

# ***STROKE RECOVERY CENTER***

***Update to***

***Organizational Health Initiative Project***

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## **Executive Summary**

### **Organizational Health Initiative Project**

The Organization Health Initiative Project (OHIP) is now in its second year of data gathering and analysis. The OHIP methodology is to gather data regarding outcomes of treatment for chronic stroke sufferers from the existing patient base and compare such data to stroke victims who are in the early stages of rehabilitative programs or those who have not access to assistance. The Project objective is to develop a client data tracking system that will be used to prove the economic and social value of long-term stroke rehabilitation. The hypothesis to be tested is that stroke victims who use Stroke Recovery Center are less a financial burden on the health and social service budgets than those who do not access Stroke Recovery Center services. Stroke Recovery Center, as the best practice model for continuing care for stroke survivors, requires

eligibility for predictable and sustainable funding from government, private insurance and/or medical group providers to be replicated in other locations.

## **Research Design and Parameters**

We have collected and tabulated data for 95 clients who as of February 1<sup>st</sup>, 2008 were Stroke Recovery Center users having been there 3+ months and attended at least 3 times per month or more. In year 2 we collected data on 119 clients that met the on-going criteria and were able to compare their data to each other, as in the first study as well as to the data collected in year 1.

The initial baseline data was analyzed using the criteria of length of attendance (LOS) at the Stroke Recovery Center. Looking at the year 2 data, we found that the length of attendance remained a median of 2 years with the heaviest concentration continuing to be in the 2 and 3 year time frame consistent with the year 1 data.

Having two years of data we were able to track the drop-out rate and analyze the characteristics of those who do not continue and reasons for non-compliance with the program along with the utilization criteria we determined in the year 1 study.

With the median LOS at 2 years, data points were again compared to determine if there were differences in the early users as compared to those who have been at the center for 2+ years. With that data in hand, analysis went deeper to look at the changes from year 1 as well.

## **Results**

The data findings were addressed and compared to data from year 1 in the following categories:

*Client Drop-out in year 2:* This category was identified as clients who had attended at least 3 months in 2008, however, had dropped out by December of 2008. There was a 17% drop out as a percentage of the whole, however, of that number, 61% were from death and/or deteriorating health issues that no longer allowed the client to participate. The other reasons reported were dissatisfaction, transportation and graduation reasons.

*Age and Sex of Clients:* The average age of clients attending grew older slightly over 3 years. The median age is 72, up two years from year 1. The largest increase is in the group of clients who have attended over 2 years with an average of 73.6 years and a median of 75 years. The age range in the year 2 study group was from 25 years of age to 92 years of age which helps to explain the differential. The client base continues to reflect national norms with men growing from 53% of the total to 62% of the total after the 2 year average.

*Prescription Drug Usage:* The average number of drugs taken by the client population grew by 1 and .8 respectively per day to 5.5 in the group participating under 2 years and 5.3 in the group participating over 2 years. Median drug usage was 5 for each group. While this is a positive move in those attending longer, correlation appears to follow co-morbidities and age as opposed time spent. However, the positive move toward less drug usage will continue to be followed to determine if the drug education along with the general well being of the client base may have influence as they stay longer in the programs.

*Ambulation:* While the year 1 data indicated a difference in ambulation and ambulation aids showing a movement from walkers to canes among those who spend a longer time at the Center from those that are in the first 2 years, year 2 data is less clear. The decline in walker use may be shifted to cane but also there is a significant increase in wheelchair usage suggesting that more clients may be requiring greater assistance as time goes on. However, the year 2 data also suggests that more clients are being moved to ambulation assistance. This may be related to the increased age of the group reported and/or more clinical analysis of client need related to the results of the first year study. It is less conclusive that length of time at the center is a major influence on ambulation.

Orthotics: Orthotics usage is showing a stronger decline than in the year 1 data indicated. Of those in their first year at the center, 51% are using Orthotics. By the time they have spent 2 years at the Center, 29.2% are using orthotics. The biggest drop occurs after the first year at the center.

Transportation: The reliance on families and caregivers for transportation to the Center increased in the year 2 data to 67.6% and declining to 41.2 % after the clients have been at the Center for 2 years. The change to using the bus for transportation grows from 5.9% to 29.4%. However, of great interest is the percentage of clients who take the bus after the first year, 24.4%. This number is higher than was shown in our first study. Of the drop-outs who cited transportation as an issue, 3 of 5 were dependent upon families.

