BURTON BLATT INSTITUTE
CENTERS OF INNOVATION ON DISABILITY

Comments on the 2010 Advance Notice of Proposed Rulemaking on Equipment and Furniture (Nondiscrimination on the Basis of Disability by State and Local Governments, etc.: Equipment and Furniture (Document ID DOJ-CRT-2010-0008-0001) 28 C.F.R. Parts 35 and 36; CRT Docket No. 113; AG Order No. RIN 1190-AA64

Thank you for the opportunity to comment on your Advanced Notice of Proposed Rulemaking regarding Americans with Disabilities Act (ADA) requirements for Equipment and Furniture.

The Burton Blatt Institute (BBI) is a research, education, and advocacy organization dedicated to advancing the civic, economic and social participation of people with disabilities worldwide. Our focus areas are employment, entrepreneurship, economic empowerment, civil rights and community participation.

BBI commends the Department for proposing additional regulation of furniture and equipment accessibility. However, it is important that the Department not create the false impression that furniture and equipment, including Electronic and Information Technology, are not *already* subject to accessibility requirements. As the Department notes, "[t]he provision of accessible equipment and furniture has always been required by the ADA and the Department's implementing regulations under the program accessibility, reasonable modification, auxiliary aids and services, and barrier removal requirements." The Department should be clear that these proposed regulations are intended to confirm and clarify the strong existing ADA nondiscrimination mandates already applicable. In particular, we urge the Department to recognize the potency of ADA full and equal access entitlements — including corollary entitlements to reasonable modification of policies, practices and procedures; effective communication; and structural accessibility, with their related defenses — in a myriad of circumstances not expressly anticipated by the ADA at the time of its passage. Specifically, we urge the Department to confirm that these more general entitlements exist and endure irrespective of the existence or nonexistence of current or future ADA Standards for Accessible

Design, Web Content Accessibility Guidelines (WCAG), or other potentially applicable rules or standards. In most cases, these proposed regulations will provide standards for implementing accessibility requirements that already exist. As such, such regulations will provide *clarity* of existing requirements, rather than new requirements.

It is also important for the Department to emphasize, in these and other areas not specifically addressed by current or future Standards for Accessible Design, that the absence of a specific standard does not indicate a lack of coverage. Moreover, the Department should take this opportunity to remind that, even when a *specific* standard is not provided for an element, accessibility in accordance with an *analogous* standard may be required.

With regard to policies, practices, and procedures, the Department should expressly clarify that public accommodations of all sizes remain responsible for providing policy modifications and effective communication and that a covered entity's obligation to engage in policy modification or effective communication does not end merely because the entity fulfills its equipment design obligations.

Each of the subject areas covered in this ANPRM are of critical importance to the achievement of the goals of the ADA. In light of this importance and the fact that accessibility has already been required generally for these areas, the Department should resist calls for delay either in issuance of regulations or in effective date. Moreover, we urge the Department to move ahead with each area of rulemaking independently as it is able, and not allow time delays in one area to hold up rulemaking on the other issues raised in this ANPRM, and in all of the ANPRMs issued by the Department in July 2010.

A. Medical Equipment and Furniture

Numerous sources, including the Institute of Medicine and the Surgeon-General, have noted the reality of the aging U.S. population and the resulting increased propensity for acquiring disabilities. American health care is unprepared for this in many ways, including such basic infrastructure as accessible medical equipment. Accessible medical equipment benefits not only patients with chronic or newly-acquired disabilities, but also aging providers by reducing the potential for workplace injury and consequent lost productivity.

The below comments address primarily the need for accessibility standards for people with physical and mobility disabilities. However, it is important to provide standards, consistent with the technical and functional standards of Section 508, for the information and communication elements of medical equipment. All medical equipment that provides patient-facing information and communication features should be required to comply with communication

accessibility standards, such as audio, visual and tactile alert signals and patient-provider communication capacity during exams (e.g., to indicate when patient should hold breath for CT machines or self-regulate breathing in MRI devices), accessible means to communicate with nurses and other staff from a hospital bed, and accessible infusion pump controls and alarms.

Question 1: *The Department is considering adopting the Access Board's standards for medical diagnostic equipment. What other types of medical equipment and furniture should the department include in its proposed regulation? What modifications to other types of medical equipment and furniture, including equipment and furniture used for treatment or other non-diagnostic purposes, such as hospital beds, should be included in the Department's proposed regulations?*

We understand that the Access Board is developing regulatory standards for medical diagnostic equipment that the Department will consider adopting. We strongly recommend that examination tables and chairs of all types, and the lifts used to provide lift/transfer assistance on to those tables and chairs, be considered "medical diagnostic equipment" by the Access Board and also included in the Department's proposed regulations. From the patient's point of view, each category of item performs a distinct and necessary function to enable an individual with a disability to receive an effective examination in various contexts. A five year study undertaken by Marquette University from 2003-2007, and funded by the National Institute on Disability Rehabilitation Research (NIDRR), resulted in the work of the Rehabilitation Engineering Research Center on Accessible Medical Instrumentation (RERC-AMI). RERC produced a number of technical reports on specific medical equipment items that are available at http://www.rerc-ami.org/ami/. Even though the results have not been updated since 2007, the project's findings and recommendations remain informative and thoughtful.The RERC website has publicly available technical reports on a number of classes of medical products, including examination tables, cardiopulmonary exercise equipment, infusion pumps, weight scales, medical imaging, and medical beds.

Furthermore, tables and chairs in medical, dental, and ophthalmology/optometry settings are frequently used for successive or simultaneous diagnostic and treatment purposes, and even medical procedures are not necessarily easy to neatly characterize as diagnostic or treatment. Other types of equipment such as gurneys, lifts, and bathroom commodes are commonly used for both diagnosis and treatment since out/in-patient examinations and care both frequently require transfers and specimen collection. Ultimately, it makes little sense for providers or the department to parse out the degree to which a particular item of furniture or equipment is used for diagnosis or treatment. The Department's regulations should simply apply broadly to medical equipment and furniture, regardless of whether the item is used for diagnosis or treatment procedures, and scoping requirements should ensure that facilities and offices have

accessible tables, chairs, and other equipment available for both diagnostic and treatment purposes. There may be some specialized items with built in chairs that are used almost exclusively in a treatment context, but from the patient's point of view there is little point to establishing accessibility standards for diagnostic purposes, but no standards for the equipment that is actually used to treat a newly-diagnosed medical condition.

Some equipment that should be addressed by the Department's rules include:

Accessible Scales

Correct weight measurement is critical for a variety of medical purposes, including tracking obesity, determining the risk of such medical conditions as cancer, high blood pressure, and depression, and determining correct prescription medication or anesthesia dosages. Standard medical weight scales require a patient to stand on a small platform while a provider finds and notes the patient's weight and height. Health care providers frequently ignore the need for accurate weight measurement of wheelchair users and other individuals who are unable to use standard weight scales because of activity limitations or mobility or balance issues.

Accessible weight scales that do not require a patient to independently stand, balance, and/or transfer on to a platform are now available in a wide variety of models and styles, and there is simply no justification for a provider's failure to take accurate weight measures for all patients with disabilities. Accessible scales are available that are integrated into other medical equipment (e.g., a patient lift, a hospital bed), or that allow a wheelchair user to independently access a surface for weight measurement on a stationary stand-alone device that is either wall-mounted (folding or non-folding) or on an in-ground platform. Portable platform scales are also available in folding and non-folding models. People who have difficulty independently standing on a platform scale can also be accurately weighed through an independent or assisted transfer to a bed scale, or to a wheelchair which is then weighed on a platform scale. An accessible weight scale should have the following features:

- A wide platform that is sufficiently large to fit larger powered wheelchairs and scooters;
- Sturdy hand rails that are removable if necessary to maintain unimpeded wheelchair access to a platform of sufficient size;
- A weight capacity minimum of 500-800lbs+;
- A large and easy-to-read digital display that can be seen by the patient who is being weighed;
- A slip resistant platform with high-contrast edges.

Radiological Diagnostic Equipment

Computerized Tomography (CT), Magnetic Resonance Imaging (MRI), x-ray, and mammography are important diagnostic tools that are commonly used to screen for numerous medical conditions. These technologies must be equally available to people with disabilities. Unfortunately, most of these technologies are designed so that individuals must assume a single specific posture, such as lying prone or independently standing upright, often for a considerable length of time. People who have balance, posture, endurance, muscle weakness or fatigue, and/or spasticity issues may be unable to use these technologies.

Each type of equipment interacts with the body in a somewhat different way, so each type of equipment will benefit from having specific technical recommendations. However, a number of general accessibility features can also be incorporated into all radiology diagnostic equipment as follows:

- Height-adjustable tables and chairs with a minimum height capacity of 17 to 19 inches from floor to top of cushion;
- Larger openings on CT and MRI machines, which enable a patient to be more comfortable overall and therefore lead to a more efficient exam;
- Padded side rails and guide rails for positioning assistance and comfort that can also be fully recessed so as not to interfere with patient transfers;
- Adjustable table widths for secure positioning and safety while on table;
- Higher weight capacities (e.g., 500-800+ pounds);

Development and use, wherever possible, of smaller, lightweight devices that are capable of being flexibly positioned so that proper imaging angles can be obtained through moving the device relative to the patient rather than forcing patients to maintain and assume difficult positions to conform to the device.

Radiological Diagnostic machines are among the most expensive pieces of equipment purchased by medical facilities. Covered entities may incur significant capital outlay switching from an inaccessible machine to one that provides better access. At the same time, the Department should keep in mind that many medical facilities and centers replace their radiological diagnostic equipment relatively frequently due to the rapid pace of technological and functional advancements in this equipment. The establishment of regulatory standards on accessibility in radiological diagnostic equipment will help put accessibility considerations on the agenda of research and design teams in the first place by increasing demand, and this in turn will broaden the choice and availability of universally designed, top quality and innovative devices for purchase by medical facilities and providers.

Rather than have accessibility needs addressed in a haphazard and serendipitous fashion, such that a new innovation may meet the needs of people with mobility impairments but fail to address the needs of people with visual impairments or spasticity, the Department should establish overall accessibility parameters for radiological diagnostic equipment in general, in addition to setting more device-specific technical requirements.

