

# Embedding Clinical Decision Support in the EHR: Best Practices and Lessons Learned



You should read this eBook if you are a clinician, librarian, quality manager, medical education professional, executive manager, or IT manager in a healthcare organization and are looking to maximize your electronic health record (EHR) investment through clinical decision support (CDS).

This eBook will answer the following questions:

- 1 What are the benefits of embedding CDS into the EHR?
- 2 What are best practices?
- 3 How can UpToDate help?

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# Chapter1

## Why embed clinical decision support into your EHR?

<div>On average,</div> <div>2 in 3</div> <div>clinical encounters generate a question</div>	<div>The typical primary care physician has approximately</div> <div>11</div> <div>clinical questions per day</div>
<div>Ultimately</div> <div>60%</div> <div>of questions are unanswered</div>	<div>Answering all clinical questions could change</div> <div>5-8</div> <div>management decisions each day</div>

Multiple studies have evaluated questions that arise in clinical practice. [1-5]

Clinical decision support (CDS) enables clinicians to answer more of these questions accurately. The published literature overwhelmingly shows the positive impact that CDS has on patient care and outcomes.

How to maximize your IT investments by embedding clinical decision support (CDS) into your Electronic Health Record (EHR).

View the research that shows how **CDS** is linked to **improved outcomes**:  
<http://www.uptodate.com/home/research>

Given increased caseloads, regulatory burdens, and adoption of new technologies, clinicians are under more time constraints than ever. For this reason, it is critical that CDS is easily accessible to clinicians while they work. Given most clinician workflow is driven by the EHR, it makes sense to embed CDS within the EHR. Any barriers to CDS mean that clinicians will be less likely to use it at the point of care.

UpToDate conducted a survey of healthcare leaders on the results of embedding UpToDate into their EHRs and asked them to share lessons learned, best practices, and benefits. The following benefits emerged:

- Embedding CDS into the EHR improves the quality of care they provide
- Elimination of multiple sign-ins and online sessions means that clinical workflows become more efficient
- Clinicians can access information faster and more efficiently without any disruption to their patient encounter, leading to increased utilization and better quality of care



**UpToDate improves patient care**



**UpToDate has an important role in medical education**



**UpToDate saves time**



**UpToDate use provides quantifiable ROI**

Learn more about how UpToDate customers have successfully embedded CDS within their EHR:

<http://www.uptodate.com/home/customer-testimonials>

Embedding CDS promotes standardized care across all disciplines — a benefit that many healthcare providers and IT and clinical leaders reported they had not previously considered. The EHR makes it easy for all of your clinicians to access CDS at the point of care. Embedding CDS into the EHR removes clinician barriers to access and brings evidence-based medical knowledge into the clinical workflow.

The available data also suggest that embedding CDS in your EHR is important. As an example, one study found that EHR implementation alone was not associated with improvements in performance on measures of healthcare quality and efficiency. The exception was that the presence of CDS was associated with quality gains. [6]

Chances are you have already made a significant financial and resource investment in your EHR system, or are about to make such an investment. You also likely have a CDS resource. By integrating these two investments you can:

- 1 Enhance patient care
- 2 Enhance physician satisfaction with your EHR
- 3 Encourage use of your EHR [7]

Read more about these benefits in **Chapter 2**.

In fact, embedding CDS into the EHR may be one of the few electronic initiatives that saves clinicians time and improves efficiency, as well as increases clinician satisfaction while improving clinical and economic outcomes.

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# Chapter 2

## What are the benefits of integrating clinical decision support into my EHR?

Embedding a CDS solution like **UpToDate** is a quick and easy process. It can take as little as one to four hours. **Chapter 4** provides details.

