

Bariatric Surgery in California

Center for Medical Technology Policy
Center for Surgical Outcomes and Quality at UCLA

IHA Board Meeting
April 12, 2007

Two Investigator Teams

CMTP

- Center for Medical Technology Policy
- Mission: to improve care for current and future patients. We do this through collective action, providing an objective, neutral, private-sector forum to identify and close important evidence gaps regarding existing and emerging medical technologies.

CSOQ

- Center for Surgical Outcomes and Quality (UCLA/RAND/VA)
- Mission: to study surgical care and outcomes within the broader scope of health care. By integrating the clinical strengths of the Surgery Department with methodological experts, a scientific basis will be provided for the improvement of surgical quality at the patient as well as at the population level.

Aims

1. Describe the characteristics of patients receiving bariatric surgery.
2. Trends in the annual rate of bariatric surgeries in California.
3. Annual volume of surgeries
4. Outcomes (adverse) and predictors of these outcomes.
5. Cost issues of bariatric surgery in California.

Background: Obesity

Obesity in California Continues to Grow

- Prevalence of overweight CA residents grew from 37% in 1984 to 57% in 2003¹
 - **1 in 3 children is at risk or already overweight in CA¹**
- Obesity results in associated health risks such as heart disease, type 2 diabetes, high blood pressure, sleep disorders, some cancers, and depression
- CDC found that CA had \$7.7 billion in direct medical expenditures attributable to obesity in 1998-2000²

*“Obesity is a public health challenge
that is of equal magnitude to tobacco”*

1. California Obesity Prevention Initiative. Reversing the Obesity Epidemic: California's Strategies for Action. Sacramento: California Department of Health Services, 2006.
2. Finkelstein, Fiebelkorn, and Wang. Overweight and Obesity: Economic Consequences. Centers for Disease Control and Prevention, 2004.

Growth in Bariatric Surgery

- Nationally between 1998 and 2004 the number of bariatric surgeries performed increased from 13,000 to 121,000, a 9-fold increase¹
 - **Simultaneously LOS decreased from 4.99 days to 3.21 days on average**
 - **In patient death rates has likewise decreased**
- Of the 11.5 million clinically eligible adults in 2002, only 0.6% received the surgery²
 - **While not everyone eligible wants surgery, this statistic demonstrates there is still potential for exponential growth**
- Hospital costs for bariatric surgery grew six-fold to \$948 million in 2002²

1. Zhao Y, Encinosa W. Bariatric Surgery Utilization and Outcomes in 1998 and 2004. Statistical brief #23. In: Agency for Healthcare Research and Quality, 2007.

2. Encinosa, W. Bernard, D. et. al. Use and Costs of Bariatric Surgery and Prescription Weight Loss Medications. Health Affairs, July/August 2005.

AHRQ Finds Complication Rates ↑ w/ Time¹

- Researchers found that 4 out of every 10 obesity surgery patients develop a complication within 6 months of leaving the hospital
 - **“Complications” include dumping, anastomosis, leaks, abdominal hernias, infections, and pneumonia**
- 10.8% of patients who did not experience a complication within the first 30 days did so in the following 180 days
 - **This finding challenges the low in-hospital complication rate reported in other studies**
- Surgical complications increased medical care spending
 - **Average cost was ~\$35K for patients with a complication (up to \$65K if re-hospitalized)**
 - **Only ~\$25K for patients without complications**
- However, this study could not risk adjust for patient BMI levels or surgeon/hospital bariatric volume

1. Encinosa, W. Bernard, D. et. al. Healthcare Utilization and Outcomes After Bariatric Surgery. Medical Care, August 2006.

Other Interesting New Findings

- Encinosa found pronounced differences nationally by gender
 - **Men have higher in-hospital mortality rate and longer length of stay despite the fact that 84% of bariatric patients are female**
 - **Women use drug therapy more than men, but men spend more \$\$ on drugs and use them longer**
- Flum found mortality rates were higher for individuals $\geq 65^2$
 - **Found a strong association between risk of death with older age, male sex, and surgeon procedural volume**

1. Encinosa, W. Bernard, D. et. al. Use and Costs of Bariatric Surgery and Prescription Weight-Loss Medications. Health Affairs, July/August 2005.

2. Flum D, Salem, L., et. al. Early Mortality Among Medicare Beneficiaries Undergoing Bariatric Surgical Procedures. Journal of American Medical Association, October 19, 2005.

