

# Clinical Decision Support for the Independent Physician Practice

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**First Consulting Group** is a leading provider of consulting, technology, and outsourcing services for health care, pharmaceutical, and other life sciences organizations in North America and Europe. More information about FCG is available at [www.fcg.com](http://www.fcg.com).

This report was prepared by Jane Metzger and Keith MacDonald of First Consulting Group. Interviews with physicians who have adopted clinical decision-support tools into their own practices provided the real-world view of what can be accomplished today. The authors are grateful for the time and contributions of the individuals listed in Appendix B.

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# Executive Summary

PHYSICIANS REQUIRE READY ACCESS TO COMPREHENSIVE information for clinical decision-making, including the patient's medical history and possible current conditions, as well as the latest thinking about how to manage those conditions. Compared to large group practices or those owned by hospitals or health systems, physicians in solo or small group practices are less likely to be using electronic decision-support tools that bring patient information and clinical knowledge to the point of care. This disadvantage is significant and growing given the burgeoning clinical knowledge and severe time pressures in today's medical practice—not to mention the fallibility and inefficiencies of paper-based medical records.

However, the technology, marketplace, and cost barriers that have traditionally discouraged independent practices from using decision-support tools have diminished to a point that even smaller practices may be able to benefit from a variety of electronic options. This report identifies the types and characteristics of tools that are now available, shares the experiences of physicians in independent practices who are early adopters, and provides tips about getting started.

Currently available decision-support tools can assist physicians in a variety of ways:

- Bringing accessible information and knowledge to the point of clinical decision-making;
- Bringing knowledge *relevant to the particular clinical situation* (for example, the specific patient, the specific issue, or the specific medication) to the physician when needed;
- Combining clinical knowledge with patient information to help the physician stay abreast of the patient's health status (for example, identifying preventive interventions that are due or issues requiring follow-up);
- Identifying patients lost to follow-up or overdue for recommended interventions; and
- Alerting the physician to contraindications or potential problems by checking planned actions against other patient information and generally accepted clinical knowledge.

A variety of factors need to be weighed by the physician in deciding which avenues to pursue. Among these considerations are ease of use, fit with practice objectives and workflow, and data integration.

Vendors are now offering new products and services that can be applied in the small physician practice environment. Rapidly growing use of PCs and access to the Internet in small practices have laid the foundation for some of these new tools, including the application service provider (ASP) model, in which the vendor takes on the burden of computer maintenance tasks and the practice has fewer upfront costs.

These developments are particularly important because nearly 60 percent of physicians are self-employed—many of them working in small practices where both the financial resources to invest in clinical IT and the skills to implement and operate it are in short supply. Although these physicians, in general, have been slow to acquire decision-support technologies, a growing number of early adopters are successfully using a variety of tools ranging from simple to complex. Their experiences exemplify the possibilities springing from the growing array of options for bringing electronic decision-support tools to the point of care.

# I. Introduction

*“Current processes for diagnosing and treating patients are confusing and inefficient. The physician’s enemy is time. If it is going to take a lot of time to find the information you want, then you won’t do it.”*

—Dr. David Goldman, VP,  
ACP-ASIM

DECISION-MAKING ABOUT HOW BEST TO MANAGE patient care requires a great deal of information about the patient, the clinical conditions that may be present, and current thinking about how to manage such conditions. Given the fallibility and inefficiencies of paper-based medical records, the burgeoning literature about clinical practice, and the severe time pressures in today’s physician practice, the task of consistently making the best possible decisions for all patients in a practice is profoundly challenging.

A range of barriers to information further adds to the challenge for physicians.<sup>1-4</sup> First, there must be sufficient understanding of the situation and a realization that key information is lacking. Then the source must be nearby and organized to meet the need quickly. In actual practice, the medical record is often not immediately available, or a key piece of information is buried or missing. Clinical references are neither easily accessible nor up-to-date; when they are, it may take considerable time to pinpoint the relevant information.

Electronic decision-support tools offer physicians help in (1) recognizing when there is a need to probe for further information; (2) getting the information immediately; and (3) having it organized and synthesized in a way that best aids clinical decision-making. The purpose of this report is to provide practical information about a new generation of tools and to describe the ways that independent physician practices can use—and are using—them to enhance the efficiency and quality of their work.

“The volume and complexity of data and information on which health care decisions are made is growing at a rate that challenges the ability of providers to keep abreast of developments; and the processes used in decision-making are becoming too numerous and specialized for even dedicated providers to master completely.”

—P.F. Fisher et al. in “Decision-support Tools in Health Care.”

The working definition for “tools” used here is a practical one borrowed from Fischer et al.<sup>1</sup>: Tools use computer systems to support health care providers in decisions related to diagnosis, care planning, and treatment of individual patients. Today’s decision-support tools can assist physicians in several ways:

- Bringing accessible information and knowledge to the point of clinical decision-making;
- Bringing knowledge *relevant to the particular clinical situation* (for example, the specific patient, the specific issue, or the specific medication) to the physician when needed;
- Combining clinical knowledge with patient information to help the physician stay abreast of the patient’s health status (for example, identifying preventive interventions that are due or issues requiring follow-up);
- Identifying patients lost to follow-up or overdue for recommended interventions; and
- Alerting the physician to contraindications or potential problems by checking planned actions against other patient information and generally accepted clinical knowledge.

Both physicians and patients can gain value from electronic decision-support tools. When less time is consumed assembling information, physicians can devote more time to seeing the patient. They are also more likely to have complete information on which to base their decisions. Thus the patient’s health issues are addressed in a more timely way and physician decisions are informed consistently by current clinical knowledge.

### Computer-based Patient Record (CPR) Guidelines

“The committee believes that future patient records must be more than a way to store patient data—they must also support the clinical decision process and help improve the quality of care.... Further the committee identified 12 attributes that comprehensive CPRs and CPR systems possess.”

Two attributes specifically call for clinical decision support:

“8. The CPR system can be linked to both local and remote, literature, bibliographic, or administrative databases and systems (including those containing clinical practice guidelines or clinical decision-support capabilities) so that such information is readily available to assist practitioners in decision-making.”

“9. The CPR can assist and, in some instances, guide the process of clinical problem solving by providing clinicians with decision analysis tools, clinical reminders, prognostic risk assessment and other clinical aids.”

—IOM Committee on Improving the Patient Record (1997)

The concept of applying electronic tools to clinical decision-making in the physician practice is not new. In the late 1970s G. Octo Barnett first reported on efforts with decision support in an early medical record system, COSTAR.<sup>5</sup> The concept was also one cornerstone of the Institute of Medicine’s 1997 charge to the industry to adopt computer-based patient records (see sidebar). Despite this long history, most physicians today still lack electronic decision-support tools to aid them in their work.

This report discusses important advances in technology and the vendor marketplace and describes new ways for independent physician practices to minimize their costs for these technologies. Electronic tools previously perceived as restricted to large group practices or ones owned by a hospital or health system are now within reach for typical independent practices, even smaller ones. The report is designed to help independent practices take advantage of these new possibilities.

Chapter 2 lays a foundation for understanding the types of tools that are available and their characteristics. Chapter 3 reviews the combination of technology, marketplace, and financial factors that makes it more feasible to bring electronic tools into the independent practice setting. Chapter 4 sets out considerations for small practices beginning the process of selecting and using decision-support tools.

The core of the report is Chapter 5, which includes eight case studies that illustrate how early adopters are using a wide variety of simple and complex electronic tools to accomplish particular goals, told from the perspective of the physicians involved. Because little has been written about them, a special effort was made to collect examples in smaller physician practices where implementing clinical tools is particularly challenging.



