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The Importance of Care Coordination of Patients with Multimorbidity: An Evaluation of the Patient-Centered Medical Home Model

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The importance of care coordination of patients with multimorbidity: an evaluation of the Patient-Centered Medical Home Model

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One sentence summary:

The patient-centered medical home model has been identified as a promising strategy for improving the continuity of care for patient with multimorbidity by providing a centralized medical home responsible for organizing all patient interactions.

ABSTRACT

The rise in multimorbidity among various patient populations has made fragmentation of care an increasingly common issue due to the need for specialized care of each chronic condition and complexity of treatment plans. Implementation of care coordination intervention models has been identified as an essential component in combating this fragmented nature of our current health care system. This is done by providing an organized model of care and improving communication between all parties involved in care and treatment plans. This literature review will begin with a brief discussion on the importance of care coordination and components needed for implementation and evaluation of such intervention models. This review then analyzes a staple model of care coordination and how it has been integrated into current health care settings. The focus of this literature review is to understand what population of patients benefit the most from care coordination and how these frameworks can be integrated into current health care systems. The conclusion of this review discusses the limitations of current studies and offers some insight on how the effectiveness of care coordination can be improved in the future.

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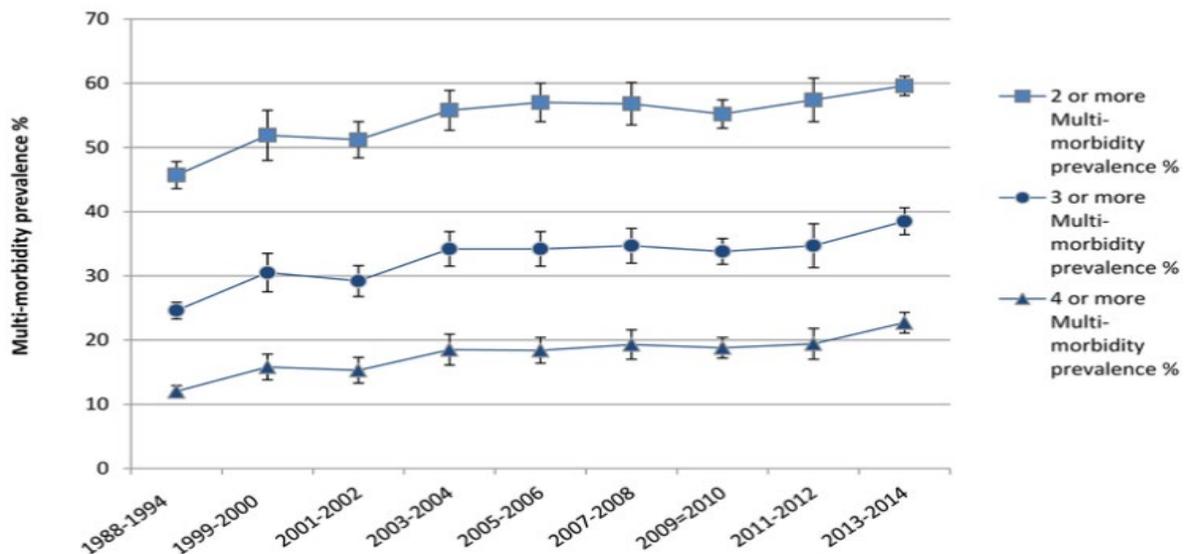
INTRODUCTION

Effective and efficient treatment management of patient care has become a primary goal for improving healthcare quality and cost in the United States as well as correcting the fragmented nature of our current health care system. Care coordination has been identified as a possible strategy for not only improving the continuity and accessibility of care, but also attenuating health care spending (1, 2). Care coordination programs have targeted patients with complex medical histories and multiple chronic conditions as a way of reducing health care spending. This patient population is thought to benefit greatly from such programs because they are at greater risk for fragmentation in care. This is because multiple specialists are often seen for each chronic condition; if coordination of care is not prioritized, redundant diagnostic procedures and discontinuity in care can occur.

