

Successful Models of Comprehensive Care for Older Adults with Chronic Conditions: Evidence for the Institute of Medicine's "Retooling for an Aging America" Report

[see editorial comments by Dr. David B. Reuben, pp. 2348–2349]

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The quality of chronic care in America is low, and the cost is high. To help inform efforts to overhaul the ailing U.S. healthcare system, including those related to the "medical home," models of comprehensive health care that have shown the potential to improve the quality, efficiency, or health-related outcomes of care for chronically ill older persons were identified. Using multiple indexing terms, the MEDLINE database was searched for articles published in English between January 1, 1987, and May 30, 2008, that reported statistically significant positive outcomes from high-quality research on models of comprehensive health care for older persons with chronic conditions. Each selected study addressed a model of comprehensive health care; was a meta-analysis, systematic review, or trial with an equivalent concurrent control group; included an adequate number of representative, chronically ill participants aged 65 and older; used valid measures; used reliable methods of data collection; analyzed data rigorously; and reported significantly positive effects on the quality, efficiency, or health-related outcomes of care. Of 2,714 identified articles, 123 (4.5%) met these criteria. Fifteen models have improved at least one outcome: interdisciplinary primary care (1), models that supplement primary care (8), transitional care (1), models of acute care in patients' homes (2), nurse-physician teams for residents of nursing homes (1), and models of comprehensive care in hospitals (2). Policy makers and healthcare leaders should consider including these 15 models of health care in plans to reform the U.S. healthcare system. The Centers for Medicare and Medicaid Services would need new statutory flexibility to pay for care by the nurses, social workers, pharmacists, and physicians

who staff these promising models. *J Am Geriatr Soc* 57:2328–2337, 2009.

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On January 1, 2011, the first members of the American "baby boom" generation will reach age 65, swelling the population of Americans aged 65 and older to 40 million in 2011, nearly 55 million by 2020, and more than 70 million by 2030.¹ Many older persons, especially the "oldest old," have chronic conditions that require complex health care, so as the population ages, the total number of Americans with chronic conditions will rise rapidly. Unless scientists make unprecedented breakthroughs in preventing or curing such conditions soon, the United States will face a pandemic of chronic disease throughout the next several decades.

For 30 years, experts have warned that the U.S. healthcare system, which focuses on caring for acute illnesses and injuries, will be unprepared to provide adequate chronic care for the aging baby boomers.^{2,3} Despite these admonitions, America's healthcare system has not developed the capacity to provide good chronic care. Its hospitals, nursing homes, outpatient clinics, and home care agencies still operate as uncoordinated "silos";⁴ much of its physician workforce is inadequately trained in chronic care;⁵ and the quality and efficiency of chronic care remain "far from optimal."^{4–6} In a recent study of health care in six developed nations, the United States ranked first in health care spending; fifth in quality; and sixth in access, efficiency, and equity. U.S. per capita healthcare expenditures are two to three times as great as those of the other nations.⁷

Medicare beneficiaries who have five or more chronic conditions generate two-thirds of all Medicare spending,

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and those with four or more chronic conditions account for 80%.⁸ Much of this spending, which totaled \$462 billion in 2008,⁹ could be avoided if patients with multiple chronic conditions were monitored regularly, received timely evidence-based ambulatory care, and required fewer hospital admissions,⁸ but Medicare beneficiaries with four or more chronic conditions are 99 times as likely to be admitted to hospitals for “ambulatory care-sensitive conditions” as beneficiaries with only one condition.⁸ Without improvements in the efficiency of chronic care, the trust fund that finances Medicare Part A is likely to become insolvent in 2017.⁹

To help improve chronic care, an expert panel recently recommended a set of policy reforms for “strengthening the primary care system, encouraging care coordination, and promoting care management of high-cost patients with complex conditions.”¹⁰ Despite thousands of studies of care models designed to accomplish these aims, no consensus exists about which models can improve clinical and financial outcomes. Such a consensus, once attained, could inform efforts to overhaul our ailing healthcare system and help shape the services to be provided by the increasingly popular, but as yet ill-defined, “medical home.”

