BEST ADVICE

Advanced and Meaningful Use of EMRs

MODULE 3

Clinical Decision Support in Canadian EMRs

NOVEMBER 2018

There is an exponentially expanding amount of clinical and administrative information available to clinicians. As a result, it is increasingly challenging for family physicians to provide care based on the latest available evidence.

Clinical decision support (CDS) tools can help address this challenge.[1] Embedded in a physician's electronic medical record (EMR), these analytical tools offer a process for enhancing health-related decisions and actions with pertinent, organized clinical knowledge and patient information to improve health and health care delivery.[2]

CDS tools aim to provide the right information at the right time to the physician, in order to enhance clinical decision making with individual patients. In fact, CDS is linked to much of the clinical benefit that results from the digitization of health care.[3] The added value is attributed to the delivery of improved quality of care, increased safe practices, reduced cost of care, and improved consistency of documentation.[4]

Such tools can be part of native EMR software, or can be acquired separately from the EMR vendor or from other third-party software vendors. Furthermore, other tools, or at least guidance on their use, can be obtained directly from EMR user groups, provincial agencies, or national informatics organizations.[5–9]

Table 1: Examples of CDS resources

Organization	Website
OSCAR EMR User Group (open source)	oscarcanada.org/usersgroups
eHealth Centre of Excellence	www.ehealthce.ca
OntarioMD	www.ontariomd.ca
Toward Optimized Practice	www.topalbertadoctors.org/tools--resources/emrsupports
Digital Health in Canada	Canada Health Infoway	www.infoway-inforoute.ca/en
TheWell™	thewellhealth.ca

CDS CATEGORIES

CDS tools can be sorted into distinct functional categories, described below.[10]

Please be aware that the inclusion of a tool example does not denote the CFPC's or Infoway's endorsement of that tool.

FORMS

Documentation forms and templates: data entry reminders/facilitators

EMR-embedded forms and templates can remind clinicians about important diagnostic information to obtain during a clinical visit.

A form can be automatically populated with relevant, previously entered data. These data can enable the automatic calculation of clinically important measures. Similarly, new data can automatically trigger alerts, or provide guidance on the next, best evidence-based clinical step.

This type of CDS tool is primarily effective for the following clinical scenarios:

- Clinical visits for routine chronic disease management

  Because the evidence supports routine follow-up visits for certain clinical conditions—such as diabetes, smoking cessation, and opioid use—the clinical information obtained at each visit is fairly standard. Therefore,

clinicians can benefit from guided reminders in forms and templates.[11-12] If there is an acute change in the status of one of those chronic diseases, a form may assist in both alerting and providing the clinician with management guidance.

- Clinical visits for common acute clinical presentations

  Family physicians are trained to identify common clinical situations and use tools to determine their severity and urgency. CDS forms and templates enable efficient collection of these data, and provide guidance about how to approach a specific case based on the data collected. For example, the Centor criteria calculator is a basic CDS tool that uses a template of individual patient characteristics to score the likelihood of streptococcal pharyngitis, and when a clinician should consider treating with an antibiotic, based on the score.

- Screening at clinical visits

  Relatively strong evidence supports using CDS tools to screen for dyslipidemia, with less consistent evidence for cancer symptoms, addictions and mental health-related conditions, preconception care, vaccinations, and others.[13] The Centre for Effective Practice's Preconception questionnaire and the Alcohol Screening, Brief Intervention & Referral: A clinical guide are good examples.[14,15]

Notably, patients can complete EMR-embedded forms and templates using an approach called computerized assisted self-interviewing. Patients fill in structured questionnaires on computer tablets in the waiting room, and these results are automatically and securely entered in their EMR chart.[16,17] This approach benefits clinicians' time management, as they do not have to collect and enter the information manually.

DATA VISUALIZATION

### Relevant data presentation: graphs, flow sheets, and dashboards

EMR data can be filtered and displayed in a manner that helps shared clinical decision making. This is especially important in a Patient's Medical Home (PMH) context as these aids facilitate discussion with patients.

