A system architecture supporting the agile coordination of homecare services

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Context

- Increased life expectancy
  - Europe counts today about 80 million senior citizens
  - This number will almost double by 2050
- Increase of 'fragile' persons and the development of chronic diseases
  - Require monitoring and care management on a long-term basis
- The increasing [illegible] information
  - Limit spending of the state, insurance and insured
- The field of eHealth is currently the subject of intense research projects and commercial development
  - Obvious lack [illegible] of existing ICT health services
- Establishment of an infor[illegible]em and use of Information and Communication Technolo[illegible]
  - Essential for improving the global efficiency of healthcare systems
- Homecare is becoming increasingly common in healthcare delivery
  - Management challenges in terms of coordination and follow up of activities

PASPORD research project

Collaborative platform to help persons with restricted autonomy

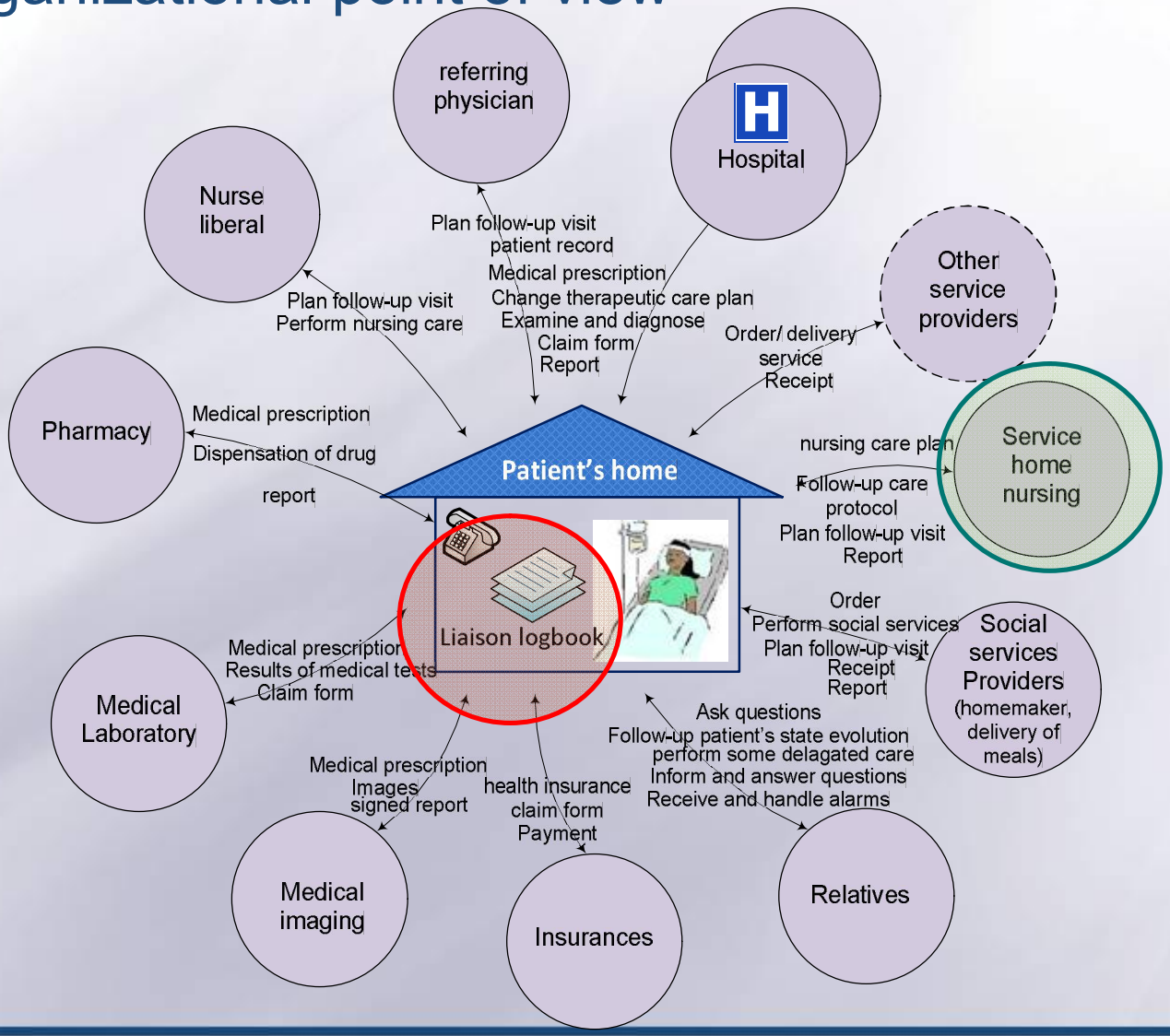
RÉGION MIDI-PYRÉNÉES

Agenda

- Homecare ecosystem
- Proposed system architecture
- Case study: management of undernutrition
- Conclusion and future work

