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Estimating the Economic Burden of Hypertension in Mississippi

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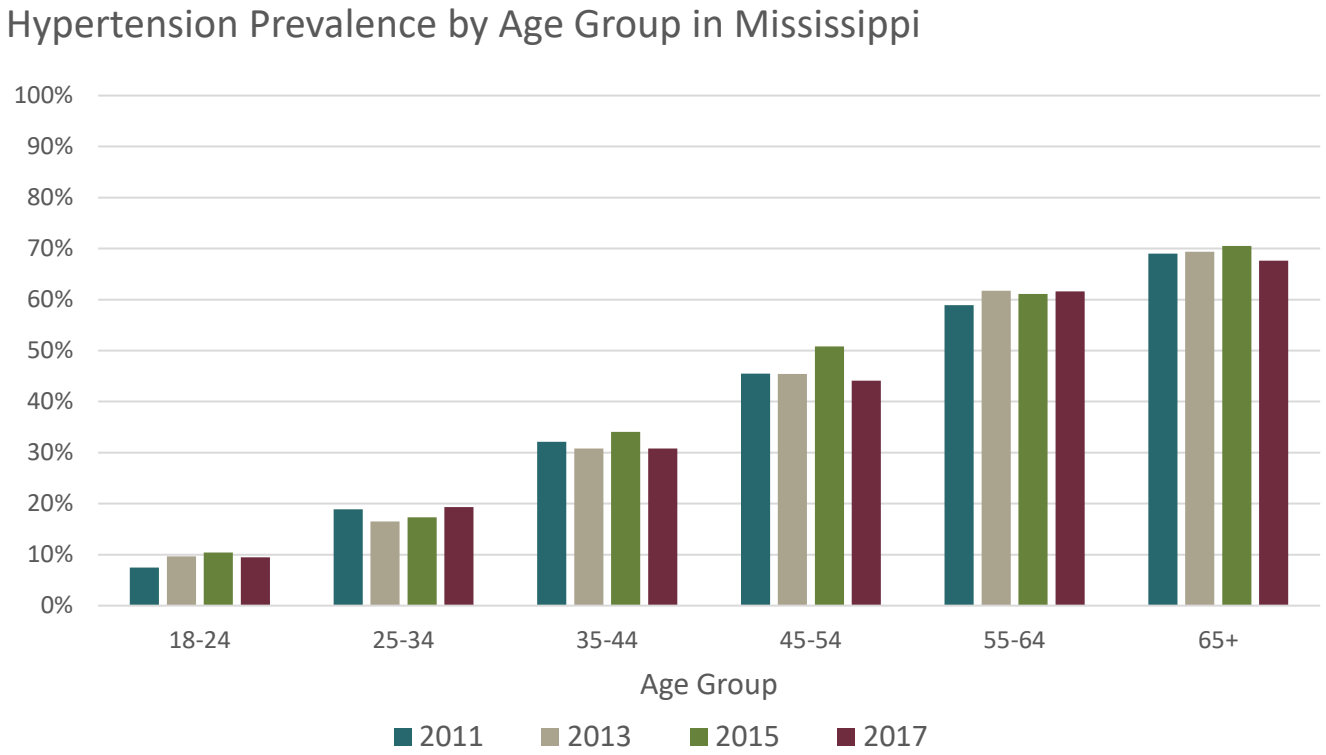
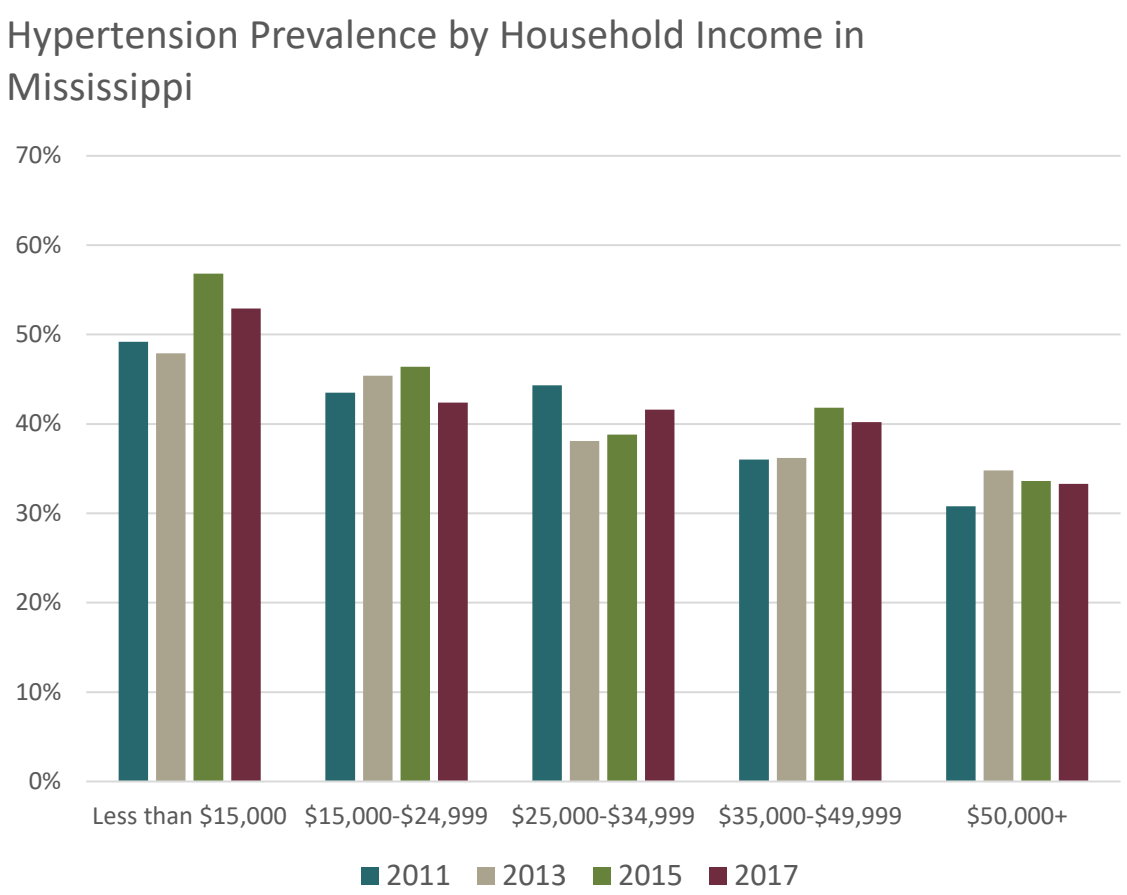
Hypertension Prevalence