## II. Clinical Decision-Support Tools

THE MANY CLINICAL DECISION-SUPPORT TOOLS that are available can be grouped into three categories based on what the physician is attempting to accomplish:

1. Bring relevant clinical knowledge to the point of care to support decisions about individual patients;
2. Assist in managing individual patients by making it easy to assemble all relevant patient information and to identify the most appropriate interventions; or
3. Apply care recommendations across a population of patients by developing appropriate care plans during patient encounters and reaching out to patients for follow-up to avoid gaps in care.

Within each of these three functional categories are four dimensions:

1. Timing of application in the decision-making and care process;
2. Active versus passive mode of delivery;
3. Level of customization to the clinical situation; and
4. Ease of access.

Understanding these dimensions is important because they influence effectiveness. They are described further in the sidebar.

### Four Dimensions of Clinical Decision-Support Tools

**Timing of application in the decision-making and care process.** Tools may (1) bring relevant information *during the information-gathering process*; (2) array the appropriate interventions (and warning against inappropriate ones) *during the decision-making process*; or (3) review the selected actions and point out possible problems *after the decision-making process*.

**Active versus passive mode of delivery.**

“Active” decision-support information appears automatically. It can provide either a screen pop-up alert, such as a warning that the patient is allergic to a medication being ordered, or a constantly displayed reminder, for example, that the patient has diabetes. “Passive” tools require the user to seek out the desired information. These include order sets (recommended orders for a particular situation) as well as clinical knowledge tools that can be consulted. Electronic medical records typically include both types of tools, and achieving the right balance is important. Too many red flags can disrupt work flow.

**Level of customization to the clinical situation.**

The closer decision-support information fits the particular patient and situation at hand, the more useful it is in decision-making. Truly customizing advice or knowledge to specifics about the patient requires electronic patient information either already documented or entered at the time.

**Ease of access.** Again, the more easily accessible a tool, the greater is its usefulness. At a minimum, the tool should be available in the exam room or a nearby office. The ideal is mobile access that moves around with the user, from office to examination room, to hospital, to home. Ease of access also includes the effort and time—or number of steps—required to sign on and get to the desired information. Time is of the essence. Tools integrated with electronic tasks such as prescribing or documenting require little extra effort because the user is already signed on to the system.

Source: “A Pragmatic Framework for Understanding Clinical Decision-Support” by L.E. Perreault and J.B. Metzger

### Tools That Bring Relevant Clinical Knowledge to the Point of Care

Paper-based clinical knowledge resources are unwieldy and not always up-to-date or easy to locate. Online access to synthesized knowledge organized around typical questions that arise in practice can overcome these barriers. Table 1 describes two types of tools; the major differences between them are the organization of and the manner of getting to the desired information.

**1. Clinical knowledge synthesized to answer common questions.** This is a stand-alone reference tool available on the physician’s electronic desktop. It synthesizes current research and expert opinion around questions that often arise in practice—the medical equivalent of “frequently asked questions.” This type of reference tool is passive in that the physician takes action to request the information and define the question. Physicians can use these tools to print out or refer to online displays during discussions with patients or others. Although these tools don’t provide patient-specific recommendations, they offer much quicker access to answers than searching the clinical literature and other sources. This is the model for several products currently in the vendor marketplace.

**Table 1. Tools That Bring Relevant Clinical Knowledge to the Point of Care**

Tool Type	Description/Mechanism	How Tool Supports Decision-making
<b>1. Clinical knowledge synthesized to answer common questions</b>	Electronic reference indexed according to symptoms or conditions	Quickly provides answers to questions that commonly arise in practice
<b>2. Clinical knowledge linked to specific tasks</b>	Link to reference information from within an electronic task such as writing a prescription, updating a problem list, or writing an encounter note	Provides immediate access to task-relevant information upon request

For such a tool to be useful to the physician, the information must be (1) intended for the right audience (for example, primary care, gastroenterology, gynecology), (2) developed and maintained by a credible source, and (3) truly available for quick access at the point of care (office, exam room, or remote location such as the hospital or home).

**2. Clinical knowledge linked to specific tasks.**

The second type of clinical knowledge tool is available to practices that use computers to write prescriptions, capture encounter documentation, or manage patient problem lists. Many vendors offer products with one or more of these functions and linked knowledge resources; a comprehensive electronic medical record (EMR) system is not needed.

Through a button or tab, the physician can obtain synthesized knowledge related to a particular medication (the one being ordered) or patient problem (the one being documented). Although passive, this type of access requires little effort because the user is linked to the desired information in one step. The most common form of linked clinical knowledge is medication reference information that can be accessed during prescription writing to obtain specifics such as dosing recommendations, contraindications, or side effects.

**A New Online Clinical Reference Tool from ACP-ASIM**

The American College of Physicians/American Society of Internal Medicine (ACP-ASIM) developed an electronic tool to bring up-to-date clinical knowledge to the point of care. According to Dr. David Goldman, VP and editor-in-chief, the new product (dubbed PIER for Physicians’ Information and Education Resource) was just released in April to the college’s 115,000 members for pilot review and trial over the coming year.

The modular product is designed to present the most important information first, in general-to-detailed, bulleted format, on a range of disease topics (currently numbering 125 and growing to 300 in the next 18 months) culled from the latest research. The product is a Web-based stand-alone tool, engineered so that components can be integrated with EMR and handheld products already in the marketplace. One vendor has already announced a partnership with ACP-ASIM that promises integration with that vendor’s handheld applications.

The future revenue model and a widespread release date are uncertain, but the product is currently available free to college members. See the Web site (<http://pier.acponline.org>).

## Tools That Assist in Managing Individual Patients

Tools in this group help the physician assemble the basic information about a patient and initiate the right care plan—making it easier to do the right thing. Table 2 shows the tools in this group. The first two can be implemented as stand-alone tools. The others are available to physicians that routinely use electronic prescription writing, order entry, encounter documentation, or patient problem list management.

**1. Patient self-assessment.** This tool can shorten the time-consuming process of history taking and

possibly make it more comprehensive. Patients answer a series of questions eliciting their status and history; then the information is synthesized and summarized in advance of the actual encounter to highlight areas of concern for the physician. Some tools use branching logic to guide the questions and provide more detailed information. Some offer possible diagnoses, treatments, or both. Self-assessment tools are not necessarily employed during every visit. In some practices, use may be limited to new patients or those coming in for a complete physical examination or a check-up relating to a diagnosed chronic disease.

**Table 2. Tools That Assist in Managing Individual Patients**

Tool Type	Description/Mechanism	How Tool Supports Decision-making
<b>1. Patient self-assessment</b>	Summary and synthesis of patient-reported information about status and history	Provides a synopsis of information otherwise obtained by physician; may uncover issues that could be missed during history taking
<b>2. Clinical calculation</b>	Formulas and algorithms used in clinical practice presented to accept relevant patient data and perform calculation	Assists physician in remembering formulas/algorithms and performing complicated calculations
<b>3. Electronic flow sheet with time series of condition-relevant indicators</b>	Graphic or tabular presentation of disease management status indicators over time	Provides update on patient history and status at a glance
<b>4. Patient summary screen with problems flagged</b>	Inclusion of information about chronic diseases being managed in electronic screen header, a patient summary screen, or both	Reminds any clinician viewing electronic chart that the patient is being actively managed for the noted chronic condition(s)
<b>5. Medication checking</b>	Rules-based checking of medications with message display	Advises physician of possible contraindications or dosage problems with medication being ordered
<b>6. Order set/protocol</b>	Organized set of diagnostic and/or treatment orders for a particular disease, problem, or type of visit	Provides quick way to order recommended set of tests, medications, immunizations, etc.
<b>7. Documentation template</b>	Structured template for capturing encounter notes with relevant topics identified; may build note from free text or coded entries	Guides entry of documentation to include relevant topics and observations; prompts for completeness of documentation and assessment

One self-assessment tool, for example, focuses on the health and quality-of-life issues typically affecting older patients. It can be administered to new patients and to returning patients every six months in the waiting room using either a grease board or kiosk to capture the information. Patients can also complete the self assessment online before coming to the office. When seeing the patient, the physician has a one-page summary (display or printed) highlighting areas of concern to be pursued during the visit.<sup>8</sup> Feedback is also provided to the patient concerning health and lifestyle issues identified in the assessment, with cross-references to relevant educational materials.

