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Planning and Design Guidelines for Bariatric Healthcare Facilities

Abstract* | *Article

Healthcare organizations across the nation are adapting their care practices to address the increasing needs of the bariatric population. The objective of this study is to present the issues related to this demographic to the healthcare design community. It will provide tools to assist in the development of healthcare settings by defining the physical demands, specialized equipment required, and underlying basic activities of the morbidly obese patient.

The dimensions and guidelines defined in this article respond to the scale of the bariatric patient and his or her restrictions through the continuum of care. The material is broken down into the following sections:

- ***Understanding bariatrics. An overview of this health condition, its ergonomics, the impact regarding healthcare settings, ways of obesity assessment, definition of the design target, and minimum width dimensions.***
- ***Bariatric-specific design considerations. Criteria that applies to healthcare facilities only, regarding circulation, equipment, clearances, safety and privacy.***
- ***Continuum of care. An analysis of the bariatric journey and space planning tools.***
- ***General design considerations. An invitation to rethink the built environment, the potential consequences from introducing architecture into it and to address some of the causes of obesity with design.***

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Planning and Design Guidelines for Bariatric Healthcare Facilities

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Bariatrics and healthcare architecture
Healthcare organizations continue to balance the cost of care with quality, staff, patient safety, morale, and accessibility. The design of facilities has a direct impact on all of these performance criteria for care and must apply for all patient types, including the increasingly larger bariatric population, which is significantly affecting the continuum of care and all those who are part of it. The negative consequences of lacking proper accommodations have been aggravated, and healthcare settings are adapting care practices, procuring special equipment and supplies, renovating, and building new spaces to accommodate morbidly obese people.

Morbidly obese patients access healthcare systems just as all other patient types and become part of the healthcare delivery continuum through inpatient, ambulatory, and outpatient settings. Their physical needs and conditions, however, are highly specialized. The design community is facing the request for the creation of "bariatric-friendly" healthcare environments in the United States without defining what this concept really means or what this issue involves.

As a response to the design community and with the understanding that research into all aspects of design is critical, the AIA Academy of Architecture for Health (AAH) has sponsored this research study in the field of bariatrics through the Arthur N. Tuttle Jr. Fellowship program. The study focuses on the needs of healthcare designers and intends to help the profession understand the issues surrounding this growing population. At the same time, it is a call to rethink the opportunities that before us as designers and to consider how to better influence the lifestyle of our communities with regard to obesity prevention.

Even though architecture may not be the main factor for shaping a person's personality, it certainly plays an important behavioral role. We must first agree on the premise that obesity is an epidemic and that, among many different factors, it relates directly to eating disorders and anxiety. The direct impact of an environment on human behavior encourages the design community to design spaces with a positive, omnipresent, and permanently increasing

influence on people—provoking physical and psychological reactions in the user. From an architectural standpoint, it is time to recognize that this epidemic has spread organically to our field, affecting it in both generic and specific ways.

Certainly it is not a matter of creating and developing an "extra large" architecture. It's about elevating the dialogue pertaining to the direction that the country is taking and how to stop obesity from disturbing our standards and morphing our built environment. We need to address these issues with a sustainable and lean approach that considers the differences in ergonomics and proportions of the bariatric patient. This can be accomplished by letting ourselves rethink the built environment with an awareness of the direct relationship between environment and behavior and its consequences.

Understanding bariatrics
Current social dialogue has much to say about the bariatric definition, the medical implications, and means of assessment. For designers, the Body Mass Index (BMI) charts do not say much without a graphic and dimensional correlation (see Figures 1 and 2, below).

As a reminder, the following information and data are presented to establish a consistent perspective and basic concepts of the problem. The term "bariatric"—coming from the Greek "barros," which translates as heavy or large—refers to patients who are morbidly obese. In terms of BMI, being overweight is defined as a BMI of 25.0 to 29.9. Obesity is defined as a BMI of 30 or higher. Morbid obesity is typically defined as being 100 pounds or more over ideal body weight or having a BMI of 40 or higher.

Currently more than 59 million Americans (about 31 percent of the population) are obese, of whom an estimated 5 to 10 million suffer from morbid obesity. At the current rate, 39 percent of Americans will be obese by 2008.

Public health in the United States has focused on the following, by decade:

- ***Pre-1950: improving sanitation***
- ***1950s: eradicating infectious diseases***
- ***1970s: removing toxic environments***
- ***1980s: preventing risky lifestyles***
- ***21st century: creating healthy environments, increasing physical activity, and preventing obesity***

The obesity epidemic is so critical that the 2005 edition of Dietary Guidelines for Americans (revised every five years) is based on new scientific research on nutrition and physical activity from the U.S. Departments of Health and Human Services (DHHS) and Agriculture (USDA).

Although it is not my intention to discuss technicalities of the medical field, I will present a brief overview of bariatrics and will continue with a graphic analysis of ergonomics and the spaces affected in the continuum of care by the presence of this population segment.

Obesity is understood to result from genetics, medical care, behavioral choices, social circumstances, environmental conditions, or a combination of these. There are several ways to assess obesity; determine whether an individual falls under the "obese" category; and, depending upon the severity of the case, determine whether the person could be classified as "bariatric." The assessment involves a combination of the following parameters:

- ***BMI (a measure of an adult's weight in relation to his or her height)***
- ***Waist circumference (high-risk for men > 40" and women > 35")***
- ***Health co-morbidities***

