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An Evaluation of the Allocation of Funding for Assistive Technology: A Case Study

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AN EVALUATION OF THE ALLOCATION OF FUNDING FOR ASSISTIVE TECHNOLOGY: A CASE STUDY

by

Cindy Ollis

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ABSTRACT

An Evaluation of the Allocation of Funding for Assistive Technology: A Case Study

by

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Although benefits of assistive technology (AT) to people with disabilities are widely apparent, barriers, primarily funding, still inhibit access to needed AT. All agencies receiving federal funding are required to show no discrimination with regard to age, race, disability, and gender. This case study of a state-run agency providing funding for AT to enable independent living among people with disabilities involved analyzing spending data from 2003-2008 to determine who used the fund, what was purchased, and whether it was equitably distributed according to age, ethnicity, gender, and population density. Additionally variables predictive of amount spent per person were also sought. Results indicated the fund

was equitably distributed according to ethnicity and gender, but not age and population density. Age, gender, population density, and device type were found to have main effects with an interaction between device type and primary cause of disability in predicting the amount spent per person.

(210 pages)

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Cindy Ollis

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PROBLEM STATEMENT

There has been great progress made in comprehending what disability is, understanding the potential benefits of assistive technology in accommodating disability, and in passing legislation to increase access to assistive technology (AT). Although there are various types of AT, they all share one of four common purposes: To increase the independence of people with disabilities, to decrease the demands placed on caretakers, to enable those with disabilities to obtain and maintain employment, and to enhance the social life and well being of people with disabilities. However, it has been found that many of those who could potentially benefit from the use of assistive technology still are not using it. There are unresolved barriers, such as funding, training, access to services and so on, hindering their use of AT. While attempting to tear down the most pervasive barrier of AT use, lack of funding, all public and private agencies that receive federal funds are required by law to show no discrimination based on age, sex, disability, or race. Therefore, agencies that operate with federal funds and provide funding for AT must ensure that the funds are distributed equitably.

This paper provides a case study of a last resort funding program, administered by the Utah State Office of Rehabilitation (USOR) that helps Utah residents with disabilities purchase the AT needed to live more independently. This case study provides a clearer picture of the kinds of AT that were purchased over a 5-year period and for whom, in order to determine whether the funds were used equitably.

REVIEW OF LITERATURE

This section reviews the literature that explains what disability is, what legal attempts have been made to help those people with disabilities function more independently and the purposes and types of AT. Next, the main barriers that have prevented the use of AT by people with disabilities are discussed, along with who is more and less affected by them, and the laws governing the equitable distribution of funding by federally and publicly funded agencies who try to help individuals overcome them. Finally, a state-run funding agency that has provided funds for the purchase of AT to aid in independent living (IL) is introduced as the topic for a case study and research questions are provided.

Theoretical Background of Disability

In 1991, a panel representing the Institute of Medicine convened to discuss disability prevention and policy (Pope & Tarlov, 1991; Verbrugge & Jette, 1994). During this convention they adopted a theoretical framework, now called the Institute of Medicine Scheme/Model or Nagi’s Scheme/Model, which was created by

the sociologist Saad Nagi (Agree, 1999; Verbrugge & Jette). This framework provided a structure for the relationship between long-term care and the measurement of disability (Agree).

Nagi's Scheme consisted of four steps: pathology, impairment, functional limitation, and finally disability (Nagi, 1965, 1979, 1991). Pathologies involve cellular or tissue change (Agree, 1999). They can be caused by disease, injury, infection, or birth defect. Impairments include any kind of losses, defects or abnormalities in the functioning of organs or body systems. While all pathologies lead to impairment, it is possible for a pathology to go away but leave an impairment behind. Functional limitation refers to any limitation on one's abilities as a result of impairment (Verbrugge & Jette, 1994). Disability refers to a limitation in one's ability to perform their socially defined role. According to Verbrugge and Jette (p. 9), "Disability is not a personal characteristic, but is instead a gap between personal capability and environmental demand."

Agree (1999) and Verbrugge and Jette (1994) have each listed four methods that can be used to close this gap between demand and one's ability. Summarizing and

combining, in essence, their four ways include: activity accommodations, environmental modifications, psychosocial coping, and external supports that include both compensation and ability modification. Activity accommodations include what activities one does, how one does them, how long they last, and how often one chooses to do them. Environmental modifications are modifications to fixed architectural structures. Psychosocial coping is a way of addressing how one thinks about these challenges. External supports include both compensation and ability modification. Compensation refers to other ways a person finds to get demands met without actually meeting them on their own. This includes aids such as personal assistance, and community services. Ability modification includes any change in one's ability that resulted either from rehabilitation or from the use of any type of assistive device or AT.

According to Agree (1999) and Verbrugge and Jette (1994), external supports (including both compensation and ability modifications) and environmental modifications were ways of reducing the disabling effects of functional limitations, while role-redefinition through activity accommodations and psychosocial coping were coping

strategies that helped one to change the demands present. This paper honed in on the first technique, which involved ways to increase ability as much as possible to meet current demands.

Laws

Over the past nearly two decades there have been several laws passed addressing the rights of the population with disabilities. Some of these include the Rehabilitation Act of 1986 that was reauthorized in 1998 to ensure that information technology was available to people with disabilities (Mondak, 2000). The Technology-Related Assistance for Individuals with Disabilities Act was passed in 1988. It was amended in 1994. In 1998 it was amended again, changing the name to The Assistive Technology Act of 1998 which was amended in 2004 to help states set up and fund comprehensive, statewide systems to provide devices and technologies to assist the people with disabilities. In 1990, the Americans with Disabilities Act (ADA) was passed. This act required employers to hire people based on their qualifications regardless of the presence of disabilities, and to provide any reasonable and needed environmental adjustments or AT necessary for a person with

a disability to fill the position. The Individuals with Disabilities Education Act (IDEA) passed in 1990, and amended in 2004, mandated that when needed for educational purposes, assistive devices be written into each student's Individualized Education Program, (IEP), meaning that as necessary, the schools would provide the needed assistive devices.

Purposes of Assistive Technology

Consistent throughout federal legislation, assistive device is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the function of individuals with disabilities" (see IDEA 1990, section 1401).

Assistive technology serves several purposes. Increasing independence in activities of daily living by reducing physical limitations thereby reducing the number of hours of personal assistance needed is one of the main purposes served by AT (Copley & Ziviani, 2004; Hoenig, Taylor, & Sloan, 2003; Inge, Strobel, Wehman, Todd, & Targett, 2000). Hoenig et al. did a cross-sectional study of elderly (>65 years), community dwelling, Medicare

recipients. Their group of interest, *n* = 2,368, consisted of individuals who had at least one disability. They also had a control group of *n* = 1,200 who did not have any reported disabilities. They found that their "multivariate models showed a strong and consistent relationship between technological assistance and personal assistance, whereby use of equipment was associated with fewer hours of help" (p. 330). On average, they found that people who do use AT reported about four fewer hours per week of personal assistance, than those who do not use AT. They suggest that while help from another person may reduce the difficulty a person experiences while trying to accomplish a task, it does not enable them to function more independently.

Verbrugge, Rennert and Madans (1997) used data from the First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study conducted from 1971 to 1975 with follow ups from 1982 through 1987, by the National Center for Health Statistics, which initially surveyed people from age 1 to 74 with an initial *n* = 14,407, and various targeted follow-ups ranging in size from *n* = 3,027 to *n* = 10,523 conducted an average of 15 years later. They looked at three groups, those who use no AT, those who use

both AT and personal assistance, and those who use only AT. They found that the use of only equipment was the most effective method for both reducing and resolving functional limitations.

Agree (1999) also did a study in which she compared elderly people, at least 70 years in age, who used AT with those who did not, using ordered logistical regression. She found that while controlling for functional limitations, those who relied exclusively on AT reported less disability, (the gap between what they can do and what is demanded) regarding mobility, than those relying exclusively on personal assistance. She also suggested that the use of assistive technology does not require the ongoing cooperation and coordination required by personal assistants. This freedom facilitates an increased sense of independence among the elderly with long-term care needs.

Assistive technology can be helpful in reducing demands, such as heavy lifting, on caretakers (Andrich, Ferrario, & Moisiva, 1998; Hoenig et al., 2003). Andrich and colleagues (1998) conducted a cost-benefit analysis to determine the true cost or benefit of AT for seven case studies with varied disabilities and needs. They pointed out that in doing so, it was important to factor in the

cost of care provided at no charge by loved ones and the effect that caregiving has on the quality of life for the caregiver. They found that if the caregivers were to be paid for their services, in all seven cases, it was less costly to purchase the AT than it would have been to pay for assistants to provide the service that the AT provided.

Another fact that must be kept in mind is the quality of life for the caregiver. In a study by Bookwala and colleagues (2004) a positive relationship between depressive symptoms among caregivers and the amount of care they provided was found. Additionally Cheffings (2003) surveyed 1,000 caregivers and found that nearly 50% of them reported some type of negative health impact resulting from their service. Some of the reported effects include increased rates of anxiety, stress and tension, depression, and back injury. Assistive Technology is able to relieve some of the burdens placed on caregivers, and thus improve the caregivers' quality of life. Improved quality of life for the caregiver is an advantage of AT that may be easily overlooked.

Another purpose of AT is to help those with functional limitations to obtain and maintain employment (Americans with Disabilities Act [ADA], 1990; Dorman, 1998). The

importance of this function of AT is clearly demonstrated by the laws that mandate employers to provide reasonable accommodations to people with disabilities (ADA; Assistive Technology Act, 2004).

Finally, AT can aid students in meaningfully participating in educational opportunities and improving their social interactions and well being (Salminen, Petrie, & Ryan, 2004). As shown by the fact that this has been included as legislation in IDEA (2004), this clearly is important for a good educational experience for children with functional limitations, and is valued by our society.

Types and Accomplishments of Assistive Technology

Assistive technology comes in many varieties and forms. It ranges from adjustments that can be made with little or no monetary cost to devices or technologies that can be quite expensive. Assistive Technology can be low tech, such as increasing the size on a spoon handle making it easier to hold on to (Scherer & Glueckauf, 2005). It can also be high tech, such as a specialized switch that can function as a computer interface allowing its user to

input information via breath pressure, by either sipping or puffing (Dorman, 1998).

Several types of physical limitations exist for which AT can be of use. Some of these limitations are in the areas of mobility, communication, hearing, vision, fine motor coordination, and learning disabilities. Advances in technology to aid in dealing with each of these types of limitations will be discussed next.

Mobility limitations have been shown to be the root cause of the most common disabilities leaving people in need of AT (Agree, 1999). Pathologies that lead to the need for mobility devices include, but are not limited to: quadriplegia, paraplegia, spina bifida, multiple sclerosis, cerebral palsy, trauma, amputation, arthritis, cardiovascular insufficiency, and congestive lung disease (Agree; Andrich et al., 1998; Inge et al., 2000; Johnson, Dudgeon, Kuehn, & Walker, 2007). In consequence of the frequency of demobilizing disabilities, mobility enhancing devices are the most used type of AT. Examples of devices available to help those with mobility impairments include: electric scooters, bimanual rear wheel-driven wheelchairs, electric motor-driven wheelchairs with powered steering, bicycles with propulsions units (Inge et al.; Wessels, de

Witte, Jedeloo, van den Heuvel, & van den Heuvel, 2003). These devices assist people to move around when they cannot effectively ambulate independently. For those without good control or strength in their arms, the devices can be made to be self-propelled, and controlled by joystick (most commonly) or another input method, if necessary. For those who are not capable of controlling their own chair, manual chairs controlled by another work well. Manually powered chairs are also a good option for those who have good arm control and strength because it helps them to keep in shape. Devices available to help with walking include: crutches, braces, canes and walking frames (Mondak, 2000; Wessels et al.). These devices enable individuals to do as much as possible on their own by providing only the necessary amount of assistance, but still make it possible for individuals to get around when they are not capable of doing what is required of them without help.

Assistive devices have made great strides in the area of communication facilitation for people with disabilities. Pathologies that cause communication deficiencies include, but are not limited to: dysarthria (a speech motor disorder), spinal cord injuries, traumatic brain injury, cerebral palsy, and multiple sclerosis (Barry & Wise, 1996;

Hawley et al., 2007; Salminen et al., 2004; Yang, Huang, Chaung, & Yang, 2008). Devices that can aid with these pathologies include: a single-switch Morse code input device for mobile phones (not as common today as in the past), digital audio communication devices, speech recognizers, alternative and augmentative communication devices, and computer-augmented communication devices. All of these devices aid the user by either producing voice, or Morse code output allowing the individual who is speech-impaired to communicate with other individuals, or are designed to recognize the speech output provided by the speech-impaired individual and send the data to some kind of control system, such as an environmental control system.

People who are hard of hearing or deaf require AT to do tasks such as watch television, use the telephone, answer the door, and sometimes use the computer. There are special phones, commonly referred to as Telecommunication Devices for the Deaf (TDD’s) that send text over the phone line rather than vocalizations (Mondak, 2000). There are also telephone hand sets that can amplify the sound output enabling those who are hard of hearing to better hear. Doorbells and telephones can be set up to flash a light rather than ring a bell when they need to be answered.

Closed captioning is available on television programs to enable one to read what others receive as audio data. Additionally, computer software can now produce text to accompany auditory information on-line.

People with poor vision or no vision also require AT. There are the obvious devices such as eyeglasses and contacts to improve the vision of those who have poor vision. White folding canes are also available to enable people who are blind to feel what is in front of them as they walk. Books can be recorded onto audio cassette or CD, or they may also be available in Braille or another digital format. There are closed circuit television systems to enable those with low vision to see what others are seeing on the television (Abner & Lahm, 2002). Note-taking devices enable people who are blind to be able to take notes during their classes. Technologies to enlarge font size, such as optical magnifiers or computer software, can help to magnify text. There are also many computer devices, software, and web sites that are helpful in accessing text and the Internet such as: optical scanners, software and peripheral devices that use synthesized speech to read to the user, optical character readers, Braille translation software for both input and

output, enlarged cursors, and enlarged key labels, Braille key labels, and sites that offer text versions (which may be read with a voice synthesizer; available on all recent Microsoft operating systems) (Abner & Lahm, 2002; Mondak, 2000; Nochajski Oddo, & Beaver, 1999).

Difficulties with fine motor coordination can be caused by many of the same pathologies that cause mobility challenges. Some of these include spina bifida, muscular dystrophy, cerebral palsy, multiple sclerosis, traumatic brain injury, and trauma (Yang et al., 2008). Some devices available on the market include: head sticks, mouth sticks, keyboard guards, modified placement of switches on wheelchairs for head or hand use, and electronic page turners (Scherer & Glueckhauf, 2005; Yang et al). There are also many types of modified computer input devices such as: modified keyboards with different layouts (one-handed, miniature, or expanded keyboards), touch screens or tablets, or light sticks (Dorman, 1998; Mondak, 2000).

Finally, learning disabilities can affect many areas of functioning. Some of these include: listening, speaking, reading, writing, concentrating, communicating, and math skills (Klemes, Epstein, Zuker, Grinberg, & Ilovitch, 2006). Devices to help with learning

disabilities seem to generally be related to computer hardware and software technology. They include synthetic speech output with synchronized text with variable reading speeds, and different color fonts to highlight text. There are also software programs that can predict words and improve spelling. All of these devices and technologies can help those with learning disabilities to be able to read, focus, and learn more effectively.

Who Has Used AT and Who Still Needs More Help

Not all types of people with disabilities are equally likely to need or use AT. Verbrugge and colleagues (1997) found that women were more likely than men to need AT because fewer of their most common chronic conditions are fatal. Therefore, they are more likely to remain alive to deal with their functional limitations. In her study on residual disability, or unmet need resulting from functional limitations, Agree (1999) found that neither gender nor marital status had a statistically significant effect; however, there was an interaction between gender and marital status. Married men suffered from less unchecked disability than married women and both unmarried

men and unmarried women. The interaction between gender and marital status suggested that marriage reduced unmet needs for men, but not for women.

Agree (1999) found some other variables that are worth discussing with regard to their effect on residual disability. Age, net worth, disability severity, and disability type had main effects on residual disability. On the other hand, she found that ethnicity made no difference in rates of unmet need. The older a person got the less residual disability they reported, until the very oldest ages. She believed this was because either there was a better system in place to meet people's needs as they aged, or people expected to have more problems so they complained less about them. She found that people with a medium high income had the lowest rates of residual disability. She hypothesized this was because they had the means to purchase any needed AT, but were not as demanding as those who were most affluent. The relationship between severity and type of the disability was as one would have expected. The worse the disability, the more unmet need there was.

Studies and experience have shown that some devices are more likely than others to be used regularly. In their

study of computer augmented communication (CAC) devices (more commonly known as augmentive assistive communication technology—AAC) among six children ages 7 - 15, Salminen and colleagues (2004) found that after using and training on the devices for 3 to 6 months, most of the children lost enthusiasm for the devices. By the end of the year, only one child used his device regularly at both home and school. Another child used the device regularly at school only. The other four children used their devices at most a few times per week. All six of the participants used their Bliss folders as their primary mode of communication. A Bliss folder is a piece of paper with text and/or symbols representing various vocabulary concepts, and relatively simple to use. However, Dr. Foley, who specializes in assistive technology at Utah State University (personal communication, April 22, 2008) pointed out that if someone is trying to communicate with someone else who does not know how to use the Bliss folder, it is not very helpful.

According to Dr. Beth Foley (personal communication, April 22, 2008), devices that are easier to use are overall less likely to be shelved. Easy devices would include, for example, wheel chairs or scooters. Additionally, devices that are used for work and home adaptations where the

person cannot perform the requirements without the device are also more likely to be used. CAC devices, for example, are very difficult to learn how to use, and is the reason why they are more frequently abandoned, but if the person becomes proficient in using them they can be tremendously powerful.

Common Barriers That Prevent AT Use

Unfortunately, not everyone who could benefit from the use of AT has access to or uses AT to help them in their daily lives. The main barrier to AT is insufficient funding (Copley & Ziviani, 2004; Derer, Polsgrove, & Rieth, 1996). Other barriers include: difficulties procuring and managing the equipment, lack of support in using it, poor planning, and time constraints (Copley & Ziviani). While the previous list was generated in the context of why children do not use AT in the classroom, these reasons could apply to everyone.

With regard to overcoming the funding issue, three key pieces of legislation exist, which govern the distribution of funding by all agencies who receive any federal funds. First, Title VI of the Civil Rights Act of 1964 prohibited

discrimination based on race, color, or national origin by governmental agencies providing services. Second, Title IX of the Education Amendments of 1972 prohibited discrimination in governmental service provision based on sex. Third, the Age Discrimination Act of 1975 prohibited discrimination of governmental services based on age. Additionally, all agencies were required to have an employee who deals with any possible discrimination issues to ensure that discrimination is not occurring. Therefore, agencies need to be aware of who they are serving and who they are not serving to ensure that no one is being overlooked or denied service based on what demographic group they belong to.

According to Johnson, and colleagues (2007) students have more access to AT than do adults over the age of 21. This is because children have access to AT through schools, and are also more apt to be eligible for medical insurance that may cover the needed devices. Adults however, are no longer in school and less likely to have access to needed devices from medical insurance providers. The lack of access to devices needed to close the disability gap puts adults in a position of having to deal with more residual disability. This may leave many adults with disabilities

wishing to participate more fully in their communities but finding themselves unable to do so due to residual disability.

One program that has been attempting to address the primary barrier to AT use, funding, is the Independent Living/Assistive Technology (IL/AT) fund provided through the Centers for Independent Living (CIL) program administered by the USOR. They have helped to alleviate some of the need for AT and therefore some of previously unchecked disability by providing funds with which people may purchase AT when there are no other options available to them. Until now, a detailed summary analysis of who has been served by this fund and what has been purchased had never been done.

This study looked at who was being served by this IL/AT fund, whether the funding was equitably distributed across ethnic groups, what age groups were served, what the primary causes of the clients disabilities were, what types of devices were purchased, how many times CIL clients accessed the fund, and how much they were spending on average per person and per device for each of the demographic groups mentioned previously.

Case Study

The USOR has a state-appropriated fund set up through nonprofit CILs to provide individuals with AT who have no other way of obtaining it. If a person can not reasonably afford the needed technology on their own, and it is not available to them either through health insurance providers, such as Medicare or Medicaid, or a school district, they may apply to have the CIL fund purchase the device for them. Unfortunately, USOR's IL/AT fund also faces shortages. Every year the need for AT increases and consequently the fund is expended sooner in the year. Sometimes the waiting list can be up to 8 months long. In recent years additional funding has sometimes been appropriated from the state legislature or other sources helping to ease the waiting list, but generally there is not enough funding to go around.

Due to their inability to serve everyone needing help, the program administrator at USOR wanted to be sure that they were serving all groups equally and no groups were being inadvertently overlooked or served inequitably. USOR has maintained two databases to which access was provided. One of them had information on what devices were purchased,

how much they cost, which vendors they were purchased from, and what year the purchase occurred in, all organized by a client number representing the client from whom it was purchased. They have also maintained another database containing some general demographic information about the clients such as:

A. District;

B. The counselor through whom the client worked;

C. The county which the client lived in;

D. Ethnicity (White, Black, Indian, Asian, Pacific Island, Hispanic);

E. Marital status (married, widowed, divorced, separated, never married, unknown);

F. Education level (no formal schooling, elementary education grades 1-8, secondary education grades 9-12 no diploma, special education certificate of completion, high school graduate or equivalency, postsecondary education no degree, associates degree or vocational/technical certificate, bachelor’s degree, master’s degree or higher);

G. Primary cause of disability;

H. Source of referral to USOR;

I. Living arrangement (private residence, community residential/group home, rehabilitation facility, mental health facility, nursing home, adult correctional facility, halfway house, substance abuse, treatment center, homeless/shelter, other; and

J. Primary source of support (personal income, family and friends, public support and all other sources).

Additionally, USOR has provided the date of birth and gender information for their clients.

All data was maintained separately for each year in which service was provided. Access to the data bases from the years 2003 to 2007 was provided by USOR.

Research Questions

1. What did some of the directors of the CILs want to know that could be answered with the data USOR provided access to?

2. What were the proportions of the funds, overall and for each year, spent on the different types of devices and services (by category) that were purchased? What percentage of the fund was spent on all devices as a group

compared to all services as a group both overall and per year?

3. What was the average amount spent per client per year? What was the average amount spent per client over the 5 year period? What was the average amount spent overall per device or service category? Did clients use the fund more often than once over the 5-year span?

4. Was the fund distributed equitably according to age, gender, ethnicity, and population density, relative to the observed population base in Utah from the 2000 census?

5. As suggested by the literature, were age (by category), marital status, or gender useful either as primary effects or as part of an interaction, in predicting the overall amount spent per client?

6. Were there any additional variables not mentioned in question 5 that appeared to be useful as covariates or predictors of amount spent per client

7. Were there any interesting trends in spending patterns over the 5-year period regarding age, ethnicity, gender, education level, or CIL?

8. According to the CIL directors, were any answers to questions 2-7 not in a range that they considered to be either acceptable or expected? If so, what should they

have been, and what did they believe may have been the probable cause of the out-of-range value? Additionally, what did the CIL directors think may have been the cause of any apparent trends found?

METHODS

This study took place in three phases. Phase one involved contacting some of the key stakeholders and collecting the qualitative data necessary to answer question 1. Phase two involved working with the data collected in the database provided by USOR to answer questions 2-8. Phase three involved another contact with the CIL directors to explain the results that were found in phase 2 and ask for their opinion about probable causes for any results that seemed out of range.

In phase one of the study, qualitative data was collected from some of the key stakeholders, including three of the six CIL directors and the two people who work for USOR to oversee the IL/AT fund program in Utah. They were asked, what they thought an equitable distribution of funds should look like, given the data available, what information they thought would be useful to them in doing their jobs, and what their concerns were.

The second phase involved working with the data. First, the data had to be combined into a usable form. Then the data was analyzed to provide answers to the stakeholders questions which were illuminated in phase one,

and questions 2-7 listed above (most of which have been derived from questions posed by the two people working for USOR).

The final phase involved again communicating with the CIL directors. The findings were explained to them. Additionally, they were asked which of the findings, including any trends, appeared surprising or out of range to them. Finally, they were asked for any interpretation or enlightenment they may be able to offer regarding the surprising findings.

Phase 1: Contacting Stakeholders

Question 1 was answered in phase 1 of the study. The sample of CIL directors consisted of the three CIL directors residing in the northern half of Utah (Logan, Ogden, and Provo), who had several years of experience as CIL directors. They were each contacted individually by telephone to set up an appointment when they would have time for a phone interview, around 15-20 minutes. At the time of first contact, it was explained to them what the purpose of this study was to provide them with whatever information they thought would be helpful in running their CILs, to answer their questions, and to collect data

regarding distribution on some key demographic variables. They were also told that the person who oversees this fund at the state level had initiated this study, and he wanted to make sure the product of this study would be optimally useful for them too.

At their individually appointed times, each CIL director was contacted by phone. No two CIL directors were scheduled for the same time, so the answers of one would be less likely to influence the answers of another. They were asked what they believed an equitable distribution of funds ought to look like (i.e., how much is reasonable for the distribution of funds to differ from the actual population distribution on key variables such as race, gender, age, and population density). They were also asked what information, given the data available, would be helpful to them in doing their jobs and understanding the population they work with. Finally, they were asked if they had any concerns. At the end of the interview, they were informed that they would be called back after results and answers to their questions had been computed.

Phase 2: Working with the Data

Phase 2 involved two steps. First, the data had to be cleaned and prepared. As it was received, the data was not in a form that lent itself to analysis. Once the data was cleaned and prepared, the second step of this phase was to take the prepared data and run the needed statistical analyses on it.

Preparing the Data

The second phase focused on working with the data. The first step in preparing the data was to combine the three data bases for each year into one data base for each year by matching records according to client number, and creating repetitions of entries in the demographic information database as needed to ensure that each purchase record was matched by client number with the demographic information for that client. This provided a database with an entry for every purchase, so if a person had three purchases made for them within a single year, they had three entries in that year's database. These databases, one for each of the 5 years, with multiple entries per client (ME), were used to answer the parts of question 2

that dealt with the individual years, and the parts of question 7 that examined the number of times the fund was used (see Table 1).

Next, the amount spent on purchases for each client (represented by a client number that was constant across all databases, but unique to the individual) in each of the year's multiple entries per client databases was summed and the number of uses tallied, thus allowing all purchases within a year for a single client to be incorporated into a single entry. This database, with a single entry per client (SE), was used to answer the part of question 3 dealing with the individual years, and the part of question 7 dealing with amount spent (see Table 1).

