

Accessibility and Usability of Medical Instrumentation for Persons with Disabilities: A National Survey



This study was funded by:

- National Institute on Disability and Rehabilitation Research

U.S. Department of Education

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Objectives



- Review results from a National Consumer Needs Assessment Survey
- Review preliminary results from a National Provider Needs Assessment Survey

Objectives



- Discuss: what equipment is the most difficult or uncomfortable for you and your patients?

Purpose

- Identify the nature and scope of obstacles related to medical instrumentation that prevent people with disabilities from receiving appropriate healthcare services



Just Hop Up!



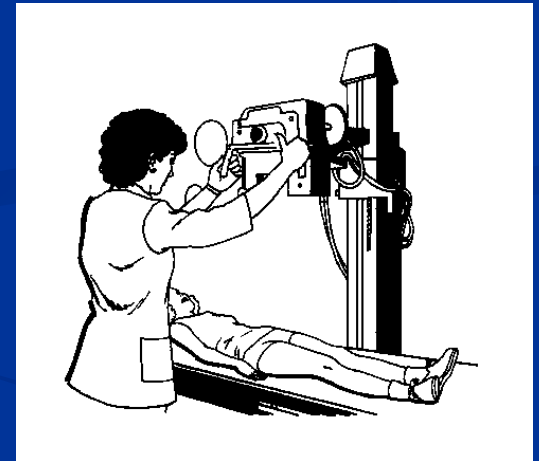
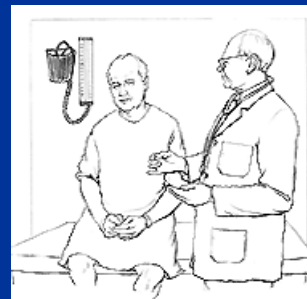
Method

- Survey of consumers
- Focus groups with consumers
- Survey of Health Care Professionals
- Interviews of Health Care Professionals

Consumer Survey on Accessibility of Medical Instrumentation

RERC on Accessible Medical Instrumentation

Marquette U. – Western U. – UC-Berkeley/San Francisco



Funding provided by:

*National Institute on Disability and Rehabilitation Research,
U.S. Department of Education*

Consumer Survey

- Web-based survey
 - On-line
 - Word document (regular & large print)
 - PDF (regular & large print)
 - Telephone (standard & TTY)
 - In-person



What condition(s) cause difficulties for you?

| | |
|---------------------------------|-------|
| ■ Vision impairment | 28.6% |
| ■ Hearing impairment | 14.3% |
| ■ Speech impairment | 6.9% |
| ■ Orthopedic impairment | 35.1% |
| ■ Back or spine condition | 29.6% |
| ■ Arthritis or rheumatism | 22.9% |
| ■ Absence of loss of arm or leg | 3.7% |

Summary

| Type of Equipment | \geq Moderate difficulty |
|-----------------------------|----------------------------|
| ■ Exam tables (n=291) | 74.9% |
| ■ X-ray equip. (n=258) | 68.2% |
| ■ Rehab./Ex. equip. (n=203) | 55.1% |
| ■ Weight scales (n=222) | 53.6% |
| ■ Exam chairs (n=262) | 49.7% |

Categories of Concern for Most Challenging Types of Equipment





Exam Tables (74.9%)



Difficulty with Exam Tables by Type of Disability

| | χ^2 | p |
|--------------|----------|------|
| Vision | 10.84 | .028 |
| Orthopedic | 17.01 | .002 |
| SCI | 11.02 | .026 |
| Paralysis | 11.36 | .023 |
| Chronic Pain | 13.60 | .009 |
| Cancer | 9.89 | .042 |

Transfer

- “Exam tables are too high to easily transfer from a wheelchair, and provide no leverage to lift yourself up.”

Support/Safety

- “Generally, tables are too high and there are no side rails. Side rails are necessary because muscle spasms and/or involuntary movement are more frequent if I'm anxious and/or in an unusual position.”

Positioning/Comfort

- “They are not wide [enough] to turn over; there is nothing to grab on to to facilitate positioning one's self or turning over.”



