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House Calls for Seniors: Building and Sustaining a Model of Care for Homebound Seniors

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Abstract

Homebound seniors suffer from high levels of functional impairment and are high-cost users of acute medical services. This article describes a 7-year experience in building and sustaining a physician home visit program. The House Calls for Seniors program was established in 1999. The team includes a geriatrician, geriatrics nurse practitioner, and social worker. The program hosts trainees from multiple disciplines. The team provides care to 245 patients annually. In 2006, the healthcare system (62%), provider billing (36%), and philanthropy (2%) financed the annual program budget of \$355,390. Over 7 years, the team has enrolled 468 older adults; the mean age was 80, 78% were women, and 64% were African American. One-third lived alone, and 39% were receiving Medicaid. Reflecting the disability of this cohort, 98% had impairment in at least one instrumental activity of daily living (mean 5.2), 71% had impairment in at least one activity of daily living (mean 2.6), 53% had a Mini-Mental State Examination score of 23 or less, 43% were receiving services from a home care agency, and 69% had at least one new geriatric syndrome diagnosed by the program. In the year after intake into the program, patients had an average of nine home visits; 21% were hospitalized, and 59% were seen in the emergency department. Consistent with the program goals, primary care, specialty care, and emergency department visits declined in the year after enrollment, whereas access and quality-of-care targets improved. An academic physician house calls program in partnership with a healthcare system can improve access to care for homebound frail older adults, improve quality of care and patient satisfaction, and provide a positive learning experience for trainees.

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Keywords

home visits; house calls; physicians

There are at least 1 million individuals aged 65 and older who are permanently homebound.¹ Millions more are homebound with temporary illness or injury.¹ Many of these older adults rely on home visits from physicians to provide for their healthcare needs. From 1999 to 2004, the number of reimbursable home visits increased from approximately 1.5 million to 2.07 million.² In 2005, the number of home visits reached a plateau, at least in part because of changes in reimbursement.³

Homebound patients tend to be the frailest of the frail, with high levels of functional impairment. These patients are typically nursing home eligible but are at higher risk for inadequate care because of continued residence in the community. Prior research has documented a high disease burden, including dementia, urinary incontinence, falls, diabetes mellitus, depression, stroke, coronary artery disease, cancer, and congestive heart failure.⁴ Older adults with five or more chronic conditions account for two-thirds of Medicare expenditures.⁵ Because homebound patients are similar to nursing home patients with regard to chronic disease burden, they require a similar number of provider visits (9–12 visits per year) to provide quality health care. Given that the current population of 1 million homebound elderly people receives only 2.1 million provider visits per year, the need for more providers performing house calls is clear. It is estimated that, by 2020, 2 million elderly people will be chronically homebound because of functional impairment.⁶

Few home visits programs have published data on their clinical experiences or their model of care. A 10-year experience with the Mount Sinai Visiting Doctors program was recently reported, and the lessons learned in establishing and nurturing the program were discussed.⁴ In a report on another program based in New York City, a 27-year experience in providing long-term care to homebound older adults is described.⁷ Both reports provide information on the structure and financing of these programs but less detail on the functional status and longitudinal healthcare utilization of the population served.

This article describes the development and growth of an academic program called House Calls for Seniors. The program represents a partnership between an urban tax-supported healthcare system, Wishard Health Services, in Indianapolis, Indiana, and the Indiana University Geriatrics Program. All patients enrolled in the program received a standardized in-home assessment, and all agreed to receive their medical care through Wishard Health Services. Thus, recent publications are built on by providing a detailed and systematic assessment of geriatric conditions and functional status, as well as a before-and-after study of health services use as monitored by a comprehensive electronic medical record. It was hypothesized that the House Calls for Seniors program would improve ambulatory care access and quality while reducing ambulatory visits to primary care and specialty clinics. It was also hypothesized that the program would reduce the overall hospitalization rate and reduce hospitalizations outside the targeted healthcare system.

