

*“Impact of Obesity on Maxillofacial
Surgery”*



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The following potential conflict of interest relationships are germane to my presentation.

Equipment: None

Speakers Bureau: None

Stock Shareholder: None

Grant/Research Support: None

Consultant: None

No devices or off label use



Outline

- I. What is obesity?
- II. Statement of Facts
- III. Pathophysiology
- IV. Changes to Society
- V. Medical implications
- VI. Surgical implications

For the first time in human history, in the year 2010 it was estimated that there were more overweight than underweight people.

Source: Mendex, Monteiro, & Popkin 2015

Definition of Obesity

<u>Classification</u>	<u>BMI (kg/m²)</u>	<u>Comorbidity Risk</u>
Underweight	< 18.5	Low*
Normal range	18.5 to 24.9	Average
Overweight	25.0 to 29.9	Increased
Obese class 1	30.0 to 34.9	Moderate
Obese class 2	35.0 to 39.9	Severe
Obese class 3 (Morbidly obese)	40.0	Very severe

Statement of Facts

- 1/3 of U.S. population is overweight
- 1/3 of U.S. population is obese
- 6% population BMI > 40
- 2045 55% obese
- Costs U.S. companies \$13 billion/year
- 10% of U.S. health care spending
- Health costs > 30% higher than normal weight individuals
- More than twice as many sick days

Statement of Facts

- 1/3 of all children born since 2000 will develop DM II during their lifetime
- Current generation is on track to have a shorter lifespan than their parents



Statement of Facts

- Obesity rates are the highest among Black women and Hispanic men in urban areas
- Number one cause of “on the job” death among firefighters and police officers
 - MI





