

Low Value Care in Hospitalized Patients (LUCID), a National Data Stream on Quality of care in Swiss University Hospitals

Executive summary

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1. Executive summary

Goal of the National Data Stream on Quality of Care: National Data Streams (NDS) are set to play an important role in making Swiss healthcare more effective, cost-efficient, data-driven, and evidence-based. Our project will focus on hospital inpatient quality of care and will attempt to find ways of improving healthcare processes in Swiss hospitals. As both the number of patients and the cost of acute care are expected to increase in the future, avoiding healthcare waste, while satisfying inpatients expectations, is key for the Swiss health system. Since value-based healthcare aims at preventing low-value healthcare processes while keeping costs under control through **a patient-centered outcome orientation, and within an evidence-based and data-informed framework**, our **broad objective** is to build an NDS permitting **to monitor and study the quality** of care in Swiss hospitals **using existing hospital data and Patient Reported Outcomes (PROs)**. While the current project will focus on **hospitalized patients in medicine** who represent the largest part of hospitalizations, the project's infrastructure and processes are applicable for hospitalized patients from other specialties.

Background and rationale: Reducing **low value care (LVC)**, defined as healthcare practices providing minimal or no benefit to patients, is a largely untapped opportunity **to increase the value of health care at a given cost** while simultaneously reducing patient's harm and test/treatment overuse. LVC is estimated by the Organisation for Economic Co-operation and Development (OECD) to represent up to 20% of healthcare costs (i.e., 16 billions/year) in Switzerland. One way to reduce LVC is to apply the **Choosing Wisely Initiative** (www.choosingwisely.org; named Smarter Medicine in Switzerland; www.smartermedicine.ch) which aims to reduce LVC practices and health-related costs worldwide. This initiative is recommended by the OECD. While reducing LVC is necessary for sustainable healthcare systems, there is **no monitoring of LVC in Swiss hospitals**. The burden and consequences of LVC, as well as the overall impact of the Choosing Wisely Initiative in Swiss hospitalized patients, remains largely unknown. An efficient method to translate value-based initiatives into practice is to promote **data-driven benchmarking** to uncover potential hospital variation in the provision of LVC and also to **disseminate quality improvement interventions** and report on improvements. So far, in Switzerland, such quality monitoring and improvement initiatives have been limited by the lack of a federated database able to detect LVC provision in hospitalized patients. Further, the treatment success from the point of view of the values, needs and preferences of patients have hardly been monitored so far in Swiss University hospitals.

Main objectives: Our overarching goal is to build an NDS permitting to monitor and study the quality of care in Swiss hospitals. The current LUCID project will be a collaborative effort between the General Internal Medicine and IT Teams of the 5 Swiss University Hospitals, the nationwide IT-infrastructure initiative for personalized health by the Swiss Personalized Health Network (SPHN), the Swiss Data Science Center (SDSC), and the Swiss Institute of Bioinformatics (SIB). LUCID consists of both SPHN partners and partners from the ETH Domain, namely the Swiss Data Science Center. The **specific aims** of our LUCID NDS are:

- 1) To investigate the frequency and monitor trends in LVC in medical patients hospitalized in the 5 Swiss university hospitals through a distributed informatics data-sharing network
- 2) To evaluate whether the publication of the Swiss Choosing Wisely for inpatients in 2016 was associated with a decrease in LVC

- 3) To assess the down-stream consequences of LVC in medical hospitalized patients by comparing outcomes (hospital readmission; transfer in a secondary care facility; overall costs of the hospital stay; and in-hospital overall mortality) between patients with and without LVC
- 4) To implement the collection and monitoring of PROMs across participating hospitals (including digital implementation), taking advantage of the NDS

LUCID will additionally integrate nested research projects, which will generate scientific insights in the field of quality of care and in personalized health data science. In particular, a nested-proof of concept study which will assess the feasibility and utility of PROMs data collection in consenting medical multimorbid patients hospitalized for acute non-oncological disorders.

Methods: We will build our NDS on the existing SPHN semantic-driven, interoperable framework to enable analysis of medical data across all 5 university hospitals of Switzerland, in compliance with stringent ethical and legal requirements. Using hospital data collected since 2014, we will assess the number, trends, and outcomes of medical inpatients exposed to LVC. LUCID lighthouse is divided into 4 work packages (WP).

In WP1, we will select LVC listed by reputed national quality organizations. We will prioritize healthcare processes and recommendations that are measurable in medical inpatients in Swiss university hospitals. We will then translate the Choosing Wisely recommendations into LVC indicators that can be applied to our data. We will assess and compare the frequency of the developed LVC measures across hospitals using a chi-squared test; and test for trends using mixed-effects logistic regression models. **For WP2**, we will focus on recommendations published in May 2016 for the inpatient sector that have been characterized as LVC by the Choosing Wisely Switzerland initiative (www.smartermedicine.ch). We will use an interrupted time series analysis to assess change in LVC over time in relation to the publication of the recommendations. The study period will be divided in 2 time segments, i.e. 2014 to April 2016 as pre-publication period and May 2016 to 2024 as post intervention period) with the boundaries between segments set on the date of the publication of the recommendation for the inpatient sector in May 2016. Finally, **in WP3**, we will compare 30-days readmission and other outcomes (transfer in a secondary care facility; overall costs of the hospital stay; in-hospital mortality) between patients with and without LVC. Multivariate analyses assessing the likelihood of binary outcomes will be conducted using mixed-effects logistic regression, adjusting for confounders such as age and gender, Charlson comorbidity index, drug intake, admission ward, and discharge destination, accounting for hospital and calendar time as random terms. For cost data, we will use mixed-effects generalized linear models with Gamma distribution and log-link instead. In addition, we will apply causal inference methods such as propensity score weighted analyses to model clinical outcomes and cost data. **In WP4**, with the overall goal to investigate and compare the patient-centeredness of care provided during a hospital stay and to further identify LVC healthcare practices, we aim to collect PROs in medical multimorbid inpatients and compare the change in generic PRO scores from admission to discharge across hospitals, taking advantage of the NDS.

Relevance: This NDS will implement a nationwide effort for the documentation, better knowledge of trends and consequences of LVC in hospitalized patients. Because Choosing Wisely is a major paradigm change for medical care in Switzerland and worldwide, the present research will also generate new knowledge on the adherence to Choosing Wisely recommendations. Studying trends of LVC measures before and after the release in 2016 of Choosing Wisely Switzerland recommendations for medical inpatients will be an indirect demonstration of the impact of such an initiative. This knowledge has the potential to help build strategies that can be adopted by health authorities, hospitals, healthcare professionals and patients in order to reduce the frequency of LVC. Further, this NDS project will pave the way for a regular monitoring and benchmarking of the value of care in Switzerland and will have a sustainable impact on the quality of hospital care across Swiss hospitals by revolutionizing how routinely available data is shared for research and healthcare. Finally, the project will also enable a value-oriented optimisation of the Swiss healthcare system, to ensure that patients and public voices are heard.

International benchmarking: In Switzerland, the frequency of LVC cannot be compared with other countries since there is no monitoring of LVC. Further, Switzerland does not have any large research dataset of patient-centered data, including PROs data, for medical hospitalized patients, nor is a standard set of PROs available for use in Swiss hospitals. This project is a unique opportunity to fill this gap.