The Agency for Healthcare Research and Quality (AHRQ) reported that within the USA, 5% of the population accounts for approximately half of all health care spending (3). Evaluation of this high-cost patient population identified a high prevalence of patients with multiple chronic conditions, or multimorbidity. This small population accounts for a disproportionate amount of health care expenditure, yet still report unmet health care needs, increased health care utilization, and increased risk for medical errors. Multimorbidity is defined as the co-occurrence of two or more chronic conditions, where one is not necessarily more central than the other (4). While definitions may vary between articles, the broad conclusion remains the same – the presence of multimorbidity is continuing to increase, with an estimated prevalence of 50% for two or more chronic conditions by the age of 65 (4, 5). Care coordination for this population has become increasingly more difficult to manage as the prevalence of multimorbidity continues to expand. Figure 1 shows the trends in multimorbidity in the United States from 1988-2014. This study

recorded over half of all adults age 20 and older have two or more multimorbidities, with the highest prevalence in people aged 65 years or older (6). As the life expectancy and population continues to rise, the prevalence of multimorbidity will continue to rise as well, and the total health care expenditure will likely follow. This creates a greater need for improving the fragmented nature of our current health care system in order to improve health and wellbeing outcomes and reduce health care spending.

Figure 1. Prevalence of Multimorbidity from 1988-2014.



The presence of multimorbidity has continued to increase over time. This is due to an expanding aging population and earlier onset of chronic conditions (5).

Despite this increase in frequency of patients with multimorbidity, clinical guidelines and current methods of care delivery still emphasize care and treatment focused on each single disease rather than promoting preventative medicine and implementing coordinated measures for a more organized treatment plan (7, 8). The current model of care in our health care system creates fragmentation for multimorbidity patients due to the discontinuity between care and prevents effective utilization of care. Fragmentation describes the lack of coordination and

inefficient allocation of resources in health care delivery (9). Ultimately fragmentation of care leads to a greater risk of medical error and inflation of costs due to redundancy in diagnostic procedures and inefficient communication between providers. Patients with multimorbidity tend to experience greater discontinuity in care due to the specialized needs of each patient. This results in lower quality of life, increased hospitalizations and cost of care, and decreased satisfaction with care (10). Care coordination has been identified as a key component in improving the fragmented nature of health care experienced by patients with multimorbidity while also reducing health care spending (11-13). This coordination is achieved by identifying where discontinuities in care are occurring and implementing protocols and coordination models to resolve these inconsistencies and improve the quality of care for each patient.

Care coordination is often cited in health care and services literature but is seldom explicitly defined. The 2007 Agency for Healthcare Research and Quality evidence report on care coordination identified over 40 definitions of care coordination relative to health care settings. This report created a working definition of care coordination in order to provide a more comprehensive evaluation of intervention methods used and is defined as follows: “Care coordination is the deliberate organization of patient care activities between two or more participants – including the patient – involved in a patient’s care in order to facilitate the appropriate delivery of health care services” (14). Because of the ambiguity of this definition, care coordination frameworks are diverse in their components, implementation strategies, and interventions used. However, the ultimate outcome for each care coordination model remains the same – organizing patient care in order to improve disease outcomes while containing overall health care costs. In order to determine the effectiveness of these intervention models it is critical to understand how the effects of care coordination are measured.

MEASURING CARE COORDINATION

Given the combination of a rise in multimorbidity prevalence among various patient populations and the fragmented nature of the U.S. health care system, coordination intervention models have been recognized as a key method at improving the continuity of care received while attenuating overall health care spending (1, 2). These models of care continue to receive recognition, resulting in an increase in private and public vendors of care coordination services, with revenue from these services increasing from \$78 million to \$1.2 billion from 1997 to 2005 (14). As these models continue to develop and are implemented into current health systems, it is important to evaluate the impact of these programs on various patient populations and determine the overall effectiveness in current health care systems. The diversity of care coordination components and various implementation protocols has created many avenues for measuring the effects of such coordination intervention models. This makes it difficult to determine the validity of such models of care due to the variability of outcomes for each component involved in achieving coordination of care. Measuring care coordination remains an active area of improvement because many providers disagree on how to best measure care coordination outcomes (12). In order to provide a more comprehensive evaluation of these intervention models, organizations including the Disease Management Association of America and National Committee for Quality Assurance continue to develop standardized care management measures and accreditation of disease management programs. Current methods of measuring outcomes of care coordination have been compiled in the Care Coordination Measurement Atlas and focuses on three main categories – perspectives, outcomes, and contexts (15). These variables will be discussed further in the following sections.