Program Description

The House Calls for Seniors program was established in 1999 within the Senior Care at Wishard program. In addition to the House Calls program, the Senior Care program consists of an inpatient Acute Care for Elders (ACE) team; the outpatient Indiana University Center for Senior Health, which houses consultative and primary care geriatrics; a nursing home service; and Senior Connection, a community resource and referral program. Key program features are summarized in Table 1.

The House Calls for Seniors team consists of geriatricians, geriatrics nurse practitioners, social workers, a nurse, a patient service assistant, and a practice manager. The goal of the program is to provide medical care at home to frail elderly people who have great difficulty in accessing medical care because of physical or psychiatric disabilities. Patients must be aged 65 and older, live within Marion County, accept the House Calls providers as their primary providers, accept Wishard Hospital as their primary hospital, and be homebound according to the definition created by the team.

The geriatricians conduct the initial visit to develop a comprehensive medical care plan. During this initial visit, which can take up to 2 hours, a comprehensive review of the patient's medical history, medications, activities of daily living (ADLs), and instrumental activities of daily living (IADLs) is done. A comprehensive examination is performed that includes a Folstein Mini-Mental State Examination (MMSE) and the 15-point Geriatric Depression Scale. A home safety evaluation is done and a caregiver stress evaluation if a caregiver is present. The geriatricians visit patients in their home approximately every 3 to 4 months thereafter. Routine follow-up visits are usually no longer than 45 minutes.

The nurse practitioners perform almost all urgent visits and visit patients approximately every 4 to 6 weeks between physician visits. Thus, in the first year after intake, patients see a provider nine times on average. Patients discharged from the hospital are seen within 1 to 2 days. The Indiana University geriatricians share after-hour telephone calls with the help of a nursing telephone service operated by Wishard Hospital. During office hours, there is a rotating schedule for call backup for the triage nurse. Patients who contact the program with an urgent need are usually seen within 48 hours.

The social workers see new patients within 2 weeks of the initial visit and develop a comprehensive social needs plan that includes a complete social history, insurance and pharmacy information, caregiver and family details, financial review, durable medical equipment review, community resource information, advance directive discussion, and a detailed psychosocial history. Thereafter, the social worker will see or telephone patients as needed, but no patient goes longer than a year without at least one home visit. The social workers are also responsible for annual reviews. Every 12 months, annual reviews include functional, cognitive, and emotional assessments, and all financial and insurance information is updated.

A patient service assistant and the social workers, nurse practitioners, and geriatricians attend a weekly patient care meeting. Patients seen in the previous week are discussed, as well as any new problems or concerns that have arisen. In a typical team meeting, lasting 90

minutes, up to 30 patients can be discussed. The team meeting is considered critical to the coordination of care and success of the House Calls program.

At the start of the program, meetings were held with local home care agencies to explain the program, its goals, and admission criteria. Because the House Calls program currently uses up to 25 different home care agencies, creating and nurturing these relationships was key to the success of the program. The social workers in the House Calls program described the program in detail to each community resource agency. Marketing materials were also sent to the internal medicine physicians in Indiana University Medical Group-Primary Care explaining the program and how to refer patients. Most patient referrals are from these primary care physicians (44%).

Providers can see up to four established patients in a 4-hour session. A new patient visit is equivalent in time requirements to two established patient visits. A physician working in collaboration with a nurse practitioner can follow approximately 57 patients per 0.10 full-time equivalent (FTE) or half-day session. The nurse practitioner can follow approximately 19 patients per 0.10 FTE or half-day session. Since 1999, the program has enrolled 468 patients. The program steady-state capacity currently is approximately 170 patients. Because approximately 75 to 85 new patients are admitted yearly as patients leave the program, a total of 245 patients are cared for annually. In 2006, 1,505 provider visits were completed. In this same year, the social workers performed 227 face-to-face visits and had 3,048 telephone contacts. Eighty-five new patients were admitted into the program, with 16% being new to the healthcare system (defined as a patient who has not received primary care at Wishard Health Services for at least 3 years).

