Final Report to Congress:
Evaluation of Medicare's Competitive Bidding Demonstration
For Durable Medical Equipment, Prosthetics, Orthotics, and Supplies

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Purpose

Section 1847 of the Social Security Act, as added by section 4319 of Public Law 105-33, the Balanced Budget Act of 1997 (BBA), directs the Secretary of Health and Human Services to submit a series of annual reports and a Final Report on the impact of competitive bidding projects authorized in the BBA. The reports are to "evaluate the impact of the demonstration projects on Medicare program payments, access, diversity of product selection, and quality." The Secretary is hereby submitting the Final Report.

Background

Section 1847 of the Social Security Act authorized the Secretary to conduct Demonstration Projects for Competitive Acquisition of Items and Services. In these projects, Medicare Part B items and services (other than physician services) could be furnished under competitively awarded contracts, with competitions conducted in competitive acquisition areas (defined under the act as a Metropolitan Statistical Area [MSA] or smaller area within an MSA). Under this authority the Centers for Medicare & Medicaid Services (CMS) implemented competitive bidding for durable medical equipment, prosthetics, orthotics, and supplies (DMEPOS) in two demonstration sites from 1999 to 2002. The CMS' approach was to test competitive bidding in the context of the current regulatory environment, without otherwise making major changes.

In the first site, Polk County, Florida, (pop. 491,851) the CMS conducted the first of two rounds of bidding in 1999. Five categories of DMEPOS were put up for bidding: oxygen equipment and supplies (required by statute), hospital beds and accessories, enteral nutrition formulas and equipment, urological supplies, and surgical dressings. A total of 16 winning suppliers began providing demonstration products and services in Polk County on October 1, 1999, and continued for 2 years. The second and final round of bidding in Polk County was conducted in 2001 for the same product categories minus enteral nutrition. (Enteral nutrition was dropped to retain only product categories that are overwhelmingly used in private homes.) The second set of competitively bid fees took effect in October 2001. As in round one, 16 suppliers were selected, of whom half participated as winners previously. The new fee schedules developed from the bids in each round replaced the statewide Medicare DMEPOS fees. The second round of the demonstration in Polk County ended in September 2002.

Texas was the second site of the demonstration. In the San Antonio MSA's Bexar, Comal, and Guadalupe counties (pop. 1,593,389) the CMS conducted bidding in 2000 for five kinds of DMEPOS: oxygen equipment and supplies, hospital beds and accessories, wheelchairs and accessories, general orthotics, and nebulizer drugs. Fifty-one suppliers were selected and began serving Medicare beneficiaries under the new fees in February 2001. The San Antonio site ended operations in December 2002, the statutorily required termination date in the BBA.

Evaluation Study

The CMS contracted with the University of Wisconsin-Madison in 1998 to conduct the evaluation. The University and the Research Triangle Institute led the evaluation team. For the First Annual Report, evaluation activities included a beneficiary survey; five site visits by the team to Polk County, Florida, and to the Medicare DME regional carrier managing the project in 1999 and 2000 (Palmetto Government Benefits Administrators [PGBA]); focus groups in Polk County with suppliers and members of other affected groups; analysis of suppliers' bids and comparison of fee schedules; and review of operational and documentary materials such as ombudsman records and the demonstration Request for Bid Proposals from suppliers.

For the Second Annual Report, the team conducted a followup beneficiary survey in Polk County, enabling assessment of numerous effects of competitive bidding. The team also analyzed the Medicare savings under the second competitively bid fee schedule in Polk and collected information from nine Florida suppliers in a written format. The team traveled to San Antonio for three site visits to interview demonstration and nondemonstration suppliers, referral agents, beneficiary representatives, and the San Antonio demonstration ombudsman. They also analyzed Medicare savings under the competitively bid fee schedule in San Antonio. They held discussions about the San Antonio operations with PGBA in Columbia, South Carolina. As in Polk County, a baseline survey was administered to a sample of Texas beneficiaries.

Additional evaluation activities followed the Second Annual Report. The team conducted a followup survey among San Antonio beneficiaries to enable comparisons with the baseline survey. They conducted several analyses of Medicare claims data from 1997 to 2002 in order to refine earlier estimates of Medicare savings under the demonstration, examine access to portable oxygen, assess competition in the demonstration areas, and test for possible volume changes due to the demonstration. A supplier survey in San Antonio and a comparison area was fielded to study impacts on product selection and on the financial status of suppliers. The team also conducted one additional site visit to Polk County and one to San Antonio, during which they gathered information from informants and stakeholders such as referral agents, suppliers, and beneficiary groups.

From these many sources, the evaluation team developed a wide array of information useful to both policymakers and Medicare program planners. Their Final Evaluation Report, attached, details numerous facts and analyses upon which the findings rest.

Results in Brief

The evaluation focuses on five major areas of impact:

1. Medicare expenditures;
2. beneficiary access;
3. quality and product selection;
4. market competitiveness; and
5. administrative feasibility of the reimbursement system.

In each area evaluation data indicate mostly favorable results for the Medicare program.

- The project **saved significant expenditures**, nearly 20 percent overall in each site.
- Statistical and qualitative data indicate that **beneficiary access and quality of services were essentially unchanged**. With the help of traditional intermediaries such as hospital discharge planners and physicians, beneficiaries negotiated the new system satisfactorily. A few areas of concern surfaced in either statistical data or site visits—most notably, possible pressure on access to portable oxygen in Polk County, where evidence from both the beneficiary survey and person-level claims analysis indicated a reduction in the proportion of oxygen patients using portable oxygen. An area of concern arising during San Antonio site visits was reportedly poor service quality from some wheelchair suppliers. Some of the specific concerns involved improper fitting and instances of separate billing for accessories formerly provided *gratis* as part of the overall wheelchair order. These findings suggest areas where administrative and policy tools can be developed to forestall deterioration of access and quality in future bidding initiatives.
- Although it was difficult to generate information on changes in product selection, the San Antonio supplier survey and site visit data suggest that beneficiaries experienced **little or no change in the array of products available** to them.
- The market competitiveness analysis indicates that **adequate numbers of bidders participated**, particularly in the larger-volume product categories. A second competition held in Polk County after 2 years resulted in 50 percent turnover in winning suppliers; both small and large suppliers were selected. **Market concentration usually changed little**, despite the fact that 53 percent to 65 percent of bidders were chosen as suppliers.
- The CMS, with PGBA serving as project manager, **successfully administered the new payment system**, from early site preparation through the bid solicitation and evaluation period to the implementation and monitoring phases. Suppliers reported little difficulty preparing bids, and claims processing proceeded smoothly.

Medicare's policy objectives in terms of savings, access, quality, competition, and administrative feasibility were largely realized under the competitive bidding demonstration. The program design, calling for multiple winners to maintain quality-based competition, appears to be a critical element. For example, during site visits, referral agents repeatedly took credit for judging service quality and steering beneficiaries to suppliers whom they judged to be the better performers. For the dual purposes of maintaining quality and access, and sustaining competitive markets, the multiple winner design appeared to serve Medicare's needs.

Results by Evaluation Area

Below we summarize the key evaluation findings in each impact area, comment on the strength and consistency of the evidence, and discuss some reasons for the findings. We

also summarize the evaluation team's recommendations regarding the suitability of the individual demonstration product categories for competitive bidding. The Final Evaluation Report contains further details on methods, results, and implications for future competitive bidding initiatives.

Medicare expenditures

Fee schedules resulting from the three bidding competitions held in the two sites suggest that substantial savings can be realized from competitive bidding. Our final estimates suggest savings of 16-17 percent annually in Polk County's Round 1, 20 percent in Polk County's Round 2, and 20 percent in San Antonio's single round. Overall, the demonstration in both sites saved 19 percent over what would have been paid under the existing statutory fees. The demonstration reduced Medicare payments by $7.5 million and beneficiary payments by $1.9 million.