If a family physician's EMR can identify appropriately entered data points (such as a blood pressure reading, or a lab value), it may be able to present or visualize these data in one of the following ways:

Graphs

One option is the time-based graph, which helps a clinician visualize how a clinical parameter has evolved over time. For example, many EMRs have a structured way of entering measures such as height, weight, and blood pressure. These data points can be integrated into a time-based graph, facilitating conversations with patients and clinical decision making.

Figure 1: Sample EMR patient blood pressure time-based graph

EMR — Patient Blood Pressure Trend 2018
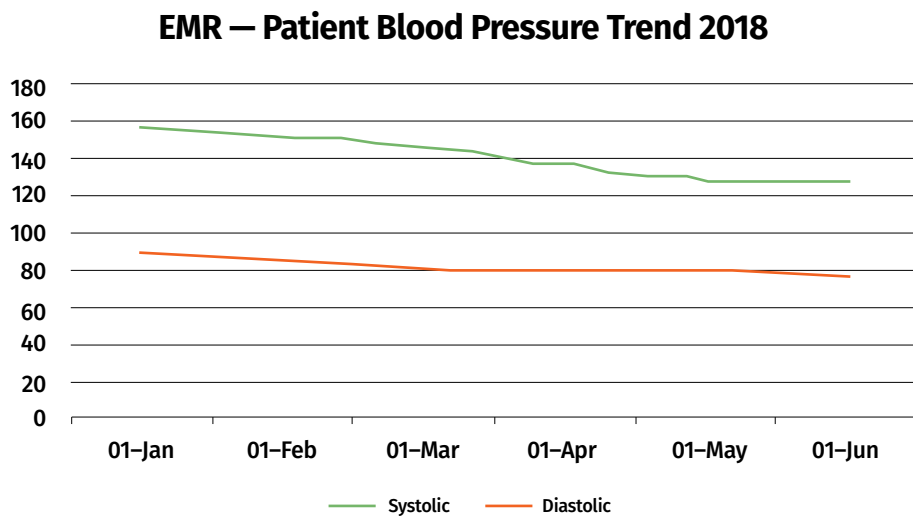
Source: Dr. Rashad Bhyat; created the Best Advice guide *Advanced and Meaningful Use of EMRs.*

Flow Sheets

A second type of data visualization CDS tool is the time-based flow sheet, which allows a clinician to see columns of key data point values obtained through different clinical visits. For example, laboratory values can populate an easy-to-read time-based table. Many clinicians find this format helps them make efficient clinical decisions using multiple relevant data points.

Dashboards

Some EMRs have intelligent dashboard graphics, which use more complex data processing to generate key clinical insights. These dashboards are a constant presence in the EMR user interface, similar to the cumulative patient profile (CPP). In Ontario, the East Wellington Family Health Team's Preventive Care coloured tool for cancer screening status provides a good example.[18] Integrated within the CPP, the tool's colour changes depending on when the patient is due for a screening test, to remind the clinician to screen this patient at the next opportunity.

As a final point, EMR-embedded practice communication tools—such as messaging, tasks, or documenting a static note—may be considered data presentation tools. Exchanges between a clinic's personnel and patients can be preserved and prominently displayed within a patient's EMR chart. Such notes to other care team members, or to clinicians, essentially function as a self-generated CDS reminder of clinically relevant data. This is most frequently used as a reminder of individualized clinical goals for a specific patient (e.g., the EMR note "Ms. Smith's goal is to quit smoking in 2018").

ORDER AND PRESCRIPTION FACILITATORS

Order and prescription facilitators include various approaches to ensure that family physicians are following best evidence and safety precautions when ordering tests or prescribing.

Similar to templates, a clinician may customize their laboratory order and prescription entry fields to include standardized pick lists and order sets. Many clinicians find doing so helps them efficiently provide high quality care for a select number of regularly seen medical conditions.

