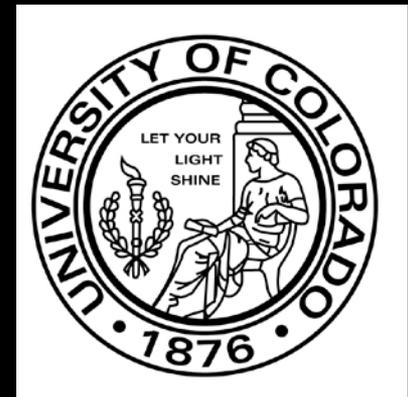


Surgical Care for the Underserved: US – We have our own problems

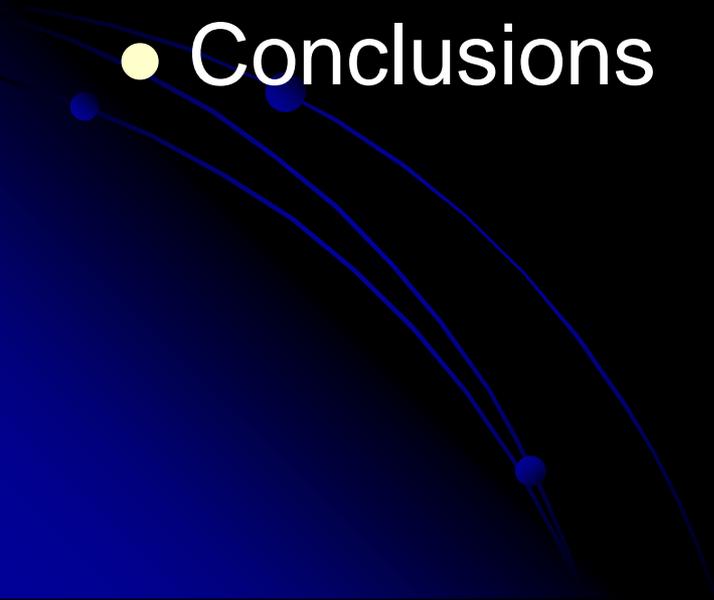
Gregg Marshall

Grand Rounds

February 27, 2012



Outline

- Introduction
 - US Statistics
 - Underserved populations in the US
 - Global Health – Lack of infrastructure
 - Conclusions
- 

US statistics

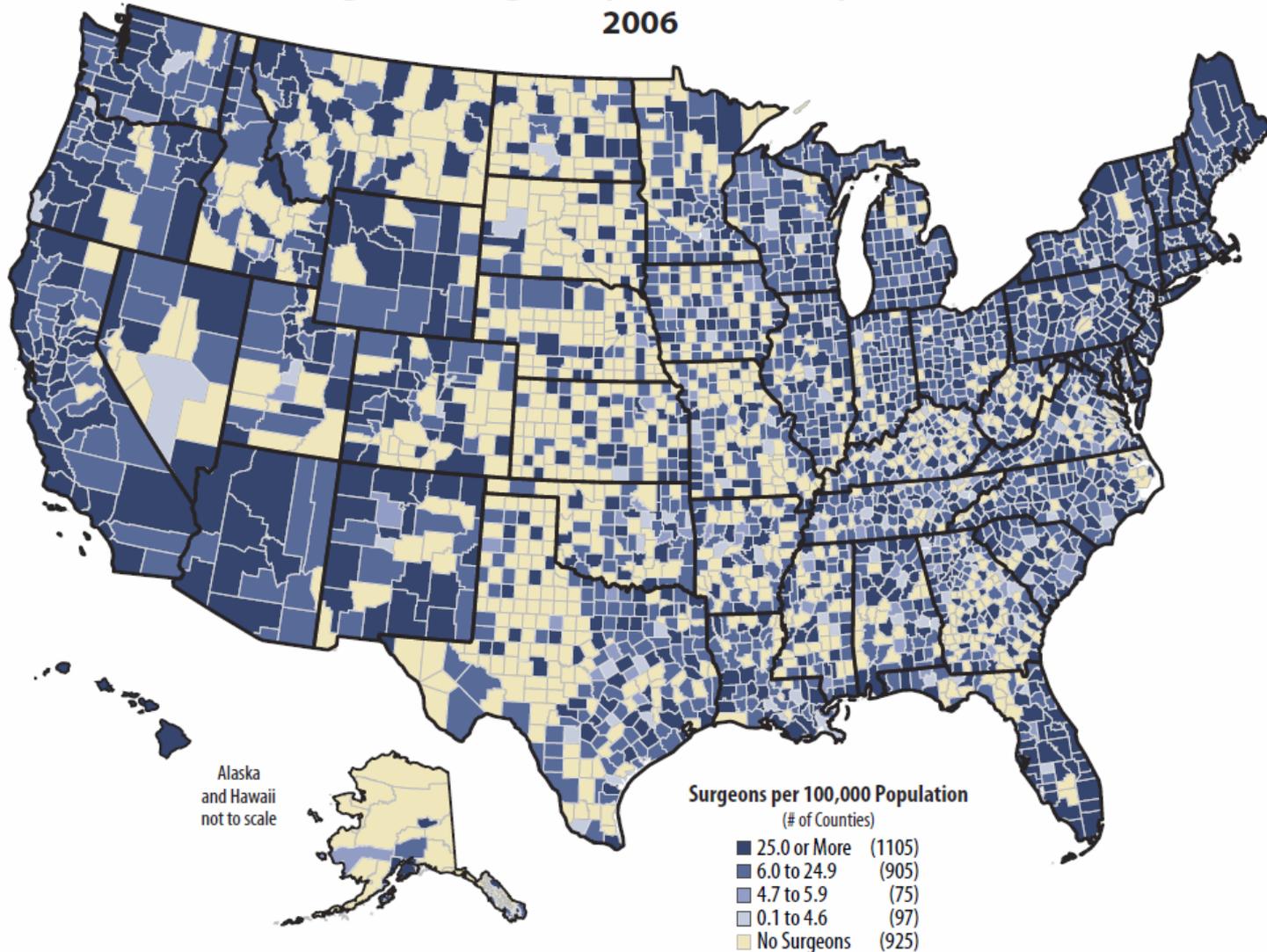
- There were 133,796 surgeons in active, post-residency practice in the U.S. in 2006
- Averages out to be ~45 surgeons per 100,000 persons
- 30% (925) of the 3,107 US counties lacked a single surgeon and nearly 9.5 million Americans lived in those counties