For each demonstration product or service, the prices bid by winning suppliers were combined to determine the competitively bid Medicare fees. A bid consisted of an offered price for each item within a demonstration product category. For each bidder, the prices for all items in a category were combined into an average price using a standard set of weights. These "composite prices" were arrayed from lowest to highest. To determine a cutoff separating firms in the competitive range from remaining firms, the CMS selected bids in order of composite price until design requirements were met. These requirements included, for example, a certain minimum number of suppliers for each category. The offered prices of firms in the competitive range were adjusted[1] and then averaged to determine the demonstration fee.

Polk County fees and savings

Fees resulting from the Round 2 competition in Polk County were lower than the fees on the Year 2001 Medicare statewide fee schedule for 7 of 7 oxygen items, 17 of 17 hospital beds and accessories items, 18 of 24 urological items, and 21 of 28 surgical dressings items. Among the six urological items and seven surgical dressings items with fees higher than the Medicare statewide fee schedule, one-half or more are no greater than 20 percent higher. An increase in some fees under competitive bidding may be an indication that cost growth for certain items outpaced general cost increases allowed under statewide fees.

Overall, the new fees were favorable to Medicare. In Round 2, the average price reduction for oxygen was 19 percent; for hospital beds and accessories, 34 percent; for urological supplies, 7 percent; and for surgical dressings, 4 percent. The percentage reduction in total allowed charges for these categories was 20 percent, 31 percent, 9 percent, and -1 percent, respectively (Table 1).

[1] The adjustment factor is the ratio of the cutoff composite price to the bidder's composite price. The minimum adjustment factor equals 1. The adjustment ensures that total revenues under the demonstration fees equal the revenues that would result from using the cutoff composite price, assuming a standard set of volume weights.

Compared to the fees in Round 1, fees in Round 2 for oxygen and hospital beds exhibited little change, falling generally within about 5 percent of round one fees. Savings for hospital beds and accessories grew from about 18 percent to approximately 25 percent during Round 1, even though fees did not change for the 2-year duration. The increase was probably due to the expiration of grandfathering clauses for capped rentals that predated the demonstration. New rentals starting after these expired were all subject to the demonstration fees.

Table 1 **Medicare DMEPOS Competitive Bidding Demonstration:**
Percentage savings in total allowed charges, by bidding round and year

	Polk County, Florida			San Antonio, Texas	
	Round 1, Year 1	Round 1, Year 2	Round 2	Year 1 (11 mos.)	Year 2
Oxygen equipment and supplies	16.6	16.7	19.8	20.7	18.0
Hospital beds and Accessories	18.5	27.5	30.7	13.8	24.5
Urological supplies	17.8	17.2	9.4	n/a	n/a
Surgical dressings	-12.0	-12.7	-1.2	n/a	n/a
Enteral nutrition	16.3	17.0	n/a	n/a	n/a
Wheelchairs and Accessories	n/a	n/a	n/a	14.9	23.0
General orthotics	n/a	n/a	n/a	25.4	21.5
Nebulizer drugs	n/a	n/a	n/a	26.4	26.0
ALL CATEGORIES	16.3	17.2	20.3	19.6	21.3

Note: Savings are based on actual utilization derived from Medicare claims data.

Fees in Round 2 were almost always lower for surgical dressings, and all fees were higher for urological supplies. Surgical dressings fees in Round 1 were high due to unintended consequences of the technical procedure for summarizing an individual firm's bid prices. An improved procedure used in Round 2 probably helped to lower surgical dressings fees so that most are now below the statutory fee schedule. Round 2 fee increases for urological items were generally between 10 and 20 percent. Once the demonstration got underway, some urological suppliers discovered they had bid too low to cover costs. The shift in fees for these two categories is reflected in the changes in savings between Round 1 and Round 2.

San Antonio fees and savings

Demonstration fees resulting from the San Antonio competition conducted in 2000 were lower than the Medicare statewide fee schedule for 10 of 10 oxygen items, 18 of 18 hospital beds and accessories items, 61 of 61 wheelchair and accessories items, 46 of 46 orthotics items, and 16 of 27 nebulizer drugs put up for bidding. The average price reduction for oxygen was 22 percent; for hospital beds, 26 percent; for wheelchairs, 20 percent; for general orthotics, 10 percent; and for nebulizer drugs, 21 percent . Annual savings in the second year of San Antonio's single round were 18, 24, 23, 21, and 26 percent, respectively (Table 1). As in Polk County, savings grew from Year 1 to Year 2 for capped rental equipment (hospital beds and wheelchairs), apparently due to the expiration of grandfathered arrangements.

Volume impacts

If price changes affect utilization--for example, by making equipment more affordable for beneficiaries--then savings estimates should take the impacts into account. So it is important to consider whether large volume increases significantly reduced the potential savings from the fee reductions. The evaluation team provided alternative savings figures predicated on estimates of volume impacts. The alternative estimates are based on statistical models of growth in claims volume in the demonstration areas in comparison to similar areas in the states of Florida and Texas. Each product category was analyzed separately, and most analyses revealed no statistically significant impact on volume.

Two notable exceptions were the analyses of oxygen concentrators and portable gaseous oxygen systems in Polk County. The models for these categories indicated statistically significant volume increases which would reduce the savings estimates for oxygen equipment overall in Polk by about half.[2] This result rested largely on an unexplained drop in volume in several of the Florida comparison counties during Round 2. Specifically, under the demonstration, raw data suggested that Polk's oxygen growth continued at historical rates while growth in several of the comparison counties turned negative. The team concluded that the statistical evidence of the demonstration causing volume growth in these two important oxygen categories in Polk is questionable. Further, information in support of such an impact did not emerge from analysis of volumes in San Antonio and site visits there. Accordingly, the best estimate of the demonstration savings in Table 1 is not adjusted using results of the volume analysis.

Another category of note is wheelchair accessories, which were very low volume items sometimes provided *gratis* by wheelchair suppliers in San Antonio. For five of the six accessories tested in the analysis, estimated volume impacts were an increase of at least 100 percent, averaging about 150 percent. However, only one of these tests, for rental of an anti-tipping device, was statistically significant. Yet there were some indications from informants during site visits that suppliers were less likely to forgive the price of

[2] Final Evaluation Report, Appendix B.

wheelchair accessories under the demonstration. It is also possible that the price reductions for the accessories, which averaged slightly more than 20 percent, led to higher beneficiary demand. Because accessories are an exceedingly small factor in the expenditures for the wheelchair category, and because the formal statistical findings were very weak, the best estimate in Table 1 is not adjusted for volume impacts.

In summary, some isolated results were possibly suggestive of volume responses to the fee changes brought by competitive bidding. These results were far from conclusive, yet they do not completely negate the notion that a volume impact is possible in future initiatives.

Access to DMEPOS goods and services

The evaluation's three main sources of information on access to care were the beneficiary surveys, site visits, and San Antonio supplier survey. Data from all three sources suggested little or no impact of the demonstration on access to goods and services put up for bidding. Reduced use of portable oxygen among Polk beneficiaries is the single important result pointing to a risk of lower access under competitive bidding. We discuss this further below.

In both sites, transition policies protected beneficiaries from disruptions in existing relationships with oxygen companies, nebulizer drug suppliers, and suppliers of capped rental equipment (nutrition infusion pumps, hospital beds, and wheelchairs). For oxygen and nebulizer drugs, existing relationships could continue as long as the supplier agreed to accept demonstration fees, and suppliers overwhelmingly agreed to this arrangement. Capped rental fees for agreements predating the demonstration stayed in place.