**California and Bariatric Surgery:
Analysis Using the California
Inpatient Data (1998-2005)**

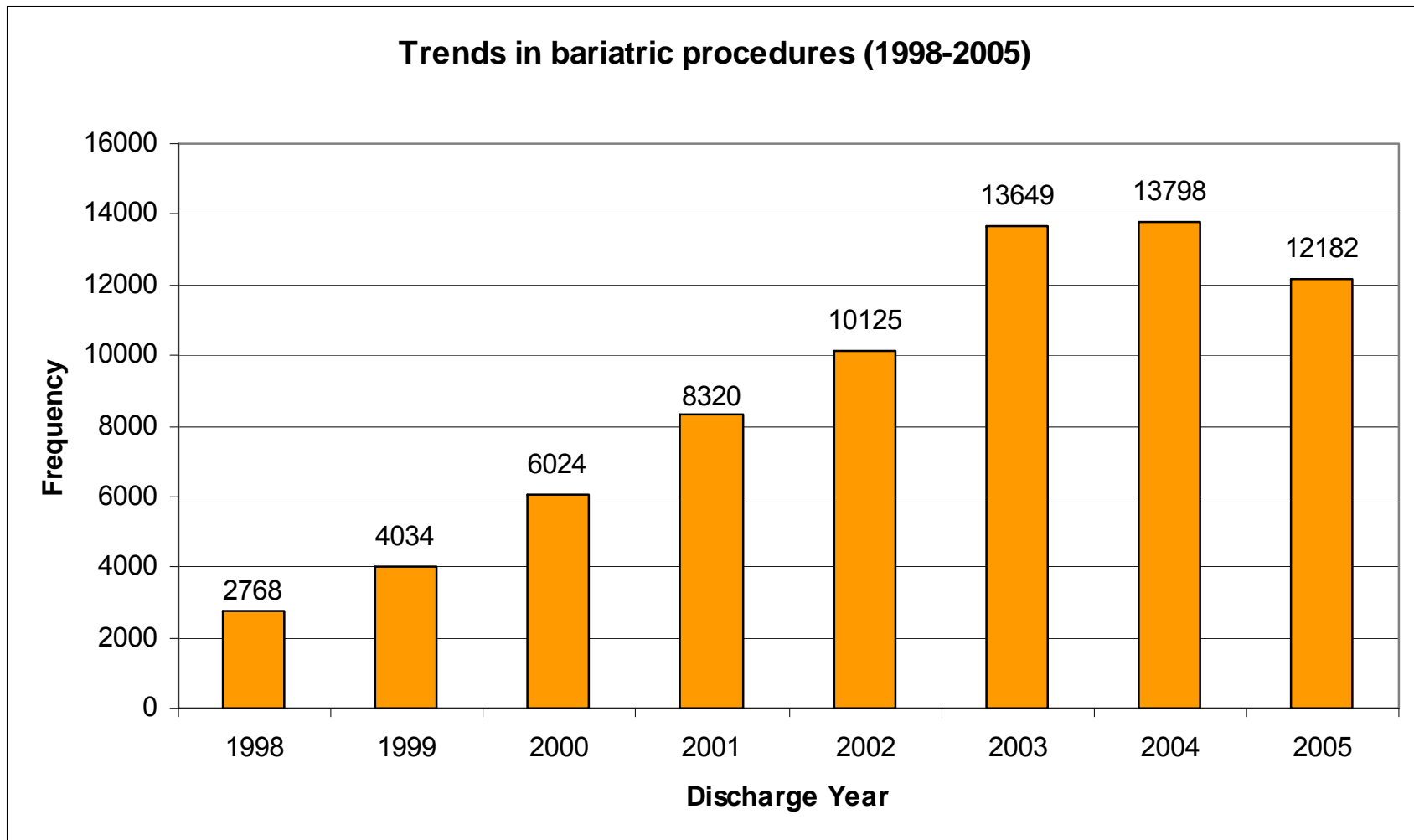
Differences in CA Obese Population and People Undergoing Bariatric Surgery

| Variables | | CA State Obese patients | CA Inpatient data |
|----------------|-----------|-------------------------------|-------------------------|
| Mean Age (yrs) | Females | 46.2 | 42.0 |
| | Males | 42.8 | 46.8 |
| Gender (%) | Females | 54.8 | 86.3 |
| | Males | 45.2 | 13.7 |
| Race (%) | Whites | 46.5 | 83.5 |
| | Blacks | 10.7 | 5.4 |
| | Hispanics | 34.4 | 9.7 |
| | API | 4.0 | 0.3 |
| | Other | 4.3 | 1.1 |
| Insurance (%) | Medicare | 11.8 | 4.9 |
| | Medicaid | 15.9 | 4.7 |
| | Private | 51.9 | 83.1 |
| | Other | 2.3 | 2.5 |
| | Ind | 18.8 | 4.9 |

