Family & Community Medicine
UNIVERSITY OF TORONTO

THE ELECTRONIC MEDICAL RECORD (EMR) TASK FORCE REPORT

Collaborating across the Department of Family and Community Medicine to facilitate the EMR's full potential around quality, research and education.

Task Force Chair: Dr. Karen Tu MD MSc CCFP FCFP

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TASK FORCE MEMBERSHIP

Dr. Karen Tu, EMR Task Force Chair, Faculty EMR Lead at the Department of Family and Community Medicine, University of Toronto, Toronto Western Hospital, ICES
Dr. Lynn Wilson, Professor and Chair of the Department of Family and Community Medicine
Dr. Robert Doherty, Chief of Family Medicine at the Southlake Regional Health Centre
Dr. Sharon Domb, Sunnybrook Health Sciences Centre
Dr. Philip Ellison, Quality Improvement Faculty Director at the Department of Family and Community Medicine, Toronto Western Hospital
Dr. Michele Greiver, North York General Hospital
Dr. Stephen Holzapfel, Women's College Hospital
Dr. Betty Hum, Toronto East General Hospital
Dr. Karl Iglar, Postgraduate Program Director at the Department of Family and Community Medicine, St. Michael's Hospital
Dr. Stuart Murdoch, Chief of Family Medicine at the Royal Victoria Hospital
Dr. Paul Philbrook, Chief of Family Medicine at the Credit Valley Hospital
Ms. Leslie Sorensen, Strategic Plan Implementation Consultant at the Department of Family and Community Medicine

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The Department of Family and Community Medicine Focus Group Participants

Chiefs of Family Medicine with the Department of Family and Community Medicine, University of Toronto

Dr. Jeff Bloom, Toronto Western Hospital
Dr. Jocelyn Charles, Sunnybrook Health Sciences Centre
Dr. Robert Doherty, Southlake Regional Health Centre
Dr. Larry Erlick, The Scarborough Hospital
Dr. Stuart Murdoch, Royal Victoria Hospital
Dr. Jim Ruderman, Women's Collage Hospital
Dr. Daphne Williams, St. Joseph's Health Centre
Dr. David White, North York General Hospital

DFCM Research Rounds Focus Group

DFCM researchers and research administrators

Department of Family and Community Medicine Faculty Member Interviews

DFCM Education Directors

Dr. Jennifer McCabe, Undergraduate Program
Dr. Erika Catford, Teaching Practices in the Postgraduate Program

IT Leads at The Department of Family and Community Medicine's Family Medicine Teaching Units

Dr. Sharon Domb, Sunnybrook Health Sciences Centre
Dr. Kirk Lyon, University Health Network
Dr. Marcus Law, Toronto East General Hospital
Dr. Stephen Holzapfel, Women's College Hospital
Dr. Judy Thompson, St. Joseph's Health Centre

External Interviewees and Environmental Scan

Provincial Family Medicine Departments

Dr. David Price, McMaster University

National Family Medicine Departments

Dr. Shirley Schipper, Residency Program Director, University of Alberta
Dr. Nicola Shaw, Health Informatician, University of Alberta
Dr. Nandini Natarajan, IT Lead, Dalhousie University
Dr. Martin Dawes, Department Chair, McGill University
Dr. Bob Woollard, Past Department Chair, University of British Columbia
Dr. Tracy Monk, IT Lead, University of British Columbia

International Family Medicine Departments

Dr. Chris Van Weel, Past President of WONCA, Radboud University Medical Centre, Nijmegen, Holland
Dr. Simon De Lusignan, Course Director of Biomedical Informatics and Head of General Practice and Primary Care at St. George's University in London, England
Dr. Grant Russell, Director of the Primary Care Research, Monash University, Australia
Dr. Dee Mangin, Director of the Primary Care Research Group in the Department of General Practice at the Christchurch School of Medicine, New Zealand

Literature Search

Rita Shaughnessy, Librarian, The Department of Family and Community Medicine at the University of Toronto

INTRODUCTION

The Department of Family and Community Medicine (DFCM) is committed to providing leadership in Family Medicine nationally and internationally. Adoption of an electronic medical record (EMR) is a key element of primary care renewal and primary care providers are currently largely focused on the complex task of implementing an EMR. The DFCM has engaged with faculty from departments of Family Medicine across the country and internationally, to hear perspectives around utilizing an EMR to support quality, education and research.

The EMR offers significant potential to engage in quality measurement across the whole Department, to enhance Family Medicine education through teaching tools including resident patient profiles, linking diagnostic profiles to reference databases to enhance

guideline use and to advance primary care research through the use of EMR data for multiple research agendas. This report provides the background, methodology and key findings from both a comprehensive environmental scan as well as a faculty needs assessment. Recommendations are put forward for consideration by the DFCM's leadership around the vital role the DFCM can play in using the EMR to enhance quality of care, education and research across the Department.

