Melbourne Genomics
Health Alliance

Global knowledge. Individual care.

Developing the genomic workforce: Overview

Background

A workforce skilled in analysis, interpretation and use of genomic sequencing information is required for this new health technology to be appropriately used in mainstream healthcare.

At the outset of the Melbourne Genomics workforce development program (in 2016), it was clear there was an immediate need to ensure that professionals working in genetic testing laboratories and specialist genetic services had sufficient experience and expertise in analysing and interpreting genomic sequencing information.

There were shortages in the specialist workforce needed for genomics (e.g. clinical bioinformatics and genetic counselling). It was also evident that in the near future genomics would impact on the wider clinical workforce, which was not yet equipped to guide patients through genomic medicine pathways.

Program description and activities

The objective: a workforce able to incorporate genomics into patient care.

The first priority was to address the existing genetics workforce, and thereafter the broader medical professional workforce – noting that these two groups require different levels of genomic knowledge and competency as they will practice genomic medicine differently.

A multifaceted approach was taken to ensure the existing healthcare workforce could confidently and accurately incorporate genomics into patient care, as relevant to their role. Clinical Flagships (see separate project summaries) were key to supporting capability building through 'hands on' experience and informed workshops.

Co-design principles, adult learning theory and problem-based learning designs were applied to develop specific continuing education activities[1] tailored to the needs of particular professional groups:

- For health professionals working in laboratory testing
  - Cross-laboratory training in curation, interpretation and reporting of genomic variants (cancer and rare disease) was provided for medical scientists in the NATA-accredited laboratories at two Melbourne Genomics members
  - Education workshops in variant interpretation, combining didactic and practical learning, were developed and deployed
- For medical specialists
  - Funding was provided to a group of medical specialists to allow them to gain practical experience in genomics relevant to their specialty through immersion learning. These specialists are now in a position to provide genomic expertise to colleagues and assist their hospital and their specialty to implement genomics.
  - Continuing education workshops and blended learning courses were developed and deployed to support medical professionals' ability to incorporate genomic testing into their practice
- To increase the number of skilled genetic counsellors
  - Positions for new graduates to gain clinical experience while supporting the Clinical Flagships were funded at each hospital site. Graduates were supported to undertake professional training

[1] See separate summaries which detail each of these initiatives.

  - An educator was funded to support revision of the Master of Genetic Counselling, both to incorporate genomics and to double student numbers
  - Continuing education workshops in genomics were developed and deployed for the broader genetic counselling workforce
- For bioinformaticians
  - Master of Bioinformatics students were attracted into clinical bioinformatics through bursaries for clinical projects in member laboratories
- For advanced trainees in clinical genetics
  - Six-month research projects were funded to support development of genomic skills and knowledge

Activities also focused on building wider capability, establishing a foundation for ongoing training and professional development in genomics:

- 10 online training modules in variant interpretation were developed, road-tested and deployed for use in university courses and for in-house training within the Melbourne Genomics member laboratories. A further seven online modules including practical exercises and cases, welcome video and a workshop preparation module were developed in early 2020.
- An enduring mechanism for health professional learning was provided, by establishing a modular, nested Master of Genomics and Health in which individual subjects, a graduate certificate, graduate diploma or full master degree can be undertaken

Program evaluation included quantitative and qualitative data collected before and after activities, to assess education impact on known key indicators of behaviour change – such as confidence, knowledge and skills.

All 10 Melbourne Genomics members were involved in workforce development activities.

Outcomes

Overall, 1,506 professionals gained skills and knowledge from more than 75,000 person-hours of workforce development activity over the period 2016 to 2019:

- Immersion training and experience was provided to 251 medical and laboratory professionals, including clinicians, medical scientists, genetic counsellors and bioinformaticians
- Workshops provided hands-on training to 1,255 healthcare and laboratory professionals, who are now better informed and skilled to apply genomics in patient care

Evaluation of activities showed that key genomic concepts were understood by health professionals with a wide range of roles, demonstrating that continuing education in genomics can be successfully delivered to multidisciplinary audiences.

All genomic workforce development activities had a positive impact on participants' confidence in applying genomic testing, as relevant to their role (whether clinical or laboratory professionals).

Learning objectives developed for continuing education activities are providing a basis for formal competencies and benchmarking.

Impact

Melbourne Genomics' initiatives in professional education have been nationally significant, particularly in the field of variant interpretation. Australia's first national training workshop in variant interpretation for cancer was delivered by Melbourne Genomics in 2018, in partnership with Queensland Genomics – attended by 63 professionals from most States and Territories.

Melbourne Genomics has established a free access professional education website[2], centred on an Australian-first infographic detailing all stages of the genomic testing process, across all test types. This material can be accessed[3] by medical professionals nationwide and globally.

There is interest in Melbourne Genomics' strategy and activities work from initiatives grappling with professional education in genomics, both in Australia and internationally. For example, NHS England is interested in translating the medical professional immersion program and variant interpretation training into the English setting.

Lessons learnt

- Most programs were oversubscribed, suggesting a continuing need for genomic education.
- Ongoing advances in genomics and precision medicine will require evolution and sustainable delivery of continuing education, for the current and emerging workforce.
- A hub or 'home' for continuing education in genomics is needed, as it is a field that crosses discipline boundaries (e.g. healthcare, laboratory, data science).
- In the near term, genomics also needs to be incorporated into medical and other health professional university degrees.

[2] http://learn-genomics.org.au

[3] These online resources were published in late 2019. At the time of writing, at least 230 professionals had accessed the website, and anecdotal feedback was very positive.