Emergency Room Visits: Over year 2 there is further reduction in the ER visits by the clients who have been at the Center for more two years. Overall 25% of the client population visited the ER in 2008. Of those who have been at the center more than 2 years, only 12.2% visited the ER while 35% of the clients who have been at the Center less than two years visited the ER. These results exceed the prior results offer an even great saving to the healthcare system as a whole.

Falls: There has been an overall reduction in the percentage of the population who suffer falls to 20.4% as opposed to 30% in year 1 of the study. As clients are at the center 2+ years, that percentage is reduced to 18.4%. There is a drop after the 2+ year mark while the difference between year 1 and year 2 at the Center is negligible.

## **Conclusions**

There are positive changes in the direction and velocity of outcomes that are noted in the data from year 2. The major variable that has changed is the study itself and its reported results which may be causing an Hawthorne effect both on the part of the client themselves who know the utilization points that are being reported upon and the staff therapists who have read the results and want to improve upon what was reported in year 1. The move to the riding the bus showing such an increase would fall into this category as would ER visits, falls and use of orthotics. That said, the results of the program become even more important in demonstrating cost savings for the healthcare system as a whole and support even more strongly the introduction of this program to stroke survivors and their families throughout the country.

# **ORGANIZATION HEALTH INITIATIVE PROJECT**

## **Introduction**

The Organization Health Initiative Project (OHIP) is now in its second year of data gathering and analysis. The OHIP methodology is to gather data regarding outcomes of treatment for chronic stroke suffers from the existing patient base and compare such data to stroke victims who are in the early stages of rehabilitative programs or those who have not access to assistance. The Project objective is to develop a client data tracking system that will be used to prove the economic and social value of long-term stroke rehabilitation. The hypothesis to be tested is that stroke victims who use Stroke Recovery Center are less a financial burden on the health and

social service budgets than those who do not access Stroke Recovery Center services. Stroke Recovery Center, as the best practice model for continuing care for stroke survivors, requires eligibility for predictable and sustainable funding from government, private insurance and/or medical group providers to be replicated in other locations.

## **Design**

We have collected and tabulated data for 95 clients who as of February 1<sup>st</sup>, 2008 were Stroke Recovery Center users having been there 3+ months and attended at least 3 times per month or more. In year 2 we collected data on 119 clients that met the on-going criteria and were able to compare their data to each other, as in the first study as well as to the data collected in year 1.

The initial baseline data was analyzed using the criteria of length of attendance (LOS) at the Stroke Recovery Center. Looking at the year 2 data, we found that the length of attendance remained a median of 2 years with the heaviest concentration continuing to be in the 2 and 3 year time frame consistent with the year 1 data.

Having two years of data we were able to track the drop-out rate and analyze the characteristics of those who do not continue and reasons for non-compliance with the program along with the utilization criteria we determined in the year 1 study.

With the median LOS at 2 years, data points were again compared to determine if there were differences in the early users as compared to those who have been at the center for 2+ years. With that data in hand, analysis went deeper to look at the changes from year 1 as well.

## **Parameters**

The baseline data is analyzed using the criteria of length of attendance (LOS) to the Center to keep the results and outcomes consistent for analysis. This parameter was chosen to determine if clients show improvement over time spent at the Center and partaking in the programs. To support this as the supporting factor to recovery, the data was also analyzed and adjusted for age variations, co-morbidities, type of stroke and length of time since the last stroke. The year 2 data was also rigorously examined to ensure the results were consistent.

The 119 clients in the year 2 group have an average (mean) length of attendance at the Center of 2.6 years with a median of 2 years. The spread continues to be great so the use of the median has greater validity. The median is the middle of the data set and has an equal number of data points above and below the median value. Therefore, going forward with our analysis as we did with the year 1 data, we will use the median number of 2 years attendance and compare the greater than (>) 2 year attendees to the less than (<) 2 year attendees. We did however, add to

some of the outcomes that we measured a further analysis looking at the first year compared to the 1+ years.

Further we had the ability to look at the drop-out clients and analyze that cohort and its effect both on the data and on the treatment modalities. The drop-out percentage was 17% (26 clients) of the total for 2008. Of that 26% (7 clients) died and 34% (9 clients) were unable to attend because of deteriorating health. Of that group, 50% were in their first year at the center. Two out of three dissatisfied clients were also in their first year while the third is a client who has been coming to the Center off and on for 20 years having had a stroke as a young woman and never recovering her ability to talk. Our two graduates, no longer in need of services were here 5 years and less than 1 year, however, the later was a TBI as opposed to a stroke survivor. Those identifying transportation as an issue (5 clients) varied in attendance from 11 years to -1 years.

