Supporting Care Management:
The Role of Electronic Health Record (EHR) Systems

Electronic Health Record (EHR) systems support physicians and other healthcare professionals in the delivery of care management services. Although published literature on the use of EHR systems in care management in solo and small group practices is very limited (29,30), there is a growing recognition of the role of EHR systems to support individual and population-based care management in medical practices. Independent of practice size, EHR systems support physicians and care teams in multiple care management areas, including patient self-management, individual and population management, delivery system design, and clinical decision support system (33,35).
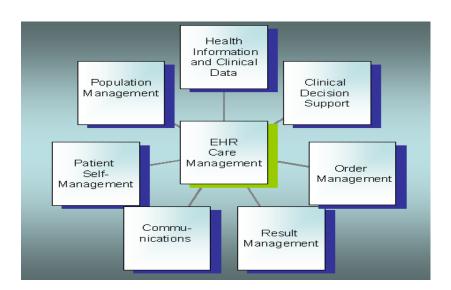
What is care management?

Care management is the coordination of healthcare services to meet the needs of an individual or a population of patients. Care management is similar to care coordination. It is a "process, which assesses, plans, implements, coordinates, monitors and evaluates options and services to meet an individual's health needs (1)."

Physician office-based care management is the organization and delivery of services to meet the six Institute of Medicine quality goals — efficient, equitable, safe, effective, patient-centered, and timely — through such activities as needs assessment, care plans, direct patient services, coordination with other providers and with community resources, and monitoring/evaluation of process and outcomes.

How might EHR systems support healthcare providers in care management?

- **Use EHR systems to support individual care management at the point-of-contact.** A physician in an exam room may use a computer or a handheld device to read a patient's medical history, assess symptoms, obtain clinical information, document observations, establish a diagnosis, and order medications, radiology studies, lab tests, or treatment services.

EHR systems support physicians with individual care management functions
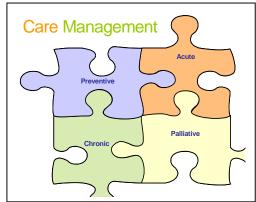
How might EHR systems support physicians in care management?

EHR systems support individual and population care management, practice design, clinical decision support systems, and patient self-management activities:

Care Management Functions	Care Management Characteristics	Use Information Systems to Support Care Management
Design Methods of Delivering Services	- Open access appointment system - Planned visits/primary care teams - Coordinated and proactive team - Disease and case management - Coordination with other providers - Telehealth and telemedicine	- Use e-scheduling systems - E-communication with providers - Use e-disease management tools - Use order communication - Use IT to deliver healthcare services
Evaluate Care of the Population	- Identification of patients, profiles, and subpopulations - Measuring process and outcomes - Performance feedback - Planning of services for subpopulations	- Use HIT to identify cohorts of patients specific to population - Generate assessments, surveys, etc. - Measure clinical outcomes - Generate population reports - Identify at-risk-individuals
Support Clinical Decision Making	- Clinical practice guidelines - Provider prompts and reminders - Clinical knowledge - Templates and forms - Data presentation - Order communication	- Electronic clinical practice guidelines - Use electronic provider prompts, alerts, and reminders - Use order orders (Rx, labs, orders) - Use E-prescribing
Support Patient Self Management	- Patient readiness assessment and activation - Care plan - Patient education, consultation, and interactive support - Patient reminders and self-care tools	- Personalized care plan - Personal health record - Online goal setting tools - Use IT systems for monitoring/ flagging/reminders/self-care tools

EHR systems support multiple care management areas, including preventive, acute, chronic, and palliative care.

Use EHR systems to support patient self management. A physician and members of the care team may use an EHR system to support self-management activities:

- Assess patient needs and symptoms using problem list templates
- Empower patients to set goals and specific action plans to reach those goals
- Discuss with patients their goals, priorities, barriers, strategies, and action items
- Work on problem-solving and healthcare system navigation skills
- Document, track, and follow-up care planning goals
- Empower patients to use their electronic personal health record
- Provide culturally appropriate patient education programs, resources, and tools
- Facilitate self-efficacy and provide emotional support to reach self-care goals
- Facilitate links to community resources and referral to other healthcare professionals

EHR Systems Support Patient Self-Management Functions

Patient assessment tools-

Use templates to evaluate patient readiness to change, list problems, and barriers to self-management.

Personalized goal setting tools-

Use templates to help patients to set, document, and follow-up goals to manage disease and reach personal goals.

Patient action plan-

Use templates to develop an individual plan of actions to reach individual goal.

Personal health record- Empower patients to have access to their personal health records.

Patient reminders-

Use EHR systems facilitate patient reminders to increase adherence to recommended care facilitating self-management skills.

Physician, care team, and patient communication-

Facilitate e-mail communication among physicians, care team, and patients.

