Development of an Educational Resource for Preventative Wheelchair Maintenance

An Interactive Qualifying Project Report submitted to the Faculty of the WORCESTER POLYTECHNIC INSTITUTE in partial fulfillment of the requirements for the Degree of Bachelor of Science by

Ethan Holmes

Andrew Young

Date: March 5, 2001

Approved:

Professor Holly K. Ault

1. wheelchairs
2. MDMR
3. maintenance

Professor Allen H. Hoffman
Abstract

The Massachusetts Department of Mental Retardation (MDMR) has noticed that many wheelchairs are not properly maintained. This problem and possible solutions have been explored through research via the Internet and public libraries, and interviews with wheelchair users, parents, care providers, and maintenance professionals. A website and an instructional video have been created to assist people in performing proper preventative wheelchair maintenance. These resources have been submitted to MDMR with a distribution plan, and recommendations for testing the effectiveness after implementation.
Acknowledgements

We would like to extend special thanks to our liaison Michelle Harris of the Massachusetts Department of Mental Retardation for being a great source of support and knowledge throughout the project. We also wish to acknowledge Bruce Klockars and Kathy McMahon of the Monson Developmental Center for teaching us about proper wheelchair maintenance.

Our deepest gratitude to our advisors Prof. Holly K. Ault and Allen H. Hoffman for the support and direction that they have given us over the course of the project.

We could not have completed our research without the help of numerous wheelchair users, the MDMR Training Director Colleen Ryan, Robin Foley of Worcester Area ARC, and Mike Pasquewicz and the staff of Wheelchairs Unlimited.

Special thanks to Bruce Fiene for his help with the production and editing of the instructional video and Robin Green for her assistance in editing our final report.
Executive Summary

The Massachusetts Department of Mental Retardation (MDMR) approached our advisors, Holly K. Ault and Allen H. Hoffman, with an initial problem statement: Many wheelchair users do not perform proper wheelchair maintenance. This can pose a serious safety risk and greatly reduce the lifespan of the wheelchair. Three project objectives have been formulated in order to address this problem. The objectives are to compile an instructional wheelchair maintenance resource, determine the best medium(s) to reach our target audience, and formulate a distribution plan to bring our resource to those who need it.

Since we had no previous experience with wheelchair maintenance, we began conducting research about general wheelchair maintenance, information distribution mediums, the target population, and the health care system in Massachusetts. We collected information from the Internet and several public libraries in an attempt to better understand both wheelchairs and the people who use them. We also conducted research during visits to the Monson Developmental Center, the Abilities Expo, and Wheelchairs Unlimited Inc.

After the completion of the initial research we decided to interview people in order to assess wheelchair users current maintenance practices and to help determine the best media type for distributing the resource. We interviewed four wheelchair users; Colleen Ryan, DMR Training Coordinator; Robin Foley, Vice President of Worcester Area ARC, Inc.; parents of children who use wheelchairs; residents of a DMR group home; and Mike Pasquewicz, President of
Wheelchairs Unlimited. As a result of the interviews we were able to determine that the current maintenance practices are lacking and very few people know how or where to access information about wheelchairs. Also, most people prefer the Internet as a means for accessing information, however not everyone has access to the Internet. The people who do not have Internet access preferred an instructional video as a medium for the resource and instructional videos are already widely used by MDMR.

Using the results of the interviews and several criteria such as ease of distribution, convenience/accessibility, cost, graphical content and ability to update. Each criterion was compared for a manual, website, instructional video, newsletter/pamphlet, and training seminar. Based on the comparisons and the conclusions of our interviews we determined that the creation of a website and an instructional video would be the best way to distribute the information to our target population.

Next, we had to determine the content that would be contained in each of our resources. Based on our research and our interview with Colleen Ryan, we were able to determine that our resource must contain information about the importance of wheelchair maintenance, preventative maintenance procedures, and the necessary toolkit to perform the maintenance. Preventative maintenance can be covered best if it is broken into three sections. There are certain maintenance procedures that must be performed on a weekly, monthly, and annual basis. We have used descriptions and, pictures or video, to present this information.
The content has been used to create both a website and an instructional video. The website features, wheelchair maintenance practices, photographs, written procedure descriptions, a list of manufacturers in the U.S. and Canada a list of repair shops in M.A., and an interactive bulletin board where users and professional may post and answer questions. The website has been constructed using industry standards, such as HTML, Perl, and Java. The website is also Bobby approved, which makes the site more accessible to people with disabilities. The website has been given to MDMR and they should take steps to promote the location of the website in existing publications. We have also produced a thirty-four minute instructional video. The video contains narration about the toolkit and several preventative maintenance procedures. The video has been submitted to MDMR and it should be distributed to clients and caretakers. The video should also be made available to the public upon request.

We have made several recommendations to MDMR about future research opportunities that can be completed by other WPI students. We suggest that steps should be taken to test the resources among a control population. Feedback from this can be used to make improvements to the website. The website and video should also be tested for effectiveness once the maintenance program has been implemented by wheelchair users. Our recommendations will allow the work that we have begun to be expanded and improved in order to make a larger impact upon the quality of life for wheelchair.
# Table of Contents

Abstract ......................................................................................................................... ii
Authorship Page .............................................................................................................. iii
Acknowledgements ......................................................................................................... iv
Executive Summary ......................................................................................................... v

1.0 Introduction .............................................................................................................. 1

2.0 Literature Review .................................................................................................... 4
  2.1 Importance of wheelchair maintenance ................................................................. 4
  2.2 Current system ......................................................................................................... 5
  2.3 Sources of funding for wheelchairs ............................................................................ 6
  2.4 Types of wheelchair users in Massachusetts .......................................................... 8
  2.5 Information distribution systems .......................................................................... 10
    2.5.1 Internet ............................................................................................................. 10
    2.5.2 Manuals / Books ............................................................................................. 12
    2.5.3 Pamphlets ....................................................................................................... 12
    2.5.4 Newsletters .................................................................................................... 13
    2.5.5 Video Tapes ................................................................................................... 13
    2.5.6 Courses / Training Seminars .......................................................................... 14

3.0 Methodology ............................................................................................................ 15
  3.1 Determining the target population ......................................................................... 15
  3.2 Research ................................................................................................................ 15
  3.3 Interviews ............................................................................................................... 16
  3.4 Choosing a distribution system ............................................................................. 18
  3.5 Creating the resource ............................................................................................ 18

4.0 Findings and Analysis ............................................................................................. 20
  4.1 Interview results and conclusions ......................................................................... 20
  4.2 Choosing a media type .......................................................................................... 20
    4.2.1 Criteria ............................................................................................................ 21
    4.2.2 Options ........................................................................................................... 22
    4.2.3 Results ............................................................................................................ 23
  4.3 Resource content .................................................................................................... 24
  4.4 Resource effectiveness ........................................................................................... 25

5.0 Results and Recommendations .............................................................................. 26
  5.1 Final resources ....................................................................................................... 26
    5.1.1 Website .......................................................................................................... 26
    5.1.2 Instructional video ......................................................................................... 28
  5.2 Distribution plan ..................................................................................................... 28
    5.2.1 Website .......................................................................................................... 28
    5.2.2 Instructional video ......................................................................................... 29
  5.3 Further research opportunities ............................................................................. 29
1.0 Introduction

Throughout the state of Massachusetts, there are thousands of people confined to wheelchairs. People from all walks of life and from every segment of society are restricted to wheelchairs. The many people who use wheelchairs every day constitute a range of different disabilities, social, and economic classes including veterans with disabilities, people with spinal cord injuries, people with mental retardation, elderly people, and people with physically disabling diseases.

For most of these users, their wheelchairs are one of their most important possessions. For many, it is the only way that they are able to move around freely and independently. As a result, any breakdown of one's wheelchair poses a major interruption to the daily life of its user. The user is rendered immobile until the wheelchair is fixed or he/she is able to obtain a replacement chair.

While most wheelchair users have spent the duration of their lives living and interacting within their communities, many wheelchair users, particularly those people with mental retardation and physically disabling diseases, have only recently been moved out of institutional facilities and into a broader social setting. Over the past 25 years, the state of Massachusetts has been making significant efforts to move people with mental retardation from institutional facilities into the community as a means to improve the quality of life for people with mental retardation (Bullock, 1995). The residents also had very little control over their day-to-day living and the future of their lives. Once people with mental retardation began to live outside institutions they became a much bigger part of
the community. Many people with mental retardation are now being encouraged to take some control over their lives.

As wheelchair users have moved out of institutions into the general population, they have come to reside in many forms of community housing such as group homes and cooperative apartments. However, this influx of wheelchair users into new social settings has caused some problems in that these new living arrangements no longer provide the necessary services once so easily accessible within the institution. Among these services is that of preventative wheelchair maintenance, which is maintenance that is provided on a regular schedule in order to avoid major repairs in the future. When people lived in institutions, the service was provided on a regular basis by the institution. People in these institutions had almost no responsibility for maintaining their own chairs.

While there are more wheelchair users now living in the community than ever before, there is no form of preventative wheelchair maintenance provided by the state. The only way a person can have his/her wheelchair preventively maintained is through a private business. This poses a serious problem for wheelchair users who are not able to pay for private services. Insurance programs such as Medicaid or Medicare do not typically pay for preventative maintenance so, as a result, routine maintenance is rarely performed. People who do not perform preventative maintenance risk the chance of costly wheelchair repairs and possible injury. In addition, wheelchairs that are not properly maintained are often visually unappealing. However, these people do
have the option of performing the maintenance on their own, if physically and
cognitively capable, and, if not, with the assistance of a caregiver.

In order to help wheelchair users with their preventative maintenance
needs, we have created a website and an instructional video about preventative
wheelchair maintenance. These resources contain an acceptable preventative
maintenance program that is based on information collected from the
Massachusetts Department of Mental Retardation, the Monson Developmental
Center, and numerous interviews with wheelchair users, and several existing
wheelchair maintenance programs. We have also formulated a distribution plan
to make the resource available to as many people as possible.
2.0 Literature Review

2.1 Importance of wheelchair maintenance

There are many reasons why it is important for a person to perform preventative maintenance on his/her wheelchair, including the user’s safety, avoidance of major repairs, and the wheelchair’s overall appearance. In terms of safety, failing to properly inflate and replace tires can result in brakes that do not function properly. Loose handgrips can come off while someone is pushing the chair, which can result in severe accidents. For optimal safety, a person must have control over his wheelchair. He must know how it functions, and if there are any problems with the chair.

Performing regular maintenance also helps to avoid major repairs. Would an automotive owner neglect to change the oil in his car? Of course not, because to do so would result in more costly repairs in the future. In the same way, a wheelchair needs to be properly cleaned and maintained to avoid possible injuries and repairs. In addition, maintenance helps to make a wheelchair more visually attractive. This is important because, unfortunately, the first thing that people tend to see when meeting a wheelchair user is the wheelchair. As a result, it is important for users to properly clean and maintain their chairs in order to make the chair less noticeable to the people that they meet. This is of course not true in all circumstances, but it is a general observation that was noted by Colleen Ryan of the MDMR (see Appendix B.4). Maintaining one’s wheelchair in order to improve and maintain its appearance could provide a powerful tool for convincing a person to take interest in the maintenance of his/her wheelchair.
2.2 Current system

In the current system, access to preventative wheelchair maintenance and repairs varies among users. There are very few insurance companies that will pay for preventative maintenance. This means that most users must pay out of their own pockets in order to have preventative maintenance performed by a professional. People who have MassHealth / Medicaid are not allowed to pay for any wheelchair services out of their own pocket. This is because Medicaid is for people who have low income. For this reason, the only way that these people can perform preventative maintenance on their wheelchairs is to do it themselves, or with the help of family, friends, or care providers. As a result of this system, many people fail to perform proper preventative maintenance on their wheelchairs. This results in more costly and potentially harmful problems in the future (Stapler, 2000).

If one’s wheelchair needs to be repaired by a professional, then there is a series of steps and options that can be taken to do this. There are two options for having the wheelchair repaired. If the user plans to pay for the repairs from his own pocket, he can just bring the chair to a trained mechanic and usually have the repairs made while he waits. If the user is unable to pay for the repairs, and he wishes to have his insurance or the state pay, the process is more complex. First of all, the wheelchair user needs to receive a doctor’s prescription that details what needs to be done to fix the wheelchair. Then the user may bring the chair to a repair shop that is willing to accept that particular prescription. The shop will then perform the repairs that are noted in the prescription.
however, if anything else needs to be fixed on the chair, then the shop will not fix it because if it is not specified in the prescription then they will not be reimbursed for the work. In addition, it sometimes takes several weeks for a shop to get the parts and perform the repairs needed. If the chair requires very expensive repairs, the shop will not perform the repairs until they have received payment from the insurance company, which can often take several months. During this time, the user can try to get a wheelchair on loan, however, this can be difficult to find. Performing preventative maintenance will best help users to keep their wheelchairs out of the shop and running smoothly (Stapler, 2000).

2.3 Sources of funding for wheelchairs

There are several organizations that provide funds to wheelchair users. These funds vary depending on the severity of the user’s disabilities and his or her financial status. All of the following organizations noted below provide funds for the purchase of a wheelchair and prescribed repairs to those who qualify. Private insurance is the only form of insurance that, in some cases, pays for preventative wheelchair maintenance. This is yet another reason why people should be trained to maintain their own wheelchairs.

*Department of Mental Retardation (DMR)*

The DMR provides assistance to people with all levels of mental retardation who are generally over the age of 21. This assistance includes the purchase of a wheelchair and necessary repairs (WheelchairNet, 2000).
Department of Education

The Department of Education is responsible for providing for persons with disabilities within the school system (WheelchairNet, 2000).