US Statistics

- The supply of surgeons in the United States is very uneven and this creates potential problems with access to surgical services
- A substantial number of Americans must travel to the next county or beyond to receive necessary or lifesaving surgical treatment

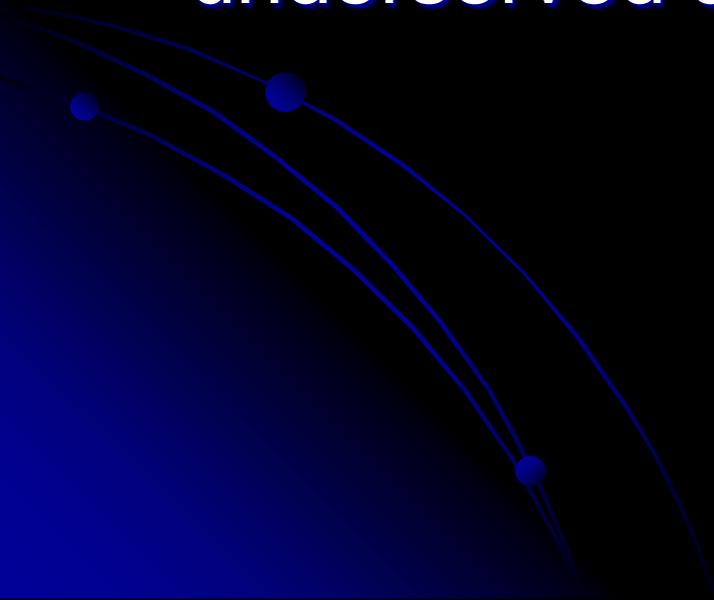
US statistics

Figure 1. Surgeons per 100,000 Population
2006



What does that mean?