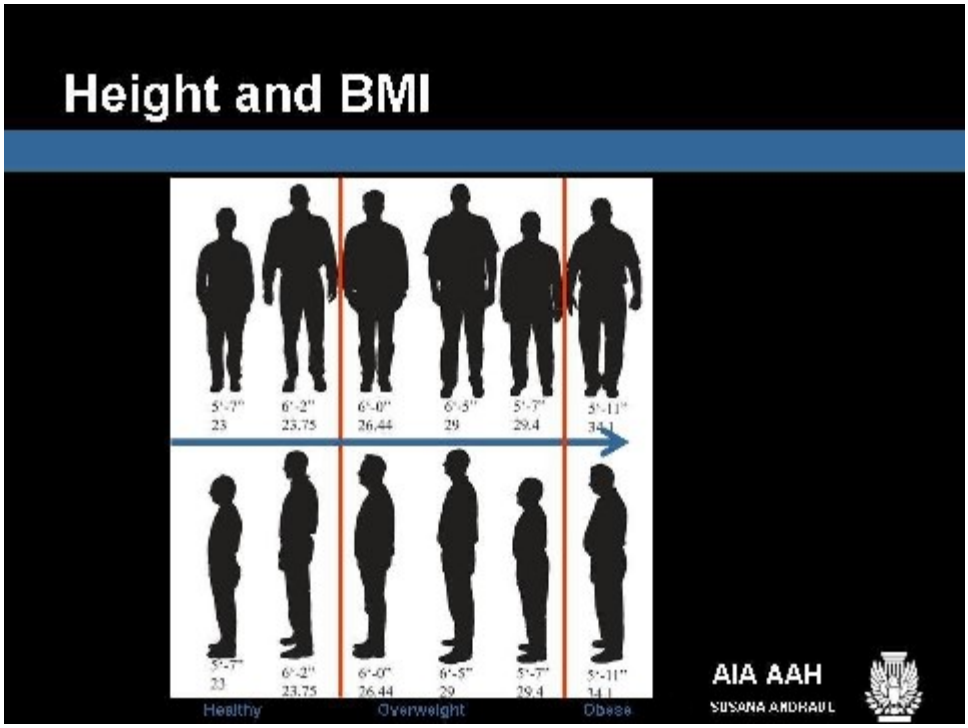


Figure 1

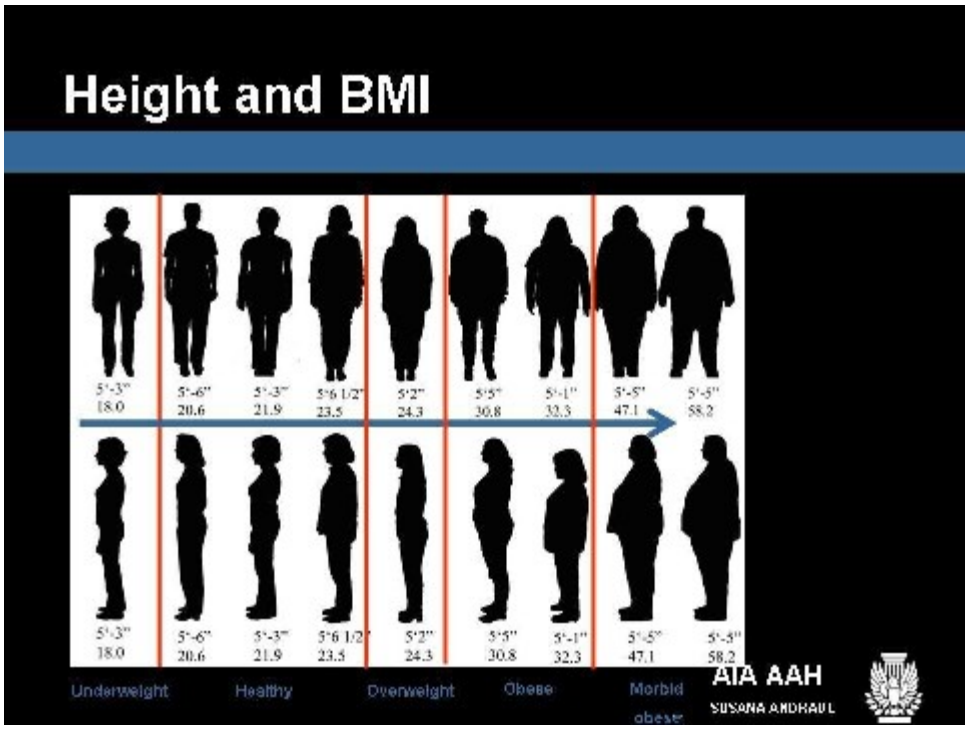


Figure 2

Why are there bariatric programs in healthcare settings? This specific medical program appears primarily as an answer for weight loss and involves surgery after clinical pre- and post-op treatment once other weight loss programs have failed. These programs include dietary therapy, physical activity, behavioral therapy, and pharmacotherapy. "Mainly two types of surgery have proven to be effective: those that restrict gastric volume (banded gastroplasty) and those that, in addition to limiting food intake, also alter digestion (Roux-en-Y gastric bypass)" (from The Practical Guide: Identification, Evaluation and Treatment of Overweight and Obesity in Adults, NHLBI Obesity Education Initiative, National Institutes of Health, 2000).

How big is the patient we must design for? After extensive firsthand research in the field; compiling surveys done by medical and design professionals; data on 275 candidates for bariatric surgery; and shadowing of patients, staff, and physicians, the results are as follows:

- ***Average patient: 330 pounds***
- ***Bariatric visits of: 450–510 pounds***
- ***Design target: "minimum" of 500 pounds***
- ***Design drop weight (impact factor 1.4): 700 pounds***

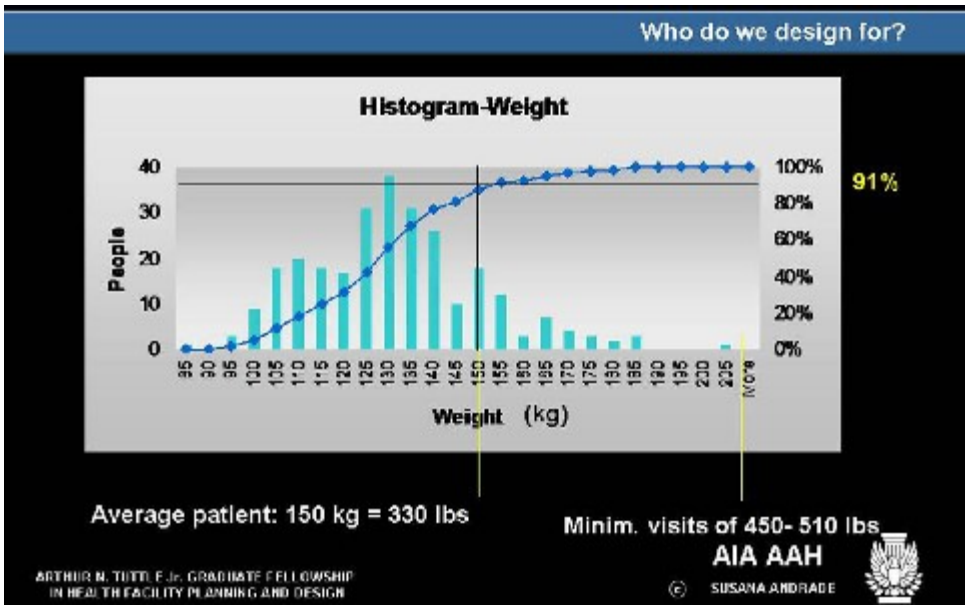


Figure 3

To define minimum design dimensions, variations in body type must first be accounted for. Fourteen percent of the population has what can be referred to as apple-shaped bodies, which indicates a waist measurement greater than the hip. Eighty-six percent of obese individuals have the pear-shaped body type, which indicates a hip measurement greater than the waist. Because the pear-shape body type predominates, the hip dimension rules over waist, and therefore we use the hip dimension criteria to determine minimum widths:

> ***Minimum stretcher width analysis: 57" (average hip) divided by 2 = 28.5" + 16 " (allowing 8" clearance on each side for IV and arms) = 44.5"***
>
> ***Minimum chair width analysis: 57" (average hip) divided by 2 = 28.5" + 4" (allowing 2" clearance on each side) = 32.5"***

Bariatric-specific design considerations (applies to healthcare facilities only)

Circulation
It is important to provide barrier-free settings.

