



The Impact of Regional Health Services Research on Health and Health Care A Pediatrician's View

David C. Goodman, MD MS

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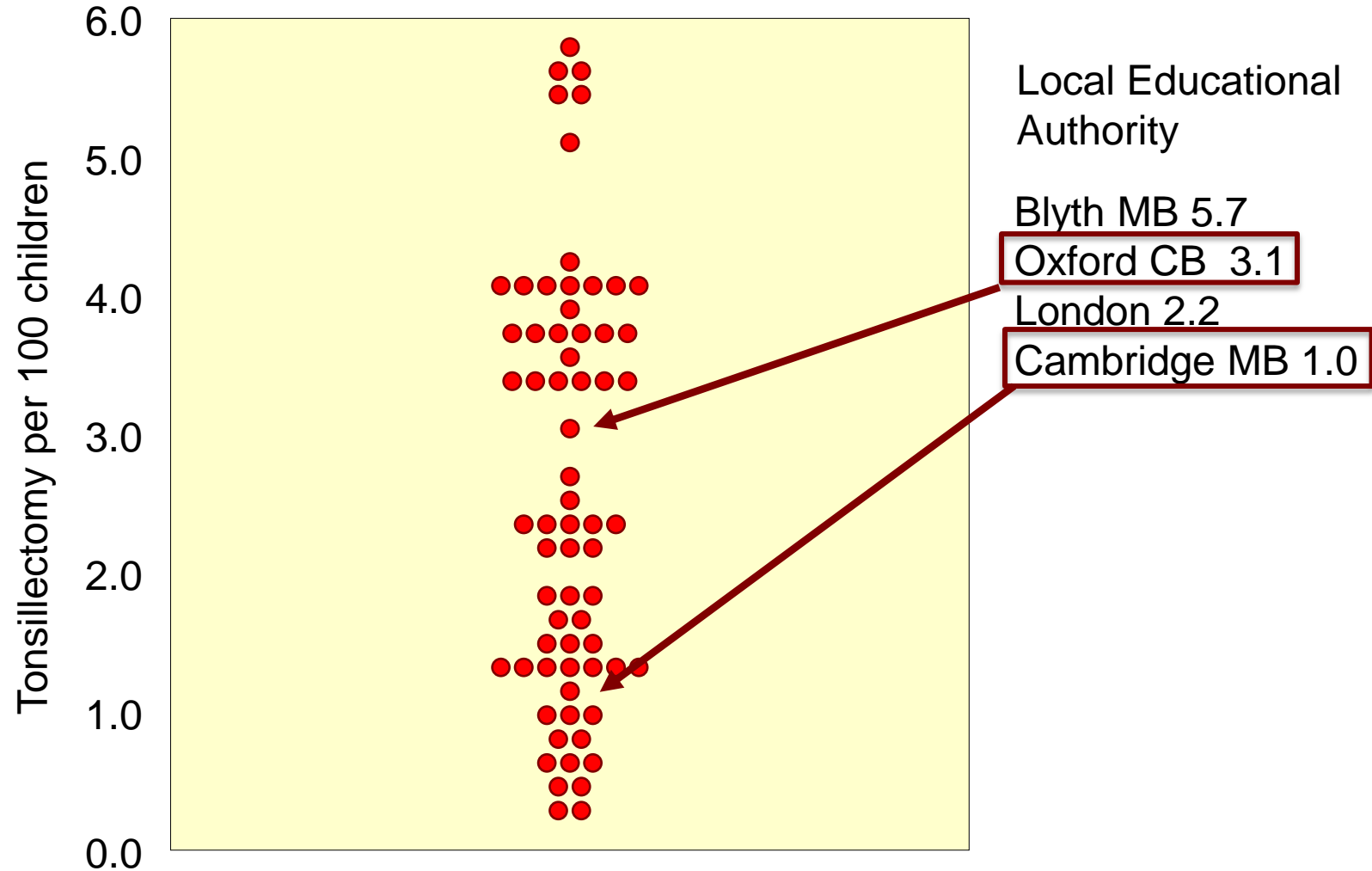
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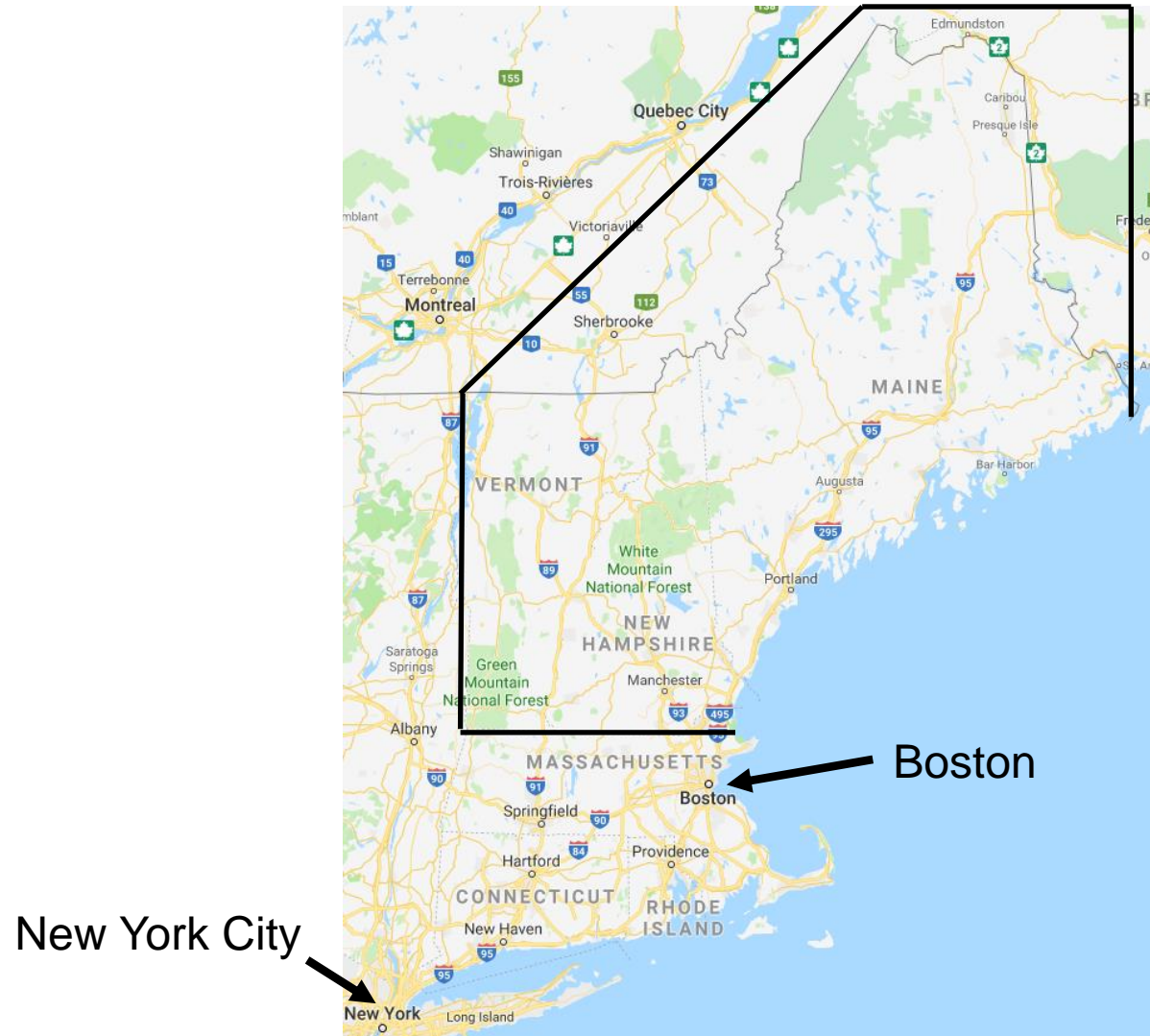
First Medical Care Variation Paper: *The incidence of tonsillectomy in school children (1938)*

TABLE II – Number of tonsillectomies officially recorded annually in public elementary school children for London and England and Wales respectively

	London	England and Wales
1919	11,817	42,004
1920		55,293
1923	7,656	47,685
1924	8,051	49,436
1925	12,179	60,871
1926	13,165	68,250
1927	14,843	80,548
1928	17,372	92,171
1929	17,186	97,518
1930	18,119	109,738
1931	18,178	110,239
1932	15,558	95,875
1933	11,436	77,564
1934	9,715	73,259
1935	9,959	73,763
1936	9,937	80,676
1937	10,198	84,414