**2. Clinical calculation.** Physicians often use formulas or algorithms during diagnosis or treatment decisions. Calculation tools can bring an array of these to the point of care, either as a package of such tools or as part of another application such as a prescription writer or knowledge reference. These tools help to ensure that the proper calculation is performed and mathematical errors eliminated. For infrequently used calculations, they also speed up locating the proper formula.

#### Examples of Calculation and Algorithm Tools

- Predicted total lung capacity
- Estimated blood volume in infants based on body weight
- Thyroid testing
- Drug-induced liver injury diagnostic score
- The Schwab and England scale of capacity for daily living

See the Medical Algorithms Project online ([www.medal.org](http://www.medal.org)) by Quanta Healthcare Solutions, Inc.

**3. Electronic flow sheet.** When the clinical tool is capturing laboratory test results, vital signs, medication dosage, and other electronically documented information, time-series results of one or multiple parameters can be displayed in flow-sheet or graphical format. The broader the range of patient information captured, the more potential there is for constructing flow sheets and graphs that are useful. Such a display provides a customized update on patient history and status at a glance. In active tools the displays appear automatically when the electronic record is opened; passive tools require the physician to request the display.

#### Examples of Patient Flow Sheets

- Graph of pediatric growth chart showing percentile by age
- Flow sheet of peak expiratory flow at each testing date
- Graph of recorded blood pressure readings contrasted with management goal and including dosage of blood pressure control medication
- Diabetes flow sheet displaying blood glucose levels and insulin dosing over time

**4. Patient summary screen with key issues flagged.** Displays of information about patient problems that appear as the physician is using an electronic clinical tool can make it easy to consistently remember key health issues such as a chronic disease. Two different styles can be used, singly or in combination:

- **Headers.** Patient electronic records always display a standard set of patient information as a header. Typically this includes name, medical record number, age, date of birth, sex, and possibly type of insurance, primary physician, or other data. When a note such as “diabetes” or “asthma” is included in these header fields, the information appears at the top of every screen of patient information, as a constant reminder.
- **Summary screens.** Usually the first screen to appear when an electronic patient record is opened, a summary screen displays patient problems, medications, recent laboratory test results, and recent encounters. This type of “patient at a glance” display can serve as a reminder of particular aspects of the patient’s history to factor into decisions, and in some systems it can be tailored to the physician’s specialty. Summary screens are a typical feature of both simple and comprehensive electronic medical records.

Both of these patient summaries are active tools in that they display automatically. They are particularly useful as reminders during patient interactions around an acute problem that may be unrelated to the patient’s chronic condition and at times when other clinicians in the practice are covering for the patient’s physician.

**5. Medication checking.** Other forms of clinical decision support become possible when the physician completes tasks such as writing orders online. The most common one is checking prescriptions for possible contraindications based on such factors as patient age, allergies, diagnosis, other current medications, and dosing. The extent of patient information available and the rules-based logic employed determine how comprehensive the checking can be. A major challenge is maintaining complete information about a patient’s current medications. (For a detailed discussion concerning e-prescribing and medication checking, see *E-Prescribing*, November 2001.) Prescription writing tools are available on their own and also as separate modules in certain broader clinical products, including EMRs.

**6. Order set/protocol.** These tools, used in systems supporting electronic order writing, create sets of preassembled orders for typical clinical situations, which the physician can select and then edit as necessary for the particular patient.

#### Examples of Clinical Situations Addressed with Order Sets

- Annual physical examination for a female over age 45
- Six-month well-baby check up
- Pre-op for a hip replacement
- Six-month check up for a new diabetic

Order sets, although passive, speed up ordering *and* aid the clinician in ordering the right things, according to the correct protocol. Typically, this feature is only present in an application that supports several types of diagnostic and treatment services, such as an electronic medical record. However, more limited order sets can also be found in prescription writers and laboratory test management applications.

**7. Documentation template.** Found in both electronic medical records and note-writing applications, templates guide the physician in considering and documenting the right interventions. Headers serve as reminders, which can benefit both the thoroughness of the patient assessment *and* the eventual level of coding for the visit because of better documentation. Templates can be tailored to the problem, condition, and visit type, and incorporate available electronic patient information so that it need not be documented again.

#### Examples of Documentation Templates

- Two-week post-natal visit
- Adult with upper respiratory infection
- Telephone care of adult female with urinary tract infection (UTI) and prior history of UTI
- Adult with low back pain

## Tools That Apply Care Recommendations across a Population of Patients

Applying care recommendations or guidelines consistently for all patients in a practice or a particular cohort of patients is difficult with paper medical records. Decision-support tools—either incorporated into an electronic record or implemented as stand-alone patient tracking tools—make it possible to track patients and increase compliance with the desired practices. Table 3 lists the different types of tools that aid in this pursuit.

### 1. Disease registry or patient tracking tool.

This simple and practical tool for applying a consistent disease management approach captures a limited set of patient information.<sup>10</sup> It does not replace the medical record, but presents a snapshot of patient disease burden and intervention status at the point of care (typically on paper attached to the medical record). It serves as a quick reference for physicians and other members of the team, providing the last dates and results of recommended condition-associated interventions (for example, testing, foot checks, and retinal exams for patients with diabetes).

#### Examples of Patient Information Tracked in Registry

**Diabetes** HbA1c test results and testing dates; dates of last foot and eye exam; due dates for next services

**Asthma** Severity rating, peak flow or FEV1 results and test dates; due dates for next services

**Hypertension** Severity rating; blood pressure (SBP, DBP) results and measurement dates; prescribed status for diuretic, beta blocker; due dates for next services

**High Cholesterol** Lipid (HDL, LDL) test dates and results; anti-lipid drugs prescribed; due dates for next testing

Unless the registry is interfaced with billing or laboratory systems, all of the information tracked must be manually entered. As a result, practices that use this type of tool are judicious in determining the types of patients to track in the registry and the most useful pieces of information to be entered and updated. Hence electronic patient tracking tools are typically maintained for one or more chronic conditions, rather than for tracking wellness and prevention services for all patients.

**2. Wellness or disease management reminder.**

Recommendations about patient interventions to consider can be conveyed, without requiring extra data entry, in an EMR that manages the required patient information and has the necessary rules-based logic to scan available information and flag patients not in compliance. EMRs—whether comprehensive or not—typically have a summary screen with a snapshot of the patient’s health history. This display may include reminders about interventions due or a flag may alert the user that patient recommendations are available to be viewed. Regardless of the reason for viewing patient information, the user always receives a reminder to consider these possible gaps in care.

Another design delivers message-style prompts as the physician opens the record or writes orders. The extent of patient data and the complexity of the application’s rules-based logic determine the level of prompting possible. Many applications are easily set up to accomplish wellness-related prompting, and most come with tools for building the set of rule-based recommendations that matches care initiatives in the physician practice.