Medicare, Part B

Medicare provides Durable Medical Equipment (DME), which is equipment that can withstand repeated use and is primarily intended to serve a medical purpose, to people who are over the age of 65. Medicare is also available to people under the age of 65 who are disabled enough to qualify for Social Security Disability Insurance (SSDI) for at least 25 months (WheelchairNet, 2000).

Medicaid / MassHealth

Medicaid covers disabled people who are categorized as needy and as a result qualify for Supplemental Security Income (SSI) programs. It also covers those who are below a certain income after the deduction of medical expenses (WheelchairNet, 2000). Wheelchair shops are not allowed to accept cash payment from a MassHealth client, since MassHealth is provided for people with low-income.

Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA)
TEFRA covers children from birth to 6 years who are diagnostically eligible for SSI, but are ineligible for SSI due to parent income (WheelchairNet, 2000).

*Private Insurance*

Coverage is provided to the dependants of the policyholder. Benefits vary depending on the type of insurance (WheelchairNet, 2000).

*Veterans Administration*

The Veterans Administration provides benefits to all veterans, with varying levels of coverage based on the income level of the veteran (WheelchairNet, 2000).

*Worker's Compensation*

Coverage is provided to those who are covered under their employer's workers' compensation policy (WheelchairNet, 2000).

2.4 Types of wheelchair users in Massachusetts

There are several different types of people who depend on wheelchairs in their everyday life. It is hard to classify each type of wheelchair user because the diversity of these users is a reflection of the many unique, individual people in our society. However, for the purposes of our project, we have classified wheelchair users into specific categories. It is important to note that there are two major types of wheelchairs, electric and manual. Electric chairs contain a motor to
propel the wheelchair. The user, through a controller that is suitable to his or her capabilities, controls the motor. Electric wheelchairs are very complex and hard to maintain. Since electric wheelchairs are often used by people with severe disabilities, the users are usually not capable of maintaining their wheelchairs. Manual wheelchairs are simpler and contain no electronics. The user, or another person, propels the wheelchair. Manual wheelchairs are easier to maintain and repair than the electric wheelchairs. Also, people who use manual wheelchairs are often more capable of performing maintenance on their own chairs. For these reasons, this project will focus only on people who use manual wheelchairs.

The first category used for classifying wheelchair users is age. There are three major categories that are based on the user's age, labeling the user as either: children, adults, or elderly. After this, users are then categorized by their individual physical and mental abilities. Active users are those who need a wheelchair, but are able to function normally in most physical activities. Inactive users, on the other hand, are those who cannot perform most physical activities.

There are also several categories to classify the varying cognitive abilities of wheelchair users. Many people in wheelchairs have mental retardation of varying degrees. As a result, people can be classified into five groups: cognitively able, mildly retarded, moderately retarded, severely retarded, and profoundly retarded. People with mild retardation are the most active and independent. They are able to take care of themselves and participate in the community regularly. In addition, mildly retarded people can often work a simple
job without assistance. These people often need help with both their finances and healthcare (Bullock, 1995). Moderately retarded people are able to perform simple tasks like bathing and cooking simple foods. They rarely live on their own, because they often need some supervision and assistance on a daily basis (Bullock, 1995). The next classification is severe mental retardation. These people are dependant on caregivers on a daily basis. People with severe mental retardation are able to care for their personal needs and they can participate in simple conversations. They are generally unable to read and they need help to remain focused on a task (Bullock, 1995). Profoundly retarded people are those who require the most personal care. The range of people that fall into the profoundly retarded classification varies greatly in terms of ability. Some can speak and feed themselves, but others are unable to even move. As a result, they need help from a caregiver on almost all aspects of daily life (Bullock, 1995).

2.5 Information distribution systems

There are several distribution systems that may provide effective means of spreading information to our target population. The wide range of advantages and disadvantages associated with each distribution system, as well as the diversity of the target population, suggests that a combination of methods might provide an optimal solution.

2.5.1 Internet

The Internet has evolved in recent years into a rapidly growing and diverse community of computer users and information vendors. “Some
projections indicate that if Internet usage continues along its current path of growth, the entire Western world will be connected by the year 2001” (Anonymous 128). The World Wide Web, “the open community of hypertext-enabled document servers and readers on the Internet” (Musciano and Kennedy 1), provides users all over the world with a free communication medium over which they can share multimedia content of all types (Musciano and Kennedy).

The World Wide Web is extremely accessible and requires only a computer, an HTML viewer or browser, and an Internet connection. It began in the late 1960’s as an experiment in robust computer network design and now connects millions of computer users all over the globe (Musciano and Kennedy). According to internet.com’s CyberAtlas, as of December 2000, there were 137.5 million Internet users in the United States alone.

The World Wide Web distributes information using a client / server model. The servers store and distribute information as Hyper Text Markup Language (HTML) documents. The clients retrieve documents from the servers and display them to the end user (Musciano and Kennedy 4). This model provides a means for a single copy of a document, stored on a web server, to be distributed all over the world in a matter of seconds. In order to update or otherwise modify the content of the document one needs only to alter the copy stored on the server.

While the Internet has many advantages as a means of information distribution there are drawbacks as well. At the end of the year 2000 roughly 63.8% of the U.S. population did not have access to the Internet (cyberatlas.internet.com). Another drawback to the Internet is that a web site
needs to be maintained. First, in order to take advantage of the dynamic
capabilities of a web site, the information must be updated periodically. Second,
the web server that hosts the web site also needs to be maintained. It must have
a permanent connection to the Internet and be upgraded on occasion to ensure
reliability and speed. Third, the domain name for a web site cannot be
purchased for a one-time fee but must be paid for on a yearly basis. Combined,
these add up to significant recurring costs in order to maintain a web presence.

2.5.2 Manuals / Books

Manuals and books are very traditional means of distributing information
dating back to 3500 BCE when the Sumerians stored information on clay tablets
(Book Information Website). They have been used for centuries and still hold
advantages over today's emerging information technologies. Mainly, manuals
and books require no maintenance. Once a book is printed, it can remain on a
bookshelf for years without further attention. The drawbacks to manuals and
books are fairly significant. First, manuals and books are expensive to produce
and distribute. Unlimited Publishing Services charges a flat rate of $895 to print
and distribute a single volume (Unlimited Publishing Services). Second, once
distributed, the material cannot be updated.

2.5.3 Pamphlets

Pamphlets provide several advantages over manuals and books due to
their small size. They can be easily produced for a fraction of the cost involved in
printing an entire book. This makes them relatively disposable and thus they can
be distributed and updated easily. Similar to manuals and books, they require no maintenance once printed and do not entail any recurring costs like a web site.

The main drawback of pamphlets, however, is that their size makes it difficult to distribute a large amount of information. In addition, they can be easily lost or misplaced. In contrast, a web site is a permanent resource, i.e. it cannot be misplaced and is always available at the same location.

2.5.4 Newsletters

Newsletters combine the advantages of pamphlets with an extremely effective and targeted distribution system. Newsletters are sent directly to the people interested in the information. Updating the information simply entails sending out a new newsletter. If a consumer loses or misplaces a newsletter he / she can usually contact the provider and request another. In contrast, a consumer might not know whom to contact to request another copy of a lost pamphlet. Newsletters share the drawbacks of pamphlets, such as limited information, and the fact they can easily be lost or misplaced.

2.5.5 Video Tapes

Instructional videos provide a rich medium for instruction that can combine movement with other types of media such as diagrams, text, and audio. They are easy to produce and are culturally familiar and comfortable (Bell). Instructional videos are often used to distribute information on a specific topic. For example, the Worcester Public Library has a videocassette on wheelchair maintenance entitled “Maintaining Your Wheelchair” (EPVA).
Video has some inherent drawbacks as well. The information flow is not interactive and can only display a single frame at once. Further, once created, it is difficult to alter the content even in a raw digital format. Size is another limiting factor. Currently VHS provides full screen, uncompressed video at 27 megabytes per second. This is well beyond the current capabilities of networked distribution. In an effort to solve this problem lossy compression algorithms have been devised although many problems still exist that prevent video from being a viable digital medium (Bell).

2.5.6 Courses / Training Seminars

Courses and training seminars provide an intensive, high quality, interactive method of distributing information. Through demonstration, courses and training seminars can produce a much higher retention rate of the information being distributed (Ryan).

Unfortunately, courses or training seminars often require a fee to participate. They are also only offered during certain specific times slots. Lastly, they only reach a relatively small group of consumers.
3.0 Methodology

3.1 Determining the target population

One of the first steps in our project was to determine the target population of our resource. The target population played a large role in the subsequent stages of our project, especially when determining our distribution system. For example, courses or training seminars target a small population in an interactive, and hands-on manner. In contrast, websites, instructional videos, and manuals target a much larger population, but are not as effective or thorough.

3.2 Research

A large amount of research has been conducted in order to gain a better understanding of both wheelchair maintenance and the problems that it can pose for wheelchair users. The research was gathered from a wide variety of sources including the Internet, the Samuel Gridley Howe and Worcester Public libraries, the Monson Developmental Center, and several interviews with wheelchair users and professionals.

The Internet proved to be a valuable resource and we found several sites containing information on wheelchair maintenance. While it was not difficult to find wheelchair maintenance information on the Internet, it was scattered among several different locations. It was interesting that no websites were found that are dedicated solely to wheelchair maintenance and the majority of the information found was articles posted in discussion forums.

A visit to the Howe library, located at the Fernald Development Center in Waltham, MA proved to be extremely informative. The Howe library contains a
wealth of information relating to a wide variety of disabilities. The library has several folders full of wheelchair information from magazine articles and manuals as well as descriptions of clinical studies.

The Worcester Public library had a respectable collection of wheelchair maintenance information, the most useful of which was a copy of an instructional video produced by the Eastern Paralyzed Veterans Association (EPVA). The video covered manual and powered wheelchair maintenance and would serve as a model for our instructional video.

The Monson Developmental Center, located in Palmer, MA, was essential to our research efforts. We made two trips to the facility where we worked with Bruce Klockars and Kathy McMahon. Bruce and Kathy are experts in the wheelchair maintenance field and they provided us with a plethora of information. On our first trip we learned all about the current system of wheelchair repair and the problems wheelchair users face when trying to find access to preventative maintenance programs. On our second trip Bruce and Kathy helped us restore an old wheelchair that we brought with us. This hands-on experience proved extremely valuable as we were able to go through the maintenance process step by step from greasing the cross brace to replacing the bearings.

3.3 Interviews

The main objectives of the interviews we conducted were as follows: to determine current wheelchair maintenance practices, to determine whether or not the current population of wheelchair users would benefit from our information
resource, and finally, to determine which information distribution methods would be most beneficial.

A list of interview questions for the general wheelchair user (see Appendix D.1) as well as the general administrator (see Appendix D.2) have been compiled. These have been used as templates for each interview, altering them as seen fit depending on the interview subject.

The following is the list of the people interviewed:

- Carl McAllister, wheelchair user
- Patrick Moeschen, wheelchair user
- Brent Whitaker, wheelchair user
- Colleen Ryan, DMR training coordinator
- Robin Foley, Vice President of Worcester Area ARC
- Mark Hanlyn, wheelchair user
- Marie Rollins, Seven Hills advocate
- Focus group for parents of children with disabilities
- Wheelchair users living in a group home
- Mike Pasquewicz, CEO of Wheelchairs Unlimited
- Employee of a wheelchair maintenance shop

The majority of the people on our interview list are wheelchair users from a variety of environments. We chose such a wide sample of the population in order to gain an objective understanding of the current practices and avoid opinionated or otherwise skewed information.

The remaining people on our list are mostly administrators or care providers. By speaking to these people we obtained a broader view of the
wheelchair user population than the experiences of a single individual; a view of the forest as opposed to the trees, so to speak.

3.4 Choosing a distribution system

We combined the feedback we received from our interviews with the rational method of decision making to pick the distribution system that will most effectively reach our target population. The rational method of decision making, as described in Appendix E, entails five steps: determine and list all constraints, consider alternatives, determine and list all criterion (i.e. cost and number of people reached), weight each criteria by order of importance, and determine a grading system (i.e. 1 –10). As a result we have decided to create a website and an instructional video.

3.5 Creating the resource

In order to ensure that our resource would be accessible to persons with cognitive disabilities we interviewed Colleen Ryan, the training director at the MDMR. During our interview Colleen provided us with several guidelines we should follow when creating our resource. Keywords should be used wherever possible. First of all, we would need to stress the importance of preventative wheelchair maintenance. Secondly, she suggested that more graphical content is better because many of the MDMR’s clientele are not strong readers.

The resource content was developed by analyzing the feedback from our interviews combined with the data we collected during our research. This analysis is described in detail in section 4.2.
We created the website using the Hyper Text Markup Language (HTML), Perl and Java. All of these technologies are industry standards and extremely portable. These considerations were taken in order to ensure that the site would function on a variety of server platforms since the website's final home was unknown at the design stage. The website's portability could prove useful in the future as well if the MDMR ever decides to move it.

The video was taped and edited on the WPI campus. The end result was a master copy that the MDMR will be responsible for copying and distributing based on our recommendations outlined in section 5.2.2.
4.0 Findings and Analysis

4.1 Interview results and conclusions

During our research we decided that the information in our resource could be effectively distributed in a website, instructional video, or manual. Additionally, our interview process illustrated that our resource would be helpful to a large number of people and that a course or training seminar would not be capable of reaching enough people. Based on these arguments we decided that our resource should be targeted towards a large population, basically, anyone who uses or takes care of wheelchairs.