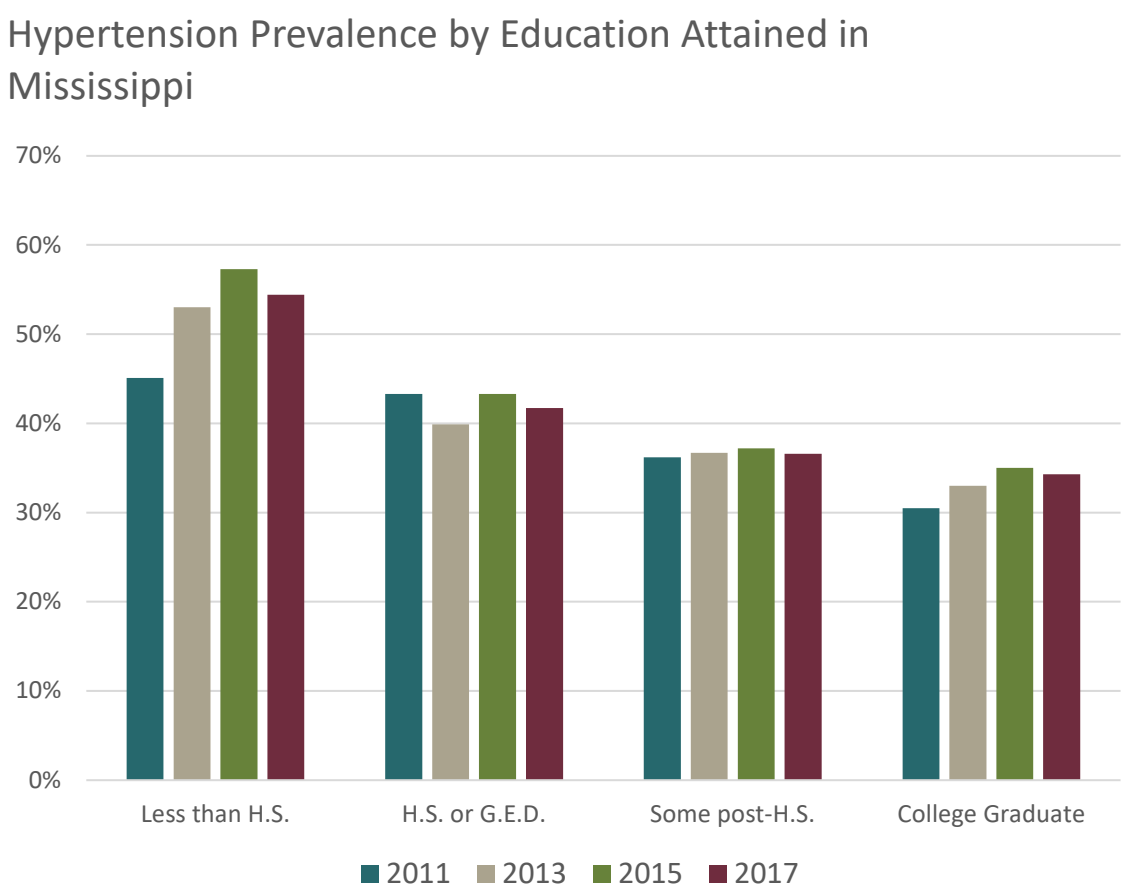
- Hypertension, also known as high blood pressure – a condition in which the blood vessels have persistently raised pressure (WHO)



