

Conceptual Framework for Dynamic Clinical Decision-Making

A cross-system approach to personalized medicine
based on patient state, trajectory and adaptive intervention

Dynamic Clinical Decision-Making

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First Holistic Portal "Puti Zdorovya"

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1. The problem

Modern medicine has a large repertoire of effective interventions. Yet an indication for a particular intervention does not, by itself, determine the optimal personalized moment to apply it.

The same intervention may be appropriate in one patient state, excessive in another, and potentially harmful in a third.

This creates a need to describe not only indications for intervention, but also the conditions for delaying, modifying, or discontinuing it – in other words, the appropriateness of intervention.

Today, appropriateness is commonly described through diagnosis, clinical context, and existing protocols. Yet several questions remain insufficiently formalized:

- Is active intervention needed now?
- What type of intervention corresponds to the patient's system state?
- What intensity is appropriate?
- Is a sequence or combination of interventions needed?
- How should system response be assessed?
- When should the intervention be modified or discontinued?

* The patient is considered a complex adaptive system continuously interacting with its environment.

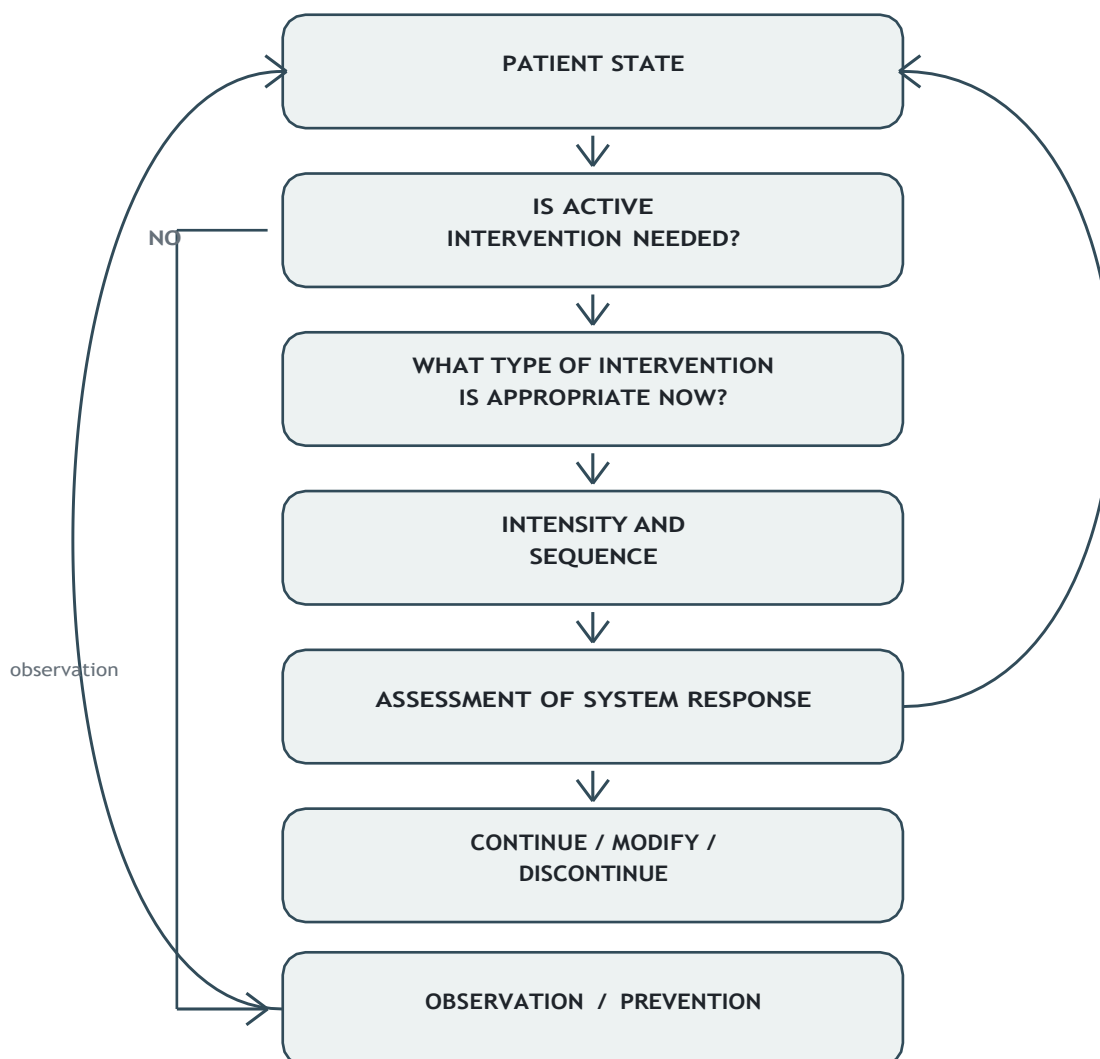
2. Central hypothesis

Appropriateness of intervention is determined by its correspondence to the patient's current state, process dynamics, available recovery resources, previous interventions, and system response.

