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Use of Open-Access Databases in Anesthesiology and Intensive Care: A Systematic Review and Practical Recommendations

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ADMINISTRATIVE INFORMATION

Support - Nil.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 December 2024 and was last updated on 12 December 2024.

INTRODUCTION

Review question / Objective This review aims to systematically analyze open-access databases of critically ill patients by identifying accessible databases, comparing their characteristics, and providing practical recommendations for their application in anesthesiology and intensive care research.

Rationale Open-access databases containing ICU patient data have garnered significant global interest but remain underutilized in Russian research and clinical practice. This systematic review seeks to close this gap by analyzing the availability, features, and usability of these databases. By highlighting key characteristics, advantages, and limitations of these databases, this study will provide practical recommendations for their effective use in anesthesiology and critical care.

Condition being studied Critical illnesses requiring intensive care management, including sepsis, acute respiratory distress syndrome, and multi-organ dysfunction.

METHODS

Search strategy A systematic literature search will be conducted in PubMed, Google Scholar, and LitMaps for studies published up to Dec 2024. Backward and forward snowballing methods will ensure comprehensive coverage. No language restrictions will be applied.

Participant or population Critically ill adult patients (aged ≥18 years).

Intervention Analyzing open-access databases containing patient-level data from ICUs.

Comparator Not applicable.

Study designs to be included Studies presenting open-access ICU databases.

Eligibility criteria Databases of ICU patients that can be accessed; 2) the open-access databases represent mainly patients aged 18 years and older; 3) data on monitored vital parameters in ICU are available.
Exclusion:
Databases focusing exclusively on pediatric patients.

Information sources PubMed, Google Scholar, LitMaps, and supplementary database-specific websites.

Main outcome(s) Identifying and comparing database characteristics, such as:
-Number of patients
-Monitoring frequency
-Data categories (vitals, labs, therapies)
-Geographic origin.

Additional outcome(s) Advantages and limitations of each database.

Quality assessment / Risk of bias analysis Criteria will include data completeness and data quality.

Strategy of data synthesis Extracted data will include:
General database characteristics, such as patient population, inclusion period, and data granularity.
Technical details, including access protocols.
For analysis, the following data will be extracted: year of publication, number of centers, period, number of patients and hospitalizations, age, sex, ICU length of stay, mortality rates, patient categories, severity scores at admission (e.g., prognostic scales), and frequency of interventions such as vasopressors, inotropes, mechanical ventilation (MV), and renal replacement therapy (RRT). Additionally, the availability of patient history and other parameters will be assessed.
The monitoring frequency of fluid balance and medication data, as well as other vital and laboratory parameters, will also be evaluated. For these, the mean number of measurements per hour or day (total parameter records divided by ICU stay duration in hours/days) and standard deviation (SD) will be calculated. The average number of measurements per patient (total parameter records divided by the total number of patients in the database) over the entire hospital stay will be calculated.
Database characteristics, when available, will be extracted from official data repository websites or accompanying publications. When unavailable, information will be directly retrieved from the databases themselves.
Access to databases will be obtained as part of this study.
Data extraction will be conducted using tools such as DB Browser for SQLite and DBeaver. Summary statistics will include frequencies of monitored parameters, such as vital signs and laboratory values, presented as means with standard deviations. Comparative tables and visualizations will be generated using Python libraries, including matplotlib and pandas. A descriptive analysis will summarize key differences in database features and potential research applications.

Subgroup analysis Not applicable.

Sensitivity analysis Not applicable.

Language restriction No language limitations.

Country(ies) involved Russian Federation.

Keywords Open-access databases; critical care; anesthesiology; ICU; systematic review.

Contributions of each author
Author 1 - Mikhail Yadgarov - conceived and designed the review, performed the analysis, wrote the paper.
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