

UCSF's Digital Patient Experience - Patient Access Suite

Submitter:

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Project Team:

CDHI: Nat Gleason, MD, Clinical Lead; Aaron Neinstein, MD, Clinical Informaticist; Ramki Yeramsetty, Product Manager; Ed Martin, Technical Director; David Steuer, Lead Designer; Eli Medina, Project Manager; Fel Bautista, Solution Architect; Sondra Renly, Integration Architect; Mel Smith, Designer; Farshad Hemmati, Software Engineer; Omid Boozarpour, Software Engineer; Jenny Ilinets, QA Engineer; Pavan Gupta, AWS Architect; Abhijit Singamaneni, AWS DevOps Engineer; Harris Durrani, QA Engineer; Daniel Tjandra, QA Engineer; Melisa Smith, UI/UX Designer

Clinical Systems: Andrew Robinson, Clinical Solutions Manager; Chris O'Hara, Patient Access Specialist; Karen Anderson, Epic Specialist; Chris Miller, Innovation Engineer

School of Medicine Technology: Jonathan Prugh, UI/UX Designer

IT: Victor Galvez, Manager, Integrations; Julia Wallace, API Team Manager; Veera Gopalakrishnan, Integration Engineer; Devin Church, Integration Engineer

Project Description

UCSF Health's Digital Patient Experience Initiative is a digital transformation program focused on providing our patients with a modern, delightful user experience in their interactions with us. Our Patient Access Suite addresses the challenge that patients have with scheduling an appointment to see a specialist at UCSF, which is primarily a frustrating manual process handled by fax and telephone calls that often takes several days to complete. The Patient Access Suite provides digital tools to patients and our staff with the goal of same day appointment scheduling.

Project Narrative

Problem/Goals

As an academic medical center that focuses on specialty care, getting an appointment to see a clinician at UCSF is difficult and often frustrating. To get an appointment, the patient's primary care physician (PCP) must fax a referral to UCSF. That fax is then manually entered into the electronic health record (EHR) system by an access coordinator to create a digital referral record. The access coordinator then calls the patient to get additional information required to schedule an appointment, often playing phone tag over several days before an appointment is finally scheduled.

If all goes well, we are able to hit our goal of scheduling an appointment within 5 days from when the referral record is created. However, that is typically the exception, and often we are unable to hit that 5-day goal given the high demand for UCSF specialists. This leads to patient frustration and frequently results in the patient going elsewhere. Patients with commercial insurance often have the option to go elsewhere, causing an imbalance in our payor mix and negatively affecting our financial performance. In 2018 alone, we estimate that we lost 46,000 referrals due to the inefficiencies in our process.

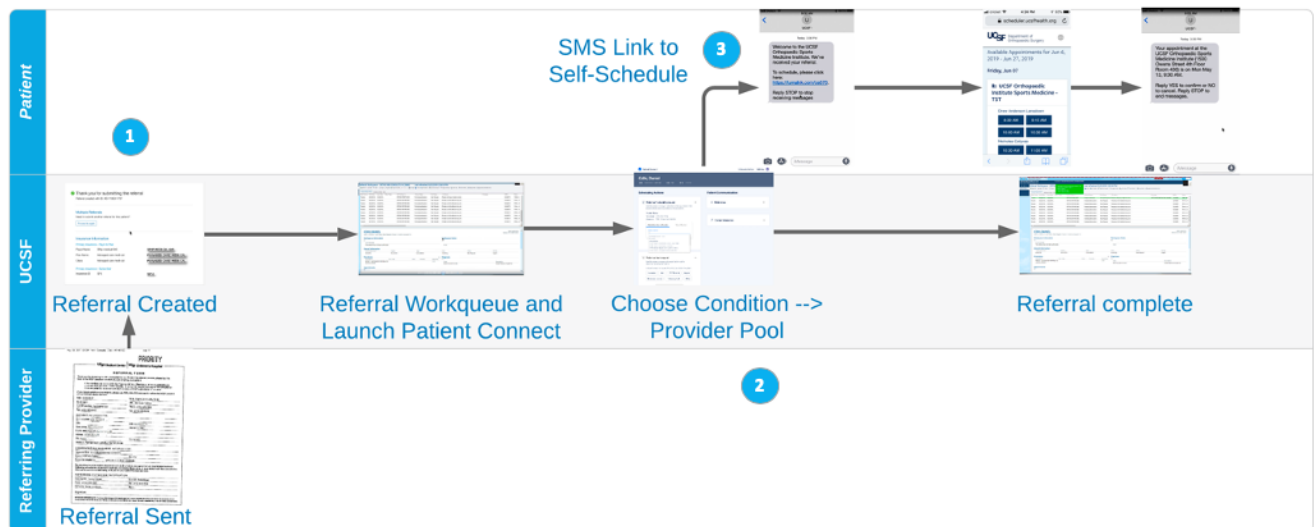
With the implementation of the full Patient Access Suite, our goal is to schedule the patient the same day we receive the referral. We continually measure the success of the program through scheduling metrics, patient satisfaction, and payor mix.

