

High-Cost Medicaid Clients:
Targeting Diseases for Case Management

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EXECUTIVE SUMMARY

The rapid growth of Washington State's health care expenditures has renewed efforts to contain the state's health care costs. Of particular interest is the potential to reduce expenditures and improve health outcomes for low-income Medicaid recipients with disabilities or who are over age 65. Currently, these individuals receive medical care on a fee-for-service basis rather than through a managed care plan. Washington State was unsuccessful in a recent attempt to extend managed care to this population. That attempt included coordination of social and health services for special needs clients but not case management approaches proposed in this report. This paper proposes an approach that uses medical claims data to identify high-cost Medicaid beneficiaries and provide them with case management services to help improve their health status and contain their medical costs.

Evidence Supports Using a Focused Case Management Approach

Evaluations of a variety of case management programs have produced mixed results. Some case management programs reduce expenditures and maintain or improve patient health status, while others have no impact or actually increase health care expenses. However, research suggests case management efforts that concentrate on specific patient subgroups or diseases provide the best opportunity for near-term cost savings and improved health outcomes.

Disease Groups With High Cost-Savings Potential

Using Washington State data, this paper identifies disease groups associated with clients most likely to benefit from case management. The selected disease groups have a concentration of high-cost patients and represent a substantial share of Medicaid expenses. They are also diseases for which evidence suggests that case management may improve patient outcomes and reduce costs. Based on this research, we have determined that patients with the following diagnoses offer the best potential for case management efforts:

- ❑ Asthma
- ❑ Coagulation Defects
- ❑ Diabetes
- ❑ Heart Failure
- ❑ Intervertebral Disc Disorders
- ❑ Malignancy
- ❑ Obesity
- ❑ Poisoning by Medical Substances
- ❑ Renal Disease
- ❑ Transplants

Next Steps

We provide evidence that both savings and improved health outcomes could result from case management of clients in some or all of the above-mentioned disease groups. However, it is not currently possible to project the cost or health outcomes associated with providing case management. To properly estimate impacts, it is necessary to implement case management on a small scale in a manner that allows for rigorous evaluation. We propose that the following steps be taken:

1. Conduct further analyses of the disease groups to rule out other diseases to which high costs may actually be attributable.
2. Choose one to five of the suggested disease groups for case management.
3. Within each of these groups, develop protocols to select high-cost patients for case management.
4. Solicit proposals from physician clinics and other health care provider groups for case management pilot programs supported by recent research.
5. Implement these programs as pilot projects in limited geographic areas, *explicitly incorporating an evaluation component as part of the program design.*
6. Use cost and outcomes information from the program evaluations to identify successful programs and expand them to additional areas or statewide.

INTRODUCTION

Although representing only 27 percent of the total budget, Washington State health care expenditures are expected to account for over 84 percent of allowable growth in the budget during the 2001-03 biennium.¹ This disproportionate growth has prompted renewed focus on strategies to contain state health care costs.

One area experiencing high rates of expenditure growth is the portion of the Department of Social and Health Services' Medical Assistance Administration (MAA) that provides health benefits to low-income individuals outside of managed care plans, the majority of whom are covered by Medicaid. These individuals, most of whom are elderly or have disabilities, receive health care on a "fee-for-service" basis.

Fee-for-service differs from managed care coverage in two important ways. First, managed care plans are paid a fixed (capitated) amount regardless of the services used by an individual. Fee-for-service arrangements require a payment for each health care service received. Second, managed care plans provide a central point of contact, sometimes referred to as a medical home, for access to various health care services. While this limits patient choice of physicians, it also provides for some coordination of care, an important issue for persons with chronic illnesses or disabilities. Under fee-for-service, individuals are free to see any health care provider willing to accept the level of reimbursement provided by MAA.

Because fee-for-service patients do not have a central point of coordination for their health care needs, there may be an opportunity to improve health outcomes and reduce costs for at least some members of this population by providing case management services.²

Before presenting conclusions regarding case management for SSI Medicaid beneficiaries, this report:

- Defines case management and discusses its effectiveness;
- Summarizes previous case management efforts for Washington State SSI recipients;
- Describes case management initiatives in other states; and
- Identifies potential targets for case management in Washington State.

¹ Allowable growth as determined by the spending limits imposed by Initiative 601.

² For the sake of brevity, this population will be referred to as Supplemental Security Income (SSI) clients for the remainder of this paper. SSI clients are the majority of those in the state's Medicaid fee-for-service population.

WHAT DO WE MEAN BY “CASE MANAGEMENT,” AND DOES IT WORK?

Case Management

Case management has “a dizzying array of connotations.”³ For example, it may focus either separately or in combination on activities such as utilization management, disease-specific interventions, medical and social services coordination, or other services that may be referred to as case management. For the purpose of this discussion, case management consists of identifying individuals likely to incur high health care costs, teaching them to take better care of themselves, identifying and improving adherence to state-of-the-art treatment regimens, improving access to post-hospital care and other support services, and avoiding adverse health outcomes.⁴

Hospitalizations, emergency room visits, and utilization of other medical services may be the result of preventable medical complications associated with chronically ill or high-risk patients. Health care that is fragmented, not focused on client education, and dependent on patient-initiated follow-up may not meet the needs of chronically-ill or high-risk persons and may eventually lead to higher total health care costs. Case management that focuses on high-cost patients may improve patient health outcomes, reduce hospitalizations and use of other health services, and ultimately reduce total health care costs.⁵

For the purpose of this report, programs that take on either of the following two forms are referred to as case management programs:

- ❑ **High-risk case management** of persons with a high risk of becoming seriously ill due to a combination of medical, social, and functional problems; or
- ❑ **Disease management** of persons that addresses standard, evidence-based needs related to a specific diagnosis.

✓ **Case management as considered here consists of the following:**

- ❑ *Identifying individuals likely to incur high health care costs.*
- ❑ *Educating these individuals to take better care of themselves.*
- ❑ *Identifying and improving adherence to state-of-the-art treatment regimen and access to post-hospital care and other support services.*
- ❑ *Avoiding adverse health outcomes.*

³ T. Kastner, et al., *Case Management in Medicaid Managed Care for People With Developmental Disabilities: Models, Costs and Outcomes* (Center for Health Strategies, Inc., 1999).

⁴ J. Schore, et al., “Case Management for High-Cost Medicare Beneficiaries,” *Health Care Financing Review* 20, no. 4 (1999).

⁵ Schore, 1999; H. Chen, et al., *Best Practices in Coordinated Care* (Mathematica Policy Research, Inc., 2000).

Evaluations of Case Management

Evaluations of Case Management Provide Mixed Results. Due to variations in the types of interventions, settings, and study populations, the evaluation literature provides a mixed picture of case management. Some evaluations fail to attribute improved health outcomes or cost savings to case management efforts.⁶ A recent evaluation of three high-cost case management demonstrations with fee-for-service Medicare clients was unable to attribute improvements in health or reduced medical spending to any of the programs.⁷ Moreover, little or no information is available on the long-term impacts of case management or the impacts of extensive case management that attempts to coordinate all health and social service needs.

On the positive side, numerous evaluations indicate that case management can improve health outcomes, reduce costs, or both. Recently, a rigorous evaluation of a chronic disease self-management program was shown to improve the health status and decrease hospitalization and use of outpatient services of a diverse group of chronically ill patients.⁸ An evaluation of a Virginia asthma management program specifically designed for low-income patients with severe asthma attributed significant improvements in health outcomes and cost savings to the program.⁹ Case management focusing on education, nutrition, medication review, social services, and patient follow-up has proven to be successful at reducing costs for elderly patients with congestive heart failure, reducing readmissions by 32 percent, and improving quality of life.¹⁰ Therefore, despite some mixed results, much of the evaluation literature suggests that case management targeting high-cost clients or high-cost diseases is promising.

Costs. Expenditures associated with case management programs examined in the literature review conducted for this report ranged from \$2.50 per member per month in some primary care case management (PCCM) arrangements to \$122 per member per month in a more intensive case management program.¹¹ However, the descriptions of many programs examined lacked information on operating costs, outcomes, or both, making it difficult to determine if interventions are cost effective.

⁶ Schore, 1999.

⁷ Schore, 1999.

⁸ K. Lorig, et al., "Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization: A Randomized Trial," *Medical Care* 37, no. 1 (2000).

⁹ J. Hawks, et al., "The Virginia Health Outcomes Project: A Unique Approach to Lowering Medicaid Costs and Improving Health Outcomes," *American Journal of Managed Care* 2 (1996).

¹⁰ M. Rich, et al., "Multidisciplinary Intervention to Prevent the Readmission of Elderly Patients with Congestive Heart Failure," *New England Journal of Medicine* 333, no. 18 (1995).

¹¹ Chen, 2000; Schore, 1999.

Successful Case Management Programs Share Common Traits. Recent attempts to identify best practices in providing case management to chronically ill patients found that successful programs share the following qualities:¹²

- ❑ Involving physicians in developing the program;
- ❑ Setting goals and developing measurement tools as part of the initial program design;
- ❑ Exploiting existing evidence-based approaches to disease-specific case management;
- ❑ Using technology to educate and share information with physicians and patients; and
- ❑ Providing appropriate financial incentives.

Based on evaluations of case management programs with the characteristics described above, research indicates that such programs have the potential to improve health and reduce expenditures associated with high-cost SSI clients.

¹² Chen, 2000; V. Smith, et al., *Exemplary Practices in Primary Care Case Management: A Review of State Medicaid PCCM Programs* (Center for Health Care Strategies, Inc., 2000).

PREVIOUS CASE MANAGEMENT EFFORTS FOR SSI RECIPIENTS IN WASHINGTON STATE

The concept of providing case management services to SSI recipients is not new. Past attempts to contain Medicaid costs in Washington State included enrolling SSI beneficiaries in managed care programs which included some case management components. The combination of case management with managed care is logical, as the coordination and management of health care requires some type of organized delivery system (also called a medical home) beyond fee-for-service arrangements.

The following is a brief summary of Washington's experience with one aspect of case management, referred to as care coordination, as part of a managed care program for SSI recipients. A closer look at this program may help identify keys to providing a medical home and successful case management services to SSI Medicaid beneficiaries.

Washington State's Attempt at Case Management and Managed Care for SSI Beneficiaries

Overview. Washington State Medicaid reimburses health care costs of SSI recipients on a fee-for-service basis. Other Medicaid beneficiaries (Temporary Assistance for Needy Families [TANF] recipients, low-income children, and pregnant women) are served by *Healthy Options* managed care.

In 1995, Washington State began enrolling SSI recipients in a managed care program that included care coordination for recipients with special needs. Care coordination provided a method to identify needed medical and social services and facilitate access to those services. Enrollment started first as a pilot project in Clark County and then expanded in a modified form to eastern Washington. More than 10,000 SSI recipients were enrolled in managed care by 1997.¹³

In the Clark County pilot project, two health plans developed and managed a network of providers to service SSI Medicaid recipients through a primary care case management (PCCM) model. Under this PCCM model, the state paid the health plans a \$15 per member per month case management fee for physicians to coordinate patient care and paid for authorized medical services on a fee-for-service basis. In eastern Washington, the county-by-county expansion of managed care for SSI recipients was delayed until 1997. Instead of the PCCM model, the state contracted with health plans under a typical managed care arrangement, paying a fixed amount per month for each SSI recipient enrolled.¹⁴

By that time, however, several plans had either dropped out of the program or were not awarded contracts for 1998. The immediate short-term costs of providing managed care to

¹³ J. Verdier, et al., *Washington State's Experience in Extending Medicaid Managed Care to the SSI Population: A Retrospective Analysis* (Center for Health Care Strategies, Inc., August 1998).

¹⁴ Washington State Medical Assistance Administration, *Managed Care for People with Disabilities: Washington State's Experience Providing Managed Health Care to SSI Clients* (December 26, 1997), Draft.

