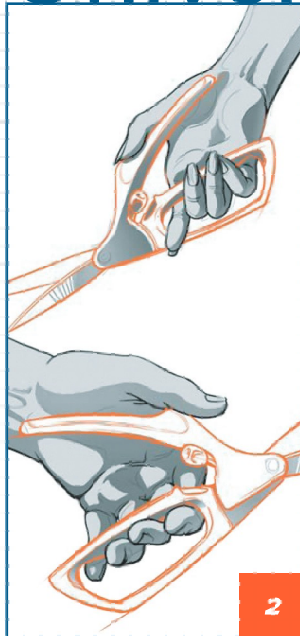


## The Principles of Universal Design



1



2



3



### PRINCIPLE

#### Equitable Use

The design is useful and marketable to people with diverse abilities.

#### Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

#### Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or education level.

### GUIDELINES

- 1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
- 1b. Avoid segregating or stigmatizing any users.
- 1c. Provisions for privacy, security, and safety should be equally available to all users.
- 1d. Make the design appealing to all users.

- 2a. Provide choice in methods of use.
- 2b. Accommodate right- or left-handed access and use.
- 2c. Facilitate the user's accuracy and precision.
- 2d. Provide adaptability to the user's pace.

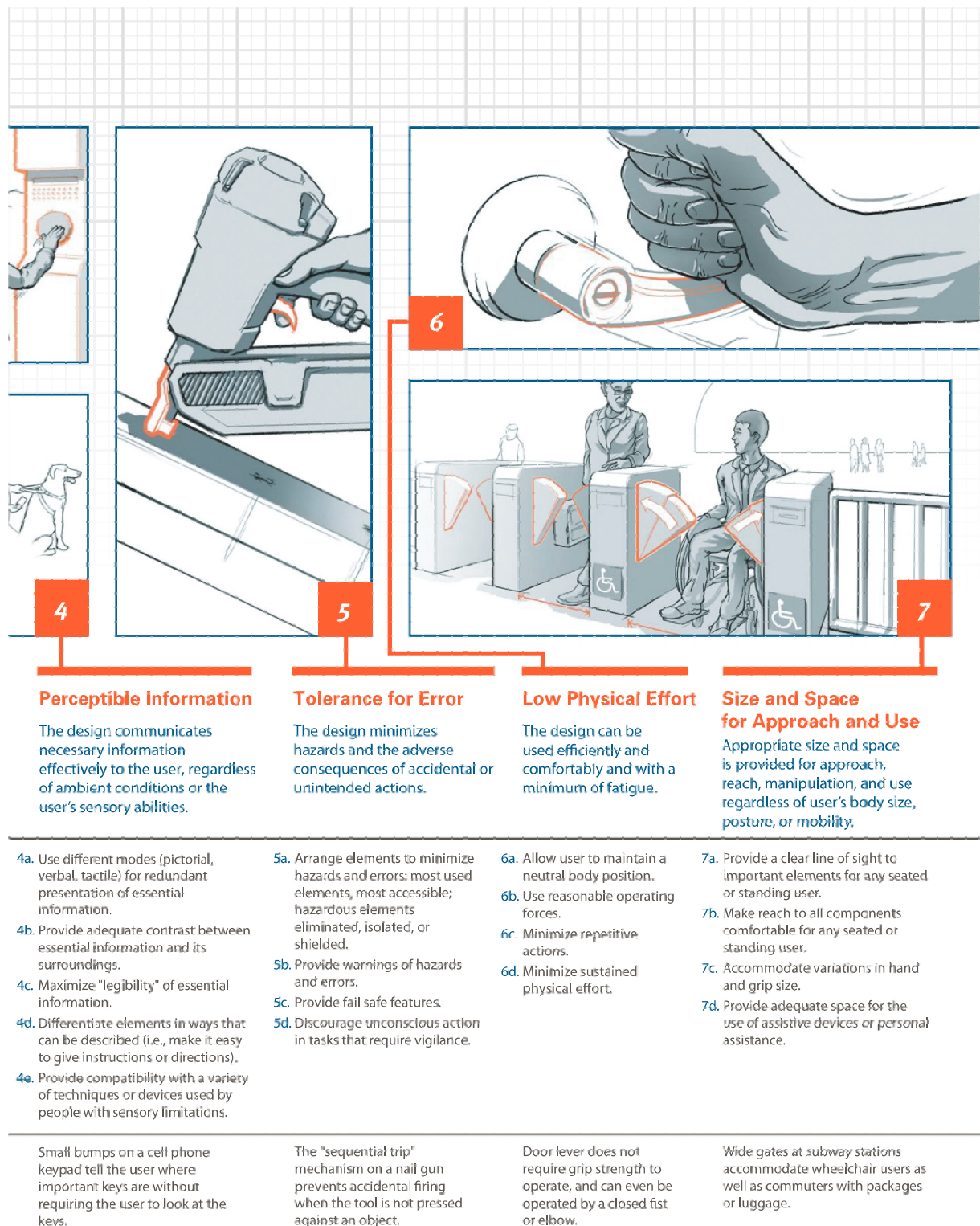
- 3a. Eliminate unnecessary complexity.
- 3b. Be consistent with user expectations and intuition.
- 3c. Accommodate a wide range of literacy and language skills.
- 3d. Arrange information consistent with its importance.
- 3e. Provide effective prompting and feedback during and after task completion.

