



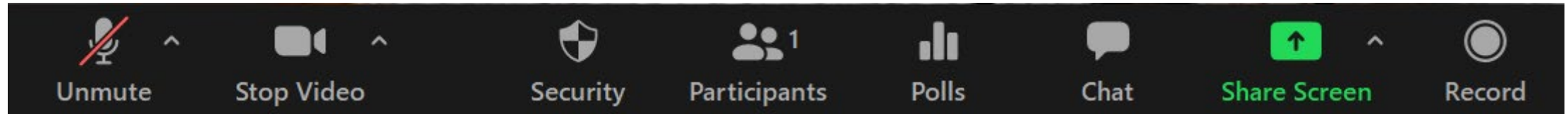
# Success and Sustainability: Digitally-Provided Genetic Services Overcome Obstacles to Patient Access to Precision Medicine

AI-Enabled Digital Health Series

David Flannery, MD | Cleveland Clinic

**March 7th, 2024**

# Zoom Tips



## Muted on Entry

You are muted on entry. If you wish to comment or ask a question, you can unmute yourself.

## Open the Chat & Q&A

Please open the chat and use it liberally; we want to hear from you!

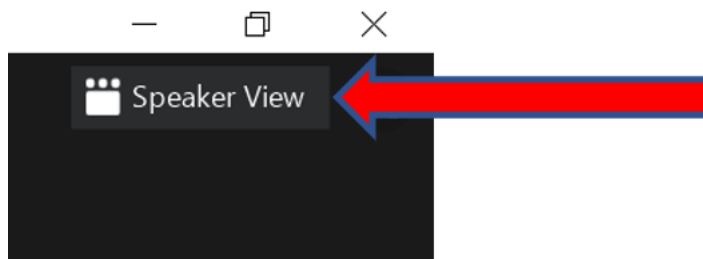
Send comments and feedback to **"Everyone"**

## Session Recording

We are recording today's session to capture LIVE responses. The recording will be made public. By attending you consent to be included

## Speaker View vs Gallery View

At the top right of your screen you can change the video panel to just show the main speaker, or to gallery view to see the speaker and other participants, depending on your preference.



# Before We Get Started

---

**Today's session is purely for informational purposes.**

CTRC does not provide legal advice. CTRC has no relevant financial interest, arrangement, or affiliation with any organizations related to commercial products or services mentioned in this session.

# Success and Sustainability: Digitally-provided Genetic Services Overcome Obstacles to Patient Access to Precision Medicine



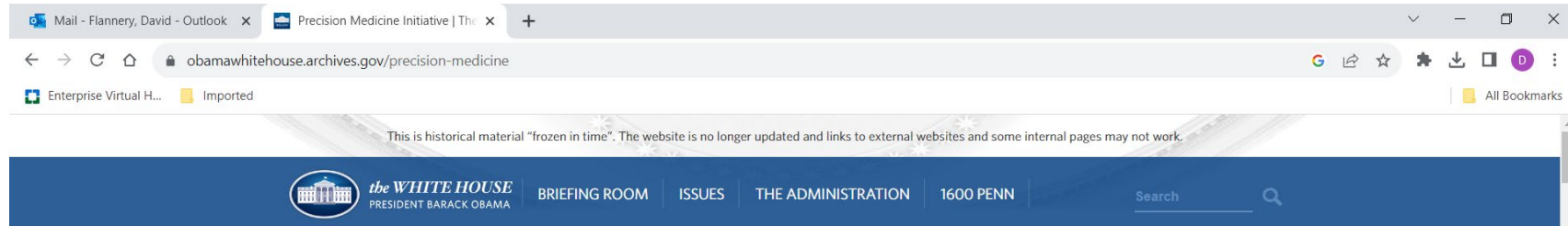
**David Flannery, MD**

**Director of Telegenetics and Digital Genetics**

**Center for Personalized Genetic Healthcare**

**Cleveland Clinic**

# Genetics is becoming more and more important in healthcare



## THE PRECISION MEDICINE INITIATIVE



# There is a rising demand for genetic and genomic services



# Implementing Precision Medicine

- Numerous published surveys indicate that 66% or more of physicians think that genomics will impact their practice, regardless of their specialty, while only 25% felt that they knew enough to actually implement genomics clinically.



