



Nasjonalt senter for  
e-helseforskning

# Beyond Clinical Decision Support: Enabling Process Management in Healthcare

Luis Marco-Ruiz, Alberto Budia-Alba, Juan Bru, Johan Gustav Bellika, Vicente Traver, Kristian Nicolaisen, Rune Pedersen



# Background

- Realize the full potential of Evidence Based Medicine requires delivering latest evidence in the form of Clinical Decision Support (CDS) at the appropriate place and time (IOM 2017, Rigby 2013).
- This requires supporting the clinical workflow considering all actors, processes and stages that participate in it.



For this, CDSS need to leverage **clinical decision** with **Business Process Management (BPM)** (Peleg 2014).



# Background

**BPM** has been approached using commercial BPM frameworks, and, in the healthcare arena, by Computer Interpretable Guidelines (**CIGs**).

However, the **industrial BPM** has only reached **limited success** due to the complexity involved in medical decision criteria with temporal patterns and abstract terms inferred from the EHR

**CIGs** also present limitations since they often **lack support to multi-morbidities** and shared decision making. In addition, CIGs present **limitations for supporting coordination with order entry systems** and scheduled **activities**.

Example: The CIG formalism that supports most BPM patterns (PROforma) only implements 23 out of 43 BPM patterns (Mulyar et al., 2007).



**Both approaches need to be combined to enable BPM in healthcare.**



## **Objective:**

To analyze and develop methods to provide the IT infrastructure **for enabling BPM of care pathways**. This will allow **detecting deviations** of patients from the optimal healthcare workflow, **avoid unnecessary clinical steps** and **save global costs**.



# Methods

The project will proceed as follows:

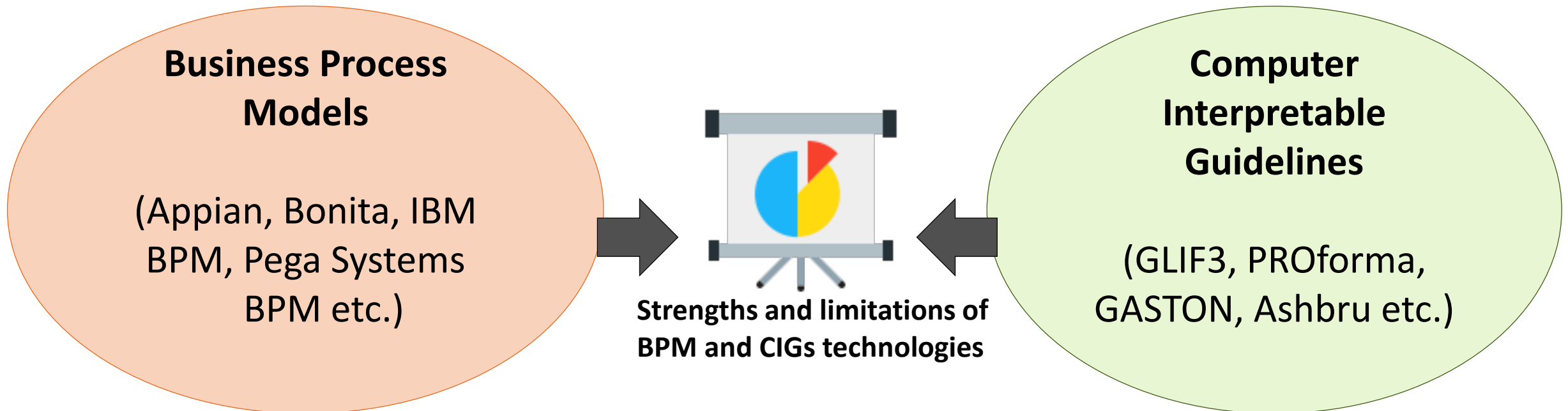
**Stage 1: benchmark of the technologies/standards available to support BPM and CIGs.**

**Stage 2: design patterns to integrate the different tooling for BPM and CIGs specification to support healthcare pathways.**

