Universal Design:
Meeting the needs of the Bariatric Population

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Introduction

A **Design Dilemma** is a critical design decision for which there is no clear, obvious solution. The **purpose** of this project is to use an **evidence-based approach** to guide design recommendations that provide holistic care for the growing **obese population**. These recommendations cater to the physical, environmental, and financial context of Auburn Memorial Hospital.

Overview

- Obesity in the U.S. and what this means to health care providers and patients.
- Key issues for the care of bariatric patients.
- Stakeholder needs and demands.
- Supportive environments: how to achieve it and how far to take it.
- Universal Design: A solution for flexibility, and bridge for ADA and bariatric design.

Auburn Memorial Hospital

17 Lansing Street
Auburn, NY 13021
(315) 255-7011

auburnhospital.org

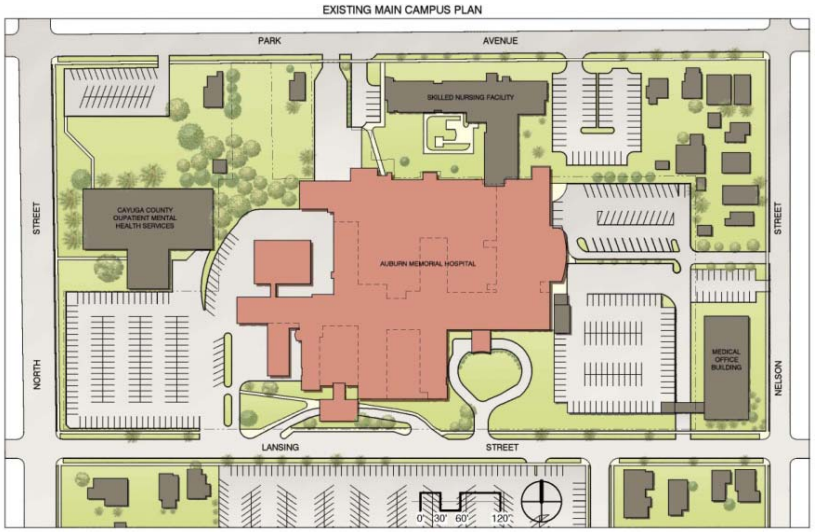
Clinical Services
Behavioral Health
Cardiac Rehabilitation
Critical Care Unit
Emergency Care
Inpatient & Outpatient Surgery
Laboratory
Obstetrics
Gynecology
Radiology
Rehabilitation
Social Work

Quick Facts:

- Not-for-profit
- 99-bed acute care facility serving a population of approx. 80,000
- Provides services to Cayuga County and surrounding areas in the Finger Lakes region of Central New York.
- The **Fingerlakes Weight Loss Center** is accredited as a level 2b facility for bariatric surgery. Center of Excellence.

Level 2b Certification

Center provides care to 25 or more weight-loss operations annually. Level 2 centers are not allowed to operate on high-risk patients such as men with BMI 55+; women with BMI 60+; non- ambulatory patients.



AMH Site Plan

AMH in 2008:

- Admitted 5,000 patients
- Performed 7,450+ operations
- Treated 20,223 patients in Emergency Care Unit
- Performed 60,000 radiology services
- Performed 543,032 laboratory tests

AMH 2008 Fact Sheet

What is Obesity?

High risk of:
Hypertension
Type 2 Diabetes
Coronary Heart Disease
Gallbladder Disease
Dyslipidemia
Stroke
Osteoarthritis
Sleep Apnea
Respiratory Problems
Gynecological Problems
Cancers: Endometrial, Breast
Colon Cancer

Source: NIH, NHLBI. 1998

Obesity:

Body Mass Index (BMI) of 30 or higher

BMI of 40 or more is considered morbid obesity

BMI of 25-29.9 is considered overweight

BMI:

A measure of an adult's weight in relation to his or her height (kg/m^2)

Causes:

Weight and its regulation is affected by genetics, gender, physiology, biochemistry, neuroscience, as well as cultural, environmental, and psychosocial factors.

Obesity is associated with increases in mortality and suffer from social stigmatization and discrimination. Source: NIH, NHLBI. 1998

Obesity Trends in the U.S.

