Towards a Regulatory Framework for Workflow Improvement in Electronic Medical Records

Faiza ARSLANa, Jonathan MARCUSb, Alireza KHATAMIac, Aziz GUERGACHIad and Karim KESHAVJEEa,c,1

a Institute of Health, Policy and Management, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada
b Dr. Jonathan Marcus Medicine Professional Corp., Toronto, ON, Canada
c Department of Information Technology Management, Ted Rogers School of Management, Toronto Metropolitan University, Toronto, ON, Canada
d Department of Mathematics and Statistics, York University, Toronto, ON, Canada

ORCiD ID: Alireza Khatami https://orcid.org/0000-0002-4175-5755, Karim Keshavjee
https://orcid.org/0000-0003-1317-7035

Abstract. Physicians have to complete several time-consuming and burnout-inducing tasks in their EMRs for everyday care of patients. Poor workflow design generates increased effort for physicians. In this study, we measure time doctors take to retrieve and review information in the patient chart at the beginning of a visit; one of approximately 12 tasks a doctor must do in the EMR during the visit. Information retrieval takes approximately 40 minutes per day. Automation could save 75% of that time. We estimate that if every family doctor in Canada could save 30 minutes through automation of just this one process, we could free up time equivalent to >3000 physicians and >5 million patients; enough to absorb the vast majority of patients who currently do not have a doctor. We know of no more powerful intervention than workflow automation in Canadian EMRs to increase the supply of doctors while simultaneously reducing a major cause of burnout. We recommend an accelerated research program to identify additional opportunities for workflow automation and a regulatory program to ensure that every physician has access to workflow automation in their EMR.

Keywords. Electronic medical records, workflow optimization, burnout, workflow automation, regulation

1. Introduction

The Canadian healthcare system is facing a pressing challenge, as approximately 50% of Canadians either don’t have a doctor or are challenged to book an appointment with one, while an impending wave of retirements threatens to exacerbate the situation over the next five years [1,2]. Numerous factors contribute to this alarming trend, including physician burnout, time constraints, job dissatisfaction and cognitive overload. A significant factor is the burden imposed by Electronic Medical Records (EMR). Family
physicians spend twice as much time on EMR and deskwork as they do with their patients, impacting both efficiency and patient care [3]. Our healthcare system is unable to be proactive if we do not have an adequate supply of family physicians. The lack of primary care services is precisely why our system is so reactive and not proactive.

It is noteworthy that the principles underlying existing regulatory regimes for EMRs were developed in the 1990s and have not been re-evaluated in spite of the rapid advancements in technology over the last decade. Numerous tools have emerged to streamline processes and optimize workflows in other sectors, creating an opportunity to harness those advancements and adapt them for the benefit of family physicians and their patients. While some physicians have resorted to purchasing market-based solutions or employing medical scribes [3], these options are not universally accessible, affordable, or scalable. Additionally, some EMRs struggle to accommodate these assistive tools effectively, leaving many physicians at a disadvantage and leaving the healthcare system inefficiently resourced for primary care.

Addressing this pressing issue calls for the development of a new regulatory regime that incorporates advanced workflow features into EMR systems, providing advanced automation and ensuring equitable support for all family physicians.

2. Methods

Observations of daily patient visits were conducted to capture the real-time workflow of family physicians. We measured the approximate time taken for each task physicians performed. To emphasize the time inefficiencies associated with repetitive tasks within the EMR system, we conducted a time measurement study focused on the retrieval and review of documents at the beginning of the patient visit. We categorized patients into broader diagnostic groups, including acute, chronic, and annual physicals. We carefully timed and recorded each task performed by physicians.

Additionally, we conducted semi-structured interviews with key stakeholders, including family physicians, patients, administrative staff, and the EMR vendor to gain insights into their perspectives on the workflow process.

Our project was based on healthcare process improvement and did not involve collection of any personally identifiable data; therefore, Research Ethics Board approval was not obtained.

3. Results

3.1. EMRs and interoperability create new work that did not exist before

We identified 3 stages of a clinical encounter that impact clinical workflows: pre-visit, visit and post-visit. The visit stage can be further broken down to retrieval, review and documentation of historical information, identification of opportunistic issues (e.g., disease prevention, medication renewal, etc.), obtain history, complete questionnaires, conduct physical examination, generate differential diagnosis, formulate diagnostic plan, educate patient, formulate treatment plan and formulate follow-up plan.

From the workflow assessment, we realized that compilation of the historical record can be extremely time consuming and is new work that did not exist 25 years
ago. At the time EMRs were first being designed, data entry was the big challenge. Since EMRs had no historical information nor was interoperability widespread, reviewing information in EMRs was not considered to be a problem.

Physician regulators require them to document all information used in the course of providing care to patients, including information that may reside in different parts of the EMR; i.e., laboratory test results, diagnostic imaging reports, procedure reports, the updated medication list (from specialists, walk-in clinics and emergency department), treatment recommendations from specialists documented in consult notes, and so forth. Since all this information resides in different parts of the EMR, physicians need to retrieve the information, review it and document (henceforth ‘compile’) it before going onto the next step of providing care.

3.2. Retrieving, reviewing and documenting historical information is time-consuming

Table 1 shows the time it takes to compile historical information. On average it takes more than 1 minute to compile information for patients presenting with an acute self-limiting illness and close to 2 minutes for patients with a chronic condition or being seen for an annual physical examination. In a typical day where a physician sees approximately 30 patients per day, they may spend as much as 40 minutes just compiling information from the EMR! That is the equivalent of 4 patient visits foregone.