**Stage 3: analyze the proposals of vendors in the bid to implement those patterns to support BPM integrated in their architectures.**

# Stage 1: benchmark of the technologies/standards available to support BPM and CIGs.

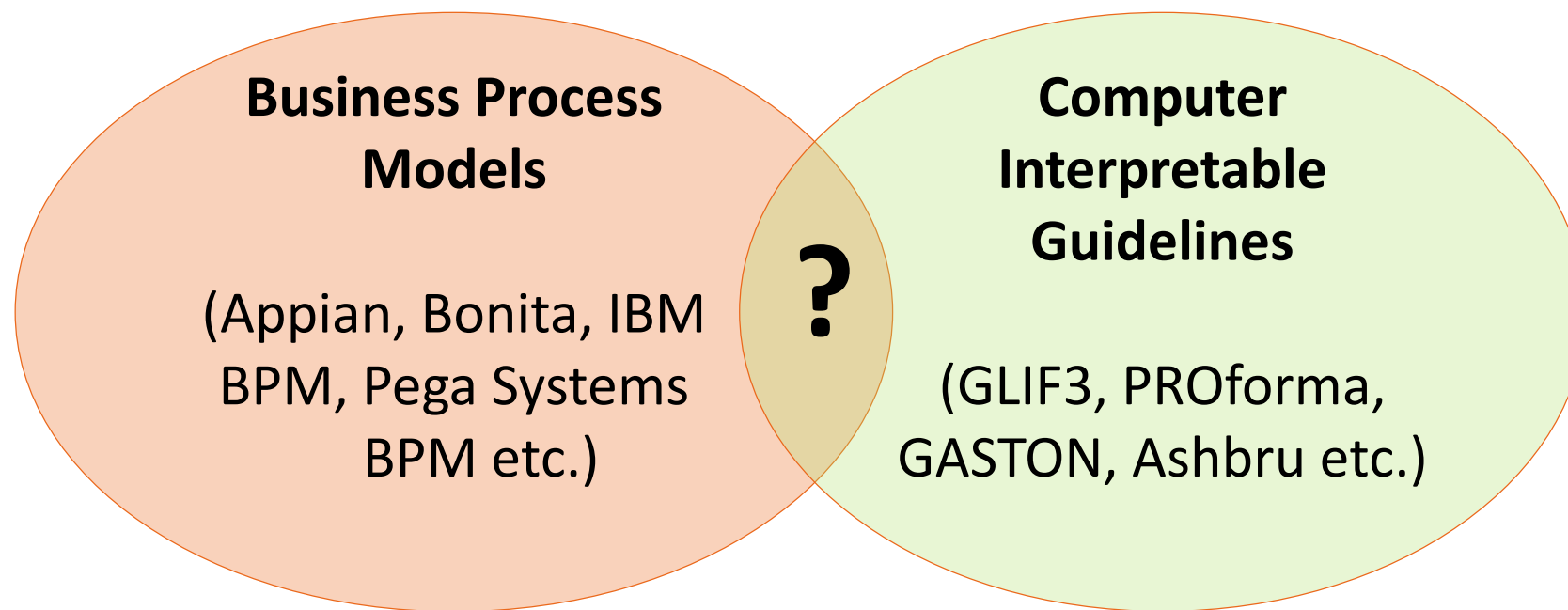
- Analyze leading technologies in the market for the specification of the business workflows and Clinical Guidelines respectively.
- Analyze how good each technology is for integrating resources, organizational policies, activities, medical decision logic etc.
- Analyze how good each technology is for integrating clinical data from the EHR.





