Variations in Procedure Use in California

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Study Goal

- Identify variations in key procedures across geographic areas in California
  - Focus on elective treatments and treatments sensitive to patient information
  - Target situations where “shared decisionmaking” could be useful

Methodology Highlights

- Population-level rates of use of a range of procedures for all of California
- Includes both hospital and, where appropriate, ambulatory surgery center (ASC) procedures
- All-payer data
- Includes patients under age 65
- Risk adjusted

Data

- OSHPD hospital discharge data
- OSHPD ASC encounter data

➡ Study data (2005-2009)

  – Generally focusing on patients age 20 and over, treated in acute care hospitals or ASCs

Finding Procedures

- Identify procedures of interest that meet identified specifications
  - Based on ICD-9 or CPT procedure codes
- In some cases, focus on patients with specific diagnoses
  - e.g., patients with diagnoses for which a treatment is likely to be “elective”

Study Treatments

Heart Procedures

- Elective coronary angiography
- Elective angioplasty (PCI)
- Elective coronary artery bypass graft (CABG)

Childbirth Procedures

- Elective cesarean section
- Elective induction
- Vaginal birth after cesarean

Joint Replacement

- Hip replacement
- Knee replacement

Women's Health

- Hysterectomy
- Mastectomy

Other

- Carotid endarterectomy
- Cholecystectomy (gallbladder removal)
- Weight loss surgery

Geographic Areas

- Assign each procedure to the geographic area in which the patient resides
  - Hospital Referral Region (HRR) – 22 in CA
  - Hospital Service Area (HSA) – 209 in CA

  Note: Area of residence is not necessarily the geographic area in which treatment is given but is often closely related

Area Measures

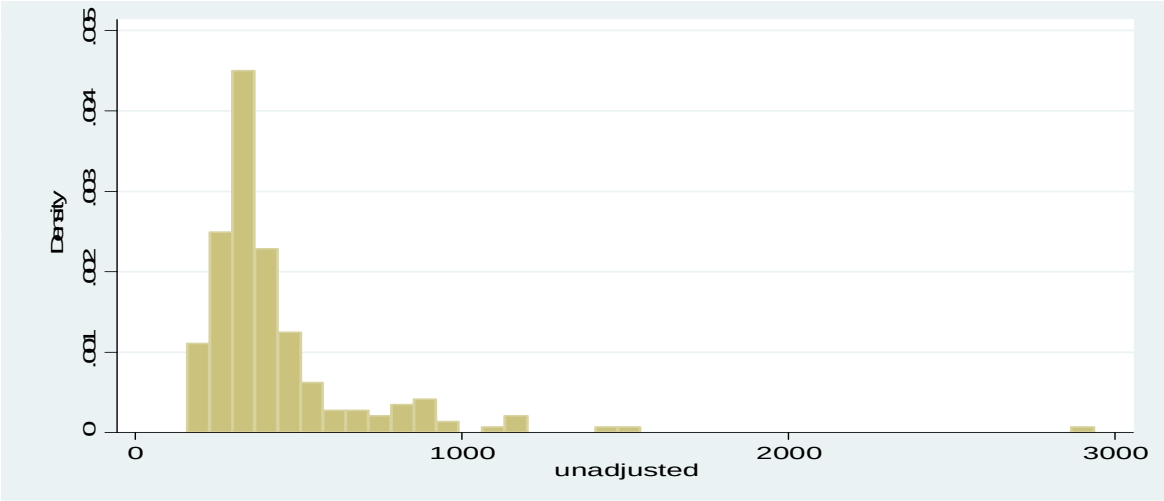
- Create rates of procedure use per population of the area
  - For birth measures, per delivery
- Rates only computed for areas where 15 or more procedures are observed
- Risk adjust for a range of characteristics
  - Variations across areas should not be due to factors included in the risk adjustment