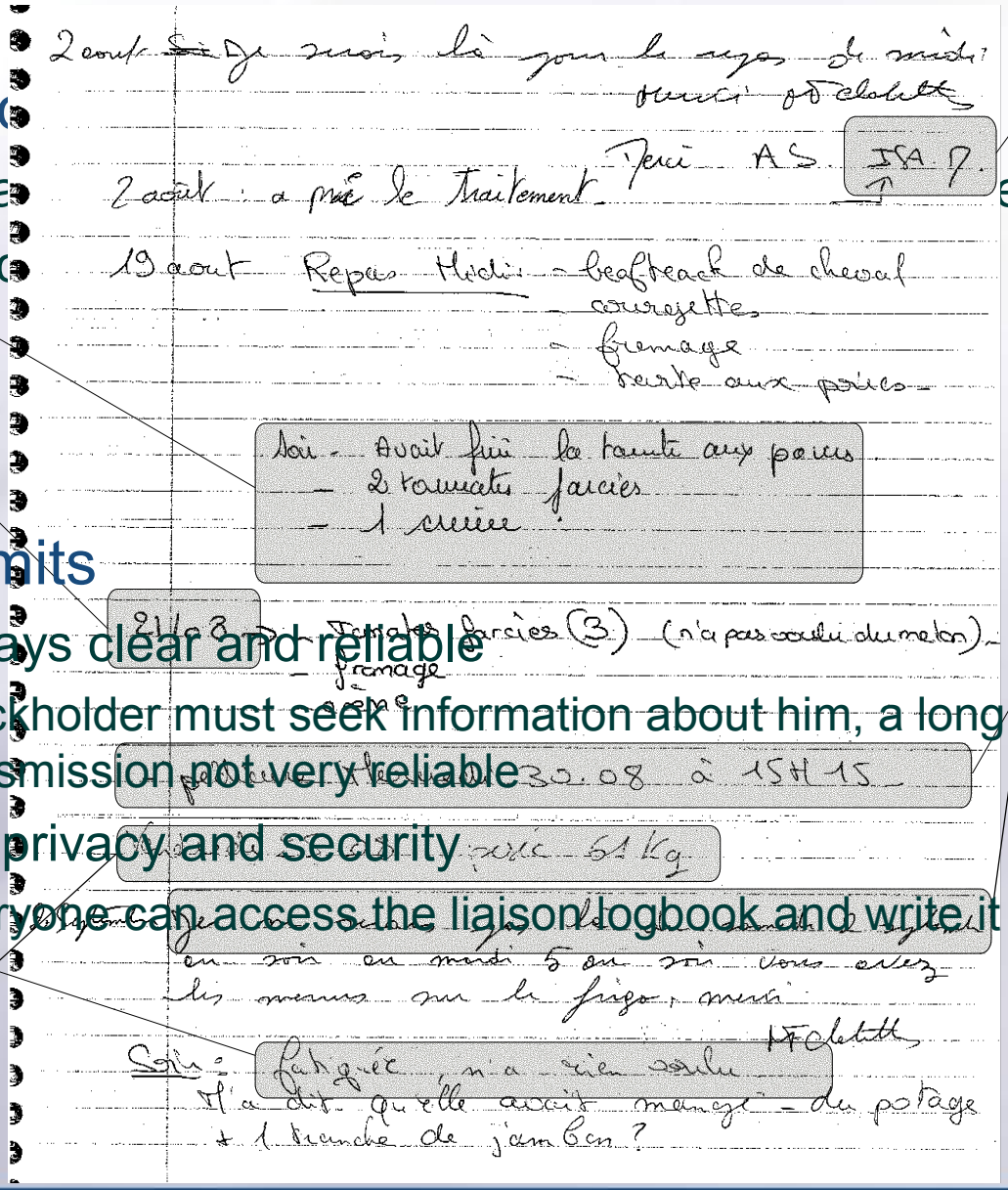
Homecare ecosystem

- The organizational point of view



Homecare ecosystem

- Liaison l
  - The ma ent stakeholders
  - Unstruc



- Several limits
  - Not always clear and reliable
    - Stockholder must seek information about him, a long process of transmission not very reliable
  - Lack of privacy and security
    - Everyone can access the liaison logbook and write it on

Homecare process

- Characteristics of the homecare process
  - Collaborative:
    - *An assembly of distributed business processes among several participants composed of heterogeneous elements, with various levels of autonomy, implemented jointly to achieve a common goal*
  - Custom:
    - *Each patient being a specific case due to particular health conditions, social networking, geographic location, etc.*
  - Dynamic:
    - *According to health conditions, social networking, etc.*
  - Extending over long periods of time:
    - *Especially in the case of chronic diseases,*

Proposed system architecture

- The homecare ecosystem is still in a primary stage of maturity
  - Lack of real-time access to information and of communication between stakeholders which hampers the management and the follow up of the homecare activities.
- Many ICT can be used to enhance global homecare ecosystem efficiency

▪Visadom

Visiophone system allowing communication between patients receiving homecare and hospital

▪DigiCare

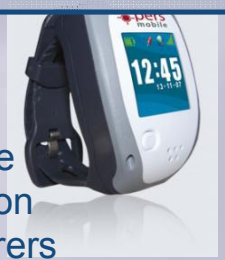
Automatic Information feedback

▪Carroussel

Autonomous controlled drug dispensing system

System architecture integrating existing eHealth ICT

▪Columba



Guardian-angel *bracelet* locate the geographic position Alzheimer's sufferers from wondering away

▪ *Vivago*

continuously monitors the patient daily activity levels and prevent a sustained inactivity