SSI recipients were significantly higher than the health plans expected, and the state was unable to absorb the additional costs necessary to reimburse the plans at a higher rate. The state thus terminated managed care and care coordination for SSI clients on January 1, 1998. A more detailed discussion of care coordination is provided to better understand why this effort failed and what lessons it provides for future case management efforts.

Enhanced Needs Care Coordinators. In both Clark County and the eastern Washington expansion, health plans were required to coordinate medical and social services. Based on an existing model used in Oregon's managed care program, health plans used enhanced needs care coordinators (ENCCs) to meet their requirements to coordinate care. In addition to other defined administrative tasks, the state required the ENCCs to perform the following duties:

- ❑ Prioritize every client's medical and social service needs and identify providers within 30 working days of enrollment; repeat this process every six months.
- ❑ Coordinate with the primary care physician (PCP) to assure that the client receives necessary medical care, and inform the PCP of other services provided.
- ❑ Facilitate client access to all necessary medical services.

As previously discussed, the state's unsuccessful attempt to move SSI recipients into managed care had primarily financial roots. However, an independent evaluation of the program by the Center for Health Care Strategies, Inc. identified other factors that may have contributed to the failure of the program.¹⁵ Some of these factors were offshoots of the state's requirements to coordinate care as well as the diverse needs of the SSI population. The following issues were identified as contributing to the difficulties of extending case management and managed care to the SSI population:

- ❑ Requirements placed on ENCCs to screen all enrollees limited their ability to focus on high-cost clients.
- ❑ ENCCs were preoccupied with paperwork and administrative tasks.
- ❑ ENCCs had no way to identify high-cost clients based on their previous medical usage.¹⁶
- ❑ ENCCs drove up medical costs when they linked SSI clients to medical services not received under prior fee-for-service arrangements.
- ❑ The diverse needs of the SSI population and their use of social services provided by multiple state and local agencies made it difficult to coordinate services.

These care coordination issues are worth noting while considering future case management efforts for the SSI population.

¹⁵ Verdier, 1998.

¹⁶ Some of the difficulties with information were based on confidentiality issues. The managed care organizations identified confidentiality restrictions as a major obstacle to coordinating care.

CASE MANAGEMENT INITIATIVES IN OTHER STATES

Case management programs across the country vary considerably in quality and program goals. Some programs do not intend to save money and instead provide advocates for high-risk clients; these programs are organized to bridge the gap between health and social services.¹⁷ These broad-reaching programs, however laudable, are not the focus of this report. Instead, we focus on programs that attempt to improve health outcomes and lower costs by targeting specific diseases or high-risk clients.

The following programs are examined in recent independent studies of case management that target specific diseases of high-cost or disabled persons enrolled in Medicaid or Medicare. They include examples of case management for asthma, diabetes, congestive heart failure, HIV-AIDS, and a more general program that targets the chronically ill. Some programs focus on pharmaceutical approaches to managing disease; other programs address patient education, the primary care physician, or both. The following examples are used to illustrate a variety of case management initiatives and are not offered as recommendations.

Virginia Health Outcomes Partnership (Asthma Pilot)¹⁸

Virginia's program demonstrates that case management helps physicians in a fee-for-service PCCM environment improve health outcomes of low-income patients with severe asthma while lowering costs. An evaluation of the program showed that every additional dollar spent on case management support to physicians saved Medicaid \$3 to \$4.

Severe asthma patients are selected using Medicaid claims data. The voluntary program offers primary care physicians intensive asthma education and guides them in communicating state-of-the-art self-management skills to their patients. Physicians are not required to seek prior approval for prescriptions and are provided periodic updates on critical indicators of patient health status. The program is designed specifically for low-income patients and should be easily replicated in other states with established PCCM programs.

Maryland Medicaid Program for Diabetes¹⁹

Maryland's case management program for Medicaid fee-for-service patients diagnosed with diabetes reduces inpatient and emergency room use 40 to 50 percent. Patients hospitalized because of diabetes are selected for case management; participation is voluntary for the physician and the patient. The program includes outpatient diabetes education, ongoing efforts to keep primary care providers informed of patient status, reminders to patients to see their primary care provider, and six hours of continuing medical

¹⁷ This is the case management model provided by Oregon and Washington ENCCs.

¹⁸ Hawks, 1996; L. Rossiter, et al., "The Impact of Disease Management on Outcomes and Cost of Care: A Study of Low Income Asthma Patients," *Inquiry* 37 (2000).

¹⁹ P. Fox, et al., "Addressing the Needs of Chronically Ill Persons Under Medicare," *Health Affairs* 17, no. 2 (1998).

education credit in diabetes management for physicians. Participating physicians receive an additional \$20 per month for each patient they manage.

Congestive Heart Failure²⁰

A nurse-directed, multidisciplinary approach to reducing hospital readmissions among elderly patients with congestive heart failure (CHF) has resulted in decreased costs of care and improved quality of life. Patients hospitalized due to CHF are selected for case management, where trained nurse practitioners develop care plans based on guidelines created by specialists. If needed, patients receive services from dieticians and social workers. Patients are instructed about the important role of self-care in the treatment of CHF. A special transitional plan eases the shift from the hospital to the home. The program reduces hospital use and medical costs for elderly patients.

Florida Disease Management Initiative²¹

Florida has implemented case management programs for HIV-AIDS, asthma, diabetes, and hemophilia. Programs for congestive heart failure, end stage renal disease, hypertension, cancer, and sickle cell anemia are planned or are under consideration. While the Florida initiative has not been evaluated, it provides an example of a uniform approach that targets different groups of patients based on specific diagnoses.

The Florida legislature specified nine diseases on which to focus the disease management efforts of the state's Medicaid PCCM providers. Contractors selected to provide disease management services have primary responsibility for Medicaid patients diagnosed with the targeted disease. In the case of multiple diagnoses, only one case manager is assigned. Case managers work closely with primary care physicians, other health service providers, and enrollees to ensure delivery of appropriate services. A CD-ROM produced by contractors and distributed to primary care physicians provides state-of-the-art protocols and guidelines for treating patients with HIV-AIDS and includes up-to-date information on the Florida disease management initiative. CD-ROMs will be developed for each of the nine diseases targeted.

Colorado Cooperative Health Care Clinics for the Chronically Ill²²

Kaiser-Permanente Cooperative Health Care Clinic (CHCC) in Colorado provides clinical care to chronically ill, high-cost patients in a structured setting. As a group, about 25 patients meet with their primary care provider and a registered nurse to exchange information, provide support, and listen to presentations on such issues as medication safety. Physicians and patients plan topics together; patients maintain records of care and bring them to the meetings. Individual assessments are also conducted at the meetings, and individual appointments are made if necessary. CHCC visits have been linked to increased use of preventive services, increased provider and patient satisfaction, and cost savings.

²⁰ Rich, 1995. E. Wagner, et al., "A Survey of Leading Chronic Disease Management Programs: Are They Consistent with the Literature," *Managed Care Quarterly* 7, no. 3, (1999).

²¹ Smith, 2000.

²² Wagner, 1999.

POTENTIAL TARGETS FOR CASE MANAGEMENT IN WASHINGTON STATE²³

Two points are relevant to controlling costs and improving health outcomes for fee-for-service Medicaid beneficiaries. First, proper management of chronic medical illness may decrease expenses because it reduces unnecessary treatment and also because proper treatment results in improved health for the client. Second, a targeted, disease-based approach to case management may be more likely to contain costs and improve health outcomes than a broad-reaching health and social service care coordination program. With these two points in mind, the objectives of our analysis are to:

- Identify frequently occurring diseases among Medicaid fee-for-service enrollees; and
- Use a combination of medical expertise, published scientific reports, examples from other states, and public health goals to identify a subset of SSI recipients for whom case management could result in improved health and lower costs.

Data and Methods

We examined records on 174,609 Medicaid and other Washington State medical assistance fee-for-service enrollees who were covered for at least 11 months during 1999 and not enrolled in managed care.²⁴ The data include information on enrollee age, primary language, gender, race/ethnicity, and county of residence as well as medical information on disease and health care services covered by state medical assistance programs.²⁵

Once the data were assembled, the following steps were completed:

- Enrollees were grouped into 77 disease groups. Because individuals could be diagnosed with multiple diseases, some enrollees are included in more than one disease group.
- Individuals receiving case management services were identified.²⁶
- Any individual with annual medical costs above \$10,000 was considered “high cost.” The high-cost category included 15,283 individuals (8.8 percent of the sample), and their reimbursements totaled \$378.3 million (49.7 percent of all reimbursements).

²³ This section summarizes a report written by William Lafferty, MD, of the School of Community Medicine and Public Health, University of Washington. His entire report is included as Appendix A.

²⁴ The database used for the study combined data on program eligibility with medical claims files. An additional 17,708 enrollees were excluded from the analysis because they received no state-reimbursed health care services (17,644) or received only nursing home services (64) during 1999.

²⁵ Nursing home services were excluded from the analysis to focus on services most likely to be addressed by a case management program.

²⁶ Washington State provides case management for pregnancy, HIV-AIDS, and chemical dependency.

- A cost index was calculated that represents the relative risk for being a high-cost enrollee if one has a diagnosis included in a particular disease group.²⁷

Results

Individuals receiving state medical assistance on a fee-for-service basis are eligible for either Medicaid or both Medicaid and the federal Medicare program. Because data on most health care expenditures for Medicare beneficiaries are unavailable, this analysis focuses on persons who were eligible for Medicaid only, approximately 63 percent of enrollees in the database.²⁸ A total of \$525 million in state and federal funds was spent on non-nursing home health care for these individuals during 1999.

Exhibit 5 shows health care expenditures, total number of enrollees, cost index, and number of enrollees currently receiving case management services for selected disease groups. Individuals may be diagnosed with multiple diseases over the course of the year. Therefore, individuals and expenditures may appear in multiple disease groups. While the analysis considers 77 disease groups, Exhibit 1 is limited to those disease groups with high total expenditures, high values for the cost index, or both.

²⁷ To compute the index, we first compute the proportion of the high-cost individuals with the diagnosis (HC) and the proportion of all enrollees with the diagnosis (T). The cost index is set equal to HC/T.

²⁸ Medicare covers most expenses for hospital and physician services. Only uncovered Medicare expenses, such as prescription drugs, are available in the database for individuals with dual Medicaid and Medicare coverage. This means that most health care expenses are unavailable for dual Medicaid and Medicare enrollees, which could bias our results. It also means that the state Medicaid program has little information on health care providers or types of services used by such individuals, making case management difficult. See Appendix A, Tables A-5, A-6, and A-7 for results including enrollees with Medicare eligibility.

Exhibit 1
Selected Disease Groups With High Total Expenditures and a High Cost Index
(Enrollees With No Medicare Eligibility)

Disease Group (ICD-9-CM Diagnosis Codes)	Total Expenditures (\$ millions)*	Total Enrollees	Cost Index**	Case-Managed Enrollees
Aplastic Anemia (284)	\$8.87	176	7.78	7
Pulmonary Embolism/Infarction (415.1)	\$4.70	141	7.23	1
Primary Pulmonary Hypertension (416.0)	\$6.92	183	7.00	8
Transplant (996.8,V42)	\$11.32	233	6.58	2
Renal Disease (580-589)	\$40.49	1,161	6.41	23
Coagulation Defect (286)	\$18.43	469	6.38	4
HIV (042)	\$11.86	617	6.20	341
Cystic Fibrosis (277.0)	\$3.73	102	6.19	3
Inflammatory Central Nervous System (320-326)	\$6.69	192	5.87	14
Obesity (278.0)	\$24.75	1,243	5.85	25
Heart Failure (428)	\$50.74	2,146	5.51	19
Purpura/Hemorrhagic Conditions (287)	\$14.71	506	5.30	22
Sickle Cell Anemia (282.6)	\$2.56	99	5.20	6
Immune Disorders (279)	\$6.19	271	4.80	57
Poisoning by Medical Substances (960-979)	\$19.32	1,185	4.60	33
Malignancy (140-208,230-234)	\$47.24	2,594	4.25	46
Veins/Lymphatics/Other Circulatory (451-459)	\$74.26	3,732	4.24	113
Invertebral Disc Disorders (722)	\$31.01	3,028	3.06	17
Diabetes (250)	\$91.26	8,024	2.92	122
Asthma (493)	\$79.57	7,813	2.43	145
Respiratory Diseases (460-519)	\$324.69	42,930	1.67	1,573

Note: Disease groups in bold are most likely candidates for case management. See Appendix A for a complete list of disease groups examined for this report. The analysis excludes patients with Medicare coverage.

*Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

**Proportion of high-cost enrollees in this disease group divided by proportion of all enrollees in this disease group.

Not all disease groups with high total expenditures or a high cost index are suitable for case management efforts. Disease groups in bold type in Exhibit 1 are the most likely candidates for case management. Several points should be noted with regard to Exhibit 1:

- Some diseases with very high expenditures are not appropriate for case management because most persons with the disease have relatively low costs (a low cost index). For example, although almost \$325 million was spent on individuals with respiratory disease in 1999, this expenditure was spread over 42,930 people. The low value for the cost index (1.67) indicates that enrollees with this diagnosis are inexpensive relative to clients with other diseases.
- Other disease groups with very high cost indexes but relatively low total expenditures may also be inappropriate targets for case management. Using an arbitrary standard, we limit candidates for case management to those disease

groups with greater than \$10 million in total expenditures. For example, cystic fibrosis, with a cost index of 6.19, affects only 102 individuals at a total cost of \$3.7 million so is not suitable for case management. Despite their high cost indexes, aplastic anemia, primary pulmonary hypertension, pulmonary embolism and infarction, inflammatory central nervous system diseases, immune disorders, and sickle cell anemia are also considered unlikely candidates for case management due to low total expenditures.

- ❑ Some disease groups that appear to have a favorable cost profile for case management may not reflect groupings that are practical for case management because the medical diagnosis is often a complication of other conditions. Examples include purpura and hemorrhagic conditions and vein, lymphatic, and other circulatory system diseases.
- ❑ Diagnoses associated with existing case management efforts are also excluded. One disease group, HIV, already has a substantial share of enrollees receiving case management services. An additional 3,500 enrollees receive case management services related to pregnancy or substance abuse rather than a specific disease.

Therefore, diseases suitable for case management can be identified based on the following criteria: a high cost index, high total expenditures, and evidence-based interventions suggesting that improved health quality and decreased costs may be achievable. Using these criteria, the following diseases have been identified:

- ❑ **Transplants:** In terms of both cost index and total expenditures, transplant patients meet the above criteria for case management. In addition, there is clinical precedent for coordination of care.
- ❑ **Renal disease:** Expensive treatments are included in this category and are in some circumstances partially subsidized by Medicare. At least one state (Florida) is considering this disease for case management.
- ❑ **Coagulation defects:** Hemophilia is expensive to treat and often complicated. Several states, including Florida, are looking at case management models for this disease.
- ❑ **Obesity:** Morbid obesity not only is associated with high total expenditures, but this condition is also amenable to lifestyle modifications. A case management program for this condition could be innovative and cost-effective.
- ❑ **Poisoning by medical substances:** Costs associated with improper use of prescribed medications are substantial. Several population groups are especially vulnerable to improper use of medication. High costs incurred among these individuals result not only from the initial cost of the medication but also from the need to treat complications created by overmedication or drug interactions.
- ❑ **Heart failure:** Quality guidelines exist for management of heart failure and other cardiac conditions and could be adapted to a best-practice model of care.
- ❑ **Malignancy:** These patients require a wide range of services for which coordination of care could be very beneficial.
- ❑ **Intervertebral disc disorders:** The medical literature suggests that patients with back pain are inconsistently managed. Local experts, including the Department of

Labor and Industries,²⁹ have researched a variety of different approaches and might have insight into better methods of care.

- **Diabetes and asthma:** For both of these conditions, there are medical models and systems of care such as those in Virginia and Maryland that appear to save money and improve health results.

Given the major role that pharmaceuticals play in overall costs (27 percent of expenditures for enrollees not eligible for Medicare), a successful program for any of the above diseases will need to address drug cost and use.

²⁹ See the diagnostic and treatment guidelines available at <http://www.lni.wa.gov/hsa/authorization.htm>.

CONCLUSIONS AND RECOMMENDATIONS

Evidence Supports a Focused Case Management Approach

Recent experience with medical case management, whether broadly defined or focused on a specific disease, has been mixed. Some efforts have reduced expenditures and maintained or improved patient health status, while others have had no impact or have actually increased health care expenses. Although little is known about the longer-term impacts of different case management approaches on cost or health outcomes, the research literature indicates that concentrating on specific patient subgroups provides the best opportunity for near-term savings.

Disease Groups With High Cost-Savings Potential

Using Washington State Medicaid claims data, we examined enrollees in state-administered medical assistance programs and identified disease groups most likely to benefit from case management based on four criteria:

- ❑ Concentration of high-cost patients;
- ❑ Substantial share of Medicaid expenses;
- ❑ Research suggesting the feasibility of improving patient outcomes while reducing costs; and
- ❑ Little or no existing case management.

Using these criteria, we have identified the following disease groups:

- ❑ Asthma
- ❑ Coagulation defects
- ❑ Diabetes
- ❑ Heart Failure
- ❑ Intervertebral Disc Disorders
- ❑ Malignancy
- ❑ Obesity
- ❑ Poisoning by Medical Substances
- ❑ Renal disease
- ❑ Transplants

Next Steps

This discussion suggests that both savings and improved health outcomes could result from case management for some or all of the above-mentioned groups. However, it is not currently possible to estimate savings associated with management programs for any of these groups. To establish if the desired changes in cost and health status are possible, it

will be necessary to implement case management for one or more of the selected disease groups in a manner that allows for a rigorous evaluation. We propose that the following steps be taken:

1. Conduct further analyses of the disease groups to rule out other diseases to which high costs may actually be attributable.
2. Choose one to five of the disease groups for further analysis.
3. Within each of these groups, identify other factors (co-occurring diseases, age, etc.) to improve targeting of case management to high cost patients.
4. Solicit proposals from physician clinics and other health care provider groups for case management programs supported by recent research.
5. Implement these programs as pilot projects in limited geographic areas, explicitly incorporating an evaluation component as part of the program design to ensure the ability to measure cost and health outcomes.
6. Use cost and outcomes information from the program evaluations to identify successful programs and expand them to additional areas or statewide.

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APPENDIX A

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The Distribution of Fee-for-Service Medicaid Payments by Demographic Groupings, Claim Type, and Diagnosis Codes: Suggested Priorities for Case Management

Background

The Health Care Financing Administration (HCFA) projects that costs for personal health services will increase to 17% of the U.S. gross domestic product by 2007. Care of the elderly and persons with chronic medical conditions will account for a substantial proportion of these charges. Some of these conditions are preventable by modification of health behavior. Other expensive conditions are actually created by medical treatment. The Institute of Medicine Report, *To Err is Human*, demonstrates the enormous cost to society of medical error. Proper management of chronic medical illness may not only be less expensive (because it reduces over-treatment) but also beneficial to the client (because proper treatment results in improved health).

Objectives

The purposes of the current study were as follows:

- ❑ To describe the Medicaid fee-for-service population and profile expenditures by demographic predictors of cost.
- ❑ To define a subset of the Medicaid fee-for-service enrollees who have “high-cost” medical care and compare them to the other fee-for-service clients by diagnosis groupings (ICD-9 code).
- ❑ To use a combination of medical expertise, published scientific reports, examples from other states, and public health goals to identify a subset of clients where improved management of their medical care could result in improved health and lower costs.

Methods

Individuals Included in the Study Sample. This study was based on 174,609 Medicaid fee-for-service enrollees who were covered during 1999, who were not enrolled in managed care during 1999, and for whom Medicaid had made some reimbursement as of July 31, 2000, for services exclusive of nursing home care provided during 1999. The Office of Information Services of the Washington State Medical Assistance Administration (MAA) provided the study team with data for 192,317 individuals enrolled in the fee-for-service

program during 1999. Of these, 17,644 received no service for which Medicaid made reimbursement, and 64 received nursing home service only.

Most of the individuals included in the sample had continuous fee-for-service coverage, defined as 11 or 12 months of eligibility, during 1999. This requirement was specified as a criterion when records were pulled for analysis. However, the eligibility status flags in the Medicaid eligibility file did not correctly take into account birth and death dates for all individuals. As a result, 48 individuals who were born after 1/31/99 and 294 individuals who died prior to 12/1/99 were included in the analyses. Although none of these individuals could have had 11 full months of eligibility, the Medicaid eligibility file showed them as having been eligible for at least 11 months. The error was detected after the bulk of the analyses had been completed. Because of the small number of individuals involved (less than .002 of the sample), and the unlikelihood that their inclusion made substantial differences in the findings, we did not rerun analyses without them.

Human Subjects Review. The study team received clearance for the study from both the Institutional Review Board of the University of Washington and the Human Research Review Board of the Washington State Department of Social and Health Services. Because the study was based exclusively on analysis of extant data that did not include direct links to subject identifiers, it qualified for expedited review at both institutions.

Data Provided by Medicaid. For all individuals in the sample, demographic and program-code data were extracted from Medicaid eligibility files, one record per enrollee, with a scrambled identification number attached to each record. For the same set of enrollees, claims data for all services with a start-of-service date in 1999 were pulled from the extended database, one record for each line item of each claim. End-of-service dates were not queried in the extraction algorithm. Therefore, some lines in the data set reflected service that began in 1999 and ended in 2000. The line-item records were identified with the same scrambled identifier as was used for the person-level record. The claims file (including nursing home claims and non-reimbursable claims) contained 9,953,077 separate claims recorded as a flat file of 13,024,381 line-level records. MAA provided all extracted records to the research team as formatted text records, zipped to compact disk. The raw data consisted of one file of person-level records and two line-level files (the total line-level file split to avoid the necessity for spanning over two disks).

The study team imported the eligibility records into a person-level table in a Microsoft Access database. Because Microsoft Access has a database size limit of 1 gigabyte, the line-level records were imported into 14 separate databases, with approximately 1 million records per database. Each of the 14 databases was then reconstructed as two relational tables, one containing claim-level information, and one containing line-level information. The two tables in each database linked to each other through the claim-number field, as recorded in the transaction control number. Each record in the 14 claim-level tables linked to a record in the person-level table through the scrambled ID#. Summary measures for each enrollee were compiled from the 14 claims databases and imported into new fields constructed in the person-level table.

