

OUR PLANS TO BUILD A SYSTEM THAT LAUNCHES COMPUTER-GENERATED TELEPHONE MESSAGES TO INCREASE THE USE OF INFLUENZA IMMUNIZATION

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Here, we outline our plans for building a system that launches computer-generated telephone messages to:

- * inform the population of when and where they can get influenza vaccine*
- * persuade them to get immunized*

The goal of this system is to increase the use of immunization

This brief outline is for planning purposes:

Once the appropriate agency/foundation is identified, a more substantive proposal will be produced.

SUMMARY: Underutilization of influenza immunization is widespread in the United States, resulting in an enormous burden of illness and death, principally because of the difficulty in stimulating sufficient patient demand for vaccine. *We propose to develop, test, and implement a system that will use modern computer speech and telephony to launch computer-generated telephone reminder messages to encourage individuals to be immunized.* Information on who will be called will be derived from a variety of sources: the patients themselves, immunization registries, telephone directory databases, physician's, HMO's, hospitals, pharmacies, vaccine manufacturers, church groups, etc. The system will include a variety of web-forms and uploading tools, which these organizations/individuals can use to provide information on when and where influenza vaccine will be available. Calls can also be generated on a widespread geographic basis by random dialing. We propose to create a variety of telephone messages, in a variety of languages, each of which is specific to the person called and the organization/individual who requested the call. We shall also make it possible for physicians to call an 800 number and record a message in his/her-own voice for his/her-own patients. By calling an 800 number, patients will be able to request information on the availability of vaccine, request that a call be made to them when vaccine is available, or opt-out of the system entirely. Data will be held in the system in a HIPAA-secure fashion. Each provider of patient information, and each provider of information on the location and availability of vaccine, will be assured of the confidentiality of the data provided. Development of the system will proceed on a small-scale basis, with various components tested in small populations over the next few years. The orientation of the effort will be research-based, with the results to be published. However, the long-term goal of this work is to create a reminder system that can be turned over to a national organization for widespread use.

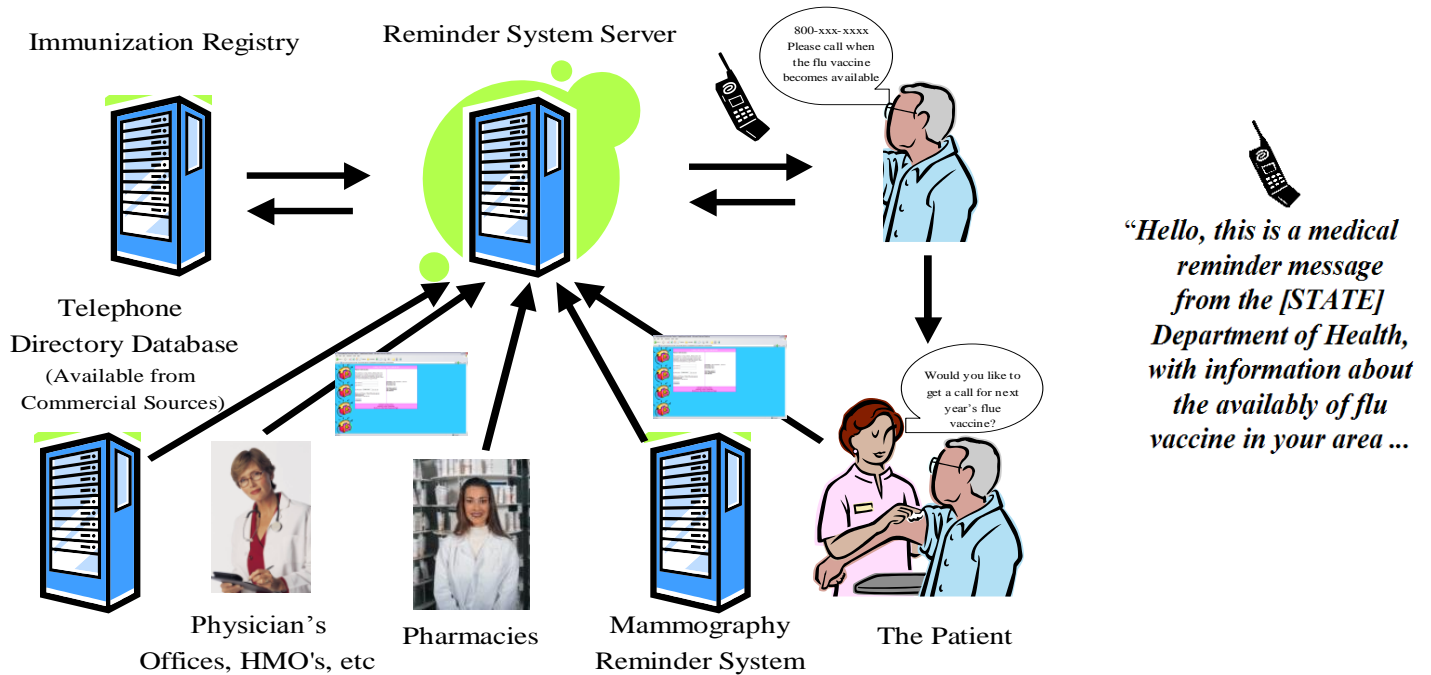
Who We Are:

For the past decade, the work of our group has concerned:

- * The operational aspects of cancer screening.
- and

* The development of systems that send computer generated telephone recruiting/reminding messages to increase the use of preventive health interventions, especially cancer screening.