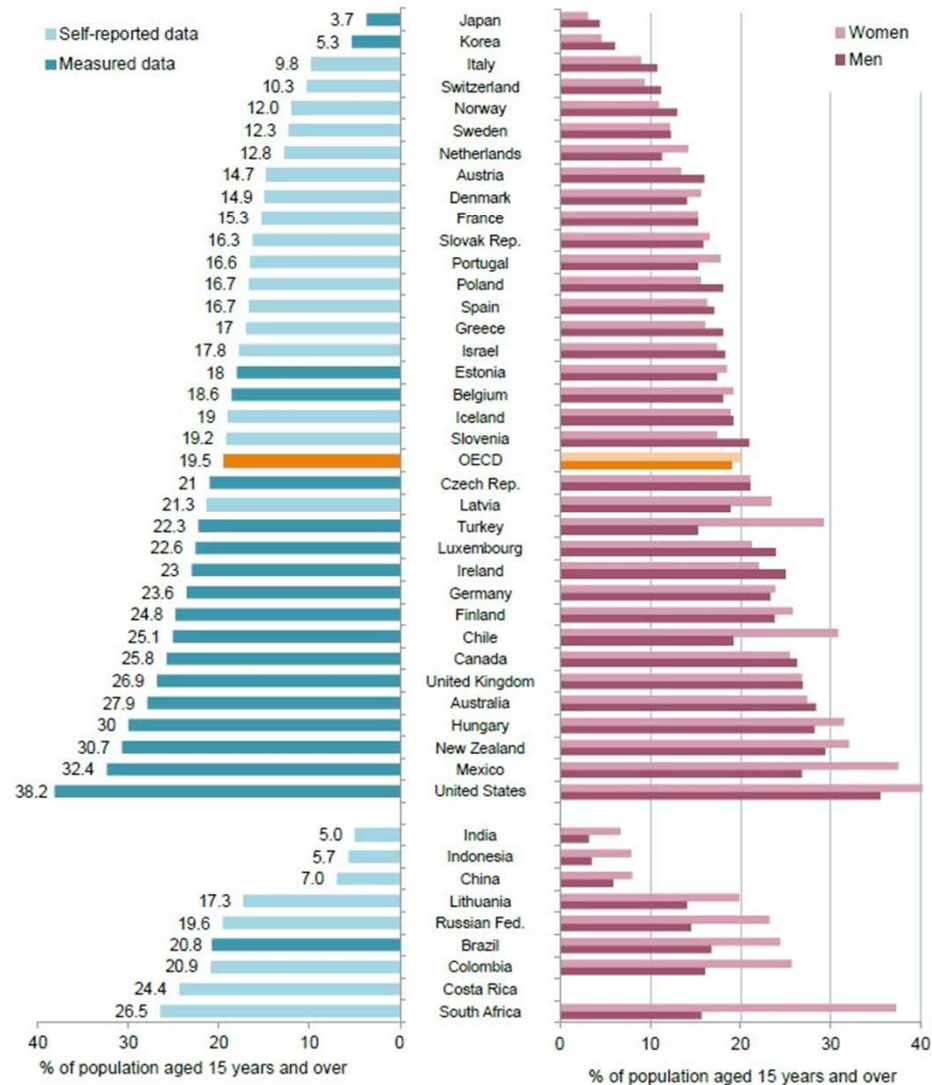
THE 10 MOST OBESE COUNTRIES ON EARTH

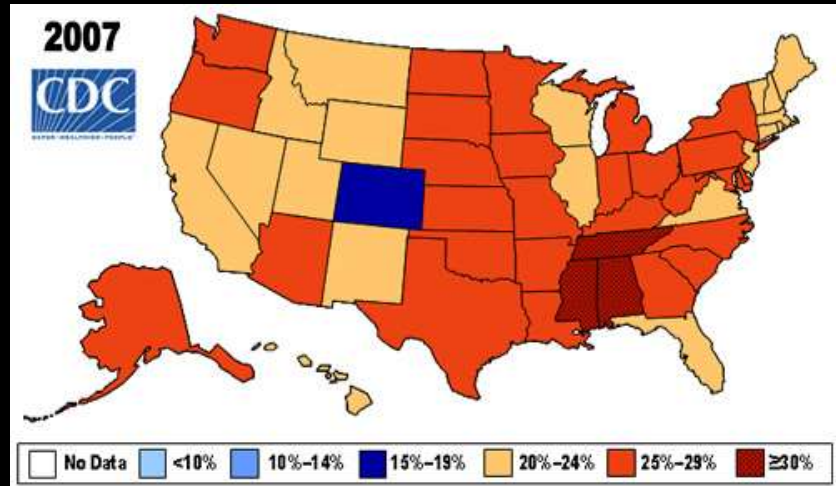
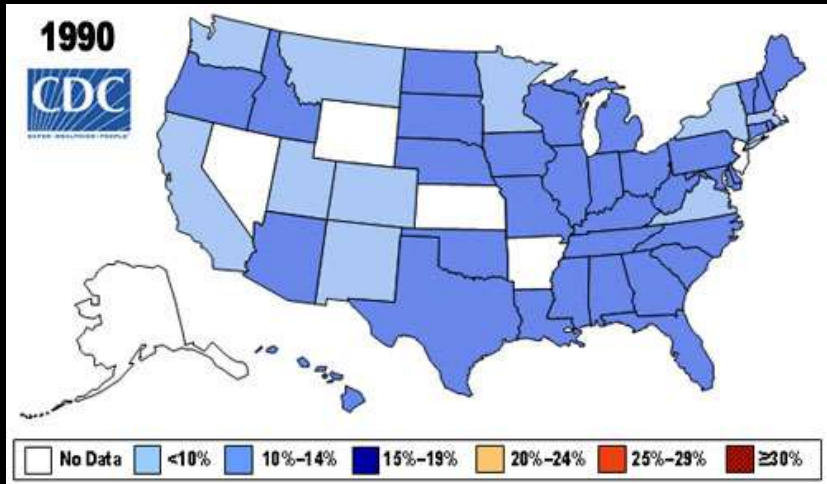
According To The World Health Organization | % Obesity rate



