

## Does the Chronic Care Model Work?



### Slideshow of the Chronic Care Model and its Evidence Base

*Supporting information extracted from PowerPoint notes*

#### Slide 1

In this discussion of the Chronic Care Model (CCM) chronic illness is defined very broadly: any condition that requires ongoing activities and response from patients and their personal caregivers, as well as a response from the medical care system. This includes the traditional physical chronic illnesses, but also chronic mental disorders, and behavioral disorders like attention deficit disorder in children. Some are also applying the model to prevention, addiction, and other behaviors.

#### Slide 2

No notes

#### Slide 3

The magnitude of the problem:

45% of the U.S. population suffers from one or more chronic illnesses, and over 60 million (21% of the population) have multiple conditions.

Anderson G, Horvath J. The Growing Burden of Chronic Disease in America, Public Health Reports, May–June 2004. Accessed February 6, 2007, at: [http://www.publichealthreports.org/userfiles/119\\_3/119263.pdf](http://www.publichealthreports.org/userfiles/119_3/119263.pdf)

#### Slide 4

Too often we organize our care around a certain chronic condition, like diabetes, or asthma. But the data show a different story. Well over half of those over age 65 have more than one chronic condition and they account for 95% of all health care expenditures. Almost a quarter of Medicare beneficiaries have four or more chronic illnesses, and they consume two-thirds of all Medicare expenditures.

We can no longer think about disease management in the singular, given the prevalence of multiple conditions.

Source, Partnership for Solutions, Johns Hopkins University, <http://partnershipforsolutions.org/>

#### Slide 5

In 2001, the Institute of Medicine published this report, “Crossing the Quality Chasm.” What we have in the U.S. is not a gap between what we know is good care and what we do; it is a chasm.

#### Slide 6

These quotes from the report capsulize the findings. They are very applicable to chronic care.

#### Slide 7

Why the emphasis on changing systems, and the reduction in emphasis on the people? Historically, quality assurance activities looked for individual providers that weren't doing their job, and then tried remedial education, or worse, in order to improve quality.

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If one looks at quality in multiple practices, the variation in quality is often greater within a practice than between practices. This means that essentially all practices do the right thing some of the time. So the question is, how do you reduce in-practice variation to get practices to do the right thing most of the time?

#### Slide 8

These reviews will be discussed in more detail later.

##### Congestive Heart Failure

Riegel, B *et al.* Interventions to prevent readmission for congestive heart failure. *JAMA* 2004 Jun 16.

Phillips CO, Wright SM, Kern DE, Singa RM, Shepperd S, Rubin HR. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. *JAMA* 2004; 291(11):1358-67.

##### Diabetes

Renders CM, Valk GD, Franse LV, Schellevis FG, van Eijk JT, van der Wal G. Long-term effectiveness of a quality improvement program for patients with type 2

diabetes in general practice. *Diabetes Care*. 2001 Aug; 24(8):1365-70.  
Shojania KG, Ranji SR, McDonald KM *et al.* Effects of quality improvement strategies for type 2 diabetes on glycemic control: a meta-regression analysis. *JAMA* 2006; 296(4):427-40.

##### Depression

Druss BG, von Esenwein SA. Improving general medical care for persons with mental and addictive disorders: systematic review. *Gen Hosp Psychiatry* 2006; 28(2):145-53.

#### Slide 9

No notes

#### Slide 10

As we began to look at this literature it became clear that a number of different ingredients are needed to improve the quality of chronic illness care. First of all, there has to be a clear understanding of the clinical interventions that make a difference. Usually those are represented in evidence-based guidelines. You then need ideas for changing the system (such as the CCM) to increase the likelihood that those evidence-based clinical changes get done. But what we've found is that such change is extremely difficult. So you need an approach to changing systems, such as the Model for Improvement used by the Institute for Healthcare Improvement. These three provide the intellectual foundation for quality improvement.

The final piece that is needed is a learning model that permits busy practices to take this intellectual foundation and make it real, and for us that has been the Breakthrough Series Collaborative.

#### Slide 11

In the past, deficiencies were attributed to bad physicians who just didn't do the right thing. Instead, the emphasis needs to be on the system and the care it delivers.

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The literature hadn't been organized in a way that made it easy to understand how researchers achieved better results.

Research is primarily condition-specific because of funding sources. We need to be able to provide care in a way that works for patients with asthma, depression or multiple sclerosis. We need to do this for our own sanity and for our patients', who can't be expected to deal with a system where they have five case managers, seven providers and charts in every one of those places.

