RECOMMENDATION OF 19-INCH LOWER ADJUSTABLE HEIGHT AS THE MINIMUM ACCESSIBILITY STANDARD

SEPTEMBER 27, 2013

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BACKGROUND

Section 4203 of the Patient Protection and Affordable Care Act (the "Affordable Care Act") adds a new section to the Rehabilitation Act of 1973 requiring the U.S. Access Board to promulgate regulatory standards "setting forth the **minimum technical criteria** for medical diagnostic equipment used in (or in conjunction with) physician's offices, clinics, emergency rooms, hospitals, and other medical settings. The standards shall ensure that such equipment is **accessible to, and usable by, individuals with accessibility needs**, and shall allow **independent entry to, use of, and exit from the equipment by such individuals to the maximum extent possible**." It also requires the U.S. Access Board to periodically review and, as appropriate, amend the standards.

Based on this, the Access Board is to establish minimum technical criteria for medical diagnostic equipment used in (or in conjunction with) physician's offices, clinics, emergency rooms, hospitals, and other medical settings.[1] In response, the Access Board issued a notice of

[1] Patient Protection and Affordable Care Act, Pub. L. No. 111-148, §4203, 124 Stat. 119 (2010).

proposed rulemaking[2] that, among other things, would specify a maximum lower adjustable height for the transfer surface. The intent of this minority report is to discuss the specific recommendation that the minimum standard for the highest point of the transfer surface in the lowest adjustable height should be 19 inches in sections M301.2.1 and M302.2.1.

SUMMARY OF THE 19-INCH RECOMMENDATION

The subcommittee on tables and chairs convened by the U.S. Access Board's Medical Diagnostic Equipment Technical Advisory Committee discussed transfer surface height extensively. The subcommittee concluded with a majority recommendation that examination tables and chairs have a **lower adjustable height of 19 inches or lower**.[3] A minority of the subcommittee did maintain that 17 inches was preferred, and when this 19 inch recommendation was discussed with the full Advisory Committee on May 7th, 2013, the full committee was unable to reach a consensus position or even a strong majority sentiment.

Although the subcommittee's conversations were complex and far-reaching, the following points summarize the factors that were considered in the selection of the 19 inch height recommendation:

- Equipment must be accessible to, and usable by, individuals with accessibility needs and will allow independent entry to, use of, and exit from the equipment by those individuals
- Carefully balance the costs to hospitals, physicians, and other health care providers of replacing or modifying existing equipment together with manufacturer costs of redesigning equipment
- Carefully balance the costs to hospitals, physicians, and other health care providers for providing alternative means of access (such as patient lifts, or staff providing lift assistance)
- Minimizing costs to health care systems
- Maximize rate of adoption of accessible equipment by health care providers and the benefits of that equipment to individuals with accessibility needs, particularly those who use wheeled mobility devices.

The minority report explains why a requirement for a 19 inch lower adjustable height for tables and chairs is the most appropriate standard for the initial implementation of section 4203 of the Patient Protection and Affordable Care Act.

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[2] See Architectural and Transportation Barriers Compliance Board. Notice of Proposed Rulemaking: Medical Diagnostic Equipment Accessibility Standards, 77 Fed. Reg. 6916, February 9, 2012

[3] Note that height measurement, as defined by the tables and chairs subcommittee, represents the highest point of the transfer surface, inclusive of bolsters, when measuring to the top of uncompressed foam. See the "Measurements of Tables and Chairs" subcommittee report, dated April 5th, 2013.

CURRENT SITUATION: THE VAST MAJORITY OF EXAMINATION AND PROCEDURES TABLES ARE 32 INCHES HIGH

In the United States, approximately 82 percent[4] of physicians, hospitals and other health care providers use examination and procedures tables with a 32-inch fixed height, as shown in Figure 1. Industry commonly refers to these tables as "box tables." These tables provide an often-insurmountable barrier to health care for people with mobility disabilities. Since 2001, the number of adjustable-height tables has steadily increased, but continues to represent a minority of examination tables in the United States.

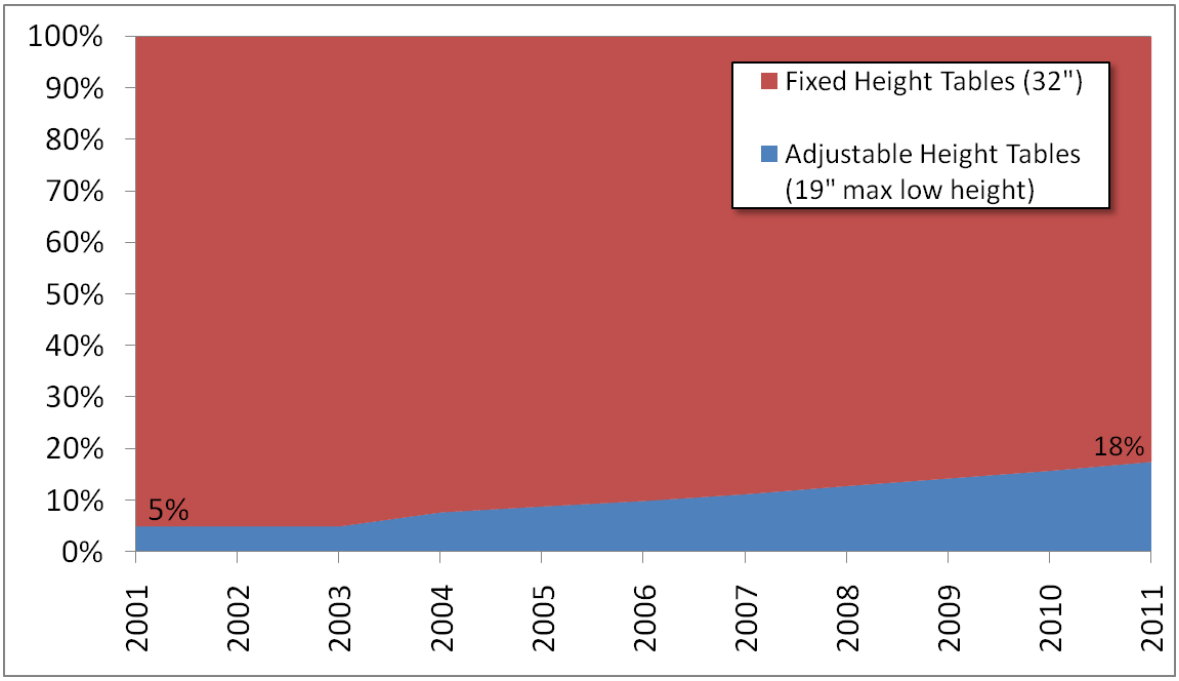

Figure 1: Percentage of fixed height versus adjustable height medical tables (representing the U.S. install base of medical tables)

One of the primary objectives of the U.S. Access Board's requirements should be to accelerate the growing trend of heath care providers to purchase adjustable height tables. In doing so, care should be taken to not render the progress that has already been made obsolete. For the reasons presented in this minority report, a 19 inch low adjustable height is best suited to achieving this objective. . As illustrated in Figure 1 above, a standard lower maximum height that is less than 19" would re-classify the existing adjustable height tables available on the market today as inaccessible and penalize the physicians who have already made a good faith effort at accommodating their disabled patients.

[4] Medical table install base derived from U.S. medical distribution sales data, as provided by Global Healthcare Exchange (GHX), found at http://www.ghx.com/product-pages/solutions/supplier-solutions/sales-data-analytics.aspx

Figure 2: Photograph illustrating the height difference between a fixed height and adjustable height medical table

IMPLICATION OF A 19-INCH MINIMUM STANDARD FOR THE HIGHEST POINT IN THE LOWEST ADJUSTABLE POSITION

This minority report presents the factors that support a minimum standard of 19 inches as the highest point on the transfer surface in a table or chair's lowest adjustable position. However, shorthand references to 19 inches as the minimum standard as used in this minority report should not be equated with a 19-inch transfer surface height, for two major reasons. First, as depicted in Figure 3, adjustable tables currently on the market generally feature contoured bolsters that provide greater security once an individual is seated or lying on the table or chair. A 19-inch standard means that any bolsters fit within the highest point standard, thereby making the front edge of the table/chair lower than the bolsters (by about ¾" based on currently marketed bolsters, or about 18 inches compressed at the transfer surface).

Second, as a *minimum* standard, establishing a 19-inch highest point standard does not mean that all newly manufactured tables and chairs will necessarily be fixed at a 19-inch height. Unlike fixed transfer surfaces such as toilets or non-adjustable tables, there is no reason to standardize at a single height based on broadest usability. In a marketplace of adjustable tables and chairs, increased range of adjustability will be advantageous to patients and caregivers alike. It is not unreasonable to expect that table and chair manufacturers will seek to compete by offering products with greater degrees of adjustability.

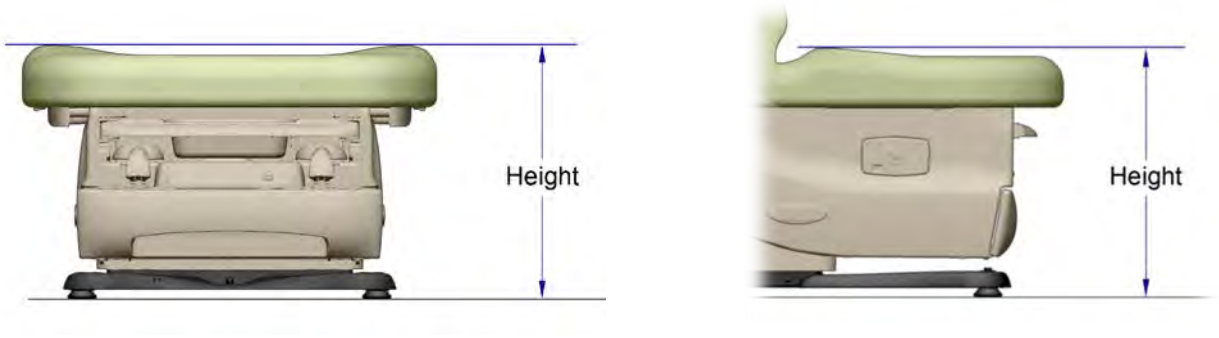

Figure 3. Illustration of measurement height at bolsters relative to lower transfer surface

ALIGNMENT OF 19-INCH RECOMMENDATION WITH ACCESS BOARD PROPOSED RULEMAKING

The subcommittee's recommendation of a lower adjustable height of 19 inches maximum is consistent with the U.S. Access Board's proposed rule and supported by public comments. In its proposed rule, the Access Board proposed that the "height of the transfer surface during patient transfer shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum measured from the floor to the top of the transfer surface" for both examination tables and chairs.[5] The Access Board based its proposal, "on provisions in the 2004 ADA and ABA Accessibility Guidelines for architectural features that involve transfers (e.g., toilet seats, shower seats, dressing benches)." [6] In addition, the Access Board recommended, "Where patient support surfaces are contoured or upholstered for patient comfort or to support patient positioning during diagnostic procedures, the height of the transfer surface measured from the floor may vary across the transfer surface. The highest and lowest points of the transfer surface on such equipment would have to be within the specified dimensions." [7] The Access Board proposed that the measurement should be taken from the "floor to the top of the upholstery under static conditions, without compression or deflection in the transfer surface …." [8]

The Access Board's proposal also explained that it is considering a requirement in the final standards that the height of transfer surfaces be adjustable from 17 inches minimum to 25 inches maximum during patient transfer. In support of the alternative proposal, it cites ANSI/AAMI HE75 [9] and the Wheeled Mobility Anthropometry Project.[10] The results of this study

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[5] See M301.2.1 and M302.2.1.

[6] See Architectural and Transportation Barriers Compliance Board. Notice of Proposed Rulemaking: Proposed Accessibility Standards for Medical Diagnostic Equipment. February 8, 2012.

[7] Ibid.

[8] Ibid.

[9] Ibid, citing ANSI/AAMI HE 75, section 16.4.4. ANSI/AAMI HE75 recommends that the height of patient support surfaces "should be easy to adjust (ideally, powered) to suit the needs of health care professionals and patients." ANSI/AAMI HE75 further recommends that the height of patient support surfaces "should be adjustable to a position high enough to accommodate tall health care providers and the range of medical procedures that could occur . . .

recommended adjustable heights, with an increased maximum height above 19 inches, be provided in order to better accommodate users of powered wheelchairs and scooters. During the committee hearings, the manufacturers accepted that this would be appropriate and offered 19-inch to 25-inch adjustable height through powered tables.

The subcommittee's recommendation appropriately balances the two proposed alternatives included in the Access Board's proposed rule. Therefore, the Access Board should adopt the subcommittee's recommendation provider for continuous adjustability of the height of the transfer surface between 19 and 25 inches.