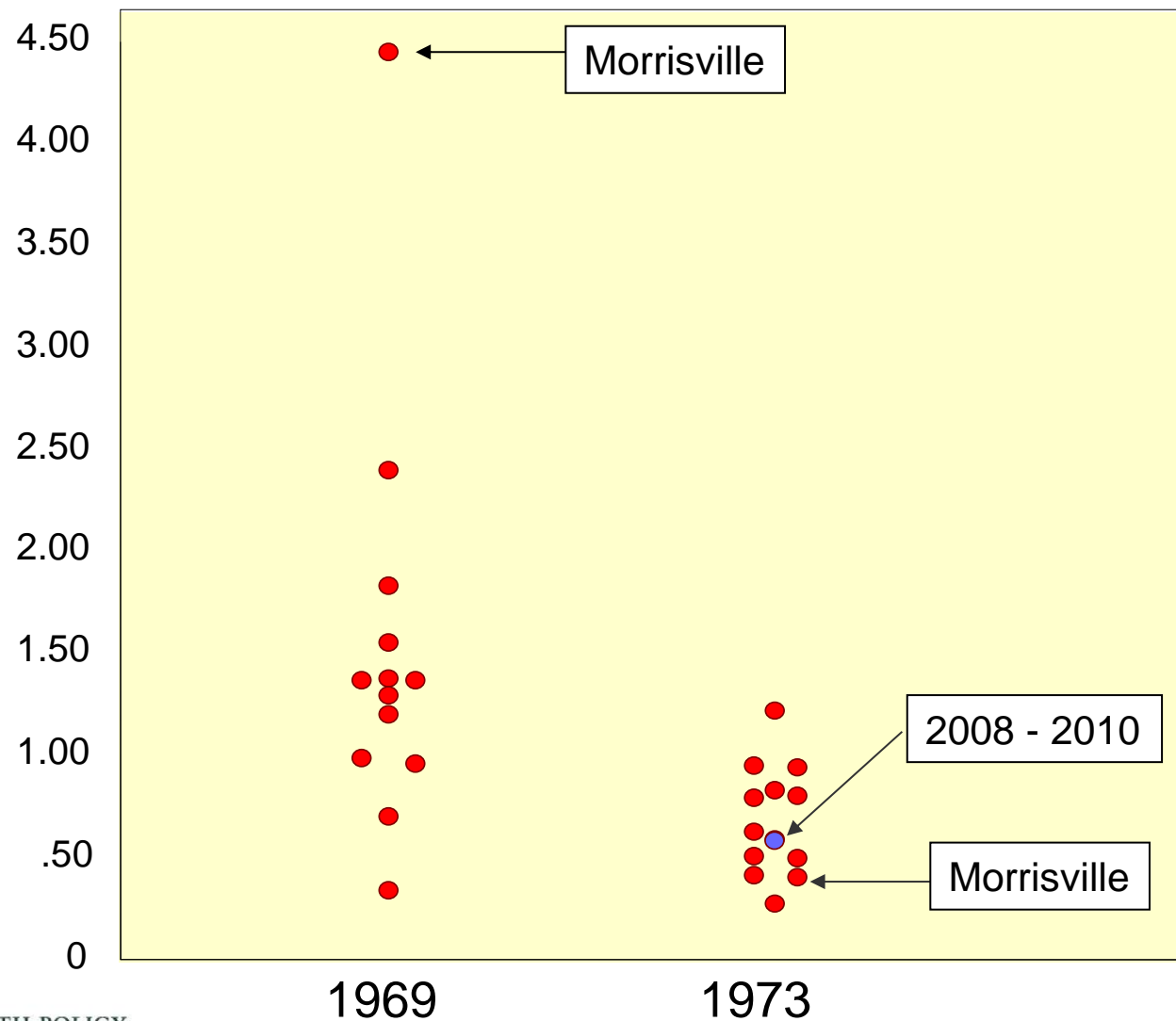
Maine, New Hampshire, and Vermont



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Tonsillectomy Rate per 100 Children Among 13 Vermont Hospital Service Areas



What is the evidence? 45 years later

A Randomized Clinical Trial for Recurrent Tonsillitis

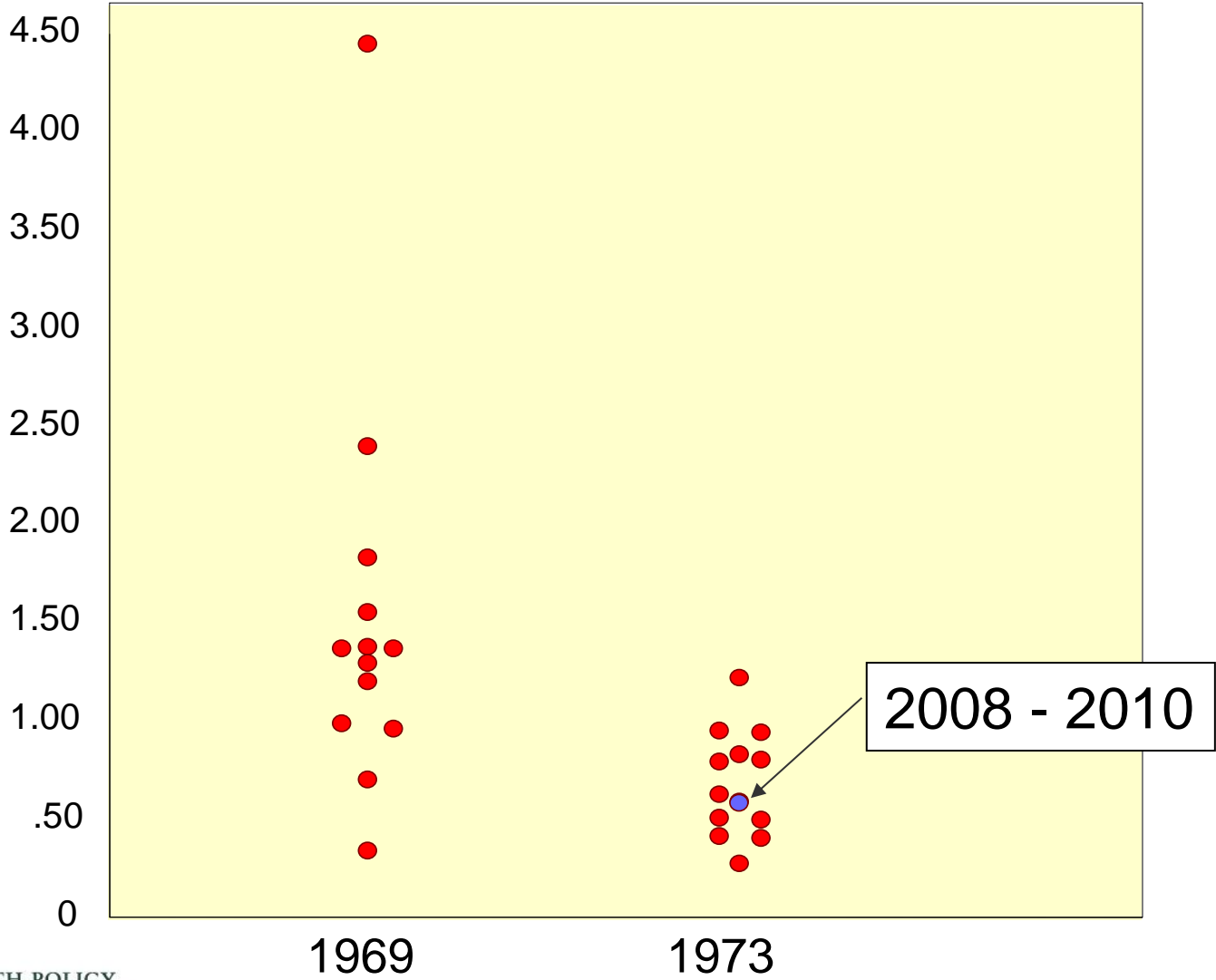
	Inclusion criteria	N	Mean age	Outcome period	
Paradise 1984	≥ 7 in past yr OR ≥ 5 each past 2 yr OR ≥ 3 each in past 3 yr	91	8.1	1,2,3 yrs	

The risk difference between tonsillectomy and control groups was 1.2 fewer sore throats per year over three years.

The study population was ~10% of the children referred for T&A.

