Universal Design: Meeting the needs of the Bariatric Population
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

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auburnhospital.org

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.

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

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?

**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/m²)

**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

**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
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
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.

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.

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

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.

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. 

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 Detail

Novation is one of the industry’s leading health care contracting services company.
Key Considerations

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

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
Stigmatization & Discrimination

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

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.

- Workplace Injuries
- Environmental Barriers
- Dignity & Care
Bariatric Care: Workplace Injuries

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
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

**Workplace Injuries**

**Environmental Barriers**

**Dignity & Care**

**Stakeholder Consideration**

**Administration**
Staf training costs. Acquisition of equipment.

**Doctors**
Communication with nursing and support staff

**Nurses**
Time required for training and education. Develop protocols to ensure staff are aware of equipment and how to use it.

**Patients**
Increase in support staff and equipment can improve quality of care.

**Family**
Concern for patient safety and 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

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 16.61m². A minimum of 17.54m² 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

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

Workplace Injuries

Environmental Barriers

Dignity & 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

Stakeholder Consideration

Admission
Staff training costs.
Acquisition of equipment.

Doctors
Ensure proper treatment

Nurses
Time required for training and education.
Develop protocols to ensure staff are aware of equipment and how to use it.

Patients
Increase in support staff and equipment can improve quality of care.

Family
Provide comfort by explaining how equipment and device are safe for patients.
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

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.
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

**Benefits:**
- Flexible design to accommodate a range of users.
- Prevents stigmatization of bariatric toilet rooms.
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.
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
References

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