After analyzing the feedback we received from our interviews we came to the following conclusions:

- Current maintenance practices are lacking.
  - Bruce and Kathy
  - Mike Pasquewicz
- Most people prefer the Internet as a media format.
  - All interviews
  - Parental focus group
- Instructional videos are widely used for training purposes.
  - Group home focus group
- Most people have access to a TV and VCR.
  - Interviews

4.2 Choosing a media type

The process of determining the format for our resource involved combining the feedback from our interviews as discussed in section 4.1 with a general analysis of several media format options that we considered.
4.2.1 Criteria

When performing the general analysis of different media format options we started with the following set of criteria:

- Ease of distribution
- Convenience / accessibility
- Low cost
- Graphical content
- Ability to update

Ease of distribution is important because we are trying to reach as many people as possible with our resource. Convenience and accessibility are important since people are not likely to use our resource if they have to go through great lengths to obtain it. Low cost is important since we do not have a large budget. During our discussion with Colleen Ryan (see Appendix B.4) she stressed that graphical content was very important since many of the MDMR’s clientele are not strong readers. Additionally, graphical content provides the user with a better understanding of the material discussed in the text. Finally, we felt that the ability to update the resource was also important, however, due to the relatively static nature of the content, we did not consider this attribute as important as the rest.

Some of these attributes directly affect others. For example, whether or not our resource is convenient or accessible depends a great deal on how well it was distributed. Similarly, the cost of the resource can be affected by its ability to display graphical content, especially when dealing with printed formats.
4.2.2 Options

In order to find the best media format for our resource we reexamined the formats discussed in section 2.5 with regards to the criteria specified in the previous section.

Web sites score very high in all of the categories. Distribution is non-existent since a single copy of the data is accessible to anyone in the world with an internet connection. Web sites are extremely convenient and accessible since they can be viewed directly from the user’s home computer. The only costs associated with a website are hosting fees. Since our project is affiliated with both WPI and MDMR, both of whom have already have web sites, it is likely that we will be able to utilize their resources, thus minimizing hosting fees. Web sites are very capable in terms of displaying graphical content and also extremely easy to update.

In contrast, manuals are mediocre at best. Reproduction and distribution of manuals is very expensive, especially when they include color photographs and other graphical content. The convenience and accessibility of manuals are adversely affected by their cost, as is their ability to display graphical content. That is, manuals can be very convenient, accessible and can display graphical content well provided that enough money is invested in their reproduction and distribution. Manuals are not easily updated since such an update would require reprinting and redistribution.
While pamphlets and newsletters are easy to distribute, convenient, accessible, and easy to update their cost and ability to display graphical content are affected by the same issues facing manuals, *i.e.* high graphical content makes them very expensive. Outside of the specified criteria we decided that, given their relatively small size, they did not have the ability to convey as much information as is necessary for our project.

Instructional videotapes are fairly easy and cost effective to distribute. The reproduction costs are well below those of manuals since each additional copy costs only as much as a blank tape. We noted that everyone we spoke with had access to a TV and VCR thus making instructional videos very convenient and accessible. Instructional videos are great for demonstration of graphical content because they allow the user to watch the entire process step-by-step. Instructional videos are not very easy to update.

Courses and training seminars are excellent training tools, perhaps the best out of all the formats we examined. However their distribution is limited and they are not capable of reaching the amount of people we are trying to target.

4.2.3 Results

As a result of the general analysis of the media formats we examined combined with the feedback we received from our interviews we decided to create a web site and an instructional video. We felt that the combination of these two formats would be the most effective and cost efficient method of reaching our target population.
4.3 Resource content

The content of our resource was a direct product of our research. We stressed the importance of preventative wheelchair maintenance in order to persuade users that it is worth the extra effort. We compiled a list of wheelchair maintenance tasks (see table 4.3) from a collection of sources including web sites, various printed publications, and our experiences at Monson. We included a general toolkit that contains all of the tools necessary to perform the maintenance tasks described in the resource. The web site contains some additional information including a list of wheelchair manufacturers in the U.S. and Canada and a list of wheelchair repair facilities in Massachusetts.

Table 4.3: Wheelchair Maintenance Task List

- **Weekly**
  - Tires
  - Casters
  - Brakes
  - Hand Rims
  - Clean Upholstery
  - Clean Metal

- **Monthly**
  - Wheels
  - Spokes
  - Tighten Screws
  - Footrests

- **Yearly**
  - Check Frame
  - Visit a Professional
4.4 Resource effectiveness

In order to assess the effectiveness of our resource we asked several of our original interviewees as well as Bruce Klockars and Kathy McMahon from the Monson Developmental Center to fill out a short survey (see Appendix D.3) on their initial opinions of the website. We received responses from Bruce Klockars and Brent Whittaker, a wheelchair user from New Hampshire, (see Appendices B.9 and B.10). The two responses were significantly different as would be expected given the two different positions held by Bruce and Brent. Bruce liked the layout but felt that the content could be augmented with more detail. Brent also liked the layout and felt that the detail was more than sufficient.

Clearly much more work is needed in order to effectively analyze the effectiveness of the website and video. Unfortunately, due to the time constraints posed on our project, we will not be able to carry out further analysis. Section 5.3 describes several suggestions for future research and analysis possibilities.
5.0 Results and Recommendations

5.1 Final resources

5.1.1 Website

As a result of this project we have produced two preventative maintenance resources from the same knowledge base. We have created a website and an instructional video that will be reproduced and distributed by MDMR.

The website has been created as a means for people all over the world to access preventative maintenance information. There are several other such websites on the Internet, however we have taken several steps in order to ensure that this site will be helpful for people in Massachusetts. The site begins with a section detailing the importance of preventative wheelchair maintenance. It also includes the preventative maintenance program that we have designed, as well as other useful information. The site has a complete listing of contact information for wheelchair manufacturers throughout the US and Canada, and a listing of businesses in Massachusetts that sell and repair wheelchairs, scooters, and ramps. There are also links to other websites that may be helpful to the users. We have also included a bulletin board, which will likely prove to be very useful to the site’s visitors. The bulletin board allows users of the site to post messages and reply to others’ questions. This will allow people to share their knowledge and experience with those who need it.

To ensure access to the website by people with disabilities, the website has been submitted to Bobby. Bobby is a software tool designed to alert web page authors to barriers that people with disabilities face when using the Internet.
It searches through an HTML document and flags sections that could pose viewing problems to an individual with a disability. In addition, Bobby provides several general guidelines that web page authors should follow in order to make their website as accessible as possible. Our website was deemed “Bobby Approved” (Bobby, 2001).

The website will prove to be a very cost effective method of distributing information to the public. This website will be hosted for free on the Internet and as a result it will have no overhead or operational costs outside of marketing the website to wheelchair users and minimal maintenance. The marketing of the site is not a significant cost though, because it will be done primarily through existing DMR resources. The website can be updated by a DMR employee who has a little website experience.

The site does not need to be maintained to continue functioning, however as the wheelchair industry is rapidly changing, some of the information may become out of date. The contact information for manufacturers and retailers and the links to other websites should be checked for accuracy on a yearly basis. The links should be checked to make sure that they all still work. The contact information of manufacturers and retailers should be verified by using online yellow pages, such as www.bigyellow.com. The yellow pages are frequently updated, and easily accessible. This method will prove much more cost effective and time efficient then trying to contact each business for verification.
5.1.2 Instructional video

The instructional video that we have created begins by talking about the importance of preventative wheelchair maintenance. This is necessary so that when people watch the video for the first time, they will learn why they should perform maintenance in the future. The video also contains a visual guide of proper wheelchair maintenance techniques. The video is comparable to the website in content, but it also allows the user to see implementation of the maintenance process.

There will be several costs associated with the video. Copies of the master tape will need to be produced. The video will also need to be distributed to people in the community. In addition the video could incur marketing costs depending on how the DMR decides to make the public aware of the resource.

5.2 Distribution plan

5.2.1 Website

The website has been posted, and should now be marketed by MDMR. This can be done in many ways. The MDMR should begin to include the website address in its publications. In addition, the website address should be submitted to search engines, such as AltaVista, Yahoo, and Google. This can be done quickly using a free search engine submission site such as http://www.submitexpress.com/submit.html. The MDMR should also include a link on its own website, as well as asking other related websites to create links to the wheelchair maintenance website.
5.2.2 Instructional video

The instructional video has been created and given to MDMR. It should arrange to have copies of the video produced. The video should then be distributed to MDMR residences. It should also be available to care providers who work for MDMR. The video should be available from MDMR upon request. It should also be distributed to libraries around Massachusetts, so that it is more accessible to potential users. The video can also be marketed in MDMR publications and on the MDMR website.

5.3 Further research opportunities

Once the video and website have been distributed to users, the accuracy and effectiveness should be tested. A survey (see Appendix D.3) has been designed to test the content and accessibility of the website. This survey, or a modified version, should be distributed to people who have had a chance to use the website. The results can be used to determine what changes and additions should be made to the site. When people have had a period of time to implement the preventative maintenance program described in the resources, another Interactive Qualifying Project should be completed to test the effectiveness of the resources should be completed. The web site should be distributed to a portion of the target population. The people who view the site should be given a survey or questionnaire that will allow them to provide structured feedback about the web site. The feedback can be used to make
improvements to the website in order to create a resource that is more useful to the people who need it.

In the future the MDMR will be able to use the information that has been gathered to generate other media types of the resource, if they deem it necessary. This information can be revised and used in manuals, pamphlets, or training seminars. The DMR could also consider the possibility of creating a training seminar from the wheelchair maintenance material. A training seminar would be a good way to acquaint new DMR employees with wheelchair maintenance. The training seminar could also be offered to wheelchair users and their friends and families.

During our research we were made aware of several problems that exist in the current system of wheelchair maintenance. Most of these problems stem from the slowness of payment from insurance companies. There are very few wheelchair maintenance businesses in Massachusetts, despite the large number of people who use assistive mobility devices. This is due mainly to the difficulties involved with collecting payment. Businesses often have to submit a request for payment several times before they receive the money. This process takes several months, and as a result the shop must be able to cover the costs of completed jobs until they receive payment. This makes it very difficult to run a profitable wheelchair maintenance business. MDMR should look further into the way the current system runs. The further research can be used as a starting point to make changes to the system that will encourage growth among the wheelchair maintenance industry.
References

<http://cyberatlas.internet.com/big_picture/geographics/article/0,1323,591
1_151151,00.html>

Bell, Benjamin L. "Instructional Multimedia: Preliminary Recommendations in the
<http://www.tc.columbia.edu/~academic/edtech/video/recommen.htm>


<http://www.cast.org/bobby>

<http://www.xs4all.nl/~knops/timetab.html>

WPI Interactive Qualifying Project.


“Daily Care of Wheelchairs by Employees of Monson Developmental Center”.
Monson Developmental Center.

Eastern Paralyzed Veterans Association “How to Maintain Your Wheelchair”
(VHS)

Katz, R.C. and Singh, N.N. “Comprehensive fire safety training for adult mentally
retarded persons”.
J MENT DEFIC RESEARCH, 1986, 30(1), 59-69


Massachusetts Department of Mental Retardation. “Massachusetts Department
of Mental Retardation Home Page” November 18, 2000.
<http://www.dmr.state.ma.us/aboutus.html>

Massachusetts Rehabilitation Commission. “MRC Rehabilitation Technology”.
<http://neuro-www.mgh.harvard.edu/neurowe...sArticles
/Gettinghelpbuyingawheelchair.html>


<http://www.unlimitedpublishing.com/costs.htm>

"Wheelchair Care and Maintenance". Monson Developmental Center.


WheelchairNet. "WheelchairNet: Sources of Funding for Wheelchairs". November 13, 2000
<http://www.wheelchairnet.org/ProdServ/Funding/fundingsources.html>
Appendix A – Massachusetts Department of Mental Retardation (MDMR)

Note: The majority of this appendix has been gathered from the MDMR website and through conversations with our liaison Michelle Harris.

A.1 Mission statement

“The department of Mental Retardation is composed of people dedicated to creating in cooperation with others, innovative and genuine opportunities for individuals with mental retardation to participate fully and meaningfully in, and contribute to, their communities as valued members (MDMR Home Page).”

A.2 Background

The Department of Mental Retardation (DMR) is a state agency that provides support to the Commonwealth’s citizens who have mental retardation. It is part of the Executive Office of Health and Human Services.

Every day the DMR provides a wide array of services to more than 28,500 individuals. Their level of disability may require assistance in job placement, transportation, residential services, or intense levels of treatment, monitoring and care. The DMR offers assistance to people with severe disabilities. The DMR provides these services through state-operated programs and by contracting with more than 297 private provider agencies across the state.

Based on available funding, the DMR provides support services to:

- Adults 18 years or older who have mental retardation
- People whose permanent, primary residence is in Massachusetts and who need assistance to live and work in the community

It also provides support to:
- Families with children under 18 years of age if the family could benefit from support in caring for their child at home.

**A.3 DMR support services**

The DMR strives to create an array of supports, housing options, training and services that are custom-fit to a person’s needs and desires. This system supports people in defining their own needs and preferences in many areas including daily routine, personal goals, home, work, leisure and life-style.

The agency strives to provide assistance that is responsive to individual needs and provided in safe environments. DMR is committed to creating opportunities for people with mental retardation to become fully integrated in their communities by providing a wide range of choices. It promotes individual decision-making, encourages family involvement, and emphasizes consumer and family participation.

**Individualized service coordination**

Service coordination enables each person to receive the most appropriate supports and opportunities. DMR service coordinators provide information, assistance, crisis intervention, advocacy, and other supports. Service coordinators also conduct assessments to determine if people are eligible for services.

**Flexible family supports**

The majority of persons served by DMR live with their families. The DMR offers a flexible array of supports to help families keep their loved ones at home.
These supports may include community oriented resources, respite, special activities, and other supports.

**Employment services**

These services help consumers develop and refine their work skills so they can find meaningful work. The DMR also works closely with individuals and families to help them find good jobs that meet their interests and needs.

**Day services**

These are non-work related supports that help people develop skills to lead more fulfilling lives. Increasingly, these programs use existing community resources.

