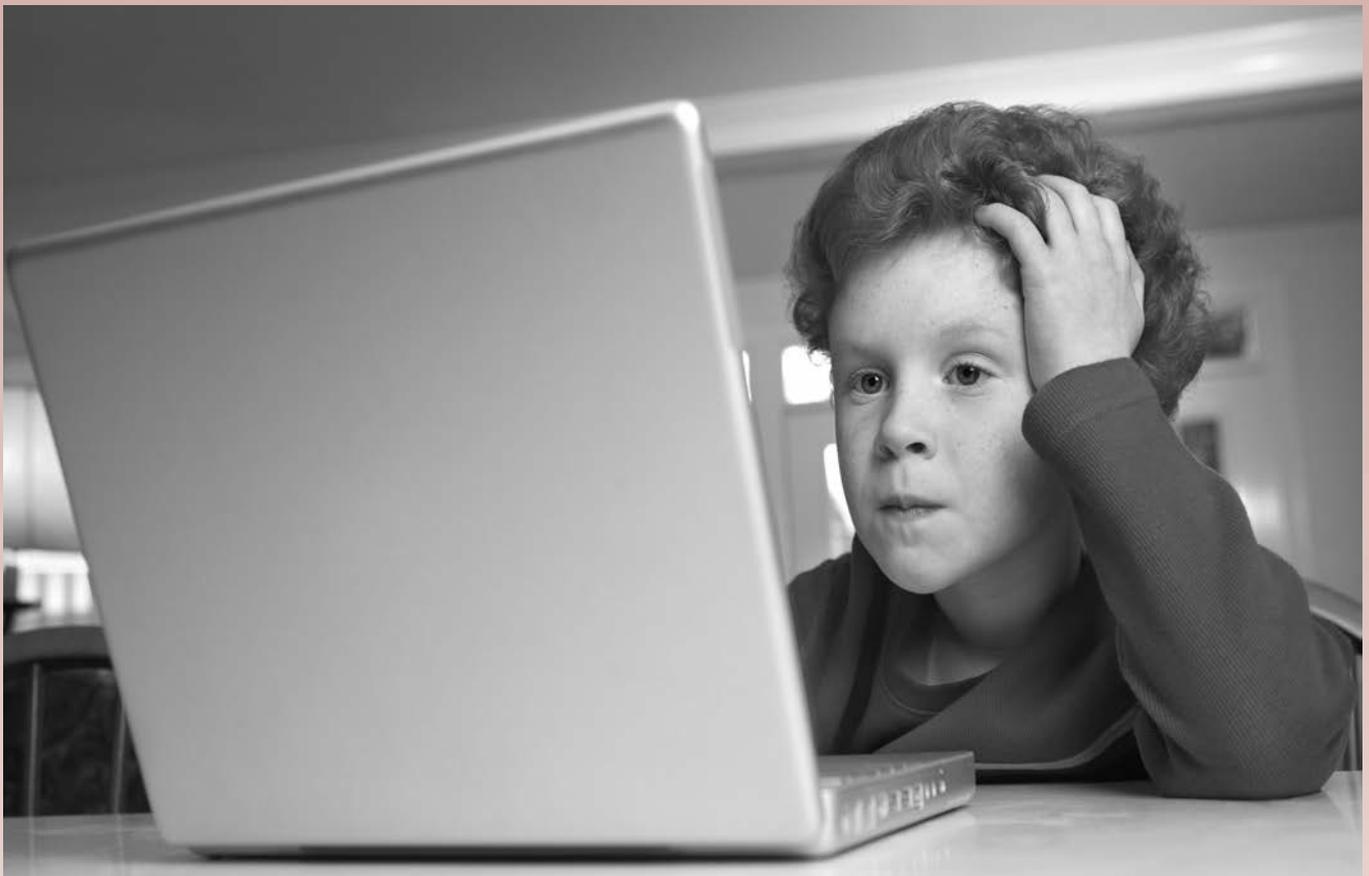


# Secure Messaging in a Pediatric Respiratory Medicine Setting



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*Final Report*

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# Secure Messaging in a Pediatric Respiratory Medicine Setting

**Prepared for:**

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None of the investigators has any affiliations or financial involvement that conflicts with the material presented in this report.

The study was performed in the Pediatric Pulmonary Medicine Clinic at Yale New Haven Children’s Hospital in New Haven, Connecticut, from September 2007—September 2009. The Kryptiq Secure-Messaging System™ referenced herein was the secure messaging system used by the clinic at that time. The authors do not endorse or support the use of any specific brand of secure messaging system. The study was undertaken for the sole purpose of evaluating the impact of a secure messaging system on care delivery.

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## Preface

This project was funded as an Accelerating Change and Transformation in Organizations and Networks (ACTION) task order contract. ACTION is a 5-year implementation model of field-based research that fosters public–private collaboration in rapid-cycle, applied studies. ACTION promotes innovation in health care delivery by accelerating the development, implementation, diffusion, and uptake of demand-driven and evidence-based products, tools, strategies, and findings. ACTION also develops and diffuses scientific evidence about what does and does not work to improve health care delivery systems. It provides an impressive cadre of delivery-affiliated researchers and sites with a means of testing the application and uptake of research knowledge. With a goal of turning research into practice, ACTION links many of the Nation's largest health care systems with its top health services researchers. For more information about this initiative, go to <http://www.ahrq.gov/research/action.htm>.

This project was one of seven task order contracts awarded under the *Improving Quality through Health IT: Testing the Feasibility and Assessing the Impact of Using Existing Health IT Infrastructure for Better Care Delivery* request for task order (RFTO). The goal of this RFTO was to fund projects that used implemented health IT system functionality to improve care delivery. Of particular interest were projects that demonstrated how health IT can be used to improve decision support, automate quality measurement, improve high-risk transitions across care settings, reduce error or harm, and support system and workflow design, new care models, team-based care, or patient-centered care.

# Study Aims

The specific aims of the study are as follows:

## **Aim 1**

To understand the content of what children, adolescents, and their parents will send to their health care provider as a secure message

## **Aim 2**

To evaluate the impact of secure messaging with regard to provider time spent, ED utilization for medication refills and qualitative satisfaction by the patients and clinicians

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# Executive Summary

Developing health information technology (health IT) techniques for communication with patients is essential in the coming years both to take advantage of the growing technologies as well as to increase the efficiency of communication with patients. Secure messaging is one such technology; however, the impact of secure messaging on the patient–provider dyad has not been fully evaluated. In particular, when these systems are implemented for children and adolescent patients, there are special issues of safety that need evaluation. The primary goal of this project was to further the state of knowledge about secure messaging between health care providers and children with chronic illness.

Electronic messaging between patients and providers (specifically e-mailing) has been recommended as an important part of patient-centered care.<sup>1-3</sup> Several studies have evaluated the use of e-mail between providers and patients and found that it is typically satisfactory to both, has not been abused by patients and has not been used inappropriately for urgent items.<sup>3-11</sup> Patients express a strong interest in using electronic communication<sup>12</sup> and 75 percent of Americans have Internet access from home, making it increasingly possible for patients to communicate electronically with clinicians.<sup>13</sup> Products that entail secure electronic messaging are now readily available and provide the advantage over standard e-mail of having a high degree of privacy protection.

Studies have not evaluated the use of e-mailing or secure messaging by children or adolescents with chronic diseases or their families. The setting of chronic disease provides a natural forum for discussion about such products since these families may need more frequent contact with their health care providers, need more frequent medication refills and may have close relationships with providers that encourage and support the use of novel communication modalities such as secure messaging.

As many adolescents are comfortable with text messaging and e-mail, we hypothesized that adolescent patients themselves might feel empowered to contact their providers using this medium. This potential shift to having the adolescents communicate with the providers presented two main hypotheses of interest to us:

1. Adolescents may be more prone to send a message that may be of an urgent nature because of their sense that messaging is “instant” as well as a possible feeling of more privacy. This issue presented the concern that adolescents in particular could send a secure message about information that is potentially urgent in nature such as a severe asthma exacerbation or suicidality. Such messages would need immediate attention.
2. Adolescents might be more apt to disclose questions about their care that they would not have otherwise brought up with the provider. By giving them a medium where they feel comfortable communicating, clinicians may actually be able to better meet the medical and psychosocial needs of adolescents and their families.