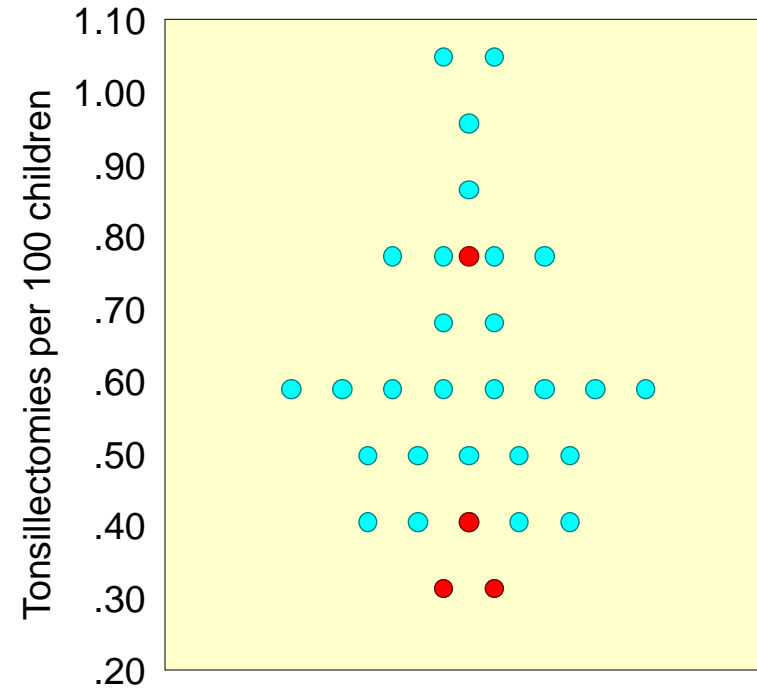
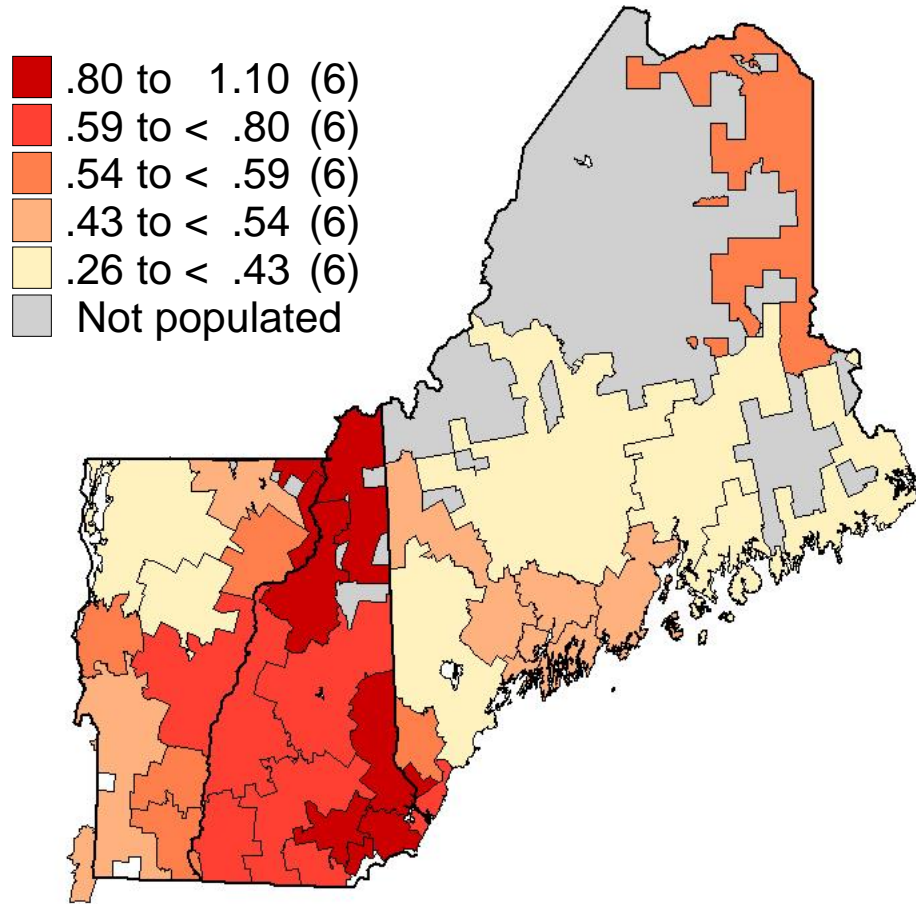


Tonsillectomy Rate per 100 Children Among 13 Vermont Hospital Service Areas



Tonsillectomies per 100 children

Age, sex, and payer adjusted (2007-10)



Lebanon, NH .79
 Portland, ME .40
 Burlington, VT .29
 Bangor, ME .27



The Continuing Story of Pediatric Tonsillectomy

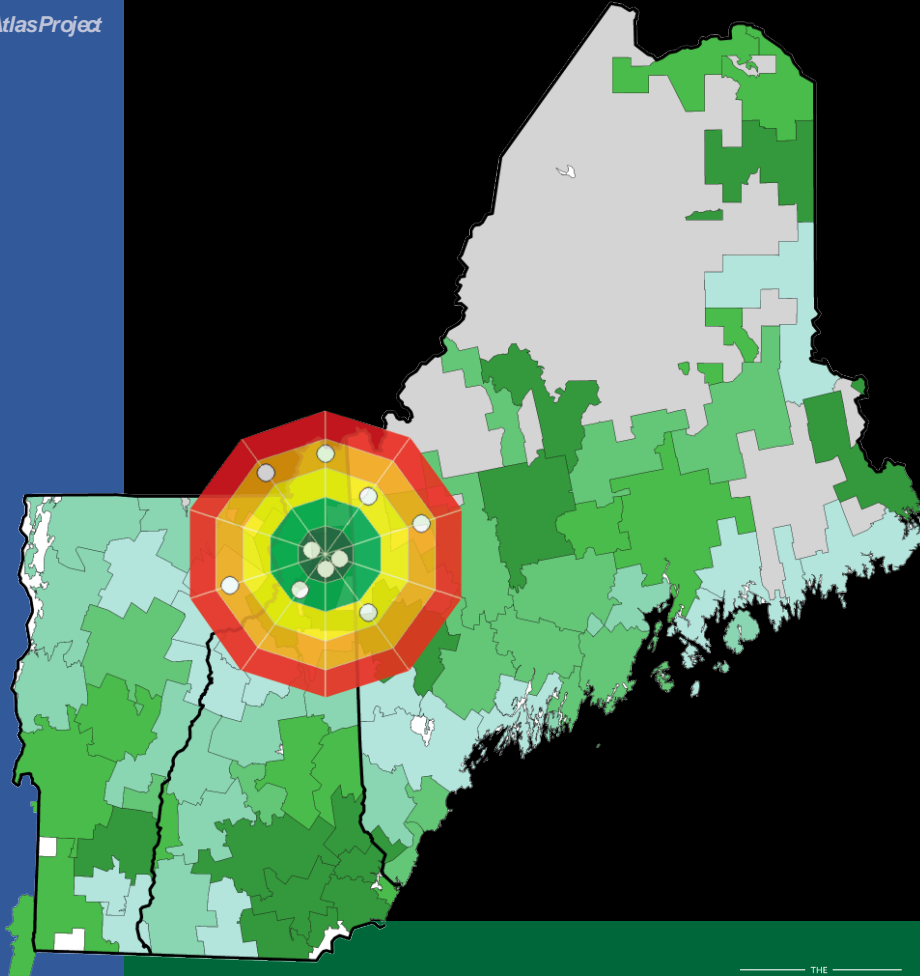
- Population-based measurement of tonsillectomies led to identification of...
 - The rising incidence of the procedure that was unrelated to any change in health need
 - Marked variation in physician practices
- Leading to...
 - Vigorous discussion of the indications for the procedure
 - Successful efforts to reduce high rates without adverse effects
 - Eventually, randomized clinical trials showing that benefits were lower than expected
- Leading to...
 - Continued measurement, discussion, research, and improvement





The Dartmouth Atlas of Children's Health Care in Northern New England

A Report of the Dartmouth Atlas Project



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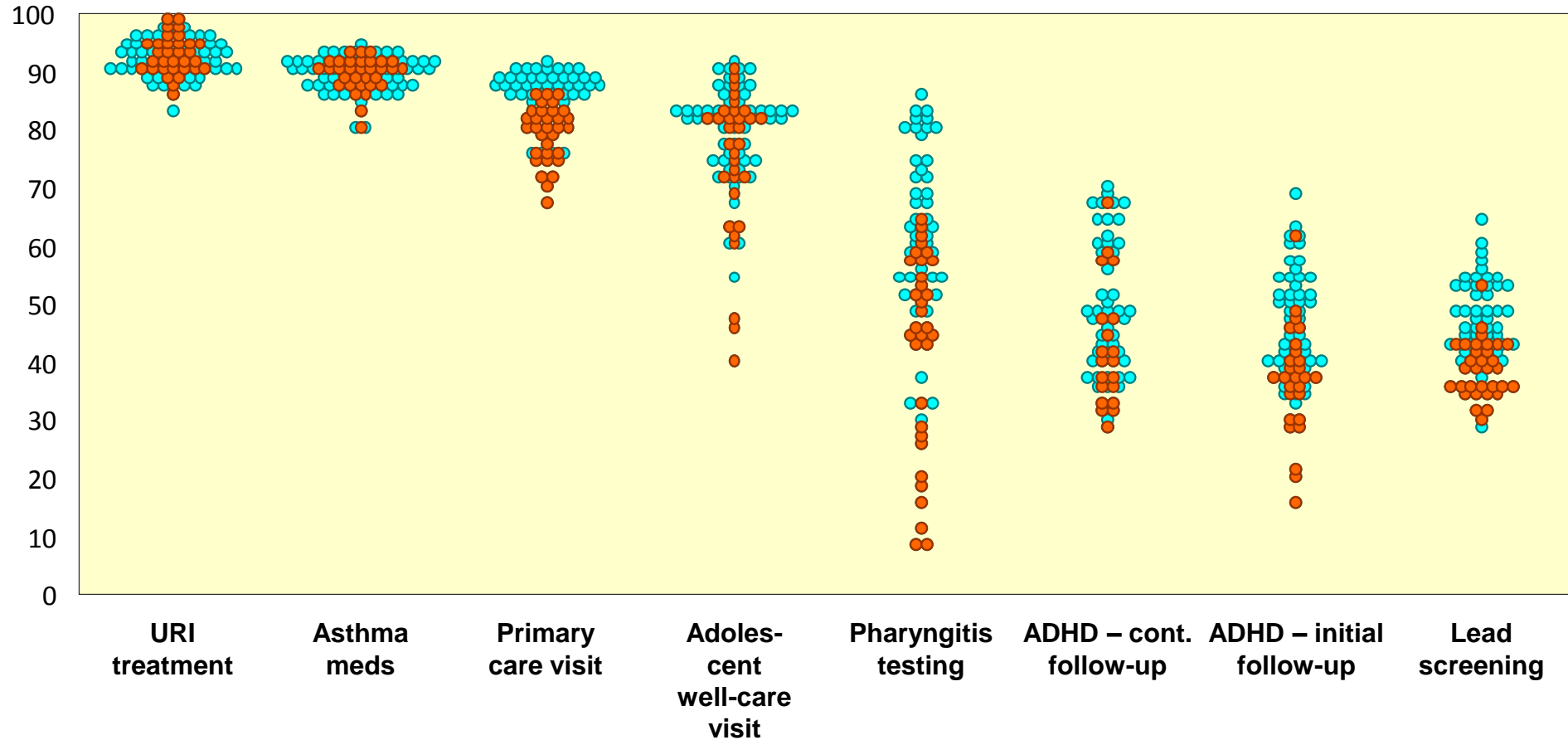
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Percent of Appropriate Children Receiving Indicated Effective Care Maine, New Hampshire, and Vermont Hospital Service Areas, 2007-10



Orange dots indicate Maine HSAs.