#### Slide 12

Our premise is that good outcomes at the bottom of the Model (better health status and patient satisfaction) result from productive interactions. To have productive interactions the practice must be redesigned in four areas (shown in the middle): self-management support (how we help patients live with their conditions), delivery system design (who's on the health care team and in what ways we interact with patients), decision support (what is the best care and how do we make it happen every time), and clinical information systems (how do we capture and use critical information for clinical care). These four aspects of care are at the practice level. Some aspects of larger healthcare organizations influence clinical care. The health system itself exists in a larger community. Resources and policies in the community also influence the kind of care that can be delivered. It is not accidental that self-management support is on the edge between the health system and the community. Some programs that support patients exist in the community. It is the most visible part of care to the patient, followed by delivery system design. They know what kind of appointments they get and who they see. They may be unaware of the guidelines that describe best care (but we should work to change that) and they may be totally unaware of how we keep information to provide that care. We'll talk about each in detail in the following slides.

Wagner EH, Davis C, Schaefer J, Von Korff M, Austin B. A survey of leading chronic disease management programs: Are they consistent with the literature? *Managed Care Quarterly*. 1999; 7(3):56-66.

Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the chronic care model, Part 2. *JAMA* 2002 Oct 16; 288(15):1909-14.

Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A., Improving chronic illness care: translating evidence into action. *Health Aff (Millwood)*. 2001 Nov-Dec; 20(6):64-78.

#### Slide 13

The essential element of good chronic illness care is a productive interaction, versus current interactions that tend to be frustrating for both patients and providers. An interaction can be a face-to-face visit, a phone call or an email message. Productive means that the work of evidence-based chronic disease care gets done in a systematic way, and patient needs are met.

Wagner EH, Davis C, Schaefer J, Von Korff M, Austin B. A survey of leading chronic disease management programs: Are they consistent with the literature? *Managed Care Quarterly*. 1999; 7(3):56-66.

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#### Slide 14

To maximally improve outcomes, we need a different kind of patient. “Informed” means the patient has sufficient information to become a wise decision-maker related to their illness. Patients also need to be “activated” by understanding the importance of their role in managing the illness.

#### Slide 15

The other side of the productive interaction is a practice team that is organized, trained, and equipped to conduct productive interactions.

#### Slide 16

The overarching definition of a productive interaction is one that assures that patient needs for evidence-based clinical and behavioral care information and support to become better self-managers, and monitoring over time are met.

#### Slide 17

Let’s look at each of the elements in a little more detail:

#### **Self-Management support: Empower and prepare patients to manage their health and health care.**

1. Emphasize the patient’s central role in managing their health. Providers reinforce the patient's active and central role in managing their illness.
2. Use effective self-management support strategies that include assessment, goal-setting, action planning, problem-solving, and follow-up. Evidence now strongly suggests that to achieve optimal outcomes in most chronic illness, we must improve the patients ability and interest in managing their own condition. The best tested strategy to support self-management employs the 5A’s:

Assessment includes not only knowledge but beliefs and behavior. (Knowledge isn’t enough to change behavior. We need to understand more about what patients value and what they do.)

Advice needs to be linked to scientific evidence, not provider biases.

Agree on goals that are important to patients and actions to reach them.

Assist by identifying barriers and problem-solving to deal with them.

Arrange a specific follow-up plan including utilizing internal and community resources to provide ongoing self-management support to patients.

One example of an effective program based in the community is the Chronic-Disease Self-Management Program developed by Stanford. It is a six-week scripted curriculum delivered by lay people with chronic illness.

Lorig KR, Sobel DS, Stewart AL, Brown Jr BW, Ritter PL, González VM, Laurent DD, Holman HR. Evidence suggesting that a chronic disease self-management program can improve health status while reducing utilization and costs: A randomized trial. *Medical Care*, 1999; 37(1):5-14.

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#### Slide 18

**Delivery system design: Assure the delivery of effective, efficient clinical care and self-management support.**

Delivery system design is where we all work everyday--(WHO is there and WHAT do they do to contribute to good quality care. This is about HOW we interact with patients.)