SOURCES OF INFORMATION FOR THE SYSTEM



THE SYSTEM'S PRIMARY FUNCTION WILL BE TO LAUNCH OUTGOING COMPUTER GENERATED TELEPHONE MESSAGES TO ENCOURAGE INDIVIDUALS TO GET IMMUNIZED

The system will be designed to send a variety of computer-generated telephone reminder messages:

1. Messages to specific patients who have requested the call themselves.
2. Messages to specific patients whose physician has requested the call.
3. Messages to specific patients whose HMO or hospital has requested the call.
4. Messages to specific patients whose pharmacy has requested the call.
5. Messages to specific patients whose church, school, or other social organization has requested the call.
6. General messages to households from the state department of public health, to be launched on a widespread geographic basis by random dialing or by purchasing directory assistance databases.

Reminder scripts will be recorded in many languages: English, Spanish, Haitian Creole, Chinese (Mandarin and Cantonese), Portuguese, Laotian, French, Russian, and Vietnamese messages will be made first. Additional languages will be added as requested.

THE SYSTEM WILL BE ABLE TO TELL PEOPLE WHEN AND WHERE VACCINE IS AVAILABLE

The system will have a variety of ways to receive information on where and when vaccine is available:

- * Web-forms and web-uploading tools will be made that will allow manufacturers and pharmaceutical chains to provide information. Such information is now made available to The American Lung Association's web-based Flu Clinic Locator (<http://www.flucliniclocator.org/>), and we shall make it possible for manufacturers and pharmaceutical chains to enter the same information into our reminder system.
- * Web-forms and web-uploading tools will be made that will allow PCP's, hospitals, departments of public health, HMO's, pharmacies, churches, schools, and other social organizations to inform the system of when and where flu shots are to be given.

THE SYSTEM WILL HAVE MANY WAYS TO KNOW WHO TO CALL

The system will be designed to have:

- * Web-forms and web-uploading tools will be provided that will allow hospitals, large medical practices, and HMO's to inform the system of when and where the vaccine is available, as well as to provide telephone numbers of individuals to call.
- * Simple Web-forms for local clinics to enter information on the time and place when influenza vaccine is available, as well as to provide telephone numbers of individuals to call.
- * Simple Web-forms will be made available for physicians to enter information on the time and place when influenza vaccine is available at their practices, as well as to provide telephone numbers of individuals to call. Physicians will also have an 800 number that they can use to record a message in his/her-own voice for his/her-own patients.
- * Patients themselves will be able to request calls, though an 800 number, and though web-forms available through the internet.
- * Random dialing and directory assistance databases will permit widespread calling, as requested by departments of public health.

PANDEMIC PREPAREDNESS

The system will be built to include the potential to make large-scale calls in the event of pandemic influenza. Such a potentiality would involve nation-wide random dialing. While the execution of such widespread calling would be quite expensive, the preparation for such a system ahead of a national emergency could be accomplished fairly economically.

PEOPLE HATE MOST "ROBO-CALLS", BUT THAT NEEDN'T BE THE CASE

While the general perception of computer-generated messages is negative, mostly due to their association with tawdry telemarketing schemes, when used in a medical context, patients like such communications. Key to successful computer speech is the use of the optimal text, voice, personality, accent, emotion, and other features. The standard in the industry is Amtrak's talking computer, "Julie" (800-872-7245); interested readers are encouraged to call it to get some idea of the remarkable ease and power of current technology. Creating health messaging that patient want, and like, is something of a specialty of our group, and would be key to any successful computer telephone system designed to increase the use of immunization.

Computer telephony is effective *and* cheap

A PubMed search for "telephone intervention" will yield 3,851 articles, many of which demonstrate that calling patients is an effective way to increase their use of preventive interventions such as cancer screening and immunization. And yet, such telephone interventions are seldom carried out. Why? Employing humans to call patients on the phone is phenomenally expensive. For example, Costanza et al (Am J Prev Med. Jul;19 (1):p39 2000) demonstrated that calling patients is an effective way to increase mammography use, but at a cost of \$726 for each additional mammogram!