We looked at the following data based on the client's length of attendance to compare it to the prior year's results:

- Age and Sex
- Transportation
- Co-morbidities and Drug Usage
- Ambulation
- Orthotic usage
- ER Visits
- Number of Falls

## **AGE AND SEX OF CLIENTS**

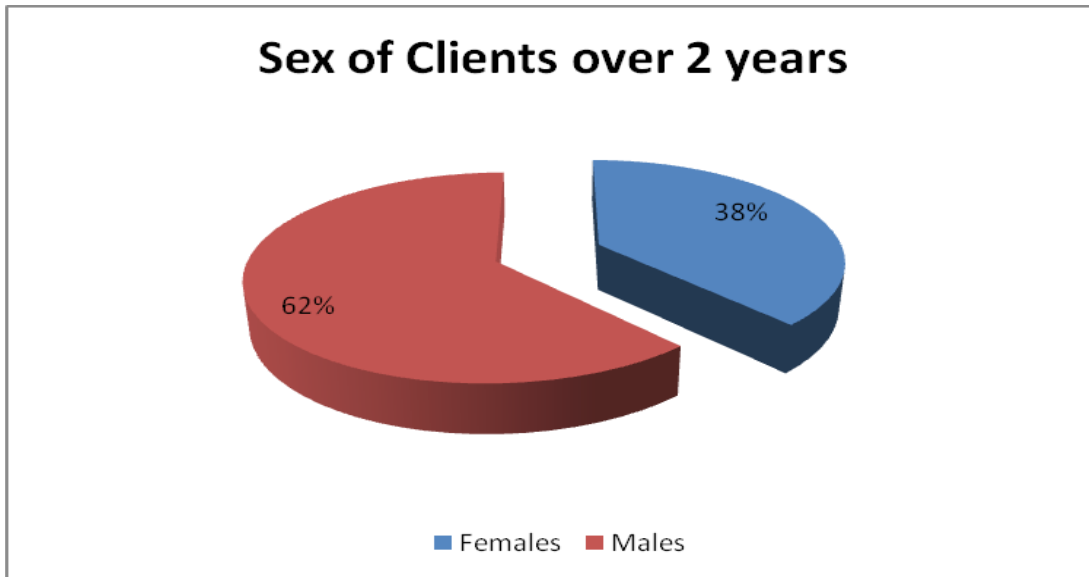
The average age of clients attending in year 1 was 68 years of age with a median of 70 years of age. Year 2 showed an increase in the average and the median ages, 71.2 and 72 respectively. However, the age range in the second year expanded to 25 to 92. We had two clients in their 90's join us in 2008 and that does skew the data upward. The single client in his 20's was a TBI as opposed to a stroke.

The year 1 group that had attended less than 2 years had a mean age of 67 with the median 68 years of age. The year 2 data aged this group to 69.3 average and 71 median with a standard deviation of 12.2. This reflects the very elderly clients who joined us along with the very young. In

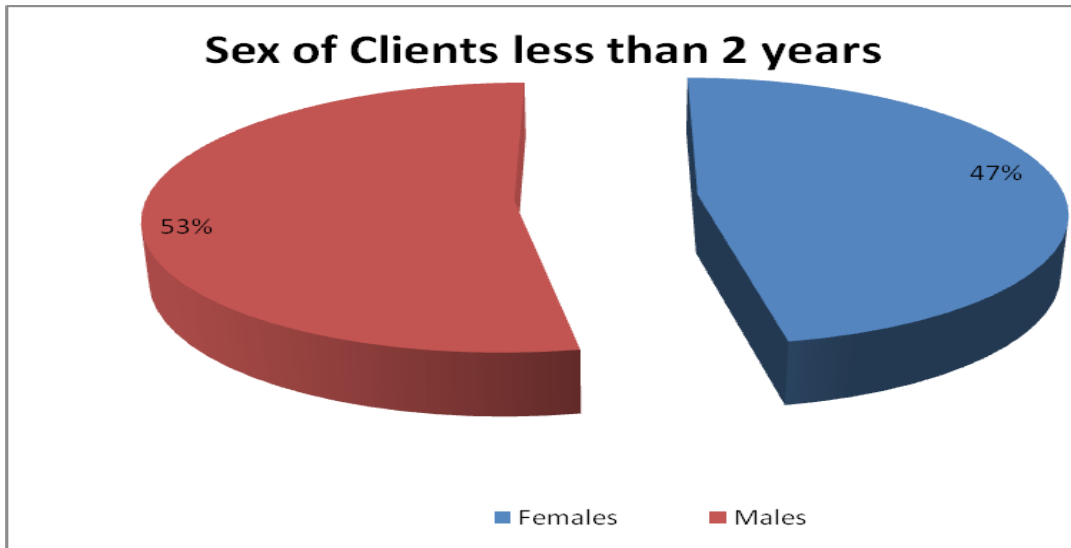
the first year, the group that had attended longer than 2 years was older with an average (mean) age of 70.6 years of age and a median age of 71 years. In year 2 data the average grew to 73.6 and the median to 75. The standard deviation was 10.9 still reflecting a wide range of ages. Results do not correlate to age differentials suggesting that improvements that are made are not age dependent.

