

# How? Might? clinical questions drive expansion of screened conditions?

**BEYOND THE BLOODSPOT: HOW WILL EMERGING TECHNOLOGIES SHAPE  
DETECTION AND CLINICAL CARE?**

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# Assuming:

Panel/exome/genome sequencing for NBS becomes

- Fast
- Accurate &
- Cheap enough

And public databases are informative

**“Whatever you want for whatever disease -- you have the entire genome in front of you”**



# What should be screened?

2,266 recent and prospective mothers

Recent mothers

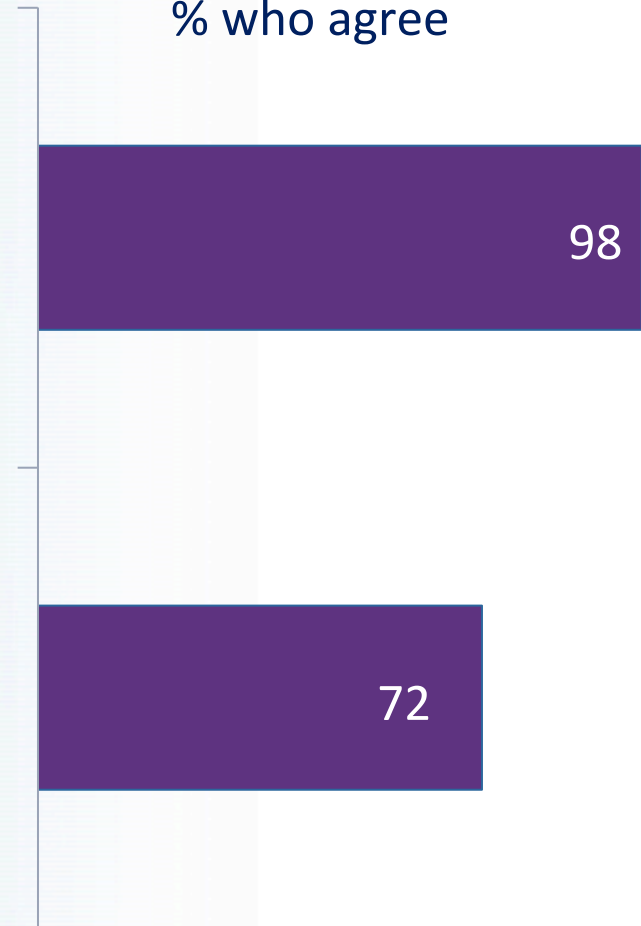
% who agree

Newborns should be screened for conditions where early Dx could improve the baby's health

98

Newborns should be screened for conditions where early Dx may not improve the baby's health