During the course of this study, we did the following:

- Implemented a secure messaging software system in the Pediatric Pulmonary Medicine Clinic at Yale New Haven Children’s Hospital, in New Haven, Connecticut.
- Implemented an electronic means to have the messages reviewed in real time using a mobile device.
- Evaluated the content of the messages.
- Evaluated the impact of the messaging on: provider time spent, emergency department (ED) utilization for medication refills, and qualitative satisfaction by the patients.

## **Study Goals and Aims**

Although e-mail may be an efficient clinician–patient communication tool, standard e-mail is not adequately secure to meet Health Information Portability and Accountability Act (HIPAA) guidelines. For this reason fire-wall secured electronic messaging systems have been developed for use in health care. The impact and usability of these secure systems have not been broadly assessed.

The overarching goal of our study was to implement and evaluate the impact of a secure messaging system, specifically Kryptiq Secure-Messaging System™, in the Yale New Haven Children’s Hospital, in New Haven, Connecticut. The specific study aims were as follows:

- Aim 1: To understand the content of what children, adolescents and their parents will send to their health care provider as a secure message. More specifically:
  - To catalogue information regarding the content of the messages that can be used to develop a triage system for the messages.
  - To conduct qualitative interviews with the patients and their families to assess their attitudes towards the messages.
- Aim 2: To evaluate the impact of secure messaging with regard to provider time spent, ED utilization from medication refills, and qualitative satisfaction by the patients and clinicians. More specifically:
  - To assess provider time spent, comparing the time spent on e-mails to patients and their families preintervention versus the time providers spent secure-messaging with patients and their families postintervention.
  - To assess ED utilization by patients of the clinic for medication refills pre- and postintervention.
  - To assess patient satisfaction by conducting qualitative interviews with them.
  - To garner feedback and assess clinician satisfaction with the process through qualitative interviews.

## **Study Methods**

The project was completed at the Pediatric Pulmonary Medicine Clinic at Yale New Haven Children’s Hospital, in New Haven, Connecticut. The clinic is a subspecialty clinic within a tertiary care hospital serving a diverse patient population. The clinic has approximately 2,300

encounters annually and provides care to 900 pediatric patients with chronic illnesses such as asthma, cystic fibrosis, broncho-pulmonary dysplasia, and sleep disorders. Approximately 66 percent of visits are for asthma patients. The clinic is staffed by: five attending pediatric pulmonologists, one nurse practitioner, three pediatric pulmonary fellows and two RNs. The Centricity EMR (GE) has been used for all documentation since 2004. The Kryptiq Secure-Messaging System™ was installed in the spring of 2009 to be used with the existing Centricity electronic medical record.

Study methods included—

- Preimplementation survey of patients regarding Internet use
- Tracking messages
- Open-ended qualitative interviews with 28 users and non-users to describe the impact of the system
- Description of the implementation process

Prior to enrollment of patients, we conducted a time-motion study of the clinic providers answering the numerous phone calls for scheduling, refills, and routine questions each day. This was done to compare to provider time utilization postimplementation to determine whether or not providing care (refills, answering questions, etc.) required similar or different amounts of provider time when conducted electronically.

To maximize generalizability purposeful sampling and interviewing to the point of thematic saturation were used. We achieved a representative subgroup of our overall patient population. The entire research team reached consensus that we had achieved thematic saturation after 21 individual interviews. Additionally, logs of phone notes were also reviewed and abstracted by the investigators of this study, parsing the reasons and topics of clinic contact into major categories with subcategories for reference in anticipation of doing the same with e-messaging content.

## Key Findings

During the first 6 months after implementation, 127 patients successfully completed enrollment in the system, but only five messages were sent by patients. Initially, it was unclear why there was not stronger interest in this new feature, as apparent enthusiasm for such a service was very strong prior to its installation and use at Yale-New Haven Hospital. The few users who initially used the system appeared to be newer patients/families to the practice. We conducted qualitative interviews to explore patient thoughts and possible reasons for not signing up, signing up and not using the system, and unforeseen barriers to its adoption. We also sought input from those users who had used it regarding their satisfaction with the system. We continued to enroll patients but decided to target new patients, as more established patients were more prone of resort to “tried and true” methods of communicating with the clinic.

While our decreased utilization and enrollment were quite disappointing, we felt this might, in fact, yield a great deal of useful information that can be capitalized on by others in the future. While a proportion of patients may have had barriers we anticipated (lack of access to computers, literacy, discomfort with new technology), we uncovered information about unpredicted barriers in our qualitative interviews.

While every indication was given that new technology was desired, patients appeared to prefer the more traditional methods of contact at this clinic. This clinic has a well-established and trusted nurse-managed telephone system that patients use to address questions and concerns such as triage of symptoms.

## **Limitations**

The limitations of this study are relegated to three areas: the number of sites included in the study, the use of a single secure messaging system and the number of patients who utilized the system during the study. Although our study was conducted in a single clinic in Connecticut that is focused on the care of patients with pulmonary diseases, the patient population reflected multiple dimensions of diversity. To maximize generalizability we used purposeful sampling and interviewing to the point of thematic saturation.

This study examines the use of one specific secure electronic messaging product; however, the focus was on the process of implementation and measurement of impact on patient care. The tools developed and lessons learned can be easily adapted and applied to other systems and outpatient settings.

## **Conclusions and Recommendations**

Although families had ready access to the Internet and expressed very strong interest in e-mailing, secure messaging was ultimately utilized only by a handful of patients because it was less convenient than phoning, too technically cumbersome, and lacked a personal touch.

For secure messaging systems to be used to improve communication with providers and be part of a patient-centric model of care, they must be integrated into more readily usable portals with messaging ability accompanied by content of interest to patients and their families.

## Introduction

The Institute of Medicine (IOM), in its report *Crossing the Quality Chasm*, articulates six specific aims for a 21<sup>st</sup> century health care system. Care should be safe, effective, efficient, equitable, timely and patient-centered. As part of patient-centered care, the IOM specifically includes e-mail exchanges between care providers and patients as an important ingredient in a modern health care system. In addition to the IOM, many other leading health care experts have echoed the importance of e-mail. Benefits include improved patient-physician communication, enhanced patient-centered care, reduced cost and continuous monitoring of clinical status, especially for patients with chronic conditions. Unique features of e-mail include its asynchronous nature, allowance for essentially continuous access to the health care system, full written record of communication with patients and the ability to embed written and Internet resources for additional medical information when addressing a medical question. The IOM has called for an increased use of nonvisit care in response to patients' needs. E-mail may be the most efficient venues for the provision of such care.

High quality patient-centric communication may be facilitated by use of e-mail. It has been found to improve the quality of care because it is a flexible patient access point and an effective form of asynchronous communication. However, traditional e-mail is not secure. Electronic messaging systems that are secure and HIPAA-compliant have been developed for use in health care settings; they confine content behind firewalls and can save messages directly to electronic medical records (EMR). The impact on quality communication and usability of these secure systems had not been broadly assessed.

Several studies have evaluated the use of e-mail between providers and patients and found that it is typically satisfactory to both, has not been abused by patients, and has not been used inappropriately for urgent items. Patients express a strong interest in using electronic communication, and 75 percent of Americans have Internet access from home—making it increasingly possible for patients to communicate electronically with clinicians. Products that entail secure electronic messaging are now readily available and provide the advantage over standard e-mail of having a high degree of privacy-protection.

Studies have not evaluated the use of e-mailing or secure messaging by children or adolescents with chronic diseases as well as their families. The setting of chronic disease provides a natural forum for discussion about such products since these families may need more frequent contact with their care-providers, need more frequent medication refills, and may have close relationships with their providers that encourage a communication genre such as secure messaging.

In particular, as many adolescents are comfortable with text messaging and e-mail, we hypothesized that adolescent-patients themselves may feel empowered to contact their providers using this medium. This potential shift to having the adolescents communicate with the providers presented two main hypotheses of interest to us. First, adolescents may be more prone to send a message that may be of an urgent nature because of the sense that messaging is “instant” as well as a possible feeling of more privacy. This issue presents the concern that adolescents in particular could send a secure message about information that is potentially urgent in nature such as a severe asthma exacerbation or suicidality. Such messages will need immediate attention. Second, adolescents may be more apt to disclose questions about their care that they would not have otherwise brought up with the provider. By giving them a medium where they feel

comfortable communicating, clinicians may actually be able to better meet the medical and psychosocial needs of adolescents and their families.