1. Most successful chronic care interventions involve increased clinical involvement of the non-physician members of the care team. We are talking about actually having a team who discusses the work they do, how they are going to do it, and how to improve on it. Taplin S, Galvin MS, Payne T, Coole D, Wagner E. Putting Population-Based Care Into Practice: Real Option or Rhetoric? *J Am Board Fam Pract.* 1998; 11(2):116-26.
2. Planned interactions have an agenda, like a routine physical or a prenatal visit. Planned visits can be either 1:1 or in groups. We can use a registry and tools to help set the agenda and not leave out critical parts of the care. McCulloch *et al.* *Effective Clinical Practice* 1998; 1:12-22 and *Disease Management* 2000; 3(2):75-82
3. Patients with complex needs, or engaged in an acute transition or exacerbation, often benefit from more intensive attention. The use of a clinical case or care manager, usually a nurse or a pharmacist, has been shown to be effective in diabetes, CHF, depression, and other illnesses.
4. Follow-up is not left to chance. Better outcomes in chronic illness care are due to proactive follow-up by the health care team. In real estate, they say, Location, Location, Location. In chronic illness, it is Follow-up, Follow-up, Follow-up. Support for telephone follow-up: Nurses increase exercise in elderly primary care pts using phone calls: *Journal of Geront: Medical Sciences* 2002 vol 57A no 11 M733-M740.  
  
*Piette et al.* Impact of automated phone calls and nurse calls on diabetes in the VA, *Diabetes Care* 2001; 24:202 (better HbA1c, more lipid testing, fewer sx, better satisfaction)
5. Patients should be routinely asked to “teach back” to check comprehension and if they are comfortable with the plan. Providers need to check in with patients to make sure that the interaction style is compatible with their cultural norms, values, and beliefs.

#### Slide 19

Same features as productive interaction, but more intensively provided for patients with particular needs.

Practices that don't have access to nurses or pharmacists can provide some CM services by using available office staff to more frequently check patient status and alert the clinician if needed.

Simon *et al.* Randomized trial of monitoring, feedback, and management of care by telephone to improve treatment of depression in primary care. *BMJ.* 2000; 320:550.

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#### Slide 20

**Decision support: Promote clinical care that is consistent with scientific evidence and patient preferences.**

Decision support begins, but cannot end, with the dissemination of evidence-based guidelines. Distribution of guidelines alone has minimal impact. What does work is the integration of guidelines into the flow of clinical decision making.

1. We need to not only possess guidelines, but we must get them off the shelf or the computer screen and use them in decision making.

Grimshaw & Russell Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations. *Lancet* 1993; 342:1317

2. Our typical way of interacting with specialists is to refer a patient and hope to get a letter back. Some examples include shared care, real-time consultation, and email exchanges

Quinn *et al.* Overcoming turf battles: developing a pragmatic, collaborative model to improve glycemic control in patients with diabetes. *Jt Comm J Qual Improv* 2001; 27:255

Katon *et al.* Collaborative management to achieve treatment guidelines. Impact on depression in primary care. *JAMA*. 1995 Apr 5; 273(13):1026-31

McCulloch DK, Price M, Hindmarsh M, Wagner E. Improvement in Diabetes Care Using an Integrated Population-based approach in a Primary Care Setting. *Disease Management* 2000; 3(2):75-82.

3. Providers and care teams benefit from problem or case-based learning, academic detailing or modeling by expert providers.
4. Another thing we can do is to inform patients of guidelines pertinent to their care so they understand why a particular test, procedure, or screening is being performed.

#### Slide 21

**Clinical information system: Organize patient and population data to facilitate efficient and effective care.**

The crucial factor in improving chronic illness care is a clinical database that has the critical information that one needs to have a productive interaction (a registry). Even in the absence of a full electronic medical record (EMR), many registries can perform all the functions shown on the slide. Conversely, some EMRs may not be able to perform these functions so practices should be careful what information systems they employ to manage their patients' care.

#### Slide 22

**Community: Mobilize community resources to meet needs of patients.**

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There are many important resources and services for patients that are not part of most medical systems: peer support groups, exercise programs, nurse educators, or dieticians often aren't in small practices.

1. Encourage patients to participate in effective community programs. This means you need to first know what and where they are.
2. Form partnerships with community organizations to support and develop interventions that fill gaps in needed services. For example, in the Seattle area, the University of Washington partnered with Group Health Cooperative and Senior Services to make "Lifetime Fitness" exercise program available in senior centers and community meeting rooms throughout the area.  
<http://www.seniorservices.org>
3. Advocate for policies to improve patient care such as insurance coverage for diabetes supplies.

Another potential way is to have health plans work together. In several states, health plans have coordinated chronic illness guidelines, measures, and care resources throughout the community.