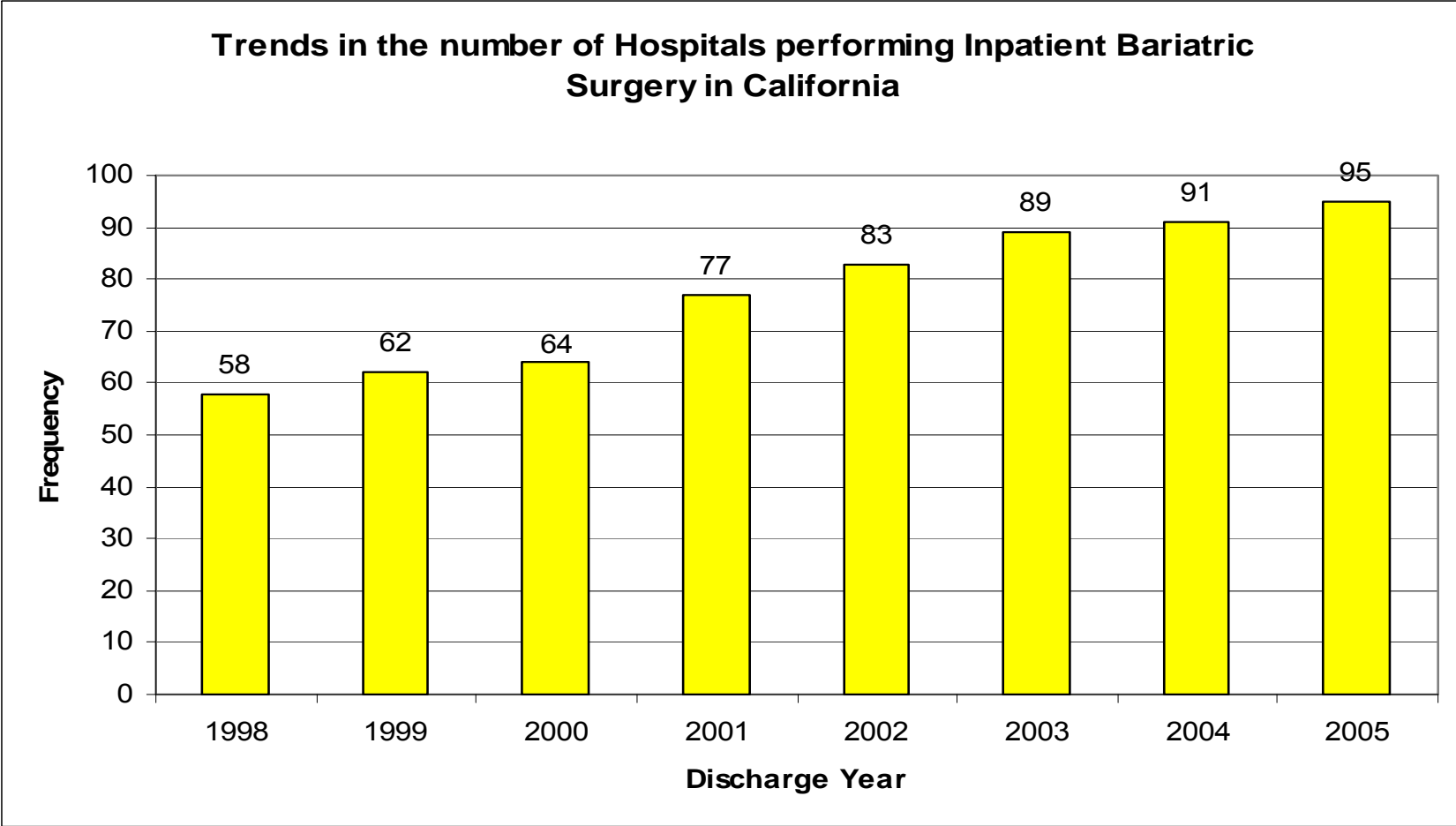
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Inpatient bariatric procedures decreased for the first time in 2005