Ages of the drop-out group do not correlate with the reported issue. Deaths range from 47 as the youngest to 88 as the eldest, an average of 70.6 and a median of 73 with a standard deviation of 12.6. Those in declining health were older with an average of 72.2, median of 74 and a standard deviation of 11.1 ranging from 53 to 87. The graduates, those expressing that they no longer needed the services of the Center were 42 and 25, well below the average and median ages.

The gender of the client base that stays at the Center over 2 years is higher than the national norms with regard to the percentage of females treated. In the first two years the percentage is closer to the national norm of 43% of strokes each year.



Among the clients who have attended less than 2 years in year 1, the numbers were almost equal: 49% women and 51% men. In year 2 data there were fewer females, 47% and more males, 53% which is slightly ahead of the national norms. For those who have been here longer than 2 years, the percentage changed in the first year to 35% women and 65% men while in year 2 of the study there were 38% females and 62% males.



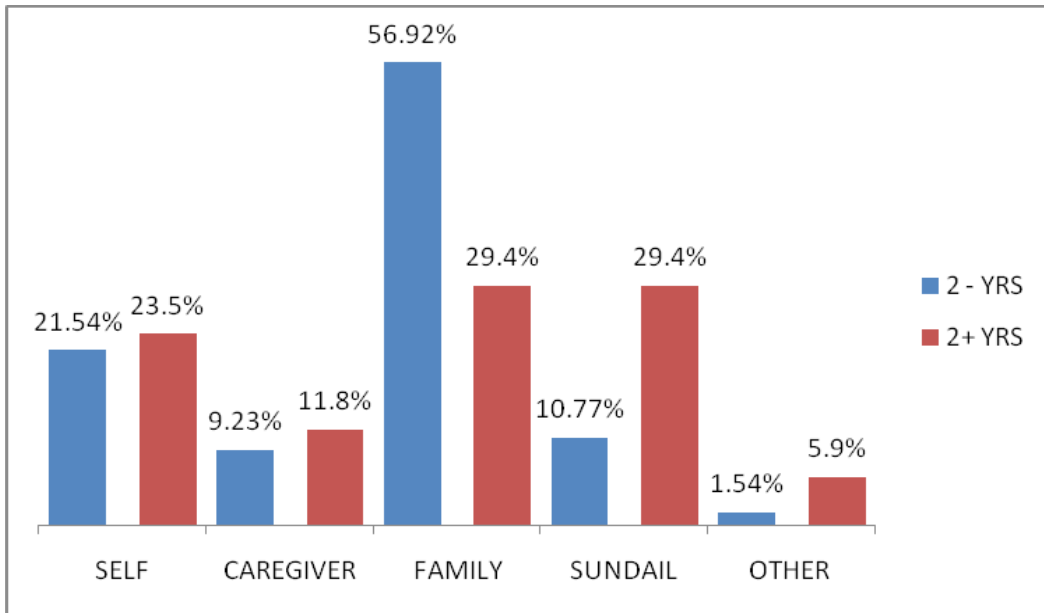
Females account for 61% of the deaths from stroke each year. In the drop-out group, deaths were 4 female and 3 males. Of interest is the fact that the 3 males who died, did so in their first year at the Center, while the females who died had been at the center over 2+ years. Those in declining health were 4 females and 5 males. Males and females were evenly distributed in the dissatisfied and transportation group, however, both our graduates were male.