Third, the records from the ME databases for each of the 5 years were copied and pasted into a single file. This database was intended to cover all 5 years of data available (2003-2007) with multiple entries per client (5ME). It was intended to be used to answer the overall part of question 2, the part of question 3 dealing with the average amount spent per device or service, and all of question 4 (see Table 1).

Finally, the SE databases for all 5 years (2003-2007) were combined by copying and pasting each individual

Table 1

Sources Used to Answer Each Research Question

Question numbers	ME	SE	5ME	5SE	Communicate with CIL directors and USOR people over IL programs
1	--	--	--	--	X
2	X	--	X	--	--
3	--	X	X	X	--
4	--	--	X	--	--
5	--	--	--	X	--
6	--	--	--	X	--
7	X	X	--	--	--
8	--	--	--	--	X

expenditure amount and the year in which the purchase took place. Then the expenditures were summed to compute a total amount spent. Finally, the number of times the fund was used for each client across the 5 year period was tallied. This 5-year combined single entry per client database (5SE) was used to answer questions 5 and 6, and the overall parts of question 4 dealing with the amount spent per client and the number of times the fund was used across the 5-year time period (see Table 1).

Analyses

The analyses used involved the performance of some hand-calculated statistics along with the use of two software packages. First, hand-calculated chi-square tests were performed. Next, most of the remaining calculations were performed by using SPSS. Finally, MS Excel was used as needed to graph some of the data results obtained through the use of SPSS to show percentages or trends across time.

For question 2 descriptive statistics were computed using SPSS for each of the SE databases covering only 1 year each, and the 5SE database covering all 5 years. Percentages of devices and services were then calculated

for each year individually, and all 5 years combined and graphed using MS Excel.

For question 3, the average amount spent per client was computed using SPSS descriptive statistics for each of the SE databases. The average amount spent per client was reported along with its standard deviation for each of the 5 years. The average amount spent per device or service category was also computed using SPSS descriptive statistics for all of the years combined using the 5ME databases. These percentages were then graphed using MS Excel. Finally, the number of times clients used the fund over the past 5 years was counted using the 5SE database.

To answer question 4, SPSS was used to calculate the relative frequencies of the different groups of ethnicity, gender, population density, and age. These observed frequencies were then compared with the frequencies obtained from the 2000 census on those same variables for the state of Utah (U.S. Census Bureau, 2000 a, b). Finally, a hand-calculated χ^2 was used check to if the distributions fell within chance limits. A statistically significant chi-square would be interpreted as indicating that the data did not support a claim of equitable distribution between the groups.

Question 5 was answered using SPSS to run a three-way ANOVA to determine whether or not there were any main effects or any interaction effects of age group, gender, or marital status on amount spent per client. Age was grouped into five categories according to a CIL director's suggestion in phase 1, 0-3, 4-21, 22-64, 65-74, and 75 and over.

Question 6 required the use of SPSS to compute a regression analysis, ANCOVAs, and an ANOVA. Exploratory work was done to see if there were any additional variables available that aided in predicting the amount spent per client. Both the SE and the 5SE databases were examined because they both provide information on the total amount spent per client.

To answer question 7 the annual data from all 5 years were computed using SPSS, then graphed, using MS Excel, across time to look for any trends in the amount of funding received according to age, ethnicity, education level, or the CIL under which the client was served. The SE databases were used to answer this question.

Phase 3: Discuss Findings with Stakeholders

The third and final stage of this project involved discussing the findings with the CIL directors. When the data analyses had been completed and a report of the results compiled, the CIL directors were again each individually contacted via telephone to schedule a time to go over the results with them. They were also each asked for their email address so that a copy of the report of the results could be emailed to them and they could look it over before the scheduled time to go over the results. At the appointed times, each CIL director was contacted one last time again via telephone. The duration of the interview was, to a large degree, controlled by the individual CIL directors, and based on how much each CIL director had to say or wanted to have explained. These interviews ranged from about 30 minutes to a little over two hours.

During these interviews, the results of the study were explained. Also, the individual questions and concerns of the CIL directors were discussed. Particular attention was given to question 4 dealing with the equality of fund

distribution among the demographic groups and question 7 dealing with trends across time. Additional time was also given in each interview to the results of the questions asked by the individual being interviewed. Additionally, the CIL directors were asked for possible explanations of any discrepancies between the results obtained and what they expected or hoped to find. They were asked for any possible explanations on apparent trends found in question 7. Finally, they were asked for any last thoughts.

In summary, this study was executed in three phases. During the first phase, key stakeholders were contacted and questioned regarding their opinion of what an equitable distribution on key demographic variables should look like, and what questions they had that could be answered using the data available from USOR. The second phase involved organizing the data in a manner that lent itself to useful analysis and performing the analyses. Finally, the third phase involved returning to the stakeholders, presenting them with the results, and questioning them regarding any incongruencies between the data and the literature, laws, or expectations of the stakeholders.

RESULTS

This section contains the results from the three phases of the study. First the results from phase 1 are reported. In a subsection of phase one the research questions were adjusted to incorporate the questions of the CIL directors. In the second phase the results obtained from the data analysis were reported. Finally, in the third phase the comments of the stakeholders regarding the results of phase two were reported.

Phase 1: Contact Stakeholders

Two types of stakeholders were contacted and their questions were incorporated into the research questions. First, the two USOR workers responsible for the oversight of the IL/AT fund and its distribution to the CILs provided questions to which they wanted answers. Then, the CIL directors were contacted and their questions were added to the original set of research questions and a revised set of research questions was formed.

Question 1: Stakeholder Opinions and Questions

The first contacts made were to the two USOR workers responsible for the oversight the IL/AT fund at the State level and its distribution to the CILs. They had many questions that were worked into the previous research questions 2-4 and 7. These two USOR workers also indicated that they would like to know what the CIL directors thought were plausible explanations of any trends that emerged in the data or any unexpected findings.

The three CIL directors were contacted. Each CIL director was asked the following three questions. “What would an equitable distribution of funds look like, or how much variance should there be between how the fund has been distributed and the Utah census data?”; “What information would be useful to you in doing your job, that can be provided given the data provided by USOR?” (A list of the variables yielded in the data sets was then read to them.) Lastly, they were asked if they had any questions or concerns.

The first CIL director contacted oversees the Tri-County CIL, which services two urban counties and one

rural county. He believed that an equitable distribution of the fund on the variables of ethnicity, population density, and age may not necessarily need mirror the actual population distribution. He suggested that there are more funds in the form of in-kind donations available to ethnic minorities and people living in urban areas. Due to this imbalance of funding, he suggested that a last-resort fund, similar to the IL/AT fund should reasonably be expected to be more frequently needed by people who have fewer other options for funding available to them. He believed that ethnic distribution should be close, but that due to an increased amount of funding available to some of the minorities there may be a little less need for the IL/AT fund among some of the ethnic minority groups. He also believed that those in rural areas may have a greater need for the IL/AT fund. He suggested that elderly people face disabilities at a much higher rate than do the younger people in the population and, therefore, the fund should serve a higher proportion of the elderly. Finally, he did not know what an equitable gender distribution should look like. Overall, he felt that an equitable distribution should not differ more than 15 - 25% from the distribution of the 2000 census data in the area of ethnicity, but he

would not be surprised by anything in the areas of population density, gender, or age because he thought population density and age should not necessarily be equal, and did not know what age should look like.

Information that he thought would be useful to him included the average amount spent per person, per device, and per device code. Also, he thought the number of items purchased per person would be useful for him. Finally, he wanted to know how education level, device type, and disability type affected the amount spent per person. He did not express any concerns.

The second person to be contacted runs the Central Utah Center for Independent Living (CUCIL), which serves one urban and three rural counties. When asked what an equitable distribution should look like, she said that there should not be a great difference on the variable of ethnicity between the percents indicated by the census data and the observed percents in the usage of the independent living fund. The people at CUCIL have worked very hard to help with this by hiring people to work at their center who are from other cultures. She hoped they were similar, not off by more than 10 - 15%. Regarding population density she suggested that traditionally more services have been

available to people with disabilities in urban areas. Consequently, they have been working really hard through outreach programs to make CUCIL known to the people living in rural areas. She hoped to see the pendulum swinging the other direction, with a higher percentage of use among the rural dwellers because they needed more help right now. Regarding gender equity, she said she expected there to be more use by females because they seemed to live longer, but she would expect some variability on this factor. Finally, regarding age, she said she guessed most of their clientele were working-age people and the elderly. She hoped the children were getting what they needed, but recognized that the amount of children should be lower because a smaller percentage of children have disabilities. Additionally, she said the schools should purchase many of the devices children need, but frequently either they will not do it, or if they do, they will not allow the children to take the device home. She noted that this was especially a problem with communication devices and other devices needed to do homework effectively. She hoped they were getting to these kids who had been underserved by the school districts.

When asked what information she thought would be useful, and what was of concern to her, she had several

ideas. First, she said she wanted to see a graph of the age distribution of those using the fund. She also wanted to examine the trend of usage across population density and ethnicity. The only concern she expressed was that she hoped this study would provide information to help them to improve their effectiveness at obtaining funding from the legislature and, in turn, to use their funding more effectively to help those with disabilities, thus ensuring that they are able to get all of those who need them most.

The third CIL director runs OPTIONS for Independence, which provides service in three rural counties. When asked what an equitable distribution should look like and how much it should deviate from the distribution shown on the Utah 2000 census, she indicated, with regard to ethnicity, that she would expect some of the minority groups to have a smaller showing in fund use either because they were here illegally, or because they are from a culture that teaches that one should do for themselves as much as possible. She also said those who ask get what they need eventually. On the topic of population density, she expressed the goal of increasing service to the rural areas, and hoped to see that their efforts had been successful in increasing service to the rural areas. With regard to gender, she said

the distributions should be fairly equal, but women tend to live longer so they may need a little more. Finally, she said on the variable of age, they could not possibly be equal, because age has a huge impact on the need for AT.

When asked what information would be useful to her and if she had any concerns, she expressed no concerns but had several ideas regarding useful information. She wanted to see some data on age. What age were the people who were using the fund? Were they being successful at reaching the population 75 and older? She also wanted to see the breakdown of ethnicity by county. She was not concerned with the amount spent, but rather with the number of devices purchased because there was some natural variation in amount spent and she felt that she already had a good understanding of this variation in cost, but did not have as clear a picture of what the variation in usage across the other parts of Utah looked like. She wanted a breakdown of age on the number of devices purchased, the device category types, and the types of disabilities that various devices were being purchased for among the different age groups.

Addressing Stakeholder Questions

Many of the questions the USOR representatives and the CIL directors had were already covered by the eight research question listed previously. Several revisions were made to address any new questions. Question 3 was expanded slightly to include an average amount spent per device in addition to the average amount spent on the devices versus services category. Additionally, the part of question 3 that asked whether clients had used the fund more often than once over the 5-year span was expanded to include the overall average number of devices purchased and how many people were in each “Number of Times Used” group.

Question 7 was expanded to include not only the trends in expenditures, but also the trends in number of devices purchased each year, (using the ME database) and the population density variable.

Question 6 was modified to include specifically whether or not device type and primary disability cause had a statistically significant effect on the amount spent per person using the 5SE database.

The initial question 8 was changed to question 9, and a new question 8 was added to address what the population

using the fund looked like. This question addressed what devices were being used by which age groups, and which primary disability causes most commonly affected each age group, using the 5ME database. It also provided a breakdown of ethnicity by county, and device/service purchase by disability category using the 5SE database.

The research questions and the table of figures were revised to include the input of the CIL directors (see Table 1 Revised). Additionally to make the paper easier to navigate, a table specifying the table and figure numbers used in each question was included (see Table 2).

Revised Research Questions

1. What did some of the directors of the CIL's want to know that could be answered with the data USOR provided access to?

2. What were the proportions of the funds, overall and for each year, spent on the different types of devices and services (by category) that were purchased? What percentage of the fund was spent on all devices as a group compared to all services as a group both overall and per year?

Table 1 Revised

Sources Used to Answer Each Revised Research Question

Question Numbers	ME	SE	5ME	5SE	Communicate with CIL directors and USOR people over IL programs
1	--	--	--	--	X
2	X	--	X	--	--
3	--	X	X	X	--
4	--	--	X	--	--
5	--	--	--	X	--
6	--	--	X	X	--
7	X	X	--	--	--
8	--	--	X	X	--
9	--	--	--	--	X

Table 2

Table of Tables Numbers and Figure Numbers for Each Question

Question number	Table numbers	Figure numbers
1	1 Revised, 2	--
2	3, 4	1, 2, 3
3	5, 6, 7	--
4	8, 9	--
5	10, 11, 12, 13	4, 5, 6, 7
6	14, 15, 3, 16, 17, 18, 19, 20, 4, 21, 22, 23, 24, 25	8, 9, 10, 11
7	--	12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
8	26, 27, 28	--
9	7, 8, 12, 13, 14, 28, 29, 30	--

3. What was the average amount spent per client per year? What was the average amount spent per client over the 5-year period? What was the average amount spent overall for all of the devices and services purchased, and per device or service category? What was the overall average number of times clients used the fund over the 5-year span, and what was the breakdown of exactly how many clients used the fund for each “number of times used” group?

4. Was the fund distributed equitably according to age, gender, ethnicity, and population density relative to the observed population base in Utah from the 2000 census?

5. As suggested by the literature, were age (by category), marital status, or gender useful either as primary effects or as part of an interaction, in predicting overall amount spent per client?

6. Were there any additional variables not mentioned in question 5 that appeared to be useful as covariates or predictors of amount spent per client, as shown by a regression analysis of birth year, population distribution, gender, and ethnicity? Were there any predictors of amount spent per client as shown by ANCOVA? First, did population density have a main effect with education level, support

source, and living arrangement as covariates? Second, did population density have the main effect with education level, support source, and living arrangement as covariates, but with gender, county, primary disability cause, race code, marital status, and age category as additional covariates? Third, did age category have a main effect with marital status, gender, ethnicity, education level, living arrangement, primary disability cause, population density, support source, and counselor as covariates? Finally, using a two-way ANOVA, did device type or primary cause of disability have a statistically significant effect on amount spent per client?

7. Were there any interesting trends in spending patterns or in number of devices purchased each year over the 5-year period regarding age, gender, ethnicity, population density, CIL, or education level?

8. What devices were most commonly used by which age groups, which primary causes of disabilities were most common among the different age groups, and which counties purchased the most devices for the various minority groups?

9. According to the CIL directors, were any answers to questions 2 - 7 not in a range that they considered to be either acceptable or expected? If so, what should they

have been, and what did they believe may have been the probable cause of the out-of-range value? Additionally, what did the CIL directors think may have been the cause of any apparent trends found in the data?

Phase 2: Working with the Data

The results for each of the questions in the second phase are individually presented in this section. The questions addressed in the second phase include question 2 on equitable distribution, question 3 on devices and services purchased, question 4 on amount spent per category, question 5 on age marital status and gender as predictors, question 6 on additional predictors, question 7 on trends over time, and question 8 on types of devices used, by demographic category.

Question 2: Devices and Services Purchased

What were the proportions of the funds, overall and for each year, spent on the different types of devices and services (by category) that were purchased? What percentage of the fund was spent on all devices as a group

compared to all services as a group both overall and per year?

Percentages were calculated for all types of devices and services (see Table 3). Next, to represent the data more clearly, the devices/services were grouped by type, and plotted across the years on a line graph (see Figure 1) and overall in a pie graph (see Figure 2). As shown by Figure 1 and Figure 2, both overall and each year, mobility devices were the most commonly purchased of all device types. The second most common purchases were aids to daily living. The third most common types of purchases were modifications (to either a vehicle, home, or job site). After modifications, all other purchase types were less than 10%. The most commonly purchased service was device maintenance. The aggregate percentage of services provided has been on a slow but steady decline starting at 10% in 2003 and dropping to 5.2% by 2007, with an overall average of 8.2% (see Table 4 and Figure 3). This means the percentage of purchases that were devices consistently increased from 2003 to 2007.

Table 3

Percentages of Devices and Services Purchased with IL/AT

Device or service types	2003	2004	2005	2006	2007	2003-2007
Eye exam	0.2	0.0	0.2	0.0	0.0	0.1
Hearing aid evaluation	1.1	0.8	0.7	0.8	0.0	0.7
Mobility evaluations	0.0	0.0	0.2	0.9	0.5	0.3
Augmentative communication evaluation	0.0	0.3	0.0	0.0	0.0	0.1
Hearing aids or supplies	3.5	2.1	2.5	3.4	4.9	3.2
Augmentative communication devices	2.6	1.5	1.1	1.8	1.5	1.7
Glasses/contacts	0.0	0.0	0.2	0.0	0.5	0.1
Optical aids	1.6	1.5	0.2	1.6	1.2	1.2
Wheelchair-manual	3.9	4.1	4.2	1.6	2.9	3.2
Wheelchairs-power	12.4	15.3	15.7	18.5	13.2	15.4
Wheelchair accessories	9.5	8.4	4.9	3.1	4.4	6.0
Lifts	11.4	13.8	14.8	14.0	17.4	14.1
Body braces	0.0	0.2	0.0	0.0	0.2	0.1
Mobility aids	2.5	2.5	3.7	2.6	3.2	2.8
Aids to daily living	26.6	23.2	27.5	33.6	27.5	28.0
Seating and positioning	0.0	0.2	0.0	0.0	0.0	0.0
Environmental control systems	1.2	1.3	0.7	0.9	1.7	1.1
Computers	0.9	0.7	0.2	0.0	1.0	0.5
AT Maintenance	0.2	0.0	0.0	0.0	0.0	0.0
AT repairs	5.3	7.2	5.6	3.2	4.4	5.1
AT assistance/training	0.4	0.0	0.2	0.0	0.0	0.1
Artificial limbs	0.2	0.0	0.0	0.0	0.0	0.0
Prosthetics or orthotics	0.4	0.2	0.4	0.0	0.2	0.2
Job site modification	0.5	0.5	0.4	0.0	0.0	0.3
Home modification	0.2	0.2	0.4	0.0	0.2	0.2
Vehicle aids	11.4	14.1	15.3	10.9	14.0	13.0
AT fabrication & design	0.0	0.2	0.0	0.0	0.5	0.1
AT installation	3.0	1.5	1.1	2.3	0.5	1.8
Other AT not listed	1.4	0.3	0.2	0.8	0.0	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

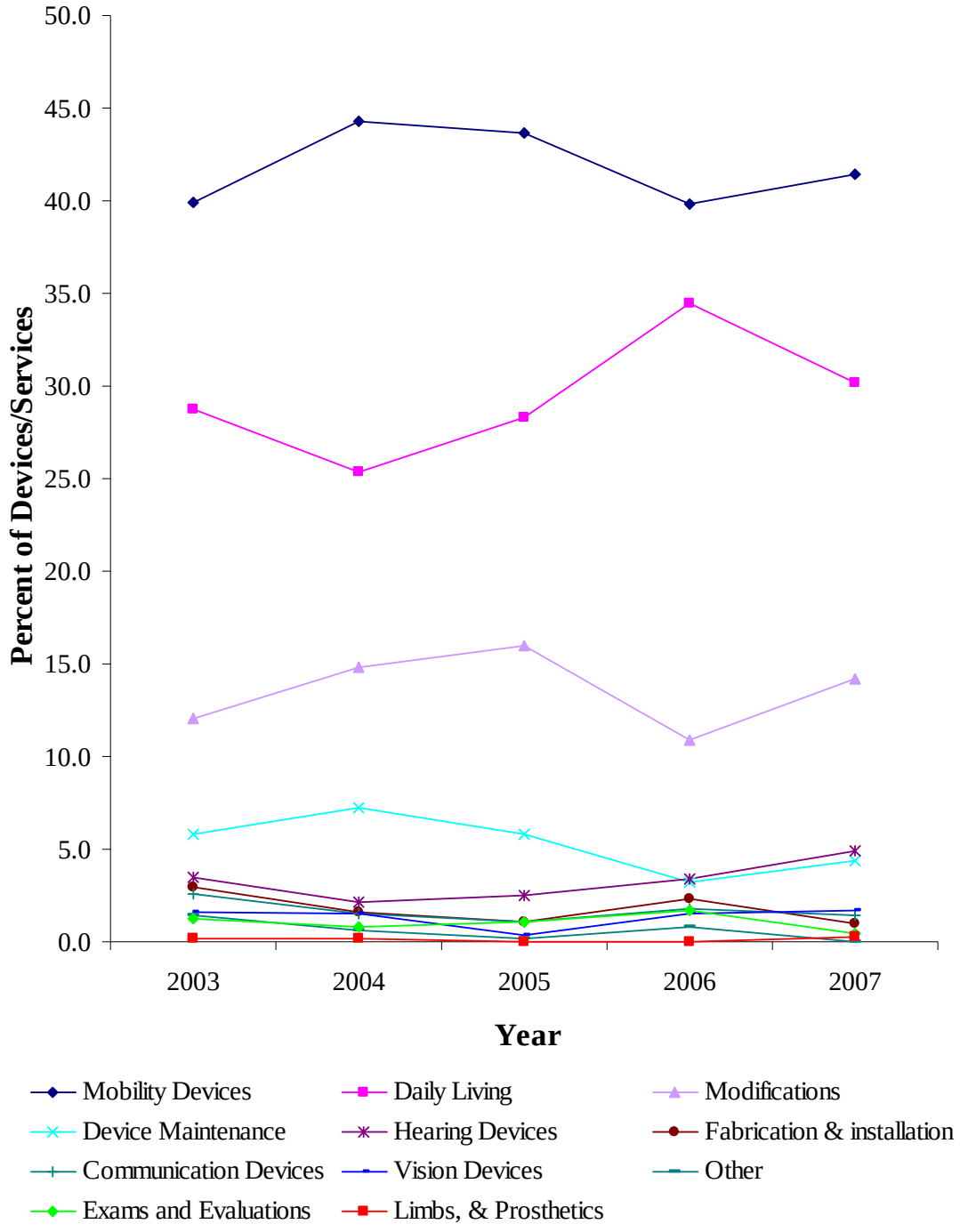

Figure 1. Types of devices and services purchased.

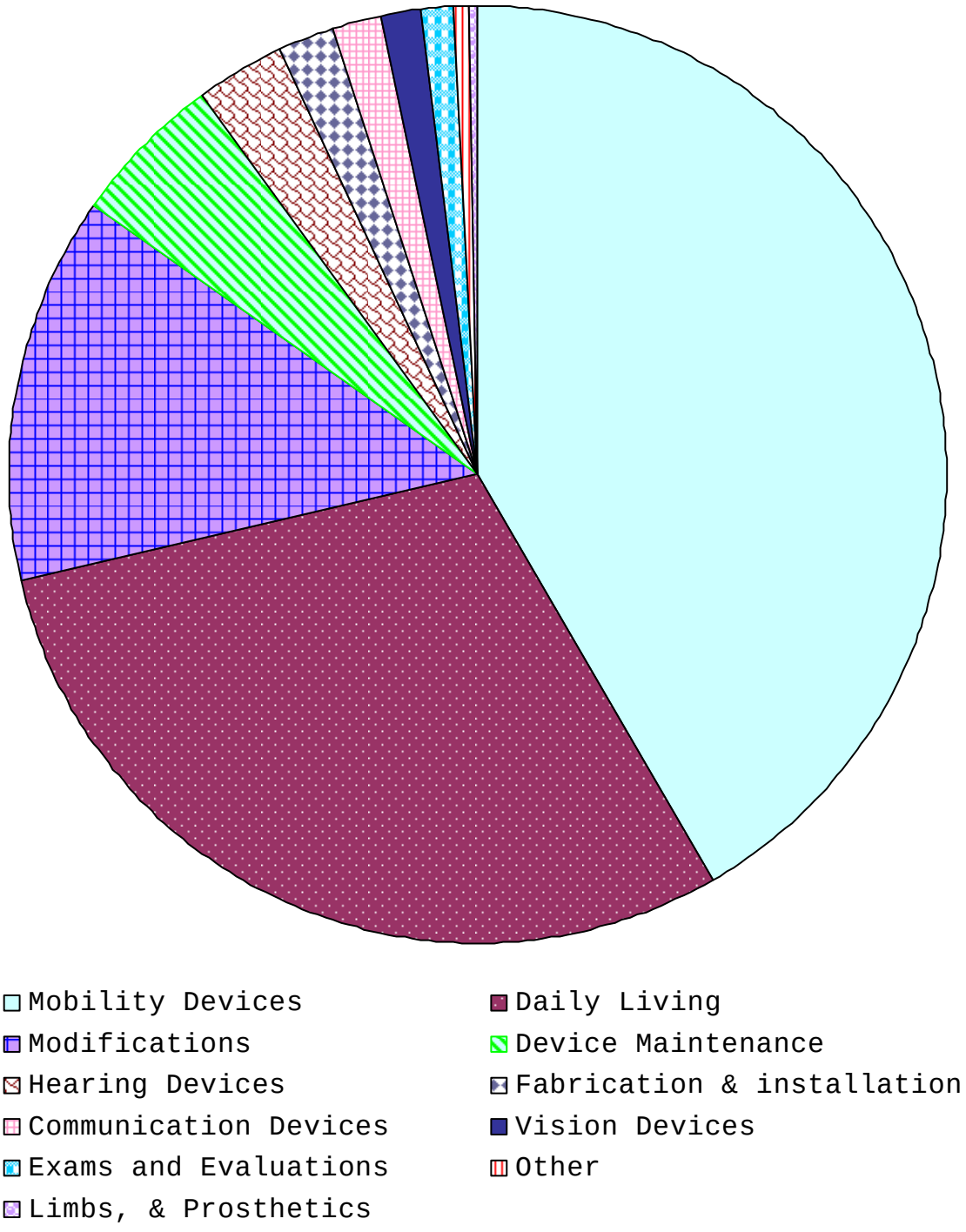

Figure 2. Percentages of devices and services purchased from 2003-2007.

