
Project Using Reacts for Secure Communications at Hôpital du Sacré-Coeur de Montréal

Recipients:	Julie d'Entremont, Director of Information Resources
Project Managers:	Vicky Soulière, MD Cardiologist-Echocardiographer Hôpital du Sacré-Cœur de Montréal Clinical Professor, Université de Montréal Co-Medical Manager, Direction of Information Technology Resources (DIT) CIUSSS du Nord-de-l'Île-de-Montréal Yanick Beaulieu, MD Cardiologist-Echocardiographer, Intensive Care Specialist Hôpital du Sacré-Cœur de Montréal Assistant Clinical Professor, Université de Montréal Creator of Reacts and President/Founder of IIT Inc.
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	Pilot Project Using Reacts for Secure Communications at Hôpital du Sacré-Coeur de Montréal

1 Summary:

The modern era has brought us new possibilities in technology, applications and communication tools. However, some communication issues persist and new challenges have arisen. Communication methods are fragmented, costly and rarely meet security standards, thereby undermining effective service delivery within organizations and networks, as well as collaboration between healthcare professionals. As the healthcare system is under increasing financial and structural pressure, organizations need to be able to count on simple, secure and integrated collaborative solutions to meet their objectives.

This pilot project's main goal consisted in assessing the feasibility and impact of implementing the Reacts platform, specifically its instant messaging and secure file transfer features, in order to optimize communications between members of the healthcare team (physicians, pharmacists, nurses, etc.), and with administrative and support personnel (administrative agents, technologists, coordinators, etc.).

The initial hypothesis was that Reacts' instant messaging feature would optimize communications between participants, thus improving efficiency, by avoiding, among other issues, delays inherent to the paging system, all while meeting security, tracking and protection requirements relative to the patients' health information (PIPEDA and HIPAA).

Several other key aspects were also assessed, regarding both the information technology resources and users. Specifically, we sought to assess the feasibility of implementing Reacts in a clinical setting, as well as the ease with which information technology (IT) services could install and deploy the Reacts application on various workstations. Users answered questions regarding their use of the application, the ease with which they were able to integrate it in their workflow, as well as their willingness to adopt such a platform in their daily activities..

2 Description of the Reacts platform

Reacts is a digital platform that offers a rich, integrated collaborative ecosystem to foster communications and interactions between healthcare professionals, and that also provides innovative tools for remote education and supervision, thereby contributing practical added value to all stakeholders, including patients. The platform was designed to meet the medical industry's strict performance and security standards. While Reacts boasts a wide range of communication options (secure video calls, video streaming through web cams or medical peripherals, remote supervision of procedures), this project focused on studying the use of the instant messaging and secure file transfer features.

Instant messaging and secure file transfer are simple, effective features that enable clinical and administrative professionals to share information through text message and share files (photos, videos, documents, ECGs, etc.) confidentially, while meeting all security, tracking and protection requirements relative to the patients' health information (PIPEDA and HIPAA).

3 Methodology

The 11-week assessment project was conducted within the Hôpital du Sacré-Cœur de Montréal's cardiology department between June 12 and August 24, 2017. The professionals working in the cardiology department must be able to communicate with each other at all times, no matter their specific role within the team (physician, nurse, administrative agent, pharmacist, technologist, etc.) or where they work (ward, outpatient clinic, coronary care unit, echocardiography lab, operating room, interventional cardiology or electrophysiology labs, etc.).

All department staff needing to communicate with other department members were included in this project, thereby introducing a wide variety of users (see Table 1). Physicians mostly used the application's mobile version (iOS) on their smartphones, while most of the other professionals used the standard version installed on their hospital workstations (PC).

Each user was emailed a link granting them access to the Reacts platform. They then had to create a password to complete the account creation process. Professionals using Reacts on their smartphones had to download the application from the App Store. iOS users received no formal training in using this application. However, most professionals using the application on a workstation (PC) were given a short demonstration of how it is used. They also had access to a few simple online tutorials for reference purposes. Professionals were then encouraged to use Reacts' instant messaging feature to communicate with each other instead of using pagers, phones or unsecured text messages. They could therefore use the platform to send new consultations, notify staff of the operating room's readiness status, transfer test results to a colleague, prioritize tests, solicit a second opinion with the option of attaching an ECG result, etc.