BACKGROUND

The Department of Family and Community Medicine (DFCM) at the University of Toronto is North America's largest department of Family Medicine with over 1,000 faculty, 367 postgraduate trainees, 228 clinical clerks, 26 funded researchers and a broad array of fellows and elective students. Throughout its history the Department has demonstrated creativity and leadership in many areas: primary care renewal, emergency medicine, inner city medicine, palliative care, women's health, faculty development, knowledge translation and global health. The Department continues to be at the front and centre of many changes such as primary care renewal and the transformation of Family Medicine Teaching Units (FMTUs) to academic Family Health Teams; growth and expansion across all educational programs; shifts to integrated medical education with new teaching sites; and major initiatives in interprofessional care and education.

Strategic Planning

In 2008, the DFCM completed a formal strategic planning process resulting in a Strategic Plan for 2009 to 2013 called Primary Connections: Linking Academic Excellence to High Quality Patient-Centred Care. In September 2009 the EMR Task Force was struck to help implement a key enabling strategy of the DFCM Strategic Plan which was to strengthen our communications and foster connectivity within the DFCM and collaborations with strategic partners.

DFCM EMR Task Force

Responsible to the Chair of the DFCM and chaired by DFCM's Faculty EMR Lead, the EMR Task Force was charged with the mandate of determining the role the DFCM can take to facilitate collaboration around the EMR across Family Medicine Teaching Units and to make recommendations to the DFCM's Executive Committee for next steps. Membership on the Task Force included DFCM faculty members representing DFCM's programs such as quality, research, postgraduate and undergraduate medical education, as well as representatives from the DFCM's Family Medicine Teaching Units (FMTUs).

Core Functions of the EMR Task Force were:

1. To conduct an environmental scan across Canada and internationally, including a literature review to gather information about what other Family Medicine departments, faculties of medicine and other organizations are doing to facilitate the use of EMRs by faculty for the purposes of quality, education and research.

2. To conduct a faculty and staff needs assessment to determine the role of the DFCM to facilitate collaboration across the FMTUs with respect to the use of an EMR to support quality, research and education.

3. To make recommendations about an ongoing working group(s) and plans to move forward over the next two to three years.

METHODOLOGY

The Task Force took an academic planning approach to inform the recommendations for this report. The information was analyzed and synthesized to provide key themes and to propose recommendations for the DFCM to consider so that the Department can facilitate collaboration across the Department to support and enhance quality, research and education.

Specific Activities

1. *Completing an environmental scan* about the roles other Family Medicine departments play around the EMR. Several of the initiatives included:
    a. Conducting selected one-to-one interviews with academic and IT leaders of Canadian departments of Family Medicine.
    b. Conducting selected one-to-one interviews with academic and IT leaders of international departments of Family Medicine.
    c. Conducting one-to-one interviews with EMR advisors and experts.
    d. Reviewing relevant literature in international, national and local publications and websites.
    e. Participating in international, national and local conferences to gain information and insights into views and perspectives on the EMR and the role of academic departments.
2. *Conducting a DFCM faculty needs assessment* to hear perspectives from faculty around the role the DFCM can play to support EMR collaboration and to understand current challenges and enablers with the EMR around quality, research and education. Several activities of the faculty needs assessment included:
    a. Conducting focus groups with the DFCM's Family Medicine Chiefs.
    b. Conducting a focus group with departmental researchers and research administrators at the DFCM's *Research Rounds.*
    c. Conducting interviews with DFCM's Postgraduate and Undergraduate Education Program Directors, as well as the Teaching Practices Director.
    d. Conducting interviews with IT leads from the DFCM's FMTUs.

KEY FINDINGS

Environmental Scan

Literature Review

Rita Shaughnessy, DFCM librarian, conducted a Medline literature search to attempt to identify what activities departments of Family Medicine around the world were conducting with respect to electronic medical records. Attached in the Appendix 1 and 2 are the search strategy and citation list found.

Although there were a few key references describing the state of electronic medical records in multiple countries, determining the activities other departments of Family Medicine were engaged in with respect to related quality, education and research initiatives was not possible from a literature review.

From the articles that were identified, it appears that countries or groups of family physicians and general practitioners on the same EMR system (but not necessarily from one department of Family Medicine) tend to conduct activities like conducting research using data from EMRs or quality measurement. There are varying levels of uptake of EMR systems that are mostly dependent on individual government policies. Canada ranks very low in terms of uptake of electronic medical records compared to other industrialized countries.[1]

Perspectives on the Use of EMRs from other Family Medicine Departments:

- National (McMaster University, McGill University, The University of British Columbia (UBC), Dalhousie University, The University of Alberta)
- International (UK, Holland, Australia, New Zealand)

National

Canadian medical school departments of Family Medicine are all at a variety of stages of EMR implementation. Most academic centres have adopted EMRs with a few having been integral in EMR software development. Currently a few academic centres are in the process of implementation or still using paper. Reflective of the Canadian landscape of EMR software, a variety of different EMR vendor software has been implemented at the various academic centres across the country.