Risk Adjustment

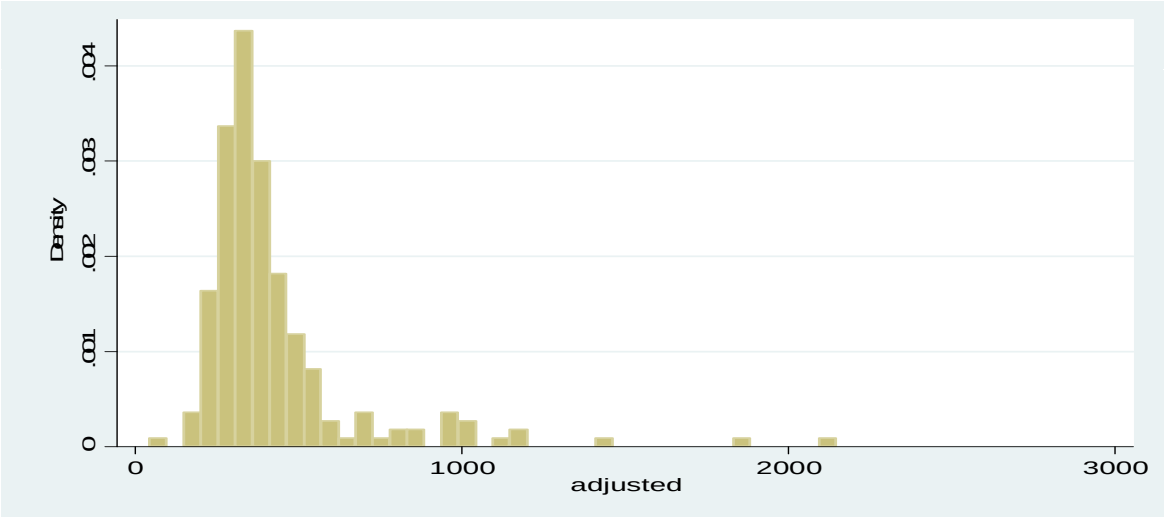
- Regression-based risk adjustment
- Risk adjusters
  - Age
  - Sex
  - Race/ethnicity
  - Education
  - Income
  - Insurance coverage
  - AMI hospitalization rate*
  - Rate of hospitalization with diabetes diagnosis*