Measures

- *Demographic information from the Medicaid eligibility file.* Five measures were drawn from the Medicaid eligibility file: age, primary language, gender, race/ethnicity, and program code under which the enrollee was eligible for Medicaid benefits. Date of birth, as represented in the eligibility file, was used to compute the enrollee's age on his or her 1999 birthday. The resulting integer was recoded into five categories, as represented in Table A-2. The primary language code in the eligibility file includes 34 separate values. For purposes of study analyses, codes for "English" and "large print English" constituted the English category; codes for "unknown" and "Braille" were categorized as "unknown"; the remaining 30 values were categorized as "non-English." Individuals with no code in the language field were categorized as "unknown." The remaining three fields from the eligibility file were used in their original form, with categories as presented in Tables A-1 and A-2.
- *Rural/urban residence.* Enrollees were categorized as rural or urban, based on county codes in the claims file. For each claim, the county code was initialized to the value found in the "recipient county of residence" field. When the value was 72, 73, or 76 (values used to designate state-wide programs), the value from the "CSO of residence" field was substituted. The final step at the claim level was to recode values into three categories. Values reflecting the 11 most densely populated Washington counties (Benton, Clark, Franklin, King, Kitsap, Pierce, Snohomish, Spokane, Thurston, Whatcom, and Yakima) constituted the urban claims. Those coded as "unknown," along with those still reflecting state-wide programs, constituted the unknown category. The remaining values represented the rural claims. Finally, we compared all claims for each individual. If all claims had unknown residence, the enrollee was classified as unknown. Enrollees with urban, but no rural, claims were classified as urban. Those with rural, but no urban, claims were classified as rural. Those with both rural and urban claims were classified as mixed.
- *Medicare eligibility status.* Each enrollee's Medicare eligibility status was estimated from the Budget Aid Category field in the claims file. Values in the range 0-7 in this field designated claims for Medicare-eligible enrollees. All claims, irrespective of reimbursement status, were used to determine Medicare eligibility. From the claims-level information, we flagged enrollees as belonging to one of three categories: (1) no eligibility (Medicare eligible on no claims), (2) complete eligibility (Medicare eligible on all claims), or (3) partial eligibility (Medicare eligible on some claims and ineligible on others). Summary information regarding enrollee status is included in Table A-1.
- *Claim type.* Each claim-level record was identified by type, based on the claim input form indicator, with values recoded as follows: "D" = drug claim; "J" and "O" = physician; "K" = dental; "L" = EPSDT; "M" and "W" = hospital outpatient; "P" = medical vendor; "Q" = gross adjustment; "A", "R", "S", and "V" = hospital inpatient. These data were used to compile Table A-3. All claims submitted on "T" (nursing home) forms were disregarded in computing reimbursements and were, correspondingly, excluded from Table A-3.

- *Total reimbursements and high-cost indicator.* Individuals were classified as high-cost or lower-cost on the basis of their total reimbursements for 1999, excluding nursing home care. Using the 14 claims-level tables, we summed the reimbursements for all claims (other than type “T” claims) with the same person-level ID#. Results, matched to the person-level table by ID#, were added as a total-reimbursement field in the person-level table.

After examining a frequency distribution of person-level reimbursements, we established a cutoff for high-cost individuals at values above \$10,000. The high-cost category included 15,283 individuals (8.8% of the sample), and their non-nursing-home reimbursements totaled \$378,278,448.79 (49.7% of all reimbursements). A high-cost field was added to the person-level table, and each individual was flagged according to high-cost status.

- *Diagnoses.* Diagnosis codes were based on the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). Using the codebook for ICD-9-CM, we located 77 values (or value ranges) that designated diagnoses of interest to the study. These 77 diagnoses, and the codes or code ranges that defined them, represent the rows in Table A-7. In the person-level table, 77 fields were established to allow flagging enrollees according to whether they had received each of the diagnoses of interest during 1999. Diagnoses were then constructed from the 14 line-level tables. Each line item of each claim included nine fields for ICD-9 codes. To summarize the codes, we constructed a new database with a table (the ICD9 table) that included two fields: a person-level identifier (ID#) and an ICD-9 code (ICD). Next we ran 126 queries (9 diagnosis fields by 14 databases), each extracting all unique ID#/ICD pairs from the lines and appending these records to the ICD9 table. Next we deleted from the ICD9 table all records that had invalid ICD-9 codes. The resulting table included 1,412,091 unique ID#/ICD pairs. Using this table, we ran 77 Access queries, each extracting all ID#s with the ICD9 (or range) of interest. Following each query, we flagged the appropriate field in the person-level table for individuals with the diagnosis.
- *Case-management indicator.* Claims involving reimbursement for case management services were identified through codes in the line-level field containing CPT procedure codes. In addition to CPT codes, this field was used to enter HCFA Common Procedure Coding System (HCPCS) codes, including those that are specific to Washington State. The state-specific code set includes values designating case management. Individuals having any of the following codes on one or more claims were identified as case managed: 0028M, 0029M, 0073M, 0075M through 0087M, 0173M, 0355M, 0356M, 0411M, 0416M through 0418M, 0430M, 0434M, 0435M, 0470M, 0471M, 0567M, 0568M, 1209M, 1210M, 1213M, 1214M, 1220M through 1225M, 2186M, or 2196M. A total of 4,492 individuals, who received one or more of these codes during 1999, were flagged as case managed in a new field added to the person-level table.
- *High-cost weight.* Each diagnosis presented in Tables A-5 through A-9 was assigned a high-cost weight, representing the relative risk for being a high-cost enrollee if one has the diagnosis. To compute this weight we first computed the proportion of the

high-cost individuals with the diagnosis (HCP) and the proportion of all enrollees with the diagnosis (TP). The high-cost weight was set equal to HCP/TP.

□ *Statistical analysis*

- Data from the Access person-level table were output to SPSS for the descriptive analyses presented in Tables A-1 and A-2. These data were then used to generate the logistic regression model presented in Table A-4. The logistic regression analysis excluded all individuals with unknown values for gender, race/ethnicity, primary language, or rural/urban residence, as well as individuals with mixed rural-urban residence.
- For Table A-3, we used Access to count enrollees with reimbursed claims of each type, to count claims of each type, to sum reimbursements for each type of claim, and convert these values to percentages. For each claim type, only the claims for which some reimbursement was made figured into the counts. The middle panel of Table A-3 is based on the subset of enrollees with no Medicare eligibility or partial eligibility (codes 1 and 3 in the Medicare eligibility field). The bottom panel includes only those enrollees with no Medicare eligibility (code 1 in the Medicare status field).
- Table A-7 was based on results from 77 Access queries, using the person-level table. Each query used records for individuals flagged as having received one of the 77 diagnoses. The query computed the total reimbursements for those individuals. In addition, it counted, respectively, the number of high-cost, lower-cost, and case-managed individuals with the diagnosis. Results from each query were added to an Excel table. Using this information, Excel computed the total number of individuals with each diagnosis, the proportion of the total sample with the diagnosis, and the proportion of high-cost individuals with the diagnosis. Finally, it computed a high-cost weight, equal to the proportion of high-cost individuals with the diagnosis divided by the proportion of the total sample with the diagnosis.
- Tables A-5 and A-6 were constructed from Table A-7, using Excel, by simply reordering the lines in descending order of, respectively, high-cost weight and total reimbursement.
- Tables A-8 and A-9 were constructed using a method identical to that used for Table A-7, but based on subsamples of enrollees defined by Medicare eligibility status. Table A-8 includes only the enrollees in Medicare eligibility category 1 (no eligibility). Table A-9 includes only those in categories 1 and 3 (no eligibility and partial eligibility).

Findings

Table A-1 shows the Medicare and Medicaid eligibility status of the 174,609 fee-for-service clients in the sample. About 63% had no Medicare eligibility. A quarter were Medicare eligible for all of 1999, and 12% were eligible for part of the year. About 75% of all enrollees were either aged (45,812) or disabled (84,319). Excluding those with at least some Medicare coverage, this dropped to about 60%.

Table A-1
Number and Percentage of Enrollees by Medicare Eligibility Status and Program Conferring Medicaid Eligibility

Medicaid Program Code	All Enrollees		No/Partial Medicare		No Medicare	
	N	%	N	%	N	%
Aged	45,812	26.24	21,842	16.6	10,277	9.4
Blind	129	0.07	103	0.1	94	0.1
AFDC-Regular	7,508	4.30	7,426	5.6	7,370	6.7
Child Welfare Services	8,282	4.74	8,261	6.3	8,244	7.5
AFDC-Employable	224	0.13	223	0.2	222	0.2
Other Child, Not Elig AFDC	6,054	3.47	6,014	4.6	5,990	5.5
Medically Indigent	63	0.04	61	0.0	61	0.1
FIP Program	1	0.00	1	0.0	0	0.0
Disabled	84,319	48.29	65,667	49.9	55,646	50.7
ITA-Blind	5	0.00	3	0.0	2	0.0
Refugee	33	0.02	32	0.0	32	0.0
GAU-Pregnant Woman	5,924	3.39	5,889	4.5	5,858	5.3
Old Age, Psychiatric	76	0.04	28	0.0	11	0.0
Continuing General Assistance	2,640	1.51	2,596	2.0	2,580	2.4
Children's Health Program	9,092	5.21	9,084	6.9	9,081	8.3
Substance Abuse	243	0.14	228	0.2	221	0.2
Presumptive SSI	4,204	2.41	4,128	3.1	4,088	3.7
TOTAL	174,609		131,586		109,777	

Table A-2 shows that 77% of clients (and almost 64% of those with no Medicare coverage) were older than 19 years of age. Almost 60% were female. Only 67% were Caucasian, and this dropped to 61% among those without Medicare coverage. Seventeen percent (21% of those without Medicare coverage) had a primary language other than English, and over 75% lived in urban areas.

Table A-2
Enrollee Demographics

Age Category	All Enrollees		No/Partial Medicare		No Medicare	
	N	%	N	%	N	%
0-5	7,695	4.4	7,694	5.8	7,688	7.0
6-12	18,092	10.4	18,085	13.7	18,081	16.5
13-19	13,955	8.0	13,949	10.6	13,942	12.7
20-64	88,720	50.8	69,987	53.2	59,933	54.6
65+	46,147	26.4	21,871	16.6	10,133	9.2
Gender						
Male	70,059	40.1	54,557	41.5	46,420	42.3
Female	104,523	59.9	77,003	58.5	63,331	57.7
Unknown	27	0.0	26	0.0	26	0.0
Race/Ethnicity						
Caucasian	116,501	66.7	82,780	62.9	66,723	60.8
African American	9,701	5.6	7,819	5.9	6,727	6.1
Asian American	11,615	6.7	8,381	6.4	6,289	5.7
American Indian	7,869	4.5	7,210	5.5	6,813	6.2
Hispanic	18,857	10.8	17,151	13.0	16,066	14.6
Other	7,355	4.2	6,039	4.6	5,321	4.8
Unknown	2,711	1.6	2,206	1.7	1,838	1.7
Primary Language						
English	144,219	82.6	105,007	79.8	85,813	78.2
Non-English	29,522	16.9	25,739	19.6	23,133	21.1
Unknown	868	0.5	840	0.6	831	0.8
Residence in 1999						
Rural Area	36,722	21.0	28,254	21.5	23,921	21.8
Urban Area	134,169	76.8	100,158	76.1	83,091	75.7
Both	3,337	1.9	2,793	2.1	2,384	2.2
Unknown	381	0.2	381	0.3	381	0.3
TOTAL	174,609		131,586		109,777	

Medicaid spent \$1,157,369,494.16 on 174,754 non-managed-care clients, for whom claims had been processed as of July 31, 2000. Most of these clients (99.8%) had continuous enrollment throughout 1999. Of these individuals, 81 received no reimbursement, and 64 received reimbursement for nursing home care only. Of 9,953,077 claims, 147,176 were for nursing home facility charges costing \$396,895,506.59. These were excluded from the subsequent analyses. Non-nursing home reimbursements totaled \$760,473,987.57. Excluding enrollees who had at least some Medicare coverage, this figure dropped to \$525,004,096.57.

Table A-3 shows the expenditures by claim type. The enormous role of drug claims for this population is clear: almost 7 million claims (\$300 million), representing almost 40% of all non-nursing home charges. However, much of the drug expenditure went to enrollees for whom Medicare paid the bulk of other health care charges. Excluding claims for enrollees who had some Medicare eligibility during the year, just over 3 million drug claims received Medicaid reimbursement, with these reimbursements accounting for about 27% of all reimbursements to this subgroup.