*"Installation was very easy. It literally took a couple of hours for one person to get it all working."*



— David C. Kaelber, MD, PhD, MPH  
CMIO, MetroHealth Medical Center, Cleveland, OH

**UpToDate and leading EHR vendors have already done the work to make embedding CDS easy for your organization. Here are the top seven benefits that organizations typically see when they embed CDS into their EHR workflow:**

### 1 Improved Quality of Care

Clinical and IT leaders report and **research demonstrates** that quality of care improves when clinicians have easy access to the medical knowledge they need to make the right decisions at the point of care. CDS resources like UpToDate provide complete treatment, screening, and diagnostic recommendations; medication dosing information that considers patient age, weight, disease, and renal adjustments; medical calculators that save time and reduce mathematical error; practice-changing evidence notification, and much more. By integrating these resources within the clinical workflow, clinicians and institutions reduce errors, avoid unnecessary tests, accelerate treatment planning, and improve outcomes.

In a systematic review of 70 studies, decision support systems significantly improved practice in 68%. Independent predictors of improved clinical practice included provision of decision support in the workflow, provision of recommendations rather than just assessments, provision of decision support at the time of decision making, and computer based decision support. [8]

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## 2 Improved EHR Usage

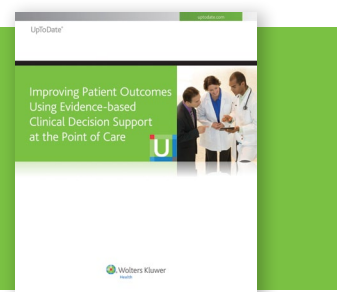
*“We’ve integrated UpToDate into Cerner Millennium across our entire network. This has been successful and delivers a seamless means of accessing clinical information just when it’s needed — in the midst of patient care. Our utilization is high because of the great content and our clinicians also appreciate the CME program.”*

— Neil Kudler, MD

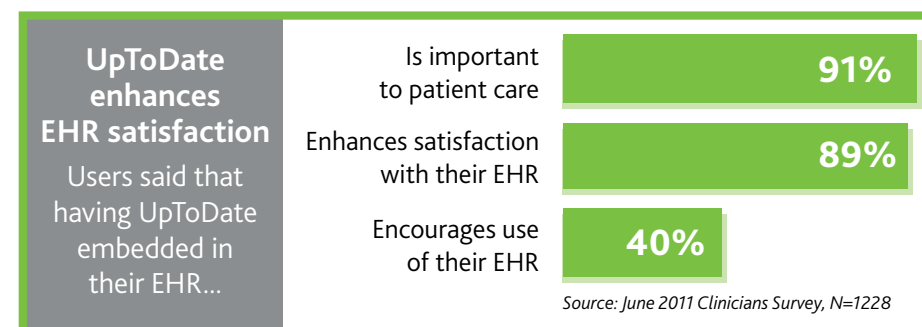
Medical Director, IT Services  
Baystate Health  
Springfield, MA

UpToDate customers report that utilization of UpToDate increases dramatically when it is embedded into their EHR.

**See more on how usage of UTD improves performance in the Evidence Based Outcomes eBook**



According to an UpToDate survey, clinicians consider having CDS in the EHR important to patient care and report that it enhances their satisfaction with the EHR.[7] Additionally, 40% reported that having UpToDate in their EHR actually encouraged them to use their EHR.



## 3 Increased Efficiency and Productivity

**Physicians cannot afford activities that remove them from the clinical workflow. When you embed CDS into the EHR, evidence-based clinical answers can be accessed within the EHR workflow in one click.**

In an UpToDate institutional subscriber survey, interviewees reported that integrating CDS within the EHR translates into meaningful improvements in clinician productivity. When clinicians can rapidly determine the correct medication dose, calculation, or diagnosis, they can order relevant tests faster and initiate appropriate treatment sooner — saving time, eliminating unnecessary costs, and improving patient care.

CDS integration within the EHR eliminates the “silos,” or separate user sessions, in the EHR and CDS applications. Single-sign-in enables the clinician to log in only once, with one ID and password, granting immediate and secure access to both resources.





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## 4 Access to Unlimited AMA PRA Category 1 Credit



Earning CME credits is a welcomed benefit, highly valued by clinicians. When a clinician uses UpToDate, they may accumulate continuing medical education (CME) credits required for recertification and/or license renewal. One of the most compelling and attractive benefits of EHR integration with this type of clinical-knowledge resource is the automatic capture of usage and the automatic accumulation of earned CME credits. Individual and site IDs are embedded into the URL, so that every time a clinician signs in to their EHR, it recognizes the user, records usage, and displays accruing CMEs.