Solution

The Patient Access Suite is an exemplar of digital transformation that needs to occur in healthcare. We migrated an analog, manual process to an automated, digital solution that improves operational efficiencies as well as improving our patients' experience. The DPE Patient Access Suite consists of 2 modules: Referrals Automation and Patient Connect. The solutions combine 3rd party commercial components integrated with a custom user interface integrated into our Epic EHR system.

Patient Access Workflow:

1. Referrals Automation (RA) expedites referral fax processing by providing our access coordinators a tool for automatically converting faxes into digital referral records directly into the EHR. When faxes are received, RA uses 3rd party OCR technology from Kofax to convert the fax into structured data. Utilizing a custom web user interface launched directly from the EHR, the access coordinator is then able to verify the correctness of the transcribed data, correct if necessary, and then create the digital referral record in the EHR.
2. Once the digital referral record is created, the referral coordinator is able to use Patient Connect (PC) to accelerate the appointment scheduling. PC is launched directly from the EHR as part of the referral coordinator's workflow. Using PC, the referral coordinator determines what information is needed from the patient and can reach out to the patient via SMS. PC provides a checklist to the referral coordinator to drive readiness for scheduling. If the information needed to schedule an appointment is complete, the referral coordinator can select one or more clinicians for the patient to schedule with based on the patient's condition(s).
3. PC then calls out to Luma Health, a 3rd party mobile web application, that allows the patient to self-schedule with the clinicians selected by the referral coordinator.



Patient Access Suite Timeline

Event / Milestone	Date
Referrals Automation 1.0 Project Started	October, 2017
Referrals Automation 1.0 Completed	May, 2018
Referrals Automation 1.0 Pilot Launched in Pediatric Access Center	August, 2018
Referrals Automation 1.2 Completed	December, 2018
Referrals Automation 1.2 Launched in Adult Orthopedics	January, 2019
Referrals Automation 1.2.3 Completed	March, 2019
Referrals Automation 1.2.3 Launched in Urology	April, 2019
Patient Connect 0.5 Project Started	October, 2019
Patient Connect 0.5 Completed	January, 2020
Patient Connect 0.5 Launched in Adult Orthopedics	January, 2020

Collaboration

While the Digital Patient Experience Program at UCSF has been led by the Center for Digital Health Innovation, the project teams included other members from different teams across UCSF including Clinical Systems, Information Technology, and the School of Medicine. Furthermore, we worked very closely with our UCSF Health operational partners to gather requirements, improve workflows, and pilot our minimum viable products (MVP), most notably, our business partners in the Patient Access team, the Pediatric Access Center, and Adult Orthopedics. They were willing to innovate with us and provided valuable feedback to continually improve the solutions.

Our strategic direction was set by our Steering Committee consisting of nine executives from the health system. They set our priorities for the issues we needed to address. The Patient Access program also received help from across the UCSF Health organization through a working group of 40+ managers and directors that provided monthly guidance and feedback as we progressed. Finally, we also were guided by our Patient Facing Advisory Committee, a group of UCSF patients who provided candid feedback during our discovery process and critiqued our proposed designs for improving access to UCSF.

