Selecting a Wheelchair for Agricultural Use

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Ohio AgrAbility
Cultivating Accessible Agriculture

The Ohio State University
College of Food, Agricultural, and Environmental Sciences
Agricultural Safety & Health Program

Easter Seals Disability Services
Basic Webinar Instructions

- Check sound via Audio > Computer Audio Settings.
- Please don’t activate camera.
- Closed captions: use arrow to expand the Closed Captions window to view.
- Expand/contract any of the windows in the right-hand column with the arrows.
- Expand/contract the size of the right-hand column.
Basic Webinar Instructions

• Questions and comments
  • Click Chat icon at top right of screen (it should turn blue). Enter message in box, choose who to send it to, and click send. You may enter questions about the presentation at any time
  • In addition, during the Q & A period, if you have a web microphone, click the “Raise Hand” icon to indicate that you have a question. We will enable your microphone
Basic Webinar Instructions

• 5 quick survey questions + opportunity to share comments
• Session recorded and archived with PowerPoint files at www.agrability.org/Online-Training/archived
• Problems: use chat window or email agrability@agrability.org
Potential Webinar Issues

- Audio continues, but slides don’t advance
  - Move your mouse or hit Enter
  - Disconnection with presenters
    - Hang on – we’ll reconnect as soon as possible
  - Disconnection with participants
    - Log in again
• AgrAbility: USDA–sponsored program that assists farmers, ranchers, and other agricultural workers with disabilities.
  ▫ Partners land grant universities with disability services organizations. Currently 20 state projects
  ▫ National AgrAbility Project: Led by Purdue’s Breaking New Ground Resource Center. Partners include:
    • Goodwill of the Finger Lakes
    • The Arthritis Foundation, Heartland Region
    • University of Illinois at Urbana–Champaign
    • Colorado State University
  ▫ More information available at www.agrability.org
Today’s Objectives for the Webinar:

1. Introduce the new bulletin and its contents
2. Identify multiple factors that exist on the farm, and how they affect wheelchair selection
3. Understand the expectations and limitations of the person in the chair, including the chores he or she will tackle
4. Recognize both the common and subtle features of a wheelchair and their impacts on utility

The presentation is designed for the chair user, not the service provider.
Evaluating your Environment

Identify factors that exist on the farm, and how they affect wheelchair selection
Evaluating your Environment

- Needs and Goals
- Roles and Routines
- Physical and Mental Status
- Progression of Disease Processes
- Psychosocial Appearance
- Compatibility with other Assistive Technology
What to Consider:

Where will I be using the wheelchair?
- inside or outside
- grass, dirt, or concrete

What climate will I be in?
What to Consider:
Will stairs or narrow doorways be an issue for me?
Will I use it constantly or occasionally?
More to Consider:
Do I need my wheelchair to be compatible with other assistive technology?
Do I have a caregiver or will I be independent?

Evaluating Your Environment

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Cultivating Accessible Agriculture
Understand the expectations and limitations of the person, including the chores he or she will tackle.
Current and Future Needs:
What are my needs today?
What will my needs be in the future?
How will my farming operation change in the future?
Will my needs change as a result of my farming operation changing?
What types of mobile devices are available?

Recognizing the common and subtle features of a wheelchair and their impacts on utility
◆ Attendant-Propelled
◆ Manual
  Folding vs. Rigid
◆ Lightweight
◆ Ultra Lightweight
◆ Standard-Weight

◆ Power
◆ Manual with Power Unit
◆ Scooter
◆ Smart
◆ Standing
Attendant-Propelled Chairs

- Can be used as substitute while power chair is in repair
- Pushed by another individual
- Talk with caregiver to find a chair that will work for both of you
- Can be used full-time
Manual Chairs

