HL7® FHIR® DevDays

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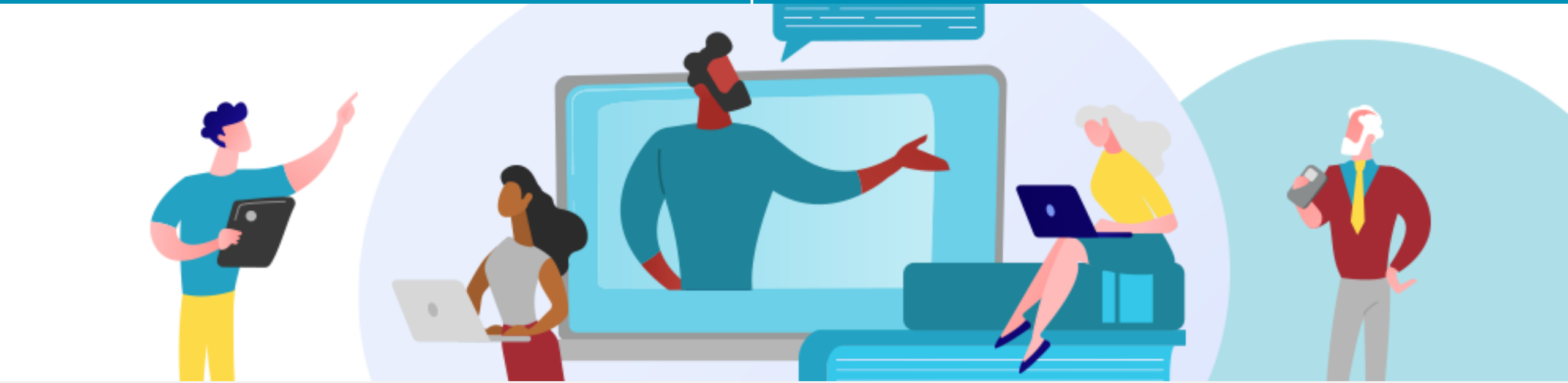
Porting from Basic to SMART on FHIR Launch

Adam Moses, Paul Yelton, Ajay Dharod
Wake Forest Baptist Medical Center



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Agenda

1. Team
2. Background/Current State
3. Process
4. Next Steps
5. Conclusions

Who are we?

Adam Moses

Senior Informatics Analyst

Department of Internal Medicine

Center for Healthcare Innovation

Wake Forest School of Medicine

Paul Yelton

IT Program Director – Technology

Center for Healthcare Innovation

Wake Forest School of Medicine

Ajay Dharod, MD, FACP

Assistant Professor

Vice Chair for Informatics and Analytics

Department of Internal Medicine

Wake Forest School of Medicine

Department of IM Informatics and Analytics Mission

The Wake Forest Department of Internal Medicine's Informatics and Analytics team aims to advance the Department's mission of leading Wake Forest Baptist Health's evolution as a preeminent learning health system. The team supports this mission by working with faculty to improve electronic health record (EHR) workflows by:

1. Mobilizing and visualizing EHR data in support of health care delivery research and initiatives to improve quality, safety and costs
2. Generating the data needed to advance evidence-based practices
3. Promoting interprofessional and cross-departmental collaborations

Wake Forest Center for Healthcare Innovation

The Wake Forest Center for Healthcare Innovation accelerates the translation of medical discoveries into healthcare systems in order to increase hospital efficiency and improve patient outcomes. We move medical innovations into the clinic faster by streamlining the translation process and providing the resources—such as clinical service lines, personnel, digital health expertise and funding—needed to integrate research findings into patient care by:

1. Integrating findings from published research into our clinics our health system rather than waiting for industry-wide acceptance before applying.
2. Evaluating, testing and applying new ideas that improve the efficiency of healthcare providers.
3. Addressing healthcare systems, not just products, in order to improve patient outcomes and experiences.