*Used with treatments for which these are relevant risk adjusters

Effects of Risk Adjustment



standard deviation = 281



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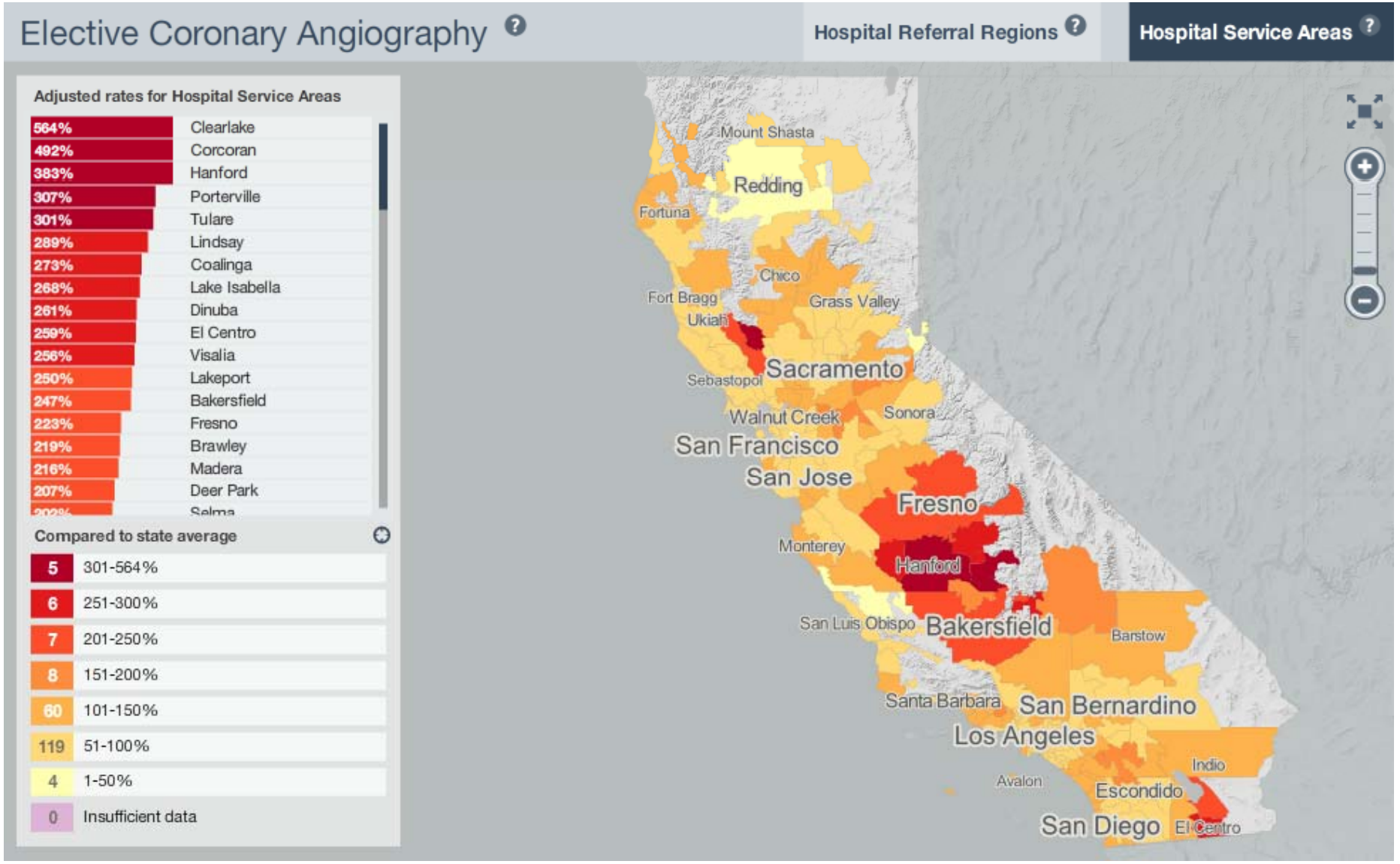
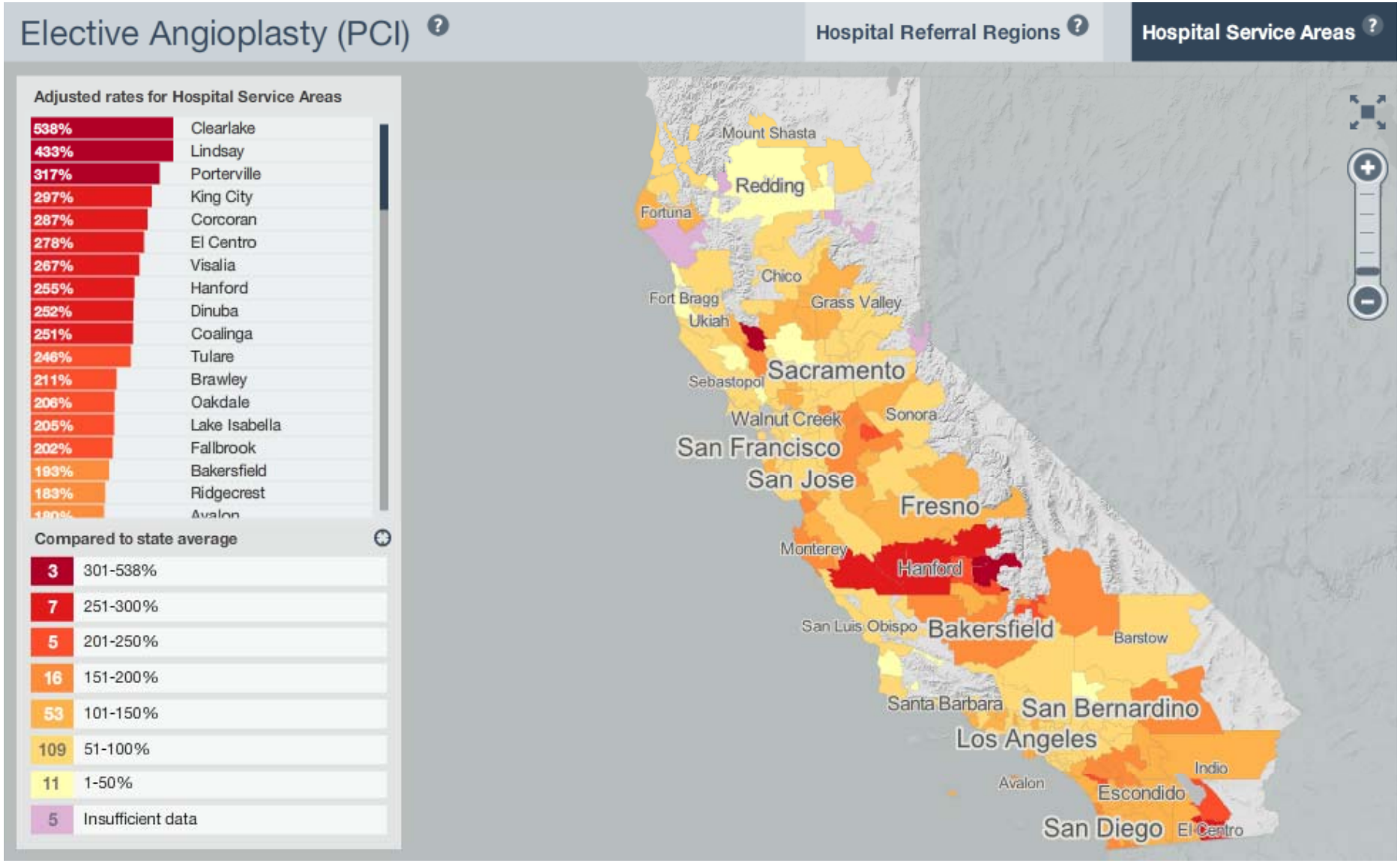
Presentation and Precision

