Minimally Invasive Solutions to Diabetes and Obesity

Kent Sasse, M.D., MPH, FACS, FACRS
Kent C. Sasse, M.D.,
MPH, F.A.C.S, F.A.C.R.S.

Dr. Sasse
UCSF
Fellowship trained Lahey, Boston
Colon and Rectal Surgery
Minimally Invasive Specialist
University School of Medicine Faculty
Alpha Omega Alpha
Performed first Laparoscopic Gastric Bypass in northern Nevada

Kent Sasse, MD, MPH, F.A.C.S, F.A.C.R.S.

Integrated Approach to Obesity and Type 2 Diabetes

• Emerging science of obesity
• Treatment Spectrum
• Supplements
• Medications
• Surgery
• Resolving Diabetes and PreDiabetes
Energy Balance Equation

Intake
- Hunger
- Satiety
- Nutrient Absorption

Expenditure
- Metabolic Rate
- Thermogenesis
- Activity

Obesity results from small errors

<table>
<thead>
<tr>
<th>Energy Intake in a Year</th>
<th>Error of 0.4%</th>
<th>or</th>
</tr>
</thead>
<tbody>
<tr>
<td>912,500 calories</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gaining 1 pound (0.45 kg) in a year

<table>
<thead>
<tr>
<th>4,050 calories</th>
<th>11 calories/day</th>
</tr>
</thead>
</table>
The Subtlety of Severe Obesity

A consistent energy excess of < 30 kcal/day will generate > 100-pound weight gain during adult life.

30 kcal/day corresponds to a 1.5% mismatch between energy intake and expenditure.

Kent C. Sasse, M.D.

Yes, The Genes have changed…

...Just not your genes.

Wheat today has higher glycemic index than table sugar.

The Food supply today is:

Sweeter, whiter, less green, less purple, less bitter.
Obesity and Health Risks or Comorbidities

More than 30 medical conditions stem from obesity

- 80% of Type II Diabetes related to obesity
- 70% of Cardiovascular Disease related to obesity
- 42% Breast and Colon cancer diagnosed among obese individuals
- 30% of Gall Bladder surgery related to obesity
- 26% of obese people having High Blood Pressure

Obesity

- Very common
- Growing
- Complex physiology
- Clinically heterogeneous
- Resistant to treatment
- Frustrating
- Global health priority
- Associated with cancer
Epidemiology and definitions

- Diabetes (Hgb A1c >6.5% or FBS 100-125)
  - 26 million
- Pre-Diabetes (HgbA1c 6.0-6.5% or FBS>125)
  - 79 million!
  - 33% of pre-diabetics develop diabetes within 3 years

CDC 2011 data
Diabetes: Bad News

- #1 cause of blindness
- #1 cause of kidney failure
- #1 cause of amputations

Epidemiology: Very Bad News

*Source: Center for Disease Control and Prevention*
Kent C. Sasse, M.D.

Obesity by the Numbers

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight U.S. adults</td>
<td>67%</td>
<td></td>
</tr>
<tr>
<td>U.S. adults with obesity</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>U.S. children with obesity</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Annual U.S. health care expenditures for obesity</td>
<td>&gt; $168 billion</td>
<td></td>
</tr>
<tr>
<td>U.S. consumer expenditures for weight loss products</td>
<td>&gt; $50 billion</td>
<td></td>
</tr>
<tr>
<td>Weekly deaths from obesity complications</td>
<td>&gt; 6,000</td>
<td></td>
</tr>
</tbody>
</table>

Kent C. Sasse, M.D.

Negative Energy Balance in Rats:

A Physiologic "Set Point"
Kent C. Sasse, M.D.,

Positive Energy Balance in Rats

![Graph showing body weight over days for Overfed, Control, and FoodRestricted groups.]

