

# Enhancing Trainee Education in Medical Genetics Rotations: Exploring the Efficacy of Video-Based Learning Modalities for Core Genetics Concepts

Meredith Suggs<sup>1</sup>, Gabrielle Segal<sup>2</sup>, Devin Davis<sup>2</sup>, Anna Beck<sup>2</sup>, Megan Morand<sup>1</sup>, Jenny Do<sup>1</sup>, Erin Cooney<sup>1</sup>, Elizabeth Rodriguez Lien<sup>1</sup>  
<sup>1</sup>Department of Pediatrics, University of Texas Medical Branch at Galveston; <sup>2</sup>UTMB John Sealy School of Medicine

## Introduction

In the ever-evolving landscape of medicine, genetics stands as a cornerstone of understanding disease etiology, prognosis, and treatment. Advancements in genomic medicine have transformed the clinical landscape, offering unprecedented insights into individualized patient care (1). As the field progresses, the education of medical trainees must adapt to ensure future providers are equipped with the necessary knowledge and skills to navigate the genomic era effectively. It is imperative trainees have access to a revamped curriculum that not only ensures proficiency in genomic medicine but also delivery of effective healthcare to diverse patient populations.

Our objectives were as follows:

- Develop and implement a video-based curriculum to supplement genetic education during genetic clinical rotations
- Improve the trainee educational experience
- Improve trainee comfortability in answering genetics questions

## Abstract

Recent research highlights a concerning trend: despite genetics significantly influencing virtually every medical specialty, medical training fails to instill confidence in physicians when it comes to applying medical genetics and genomics in practice (2). At the University of Texas Medical Branch (UTMB), a multitude of trainees, ranging from medical students to maternal fetal medicine fellows, engage in rotations within the genetics clinics each month. However, there was an absence of a standardized curriculum for rotators, often relying on whiteboard sessions or small group discussions for teaching. Our hypothesis posits the implementation of an innovative, standardized, video-based curriculum could substantially enhance the educational experience during the genetics rotation and bolster confidence in addressing genetics-related questions.

## Description of Intervention/Study

We crafted a series of nine videos, each spanning around 10 minutes, addressing high-yield genetics topics (Fig. 1). These videos covered a wide spectrum, from the art of constructing pedigrees to exploring resources available for children with developmental delays (Fig. 2).

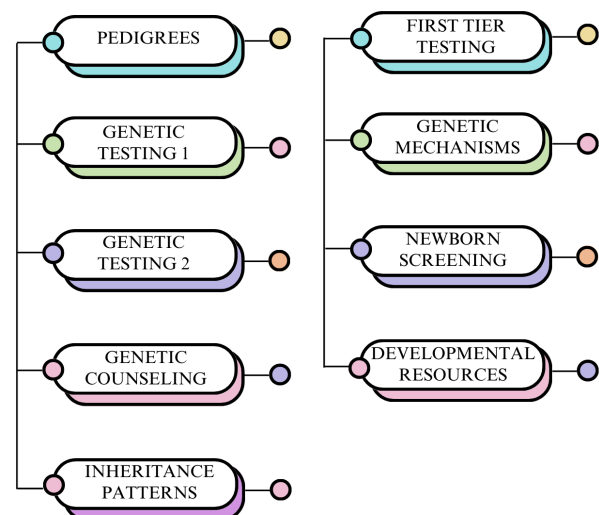


Figure 1: Instructional video topics

Prior to starting their genetics rotation, all trainees were tasked with anonymously completing a comprehensive 19-question quiz. Trainees were divided into two groups: one group was provided access to our instructional videos, while the other group did not have access to these resources. Following the rotation, post-assessment quizzes (Fig. 3) were administered to both groups to gauge the impact of video-based learning on knowledge acquisition, retention and overall educational experience.

Participation had no effect on resident evaluations. IRB exemption was obtained. We utilized unpaired and paired t-testing for statistical analysis.