In our study of the impact of computer generated messages designed to recruit patients at the Greater Lawrence Health Center to cancer screening visits (see below), 25% of individuals were found to actually transfer to an operator to schedule an appointment. Line costs are 8 cents a minute and most calls take less than two minutes. ***Thus, computer generated health messages are highly effective, and roughly three orders of magnitude cheaper than humans.***

Ongoing Computer Telephone Projects by the Michaelson Group

Cancer Screening Recruiting Project, Greater Lawrence Health Center (CATCH):

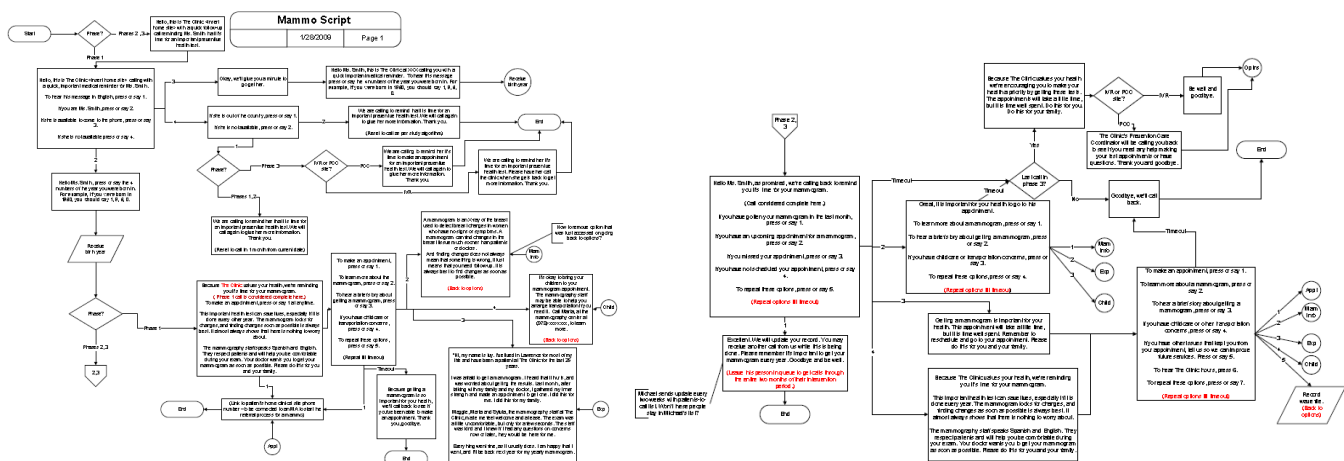
A major challenge is to reach out to patients to encourage them to make appointments for cancer screening tests. We have developed a system for launching computer generated telephone recruiting messages to help patients make appointments for mammograms, pap tests, and colonoscopies. Since June of 2009, in an NIH funded project in collaboration with Dr. Karen Emmons of the Dana Farber Cancer Center, we have been testing this system to the Greater Lawrence Health Center, and testing its impact on the utilization of screening.



The Greater Lawrence Health Center

- Lawrence Is the Poorest City in Massachusetts
- Many Immigrants
- Many Undocumented
- 2nd Largest Dominican Population in US
- 90% Spanish Speaking
- 60% Do Not Understand English
- 30% Illiterate in all Languages
- Deeply Committed to Good Health for All
- Research Oriented