**3. List of patients with interventions due.**

A proactive approach to increasing compliance with adopted guidelines necessitates identifying patients who require follow-up.<sup>10</sup> Disease management registries, EMRs designed to support disease and wellness management, and applications for prescription writing and laboratory results management can all be useful in producing lists of patients whose reported information suggests a gap in care. Typically, on either a scheduled or as-needed basis, reports are requested that create a list and provide basic information about some group of patients. Depending on the extent of the data, these tools serve a number of important purposes:

**Table 3. Tools That Apply Care Recommendations across a Population of Patients**

Tool Type	Description/Mechanism	How Tool Supports Decision-making
<b>1. Disease registry or patient tracking tool</b>	Printed or displayed information concerning status of guidelines-based interventions (dates completed, dates due, results)	Provides at-a-glance update concerning patient compliance with care recommended for condition
<b>2. Wellness or disease management reminder</b>	Display of overdue guidelines-based interventions (e.g., preventive, screening) shown on patient summary screen or delivered as message	Advises physician of gaps in care according to adopted guidelines based on age, disease
<b>3. List of patients with interventions due</b>	Report listing patients who are candidates for outreach because of clinical status or overdue guidelines-based intervention	Identifies patients with some gap in care who should be considered for outreach



- Contacting patients on a recalled medication or those on a chronic medication with a lapsed prescription;
- Identifying patients with patterns of abnormal test results suggesting an undiagnosed condition or ineffective management (for example, diabetes); or
- Identifying patients with gaps in care according to wellness and disease-management guidelines in use in the practice (for example, needing an influenza vaccination, overdue for screening for complications of diabetes).

Phone lists and mailing cards can sometimes be produced to facilitate patient contact. In many practices, the physician or team reviews outreach lists to devise an appropriate response for each identified patient rather than automatically contacting each patient. Periodic reporting about population compliance with care management (all identified patients to whom the guideline applies) also provides feedback to physicians and the practice about the success of their efforts to deliver care in the desired way so that they can redesign or fine-tune procedures in the practice.

### III. Feasibility Issues

*The physician adopters interviewed for this research indicated that quality improvement, rather than cost reduction, was the primary objective for investing in decision-support tools. Nonetheless, because independent physician practices have little to invest in IT, expense is always an issue.*

#### **Many Physicians Have PCs and Internet Access**

- 56 percent have Internet access from the office
- 40 percent have access from the clinical work area
- 34 percent routinely communicate with support staff via email
- 46 percent of other clinical staff have access in the clinical work area
- 62 percent of practice administrative staff have access in their offices

Source: *Harris Interactive Health Care News*, February 26, 2001.

MANY PHYSICIANS IN THE UNITED STATES ARE solo practitioners or members of independent medical groups. Typically, in this environment, both the financial resources to invest in clinical IT tools and the skills to implement and operate them are in short supply.

In the past, a number of factors made it difficult to implement clinical decision-support tools—with or without an electronic medical record—in smaller independent practices. Today, changes in technology, the vendor marketplace, and cost make these tools much more feasible. There is even a glimmer of hope that new reimbursement incentives may evolve to help offset the expense of IT. As a result, adoption of clinical tools including decision-support is picking up speed. This chapter reviews recent developments that have opened up new possibilities.

#### **Advances in Technology**

As the sidebar shows, many physicians have installed PCs for themselves and for other clinical and administrative staff. And with widespread connectivity to the Internet, staff in a growing number of practices can access the Web from PCs in their offices. This access provides the basic technology infrastructure for many new applications.

The Internet and browser technology have made possible remote, shared computing through a Web-hosting model called ASP (application service provider). Under the ASP model, a vendor houses and supports the application remotely for its clients, thereby transferring the majority of the technical burden and computer processing from the client to the vendor. Such an arrangement means little or no upfront costs for the client, and the shared acquisition and operating costs can be spread out in more affordable increments over time.

Additionally, because the recent Web-based applications require a lower level of desktop computing, less expensive PCs already in use can now be deployed to execute more complicated functions. As a result, newer remote-hosted applications no longer require expensive onsite mainframe and personal computers or professional staff with advanced knowledge of systems in the physician practice. With vendors hosting and managing the systems, staff in physician practices no longer have the traditional burden of understanding and supporting complicated technology.

The advent of mobile computing devices is another breakthrough that represents new opportunities for physician practices. No longer must physicians wire every office and exam room for PC connectivity and outfit each workstation with a PC. Connectivity can be provided via networks using radio frequency, infrared beams, or “hot-sync” stations where mobile devices are periodically docked to download and upload information.

Any of these approaches makes IT access more universally possible throughout a practice, with minimal disruption. With a mobile device, applications can actually be brought to the point of decision-making, not just the point of care.<sup>11</sup>

## A New Marketplace

Nearly 60 percent of U.S. physicians are self-employed and many work in small practices. This pattern of disparate, independent practices has presented a challenge for vendors using traditional approaches to marketing, sales, and service. As a result, most vendors of traditional clinical applications have focused their selling efforts on larger group practices and integrated delivery networks (IDNs).

Similarly, traditional vendor-supplied implementation support (including on-site configuration and training during the go-live period) has not been practical or affordable in small practices. This picture has changed with the development of out-of-the-box applications, modular components, user-driven customization at the desktop, and intuitive navigation, all of which shorten the implementation and learning curves and make ongoing support largely unnecessary.

In the past, clinical decision-support tools were available only as part of monolithic, multi-function electronic records products. Now vendors offer single-function products and some offer modular applications that can be implemented to fit local priorities and pocketbooks. Vendors can more easily activate new features as physicians decide to integrate new functionality into their practice.

### Most Physicians Self-Employed or Working in Small Practices

- 43.4 percent in solo practice
- 11.9 percent in 2-physician practices
- 8.3 percent in 3-physician practices
- 18.1 percent in practices with 4 to 8 physicians
- 19.2 percent in larger practices

Source: American Medical Association. *Physician Socioeconomic Statistics, 2000-2002.*

### Third-Party Sponsors

A number of stakeholders who view the independent physician practice market as a potential opportunity have begun sponsoring IT initiatives. Pharmacy benefits managers, payers, and employers alike see the potential to stem rising health care costs by sponsoring patient management programs at the point of care.

Pharmaceutical companies have also entered this space in the hopes of capturing patient data to support their clinical trial efforts or gain information on medication utilization. These third parties provide the tools at no cost to the physician practice, by making them available either in the practice itself or through the Internet.

The case studies in the box below and in Chapter 5 give examples of physician practices that obtained IT from a third party. Unquestionably this type of sponsorship helps with affordability.

However, before participating in one of these arrangements, it is important to understand the sponsor's business model and ensure that the terms and expectations are acceptable, including ownership and uses of the aggregate and individual patient information to be captured.

#### **Payer-Sponsored Tools for Disease Management: GlaxoWellcome, Blue Cross & Blue Shield of Mississippi, and the Hattiesburg Clinic**

Dr. Jerald Jackson was so motivated after attending a disease management course sponsored by the Institute for Healthcare Improvement several years ago that he wrote a paper on the topic and has since become a disease management champion in southern Mississippi. In a unique project, Blue Cross and Blue Shield of Mississippi is embarking on implementation of a tool for Hattiesburg-area physicians that gives feedback at the point of care on patients with chronic diseases so that they can be better managed. GlaxoWellcome is funding this Web-based patient disease registry through an arrangement with DocSite for use at 80 sites. What makes this pilot unique is that Blue Cross & Blue Shield of Mississippi is partnering with physicians who use this product to treat patients with diabetes mellitus, of which Mississippi has the highest incidence in the United States.

In practical terms, the patient registry product (called "DocSite") is easy to implement since it's Web-based and requires no installation on the part of interested users. Configuring the product for local use did require Dr. Jackson and colleagues to establish the clinical guidelines that would be used and to convince his colleagues that their efforts would pay off. In the absence of an electronic record system, Dr. Jackson has found that the product provides great benefit for only a small effort. He's begun using the product in his clinic with 160 diabetes patients and has already demonstrated a measurable decrease in their HbA1c levels.

While Dr. Jackson's multi-specialty clinic of 175 health providers has 16 satellite clinics of Family and Nurse Practitioners, he believes his experience with this product is replicable across any ambulatory physician practice.