Table 4

Percent of Devices Versus Services

Purchased	2003	2004	2005	2006	2007	2003-2007
Services	10.0	9.7	7.9	7.3	5.4	8.2
Devices	90.0	90.3	92.1	92.7	94.6	91.8

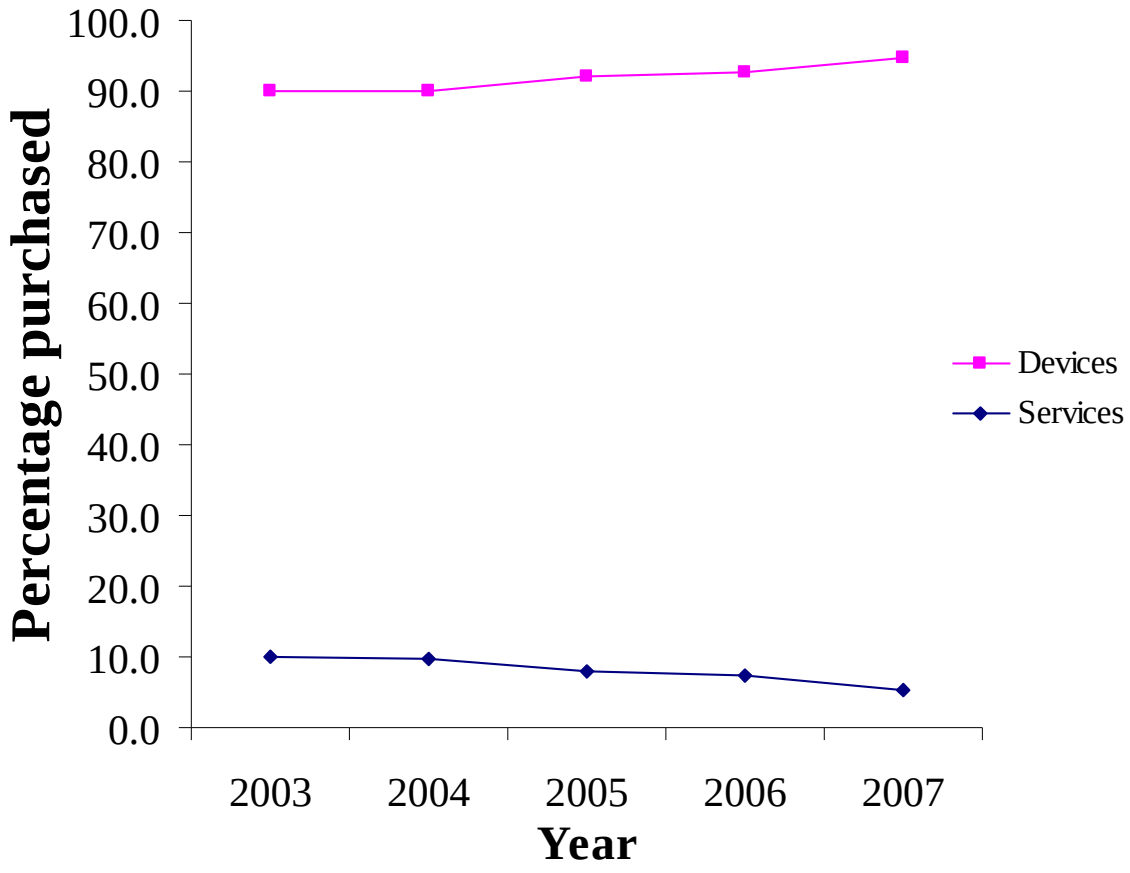

Figure 3. Percentage of devices versus services purchased from 2003-2007.

Question 3: Amount Spent by Category

What was the average amount spent per client per year? What was the average amount spent per client over the 5-year period? What was the average amount spent overall for all of the devices and services purchased, and per device or service category? What was the overall average number of times clients used the fund over the 5-year span, and what was the breakdown of exactly how many clients used the fund for each “number of times used” group?

The average amount spent per client per single year ranged from $3,155.5 in 2004 to $3,800.9 in 2007 (see Table 5). Many clients used the fund in more than 1 year between 2003 and 2007; consequently the average amount spent per client for 2003 through 2007 is higher than any single year, $4,338.95, with a standard deviation of 4686.89.

The overall average cost per device or service was $2,104. Prosthetics and lifts were the categories with the highest average cost per item, both around $4,000 (see Table 6). Vehicle aids, power wheelchairs, and artificial limbs all had an average cost in the $3,000 range. Communication devices, and hearing aids and supplies had

Table 5

Average Amount Spent Per Client Per Year

Year	Number of Clients Served	Mean	*SD*
2003	355	$3244.01	4079.67
2004	414	$3155.49	3706.36
2005	350	$3207.08	3595.00
2006	447	$3311.05	3656.63
2007	287	$3800.87	4539.63
2003-2007	1419	$4338.95	4686.89

average costs in the $2,000 range. Computers, optical aids, manual wheelchairs, job site modifications, home modifications, and body braces all had an average cost in the $1,000 range, and everything else had an average cost of less than $1,000.

A little over one half of the clients have used the fund more than once (see Table 7). The number of times clients used the fund ranged from 1 to 10 times. About 45.1% of the clients used the fund only once over the last 5 years. About 27.6% used the fund twice; 14.4% of the clients used the fund three times; 7.0% used it four times;

Table 6

The Average Cost by Type of Device/Service from 2003 - 2007

Categories of devices and services	Devices/ services purchased	Average cost per device	*SD*
Eye exam	2	$64.98	35.39
Hearing aid evaluation (eval.)	21	$114.40	26.52
Seating and positioning	1	$54.00	----
Augmentative communication eval.	10	$420.00	63.25
Artificial limbs	1	$3,411.76	----
Body braces	2	$1,368.78	442.96
Hearing aids and supplies	93	$2,225.80	973.01
Augmentative communication device	50	$2,076.83	2273.84
Computers	14	$1,526.92	1292.83
Glasses/contacts	3	$332.97	39.70
Optical aids	36	$1,689.32	1172.70
Prosthetic or orthotics	6	$4,188.51	4284.66
Wheelchairs-manual	95	$1,688.87	1209.86
Wheelchairs-power	450	$3,271.38	2153.95
Wheelchair accessories	175	$564.37	789.68
Lifts	412	$4,440.03	3379.16
Mobility aids	83	$577.67	1161.06
Environmental control systems	33	$1,404.82	1856.16
Vehicle aids	379	$3,625.11	4564.36
Aids to daily living	820	$706.81	884.99
AT maintenance	1	$91.50	----
AT repairs	149	$449.89	490.37
AT design	3	$546.33	152.51
AT assistance/training	3	$541.00	506.50
Job site modification	8	$1,507.81	1264.18
Home modification	5	$1,090.00	1014.67
AT installation	52	$363.37	720.18
Other AT	19	$507.96	462.07
Total	2926	$2104.23	2812.72

Table 7

How Many Times the Fund Was Used: The Number and Percent of Clients

Number of times the fund was used by an individual	Number of clients	Percent of clients
1	640	45.1
2	391	27.6
3	204	14.4
4	100	7.0
5	44	3.1
6	24	1.7
7	5	0.4
8	6	0.4
9	4	0.3
10	1	0.1
Total	1419	100.0

3.1% used it five times. Those using the fund six or more times totaled less than 3%.

Question 4: Equitable Distribution

Was the fund distributed equitably according to age, gender, ethnicity, and population density relative to the

observed population base in Utah from the 2000 census? Results indicated that within reasonable chance margins, the fund was equitably distributed between ethnic groups and gender, $\chi^2(6) = 5.69$, $p > .05$, and $\chi^2(2) = 2.26$, $p > .05$, respectively (see Table 8). It was also found that the fund had not been equitably distributed according to age and population distribution, $\chi^2(5) = 65.36$, $p < .001$, and $\chi^2(1) = 61.38$ $p < .001$, respectively. Seniors 75 and over received 15.42% of the fund but contributed only 3.97% to the population of the state of Utah. Seniors between the ages of 65 and 74 contributed only 4.28% of the population, but received 12.93% of the fund. The working-age population received a proportional amount of funding relative to the size of their contribution to the population contributing 51.43% and receiving 54.49%. The young children and the school-age children both received a relatively small portion of the fund, receiving 0.41% and 16.61%, respectively, while contributing 7.60% and 32.72% to the population, respectively. The rural areas received more funding than the urban areas, 57.15% to 42.85% respectively, while the urban areas contributed three times as many people to the population 23.79% compared to 76.21%, respectively.

Table 8

Percentage of Amount Spent by Age, Ethnicity, Gender, and Population Density

Demographic variable	*N*	Observed %	Expected %	Difference (D=Obs-Exp)	D^2/Exp	*Chi-square*
Age						
Unknown	3	0.14	0.00	0.14	--	
0-3	7	0.41	7.60	-7.19	6.80	
4-21	162	16.61	32.72	-16.11	7.93	
22-64	714	54.49	51.43	3.06	0.18	
65-74	231	12.93	4.28	8.65	17.48	
75+	302	15.42	3.97	11.45	32.97	
Total	1,419	100.00	100.00			$\chi^2(5) = 65.36$***
Ethnicity						
White alone	1,226	85.491	85.346	0.145	0.00	
Black alone	14	1.351	0.723	0.628	0.55	
Indian alone	55	3.243	1.195	2.048	3.51	
Asian alone	7	0.352	1.635	-1.283	1.01	
Pacific Islander alone	5	0.404	0.664	-0.260	0.10	
All Hispanic	94	7.264	9.034	-1.770	0.35	
At least 2 races (non-Hispanics)	18	1.895	1.403	-0.492	0.17	
Total	1,419	100.00	100.000			$\chi^2(6) = 5.69$

(*table continues*)

Demographic variable	*N*	Observed %	Expected %	Difference (D=Obs-Exp)	D^2/Exp	*Chi-square*
Gender						
Female	894	42.46	50.10	-7.64	1.17	
Male	520	57.28	49.90	7.38	1.09	
Unknown	5	0.26	0.00	0.00	--	
Total	1,419	100.00	100.00			$\chi^2(2) = 2.26$
Population Distribution						
Rural	887	57.15	23.79	-33.36	46.78	
Urban	532	42.85	76.21	7.25	14.60	
Total	1,419	100.00	100.00			$\chi^2(1) = 61.38$***

Note. The observed is the percent of the fund that was spent on the group while expected is the percent of the population which the group contributes to the population of the state.

*** Statistically significant at the .001 level.

A similar trend was found in looking at the number of devices purchased (see Table 9). Distribution was fairly equitable among ethnicities relative to the ethnic distribution reflected in the 2000 census of Utah, $\chi^2(6) = 8.14$, $p > .05$. The distribution of devices between sexes was just significant, $\chi^2(2)= 6.51$, $p < .05$, indicating that the number of devices purchased for females was greater than would have been expected based on chance if the males and females were drawn from the same population. Females contributed 49.89% of the population, but 62.51% of the devices purchased were for females (see Table 9). There was much less of a chance that the different age groups and population distributions were all from the same sample. The different age groups and urban versus rural counties did not appear to have been equitably distributed, $\chi^2(5) = 125.30$, $p < .001$, and $\chi^2(1) = 93.99$, $p < 001$, respectively. Again both of the elderly groups received more devices/services, 15.96% and 20.81% per population contribution, 4.28% and 3.97% than would have been expected based on chance. The working-age adults received about the expected number of devices, 52.19%, relative to their contribution, 51.43%, and the children received fewer devices, 0.34% and 10.53%, than was expected based on their

Table 9

Percentage of All Devices Purchased by Age, Ethnicity, Gender, and Population Density

Demographic variable	*N*	Observed %	Expected %	Difference (D=Obs-Exp)	D^2/Exp	*Chi-square*
Age						
Unknown	5	0.14	0.00	0.14	NA	
0-3	10	0.34	7.60	-7.26	6.94	
4-21	308	10.53	32.72	-22.19	15.05	
22-64	1527	52.19	51.43	0.76	0.01	
65-74	467	15.96	4.28	11.68	31.87	
75+	609	20.81	3.97	16.84	71.43	
Total	2,926	100.00	100.00			$\chi^2(5) = 125.30$***
Ethnicity						
White alone	2,521	86.159	85.346	0.813	0.01	
Black alone	33	1.128	0.723	0.405	0.23	
Indian alone	11	3.794	1.195	2.599	5.65	
Asian alone	7	0.239	1.635	-1.396	1.19	
Pacific Islander alone	7	0.239	0.664	-0.425	0.27	
All Hispanic	204	6.972	9.034	-2.062	0.47	
At least 2 races (non-Hispanics)	43	1.470	1.403	0.067	0.32	
Total	2,926	100.000	100.000			$\chi^2(6) = 8.14$

(*table continues*)

Demographic variable	*N*	Observed %	Expected %	Difference (D=Obs-Exp)	D^2/Exp	*Chi-square*
Gender						
Female	1089	37.22	50.11	-12.89	3.32	
Male	1829	62.51	49.89	12.62	3.19	
Unknown	8	0.27	0.00	0.30	NA	
Total	2926	100.00	100.00			$\chi^2(2) = 6.51$*
Population Distribution						
Rural	1022	34.93	76.21	-41.28	22.36	
Urban	1904	65.07	23.79	41.28	71.63	
Total	2926	100.00	100.00			$\chi^2(1) = 93.99$***

Note. The observed is the percent of the number of times the fund was used on the group, while expected is the percent of the population that the group contributes to the population of the state.

* Statistically significant at the .05 level.

*** Statistically significant at the .001 level.

population contribution, 7.6% and 32.72%. Finally, the rural counties received 65.07% of the devices for representing only 23.79% of the population, while the urban counties received only 34.93% of the devices for 76.21% of the population.

Question 5: Age, Marital Status, and Gender as Predictors

As suggested by the literature, were age (by category), marital status, or gender useful either as primary effects or as part of an interaction, in predicting overall amount spent per client?

Before any inferential statistics were run, the data was checked for normality using a Q-Q plot and a histogram. The data were not normal, but appeared to have been distributed around a curve that looked like a Poisson Distribution (heavily skewed to the right; see Figures 4 and 5). Consequently, the data were transformed using a natural log transformation. The data looked much better after the log transformation was completed (see Figures 6 and 7). The data were then tested using a three-way ANOVA with age group (five age groups, based on clients' age the first time they used the fund between 2003 and 2007),

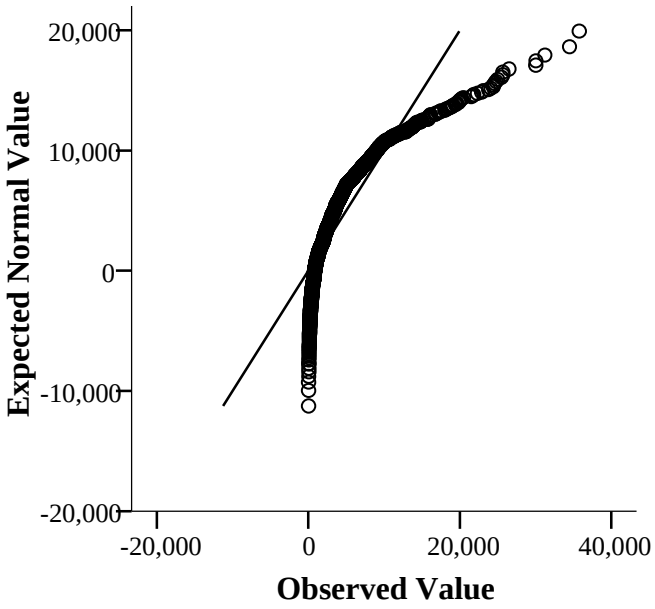

Figure 4. Q-Q plot of total amount spent per client, 5SE. Note, to be considered normal, the circles should be close to the diagonal line. These data are not normal.

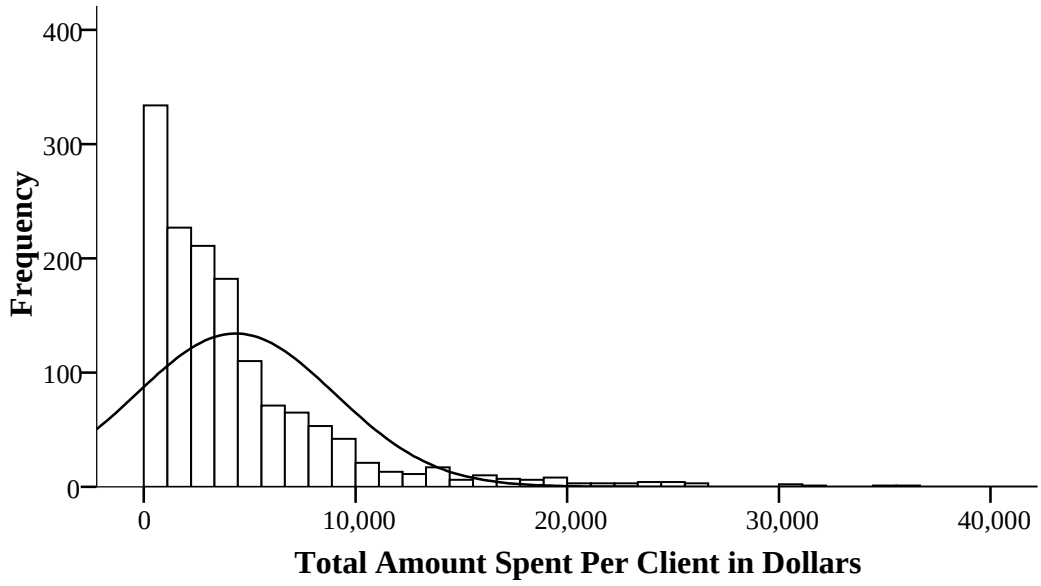

Figure 5. Histogram of total amount spent per client, 5SE. Note; these data do not follow a normal distribution.

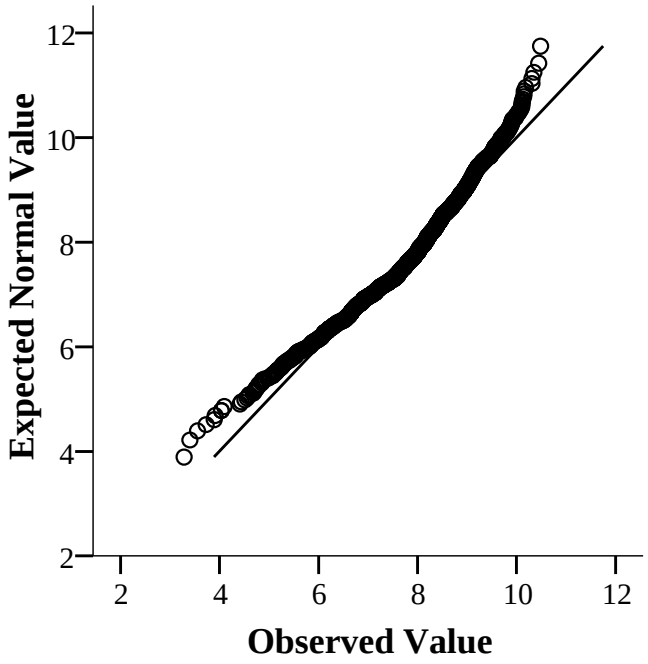

Figure 6. Q-Q plot for log transformed total amount spent per client, 5SE. Note, the circles are reasonably close to the diagonal line indicating approximate normality.

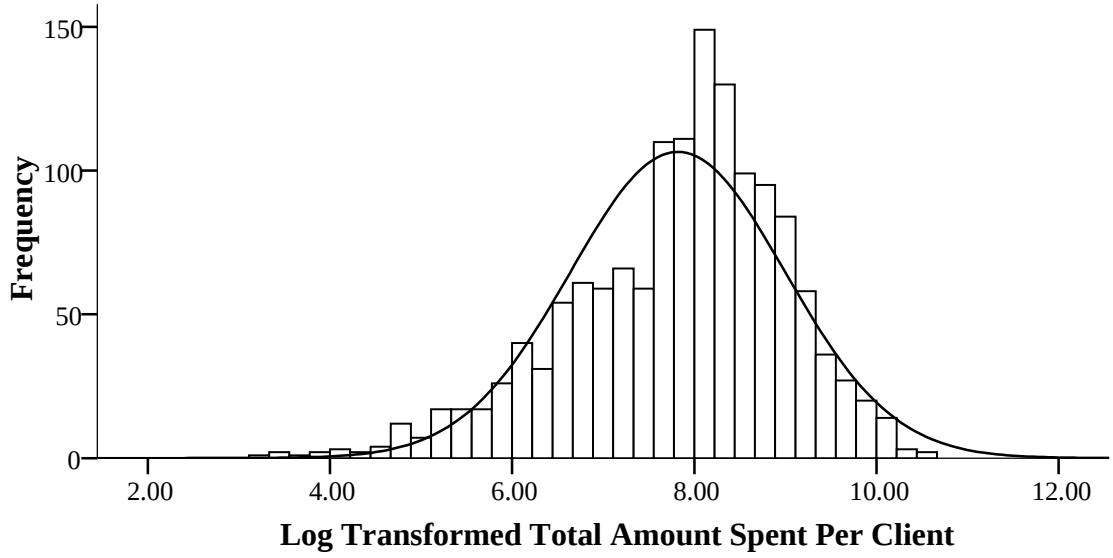

Figure 7. Histogram of log transformed total amount spent per client, 5SE. These data are reasonably normal.

marital status (five groups), and gender (two groups). However, neither statistically significant main effects nor statistically significant interaction effects between age, gender, or marital status, on the total amount spent were found (see Table 10). However, when age and gender were tested together without marital status, there was a statistically significant main effect of age, F (4,1401) = 5.526, p <.001, η^2 = .016 (see Table 11). The main effect of age indicated that devices for school-age children were the most expensive, devices for seniors tended to be the least expensive, and devices for working-age adults and very young children were in the middle (see Table 12).

Question 6: Other Predictors

Were there any additional variables not mentioned in question 5 that appeared to be useful as covariates or predictors of amount spent per client, as shown by a regression analysis of birth year, population distribution, gender, and ethnicity? Were there any predictors of amount spent per client as shown by ANCOVA? First, did population density have a main effect with education level, support source, and living arrangement as covariates? Second, did

Table 10

Three-Way ANOVA Age Category, Marital Status, and Gender on Natural Log Transformed Total Amount Spent Per Client

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	107.820	37	2.914	2.159	.000	.055
Age category in first year served	12.055	4	3.014	2.233	.063	.006
Marital status	2.084	4	0.521	0.386	.819	.001
Gender	0.008	1	0.008	0.006	.939	.000
Age category and marital status	11.395	11	1.036	0.767	.673	.006
Age category and gender	2.314	4	0.579	0.429	.788	.001
Marital status and gender	7.473	4	1.868	1.384	.237	.004
Age category, Marital Status and Gender	13.956	9	1.551	1.149	.325	.007
Error	1853.152	1373	1.350			
Total	88279.985	1411				
Corrected total	1960.972	1410				

Note. R^2 = .055 (Adjusted R^2 = .030).

Table 11

Two-Way ANOVA Age Category and Gender on Natural Log Transformed Total Amount Spent Per Client

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	65.551	9	7.283	5.384	.000	.033
Age category in first year served	29.905	4	7.476	5.526	.000	.016
Gender	0.239	1	0.239	0.176	.675	.000
Age category and gender	4.302	4	1.075	0.795	.528	.002
Error	1895.421	1401	1.353			
Total	88279.985	1411				
Corrected total	1960.972	1410				

Note. R^2 = .033 (Adjusted R^2 = .027).

Table 12

Descriptive Statistics for Age

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	65.551	9	7.283	5.384	.000	.033
Age category in first year served	29.905	4	7.476	5.526	.000	.016
Gender	0.239	1	0.239	0.176	.675	.000
Age category and gender	4.302	4	1.075	0.795	.528	.002
Error	1895.421	1401	1.353			
Total	88279.985	1411				
Corrected total	1960.972	1410				

population density have the main effect with education level, support source, and living arrangement as covariates, and with gender, county, primary disability cause, race code, marital status, and age category as additional covariates? Third, did age category have a main effect with marital status, gender, ethnicity, education level, living arrangement, primary disability cause, population density, support source, and counselor as covariates? Finally, using a two-way ANOVA, did device type or primary cause of disability have a statistically significant effect on amount spent per client?

This question involved some general data fishing based on the results of the χ^2 tests done for question 4 and reasoning of the author, to see what helped to predict the total amount spent, or had a statistically significant effect on the total amount spent. The data fishing included a multiple regression with all of the demographic information that was either continuous, or dichotomous. An ANCOVA looking for a main effect of population density on the natural log of the amount spent, with education level, support source, and living arrangement as covariates, based on the notion that education level, support source, and living arrangement could account for a large portion of the

variation seen in population density. Next the above ANCOVA was repeated with the addition of gender, county, primary disability cause, ethnicity code, marital status, and the first year in which help from the IL/AT fund was received (from 2003-2007) as covariates to see what else may possibly be impacting the relationship between population density and amount spent. A third ANCOVA was run on the natural log of the total amount spent with age category in 2007 as the predictor, and marital status, gender, population density, race, education level, living arrangement, primary disability cause, support source, and counselor as covariates. Finally, a two-way ANOVA was run to check for main effects and interactions of type of device purchased and the primary cause of disability.

The regression analysis was done to see if birth year, gender, population density, and/or any of the ethnic categories were helpful as predictors of the natural log of the total amount spent across all 5 years. Gender, population density, and ethnicity were dummy coded using simple coding. For gender, females were assigned a “0” and males were assigned a “1.” For population density, rural counties were assigned to a “0” and urban counties were assigned to a “1.” For the ethnicity a simple coding

scheme was used in which the white group was used as a reference group and, therefore, coded as “0” in each category. For the other six groups a “1” was coded for the group to which the client belonged, and a “0” was coded to all of the other groups.

An overall R = .193, accounting for 3.7% of the variance in the total amount spent resulted (see Table 13). The following beta weights of all of the variables entered into the equation were found: birth year β = .137, p < .001; gender β = .086, p = .001; population density β = .031, p = .257; Black β = -.050, p = .056; Indian β = .013, p = .630; Asian β = -.023, p = .389; Pacific Islands β =-.019, p = .475; all Hispanic β = -.008, p = .752; and two or more races(excluding Hispanics) β = .051, p = .052 (see Table 14). As birth year increased, so did the total amount spent per client. In other words the younger the clients, the more that was spent on them. As indicated by the positive number for gender, males had a higher average amount spent than did females (see Table 15). Finally, as indicated by the positive number, urban counties had a higher per client mean than did the rural counties. None of the other variables had a statistically significant effect.

Table 13

Regression Model Fit: Age, Gender, Population Density, and Race on Total Number of Dollars Spent per Client

R	R^2	Adjusted R^2	Std. error of the estimate
.193	.037	.031	1.161

The Black group and the two or more ethnicities group were not statistically significant, but both approached it. The directionality of the Black group was counterintuitive. The negative number in the regression data for the Black ethnic group indicated that the average amount spent per Black client was nearly statistically significantly lower than the average amount spent on all of the other clients, yet descriptive statistics indicated that the average amount spent on the Black group, *M* = 5940.10, *SD* = 8664.27, was higher than the average amount spent on the rest of the groups, *M* = 4323.00, *SD* = 4633.04 (see Table 16). This discrepancy was due to the fact that of the 14 Black people served, the amount spent on two of them was over $20,000 each. These two extreme outliers effectively threw off the group mean. When these two outliers are thrown out, the group mean of the Black group drops to $2,900.93 with a

Table 14

Multiple Regression of Age, Gender, Population Density and Ethnicity on Total Amount Spent per Client

	Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Predictors	*B*	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
Constant	-6.198	2.839	--	-2.183	.029	--	--
Birth year	0.007	0.001	0.137	4.882	.000***	0.877	1.140
Gender	0.211	0.065	0.086	3.236	.001***	0.963	1.038
Population density	0.077	0.068	0.031	1.134	.257	0.891	1.122
Black	-0.599	0.314	-0.050	-1.911	.056	0.988	1.012
Indian	0.078	0.162	0.013	0.481	.630	0.975	1.025
Asian	-0.381	0.442	-0.023	-0.862	.389	0.992	1.008
Pacific	-0.373	0.523	-0.019	-0.714	.475	0.990	1.010
Hispanic	-0.040	0.125	-0.008	-0.316	.752	0.981	1.019
Two or More Races	0.537	0.276	0.051	1.945	.052	0.995	1.005

Note. ***$p \leq .001$.