To help inform the debate on U.S. healthcare reform and the optimal structure and function of the medical home, this study sought to identify models of comprehensive care that high-quality research has shown to be capable of improving the quality, outcomes, and efficiency of care for chronically ill older persons. The considerable heterogeneity of models, target populations, and research methods precluded meta-analyses (or even systematic reviews) of the models’ positive and negative effects. Instead, the study strove to identify promising models that should be considered for replication or further study. A related, but more limited, literature search was conducted in 2007 that helped inform the Institute of Medicine’s 2008 recommendations for reshaping the U.S. workforce of health professionals to better care for the aging American population.¹¹

METHODS

MEDLINE was searched for articles published in English between January 1, 1987, and May 30, 2008, that reported statistically significant positive outcomes (improvements in the quality or efficiency of care or in patients’ quality of life, functional autonomy, or mortality) from high-quality studies of clinical models staffed primarily by healthcare professionals to provide comprehensive health care to older persons with several chronic conditions. Models were considered to be comprehensive if they addressed several health-related needs of older persons, such as care for several chronic conditions, for several aspects of one condition, or for persons receiving care from several healthcare providers. Studies of more narrowly focused models such as innovations in cataract surgery and management of single medications were excluded. Studies were considered to be high quality if they met five criteria: strength of design (reviews, meta-analyses, or controlled trials with equivalent concurrent control groups), adequacy of sample (adequate number of representative, chronically ill participants ≥ 65), validity of measures, reliability of data collection techniques, and rigor of data analysis.

The search strategy relied on Medical Subject Headings (MeSH) and text terms that identified models of care (e.g., case management, disease management, comprehensive geriatric assessment, geriatric evaluation and management, Program of All-inclusive Care for the Elderly, palliative care, patient education, primary care, pharmaceutical services, self management, and transitional care) and settings in which care is provided (e.g., hospitals, nursing homes, emergency departments, rehabilitation centers, and patients’ homes). Repeated searches of the database were performed, each combining one of these terms with the MeSH term “outcome and process assessment (health care).” These searches identified 2,714 citations, 305 of which appeared, based on their titles, to be relevant to the goals of the project.

Two of the authors (CB, AG) read the abstracts of these 305 articles to assess their fulfillment of the inclusion criteria described above. Each of the authors then reviewed one-sixth of the 131 articles that appeared to meet the inclusion criteria, adding 51 relevant articles cited in their bibliographies and discarding 59 that did not meet the inclusion criteria. Divergent opinions about individual articles’ adherence to the inclusion criteria were resolved by consensus. Articles that had been included in meta-analyses or systematic reviews were not reviewed separately (Figure 1).

Next the findings reported in the 123 eligible articles were tabulated according to the type of model evaluated. Finally, based on these tabulated outcome data, the evidence of each model’s effects on health status and on the quality and efficiency of health care for chronically ill older Americans was summarized.

RESULTS

Fifteen “successful” models of care for older persons with chronic conditions were identified (Table 1). Nine of these

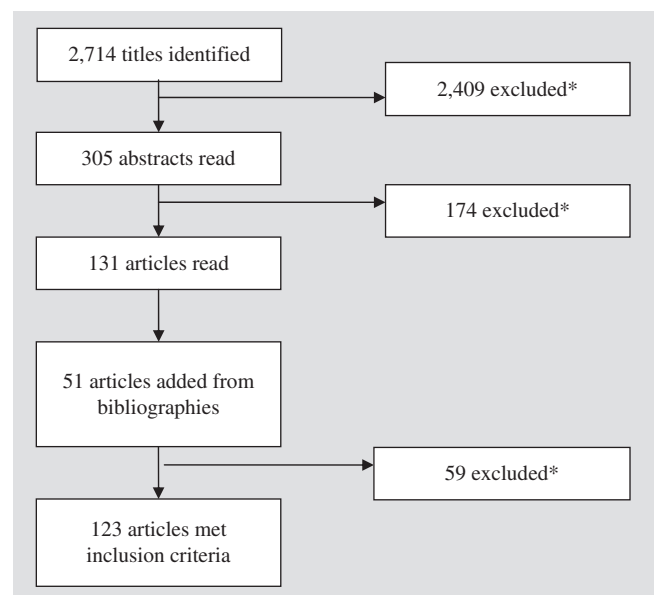


Figure 1. Literature search.