Commodes and Shower Transfer/Benches

Drop-arm commode chairs enable individuals with mobility disabilities, independently or with some assistance, to use a toilet safely. Portable shower benches perform the same function for shower use. Commodes and shower/transfer benches should include the following accessibility features:

- Height-adjustable legs;
- A padded seat and back to protect the user from skin breakdown;
- Height-adjustable arms, primarily to provide transfer assistance as they are unlikely to be tall enough to assist people with stability issues;
- Arms that drop down completely below the level of the seat or that are removable to facilitate lateral transfers used by some wheelchair users (i.e., it can be difficult or impossible for a patient with no lower extremity function to get over an arm that lies above the seat level, and any attempt to do so can cause or exacerbate skin injury);
- Shower/transfer benches should also have suction cups on the feet for increased stability during shower use.

Continuous Railing Systems

A well-designed, continuous network of grab bars placed along clinic and hospital hallways and walls, and in patient rooms along the pathway from bed to toilet to shower, is effective for many patients in providing stability and reducing falls. This standard would, for example, benefit infusion patients who need to use the restroom frequently due to increased hydration, but also experience fatigue and decreased energy due to the treatment.

Complementary and Alternative Medicine (CAM) Equipment and Furniture

Alternative and traditional medical treatments, such as acupuncture, chiropractic therapy, and massage, are gaining increased recognition from health plans and insurance companies and "Alternative and Complementary Medicine Departments" are now seen on most major medical campuses. These departments often combine standard Western treatment such as radiation and surgery with traditional and alternative therapies. Based on the clinical treatment needs of

patients, tables in these departments are typically manufactured and distributed by chiropractic or massage/retreat type manufacturers. If used in a "clinical" or standard medical facility or treatment context, these tables and chairs must be held to the same standards as the standard medical examination and treatments tables and chairs. That is, they must be height adjustable to a minimum 17 to 19 inches, provide sufficient surface width and height to safely accommodate transfers and positioning of any individual with balance or movement control issues, and be useable with ancillary equipment such as supportive straps, cushions or rails. One simple way to provide ample width is to design tables that can be "locked together" side-by-side in a stable way to provide a safe and comfortably broad surface.

Hospital Bassinets, Cribs, and Incubation Units

Hospital bassinets, cribs and incubation units in the newborn nursery, Newborn Intensive Care Unit, and/or in-patient children's wards must be accessible to enable a mother with disabilities (or a provider with disabilities) to gain access to a newborn for various purposes such as breastfeeding, bonding, comfort, and caregiving. Usually there is no knee clearance allowing a wheelchair user approach closely enough to pick up or hold a child with both hands, and crib gates/doors cannot be let down without difficulty and considerable upper body strength. There are cribs available on the market that provide parents or caregivers with the ability to gain access to most of a crib's interior. Research and development is needed to incorporate the following needed accessibility features in bassinets, cribs and incubation units for the medical market:

- Height-adjustable legs, or a variable pedestal base, that will provide knee clearance so that a wheelchair user may approach the bassinet/crib opening and fit beneath the infant's sleeping or resting area;
- A bassinet/crib door or panel that as much as possible can be easily and independently removed from the exterior of the bassinet/crib.

Question 2: *The Access Board is expected to promulgate design standards for medical and dental diagnostic tables and chairs. Are there tables or chairs used for medical, dental, ophthalmology or optometry treatments, which are not typically used for diagnostic purposes, that would pose unique accessibility challenges? What modified features would make these tables or chairs accessible? What features would enhance patient stability and facilitate correct positioning?*

Given the close relationship between examination and treatment purposes and procedures, already discussed in the introduction to Question #1 above, the following comments concern accessibility features and modifications needed in medical, dental, ophthalmology or

optometry chairs and tables regardless of whether they are primarily associated with examination or treatment.

Examination Tables

Exam tables are widely used for examinations, procedures and treatment in primary care as well as many specialty areas such as Obstetrics and Gynecology, Physical Therapy, Oncology, Podiatry, Dermatology, and Urology. Thorough and proper examination cannot take place unless a patient is positioned safely, comfortably, and correctly, and providers are also able to adjust the table sufficiently to allow for visual and physical access to a patient as required. Inaccessible exam tables result in patients with disabilities receiving incomplete exams and delayed diagnoses, and being reluctant to seek regular health maintenance and needed medical examinations.

Exam tables require the following features to be accessible:

- Height-adjustable to within 17 to 19 inches of the ground from the top of the cushion(ing);
- Cushioning thick enough to minimize the potential for causing or exacerbating pressure sores;
- Side grab bars that can be used for transfer assistance, and are also removable or can be fully recessed to not interfere with a wheelchair user's lateral transfer.
- Easily adjustable, high-contrast drop-down side railings, safety straps, and pillows for stability and positioning support once on the table;
- The capacity to "mate" closely with a portable floor lift;
- Adequate clear floor space to enable independent lateral transfers from wheelchair users or the operation of lifts or staff lift/transfer assistance;
- Universally designed or adaptable call buttons and powered bed position and height controls that can be operated by persons with limited or no reach range, fine motor ability, and vision (e.g., high-contrast foot paddles);
- Extra-wide (e.g., 30+ inches) and high weight capacity (e.g., 500 to 800+ pounds);
- Sufficient length (balance problems can be exacerbated if a taller patient's feet extend beyond the edge of the table);
- An elevated leg support system such as articulating knee crutches and/or stirrups with flexible degrees of freedom for proper positioning and support of the legs for a complete pelvic examination for women with disabilities.

Mammography Equipment

An accessible mammography procedure requires the following features:

- The imaging receptor should lower to a minimum height of 24 inches from the floor to the top side of the imaging receptor platform;
- Sufficient clear knee space from the stand to the front edge of the imaging receptor to enable wheelchair users to go into position for mammography without running into protruding imaging platforms or tube heads connected to the central stand.

Ophthalmology and Optometry Chairs and Tables

Early detection and treatment of eye and vision disorders are essential to minimizing vision loss and maintaining the functional abilities of people with and without disabilities. People with ambulatory impairments and balance and muscle-control issues, including many seniors, face numerous access issues when seeking periodic eye examinations. Common access issues faced by people with ambulatory impairments include:

- Examination chairs that are typically fixed to the floor and cannot be slid back or moved to permit a person in a wheelchair to be positioned in its place to access the refractive equipment on equipment stands;
- Examination chairs that are not height-adjustable to the degree that would enable independent transfer for many people with disabilities;
- Lack of portable or track lift equipment in ophthalmology and optometry practices and facilities to provide lift or transfer assistance to examination chairs for persons using wheelchairs;
- Examination rooms with insufficient clear floor space to allow wheelchair users to maneuver, examination chair to be slid back or moved out of the way, or portable lifts to function, even if a lift were available;
- Refractive equipment fixed to a stationary ophthalmic equipment stand that cannot be moved or sufficiently lowered to examine patients in their wheelchairs or people of short stature.
- Lack of ancillary equipment to assist people with quadriplegia and other conditions affecting balance and the core muscle control to maintain the head and chin contact required for the use of slit-lamp and (air-puff) tonometry equipment.

As a result of the above barriers, people with disabilities who cannot independently transfer from their wheelchairs onto the examination chair and cannot access refractive equipment, receive no examination or a less comprehensive, manual eye examination. Full and equal access to vision care services for people with disabilities requires ophthalmology and optometry

treatment chairs, ophthalmology and optometry equipment stands, ophthalmology and optometry equipment tables, and dental examination chairs to have the following features:

- Ophthalmology and optometry treatment chairs must be (i) height-adjustable with a minimum height of 15 to 17 inches from the floor to the top of the seat to facilitate the independent transfer of persons with mobility disabilities who are able to either independently transfer or transfer with assistance; and (ii) sufficiently moveable to permit a wheelchair user to choose to be examined in her wheelchair by positioning herself in the examination chair's place;
- Ophthalmology and optometry equipment stands must be (i) sufficiently height adjustable to provide full use of the ophthalmology and optometry equipment on such stands to persons who choose to remain in their wheelchair and to persons of short stature; and (2) be sufficiently moveable to allow for examination of a person in a wheel chair in those cases where an examination chair cannot be moved;
- Ophthalmology and optometry equipment tables must be (i) height adjustable to provide the full use of ophthalmology and optometry equipment on such tables to persons who remain in their wheelchairs, and (ii) at least 3 feet of clearance below the table to permit a person in a wheelchair to closely approach such tables frontally in order to be examined with a minimum of "leaning forward."

Dental Chairs

The need for routine dental care, including preventative care and maintenance, oral surgery, and orthodonture, and the equipment access problems that people with disabilities face when seeking that care, are similar to those for ophthalmology and optometry care. However, patients most frequently receive dental care while seated in a chair that providers set at various angles of recline as required for specific procedures rather than in an upright position, as is commonly required in ophthalmology/optometry practice. As a result, dental chairs and equipment need the following distinct features to be accessible to people with disabilities:

- Dental treatment chairs must (i) be height-adjustable with a minimum height of 15 to 17 inches from the floor to the top of the seat to facilitate the independent transfer of persons with mobility disabilities who are able to either independently transfer or transfer with assistance; and include (ii) armrests that lift up and swing out of the way so they do not impede a transfer; (iii) a reclining feature that would enable a person's knees to remain at a 90 degree angle to their body when seated and reclined at any angle to reduce the risk of the person with a disability sliding out of the chair; (iv) belts and other positioning aids for safety and stability when seated.

- Dental equipment and light stands must be sufficiently height adjustable and moveable to provide full use of the dental equipment to persons who can appropriately, and prefer to, remain in their wheelchair to receive dental services.

Infusion Recliners

Infusion recliners are chairs widely used, for example, by patients who are receiving chemotherapy, donating blood, and being cared for in day surgery recovery areas. Sometimes patients must use reclining infusion chairs for up to twelve hours at a time, and may be weak both before and after treatment. This makes transferring into a standard reclining chair difficult, and sometimes impossible, without the assistance of multiple staff members. Infusion chairs would require the following features to be accessible:

- Adjustable seat height that can be lowered to at least 17-19 inches from the floor to the highest point of the cushion;
- A swing-away side arm that facilitates lateral transfers; and
- A reclining back and cushioned patient leg support mechanism that can be easily used by people who do not have full body strength.