Table 15

Descriptive Statistics for Gender

Gender	Number of clients	Mean number of dollars	*SD*
Unknown	5	3247.54	3657.90
Female	894	3944.57	4264.39
Male	520	5027.48	5279.26

standard deviation of 4147.04, making their standard deviation much more closely resemble that of the whole group, while making their mean much smaller than that of the rest of the whole group.

The two or more ethnicities group also approached statistical significance with a $p = .051$. This group had a higher average amount spent per person $M = \$6,482.09$ with a $SD = 6235.04$ (see Table 16). Unlike the Black group, this possible group difference is intuitive. Among the 18 people served in this ethnic group, there was only one extreme outlier with a total amount spent just over $25,000. Everyone else had a total amount spent of less than $16,000. Even when this person was thrown out, the overall group mean, $M = \$5,353.16$, $SD = 4114.70$, was still above the group average of all the other groups,

Table 16

Descriptive Statistics for Ethnicity

Ethnic group	*N*	Mean	*SD*
White only	1226	4293.35	4625.60
Black only	14	5940.10	8664.27
Indian only	55	3630.26	3062.48
Asian only	7	3099.79	3137.46
Pacific Islander only	5	4977.45	7420.42
Hispanic alone or in combination	94	4757.86	5014.24
Two or more races (except Hispanics)	18	6482.09	6235.04
All groups except Black only	1405	4323.00	4633.04
All groups except two or more races	1401	4311.42	4660.20
Black only with two outliers dropped	12	2900.93	4147.04
Two or more races with outlier dropped	17	5353.16	4114.70
All groups	1419	4338.95	4686.89

M = $4316.43, *SD* = 4670.79, but the SD of the two or more ethnicities group had a lower standard deviation. Although not statistically significantly different due to the small group size and a lack of test power, this mean difference is potentially meaningful with an effect size of β = .051.

An ANCOVA was run to check for a main effect of population density on the natural log of the total amount

spent across all 5 years, as suggested by the χ^2 tests, using source of support, living arrangement, and education as covariates. Population density, living arrangement, and source of support were all statistically significant. Although those from rural counties used more money from the fund as a group than those from urban counties (see Table 8), the urban counties had a statistically significant higher (natural log of the) average amount spent per client than did the rural counties, F (1,1407) = 6.403, p = .011, d = .005 (see Tables 17 and 18). Because post hoc tests and interactions were not available for ANCOVA's they were not reported. However, the descriptive statistics were examined for each statistically significant covariate. Support source and living arrangement were statistically significant covariates of population density, F(1,1407) = 7.152, p = .008, d = .005, and F(1,1407) = 4.287, p = .039, d = .003, respectively (Table 17). Those who were supported by unknown sources or family and friends had higher average per client expenditures than any of the other groups (see Table 19). People who lived in rehabilitation facilities received about twice as many dollars as the average client, and the one client in a mental health facility received more than five times as

Table 17

Statistical Summary of ANCOVA; Population Density on Log Transformed Total Amount Spent per Client with Support Source, Living Arrangement, and Education Level as Covariates

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	23.674	4	5.919	4.288	.002	.012
Support source	9.872	1	9.872	7.152	.008	.005
Living arrangement	5.918	1	5.918	4.287	.039	.003
Education	0.003	1	0.003	0.003	.960	.000
Population density	8.839	1	8.839	6.403	.011	.005
Error	1942.216	1407	1.380			
Total	88226.237	1412				
Corrected total	1965.890	1411				

Note. R^2 = .012 (Adjusted R^2 = .009)

much as average, while those in nursing homes received only about half as many dollars (see Table 20). Education level was not significant.

Table 18

Descriptive Statistics for Population Density

Population type	Clients served	Mean number of dollars	*SD*
Urban	532	4959.47	5497.92
Rural	887	3966.78	4083.05
Total	1419	4338.95	4686.89

Table 19

Descriptive Statistics for Support Source

Type of support	Clients served	Mean	*SD*
Unknown	5	7547.37	5529.55
Personal income	128	4042.70	3063.68
Family and friends	275	5261.99	5403.83
Public support	958	4163.10	4656.84
All other sources	53	3140.98	3608.96
Total	1419	4338.95	4686.89

For the second ANCOVA, gender, county, primary disability cause, ethnicity, marital status, and the first year in which help was received (from 2003-2007), were

Table 20

Descriptive Statistics for Living Arrangement

Type of residence	Clients served	Mean	*SD*
Unknown	3	4699.17	3738.01
Private residence	1319	4368.22	4680.45
Group home	25	2832.33	1622.73
Rehabilitation facility	4	8524.65	10876.86
Mental health facility	1	30037.40	--
Nursing home	26	3570.61	3165.88
Homeless shelter	1	818.56	--
Other	40	3814.95	4391.49
Total	1419	4338.95	4686.89

added as covariates to the first ANCOVA (above). This resulted in a significant main effect of population distribution, $F(1,1396) = 11.189$, $p = .001$, $d = .008$ (see Table 21), and the following significant covariates: Support source, $F(1, 1396) = 7.685$, $p = .006$, $d = .005$; living arrangement, $F(1, 1396) = 4.614$, $p = .032$, $d = .003$; gender, $F(1, 1396) = 14.003$, $p < .001$, $d = .010$; and

Table 21

Statistical Summary of ANCOVA; Population Density on Log Transformed Total Amount Spent per Client with Covariates: Support Source, Living Arrangement, Education Level, Gender, County, Primary Disability Cause, Ethnicity, Marital Status, and First Year Served

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	65.735	10	6.574	4.871	.000	.034
Support source	10.371	1	10.371	7.685	.006	.005
Living arrangement	6.227	1	6.227	4.614	.032	.003
Education	0.898	1	0.898	0.665	.415	.000
Gender	18.899	1	18.899	14.003	.000	.010
County	18.769	1	18.769	13.907	.000	.010
Primary disability cause	0.036	1	0.036	0.026	.871	.000
Ethnicity	0.471	1	0.471	0.349	.555	.000
Marital status	2.522	1	2.522	1.869	.172	.001
First year served	0.077	1	0.077	0.057	.812	.000
Population density	15.100	1	15.100	11.189	.001	.008
Error	1884.024	1396	1.350			
Total	87957.867	1407				
Corrected total	1949.759	1406				

Note. R^2 Squared = .034 (Adjusted R^2 = .027).

county, $F(1, 1396) = 13.907$, $p < .001$, $d = .010$. The type and direction of effect of support source and living arrangement as covariates of population density on total amount spent per client remained the same as described above and in Table 19. Although females used the fund more often than males did (see Table 9), the average amount spent per client was statistically higher among males (see Table 15). The average amount spent per client (among counties in which the fund was used more than once during the 5 year period) was much higher than average in Morgan County, and much lower than average in Garfield and Beaver counties (see Table 22).

The final ANCOVA looked at the main effect of age category (in 2007) on the natural log of the total amount spent across all 5 years with marital status, gender, population density, ethnicity, support source, and counselor as covariates. The main effect of age by category, based on the first year in which the clients accessed the fund (between the years 2002 and 2007), was statistically significant, $F(4, 1395) = 6.240$, $p < .001$, $\eta^2 = .018$ (see Table 23), indicating that the children under age 3 and seniors had less spent on them per person than did the working-age adults, and school-age children had the

Table 22

Descriptive Statistics for County

County	Number of clients served	Mean	*SD*
Beaver	13	2167.12	2025.17
Box Elder	75	4646.86	5947.36
Cache	116	3120.97	3548.63
Carbon	157	4463.10	3426.99
Davis	67	6089.92	6130.79
Duchesne	34	5687.32	4193.16
Emery	59	4799.23	4856.14
Garfield	2	354.79	274.65
Grand	51	4641.59	4010.32
Iron	21	3316.62	2423.49
Kane	5	4956.17	6287.75
Millard	9	3490.00	3947.49
Morgan	4	13456.73	9289.64
Rich	4	6389.74	3434.91
Salt Lake	227	5241.51	5820.56
San Juan	44	4459.82	2966.31
Sanpete	13	3675.31	2264.67
Sevier	65	3685.01	3714.62
Summit	1	22323.00	---
Tooele	5	6809.80	4751.56
Uintah	70	3621.14	4394.55
Utah	151	4328.48	5288.63
Wasatch	1	1199.00	---
Washington	133	2562.89	2893.13
Wayne	5	4895.91	3897.23
Weber	87	4448.17	4219.67

Table 23

Statistical Summary of ANCOVA; Age Category on Log Transformed Total Amount Spent per Client with Marital Status, Gender, Population Density, Ethnicity, Support Source, and Counselor as Covariates

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	81.587	10	8.159	6.077	.000	.042
Marital status	1.900	1	1.900	1.415	.234	.001
Gender	15.976	1	15.976	11.899	.001	.008
Population density	2.666	1	2.666	1.986	.159	.001
Ethnicity	0.496	1	0.496	0.370	.543	.000
Support source	8.774	1	8.774	6.535	.011	.005
Counselor	7.809	1	7.809	5.816	.016	.004
Age category in first year served	33.510	4	8.377	6.240	.000	.018
Error	1872.953	1395	1.343			
Total	87900.655	1406				
Corrected total	1954.540	1405				

Note. R^2 = .042 (Adjusted R^2= .035).

very most spent on them. As in one of the previous two ANCOVA's, gender, $F(1, 1395) = 11.899$, $p = .001$, $\eta^2 = .008$, and support source, $F(1, 1395) = 6.535$, $p = .011$, $\eta^2 = .005$, were also significant as covariates of age category, with the same types of effects as described in the previous ANCOVA's. In addition, counselor was also found to be statistically significant as a covariate in explaining the effect of age category on the amount spent per person, $F(1, 1395) = 5.816$, $p = .016$, $\eta^2 = .004$. The clients served by counselors 19, 8, 17, and 3 had an average amount spent that was statistically significantly less than the average amount spent on clients of counselors 13, 7, and 18 (see Table 24). Counselors 12, 10, 11, and 5 had clients with a lower average amount spent than counselor 18. This counselor data is not really interpretable by the author because the method of assigning counselor numbers was not consistent. In the Tri-County CIL, only one counselor number was assigned to the entire CIL, regardless of who did the intake paperwork and who worked with the client. In the OPTIONS for Independence CIL there were three people who did intake paperwork and worked with the clients. Each of these people had their own counselor number. Overall, it can be safely assumed that no counselor number was used

Table 24

Descriptive Statistics for Counselor

Counselor	Number of clients served	Mean	*SD*
1	214	5159.77	5972.71
2	217	4472.42	3663.98
3	81	2697.29	2841.16
4	70	4598.93	6114.41
5	77	3784.56	4067.13
6	95	4667.49	3617.74
7	5	7480.11	9473.38
8	15	1859.41	1170.75
9	98	4222.87	4394.21
10	13	2892.43	2491.94
11	82	3675.05	3662.45
12	36	2736.97	2326.15
13	141	5262.64	5094.26
14	68	4516.14	5457.05
15	90	4330.26	5005.54
16	38	3968.85	5196.51
17	52	2115.01	1734.68
18	21	8698.22	6200.65
19	6	1351.06	1764.67
Total	1419	4338.95	4686.89

in more than one CIL, and, therefore, the counselor numbers will correspond in some way with CIL numbers. Additionally, in order to protect the anonymity of their employees, USOR did not provide any code sheet for this variable.

Before the final ANOVA in question 6, which used the 5ME database could be answered, the data had to be checked for normality. As with the data in 5SE database the 5ME data were also found to not be normal (see Figures 8 and 9). After a log transformation was performed, the data looked much better, so analyses were carried out (see Figures 10 and 11).

Initially, when the two-way ANOVA between type of device, and primary disability cause, was run, both of the main effects and the interaction were significant. However, both of the independent variables had several categories with only one device purchase in them. The three types of primary cause of disability that had only one client that purchased only one device were HIV, alcohol abuse, and personality disorder. The HIV category was combined with the immune deficiency category, the personality disorder category was combined with the mental illness category, and the alcohol dependency category was combined with the other drug dependency category.

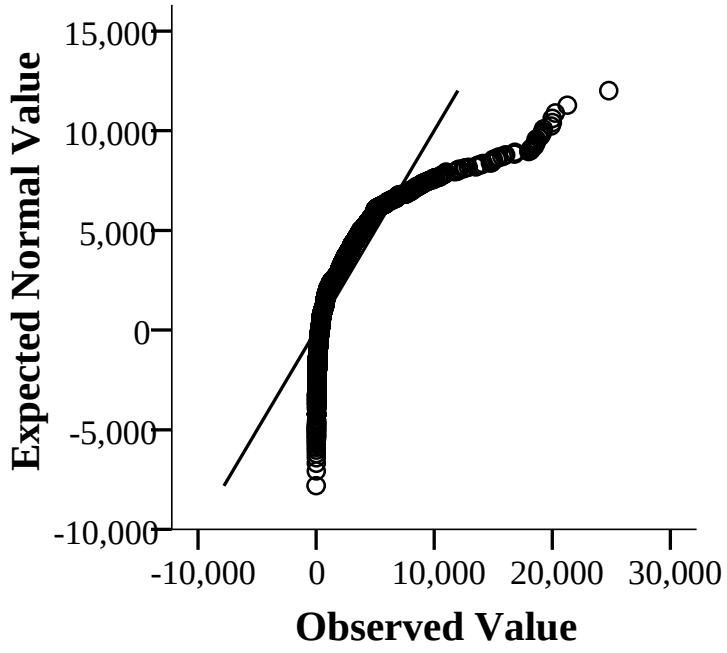

Figure 8. Q-Q plot of total amount spent per client, 5ME. Note, to be considered normal, the circles should be close to the diagonal line. These data are not normal.

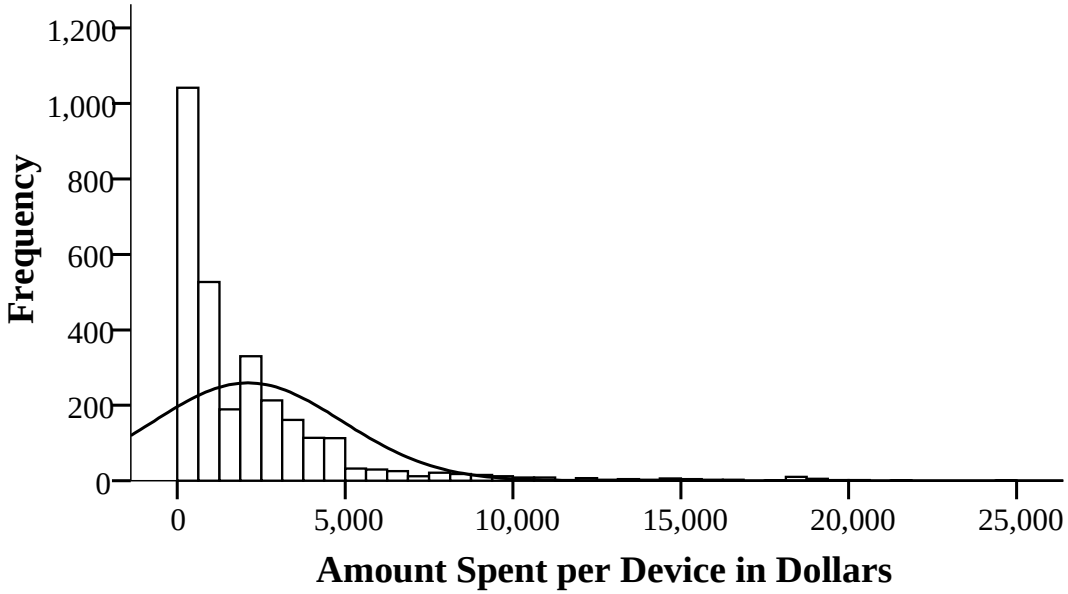

Figure 9. Histogram of total amount spent per client, 5ME. Note, these data do not follow a normal distribution, but are rather skewed like a Poisson distribution.

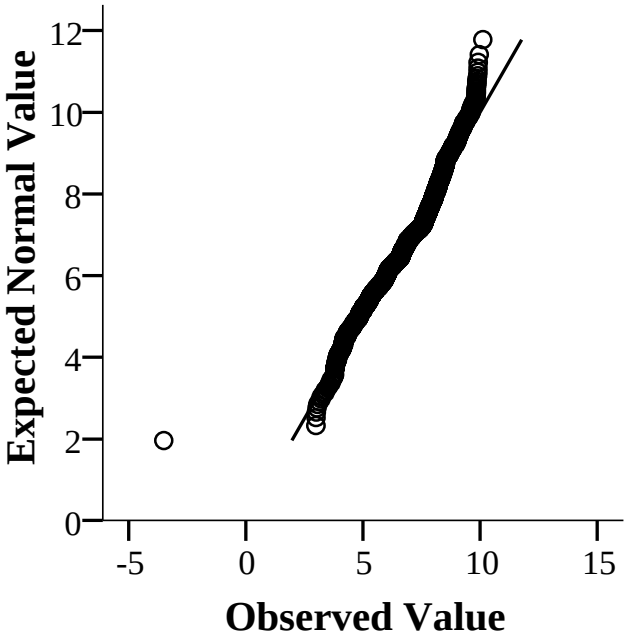

Figure 10. Q-Q plot for log transformed total amount spent per client, 5ME. Other than an outlier, the circles are close to the line, indicating approximate normality.

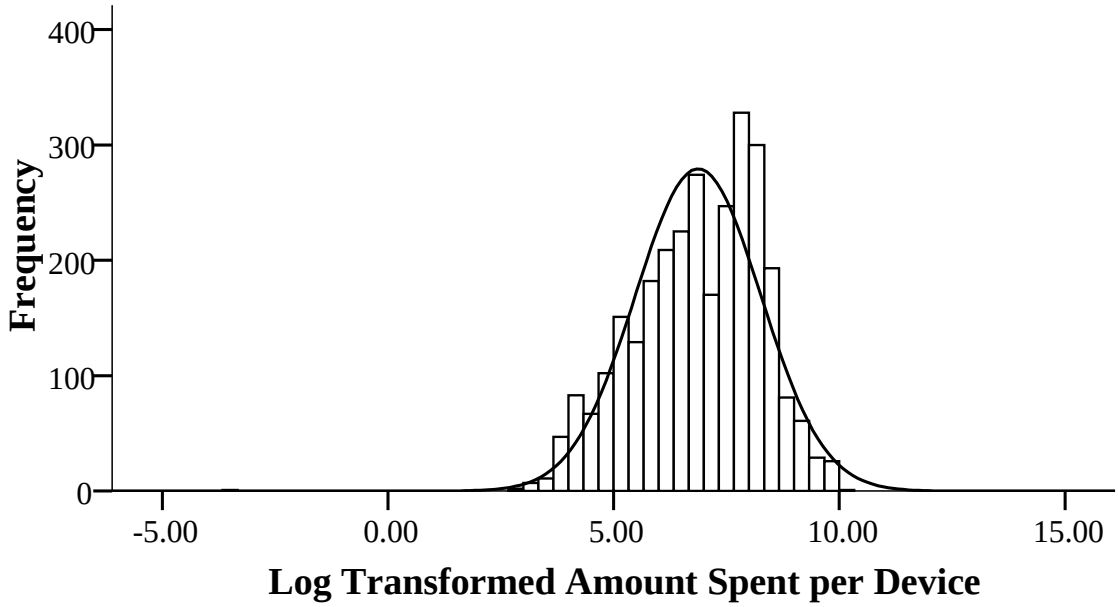

Figure 11. Histogram of log transformed total amount spent per client, 5ME. Note, these data are reasonably close to a normal distribution.

To both simplify the results and solve the problem of categories used only once among the device and service category types, the device and service categories were combined to form 11 broader categories: exams and evaluations, device maintenance, hearing devices, communication devices, vision devices, mobility devices, aids to daily living, limbs and prosthetics, modifications, device maintenance, fabrication and design, and other. After being combined the statistical significance changed. The final result was a statistically significant main effect of type of device purchased, $F(10,2748) = 37.404$, $p < .001$, and a statistically significant interaction effect of type of device and primary cause of disability, $F(170, 2748) = 1.283$, $p = .019$, $\eta^2 = .058$ (see Table 25). According to Levene's Test of Equality of Error Variance, homogeneity of variance was not achieved, $F(170,2748) = 2.116$, $p < .001$. However, due to the extremely large sample size, $N = 2,920$, significance on this statistic may not be particularly meaningful; therefore the analyses were carried out anyway.

Using an REGWQ post hoc test (see Table 26), fabrication and design had a smaller average cost per service/design than all other categories with exception of

Table 25

Statistical Summary of Two-Way ANOVA; Primary Disability Cause and Device Type Category on Log Transformed Amount Spent per Device

Source	Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Corrected model	1993.324	170	11.725	8.761	.000	.351
Primary disability cause	47.077	29	1.623	1.213	.200	.013
Device type category	500.587	10	50.059	37.404	.000	.120
Primary disability cause and device type category	224.873	131	1.717	1.283	.019	.058
Error	3677.684	2748	1.338			
Total	143419.692	2919				
Corrected total	5671.008	2918				

Note. R^2 Squared = .351 (Adjusted R^2 = .311).

exams and evaluations, and other. Exams and evaluations used a statistically significant average amount that was greater than fabrication and design, and less than aids to daily living, vision devices, communication devices, mobility devices, hearing devices, limbs and prosthetics,

Table 26

Post Hoc REGWQ for Device/Service Category

		Subset				
Device type category	N	1	2	3	4	5
Fabrication and design	55	4.88	--	--	--	--
Exams and evaluations	33	5.07	5.07	--	--	--
Other	19	5.61	5.61	--	--	--
Device maintenance	153	--	5.68	--	--	--
Aids to daily living	866	--	--	6.11	--	--
Vision devices	39	--	--	--	6.83	--
Communication devices	50	--	--	--	6.87	--
Mobility devices	1212	--	--	--	7.44	7.44
Hearing devices	93	--	--	--	--	7.56
Limbs, prosthetics, and orthotics	7	--	--	--	--	7.57
Modifications	392	--	--	--	--	7.59
Sig.	--	.404	.281	1.000	.127	.59

and modifications. The average amount spent on aids to daily living was smaller than vision devices, communication devices, mobility devices, hearing devices, limbs and prosthetics, and modifications and larger than fabrication

and design, exams and evaluations, and other. The average amounts spent on vision, communication, and mobility devices were statistically significantly higher than the average amounts spent on fabrication and design, exams and evaluations, other, and aids to daily living, and lower than the average amount spent on hearing devices, limbs and prosthetics and modifications. The average amount spent on hearing devices, limbs and prosthetics, and modifications was statistically significantly higher than all other devices with the exception of mobility devices. The interaction had too many levels to be usefully interpreted.

Question 7: Trends over Time

Were there any interesting trends in spending patterns or in number of devices purchased each year over the 5-year period regarding age, gender, ethnicity, population density, CIL, or education level?

To provide a complete picture of the trends in both the amounts spent and the number of times used, three graphs were developed for each variable of interest: Age, gender, population density, Centers for Independent Living, ethnicity, and education level. The first graph for each variable addressed the amount spent. The second graph

provided answers to the number of devices purchased for each group. The third graph displayed the percent of the total number of devices purchased. Many of the interesting trends/changes occur around 2006.

Age

With regard to the number of dollars spent on each age group (see Figure 12) the amount spent on all of the adult categories increased in 2006 then dropped again in 2007, however the increase was much more dramatic among the seniors 65 years and older than it was among the working-age adults. All of the categories with children remained nearly constant across all years, with a slight dip in 2006 for the school-age children followed by a slight increase in 2007. The second age graph (see Figure 13) showed that the fund was used more times in 2006, especially by the 65 and older population. For 2006, the third graph (see Figure 14) showed a sharp rise in the percentage of times seniors 65 and over used the fund accompanied by a slight decrease in the percentage of times used by the working-age population.

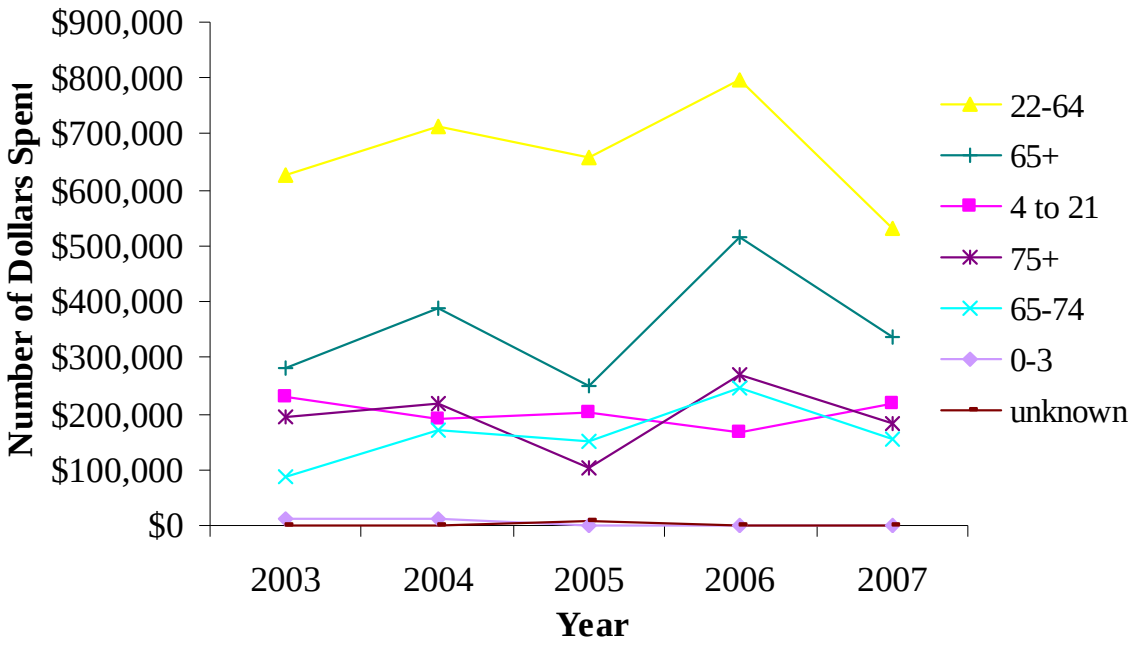

Figure 12. Age by number of dollars spent: Trend from 2003-2007.