## PRESCRIPTION DRUG USEAGE

The average (mean) number of drugs taken by the client population in the year 1 study was 4.5 per day with a median of 5 and standard deviation of 3 which indicated a number of significant outliers that are attributable to co-morbidities. In the second year the average increased to 5.5 in those with less than two years at the Center and 2.3 for those who have been at the Center longer. The median numbers are both 5 which is the same as it was in year 1 of the study. With

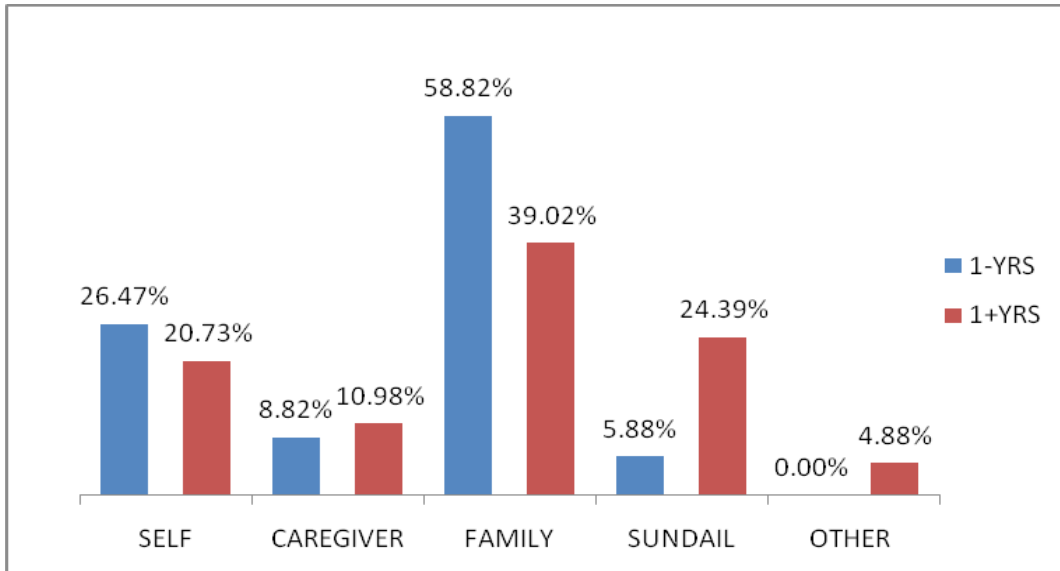
the range being high the initial presumption that the number of drugs and usage appears to be more highly related to the co-morbidities than to the years spent at the Center. The consistency of the data supports this contention.

## **TRANSPORTATION**



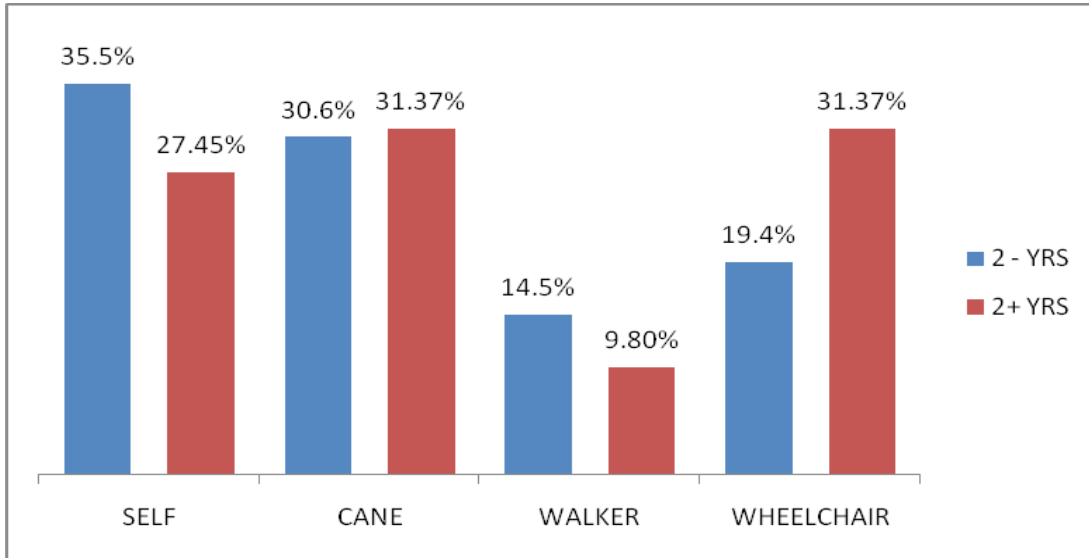
As was true with the year 1 data, the shift to public and/or commercial forms of transportation away from reliance on the family is noticeable after the clients have been at the center for 2+ years. In the early years, 65.1% of clients rely on their families or caregivers for transportation needs while that percentage shrinks to 41.2% after year 2. Those taking public transportation grows from 12.3% to 36.3%. The constancy of caregiver transport is probably due to need for assistance both for transportation but also for participation at the Center.