Increasing trend in the number of hospitals performing bariatric surgery

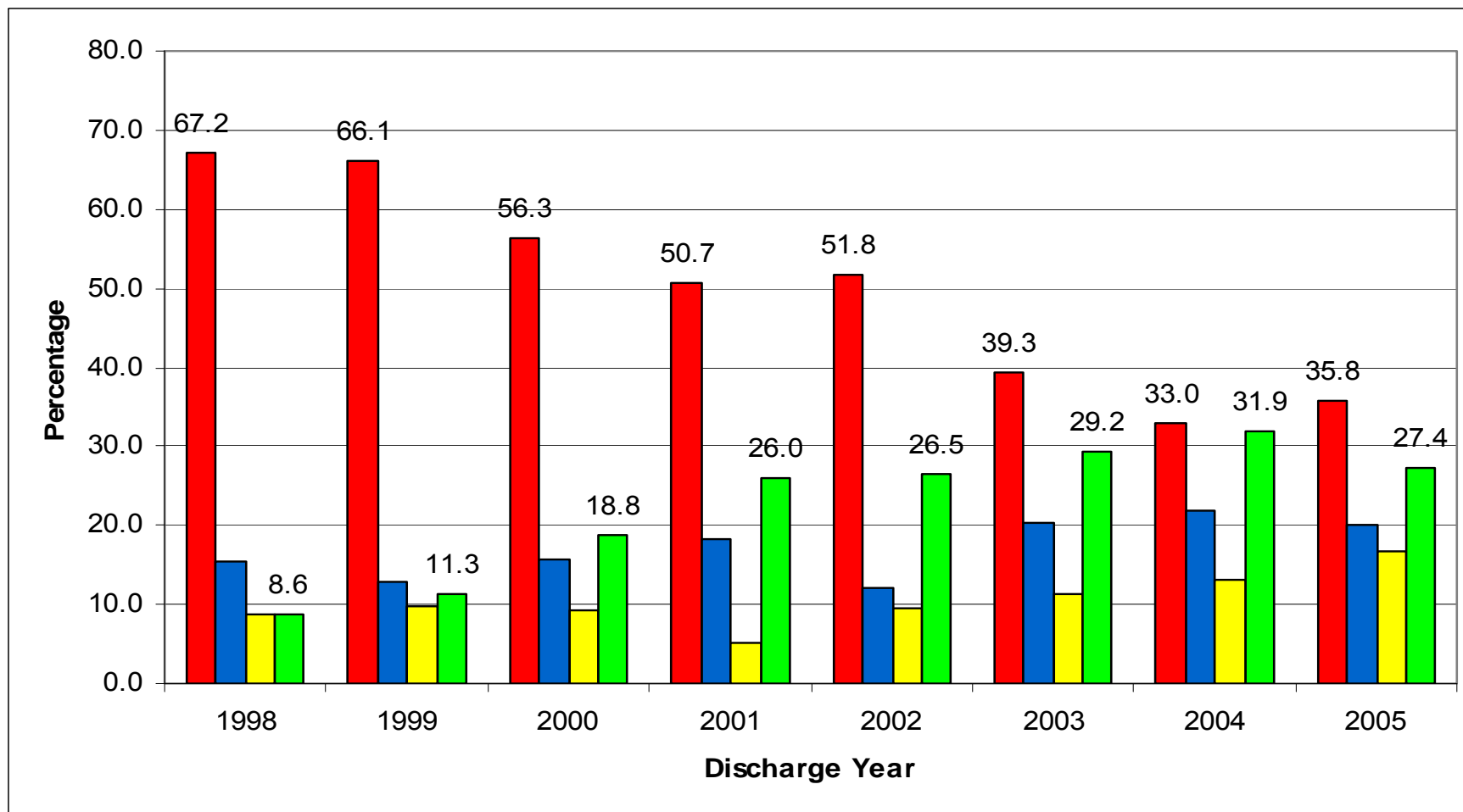


Volume Thresholds

- 50 – ACS Level 2 Accreditation
- 100 – Proposed Leapfrog Criteria
- 125 – ACS Level 1 Accreditation, SRC

Trends in Number of LV & HV California Hospitals performing Bariatric Surgery

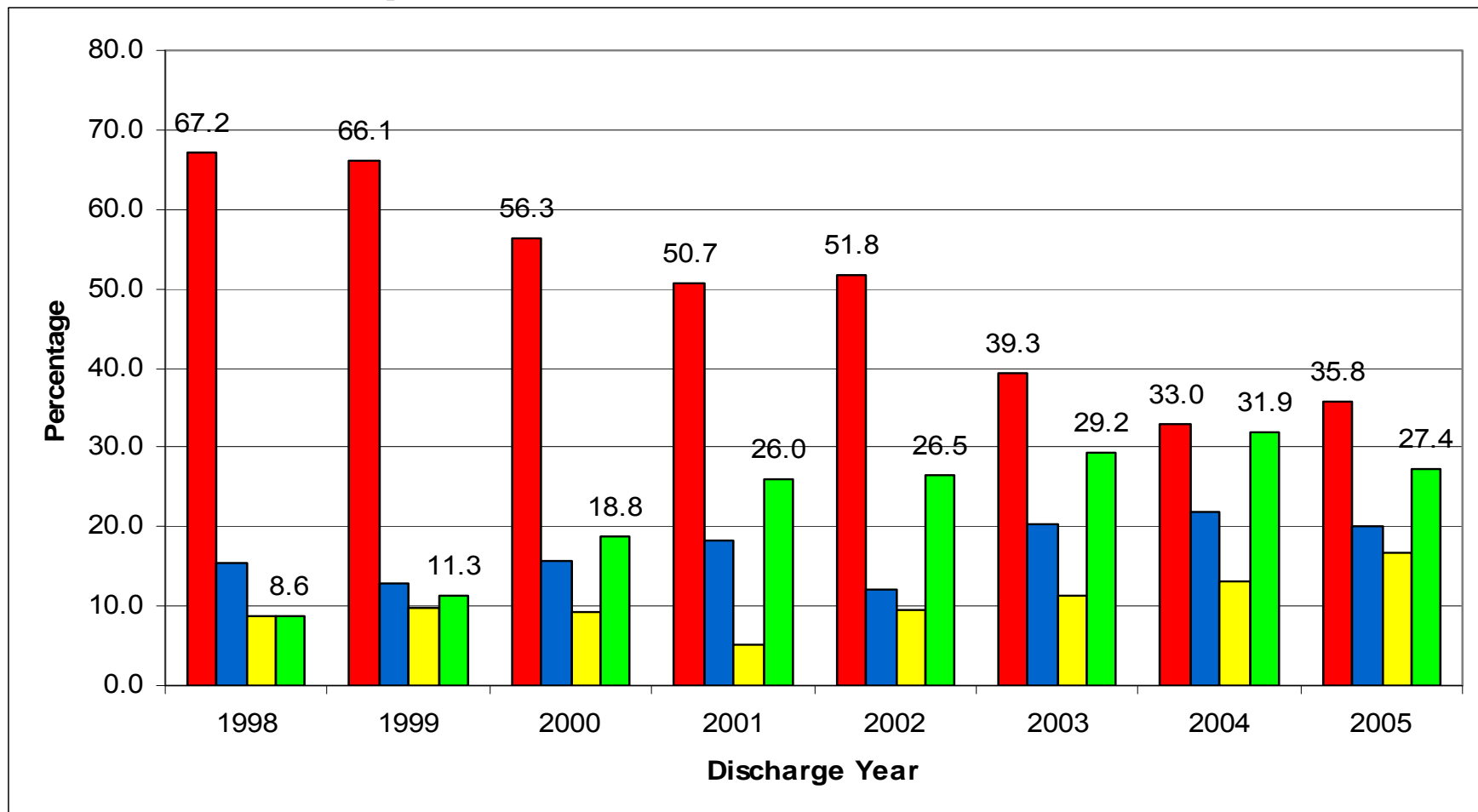
(RED: <50; BLUE: 50-100; YELLOW: 100-125; GREEN: 125+)