Table 1. Time taken to retrieve, review and document historical information (seconds).

<table>
<thead>
<tr>
<th>Care Process</th>
<th>Acute Care Average (Range)</th>
<th>Chronic Care Average (Range)</th>
<th>Annual Physical Average (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrieve and review</td>
<td>40 (20-60)</td>
<td>55 (20-90)</td>
<td>75 (30-120)</td>
</tr>
<tr>
<td>Document</td>
<td>34 (10-120)</td>
<td>61 (20-120)</td>
<td>44 (30-120)</td>
</tr>
<tr>
<td>Total time taken</td>
<td>74 (30-180)</td>
<td>116 (40-210)</td>
<td>119 (60-240)</td>
</tr>
</tbody>
</table>

3.3. Automating compilation of historical information could save significant time

We developed a logical algorithm for automation of retrieving and documenting historical information so that a physician could review it faster. We estimate that automation of this time-consuming compilation process could save 75% of the time currently taken in compiling information, since review is very rapid and efficient once all the data is in one place.

If we could save a physician 30 (0.75*40) minutes per day through automation of this one single EMR-related task, we estimate that each primary care physician in Canada could potentially be freed up for 2-3 additional patient visits per day, with a lot less cognitive effort. Multiplied by the number of primary care physicians across Canada (47337), this could open up an additional 95000 patient visits per day (the equivalent of over 3000 physicians); over the course of a year it would generate an additional 19 million visits (assuming 200 working days per year). The average patient visits their doctor 3.3 times per year, resulting in additional capacity for 5.7 million patients, addressing most of the current shortfall in primary care capacity in the country.
4. Discussion

Our study in a small clinic shows the promise of workflow automation in primary care. Even small efficiencies are greatly magnified when multiplied by the number of physicians across the country. Our study demonstrates that workflow automation is possible and that it cannot only save time, but can save cognitive effort, greatly reducing a key source of burnout when using an EMR. Even if our estimates are off by 50%, the small savings in time magnified by the number of physicians would lead to capacity to see an additional 2.8 million patients.

A key limitation of our study is that we only studied the first step in a multi-step process in one clinic. We recommend further research to identify workflow automation opportunities in 1) workflows in the pre-visit phase such as ensuring all tests and questionnaires are completed before the visit, 2) workflows in the in-visit phase such as documentation of the history and physical examination, formulation of the testing plan, the differential diagnosis, patient education, formulation of the treatment plan and follow-up plan, and 3) workflows in the post-visit phase, such as ensuring patients complete diagnostic testing, fill their prescriptions, attend specialist visits and providing appropriate support to patients to assist them in implementing the diagnostic and treatment plan.

5. Policy options and recommendation

Workflow automation is a very powerful tool that could have a significant impact on our healthcare system. Once improved workflows are developed and the software architectures are tested, a regulatory framework that incorporates these requirements into the EMR system would provide much-needed support to all family physicians. Replacing a family physician can cost between $250,000 to one million dollars and takes 6 years [3]. We propose the following policy options for governments and key stakeholders to consider.

Option 1. Do nothing about workflow automation. Continue with the current approaches, which include funding additional teams, funding additional family medicine training spots and increasing funding for existing providers. The advantage of this approach is that investments have already been made, so let us wait to see what happens. There are many start-ups working in this area. Something is bound to work out. The disadvantage of doing nothing is that we lose out on a potentially high impact approach to improving physician supply that can deliver results in a shorter period of time than current approaches are capable of doing.

Option 2. Our recommended approach is to invest in research to identify more potential time-savings with workflow automation. If a small study can find such large time-savings, more research is likely to unearth additional opportunities for time-savings. The advantages of this option are that speeding up EMRs by improving their workflow capabilities can be put into motion very quickly and the benefits can be realized faster than it takes to train more family physicians. Results of the research can be shared with EMR vendors and start-ups who are already working to improve provider productivity, but without the benefit of a solid research program backing their efforts.

Option 3. To support market driven approaches already taking place by providing more grants to encourage greater uptake from the start-up community. This approach is
likely to increase the number of solutions, but given the high costs of customer acquisition in the primary care space, it is likely to take a very long time and not lead to uniform adoption. Additionally, since research backing is missing from this option, it is unlikely to be sustainable or comprehensive, leaving many options unrealized.

There is another important reason for pursuing the approach we recommend. Primary care EMRs in Canada are a home-grown industry that does not depend on innovation arriving from the US. We cannot expect that the Americans, who have their own workflow optimization problems to solve that are completely different from those faced by Canadian physicians, will come to our rescue. Canadian EMRs are a uniquely Canadian problem that Canadians need to solve.

6. Conclusion

Our paper underscores the pressing issue of time-consuming, mind-numbing and repetitive tasks faced by family physicians during routine patient visits, contributing to burnout. Automating recurring processes in EMRs can save valuable time during patient visits and address an important source of health provider burnout.

To achieve this goal, we recommend a research program to identify more time-savings from workflow optimization and the software architectures that can deliver those workflow optimizations. Improving EMRs is likely to be much less expensive on a physician-equivalent basis and will generate the equivalent of thousands of physicians’ worth of visits much faster.

By acting on and implementing the recommended changes, we believe we can alleviate the burden on our healthcare professionals, enhance patient care, and build a more proactive, sustainable and effective healthcare system for the future. It is time to recognize the importance of optimizing workflows and leveraging technology to create better working conditions for all healthcare providers in Canada by following a “Built by Canadians for Canadians” regulatory framework for EMRs.

References

