

**Evaluation of the Low Vision Rehabilitation Demonstration
Claims Analysis
Final Report**

CMS Contract No. 500-00-0031

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1. Introduction

Very little is known about Medicare beneficiaries who need low vision rehabilitation (LVR) services. This analysis uses available administrative data to describe the utilization and characteristics of Medicare beneficiaries who used LVR services prior to and during the Low Vision Rehabilitation Demonstration.¹ This report addresses five questions:

1. Who uses LVR therapy?
2. What is the population-based rate of use of LVR therapy?
3. How much LVR therapy service is provided, at what cost to Medicare?
4. What are the characteristics of the LVR therapy provided under Medicare?
5. What Medicare expenditures do LVR therapy users incur in the year prior to utilization?

These questions are addressed for the following areas and periods:

- prior to the Demonstration (in Demonstration and non-Demonstration states and areas)
- under the Demonstration (in Demonstration states and areas)
- in non-demonstration areas during the Demonstration period

Planning for the LVR Demonstration assumed that .4% of Medicare beneficiaries would use LVR Demonstration services if covered by Medicare. This should have yielded approximately 13,800 service users per year.² Further, the demonstration provided that each user could receive up to nine hours of service (later raised to 12). Actual utilization was substantially lower, causing a shift in the emphasis for the Evaluation. It was decided that intensive assessment of satisfaction for samples of beneficiaries and providers would not be worthwhile for such a small group, and that formal evaluation of the impact on outcomes should be deferred. Two project reports based on interviews with providers and patients shed light on barriers to access and utilization for the Demonstration services (Leutz, Gurewich, Bishop et al. 2009a, 2009b). The current analysis fills a need by building a quantitative foundation concerning need, utilization patterns and outcomes of low-vision rehabilitation services. Further, it explores differences between use and cost in the Demonstration and non-Demonstration areas both before and during Demonstration implementation.

Although this analysis cannot provide an evaluation of Demonstration success, analysis of claims data can provide a window on the Medicare population with low vision diagnoses and needs that

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² Based on computations (see below) for the number of Medicare fee-for-service beneficiaries in the Demonstration states and areas in 2006.

will be useful to CMS and others considering future policy toward LVR services. The available data are far from ideal: it is difficult to identify candidates for LVR services; the number of beneficiaries participating in the LVR Demonstration and the number using any LVR-like service under non-Demonstration conditions are both very small; providers bill for these services in varied ways, so it is difficult to identify which providers are active in this sector; and it is difficult to assemble appropriate comparison groups for an intervention to assess any impact it might have had on outcomes. However, it will be worthwhile to learn from Medicare claims to prepare for future studies and initiatives in this area of LVR service.

Plan of the Report. This report begins with Background briefly describing low vision rehabilitation services, the reasons for and plan for the Demonstration, and issues with its implementation that are relevant to the analysis. The methods used to develop data to describe low-vision rehabilitation users, determine population-based rates of use, and any shifts in the amount, type, providers or place of service associated with the Demonstration are then presented. The next section presents Exhibits describing LVR users, population-based rates of service, and the amounts and types of services they used. The final section presents conclusions, implications and recommendations for further research.

2. Background

The intervention that was implemented by the Low Vision Rehabilitation (LVR) Demonstration was a change in Medicare coverage. Specifically, during the Demonstration period, Medicare covers the services of LVR therapists regardless of place of service when they are prescribed by a qualified provider (in this case, an ophthalmologist, optometrist, or other physician) for beneficiaries enrolled in Medicare Part B who reside in particular Demonstration areas. Thus this LVR Demonstration does not directly implement particular changes in practice in specific sites but instead flexes payment policy to cover particular services by specific providers. The “sites” for the LVR Demonstration are the entire areas (states and metropolitan areas) where these coverage rules apply rather than particular participating organizations.³

Because this analysis stresses comparisons of beneficiaries and utilization in the Demonstration and non-Demonstration states and areas prior to and during the Demonstration, it is important to understand certain aspects of the coverage of low-vision rehabilitation therapy services prior to and under the Demonstration.⁴

Providers and Services. It is important background for this analysis that Medicare has covered and continues to cover therapy services for beneficiaries with vision impairment when they are provided by qualified occupational and physical therapists. Medicare coverage rules specify the settings where covered services may be provided, and in practice covered services are provided under various regulations both in physicians’ offices and beneficiaries’ residences.

Other types of low-vision specialists, specifically low-vision therapists, vision rehabilitation therapists, and orientation and mobility specialists (Academy for Certification of Vision

³ Nevertheless, it is recognized by the field that five provider organizations spearheaded the drive for the Demonstration, one in each of five of the six Demonstration state/metropolitan area; see Massof, R.W. (2010)

⁴ The Appendix presents general background on the Demonstration.

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Providers and Services. It is important background for this analysis that Medicare has covered and continues to cover therapy services for beneficiaries with vision impairment when they are provided by qualified occupational and physical therapists. Medicare coverage rules specify the settings where covered services may be provided, and in practice covered services are provided under various regulations both in physicians’ offices and beneficiaries’ residences.

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Rehabilitation and Education Professionals 2010), have typically worked in teaching roles with training programs for the visually impaired through school systems, non-profit institutions, and state and local governments. However, prior to 2005 some of these personnel provided LVR therapy services to patients as part of the service (“incident to”) of eye-care physicians. They taught patients strategies for coping with diminished vision and for using vision-enhancing devices. During the past decade these personnel have sought recognition for their growing role in the health care (as opposed to the educational and vocational rehabilitation) sphere (Academy for Certification of Vision Rehabilitation and Education Professionals 2010; Massof 2010). Their goal was to join occupational therapists in expanding services to elders and others with impaired vision, especially important as the US population ages.

Coverage Change. Therapy services, including services addressing vision problems, provided by qualified occupational therapists have been and continue to be covered by Medicare when provided in physicians’ offices; and occupational therapists in private practice (OTPP) can provide LVR therapy services in beneficiaries’ homes under current Medicare coverage and payment policy. The Demonstration did not change the coverage of this traditional approach to therapy services.

In July 2005, a year before the Demonstration began, in response to concerns about non-traditional personnel providing billable services in physicians’ offices (as described retrospectively in (Office of Inspector General Health and Human Services 2006)), CMS restricted the ability of providers working in physicians’ offices to supply covered therapy services “incident to” the physician’s service.⁵ This coverage change, not related to the Demonstration, means that services of low vision rehabilitation specialists and associated personnel in the non-Demonstration areas are no longer covered by Medicare, even when provided in physicians’ offices. Thus the expansion of coverage within the Demonstration areas, which includes a restoration of the coverage of low vision rehabilitation therapy services provided by certified providers (certified LVR specialists and occupational therapists, among others) incident to physician services, occurred about nine months after a general restriction on the provision of LVR therapies by LVR personnel.

The Demonstration was designed to assess the impact of increased access to vision rehabilitation services for an aging population in appropriate settings, including patients’ homes. Coverage of service at home was a focus because patients with impaired vision face special difficulties in getting to office visits, and learning to adapt and function in one’s own home environment is especially valuable (Agency for Healthcare Research and Quality 2004). Thus the Demonstration restored coverage of the services of LVR therapists when ordered by a physician and covers these services when provided in the home.

⁵ Prior to July 25, 2005, therapy services supplied by a variety of personnel in physicians’ offices could be paid for by Medicare if they were provided “incident to” the physician’s service. On that date, the regulations were tightened so that...”Therapy services appropriately billed incident to a physician’s/NPP’s service shall be subject to the same requirements as therapy services that would be furnished by a physical therapist, occupational therapist or speech-language pathologist in any other outpatient setting Regardless of any state licensing that allows other health professionals to provide therapy services, Medicare is authorized to pay only for services provided by those trained specifically in physical therapy, occupational therapy or speech-language pathology. That means that the services of athletic trainers, massage therapists, recreation therapists, kinesiotherapists, low vision specialists or any other profession may not be billed as therapy services.” Centers for Medicare and Medicaid Services (2010), .p. 202.

Medicare Payment Rates, Provider Issues. As described in (Leutz, Gurewich, Bishop et al. 2009a), CMS set payment rates for LVR specialists as a proportion of the rates for occupational therapy payment. The resulting payments per unit (15 minute increment) put the rates below what an optometrist could bill for occupational therapists providing this service, and below what independent occupational therapists can receive. Further, LVR therapy must be ordered by a physician or optometrist, who must certify the plan of care every 30 days. Ophthalmologists and optometrists were hesitant to certify such care without a low-vision rehabilitation assessment. The Demonstration did not contain strong positive incentives for ophthalmologists and optometrists to adopt or expand their use of LVR therapy for their patients.

Amount of Service per User. The LVR Demonstration was designed within tight fiscal constraints: \$2 million was allocated by Congress to pay for Medicare coverage of this service. Given the Medicare payment rates and the estimate of approximately 14,000 users per year, a ceiling on lifetime LVR therapy was set at 9 hours per beneficiary. In response to analysis presented by the LVR community, this was increased to 12 hours per year.