## Financial Incentives and Possible Cost Offsets

The physician adopters interviewed for this research indicated that quality improvement, rather than cost reduction, was the primary objective for investing in decision-support tools. Nonetheless, because independent physician practices have little to invest in IT, expense is always an issue. Financial incentives and possible cost offsets are both of interest.

Recently, a few experimental programs have offered increased reimbursement as an incentive to physicians for undertaking specific quality improvement initiatives—especially those aiming to increase compliance with disease and wellness management recommendations. The following programs are of particular interest:

- A coalition of California health plans, medical groups, and employers has created an initiative, Pay for Performance, that gives bonuses to physician groups that do well on a standardized set of performance measures. Bonuses are funded by premium increases associated with capitation.<sup>12</sup>
- Independent Health Association, a not-for-profit HMO in Buffalo, New York, provides an extra payment for performance in five key areas: patient satisfaction, emergency room utilization, access, breast screening, and colorectal screening. Based on level of performance (high, average, below average), physicians can earn an incentive award up to \$1.50 per member per month.<sup>13</sup>

- Cigna HealthCare will test quality incentives with physicians treating Cigna patients at Promina, an integrated health system in Atlanta.<sup>14</sup> Physicians will receive three levels of payment (their current level or one of two bonus levels) based on a score for meeting eight quality measures that physicians helped to choose: patient satisfaction, generic prescribing, heart-attack management, antibiotic use, readmission rates, mammograms, Pap smears, and prostate cancer screening. The program is scheduled to begin in January 2003.

These efforts are still very new. However, they could represent the wave of the future, in which performance-based reimbursement helps offset some of the costs of clinical technology.

In addition, other cost offsets from operational savings can help decrease the financial burden for independent practices. Some malpractice insurers have offered discounts on premiums for physicians using IT for documentation and decision support at the point of care.

In some cases, practices have achieved operational efficiencies, time savings, and a reduction of staff when they installed IT. Physicians interviewed for this research provided several examples of actual savings achieved, including reduced operational costs for transcription and medical record management. Chapter 5 describes their experiences.

## IV. Getting Started

*In order to select the application that fits best with practice needs and resources, practice members need to clarify and agree on both their objectives for practice redesign and their desired level of investment.*

AS PHYSICIANS IN INDEPENDENT PRACTICES START to review the possibilities that might suit their local needs, some issues arise. This chapter discusses these considerations using information from early adopters and vendors.

### Identifying Products

Unfortunately there is no single, up-to-date listing of the products available to the smaller physician practice, and Web searches by themselves are not an effective way to identify likely products. Physicians can turn to several other sources:

- Physician colleagues from other practices around the country who have used decision-support tools;
- Other physicians sharing a common hospital affiliation, IPA, or other umbrella organization;
- Vendor exhibits and demonstrations at meetings of organizations such as the Medical Group Management Association and American Association of Family Practice. Vendors turn out in large numbers for these events. Professional organizations also offer good vendor resources on their Web sites; and
- Publications and trade journals targeting physicians. Appendix A provides an annotated list of recent publications providing information about products that include some form of electronic clinical decision support.

A number of the physicians interviewed for this report recommended speaking with current physician users of products being seriously considered; and in several case examples in Chapter 5, IT users initially were directed to a particular product by another physician.

## Solo Implementation Within a Group

In many practices, one physician emerges as the early adopter and acquires the basic infrastructure for a limited implementation (PC with dial-up modem and Internet access). Today many vendors accommodate single-physician licenses. In fact, in some cases, a pilot implementation limited to one physician can establish both feasibility and effectiveness as an initial step for the practice.

There are, however, trade-offs to consider. First, costs per physician are sometimes higher with individual licenses. More important is the fact that applications capturing patient data are more useful when other physicians and nurses in the practice can consult the information when they cover for the physician. Medical record policies and HIPAA compliance are also more easily managed when consistent procedures are developed and employed across the practice.

## Integration of Patient Data from Multiple Tools

Single-function tools that capture patient information—such as prescribing or note writing—are now available. But integration issues need to be considered: (1) how to avoid re-entry of information already available in the practice management system; and (2) how to eventually integrate patient information captured by multiple clinical applications.

The information in the practice management system usually includes such items as patient medical record number, date of birth, address, contact information, and other data. At least some of this information is also needed in clinical tools. Managing the information in two places is inefficient and subject to inconsistencies. Although an interface can be used to pull the information across applications, building and maintaining system interfaces requires skills and time that are not usually available in the small practice. Some vendors of ASP-provided clinical products will develop an interface to a practice management system for an extra charge.

As indicated in many of the case examples, lack of integration need not be a barrier to getting started. A number of the physicians interviewed for the case studies see integration as a long-term goal, but are not there yet. In the meantime, they find the value of the tools sufficient to justify the extra effort invested in data entry. However, thinking ahead about integration can avoid problems later—such as discrete databases that must be added to and consulted separately, rather than providing an integrated view of electronic information about a patient.

Practices are likely to implement clinical support in increments. One strategy for eventual integration of patient information is to use a modular clinical product. Additional modules are either integrated (use the same database) or already interfaced (able to transfer and combine data). Another strategy that preserves options for the future is to ensure that any clinical applications acquired include industry-standard relational databases and data-export tools that can organize and send information to another database or application. With these in place, the risks of not being able to reuse electronic patient data in the future are minimized.

## Evaluating Knowledge Resources

An obvious concern about products that deliver clinical knowledge is how the information is developed (by whom and by what process) and maintained (how frequently and by what process for updates). Databases of information for prescription interaction and contraindication checking are the most widely used, and a couple of commercial vendors of these products have established credibility and a track record over many years. Knowledge vendors in other areas are much newer.

Many vendors have physicians on staff, as well as a panel of specialist experts from around the country who contribute to the synthesis of knowledge into practice briefs and updates. Some have been recognized by national medical associations or other organizations with credibility in a particular practice area (for example, American Diabetes Association). In addition to understanding the sources and reviewers, purchasers need to know how often information is updated and how updates become available to practice sites.

## Implications for Work Processes

The cases reported in Chapter 5 are success stories. In fact, research conducted for this report uncovered scant disappointment with the performance of decision-support tools installed in the independent practice setting. Realistically, however, not every physician practice has the same appetite for using clinical decision-support tools in new approaches to managing patients. As with any IT purchase, in order to select the application that fits best with practice needs and resources, practice members need to clarify and agree on both their objectives for practice redesign and their desired level of investment.

Tools that aid in delivering guidelines-based care to all patients in the practice entail the largest investment in change. Physicians must identify the groups of patients to be targeted and the specific interventions to be recommended (wellness, prevention, chronic disease), and determine how decision-support tools are to aid practice staff in following the recommendations. Then physicians and staff determine how the tools will be integrated into the patient care routine and identify roles and responsibilities for data entry and for responding to decision-support data. Case examples in Chapter 5 include both decision-support tools used exclusively by physicians and those targeted also to other members of the clinical and administrative team. The latter approach delegates more work responsibilities to non-physicians (thus making it easier for the physicians) but requires more effort to implement.

Physician leadership, investment of time and resources, and committed follow-through are all components of successful efforts to move clinical practice toward greater efficiency, consistency, and quality.



## V. Case Studies in Clinical Decision Support

*“Patients do notice and appreciate that the practice is more technically oriented. They feel they’re getting better care as a result.”*

—David Nelsen, M.D.

Physicians already using clinical decision-support tools provided the information in the following case studies. They describe why they decided to use decision-support tools, how they went about implementing them in the practice, and what the results have been.

The focus of this report is on smaller practices, because limited resources make IT projects particularly challenging in those settings, and because there is less information in the literature about IT use in small practices as opposed to larger ones with more resources. Of course, practices of all sizes can make use of these tools, and the importance of physician leadership, group commitment, and investment in change holds true in any setting.