Measuring Perspectives

As the definition of care coordination states earlier, coordination of care involves collaboration between many participants in order to effectively organize patient care activities (14). This can include the patient and their family, health care provider and other medical staff, and health care system representatives. Measuring the perspectives of each party involved in coordinating care can help determine any shortcoming in the care coordination frameworks and where additional support is needed (15). Evaluation of participant perspectives can also provide insight on the effectiveness of the components of care coordination that occur between participants and where miscommunication or discrepancies between those involved in care plans occurred.

Because perspectives vary depending on the person's point of view, a single component of care coordination can be evaluated from each participant's perspectives. One common example of this is the assessment of communication in the health care setting. This measurement can focus on the communication between the patient and health care provider, communication within the health care teams, or communication across the health care system and campuses (16). Patients provide insight into the quality of care by evaluating how well the provider listened to and addressed their concerns. Health care provider's perspectives shed light on whether staffing and appointment times are adequate (17). Measurement of patient and health care provider perspectives are often conducted as a satisfaction questionnaire in addition to a follow up analysis of patient records (18). The Consumer Assessment of Healthcare Provider and Systems program, created by the Agency of Healthcare Research and Quality, offers standardized patient surveys as a means of providing a central form for measuring patient – provider communication (19). Health care systems can evaluate the effectiveness of communication by analyzing

documentation records for consistency and their role in communication between health care teams. This provides insight on whether care management protocols are properly defined and job responsibilities are clear between each team involved in a patient's care, both within and across health care systems. Measuring health system perspective is performed by analyzing audits on clinical activities and administrative claims within the health care system. Evaluation of health care system's perspective is typically the responsibility of the quality assurance departments within a health care system and is critical for continued quality and safety improvement (16). When evaluated together, the perspectives of all participants involved offers a complementary and comprehensive picture of the care coordination model and identifies places where improvements may be needed.

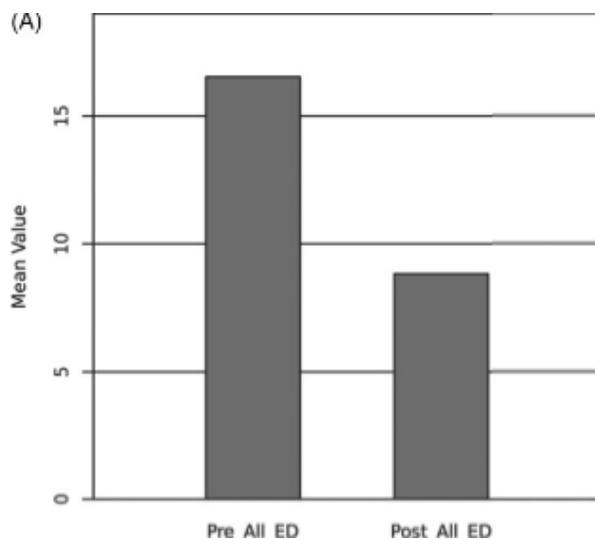
Measuring Outcomes

Clinical, financial, and accessibility outcomes as well as quality of life assessments provide a long-term evaluation of the impact care coordination intervention models have on a health care system. This method of evaluation is used to assess the endpoints of interest and whether the integration of care coordination model was proven to be effective. These variables are easier to measure than participants' perspectives because data is more readily available in the patient medical records and there is less subjectivity. This approach also provides details on the overall effects of such coordination intervention frameworks by comparing patient and clinical outcomes before and after coordination models have been implemented. While this method of evaluation provides a definitive answer on whether a care coordination program was successful at improving the fragmented nature of a health care system, it is unable to determine where shortcomings are occurring in the model (15). Clinical outcomes can be assessed by evaluating hospital readmissions, mortality rate and overall improvements in health. Financial outcomes are

assessed by comparing health care spending, both for the patient and health care system. Finally, accessibility outcomes are analyzed by comparing wait times and scheduling availability. These measurements are able to show a correlation between the implementation of care coordination interventions and improved patient outcomes.

One common example of outcome measurement is the evaluation of emergency department utilization and hospital readmission. Hospital emergency departments have been identified as one of the main areas in need of improving coordination of care due to the increase in cost of utilization and greater risk of fragmentation and discontinuity of care (20, 21). Frequent emergency department users, identified as visiting an emergency department 10 or more times within a six-month period, represent a minority patient population, but account for a disproportionate rise in healthcare costs (22, 23). Additionally, patients with chronic conditions are at a greater risk for becoming frequent emergency department users (21, 24). Care

Figure 2. Evaluation of a Multidisciplinary Care Coordination Program on ED Visits.



