Novel framework provides 'measuring stick' for assessing patient matching tools

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Accurate linking of an individual's medical records from disparate sources within and between health systems, known as patient matching, plays a critical role in patient safety and quality of care, but has proven difficult to accomplish in the United States, the last developed country without a unique patient identifier. In the U.S., linking patient data is

dependent on algorithms designed by researchers, vendors and others.

Research scientists led by Regenstrief Institute Vice President for Data and Analytics Shaun Grannis, M.D., M.S., have developed an eight-point framework for evaluating the validity and performance of algorithms to match medical records to the correct patient.

"The value of data standardization is well recognized. There are national healthcare provider IDs. There are facility IDs and object identifiers. There are billing codes. There are standard vocabularies for healthcare lab test results and medical observations—such as LOINC here at Regenstrief. Patient identity is the last gaping hole in our health infrastructure," said Dr. Grannis. "We are providing a framework to evaluate patient matching algorithms for accuracy.

"We recognize that the need for patient matching is not going away and that we need standardized methods to uniquely identify patients," said Dr. Grannis.

"Current patient matching algorithms come in many different flavors, shapes and sizes. To be able to compare how one performs against the other, or even to understand how they might interact together, we have to have a standard way of assessment. We have produced a novel, robust framework for consistent and reproducible evaluation. Simply put, the framework we've developed at Regenstrief provides a 'measuring stick' for the effectiveness of patient matching tools."

Individuals increasingly receive care from multiple sources. While patient matching is complex, it is crucial to health information exchange. Is the William Jones seen at one healthcare system the same person as the William, Will or Willy Jones or perhaps Bill or Billy Jones receiving care at other facilities? Does Elizabeth Smith's name appear at different medical offices or perhaps at a physical therapy or a dialysis facility as

Liz or Beth? To which Juan J. Gomez do various lab test results belong? Typos, missing information and other data errors as well as typical variations add to the complexity.

The framework's eight-point approach to the creation of gold standard matching data sets necessary for record linkage encompasses technical areas including data preprocessing, blocking, record adjudication, linkage evaluation and reviewer characteristics.

The authors note that the framework "can help record linkage method developers provide necessary transparency when creating and validating gold standard reference matching data sets. In turn, this transparency will support both the internal and external validity of recording linkage studies and improve the robustness of new record linkage strategies."

Measures and standards are ubiquitous. "When you go to a gas station pump, the measure of how much gas goes through is standardized so that we know exactly how much is flowing. Similarly, we need to have a common way of measuring and understanding how algorithms for patient matching work," said Dr. Grannis. "Our eight-pronged approach helps to cover the waterfront of what needs to be evaluated. Laying out the framework and specifying the tasks and activities that need to be completed goes a long way toward standardizing patient matching."

In addition to playing a critical role in patient safety and quality of care, improved patient matching accuracy supports more cost-effective healthcare delivery in a variety of ways including reduction in the number of duplicate medical tests.

The work is published in the *Journal of the American Medical Informatics Association*.

More information: Agrayan K Gupta et al, A framework for a

consistent and reproducible evaluation of manual review for patient matching algorithms, *Journal of the American Medical Informatics Association* (2022). DOI: 10.1093/jamia/ocac175