# Genetic Workforce in the US

- MD Clinical Geneticists = ~1600
- Genetic Counselors - ~5,000
- Total Genetics workforce = 6,600





# Cleveland Clinic Center for Personalized Genetic Healthcare (CPGH)

- One of the largest clinical genetic services in the country
- Every time we add additional MD Geneticists and Genetic Counselors, our schedules fill up, which means that there is still an unmet demand
- Last year 11,634 patient encounters
  - Inpatient and outpatient



# CPGH Current Staffing

- 11 MD geneticists
  - Dual/triple certifications
- 25 Genetic Counselors
  - Licensed and board-certified medical professionals
  - Sub-specialization
    - Cancer
    - Cardiovascular
    - General
    - Ophthalmic
    - Prenatal
    - Renal



1 Pharmacist (PharmD) Pharmacogenomic clinic/testing



# My Vision to Increase Access to Genetics and Genomics Was:

- Transform the delivery of genetic services by using digital tools to provide care:
  - Right Person
  - Right Genetic Service Provider
  - Right Way
  - Right Time



# Cleveland Clinic Center for Personalized Genetic Healthcare's "Prime Directive" 🖐️

- Ensure that all CPGH providers practice at the top of their license



# How to Do This

- Telemedicine (“Telegenetics”)
- eConsults
- Genetic Counseling Chatbots

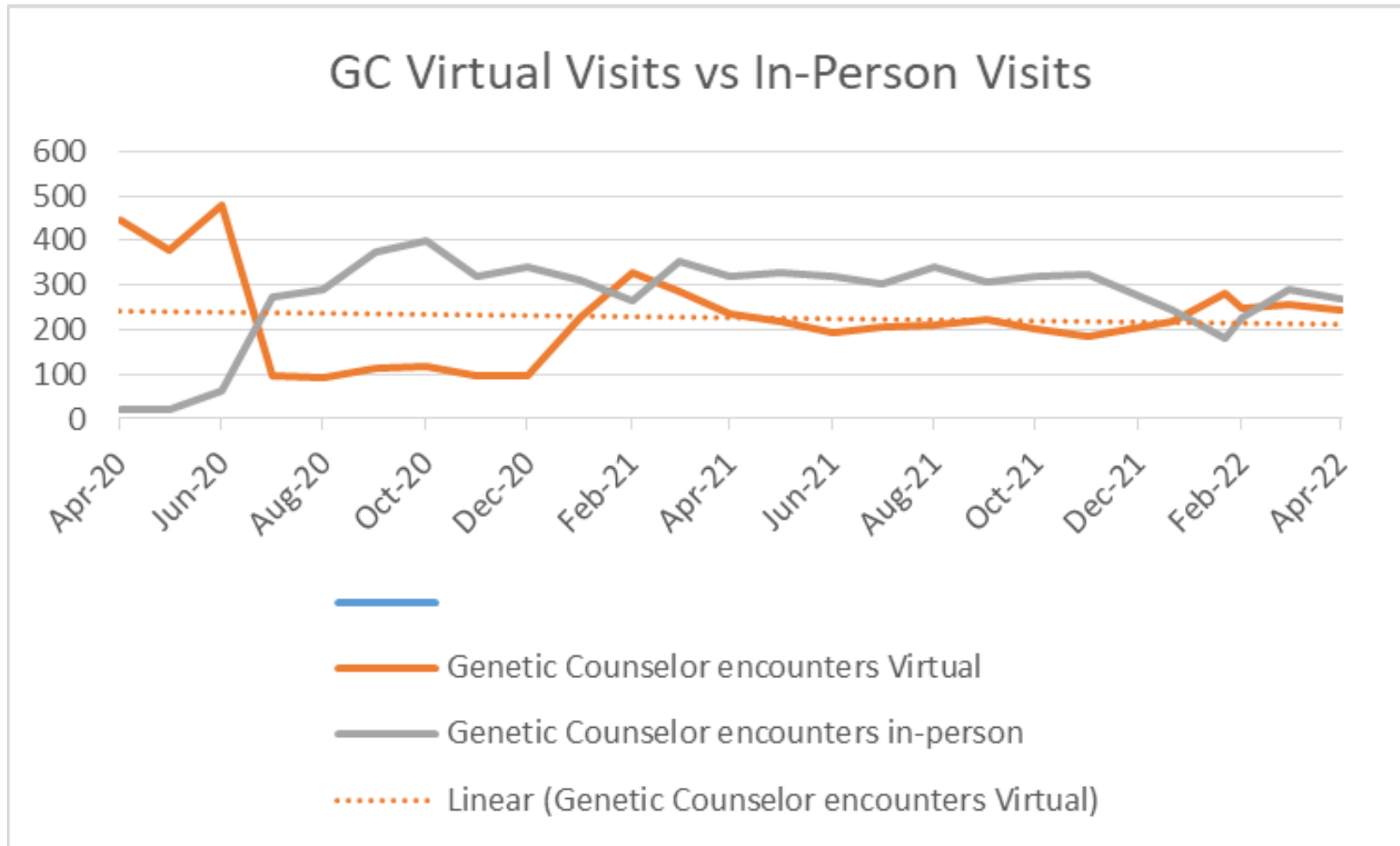


# Telegenetic Services at Cleveland Clinic Pre-Pandemic

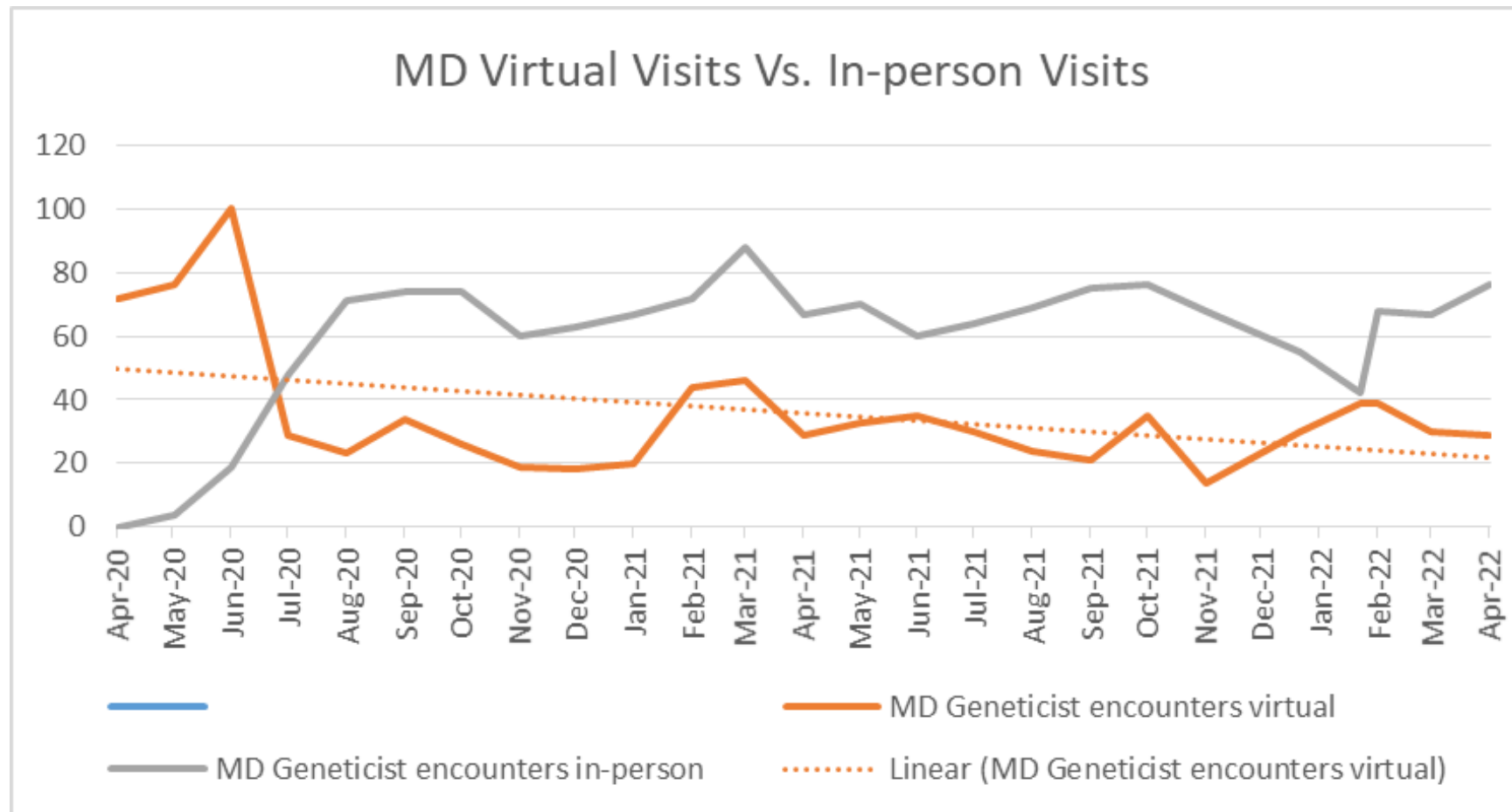
- Regularly scheduled telegenetic cancer counseling clinic sessions to hospitals in Sandusky, Mansfield and Wooster Ohio
- An M.D. Geneticist saw patients in our on-campus Genetic Clinic from her home office in Florida
- Telegenetic M.D. consults to NICU at Hillcrest and Fairview hospitals
- Total virtual encounter in 2019 = 129
- Quickly flipped all of our outpatient genetic services to virtual outpatient visits starting March 16, 2020



