Aims
- To establish functional near infrared spectroscopy (fNIRS) as a low cost, non-invasive brain imaging tool for assessing neurocognitive function in infants from birth in resource poor settings.
- To provide early biomarkers of cognitive development to inform and evaluate nutritional intervention strategies.
- To supplement current assessment methods with a direct measure of cognitive functioning, unbiased to cultural background.

Study Protocol
A total of 99 infants were studied between birth and 24 months of age. Infants wore an fNIRS source detector array over the right hemisphere. Newborn infants were presented with social and non-social auditory stimuli whilst sleeping. All other age groups were presented with social and non-social visual stimuli in addition to the auditory stimuli. Additionally, infants 6 months and older underwent behavioural assessment using the Mullen Scales of Early Learning (MSEL). An assessment of the implementation of MSEL was performed to control for cultural bias.

Rationale
Faltering head growth is apparent by 12 months of age in rural Gambian infants. Associated neurocognitive ramifications are poorly understood.

Standarised assessment measures are designed and normed on Western population, and are biased as such. Anthropometric measurements are commonly used to track physical development; indices from which indicators of nutritional status can be derived.

Results
* When the same aged UK infants were studied, similar patterns of selective cortical activation were seen.

Conclusions
- fNIRS can be used to measure neurocognitive function in infants from birth to 24 months of age in a resource poor setting.
- Cross-sectional and longitudinal studies revealed distinct regions of the posterior superior temporal and inferior frontal cortex activated by either visual or auditory social stimuli.
- fNIRS may be used to elucidate typical and atypical brain development from birth and hence investigate the effects of nutritional insults and interventions in global health studies.