Many EMRs also incorporate automated prescriber feedback tools, including alerts to clinicians about a patient's drug allergies, drug-drug interactions, drug-disease incompatibilities, and abnormally entered drug doses. Studies demonstrate that these tools can reduce medication errors.[19]

However, it must be noted that EMR ordering and prescribing features are variable. Some EMRs are more restrictive and force clinicians to use their standardized data entry interface, while others allow the clinician to enter free-form text for an order or a prescription. These EMR differences present a trade-off. More flexibility allows a clinician to customize their prescription. However, they may not benefit from automated feedback tools that can contribute to improving their prescribing quality. These CDS tools require standardized data entry to function.

REFERENCE INFORMATION AND GUIDANCE

These types of tools provide diagnostic and management decision support for frequent clinical presentations, or for unclear or challenging ones.

Clinical pathway support

Clinical pathway support can help family physicians follow evidence-based clinical guidelines. Some EMRs may integrate a decision tree algorithm for screening, diagnosing, and managing conditions (e.g., osteoporosis).[20] Certain EMRs permit users to upload their own version of reference tools in an intuitive section of the EMR user interface for easy access. These tools can be edited to include macros (sets of instructions) to efficiently generate clinically relevant measures.

Reference tools

Such clinical pathway support rules are less useful for more challenging, atypical clinical presentations. For these cases, many EMRs include hyperlinks to web-based, point-of-care reference tools, such as DynaMed or UpToDate.[21,22] Similarly, software add-ons for EMRs are a common source for this type of CDS. For instance, MedCurrent is an add-on with comprehensive resources for guidance on imaging selection.[23]

EMR integration is not required for this type of reference CDS tool. Stand-alone websites and smartphone-based apps are also options to obtain useful reference information. However, these services forego the benefit of leveraging a patient's EMR data to generate personalized recommendations.

INVOLVING PATIENTS

Family physicians should be aware of the potential adverse impact that technology can have on patient-clinician communication. Awareness by and education for physicians about how to effectively use technology in a clinical encounter should support critical communications.[24] Some of the data visualization CDS tools already mentioned, such as simple graphs, can stimulate interesting discussions with patients about their health conditions and treatment options.

The Association of Faculties of Medicine of Canada (AFMC) and Infoway have produced an eHealth Resources toolkit that contains a number of relevant resources, under the category Doctor-Patient Communication, such as Dr. Sharon Domb's video podcast entitled "The Computer as a Third Party in the Clinical Encounter."

Physicians must ensure that technology does not make the patient feel like the odd person out in the clinical encounter. Clear and inclusive communication with patients is key to providing effective care, as outlined in the Best Advice guide *Health Literacy in the Patient's Medical Home*.

FINAL CONSIDERATIONS

This module has described the types of CDS tools and their benefits for family physician practices.

However, these benefits do not always materialize.[25] The lack of quality tools available from EMR vendors, the challenge of maintaining the clinical knowledge databases, and issues with integrating the tools into clinician workflows all contribute to the inconsistencies in the benefits observed.

Some studies demonstrate that improperly implemented CDS can facilitate errors, or can have unintended consequences.[26,27] For example, alert fatigue is one major issue afflicting CDS effectiveness. As noted previously, feedback from CDS tools to a clinician often present as an alert or reminder. But if the sensitivity of a CDS tool's output is poor and the alerts hinder physician's workflow, they may override the alerts and forego the possible benefits the tool provides.[28]

It is imperative that implementing CDS is optimally customized to a physician's preferences, in order to facilitate adoption of the tool and realize its benefits. In the context of the PMH, CDS technology can support shared clinical decision making and enhance communications with patients to provide connected care based on the latest available evidence.