In **1990**, ten states had a prevalence of obesity less than 10% and no states had equal or greater than 15%

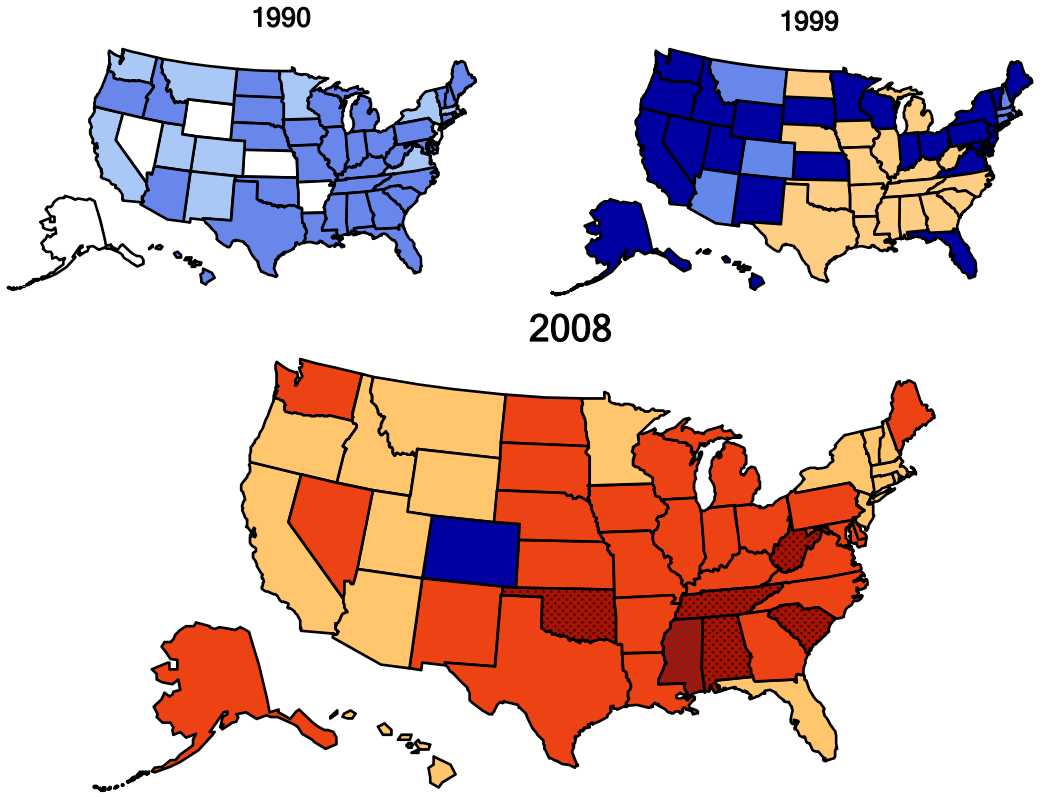
By **1999**, no state had prevalence less than 10%, eighteen states had a prevalence 20-24%, and no state had equal or greater than 25%.

In **2008**, only one state had prevalence less than 20%. Thirty-two states had a prevalence equal or greater than 25%; six of these states had a prevalence equal to or greater than 30%.