Link to community and health system resources-

Facilitate patient health navigation skills and seeking of community resources like community classes and support groups.
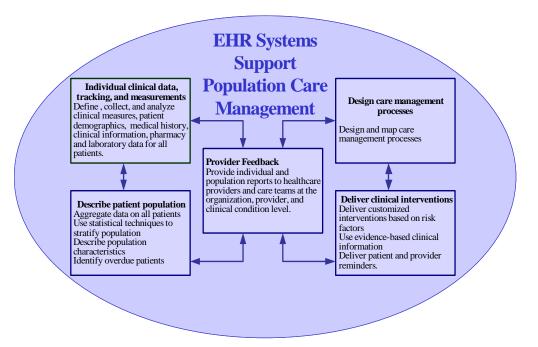
Cultural competent patient education materials, resources, and tools

Use EHR systems to provide clinicians and patients with multilingual patient education materials and self-help tools.
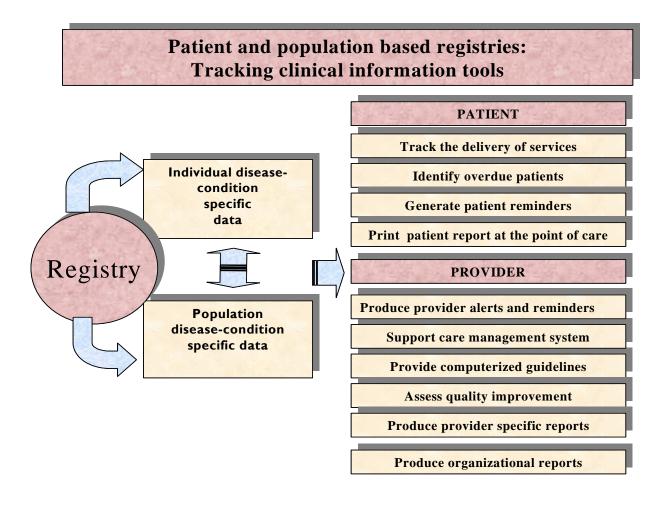
Use EHR systems for population management

A physician may use an EHR system to:

- Aggregate data on all patients to identify overdue patients
- Stratify patients by risk or conditions
- Obtain population reports and profiles
- Provide feedback to healthcare providers
- Segment the patient population to administer tailored educational interventions such as patient reminders and alerts
- Use simple statistics to characterize the practice needs and patients demands
- **Make sure that the EHR system that you are buying has population management functionalities**. Not all the EHR systems have the ability to aggregate individual data.

EHR Systems Support Population Care Management

Individual clinical data, tracking, and measurements
Define , collect, and analyze clinical measures, patient demographics, medical history, clinical information, pharmacy and laboratory data for all patients.

Describe patient population
Aggregate data on all patients
Use statistical techniques to stratify population
Describe population characteristics
Identify overdue patients

Provider Feedback
Provide individual and population reports to healthcare providers and care teams at the organization, provider, and clinical condition level.

Design care management processes
Design and map care management processes

Deliver clinical interventions
Deliver customized interventions based on risk factors
Use evidence-based clinical information
Deliver patient and provider reminders.

- **Use registries as an alternative to support population care management.** Like EHR systems, registries enhance quality, safety, and efficiency of patient care and office workflow. Registries are useful tools in assisting physician offices to achieve improvement of clinical outcomes (31). A registry or list of patients and their related data is a tool for tracking individual and population clinical care information. Manual registries track patient information in a card file or notebook. Computerized registries capture, manage, and provide information on individual disease/condition to support care management (5).

- **Definition and components**. A registry is a computer application that stores disease/condition-specific individual and population-based information to support care management, outreach, quality improvement, and outcome research. Registries identify overdue patients, provide computerized guidelines, implement care management systems, produce automated reminders, assess quality improvement, and produce provider-organizational specific reports (31).

- **Choose or develop a registry.** Many registries are free of charge. Others are available commercially. Select the registry that best supports the desired operational or clinical outcome and that fits the practice or clinic's technical and financial needs (32).

- **Document processes and ensure accurate information**. Decide which data to include in the database, document the registry process, and define the process of identifying patients with gaps in care (5). Test the database and make sure data quality is appropriate.

- **Integrate the registry within the workflow of the practice or clinic** (32). Develop processes for the use of the registry, including designating personnel to enter data, assure data integrity, and maintain the registry (32).

- **Use the registry to provide clinical support and population-based care management**. Registries support physicians by providing printed patients reports, identifying patients who are overdue and creating aggregate reports (32,5). Use the registry to generate reminders and care-planning tools for individual patients (32,5). Also, use the registry to provide feedback to care team, leaders, and affiliated organizations. (32,5).

