

Survey probes staff shortage in genomics labs

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March 2024—From a technologist workforce perspective, clinical genomics laboratories are in trouble.

“It’s truly a crisis,” said Marco Leung, PhD, clinical director of the Steve and Cindy Rasmussen Institute for Genomic Medicine at Nationwide Children’s Hospital in Columbus, Ohio, speaking last fall in an Association for Molecular Pathology annual meeting session. “Without technologists there will be no science and no test results coming out of the genomics laboratories.”

Listserv comments and widespread worry about the shortage led to a group of laboratory directors gathering to talk at the American College of Medical Genetics and Genomics annual meeting in 2022. Recruitment, retention, state-specific requirements—all the usual things were up for discussion. “And one of the big things we also talked about was the need to collect data to show the existence of the shortage to administrators and hospital higher-ups to make them aware of the current state.”

“Very little has been published to inform the fundamental reasons behind this shortage,” said Dr. Leung, who is also assistant professor in the pathology and pediatrics departments at Ohio State University College of Medicine.



Dr. Leung

He and coauthors (Yasmine Akkari, PhD; Bob Best, PhD; and Sheila Dobin, PhD) wrote a technologist-based survey targeting clinical directors of CLIA-certified, U.S.-based molecular and cytogenetics laboratories in which staff perform germline or cancer genomics testing, or both. An email with the survey link was sent in July 2022 to more than 330 laboratory directors, identified using the Genetic Testing Registry (through the National Library of Medicine) and via professional connections, and announced on the American Cytogenomics Conference email listserv.

“Ninety-one entries were initiated on the demographic questions, and of these, 70 had answered some portion of the workforce questions and were used for downstream analysis,” Dr. Leung said (Akkari Y, et al. *Genet Med Open*. Published online March 27, 2023. doi:10.1016/j.gimo.2023.100806). Respondents were evenly distributed across the United States. Fifty laboratories were affiliated with a university or medical center and 10 with a community hospital. (Four were commercial/industry-affiliated, one was government-affiliated, and five were classified as other.) Twenty-nine of the represented laboratories specialized in cytogenetics, 16 in molecular, and 25 in both.

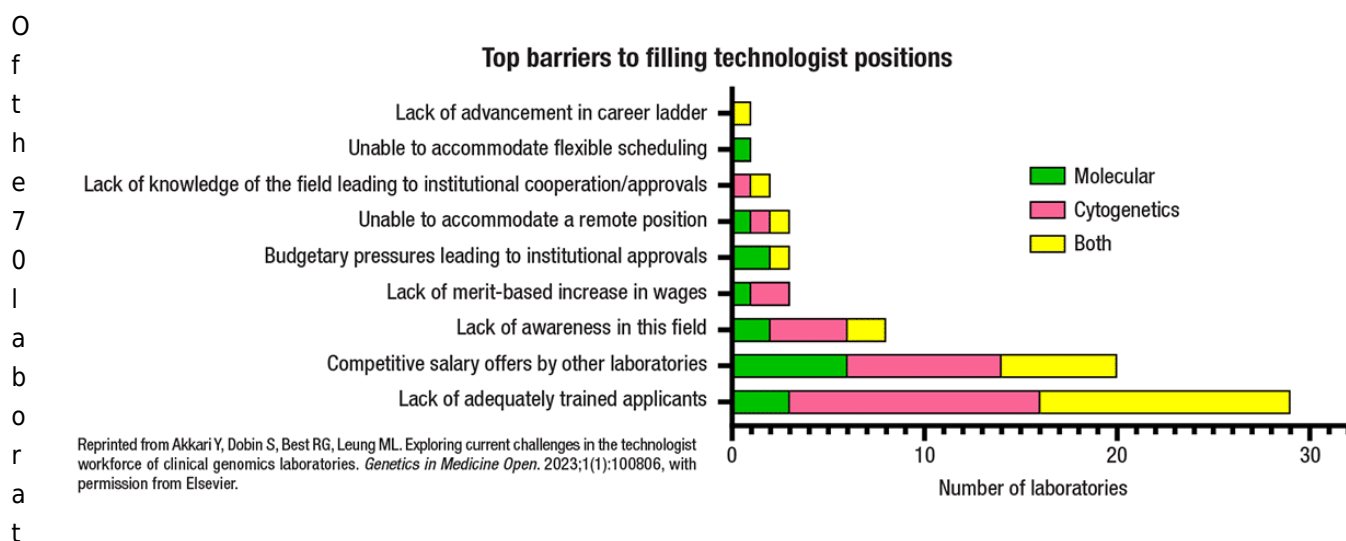
The top three reasons respondents said technologist positions were difficult to fill were the lack of adequately trained applicants (29/70), other laboratories offering competitive salaries (20/70), and a lack of awareness in this field (8/70).