- Rates often expressed relative to the state average
  - e.g., an area may be 200% of the state average – twice as high
  - e.g., an area may be 50% of the state average – half as high
- Statistical precision information available online
  - 95% confidence intervals for risk adjusted rates



Screenshot from: http://www.chcf.org/publications/2011/09/medical-variation-rates-california



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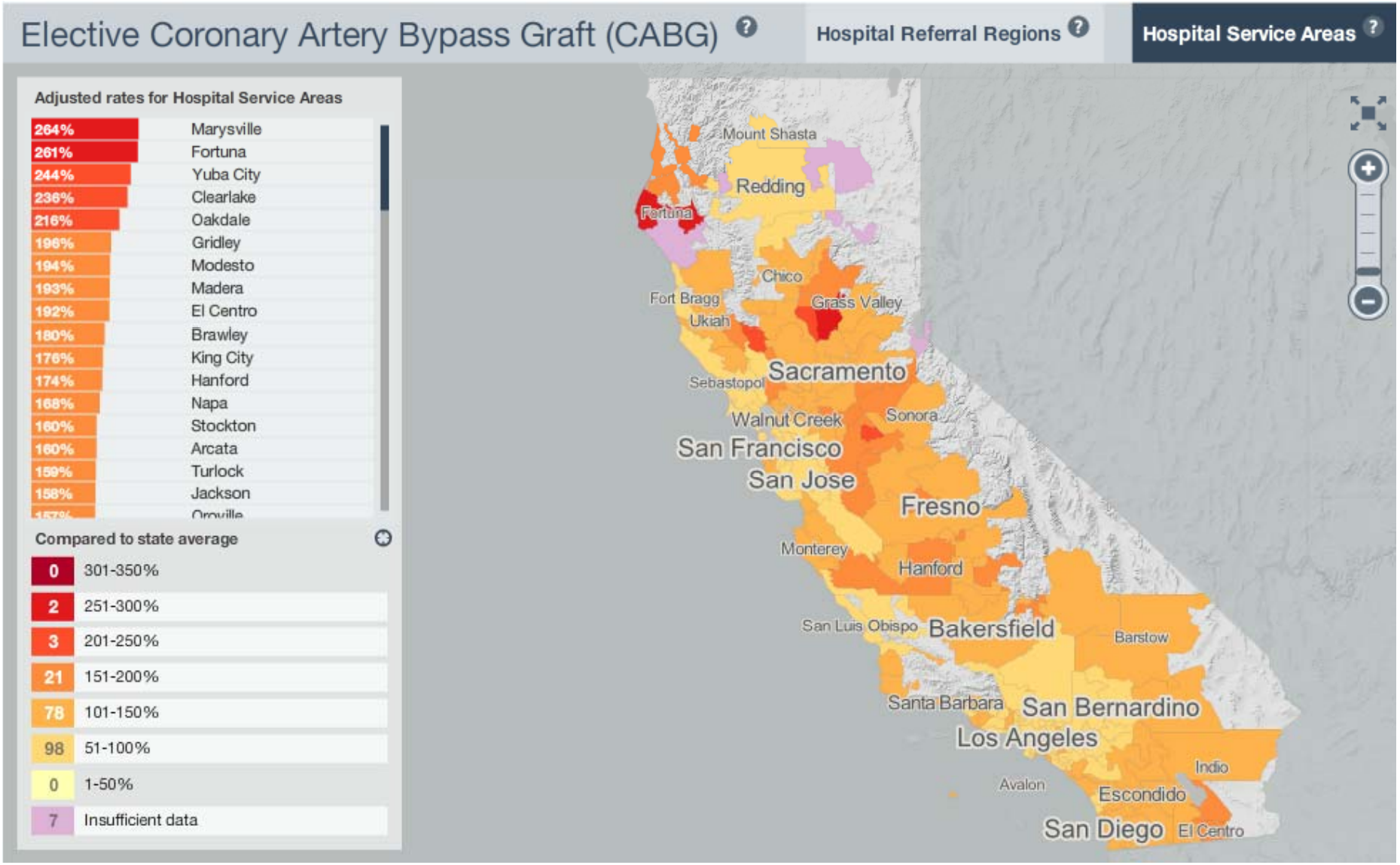