Additional case examples involving use of clinical decision-support tools in physician practice can be found in three other reports published by the California HealthCare Foundation.<sup>9,15,16</sup>

### Synthesized Clinical Knowledge in a Group Practice

#### Case Study

Fritz Hofheinz, M.D.

The Medical Group; Beverly, MA

*Setting:* 11-Physician Internal Medicine/  
Subspecialty Practice

*Product:* UpToDate (www.uptodate.com)

#### Background

When he encountered a patient problem that was unfamiliar, Dr. Hofheinz used to scramble to find appropriate clinical references or grab his colleagues throughout their busy day in order to get the latest treatment information. “In internal medicine, we see everything at least at *some* point,” he says. Maintaining access to accurate, up-to-date information has always been a challenge, but the current time pressures have made the traditional methods of getting advice all the more impractical for Dr. Hofheinz. He’s also been concerned more recently about medical malpractice. These challenges prompted him to begin using the UpToDate clinical reference product in his practice.

## Implementation

Dr. Hofheinz had learned of the UpToDate product through a colleague and used it during medical school and residency, so incorporating the tool into his practice seemed logical. He initially subscribed for less than \$500. With his username and password, he can search the online clinical information resource from any computer with Internet access. (A CD-ROM version is also included with the \$400 annual product subscription, updated and distributed every four months.) Because there was already a PC with Internet connection in his office, the initial installation was easy; no other setup was required.

## How It Works

Even though he has an EMR system that he and his colleagues use in the exam room with patients, Dr. Hofheinz finds himself accessing the online version of UpToDate in his office instead, just as he would have consulted his traditional journal references or talked to colleagues throughout his day. Although the way he uses the product is mostly invisible to patients, he does occasionally point out specific information from the product to his patients—and he can envision a more collaborative discussion taking place during the patient visit. After all, patients in general are already doing more research on their own, so, Dr. Hofheinz remarks, “Why not direct them to more appropriate information?” One of his colleagues has the product installed on the handheld device on which he accesses the EMR, and he uses UpToDate in the exam room during patient visits.

## The Results

While not all of his colleagues in this high-volume practice use the knowledge tool, “those who do try it like it,” says Dr. Hofheinz. Some who don’t use it don’t use references in general, he adds. A few colleagues either aren’t aware of the tool or have dismissed all such product offers because they’re inundated with vendor marketing materials.

*“My hit rate [for finding information] is high enough that I know I’ll use it and it’ll be effective.”*

In terms of cost, Dr. Hofheinz notes, “There’s always a price threshold. Having used the product myself I know that it’s well worth it, but it’s not always obvious to everybody else. They believe that using their old methods of accessing information will be fine.” While Dr. Hofheinz says that it’s difficult to put a price tag on the benefits he receives, he feels his practice is more emotionally satisfying as a result of the tool. “My hit rate [for finding information] is high enough that I know I’ll use it and it’ll be effective.”

## Synthesized Clinical Knowledge in a Residency Clinic

### Case Study

David Nelsen, M.D.  
University of Arkansas for Medical Sciences,  
Department of Family and County Medicine

*Setting:* 4-Physician Equivalent Family  
Practice Residency Clinic

*Product:* Clineguide (www.clineguide.com)

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### Background

“Medicine is too complex to keep everything in your head,” says Dr. David Nelsen. “Physicians need reference tools and now they can get them electronically.” He notes that his practice at the University of Arkansas’ Family Practice Residency Clinic was already biased toward technology; they’ve been using an EMR for five years. So it was no surprise when he moved their paper-based clinical reference tools to the computer. “We used to have a library but books quickly become outdated—plus they ‘walk away,’” he says. “With Web-based tools, someone else keeps the information up-to-date.”

### Implementation

Being a part of a larger organization afforded Dr. Nelsen’s clinic the chance to subscribe to Clineguide’s clinical reference tool at no additional cost. They already had PCs and the necessary Internet connections in place, making access easy.

### How It Works

While Dr. Nelsen sometimes uses the product to access disease and pharmaceutical information in the exam room with patients (he has used the tool to help them visually identify the pills they’re taking), he prefers to maximize his face-to-face time with the patient and usually accesses information from a PC in the common work area.

### The Results

While the benefits aren’t quantifiable in financial terms, Dr. Nelsen sees increased efficiency in his practice through his ability to find information faster. Both the speed and the extensive clinical content greatly benefit his real-time decision-making capabilities. “Patients do notice and appreciate that the practice is more technically oriented,” he says. “They feel they’re getting better care as a result.”

*“We used to have a library but books quickly become outdated —plus they ‘walk away.’ But with Web-based tools, someone else keeps the information up-to-date.”*

## Documentation Templates for Chronic Disease in a Small Family Practice

### Case Study

Alan Tannenbaum, M.D.  
Primary Care Associates;  
Cape Coral/Ft. Myers, FL

*Setting:* 5-Physician Family Practice

*Product:* Charting Plus by MediNotes Corp.  
(www.medinotes.com)

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### Background

Dr. Tannenbaum was a long-time user of an EMR product before he switched to MediNotes' Charting Plus in 1995. The EMR made it easier for him to practice medicine. "Every physician should be using one," he says. "Using handwritten notes felt like a horse-and-buggy approach to medicine."

When he started Primary Care Associates six years ago and selected an EMR product, it was initially for compliance and coding reasons, not for disease management capability. Once he began using the product, however, and clinical guidelines became more prevalent, he started incorporating guidelines into the product's note-writing capabilities and now uses them extensively for patients with chronic disease.

*"Using handwritten notes felt like a horse-and-buggy approach to medicine."*

### Implementation

Product installation was straightforward. The practice initially installed one main server with five physician workstations connected through wiring to each room. By deploying less-robust "dumb terminals" in place of PCs, he avoided higher initial costs and kept ongoing maintenance costs low. The software was loaded onto both the server and the client terminals in less than an hour with minor vendor support.

*The software was loaded onto both the server and the client terminals in less than an hour with minor vendor support.*

After installing and using the EMR product for a period of time, Dr. Tannenbaum spent a weekend with his physician assistants designing the templates and incorporating standards of care from the Medicare guidelines that they would jointly use for treating patients with chronic diseases such as asthma, diabetes, congestive heart failure, and osteoarthritis.

### How It Works

For each of the chronic diseases they chose to address, Dr. Tannenbaum created a template that guides the provider during the note-writing process through a checklist based on the latest standards of care (in this case, ACP-ASIM protocols). Items on each template include essential tests, medication management, patient instructions, and other preventive measures that patients should be undertaking for their specific disease. Following a standard template to document each patient note helps Dr. Tannenbaum and his team ensure that they're maintaining the highest standards of care for all of their patients.

### The Results

Quantifiable savings have resulted from eliminating dictation costs and revenue has increased through use of new guideline-generated laboratory tests. The bottom line for Dr. Tannenbaum, however, is that "using the EMR makes practicing medicine easier so I can spend more time with the patient." And his patients notice the difference, he says. Patients tell him daily that they feel having their information stored in a computer leads to more thorough and complete care.

## Patient Registry in an IPA

### Case Study

Jim Barr, M.D., Medical Director  
Central Jersey Physician Network

*Setting:* IPA of 33 practices, each with up to 8 family practitioners

*Product:* PatientPlanner™ patient tracking system by DocSite, LLC (www.docsite.com)

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### Background

As a strategy for differentiation, the physician board of the independent practice association (IPA) decided to work as a group to offer demonstrable care quality to managed care plans with which the IPA contracts. Under a program offered by GlaxoWellcome, they obtained a patient registry tool for patient tracking and set up a pilot in four of the larger primary care practices.