X-Ray Equipment (68.2%)



Difficulty with X-Ray Equipment by Type of Disability

| | χ^2 | p |
|-----------------|----------|------|
| Orthopedic | 9.569 | .048 |
| Back/spine pain | 10.80 | .029 |
| Cerebral palsy | 11.84 | .019 |
| Parkinson's | 11.67 | .020 |
| Chronic pain | 14.40 | .006 |
| Learning Disab. | 10.95 | .027 |
| Latex sens. | 10.80 | .029 |

Transfer

- “MRI, PET & CT Scan Tables do not go low enough for easy transfer. Help is always needed. X-Ray equipment is always difficult to approach and get close enough to”
- “This type of medical equip is never accessible. recently could not get [MRI] because no staff available to lift me onto [table].”

Safety

- “If I have to get onto an [X-ray] table, I may have to be lifted, and these tables are notoriously cold and slippery, great for falling off.”

Positioning/Comfort

- “Certain films are hard to get because my body parts can not turn to adjust to the angles needed to get the shot.”



Rehab/Exercise Equipment (55.1%)



Difficulty with Exercise/Rehab Equipment by Type of Disability

| | χ^2 | p |
|----------|----------|------|
| Diabetes | 16.55 | .002 |



Transfer

- “Not enough equipment that can be transferred on to.”
- “[Difficulty with] getting into and out of seats in circuit-training equipment.”
- “Mats on [the] floor and no way to get down or up”

Safety / Stability

- “In regular gyms I have to transfer out of my chair and onto the weight bench. It takes time and I have fallen off before by accident.”

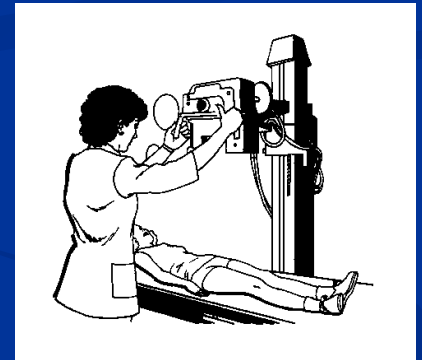
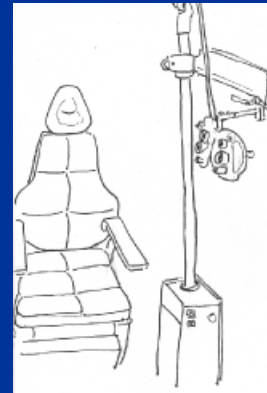
Visual Display

- “can physically use the equipment but cannot access monitoring features”
- “Because of being blind it was hard to figure out how to use some of the equipment. Crowded gyms made trying to walk very difficult because of obstacles in the way. Some equipment relied on visual cues to know you were doing things right.”

Focus Groups on Accessibility of Medical Instrumentation

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Focus Group Subjects

- 6 targeted sessions: N = 55

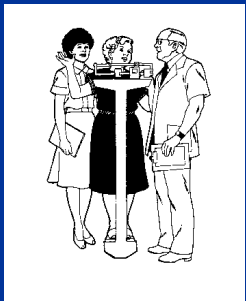
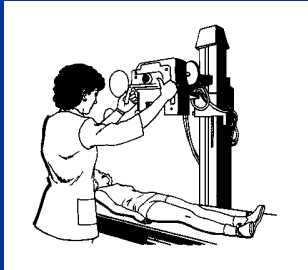
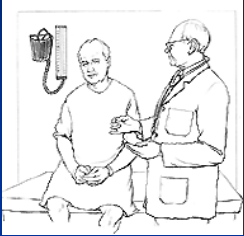
- Disabilities represented:

| | | |
|-----------------------------------|------|-------|
| ■ 4 groups: physical disabilities | n=38 | 69.1% |
| ■ 1 group: deafness | n=10 | 18.2% |
| ■ 1 group: visual disabilities | n=7 | 12.7% |

- Race/ethnicities represented:

| | | |
|-----------------------------------|------|-------|
| ■ Caucasian | n=34 | 61.8% |
| ■ Hispanic/Latino(a) | n=11 | 20.0% |
| ■ African American | n=6 | 10.9% |
| ■ Asian American/Pacific Islander | n=4 | 7.3% |

Focus Group Topics



- Examination tables
- Medical chairs (dentist, eye exam, foot exam, etc.)
- Imaging (x-ray, mammogram, MRI, CAT, PET scan, ultrasound, radiation therapy)
- Weight scales (standing, seated, wheelchair, sling, bed)