The current clinical FTE time allocation is as follows: 0.30 geriatrician (split between 2 physicians, each with a Certificate of Added Qualifications in Geriatrics), 0.90 nurse practitioner, 1.3 social worker, and 0.50 licensed practice nurse. Administrative FTE includes 1.3 patient service assistant, 0.10 staff manager, and 0.05 practice manager. The medical director has an additional 0.05 FTE to manage the program. Both the physicians in the program have an additional 0.05 FTE for team time and teaching fellows. The nurse practitioner has a 0.10 FTE for case management and team time. The program is working at capacity and often will have up to 50 patients on the waiting list to enter.

The program uses a mobile X-ray company for X-rays in the home and has a portable electrocardiogram machine. Also available are Holter monitoring services and overnight oximetry in the home. The providers carry phlebotomy equipment, specimen containers, wound care supplies, urine catheters, a pulse oximeter, digital thermometer, sphygmomanometer, otoscope, ophthalmoscope, sharps container, nail clippers, cerumen spoons, pocket talker, Snellen card, reflex hammer, tuning fork, and rescue mask in their bags. Shadow paper charts are taken out on visits that include up-to-date medication lists, past encounter forms, communication with other healthcare providers, advance directive information, and maps. Visit data are entered into the Wishard Health Services electronic medical record on returning from the home visit.

The providers, with the social workers, orchestrate home care agency and hospice services as well as referrals to specialists and the need for durable medical supplies. House Calls has partnered with psychiatry for in-home psychiatric services. These services may include medication delivery and support for medication self-management and counseling. House Calls also has a close working relationship with several local podiatrists who perform home visits.

RESULTS

Patient Characteristics

Table 2 compares the characteristics of 468 patients enrolled in the program from 1999 to 2007 with those of other cohorts of patients reported in the literature. The cohorts are similar with regard to sociodemographic characteristics and rates of geriatric syndromes. Table 3 shows additional baseline characteristics for the patients enrolled in House Calls for Seniors. No direct comparison data were found in the literature for these clinical characteristics. As demonstrated in Table 3, the program cares for a large percentage of poor urban older adults with multiple social, medical, and psychiatric stressors. Nearly one in three of these vulnerable older adults lives alone. Reflecting the disability of this cohort, 98% had one or more IADL impairments (mean 5.2), 73% had one or more ADL impairments (mean 2.6), 53% had a MMSE score of 23 or less (mean 21.3), and 10% had a Geriatric Depression Scale score of 10 or greater (mean 4.6). Of patients with an MMSE score of 23 or less, 41% were living alone. Approximately 10% of patients enrolled in the program from 1999 to 2007 have been referred to hospice.

The average length of stay in the program is 2.5 years, with most patients leaving the program because of death or nursing home placement. In 2006, 48 patients left the program, with 19% (n = 9) going into a skilled nursing facility and 73% (n = 35) dying. Since 1999, 225 of 468 patients cared for by House Calls for Seniors have died. One in four patients dies within the first year of enrollment, and the mean survival time is 3.2 years.

Quality

The program has demonstrated improved quality across multiple domains, including preventive health services, recognition of geriatric syndromes, and patient satisfaction. House Calls for Seniors started a formal quality improvement program in approximately 2006. During the 2007/08 influenza season, of the 179 patients in the program at the time, 94% were offered the influenza vaccine; 23% (41) of those refused, and 72% (128) accepted. These rates compared favorably with the national rate of 46.5% for Medicare beneficiaries^{9,10} and 67% within the local healthcare system, where providers received computer-based reminders to encourage vaccination.^{10,11} The rate of pneumococcal vaccination in July 2008 was 82%, compared nationally with a rate of 8% in Medicare beneficiaries^{9,10} and 15% locally.¹¹

