Utilizing an All-Payer Claims Database for Clinical Research

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ABSTRACT

All-Payer Claims Databases combine procedure, assessment, and treatment data for all patients covered by health insurance. While such databases have historically been used for cost/benefit analysis with regard to healthcare policy, they may prove to be a useful tool for clinical research, especially in the context of non-acute conditions. This presentation examines the structure and potential of HealthFacts RI, Rhode Island's new APCD, for application in clinical research.

INTRODUCTION

Questions in clinical medicine have often been addressed using databases such as the National Inpatient Sample (NIS) and the National Surgical Quality Improvement Program (NSQIP). These databases carry certain limitations. The NIS only examines inpatient data, while the NSQIP examines issues from a mainly surgical outlook.[1,2] Prior research has shown contradicting results from using these two different databases.[1-4]

All-Payer Claims Databases (APCDs), a result of recent push by states to generate and analyze more comprehensive health and cost data, compile all claimed medical events—procedure, assessment, or treatment and its associated cost—into one database.[5-6] Use of these databases is slowly making its way into medical literature, but studies utilizing them nearly exclusively examine cost. HealthFacts RI, Rhode Island's APCD provides a unique opportunity to examine comprehensive patient outcomes longitudinally. This may prove particularly useful when evaluating patients who live with subacute or chronic conditions that may seek treatment on an outpatient basis.

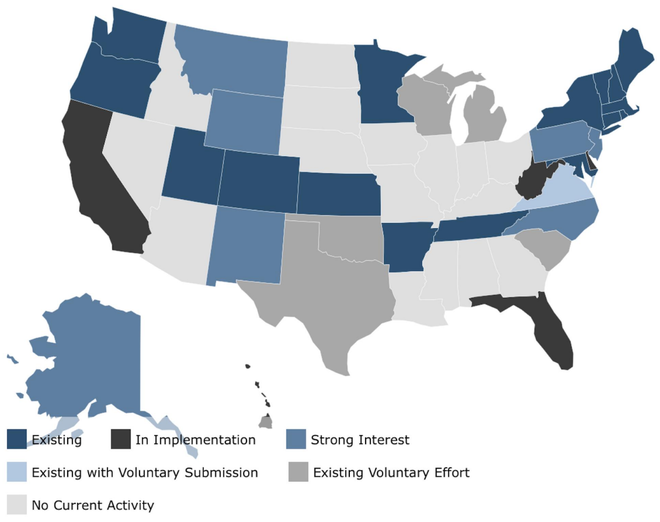

Figure 1: States with or considering implementation of all-payer claims databases as of September 2018.
(APCD Council Interactive State Report Map https://www.apcdcouncil.org)

METHODS / DATA STRUCTURE

HealthFacts RI must be accessed through a secure computing environment following approval from the Rhode Island Department of Health. HealthFacts RI contains de-identified data on longitudinal health claims for all insured patients (both publicly and privately) in the state of Rhode Island from 2011-2016. Each de-identified patient contained a unique record identifier (ID) that was generated by the data de-identification center, Lockbox Services Vendor. Owing to substantial file size, the database is broken down into 33 tables containing information on insurance, medical procedures (ICD-9-CM, HCPCS, CPT, HIPPS) and diagnoses (ICD-9-CM), pharmacy data, and provider data. Specific variables can be merged into an analyzable, consolidated table using a general purpose programming language, such as Julia or Python, based on the unique ID and on timing of service rendered. HealthFacts RI's contents and potential workflow are summarized in Figure 2 below.