Technology

For both Referrals Automation and Patient Connect, we utilized commodity technologies to build and host the solutions. Both are Microsoft ASP.Net web applications using modern JavaScript user interface libraries, i.e. Angular JS and Bootstrap. The solutions are both hosted on AWS, which allowed us to utilize agile DevOps processes to deliver quickly. We made extensive use of Mulesoft Anypoint as our middleware to orchestrate many of the APIs and data interfaces needed by our solutions.

For both modules, a key innovative technology utilized was SMART-on-FHIR, a health interoperability standard created a few years ago that allows externally applications to be seamlessly integrated into the EHR. SMART-on-FHIR combines several standards:

- Substitutable Medical Applications / Reusable Technology (SMART) – allows an external web application to be launched from inside the EHR, passing along the context of the current user and patient record being viewed in the EHR. This allows our solutions to be launched as part of the coordinators' current workflows within the EHR, making it easy for users to adopt. Any app created with this standard can be reused by any of the major EHR vendors in use today. This allows our solution to be utilized by health systems outside of UCSF.
- OAuth – a standard authentication mechanism that allows a 3rd party application to reuse the user authentication provided by the EHR, i.e. the user doesn't need to log in again, and the data access security constraints are respected by the 3rd party application.
- FHIR API – a healthcare data interoperability standard that allows consistent retrieval and storage of patient health data across different vendors

For Referrals Automation, one key challenge we faced was that off-the-shelf OCR libraries are insufficient to deal with the myriad of referral fax formats that come to UCSF. Our solution allows us to create templates for the various referral faxes we receive. The templates define areas on a fax where the OCR engine will translate text and where to map the transcribed data. The template creation is currently manual, but we have established a framework that will allow us to use machine learning for the future. There are currently no commercially available solutions that solves this problem, and it's one that's prevalent in healthcare.

For Patient Connect, the key innovations include the incorporation of an automated workflow to facilitate interactions with the patient and the condition-based approach to determine which physicians are recommended to the patient. The checklist and mapping are currently encoded into the solution, and the coordinators have the ability to override the defaults. We have instrumented the app so that in the future, we can use machine learning to automatically predict the clinicians to recommend to the patient based on the contents of the referral and the information we have from the patient.

Measure of Success

- Increase access center capacity
 - Reduced processing time per referral by 40%
 - Increased coordinator productivity (Referrals/FTE/Day) by 50%
 - Reduced time spent servicing appointments (Approx. 5 mins saved per Cancellation/ Reschedule)
- Improve financial performance
 - Improved contribution margin by shifting payor mix to more sustainable ratio in areas using the new patient access tools (cannot share this data)
- Improve utilization
 - Reduced no-shows: For Adult Orthopedics, which has the complete Patient Access Suite implemented, no-show rates were reduced by at least 30%.
 - Canceled appointments are automatically offered to waitlisted patients and 52% of waitlist offers were accepted
- Improve patient experience
 - 90% of patients reported a scheduling experience of 8+/10

Screenshots

Referrals Automation:

A referral coordinator selects which referral to process next

UCSF Referrals Automation User Name: Yerramsetty, Ramakrishna

My Faxes **5** | All Faxes **417** | Processed Faxes **0** | Fax Upload Failed **85** | Referral Creation Failed **44**

Select a row to get started Impersonate User

Received	Patient Name	MRN	Priority	Notes	Action
mm/dd/yy	last, first name	UCSF MRN	Ref Prio	Any	
01/14/19, 07:24 AM	CDHI, Harris	96803192	Urgent		
11/28/18, 02:08 AM	Cdhi,Leo	96803480	Asap	For D	Start
04/09/18, 07:28 AM	Grad,Elle	96802439	Routine		
04/09/18, 07:28 AM	Grad,Elle	96802439	Routine		
04/09/18, 07:28 AM	Grad,Elle	96802439	Routine		

20 entries per page

Download

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98/13/2018 10:54AM FAX 7075461886 SRO 0001/0028

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REFERRAL FORM

Thank you for choosing to refer your patient to us. To start the referral process, please fax this form to the UCSF service to which you are referring your patient.