Myth 1

Weight can be effectively controlled by adjusting the number of calories through diet and exercise.
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Feedback Regulation of Energy Metabolism

- Sensory Organs
- GI Tract
- Environmental sensing
- Muscle
- Liver Bone
- Irisin?
- Metabolic activity and needs
- Food intake
- Nutrient handling
- Energy expenditure
- Adipose tissue
- Energy stores

GI Regulation of Metabolic Function

- Central Mechanisms
- Appetite
- Energy balance
- Glucose metabolism
- Weight Loss
- Improved Diabetes
- Liver
- Pancreas
- Nutrients
Environmental Drivers to Obesity

(1) Altered food supply
(signaling more than calories)

(2) Decreased physical activity
(effects on muscle more than calories)

(3) Stress and distress
(direct impact on relevant areas of the brain)

(4) Drugs
(accounts for up to 10%)


Gut Hormone Changes Persistently Oppose Diet-induced Weight Loss
Defense of a Body Fat Storage “Set Point”

Energy Intake

Energy Expenditure

(+) Energy Balance

(-) Energy Balance

Body Mass Index (kg/m²)

Historical view

- Lifestyle choice
- Characterological flaw (willpower, psychology)

Current perspective

- Complex physiology
- Epidemic from changes in modern environment
- Widely recognized as a disease
- Huge burden of associated illness — a cause of more than 60 medical disorders (incl. 12 types of cancer)
- Devastating effect on efficacy and quality of life

Etiology of Obesity

Adapted from Weigle DS. FASEB Journal 1994;8:302-310.
Kent C. Sasse, M.D.,

Obesity: A Failure of Weight Regulation

Genetics → Developmental programming → Environment

Implications for Obesity Therapy

- Effective therapies of obesity will need:
  - Promote changes in the energy set point
  - Affect the weight regulatory system at multiple levels
  - Blunt the environmental influences on body weight

- These requirements suggest that **individualized approaches, early surgery and combination therapies will be most effective**
Integrated Approach to Obesity and Type 2 Diabetes

- Emerging science of obesity
- Treatment Spectrum
- Supplements
- Medications
- Surgery

- Counseling, education, diet and exercise: RD, PA, PhD, CFT
- Support groups
- Structured program
- Supplements
- Medications
- Surgery
Kent C. Sasse, M.D.,

Obesity: Matching Treatment to Disease

Effectiveness

Invasiveness

Various Levels of BMI

What does obesity look like? *based on female 5’4” tall

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>Weight</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Weight (BMI 19 to 24.9)</td>
<td>130#</td>
<td>BMI 22</td>
</tr>
<tr>
<td>Overweight (BMI 25 to 29.9)</td>
<td>152#</td>
<td>BMI 26</td>
</tr>
<tr>
<td>Obese (Class I) (BMI 30 to 34.9)</td>
<td>175#</td>
<td>BMI 30</td>
</tr>
<tr>
<td>Obese (Class II) (BMI 35 to 39.9)</td>
<td>205#</td>
<td>BMI 35</td>
</tr>
<tr>
<td>Morbidly Obese (BMI 40 or more)</td>
<td>234#</td>
<td>BMI 40</td>
</tr>
</tbody>
</table>


AF1  Brian Ruble's comment: Need reference material cited to support data above
Alexander Feng, 7/23/2010
Supplements

- Nutritional value, micronutrients
- Taste, texture
- Satiety from fiber and protein
- Compliance and tolerance
  - Gluten free
  - No artificial sweeteners
  - Lactose free

Medications

- Fenfluramine off market
  - 5-HT 2b receptor valvulopathy
- Sibutramine (Meridia) off market
  - Cardiovascular disease
- Orlistat (Xenical) available
  - Low effectiveness
- Phentermine available
  - effective
New Prescription Drugs

- New weapons in the battle.
- Qsymia
- Belviq

Qsymia

- Phentermine/Topiramate ER
- EQUIP Study
  - 53 weeks
  - BMI > 35
  - 3.75mg/23mg dose vs. placebo (p<0.001)
  - 15mg/92mg dose vs. placebo (p<0.001)
  - Improved glucose, BP, and Trig for upper dose

Mean weight loss 10.9% at Week 56 vs 1.6% placebo
Qsymia

• Phentermine/Topiramate ER
• CONQUER Study
  – 1 year
  – BMI 27-45
  – 15mg/92mg dose vs. placebo (p<0.001)
  – 70% lost >5%BW vs. 21% placebo
  – Improved glucose, BP, and Trig for upper dose