At the end of the project, an assessment questionnaire was sent to four groups of respondents:

- Group 1 ("Computer specialists"): the specialists who installed and deployed the application on hospital workstations (2 respondents/2)
- Group 2 ("DIR"): managers from the Direction of Information Resources (DIR) team at the CIUSSS du Nord-de-l'Île-de-Montréal (2 respondents/2)
- Group 3 ("Physicians"): cardiologists and cardiac surgeons (18 respondents/22)
- Group 4 ("Other professionals"): professionals other than physicians, including head nurses, administrative agents, technologists, pharmacists, etc. (17 respondents/36)

Results were obtained through online surveys (Survey Monkey) sent to each participant. The results are presented below.

4 Results

4.1 Group 1: “Computer specialists”

A short survey was given to computer specialists and analysts in the IT Resources Management Department to assess the efforts required by said department to deploy the application on hospital PC's. In response to the following statements:

- “The application is easy to install and deploy”, 100% of respondents answered “Yes”.
- “The application is easy to service in terms of technical support”, 100% of respondents answered “Yes”.
- “The application requires only minor interventions from the IT Department following its installation”, 100% of respondents agreed.
- “The application does not affect the proper functioning of other software installed on hospital computers”, 100% of respondents agreed.
- “The application does not require large amounts of bandwidth (as part of the pilot project and excluding the use of video)”, 100% of respondents agreed.
- In response to the question “What are the main benefits of secure instant messaging when used by medical staff?”, the following answers were selected from the multiple-choice options:
 - “Improves operational efficiency” (50%)
 - “Enables to communicate in a timely manner” (100%)
 - “Offers more flexibility when on the move” (50%)
 - “Offers an effective healthcare coordination tool that complies with privacy standards” (50%)
 - “Facilitates image sharing” (50%)

Only one additional comment was provided by respondents from this group; said comment was not relevant to the Reacts application's use as part of the instant messaging assessment project. Rather, it was a suggestion to provide an option for administrators to activate or deactivate the videoconferencing feature directly at the server level when such a feature would eventually be used.

4.2 Group 2: Direction of Information Resources (DIR)

A short questionnaire was also given to DIR managers to assess their opinions on deploying such an application in a CIUSSS and CISSS setting.

- In response to the statement “Implementing secure messaging of the type used in the pilot project meets institutional, technical and regulatory needs”, 100% of respondents answered “Yes”.
- When asked whether the application's deployment requirements for the use of secure messaging in a hospital setting are easy to implement (in terms of staff/technical/server/bandwidth/other requirements) and compatible with a large-scale deployment in a CIUSSS and CISSS setting, 100% of respondents answered “Yes”.
- Respondents from the DIR group deemed the large-scale deployment of this application in a CIUSSS setting (for the use of secure messaging) to be easy.

- In response to the question “What are the main benefits of secure instant messaging when used by medical staff?”, the following answers were selected from the multiple-choice options:
 - “Improves operational efficiency” (100%)
 - “Enables to communicate in a timely manner” (100%)
 - “Offers more flexibility when on the move” (100%)
 - “Offers an effective healthcare coordination tool that complies with privacy standards” (100%)
 - “Facilitates image sharing” (100%)

The additional comments provided by this user group were not relevant to the Reacts application’s use as part of the instant messaging assessment project. Rather, they pertained to uncertainty regarding bandwidth usage during the eventual use of Reacts’ videoconferencing feature.

4.3 Group 3: “Physicians” (cardiologists and cardiac surgeons)

Most respondents in this group used the application’s mobile version on their smartphones (iPhone). 100% of respondents said that creating their account and learning how to use the application was easy. In terms of app usage frequency, 6% of respondents in this group used it once a day, 17% used it twice a day, 17% used it three times a day or more, and 60% used it several times a week.

- 100% of respondents said the platform was easy to use. In response to the statement “When I use the application, the system works well and reliably enables me to complete my tasks”, 89% of respondents agreed. To the statement “Using this application is entirely relevant for optimizing communications with physicians and other stakeholders”, 100% of respondents agreed.
- In response to the statement “Overall, the application facilitated and optimized communications with the various stakeholders”, 94% of respondents agreed. When asked what Reacts enabled them to do compared to the current system (i.e. pager and dispatcher), 89% of respondents said it enabled them to “Get answers to my questions faster”, 100% said they “Spend less time on hold”, and 94% said they were “More efficient and productive”.
- In response to the statement “Using this application has made my communications more secure”, 100% of respondents agreed.
- In response to the statement “This application was easy to integrate into my daily work flow”, 67% of respondents fully agreed, while 33% of them partly agreed.
- When asked if they would like to see this type of application be permanently integrated to their work, 83% of respondents fully agreed, while 17% of them partly agreed.
- When asked if they would download the application on their personal smartphone and use it at work, 100% of respondents agreed.
- When asked whether or not they would like to use Reacts’ other features as part of their work, 89% of respondents answered “Yes”, while 11% answered “No”. Those who answered “Yes” chose the following features: videoconferencing (56%), screen sharing (75%) to remotely review lab results and PACS images, and remote supervision (69%) to review an echocardiography exam in real-time.

