Axe the Fax: What Users Think of Electronic Referral

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Abstract. Long wait times for elective services are seen as one of the major challenges for Canadian healthcare. Canadians report that they wait longer for specialists than citizens in other countries. The main reason for this is that the referral process is poorly coordinated and leads to delays in care. Electronic referral (eReferral) is seen as a potential means of improving the referral process and enabling faster access to care. There is the potential for national implementation of eReferral in Canada to help achieve this aim. However, existing initiatives have encountered challenges with user adoption and users have continued to use fax. A validated tool was used to survey both users of fax as well as users of eReferral. These two groups of users were then compared. Most family physicians using fax were satisfied overall with the process. This highlighted how challenging any change of this engrained technology will be. There were, however, some significant areas were eReferral was superior to fax. This included response time, the overall quality of referral information, completeness of the information, the timeliness of the information, and the format and layout. There is an opportunity to leverage these findings to support the adoption of eReferral and help reduce wait times.

Keywords. Wait times, electronic referral, eReferral, fax

1. Introduction

Canadians cherish their health care system with 94% calling universal health care a source of collective pride [1]. However, there exist a number of challenges. Long wait times for elective services are seen as one of the three major challenges for Canadian health care [2]. Canadians report that they wait longer for specialists than citizens in other countries [3].

In many cases, long wait times are the result of a poorly designed process as opposed to a lack of capacity [4-6]. Evidence from jurisdictions other than Canada suggest that replacing fax with electronic referral (eReferral) can improve the referral process by increasing the number of complete referrals, reducing inappropriate referrals and ultimately helping reduce wait times [7-9]. Little evidence has been synthesized about the Canadian experience with electronic referral, and the most recent environmental scan, which was conducted based on evidence until early 2013, concluded that there was little data on referral systems in Canada [10]. Without replacing fax and adopting electronic referral systems the potential benefits, including reducing wait times, cannot be realized.

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Canada Health Infoway, a not-for-profit organization, which has as its members the federal, provincial and territorial Deputy Ministers of Health has recently launched an ambitious access initiative to create a gateway that will enable a health technology ecosystem across Canada [11]. One proposed service that may be part of this ecosystem is electronic referral. Before implementation begins, it will be important to understand the experiences of Canadian users with electronic referral so as to understand if users will abandon faxing and adopt electronic referral.

2. Review of the Literature

A literature review of Canadian studies and reports was conducted and highlighted a number of benefits of electronic referral and also the challenges encountered [12-18]. Electronic referral systems can be easy to use, lead to improvements in the referral process, improve the quality of referral, improve the management of patient care, support more equitable access, and decrease wait times [12-18]. There are, however, also a number of challenges in using electronic referral. There is poor adoption of electronic referral systems among Family Physicians, there is a higher information requirement to complete an eReferral, eReferral systems are not connected with other systems, there are a lack of specialists on these systems, users of eReferral are often not engaged in the development or deployment process, there are potential significant cost of these systems, training is inadequate, and there are technical barriers [12-18].

No studies in Canada used a validated questionnaires to survey eReferral users. Also, no studies directly compared eReferral users to users of fax. This research aims to add to the existing literature by directly comparing users of fax to users of electronic referral using a validated questionnaire.

3. Methods

3.1. Participants and Recruitment

Participants were Family Physicians from a local health region in Ontario that had an electronic referral system. Understanding the perspectives of these participants was important as expansion of electronic referral in the area was being contemplated. These users were engaged in this study from March 2017 to December 2017. There were 2 groups in this study:

- Group 1 – Family Physicians referring to hospital outpatient services who had not used the electronic referral platform
- Group 2 – Family Physicians referring to hospital outpatient services who had used the electronic referral platform

This was a matched cohort study where users of eReferral were compared to users of fax.

The electronic referral system was a web-based system that launched directly from the Family Physician's electronic medical record. Patient demographic and medical data was auto-populated and the Physician was automatically signed in. The system also allowed for direct access through an online portal to both initiate and receive referrals.

This study was approved by the Human Research Ethics Board at the University of Victoria. All participants were provided a $20 gift card for participation in the survey.

Twenty Family Physicians who used fax to send referrals were sent surveys. Six Family Physicians responded for a 30% response rate. Twenty-two Family Physicians, all those using eReferral in the region, were sent the survey. Nine Family Physicians responded for a 41% response rate.

3.2. Procedure

The System and Use Survey (SUS) developed by Canada Health Infoway [19] is a validated tool that captures user perceptions of health information systems. It is aligned to the Canada Health Infoway Benefits Evaluation Framework as well as the micro dimensions of the Clinical Adoption Framework developed by Lau et al [20]. These dimensions are system quality, information quality, service quality, use and user satisfaction, and then quality, access, and productivity under net benefits. Results were analyzed within these dimensions.