EMR Vendor Relationships

The most striking common element that was noted from the interviews with leaders from departments of Family Medicine across the country currently on an EMR, was the relationship that each department has with their vendor. At Dalhousie, the Department of Family Medicine, with two main academic sites, has an EMR Committee which is a decision-making group of about ten individuals who create ideas and implement improvement strategies related to the EMR. The EMR committee first holds internal discussions to identify and prioritize and then meets with the vendor on a regular basis to work on implementing the changes in priority order. At the University of Alberta, faculty receive templates from their vendor such as the periodic health exam, Rourke, and a ‘goals’ function which is age, sex and disease specific. If a clinic develops a new template, the vendor puts it into the next update for the rest of the clinics. Each site has a quality lead and the department has an IT lead that goes to all of the sites to gain an understanding of the issues and then communicates with the vendor.

McMaster, McGill and UBC all use OSCAR EMR, an EMR that is run out of McMaster. There is a listserv for OSCAR and an active OSCAR users group. Members work on making adjustments to the software since OSCAR is not a vendor, but built using open source software. If an individual wants to know how to do something within the EMR, they can send an email out to the listserv and usually within a day, they receive instructions or a piece of code to put into their software that will allow them to accomplish the specific task. One of the benefits of OSCAR is that users are not reliant

on a vendor to implement software enhancements, so tasks are accomplished quickly and without any costs other than faculty time. McMaster is developing an academic OSCAR consortium and has recently received a grant to complete their resident education research tool which provides resident patient profiles at a group and individual level. This tool is intended to enable tracking of resident visits and to provide proactive notifications to residents and their supervisors to ensure that clinical requirements are met.

Quality

OSCAR, from McMaster, has an electronic quality assurance program for chronic disease management by residents. For example, when patients with diabetes attend the clinic, their data from the diabetes registry pops up and shows red, yellow or green for the various fields so that residents and supervisors can see at a glance if clinical targets are being met. McMaster completes continuous quality improvement projects to examine various aspects of clinical care. Most of the major chronic illnesses seen in primary care have this kind of system built within OSCAR.

At Dalhousie the EMR is used to assist the completion of quality assurance audits by all second-year Family Medicine residents by providing clinical data for defined populations. The two clinics that form the main Halifax site and train 18 residents each year, all participate in team-based audits. The projects, about three per year, are resident-driven using Canadian Institute for Health Information (CIHI) indicators and have included influenza vaccination, blood pressure control and diabetes management. The methodology is developed, the quality assurance audit is conducted and feedback and suggestions for areas of improvement are shared with all faculty, residents and the other members of the patient care team. As a result of these audits, improvements have been realized. Comparisons are made across the country when possible, e.g., percentage of eligible patients receiving Pap smears.

Education

The Department of Family Medicine at the University of Alberta is submitting a proposal for funding to set up a training program around the use of EMRs and doctor-patient interaction. Finding an individual with the ability to teach all of the issues involved in computer use has been difficult; and nothing has been initiated to date with regards to education or research methods training.

The Department of Family Medicine at McGill uses chronic disease indicator templates which meet government requirements. A complete template drop-down provides a reminder of requirements. These templates are intended to assist clinical decision making. For example, the UTI template includes a note reminding clinicians that it may not be necessary to perform a urine culture. There are educational prompts embedded within the templates. It is felt that telling residents that they can't use templates is like telling them they can't use a cell phone. Templates can reduce the risk with a resident who may not know best practices. McMaster, however, is using templates less and instead uses the standard SOAP format for encounter notes. Residents can then elect to write a brief note in SOAP format and then add it to a template. Reading the residents' notes as they are writing them allows timely supervision, but viewing residents while they are interacting with patients is usually required for accurate assessment of the resident's clinical direction, if there are concerns.

At UBC they voiced concerns about the EMR and education. Depending primarily on algorithms lessens the residents' ability for independent and integrative analysis which is important for the instances when a patient's condition may not correlate directly with an algorithm.

"Right now if I walk into the central room where residents are, what used to be an active discussion among faculty and residents about interesting cases and so on, is silent because they're looking at the screens of the various computers and now they're frustrated by the fact that the patient care disease algorithms are not reflected in the chart. They are just slavering for the day when the algorithms would be automatically in the patients' chart," said an interviewee at UBC.

There are concerns that the use of algorithms for evidence-based care (the science of medicine) is limiting for residents and for patient care (the art of medicine). Algorithms may limit a practitioner's ability to detect 'red flags' in a particular, case presentation. In investigating a child death in BC, it was ascertained by the provincial College that the EMR had contributed to the death and there were particular issues with the EMR, for example the templating and the problems with flagging for follow-up.