Qsymia

• Phentermine/Topiramate ER
• SEQUEL Study
  – 108 weeks
  – Sustained wt loss (10.7%) vs placebo (2.2%)
  – Side effects paresthesia, dry mouth, constipation
  – Completion rate 83% vs 86% placebo
Belviq

- Lorcaserin
- Blossom Study
  - 1 year
  - BMI 30-45
  - 47% lost >5% BW vs. 25% placebo
- Bloom-DM
  - 1 year
  - Improved HbA1C and FPG (p<0.015)

Belviq

- Lorcaserin
- Bloom Study
  - 2 year study
  - BMI 27-45
  - 47% lost >5% BW vs. 20% placebo group
  - 23% lost >10% BW vs. 10% placebo group
Integrated Approach to Obesity and Type 2 Diabetes

- Counseling, diet and exercise
- Support groups
- Structured program
- Supplements
- Medications
- Surgery

Minimally Invasive Surgery

- Small Incisions
- Rapid Recovery
- Less Pain
- Less Risks
Weight Loss Surgery

<table>
<thead>
<tr>
<th>Gastric</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable Gastric Banding</td>
<td>Roux-en-Y Gastric Bypass</td>
</tr>
<tr>
<td>Vertical Sleeve Gastrectomy</td>
<td></td>
</tr>
</tbody>
</table>

Prospective Studies

- Dixon: 64% complete remission at 1 year
- Pontiroli: 80% complete remission at 3 years
Minimally Invasive Surgery

- “50 minutes to healthy”
- 23 hour stay
- Risks on par with Caesarian section
- Durability 80% at 10 years

STAMPEDE Trial Results:
- Bariatric Surgery vs Intensive Medical Therapy in Obese Patients with Diabetes
- Schauer et al
- March 2012 publication in NEJM
Population

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Intensive Medical Therapy</th>
<th>Lap Roux-en Y Gastric Bypass</th>
<th>Lap Sleeve Gastrectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>N total (% female)</td>
<td>50 (62)</td>
<td>50 (58)</td>
<td>50 (78)</td>
</tr>
<tr>
<td>Mean Duration T2DM, in years</td>
<td>8.9</td>
<td>8.2</td>
<td>8.5</td>
</tr>
<tr>
<td>Insulin use, N(%)</td>
<td>22 (44)</td>
<td>22 (44)</td>
<td>22 (44)</td>
</tr>
<tr>
<td>Mean BMI, kg/m² (% BMI&lt;35)</td>
<td>36.8 (38) [31.8 - 42.3]</td>
<td>37.0 (28) [30.6 - 43.0]</td>
<td>36.2 (36) [28.0 - 43.0]</td>
</tr>
<tr>
<td>Mean HbA1c¹, %</td>
<td>8.9</td>
<td>9.3</td>
<td>9.5</td>
</tr>
<tr>
<td>Mean FPG², mg/dl</td>
<td>155</td>
<td>193</td>
<td>164</td>
</tr>
</tbody>
</table>

1 Population consisted of predominately female, moderately obese patients with long standing and uncontrolled T2DM
2 44% required the use of insulin
3 No statistically significant differences existed between the three groups with regard to baseline characteristics

1-year Outcomes, Impact on T2DM Control

<table>
<thead>
<tr>
<th>Groups</th>
<th>IMT (%)</th>
<th>LRYGB (%)</th>
<th>LSG (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>41</td>
<td>50</td>
<td>49</td>
</tr>
<tr>
<td>Euglycemia¹</td>
<td>5 (12.2)</td>
<td>21 (42.0)</td>
<td>18 (36.7)</td>
</tr>
<tr>
<td>Complete Remission²</td>
<td>0 (0)</td>
<td>21 (42.0)</td>
<td>13 (26.5)</td>
</tr>
<tr>
<td>Partial or Complete Remission²</td>
<td>0 (0)</td>
<td>34 (68.0)</td>
<td>22 (44.9)</td>
</tr>
<tr>
<td>No Diabetes Medications</td>
<td>0 (0)</td>
<td>38 (77.6)</td>
<td>25 (51.0)</td>
</tr>
</tbody>
</table>