Table A-3
Number of Enrollees, Number and Value of Reimbursed Claims
by Claim Type by Medicare Eligibility Status¹

Claim Type	# Enrollees ²	% of Total	# Claims ³	% of Total #	Reimburse-ments	% of Total \$
ALL ENROLLEES						
Drug	155,085	88.82%	6,891,843	70.53%	\$293,097,664.56	38.54%
Physician	152,612	87.40%	1,765,906	18.07%	\$109,863,317.17	14.45%
Dental	65,560	37.55%	172,072	1.76%	\$20,911,869.76	2.75%
EPSDT	13,744	7.87%	18,337	0.19%	\$1,053,436.38	0.14%
Hospital Outpatient	89,038	50.99%	439,962	4.50%	\$82,642,408.88	10.87%
Medical Vendor	71,826	41.14%	448,518	4.59%	\$86,983,140.92	11.44%
Gross Adjustment	5	0.00%	5	0.00%	\$67.25	0.00%
Hospital Inpatient	22,043	12.62%	35,112	0.36%	\$165,922,082.65	21.82%
TOTAL	174,609	100.00%	9,771,755	100.00%	\$760,473,987.57	100.00%
ENROLLEES WITHOUT FULL MEDICARE COVERAGE (excludes people all of whose claims were Medicare-eligible)						
Drug	115,896	88.08%	4,527,958	65.49%	\$196,859,215.41	31.92%
Physician	115,810	88.01%	1,533,716	22.18%	\$101,627,285.77	16.48%
Dental	51,456	39.10%	136,402	1.97%	\$16,673,917.45	2.70%
EPSDT	13,716	10.42%	18,288	0.26%	\$1,050,818.67	0.17%
Hospital Outpatient	67,286	51.13%	339,452	4.91%	\$69,744,875.38	11.31%
Medical Vendor	53,344	40.54%	327,917	4.74%	\$71,882,728.75	11.66%
Gross Adjustment	3	0.00%	3	0.00%	\$50.95	0.00%
Hospital Inpatient	17,450	13.26%	29,773	0.43%	\$158,865,921.97	25.76%
TOTAL	131,586	100.00%	6,913,509	100.00%	\$616,704,814.35	100.00%
ENROLLEES WITH NO DETECTABLE MEDICARE COVERAGE (excludes all people who had any Medicare-eligible claims)						
Drug	94,492	86.08%	3,242,235	60.89%	\$141,638,093.55	26.98%
Physician	95,581	87.07%	1,385,602	26.02%	\$95,530,061.97	18.20%
Dental	43,820	39.92%	116,045	2.18%	\$13,953,276.72	2.66%
EPSDT	13,669	12.45%	18,214	0.34%	\$1,046,871.91	0.20%
Hospital Outpatient	53,852	49.06%	268,630	5.04%	\$59,095,315.29	11.26%
Medical Vendor	43,274	39.42%	268,425	5.04%	\$63,337,859.46	12.06%
Gross Adjustment	3	0.00%	3	0.00%	50.95	0.00%
Hospital Inpatient	14,395	13.11%	25,946	0.49%	\$150,402,566.72	28.65%
TOTAL	109,777	100.00%	5,325,100	100.00%	\$525,004,096.57	100.00%

¹ Medicare eligibility status was based on all claims, including non-reimbursed claims.

² Number of enrollees with reimbursed claims of this type.

³ Number of reimbursed claims of this type.

Table A-4 estimates the effect of demographic categories on cost status. Age between 20 and 64 years was the strongest demographic predictor of high cost status. In the sample as a whole, those aged 65 and older cost the least—primarily because many of them received Medicare benefits. When this group was excluded, enrollees aged 6-19 became the least expensive. In the non-Medicare sample, enrollees aged 20 to 64 had over two and a half times the odds of being high cost as did children aged 5 and younger.

Table A-4
Association¹ of Enrollee Demographics with High-Cost² Status

Predictor		Est Odds Ratios		
		All Enrollees ³	No/Partial Medicare ⁴	No Medicare ⁵
Age Category	0-5	1.00	1.00	1.00
	6-12	0.62	0.62	0.62
	13-19	0.76	0.75	0.75
	20-64	2.22	2.47	2.57
	65+	0.60	0.79	1.02
Gender	Male	1.00	1.00	1.00
	Female	1.01	0.99	1.01
Race/Ethnicity	Caucasian	1.00	1.00	1.00
	African American	1.10	1.04	1.02
	Asian American	0.76	0.70	0.68
	American Indian	0.94	0.87	0.82
	Hispanic	0.80	0.79	0.78
	Other	0.79	0.77	0.75
Primary Language	English	1.00	1.00	1.00
	Non-English	0.82	0.76	0.72
Residence	Rural Area	1.00	1.00	1.00
	Urban Area	1.30	1.32	1.31

¹ Based on a multivariate logistic regression model with all demographic predictors.

² Enrollees were defined as “high cost” if their total reimbursements other than nursing-home costs for 1999 exceeded \$10,000. This constituted the most expensive 8.8% of all enrollees, and their non-nursing-home reimbursements constituted 49.7% of all non-nursing-home reimbursements.

³ N = 167,611 enrollees with complete data on all demographic predictors.

⁴ N = 125,657 enrollees with either no Medicare coverage or only partial coverage, and with complete data on all demographic predictors.

⁵ N = 104,631 enrollees with no Medicare coverage and with complete data on all demographic predictors.

Table A-5 shows Medicaid payments by ICD-9 diagnosis group. The ICD-9 diagnoses are sorted by “high-cost weight,” a measure of relative risk for being a high-cost enrollee if one has the diagnosis. Tables A-6 and A-7 represent reorderings of Table A-5. Table A-6 is presented in decreasing order of total Medicaid reimbursements for 1999. Table A-7 is presented in order of ICD-9 code; this table serves primarily to show diagnoses that are subsets of broader diagnosis clusters. All three tables provide information on the total number of enrollees with each diagnosis and the number of those individuals who received some case management services during the year.

Table A-5
Diagnoses Ordered by High-Cost Weight, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$¹	Total #	High-Cost Weight²	# Case Managed
Aplastic Anemia (284)	\$9,403,088.68	222	8.14	8
Cystic Fibrosis (277.0)	\$3,855,536.50	109	7.24	3
Primary Pulmonary Hypertension (416.0)	\$7,584,466.90	234	7.13	8
HIV (042)	\$19,591,150.53	1,120	7.10	692
Transplant (996.8,V42)	\$16,612,531.16	573	7.04	2
Pulmonary Embolism/Infarction (415.1)	\$5,369,273.42	204	6.84	4
White Cell Disease/Not Leukemia (288)	\$17,319,991.90	562	6.63	26
Pulmonary Circulation Diseases (415-417)	\$19,057,336.58	700	6.27	16
Nephritis/Nephrotic Syndrome/Nephrosis (580-589)	\$56,491,111.26	2,461	6.25	32
Coagulation Defect (286)	\$20,494,648.01	640	6.22	6
Obesity (278.0)	\$27,486,607.98	1,535	6.13	25
Inflammatory CNS (320-326)	\$7,223,398.22	243	6.07	15
Purpura/Hemorrhagic Conditions (287)	\$15,752,411.94	609	5.75	31
Immune Disorders (279)	\$7,202,990.59	331	5.73	71
Sickle Cell Anemia (282.6)	\$2,722,026.63	121	5.58	6
Conductive Disorders (426)	\$10,630,711.59	497	4.95	6
Poisoning by Medicinal Substances (960-979)	\$22,803,195.73	1,576	4.77	49
Nerve/Spinal Cord Injury (950-957)	\$9,568,836.08	548	4.40	17
Veins/Lymphatics/Other Circulatory(451-459)	\$87,384,334.68	5,635	3.93	134
MS (340)	\$11,262,643.51	1,080	3.88	2
Cardiac Dysrhythmia (427)	\$67,946,750.11	4,539	3.77	64
Puerperium Complications (670-677)	\$5,766,045.97	455	3.69	220
Arteries/Arterioles/Capillaries (440-448)	\$40,409,471.37	2,865	3.67	8
Drug Dependency (304)	\$32,683,023.35	2,804	3.63	181
Heart Failure (428)	\$68,652,541.99	4,985	3.58	22
Peripheral NS (350-359)	\$54,908,112.69	4,747	3.46	102
Ischemic Heart Disease (410-414)	\$71,212,914.01	6,144	3.42	21
Pneumonia/Influenza (480-487)	\$114,276,694.29	8,165	3.38	219
Mental Retardation (317-319)	\$12,174,205.14	1,046	3.19	4
Malignancy (140-208,230-234)	\$61,853,033.45	5,199	3.17	73
Retinal Detachments/Defects (361)	\$3,077,053.15	249	3.17	7
Congenital Anomalies (740-759)	\$74,017,977.56	5,719	3.17	336
Maternal Causes of Perinatal Morbidity/Mortality (760-763)	\$7,594,278.87	622	3.16	191
Other Perinatal Conditions (764-779)	\$43,962,146.26	3,027	3.13	1,313
Other CNS(340-349)	\$145,817,401.01	12,918	3.12	193
Invertebral Disc Disorders (722)	\$37,339,855.21	4,111	3.11	26

Table A-5 (continued)
Diagnoses Ordered by High-Cost Weight, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$ ¹	Total #	High-Cost Weight ²	# Case Managed
Migraine (346)	\$27,345,995.38	3,027	3.03	77
Osteopathies/Chondropathies/Musculoskeletal Deformity (730-739)	\$84,995,789.44	8,080	3.02	76
Alcohol Dependence Syndrome (303)	\$33,954,001.79	3,546	3.01	191
Female Breast Cancer (174)	\$9,451,069.58	987	2.99	1
Other Urinary System Diseases (590-599)	\$147,336,792.97	13,914	2.92	659
Cataplexy/Narcolepsy (347)	\$623,069.95	71	2.90	0
Epilepsy (345)	\$42,133,685.11	3,861	2.87	49
Cerebrovascular (430-438)	\$56,831,299.07	5,350	2.73	20
Hereditary/Degenerative CNS (330-337)	\$43,354,198.01	3,896	2.65	24
Other Retinal Disorders (362)	\$29,121,600.09	2,964	2.63	39
Diabetes (250)	\$129,022,478.03	14,666	2.56	147
Asthma (493)	\$93,241,704.54	10,145	2.54	154
Rheumatoid Arthritis/Related (714)	\$13,627,363.02	1,720	2.54	8
DigestiveSystemDiseases(520-579)	\$293,577,495.37	31,845	2.52	1,009
Burns (940-949)	\$9,916,533.03	1,210	2.45	24
Chronic Obstructive Pulmonary Disease (490-496)	\$180,392,414.62	20,606	2.39	278
Neurotic Disorders (300-316)	\$244,649,835.60	29,842	2.33	716
Blindness/Low Vision (369)	\$6,629,815.27	789	2.32	14
Genitourinary System Diseases (580-629)	\$265,650,631.03	32,100	2.28	1,653
Hypertensive Disease (401-405)	\$155,028,087.03	18,925	2.24	93
Circulatory (390-459)	\$307,265,780.29	36,722	2.19	343
Osteoarthritis/Related (715)	\$57,040,374.39	7,927	2.17	27
Pregnancy Complications (640-648)	\$32,427,951.89	3,845	2.16	1,955
Psychoses (290-299)	\$160,712,994.14	21,752	2.14	271
Injury/Poisoning (800-999)	\$333,362,231.14	42,820	2.11	818
Arthropathies/Related (710-719)	\$194,783,238.89	25,868	2.07	263
Skin/Subcutaneous Diseases (680-709)	\$210,380,137.01	27,705	2.05	883
Inflammatory Disease of Female Pelvic Organs (614-616)	\$32,373,006.77	4,714	2.00	495
Female Infertility (628)	\$274,835.92	35	1.96	4
Labor/Delivery Complications (660-669)	\$25,275,630.43	3,114	1.84	1,702
Other Female Genital Tract Disorders (617-629)	\$85,384,657.26	13,050	1.82	908
Labor/Delivery (650-669)	\$40,850,088.91	5,132	1.77	2,533
Respiratory Diseases (460-519)	\$399,256,045.64	58,411	1.73	1,698
Ectopic/Molar Pregnancy (630-633)	\$1,357,637.59	260	1.58	61
Parkinsons (332)	\$3,945,994.52	648	1.57	0
Acute Respiratory Infection (460-466)	\$208,406,865.98	36,013	1.47	1,327
Glaucoma (365)	\$17,309,949.48	3,261	1.38	10
Eye/Adnexa (360-379)	\$245,414,540.98	44,915	1.34	956
Ear/Mastoid (380-389)	\$101,919,908.26	18,506	1.33	428
Cataract (366)	\$36,926,864.23	7,172	1.20	15
Alzheimers (331.0)	\$4,166,033.78	1,023	0.58	0

¹ Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

² Proportion of high-cost enrollees who received this diagnosis, divided by proportion of all enrollees who received the diagnosis.