*Failed to meet inclusion criteria.

models are based on interdisciplinary primary care (Model A) or supplemental health-related services that enhance traditional primary care (Models B–I). Three models address the challenges that accompany care transitions, including one that facilitates transitions from hospital to home (Model J) and two that provide acute care in patients' homes in lieu of hospital care (Model K) or after brief hospital care (Model L). This literature search also revealed successful models of care for residents of nursing homes (Model M) and for patients in acute care hospitals (Models N and O).

In Table 1, an up arrow indicates that a model has significantly improved an outcome. The fractions in parentheses indicate the number of selected studies that assessed an outcome (denominator) and the number that reported

significantly positive effects (numerator). Asterisks indicate that at least one meta-analysis reported a significantly positive effect. Italics highlight increases in the use or costs of certain healthcare services, some of which may be desirable (e.g., increases in outpatient visits that lead to fewer hospital admissions).

Below the reported benefits of the identified models are briefly summarized. Details about the models and the results are provided in the Web supplement.

Interdisciplinary Primary Care

In each of these heterogeneous models, a team composed of a primary care physician and one or more other healthcare professionals, such as nurses, social workers, nurse practi-

Table 1. Summary of Evidence on 15 Successful Models of Chronic Care

Model	Studies	Quality of Care	Quality of Life	Functional Autonomy	Survival	Use/Cost of Health Services
A. Interdisciplinary primary care	1 meta-analysis 2 reviews 9 RCTs 3 QE studies 1 XS time series	↑ (11/11)	↑ (9/9)	↑ (6/9)	↑ (2*/14)	Lower use (9*/12) Lower costs (2*/8) <i>Higher costs (1/7)</i>
B. Care and case management	12 RCTs 1 QE study	↑ (4/4)	↑ (7/8)	↑ (1/4)	↑ (4/8)	Lower use (6/10) <i>More use (4/10)</i> Lower costs (1/3)
C. Disease management	1 review 1 meta-analysis 2 RCTs	↑ (1/1)	↑ (2/3)	↑ (1/1)	↑ (1/3)	Lower use (2*/3)
D. Preventive home visits	3 meta-analyses	NA	NA	↑ (2*/3)	↑ (3*/3)	Lower use (2*/3)
E. Comprehensive geriatric assessment, geriatric evaluation and management	10 RCTs 1 QE	↑ (4/4)	↑ (7/10)	↑ (6/11)	↑ (1/9)	Lower use (4/9) <i>More use (3/9)</i> <i>Higher costs (1/5)</i>
F. Pharmaceutical care	6 RCTs	↑ (4/4)	↑ (1/3)	NA	↑ (2/5)	Lower use (2/3)
G. Chronic disease self-management	1 meta-analysis 10 RCTs	NA	↑ (8*/9)	↑ (7*/7)	NA	Lower use (4/5) Lower costs (1/1)
H. Proactive rehabilitation	4 RCTs 1 QE study	NA	↑ (2/3)	↑ (4/5)	↑ (1/3)	Lower use (2/4) <i>More use (1/4)</i>
I. Caregiver education and support	2 meta-analyses 3 RCTs	NA	↑ (3*/3)	↑ (1/2)	ND (1/1)	Lower use (3*/4) Lower costs (1/1)
J. Transitional care	1 meta-analysis 2 RCTs	NA	↑ (2*/2)	ND (1/1)	↑ (1/2)	Lower use (2/3) Lower costs (3*/3)
K. Substitutive hospital-at-home	5 RCTs 1 QE study	ND (3/3)	↑ (5/6)	↑ (1/6)	ND (5/5)	Shorter LOS (3/3) Lower costs (5/5)
L. Early-discharge hospital-at-home	4 RCTs	NA	↑ (1/4)	↑ (1/4)	ND (3/3)	Lower use (4/4)
M. Care in nursing homes	5 QE studies 1 RCT	↑ (6/6)	↑ (1/1)	↑ (1/3)	↑ (1/2)	Lower use (4/4) <i>More use (2/4)</i> Lower costs (1/1)
N. Prevention and management of delirium	4 RCTs 2 QE studies	↑ (1/2)	↑ (5/5)	↑ (1/1)	↑ (1/3)	Shorter LOS (2/3) Lower costs (1/3)
O. Comprehensive inpatient care	2 meta-analyses 5 RCTs 1 QE study	↑ (1/1)	↑ (3*/4)	↑ (5*/6)	↑ (3*/6)	Lower use (2/8) <i>More use (1/8)</i>

Fractions: numerator = number of studies showing significant difference, denominator = number of studies in which this outcome was assessed.

