Genomic newborn screening in France: from a social acceptability study to a pilot project

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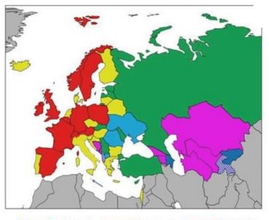
CONTEXT: NEWBORN SCREENING, A PUBLIC HEALTH PROGRAM THAT IS ON THE MOVE INTERNATIONALLY & IN FRANCE

France and newborn screening evolution: a pioneer and then a laggard?

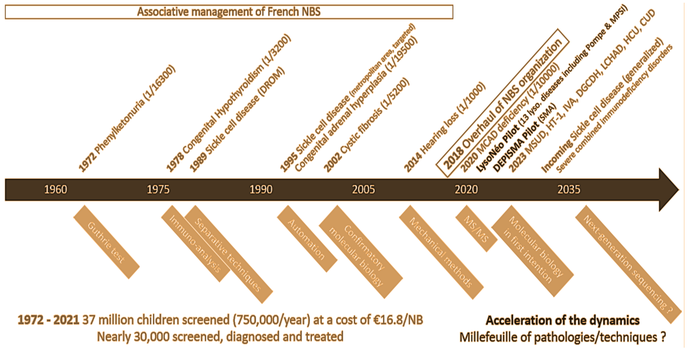
NBS starting year Loeber et al., 2021



2023

Charles River Associates & Novartis, 2023

Recent trends in France



1972 - 2021 37 million children screened (750,000/year) at a cost of €16.8/NB
Nearly 30,000 screened, diagnosed and treated

Acceleration of the dynamics
Millefeuille of pathologies/techniques ?

Law no. 2021-1017 of August 2, 2021 on bioethics

After article L. 1411-6 of the French Public Health Code, an article L. 1411-6-1 is inserted as follows: "Art. L. 1411-6-1 - Newborn screening using medical biology tests**, including genetic testing**, constitutes a national health program within the meaning of article L. 1411-6."
"The procedures for organizing this screening and the list of diseases covered by it are set by order of the ministers responsible for health and social security, after consulting the Haute Autorité de Santé and the Agence de la biomédecine."

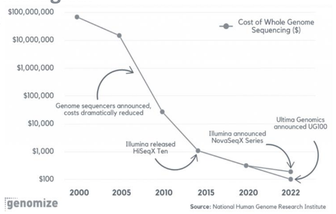
↗ therapeutic in rare disease

2022: a pivotal year for diagnosis and treatment of rare genetic diseases

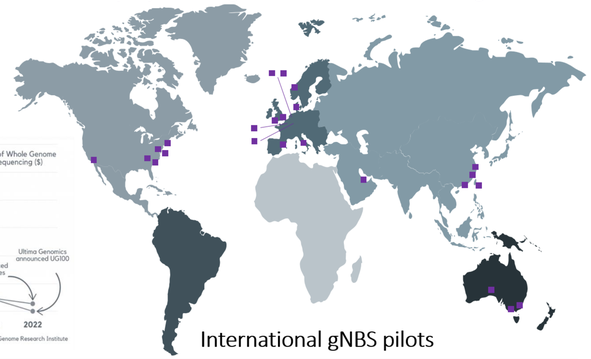
Stephen F. Kingsmore

Rady Children's Institute for Genomic Medicine, Rady Children's Hospital, San Diego, California 92123, USA; Keck Graduate Institute, Claremont Colleges, Claremont, California 91711, USA

Decreasing genome sequencing costs with technological developments



More than twenty international consortia and pilot projects on genetic newborn screening



International gNBS pilots

OUR FIRST STEP: SEDEN PROJECT TO ASSESS SOCIAL ACCEPTABILITY (2020-2024)