In this study we implemented a secure messaging software in the Yale University School of Medicine Pediatric Respiratory Medicine Clinic, implemented an electronic means to have the messages reviewed in real-time using a mobile device, evaluated the content of the messages, and evaluated the impact of the messaging on: provider-time spent, emergency department utilization for medication refills and qualitative satisfaction by the patients.

This project addressed a demand-driven, practical, applied topic of interest to the Yale New Haven Health System and the Yale University School of Medicine and provides outputs that are generalizable across a number of settings.

## **Getting Started**

The contract for this project was awarded in September of 2007. The IRB approval process was completed very efficiently; however, the OMB approval process for key tools needed to complete the study was protracted over a period of 10 months delaying the official start of the study.

## **The Setting**

This study was conducted at the Pediatric Pulmonary Medicine Clinic at Yale New Haven Children's Hospital, in New Haven, Connecticut. The clinic is run by physicians from the Yale University School of Medicine. The clinic has approximately 2300 encounters each year and provides care to 900 pediatric patients with chronic pulmonary illnesses, such as asthma, cystic fibrosis, bronchopulmonary dysplasia, and sleep apnea. The majority of clinic visits (2/3) are for patients with asthma. The clinic is staffed by five attending pediatric pulmonologists, one nurse practitioner, three pediatric pulmonary fellows and two registered nurses.

The unit staff was very engaged and supportive of the study. They initially expressed concerns about moving away from a well-established nurse managed telephone system to a secured messaging system. Their greatest concerns were related to workflow, fear of missing an important e-mail and potential misuse of the system by patients (i.e., using the system for emergencies). Staff concerns were addressed by actively involving them in the design of workflow for the secured messaging system and education of patients and their families in the appropriate use of the system.

## **Secure Messaging System**

The Centricity electronic medical record (EMR) has been used for all documentation in the clinic since 2004. The Kryptiq Secure-Messaging System™ was installed in the fall of 2008 to be used with the existing Centricity EMR. The system allowed electronic communication in a secure, encrypted, firewall-protected, HIPAA-compliant manner. By design the system requires patients to match key identifying information in order to successfully register and use the system. We had a special computer kiosk installed in the waiting room of the clinic to facilitate ease of introduction of patients to the system and onsite set-up of new accounts. Despite the challenges of engaging patients/families with time limitations related to restless children, length of medical visit and the associated tests or procedures the research assistant was successful in helping patients to set up accounts prior to leaving the clinic or to take instructions home to register.

## **Our Study Team**

Our study team was composed of an attending physician and a nurse practitioner who took care of patients in the clinic, a physician with a specialty in medical informatics and pediatrics, a physician with a specialty in performance improvement and pediatrics, a project manager and a

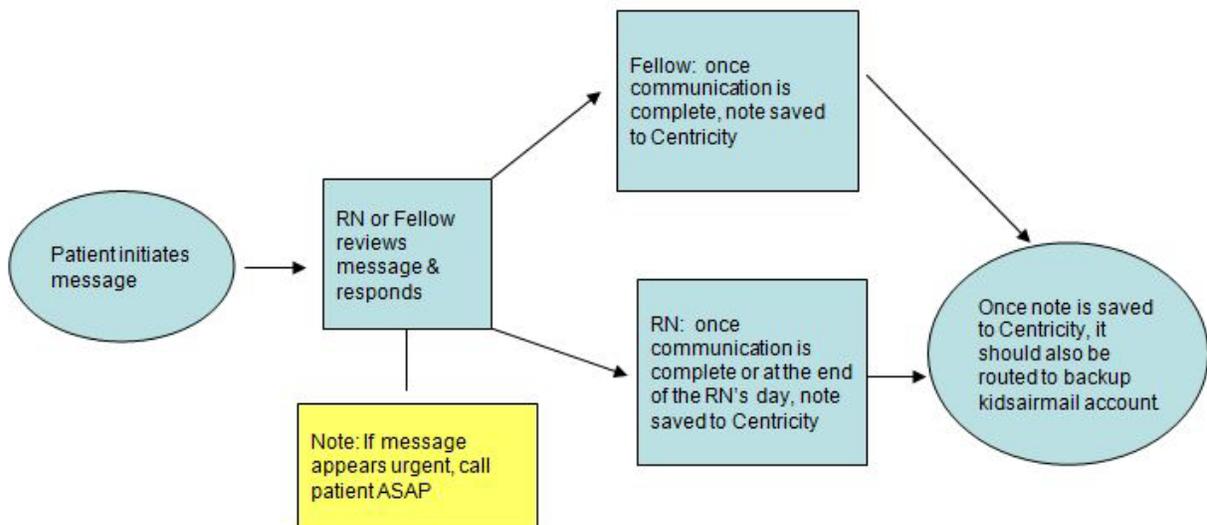
research assistant. The research assistant was strategically stationed in the clinic to allow her to assist patients/families in setting up new accounts and participating in interviews.

The study team adopted the moniker “Kids’ Airmail” (referencing e-mails from children with airway problems) as a fun way to identify the secure messaging system when communicating with children and their families. The patients and their families found this name easy to remember.

## The Process

We used the process diagrammed below to provide coverage for incoming secure messages 24 hours a day, 7 days a week.

Figure 1. Message maintenance



## Security Measures

Responses from patients participating in qualitative interviews was recorded and stored. After interview transcription from the recorded interviews, the results were stored on a study-specific folder on the Hospital Secure Server. AES-128 Encryption was applied to the folder containing the information and accessible only by the three primary investigators and two listed study personnel. Study data was not stored in unencrypted moveable media. Maintenance on a secure server (accessible only from within the Hospital network) in an encrypted folder obviated the need for moveable media. Wherever possible, patient information from the qualitative interviews was de-identified and stored as above on a Hospital Secure Server with AES-128 bit encryption. Very limited access to the secure server was given to project staff as outlined above (Dr. Hsiao, Dr. Bazy-Asaad, Dr. Benin, Project Manager Tina Tolomeo, MSN, APRN and

Research Assistant Diana Edmonds). The primary investigator reviewed access and use of data on a regular basis.

After completion and analysis of the study data, the data will be stored for 5 years on the secure, encrypted, server for referral and analysis. At conclusion of that period, with the aid of the Hospital Information Systems & Technology Security Officer, the data will be securely erased, likely using a zeroing tool. While AHRQ is funding this study and will be monitoring the progress of data collection, they will not have any access to study data and will not be given access to the secure servers.

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# Study Design and Analysis

The study design had four phases: (1) a preimplementation survey of patients regarding Internet usage (see Appendix F), (2) quantitative tracking of usage and content and analysis of messages, (3) qualitative assessment of attitudes toward and impact of the secure messaging system and (4) description of the implementation process.

## Phase 1: Preimplementation Survey of Patient Regarding Internet Use

Beginning December 1, 2008 through May 31, 2009 all patients attending the clinic on a designated day were invited to complete a survey about their Internet and clinic usage. A total of 144 patients/families were invited to participate in the survey: 127 agreed to participate and 72 declined. Of those that declined: 32 (44 percent) did not have easy access to the Internet, 17 (23.6 percent) did not have a computer, 16 (22 percent) were genuinely not interested in completing the survey, 4 (5.5 percent) did not use e-mail, and 3 (4.2 percent) did not have time to complete the survey.

Of those who completed the survey, 94 percent were parents or guardians and the remaining 6 percent were patients of the clinic who completed the survey themselves. The results of the survey are highlighted in Table 1 below.

**Table 1. Characteristics of participants in the preimplementation survey**

**Table 1a. Demographics**

Characteristics	% (n)
Black/African American	20(25)
Hispanic/Latino	13(17)
White	57(72)
Other (Asian, American Indian, Pacific Islander)	6(7)
Prefer not to answer	4(6)

**Table 1b. Annual Income**

Characteristics	% (n)
Less than \$20,000	9(11)
\$20,00-\$80,000	43(55)
More than \$80,000	27(34)
Prefer not to answer	21(27)

**Table 1c. Main underlying medical condition\***

Characteristics	% (n)
Asthma	77(98)
Bronchopulmonary Dysplasia	4(5)
Cystic Fibrosis	7(9)
Sleep Disorder	8(10)

**Table 1d. Access to internet**

Characteristics	% (n)
Any	100(127)
At home	98(124)
At school	80(102)

**Table 1e. Frequency of contacting clinic**

Characteristics	% (n)
Call > 1 time per month	11(14)
Call < 1 time per month	58(74)
Never call the clinic	31(39)

**Table 1f. Reasons for contacting clinic\***

Characteristics	% (n)
Appointments	46(58)
When patient was not feeling well	27(34)
Medication refills	15(19)
Finding out test results	10(13)
Updating clinicians on patient status	5(6)
Insurance authorization	3(4)

\*May choose more than 1.