The rate of having at least one end-of-life discussion pertaining to advance directives and goals of care and documenting in the electronic medical record was 58% in July 2008. This improved from 38% when the measure was started in 2006. The rate of documentation of a

healthcare representative in the medical record was 41% in July 2008, compared with a rate of 17% locally. The rate of assessing for falls annually was 97% in July 2008, compared with 60% when the measure was started in 2006. Before being admitted to the House Calls program, many patients have not had regular, coordinated primary health care because of poor access. After assessment by the House Calls for Seniors team, 69% of patients had at least one new geriatric syndrome diagnosed; difficulty with walking was newly diagnosed 29% of the time, cognitive impairment 25% of the time, and depression 13.7% of the time.

Independent surveyors conduct quarterly patient satisfaction telephone surveys. Patients are asked a series of questions about the visit with their provider and access to the House Calls team. The questions are graded on a 5-point scale (1 = poor to 5 = excellent). Mean scores for visit and access have been consistently above 4.

Education—Internal medicine residents rotating through the required month-long geriatrics rotation spend half a day accompanying one of the House Calls physicians on home visits. They also are required to choose one of their own clinic patients to visit at home. This patient should be someone about whom they have a question that cannot be solved through routine clinic appointments (e.g., medications in disarray, falling, decline in health or function). A geriatrics fellow goes with them to guide them through this visit. The residents then present their patient to the medical director of House Calls at the end of the month. This home visit experience is consistently rated as the best part of the geriatrics rotation, because the residents almost always learn something new about their patient that can result in better healthcare delivery. Over the past 5 years, the average score for the House Calls venue experience as graded by 187 trainees is 4.1 on a 5-point scale (1 = poor to 5 = excellent).

Geriatrics fellows are assigned eight to 10 patients to follow longitudinally through their first year of fellowship. Fellows have half a day per week to see patients and present those patients to their House Calls attending. They also take internal medicine residents on home visits as described above and medical students. The medical student initiative was started through funding from the John A. Hartford Foundation to expose medical students to geriatrics earlier in their training. The geriatrics fellow and a third-year medical student visit an established patient in House Calls for a social visit. The purpose is to allow the medical student to see firsthand what community resources are needed to keep a frail, older adult in the community in a positive way.

Healthcare Utilization—To describe the effect of the House Calls for Seniors program on healthcare utilization and costs, a before-and-after study was completed using data routinely collected and stored in the Wishard Health Services electronic medical record system.¹² In addition, through an innovative regional health information exchange, all emergency department and inpatient utilization for these seniors at any of the five regional healthcare systems in metropolitan Indianapolis was also obtained.¹³ Table 4 shows healthcare utilization and cost for this cohort in the year immediately before and the year after intake into the program. These data show a fundamental shift in the site and volume of care consistent with the goals of the House Calls for Senior Program. In the year after enrollment, emergency department, primary care, and specialty care visits decreased while services

provided in the home and the total number of visits increased. In addition, fragmentation of care is decreased in the year after enrollment in that fewer emergency department visits and hospitalizations take place outside of the Wishard Health System. Consistent with improved access, mean total charges in the year after enrollment increased by \$5,721, but \$5,430 (95%) of these charges were for outpatient services. In the year after intake into the program, patients had an average of nine home visits; 21% were hospitalized, and 59% were seen in the emergency department. The mean number of days until the first hospitalization after enrollment was 119.

Program Costs—Table 5 shows the annual budget for 2006. In 2006, the House Calls for Seniors program generated \$120,604 in revenue from professional billing. Other income included \$8,224 from Health Professional Shortage Area dollars and \$7,722 from philanthropic support. Total revenue for the year was \$136,550. Therefore, the program generated income to meet 38% of total costs. Wishard Hospital provides support to the extent that the direct costs exceed the revenues. The cost per patient per year in the program is approximately \$1,480. Wishard Hospital provides office space, utilities, and medical supplies, which are not included in these costs.

