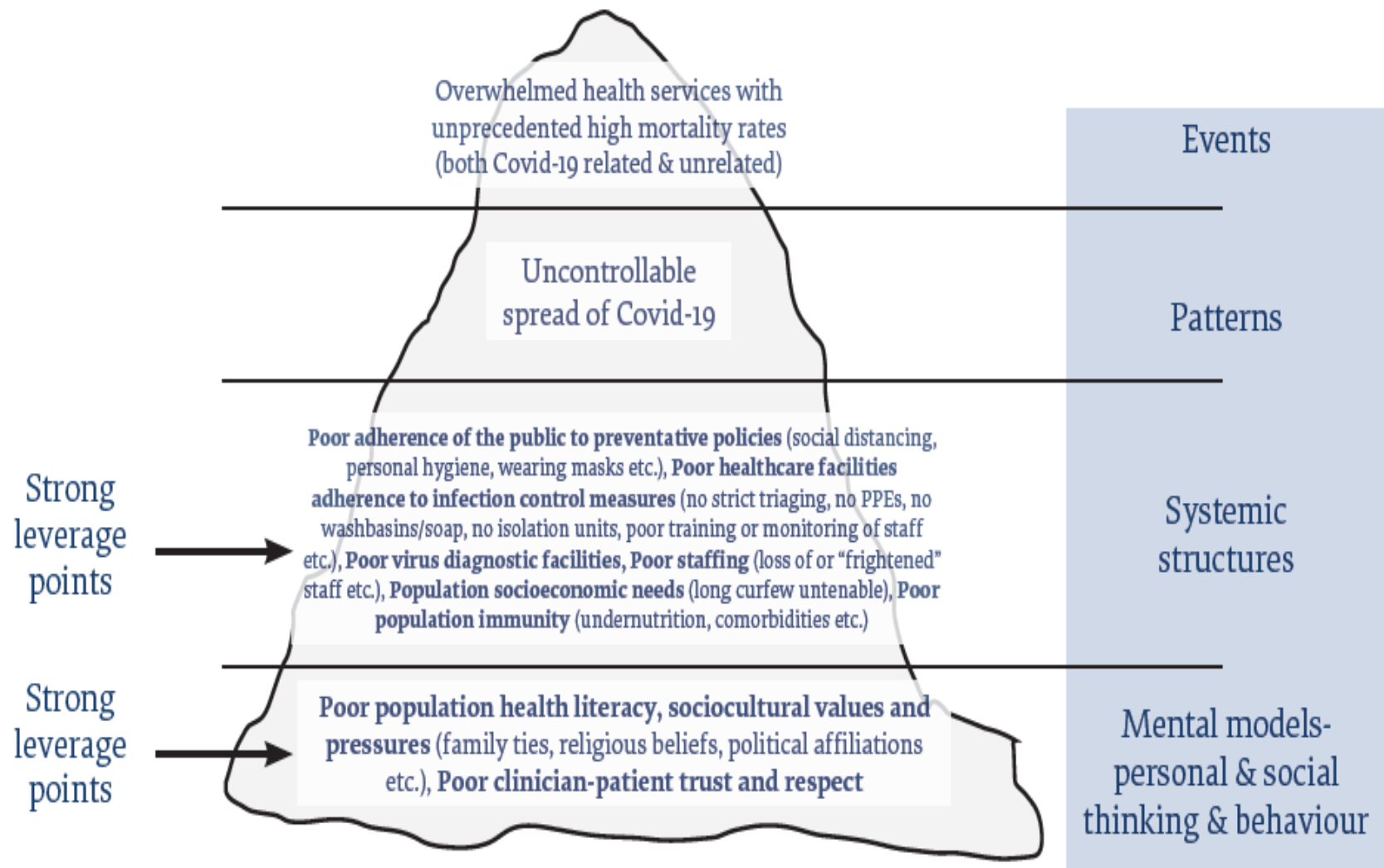
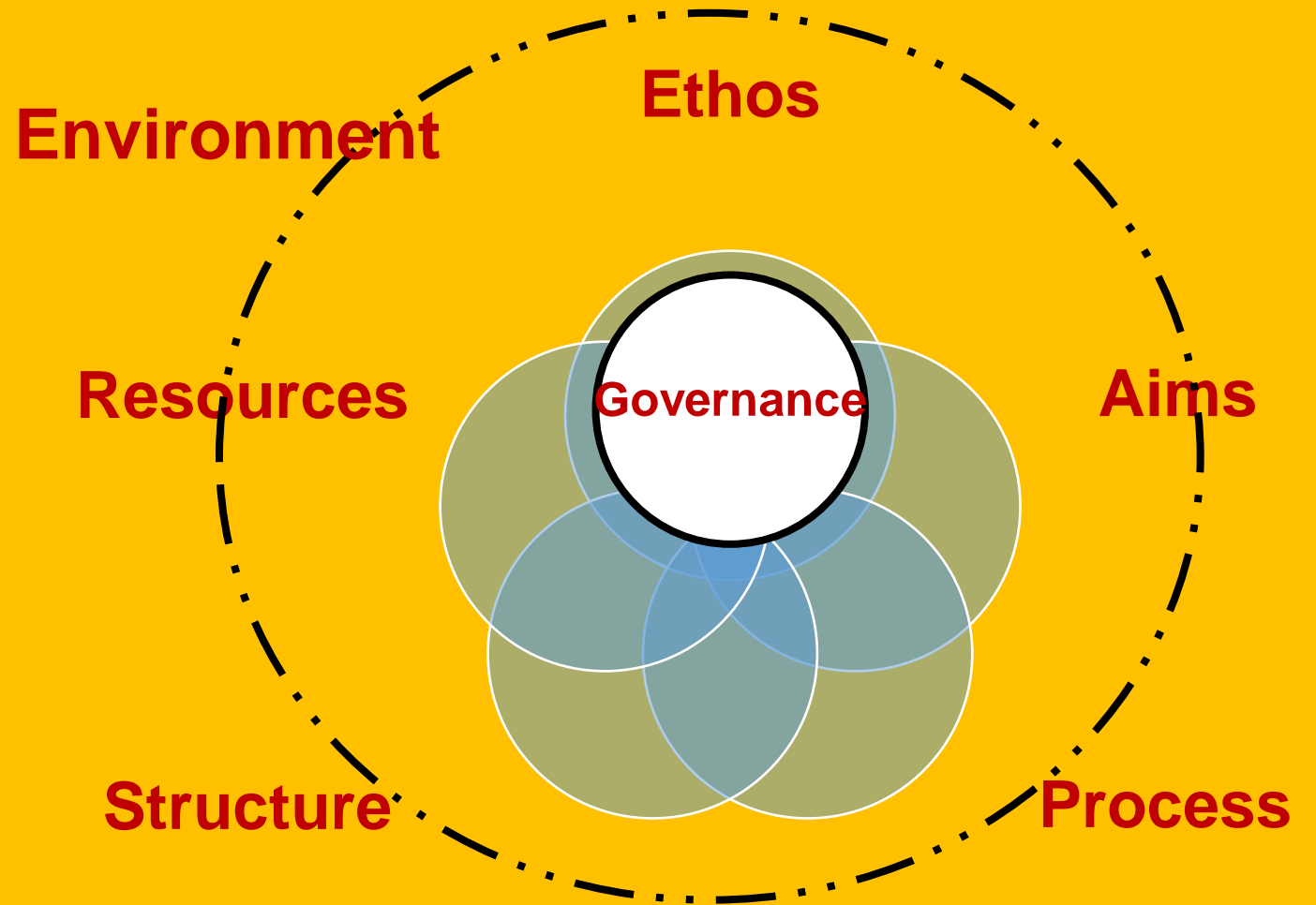