The top cited reason—lack of adequately trained applicants—is “perhaps not too surprising,” Dr. Leung said, “because according to NAACLS [National Accrediting Agency for Clinical Laboratory Sciences] there are only two accredited cytogenetics programs and eight accredited molecular programs” as of October 2023. “There’s such a big difference compared to more than 240 medical laboratory scientist programs. There are just not enough programs for people to get trained in.”

Of the competitive salary offers by other laboratories, he said, “Compensation in the industry is generally higher than in an academic institution.” But with so few industry laboratory respondents, he said, “this is not something we can truly compare.” Many COVID-19 testing laboratories launched during the pandemic did draw away some molecular technologists from noncommercial institutions, he noted.

Dr. Leung agrees that students generally are not aware of cytogenetics. “People have gone through an undergraduate biology degree and probably still have not heard of cytogenetics,” he said. In open-ended comments, one laboratory director wrote: “I truly believe that students are not aware that the field of cytogenetics exists. We need to introduce this field to students at the college level or even early high school.” Another wrote, “Even hospital administrators think cytogenetics has something to do with cytology.”

The top reason cited for leaving a technologist position was having another job offer with a higher salary (20/67), and an approximately equal number categorized their reason as “other.” Twelve of 67 said it was to pursue further education or training, and seven of 67 said it was a loss of interest or dissatisfaction in the position.



ories that provided data, the average number of open positions in the prior two years was 4.24, with no difference noted between the two specialties, Dr. Leung said. But in the number of open positions that had gone unfilled, there’s “a striking difference between molecular and cytogenetics and combined laboratories.” In molecular laboratories about 10 percent of the open positions were not filled, compared with 31 percent in cytogenetics laboratories and 44 percent in laboratories that do both. Molecular laboratories had an average of 6.73 applications per position compared with 3.38 for cytogenetics laboratories and 3.88 for combined laboratories.

It took an average of 16.5 weeks to fill 125 positions, based on data for 183 positions in 67 laboratories. Fifty-eight positions were reported as unfilled. Laboratories in the Northeast had the highest number of unfilled positions, followed by the South, Midwest, and West.

“We also asked about the minimal requirement for technologists, and most of the laboratories said either a bachelor’s degree or a bachelor’s degree with experience,” Dr. Leung said.

The last three technologists who left laboratories were reported to have been retained for an average of 7.5 years based on data for 186 positions. “The technologists in the cytogenetics laboratory were there for 9.5 years versus in molecular,” where they were retained for 3.68 years, Dr. Leung said. In combined laboratories it was 7.67 years.

The base salaries on average for entry-level positions and for five and 10 years of experience were found to be \$61,647, \$73,950, and \$86,929, respectively, based on data from 64 respondents. Entry-level salaries on average were found to be highest in the West (\$78,691), compared with the Northwest (\$63,268), Midwest (\$55,425), and South (\$49,124). “When we stratified the data by laboratory specialties—molecular, cytogenetics, and combined discipline—there’s not really a significant difference in salary,” Dr. Leung said.

Twenty-seven of 63 respondents said their laboratories offer sign-on bonuses.

Raising awareness at the high school and undergraduate student levels is a must, Dr. Leung said.

He regularly visits Ohio State University undergraduate biology intro classes to talk to college freshmen students about clinical diagnostics in genomics laboratories. By the time students graduate, "it may be a little too late to learn about cytogenetics," he said. He also speaks at career seminars.

"We should also increase the awareness of genomics in MLS programs," where he gives lectures on molecular testing "to pique their interest in genetics," he said. Dr. Leung and his coauthors suggest in their article "working with universities to establish molecular or cytogenetic avenues within their MLS programs or other undergraduate life science curricula."

Combining molecular and cytogenetics training is another possibility, he said, just as the American Board of Medical Genetics and Genomics has done for clinical directors at the MD and PhD levels, such that a diplomate in laboratory genetics and genomics can direct and interpret clinical cytogenetics and molecular genetic analyses. "Maybe this is something we can do at the undergraduate level," he suggests.

The survey is only the first of multiple steps needed to understand the critical shortage in the clinical genomics laboratory setting, Dr. Leung said. Hearing directly from technologists is critical, he and his coauthors write, and they plan to survey them. Dr. Leung and Michelle Axford, PhD, of SickKids in Toronto, are preparing a similar survey to study the technologist shortage in Canadian laboratories.

For now, "be an advocate for clinical genomic diagnostics," he urges. "If you tell people cytogenetics is dead, it discourages new people from coming into the field and working in cytogenetics and in clinical genomics." It's not dead, he insists. It's the study of chromosomes and how the abnormalities can affect disease and cancers, and the treatment implications. Crediting his Nationwide Children's colleague Dr. Akkari, he said, "Different methodologies within cytogenetics may come and go, but cytogenetics is still here."

And it needs people.

Amy Carpenter is CAP TODAY senior editor.