Telephone recruiting script for the CATCH Project

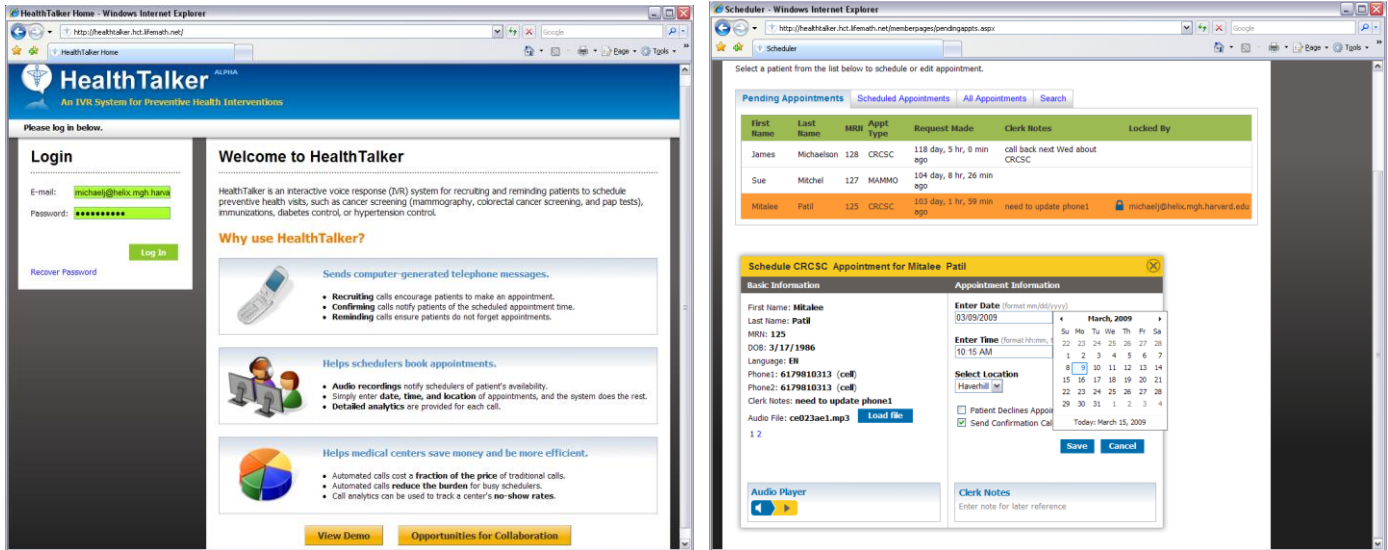


Results to date have revealed that roughly 25% of individuals actually transfer to an operator to schedule an appointment.

Thus, the findings of our CATCH study demonstrate that computer generated health messages can be highly effective and cheap.

Our *HealthTalker* system for launching computer-generated telephone messages that recruit, schedule, and remind patients for preventive health visits

Many studies have shown that contacting patients by phone can increase the use of preventive health services. However, the high labor cost of such efforts has limited their potential. To solve that problem, we have developed the *HealthTalker* system, which launches computer-generated telephone calls to recruit patients, and help clerks schedule those appointments. Because the *HealthTalker* system is completely automatic, it can accomplish for pennies what would cost dollars to be accomplished by human callers.



The *HealthTalker* automatically calls each patient from a list of names and telephone numbers, engages each patient in a personalized telephone conversation, and then provides the patient with the opportunity to record a message (saved as a wave file) with information on when he/she is available to make the preventive medical appointment. The system then transfers the wave file to a web-form accessible to schedulers, on which they can schedule the appointment. Because the *HealthTalker* system captures the date and time of each appointment, it then launches a computer-generated telephone message confirming that the appointment has been made, and subsequently launches a reminder message when the date of the appointment arrives. The *HealthTalker* system can launch messages in any language of interest, at any time desired. Since it "knows" which patients have not agreed to make appointments, it can re-call those individuals, launching messages in a variety of voices, with a variety of pitches. (To see the *HealthTalker* in action, go to the videos at our website: <http://healthtalker.hct.lifemath.net/>).

The MammoReminderSystem

Our MammoReminder System, an integrated tracking/reminder system for minimizing delay in the diagnosis and treatment of breast cancer, now being tested throughout Massachusetts

Our studies have shown that one in four women come in for one screening mammogram, and never return, and that one in four women who make an appointment for a mammogram for get to show up. Our studies have also found that that these failures of adherence are the main cause of breast carcinoma death in this country.

To address the problem of underutilization of breast cancer screening, and specifically the problem of failure to attend visits to screening, we have developed a system, the **MammoReminderSystem**, which provides computer-generated telephone reminder messages encouraging women to make, and then attend, mammography screening appointments.

The **MammoReminderSystem** is controlled by a series of web-forms and web-calendars, which are available to each screening center through the Internet. When scheduling an appointment, or simply initiating a reminder message, the clerk need only to click on the day of the month, and the computer-generated telephone reminder message will be sent a week before, and the day before, the appointment.

Physically, the system is maintained on a HIPAA secure, locked half cabinet that we rent at a local server farm, utilizing Windows Server 2008 and a MS SQL Server 2008 database, with web forms controlled by ASP. Net (C#), JavaScript, and AJAX. The telephony component of the system is accomplished by a VXML controlled hosted telephony contract with Plumb Voice, Inc, using the Nuance text-to-speech generator.

Our **MammoReminder System** is now being tested in a demonstration project funded by the Susan G. Komen Foundation. The goal of this project is to determine whether computer-generated telephone reminders can increase the use of screening. It is now in operation, and over the next six months, it will be made available to all of the breast imaging centers in Eastern Massachusetts, including all of the Harvard affiliated hospitals and all of the hospitals of the Partners HealthCare System.

The MammoReminder System

The MammoReminder System, a demonstration project funded by the Susan G. Komen Foundation to Provide Mammography Reminders to All Women in Massachusetts and determine whether computer-generated telephone reminders can increase the use of screening

TABLE: Features of the population in the greater Boston (617 area code) region

City	Population	% of Massachusetts Population
Boston	589,141	9.3%
Winthrop	18,303	0.3%
Chelsea	34,106	0.5%
Brookline	57,107	0.9%
Newton	84,323	1.3%
Milton	26,062	0.4%
Quincy	89,059	1.4%
Somerville	76,296	1.2%
Everett	37,540	0.6%
Belmont	24,194	0.4%
Watertown	32,915	0.5%
Cambridge	101,587	1.6%
TOTAL POPULATION	1,106,267	18.4%
Estimated number of woman age 40+	220,000	
Estimated number of mammo calls/year (2 per woman)	442,506	
Estimated Line Cost/year (BrCa) (2 calls per@\$0.05/call)	\$22,000	
Estimated number of potential screening colonoscopies ¹²²	221,253	
Estimated number of CoCa calls/year (2 per patient)	442,506	
Estimated Line Cost/year (CoCa) (2 calls per@\$0.05/call)	\$22,125	