The beneficiary surveys in Florida and San Antonio employed similar designs. Separate surveys were administered to random samples of oxygen users and other equipment users. The team analyzed total users and new users separately. New users are more likely to be directly affected by the demonstration, because they had no previous relationship with a supplier in their product category. New users accounted for 10 to 40 percent of the samples (across sites and time periods). Questionnaires covered a wide range of measures dealing with access to equipment, training, maintenance, customer service, and delivery services. Responses collected before the demonstration were compared with responses after the demonstration. Impact estimates took into account general trends that might affect responses (by surveying a similar area). Estimates also controlled for sample differences in demographic composition and health status. The Florida surveys were conducted in the second quarter of 1999 and the first quarter of 2001; the San Antonio surveys were conducted in the 4 months ending February 2001 and the 5 months ending July 2002.

Access to oxygen services in Polk County and San Antonio

Beneficiary survey measures overall indicated that access to oxygen services remained unchanged under the demonstration. At both baseline and followup, measures suggested beneficiaries in general have good access to oxygen services.

Delivery and supplier accessibility indicators. Numerous delivery and accessibility measures remained stable. About three-quarters of beneficiaries initially received their equipment on the same day it was ordered. The frequency of portable oxygen refills remained unchanged or, in the case of new users in San Antonio, increased. Also stable were the rate of home delivery by the supplier, distance to supplier, number of portable refills ordered each time, and the rate beneficiaries ran out of supplies. Access to customer service also did not shift markedly, including the number of phone or in-person contacts in the past 6 months, service call response time, and ability to contact the supplier by telephone. Home health agencies became more involved in ordering and delivery in Polk, a change with no clear explanation, although it might reflect greater initiative taken by paid caregivers to help beneficiaries adjust to the demonstration environment.

Access to training. Estimates of changed performance in particulars of training upon initial delivery (e.g., receipt of written instructions, trained in replacing parts) were mixed and usually statistically imprecise. Impacts tended to be quite small. Training indicators were more consistently unfavorable in San Antonio than in Polk County, and a couple were marginally nonsignificant.

Access to maintenance, important to assure continued purity of the oxygen flow, did not change. For example, about 70 percent in Polk and 50 percent in San Antonio reported a maintenance visit from the supplier in the past month.[3] Majorities reported receiving maintenance visits routinely every 1 to 3 months. Access to these and other services appeared stable. Respiratory therapist visits remained unchanged, as did the time since the last physician respiratory checkup, a measure included as an indirect effect of changes in supplier access.

Portable oxygen

Although most survey access indicators indicated stability, an important exception was portable oxygen use in Polk County. Portable oxygen is necessary for certain patients to move freely about their home and to travel outside the home. It can facilitate adherence to the doctor's prescribed oxygen regimen. Access to portable oxygen can be important for promoting quality-of-life and for assuring the effectiveness of oxygen therapy.

The Polk County survey results suggested a marginally nonsignificant decline of about 6 percentage points in the overall rate of portable use ($p=.057$) and a significant reduction of 24 percentage points among new users ($p =.025$). The survey impact estimates pertain to Round 1 of the demonstration. This result was further investigated with claims analysis, which suggested a small, statistically significant reduction of 3 percentage points among new users in Round 1 ($p < .01$) and a larger decline of 12 percentage points among new users in Round 2 ($p < .01$). Unadjusted claims trend data showed a general decline in portable use, beginning early in Round 1 and affecting Polk and the five counties used for comparison in Florida claims, except that the Polk downtrend among new users was steeper. New users also reported a 44-percentage-point increase in

[3] See Final Evaluation Report, Appendix C.

oxygen-conserving devices on portable systems. These devices can reduce the frequency of portable refills, although they are not well suited to every patient.[4]

San Antonio's results contrasted with Polk County's. In the survey, portable oxygen use appeared stable. There was trivial change in oxygen-conserving devices. A relatively large increase in use of portable liquid cylinders, from about 12 percent to 18 percent, may be a positive access indicator, because these are often lightweight systems; however, statistical confidence in this finding was limited (p=.098). Claims analysis, using the same comparison area used in the survey, revealed very small reductions in the portable use rate. Claims trend data indicated no general decline.

The two statistical sources of evidence on portable oxygen in Polk County were consistent in pointing to a possible access problem, but the impact sizes differed. Size inconsistency may be due to differences in comparison areas between the survey and claims analyses, sample-related variation in the survey, and factors affecting survey responses that remain unclear. Both sources used large numbers of observations, especially the claims data. Notwithstanding the size difference, the survey and claims evidence seem sufficiently persuasive to conclude that lower access to portable oxygen is a real risk posed by competitive bidding, at least in some areas and in the general program environment in effect during the demonstration.[5] Suppliers have an incentive to reduce access, because the add-on payment for portable oxygen is fixed per month, regardless of the number of refills needed. Previous research on the impact of price reductions did not find lower access to portable oxygen following 25 percent national fee reductions in 1998 mandated by the 1997 Balanced Budget Act (CMRI, 2000). But fee reductions under the demonstration came in addition to the pre-existing reductions. Fees may have dropped low enough to induce a market response.

How could the demonstration have brought about changes in access to portable oxygen? Two previous studies (CMRI, 2000; GAO, 1997) mentioned indications of high variability among suppliers in the proportion of patients offered portable or lightweight portable systems, with some suppliers providing portable oxygen to only a minority of patients. However, we found little indication that such suppliers may have been more likely to win the bidding. An oxygen policy change coinciding with the initiation of the Polk demonstration raised another possibility, because this change tightened Medicare eligibility for portable oxygen. (Florida trend data cited above illustrate the impact.) Perhaps the Florida winning suppliers adhered with unusual diligence to the new coverage requirement in the spotlight of the payment system experiment. We did not have systematic data necessary to examine this possible explanation, and no informants mentioned this type of behavioral change during the team's site visits. The coverage change could have combined with the demonstration's cost-reduction incentives, with both resulting in less portable oxygen use. For reasons cited above, even in the absence of the coverage change, Polk suppliers might have been highly motivated under competitive bidding to save costs by strictly following the coverage and documentation rules. Another portable oxygen indicator in Polk County was consistent with supplier

[4] United States General Accounting Office, *Medicare: Access to Home Oxygen Largely Unchanged; Closer HCFA Monitoring Needed*, GAO/HEHS-99-56, April 1999

[5] Except for lowered fees and fewer suppliers, basic program requirements were otherwise unchanged.

cost-consciousness—the large increase in oxygen-conserving devices on portable systems.

It is not certain that reduced portable use rates harmed any beneficiaries. Other sources of data did not suggest serious problems with portable oxygen access. Site visit sources did not cite access to portable oxygen as a problem in either Florida or Texas. In general, satisfaction measures in the survey remained high and unchanged under the demonstration. The survey did not find large numbers of beneficiaries switching their patronage to new suppliers. Moreover, it is not clear that all beneficiaries need or use portable oxygen when provided. Previous research has found that a significant fraction do not use their units.[6] For these reasons, we cannot rule out the possibility that the demonstration reduced some inappropriate provision of portable oxygen. In future initiatives, policy and administrative tools, such as stakeholder education, can be enhanced towards providing oxygen modalities that fit the medical necessity in each case.

Access to medical equipment in Polk County and San Antonio

Beneficiary survey estimates for medical equipment users in the demonstration suggested larger access impacts compared to oxygen, but these were in no consistent direction. Most findings were statistically nonsignificant, due in part to smaller sample sizes for the medical equipment surveys. The overall impression emerging from the medical equipment surveys was, again, few signs of problems, stability in access, and generally strong access levels.