#### Slide 23

**Health care organization: Create a culture, organization, and mechanisms that promote safe, high-quality care.**

1. Visible support for leaders is believed to be critical for ongoing success. Ovretveit *et al.* Quality collaboratives: lessons from research. *Qual Saf Health Care* 2002; 11:345-351.
2. Some QI strategies work. Langley and colleagues have categorized what they learned from helping organizations institute improvements.

References on Effective QI: Walshe & Freeman *Qual Saf Health Care* 2002 Mar; 11(1):85-87. Langley *et al.*: *The Improvement Guide*, Jossey Bass, 1996.

3. Encourage open and systematic handling of errors and quality problems to improve care. Safety has been a rallying cry for inpatient care and is becoming a concern in outpatient care. The system needs to be open and honest about handling errors in care and shortcomings in quality.
4. Reward care teams for quality of care, not just productivity. Not just physicians and not always monetary but through recognition, attending CME.
5. Develop agreements that facilitate care coordination within and across organizations. Work with local hospitals, VNS, and social service agencies in an open and coordinated manner. IOM Quality Chasm.

#### Slide 24

If the practice changes that improve outcomes differed from condition to condition, it would be very difficult to implement and sustain. Fortunately, the evidence that follows strongly suggests that CCM redesign applies across conditions. In addition, the CCM seems to apply to clinical preventive service delivery as well.

Glasgow RE, Orleans CT, Wagner EH. Does the chronic care model serve also as a template for improving prevention? *Milbank Q* 2001; 79(4):579-612, iv-v.

#### Slide 25

A Resource from Improving Chronic Illness Care  
*Does The Chronic Care Model Work?* CDRom  
[www.improvingchroniccare.org](http://www.improvingchroniccare.org)

This information is current as of February 2007.

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No notes

#### Slide 26

The following slides discuss each of these types of evidence in turn.

#### Slide 27

No notes

#### Slide 28

##### STUDY SPECIFICS

- A review of systematic reviews demonstrates that integrated care programs generally have positive outcomes. The most commonly used components of integrated care programs include: self-management support, patient education, case management, multidisciplinary patient care team, and clinical feedback/reminders/education. Authors caution that inconsistent definitions of interventions and outcomes are prevalent throughout the literature and, if ignored, can lead to inappropriate conclusions about the effectiveness of programs in meta-analyses.<sup>1</sup>
- One of two reviews of depression treatment in primary care finds that complex interventions using clinician education, enhanced nurse case management, and greater integration between primary and specialty care are effective in improving patient outcomes. Less complex interventions like provider education alone are less likely to be effective.<sup>2</sup>
- Badamgarav and colleagues conducted systematic evaluation of disease management. Lack of a clear definition of “disease management” makes interpreting the findings difficult, but in general they found an improvement in patient satisfaction, adequacy of prescribed treatment, and other quality of care markers. They also found increases in costs associated with hospitalization and treatment costs among the intervention groups as compared to controls.<sup>3</sup>
- A review of quality improvement strategies in hypertension finds that interventions that include team care are associated with the greatest improvement in blood pressure outcomes. Here, team care is defined as the “assignment of some responsibilities to a health professional other than the patient’s physician.” Other strategies that proved effective include patient education and self-management support.<sup>4</sup>
- Glasgow and colleagues published a literature review and expert recommendations for future research around diabetes care as part of the Health Care Delivery Work Group. They find that the continued focus on acute illness, rather than proactive chronic care management, is the cause for poor-quality diabetes care processes and outcomes. They cite articles showing that self-management support, improved patient-provider communication, and collaborative goal setting are linked to improved behavioral, biological, and quality of life outcomes. They also cite that a population focus, inclusion of clinician prompts and reminders, and a quality clinical information systems that supports disease registries are helpful tools to improve care.<sup>5</sup>
- A second systematic review of diabetes shows that multifaceted interventions that “facilitate structured and regular review of patients were effective in improving the process of care.” Renders *et al* finds that studies rarely assess outcomes. Like the studies above, they find that clinician education with performance feedback and use of care teams seemed to improve care.<sup>6</sup>