# Genetic Counselor Encounters from the Beginning of the Pandemic



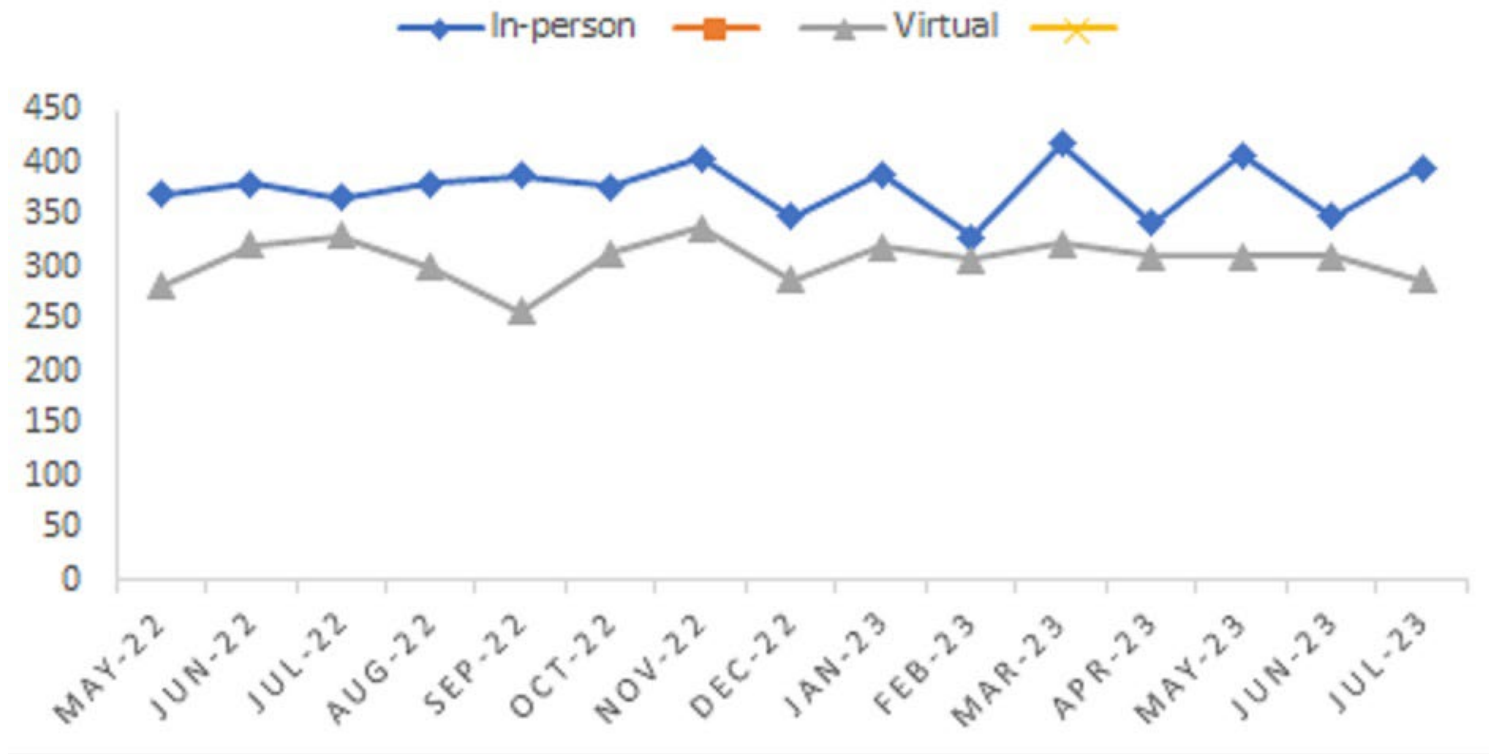
# MD Geneticist Encounters from the Beginning of the Pandemic





# Maintenance of Telegenetic Encounters

## VIRTUAL VS IN-PERSON MONTHLY




# Additional Successes

- This hybrid model of providing Genetic services has been great for retention of team members
- 4 MD Geneticists now continue to work for CPGH after moving outside of Cleveland
- 3 Genetic Counselors work from outside of Cleveland



# eConsults for Genetics

- eConsults are a form of “store and forward” digital service
  - eConsults are typically provider-to-MDconsultant and ask specific questions. Consultant reviews the patient data and answers the question(s) and makes recommendation back to the requesting provider but does not encounter the patient.
- 

# eConsults

- CPT codes used: “Interprofessional Internet Consultations”
  - There is a code for the provider requesting the eConsult and also a code for the Consultant answering the eConsult
- eConsults typically are sent within the EHR
- Published data for other specialties’ eConsults showed that the patient did not need to see the consultant specialist ~25% of the time

# Genetics eConsults

- We Began Offering Genetics eConsults in October 2019
- It is an order in Epic for CCF providers in Ohio.
- We developed a playbook explaining the process and what would be reasons to request a Genetics eConsult



# Screenshot of Epic Order for Genetics eConsult

E-CONSULT GENOMIC MEDICINE ✓ Accept ✗ Cancel

Status: **Normal** Standing Future

Class: Normal

Priority: Routine

Modifiers:

Quantity: 1 (The maximum orderable quantity for this procedure is 100)

Sched Inst.: + Add Scheduling Instructions

Comments: abc Insert SmartText

If the patient has an established Genetics Specialist please direct to his/her established Specialist for follow up recommendation.