24.4% of New York State is obese

Source: CDC 2008

Obese Adults BMI ≥ 30



Source: CDC Behavioral Risk Factor Surveillance System. 2008

Aging and Obesity Trends

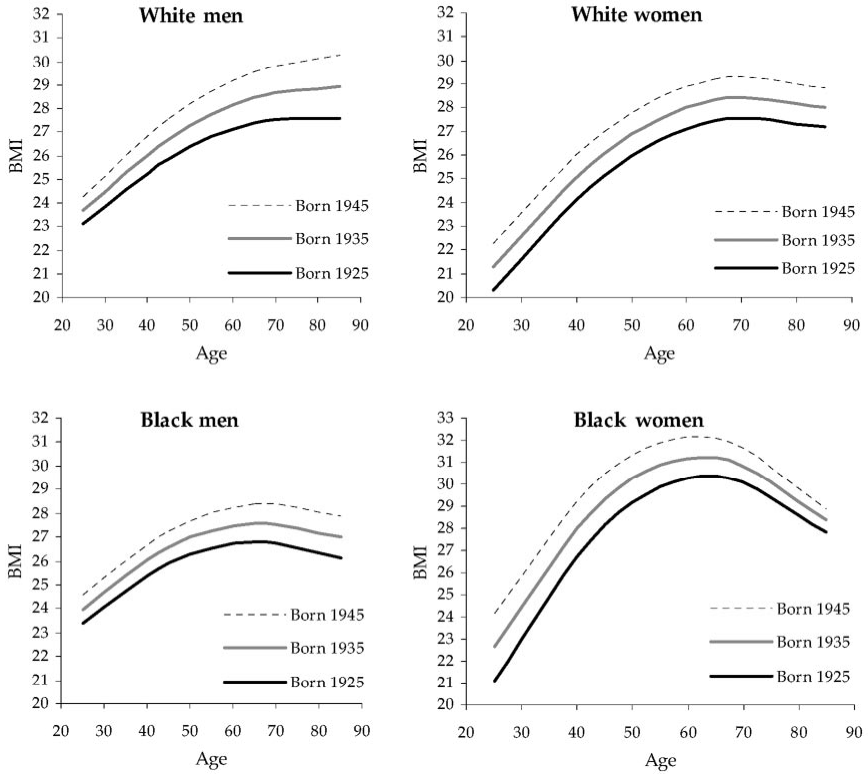
As the **baby-boom generation** approaches retirement age, the continuing obesity epidemic signals a likely **expansion** in the population with obesity-related **comorbidities**.

Source: Wang et al, 2007

The rapid growth in the number of older persons, coupled with continued advances in medical technology, is expected to create pressure on **healthcare spending**.

Source: CDC, 2003

BMI Trajectories by birth cohort



These three birth cohorts were chosen to exemplify the 3 generations of U.S. individuals who turn 65 years of age (Medicare-eligible) in 1990, 2000, 2010 respectively.

Obesity Epidemic in the Aging U.S. Population

- Cohorts born in later years tend to have higher BMI, on average and at young ages and exhibit faster increases in mean BMI over the years compared to cohorts born in earlier years.
  - The **need** and **demand** for health care for obese individuals will **increase**.

Source: Wang et al, 2007

Aging and Obesity

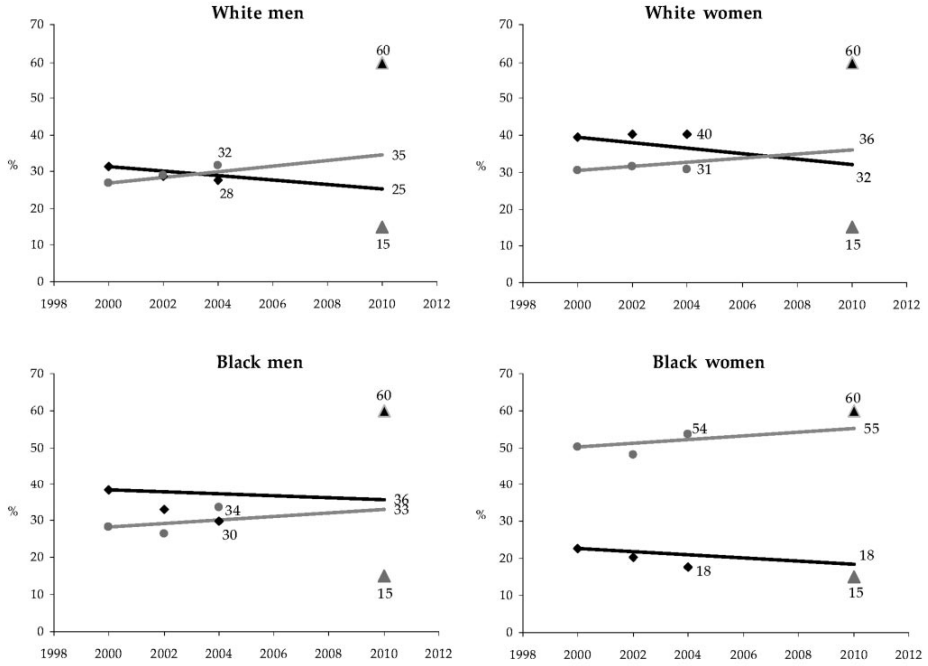
The number of persons aged **>65 years** is expected to increase from approximately 35 million in 2000 to an estimated **71 million in 2030**

Source: US Census Bureau, 2008

When an obese individual aged 65 enters **Medicare**, his or her **costs** will be immediately **higher** than healthy weight individuals.