Note: UpToDate is accredited and recognized by colleges, associations, and authorities from around the world, and is a globally accepted information resource and learning tool. To see if you can use UpToDate to fulfill CME requirements in your country, or specialty, please visit [www.uptodate.com/cme](http://www.uptodate.com/cme) for the most current list of CME requirements. The ability to earn CME credit is not available in all countries, and it is up to each user to determine whether his or her use of UpToDate qualifies for CME in any particular country/specialty.

## 5 Physician Satisfaction

For busy clinicians, few things are more welcomed and appreciated than solutions that improve patient care while streamlining the clinical workflow. Therefore, it is not surprising that embedding CDS within the EHR workflow of health systems and clinical practices leads to improved physician satisfaction. UpToDate conducted a survey of over 1,200 institutional customers who have UpToDate embedded in their EHR.[7] The result: 91% report having UpToDate in their EHR is important to patient care; 89% said it enhances their satisfaction with their EHR. Physicians enjoy the simplicity of automatic capture of CDS usage to attain appropriate CME/CE/CPD credits.

## 6 Standardized Care

Healthcare organizations want to standardize the care their patients receive across disciplines and across healthcare sites. Reduced variation in treatment delivers care that is coordinated, which leads to improved outcomes. When every clinician has immediate and easy access to a consistent set of protocols, recommendations, and research, all clinicians are working from the same “play book.” When CDS is available in the EHR, all clinical staff can benefit from the best available evidence-based recommendations at the point of care.



## 7 Support of Meaningful Use

Healthcare organizations in the US can use the HL7 Infobutton to support their institutions EHR efforts to meet Meaningful Use 2 requirements through linked clinical decision support, and patient information distribution.

The HL7 Infobutton facilitates quick access to CDS vendors, such as UpToDate, with content relevant to a patient's specific disease, condition, medication, lab results, and contextual information. With an HL7 Infobutton embedded in the patient record, clinicians see targeted search results in seconds, keeping the focus on the patient.

The UpToDate HL7 Infobutton uses codified data, such as ICD-9 for patient condition or LOINC for patient lab results, to retrieve UpToDate content that is targeted to a specific patient. UpToDate has developed HL7 capability for use with many leading EHR companies, including Epic, Cerner, Meditech, McKesson Horizon and McKesson Practice Partner. HL7-assisted free text search capability and tracking of patient information materials are also available with select vendors. Embedding UpToDate into the EHR and HL7 integration requires an appropriate license. To learn more about EHR embedded access to UpToDate and HL7 visit:

[Click here](#) to view the HL7 Benefits video.

## Chapter 3

### What are best practices and lessons learned in embedding CDS into the EHR?

By now, the benefits of embedding CDS within your EHR workflow should be clear. Now, you may be wondering, "How do I get started? And what should I do to ensure I realize these benefits you have just described?"

Hear UpToDate customers [describe the process](#) of embedding UpToDate in their EHR/EMRs and the positive results they have seen.

Unlike many time-consuming EHR implementations, embedding CDS is a very straightforward process. Using a simple API, it can take as little as one to four hours to put in place. The following seven tips will provide you with a roadmap of items to consider when embedding CDS into your EHR:

It can take as  
little as  
**1 to 4 hours**  
to embed CDS  
into the EHR.

<http://www.uptodate.com/home/ehr-interface>

How to maximize your IT investments by embedding clinical decision support (CDS) into your Electronic Health Record (EHR).

## Tip 1: Location, Location, Location

The three most important words in the world of real estate also apply when embedding CDS: Location, location, location. *How and where* you deploy CDS functionality is critically important in optimizing benefits to your healthcare organization. **The importance of where you locate links to your CDS in the EHR cannot be understated.** According to medical and IT leaders surveyed by UpToDate, it might be the single-most important factor affecting adoption by clinicians. Best practice is locating your CDS resource prominently — such as on tabs in the upper- or side-navigation bar, or as a fixed on-screen button or icon. Clinicians use CDS in the EHR when it is easily identifiable and instantly accessible.