Mammography facilities in the greater Boston (617 area code) region


Facility	Phone Number	City	Zip Code	Phone Number	Harvard Affiliates
BETH ISRAEL DEACONESS MEDICAL CENTER	330 BROOKLINE AVENUE	BOSTON	02215	617-567-718	Yes
BOSTON'S MAMMOGRAPHY VAN	44 BINNEY STREET	BOSTON	02111	617-632-1974	Yes
BRIGHAM & WOMEN'S ANGIOLOGY	850 BOYLSTON STREET, ST 80	CHESTNUT HILL	02445	617-732-6801	Yes
BRIGHAM & WOMEN'S HOSPITAL	75 FRANCIS STREET	BOSTON	02111	617-732-6324	Yes
CAMBRIDGE HEALTH ALLIANCE	1489 CAMBRIDGE STREET	CAMBRIDGE	02138	617-665-1311	Yes
DANA-FARBER CANCER INSTITUTE	44 BINNEY STREET	BOSTON	02111	617-632-3214	Yes
FAULKNER HOSPITAL-SAGOFF CENTER	1151 CENTRE STREET	BOSTON	02138	617-983-7069	Yes
HARVARD MEDICAL FACULTY					Yes
PHYSICIANS D.B.A. BETH ISRAEL RADIOLOGY	25 BOYLSTON STREET, STL	CHESTNUT HILL	02445	617-754-0300	Yes
HARVARD MEDICAL PHYSICIANS GROUP					Yes
DBA B.I. RADIOLOGY	1101 BEACON STREET, 3 WEST	BROOKLINE	02144	617-731-5255	Yes
HARVARD UNIVERSITY HEALTH SERVICES	75 MOUNT AUBURN ST.	CAMBRIDGE	02138	617-495-0669	Yes
HARVARD VANGUARD MEDICAL ASSOCIATES	291 INDEPENDENCE DRIVE	WEST ROXBURY	02445	617-541-4924	Yes
HARVARD VANGUARD MEDICAL ASSOCIATES	40 HOLLAND STREET	SOMERVILLE	02144	617-629-6114	Yes
HARVARD VANGUARD MEDICAL ASSOCIATES					Yes
KENMORE CENTER	133 BROOKLINE AVENUE	BOSTON	02215	617-421-4899	Yes
HARVARD VANGUARD MEDICAL ASSOCIATES					Yes
QUINCY	1250 HANCOCK STREET	QUINCY	02169	617-774-0716	Yes
NOVA AVON COMPREHENSIVE BREAST CENTER	159 PARKMAN STREET, ST240	BOSTON	02114	617-726-6002	Yes
MT. AUBURN HOSPITAL	330 MT. AUBURN STREET	CAMBRIDGE	02138	617-499-6079	Yes
NEWTON-WELLESLEY HOSPITAL	2014 WASHINGTON STREET	NEWTON	02459	617-243-4005	Yes
1180 BEACON IMAGING, LLC	1180 BEACON STREET	BROOKLINE	02445	617-232-1482	No
BIOCARE DIAGNOSTICS	300 CONGRESS STREET	QUINCY	02169	617-770-6900	No
BOSTON IMAGING ASSOCIATES	ONE BROOKLINE PL., ST105	BROOKLINE	02144	617-754-4500	No
BOSTON MEDICAL CENTER					No
DOCTOR'S OFFICE BUILDING	720 HARRISON AV. ST703	BOSTON	02118	617-633-8124	No
BOSTON MEDICAL CENTER	850 HARRISON AV.	BOSTON	02118	617-414-4854	No
CODMAN SQUARE HEALTH CENTER	637 WASHINGTON STREET	DORCHESTER	02122	617-825-2668	No
DORCHESTER HOUSE MULTI-SERVICE CENTER	1333 DORCHESTER AVENUE	DORCHESTER	02122	617-283-3233	No
EAST BOSTON NEIGHBORHOOD HEALTH CENTER	10 GOVE STREET	EAST BOSTON	02122	617-559-5900	No
LEWIS SHATTUCK HOSPITAL	170 MORTON STREET	JAMAICA PLAIN	02130	617-971-3366	No
MEDICAL CARE CENTER-NORTH	1000 BROADWAY	CHELSEA	02155	617-560-4902	No
MILTON HOSPITAL	92 HIGHLAND STREET	MILTON	02184	617-694-4000	No
MIT HEALTH SERVICE CENTER	25 CARLETON STREET	CAMBRIDGE	02138	617-253-4485	No
NEW ENGLAND MEDICAL CENTER/HOSPITAL					No
DEPT OF RADIOLOGY	750 WASHINGTON ST	BOSTON	02111	617-636-0044	No
QUINCY MEDICAL CENTER	114 WHITWELL STREET	QUINCY	02169	617-374-4133	No
SCHATZKI ASSOCIATES, INC.	725 CONCORD AVENUE	CAMBRIDGE	02138	617-876-8653	No
SCHATZKI ASSOCIATES, INC.	521 MOUNT AUBURN STREET	WATERTOWN	02172	617-924-5211	No
SOMERVILLE HOSPITAL RAD DEPT	230 HIGHLAND AVENUE	SOMERVILLE	02144	617-591-4133	No
SOUTH BOSTON COMMUNITY HEALTH CENTER	409 WEST BROADWAY	SOUTH BOSTON	02127	617-269-7500	No
SOUTH COVE COMMUNITY HEALTH CENTER	885 WASHINGTON STREET	BOSTON	02111	617-521-4864	No
ST. ELIZABETH'S MEDICAL CENTER OF BOSTON	734 CAMBRIDGE STREET	BOSTON	02134	617-789-2762	No
THE CARNEY HOSPITAL, INC.	2100 DORCHESTER AVENUE	DORCHESTER	02124	617-294-4000	No
WILKINS CORNER HEALTH CENTER	415 COLUMBIA ROAD	DORCHESTER	02124	617-287-8000	No
WILKINS MEMORIAL HOSPITAL	103 GARLAND STREET	EVERETT	02146	617-388-6274	No
WOMEN'S HEALTH CENTER	66 GARLAND STREET	EVERETT	02146	617-381-7184	No