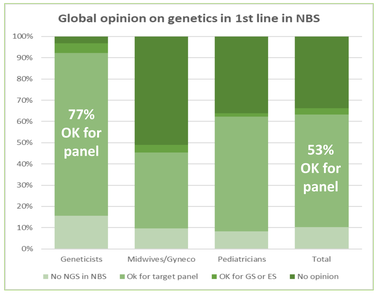
SeDeN-p2 Professionnels

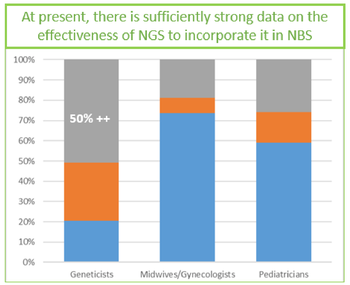
1199 French health professionals

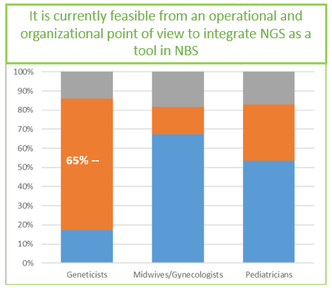
17.8% geneticists and genetic counselors
44.3% pediatricians
37.9% midwives and gynecologists

	Actionable	Non-actionable
Childhood onset	81% +++	39% - ***
Adult onset	80% ++ *	51% --- ***

Pharmacogenetic variations	42% + *
Related to costly disease	38% + *
Heterozygous	67% -- *
Information for relatives	65% -- *
VUS	56% --- ***



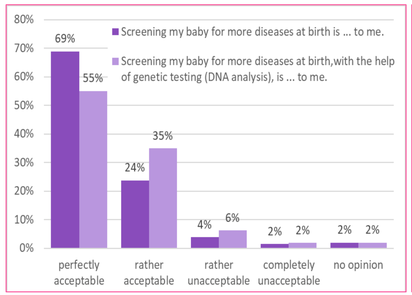


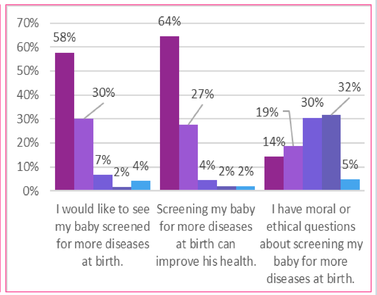


"Parent in general population" arm

SeDeN-p3 Parents

408 parents of a child less than 1 week old (questionnaire followed, for some, by interview at the maternity hospital within 3 days of birth)
1247 parents of a child under 3 years of age (questionnaire proposed by polling institute, quotas based on CSP, size of town, region)





"Parent of a sick child" arm

Interviews scheduled for end 2023

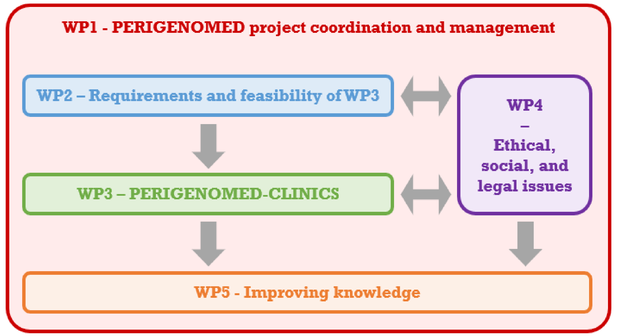
OUR SECOND STEP: PERIGENOMED PROJECT TO PROVIDE INITIAL CONCRETE EVIDENCE ON THE RELEVANCE OF GENOMIC NEWBORN SCREENING WITH *IN SILICO* PANEL (2024-2028)

Inclusion of 18,000 newborns
Over a 15-month period from early 2025
Born in the university hospitals of 2 recognized University Hospital Federations on genomic medicine

FHU GenOMedS — TRANSLAD

Strategy studied in PERIGENOMED: genome sequencing with bioinformatics filters = in silico panel

Recovery of DBS — Sample preparation — Genome sequencing — Bioinformatics pipeline — Bioinformatics filters on variants (ClinVar) — Reading of panel by biologist → *Then orthogonal confirmation test*



Advantages
Better quality/cost ratio
Reduction of false positives
Limitation of false negatives due to technical problems
Easily modifiable filtering

→ Multiple deliverables
Lists of genes / variants
Information documents for families
Bioinformatics pipelines
Analysis and management circuits
Performance of diagnostic test
Assessment of psychosocial consequences of results ...

PERIGENOMED — PERINATAL GENOMIC MEDICINE

is part of the International Consortium on Newborn Sequencing

ICoNS

Please scan QR code for more information

moderate heterogeneity based on the specialty * important heterogeneity based on the specialty*

No opinion / Not my field of expertise — Disagree / Rather disagree — Rather agree / Agree — Completely agree — Rather agree — Rather disagree — Strongly disagree — No opinion