A MINIMUM HIGHEST POINT STANDARD OF 19 INCHES IS CONSISTENT WITH EXISTING ACCESSIBILITY STANDARDS

Current accessibility standards and regulations generally consider a transfer surface with a fixed height between 17 inches and 19 inches accessible. Therefore, under these rules a transfer surface with a fixed height of 19 inches meets the definition of accessibility.[11]

Nineteen-inch water closet and toilet seats are accessible:

> **604.4 Height.** The height of water closet seats shall be 17 inches (430 mm) minimum and **19 inches** (485 mm) maximum above the floor, measured to the top of the seat. Seats shall not be sprung to return to a lifted position.[12]

Likewise, 19 inch high benches are accessible:

> **903.5 Height.** The top of the bench seat shall be 17 inches (430 mm) minimum and **19 inches** (485 mm) maximum above the floor, measured to the top of the seat.[13]

[and] to a position low enough [19 inches maximum] to allow for the comfort of providers who choose to work in a seated position, to enable patients to keep their feet on the floor while seated, and to accommodate patients who need to transfer laterally between the platform and a chair or wheelchair alongside."

[10] See Analysis of Seat Heights for Wheeled Mobility Devices at: http://udeworld.com/analysis-of-seat-height-for-wheeled-mobility-devices. The seat heights ranged from 16.3 inches to 23.9 inches for manual wheelchair users; 16.2 inches to 28.9 inches for power wheelchair users; and 18.8 inches to 25.3 inches for scooter users. Seat heights for males were typically higher than for females. Thirty (30) percent of female manual wheelchair users and 6 percent of female power wheelchair users had seat heights equal to or less than 19 inches. All the male manual wheelchair users and 92 percent of the male power wheelchair users had seat heights equal to or less than 25 inches. Thus, transfer surfaces that are adjustable from 17 inches minimum to 25 inches maximum during patient transfer accommodate significantly more patients who use mobility devices.

[11] Although the current accessibility standards and regulations described here reference a fixed height, the MDE advisory committee has recommended adding adjustable height to further enhance accessibility for users whose WMD's are higher than 19 inches. This includes most power wheelchair and scooter users, as described in the AWM Project. Note that the accessibility standard for pool lifts, 1009.2.4, also specifies adjustability, but with a very different range of motion due to its intended use of lowering a person down into a body of water.

[12] See Accessible and Usable Buildings and Facilities, ICC/ANSI A117.1-2009. Emphasis of upper dimension of range added.

[13] Ibid.

Nineteen-inch high bathtub seats are accessible:

> **610.2 Bathtub Seats.** The height of bathtub seats shall be 17 inches (430 mm) minimum and **19 inches** (485 mm) maximum above the bathroom floor, measured to the top of the seat. Removable in-tub seats shall be 15 inches (380 mm) minimum and 16 inches (405 mm) maximum in depth. Removable in-tub seats shall be capable of secure placement. Permanent seats shall be 15 inches (380 mm) minimum in depth and shall extend from the back wall to or beyond the outer edge of the bathtub. Permanent seats shall be positioned at the head end of the bathtub.[14]

Nineteen-inch high shower compartment seats are accessible:

> **610.3 Shower Compartment Seats.** The height of shower compartment seats shall be 17 inches (430 mm) minimum and **19 inches** (485 mm) maximum above the bathroom floor, measured to the top of the seat. In transfer-type and alternate roll-in-type showers, the seat shall extend along the seat wall to a point within 3 inches (75 mm) of the compartment entry. In standard roll-in-type showers, the seat shall extend from the control wall to a point within 3 inches (75 mm) of the compartment entry. Seats shall comply with Section 610.3.1 or 610.3.2.[15]

Nineteen-inch high amusement park rides are accessible:

> **1102.5.2 Transfer Height.** The height of amusement ride seats designed for transfer shall be 14 inches (355 mm) minimum and **24 inches** (610 mm) maximum measured from the surface of the load and unload area.[16]

As mentioned above, a minimum standard of 19 inches at the highest point of a table or chair is not the same as the transfer surface height experienced by patients because the front edge of currently available tables is lower than the highest measured point. However, the fact that a 19 inch height is so widely accepted by existing accessibility standards for various types of benches and chairs strongly commends maintaining the standard for medical diagnostic equipment as the minimum standard for accessible examination tables and chairs. This is particularly the case because of the manner in which medical diagnostic equipment is used. Toilets, bench seats, and bathtub seats remain at a fixed height for both transfer and normal use; in fact, usability of these devices may require constant contact of one's feet with the floor for stability or require free use of one's hands. Medical examination tables and chairs, on the other hand, are lowered to a low height to facilitate transfer, and then are raised to a considerable height to facilitate medical examinations by the medical clinician.[17]

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[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Because medical table and chair are typically raised in height for a clinical examination, the transfer supports described in the proposed standards may provide the added benefit of patient security and stabilization.

Finally, it is important to note the requirements for tolerancing under current regulations:

> **104.1.1 Construction and Manufacturing Tolerances.** All dimensions are subject to conventional industry tolerances except where the requirement is stated as a range with specific minimum and maximum end points.[18]

In practical terms, because the low adjustable height is intended to be specified as a maximum dimension, manufacturers of accessible MDE will design their equipment not to exceed this maximum. Thus equipment designed to this standard will be, on average, less than the maximum allowed low adjustable height (e.g. 19 inches) by a height of conventional industry tolerances. These tolerances can be 1/4" or more, depending on the type of equipment.

AN INCREASING NUMBER OF HEALTH CARE PROVIDERS ARE TRANSITIONING TO ADJUSTABLE HEIGHT TABLES

In 2012, approximately 25 percent of examination tables sold in the U.S. are at about a 19-inch low height.[19] This is a significant increase over the 17 percent of adjustable height tables sold in 2005. While manufacturers of tables and chairs understand that lower heights may be desirable, there currently are no commercially available examination tables or chairs that can reach a height lower than 19 inches uncompressed at its highest point on seating surface. It is unclear when such a table or chair could be available.

If adopted by the Access Board, a recommendation of 19-inch maximum height will build on the growing percentage of providers voluntarily purchasing accessible, adjustable height tables, at 25 percent today.[20] Conversely, if a new standard lower than 19 inches is established, thereby deeming all current adjustable tables inaccessible, the entire U.S. health system will be forced to begin at 0 percent accessible.

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[18] See Accessible and Usable Buildings and Facilities, ICC/ANSI A117.1-2009.

[19] Medical table install base derived from U.S. medical distribution sales data, as provided by Global Healthcare Exchange (GHX).

[20] Some tables may require installation of a modified top to meet the 19” standard but would not require changing out the installed base.

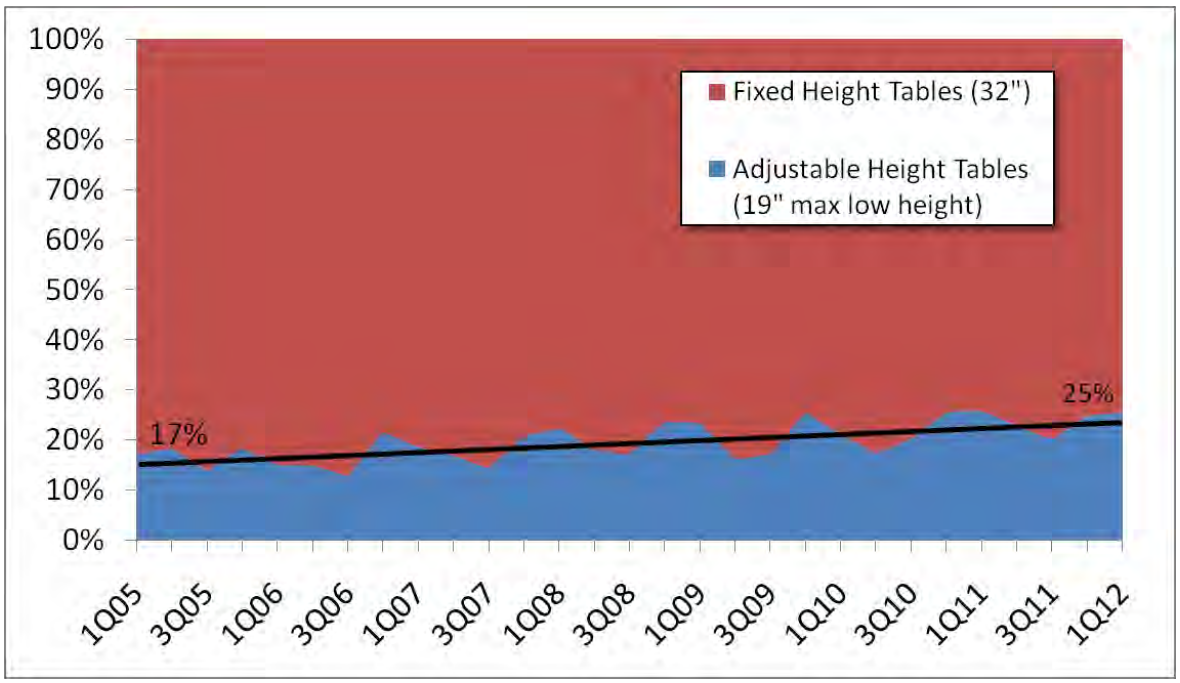

Figure 4: Sales percentages of fixed height versus adjustable height medical tables (respesenting sales volume of new medical tables)

AVAILABLE DATA DO NOT SUPPORT DEPARTING FROM THE CURRENTLY ACCEPTED STANDARD OF 19-INCH TRANSFER SURFACE HEIGHT

The Medical Diagnostic Equipment Technical Advisory Committee appropriately tried to determine what the optimal accessible transfer surface height is based on available data. In particular, the Advisory Committee spent a great deal of time discussing the Anthropometry of Wheeled Mobility (AWM) Project.[21] In that study, which the U.S. Access Board commissioned, Dr. Steinfeld served as the lead investigator. This study measured the **physical characteristics of people who use wheeled mobility devices** and some of the characteristics of those devices. The resting position of a person before attempting an independent transfer is important, and the Committee members valued the study's useful information in evaluating potential recommendations. However, because the Wheeled Mobility Anthropometry project only studied static positioning of users in their devices, it did not identify optimal transfer surface

[21] See Analysis of Seat Heights for Wheeled Mobility Devices at: http://udeworld.com/analysis-of-seat-height-for-wheeled-mobility-devices. The seat heights ranged from 16.3 inches to 23.9 inches for manual wheelchair users; 16.2 inches to 28.9 inches for power wheelchair users; and 18.8 inches to 25.3 inches for scooter users. Seat heights for males were typically higher than for females. Thirty (30) percent of male manual wheelchair users and 6 percent of male power wheelchair users had seat heights equal to or less than 19 inches. All the male manual wheelchair users and 92 percent of the male power wheelchair users had seat heights equal to or less than 25 inches. Thus, transfer surfaces that are adjustable from 17 inches minimum to 25 inches maximum during patient transfer accommodate significantly more patients who use mobility devices.

heights, and did not assess the ability of wheeled mobility device users to transfer independently from their mobility device onto an examination table or chair.

In evaluating data about seat height, the Committee took into account the relevant transfer height from the wheelchair. The AWM Project measured the **rear compressed seat height of the wheeled mobility device with the user seated in it**. For transfer purposes, however, the most relevant height is the wheelchair front edge. The height of the front edge of the seat or cushion is important because the user will shift to the front of the seat (to avoid having to lift over the side wheel) before moving to the side to complete the transfer. Unfortunately, the AWM Project did not measure the height of those same users' front wheelchair edges.

There is a recognized international standard defining various measurements of wheelchairs: ISO 7176-7:1998 Wheelchairs — Part 7: Measurement of seating and wheel dimensions. Figures 6 and 7 below are selected screenshots from this international standard. These illustrations identify several key measurements. The most important illustrations for present purposes are "seat plane angle," "effective seat depth," and "seat surface height at the front edge." The standard focuses on measurement procedure so it does not prove any actual measurements. However, as the images below make clear, the seat reference plane and effective seat depth will dictate the difference between the seat surface height at the front edge and the height of the seat at the rear of the wheelchair. Note further that wheelchair height measurements generally do not take into account the height of the cushion, which the consumer will need to clear at the front edge to enable a successful transfer.

In addition, section 4 of the Paralyzed Veterans of America's "Guide to Wheelchair Selection"[22] also illustrates the distinction between the following heights:

> *…the seat surface height at the front edge (which excludes the effect of a seat cushion, typically measuring 2-4" in depth), the seat height at the rear of the seated surface, and the relevant transfer surface height for clearing the seat cushion.*[23]

Furthermore, the PVA's "Clinical Application Guide to Standardized Wheelchair Seating Measures of The Body And Seating Support Surfaces"[24] defines the seat surface height as "the distance from the floor to the top of the seat at front edge, in area intended for thigh loading." It goes on to state that:

> *This measure is clinically relevant because it impacts the user's overall sitting height, clearance under tables, clearance of foot supports above casters or ground, and functional activities such as transfers.*[25]

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[22] Available at http://www.wheelchairnet.org/WCN_ProdServ/Docs/PDF/AXbook_Sec4a.pdf.
[23] Ibid.
[24] Available at http://www.ucdenver.edu/academics/colleges/medicalschool/programs/atp/Resources/WheelchairSeating/Pages/WheelchairSeating.aspx
[25] Ibid.

Therefore, it cannot be inferred that the seat surface height at the front edge is the same as the seat height measured in the AWM Project. Similarly, these illustrations used in measuring individuals for manual wheelchairs indicate that the AWM Project's data cannot be used to make a direct assessment of the table height needed to accommodate wheelchair users effectively. Based on figures 5-7 below, a 17-inch rear compressed height measured in the AWM Project could easily correspond with a 20- or 21-inch uncompressed seat surface height at the front edge. This could in turn mean that individual users participating in the AWM Project measured below 19 inches would be able to transfer comfortably to a table surface for which the highest uncompressed surface is 19 inches.

