Facing the challenge of Genetic Counselors' need for education about genomic technologies: Opportunities for improvement in training for genetic counselors

Kimberly Banks[1], Devon Lamb Thrush[2], Samantha Freeze[3], Darnelle L. Dorsainville[4], Jennifer Eichmeyer[5], Kelly Farwell Hagman[2], and The Genomic Technologies Special Interest Group (SIG) of the National Society of Genetic Counselors (NSGC)

1. Guardant Health, 505 Penobscot Drive, Redwood City, CA 94063
2. Ambry Genetics, Department of Clinical Genomics, 15 Argonaut, Aliso Viejo, CA, 92656
3. Indiana University School of Medicine | Riley Hospital for Children, 705 Riley Hospital Drive, Indianapolis, IN 46202
4. GeneDx 207 Perry Parkway, Gaithersburg, MD 20877
5. St. Luke's Mountain States Tumor Institute, 100 E. Idaho, Boise, ID 83712

Molecular technologies continue to rapidly advance. Most genetic counselors were educated prior to their implementation and did not receive training in order to understand and critically evaluate the new technologies.

The Genomic Technologies (GT) Special Interest Group (SIG) issued a needs assessment survey to genetic counselors to assess current genomic technologies knowledge gaps. The survey covered the following twelve core GTs: Next-gen sequencing, Sanger Sequencing, PCR/ DNA amplification, in-solution sequence capture methods, on-array sequence capture methods, comparative genomic hybridization (aCGH), multiplex Ligation-dependent probe amplification (MLPA), NGS-based copy-number variation (CNV) detection, Bioinformatics, non-invasive prenatal testing/screening (NIPT/NIPS), cell free DNA (cfDNA): Tumor, and pre-implantation genetic diagnosis/ screening (PGD/PGS).

A total of 171 genetic counselors completed the survey who worked in a variety of settings including university medical centers, diagnostic laboratories and public hospitals. A majority graduated in recent years: 11 (6.4%) between 1979 and 1989, 19 (11.1%) between 1990 and 1999, 68 (39.8%) between 2000 and 2009, and 73 (42.7%) between 2010 and 2015. Across the twelve GT categories, an average of 74% of respondents reported that knowledge of the technologies is "important" or "somewhat important" in order to successfully perform his/her job. Further, an average of 55% of counselors reported that at least "some training" is needed for adequate job performance. Next-gen sequencing (NGS) ranked the highest with 98.8% (169/171) considering NGS as important for their jobs and yet 56% (95) reported that additional NGS training is needed for adequate job performance. Overall across the twelve GT categories, an average of 56% of respondents reported that training in the GTs was either "poor", "very poor", or that "no training was received". The level of reported training improved with more recent graduates, however even among those graduating between the years of 2010 and 2015, an average of 37% reported that graduate training was either "poor" or "absent" and specifically 29% (21/72) reported that training in NGS was "poor" or "absent."

These results have implications for training programs and will serve to guide the GT SIG in pursuing the mission to promote the ongoing education of genetic counselors and other providers about existing, new, and emerging genomic technologies.