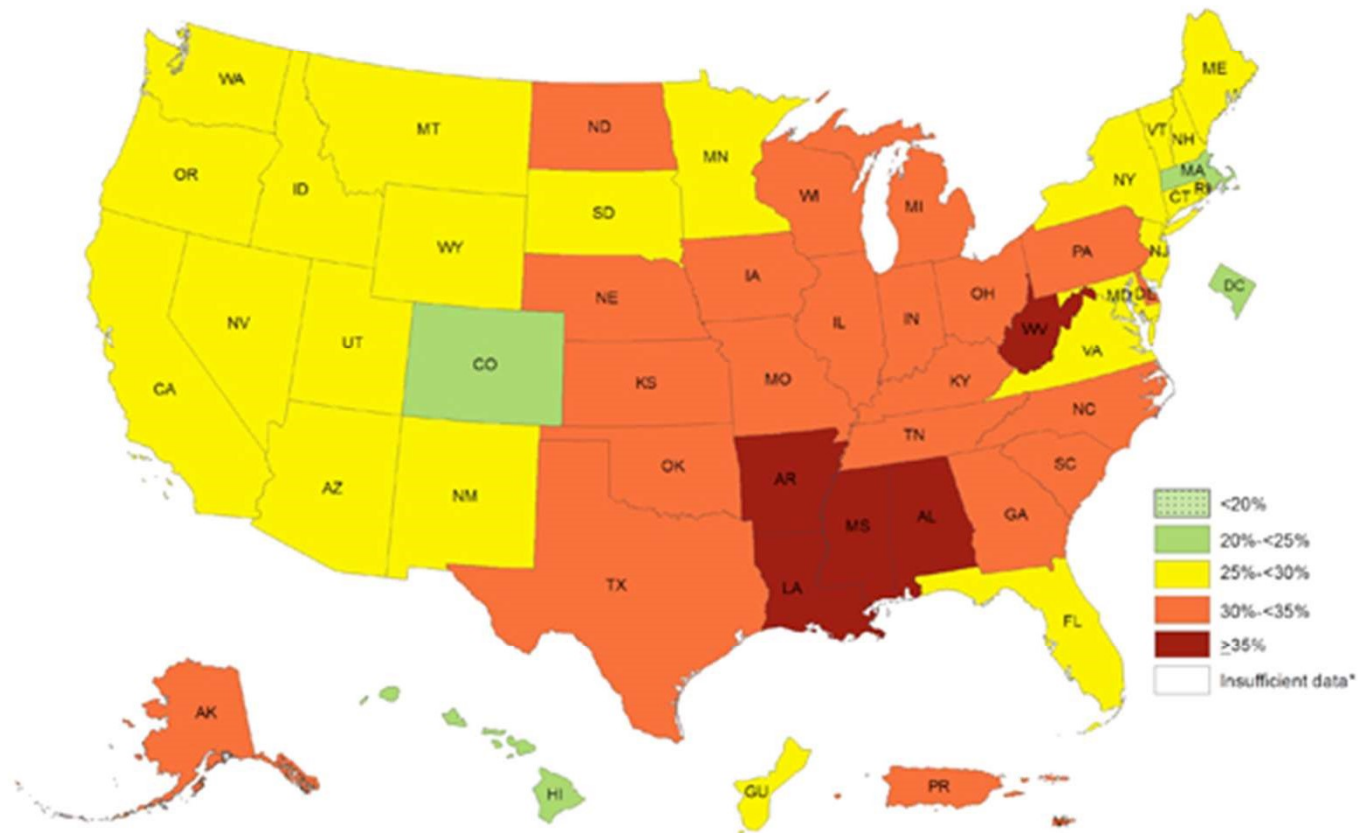
									
United States of America	New Zealand	Australia	Czech Republic	United Arab Emirates	Slovakia	Norway	Canada	Germany	Hungary
33.8%	26.5%	24.6%	24.2%	23%	23%	22.4%	22%	20.2%	18.8%

Figure 1: Obesity among adults, 2015 or nearest year





Self-reported Obesity Prevalence by US State and Territory, BRFSS, 2016.

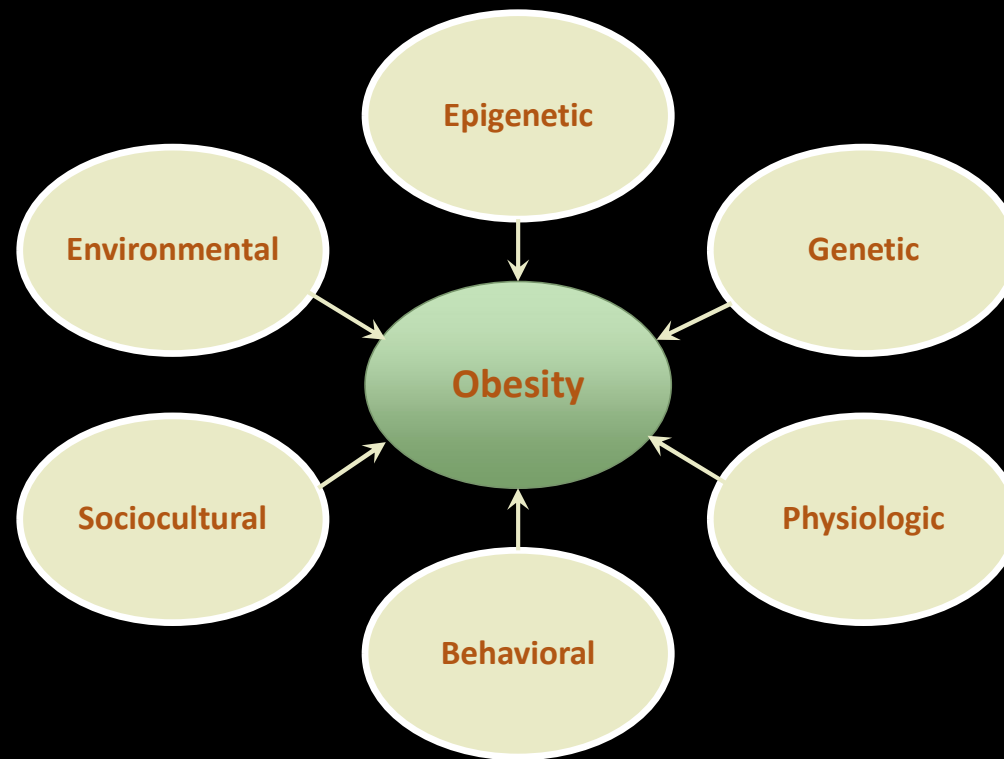


Center for Disease Control (CDC)

- America's number one health threat is obesity
- Leading cause of preventable death, surpassing tobacco.
- #1 Dx PCP, replacing HTN
 - New England Journal of Medicine (2015)



Pathophysiologic Origin of Obesity



A Changing Society

- Supersized Americans are forcing a re-examination of *out of date weight limits*. In 1960 the average passenger weight was established
- Airline industry is accommodating additional passenger width.
 - *The added weight cost airlines an extra \$300 million*
- 2003 Charlotte
 - Plane crash kills 21
 - FAA raised average passenger weight to 174lbs



travel advice **travellers stories**

A flight U.S. ... to fly

AS KELL
— for beir

AMERICAN AIRLINES PASSENGER SAYS FELT TARGETED FOR 'FLYING WHILE FAT'

'd have to fork out an extra

Rachelle Bergstein

NY Post JUNE 1, 2018

Thai Airways bans fat passengers and young parents from business class seats on their new Boeing Dreamliner 787-

Supreme Court orders 2nd look at complaint about
airline bumping obese passengers