Background – Parent R01 Grant

- In a prior multisite randomized controlled trial, our highly successful mPATH™-CRC (**m**obile **PA**tient **T**echnology for **H**ealth-Colorectal Cancer) iPad app doubled the proportion of patients who were screened for colorectal cancer [1].
- We are currently conducting a **hybrid implementation-effectiveness trial** of mPATH™-CRC in 28 community-based clinics (R01CA218416-A1). As part of this parent award, we conducted **qualitative research with clinical staff and administrators to determine the best way to integrate mPATH™-CRC in clinical workflow.**
- We then spent 9 months **converting mPATH™-CRC from a stand-alone iPad app to one that is fully-integrated with Wake Forest's Epic EHR.**
  - Used basic/PACs based Launch mechanism with embedded parameters on launch.
  - Leveraged legacy encryption, authentication, authorization paradigms

1) Miller DP, Denizard-Thompson N, Weaver KE, Case LD, Troyer JL, Spangler JG, Lawler D, Pignone MP. Effect of a Digital Health Intervention on Receipt of Colorectal Cancer Screening in Vulnerable Patients: A Randomized Controlled Trial. *Annals of Internal Medicine* 2018;**168**:550. doi:10.7326/M17-2315 PMID: 29532054 PMCID: PMC6033519

Background – NIH ODSS Administrative Supplement

We will now accelerate the development of robust, sustainable and cloud ready research software through the migration of the current technical architecture to an interoperable SMART on FHIR App launch and migration of the EHR-integrated components of the application to the cloud.

1. **Specific Aim #1:** Enhance the mPATH™-CRC application's interoperability and decrease EHR-vendor specific dependencies by leveraging Webservices and SMART on FHIR.
2. **Specific Aim #2:** Migrate mPATH™-CRC from a containerized, on-premise architecture to a service-agnostic cloud-based architecture.
3. **Specific Aim #3:** Validate the interoperable (SMART on FHIR leveraging OAUTH2.0) and cloud-based architecture through rigorous testing.

Current State

mPATH

Tablet Based Screening Program

Wake Forest Baptist Health

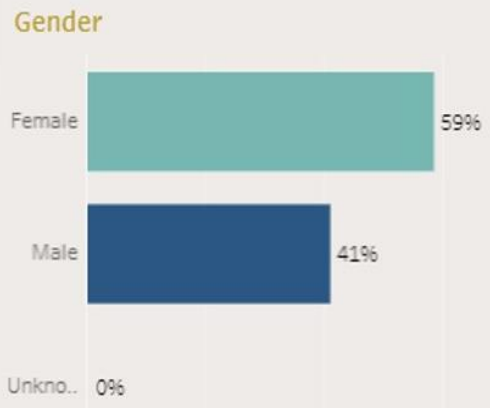
Clinic Name

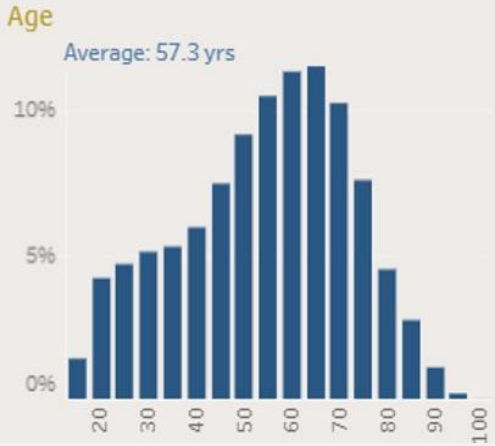
(All)

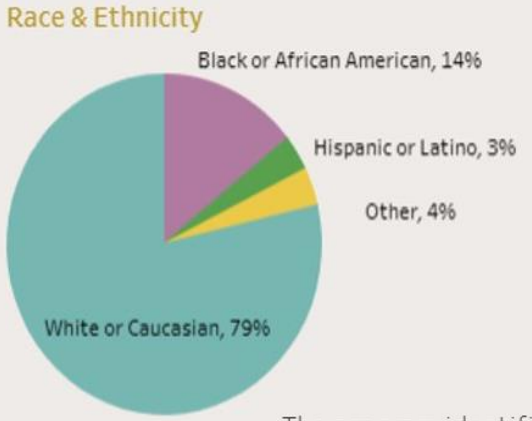
Encounter Date

08/23/19 — 05/11/21

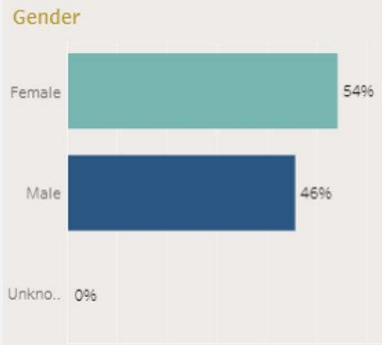
mPATH was used 18,565 times by the following patients:

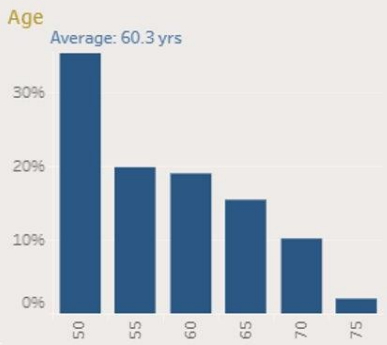


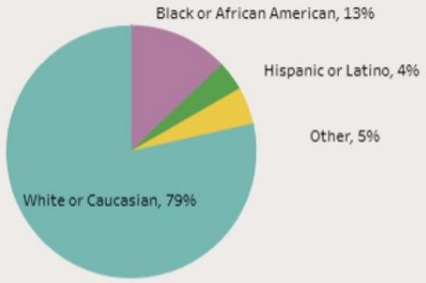




The program identified 1,240 patients needing colorectal cancer screening. 79% of these patients never had colorectal cancer screening in the past. Patient demographic below:





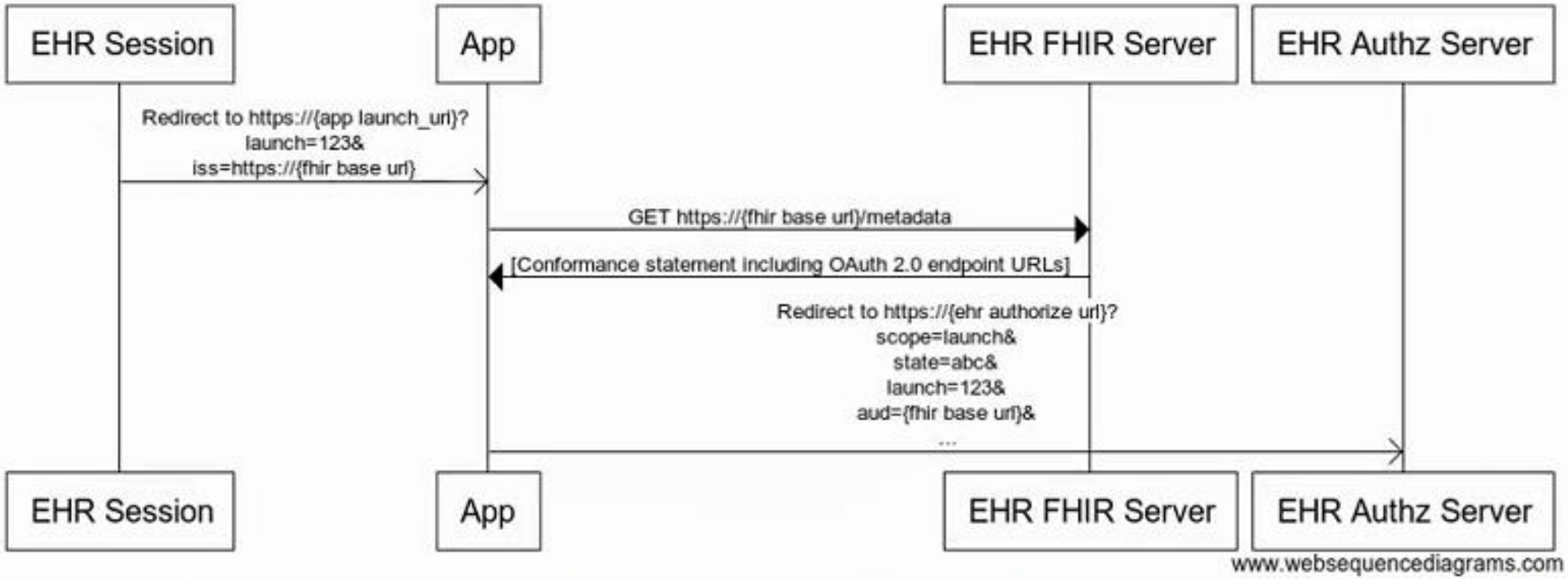


Process - Approach

- All existing APIs were converted to most up-to-date APIs
  - R4 when available
- New Button Created in Epic to Launch using new Smart on FHIR context
- Handshake Methodology