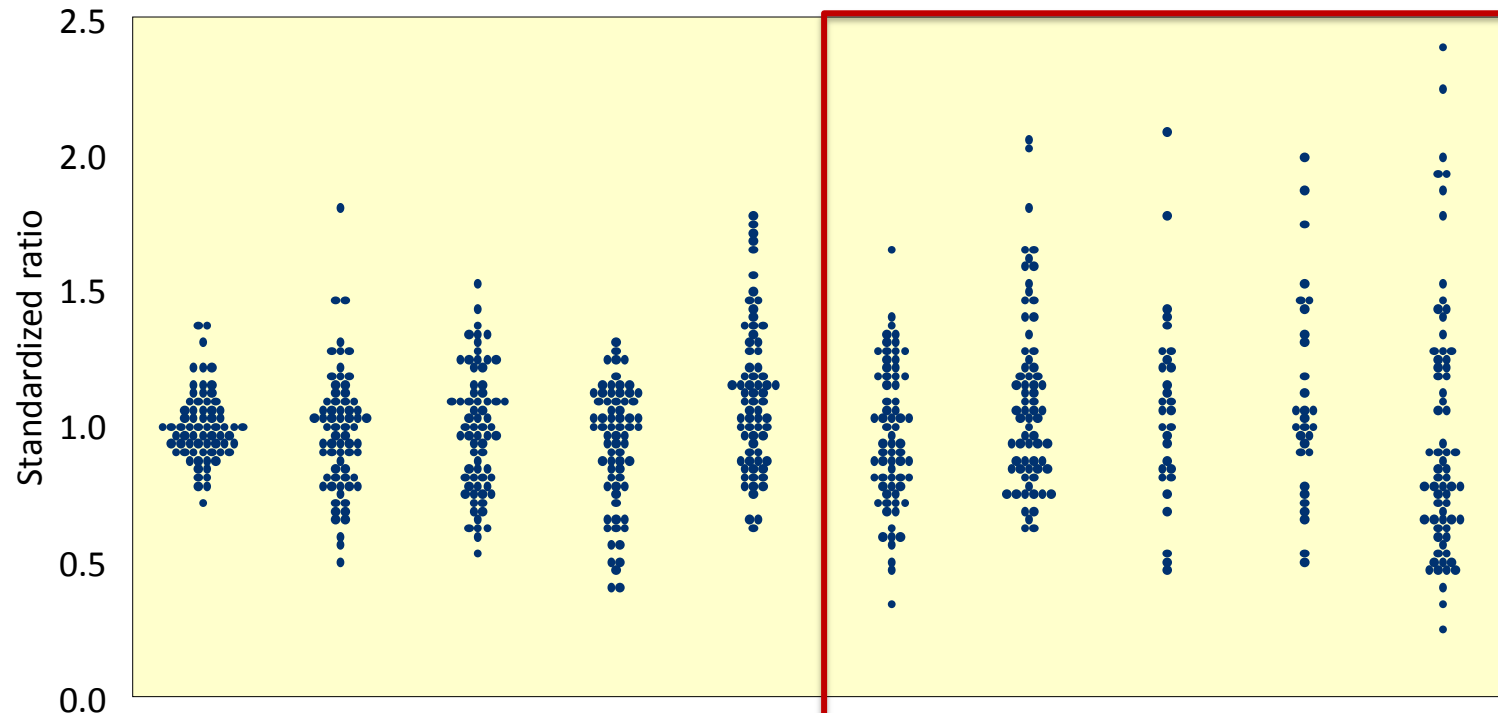


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Children's Utilization Northern New England

Maine, New Hampshire, and Vermont Hospital Service Areas, 2007-10

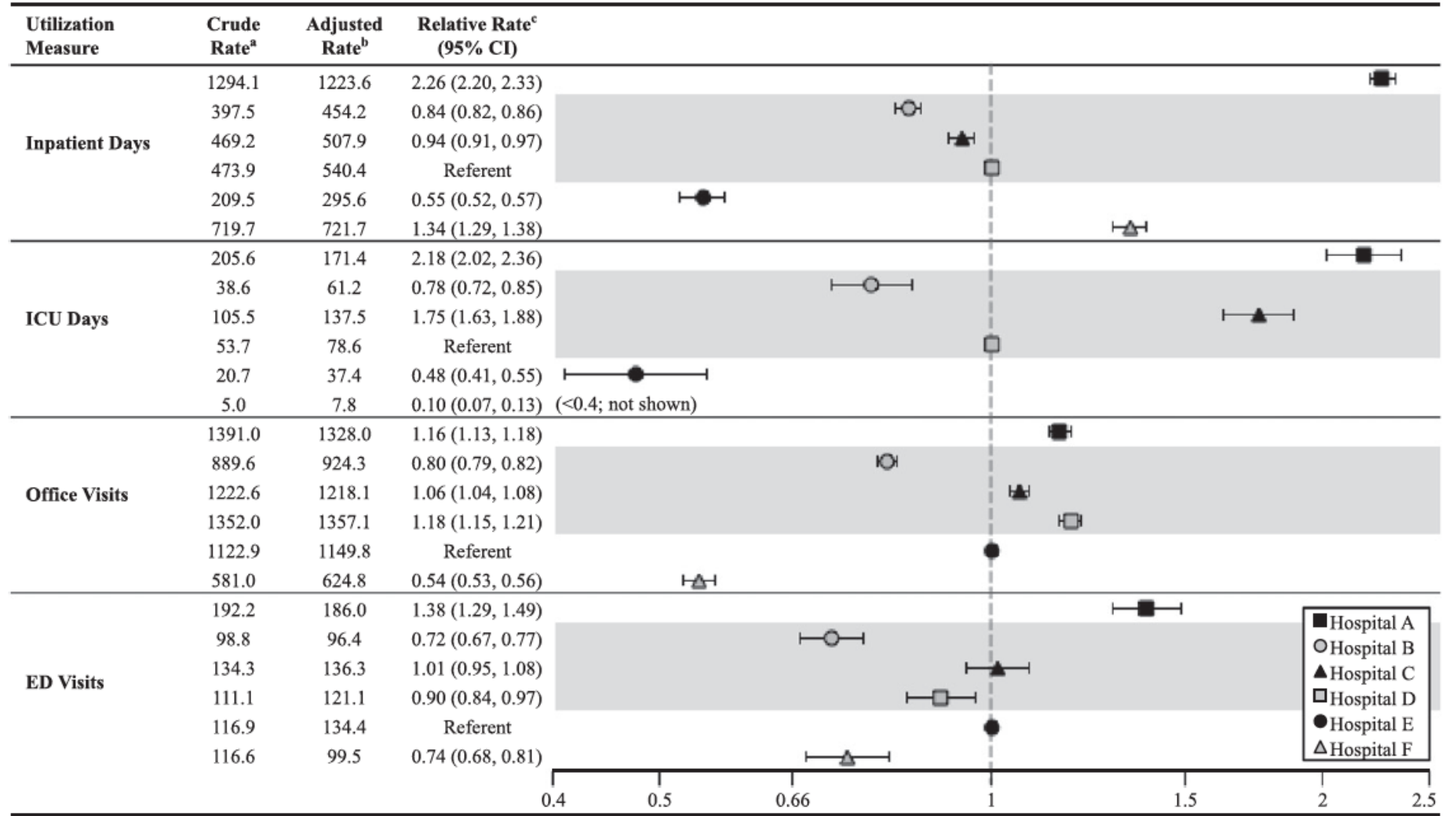


	Prescription fills	Chest x-rays	Medical disch.	Office visits	ER visits	Head CT scans	Head MRIs	PE tube placement	Tonsill-ectomy	Mental illness disch.
NNE average	4.4/child	71.5	11.7	2.8/child	359.3	12.0	7.1	7.4	5.5	5.2
Extremal ratio	1.96	3.74	2.82	3.31	2.85	4.61	3.35	4.45	4.11	9.54
Interquartile ratio	1.16	1.35	1.42	1.38	1.42	1.50	1.49	1.47	1.48	1.92
Coefficient of variation	12.9	23.2	23.3	24.1	24.8	26.9	30.3	33.0	34.1	46.2



Hospital Variation in Health Care Utilization by Children With Medical Complexity

Shawn L. Ralston, MD, MS^{a,b}, Wade Harrison, MPH^a



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FIGURE 1
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& CLINICAL PRACTICE

Ralston SL, Harrison W, Wasserman J, Goodman DC. (2015) Hospital Variation in Health Care Utilization by Children With Medical Complexity. *Pediatrics*. 136(5):860-867.