- A substantial portion of our country can be characterized as surgically underserved, despite several programs designed to help sustain health care services in underserved communities



Minority Groups

Residential Segregation and Access to Surgical Care by Minority Populations in US Counties

- Cross sectional analysis of US counties
- Each county in the US was categorized into one of three levels: most, moderately, or least segregated, using the Isolation Index. (0-1.0 -> higher being more segregated)
- Linear regression analysis performed
 - Study association between access to surgical services and degree of segregation

Minority Groups

Table 2. Number of Counties by Level of Segregation

Mean Isolation Index for African Americans	No. of counties
0–0.15 (least segregated)	2,273
>0.16 to ≤0.30 (moderately segregated)	365
>0.30 (most segregated)	581

- Most segregated counties included Cook County, IL and Bullock, Alabama. (Index >0.7)
- Other metropolitan areas including Chicago and New York, featuring inner-city ethnic enclaves with low income (Index >0.50)

Minority Groups

Table 3. Linear Regression β Coefficients Representing Mean Differences in Health Care Indices within US Counties by Racial Composition in the Most Segregated Counties

β coefficient for:	African American	95% CI	Hispanic	95% CI	Asian	95% CI
No. of doctors per 1,000 population	-0.098	-0.13 to -0.066 (p < 0.0001)	-0.008	-0.01 to -0.006 (p < 0.0001)	0.11	0.095 to 0.138 (p < 0.0001)
No. of emergency visits per 1,000 population	-7,661.16	-10,138.17 to -5,184.16 (p < 0.0001)	543.97	716.53 to 371.41 (p < 0.0001)	5,985.66	4,291.91 to 7,679.40 (p < 0.0001)
No. of general surgeons per 1,000 population	-0.005	-0.008 to -0.003 (p < 0.0001)	-0.0005	-0.0007 to -0.0004 (p < 0.0001)	0.004	0.002 to 0.005 (p < 0.0001)
Ambulatory surgical centers per 1,000 population	-0.0007	-0.001 to -0.0002 (p = 0.004)	-0.00004	-0.00008 to -0.00001 (p = 0.011)	0.0001	-0.0001 to 0.005 (p = 0.299)
No. of outpatient surgical procedures per 1,000 population	-4.21	-5.98 to -2.44 (p < 0.0001)	-0.41	-0.54 to -0.29 (p < 0.0001)	1.77	0.56 to 2.98 (p = 0.004)
No. of inpatient surgical procedures per 1,000 population	-2.64	-3.82 to -1.47 (p < 0.0001)	-0.17	-0.26 to -0.09 (p < 0.0001)	1.34	0.54 to 2.14 (p = 0.001)

Minority Groups

- In the most segregated counties:
- Mean increase of 1% in either the percentage of African-American or Hispanic population = decrease in:
 - number of general surgeons ($p < 0.0001$)
 - ambulatory surgical centers ($p < 0.0001$)
 - number of outpatient /inpatient surgical procedures ($p < 0.0001$)

Health Care Spending

Americans spent \$2.6 trillion on health care in 2010, a staggering 18% of GDP.



Outcomes

Primary Payer Status Affects Mortality for Major Surgical Operations

Damien J. LaPar, MD^{*}, Castigliano M. Bhamidipati, DO^{*}, Carlos M. Mery, MD, MPH^{*}, George J. Stukenborg, PhD[†], David R. Jones, MD^{*}, Bruce D. Schirmer, MD^{*}, Irving L. Kron, MD^{*}, and Gorav Ailawadi, MD^{*}

^{*} Department of Surgery, University of Virginia Health System, Charlottesville, VA

- 2003 to 2007 - 893,658 major surgical operations were evaluated using the Nationwide Inpatient Sample (NIS) database
- Procedures: lung resection, esophagectomy, colectomy, pancreatectomy, gastrectomy, abdominal aortic aneurysm repair, hip replacement, and CABG
- Patients were stratified by primary payer status: Medicare (n = 491,829), Medicaid (n = 40,259), Private Insurance (n = 337,535), and Uninsured (n = 24,035).

Outcomes

- Primary outcomes
 - adjusted in-hospital mortality
 - In-hospital complications (8)
 - hospital length of stay
 - total costs
- Multivariate analysis
 - patient age, gender, elective operative status, mean income, hospital geographic region, teaching hospital status, type of operation, primary payer status, and categories for comorbid disease

Outcomes

TABLE 4

Unadjusted Outcomes for all Patients Undergoing Major Surgical Operations by Primary Payer Group