1 HbA1c < 6.0, i.e., “normal” with or without medications
2 Diabetes Care. 2009 Nov;32[11]:2133-5
³Complete Remission¹: HbA1c<6.0, “normal” without medications
4 Partial Remission²: HbA1c<7.0, “in control” without medications
1-Year Outcomes
Impact on T2DM Control

A. Normal HbA1c, < 6%
B. Normal FPG, 82 to 110 mg/dl

1-Year Outcomes
Impact on Diabetes Medication Use and Body Weight

C. Average Number of Diabetes Medications
D. Change in BMI
LSG Laparoscopic Sleeve Gastrectomy

Jody lost 60 lbs in 90 Days from the Sleeve
- and is still losing!
Myth 2

Diabetes improvement after bariatric surgery is dependent on weight loss

1955 Friedman reports “dramatic improvement of diabetes” in 3 patients…

…only 3-4 days after subtotal gastrectomy
Mingrone Trial Results: Bariatric Surgery vs. Intensive Medical Therapy in Obese Patients with Diabetes – 2 Year Outcome

Mingrone, et al
March 2012 publication in NEJM

Mingrone: 60 Patients Randomized to IMT vs. Surgery

- **Endpoint:**
  - Off medications
  - Normal Glucose (<100)
  - Glycated hemoglobin <6.5%

- **2 year result:**
  - IMT 0%
  - LRYGB 75%
  - LBPD 95%
Richard - Lost 190 lbs from Gastric Bypass

Biliopancreatic diversion

- Malabsorbtive
- Bypasses antro-duodenal area
- Vitamin deficiencies
LRYGB Laparoscopic Gastric By-Pass

Ileal Interposition
- Animal studies: increased GLP-1 and PYY
- Human diabetes BMI 24-34: 87% resolution

Research on mechanisms
Endoluminal Sleeve

- Animal studies: lean diabetic rats
- Human diabetes: major reduction in FBS and HbA1c, starting in one week

• Research on mechanisms

Weight Loss and Diabetes

- Increased insulin sensitivity
- Increased adiponectin levels
- Enhanced insulin-receptor concentration
- Target tissues: increased insulin signaling
- Enzyme activation for glucose metabolism
- Decreased intramuscular and intrahepatic lipids
Weight-Independent Antidiabetic Effects

- Very Rapid postoperative T2DM remission
- Greater improvement after RYGB than after nonsurgical or LapBand weight loss
- Improved T2DM in experimental procedures that induce little or no weight loss
- Beta cell hyperactivity

Greater Improvement in T2DM after RYGB

- LaFerrere Study (2008)
  - Randomized to RYGB vs. dieting
  - When equivalent weight loss, RYGB had
    - Superior glucose control
    - Elevated GLP-1
    - Increased Incretin effect
- Lee study
  - Randomized SL with or without RYGB
    - Diabetes remission 93% vs. 46%
Weight-Independent Effects

- Rubino DJB rats (and a few humans)
  - T2MD resolution independent of calorie intake
  - T2DM resolution independent of weight loss
- Endoluminal Sleeve and IT
  - T2DM resolution independent of weight loss

Beta-cell hyperactivity

- 1-9 years postoperatively
  - Hyperinsulinemic hypoglycemia
  - RYGB milieu stimulates Beta cells
    - Usually a good thing
    - Occasional dangerous hypoglycemia
- Restoration of acute Beta cell acute response to glucose
Rapid T2DM resolution

• Schauer 2003 study
  – 1160 patients undergoing LRYGB
  – One-third of T2DM patients were discharged home from hospital normoglycemic
  – Few ever require medication again*
    • *Sasse

Restrictive
- Dissect approximately three-fourths of the stomach

Malabsorptive & Restrictive
- Bypass a portion of the small intestine and create a 15-30cc stomach pouch

Rapid T2DM resolution

• Schauer 2003 study
  – 1160 patients undergoing LRYGB
  – One-third of T2DM patients were discharged home from hospital normoglycemic
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    • *Sasse

