Evidence-based Health Policy Making: Leveraging Large Healthcare Linkage Data

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US Medicare

- Medicare Part A, B, C: ≥65+disabled, 1966
- Part D, initiated in 2006, $92 billion in 2018
- Private market delivery; 20-35 plans/person
- Complex patient copayment
- Low-income subsidy

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US Medicare Data

- 2006-2016 5% random sample (2.5million)
  - Inpatient, physician, outpatient
  - Prescription drug events, insurance plan
  - Nursing home, home health, hospice
  - Physician and pharmacy characteristics
  - Zip code, provider id
- Secure remote server with applications (5TB)

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Evidence-Based Health Policy

- Examples:
  - Geographic variation in $ and quality
  - Impact of new funding and care delivery model
  - Simulate alternative policies
  - Individual response to complex incentives
  - Comparative risk and benefit
- Relevant to Australia
  - Value-based health care –value and incentives
  - Private health insurance
  - Post-market surveillance

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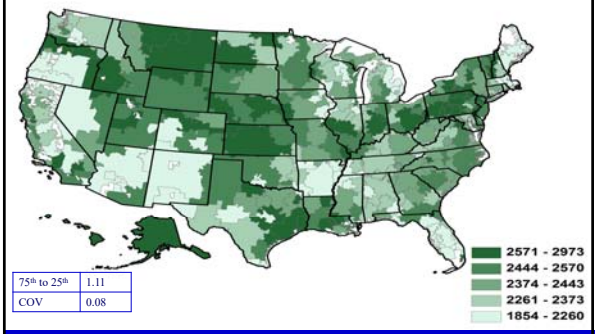
Geographic Variation in Medicare Pharmacy Spending



75th to 25th	1.11
COV	0.08

Source: Zhang, Baicker, Newhouse. *N Engl J Med.* June 9 2010

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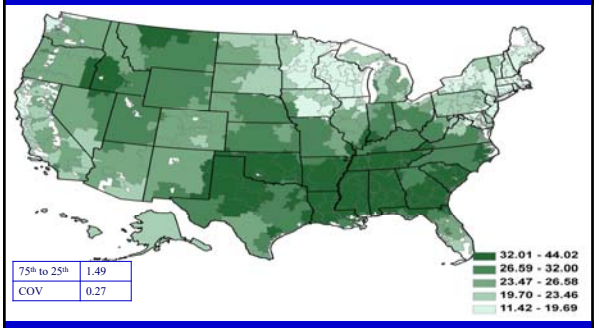
Geographic Variation in the Quality of Prescribing

Proportion Using High-Risk Drugs (Lower Scores Indicate Better Quality)



75th to 25th	1.49
COV	0.27

Source: Zhang, Baicker, Newhouse. *N Engl J Med* . November 3 2010

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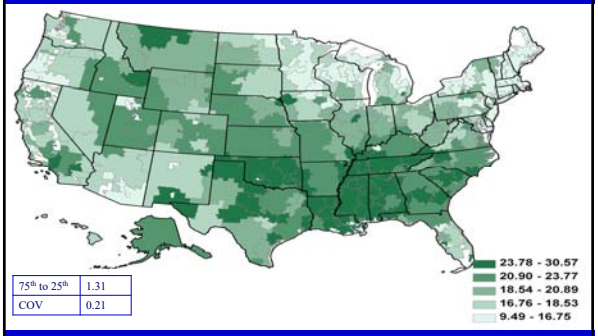
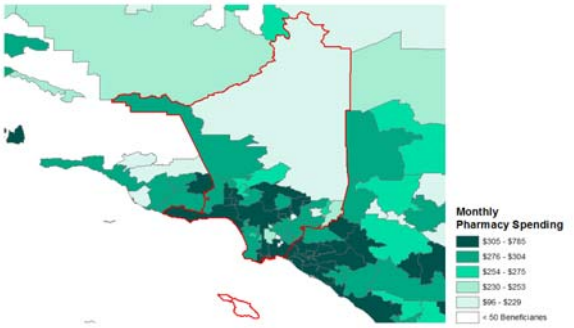
Geographic Variation in the Quality of Prescribing
Potentially Harmful Drug-Disease Interactions