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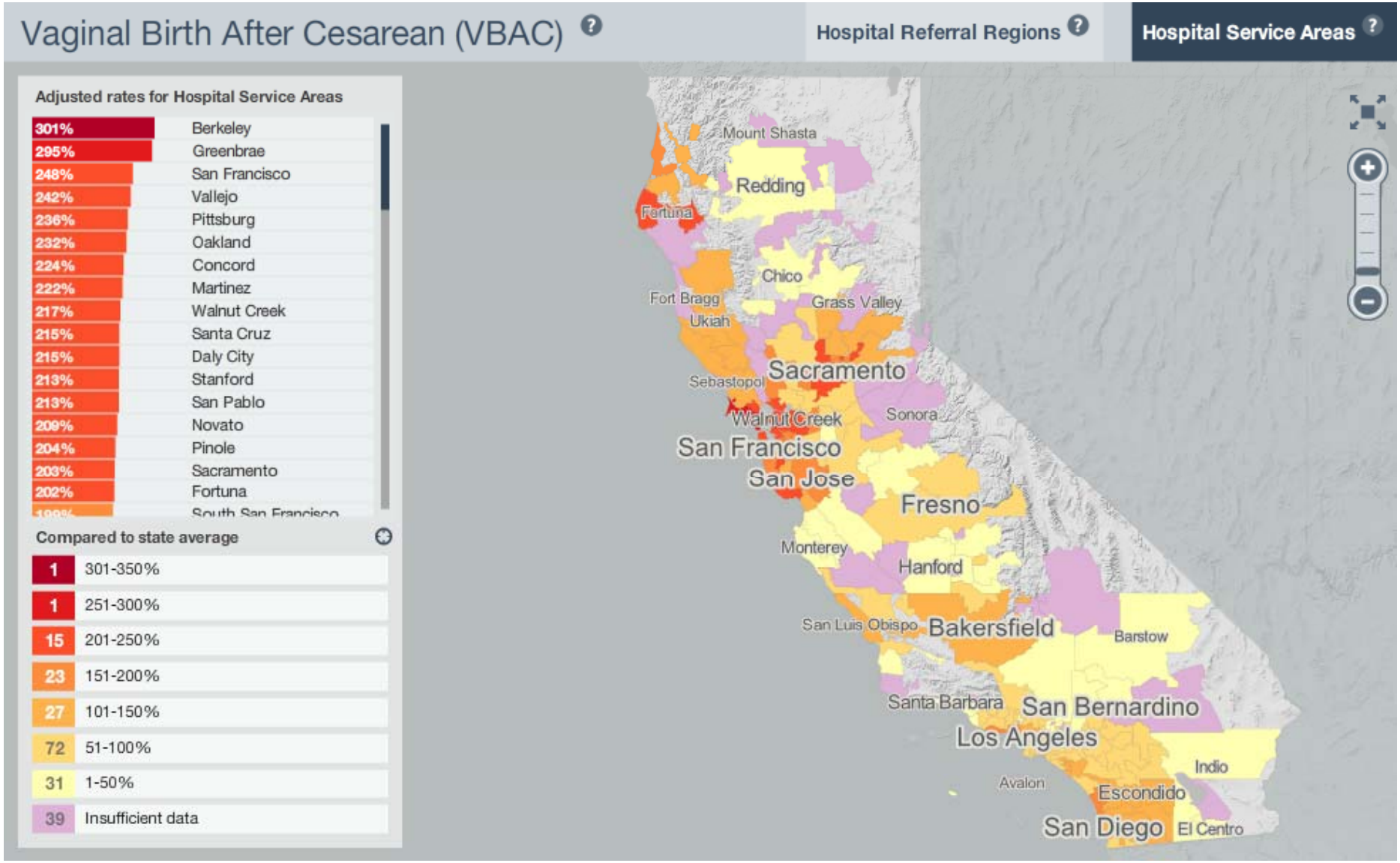