### EXAMPLES

- Power doors make visiting public spaces easier for all users.
- E-mail makes communication easier for everyone, including people who have trouble communicating via phone.

Large grip scissors accommodates use with either hand and allows alternation between the two in repetitive tasks.

- Public emergency stations utilize recognized emergency colors and a simple design to quickly convey function to passers-by.
- Intuitive ATM interfaces allow use without instruction or training.



## appendix 9.B

# Usability in My Home—A Self-Report Instrument

**Directions:** The questionnaire consists of two parts, with a number of questions about the design of the *physical housing environment* in which you live. You are asked to answer the questions by assessing how you feel that the design and form of the physical housing environment suits you, your needs, and your wishes.

By physical housing environment is meant here your home, the car park, garage, or parking space that you use if you have a car, your own letterbox, the dustbin/refuse storage place, the storage space, and the shared laundry, if there is one. This includes all the routes along which you move on the site to and from these places. It also includes a balcony, patio, and garden where applicable.

The questions are very general, and the aim is to capture your immediate perception of how the physical housing environment suits you.

For each question, there are seven response alternatives in the form of the numbers 1 to 7. The number 1 stands for what is the worst and lowest alternative for you, and 7 stands for the best and highest alternative. The numbers 2 to 6 describe the positions that lie between the best and the worst alternatives. The number 4 is the neutral point on the scale, neither good nor bad. Put a circle round the alternative that agrees best with your perception.

*Example:* If you are so dissatisfied with your physical housing environment that it could not, in your opinion, be worse for you, then circle the number 1. If you are so satisfied with the design of your physical housing environment that it could not, in your opinion, be better, then circle the number 7. You use the numbers 2 to 7 to describe how close to the best or worst alternative you find the features of your housing environment.

There now follow a number of questions about how well you feel that the design of your physical housing environment suits your needs and wishes. Some questions concern security, social interaction, and so forth, while others concern how the design of the housing environment makes it easy or difficult to do the everyday tasks you wish and need to perform.

Draw a circle round the number that you think agrees best with your own perception.

**1. In relation to how you normally manage your personal hygiene, dressing, visiting the toilet, or how you eat; to what extent is the housing environment**

**suitably designed? (If you do not manage any of these at all, cross out the whole question.)**

1      2      3      4      5      6      7  
Not at all suitable      Very suitable

**2. In relation to how you normally manage your cooking/heating of food or preparation of snacks; to what extent is the housing environment suitably designed? (If you do not manage any of these at all, cross out the whole question.)**

1      2      3      4      5      6      7  
Not at all suitable      Very suitable

**3. In relation to how you normally manage your washing up, cleaning, care of flowers; to what extent is the housing environment suitably designed? (If you do not manage any of these at all, cross out the whole question.)**

1      2      3      4      5      6      7  
Not at all suitable      Very suitable