Source: Behavioral Risk Factor Surveillance System

Hypertension Prevalence





Source: Behavioral Risk Factor Surveillance System

Estimating the Economic Burden

- Goal of study
  - Direct medical expenditures attributable to hypertension
  - Cost of burden, or the indirect cost due to absenteeism and disability
- Methods used
  - Prevalence-based approach
  - Regression analysis using Stata
- Outcome
  - Better understanding of the burden this chronic health condition places on the state’s economy

Direct Medical Expenditure Data

- Medical Expenditure Panel Survey (MEPS)
- Historical trends – 2015-2017
- Utilized 99% of data due to unexplained outliers
- Data Summary Statistics
  - Number of observations: 71,543 from weighted MEPS combined surveys (population 719,073,610)
  - High Blood Pressure Diagnosis
    - No: 47,796
    - Yes: 23,734 (33.2%)
  - Explanatory variables controlled for socio-economic, health status, and risk factors (region, gender, age, race, marital status, education, income, ethnicity, insurance coverage, health status, other illnesses/diseases)

Direct Medical Costs to Consumers

- Direct Medical Cost Estimation Model
  - Survey weights and variance estimations
  - Two-part model – used to account for excess number of reported zero expenditures
    - First part Probit
    - Second part OLS Regression
  - Log transformation – used to control for skewed data
  - Duan smearing – used to transform margins
  - Bootstrapping – 2,000 replications used to correct standard errors after log transformation