* Includes meta-analysis.

NA = not assessed; ND = no difference; ↑ = better outcome; LOS = length of stay in hospital; QE = quasi-experimental; RCT = randomized controlled trial; XS = cross-sectional.

tioners, and rehabilitation therapists, who communicate frequently with each other provide comprehensive primary care (Supporting Information, Table S1). Such teams have improved several indices of the quality of multimorbid patients' primary health care, and many have improved patients' quality of life and functional autonomy. Some types of teams have significantly reduced patients' use of selected health services. For most of these models, the available evidence of success is limited to a single randomized trial. Only teams focused on heart failure have improved patients' survival and have been evaluated in enough studies to allow a meta-analysis, which reported significant reductions in hospital admissions and total costs.^{12–30}

Care or Case Management

Care management (CM) is a collaborative model that generally involves a nurse or social worker helping chronically ill patients and their families to assess problems, communicate with healthcare providers, and navigate the healthcare system (Supporting Information, Table S2). Care managers are usually employees of health insurers or capitated healthcare provider organizations. CM has been associated with better satisfaction with care, quality of care, quality of life, and survival. Evidence demonstrating better functional autonomy is weaker, and results related to use and cost of health services are mixed; most studies showed at least one positive effect on utilization, and several showed at least one negative effect.^{31–42}

Disease Management

Disease management (DM) programs supplement primary care by providing patients with information about their chronic conditions (e.g., diabetes mellitus or heart failure) in writing or by telephone (Supporting Information, Table S3). Nurses or other trained technicians employed by companies under contract with insurers or capitated provider organizations provide health education and instruction about self-monitoring, treatment guidelines, and medical encounters. One review that examined DM for heart failure, coronary disease, and diabetes mellitus reported no significant effect on any of the relevant outcomes. A meta-analysis of heart failure programs reported that DM was associated with significantly fewer hospital admissions. A subsequent randomized controlled trial (RCT) found that DM for patients with chronic obstructive pulmonary disease (COPD) was associated with better quality of care, better quality of life, longer COPD-related survival, and a shift from unscheduled to scheduled visits to physicians. Another RCT showed significant improvements in quality of life and functional autonomy, as well as lower use of hospitals by patients with angina.^{43–46}

Preventive Home Visits

Preventive home visits are multidimensional, in-home assessments provided to older people by nurses, physicians, or other visitors who generate specific recommendations for treating existing health problems and preventing new ones (Supporting Information, Table S4). Such programs have improved several aspects of health and service use, although the heterogeneity of interventions and study populations contributes to uncertainty about the generalizability of their results. A meta-analysis of 15 trials found that the programs

reduced mortality and nursing home admissions in frail and nonfrail members of the older population. Two subsequent meta-analyses also found evidence of benefit, provided that the interventions targeted relatively healthy “young-old” persons, included a clinical examination with the initial assessment, or offered extended follow-up.^{47–49}

Outpatient Comprehensive Geriatric Assessment and Geriatric Evaluation and Management

Outpatient comprehensive geriatric assessment (CGA) and geriatric evaluation and management (GEM) are supplemental services designed to identify all of a person's health conditions, to develop treatment plans for those conditions, and (in GEM) to implement the treatment plans over weeks to months (Supporting Information, Table S5). Interdisciplinary teams of physicians, nurses, social workers, and in some programs, rehabilitation therapists, pharmacists, dietitians, psychologists, or clergy usually staff CGA and GEM programs. Hospitals, academic health centers, or capitated healthcare provider organizations such as the Veterans Affairs sponsor most programs. They obtain information from and communicate their findings and recommendations to their patients' established primary care providers. Several RCTs have shown that outpatient GEM can improve patients' quality of care but not their survival or the efficiency of their health care. In approximately half of the selected RCTs that measured patients' quality of life and functional autonomy, outpatient GEM improved these outcomes.^{50–62}