'Expert' claims overweight people should pay more for
plane travel

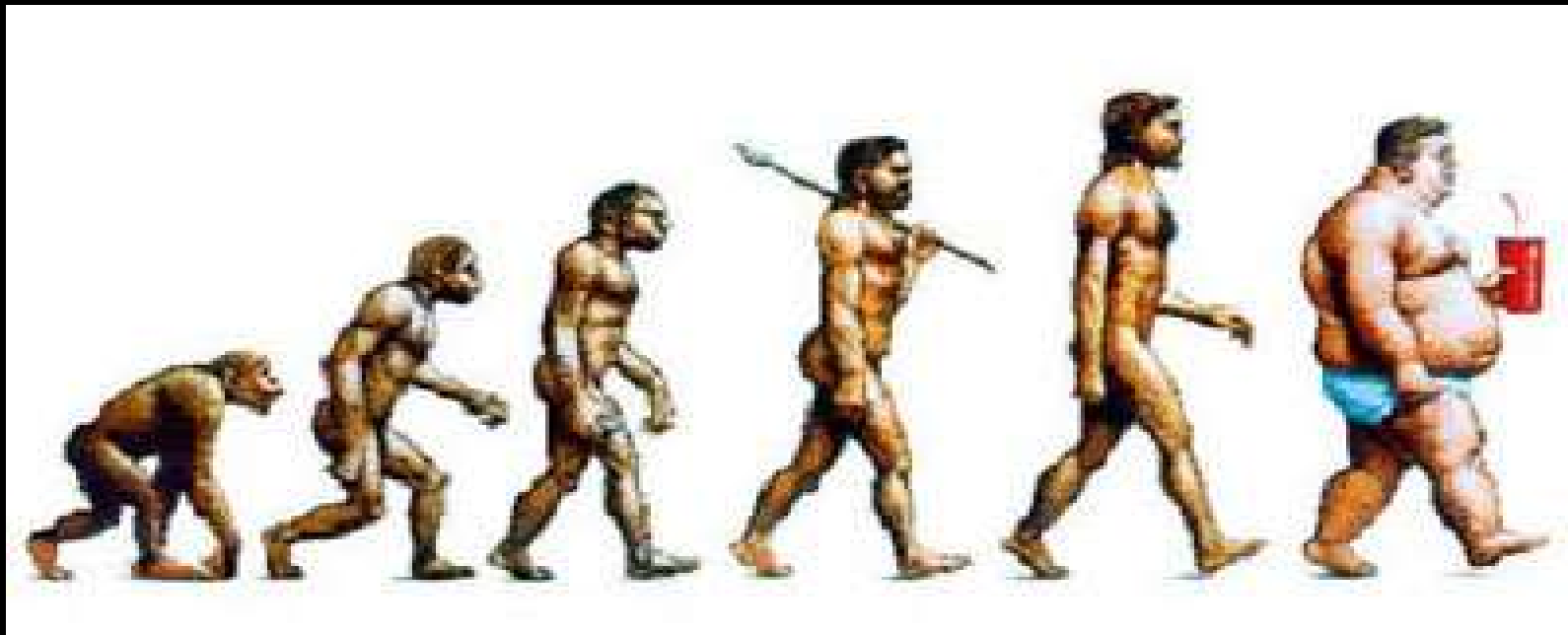
A Changing Society

- 2004 Baltimore
 - 36ft water taxi capsizes, 5 out of 20 people drowned.
 - Max capacity was 30 people
 - Boat was 700 lbs over 3500lb capacity
- 2005 New York
 - 47 tourists capsized on Lake George
 - The US Park Service increased passenger weight estimate to 175lbs average



A Changing Society

- Blunt trauma
 - Obese patient has 8% higher chance of mortality than normal weight person



Practice Considerations





OBESSE

← WAITING ROOM →

Facility architecture accommodates the bariatric size patient and equipment

- | | | | | |
|-----|--------------------------|----|--------------------------|--|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 1. Doorways accommodate wide equipment (39") |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 2. Bathroom/ Shower rooms have sufficient space and accessibility |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 3. Toilets are floor mounted |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 4. Sinks are floor mounted or securely attached to the wall |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 5. Grab bars are securely attached to the wall |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 6. Therapy equipment is sufficient is size and weight capacity |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 7. Lobby and dining room equipment is appropriate in size and weight capacity |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 8. 100 square feet are available for each bariatric patient |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 9. Hospital and medical community has equipment in appropriate weight capacity to transport/transfer |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 10. Emergency squad is on call to assist in planned/unplanned transfer |

Equipment Management

- | | | | | |
|-----|--------------------------|----|--------------------------|--|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 1. Facility will order appropriate bariatric capacity equipment including: |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Bed frame- 39" to 48" width 80" to 88" length |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Mattress- Foam or alternating pressure, low air loss |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Trapeze if patient is able to assist with transfer |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Wheelchair up to 1000 lb capacity 32" width |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | - leg rests available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Commode/ shower chair up to 850 lb capacity |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Walker up to 850 lb capacity |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Transfer System |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | - Air |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | - Lift up to 1000 lb capacity (sling) |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | • Scale |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 2. Equipment is rented or owned (determined by predicted length of stay) |

Bariatric procedures and protocol are developed and communicated to staff

- | | | | | |
|-----|--------------------------|----|--------------------------|---|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 1. Physician's standing orders are drafted |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 2. Dietary/ Nutritional consult is available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 3. Weight reduction options available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 4. PT/OT consult is available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 5. Restorative program is customized and operational |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 6. Psychological consult is available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 7. Interdisciplinary care plan process is customized |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 8. Care conferences may be conducted in a patient room |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 9. Documentation forms are available |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 10. Process for communication with patient and family is developed |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 11. Activities are available to the room bound patient |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 12. 3 or more staff members are available for care and positioning/transferring |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 13. Quality indicators are identified, evaluation is planned |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 14. Process for program review and revision is planned |