**4. In relation to how you normally manage your washing, ironing, or repair of clothes; to what extent is the housing environment suitably designed? (If you do not manage any of these at all, cross out the whole question.)**

1      2      3      4      5      6      7  
Not at all suitable      Very suitable

**5. How secure do you feel in your housing environment?**

1      2      3      4      5      6      7  
Not at all suitable      Very suitable

**6. To what extent does the design of the housing environment allow you to be by yourself when you so wish?**

1      2      3      4      5      6      7  
Not at all      As much as I want to

**7. To what extent does the design of the housing environment allow you to socialize with the friends and acquaintances you want to meet?**

1      2      3      4      5      6      7  
Not at all      As much as I want to

8. To what extent does the design of the housing environment allow you to do hobbies/leisure pursuits and relax?

1 2 3 4 5 6 7  
Not at all As much as I want to

9. If your health should change, to what extent would it be possible for you to make simple changes to your housing environment (e.g., to use a different parking place, to use a different toilet, to rearrange the furniture, to use a different room as a bedroom, and so forth)?

1 2 3 4 5 6 7  
Not at all As much as I want to

There now follow a number of questions about how usable you feel your housing environment is. First you make an overall assessment (question 10). This is followed by a number of more detailed questions about usability in different parts of the housing environment. State the problems you perceive and make an assessment of how accessible each part of the housing environment is, with regard to the problems you have stated (questions 11 to 22). If you do not feel that there are any special problems, please say so. Do not forget to assess each part of the physical housing environment, even if you have not stated any specific problem.

10. How usable do you feel that your housing environment is in general?

1	2	3	4	5	6	7
Not at all usable						Fully usable

11. What problems do you perceive in the physical environment just outside your home (e.g., paths and pavements, car park/garage/carport, the design of the refuse storage place, the placing of your letterbox, and so forth)?

None

12. In view of the above problems in question 11, how usable do you feel that the environment outside your home is?

1 2 3 4 5 6 7  
Not at all usable Fully usable

13. What problems do you find in the design of the entrance to your home (e.g., heavy doors, narrow stairs, ramps, cramped lift, poor lighting, and so forth)?

None

14. In view of the above problems in question 13, how usable do you feel that the entrance to your home is?

1      2      3      4      5      6      7  
Not at all usable      Fully usable

15. What problems do you find in the design of the secondary spaces in your home (e.g., storerooms, attic/basement, refuse storage place, laundry [if any], and the routes you have to follow indoors to reach these places)?

None

16. In view of the above problems in question 15, how usable do you feel that the secondary spaces in your home are?

1 2 3 4 5 6 7  
Not at all usable Fully usable

17. What problems do you have in reading and understanding markings and signs outside the building or at the entrance? (For example, are lift buttons fully visible and easy to use? Are the signs at the waste sorting station clear and easy to understand? Are the markings in staircases easy to see?) *(The questions should only be answered by people living in apartments. If you live in your own house, omit this question and question 18.)*

None

18. In view of the above problems in question 17, to what extent would you say that the markings and signs outside the building and at the entrance can be read and understood?

1 2 3 4 5 6 7  
Not at all Perfectly easily



19. What problems do you find in the design of your balcony, patio, or garden? *(If you do not have any balcony, patio, or garden, please say so. You may then omit question 20.)*

None

20. In view of the above problems in question 19, how usable do you feel that the balcony, patio, or garden are?

1 2 3 4 5 6 7  
Not at all usable Fully usable

21. What problems do you find in the design of the interior of your home?

Sucks, Chair

22. In view of the above problems in question 21, how usable do you feel that the interior of your home is?

1 2 3 4 5 6 7  
Not at all usable Fully usable

To conclude, there is a general question that allows you to express your wishes and needs.

23. If you were able to wish for anything at all concerning your home and your housing environment, what would you wish for?

From Fänge, A: Usability in My Home: Manual and Instrument Form. Division of Occupational Therapy, Lund University, Sweden, 2002. © Agneta Fänge, 2002, with permission.