Note further in figure 5 that the rear seat height is considerably lower than the height of the wheelchair wheels, which typically measure 22-26 inches. Any transfer from the rear of the chair would require the user to transfer up and over the wheelchair wheel, again, well above a minimum low-range height of 19 inches. Based on this difficulty of transferring over the wheelchair wheel, Committee members noted transferring over the wheelchair wheel is an extremely unlikely scenario. This emphasizes the fact that the front edge of the seat is the most relevant for transfer.

In addition, a second study commissioned by the U.S. Access Board and evaluated by the Advisory Committee (the Pittsburgh study[26]) determined that manual wheelchair-users, who are generally the users most likely to have the lowest seated heights, are generally able to accommodate a 2-inch difference in height between one's wheelchair and a transfer surface. Consequently, even if one posited that the AWM Project finding of 17 inches at the rear of the seat compressed corresponded to an uncompressed height of 17 inches at the front edge of the wheelchair, the maximum height of 19 inches at the highest point of a table or chair transfer surface would still fall within the 2-inch differential identified by the Pittsburgh study as accessible to most manual wheelchair users. Of note, Committee members pointed out that the Pittsburgh study utilized a sample of younger and more active subjects than the AWM Project. As such, broad conclusions for a broader population of persons with disabilities, and direct correlations with the AWM Project, should be avoided.

[26] Human Engineering Research Laboratories, University of Pittsburgh, *The Impact of Transfer Set-Up on the Performance of Independent Transfers: Final Report*. Available at: http://herl.pitt.edu/ab/transfer_assessment_report.pdf (visited May 22, 2013).

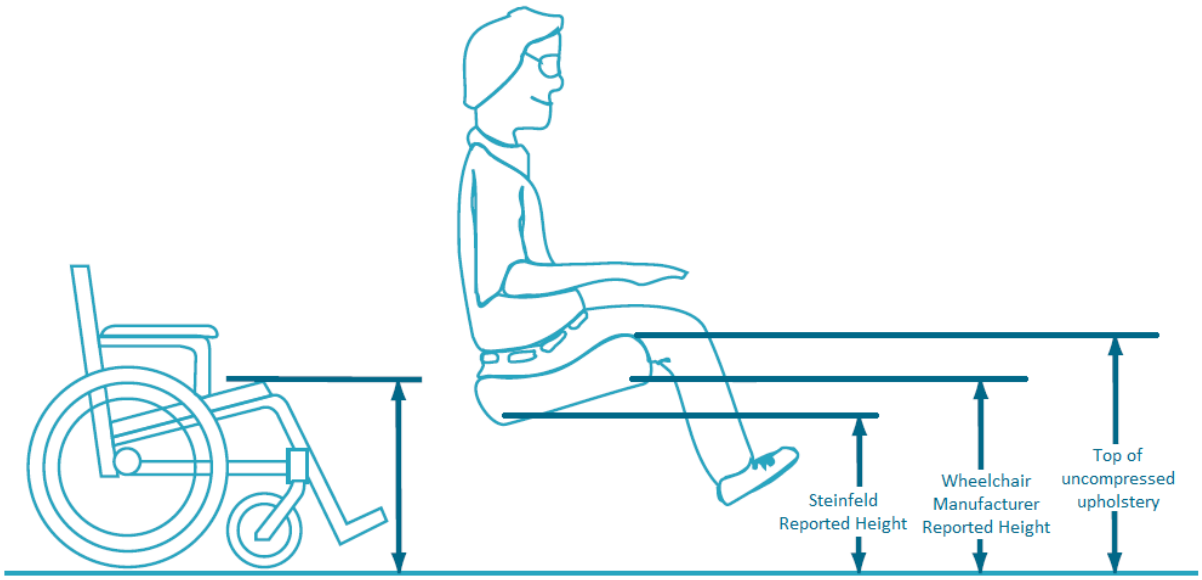


Figure 5: Adapted diagram from the "Paralyzed Veterans of America's Guide to Wheelchair Selection" showing difference in measured height between the AWM Project, wheelchair manufacturer's height per ISO 7176-7, and the uncompressed upholstery measurement height.

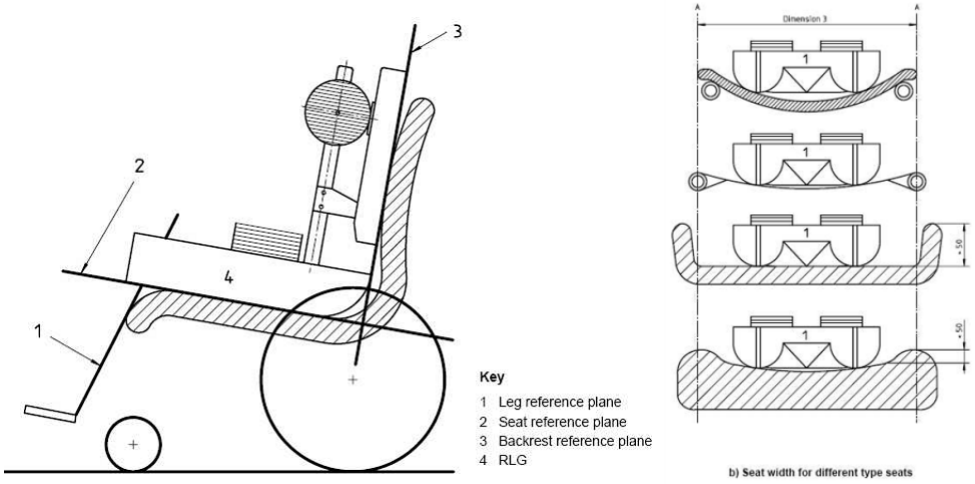
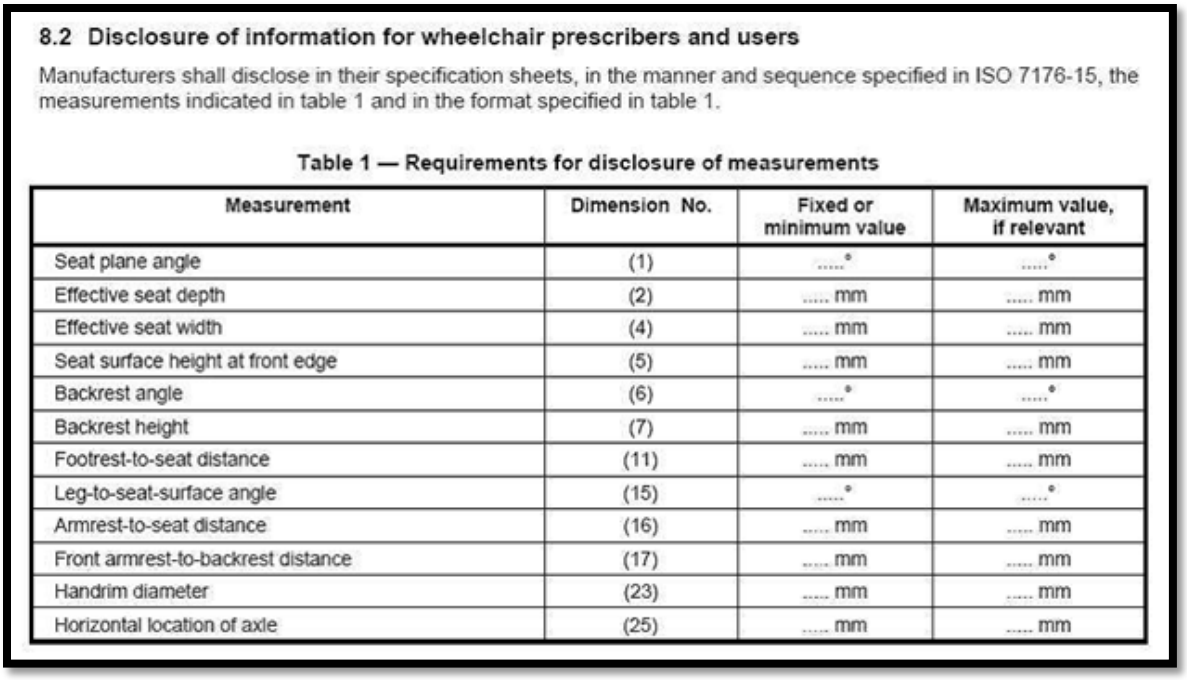


Figure 6: Wheelchair manufacturer's height and seat construction types (showing variation in compression when person's weight is applied) per ISO 7176-7



8.2 Disclosure of information for wheelchair prescribers and users

Manufacturers shall disclose in their specification sheets, in the manner and sequence specified in ISO 7176-15, the measurements indicated in table 1 and in the format specified in table 1.

Table 1 — Requirements for disclosure of measurements

Measurement	Dimension No.	Fixed or minimum value	Maximum value, if relevant
Seat plane angle	(1)	.....°	.....°
Effective seat depth	(2)	..... mm	..... mm
Effective seat width	(4)	..... mm	..... mm
Seat surface height at front edge	(5)	..... mm	..... mm
Backrest angle	(6)	.....°	.....°
Backrest height	(7)	..... mm	..... mm
Footrest-to-seat distance	(11)	..... mm	..... mm
Leg-to-seat-surface angle	(15)	.....°	.....°
Armrest-to-seat distance	(16)	..... mm	..... mm
Front armrest-to-backrest distance	(17)	..... mm	..... mm
Handrim diameter	(23)	..... mm	..... mm
Horizontal location of axle	(25)	..... mm	..... mm

Figure 7: Wheelchair manufacture standardized measurements per ISO 7176-7

ADOPTION OF A 19-INCH HEIGHT MINIMIZES COSTS TO HEALTH CARE PROVIDERS

In the absence of Committee consensus commending a departure from the existing broadly accepted transfer surface height maximum of 19 inches, information related to costs is especially critical to take into account in determining the minimum standard height for medical examination tables and chairs. We (representing medical table and chair manufacturers) estimated the costs of various examination table heights under consideration by the Medical Diagnostic Equipment Technical Advisory Committee using third-party data that represents approximately 80 percent of all distributed examination tables sold in the United States.[27] This data was presented to the MDE Advisory Committee Meeting held on February 26 and 27, 2013.[28]

To determine the total number of examination rooms in the United States, we reviewed the CDC National Ambulatory Care Survey, and found that there are approximately 639,000 exam rooms in the United States today.

From this total number, and based on historic trends, we estimated that physicians will build new, or remodel existing, exam rooms at a rate of 4 percent each year, but the total number of examination rooms will remain unchanged from year to year.

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[27] Medical table install base derived from U.S. medical distribution sales data, as provided by Global Healthcare Exchange (GHX), found at http://www.ghx.com/product-pages/solutions/supplier-solutions/sales-data-analytics.aspx

[28] The full meeting minutes, as well as a copy of the presentation delivered, can be found in Appendix A to this report.

Also based on historic trends, we estimated that physicians will replace equipment in 7 percent of their examination rooms each year, including new and replacement medical tables.

We also estimated that the average annual inflation rate will be 3% over the next ten years.

BENEFITS AND COSTS: OVERVIEW

Based on our analysis, we determined that transfer surface height requirements lower than 19 inches would increase the cost of designing and manufacturing examination tables, reduce the rate of adoption of accessible equipment, and increase the health provider's cost of purchasing accessible equipment.

While we estimate that adopting a lower-range requirement of 19 inches, health care providers will experience a 24 percent price increase. This means that a $5,000 adjustable-height examination table purchased today would cost approximately $6,200 after the Access Board adopts the requirements for knee-crutches and transfer supports because health care providers will need to retrofit existing tables and chairs with the required equipment. The price of that same table would be 39 percent higher than the cost of today's examination tables if the height standard were lower than 19 inches.