Research

The UBC Centre for Relationship-Based Care is doing research funded by the Canadian Institute for Health Research (CIHR) around the use of the EMR and recently applied for a grant to study EMR implementation and its impact on the doctor-patient relationship. The study is examining templating in different EMRs and the degree to which this affects flow. Interactions are being videotaped by a sociologist who is applying a technique called micro-analysis (observing eye-contact and coding key elements of the interaction pre-and post-EMR implementation). Barbara Starfield emphasizes the importance in primary care of the shared agreement: that over the course of a visit, the doctor and the patient come to an agreement about the nature of the problem or its uncertainties and what the plan is. If the patient doesn't feel that that was achieved, no matter how technically appropriate the transaction, they just don't get better at the same rate. The question concerns the degree to which an EMR can enable, and the degree to which an EMR can hinder the patient-centered clinical method. The degree of templating can really have an impact on the nature of the flow and how 'heard' the patient might feel. Phase one is looking at the relationship and the forging of an agreement, a key attribute of primary care.

Dr. Nicola Shaw at the University of Alberta led a primary care pan-Canadian research study on behalf of the Canadian Medical Association and funded through Canada Health Infoway. Twenty case studies in primary care and electronic medical records were completed and published in a report by the Canadian Medical Association.[2] The rationale for the study was the noted limited uptake of EMRs by Canadian physicians; 18% uptake over six years with no change. The study examined early adopters, particularly those who have been using electronic charting for at least two years without pulling paper charts. In these case studies, the attitudes towards the EMR were generally positive. However, through this study and Dr. Shaw's other research and experiences in Canada and the United States, she has found that in general while clients would not go back to paper

charts, they would not necessarily implement an EMR again, given the volume of work and lack of expected benefit like cost savings. The EMR enables better care for patients but the costs associated with EMR implementation may not be realized by any cost savings after implementation. There are no increased savings through billings as most physicians had electronic billing prior to EMR implementation. Most physicians do not chart while the patient is in the room, so charting after the patient has left will not provide the alerts and reminders that the computerized record is meant to be giving. Of note, in the twenty case studies, the use of a laptop in patient examining rooms was an enabler for EMR use. However, most family physicians will have two or three patient examining rooms; leaving the room with a patient record that is not yet completed could lead to inaccurate data entry such as entering the wrong data into the wrong patient record.

The possibilities for research using the data from EMRs may be limited in Alberta. Alberta Health and Wellness, in cooperation and partnership with Alberta Health Services, and many other partners including the health professional colleges and associations, set up Alberta Netcare EHR Portal. This portal provides up-to-date information immediately at the point of care across most of the province. This has greatly facilitated clinical use of the EMR, however an agreement was made with Netcare that the data entered would not be made available for research; thus Alberta has a provincial electronic health record that allows for viewing of data only, not access to it for research. Researchers wanting to use EMR data in Alberta have experienced multiple barriers as a result of this set-up. Making data available for researchers was not a high priority on the provincial agenda. Alberta was ahead of the rest of Canada in the implementation of an EMR but they didn't have a research culture and went with a clinical focus only.

International

Holland

Over 90% of general practices in Holland are fully electronic. The move towards electronic medical records began in the early 1990s and initially there were very few requirements from the Dutch College of General Practitioners for vendors with respect to system capabilities. In 1991 and 1992 a requirement was introduced that EMR software must be able to classify disease based on the International Classification of Primary Care (ICPC). There was no reimbursement for physicians to adopt an EMR but the electronic record allowed easier submission of billing which in fact paid for the whole investment.

ICPC-diagnostic codes are being used by physicians across Holland who are aware of and interested in research. At least seven of the eight departments of Family Medicine have a network of practices that use ICPC. There is no central collection of data on a national basis but there is a representative sample network of practices that report to the NIVEL Institute, a health services research institute with a primary care division, and every ten years they produce a national report on the state of primary care. There is an independent institute of quality of care that collaborates with the NIVEL Institute to conduct quality assessments of primary care.

Conceptually ICPC restricts information but brings in a granularity that is helpful. Lack of information is a problem in primary care but too much information can also be problematic. In contrast, SNOMED-CT (Systematized Nomenclature of Medicine-

Clinical Terms) is very detailed. WONCA has made an agreement to develop SNOMED-CT Primary Care which would be linked directly to ICPC-3, and then ultimately have an ICPC-3 that is compatible with the next version of the International Classification of Disease (ICD)-11 and to SNOMED-CT. This would allow the funnelling of information through ICPC, into ICD and then into SNOMED-CT which would enable bringing in generic concepts where decision making requires more generic concepts. Then in the hospital further breakdown can occur, e.g., the seven types of hypertension or eight types of diabetes that may be helpful to the endocrinologist but useless to the primary care physician.

Physicians are responsible for their patients 24 hours a day, 365 days of the year. For physicians to cover each others' practices, patient information needs to be made available to the physicians who are treating the patient. Thus the EMR and coding are enablers for out-of hours practice requiring that patient information is made available. Coding within an EMR enables identification of risk groups through standardization of terminology, as well as development of management plans, for example, identification and team-based management of patients with diabetes.