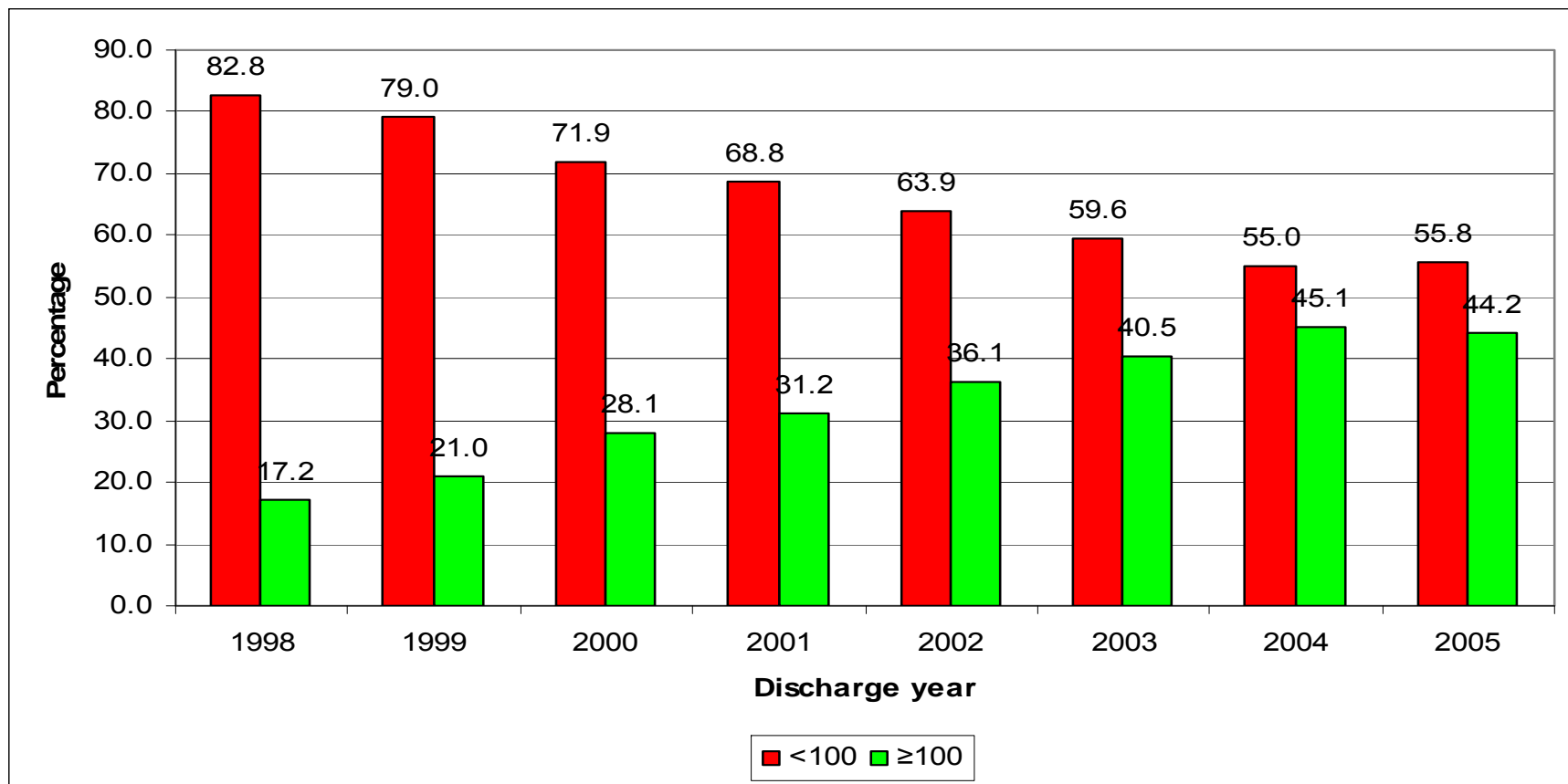
Trends in Number of LV & HV California Hospitals performing Bariatric Surgery