Table A-6
Diagnoses Ordered by Amount of Reimbursement, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$¹	Total #	High-Cost Weight²	# Case Managed
Respiratory Diseases (460-519)	\$399,256,045.64	58,411	1.73	1,698
Injury/Poisoning (800-999)	\$333,362,231.14	42,820	2.11	818
Circulatory (390-459)	\$307,265,780.29	36,722	2.19	343
Digestive System Diseases(520-579)	\$293,577,495.37	31,845	2.52	1,009
Genitourinary System Diseases (580-629)	\$265,650,631.03	32,100	2.28	1,653
Eye/Adnexa (360-379)	\$245,414,540.98	44,915	1.34	956
Neurotic Disorders (300-316)	\$244,649,835.60	29,842	2.33	716
Skin/Subcutaneous Diseases (680-709)	\$210,380,137.01	27,705	2.05	883
Acute Respiratory Infection (460-466)	\$208,406,865.98	36,013	1.47	1,327
Arthropathies/Related (710-719)	\$194,783,238.89	25,868	2.07	263
Chronic Obstructive Pulmonary Disease (490-496)	\$180,392,414.62	20,606	2.39	278
Psychoses (290-299)	\$160,712,994.14	21,752	2.14	271
Hypertensive Disease (401-405)	\$155,028,087.03	18,925	2.24	93
Other Urinary System Diseases (590-599)	\$147,336,792.97	13,914	2.92	659
Other CNS(340-349)	\$145,817,401.01	12,918	3.12	193
Diabetes (250)	\$129,022,478.03	14,666	2.56	147
Pneumonia/Influenza (480-487)	\$114,276,694.29	8,165	3.38	219
Ear/Mastoid (380-389)	\$101,919,908.26	18,506	1.33	428
Asthma (493)	\$93,241,704.54	10,145	2.54	154
Veins/Lymphatics/Other Circulatory(451-459)	\$87,384,334.68	5,635	3.93	134
Other Female Genital Tract Disorders (617-629)	\$85,384,657.26	13,050	1.82	908
Osteopathies/Chondropathies/Musculoskeletal Deformity (730-739)	\$84,995,789.44	8,080	3.02	76
Congenital Anomalies (740-759)	\$74,017,977.56	5,719	3.17	336
Ischemic Heart Disease (410-414)	\$71,212,914.01	6,144	3.42	21
Heart Failure (428)	\$68,652,541.99	4,985	3.58	22
Cardiac Dysrhythmia (427)	\$67,946,750.11	4,539	3.77	64
Malignancy (140-208,230-234)	\$61,853,033.45	5,199	3.17	73
Osteoarthritis/Related (715)	\$57,040,374.39	7,927	2.17	27
Cerebrovascular (430-438)	\$56,831,299.07	5,350	2.73	20
Nephritis/Nephrotic Syndrome/Nephrosis (580-589)	\$56,491,111.26	2,461	6.25	32
Peripheral NS (350-359)	\$54,908,112.69	4,747	3.46	102
Other Perinatal Conditions (764-779)	\$43,962,146.26	3,027	3.13	1,313
Hereditary/Degenerative CNS (330-337)	\$43,354,198.01	3,896	2.65	24
Epilepsy (345)	\$42,133,685.11	3,861	2.87	49
Labor/Delivery (650-669)	\$40,850,088.91	5,132	1.77	2,533
Arteries/Arterioles/Capillaries (440-448)	\$40,409,471.37	2,865	3.67	8
Invertebral Disc Disorders (722)	\$37,339,855.21	4,111	3.11	26
Cataract (366)	\$36,926,864.23	7,172	1.20	15
Alcohol Dependence Syndrome (303)	\$33,954,001.79	3,546	3.01	191
Drug Dependency (304)	\$32,683,023.35	2,804	3.63	181
Pregnancy Complications (640-648)	\$32,427,951.89	3,845	2.16	1,955
Inflammatory Disease of Female Pelvic Organs (614-616)	\$32,373,006.77	4,714	2.00	495
Other Retinal Disorders (362)	\$29,121,600.09	2,964	2.63	39
Obesity (278.0)	\$27,486,607.98	1,535	6.13	25
Migraine (346)	\$27,345,995.38	3,027	3.03	77
Labor/Delivery Complications (660-669)	\$25,275,630.43	3,114	1.84	1,702
Poisoning by Medicinal Substances (960-979)	\$22,803,195.73	1,576	4.77	49
Coagulation Defect (286)	\$20,494,648.01	640	6.22	6
HIV (042)	\$19,591,150.53	1,120	7.10	692
Pulmonary Circulation Diseases (415-417)	\$19,057,336.58	700	6.27	16

Table A-6 (continued)
Diagnoses Ordered by Amount of Reimbursement, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$ ¹	Total #	High-Cost Weight ²	# Case Managed
White Cell Disease/Not Leukemia (288)	\$17,319,991.90	562	6.63	26
Glaucoma (365)	\$17,309,949.48	3,261	1.38	10
Transplant (996.8,V42)	\$16,612,531.16	573	7.04	2
Purpura/Hemorrhagic Conditions (287)	\$15,752,411.94	609	5.75	31
Rheumatoid Arthritis/Related (714)	\$13,627,363.02	1,720	2.54	8
Mental Retardation (317-319)	\$12,174,205.14	1,046	3.19	4
MS (340)	\$11,262,643.51	1,080	3.88	2
Conductive Disorders (426)	\$10,630,711.59	497	4.95	6
Burns (940-949)	\$9,916,533.03	1,210	2.45	24
Nerve/Spinal Cord Injury (950-957)	\$9,568,836.08	548	4.40	17
Female Breast Cancer (174)	\$9,451,069.58	987	2.99	1
Aplastic Anemia (284)	\$9,403,088.68	222	8.14	8
Maternal Causes of Perinatal Morbidity/Mortality (760-763)	\$7,594,278.87	622	3.16	191
Primary Pulmonary Hypertension (416.0)	\$7,584,466.90	234	7.13	8
Inflammatory CNS (320-326)	\$7,223,398.22	243	6.07	15
Immune Disorders (279)	\$7,202,990.59	331	5.73	71
Blindness/Low Vision (369)	\$6,629,815.27	789	2.32	14
Puerperium Complications (670-677)	\$5,766,045.97	455	3.69	220
Pulmonary Embolism/Infarction (415.1)	\$5,369,273.42	204	6.84	4
Alzheimers (331.0)	\$4,166,033.78	1,023	0.58	0
Parkinsons (332)	\$3,945,994.52	648	1.57	0
Cystic Fibrosis (277.0)	\$3,855,536.50	109	7.24	3
Retinal Detachments/Defects (361)	\$3,077,053.15	249	3.17	7
Sickle Cell Anemia (282.6)	\$2,722,026.63	121	5.58	6
Ectopic/Molar Pregnancy (630-633)	\$1,357,637.59	260	1.58	61
Cataplexy/Narcolepsy (347)	\$623,069.95	71	2.90	0
Female Infertility (628)	\$274,835.92	35	1.96	4

¹ Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

² Proportion of high-cost enrollees who received this diagnosis, divided by proportion of all enrollees who received the diagnosis.

Table A-7
Diagnoses in ICD-9 Order, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$¹	Total #	High-Cost Weight²	# Case Managed
HIV (042)	\$19,591,150.53	1,120	7.10	692
Malignancy (140-208,230-234)	\$61,853,033.45	5,199	3.17	73
Female Breast Cancer (174)	\$9,451,069.58	987	2.99	1
Diabetes (250)	\$129,022,478.03	14,666	2.56	147
Cystic Fibrosis (277.0)	\$3,855,536.50	109	7.24	3
Obesity (278.0)	\$27,486,607.98	1,535	6.13	25
Immune Disorders (279)	\$7,202,990.59	331	5.73	71
Sickle Cell Anemia (282.6)	\$2,722,026.63	121	5.58	6
Aplastic Anemia (284)	\$9,403,088.68	222	8.14	8
Coagulation Defect (286)	\$20,494,648.01	640	6.22	6
Purpura/Hemorrhagic Conditions (287)	\$15,752,411.94	609	5.75	31
White Cell Disease/Not Leukemia (288)	\$17,319,991.90	562	6.63	26
Psychoses (290-299)	\$160,712,994.14	21,752	2.14	271
Neurotic Disorders (300-316)	\$244,649,835.60	29,842	2.33	716
Alcohol Dependence Syndrome (303)	\$33,954,001.79	3,546	3.01	191
Drug Dependency (304)	\$32,683,023.35	2,804	3.63	181
Mental Retardation (317-319)	\$12,174,205.14	1,046	3.19	4
Inflammatory CNS (320-326)	\$7,223,398.22	243	6.07	15
Hereditary/Degenerative CNS (330-337)	\$43,354,198.01	3,896	2.65	24
Alzheimers (331.0)	\$4,166,033.78	1,023	0.58	0
Parkinsons (332)	\$3,945,994.52	648	1.57	0
Other CNS(340-349)	\$145,817,401.01	12,918	3.12	193
MS (340)	\$11,262,643.51	1,080	3.88	2
Epilepsy (345)	\$42,133,685.11	3,861	2.87	49
Migraine (346)	\$27,345,995.38	3,027	3.03	77
Cataplexy/Narcolepsy (347)	\$623,069.95	71	2.90	0
Peripheral NS (350-359)	\$54,908,112.69	4,747	3.46	102
Eye/Adnexa (360-379)	\$245,414,540.98	44,915	1.34	956
Retinal Detachments/Defects (361)	\$3,077,053.15	249	3.17	7
Other Retinal Disorders (362)	\$29,121,600.09	2,964	2.63	39
Glaucoma (365)	\$17,309,949.48	3,261	1.38	10
Cataract (366)	\$36,926,864.23	7,172	1.20	15
Blindness/Low Vision (369)	\$6,629,815.27	789	2.32	14
Ear/Mastoid (380-389)	\$101,919,908.26	18,506	1.33	428
Circulatory (390-459)	\$307,265,780.29	36,722	2.19	343
Hypertensive Disease (401-405)	\$155,028,087.03	18,925	2.24	93
Ischemic Heart Disease (410-414)	\$71,212,914.01	6,144	3.42	21
Pulmonary Circulation Diseases (415-417)	\$19,057,336.58	700	6.27	16
Pulmonary Embolism/Infarction (415.1)	\$5,369,273.42	204	6.84	4
Primary Pulmonary Hypertension (416.0)	\$7,584,466.90	234	7.13	8
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Heart Failure (428)	\$68,652,541.99	4,985	3.58	22
Cerebrovascular (430-438)	\$56,831,299.07	5,350	2.73	20
Arteries/Arterioles/Capillaries (440-448)	\$40,409,471.37	2,865	3.67	8
Veins/Lymphatics/Other Circulatory(451-459)	\$87,384,334.68	5,635	3.93	134
Respiratory Diseases (460-519)	\$399,256,045.64	58,411	1.73	1,698
Acute Respiratory Infection (460-466)	\$208,406,865.98	36,013	1.47	1,327
Pneumonia/Influenza (480-487)	\$114,276,694.29	8,165	3.38	219
Chronic Obstructive Pulmonary Disease (490-496)	\$180,392,414.62	20,606	2.39	278