Clinical outcomes, such as emergency department utilization, can be used to evaluate the effectiveness of care coordination intervention models (20).

coordination intervention models can be implemented to identify this minority patient population and provide the necessary services to reduce nonemergent emergency department utilization. Figure 2 shows how this measurement can be evaluated in an actual health care system. In this figure, emergency department utilization by frequent users was evaluated before and after a multidisciplinary care coordination program was implemented.

Measuring Context

The context in which care coordination models are implemented should also be considered when measuring the impact care coordination interventions have on a specific patient population; these include patient population characteristics and demographics as well as clinical settings. The effects of care coordination may be mediated by factors outside of the clinical setting. These factors can determine which patient populations will benefit from interventions. Evaluation of social determinants of health can aid in assessing which populations would benefit from care coordination intervention programs. Social determinants of health are the social, economic, and physical conditions in which a person lives that may affect the health, quality of life, and overall wellbeing of a person (25). Some examples include access to healthy foods and health care services, educational opportunities, and community demographics. These factors can impact overall wellbeing and lead to a greater risk for health problems. Assessment of social determinants of health through health and wellbeing screenings can identify this patient population. Care coordination programs can then be utilized to minimize the risk of future health problems due to these environmental circumstances (26, 27).

THE PATIENT-CENTERED MEDICAL HOME MODEL

Care coordination is essential for improving the risks of fragmentation in our current health care system, especially for patients with multimorbidity and complex care needs. While there are many approaches used to improve care coordination, the Patient-Centered Medical Home (PCMH) model has been identified as a promising strategy for improving health care quality in the United States by transforming how primary care is organized and delivered (28). Before discussing the components involved in the PCMH model and its current impact on care

coordination, it is important to review the development of the medical home and creation of the PCMH Model.

History of PCMH Model

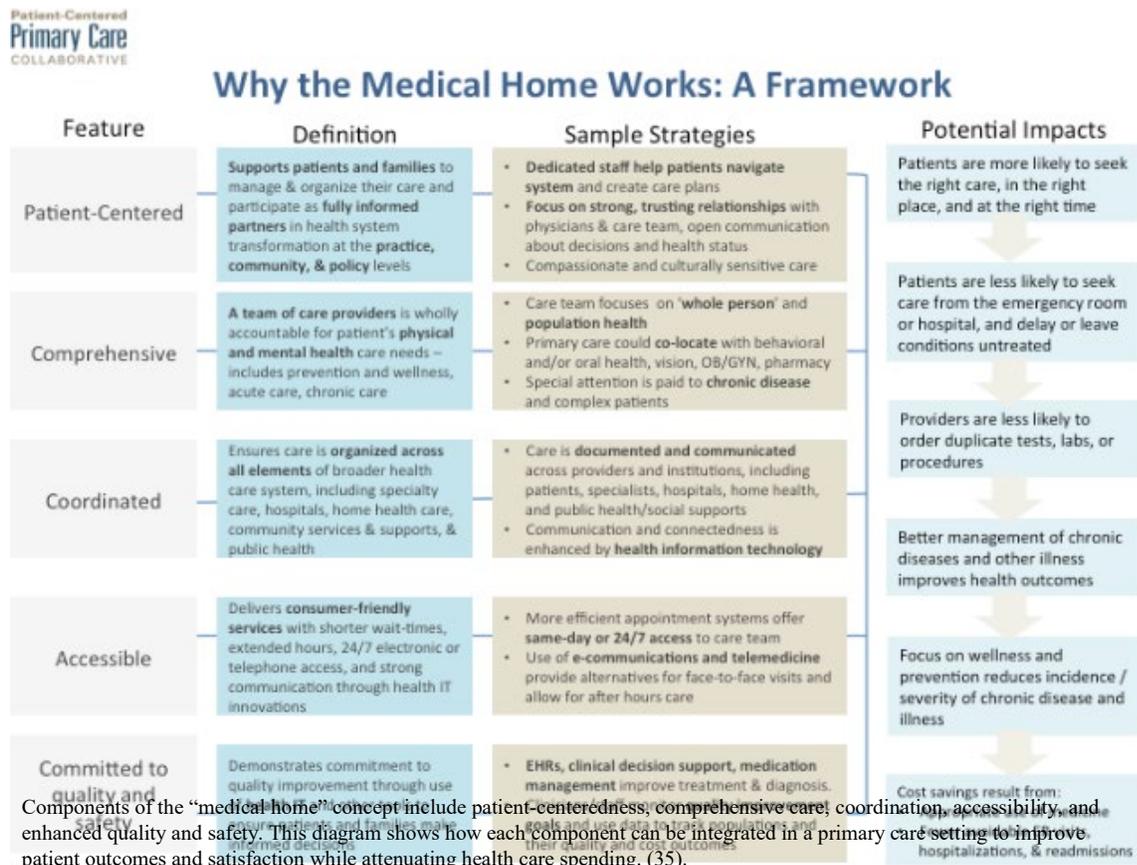
Elements of the PCMH model were first seen in the 1960's, when the American Academy of Pediatrics (AAP) introduced the concept of a "medical home" and established the role of primary care providers in the care of chronically ill children (29). This concept has since been expanded to improve health care services for a broader patient population. The Chronic Care Model of was introduced in 1996 by Dr. Ed Wagner as a way of improving care management for adult patients with chronic illnesses; this model emphasized team-based care and patient self-management support (30). Components of this model were integrated with the medical home concept more broadly in primary care settings as a way of improving patient outcomes, reducing cost, and improving patient and provider satisfaction. This "advanced medical home" concept was endorsed as the "Joint Principles of the Patient centered medical home" in 2007 by the Patient-Centered Primary Care Collaborative and recognized by the National Committee for Quality Assurance in 2008 (31). This model of care continues to receive support from various accrediting bodies including the Accreditation Association for Ambulatory Health Care and the Utilization Review Accreditation Commission.