Question 3: *What types of lifts are the safest, most efficient, and most cost effective lifts for transferring PWD in different medical or dental settings? Should the use of lifts or staff to lift patients be considered a substitute for providing independent access to medical equipment?*

Either floor or track lifts can provide safe and efficient transfer and lift assistance provided that the following features of use are incorporated:

- Sufficient floor space for a wheelchair to maneuver, and clear space around the piece of equipment to which a person will be transferred, for the lift to operate, and for provider staff to assist with the use of the lift;
- The ability to "marry" or closely approach laterally and/or frontally (side approach and/or forward approach to) a variety of wheelchairs and other mobility devices on the one hand, and the chairs and tables used with diagnostic and treatment equipment on the other hand;
- The capacity to navigate safety straps and padded supports on accessible diagnostic and treatment equipment that help keep patients safe and stable while on the equipment;
- The capacity to be used in conjunction with the ongoing operation of such personal medical equipment as ventilators, feeding tubes and infusion pumps;
- High weight limits of at least 600 to 650 pounds.

One-time costs associated with any of these solutions must be seen in light of the costs of (i) lesser quality and delayed health care borne by persons with disabilities who do not receive needed lift and transfer assistance, (ii) the injuries and lost time suffered by both patients with disabilities and provider staff when non-mechanical transfer assistance is provided unsafely or by untrained staff, or in situations where lift options other than mechanical lifts are not available (e.g., for bariatric patients), and (iii) the personal litigation risks posed by both (i) and (ii).

One of the most cost-effective ways to implement a requirement for lifts in hospitals and other health care facilities is to mandate the installation of the physical infrastructure and architectural elements needed for ceiling and floor lifts (e.g. ceiling infrastructure, adequate floor space in locations where lifts are likely to be used, storage) in all new hospital and health care facility construction, additions, or alterations. This requirement should apply at a minimum to all the accessible rooms that are required for the facility by the ADA Standards for Accessible Design, as well as for all Emergency Departments. As the Justice Department has frequently noted, it is less expensive to build in accessibility in the first place than to engage in retrofitting an existing structure after the fact. Covered entities would also have the benefit of a clear mandate that would enable them to plan for the purchase and use of accessible equipment ahead of time.

In general, the use of staff to lift patients should not be a substitute for the provision of accessible equipment, particularly in new construction and alterations and when new equipment is purchased. Using staff to lift patients risks injury to both the staff and the patients, particularly if staff are not well trained. Requirements that staff be capable of lifting patients also limit the employment prospects for otherwise qualified staff with disabilities. Poorly executed manual lifts risk serious injury to patients. Anxiety about badly executed transfers and resulting pain and injury can cause people with disabilities to avoid seeking needed health care and disease prevention services. It is also inappropriate to force people with disabilities to wait until the one or two staff members who are trained and capable of providing lift assistance become available. On the other hand, people with disabilities cannot be expected to endure improper lift and transfer assistance from untrained staff who are immediately available.

Nor should the availability of lifts be an excuse for not providing independent access to medical equipment. Many individuals with disabilities are capable of making their own transfers to equipment such as exam tables, provided that the equipment in question is adjustable to an appropriate minimum height. The fact that an entity has lifts available should not excuse health care entities from purchasing adjustable-height examination or accessible diagnostic equipment, or act to discourage equipment manufacturers from designing independently

accessible medical equipment. Accessibility solutions should provide for the most independence appropriate to the situation. For example, a wheelchair user can receive some examinations of equal quality, such as a mammography or an ophthalmology exam, while remaining in her chair and purchasing equipment that allows that approach should be encouraged, rather than relying on lifts. For equipment that, by its nature, requires transfer out of a wheelchair, the equipment itself should be required to be accessible to facilitate transfer and, for those who cannot independently transfer, lifts should be required. The use of lifts, just as with the use of human assistance and lift teams, should supplement and not supplant the provision of individually accessible medical equipment.

Question 4: *If a hospital or medical provider uses staff to lift patients onto and off of medical equipment and furniture, should it be excused from the requirement to have lifts in any or all situations? What types of training programs are available to provide information to medical staff on lifting and transferring patients with disabilities? What are particular situations, if any, where lifting by staff should not be allowed?*

As noted above, the availability of manual lifting assistance should not be used as an excuse for not having mechanical lifts and height-adjustable medical equipment, because manual lifting alone carries too many inherent health and safety risks. Very narrowly interpreting the instances where human lift and transfer assistance are acceptable options for achieving access is entirely in keeping with how the U.S. Department of Health and Human Services (HHS) an the Department have historically viewed carrying. The U.S. Department of Health, Education and Welfare's[10] Section 504 Policy Interpretation No. 4, 43 Fed. Reg. 36035 (August 14, 1978) categorically stated:

Carrying is an unacceptable method for achieving program accessibility for mobility impaired persons except in two cases. First, when program accessibility can be achieved only through structural changes, carrying may serve as an expedient until construction is completed. Second, carrying will be permitted in manifestly exceptional cases if carriers are formally instructed on the safest and least humiliating means of carrying and the service is provided in a reliable manner.

The Department of Justice explicitly referred to and incorporated the above interpretation in its Section-By-Section Analysis to ADA Title II Regulations, 28 C.F.R. § 35.150(b)(b), 56 Fed. Reg. 35709, stating that "carrying an individual with a disability is considered an ineffective and therefore an unacceptable method for achieving program accessibility." While these directives were originally made in the specific context of carrying when ramps were not available as a means of independent entry into a building, the fundamental idea that disability rights

prioritizes independent access to activities, programs and services applies equally to the health care and equipment context.

For the limited circumstances in which lifting is permitted, annual lifting and transferring competency training and refresher training for health care workers is critical. Many nurse education programs touch on lift and transfer assistance, though there is a need for such information to be more formally organized, presented, and institutionalized, with nursing students and new nurses given the opportunity to actually execute and practice transfer techniques with experienced nurses. Considerable research and training has been done on the subject of "safe patient handling" from the viewpoint of minimizing the risk of injury for health care workers such as nurses and personal assistants. Both the U.S. Department of Veterans Affairs and the U.S. Occupational Health and Safety Administration (OSHA), See http://www.visn8.va.gov/patientsafetycenter/safePtHandling/default.asp (last visited December 27, 2010). See http://www.osha.gov/ergonomics/guidelines/nursinghome/final_nh_guidelines.html for guidelines applicable to nursing homes (last visited December 27, 2010), have developed good guidelines on safe patient handling in different contexts. Safe patient handling standards and guidelines on topics ranging from mechanical lift use and storage and the room clearances needed for lift operation to proper equipment disinfection provide a good foundation for lift and transfer training, but for ADA purposes, such training must be supplemented by information on the person with a disability's right to barrier removal and policy modification, the prioritization of independent access and integrated means of accommodation, and disability culture.

Lifting perhaps does not constitute a medical procedure in and of itself, but it remains physical contact in the health care context that requires patient consent. If a person with disabilities refuses an offer of lift or transfer assistance, staff cannot force or override the person's wishes. Respect for the individual patient's dignity and choice requires honoring the accessibility preferences of the consumer, and recognizing that competent people with disabilities know the transfer/lift assistance that will work best for them. We recommend that the Department not provide a finite list of circumstances where staff lifting should not be allowed, or detailed criteria under which providers cannot provide lifts, but instead endorse an approach that mandates providing a range of transfer/lift options to people with disabilities, including adjustable diagnostic equipment, mechanical lifts, and policies and procedures for providing a trained, safe-lifting team. Lifting by untrained staff, or non-medical staff such as security guards or parking attendants, should not be considered or offered as a legitimate lift/transfer assistance option. The Department should also emphasize that the individual's choice of transfer/lift assistance should be honored except for rare circumstances, for example, where a

bariatric patient expresses a strong desire for staff assistance/transfers that would place both the patient and staff members at risk of injury. In the event that a person with a disability's expressed lift preference cannot be safely accommodated, the entity must have a policy and practice of documenting the circumstances and reasons for the refusal, and the record will be made available for the Department and public's inspection upon request.

Question 5: *What features, such as low bed heights, can best enhance the accessibility of hospital beds and gurneys? Are these features available in products that are currently available?*

Low bed heights are crucial for people with disabilities using hospital beds. Many people who use such mobility devices as canes and walkers, or who have frail joints or bones resulting from such conditions as osteoporosis or as a side effect of medications or treatments, still prefer and are capable of getting in and out of bed largely independently, but cannot risk leaping up or jumping down from a bed that cannot be lowered or adjusted in height. This is also true for people of small stature, and for wheelchair users who employ a pivot transfer or use a sliding board. For those people who do need an assisted transfer, adjustable bed height will also facilitate transfers and lift assistance. Since the bed is adjustable, its ability to be lowered to within 15 inches from the ground to the top of the cushion will not impede the bed's ability to serve taller individuals as well, with or without disabilities. Key accessibility features needed for hospital beds include:

- Height-adjustable to within 15 to17 inches of the ground from the top of the cushion;
- Easily adjustable, high-contrast drop-down side railings and pillows for stability and positioning support;
- Mattresses thick enough to minimize the potential for causing or exacerbating pressure sores;
- Clear vertical space under the bed to accommodate the "legs" of a portable floor lift;
- Adequate clear floor space to enable independent lateral transfers from wheelchair users or the operation of lifts or staff lift/transfer assistance;
- Universally designed or adaptable call buttons and motorized bed position and height controls that can be operated by persons with limited or no reach range, fine motor ability, and vision (e.g., high-contrast foot paddles, sip-and-puff controls).

Gurneys are frequently used for diagnostic and other medical procedures, such as ultrasound, electrocardiogram, catheter, and gastro-intestinal procedures, as well as for transferring patients within a medical facility or campus. Many hospitals and clinics prefer the use of gurneys because (i) patients can remain in one position and still be moved easily by staff for multiple procedures and/or tests, (ii) patients can receive tests and treatment and then recover on the same surface with less lifting/transfer assistance by staff and resulting strain on the

patient, and (iii) fluids that can spill to the floor during clinical procedures and tests require ease and quickness of equipment movement for cleaning and sterility purposes. Because gurneys commonly are used for diagnostic procedures, the Department should mandate essentially the same accessibility features as needed in beds, with the following additional requirements to clarify that a patient typically may use a gurney for less time than a hospital bed, but use for any length of time requires the following minimum features:

- Extra-wide (e.g., 40+ inches) and high weight capacity (e.g., 500-800+ pounds);
- Sufficient length (balance problems can be exacerbated if a taller patient's feet extend beyond the edge of the table);
- Safety straps and padded side rails for positioning support and stability
- Capacity to elevate legs;
- Wheel locks.