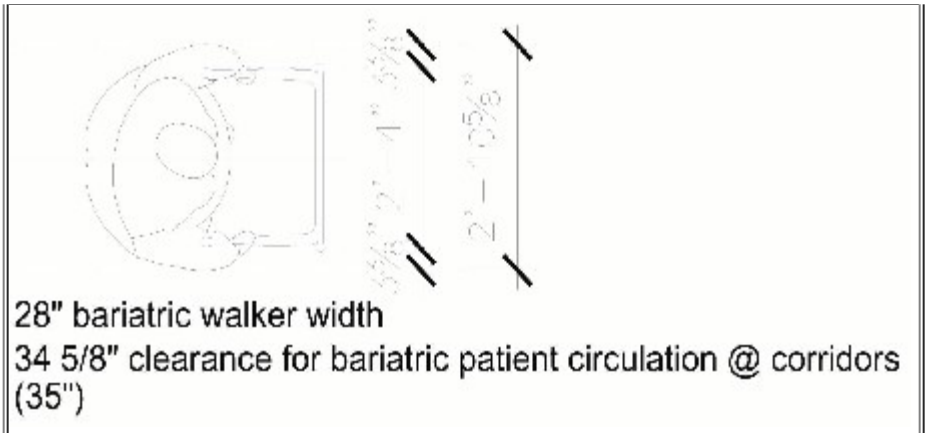


Figure 4. *Single bariatric patient on a walker*

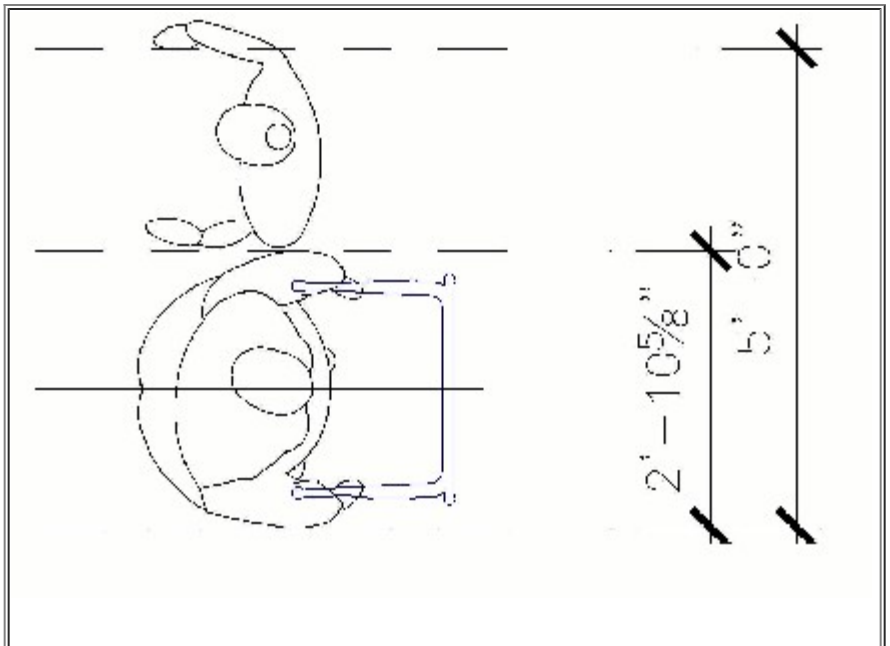
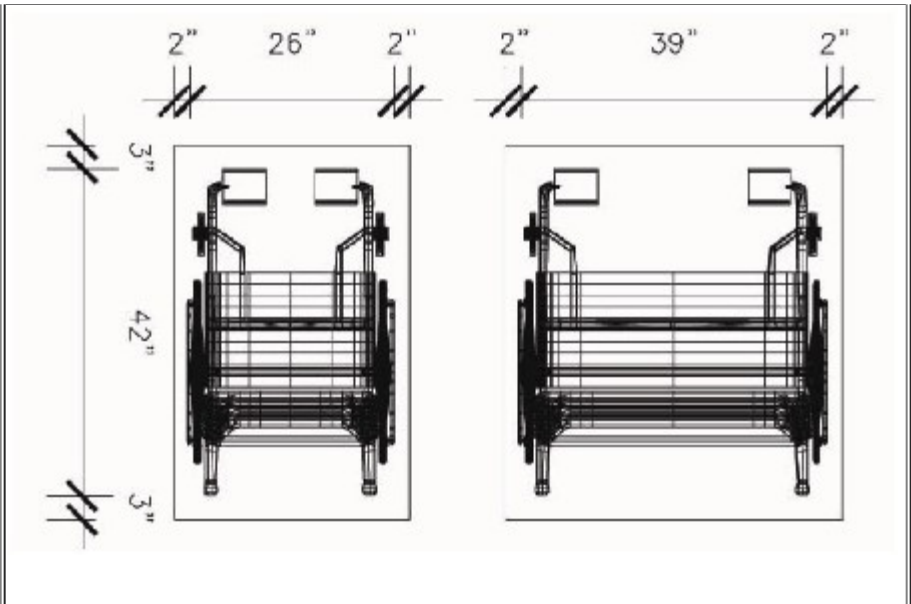


Figure 5. *Required width for one bariatric and one non-bariatric person in a five-foot corridor (does not affect current standard)*

A bariatric patient could be transported with the help of a cane, a wheelchair, a walker, a lift, or a stretcher. Figures 6 through 11 summarize the dimensions and the type of space and equipment that could go through a door.