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- A recent Cochrane review of diabetes care finds that in 58 papers with 66 comparisons, quality improvement initiatives that used team changes and those that use case management with the ability to influence physicians' prescribing patterns showed the largest difference in post intervention HbA<sub>1c</sub> scores.<sup>7</sup>
- 1. Ouwens M, Wollersheim H, Hermens R, Hulscher M, Grol R. Integrated care programmes for chronically ill patients: a review of systematic reviews. *Int J Qual Health Care* 2005; 17(2):141-6.
- 2. Gilbody S, Whitty P, Grimshaw J, Thomas R. Educational and organizational interventions to improve the management of depression in primary care: a systematic review. *JAMA* 2003; 289(23):3145-51.
- 3. Badamgarav E, Weingarten SR, Henning JM *et al.* Effectiveness of disease management programs in depression: a systematic review. *Am J Psychiatry* 2003; 160(12):2080-90.
- 4. Walsh JM, McDonald KM, Shojania KG *et al.* Quality improvement strategies for hypertension management: a systematic review. *Med Care* 2006; 44(7):646-57.
- 5. Glasgow RE, Hiss RG, Anderson RM *et al.* Report of the health care delivery work group: behavioral research related to the establishment of a chronic disease model for diabetes care. *Diabetes Care* 2001; 24(1):124-30.
- 6. Renders CM, Valk GD, Griffin SJ, Wagner EH, Eijk Van JT, Assendelft WJ. Interventions to improve the management of diabetes in primary care, outpatient, and community settings: a systematic review. *Diabetes Care* 2001; 24(10):1821-33.
- 7. Shojania KG, Ranji SR, McDonald KM *et al.* Effects of quality improvement strategies for type 2 diabetes on glycemic control: a meta-regression analysis. *JAMA* 2006; 296(4):427-40.

#### Slide 29

Let's look at some of the evidence that initially led the IOM Committee to conclude that it was the system, and not individuals, that was the issue.

This review was focused on intervention studies (about 85% were RCTs) that tried to improve the primary care of persons with diabetes. Interventions were fairly diverse, but fell into four broad categories:

- 1) Interventions directed at provider behavior change, to increase the likelihood they would do evidence-based care.
- 2) Interventions directed at patients to make them more knowledgeable about their condition, more skillful in managing their health, and more confident in their ability to take care of their illness.
- 3) Interventions directed at the design of the practice: Changes to the way the practice team is configured, such as an added team member, or new responsibilities taken on by existing members. Changes to the way visits were organized and structured, such as use of planned visits and groups visits. Case management.
- 4) Enhancements to clinical information systems. Development of systems that provided automated reminders, performance feedback to practice, and the like.

The interventions as a group tended to improve care. But, there was no magic bullet; no single intervention seemed to make the major difference. As the number of intervention categories increased in the program tested, the more effective the program seemed to be.

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The Bodenheimer *et al* re-analysis found five studies that included interventions in all four categories. All five studies had a major positive effect on both process and outcome measures, suggesting that it is comprehensive system change that makes the difference. One apparently necessary but not sufficient intervention was self-management support, as summarized in the last two bullets.

#### Slide 30

What impact does the CCM and its components have on patients? This is a meta-analysis of chronic care model-like interventions in asthma, congestive heart failure, depression, and diabetes done by the RAND Team.

Across these four conditions, meta-analytically they found a 30-60% improvement in the process of care associated with CCM-like interventions, and a 10-15% improvement in clinical outcomes, across all of these studies, suggesting that they really do have a measurable effect on patients.

Tsai AC, Morton SC, Mangione CM, Keeler EB. A meta-analysis of interventions to improve care for chronic illnesses. *Am J Manag Care*. 2005 Aug; 11(8):478-88. PMID: 16095434.

#### Slide 31

The Shojania article, also included in the earlier summary slide, illustrates the variety of QI strategies attempted and their effectiveness.

#### Slide 32

Several studies have tried to identify the characteristics of high-quality practices by examining the extent to which practices used the components of the CCM.

#### Slide 33

##### STUDY SPECIFICS

- There is a significant relationship between a practice's primary care orientation and its implementation of the CCM. Specifically, medical groups (as opposed to IPAs) that accept risk for hospitalization costs, use health promotion programs, have an electronic standardized problem list, and are required to report patient process and outcome measures appear to use more chronic care management practices.<sup>1</sup>
- Flemming *et al.* studied 134 managed Medicare organizations and collected diabetes quality measures (HbA1c, LDL, microalbuminuria and eye exams). They assessed 32 care elements based on the CCM and compared top and bottom quartiles on quality (e.g., HbA1c > 9.5–20% vs. 50%). Top quartile more likely to employ CCM elements, especially: computerized reminders, practitioner involvement on QI teams, guidelines supported by academic detailing, formal self-management programs, a registry.<sup>2</sup>
- Staff participation in practice decisions and optimization of the clinical care team to include non-physician staff can improve the delivery of preventive services. In addition, improved clinical systems such as reminders and patient registries are associated with improved delivery of preventive services.<sup>3</sup>
- Overall, physician organizations have not adopted as many components of the diabetes care management index as we would expect. 47% use one or fewer