# Home Examination Form

## Type of Home

(Indicate apartment or single-family home)

☐ **Apartment**

Own \_\_\_\_\_ Rent \_\_\_\_\_

Is elevator available? \_\_\_\_\_

What floor does patient live on? \_\_\_\_\_

☐ **Single-family home**

Two or more floors \_\_\_\_\_

Does patient live on only one floor, or use all floors of home? \_\_\_\_\_

Basement. Does patient have or use basement area? \_\_\_\_\_

## Entrances to Building or Home

### Location

Front Back Side (Circle one)

Which entrance is used most frequently or easily? \_\_\_\_\_

Can patient get to entrance? \_\_\_\_\_

### Stairs

Does patient manage outside stairs? \_\_\_\_\_

Width of stairway \_\_\_\_\_

Number of steps \_\_\_\_\_ Height of steps \_\_\_\_\_

Railing present as you go up? R \_\_\_\_\_ L \_\_\_\_\_

Both \_\_\_\_\_

Is ramp available for wheelchair? \_\_\_\_\_

### Door

Can patient unlock, open, close, lock door? (Circle for yes)

If doorsill is present, give height \_\_\_\_\_ and material \_\_\_\_\_

Width of doorway \_\_\_\_\_

Can patient enter \_\_\_\_\_ leave \_\_\_\_\_ via door?

### Hallway

Width of hallway \_\_\_\_\_

Are any objects obstructing the way? \_\_\_\_\_

## Approach to Apartment or Living Area

(Omit if not applicable)

Obstructions? \_\_\_\_\_

## Steps

Width of stairway \_\_\_\_\_

Number of steps \_\_\_\_\_ Height of steps \_\_\_\_\_

Railing present as you go up? R \_\_\_\_\_ L \_\_\_\_\_

Both \_\_\_\_\_

Is ramp available? \_\_\_\_\_

## Door

Can patient unlock, open, close, lock door? (Circle one)

Doorsill? Give height \_\_\_\_\_ material \_\_\_\_\_

Width of doorway \_\_\_\_\_

Can patient enter \_\_\_\_\_ leave \_\_\_\_\_ via door?

## Elevator

Is elevator present? \_\_\_\_\_ Does it land flush with floor? \_\_\_\_\_

Width of door opening \_\_\_\_\_

Height of control buttons \_\_\_\_\_

Can patient use elevator alone? \_\_\_\_\_

## Inside Home

*Note width of hallways and of door entrances.*

*Note presence of doorsills and height.*

*Note if patient must climb stairs to reach room.*

Can patient move from one part of the house to another?

Hallways \_\_\_\_\_

Bedroom \_\_\_\_\_

Bathroom \_\_\_\_\_

Kitchen \_\_\_\_\_

Living room \_\_\_\_\_

Others \_\_\_\_\_

Can patient move safely?

Loose rugs \_\_\_\_\_

Electrical cords \_\_\_\_\_

Faulty floors \_\_\_\_\_

Highly waxed floors \_\_\_\_\_

Sharp-edged furniture \_\_\_\_\_

Note areas of particular danger for patient.

Hot water pipes \_\_\_\_\_

Radiators \_\_\_\_\_

## Bedroom

Is light switch accessible? \_\_\_\_\_

Can patient open and close windows? \_\_\_\_\_

**Bed**

Height \_\_\_\_\_ Width \_\_\_\_\_  
 Both sides of bed accessible? \_\_\_\_\_ headboard  
 present? \_\_\_\_\_ footboard? \_\_\_\_\_  
 Is bed on wheels? \_\_\_\_\_ Is it stable? \_\_\_\_\_  
 Can patient transfer from wheelchair-to-bed? \_\_\_\_\_  
 And bed-to-wheelchair? \_\_\_\_\_  
 Is night table within patient's reach from bed \_\_\_\_\_  
 Is telephone on it? \_\_\_\_\_

**Clothing**

Is patient's clothing located in bedroom? \_\_\_\_\_  
 Can patient get clothes from dresser? \_\_\_\_\_  
 Closet? \_\_\_\_\_ Elsewhere? \_\_\_\_\_