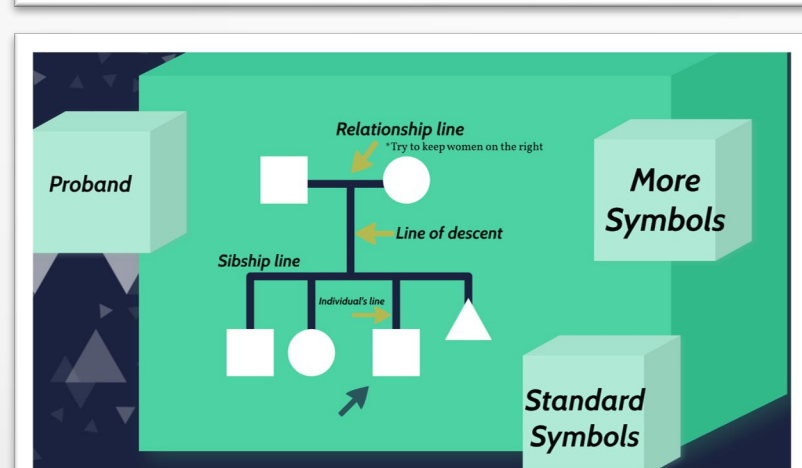
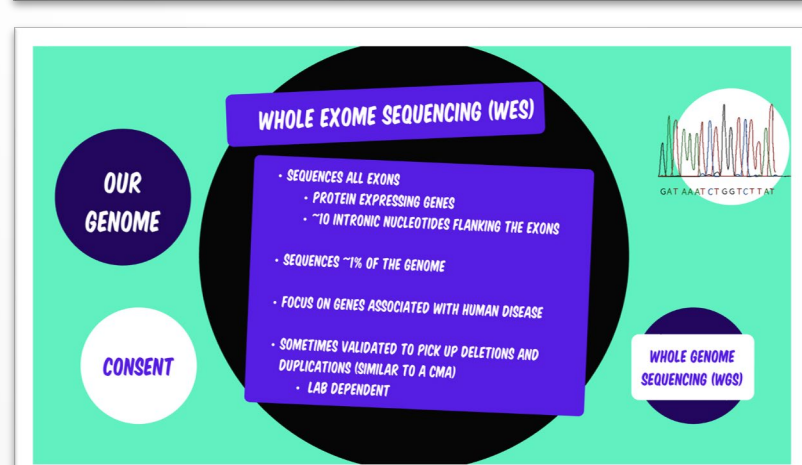
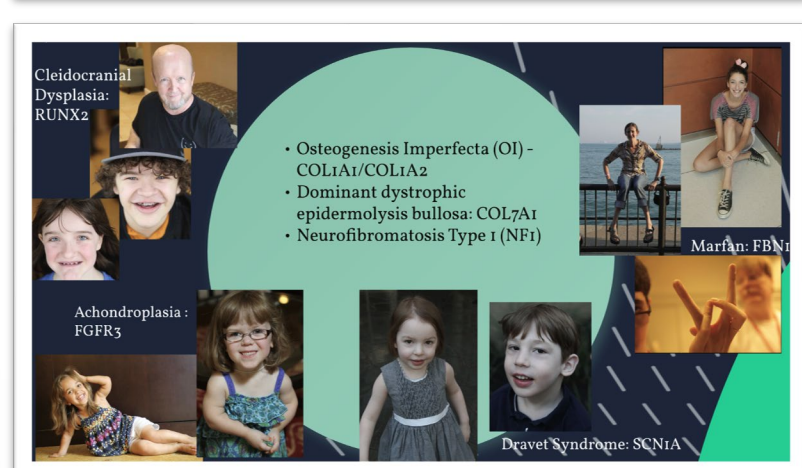