**Residential supports**

The DMR provides residential service options to adults who are unable to live at home due to extreme circumstances.

*Community-Based*

The DMR supports people in a wide range of living arrangements in the community. These are managed both by state and non-profit organizations. They can range from small family settings to group living situations.

*Facilities*

The DMR continues to serve 1,300 persons in its seven Developmental Centers. These centers provide 24-hour support in compliance with
federal regulations. The Department continues to assist individuals and families who choose to move to homes in the community.

Collaboration with other services

Some DMR consumers receive their services directly from generic community providers and agencies. Often they will require the services of multiple providers. DMR collaborates with all appropriate agencies to help people get the supports they need.

A.4 Distribution systems

The DMR uses several means of distributing information to their clients including mailing lists, parent groups, provider groups, and training seminars.
Appendix B - Interviews

B.1 Interview with Carl McAllister

General:

Carl McAllister
(603) 887-2674
Sandown, NH
Age: 55
AVM, paralyzed below his chest

How long have you been using a wheelchair?
13 years.

What type of wheelchair do you use?
I have a Quickie 2 lightweight wheelchair.

Preventative Maintenance:

What type if any of routine wheelchair maintenance do you currently perform? And how often do you perform it?
(Example: Inflate tires, clean frame and seat, check spokes, tighten handle grips, and clean caster housing)
Tighten handrails, check air pressure in tires, tighten bolts, replace pivoting pieces when they break, tighten any loose screws and spokes, clean frame and seat. Maintenance is performed when a problem is noticed. I also check every couple weeks to identify loose parts.

What tools do you own for maintaining your wheelchair?
Just common tools that I bought at a hardware store. Ex: Allan wrenches and screwdrivers.

Where do you acquire parts and tools?
Parts: Ryder in Manchester, NH and LifePlus in Raymond, NH (Dissatisfied with both places)

Do you take your wheelchair to a maintenance facility for any routine preventative maintenance? If yes, where? How often?
No, I perform preventative maintenance on my own. I had someone come to the house to maintain my wheelchair once, but he didn't seem to really know what he was doing.

How does this temporary loss of your wheelchair affect you?
Loosing my wheelchair is a big problem. Without I am unable to get out of bed.
Do you find the overall service at maintenance facilities to be acceptable?  
N/A

**How do you pay for preventative wheelchair maintenance?**
I pay out of my own pocket. Once I went to the doctor and got a prescription for the footrest to be repaired, but Medicare did not cover the bill, so I decided it was easier to pay it on my own.

**Repairs:**

**How often do you experience mechanical problems with your wheelchair?**
Once or twice a year, I have had problems with the frame, leg braces, and the brakes.

**What are the steps involved in having your wheelchair repaired?**
I call someone to come fix it, or I order the parts and do it myself. It is often difficult to find someone to make the repairs.

**Where do you bring your wheelchair for these repairs?**
No, But once, when the chair was under warranty, the manufacturer came and took the chair for two days in order to fix a weld on the frame. They provided a temporary chair, and it was not a major inconvenience.

**How long does it take to have a minor repair made to your wheelchair?**
Between a couple hours and a couple days.

**How do you pay for wheelchair repairs?**
I pay out of my own pocket.

**Maintenance & Repairs Conclusions:**

**Who should perform preventative wheelchair maintenance services?**
*Example: The users, government, private businesses*
I need someone to help me maintain my wheelchair. I think that my need would be best served by a business. It’s not that I am unwilling to pay for service, it is just hard to find anyone who can do it well.

**Do you feel you would benefit from a training program about routine wheelchair maintenance?**
Yes, greatly. I would be willing to pay for someone to come to my house and teach me how to maintain my chair properly. It would be nice if it was a professional or a manufacturer’s representative.
Resources:

How do you find information about wheelchair maintenance?
I just use common sense. I have never done research on wheelchair maintenance.

Do you have access to the Internet?
Yes

How often do you use the Internet?
All the time

Do you have access to a library?
Yes

How often do you use a library?
Not very often

Do you have a television / VCR?
Yes

Which organizations for persons with disabilities do you belong to?
None

Do you receive information from these organizations?
N/A

By what means do you receive this information?
N/A

Would you be interested in attending a free local class about preventative wheelchair maintenance?
Yes, I think that would be very helpful.

Which type of instructional material would you find most helpful for preventive wheelchair maintenance?
A website or video would be most helpful for me. I would like know what a proper maintenance program is, and what things I am missing in my maintenance program.
B.2 Interview with Patrick Moeschen

General:

Patrick Moeschen
(603) 893-7055
Woodbury School
Salem, NH
Age: 28
Muscular Dystrophy, Marginal Ambulator

How long have you been using a wheelchair?
5 years

What type of wheelchair do you use?
I use a Quickie lightweight wheelchair

Preventive Maintenance:

What type if any of routine wheelchair maintenance do you currently perform? And how often do you perform it?
(Example: Inflate tires, clean frame and seat, check spokes, tighten handle grips, and clean caster housing)
I perform basic maintenance, tighten loose screws and check air pressure in the tires.

What tools do you own for maintaining your wheelchair?
A wrench and some screw drivers

Where do you acquire parts and tools?
N/A

Do you take your wheelchair to a maintenance facility for any routine preventative maintenance? If yes, where? How often?
Yes, I bring my chair to Ryder in Manchester, NH. They clean my chair and give it a tune-up. Not on a regular schedule of maintenance, generally once a year.

How does this temporary loss of your wheelchair affect you?
It only takes about 25 minutes, so I just wait and take my chair home with me.

Do you find the overall service at maintenance facilities to be acceptable?
Yes, I have no complaints.

How do you pay for preventative wheelchair maintenance?
I pay out of my own pocket. My insurance does not cover routine maintenance.
Repairs:

How often do you experience mechanical problems with your wheelchair?
I haven’t experienced any major problems.

What are the steps involved in having your wheelchair repaired?
N/A

Where do you bring your wheelchair for these repairs?
N/A

How long does it take to have a minor repair made to your wheelchair?
N/A

How do you pay for wheelchair repairs?
N/A

Maintenance & Repairs Conclusions:

Who should perform preventative wheelchair maintenance services?
*Example: The users, government, private businesses*
I am happy with the business that I currently bring my wheelchair to.

Do you feel you would benefit from a training program about routine wheelchair maintenance?
Yes.

Resources:

How do you find information about wheelchair maintenance?
I just use common sense. I have never done research on wheelchair maintenance.

Do you have access to the Internet?
Yes

How often do you use the Internet?
A lot

Do you have access to a library?
Yes

How often do you use a library?
No, just the Internet.

Do you have a television / VCR?
Yes

Which organizations for persons with disabilities do you belong to?
Muscular Dystrophy Association

Do you receive information from these organizations?
Yes

By what means do you receive this information?
I receive a magazine called Quest, as well as some other mailings, and I go to some of the seminars that they offer.

Would you be interested in attending a free local class about preventative wheelchair maintenance?
Yes, I think that would be very helpful.

Which type of instructional material would you find most helpful for preventive wheelchair maintenance?
Internet
B.3 Interview with Brent Whitaker

General:

Brent Whitaker
(603) 893-7055
Woodbury School
Salem, NH
Age: 30
Spinal Cord Injury (Paraplegia)

How long have you been using a wheelchair?
11 years

What kind of wheelchair do you use?
Custom made wheelchair from Halls Wheels.

Preventative Maintenance:

What type if any of routine wheelchair maintenance do you currently perform? And how often do you perform it?
(Example: Inflate tires, clean frame and seat, check spokes, tighten handle grips, and clean caster housing)
I oil the wheels, and tighten loose screws.

What tools do you own for maintaining your wheelchair?
A wrench, Allen wrenches, some screw drivers, and a compressor.

Where do you acquire parts and tools?
Halls Wheels in Cambridge, MA

Do you take your wheelchair to a maintenance facility for any routine preventative maintenance? If yes, where? How often?
Yes, I bring my chair to Halls Wheels, and he takes care of everything.

How does this temporary loss of your wheelchair affect you?
I wait for my chair to be maintained and I bring it home with me.

Do you find the overall service at maintenance facilities to be acceptable?
Yes, I am lucky because I have a good connection with Halls Wheels. If I didn’t have this connection, I have no idea how I would go about having my wheelchair maintained or repaired.

How do you pay for preventative wheelchair maintenance?
I pay all of it out of my own pocket.
Repairs:

How often do you experience mechanical problems with your wheelchair?
About once a year, it is generally in the spring as a result of the snow and salt that my wheelchair is exposed to in the winter.

What are the steps involved in having your wheelchair repaired?
N/A

Where do you bring your wheelchair for these repairs?
Halls Wheels in Cambridge, MA

How long does it take to have a minor repair made to your wheelchair?
1–2 hours, if it takes longer then the shop provides me with a chair to use in the interim.

How do you pay for wheelchair repairs?
I pay all of it out of my own pocket.

Maintenance & Repairs Conclusions:

Who should perform preventative wheelchair maintenance services? (Example: The users, government, private businesses)
I am happy with the business that I currently bring my wheelchair to.

Do you feel you would benefit from a training program about routine wheelchair maintenance?
Yes, a guide or manual would be very helpful. I would like something that I can refer to whenever my wheelchair has a problem.

Resources:

How do you find information about wheelchair maintenance?
I just use common sense. I have never done research on wheelchair maintenance.

Do you have access to the Internet?
Yes

How often do you use the Internet?
A lot

Do you have access to a library?
Yes

How often do you use a library?
Sometimes

Do you have a television / VCR?
Yes

Which organizations for persons with disabilities do you belong to?
None

Do you receive information from these organizations?
N/A

By what means do you receive this information?
N/A

Would you be interested in attending a free local class about preventative wheelchair maintenance?
N/A

Which type of instructional material would you find most helpful for preventive wheelchair maintenance?
Internet
B.4 Interview with Colleen Ryan

General

Colleen E. Ryan
Training Director, MDMR
Phone: (508) 845-9111x253
Fax: (508) 792-7586
Email: Colleen.E.Ryan@dmr.state.ma.us

Transcript

I guess we should probably start by explaining what we’re doing.

Sure, go for it.

We’re working with the DMR and we’re trying to create a resource for wheelchair maintenance. We’re not sure what that is yet, whether it is a website, a pamphlet or a video. We’re trying to create something that will help people maintain wheelchairs in their home through preventative maintenance. This is a project we’re doing with the school and we’ve begun interviewing some people and we’ve set up some more interviews with people we’ve contacted through the DMR.

Great.

So we have some questions about that, about what are the different techniques we should use to interview people with mental retardation.

So you are going to interview individuals who use wheelchairs?

Yes, that is our overall goal.

Do you have particular people that you already are going to meet?

We’ve already interviewed three people in New Hampshire who don’t have mental retardation, they’re just disabled and have wheelchairs.

OK.

So two of them are teachers and the other one is a husband of a teacher.

So now you want to interview people with cognitive disabilities on wheelchair maintenance kinds of stuff? And are there special things you should be knowing about when you talk to them?
Well yes, the reality is most of the people you may encounter won’t read. It mostly has to do with the age of the person that you are interviewing. If you were to interview a younger person then in all likelihood they probably do read at some level. But if it’s an older person, particularly a person who has lived most of their life in an institution, they, in all likelihood, won’t read. So the use of pictures is very helpful.

The other parts of that which are very very helpful is to demonstrate what’s going on. So, if you are talking about maintaining a wheelchair you need to really help that person relate to the chair that they use. You probably will want to ask them, “How does it feel? Who fixes it for you now?” and more of that stuff. So, as concrete as you possible can with that would be really helpful. It would be really helpful...help people be really grounded in that stuff... how they get around and that sort of thing. Also, probably, when you interview individuals you might want to interview the staff that are there with the individuals, as well. You probably want them to actually show you, as opposed to just talking. So, for instance, I am thinking of one gentleman in particular, who would actually be great to interview cause he’s got terrible, terrible wheelchair maintenance, I’ll give you his name and number. But, have people actually show you, as opposed to just talking about what they do. My experience has been that people will tell you what you want to hear, ok, and so you want to be able to have people show you, you know, say “Show me what it is that you do.” You know, this is broken so show me what you would actually do. So, that would be really helpful. If you do have individuals that..., another thing would be if you interviewed people who have high maintenance wheelchairs, you know, some wheelchairs are...

**We’re just talking manual wheelchairs.**

You’re just talking manual. Ok. Cause most of the high maintenance is on the motorized jobs, so...yeah, it’s a whole different thing. And some people have more than one, too. But have them show you, stuff like that. Um, a lot of people actually do have some very sophisticated equipment but that would be mostly motorized. I think you’ll find that, you may find that a lot of people who use wheelchairs use that as a secondary means... where some people might use a walker or might just use a wheelchair for long distance stuff. Which means it never needs any maintenance cause it’s in the closet until its needed to be used. So, find out, really, from people how often its really used if its noticeable that the persons not actually sitting in the chair at that time. The other thing is, when you go to interview people, is to just be yourselves. The people we are...the people are really friendly...people want to chat with people. This is true for the individuals as well as the staff. It’s fun...make it fun. Make it enjoyable. So, the gentleman that I thought you should interview actually uses a motorized wheelchair so you probably wouldn’t want to do that. Do you know where you’re going to go to find people to interview?
Michelle is going to help us a lot. I think we’re going to interview, like, do a focus group in a group home, we were talking about…a focus group with some parent, as well.

Michelle can really connect you with that cause she’s connected with the families and stuff like that. Yeah, that would be great. Yeah, but you know, it’s family…have concrete questions and, you know, there’s issues of…what I find, in teaching, is where if you tell me I only remember 10% and if you show me, and demonstrate to me, I have a much higher percentage of remembering it. So that’s really it. Cool. Have fun. Don’t be nervous. People are people and those people love to share… and you may find that people will share things you’re not sure if they really should or not, so really be prepared for that, you know, that information they give you and stuff is not going to go back to the dorm… most of the people that I have worked with have been pretty lonely, so, they may tell you things that you may not necessarily want to hear. But you’ve given me confidence so…

…And he’s [Andy] worked with Special Olympics…

Yes, oh yes, sure so if you’ve done some of that volunteer work you know. Cause that is the number one problem is you have people having problems relating to other in a social environment.