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care management processes. A number of factors were associated with increased use of care management processes: Reporting data to external organizations; receiving income, recognition, or better contracts for quality; improved IT infrastructure; ownership by HMO or hospital system; receiving capitated payments; and large size.<sup>4</sup>

1. Schmittiel JA, Shortell SM, Rundall TG, Bodenheimer T, Selby JV. Effect of primary health care orientation on chronic care management. *Ann Fam Med* 2006; 4(2):117-23.
2. Fleming B, Silver A, Ocepek-Welikson K, Keller D. The relationship between organizational systems and clinical quality in diabetes care. *Am J Manag Care* 2004; 10(12):934-44.
3. Hung DY, Rundall TG, Crabtree BF, Tallia AF, Cohen DJ, Halpin HA. Influence of primary care practice and provider attributes on preventive service delivery. *Am J Prev Med* 2006; 30(5):413-22.
4. Li R, Simon J, Bodenheimer T *et al.* Organizational factors affecting the adoption of diabetes care management processes in physician organizations. *Diabetes Care* 2004; 27(10):2312-6.

### Slide 34

#### STUDY SPECIFICS

- Use of reports to physicians were associated with better medication prescription practices, parent ratings of care, and asthma physical status among Medicaid-insured, asthmatic children.<sup>1</sup>
  - In the VA, programs with improved HbA1c results utilize computerized diabetes reminders, engage patients, and involve physicians in quality improvement.<sup>2</sup>
  - Use of physician reminders, performance feedback, and structured care management were all associated with improved diabetes process, but not improved outcomes.<sup>3</sup>
  - Top performing practices utilize combinations of 10 key strategies to improve care: leadership, resources, clinical guideline, organized care teams, patient activation, information systems, identification of population at risk, monitoring, prioritization, and active outreach to patients.<sup>4</sup>
  - Leader's responses to a survey assessing the presence of CCM components in their practices were partially correlated to improvements in HbA1c and LDL testing rates and outcomes. Delivery system design scores indicate that improvement in this area may be associated to improvements in process and outcome measures for diabetes.<sup>5</sup>
  - Clinician's responses to a survey assessing their use of CCM components was significantly correlated to improvements in HbA1c values and ratios of total cholesterol to HDL cholesterol. Clinician's responses were also associated with the behavioral composite score and clinical care composite score--patient reported measures of improved care processes.<sup>6</sup>
1. Lieu TA, Finkelstein JA, Lozano P *et al.* Cultural competence policies and other predictors of asthma care quality for Medicaid-insured children. *Pediatrics* 2004; 114(1):e102-10.
  2. Jackson GL, Yano EM, Edelman D *et al.* Veterans Affairs primary care organizational characteristics associated with better diabetes control. *Am J Manag Care* 2005; 11(4):225-37.
  3. Mangione CM, Gerzoff RB, Williamson DF *et al.* The association between quality of care and the intensity of diabetes disease management programs. *Ann Intern Med* 2006; 145(2):107-16.

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4. O'Connor PJ, Sperl-Hillen JM, Pronk NP, Murray T. Primary Care Clinic-Based Chronic Disease Care - Features of Successful Programs. *Disease Management & Health Outcomes* 2001; 9( 12):691-8.
5. Sperl-Hillen JM, Solberg LI, Hroschick MC, Crain AL, Engebretson KI, O'Connor PJ. Do all components of the chronic care model contribute equally to quality improvement? *Jt Comm J Qual Saf* 2004; 30(6):303-9.
6. Nutting PA, Dickinson WP, Dickinson LM, Nelson CC, King DK, Crabtree BF, Glasgow RE. Use of Chronic Care Model Elements Is Associated with Higher-Quality Care. *Annals of Family Medicine* 2007; 5(1):14-20.

#### Slide 35

RAND Evaluation of the Improving Chronic Illness Care was a multimillion dollar evaluation effort sponsored by the Robert Wood Johnson Foundation. Because of the size and robustness of that evaluation, those findings are highlighted separately in the next few slides.

#### Slide 36

See [www.rand.org/health/projects/icice/](http://www.rand.org/health/projects/icice/) for details.