Source: Finkelstein et al. 2008

Prevalence of Obesity and Healthy Weight from 2000 to 2010



Black lines represent predicted % of healthy weight

Grey lines represent predicted % of obesity

*Numbers besides the lines mark BMI

Obesity Epidemic in the Aging U.S. Population

- According to BMI trends, the prevalence of obesity is expected to reach 33% among white men, 36% white women, 33% black men, 55% black women by **2010**.
- There will be approximately **58.7 million obese** individuals between the ages of 20 to 74 in 2010. This is up from 49.4 million in 2000.

Source. Wang et al, 2007

Cost of Obesity

Obesity increases the likelihood of **disease** and treatments that result in higher **medical spending**.

Source: Finkelstein et al. 2008

The median spending on treatment of obese patients in 2007 was $82,500. 68% of hospitals (that responded to the surveys) spent more in 2007 than 2006.

Source: Novation Market Report. 2008

Source Detail

Novation. 2008 Bariatric Supplies Survey: Market Research Report.

Novation is one of the industry's leading health care contracting services company.

Cost Premiums for the Care of Bariatric Patients

- In order to treat bariatric patients, health care providers must **invest** in equipment, furniture and renovation that support heavier weights.
  - Bariatric products generally run about 25% more than standard-sized products. Disconsiglio. 2006
  - The median estimated cost of all obesity-related hospital renovations is $100,000. Novation Market Report. 2008
- There is a significant premium for bariatric supportive equipment and building modifications (i.e. wider doors, higher weight capacity elevators and toilets, etc.)
  - However, hospitals are able to **offset bariatric costs** through increase and popularity of bariatric surgeries, and Medicare reimbursements. Equipment inventory often pays for itself within 6 months. Disconsiglio. 2006

Economics of Obesity

- Caring for obese and overweight patients cost an average of 37% more than treatment of non-obese patients. Source. CDC, 2003
- National analysis states that obesity even as a secondary diagnosis is associated with significantly higher charges for hospitalization and longer length of stay. Source. Woolford et al, 2007
- Direct medical cost from obesity consumes 5.7%, an estimated **$93 billion** of total U.S. expenditures Source. NIH, 1998 and Wolf et al, 1998.

Key Considerations

There was an 88% **increase** in the number of **physician appointments** attributed to obesity from 1988 to 1994, and total of 62.6 million obesity-related visits in 1994.

Source: Wolf & Colditz, 1998

Design and Organizational Decisions should reflect the needs and demands of:

- Key Stakeholders:
  - **Patients:** provide dignity and quality care through treatment based on illness and not by size and weight.
  - **Family:** provide supportive spaces that accommodate both the obese and non-obese
  - **Care Providers** (Nurses, Doctors, hospital staff): ensure safe and effective patient handling
  - **Administrators**: ensure appropriate equipment is acquired and available, that needs are met cost effectively, and improve staff retention and productivity.
- Demand for Bariatric Treatment
  - Population trends show an expected increase in flow of bariatric care

Stigmatization & Discrimination

Stakeholder Consideration

Administration

With Medicare refusing to reimburse hospitals for errors related to safety, health care providers must make a concerted effort to assure environments are **safe** and **supportive** of bariatric patients.

Kirkpatrick et al, 2009.