Staff education and training is provided and includes

- | | | | | |
|-----|--------------------------|----|--------------------------|---|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 6. Assessment of equipment needs |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 7. Use of bariatric equipment including bed pressure reduction surfaces, trapeze, wheelchair, commode/shower chair walker and transfer device |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 8. Emergency procedures such as patient falls and evacuation plan |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 9. Documentation process and accurate form completion |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 10. Information about gastric bypass/ banding/ stapling and how to manage the post operative care |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 11. Assessment of equipment needs and type and number of necessary assistance for transferring |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 12. Pharmacists and physicians verbalized understanding of unique considerations regarding drug absorption and reaction to treatment for bariatric patients |
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | 13. Staff competency assessments are completed and signed. All questions have been answered |

Staff education and training is provided and includes

Yes No
 Yes No

1. In-services on topics such as: Anatomy, physiology
2. Completion of a bariatric pre-admission assessment including calculation of BMI
3. Completion of a bariatric admission assessment including the following high-risk, high costs, problem prone co-morbidities and conditions including:

Yes No
 Yes No
 Yes No
 Yes No
 Yes No
 Yes No
 Yes No
 Yes No

- Diabetes
- CVA
- Hypertension
- Skin breakdown
- Respiratory compromise
- Continence and hygiene challenges
- Mobility limitations
- Psychosocial issues

Yes No

4. Information about unique patient rights challenges including comfort, respect, dignity, privacy sensitivity and cultural differences
5. Demonstration on safe patient transfer procedures to prevent injuries to themselves and patients when providing care, transferring, ambulating and lifting

Supplies are available in appropriate sizes

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Over bed table
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Backboard
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Step stool
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Gait belt
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Gowns, slippers
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Bed linens
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Sphygmomanometer and cuff
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Incontinence products: bed pan, urinal w/ handle, disposable briefs
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Needles 2"-5" length (IM and SQ)
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Tourniquets
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Tape measure
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Abdominal Binders, pannus sling
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Lift sling
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Sit to stand device
Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	• Friction reducing device

Safe Patient Handling

- Lifting properly
- Lifting weight beyond a safe lifting capacity
- Working in a “bent over” position



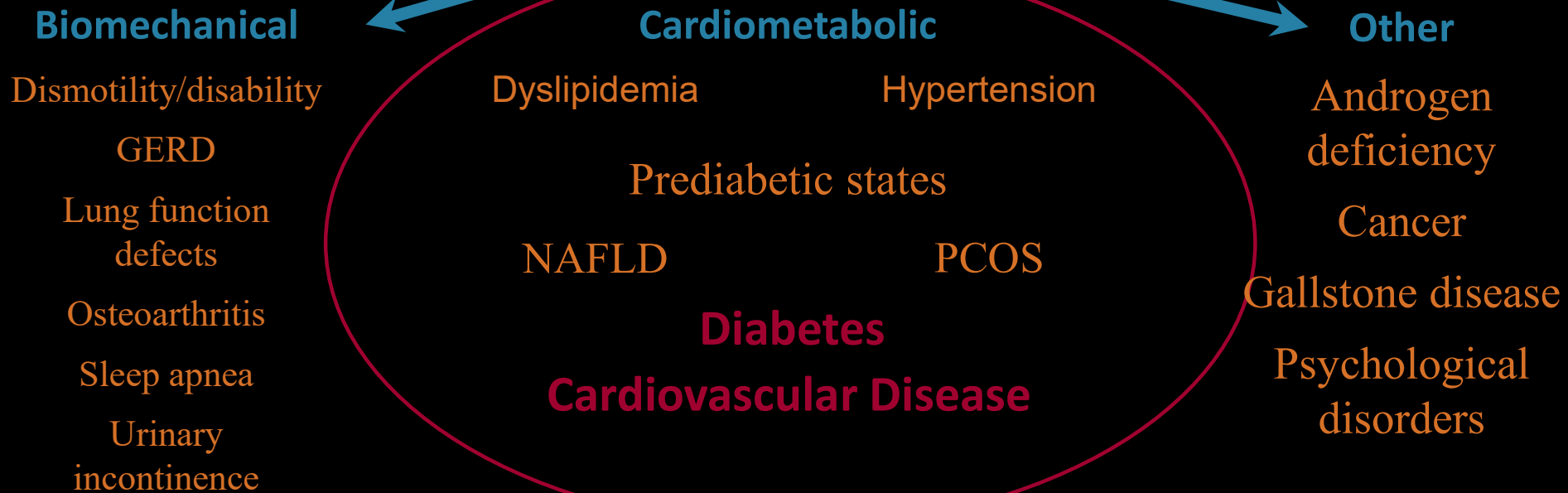
Safe Patient Handling

- Workers comp costs
- Staff / patient injury
 - Lost time claims
 - Staff turnover
 - New employee training costs

