

Anemia during pregnancy and outcomes in childhood The TOVI project

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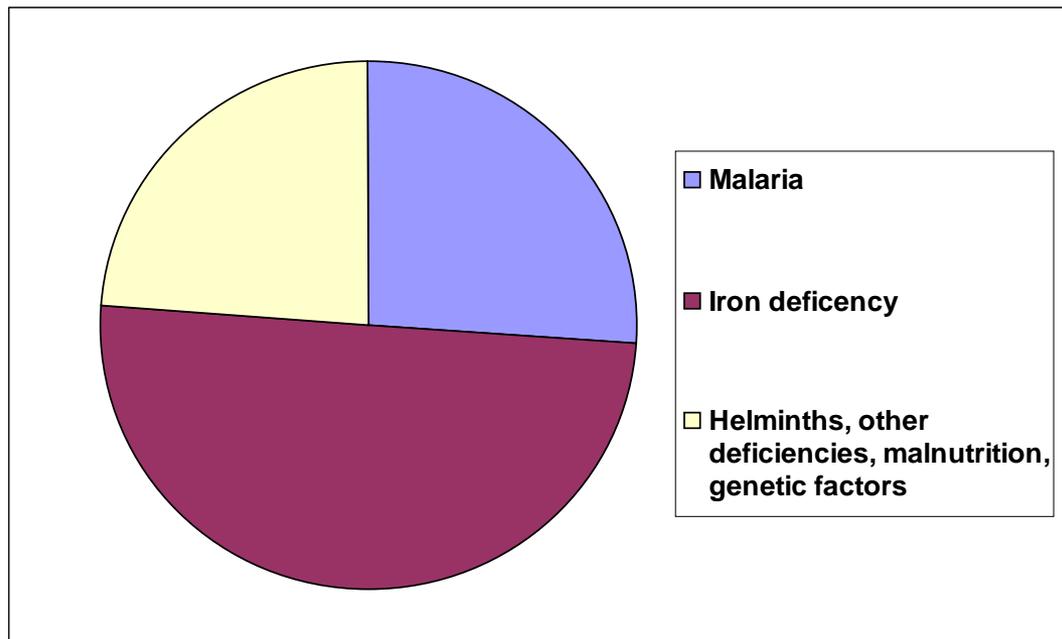
PI: Florence Bodeau-Livinec, NYU, School
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Anemia during pregnancy

- More than 50% of pregnant women are commonly said to be anemic in developing countries
- A multifactorial condition



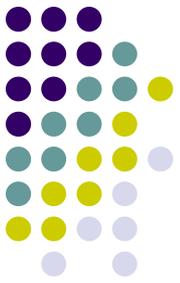
Prevalence of maternal anemia in Benin



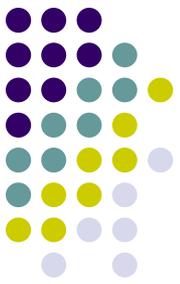
- Incidence of LBW=9.1%
- Incidence of preterm birth=1.2%
- Anemia at different stages of pregnancy

	Hb during the 2 nd trimester		Hb during the 3 rd trimester		Hb at delivery	
	(N)	%	(N)	%	(N)	%
Total	(1274)	100.0	(989)	100.0	(1221)	100.0
Hb (g/L)						
<80 (severe anemia)	(53)	4.2	(40)	4.2	(30)	2.5
80-99 (moderate anemia)	(367)	28.8	(286)	30.0	(192)	15.7
100-109 (mild anemia)	(395)	31.0	(279)	28.3	(262)	21.5
≥110 (no anemia)	(459)	36.0	(348)	36.5	(737)	60.4

Objective

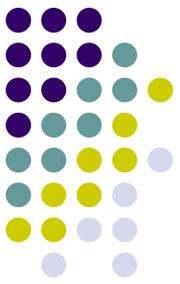


- To study the motor and cognitive development at 12 months of children in relation to anemia during pregnancy within the NIH grant R21
- To prepare a R01 study after completion of the R21:
 - Motor, cognitive and sensorineural assessments and mortality by 3-4 years of age and 6 years