**Bathroom**

Does patient use wheelchair \_\_\_\_\_  
 walker \_\_\_\_\_ in bathroom?  
 Does wheelchair \_\_\_\_\_ walker \_\_\_\_\_ fit into bathroom?  
 Light switch accessible? \_\_\_\_\_ Can patient open and  
 close window? \_\_\_\_\_  
 What material are bathroom walls made of? \_\_\_\_\_  
 If tile, how many inches does tile extend from the  
 floor beside the toilet? \_\_\_\_\_  
 How many inches does tile extend from the top of  
 the rim of the bathtub? \_\_\_\_\_  
 Does patient use toilet? \_\_\_\_\_  
 Can patient transfer independently to and from  
 toilet? \_\_\_\_\_  
 Does wheelchair wheel directly to toilet for transfers?  
 \_\_\_\_\_  
 What is height of toilet seat from floor? \_\_\_\_\_  
 Are there bars or sturdy supports near toilet? \_\_\_\_\_  
 Is there room for grab bars? \_\_\_\_\_  
 Can patient use sink? \_\_\_\_\_ What is height  
 of sink? \_\_\_\_\_  
 Is patient able to reach and turn off faucets? \_\_\_\_\_  
 Is there knee space beneath sink? \_\_\_\_\_  
 Is patient able to reach necessary articles? \_\_\_\_\_  
 Mirror? \_\_\_\_\_ Electrical outlet? \_\_\_\_\_

**Bathing**

Does patient take tub bath? \_\_\_\_\_ Shower? \_\_\_\_\_  
 Sponge bath? \_\_\_\_\_  
 If using tub, can patient safely transfer without  
 assistance? \_\_\_\_\_  
 Bars or sturdy supports present beside tub? \_\_\_\_\_  
 Is equipment necessary? (tub seat, hand-spray  
 attachment, tub rail, no-skid strips, grab rails,  
 other: \_\_\_\_\_)  
 Can patient manage faucets and drain plug? \_\_\_\_\_  
 Height of tub from floor to rim \_\_\_\_\_  
 Is tub built-in \_\_\_\_\_ or on legs? \_\_\_\_\_  
 Width of tub from the inside \_\_\_\_\_  
 If uses separate shower stall, can patient transfer  
 independently and manage faucets? \_\_\_\_\_

If patient takes sponge bath, describe method. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Living Room Area**

Light switch accessible? \_\_\_\_\_ Can patient open and  
 close window? \_\_\_\_\_  
 Can furniture be rearranged to allow manipulation of  
 wheelchair? \_\_\_\_\_  
 Can patient transfer from wheelchair to and from sturdy  
 chair? \_\_\_\_\_  
 Height of chair \_\_\_\_\_  
 Can patient transfer from wheelchair to and from sofa?  
 \_\_\_\_\_  
 Height of sofa \_\_\_\_\_  
 Can ambulatory patient transfer to and from chair or  
 sofa? \_\_\_\_\_  
 Can patient manage television and radio? \_\_\_\_\_

**Dining Room**

Light switch accessible? \_\_\_\_\_  
 Is patient able to use table? \_\_\_\_\_ Height of  
 table \_\_\_\_\_

**Kitchen**

What is the table height? \_\_\_\_\_ Can wheelchair  
 fit under? \_\_\_\_\_  
 Can patient open refrigerator door and take food?  
 \_\_\_\_\_  
 Can patient open freezer door and take food? \_\_\_\_\_

**Sink**

Can patient be seated at sink? \_\_\_\_\_  
 Can patient reach faucets? \_\_\_\_\_ Turn  
 them on and off? \_\_\_\_\_  
 Can patient reach bottom of basin? \_\_\_\_\_

**Shelves and cabinets**

Can patient open and close? \_\_\_\_\_  
 Can patient reach dishes, pots, eating utensils, and  
 food? \_\_\_\_\_  
 Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Transport**

Can patient carry items from one part of kitchen to  
 another? \_\_\_\_\_

**Stove**

Can patient reach and manipulate controls? \_\_\_\_\_  
 Manage oven door? \_\_\_\_\_  
 Place food in oven and remove? \_\_\_\_\_  
 Manage broiler door? \_\_\_\_\_  
 Put food in and remove? \_\_\_\_\_

**Other Appliances**

Can patient reach and turn on appliances? \_\_\_\_\_  
 Can patient use outlets? \_\_\_\_\_

**Counter space**

Is there enough for storage and work area? \_\_\_\_\_  
 Diagram (include stove, refrigerator, microwave, sink, table, counters, others if applicable)

**Laundry**

If patient has no facilities, how will laundry be managed?