Billing for Demonstration Coverage. The Demonstration design included a set of diagnoses for which LVR therapy would be covered. Providers of LVR services under the Demonstration were expected to bill Medicare for services provided to beneficiaries with these diagnoses. Special Demonstration G-codes were to be used to identify Demonstration-related therapy.

Expansion of Demonstration Area. The Demonstration states and areas were established in 2006 and include the cities of New York and Atlanta as well as four states (Kansas, New Hampshire, North Carolina and Washington State). In 2007, noting that service utilization was low, CMS expanded the New York and Atlanta sites to include surrounding areas, defined by ZIP code of residence of the beneficiary. The New York City Demonstration area now includes portions of several counties surrounding New York City.⁶ It is the later definition of the Demonstration areas that is used throughout the analysis.

3. Data and Methods

The data used for the current analysis are developed from Medicare claims for the years 2004 through 2008. (Limited data are available for 2009, but lacking a full year of claims, these were excluded from the analysis.)

Medicare claims filed in 2004 through 2008 with rehabilitation therapy codes and vision-related diagnoses and all claims with a G code indicating Demonstration services (appearing after the Demonstration began in 2006) were requested from CMS' Data Extract System (DESY).

Low vision diagnoses. The major diagnoses of interest were named by CMS as valid for the LVR Demonstration services in the Demonstration design and implementation. Recent studies identify additional low-vision-related diagnoses ("expansion" diagnoses) that might be associated with a LVR claim (Javitt, Zhou, Maguire et al. 2003; Javitt, Zhou and Willke 2007; Coleman and Yu 2008). In addition, examination of Medicare claims that listed Demonstration G codes revealed that some of the diagnostic codes associated with G-codes were not included in the original CMS list (these *were* encompassed in the "expansion" diagnoses identified from the literature). Although it required multiple data requests, all of these diagnoses are included in the

⁶ The covered ZIP codes are from eight New York counties.

data definition. The diagnoses used to identify possible LVR claims are listed in an Appendix Exhibit.

Rehabilitation codes. There is no specific code for low vision rehabilitation therapy. Instead, the therapy codes reflect general therapeutic activities like vision training, neuromuscular re-education, gait training or community/work reintegration. Each of these more general therapy codes was taken to indicate a LVR therapy procedure only if it was paired with (on the same claim line as) a low vision diagnosis to indicate low vision rehabilitation.

Identifying LVR therapy use. Some claims pulled in through the data request reported valid rehabilitation therapy codes and a valid low vision diagnoses on different lines, suggesting that the therapy service was related to a different diagnosis not related to vision. Only claims where the rehabilitation therapy service was clearly associated with a low vision diagnosis (i.e., the therapy code and vision diagnosis were on the same line) were included in the study, thereby eliminating a number of candidate claims. Further, some claims reflected a charge of \$0.00 on a line with a low vision diagnosis and a therapy code. There also were instances of multiple claims filed on the same day for the same beneficiary and service; almost all of these claims did not list charges. The relatively high frequency of claims with zero charges was unexpected, and questions remain about how these claims arise. One explanation that has been put forward is that these are services that the providers expect will be rejected by Medicare, but they need to bill Medicare first before they can bill another insurer. The analysis presented here is restricted to claims with positive charges, and beneficiaries are identified as LVR therapy users only if they had such a claim.

Deriving Medicare expenditures and services from claims data. An individual claim can have multiple therapy procedure codes, each with its own 'allowable charge.' However, the total 'amount paid' for any given claim is generally lower than the sum of the allowable charges. This reflects the fact that providers do not always receive the full allowable charge. Thus the amount Medicare paid for any type of service, like low vision rehabilitation, cannot be determined definitively from a claim that lists multiple services. Some information about the number of different services can be gleaned from the number of therapy procedure codes reported on claims, but claims do not report a count of service units. For these reasons, the claims data can support analysis of total claims for LVR therapy services, total Medicare payment and payment per claim and per user, but the claims and claims lines cannot support more fine-grained counts of units of LVR service or payment per unit of LVR service.

Roll-up to beneficiary level. Claims made on behalf of unduplicated beneficiaries were aggregated to the beneficiary level. Information on beneficiary age, sex and residence address was accessed from claims. To get additional demographic information, a finder file of all beneficiaries who received Medicare-paid low vision rehabilitation was created and merged with the 100-percent Medicare Denominator Files for 2004 through 2007.⁷ This enabled description of each user's race, basis of entitlement, and state buy-in status (an indicator of poverty status).

Aggregation to states and areas. Demonstration status of each beneficiary was determined using data on the claim to identify whether a LVR therapy user resided in a Demonstration state or area. For many beneficiaries, the state of residence indicated whether he or she lived in a

⁷ The 2008 Denominator File is not currently available at Brandeis.

Demonstration or non-Demonstration area. But as described above, the Demonstration was also implemented in the New York City metropolitan area and the Atlanta metropolitan area. These Demonstration areas were not congruent with counties, so LVR Demonstration area users had to be meticulously identified by a ZIP code match. To accomplish this, ZIP code finder files had to be constructed from the Denominator File and then merged onto the claims files. By the same token, users residing in the non-Demonstration areas of Georgia and New York had to be specifically distinguished as non-Demonstration participants. This distinction was made for the two years prior to the Demonstration (2004, 2005) as well as the Demonstration implementation year (2006) and one full implementation year (2007). Because the analysis did not have access to the 2008 Denominator File, claims and beneficiaries cannot be definitively identified as from the Demonstration or non-Demonstration areas (Atlanta area, New York City area) in 2008.

Medicare population base. To compute population-based rates of use for LVR therapy services, fee-for-service (FFS) Medicare beneficiaries in Demonstration and non-Demonstration states and areas were counted. Again, these statistics were quite easy to locate by state, but had to be computed by ZIP code using the 100-percent Medicare Denominator File for the Demonstration and non-Demonstration portions of New York and Georgia. The 2008 denominator file is not available at Brandeis, so it was not possible to calculate exact denominators for this year.

Health Services Utilization in the Year Prior to LVR Therapy Use. To assess overall levels of illness and Medicare utilization of LVR therapy users, Medicare claims for inpatient services, facility outpatient services, and physician services (“carrier claims”) incurred in the twelve months prior to a beneficiary’s first utilization of a LVR therapy service in the period 2006 through 2008 were identified. In addition, with further validation, the diagnosis pattern prior to utilization of the LVR therapy service could be used in a future study to identify beneficiaries likely to use these services. Claims for home health services, skilled nursing facility services and prescription drugs were not included because inpatient and physician claims were considered sufficient to indicate a low vision or chronic condition diagnosis if one was present. The Chronic Condition Indicator (CCI) definitions distributed by the Hospital Cost and Utilization Project of the Agency for Healthcare Research and Quality were used to determine whether LVR therapy users were diagnosed with chronic illness in the year before their therapy utilization (Health Care Cost and Utilization Project 2010). Using these definitions, the diagnoses from claims of all types filed for the previous year were flagged as either a chronic or non-chronic. These flags were aggregated to identify which beneficiaries had a chronic illness diagnosis. It should be noted that this method is less restrictive than certain other methods (for example the Chronic Care Warehouse flags, which require multiple years of data and multiple occurrences of diagnoses) and identifies a relatively inclusive population as chronically ill because it does not differentiate beneficiaries with only one or a few occurrences of any given diagnosis.

4. Results

LVR therapy services paid for by Medicare were rarely provided prior to the Demonstration and only show very slight growth over the 3 year demonstration period. In total, only 28,300 unique Medicare beneficiaries had a claim for this type of therapy during the years 2004 through 2008, about 5,700 per year. Only 1,176 beneficiaries resident in the Demonstration states and

metropolitan areas used LVR therapy services during the calendar years 2006 through 2008,⁸ resulting in only 1,735 claims for services and total Medicare payment of \$110,000.

It is a challenge to study such a rare event using claims analysis. Nevertheless, patterns were observed in the Demonstration and non-Demonstration areas.

4.1 Characteristics of LVR Users

The characteristics of Medicare beneficiaries in Demonstration and non-Demonstration areas using LVR therapy services in 2004 through 2007 are shown in Exhibit 1. With an average age of 79.9, about two-thirds female, and largely entitled to Medicare as Aged rather than Disabled, they mirror the elderly population at risk of vision impairment.⁹ Most LVR therapy service users are White.