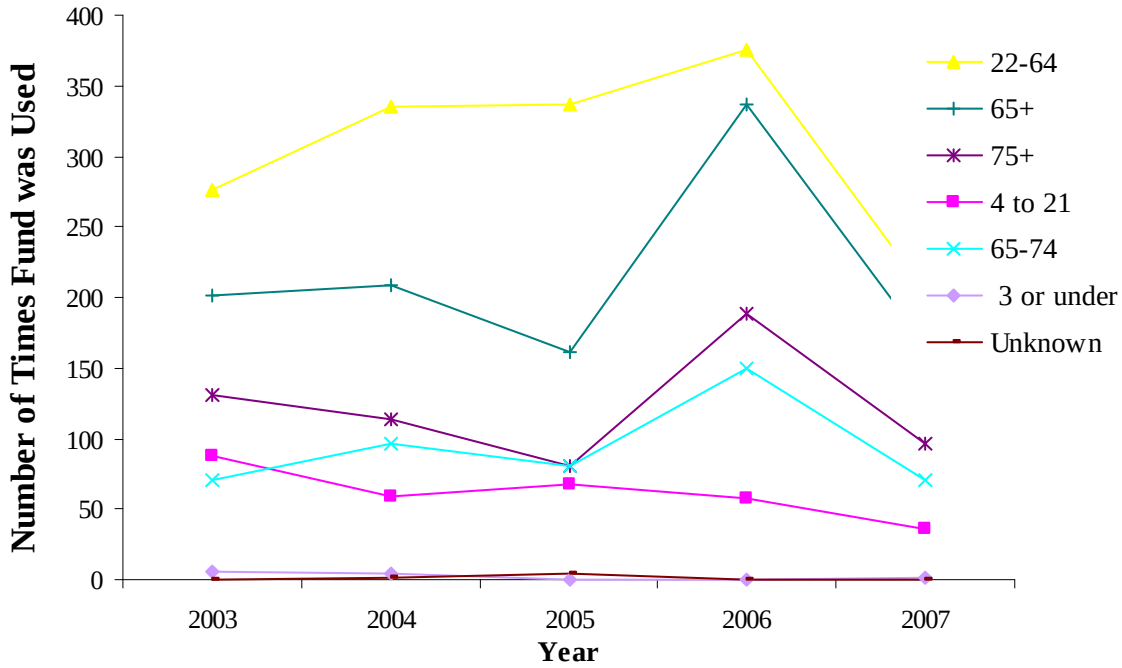

Figure 13. Age trend: Number of times fund was used from 2003-2007.

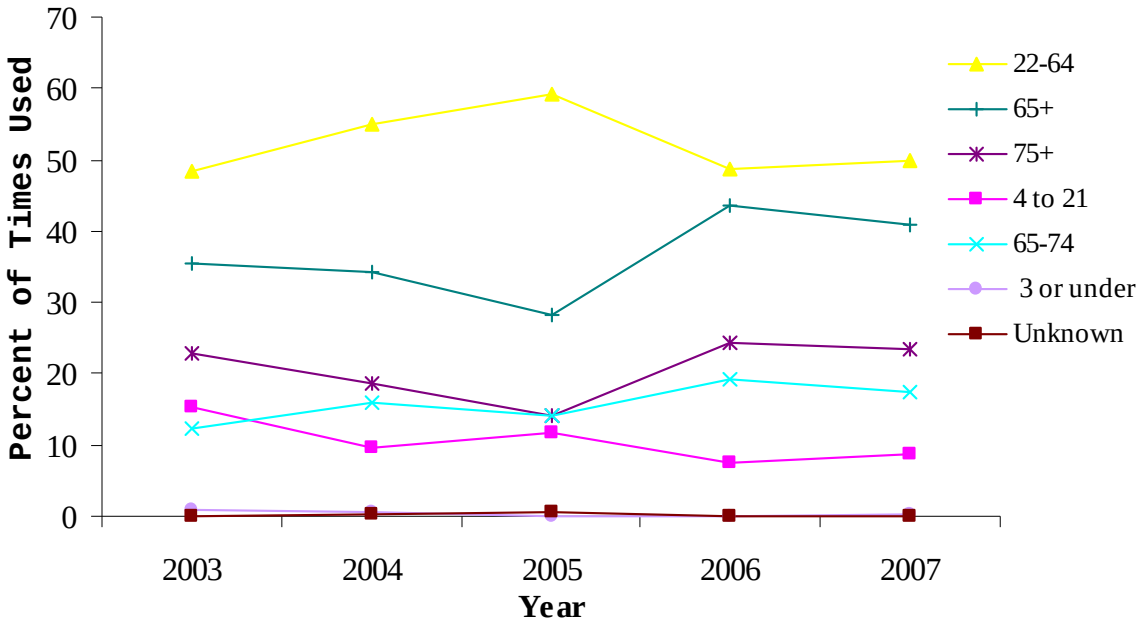

Figure 14. Age: Percent of overall times the fund was used by each group.

Gender

Females as a group consistently used both more money from the fund overall, and used the fund more times than males (see Figures 15, 16, and 17). For the first three years, 2003 – 2005, the gap was closing slightly. However, from 2005 to 2006, the trend changed directions, and the females had a sharp increase in both amount and times used that was not matched by the males (see Figures 15 and 16). The third graph confirmed this by indicating a lower percentage of times used for males in 2006, and a higher percentage of times used for the females.

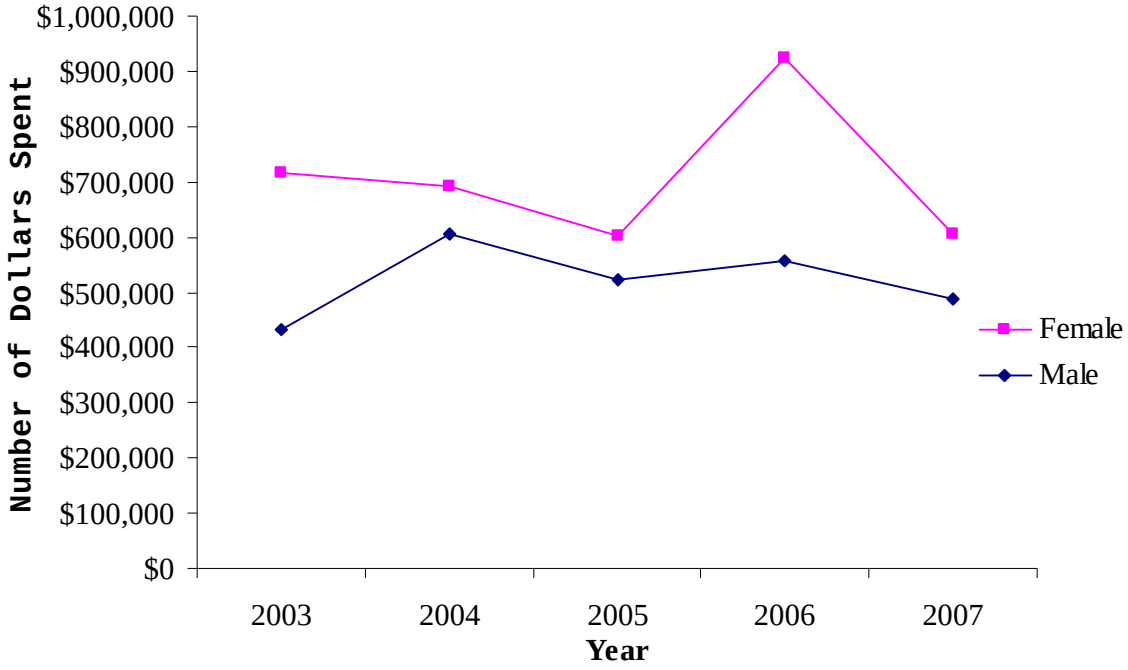

Figure 15. Gender by number of dollars spent: Trend from 2003-2007.

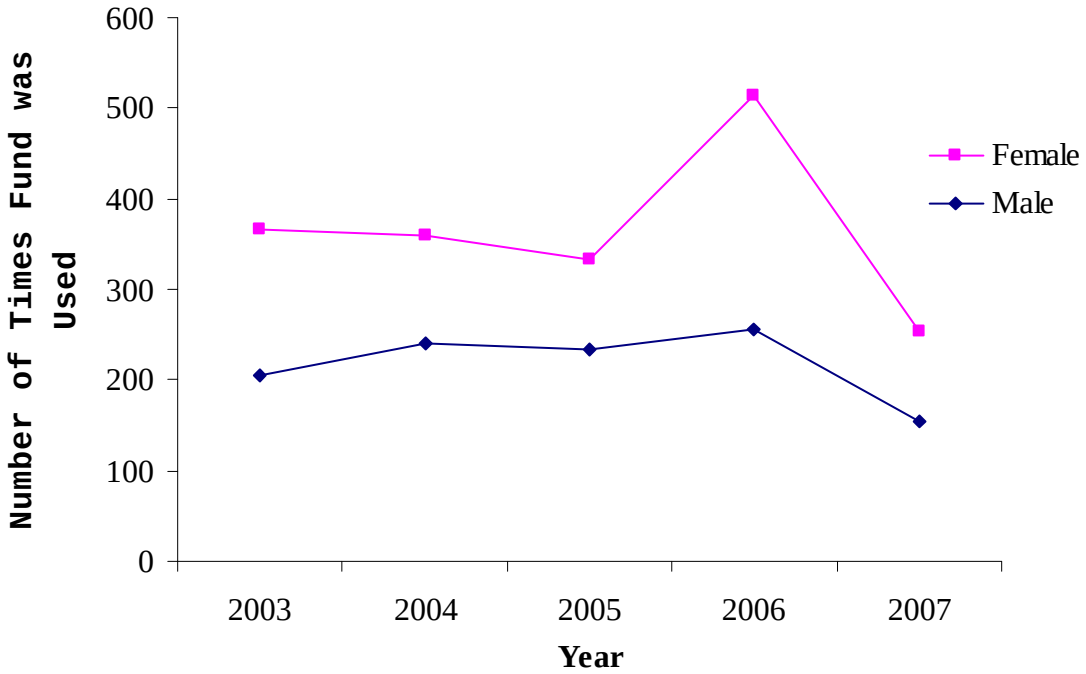

Figure 16. Gender trend: Number of times fund was used from 2003-2007.

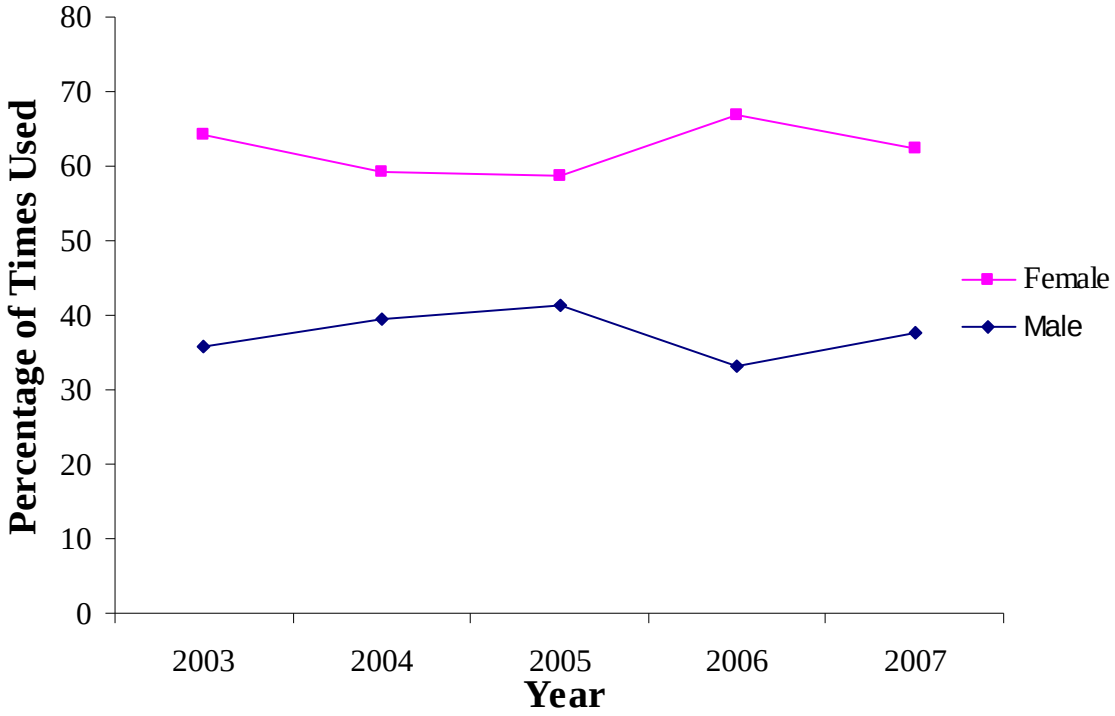

Figure 17. Gender: Percent of overall times the fund was used by group.

Population Density

From 2003 to 2005 the amount spent on urban and rural counties was about the same (see Figure 18). In 2006, the amount spent on the rural counties increased sharply, while the amount spent on the urban counties decreased slightly. In 2007, amount spent on the rural counties dropped back down, but not all the way back down to its previous level of 2005. Figure 19 showed that the rural counties have consistently purchased more devices than the urban counties, but this was especially true for 2006 when the

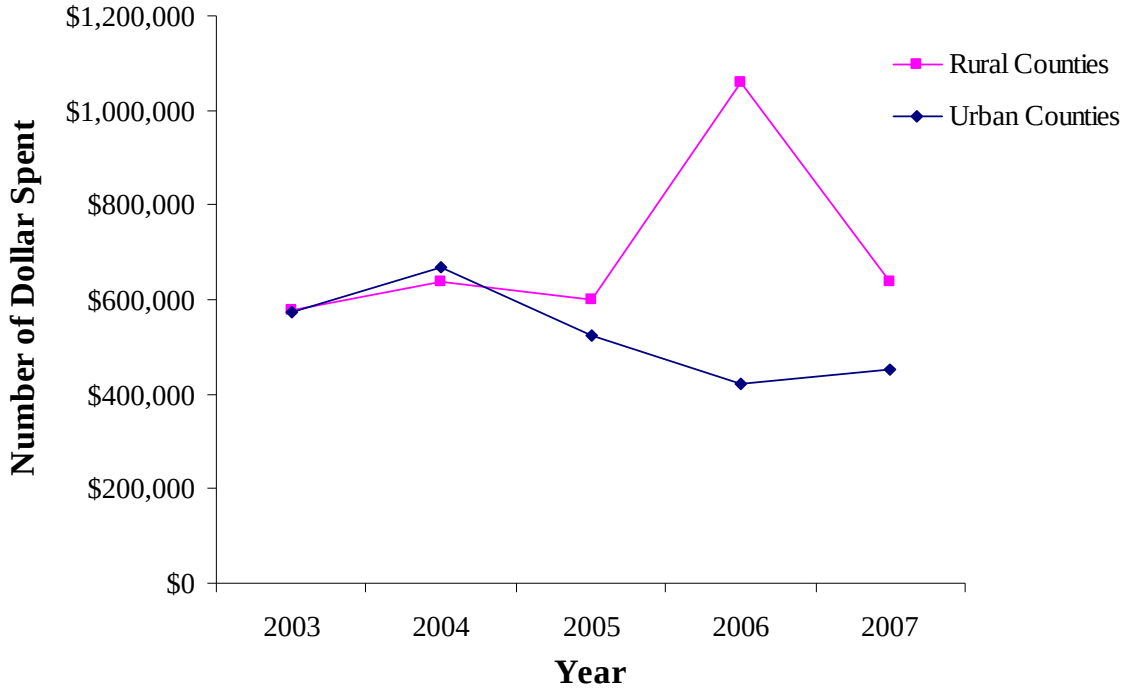

Figure 18. Population density by number of dollars spent.

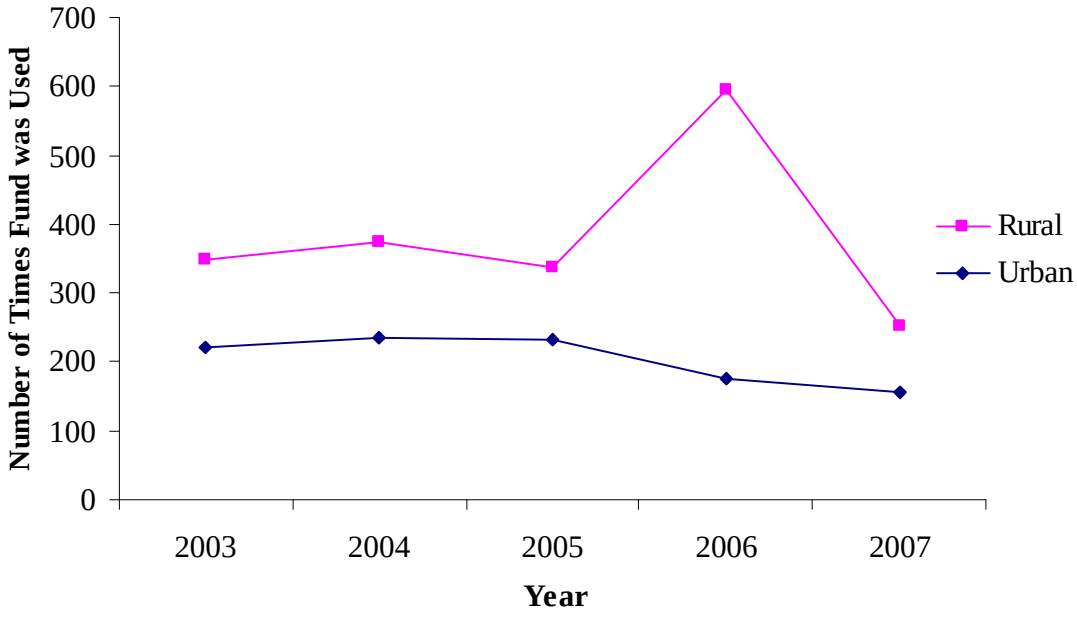

Figure 19. Population density: Number of times fund was used from 2003-2007.

number of times the fund was used increased sharply for the rural counties. Figure 20 showed that as a percentage of the whole, the usage of the rural counties increased in 2006, while the usage of the urban counties decreased.

Centers for Independent Living

The only major trend that jumps out among the six CILs is a huge jump by the Active Re-entry CIL in 2006 followed by a slightly smaller drop in 2007. This trend is apparent across all three CIL graphs, amount spent (see Figure 21),

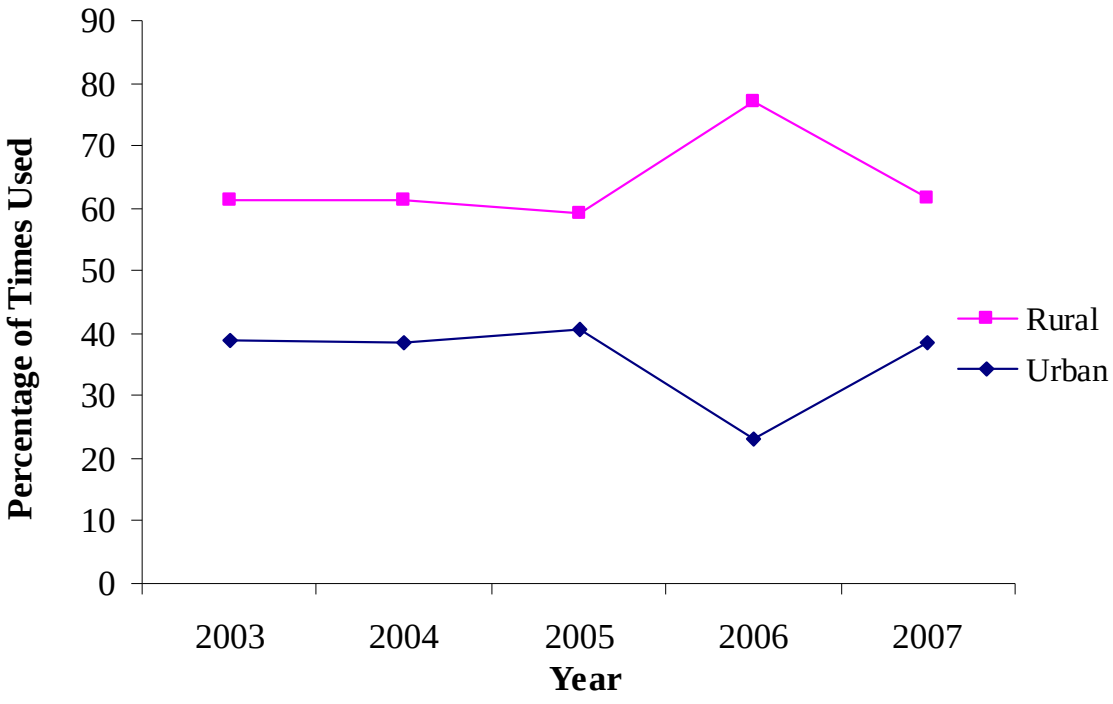

Figure 20. Population density: Percent of overall times the fund was used.

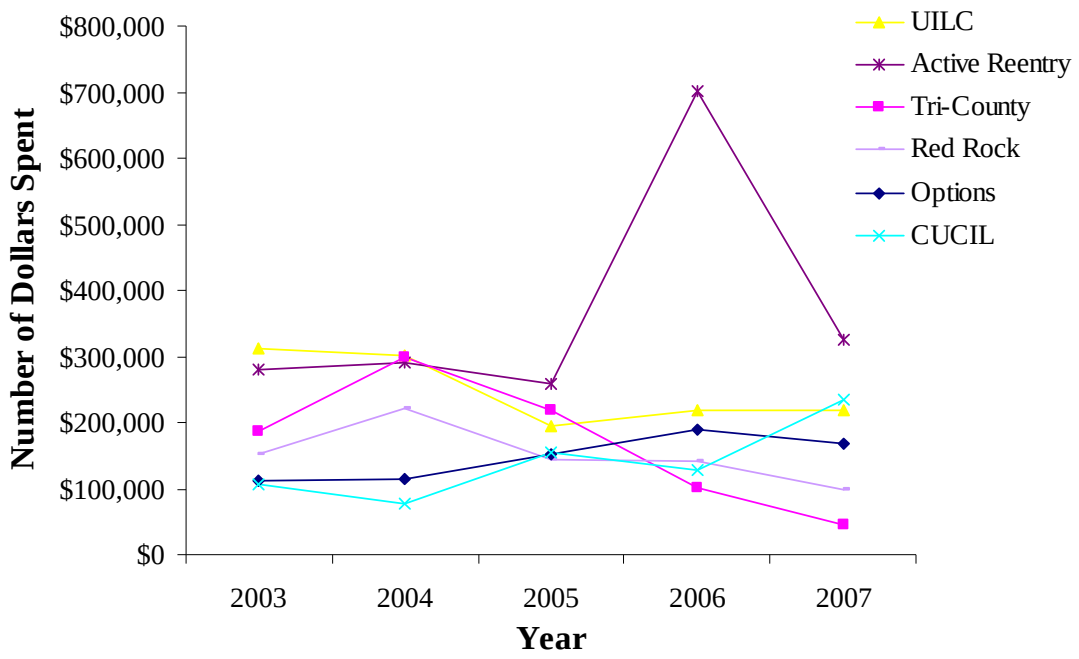

Figure 21. Centers for Independent Living: By number of dollars spent.

number of times used (see Figure 22), and percentage of uses (see Figure 23).

Ethnicity

From the first two ethnicity graphs (see Figures 24 and 25), the only apparent trends were seen across the White ethnic group, which forms the vast majority of the population in the state of Utah and, thus, were most often served by the funds. First there was a rise in the amount spent in 2004 followed by a subsequent drop in 2005 (see Figure 24). Then there was another rise and fall pattern across 2006 and 2007. Figure 25 shows a fairly even line

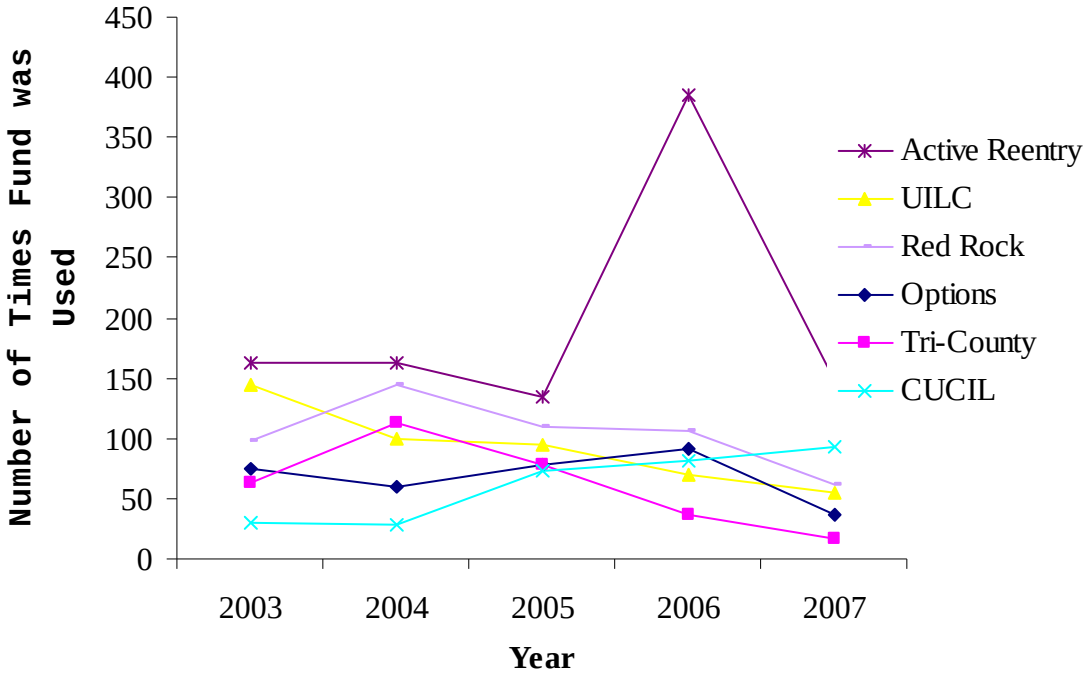

Figure 22. Centers for Independent Living: Number of times fund was used.