Patient and population based registries: Tracking clinical information tools

Registry

Individual disease-condition specific data

Population disease-condition specific data

PATIENT
- Track the delivery of services
- Identify overdue patients
- Generate patient reminders
- Print patient report at the point of care

PROVIDER
- Produce provider alerts and reminders
- Support care management system
- Provide computerized guidelines
- Assess quality improvement
- Produce provider specific reports
- Produce organizational reports

Use clinical decision support systems to facilitate decision-making. Clinical decision support systems reduce medical errors and improve patient care (25). These systems provide physicians with clinical knowledge, tools, and resources to support decision-making by:

- Providing decision support for evidence-based care
- Providing guidelines, clinical pathways, and protocols to guide decision-making
- Incorporating evidence-based guidelines into daily clinical practice

- **Use clinical decision support systems components that:**
    - Integrate decision support as part of clinician workflow
    - Provide recommendations rather than just assessments
    - Provide decision support at the time and location of decision making
    - Facilitate computer-based decision support (25).

- **Incorporate evidence-based care management standards into the clinical workflow,** making it easy for clinicians to receive and act on system recommendations (25).

- **Decision support systems facilitate care management activities in multiple ways:**

Decision Support System Components	Characteristics
Care plan protocol support, guidelines, and pathways	Decision support systems support multi-steps care management plans, including care plans protocols, pathways, and guidelines (28).
Evidence-based clinical knowledge and information	Decision support systems provide clinical knowledge, reference information, and guidance to team care members and patients.
Reminders	Deliver provider and patient reminders according to intervention goals.
Alerts	Alerts provide notification of errors, warnings of abnormal values, or information to prevent adverse events such as medication errors after checking for drug interactions, duplicated orders, drug allergies, and age, height, weight, and renal function warnings (26).
Data presentation	Summarize pertinent data and recommend actions to follow (27).
Documentation forms and templates	Use electronic or printed templates (e.g., standing orders, condition identification) and forms (e.g., patient-specific information).
Order communication	Order creation allows physicians to use electronic templates to enter orders in a computer. Physicians can have access to pharmacy, laboratory, radiology, and other systems to order diagnostic and treatment services. Physicians use medication order templates to specify "dose, route, frequency, duration, start and stop (4)."
Checks	Clinical support systems provide evidence-based orders, order checking, conditional orders, clinical appropriateness, and clinical knowledge (26).

EHR systems support the design of efficient and timely healthcare delivery services.

Delivery System Components	Characteristics
Planned visits	• Establish a population-based management system to monitor the entire population of patients (6). Focus on individual patients, but have a population management reference to see the "big picture." • Be proactive by "activating" patients who are overdue for routine preventive screening using patient reminders and follow-up phone calls. • Be prepared at the time of the visit with information, supplies, personnel, forms, decision support tools, equipment, and time to deliver quality care (7). • Collect visit information before you see the patient on the phone or in the waiting room (6).
Coordinated team	• Develop a coordinated team with clear roles and responsibilities (5,6). • Have team huddles to anticipate patient needs ahead of time (6).

Group visits	• Consider using group visits, an extended physician's office visit designed for multiple patients with chronic disease and utilization patterns. Group visits may:
	
	  - Reduce visits to subspecialties, hospitalization admissions, hospital length of stay, and may increase self-efficacy, physician-patient satisfaction with care, and social interaction with other patients (12).
	
	  - Provide specialty services, one-on-one with physicians, medication counseling, self-management support training, and special support (11,21).
	
	  - Support care management by assessing disease control, self-management status, treatment adherence, need assessment, self-management support, follow-up, and healthcare navigation skills (11).
	
	  - Address patients' health education and emotional needs, and support patient self-management..
	
	• Use practice management software and EHR systems to identify patients with similar conditions, schedule appointments, have patients records ready for group visits, identify common problems for review, document and monitor patient's goal setting and action plans, and provide patient self-management tools and educational resources.

Open access appointment system	• Practice Management (PM) and EHR systems support same-day appointments, a system in which the doctor can see the majority of patients the same day they call the office. Practice Management and EHR systems help care team members to:
	
	  - Assess practice demand, system capacity, and size panel.
	
	  - Make sure each physician has an appropriate panel size.
	
	  - Reduce demand for unnecessary visits.
	
	  - Work down appointment backlog.

Delivery System Components	Characteristics
E-mail	• E-mail communication, the telephone of the 21st century, has the potential to increase physician-patient interaction, patient satisfaction, and patient self-care (18). • E-mail communication may improve continuity of care because patients can interact with their physicians more frequently (16). In a survey of e-mail users, more than half wished to send e-mail messages to their physician (19). • E-mail supports timeliness and accuracy of messages among healthcare providers (16,17). • Physicians have an interest in e-communication: About 30% of physicians are interested in using e- communication with patients (20).
Resource coordination	• Beside physicians, other healthcare providers, including physician assistants and nurse practitioners, support care management services. Patient satisfaction is similar among physician assistants or nurse practitioners when compared with physicians (13,14). Also, nurses equipped with computerized tracking and recall systems increase diabetes adherence indicators (15).