The System and Use Survey (SUS) was modified for the use of fax and eReferral. Both are types of information systems and thus the SUS is appropriate for use. The surveys were put on Fluid Surveys (FluidSurveys, Ottawa, ON) and questionnaires were emailed to participants. Fluid Surveys stores data in Canada.

3.3. Analysis

Characteristics of the study population were collected. A matched cohort approach was used for survey data. The results from the eReferral group were compared with the fax group for questions that were the same for both groups. Since the SUS contained questions with ordinal variables and the expected value in each cell was less than five (as tested for each comparison), a Fisher's exact test was used. The XLSTAT (v2018.5, Addinsoft, Paris) statistical program was used which runs within Microsoft Excel (Microsoft, Washington).

4. Results

The group of Family Physicians using electronic referral (FP using eR) was compared to the group of Family Physicians using fax (FP using Fax) in terms of gender, computer proficiency, length of time in practice, family practice organization type, and clinic location. A Fischer's exact test was used and there was no statistically significant difference between the groups in any category.

4.1. Dimensions of User Satisfaction and System Quality

The overall user satisfaction was not significantly different between Family Physicians using fax (FP using Fax) and those using eReferral (FP using eR). In terms of system quality, the only statistically significant result was regarding response time of the status of referral (see Figure 1). All Family Physicians strongly or moderately agree that the response time for the status of referrals is acceptable through eReferral, with the exception of only one physician stating this is not applicable. For Family Physicians

using fax, three were not sure if response time from the hospital about their faxed referral was acceptable, while two physicians moderately agreed that the response time was acceptable and one physician felt that this was not applicable.
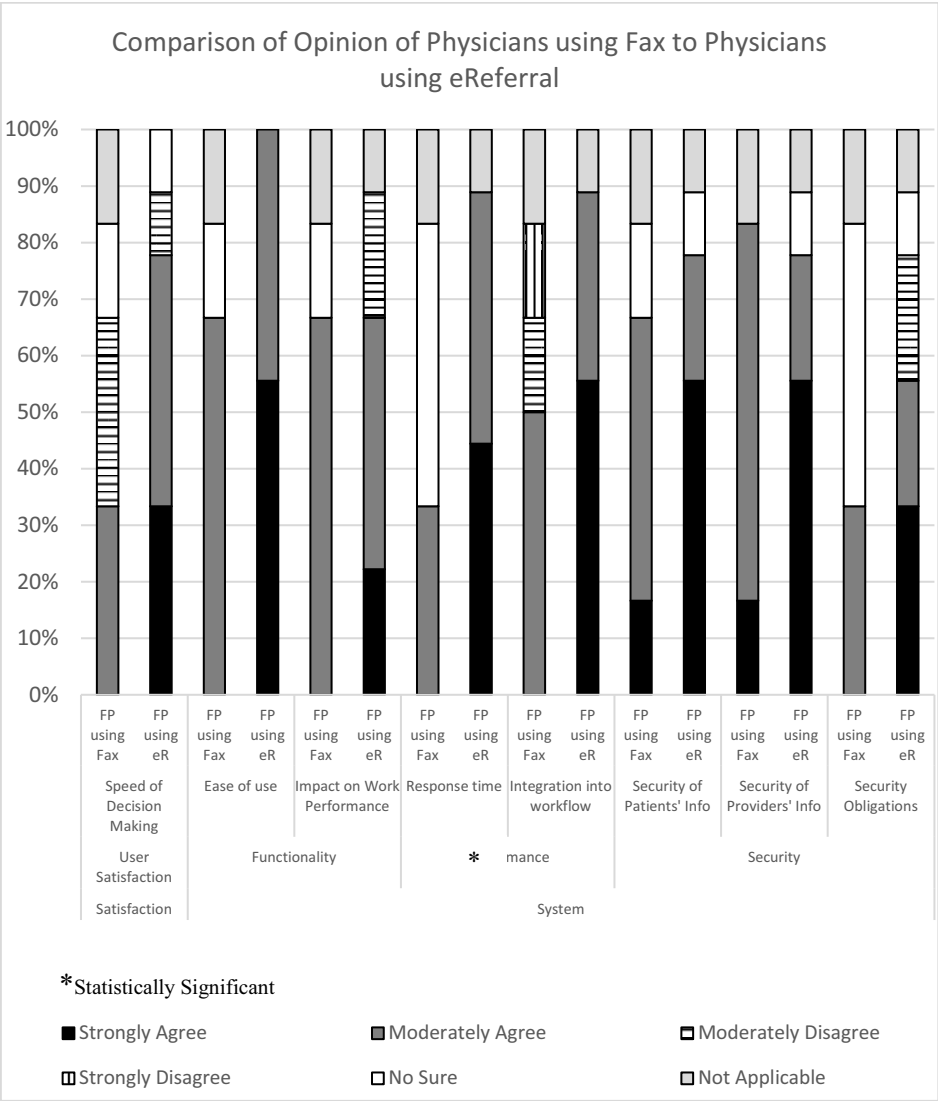