Respondents also expressed a strong interest in using electronic communication for medication refill requests, insurance preauthorization, status updates and receipt of test results. One hundred percent were interested in contacting providers using the Internet and 98 percent of users have access to the Internet at home. Detailed results are listed in Table 2 below:

**Table 2. Preferred methods of contacting clinic preimplementation survey (n=127)**

	Refills % (n=123)	Insurance Authorization Issue (n=122)	Sick Call (n=124)	Status Update (n=124)	Test Results (n=125)
E-mail	54% (66)	57% (69)	24% (30)	66% (82)	55% (69)
Phone	34% (42)	34%(42)	68% (84)	27% (34)	39% (49)
In Person	9% (11)	7% (9)	7% (8)	5% (6)	4% (5)
Other	3% (4)	2% (2)	2% (2)	2 % (2)	2% (2)

## Phase 2: Quantitative Tracking of Use and Content Analysis of Messages

To quantify usage and understand the content of what children, adolescents and their parents would potentially send as a secure message we audited the secure messages and performed a content analysis on both phone calls and secure messages. Messages were saved on the secure messaging database and queried to generate reports of usage.

To understand why patients called the clinic prior to implementation of the secure messaging system, we obtained a list of all documented calls from the EMR between January 1, 2006 and December 31, 2007. We selected every 10<sup>th</sup> call and systematically analyzed the content of 100 calls. A total of 18 themes emerged from this review. We also prospectively analyzed all calls over a 3 day period and found an additional 14 themes.

We combined and categorized the themes into six major content themes and 18 subthemes as listed in Table 3 below. This taxonomy was consistent with themes reported in the published literature. To further verify the taxonomy we selected another 50 calls and had team members individually apply the themes to these calls. We then met as a group to verify the categorization and assess for thematic classification.

**Table 3. Taxonomy of telephone call content**

<b>Theme</b>	<b>Sub-theme</b>
Information/advice/ medical question	From patient/parent From provider
Medication Inquiry (non-acute)	Refill request Question
Sick Call	Sick update, New symptoms
Test Results	Patient/parent inquiry, Provider inquiry
Care Coordination	Home-care concerns School concerns/forms Referrals Section 504/housing/ environmental issues Department of Children and Families Supplemental Nutrition Program for Women, Infants and Children Durable medical equipment Peripherally inserted central catheter/intravenous line issues Insurance issues/ authorization Scheduling tests Scheduling appointments
Miscellaneous	Wrong number Internet down Not identified

### **Phase 3: Qualitative Assessment of Attitudes Toward and Impact of the Secure Messaging System**

Using purposeful sampling we conducted open-ended, qualitative interviews with 28 patients and their guardians to assess their attitudes toward electronic messaging. The interview used a standardized set of open-ended questions with probes to elicit detail. We reviewed clinician logs to identify which patients and family members used the messaging system during the 9-month postimplementation period.

Interviews were performed by a single interviewer who was not involved in the medical care of the patients. Interviews took place in the clinic and lasted for approximately 20 minutes. Seven interviews were conducted before implementation of the system. During these interviews the interviewer took field notes. The goal of the 7 preimplementation interviews was to inform the implementation process. An additional 21 interviews were conducted after implementation of the system and they were audiotaped and transcribed by an independent transcriptionist. Interviewees included those who had registered but never used the system, those who used the system and those who did not complete registration.

We used validated qualitative research techniques to analyze both transcribed and notated data. We coded the data in a series of iterative steps. During the coding process we revised and refined the code structure multiple times as we developed new insights and elicited new relationships. The coded data were entered into a software package that was designed to manage unstructured qualitative data. We enrolled participants in the interviews until we reached the point of thematic saturation (the point at which there was no additional data being elicited from additional interviews).

## **Phase 4: Description of the Implementation Process**

We reviewed our notes from the implementation process and our discussions with clinicians and participants to create an implementation guide. The guide has screen shots from the specific secure messaging product used at our institution but the process can be adapted for any secure messaging product (see Appendix J).

## Outcomes

### Qualitative Assessment of Attitudes Regarding Secure Messaging

Qualitative review of interview data revealed themes in 3 categories: barriers to adoption, promoters of adoption and other potential uses. Each of these themes is detailed in tables 4, 5, and 6.

**Table 4. Barriers to usage of secure e-messaging**

Barriers	Notes
Secure messaging is more impersonal	Secure e-mail lacks personal touch that voice/person on phone is able to convey. Not always sure who will receive/read message once sent
Security/privacy concerns	Worried someone other than their physician may have access to the messages or messages may be used inappropriately
Internet is not readily accessible	Lack of easy/convenient access to Internet. No computer at work or home Internet available but not in convenient room (such as child's bedroom). Phones are available everywhere
Effective pre-existing system	Pre-existing phone system highly functional and effective—answered immediately by clinic providers
Nonintuitive/ cumbersome system	Secure e-mail lacks ease of use :hard to enroll, log on and use (another log-in and password to remember, requires specific browser) Secure e-mail has a lag time response. It is asynchronous unlike phone conversations
Lack of knowledge (system and computers)	Just using computers- system and typing are a challenge. Electronic communication is too novel
Forgetfulness: application too narrowly focused	Offered ability to communicate only with one group of providers Not full patient portal (missing real-time results review, chart content review, appointment calendar, etc), as a result it is easily forgotten as an option
Forgetfulness: application too novel	Option to securely e-message forgotten by the majority of patients because new and not yet mainstream Lost directions to sign-up/register/use

**Table 5. Promoters of secure e-messaging**

Promoters	Notes
Efficient and fast means of communication	Avoid phone queues and being put on hold by allowing messages to be sent right away for routine tasks
Written record of exchange	Parents and patients like having a hard copy that they can print out and refer to Record of messages in electronic discussion viewable by physician at subsequent visits improves clinician information access
Modality gives time to formulate thoughts and questions	Asynchronous aspect of secure messaging can be an advantage : do not feel rushed as on phone, can compose thoughts Good for follow-up and forgotten questions or it time had run out during the visit

**Table 6. Potential uses for secure e-messaging**

Efficient data source	Conduit for reminders, reiterate important instructions (e.g., asthma plan, follow-up directions)
Suited for routine simple tasks	Suggested by patients for refills, appointment checks and test results
Useful as an adjunct to the provider encounter	To reiterate important part of encounter (e.g., office could e-mail out an asthma action plan or reminder for follow-up)
Part of a patient portal	May be most useful when coupled in a portal rather than a stand-alone system that offers little other value Patients and families note they might remember to use system more if there were more content (e.g., educational materials, other providers on same system or personal health record capabilities)

## Key Findings and Limitations

During the first 6 months after implementation, 127 patients successfully completed enrollment in the system, but only five messages were sent by patients. Initially, it was unclear why there was not stronger interest in this new feature, as apparent enthusiasm for such a service was very strong prior to its installation and use at Yale-New Haven Hospital. The few users who initially used the system appeared to be newer patients/families to the practice. We conducted qualitative interviews to explore patient thoughts and possible reasons for not signing up, signing up and not using the system, or unforeseen barriers to its adoption. We also sought input from those users who had used it and their satisfaction with the system. We continued to enroll patients, but decided to target new patients, as more established patients were more prone of resort to “tried and true” methods of communicating with the clinic.

While our decreased utilization and enrollment was quite disappointing, we felt this may, in fact, yield a great deal of useful information that can be capitalized on by others in the future. While a proportion of patients may have had barriers we anticipated (lack of access to computers, literacy, discomfort with new technology), we uncovered information about unpredicted barriers in our qualitative interviews.