In response to the following questions:

- “Have you also had Reacts installed on your workstation’s PC?”, 94% of respondents answered “No”. 88% of respondents said they planned to use Reacts only on their mobile device, while 22% also planned to have the application installed on their workstation.
- “Did you encounter any specific issues?”, 54% of respondents answered “No”, while 50% answered “Yes”. Among the latter, said issues pertained to the hospital’s Wi-Fi connection (17%), an application update (6%), the application’s use (44%) or their device (6%). Among the issues encountered with “using the application”, some respondents reported intermittent lag.
- “What are the main benefits of secure instant messaging when used by medical staff?”, the following answers were selected from the multiple-choice options:
 - “Improves operational efficiency” (56%)
 - “Enables to communicate in a timely manner” (44%)
 - “Offers more flexibility when on the move” (28%)
 - “Offers an effective health care coordination tool that complies with privacy standards” (100%),
 - “Facilitates image sharing” (33%)

Additional comments from this user group mostly pertained to the application’s intermittent lag. A few comments pertained to the application’s reduced efficiency when users are not connected, as also reported by the “other professionals” group (see below).

4.4 Group 4: “Other professionals” (head nurses, administrative agents, technologists, etc.)

Due to the sheer quantity and variety of professionals included in this user group, it was essential to assess how easily they could create their account and learn how to use the platform. 100% of respondents in this group said that creating their account and learning how to use the application was easy. In terms of app usage frequency, 18% of respondents in this group used it once a day, 6% used it three times a day, 62% used it several times a week, and 12% never used it.

100% of respondents reported that the platform was easy to use. To the statement “When I use the application, the system works well and reliably enables me to complete my tasks”, 89% of respondents agreed. To the statement “Using this application is entirely relevant for optimizing communications with physicians and other stakeholders”, 100% of respondents agreed.

In response to the following statements:

- “Overall, the application facilitated and optimized communications with the various stakeholders”, 56% of respondents fully agreed, while 44% of them partly agreed. When asked what Reacts enabled them to do compared to the current system (i.e. pager and dispatcher), 92% of respondents said it enabled them to “Get answers to my questions faster”, 88% said they “Spend less time on hold”, and 100% said they were “More efficient and productive”.
- “Using this application has made my communications more secure”, 94% of respondents fully agreed, while 6% of them only partly agreed.
- “This application was easy to integrate into my daily work flow”, 69% of respondents fully agreed, while 31% of them partly agreed.

When asked if they would like to see this type of application be permanently integrated to their work, 82% of respondents fully agreed, while 18% of them partly agreed.

When asked if they would download the application on their smartphone and use it at work, 71% of respondents fully agreed, 12% of them partly agreed, and 29% disagreed.

When asked whether or not they would like to use Reacts' other features as part of their work, 59% of respondents answered "No", while 41% answered "Yes". Those who answered "Yes" chose the following features: videoconferencing (50%), screen sharing (50%) to remotely review lab results and PACS images with another user, etc.

In response to the question "Did you encounter any specific issues?", 94% of respondents answered "No", while 6% answered "Yes". Respondents in this user group reported that the issues they encountered were with their PC, not the application itself.

In response to the question "What are the main benefits of secure instant messaging when used by medical staff?", the following answers were selected from the multiple-choice options:

- "Improves operational efficiency" (75%)
- "Enables to communicate in a timely manner" (60%)
- "Offers more flexibility when on the move" (33%)
- "Offers an effective health care coordination tool that complies with privacy standards" (60%)
- "Facilitates image sharing" (20%)

The additional comments provided by this user group focused on two issues. A few respondents reported that a more prominent visual prompt is needed when a new message is received while the application is minimized on the screen. This feature will be added soon. A few users also reported that some physicians forgot to connect to the application or check their smartphones, meaning that conventional means of communication had to be used.