Comparing pre-Demonstration (2004 and 2005) to post-Demonstration (2007) characteristics for the Demonstration states and areas only, it appears that the proportion White is significantly smaller for the Demonstration period beneficiaries, the proportion Black is significantly larger, and the proportion eligible for Medicare as Disabled is about one percentage point larger, a small but statistically significant difference. For the non-Demonstration areas, there were no significant differences in these characteristics for LVR therapy users between 2004-5 and 2007; however, LVR therapy users in non-Demonstration areas were more likely to participate in Medicare buy-in programs in the later period, i.e. were more likely to be poor or near-poor.¹⁰

Similar patterns were found when user characteristics were compared for beneficiaries in the Demonstration and non-Demonstration areas in 2007, the only full Demonstration year for which demographic information is available. The proportion White in the Demonstration areas was significantly smaller while the proportion eligible for Medicare on the basis of disability was larger.

4.2 Profile of Service Use and Diagnoses in the Year Before LVR Therapy

In order to better understand who uses low vision rehabilitation therapy, service use and diagnostic profiles were examined for LVR therapy users for the year before each beneficiary's first LVR therapy claim. One objective of this analysis was to determine whether beneficiaries using LVR services tend to have high utilization rates for other services, perhaps due to chronic illness; another was to examine the pattern of diagnoses reported on Medicare claims in the year before LVR therapy service, with the hope of using this pattern to identify other likely LVR therapy users. This is also important to consider because not all beneficiaries who could benefit from this service gain access. All LVR therapy users in Demonstration and non-Demonstration areas with a first LVR therapy service in 2006 through 2008 were included in this analysis.

⁸ The LVR Demonstration began in April 2006. Claims made in the first third of 2006 were not distinguished from those made in the second two-thirds.

⁹ Computed for all users from data presented in Exhibit 1 Part 1 and Part 2.

¹⁰ Because numbers are so small, these tests compare all beneficiaries using services in 2004 and 2005 to all those using services in 2007. A chi square test for differences between just two years, 2005 and 2007, in the proportion of beneficiaries served in the Demonstration areas by race was highly significant (12.305, $p < .00045$), corroborating the significance of the increase in the proportion Black served in the Demonstration areas.

As a context for utilization of LVR therapy users, it would be ideal to have a comparison group of fee-for-service Medicare beneficiaries who did not use low vision therapy. For instance, a comparison group of Medicare fee-for-service beneficiaries matched by age and sex could reveal how the full range of Medicare utilization and diagnoses of LVR therapy users differs from that of similar Medicare beneficiaries. However, such a comparison was not possible within the scope of the evaluation. Instead, expenditures were benchmarked using data on Medicare expenditures and utilization for all fee-for service beneficiaries from the 2008 Medicare Trustees report (Medicare Trustees 2008).

As shown in Exhibit 2, in the 12 months prior to the first LVR therapy visit, the mean number for all Medicare claims per beneficiary using LVR therapy was approximately 28. Just a small portion of these were inpatient or outpatient facility claims (less than one per beneficiary for each of these types), while the majority of claims were for physician services (27 per beneficiary on average). LVR therapy users had average Medicare expenditures of \$4,255 for physician services, \$193 for outpatient facility use and \$4,081 for inpatient care. The total Medicare expenditure per LVR therapy users was \$8,529. This is much greater than mean estimated Medicare expenditures for inpatient and physician services in 2007 of \$4,940 per fee for service beneficiary as computed from the annual report of Medicare Trustees (Medicare Trustees 2008). Although not an exactly equivalent comparison, these figures suggest that LVR therapy users tend to have Medicare expenditures that are higher than those of the average Medicare beneficiary in the year prior to their first LVR therapy visit.

Exhibit 3 groups all claims in the year prior to LVR therapy use by diagnostic category to show that the pattern of claims remains quite constant year to year. In each year, approximately 10% of all the Medicare claims for LVR therapy users listed a low vision-related diagnosis as the principal diagnosis (Exhibit 4); these diagnoses are found within the nervous and sense organs diagnostic category in Exhibit 3. Further breakdown of the low vision diagnoses listed on claims shows that overall, the top ten low vision diagnoses found on these claims were relatively stable across each demonstration year examined (Exhibit 5). *Exudative* and *non-exudative macular degeneration* were the top two low-vision-related diagnoses for these beneficiaries' claims, respectively. These top two diagnoses were not included in the original Demonstration-specific diagnoses list, but are included throughout this analysis in the expanded list identified through the literature.

The AHRQ Chronic Condition Indicator (AHRQ-CCI) software identified approximately half of the claims of all beneficiaries who used LVR therapy in each year as related to a chronic illness as defined by the AHRQ-CCI (Exhibit 6). This is comparable to the rate of flagged claims for the Medicare five-percent sample in 2004 (50.6%; authors' analysis). About two-thirds of these beneficiaries with any chronic condition claim had between 1 and 10 claims flagged as a chronic (Exhibit 7). The vast majority of the remaining one-third had between 11 and 20 diagnosis flags, with very few LVR-using beneficiaries having more than 20 claims with a chronic diagnosis flag. Eleven to 20 claims with chronic condition flags may represent moderate health concerns, but it appears that only a small portion of LVR therapy users have a heavy burden of illness (as indicated by more than 20 claims flagged as chronic). In the total five-percent sample, about half the beneficiaries (52%) had between 1 and 10 chronic condition flags, 25 percent had 11 to 20 flags, 11 percent had 21 to 30 flags and 12 percent had 31 flags or higher. This suggests that, in

general, LVR therapy users may have slightly less chronic illness than the total Medicare-enrolled population.¹¹

4.3 Population-Based Rates of Use of LVR Therapy

Pre Demonstration Period. The numbers of beneficiaries using LVR therapy per thousand FFS Medicare beneficiaries in all states and areas prior to the Demonstration period was .185 in 2004 and .164 in 2005 (Exhibit 8). The rate projected for the Demonstration (.4%, or 4 per 1000 beneficiaries) was about 22 and 24 times larger than these values. The Demonstration states and areas as a whole had significantly lower rates of use¹² of the LVR therapy service in the pre-Demonstration period than the non-Demonstration states and areas taken as a whole (Exhibit 8), although the rate of use in Demonstration state Kansas was especially high in the pre-Demonstration years.

Post Demonstration Period. The rate of use of LVR therapy services in the one full Demonstration year with available data (2007) does not show an increase for the Demonstration states and areas (Exhibit 8). The penetration rate in Kansas, previously about four times the national rate, declined sharply, possibly reflecting barriers to reimbursement and other Demonstration issues identified by the qualitative case study (Leutz, Gurewich, Bishop et al. 2009a).

In the non-Demonstration states and areas, the rate of use of LVR therapy services declined between 2004 and 2005, and declined still further through 2007, perhaps due to the change in the “incident to” rules (see page 3).

4.4 Volume and Expenditures for Medicare LVR Therapy Service

In the Demonstration states and areas, paid LVR therapy claims actually fell by 32% between the pre-Demonstration period and the Demonstration period (Exhibit 9). At the same time, likely due to the change in the “incident to” rules, the total number of claims filed annually decreased in the non-Demonstration states and areas. The overall impact was a decrease in the total LVR therapy services provided in the nation (Exhibit 10).

Total expenditures on LVR therapy services in the Demonstration states and areas were substantially under the \$2 million projected for the Demonstration (Exhibit 9).

Payment per claim depends on the amount of service (length and number of visits included), provider and other factors. The pattern of service in the Demonstration states and areas *prior to* the Demonstration period resulted in Medicare payments per claim that were substantially lower

¹¹ Provider and beneficiary case studies conducted for the evaluation indicate that users of LVR therapy reside in the community (i.e. are not nursing home residents) and generally are able to get out to doctor visits. Thus two segments of beneficiaries with a large burden of chronic disease and disability, nursing home residents and home-bound beneficiaries with severe illness, are not present in the beneficiary population who are current users of LVR therapy.

Data from 2004 are used to provide a sense of scale. The five-percent sample is not available to the evaluation for any of the study years, so a more direct comparison cannot be made between the LVR therapy sample and the general Medicare population.

¹² Rate of use refers to LVR therapy users per thousand FFS beneficiaries. The difference in the proportions is negative and significantly different from zero at $p < .01$.

than payments in other parts of the country. This relatively lower payment per claim persisted into the Demonstration period (Exhibit 9).

Exhibit 11 contrasts mean claims per user and Medicare payments per user in the Demonstration and non-Demonstration states and areas. Both the number of claims provided per user and expense per user are quite variable (high coefficient of variation) and vary over time. Assuming that each claim is for a visit of an hour or even somewhat more, the mean for utilization is far below the 12-hour cap set by the Demonstration.

The distribution of LVR therapy claims per user was very similar in the Demonstration and non-Demonstration areas, whether before or after the Demonstration began (Exhibit 12). Users under the Demonstration were somewhat more likely to have only one or two LVR therapy visits (89%) than users in the non-Demonstration areas (84%). Across all years, only 1.3% of Demonstration area users and 2.8% of non-Demonstration area users had more than five visits. It was more unusual for a beneficiary to have more than five visits in the Demonstration states and areas than in the rest of the nation during the Demonstration period (.7 % vs. 2.7%). Very few beneficiaries used anything near the nine or 12 hour cap that limited Demonstration services.