Restrictive
- Dissect approximately three-fourths of the stomach

Malabsorptive & Restrictive
- Bypass a portion of the small intestine and create a 15-30cc stomach pouch

Current Most-Used Bariatric Techniques

Adjustable Gastric Banding
  Restrictive
  Place implantable device around upper most part of stomach

Vertical Sleeve Gastrectomy
  Restrictive
  Dissect approximately three-fourths of the stomach

Roux-en-Y Gastric Bypass
  Malabsorptive & Restrictive
  Bypass a portion of the small intestine and create a 15-30cc stomach pouch
Kent C. Sasse, M.D., MPH, FACS, FACRS
Impact of Bariatric Surgery on Diabetes

Impact of All Surgery Types and Gastric Bypass, in Specific on Diabetes

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>TOTAL*</th>
<th>% [95%CI]</th>
<th>GASTRIC BYPASS</th>
<th>% [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Patients Diabetes Resolved</td>
<td>63 (1,846)</td>
<td>76.8 [70.7, 82.9]</td>
<td>26 (889)</td>
<td>83.7 [77.3, 90.1]</td>
</tr>
<tr>
<td>HbA1C (%) Reduction (Diabetics)**</td>
<td>6 (171)</td>
<td>-2.4 [-3.8, -1.0]</td>
<td>4 (88)</td>
<td>-3.0 [-5.0, -1.1]</td>
</tr>
<tr>
<td>Fasting Glucose (mmol/L)**</td>
<td>14 (296)</td>
<td>-4.0 [-5.2, -2.7]</td>
<td>7 (164)</td>
<td>-3.4 [-5.2, -1.7]</td>
</tr>
<tr>
<td>Fasting Insulin (pmol/L)**</td>
<td>36 (1,460)</td>
<td>-114.6 [-269.1, -42.0]</td>
<td>6 (93)</td>
<td>-118.3 [-172.8, -107.6]</td>
</tr>
</tbody>
</table>

THE MAJORITY OF MORBIDLY OBESE DIABETICS EXPERIENCE RESOLUTION OF DIABETES AFTER BARIATRIC SURGERY

* Total—All bariatric procedures including gastric bypass surgery, Vertical Banded Gastroplasty (VBG), Laparoscopic Adjustable Gastric Banding, Biliopancreatic Diversion, and Duodenal Switch; Normal Ranges: HbA1c < 6.0 percent, Fasting glucose = 4.2–6.4 mmol/L, Fasting insulin = 43–186 pmol/L.

Program Name | Date
---------|-------

Proposed Mechanisms

- Increased postprandial secretion of L-cell peptides: GLP-1
- Exclusion of duodenum
  - Down-regulating anti-incretin factors
- Impaired ghrelin secretion (antrum)
- Change intestinal nutrient-sensing
  - Increases insulin sensitivity
- Alterations in bile acid and gut hormones
**Impact on Sleep Apnea**

Impact of All Surgery Types and in Specific Gastric Bypass on Obstructive Sleep Apnea

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>TOTAL*</th>
<th>GASTRIC BYPASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Patients OSA Resolved</td>
<td>38 (1,195)</td>
<td>85.7 [79, 92]</td>
</tr>
<tr>
<td>Apnea/Apnea-hypopnea Index**</td>
<td>4 (92)</td>
<td>-33.9 [-50, -17]</td>
</tr>
</tbody>
</table>

**SLEEP APNEA RESOLVES IN MOST PATIENTS FOLLOWING BARIATRIC SURGERY**

* Total—All bariatric procedures including gastric bypass surgery, Vertical Banded Gastroplasty (VBG), Laparoscopic Adjustable Gastric Banding, Biliopancreatic Diversion, and Duodenal Switch.
** Apnea-hypopnea index normal range is = 5 events per hour of sleep.

** Impact on Hypertension**

Impact of All Surgery Types and in Specific Gastric Bypass on Hypertension

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>TOTAL*</th>
<th>GASTRIC BYPASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Hypertension Resolved</td>
<td>67 (4,805)</td>
<td>61.7 [55.6, 67.8]</td>
</tr>
</tbody>
</table>

**HYPERTENSION IS RESOLVED OR IMPROVED IN MOST PATIENTS FOLLOWING BARIATRIC SURGERY**

* Total—All bariatric procedures including gastric bypass surgery, Vertical Banded Gastroplasty (VBG), Laparoscopic Adjustable Gastric Banding, Biliopancreatic Diversion, and Duodenal Switch.