You mentioned we should try to avoid printed material and that type of thing. Is there any other type of material we should avoid using?

If you use printed materials, find out for the person if they have some sort of visual impairment…cause if a person has a visual impairment fourteen point is better than twelve and if you are going to use printed materials then really just use the standard…I think it’s Times New Roman…don’t use any fancy kind of lettering and stuff like that cause it makes it much harder for people to read. Less on the paper is better, so even as your developing your, , whatever it is you develop, so even if it’s a website or a checklist, or whatever, less information is actually better. My experience has been that people don’t necessarily take a lot of time to read, even the individuals with disabilities who do read, so they’ll look for key words. So there might be someway if you use very specific key words…And that’s helpful for staff as well, we do employ a number of staff where English is a second language and have very busy schedules. So whatever your going to put in print, keep it brief…pictures with words are the best, people have, well, my experience has been that people with disabilities gravitate towards TV so they like the graphic kind of stuff, but, then again, make sure your graphics aren’t too busy.

So, do you think a video type presentation would be better than printed material?
Well, if you do a video, you still have to have some printed material. The fun thing would be to do a website but the problem is that most individuals with disabilities don't have access to websites and most direct care staff don't either. Although...

Do you know where we could find numbers about that...I don't know, I doubt they exist?

Yeah, I'm trying to think...I know at our state operated homes that we have in central Massachusetts there is a computer in each home and individuals have access to that.

How many individuals are roughly in each home?

Anywhere from 4 to 5 to 6, although, we do have people who live in institutions... so there are more people there but people still have their own kind of rooms within that but there are very few. I've worked with individuals who call themselves self advocates, they're individuals who are really in charge of their lives, they are the primary decision makers. Maybe out of the twenty-five to thirty people I work with maybe 4 or 5 have daily access to a computer, so we are slowly getting there but it is less and less. I don't know if we would know the access for direct care staff, but, I wouldn't say that every home that we provide support to has a computer in it, although, people who do have access to the computers...

Well, the people that we interviewed, certain people we interviewed, all use their computers all the time as a means to get information...

A person with physical disabilities would, you see...

And they have some money and...

Yes, but most of the people we provide support to are poor, so..

But for them its just like compared to taking yourself and your wheelchair to the library or going to your computer and finding what you need..

And you find younger people tend to be more towards the computer more than us older people although I am pretty computer savvy...I like the idea of a web page..what would really work if you did that would be a touch screen system where people could touch the screen. One of the things we have... actually, there's a women who runs a home, Marie Rollins, if your interested in going more towards the website stuff, Marie is a residential director of state operated home in the Worcester area and ...Rollins...and I'll give you her phone number and she's very interested in the types of software and modifying the software, and has spent a lot of energy looking towards how to use...cause a lot of people don't have access...and if people are using some form of a wheelchair they may not
have a lot of hand mobility and so they may not, mice aren’t going to work, and so touching the screen with the pictures on it... so if your going to do a website that would probably be the best way to do it... and its interactive so the staff and the individuals can do it together...

So it may be a resource that MDMR...

Yeah, if you had... if you created a website that said, ok, wheelchair maintenance website, www., whatever it would be, and then anyone could... cause most people, they have a computer, they have access, both direct care staff and individuals, if they have access to the computer than they are somehow connected to the internet.

We were actually surprised when we were doing some research on our own on the internet at how much information we actually found on the internet...

Yeah, you know...

We found a lot of websites... with monthly checklists, weekly checklists...

Yeah, we do have a website, I don’t know if Michelle had mentioned it to you, we have a website called: communitygateway.org and I don’t think it has anything on there. I think we’re starting to... actually, if your thinking web, Cindy Bistle would be a great person to talk to, as well...

That’s definitely... like, the web, there’s a lot of downside to it but also there’s a lot of pros and we’re both in a technological school and we have a lot of experience in websites so in that sense it...

The other thing would be, if you’re going to create a video, say, you’d have to have some, like, a little folder that would go with the video so people would have some of that... but the video would have to be relatively short but you’d want to be able to actually demonstrate stuff on the video so you wouldn’t have a talking video. You would really have, four or five steps to wheelchair maintenance. You would say, “This is step one.” Then you’d actually demonstrate it so people would actually see the...

We got a video like that from the EPVA, it was a half hour video with someone showing you every step through wheelchair maintenance...

So, that’s a cool idea too... cause every home has VCR and cable. So, you could even have fun with it and put it on cable or something. The trick with any kind of... my experience at least with assisted technology is that unless you have the staff build it in how important it is to each individual, it tends to get sort of pushed to the side. One of the things your going to really want to do, with whatever you
create, is to really talk about how important it is for good maintenance and the impact it has on the individual when the maintenance isn't done well.

Just showing them the rewards that will come from...

Yeah, you have to convince them that putting in the right bolt...

... like in a fire safety training program, they said, the rewards were definitely one of the major incentives, you know, you have to have incremental rewards and then at the end there was a certificate of completion...just making people feel that they’re doing something good...

And that’s great... and we actually create some of our certificates right on the computer...but that sort of stuff of honoring the importance of the work and, also, in the material, whatever you create, talking about the potential of uncomfortableness for the person...

Safety issues...

And I would say to you there’s also another issue, around the notion of uncomfortableness and safety, but the other issue is that when someone is out and about in the community if their equipment doesn’t look good, they don’t look good. Cause what happens in our society is that people don’t see the person, they see the wheelchair. And so people make decision on...if the wheelchair looks good, they’re more apt to engage with the person...

And clothes...

Clothes are the same way. Yeah, and so that is really important cause if your wheelchair looks like crap then people tend to bias...they’re making judgments that, you know...you know, it’s the whole notion of the person really being valued. The other piece, which is very true, is because people don’t see the person, they only see the wheelchair, you could probably potentially do a skit in your video that would actually demonstrate that, you know, because...the maintenance is probably the easy part, it’s getting people to understand why the maintenance is so important is the deeper issue.

Yeah, cause coming up with the steps that you need to maintain a wheelchair isn’t...you can search for it and there it is..

But any given day some people will come by and their wheelchair will look like crap. And so a lot of it has to do with the person and the importance of it, and that’s really the harder...but people will do that, I’ve seen demonstrations where people will do a skit where they’ll only talk to the chair and they’ll ignore the person completely and everyone’s like, that’s stupid..., and then I’ve seen videos where people dance in their wheelchairs, I don’t know if you’ve ever had a
chance to see...we saw them down in Rhode Island, they’re a dance troupe, and everyone of them uses wheelchairs and their modern dance is just exquisite, just exquisite...

Wow...

I don’t know how you reach them, we were at a conference…but I’ll think if there’s a way… cause that’s another thing of how you demonstrate the importance of it is when you see this kind of movement these people used…So, anyways, I can’t think of who they might be but if I do I’ll track it done for you. But again, it is that notion of why its so important to do…its so important because…I’m convinced you need to talk to this friend of mine, his wheelchair is always dirty, its never in good condition, and he can’t personally do it himself. this is where people who, if their using chairs, the likelihood is their not sitting on the floor with it…they’re relying on staff to do it for them and so that’s why it become so important...

So educating the staff...

Yeah, and if kids are young, its families. The other piece of it though is, that, working with the individual to be invested in their chair, as well. So even though they may not be the maintainer of the chair, that, they have an ownership to the chair...

So that even though they can’t maintain it, they still want it maintained…and they’ll pressure someone to...

And that’s right, if they want it then they’ll keep saying, hey, this needs to be fixed, this needs to be fixed…So, that would be another important piece…that it is, you own this, this is your means of transportation, I mean, even just moving from the living room to the…you know, its important… I think that, clearly, a video and a website and stuff are a lot more glitzy than just a traditional kind of training. But even if you did just a traditional training, where people came to a room and you where going to teach them how to, it will still have to be all hands on. You still would have to have wheelchairs there. You’d have to pull them apart and people would have to try and fix them, you know, you’d have to do some skits where the person was ignored and that kind of stuff. You know, when we first started doing computer training for staff we actually did that. We called this class the techno phobia class, or whatever it was, so we had people open up the computer and show them what was inside of it and they opened up the mouse…just to get rid of some of the fears. Especially if a wheelchair is sophisticated, staff are very reluctant to touch it or do anything with it, oh, that has to go out to the specialist over there, whatever…And that may be another reason that even though it’s a traditional kind of training it may actually be really worthwhile. Cause then people could actually touch it, cause that’s really when
people learn is they've got something in front of them and the know that if they screw it up there's a teacher they can, you know...

And if they screw up the chairs there, there's no sanctions, no problems...

It's a good opportunity, to say, you know, we do that...if your learning how to use the computer, learn at work where you can hire people to fix it when you screw up as opposed to at home where you have to find a neighbor to come in, or something like that. But people do tend to be...it's a very similar fear of computers, particularly with wheelchairs. Not so much with other adapted, small adapted equipment, like spoons and some of that stuff its not a big deal, but once you get into computers being adapted or anything that would be considered high tech, people get really, they panic...So, if you did it traditional, it would really be a demonstration, hands on, people would get to experience it and stuff like that. And you'll still do surveys, certificates...And even if you did that in the homes, you could do the same thing, bring in some of your equipment and talk to people. But I would say, I'm not crazy about teaching in the homes, because the likelihood is that four or five people live in the home and the maintenance, and the class, may be for only one person who uses the chair, but you know I would just engage everyone else as well.

So if there's only one person there who uses a wheelchair, just engage everyone...

Yeah, engage everybody, cause people are going to be curious anyways and stuff. That's the dilemma about doing a training in somebody's home...we don't typically, I don't got to your home and teach you something, but in many cases, for the individual, it's the place where they going to use the wheelchair the most or their going to have some problems with the wheelchairs... so it would be in home or if they went to a day program, of some sort. Have you talked to people in day programs, like a day habilitation program, where pretty much anyone who goes there is going to use a wheelchair...

I don't know a lot about those...

There's a woman by the name of Mary Beth Fisher, I'll get you her number as we head out, she runs Therapeutic Work Options, it's a day, we call a day habilitation program, but its primarily for people who have pretty significant physical impairments as well as cognitive impairments. So, it tends to be very therapeutic, so physical therapists would be there, an occupational therapist would be there...people have opportunities to go out and about. My experience is that a lot of people attending those programs do use wheelchairs so I have a good relationship with Mary Beth Fisher and I'm sure she'd love to have you guys come over and she might even be willing, when you develop your training, she might even be willing to let you come over and pilot it...
So this is a program that's provided by...

She works for an agency called Seven Hills.

Yeah, we’ve heard of Seven Hills...it's Worcester Area Arc...

They're part of Seven Hill. Did you talk to Robin Foley?

Robin Foley, that's right. We have an interview with her next Wednesday...

Mary Beth also works for Seven Hills but she works in the day habilitation. And your information with Robin, Robin is a family member, and most of her connection will be with young people where as Mary Beth will have a connection with people who are adults.

So, the day programs, it is rehabilitation...

Yeah, well they call it rehabilitation, but its hard to fathom...yeah, they would be, people have fine motor issues or gross motor issues or even if... we do provide support for people where work is not an option for them, for whatever it is, it just may not be something they're really interested in or it may not be something they have cognitive awareness of, or whatever. So, we do have these, we call them habilitation instead of rehabilitation cause rehabilitation means that something got broken along the line and your trying to fix it and, in this case, people were born this way. Which is an interesting notion, you can't fix...when a person is sort of born this way there are some things you can do to really support that person but the disability doesn't go away...

Yeah, we are slowly learning the different ways of wording stuff...speaking of which, is there anything specific, in terms of wording, that...

No, you should just respect, just remember respect, just be respectful and you'll be fine. Cause even if you make as mistake, be respectful, and no one will jump down on you. We change our language all the time. There are some things...sometimes you'll hear people talk about the individuals as clients, sometimes as consumers, and stuff like that. Just talk about people as people and be respectful, that's key. And people run into this dilemma a lot, they see people with disabilities as being abnormal and, of course, all the education you get in the world...compared to what's normal, people are abnormal. Cause there's always this famous joke that there’s this conference of normal people and there’s only one person there... [laughter]...But, uh, one of the ways we address that is we go back and say, this is the way this person was born, that's normal for them. It may not be what you see, but this is who they are, this is what they always had.
Thank you very much for your time. We appreciate your help and we will keep you posted on the progress of our project.

B.5 Interview with Mike Pasquewicz

Mike Pasquewicz
President
Wheelchairs Unlimited
Worcester, MA
February 1, 2001

What are the most common repairs that are made on manual wheelchairs?
Bearings, wheels, front riggings, and upholstery.

Do you provide preventative maintenance for your clients' wheelchairs?
We recommend that the chair is brought to the shop every 6 months for a routine checkup. However, people very rarely bring their chairs in if nothing is broken. Also, insurance does not cover preventative maintenance, only repairs.

What are the benefits of preventative wheelchair maintenance?
Mobility, people without chairs cannot continue their regular daily activities. Also, $50 to $75 of repairs can be avoided each year, however insurance usually pays the bill, so this is not a saving to the customer.

How do you market the company's products and services?
There are several ways that the target population can be reached. The internet has become one of the best ways for people who use wheelchairs to access information and people without appearing disable. Wheelchair users in the Worcester area also access information through trade shows, MRC, Nurses, social services, Council on Aging, City of Worcester Handicapped Affairs, Center for Living and Working, and national organization for people with disabilities.