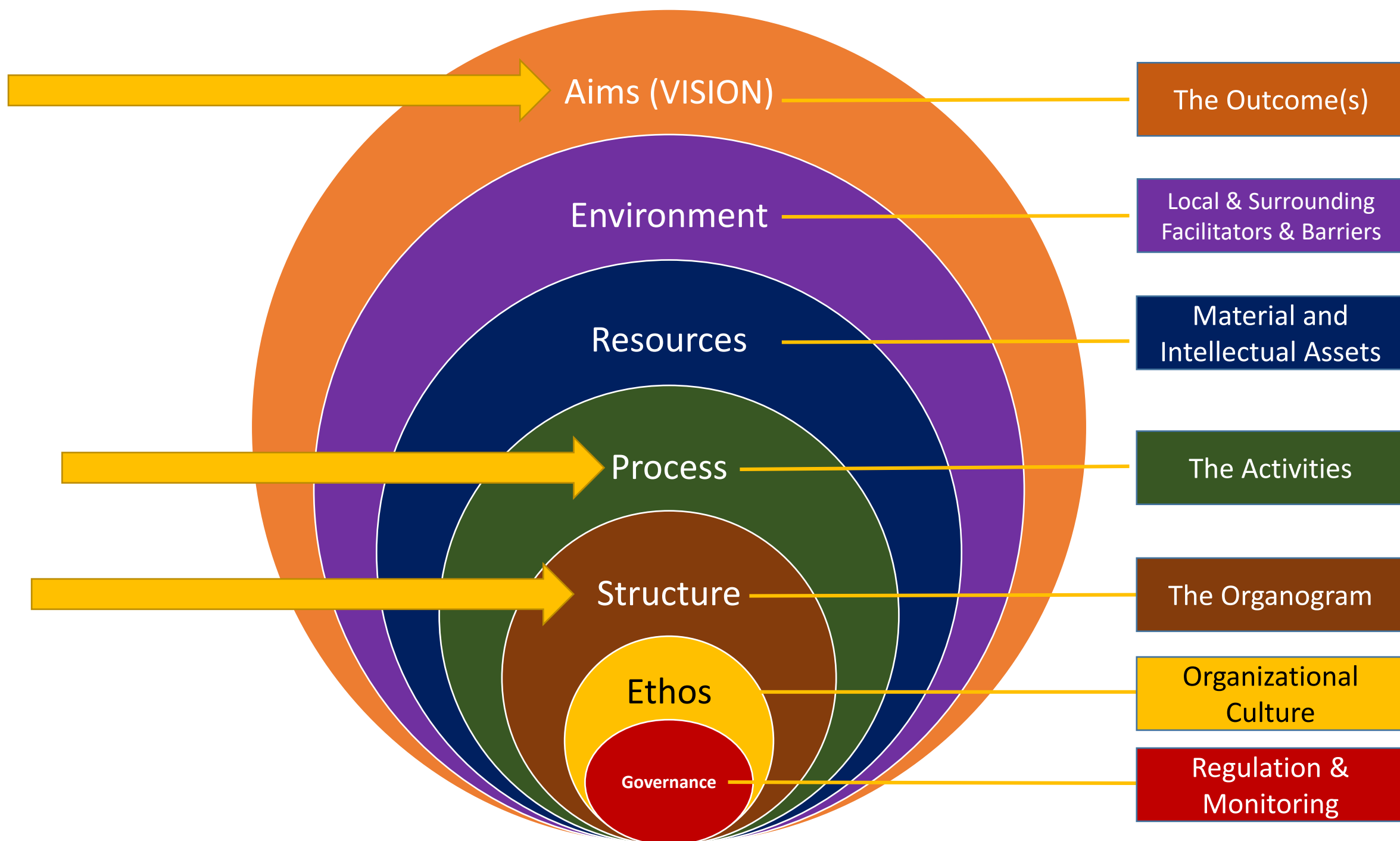
Figure 2 The Iceberg Tool depicting the root causes of a failed response to a COVID-19 epidemic and the strong leverage points for effective action