Delivery indicators. Findings suggested some small changes took place for medical equipment users but these probably did not represent important shifts in access. In Polk County the demonstration may have caused less reliance on supplier home delivery in favor of mail and home health agency delivery, although none of these changes was statistically significant, and supplier delivery remained dominant by far. For new users, a decline in home delivery was more apparent (-24 percentage points, p=.017). By contrast, in San Antonio, delivery overall appeared to shift towards home delivery, as well as to mail delivery, and marginally away from home health agency delivery. The shift to supplier delivery was due to new equipment users generally (+19 percentage points, p=.034), and nebulizer drug users (+21 percentage points, p=.047). These results may mean that suppliers sought to reduce costs by cutting back on home delivery. Also, the survey substantiated a small lengthening of initial delivery time in San Antonio, which increased on average from 2.3 to 2.9 days overall (p=.080) and from 1.6 to 2.7 days (p=.042) for hospital beds. In Polk, delivery time remained unchanged at two days, on average.

Supplier accessibility. Measures here were stable or appeared improved. Supplier service call response time changed trivially, except for surgical dressings users in Polk, where it fell from about three days to about one day (p=.033). Medical equipment users in San Antonio gained in their ability to contact the supplier by telephone for all users (+10 percentage points, p=.026) and for new users (+20 percentage points, p=.049) .

[6] Department of Health and Human Services, Office of Inspector General, *Usage and Documentation of Home Oxygen Therapy*, OEI-03-96-00090, August 1999.

In both sites, it is likely that beneficiaries became less directly involved in arranging for their own equipment. In Polk County, the rate of self-ordering fell by 14 percentage points (p=.043) overall. This reduction was particularly associated with the subgroup of hospital bed users (-26 percentage points, p=.001). Similarly, in San Antonio, self-ordering declined for all medical equipment users (-13 percentage points, p=.009), wheelchair users (-12 percentage points, p=.040), and nebulizer drug users (-31 percentage points, p=.006). Survey results in both sites suggested a "caregiver" became more involved in ordering, but with the exception of new medical equipment users in San Antonio (+21 percentage points, p=.033), statistical precision on this impact was low.

Access to training. Specific indicators of training at initial delivery were generally strongly improved in both Polk and San Antonio, but often had low statistical reliability. Two exceptions were for Polk subgroups; these were large, negative and statistically significant--a 22 percentage point rise (p=.047) in urological supplies users reporting receiving no training, and a 40 percentage point decrease (p=.032) in surgical dressings users reporting instruction in maintenance. Both results may be tied to more mail delivery in these categories, a trend observed in unadjusted data that may be partly traceable to the out-of-town location of several winning suppliers in these categories. Relatedly, surgical dressings users reported a halving, on average, of the number of contacts with suppliers "in the past six months" (from 4.4 to 2.5, p=.046). It is not known whether local diffusion of new surgical dressing technology contributed to findings of fewer direct contacts. In the First Annual Report to Congress, the team noted that a winning supplier new to the area may have helped spread use of better dressings. To the extent surgical dressings patients receive wound treatment from medical personnel, a reduction in contacts and maintenance training from the supplier may not be clinically important.

Access to maintenance. In both sites indicators suggested modest, statistically nonsignificant reductions in the likelihood of routine maintenance visits. However, in one Polk subgroup, new users, the probability of a maintenance visit in the past 30 days declined 34 percentage points (p=.042). Unadjusted data suggest the groups most affected were new surgical dressings and new hospital bed users.

Other access-related information: supplier coverage area, site visits, supplier survey

Supplier coverage area. Winning suppliers helped maintain good access by offering extensive service areas. In Polk's Round 1, three-quarters of the winning suppliers agreed to serve the entire demonstration area. CMS required all winners in Round 2 to serve the entire demonstration area, potentially easing access further. In San Antonio, 80 percent of winning suppliers agreed to serve the entire three-county demonstration site. These coverage rates were achieved with many small suppliers represented among the winners.

Site visits. The evaluation team conducted interviews and focus groups among beneficiary groups, suppliers, and referral agents such as hospital discharge planners. The site visits produced a variety of interesting facts and perspectives. Referral agents, beneficiary groups, nondemonstration suppliers, and others early on voiced fears about threats to access from having fewer suppliers to patronize, from selecting out-of-county suppliers, and from the possible loss of suppliers who might add in certain items *gratis*

for indigent patients. In addition, they worried about the loss of "one-stop shopping," whereby a beneficiary might choose one supplier for all of their needs based on the price for needed services not covered by Medicare. Charges for noncovered services can vary, whereas covered services' prices are uniform under the statewide Medicare fee schedule. If a winning supplier charges more than a nondemonstration supplier for a noncovered item, a beneficiary would either have to incur higher charges than necessary or split his or her patronage among multiple suppliers.

Data-gathering during multiple site visits indicated that these fears generally were not realized, in part because referral agents worked harder than before in assisting beneficiaries to negotiate the new marketplace. In some cases they said they helped beneficiaries find multiple suppliers to save money. During the early transition period, when referral agents were pressed for time to familiarize themselves with new firms and make judgments about their performance, some felt frustration and disappointment about unexpected waiting times and low responsiveness, until they identified a winning supplier who met their standards. By the end of the demonstration, site visit evidence suggested referral agents and other stakeholders tended to see access as essentially unaffected by the demonstration.

The beneficiary surveys included questions bearing on several of these concerns. Responses did not indicate any systematic, large-scale changes that would indicate serious problems. Average initial delivery times remained unchanged, except for hospital bed users in San Antonio (see above). All four surveys suggested a possible trend to using more than one supplier but had low statistical reliability for this measure; the estimated prevalence of using multiple suppliers remained under 5 percent for oxygen users and close to 30 percent for medical equipment users. A question about the "time and energy it takes to get the medical equipment you need" produced a slight reduction in the probability of the most favorable response category in three of the four surveys, but no estimate of change was statistically significant. Three of the four surveys had answers suggesting that beneficiaries were more likely to have changed suppliers in the last 6 months but, again, these estimates were not statistically significant, and changing was unusual (5 to 10 percent switched under the demonstration). Beneficiaries sometimes noted reasons for changing that had nothing to do with supplier performance.

Supplier survey. The San Antonio supplier survey was administered once, in 2002. Asked about the timeliness of Medicare equipment delivery back in February 2001, 66 percent of nondemonstration suppliers in San Antonio said they believed Medicare equipment was delivered on time. When asked the same question about a period during the demonstration, only 26 percent of these suppliers thought equipment was delivered on time. No such dramatic change in responses occurred among either demonstration suppliers and suppliers in the comparison area; large, stable majorities assessed delivery as timely for both periods. Even though sample sizes were small for purposes of statistical confidence, the results suggested that supplier perceptions are influenced by market position. Taking that into consideration, these results seem broadly consistent with the beneficiary survey results pointing to little impact on timeliness.

Discussion

The survey data suggested little or no change in access overall. Where statistical evidence suggested real change, results were mixed, with probable mild repercussions. An apparent real reduction in the use rate of portable oxygen occurred in Polk County, but there was no evidence that access to portable oxygen was perceived as a problem. Polk surgical dressings users experienced faster response to service calls but less routine maintenance contacts. San Antonio medical equipment users achieved better phone accessibility to their suppliers. There was a tendency for more mail and home health agency delivery in Polk, and a small lengthening of initial delivery time for San Antonio hospital bed users. There was a weak suggestion in the data that routine maintenance visits declined somewhat for medical equipment users, but not oxygen users, where regular maintenance is clearly critical. Beneficiaries in both sites became less frequently involved in ordering their equipment.

Hypothetically, a change in delivery source might be associated with a decline in certain other indicators, particularly training received from the supplier upon delivery. However, for the variety of training indicators on the survey, generally this was not the case. Part of the explanation for a shift away from supplier delivery may be that mail delivery for supplies such as surgical dressings and urological items found increasing use as a cost-saving measure. The shift in ordering party may indicate that beneficiaries sought help or were offered help more often than before in adapting to the DMEPOS market, which changed under the demonstration. Medicare's pre-demonstration publicity efforts could have contributed by preparing referral agents, particularly home health agencies, and motivating them to assist both oxygen users in Polk County.

