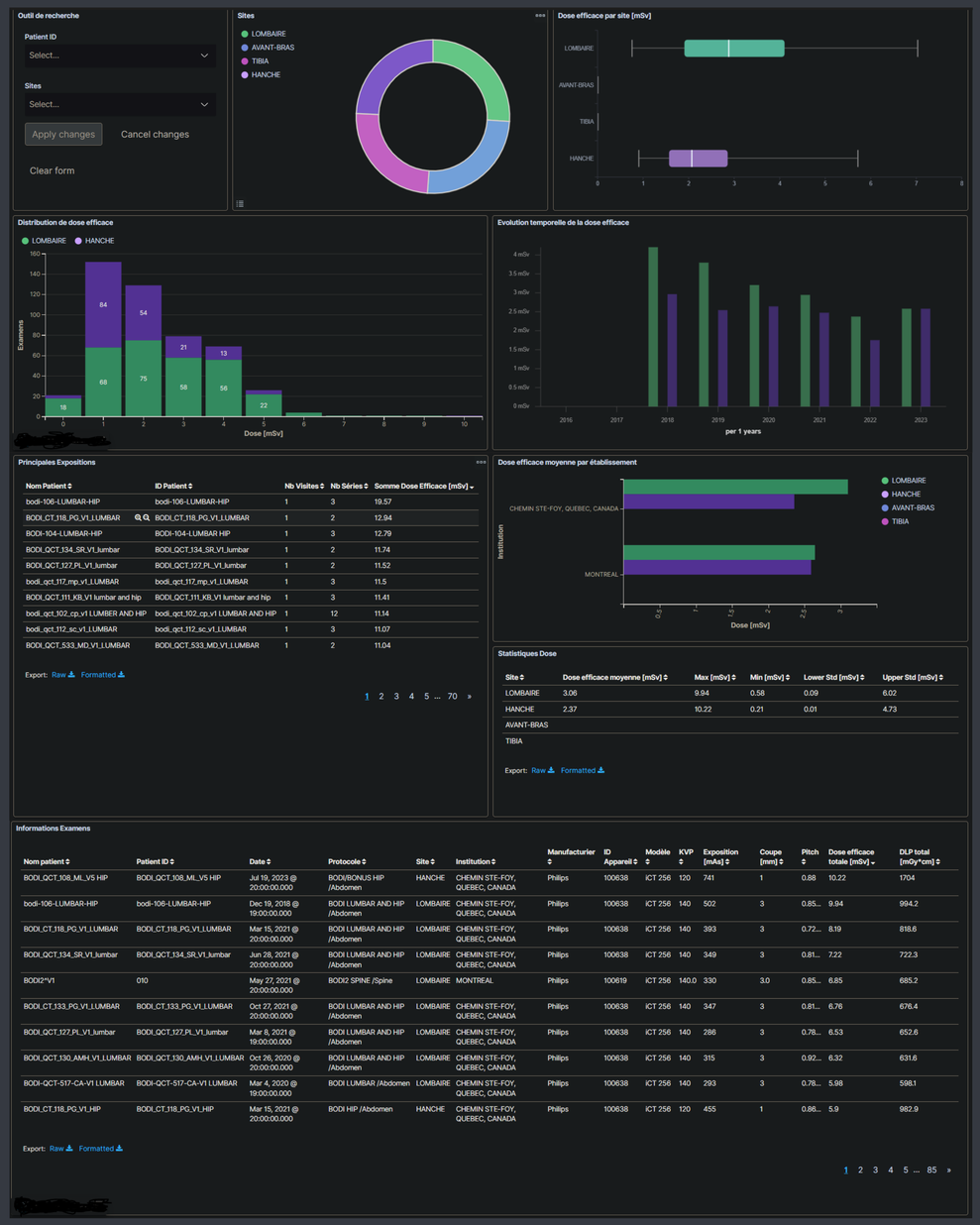
Dashboards can support **real-time** CT dose **monitoring**



Filters

Dose Statistics

Acquisition Parameters

Figure 1. Dashboard use-case

Big data methods for CT doses analysis and monitoring

Pierre-Luc Asselin, Yannick Lemaréchal, Gabriel Couture, Samuel Ouellet, Jonathan Boivin and Philippe Després

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RHHD2 Responsible health and healthcare data science
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Introduction

Computed Tomography is the principal contributor to ionizing radiation exposure of medical origin for the Canadian population [1], a situation that typically prevails in developed and developing countries. CT examination requests are also on the rise, with an increase of 30% from 2010-2020 and an additional expected increase of 18% within the next twenty years [2]. Radiation emission guidance (Diagnostic Reference Levels) is available but might fail to capture the reality of clinical activities.

This project aims at developing a dashboard capable to support capable to provide visualization and analytic tools to managers and technical personnel to monitor radiation usage in CT, leading to opportunities to study clinical practice trends and facilitating the identification of outliers to improve heath care.

References:
[1] UNSCEAR. 2008 Report to the General Assembly with Scientific Annexes, Volume I: Sources, Annex A: Medical radiation exposures. Tech. rep. United Nations, 2008.

[2] A. M. Yi-Sheng Chao Alison Sinclair. “The Canadian Medical Imaging Inventory 2019 - 2020”. Canadian Journal of Health Technologies 1.1 (2021), p. 215

Methods

A - Data Collection
Medical data within the clinical center’s PACS is collected in the **DICOM** format. Sensitive data is **de-identified**.

B - Data Storage and Curation
Data is stored with the open-source software **Orthanc**. Data curation is assured by **automated scripts** within the storage.

C - Analyzes
Another open-source software, **OpenSearch**, is used to ingest aggregated data and produce **customizable metrics**.

D - Display
Real-time **dynamic dashboards** are hosted directly on OpenSearch and available for personalized data exploration.

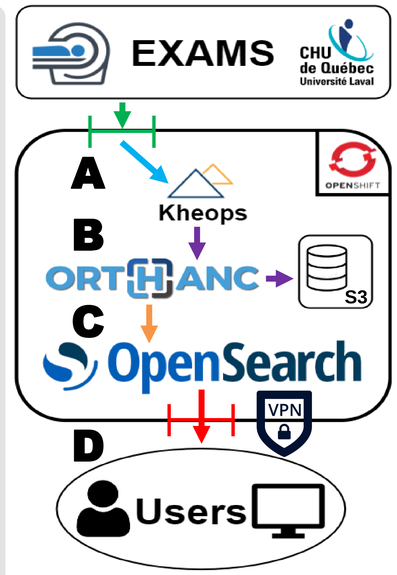

Figure 2. General data workflow

Results

- ☑ Automated data pipeline that doesn’t interfere with clinical activities
- ☑ FAIR principles integrated within the data workflow
- ☑ Working dynamic dashboards
- ☑ Ensures data standardization
- ☑ Sensible information properly de-identified and securely stored
- ☑ Visualization and analytic tools supporting health professionals and managers needs
- ☑ Real use-case within a clinical context (Figure 1)