

Abstract:

TITLE: Outcomes Matter: Linking EMS Records to Hospital Diagnoses

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INTRODUCTION: EMS agencies receive limited information regarding patient outcomes from hospitals due to a lack of standardization, fear of legal implications, and other issues. Similar presentation of various health conditions (e.g. stroke and diabetic shock) leave EMS providers questioning whether they correctly assessed and treated their patients. This knowledge gap has restricted: the evaluation of real world protocols, procedures and assessments; the implementation of benchmarks based on patient outcomes; and proper feedback to field personnel.

OBJECTIVE: To deterministically link the Arizona Prehospital Information & EMS Registry System (AZ-PIERS) to the Arizona Hospital Discharge Database (HDD) in order to obtain information on patient hospital outcomes.

METHODS: Data were queried from AZ-PIERS and from HDD for the year 2014. AZ-PIERS was restricted to include only 911 calls with a patient disposition of “treated and transferred,” or “treated and transported”. Patients transported to facilities not reporting to HDD and to those located outside of Arizona were excluded from the AZ-PIERS dataset.

A fifteen step deterministic approach was used to link AZ-PIERS to HDD using SAS 9.4 (SAS Institute, Cary, NC). Records were matched in progressively less restrictive steps using any combination of following variables: last name (or soundex of last name), first name (or soundex of first name), date of birth, Social Security Number, gender, date of incident/date of admission, hospital ID (Table 1). Record pairs that did not meet the first set of match criteria were passed to the second set of match criteria for further comparison. To qualify as a match, a record pair had to meet all the criteria in any given step.

RESULTS: In 2014, a total of 318,783 records were reported to AZ-PIERS. Of those, 290,902 qualified for linkage. These records were matched against the 2,953,519 discharge records reported to HDD for the year 2014. The first step, which involved exact matching on first name, last name, date of birth, gender and date of incident/date of admission, yielded a linkage of 64.7% (188,245). The successive fourteen steps yielded a further linkage of 21.7% for a total linkage of 86.4% (251,203) (Table 1).

CONCLUSION: Using a stepwise deterministic approach we were able to successfully link a high percentage of EMS records to their respective outcomes in HDD. This is an important first step towards developing a standard methodology for linking health information at the state level. Future linkage projects involving other registries and states may help validate the presented template.

Table 1: Deterministic linkage steps, count and percent linked

Deterministic Linkage between AZ-PIERS and HDD 2014 data:			
EMS 2014		290902	
1	LN, FN, Sex, DOB, DOI	188245	64.71%
2	LN, FN, Sex, SSN, DOI	1721	0.59%
3	LN, FN, Sex, DOB or SSN, DOI +2 days	17403	5.98%
4	LN, FN, Sex, Facility, DOI +2 days	4552	1.56%
5	LN, FN, DOB or SSN, DOI +2 days	6441	2.21%
6	LN, Soundex FN, Sex, DOB or SSN, DOI +2days	9701	3.33%
7	LN, Soundex FN, Sex, Facility, DOI +2days	377	0.13%
8	LN, Soundex FN, DOB or SSN, DOI +2days	338	0.12%
9	Soundex LN, FN, Sex, DOB or SSN, DOI +2 days	7388	2.54%
10	Soundex LN, FN, Sex, Facility, DOI +2 days	324	0.11%
11	Soundex LN, Soundex FN, Gender, DOB or SSN, DOI +2 days	658	0.23%
12	SSN, DOB, Sex, DOI +2 days	4869	1.67%
13	LN, SSN/DOB, Sex, DOI and facility	5452	1.87%
14	LN, FN, SSN/DOB, Gender, DOI + or - 2 days	2701	0.93%
15	LN=FN, FN=LN, SSN/DOB, Gender, DOI + or - 2 days	1033	0.36%
	Total cases linked	251203	86.35%