4.5 Characteristics of the LVR Therapy Provided under Medicare: Providers, Place of Service, Diagnoses

Providers of Service. Using LVR therapy claims' report of provider type shows that prior to the Demonstration (2004 and 2005), ophthalmologists billed for 17.7% of all low vision therapy claims in Demonstration and non-Demonstration areas combined, while optometrists billed for another 34.8% (Exhibit 13; calculated by combining data in Exhibit 13 Parts 1 and 2). Thus these two types of providers were responsible for more than half of LVR therapy service. Occupational therapists billed for 38% of claims.

The service pattern in the Demonstration areas *prior to* the Demonstration appears to have been quite different from the overall national pattern. In 2004 and 2005 other physicians, not specialists in eye care (i.e. ophthalmologists, optometrists), were responsible for a surprising 56.5% of Medicare claims for low vision rehabilitation therapy in the areas that were to become part of the Demonstration. These physicians were identified as general practitioners, general surgeons, and internists, as well as a scattering of other specialties. In addition, in the Demonstration areas prior to the Demonstration (2004-2005), independent occupational therapists played a much more limited role in LVR therapy claims, providing 8.0% of the services counted, in contrast to 39.9% in the non-Demonstration areas.

After the Demonstration coverage rules went into effect, the services billed in the Demonstration states and areas shifted sharply toward optometrists, who were responsible for 87.9% of claims in the Demonstration area by 2008. The role of occupational therapists declined still further in the Demonstration states and areas.

Place of Service. One of the objectives of the Demonstration was to enable and encourage the provision of LVR therapy services in settings where they are thought to be most useful to beneficiaries, particularly in the beneficiary's home. Overall, in the two years before the Demonstration began, 87.8% of LVR therapy services were provided in physicians' offices and only 11.6% were provided in beneficiaries' homes (computed from Exhibit 14). It is notable that services provided in the Demonstration states and areas *prior to* the Demonstration were much more concentrated in the *office* setting, with only 2.1% provided in beneficiaries' homes. This

did not change markedly as the Demonstration rolled out. It is also interesting to note that the proportion of services provided in the home and residential care settings in the non-Demonstration states and areas steadily increased over the Demonstration period. Further investigation could reveal which provider types were supplying these in-home services, relevant to the Demonstration goal of more home-based therapy.

Diagnoses. The principal diagnosis in the header on the claim including a low vision therapy service was mostly in the 360 to 379 range associated with vision pathology (Exhibit 15). The specific diagnoses named in the Demonstration design (mostly five-digit diagnosis categories in the 369 group, blindness and low vision; but also including several in the 368 group, visual disturbances) made up a substantial portion of these diagnoses (Exhibit 15), but other diagnoses were named as the principal diagnosis on claims as well. Retinopathy (362), especially as related to diabetes, was the principal diagnosis for around 9% of the claims in the pre-Demonstration period. Other aspects of visual disturbances (368), not specifically named in the Demonstration, were also common diagnoses heading a LVR therapy claim. Other visual diagnoses, including glaucoma (365), made up a small portion of these diagnoses; and some claims had as a principal diagnosis a category that was not in the vision range.

In the Demonstration states and areas, 95% of claims had a 368 or 369 diagnosis prior to the Demonstration. After Demonstration implementation, this proportion grew until all but a handful of claims were in these categories. In the non-Demonstration states and areas, providers of LVR therapy continued to list diagnoses of retinopathy and glaucoma as a reason for service provision as well as the visual disturbances, blindness and low vision.

The differences in the pattern of diagnoses on the LVR claims in Demonstration and non-Demonstration areas may not be meaningful. The blindness and low vision diagnosis categories (369) that are the focus of the Demonstration are functional in nature, while other diagnoses specify the etiology of the beneficiary's vision condition rather than the functional impairment caused by the condition. Providers may choose etiologic over functional diagnostic categories when they wish to be more specific about the cause of impaired vision. Providers in the Demonstration states and areas understandably selected the functional diagnoses that were on the Demonstration covered list to describe their patients' needs, but this did not represent a change in practice, because they were substantially more likely to use functional diagnoses prior to the Demonstration as well. Patterns and practices of specifying diagnoses for therapeutic procedures may be associated with certain provider types: ophthalmologists are expected to diagnose disease, while occupational therapists are expected to assess the functional impairment that results from disease. Further investigation of the relationship of provider to diagnosis might shed light on this issue, but would be unlikely to reveal more about the conditions of the beneficiaries receiving LVR therapy, which have both etiological and functional aspects.

5. Discussion: Policy Implications and Directions for Further Investigation

The analysis of low vision rehabilitation therapy claims for the pre-Demonstration and Demonstration periods has uncovered a number of findings that suggest directions for CMS policy and for future research.

- Low-vision rehabilitation therapy users are older, less likely to be Black, and about equally or somewhat less likely to be chronically ill when compared with the general

Medicare beneficiary population; their Medicare expenditures are estimated to be higher than average, and a substantial portion of their Medicare claims in the year prior to receipt of first LVR therapy service list a primary diagnosis related to low vision.

The presence of low-vision diagnoses, the primary diagnosis on 10% of the Medicare claims for LVR therapy users for the year prior to first service, could be a way to identify beneficiaries who are similar to service users. This could support a projection of the utilization rates and Medicare expenditures that would obtain if LVR therapy were available and accessible.

- The rates of use of LVR therapy as documented here suggest that many beneficiaries who could make use of this therapy are not receiving this service from Medicare.

Previous research has estimated the number of persons who could benefit from low vision rehabilitation therapy (Cavanaugh and Steinman 2005) and a Technical Assessment by the Agency for Healthcare Research and Quality determined that low-vision rehabilitation services could be of great benefit to many older Americans (Agency for Healthcare Research and Quality 2004). The claims analysis shows that few beneficiaries access LVR therapy service under current coverage or under the Demonstration. The gap between need and utilization appears to be large.

- Projections of use and cost per beneficiary for future coverage enhancements can be improved.

Demonstration planners did not have access to the analysis of non-Demonstration use and expense presented here, and experience under the Demonstration also can support projections. Not only was LVR therapy less utilized under the Demonstration than expected, but these services as currently provided appear to be much less costly than predicted by Demonstration planners. Claims per user averaged only 1.6 for beneficiaries in the Demonstration states and areas in 2008, and a majority of users had only one claim. By 2008, Medicare costs per user averaged \$107 in the Demonstration areas and \$209 in the non-Demonstration areas.

- The patterns of Medicare provision of LVR therapy services in the Demonstration areas prior to the Demonstration differed substantially from the patterns seen across the nation.

Systematic differences between practice patterns in the states and areas selected for the Demonstration and the practice patterns in the non-Demonstration states and areas *prior to* Demonstration implementation may raise issues for developing any future demonstration enhancing LVR therapy services. Areas were not selected for the Demonstration if they were known to have very few of the certified LVR personnel that are the focus of the coverage change, and were chosen with advice of the vision rehabilitation community. Five of the six states and areas hold a large nonprofit organization serving persons with vision impairment. Apparent systematic differences in LVR therapy service provision between Demonstration and non-Demonstration areas suggest that the experience from the Demonstration may not translate to other states and areas where practices are different and such large visual services organizations do not exist. Service penetration (proportion of beneficiaries using Medicare-paid LVR therapy services) was actually smaller in Demonstration areas prior to the Demonstration. Payments per claim and per service user were significantly smaller, suggesting a different mix of providers (or perhaps a different approach to filing Medicare claims). With respect to provider type,

occupational therapists were responsible for a smaller portion of claims, and, prior to the Demonstration, physicians without an eye care specialty filed a much greater proportion of all claims for LVR therapy services. In addition, services were rarely provided in patients' homes in the Demonstration states and areas prior to the Demonstration, while this was not such a rare occurrence in other states and areas.

- Although LVR therapy use is rare, it became even rarer in the non-Demonstration areas with the removal of services “incident to” physician services.

Removing coverage for services of LVR therapists “incident to” physician services was associated with a reduction in service use. Although all the rates of use are very small, number of LVR therapy users per thousand Medicare beneficiaries fell almost 25% in the non-demonstration areas between 2004 and 2007, concurrent with the removal of coverage of “incident to” services.

- The Demonstration cap of 12 hours is not a binding constraint.

Most beneficiaries accessing LVR therapy had only a few claims for services. Medicare expenditures per user were modest, and well below projections. The Demonstration allowed first a 9 hour lifetime limit and then 12 hours of service to be provided annually to each beneficiary certified to need LVR therapy services, as recommended by provider organizations. Claims tend to be associated with visits, and the distribution of the number of LVR claims per beneficiary suggests that very few beneficiaries hit this service cap. It cannot be inferred that these beneficiaries were receiving all the LVR therapy services they might benefit from, because low availability of LVR personnel, low Medicare rates, and other administrative issues were barriers to unfettered utilization. However, cost estimates for a future extension of coverage could start with the average claims and expenditures per Demonstration beneficiary served which are reflective of current practice.