COST OF EQUIPMENT

Table 1: Cost of Equipment

Configurations	Dimensions	Price Range	Average Price	Price Increase
Configuration #1: Accessible equipment as currently available on the market, standard chair arms and stirrups	19 inch max. height 28 inch width 17 inch depth	$5,000 - $9,000	$7,000	0% (baseline)
Configuration #2: Accessible equipment as currently available on the market, with the addition of transfer supports and leg supports	19 inch max. height 28 inch width 17 inch depth	$6,200 - $11,100	$8,650	24%
Configuration #3: New equipment design with reduced height of 17"	17 inch max. height 28 inch width 17 inch depth	$6,700 - $12,900	$9,800	39%

COSTS TO LOWER MINIMUM TABLE HEIGHT

To be useful for its intended purpose, examination tables and chairs must maintain a high height of at least 32 inches, so that the health care provider has clinical access to the patient. In fact, 37 inches is the standard high height today for OB/GYN examinations. The need to reach heights above 32 inches interferes with efforts to lower the transfer surface height. The mechanical system necessary to raise the table are located in the base of the table, beneath the seating surface. As the difference between the required low-height and the necessary high-height for health care providers increases, the mechanics necessary to achieve that adjustable range become more complex and expensive.[29]

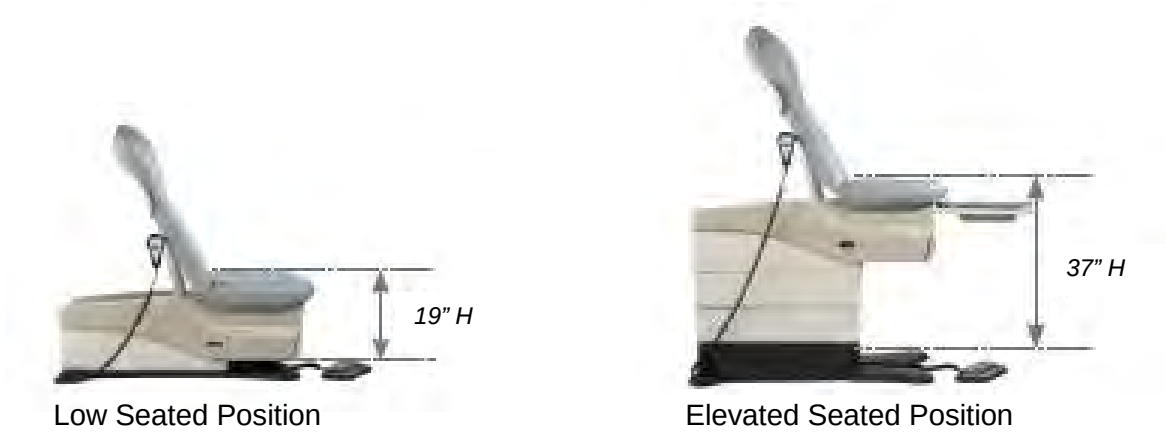


Figure 8: Range of medical table heights

In addition, we took the costs of other requirements that the Access Board is likely to adopt into account. Based on currently marketed products, we estimate the following costs:

- Transfer Supports (TS): $500 - $1,000 (M301.3.1)
- Leg Supports (LS): $700 - $1,100 (M301.3.2)

Therefore, the average "upgrade" cost to add transfer and leg supports would be approximately $1,650.

SCOPING SCENARIOS: RANGE OF POSSIBILITIES

We do not know what mandates may be put in place in the future to require Access Board standards. However, the U.S. Access Board's decisions regarding technical requirements for equipment will significantly affect the costs on health care providers and examination table and chair manufacturers.

[29] The example given here describes an examination table, but the complexity and cost would similarly increase for examination chairs, especially those equipped with footplates. See section 4.1.3 of the full committee report for further details.

To illustrate this effect, we considered a broad range of scenarios. For example, if a national mandate were to require one accessible table per physician work area of five exam rooms (a typical physician practice set-up today), that would require a 20 percent adoption rate. We also considered a 100 percent adoption rate to show the full range of potential costs.

If the market adoption rate of adjustable tables were to match a requirement that one table of every five tables meet a 19 inch lower adjustable range when facility construction occurs, there would be a drop in patient access to compliant examination tables of 17% and a savings of $420 million over ten years. However, if the market adoption rate were to match a requirement that ALL new tables meet a 19-inch lower adjustable range when new construction or remodeling occurs, then accessibility would increase by 17% at a cost to health care providers of $1.38 billion over a ten-year period.

By contrast, if the market adoption rate matched a requirement to make one table of every five tables meet an adjustable range lower than 19 inches, there would be a reduction in availability of accessible tables by 35% for a savings of $530 million over ten years. However, if the requirement were to make ALL new tables meet an adjustable range lower than 19 inches when new construction or remodeling occurs, then accessibility would decrease by 1% at a cost to health care providers of $1.52 billion over a ten-year period.

The table and chart below illustrate these examples.

Table 2: Costs of Scoping Scenarios

Scenarios (10 year totals)	Adoption Rate	Penetration vs. Baseline	Cost vs. Baseline
Baseline: * Existing historic buying patterns continue * Config #1 (19”H max., 28”W, 17”D) * Transfer supports and leg supports are not included	Baseline: 30%	Baseline: 43%	Baseline: $1.91B
Scenario A: * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #2 (19”H max., 28”W, 17”D) * Existing tables upgraded to accessible (config #2)	20%	-17%	-$0.41B
	100%	17%	$1.36B
Scenario B: * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #3 (17”H max., 28”W, 17”D) * Existing tables not able to be upgraded to be accessible	20%	-35%	-$0.53B
	100%	-1%	$1.53B

BENEFITS AND COSTS: SUMMARY

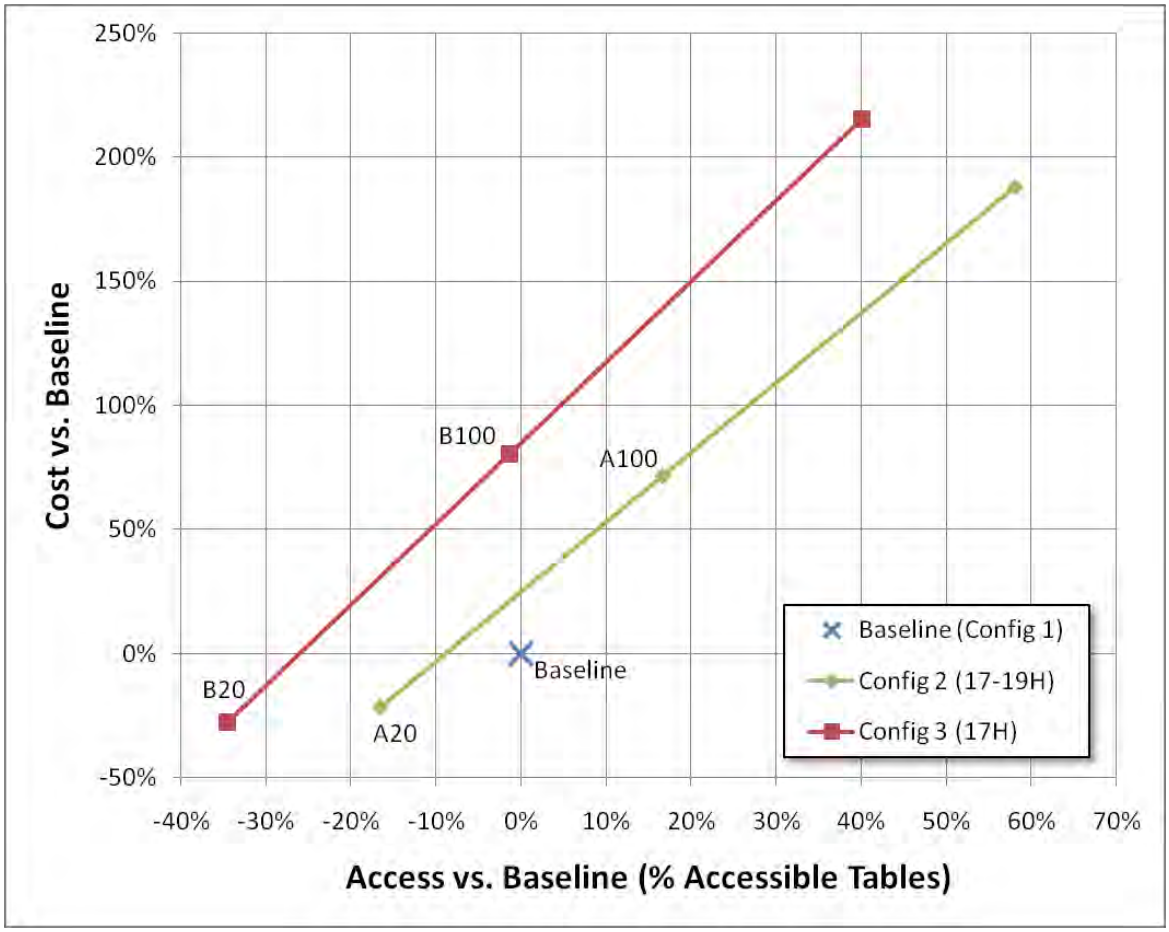


Figure 9: Summary of cost and implementation scenarios of Table 2

Therefore, while establishing these requirements will result in significant costs to health care providers, establishing a lower adjustable height requirement of 19 inches will maximize the percentage of accessible tables and will cost less than requiring an adjustable height lower than 19 inches.

HOW TO MEASURE TRANSFER HEIGHTS IS IMPORTANT

Many medical examination rooms are equipped with fixed height examination tables, with a typical 32-inch seat height. However, these fixed heights tables do not allow for independent transfer of patients who use wheeled mobility devices (WMD). To solve this problem, manufacturers have designed adjustable height examination tables to work with a variety of WMD's. Manufacturers designed the shape of the seat for these tables to meet both patient accessibility and clinical needs, resulting in a complex, contoured shape.

Because of these complex shapes, it is necessary to create a standard method by which to measure table seat dimensions. These proposed measurement techniques would apply equally to tables (M301) and chairs (M302).

FEATURES

Several necessary features determine the shape of an examination table seat:

The perineal cut-out provides access to the perineum for gynecological and urological examinations.

The corner radii allow for closer wheelchair positioning to facilitate independent transfer by minimizing gaps. The corner radii also eliminate seams in the upholstery, which improves longevity, but more importantly also improves asepsis and infection control.

Bolsters improve patient comfort and stability when seated on table. Note that the design minimizes the bolsters at the front half of the seat in order to promote ease of transfer.

Note that these features are widely used in both tables and chairs. Beds, stretchers, and other types of equipment will have unique features that determine the shapes of their patient support surfaces.

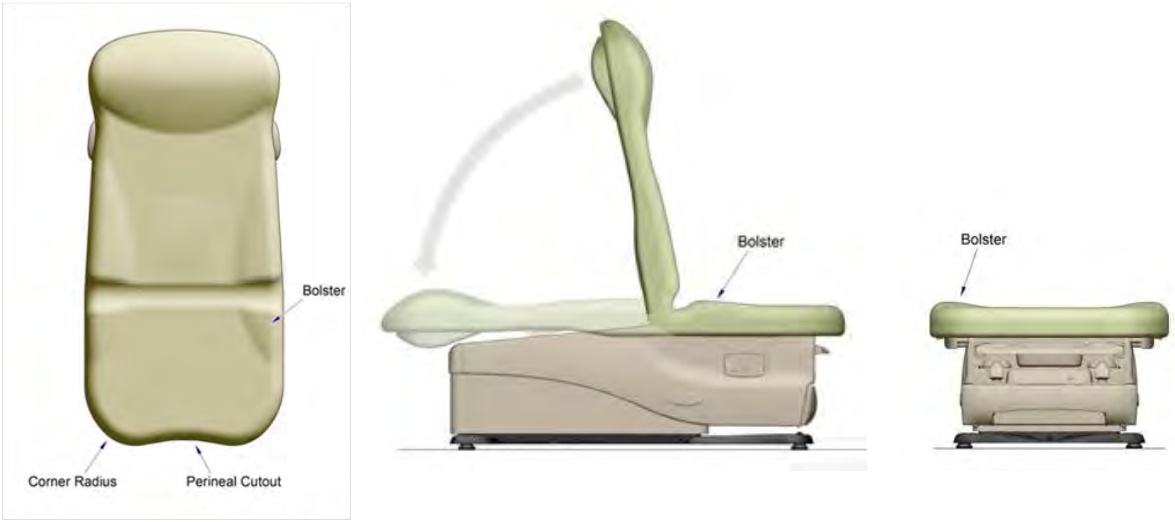


Figure 10: Features of the countered shape of a medical examination table

WMD POSITIONS FOR TRANSFER

The design of the corner radii allows closest possible position for wheelchair transfers, minimizing potential gaps and improving the patient's ability to transfer independently.

In the diagram below, the upper wheelchair illustrates a typical side transfer, which may optionally utilize a transfer board. The lower wheelchair illustrates a typical diagonal transfer.[30]

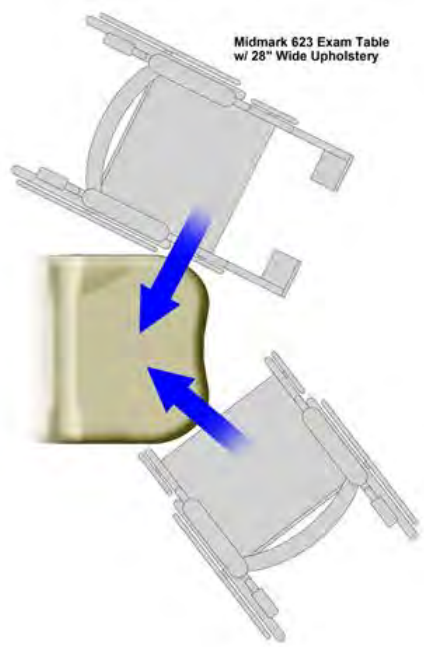


Figure 11: Corner radii of a medical examination table

MEASUREMENT TECHNIQUE

The depth and width are measured along the centerlines of the seat, and the height from the floor to the highest point of the transfer surface:

- The depth is measured between the perineal cutout and the hinge point at the back of the seat.
- The width measured across the seat at the midpoint between the seat hinge and the front of the seat.

[30] Examples of such transfers can be viewed here: http://www.youtube.com/watch?v=qivOb_V6IgA

- The height is measured at the highest point of the seat, inclusive of bolsters, with the foam in an uncompressed state. Note that this measurement would be at the highest point on the seating surface, which may not necessarily be at the centerline of the seat.