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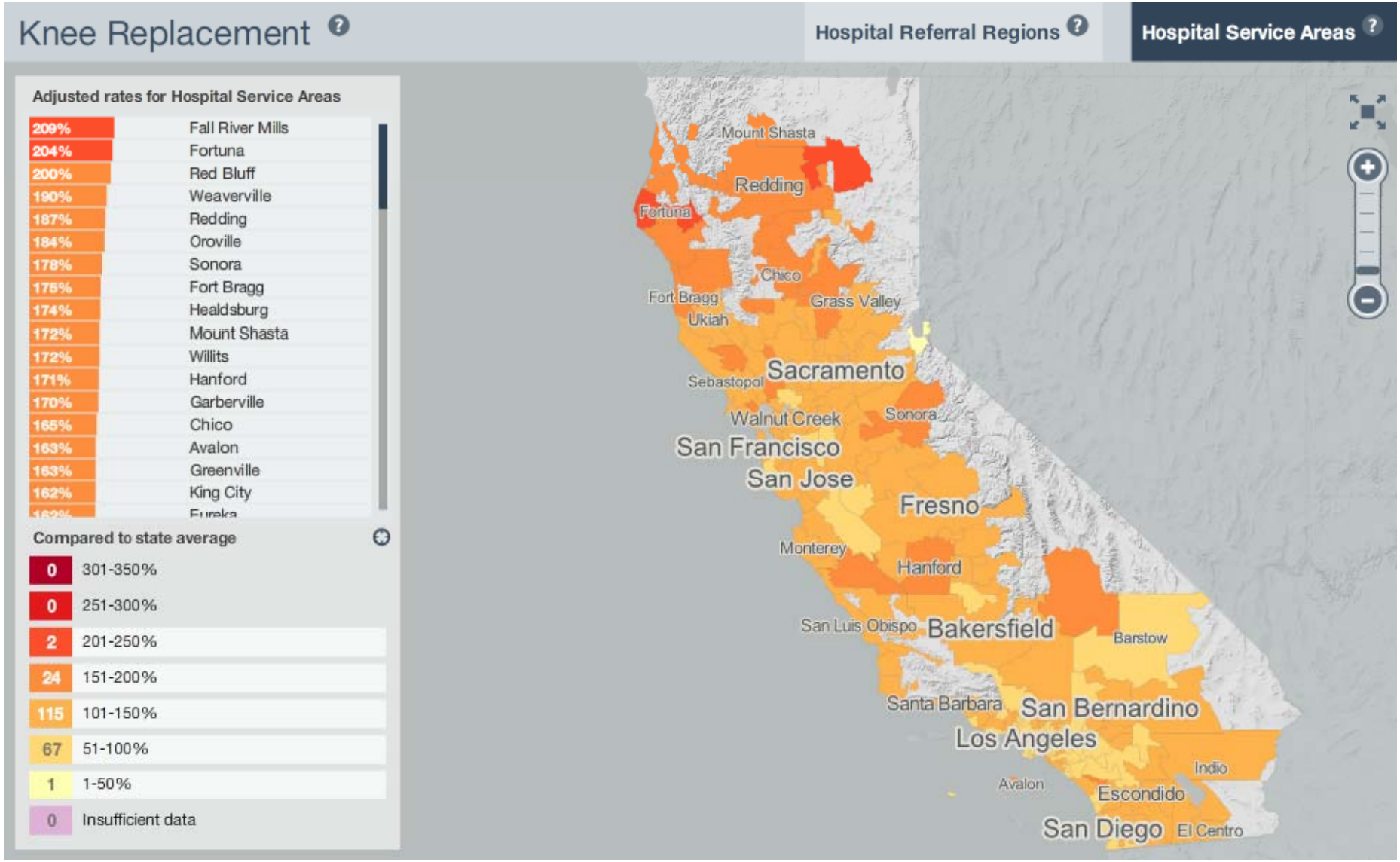