The incorporation of accessibility features in gurneys used exclusively for surgical procedures or in hospital emergency rooms may appear to be unnecessary because staff members almost always perform transfers in those contexts. However, adjustable height features are still very useful during staff transfers. In addition, an individual with a disability can be required to spend an unexpected and considerable amount of time on a gurney while in the ER or after being prepared for surgery. Those individuals who are at risk of pressure sores and/or who require position and stability support while lying prone, as well as larger individuals or persons with balance issues, should be able to rest as comfortably and securely as possible whether they are undergoing a scheduled examination procedure or awaiting an emergency consultation or surgery.

Question 6: *What technologies are currently available to increase the accessibility of infusion pumps? What types of infusion pumps are partially or fully operated by patients in the normal course of treatment?*

Infusion pumps can be programmed by patients, within certain limits set by a clinician. Ambulatory infusion pumps enable an individual to administer needed nutrients or medications in the comfort, convenience, and privacy of one's own home. Patients must therefore have the capacity to accurately input, monitor, and potentially correct an infusion pump's dosing rates and volumes, even in pre-programmed systems, as over- and under-infusion can lead to serious problems for the patient. Regulations require that infusion pumps have alarms associated with errors in input or problems in delivery, but the alarms tend to be only auditory, with some also providing error indications through visual output on the display screen. In addition, it is particularly important to ensure that infusion and insulin pumps are accessible to people with

vision impairments in accordance with the technical and function standards of Section 508 because research shows that one in five people living with diabetes have significant vision loss.

Question 7: *What are the greatest difficulties facing individuals with disabilities in accessing rehabilitative and exercise equipment and furniture in a therapeutic setting? What equipment and furniture most effectively permits accessibility for different types of rehabilitative needs? Can different types of equipment meet different access needs of, for example, people with low-vision who need access to visual displays on equipment? Are there differences between exercise equipment in therapeutic settings and exercise equipment in non-therapeutic settings (e.g., gym or fitness center)? What exercise equipment or machines are available to meet the needs of individuals with mobility impairments?*

People with various disabilities face similar barriers to using rehabilitative and exercise equipment and furniture, regardless of the setting. In a therapeutic setting, individuals exercise to regain or maintain range of motion and strength after experiencing a primary or secondary impairment or injury. However, the main categories of activity offered in rehabilitation include stretching/flexibility exercises, strength training, and cardiovascular endurance training, which are the same main exercise activities offered in a non-therapeutic gym or fitness center.

Unfortunately, even in therapeutic settings these activities are usually offered on or through equipment that assumes users have a body type within "average" height and weight ranges, and such physical capacities as the use of the legs, the capacity to grip, unimpaired vision, and fine motor control. One product survey of cardiopulmonary equipment "found a lack of accessories and options that would better assist users with impairments. Removable seats, access to weights, ergonomic pins, cuffs, supports and safety devices have all been identified as desirable features for universal equipment, yet most of the products found have been targeted for the younger, unimpaired population." Rehabilitation Engineering Research Center on Accessible Medical Instrumentation (RERC-AMI) Technical Report on Cardiopulmonary Exercise Equipment, authors Lora Mielcarek and Elizabeth Omiatek, coordinating editors Dr. Jack Winters and Dr. Jill Winters at http://www.rerc-ami.org/ami/tech/tr-ami-mu-003_cardio-exercise/ (last visited January 1, 2011), in part citing North Carolina Office on Disability and Health. (2002). Removing Barriers to Health Clubs and Fitness Facilities. North Carolina. North Carolina Office on Disability and Health.

There is a difference in operations between therapeutic settings and non-therapeutic settings. Exercise in a rehabilitation context is usually more closely supervised, and providers control the machine settings and/or provide ready assistance with adjusting machine settings and transfers. However, while the goal of rehabilitation is usually recovery from a specific injury or health event such as a stroke, maintaining functional recovery inevitably requires the ongoing

use of exercise equipment as part of one's lifestyle. The therapeutic setting is the ideal place and time for individuals to gain access to barrier-free exercise equipment and to learn how to use such equipment as independently as possible in anticipation of a return to the community. Some of the main access barriers interfering with the goal of independent access to rehabilitation equipment are:

- A seat that is fixed in place and cannot be swung away or completely removed to enable wheelchair users to engage in an exercise activity without transferring to the exercise seat;
- Insufficient clear floor space around equipment to allow for independent transfer, or lift assisted transfer, from a wheelchair to a fixed exercise seat;
- Seats that are too narrow for needed stability, no safety strap options to assist persons with limited balance or core strength, insufficient padding to avoid causing or exacerbating pressure sores, and maximum weight capacities that are too low;
- Lack of modifications for individuals with limited mobility or grip, such as the ability to secure feet and hands to foot pedals and hand grips/handles;
- Performance and control setting monitors and displays that use a small font size and colors that are difficult to distinguish, and controls that lack tactile indications;
- Lack of access to on-screen information through audio output and tactile controls;
- Control settings and manual components such as weight pins and seat adjustments that are difficult to see and difficult to use without fine motor control and the ability to grasp;
- Lack of visual alerts and indications to supplement auditory alarms.

Many rehabilitation and exercise machines could be made more accessible and easier to use for people with disabilities and seniors with newly acquired health conditions through low cost adaptations such as the ones described below:

- Velcro foot straps or clips to secure limbs or feet to pedals, and gloves, cuffs, or splints to augment grip strength on handles and avoid slippage;
- High-contrast, large-font labels on free exercise weights and universal weight sets;
- Large, open grips for weight pins that secure a desired weight setting on weight machines;
- High-contrast tape on the edges of all handrails, steps, and drop-offs to make the edges easier to see.

Additional design modifications such as control consoles that feature raised lettering, single-handed adjustment levers, weight machines that have lower starting weights and smaller

incremental gains, and recumbent cardio machines with hand and feet components that can move together or separately also enhance accessibility for different rehabilitation needs.

Further, all accessible exercise equipment must meet the Section 508 technical standards, which will guarantee access to on-screen information through audio output and tactile controls. This will make the exercise equipment accessible to people who are blind or have vision impairments.

B. Exercise Equipment and Furniture

The ADA already requires exercise equipment that is usable by people with disabilities in exercise facilities through, at a minimum, the ADA's general non-discrimination requirements. Public and private entities that offer exercise equipment are required to engage in a considered process to provide usable equipment. The comments below are the provisions, reasons, and analysis we propose about how to regulate this existing requirement.

A typical exercise facility has dozens of pieces of equipment that require the use of the legs and are utilized by people who can get exercise from walking or running. However, exercise equipment is virtually never provided for people who can't get exercise from walking or running even though exercise equipment may be essential to maintain their health and wellness. In addition, exercise equipment generally provides only visual output, thus making it inaccessible to people with vision impairments. This discrimination against people with disabilities can have a severe negative impact upon their health, and excludes people with disabilities from engaging in an important social and recreational activity available to non-disabled people. Universally designed exercise equipment that can be used by people with and without disabilities is an essential right under the ADA. Therefore, we strongly support regulations specifically requiring accessible exercise equipment.

Over 20 million adults have a mobility disability and either cannot walk or have difficulty walking. Many sit all day, using a wheelchair or scooter. Other adults with disabilities use a walker, crutches, or cane and have limited mobility. For many, the only way to engage in physical activity is by using an exercise machine. These individuals have a variety of medical conditions and health-related issues that require regular exercise to improve their ability to live independently and maintain their health and function. Lack of movement increases the risk of cardiovascular disease, obesity, type 2 diabetes, deep vein thrombosis, and dependence on others for assisting with activities of daily living. Serious medical complications can often be avoided by engaging in a regular routine of cardiovascular and strength exercise that involves, when possible, the lower extremities. There are also social and other benefits to utilizing exercise facilities that are precluded when the facilities have no accessible exercise equipment.

Exercise facilities often provide between 40 and 100 cardiovascular machines. These include treadmills, ellipticals, stair climbers, rowers, upright bikes, recumbent bikes, spinning bikes, and dozens of different types of strength machines. Virtually all of the publicly available

cardiovascular machines require use of the legs to propel the machine and thus are either unable to be used by people with a mobility impairment, or may be minimally usable by some individuals who have partial use of their lower extremities. People who are elderly often have extreme difficulty mounting or dismounting the machine, or difficulty initiating the motion due to high initial loads required to start the machine.

Exercise facilities also provide many kinds of strength training equipment. Strength training is particularly important for people who use wheelchairs or crutches since transfers from a wheelchair, pushing a wheelchair, or using crutches are repetitive motions that increase the risk of overuse injuries. Strengthening opposing muscle groups has been shown to protect certain joints, thereby reducing the risk of these repetitive stress injuries. However, most of this equipment either requires a person using a mobility device to transfer to a bench seat, which is often unsafe or difficult to do, or to stand to lower the bars containing the weight, which many mobility impaired individuals cannot do.

There are also eight million adults who are blind or have vision impairments. Many of these individuals are also unable to use most of the cardiovascular and strength machines because they cannot read the displays. Although they are physically capable of a brisk walk or run, it is difficult, if not dangerous, for them to do so because of impaired vision. Many would prefer to use an exercise machine for cardiovascular activity. For example, treadmills and ellipticals, the two most popular types of cardiovascular exercise equipment, have controls for speed and incline. It may be dangerous to use this equipment without being able to operate the controls. Although cardiovascular machines with raised iconography are available and can be used equally by the people with and without vision impairments, exercise facilities virtually never provide them.

The Healthy People 2010 report was published by the Department of Health and Human Services in 2000. It presented a comprehensive, nationwide health promotion and disease prevention agenda designed to serve as a roadmap for improving the health of all people in the United States during the first decade of the 21st century. It stated that one of the factors that adversely affects the health and well being of people with disabilities is "fitness centers may not be staffed or equipped for people with disabilities." It further stated: "Compliance with the Americans with Disabilities Act (ADA) would help overcome some of these barriers." Healthy People 2010: Objectives for Improving Health; Disability and Secondary Conditions, p. 6-3 Then, Healthy People 2010 made the following recommendation:

> For people with disabilities to have the opportunity for healthy lives, both physically and emotionally, programs and facilities that offer wellness and treatment services must be fully accessible. Effective enforcement of the Americans with Disabilities Act can improve services for people with disabilities and help prevent secondary disabilities.