Outcome	Medicare	Medicaid	Uninsured	Private Insurance	<i>P</i>
In-hospital mortality	4.4%	3.7%	3.2%	1.3%	<0.001
Wound complication	1.4%	1.7%	1.4%	1.1%	<0.001
Infectious complications	2.0%	3.4%	2.8%	2.0%	<0.001
Urinary complications	1.8%	1.0%	0.8%	1.0%	<0.001
Pulmonary complications	9.7%	9.3%	8.3%	6.7%	<0.001
Gastrointestinal complications	4.5%	4.7%	4.6%	4.3%	<0.001
Cardiovascular complications	6.7%	4.1%	4.3%	4.0%	<0.001
Systemic complications	1.5%	1.8%	1.4%	1.5%	<0.001
Procedure-related complications	3.9%	3.8%	3.5%	3.1%	<0.001
Length of stay (d)	9.5 ± 0.1	12.7 ± 0.4	10.1 ± 0.3	7.4 ± 0.1	<0.001
Total cost (\$)	76,374 ± 53.1	93,567 ± 251.4	78,279 ± 231.0	63,057 ± 53.0	<0.001

Outcomes

TABLE 5

In-Hospital Mortality for all Patients Undergoing Major Surgical Operations by Primary Payer Group

Outcome	Medicare	Medicaid	Uninsured	Private Insurance	<i>P</i>
Lung resection	4.3%	4.3%	6.2%	2.0%	<0.001
Esophagectomy	8.7%	7.5%	6.5%	3.0%	<0.001
Colectomy	7.5%	5.4%	3.9%	1.8%	<0.001
Pancreatectomy	6.1%	5.8%	8.4%	2.7%	<0.001
Gastrectomy	10.8%	5.4%	5.0%	3.5%	<0.001
AAA	12.4%	14.5%	14.8%	7.0%	<0.001
Hip replacement	0.4%	0.2%	0.1%	0.1%	<0.001
CABG	4.0%	2.8%	2.3%	1.4%	<0.001

CABG indicates coronary artery bypass grafting; AAA, abdominal aortic aneurysm.

Outcomes

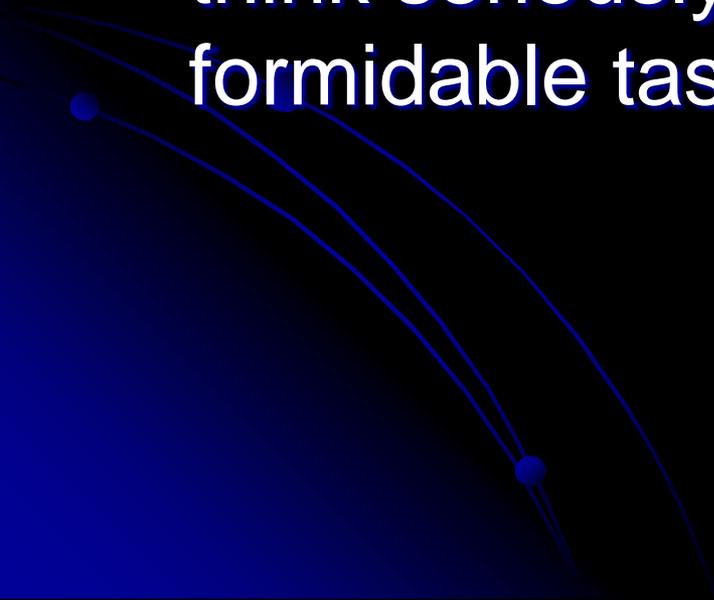
TABLE 6

Adjusted Outcomes for the Effect of Primary Payer Status Among Patients Undergoing Major Surgical Operations

Outcome	Medicare	Medicaid	Uninsured	Private Insurance	AUC
In-hospital mortality	1.54 (1.48–1.61)*	1.97 (1.84–2.10)*	1.74 (1.60–1.90)*	1.0	0.86
Wound complication	1.16 (1.13–1.18)*	1.23 (1.18–1.28)*	1.06 (1.01–1.12)*	1.0	0.68
Infectious complications	1.11 (1.09–1.14)*	1.24 (1.20–1.27)*	1.02 (0.98–1.06)	1.0	0.79
Urinary complications	1.15 (1.12–1.18)*	1.02 (0.97–1.08)*	0.94 (0.88–0.99)*	1.0	0.72
Pulmonary complications	1.06 (1.05–1.07)*	1.13 (1.11–1.15)*	0.96 (0.94–0.99)*	1.0	0.77
Gastrointestinal complications	1.08 (1.06–1.09)*	0.99 (0.97–1.02)	0.88 (0.86–0.91)*	1.0	0.81
Cardiovascular complications	1.12 (1.10–1.13)*	1.04 (1.01–1.07)*	1.00 (0.97–1.03)	1.0	0.78
Systemic complications	0.99 (0.97–1.01)	1.12 (1.08–1.16)*	0.94 (0.90–0.99)*	1.0	0.61
Procedure related complications	1.10 (1.08–1.12)*	1.10 (1.07–1.13)*	0.97 (0.94–1.01)	1.0	0.69
Length of stay (d)*	8.77 % 0.01	10.49 % 0.04	7.01 % 0.03	7.38 % 0.01	—
Total costs (\$)*	\$69,408 % 53.1	\$79,140 % 251.4	\$65,667 % 231.0	\$63,057 % 53.0	—