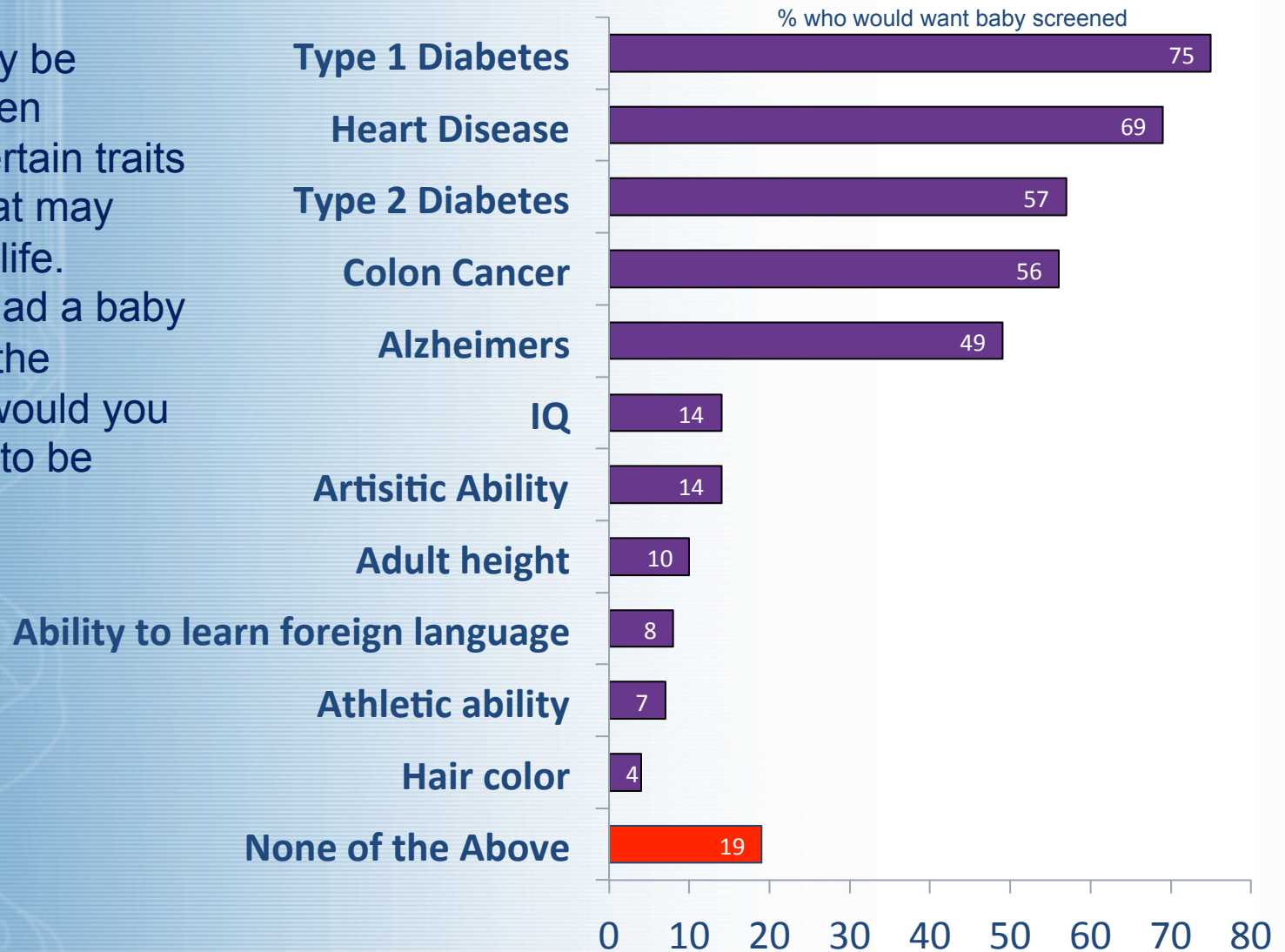
72







# Recent mothers' interest in NBS for adult onset diseases and traits

“Someday it may be possible to screen newborns for certain traits or conditions that may develop later in life. Assuming you had a baby today, which of the following traits would you want your baby to be screened for?”



# Original criteria to include a condition

- Sensitive, specific screen
- High throughput 200+/day 
- Cost 
- Feasibility (bloodspot) **X**
- Multiplex testing **X**
- One analyte >> multiple conditions **X**

## Original criteria, II

- High(er) incidence **X**
- Typically would go undetected **X**
- High burden **X**
- Available, simple, effective treatment
- Available expertise
- Realistic treatment cost
- Increased efficacy after test
- Prevent mortality
- Child benefits
- Family, society benefits
- Confirmatory test available





Accurate assessment of phenotype based on screen

Simple, cheap implementation of next steps across populations

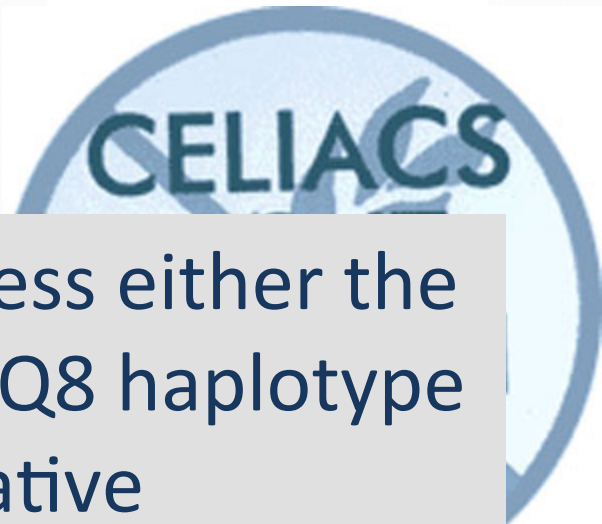
Common diseases

Low risk of harms

Some change in disease progress or treatment efficacy

# Broader range of genotypes that might serve as diagnostic, or as differential dx

The majority of people with CD possess either the HLA DQ2 haplotype (>90%), or the DQ8 haplotype (and 5% to 10% ) >> test gives a negative predictive value greater than 98%.