#### Slide 37

##### STUDY SPECIFICS

- Over four-fifths of the organizations implemented some interventions in all six CCM elements. However, there were differences: since many elements of the CCM depend on having a registry of patient, sites worked most intensely on improving information support (24% of all their efforts, on average) and least intensely on developing community linkages (8% of their efforts).<sup>1</sup>
1. Pearson ML, *et al.* Assessing the implementation of the chronic care model in quality improvement collaboratives. *Health Serv Res.* 2005 Aug; 40(4):978-96.

#### Slide 38

##### STUDY SPECIFICS

- The 10-year risk of cardiovascular disease was determined using a modification of the U.K. Prospective Diabetes Study risk engine. The baseline 10-year risk was 31% for both cases and controls. At the end of the period, the intervention group had a 2.1% greater reduction in predicted risk.<sup>1</sup>
- Participation in the collaborative for Heart Failure was associated with fewer emergency department visits.<sup>2</sup>
- The RAND team also utilized medical record review to measure performance on 23 predefined quality indicators for sites participating in the heart failure collaborative. Patients from collaborative sites showed greater improvement than control sites for 11 of the 21 indicators, including use of lipid lowering and angiotensin converting enzyme inhibition therapy. When all indicators were combined into a single overall process score, participating sites improved more than controls (17% versus 1%,  $P = 0.0001$ ). The improvement was greatest for measures of education and counseling (24% versus 1%,  $P = 0.0001$ ).<sup>3</sup>
- The overall process of pediatric asthma care improved significantly in the intervention group but remained unchanged in the control group (change in process score +13% vs 0%;  $P < .0001$ ). Patients in the intervention group were more likely than patients in the control group to monitor their peak flows

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- (70% vs 43%;  $P < .0001$ ) and to have a written action plan (41% vs 22%;  $P = .001$ ). Patients in the intervention group had better general health-related quality of life (scale score 80 vs 77;  $P = .05$ ) and asthma-specific quality of life related to treatment problems (scale score 89 vs 85;  $P < .05$ ).<sup>4</sup>
- The RAND study of adult asthma care had a smaller study population and found process of asthma care improved significantly, as did patient satisfaction with communication, but outcomes were not significantly different from controls.<sup>5</sup>
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#### STUDY SPECIFICS

- Used disease registry, diabetes nurse case managers, and group visits to improve diabetes outcomes in rural, minority populations in Eastern North Carolina. Pre-post findings indicated an increase in patients with self-management goals who received lipid panel, used aspirin and received a foot exam.<sup>1</sup>
- Pre-post examination of Midwestern CHCs' participation in the Diabetes Health Disparities Collaborative showed increased process measures, like rates of HbA1c measurement, eye examination referral, foot examination and lipid assessment. Mean value of HbA1c also decreased. Survey respondents felt the effort was worth it and successful. Practices struggled in: needing more time, developing a patient registry, staff turnover, more support by senior management.<sup>2</sup>
- Teams implementing CCM as part of the Diabetes BTS collaborative improved their self-management support capabilities, as measured both by self report and objective data. Among heart failure collaboratives, daily self-monitoring of weight by patients improved significantly (19% to 93%) and teams provided education significantly more often to patients.<sup>3</sup>
- Harwell and colleagues supported primary care practices with performance feedback. Practices then did a variety of additional system changes. This cross-sectional study found improvements in some processes – foot examinations, microalbumin testing, dilated retinal examination – but not others like HbA1c testing or LDL-C testing.<sup>4</sup>