Process – SMART Launch from EHR

Figure 2: EHR Launch Sequence



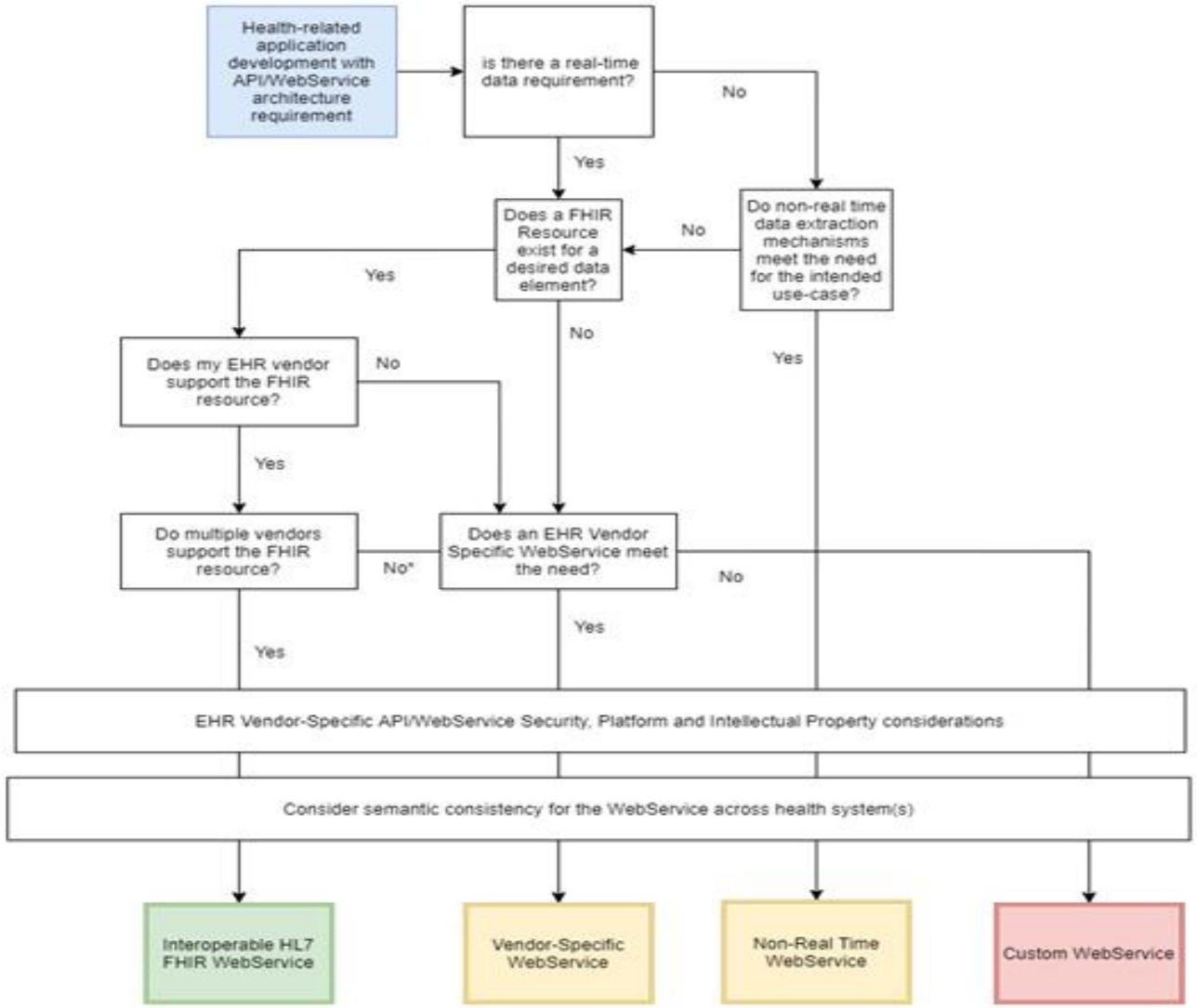
In SMART's EHR launch flow (shown above), a user has established an EHR session, and then decides to launch an app. This could be a single-patient app (which runs in the context of a patient record), or a user-level app (like an appointment manager or a population dashboard). The EHR initiates a "launch sequence" by opening a new browser instance (or `iframe`) pointing to the app's registered launch URL and passing some context.

