NATIONAL ACADEMIES Sciences Engineering Medicine

Next-Generation Screening – The Promise and Perils of DNA Sequencing of Newborns at Birth: A Workshop

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Session I Highlights: Keynote

- Sequencing in newborns is here - we need to think how to do this responsibly and equitably to improve health
- Considerations today
  - screening vs sequencing
  - healthy (prevent) vs sick (diagnose/treat)
  - return results: everything/some/over time
  - utility: when are findings useful for parents and families
  - uncertainty in the findings
  - availability vs accessibility: testing and follow-up
  - privacy, trust, protections

Session I Highlights: Keynote - Proposed Action Items

- Promote regulatory structures to support translation
- Build strategies for hearing from parents
- Avoid giving in to inequitable health care
- Establish a culture where equity and ethics are foundational
- Challenge our own assumptions

Session I Highlights: Discussion

- Trade-offs: newborn state run programs are fragile; follow-up care intervention can be inconsistent and costly
- Who to test, what for, and when (re-test?)
- Define newborn sequencing *by what it is not*, not by what it is
- Promise and perils - not in perfect balance
  - Are we focusing on the negatives, and on the "now," rather than the lifelong possible benefits?
- Just because it is happening, does not make it equitable:
  - Use of facial recognition for arresting black men
  - Few states have laws protecting against law enforcement's use of genetic data, exacerbating racial inequities

Session I Highlights: Discussion

- For families, false positives are perceived as harms
- Psychosocial benefits to parents and families; families are the biggest source of support
- Should discuss benefits and harms of screening *and* not screening
- Amplify voices particularly affected families and those who are not well represented
- Remaining in the status quo is often seen as the safest option, but it is failing families
- Embrace complexities and nuances of this topic

Session II Highlights: Lessons Learned from Newborn Genomic Testing and Screening

- Emerging lessons and ongoing learning from a variety of programs: UNCHealth, NBSeq, BeginNGS, BabySeq
  - Understanding families' interest in and value from sequencing
  - Clinical validity and utility of sequencing, variant interpretation
  - Sequencing not in a position to replace screening
  - Unresolved complexities

- Discussion
  - Hype vs reality: protect value of NBS
  - Partnerships among all sectors: researchers, regulators, and families

Session III Highlights: Implementing Newborn Sequencing at Scale - Health System Challenges & Opportunities

- Systems needs and challenges:
  - Workforce training and education
  - Diversity in data and workforce
  - Building trust
  - Evidence to inform sequencing and follow up care (long term)
  - Current newborn screening is inequitable, will adding sequencing increase those inequities?
  - All voices need to be at the table
  - Urgency of action for families

Session IV Highlights: Deploying Newborn Sequencing Responsibly and Equitably

- Working with communities:
  - Engaging groups with legacies of institutional untrustworthiness; fostering a culture of trust, equity, respect
  - Respect moral agency, local expertise, values and priorities
  - Focus on engagement and empowerment for community buy-in
  - Ask populations directly about their needs
  - Accountability for gaps in outreach, education, communication, and support
- Needs and opportunities:
  - Funding mechanisms and training next generation of health equity scholars
  - Upskilling nurses as non-genetic workforce
  - Social and economic support lagging behind scientific advancement
  - Measuring effectiveness and outcomes through an equity lens

Session V Highlights: Will Newborn Sequencing Change the Trajectory of Precision Health?

- Needs:
  - Clear line to improved health or care as a result of screening
  - Evaluation and accountability beyond diagnosis → system of intervention and support leading to quality of life outcomes
  - Increased genomics knowledge among healthcare providers
- Remaining Questions:
  - How should genetic information from birth be used across a lifespan?
  - How “disruptive” will sequencing be to traditional NBS/PKU model? Could sequencing be rolled out at different ages as part of routine clinical care?
  - How can screening be more equitable? How will all who need it receive follow-up care?

Themes throughout the day

- Who decides what are the harms, benefits, and balance?
- Affected families and those who are not well represented at the table need to be included
- Building trust is key
- Which results should be returned?
- Discussion on cost is needed
- Workforce issues
- We already have inequities, how does this work help us improve upon them not just build on top of them

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Thank you and Next steps

- Please complete our post-workshop survey
- Slides and videos will be posted to the workshop webpage within a couple of weeks
- A proceedings-in-brief will be published later this year to capture the discussions here today
- Thank you for participating with the Roundtable on Genomics and Precision Health!