DISCUSSION

Homebound seniors suffer from high levels of functional and cognitive impairment and are high-cost users of acute medical services. They have multiple medical and geriatric conditions that require close and comprehensive care management to ensure adequate health care. With a team approach to care and collaboration with community agencies, the healthcare needs of homebound seniors can be met in the home. The data reported here represent one of the first systematic descriptions of the clinical and functional characteristics and healthcare utilization of a cohort of homebound seniors receiving physician house calls. These patients suffer from multiple comorbid conditions and geriatric syndromes, such as dementia and depression, many of which have gone undiagnosed into later age. The majority of patients cared for in this program live in their own homes and suffer from functional impairment similar to that found in a nursing home population. The Kaiser Commission on Medicaid and the Uninsured found that 86% of long-term care patients in the nursing home setting had dependency in two or more ADLs, compared with 54% in the current study's homebound cohort.¹⁴ Nearly all of these homebound patients also had dependency in at least one IADL, and 41% of patients with evidence of cognitive impairment (MMSE score < 23) were living alone.

Primary care physicians who recognize that patients are experiencing increasing difficulty in traveling to ambulatory care sites for health care generate most referrals into the program. This fundamental barrier to access results in fragmented, uncoordinated care that can be detrimental to these frail, vulnerable older adults and result in high-cost acute care. The House Calls for Seniors program is designed to improve access to care in a coordinated manner. The home-based care allows these patients regular and coordinated access to an interdisciplinary geriatrics team. Access to home-based mental health services and treatment also improves patient satisfaction with the healthcare system. The before-and-after data clearly demonstrate improved access to ambulatory care, with a clear reduction in clinic-

based visits, an increase in home visits, and an overall increase in provider visits to these frail patients. Indeed, the average number of contacts in the year after enrollment more closely approximate those expected for patients served in a nursing home setting. In addition, the program tends to shift acute care to the targeted healthcare system.

A key limitation of our findings, and in the literature on house calls in general, is the lack of a methodologically rigorous control group with which to compare the reported findings. A randomized controlled trial would provide more-conclusive evidence regarding the effect of house calls on patient outcomes and costs. Lacking randomized controls, before-and-after comparison data are presented in the present report. These findings can also be compared with those reported in the literature for patient groups with some similarities to this house calls cohort. For example, the most recent report for utilization outcomes for patients receiving home healthcare services revealed an annual hospitalization rate of 29% across all states and a rate of 30% for Indiana.¹⁵ Although not all the House Calls for Seniors patients have home healthcare services on admission (42.8%), the site of care is similar, and many patients who initially do not have services are referred once admitted to the program. The House Calls for Seniors annual hospitalization (21%) compares favorably with these figures.

Successfully sustaining a physician home visit program in an academic setting located in an urban public health system requires in-depth knowledge of the financial resources available. With this knowledge and understanding of the needs of the academic and clinical arenas surrounding the program and making the right arguments to those stakeholders, a house call program can flourish. Because the healthcare system is primarily concerned with improving access and quality of care for homebound seniors while controlling costs, the House Calls for Seniors program can demonstrate downstream revenues to offset program costs in this low-resource environment. These downstream revenues are primarily captured through hospitalizations that might have occurred at other hospitals and increased ambulatory care services.

Although it is recognized that, in the first year of admission into the program, overall expenses per patient increased, further study of costs will need to be made of subsequent years in the program to determine whether cost savings are achieved over time and to whom these cost savings accrue. Because of the level of frailty and the inevitable physical deterioration of these patients, many would have been admitted to a nursing home for long-term placement rather than staying in the community without the assistance of the program. A delay in nursing home placement would result in cost savings from a societal perspective. Also, even though greater access may have led to higher costs, these short-term costs ultimately may be lower than the costs of continued fragmented care over the longer term.