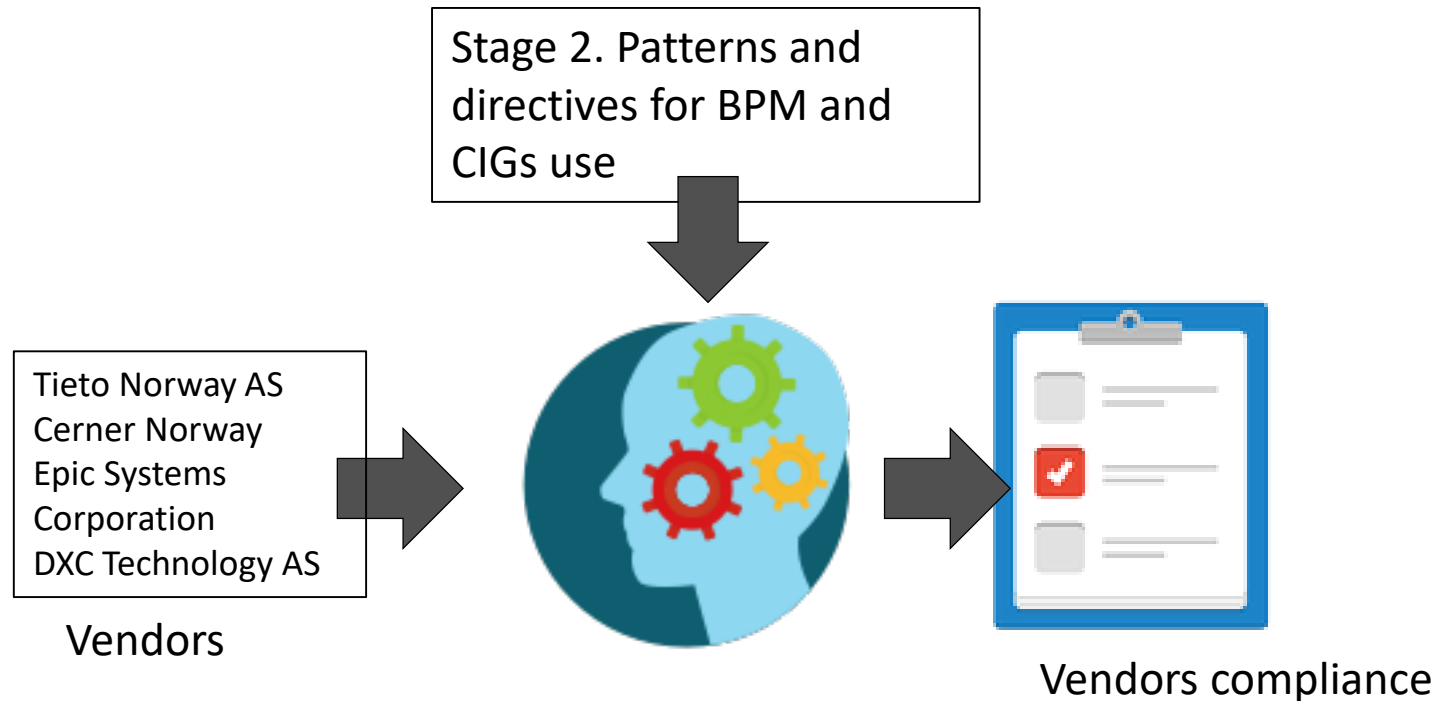
## Stage 2: design patterns to integrate the different tooling for BPM and CIGs specification to support healthcare pathways.

- Once the strengths and limitations of each approach are clear it is important to define the proper combination of technologies.
- We will define generic directives and patterns on which parts of the clinical processes are better defined with BPM tooling and which parts with CIGs formalisms.



# Stage 3: analyze the proposals of vendors in the bid to implement those patterns to support BPM integrated in their architectures.

- With the patterns and directives of Stage 2, the technologies presented by the vendors of Helseplatformen will be analyzed.







## Results (Specific)

Insights into the capabilities of the vendors in Helseplattformen for implementing BPM considering dimensions such as:

- Integration of activities, actors, processes and stages,
- Specification of clinical decision logic.
- Workflow integration with clinical data.



## Results (General)

- Avoid unnecessary clinical steps → Identify optimal workflows.
- Set the basis for process mining to diagnose deviations from the optimal workflow.
- Optimize healthcare and save global costs.