Neonatal screening programs: Should parents be given a choice of screening options?

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Newborn screening in the Netherlands

Newborn screening: voluntary program, 99% participation

Screening program:
from…

- Phenylketonuria (PKU)
- Congenital hypothyroidism (CH)
- Adrenogenital syndrom (AGS)

…to…

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... to :

1. Phenylketonuria (PKU)
2. Congenitale hypothyroidism (CHT)
3. Adrenogenital syndrom (AGS)
4. biotinidase deficiency,
5. cystic fibrosis (voorwaardelijk),
6. galactosemia,
7. glutaar acidurie type I,
8. HMG-CoA-lyase deficiency,
9. holocarboxylase synthase deficiency,
10. homocystinuria,
11. isovaleriaan acidemia,
12. long-chain hydroxyacyl CoA dehydrogenase deficiency
13. maple syrup urine disease,
14. MCAD deficiency,
15. 3-methylcrotonyl-CoA carboxylase deficiency,
16. Sickel cell anemia
17. tyrosinemia I,
18. very-long-chain acylCoA dehydrogenase deficiency.

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But why not:

Core Panel as recommended by the American College of Medical Genetics

1. 3-Methylcrotonyl-CoA carboxylase deficiency (3MCC)
2. 3-OH 3-CH3 glutaric aciduria (HMG)
3. Argininosuccinic acidemia (ASA)
4. Beta-Ketothiolase deficiency (BKT)
5. Biotinidase deficiency (BIOT)
6. Carnitine uptake defect (CUD)
7. Citrullinemia (CIT)
8. Classical galactosemia (GALT)
9. Congenital adrenal hyperplasia (21-hydroxylase deficiency) (CAH)
10. Congenital hypothyroidism (CH)
11. Cystic fibrosis (CF)
12. Glutaric acidemia type I (GA 1)
13. Hb S/C disease (Hb S/C)
14. Hb S/ß-thalassemia (Hb S/ßTh)
15. Homocystinuria (due to CBS deficiency) (HCY)
16. Isovaleric acidemia (IVA)
17. Long-chain L-3-OH acyl-CoA dehydrogenase deficiency (LCHADD
18. Maple syrup disease (MSUD)
19. Medium-chain acyl-CoA dehydrogenase deficiency (MCADD)
20. Methylmalonic acidemia (Cbl A,B) (Cbl A, B)
21. Methylmalonic acidemia (mutase deficiency) (MUT)
22. Multiple carboxylase deficiency (MCD)
23. Phenylketonuria (PKU)
24. Propionic acidemia (PROP)
25. Sickle cell anemia (Hb SS disease) Hb (SS)
26. Trifunctional protein deficiency (TFP)
27. Tyrosinemia type I (TYR I)
28. Very long-chain acyl-CoA dehydrogenase deficiency (VLCADD)

Secondary Targets as recommended by the American College of Medical Genetics

29. 2-Methyl 3-hydroxy butyric aciduria (2M3HBA)
30. 2-Methylbutyryl-CoA dehydrogenase deficiency (2MBG)
31. 3 Methylglutaconic aciduria (3MGA)
32. Argininemia (ARG)
33. Biopterin cofactor biosynthesis, defects of (BIOPTBS)
34. Biopterin cofactor regeneration, defects of (BIOPTREG)
35. Carnitine palmitoyltransferase I deficiency (liver) (CPTIA)
36. Carnitine palmitoyltransferase II deficiency (CPTII)
37. Carnitine: acylcarnitine translocase deficiency (CACT)
38. Citrullinemia type II (CITII)
39. Dienoyl-CoA reductase deficiency (DERED)
40. Galactokinase deficiency (GALK)
41. Galactose epimerase deficiency (GALE)
42. Glutaric acidemia Type II (GA 2)
43. Hypermethioninemia (MET)
44. Hyperphenylalaninemia, benign (H-PHE)
45. Isobutyryl-CoA dehydrogenase deficiency(IBG)
46. Malonic acidemia (MAL)
47. Medium/short-chain L-3-OH acyl-CoA dehydrogenase deficiency (M/SCHADD)
48. Medium-chain ketoacyl-CoA thiolase deficiency (MCKAT)
49. Methylmalonic acidemia (Cbl C,D) (Cbl C,D)
50. Short-chain acyl-CoA dehydrogenase deficiency (SCADD)
51. Tyrosinemia type II (TYR II)
52. Tyrosinemia type III (TYR III)
53. Variant Hb-pathies (including HB E) (Var Hb)