While every indication was given that new technology was desired, patients appeared to prefer the more traditional methods of contact at this clinic. This clinic has a well-established and trusted nurse managed telephone system that patients use to address questions and concerns as triage of symptoms

The limitations of this study are relegated to three areas: the number of sites included in the study, the use of a single secure messaging system, and the number of patients who utilized the system during the study. Although our study was conducted in a single clinic in Connecticut that is focused on the care of patients with pulmonary diseases, the patient population reflected multiple dimensions of diversity. To maximize generalizability we used purposeful sampling and interviewing to the point of thematic saturation.

This study examines the use of one specific secure electronic messaging product; however, the focus was on the process of implementation and measurement of impact on patient care. The tools developed and lessons learned can be easily adapted and applied other systems and outpatient settings.

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## Conclusions

Although families had ready access to the Internet and expressed very strong interest in e-mailing, secure messaging was ultimately utilized only by a handful of patients because it was less convenient than phoning, too technically cumbersome and lacked a personal touch.

For these secure messaging systems to be used to improve communication with providers and be part of a patient-centric model of care, they must be integrated into more readily usable portals with messaging ability accompanied by content of interest to patients and their families.

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## **Recommendations for Future Research**

We recommend this study be repeated within an adolescent clinic or another clinical setting where adolescents are more likely to be more actively involved in the patient–provider relationship. We would expect a substantially increased usage of the system over what we saw in the Pediatric Pulmonary Medicine Clinic at Yale New Haven Children’s Hospital.

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# Appendix A: Study Information Sheet

## INFORMATION AND INVITATION TO JOIN US IN STUDYING OUR NEW MESSAGING SYSTEM!

### YALE UNIVERSITY SCHOOL OF MEDICINE–YALE-NEW HAVEN HOSPITAL

(Patient/Guardian)

**Project Title:** Secure Messaging in a Pediatric Respiratory Medicine Setting

**Principal Investigators:** Alia Bazy-Asaad, MD, Andrea Benin, MD, & Allen Hsiao, MD

**Funding Source:** U.S. Agency for Healthcare Research and Quality

As you may have heard already, we are excited to be installing and using a new electronic messaging system in our Pediatric Respiratory Medicine Clinic! Among the many new things and services we can offer with it, we can now communicate safely and effectively with our patients and their families by e-mail! All patients and their families are eligible to use this system, and to use it as much or little as you would like. There is no cost to use this service!

We would like to invite you and your child to join us in studying how well this system works. If you agree, we would ask you complete a short survey before you use the system, and then again after you have signed up and had the opportunity to use it. That's it! There is no pressure to join us; you can absolutely use our new messaging system as much or as little as you want, whether or not you decide to be part of the study.

If you decide to join the study, your opinion and thoughts through completion of a brief survey will be very valuable in determining how helpful the system is. For instance, your opinions may determine how widely this system is used in other clinics. As with any study, it is important you know what the risks and benefits are to make an informed judgment. The only potential risk would be accidental disclosure of information about the care you receive. For this reason, your name and the name of your child and other identifiers will be removed from any survey results you agree to provide, and the surveys will be analyzed anonymously.

There are no costs to you for being part of this study, nor will you receive any money. Your thoughts are very helpful to us however, and we would be very grateful! Remember, you are free to choose not to participate and if you agree to take part but change your mind, you can do so at *any* time, just let any of our staff or your health care provider know. Completing the survey will serve as your permission to participate.

Please feel free to ask about *anything* you don't understand and to consider this research and the consent form carefully—as long as you feel is necessary—before you make a decision. *If you have further questions about this project or if you have a research-related problem, you may contact the Principal Investigator, Dr. Allen Hsiao 203-688-7970.*

THIS FORM IS NOT VALID UNLESS THE FOLLOWING BOX HAS BEEN COMPLETED IN THE HIC OFFICE

THIS FORM IS VALID ONLY UNTIL: _____ HIC PROTOCOL #: _____ INITIALED: _____
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# Appendix B: Consent (Parent/Guardian)

## CONSENT FOR PARTICIPATION IN A RESEARCH PROJECT

### YALE UNIVERSITY SCHOOL OF MEDICINE–YALE-NEW HAVEN HOSPITAL

(Patient/Guardian)

**Study Title:** Secure Messaging in a Pediatric Respiratory Medicine Setting

**Principal Investigators:** Alia Bazy-Asaad, MD, Andrea Benin, MD, & Allen Hsiao, MD

**Funding Source:** U.S. Agency for Healthcare Research and Quality

### Invitation to Participate and Description of Project

You are invited to participate in an interview as part of a research study designed to see if secure health messaging (a type of electronic communication similar to e-mail) is a useful and well-received tool in the care of children with chronic disease. You are part of a small group that has been chosen to participate. Your opinions and thoughts are very important to us because you currently receive care at the Yale Pediatric Respiratory Medicine Clinic.

In order to decide whether or not you wish to be a part of this research study you should know enough about its risks and benefits to make an informed judgment. This consent form gives you detailed information about the research study, which a member of the research team will discuss with you. This discussion should go over all aspects of this research: its purpose, the procedures that will be performed, any risks of participation, possible benefits, and possible alternative treatments. Once you understand the study, you will be asked if you wish to participate; if so, you will be asked to sign this form.

### Description of Procedures

If you agree to participate in this study, we will invite you to meet with two of our staff to discuss your thoughts and opinions about the system. Your responses will be anonymous and pooled with the responses of other patients to allow us to evaluate satisfaction with this system as part of our research reports. Information we are interested in includes the ease with which you were able to contact a clinic staff member or health care provider, and your satisfaction with the different forms of communication. Of course, specific information that would identify you or your child will be removed prior to preparation of any research report.

### Risks and Inconveniences

The major risk would be unintentional disclosure of information about the care you provide. We plan to remove your name and other identifiers from all materials used for our analysis and reporting and substitute a unique study identifier. The key that would allow someone to identify you using this identifier will be kept locked in Dr. Hsiao's office.

### Benefits

It is difficult to predict, but it is possible you may benefit directly from participating in this study as a result of improved or more efficient workflow as secure messages will be

automatically logged into each patient's Centricity electronic medical record. This may save some time and effort, but may not be very significant. The quality improvement effort will likely lead to improvements in the documentation of care you receive and potentially will lead to health improvements for your patients with chronic respiratory diseases.

## **Economic Considerations**

We anticipate no economic costs to you occurring as a result of this study.

## **Confidentiality**

Any identifiable information that is obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by U.S. or State law. Examples of information that we are legally required to disclose include abuse of a child or elderly person, or certain reportable diseases. When the results of the research are published or discussed in conferences, no information will be included that would reveal your identity unless your specific consent for this activity is obtained.

Representatives from the Yale Human Investigation Committee may inspect study records during internal auditing procedures. However, these individuals are required to keep all information confidential.

The data we collect will be destroyed after analysis and publication of the data + 3 years. In the event that a publication does not result from this research, the data will be destroyed 5 years after its collection.

## **Voluntary Participation and Withdrawal**

You are free to choose not to participate and if you do become a subject you are free to withdraw from this study at any time during its course. If you choose not to participate or if you withdraw it will not harm your relationship with faculty or with Yale-New Haven hospital.

The researchers may withdraw you from participating in the research if necessary.

## **Questions**

Please feel free to ask about anything you don't understand and to consider this research and the consent form carefully—as long as you feel is necessary—before you make a decision.



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# **Appendix C: Patient Assent**

## **Patient Assent for Being in a Research Study**

### **Yale-New Haven Hospital/Yale University School of Medicine**

(12-17years)

### **Title: Computer Messaging for Children with Lung Problems**

#### **Why am I here?**

We are asking you to take part in a research study because we are trying to learn more about how well computer messaging works for children and their families to talk to doctors and nurses. We are inviting you to be in the study because you are a patient in our clinic and this is something the doctors and nurses here are interested in studying.

#### **Why are they doing this study?**

We think computer messaging will be an easy way for you and your family to talk with the doctors and nurses at this clinic. However, no one has studied this well to see if it really is a helpful way of talking.

#### **What will happen to me?**

If you and your family agree to join this study, we will ask for an e-mail address for your family and study how often computer messaging is used by all of you. We will meet with you and your family after several months to ask what you all liked or did not like about the system.

#### **Will the study hurt?**

Not at all! We just ask for a little your time to tell us what is good or bad about computer messaging.

#### **Will the study help me?**

If your family/parents/guardians find it an easy way to talk/communicate with the doctors and nurses, it may help them do so. It probably won't change things for you a lot, however.