The House Calls for Seniors program also has shown success in creating a robust educational experience for students, residents, and fellows and is considered a highly valued venue for teaching by the Division of Internal Medicine and Geriatrics. One of the most valuable teaching lessons is that home visits can improve the doctor–patient relationship. By walking in a patient’s shoes for a short time, better, individualized, coordinated care can be delivered than from the clinic setting. The Mount Sinai Visiting Doctors program also reported health system support through the demonstration of an overall cost–benefit profile

and securing departmental and medical school support by shouldering significant teaching responsibilities. Mount Sinai Hospital leadership recognized the disproportionate effect that a small cohort of patients can have on the goal of keeping the hospital system functioning at high efficiency.⁴

Given the anticipated explosive growth in the number of homebound older adults and the increasing cost of institutional care to personal, state, and federal budgets, programs such as House Calls for Seniors merit further investigation. This article reports on the high burden of illness and disability in a group of homebound seniors and describes the programmatic characteristics of a house calls program. Lessons learned from this program may help spawn other programs in other settings.

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References

1. Levine SA, Boal J, Boling PA. Home care. *JAMA*. 2003; 290:1203–1207. [PubMed: 12953004]
2. Press Room/Info for Media. [Accessed July 19, 2008] American Academy of Home Care Physicians [online]. Available at www.aahcp.org/housecalls.shtml
3. Rumbach, D. Lifestyles Section, July 11, 2007. South Bend, IN: South Bend Tribune; 2007. Doctor Rings Bell for House Calls.
4. Smith KL, Ornstein K, Soriano T, et al. A multidisciplinary program for delivering primary care to the underserved urban homebound: Looking back, moving forward. *J Am Geriatr Soc*. 2006; 54:1283–1289. [PubMed: 16914000]
5. Partnership for Solutions. *Chronic Conditions: Making the Case for Ongoing Care*, 1st printing. Baltimore, MD: Johns Hopkins University, for The Robert Wood Johnson Foundation; 2002.
6. Boling PA. The physicians role in home care. *Caring*. 1998;10–15. [PubMed: 10345601]
7. Kellogg FR, Brickner PW. Long-term home health care for the impoverished frail homebound aged: A twenty-seven-year experience. *J Am Geriatr Soc*. 2000; 48:1002–1011. [PubMed: 10968309]
8. Perkel RL, Kairys MZ. Eleven years of house calls: A description of a family practice residency program's experience from 1981–1992 with an urban home visit program for the elderly. *J Long Term Home Health Care*. 1994; 13:13–26. [PubMed: 10139430]
9. Pham HH, Schrag D. Delivery of preventative services to older adults by primary care physicians. *JAMA*. 2005; 294:473–481. [PubMed: 16046654]
10. Jencks SF, Huff ED, Cuedon T. Change in the quality of care delivered to Medicare beneficiaries, 1998–1999 to 2000–2001. *JAMA*. 2003; 289:305–312. [PubMed: 12525231]
11. Counsell SR, Callahan CM, Clark DO, et al. Geriatric care management for low-income seniors. *JAMA*. 2007; 298:2623–2633. [PubMed: 18073358]
12. McDonald CJ, Overhage JM, Tierney WM, et al. The Regenstrief medical record system: A quarter century experience. *Int J Med Inform*. 1999; 54:225–253. [PubMed: 10405881]
13. McDonald CJ, Overhage JM, Barnes M, et al. The Indiana Network for Patient Care: A working local health information infrastructure. An example of a working infrastructure collaboration that links data from five health systems and hundreds of millions of entries. *Health Aff (Millwood)*. 2005; 24:1214–1220. [PubMed: 16162565]
14. Kasper, J.; O'Malley, M. Changes in characteristics, needs, and payment for care of elderly nursing home residents: 1999–2004 Kaiser Commission on Medicaid and the Uninsured. Jun. 2007 p. 11-13.

