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

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Fact

• 70% of Change Efforts in the World FAIL\(^1\)!

• 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.
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”.
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).
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
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

The Corona Pandemic & Systems Thinking

Health services: Total SYSTEM Disruption

- **Cancelation** 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.
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
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.
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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

Diagnostic Tools

Therapeutic Tools
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

The Iceberg Tool

The Biomatrix Tool
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.

**Actions**
- Resolution is a knee-jerk reaction
- Resolution is by anticipation and prevention
- Resolution is through designing or redesigning the system
- “Transformative” resolution is through impacting the negative mental models.

**Weak leverage points**
- The Water Line
- Problem or events (symptoms)
- Patterns (trends)
- Underlying systemic structure
- Mental models-personal & social thinking & behaviour

**Strong leverage points**
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.

- **Overwhelmed health services with unprecedented high mortality rates (both Covid-19 related & unrelated)**
  - **Uncontrollable spread of Covid-19**
  - **Poor adherence of the public to preventative policies (social distancing, personal hygiene, wearing masks etc.), Poor healthcare facilities adherence to infection control measures (no strict triaging, no PPEs, no washbasins/soap, no isolation units, poor training or monitoring of staff etc.), Poor virus diagnostic facilities, Poor staffing (loss of or “frightened” staff etc.), Population socioeconomic needs (long curfew untenable), Poor population immunity (undernutrition, comorbidities etc.)**
- **Poor population health literacy, sociocultural values and pressures (family ties, religious beliefs, political affiliations etc.), Poor clinician-patient trust and respect**

**Systemic structures**

- **Events**
  - **Patterns**
  - **Mental models-personal & social thinking & behaviour**
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 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>
<thead>
<tr>
<th>Biomatrix Item</th>
<th>Description</th>
<th>Component or Action</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td><strong>Aims (Vision)</strong></td>
<td><strong>The Outcome(s):</strong> the results that the system wants to achieve. Aims create focus.</td>
<td><strong>A nation without Coronavirus!</strong> (Positive public Communication)</td>
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<td><strong>Ethos</strong></td>
<td><strong>Organizational Culture:</strong> its unique expectations, and values and is expressed in its self-image: “As you think, so you will become”.</td>
<td><strong>We always win!</strong> (Positive public Communication)</td>
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<td><strong>Structure</strong></td>
<td><strong>The Organogram:</strong> the anatomy of a system.</td>
<td>• <strong>Strategic Multidisciplinary</strong>, Intergovernmental body with its comprehensive administrative and executive components.</td>
<td>Multidisciplinary Team from all ministries, nongovernmental organizations, social support societies, charitable organizations, professional unions, international agencies etc.</td>
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<td>• <strong>Strategic Roadmap</strong> for the Healthcare sector and the population as a whole.</td>
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<td>• <strong>Monitoring and Assessment</strong> unit with timely data capture, analysis and action supported by efficient information technology platforms.</td>
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**Process**

**The Activities:** describes the activities of the system: the activities involved in the delivery of services (training) to the customers.

**Health care directed:**
- Facility preparedness
- Staff education and training
- Confirmed and suspected patients’ clinical management pathways
- Staff support and incentives, etc.
- Patient and family education

**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.

- 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.
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
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<td>Environment</td>
<td><strong>Local &amp; Surrounding Facilitators &amp; Barriers</strong>: (the latter need to be resolved at the outset).</td>
<td>• Social activists and local support networks in the community.</td>
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<td>• Incentive Program for all healthcare workers.</td>
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<td>• Insurance and financial support to healthcare workers who get infected.</td>
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<td>• Collaboration with Research Centers, Technology and Innovation Centers, Evidence-</td>
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<td>based Practice Centers, Quality Improvement Organizations, International bodies etc.</td>
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<td>Governance</td>
<td><strong>Regulation &amp; Monitoring</strong>: The function of governance in an organization is to set aims and</td>
<td>• Daily reporting from the monitoring unit and assessment of progress, successes and</td>
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<td>to monitor and regulate the movement of the organization towards the attainment of these aims.</td>
<td>failures and timely interventions to improve performance and deal with unintended</td>
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<td>consequences.</td>
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• **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.

thank you!