Experience with Healthy Individuals Pursuing Genomic Screening:

providing guidance for genomic counseling via a telemedicine approach

B. Swope, S. Kalia, SM. Weissman, A. Fan, CA. Fine, H. Shabazz, EG. Gordon, P. Atwal, SB. Bleyl

INTRODUCTION

Advances in genome sequencing have allowed the public to pursue rapid, more available, and less costly genetic testing options. 'Genetic wellness" has become more popular and proactive genomic screening is increasingly being explored by healthy individuals in order to reveal genetic insights into medically actionable outcomes. As a nationwide medical practice of genetic counselors and medical geneticists, we describe our experience providing responsible access to genomic information to apparently healthy individuals via assessment, counseling, test authorization, and clinical management using a telemedicine platform.

METHODS

ASSESS

Pre-test genetic consultation was performed to determine if patient would benefit from genetic testing, either proactive or diagnostic

- Interest and indications for testing were discussed
- Relevant family histories were obtained
- Proactive genomic screening (targeted panels to whole genome sequencing (WGS)) and/or indication-based testing were reviewed

SELECT

The most appropriate genetic test for the patient was chosen and ordered.

- Potential results that may be identified relevant to reported family history were discussed

INTERPRET & INTEGRATE

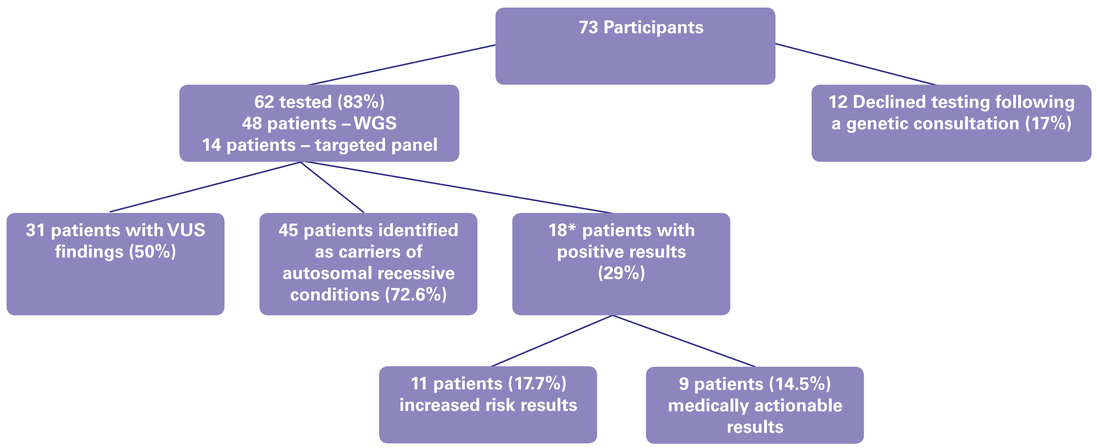
Test results were reviewed in a follow-up telegenomic consultation and clinical action plans were created to help guide the incorporation of clinically actionable insights into the patient's care.

All consultations (both initial and follow-up) were scheduled for 30 minutes by either phone or video. Data was collected and analyzed based on demographics and results.

Demographics

Average age	49.9 (range 27-80)
Sex	
Males	40 (54.8%)
Females	33 (45.2%)
Ethnicity	
Ashkenazi Jewish	4 (5.5%)
Asian	2 (2.7%)
Caucasian	60 (83%)
Hispanic	3 (4.1%)
Other/Mixed	4 (5.5%)
Referral	
Self	55 (75.3%)
Physician	18 (24.7%)
Referral Indication	
Interested	66 (90.4%)
Family History	7 (9.6%)
Appointment	
Phone	46 (63%)
Video	27 (37%)

RESULTS



*2 patients had more than 1 positive result

Pathogenic/Likely pathogenic variants identified in the study participants

Increased Risk**	Gene	Condition
Clotting	F2	Prothrombin thrombophilia
	F5	Factor V Leiden Thrombophilia
	F11	Factor II deficiency
	VWF	Von Willebrand disease
Other	MBL2 (homozygous)	Mannose-binding lectin deficiency
Medically Actionable	MUC5B	Idiopathic pulmonary fibrosis
Cancer		
	APC	Familial adenomatosis polyposis
	BRCA2	Hereditary breast and ovarian cancer
	PALB2	Hereditary breast and ovarian cancer
	BRIP1	Hereditary breast and ovarian cancer
Cardio	RAD51C	Hereditary breast and ovarian cancer
	PKP2	Arrhythmogenic right ventricular cardiomyopathy
	TTN	Familial dilated cardiomyopathy
Neuro	MYBPC3	Familial hypertrophic cardiomyopathy
	SH3TC@	Charcot Marie Tooth

1. **Some patients carried variants in the same increased risk gene.
2. Patients that were found to carry variants in the following genes were also noted to have a family history that suggested a potential increased risk: F11, APC, BRCA2, BRIP1.

DISCUSSION

Our experience with healthy individuals pursuing genomic screening identified 14.5% of tested individuals with pathogenic variants for medically actionable conditions, as well as additional variants in genes that may result in subsequent medical surveillance and screening. Interestingly, most positive results were not related to an attributable family history. Lastly, a majority of participants that underwent WGS were identified as carriers of autosomal recessive conditions which could impact reproductive health, and/or variants of uncertain significance which may require additional follow-up as literature becomes available that results in reclassification.

The potential to identify at risk individuals reinforces the need for a patient-centered approach to counseling that provides accurate information of the benefits, limitations, and uncertainties of testing while supporting the individual's motivation for access to genetic information. Ongoing assessment of the breadth and depth of knowledge that clients desire pre-test is strongly encouraged, and the emergence of additional genetic counseling tools to provide that education should be pursued. Core genetic counseling competencies should continue to adapt to this new era of largely patient-initiated genomic screening.

genome MEDICAL

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3. Linderman MD et al. Personal genome sequencing in ostensibly healthy individuals and the PeopleSeq Consortium. J. Pers Med. 2016:6(14).