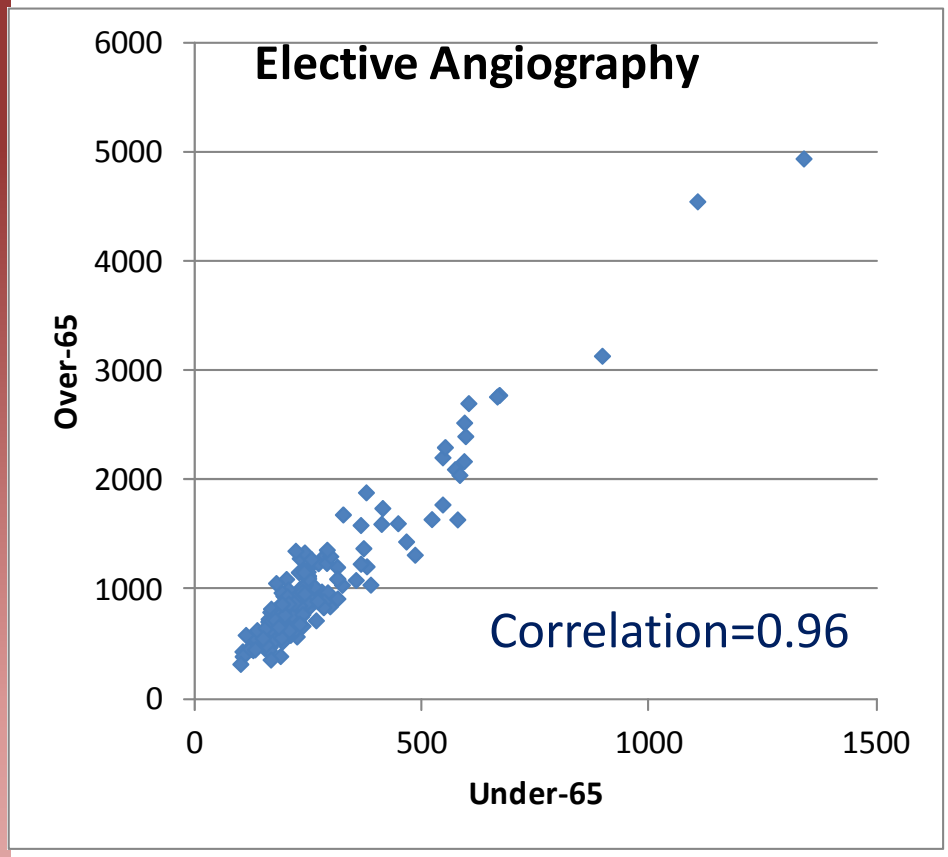
Screenshot from: http://www.chcf.org/publications/2011/09/medical-variation-rates-california