How many wheelchair shops are there in Massachusetts?
There are only 6 that I know of in the state. There are 2 in the Worcester area, which has more than 161,000 people use assistive mobility devices on a daily basis.

Why are there so few maintenance and repair shops?
Because of the insurance system most clients pay with some form of insurance, and it generally takes 4 months to receive reimbursement for repairs that are made. This means that we have over a third of our annual sales in accounts receivable. This makes it hard to be profitable. Also, the insurance companies are not willing to pay for travel time or costs when an employee has to make a visit to a patient's home.
When a client brings in his wheelchair for a repair, how long is it usually at the shop?
The chair is returned within 24 hours 95 percent of the time. If we are unable to return the chair in that time period, the client can borrow a chair to use in the interim.

Why do so few people properly maintain their wheelchairs?
Well, there are many reasons. People who have progressive diseases almost never perform maintenance. With a progressive disease the last thing that the client and his family are worried about is the wheelchair. Many people who will use wheelchairs as a life long means of mobility, do provide some maintenance. However, many also just wait for the wheelchair to break, and then their insurance pays for the repairs. It's kind of like the welfare system. Why would someone go get a job, if the money was not enough to survive, when the person could remain on welfare and get enough money from the government?

B.6 Interview with Mark Hanlyn and Robin Foley

Robin Foley
Vice President/COO
(508) 572-6983
rfoley@sevenhills.org
Worcester Area Arc, Inc.
81 Hope Avenue
Worcester, MA 01603

During this interview we talked with Mark Hanlyn, a self-advocate who uses a wheelchair, and Robin Foley, the Vice President/COO of Worcester Area Arc. Mark has both an electric and manual wheelchair; he uses the electric one most of the time. Mark has had his electric wheelchair for seven years it has several mechanical problems. When Mark’s wheelchair breaks, he uses his manual wheelchair, however he is only able to push the chair backwards and this greatly impedes his speed and mobility. Since Mark primarily uses only his electric wheelchair, which is not in the focus of our project, we talked with Robin and him about the system which he must deal with in order to have repairs made to his
chair. MassHealth pays for repairs to Mark's wheelchair and it can also take more than a month before the repair is made. When Mark is having a problem with his chair tells his nurse and she arranges for the repair through her manager. Mark's personal care attendants are supposed to clean his chair, however the staff sometimes does a very poor job of cleaning the wheelchair.

B.7 Focus group with MDMR group home

We visited a DMR group home and we talked we two of the residents as well as two care providers. We were not able to communicate very effectively with the residents of the home, however we learned some interesting information from the care providers. When the residents of a group home experience problems with their wheelchairs, they tell one of the employees that works at the group home. The personal care attendants are supposed to clean the residents wheelchairs every night during third shift, however this is sometimes overlooked and the chairs are rarely cleaned properly. The group home offered evidence that the wheelchairs take a lot of abuse from both the users and the staff. All of the doorways and walls clearly display the wear that has come from many close encounters with the wheelchair. The group home that we visited had a computer, but it did not appear to be used by the home's residents. The home also had a television and VCR, as well a several instructional videos to assist both the residents and the care providers. Videos are very useful to a DMR group home because of the graphical context.
B.8 Focus group with parents of wheelchair users

We expected about twelve families to show up for the focus group, however due to a snow storm only two parents and children came to the group. This made an informal discussion of relevant topics a more useful approach to collecting information. We all talked as a group, however both of the wheelchair users seemed more interested in trying to talk to each other rather than us. We were able to discuss some of the challenges that the clients face on a daily basis, and a few useful ideas were generated. It was brought to our attention that our video should be made with closed-captions to be accessible to people with visual disabilities. We also discussed the possibility of having a bulletin board on the website. This idea received positive feedback, and we determined that it could prove very useful to the website's users. A bulletin board is a great way for people with both questions and answers to be able to share their knowledge and experiences.

B.9 Web site feedback from Bruce Klockars

Bruce Klockars
AES Director
Adaptive Equipment Services
Monson Developmental Center
175 State Avenue
Palmer, MA 01069-1856
Ph.#: 413/283-3411 ext. 280

Do you like the layout of the website?
Yes, Good image and color.
Page layout is perhaps too elongated. On our 15" screen the bottom 1/4 of the page could not be seen without scrolling down.
Is it easy to navigate?
Yes, all but "Maintenance" heading 'button' in left column because it is inactive and, the long lists of manufacturers and repair centers could be broken down by type of chair or area serviced to avoid the excessive scrolling and enhance access to information relevant to each visitor.

Are the instructional maintenance procedures clear and easy to follow?
Mostly

If not, how should they be improved?
Too little information – lots more could be provided

Are the pictures useful and clear?
Yes, but...

If not, how should they be changed?
Could be more illustrative of the point being targeted

Does the website contain an adequate amount of information?
Too little information - inadequate content - more hints, at least about what can be done even if not all visitors could perform the actions

If not, what additional information should be contained? Why?
Why cleaning upholstery keeps it alive. Why tight spokes and true wheels make a difference. Why I need to know the make, model and serial # s, it's just a chair, etc. etc

Were you able to find everything that you were looking for?
No.

If not, what additional features or sections were you looking for?
Glossary in words and pictures
How to get repair literature, like exploded parts diagrams, on my particular chair.
Where to go to get parts and repairs on my (e.g.) Meyra power wheelchair.
What to call that part of the wheelchair when I'm on the phone with the people I want help from.
Where to find the Serial # and model # on the wheelchair and how are they different from the #’s on the motors, joystick and control box.

Were you able to easily use and navigate the bulletin board?
N/A

Would you use the site to help you with preventative wheelchair maintenance?
Presently, to locate dealers & manufacturers

After visiting the website, will you be more likely to perform proper preventative maintenance in the future? Why?
We'll have to consider it carefully.

Do you have any additional feedback about the website?
The tool selection could start with identifying the type of hardware and fasteners used on your chair. If they are metric, you'll need a whole different set.

B.10 Web site feedback from Brent Whittaker

Brent Whitaker
(603) 893-7055
Woodbury School
Salem, NH

Do you like the layout of the website?
Yes very friendly

Is it easy to navigate?
Very easy to navigate.

Are the instructional maintenance procedures clear and easy to follow?
Very simple any person could follow the procedures.

If not, how should they be improved?
N/A

Are the pictures useful and clear?
Yes I believe they are useful, in the case of a new wheelchair user it helps to clarify parts like casters...

If not, how should they be changed?
N/A

Does the website contain an adequate amount of information?
I believe you included plenty of information.

If not, what additional information should be contained?
N/A
Were you able to find everything that you were looking for? It covered most all aspects needing to be addressed.

If not, what additional features or sections were you looking for? N/A

Were you able to easily use and navigate the bulletin board? N/A

Would you use the site to help you with preventative wheelchair maintenance? I believe this site would be helpful for any new wheelchair user. Once you have been using one for a time you basically go through those steps.

After visiting the website, will you be more likely to perform proper preventative maintenance in the future? Why? Well I do routine maintenance on my own but it definitely helps with awareness.
Appendix C – Site Visit Summaries

C.1 Monson Developmental Center (trip #1, 10/27/2000)

Contacts:

Cindy Brown
Bruce Klockars
Kathy McMahon

Each contact’s major points have been noted in semi-shorthand.

Cindy Brown:

There are people that have been put out of homes, and into the community. These people have a demand for wheelchair maintenance, but no access. There is a belief that the market system should meet the demand that exists, however the demand has not been met. This is mainly due to the fact that wheelchair repairs are usually paid for by a third party, such as the federal government, and as a result it is often hard to collect money for the work that is done. In addition, it is necessary to visit a doctor and get approval before any wheelchair work is performed.

We discussed the issue of having people from the community bring their wheelchairs to the shop at Monson. This would be an effective way to operate a repair facility, however there are issues in the community that hinder this idea. People in the community made a movement against institutional homes in the 60’s and 70’s, and as a result people began leaving these homes and living in
the community. The feeling still remains that people should not be in these institutions, and as a result many are not willing to go there even for one day. In the course of a day at Monson people from the community could be fitted for a wheelchair by an OT and be fitted for a custom seat. However, many people are philosophically opposed. The region that Monson serves spans from the Vermont border to the Connecticut border, and from Springfield to Worcester.

Bruce Klockars:
- Wheelchair maintenance falls into two phases: phase one being the identification of what the problem is, phase two being taking the steps to fix the problem.
- Repairs paid for by a third party require medical approval that there actually is a problem. If any additional problems are encountered during the repair they cannot be fixed without additional approval.
- History of general wheelchairs.
- Wheelchair technology launched after the Vietnam War.
- Mass produced wheelchairs adequately meet the needs of roughly 70% of the population.

Kathy McMahon:
- Hospitals and homes have “appalling” practices.
- Wheelchair manufacturers don't understand the needs of handicapped people. As a result they often produce products that either fail to meet these needs or actually cause harm.

- Repairs that are under warrantee often take up to 6 weeks or more. Temporary replacement chairs are usually unavailable.

Maintenance Practices:

- Wheel changing

- Wheels are widely available at bicycle shops though they often do not use inner tubes. Instead, they use a filler tube made of semi-hard rubber.

- Caster, bearings, seat style (sling, other).

- Lateral Suspension System (LSS)

- Problems with screws.

Conclusions:

- A large part of the problems with wheelchairs is the lack of communication between the people using the products and those that produce them.

- Wheelchair users are extremely diverse in ability level and specific needs. This makes it very difficult for manufacturers to mass-produce equipment that fits everyone's needs.
Wheelchair users are separated into two major categories: residential and group homes.

Our distribution methods will probably have to be focused toward several different groups.

Due to the huge volume of dynamic information relating to wheelchair repair and maintenance, a web site would provide an advantageous medium for distribution.

In contrast, printed material would be much more difficult to physically distribute and would not be as current as possible. Unfortunately, a web site might not reach as much of the target population.

We should prepare guidelines to help handicapped people assemble an inexpensive toolkit for home wheelchair maintenance.

C.2 Wheelchairs Unlimited (1/19/2001)

Today we called Wheelchairs Unlimited and talked with Leah. She told us that the company offers courses in wheelchair maintenance and she would schedule us an appointment with Michael the president. We visited Wheelchairs Unlimited to pick up the information about its courses. While we were there Leah, the receptionist, introduced us to Steven, a wheelchair maintenance professional. Steven explained to us what the company does, and how they go about maintaining wheelchairs. When the company repairs a wheelchair they will only fix everything at once. They look at every piece of the wheelchair and inspect it for damage. Many people don’t properly maintain their wheelchairs because they do not pay attention to problems. If anything feels different about a
chair, then it should be looked at to find the problem. Even if they are no
problems, Steven stressed that wheelchairs should be brought to the shop at
least once a year for a check-up. A check-up will generally identify some
problems with the chair that were not noticed by the user. The majority of the
clients of Wheelchairs Unlimited pay with some sort of insurance or state funds,
however many also pay out of pocket. The majority of the repairs performed at
Wheelchairs Unlimited are a result of wheelchair abuse. We heard many
examples of people banging footrests into walls and having seizures in their
wheelchairs. This shows that it will be important to show people how to treat
their wheelchairs with respect in addition to performing proper routine
maintenance. Steven also mentioned that the reason there are not many
wheelchair shops is because they have trouble getting paid properly for their
services. Most of the health insurance companies do not have specific codes
setup for different types of wheelchair repairs. As a result the shop has to file a
miscellaneous wheelchair repair, and it is almost always underpaid for the
services that it has provided.

Appendix D – Interview Questions

D.1 General wheelchair user question list

General:

Name?

Contact Information?

Age?
What type of wheelchair do you use?

How long have you been using a wheelchair? ______ How long have you been using this chair? ______ How often to need to replace a chair? ______ How many wheelchairs do you estimate you have used?

Preventative Maintenance:

What type if any of routine wheelchair maintenance is performed on your chair? By who and how often?  
(Example: Inflate tires, clean frame and seat, check spokes, tighten handle grips, and clean caster housing)

What tools do you own for maintaining your wheelchair?

Where do you acquire parts and tools?

Do you take your wheelchair to a maintenance facility for any routine preventative maintenance? If yes, where? How often?

How long does it take to have preventative maintenance performed on your wheelchair?

How does this temporary loss of your wheelchair affect you?

Describe the overall service provided by maintenance facilities.

Is preventive maintenance provided by your insurance? Have you had to pay for wheelchair maintenance “out-of-pocket”? Do you have any other means of covering this expense?

Repairs:

How often do you experience mechanical problems with your wheelchair?

What are some of the problems/ types of problems that you have experienced?

What are the steps involved in having your wheelchair repaired?

Where do you bring your wheelchair for these repairs?

How long does it take to have a minor repair made to your wheelchair?

How does this temporary loss of your wheelchair affect you?
How do you pay for wheelchair repairs? (Medicaid, state funds, insurance, other sources)

What repairs have you or other non-trained professionals made on any of the chairs you have used?

How often are these types of repairs made?

Has anyone altered/ repaired your chair that has resulted in injury or loss of mobility for you? Describe what happened.

**Maintenance & Repairs Conclusions:**

Would you use a preventative wheelchair maintenance/ repair center that was offered by a state agency?

Do you see a demand or need for such a facility?

Do you feel you would benefit from a training program about routine wheelchair maintenance?

What information would you find helpful from a training program?

**Resources:**

How do you find information about wheelchair maintenance?

Do you have access to the Internet?

How often do you use the Internet?

Do you have access to a library?

How often do you use a library?

Do you have a television / VCR?

Which organizations for persons with disabilities do you belong to?

Do you receive information from these organizations?

By what means do you receive this information?

Would you be interested in attending a free local class about preventative wheelchair maintenance?
Which type of instructional material would you find most helpful for preventive wheelchair maintenance?

**D.2 General administrator question list**

How long have you worked with people who use wheelchairs?