Examination Tables



Examination Tables

- Height: too high
- Width: too narrow
- Comfort: hard surface, nothing to lean on
- Getting on: nothing to hold on to
- Fear: being alone; long wait
- Other:
 - The step: too small, nothing to hold on to
 - Stirrups: hard to use
 - The paper: slippery; contrast; notes



Examination Tables

- **Woman 25-44, manual wheelchair user with spinal cord injury:**

“Tables that do not drop [in height], I can’t transfer to them at all. My upper body is pretty strong, but I can’t get the right kind of leverage. I can’t get close enough to it. There aren’t handles in the right place for me to support myself. Even if a transfer were possible at the height differential, there are other things in the way.”



Examination Tables

- Man, 45-64, manual wheelchair user with spinal cord injury:

“Often will jack you up on a table and then leave the room, so you’re there not knowing how long, and you can’t independently move because there’s nothing to grab on. There’s no rail or no hand grab alongside these things at all, so you can’t independently adjust yourself on the tables, and there’s a lot of sharp edges.”



Examination Tables: Paper

- **Woman 45-64, manual wheelchair user with cerebral palsy (CP):**

“[The paper strip on the table] can be kind of slippery; and I know it’s for sterile procedures and cleanliness and sanitation, but one assumes that if somebody is going to pee or bleed or do something else of a fluid nature from the human body, then that paper is not really doing anything for it.”



Examination Tables: Paper

- **Man, 65-74, blind:**

“Sometimes [the paper on the exam table] works to an advantage. If the paper is white and it shows up the contrast on the table itself, it helps in identifying where the table is.”

- **Woman, 25-44, deaf:**

“I remember, before, I had to wait for an interpreter to show up but nobody showed up, and so they wrote on the paper [on the exam table] ... that was an easy way for us to communicate. Then when we were done, we just picked it up and threw it away.

Imaging Equipment



- X-ray & bone density scan

- Mammogram

- MRI, CT, PET scan



- Ultrasound & radiation therapy

Imaging Equipment

- Many of same issues as exam tables
- Imaging tables are uncomfortable, need padding and/or pillows
- Can't take wheelchair into MRI room = double transfer before and after
- Communication with provider is critical



Imaging Equipment

- **Woman 25-44, manual wheelchair user with spinal cord injury:**

“[The table in that picture] doesn’t have any padding ... I’ve had one x-ray experience that was like that, and I was hysterical over the possibility of ripping a hole across my pelvic bone or tail bone. I wanted to be off that table instantly.”



Imaging Equipment

- **Woman 25-44, deaf:**

“I have new idea about new technology and maybe they can have captions over there and they can tell you to hold your breath and there would be words flashing and you would know to hold your breath or something. Maybe some new technology they can add. Maybe they could have an interpreter, maybe a TV, picture of an interpreter. ”

Medical Chairs



Medical Chairs

- Base: if extends beyond seat, cannot maneuver wheelchair close alongside
- Chair height: may be too high
- Arm rests: may be missing or too low; if present, may interfere with transfer
- Leg support: fixed knee angle may be uncomfortable
- Foot rest: depending on shape, feet may get tangled or not be supported



Medical Chairs

- **Woman 45-64, leg brace user with spina bifida:**

“The assumption for all of these chairs is that you have to have a standard shaped body. The designs weed out so many people that it seems there should be an adjustment that accommodates unique body shapes ... different shaped backs, whether it is curvature, scoliosis, or whatever....”

Weight Scales

- Standing, seated, WC, sling, bed scales



See? I knew we had an accessible scale around here somewhere!

WAYEM HEALTH PLAN
Shipping & Receiving
PULLER

Hard Hat
Area

THIS END
UP

TO: Warehouse
By April

To: Warehouse
Chief Storage
By: [unclear]

FRAGILE
HANDLE WITH CARE

THIS END
UP
↑

Shut Off
Motors

Weigh
Scales
PULLER

LORAX
DISPOS

Karin
Schweizer



Weight Scales

- Standing scales may be unstable
- Standing scales may have nothing to hold on to
- Scale displays are not usable by blind
- Some people do not know their weight, have not been weighed in many years
- Guessing or estimating one's own weight is common



Weight Scales

- **Man 45-64, manual wheelchair user with spinal cord injury:**

“I’ve not been on a wheelchair scale since rehab, over twenty-two years [ago].... My HMO has one, but apparently it’s in a storage room down by emergency somewhere, and nobody has ever seen it.”
- **Woman 45-64 with muscular dystrophy & heavy:**

“There have been long periods of years when I have not been weighed. I have been weighed more on laundry scales than on actual human scales.... I actually prefer that because I have a great big wheelchair.”