- Fax numbers can be found online at www.ucsf.edu/health/organization2010
- Include brief pertinent medical records, including test results that support the consultation

If you require additional assistance, please call (800) 444-2559 and ask for either the UCSF practice or the Referral Liaison Service.

Date: 08/09/2018 From: _____ Title: _____
 No. of pages: _____ To UCSF practice: Dr. Igor Immerson Phone: 707-546-1922
 Fax: 416-885-3852 Fax: 707-528-1602

PATIENT INFORMATION

Name of patient: Leo Cdhi
 DOB: 11/11/2011 Interpreter needed: Yes No Language: Spanish
 Home phone: 707-280-8888 Work or cell phone: 707-7077777
 If child, name of parent: _____
 Address: 444 15th ave apt 9999
 City: San Francisco, CA Zip: 94116

Transcribed data is displayed next to the fax snippets for easy verification. For each field, the coordinator can decide to either keep the value in the EHR or update it with the value from fax.

Demographics * required field

*** Address**

APoX 444 15th Ave Apt 9999 San Francisco SAN FRANCISCO 94118 United States of America

Fax 444 15th Ave Apt 9999, San Franck 444 15th ave apt 9999 San Francisco, CA 94116 Page 1

Street Address: 444 15th Ave
 Apt: Apt 9999
 City: San Francisco
 State: CA
 Zip: 94118
 County: San Francisco
 Country: USA

*** Referring Provider**

Fax Neema Pourshari, Name: Neema Pourshari, Page 1
 Address: _____
 Phone: 707-546-1922 Page 1
 Fax: 707-528-1602 Page 1

Neema Pourshari, MD 187 Lynch Creek Way, Pittsburg California 94954 phone: 707-546-1922 fax: 707-569-8620 Page 1

Provider not in dictionary
 Select this if no provider found with same name

Provider not confirmed
 Select this if provider is found with same name but their phone or fax does not match Fax

*** PCP**

APoX Neema Swidler, MD Name: Swidler, Page 1
 Address: _____
 Phone: _____ Page 1

Referral

*** Referral Received Date**
 11/28/2018

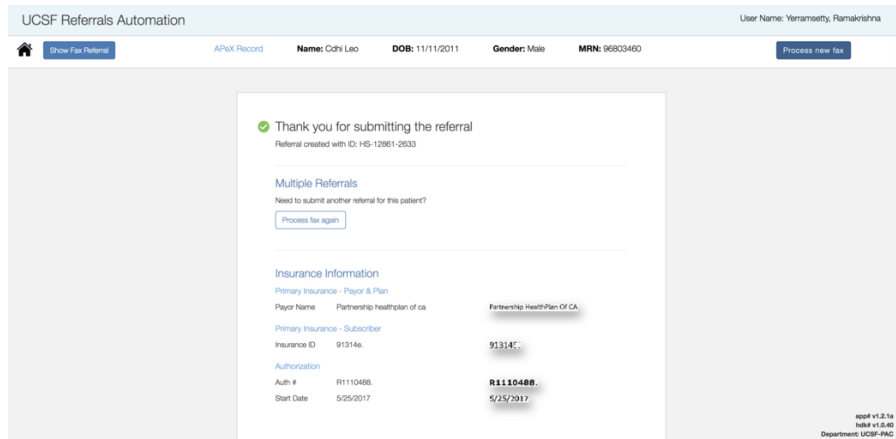
Priority
 Routine Urgent From file name: ASAP

Diagnoses
 M75.51 Page 1
 Bursitis of right shoulder

*** Referred to Department**
 3010003. ORTHO ARTHRO MB

Referred to Specialty
 Orthopedic Surgery

Once information is verified, the referral is created in the EHR prep for scheduling.



Patient Connect

Main Referral Coordinator Screen that allows the referral coordinator to

- Collect missing information from patient
- Request the patient to self-schedule their appointment with one or more specialists for their specific condition.
- Request the patient to callback the department