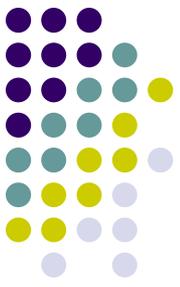
Methods

- Birth cohort study in Benin
- 1183 pregnant women included in a trial
- 941 women followed until delivery
- Randomized trial:
 - Funded by the European Commission
 - Comparing 2 IPTp: sulfadoxine–pyrimethamine and mefloquine



Outcomes

- To add a follow-up of all children on the top of the trial
- First phase (R21):
 - Motor and cognitive assessment at 1 year
 - Pilot study for cognitive assessment at 3-4 years and 6 years
- Second phase (R01):
 - Cognitive assessment of children at 3-4 years and 6 years



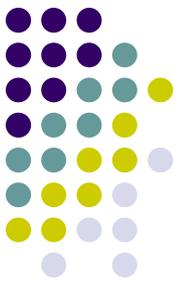
Outcomes Variables in Infants

- At 1, 9 and 12 months (within the trial):
 - Mortality
 - Anthropometric measurements
 - Blood assessments: malaria, other infections, nutrition, Hb, ferritin, helminthes, folic acid, vitamin B12
- At 12 months (within the R21):
 - Development assessment: Mullen Scales of Early Learning (MSEL), Kaufman Assessment Battery for Children-II (K-ABC2), Ten Questions Questionnaire (TQQ)
 - Maternal depression, parent-child interaction (HOME), maternal non-verbal IQ (Raven)
 - Blood lead

Capacity building for the R21

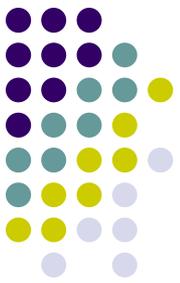


- Training in development tools:
 - Training psychologists/nurses to administer the tests: 2 training of total 4 weeks in Benin with Florence Bodeau-Livinec and Michael Boivin
 - Training faculty: Ghislain Koura will defend his PhD in October 2012
- Training in epidemiology:
 - Training faculty in epidemiology in Paris: Dr Koura (PhD defense October 22nd, 2012), Dr Alao



Study Update

- Mullen translated and back translated from English to French and from French to English, approved by Pearson's Assessment
- 650 children already assessed with Mullen
- Staff trained for Mullen and K-ABC2: preparing for a pilot study with K-ABC2
- 3 articles published on anemia in AJTMH
- A book chapter
- Preparing article on validation of Mullen and TQQ



Preliminary results

- Strong associations between known socio-economic status and maternal factors and the MSEL
- Strong associations between the TQQ and the MSEL
- Questions 1 and 5 of the TQQ showed good validity with the MSEL as a gold standard
- High prevalence of elevated lead levels in children: Exposure unknown so far in Benin



Study upcoming

- Assessing about 100 more children at one year of age
- 2 pilot studies completed:
 - One in 75 children at 5-6 years with K-ABC2
 - One in 75 children at 3-4 years with Mullen
- Preparing for an R01 with the same team

Team



- In the US
- **Dr Bodeau-Livinec**, perinatal epidemiology
- **Dr Xu Xiong**, Tulane University, Perinatal epidemiology
- **Pr Karen Day**, Parasitology
- **Pr Leslie Davidson**, Columbia University, Perinatal epidemiology
- **Dr Michael Boivin**, Michigan University, Childhood development in Africa
- In Benin
- **Pr Massouboudgi**, Parasitology
- **Dr Alao**, Pediatrics
- **Dr Tognide**, Psychiatry
- **Dr Koura**, PhD candidate, perinatal epidemiology
- In France
- **Dr Bodeau-Livinec**, perinatal epidemiology
- **Dr Cot**, perinatal epidemiology and malaria
- **Dr Berger**, nutrition in pregnancy and infants in developing countries