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Why not?

- Further expansian relatively simple, thanks to tandem mass spectrometry
- Can it be justified to decide *not* to acquire medically relevant information about a newborn child?

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Why not?

- Many diseases: early deteaction will not improve prognosis
- Screening has also costs and disadvantages
  - Early knowlegde of untreatable disease may decrease well being
  - More diseases→ more false-positives → more unnecessary follow-up testing, worries, etc
  - Financial issues
- Most importantly…

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Justification

- Public program requires strong justification
- Primary goal: health benefits for child
- Possibly secundary goals: indirect advantages for child and family

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NL Health Council (2005)

1. Considerable, irreparable damage can be prevented

2. Less substantial or insufficient evidence of prevention of damage to health

3. No prevention of damage to health

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(Foto Stock.xchng)

'Meer ziektes testen door hielprik baby'

Door een onzer redacteuren

Den Haag, 4 jan. Artsen moeten de mogelijkheid krijgen ouders na een hielprik te vertellen aan welke onbehandelbare ziektes hun pasgeboren kind lijdt.

Daarvoor pleiten patiëntenorganisaties naar aanleiding van een oproep van de Leidse klinisch geneticus Breuning, van het Leids Universitair Medisch Centrum.

Archief:
- overzicht - Meer binnenlands nieuws

print artikel mail artike

Nu maakt de hielprik het nog alleen mogelijk ouders in te lichten over behandelbare aandoeningen.

- Some parents may want to know whether their child has a disease from categories 2 or 3 (e.g. Duchenne)
- Many other may forgo such screening
- → ? → let people choose:

  "We do / do not want to receive information about all ('untreatable') diseases"

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Chosing to receive information about untreatable diseases

- Diversity of diseases: incidence, seriousness of symptoms, implications family life, differences in onset, diagnostic process, etc.
- Reasoable choice: depends on characteristics of disease; it makes sense to prefer information about some untreatable diseases but not all.
- Hence: choice per disease