15. Centers for Medicare and Medicaid Services Web site. Risk Adjusted Home Health Outcome Report for Utilization Outcomes. July 2007–June 2008. OASIS-Based Home Health Agency Patient Outcome and Case Mix Reports.

Table 1**Key Program Elements**

<i>Goal:</i> To provide medical care at home to frail elderly people who have great difficulty in accessing medical care because of physical or psychiatric disabilities
<i>Criteria:</i> Aged 65 and older, live in health system catchment area, accept the House Calls providers as their primary care providers, defined as homebound
<i>Capacity:</i> Average daily census of 170 patients, admit ~ 80 new patients per year
<i>Clinical FTE:</i> 0.3 geriatrician, 0.9 nurse practitioner, 1.3 social worker, 0.5 LPN
<i>Administrative FTE:</i> 1.3 secretary, 0.1 staff manager, 0.05 practice manager, 0.05 medical directorship, 0.1 NP case management, 0.1 MD team time/fellows teaching
Physician and social worker each perform an initial standardized assessment
Patients are seen on average every 4 to 6 weeks
Capacity exists to perform phlebotomy, electrocardiograms, mobile X-rays, vaccinations in the home
Multiple community resources such as home care agency and hospice services, in-home psychiatric and podiatric services are used
Care plans are reviewed in weekly care management meetings

Table 2

Baseline Patient Characteristics Compared with Other Home Visit Cohorts

Characteristic	Current Study	Smith ⁴	Kellogg ⁷	Perkel ⁸
Age, mean	80.2		83.9	
Age, %				
<65	0.2	12.6	3.6	27
65–74	28.2	11.2	10.9	
75–84	37.8	28.9	39.2	
85	33.8	47.3	46.3	20
Female, %	78.2	75.6	76.1	78
Race, %				
Black	63.5	25		65
White	35.9	46.5		35
Education 8 years, %	35.3		40.7	
Living situation, %				
Alone	30.1	33.8	57.9	30
No caregiver	25.4			
1 caregiver	49.6			
2 caregivers	16.0			
3 caregivers	9.0			
Type of insurance, %				
Medicare	91.5	91.7		72
Medicaid	38.7	48.2	39.7	
Wishard Hospital program	33.1			
Private	14.7	28.8		
No insurance	1.1			
Other	6.4	0.2		
Geriatric syndromes, %				
Cognitive impairment	53.4	59.4	44.9	
Pain	50.6			
Difficulty walking	45.1			
Depression	43.8	46.9	18.6	19
Urinary incontinence	41.5	54.8		
Constipation	34.8			
Visual impairment	31.2			20
Insomnia	18.4			
Hearing loss	17.7			
Weight loss	15.0			
Osteoporosis	14.5			
Pressure ulcer	12.6	10.5	11.9	

Characteristic	Current Study	Smith ⁴	Kellogg ⁷	Perkel ⁸
Anxiety	4.9			
Parkinson's disease	2.4		3.5	
Comorbid conditions, %				
Hypertension	74.4		42.3	61
Osteoarthritis	42.3		31	44
Diabetes mellitus	31.0	24.7	15.7	26
Hyperlipidemia	25.9			
Anemia	22.7		23.8	
Congestive heart failure	20.5	18	28.1	19
Coronary artery disease	18.6	18.8		40
Chronic obstructive pulmonary disease	18.4	9.7	20.3	19
Chronic renal insufficiency	10.7		7.5	
Cerebrovascular accident	7.1	21.1	17.7	29
Peripheral vascular disease	5.6	8.2		13