Figures 6, 7, 8. *Wheelchair dimensions*

Figure 7

Figure 8

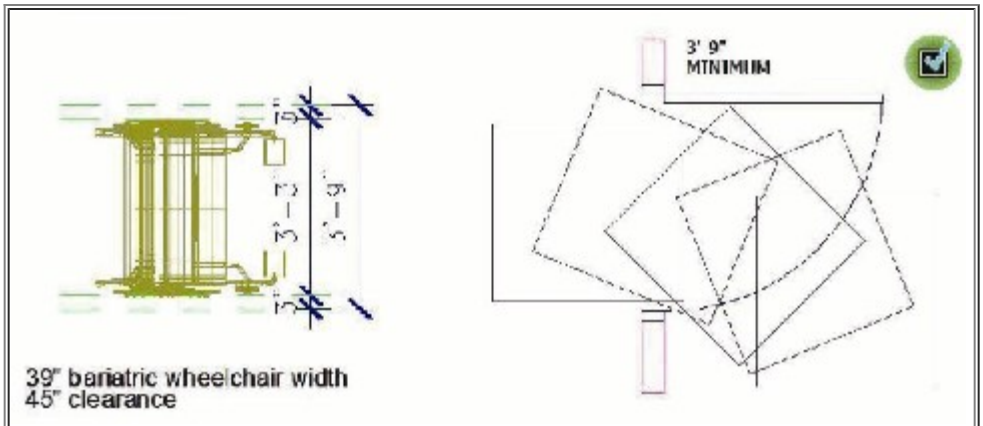


Figure 9. *Door widths at exam rooms and outpatient toilet rooms*

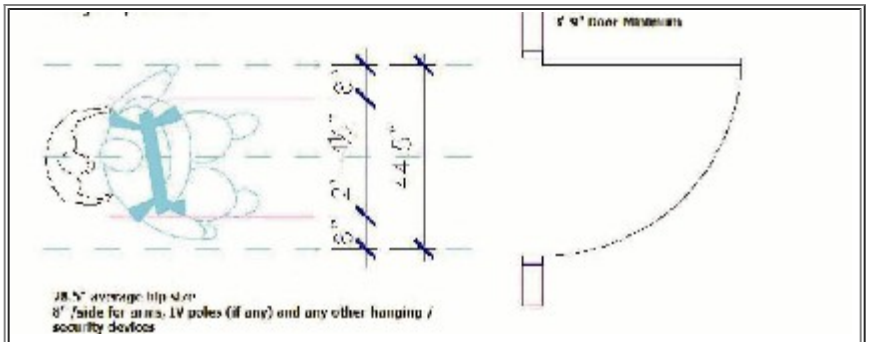


Figure 10. *Door width at inpatient toilet rooms or where ceiling lift system goes through*

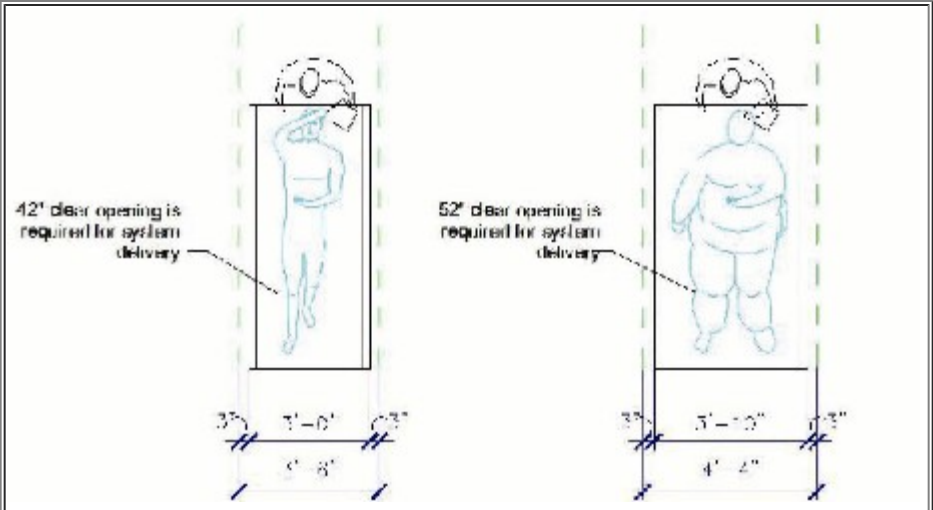


Figure 11. *Circulation at inpatient corridors, critical patient rooms, and hospital elevators*

Equipment and clearances
The healthcare industry has developed equipment that addresses the requirements for bariatrics, so designers must be aware of sizes and ratings of the following: exam tables, surgical tables, stretchers, patient beds, imaging equipment, general bariatric furniture, floor scales, commodes, wheelchairs, recliners, and floor-mounted toilets, among others. For patient-transferring devices, depending on each specific case, one could use ceiling-mounted lifts, portable lifts, slings, repositioning devices, or all-inclusive bed care systems. When opting for a ceiling transferring device in retrofitting situations, one should consider the existing conditions of the space regarding the ceiling layout, location of HVAC systems and lighting, structural conditions of the space, and current clearance code compliance (see Figure 12).

Figure 12

Safety
The design should aim to achieve barrier-free environments,

provide ramps where feasible, and avoid steps. Avoid the use of floor-mounted and protruding grab bars as they make staff assistance to the patient more difficult. For self-assistance, provide perimeter wall-mounted grab bars with reinforcement to meet rating, where feasible (e.g., scale alcoves, toilet rooms, patient rooms). (See Figure 13.)

Figure 13

Privacy
Comply in "all" spaces with HIPAA requirements. At scale alcoves provide three-side enclosure and handrails at each side, locating the scale screen to face the opposite direction of main traffic. For proper acoustics, walls with STC minimum of 45 are optimum. In open-plenums conditions and when batt of insulation is not sufficient, include a sound boot (privacy boot) at every exam and consultation room (see Figure 14).

Figure 14

Continuum of Care
This study attempts to present a graphical understanding of the problem, so it may be used as a tool for planning spaces for the current state of healthcare. The flowchart below (Figure 15) represents the journey of bariatric patients when they access healthcare for surgery.