Weight Scales

- **Woman 45-64, power wheelchair user with post-polio:**

“What I’ve done is, I have a friend who’s still strong enough to carry me, and so we weigh her, and then she carries me. We get on the weighing scale and then we subtract.”

- **Woman 25-44, manual wheelchair user with spinal cord injury:**

“I have never been weighed at my doctor, ever. ... I was once at the doctor’s with my boyfriend, who is six-foot-five and is perfectly able to hold me, but the scale doesn’t have a maximum to carry both of us on the scale at the same time.”

Communication Issues

- Interpreters may not be available
 - Particularly in emergency departments
 - May have to rely on family members
- Interpreters may not be gender-matched
- Interpreters may not be trained in (unfamiliar) medical terminology
- Providers may not explain procedures and expectations of patients beforehand



Communication Issues

- **Man 25-44, deaf – on having an MRI scan:**

“I was just lying there and it was my first time and so I’m lying there and I have no idea. I’m just lying there and I was breathing and kind of looking around, and the nurse was like, ‘No, don’t breathe!’ And I said, ‘Well, why didn’t you tell me in the first place?’ I go in and she’s, like, rushing me; and then they shove me in there and there’s no explanation. ... ‘Now you have to do it again,’ she says. It’s her fault and not mine.”



Communication Issues

- **Woman 45-64, blind – on having a pelvic exam:**

“The problem that I have with that is ... I have never seen what they use to do the exam. Having something inside of me without knowing what it is, [the speculum] feels cold and painful but I have no idea what it feels like or looks like. ...It is already painful and invasive, and [I don't like] not knowing what it is because I have never seen or touched it.”

Personnel Issues

- Unusual situations
 - Unexpected anatomy and biomechanics
 - Corner cutting (remain in wheelchair)
 - Concern for lower level of care
- Inappropriate attitudes
 - Impatience (“always in a hurry”)
 - Disrespect/rudeness
 - Inappropriate patient handling (AT, too)



Personnel Issues

- **Woman 45-64, power wheelchair user with post-polio:**

“When they saw my chair ... [they said,] ‘Oh, it’s okay, we’ll do [the mammogram] next year,’ and that’s the kind of response I hate.... And you have to be the one that says, ‘No, we can do this, because I’ve done it.’ ”

- **Woman 45-64, power wheelchair user with post-polio and cancer:**

“I had several ultrasounds done in the chair, ... and there was no interest in trying to lift me onto the table.... I prefer to have it done in a way that it’s conventionally done, whatever has been determined as the best practice.”



Personnel Issues

- **Woman 25-44, manual wheelchair user with spinal cord injury:**

“... At the urologist ... there is a cutout in the table. The cutout alone makes transferring a little bit difficult but ... it was covered with one of those papers and I didn't know it was there. So I was asked if I could manage the transfer, and the table was low enough, and I said, 'Sure, no problem,' and they left the room. And I went to transfer, stuck my hand in the hole, and ended up on the ground because I didn't know there was a hole there and nobody thought to [tell me]....”



Personnel Issues

- **Woman 45-64, power wheelchair user with muscular dystrophy:**

“The people who are taking the mammograms will grab for your joystick, and you have your breasts between the things, and they don’t realize how fast the chair can go. So you have to be very assertive and say, ‘Do not touch my joystick, please!’ ”

Fear

- **Woman, 25-44, power wheelchair user with muscular dystrophy:**

“I’m going to be honest. I have avoided [gynecology] exams. I’m a thirty-one-year-old woman, and I have not had a pelvic exam – ever – because of all the different complications and fears, for multiple reasons. ... Here I am, a woman who’s a researcher in sociology and health, and I’m a real health advocate for others and myself – and this is my secret shame.”