- The providers who under current practice most commonly bill for LVR therapy services are optometrists and occupational therapists in private practice (OTPPs).

The coverage expansion under the Demonstration seemed to envision an optometrist (or perhaps an ophthalmologist) billing for services of a LVR specialist provided in the office or in the beneficiary's residential setting. However, the providers actually billing Medicare for LVR therapy services prior to the Demonstration varied across the nation and over time. Medicare claims for these services are currently filed by a variety of responsible providers, and the patterns suggest that practices differ by region. Prior to the restriction of “incident to” coverage, both ophthalmologists and optometrists oversaw a large proportion of LVR therapy services in the non-Demonstration states and areas. In Demonstration areas, services which previously were billed through a variety of physicians were consolidated to optometrists specifically.¹³

Certified occupational therapists were and continue to be an important provider of LVR therapy services in the non-Demonstration states and areas. Neither the claims analysis nor the site visit portion of this evaluation documents the referral patterns and practices of OTPPs. Because they

¹³ Further investigation drilling into claims might reveal that these characteristics were due to the practices of one or more specific large entities in the Demonstration states and areas, as it is well known that low vision rehabilitation is the province of particular large providers in five of the six areas; see Massof, R.W. (2010)

are responsible for such a large proportion of LVR therapy services, it is advisable that their practices be better understood with respect to referrals, market area, services provided and the like. OTPPs and optometrists would seem to be key links in the process of expanding access to LVR therapy services for Medicare beneficiaries.

- The practices of providers who currently provide LVR therapy services in beneficiaries' homes should be better understood if the home is to become a more usual setting for this service.

As noted above, one aim of the Demonstration is to support provision of LVR therapy services in beneficiaries' homes, where LVR professionals can help patients with failing vision to improve their ability to function in their own home environments. The claims show that very little Demonstration service was provided in beneficiaries' homes (1.3% in both 2007 and 2008). In the non-Demonstration states and areas, the proportion of LVR therapy service provided where patients reside increased to 17.5% by 2008. Further investigation could reveal which types of providers were supplying services in beneficiaries' homes in the non-Demonstration areas and document the role of physicians in certifying these services (for example, are a few physicians responsible for certifying most of the home-provided services, or is this spread over many certifying physicians). Provision of home services is costly, and it may be necessary to develop special home care rates to get services to beneficiaries' homes.

- The objective of enhancing access to a service that supports beneficiary functionality (IADLs), with a premium on home provision, is unusual for Medicare; home health and other Medicare services requiring functional assessment and physician orders may provide lessons.

LVR therapy is directed toward supporting persons with diminishing vision in continuing daily activities. Thus under the Low Vision Rehabilitation Demonstration, Medicare coverage was enhanced for a service focused on functional status of beneficiaries. This is unusual for Medicare services, which are generally directed at preventive, acute and post-acute health issues. Most Medicare providers are thus not accustomed to ordering services for functional needs. Assessment by a physician for LVR needs could be made a required part of Medicare eye care for beneficiaries with certain diagnoses. Alternatively or in addition, in recognition of the functional nature of low vision issues, assessment for LVR could become a more salient part of a home health assessment, which includes other functional components. This may be especially appropriate because certified occupational therapists, an occupation prominent in provision of LVR therapy services, may provide services under the Medicare home health benefit. Because home health services are only covered for beneficiaries who are home bound, this approach would reach only a portion of beneficiaries who could benefit from LVR therapy.¹⁴

¹⁴ Interviews with providers revealed that at least one provider was prevented from supplying LVR therapy services in residents' homes because it was not licensed to provide home care in its state; see Leutz, W., D. Gurewich, C. E. Bishop and M. D. Gaiser (2009a). Evaluation of the Low Vision Rehabilitation Demonstration: Provider Case Studies. Submitted to and under review by Centers for Medicare and Medicare Services. Final Report. June 19, 2009; rev January 22, 2010.

Exhibits

Exhibit 1: Beneficiary Characteristics, Demonstration and Non-Demonstration States and Areas, 2004-2008 (Beneficiaries with Claims with Charges)

Exhibit 1 Part 1: Demonstration

Beneficiary Characteristic	2004	2005	2006	2007	2008*
N	438	455	491	375	310
Age	80.0	79.6	80.0	80.4	--
(standard deviation)	(10.2)	(10.9)	(10.4)	(10.6)	--
Sex: Female	67.8%	64.6%	64.4%	64.8%	71.6%
Race: White	95.4%	95.6%	94.3%	92.8%	--
Black	3.0%	2.3%	4.5%	6.1%	--
Asian	0.7%	0.2%	0.2%	0.3%	--
Hispanic	0.5%	0.4%	0.4%	0.0%	--
Other or unknown	0.7%	0.2%	0.2%	0.5%	--
Entitlement : Aged	94.5%	93.4%	94.4%	93.6%	--
Disabled	5.0%	6.4%	4.8%	6.1%	--
ESRD	0.0%	0.0%	0.3%	0.0%	--
ESRD & Disabled	0.5%	0.2%	0.4%	0.3%	--
State Buy-In	11.2%	12.1%	11.2%	7.7%	--

* Only demographic information that is reported on claims is available for 2008.

Exhibit 1 Part 2: Non-Demonstration

Beneficiary Characteristic	2004	2005	2006	2007	2008*
N	6498	5699	4711	4889	4436
Age	79.5	79.7	80.2	80.4	--
(standard deviation)	(10.0)	(10.1)	(10.2)	(11.1)	--
Sex: Female	67.5%	66.2%	66.2%	68.1%	67.1%
Race: White	92.7%	93.3%	92.4%	91.8%	--
Black	5.0%	4.6%	4.7%	5.0%	--
Asian	0.4%	0.3%	0.6%	0.8%	--
Hispanic	1.2%	1.0%	1.4%	1.4%	--
Other or unknown	0.4%	0.46%	0.7%	0.8%	--
Entitlement : Aged	94.4%	94.4%	94.4%	93.3%	--
Disabled	4.9%	4.8%	4.8%	6.0%	--
ESRD	0.3%	0.4%	0.3%	0.3%	--
ESRD & Disabled	0.3%	0.4%	0.4%	0.4%	--
State Buy-In	10.9%	11.2%	12.1%	13.1%	--

*Only demographics reported on claims are available for 2008.

Exhibit 2: Mean Number of Claims and Expenditures per Beneficiary in the 12 Months Prior to First LVR Therapy Visit in 2006-2008

Claim Type	Mean	Std Dev	Mean (\$)	Std Dev
Physician claims	26.8	19.4	4255.78	4875.87
Outpatient facility claims	0.6	2.6	192.83	1523.82
Inpatient claims	0.5	1.0	4080.61	11430.70
Total claims	27.7	19.7	8529.22	14136.24

Exhibit 3: Claims in the 12 Months Prior to First LVR Therapy Visit in 2006-2008, by Diagnostic Category

Year	2006		2007		2008	
Diagnostic Category	Frequency	Percent	Frequency	Percent	Frequency	Percent
Infectious disease	2521	2.47	1950	2.33	1954	2.35
Neoplasms	4291	4.21	3589	4.28	3455	4.16
Endocrine	7536	7.39	6267	7.47	6341	7.63
Blood diseases and disorders	1968	1.93	1631	1.94	1570	1.89
Mental disorders	1475	1.45	1224	1.46	1362	1.64
Nervous and sense organs	13724	13.45	11170	13.32	11074	13.32
Circulatory	17222	16.88	14404	17.18	14414	17.34
Respiratory	5721	5.61	4700	5.6	4669	5.62
Digestive	4342	4.26	3340	3.98	3189	3.84
Genitourinary	4916	4.82	4252	5.07	3880	4.67
Pregnancy	50	0.05	48	0.06	59	0.07
Skin	5118	5.02	4288	5.11	3914	4.71
Musculoskeletal	11772	11.54	9649	11.51	9631	11.58
Congenital	292	0.29	199	0.24	197	0.24
Perinatal	28	0.03	24	0.03	20	0.02
Ill defined	15937	15.62	13077	15.59	13385	16.1
Injury and poisoning	5127	5.02	4049	4.83	4027	4.84
Total claims	102040	100	83861	100	83141	100

Exhibit 4: Percent of Claims in the 12 Months Prior to First LVR Therapy Visit in 2006-2008 with Low Vision Diagnosis as the Principal Diagnosis

Year	2006		2007		2008	
Principal Diagnosis	Frequency	Percent	Frequency	Percent	Frequency	Percent
Other than Low Vision	111,114	90.9	91,705	90.24	90,694	90.32
Low Vision	11,120	9.1	9,920	9.76	9,722	9.68

Exhibit 5: Most Common Low Vision Diagnoses on Claims in the 12 Months Prior to First LVR Therapy Visit in 2006-2008