Disease management	• EHR systems support disease management, a patient-centered, cost-effective approach to managing chronic conditions by:
	
	   - Providing the best scientific evidence available.
	
	   - Focusing on outcomes to prevent complications and treat chronic conditions.
	
	   - Providing integrated services across care team members (9).
	
	• The use of IT, including EHR systems and registries to support disease management, can significantly improve the quality of healthcare and adherence to optimal standards of care.

Coordination with other providers	• EHR systems facilitate the availability, timeliness, and accuracy of messages among healthcare providers, increasing care coordination and chronic disease management.
Telemedicine and telehealth	• **Telemedicine** is the "use of electronic communication and information technologies to provide or support clinical care at a distance." (22,23) • **Telehealth** is the "use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health related education, public health and health administration." (22,24) Telehealth is an alternative way to deliver healthcare services especially to underserved and rural populations (22). • Telehealth and EHR systems can help to monitor patient compliance to medications, provide emotional support to patients with chronic care conditions and their families, provide clinical interventions, and support the ability of the patient to live an independent life. • A guide to getting started with telemedicine including step-by-steps in disease management and EHR systems is available (22).

Delivery system components-communication	Characteristics
Coordination of care providers	• Improve the availability, timeliness, and accuracy of messages among healthcare providers. • Increase care coordination and chronic disease management by entering coded entries that facilitate advanced computer-based decision support. • Improve sharing patient information among authorized professionals. • Increase making timeliness referrals to other healthcare providers. • Improve continuity of care and timeliness of diagnoses and treatments.
Physician and care team – Patient communications	• Increase physician-patient communication. • Increase messaging with patients that may improve patient satisfaction, self-care, and compliance. • Save physician time by using e-mail messaging. • Increase better identification of patient needs.
Intra-office communications	• Increase communication between physicians, nurses, and support staff. • Increase office communication and efficient task management. • Increase the exchange of detailed patient clinical information with other healthcare team members.

What are the benefits of EHR systems that support care management?

Increase decision support. EHR systems facilitate evidence-based information and improve the clinicians' ability to make sound clinical decisions in a timely manner at the point of care.

- **Increase care coordination and communication.** EHR systems increase the availability, timeliness, and accuracy of messages among healthcare providers.
- **Increase patient self-management.** EHR systems facilitate the provision of care-planning tools, clinical support services within the healthcare system and community, and increase self-management behaviors, use of self-management tools, home monitoring, and patient access to their medical records.
- **Increase access to patient information and better documentation.** EHR systems increase real-time access to person- and population-level information to support care management. EHR systems reduce transcription time and costs, speed up turnaround time of transcribed notes, and Increase dictation workflow efficiencies and accuracy.
- **Increase population based care management.** EHR systems increase timeliness of patient tracking and follow-up, coordination of care for patients with similar conditions, identification of overdue patients, provision of feedback to care team, and facilitation of assignment of patients to risk groups to increase better planning and care management.
- **Increase efficiency and validity regarding order entry and result management**. Increase ability for electronic ordering of lab, radiology, procedures, and immunizations. Increase accuracy and compliance with the entry, storage, and documentation of orders for all medications, tests, and other services in a computerized system of orders.

What are the lessons learned in an EHR system to support care management?

- **Integrate EHR systems and clinical flow.** EHR system implementation involves a major system design of the practice workflow processes (2). To maximize the benefits of EHR systems, practice redesign is necessary. A valuable strategy is to map all care management steps and understand how an EHR system will be integrated into the practice workflow (2).
- **Minimize clinicians' efforts.** Use decision support systems that are incorporated within the clinical workflow and that minimize clinicians' time and effort to receive and act on system recommendations (25).
- **Modular system.** Consider purchasing a modular EHR system that enables incrementally obtaining an EHR system with smaller up-front investment and building a full-scale EHR over time (3). Consider including modules for the major care management components.
- **Population- and patient-based management systems.** Make sure that the EHR system you are implementing in your office has both patient- and population-based management systems. There is a lack of integration and standards between EHR systems and registries.
- **Use physician champions.** Respected and credible physician champions facilitate a more rapid diffusion and adoption of EHR systems to support care management (22, 30, 34).
- **Seek support to customize EHR system.** When purchasing or renting an EHR system, make sure your contract has adequate terms for the provision of complementary changes and adequate support to customize the EHR product to the needs of your particular office.
- **Make sure that the EHR system you are buying has critical care management functions.** Work with vendors to see if the EHR system you plan to buy has multiples ways to aggregate data, produce specialized reports, identify subpopulations of interest, generate reminders, provide evidence-based clinical decision support, create self-management templates, and support care coordination and the delivery of effective patient-centered services.

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