### Implementation

The registry (PatientPlanner) is currently implemented on one PC at each practice site, although the IPA plans to make a Web version available in the future. The tool can be used for any disease and the interventions to be tracked can be customized to fit local needs. The IPA decided to focus first on asthma patients. To keep the program initially simple, the IPA's asthma committee settled on one patient data element to track: frequency of short-acting bronchodilator use as an indicator of how well the disease is controlled. Patients who use the bronchodilator fewer than two times per week are considered to have their disease under control.

*Early evidence showed that only 42 percent of patients had adequately controlled disease and prescribing of controller medication for asthma patients was suboptimal.*

### How It Works

Patients with asthma were identified from billing data and stickers were affixed to patient medical records for easy identification whenever records are pulled. A clinical coordinator was recruited in each of the pilot sites to work with practice staff to complete a survey form each time one of the designated patients is seen. The form asks only a few questions: how frequently the patient used a bronchodilator during the previous week; current medications; and any emergency room visits or hospital admissions for asthma since the last time the patient was seen. Forms are collected from all of the practices and the information is entered into the patient registry.

*The IPA has convinced local employers and health plans to negotiate more favorable contracts because of the disease management efforts.*

Initially, capture of survey information was spotty, and Dr. Barr and others had to educate physicians and discuss the importance of the initiative at group meetings. Early evidence showed that only 42 percent of patients had adequately controlled disease and prescribing of controller medication for asthma patients was suboptimal. Physician participation and patient enrollment improved, and one staff member realized that the added tasks did not disrupt workflow.

Each quarter Dr. Barr requests outreach reports for each physician from the registry, listing patients for whom the last survey results indicated that asthma was not well controlled. These reports provide a summary of the available clinical information for each patient. Dr. Barr meets with the physician/nurse team and the clinical coordinator for each site to discuss gains in asthma management and review possible changes in approach, leaving it to the team to devise appropriate follow-up for each patient.

## The Results

According to Dr. Barr, just the reminder to ask about control when they see a patient with asthma has prompted a change in physician behavior. For patients deemed “not in control” on the first visit according to the criterion set, physician prescribing of long-term control medication increased dramatically. They have seen increases in capturing the registry information, as well as in patients moving out of the “not in control” group between the first and second visits recorded in the registry:

- In one practice, 69 percent of previously uncontrolled asthmatics were in control at the time of their second visit.
- Overall, 46 percent of previously uncontrolled asthmatics were in control at their second visit.
- Further, in all practices, physician prescribing of controller medications in patients under poor control increased from 43 percent to 76 percent.

The IPA has convinced local employers and health plans to negotiate more favorable contracts because of the disease management efforts. Further, Dr. Barr believes the chronic disease management program has strengthened physician-patient relationships. He says, “Patients like the fact that physicians are going out of their way to help them.”

The asthma committee is considering adding more patient elements to the registry; the next disease target will be diabetes. With the aid of local employers, the IPA has successfully negotiated with both health plans and local laboratories to share some of the electronic data the diabetes committee wishes to track. With a planned upgrade to a Web-based registry, staff in each practice will be able to print out registry encounter documents, enter data locally, and request other reports as needed.

## Patient Registry Used with an EMR in a Solo Practice

### Case Study

Gordon Moore, M.D.

Ideal Health of Brighton; Rochester, NY

*Setting:* Solo Family Practice

*Product:* PatientPlanner™ patient tracking system by DocSite, LLC  
(www.docsite.com)

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### Background

When Dr. Gordon Moore decided to open a solo practice without support staff, he knew he needed to leverage IT tools to maximize efficiency and improve patient outcomes. He had spent three years participating in a collaborative sponsored by the Institute for Healthcare Improvement (IHI) that demonstrated the results that an ambulatory practice could achieve if it focused on process reliability and patient access to services. Through this work he was introduced to a newly developed product—a patient registry—for managing chronic disease that he now uses alongside an EMR.

### Implementation

Installing the patient registry was as simple as loading the software from a CD-ROM onto a PC in his office. Initially, Dr. Moore tracked just his hypertension patients as an easy way to start populating the registry; he loaded his patient data into the system gradually over time, including the key information for each condition that he decided to track. Currently, he uses the EMR and the patient registry in parallel to manage patients with diabetes, high blood pressure, and high cholesterol. Because of the design of the registry, patients with more than one of these conditions are tracked in a single electronic record.

*Installing the patient registry was as simple as loading the software from a CD-ROM onto a PC in his office.*

### **How It Works**

Dr. Moore identifies the patients that he is tracking by inserting a flag on the EMR patient header page noting the patient's chronic condition(s). Whenever the patient calls or visits the office, Dr. Moore has an immediate visual cue in the EMR that the patient is being specially tracked and monitored for one or more of the three conditions. Dr. Moore completes his documentation in the EMR as he would for his other patients, and because there is currently no link between the two products, he prints out and sets aside an EMR summary of the patient visit.

Several times a week, he refers to these summaries and enters critical data into his patient registry tool—such as the latest blood pressure, cholesterol level, or HbA1c value, as appropriate. Then every few weeks Dr. Moore runs a report to identify patients in need of follow-up. This type of proactive management prevents his patients from slipping through the cracks if they don't otherwise come to him for help.

### **The Results**

Despite the need to double-enter some patient information (in the EMR and the registry), Dr. Moore still believes using both tools is worth the extra time and saves him downstream costs. The results in terms of patient compliance are demonstrable: He now has a 75 to 80 percent compliance rate for his hypertensive patients.

*“It’s a matter of feeling comfortable with being less reactive with patients and more proactive instead,” he says. “I’m doing this because it’s the right thing to do.”*

Dr. Moore considers the patient registry an essential tool for ensuring reliability and managing patient outcomes. He admits that the new approach was a change in mindset for him. “It’s a matter of feeling comfortable with being less reactive with patients and more proactive instead,” he says. “I’m doing this because it’s the right thing to do.”

## Patient Summary and Tracking Using an EMR in a Group Family Practice

### Case Study

Eric Schnakenberg, M.D.  
Latham Medical Group; Latham, NY

*Setting:* 8-Physician Family Practice

*Product:* EMR by NextGen  
([www.nextgen.com](http://www.nextgen.com))

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### Background

Dr. Eric Schnakenberg and his colleagues knew that “we’d fail if we continued to use paper records. We couldn’t keep dealing with patient visits the way we were in the past with large volumes of paperwork handled in batch mode.” At the time, Latham Medical Group was participating in a collaborative redesign project sponsored by the Institute for Healthcare Improvement (IHI); physicians saw an EMR as the essential tool to support the redesigned processes being developed in the IHI effort. After searching for an EMR, Latham chose NextGen.

*“We couldn’t keep dealing with patient visits the way we were in the past with large volumes of paperwork handled in batch mode.”*

### Implementation

The practice started using NextGen’s message-routing capabilities as a way to achieve an early quick win. “You need to evolve capabilities gradually.” Once staff were comfortable with using information technology as a more routine part of their work lives, the practice then tackled workflow components like laboratory test results and prescription renewals. Finally, an office-based problem list and dictation were implemented. With more complete information online, the practice was able to eliminate 135 chart pulls a day.

With core functionality in place, Dr. Schnakenberg and his colleagues configured some of NextGen’s decision-support tools to support patient management. Several disease management activities had already been underway in the practice, but the manual approach was stressing staff. Because patients’ test results are electronically transmitted from the lab directly into the EMR system, Latham chose diabetes, thyroid disease, and hyperlipidemia—all conditions primarily tracked through laboratory tests—for initial patient tracking for disease management.

### How It Works

First, Latham set up health maintenance information to appear on the summary screen of each patient’s electronic medical record so that any provider opening the record is reminded of the status of these interventions.