U.S. Cystic Fibrosis Foundation

Public release of seven quality indicators for all Cystic Fibrosis Centers

Dartmouth - Hitchcock Medical Center

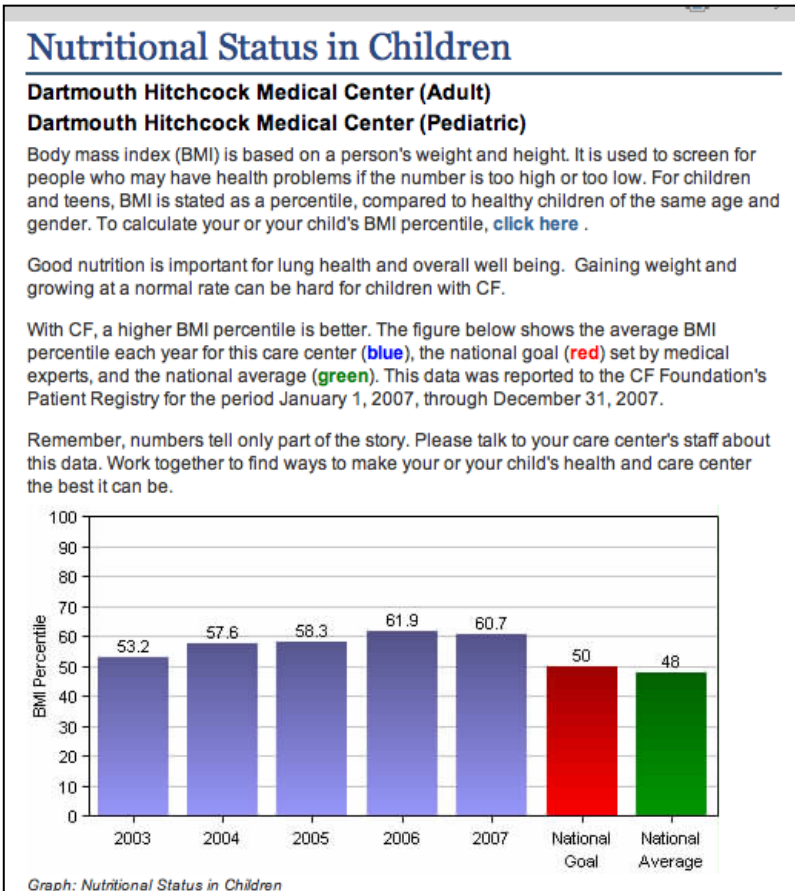
Dartmouth Hitchcock Medical Center
 Lebanon, NH
 Appointments: (603) 653-5533
 Director(s): H. Worth Parker, M.D.
 Patients Served: Adult

Dartmouth Hitchcock Medical Center
 Lebanon, NH
 Appointments: (603) 653-9884
 Director(s): Pamela Hofley, M.D.
 Patients Served: Pediatric

Total number of patients in the registry at this center: 154.
 National average of patients at a center: 109.

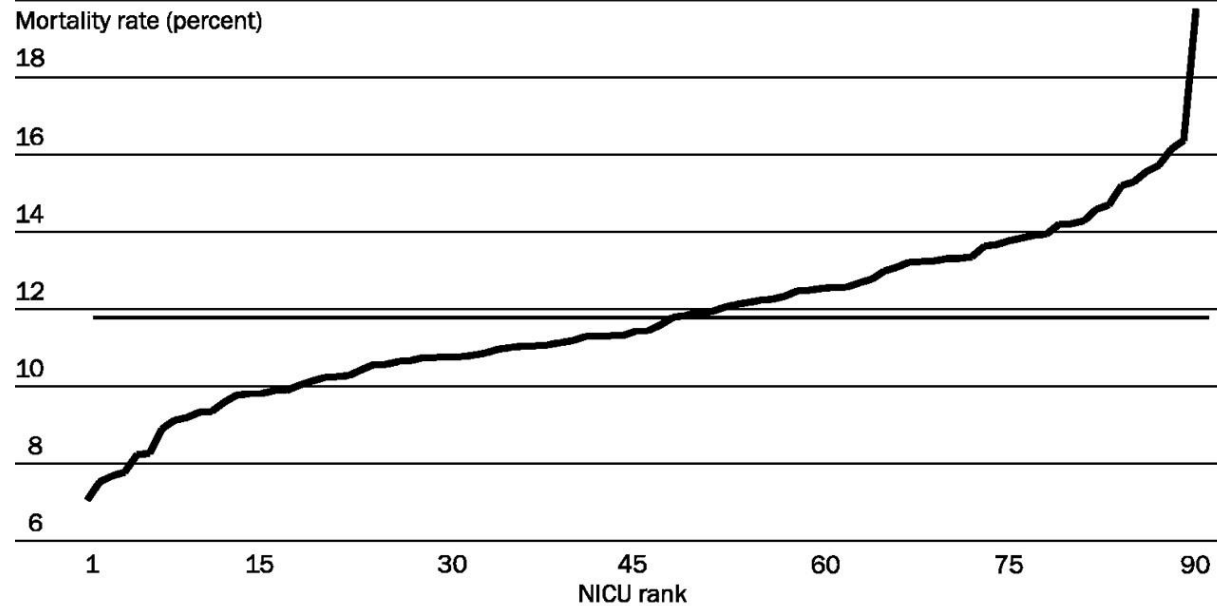
Measures	Level at this CF Center	National Average	National Goal
Lung Function in Children *: Mean FEV ₁ percent of predicted in children 6 to 17 years of age.	91.1	89.6	98.0
Lung Function in Adults *: Mean FEV ₁ percent of predicted in adults 18 years of age and older.	65.6	63.4	73.0
Nutritional Status in Children *: Mean BMI percentile in children 2 to 20 years of age.	60.7	48.0	50.0
Nutritional Status in Adults *: Mean BMI in adults 20 years of age and older.	23.2	22.4	23.0
Screening for Diabetes in Teens and Adults: Percent of non-diabetic patients 14 years of age and older screened for CF-related Diabetes (CFRD).	77.4	75.0	95.0
Guidelines for Care in Children: Percent of children less than 18 years of age who had at least four clinic visits, two lung function tests and a sputum or throat culture in 2007.	82.0	68.2	90.0
Guidelines for Care in Adults: Percent of adults 18 years of age and older who had at least four clinic visits, two lung function tests and a sputum or throat culture in 2007.	47.5	54.7	90.0

* Adjusted for attained age of patients, gender, pancreatic sufficiency, race/ethnicity, socioeconomic status, and age of diagnosis



Risk Adjusted Neonatal Mortality Rates in 90 Vermont-Oxford Network Neonatal Intensive Care Units - 1999

EXHIBIT 1
Rankings Of Selected Neonatal Intensive Care Units (NICUs) Based On Estimates Of Risk-Adjusted Twenty-Eight-Day Mortality For 1999



SOURCE: Authors' calculations based on data from the Vermont Oxford Network (VON) database.

NOTES: Fifteen NICUs with above-average mortality rates had significantly higher mortality than thirteen NICUs with below-average mortality rates. The horizontal line denotes the national average. The sample of NICUs shown includes all VON member hospitals that were members of the network continuously from 1994 to 1999. Estimates for twenty-eight-day mortality rates in 1999 pool information from all years 1994–1999 and are adjusted for reliability using a hierarchical method. Standard errors for the estimates range from one to two percentage points of the mean.



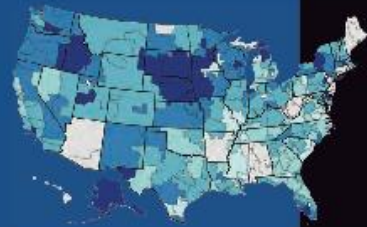
The Last Frontier:

Population-based Measurement of Newborn (and NICU) Care



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The Dartmouth Atlas of Neonatal Intensive Care