(RED: <50; BLUE: 50-100; YELLOW: 100-125; GREEN: 125+)

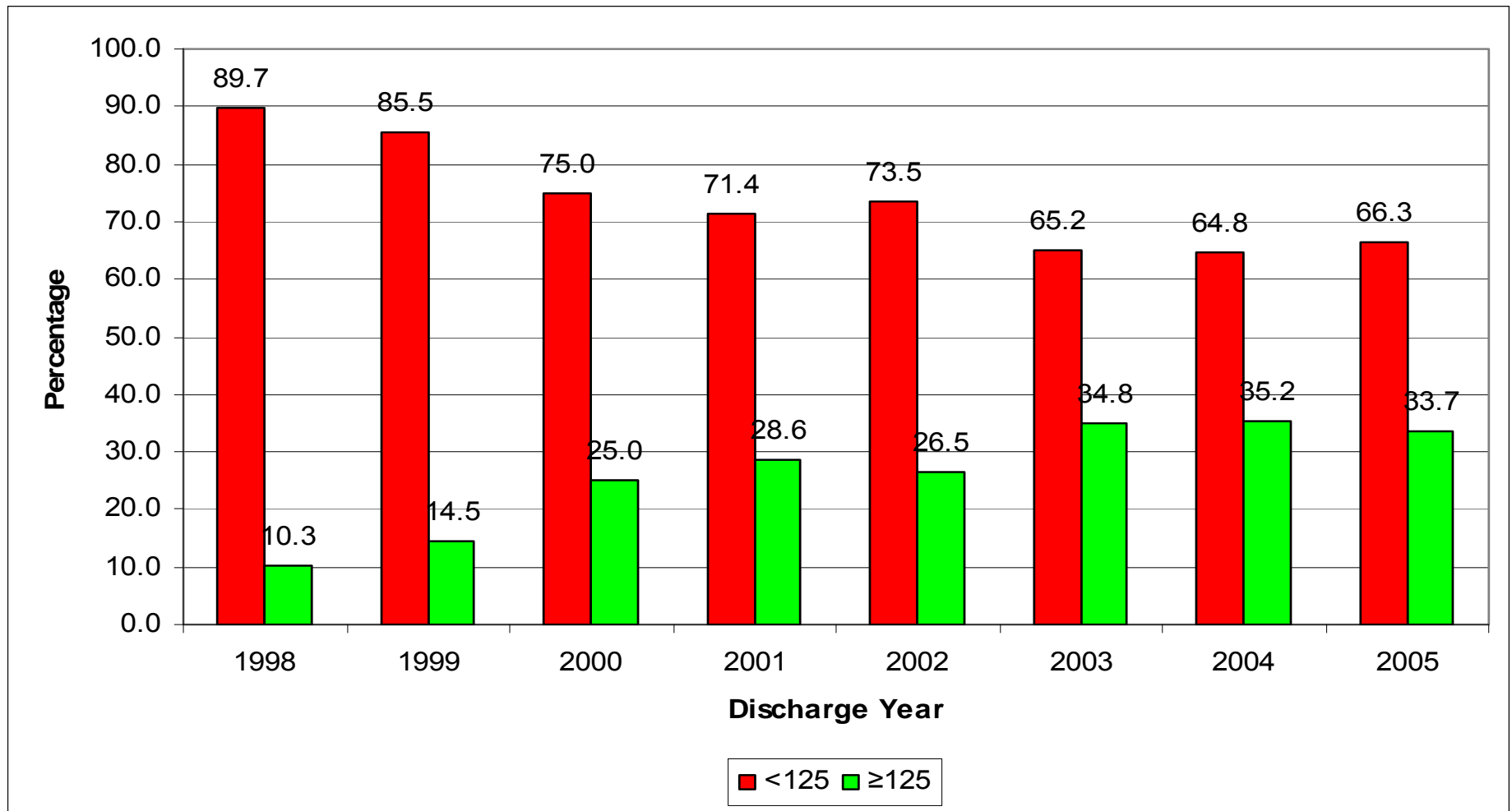
36% hospitals are low volume; 27% are HVH



Trends in Number of LV & HV California Hospitals performing Bariatric Surgery (100 is the Leapfrog Cutoff)