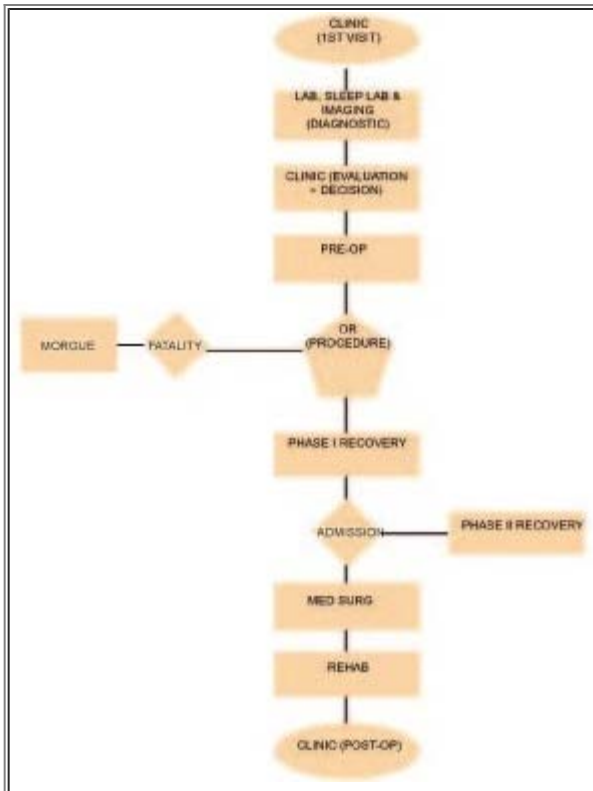


Figure 15

Clinic
Planning should take into account the following functions

(Figure 16) that are necessary for a bariatric clinic and provide the space for psychological evaluation, support groups, and nutritional consultation. In some cases a space for physical therapy is required.

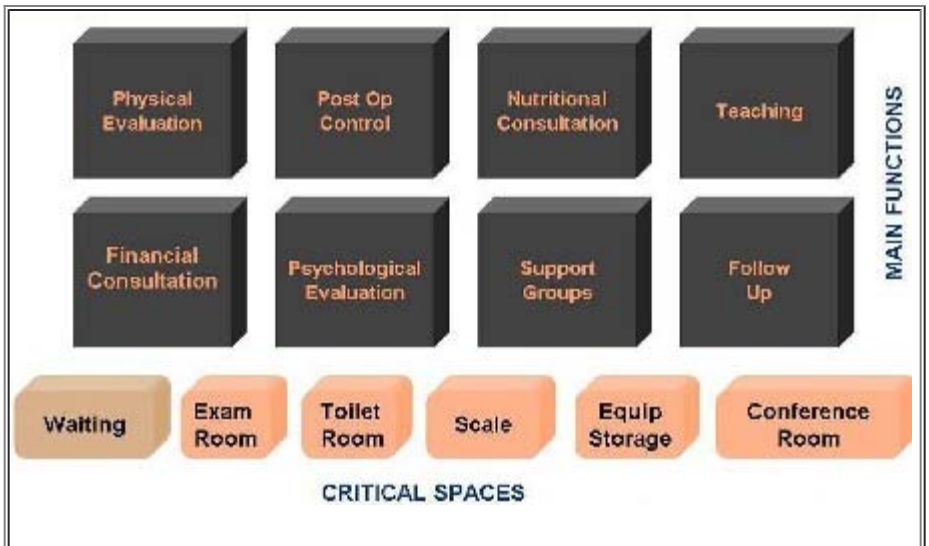


Figure 16

Imaging

In addition to the physical evaluation that a common individual goes through before a surgical procedure, a bariatric patient often presents co-morbidities that require imaging, diagnostics, and control (see Figure 17). Specify the proper rating for diagnostic equipment and consider their dimensions, which can affect the overall square footage of the space.

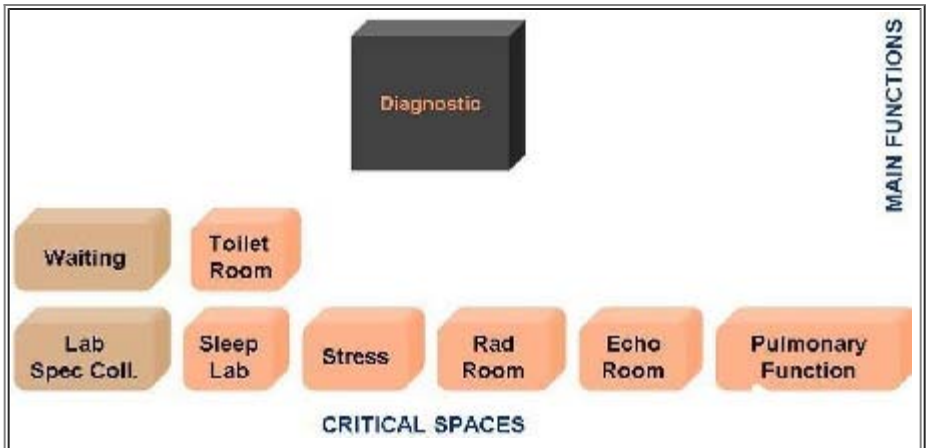


Figure 17

Pre-op

The AAH Guidelines for Design and Construction of Hospital and Health Care Facilities, 2001 Edition, states that "each stretcher station shall be a minimum of 80 square feet (7.43 square meters) and shall have a minimum clearance of 4 feet (1.22 meters) on the sides of the stretchers and the foot of the stretcher." When this criterion is applied to bariatric dimensions, the result is as shown in Figure 18.