ICD9	Description	Year		2006		2007		2008	
		Rank	Percent of all claims with this diagnosis	Rank	Percent of all claims with this diagnosis	Rank	Percent of all claims with this diagnosis		
36252	Exudative senile macular degeneration	1	21.65	1	20.74	1	21.07		
36251	Nonexudative senile macular degeneration	2	20.42	2	20.63	2	20.57		
36924	Better eye: moderate impairment; lesser eye: severe impairment	5	7.81	3	8.47	3	8.32		
36250	Macular degeneration (senile), unspecified	3	9.04	5	8.06	4	7.59		
36922	Better eye: severe impairment; lesser eye: severe impairment	4	8.29	4	8.21	5	7.54		
36925	Better eye: moderate impairment; lesser eye: moderate impairment	6	5.22	6	6.20	6	5.85		
36914	Better eye: severe impairment; lesser eye: profound impairment	7	4.96	7	4.84	7	5.55		
36918	Better eye: moderate impairment; lesser eye: profound impairment	8	4.24	8	4.53	8	4.07		
36913	Better eye: severe impairment; lesser eye: near-total impairment	11	2.69	10	3.22	9	3.39		

	Year	2006		2007		2008	
36917	Better eye: moderate impairment; lesser eye: near-total impairment	10	2.75	9	3.27	10	3.13
36908	Better eye: profound impairment; lesser eye: profound impairment	9	2.81	20+	0.08	11	2.54
	Total percent of all claims captured with these most common diagnoses		87.19		88.17		87.08

Exhibit 6: Percent of Claims in the 12 Months Prior to First LVR Therapy Visit in 2006-2008 with Chronic Condition Diagnosis

Year	Total Claims	Number Flagged Claims*	Percent
2006	121033	59614	49.25
2007	100678	50213	49.87
2008	99369	49366	49.68

* Based on AHRQ Chronic Condition Indicator tool

Exhibit 7: Frequency of Claims with Chronic Condition Diagnosis in the 12 Months Prior to First LVR Therapy Visit in 2006-2008

Year	2006		2007		2008	
Number of Claims	Number of Beneficiaries	Percent	Number of Beneficiaries	Percent	Number of Beneficiaries	Percent
1 to 10	3613	63.14	3690	67.56	3491	66.92
11 to 20	1663	29.06	1544	28.27	1479	28.35
21 to 30	293	5.12	195	3.57	208	3.99
31+	153	2.67	33	0.6	39	0.75

Exhibit 8: LVR Therapy Users per 1000 FFS Beneficiaries, Demonstration and Non-Demonstration States and Areas, 2004-2008
(Beneficiaries with Claims with Charges)

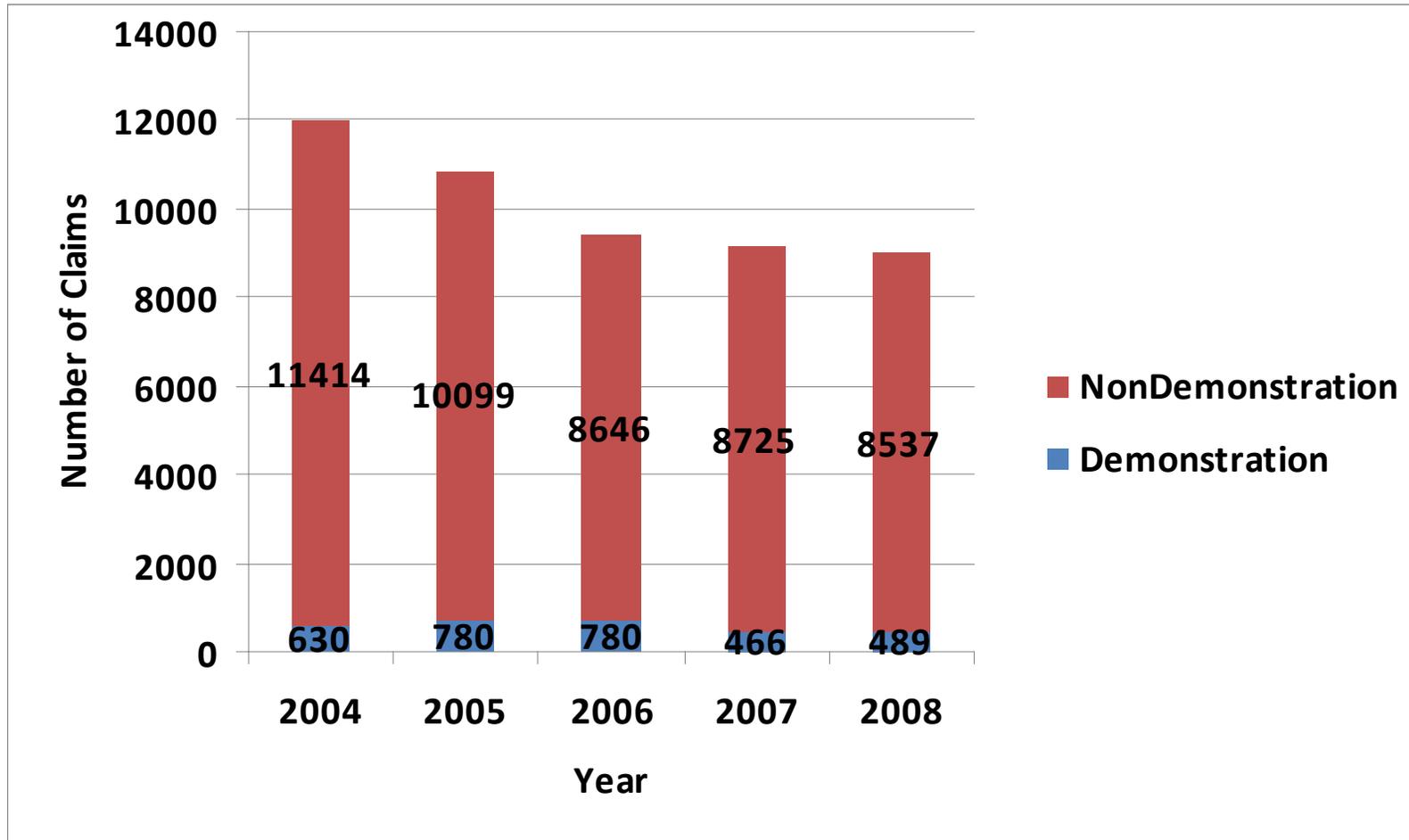
Beneficiary Residence	2004	2005	2006	2007*
All States and Areas	0.185	0.164	0.142	0.144
All Non-Demonstration	0.191	0.167	0.142	0.148
All Demonstration	0.128	0.132	0.143	0.109
Atlanta	0.010	0.010	0.025	0.016
Kansas	0.783	0.842	0.878	0.387
New Hampshire	0.021	0.010	0.015	0.019
New York City	0.033	0.066	0.038	0.045
North Carolina	0.024	0.026	0.034	0.069
Washington State	0.102	0.069	0.096	0.146

*Denominator data not available for 2008

Exhibit 9: LVR Therapy Claims, Medicare Charges and Payment per Claim, Demonstration and Non-Demonstration States and Areas, 2004-2008

						Sum	Sum	Percent
Demonstration	2004	2005	2006	2007	2008	2004-2005	2007-2008	change
Paid Claims (N)	630	780	780	466	489	1410	955	-32.3%
Paid Claims (\$)	\$40,831	\$52,259	\$47,645	\$29,124	\$32,864	\$93,090	\$61,988	-33.4%
Payment Per Claim	\$64.81	\$67.00	\$61.08	\$62.50	\$67.21	\$66.02	\$64.91	-1.7%
Non-Demonstration								
Paid Claims (N)	11414	10099	8646	8725	8537	21513	17262	-19.8%
Paid Claims (\$)	\$1,150,733	\$1,060,271	\$895,251	\$962,387	\$1,000,542	\$,211,004	\$1,962,929	-11.2%
Payment Per Claim	\$100.82	\$104.99	\$103.55	\$110.30	\$117.20	\$102.78	\$113.71	10.6%
All Areas								
Paid Claims (N)	12044	10879	9426	9191	9026	22923	18217	-20.5%
Paid Claims (\$)	\$1,191,564	\$1,112,530	\$942,896	\$991,511	\$1,033,405	\$2,304,094	\$2,024,917	-12.1%
Payment Per Claim	\$98.93	\$102.26	\$100.03	\$ 107.88	\$ 114.49	\$ 100.51	\$111.16	10.6%

*Exhibit 10: LVR Therapy Claims, Demonstration and Non-Demonstration States and Areas, 2004-2008**



*Descriptive text provided within Exhibit.