UK

The UK, with a long history of EMR use and pay-for-performance, is likely the world leader with respect to quality measurement and primary care. There are a number of organizations in the UK looking at quality measurement and improvement. The UK uses the **Quality and Outcomes Framework (QOF)**, which has been a component of the General Medical Services contract for general practices, since 2004. PRIMUS is a quality improvement organization with a focus on quality indicators and a mandate to improve the standards of records.

The Primary Care Data Quality (PCDQ) Program that runs out of St. George's University in London, England, conducts quality improvement studies with 20 to 139 practices (depending on the study) using routinely collected data for primary care. With approximately 1,900 patients per full-time employee (FTE), 139 practices can include data for approximately one million patients. At the end of each study, the study's feedback is provided to all physicians, including those in the control group. The locations of participating practices are nationally representative. Each project goes through ethics centrally and then regionally. The PCDQ uses MiQuest, a query software program mandated by the government that extracts and transfers the required data elements from multiple different EMR systems. They extract and transfer all structured data. Active problems are coded with a date and in theory every visit has a code but may have multiple codes. Chronic diseases are coded more rigorously because of the pay-for-performance system in the UK. Lab data are extracted but they do have some issues with these data as the same lab test can have different names. Data regarding prescriptions are theoretically complete as patients don't go elsewhere and stick to their regular GP practice. The referral letters and consult letter data are not very good. Letters may not have a date and may or may not indicate the type of consultant. The information is only captured if the GP pulls specific items from the letter and codes it, or if practices employ 'data extractors' to rigorously extract data from correspondence and reports from hospitals and consultants.

There are four main EMR vendors in the UK. EMIS LV is the most popular. General Practice Research Database (GPRD), Q-research (which uses EMIS) and The Health Improvement Network (THIN) are all single vendor research programs: GPRD use VISION practices.

EMIS LV has a 'population manager' that queries the system for QOF data to provide an update on indicators every two weeks. At the end of the year, physicians can receive up to about 30% more money for targets met. The population manager enables the generation of an automatic list of patients for whom indicators have not been achieved and automatically sends a letter out to the patients to come in for an appointment; it also auto flags unmet indicators in the patient chart. The nurse and receptionist have access to this information and take appropriate action to enable achievement of the required indicator. Enablers for this process include monthly status meetings to see how the clinical team is doing and to ensure that correct templates are being used to collect the data elements that are required. The GPs generally try to be very careful about what codes they enter for the chronic diseases that they get measured on. This is because once a patient gets coded with a diagnosis it goes into the registry which then is used to apply the quality indicator. For example, they are careful with anxiety vs. depression because whatever they put in, puts the patient into that registry. One strategy used is to have a 'significant list' which is coded. Patients do not get put on the significant list until the clinician is sure of the diagnosis. For example, with asthma, patients are only put in the asthma registry if the clinician is sure the patient has the condition, not if they are wondering if they have the condition.

Australia

Australia has a been quite successful implementing EMRs in primary care primarily due to a government-led initiative in 2005 that provided practices with $20,000 to purchase EMRs. Although this was not enough money for most practices, it was enough to initiate widespread implementation. Australia has only three providers, with one in particular, Medical Director, having a large share of the market. Australia has a fee-for-service billing system that has become increasingly complex over the past ten years due to extra payments for chronic disease management and care planning, for example, which is easier with an electronic system. The Regional Primary Care Organization in Australia, the Division of General Practice, has been given a mandate regarding information technology and communication and through project officers, it is implementing IT solutions. In Australia, central data collection occurs through the federal government but not necessarily through the EMRs. Australia has a universal drug health plan. Billing is not linked to diagnostic coding but to the time spent with patients (about 20 minutes). With respect to quality measurement, Australia has a national program for accreditation of medical practices. While not implemented to the extent seen in the UK, there are pay-for-process outcomes, like processes of care around diabetes, care management across systems and immunizations.

New Zealand

Family Medicine practices in New Zealand have been using an EMR for a long time and most, with the exception of small clusters, are on the same EMR: Medtech. No government funding was provided to support EMR implementation.

In Christchurch, a collective GP organization negotiates on behalf of all the GPs in the area and is responsible for submitting all billings. As an EMR was required for the collective submission of billings, the GP organization paid for the computers. The practices do not put billing codes into the EMR. The practice is partly capitation and partly fee-for-service and funding varies with the demographic profile of the practice and top-ups for minority groups.