* $P < 0.05$. In-hospital mortality and postoperative complications reported as adjusted odds ratios (95% confidence interval). Length of stay and total costs reported as adjusted means \pm standard deviation. Reference group: primary payer status (private insurance). Outcomes adjusted for patient age, gender, elective operative status, mean income, hospital geographic region, teaching hospital status, type of operation, primary payer status, and categories for comorbid disease.

Global Surgical Care

- Dr. Kulongowski is going to show you a number of sad statistics about surgical care in the rest of the world. While I don't deny that there are issues, we need to think seriously before taking on such a formidable task.
- 

Global Surgical Care

- Even the advocates of global health admit that the infrastructure is inadequate.
 - Poor working environment with no electricity or clean water, poor instrumentation, or anesthesia
 - We can do more harm than good!
- 

Global Surgical Care

WHO Guidelines for Safe Surgery 2009

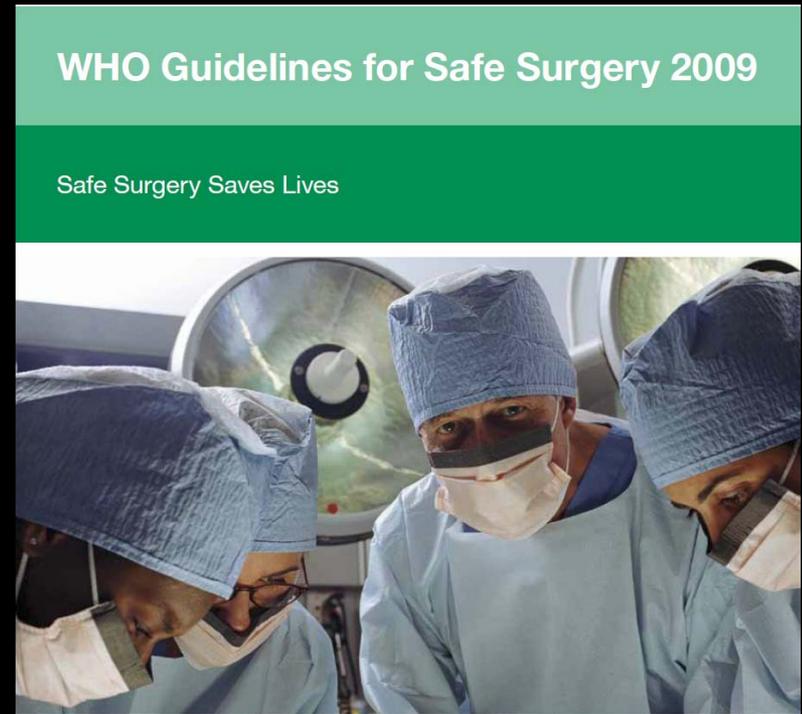
Safe Surgery Saves Lives



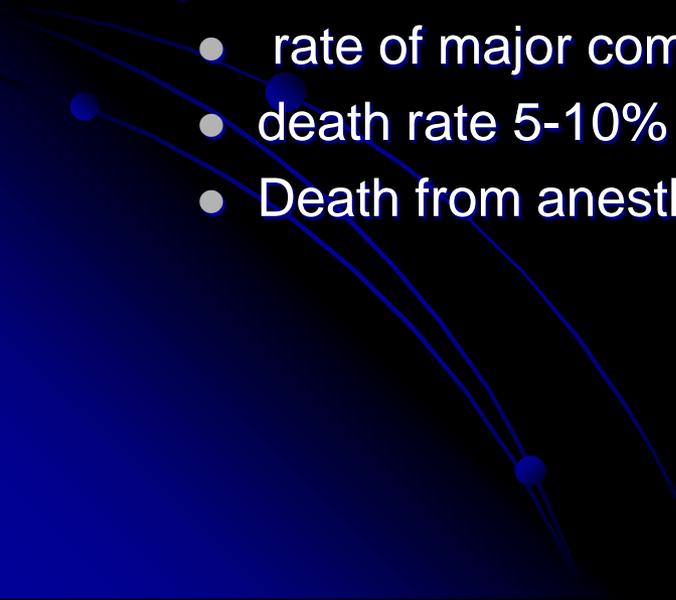
- Complications of surgical care have become a major cause of death and disability worldwide.
- It is a significant public health concern!