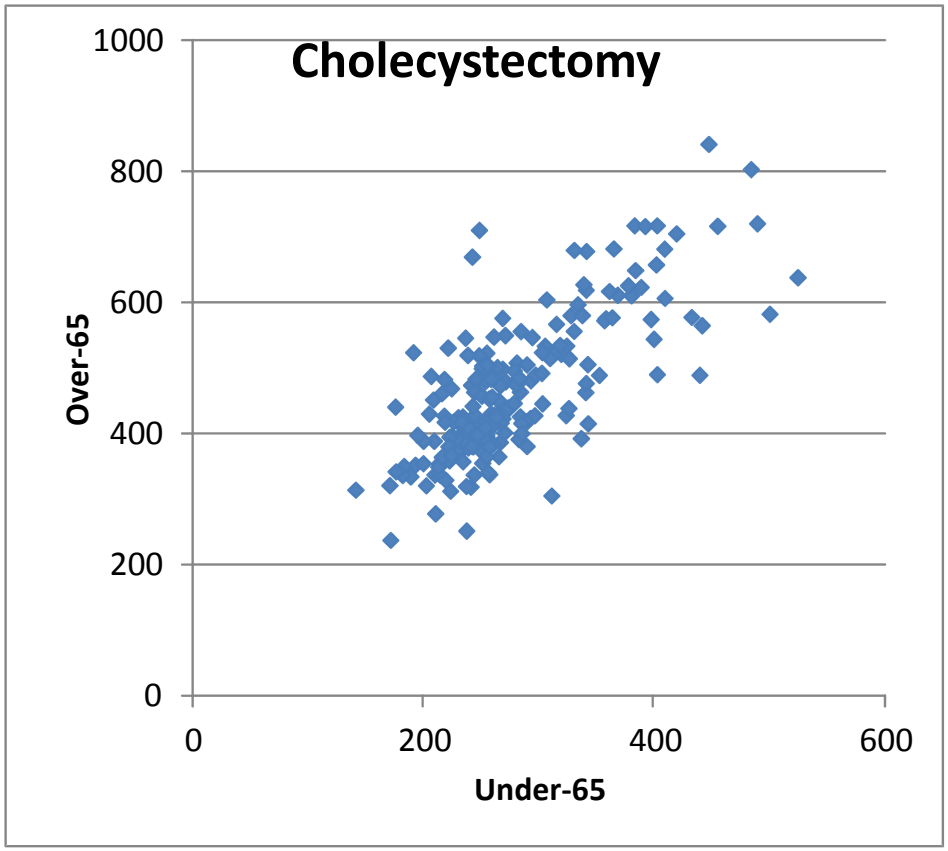
Variation in Procedure Rates Across 209 California HSAs (Rates per 100,000)

Measure	Median	10th Percentile	90th Percentile	Ratio
Elective angiography*	354	251	690	2.75
Elective PCI*	93	59	174	2.96
Elective CABG	40	30	62	2.09
Cesarean	16263	13217	21331	1.61
Elective Induction	8262	5108	12359	2.42
VBAC	7390	3037	17476	5.75
Total hip replacement	87	63	111	1.76
Total knee replacement	179	133	246	1.85
Cholecystectomy*	293	239	414	1.73
Carotid Endarterectomy	33	22	51	2.32
Hysterectomy	316	238	490	2.06
Unilateral mastectomy	41	28	55	1.96
Weight loss surgery*	13	7	25	3.50
Hospitalization with hip fracture	105	89	126	1.41

*Combines hospital and ASC data

Variation in Patterns for <65 and >65 Populations





Variation in Patterns for <65 and >65 Populations (2)

Measure	Under-65 Median	Over-65 Median	Correlation
Elective angiography*	207	796	0.96
Elective PCI*	52	213	0.93
Elective CABG	18	106	0.71
Total hip replacement	49	283	0.57
Total knee replacement	81	674	0.73
Cholecystectomy*	259	446	0.75
Carotid Endarterectomy	8	162	0.64
Hysterectomy	356	139	0.68
Unilateral mastectomy	29	92	0.65

*Combines hospital and ASC data

Note: Insufficient data to compute correlations for c-section, induction, VBAC, and weight loss surgery

Conclusions

- Significant variation across areas in CA observed in a range of procedures
- Variation more in some procedures than others
- Under and over-65 rates are often correlated

Interpretation

- What rate is right?
  - We are often concerned about overutilization
  - But, underutilization is also possible
- Actions: Many possible approaches to reducing variation