## Tip 2: Anywhere Access

Clinicians need to be able to access the CDS wherever they are in the clinical workflow. For example, if the CDS link is only accessible in one section of the EHR, clinicians will be limited in when and where they can use the CDS. Every EHR offers unique access possibilities, but best practice is placing your CDS on every screen of the EHR in order to obtain maximum use.

## Tip 3: Visibility

Another placement best practice is making your CDS resource clearly visible on the EHR screen. CDS resources available only by right-clicking on a term result in lower utilization because the link is not obvious to users. Clinicians consistently report that even a standard drop-down menu inhibits access.

## Tip 4: The Fewer Clicks, the Better

Hear UpToDate customers **describe the process of embedding UpToDate into their EHRs and the positive results that they have seen.**

In the world of medicine, seconds matter. The difference between one click and five clicks in accessing clinical knowledge can mean the difference between whether your clinicians use your CDS or not. This is a lesson learned and reported by many IT professionals. Before you deploy, think carefully about the most efficient way for clinicians to access information. Multiple drop-down menus, log-ins, and steps to access will hinder utilization. Whenever possible, make your CDS accessible with as few clicks as necessary. Healthcare leaders universally cite one click as the gold standard and best practice.

**One Click Access to CDS is a Gold Standard and Best Practice**



How to maximize your IT investments by embedding clinical decision support (CDS) into your Electronic Health Record (EHR).

## Tip 5: Training and Communication

Taking a “build it and they will come” approach to embedded CDS access is not effective. When you embed CDS into the EHR, it is necessary to have a training and rollout plan that informs your organization on the optimal ways to access the CDS through the EHR.

Your plan should include a series of email announcements, training sessions, and medical staff meetings. Some best practices include:

- 1 Include CDS training in your EHR on-boarding and ongoing trainings.
- 2 Hold CDS registration events.
- 3 Train your IT trainers to conduct one-on-one demos with clinicians in the physicians’ lounge.
- 4 Include all disciplines and specialists in training sessions so everyone in your healthcare organization knows how to access information.
- 5 Develop a tutorial with screen shots on how to use the CDS in the EHR and how to earn and redeem CME/CE/CPD.
- 6 In every case, healthcare leaders report that another best practice is to “show, don’t tell.” Show your clinicians screenshots so that they can see the resource in action.

- 7 Registration events are the most effective way to register staff; each registration takes less than one minute and a scheduled event is an easy way to encourage clinicians to take action.

See examples of UpToDate CDS and EHR training and enablement resources:

<http://www.uptodate.com/home/training-resource-center>

## Tip 6: Have a Physician Champion

The health systems that are most successful in CDS use in the EHR rely on a physician champion to spearhead awareness. Your champion should be an influential staff clinician, and *de facto* leader who can play a large role in the success of your CDS implementation. Often, a Chief Medical Information Officer (CMIO) can be a key champion. Your champion will be your “go-to” expert, and serve as your primary resource for *ad hoc* questions, training, and assistance.

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## Tip 7: Involve Your Patients

If you follow these tips and recommendations you have the potential to realize the following benefits:

- 1 Stronger adoption rates
- 2 Increased utilization
- 3 Improved patient outcomes
- 4 Improved hospital efficiency

When CDS is embedded into the EHR, clinicians have the most up-to-date, evidence-based resource at their fingertips, which creates new opportunities for stronger patient engagement and partnership. Best practice recommendations include using the CDS in the EHR as a means of partnering with the patient in treatment decisions and providing patient education regarding treatment options. This allows healthcare professionals to directly share clinical information with patients as they explain a diagnosis, test, or treatment approach.

Many clinicians are finding that the simple act of turning the computer screen toward the patient and sharing CDS information is a powerful practice. Healthcare organizations report that it is not uncommon to share a picture related to an illness or the most recent clinical information. It can be very powerful to say to the patient, for instance, "I know you have shingles. Let's look together at how we're going to treat that. Here's the most up-to-date treatment and here's what we're going to do." Respondents to a survey from UpToDate report another best practice is to print out or email the information for the patient during the office visit. Involving patients in treatment of their condition gives them a level of confidence and develops a partnership in managing their condition.