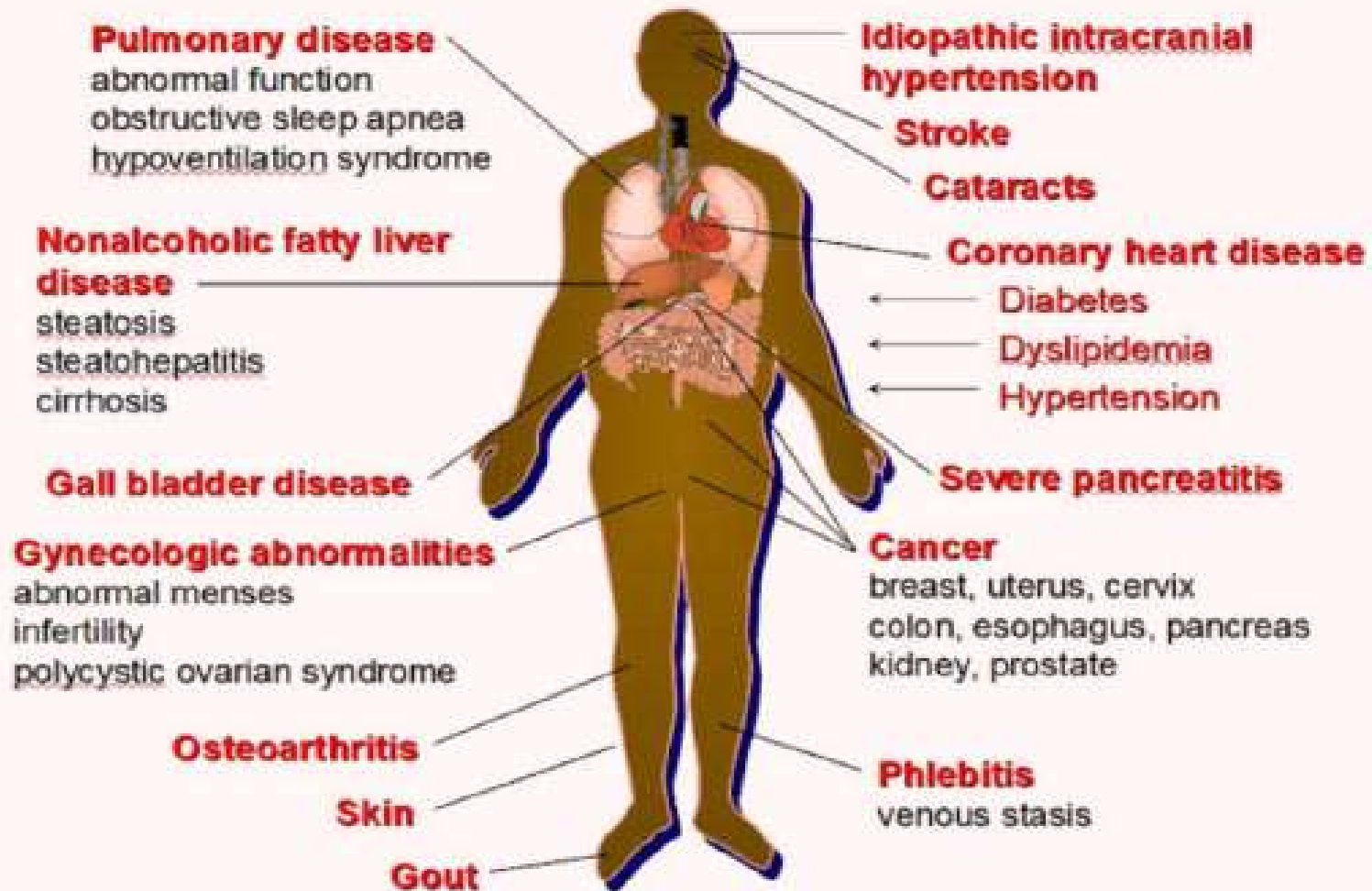


Medical Considerations

Obesity



Medical Complications of Obesity



Vital Signs

Pulse

- Carotid may be difficult to palpate
- A radial pulse may be the easiest way to palpate pulses if the bariatric patient has a short, thick neck