#### **What if I have any questions?**

You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call Dr. Allen Hsiao (203-688-7303) or ask me next time. As always, you may call the Respiratory Medicine clinic at any time to ask questions about your disease or treatment.

#### **Do my parents know about this?**

This study was explained to your parents and they said that you could be in it. You can talk this over with them before you decide.

**Do I have to be in the study?**

You do not have to be in the study. No one will be upset if you don't want to do this and there will be no change in the care you receive here or the ways you and your family can communicate with the doctors and nurses here. . If you don't want to be in this study, you just have to tell them. You can say yes now and change your mind later. It's up to you.

Writing your name on this page means that that you agree to be in the study and know what will happen to you. If you decide to quit the study all you have to do is tell the person in charge.

\_\_\_\_\_  
Signature of Child

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date

**THIS FORM IS NOT VALID UNLESS THE FOLLOWING BOX HAS BEEN COMPLETED  
IN THE HIC OFFICE**

<p>This form is valid from _____ until _____ (date) HIC PROTOCOL No. _____ Initialed _____</p>
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# Appendix D: Research Authorization

## YALE UNIVERSITY RESEARCH AUTHORIZATION

Subject Name:                      Medical Record #:              IRB #:

Principal Investigator: Allen Hsiao, MD

Principal Investigator's Contact Information: 840 Howard Avenue, New Haven CT, 203-688-7303

To the Subject:

The health-related information that we gather about you and your child in this study is personal. The Yale School of Medicine and the Yale New Haven Hospital researchers are required by law to protect the privacy of the information known as protected health information or PHI. All reasonable efforts will be made to protect the confidentiality of your and your child's PHI, which may be shared with others to support this research, to conduct public health reporting, and to comply with the law as required. Despite these protections, there is a possibility that information about you and your child could be used or disclosed in a way that it will no longer be protected by Federal law. For example, some of the individuals listed on page 2 of this form may not be required by law to meet HIPAA standards for privacy of health information. These individuals or companies are nonetheless required through other agreements with Yale to keep your information confidential.

In this form, we describe who will be working with this information and ask for your permission to use the information in the research study.

Please read this form carefully. If you have any questions, please ask the Principal Investigator listed above before signing this form.

By signing this form, you give permission for the researchers to use and/or disclosure the information as described below, for this research study. The reason for the uses and disclosures is to examine how useful Computer Secure Messaging is for families to communicate with their health care providers.

You have a right to refuse to sign this form. Your (your child's) health care outside the study, the payment for your (your child's) health care, and your (your child's) health care benefits will not be affected if you do not sign this form.

If you sign this form, you may change your mind at any time, but the researchers may still use the information collected before you changed your mind in order to complete the research.

This form will never expire unless and until you change your mind and retract it. To retract the permission to use your information, please write to Allen Hsiao, MD.

You have a right to receive a copy of this form after you have signed it. If after you have signed this form you have any questions about your rights, please contact the Yale Privacy Officer at 203/436-3650.

## Use and Disclosure Covered by this Authorization

### 1. Who will disclose, receive, and/or use the information?

The following person(s), class(es) of persons, and/or organization(s) may share, use, and receive the information listed below in connection with this Study. These persons are authorized to use and disclose the information to the other parties on this list, to you or your personal representative, or as permitted by law.

[Check appropriate boxes and add requested information on names/classes of recipients of PHI. Delete all boxes and categories that do not apply. Note that when the specific individual may change over the course of the project it is preferable to list their class as opposed to specific names. For example reference the “research coordinator” as opposed to the name of the current individual performing that role.]

- The following health care facilities or research site(s) and research staff involved in this study: Yale University School of Medicine and Yale-New Haven Hospital
- Health care providers at Yale Pediatric Respiratory Medicine Clinic who provide services to you in connection with this study
- The members and staff of the Human Investigation Committee that approved this study
- Principal Investigators: Alia Bazy-Asaad MD, Andrea Benin MD, & Allen Hsiao MD
- Additional members of the Research Team
- Agency of Healthcare Quality and Research (sponsors of the study)

### 2. What personal health information will be used or disclosed?

The following information about you may be used and disclosed: Your (your child’s) responses to the interview questions, medical history, and relevant history of contacting health care providers may be used as part of the study, but strictly confidential.

[Check appropriate box and provide description of PHI, Delete all boxes and categories that do not apply]

- Research study records
- Medical and laboratory records of only those services provided in connection with this Study
- The following information: Your (your child’s) responses to interview questions during focus groups or one on one interview sessions.

Signature

I have read this form and all of my questions about this form have been answered. By signing below, I authorize the described uses and disclosures of information.

\_\_\_\_\_  
Signature of Subject or Personal Representative

\_\_\_\_\_  
Print Name of Subject or Personal Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Description of Personal Representative’s Authority

**Contact Information**

The contact information of the subject or personal representative who signed this form should be filled in below.

Address:

Telephone:

\_\_\_\_\_  
(daytime)  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (evening)

\_\_\_\_\_  
E-mail Address (optional):  
\_\_\_\_\_

**THE SUBJECT OR HIS OR HER PERSONAL REPRESENTATIVE MUST BE PROVIDED WITH A COPY OF THIS FORM AFTER IT HAS BEEN SIGNED**

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# **Appendix E: Outside Individuals Consulted for the Project**

## **Outside individuals consulted on the project:**

Raymond Seligson, MD, JD  
Pediatric Physician  
Yale-New Haven Hospital  
Member, Yale University School of Medicine Human Investigation Committee (HIC-1)  
(203)-488-8345

Steven Bartolotta  
Manager, Information Systems Security  
Yale-New Haven Hospital  
(203)-688-2425

Paula Burns  
Manager, MIS Corporate Systems, Yale- New Haven Hospital  
(203)-688-8844

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# Appendix F: Demographic Survey

## Demographic Survey

1. Race
  - a. American Indian or Alaskan Native
  - b. Asian
  - c. Black or African American
  - d. Hispanic
  - e. Native Hawaiian or Other Pacific Islander
  - f. White
  - g. Prefer not to answer
2. Yearly household income
  - a. <\$20,000
  - b. \$20,000-\$40,000
  - c. \$40,000-\$60,000
  - d. \$60,000-\$80,000
  - e. >\$80,000
  - f. Prefer not to answer
3. Medical condition treated for in the Pediatric Respiratory Medicine Clinic (circle all that apply)
  - a. Asthma
  - b. BPD
  - c. CF
  - d. Sleep Disorder
  - e. Other:\_\_\_\_\_
4. Do you have access to the Internet?
  - a. Yes
  - b. No
5. If yes, where do you have access (circle all that apply)?
  - a. Home
  - b. Personal digital assistant (ex. Blackberry)
  - c. School
  - d. Work
  - e. Other:\_\_\_\_\_
6. How often do you currently **call** the Pediatric Respiratory Medicine Office (nurse or doctor)?
  - a. Never
  - b. Less than once a month
  - c. 1-3 times a month
  - d. 1-2 times a week
  - e. Greater than twice a week

7. Who is the one calling the Pediatric Respiratory Medicine Office (nurse or doctor)?
  - a. Both parent/guardian and child
  - b. Child
  - c. Parent/Guardian
8. Place the following list in order from the most common reason you call the Pediatric Respiratory Medicine Office (nurse or doctor) to the least common reason you call.
  - a. Appointment issue \_\_\_\_\_
  - b. Medication Refill \_\_\_\_\_
  - c. Not feeling well \_\_\_\_\_
  - d. Prior authorization/insurance issue \_\_\_\_\_
  - e. To find out test results \_\_\_\_\_
  - f. To give an update on how you are feeling \_\_\_\_\_
9. How would you prefer to contact the Pediatric Respiratory Medicine Office (nurse or doctor) for the following reasons:
  - a. Medication Refill
    - i. E-mail
    - ii. In person
    - iii. Telephone
    - iv. Other \_\_\_\_\_
  - b. Prior authorization/insurance issue
    - i. E-mail
    - ii. In person
    - iii. Telephone
    - iv. Other \_\_\_\_\_
  - c. Not feeling well
    - i. E-mail
    - ii. In person
    - iii. Telephone
    - iv. Other \_\_\_\_\_
  - d. To give an update on how you are feeling
    - i. E-mail
    - ii. In person
    - iii. Telephone
    - iv. Other \_\_\_\_\_
  - e. To find out test results
    - i. E-mail
    - ii. In person
    - iii. Telephone
    - iv. Other \_\_\_\_\_

f. Appointment issue

- i. E-mail
- ii. In person
- iii. Telephone
- iv. Other \_\_\_\_\_

By completing this survey, I am consenting to be a part of the study that was explained to me and was described in the *Secure Health Messaging for Pediatric Patients* information sheet.