The EMR is crucial for continuing medical education. Ten years ago, a Primary Care Research Group was started to provide feedback for prescribing in clinical practice. It is a complex feedback model that uses a care network and a GP-led small peer group framework. The discussion group meets once a month and is informed by an evidence-based literature search on a current topic of interest. The lead GP and the pharmacists prepare the list and provide it to the GPs in advance. A discussion is held, providing an opportunity for the GPs to determine if they agree with the presented guidelines. The critical appraisal skills of the GPs have improved considerably, for example, understanding and application of concepts such as number needed to treat (NNT) and relative risk. Physicians need these skills to evaluate the strengths and weaknesses of the evidence, as opposed to a guidelines-driven target-based model which might encourage a move towards a particular target, but which may not be appropriate for a particular patient. The sessions are evidence-based and GP-led, with experts sometimes used as a resource. Topics are planned well in advance based on a brainstorming session done at the beginning of the year. There are four full-time pharmacists whose main job is to run this initiative, including pulling the data. They look at overall prescribing and areas where GPs appear to not be doing well or where big changes have been made.

A national quality and outcomes measurement program was implemented in the past few years. The national program is not mandatory although there is a financial incentive attached to it. Given their informative education program, Christchurch opted out.

Individual GPs see no benefit in using ICD-9 coding other then for the purposes of research on chronic diseases; thus the use of ICD-9 coding is variable. There is an opportunity cost given the time and difficulty of use. Furthermore, about 40% of GP consultations have no diagnosis attached to them.

The EMR communicates with the hospital around lab data, radiology/x-rays and discharge letters which all enter the EMR automatically. Given a monopoly provider that is perceived to be unreceptive to programming suggestions, the practice is considering OSCAR, McMaster University's open source EMR (described previously). Medtech allows for some research but poor data coding is a barrier. Family Medicine residents use EMRs for their work in the practices. The EMR links into an EMR grid Internet enabling an individual GP's office to access resources, e.g., for education topics, rationale for ordering tests. Past topics can be retained for comparison with new guidelines.

DFCM Faculty Perspective

Faculty interviewed by the Task Force supported the DFCM playing a lead role in facilitating collaboration across the Department with regards to the use of the EMR to support quality, education and research. The following is a synopsis of key themes that emerged from interviews and focus groups with DFCM faculty.

It is important for the DFCM to define, as succinctly and as early as possible, a shared vision and strategic directions for its role around the EMR. Immediate tactical objectives need to be established toward this shared future vision and strategic end goals. There was consensus that an overarching committee with representatives from every site, as well as from education, quality and research programs, would foster collaboration of purpose across all units and enable shared ideas.

An 'umbrella language' or 'data standards', for the DFCM should be developed, including acronyms, definitions, data elements to be collected and evidence-based guidelines that would ensure consistency in measuring quality of care, educating medical students and residents and engaging in research across the Department. While suggestions varied, there was consensus that agreed-upon standardized templates and forms should be created and centrally disseminated. These tools could be tailored to allow for site-specific variations while enabling consistency across all units and to avoid duplicate efforts.

User-friendly EMRs that have been adapted for academic purposes are needed to support quality of care, education and research. With a strong unified voice, the DFCM is in an optimal position to play a vital role in software modifications with both Practice Solutions and other vendors, to facilitate the development of a user-friendly academic EMR. There was agreement by both Practice Solutions (PS) sites and sites using other EMR software that focusing initially on academic adaptations of PS is logical given its position as the dominant vendor among academic teaching units in the DFCM.

Role of the DFCM with the EMR to Support Quality

The EMR is an important enabler for enhancing quality of clinical care. The EMR offers significant potential to facilitate the adoption of DFCM-wide quality measures. Without an EMR in place, many clinical quality indicators would be difficult to measure. Teaching sites who are already doing quality measurement through the Quality Improvement & Innovation Partnership (QIIP) don't think that the DFCM should reinvent the wheel. They encourage other academic sites to participate in QIIP. Centrally-directed quality measurement tools and benchmarks would be welcome; however implementation of these, as well as sharing of results, would need further discussion and agreement. There were suggestions to create a forum and/ or an opportunity to share, exchange feedback, discuss challenges and celebrate achievements around both quality measurement and use of the EMR. There is a desire to incorporate evidence-based guidelines within the EMR and to have built-in reminders within the system. Faculty envision the DFCM librarian and website to be an integral part of this coordinated strategy. Faculty also view the DFCM's Quality Program as having a key role in developing agreed-upon sets of indicators to measure quality across the DFCM.

The major challenges identified with respect to quality measurement concern uniformity across the department around capturing and entering data into the EMR and how to extract the data, especially from more than one system. Coding data to facilitate the identification of patients with specific disease conditions arose as one strategy; however, not all physicians may be receptive to coding. Challenges include the variation in ease of coding for different EMR software, determining which coding system should be used and

inconsistency of faculty in keeping their Cumulative Patient Profiles up-to-date. Concerns were expressed with respect to the time and expertise it would take to perform the quality measures and who would pay for the personnel to do this. There were also concerns voiced around the potential difficulty to find incentives for physicians to participate in quality improvement initiatives; however if the work is efficient, makes sense and does not take a lot of time, faculty felt that buy-in would be increased.