Blood pressure

- Appropriate cuff size
- 40-50% of the arms circumference

Respirations

- Lying flat



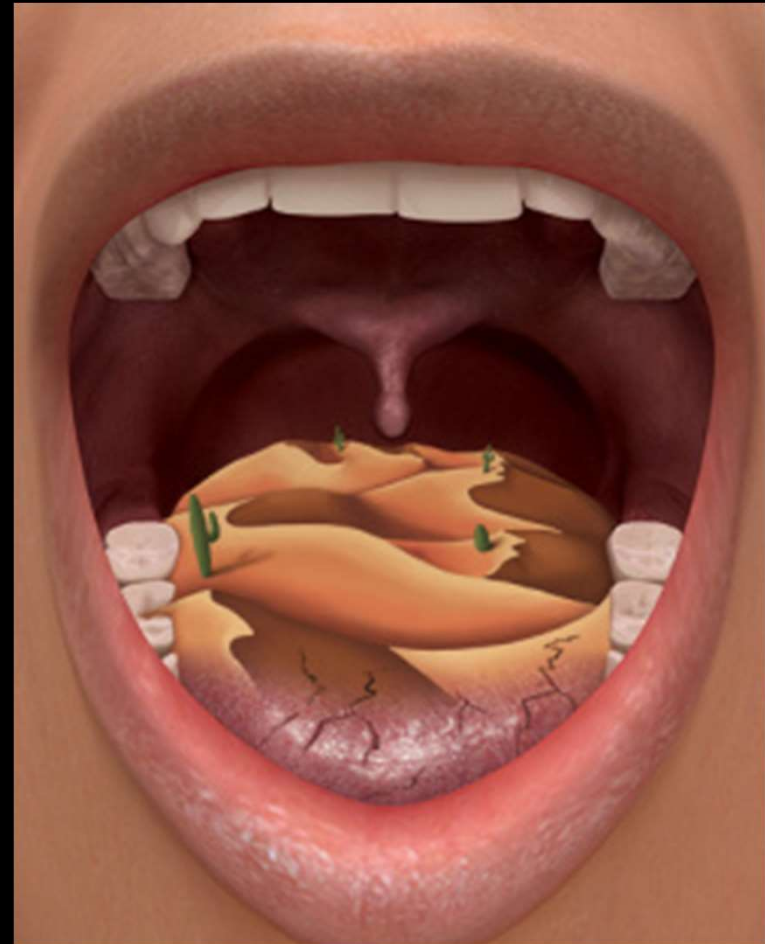
Pharmacology

Clinical Issues

- Oral meds rely on normal pH for proper absorption, obesity encourages lower gastric pH
- Topical meds
 - Cutaneous tissue is not well vascularized
- Subcutaneous injection may be inappropriate due to low vascularization
- IM administration may be difficult to access
 - Delayed onset
 - Accumulation causes overdose
- IV access may be difficult as veins are deep

Pharmacology

- Effect of polypharmacy
 - Xerostomia
 - Periodontium



Medication Administration

- Total body weight (TBW) based dosing can result in overdose
- Ideal body weight (IDW) can result in sub-therapeutic administration
- Therefore, lean body weight (LBW) is ideal
 - Men (kg) = 50 kg + 2.3 kg for every inch over 5 feet
 - Women (kg) = 45.5 kg + “ ”
- 51% adverse respiratory events secondary to opioids occurred in obese individuals

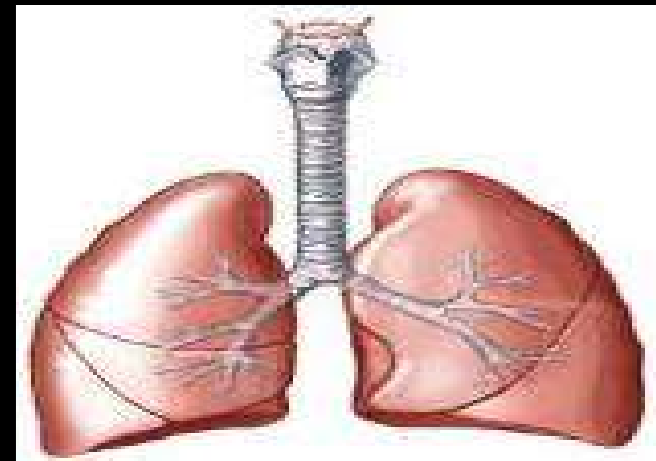
Medication Administration

Drug	Dosing Method	Description
Fentanyl	LBW	Accurately predict plasma concentrations
Propofol	LBW & TBW	Induction: LBW, Maintenance: TBW
Midazolam	LBW	Volume of distribution
Succinylcholine	TBW	Increase in extracellular fluid

Respiratory

Clinical Issues

- Lung capacity does not increase with weight gain
- Weight on abdomen and chest restricts inspiration and expiration
 - Obesity Hypoventilation Syndrome (OHS)
 - Hypoxemia, Hypoventilation, and Hypercapnia
 - Increased soft tissue of head, neck and tongue
 - High risk for rapid de-saturation
 - 6 mins vs 3 mins

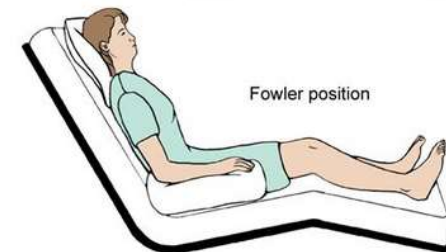
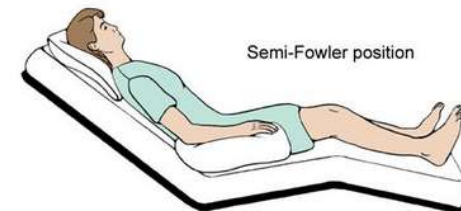


Respiratory

Management

- Identify a rescue/alternative airway management plan
- Identify and maintain extra size supplies
- SpO₂ and capnography
- Position shoulders and neck as needed
- Maintain bed in Fowler
- Limiting opioids

Fowler's Positions



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Respiratory

- Airway Adjuncts
 - Video laryngoscope
 - Bougie
 - LMA
 - “Can’t intubate, cant ventilate.”
- Surgical airway
 - Occlusion
 - Dislodged
 - Too short



Laryngeal Mask Airway Use in Morbidly Obese Patients Undergoing General Anesthesia

A recent lawsuit involving 2 anesthesiologists and a Certified Registered Nurse Anesthetist resulted in 2 of the 3 providers being found negligent because their choice of using a laryngeal mask airway (LMA) and general anesthesia after monitored anesthesia care failed in a morbidly obese patient. The case involved a 44-year-old woman with a body mass index of 48 and a history of gastro-esophageal reflux disease.

The patient aspirated after LMA placement. An endotracheal tube was promptly inserted and the case canceled. The patient survived but suffered substantial neurologic damage. The court awarded the plaintiff and her husband \$10,541,808.¹ This case highlights the need for evidence examining the use of LMAs in morbidly obese patients.