Pharmaceutical Care

Pharmaceutical care is advice about medications provided by pharmacists to patients or interdisciplinary care teams (Supporting Information, Table S6). Pharmacists' recommendations can be targeted to a site of care (e.g., home, hospital, or nursing home), to a specific disease (e.g., heart failure or hypertension), or to patient profiles (e.g., patients receiving GEM or taking several medications). Such programs have been shown to be capable of improving medication adherence, appropriate prescribing, disease-specific outcomes, and in some cases, survival. Some programs have reduced the use of hospitals.^{63–68}

Chronic Disease Self-Management

Chronic disease self-management (CDSM) programs are structured, time-limited interventions designed to provide health information and engage patients in actively managing their chronic conditions (Supporting Information, Table S7). Health professionals lead some programs, which focus on managing a specific condition, such as stroke, whereas trained lay persons lead others, which are aimed at addressing chronic conditions more generically. Health insurers or community agencies sponsor most; they communicate with primary care providers only through their clients. In the selected studies, CDSM was associated with better quality of life and functional autonomy, as well as greater efficiency in the use and cost of health services. Quality of care and survival were not assessed in any of the studies.^{69–79}

Proactive Rehabilitation

Proactive rehabilitation is a relatively new supplement to primary care in which rehabilitation therapists provide

outpatient assessments and interventions designed to help physically disabled older persons maximize their functional autonomy, safety at home, and quality of life (Supporting Information, Table S8). The few studies that have evaluated this intervention have shown its potential for beneficial effects on physical function. Reductions in hospital, emergency department, or home care use have been reported less frequently. In a quasi-experimental study, subjects receiving restorative care had a significantly greater likelihood of remaining at home. One randomized trial of proactive rehabilitation reported a reduction in mortality, but two others found no effect on survival.^{80–85}

Caregiver Support

Caregiver education and support programs are designed to help the informal and family caregivers of older persons with chronic conditions such as dementia and stroke (Supporting Information, Table S9). Led by psychologists, social workers, or rehabilitation therapists, these programs provide varying combinations of health information, training, access to professional and community resources, emotional support, counseling, and information about coping strategies. They communicate with primary care providers primarily through their clients. There is strong evidence, in individual studies and in two meta-analyses, that programs supporting caregivers of patients with dementia, particularly programs that are structured and intensive, can delay nursing home placement significantly. Similarly, all three selected studies that examined patients' quality of life, including one meta-analysis, showed significant benefit. The only study that examined survival showed no benefit.^{86–91}

Transitional Care

Most interventions in transitional care are designed to facilitate smoother, safer, and more-efficient transitions from hospital to the next site of care (another healthcare setting or home) (Supporting Information, Table S10). A nurse or an advance practice nurse (APN), who prepares the hospitalized patient and informal caregiver for the transition, typically leads transitional care interventions. The nurse, sometimes known as a "transition coach," provides intensive patient education about self-care, coaches the patient and informal caregiver about communicating effectively with health professionals, performs a home visit, and monitors the patient after the transition. Health insurers or capitated healthcare provider organizations sponsor most nonexperimental transitional care programs. Transitional care is clearly capable of reducing hospital readmission rates and costs.^{92–94}

Hospital-at-Home

Hospital-at-Home (HaH) programs provide care for certain acute conditions that are usually treated in acute care hospitals (Supporting Information, Tables S11 and S12). In "substitutive" HaH, care is provided in the home in lieu of hospital care. After initial assessment confirms that a patient requires hospital-level treatment but can be treated safely at home, the patient returns home and is treated by a HaH team that includes a physician, nurses, technicians, and rehabilitative therapists. Tests and treatments that would otherwise be provided in a hospital are delivered in

the home until the patient has recovered. Substitutive models differ in the intensity of the care they provide, particularly by physicians. Most of the selected studies have shown that substitutive HaH can improve patients' quality of life and reduce their hospital utilization and healthcare costs.

