A Retrospective Cross Sectional Analysis of Asthma, Hypertension, and Diabetes Emergency Encounters in Philadelphia; New Insights for Community Health Needs Assessments

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BACKGROUND

Community Health Needs Assessments and the developed strategies corresponding to any findings provide opportunities to improve the health of communities by targeted, coordinated efforts to meet the community needs. Thomas Jefferson University Hospital's 2016 Community Health Needs Assessment utilized numerous data sources: the Public Health Management Corporation's (PHMC) household health survey, secondary data and literature sources, ninety internal and external experts and representatives of healthcare and community based organizations knowledgeable of health and social conditions within the communities, and focus groups. The data used for the CHNA was found to have data gaps pertaining to the health status of immigrant populations due to language barriers within surveys utilized.

Large amounts of electronic patient-specific information are generated, exchanged, and stored capturing data pertaining to all aspects of care (diagnosis, medication, laboratory test results and radiological imaging data. There is much potential for the mining of EHRs for establishing new patient-stratification principles, revealing unknown disease correlations, identifying patient risk factors and better understanding populations as a whole as the data is clinically originated.

Unfortunately, typically large amounts of patient data are scattered, heterogeneous, and difficult to access to assess. The HealthShare Exchange (HSX) is the health information exchange within the Greater Philadelphia region. HSX engages providers, health systems and health plans in securely sharing patient information, working to ensure interoperability between health information systems of its members. The HSX does this through linking the electronic medical record systems of its members to enable accessibility at inpatient and outpatient points of care and for care management.

Project Goals

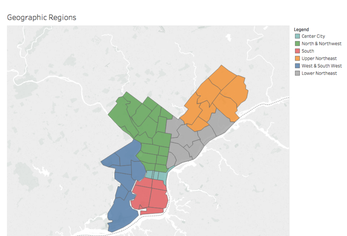
- To identify disparities of the following indicators present within the adult population within the city of Philadelphia: asthma, hypertension, diabetes without complications, diabetes with complications between race/ethnicities in emergent encounters.
- To investigate the HealthShare Exchange's Clinical Database Repository use for community health needs assessments and population evaluations.

METHODS

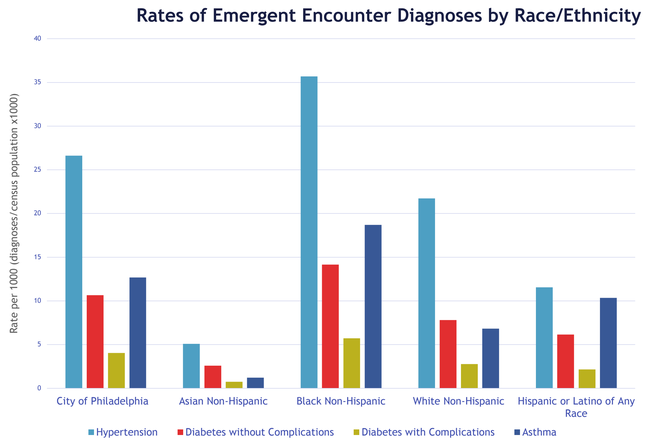
This analysis uses data from the HealthShare Exchange (HSX), the health information exchange within the greater Philadelphia region. The data were mined via an SQL query of the HSX Clinical Data Repository over selective criteria: (1) within the calendar year 2017, (2) within the emergent patient class (emergent encounters), (3) within the over age 18 during their encounter date population, and (4) encounters carrying the Health Care Utilization Project's (HCUP) clinically relevant diagnosis grouping were used to group diagnoses related to hypertension, asthma, diabetes mellitus without complications and diabetes mellitus with complications.

The sample population was then narrowed to patients to the adult population (as defined by 18-105 years of age), to the Philadelphia zip codes, and to the encounters with complete sets of information (gender, age, ethnicity label, zip code, and patient class).

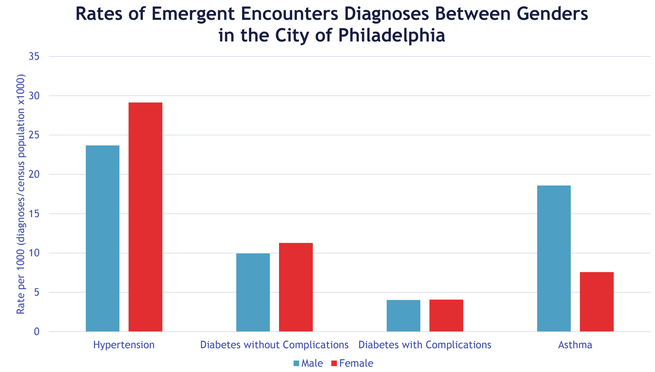
For analysis, sample was evaluated using IBM's SPSS statistical software using descriptive statistics and comparison analysis for statistically significant differences. Excel was used to perform two sample z-test to determine significant differences between rates of diagnoses. Excel was used to complete risk ratios comparing found values to the City of Philadelphia rates and the White Non-Hispanic Population. The sample was geographically organized loosely into the planning districts of Philadelphia by zip code. Due to small sample sizes found within the planning districts, the planning districts were grouped according to the following:



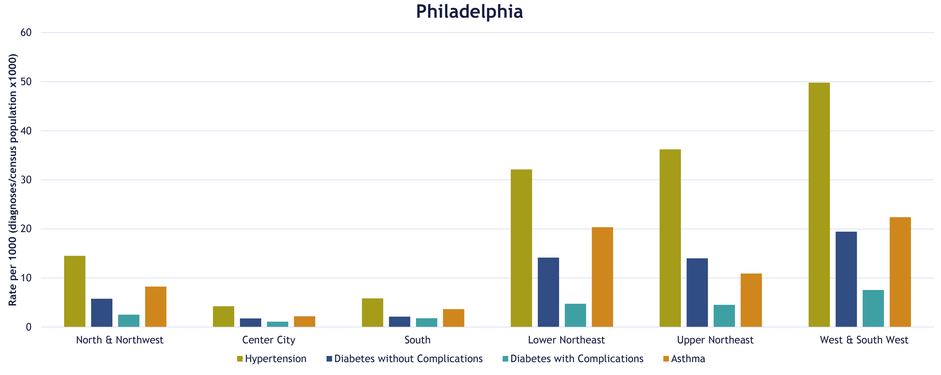
RESULTS



There were significant differences found between race ethnicity pairings in the rates of diagnoses. The Black Non-Hispanic has the most diagnoses for all of the conditions analyzed. The Asian Non-Hispanic population had the least diagnoses for all of the conditions analyzed.



There were significant differences between genders in the city of Philadelphia when comparing rates of asthma and hypertension diagnoses. The differences between diabetes with and without complications was not significant.



There was significant variability seen when comparing rates of the diagnoses between geographical areas within the city of Philadelphia between all diagnoses.

DISCUSSION AND NEXT STEPS

Conclusions

The following findings of this study are consistent with the previous Jefferson Health Community Health Needs Assessment:

(1) the rates of adult hypertension were seen to be highest in the Black Non-Hispanic population and lowest in the Asian Non-Hispanic population, and

(2) the Black Non-Hispanic adult population was seen to have the highest rates of diabetes and Asian Non-Hispanics the lowest.

The magnitude of the differences in rates may stem from cultural differences of emergency department use by the different race/ethnicities. This study provides deeper assessment of the health status of the Asian Population, which had been identified as a significant gap of data within the Jefferson Health Community Health Needs Assessment.

Limitations

Limitations of the study originate with the data source being utilized. The HealthShare Exchange's Clinical Database Repository, while containing timely and provider supplied information have the following limitations:

- A non complete source of encounters provided in the year 2017 as not all healthcare facilities in the City of Philadelphia were contributing data to HSX for the entire time frame.
- The data source has not undergone validity testing for its representativeness.
- The data source does not delineate primary versus secondary diagnoses.

Limitations to this study are also due to the study design:

- The study was limited to emergent encounters which excludes inpatient and ambulatory encounters.
- The study was limited via the selection criteria and the fields used to identify counts. For example, only coded information was used to perform this analysis. There is a likely possibility that uncoded diagnoses occurred within the sample set that may have underrepresented the results.

Proposed Changes and Next Steps

In the exploration of a novel data source in support of Community Health Needs Assessments, this analysis showed promise of the utilization of "big data" sets for this purpose. This study showed there were significant health disparities within race/ethnicities, genders (for hypertension and asthma diagnoses), and geographic locations, which will provide support different targeted interventions in the area. With the addition of primary care facility data to the large dataset, the HealthShare Exchange's Clinical Database Repository shows promise in the assessment of health indicators derived from clinical information. Future research is needed to better assess the data source for completeness.

CORE COMPETENCIES

This project includes the following core competencies: Analytical and Assessment Skills, Policy Development/Program Planning Skills, Communication Skills, Cultural Competency Skills, Community Dimensions of Practice Skills, Public Health Science Skills, Financial Planning and Management Skills, Leadership and Systems Thinking Skills,

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