



GEOGRAPHIC VARIATION SERIES. This Close-Up is part of a comprehensive set of reports that examine the rates at which certain procedures are delivered in different communities across the state. These procedures may be considered elective. They include cardiac procedures, carotid endarterectomy, hip and knee replacement, cancer and spinal procedures, hysterectomy, childbirth procedures, and gallbladder surgery. A research summary, "All Over the Map: Elective Procedure Rates in California Vary Widely," provides additional information on regional variation and a complete methodology for the study.¹

Based on patients' place of residence, the data are from 2005 through 2012, and have been divided into two time periods for purposes of comparison over time. Rates can vary widely, even in contiguous communities. The data account for age, sex, income, education, insurance status, and race. The data are adjusted at the Zip code level for rates of AMI (heart attack) hospitalization and rates of hospitalizations in which the patient had a diabetes diagnosis.

Cholecystectomy in California: A Close-Up of Geographic Variation

Gallstones are pebble-like growths that range in size from a grain of sand to a golf ball. They are formed from cholesterol and substances in bile and are found in the gallbladder or bile duct. While some people never exhibit symptoms from gallstones, others experience pain, nausea, vomiting, or other symptoms that cause them to pursue treatment. The pain from gallstones is called biliary colic, which commonly manifests itself as a very severe, sudden cramping pain in the right upper part of the abdomen.

Treatment choices for gallbladder attacks include:

- ▶ Watchful waiting
- ▶ Medical therapy with drugs that dissolve cholesterol, a major component of gallstones
- ▶ Lithotripsy, which uses sound waves to break up gallstones so they are small enough to pass through the bile duct
- ▶ Cholecystectomy to remove the gallbladder

Most gallstones are detected as "silent gallstones," meaning those that do not cause symptoms.

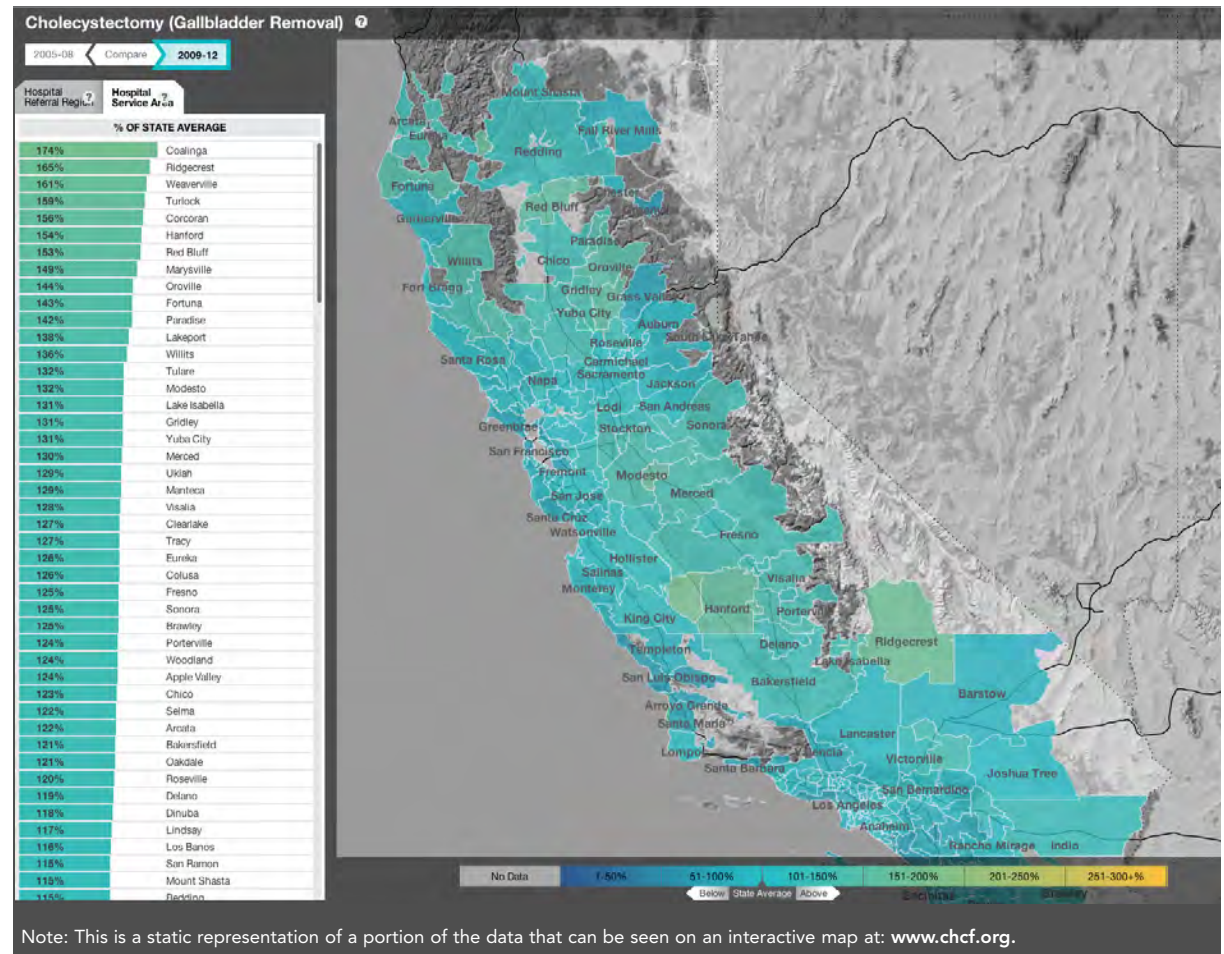
Gallstones are sometimes found on imaging tests that are done for abdominal pain other than typical biliary colic. Patients with gallstones and no symptoms (or atypical symptoms) do not require immediate treatment; rather, they should be educated about the symptoms of gallstone disease and when to seek treatment if symptoms occur.