Among the five clients that cited transportation as a reason for discontinuing their therapy, three were dependent upon their families while the other two used commercial methods. The data in this area is inconclusive.

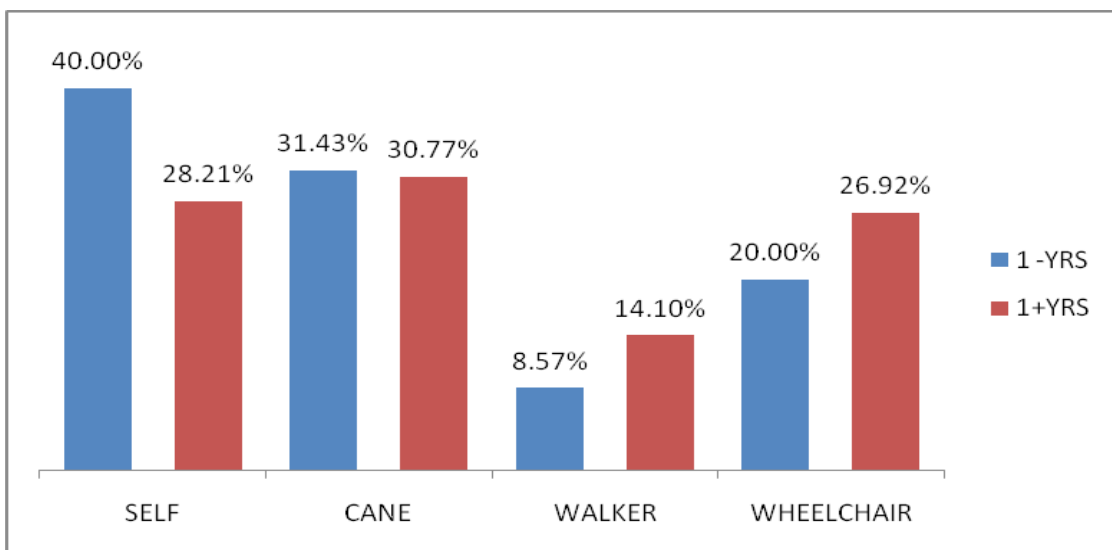


Of interest in analysis of the data is the shift that occurs after the first year of attendance. This may be one of the areas that we are seeing some of the Hawthorne effect. The results of the first study may be incentivizing both the staff therapists and the clients to work harder and to show results more quickly since the shift to commercial transportation is so dramatic even after one year reducing the reliance on families and increasing independence.