In sum, the millions of Americans with mobility or vision impairments are unable to obtain the health benefits from some of our nation's most popular forms of exercise due to the failure of exercise facilities to provide equipment they can use.

Question 13: *Should the Department require covered entities to provide accessible exercise equipment and furniture? How much of each type of equipment and furniture should be provided? Should the requirements for accessible equipment and furniture be the same for small and large exercise facilities, and if not, how should they differ?*

Wheelchair accessible exercise equipment is being developed, for example by the Veterans Administration to respond to the needs of returning veterans with disabilities, http://abclocal.go.com/kgo/story?section=news/health&id=7502683, and should be looked to for examples of accessibility features.

We strongly support specific requirements for covered entities to provide accessible exercise equipment and furniture for the following reasons:

- Since the vast majority of people with disabilities cannot afford home-based exercise equipment and very few fitness facilities today provide any accessible exercise equipment, millions of people with disabilities have no way of improving their health and wellness, and engaging in the social and other benefits of gym exercise.
- The failure of covered entities to provide readily available accessible exercise equipment is a clear violation of the ADA.

Exercise facilities with 30 or more pieces of exercise equipment should be required to have the following:

New facilities (30 or more pieces of exercise equipment)

1. A minimum of one piece of combination upper and lower extremity aerobic exercise equipment with universal design features (see definition below) that has a seat that can be removed to allow usage by a wheelchair user while seated in their wheelchair.
2. A minimum of one treadmill with universal design features
3. A minimum of one piece of upper extremity strength exercise equipment with universal design features that allows a person to do multiple exercises while seated in their wheelchair. This could either be a multi station machine or a dual pulley system that either has no seat or a removable seat.
4. A minimum of one piece of upper extremity aerobic exercise equipment with universal design features that has a seat that can be removed to allow usage by a wheelchair user while seated in their wheelchair.
5. Whenever there are three pieces of equipment in the same category, e.g. treadmill, cycle, elliptical, etc., one of the pieces must have universal design features.
6. Accessories to enhance accessibility shall be provided.

Existing facilities (30 or more pieces of exercise equipment)

1. Items 1, 2 and 3 above.

2. Whenever new cardiovascular equipment is acquired, it shall have universal design features unless there is already one piece of equipment in that category with universal design features.
3. Accessories to enhance accessibility for existing machines shall be provided.

Exercise facilities with less than 30 pieces of exercise equipment should be required to have the following:

New facilities (less than 30 pieces of exercise equipment)

1. A minimum of one piece of combination upper and lower extremity aerobic exercise equipment with universal design features (see definition below) that has a seat that can be removed to allow usage by a wheelchair user while seated in their wheelchair.
2. A minimum of one piece of upper extremity strength exercise equipment with universal design features that allows a person to do multiple exercises while seated in their wheelchair. This could either be a multi station machine or a dual pulley system that either has no seat or a removable seat.
3. At least one of every category of cardiovascular exercise machine shall have universal design features.
4. Accessories to enhance accessibility shall be provided.

Existing facilities (less than 30 pieces of exercise equipment)

1. Comply with the requirements for a new facility to the extent it is readily achievable.
2. To the extent compliance with the requirements for a new facility is not readily achievable, whenever new cardiovascular equipment is acquired, it shall have universal design features unless there is already one piece of equipment in that category with universal design features.
3. Accessories to enhance accessibility for existing machines shall be provided.

In addition, all information and interface aspects of all exercise equipment must meet the technical and functional accessibility standards of Section 508, which will guarantee access to on-screen information through audio output and tactile controls. This will make the exercise equipment accessible to people who are blind or have vision impairments.

D. Beds in Accessible Guest Rooms and Sleeping Rooms

The ADA already requires beds that are usable by people with disabilities in accessible sleeping rooms through, at a minimum, its general non-discrimination requirements. Public and private entities that offer sleeping rooms are required to engage in a considered process to provide usable beds. The comments below are the provisions, reasons, and analysis we propose about how to regulate this existing requirement.

Question 16: *Should the Department develop a general standard that specifies requirements for beds wherever accessible sleeping accommodations are required? What is the optimal clearance needed under a bed to accommodate a mechanical lift? What are appropriate bed heights to ensure accessibility by individuals with mobility disabilities and should there be requirements for mattresses to ensure that the height of the mattress, even when compressed by the weight of a person sitting or laying down on it, remains within a certain range? Are there existing standards that the Department should look to for developing standards for beds in accessible rooms? What is the optimal clearance needed under a bed to accommodate a mechanical lift? Should any such requirements apply to all accessible guestrooms or sleeping rooms or only to a percentage of them? What time line should the Department establish for requiring accessible beds in accessible guest rooms and sleeping rooms and should such a time line be phased in?*

We support specific accessibility requirements for accessible beds. Beds that are too high have been a significant barrier for travelers with disabilities. According to a JD Powers customer satisfaction survey that was conducted several years ago, one of the "must haves" in a lodging experience was a comfortable bed. In its eagerness to meet their customer's desires, the lodging industry responded to this survey by installing new beds, and in some cases worked with bed manufacturers to develop their own branded premium beds. These new beds, ranging in heights from 25"-30", are notably higher than the beds previously found in hotels, and often pose a significant barrier to people with mobility disabilities, including people with paralysis, polio, cerebral palsy, short stature and other disabilities. Due to the increased heights of these beds, rooms that were once considered accessible have become inaccessible. People who rely solely on their arms to transfer into bed may not have the strength to lift their entire body to the top of these mattresses. People with short stature have a limited height they can jump to access a bed. People with restricted movement in their joints may not have the flexibility to lift their legs onto a high bed. This bed height problem has become pervasive across the spectrum of lodging categories, from high-end luxury properties to budget properties. It is not uncommon that people with disabilities need to call multiple properties before they find one that will work for them. In some cases, they must travel with someone who can assist them into bed, or must even cancel their trip altogether. As our population ages and as more people lose their mobility, it is imperative that the DOJ respond to this issue of increased bed heights.

The typical seat height of a wheelchair is 19" above the floor, a dimension that was published in the ADA Accessibility Guidelines in 1991. Consequently, a bed that is substantially higher than 20 inches presents a problem for most wheelchair users. We recommend as follows:

- Require beds in the accessible guestrooms to measure 20 to 23 inches high from the floor to the top of the mattress, whether or not it is compressed. This is based on a sampling of 50 different wheelchair heights by Access Compliance Services, as well as on the range of bed heights that were found in the first years after the ADA became effective, before bed heights increased so dramatically. In those early years, these lower bed heights did not appear to pose a problem.

- Require bed frames that can readily be removed, thus lowering the bed when requested by guests. This would mean that stationary box frames are not acceptable.
- Have adjustable legs, either as part of the existing frame, or various height bed risers that can be added to the frame (the latter currently exist on the market).
- Require at least one accessible room to be equipped with a ceiling transfer lift.
- While the least beneficial, at the very minimum, information about bed heights should be readily available on a property's website, with the reservation department, and at the front desk.

Clearance Under The Bed

We recommend that DOJ adopt a provision that is consistent with California's Title 24 accessibility requirements. Title 24 has a requirement for a seven-inch clearance under the bed. Many beds are placed on stationary platforms (AKA stationary box frames). These stationary platforms not only limit access for lifts, they make it impossible to move the bed in any direction if someone should need to move it to create an accessible pathway to either side of the bed (often there isn't the required 36-inch clear width maneuvering space along both sides of a bed). Therefore, we suggest that, along with a required clearance underneath, that the bed be required to be moveable.

Maneuvering To The Bed

Operating a lifting device requires adequate space to steer the lift to a position alongside and parallel to the bed, as well as space to then turn the lift 90-degrees so that it is perpendicular to the bed with its support legs underneath the bed. Since the longest lifts are approximately the same 48-inch length as the ADA standards designate for a wheelchair space, applying maneuvering space requirements for wheelchairs would ensure adequate space for using a lift. For example, the original ADAAG at Section 9.2.2(1) already requires a 36-inch wide space alongside of the beds in transient lodging, as does the 2010 ADA standards at Section 806.2.3. And, both versions of the ADA standards require that in order to navigate a 90-degree turn, both legs of the turn must be 36-inches wide (See original standards at Section 4.3.3, and the 2010 standards at Section 403.5.1). Consequently, adequate space for using a lift could be provided by a 36-inch wide accessible route to alongside a bed or between two beds, that connects to a space under the bed that is 36-inch wide and at least 7-inches high. Requiring the 7-inch high under-bed clearance to extend 30 inches deep would ensure that the mast of the lift could be brought all the way to the bed for safely picking up or placing an individual. Providing such an under-bed space that extends 30 inches deep can be achieved without conflicting with the common hotel practice of installing a mid-span support under wider beds, since the narrowest beds for which such support would be needed are 60-inch wide queen-size models.

Requiring all guestrooms to have the same bed height ignores the diverse needs of people with disabilities and people who are elderly. People that require someone to assist them into a bed often prefer a higher bed to minimize back strain for the assistant whereas people with limited

mobility who aren't using outside assistance generally need a lower bed, per the specifications given above. Having the ability to safely and easily adjust the bed to individual requirements is the ideal; however, an alternative would be to require a portion of accessible rooms to have low beds (20 to 23 inches, per above), and allow the remaining accessible rooms to provide the same (higher) beds as in non-accessible rooms. If there is only one accessible room, it should be required to have a lower bed.

The lodging industry should have no more than one year to comply with any new bed height standards.

F. Electronic and Information Technology

Question 18: What are the challenges posed by the inaccessibility of EIT, including EIT kiosks, POS devices, and ITMs? Are there issues regarding other uses of EIT that the Department should consider adopting to ensure that EIT equipment is accessible?

The challenges posed by inaccessible EIT, including EIT kiosks, POS devices, and ITMs, vary depending on the type of technology, the intended purpose of the technology, the environment of use, and the type and severity of disability. Accessibility standards governing EIT need to be specific enough to provide consistency and performance-based enough to allow flexibility to accommodate emerging technology.

