Epidemics of Obesity in the United States
It has recently become obvious that the prevalence of obesity has been rapidly increasing in the United States... Obesity is definitely associated with a relative increase in diabetes, cardiovascular disease, various cancers, respiratory disorders in sleep, gallbladder disease and osteoarthritis. It also has negative effects on a variety of other conditions such as pregnancy complications, menstrual disorders, psychological disorders, and urinary stress incontinence. It is an integral component of the metabolic syndrome...

➢ Obesity is a number 1 cause of preventable deaths. In the USA, an estimated 400,000 annual deaths (Mokdat JAMA 2000) in the US is attributable to obesity and poor diet.
Morbid Obesity

In 1997 World Health Organization (WHO) and in 1998 National Institute of Health (NIH) endorsed the BMI as a measure of obesity.

• BMI < 18.5 kg/m² – underweight

• BMI 18.5-24.9 kg/m² – normal range

• BMI > 25 as “overweight” with 3 classes of “obesity”
  
  I. Class I = BMI 30 - 34.9 kg/m² - moderate
  II. Class II = BMI 35 – 39.9 kg/m² - severe
  III. Class III = BMI > 40kg/m² – very severe
  IV. Class IV = BMI > 50 kg/m² – super-obesity
Demographic Data

• 1 in 3 American adults are obese, while 1 in 6 American children are obese
  • Highest rates of obesity found in West Virginia (37.7%), Mississippi (37.3%), Alabama & Arkansas (35.7)

• Obesity rates have doubled in adults and tripled in children since 1980’s

• Obesity rates are now starting to level off and even decline in some parts of the country
National Health and Nutrition Examination Survey (NHANES), 2011-2014 data

Obesity Rate for Children Ages 2 to 19 by Race and Ethnicity

- Latinos: 21.9%
- Blacks: 19.5%
- Whites: 14.7%
- Asians: 8.6%

Obesity Rates for Adults by Race and Ethnicity

- Latinos: 42.6%
- Blacks: 48.4%
- Whites: 36.4%
- Asians: 12.6%
Global Prevalence

- Obesity is a threat to public health in **developed** countries globally, especially in urban areas.

- European obesity prevalence has doubled since the 1980’s
  -Highest prevalence rates found amongst adults in UK (24.4%) & Germany (14.7%)

- Linkage between socioeconomic standing/gender and obesity in Europe

- Linkage between race and obesity found to have stronger correlational ties in the United States
Years of Life Lost (YLL) for white men aged 20-30 years with a severe level of obesity (BMI >45) is 13 years of life and represents approximately 22% reduction in expected life span. (JAMA, Jan 8, 2003: 187-193)

Example: Life expectancy of a 20-year-old morbidly obese male is 13 years shorter than a normal-weight male of the same age.
The relative risk of death and disease for a person of BMI 40 kg/m² compares with that of normal BMI 20-25 kg/m². All risks are approximations compiled from cited literature.

<table>
<thead>
<tr>
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<tr>
<td>Type 2 Diabetes</td>
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<td>Stroke</td>
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<td>Endometrial carcinoma</td>
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<td>syndrome</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Gout</td>
<td>Anaesthetic risk</td>
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</table>
Obesity & Healthcare

• $150 billion in healthcare costs annually
  • Severe obesity complication costs Medicaid programs between $5 million (Wyoming)- $1.3 billion (California) a year varying on state.

• Reducing obesity, improving nutrition and increasing activity can help lower costs through fewer doctor's office visits, tests, prescription drugs, sick days, emergency room visits and admissions to the hospital and lower the risk for a wide range of diseases.
Obesity & Diabetes

• As rates of obesity fall & level off in the country, similar trends can be seen in incidence cases of Diabetes

• Type II Diabetes accounts for 90-95% of diagnosed cases in the country (~25.8 million Americans or 8.3% of total pop.)

• > 90% of Type II diabetics are obese, ~ 30% of obese individuals have the disease

• Risk factors:
  - Being overweight
  - Age of ≥ 45
  - Family history of Diabetes
  - Not being physically active < 3 times a week
In 2012 the United States estimated GDP was $16.16 trillion

- ~$3 trillion estimated expenditure on United States Health Care in 2012
- $245 billion spent on diabetic related complications in 2012
- $176 billion direct costs vs. $69 billion indirect costs
“People with diagnosed diabetes accounts for 1 in 5 health care dollars in the U.S., and more than half of that expenditure is directly attributable to diabetes...”