Table A-7 (continued)
Diagnoses in ICD-9 Order, All Enrollees
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Asthma (493)	\$93,241,704.54	10,145	2.54	154
Digestive System Diseases(520-579)	\$293,577,495.37	31,845	2.52	1,009
Genitourinary System Diseases (580-629)	\$265,650,631.03	32,100	2.28	1,653
Nephritis/Nephrotic Syndrome/Nephrosis (580-589)	\$56,491,111.26	2,461	6.25	32
Other Urinary System Diseases (590-599)	\$147,336,792.97	13,914	2.92	659
Inflammatory Disease of Female Pelvic Organs (614-616)	\$32,373,006.77	4,714	2.00	495
Other Female Genital Tract Disorders (617-629)	\$85,384,657.26	13,050	1.82	908
Female Infertility (628)	\$274,835.92	35	1.96	4
Ectopic/Molar Pregnancy (630-633)	\$1,357,637.59	260	1.58	61
Pregnancy Complications (640-648)	\$32,427,951.89	3,845	2.16	1,955
Labor/Delivery (650-669)	\$40,850,088.91	5,132	1.77	2,533
Labor/Delivery Complications (660-669)	\$25,275,630.43	3,114	1.84	1,702
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Skin/Subcutaneous Diseases (680-709)	\$210,380,137.01	27,705	2.05	883
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Osteoarthritis/Related (715)	\$57,040,374.39	7,927	2.17	27
Invertebral Disc Disorders (722)	\$37,339,855.21	4,111	3.11	26
Osteopathies/Chondropathies/Musculoskeletal Deformity (730-739)	\$84,995,789.44	8,080	3.02	76
Congenital Anomalies (740-759)	\$74,017,977.56	5,719	3.17	336
Maternal Causes of Perinatal Morbidity/Mortality (760-763)	\$7,594,278.87	622	3.16	191
Other Perinatal Conditions (764-779)	\$43,962,146.26	3,027	3.13	1,313
Injury/Poisoning (800-999)	\$333,362,231.14	42,820	2.11	818
Burns (940-949)	\$9,916,533.03	1,210	2.45	24
Nerve/Spinal Cord Injury (950-957)	\$9,568,836.08	548	4.40	17
Poisoning (960-979)	\$22,803,195.73	1,576	4.77	49
Transplant (996.8,V42)	\$16,612,531.16	573	7.04	2

¹ Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

² Proportion of high-cost enrollees who received this diagnosis, divided by proportion of all enrollees who received the diagnosis.

Several points should be noted with regard to Tables A-5 through A-7:

- Some of the conditions with very high total dollar amounts (e.g., occupying a high position in Table A-6) are not amenable to individual case management approach because of the large number of individuals in the lower-cost category who also have the condition. This is reflected by low values on the high-cost weight indicator and a correspondingly low position in Table A-5. An example of this would be the general diagnosis of respiratory diseases (ICD codes 460-519). Although almost \$400 million was spent on individuals with these diagnoses in 1999, this expenditure was spread over 58,411 people. The low high-cost weight (1.73) for these conditions results from the diagnosis cluster's lack of specificity for the identification of expensive clients.
- In contrast, other diagnoses exhibit very high high-cost weights but account for a very small proportion of the Medicaid budget. These diagnoses may, similarly, be inappropriate targets for investment of case management resources. Using an arbitrary limit for deciding which diagnoses merit consideration for case management, we would eliminate those entailing less than \$10 million in total

expenditures, despite relatively high high-cost weights: e.g., cystic fibrosis (277.0) with high-cost weight of 7.24, but affecting only 109 individuals at a total cost of \$3.86 million. Other selected examples include aplastic anemia (284), primary pulmonary hypertension (416.0), pulmonary embolism and infarction (415.1), inflammatory central nervous system diseases (320-326), immune disorders(279), and sickle cell anemia(282.6).

- Some of the diagnostic groups that appear to have a favorable cost-profile for case management probably do not reflect groupings that are practical for case management because the medical diagnosis is often a complication of other conditions. Examples include purpura and hemorrhagic conditions (287) and vein, lymphatic, and other circulatory system diseases (451-459).
- There exists a group of conditions that may reflect several attractive qualities for case management strategies: high-cost weight, total dollars spent, and some literature suggestive that improved quality and decreased costs might be an achievable goal.

Conditions Potentially Amenable to Case Management

- Given the major role that pharmaceutical costs play in the overall cost picture, it is difficult to imagine a successful program that does not address this issue in some fashion.
- Transplants: In terms of both high-cost weight and total expenditures, transplant patients meet the criteria for case management. In addition, there is clinical precedent for coordination of care.
- Renal disease: Expensive treatments are included in this category and are in some circumstances partially subsidized by Medicare. At least one other state is choosing to consider this disease for case management.
- Coagulation defects: Hemophilia is expensive to treat and often complicated. Other states have chosen to look at some case management models for this disease.
- Obesity: Morbid obesity not only is associated with very expensive clients, but this condition is also amenable to lifestyle modifications. A case management program for this condition could be innovative and very cost-effective.
- Poisoning by medical substances: Costs associated with improper use of prescribed medications are substantial. Several population groups are especially vulnerable to medication complications. High costs incurred in polypharmacy among the elderly result not only from the initial charges for medication, but also from the need to treat complications created by medication over-use.
- Cardiac disease: Quality guidelines for management of heart failure and other cardiac conditions do exist and could be adapted to a best-practice model of care.
- Malignancy: These patients need such a wide range of services that coordination of care could be very beneficial to the patients.

- ❑ Intervertebral disc disorders: The medical literature suggests that patients with back pain are inconsistently managed. Local experts have researched a variety of different approaches and might have insight into better methods of care.
- ❑ Diabetes and asthma: For both of these conditions there are medical models and systems of care that seem to save money and improve results.

Tables A-8 and A-9 are similar to Table A-7 except that they exclude some enrollees with Medicare eligibility. Table A-8 excludes everyone who had any Medicare eligibility during 1999. Table A-9 excludes only those who were covered for the full year. Although the exclusion of these subgroups results in slight changes in the rank ordering of diagnoses by high-cost weight, it does not substantially change the conclusions drawn from analyses on the total sample.

Table A-8
Diagnoses in ICD-9 Order, Enrollees with No Medicare Eligibility
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$ ¹	Total #	High-Cost Weight ²	# Case Managed
HIV (042)	\$11,860,978.38	617	6.20	341
Malignancy (140-208,230-234)	\$47,240,051.19	2,594	4.25	46
Female Breast Cancer (174)	\$6,681,591.67	458	4.32	1
Diabetes (250)	\$91,258,379.57	8,024	2.92	122
Cystic Fibrosis (277.0)	\$3,726,268.71	102	6.19	3
Obesity (278.0)	\$24,753,134.83	1,243	5.85	25
Immune Disorders (279)	\$6,193,629.67	271	4.80	57
Sickle Cell Anemia (282.6)	\$2,556,892.64	99	5.20	6
Aplastic Anemia (284)	\$8,871,463.60	176	7.78	7
Coagulation Defect (286)	\$18,425,765.54	469	6.38	4
Purpura/Hemorrhagic Conditions (287)	\$14,713,438.50	506	5.30	22
White Cell Disease/Not Leukemia (288)	\$15,886,106.27	464	6.05	19
Psychoses (290-299)	\$106,386,713.92	11,251	2.57	177
Neurotic Disorders (300-316)	\$207,597,904.70	22,762	2.27	591
Alcohol Dependence Syndrome (303)	\$29,840,388.17	2,762	2.94	156
Drug Dependency (304)	\$28,520,149.39	2,245	3.44	147
Mental Retardation (317-319)	\$10,295,385.39	598	4.27	4
Inflammatory CNS (320-326)	\$6,689,395.80	192	5.87	14
Hereditary/Degenerative CNS (330-337)	\$33,952,989.06	1,894	3.86	17
Alzheimers (331.0)	\$1,381,459.08	170	1.54	0
Parkinsons (332)	\$1,623,468.85	182	2.35	0
Other CNS(340-349)	\$123,444,359.16	9,262	3.10	171
MS (340)	\$6,887,339.15	501	3.97	2
Epilepsy (345)	\$37,188,644.19	2,927	2.89	43
Migraine (346)	\$23,294,508.59	2,437	2.72	70
Cataplexy/Narcolepsy (347)	\$553,691.28	60	2.75	0
Peripheral NS (350-359)	\$45,806,788.28	3,488	3.35	76
Eye/Adnexa (360-379)	\$174,838,106.23	27,017	1.46	811
Retinal Detachments/Defects (361)	\$2,571,804.42	153	3.43	4
Other Retinal Disorders (362)	\$22,191,983.11	1,567	3.43	31
Glaucoma (365)	\$11,548,912.50	1,606	1.89	7
Cataract (366)	\$18,976,605.48	2,232	2.21	7
Blindness/Low Vision (369)	\$5,496,251.52	541	2.46	12

Table A-8 (continued)
Diagnoses in ICD-9 Order, Enrollees with No Medicare Eligibility
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$ ¹	Total #	High-Cost Weight ²	# Case Managed
Ear/Mastoid (380-389)	\$88,994,160.28	15,176	1.24	402
Circulatory (390-459)	\$227,195,124.53	19,603	2.75	285
Hypertensive Disease (401-405)	\$124,518,434.56	12,109	2.50	77
Ischemic Heart Disease (410-414)	\$54,422,882.20	3,372	4.35	14
Pulmonary Circulation Diseases (415-417)	\$17,080,844.31	493	6.70	13
Pulmonary Embolism/Infarction (415.1)	\$4,704,216.19	141	7.23	1
Primary Pulmonary Hypertension (416.0)	\$6,917,897.76	183	7.00	8
Conductive Disorders (426)	\$9,386,105.79	319	5.94	5
Cardiac Dysrhythmia (427)	\$57,493,295.79	2,722	4.60	56
Heart Failure (428)	\$50,743,083.06	2,146	5.51	19
Cerebrovascular (430-438)	\$40,785,048.69	2,225	4.22	15
Arteries/Arterioles/Capillaries (440-448)	\$31,814,735.49	1,514	4.67	4
Veins/Lymphatics/Other Circulatory(451-459)	\$74,256,830.67	3,732	4.24	113
Respiratory Diseases (460-519)	\$324,692,438.04	42,930	1.67	1,573
Acute Respiratory Infection (460-466)	\$183,693,936.25	29,995	1.34	1,269
Pneumonia/Influenza (480-487)	\$96,679,959.65	5,325	3.72	190
Chronic Obstructive Pulmonary Disease (490-496)	\$142,959,653.95	13,720	2.50	248
Asthma (493)	\$79,574,194.68	7,813	2.43	145
Digestive System Diseases(520-579)	\$239,486,252.48	22,393	2.53	886
Genitourinary System Diseases (580-629)	\$212,720,627.10	22,939	2.16	1,569
Nephritis/Nephrotic Syndrome/Nephrosis (580-589)	\$40,487,238.98	1,161	6.41	23
Other Urinary System Diseases (590-599)	\$124,507,142.68	10,206	2.86	633
Inflammatory Disease of Female Pelvic Organs (614-616)	\$29,895,339.30	4,190	1.79	483
Other Female Genital Tract Disorders (617-629)	\$71,770,778.44	10,131	1.76	873
Female Infertility (628)	\$232,296.72	25	2.33	4
Ectopic/Molar Pregnancy (630-633)	\$1,291,873.99	244	1.39	60
Pregnancy Complications (640-648)	\$30,665,709.48	3,708	1.85	1,903
Labor/Delivery (650-669)	\$39,461,382.82	4,937	1.52	2,485
Labor/Delivery Complications (660-669)	\$24,787,471.85	3,077	1.57	1,686
Puerperium Complications (670-677)	\$5,685,271.39	435	3.28	216
Skin/Subcutaneous Diseases (680-709)	\$169,932,660.91	19,742	2.01	822
Arthropathies/Related (710-719)	\$153,599,005.98	17,025	2.22	220
Rheumatoid Arthritis/Related (714)	\$9,679,164.06	1,030	2.58	6
Osteoarthritis/Related (715)	\$43,125,031.57	4,725	2.60	19
Intervertebral Disc Disorders (722)	\$31,008,173.59	3,028	3.06	17
Osteopathies/Chondropathies/Musculoskeletal Deformity (730-739)	\$69,698,244.64	5,169	3.35	57
Congenital Anomalies (740-759)	\$67,824,956.37	4,943	2.88	319
Maternal Causes of Perinatal Morbidity/Mortality (760-763)	\$7,353,017.29	609	2.68	187
Other Perinatal Conditions (764-779)	\$42,277,582.07	2,943	2.66	1,286
Injury/Poisoning (800-999)	\$262,324,467.77	29,488	2.07	677
Burns (940-949)	\$8,603,887.49	937	2.36	22
Nerve/Spinal Cord Injury (950-957)	\$8,268,547.00	393	4.30	14
Poisoning (960-979)	\$19,318,465.50	1,185	4.60	33
Transplant (996.8,V42)	\$11,317,315.18	233	6.58	2

¹ Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

² Proportion of high-cost enrollees who received this diagnosis, divided by proportion of all enrollees who received the diagnosis.