- Must be able to brake and propel independently with upper limbs and/or lower limbs
- Freedom to tilt - helpful in a farm environment
- Flexible
- Easy to transport
- Various Types:
  - folding
  - rigid frame
<table>
<thead>
<tr>
<th><strong>Folding</strong></th>
<th><strong>Rigid</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>User/caregiver needs ample strength and range of motion for transportation and storage of chair</td>
<td>Improved energy efficiency &amp; performance</td>
</tr>
<tr>
<td>Heavier weight and frame</td>
<td>Lighter frame weight</td>
</tr>
<tr>
<td>Elevating footrests available</td>
<td>Limited footrest options available</td>
</tr>
<tr>
<td>Snap-secure frames</td>
<td>Custom ordering from a rehabilitation technology supplier</td>
</tr>
<tr>
<td>Quick release wheels/Adjustable front rigging</td>
<td>Better for a user who needs to be cautious of energy use</td>
</tr>
</tbody>
</table>
Ultra Lightweight Chairs
• less than 25 lbs.
• intended for supplemental use
Standard-Weight Chairs

- Increased weight for improved balance and stability
- Come with less custom options
- Generally less expensive
Do I have enough strength, range of motion, and endurance to propel the chair?

Do I have enough strength to propel the chair for several hours at a time?

Does my caregiver have enough strength to propel the chair?

Standard-Weight Chairs
**Power Chairs**

- Most have wheels separate from seating system
- Sturdy
- Good for full-time users
- Works well both indoors and outdoors
Power Chairs

◆ Additional maintenance and upkeep needed
◆ Batteries: wet cell lead acid and gel-cell lead acid*

For agricultural purposes:

*Gel-cell lead acid may be a good option
- battery cases exposed to weather elements are more likely to be damaged
- user is less likely to be injured with a gel-cell lead acid battery if the battery case is damaged

◆ If the power chair breaks down, do you have a backup mobility option?
Power Chairs

Points to Consider:
- Requires cognitive and visual-perceptual ability to operate
- Specialized transport requirements: lifts, ramps
- Large turning radius
- Vehicle needs to accommodate the weight and size of chair

Types of Wheelchairs
Manual Chairs with Add-on Power Unit

- Allow power unit feature to be engaged or disengaged as needed
- “Test drive” of a power chair before committing to the purchase of a real power chair
- Power component adds weight to a manual chair
Scooters

- Not intended for full-time use
- Used as a supplement to a cane/walker for farther treks such as between barns
- Intended for community use
Scooters

- Large turning radius
- Difficult to operate:
  - indoors
  - In small outdoor spaces such as livestock pens or workshops
Smart Chairs

Computer or set of sensors attaches at the base of a mobile robot where the seat is attached.

Useful chair for those with:
- Low vision
- Cognitive impairment
- Musculoskeletal dysfunction
Smart Chairs

Three Main Functions:
1. Collision avoidance
2. Navigation through environmental barriers
3. Navigation features from place to place
Standing Chairs

◆ Good option for those with a spinal cord injury or multiple sclerosis
◆ Pressure relief
◆ Improved environmental accessibility
◆ Face-to-face communication with others
◆ More expensive than other wheelchair options
◆ Some can be mobile in an upright position
◆ Large in size
Manual Power
Includes Manual Driven & Manual Lift

- Uses hydraulic system with a pump to raise the user to a standing position
- User has a support system that uses padded bars to keep them upright

Types of Wheelchairs
Half Power
Includes Manual Driven & Manual Lift

◆ Manually driven chair that has a button that will automatically move user into a standing position

◆ User has a support system that uses padded bars to keep them upright
Full Power
Includes Manual Driven & Manual Lift

- Motorized chairs where the user has a button that will automatically move them into a standing position
- User has a support system that uses padded bars to keep them upright
Fitting your Chair

Points to consider for the best fit
Ensuring the best fit

- Seat width
- Seat depth
- Back height
- Seat height and leg rests
- Armrests
Seating and Positioning

Options for seating surfaces
Planar

- for those needing little or no postural support
- must be able to reposition themselves easily
Pre-Contoured

- gives added contact for stability
- provides greater pressure distribution
Custom Contoured

Best option for:
- a spine or pelvic deformity
- abnormal muscle tone
- decreased spinal support
Seating and Positioning