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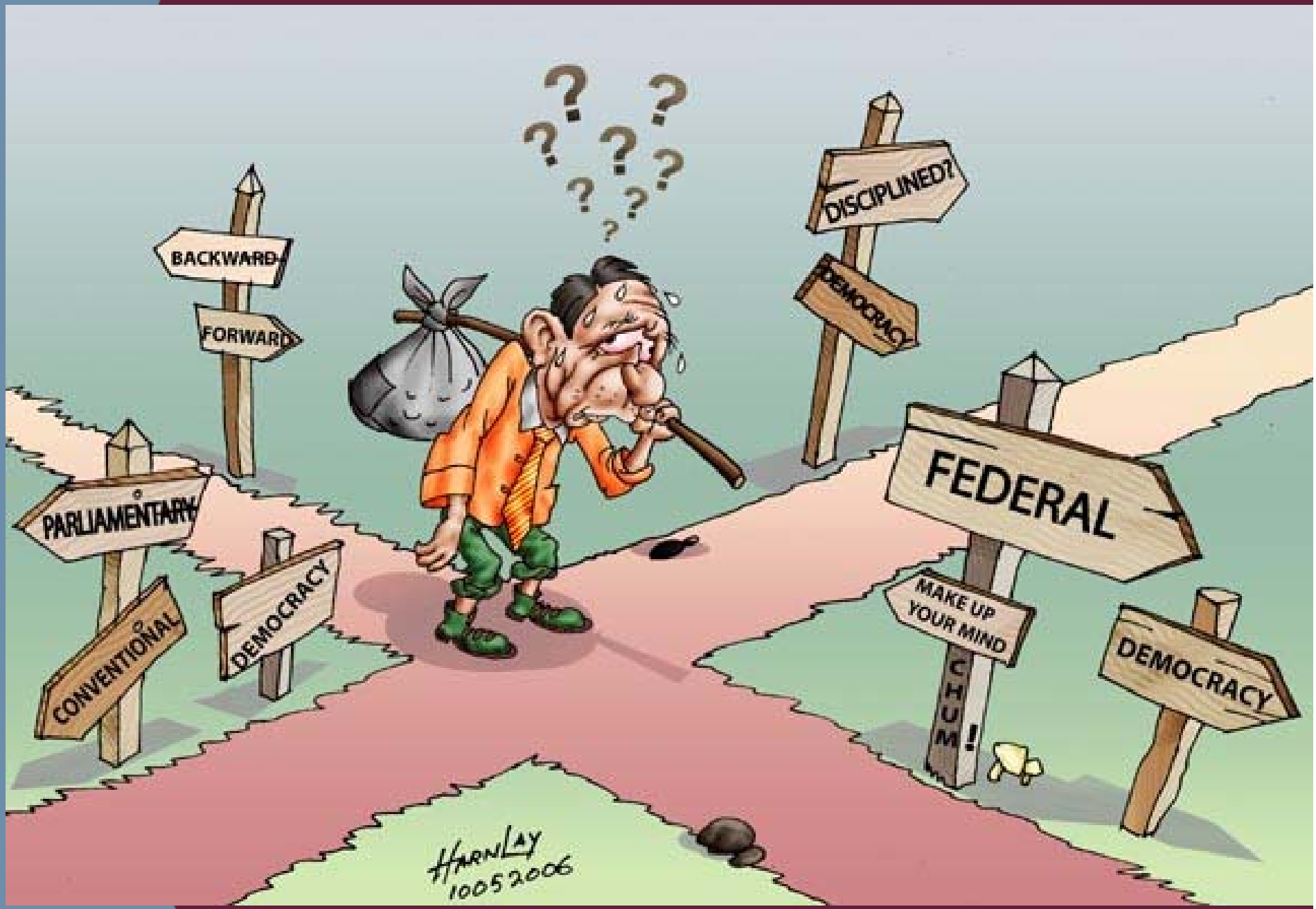

Problems

- Complex and burdenful choice
- Which most often will have no practical consequences at all (given that most diseases are rare)
- Reasonable choice requires adequate information
  - High demands on knowledge and communication skills of professionals

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Well-considered choice?

- Attainable for almost no one, except for
  - Parents who want to know *everything*
  - Parents who are acquainted with specific diseases
  - Parents who do *not* want to know *anything*

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Offering choice options

- Many parents may not want to choose
  - Yet are forced to choose
- Most parents will not be able to make well considered choice
  - Yet they must make a choice
- Professionals must disclose relevant information about diseases
  - Overdemanding, if not impossible

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- False (and paternalistic) assumption that it is always better for parents to have a choice

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Current practice newborn screening (NL)

- 18 diseases, selected by experts
- Informed consent must be obtained – isn't that equally impossible?

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Why informed consent at all?

- To enable parents to make their own autonomous choice → optimal information required

OR

- Important that children are not tested for all kinds of conditions against the will of parents. Consent is important to promote and sustain trust in the program

  → Basic information is sufficient

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Basic information & consent

- Possible if diseases / conditions are selected on the basis of clear and strict criterion
- “Diseases for which there is evidence that detection and immediate treatment after birth will prevent substantial, irreversible damage to child’s health”

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Conclusion

- Newborn screening
  - Basic informed consent for screening for limited, well-defined set of diseases/conditions
  - Expanded choice model: unjustified

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