A Report of the Dartmouth Atlas Project



The Dartmouth Atlas of Neonatal Intensive Care

A Report of the Dartmouth Atlas Project

Spring 2019

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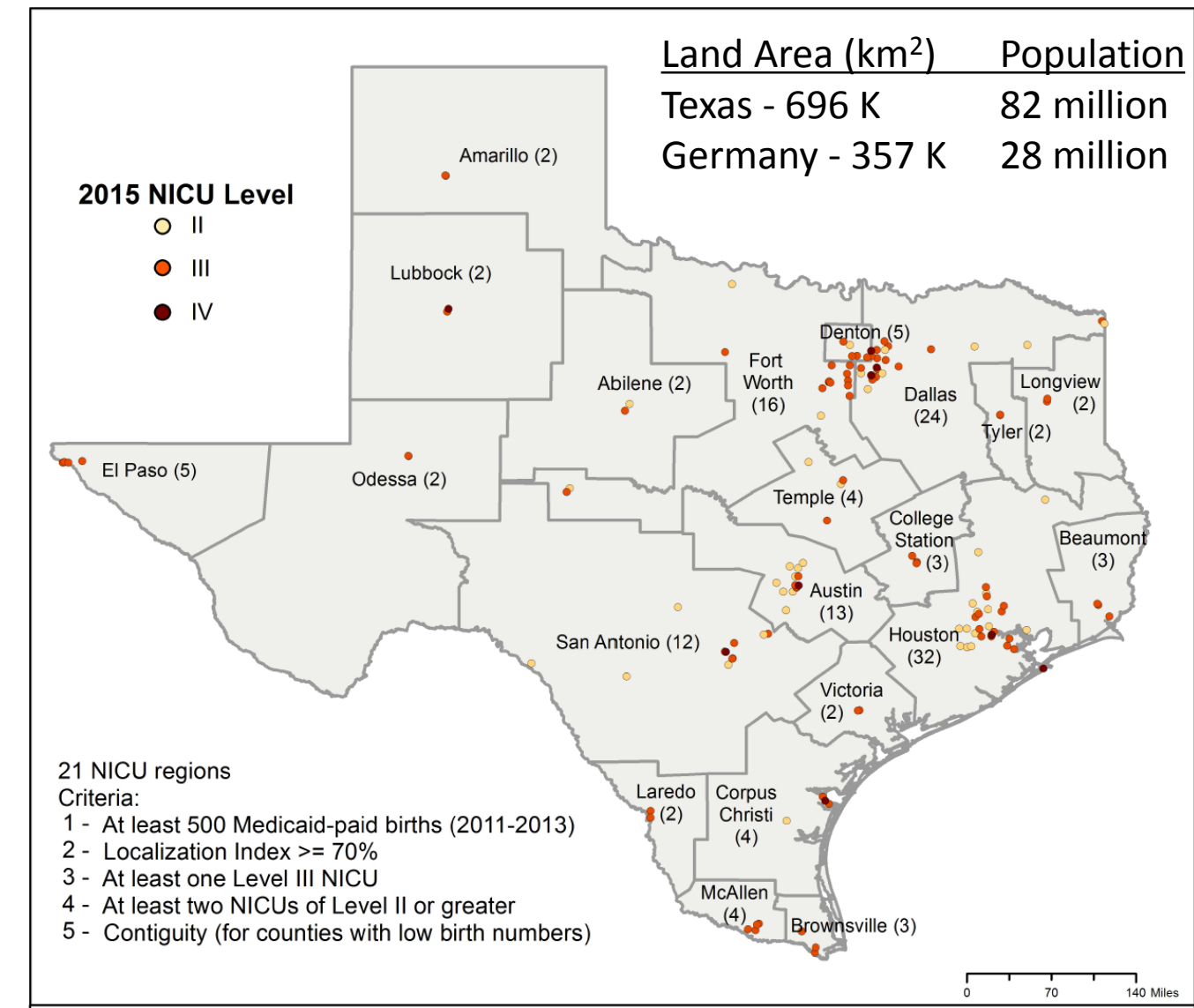
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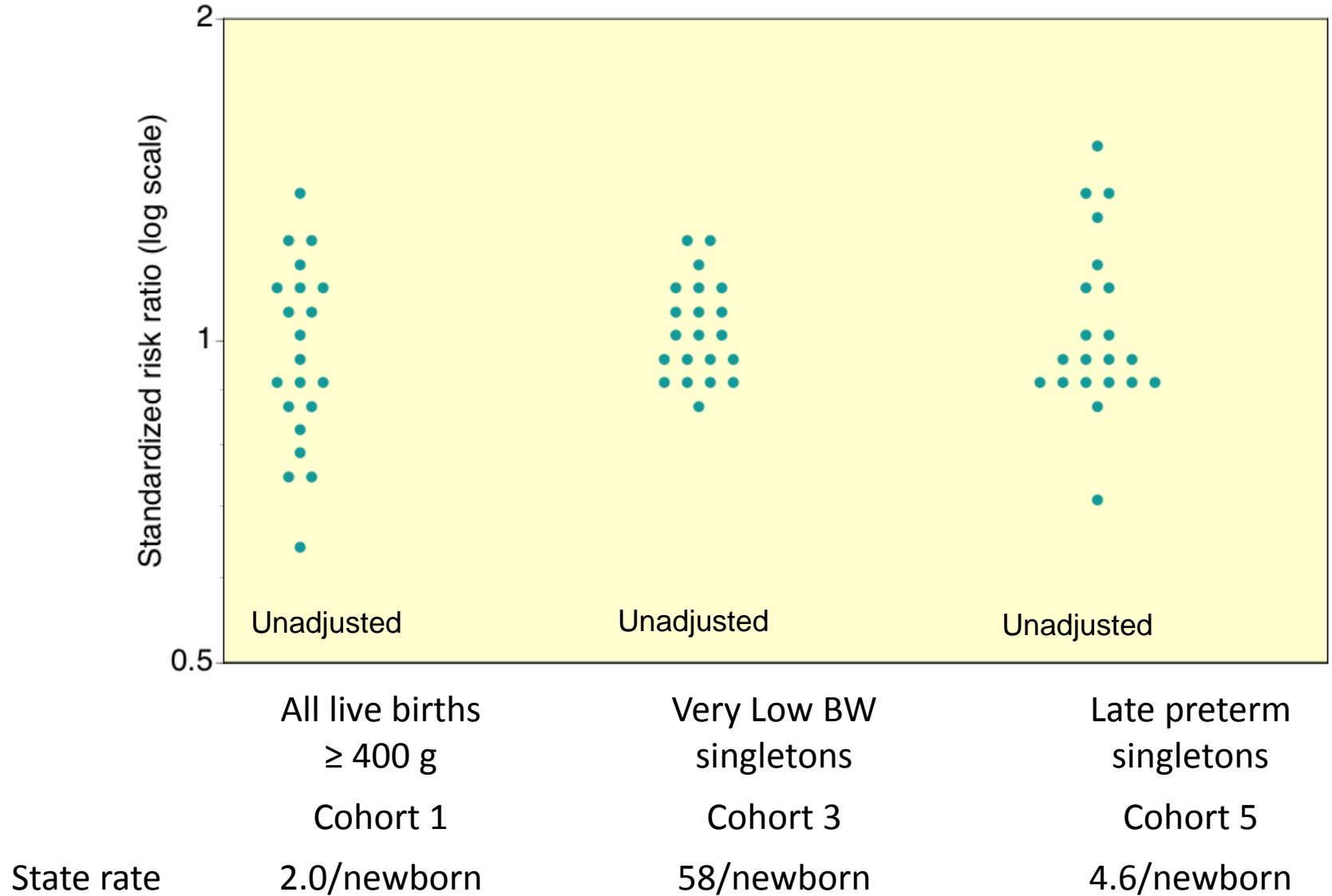
Release date:
19 June, 2019

The Texas NICU Project

- **To Neonatal Intensive Care Regions:**
Assignment from maternal residence to NICUs mostly likely to provide care - most NICU admissions occur at within region hospitals
- **To Hospitals:**
Attribution to the hospital providing the majority of inpatient days.

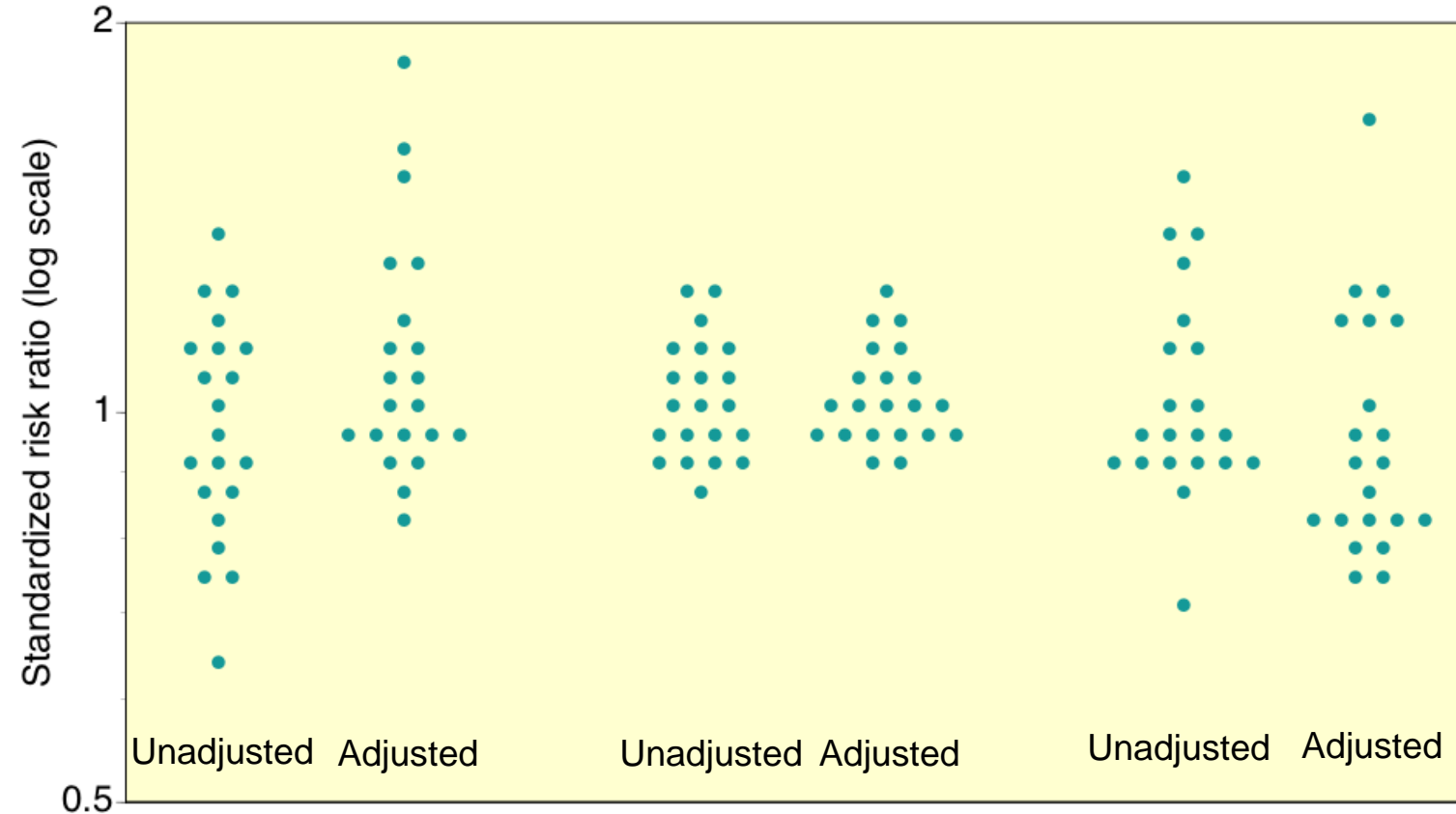


Number of Special Care Days (Intensive or Intermediate) per Birth, Neonatal Intensive Care Regions, CY 2010-14