In general, the most common challenges posed by inaccessible EIT fall into 6 general categories:

- Access to people with mobility disabilities, including people who use wheelchairs
    - Examples of barriers include:
        - reach ranges for controls
        - viewing angles of controls, displays or information
        - heights of writing surfaces
        - size, placement, slope and surface of path of travel and clear floor space
- Access to people with vision disabilities
    - Examples of barriers include:
        - touch screen interfaces without audio and tactile input options
        - visual (on-screen or printed) information without audio, tactile, large print, or high contrast output options
        - video information without audible description
        - Biometric authorization, authentication, or identification mechanisms that depend on retina or iris
        - input mechanisms that time out
- Access to people with manual dexterity disabilities
    - Examples of barriers include:

        - objects required for interaction (styli, credit card swipes, keypads, mobile devices) that are hard to retrieve, hold, position, manipulate, and stow
        - Keypads and buttons (physical or on-screen) that are small or require precision to operate or don't work with prosthetic devices
        - Input mechanisms that time out
- Access to people with hearing disabilities
    - Examples of barriers include:
        - audio or video information that is not captioned or otherwise available in visual format
        - audio information without volume control
        - hearing aid interference
- Access to people with cognitive and learning disabilities
    - Examples of barriers include:
        - Content, authorization/authentication systems, and navigational controls that are complicated, lack simple cues, or use multiple media at the same time
- Access to people with other physical disabilities
    - Examples of barriers include:
        - Interactive mechanisms (such as facial recognition or body scanning) that assume a particular "standard" appearance, size, or posture (sitting versus standing)

The effects of inaccessible EIT are not limited to consumers of goods, information and services. Inaccessible EIT also poses significant barriers to employment of people with disabilities. Unless accessibility is built in and assistive technology is readily available, individuals with disabilities will be forced even further out of the labor force.

As EIT becomes more prevalent, it replaces human staff (as, for example, automatic parking payment machines are replacing parking attendants), leaving people with disabilities without access to flexible, on-demand, individualized assistance. Inaccessibility forces people with disabilities to give up their independence and, often, their private financial, health, or other personal information, to strangers in order to interact with machines. It is, therefore, imperative that EIT be as universally accessible, as consistent from device to device, as flexible/accommodating to the user, and as simple to understand as possible.

It is also important not to simply recognize and address the barriers that inaccessible EIT currently poses. The technology development cycle is much faster than the regulatory cycle, so it is important to be forward-looking to address, not only the EIT barriers currently on the table,

but also those drawing board and beyond. The drivers for rapid adoption of these technologies include:

- Staff savings
- Increased customer satisfaction due to simpler, easier, and more entertaining transactions
- Integration with customer relationship databases for improved loyalty and increased opportunities to sell to the customer

These drivers will only accelerate over time, regardless of the specific technologies in play at any given moment. Comprehensive and efficient accessibility regulation will demand comprehensive but clear definitions of the covered EIT, and clear functional requirements for them.

Appendix A provides some examples of current and developing uses of EIT in various contexts.

Question 20: *What are appropriate scoping criteria for the availability of accessible EIT and triggering events for the replacement or refurbishing of EIT devices, including kiosks, ITMs and ATMs, to ensure accessibility?*

Appropriate scoping criteria and triggering events for accessible EIT must provide the greatest possible access to goods, services, and information offered by Title II and III entities through the technology, while recognizing relevant ADA defenses that have provided adequate protection to covered entities for the past twenty years.

Hundreds of thousands of inaccessible kiosks and other EIT currently dot both the public sector and commercial landscape. EIT provides programs, services and information in the health, education, financial, retail, transportation, entertainment and government sectors. There is no escaping the fact that each day, more and more machines are doing what people used to do. In November 2010, for example, AARP reported that twenty-two states have emergency rooms equipped with (completely inaccessible) machines that dispense prescription medication. (For additional details about varying types of kiosks currently available, see http://lflegal.com/2010/07/self-service/ and response to Question 18.)

Robust and stringent scoping and triggering event requirements, as well as mandated technical and performance standards and clear definitions, are necessary so people with disabilities do not fall further and further behind in the 21st century technology environment. The principles outlined below will ensure that people with disabilities are able as quickly as possible to access the myriad services, programs and information now provided by covered entities through EIT, including kiosks, ITMs and ATMs.

However, it is important to note that such new regulatory detail must be accompanied by explicit Department confirmation of the ways in which long-standing ADA requirements already apply to EIT. As specified in the "general categories" of barriers above, EIT accessibility is certainly affected by the inherent features of EIT devices themselves (e.g., size and positioning of keypads or other buttons on the device, nature of visual display screens, and presence of styli and card swipe features). However, EIT access is also affected by the way these devices interact with, and function in, the environments in which they are used. Indeed, such contextual factors can be among the most decisive factors in creating or mitigating access barriers for people with certain types of disabilities. This is particularly true as to smaller EIT devices, such as POS devices, which are affected by positioning and orientation decisions made by covered entities.

For example, there is a widespread retail industry practice of affixing POS devices beyond the practical reach range or view of many persons with disabilities (including persons who use wheelchairs, persons of short stature, or persons with manual dexterity impairments). In making these placement decisions, retailers are often relying purely on general reach range requirements, while ignoring Guidance accompanying the 1991 ADA Standards that emphasizes that placement of operative features when visual interaction is contemplated should "[c]onsider that the standard eye level range of an adult seated in a wheelchair is from 43 to 51 inches from the floor." See ADAAG Manual: a guide to the Americans with Disabilities Act Accessibility Guidelines at 135 (Check-Out Aisles [7.3]). the overarching full and equal access obligations that the ADA imposes on their POS decision-making.

It is true that former and current architectural design standards do not explicitly address many new forms of EIT, which were unavailable or unimagined in 1990 when the ADA was passed. However, the Department should underscore that even when there are no precisely relevant standards targeted at particular types of EIT (now or in the future), more general ADA analysis still applies. Among other things, this analysis can require identifying and complying with technical standards that govern analogous situations.

As to POS access, the proper analogy is not to reach range requirements. Reach range requirements comfortably govern a single, gross-motor-skills interaction with a basic operating mechanism — a transaction so elemental that it can be effectively accomplished by a person seated in a wheelchair who is engaging an operating mechanism that can be overhead and out of view. However, such requirements do not appropriately govern modern POS devices, which over the past two decades have evolved to permit or require increasingly nuanced interactions with customers. Modern POS transactions generally require customers to absorb and respond to information presented by the device (including specifying which of several possible credit or debit transactions is to be conducted, and authorizing or confirming various steps in the

process); to input specific unique personal data (including confidential "PIN" information); and to execute a signature.

These kinds of interactive and fine-motor-skills tasks are much more appropriately analogized to the type of "manual work," "light detailed work, such as writing" or "check writing" activities that are contemplated by the existing work surface and counter requirements of both the 1991 and the 2010 ADA Standards. Notably, the height specifications for these requirements are significantly lower than the reach range height requirements. Thus, to the extent that existing technical standards are referenced in determining POS positioning and orientation, the reference must be to counter and work space height requirements, with attention to the view angle considerations highlighted in existing Guidance.

In addition to devoting more focused attention to specifically identified EIT access issues, the Department's current regulatory process should confirm and clarify that covered entities have ongoing EIT access obligations to carefully choose and reference appropriate requirements of existing standards, and to meet general ADA full and equal access obligations. Moreover, to the extent that existing standards are deemed inapplicable to current or future EIT devices (e.g., where no express or analogous requirements can be identified), other more general provisions of the ADA still apply, including policy modification, communication access and barrier removal obligations. Retailers thus have existing, ongoing obligations to reasonably modify their point-of-sale practices and protocols to ensure access for customers with disabilities; to provide auxiliary aids and services; to remove barriers where it is readily achievable; and to provide alternatives methods of access to pay points.

<u>Definition of EIT, kiosks, ITMs and ATMs</u>

The Department should ensure that its new regulations for EIT include a forward-looking definition that will embrace the myriad types of electronic and information technology currently being used, and that will be used, by Title II and III entities to provide programs, services and information covered by the ADA.

The Department should include accessibility requirements for the information and interface aspects of a variety of equipment, not only for equipment that is primarily for the purpose of information input and output. Thus, for example, digital thermostats in hotel rooms, digital interfaces on exercise equipment, communication elements of medical equipment, and other equipment for which information, communication, and interaction are important functions, should be required to be accessible. Such information and interfaces should be required to comply with the performance and technical standards of Section 508.

<u>Technical and Performance Standards for EIT</u>

The new regulations should reference the Section 508 technical standards. Industry, people with disabilities, and the public at large need a consistent standard for accessible EIT development, and applying the technical standards of Section 508 to EIT used by Title II and III entities to provide programs, services and information will provide that. (This is different than the new web standards, where we recommend that WCAG 2.0 AA, and not Section 508, serve as the technical standard. Unlike web accessibility, there is no internationally sanctioned direct set of robust and flexible technical standards for EIT that the Department should point to).

However, the ADA implementation and enforcement scheme should remain different from the 508 procedure, which is under review in any event. Section 508's enforcement and implementation scheme was specifically designed for the federal government and its procurement procedures. ADA regulations should not impose an additional layer of requirements on Title II and III entities. For example, Section 508 Voluntary Product Accessibility Templates (VPATs) have proved less effective than hoped, with reports of inaccurate and incomplete VPATs leading to inappropriate adoption of inaccessible technology. There are a variety of instruments and mechanisms covered entities can use to test accessibility of information technology equipment. We would encourage DoJ to participate in and support development and dissemination of these compliance tools as part of its technical assistance.

The Department's new rule should recognize that detailed technical standards already exist in Section 707 of the 2010 Standards for Accessible Design for Talking ATMs and Fare Machines. Developed as a result of a multi-year rigorous rule making process, the Talking ATM technical standards should not be tampered with (although we do recommend below a change to the Talking ATM scoping provision in Section 220 of the Standards.) The Department's new rules should not re-create the wheel of Talking ATM standards.

In addition to adopting Section 508 standards, the Department should adopt a generalized performance standard for EIT, such as the following: *"*EIT shall be accessible to and usable by persons with disabilities so that persons with disabilities may access, perform or acquire the same programs, services and information that the covered entity offers to people without disabilities by means of EIT with a substantially equivalent ease of use."

This two-pronged regulatory construct (general performance and technical specifications) is currently used in the Department's new construction regulations. Section 36.401(a) of the DOJ's Title III regulations defines discrimination as including a failure to design and construct facilities that are "readily accessible to and usable by individuals with disabilities" and Section 36.406 requires that new construction "shall comply" with the technical standards set forth in the Standards for Accessible Design.