5 Discussion

Integrating new processes or technologies in healthcare professionals' work flow is not always an easy task. Indeed, since the healthcare and administrative teams are often extremely busy, they don't always appreciate the introduction of new methods, as they consider these to be a potential burden on their workload. Moreover, due to their schedules being consistently full, any new tool must be quick to learn, easy to use and very reliable. These are key factors to avoid frustrating professionals, who generally have a very low tolerance toward new tools or processes that tend to malfunction or are too complicated to use. This pilot project clearly showed that all users, including "Physicians" and "Other professionals", found the Reacts application easy to learn and use.

While we were initially worried that respondents in group 4 ("Other professionals") would not be as interested in adopting such an application, they were actually very interested in using it. In fact, all users in this group reported that the application facilitated and optimized communications with various stakeholders, and specifically helped them get an answer to their questions more quickly, spend less time on hold on the phone, and become more efficient and productive. This last point was further underscored by the fact that 75% of respondents said that improving operational efficiency was instant messaging's most important benefit.

Overall, answers from the “Physicians” group pertaining to the application’s integration, user-friendliness and relevance were similar to those of respondents in the “Other professionals” group. Physicians quickly adopted and learned to use the application without any guidance, except the few tutorials suggested when they first connected to the application. Much like respondents in the “Other professionals” group, physicians reported that using the Reacts application facilitated communications with various stakeholders, thereby enabling them to get an answer to their questions faster (89%), spend less time on hold on the phone (100%) and become more efficient and productive (94%).

The fact that nearly all respondents reported that they were easily able to integrate the Reacts application into their work flow and were in favour of such an app becoming a permanent addition to their work process (98% of the “Other professionals” group and 100% of the “Physicians” group) underscores the enthusiasm toward and need for this type of application. These very positive results are even more compelling since the study was conducted in mid-summer, when rotations are at their longest and fewer employees are on hand, all of whom must deal with overloaded schedules, because of vacation leave. We now know that this application can be successfully integrated within a multidisciplinary team, despite its extensive variety of users (physicians, nurses, administrative agents, technologists, etc.).

The aforementioned results showed that healthcare teams were very interested in using a tool like Reacts, which facilitates communication and collaboration, and enables them to become more efficient and productive in their daily tasks. This user group’s quick adoption of the Reacts application shows that medical personnel are motivated to integrate and use such tools if they are simple and effective. Increased efficiency and productivity resulting from the various stakeholders’ use of a collaborative communication tool such as Reacts may directly contribute to improving the quality of care given to patients (faster decisions, shorter wait time until patient discharge, etc.). Moreover, greater operational efficiency could help reduce costs.

In terms of security, all users agreed that this application made their communications more secure. Providing tools that ensure that all communications between stakeholders are secure is of paramount importance. When such tools are unavailable, employees tend to use standard text messaging, personal email and unsecured storage platforms to convey personal information.

The Reacts application enabled users of the “Other professionals” group to directly communicate with any physician on his or her smartphone, without the need for his or her phone number or personal email address. This important feature enables the optimization of communications between the various stakeholders, while respecting their privacy, as most have no wish to share their cellphone number or personal email address.

It bears mentioning that while most medical personnel used Reacts on their workstation’s PC instead of a mobile device, 71% of respondents in this group said they would be interested in installing this application on their personal smartphone for use at work. Moreover, most physicians (88%) only planned to use the application’s mobile version, thereby highlighting the importance of providing physicians with simple tools they may use on their own devices.

Most communications between stakeholders occur asynchronously using secure instant messaging. This was confirmed by the fact that 59% of medical professionals reported they saw no need to use Reacts’ other features in their daily work. However, 41% of respondents in this group would still like to be able to use the videoconferencing (50%) and screen sharing (50%) features to review lab results and images remotely with the relevant stakeholder, thereby proving that even this group shows a definite need for a means enabling several forms of interactive communication beyond instant messaging. As for physicians, 89% of respondents said they would be interested in using Reacts’ other features in their daily activities (videoconferencing (56%), screen sharing (75%) to remotely review lab results and PACS images, and remote supervision tools (69%)). These results come as no surprise in the context of a multidisciplinary team comprising various types of professionals that constantly interact through diverse means to remain efficient and productive. Being able to do so at all times while remaining at one’s workstation is a key part of the process. Secure, remote resident supervision is yet another benefit of this type of communication tool.