Medical decision-making can therefore be considered not as a single static choice of method, but as an adaptive process of managing interventions in a changing patient system.

The proposed framework does not replace clinical reasoning or claim to be a finished algorithm. Its purpose is to identify a level of description at which decisions from different medical systems can be compared.

The decision is not a single event. It is an adaptive cycle.



3. What constitutes the model

The diagram is intentionally incomplete. Its essential content is not the sequence of boxes itself, but the criteria governing transitions between them.

For the framework to become reproducible, it is necessary to determine which features indicate that the system requires intervention; what triggers a change of strategy or tactics; when a transition to the next intervention is justified; and by which criteria an intervention becomes sufficient to discontinue.

These questions require further methodological development and subsequent testing on clinical material.

The visual diagram therefore represents only the external architecture. The core intellectual task lies in formalizing the criteria that connect its elements.

4. Why a cross-system approach

Different medical systems use their own conceptual frameworks, criteria for assessing patient state, and models for selecting interventions.

When such knowledge is digitally formalized, there is a risk of reducing complex clinical reasoning to simplified categories and losing essential parts of the original knowledge.

The proposed approach reverses this order: first identify a common level for describing clinical decisions, and then examine which elements of different medical systems can be represented at that level without losing their internal logic.

The aim is not to make traditional medicine computable by simplifying it. The aim is to formalize its clinical logic without destroying that logic in the process.

5. Potential domains of application

Domain	Potential contribution
Health systems	Rationalization of intervention sequencing and resource use
Healthcare organizations	A framework for clinical pathways and interdisciplinary interaction
Digital Health / AI	Formalization of Dynamic Clinical Decision-Making and clinical decision support logic
Research	Criteria, research questions, and opportunities for clinical validation
Medical education	A new level for teaching clinical reasoning
Traditional, complementary and integrative medicine	A cross-system language for describing different types of interventions
Personalized medicine	Linking patient state, trajectory, and adaptive intervention

Cross-system principle: the framework does not depend on which medical system a particular intervention comes from. What matters is its function in the clinical situation, timing, system response, and the justification for the next step.

6. Connection with practice

The Portal has already published practical materials examining strategy selection, intervention sequencing, and resource burden in medical decision-making.

Economics of medical decision-making: acute conditions

<https://www.youtube.com/watch?v=A-yV1WDKat8&t=49s>

Economics of medical decision-making: chronic conditions

<https://www.youtube.com/watch?v=wTHdqwu3fv8&t=15s>

These materials do not constitute proof of a completed framework. They demonstrate the practical context from which the formalization problem emerged.

The Portal provides an independent interdisciplinary environment in which knowledge from different medical traditions can be brought into dialogue before formal institutional mechanisms for their interaction are established.

7. Status and next stage

Working Version 0.1 represents a preliminary conceptual level of the framework. It is not a completed system and does not claim to describe a ready-made clinical decision support system.

The next stage is professional work aimed at making the proposed architecture operational, reproducible, and suitable for research and digital validation.

The clinical logic of the underlying medical approaches must be preserved during formalization rather than replaced by simplified analogues.

We are not presenting a finished answer. We are presenting a working point from which that answer can begin to be developed.

8. Professional discussion

If you work in healthcare, clinical reasoning, digital medicine, artificial intelligence, medical education, health economics, or traditional, complementary and integrative medicine, and see a problem here worth developing further, we welcome professional dialogue.

We are particularly interested in expertise capable of connecting clinical practice, systems thinking, research methodology, digital health, AI, and medical education.

We are open to discussion of the framework's structure, applicability, limitations, and possible directions for further development.

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Patients want care that is genuinely appropriate to their needs.

Clinicians need confidence that an intervention is timely and justified.

Health systems need effective use of resources.

Medicine should strive to ensure that intervention produces more benefit than harm.

We propose a language for discussing these four goals simultaneously.