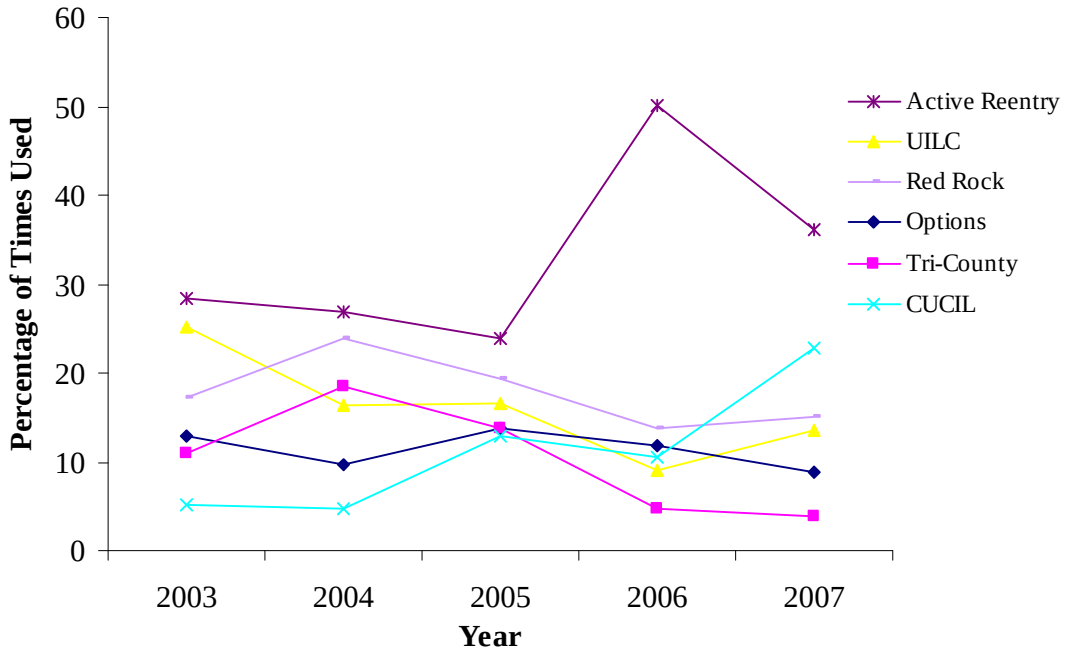

Figure 23. Centers for Independent Living: Percentage of times used.

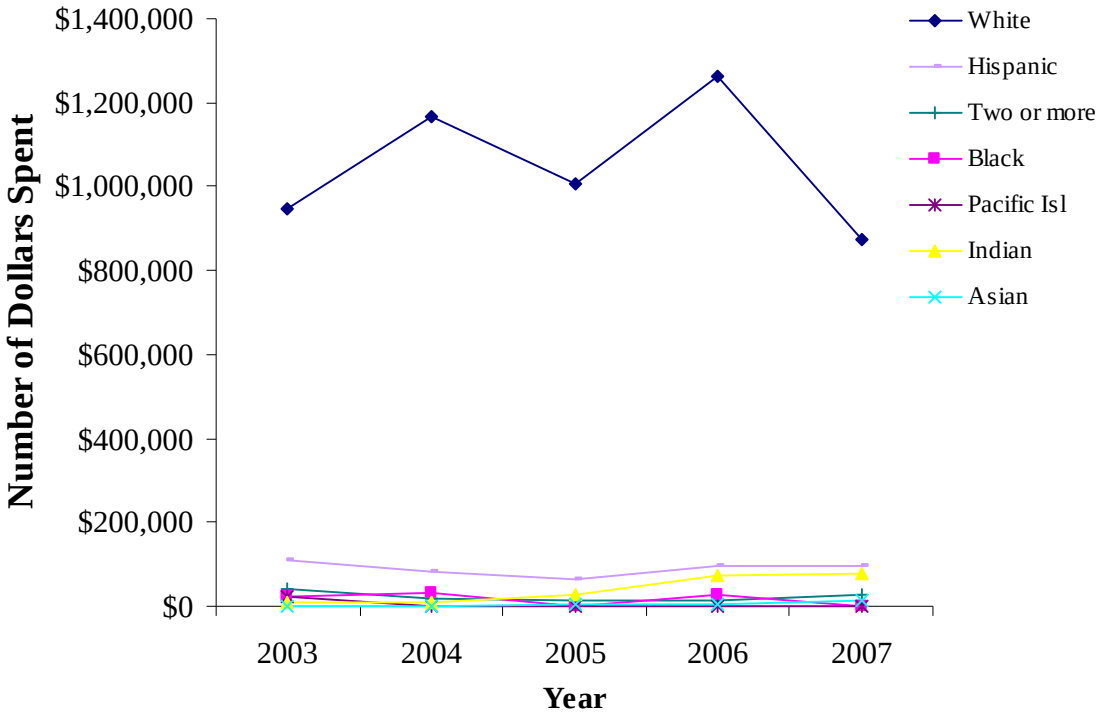

Figure 24. Ethnicity by number of dollars spent.

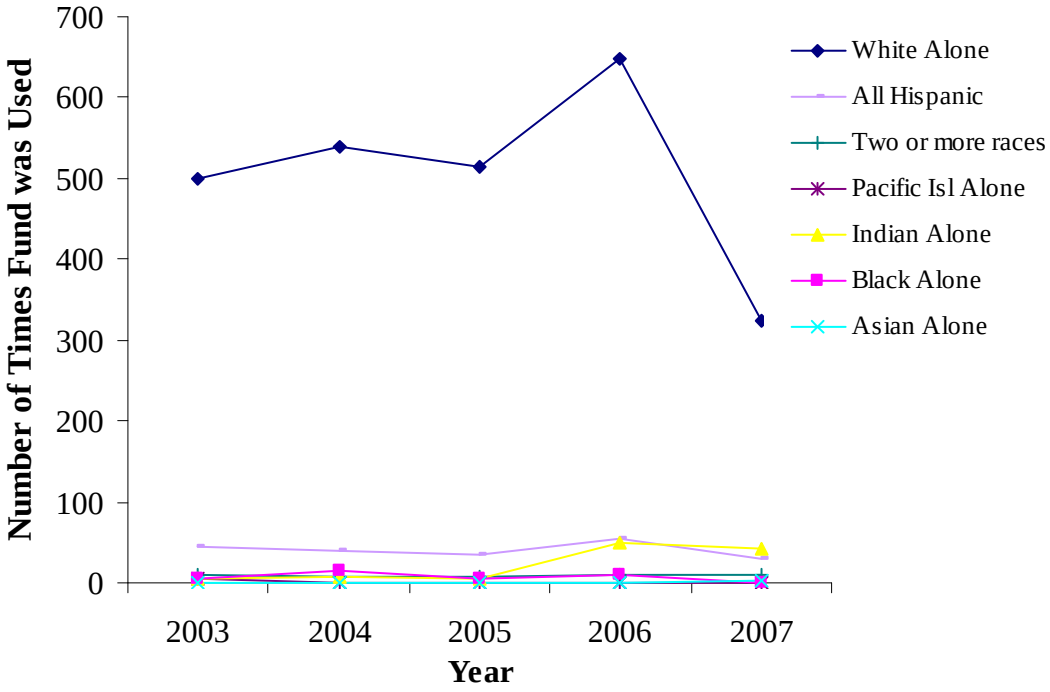

Figure 25. Ethnicity: Number of times used.

for number of devices/services purchased for the White ethnic group from the beginning until 2006, where we see a moderate increase. This was followed by a large drop in 2007.

To get a closer look at the other ethnic groups on the number of times the fund was used, for the third ethnicity graph (see Figure 26), the White ethnic group was omitted. Figure 26 shows that until 2006, the Hispanic group was the most frequent user of the fund. However, in 2006, the Hispanic group had a moderate increase in the number of times the fund was used, while the Native Americans experienced a very large increase in the number of times the fund was used. (The Native American population has been coded “Indian” in the graphs because “Indian” was the term USOR had provided and has used in their coding systems; however, after consulting with the CIL directors it was apparent that this term referred to the Native American population.) The Hispanic group experienced a subsequent moderate drop in 2007, but the Native Americans experienced only a very slight drop in 2007. The pattern displayed by the Black ethnic group resembles the same pattern shown by the White group on the amount spent (see Figure 24). The other three ethnic groups, Asians, Pacific

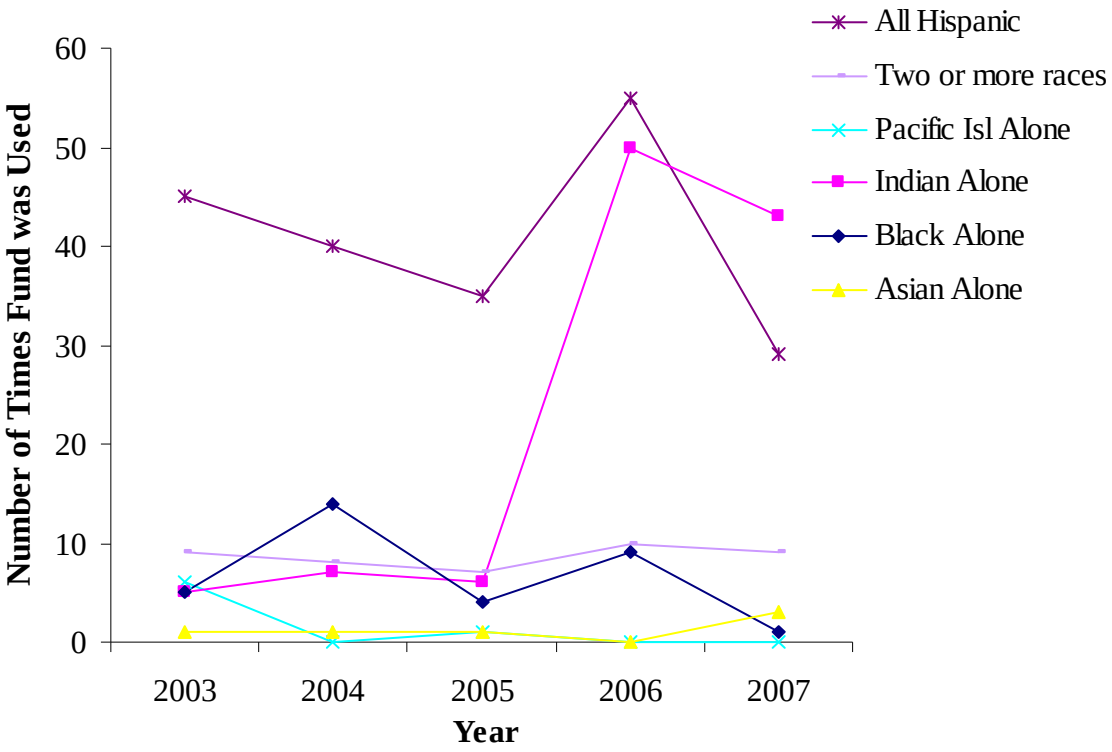

Figure 26. Ethnicity without whites: Number of times used.

Islanders, and those with two or more non-Hispanic races, were reasonably stable.

The last ethnicity graph (see Figure 27) shows a slight drop in the overall percentage of purchases made for the White ethnic group. It also shows a small increase for the Native Americans (coded Indian in the graph) in the overall percentage of times the fund was used. The other groups appear to have maintained a fairly consistent percentage of the number of times the fund was used.

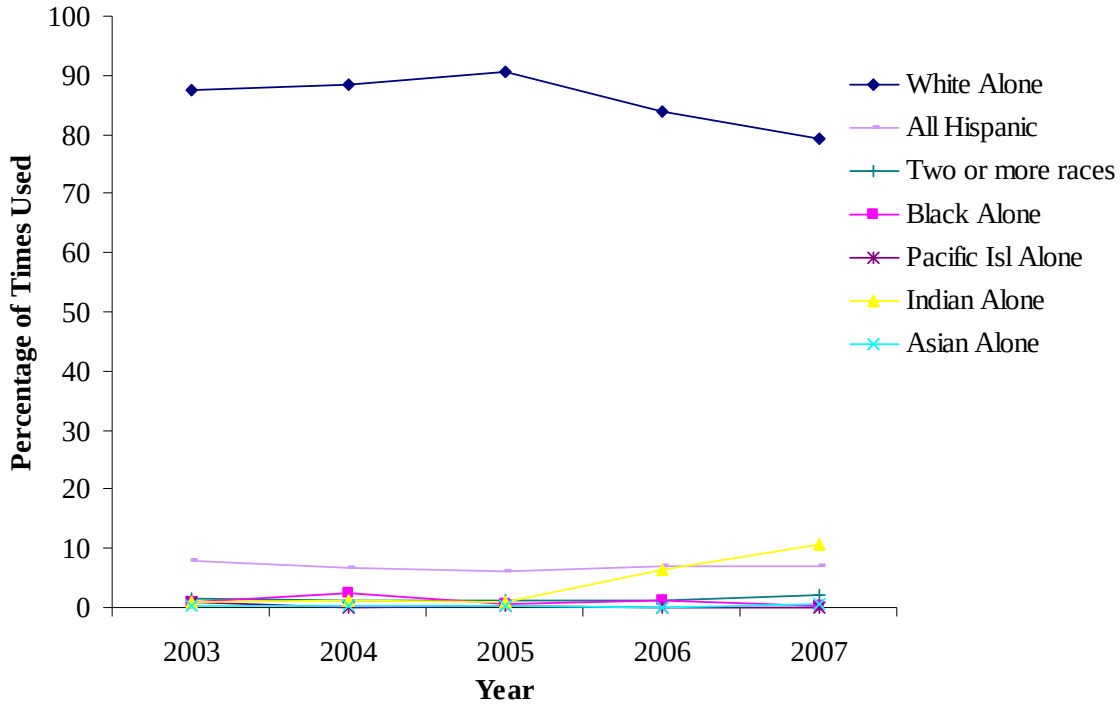

Figure 27. Ethnicity: Percentage of times used.

Education Level

The first education level graph (see Figure 28) shows that the group with less than a high school diploma was the largest user of the total number of dollars spent. Those with a high school diploma were a close second with regard to the amount spent. Both of these groups showed an increase in the amount spent in 2006, followed by a decrease in 2007. Additionally, though not as extreme, they both showed an increase and subsequent decrease in 2004 and 2005. This was more pronounced among the high school graduates. The other groups were more consistent

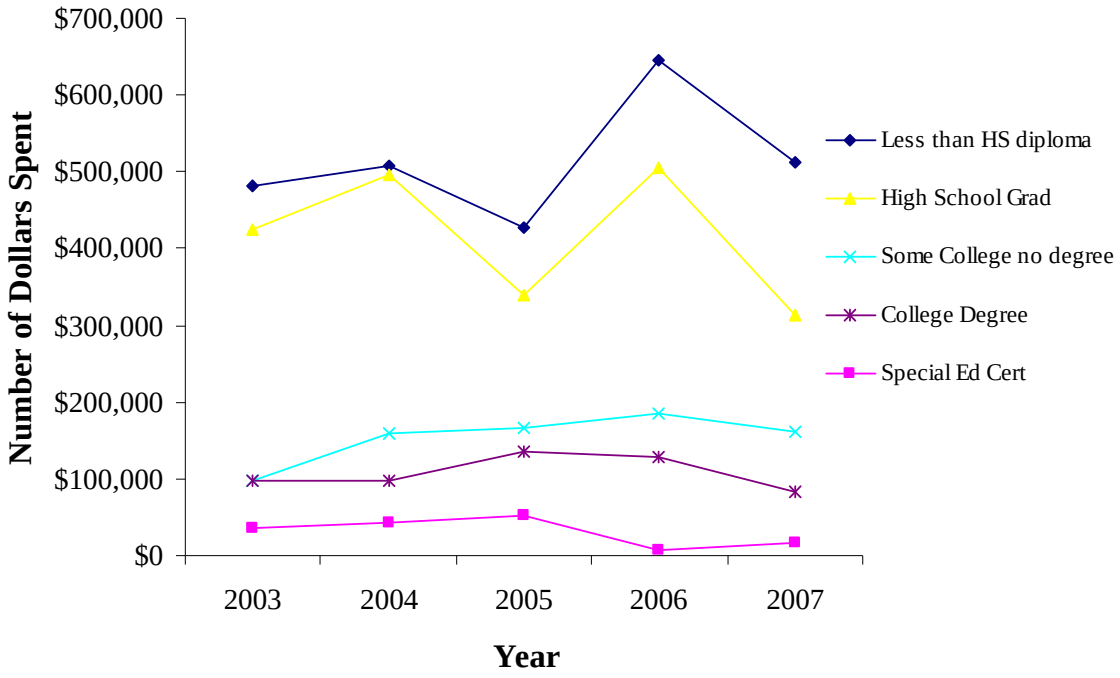

Figure 28. Education level: Number of dollars spent.

across time; however, the some college group showed a slight increase over time with a very slight drop in 2007. Figure 29, which shows the number of times the fund was used, displayed similar tends to those listed above for Figure 28, amount spent. Figure 30 shows that the group with a high school diploma was very consistent as a percentage of the average number of times used. It also shows that the group with less than a high school diploma and the group with just high school diplomas together purchased somewhere between 70 - 80% of the total number of items purchased. Additionally, it shows a slight decrease

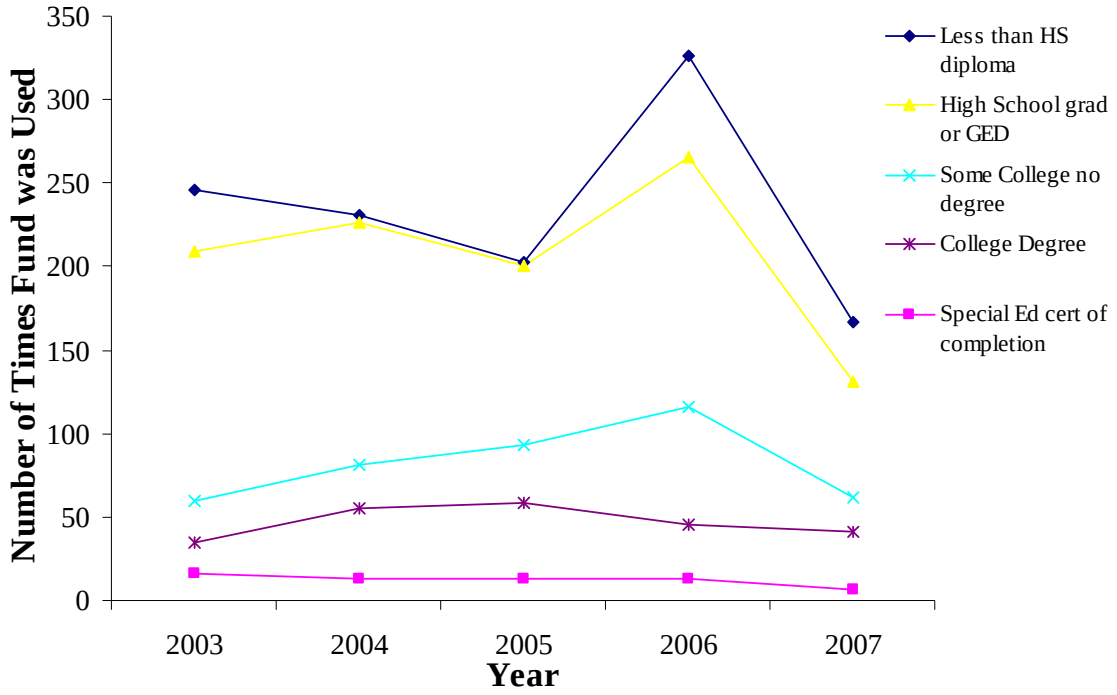

Figure 29. Education level: Number of times used.

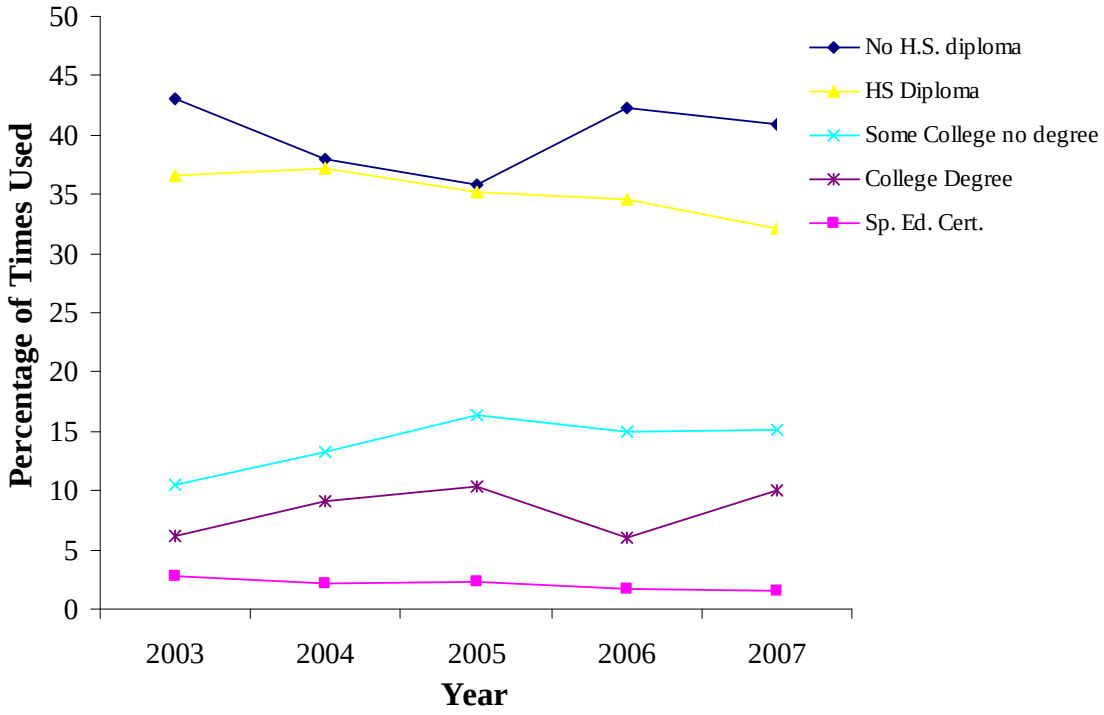

Figure 30. Education level: Percentage of times used.

over 2004 and 2005 in the percentage of items purchased for those without college diplomas, and a slight increase in the percentage of devices/services purchased for those with college degrees, and with some college. In 2006 the percentage of items purchased subsequently increased for those with less than high school degrees and decreased for those with college degrees. From 2003 through 2007 the group with high school diplomas showed a consistent downward trend in the percentage of items purchased. Finally, in 2007, the percentage increased again slightly for those with college degrees, and dropped slightly for those with less than high school diplomas.

Question 8: Types of Devices Used by Demographic Categories

What devices were most commonly used by which age groups, which primary causes of disabilities were most common among the different age groups, and which counties purchased the most devices for the various minority groups?

To answer all of these questions the split file feature of SPSS was used to divide the data into groups (the exact type of groups depended on the question asked). Next the descriptive statistics frequency count was used to

tally the number of devices purchased by each group among the second variable indicated by the question. Finally, the results of the table produced from the above described procedures were gone through by hand to pick out the three combinations with the largest number of devices purchased and the three combinations with the largest percent of number of devices purchased. Every time a combination had both one of the largest numbers and percents of devices purchased then the number of combinations reported for the category was decreased by one.

Devices/Services by Age Group

To determine which devices/services were most commonly used for each age group, the 11 broader device/service categories were used. Mobility, aids to daily living, and modifications were respectively the three most commonly purchased categories for all groups of clients age 74 or younger (see Table 27). For children age 3 and under the most commonly used devices were mobility devices (n = 4), aids to daily living (n = 3), and modifications (n = 2). For school-age children from 4 to 21, 121 mobility devices, 76 aids to daily living, and 50 modifications were

Table 27

Device/Service Type Categories Divided by Age Categories

Age category	Device/service type category	Times used	%	Cumulative %
Age not reported	exams & evaluations	1	20.00	20.00
	hearing devices	4	80.00	100.00
	communication devices	--	--	--
	vision devices	--	--	--
	mobility devices	--	--	--
	aids to daily living	--	--	--
	device maintenance	--	--	--
	limbs, prosthestics, and orthotics	--	--	--
	modifications	--	--	--
	fabrication & design	--	--	--
	other	--	--	--
	total	5	100.00	--
Children 3 or under	exams & evaluations	--	--	--
	hearing devices	--	--	--
	communication devices	1	10.00	10.00
	vision devices	--	--	--
	mobility devices	4	40.00	50.00
	aids to daily living	3	30.00	80.00
	device maintenance	--	--	--
	limbs, prosthestics, and orthotics	--	--	--
	modifications	2	20.00	100.00
	fabrication & design	--	--	--
	other	--	--	--
	total	10	100.00	

(*table continues*)

Age category	Device/service type category	Times used	%	Cumulative %
School-age 4-21	Exams & evaluations	--	--	--
	Hearing devices	--	--	--
	Communication devices	14	4.55	4.55
	Vision devices	--	--	--
	Mobility devices	121	39.29	43.83
	Aids to daily living	50	16.23	60.06
	Device maintenance	35	11.36	71.43
	Limbs, prosthestics, and orthotics	--	--	--
	Modifications	76	24.68	96.10
	Fabrication & design	3	0.97	97.08
	Other	9	2.92	100.00
	Total	308	100.00	
Working class 22-64	Exams & evaluations	16	1.05	1.05
	Hearing devices	24	1.57	2.62
	Communication devices	31	2.03	4.65
	Vision devices	14	0.92	5.57
	Mobility devices	673	44.07	49.64
	Aids to daily living	433	28.36	78.00
	Device maintenance	88	5.76	83.76
	Limbs, prosthestics, and orthotics	6	0.39	84.15
	Modifications	217	14.21	98.36
	Fabrication & design	17	1.11	99.48
	Other	8	0.52	100.00
	Total	1,527	100.00	

(*table continues*)

Age category	Device/service type category	Times used	%	Cumulative %
Seniors aged 65-74	Exams & evaluations	6	1.28	1.28
	Hearing devices	19	4.07	5.35
	Communication devices	2	0.43	5.78
	Vision devices	4	0.86	6.64
	Mobility devices	194	41.54	48.18
	Aids to daily living	148	31.69	79.87
	Device maintenance	14	3.00	82.87
	Limbs, prosthestics, and orthotics	1	0.21	83.08
	Modifications	69	14.78	97.86
	Fabrication & design	8	1.71	99.57
	Other	2	0.43	100.00
	Total	467	100.00	
Seniors 75 and over	Exams & evaluations	10	1.64	1.64
	Hearing devices	46	7.55	9.20
	Communication devices	2	0.33	9.52
	Vision devices	21	3.45	12.97
	Mobility devices	225	36.95	49.92
	Aids to daily living	234	38.42	88.34
	Device maintenance	6	2.63	90.97
	Limbs, prosthestics, and orthotics	--	--	--
	Modifications	28	4.60	95.57
	Fabrication & design	27	4.43	100.00
	Other	--	--	--
	Total	609	100.00	

purchased. For working-age adults 673 mobility devices, 433 aids to daily living, and 217 modifications were purchased. For seniors between the age of 65 and 74, 194 mobility devices, 148 aids to daily living, and 67 modifications were purchased. For seniors 75 years or older, aids to daily living were the most commonly purchased device (*n* = 234), followed closely by 225 mobility devices, then 46 hearing devices.