Number of Special Care Days (Intensive or Intermediate) per Birth, Neonatal Intensive Care Regions, CY 2010-14

After adjustment for differences in newborn health risk, variation persists, indicating practice variation is the dominant cause.



All live births
 ≥ 400 g
 Cohort 1

Very Low BW
 singletons
 Cohort 3

Late preterm
 singletons
 Cohort 5

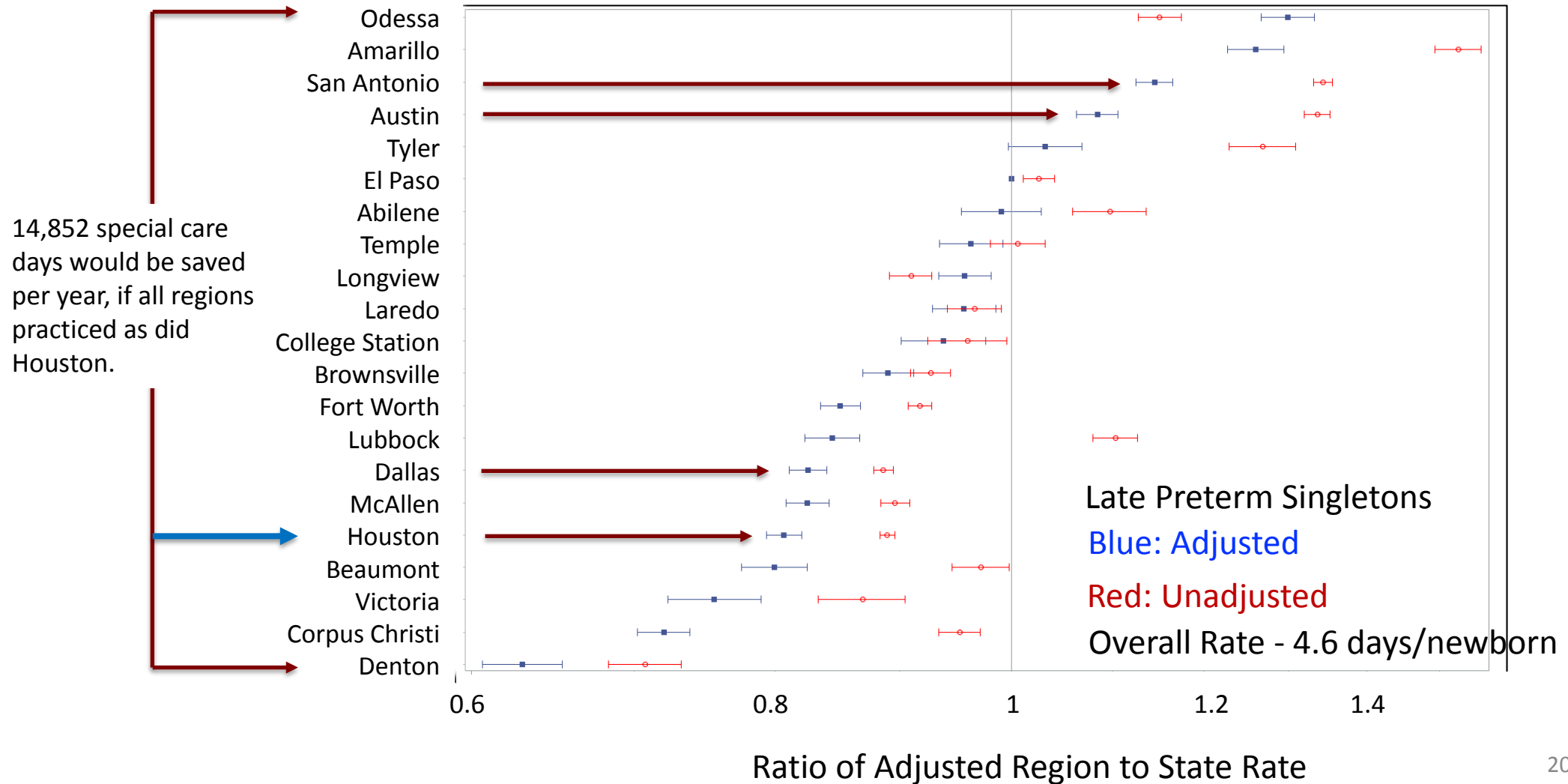
State rate

2.0/newborn

58/newborn

4.6/newborn

Number of Special Care Days per Late Preterm Births, Neonatal Intensive Care Regions, CY 2010-14