I am requesting a Genetics E-Consult for my 64 year old female. My Clinical Question pertains to (select all that apply): **Genetic Domain Econsult: 137170**.

**General genetics evaluation.**  
**Interpretation of a genetics test result**  
**Patient's family history**  
**Carrier Testing**

Dx Assoc.:

Assc	Encounter	Diagnoses	Codes	Qualifier	Comment
1	<input type="checkbox"/>				

Next Required ✓ Accept ✗ Cancel



Zztest, Babby M Female, 12 month old, 08/19/2018 MRN: 56084541 Allergies: Penicillins, Amoxicillin, Flagyl... Code: Full Code by Default Type: None Alerts: HM Care Path: Pt Reminders: None +

6/6/2019 visit with Theresa H Testmd, MD for E-Consult

- Chart Review
- Results Review
- Synopsis
- Growth Chart
- Demographics
- Problem List
- Medications
- Get Images
- PDMP Report
- Visit Navigator
- Customize

- Care Everywhere
- Chief Complaint
- Rooming Intake
- Vitals
- Allergies
- Pt Entered Qnr
- Verify Rx Benefits
- Rx Payor Disclaimer
- Outside Meds
- PDMP Report
- Med Update
- Nursing Notes
- MyChart Sign-up
- Problem List
- Review
- Goals
- DOCUMENTATION
- Progress Notes
- H&P Notes
- Procedure Notes
- WRAP UP

Progress Notes (F3 to enlarge)

Date of Service: 9/4/2019 03:59 PM

Insert SmartText

E-Consult Genetics Response

In response to your eConsult request to Genetics for Babby M Zztest regarding: \*\*\*.

History of present illness provided through requesting provider documentation and additional pertinent information in the patient's Epic record, including photos, if associated with this eConsult was reviewed.

Based on the patient history provided, my impression is as follows: \*\*\*

Appointment recommendations: [E-consult genetics response: 143362]

No appointment with Genetics is needed  
 Patient needs to be seen ASAP. An appointment will be coordinated by Genetics  
 Patient can be seen by Genetics on a non urgent basis, our office will contact the patient to schedule.  
 A Genetic Counseling visit is indicated, our office will contact the patient to schedule  
 \*\*\*

David Flannery, MD  
September 4, 2019

Sign at Close Encounter

+ ADD ORDER

1 SIGN ENCOUNTER

# CCF Genetics eConsults

- Slow growth, improved with “booster” reminders about their availability in Department newsletters and during huddles
- Typically 1 per business day





# Future eConsult services

- Working on setting up availability of eConsults to Cleveland Clinic providers outside of Ohio.
- Working on getting approval for Genetic Counselors to provide eConsult services as well.



# Chatbots for Clinical Genetics



# What is a Chatbot?

- It is a software program designed to simulate conversation with humans online
- You have encountered them on web sites





Track a package or search

# Shipment Ready for UPS



## Scheduled Delivery

When the shipment arrives at our facility the delivery date will be updated.

View delivery time window with UPS My Choice®. [Continue](#)

## Additional Information

Adult Signature Required

Send Updates Delivery Options

**Ship To**  
CLEVELAND, OH, US

We care to get m

**Need Help?**  
Get Quick Answers

Hello, I'm the UPS Virtual Assistant. I see you tracked a package. Let me know how I can help.

Feedback

Start typing here...

Aa

# Healthcare Chatbots

- Provide additional information to patients about diagnosis, condition, side effects, etc.
- Ensure that patients are directed to the “correct” type of care or care provider.
- Digital therapeutics
  - Psychotherapy. (e.g. Woebot)
- Ask patients preliminary/screening questions, so that doctors can use their time in the most efficient manner when caring for patients.