The Seven System's Aspects

- According to the **Biomatrix systems theory**, each organisation, such as a hospital, display **seven different aspects**, just like a coin is made up of two sides and a dice is made up of six sides.





The Seven Systems Aspects cont.



The practical meaning of the **seven systems aspects framework** is that the seven aspects of an organisation must be understood for it to be understood as a whole.



It also means that these seven aspects are the **STRATEGIC LEVERS (Leverage Points)** or **PLACES TO INTERVENE** for the **Transformation** of the organisation.



Any shift in any one of these seven aspects can produce big changes in the whole organisation.

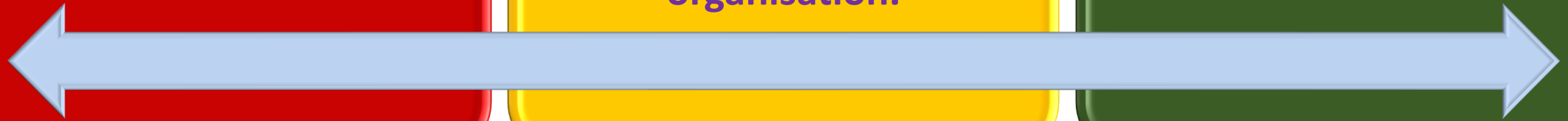


Table 1 A COVID-19 control package using a Systems Thinking Biomatrix Tool and administrative actions