Figure 2: Samples of instructional videos created for trainees

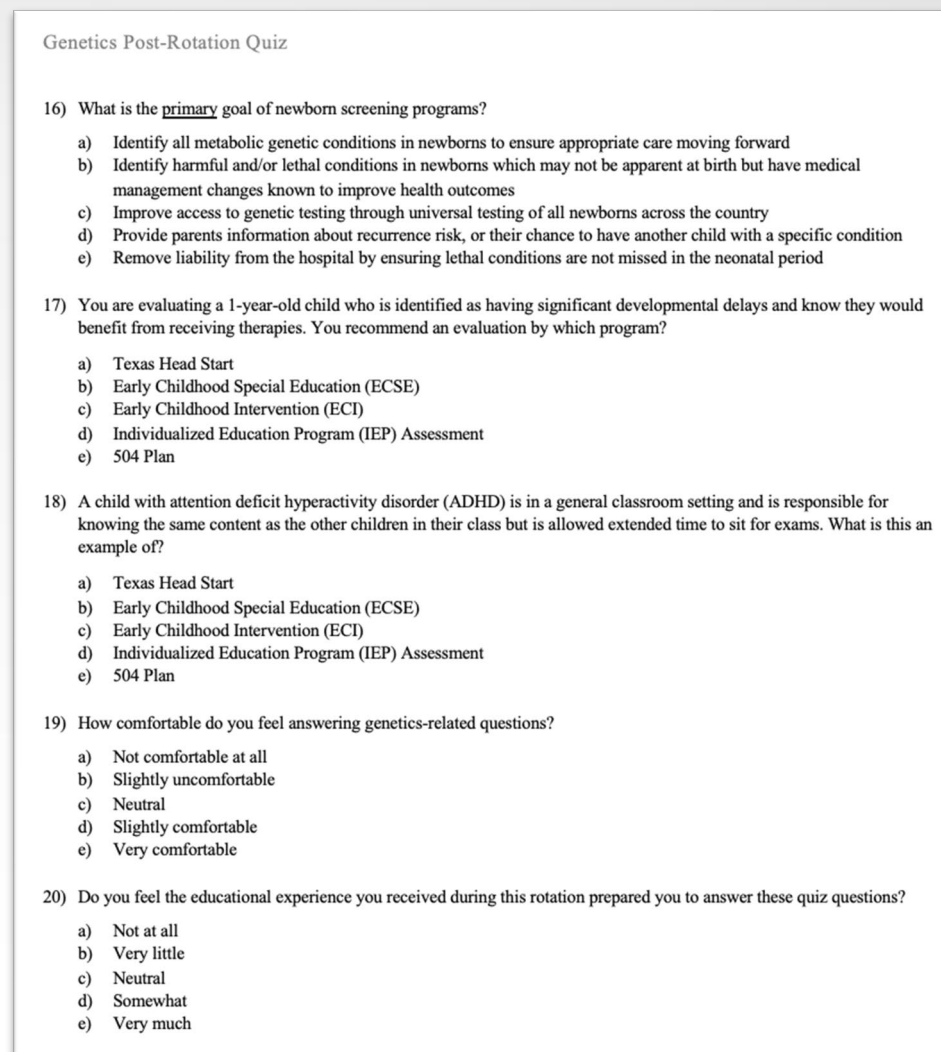


Figure 3: Excerpt from post-rotation quiz

## Results

Twelve trainees completed both pre- and post-rotation quizzes without exposure to the instructional videos, while eight trainees completed quizzes after watching all nine videos. Additionally, two trainees who had access to the videos did not watch any, and five trainees had access but did not watch all nine (specifically, 1, 2, 3, 5, and 7 videos).

One trainee from the non-video group and one trainee from the video group were omitted due to not completing all survey questions.

Notably, trainees who viewed all videos demonstrated a statistically significant improvement in their perceived preparedness to answer genetics questions ( $p = 0.0069$ ) compared to those who did not have access to videos (Fig. 4). This was computed using an unpaired t-test.