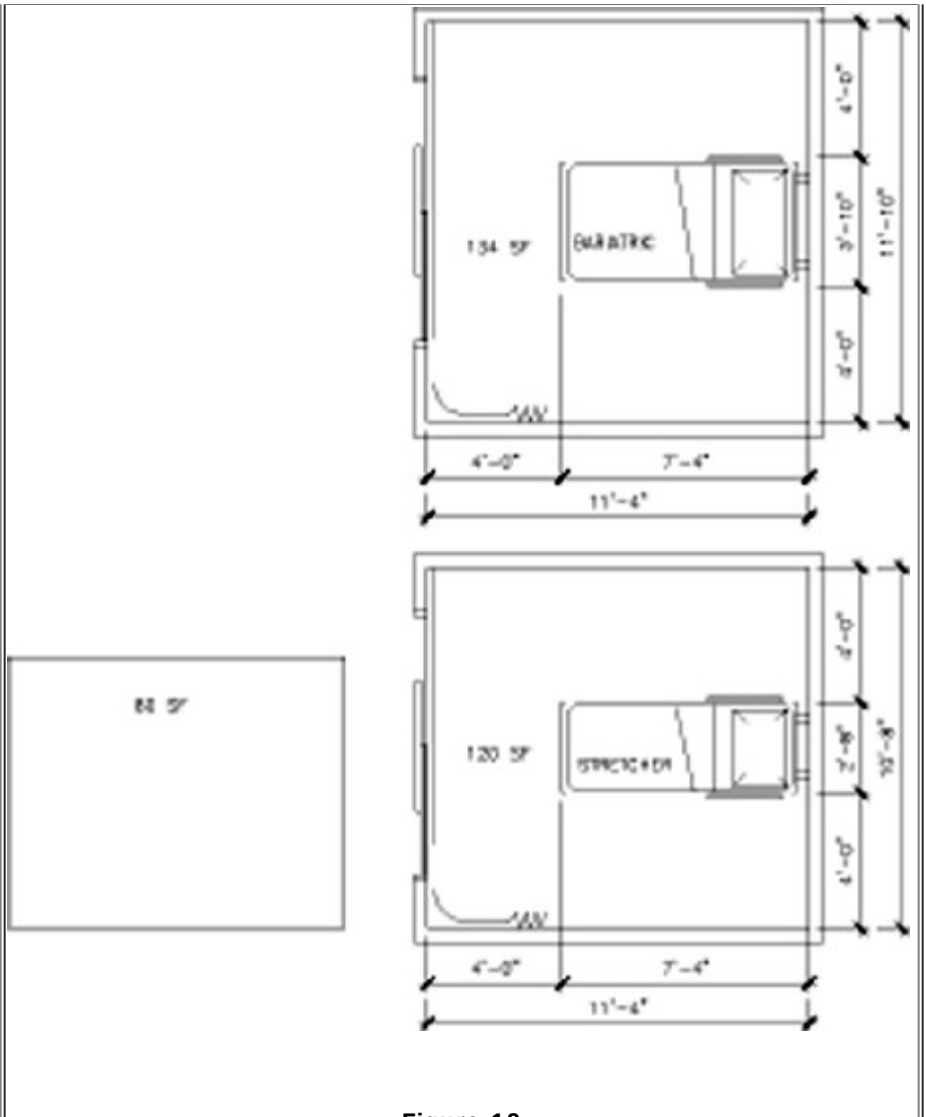


Figure 18

Operating room

Depending on the assessment, the patient could face either a banded gastroplasty or a Roux-en-Y gastric bypass. Either of these can be performed through a laparoscopic or an open procedure. The operating room design criterion is based on the type of procedure, number of personnel, clearances, and equipment. The 2001 edition of the Guidelines states that for "surgical suites for special procedures that require additional personnel and/or large equipment, the room shall have, in addition to the above, a minimum clear area of 600 square feet, with a minimum of 20 feet clear dimension exclusive of fixed or wall mounted cabinets and built-in shelves . . . ." This specifically applies to the operating room in which an open gastric bypass will be performed (see Figure 19).

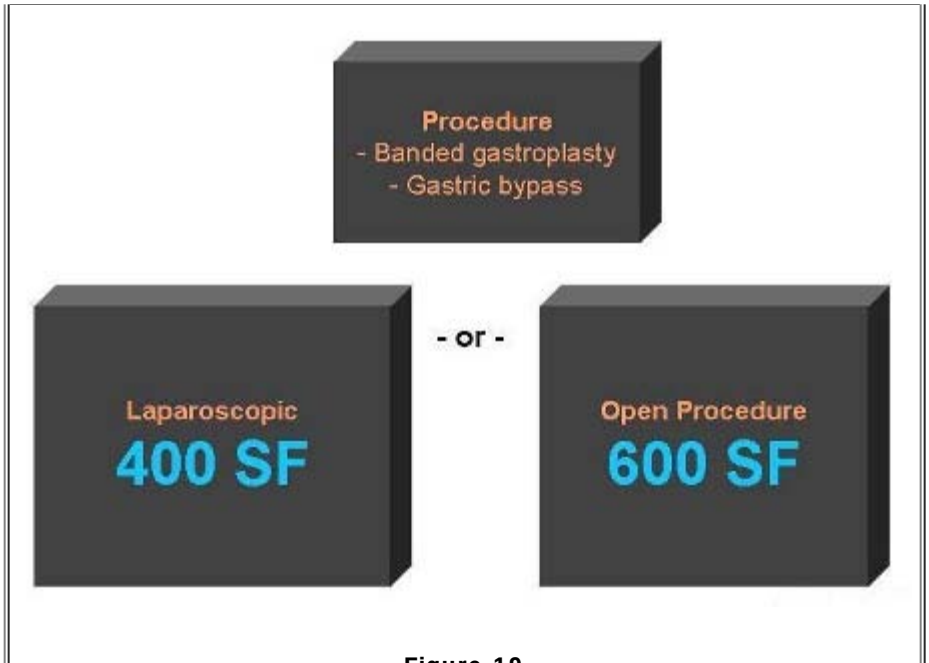


Figure 19

Phase I recovery: post-anesthetic care units (PACUs)
Also from the 2001 Guidelines: "Additionally, the design shall provide a minimum of 80 square feet (7.43 square meters) for each patient bed with space for additional equipment described in the functional program, and for clearance of at least 5 feet (1.52 meters) between patient beds and 4 feet (1.22 meters) between patient bedsides and adjacent walls (see Figure 20).

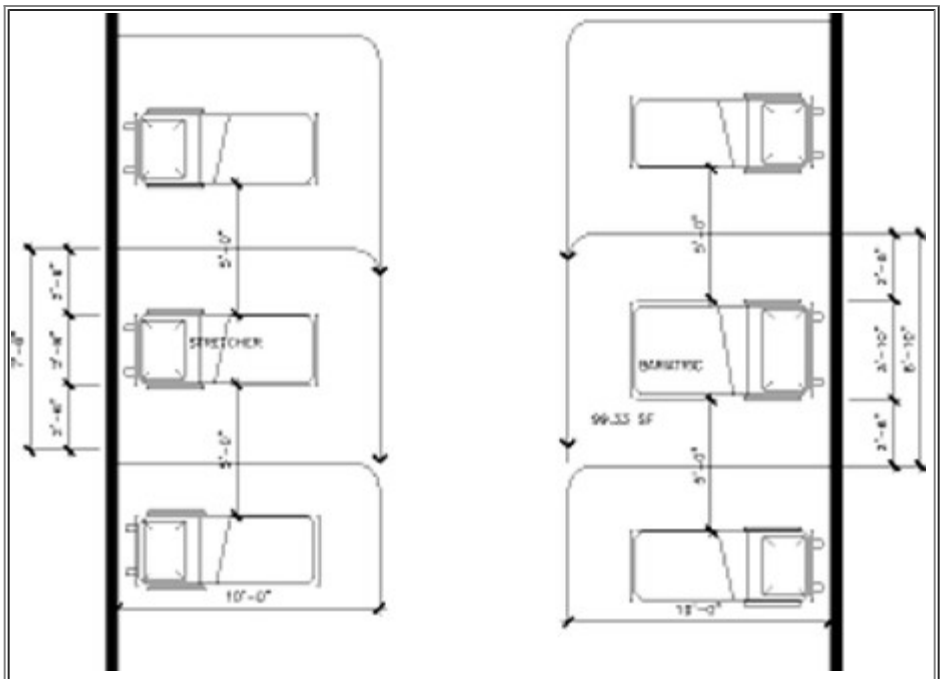


Figure 20

Morgue
Because 31 percent of the population is currently obese, this same percentage must apply for cadavers. Therefore, we

should include a transferring system, specify enlarged tables with proper rating, and provide sufficient clearances for maneuvering the cadavers in bariatric stretchers and for body holding or autopsy functions.