People who suffer from gallstones that cause symptoms may want to consider treatment options. Patients choosing not to have surgery may try to prevent attacks by making lifestyle choices, such as staying close to a healthy weight and avoiding rapid weight loss. Some kinds of gallstones can be treated with drugs to dissolve the cholesterol. Alternatively, gallstones can sometimes be broken up using shock wave lithotripsy, which involves a powerful beam of sound. While lithotripsy is generally considered to be a safe procedure, risks include bleeding around the kidney, ulcers in the stomach or small intestine, and kidney infection. Finally, the gallbladder can be surgically removed (cholecystectomy) to prevent future attacks. In rare cases, a stone blocks the bile duct completely, and surgery must be performed immediately to prevent injury to the pancreas.

Cholecystectomy, or surgical removal of the gallbladder, can be performed through open surgery or a laparoscopic operation. Sometimes gallstones are also removed from the common bile duct. If the surgery is done laparoscopically, recovery can take 7 to 10 days. Risks from laparoscopic surgery are very low; the most serious are infection, bleeding, injury to the common bile duct or small intestine, and risks associated with general anesthesia. If cholecystectomy is done via open surgery, recovery can take four to six weeks. Risks from open surgery are similar to those for laparoscopic surgery, but include injury to the liver or major blood vessels, and blood clots or pneumonia during the longer recovery.²

Residents of some hospital service areas (HSAs) undergo cholecystectomy at much higher or much lower rates than those in other HSAs. State averages should not be taken as the correct or “right” rate for elective procedures; they are used only as the comparator for analysis, not as a benchmark. There is no recommended baseline for elective procedures. See Figure 1.

Figure 1. Geographic Variation in Cholecystectomy, California, 2009-12



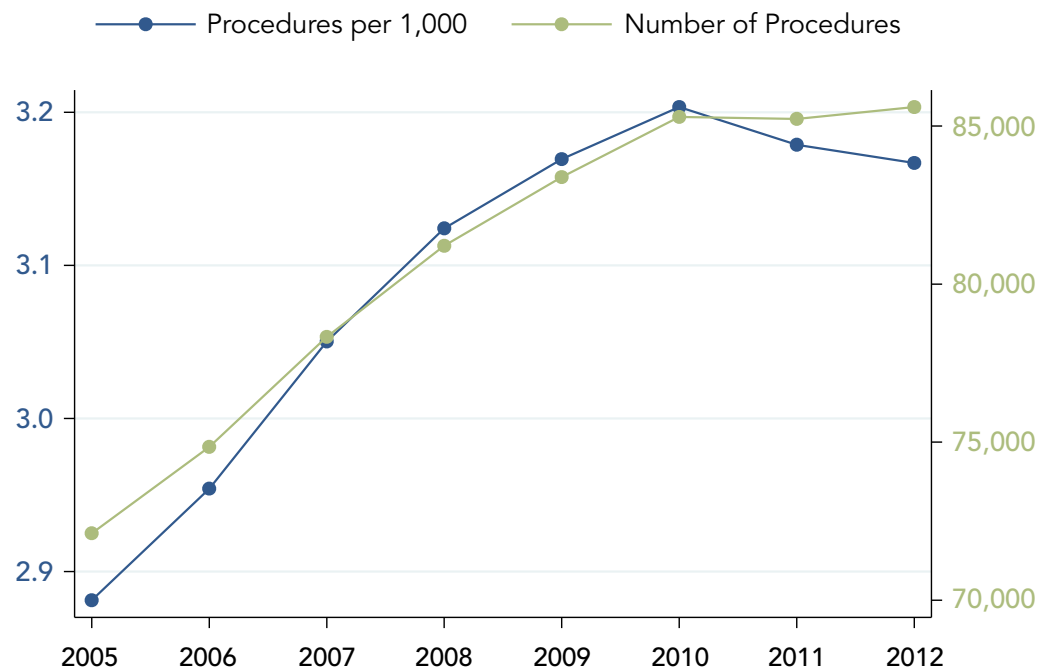
The high and low extremes by HSA are shown in Figure 2 for both data-collection periods, 2005-08 and 2009-12.

