Time for Changes in the Reporting of Diagnosis Codes in Administrative Data

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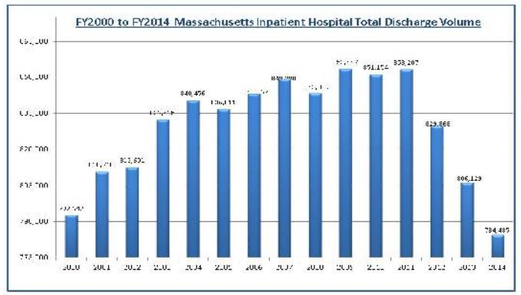
BACKGROUND

The completeness of medical diagnosis (dx) codes collected is a key data quality metric influencing the usability of health care data for comorbid analysis, severity adjustment, population health surveillance and quality of care improvement. The Federal Agency for Healthcare Research and Quality (AHRQ) revealed sizeable state-by-state variation in the number of *International Classification of Diseases Ninth Revision* (ICD-9-CM) dx codes collected in state-level administrative hospital inpatient discharge data (HIDD), ranging from less than ten (10) to greater than sixty (60) dx codes.[1] Until 2015, the Commonwealth of Massachusetts (MA) HIDD submission guidelines set a limit of 15 ICD-9-CM dx codes. MA Center for Health Information and Analysis, UMass Medical School Health Geography Lab and MA Department of Public Health researchers previously linked patient level clinical trauma registry data (which sets no dx code limit) to MA HIDD records for the same trauma patients and discovered a **lower mean number of HIDD dx codes compared to registry dx codes (mean of 3.5 vs 5.8)** and traumatic derangement in a lower number of distinct anatomical structures (count of 449 vs 519).[2]
As a follow-up to that research, the Center for Health Information and Analysis sought to look beyond trauma patients to all medical diagnoses to:

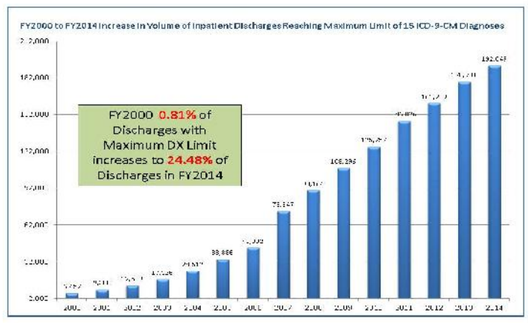
1) **Examine historically over a 15-year period before and after Massachusetts Health Care Reform (MA HCR) the magnitude to which all MA HIDD records began to reach the maximum fifteen dx field code limit;**

2) **Examine the magnitude of difference in reaching the maximum field code limit before and after MA HCR by insurance payer type, gender, discharge disposition, and major diagnosis categories.**

Study Data 15-Year Historical Inpatient Volume Change



Sustained Linear Increase in Maximum DX Field Coding



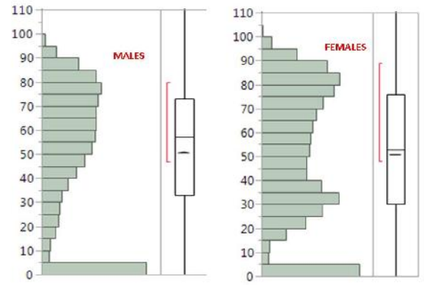
STUDY DESIGN

Analysis was performed using SAS 9.4 and SAS JMP 12.2. Fifteen years (2000-2014) of historical MA HIDD (see Figure 1) were appended into a longitudinal file. The longitudinal file containing 12.4 million patient discharge records and 87.5 million dx codes were analyzed using a difference-in-difference approach and parallel plots to compare and visualize differences in pre and post MA HCR linear trends in maximum field limit reached for major dx categories and stratified by gender, payer type, and discharge disposition.

PATIENT STUDY POPULATION

The MA HIDD includes population-based data on all Massachusetts inpatient acute care hospitalizations demographically representing all MA census age groups, all public and private insurance payer types (including self-pay, free care and workers compensation) and is geographically composed of 94% MA residents, 5% New England residents and 1% non-New England residents.

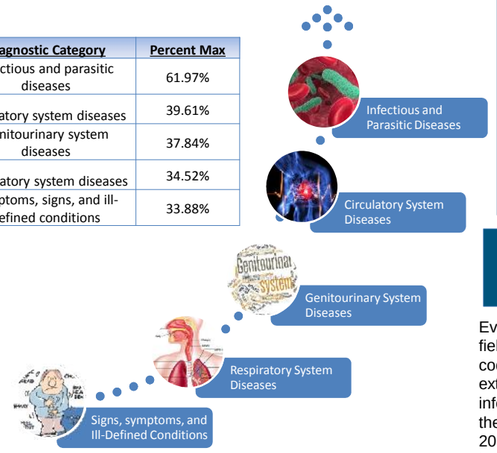
Study Population Age Distribution by Sex



Top 5 Ranking Maximum DX Categories

The major diagnosis category of infectious and parasitic diseases ranked first in the highest post MA HCR coding increase. This increase was due to increase coding for inpatient sepsis cases.