Considering the stakeholder perspectives gathered during site visits, it seems likely that competitive bidding complicated the activities of referral agents, such as discharge planners and physician offices, on behalf of beneficiaries. Competitive bidding may carry some unavoidable costs, such as a heavier workload for referral agents, more comparison shopping for beneficiaries, higher out of pocket payments on noncovered items, more paperwork if multiple suppliers are used, and some discomfort and occasional disruption in adapting to a modified list of approved suppliers after each bidding round.

As noted in previous Reports to Congress, the mostly favorable access findings appeared related to several demonstration features. First, the design provided for multiple winners in each product category. Second, winner selection procedures explicitly considered bidders' capacity and service capabilities. Third, transition policies allowed beneficiary-supplier relationships to continue for appropriately selected categories of equipment.

Quality and product selection

The evaluation's three main sources of information on quality and product selection were the beneficiary surveys, site visits, and the San Antonio supplier survey. Global measures of beneficiaries' satisfaction with their supplier remained high under the demonstration, and detailed quality measures were similarly favorable and stable. Based on the supplier survey, products provided to beneficiaries changed little during the

demonstration. The site visits revealed issues surrounding urological supplies and wheelchair fitting and delivery, which are discussed further below.

Quality of oxygen services in Polk County and San Antonio

As with the measurement of access, numerous survey measures captured dimensions of quality, such as overall satisfaction, equipment reliability, and quality of training and service. In the oxygen surveys only four indicators exhibited statistically significant change. These four were balanced between favorable and unfavorable outcomes, and they did not come from a common dimension. Such a pattern suggests that quality remained essentially the same under the demonstration.

Consumer satisfaction. Both before and during the demonstration, a healthy majority of oxygen users in both sites (60-70 percent) gave their supplier the highest satisfaction rating on a scale of 0 to 10. More than 95 percent in both sites were willing to recommend their oxygen supplier to a friend, another measure that remained unchanged.

Quality of equipment. More than 90 percent of oxygen users in both sites rated their equipment "very reliable." About four in five respondents said they experienced no major problems with their equipment in the past 6 months. Similarly, about 20 percent in both sites reported equipment replaced due to malfunction in the past 6 months. None of these measures changed more than trivially in the overall sample, suggesting continued acceptable equipment quality. In Polk County's subsample of new users, the number of major equipment problems in the past 6 months probably declined substantially; the average number cited by respondents fell 75 percent ($p=.048$).

Quality of training. The survey measured training quality via a direct question asking for an evaluation of training, as well as other questions about the beneficiary's "comfort level" when using and maintaining their equipment. In Polk County, nearly 60 percent rated training quality as "excellent," while in San Antonio, nearly 50 percent assigned the same rating, with little or no change due to the demonstration in either site. The proportions saying they were "very comfortable" (the highest rating) controlling oxygen flow, using a humidifier, attaching regulators, and cleaning the system's filter ranged between 70 and 85 percent in Polk County, and between 35 and 80 percent in San Antonio. These measures hardly changed in either Polk County or San Antonio due to the demonstration. Patients using portable oxygen with an oxygen conserving device were asked about comfort level using that device. In both sites, regardless of the demonstration, approximately 70 percent reported being "very comfortable."

Quality of customer service. Asked about the tone of the beneficiary's contacts with the supplier in the past 6 months, upwards of 80 percent reported always being treated with "courtesy and respect" in both sites, regardless of the demonstration. In Polk County, 75 to 80 percent said the supplier "always" explained things understandably and "always" gave all the information or help needed during the past 6 months. The prevalence for this rating was lower, about 55 percent, in San Antonio, but in both sites little or no change was attributable to the demonstration. One subgroup, new oxygen users in Polk, reported a large improvement in having things explained understandably (+44 percentage points, $p=.002$).

The surveys asked about problem resolution, namely, whether the beneficiary contacted the supplier with a problem or complaint in the past 6 months, and whether this was satisfactorily resolved. This complaint rate was stable at about one-quarter in Polk, while there was indication it might have risen somewhat in San Antonio (from 19 to 25 percent, p=.088). In both sites approximately 95 percent reported satisfactory resolution, which was unaffected by the demonstration.

The surveys also asked about any after-hours calls to the supplier in the past 6 months, and whether these contacts produced the help the caller sought. After-hours calling was reported by less than 20 percent in both sites. Of these respondents, at least 7 in 10 said the supplier was always thorough, with somewhat fewer making this assessment under the demonstration (-6 percentage points in Polk County and –9 percentage points in San Antonio). Neither change was statistically significant.

Five questions about receiving help from the supplier with insurance when getting started on oxygen service suggested mixed favorable and unfavorable outcomes under competitive bidding, but with few exceptions (e.g., in San Antonio, a nearly doubling of reports of "no help" [+6 percentage points, p=.016], and a halving of reports of being told how to get insurance information [-8 percentage points, p=.019]), these changes in customer service indicators were not large or statistically significant.

Quality of medical equipment services in Polk County and San Antonio

In the medical equipment surveys a handful of indicators changed significantly, with most of these suggesting a change for the better. Most such changes involved subgroups such as new users and hospital bed users. For medical equipment users in general, quality appears not to have changed as a result of the demonstration.

Consumer satisfaction. About 40 to 50 percent of demonstration medical equipment users in Polk County and San Antonio gave their medical equipment supplier the highest rating on a scale of 0 to 10, a level not significantly different from ratings in the absence of the demonstration. At least 9 in 10 said they would be willing to recommend the supplier to a friend. However, San Antonio's nebulizer drug users registered a 6 percent drop in willingness to recommend (p=.005) from a baseline estimate of near-unanimous willingness.

Quality of equipment. Overall, three-quarters of medical equipment users in both sites rated their equipment "very reliable," with one subgroup, surgical dressings users in Polk County, experiencing a significant increase in the reliability rating (+41 percentage points, p=.035). It was unusual in either site for respondents to indicate that they had to replace malfunctioning equipment, and impact estimates were statistically insignificant. The average number of major equipment problems in the past 6 months fell slightly, from .41 to .33, in Polk County, and increased from .33 to .52 in San Antonio, but neither change measure was statistically reliable.

Quality of training. Initial training was rated "excellent" by 30 percent of medical equipment users in both sites. As for "comfort level" in using equipment and in taking

care of it, about 70 percent of respondents in Polk County and in San Antonio said they were "very comfortable" in performing these activities, with ratings essentially unchanged under the demonstration.

Quality of customer service. In Polk County about three-quarters of respondents reported that in their recent contacts with suppliers they were "always" treated with courtesy and respect, while this rating was assigned by about half of San Antonio medical equipment users. In both cases, change attributable to the demonstration was trivial, except among the San Antonio subgroup of new nebulizer drug users, where the "always" response tripled to an estimated 85 percent (p=.009). About half or more in Polk County reported that the supplier "always" explained things understandably and "always" gave all the help needed during contacts in the past 6 months compared to about 30 percent in San Antonio reporting this frequency of good performance, but, again, little or no change was observed due to the demonstration.

The complaint rate "in the past six months" was about one-quarter in both Polk County and San Antonio, but in Texas this level represented a significant demonstration-related change—up nearly +9 percentage points (p=.033). One subgroup, San Antonio hospital bed users, experienced a doubling in the complaint rate under the demonstration, up from about 14 percent (p=.032). In Polk, impact estimates suggested a sizable increase in numbers reporting satisfactory resolution of complaints, but this was not statistically reliable (p=.133). In San Antonio, satisfactory resolution declined by 11 percentage points from 90 percent, but this change estimate was not statistically reliable, either.

After-hours calls to the supplier were unusual in both sites. Sizable positive change in reports of supplier thoroughness during such after-hours contacts was measured in Polk, while negative change was observed in San Antonio, but neither impact estimate was statistically significant, given the small base of respondents. New medical equipment users in San Antonio, however, registered a large and statistically significant improvement in reports of after-hours thoroughness.