Scoping and Trigger events: New and Altered EIT

100% of new and altered EIT, including kiosks, ITMs, and ATMs owned, leased or operated by covered entities that provide services, programs and information to the public should meet accessibility standards. "New" in this context should be defined as technology installed on or after the effective date of the new regulations. "Altered" should include technology installed prior to the effective date and refurbished or modified in any way thereafter, including any significant software modification or upgrade. The Department's well-established "maximum extent feasible" protection for covered entities should apply to alterations of EIT.

A 100% requirement for new and altered EIT makes sense from the perspective of people with disabilities, the general public, and the covered entity. Significantly, the cost of accessibility at the time of new purchase or alteration is minimal, often involving only inexpensive hardware and a nominal software license fee, a fee that can at times be applied to multiple devices or even enterprise-wide without a per-device cost.

Moreover, it is unfair to make a person with a disability wander around seeking a small percentage of accessible devices among many. This is especially so for people with visual impairments who cannot see the accessible device, or signage designed to identify the accessible device. Braille or large print signage, tactile markings, or other (non-audio) identifiers cannot be located until the person with a visual impairment is at the device, searching for the identification.

The general public is also inconvenienced by anything short of full accessibility. In the grocery store check out context, for example, a blind shopper who has stood in line only to discover an inaccessible point of sale device will delay other customers in that line. If the blind customer is directed to then move to the front of a second line with an accessible device, not only is the customer embarrassed and inconvenienced, but another line of shoppers is made to wait. Universal, accessible design is possible in the world of technology: the Department of Justice should insist upon it.

100% accessibility also benefits covered entities, which typically want a uniform approach to technology for infrastructure management, customer service, and staff training purposes. Indeed, even though current regulations require only one Talking ATM per location, many financial institutions have converted every ATM to a Talking ATM to avoid inconsistent brand identity and to provide full service to all customers at all locations. Bank of America announced in 2010, for example, that all 18,000 of its ATMs were Talking ATMs. See http://lflegal.com/2010/03/bank-of-america-atms/. All major ATM manufacturers are now able to ship Talking ATMs as easily as they can deliver inaccessible machines. Indeed, more than five years ago Triton, an ATM manufacturer that sells ATMs across the pricing spectrum, including low cost devices, announced publicly that all its ATMs would ship with audio capabilities. (The Department should modify Section 220.1 of the 2010 Standards for

Accessible Design and eliminate the "one per location' scoping for automatic teller machines or self-service fare vending, collection, or adjustment machines. These machines should be subject to the same 100% rule as other types of new EIT.)

Scoping and Triggering Events: Existing EIT

To ensure the greatest access possible to the hundreds of thousands of inaccessible kiosks and other EIT currently owned, leased or operated by Title II and III entities and deployed across the country, the Department's new regulations should clarify that accessibility upgrades to existing EIT are considered auxiliary aids and services under 28 C.F.R. 36.303 and 28 C.F.R. 35.104.

Such a classification fits easily within the Department's existing Title II and III regulatory construct. The 2010 revisions to Sections 36.303(b)(1) and (2) and to the definition of auxiliary aids and services in Section 35.104, for example, added the phrase "accessible electronic and information technology" to the list of examples of auxiliary aids and services in all these sections. And, by leaving untouched the language of Section 36.303(b) (4), and part (4) of the Title II auxiliary aid and service definition in Section 35.104, the Department reaffirmed that auxiliary aids and services also include "[a]cquisition or modification of equipment or devices."

In the new regulations specifically addressing kiosks, ITMs and other types of EIT, the Department should clarify that adding accessibility features to these devices is already required by the auxiliary aids and services requirements of Titles II and III.

As auxiliary aids and services, the obligation to add accessibility features to kiosks that were installed prior to the effective date of the new regulations would be subject to the "undue burden" defense for Title III entities, and the "undue financial or administrative burden" defense for Title II entities. See 28 C.F.R. 36.104 (Title III) and 28 C.F.R. 35.150(a)(3) (title II). The Department should clarify that adding accessibility features to existing kiosks would never require a fundamental alteration of the kiosk or EIT.

The Department is playing "catch-up" when it comes to ensuring the accessibility of kiosks, ITMs, and other types of EIT. It is, therefore, particularly imperative that new regulations be strong and unambiguous. The Department's rulemaking on this important issue must move the country forward in its promise of full equality for people with disabilities.

The Department's rules should mandate that any ITM, kiosk or other EIT installed or altered (upgraded or refurbished) after the effective date be accessible to people with disabilities. The Department should also clarify that accessibility features for existing kiosks, ITMs and other EIT are already part of the definition of "auxiliary aids and services" subject to the well established "undue burden" / "undue financial and administrative burden" defenses.

Only this type of scoping will fulfill the ADA mandate that a person with a disability must not be "segregated" or "treated differently" and must have an "opportunity to participate" that is "equal to that afforded to other individuals." 42 U.S.C. § 12182(b)(2)(A)(iii); 28 C.F.R. §36.202(b).

If there is any doubt that swift decisive action by the Department is needed now, it can be found in the following text from a press release issued in September, 2010 by Instymeds, a company that makes prescription – dispensing kiosks for public use – kiosks that do not have accessibility features:

> Johnson Drug at ARMC, located in Amery Regional Medical Center, today announced it has begun offering InstyMeds, a fully automated ATM-style machine that dispenses prescription medications directly to patients immediately following their doctor visit. The system, the first of its kind, offers a safe, convenient way for patients to receive their prescription medications on-site.
>
> "This new system allows patients to get their urgent care and emergency prescriptions filled after clinic hours, when local pharmacies are closed. They can now have those prescriptions filled at the medical center" says Julie Hanlon-Johnson, managing pharmacist. "InstyMeds helps them get back on the road to recovery as soon as possible.
>
> The InstyMeds system automates the entire process from the prescriber issuing the prescription, to the patient obtaining their medications, and payment collection. The patient can obtain their medications and be on their way in about the same time it takes them to use their bank ATM.

http://www.instymeds.com/index.php?page=press. It is very likely that such dispensers will soon be available in drug stores and allow customers (who can use the machines) to fill prescriptions at hours when the pharmacy in the drug store is not open. People with disabilities should be able to obtain needed drugs during the same hours as everyone else.

In its initial Standards for Accessible Design, adopted almost twenty years ago, the Department recognized that bank ATMs had to be "independently usable by and accessible to" persons with disabilities. The 2010 Standards clarified what it means to be independently usable by prescribing detailed accessibility requirements. Also in 2010, the Department's revised its ADA regulations to specifically recognize that Title II and III entities are required to provide accessible electronic and information technology.

The Department must now continue this progress and make sure that people with disabilities can also use all the EIT that is now so integral to the provision of Title II and III programs, services and information.

G. Other Types of Equipment and Furniture

Question 21: *Are there other types of equipment or furniture that impede accessibility that should be specifically addressed in the Department's regulation? What types of accessible equipment or furniture would effectively address any such concerns? What scoping would adequately address the impediments to accessibility and what triggering event would be appropriate for each type of other equipment or furniture? Are there particularly helpful types of equipment or furniture that are not generally available to the public that may assist individuals with disabilities, such as pool or shower chairs?*

Self-service display racks and shelving

We believe the Department should require that freestanding furniture and equipment used to display merchandise for self-service by customers be on an accessible route. Even now, 20 years after the ADA was passed, an ordinary shopping trip can be an ordeal of exclusion, frustration and dependence for people who use wheelchairs. Most modern retail stores are designed for self-service by customers. Nondisabled shoppers are able to browse throughout available merchandise, either to search for a desired item, model, color, size or style, or simply at random, open to the inspiration retailers crave: the impulse purchase. The comprehensive access enjoyed by nondisabled shoppers permits them to examine the material and workmanship of potential purchases, to compare or coordinate different items, and -- in clothing stores -- to select items to try on. Retailers encourage full use of their stores, designing them to attract customers to browse as much merchandise as possible.

In stores that do not provide an accessible route to merchandise, shopping is a very different experience for people who use wheelchairs. When such customers enter a clothing store, shelves and display units are often arranged so as to block access to much of the merchandise. Tables jut out in front of T-stands, and rounders are backed up against each other or the store wall. Clothing racks are often spaced so that none of the merchandise displayed on them is accessible, or even visible. Whole sections of the store and large quantities of merchandise are inaccessible because display units are crowded so close that only those able to walk can pass between them. Under these conditions people with disabilities often have no access to specific items for which they are searching. Leisurely browsing -- enjoyed by so many nondisabled shoppers -- is out of the question for people who use wheelchairs. In addition, customers with disabilities may find themselves unable to avoid damaging merchandise when attempting to access display units that are inaccessible.

Many stores argue that, in lieu of independent access to merchandise, customers who use wheelchairs should rely on sales help to retrieve merchandise from inaccessible fixtures. This is, of course, a far cry from equal access. There is simply no way an employee can retrieve all of the merchandise necessary to

provide the equivalent ability to browse, compare and select that nondisabled shoppers have. In addition, the need for assistance in shopping eliminates the independence that nondisabled shoppers take for granted. Shoppers who use wheelchairs, like all shoppers, want to be able to browse and shop at their own pace, without the oversight of store employees. Ultimately, a system in which people who use wheelchairs can only shop with assistance is in fundamental conflict with the independence the ADA was passed to ensure.

The real-world impact of the congestion that occurs daily in the display practices of most retailers is that many people who use wheelchairs are simply unable to patronize these businesses. The deterrent effect of congested display areas is as real as steps at an entrance.

From the perspective of a customer who uses a wheelchair, there is often little distinction between a fixed rack and a moveable rack or shelf. For a customer using a wheelchair, the rack cannot be moved, even if it is not permanently attached to the floor/wall. It is too heavy, too cumbersome, to laden with merchandise (often breakable), or too high to move. Moreover, the placement of non-fixed racks is often planned for in the design stage of retail facility construction. Failing to include placement of such racks in the new construction requirements encourages retailers to plan for inaccessibility and then claim any change in layout is only required if it is readily achievable without affecting potential sales.

Requiring accessibility of both fixed and non-fixed display racks and shelves will encourage architects and builders to include accessibility from the beginning. Therefore, we encourage the Department to require furniture (including racks and shelves) used to display merchandise for self-service, whether fixed or non-fixed, to be on an accessible route. We propose that the Department clarify in commentary that this standard would not necessarily require 36 inches around each such element, as an "accessible route" can narrow to 32 inches for lengths of 24 inches or less, *see* 2010 Standards 403.5.1, and note such access to two opposite sides of typical clothing display units may be sufficient to enable customers with disabilities to reach most of the merchandise on display.

