Design For Workflow Intelligence in Cardiology

Prompt User Liaison Service Experience system

1 Introduction

PHILIPS

"At Philips, we are striving to make the world healthier and more sustainable through innovation, with the goal of improving the lives of 3 billion people a year by 2030."

Philips Research is a global organization with research departments in Europe, North America, Africa, Asia and South America. It helps introduce meaningful innovations that improve people's lives and provide technology options for innovations in the area of health and well-being, targeted at both developed and emerging markets.

Philips Research in health solution services is strong and competitive in the market of:

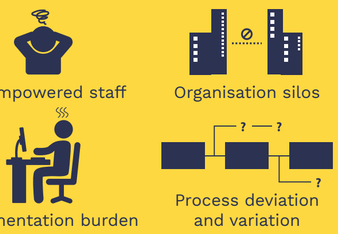
Radiology Cardiology Intensive Care

Not connected and with multiple data entry points – the potential for human error is greater. One important step is the development of **integrated solutions that streamline workflow and make procedures easier**.

2 Project Context

We understand how streamlining workflow is crucial in the Cardiology domain, and the need for integrated solutions is desirable.

Workflow Orchestration – Challenges



Existing Solutions

- Automation
- Dynamic Workflow
- System of Engagement

"New strategies are needed for intelligent automation in healthcare organizations to save time and resources, accelerate throughput, enhance patient safety, and improve outcomes."

3 Problem Definition

The aim of this project is to design a product-service offering that:

Gives the right information at the right time and place. Helps the Cardiology staff to make the best decisions and plan the right actions, and help them collaborate more effectively.

4 Project Focus

We map out a **cardiac patient journey** to understand how a patient would go through a treatment process.

We contacted with people in Philips, LUMC (academic hospital) and Elisabeth-TweeSteden Ziekenhuis (peripheral hospital). 11 personnel of which all have expertise and experience in the Cardiology domain.

We have identified the 'nursing department' and the 'Cath lab' are in the most need for workflow orchestration solutions.

5 Unmet Needs And Requirements

1. Key Requirement 1: To be **context-aware** of the situation happened about patients, even if the personnel is not present. To have a **head start** at the beginning of the day.

   To be context-aware means to know what is going on in the environment and adapt to behaviour. Moreover, a head start means the advantage of getting all information in advance the personnel needs to act upon.

2. Key requirement 2: To establish **teamwork** and support in **decision-making**.

   Doctor and nurses work as a clinical team when it comes to patient care and treatment. Teamwork is, therefore, essential in order to make the best decisions.

3. Key Requirement 3: To have **accessible and usable data** with **high mobility**.

   Data is always available, stored in the databases of the hospital IT infrastructure. However, having data for the staff to easily have access to is a challenge. Moreover, the extracted data that is accessible should be meaningful in a way that it affects decisions or planning. High mobility means to carry the data wherever a staff is, whether it is on a phone app or wearable devices.

4. Key Requirement 4: To classify the **urgency of tasks** and **plan the right actions at the right time**.

   Tasks range from emergency cases to regular routines. The time to solve emergency tasks is always 'now'. Regular routines are essential, but the time to do those tasks depends on the queue of other tasks. Therefore, a system might help in pushing notifications that specifies the actions the staff must take.

5. Key Requirement 5: To be **proactive** to interact with passive information and **reduce information overload**.

   Passive information such as lab results, relevant emails, messages, newsletters, requires the staff to read them thoroughly in order to be updated. However, similar to the aviation staff mentioned in the earlier chapter, be aware of information overload that would possibly lead to stress and burnouts.

6. Key Requirement 6: To **have control** over their working habits, with a **short learning curve** to operate and manage a new system.

   A newly introduced system has to provide the staff with the autonomy to manage their workload and tasks. Furthermore, a short learning curve concept means the user can learn in a short time, with intuitive functionalities and to the point.

7. Key Requirement 7: To be **flexible** on the fixed schedule from both the personnel and its context, and to be adaptable to **plan the right actions**.

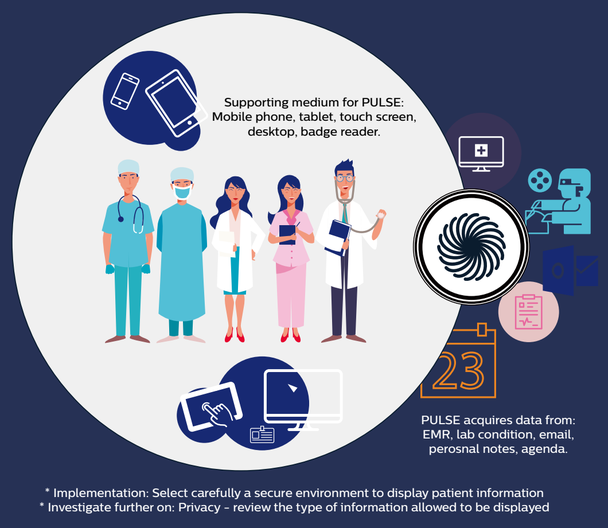
   Cardiologists in the Cath lab need the flexibility to maximise the effective use for the cath lab rooms. Having a visual overview of patients details, staff agenda, room availabilities and the on-going progress of procedures is essential.

6 PULSE system

7 PULSE Roadmap

Phase 1
Connected Staff Engagement

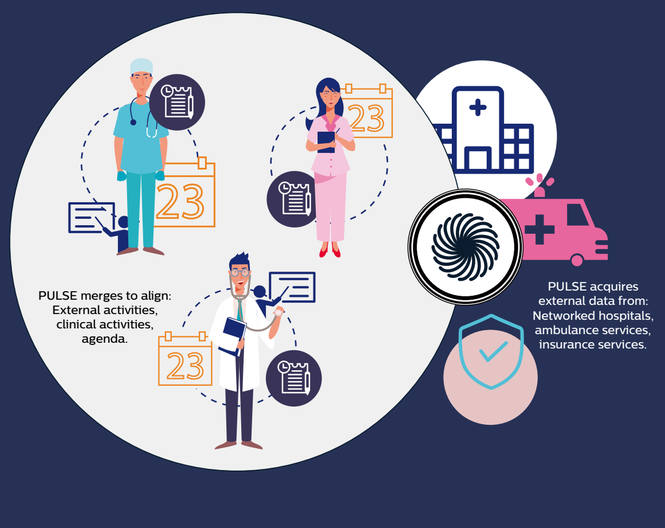
PULSE is an AI-supported interactive assistant that brings up vital information to the medical staff at the right time and the right place.



* Implementation: Select carefully a secure environment to display patient information
* Investigate further on: Privacy - review the type of information allowed to be displayed

Phase 2
Connected Organisation Engagement

PULSE aligns the planning of clinical activities with other professionals and interconnecting other professional organisations.



Phase 3
Connected Well-Being

PULSE detects signs of deterioration of patients and alerts with suggestive actions to all parties who are involved.

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