Figure 2. Cholecystectomy, 10 Lowest and Highest HSAs, 2005-08 and 2009-12

	2005-08		2009-12	
10 Lowest HSAs, adjusted rate per 1,000				
Avalon	1.10	Avalon	2.07	
Alameda	2.05	Monterey Park	2.08	
Oakland	2.14	San Luis Obispo	2.11	
San Pablo	2.15	South Laguna	2.13	
Coronado	2.16	Greenville	2.14	
Santa Monica	2.16	Laguna Hills	2.18	
Monterey Park	2.16	Santa Monica	2.19	
San Francisco	2.19	Sun City	2.23	
Inglewood	2.20	Mission Viejo	2.24	
Los Angeles	2.24	Coronado	2.24	
10 Highest HSAs, adjusted rate per 1,000				
Lake Isabella	4.57	Fortuna	4.54	
Gridley	4.62	Oroville	4.57	
Turlock	4.66	Marysville	4.74	
Red Bluff	4.69	Red Bluff	4.87	
Mount Shasta	4.80	Hanford	4.89	
Willits	5.01	Corcoran	4.97	
Paradise	5.04	Turlock	5.04	
Lakeport	5.10	Weaverville	5.13	
Ridgecrest	5.17	Ridgecrest	5.26	
Oroville	5.35	Coalinga	5.55	

From 2005 to 2010 the statewide rate for cholecystectomy rose from fewer than 2.9 procedures per 1,000 to 3.2 per 1,000, before dropping slightly by 2012. See Figure 3.

Figure 3. Cholecystectomy, Statewide Trends in the Number and Rate of Procedures, 2005 to 2012



Procedures Chosen for the Study

Procedures studied were based on patient discharge data for cholecystectomy. This analysis controlled for age, sex, income, education, insurance status, and race, as well as rates of acute myocardial infarction (heart attack) and diabetes.

Authors

The original content of this report, published in September 2011, was developed by Vanessa Hurley, MPH, and Shannon Brownlee, MS. It was updated in November 2014.

About the Foundation

The California HealthCare Foundation works as a catalyst to fulfill the promise of better health care for all Californians. We support ideas and innovations that improve quality, increase efficiency, and lower the costs of care. For more information, visit us online at www.chcf.org.

Endnotes

1. The research for this report was developed by Laurence Baker, PhD, a consultant to this project and professor of health research and policy, and chief of health services research, Stanford University School of Medicine, in collaboration with Maryann O'Sullivan, JD, an independent health policy consultant. Analysis and interpretation of the estimates were performed by Frances Tompkins, data consultant. Lance Lang, MD, chaired an advisory committee of clinicians in various specialties, which was also consulted in the production of this report to review the analysis and to ensure the accuracy of medical content. For a complete list of advisory committee members, see the research summary "All Over the Map: Elective Procedure Rates in California Vary Widely," www.chcf.org. Data were obtained from the Office of Statewide Health Planning and Development.
2. This section was written using the following sources:
 - Shannon Brownlee et al., *Improving Patient Decision-Making in Health Care: A 2011 Dartmouth Atlas Report Highlighting Minnesota* (Lebanon, NH: Dartmouth Atlas Project, 2011).
 - "Gallstones: Should I Have Gallbladder Surgery?," Kaiser Permanente, accessed February 8, 2011, members.kaiserpermanente.org.
 - "Lithotripsy," MedLinePlus, www.nlm.nih.gov.