Figure 1: The Opinion of Family Physicians using Fax compared to Family Physicians using eReferral about User Satisfaction and System Quality

4.2. Dimensions of Information Quality

For the dimension of Information Quality there were 3 statistically significant results (see Figure 2). Eight of the Family Physicians using eReferral strongly or moderately agreed that the information coming back to them from the hospital about their referral is

complete with only one moderately disagreeing while those that are using fax had a mixed opinion of the completeness of the information coming back. In addition, seven of the Family Physicians using eReferral strongly or moderately agreed that the information (e.g. Status of Referral, tests available) from hospital is timely, with one Family Physician moderately disagreeing and one selecting not applicable. On the other hand, there was a mixed opinion from those using fax with three physicians saying they are not sure if the information is timely, one physician moderately agreeing that the information is timely, one moderately disagreeing with this, and one stating it is not applicable. Finally, all Family Physicians using eReferral strongly or moderately agree that the format and layout of the referral information from the hospital is acceptable, while half or three of the physicians using fax moderately disagree that the format and layout is acceptable, while two were not sure and one felt it was not applicable.
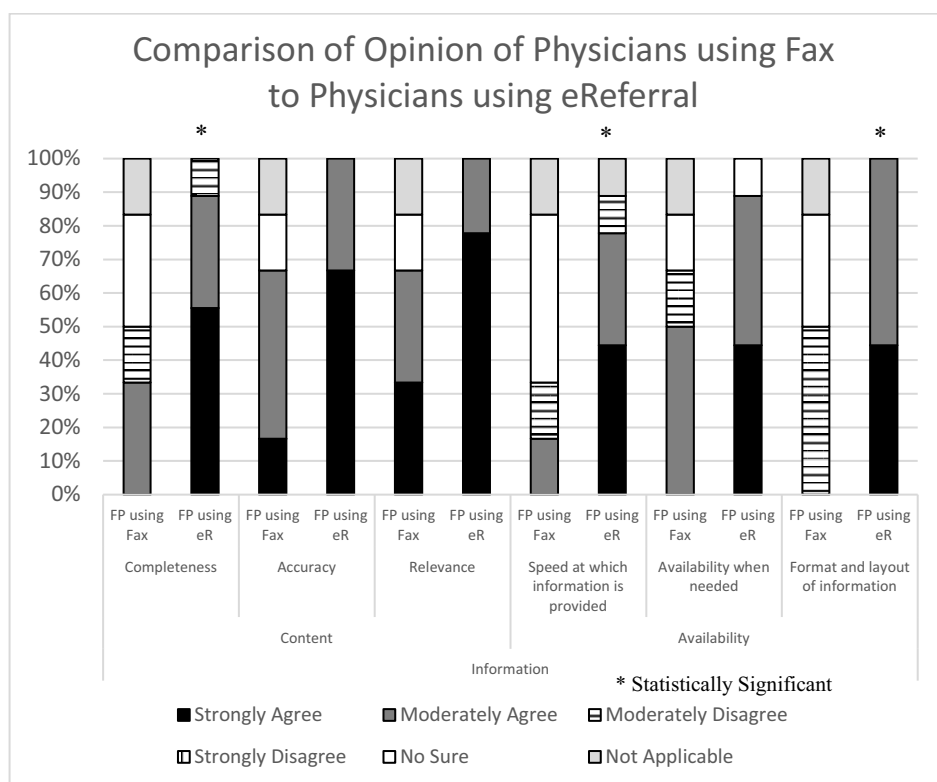

Figure 2: The Opinion of Family Physicians using Fax compared to Family Physicians using eReferral about Information Quality

4.3. The Likelihood to Recommend

There was a statistically significant difference between eReferral and faxed referral with regards to likelihood to recommend the solution to a colleague (see Figure 3). All Family Physicians definitely or probably would recommend eReferral to a colleague. For fax,

