

Thema für Projektstudium, Masterarbeit: Erfassung und Transformation von Hygiene-spezifischen Routinedaten im Krankenhaus in ein standardisiertes Datenmodell zur automatischen Infektionsüberwachung

Motivation

An der Universitätsklinik für Krankenhaushygiene und Infektionskontrolle der Medizinischen Universität Wien soll ein System zur automatischen Infektionsüberwachung basierend auf Routinedaten realisiert werden. Ausgangspunkt dabei ist der im Zuge des internationalen Projekts AUTOSurv entwickelte minimale Datensatz (MDS), der alle für die Infektionsüberwachung erforderlichen Daten beschreibt.

Arbeitsthemen

Im ersten Schritt der Arbeit soll – in Kooperation mit der IT-Abteilung der MedUni – eruiert werden, in welchem Umfang die MDS-Daten bereits in den Routine-Systemen des AKH / MedUni erfasst werden bzw. wo noch Lücken bestehen. Für die fehlenden Daten sollen gemeinsam mit der IT-Abteilung entsprechende Dokumentationsformulare erarbeitet werden.

Im zweiten Schritt ist eine Repräsentation des MDS mittels des standardisierten Datenmodell OMOP CDM zu erstellen, wobei sowohl die strukturellen als auch die terminologischen Vorgaben des OMOP CDM zu berücksichtigen sind.

Im dritten Schritt sind die erforderlichen ETL-Skripts zu erstellen, mittels derer die Quelldaten extrahiert, transformiert und in die OMOP Ziel-Datenbank eingefügt werden.

Der letzte Schritt besteht darin, die für die Infektionsüberwachung benötigten Auswertungen als Abfragen auf das OMOP CDM zu formulieren, um diese auf die standardisierten Daten anwenden zu können.

Qualifikation und Administratives

Erforderlich sind Engagement und gute Kenntnisse in SQL, Python, Deutsch und Englisch. Eine **finanzierte Anstellung** an der Universitätsklinik für Krankenhaushygiene und Infektionskontrolle, die auch über die Masterarbeit hinausreichen kann, ist möglich. Weitere Details zum Forschungsprojekt finden Sie in englischer Sprache ab Seite 2.

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Research proposal

“Automatic surveillance of hospital onset bacteremia to quantify the risk of catheter related infection and hygiene gaps”

Introduction/background

Healthcare-associated infections (HAI) are major cause of prolonged morbidity and increased mortality among the patients receiving medical treatment and care in healthcare institutions (1, 2). Formerly named “nosocomial infections” – “nosos” meaning “hospital” – they are not confined to hospitals only but also to other institutions, e.g. long-term care facilities (3). The European point prevalence survey 2015-2016 included 310,755 patients from 1,209 acute care hospitals (ACH) in 28 countries and 117,138 residents from 2,221 long-term care facilities in 23 countries in the European Union and European Economic Area and identified an HAI rate of 6.5% in acute care hospitals and 3.9% in long-term care facilities (3). The most common HAI include surgical site infections, pneumonia, urinary tract infections and bacteremia. Hospital-onset bacteremia is defined as bacteremia starting with day 2 after admission to the hospital with estimated 1.200,000 episodes per year in Europe and 157,000 related deaths (4).

Surveillance of HAI is a worldwide standard for infection prevention and control in hospitals. Surveillance only leads to a decrease of the surveyed infections (5, 6). Depending on the IT infrastructure and the HAI surveillance software and operational interfaces to the hospital patient data management system (PDMS) surveillance is more or less time consuming for the infection prevention and control (IPC) teams. Best case is, when admittance, movement and demography data are supplied from the PDMS into the surveillance software. More often, all data for HAI surveillance are manually collected from the patient charts and entered into the surveillance software – including all data which are already in the PDMS. In Europe, all EU-EAA countries supply HAI surveillance data to the European Center of Disease Prevention and Control (ECDC)’s TESSy database using the ECDC HAI definitions for case identification and data formats according the current TESSy Metadata Set.

Automatic surveillance for HAI will use existent data from the hospital administration IT system, the PDMS and subsystems. The aim is to ease surveillance and lessen the workload of the IPC teams by reusing data already present in the PDMS to detect and document HAI. The EU project PRAISE addressed the roadmap to automatic surveillance resulting the various documents, e.g. for governance, technical requirements etc. (7-9). Now, members of this group re-assembled and started to discuss automatic surveillance. Given the most commonly available data, semiautomatic surveillance of surgical site infections (SSI) (10, 11) and automatic hospital-onset bacteremia (HOB) (12) are most promising to begin with.

Aim

The present proposal aims to check the feasibility of the automatic surveillance of HOB in the University Hospital of Vienna using a prospective and a retrospective approach. This feasibility study will use the research data base IT4Science of the Medical University of Vienna. It will be part of the international research project.

Secondary research questions will be chosen according to the available data and may include:

- Is the cut off of two days to distinguish between healthcare-associated and community-associated infections accurate?

- What is the proportion of HOB due to so called “common commensal contaminants” (CSC) if different time intervals for repeated bloodcultures are chosen (1 day, 2 days, 3 days)?
- How does the incidence of HOB change when taking into account polymicrobial HOBs vs. not taking into account polymicrobial HOBs?
- What is the impact of allowing for new HOB episodes (with different pathogens) within the same admission, as opposed to how it is done by ECDC?
- What is the mortality of patients within 2 weeks of developing HOB compared to similar patients not developing HOB?
- To what extent is the HOB rate affected by differences in blood culture practices (e.g. number of blood cultures obtained per 1000 patient days)?
- To what extent is the HOB rate affected by differences in blood culture practices in the first 2 days of admission (e.g. number of blood cultures obtained per 1000 patient days)?
- Do HOB surveillance and surveillance with established HAI definitions (CLABSI, pneumonia, SSI, UTI, etc.) identify the same patients?
- Do HOB surveillance and surveillance with established HAI definitions reveal similar results when used for benchmarking? Do the same wards/departments/hospitals have low vs. high rates?

Methods

HOB relevant data from the Vienna University Hospital collected in the research database IT4Science of the Medical University of Vienna will be used as a surrogate of the hospital administration system and the PDMS will be used. Data from the HAI surveillance of the Department of Infection Control and Hospital Epidemiology will be used for validation. The Department of Infection Control and Hospital Epidemiology has a waiver to use the pseudonymised data by the Austrian Data Protection Agency. The algorithms of the PRAISE II group will be applied. Research questions will require additional algorithms. The approval of the Ethical Committee will be applied.

References

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