Used appropriately and based on quality EMR data, CDS tools have a great potential to improve the efficiency and quality of care provided within a family practice.
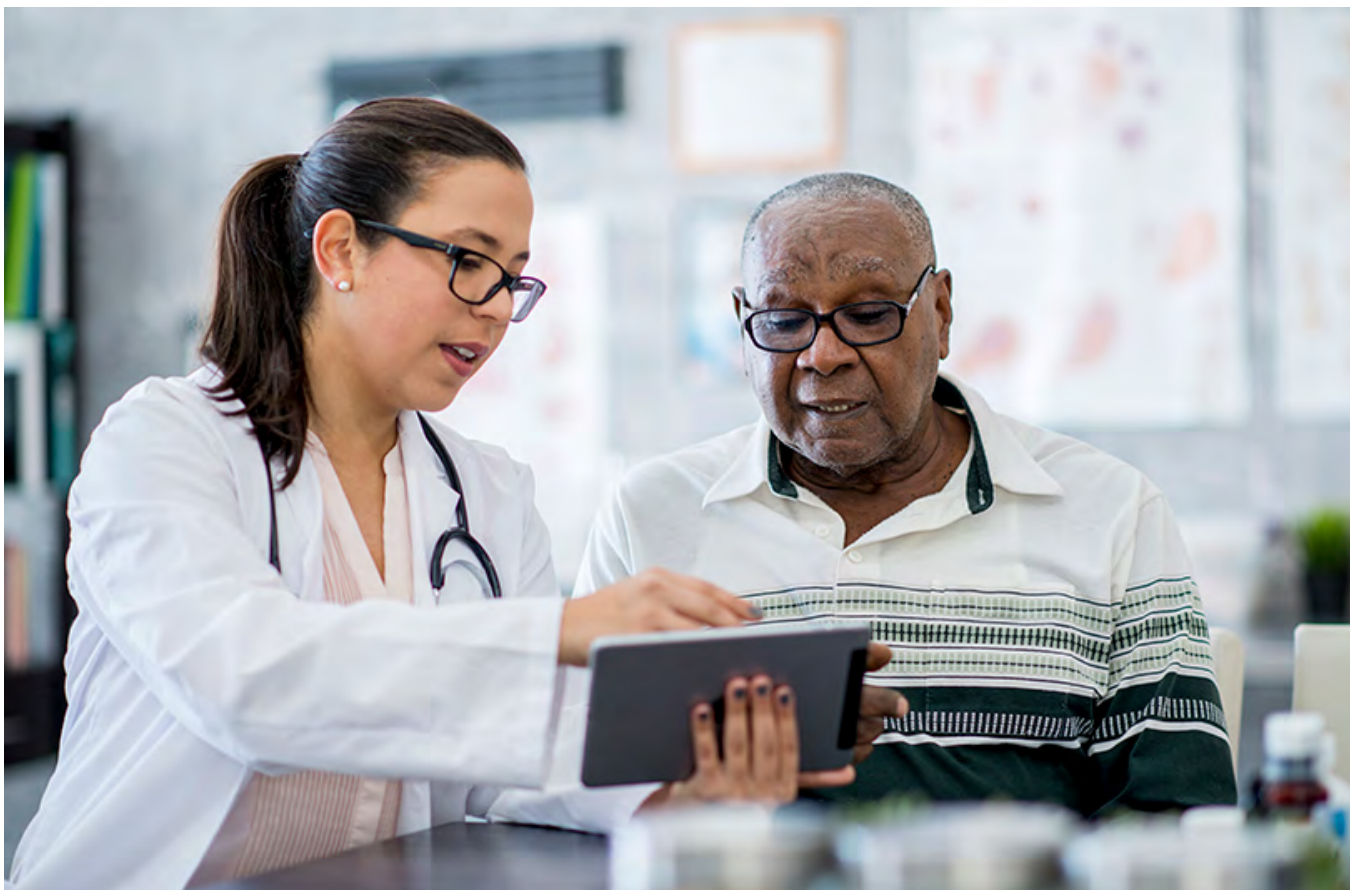
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