▪Serviligne

A surveillance system to detect dangerous situations

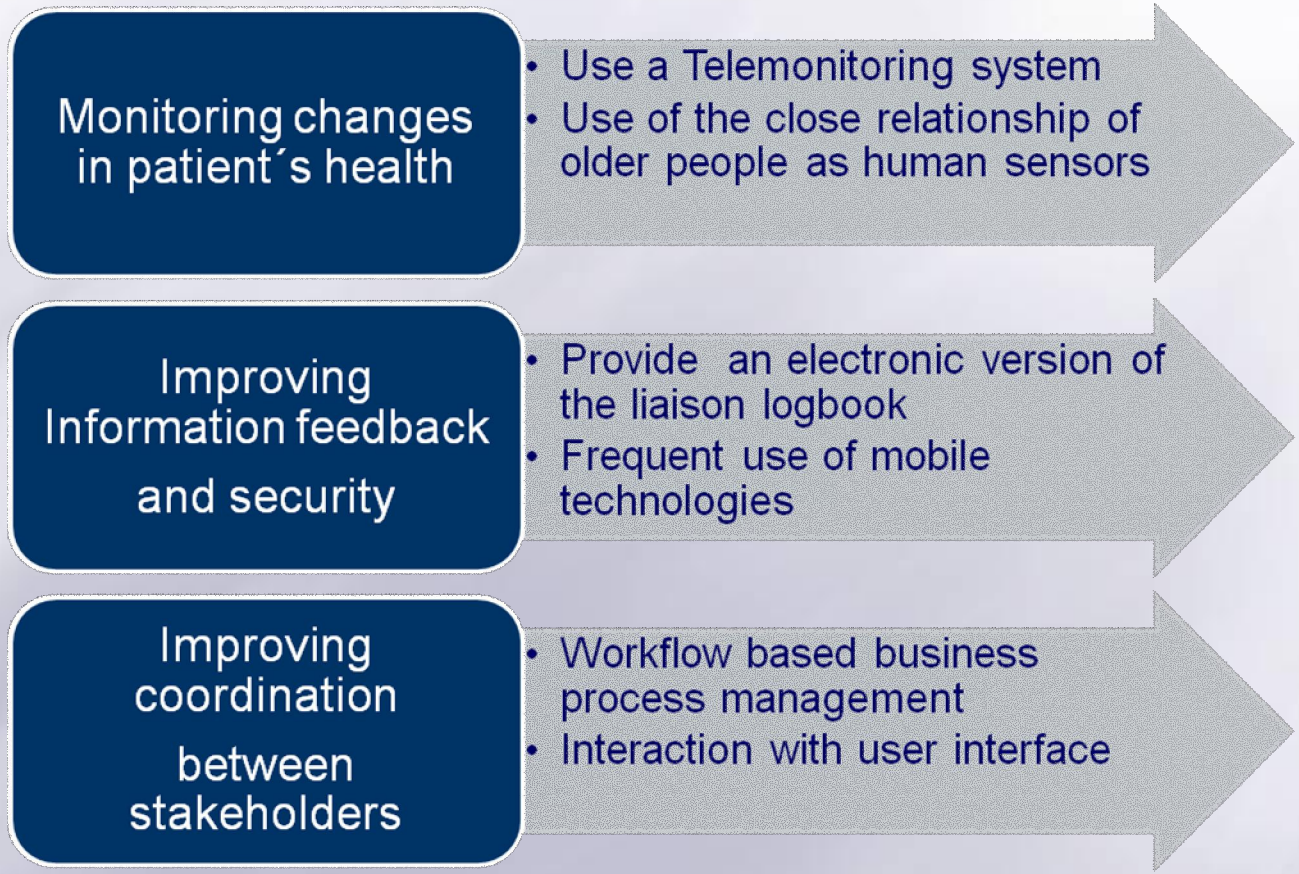
Proposed system architecture

❖ Conceptual framework

Characteristics of the homecare process	Expected characteristics of the system to support the homecare	
Collaborative	Inter-organizational coordination Collective communication	
Custom	Reconfigurable "on demand"	
Dynamic and uncertain environment	Agile	- *Ability to anticipate* - *Ability to react*
Governed by regulatory constraints	Compliance with business rules	
Requirements related to health	Quality of services in Exchanges and executions	- Security - *Privacy* - *Reliability* - *Traceability*
Heterogeneity of stakeholders	Interoperable	