Physician Avoidance and Selection

- **Woman 46-64 with chronic pain:**

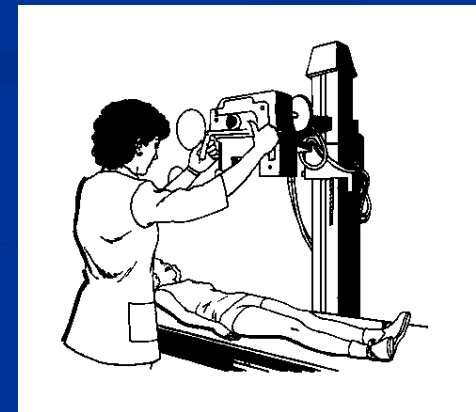
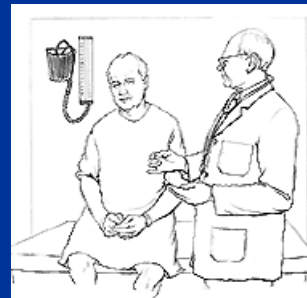
“I’ve been trying to go to doctors since I left here, about three years. I have an appointment and I cancel it, and then I call again because I know I need it and I schedule it again, and then when I remember the experience, I cancel it again, and it’s like that. It’s overwhelming, and it makes me feel so depressed that I don’t go to the doctors, and I get worse.”

- **Woman 25-44, power wheelchair user with CP:**

“I literally chose my doctors because of those tables, so that it would be easier for them to examine me.”

Survey on Accessibility of Medical Instrumentation for Health Care Professionals

RERC on Accessible Medical Instrumentation
Marquette U. – Western U. – UC-Berkeley/San Francisco



Funding provided by:

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Health Care Professionals Survey

- Web-based survey
 - Online on the Internet – go to:
<http://www.erc-ami.org/R12/>
 - On a computer – download from:
<http://www.erc-ami.org/R12/>
 - On paper – print from:
<http://www.erc-ami.org/R12/>
 - Over the telephone – to set up a time please contact the RERC staff at info@erc-ami.org or by phone/TTY at (800) 832-0524.

Four Categories of Equipment

■ Diagnostic Equipment:

- Monitoring – such as thermometer, blood pressure cuff, cardiac stress test
- Imaging – such as x-ray, MRI, mammogram, ultrasound equipment

■ Procedural Equipment:

- Furniture/Fixtures – such as tables, chairs
- Manual Tools – such as defibrillator, dental drill

■ Therapeutic Equipment:

- Drug Therapy – such as syringes, infusion pumps, ventilators
- Physical Therapy – such as rehabilitation or exercise equipment

■ Assistive Technologies

- For Mobility/Posture/Manipulation – such as wheelchair, brace, reacher
- For Sensory/Communication/Cognition – such as hearing aid, speech aid, personal digital assistant (PDA)

Preliminary Results

- Issues similar to ones consumers addressed
 - Exam Tables are too high/ Difficult to transfer
 - Exam tables have nothing to hold on too/ Unstable
 - Weight Scales are difficult to use/ Accessible scales unavailable
 - Blood Pressure cuffs do not fit all arms

Preliminary Results

Exam Tables:

- Too high - "unable to do physical exam and treatment"
- Positioning - "[difficult with] the overweight patient"

Rehabilitation Equipment:

- "Standing frame doesn't lower enough for my shorter patients."

Preliminary Results

Medical Administration Equipment:

- Problems with:
 - Reading markings on syringes;
 - Reading displays;
 - Reading labels;
 - Opening pill bottles;
 - IV poles ("not easily moved");
 - IV pumps ("not intuitive")

Preliminary Results

Monitoring Equipment:

- Poorly fitting blood pressure cuffs - “Adult BP cuff not able to fit all adult patients’ arms.”

Your Turn...

What are some of the difficulties you encounter?

With:

- **Diagnostic Equipment:**
 - Imaging, Monitoring
- **Procedural Equipment**
 - Furniture, Tools
- **Therapeutic Equipment**
 - Drug Therapy, Rehabilitation Equipment
- **Assistive Technologies**
 - Mobility, Sensory, Communication

Thank You

To complete the survey...

<http://www.rerc-ami.org/R12/>

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