"Enhancing loco-regional adaptive governance for integrated chronic care through agent based modelling (ABM)"

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ABSTRACT

1) Introduction Moving from existing segmented care to integrated care is complex and disruptive. It is complex in the sense that the type of changes and the timeframe of these changes are not completely predictable. It is disruptive in the sense that the process of change modifies but also is influenced by the nature of interactions at the individual and organisational level. As a consequence, building competences to govern the necessary changes towards integrated care should include capacity to adapt to unexpected situations. Therefore, the tacit knowledge of the stakeholders ("knowledge-in-practice developed from direct experience; subconsciously understood and applied") should be at the centre. However, the usual research and training practices using such a knowledge (i.e. action research or case studies), are highly time-consuming. New approaches are therefore needed to elicit tacit knowledge. One of them is agent based modelling (ABM) through computer simulation. The aim of this paper is to make a “showcase” of an agent-based model that uses the emergence of tacit knowledge and enhances loco-regional adaptive governance for improving integrated chronic care.

2) Theory/Methods We used a complex adaptive system's lens to study the health systems integration process. We applied key components of ABM to assess how health systems adapts through the dynamics of heterogeneous and interconnected agents (agents are characterised by their level of autonomy, heterogeneity, and interactions with other agents). The agent-based model was developed through a process wh...

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Enhancing loco-regional adaptive governance for integrated chronic care through agent based modelling (ABM)

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Building competencies to govern health and social care at loco-regional level by taking into account tacit knowledge and cognitive heuristics

Many countries (including Belgium) are attempting to move from existing segmented care to integrated care. It is complex in the sense that the type and timeframe of changes are not always predictable. A key challenge is the process that the process of change unfolds but also is influenced by the nature of interactions between agents. Building competencies to govern health and social care at the loco-regional level requires networks covering between 100 000 and 500 000 people. Acknowledging the tacit knowledge and cognitive heuristics of the stakeholders is key to the learning process.

Making a showcase of ABM that foster sharing of tacit knowledge between stakeholders

The aim of this paper is to make a showcase of an agent-based model (ABM) that build on and make explicit tacit knowledge to develop a strategy between stakeholder to enhance loco-regional adaptive governance for improving integrated care.

Results

Organisational features

- Market: All PCPs and hospitals can settle where they want
- Number of PCPs needs to be calculated (simulated for 100 PCPs)
- Number of hospitals: 9
- People are free to choose their provider if it is close enough to them

Territorial organisation:

- One hospital per territory
- Equal proportion of PCPs between the 10 PCPs (can visit them, work within a territory)
- People are free to choose their provider if it is close enough to them
- “system with a gatekeeper role”
- People can enter in the system through a PCP, except if no access to it

Case Management:

- The CM ensure that people with low autonomy have better access to healthcare services (PCPs or hospitals)

Scenarios chosen by students

| Initial state | After 500 | After 1000 | 1000th step 1 | 1000th step 2 | 1000th step 3 | 1000th step 4 | 1000th step 5 |
|--------------|----------|-----------|---------------|---------------|---------------|---------------|---------------|
| Scenario 1   | CM + PCP | CM + PCP  | PCP           | PCP           | PCP           | PCP           | PCP           |
| Scenario 2   | PCP      | PCP       | PCP           | PCP           | PCP           | PCP           | PCP           |
| Scenario 3   | CM       | CM        | CM            | CM            | CM            | CM            | CM            |
| Scenario 4   | Gatekeeper + PCP | Gatekeeper + PCP | Gatekeeper + PCP | Gatekeeper + PCP | Gatekeeper + PCP | Gatekeeper + PCP | Gatekeeper + PCP |
| Scenario 5   | Gatekeeper + CM | Gatekeeper + CM | Gatekeeper + CM | Gatekeeper + CM | Gatekeeper + CM | Gatekeeper + CM | Gatekeeper + CM |

System evolution

Behavior of the system over time (centered on ratio « cost » over « health » simulated)

| Ratio cost per health and survival over time | Choosing between best alternatives? |
|---------------------------------------------|-----------------------------------|
| 1:1000                                      | 1:100                            |

Discussion

Moving away from intervention evaluation towards system monitoring: promoting the development of methodology combining ABM with participative approaches to make better use of tacit knowledge

Conclusion

This is the initial step of an exercise to use ABM as a mean to take advantage and enhance such knowledge to strengthen governance for integrated care. It is expected that it will be used to foster dialogue between loco-regional projects to integrate health and social care for chronic diseases in Belgium (a new program bringing federal authorities).

Future research should continue the development of methodology combining ABM with participative approaches to make better use of tacit knowledge in strengthening loco-regional governance for the development of integrated care.

Using the lenses of complex adaptive system to study the health systems integration process

We used a complex adaptive systems lens to study the health systems integration process. General adaptive systems, ABM as models of system that learn, grow and evolve from experience, self-organize and behave unpredictably. CAS are open systems. As a consequence, they are influenced by the environment and feedbacks.

Complex adaptive systems features emerge after the following behavior: path dependency: emergent “order”, bounded rationality, local optimization, scale-free networks.

Generally, CAS has seven equilibrium.