Medical or surgical patient room
The patient room design criterion is based on zones, clearances, circulation, staff, and patient safety. While defining the staff, patient, and family zones and complying with current codes, we must provide for a solution for transferring the patient around the space—in and out the room, and between the patient bed and toilet room. Because the patient mobility is restricted, staff assistance is required. The diagrams in Figure 21 represent optimum layout configurations for patient room design.

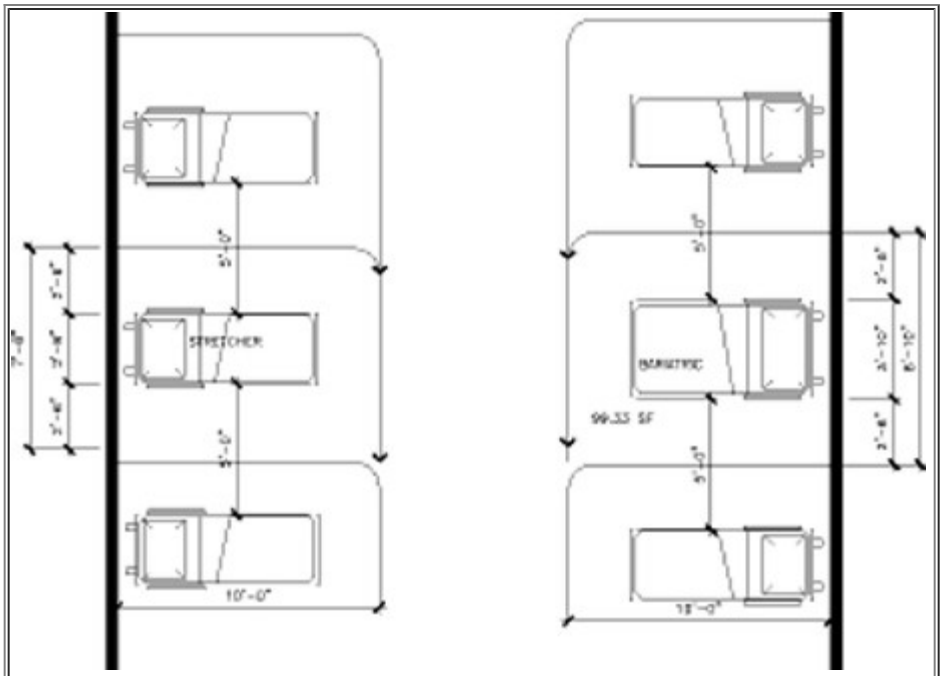


Figure 21

The staff zone, for assistance, requires a minimum width of 5' 0". If a ceiling-mounted lift system is provided, the door at the toilet room requires a minimum width of 3' 9". The door at patient room requires a minimum width of 4' 4" to allow a batriatric stretcher. Provide grab bars at walls from bed to toilet room for self-assistance.

Avoid changing the direction of the ceiling track for optimization. Be aware of the available radius for rail curving of each specific ceiling lift system vendor. Implications for the ceiling design and structural support capabilities should be taken in consideration.

Clearances mentioned above are free of the family zone, staff hand-washing sink, and patient wardrobe (see Figures 22, 23).

Figure 22

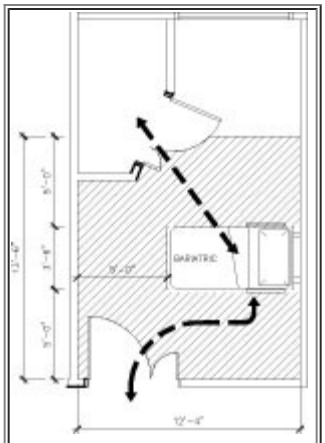


Figure 23

Toilet rooms
Provide floor-mounted toilets and allow for staff assistance on two sides of patient at toilets and showers. A clearance of 5 feet allows for location of a toilet commode if necessary and doesn't infringe on heights and distances of accessories around the toilet (toilet rating: 700 pounds [design drop weight with an impact factor of 1.4 with a patient weight of 500 pounds]). Choose porcelain over stainless steel if it meets rating (see Figure 24).

