Ethical and **practical challenges** of **big data** in evidence-based health research: a scoping review

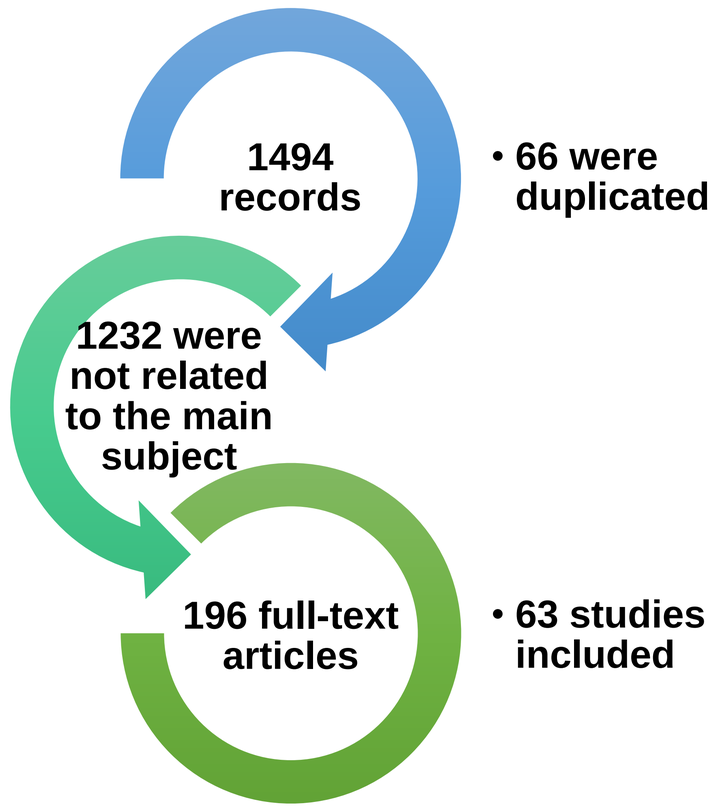
The Problem

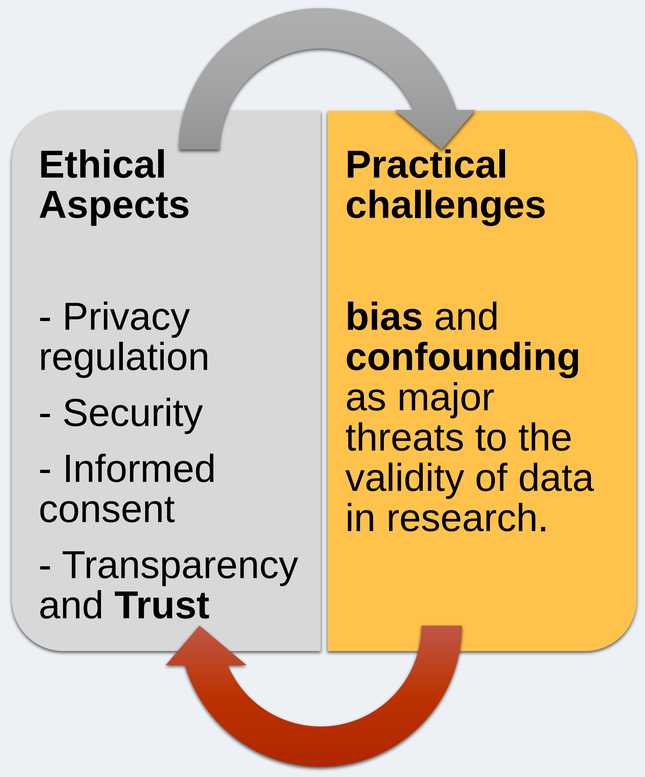
‘Big data' is the name given to a huge set of data that requires the assistance of computerized and/or analytical processing. It is at an initial stage and can bring an explosive availability of **diverse** data that are 'big' in volume, velocity, variety, helping research and decision-making in several fields within health care. However, as studies using 'big data' rely on secondary data that are collected for purposes other than research, measurement error and spurious associations may be common. Although experimental designs such as randomized controlled trials (RCTs) are considered a gold standard in determining causal relationships, when there is no clinical equipoise, it is not ethical to conduct a RCT. Also, RCTs have strict eligibility criteria and their external validity is limited. The evidence demonstrating how 'big data' can improve research in health is scant.

Methods

- We performed a sensitive search without language or publication date restriction;
- On CENTRAL, MEDLINE, Scopus, LILACS and IBECS databases to retrieve studies exploring the usage of 'big data' within health research, its ethical and practical issues and/or its relation to evidence-based health research;
- Two authors screened, selected and summarized the eligible studies.

Key Results





- **When combining Evidence-based health** and precision approaches, evidence-based precise health **can make 'big data' truly big**. The challenges ahead are numerous, but so are the rewards - namely that every individual should be able to benefit from precision health.

- **Relevance to diversity:**
  Minute by minute, several data are generated on electronic medical records by patients / consumers. These data are often potentially relevant on how they feel about their clinical conditions, interventions and even issues about new implemented treatments. The combination of these information in **Big Data is promising** in the health field as it allows multiple **data synthesis** *regardless of the individuals' location, culture, physical or socioeconomic condition.*

Relevance to patients and consumers

The conduction of clinical studies is expensive for both researchers and patients, making the search for all health solutions unfeasible in a little time. Thus, Big Data compacts and enables the transmission of this potentially relevant patient data, rapidly and without much expense, speeding up the identification of problems and clinical relevant outcomes.

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1933