

The overall purpose of this project was to design manual wheelchair technology which can meet the unique needs of aging users across the continuum of residential environments while addressing the needs of family caregivers and facility staff.

Design Input:

This project is built upon two needs assessment studies, one targeting elders living at home and the other of elders living in assisted living and long term care facilities. Input was sought from users, caregivers, nurses, aides, and facility administrators.

Community-living wheelchair users

50% reported difficulty in propelling a wheelchair

30% reported difficulty in transferring to and from a wheelchair

50% reported difficulty in performing tasks inside the home

Nearly 100% used their wheelchair outside of the home with 50% using it for medical appointments

Curbs and doorways were the most often cited environmental barriers

Nursing home residents

Spend on average 8 hours in their wheelchairs per day; some spend up to 12 hours a day

About 50% propel with foot & hand; 35% Hand only propellers; 15% Foot only propellers.

Many residents do not use a cushion in their wheelchair. Administrators only purchase cushions for those with problems.

Nursing Home administrators

Cost of a typical wheelchair - \$150 to \$200.

Price they would be willing to spend on a new wheelchair - \$400.

Safety was the most important issue the administrators identified for their residents.

Offset Pivot Wheelchair Design Goals:

Create a wheelchair which offers more efficient propulsion and increased maneuverability for foot, arm, and combination propellers.

Meets price points. Compatible with health administrators' feedback.



Navigating a curb with ease

Offset Pivot Wheelchair Features

The drive wheel is in a more-forward position, similar to an ultra-lightweight, located near the center of gravity. This location permits better access to the push rims during propulsion. Furthermore it allows for increased maneuverability for hand, foot, and hand/foot users.

The addition of two rear casters, mounted on offset-pivot swing arms, allows at least four wheels to maintain contact with the ground as the user rides over obstacles.

The position of the rear casters and articulation of the swing arms allow for equally stable motion when propelled backward.

The resulting wheelchair configuration has a reduced overall wheelbase, further increasing maneuverability

The entire system fits within an existing folding chair mechanism, allowing for easy storage and portability, already enjoyed by folding chair users.



Folding K0005 with rear casters and pivot arms.



Folding K0001 with rear casters and pivot arms.

The MobilityRERC is supported by Grant #H133E080003 from the National Institute on Disability and Rehabilitation Research (NIDRR), part of the U.S. Department of Education.



Rehabilitation
Engineering &
Applied
Research



Georgia Institute
of Technology®