Primary Disability by Age Group

The most common causes of primary disability varied more across age groups than did the types of devices/services purchased (see Table 28). For children aged 0 to 3 the most common cause of disability was cerebral palsy (*n* = 3), followed by two children with congenital conditions or birth injuries (*n* = 2), and a one-child tie between muscular dystrophy and unknown causes. School-age children from age 4 to 21 were affected by the same known causes of disability as the very young children. There were 50 school-age children with cerebral palsy, 50 children with congenital conditions or birth injuries, and 18 children with muscular dystrophy. The most common cause of the primary disability among

Table 28

Primary Causes of Disability for each Age Group

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
Unknown	Cause unknown	2	66.67	66.67
	Respiratory disorders	1	33.33	100.00
	Total	3	100.00	
0-3	Cause unknown	1	14.29	14.29
	Cerebral palsy	3	42.86	57.14
	Congenital condition or birth injury	2	28.57	85.71
	Muscular dystrophy	1	14.29	100.00
	Total	7	100.00	

(*table continues*)

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
4-21	Cause unknown	9	5.59	5.59
	Accident/injury (other than TBI or SCI)	4	2.48	8.07
	Arthritis and rheumatism	2	1.24	9.32
	Autism	3	1.86	11.18
	Cancer	1	0.62	11.80
	Cerebral palsy	50	31.06	42.86
	Congenital condition or birth injury	50	31.06	73.91
	Epilepsy	3	1.86	75.78
	Mental illness	1	0.62	76.40
	Mental retardation	1	0.62	77.02
	Muscular dystrophy	18	11.18	88.20
	Parkinson’s disease/neurological disorders	1	0.62	88.82
	Other physical disorders/conditions	8	4.97	93.79
	Polio	1	0.62	94.41
	Spinal cord injury	3	1.86	96.27
	Traumatic brain injury	6	3.73	100.00
	Total	161	100.00	
	Missing	1		
	Grand total	162		

(*table continues*)

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
22-64	Cause unknown	67	9.40	9.40
	Accident/injury (other than TBI or SCI)	92	12.90	22.30
	Alcohol abuse or dependence	1	0.14	22.44
	Amputations	14	1.96	24.40
	Anxiety disorders	3	0.42	24.82
	Arthritis and rheumatism	82	11.50	36.33
	Asthma and other allergies	1	0.14	36.47
	Autism	4	0.56	37.03
	Blood disorders	3	0.42	37.45
	Cancer	11	1.54	38.99
	Cardiac/circulatory system conditions	17	2.38	41.37
	Cerebral palsy	61	8.56	49.93
	Congenital condition or birth injury	47	6.59	56.52
	Depressive and other mood disorders	1	0.14	56.66
	Diabetes mellitus	29	4.07	60.73
	Drug abuse or dependence	1	0.14	60.87
	Eating disorders	3	0.42	61.29
	End-stage renal disease/genitourinary disorder	2	0.28	61.57
	Epilepsy	3	0.42	61.99
	HIV and AIDS	1	0.14	62.13

(*table continues*)

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
22-64	Immune deficiencies	1	0.14	62.27
	Mental illness	1	0.14	62.41
	Mental retardation	2	0.28	62.69
	Multiple sclerosis	75	10.52	73.21
	Muscular dystrophy	15	2.10	75.32
	Parkinson’s disease/neurological disorders	11	1.54	76.86
	Personality disorders	1	0.14	77.00
	Other physical disorders/conditions	58	8.13	85.13
	Polio	16	2.24	87.38
	Respiratory disorders	17	2.38	89.76
	Spinal cord injury	29	4.07	93.83
	Stroke	25	3.64	97.34
	Traumatic brain injury	19	2.66	100.00
	Total	713	100.00	
	Missing	1		
	Grand total	714		

(*table continues*)

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
65-74	Cause unknown	27	11.69	11.69
	Accident/injury (other than TBI or SCI)	22	9.52	21.21
	Amputations	1	0.43	21.65
	Arthritis and rheumatism	50	21.65	43.29
	Asthma and other allergies	1	0.43	43.72
	Cancer	3	1.30	45.02
	Cardiac/circulatory system conditions	15	6.49	51.52
	Cerebral palsy	3	1.30	52.81
	Congenital condition or birth injury	6	2.60	55.41
	Diabetes mellitus	15	6.49	61.90
	Eating disorders	1	0.43	62.34
	End-stage renal disease/genitourinary disorder	1	0.43	62.77
	Epilepsy	1	0.43	63.20
	Multiple sclerosis	10	4.33	67.53
	Parkinson’s disease/neurological disorders	3	1.30	68.83
	Other physical disorders/conditions	22	9.52	78.35
	Polio	13	5.63	83.98
	Respiratory disorders	7	3.03	87.01
	Spinal cord injury	5	2.16	89.18
	Stroke	23	9.96	99.13
	Traumatic brain injury	2	0.87	100.00
	Total	231	100.00	

(*table continues*)

Age at 1st fund use	Cause of primary disability	Number of clients	%	Cumulative %
75+	Cause unknown	51	16.94	16.94
	Accident/injury (other than TBI or SCI)	22	7.31	24.25
	Amputations	3	1.00	25.25
	Arthritis and rheumatism	94	31.23	56.48
	Blood disorders	1	0.33	56.81
	Cancer	5	1.66	58.47
	Cardiac/circulatory system conditions	16	5.32	63.79
	Cerebral palsy	2	0.66	64.45
	Congenital condition or birth injury	4	1.33	65.78
	Diabetes mellitus	14	4.65	70.43
	Multiple sclerosis	2	0.66	71.10
	Muscular dystrophy	1	0.33	71.43
	Parkinson’s disease/neurological disorders	9	2.99	74.42
	Other physical disorders/conditions	37	12.29	86.71
	Polio	3	1.00	87.71
	Respiratory disorders	8	2.66	90.37
	Spinal cord injury	3	1.00	91.36
	Stroke	26	8.64	100.00
	Total	301	100.00	
	Missing	1		
	Grand total	302		

working-age adults was accident or injury, affecting 92 people. Affecting 82 working-age people, arthritis or rheumatism was second most common, followed by multiple sclerosis, which affected 75. Arthritis was the leading cause of disability and among both groups of senior. Among seniors aged 65 to 74 there were 50 cases of arthritis, 27 people affected by disabilities with unknown causes, and 23 people suffering from disabilities due to strokes. Of the seniors aged 75 or older, 94 experienced a disability resulting from arthritis or rheumatism, 51 suffered from disabilities with unknown causes, and 37 were affected by other physical disorders.

Ethnic Minorities by County

The distribution of the ethnic minorities was not exactly the same in every county. The full race by county break down on the number of times the fund was used can be found in Table 29. In this section the top three counties, both by percentage of their number of times used and by absolute number of times used, were listed for each ethnic minority category.

Black. The Black population was best served in Tooele County, where devices/services were purchased eight times

Table 29

Number of Devices/Services Purchased for each Race by County

County	Race	Times used	%	Cumulative %
Beaver	White only	20	76.92	76.92
	Black only	--	--	--
	Indian only	--	--	--
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	6	23.08	100.00
	Two or more races (except Hispanics)	--	--	--
	Total	26	100.00	
Box Elder	White only	121	90.30	90.30
	Black only	--	--	--
	Indian only	--	--	--
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	10	7.46	97.76
	Two or more races (except Hispanics)	3	2.24	100.00
	Total	134	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Cache	White only	183	94.33	94.33
	Black only	1	0.52	94.85
	Indian only	1	0.52	95.36
	Asian only	--	--	--
	Pacific Islander only	1	0.52	95.88
	Hispanic alone or in combination	7	3.61	99.48
	Two or more races (except Hispanics)	1	0.52	100.00
	Total	194	100.00	
Carbon	White only	299	80.81	80.81
	Black only	2	0.54	81.35
	Indian only	2	0.54	81.89
	Asian only	1	0.27	82.16
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	52	14.05	96.22
	Two or more races (except Hispanics)	14	3.78	100.00
	Total	370	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Davis	White only	132	92.31	92.31
	Black only	5	3.50	95.80
	Indian only	--	--	--
	Asian only	--	--	--
	Pacific Islander only	2	1.40	97.20
	Hispanic alone or in combination	4	2.80	100.00
	Two or more races (except Hispanics)	--	--	
	Total	143	100.00	
Duchesne	White only	83	86.46	86.46
	Black only	--	--	--
	Indian only	2	2.08	88.54
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	5	5.21	93.75
	Two or more races (except Hispanics)	6	6.25	100.00
	Total	96	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Emery	White only	148	96.73	96.73
	Black only	--	--	--
	Indian only	--	--	--
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	5	3.27	100.00
	Two or more races (except Hispanics)	--	--	
	Total	153	100.00	
Garfield	White only	2	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	2	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Grand	White only	103	94.50	94.50
	Black only	--	--	--
	Indian only	4	3.67	98.17
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	1	0.92	99.08
	Two or more races (except Hispanics)	1	0.92	100.00
	Total	109	100.00	
Iron	White only	40	95.24	95.24
	Black only	--	--	--
	Indian only	2	4.76	100.00
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	42	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Kane	White only	15	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination			
	Two or more races (except Hispanics)			
	Total	15	100.00	
Millard	White only	27	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	27	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Morgan	White only	9	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	9	100.00	
Rich	White only	11	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	11	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Salt Lake	White only	363	82.69	82.69
	Black only	8	1.82	84.51
	Indian only	1	0.23	84.74
	Asian only	5	1.14	85.88
	Pacific Islander only	2	0.46	86.33
	Hispanic alone or in combination	49	11.16	97.49
	Two or more races (except Hispanics)	11	2.51	100.00
	Total	439	100.00	
San Juan	White only	22	21.57	21.57
	Black only	--	--	--
	Indian only	77	75.49	97.06
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	2	1.96	99.02
	Two or more races (except Hispanics)	1	0.98	100.00
	Total	102	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Sanpete	White only	15	78.95	78.95
	Black only	--	--	--
	Indian only	2	10.53	89.47
	Asian only	--	--	--
	Pacific Islander only	2	10.53	100.00
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	19	100.00	
Sevier	White only	135	96.43	96.43
	Black only	--	--	--
	Indian only	5	3.57	100.00
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	140	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Summit	White only	9	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	9	100.00	
Tooele	White only	5	38.46	38.46
	Black only	8	61.54	100.00
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	13	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Uintah	White only	134	85.90	85.90
	Black only	1	0.64	86.54
	Indian only	11	7.05	93.59
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	7	4.49	98.08
	Two or more races (except Hispanics)	3	1.92	100.00
	Total	156	100.00	
Utah	White only	239	83.57	83.57
	Black only	--	--	--
	Indian only	1	0.35	83.92
	Asian only	1	0.35	84.27
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	42	14.69	98.95
	Two or more races (except Hispanics)	3	1.05	100.00
	Total	286	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Wasatch	White only	2	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	2	100.00	
Washington	White only	258	98.10	98.10
	Black only	--	--	--
	Indian only	3	1.14	99.24
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	2	0.76	100.00
	Two or more races (except Hispanics)	--	--	
	Total	263	100.00	

(*table continues*)

County	Race	Times used	%	Cumulative %
Wayne	White only	12	100.00	100.00
	Black only	--	--	
	Indian only	--	--	
	Asian only	--	--	
	Pacific Islander only	--	--	
	Hispanic alone or in combination	--	--	
	Two or more races (except Hispanics)	--	--	
	Total	12	100.00	
Weber	White only	134	87.01	87.01
	Black only	8	5.19	92.21
	Indian only	--	--	--
	Asian only	--	--	--
	Pacific Islander only	--	--	--
	Hispanic alone or in combination	12	7.79	100.00
	Two or more races (except Hispanics)	--	--	
	Total	154	100.00	

for the people, accounting for 61.54% of the total times the fund was used by Tooele county residents (see Table 29). Another pocket of service to the Black community was located in Davis County, where these people were served five times, comprising 3.5% of the total number of times the fund was used by Davis County residents. Salt Lake County served people in this ethnic category eight times, accounting for 1.82% of the number of times the fund was used by residents of Salt Lake County. Finally, Iron County served these people two times accounting for 4.76% of the number of times the fund was used by Iron county residents.

Native American (Coded Indian). With a vast margin, the county which served Native Americans the most was San Juan County (see Table 29). There, Native American people were served 77 times, comprising 75.49% of the total number of times the fund was used by residents of San Juan County. The second largest server of the Native American population was Uintah County, which served Native American people 11 times, comprising 7.05% of the total number of times the fund was used by Uintah county residents. Grand and Sevier counties were very close to one another, respectively serving Native Americans four and five times, comprising

3.67% and 3.57% of their total services. Finally, Sanpete County served Native Americans two times, comprising 10.53% of the times the fund was used by Sanpete county residents.

Asian. Both the largest raw number, 5, and percent, 1.14%, of service to Asian people was by Salt Lake County (see Table 29). Utah and Carbon counties each served one Asian person, respectively, comprising 0.35%, and 0.27% of the number of times the fund was used by the residents of these two counties.

Pacific Islands. Sanpete, Davis, and Salt Lake counties each served people from the Pacific Islands two times (see Table 29). Respectively, this accounted for 10.53%, 1.4%, and 0.46% of the total number of times the fund was used for clients in each of these counties.

Hispanic. The absolute numbers and overall percentages did not line up as well with the Hispanic culture as they did with some of the other ethnic distributions (see Table 29). The highest percentage of Hispanic use of the fund was found in Beaver County, where 23% of fund usage was for Hispanic clients serving these clients a total of six times. In Carbon County, Hispanic clients were served 52 times, comprising 14.05% of the number of times the fund was used. Utah County served

Hispanic clients 42 times, accounting for 14.69% of the number of times the fund was used by Utah County residents. Salt Lake County served Hispanic clients 49 times, accounting for 11.16% of the number of times the fund was used by residents of Salt Lake County.

Two or more ethnicities (excluding Hispanics). Duschesne County served clients with two or more non-Hispanic ethnicities six times, accounting for 6.25% of the total number of times the fund was used by the residents of Duschesne County (see Table 29). Carbon County served clients with at least two non-Hispanic ethnicities 14 times, comprising 3.78% of the total number of times the fund was used by residents of Carbon County. Finally, Salt Lake County served clients with two or more non-Hispanic ethnicities 11 times, comprising 2.51% of the total number of times the fund was used by Salt Lake county residents.

Phase 3: Discuss Findings with Stakeholders

During the third phase the results of the data analysis were shared with the three CIL directors. Then to complete question 9, and thus gain a better understanding

of the results, the CIL directors were asked to provide feedback regarding the results.

The three CIL directors were contacted again via phone for the purpose of discussing the results. Additionally, before the phone contact, they were emailed the tables and figures, along with the results for questions 2 through 8. The results of the data analysis were explained to them. More detail was verbalized for questions 2 through 4, 7, and 8 than on questions 5 and 6 because the CIL directors seemed to be more interested in questions 2 through 4, 7, and 8.

Additionally, care was given to ensure that all questions personally asked by the CIL directors were thoroughly discussed. After discussing the results to each question, the CIL directors were asked whether any of the results were a surprise or seemed unreasonable or out of range.

Question 9: Stakeholder Comments on Results

According to the CIL directors, were any answers to questions 2 - 7 not in a range that they considered to be either acceptable or expected? If so, what should they

have been, and what did they believe may have been the probable cause of the out-of-range value? Additionally, what did the CIL directors think may have been the cause of any apparent trends found in the data?

First the results of question 4 were explained. All of them were pleased to see that there was not a statistically significant effect of ethnicity. The third CIL director (CUCIL) was especially impressed by their success in serving the Hispanic population, noting that considering that they could not serve residents who were not citizens and did not have visas, they were very close to the percentage of Hispanics observed in the census data.

The CIL directors were also all pleased to see that there was a statistically significant effect of population distribution, as this indicated that their outreach programs were being successful at reaching those in the rural areas, areas that the CIL directors indicated had previously been underserved. The third CIL director also pointed out that people in rural areas had more need than people in urban areas. For example, someone in an urban area who can walk a little may be able to walk outside and catch the bus, but someone with the same level of disability in a rural area where there is not a bus might

need a scooter. Additionally, both the first and third CIL directors pointed out that people in urban areas have more access to other sources of funding.

None of the directors were surprised by any of the results for question 4. Additionally, all of the CIL directors seemed to be indifferent to the effect of age and the intermittent of effect of gender in question 2.

All of the CIL directors were accepting of the results to questions 2, 3, 5 and 6. The third CIL director made a comment in pleasant surprise, with regard to the average amount spent per client per year from 2003 to 2006, that there really had not been much change (see Table 5). She also commented that 2007 saw a lot of inflation generally, so she was not surprised to see a larger jump in average cost per device between 2006 and 2007. The first CIL director was very surprised that the average cost of power chairs was so low (see Table 6). He said a basic power chair usually costs around $6,000, and they can go up to around $50,000 or $60,000 as many special features are added, such as feature combinations that use sip-and-puff controls.

There were quite a few comments on question 7 results. The second CIL director (CUCIL) suggested, in response to

seeing Figures 12-14, where there was a huge jump in fund usage among the seniors, that perhaps someone had been doing outreach at a nursing home. She also noted that she would guess that there may be more females in nursing homes. Regarding Figures 28-30, showing the trend in education level, all of the CIL directors commented that they expected the population with less than a high school education to be the most likely to have qualifying incomes, and those with high school diplomas but no college to be the second largest qualifying group.

All of the CIL directors noted the large jump in the Active Reentry CIL in 2006 (see Figures 21, 22, and 23). The third CIL director tied this to the jumps seen in both the Native American (Indian) population in 2006 (see Figure 26), the jump in the rural population (see Figures 18 and 19), and the huge number and percentage of Native Americans served in San Juan County (see Table 29). She said the Active Reentry CIL, whose boundaries included San Juan County, had an employee who had been working really hard on building a relationship of trust with tribal leaders and members on an Indian Reservation in San Juan County. She commented that she knew some of the less rural and urban areas got a lot of their devices from Globus, where, for

example, they could get a $900 dollar lift chair for $25. She also said for any purchase under $500 at her CIL they used their United Way funds. These are resources that rural areas, such as those served by the Active Reentry CIL, do not always have access due to both distance and population size. She recommended that the Active Reentry CIL director be contacted to see if most of the people that have come to them have been seniors and females, as this may also explain the huge jump in both seniors and females seen in 2006.

The first CIL director (Tri-Counties CIL) had a very different explanation to augment the explanation provided by the third CIL director. He said that in April of 2006, about two months before the end of the fiscal year, USOR provided an additional $300,000 or $400,000 to the IL/AT fund. This took care of the waiting list for 2006 and 2007. He said that about one third of the amount spent in 2006 would otherwise not have been spent, and the people served would have had to wait until 2007 to get their needed devices. He also suggested that in the haste to get through people as quickly as possible it may have been possible that in some CILs, though not in his, some people

may have been approved to receive devices that may not have been approved had they come at another time.

The third CIL director (OPTIONS for Independence), who had asked most of the questions leading to the development of the new question 8, was surprised by several of the results. First, she was surprised to see that there were no purchases made for residents of Juab county. She mentioned that there was an employee who had targeted that county specifically for outreach. She was also surprised that so few communication devices were purchased for the school-age children, yet quite a few were purchased for the working-age adult population. She suggested that perhaps the reason they had not purchased many communication devices for school-age children but had purchased quite a few for working-age adults was that the school districts had purchased them for school use but not allowed the children to keep them upon graduation. This would effectively have created a population of adults who knew how to use communication devices, which can be quite difficult to use well, but who no longer had access to them.

The first CIL director was surprised by how small some of the numbers were regarding primary cause of disability

among the seniors. He thought that mental illness and amputations both should have been higher than they were.

In summary, the results from each of the three phases were presented. For phase 1 the CIL directors expected the fund distribution to match the population distribution on ethnicity. They expected the data to be skewed with regard to age, with more funding going toward the elderly. They had no idea what to expect for a use distribution on gender. Finally, they hoped to see more funding going toward the rural than the urban population. Their questions were worked into the revised research questions.

In phase 2 the hopes and guesses of the CIL directors regarding what an equitable distribution should look like were affirmed. In answer to the fourth question it was found that there was not a statistically significant difference in distribution of funds and the population distribution with regard to ethnicity or gender. Unlike distribution of funds, distribution of devices did show a statistically significant effect of gender. More devices were purchased for women than for men, and if one were to assume that women and men were from the same population, this should not have been the case. There was a statistically significant difference in distribution of

funds and population distribution for both age and population density. The elderly and those in rural counties accessed the fund more frequently and spent a larger percentage of it than would have been expected if use depended strictly on group percentage of the total population. The distribution of devices matched the distribution of funds on all of the other variables other than gender that were addressed in question 4 (age, ethnicity, and population distribution).

There were also some findings with regard to other frequency and type of use questions. It was found that mobility devices, followed by aids to daily living were the most commonly purchased devices, and that devices were purchased much more frequently than services. It was found that the average amount spent per person per year ranged from around $3,100 to $3,800, with a total average amount across all 5 years of about $4,300. Additionally over half of the people used the fund at least twice.

In the second phase it was also realized that there were some variables that had some type of predictive power. Variables that either had a main effect on, or were predictive of the total amount spent, included: age, gender, population density, and device type. An

interaction effect was found between device type and primary cause of disability.

The results to question 7, on trends were somewhat of a surprise. There was a trend for the year 2006 that affected each demographic examined. Along with an increase of funds available, for the year 2006, there was a relatively large jump in percent of usage by the elderly, the Native American ethnic group, the rural population distribution group, the Active Reentry CIL, females, and those with no high school diploma.

Finally, there were some expected and some interesting demographic findings for question 8. It was found that the primary cause of disability among the young tended to be life-long diseases and congenital problems such as cerebral palsy and muscular dystrophy, while the adults and elderly tended to have more diseases associated with aging, such as injuries and arthritis. Tooele County served the most Blacks. San Juan County served the most Native Americans, and Carbon County served the most Hispanics.

In phase 3, the CIL directors were overall pleased with the data and offered some great points and insight regarding some of the above listed results.

DISCUSSION

This section contains a discussion of the data and its implications. First, some of the limitations of this data are illuminated. This is followed by a discussion of the results from each of the research questions. Next, additional research questions are brought forth. Finally, conclusions are drawn from the research.

Limitations

There are some limitations to this data that must be kept in mind. First, as with a last resort funding agency, only individuals with very limited financial resources are qualified to use the IL/AT fund. Secondly, there were no data provided regarding what proportion of the population that applied for assistance was accepted and why those who were refused service did not qualify. Was it because they qualified for another type of assistance such and Medicaid, Medicare, or some type of in-kind donation, or was it because their income was too high or what they were requesting was not considered large enough or important enough to be covered by this fund? Additionally, it is unknown whether the people who have made use of this fund

have additional needs that did not qualify or were not brought forward.

Question 1: Stakeholder Opinions and Questions

The three CIL directors were reasonably consistent in their expectations of what the equitable distributions should look like. Initially they all indicated that they really didn't know what an equitable distribution would look like, then they talked through it and all arrived at similar conclusions. First, they all hoped that the distribution would be fairly equal regarding ethnicity, although one noted that due to in-kind donations this may not be the case. The general gist of their opinions regarding gender could be summarized as they did not really know what to expect, but if they were not the same, the overall amount and number of uses by females should be higher because they tend to live longer. They all were afraid that the urban counties would be higher, but hoped that the rural counties would be higher because they felt that the rural areas had traditionally been underserved. They also mentioned that the people living in rural areas may face greater levels of need than the people living in

the urban areas. Finally, they all agreed that older people face a higher percentage of disabilities and, therefore, should be more frequently served by the fund.

Regarding what information the USOR employees and the CIL directors wanted to know there were also some commonalities. Nearly everyone wanted to know what the age and ethnic distributions of people served looked like. There was more divergence in what they were most interested in, the amount of money spent, or the number of devices purchased. The third CIL director was the only one who came up with totally unique questions. It was these questions from which the new question 8 was largely composed. The only CIL director concern voiced was a hope that this report be useful for them in obtaining future funding.

Question 2: Devices and Services Purchased

There were no clear trends across time in the proportions of funding spent on the various devices or services purchased. They were all reasonably consistent. However, there was a consistent downward trend in the percent of purchases that were services with a

corresponding increase in the percentage of funding spent on devices (see Figure 3). The first CIL director (Tri-County) explained that the reason for this was over time, the people working at the CILs have learned how to provide many of the services they once had to purchase. Consequently, the amount of services provided to their clients has actually increased, yet the amount of money spent on these services has been declining.

Question 3: Amount Spent by Category

The average amount spent per client changed very little from 2003 to 2006 inclusive. Across all 4 years there was only $150 difference between the lowest average cost and the highest average cost. Additionally, there was not a specific order across the years of smallest average to largest average. The average for 2007 was nearly $500 dollars more than the second highest year, 2006. This may have resulted from rising oil costs, which seem to drive inflation in the cost of goods everywhere. Additionally, given results of the second part of this question, people were using the fund more than once across time, it was expected that the overall average amount spent per client

across all 5 years should be higher than the average amount spent per client for any single year.

Regarding the surprisingly low cost of the power chairs, the first CIL director commented, “We almost never buy power chairs.” He went on to explain that most of what they have purchased has been upgrades to basic chairs provided by Medicare or Medicaid. He believes these upgrades to power chairs must have just been coded as power chairs. That would effectively pull the average cost to the IL/AT fund of a new power chair down.

It was found that most of the clients used the fund at least twice, but very few used the fund more than six times. This fit with what the CIL directors expected, and was not a surprise to anyone. However, one of the CIL directors commented that 10, the most devices purchased for any one client, did seem like a lot.

Question 4: Equitable Distribution

It is important to note that question 4 dealt only with chi-square data. These chi-square data looked only at total amount spent on everyone within each of the demographic groups and the total number of times the fund was used on behalf of members of each group relative to the

percentage each group represented within the population. Additionally, the error for each group within a single demographic variable is summed. This means it is possible for any single group to have more error if the other groups represented within the demographic variable have little error and still the variable will not manifest as significant. Additionally, these chi-square data did not take into consideration the average amount spent per client, nor the variance or standard deviation of the individuals or groups from the mean of all those represented within the demographic variable. This means that within a single variable if one group uses the fund statistically significantly more frequently, while another group tends to purchase statistically significantly more expensive devices, the total amount spent could still balance out and, therefore, not get statistical significance.