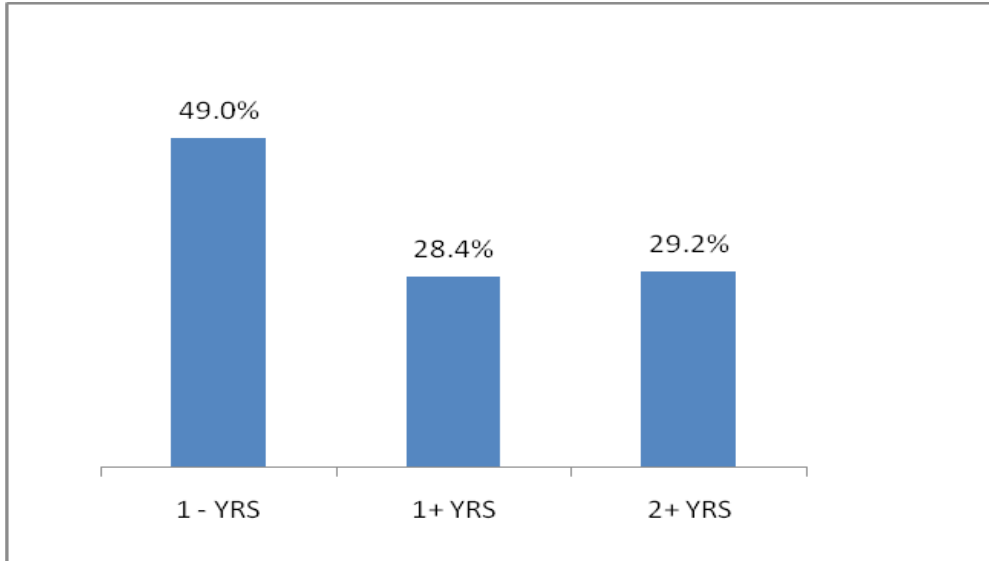
## AMBULATION



While the year 1 data indicated a difference in ambulation and ambulation aids showing a movement from walkers to canes among those who spend a longer time at the Center from those that are in the first 2 years, year 2 data is less clear. The decline in walker use may be shifted to cane but also may be shifting to wheelchairs as there is a significant increase in wheelchair usage suggesting that more clients may be requiring greater assistance as time goes on. The year 2 data suggests that overall more clients are being moved to ambulation assistance than was the case in the first year of the study. Looking at the movement that is occurring after the first year of attendance, the data suggests that therapists are moving clients to more ambulation assistance at an early stage in their program. This may be related to the increased age of the group reported and/or more clinical analysis of client need related to the results of the first year study. It is less conclusive that length of time at the center is a major influence on ambulation assistance.

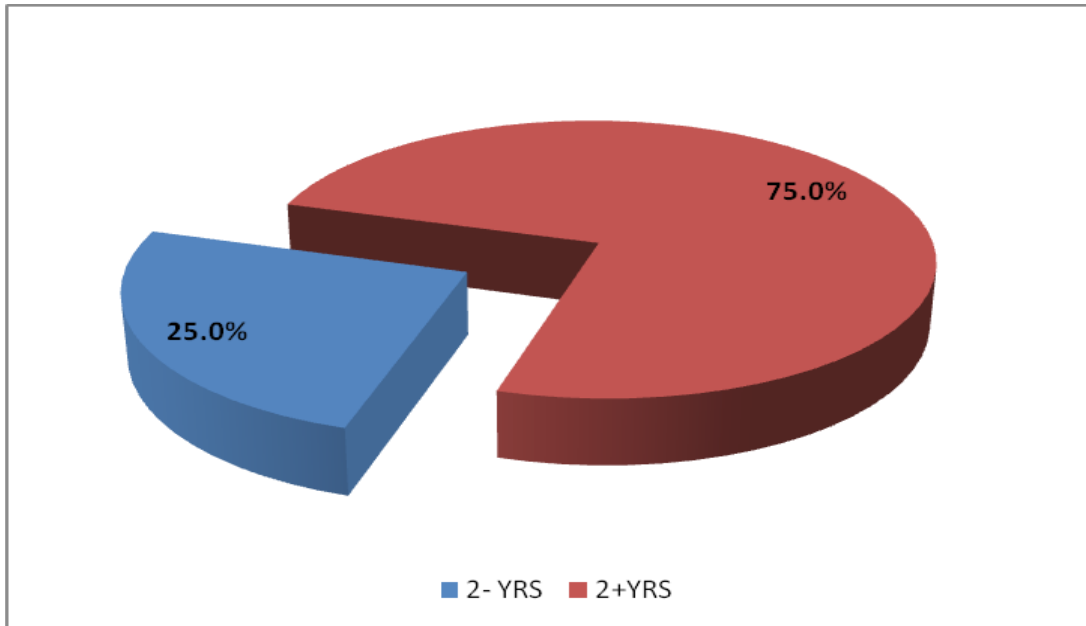


## ORTHOTICS



Use of orthotics for ambulation assistance by clients increased from the data from year 1 of the study in those who have attended the Center for more than two years to 29.2% from 21%. Additionally, the number of clients who use orthotic support initially, increased to 49% from 32%. The presentation of clients who are using orthotics may be attributed in part to the increase in age; however the significant drop in usage occurs after the 1<sup>st</sup> year of attendance and is stable thereafter. These results may be in part attributed to the Hawthorne effect on both the staff therapists as well as the clients themselves. Attention of appropriate supports in conjunction with the changed results in ambulation assistance seem to support that attention is being given at an earlier stage of recovery. The supposition is more credible than an improvement of overall recovery results because of the factor of advanced age which would tend to move the data to a longer recovery. The follow-up years will prove to be interesting in indicating which supposition is correct.