Role of the DFCM with the EMR to Support Education

The EMR will change the way we teach our trainees. Specifically, the EMR allows the potential to extract data which can be used to provide graphical demonstrations of patients' conditions and resident practice profiles. It would be ideal to create a program that determines the nature of the residency practice of each site with respect to the patient populations that they see and the morbidity of those patients. Currently the DFCM has a student-initiated electronic tracking system whereby medical students enter encounters into a University-based computer program. This system is potentially problematic as students do not always enter encounters in a timely and consistent manner. The EMR could facilitate more comprehensive and consistent recording of patient encounters which could provide faculty with more accurate and timely details of students' exposure to clinical problems. Dr. Karl Iglar, the DFCM Postgraduate Director, has already developed methods for incorporation of the current resident web-based tracker into Practice Solutions software.

Access to tools such as reminders and drop-down menus facilitate the teaching of evidence-based medicine to medical students and residents. The DFCM could provide educational tools including patient hand-outs, guidelines and modules to facilitate learning and consistent standards. Many of these tools already exist online in the DFCM residents portal but they could also be integrated with the EMR. Chart reviews can be more detailed in the EMR because the resident could go home, read up on the diagnosis or symptoms and then add to the EMR chart from locations outside of the clinic.

The DFCM should develop capacity for teaching through an EMR and should also consider creating a curriculum for the residents in order to formally teach them how to work with an EMR. However, many learners are likely to be ahead of faculty in the use of technology. Exposure of undergraduate medical students to the use of EMRs in Family Medicine may demonstrate efficient and effective practice, such as with the provision of reminders and drop-down sheets. This may increase their interest in Family Medicine if they see it as more manageable.

Current EMRs must be adapted for academic practices. Issues such as faculty sign-off of charts, identification of resident practices, tracking of types of conditions they are seeing and scheduling issues, all need to be addressed. An issue with teaching practices and some vendors arose around preceptors having to pay for licenses for their trainees, and having to use their own preceptor's stipend to pay for their residents to get online. Thus funding is required for basic use in some practices. There were also concerns voiced regarding the trainees' reliance on the EMR and that trainees may stop thinking and start referring to the EMR; thus if they don't have access to the EMR, their ability to deal with clinical problems may be diminished.

Role of the DFCM with the EMR to Support Research

The EMR is definitely an enabler for research creating the possibility for a much greater magnitude of data collection. There are hundreds of thousands of patients across the DFCM in contrast to tens of thousands of patients at any one teaching site. An EMR allows researchers to pull detailed data on an entire practice population. The EMR makes extracting data for research purposes much easier than manually using charts, especially when extracting across a number of teaching sites. Through the ability to test different approaches to care, the EMR offers the possibility of significantly advancing research in primary care.

Standardization of custom forms and a common language are essential for easier extraction and sharing of data. A DFCM EMR working group could be struck to facilitate standardization of elements including diagnosis, socio-economic status, demographics, acronyms and consensus around use of ICD-9 or other coding systems. Some but not all data can be pulled from the EMR. From a research perspective advance planning is needed before people create their own forms, so that five to ten years from now when everyone has entered data, we are able to retrieve it efficiently. For example, using a standardized diabetes template for diabetic foot exams will ensure uniformity of documentation and facilitate analysis of this data element. The DFCM could provide a strong central voice advocating with vendors for research-friendly EMRs and for different practices to have interfaces that link in order to do large cohort studies**.**

The DFCM could also play a central role in creating and adopting a system for gathering data for residents and research projects across the DFCM. Encouraging units to analyze and research their databases and creating a culture of shared data would advance primary care research across the Department and within the health care system. Determining types of care providers within the EMR, (like an RN or pharmacist) so that who the patient really saw can be determined is critical to facilitating understanding of team functioning.

Without a centralized EMR and without a shared research agenda, a DFCM-wide research initiative will be challenging. Some faculty felt that a shared vision and strategy around a research agenda that people buy into and come together around a ‘team brand’ would be critical and that demonstrating a team strategy would be an important outcome, though agreeing to a unified approach for a number of tasks can be daunting.

Thoughts on the DFCM housing central data collection

Faculty agreed that data should be housed centrally to increase the magnitude and scope of research. While challenges around privacy, anonymity, security and ownership of data were raised as concerns, faculty felt that colleagues would be willing to contribute data to a centralized database. The idea of collaborating and working together for data collection is considered a benefit; however some faculty felt that it would be important for the sites to get credit for contributing data for research. Some of these remarks are noted below.

“People will want to know what is in it for them - someone can be a data contributor; sites that are more academically developed may want to be active participants in the research and not simply be involved in the data contribution.”

"Most colleagues would be fine with the idea but if it feels like it interferes with their current research work they may have concerns and they may want more involvement and acknowledgement if their data and project is to be moved centrally."

