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Linking Emergency Medical Services and Health System Data: Optimal Strategy and Bias Mitigation

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Introduction

Emergency Medical Services (EMS) systems dispatch paramedics to emergencies in the community. For critically ill patients, paramedic interventions and transport destination decisions may impact outcomes. Research is needed to inform paramedic care, but linking EMS data to health system outcomes is a barrier. Limited research exists on EMS data linkage.

Objectives and Approach

To optimize linkage of EMS data (fiscal year 2016/17) to the National Ambulatory Care Reporting System/Sunrise Clinical Manager datasets and assess bias. A random sample of EMS records were deterministically linked on provincial health number (PHN), transport destination, and EMS/emergency department arrival/presentation times $\leq$2hrs. Linked data were manually verified using last name, sex, date of birth, and hospital file number. For patients that remained unlinked (based on the variables listed above), further linkage attempts were made using additional variables. The combination of variables that optimized sensitivity/positive predictive value/f-measure were used to link the fiscal year. Linked/unlinked groups were descriptively compared.

Results

While results are still pending (available April, 2018), we hypothesize that there may be inherent differences in the clinical and encounter characteristics of patients that were linked versus unlinked. Patient identifiers such as PHN and name are important for linkage, but are not always collected on EMS events that require immediate treatment and rapid transport, yet these patients may be the most critically ill.

Conclusion/Implications

As more EMS systems attempt to systematically link their data to health system outcome, these results will be important to mitigate potential bias.