### Impact on Hyperlipidemia

#### Impact of All Surgery Types and in Specific Gastric Bypass on Hyperlipidemia

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>TOTAL*</th>
<th>GASTRIC BYPASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Patients Improved</td>
<td>t (n/N)</td>
<td>% [95%CI]</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>23 (846/1,019)</td>
<td>79.3 [68.2, 90.5]</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>14 (2,051)</td>
<td>71.3 [55.5, 87.0]</td>
</tr>
<tr>
<td>Hypertriglyceridemia</td>
<td>11 (883)</td>
<td>82.4 [71.1, 93.7]</td>
</tr>
<tr>
<td>Total Cholesterol (mmol/L)</td>
<td>36 (2,573)</td>
<td>-0.9 [-1.1, -0.6]</td>
</tr>
<tr>
<td>HDL Cholesterol (mmol/L)</td>
<td>30 (2,003)</td>
<td>0.1 [-0.0, 0.1]</td>
</tr>
<tr>
<td>LDL Cholesterol (mmol/L)</td>
<td>21 (879)</td>
<td>-0.8 [-1.1, -0.5]</td>
</tr>
<tr>
<td>Triglycerides (mmol/L)</td>
<td>34 (2,149)</td>
<td>-0.9 [-1.1, -0.7]</td>
</tr>
</tbody>
</table>

* Total—All bariatric procedures including gastric bypass surgery, Vertical Banded Gastroplasty (VBG), Laparoscopic Adjustable Gastric Banding, Bilipancreatic Diversion, and Duodenal Switch.

$t =$ number of studies or treatment groups; $n =$ number of patients with this characteristic; $N =$ number of patients evaluated; Patients Improved numerator includes patients described by study authors as having improved by virtue of elimination or reduction in therapy and patients reported to have improved lipid parameters.

### Hyperlipidemia and Hypercholesterolemia Improve in Most Patients Following Bariatric Surgery

**Risk Reduction**

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Date</th>
</tr>
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</table>
5-Year Mortality Reduction

Surgical Patients had Nine Times Lower Mortality Rate within the Study Period


* Includes perioperative (30-day) mortality of 0.4% p-value 0.001

Judith lost 80 lbs after the Sleeve Surgery
How to Change the Physiologic Set Point?

- Surgery, definitely
- Durability/Persistence
  - probably
- Walking 60-90 min per day
  - probably

Is curing diabetes too ambitious?

Duration of “cure”? 80%+ complete remission

- Patient acceptance, physician acceptance
- Proper counseling and coaching (“It’s not magic”)
- Current data supports view that “non-surgical approach” to diabetes is riskier
Integrated Approach to Obesity and Type 2 Diabetes

- Counseling, education, diet and exercise: RD, PA, PhD, CFT
- Support groups
- Structured program
- Supplements
- Medications
- Surgery and After surgery program

Obesity and Type 2 Diabetes

- Trend to earlier, curative surgery
  - Prevent end-organ damage
Obesity and Type 2 Diabetes

• Integrated approach
• Long term battle
• Meds, supplements, coaching, support, lab/Vitamin monitoring

The Obesity Prevention Foundation

The Obesity Prevention Foundation was established to provide communities with leadership and educational resources to combat the epidemic of childhood obesity. Begun in northern Nevada in 2005, the Foundation focuses on two main areas:

First, direct interventions with educational programs, cooking and nutrition classes, fitness and wellness demonstrations for schools, classrooms, youth groups, churches and family organizations.

Second, the foundation serves to develop strategy and craft policy solutions for communities and legislatures to combat childhood obesity at the society level.
The Obesity Prevention Foundation

Kent C. Sasse, M.D., MPH, FACS, FACS

Change the Obesogenic environment

Educate kids and parents

Convince leaders, teachers, and parents this is a fight