Process

- Conversion from PACS to FHIR
- Reduce dependency on proprietary EHR APIs
- Not fully FHIR based – multiple calls where FHIR APIs did not fulfill the need

Process - Selection

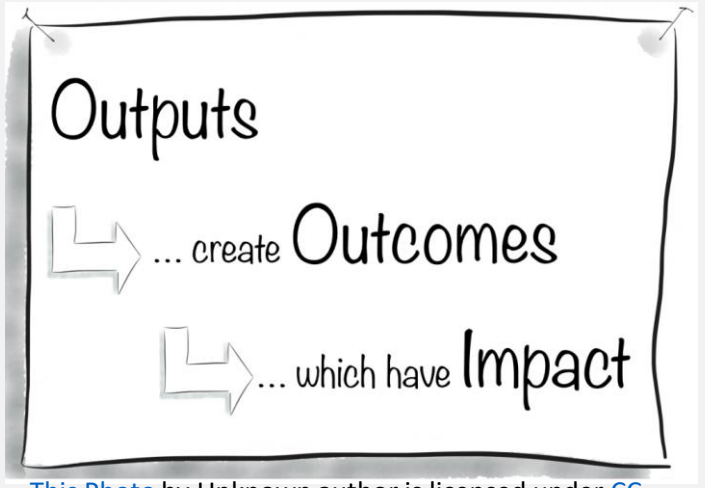
Figure 1: API/WebService Selection Tool



*FHIR Resources may remain the most effective solution in use-cases where additional EHRs do not support the desired FHIR Resource in anticipation of future support.

Process - Outcomes

- Mostly FHIR APIs were used
- Reduced the need for multiple API calls
- Health Maintenance were not available
- Writing back to EHR still required proprietary APIs



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Process - Challenges

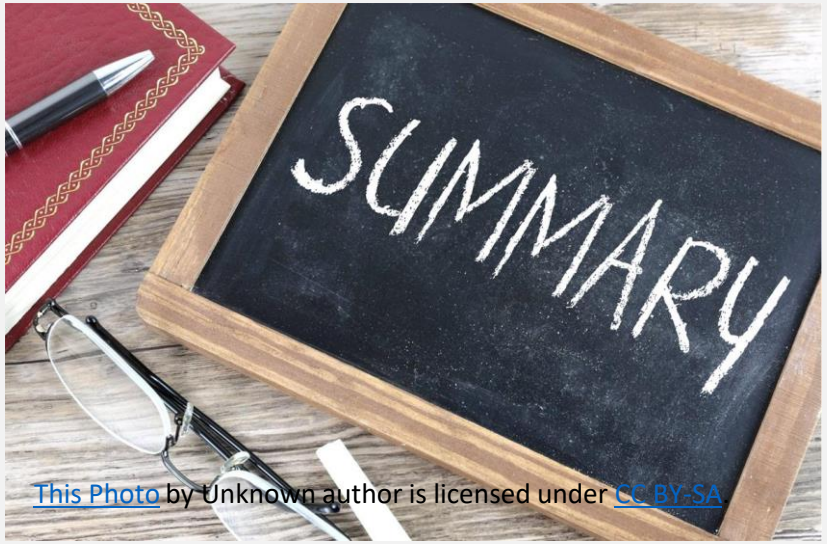
- Server configuration
  - Whitelisting endpoints
  - Determining which FHIR Server to use
- People time
  - Business Analyst time
  - Network Analyst time
  - Software Engineer time

Next steps

- Testing
- Deploy to Production

Conclusions

- High Throughput Method
- Help ease patient intake
- Automate



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Contact

- During DevDays, you can find / reach me here:
  - Via Whova App – Speaker's Gallery
  - Email: awmoses@wakehealth.edu, pyelton@wakehealth.edu, adharod@wakehealth.edu

Q&A

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