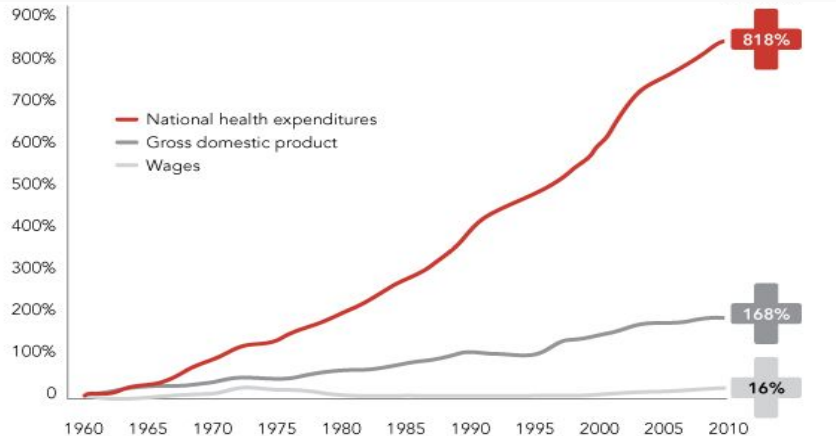# Medical Expenditure Analysis: Mood Disorders

Ben MacNeille

Health Care $$$ on the Rise

- Health Care Spending Rate of Increase (v. GDP and Wages)

- Health Care Spending (%GDP)

900%
800%
700%
600%
500%
400%
300%
200%
100%
0

— National health expenditures
— Gross domestic product
— Wages

818%
168%
16%

1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010

Sources: McKinsey, "Accounting for the Cost of U.S. Health Care" (2011), Center for American Progess

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2009
17.3%
16.2%
2008
13.8%
12.4%
9.1%
7.2%
5.2%

20

15

10

5

0

1960 '70 '80 '90 2000 '10 '20

Health Care Financing Review, Centers for Medicare and Medicaid Services

Industry Response

- Economic Transition

Fee-for-Service ➡️ Pay-for-Performance

Increase Preventative Care, Lower Costs

- Medical event type may indicate performance
- Avoid severe illness and costly events

Industry Response

- Economic Transition

Fee-for-Service ➡ Pay-for-Performance

Increase Preventative Care, Lower Costs

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Research Question: Which events are severe and costly?

Medical Event Types

Hospital
stay > 24 hrs

Hospital
stay < 24 hrs

Office-Based

Household
Visits

Medical Expenditure Panel Survey

Hospital stay > 24 hrs

Hospital stay < 24 hrs

Office-Based

Household Visits

Survey Components

Medical Classifications

- 760 Medical Classifications
- Prevalent Classifications:
    - Hypertension
    - Lipid metabolism diseases
    - Joint Disorders
    - Mood Disorders
    - General Symptoms
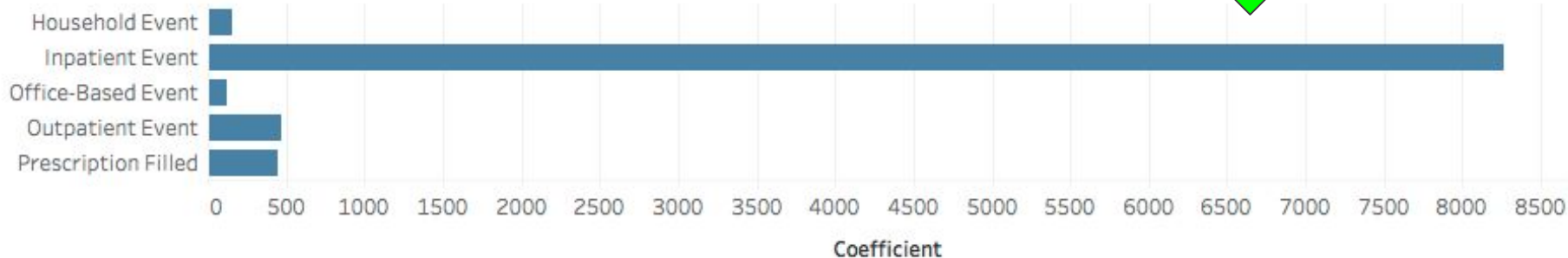   - Acute nasopharyngitis

Medical Classifications

- 760 Medical Classifications
- Prevalent Classifications:
  - Hypertension
  - Lipid metabolism diseases
  - Joint Disorders
  - **Mood Disorders**
  - General Symptoms
  - Acute nasopharyngitis

- Interesting candidate due to social stigma
- Average annual expenditures > $2,000

What types of care are responsible for expenditures?

Inpatient Events are costly...

- Linear Regression: Predict Total Costs
  - R^2 = 0.68 → Holdout Set
  - Inpatient Events comprised the largest coefficient

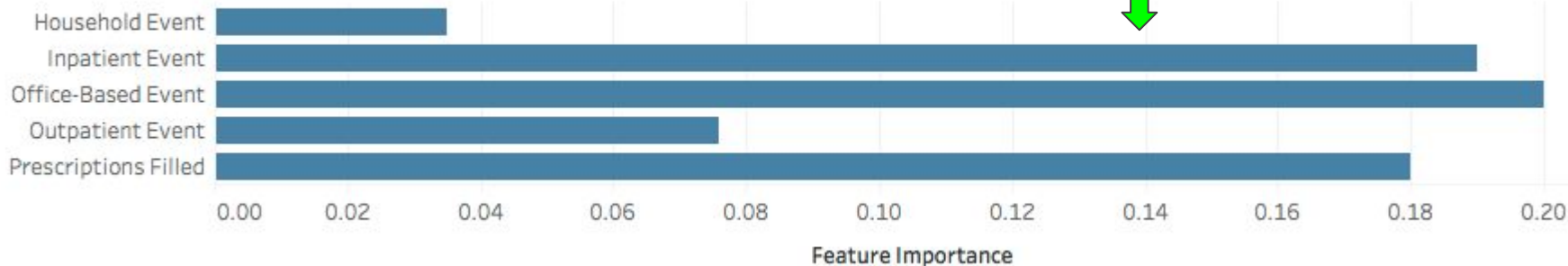# ...and a major source of entropy

- Random Forest Regressor: Predict Total Costs
  - OOB Score: 0.45
    - Score = 1 - (Model SSE / Constant Predictor SSE)
  - Inpatient Events among the important features

Inpatient Events

- Severe
  - Hospital stay > 24 hours
- Costly
  - ~$8,000 per event

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Future Questions:

- Age: younger respondents on average had an Inpatient Event

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Future Questions:

- Age: younger respondents on average had an Inpatient Event
- Office-Based Events: prior to Inpatient Event vs no Inpatient Event

Inpatient Events

- Severe
  - Hospital stay > 24 hours
- Costly
  - ~$8,000 per event

Future Questions:

- Age: younger respondents on average had an Inpatient Event
- Office-Based Events: prior to Inpatient Event vs no Inpatient Event
- Explore other features among the ~3,000 available

Thank You!

Ben MacNeille