SEAT HEIGHT MEASUREMENT DETAIL

Regardless of measurement technique used, the height is measured at the highest point of the seat, inclusive of bolsters, with the foam in an uncompressed state. Measuring to the top of the bolster would account for the maximum transfer height differential from a wheeled mobility device.

Note that examination tables and chairs only use bolsters on certain areas of the transfer surface. Lower parts of the transfer surface (such as the front edge) would have an even lower height. For reference, ¾ inches is a typical bolster height used on many examination tables. Due to their narrower seating surfaces and the increased need to support the patient securely, examination chairs often have deeper bolsters. Dental chairs, for example, have a typical 1 ¼-inch bolster height.

CONCLUSION

We recommend that the U.S. Access Board adopt the subcommittee's original recommendations to require an adjustable range of 19 to 25 inches for the transfer surface of examination tables and chairs during patient transfers. This standard will have the most benefits for consumers with the least costs for health care providers. In addition, it will build on the growing percentage of providers voluntarily purchasing accessible, adjustable height tables.

MDE Advisory Committee Meeting Minutes: February 26 and 27, 2013

February 26 and 27, 2013
Washington, DC

Members Present:

Lisa Iezzoni, Boston CIL (Chair)
Jeffery Baker, MTI
Jim Bostrom, DOJ (ex officio)
Don Brandon, ADA National Network
Carol J. Bradley, Sutter Health
Jack DeBraal, Brewer Company
Mark E. Derry, NCIL
Joseph Drago, Scale-Tronix, Inc.
Kaylan M. Dunlap, Evan Terry Associates
Molly Follette Story, FDA (ex officio)
Elisabeth George, Philips Healthcare
David Hausmann, Hausmann Industries, Inc.
John Jaeckle, GE Healthcare
Tamara James, Duke Univ. & Medical Ctr.
Zita Johnson-Betts, DOJ (ex officio)
Renee Kielich, Hill-Rom Company, Inc.
Kleo J. King, United Spinal Association
Rochelle J. Mendonca, Univ. Sciences Phila
Kevin Patmore, Stryker Medical
Maureen Simonson, PVA
Mary Ann Spohrer, CRCPD
Kat Taylor, Equal Rights Center
Jon Wells, Midmark Corporation

Alternates Present:

Bradley Baker, MTI
Janice Carroll, Sutter Health
Sarah DeCosse, DOJ (ex officio)
Richard M. Eaton, MITA
Bob Menke, Midmark Corporation
Zoltan Nagy, DVA (ex officio)
Glenn Nygard, Hologic, Inc.

Access Board Members and Staff Present:

Rex Pace (Committee DFO)
Rose Bunales
David Capozzi
Marsha Mazz
Matthew McCollough
James Raggio
Earlene Sesker

Others Present:

John Eyraud
Jim Scott, Applied Policy
Jonathan Young, Foxkiser
Dennis Monty, Beth Israel Deaconess Med. Ctr.
Michelle Lustrino, Hologic, Inc.
Darren Walters, MTI
Mark Tobolowisk, Foxkiser
Bill Hecker, Hecker Design, LLC
Paul Farber
Chava Kintisch
Heather Boyd, Applied Policy
Jesse Lin
Barbara Silken
Gloria Romanelli, Amer. Coll. Radiology
Janice Majewski, DOJ

Opening Remarks and Approval of Minutes

The Committee Chair, Lisa Iezzoni, opened the meeting. The committee approved the minutes from its December meeting and did a roll call.

The Committee Chair, Lisa Iezzoni, opened the meeting. After roll call the committee approved the minutes from its January 2013 meeting following several clarifications and agreement on one edit.

Subcommittee Reports

The chairpersons for the Stretchers, Imaging Equipment with Transfer Surfaces, and Mammography Equipment subcommittees gave status reports to the full committee. The chairpersons for the Exam Tables and Chairs and Weight Scale subcommittees also addressed the committee, but since these subcommittees

had not yet convened, their discussions only involved meeting dates

The Stretchers Subcommittee update included videos of transfers onto stretchers and the use of overhead lifts. Subcommittee chairperson, Renee Kielich, led the discussions. Because stretchers are usually accessed from the long side and not at the foot end, the group is looking at a recommendation to require unobstructed transfer to the side only. Much of the subcommittee's presentation and resulting committee discussion centered on the proposed Standards' provision for transfer surface height. Subcommittee members noted that the vertical stack configuration of stretcher equipment components aims to create compact and maneuverable patient transport devices but the necessary components presently produce surface heights well above those being considered. Another challenging consideration is cushion thickness, which typically ranges from 2 to 5 inches; furthermore, cushions are often purchased separately form the stretcher. The subcommittee will continue to deliberate these issues.

Next, John Jaeckle, subcommittee chairperson, led the discussion concerning Imaging Equipment with Transfers. Because of the broad scope of equipment covered, the subcommittee decided to discuss imaging technologies grouped into the following categories: (1) equipment with bores; (2) magnetic resonance (MR); (3) DEXA (bone density); (4) interventional; (5) conventional x-ray and fluoroscopic; and (6) prone breast biopsy table. Several important technology and design aspects of the equipment subgroups were addressed. The subcommittee has decided that the equipment under their purview should be accessed from the long side only and, like the Stretchers subcommittee, is considering only requiring access to the side and not at the foot end. Transfer supports are also being considered to offset the narrowness of imaging equipment scanning beds and tables. The difficulty of providing lift clearances in the bases of imaging equipment and the alternative of overhead lifts were also discussed. The subcommittee will continue to discuss details of these issues.

Carol Bradley, subcommittee chairperson, led discussions concerning the Mammography Equipment subcommittee. Diagrams of a typical mammography equipment profile highlighted the important considerations and clarified important terminology. As major issues, the subcommittee has identified knee and toe clearance size under the breast platform and the possibility that base supports for the equipment are likely to extend into this area. A recommendation to enlarge the depth of the knee space beyond what was proposed in the Notice of Proposed Rulemaking (NPRM) is under consideration. The committee is also deliberating whether base supports at the floor level of the knee and toe space interfere with the footrests of wheelchairs and whether they might be permitted to overhang such supports. In addition, the committee is considering proposed standing supports provisions and how such supports may be affected by height adjustability of the breast platform, including support size and distance from its front edge. The subcommittee will be moving forward on these issues.

Manufacturer Presentations

Several manufacturers presented information on technical and cost considerations for exam tables and chairs as requested at the preceding advisory committee meeting. Darren Walters, MTI and Bob Menke, Midmark Corporation led these presentations. The first presentation addressed a number of performance and efficacy considerations for examination chairs focusing on lifting mechanisms to adjust seat height, impact of height on the health care practitioner, and the relationship of exam chair footrests to seat height. The presentation revisited some of the recommendations made at the January meeting by the practitioners and clinicians about acceptable transfer surface heights. A key point was made that, while it may be technically possible for an exam chair to go even lower than what the committee is considering, there may be undesirable and unintended consequences. Benefits and limitations of the telescoping, scissor and cantilevered lift systems were reviewed. Concerns were voiced that lowering the equipment could affect the equipment effectiveness and positioning for proper exams. The committee discussed at length the different lifting systems used for adjustable height equipment and the viability of achieving the heights being considered. The presentation referred to relevant requirements for height in the ADA and ABA Accessibility Guidelines and guidance adopted by the US Department of Justice.

The afternoon presentation focused on the cost and benefit analysis based on the implementation of key provisions in the proposed Standard affecting exam tables. The presentation covered the present availability of accessible height adjustable exam tables and how this would change in the future with different scenarios based on the low heights being considered for the transfer surface. The presentation also emphasized that 18% of existing rooms in the United States are equipped with adjustqble height tables that can achieve a 19 inches low height providing a head start to maximize the availability of accessible rooms at a lower cost if the 19 inches is adopted as the standard. Committee discussions were interspersed between segments of the presentation with consideration given to research methodology, the baselines used, and health care practice issues affecting the selection and purchase of diagnostic equipment. A key issue addressed in the presentation is that no adjustable height exam tables are currently available that lower to 17 inches above the floor.

Discussions during and after the presentations did not produce consensus about the minimum transfer surface height. The committee decided to refer the issue to the Exam Tables and Chairs subcommittee for further review and discussion. The full committee will then consider the Subcommittee's recommendation.

Transfer Support Location and Configuration

Rex Pace clarified issues concerning transfer supports using the PowerPoint previously presented at the January 2013 committee meeting. The committee went through the issues listed on the decision status chart for transfer support location and configuration in an effort to achieve consensus on recommendations. The committee had extensive discussions on the placement, use (transfer, positioning, and safety) and length of transfer supports. Additionally, the committee discussed at length the proposed Standards allowance of non-circular transfer supports. Member polling indicated that there is consensus for the gripping surface cross section and clearances as proposed in the NPRM. However, two members expressed their position that only gripping surfaces with circular cross sections should be permitted. The committee agreed that the Exam Table and Chairs subcommittee will look in depth at transfer support issues and offer guidance on location, dimensions, and height.

Depth of Wheelchair Space

Rex Pace gave a PowerPoint presentation reviewing the proposed Standard's provisions for the depth of a wheelchair spaces. He also reviewed the NPRM's questions on increasing this depth for wheelchair spaces entered from the front or rear in light of recent research and possible exceptions for wheelchairs spaces located on raised platforms. The follow-up questions and discussions mostly focused on a wheelchair space necessary to accommodate larger power wheelchairs and scooters. Committee members expressed a range of views from support for an increase in depth to no opinion. No majority view emerged with a substantial number of members stating that they had no experience to evaluate the question or could not anticipate a situation where this increase would be meaningful. The committee has decided not to change the proposed wheelchair depth. The committee decided that efforts will focus on possible exceptions for wheelchairs spaces located on raised platforms. The committee concluded that the issue primarily pertains to weight scales; therefore, the recommendations of the Weight Scales Subcommittee will factor significantly in the committee's future discussions on the issue.

Final Report

Lisa Iezzoni led the discussion on the organization and timeline for completion of the committee's final report. The committee decided that the so-called "parking lot" issues added to the status decision chart be addressed in the final report. The parking lot issues identified so far are the nature of diagnostic equipment, obesity considerations, alternate means of access, recommended research, interventional procedures and situations where patients are sedated prior to transfer, and future Rulemaking topics including children standards. In addition to Dr. Iezzoni, two committee members and two alternates volunteered to be part of an editorial committee to produce the final report (Carol Bradley, Janice Carroll,

John Jaeckle, and Bob Menke).

Exhibits

The Hill-Rom Company and Stryker Medical exhibited stretchers in the meeting room. A mobile floor lift was also exhibited by Hill- Rom. Medical Technology Industries, Inc., exhibited several exam chairs. The equipment was referred to during committee discussions and members and the public examined the stretchers and exam chairs at their convenience.

Public Comment

A commenter expressed views on the proposed knee and toe clearances and shape and placement of non-circular grab bars (transfer supports).

Wrap Up and Adjournment

Dr. Iezzoni thanked everyone for their participation and the meeting was adjourned.

Examination Table Accessibility Standards

Medical Diagnostic Equipment Accessibility Standards Advisory Committee, February 26-27, 2013

Overview

Examination Table Environment in 2013

Cost and Benefit Analysis

- Implications of possible implementation scenarios

Summary and Recommendations

About the Presenter

Bob Menke
Engineering Manager
New Product Development
Midmark Corporation

- Leads design team for Midmark's medical examination products, including Barrier-Free® examination tables
- Most recently launched Midmark 625 with IQscale™, the industry's first examination table with an integrated weigh scale
- 13 years in new product development

Current Examination Table Environment

Methodology

Third-party data that represents approximately 80 percent of all distributed U.S. healthcare sales

CDC National Ambulatory Care Survey used to determine number of physicians and exam rooms

This data was analyzed to approximate population of equipment in the field as well as voluntary adoption trends

Height: Access Board Proposal

M301.2.1 Height. The height of the transfer surface during patient transfer shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum measured from the floor to the top of the transfer surface

Advisory M301.2.1 Height. The transfer surface is permitted to be positioned outside of the specified height range when not needed to facilitate transfer

