Recap:

National Academies of Science, Engineering and Medicine - Next-Generation Screening – The Promise and Perils of DNA Sequencing of Newborns at Birth: A Workshop

Natasha Bonhomme

Thursday, November 2, 2023

History/Background

- "…[P]rovides independent, objective advice to inform policy with evidence, spark progress and innovation, and confront challenging issues for the benefit of society."
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Next-Generation Screening – The Promise and Perils of DNA Sequencing of Newborns at Birth: A Workshop

Natasha Bonhomme, Workshop Co-Chair

Cathy Wicklund, Workshop Co-Chair

JUNE 7, 2023

Goals of the Workshop

- Examine the known and expected benefits, and potential harms, of the widespread utilization of newborn DNA sequencing.
- Explore the ethical and data security and ownership issues associated with DNA sequencing of newborns at birth.
- Address issues of next-generation newborn screening equity in the United States.
- Explore the scope of recently initiated programs investigating newborn DNA sequencing as a screening tool in diverse healthy newborn populations.
- Engage families, patient advocates, and public health system representatives to provide their views on the need, impact, readiness, and risks of newborn DNA sequencing.

Planning Committee Members

Cathy Wicklund (*workshop co-chair*), Representing National Society of Genetic Counselors, Northwestern University

Natasha Bonhomme, (*workshop co-chair*), Expecting Health

April Adams, Baylor College of Medicine

Amy Gaviglio, Connetics Consulting LLC

Aaron Goldenberg, Case Western University

Alex Kemper, The Ohio State University College of Medicine

Molly McGinnis, Genome Medical, Inc.

Ryan Taft, Illumina, Inc.

Joyce Tung, 23andMe, Inc.

Karen Weck, Representing College of American Pathologists, University of North Carolina at Chapel Hill

Background and Context

- Scope for this workshop
  - Examining sequencing in healthy newborns.
  - Thinking about ethics and equity throughout the day.
  - Not asking if sequencing in healthy newborns should be done, but as it is already being implemented, how can it be done responsibly and equitably moving forward?

- The Roundtable adopted a new strategic plan in 2020.

- **Vision: Realizing the full potential of health for all through genomics and precision health**

- The idea for this workshop began with the **Innovation** working group

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- Session I: Opening Remarks & Keynote
- Session II: Lessons Learned from Newborn Genomic Testing and Screening
- Session III: Implementing Newborn Sequencing at Scale – Health System Challenges & Opportunities
- Session IV: Deploying Newborn Sequencing Responsibly and Equitably
- Session V: How will Newborn Sequencing Change the Trajectory of Precision Health
- Session VI: Final Reflections

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

Newborn Screening-Current Landscape and Future Directions

- A committee of experts will conduct a study examining the current landscape of newborn screening (NBS) systems, processes, and research in the United States. The report will provide both short-term options to strengthen existing NBS programs and a vision for the next 5-15 years.
- 12-15 volunteer experts
- Submissions will be accepted until Friday Nov. 17
- https://www.nationalacademies.org/en/our-work/newborn-screening-current-landscape-and-future-directions
- https://survey.alchemer.com/s3/7583063/HMD-HSP-Newborn-Screening-Current-Landscape-and-Future-Directions

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Natasha Bonhomme
nbonhomme@expectinghealth.org

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