HLA DQ2 haplotype

DQ8 haplotype



op,  
celiac

# **Short circuiting diagnostic odysseys even when treatment is not available**

- could save resources
- could help families
- parental understanding  
and consent needed



# One-third of recent mothers had not heard of NBS

‘Before today had you heard of newborn screening?’

recent  
mothers



# Pharmacogenomics

***ClinicalTrials.gov***

A service of the U.S. National Institutes of Health

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- Hypertension
- Rheumatoid Arthritis
- Tonsillectomy (morphine)



# Pharmacogenomics



stratify (infant) populations ahead of time  
before disease to improve prescribing by  
drug, dose, regimen etc

May be relatively low risk/medium reward  
data with large public health

Some childhood diseases

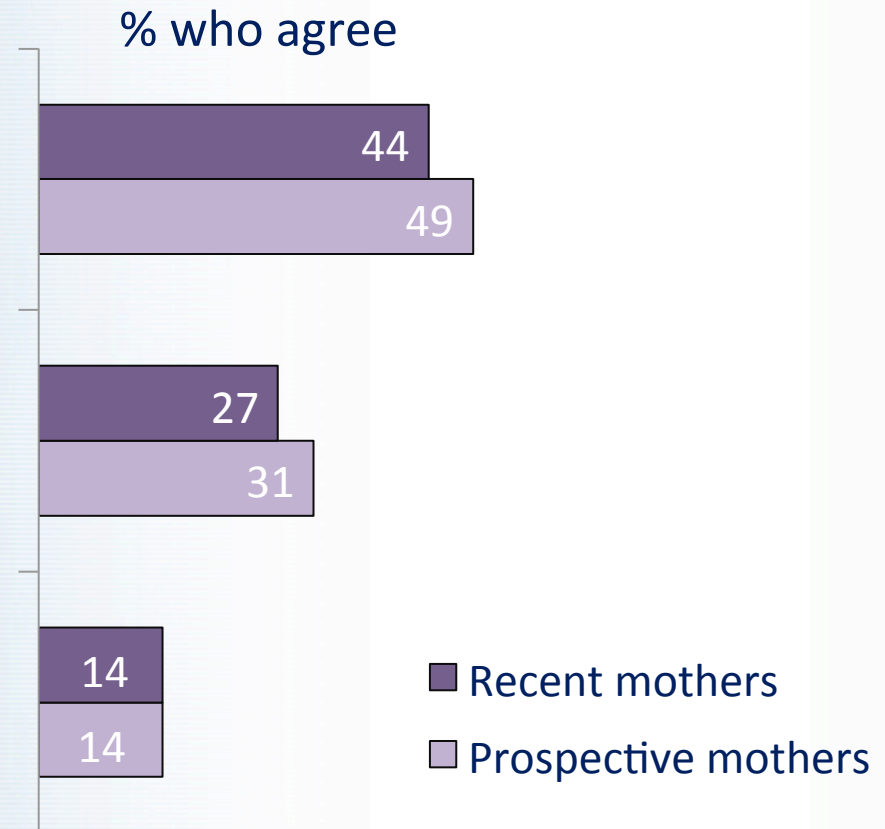
# The greatest concern: accuracy of test results

**“I worry that....”**

**NBS might not provide accurate  
info**

**NBS causes too much anxiety  
for parents**

**NBS takes money away from  
other health care needs**





**Whole genome testing will eventually be the clinical standard**

**Now: high number of false positives and unknowns**

**>> lower overall PPV**

**Need better databases to accurately interpret**

**“I think the burden of the data is greater than the value”**

# Thanks to:

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