Existing ADA-ABA Accessibility Guidelines Using 17 to 19 Inch Range

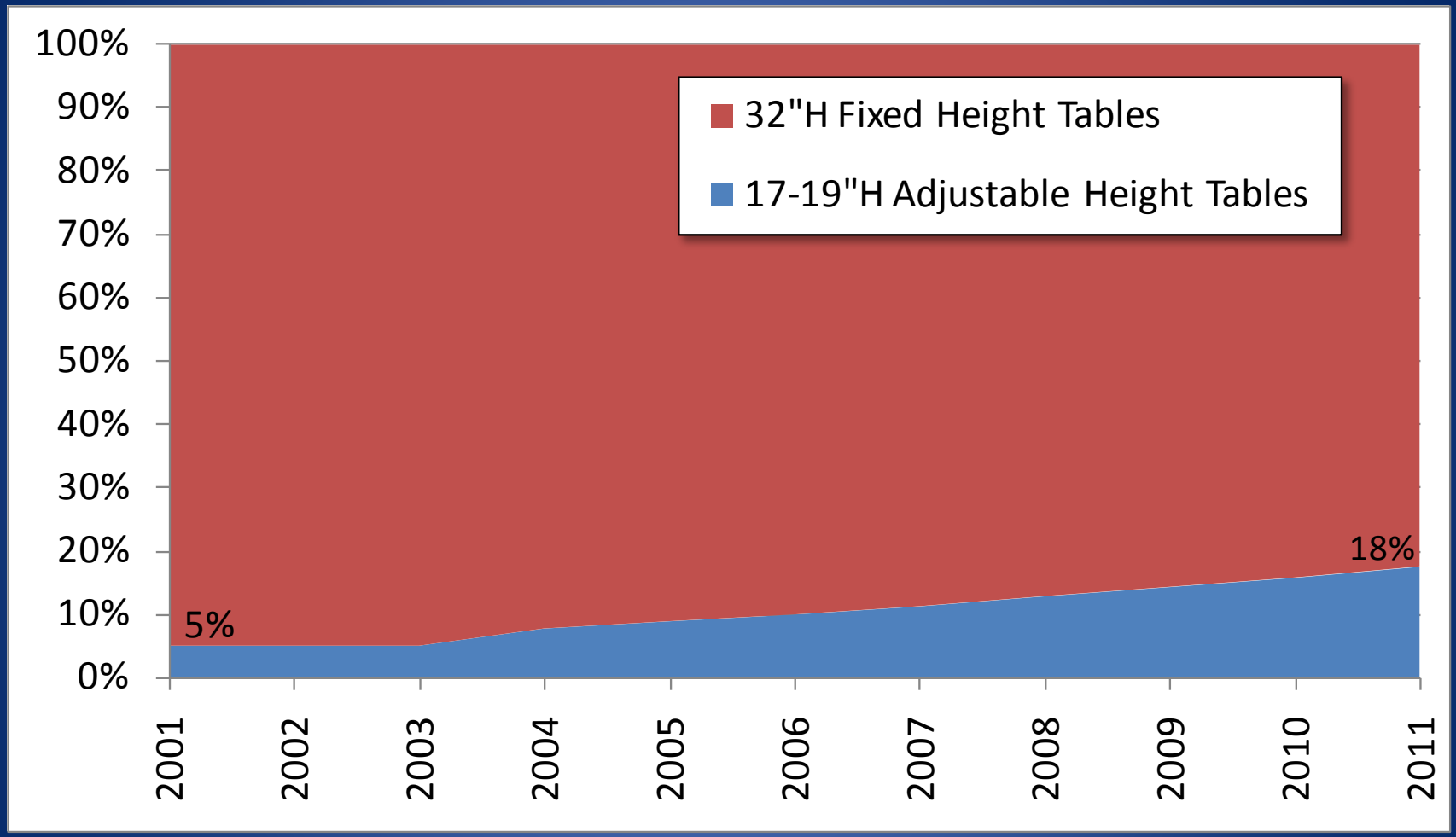
Water Closets and Toilet Compartments

- 604.4 Seats. The seat height of a water closet above the finish floor shall be **17 inches** (430 mm) minimum and **19 inches** (485 mm) maximum measured to the top of the seat

Benches

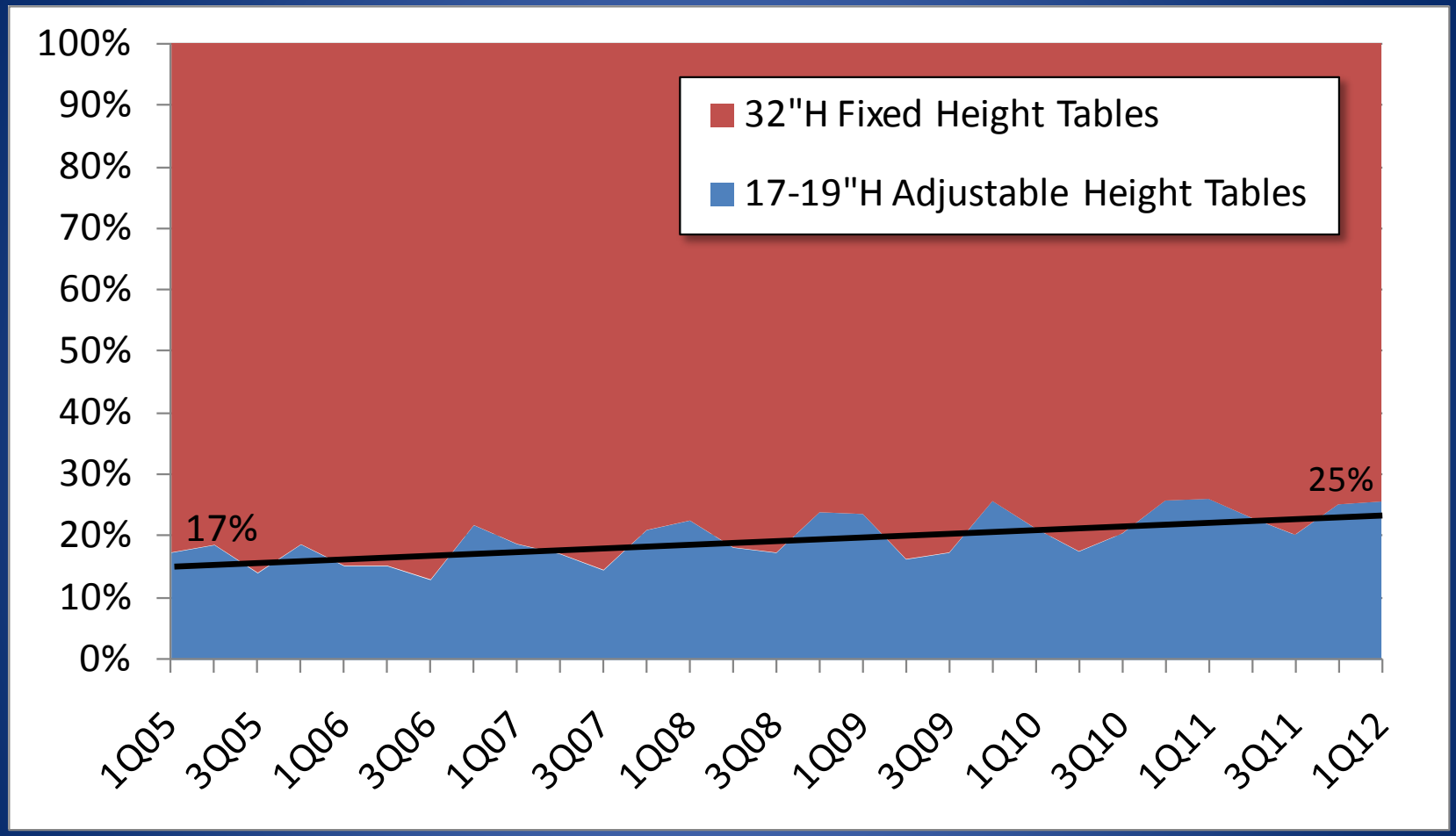
- 903.5 Height. The top of the bench seat surface shall be **17 inches** (430 mm) minimum and **19 inches** (485 mm) maximum above the finish floor or ground

Current Environment



Total population of adjustable height tables has been steadily increasing since over the last decade (18% by end of 2011)

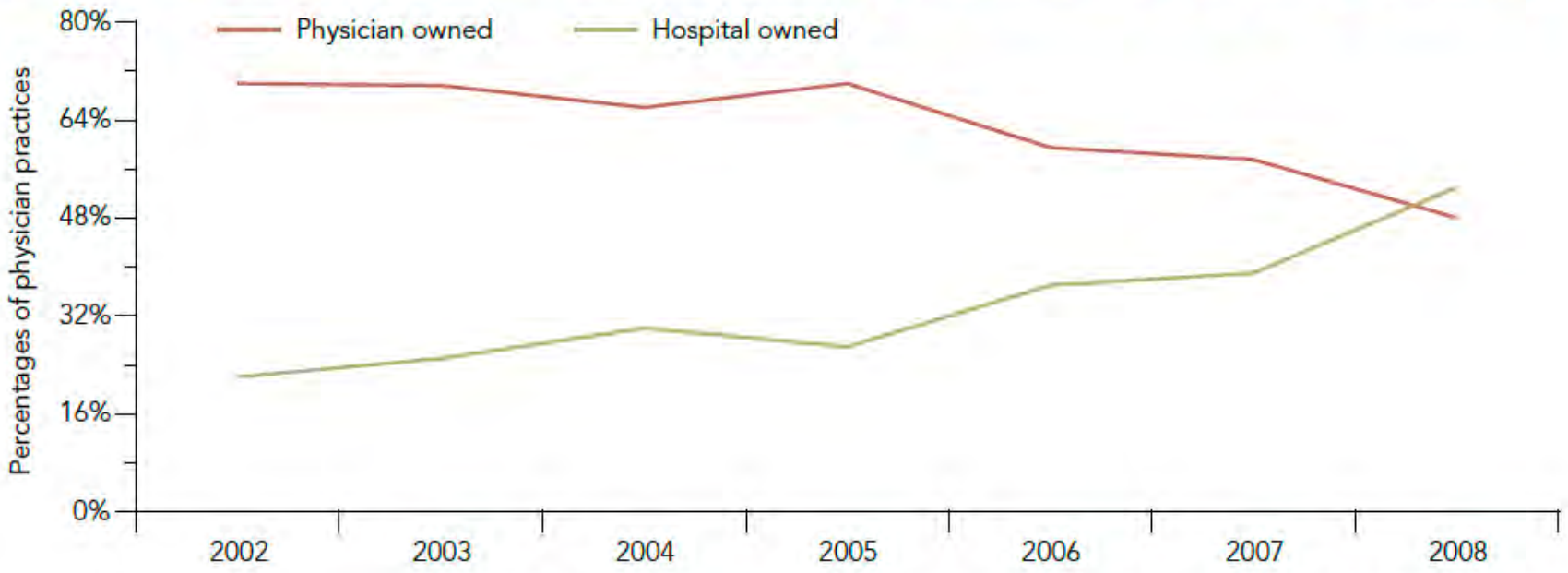
Adjustable Height Tables Increasing



1 in 4 tables sold in 2012 was an adjustable height table

Health Systems Driving Shift to Adjustable Tables

Percentages of U.S. physician practices owned by physicians and hospitals, 2002–2008



Source: Data from the Physician Compensation and Production Survey, Medical Group Management Association, 2003–2009, as reported by Kocher, R., and Sahni, N.R., The New England Journal of Medicine, "Hospitals' race to employ physicians—the logic behind a money-losing proposition," May 2011

MGMA Limitations of Data Statement: It is recommended to use caution in interpreting the data from this Medical Group Management Association (MGMA) report. The report is based on a voluntary response by primarily MGMA member practices, and data may not be representative of all providers in medical practices. Additionally, note that the respondent sample varies from year to year. Therefore, conclusions about longitudinal trends or year-to-year fluctuations in summary statistics may not be appropriate.

We expect the shift to adjustable height tables to accelerate as physicians join hospital groups

What does this population of tables represent?

82% fixed height tables

- 32” H, 28” W, 17” D

18% adjustable height tables

- 17-19” H, 28” W, 17” D

0% of tables meet a 17” requirement

Most not equipped with transfer supports or side rails

All equipped with standard stirrups

Width: Access Board Proposal

M301.2.2 Size. The transfer surface shall be 30 inches (760 mm) wide minimum

Advisory M301.2.2 Size. The size requirements in this section apply only to the portion of the diagnostic equipment used for transfer

Committee agreed to 28 inches width

Weight: Current Environment

Existing tables in the field hold at least 400 lbs

95% female: 250.9 lbs, 42.0 BMI

95% male: 273.6 lbs, 39.2 BMI

Depth: Access Board Proposal

M301.2.2 Size. . . .15 inches (381mm) deep minimum

Advisory M301.2.2 Size. The size requirements in this section apply only to the portion of the diagnostic equipment used for transfer

Committee agreed to increase to 17 inches deep

Transfer Supports and Armrests

M305.2.2 would require the transfer supports and their connections to be capable of resisting **vertical** and **horizontal** forces of **250 pounds** applied to all points of the transfer support.