# Healthcare Chatbots

- Need to be HIPAA-compliant
- Need to be secure
- Need to be clinically validated



# “Bot” Platform

- Online ecosystem where chatbots reside and from where they can be deployed
- For many chatbots, the platform includes a database of information which the bot uses to answer questions



# Using Chatbots

- Need to run on all devices – computer/laptop, smartphone, tablets
- Link to a chatbot can be sent to patient as a text message, MyChart message, or in an email





# Uses for Genetic Chatbots

- Pre-test education/counseling/consent
- Triage- assessing risk for genetic predisposition
- Return of results- “negative” or normal results
- Facilitate cascade testing
- Clinical trials –recruitment, consent, patient-reported outcome data

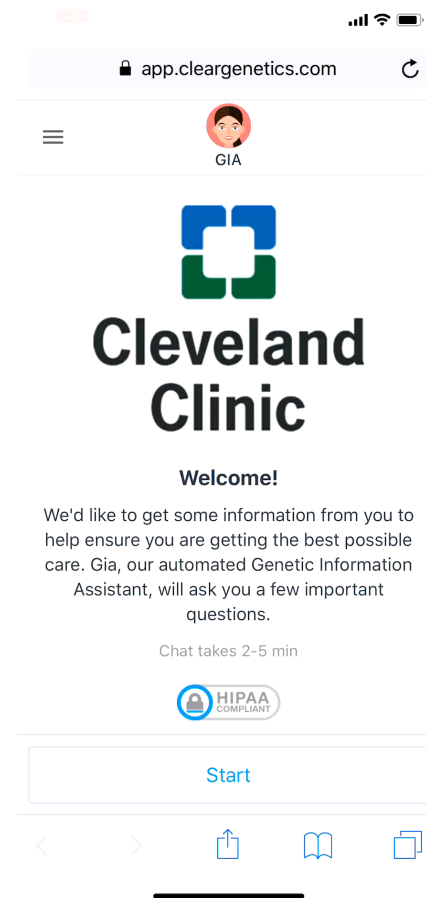


# Our Use of Genetic Counseling Chatbots

- Pre-test education/counseling for proactive genetic testing for Executive Health patients
- Assessment of patient's personal and family history to identify increased risk of Lynch syndrome and offer genetic counseling session when patients come in for colonoscopy



# Example of a Genetic Counseling Chatbot



# Newly Implemented Chatbot for Pharmacogenomic (PGx) Patients

- Pharmacogenomics tests specific genes which are involved in metabolism of specific drugs.
- Some PGx genes' activity decreases the breakdown of medications while some increase the breakdown of medications
- Some PGx genes' activity is needed to convert a prodrug into active form (e.g. Clopidogrel)



# Pharmacogenomics Chatbot Use Case

- Cleveland Clinic CPGH has 1 PharmD with a PhD PGx expert
- All patients referred for possible PGx testing need pre-test counseling/education
- We decided that a custom chatbot would be a scalable solution to deliver education and document patient decision-making regarding PGx testing, so our PGx team could more effectively provide higher-value service to patients (“top of license”)