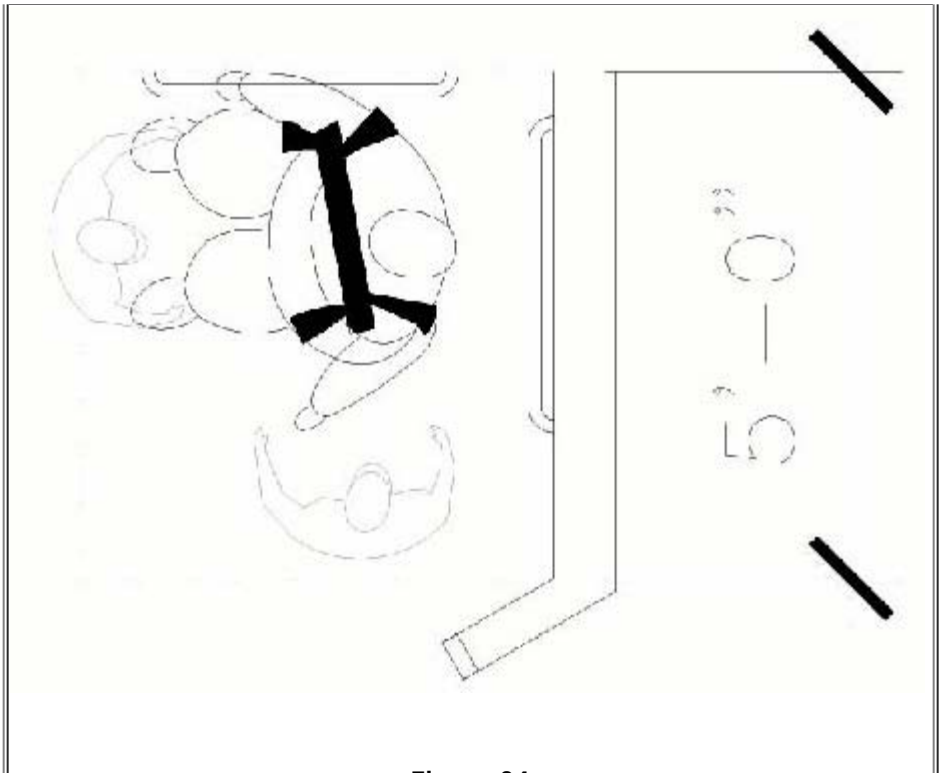


Figure 24

Sink rating is 300 pounds; avoid a floor sink as it interferes with wheelchairs. At a surface-mounted sink, provide extra support to allow for leaning, and avoid fragile materials. At showers, provide grab bars around enclosures; opt for an open shower with floor drain to allow for better staff assistance and possible continuation of the ceiling lift system.

Equipment storage rooms
The 2001 Guidelines states that for a nursing unit (medical and surgical), there should be an equipment storage room or alcove of not less than 10 square feet (0.93 square meters) per patient bed, while the 2006 Guidelines draft of November 2004 [the 2006 edition was published in July 2006] states that for critical care units, not less than 20 square feet (0.93 square meters) per patient bed is required.

To accommodate a bariatric patient, a portable lift (9.8 square feet), a walker (3.88 square feet), a wheelchair (11.3 square feet) and a commode (5 square feet) are needed—all of these of bariatric capabilities. In the case of having a portable lift, the minimum storage per bariatric patient bed adds up to 35 square feet. If rooms are provided with a ceiling lift system, then the minimum storage required is 25.2 sqiare feet.

Because 31 percent of the population is currently obese, take this into consideration along with patient volumes, lengths of stay, nature of the unit, current codes, and local regulations of each specific unit to determine the percentage of beds per unit that will accommodate this percentage of the population, and provide sufficient storage per unit.

Other affected areas

Because this population is present throughout of the healthcare system, we must endeavor to provide safe environments and pay special attention to the most critical facets of the problem. These include emergency departments, public areas, clinics, treatment, and diagnostic components of systems. As a general rule, it is best to design barrier-free spaces, provide safety devices, ensure that equipment meets proper ratings, allow for transferring systems where feasible, and plan for appropriately sized rooms and corridors.

General design considerations
Although this article responds directly to the problem of morbid obesity in healthcare settings, we cannot set aside related topics that are part of our daily practice in the way we approach design. The following is an invitation to rethink the built environment, potential consequences from introducing architecture into it, and the user's experience with it.

The built environment
Our attitude toward planning, design, and building could be more conscious of the direct relationship between environment and behavior. In the fight against obesity, designers can change behavior by understanding the impact of the built environment on lifestyle choices. We can encourage and provide opportunities for such change. Some of the areas we could positively affect are outlined below.

- ***Transit and transportation***
  - ***Facilitate interconnected public transportation systems that could take us to and from our daily destinations. Think of major loops, which are opportunities to join transportation systems (e.g., City of Vancouver's master plan).***
  - ***Give people options and choices and increase opportunities for walking, even if it means walking to the bus stop. Incite physical activity and movement in the individual. Make "utilitarian" walking accessible to anyone***

- ***Pedestrian infrastructure***
  - ***It is important that we design "pedestrian-friendly" buildings, cities, campuses, and indoor and outdoor facilities. Ultimately we need to change people's lifestyle if we are to stop the obesity epidemic. Walking and biking (walk to school, walk to work, bus to work) are activities that imply a change in behavior and that have tremendous consequences in the way we shape our environment.***
  - ***Reconsider urban and suburban areas by providing sidewalks, paths, sheltered areas, waiting areas, and spatial opportunities for social interaction, keeping in mind that the procession through the daily routine must be rich in opportunities for physical activities. An individual can raise awareness of the built environment and react to it.***
- ***City pattern***
  - ***The influence of distance on utilitarian walking—as***

well as providing the infrastructure for environments that can be walked—must also be taken into account when laying out a city plan, a campus plan, or any plan.
    - ***The city pattern matters when one has to walk it. Walking between destinations is easier, more inviting, and more efficient within a grid system than it is along and around a cul-de-sac or looped suburban residential plan. The presence or lack of sidewalks and bike paths in urban or suburban areas makes a big difference. Density really matters when it comes to physical activities and opportunities for them.***

- ***Impact of driving and walking on obesity***
    - ***Because of urban sprawl, commuting times have increased, leading individuals to social isolation and less physical activity by locking them in private transportation for endless hours. This environment involves almost no movement, with no social connection or neighborhood interaction, in a sitting position for a significant percentage of an individual's lifetime.***
    - ***Cities made for walking are real fat burners because they encourage a healthier lifestyle and make exercising and walking part of everyone's daily routine. The basic activity of "walking" has changed significantly, to the point that children walk less and become increasingly overweight; making "walking to school" less popular than before. One of our challenges is to bring back density, safety, and diversity to our built environments to facilitate a healthier lifestyle***

- ***Psychological reactions to materials and design concepts***
    - ***The use of transparency, light, and reflection could prompt self-consciousness and curiosity while one is being revealed or reflected within the space; it also communicates what lies beyond.***
    - ***The mass is not to be hidden anymore; it is to be exposed with the appropriate use of lighting, enhancing what is beyond, encouraging the user to interact with the built environment.***
    - ***Elements of reflection are crucial to an individual's responsiveness and sense of self within the space. The user becomes more conscious of his or her body image through "revelation" and exposure through building materials.***
    - ***Much has been said of the proper "wayfinding" in architecture. From an obesity prevention standpoint, this encourages social interaction, invites the user to experience the space, and promotes movement.***

One of the most important aspects of design for any situation is to provide spaces for patient equality and dignity. Our practice must continue to contribute to obesity prevention and improve spaces and environments for the health, safety, and welfare of individuals.

Susana D. Andrade, Assoc. AIA, is a designer with Hammel, Green, & Abrahamson in Minneapolis. She received the 2004–2005 Arthur N. Tuttle Jr. Graduate Fellowship in Health Facility Planning and Design for the research resulting in this paper. She can be reached by e-mail at sandrade@hga.com.

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