Designers have traditionally designed sites, buildings, vehicles and furniture with the average-size person in mind. This statistically-based "average" person has generally been an adult male without disabilities.

The result has been an environment which does not really meet the size and spatial requirements of many, if not most, of its users. The needs of extremely small or large adults, children, and persons who have physical disabilities have been overlooked in most of the criteria used to design the built environment. Although it can serve as only a general guide, this section should provide increased awareness of the spatial requirements of all people, especially those with disabilities.

As the illustrations on the following pages show, the eye and arm levels of people in wheelchairs are considerably lower than average, standing adults. This data is particularly significant in determining reach ranges, work surface heights and maximum heights for storage units, controls and signage. It is important to keep in mind that most accessibility guidelines such as ADA, ANSI, UFAS and others are based on "average" dimensions for people in wheelchairs. The arm and eye levels of elderly people and children using wheelchairs can vary widely from those norms, and should also be considered in the design of a barrier-free environment.

Special emphasis is given throughout this book to spatial requirements which result from the use of wheelchairs because persons using wheelchairs account for a significant percentage of people with disabilities, and because spatial requirements for such persons generally meet or exceed the requirements of persons with other disabilities.

The sources for the anthropomorphic data in this chapter are as follows:


Basic Human Dimension Data

Man and Woman without Disabilities

Children without Disabilities

Man with Dog Guide
Man and Woman on Crutches
Man with Walker
People who use wheelchairs need wider spaces to move about than average standing adults. However, people who use other mobility aids such as walkers or crutches, parents with strollers, people with dog guides or canes, or those carrying large objects may need wider spaces than even people using wheelchairs. This data is significant in determining not only the width of pathways, ramps, stairs and doorways but also the size of toilet stalls and clear floor space.

Basic Human Dimension Data

Cane Technique

Cane Clearances

Adult's Area of Side Reach

Child's Area of Side Reach
Child's Forward Reach

Adult's Forward Reach

Child's Front Reach Over Counter

Adult's Front Reach Over Counter
A large portion of most accessibility guidelines is based on the maneuvering and turning spaces required by people who use wheelchairs. This data is useful in the planning of areas such as restrooms, corridors and entrances, as well as the placement and spacing of furnishings in public areas such as lobbies, auditoriums and libraries.

The chart on page 48 illustrates some of the standard dimensions of manual and motorized wheelchairs which are commonly used today. Although many people still use manual wheelchairs, a significant number of people now use motorized ones. Wheelchair technology has developed to the point where motorized chairs can be used by people with very little mobility. Models are available which can be guided by use of a mouthstick, the nod of a head or even voice commands. As such technology becomes advanced to allow people with more severe mobility limitations to use wheelchairs, the proportion of motorized chairs will continue to increase.
Minimum Corridor Width for Turning a Wheelchair

Two Wheelchairs Passing in Corridor

Minimum Clear Floor Space for Parallel Approach

Minimum Clear Floor Space for Forward Approach

Basic Human Dimension Data
This chapter is by no means comprehensive. It provides data only for those disabilities which have or create a dimensional need that is different from one of the standard averages used for most design. There are a whole range of other disabilities which will affect the design and organization of the built environment, but will affect its dimensions in a much less direct manner. Such disabilities include, but are not limited to, hearing impairments, cognitive impairments, and some activity limitations. Excluding specific data pertaining to design for such disabilities from this chapter is not meant to imply that this data is being overlooked. In fact, an attempt has been made to thoroughly address the architectural requirements of disabilities without dimension throughout this book.