Home - Windows Internet Explorer

er.org/

Help


Book Web Access Gmail - Inbox (3913) - james.... Google Calendar Mammography Reminder ... X

 **EZReminder**

Username: magic@gmail.com Password: Sign In

[Forgot your password?](#)

Home About Contact Help

 A Practice Management Solution that ...

- ... facilitates efficient appointment scheduling
- ... generates automated reminder calls
- ... reduces costs

Welcome to EZReminder

EZReminder is an integrated breast health scheduling/tracking/reminding system for breast imaging centers. The central task of this system is to launch computer-generated telephone reminder messages, which remind women to make and then attend, appointments for screening mammographies.

Why use EZReminder?

The telephone reminder is the most promising opportunity for reducing the breast carcinoma death rate. Using the web-based system, screening centers can utilize EZReminder tools to simplify the process of scheduling appointments and focus more on patient health.

SCHEDULE

- Search for open slots easily
- Simply specify **dates, times, and appointment types**

CALL

- Confirming calls notify patients of the scheduled appointment time
- Reminding calls ensure that patients do not forget appointments

SAVE

- Automated calls can be done at a fraction of the cost
- Reducing **no-show** rates reduces resource waste

EZReminder Welcome magic@gmail.com | Settings | Help | Logout

Home Patient Lookup Doctor Lookup Scheduler Management

September 2009

Patient Information: MR#, First Name, Last Name, Address, City, Phone Number, (Another Field)

Scheduled Appointments: Wednesday, September 02, 2009 at 1:00 PM '08

12:00:02 PM

Find Open Slot

Date Window: Start Date: 9/2/2009, Within: 0 Weeks

Time of Day: AM, PM, Any Time

Day of Week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Any

Appointment Type: Label: 9c12, Duration: 30 minutes

Find Free Slot

Wednesday, September 02, 2009

120 104 105 110 108 203 CHA1 101 102 103 202

8 AM 9 10 11 12 1 PM

The page at <http://www.ezreminder.org> says:

You are making a double appointment. Do you want to continue?

OK Cancel

Kevin Huang 617-768-8743

Create new Appointment Clean selection

EZReminder Welcome magic@gmail.com | Settings | Help | Logout

Home Patient Lookup Doctor Lookup Scheduler Management

September 2009

Patient Information: MR#, First Name, Last Name, Address, City, Phone Number, (Another Field)

Scheduled Appointments: Wednesday, September 02, 2009 at 1:00 PM '08

11:59:17 AM

Find Open Slot

Date Window: Start Date: 9/2/2009, Within: 0 Weeks

Time of Day: AM, PM, Any Time

Day of Week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Any

Appointment Type: Label: 9c12, Duration: 30 minutes

Find Free Slot

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

30 31 September 1 2 3 4 5

6 7 8 9 10 11 12

13 14 15 16 17 18 19

20 21 22 23 24 25 26

Date: Wednesday, September 02, 2009

Time: 9:40 am

Duration: 30 Minutes

Room 110

Appointment Type: Screening

Instructions: Enter Text

Appointment Description: Screening Mammogram

☒ Print appointment card ☐ Print referral information ☐ Launch a confirmation telephone call ☐ Launch a confirmation email

Make appointment Close

Make Appointment

Appointment details:

Date: Wednesday, September 02, 2009

Time: 9:40:00 AM

Duration: 30 minutes

Room: Room 110

Patient: Patient Huang, Kevin

Patient Address: ...