Indicators of receipt of insurance help upon initial delivery were generally notably improved in both Polk and San Antonio but had low statistical reliability. An exception was hospital bed users; in Polk, they experienced a 10-percentage-point increase in the rate at which they received insurance information (p=.036) and in San Antonio, a 36-point increase in the rate at which the supplier offered to bill insurance (p=.035).

Nebulizer drug users in both the oxygen survey and medical equipment surveys in San Antonio were asked whether they experienced a delay in receiving their drugs because the supplier was out of stock. According to both surveys, there was a small improvement, but it was not statistically significant. In contrast, a question about medication error, which occurred rarely, suggested somewhat worsening performance, but the estimate also was not statistically significant.

Other quality-related information: site visits, supplier survey

During site visits to Polk County early in the demonstration, complaints surfaced about the quality of urological supplies amid admissions by some suppliers that they had bid

too low. If prices did not cover costs, suppliers had an incentive to offer inferior products or pursue other strategies that could limit product selection. When the team isolated urological users' survey results, they found no reliable indication of more quality problems. Beneficiaries may have responded to quality deterioration by switching to another supplier (perhaps at their own expense) or by obtaining a prescription for a specific product. Prices for urological supplies rose in Round 2, and a well-respected longtime supplier who carried a broad product line was among the winning bidders. A site visit source believed the situation improved in Round 2.

Findings from site visits in San Antonio suggested some wheelchair suppliers attempted to cut costs by providing fewer accessories and/or charging for accessories previously provided gratis, and perhaps by using less-qualified staff for fitting. Referral agents said they needed to be more detailed than before in specifying orders, and more vigilant in assuring specifications were met. Anecdotal evidence also revealed widely differing supplier approaches to obtaining a proper fitting. Although the survey revealed no change in quality measures for wheelchairs, this category in particular may need special monitoring and more explicit supplier standards in the future.

During site visits to Polk County, views on quality differed between demonstration suppliers and nondemonstration suppliers. Nondemonstration suppliers tended to be doubtful that quality could be maintained. In San Antonio, some demonstration suppliers expressed concern that their competitors would lower quality under price pressure, whereas others believed that in the bidding process Medicare had dropped lower-quality suppliers from the area.

Yet most referral agents once the demonstration was well under way did not believe systematic quality problems resulted from the demonstration. The role played by referral agents in screening suppliers on behalf of beneficiaries probably helped maintain quality during the demonstration. Referral agents described how they assessed their experience with each supplier to identify suppliers to recommend to beneficiaries routinely. In some cases they also adapted their documentation process to enable them to work more smoothly with certain suppliers. These reports bespeak an important position for referral agents in the competitive marketplace, especially considering that fewer approved suppliers result from competitive bidding.

The San Antonio supplier survey was the evaluation's main statistical source of information on possible changes in product selection. During early site visits to suppliers in Polk County, it was difficult to obtain from them detailed information needed to assess product selection. The survey strategy was to ask about the most typical brand offered to Medicare beneficiaries in a month before the demonstration began and in a corresponding month during the demonstration. Separately, the survey also asked the respondent to provide reasons for changing brands. Results have limited generalizability because relatively few suppliers responded, and a comparison-group analysis was not possible.

The results suggested that most suppliers did not change the brands they offered, with the possible exception of hospital bed suppliers. Five of 18 respondents began offering used mattresses instead of new mattresses. The array of brands offered before and after the

demonstration was fairly broad.[7] Respondents cited various reasons aside from "lower cost" for changing product selection (regardless of whether their data from a separate question indicated that their most common brand/model offering changed).

Discussion

The evaluation data on issues of quality and product selection suggested quality did not change appreciably. The beneficiary surveys provided the most reliable and systematic evidence on quality, and they reveal few quality issues. Key survey indicators of equipment reliability, complaints, and consumer satisfaction were stable or, in a few instances (surgical dressings users, new medical equipment users) they turned more favorable under the demonstration.

Anecdotal reports of possible quality problems with urological items in Polk County and with wheelchair service in San Antonio came to the team's attention during site visits. Evidence from the beneficiary survey did not suggest that problems were widespread or systematic. However, these cases provided lessons and guides for possible future action.

The situation with urological supplies was eventually self-correcting, in part because Round 2 prices rose[8] and new firms became demonstration suppliers. This experience illustrated that upward price adjustment may take place under competitive bidding, and that some product categories, especially smaller ones such as urological supplies, may be vulnerable to a lessening of product selection under reduced prices. Some urological supplies are associated with strong patient preferences, and therefore may be particularly vulnerable to supplier market strategies that narrow patient choice. Educational intervention among beneficiaries on their options, such as obtaining a specific prescription, is one approach that may help to limit the risk of disruption.

Wheelchair fitting and service appeared subject to widely differing supplier approaches, based on several referral agents interviewed during site visits. Along with reported instances of poor follow-through and other questionable practices, the wheelchair experience raises the question whether administrative attention to supplier standards on fitting and adjustment is needed. There were also anecdotal indications that certain quality problems became less severe when ordering documentation became more detailed. This could mean that documentation practices can be improved. Clearer, more detailed written specifications may impose more of a paperwork burden on referral agents, but there should be benefits in terms of accurately filling the order the first time and promoting accountability among suppliers.

Referral agents indicated that they learned to refer selectively as they gained experience with demonstration suppliers of varying quality and responsiveness. It is quite possible that this mode of operating existed before the demonstration but it likely was not compressed into a short time frame such as that forced by the demonstration transition.

[7] Section 4.7 in the Final Evaluation Report mentions brand names reported in the Supplier Survey.
[8] Previous literature on competitive bidding mentions the possibility that inexperienced bidders may bid too aggressively low at the outset. This may have happened in Polk County with urological supplies.

Nonetheless, the role of referral agents as market intermediaries is an interesting and important one. Referral agents may present an arena worthy of more administrative attention as Medicare seeks greater efficiency under the DMEPOS benefit.

Market competitiveness

Evidence for evaluating impacts on market competitiveness comes from four sources: bidder participation and selection data, particularly from the two rounds of bidding conducted in Polk County, claims analysis of changes in Medicare market shares, site visit informants, and the San Antonio supplier survey.

For the Final Evaluation Report, the evaluation team undertook extensive claims analysis to track market share changes between demonstration and nondemonstration suppliers, to measure market concentration, and to trace individual market shares of participating firms. The analyses suggested that during the 3-year period of the project, the DMEPOS markets for the demonstration product lines tended to stay close to their former concentration levels, even while demonstration suppliers as a group gained market share. Several other pieces of evidence pointed to good signs for competitiveness. For example, most product categories attracted numerous bidders, firms that submitted bids had a good chance of being selected, and although suppliers have a strong tendency to dislike competitive bidding, there was still some opinion among them that the demonstration-related markets remained competitive.

Polk County bidding results

In Round 1, the 30 bidders included firms with both small and large market shares. Both rounds of bidding produced relatively little change in the mix of small- and large-share firms serving the demonstration area. In the second round of bidding in Polk County, bidders numbered 26—not many fewer than in the first round, despite the reduction in product categories from 5 to 4. There were 22 bidders for oxygen, 19 for hospital beds, 7 for urological supplies, and 4 for surgical dressings. Entry into and exit from the market were demonstrated in the second round: half of the round two demonstration suppliers had demonstration status in round one, but half did not. The new winners did not represent a disproportionate number of nonlocal suppliers, relative to the group of winners from the first round of bidding. Two of the new winners had lost the competition in the first round, a possible indication that they learned how to be successful from their earlier experience. Two product categories experienced declines in bidders—urological supplies and surgical dressings.