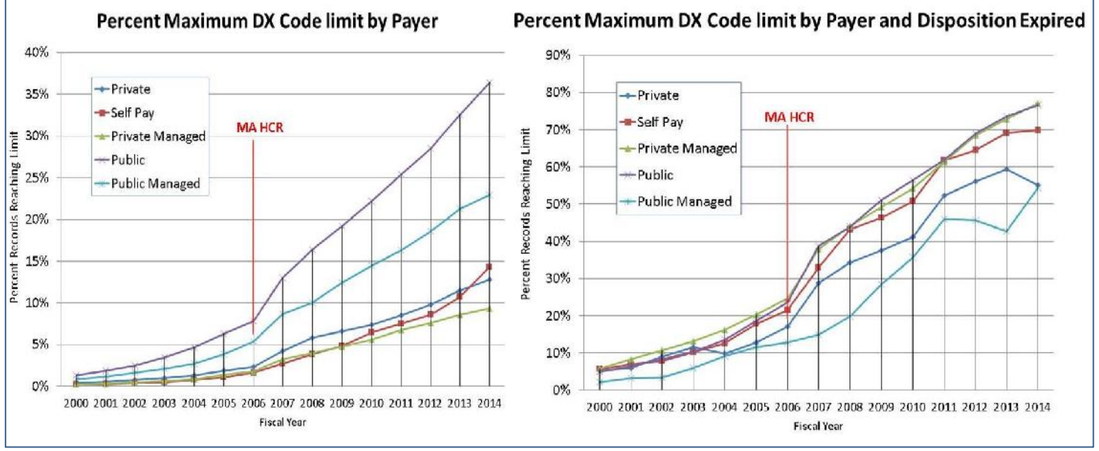
Diagnostic Category	Percent Max
Infectious and parasitic diseases	61.97%
Circulatory system diseases	39.61%
Genitourinary system diseases	37.84%
Respiratory system diseases	34.52%
Symptoms, signs, and ill-defined conditions	33.88%



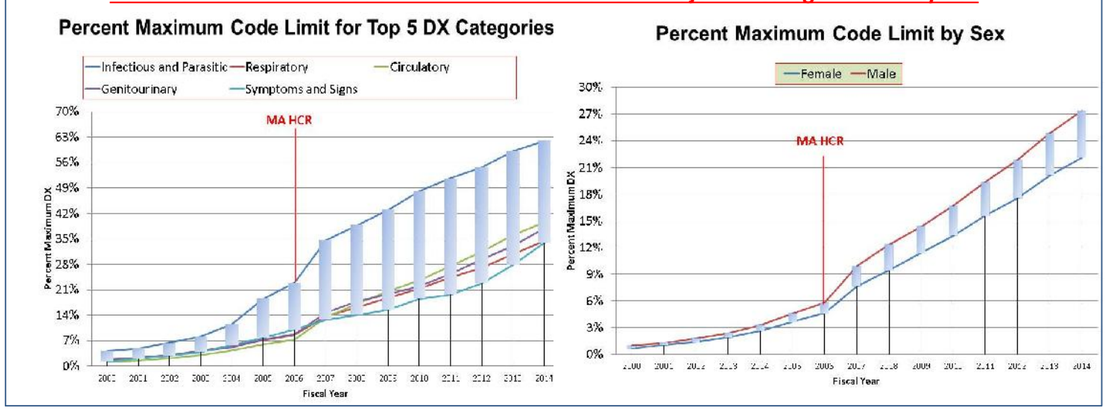
PRINCIPAL FINDINGS

After MA HCR, the percent of HDD discharge records reaching maximum DX field limit more than tripled among patients with public payers and Medicaid and Medicare managed care products compared to private payers. Discharge records for males, regardless of payer, were slightly higher than females before MA HCR with the difference increasing after MA HCR, with the highest gender difference for public managed care recipients ages 65 and older. For expired patients, the coding increases exceeded 50% of all records. This increase included a decrease in the margin of difference between public and private payers. While HIDD circulatory diseases historically have the highest percentage of coding use, infectious and parasitic diseases had the highest increase in linear increase in maximized coding use.

15 Year Trend in Percent Maximum DX Code Limit by Payer Type and Disposition Before and After MA HCR



Percent Maximum DX Code Limit Difference between Major DX Categories and by Sex



CONCLUSIONS AND POLICY RELEVANCE

Even under the ICD-9-CM coding rubric, this study calls attention to how data field limits potentially impact the completeness of key data. The ICD-10-CM coding rubric includes 4-times more codes than ICD-9-CM, with options for extensive coding of disease etiology, anatomic site, severity and other clinical information. This increase substantiates the fact that it is time for changes in the number of diagnosis codes that can be reported in administrative data. In 2015, the Commonwealth of Massachusetts lifted the limit on diagnosis codes in its administrative case mix data.

REFERENCES

1. HCUP Central Distributor SID Description of Data Elements - All States. Healthcare Cost and Utilization Project (HCUP). Aug 2008. Agency for Healthcare Research and Quality, Rockville, MD.
2. Hobbs SD, Osler T, Kane K, Santry H, Burstein J, Li W: Does the Number of Diagnostic Fields in Hospital Administrative Discharge Data Affect its Utility and Validity for Assessing Disparities in Injury Severity. Annual Meeting American Association for the Advancement of Sciences, Feb 2013.