Instructions: ...

Appointment Type: 9c12

Appointment description:

Create Cancel

Windows Internet Explorer

ezreminder.net/patientlookup.aspx

EZReminder | Magic Hospital

Home Patient Lookup Doctor Lookup Scheduler Management

Patient Lookup

Searching words separated by spaces. The search is performed among the following fields: First and Last names, MRN, SSN, City, Zip Code and Phone

smith

First Name	Last Name	Date of Birth	SSN	MOB	City	Zip	Phone	Registered at screening center
Mariah	Smith	1/1/1978					617-555-5555	Magic Hospital
Judith	Smith	2/2/1955					123-456-7894	Magic Hospital
J	smith	1/1/1945					6177688743	Magic Hospital
Roger	Smith	10/6/1987					6177688743	Magic Hospital
Emma	Smith	6/5/1954					111-111-1111	Magic Hospital
Jacinta	Smith	1/1/1978	123456789	ABCD	00000		617-625-6252	Magic Hospital
Smith	Jane	1/1/1960					617-625-6252	Magic Hospital
Pat	Smith	2/2/1955					614-545-7894	Magic Hospital
Jane	Smith	1/1/1960			Boston		617-625-6252	Magic Hospital

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Home Patient Lookup Doctor Lookup Scheduler Management

Doctor Lookup

Searching words separated by spaces. The search is performed among the following fields: First and Last names, NPI, Specialty, Address, City, Zip Code, Phone and Hospital

smith

First Name	Last Name	License Number	Specialties	Address Line 1	Address Line 2	Affiliations
Warveta	Bague	38550	Anatomic Pathology	55 Smith Rd		Seton
David	Barbe	222755	Internal Medicine Hematology/Oncology	Dana Farber Cancer Institute	44 Brinley St, Smith 353	Yonville Hospital & Rehabilitation Ctr Massachusetts General Hospital Dana Farber Cancer Institute Brigham & Women's Hospital
Charles	Smith	157897	Internal Medicine	Beth Israel Medical Center	330 Brookline Ave	Beth Israel Deaconess Medical Center
Rushdie	Yusuf	226450	Internal Medicine Hematology/Oncology	Smith 353 DFCI	44 Brinley St	Massachusetts General Hospital Dana Farber Cancer Institute Brigham & Women's Hospital
Michael	Smith	226221	Radiation Oncology	Carlee Fosters	75 Walnut St Radiation Oncology	Morton Hospital & Medical Center Sturdy Memorial Hospital, Inc. Worcester State Hospital Regional Hospital

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Home Patient Lookup Doctor Lookup Scheduler Management