What types of routine wheelchair maintenance practices do the clients of your organization use?

Do clients experience many problems with their wheelchairs?
Do they have trouble acquiring proper maintenance and repairs?

How do clients pay for preventative maintenance?
How do clients pay for repairs?

What percentage of your clients has access to the Internet?
What percentage actually uses the Internet?

What percentage of your clients can read?

Which distribution method do you feel would be most effective in reaching the clients of your organization? (website, video, seminar, manual)

What percentage of clients is capable of maintaining their own wheelchairs?

What percentage has care providers that are capable of performing routine maintenance for them?

Which would be more useful to your clients?
1) To train them how to properly maintain their wheelchairs.
2) To setup a service that provides them with preventative wheelchair maintenance.

Are there any other people in your organization that we should interview?

**D.3 Website feedback question list**

People who will complete the website feedback questionnaire

Carl McAllister
603-887-2674
c.m.mcallister@att.net
Website questionnaire

Do you like the layout of the website?
Is it easy to navigate?

Are the instructional maintenance procedures clear and easy to follow?
If not, how should they be improved?

Are the pictures useful and clear?
If not, how should they be changed?

Does the website contain an adequate amount of information?
If not, what additional information should be contained?

Were you able to find everything that you were looking for?
If not, what additional features or sections were you looking for?

Were you able to easily use and navigate the bulletin board?

Would you use the site to help you with preventative wheelchair maintenance?

After visiting the website, will you be more likely to perform proper preventative maintenance in the future? Why?

Do you have any additional feedback about the website?
Appendix E - Rational Method of Decision-Making

Throughout this project there are many important decisions that must be made, including determining the target population and the type of resource that should be created. The Rational Method of Decision-Making will be useful for making proper decisions that take into consideration the available information. We have discussed this method with Prof. Dimitri Kantarelis, a professor of economics at Assumption College, and the specifics follow. It is first necessary to identify the constraints that affect the decision at hand. Next, it is important to determine all of the alternatives or possible outcomes of the decision. After this it is necessary to identify the criteria that will be used to make the decision. The criteria are then weighted to reflect their overall importance to the decision. A system of grading is then applied to determine the best option.

An example of this method is the purchase of an automobile. First, one must determine the constraints that will affect the decision.

Constraints:
Price < $15,000
Transmission = Manual
# of door's = 2

The constraints in this example are formed as the result of one's financial capabilities and personal preferences. Once the constraints are determined, it is necessary to identify several alternatives that follow the guidelines of the constraints.

Alternatives:
95 Honda Civic
93 Toyota Del Sol
99 Hyundai Elantra
Once the alternatives have been determined, one must determine the criteria that are important for making a rational decision. The criteria must also be weighted to show differing levels of importance.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>3</td>
</tr>
<tr>
<td>Mileage</td>
<td>4</td>
</tr>
<tr>
<td>Age</td>
<td>2</td>
</tr>
<tr>
<td>Speed</td>
<td>1</td>
</tr>
</tbody>
</table>

After the criteria have been determined and weighted, one can use a grading system (1-10) to rank each alternative for each criterion. In each cell the first number is the grade that has been assigned and the second number is the weighted grade.

<table>
<thead>
<tr>
<th></th>
<th>Price/3</th>
<th>Mileage/4</th>
<th>Age/2</th>
<th>Speed/1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accord</td>
<td>3/9</td>
<td>4/16</td>
<td>5/10</td>
<td>10/10</td>
<td>45</td>
</tr>
<tr>
<td>Civic</td>
<td>6/18</td>
<td>8/32</td>
<td>8/16</td>
<td>9/9</td>
<td>75</td>
</tr>
<tr>
<td>Del Sol</td>
<td>10/30</td>
<td>5/20</td>
<td>5/10</td>
<td>7/7</td>
<td>67</td>
</tr>
<tr>
<td>Elantra</td>
<td>5/15</td>
<td>10/40</td>
<td>10/20</td>
<td>1/1</td>
<td>76</td>
</tr>
</tbody>
</table>

In the example of rational decision-making, the Elantra is best and the Civic is a close second. The Civic could have won had the example taken into consideration maintenance records, and the cars lifespan. For this reason it is important to include all criteria that are relevant to the decision.
Appendix F – Contact Information

F.1 Manual Wheelchair Manufacturers in the US and Canada

USA

Damaco
5105 Maureen Lane, Moorpark, CA 93021
Telephone: (805) 532-1832, (800) 432-2434
Fax: (805) 532-1836

Eagle Sportschairs
2351 Parkwood Rd, Snellville, GA 30278
Telephone: (770) 972-0763
Fax: (770) 985-4885

ETAC USA
2325 Parklawn Dr, Ste J, Waukesha, WI 53186
Telephone: (414) 796-4600, (800) 678-3822
Fax: (414) 796-4605

Everest and Jennings
3601 Rider Trail S, Earth City, MO 63045-2908
Telephone: (513) 569-3515, (800) 235-4661

Futuro
(A Beiersdorf Company)
5405 Dupont Circle, Ste A, Milford, OH 45150-2735
Telephone: (513) 271-3782, (800) 933-0214
Fax: (513) 576-8273

Gendron
400 E Lugbill Rd, PO Box 197, Archbold, OH 43502
Telephone: (800) 537-2521, (419) 445-6060
Fax: (419) 446-2631

Guardian Products Inc.
(A Sunrise Medical Company)
4175 Guardian St, #3190, Simi Valley, CA 93063
Telephone: (800) 255-5022, (805) 579-2700

Gunnell
8440 State St, Millington, MI 48746
Telephone: (517) 871-4529, (800) 551-0055
Fax: (517) 871-4563
Invacare
PO Box 4028, 899 Cleveland, St Elyria, OH 44036-2125
Telephone: (216) 329-6000
Customer service: (800) 333-6900
Customer service fax: (800) 678-4682
Website: www.invacare.com

Jaken Medical – New Horizons
2310 E Orangethorpe Ave, Anaheim, CA 92806
Telephone: (714) 447-4625, (800) 678-4499
Fax: (714) 447-4794

Kareco International
299 Rte, 22 E Green Brook, NJ 08812
Telephone: (908) 752-929, (800) 8KARECO
Fax: (908) 752-9636

Kuschall of America
708 Via Alondra, Camarillo, CA 93012-8713
Telephone: (800) 654-4768, (805) 484-3595
Fax: (805) 987-9844

Labac Systems
8955 S Ridgeline Blvd, Ste A. highlands Ranch, CO 80126
Telephone: (303) 791-6000, (800) 445-4402

LDC Corporation of America
7 E. Glenolden Ave, Glenolden, PA 19036
Telephone: (610) 586-0986, (800) 782-6324
Fax: (610) 586-0847

Mulholland Positioning Systems
PO Box 391, 215 N 12th St, Santa Paula, CA 93060
Telephone: (805) 525-7165, (800) 543-4769
Fax: (805) 933-1082
Website: www.disabilities.com/mullholland.htm

New Hall Wheels
PO Box 784 Cambridge, MA 02238
Telephone: (617) 628-7955
Fax: (617) 628-6546

Otto Bock
Xenium Ln N, Minneapolis, MN 55441
Telephone: (612) 553-9464, (800) 328-4058
Fax: (800) 962-2549, (612) 519-6150
Paraglide Medical. Inc.
12001 31st Court North, St. Petersburg, FL 33716
Telephone: (813) 573-1010
Fax: (813) 573-5553

Permobil of America
6B Gill St, Woburn, MA 01801-1721
Telephone: (617) 932-9009, (800) 736-9025
Fax: (617) 932-0428

Quickie Designs
(A Division of Sunrise Medical)
2842 Business Park Ave, Fresno, CA 93727-1328
Telephone: (209) 292-2171, (800) 456-8165
Fax: (209) 292-7412

Theradyne
395 Ervin industrial Dr, Jordan, MN 55352
Telephone: (612) 572-1500, (800) 328-4014
Fax: (612) 492-3443

Tuffcare
3999 E Lapalma Ave, Anaheim, CA 92807
Telephone: (800) 367-6160, (714) 632-3999
Fax: (714) 632-3998

UNI-USA
8025 SW 185th, Aloha, OR 97007
Telephone: (503) 649-7922
Fax: (503) 591-9435

Vector Mobility
5030 East Jensen, Fresno, CA 93725-1807
Telephone: (800) 441-0358, (209) 441-0358

Wheel Ring Inc. / Enduro Wheelchairs
199 Forest St, Manchester, CT 06040
Telephone: (860) 647-8596
Fax: (860) 647-7517

Wheelchairs of Kansas
PO Box 320, Ellis, KS 67637
Telephone: (800) 537-6454
Fax: (800) 337-2447
Canada

**Companion Walker**
#4 1420 40th Ave, NE Calgary, Ontario L4K 2J8
Telephone: (430) 275-5678

**Interior Mediquip**
PO Box 1875, Vernon, British Columbia V1T 8Z7
Telephone: (800) 561-8998, (604) 542-1363
Fax: (604) 549-3002

**Invacare Canada**
5970 Chedwart, Mississauga, Ontario L5R 3T9
Telephone: (800) 333-6900, (905) 890-8300

**Motion 2000**
15 west Pearce St, Unit #10, Richmond Hill, Ontario L4B 1H6
Telephone: (800) 661-4393
Fax: (800) 565-8729

F.2 Repair facilities in Massachusetts

**Aable Services**
45 Deer Run Circle, Barre, MA 01005
(978) 355-3016

**Able Ramp Company**
12 Garfield Circle, Burlington, MA 01803
(781) 270-9100

**Adaptive Mobility Equipment**
11 Grand Army Highway, Somerset, MA 02726
(508) 676-7575

**AFCO Equipment Corporation**
175 California Street, Newton, MA 02458
(617) 244-7200

**Agawam Medical Supply**
723 Main Street, Agawam, MA 01001
(413) 789-1100
All Care Home Health Services
P.O. Box 4073, Brockton, MA 02303
(781) 297-2002
(781) 341-9627 (fax)
(800) 427-1234 (toll-free)
allcarehhs@aol.com
http://www.allcarehhs.baweb.com

Alternative Care Providers
51 Middlesex Street, North Chelmsford, MA 01863
(978) 251-7077
(978) 251-7252 (fax)
(800) 258-0907 (toll-free)
info@altcareinc.com
http://www.altcareinc.com

American Elevator CO Inc
214 Harvard Avenue, Allston, MA 02134
(617) 730-8200

American Ramp Systems
202 West First, South Boston, MA 02127
(617) 269-5666
(617) 268-3701 (fax)
(800) 649-8215 (toll-free)
http://www.americanramp.com

American Services for the Handicapped and Elderly Inc
214 Harvard Avenue, Allston, MA 02134
(617) 730-8200

Automotive Innovations Inc
4 1st Street, Bridgewater, MA 02324
(508) 697-8324

Ayers Handicap Conversion Center
440 East Squantum Street, Quincy, MA 02171
(617) 328-0102

Baxter Pharmacy
385 Washington Street, Quincy, MA 02169
(617) 773-7733

Belmont Medical Supply CO
185 Belmont Street, Belmont, MA 02478
(617) 484-3888
Bouvier Pharmacy Inc
515 Lincoln Street, Marlborough, MA 01752
(508) 485-0432

Burke Medical Equipment
165 Front Street, Chicopee, MA 01013
(413) 592-5464

Burke Medical Equipment Inc
8 Walnut Street, Maynard, MA 01754
(978) 461-0426

Butler R D & CO
65 Ryan Drive, Raynham, MA 02767
(508) 823-7799

Byrne Home Health Center
16 North Main Street, Natick, MA 01760
(508) 655-3656

CHL Wheelchair Sales & Service Corporation
Southbridge, MA 01550
(508) 765-2614

Ciampa Medical Supply
425 Cambridge Street, Cambridge, MA 02141
(617) 547-0325

Claflin Continuing Care
949 Main Street, Weymouth, MA 02190
(781) 331-8696

Collins Surgical
87 Westgate Drive, Brockton, MA 02301
(508) 580-2825

Conlin S Pharmacy
Lawrence, MA 01840
(978) 552-1725

Conlin's Pharmacy
30 Lawrence Street, Methuen, MA 01844
(978) 552-1750
(978) 552-1725
(888) 266-5467 (toll-free)
info@conlinsnet.com

Davco Industries Inc
42 Walnut Street, Haverhill, MA 01830
(978) 373-5693

Denmarks Home Medical Equipment Inc
128 Main Street, Hyannis, MA 02601
(508) 771-2010

Denmarks Home Medical Equipment Inc
55 Main Street, Orleans, MA 02653
(508) 255-0132

Denmarks Home Medical Equipment Inc
509 Kempton Street, New Bedford, MA 02740
(508) 999-1239

Denmarks Home Medical Equipment
5 Tremont Street, Taunton, MA 02780
(508) 822-5000

Design Able
65 Ryan Drive, Raynham, MA 02767
(508) 823-3099

Diversified Medical Equipment
143 Mill Street, Leominster, MA 01453
(978) 537-8707

Elevator Service & Repair CO
Springfield, MA 01103
(413) 739-1885

Elmwood Towing
74 Baldwin Street, West Springfield, MA 01089
(413) 732-0600

Enhancements Unlimited
238 Broadway, Cambridge, MA 02139
(617) 492-1441

F W Access
148 Washburn Street, Northborough, MA 01532
(508) 393-9883
Foley John  
28 Whites Path, South Yarmouth, MA 02664  
(508) 394-1375

Footit Health Care Store  
340 Memorial Avenue, West Springfield, MA 01089  
(413) 733-7843

Furnance Brook Apothecary  
385 Washington Street, Quincy, MA 02169  
(617) 773-7733

Handilift  
stairlifts-wheelchair lifts-elevators since 1975  
(518) 393-2274  
(518) 393-7683 (fax)  
(888) 558-5438 (toll-free)  
lwmiller@handilift.com  
http://www.handilift.com