Components of PCMH Model

The medical home is defined by the Agency for Healthcare Research and Quality as not only a place, but as a model of the organization of primary care that delivers the core functions of primary health care (32). These factors allow for care that is unique to each patient's needs while providing continuity and consistency between all parties involved, including providers and

health care teams, and patients and their family. This framework of care coordination is becoming a common model of coordination intervention used to transition primary care into team-based care within our current health care system. This model focuses on five key components of the original “medical home” concept including comprehensive care, patient-centeredness, coordinated care, accessible services, and emphasis on quality and safety (33). Figure 3 demonstrates strategies for how these components can be implemented into current primary care practices. It is important to note that in order for this model to be implemented efficiently, these components must act in tandem. Single components can be integrated in primary care settings, but the effects will not be as significant.

Figure 3. Components of the Patient-Centered Medical Home Model and Strategies for Implementation.



Primary care providers are responsible for organizing and integrating physical and mental health care needs for a large patient population. This task often requires an extensive team of health care personnel including physicians, nurses, social workers, pharmacists, and case managers. In order to achieve comprehensive care within the PCMH model a team-based approach utilizing multidisciplinary care teams is essential. The use of multidisciplinary care teams capitalizes on the strengths of each individual team member while allowing continued education to improve the team's overall capacity (34). This task requires adequate communication between all team members involved to ensure all components of the patient's wellbeing are addressed.

Patient-centeredness is a key component in this model, as it offers individualized treatment plans based on the patient's needs and any barriers that exist. This component is often achieved by integrating case managers into the treatment plan. By implementing case managers into the health care team, a deeper patient-provider relationship can be established, and the patients are more likely to utilize their primary care provider rather than relying on emergency department visits (28). This creates greater continuity in care and prevents duplicated diagnostic procedures and miscommunication among providers.

Coordination of care is not only essential within the primary care team, but also across health care systems. This component is necessary to achieve efficient and cost-effective care. The use of electronic medical records is one technique used to improve the coordination of care across health care systems. This method improves the communication between health care personnel involved in a patient's care because previous documentation of care is readily available during the time of treatment.

Improved access refers to the availability of health care services and can include provider availability as well as hours of operation. This component is critical for ensuring that patients have the resources needed for establishing a primary care provider and continued availability for preventative and acute treatment plans. Enhanced access to health care resources can be implemented in a variety of ways. Most commonly, open-access scheduling has been used to allow for routine and follow up visits while reserving time for urgent visits (31). This has been important for reducing wait times and increasing appointment availability. Additionally, electronic patient portals have improved the access to care by streamlining patient information and enhancing self-management and patient education tools. This improved access to primary care providers will limit the use of emergency department for non-urgent medical care and aid in attenuating health care costs while improving continuity of care received by patients.