Rooms
Office Hours
Appointment Types
Reports
Manage Users

Create a New User Account

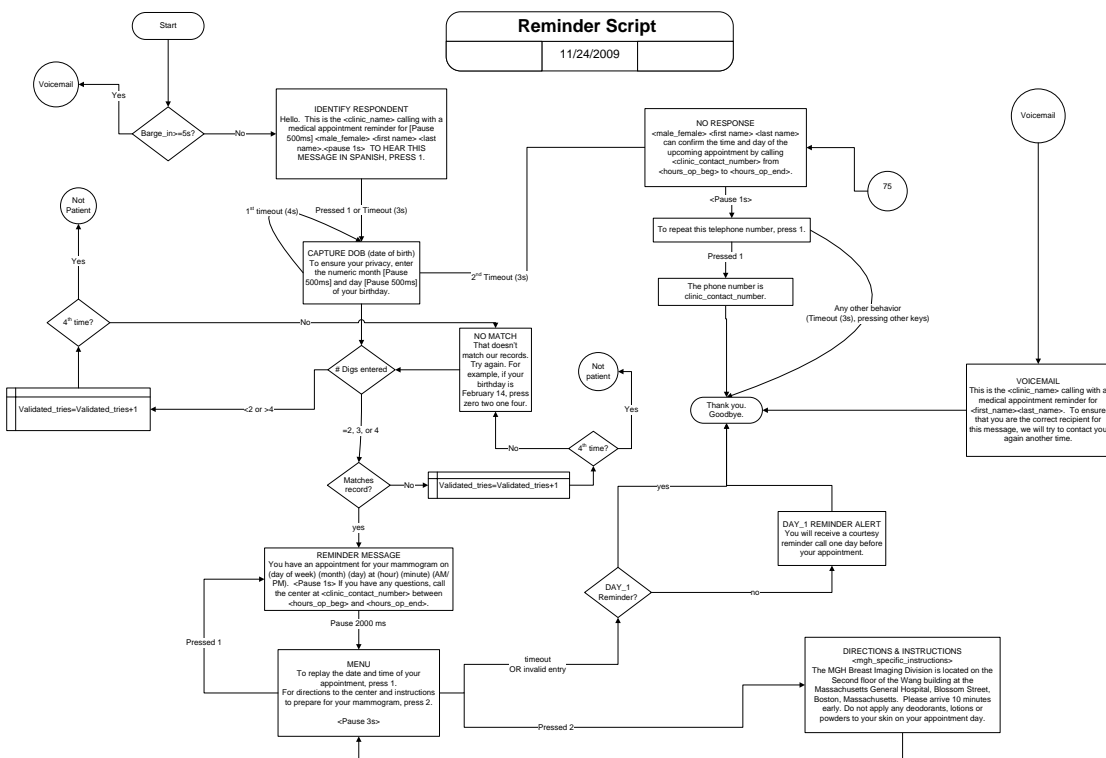
Edit Users

Office Hours

Office Hours

Appointment Types

Telephone reminder script for the MammoReminder System



RESEARCH TEAM

JAMES MICHAELSON PhD (Principal Investigator), is the Director of the laboratory for Quantitative Medicine at the Massachusetts General Hospital, Associate Biologists in the Departments of Pathology and Surgery at the Massachusetts General Hospital, and Associate Professor of Pathology at the Harvard Medical School.

MANJU DEIVASIGAMANI, Senior Software Engineer. She was directly responsible for the two-year long project to create the specification document for rebuilding the *MammoReminder* System, and then supervised the coding and implementation of the system with our collaborators at MIT (see Abel Sanchez below). She then supervised the testing and refinement of the systems and the documentation of the code. She is now supervising the ongoing operation of the *MammoReminder* system. Ms. Deivasigamani came to our group after a decade in the software industry, including extensive experience in supervising software development teams who created software products from the business analytics to the execution stages. She has working experience with many languages and systems, including MF COBOL, COBOL II, C, C++, C#, ASP, ASP.net, AJAX, SQL, Java, MVS, JCL, CICS, DB2, COBOL, DB2, Oracle, PL/SQL, Sybase, Access, SQL Server, Visual Basic 6.0, HTML, and PHP. Ms. Deivasigamani played the central role in the creation of the *MammoReminder* System.

HENRY WU (MIT, ELECTRICAL ENGINEERING, BS, and MA 09) is a Software Engineer. He has been responsible for working with our MIT colleagues in building the server infrastructure and creating the web forms of the *MammoReminder* System and the *CATCH* project. His work has also including the specification of the VoicePlumb platform, the creation of the procedures for querying the database and initiating the calls, and writing the VXML code for the messages.

KEVIN HUANG (HARVARD College, 08, Math and Computer Science), is a Software Engineer, and is our script writing specialist, who supervised the creation, testing, and implementation of the scripts for the *MammoReminder* System Project and the *CATCH* project. He has also assisted in working with our MIT colleagues in building the server infrastructure and creating the web forms of the *MammoReminder* System. This work has including the specification of the VoicePlumb platform, the creation of the procedures for querying the database and initiating the calls, writing the VXML code for the messages, and the creating the tools for the call analytics.

ANDRA IVAN (B.A. in Mathematics and Computer Science Carthage College 2000 – 2004 Summa Cum Laude, University of Illinois, Urbana-Champaign 2004 – 2007 M.S. in Computer Science GPA: 3.84/4.0), is a Software Engineer joined our group two months ago, assisting her colleagues in building the server infrastructure and creating the web forms of the *MammoReminder* System.

RASHI GUPTA (Bachelor of Science in Textile Engineering, M. Tech, CGPA-9.34, 11th Rank in Department, 2005-2007 Uttar Pradesh Technical University, UP, India Textile Technology, B. Tech, Percentage-80%, Silver medal from university, 2001-2005). As an Information Support Specialist, Ms. Gupta will concentrate on the business analytics component analyzing how patients and information flow through the medical system, analyzing the fine scale operational details of the system. She will assist in the creation of web-forms and the maintenance of the System and will assist in the general debugging and fine tuning of the system.

SEBASTIAN JARA (Tufts University, Bachelor of Science in Biochemistry and Mathematics 09). He will concentrate on the business analytics component analyzing how patients and information flow through the medical system, analyzing the fine scale operational details of the system. He will also assist in the creation of web-forms and the maintenance of the System and will assist in the general debugging and fine tuning of the system.

DEVON BUSH (PRINCETON UNIVERSITY B.S.E. Computer Science, magna cum laude, 2002 HARVARD LAW SCHOOL Juris Doctor, 2005) is a Software Engineer. He will concentrate on the business analytics component analyzing how patients and information flow through the medical system, analyzing the fine scale operational details of the system. He will also assist in the creation of web-forms and the maintenance of the System and will assist in the general debugging and fine tuning of the system.

ABEL SANCHEZ, PhD [Massachusetts Institute of Technology, is our collaborator at the Massachusetts Institute of Technology (MIT), and has worked with us and his team of two software engineers, through his consulting company (Korgi, Inc.) to execute the code writing and realization of the *MammoReminder* System.