

Assistive Transfer Device Product Design Specification (PDS)

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Function: Develop an assistive device to safely transfer patients from wheelchairs to exam tables. Patients will be able to stand on or hold the device while simultaneously being lifted and rotated into position on the exam table. The design will reduce physical exertion by the patient or medical personnel.

Client requirements:

- Small base , able to fit through door-way / easy storage
- Lift a max of 300 lbs
- Simple to operate; automated or manual
- Easy to sterilize
- Mobile in clinical setting
- Avoid in-air suspension of patient
- Cost-effective
- Reduce patient anxiety during transfer

Design requirements:

1. Physical and Operational Characteristics

- a. *Performance requirements:*
 - i. 3-5 minutes per lift
 - ii. 10-15 lifts per day
 - iii. Handle loads up to 300 lbs
 - iv. Lift to height of 15 in
 - v. Rotate patient 90°
- b. *Safety:*
 - i. Safety factor of 2 – lift 600 lbs
 - ii. Few pinch points
 - iii. Stable
 - iv. Slow, constant raising and lowering rates
 - v. Lockable turntable
 - vi. Attachable walker for support
- c. *Accuracy and Reliability*
 - i. Consistent performance
 - ii. Does not let patient slip, tip, or fall
- d. *Life in Service:*
 - i. 10 years
 - ii. Approximately 50,000 cycles

- e. *Shelf Life:*
 - i. Oil joints
 - ii. Replace hydraulic fluid
 - iii. Non-corrosive
- f. *Operating Environment:*
 - i. Room temperature
 - ii. Used by nurses
 - iii. Possible human fluids
- g. *Ergonomics:*
 - i. Intuitive use/interface
 - ii. Patient comfort
 - iii. Non-abrasive materials
 - iv. Minimal operator effort (<20 lbs)
- h. *Size:*
 - i. Less than 3 ft wide (approximately 25 x 28 in)
 - ii. Less than 4 in height when compressed (initial step height)
- i. *Weight:*
 - i. Able to be moved on wheels
 - ii. Less than 50 lbs
- j. *Materials:*
 - i. Prototype – Steel, Aluminum frame
 - ii. Casters
 - iii. Canvas
 - iv. Hydraulics
 - v. Polymers – acrylic, Plexiglas
- k. *Aesthetics, appearance, and finish:*
 - i. Paint – Blue
 - ii. Safe appearance

2. Production Characteristics

- a. *Quantity:*
 - i. *One prototype this semester*
- b. *Target Product Cost:*
 - i. Less than \$500

3. Miscellaneous

- a. *Standards and Specifications:* FDA approval
- b. *Customer:* Hospitals, clinics, nursing homes
- c. *Patient-related concerns:* Elderly, frail patients
- d. *Competition:*
 - i. Hoyer Lifts
 - ii. EZ way
 - iii. Litegait