Research studies have found that healthcare professionals, including those specializing in the care of the bariatric patient, have strong negative associations and attitudes toward obese persons. Bejciy-Spring, 2008

Consequences:

- Stigmatization and self-consciousness about weight causes many obese people to delay treatment and cancel their appointments.
- When confronted by prejudices and discrimination, it leads to a reluctance to seek care or follow medical advice. Bejciy-Spring, 2008
- Survey of severely obese individuals found that nearly 80% reported disrespectful treatment from the medical community. Camden, 2006.
- Discrimination comes not only in the form of negative attitudes, remarks, and behaviors by caregivers and staff but also failing to acknowledge the physical needs for accessibility and safety to prevent patients from injuries.
  - Mobility is a basic human need that, when not met, leads to a cascade of physical problems. Barr & Cunneen, 2001
  - Compared to non-obese individuals, a higher percentage of injury-related hospitalization was because of overexertion and falls. High number of musculoskeletal injuries among obese individuals are most likely caused by decreased mobility, strength, and body mass. Matter et al, 2007
  - Providing adequate space, supplying appropriate equipment and furniture are basic ingredients to improving quality of care, promoting participation, mobility, and independence, and ultimately, enhancing the quality of life for the bariatric patient. Bejciy-Spring, 2008

Issues for Bariatric Care

Workplace Injuries

Environmental Barriers

Dignity & Care

The following pages summarize three main issues that pertain to the care of bariatric patients. These issues affect the needs of all stakeholders and must be considered when making design decisions.

Bariatric Care: Workplace Injuries

Workplace Injuries

Environmental Barriers

Dignity & Care

Stakeholder Consideration

Administration
Worker's Compensation for patient handling injuries.
Recruitment and retention of clinical staff.

Doctors
Lack of support staff may cause poor care of patients

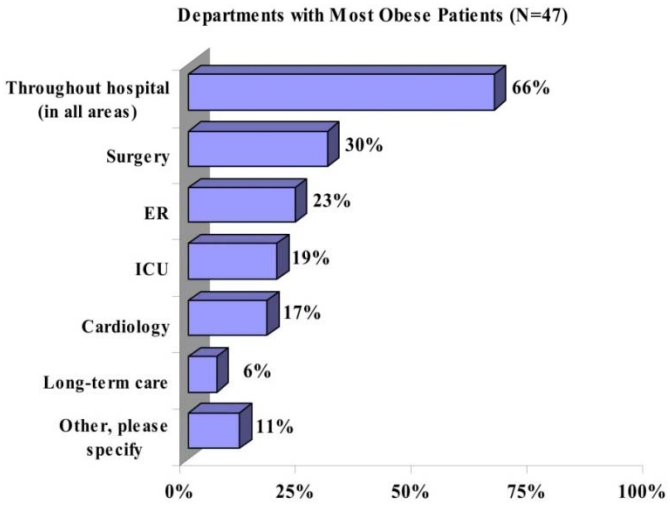
Nurses
Risk of occupational back injuries.

Patients
Risk of injuries and discomfort due to lack of mobility support.

Family
Concern for patient safety and care

As the number of Americans who are overweight and obese grows, the risk of **lifting injuries** for both patients and nurses increases.

- Nurses consistently are ranked high among occupations with back pain and injuries. Humphreys, 2007
- 89% of back injury claims filed by hospitals are related to patient handling.
- Workers' compensation back injuries cost 255% more than non-work-related back injuries and hospitalization is twice as likely. Camden, 2006
  - Injuries result in **loss of revenue** due to decrease in staff productivity, clinical staff availability and retention in the workforce.
- With increasing population of obesity, nurses are encountering bariatric patients in nearly every practice area. McGinley & Bunke, 2008



Source: Novation Market Survey. 2008

Other departments include:
General medicine
Lifestyle Management
Medical Floor
Medical Surgical Unit
Obstetrics

Bariatric Care: Workplace Injuries

Use of bariatric equipment and implementation of staff training for bariatric care can alleviate the risks of workplace injuries.

Use of bariatric training and equipment

- According to a 2008 market survey of VHA and UHC organizations, 51% of hospitals have seen a decrease in workplace injuries since committing to bariatric training and equipment. Novation, 2008
- The cost of equipment to assist moving of obese patients is significantly less than the cost of worker's compensation claims related to staff injuries.
  - CDC reports that the average workers' compensation costs most hospitals $10,000.