San Antonio bidding results

In San Antonio, the bidding competition attracted a large number of bidders. In all, 79 suppliers submitted a total of 169 bids across the 5 product categories in the bidding competition held in 2000. Oxygen, hospital beds, and wheelchairs each generated more than 40 bids, and nebulizer drugs drew 33 bids. There were only 14 bids for general orthotics, the category with the lowest total allowed charges. A total of 51 firms won supplier status. There were 32, 24, 23, 8, and 11 winners in the oxygen, hospital bed,

wheelchair, orthotics, and nebulizer drug categories, respectively. (A firm could win in more than one category.)

Market competition analysis in Polk County and San Antonio

The evaluation team analyzed changes in market share in each product category for demonstration suppliers as a group vs. the remaining nondemonstration suppliers. They also analyzed an index of market concentration for each product category.

The market share analysis showed gains in market share for winners tended to occur over time, especially for categories under transition policies that grandfathered beneficiary supplier relationships--oxygen, hospital beds, wheelchairs, and nebulizer drugs. Their market share increased as new users entered the market, while the market share of nondemonstration firms eventually fell, but not to zero, because of continuing long-term patronage by grandfathered beneficiaries. For urological supplies, shares of nondemonstration suppliers fell, but not to zero, due to the grandfathering of relationships with nursing home residents (provided that the supplier accepted the competitively bid fees), and due to a hold-harmless policy that allowed a two-month grace period if the beneficiary patronized a nondemonstration supplier in error. Program policy for enteral nutrition allowed nursing homes to honor contracts with nondemonstration suppliers. Most enteral nutrition is supplied to nursing home residents, resulting in a small reduction of market share for nondemonstration suppliers. For surgical dressings market share for nondemonstration suppliers actually increased due to a combination of factors related to the project's transition policies for nursing home residents and a reduction in total volume owing to changes in home health payment policy external to the competitive bidding demonstration.[9] Nondemonstration suppliers of orthotics saw their market share drop modestly, in part because of grandfathered nursing home relationships.

The evaluation team used a technical index of market concentration in its assessment of the demonstration's impact on market competitiveness. This index is constructed from the market shares of the firms serving a market. The measure is normally applied to well-defined markets characterized from detailed economic information. In this analysis, for convenience the Polk County and San Antonio supplier shares were assumed to define the entire market for each product category, without conducting a market definition study.

The results suggested that the demonstration had relatively little effect on concentration, except for surgical dressings. Although observers might have expected concentration to grow if the number of suppliers declines, this wasn't necessarily the case. For example, if a supplier with a large market share does not win demonstration status, the concentration index can even decline, as smaller suppliers come to characterize the market. Furthermore, the analysis took into account trends in comparison counties, and in some product categories underlying concentration was trending upward. Surgical dressings had an unusually small number of suppliers, and this category was highly concentrated in Polk County before the demonstration. A change in supplier

[9] Fee-for-service reimbursements to suppliers of surgical dressings dropped, probably because the home health prospective payment system bundled these supplies into the agency's lump-sum payment.

configuration created a large increase in the concentration measure in Round 1 and a large decrease in Round 2.

Analysis of individual firm shares over time showed, as expected, that winning suppliers generally gained market share, while losing suppliers did not. Some winning suppliers were particularly successful in adding to their market share, including some small suppliers. However, a higher market share did not materialize for every winning bidder.

Other competition-related information: site visits, supplier surveys

Site visit results. Two demonstration firms in Polk County that filed for bankruptcy during Round 1 won demonstration status again in Round 2. These bankruptcies, and another affecting a nondemonstration firm, were not related to the demonstration.

During site visit discussions in San Antonio, suppliers revealed mixed opinions about how continued competitive bidding might eventually affect market competitiveness. With varying reliance on Medicare revenues, not all suppliers felt their survival was threatened by Medicare bidding.

Supplier survey responses. Business and financial data collected informally from a small sample of Polk County suppliers suggested that some of the demonstration suppliers experienced higher volume. Of these, some also reported increased revenues, notwithstanding the price reductions brought by competitive bidding. The sample, however, was not necessarily representative. These same winning suppliers tended to perceive the Polk County market as being more competitive as a result of the demonstration.

Measures of financial health from the San Antonio supplier survey suggested that, as expected, overall revenues declined due to the reduced prices. Also as expected, demonstration suppliers were less likely to have reduced revenues and lower net income under the demonstration than nondemonstration suppliers. Suppliers' perceptions of changes in market competitiveness in the period coinciding with the first year of the demonstration depended on their demonstration status. Demonstration suppliers were nearly twice as likely as nondemonstration suppliers to rate the market as equally or more competitive. However, they were noticeably less likely than the Austin comparison-area suppliers to assign this rating.

Discussion

The demonstration tested competitive bidding over a relatively short time period, 3 years. Thus, analysis of long-term effects on market competition is beyond the scope of the evaluation. Yet several observations, site visits, and analytic results from the evaluation team provide signs that declining competitiveness is not a necessary consequence of competitive bidding.

Theory suggests that competition is easier to maintain in markets with low barriers to entry into the business. Low barriers to entry characterize DMEPOS supplier markets, in

part because these businesses are not capital-intensive, and without heavy regulatory requirements. The bidding design featuring multiple winners potentially adds further protection against shrinkage of market competitiveness. In fact, the analysis of market concentration showed little impact of the demonstration on the concentration index, probably due to the multiple winner design. Also, a multiple-winner design can motivate more competition at the bidding stage, by increasing the probability of achieving winner status. Selecting multiple winners could motivate continued competition in later bidding rounds simply by sustaining more firms in the market.[10] As noted earlier, the availability of multiple winners allowed referral agents to choose among suppliers on the basis of quality and service, fostering competition during the marketing stage.

Analysis of market shares for demonstration suppliers and nondemonstration suppliers suggested that under the demonstration design permitting grandfathering of certain beneficiary-supplier relationships, demonstration suppliers as a group enlarged their market share, but not to 100 percent. Most nondemonstration firms continued to serve existing patients, and in Polk County some losing bidders returned to the second round of competition and gained demonstration status. Considering that firms can rely on Medicare revenues to varying degrees, these results and experiences do not necessarily imply that firms should feel threatened by competitive bidding for Medicare DMEPOS.

Firm-level market share analysis found increased market share was not guaranteed for every winning supplier. This may be explained by site visit data indicating that certain suppliers did not make marketing efforts, that out-of-area suppliers were avoided by many beneficiaries, and that referral agents were selective in guiding beneficiaries to suppliers they perceived as better performers.

In Polk County, the reduction in Round 2 bidders for urological supplies raised the possibility that small profit margins deterred bidding by more urologicals suppliers in Round 2; low profit margins were reported by some suppliers to be a problem, according to early site visit information. But it is worth noting that this category had relatively low total allowed charges at stake in the bidding competitions, with comparatively few bidders and similarly small numbers of suppliers before the demonstration started. Unless designs to bolster participation can be developed, such small-volume DMEPOS categories may represent lower-priority areas for conducting competitive bidding, not only in terms of the limited savings potential on a small dollar base but also in terms of a category's competitive potential.

Administrative feasibility of the reimbursement system

The evaluation of administrative feasibility addressed the ease of implementing the process of competitive bidding and of administering the post-bidding phases, including the transition to approved suppliers, new reimbursement procedures, and site monitoring. The evaluation team also considered the net savings from the competitive bidding project after accounting for estimated administrative costs. They further estimated costs under a national program using the same administrative structure used in the demonstration.

[10] Jeffrey S. McCombs and Jon B. Christianson, "Applying Competitive Bidding to Health Care," J*ournal of Health Politics, Policy and Law* 12:4, Winter 1987, 703-722.

Estimates suggested favorable returns from competitive bidding--especially favorable under an extension to additional competitive bidding areas. Extrapolating administrative costs to a national program and assuming conservative savings, the team illustrated that investing in a national program might bring savings twice as large as outlays.