\_\_\_\_\_

Location of facilities in home or apartment and description of facilities present:

Can patient reach laundry area? \_\_\_\_\_  
 Can patient use washing machine and dryer? \_\_\_\_\_  
 Load and empty? \_\_\_\_\_  
 Manage doors and controls? \_\_\_\_\_  
 Can patient use sink? \_\_\_\_\_  
 What is height of sink? \_\_\_\_\_  
 Able to reach and turn on faucets? \_\_\_\_\_  
 Knee space beneath sink? \_\_\_\_\_  
 Able to reach necessary articles? \_\_\_\_\_  
 Is laundry cart available? \_\_\_\_\_  
 Can patient hang clothing on line? \_\_\_\_\_  
 Ironing board \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Is it kept open? \_\_\_\_\_

If not kept open, can patient set up and take down ironing board? \_\_\_\_\_

Can patient reach outlet? \_\_\_\_\_

**Cleaning**

Can patient remove mop, broom, vacuum, pail from storage? \_\_\_\_\_

Use equipment? (mop, broom, vacuum, and so forth)

\_\_\_\_\_

**Emergency**

Location of telephone in house: \_\_\_\_\_

Could patient use fire escape or back door in a hurry if alone? \_\_\_\_\_

Does patient have numbers for neighbors, police, fire, and physician? \_\_\_\_\_

**Other**

Will patient be responsible for child care? \_\_\_\_\_

If so, give number of children \_\_\_\_\_ and ages: \_\_\_\_\_

Will patient do own shopping? \_\_\_\_\_

Is family member or friend available? \_\_\_\_\_

Is delivery service available? \_\_\_\_\_

Does family have automobile? \_\_\_\_\_

Is family member or friend available to help with lawn care, changing high light bulbs, and so forth?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Web-Based Resources for Clinicians, Patients, and Families

Accessible Design/Universal Design Resources: [www.makoa.org/accessable-design.htm](http://www.makoa.org/accessable-design.htm)

Americans with Disabilities Act of 1990, as amended: [www.ada.gov/pubs/adastatute08.htm](http://www.ada.gov/pubs/adastatute08.htm)

Disability Rights in Housing: [https://portal.hud.gov/hudportal/HUD?src=/program\\_offices/fair\\_housing\\_equal\\_opp/disabilities/inhousing](https://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp/disabilities/inhousing)

Home and Community Environment (HACE)

Survey: Instrument and Scoring Manual: [www.bu.edu/enact/files/2011/05/HACE-Survey-and-Manual-v1\\_7-30-2008.pdf](http://www.bu.edu/enact/files/2011/05/HACE-Survey-and-Manual-v1_7-30-2008.pdf)

Information and Technical Assistance on the Americans with Disabilities Act: [www.ada.gov](http://www.ada.gov)

Occupational Information Network (O\*NET): [www.doleta.gov/programs/onet](http://www.doleta.gov/programs/onet)

Office of Disability Employment Policy: [www.dol.gov/odep/](http://www.dol.gov/odep/)

Rehabilitation Engineering and Assistive Technology Society of America: [www.resna.org/](http://www.resna.org/)

The Center for Universal Design (North Carolina State University): [www.ncsu.edu/ncsu/design/cud/index.htm](http://www.ncsu.edu/ncsu/design/cud/index.htm)

2010 ADA Standards for Accessible Design. U.S. Department of Justice, Washington, DC: [www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards.pdf](http://www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards.pdf)

United States Access Board: [www.access-board.gov](http://www.access-board.gov)  
Universal Design Institute: [www.udinstitute.org/whatisud.php](http://www.udinstitute.org/whatisud.php)

Workplace Ergonomics Reference Guide: A Publication of the Computer/Electronic Accommodations Program, U.S. Department of Defense, Washington, DC: [http://cap.mil/Documents/CAP\\_Ergo\\_Guide.pdf](http://cap.mil/Documents/CAP_Ergo_Guide.pdf)