Case studies:

- **Lift Teams** are specially trained to help lift, turn, and move obese patients. They assist nursing staff.
  - **Sutter Health** - Sacramento, CA. Started lift team in 1992 and since then has experienced a 60% drop in workplace injury claims. Crook, 2009
  - **UC Davis Medical Center** – Have 7 two-person teams that are on call 24-hours a day to help move patients 200+ pounds. Administration expects to save $500,000 annually. Crook, 2009

Bariatric Care: Environmental Barriers

Workplace Injuries

Environmental Barriers

Dignity & Care

The physical environment plays a critical role in the patient pathway of care. Most importantly, are corridor widths, door widths, lifts, and toilets.

Building Entries:

- Minimum door width should be 4' to accommodate bariatric wheelchairs and beds. Crook, 2009

Elevators:

- Provide 6,000-6,500 pound capacity elevators to provide space for 40"x90" bariatric bed, patient, equipment, and at least two staff members. Door widths should be a minimum of 54" to 60". Crook, 2009
  - There is a significant up charge, however this is essential to patient transfer and care.

Waiting Areas:

- Provide seating that can support and fit larger individuals. Prevent stigmatization by integrating bariatric furniture with regular seating. Disconsiglio, 2006
  - Bariatric seating vary from loveseats, and 30" to 40" wide seats with reinforced structure to support at least 750-lbs. Barista, 2005
  - 10-20% of general seating should be bariatric. Provide at least 20% in emergency departments and up to 50% in cardiac and bariatric units.
  - These numbers are frequent recommendations from designers and product manufacturers but lack research studies to support them.

Source Detail

These design guidelines are frequent recommendations from designers in practice and product manufacturers but lack concrete research studies on actual performance.

Bariatric Care: Environmental Barriers

Workplace Injuries

Environmental Barriers

Dignity & Care

The physical environment plays a critical role in the **patient pathway** of care.

Patient Rooms:

- According to a FSE (functional space experiment) run by Loughborough University, there needs to be a minimum spatial requirement of 16.61m^2. A minimum of 17.54m^2 is recommended for surgical areas.
  - *Note:* these are **ergonomic envelopes** to support functional activity and *not* room dimensions. Additional space is needed for storage, family, and hygiene. HSE, 2007
- According to the BRDAB (Bariatric Room Design Advisory Board), optimal patient room should be 14' wide and 15' long. Doors should be 60". Alternatively, use double leaf doors (42" + 18") Stroupe & Sarbaugh, 2008
- Allow 5' of clear space around three sides of the patient bed. Crook, 2009
- Rooms should be located near elevators to provide a clear path of travel. Stroupe & Sarbaugh, 2008
- Place at least 1 or 2 bariatric rooms per unit. This allows patients to be positioned according to their illness and not their weight.

Source Detail

Many of these design guidelines are frequent recommendations from designers in practice and product manufacturers but lack concrete research studies on actual performance.

Bariatric Care: Environmental Barriers

Bariatric Toilet Rooms:

- Provide floor-mounted toilets with weight capacity of at least 1,000-lbs.
- Toilet seat height should be 17” to 19” to aid patient to rise. Kent, 2006
- Provide a minimum turning radius of 6’ in order to accommodate larger wheelchairs.
- Provide reinforced grab bars that hold at least 750-lbs.
- Place sink further away from toilet to prevent people using it for lift support.

Bariatric Care: Dignity and Care

Workplace Injuries

Environmental Barriers

Dignity & Care

Develop an organizational protocol of patient assessment

- Patients should be assessed as soon as possible in order to create a patient pathway that will accommodate their needs. Through the assessment, proper equipment can be acquired and made available when the patient is admitted.

Develop an organizational culture of respect for overweight and obese individuals

- Care providers should be trained and educated about bariatric medical care.

Source Detail

Many of these design guidelines are frequent recommendations from designers in practice and product manufacturers but lack concrete research studies on actual performance.

Bariatric Care: Dignity and Care

Medical Conditions affecting bariatric patients during patient handling Baptiste, 2007

- Severe pain and discomfort
- Hip and knee replacement, joint instability, unstable spine, fractures, spasms
  - All moving puts patients at risk
- Severe edema, wounds, diaphoresis, peresis
  - Need full support slings
- Extreme osteoporosis
- Compromised respiratory, cardiac problems
  - Shoulder compression or transfers laying flat puts patient at risk
- Amputation

Staff Education and Treatment Pathway

- Bariatric patients suffer from an array of medical conditions just like healthy-weight patients. The treatment and handling of these medical conditions however require special equipment and extra support to execute them safely.