two-thirds of Physicians would probably recommend fax, while one-third would probably not recommend fax and one-third was equivocal.
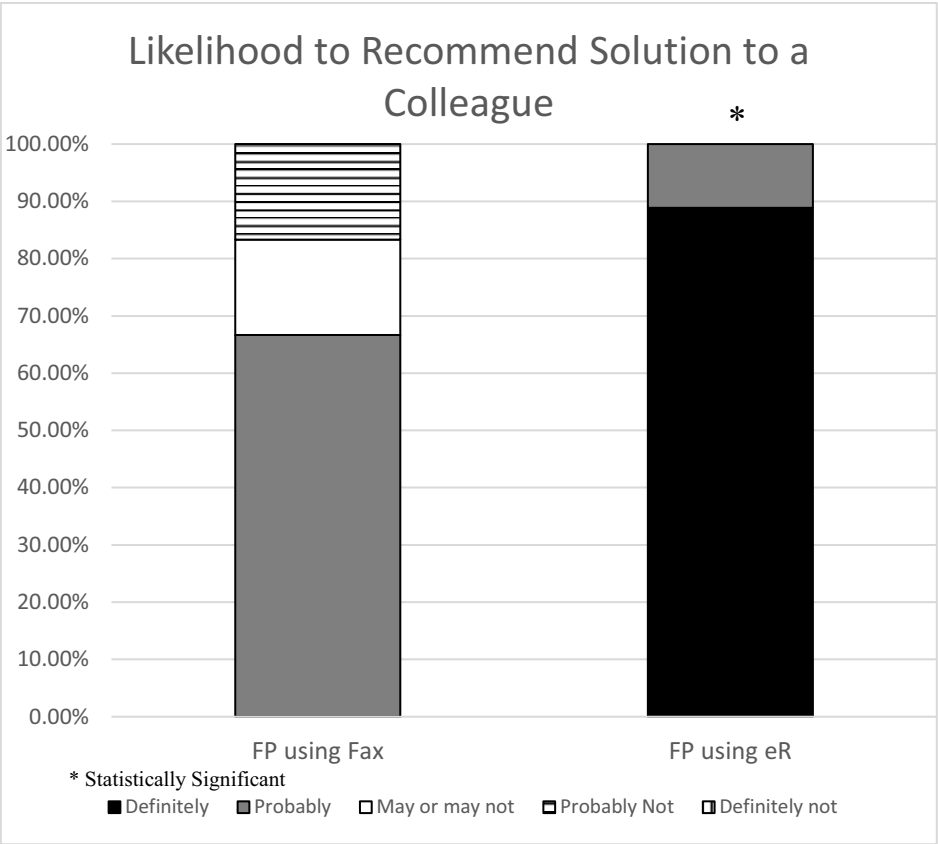

Figure 3: The Likelihood to Recommend Fax or eReferral to a Colleague for Family Physicians

5. Discussion

The group of Family Physicians using eReferral was matched with those using fax. Computer proficiency was part of the measures that was compared. Although not equivalent, attitude towards computer use is seen as an important factor in the successful use of information systems [21] and could bias the opinion of those using eReferral. However, since computer proficiency was similar, the groups did not seem biased in this regard.

The overall user satisfaction was not significantly different between Family Physicians using fax and those using eReferral. It seems that there is no overall impetus or burning platform for physicians to switch away from the fax machine.

In terms of the dimension of System Quality, the only statistically significant result was regarding response time of referral status. This finding did not appear in the literature

review so a new benefit has been identified.. Electronic referral seems to provide more timely information back to referring clinicians as they track referrals.

For Information Quality, overall Family Physicians felt the information coming back to them from the hospital through electronic referral is complete while those that are using fax have a mixed opinion of the completeness of the information coming back. This aligned with the finding in the literature in terms of process improvements and more complete information coming back to the referral sender [13, 17]. Family physicians using eReferral also felt that the information (e.g. Status of Referral, tests available) from hospital about their referral is timely. There was a mixed opinion from those using fax. This may by due to the fact that Family Physicians have more awareness of the referral process through eReferral or that the information is indeed more timely. This benefit was not captured in the literature. This aligns with the System Quality benefit of the response time of the eReferral system being seen as more favorable compared to fax. Finally, all Family Physicians using eReferral agreed that the format and layout of the referral information from the hospital is acceptable, while those using fax had a mixed opinion. This was also not found in the literature.

There was a statistically significant difference between eReferral and Faxed referral with regards to likelihood to recommend the solution to a colleague. All Family Physicians would recommend eReferral to a colleague. For fax, two-thirds of Physicians would probably recommend fax, while one-third would probably not recommend fax and one-third were equivocal. This positive impression of eReferral is not captured in the literature. The Likelihood to recommend a company to a friend/colleague has been seen as the best predictor of growth of a company [22]. This also indicates that clinicians are willing to put their reputations on the line to recommend electronic referral [22]. It should be mentioned that it was surprising to see two thirds of Family Physicians would probably recommend fax to their colleagues. This may again speak to the fact that fax is an established process that Physicians feel works well.

6. Conclusion

Long wait times across Canada present a major challenge for the Canadian health care system. Electronic referral can help improve the referral process and reduce wait times. However, the electronic referral system needs to be adopted to accomplish this. This study contributes valuable information about Family Physician's perspectives of electronic referral as compared to fax. Fax presents a high bar that may be hard for electronic referral to overcome. However, there were a few areas that were identified where electronic referral has advantages that may be used to support adoption. Further study is required with a larger sample size to more fully understand Family Physician perspectives of electronic referral.

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