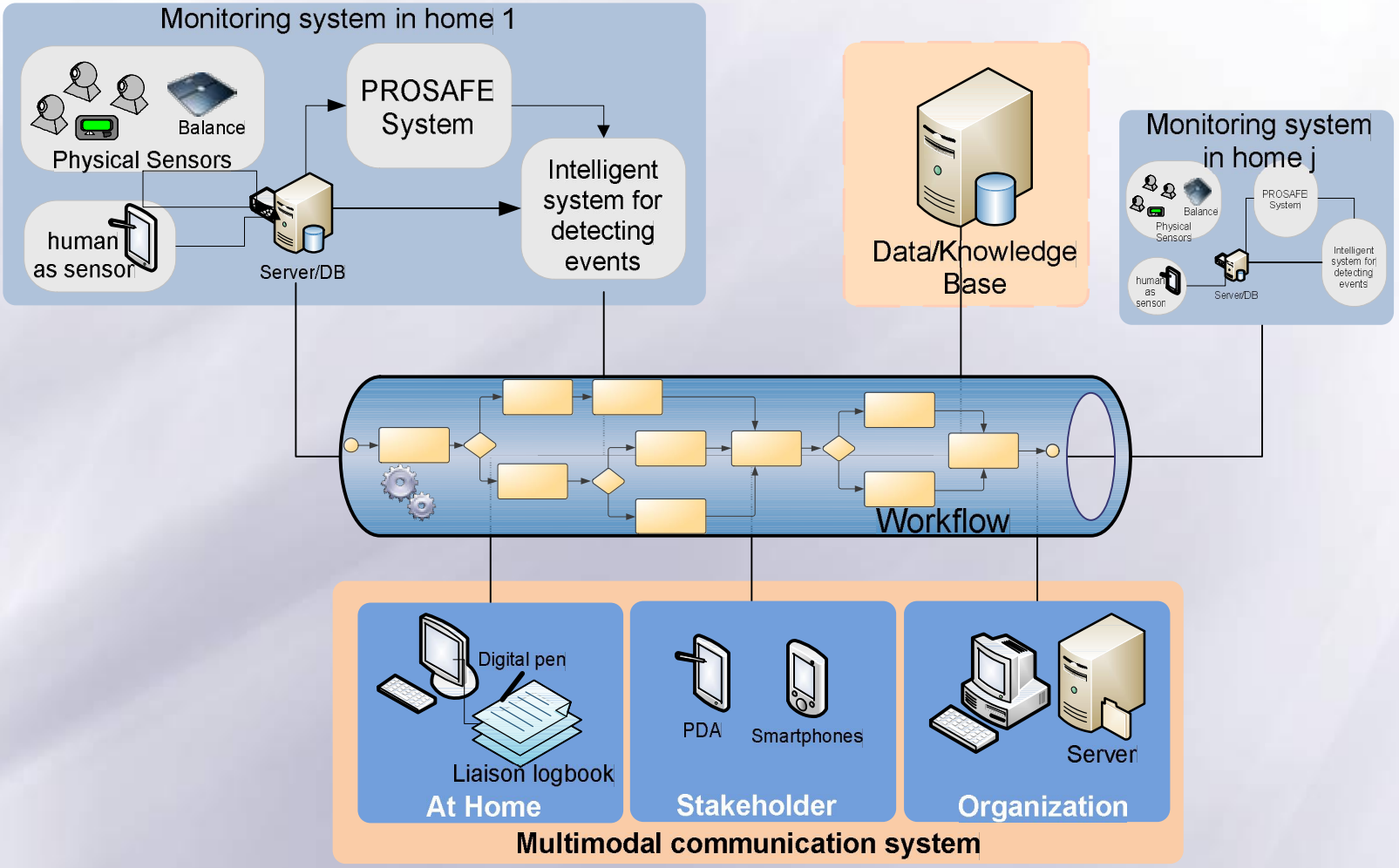
Proposed system architecture

- Functional framework …



Proposed system architecture

Target system architecture



Case study: management of undernutrition

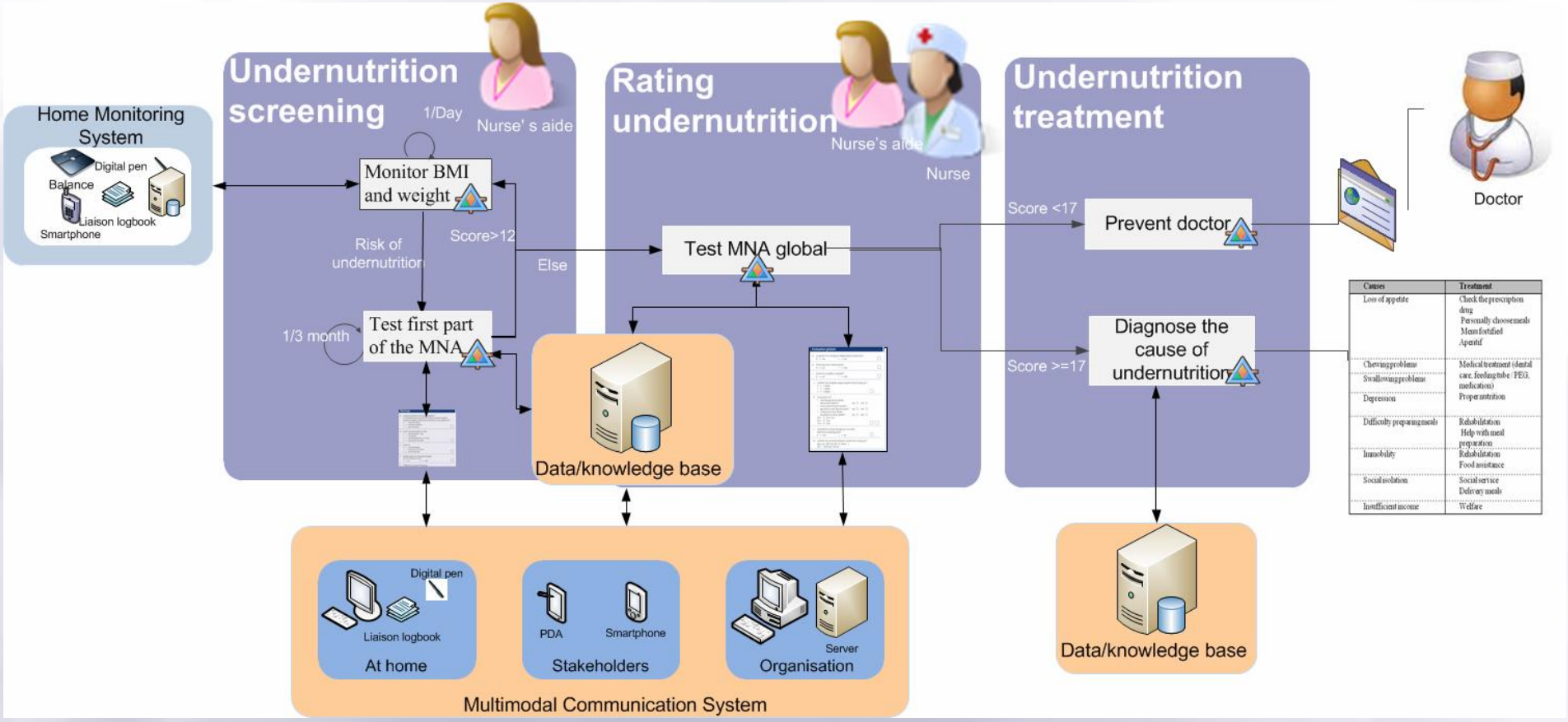
- Undernutrition: plague that affects the quality of life and economics:
  - Death 2 to 4 times higher, Increased risk of falls and time required for healing, etc.
  - In France: 350 000 to 500 000 elderly people living at home have nutrition problems
    - *Caused by depression, chewing problems, etc.*
- Methods for detecting undernutrition

Undernutrition	Severe undernutrition
• Weight loss of ⩾5% in a month or ⩾10% in 6 months • Body Mass Index <21 • Albumin <35g / l	• Weight Loss: ⩾ 10% in a month or ⩾ 15% in 6 months • Body Mass Index <18 • Albumin <30g / l