Exhibit 11: LVR Therapy Claims and Payments per User, Demonstration and Non-Demonstration States and Areas, 2004-2008 (Users with Claims with Charges)

Year	2004		2005		2006		2007		2008	
	Mean	Standard Deviation								
LVR Therapy Claims per User										
Demonstration	1.46	1.13	1.73	2.23	1.70	1.39	1.59	1.25	1.59	1.22
Non-Demonstration	1.76	1.66	1.77	1.62	1.82	1.54	1.76	1.48	1.78	1.46
Medicare LVR Therapy Payments per User										
Demonstration	\$96.12	156.6	\$115.86	202.7	\$102.69	107.5	\$94.24	126	\$106.65	118.3
Non-Demonstration	\$176.89	243.8	\$185.96	249.1	\$189.44	219.4	\$195.58	242.8	\$209.19	280

Note: See Exhibit 1 for Ns

Exhibit 12: Distribution of LVR Therapy Claims per User, Demonstration and Non-Demonstration States and Areas, 2004-2008

Exhibit 12 Part 1: Demonstration States and Areas

Number of LVR Therapy Claims	2004	2005	2006	2007	2008	All Years
1	72.6%	63.7%	60.7%	61.6%	61.3%	64.1%
2	19.0%	22.0%	24.6%	27.5%	26.5%	23.6%
3 to 5	7.1%	12.5%	12.8%	9.9%	11.9%	10.9%
6 to 9	1.1%	1.3%	1.4%	0.5%	0.0%	1.0%
10 to 12	0.0%	0.2%	0.2%	0.3%	0.0%	0.1%
13 or more	0.2%	0.2%	0.2%	0.3%	0.3%	0.2%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
N	438	455	491	375	310	2069

Exhibit 12 Part 2: Non-Demonstration States and Areas

Number of LVR Therapy Claims	2004	2005	2006	2007	2008	All Years
1	62.7%	61.8%	61.0%	62.2%	61.0%	61.8%
2	21.8%	21.6%	19.9%	20.9%	20.9%	21.1%
3 to 5	12.7%	13.8%	15.9%	14.1%	15.5%	14.3%
6 to 9	2.1%	2.2%	2.8%	2.5%	2.1%	2.3%
10 to 12	0.3%	0.4%	0.4%	0.2%	0.3%	0.3%
13 or more	0.3%	0.2%	0.1%	0.1%	0.2%	0.2%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
N	6,498	5,699	4,711	4,889	4,782	26,579

Exhibit 13: LVR Therapy Services: Provider Type, Demonstration and Non-Demonstration States and Areas, 2004-2008 (Claims with Charges)

Exhibit 13 Part 1 Demonstration States and Areas

Year	2004		2005		2006		2007		2008	
	Number	Percent								
Provider Type										
Ophthalmologist	56	8.9%	56	7.2%	94	12.0%	54	11.6%	13	2.7%
Other MD	460	73.0%	337	43.2%	--	--	--	--	--	--
Optometrist	46	7.3%	315	40.4%	667	85.5%	395	84.8%	430	87.9%
Physical Therapist	--	--	2	0.3%	--	--	--	--	18	3.7%
Occupational Therapist	44	7.0%	69	8.9%	17	2.2%	13	2.8%	28	5.7%
Other Provider	24	3.8%	1	0.1%	2	0.3%	4	0.9%	--	--
TOTAL	630	100%	780	100%	780	100%	466	100%	489	100%

*Empty cells have no claims.

Exhibit 13 Part 2 Non-Demonstration States and Areas

Year	2004		2005		2006		2007		2008	
Provider Type	Number	Percent								
Ophthalmologist	2310	20.2%	1628	16.1%	1398	16.2%	1106	12.7%	1049	12.3%
Other MD	218	1.9%	146	1.5%	101	1.2%	84	1.0%	9	0.1%
Optometrist	4553	39.9%	3068	30.4%	2425	28.1%	2538	29.1%	1906	22.3%
Physical Therapist	24	0.2%	87	0.9%	138	1.6%	107	1.2%	48	0.6%
Occupational Therapist	3996	35.0%	4579	45.3%	4026	46.6%	4377	50.2%	5131	60.1%
Other Provider	313	2.7%	591	5.9%	558	6.5%	513	5.8%	394	4.6%
TOTAL	11414	100%	10099	100%	8646	100%	8725	100%	8537	100%

Exhibit 14: LVR Therapy Services: Place of Service, Demonstration and Non-Demonstration States and Areas, 2004-2008 (Claims with Charges)

Exhibit 14 Part 1 Demonstration States and Areas

Year	2004		2005		2006		2007		2008	
	Number	Percent								
Office (11)	623	98.9%	754	96.7%	750	96.2%	457	98.1%	483	98.8%
Home (12)	6	1.0%	24	3.1%	27	3.5%	9	1.9%	6	1.2%
Assisted Living (13)	--	--	2	0.3%	--	--	--	--	--	--
Outpatient hospital (22)	1	0.2%	--	--	--	--	--	--	--	--
Skilled nursing facility (31)	--	--	--	--	--	--	--	--	--	--
Nursing facility (32)	--	--	--	--	--	--	--	--	--	--
Custodial care facility (33)	--	--	--	--	--	--	--	--	--	--
Independent care (49)	--	--	--	--	3	0.4%	--	--	--	--
End stage renal disease treatment facility (65)	--	--	--	--	--	--	--	--	--	--
Other (99)	--	--	--	--	--	--	--	--	--	--
Total LVR Claims	630	100%	780	100%	780	100%	466	100%	489	100%

*Empty cells have no claims.

Exhibit 14 Part 2 Non-Demonstration States and Areas

Year	2004		2005		2006		2007		2008	
	Number	Percent								
Place of Service										
Office (11)	10092	88.4%	8662	85.8%	7304	84.5%	7306	83.7%	6965	81.6%
Home (12)	1269	11.1%	1374	13.6%	1253	14.5%	1308	15.0%	1496	17.5%
Assisted Living (13)	5	0.0%	--	--	--	--	--	--	1	0.0%
Outpatient hospital (22)	27	0.2%	--	0.5%	88	1.0%	74	0.9%	61	0.7%
Skilled nursing facility (31)	1	0.0%	1	0.0%	--	--	--	--	--	--
Nursing facility (32)	10	0.1%	5	0.1%	--	--	1	0.0%	--	--
Custodial care facility (33)	2	0.0%	54	0.5%	1	0.0%	22	0.3%	11	0.1%
Independent care (49)	--	--	--	--	--	--	14	0.2%	3	0.0%
End stage renal disease treatment facility (65)	--	--	3	0.0%	--	--	--	--	--	--
Other (99)	8	0.1%	--	--	--	--	--	--	--	--
Total LVR Claims	11414	100%	10099	100%	8646	100%	8725	100%	8537	100%

Exhibit 15: LVR Therapy Services: Principal Diagnosis, Demonstration and Non-Demonstration States and Areas, 2004-2008 (Claims with Charges)

Exhibit 15 Part 1 Demonstration States and Areas

Diagnosis	2004		2005		2006		2007		2008	
	Number	Percent								
362: Retinopathy	8	1.3%	11	1.4%	4	0.5%	2	0.4%	--	--
365: Glaucoma	--	--	1	0.1%	--	--	1	0.2%	1	0.2%
368: Visual disturbances	105	16.7%	42	5.4%	105	13.5%	48	10.3%	227	46.4%
369: Blindness and low vision	495	78.6%	691	88.6%	665	85.3%	414	88.8%	254	51.9%
360-379 Other Vision	1	0.2%	2	0.3%	1	0.1%	--	--	1	0.2%
Other (not 360-379)	21	3.3%	33	4.2%	5	0.6%	1	0.2%	6	1.2%
TOTAL	630	100%	780	100%	780	100%	466	100%	489	100%

Exhibit 15 Part 2 Non-Demonstration States and Areas

Diagnosis	2004		2005		2006		2007		2008	
	Number	Percent								
362: Retinopathy	1175	10.3%	896	8.9%	1090	12.6%	720	8.3%	594	7.0%
365: Glaucoma	95	0.8%	65	0.6%	108	1.3%	92	1.1%	79	0.9%
368: Visual disturbances	1271	11.1%	1141	11.3%	788	9.1%	1082	12.4%	1211	14.2%
369: Blindness and low vision	8706	76.3%	7852	77.8%	6502	75.2%	6726	77.1%	6521	76.4%
360-379 Other Vision	99	0.9%	68	0.7%	77	0.9%	60	0.7%	73	0.9%
Other (not 360-379)	68	0.6%	77	0.8%	81	0.9%	45	0.5%	59	0.7%
TOTAL	11414	100%	10099	100%	8646	100%	8725	100%	8537	100%

Appendix: The Low Vision Rehabilitation Demonstration¹⁵

This report is a portion of the results of Brandeis University's project to evaluate the Low Vision Rehabilitation Demonstration (LVRD). As part of the Fiscal Year (FY) 2004 appropriations conference report to accompany Public Law HR 2673, the Secretary of Health and Human Services was directed to carry out a low vision rehabilitation demonstration as part of Fiscal '04 appropriations (Centers for Medicare and Medicaid Services 2008). Conference report language specified a five-year demonstration and authorized first-year funding of \$2 million. The Centers for Medicare and Medicaid Services (CMS) used these authorities to develop a demonstration to begin in 2006 with spending up to \$2 million annually.