• $322 billion cost of diabetic complications in the United States in 2013
  ➢ ~ 45% increase from previous $174 billion in 2007

• United States health care expenditure (NHE) in 2012 was an estimated ~ $3 trillion (Forbes, 2012)
Obesity & Diabetes

• Average diabetic incurs $13,700 in medical expenses a year (~57% is attributed directly to diabetes)
  - Medical expenditures & hospital inpatient care (43%)
  - Prescription medications (18%)
  - Antidiabetic agents & supplies (12%)
  - Physician office visit (9%)
  - Residential facility (8%)

• 2.3 x higher than for those without diabetes

American Association of Diabetes, 2012
Obesity & Diabetes

“For men and women with moderate physical activity, life expectancy without diabetes at age 50 years was 2.3 years longer than for subjects in the low physical activity group. For men and women with high physical activity, these differences were 4.2 and 4.0 years, respectively. Life expectancy with diabetes was 0.5 and 0.6 years less for moderately active men and women compared with their sedentary counterparts. For high activity, these differences were 0.1 and 0.2 years, respectively...”

• Average of 8.5 years total taken off of the average diabetics life span (National Academy of Aging Society, 2010)

• Diabetes remains the 7th leading cause of death in the United States in 2015
  – 79,535 death certificates listing it as the underlying cause of death
  – 252,806 death certificates listing diabetes as an underlying or contributing cause of death.

• Diabetes may be an underreported cause of death
Weight Loss Surgery

- Dietary, lifestyle modifications, exercise programs and medical therapy are all unsuccessful in providing patients with a significant and sustained weight loss, the natural history of morbid obesity is continuing weight gain, development of comorbidities and premature death.

- Number of bariatric weight loss surgeries increase 5-6% yearly in America

- Utilized for obese patients with a Body mass index of 40 or 35 with comorbidities to achieve long term weight loss through both invasive and noninvasive techniques

- $528 million dollar market in 2014 with expectations to more than double by 2020.

- Estimated 196,000 weight loss surgeries in 2015 with a continual rise from 158,00 weight loss related surgeries in 2011.
Procedures

• RNY Gastric Bypass
• Gastric Band
• Sleeve Gastrectomy
• BPD/DS
• Revisions
• Balloons
• V-blow
# Procedure Data

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<tr>
<td>Total</td>
<td>158,000</td>
<td>173,000</td>
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<tr>
<td>RNY</td>
<td>36.7%</td>
<td>37.5%</td>
<td>34.2%</td>
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<td>Band</td>
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<td>Sleeve</td>
<td>17.8%</td>
<td>33%</td>
<td>42.1%</td>
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<td>BPD/DS</td>
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<td>Revisions</td>
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<td>Other</td>
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<tr>
<td>Balloons</td>
<td>~700 cases</td>
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<td>V-Bloc</td>
<td>18 cases</td>
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</table>

“As the obesity epidemic has surged across America, more and more people with weight struggles are turning to weight loss, or bariatric, surgeries as a treatment. But ever since the lap band entered the mix in 2001, it’s gone from being one of the most common bariatric surgeries to the least. Mounting, longer-term research has emerged showing that lap bands too often lead to medical complications and that they’re inferior to other obesity surgeries when it comes to weight loss …”

(ASMBS, 2016)
Diabetes was resolved in 87.7% of patients and improved in 12.3% of patients.

100% of patients who underwent laparoscopic RY gastric bypass had resolved or improved diabetes.
Post Operative Weight Loss

Results obtained from ~ 1200 patients (Tyler Bariatrics, 2013)
Hb A1C levels elevated pre op, > 6

(n=78)
Insulin levels – elevated pre op, >16

(n=37)
Insulin levels – normal vs abnormal pre op

(n=34)
Glucose levels – elevated pre op

Paired t-test
P<0.001

(n=102)

Abnormal glucose, >110
<table>
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<tr>
<th>Comorbidities</th>
<th>Resolved %</th>
<th>Improved %</th>
<th>Resolved or Improved %</th>
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<td>Diabetes</td>
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</table>
Conclusions

Weight reduction surgery in morbidly obese patients produces effective weight loss and decreases long-term direct health care costs.

The initial costs of surgery can be amortized over 3.5 years.

John Sampalis PhD, Nicolas V Christou, MD PhD

*Obesity Surgery, 14, pp 939-947*
References