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# Appendix G: Patient/Family Welcome to E-messaging Fact Sheet

YALE UNIVERSITY  
SCHOOL OF MEDICINE  
DEPARTMENT OF PEDIATRICS  
SECTION OF RESPIRATORY MEDICINE  
333 CEDAR STREET  
P.O. BOX 208064  
NEW HAVEN, CONNECTICUT 06520-8064  
(203) 785-2480  
(203) 785-6337 FAX

DEPARTMENT OF PEDIATRICS  
Alia R. Bazy-Asaad, M.D.  
*Section Chief*  
Sumit Bhargava, M.D.  
David F. Donnelly, Ph.D.  
Marie E. Egan, M.D.  
Americo Esquibies, M.D.  
Pnina Weiss, M.D.  
Ying Xia, M.D., Ph.D.

Tina Tolomeo, MSN, APRN, AE-C  
*Nurse Coordinators*  
Jane Young, ASN, RN  
Patty Goncalves, APRN  
(203) 785-5852  
Pediatric Sleep Lab  
(203) 688-1240  
Pediatric PFT Lab  
(203) 688-4667

## Welcome to E-messaging

Dear Patients/Families,

We would like to make you aware of a new way for you to communicate with us. E-messaging is a way for you to send us *confidential* e-mails about things that are *not urgent*. You can send us *confidential e-mails* from home, school, work, the library or the new computer we have in our clinic waiting room. We will still be available by telephone if you want to call us.

## Important Things To Know Before Sending Us an E-Message

(It may help to keep this list as a reminder of things you can and cannot e-mail us about)

1. DO NOT send us an e-mail about things that are URGENT. For urgent matters, call 203-785-2480.
2. DO NOT e-mail us to schedule an appointment. For appointments call 203-785-4081.
3. Messages sent using e-messaging at night between the hours of 8 pm and 8 am will not be answered until after 8 am in the morning. To reach our office between 8 pm and 8 am, please call 203-785-2480.
4. You can use e-messaging to ask for refills. Our refill policy will not change, requests for refills after 4 pm or during weekend hours will not be filled until business hours (8:30 am–4:00 pm) on Tuesdays, Wednesdays and Thursdays.
5. You can use e-messaging to request forms or for general advice.
6. All messages must be typed in English.

You can start using E-messaging now. Follow the attached directions to get started. If you have any questions concerning accessing the secure messaging site, please call the help desk at 203-688-HELP (4357) and mention Secure Messaging.

Sincerely,  
The Yale Pediatric Respiratory Medicine Service

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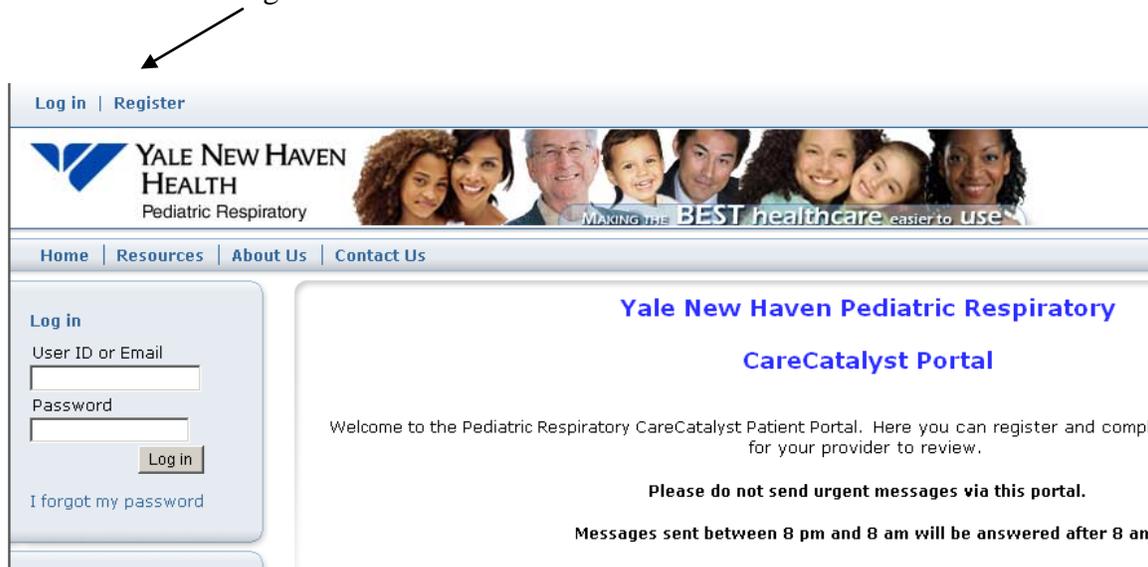
# Appendix H: Secure Messaging Instruction Sheet

## Yale New Haven Hospital (YNHH) Care Catalyst and Secure Messaging

Instructions for those followed by the Yale School of Medicine Pediatric Respiratory Medicine Service

Accessing YNHH Care Catalyst Site for Yale Pediatric Respiratory Medicine Registration

1. Type <http://kidsairmail.com> in your Internet address bar.
2. Click on Register



The screenshot shows the top portion of the Yale New Haven Pediatric Respiratory CareCatalyst Portal website. At the top left, there are links for "Log in" and "Register". Below this is the Yale New Haven Health logo and a banner image of a diverse group of people with the text "MAKING THE BEST healthcare easier to use". A navigation bar contains links for "Home", "Resources", "About Us", and "Contact Us". On the left side, there is a "Log in" section with input fields for "User ID or Email" and "Password", a "Log in" button, and a link for "I forgot my password". The main content area on the right features the heading "Yale New Haven Pediatric Respiratory CareCatalyst Portal" and a welcome message: "Welcome to the Pediatric Respiratory CareCatalyst Patient Portal. Here you can register and complete your registration for your provider to review." Below this, there is a notice: "Please do not send urgent messages via this portal. Messages sent between 8 pm and 8 am will be answered after 8 am".

### 3. Read and Accept the Website Terms



### 4. Create your account by completing the online form

The screenshot shows the "Create a New Account" form. At the top, there is a navigation menu with "Home", "Forms", "Resources", "About Us", and "Contact". The main heading is "Create a New Account". Below this, there is a paragraph: "In order to make full use of our online services, you will become a new patient. Please use the form below to create your account. Or". A sub-heading "Account Information" is highlighted in a blue box. The form contains the following fields:

- User ID:** Must be 5 to 256 characters, only letters, number. Below this is an input field. An arrow points from a callout box to this field.
- Email address:** Below this is an input field.
- Alternate Notification Email:** New message notifications. Below this is a checkbox and an input field.

At the bottom right of the form, there is a "Save" button. A callout box on the right side of the form contains the text: "Use your e-mail address as your user ID".

### 5. Click Save at the bottom of the page once you have completed all the fields

6. You need to go through a patient verification step next. To do this, select “I have an appointment or have been seen here by a physician before” and Click on “Next->”

**YALE NEW HAVEN HEALTH**  
Pediatric Respiratory

Home | Forms | Resources | About Us | Contact Us

Links  
Back to Main

### Patient Verification

You have successfully created a new website account. You are now logged in.

In order to access restricted parts of the website, you will need to provide us some additional information so that we can verify your identity.

Please answer the following question:

I have an appointment or have been seen here by a physician before.

Please take me back to the homepage.

If you don't want to verify your identity right now, you can return to this page by clicking the "Verify My Identity" link near the top of the screen, or by visiting a page that contains restricted content.

Next >

7. Complete the Patient Verification fields and click on Verify. (Your clinic will provide you with your 12 digit Medical Record Number).