Biomatrix Item	Description	Component or Action	Examples
Aims (Vision)	The Outcome(s): the results that the system wants to achieve. Aims create focus.	A nation without Coronavirus! (Positive public Communication)	
Ethos	Organizational Culture: its unique expectations, and values and is expressed in its self-image: “As you think, so you will become”.	We always win! (Positive public Communication)	
Structure	The Organogram: the anatomy of a system.	<ul style="list-style-type: none"> • Strategic Multidisciplinary, Intergovernmental body with its comprehensive administrative and executive components. • Strategic Roadmap for the Health-care sector and the population as a whole. • Monitoring and Assessment unit with timely data capture, analysis and action supported by efficient information technology platforms. 	Multidisciplinary Team from all ministries, nongovernmental organizations, social support societies, charitable organizations, professional unions, international agencies etc.

Process	The Activities: describes the activities of the system: the activities involved in the delivery of services (training) to the customers.	Health care directed: <ul style="list-style-type: none"> • Facility preparedness • Staff education and training • Confirmed and suspected patients' clinical management pathways • Staff support and incentives, etc. • Patient and family education <ul style="list-style-type: none"> • Population Directed: Education and empowerment, Personal hygiene practices e.g. hand washing, sneezing and coughing etiquette etc., Social Distancing, Wearing masks, Restriction of social gathering e.g. at work, schools, sporting events/social events, Robust contact tracing and isolation, Augmenting population innate immunity: e.g. education on healthy foods and herbs rich in immunopotentiators etc. 	<ul style="list-style-type: none"> • Efficient screening of staff and patients • Effective diagnostic capabilities • Reducing in-hospital transmission (personal protective equipment (PPEs), handwashing, triaging, cohorting of patients and of staff, disposal of hazardous material, environmental cleanliness and hygiene, restricting non-urgent clinical services, virtual outpatient and inpatient patient encounters, etc.) • Screening of visitors and restricting hospitalized patients visits by relatives, friends, etc. • Quarantine and isolation centers • Robust contact tracing, isolation and close monitoring during isolation etc.
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Resources

Material and Intellectual Assets:

refer to the resources of the organization, such as its capital equipment, financial resources, intellectual property, staff capabilities etc.

- System Leadership
- Diagnostic and treatment facilities
- Internists
- Infection Control Specialists
- Patient Educators
- Epidemiologists
- Infectious Diseases Specialists
- Intensivists
- Trainers and Educationalists
- Statisticians
- Financial Resources
- Monitoring teams/IT Specialists
- Social Psychologists
- Audiovisual Resources
- Covid-19 cyberspace resources, Website, Blogs in simple language etc.
- Local Social and Religious support teams

Table 1 A COVID-19 control package using a Systems Thinking Biomatrix Tool and administrative actions *(concluded)*

Biomatrix Item	Description	Component or Action	Examples
Environment	Local & Surrounding Facilitators & Barriers: (the latter need to be resolved at the outset).	<ul style="list-style-type: none">• Social activists and local support networks in the community.• Incentive Program for all healthcare workers.• Insurance and financial support to healthcare workers who get infected.• Collaboration with Research Centers, Technology and Innovation Centers, Evidence-based Practice Centers, Quality Improvement Organizations, International bodies etc.	
Governance	Regulation & Monitoring: The function of governance in an organization is to set aims and to monitor and regulate the movement of the organization towards the attainment of these aims.	<ul style="list-style-type: none">• Daily reporting from the monitoring unit and assessment of progress, successes and failures and timely interventions to improve performance and deal with unintended consequences.	

Summary

- **Why systems thinking?** To produce an understanding of the system as a whole, or the big picture.
- **What is systems thinking?** It's an approach to problem solving, identifying “leverage points” and for systems design/re-design using a multidisciplinary approach with **people-oriented Outcomes** emphasized.
- **When do we need to use systems thinking?** When dealing with social systems, systems involving human beings.

References

- Hassan I; et al. **A Systems Thinking approach for responding to the COVID-19 pandemic.** East Mediterr Health J. 2020;26(8):872–876.
<https://doi.org/10.26719/emhj.20.090>.
- De Savigny D, Taghreed A, Alliance for Health Policy and Systems Research, World Health Organization. **Systems thinking for health systems strengthening.** Geneva: Health Organization; 1990
(<https://www.who.int/alliance-hpsr/resources/9789241563895/en/>).

Thank you!