Respondents using the application at hospital workstations, each using a wire connection to the Internet, reported no technical issues. The main issues were flagged by some physicians using the application's mobile version on their smartphones, and most of these pertained to intermittent lag when using said app. As the quality of the network's signal (Wi-Fi and cellular) has a significant impact on the application's overall performance, these intermittent lags and underperformance issues are likely due to a weak signal in some areas of the hospital. Continuously improving the application through updates tends to diminish its vulnerability in such circumstances. That being said, the hospital needs a stable Wi-Fi network with excellent coverage throughout its facilities to ensure optimal and reliable use of the various technologies and applications requiring an Internet connection. This underscores the fact that integrating a new application to optimize communication within the healthcare teams requires that it be adopted by all personnel, as well as close collaboration with the IT resource management team to ensure that the Internet's network and access quality (both Wi-Fi and wired) are optimal and provide extensive coverage.

It was therefore vital to assess not only the application's integration, relevance and usage among staff, but also the more technical aspect, as it pertains to the deployment and support of said application on hospital workstations. The CIUSSS' IT team found the Reacts application easy to install and support, requiring few interventions thereafter. Moreover, it was reported that the application did not interfere with the proper functioning of other software already installed on hospital computers. These findings are of particular importance, as any application integrated in a context where IT resources are limited must be easy to roll out and support.

In the current era of increasingly prevalent cyber attacks, health institutions must do everything in their power to ensure the security and privacy of any confidential information circulating between professionals. Integrating a secure instant messaging system, such as the Reacts application, meets an institutional, technical and regulatory need, as confirmed by the DIR team during the project. Moreover, both the IT and DIR teams reported that an application such as Reacts helps improve operational efficiency, provides more flexibility on the move, and is an effective healthcare coordination tool that complies with privacy standards.

The concerns raised by the DIR team regarding to integration of a collaborative platform like Reacts did not pertain to the secure instant messaging feature assessed as part of the project. Rather, said concerns pertained to a potentially greater bandwidth requirement for Reacts' additional features, such as videoconferencing, screen sharing and advanced video collaboration tools. While this is a valid concern in facilities with low bandwidth availability, it should not impede the expansion of these additional features, as the benefits more than make up for any inconvenience. At the personnel level, their ability to collaborate remotely reduces the need to move between facilities, thereby cutting down on healthcare costs, improving user satisfaction and, ultimately, improving care. As the Internet is currently one of the fastest-growing means of communication, healthcare institutions must support the increasingly prevalent need for these features by providing users with an adequate network infrastructure and bandwidth, so that they may effectively use this communication technology. Of course, this initiative would first require the implementation of institutional regulations, as well as the development, on the supplier's end, of options enabling hospital IT teams to control the use of the application's video features.

6 Study limitations

The project was conducted in a single department (i.e. cardiology and cardiac surgery), but featured a wide range of users. We therefore believe these results can be applied to other departments (pulmonology, internal medicine, nephrology, etc.), whose needs and users are very similar to those of the study group. While the response rate to the survey in the medical professionals group was just under 50%, we believe that the consistent and homogeneous results obtained reflect the opinion of the entire group.

7 Conclusions

Using the Reacts application as a secure instant messaging tool optimized communications between the various stakeholders within the Hôpital du Sacré-Cœur's cardiology department, with a marked improvement in efficiency and productivity. Participants mastered and used the application easily, and all of them adopted it quickly. Users easily integrated the instant messaging feature in their daily work flow, despite the range of professionals involved and the fact that the study occurred in the summer. The hospital's IT department found the application to be easy to roll out and support, which bodes well for any future large-scale deployments.

Participants and managers all acknowledged that using Reacts made communications more efficient, while complying with security, privacy and protection requirements regarding users' health information. In order to avoid performance issues when using the application's mobile version, a reliable Wi-Fi network with adequate coverage must be available.

In the years to come, healthcare teams will be increasingly exposed to transformative technology in an increasingly complex environment, even if their core role, namely taking care of their patients, remains unchanged. As a result, and to continue fulfilling their duties as efficiently and productively as possible, as well as optimize their work processes, healthcare institutions will need to provide them with the right tools and the technology they need.

Chart 1.**Types of users included in the pilot project**

- Administrative agents
- Echocardiography technicians
- Nurses
- Head nurses
- Assistant head nurses
- Research nurses
- Operating room nurses
- Medical electrophysiology technicians
- Cardiology program coordinator
- Pharmacists
- Physicians (cardiologists and cardiac surgeons)

Units in which users work

- Cardiology and cardiac surgerywards
- Echocardiography laboratory
- Coronary Care Unit
- Electrophysiology laboratory
- Interventional cardiology laboratory
- Operating room
- Research offices
- Outpatient clinic