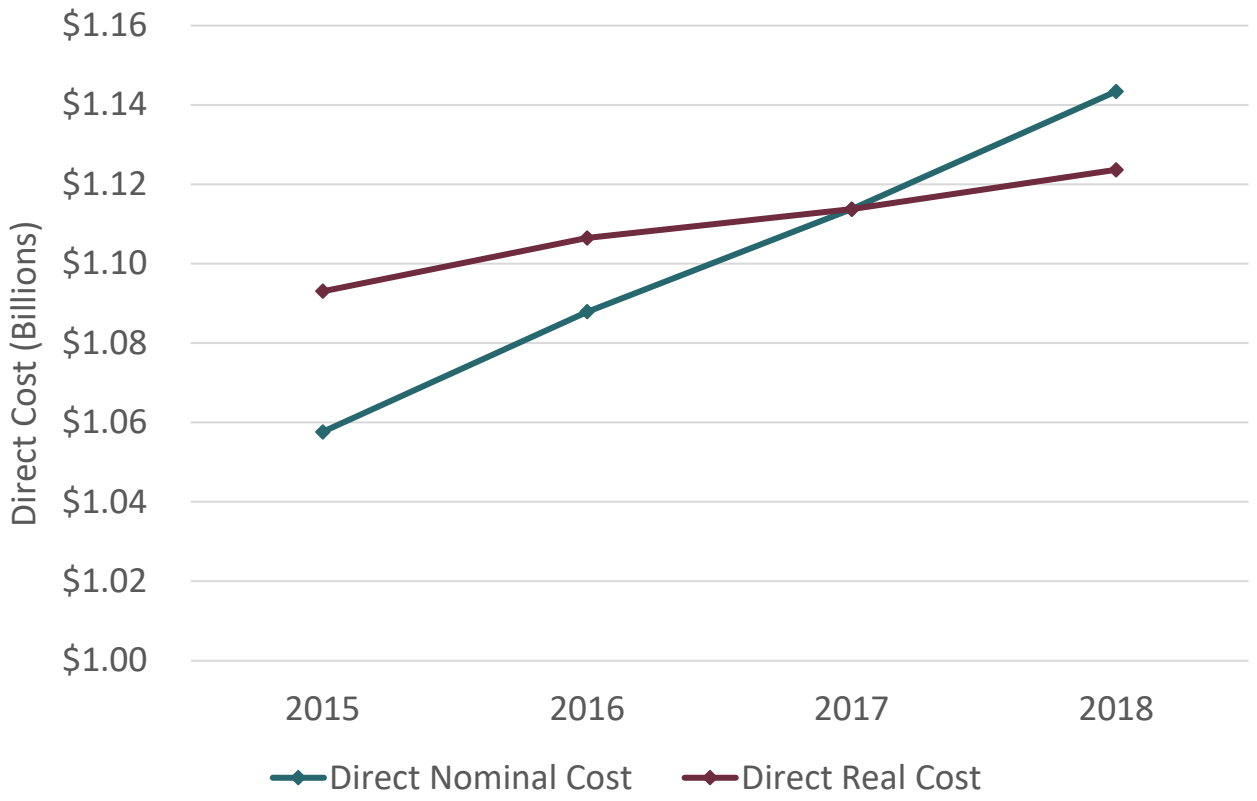
Direct Medical Costs to Consumers

- First part: Probit
  - All illnesses/diseases increase probability of positive expenditures
  - As perceived health status decreases from “Excellent” to “Poor,” the probability increases
  - Higher education status results in a higher probability
- Second part: Regression Log
  - Effect of hypertension = 18.5% higher expenditures
  - Differences across race
- Margin
  - Effect of hypertension = $1,217.98

Annual Medical Expenditures by Age Group and Year Attributable to Hypertension in Mississippi

Age Group	2015	2016	2017	2018
18-24	$ 30,234,730	$ 34,957,240	$ 35,154,204	$ 35,456,246
25-34	$ 88,345,153	$ 90,044,981	$ 91,466,497	$ 92,991,431
35-44	$ 135,238,004	$ 136,983,618	$ 138,672,704	$ 141,587,411
45-54	$ 205,841,141	$ 205,680,738	$ 206,211,412	$ 206,749,577
55-64	$ 267,482,205	$ 274,860,568	$ 282,403,016	$ 290,024,507
65+	$ 330,478,970	$ 345,372,564	$ 359,828,138	$ 376,578,770
Total	**$ 1,057,620,204**	**$ 1,087,899,709**	**$ 1,113,735,970**	**$ 1,143,387,942**

Hypertension Prevalence and Direct Cost



Average real % increase = 0.925%
Average nominal % increase = 2.633%

Sources
Price Indices: Agency for Healthcare Research and Quality, https://meps.ahrq.gov/about_meps/Price_Index.shtml
Population Data: US Census Bureau
Direct Costs: Estimated

Costs of Absenteeism

- Absenteeism – the number of days missed from work due to the adverse health conditions
- Data obtained from the National Health Information Survey (weighted survey)
- OLS regression with multiple imputations for family income
  - Missed Workdays = f(Socio-economic factors, chronic diseases and conditions)
- Hypertension is estimated to account for 1.41 days of missed work per year
  - Given a 2019 hypertension prevalence of 40.6% for adults, this results in 695,938 days missed or 1,907 man-years
- Hypertension absenteeism burden on businesses with average total earnings (wages and supplements) of $48,607 per year per worker is **$92,693,549** per year in productivity costs to business

Costs of Disability

- Disability – being unable to participate in the labor force due to the adverse health condition or its associated co-morbidities
- Data obtained from the National Health Information Survey (NHIS)
- Logistic regression
  - P(Disability) = f(Socio-economic factors, chronic diseases and conditions)
- Persons with hypertension are 1.19% more likely to be disabled
  - Calculations based on age-specific prevalences (Behavioral Risk Factor Surveillance Survey) and disability proportions (NHIS)
  - Average total earnings of $47,595 from EMSI (proprietary economic dataset)
- The economic burden of disability due to hypertension results in lost wages of **$379,189,365** per year

Conclusions

- Further work to be done in the mortality and presenteeism areas
- Hypertension results in the following economic costs
  - Direct medical costs to consumers – $1,143,387,942
  - Indirect costs to employers due to absenteeism - $92,693,549
  - Indirect cost of lost wages due to disability - $379,189,365
- While direct medical costs can be viewed as a transfer of funds from consumer purchasing to healthcare, hypertension exacts a large toll on the Mississippi economy
- Previous research indicates that education is the most effective strategy in addressing chronic disease/condition issues
- Improving local nutrition and physical environments