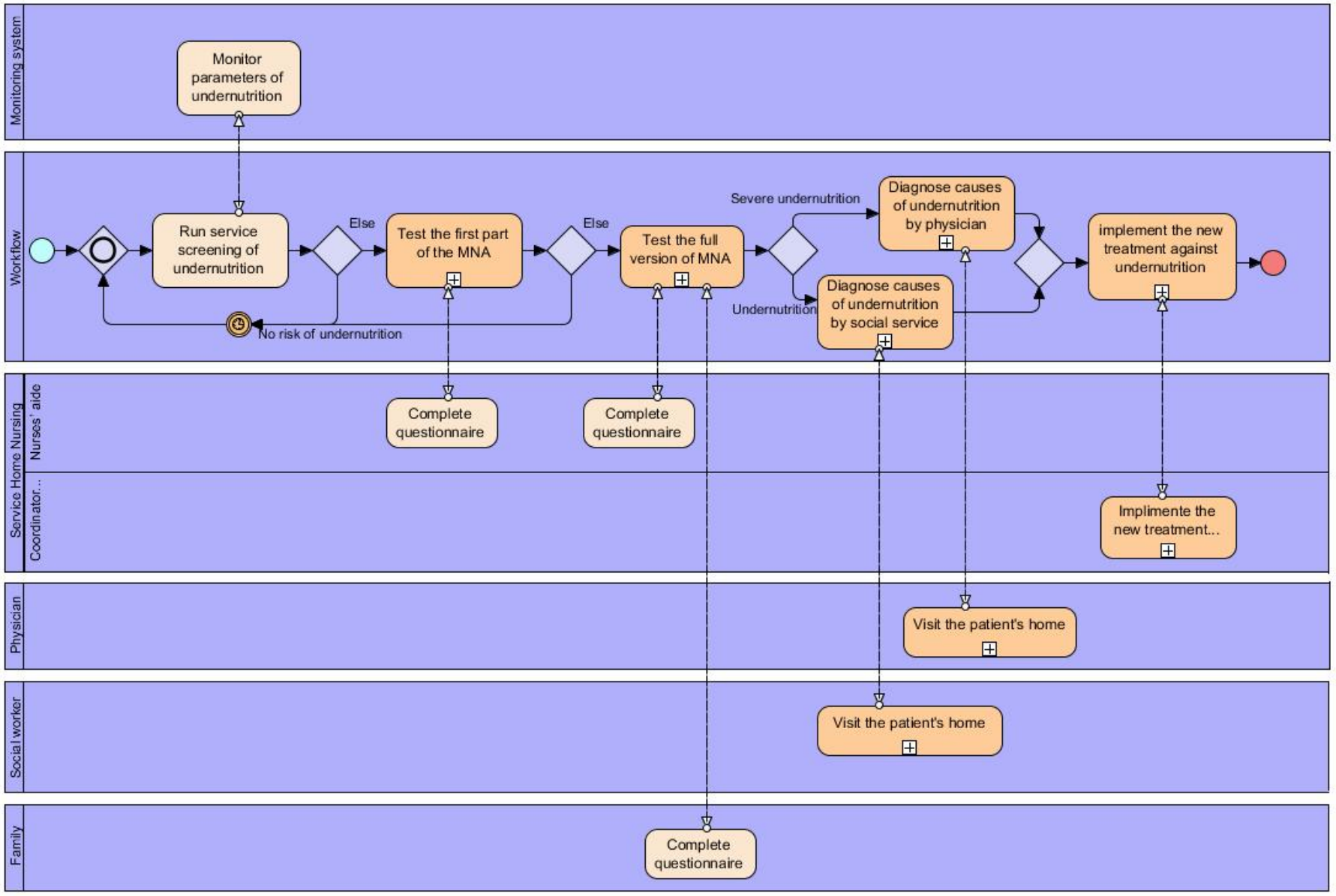
- The treatment plan depend to the causes

Causes	Treatment
• Chewing problems • Swallowing problems	• Medical treatment (dental care, medication)
• Immobility	• Rehabilitation • Food assistance
• Social isolation	• Social service • Delivery meals
• …	• …

Case study: management of undernutrition



Case study: management of undernutrition



Conclusion and future work

- Proposed architecture
  - Coupling a monitoring system to workflow engine
  - Use of the close relationship of older people (family, medical and social) as human sensors to monitor changes in their health
  - Use case focusing on management of undernutrition

- Future work
  - Real time supervision of actors in mobility (geolocation, geofencing)
  - Specialized notation for modeling healthcare processes
    - *Domain Specific Language) (DSL) for modeling homecare workflows*

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Thanks for your attention

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