Head MRIs in Very Low Birth Weight Newborns, Texas Medicaid, CY 2010-14

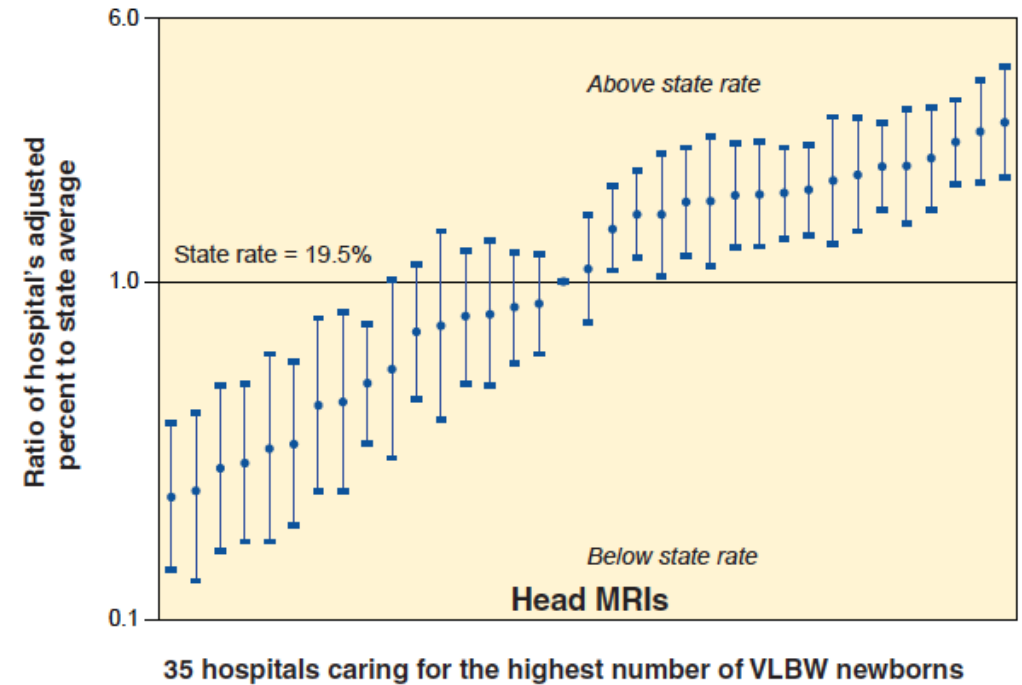
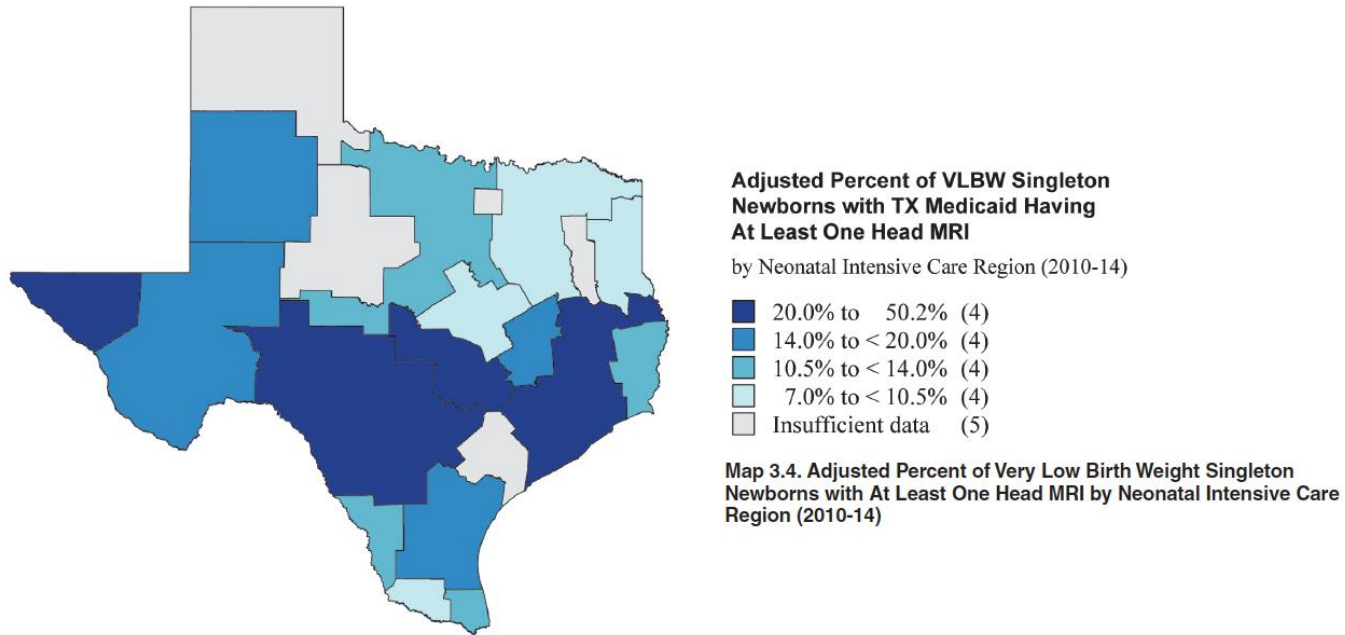
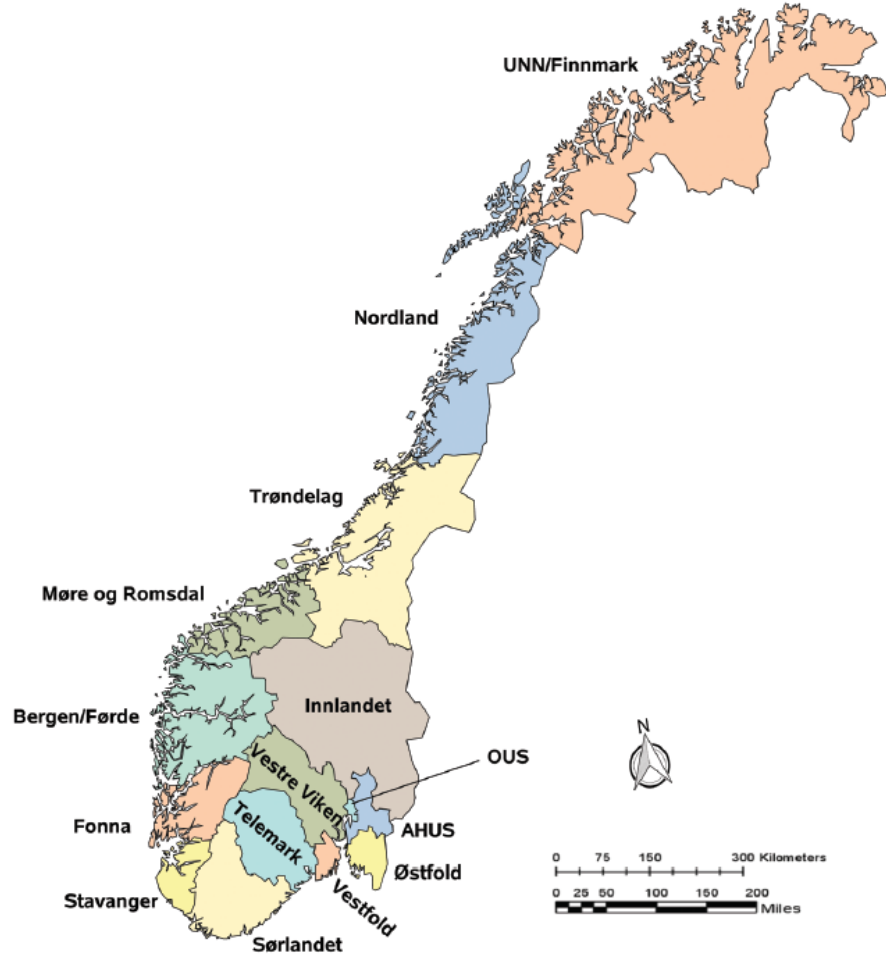


Figure 3.3. Standardized Adjusted Percent and 95% Confidence Interval for Very Low Birth Weight Singleton Newborns with At Least One Head MRI by Hospital (n=35) (2010-14)

Norway: Regional Variation in NICU Admission Rates



Map 4.1. Hospital Referral Regions in Norway

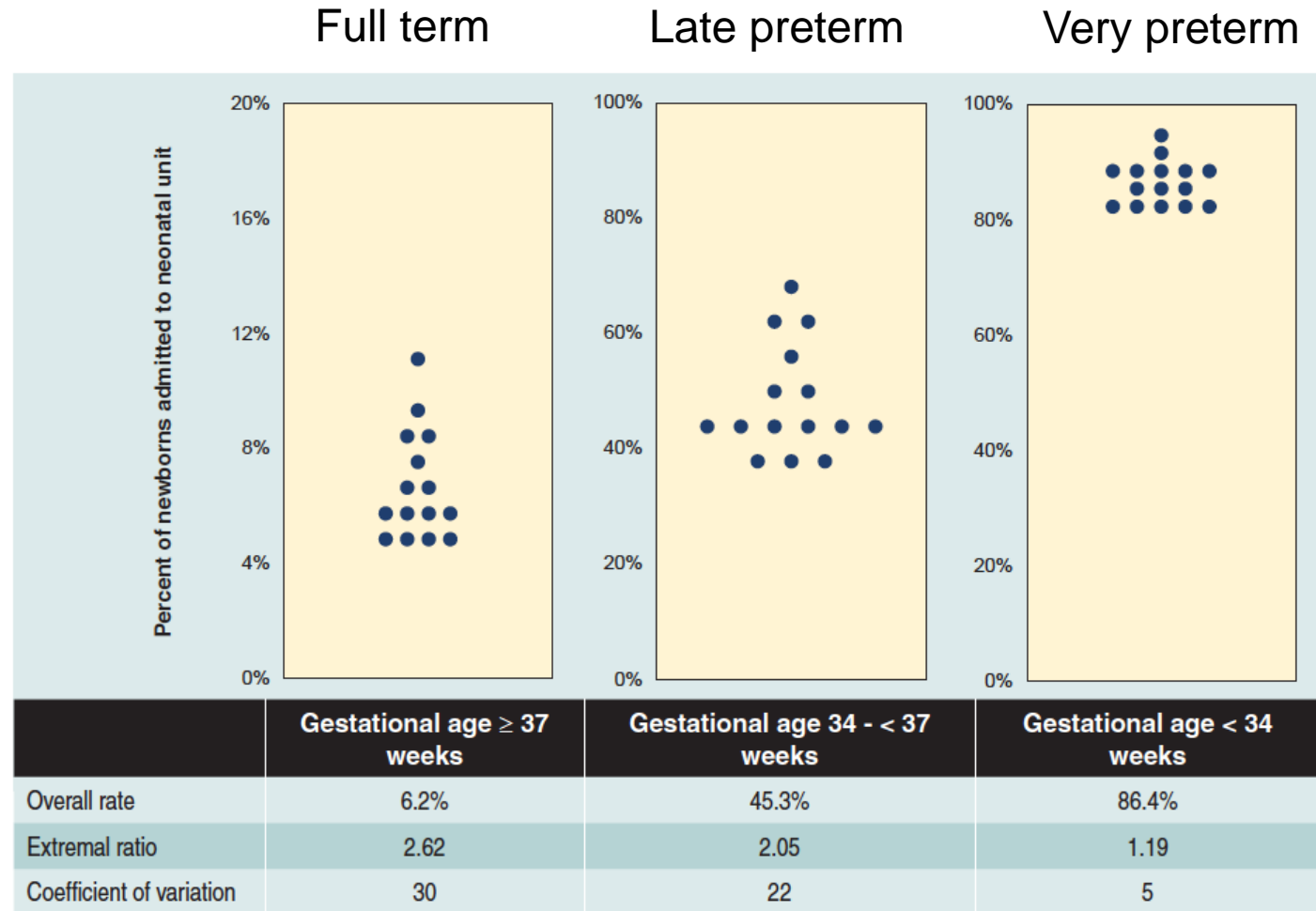


Figure 4.1. Percent of Norwegian Newborns Admitted to a Neonatal Unit, by Region and Gestational Age (2009-14)



Regional and Provider Medical Practice Variation Studies

- The goal is to improve care and lower costs.
(The goal is not necessarily to reduce variation.)
- Variation is a tool to understand health care.
(Variation, itself, is not usually the topic of study.)
- Variation in health care utilization reflects population differences in health need, preferences, and health system performance.
(Controlling for differences in health need is complex and often requires multi-level models or econometric methods.)
- Description is an important first step in identifying problems and questions in health care.
(Sometimes it leads to improvement in care, by itself.)
- Inference usually requires more complex analyses.
- Solutions need to be found within each country in partnership with clinicians, policy makers, and patients.
(Clues can come from international efforts.)



Thank you!