Healthalliance  
143 Mill Street, Leominster, MA 01453  
(978) 537-8707  
(978) 537-8797 (fax)

Healthwise  
825 Washington Street, Norwood, MA 02062  
(781) 762-2758

Home Care Specialists Inc  
12 Rogers Road, Haverhill, MA 01835  
(978) 373-7771

Home Health Care Supplies Inc  
33 Whistlestop Mall, Rockport, MA 01966  
(978) 546-3454

Homedco  
Springfield, MA 01104  
(413) 443-4788

Hospital Pharmacy  
825 Washington Street, Norwood, MA 02062  
(781) 762-2758
Hudson Home Health Care Rehabilitation Equipment  
630 Silver Street, Agawam, MA 01001  
(413) 786-7666

Hutchinson Medical  
333 Highland Avenue, Salem, MA 01970  
(978) 741-1770

Infinite Access East Inc  
36 Mechanic Street, Foxboro, MA 02035  
(508) 543-7919

Johnson Drug CO  
577 Main Street, Waltham, MA 02452  
(781) 893-3870

Letourneaus Pharmacy Inc  
351 North Main Street, Andover, MA 01810  
(978) 475-7779

Lifeplus Inc  
Revere, MA 02151  
(781) 485-0166

Lomedco  
55 Church Street, Lowell, MA 01852  
(978) 459-6101

Louis & Clark Homecare Medical  
490 Page Boulevard, Springfield, MA 01104  
(413) 737-7456

Louis & Clark Medical Supply  
Springfield, MA 01109  
(413) 782-1980

Manchester Home Improvement  
209 Rogers Avenue, West Springfield, MA 01089  
(413) 733-4689

Marchant Medical Supply  
426 Main Street, Hyannis, MA 02601  
(508) 790-8912  
(800) 235-0131 (toll-free)  
Marchant@Capecod.net  
http://www.marchant.baweb.com
McNabb General Store
Main, Pepperell, MA 01463
(978) 433-3323

Medequip Inc
134 Bliss Street, West Springfield, MA 01089
(413) 737-5466

Medi-Rents Inc
132 Brookline Avenue, Boston, MA 02215
(617) 247-1000
(800) 322-2232 (toll-free)

Medical Aids Inc
128 Main Street, Hyannis, MA 02601
(508) 771-2010

Motion Automotive Specialty
Route 20, Brimfield, MA 01010
(413) 245-9949

New England Home Health Care
38 Centre Street, Middleboro, MA 02346
(508) 947-0225

New England Medical Homecare Inc
7 Saint Mark Street, Auburn, MA 01501
(508) 832-3760

New England Mobility
10 Windemere Way, Bridgewater, MA 02324
(508) 697-0635

New England Therapeutic
17 Wilson Street, Chelmsford, MA 01824
(978) 250-0808

PKP Rehabilitation Inc
1600 Providence Highway, Walpole, MA 02081
(508) 660-2105

Prescription Pharmacy Inc
38 Centre Street, Middleboro, MA 02346
(508) 947-1909
R-D Butler & CO Inc
320 West Center, West Bridgewater, MA 02379
(508) 586-7819

Renmar Distribution
100 Ashburton Avenue, Woburn, MA 01801
(781) 938-1158

Source Equipment Company
38 Fruit Street, Leominster, MA 01453
(978) 537-3498 (fax)
(800) 743-5545 (toll-free)
support@sourceequipment.com

Southeast Railing & Iron Works CO
901 Turnpike Street, Canton, MA 02021
(781) 828-7088

Sullivans Medical Supply
1 Corinth Street, Roslindale, MA 02131
(617) 325-0013

Surgimed Corporation
109 Eagle Street, North Adams, MA 01247
(413) 663-8655

Suspension Compression Sys
238 Broadway, Cambridge, MA 02139
(617) 868-9120
(617) 868-9121

Thyssen Dover Elevator
665 Concord Avenue, Cambridge, MA 02138
(617) 547-9000

Tooheys Pharmacy
175 Main Street, Hudson, MA 01749
(978) 562-2424

Totally Mobile
182 Turnpike Road, Westborough, MA 01581
(800) 366-2994 (toll-free)
http://www.totallymobile.baweb.com
TURA S Pharmacy
85 Summer Street, Kingston, MA 02364
(781) 585-2595

United Cerebral Palsy Association of Berkshire Count
Pittsfield, MA 01201
(413) 447-9555

United Cerebral Palsy Association of Berkshire Count
57 Main Street, North Adams, MA 01247
(413) 664-9345

United Surgical Centers
87 Westgate Drive, Brockton, MA 02301
(508) 580-2825

Van Go Inc
110 Frank Bennett Highway, Saugus, MA 01906
(781) 231-1000

West Gate Pharmacy
215 West Main Street, Hyannis, MA 02601
(508) 775-9211

Wheel Chair Repair Clinic
57 Main Street, North Adams, MA 01247
(413) 664-9345

Wheelchair Depot
315 Main Street, West Springfield, MA 01089
(413) 736-0376

Wheelchairs Unlimited Inc
129 Barber Avenue, Worcester, MA 01606
(508) 856-7488
Welcome to the DMR’s website on wheelchair maintenance.

This site was created in an effort to show wheelchair users, their friends, family, and care providers how they can perform preventative wheelchair maintenance at home with a simple set of tools available at any hardware store.

Why should I perform preventative maintenance?

If a wheelchair is in the shop for repairs the user has no means of transportation and may be confined to their bed. Performing preventative wheelchair maintenance can greatly increase the lifespan and reliability of a wheelchair as well as help ensure the user’s safety. In addition, a properly maintained wheelchair will perform better, be more comfortable, and look better.

While most wheelchair repair facilities offer preventative maintenance programs, the majority of insurance companies will not cover them. The Massachusetts system further delegates that wheelchair repair facilities cannot receive payment from anyone on medicaid. This means that their clients cannot take their chair in for preventative maintenance even if they wanted to pay for it out-of-pocket.

So follow along through the website as we introduce you to the wonderful world of preventative wheelchair maintenance.
Weekly Maintenance

:: Clean Upholstery ::
You should use a cleaning solution that is appropriate for your chair's upholstery.
We found that Woolite Feather Upholstery Cleaner worked very well. Apply the
solution to the upholstery and wipe it down with a rag or paper towel. Make sure to
clean all of the cracks where dirt and crumbs may collect.

:: Tires ::
First, it is important to check the tires on your wheelchair. If the tires are filled with air, then you
should check them for proper inflation. If the tire can be squeezed, but easily then it probably needs air. If the tire pressure is too low, your wheelchair may not hold
properly. Use a pressure gauge to check the tire pressure. The proper air pressure should be written on the side of the tire. If the pressure is too low, then the
tire should be inflated with a bike pump, or an electric pump if desired. You should also look at the tire treads to make sure that they are not
worn out. This is also true for tires that have airless inserts. Hard rubber tires should
be checked for cracks and tear separations.

:: Casters ::
The front casters should be cleaned and checked for stability and play. To clean the casters you should remove them by
first taking off the cap on the top of the caster, and then
removing the nut. Do only one caster at a time so that you
can look at the second one to put the first one back together
in the correct order. Remove all of the parts and wipe them
down with a rag. Then remove the caster wheel from the fork
and clean out the hair and dirt that has built up. Now
reassemble the wheel in the correct order and repeat the
process with the other wheel.

:: Brakes ::
Once the tires have been checked for proper inflation,
you should check the wheel locks. The wheel lock
should prevent the wheel from turning. If it does not,
the brake can be adjusted to the proper tightness.
There are several different types of wheel locks that
will vary among wheelchairs, but generally there are
two nuts on the wheel lock clamp that must be
loosened. Once this is done, the brake assembly
should be moved to the proper position, and the bolts
should be retightened. That should be done until the wheel lock is positioned, as it
holds the tire firmly without slipping, while not being too difficult to lock or unlock.

:: Handrims ::
You should check the handrim to make sure that they are
tight. All of the screws should be tightened. If the handrim is
held on with metal tabs then it can not be tightened, and it
should be replaced. Also check the handrim for splinters
and cracks that may cut the users hands. If any are present then
the handrim must be replaced.
Monthly Maintenance

:: Clean Metal::
First, it is important that you put some newspaper on the floor, you will make a mess!! You should clean all of the metal parts of your chair. It is important that you clean all of the hard to get areas where dirt builds up the most. Use a cloth or rag and wipe down the parts with a household cleaner (foaming cleaners seem to work very well). After the metal parts are cleaned they should be waxed, car wax will work well. This will make your chair look good, and it will make it easier to clean next time.

:: Wheels::
In order to properly maintain the wheels, they should first be removed. You should use a wrench and a socket and ratchet that are both the same size as the axle bolt. Use the socket on the bolt head and the wrench on the nut. Twist the ratchet counterclockwise, while holding the wrench in place. Do this until the bolt comes out. Make sure to support the wheelchair so that it does not fall when the wheel is removed. While the wheels are removed, you should clean them. You should also check the handrims, as described in the handrim section. Once completed, the wheel can be reattached by using the same tools that it was removed with.

:: Spokes::
You should check the spokes to make sure they are tight. Tap a screw driver against each spoke and listen to the sound. They should all sound the same. If any spokes vibrate and sound dull then they are loose. Tightening spokes can be very difficult, and it is recommended that you take this task to a wheelchair or bicycle repair shop. They will be able to tighten your spokes and make the wheel true. If you wish to tighten the spokes on your own then you should do more research to learn to do this, however it can be very time consuming to learn.

:: Tighten Screws::
All of the screws in the chair should be tightened. This includes the screws that hold on the upholstery, as well as screws that are in the armrest and the handrims. Many wheelchairs will contain other screws that should be tightened as well. Tightening all the screws will help your wheelchair perform better as well as preventing damage to loose parts.

:: Foot Rests::
Footrest should always stay in the position that they are placed. If your footrest will not stay, then the spring needs to be replaced. Replacing a spring is not easy, it should probably be done by a trained professional.
Yearly Maintenance

You should check the frame for cracks and rust. A trained professional should look at any problems with the frame. Your chair should also be brought to a trained professional once a year for a routine checkup. The professional will be able to better spot any potential problems with your wheelchair.
The information on this website has been collected from numerous resources in order to create a comprehensive preventative maintenance plan. We have gathered information about proper wheelchair maintenance from the internet, several libraries, and through visits to wheelchair maintenance shops in Massachusetts. We have applied this knowledge by maintaining two wheelchairs. In addition, we have interviewed many wheelchair users in the community, as well as parents and care providers.

These efforts have resulted in the creation of this website and an instructional video that is available from the Massachusetts Department of Mental Retardation.
Wheelchair Maintenance

**Toolkit**

Bought at Wal*Mart on February 9, 2001

- Toolbox: $2.96
- 9 piece wrench set: $6.88
- 41 piece socket set: $9.88
- 9 piece folding hex set: $5.66
- 6 piece screwdriver set: $3.17
- Woolite foaming fabric cleaner: $3.76
- Orange Gojo hand cleaner: $1.97

(Pneumatic tires only)

- Air pump
- Air pressure gauge

---

intro | weekly | monthly | yearly | resources
---|---|---|---|---
toolkit | bulletin board | manufacturers
sales & repair | more info

 Tambourine 12
APPROVED
Wheelchair Maintenance

Bulletin Board

Showing 1 to 2 of 2 (post message | first | prev | next | last)

1. Test Message
by Joven, 4:11 PM - Feb 28, 2001

• 1.1 Re: Test Message

2. Congratulations
by Michelle Harris, 1:43 PM - Mar 1, 2001

intro | weekly | monthly | yearly | resources
toolkit | bulletin board | manufacturers
sales & repair | more info

BOBBY-3.2
APPROVED
1. Test Message
by Joven, 4:11 PM - Feb 28, 2001

This message is a test.

Reply to Message

- 1.1 Re: Test Message
The following is a list of wheelchair sales and repair facilities in the state of Massachusetts:

Able Services
45 Deer Run Circle, Barre, MA 01005
(978) 355-3016

Adaptive Mobility Equipment
11 Grand Army Highway, Somerset, MA 02726
(508) 676-7575

AFCO Equipment Corporation
175 California Street, Newton, MA 02458
(617) 244-7200

Agawam Medical Supply
723 Main Street, Agawam, MA 01001
(413) 789-1100

All Care Home Health Services
P.O. Box 4073, Brockton, MA 02303
(781) 297-2002
(781) 341-9627 (fax)
(800) 427-1234 (toll-free)
allc@allcarehhs@aol.com
http://www.allcarehhs.com
More Info

More information can be found in the following locations:

Books and Articles:
- "Daily Care of Wheelchairs by Employees of Monson Developmental Center". Monson Developmental Center.
- "Wheelchair Care and Maintenance". Monson Developmental Center.
- "Wheelchair Maintenance Basics". Exceptional Parent, April 1997, pp. 34-37

Videos:
- EPVA "How to Maintain Your Wheelchair" (VHS)

Websites:
- MRC Rehabilitation Technology
- WheelchairNet: Sources of Funding for Wheelchairs
- Department of Mental Retardation
- Assistive Technology Resource Center (ATRC)

More information can be found in the following locations:

Books and Articles:
- "Daily Care of Wheelchairs by Employees of Monson Developmental Center". Monson Developmental Center.
- "Wheelchair Care and Maintenance". Monson Developmental Center.
- "Wheelchair Maintenance Basics". Exceptional Parent, April 1997, pp. 34-37

Videos:
- EPVA "How to Maintain Your Wheelchair" (VHS)

Websites:
- MRC Rehabilitation Technology
- WheelchairNet: Sources of Funding for Wheelchairs
- Department of Mental Retardation
- Assistive Technology Resource Center (ATRC)