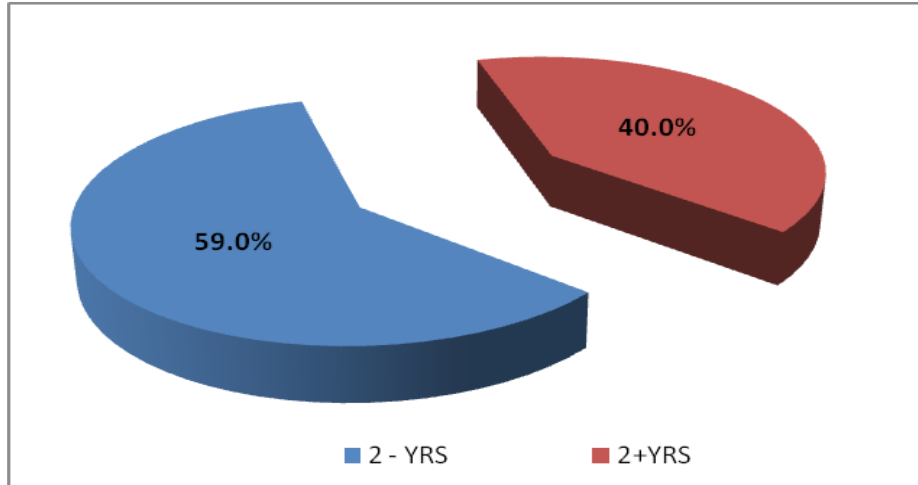
## EMERGENCY ROOM VISITS



In 2008, 25% of the client population made at least one visit to an ER which was less than the 32% of clients from the year prior. Use of the ER declined from 35% among those who were in the first two years of attendance to 25% among those who have attended more than two years. The first year of the study showed 13% of clients who have been at the center more than 2 years used the ER while the year 2 data showed 12.2% of clients had a visit to the ER. These results are consistent from year to year and support continued recovery of health and well being with attendance at the Center.

Cost for ER visits continues to be a major drain on the healthcare system as a whole. The ability to successfully have an influence on reducing this cost supports the inclusion of the therapies designed and provided at the Stroke Recovery Center to long term care programs for stroke survivors throughout the country.

## FALLS



There was an overall reduction in the number of clients who suffered falls in 2008 with 20.4% of the client base reporting falls as opposed to 30% the year prior. This current number is well below the national norm for seniors. Considering the client base is elderly and handicapped, the numbers show significant progress in treatment. This is a statistic that may be influenced by the Hawthorne affect along with the ambulation and orthotics. Looking at data of clients who have attended more than 2 years, falls are reduced by 19% over the clients who are in their first 2 years of attendance. The clients that have been with the Center less than 2 years suffered falls at nearly double the rate of those who have been at the center longer. Data that compares clients in their first year of attendance show 54% of falls occur in that first year as compared to 45% in the years afterward. This supports the contention that the staff therapists are having a greater influence on the physical recovery of clients particularly when the advanced age of the client base is factored in.

The cost reductions to the healthcare system as a whole from reduction of falls in the frail and elderly is significant not only in the medical cost, the hospital cost and medication cost but in elements like first responder cost and lost productivity of caregivers need for recovery. This statistic by itself supports the inclusion of the therapies of the Center in a long term care plan for stroke survivors throughout the country.

## CONCLUSIONS

There are some positive changes in the outcomes that are noted from the data in year 2. The major variable that has changed is the study itself and its reported results which may be causing something of an Hawthorne effect both on the part of the client themselves who know the utilization points that are being reported upon and the staff therapists who have read the results and want to improve upon what was reported in year 1. The move to the riding the bus showing such an increase would fall into this category as would ER visits, falls and use of orthotics.

The value of the Center as a functional intervention in the continuum of care for stroke survivors continues to be supported by the data for transportation usage, orthotics, emergency room visits and falls. Reduction of incidents along with ambulation supports and moving to independent use of transportation all translate to dollar savings for the healthcare system as well as reducing cost to the economy as a whole by reducing productivity loss from those family members who provide care for long term stroke survivors.

On the other hand, it continues to be important to note that a correlation between the amount of time spent at Stroke Recovery Center and improvement in the numbers is not statistically significant. In other words, we are unable to say either that the longer one stays with the program the "better" he/she will be nor are we able to say that the program "causes" less falls, lower emergency room usage, etc. However, we are also unable to correlate these improvements to age, type of stroke, passage of time since the stroke or co-morbidities. By eliminating linear regression of the possible causative elements, we are left with the common factor variation that is most significant being the time spent in the program with one's peer group as having the greatest influence on recovery as measured by these parameters. Taking the advancing age of the individual as he/she continues to attend the Center, the results we have posted become even more significant. It is possible to posit that, while unable to support a linear relationship, we are able to demonstrate recovery and maintenance of improvement as the client continues to age. This outcome is of high value is the elderly population.

Year 2 data continues to support our position and our credibility as best practice for long term rehabilitation for stroke survivors.

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