### Personal Identification Information

First Name

Last Name

Birth date  (MM/DD/YYYY)

Gender

Medical Record Number

8. Once you complete the patient verification, you will get a message stating enrollment is complete.

**YALE NEW HAVEN HEALTH**  
Pediatric Respiratory

Home | Forms | Resources | About Us | Contact Us

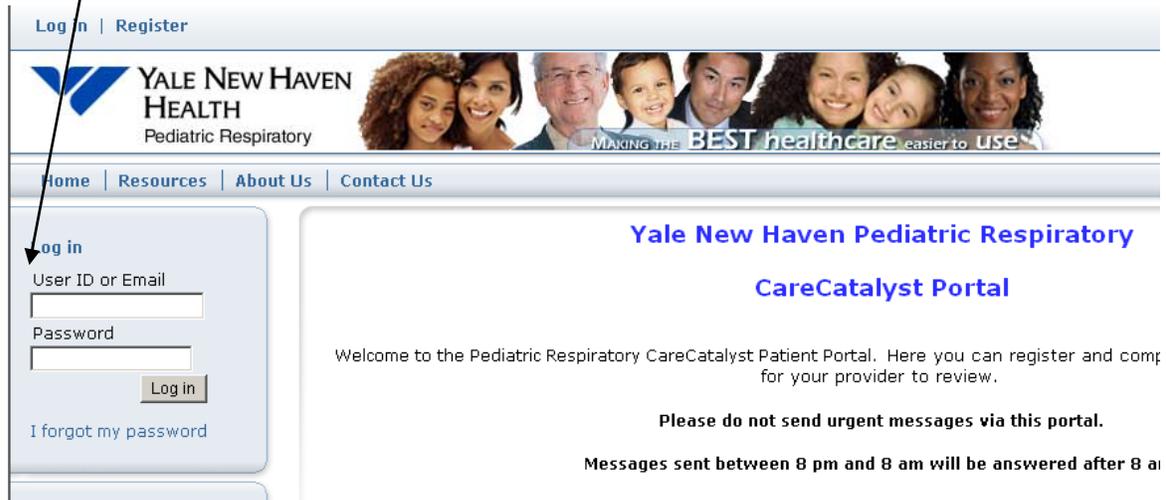
### Patient Enrollment Complete

We have successfully verified your identity.

Home | Forms | Resources | About Us | Contact Us

## Accessing YNHH Secure Messaging to send a message to or read a message from the Yale Pediatric Respiratory Medicine Service

1. Type <http://kidsairmail.com> in your Internet address bar.
2. Log in



Log in | Register

**YALE NEW HAVEN HEALTH**  
Pediatric Respiratory

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**Log in**

User ID or Email

Password

[I forgot my password](#)

**Yale New Haven Pediatric Respiratory  
CareCatalyst Portal**

Welcome to the Pediatric Respiratory CareCatalyst Patient Portal. Here you can register and complete your profile for your provider to review.

**Please do not send urgent messages via this portal.**

Messages sent between 8 pm and 8 am will be answered after 8 am.

3. After verifying your identification, you will have access to Secure Messaging. To send messages to your health care provider, click on View my Inbox

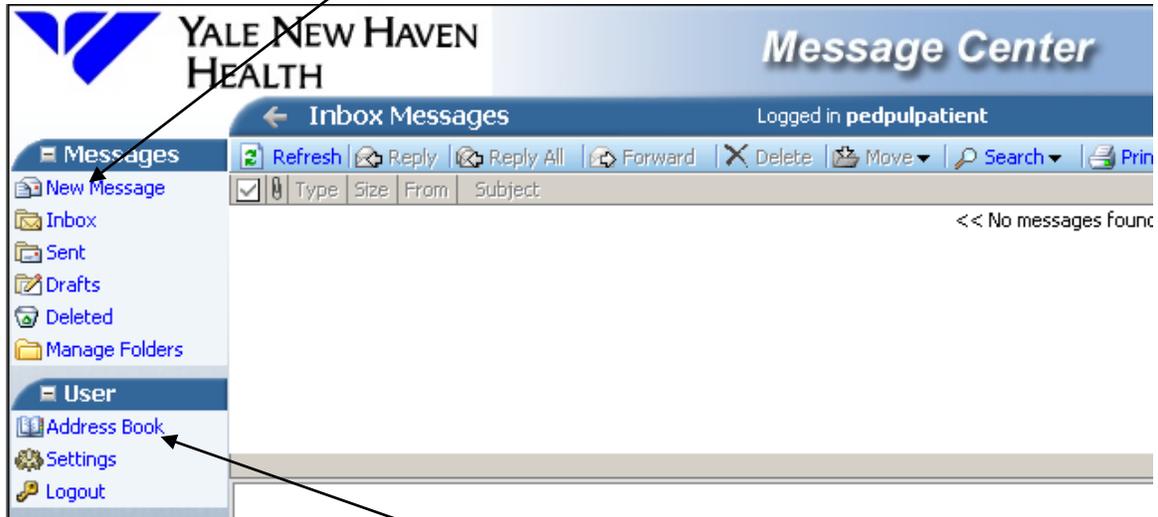


**New Secure Messages**

There are currently no messages in your inbox.

[View My Inbox](#)

4. This works just like e-mail, so click on New Message and type in the e-mail address (yalerespiratory@kidsairmail.com). Complete your message and click on send.



To save this e-mail address, click on Address Book. Complete the contact information as indicated below. Select Add to List, click Quick List, click on Save.

Save		Add To List	Close
Note: you are adding this contact to your personal contacts.			
Name (First):	Yale	(Last):	Respiratory
Email:	yalerespiratory@kidsairmail.com		
MRN/ID:			
Description:			

The Yale Respiratory Address will now be available from the new message page by simply clicking on the dropdown arrow next to TO:



5. The office will respond to the e-mail address you used to register with this site. In the e-mail there will be a link that you click on. This link brings you to the YNHH Secure Message Center. You will need to use your user YNHH Care Catalyst ID and password to access and read the reply from the Respiratory Medicine Office.

If you are having difficulty sending e-mails, please call the help desk at 203-688-HELP (4357) and mention Secure Messaging.

# Appendix I: Qualitative Interview Questions

## Qualitative Interview Questions

### Qualitative Interview Guide—Patients/Families

Tell me about your experience with the messaging system with your doctor.

Did you use it? What was it like to use it? Where did you use it from? How often did you use it?

What were the benefits of using it? What were the problems with using it? Tell me more about those. Would you continue to use it? Why, why not? What did you use it for? What types of things? What would you want to use it for?

Did you ask your doctor anything on the messaging system that you would not have asked them in person? Can you tell me more about that?

Tell about how you felt about the privacy of the messaging.

Was it easy to use? How could it be made easier to use? Was it useful?

Did it decrease/increase any phone calls to the doctor? Tell me more about that. Did it decrease/increase any visits to the doctor/to the ED? Tell me more about that.

How would the presence/absence of a messaging system affect your choice of a doctor if they had such a system? Why, why not?

Do you feel the messaging system affected your relationship with your doctor? Tell me more about that.

### Qualitative Interview Guide—Clinicians

Tell me about your experience with the messaging system. Did you use it? What was it like to use it? Where did you use it from? How often did you use it?

What were the benefits of using it? What were the problems with using it? Tell me more about those. Would you continue to use it? Why, why not? What did your patients use it for? What types of things? What would you want them to use it for?

Did your patients ask you anything on the messaging system that you think they would not have asked in person? Can you tell me more about that?

Tell about how you felt about the privacy of the messaging.

Was it easy to use? How could it be made easier to use? Was it useful?

Do you think it decreased/increased any phone calls? Tell me more about that. Do you think it decreased/increased any visits to the clinic/to the ED? Tell me more about that.

Do you think you spent more or less time accomplishing tasks? Communicating with your patients?

Do you feel it affected your relationship with your patients?

If you were to change jobs, would you having a secure messaging system affect how you chose a new practice? Tell me more about that.

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# Appendix J: ED Visit Chart Abstraction Log

PATIENT NAME	UNIT NUMBER	DOB	ED VISIT DATE	REASON FOR VISIT
				<input type="checkbox"/> Asthma Exacerbation <input type="checkbox"/> ↑ WOB <input type="checkbox"/> RAD <input type="checkbox"/> Wheezing <input type="checkbox"/> Refill Med. Name: _____ <input type="checkbox"/> Other:
				<input type="checkbox"/> Asthma Exacerbation <input type="checkbox"/> ↑ WOB <input type="checkbox"/> RAD <input type="checkbox"/> Wheezing <input type="checkbox"/> Refill Med. Name: _____ <input type="checkbox"/> Other:
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