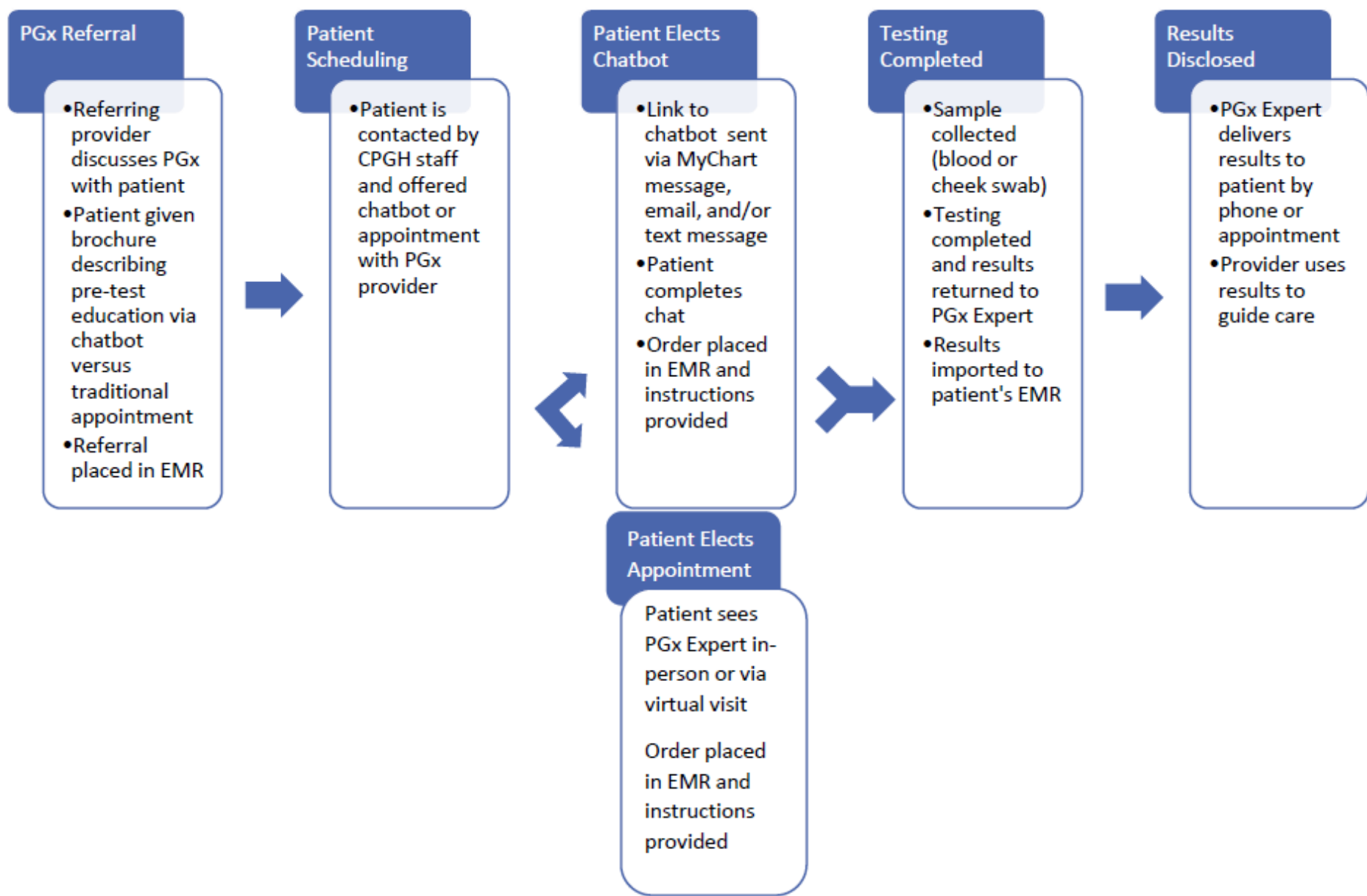


# PGx Pretest Chatbot Project

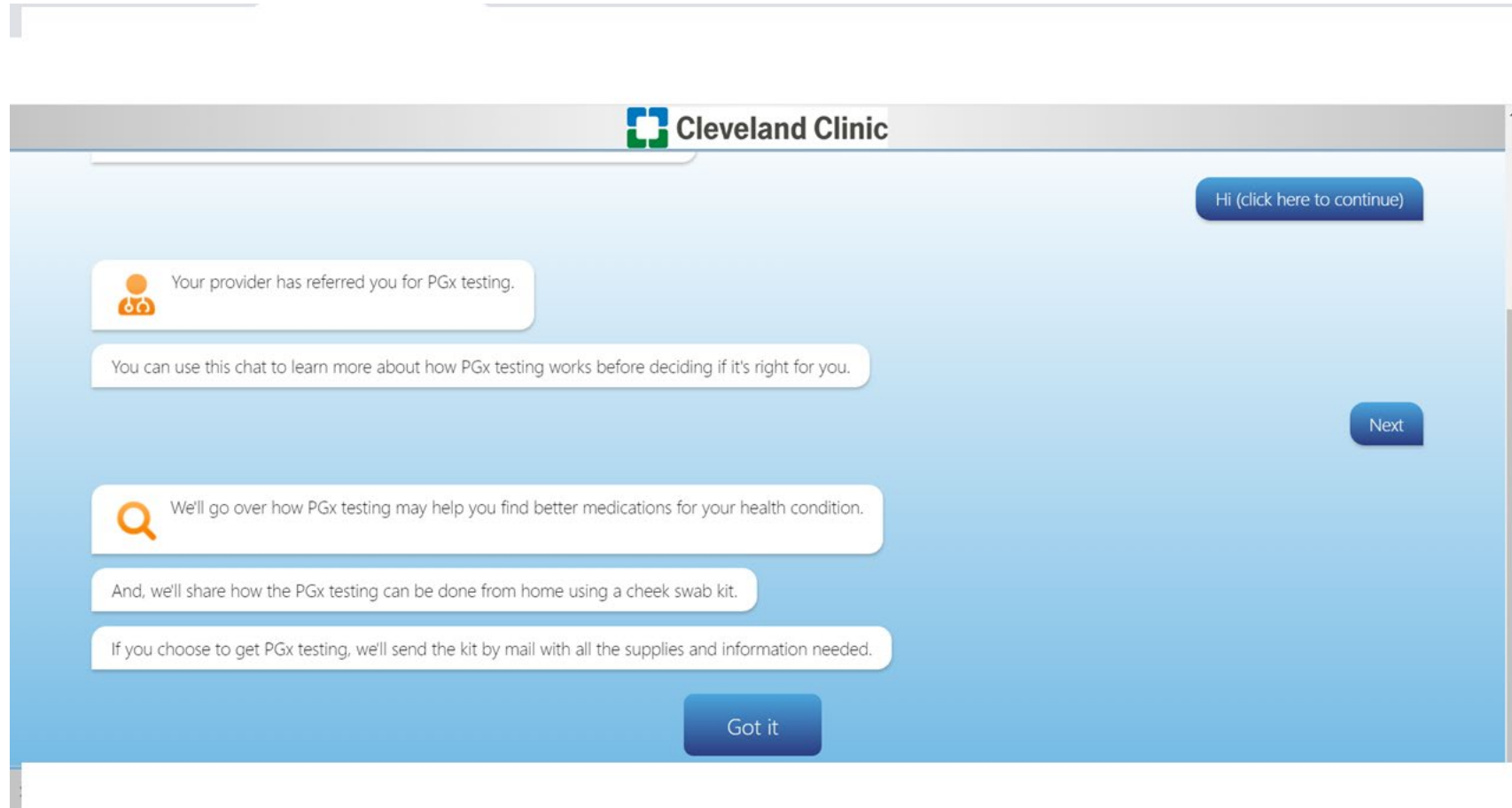
- Developed with an experienced healthcare chat company
- We wanted it to be *lab agnostic*
- Script developed by our team of 2 Genetic Counselors, Pharmacogenomic PharmD+PhD and MD Geneticist based on our well-established face-to-face pre-test visits