Traditional Medicare coverage of vision services

One of the overarching goals of the DHHS *Healthy People 2010* initiative is an “increase in the use of vision rehabilitation services by people with visual impairments,” who include more than 3.6 million persons over age 40. The purpose of the LVRD is to see if Medicare can do more to support low vision (LV) rehabilitation services. These services tend to focus on promoting beneficiaries' functioning and independence rather than on medical cures for LV problems. Traditionally, funding for LV rehabilitation services has come from state, local, and charitable sources and has tended to focus on younger persons. These sources are not adequate for the increasing number of older persons with vision impairments.

Since the mid-1990s Medicare has allowed physical therapists, occupational therapists and speech therapists to bill for LV rehabilitation services, but it has limited the ability to bill for the services of three types of traditional vision rehabilitation professionals: low vision therapists (LVTs), who specialize in training patients to use optical devices such as magnifiers; vision rehabilitation therapists (VRTs), who focus on adaptation inside the home; and orientation and mobility specialists (OMSs), whose specialty is training in mobility outside the home. The services of these professionals could only be billed "incident to" a physician's services, i.e., using the physician's Medicare billing number, and only when the services were provided in the physician's office.

Until 2002 reimbursement for LV rehabilitation services was discretionary for Medicare Carriers, based on requests for reimbursement from providers; and such services were being reimbursed in only half of the states. A 2002 CMS memorandum directed Carriers to advise providers of the “incident to” coverage of LV rehabilitation services, including coverage of LVTs, VRTs and OMSs. However, this order was rescinded in 2005, leaving

¹⁵ This descriptive background is shared with previous project reports:

Leutz, W., D. Gurewich, C. E. Bishop and M. D. Gaiser (2009a). Evaluation of the Low Vision Rehabilitation Demonstration: Provider Case Studies. Submitted to and under review by Centers for Medicare and Medicaid Services. Final Report. June 19, 2009; rev January 22, 2010. ,

_____ (2009b). Evaluation of the Medicare Low Vision Rehabilitation Demonstration: Beneficiary Case Study. Submitted to and under review by Centers for Medicare and Medicaid Services. June 19, 2009; rev January 25, 2010.

physical therapists, occupational therapists and speech therapists as the only covered therapy providers.

Demonstration design and timetable

The purpose of the Demonstration is to examine the impact of standardized national coverage for vision rehabilitation services by OTs, certified LVTs, VRTs and OMSs under “general supervision” of physicians, including services provided in the patient’s home. Six Demonstration regions were selected: the States of NH, WA, NC, and KS, and the cities of New York and Atlanta. The two metropolitan areas were expanded beyond the cities proper in 2007. Under the Demonstration, Medicare providers in these regions are allowed to bill for up to nine (9) hours of LV rehabilitation services over the life of a beneficiary (later changed to 12 hours per beneficiary per year). The Demonstration began on April 1, 2006, and is scheduled to continue through March 31, 2011.

CMS developed reimbursement rates for the Demonstration using a Relative Value Units (RVUs) analysis that started with existing RVUs for two OT services and then calculated rates for the LVT, VRT and OMS based on their salaries compared to OTs. CMS actuaries also estimated that the marginal costs of the Demonstration would not exceed the \$2 million per year Congressional limit, given the assumptions that only 0.4% of beneficiaries would use LV rehabilitation, that only half of their costs would be due to the Demonstration, and that beneficiaries could only receive 9 hours of LV rehabilitation in their lifetimes. This was later changed to 12 hours per year.

Appendix Exhibit 1: ICD-9 Diagnosis Codes for Low Vision

3690	36250	36900	36911	36922	36967	63964
3691	36251	36901	36912	36923	36968	
3692	36252	36902	36913	36924	36969	
3693	36257	36903	36914	36925	36970	
3694	36274	36904	36915	36960	36971	
3696	36611	36905	36916	36961	36972	
3698	36841	36906	36917	36962	36973	
3699	36845	36907	36918	36963	36974	
36242	36846	36908	36920	36965	36975	
36243	36847	36910	36921	36966	36976	

* Codes in bold were listed in the original RFP; all other codes came from Javitt (2007), Javitt (2003), Coleman (2008) or were found on G-code claims.

All claims from the demonstration areas used the following four G-codes.

G9041 licensed occupational therapist

G9042 certified orientation and mobility specialist

G9043 certified low vision therapist

G9044 certified vision rehabilitation therapist

Technical Appendix: Data File Construction

The analytic files for the low vision analysis were based on a series of custom data pulls from the CMS DESY system. Initially, claims were identified and pulled if they had any low vision diagnosis and a therapy procedure code. Later pulls included all claims for any beneficiary with at least one claim with a demonstration G-code and then claims for any beneficiary with at least one therapy claim with an “expansion” low vision diagnosis.¹⁶ All of these files had to be aggregated to create final analytic files for beneficiaries and claims. An overview of the file construction process is detailed below.

Files

Data files included the following:

1. Claims carrying a LV diagnosis (original definition) and therapy procedure codes
2. Claims carrying a G-code
3. Claims carrying a diagnosis from the “expansion” list and therapy procedure codes
4. Service use claims for identified LV therapy users; these included inpatient, out patient and provider claims
5. 100% Denominator file for 2004-2007

File Construction

The table below provides a summary of the contents of initial data pulls and subsequent claims roll ups. Note that the expansion diagnosis data pull did not identify any new claims – it emerged that the additional diagnoses co-occurred with diagnoses already identified as part of the demonstration.

The basic file construction process started with rolling claim lines up to the claim level. This was done separately for LVR claims and G-code claims. These files were then merged to create an overall low vision rehabilitation event level data set. The file names indicated below are internal to the project.

¹⁶ As detailed in the body of this report, the expansion diagnoses are low vision diagnoses recognized in the literature that were not included in the official CMS documents concerning the demonstration.

Appendix Exhibit 2: Number of Records by File Type

	Original file, RFA LV list	Claim roll up	LVR Claims	G-code lines	G-code claims	Merged
Data set name	Lvdgcpt4, 5, 6, 7 & 8	Lvclm04b (also 05, 06, 07 & 08)	Lvclm04b (also 05, 06, 07 & 08)	lvdg_gcode or lvocode8	lvclm06_Gb (also 07 and 08)	Clmcombo04 (also 05, 06, 07 an d08)
Year						
2004	95,225	18,731	13,412	---	---	13,412
2005	86,095	17,304	12,263	---	---	12,263
2006	72,550	14,555	10,531	22,983	4,052	18,570
2007	70,539	13,794	8,700	36,464	5,928	19,696
2008	69,434	13,436	9,956	9,993	1,484	14,894

Note: For claims with G-codes for '06 and '07 the claims report FROMDT, ST and COUNTY (elsewhere these variables are FROM_DT, STATE, and CNTY)

Once this was done it was possible to identify those claims with a low vision diagnosis and a therapy procedure on the same line. Beneficiaries were found to have multiple LVR claims without charges in every year. Some beneficiaries had G-code claims without charges during the Demonstration years. Upon consideration and discussion with CMS, LVR claims that did not have charges were dropped. This resulted in the loss of a sizable number of standard and G-code claims. It also resulted in some reduction in the number of beneficiaries identified as receiving LVR services, because some beneficiaries had only claims without charges.

Although state of residence of beneficiaries can be identified from claims, identification of beneficiaries within the metropolitan area Demonstration and non-Demonstration areas (Atlanta, New York City area) required the extra step of merging on zip code information from the Medicare Denominator file to the LVR claims analytic files. At the time of this analysis, Brandeis housed the 100% denominator file for 2004-2007, but not 2008. This precluded the identification of the Demonstration and non-Demonstration beneficiaries for this group. As a stop-gap measure, the 2007 denominator file was used to find residence locations for beneficiaries with claims in 2008. Although all but 117 of the 2008 beneficiaries could be matched to a zip code using the 2007 denominator file, this represents a substantial number of the beneficiaries using low vision rehabilitation therapy services in the two Demonstration areas. It was decided that information for 2008 LVR users should not be reported by Demonstration and nonDemonstration residence.

Where necessary, event level files were rolled up to the person level.

Service Utilization

For the service use tables, all of the LVR analytic files were pooled to identify the first LVR event for each beneficiary. The goal was to examine Medicare claims for the 12 months prior to this event to determine the volume and type of service use. Once the date of initial LVR utilization had been determined for all using beneficiaries, this date was merged onto a pooled data set reporting Medicare inpatient, outpatient and physician services for 2004 to 2008. Claims were retained for the 12 months prior to initial LVR and this formed the analytic files for the service use analysis.

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