UCSF Health: Referrals Automation

*UCSF Health’s Referrals Automation automatically converts referral faxes into digitized referrals in the electronic health record toward achievement of UCSF’s goal of same-day patient contact and appointment scheduling, with a scheduled appointment within two weeks.*

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**Project Narrative:**

“Two years ago, at the age of 36, while balancing a hectic life with two young children, aging parents on the east coast, and a demanding job, I suffered a seizure and was diagnosed with a brain cancer. I remember exactly where I was when I received the news. Drinking my morning coffee, checking email on my phone, trying to settle my kids down for breakfast, and then trying to get to work on time. I got the phone call from my primary doctor that my MRI had shown a brain mass. He was referring me to see an oncologist. I had brain cancer. I froze. I felt hopeless, scared, alone, and unsure of where to turn. I tried calling the oncologist office that my PCP referred me to, but I couldn’t get a hold of a real person. I did what I think most people would do in my situation – I sat at the kitchen table all morning and started calling and emailing friends, Googling, scouring my network and the internet to find out what to do and where to go.”

The experience described in that fictional vignette is typical for many patients trying to access specialty care in places like UCSF Health and other UC Health specialty care clinics. The demand for specialty care at UCSF Health far exceeds the clinical resources available. Further, referrals from external referring providers typically arrive via fax, entering a referrals management process that is manual, cumbersome, and inefficient, requiring manual data entry to the electronic health record (EHR) and then often phone-tag back and forth between UCSF and the patient in attempts to complete the referral and schedule the appointment. This all results in delays in patients’ access to care, negative patient experience, and increased operational costs. Patients suffer from a lack of communication and transparency, as well as delays in care from inefficient referral processing, leading to anxiety about their care and potentially worse clinical outcomes. For administrative staff at clinics, the arduous work of manually transcribing
information between paper and electronic systems may lead to decreased job satisfaction. Those same staff suffer even worse satisfaction stemming from interactions with patients frustrated by the inefficiency of the referral process. Providers suffer from suboptimal use of appointment slots and frustration with delays in their ability to provide care for patients.

At UCSF Health, our goal is to schedule 75% of new patient referrals within 0-5 days, and we have historically failed to hit that mark. In 2018, we estimated that more than 46,000 patients referred to UCSF could not be accommodated in part due to this current process.*

UCSF Health has started addressing these problems through its Referrals Automation Program, part of our larger Digital Patient Experience Initiative. The first phase of this program uses a combination of novel and off-the-shelf technologies to launch our Referrals Automation application from within the EHR using SMART-on-FHIR, automate parsing of referrals, simplify the capture and review of discrete data, and automatically input the data into the EHR. While at the same time we are working on trying to electronically connect practices who frequently refer to UCSF via electronic referral methodologies, e.g. Direct, UCSF is likely to continue to receive a majority of its referrals via fax for years to come. Our Referrals Automation software utilizes an Optical Character Recognition (OCR) system that converts faxes into structured data. A user interface integrated into the EHR allows the access coordinators to check the accuracy of the OCR results, correct transcription errors, and supplement any missing information prior to the scheduling steps in the process.

We are live in 3 locations, the Pediatric Access Center (PAC), the Orthopedics Institute at Mission Bay, and Urology, with more rollouts planned this year. The following shows our rollout plan for the next year.

For the PAC and Ortho Institute, both of which have been live for several months, we’ve demonstrated significant efficiency gains, as demonstrated by faster referral processing times and increased processing volume in both locations.

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*Clinic capacity also plays a role.
This has translated into faster patient contact and appointment scheduling:

These improvements have led to an additional pilot launched in April 2019, Patient Self Scheduling, where we send a SMS message to Orthopedic patients immediately after processing the fax. The message contains a link to a web scheduling application, allowing patients to immediately schedule their visit, further decreasing the time elapsed toward scheduling an appointment. Our goal is to achieve same day referral processing and scheduling, once a referral is received.
## Technology Overview

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<td>Epic / SMART-on-FHIR</td>
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<td>File upload from fax folder</td>
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<td>Information extraction from faxes</td>
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<td>Web application</td>
<td>Angular 6, JQuery, HTML5, CSS3, ASP.Net/C#</td>
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<td>Address verification</td>
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<td>Map diagnoses to ICD-10 codes</td>
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<td>Referrals data store</td>
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<td>Create referral in APeX</td>
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### Screen Shots

The main screen shows a list of referral faxes available for processing. This app is launched within the Epic EHR.

When a file is selected for processing, the original fax is automatically displayed. Pressing the ‘Start’ button allows the coordinator to verify the structured data extracted from the fax.
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.

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