Global Surgical Care

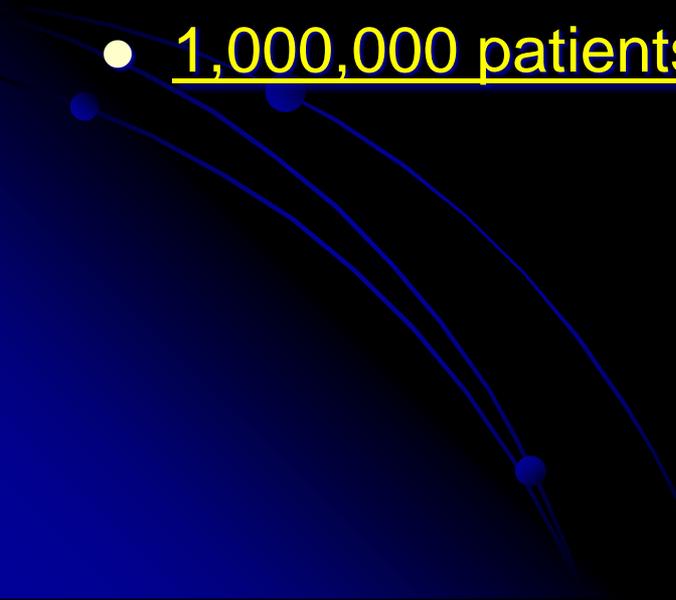
- Data from 56 countries showed that in 2004
 - annual volume was an estimated 187–281 million operations
- one operation annually for every 25 human beings alive



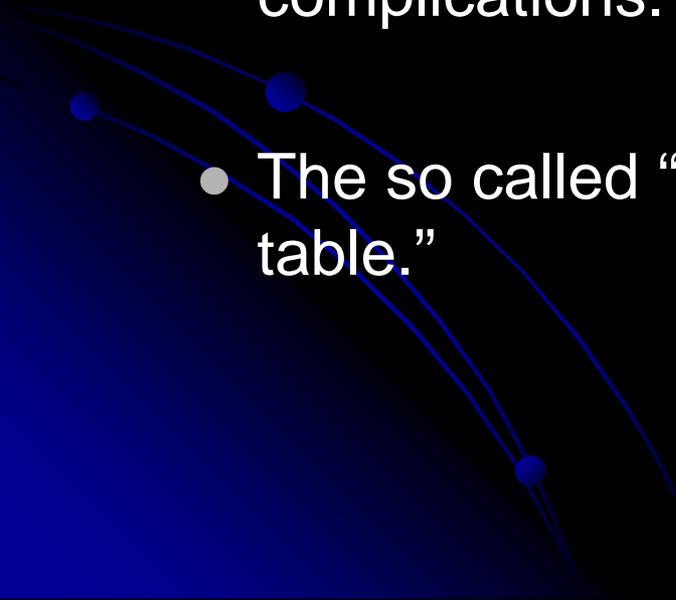
Global Surgical Care

- In **industrialized countries** where surgical procedures are performed:
 - rate of major complications 3–22%
 - death rate 0.4–0.8%
 - In **developing countries** where surgical procedures are performed:
 - rate of major complications >30%
 - death rate 5-10%
 - Death from anesthesia 1 in 150 in some parts of Africa
- 

Global Surgical Care

- Assuming a 3% perioperative complication rate and a 0.5% mortality rate globally =
 - 7,000,000 surgical patients suffer significant complications each year
 - 1,000,000 patients die during or immediately after surgery
- 

Global Surgical Care

- Poor post operative care and follow-up.
 - Many surgical teams “fly in” for 1 - 2 weeks and perform complex procedures
 - They provide little in the way of instruction to local surgeons and are not around to deal with the complications.
 - The so called “limiting of the responsibility to the OR table.”
- 

Conclusions

- The supply of surgeons in the United States is very uneven
- A substantial number of Americans must travel significant distances to receive necessary or lifesaving surgical treatment
- Poor infrastructure and post op follow- up leads to significant morbidity and mortality in the rest of the world
- We should consider addressing issues in the US before spending trillions of dollars on the rest of the world