See how Bon Secours Health System, a \$3.3 billion not-for-profit Catholic health system headquartered in Marriottsville, Maryland with 19 acute-care hospitals, one psychiatric hospital, five nursing care facilities, four assisted living facilities, and 14 home care and hospice services, streamlines point-of-care decision making with patient context sensitive UpToDate search results.

[Learn more.](#)

## How do I embed clinical decision support into my EHR?

The best practices we just described come from real healthcare practitioners. UpToDate interviewed customers who have embedded UpToDate in their EHR to learn the techniques that work best for them. Those tips are highlighted in [Chapter 3](#).

[Read about Atrius Health's experience embedding UpToDate into their EHR.](#)

Formed in 2004, Atrius Health is a non-profit alliance of six community based medical groups and a home health care, private duty nursing, and hospice agency based in Eastern and Central Massachusetts. Atrius represents more than 1,000 physicians and over 2,100 other health professionals, serving over one million patients across Eastern and Central Massachusetts.

Unlike many EHR integrations, or other healthcare IT projects that involve time-consuming integrations between systems, CDS implementation is a very straightforward process. Using a simple API, it can take as little as one to four hours to embed CDS into clinicians' workflow.

Contact an UpToDate account representative to learn more about embedding UpToDate into your EHR.

How to maximize your IT investments by embedding clinical decision support (CDS) into your Electronic Health Record (EHR).

## How UpToDate Can Help

*“UpToDate has had a significant impact on the quality of care we’re providing to our patients. That’s why we are so pleased to see that about 95% of our users are now accessing UpToDate directly from Epic. The more clinicians use UpToDate, the higher the quality of care.”*

— Richard Shuman, MD

Medical Director, Riverbend Medical Group, Agawam, MA

When you embed UpToDate into your EHR, you provide your clinicians with access to more than 9,500 topics in over 20 specialties — all with a simple click. Clinicians can receive diagnostic and treatment recommendations, information on lab results, and educational materials that they can provide to patients in real time, with no disruption to the clinical workflow.

Various studies suggest that use of UpToDate CDS at the point of care impacts treatment decisions and improves quality outcomes. [9,10] Further, this same research suggests that the benefits increase as the use of the CDS increases. Therefore, encouraging full utilization of the CDS at the point of care is vital to maximizing benefits. The question, then, is how does an institution promote and optimize use of CDS by clinicians? The answer is embedding CDS into the clinical workflow through the EHR. Take the next step: contact UpToDate today by calling **1-888-550-4788**, or **email us** to learn more.

## About UpToDate

UpToDate® uses a simple API that makes implementation fast and easy. The UpToDate API has been successfully used with all leading EHR systems.

To find out how to access UpToDate directly from your EHR, contact your UpToDate account manager by calling **1-888-550-4788**, or **email us**.

UpToDate has expertise in integrating with all leading EHRs, including Epic, Intersystems, Cerner, Allscripts, Siemens, MEDITECH, McKesson, eClinicalWorks, NextGen, and GE Healthcare. Installation is simple and easy. Many UpToDate customers have already taken advantage of EHR implementation and are realizing important benefits, including easy access to UpToDate within the EHR; free, fast and easy access to unlimited AMA PRA Category 1 Credit™; increased utilization of both UpToDate and the EHR; and improved clinician satisfaction with the EHR.



UpToDate is an evidence-based clinical decision support resource authored by physicians to help clinicians make the right decisions at the point of care. All UpToDate content is written and edited by a global community of more than 5,700 physicians, all world-renowned experts in their specialties. Supported by 50 in-house UpToDate physician-editors, these authors follow a rigorous editorial process, continually reviewing the content to ensure it is of the highest quality and based on the most current and best available evidence. More than 60 research studies confirm the widespread usage of UpToDate and its association with improved patient care and hospital performance, including reduced length of stay, adverse complications, and mortality.

**LEARN MORE**  
about **UPTODATE**

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