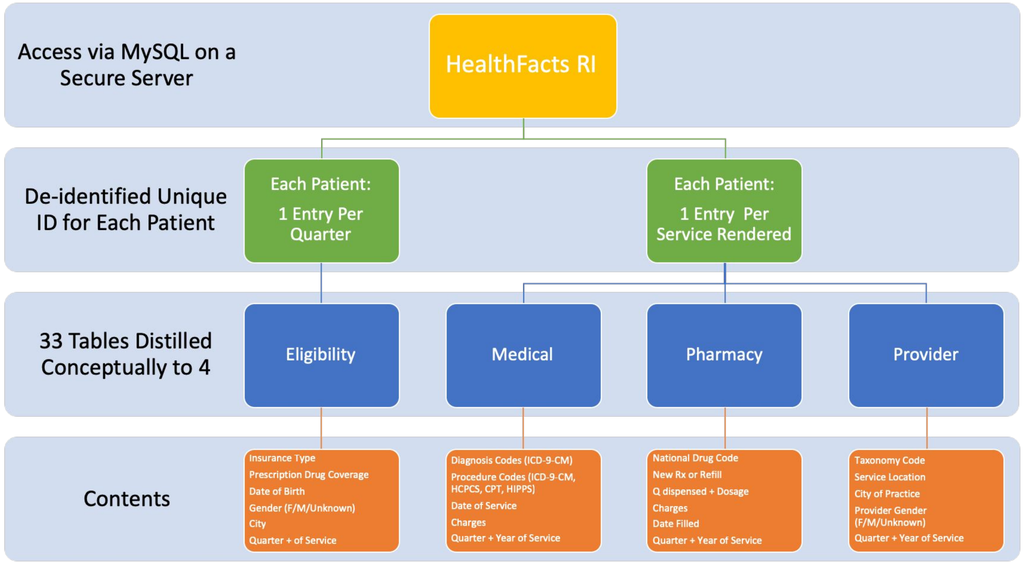

Figure 2: Consolidated Blueprint of HealthFacts RI, Rhode Island's New All-Payer Claims Database.

RESULTS AND FUTURE DIRECTION

A case study examining surgical versus non-surgical management of juvenile osteochondrosis conditions will be conducted with HealthFacts RI once it is made available by the Rhode Island Department of Health for use at our institution. Juvenile osteochondroses are a family of common ischemic bone and cartilage diseases (often subacute) affecting the joints of children and adolescents undergoing bone development.[7] When inadequately managed, severe cases lead to secondary pathological outcomes such as fragmentation, collapse, sequestrum formation, and chronic pain.[7] There is a paucity of research that synthesizes the various treatment modalities of the disorders and evaluates their differential impact on broad patient groups. A pre-analysis was performed using ICD-9-CM diagnosis codes for juvenile osteochondroses (excluding vertebral distribution) with the 2012 National Inpatient Sample. In-hospital osteochondrosis patients were found to be largely affected in the hip and lower extremity, most commonly undergoing hip arthroplasties as well as limb lengthening and shortening procedures, which may reflect the increased severity of having such conditions in areas of greatest anatomical weight distribution. For use of HealthFacts RI, patients with initial diagnoses in years 2011-2013 will be examined to allow for a standardized 3-year follow up (years 2014-2016).

DISCUSSION

While APCDs like HealthFacts RI offer exceptional potential, they carry potential limitations. For example, HealthFacts RI does not include information on patients without health insurance. Additionally, claims data may not provide complete information on all of patients' injuries and conditions—careful analysis should be employed. ICD-9-CM is limited in its granularity of many condition classifications compared to ICD-10-CM. However, APCDs confer an ability to analyze specific and possibly rare outcome measures while controlling for a variety of patient characteristics. Various outcomes occur over the course of years, or as a summation of multiple health events—thus, having the ability to evaluate cases longitudinally and without the bounds of an inpatient stay will provide a substantial opportunity for insightful analyses.

CONCLUSIONS

Although clinical understanding has benefitted from use of large databases, lack of data available for follow up on patients' long-term health outcomes may result in incomplete conclusions with a variety of database study types. APCDs confer the advantage of examining cost, medication usage, and acute and chronic outcomes in the context of health insurance coverage, provider type, and patient demographics. For conditions such as juvenile osteochondroses that typically evolve over the course of months or years, HealthFacts RI may provide a meaningful modality to objectively evaluate efficacy of various interventions.

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