Finally, enhanced quality and safety is important in providing exceptional care and developing deeper patient-provider relationships. This component emphasizes evidence-based practices and the development of quality improvement procedures in order to ensure health care systems are operating efficiently and areas in need of improvement are identified. Commitment to quality and safety is a continual goal of all health care systems, not just those using the PCMH Model. Specifically, this model of care identifies patient-centeredness as a key indicator of quality. This characteristic was defined in the 2001 report, *Crossing the Quality Chasm*, as healthcare that establishes a partnership among practitioners, patients, and their families to ensure the treatment plan respects the patients' wants, needs, and preferences and the patient is educated and able to participate in their own care.

Impact of PCMH Model

The PCMH Model continues to gain recognition as a possible solution for improving the value and quality of health care within the United States, with more than 13,000 PCMH practices in the United States currently recognized by the National Committee for Quality Assurance (36). Due to the complexity and financial resources needed to properly integrate this model into health care systems, evaluations of the effects of this model are still being conducted. Current analysis reports focus on the impact of individual components of the PCMH Model, rather than evaluating the model as a complex intervention mechanism. Because of this the impact on access to care, quality, and costs have had mixed results at a national-level evaluation (36, 37). This is likely due to the fact that individual characteristics are being analyzed for a broad patient population. In order to assess the validity of such a complex model, it is important to look at the impact of interventions as a whole, not just as individual components. Evaluation of the PCMH Model as a system, or unit, for specific patient populations yields more promising results. Research conducted at individual health care systems show that, compared to standard primary care settings, integration of the PCMH Model resulted in fewer emergency visits and hospital admissions and higher patient satisfaction of services received (36-38). Analysis of the PCMH Model within a health care system shows the impact a comprehensive medical home can have on specific patient populations compared within a health care setting. This method of evaluation provides a look at what patient population benefits from care coordination and what characteristics of patients are likely to benefit from care coordination programs.

Establishment of medical homes remains a difficult task due to the current payment structure of health care systems. Reimbursement reform, including fee-for-services systems and blended payment plans, provide incentive for health care systems to continue integrating medical

homes into their primary care settings (28). Fee-for-service systems allow for providers to bill for services not covered under tradition billing. This can include care management services and coordination fees to cover non-visit-based care services. Blended service plans offer an additional care coordination membership fee. This payment plan is used to cover the cost of developing and maintaining individualized patient-centered treatment plans, rewarding providers for identifying patients in need of care coordination. Providing financial incentive for integration of care coordination models is imperative for ensuring health care systems are rewarded for emphasizing quality, whole-person care and care coordination continues to be emphasized in primary care settings.

Lastly, advancements in health information technology continues to play a critical role in the successful implementation and development of comprehensive medical homes. Health information technology, including electronic health records, quality measurement report tools, and patient portals, allow for localized information that is accessible for all parties involved in patient care. This accessibility to patient information can enable effective care coordination by reducing the redundancies observed in current health care systems by providing timely communication and collaboration between all participants involved in the patient's treatment plan (39). Because comprehensive, patient-centered care is dependent upon communication between numerous parties, a standardized communication and documentation center is critical for ensuring information is not lost between parties involved in implementing the treatment plans. Additionally, the enhanced access to care created by health information technology has increased patient involvement in their own treatment plans. This increased involvement has had a direct correlation on patients' self-efficacy and commitment to treatment plans and health goals. Overall, healthcare payment reform, incentivizing care coordination programs, and technology to

improve accessibility of care and communication within the medical home has led to positive results in the implementation of the PCMH Model. Continued improvements in these areas of health care will allow for a more accurate analysis of the validity of care coordination models in health care systems at a national level.

CONCLUSION

With a continued rise in multimorbidity prevalence and an increase in health care expenditure, care coordination has been identified as a possible solution for improving patient outcomes, attenuating health care costs, and improving patient and provider satisfaction of care. Many conceptual models of care coordination exist, but integration into health care systems remains a difficult task. The Patient-Centered Medical Home Model remains a promising strategy for improving the fragmented nature of our current health care system. Successful implementation of these models is contingent on access to enhanced healthcare technology, such as electronic medical records and web-based patient portals, payment reform and financial incentives for high-value health care systems, and deliberate communication between all parties involved in care plans. Future studies evaluating the effectiveness of the PCMH model must consider the interaction of all components involved in achieving care coordination. The mechanisms in which the PCMH Model is effective and for whom it is beneficial should be evaluated using perspectives, outcome, and context measurements.

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