EMR WORK INITIATED OR ALREADY OCCURING WITHIN THE DFCM

Some DFCM sites participate in the Canadian Primary Care Sentinel Surveillance Network (CPCSSN, www.cpcssn.ca). CPCSSN is a collaboration between nine Primary Care Practice Based Research Networks (PBRNs), based at nine academic departments of family medicine, in six provinces. CPCSSN currently includes seven EMRs and is expanding to additional sentinel sites, Universities, provinces and EMRs; it collects standardized information on chronic diseases from data routinely entered in Sentinel practices' EMRs. CPCSSN is a sub-entity of the College of Family Physicians of Canada, collaborates with CIHI, and is funded by the Public Health Agency of Canada. CPCSSN has developed methods to transform and recode data from multiple EMRs into standardized terms, and to transmit and store these data to a secure central site for research and analysis. CPCSSN provides data quality feedback to sentinel practices and encourages data consistency; members of the Information Technology-Data Management committee have done multiple presentations at local, national and international meetings on this subject. CPCSSN's structure also supports Practice Based Research Networks (PBRNs) in terms of development and management of their local databases for research and quality improvement purposes.

EMRALD is an Electronic Medical Record Administrative data Linked Database housed at the Institute for Clinical Evaluative Sciences (ICES). This database collects data from family physicians on Practice Solutions EMR within Ontario and currently contains data from over 70 physicians and over 70,000 patients. EMRALD researchers all hold faculty positions within the DFCM. Activities have included administrative data validation for chronic diseases, methods to identify patients with chronic diseases within the EMR, EMR de-identification methods and clinical quality indicator measurement. Current projects included assessment of wait-times for referral to specialists from family physicians and optimal methods for providing feedback to physicians that lead to quality improvement.

As a number of DFCM sites have recently implemented Practice Solutions and three more sites will be adopting this EMR in the next few months, there was recognition of the urgent need to make modifications to Practice Solutions to better fit academic practices. Therefore, the creation of a subset of the planned EMR Users Group specific to Practice Solutions sites has already been initiated. Discussions for academic modifications with Practice Solutions have commenced. Dr. Sharon Domb and Dr. Karen Tu will co-chair the DFCM EMR Users Group with an inaugural meeting held Nov. 2, 2010 with representatives from all sites. In addition a recommended acronym list for populating Cumulative Patient Profiles within the EMR was developed and circulated to all the Chiefs last year.

RECOMMENDATIONS

1. Hire a **Health Informatics Specialist** to lead the determination of the technical needs and establishment of a potential centralized EMR data repository. This individual will also support the sites in their data management requirements as well as supporting Quality, Education, Research and other central programs with similar requirements. In addition, this individual will develop and update templates and searches for incorporation into EMR software.

2. Implement an overarching **EMR Working Group** with a committee structure that links to respective DFCM programs in quality, education and research and their standing committees
    a. Functions:
        i. To further develop a vision and strategic objectives around the role of the DFCM with respect to the EMR.
        ii. To agree to short and mid-term goals and appropriate implementation strategies.
        iii. To determine whether it is feasible to house a central data collection within the Department to facilitate efficient Department-wide research, analysis and quality measurement.
        iv. To collaborate with the Quality Improvement Program around establishment of a common language and processes to support quality measurement across the department.
        v. To support the Undergraduate and Postgraduate Education Programs in establishing EMR information management tools and consistent orientation to support faculty, medical students and residents.
        vi. To support the Research Program through facilitating the development of standardized language.

3. Create a **DFCM EMR Users Group** to share lessons learned, challenges and enablers, standardize data entry into the EMR and leverage central negotiations for advocacy with Practice Solutions and other vendors to create a user-friendly academic EMR.

4. Collaborate with Family Medicine departments locally and nationally in an **EMR-focused academic consortium**.

CONCLUSIONS

While there are and will be challenges, there is general enthusiasm and excitement for the implementation of EMRs across the DFCM and for the collaboration of the individual sites to work on a common agenda with respect to quality, education and research.

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APPENDICES

Appendix 1

Search strategy used for med-line search

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Search for: from 10 [7 and 9] keep 1,6-7,10,12,15,19-20,22,25,34,38-
39,45,48

Results: 1-15

Database: Ovid MEDLINE(R) <1996 to May Week 3 2009> Search Strategy:
--------------------------------------------------------------------------
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1     Medical Records Systems, Computerized/ (12232)
2     Primary Health Care/ (24523)
3     family practice/ (26944)
4     3 or 2 (48719)
5     4 and 1 (792)
6     emr systems.ti. (10)
7     Medical Records Systems, Computerized/ut (480)
8     *Medical Records Systems, Computerized/ (8538)
9     8 and 5 (538)
10     7 and 9 (48)
11     from 10 keep 1,6-7,10,12,15,19-20,22,25,34,38-39,45,48 (15)
12     exp Medical Records Systems, Computerized/og, sd, cl
[Organization &
Administration, Supply & Distribution, Classification] (2257)
13     4 and 12 (108)
14     8 and 13 (97)
15     from 11 keep 1-15 (15)
16     from 11 keep 1-15 (15)

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Appendix 2

Citations as a result of Med-line Search

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