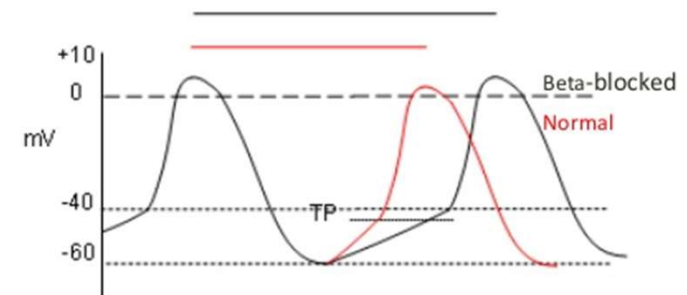
Cardiac

- Clinical Issues
 - Hypertension
 - Hypotension
 - Congestive Heart Failure
 - Cellulitis

Management

- Remember medications!!
- Pre-surgical optimization

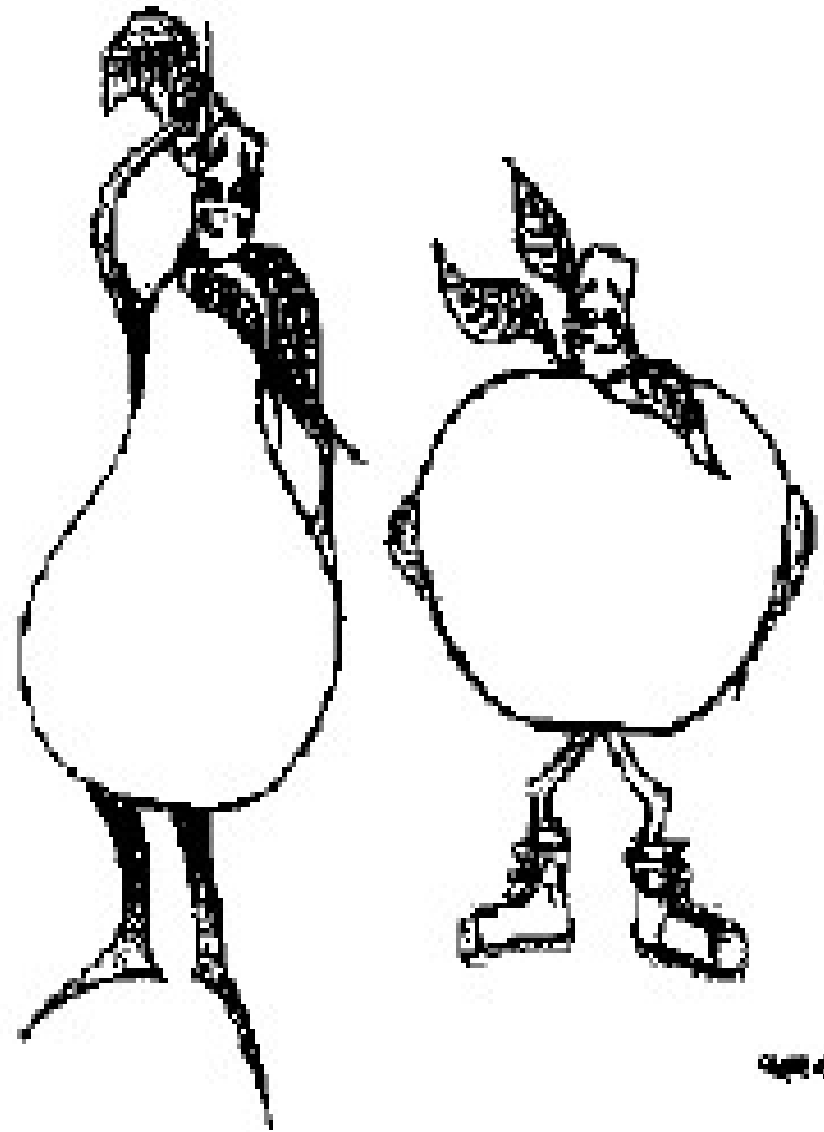
Beta-Blockade



- Beta-blockers cause bradycardia through blockage of B_1 receptors
- This reduces levels of cAMP and intracellular calcium
- Slope of pre-potential (phase 4) is reduced
- Often cause AV conduction disturbance (increased PR interval /heart block) and bradycardia

Cardiac

- Waist circumference tied to cardiovascular risk
- Men > 40 inches
- Women > 35 inches



Post Operative

- PONV
 - DC with sublingual Zofran
- Wound healing
 - DM
 - Pro-inflammatory
- DVT / PE
- MI
- Peripheral nerve injury
- Pressure ulcers
- UTI
- Atelectasis



Why does this matter?

OMSNIC

- Incidence
 - 2000 – 2017
 - 54 cases death from in office procedures with anesthesia
 - 63 % of the individuals had a BMI > 30
 - 5 times more likely respiratory event
 - 4 times more likely cardiac event, peripheral nerve injury
 - 1.7 times more likely wound dehiscence

Oh it matters.

Summary

- Practice builders
 - Time
 - Friendly atmosphere
- Surgical considerations
 - Medical optimization
 - Liberal local anesthesia
 - Limiting narcotics
 - Proper positioning
 - Airway
 - Prophylaxis
- When in doubt get assistance

STIMPS
2017
CHICAGO
TRIBUNE