"Early discharge" models of HaH provide acute care in the home after a brief hospitalization. In early-discharge HaH models, after a patient's medical condition has stabilized in the hospital, the patient returns home and is treated there by a HaH team consisting chiefly of nurses, technicians, and rehabilitative therapists. Early-discharge models have been evaluated after surgery, such as joint replacement, and for medical conditions, such as rehabilitation after stroke. These programs have demonstrated the potential to reduce inpatient utilization.^{95–110}

Nursing Home

Several models have been developed to improve the care of nursing home residents (Supporting Information, Table S13). Most rely on primary care provided by an APN or physician assistant (PA) employed by an insurance company, a nursing home, or a provider organization. The APN or PA evaluates the patient every few weeks, trains the nursing home staff to recognize and respond to early signs of deterioration, assesses changes in the patient's status, communicates with family, and treats medical conditions at the nursing home. The APN or PA usually works in partnership with a physician who is skilled in long-term care and who provides supplemental care as needed. Such programs have shown the capacity to provide better quality of care and to reduce their patients' use of hospitals and emergency departments.^{33,111–118}

Prevention and Management of Delirium

Special programs for hospitalized older patients have been designed to prevent delirium, detect its early manifestation, evaluate its causes, and initiate prompt treatment (Supporting Information, Table S14). These programs usually involve training hospital staff, implementing preventive measures and routine screening for delirium, using evidence-based guidelines to address risk factors for delirium, assessing the causes of delirium, and treating delirium when it appears. Programs that focus on preventing delirium in hospitalized patients have demonstrated the ability to reduce the incidence and complications of delirium and the duration of hospital stays. Trials of delirium management programs have demonstrated fewer benefits, suggesting that programs designed to prevent delirium may be more beneficial than those designed to treat it.^{119–125}

Comprehensive Hospital Care

Comprehensive hospital care includes models such as interdisciplinary geriatric consultation teams, acute care for elders (ACE) units, inpatient CGA units, and inpatient GEM units (Supporting Information, Table S15). ACE units are usually medical wards with environments friendly to older patients, care by an interdisciplinary geriatric team, a philosophy of patient activation, and early-discharge planning. A 1993 meta-analysis of eight studies concluded that inpatient consultation teams preserve older inpatients' cog-

dition and ability to return to their own homes but have no effect on survival, physical function, or hospital readmission. Three RCTs and one quasi-experimental study suggest that ACE units may improve inpatients' health and functional autonomy without consistently affecting their survival or their use and cost of health services. A 1993 meta-analysis reported that inpatient CGA and GEM significantly improve patients' survival (after 6 months) and functional autonomy (after 12 months).^{126–133}

DISCUSSION

This report and its Web supplement constitute a catalog of the positive studies of 15 successful care models for older Americans with chronic conditions. Each of these models provides comprehensive health care for older patients and was deemed successful, because at least one high-quality study reported that at least one version of the model is capable of improving the quality, outcomes, or efficiency of care (compared with “usual care”).

Meta-analyses of several studies provide evidence that several models can produce significantly better results than usual care. Interdisciplinary primary care (for heart failure) and transitional care can reduce healthcare costs. Interdisciplinary primary care, disease management, preventive home visits, and caregiver support can reduce the use of health services. Interdisciplinary primary care, preventive home visits, and inpatient GEM can increase survival. Additionally, preventive home visits, chronic disease self-management, caregiver support, transitional care, and comprehensive inpatient care can improve patients' quality of life and functional autonomy.

The primary value of this catalog of empirical data on successful models of chronic care lies in its ability to inform debate and decisions about improving chronic care. Using these summaries, architects and implementers of new healthcare models can readily identify models shown by high-quality research to be capable of improving specific outcomes. The contents of the original articles summarized here provide additional details about the operation of the models and the circumstances under which they have produced positive outcomes.

For example, the meta-analytical evidence that interdisciplinary primary care for heart failure can reduce the use and total cost of health services provides guidance and empirical support for the recent enthusiasm for the “medical home” concept¹³⁴ and the recent recommendations that the United States should strengthen primary care, care coordination, and care management for patients with complex health care needs,¹⁰ although it remains to be seen whether such gains in efficiency will be replicated when generalist teams care for patients with a wide range of chronic conditions, rather than only patients who have heart failure. Success may depend on the extent to which generalist teams mirror the characteristics of primary care heart failure teams: limited case loads, expert nurses, strong nurse–physician teamwork, and adherence to evidence-based guidelines. Recent studies of successful generalist teams^{22,25,30} may further inform the creation and operation of successful medical homes.