Table 3

Baseline Patient Characteristics

Characteristic	Value
Living arrangement, %	
Home or apartment	98
Assisted living	0.2
Referral source, %	
Indiana University Medical Group physician	44.1
Geriatrics venue	16.3
Self or family	9.9
Local area agency on aging	9.2
Home care agency	3.4
Adult protective services	2.8
Other	14.4
Home-based services, %	
Home care agency	42.8
Local area agency on aging, case manager	12.3
Meals on wheels	11.0
Hospice	2.4
No services	41.7
At least one service	58.3
Mean Geriatric Depression Scale score, %	4.6
9	89.9
10	10.1
Mean Mini-Mental State Examination score, %	21.3
24	47.0
23	53.0
Living alone and 23	41.4
Not living alone and 23	59.7
Mean number of activity of daily living dependencies, %	2.6
1	46.1
2-3	14.5
4-5	19.1
6	20.3
Mean number of instrumental activity of daily living dependencies, %	5.2
1	5.7
2-3	12.4
4-5	27.5
6-7	53.7
Newly diagnosed geriatric syndromes, %	

Characteristic	Value
1	69.0
2	35.4
3	15.0
Difficulty with walking	29.1
Cognitive impairment	25.0
Depression	13.7
Mean number of geriatric syndromes, %	3.9
1	10.5
2-3	35.3
4-5	34.6
6	19.7
Mean number of comorbid conditions, %	2.8
1	27.4
2-3	40.8
4-5	22.9
6	9.0
Mean number of medications, %	5.2
1	10.7
2-3	20.7
4-5	23.7
6	44.9
Classes of medications, %	
Antihypertensive	66.0
Analgesic	43.8
Laxative	43.6
Antidepressant	34.0
Narcotic	30.3
Diabetic agent	26.1
Calcium or vitamin D	16.2
Antipsychotic	11.0
Cholinesterase inhibitor	10.7
Bisphosphonate	3.6
Advanced directive, %	
Do not resuscitate	21.4
Power of attorney	20.8
Living will	4.5
Healthcare representative	1.3
Guardian	1.1
Number of assisted devices, mean	2.2

Characteristic	Value
1 assisted device, %	85.9
Assisted devices, type, %	
Walker	43.0
Wheelchair	38.3
Cane	32.3
Hospital bed	22.9
Bedside commode	20.5

Table 4

Healthcare Utilization for 468 Patients in the Year Before and Year After Enrollment in House Calls for Seniors Program

Site of Care	Number		Charges (\$)	
	Before	After	Before	After
Total ambulatory care visits	3,391	7,626	75,281,062	85,603,228
Wishard emergency department	695	594	42,154,866	36,349,496
Non-Wishard emergency department	110	92	6,671,993	5,629,888
Wishard primary care	1,111	193	11,906,230	1,566,203
House Calls for Seniors	187	4,073	623,959	19,260,693
Mental health home visits	188	1,978	1,416,100	17,173,734
Wishard specialty care	1,100	696	12,507,914	5,623,214
Hospitalizations, n (mean, median length of stay)	330 (6.6, 5.0)	356 (6.3, 5.0)	4,027,851	4,583,327
Wishard hospitalizations, n (mean, median length of stay)	238 (6.1, 5.0)	288 (6.1, 5.0)	2,664,294	3,550,551
Non-Wishard hospitalizations, n (mean, median length of stay)	92 (8.0, 6.5)	68 (7.5, 6.0)	1,363,557	1,032,776
Mean total charges			14,122	19,843
Grand total charges			79,308,913	90,186,555

Table 5

2006 Annual Budget in Dollars

Operating Budget	\$	
	2006	2000
Income		
Professional billing	330,978	87,209
Less outpatient adjustments, billing, and collection fees	-210,374	-51,595
Health professional shortage area income	8,224	
Philanthropy	7,722	
Hospital support	<u>218,840</u>	<u>99,473</u>
Total income	355,390	135,087
Expenses		
Provider expenses	173,319	89,937
Support staff expenses	140,740	36,218
Other expenses	<u>41,331</u>	<u>8,932</u>
Total expenses	355,390	135,087
Cost per person per year	1,480	1,589