Shower Chairs in Hotel Rooms, Hospitals and Nursing Homes

When hotels and hospitals provide non-fixed shower seats, they should be required to ensure that those seats are sturdy enough and properly sized and configured to facilitate safe transfers, including height-adjustable legs; a padded seat and back to protect the user from skin breakdown; a bench that extends outside of the bathtub to facilitate transfers to and from a traveler's wheelchair; height-adjustable arms to provide transfer assistance; suction cups on the feet for increased stability during shower use.

Voting Equipment

At least one recent Circuit Court decision has held that electronic voting machines are not covered by the accessibility requirements of the ADA. American Assn. of People with Disabilities v. Holland, 605 F.3d 1124 (2010). The court believed that, because such machines were not fixed, they were not required to be accessible. It is important that the Department make clear that voting machines are subject to the communication and physical accessibility requirements applicable to other forms of electronic and information technology, including accessible input and output methods, reach ranges,

clear space, and viewing angles.

CONCLUSION

Every subject area in this ANPRM is of vital importance to the disability community across the United States. We urge the Department to move ahead with each area of rulemaking independently as it is able, and not allow time delays in one area to hold up rulemaking on the other issues raised in this ANPRM, and in all of the ANPRMs issued by the Department in July 2010.

Thank you for your consideration of improvements to the ADA Standards and for the opportunity to comment on this important ANPRM.

Sincerely,

Eve L. Hill
Senior Vice President
Burton Blatt Institute
ehill@law.syr.edu

APPENDIX A

Health Care. Electronic kiosks and other EIT are developing into a central tool in the provision of health care services, including for patient self-service check-in and check-out, self-service medical testing and monitoring, medication dispensing, and making medical records, test results, and recommendations available to patients.

- In May, 2010, Fujitsu announced it would be conducting a symposium entitled "Self-Service Healthcare: Migrate Over 50 percent of Patients to Kiosks" http://bit.ly/dre52J. According to NCR MediKiosk White Paper entitled Putting the Patient in Control: Employing Technology Solutions to Empower Patients: "self-service kiosks provide an additional channel for insurers to support healthy practices and preventative care by recommending specific tests or procedures to patients with chronic disease management at the point of service. For example, at check-in, patients with diabetes may receive a message from health insurers or health plans encouraging them to discuss the importance of testing for hemoglobin A1c with their physician." http://www.ncr.com/documents/putting_the_patient_in_control.pdf.
- In-store self-service medical monitors are also likely to increase, going beyond simple blood pressure cuffs and heart rate monitors to full biometrics (weight, body fat, glucose, blood oxygen) with internet connectivity, flat screen displays of medication and disease management information, and the ability to save personal health records (see http://www.lifeclinic.com/synergy.aspx).
- EIT will also be used by pharmacies and other health care providers to dispense medications. The "The InstyMed kiosk" is a "fully automated prescription dispensing system" that is 100% touchscreen and 100% inaccessible. See http://www.instymeds.com/, a site that includes a 3 minute video of the self-service kiosk.

Retail, Entertainment, and Services. EIT is fast moving beyond one-way information provision and simple vending. See http://www.slideshare.net/PSFK/psfk-presents-future-of-retail-report; http://www.kiosk.com/market/orderentry-kiosk-experience.php.

- POS devices now require consumer input and self-checkout systems are becoming prevalent. Issues include placement, reach range, display placement/angle, visual and audio output, accessible input mechanisms.
- Restaurants may move away from printed menus to electronic displays and devices, as well as multi-media displays while waiting.

- Movie and entertainment ticketing kiosks are becoming commonplace and are being used for more and more types of experiences (e.g., ski lift tickets). http://kis-kisoks.com/custom9.html; http://www.kiosk.com/case-studies/ticketmaster.php; http://www.kiosk.com/case-studies/vail.php.
- EIT vending machines now offer everything from electronics to makeup with touchscreen input, self-checkout, and self-service. See http://www.zoomsystems.com/zoomshops/zs_index.html. Potential barriers include inaccessible touchscreens, product displays, payment methods and pickup mechanisms.
- Kiosks are also being used for photo development, http://www.frankmayer.com/portfolio/interactive_kiosk_solutions/sony_snap_lab.php, financial services and bill payment, http://www.kiosk.com/market/financial-kiosk-experience.php, gaming, http://www.kiosk.com/market/gaming-kiosk-experience.php, and credit applications, http://www.frankmayer.com/portfolio/interactive_kiosk_solutions/john_deere_kiosk.php.
- EIT in retail is beginning to provide on-demand and just-in-time product information, such as detailed turn-by-turn/step-by-step directions to find products and services within a mall or store; on-demand product details (contents, instructions, manufacturing (e.g. "green"). Potential barriers include accessible format delivery of information and compatibility with assistive technology.
- Retailers and brands are able to offer just-in-time discounts, coupons, loyalty rewards and other incentives delivered via kiosks, on-the-shelf dispensers, or other EIT devices. Barriers include reach ranges and visual-only formats.
- Stores and hotels are providing customers with "concierge" devices to look up products (e.g., an electronic grocery list organized by aisle, with directions and the ability to check off items; an electronic tablet pre-loaded with local tourist and restaurant information, see http://www.timesonline.co.uk/tol/travel/business/article7111644.ece). Barriers may include accessibility for people with manual disabilities, accessible input and output options.
- Stores are developing in-store networking systems to allow buyers to consult with their friends who are not in the store (via text, photos, and video). Barriers may include physical and communication inaccessibility for people with mobility, vision, and hearing disabilities.
- Stores are developing in-store EIT feedback mechanisms to seek consumer input and respond in real time. Barriers may include physical and communication inaccessibility for people with mobility, vision, and hearing disabilities.

- Stores are developing systems to make recommendations to consumers based on past and current purchase history. Barriers may include inaccessible communication mechanisms.
- Stores are developing body scanning and facial recognition systems to recommend products based on size, age, gender, and other factors. This includes "virtual try-on" and "virtual fitting room" technology, which enables customers to interact with digital representations of clothing. See, http://www.internetretailer.com/2010/10/12/macys-offers-virtual-fitting-room-its-nyc-flagship-store. Barriers may include physical accessibility of the technology as well as the technology's assumptions about body size, facial and physical appearance, and posture. Body scanning systems are also replacing requirements to present identification to enter some "members only" public accommodations. For example, in August 2010 the 24 Hour Fitness health club chain debuted a "Cardless Check-In," which relies on an index finger scan. http://www.24hourfitness.com/health_clubs/cardless_checkin/. This technology is not accessible to patrons who do not have index fingers, or who are unable to create fingerprints. Positioning and reach range issues may also affect access.
- Stores are offering EIT that allows customizing or previewing product effects (view a paint color on a photograph of your walls, see what a hair cut or color will look like on you). This technology may not be accessible to people with vision disabilities.
- Stores are developing virtual display cases and holographic ads, which may pose barriers to people with vision and hearing disabilities.

Education. Colleges, universities, and secondary schools across the country are using self-service EIT for a variety of educational and administrative interactions with students, parents, and visitors.

- Self-service kiosks are being used by colleges and universities "for automated registration, financial aid information, course catalogs, directories, way finding, academic & athletic event calendars, student ID validation, and more." See http://www.kiosk.com/market/government-kiosk-experience.php.
- School and other libraries are implementing self-service EIT check-out systems. See http://www.cen-tec.com/.
- Schools at all levels are also using "clickers," wireless personal response systems allowing students to answer questions and display those answers so the entire class can see. These remotes allow professors to take attendance, do polls, provide instant quizzes, and receive feedback. See "More Professors Give Out Hand-Held Devices to Monitor Students and Engage Them," New York Times (Nov. 15, 2010) http://www.nytimes.com/2010/11/16/education/16clickers.html.
- High Schools are also turning to self-service machines to provide information to, and gather information from students. Ector County Texas issued a press release in

February, 2010 announcing its purchase of 25 devices to "disseminate and collect a wide range of educational content – including administrative announcements, interactive graphics, sign-ins, and informational video to students, teachers, and parents." A requirement for the chosen kiosks was the "need to be able to stand alone - exposed and unattended." If these devices are not accessible, students, teachers and parents with disabilities are simply excluded from important school services. See press release at http://www.seepoint.com/company-press-release-article.asp?PressReleaseID=85

Transportation. Airline and train kiosks, which allow passengers to check-in, get boarding passes, select seats and perform other functions quickly, privately and independently, have been proliferating since first introduced in the United States ten years ago. See http://bit.ly/9gdxjA, a 2000 article about the "new technology". Unfortunately, despite clear non-discrimination mandates, these devices are largely inaccessible, even though the industry itself has recognized the need for access. (See IBM whitepaper, "The Need for Accessible Self-Service Travel Kiosks, at http://www-03.ibm.com/able/news/selfservkiosk.html. Information about IBM's accessible self-service travel kiosks is available at http://www-01.ibm.com/software/ucd/gallery/kiosks_research.html. These terminals that started out as a convenience on the side have rapidly become the main, and sometimes the only approach for checking in.

Government Services. Examples of EIT used by state and local governments to provide services and information to the public can be found at http://www.kiosk.com/market/government-kiosk-experience.php. Automated government services include

- Vehicle registration and licensing (*Michigan Expands License-Renewal Kiosks,* Kiosk Marketplace (May 21, 2010), *available at* http://kioskmarketplace.com/article.php?id=24554&na=1);
- Single-space and multi-space parking meters, http://www.usatoday.com/tech/news/techinnovations/2009-02-23-smartmeters_N.htm;
- Library services (*Automatic Pay Machines, San Mateo County Library*, http://smcl-main.php.isitedesign.us/content/automatic-payment-machines (last visited June 1, 2010));
- Jury service reimbursements (*Online Kiosk,* CIRCUIT COURT FOR BALTIMORE CITY, available at http://www.baltocts.state.md.us/kiosk.htm (last visited June 1, 2010));
- Building permits (Office of the Chief Technology Officer, *District of Columbia Opens Virtual Permit Center in Ward 5*, DC.gov (Oct. 15, 2008), *available at* http://octo.dc.gov/DC/OCTO/About+OCTO/Who+We+Are/Photo+Galleries/October+15,+2008:+District+of+Columbia+Opens+Virtual+Permit+Center+in+Ward+5).
- Electronic voting machines.