Implementation and operations

The CMS essentially replicated the same competitive bidding model in both Polk County and San Antonio. Substantial early efforts to educate beneficiaries, referral agents, and suppliers about the demonstration helped to ease the transition to the competitively bid fees and approved suppliers list. As noted earlier, transition policies also helped stakeholders adjust.

By the second competition (San Antonio), CMS gained experience in bid evaluation sufficient to allow some streamlining of bid processing. Experience also informed the weighting formula for summarizing bid prices into a summary bid, which likely produced some anomalous fees before it was changed.

The ombudsman was well accepted. The ombudsman conducted in-person information sessions about the demonstration, responded to inquiries about the demonstration from all stakeholders, coordinated bid evaluation site visits to suppliers, and generally served as Medicare's "eyes and ears" on-site. The ombudsman also monitored supplier performance by investigating complaints and conducting routine inspections.

PGBA encountered few problems in automated processing of claims for the demonstration areas. Because several ZIP Codes in Texas crossed into nondemonstration counties, claims from these areas had to be pulled from the claims stream and manually processed, but this affected relatively few claims.

A delay in issuing the San Antonio directory of approved suppliers appeared to cause avoidable difficulties in making DMEPOS arrangements for some beneficiaries early in the transition. In both sites, informants recommended earlier release of the directory. This underscores the importance of allowing sufficient time for site stakeholders to prepare for each changeover to new approved suppliers.

Demonstration savings net of costs

Costs of administering the demonstration were estimated to be $4.8 million (in Year 2000 dollars). These costs covered research and development activities begun in 1995, subsequent public and supplier education, bidding and bid evaluation, modifications to claims processing, and ongoing site monitoring until project termination in December 2002. Total estimated savings in the two demonstration sites since October 1999, when the first competitive bid fees became effective in Polk County, through termination in each site, were $9.4 million, of which $7.5 million are Medicare savings and $1.9 million are beneficiary savings. This implies net savings to the Medicare program of $2.7 million.

Spreading the large fixed-cost component of the project over additional sites would likely increase the return substantially. For example, the cost of adding the San Antonio site was $310,000 in the first full year, during which bidding was conducted. When bidding was not conducted, the annual costs were about $100,000. Over 3 years (2000 to 2002) the San Antonio site cost $510,000 to run, versus estimated savings of approximately $4.6 million. The actual net savings from adding more sites would depend on factors such as the size and competitiveness of the market in the additional sites, and the particulars of bidding design and administration.

Estimated costs of a national program

The evaluation team extrapolated the costs of the demonstration program to estimate potential costs of a national competitive bidding program. They assumed that competitions would be conducted in all 261 MSAs and that CMS would follow the basic design of the demonstration (including a 2-year bidding cycle). These estimates were not precise, but were developed as illustration. About 669 full-time equivalent personnel would be needed (10 at CMS and 659 at durable medical equipment regional carriers), and total annual costs on this basis were estimated at $68.9 million. This result is not a forecast of expenses under the competitive bidding program legislated in section 302 of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (Public Law 108-173). Under that program, Medicare competitive bidding is to be phased in among 10 large MSAs by 2007, 80 MSAs by 2009, and additional areas thereafter. The Secretary has authority to select items to be phased into the program, based on volume, price, and savings potential.

Discussion

Medicare was able to test operational feasibility of DMEPOS competitive bidding in two sites under the demonstration. No major difficulties surfaced during various phases, from site preparation to claims processing and monitoring.

The directory of winning suppliers was a critical document from the point of view of discharge planners and others who needed to quickly arrange DMEPOS for patients during the transition to the fee schedule and list of approved suppliers. Timeliness of the directory is therefore an important issue. In any future initiatives, Internet applications should be helpful in issuing and updating the directory virtually instantaneously.

The evaluation team's analysis of San Antonio costs and savings suggested that the returns to an extension of competitive bidding to further sites can grow substantially, due to economies of scale. The national program illustrative cost estimate of $68.9 million compares favorably to a conservative assumption on savings, say, if only oxygen were put up for bidding and savings were 10 percent instead of nearly 20 percent. Oxygen allowed charges in the year 2000 were $1.77 billion. If Medicare savings were $141.6 billion under competitive bidding (80 percent of $177 million in saved allowed charges), the savings would be twice the estimated program costs.

Recommendations on products' suitability for bidding

Considering the evidence from several criteria developed by the evaluation, the evaluation team considered the implications for product selection under a national program of competitive bidding. The criteria included allowed charges and potential savings, number of suppliers, problems reported during the demonstration, and the possible impact on prices of exclusions such as enteral nutrition in nursing homes.

The evaluators judged that several products were "well suited" (oxygen equipment and supplies, hospital beds and accessories, and nebulizer drugs), another product category was "potentially well suited" (wheelchairs), and several were "not as well suited" for competitive bidding (surgical dressings, general orthotics, urological supplies, and enteral nutrition). The categories viewed as "not as well suited" tended to have relatively low allowed charges and low numbers of suppliers. Both characteristics may not indicate sufficient potential for total savings and competition that would lead to significant price reductions. In contrast, the "well suited" categories had high allowed charges and relatively many suppliers. Wheelchairs had high allowed charges but there was evidence of quality problems in this category.

The Final Evaluation Report provides more detailed discussion of these issues. The discussion therein sets forth sound principles for evaluating future competitive bidding markets. However, the team's judgments on particular product categories should not be taken as definitive for guiding future bidding initiatives. Market analysis of individual competitive bidding areas could reveal that total savings and potential for competition are likely for some of the categories judged "not as well suited" for bidding based on the demonstration experience.

Conclusion

The broad variety of data used to evaluate the DMEPOS competitive bidding demonstration suggested that the tests in Polk County and San Antonio largely met Medicare's objectives in terms of program savings; maintaining access, quality, and product selection; preserving competition in DMEPOS markets; and administrative feasibility. Savings estimates were about one-fifth relative to payments under the statutory fee schedule, and they compared favorably to costs of running the program. In general, access and quality changed little, and market competitiveness appeared stable. The CMS demonstrated a workable competitive bidding design and feasible operating procedures and policies.

This does not assume that some suppliers' behavior remained completely the same. It is logical to think that cost-saving measures will be pursued when prices fall. Policymakers are interested in whether any behavioral changes to reduce costs were counterproductive for beneficiaries and the Medicare program, or whether they represented efficiency improvements. Further, they are interested in whether any new value was added to the services (some of which may be cost-increasing). The evaluation revealed examples of value added to beneficiaries' services: improved product reliability; easier telephone

access to suppliers; more attention to insurance procedures at the start of the beneficiary/supplier relationship; and higher frequency of portable oxygen refills.

Given the controversy surrounding Medicare competitive bidding, cost-saving behaviors attract more attention. The evaluation study provided possible examples of these, too. Examples affecting subgroups of beneficiaries included more provision of used vs. new mattresses to hospital bed users; more use of mail delivery and less use of home delivery; possibly, separate billing for wheelchair accessories previously informally bundled into the wheelchair fee; fewer excess supplies; fewer maintenance visits; more use of oxygen conserving devices on portable oxygen equipment; and less provision of portable oxygen. Some examples may be seen as a benefit by beneficiaries (e.g., oxygen-conserving devices simplifying logistics of travel outside the home). The shifts do not appear harmful or pervasive enough to be a concern, and some observers may consider specific changes justifiable from an efficiency standpoint.

A risk of lower access to portable oxygen is probably the foremost concern raised by the evaluation results. Equally, the evidence on portable oxygen highlights the problem of how the Medicare program can achieve an appropriate and efficient allocation of portable oxygen to beneficiaries who need it and will use it, under either competitive bidding or current payment methods. Policy tools such as stakeholder education, improvements in data, and revisions to payment procedures may all have a role to play in meeting this challenge.