# PHARMACOGENOMICS HEALTHCHAT WORKFLOW



# Screenshot of the PGx Chatbot Encounter





# Dashboard for the PGx Chatbot

The dashboard features a dark blue navigation bar with the following tabs: Patients, Chats, Responses, Patient Engagement, Activity, and Reporting. Below the navigation bar, there are six white cards arranged in a 2x3 grid, each with a title and a brief description of its function:

- Patients**: Search for Patients in your organization.
- Chats**: Search for Chats taken by Patients in your organization.
- Responses**: Search for Responses to specific Chat questions.
- Patient Engagement**: Search for Patients and their most recent Chat engagement state.
- Activity**: Search for Activities related to Patient communications.
- Reporting**: View program metrics and analytics.



# Results

- PGx chatbot offering went live March 13, 2023
- I cannot report specific data yet, as we have just begun analyzing data
- However, I can talk in generalities about the impact



# Generalities About PGx Chatbot Encounters

- Good uptake of the chatbot choice vs. in-person or virtual pre-test encounter
- High completion rate
- Leads to greater number of patients seen in PGx Clinic with results at initial encounter
- High patient satisfaction with chatbot encounter



# Future Genetics Chatbot Projects

- Post-visit reinforcement of understanding possible types of results from genetic tests:
    - Pathogenic, Likely Pathogenic, Likely Benign, Benign, or Variant of Uncertain Significance (VUS)
- Chatbot to be shared with family members at risk after a patient is found to have a cancer risk genetic result (“Cascade Testing”)
- Chatbot for intake assessment of patients referred with autism



“The best way to predict the future is to create it.”

- We have the tools
- We are only limited by our imagination (and regulation...)





**Cleveland Clinic**

**Every life deserves world class care.**

# Upcoming Events



## THE ROLE OF AI IN DIGITAL HEALTH SERVICES

Our **free, virtual monthly series** with timely topics, peer sharing, and community connections


[LEARN MORE](#)



FREE LEARNING EVENT

## HEALTH EQUITY ACROSS THE AI LIFECYCLE

AI-ENABLED DIGITAL HEALTH SERIES

 TUESDAY MARCH 19

 TIME 12 PM PST

[REGISTER](#)

[www.caltrc.org](http://www.caltrc.org) <<<<<<



FREE LEARNING EVENT

## ORGANIZATIONAL GOVERNANCE OF AI

AI-ENABLED DIGITAL HEALTH SERIES

 TUESDAY APRIL 23

 TIME 12 PM PST

[REGISTER](#)

[www.caltrc.org](http://www.caltrc.org) <<<<<<



# 2024 In-Person Workshop

---

CTRCs Digital Health Workshop are interactive work session aimed at supporting health centers in implementing or expanding digital care innovations

- Pre-Workshop Operational Assessment will guide content to address the specific needs of participating health centers.
- Participants will learn best practices to support the adoption of digital health services for both patients and clinicians.
- Participants will learn about reimbursement as well as state and federal regulatory policy.
- Participants will consider improvement areas such as addressing barriers to integration and opportunities to support access and sustainability.
- Participants will gain insights into implementing the needed technology, staff training, patient education, as well as provider orientation and education.

## In-Person Opportunities:

- Central Valley / Fresno March 21<sup>st</sup>
- SoCal (Los Angeles) July 24<sup>th</sup>



[Click Here for More Information & Registration](#)





# Thank You



[www.caltrc.org](http://www.caltrc.org)