Adding cushions
### Foam

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lightweight</td>
<td>Uneven pressure</td>
</tr>
<tr>
<td>Easily sized</td>
<td>Poor durability</td>
</tr>
<tr>
<td>Inexpensive</td>
<td>Hard to Clean</td>
</tr>
</tbody>
</table>

**Cushions**
## Gel-filled

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-contouring</td>
<td>Heavy</td>
</tr>
<tr>
<td>Posture control</td>
<td>Temperature sensitive</td>
</tr>
<tr>
<td>Sitting balance</td>
<td>Requires frequent maintenance to prevent leaks</td>
</tr>
</tbody>
</table>

Cushions
# Air-filled

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Lightweight</td>
<td>Reduced postural control</td>
</tr>
<tr>
<td>Even pressure</td>
<td>Air leaking is common</td>
</tr>
<tr>
<td>Reduced shear forces</td>
<td>Requires constant maintenance</td>
</tr>
</tbody>
</table>

Cushions
Honeycomb

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Lightweight</td>
<td>Uneven pressure</td>
</tr>
<tr>
<td>Easy to clean</td>
<td>Difficult to fit user</td>
</tr>
<tr>
<td>Low maintenance</td>
<td>Adds thickness to chair</td>
</tr>
</tbody>
</table>
## Custom-contoured

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>High surface area coverage</td>
<td>Expensive</td>
</tr>
<tr>
<td>Reduced shearing forces</td>
<td>Poor longevity with biological changes</td>
</tr>
<tr>
<td>Improved postural control</td>
<td>Reduced ability to weight shift</td>
</tr>
</tbody>
</table>

Cushions
## Alternating Pressure Systems

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled pressure relief cycle</td>
<td>Expensive</td>
</tr>
<tr>
<td>Reduces user effort</td>
<td>Uneven pressure relief</td>
</tr>
<tr>
<td>Self-contouring</td>
<td>Poor sitting balance</td>
</tr>
</tbody>
</table>
## Water-filled Cushions

<table>
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<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Self Contouring</td>
<td>Heavy</td>
</tr>
<tr>
<td>Posture Control</td>
<td>Prone to Leaks</td>
</tr>
<tr>
<td>Inexpensive</td>
<td>Temperature Sensitive</td>
</tr>
</tbody>
</table>
Tires

Important for terrain conditions
Pneumatic (Air-filled)

**Advantages**
- Lightweight
- Good Shock Absorption
- Can Extend life of Chair

**Disadvantages**
- Require Regular Maintenance
Semi-Pneumatic (Foam-filled)

**Advantages**
- Requires Little Maintenance
- Good Cushioning

**Disadvantages**
- Wears out quickly
Solid Rubber

Advantages
• Little Maintenance
• Good Cushioning
• Low rolling resistance

Disadvantages
• Adds Weight to Chair
Accessories

Important for overall function and independence
Guards

- Block clothing from getting stuck in tires
- Keep tools/ropes from getting stuck in tires
- Can be used on armrests
Anti-tip Devices

- Prevent chair from tipping in
  - Fields
  - Livestock Pens
- Can be difficult to maneuver in fields and pens
Lap Trays

Can use it as a personal work bench
Restraining Devices

- seat belts, vests, harnesses
- can help with neuromuscular impairment
Recline and Tilt Options

◆ offer rest changes and pressure relief
◆ most attendant-propelled wheelchairs offer
◆ semi-recline and full-recline options
Final points to consider

And where to go for more information
Final Points to Consider

• Multi-step process

• Requires user to think about themselves, their environment, and features of a wheelchair

• Consideration of seating and positioning
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RESNA
The Rehabilitation Engineering & Assistive Technology Society of North America
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Arlington, VA 22201
Tel: 703-524-6686     http://www.RESNA.org
This presentation was made based on the Ohio AgrAbility Program’s Wheelchair Bulletin. The following references were used in both the PowerPoint presentation as well as the wheelchair bulletin.


Thank You
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