High-quality studies with a variety of designs have shown that all 15 models are capable of improving the

quality, outcomes, or efficiency of care, but except for the meta-analyses, Table 1 and Appendix S1 Tables S1 to S15 summarize only positive studies and, therefore, should not be used to quantify the relative strengths of the 15 models. Publication bias and exclusion of negative studies would strongly bias any such rankings.

Few of the models of comprehensive care described in this report have been adopted widely in clinical practice in the United States. Factors that influence a model's “real world” adoption include not only its effectiveness, but also its operational and financial complexity and its fit with potentially adopting organizations' prevailing cultures.^{135–138} Operational barriers to widespread dissemination include difficulty in “scaling up” a model for use throughout large systems of care,¹³⁷ requirements for collaboration between stakeholders within and between organizations, and lack of technical assistance from model developers.¹³⁹

Financial barriers to dissemination are also significant. Some models generate savings by avoiding costs, but this is often difficult for adopting organizations to track. Other models operated and funded by one organization produce savings for another. A dearth of experts in providing chronic care is another formidable obstacle.^{11,140} It should come as no surprise that dissemination of successful models has been limited!¹⁴¹

The Medicare program will play a critical role in facilitating or discouraging the dissemination of successful new models of care for older adults with chronic conditions. Unfortunately, the statutes that now define the Medicare program limit its ability to support many of these models. For example, most nonphysician personnel, who are essential providers in many of these models, are not eligible for payment by Medicare. Similarly, most care by physicians that occurs outside of face-to-face encounters with patients cannot be reimbursed. In the inpatient setting, Medicare's differential rates of payment offer strong incentives for hospitals to perform procedures, rather than to invest in interdisciplinary medical care for patients with chronic illnesses. Thus, many successful new models of chronic care are not financially viable outside of small experiments and demonstration projects. To enable the widespread adoption and sustainability of such models, the Centers for Medicare and Medicaid Services would need new statutory flexibility to offer payment for nontraditional forms of care by nurses, social workers, pharmacists, and physicians.¹⁴²

In conclusion, many comprehensive models of chronic care for older adults have been shown to be capable of improving important outcomes, but the nation's ability to benefit from these advances will depend on the models' inherent diffusability, on additional rigorous research, and on public and private insurers' ability and willingness to reimburse providers adequately for the costs of operating these models.

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SUPPORTING INFORMATION

Additional supporting information may be found in the on-line version of this article:

Supplement, Tables S1–S15

Appendix S1. Each row of each table summarizes one high-quality study of a “successful” model of care. For each model, the columns on the left provide information about the relevant published research. The columns on the right summarize the findings of the research. Outcomes that were statistically significantly better for the recipients of the studied model than for the comparison group are displayed in green. Increases in the use of services and cost of health care (sometimes desirable) are displayed in red. Bolded entries indicate meta-analyses.

Table S1. Evidence About the Effects of Successful Interdisciplinary Primary Care Models

Table S2. Evidence About the Effects of Care and Case Management

Table S3. Evidence About the Effects of Disease Management.

Table S4. Evidence About the Effects of Preventive Home Visits

Table S5. Evidence About the Effects of Outpatient Comprehensive Geriatric Assessment (CGA) and Geriatric Evaluation and Management (GEM)

Table S6. Evidence About the Effects of Pharmaceutical Care

Table S7. Evidence About the Effects of Chronic Disease Self-Management (CDSM)

Table S8. Evidence About the Effects of Proactive Rehabilitation

Table S9. Evidence About the Effects of Caregiver Education and Support on Care Recipients

Table S10. Evidence About the Effects of Transitional Care

Table S11. Evidence About the Effects of “Substitutive” Hospital-at-Home

Table S12. Evidence About the Effects of “Early Discharge” Hospital-at-Home

Table S13. Evidence About the Effects of Models of Care in Nursing Homes

Table S14. Evidence About the Effects of Prevention and Management of Delirium

Table S15. Evidence About the Effects of Models of Comprehensive Inpatient Care

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