They built a laboratory test results template with pick lists that prompts the physician when results come back to specify future actions to be undertaken. Actions might include sending an interpretation of the results to the patient, ordering additional tests, or scheduling a follow-up appointment. Flags or cues appear on the patient's electronic face sheet that alert the nurse to schedule a particular type of appointment, assist staff in exam room preparations and patient work-ups on subsequent visits, and remind physicians about follow-up tests.

In addition, Latham created a template to capture key social issues for each patient, including tobacco, alcohol, and drug use; domestic violence; health care proxies; and patient self-management. As a result, the patient's social history appears as part of the health maintenance information on the EMR cover page, providing information about self-management capability and prompting the physician to review key issues at each visit.

*With more complete information online, the practice was able to eliminate 135 chart pulls a day.*

### **The Results**

One concrete measure of the success of Latham's efforts is patients' compliance with Coumadin management. At this point, 80 percent of the practice's coagulation patients are considered in compliance with their medication regimen.

## **Diabetes Management Tools Used in a Group Family Practice**

### **Case Study**

Greg Hoekstra, M.D.  
John Deere Medical Group; Waterloo, IA

*Setting:* 6-Physician Family Practice

*Product:* Practice Partner EMR by PMSI  
(www.pmsi.com)

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### **Background**

When the practice decided that their homegrown EMR product was no longer meeting its needs, Dr. Greg Hoekstra convinced his colleagues to install Practice Partner, which he had known of for many years. The practice considered itself on the cutting edge of IT, having used an EMR and installed PCs in each exam room long before others. Using this new product would now allow them to more effectively focus attention on their patients with complicated chronic disease.

### **Implementation**

It didn't take long to install the Practice Partner product and become proficient with its basic documentation and workflow tools. After a year, the group was ready to expand its use of the product to include disease management. With a particular interest in diabetes management, Dr. Hoekstra successfully lobbied John Deere Health Plan for its support of a new clinical initiative for managing diabetes.

*It didn't take long to install the Practice Partner product and become proficient with its basic documentation and workflow tools.*

## How It Works

First, Dr. Hoekstra's team used Practice Partner's patient inquiry features to identify all of the group's diabetic patients, including those with an HbA1c greater than 9. During the first in a series of weekly meetings, each physician team member was given a list of his or her diabetic patients. The physicians used several tools in the EMR to raise their patients' levels of adherence to guidelines.

- Eligible patients' records are flagged in red indicating diabetes on the initial summary screen so that anyone seeing the patient knows that he or she is in this special management program.
- Specially designed lists display key laboratory results on the patient summary screen so that schedulers allow adequate appointment time for review and follow-up on any overdue tests. Four of the laboratory values essential for managing diabetics—creatinine, LDL, HbA1c, and micro-albumin—were available electronically because the group developed an electronic feed of laboratory results directly into its EMR.
- A diabetic flow sheet was created that includes more detailed information on diet and exercise, tobacco use, blood pressure, foot exam, retinal exam, pneumovax, flu immunization, aspirin and ACE inhibitor use, creatinine, and LDL. Using this flow sheet, the team nurses review and update the patient's diabetic history in advance of the physician exam, ensuring a more comprehensive assessment at every visit.
- With this information in hand, physicians can then focus on patient coaching and the care plan.

Every three months, the medical group uses Practice Partner to generate a recall list of patients overdue for one or more diabetic interventions; these patients are sent a reminder to come into the office or can be interviewed by phone to assess their status. Educational information is mailed to the patient every three months to help with diabetes management.

## The Results

After only five months using this approach, more than 90 percent of the roughly 600 diabetic patients have an HbA1c of less than 9. And because the diabetes management effort was tied to the bonus objectives the group established with John Deere Health Plan, the group's success has yielded a financial reward as well.

*After only five months using this approach, more than 90 percent of the roughly 600 diabetic patients have an HbA1c of less than 9.*

## Summary Screens, Customized Documentation Templates, and Outreach Reports in an EMR in a Small Family Practice

### Case Study

John Janas, M.D.  
Family Care of Concord; Concord, NH

*Setting:* Family practice with two physicians and four nurse practitioners

*Product:* Logician from MedicaLogic (now GE Medical Systems) ([www.medicallogic.com](http://www.medicallogic.com))

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### Background

“Physicians don’t have time to do a good job anymore,” according to Dr. John Janas. Physicians “don’t deliver bad care because they’re bad people. It’s because the systems in our practices are so bad.” He believes that better processes aided by systems can make a big difference.

*Physicians “don’t deliver bad care because they’re bad people. It’s because the systems in our practices are so bad.”*

Beginning in 1996, the two-physician practice began implementing ClinicaLogic by MedicaLogic to organize and streamline workflow and help them deliver wellness and disease management care. They upgraded to Logician several years ago.

### Implementation

Dr. Janas, an admitted computer jockey, uses the tools available in Logician, combined with a program he developed, to support teamwork within the practice and increase compliance with the guidelines they have adopted. Over a period of years, he and his colleagues have developed a large number of customized templates and action buttons that permit them to document the information they need for care management *and* attend efficiently to guideline-based interventions for each patient. Dr. Janas first tackled the top ten disease states and then other chronic or subacute conditions such as headaches and dyspepsia. The guideline-assisted encounter forms use evidence-based guidelines from credible groups such as the American Diabetes Association, the National Heart, Lung and Blood Institute, and the National Cholesterol Education Program.

To complement clinician documentation, they also use a previsit questionnaire administered in the office to collect information from new patients; it allows them to assemble patient health status and health history information in a much shorter time.

## How It Works

Family Care of Concord is a good example of how decision-support tools can reinforce teamwork. During telephone triage, nurses complete online documentation, referring to specialized templates for patients with chronic disease.

At each visit, the nurse practitioner refers to the “encounter type” recorded for each visit as a way to anticipate the background. While meeting with the patient, she collects and documents history and vital signs, using this information, combined with that gained during the encounter, to pull up the appropriate encounter form in the system. As part of the work-up, she completes monofilament foot checks and other assessments called for in the care guideline and built into the template. When she uncovers issues for the physicians to address, she flags them in the note or uses a prearranged cue such as, in the case of a diabetic foot exam, leaving the patient’s shoes off.

Physicians have the advantage of all of this assessment and documentation when they see the patient, although Dr. Janas, who has assisted other area practices implement Logician, warns that the biggest hurdle is overcoming the tendency for physicians to use the tool as just an electronic version of the paper chart.

Every month, one of the nurse practitioners runs reports using the inquiry module in the EMR to identify patients overdue for certain types of care. She and the receptionist work together to contact patients and arrange necessary care.

## The Results

One of the benefits has been both physician and nurse satisfaction. “Physicians like it a lot. Nurses like it even more. They are spending more time with patients and like the guidelines-based tools as back-up.”

Dr. Janas also points out improvements in quality of care. For example, 85 percent of patients with diabetes cared for by the practice now have HbA1c results of 8 or less. Blue Cross Blue Shield of New Hampshire offers a quality bonus for performance in a number of areas of disease and wellness management. For the past five years, Family Care of Concord has received the maximum quality bonus for its efforts.

*“Physicians like it a lot. Nurses like it even more. They are spending more time with patients and like the guidelines-based tools as back-up.”*

## Appendix A: Resources

THE FOLLOWING ARE RECENT PUBLICATIONS and other resources that provide information about products that include some form of clinical decision support:

- The American Academy of Family Physicians offers a number of online and phone-based resources for physicians interested in computerization (<http://www.aafp.org/fpnet.xml>).
- Bush, Jennifer. “Looking for a Good EMR System?” *Family Practice Management*, January 2002 (<http://www.aafp.org/fpm/20020100/50look.html>).
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## Appendix B: Contributors

INTERVIEWS WITH PHYSICIANS WHO HAVE ADOPTED clinical decision-support tools into their own practices provided the real-world view of what can be accomplished today. The authors are grateful for the time and contributions of the following practitioners.

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# Endnotes

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