ANSI/BIFMA X5.1-2011 specifies loading as percentage of patient weight: 50% vertical and 25% horizontal

Recommendation:

The Access Board should adopt the ANSI/BIFMA standard

Summary: Current Environment

18% of tables in use in the U.S. today are 17-19H, 28W, and 17D

18% of tables in US could meet Access Board standards if:

Height remains as proposed at 17-19 inches	Width changed as discussed to 28 inches	Transfer supports and leg supports added

0% of tables in the US have 17 inch height

Benefits and Costs

Benefits and Costs: Goals

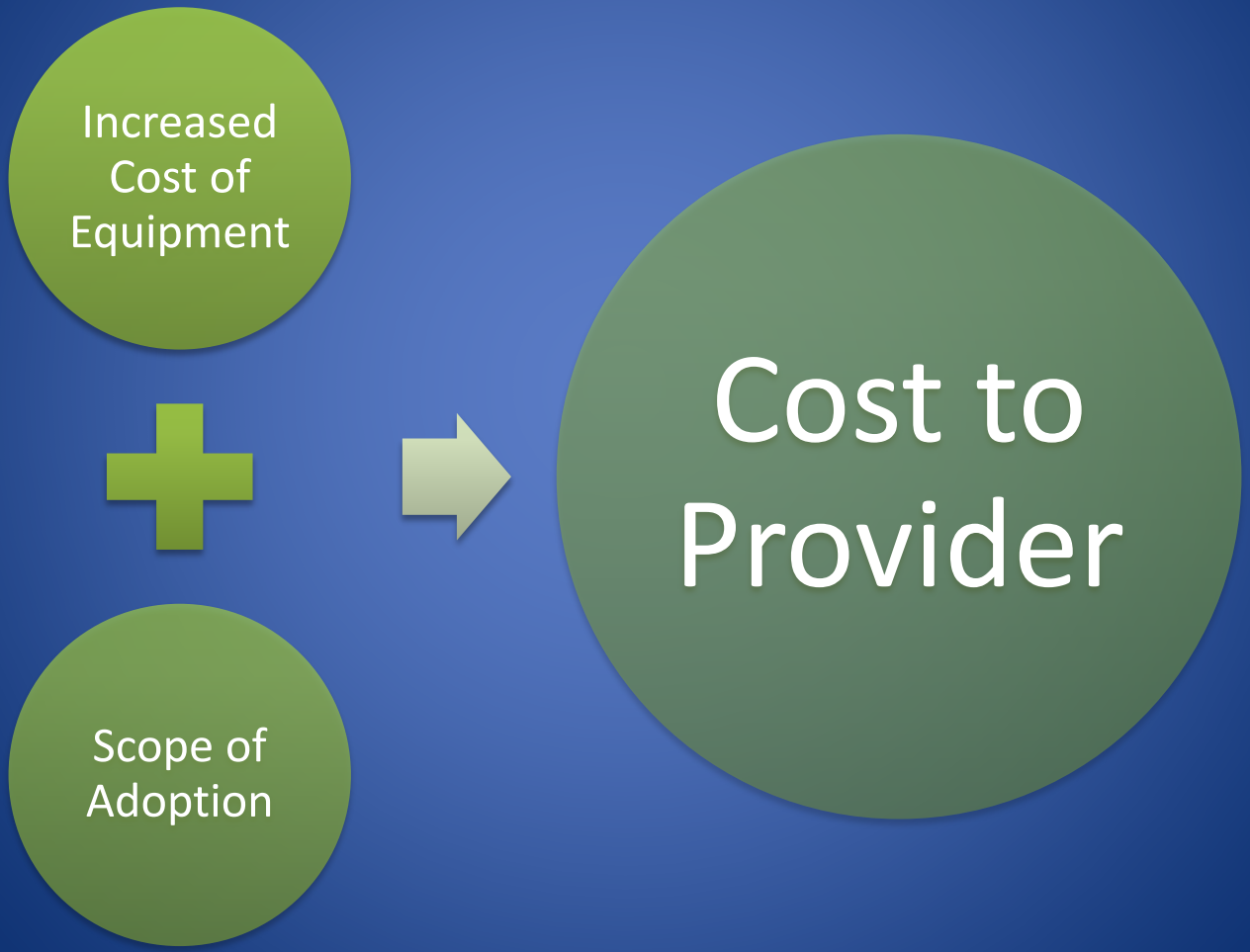
Maximize percentage of available accessible tables

Minimize cost to health care providers

Financial Assumptions

- Based on GHX data using 10 year historical norms
- 639,000 exam rooms today
- Construction rate of 4% replace/remodel annually
  (total number of exams rooms remains unchanged)
- Annual purchase rate of 7% of install base
  (includes new and replacement medical tables)
- 3% inflation

Benefits and Costs: Overview



Cost of Equipment

Configurations	Dims	Price Range	Average Price	Price Increase
Config #1: Accessible equipment as currently available on the market, standard arms and stirrups (Baseline)	17-19H 28W 17D	$5,000 - $9,000	$7,000	0% (baseline)
Config #2: Accessible equipment as currently available on the market, with the addition of transfer supports and leg supports	17-19H 28W 17D	$6,200 - $11,100	$8,650	24%
Config #3: New equipment design with reduced height of 17“, TS, LS	17H 28W 17D	$6,700 - $12,900	$9,800	39%

Costs to Lower Minimum Table Height

- Must maintain high height for provider
- Mechanical disadvantage at low heights

Elevated Seated Position

Low Seated Position

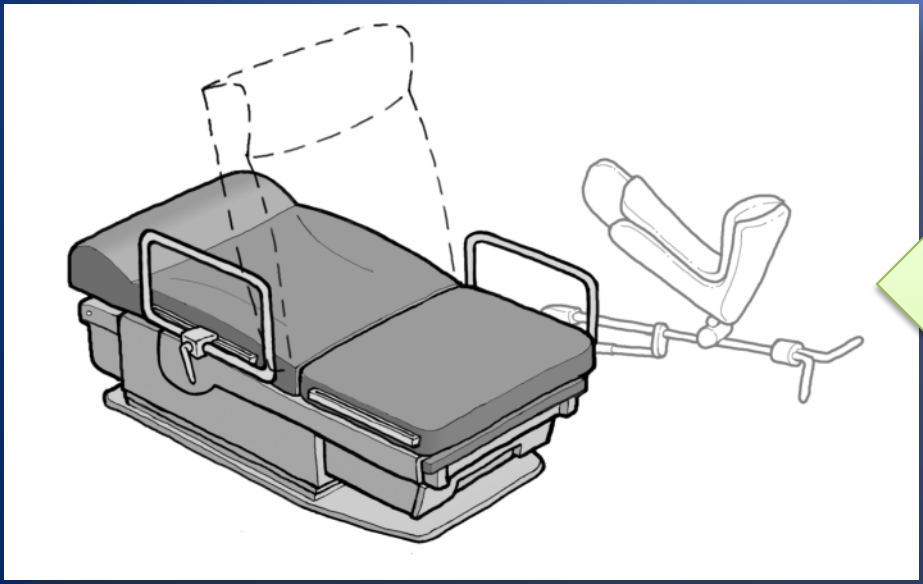
Scissor mechanism

Costs to Add Transfer and Leg Supports

Transfer Supports (TS): $500 - $1,000 (M301.3.1)

Leg Supports (LS): $700 - $1,100 (M301.3.2)

Average “upgrade” cost: $1,650



Note: Used accessible leg support instead of surgical boot ($4,000 - $6,000) in cost projections

Scoping Scenarios: Range of Possibilities

We don't know how the DOJ will implement Access Board standards

- However, Access Board decisions regarding technical requirements for equipment will affect the cost of implementing future rules

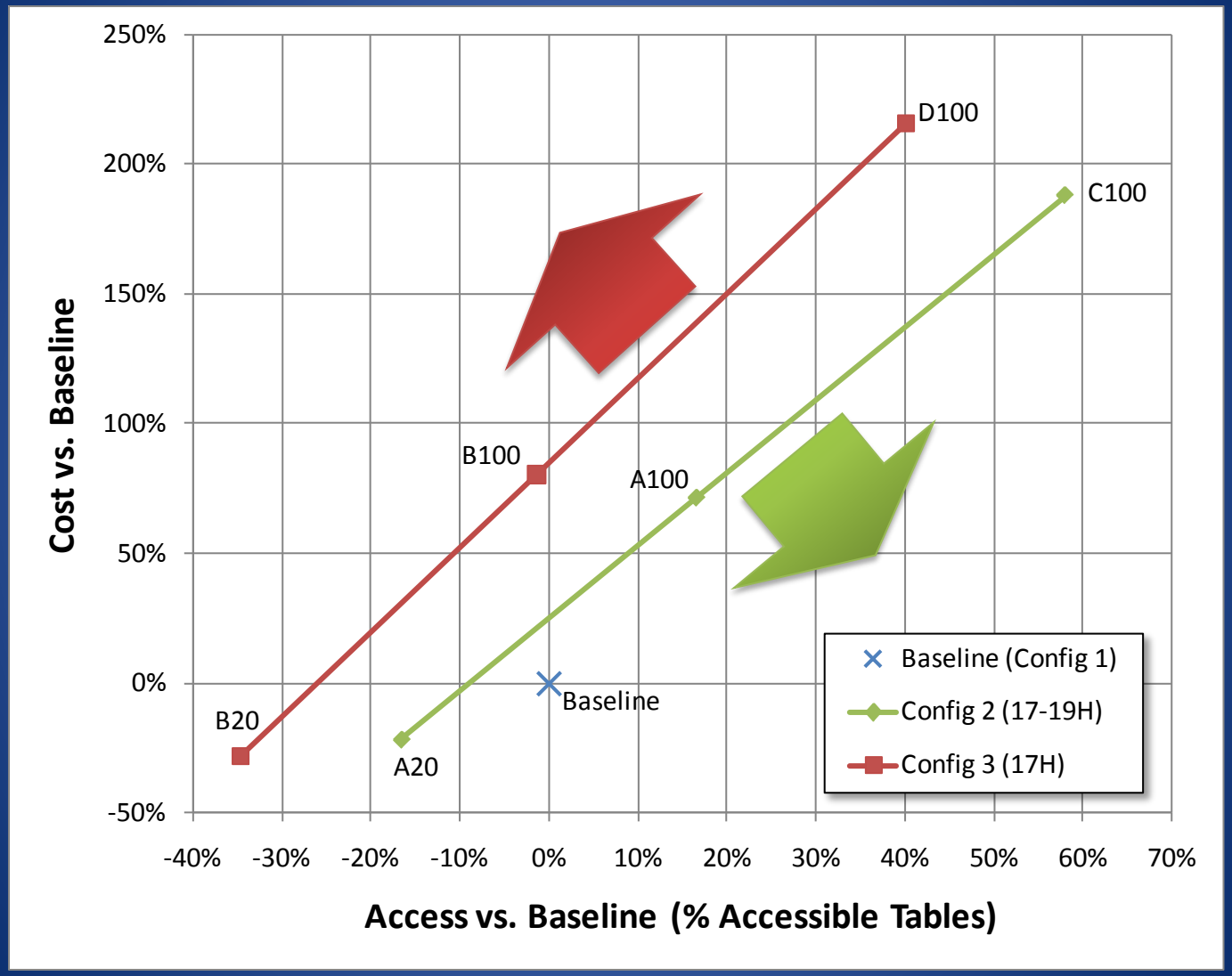
Considering a broad range of scenarios

- 20% adoption (1 accessible table per "pod" of 5 exam rooms)
- Up to 100% adoption

Costs of Scoping Scenarios

Scenarios (10 year totals)	Adoption Rate	Access vs. Baseline (43%)	Cost vs. Baseline ($1.91 B)	Chart Labels
Baseline: * Existing historic buying patterns continue * Config #1 (17-19H, 28W, 17D) * Transfer supports and leg supports are not included	25%	0%	$0	Baseline
Scenario A: (17-19H Tables) * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #2 (17-19H, 28W, 17D) * Existing tables upgraded to accessible (config #2)	20%	-17%	-$0.42 Billion	A20
	100%	+17%	+$1.38 Billion	A100
Scenario B: (17H Tables) * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #3 (17H, 28W, 17D) * Existing tables not able to be upgraded to be accessible	20%	-35%	-$0.53 Billion	B20
	100%	-1%	+$1.52 Billion	B100

Benefits and Costs: Summary



Benefits and Costs: Summary

Goals

- Maximize the percentage of accessible tables
- Minimize cost to health care providers

Modeled multiple scenarios

Across all scenarios, an adjustable height of 17-19 inches resulted in:

- Greater percentage of accessible tables
- Lower costs to health care providers

Conclusion

Summary and recommendations

Summary: Current Environment

Health care providers are voluntarily buying adjustable height tables

18% of tables in US could meet Access Board standards if:

- Height remains as proposed at 17-19 inches
- Width changed as discussed to 28 inches
- Transfer supports and leg supports added

0% of tables in the US have 17 inch height

Summary: Costs and Benefits

Goals:	
Maximize the percentage of accessible tables	Minimize cost to health care providers

Modeled multiple scenarios

Across all scenarios, an adjustable height of 17-19 inches resulted in:	
Greater percentage of accessible tables	Lower costs to health care providers