Family Education

- Address comfort and safety needs while not drawing attention to different proportions and sizes, select a variety of seating alternatives (chairs, loveseats, and sofas) with a residential design that fits with existing furniture styles.
- To calm fears and elicit patient cooperation and assistance, instruct the patient and family on the proper use of bariatric equipment and devices. Bejciy, 2008

Bariatric Care: Dignity & Care

The quality of care for obese individuals should parallel the care for the non-obese. There should be no discrimination in the providing of treatment and accommodations due to size and weight.

With the growing population of obese individuals seeking medical attention, it is a strategic move to provide holistic care for the obese.

How far do you take it?

Stakeholder Consideration

Administration

Cost of constructing bariatric rooms within units.

Ability to occupy bariatric rooms with non-bariatric patients when needed.

Nurses

Specialized nurses to treat illness of patient.

Patients

Treatment of illness and not simply size and weight.

Family

Provide accessible and supportive spaces for all needs.

Source Detail

HSE Research Report, 2007

Detailed information was collected to provide these case studies on specific incidents and manual handling risks.

Bariatric patients move through the hospital for various tests and procedures and can interact with almost every ancillary department in the facility. Hospitals need to review each area and the equipment that a bariatric patient may access. Kent, 2006

Case Study on patient handling and pathway Hignett et al. HSE Research Report, 2007

Orthopedic Emergency Admission

1. Patient admitted after suspected fracture from a fall. Ambulance notified hospital to prepare bariatric bed for when the patient arrived.
2. Patient taken to X-Ray and was transferred laterally onto the X-Ray table.
3. Patient returned to bariatric bed and taken to orthopedic ward. Fracture is diagnosed.
4. Additional equipment was provided for patient: bariatric armchair and commode. The room was too small for all equipment so thing had to be moved in/out as required.
5. Patient was hoisted into wheelchair and taken to another ward to be weighed. Patient then returned to their room.
6. Bariatric bed did not lower sufficiently for the patient to stand up straight from the bed so the patient was hoisted into the bariatric armchair to stand up. A bariatric walking frame was used to assist standing and walking.

Similar to non-obese patients, bariatric patients are admitted for an array of medical conditions and are transferred and moved to various areas of the hospital.

ADA vs. Bariatric

Bariatric and ADA design guidelines conflict in toilet room design

ADA guidelines ADA Standards for Accessible Design, 1994

- Section 4.16 notes that the centerline for toilets should be 18" from the wall.
- Grab bars must be provided behind and next to the toilet complying with the figures below.
- A minimum of a 5' turning radius must be provided.

Bariatric guidelines

- Design guidelines suggest that the minimum centerline for toilets should be 24" from the wall.
- Reinforced grab bars that can hold at least 750-lbs must be installed at heights (similar to ADA)
- A minimum of a 6' turning radius must be provided.

ADA guidelines are basic and minimal standards for accessibility. This does not imply that executing the minimal standards are optimal. When possible, these standards should be exceeded to provide a comfortable dimension of accessibility.

Section 6.1 Medical Care Facilities in the ADA Standards, states that at least 10% of patient bedrooms and toilets and all public use and common use areas are required to be accessible.

Similarly, medical care facilities should provide safety and accessibility for bariatric individuals.

Solution: Universal and Inclusive Design

Stakeholder Consideration

Administration
Costly to replace all wall-hung toilets with bariatric floor-mounted ones

Doctors
Inclusive designs that accommodate patients will encourage people to come to the hospital for treatment

Nurses
Accessible to allow nurses to aid patients if needed.

Patients
Eliminates fear of breaking equipment or fitting in the space

Family
Able to access any public use toilet

Solution: Universal and Inclusive Design

24" Centerline for Toilet Placement
Floor-mounted bariatric toilets should replace ADA with 18" centerline.

Grab Bars to Comply with ADA
Use re-inforced grab bars that support 900lbs and secure them at ADA compliant locations.