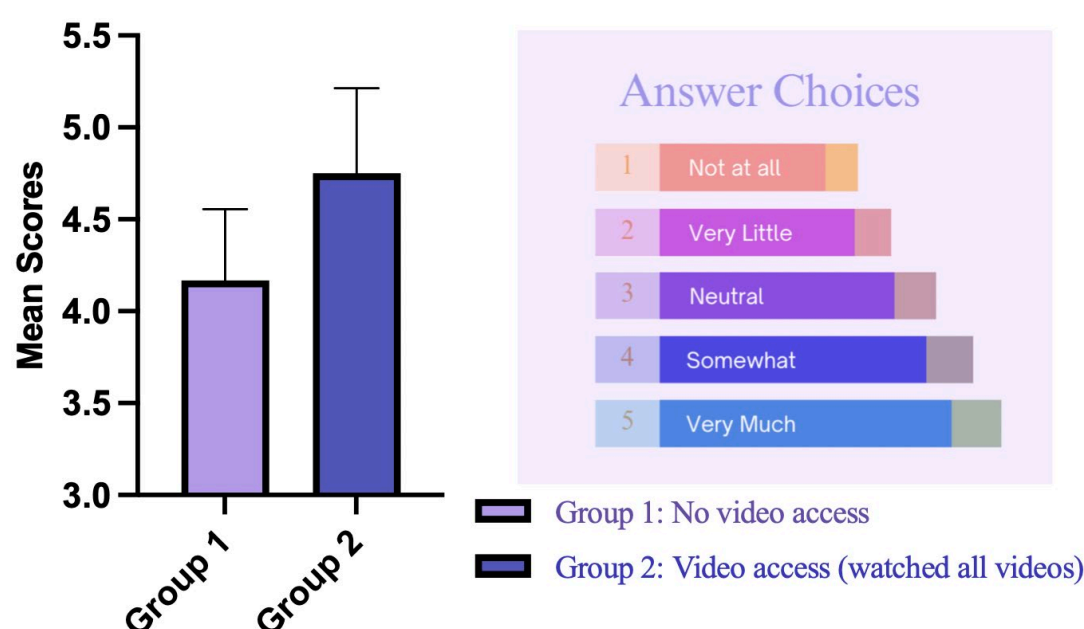


Figure 4: Do you feel the educational experience you received during this rotation prepared you to answer these quiz questions?

There was also a statistically significant improvement in comfortability pre- and post- rotation in the group who had video access (including the trainees who watched all videos, some videos and no videos) ( $n = 8$ ,  $p = 0.038$ ) as well as trainees who had no video access ( $n = 11$ ,  $p = 0.0011$ ). These were computed using paired t-tests.

Post-intervention quiz scores increased in a statistically significant manner in the group with video access who viewed all videos ( $n = 8$ ,  $p = 0.0317$ ; pre-quiz average = 48.6%, post-quiz average = 63.2%).

Post-intervention quiz scores also increased in a statistically significant manner in the group with no video access ( $n = 12$ ,  $p = 0.0002$ ; pre-quiz average = 42.1%, post-quiz average = 57.9%).

No statistically significant differences were seen in:

- Pre- and post- quiz scores in the group that had access to the videos, however watched none ( $n=2$ )
- Pre- and post- quiz scores in the group that had access to the videos, however watched at least 1, but not all ( $n=5$ )

## Conclusions

In a population of medical and physician assistant students, pediatric residents, and maternal fetal medicine fellows enrolled in a genetics rotation at UTMB, trainees who had access to (and watched all) our novel, video-based genetics curriculum reported a statistically significant improvement in their perceived preparedness to answer genetics questions.

Both the group with no video access and the group with video access (who watched all videos) demonstrated a statistically significant improvement in quiz scores pre- and post-rotation. This is likely due to our limited sample size. These initial findings suggest a possible benefit and highlight the necessity of further data collection.

We hope medical programs nationwide will adopt our framework as a model for developing similar curricula suited to their institutions. We believe by nurturing proficiency and confidence in genetics early in trainees' education, we can empower future healthcare providers to seamlessly integrate medical genetics and genomics into patient care with confidence.

## References

1. Perez N, Peterlin B, Ostojić S, Poslon Ž. Editorial: The Importance of Genetic Literacy and Education in Medicine. *Front Genet.* 2022;13:910530. Published 2022 Apr 28. doi:10.3389/fgene.2022.910530
2. French EL, Kader L, Young EE, Fontes JD. Physician Perception of the Importance of Medical Genetics and Genomics in Medical Education and Clinical Practice. *Med Educ Online.* 2023;28(1):2143920. doi:10.1080/10872981.2022.2143920

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