Recommendations

Adopt standards that

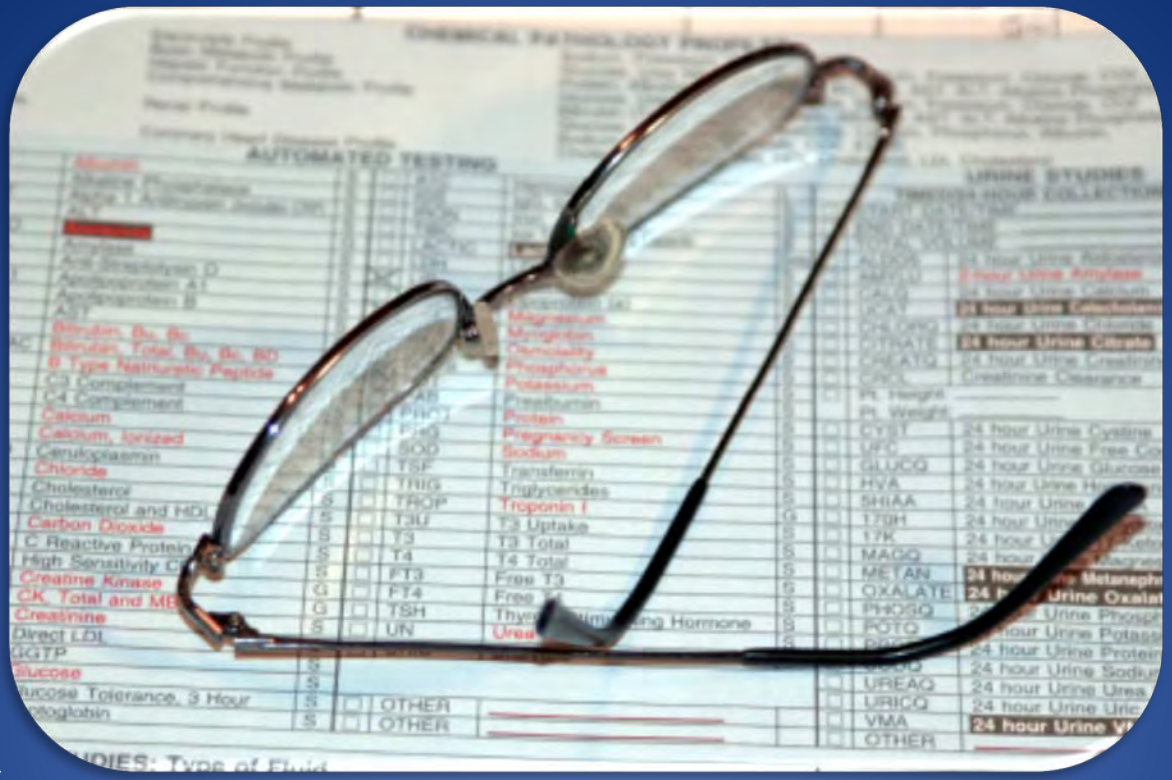
- Have the most benefits for consumers
- The least costs for health care providers

Recognize early adopters

- Build on the growing percentage of providers voluntarily purchasing adjustable height tables

Adopt examination table standards with

- 17-19 in. lower adjustable height
- 28 in. width
- 17 in. depth



Appendix

Back-Up Slides

Source: CDC NHANES 2007-2010

Weight Data

Table 4. Weight in pounds for females aged 20 and over and number of examined persons, mean, standard error of the mean, and selected percentiles, by race and ethnicity and age: United States, 2007–2010

Race and ethnicity and age	Number of examined persons	Mean	Standard error of the mean	Percentile								
				5th	10th	15th	25th	50th	75th	85th	90th	95th
All racial and ethnic groups[1]				Pounds								
20 years and over	5,844	166.2	0.78	110.7	118.2	124.8	134.6	157.2	188.6	210.3	225.3	250.9

Table 14. Body mass index values for females aged 20 and over and number of examined persons, mean, standard error of the mean, and selected percentiles, by race and ethnicity and age: United States, 2007–2010

Race and ethnicity and age	Number of examined persons	Mean	Standard error of the mean	Percentile								
				5th	10th	15th	25th	50th	75th	85th	90th	95th
All racial and ethnic groups[1]				Body mass indices								
20 years and over	5,841	28.7	0.12	19.5	20.7	21.7	23.3	27.3	32.5	36.1	38.2	42.0

Table 6. Weight in pounds for males aged 20 and over and number of examined persons, mean, standard error of the mean, and selected percentiles, by race and ethnicity and age: United States, 2007–2010

Race and ethnicity and age	Number of examined persons	Mean	Standard error of the mean	Percentile								
				5th	10th	15th	25th	50th	75th	85th	90th	95th
All racial and ethnic groups[1]				Pounds								
20 years and over	5,651	195.5	0.99	135.5	146.6	153.7	165.2	189.8	218.0	236.4	252.2	273.6

Table 15. Body mass index values for males aged 20 and over and number of examined persons, mean, standard error of the mean, and selected percentiles, by race and ethnicity and age: United States, 2007–2010

Race and ethnicity and age	Number of examined persons	Mean	Standard error of the mean	Percentile								
				5th	10th	15th	25th	50th	75th	85th	90th	95th
All racial and ethnic groups[1]				Body mass indices								
20 years and over	5,635	28.6	0.13	20.7	22.2	23.2	24.7	27.8	31.5	33.9	35.8	39.2

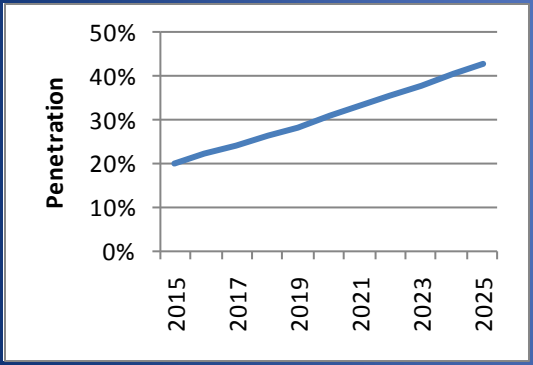
Baseline Scenario: Market Projection

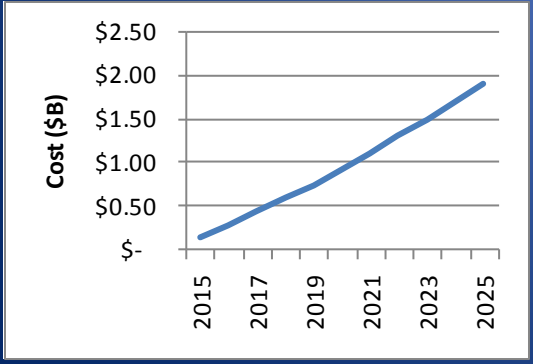
Existing historic buying patterns continue unchanged

Equipment config #1 (17-19H, 28W, 17D)

- Standard arms and stirrups
  - (as opposed to transfer supports or leg supports)

18% accessible tables, 82% fixed height tables (32”H)





After 10 years:

- Access: 43% (config #1)
- Total cost: $1.91B

This is what industry would have spent towards on medical tables without formal accessibility rules

Other scenarios will be compared against this baseline

Costs of Scoping Scenarios

Scenarios (10 year totals)	Adoption Rate	Access vs. Baseline (43%)	Cost vs. Baseline ($1.91 B)	Chart Labels
Baseline: * Existing historic buying patterns continue * Config #1 (17-19H, 28W, 17D) * Transfer supports and leg supports are not included	25%	0%	$0	Baseline
Scenario A: (17-19H Tables) * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #2 (17-19H, 28W, 17D) * Existing tables upgraded to accessible (config #2)	20%	-17%	-$0.42 Billion	A20
	100%	17%	+$1.38 Billion	A100
Scenario B: (17H Tables) * Accessible equipment required to be purchased when facility construction occurs (new or remodel) * Config #3 (17H, 28W, 17D) * Existing tables not able to be upgraded to be accessible	20%	-35%	-$0.53 Billion	B20
	100%	-1%	+$1.52 Billion	B100

Costs of Scoping Scenarios

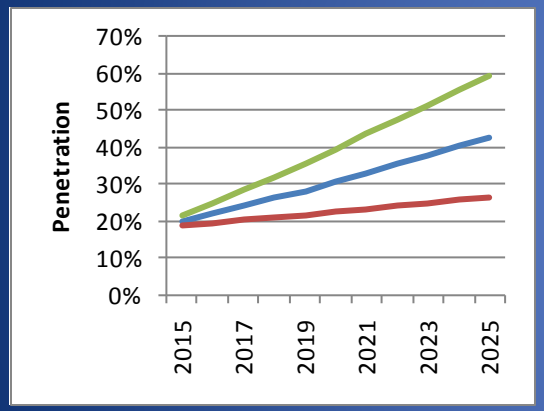
Scenarios (10 year totals)	Adoption Rate	Access vs. Baseline (43%)	Cost vs. Baseline ($1.91 B)	Chart Labels
Baseline: * Existing historic buying patterns continue * Config #1 (17-19H, 28W, 17D) * Transfer supports and leg supports are not included	25%	0%	$0	Baseline
Scenario C: (Mandatory 17-19H Tables) * All new equipment offered for sale must be accessible * Config #2 (17-19H, 28W, 17D) * Existing tables upgraded to accessible	100%	+58%	+$3.59 Billion	C100
Scenario D: (Mandatory 17H Tables) * All new equipment offered for sale must be accessible * Config #3 (17H, 28W, 17D) * Existing tables not able to be upgraded to accessible	100%	+40%	+$4.13 Billion	D100

Scenario A: 17-19” + Usual Grandfathering

Accessible medical tables required to be used when facility construction occurs (new or remodel)

Equipment config #2 (17-19H, 28W, 17D, TS, LS)

Existing tables in field upgraded to accessible (TS + LS)



20% adoption rate:

- Access: 17% less than baseline
- Total cost: 22% less than baseline

100% adoption rate:

- Access: 17% over baseline
- Total cost: 72% over baseline

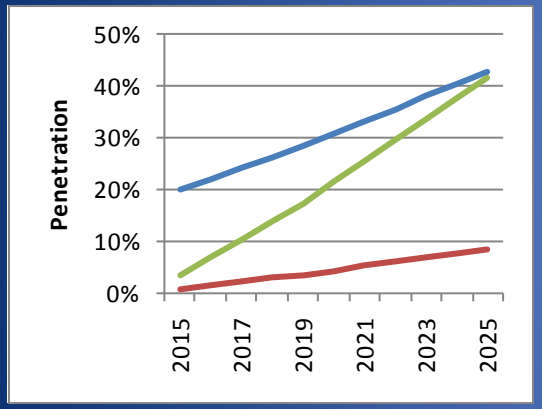
Legend: Blue = Baseline, Red = 20% adoption, Green = 100% adoption

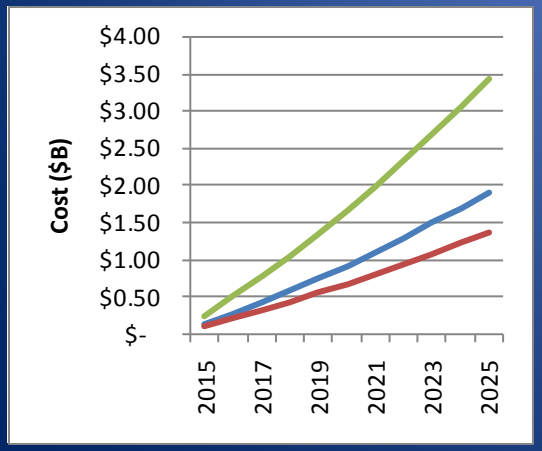
Scenario B: 17” + Usual Grandfathering

Accessible medical tables required to be used when facility construction occurs (new or remodel)

Equipment config #3 (17H, 28W, 17D, TS, LS)

Existing tables in field not able to be upgraded to accessible





20% adoption rate:

- Access: 35% less than baseline
- Total cost: 28% less than baseline

100% adoption rate:

- Access: 1% less than baseline
- Total cost: 80% over baseline

18% lower access than Scenario A

Up to 4% higher costs than Scenario A

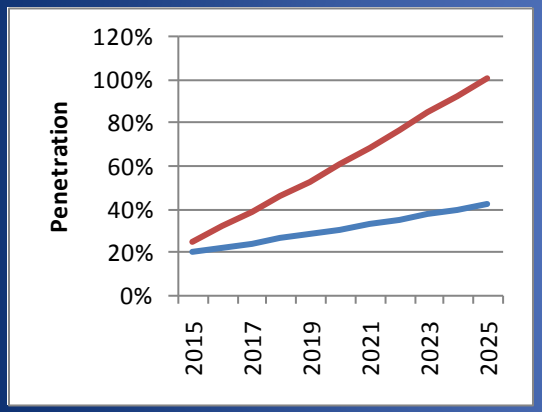
Legend: Blue = Baseline, Red = 20% adoption, Green = 100% adoption

Scenario C: 17-19” + All New Equipment

All new equipment offered for sale must be accessible

Equipment config #2 (17-19H, 28W, 17D, TS, LS)

Existing tables in field upgraded to accessible (TS + LS)



100% adoption rate:

- Access: 58% over baseline
- Total cost: 188% over baseline

Achieves a total 100% access in 10 years, supporting universal design

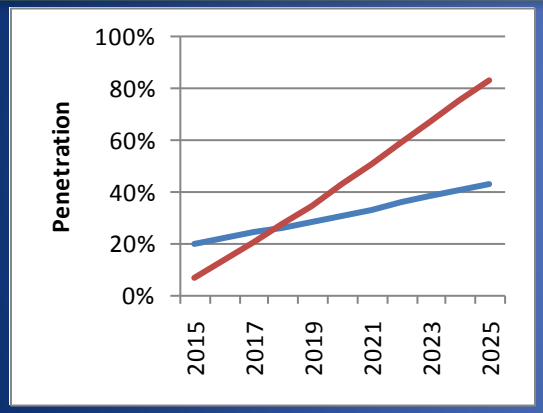
Legend: Blue = Baseline, Red = 100% adoption

Scenario D: 17” + All New Equipment

All new equipment offered for sale must be accessible

Equipment config #3 (17H, 28W, 17D, TS, LS)

Existing tables in field not able to be upgraded to accessible



100% adoption rate:

- Access: 40% over baseline
- Total cost: 216% over baseline

18% lower access than Scenario C

28% higher costs than Scenario C

Legend: Blue = Baseline, Red = 100% adoption