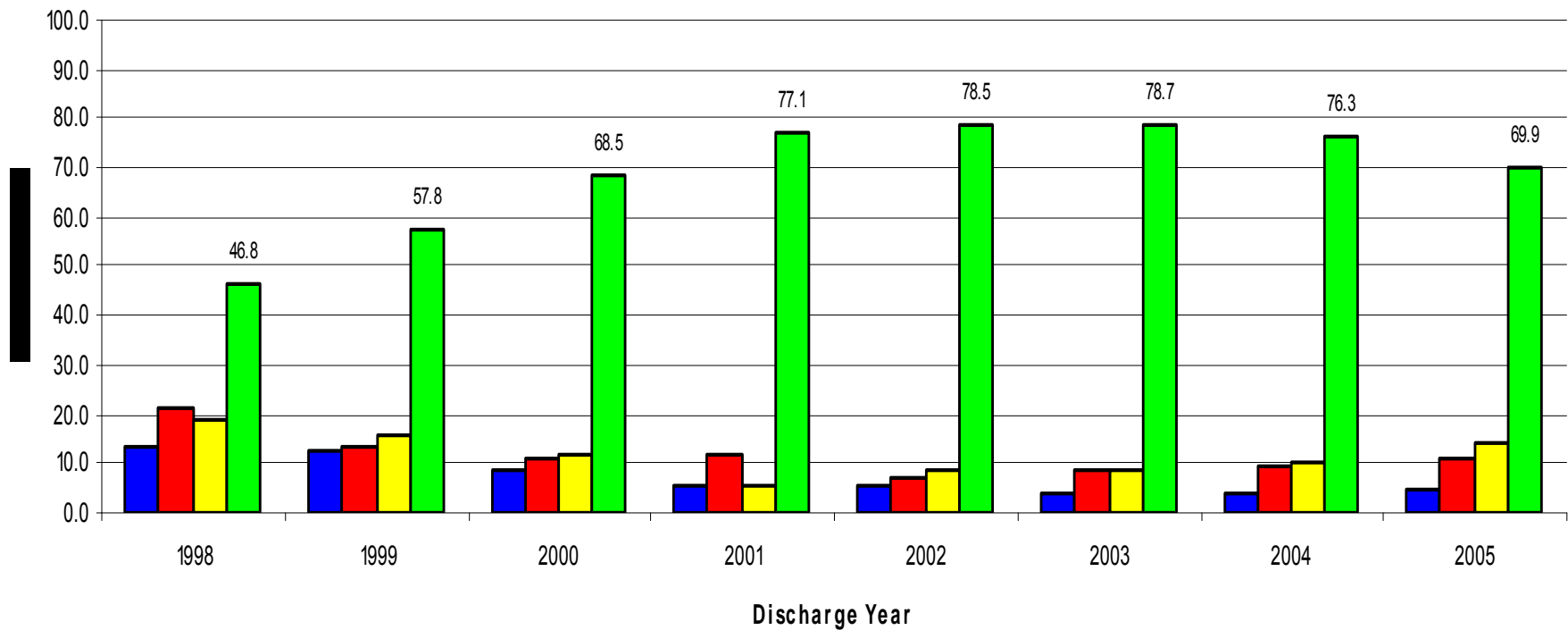
Trends in Number of LV & HV California Hospitals performing Bariatric Surgery (125 is the ACS and SRC cutoff)



Trends in Bariatric Procedures by Volume

69% of patients in HVH

Trends in number of Bariatric Procedures in California (1998 -2005) by Hospital Volume



So...

PATIENT CHARACTERISTICS

- **Obese population different than treated patients**

TRENDS:

- **Inpatient bariatric surgery has increased, but may now be decreasing**
- **Increasing number of hospitals performing bariatric surgery.**

VOLUME:

- **Most hospitals are LVH, but increasing proportion of HVH**
 - **70% of patients treated at HVH**

Does Volume Matter?

In-Hospital Mortality is low everywhere

| | In-Hospital Death Yes N (%) | In-Hospital Death No N (%) |
|-------|-----------------------------------|----------------------------------|
| <125 | 52 (0.3) | 16,159 (99.7) |
| ≥125 | 63 (0.1) | 54,626 (99.9) |
| TOTAL | 115 (0.2) | 70,785 (99.8) |

While higher hospital volume is associated with lower death, comorbidity associated with higher rate

| Variables | Haz. Ratio | P value | [95% Conf. | Interval] |
|------------------|-------------------|----------------|-------------------|------------------|
| | | | | |
| Charlson 1 | 0.88 | <0.0001 | 0.86 | 0.89 |
| Charlson 2 | 0.74 | <0.0001 | 0.72 | 0.76 |
| Charlson 3 | 0.65 | <0.0001 | 0.62 | 0.68 |
| Volume: 100+ | 1.46 | <0.0001 | 1.43 | 1.49 |

Bariatric Readmission in California

- Zingmond??

Volume, Costs, and Comorbidity/Risk

High volume is associated with lower reported charges (costs)

| Caseload | Mean (\$) |
|----------|-----------|
| < 50 | \$16,520 |
| >=50 | \$13,187 |
| | |
| <100 | \$17,401 |
| >=100 | \$12,635 |
| | |
| <125 | \$16,276 |
| >=125 | \$12,547 |

What is the factor that drives cost?