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- Multiple North Carolina residency practices participated in the BTS collaboratives and implemented strategies across all elements of the CCM. Practices evaluated themselves at base-line and after using the ACIC. Study found that key measures of diabetes care were improved in two-thirds of practices.<sup>5</sup>
  - Practices in Wisconsin and Minnesota that implemented planned care and DEMS found that planned care plus use of a disease registry improved care across all 12 performance measures. Planned care alone or in conjunction with DEMS improved metabolic outcomes. DEMS alone improved process measures, but not metabolic outcomes.<sup>6</sup>
  - Implementation of the CCM in a rural Pennsylvania practice resulted in significant improvement in adherence to ADA guidelines including 2 HbA1c tests per year, lipid profile, urinalysis, eye exam, and foot exam performed. Mean HbA1c also declined significantly, as did mean HDLc levels. Improvement in three empowerment measures was seen, though it wasn't significant.<sup>7</sup>
  - Among a highly transient, uninsured population, significant improvements in diabetes outcomes including decreased LDL, HbA1c, and Arterial Pressure were observed.<sup>8</sup>
  - Case studies from North Carolina show that participation in the CCM collaborative resulted in improved HbA1c values for diabetics. Factors contributing to success included senior leadership support, physician champions, and multidisciplinary teams. Staff turnover was a barrier.<sup>9</sup>
  - A Washington state initiative to conduct state-level collaboratives around diabetes care resulted in some improvement in process and outcome measures in most of the 47 participating teams. Absolute improvement was higher for process measures than for outcome measures.<sup>10</sup>
  - One study used the CCM framework to improve the delivery of diabetes self-management training. They found the framework useful in terms of improving the number of DSMT programs offered, enhancing reimbursement to cover costs, and lowering patients HbA1c –ostensibly by offering more patients self-management support.<sup>11</sup>
  - The implementation of the Chronic Care Model produced different results when used at two different primary care practices in London. One site showed significant improvements in identification and case management of depression; the other did not. Tangible barriers like a primitive information technology system, lack of experience with chronic disease management, and the inability to find common meeting time proved serious barriers to the implementation of the project in the second site. Other, intangible barriers which mediated the impact of the CCM at the second site included a lack of staff ownership, participation, and buy-in as well as lack of external support for the elements of the project.<sup>12</sup>
  - Sites participating in the Breakthrough Series Collaborative for HIV/AIDS did not show improvement on process or outcome measures when compared to other clinics that did not participate in the BTS collaborative. The proportion of patients with a suppressed viral load decreased in the intervention group, compared to the control group, but the decrease was not significant.<sup>13</sup>
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These trials all tested multi-component interventions based on the CCM in primary care.

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##### STUDY SPECIFICS

- Southern Australia “HealthPlus”: Four regions working on eight sub-trials found a generic model of coordinated care resulted in improved well-being for people with a wide range of chronic conditions in both rural and urban settings.<sup>1</sup>
- Asthma: Compared planned care to physician education. Planned care was shown to be more effective than physician education alone in decreasing asthma symptom days for children with mild to moderate asthma.<sup>2</sup>
- Diabetes: Implemented in underserved communities, this trial found that patients in the CCM group significantly lowered A1C levels, non-HDL cholesterol, and frequency of self monitoring compared to controls. Results of Diabetes knowledge and diabetes empowerment also improved, but not significantly more than other groups.<sup>3</sup>
- Applying CCM concepts like SMS, decision support, planned encounters, and care coordinators to treatment of bipolar disorder significantly reduced weeks in affective episodes, primarily mania in severely ill, highly comorbid individuals. Also, functional outcomes improved significantly.<sup>4</sup>
- Among low-income Latinas with comorbid depression and cancer use of proactive care, case management, self-management support, and feedback to physicians resulted in significant improvement in depressive symptoms. Patients in the intervention group were also more likely to be alive at the end of the study and to have improved emotional well-being.<sup>5</sup>
- Sites randomized to attend the Breakthrough Series Collaboratives to improve pediatric asthma care showed no differences in patient experience or outcomes. Lack of team motivation to change, as indicated by the fact that less than one-half the randomized teams attended all three learning sessions, may partially explain the results. Serious financial and other organizational factors also may have played a role.<sup>6</sup>

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No notes

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##### STUDY SPECIFICS

- Sustained reductions in HbA1c of 1% or more result in cost savings within one to two years of improvement. Cost savings are highest for individuals with highest HbA1c levels at baseline. Utilization of primary care and specialty care were significantly lower among the “improved” group, but hospitalization rates were not affected.<sup>1</sup>
  - Reviewing 44 articles examining the ROI of DM programs showed that some evidence suggests a positive ROI for CHF and multiple disease conditions. Results were mixed for asthma, diabetes, and depression studies, and depended on what types of costs were included (e.g. productivity).<sup>2</sup>
  - Gilmer and O’Connor propose that the elements of disease management that are cost effective include: disease management programs, clinical management, and self-management training. Evidence is still needed to support both the costs and effectiveness of these recommendations.<sup>3</sup>
  - Organizational features and improvement strategies differentially affect future health care costs. For example, interventions focusing on the increased use of pharmaceuticals to improve care are associated with increased health care costs. Interventions that focus on clinical meetings, registries, and resource use related to diabetes or heart disease care are associated with lower costs.<sup>4</sup>
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No notes

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For international information about the CCM and other models, see:

Singh D, Ham C. Improving care for people with long-term conditions: A review of U.K. and international frameworks. Accessed on February 7, 2007 at: <http://www.institute.nhs.uk/NR/rdonlyres/039D50E5-207B-43A0-AA4E-F92E9638A95C/o/Reviewofinternationalframeworks.pdf>

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No notes

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No notes