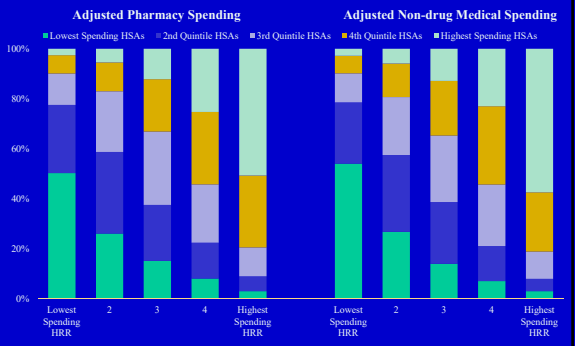
75th to 25th	1.31
COV	0.21

Source: Zhang, Baicker, Newhouse. *N Engl J Med* . November 3 2010

Geographic Variation in Adjusted Pharmacy Spending in Los Angeles, CA



Regional Analysis Masks Substantial Local Variation



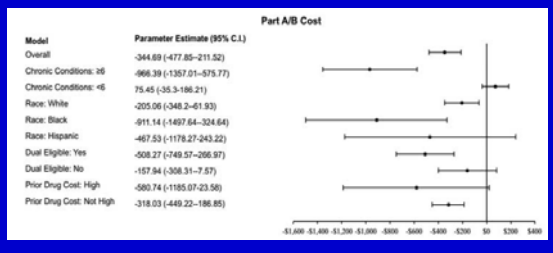
Source: Zhang, Baik, Fendrick, Baicker. *NEJM*. Nov 2012; 367(18): 1465-71

US Medicare Accountable Care Organizations (ACO)

- Provider: shared savings and risk
- Quality measures (31)
  - Preventive health
  - At risk population
  - Care coordination/patient safety (e.g., readmission, unplanned admission, ASC, EHR)
  - Patient/caregiver experience (e.g., communication, access, rating)
- Patient choice

Effects of Medicare ACOs on Medicare Spending

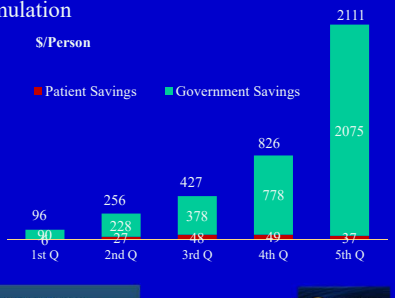
- Methods: diff-in-diff w propensity score
- Results: save non-drug $, no effects on drug $



Source: Zhang, Caines, Powers. *Medical Care*. 2017

$5 Billion Savings from Intelligent Assignment

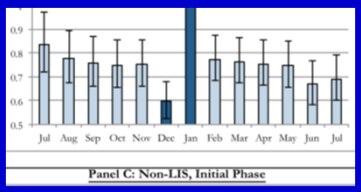
- Method: simulation
- Results:



Sources: Zhang, Zhou, Baik. *Health Affairs*. *2014*; Zhang, Baik, Newhouse. *Health Affairs* 2015, Zhou, Zhang. *Health Affairs*, 2012

Effects of Nonlinear Pricing

- Methods: triple difference, MI exogenous shock, January effect
- Results:



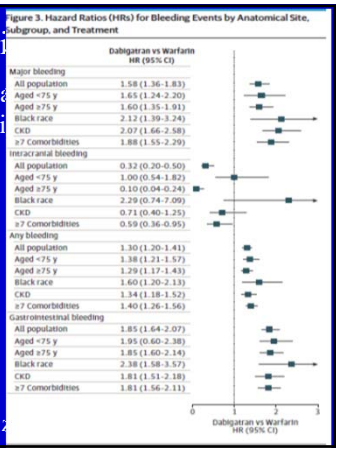
- Policy: smooth out benefit design, cover essential meds

Source: Kaplan and Zhang, *Health Economics*, Aug 2013

Risk of Bleedi

- Methods: Cox haza model with PS wei
- Results:
- Policy:

post-approval data



Source: Hernandez, He, Brooks, Z

Concurrent Opioid Use and Overdose Events

- Methods: Cox hazard model with time-dependent treatment group with adjustment
- Results:

Treatment Group	No. at Risk	Adjusted HR of Opioid-Related Overdose (95% CI)
Opioid use and no benzodiazepine use	50583	1 [Reference]
1-90 d with concurrent opioid and benzodiazepine use	3603	5.05 (3.68-6.93)
91-180 d with concurrent opioid and benzodiazepine use	2930	1.87 (1.25-2.80)
181-270 d with concurrent opioid and benzodiazepine use	4082	0.63 (0.37-1.05)
≥271 d with concurrent opioid and benzodiazepine use	10050	0.19 (0.11-0.33)

- Policy: prevent > reduce the length; # of prescribers

Source: Hernandez, He, Brooks, Zhang, JAMA Network Open, June 2018

Opportunities in Australia

- New linkage data and partnership with policy makers
  - VIC value-based healthcare
  - Integrated care model
- Improving prescribing and use
  - Prescription misuse, opioid
  - PBS copayment, value
- Precision health policy
  - Identify cohort
  - Big Data and predictive analytics