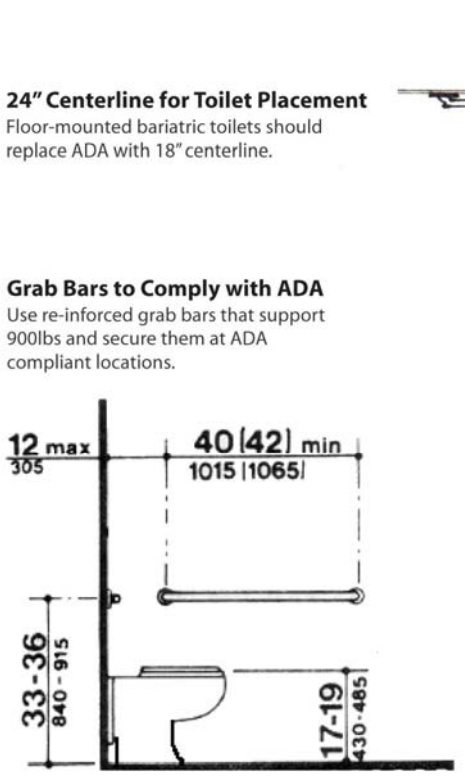


Image. ADA Guideline fig. 30d modified.

Swing Swivel Grab Bars
Provide ADA support by placing these bars to remedy the reach distance from the increased toilet centerline.

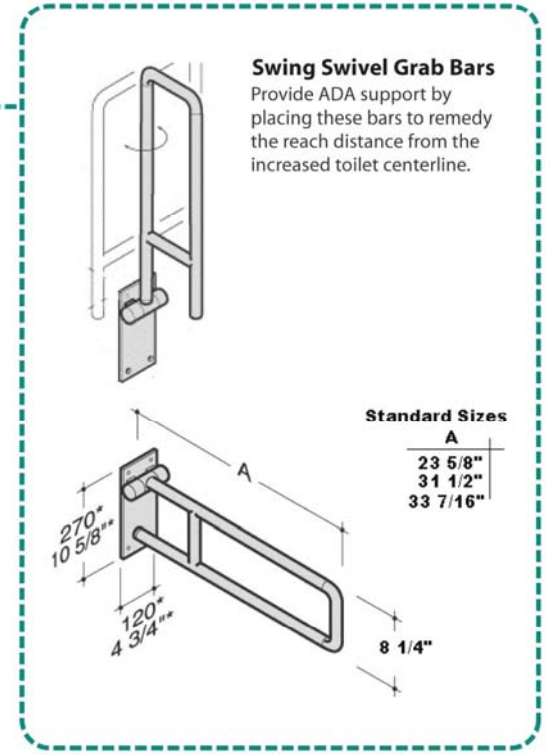


Image. www.diadot.com. Pivoting Swing up Grab Bar.

Benefits:

- Flexible design to accommodate a range of users.
- Prevents stigmatization of bariatric toilet rooms.

Summary of Recommendations

Given the financial limitations for a complete renovation of Auburn Memorial, the following is a re-cap of the short-term and long-term recommendations that may be implemented to provide holistic care of the obese population.

Short-term Goals:

- Develop an organizational protocol of assessing bariatric patients.
- Lease or buy proper bariatric equipment: beds, mobile lifts, wheelchairs, furniture.
- Provide bariatric toilets for all bariatric patient rooms. Convert ADA single bathrooms in public areas for universal use.
- Extend widths for major doorways into treatment areas and for bariatric patient rooms and toilets.

Long-term Goals:

- All areas of the hospital should incorporate universal/inclusive design to accommodate all users. Universal design will allow for maximum flexibility of the space and function.
- Each treatment unit should have at least 1 or 2 bariatric patient rooms. A storage area should be considered in space planning for additional equipment that is used.

System Solution

In order for any of the proposed recommendations to work in practice, there needs to be not only the financial means but also a change in organizational culture.

Organizational culture of:

- Understanding and respecting the needs of bariatric individuals
- Education on treatment of bariatric patients and use of proper equipment
- Utilizing lift systems to prevent workplace injuries among caregivers
- Eliminating the bias and discrimination that exists in the medical and social community

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