Table A-9
Diagnoses in ICD-9 Order, Enrollees with No or Incomplete Medicare Eligibility
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$¹	Total #	High-Cost Weight²	# Case Managed
HIV (042)	\$16,579,009.32	913	6.36	554
Malignancy (140-208,230-234)	\$54,089,170.03	3,601	3.62	67
Female Breast Cancer (174)	\$7,960,620.07	654	3.65	1
Diabetes (250)	\$108,142,678.76	10,627	2.69	138
Cystic Fibrosis (277.0)	\$3,784,150.87	105	6.48	3
Obesity (278.0)	\$26,525,079.35	1,385	5.81	25
Immune Disorders (279)	\$6,858,284.69	303	5.09	69
Sickle Cell Anemia (282.6)	\$2,609,629.52	108	5.17	6
Aplastic Anemia (284)	\$9,254,428.08	200	7.81	8
Coagulation Defect (286)	\$19,407,081.75	553	6.13	5
Purpura/Hemorrhagic Conditions (287)	\$15,163,549.15	547	5.38	29
White Cell Disease/Not Leukemia (288)	\$16,852,363.13	516	6.18	24
Psychoses (290-299)	\$127,501,995.33	15,022	2.29	223
Neurotic Disorders (300-316)	\$225,126,414.77	25,711	2.26	669
Alcohol Dependence Syndrome (303)	\$32,245,031.69	3,151	2.89	182
Drug Dependency (304)	\$30,890,452.35	2,510	3.45	164
Mental Retardation (317-319)	\$10,601,489.36	662	4.15	4
Inflammatory CNS (320-326)	\$7,005,847.31	215	5.85	15
Hereditary/Degenerative CNS (330-337)	\$38,084,142.17	2,662	3.11	19
Alzheimers (331.0)	\$2,376,603.17	475	0.75	0
Parkinsons (332)	\$2,565,432.32	364	1.70	0
Other CNS(340-349)	\$132,209,336.39	10,466	3.09	181
MS (340)	\$8,395,115.42	683	3.85	2
Epilepsy (345)	\$38,940,088.86	3,220	2.87	46
Migraine (346)	\$25,437,380.43	2,725	2.77	74
Cataplexy/Narcolepsy (347)	\$589,915.91	65	2.81	0
Peripheral NS (350-359)	\$50,612,298.75	4,027	3.32	90
Eye/Adnexa (360-379)	\$203,976,130.19	33,412	1.39	897
Retinal Detachments/Defects (361)	\$2,864,126.45	195	3.28	6
Other Retinal Disorders (362)	\$25,591,954.24	2,091	3.01	35
Glaucoma (365)	\$13,751,373.11	2,188	1.61	8
Cataract (366)	\$26,127,206.39	3,915	1.58	13
Blindness/Low Vision (369)	\$6,033,694.48	632	2.38	14
Ear/Mastoid (380-389)	\$94,731,832.22	16,404	1.26	418
Circulatory (390-459)	\$262,637,407.10	25,984	2.44	325
Hypertensive Disease (401-405)	\$139,780,540.60	14,763	2.37	89
Ischemic Heart Disease (410-414)	\$62,456,694.45	4,472	3.79	17
Pulmonary Circulation Diseases (415-417)	\$18,294,928.29	574	6.49	15
Pulmonary Embolism/Infarction (415.1)	\$5,109,048.49	168	7.01	3
Primary Pulmonary Hypertension (416.0)	\$7,377,348.50	203	7.05	8
Conductive Disorders (426)	\$10,045,474.33	383	5.46	6
Cardiac Dysrhythmia (427)	\$62,306,050.77	3,389	4.15	61
Heart Failure (428)	\$58,848,452.54	3,155	4.39	22
Cerebrovascular (430-438)	\$47,985,854.27	3,449	3.27	18
Arteries/Arterioles/Capillaries (440-448)	\$36,192,171.96	2,043	4.08	7
Veins/Lymphatics/Other Circulatory(451-459)	\$80,834,216.24	4,453	4.06	129
Respiratory Diseases (460-519)	\$357,178,916.70	48,839	1.67	1,650
Acute Respiratory Infection (460-466)	\$195,128,066.30	32,376	1.37	1,302
Pneumonia/Influenza (480-487)	\$104,904,337.54	6,383	3.54	213
Chronic Obstructive Pulmonary Disease (490-496)	\$159,213,530.29	16,357	2.40	269

Table A-9
Diagnoses in ICD-9 Order, Enrollees with No or Incomplete Medicare Eligibility
Diagnosis Group, Total Reimbursements, Total Enrollees, and High-Cost Weight

Diagnosis Group	Total \$ ¹	Total #	High-Cost Weight ²	# Case Managed
Asthma (493)	\$85,690,883.95	8,768	2.41	151
Digestive System Diseases(520-579)	\$264,012,436.18	26,058	2.48	961
Genitourinary System Diseases (580-629)	\$237,460,300.37	26,589	2.18	1,625
Nephritis/Nephrotic Syndrome/Nephrosis (580-589)	\$49,012,643.72	1,778	5.96	28
Other Urinary System Diseases (590-599)	\$135,658,401.10	11,687	2.85	652
Inflammatory Disease of Female Pelvic Organs (614-616)	\$31,172,139.52	4,430	1.84	494
Other Female Genital Tract Disorders (617-629)	\$77,165,238.32	11,242	1.75	896
Female Infertility (628)	\$248,410.88	29	2.10	4
Ectopic/Molar Pregnancy (630-633)	\$1,339,752.74	252	1.45	61
Pregnancy Complications (640-648)	\$31,395,138.20	3,781	1.92	1,934
Labor/Delivery (650-669)	\$40,285,863.63	5,031	1.59	2,511
Labor/Delivery Complications (660-669)	\$25,091,186.12	3,097	1.64	1,696
Puerperium Complications (670-677)	\$5,731,376.58	446	3.34	217
Skin/Subcutaneous Diseases (680-709)	\$187,194,374.73	22,683	2.01	856
Arthropathies/Related (710-719)	\$171,261,429.67	20,354	2.13	251
Rheumatoid Arthritis/Related (714)	\$11,457,127.90	1,308	2.56	8
Osteoarthritis/Related (715)	\$48,938,040.29	5,911	2.36	23
Invertebral Disc Disorders (722)	\$34,364,062.46	3,514	3.00	23
Osteopathies/Chondropathies/Musculoskeletal Deformity (730-739)	\$76,457,319.06	6,198	3.19	67
Congenital Anomalies (740-759)	\$70,927,687.64	5,225	2.97	329
Maternal Causes of Perinatal Morbidity/Mortality (760-763)	\$7,510,546.05	614	2.81	188
Other Perinatal Conditions (764-779)	\$42,971,097.34	2,987	2.79	1,300
Injury/Poisoning (800-999)	\$294,138,515.97	34,782	2.05	755
Burns (940-949)	\$9,223,848.26	1,049	2.35	24
Nerve/Spinal Cord Injury (950-957)	\$8,799,970.16	452	4.27	16
Poisoning (960-979)	\$21,309,390.42	1,376	4.53	41
Transplant (996.8,V42)	\$14,077,419.83	385	6.41	2

¹ Total expenditures for individuals who received this diagnosis at any time during 1999. Individuals and associated expenditures may be in multiple disease groups.

² Proportion of high-cost enrollees who received this diagnosis, divided by proportion of all enrollees who received the diagnosis.

Washington State Medicaid provided almost \$1.9 million in case management services to enrollees during 1999. Table A-10 summarizes the direct costs for these services to the 4,487 enrollees who received them.

Table A-10
Case Management Services Provided
Number of Enrollees Receiving and Cost of Service

HCPCS	Type	# Enrollees	Total \$
0028M	Chemical dependency – intensive case management	42	\$34,450.70
0075M	Case management – short term for San Juan Health	2	\$150.00
0076M	Case management/preg chem. dep women w/o child	185	\$38,079.65
0077M	Case management/preg chem. dep women w/child	416	\$118,924.15
0079M	Case management/pregnant women w/no children	1,087	\$188,379.28
0080M	Case management/pregnant women w/children	2,856	\$648,028.63
0081M	Case management/attempt to contact preg women	243	\$2,905.55
0082M	Case management/follow-up assess pregnant women	5	\$165.48
0173M	DASA - targeted case management (EPSDT)	41	\$9,369.77
0470M	HIV/AIDS case management, full month	873	\$833,225.73
0471M	HIV-AIDS case management, partial month	84	\$14,124.00
2186M	CDDA sanctioned intensive case management	4	\$1,470.88
TOTAL		4,487	\$1,889,273.82

APPENDIX B: THE PCCM ALTERNATIVE TO MANAGED CARE IN OTHER STATES

Managed care arrangements provide Medicaid beneficiaries a medical home that can support case management services. Given the current unstable climate in managed care, primary care case management (PCCM) arrangements may offer a promising alternative to the traditional managed care organization (MCO) approach to managed care. A number of states are taking this approach (see Exhibit B-1). In PCCM arrangements, the primary care physician takes on some case management responsibilities and provides a medical home to the beneficiary. Most PCCM plans shown in Exhibit B-1 provide an additional \$3 monthly administrative case management fee per beneficiary.

Though Washington failed to extend managed care to SSI beneficiaries, Medicaid clients with disabilities in other states have successfully made the transition to MCO or PCCM managed care arrangements. A more in-depth look at Medicaid programs that provide managed care to disabled clients may identify keys to providing a medical home to SSI beneficiaries.

Exhibit B-1
State PCCM Managed Care Programs
With More Than 500 Persons With Disabilities
 (Based on a 1998 Survey of State Medicaid Programs)

State	Name of Program	PWD* Enrolled	State	Name of Program	PWD* Enrolled
Alabama	Patients 1 st	15,000	Nebraska	Nebraska Health Connection – PCCM	1,290
Arkansas	Connect Care	25,470	New York	PCCM/Partial Cap Programs	6,000
California	PCCM Program	1,000	North Carolina	Carolina Access	70,000
Colorado	Primary Care Physician Program	5,000	Oregon	Oregon Health Plan: PCCM	1,510
Florida	Medipass	135,000	Pennsylvania	Family Care Network	22,000
Georgia	Georgia Better Health Care	87,000	South Dakota	Provider and Recipient in Medicaid Efficiency	11,000
Idaho	Health Connections	6,680	Texas	Star-PCCM	3,460
Kansas	Health Connect Kansas	15,000	Utah	Choice of Health Care Delivery Program	3,000
Louisiana	Community Care	12,550	Virginia	Medallion	43,970
Massachusetts	Primary Care Clinician Program	72,370	West Virginia	Physician Assured Access System	3,000
Montana	Passport to Health	6,000			

*PWD – Persons With Disabilities

Source: M. Regenstein and C. Schroer, *Medicaid Managed Care for Persons with Disabilities: State Profiles*. (Prepared by the Economic and Social Research Institute for the Kaiser Commission on Medicaid and the Uninsured, 1998).