What chi-square data did tell us is whether overall there were any statistically significant differences between the total amounts spent on the groups within a variable and the predicted amounts that should have been spent on the groups based on the census data. The chi-square data were also used to tell us whether there

were any statically significant differences between the number of devices purchased and the number that should have been purchased if each group within the variable were truly drawn from the same population.

All of the stakeholders were greatly pleased to see that there was no significant difference between fund usage percentages and the observed state population on ethnic distribution. Over all, the data seemed to fit reasonably well with the CIL directors' thoughts at the outset of the study.

The CIL directors all hoped for an equitable ethnic distribution. The data, even according to their most conservative estimates in which they suggested that fund dispersion should be within 10% of the 2000 census population distribution and the rules of statistical significance, supported them in this. The data showed an equitable ethnic distribution both in terms of number of dollars spent per ethnic group and number of people served based on the percentage of the population that each ethnic group represented. In terms of number of devices purchased, the largest deviation was by the Indian population, which was 2.605% higher than was expected based

on the size of their population within the state (see Table 9).

In terms of the amount of money spent, the largest deviation was again among the Native American population. They had 2.048% more of the money spent on them as a group than was expected based on their population size. This was likely due to outreach on the Indian reservation that was reported by the third CIL director to have been done by the Active Reentry CIL.

The second largest deviation was in the other direction. The Hispanic population was underserved both in terms of number of devices and overall percentage of funding by about 2%. The third CIL director had suggested that she would expect to see lower service among ethnic minorities due to illegal residency status. This ethnic group may have been one in which the lack of legal residency for some of its constituents has impeded their access to needed AT.

The third largest deviation was among the Asian population. The data indicated that the Asian population was underserved by about 1%, relative to what was expected based on the percentage of the population they fill on both the number of times the fund was accessed by their group,

and in the total amount spent on members of their group. There may be a couple of contributing factors to this discrepancy. First, only one person out of the entire group accessed the fund more than once, and the person who did use it more than once only used it two times. Generally speaking, most of the people served by the IL/AT fund accessed it at least two times, and about another 23% used it more than twice. In total, seven Asian people were served, and the fund was used only eight times total by members of the Asian ethnic group. In part, this data may not be very reliable because the *n* was so small. Asian people comprise only about 1½% of the population in Utah. The other possible contributing factor could be related to what one of the CIL directors mentioned. The third CIL director commented that she thought some of the cultures may, in general be too proud to use the IL/AT fund. It is possible that unless they feel like it is a necessity, the Asian people may feel reluctant to use this fund. Perhaps they feel like it would reflect shamefully on their family.

These chi-square data, showing no statistically significant differences in the percentage of funding and devices received by each ethnic group relative to their percentage in the overall observed population support the

claim that the funds were equitably distributed between the ethnic groups. This is especially cogent when taking into account that Agree (1999) found that the rate of disablement between the different ethnic groups was also not statistically significant, indicating that there was not a statistically significant greater need for assistive technology among any of the ethnic groups.

Regarding age, the CIL directors had correctly predicted that the distribution of funds would not match the distribution of the population. As expected, the elderly were overserved, and students and young children were underserved. There are at least two probable causes. First, the elderly face a much higher rate of disability than does the rest of the population. Secondly, due to federal regulations, many of the devices needed by students and some (though not as many) of the devices needed by young children, the school districts are now being required to provide. Overall, this would diminish the amount of help needed from other funding agencies, such as the IL/AT, by young children and especially by students, while the amount of help needed by the elderly would increase. This finding was congruent with what the literature suggested should have been found. Agree (1999) found a significant

effect of age in the amount of disability people suffered. Additionally, the Centers for Disease Control and Prevention (2006) has also suggested that the rate of disability in Utah increased with age, making the disability rate among the elderly (31.4%) higher by about 9% than the rate of disability among those who are 45-64, (22.8%), and higher by about 18% than those who are between 18 and 44 years old (13.0%) in the state.

The CIL directors mentioned that traditionally the rural areas had been underserved and they hoped this was no longer the case. They were quite pleased to hear that the rural counties were receiving so much service. Based on the data available for this study it was not possible to say whether or not the rural areas were underserved traditionally. This is especially the case in light of the concept presented by one of the CIL directors, that need among the rural population may be higher due to less access to other community-provided aids. These other aids have the potential of filling part of the gap between what someone is capable of doing alone and what is socially required. For example, mass transit may reduce the need for a person with a disability to have a scooter on which to travel the two miles to the grocery store. Instead the

person may be able to use a walker with which to go the 30 feet from the front door to the street where the Para-transit bus can pick the person up then drop him or her off at the store where a motorized shopping cart is available. It is apparent that the percentage of the number of dollars going to the rural areas relative to the urban areas increased from 2004 to 2007 (see Figure 18). However, the percentage of the number of devices purchased has remained fairly consistent from 2003 to 2007 (excepting the year 2006 when service to rural areas jumped dramatically). Additionally, between 2003 and 2007, the rural areas received a much higher rate of service than the urban areas. This is especially poignant in consideration of the observed population distribution: most of the population lives in urban areas. The most likely cause for this surprise in fund distribution is the outreach programs that have been conducted by the CILs in an effort to “swing the pendulum the other way” and better serve the rural population.

Finally, the CIL directors were fairly neutral regarding gender. Overall, these data were also fairly representative of the CIL directors’ guesses. One of the CIL directors believed both genders should be equally

served, another believed that females should be more frequently served because they tend to live longer. The other CIL director did not know what to expect and explained that he would not have been surprised either way. The data actually supported all of them. Although neither sex received a statistically significantly higher percentage of the funding, females did receive a statistically significantly larger portion of the devices purchased.

Question 5: Age, Marital Status, and Gender as Predictors

The literature suggested that there should have been a significant interaction between marital status and gender, but not a main effect of gender (Agree, 1999). This was not the case here. These data supported a main effect of age in the two-way ANOVA (but not in the three-way ANOVA possibly due to power loss). The total amount spent had an inverse relationship with age. In other words, less was spent per person for devices for the extreme elderly and more was spent on devices for school-age children. The very small group of children under the age of 3 did not seem to fit into this inverse relationship. There was

neither an interaction nor main effect of marital status or gender (see Table 10 and 11).

There are several reasons this may have been the case. First, the outcome variable was different. Agree (1999) was looking at unchecked disability, or disability for which appropriate steps had not been taken to lessen the gap between what was required and what an individual is capable of accomplishing. This study looked only at the amount of money spent on assistive technology to close this gap. The population of this study was not asked whether or not they still had any unmet disability. The entire population in this study had received at least some type of AT to help them cope with disability, and nearly half of them had used the fund at least twice. Given this, it may be reasonable to assume that most of the population in this study had at least a good portion of their disability resolved. This likely was not the case with the population in Agree's study.

This discrepancy may also have been due to the population used for the study. In the study reported by Agree (1999), the population observed was all 70 years old or older, while this study looked at the entire lifespan. The entire population used in this study lived in the state

of Utah. Additionally, it is possible that effects of the predominate religion in Utah, which has a health code suggesting abstinence from the use of drugs, alcohol, coffee and cigarettes, and which also places an emphasis on marriage, family, and self-sufficiency, may have effected the relationship between marital status, gender, and device need. First, it is likely that a relatively high percentage of the people in Utah who are around 22 or older have married. Due to the emphasis placed on marriage and family, often the number of children in a family may be higher. Additionally the obligation felt by the children, and their ability due to their greater numbers, to care for their aged parent may be greater. This would effectively dilute the marriage portion of the interaction. After the passing of a parent, the children would be working to see that their surviving parent has what is needed and is taken care of similarly to the way wives may have ensured that their husbands were taken care of and had what they needed to function in Agree's study. This would effectively diminish both the effects of gender and marriage and their interaction effect.

Overall, due to the difference in outcome variables, and the difference in population demographics it is

difficult to compare the results of these two studies. More research needs to be done to see if the results obtained in this study are consistent with the results of other studies. In order to really look at this question we would need data on everyone who has come to the CILs seeking funding for AT, whether or not they received it. We would also need data reflecting which of these people have unmet disability and some measure of the magnitude of any residual disability they suffer from. Finally, we would need a more generally representative population. The population used for this study may have been representative of the populations in Idaho, and parts of the other western states, but likely was not representative of the nation as a whole.

With regard to the age portion of question 5, the results of this study matched what was predicted by the literature: The older people get, the more their disability rate increases and, therefore, their need for AT (Agree, 1999; Centers for Disease Control and Prevention, 2006). The results in question 4 indicated the rate of service increases with age. However, the results of question 5 indicated that the devices purchased for the elderly tend to be less expensive than the devices

purchased for younger people, with the devices purchased for the school-age children being the most expensive. This makes sense given an understanding of several factors. First, in question 5 we were not looking at overall amount spent per category, we were looking at the average amount spent per client who was served within each age group. As was indicated in question 8 results, the most commonly purchased devices for the very elderly were aids to daily living, while mobility aids were the most commonly purchased devices for all of the younger age groups. On average, aids to daily living were less expensive than mobility aids were. Mobility aids are among the most expensive devices. This would tend to drive the average amount spent on the very elderly down. According to Dr. Marty Blair, assistant director of policy at the Center for Persons with Disabilities in Logan, Utah, (personal communication, July 25, 2008) the IL/AT fund has traditionally been used for the purchase of mobility devices for school-age children. The schools, while being required to purchase devices needed for learning by children with disabilities, do not generally consider mobility devices to fall within their required domain to provide. This would effectively drive the average cost of

devices purchased for children up. Together, the purchasing trends regarding types of devices purchased explain why the predictive power of the age variable was not in what would have appeared to have been the obvious direction.

Question 6: Other Predictors

The regression analysis was not as strong as perhaps it could have been if more of the variables would have been entered into the regression analysis. Of the nine variables entered, it was found that only two of them were statistically significant, birth year and gender. The older someone was, the smaller the amount of money that was likely to have been spent of them from the AT/IL fund. Males overall, had higher average amounts spent on AT for them than females did. Together, all nine variables accounted for about 3.8% of the variance seen in total amount spent per client.

In addition to the two variables that were statistically significant, there were two other variables that approached statistical significant (i.e., would have been statistically significant if a one-tailed test had been run rather than a two-tailed test). These two

variables were both related to ethnicity, the Black only ethnic group, and the two-or-more ethnicities group. This regression analysis indicated that members of the Black group were receiving on average less per individual than members of the general population, and members of the two-or-more ethnicities group received on average more per client than the rest of the groups. It is difficult to say why this may have been the case.

The first and third CIL directors had some insights with regard to the statistically significant effect of population density found in the first and second ANCOVAs. They explained that in many of the rural areas the CILs do not have access to the United Way funding, the in-kind donations, or the extensive loan banks that are available to the CILs in the more populated areas. In areas that have access to these other funding resources, devices that cost less than $500 dollars are able to be provided much quicker and easier through the other sources. Therefore, CILs with these resources did not need to request funds to cover devices that cost $500 dollars or less. This pulls the number of requests from these CILs down and pushes the average cost per device up.

The first CIL director went on to explain that availability of other funding sources is also why living arrangement was significant as a covariate of population density in the first ANCOVA. He explained that if a person who has received a device dies, or for some other reason no longer needs the device within 3 years of receiving it, the device must be returned to the CIL through which it was purchased. This CIL may then give it to someone else in need of it. Due to their larger population base, the CILs serving the more populated areas have had more opportunity to collect devices for redistribution. When someone comes out of a rehabilitation center the devices they need to leave the center must be obtained immediately, leaving no time to look for in-kind donations. Those CILs in urban areas are more likely than the CILs over rural areas to have the needed devices in a loan bank, especially for the less expensive devices. This means the CILs serving urban areas do not have to immediately purchase the devices, while CILs serving rural areas would.

The first CIL director also had ideas regarding the statistical significance of many of the other covariates too. For source of support, the first CIL director (Tri-Counties) explained that many of the devices purchased

for people with disabilities who are taken care of by family or friends are actually purchased to help the caregiver. Many of these devices, for example, a ceiling lift to lift someone from a chair to a bed, are quite expensive, whereas a chair lift to help someone who is capable move from their chair to their bed without another person's assistance is much less expensive With regard to gender, he had no idea, unless the males tended to be heavier and, therefore, needed higher end equipment.

A likely reason why county was a covariate of population density was that each county was assigned based on the 2000 census numbers to urban or rural status as a whole, according to what the United States Department of Agriculture (USDA) reported (personal communication with a staff member at their state office in Salt Lake City, Utah, June 25, 2008). Because a county could not have been both rural and urban, county would have been a statistically significant covariate of population density.

Finally, it makes sense that age would be a predictor in total amount spent. Many expensive devices are needed by school-age children with disabilities, and these children are not yet old enough to be eligible for Medicare. The schools are supposed to purchase the devices

needed by the children for education-related activities, but they may not always consider all of the devices the children need to be education related, especially if the device is expensive such as mobility devices. This would in effect bring the number of uses down, especially on the devices that are clearly directly related to learning and not terribly expensive, and the average cost per device up among school-age children. Older people may more frequently be able to use devices that are less customized and/or less durable due to their average adult size, the shorter amount of time that one would expect an adult to live when compared to a child with the same disability, and the higher market demand (and thus lower production cost) for devices commonly needed among the elderly.

The statistically significant covariates of age for the third ANCOVA: Gender, population density, support source, living arrangement, and counselor make sense too. We would expect there to be more females among the elderly because females tend to live longer. It is also likely that population density would vary by age group because many neighborhoods tend to have mostly people of a given age group within them. A relationship of age with both support source and living arrangement makes sense because

children are more likely to live with, and have their families take care of them. They are not very likely to be taking care of themselves or to be in nursing homes, especially if they are younger than 18. Finally, because the counselors have been assigned by region, it would make sense that they would help explain the variance in age in a similar way to the way population density did. (It is difficult to understand much more than this about counselor, because the way in which this variable was coded was inconsistent from one CIL to another. For example, in the Tri-County CIL, the entire CIL was assigned to one counselor number regardless of who the clients worked with at the CIL, while at OPTIONS for Independence there were three individuals functioning as counselors and each received their own counselor number.)

It also makes sense that the amount spent on a device would vary according to what the device was because not all devices are equally expensive. Additionally, people with some causes of disability may be more likely to need more expensive devices or higher end models in some types of devices than people with other causes of disability. Unfortunately, this interaction was too complex to yield useful information.

Question 7: Trends over Time

All of the trends seemed to focus around changes in 2006. It seems likely that most of these trends were caused by some interaction of the two factors brought up by the first and third CIL directors. First, there was more money available at the end of 2006. This money had to be spent quickly, so it would make sense that more money would have been spent on people from a CIL where one of two scenarios existed. First, an area where a new previously unserved population had just been located, and the people had a lot of needs that had not been addressed (e.g., the Indian Reservation in San Juan County served by the Active Reentry CIL), would need more money. Second, more money would have been spent in CILs where less deliberation took place on whether or not the person could cope without the device and whether it was an appropriate purchase for the IL/AT fund because the money was there and needed to be spent.

San Juan County, which is part of the Active Reentry CIL purchased 43 devices for Native American clients in 2006 and 34 in 2007. Of these 43 devices purchased for Native Americans in 2006, 30 of them were for females 65

years and older, six of them were for males 65 years and older, and seven were for females between the ages of 22 and 64. In 2007, 20 devices were purchased for Native American females over the age of 65 and 12 for males over the age of 65, and one device was purchased for a male between age 22 and 64. This information explains the trend seen in the Native American population, and is a start in explaining the trend seen in the Active Reentry CIL, gender, age group, and population density.

Question 8: Types of Devices Used, by Demographic Categories

There was a very obvious trend in the types of devices most commonly used. For all of the groups except the group with seniors 75 years or older, mobility devices were the most commonly used device. The literature also suggested that mobility devices were the most commonly purchased type of AT (Agree 1999). This was followed by aids to daily living as the second most common and modifications as the third. For the seniors 75 years and older, aids to daily living and mobility devices switched places, and the hearing aids were the third most common. This makes sense, because by the time people are at least 75 years old they

may be less active and be less likely to drive. By far the majority of the modifications were made on vehicles, and seniors who do not drive would not need modifications that enable them to drive.

There was also a trend regarding primary cause of disability. First, all of the most common primary causes of disability were causes of physical disabilities. Children were most often affected by diseases that they were born with, while working-age adults were most often affected by injuries and diseases associated with age. Seniors were mostly affected by arthritis. The first CIL director believed part of this trend may be due to an artifact of the recording system. For example, he suggested an older person would rather claim arthritis as the disability creating a need for a wheel chair than admit that they had experienced an amputation due to side effects of diabetes and needed a wheel chair. He was surprised by how low the reports of some primary causes of disability were. However, the causes that seemed too low to be accurate were also causes that he believed people would be less likely to want to admit, such as mental disorders and amputations resulting from diabetes. This misrepresentation or

selective representation of primary disability cause would effectively restrict the breadth of responses seen.

The only apparent trend seen in ethnicity and county was generally the urban counties were more likely to have served more people from the Black and Asian ethnic groups, and areas with Indian reservations were more likely to have served a higher percentage of Native Americans. This was not by any means strictly adhered to. Additionally, large numbers of Native Americans only seemed to be common when someone from the CIL serving the area had been doing outreach on the Indian reservation.

Question 9: Stakeholder Comments on Results

The CIL directors provided this author with ideas regarding possible causes of some of the effects and trends. They seemed to be very knowledgeable about what was going on in their own CIL, but were generally quite interested in how they compared with the rest of the state. They also seemed to have quite a bit of power within their own CIL to run it in the best way possible for the clients in their region, and were interested in improving their CILs in any way they could.

It is this author's opinion that this IL/AT fund has been distributed reasonably. Overall, there seems to have been equitable distribution regarding ethnicity. It seems unreasonable to expect equality with regard to age because the need faced by the various age groups is not equal. Based on the suggestion that people living in rural areas face more need for AT and have fewer resources available to them, it also seems unreasonable to hope an equitable distribution on the variable of population density. Regarding age, the literature suggested that females experienced a more frequent need for AT. These data support that claim.

The only result this author was surprised by was that the devices purchased for males tended to be more expensive than the devices purchased for females. However, this can be explained too. The 2000 census data for the state of Utah indicated that among the elderly, females tended to outlive the males. Additionally, the first CIL Director made the point that he would expect devices purchased for individuals being supported by their families to be more expensive than devices for people supporting themselves or in nursing homes, because the more expensive devices make life easier for the caregivers. It may be that on average

more men with disabilities are being taken care of by their aged wives who are not capable of doing the lifting, bending and twisting that a younger caregiver would be capable of performing. Thus, it may be that the reason the men's devices tended to be more expensive was to improve the quality of care-giving wives. Finally, with regard to the average amount spent per male client versus female client, there has not been enough research done to understand why this discrepancy has occurred to make any determination as to whether or not it is justified. It is possible that on this issue females were underserved, but without more insight one will not know for certain due to the alternate explanations mentioned.

Given that Utah is one of the few states to have an IL/AT fund or any type of last resort fund that aids the disadvantaged community with disabilities by providing funds with which to purchase AT to enhance independent living, and it seems to be successfully and equitably reaching its target population and ameliorating disability, more states should take a look at what Utah has done when trying to develop a program to meet their own needs.

Gender

Clearly, due to the variety in the results, equality among the sexes was not a totally clear subject. Gender had a statistically significant effect in the chi-square test of number of devices purchased (see Table 9), the regression analysis from question 6 (see Table 14), and as a covariate of both population density (see Table 21) and age category (see Table 23) in the ANCOVAs from question 6. However, gender was not statistically significant with regard to the percent of the total amount spent relative to the percent of each sex represented within the state population based on the census data in the second chi-square test from question 4 (see Table 8). It was also not significant in the three-way ANOVA or two-way ANOVA from question 5 as a predictor of the natural log of the total amount spent (see Tables 10 and 11). As shown by the chi-square tests, women used the fund more frequently (see Table 9), but there was a good balance between the total amounts spent on women versus men (see Table 8). It is also important to note here that the chi-square tests did not consider the total amount spent per person. All purchases were counted individually, rather than being

summed across the individual. In the regression and ANCOVA statistical tests the effect was due to variance in the average amount spent per individual not per device and not to the number of times used or the total amount spent on the groups as a whole. The average amount spent per male was higher than the average amount spent per female. This higher cost per individual may have had the effect of somewhat balancing out the difference in the overall amount spent between men and a women. Clearly females used the fund more frequently, but either purchased devices that were less expensive or the individuals did not access the fund as many times per individual.

It would be interesting to see if females were still overrepresented if the observed population was measured in a way that weighted the elderly population more heavily due to the fact that the majority of the people with disabilities are elderly, and women typically make up a larger percentage of the elderly population than men do. This would effectively put more emphasis on the gender percentage of the elderly, which may change the gender distribution of the observed group (the 2000 census data to which these data have been compared). As explained in the literature review, females do tend to live longer, and they

also tend to have a higher need for AT because their ailments tend to be more disabling and less deadly (Agree, 1999).

In examining the data available from this study regarding gender, it is difficult to arrive at any clear determination regard equality of distribution of funds and services between males and females. Without knowing for sure the rate of increased need women have for AT devices, it is not reasonable to make a determination regarding whether or not women have been overserved in the number of devices they have received. Also, without a better understanding of why the average amount spent per male was higher than the average amount spent per female it is not reasonable to determine whether men have been overserved on the average amount spent per client.

Ethnicity

Ethnicity is the other variable that was slightly muddy after all of the analyses, but it was much clearer than gender was. At no point in time did any variable gain statistical significance in any of the statistical tests used (see Tables 8, 9, 14, 21, and 23). Both of the chi-square tests used in question 4 were nowhere near

gaining statistical significance (see Table 8 & Table 9). Also all of the ANCOVA tests from question 6 were nowhere near gaining statistical significance (see Table 21 and 23). However, in the regression analysis (see Table 14), where each ethnic group was treated individually rather than looking at all of the ethnic groups together while comparing them to each other, the Black-only ethnic group and the two-or-more ethnicities group both approached statistical significance (i.e., would have been statistically significant had a one-tailed test been used rather than a two-tailed test).

Even though the Black group had a higher group mean than any of the other groups, they also had a much larger standard deviation (see Table 16). This indicated that there was the possibility of one or more outliers. After close examination of the data, two extreme outliers were discovered. Once the outliers were eliminated the group mean dropped to below the average of the rest of the groups. Additionally, the standard deviation dropped to be in the same range as the rest of the groups. It is difficult to say why less seemed to have been spent per client on the Black clients. Perhaps some of the members of this group were underserved, while two other members of

this group were overserved, thus skewing the distribution of this group.

Conclusions

Overall, the CIL directors were very pleased with the information provided to them. The data provided no evidence of discrimination based on ethnicity. Although gender was an effective predictor of total amount spent per person, there was no evidence of sex discrimination either. Males' devices tended to have a slightly higher mean cost, while females tended to use the fund a little more frequently. Overall, the two roughly balanced each other out. There was evidence that the difference in frequency of fund use relative to percentage of the population between the elderly, and the students and young children was greater than what would have been expected if the difference was caused purely by chance. However, due to the nature of what the fund was used for, and the fact that the elderly experience a much higher rate of disability than younger people, it is reasonable to expect there to be a higher rate of usage among the elderly. Along with this, given that the school districts are required to purchase many of the less expensive devices for students and many of

the elderly over the age of 75 have already gotten mobility devices or are able to get them covered by Medicare, it makes sense that the devices purchased would, on average, be more expensive for the school-age children and less expensive for the elderly. Regarding population distribution, it is difficult to tell based on these data if there is or has been any discrimination. Based on these data, there appears to have been a bit of reverse discrimination. However, we do not have the data necessary to make a judgment regarding the amount of need present in the rural versus the urban areas.

The CILs are becoming more proficient at finding ways to provide more devices and services to their clients even without large increases in the funding. The evidence supports the CIL directors' claim that the CILs are becoming increasingly effective at providing more services to their clients without having to purchase them. This leaves more funding available for device purchase, without receiving additional money for the IL/AT fund from the state or federal government. The data also support the claim that the CILs, especially in the more populated areas are either being successful in finding funding for the less expensive devices needed elsewhere, or are reusing devices

that have already been purchased. This is shown by the fact that we see a higher average cost per device in the urban areas than in the rural areas yet much less frequent use of the fund. It also appears that generally, many of the devices one would expect the children to be needing they are getting elsewhere, such as the school districts.

Finally, the data support that at least some of the outreach programs are being successful in increasing fund usage by the minority populations. For example the outreach program, carried out by the Active Reentry CIL in 2006, to reach the Native American population in San Juan County, successfully increased the usage of that group in 2006.

A few variables seemed to have some predictive power regarding the average amount spent per person. The most powerful predictor was age. As explained, previously, the average amount spent per client seemed to decrease overall with age, while the frequency of fund usage as a percentage of the population increased with age. Gender and population density also had some predictive power and again had this same reverse type relationship between average amounts spent per client, and fund access as a percentage of the population. While females and residents in the

rural areas more frequently used the fund, the overall average amounts spent per client were higher among the males and residents living in the urban areas.

Future Research Questions

There are still many questions to be answered regarding the use of the IL/AT fund and the devices purchased with it. First of all, what percentage of the devices purchased are actually being returned to the CILs and redistributed for others to use? How many years do various devices generally last before they are no longer functional? How many upgrades (such as to a power wheel chair or scooter) are actually being coded as a device purchase? How have devices purchased through the IL/AT fund affected clients' abilities to live and function independently? Has the rural population really been underserved traditionally? When accounting for the additional need faced by the rural population, is the rural population still being underserved? Is the rural population being overserved now?

Regarding ethnic distribution, additional research needs to be done to determine why some of the groups are

not using the fund with a percent frequency similar to the other groups.

There are several questions triggered by the gender findings in this study relative to the gender findings of other studies that could not be answered with the data used in this study. First, is the amount of residual disability that has not been addressed similar between males and females? If residual disability had been addressed in the data collection and were used as an outcome variable, would we find an interaction among this population between marital status and gender? Looking at a more detailed list of devices and services purchased, how exactly are the purchasing patterns of the males differing from the purchasing patterns of the females? Why is the average amount spent of men higher than the average amount spent on women? Are more expensive devices being purchased for men to aid their wives in caring for them? Are the women really being underserved in terms of average amount spent? Are the men being underserved in terms of number of devices purchased? If a similar program were to be implemented in another region of the country, would there be an interaction between marital status and gender when looking at the total amount spent as the outcome variable?

What AT does Medicaid or Medicare cover, and is this in need of adjustment? How many power chairs are being purchased by Medicaid or Medicare, and of these, what percent still need additional attachments to function effectively in filling the gap between a person’s ability and what is required of the person?

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