Older patients tend to stay longer (i.e. probable comorbid issues)

| Age | Length of Stay Mean (+/-SD) |
|------------|----------------------------------------|
| <50 | 3.2 (2.8) |
| >=50 | 3.7 (4.0)** |
| <60 | 3.3 (3.2) |
| >=60 | 4.2 (4.5)** |

** p-value <0.0001

Length of Stay Different by Number and Severity of Comorbidities

| Charlson | Length of Stay Mean (+/-SD) |
|-----------------|----------------------------------------|
| 0 | 3.1 (2.3) |
| 1 | 3.4 (2.9) |
| 2 | 4.1 (5.5) |
| 3 | 4.7 (5.2) |

Yet, No Difference in Mean Comorbidity Level* by Hospital Volume...

| Caseload | Mean Score |
|----------|------------|
| < 50 | 0.63 |
| >=50 | 0.63 |
| | |
| <100 | 0.64 |
| >=100 | 0.63 |
| | |
| <125 | 0.64 |
| >=125 | 0.63 |

* Comorbidity as defined by Charlson Index

So, regarding LOS

- Higher volume hospitals may care for the higher risk patients better.
- Accreditation Programs (ACS, SRC)

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Conclusions

PATIENT CHARACTERISTICS

- Population different than Treated Patients

TRENDS:

1. Inpatient bariatric surgery has increased, but may now be decreasing
 - Outpatient Lap Band
 - Jury still out on long term results; debated
2. Increasing number of hospitals performing bariatric surgery.

VOLUME:

1. Most hospitals are LVH, but increasing proportion of HVH
 - 70% of patients treated at HVH
2. Higher risk patients better at HVH

Conclusions (cont)

OUTCOME:

- **Mortality is low everywhere**
- **Difficult to evaluate complications.**
Readmission studied previously (DZ)

COST:

- **HVH have lower charges vs LVH**
- **Older and “sicker” patients stay longer. No identified difference in “case mix” by hospital volume, but differences in charges**

Discussion

- Quality of Care
- Accreditation
 - ACS
 - SRC

Future Work

- Quality of care measurement
- Outpatient procedures (lap band)
- Other procedures
- Longitudinal outcomes

Investigative Team

CMTP

- Sean Tunis
- Ryan Padrez

CSOQ

- Clifford Ko
- David Zingmond
- Sushma Jain

Additional Slides:
American College of Surgeons
Bariatric Accreditation Program

ACS Bariatric Centers

- Recognize two levels of inpatient facilities as well as outpatient surgical centers
 - Level 1a and Level 1b
 - Level 2a, Level 2b and Level 2 New Centers
 - Outpatient

Standards: ACS Bariatric Centers

- Human resources, physical resources, standards of practice, and documentation of outcomes

Level 1a and 1b Centers

- High volume practices (125 cases annually)
- Bariatric Surgery Director and Coordinator
- Most complex/challenging patients
 - All ages
 - All levels of obesity
- Must have provided services for 24 months before applying

Level 1 Centers continued

- Surgeons Board certified ABS
- 2 surgeons must perform 50 each annually
- Abide by credentialing criteria
- Capable managing full range of complications 24/7/365

Level 1 Services

- Consultant services – including pulmonology, cardiology, intensivists, infectious disease, nephrology, psychiatry, critical care services
- Anesthesiology – board certified
- Endoscopy Services – upper GI and bronchoscopy
- Minimally Invasive Surgery - GI tract, biliary system, and abdominal organs, anastomotic procedures
- Comprehensive Imaging Services - oversized equipment

Level 1 Facilities

- Full service operating rooms
- Recovery room
- Emergency room
- Dialysis
- Accommodations for morbidly obese

Level 1: Process and Outcomes

- Outcomes reporting
- Quality improvement
- Use of guidelines, best evidence
- Education/training of bariatric surgeons
- Patient selection process
- Patient education/counseling/informed consent
- Discharge/follow-up plan
- Post-op rehab

All Levels: Credentialing Criteria

- Criteria is procedure specific
- ACS sets surgeon credentialing standards, does not credential
- Criteria for:
 - Newly Trained Surgeons
 - Established Surgeons
 - Surgeon Re-credentialing

ACS Accreditation

- CMS endorsed
- JCAHO
- BCBS

Surgical Procedures Used Today¹

| | Malabsorptive ← | → Restrictive | | |
|---------------------------------|---------------------------------------------------|-----------------------------------------------------------|----------------------------------------|----------------------------------------------|
| | Roux-en-Y Gastric Bypass | Biliopancreatic Bypass w/ DS | Vertical Banded Gastroplasty | Lap-Band |
| Excess Weight Loss (at ~1 yr) | 57% - 67% | 66% - 74% | 62% - 75% | 40% - 54% |
| Mortality Rate | 0.5% | 1.1% | 0.1% | 0.1% |
| Hospital Stay | 2-3 days | 2-3 days | 2-3 days | <1 day |
| Operating Time | ~ 2 hours | ~3 hours | ~ 2 hours | ~ 1 hour |
| Diabetes Resolution (w/ 95% CI) | 77% - 90% of patients | 97% - 100% of patients | 55% - 88% of patients | 29% - 67% of patients |
| Problems | Dumping, obstruction, stomal complications | Technically difficult, nutritional insufficiencies | Increased LT complication rates | slow weight loss, infection, slippage |

1. Hospital stay and operating based on primary interviews; All other stats from: Buchwald, H., Avidor Y., et. al. Bariatric Surgery: A Systematic Review and Meta Analysis. Journal of American Medical Association, October 13, 2004.