

## Mobile Metabolic health Monitoring Network

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The proposed “Mobile Metabolic health Monitoring Network (M3+net)” targets technology prototypes for child health with a specific focus on pediatric obesity and metabolic health applications. The overarching goal is to create, implement, and validate individualized engineering systems for enabling evidence driven health care and management. These systems will empower the health care experts with just-in-time information so they can plan and implement individualized intervention. We will target three distinct stakeholders: children, practitioners (medical experts and therapists), and the community (parents, caregivers).

Child health issues such as pediatric obesity are reaching a major national and global crisis. Statistics suggest that 35% of all US children are clinically obese with certain populations exhibiting even higher percentages (44% Latino, 40% African American) [CDC-web; NCHS 2006]. International data reveals similarly disturbing trends. Although many interventions have been developed and implemented in overweight youth, the obesity epidemic continues to rise unabated, particularly in minority youth. In addition to the social and personal costs to children and their families, these problems translate into staggering economic costs for society. However, published reports like The World Bank Report [2001] offer some hope, noting that “new technological possibilities can reduce costs” and can lead to economic prosperity and overall societal wellbeing.

Novel approaches to achieve metabolic health for this target population are therefore sorely needed. We believe that continuous evidence driven approaches through novel human sensing and interpretation technologies will be critical in enabling new individualized assessment and intervention possibilities. To this end, an interdisciplinary team, which couples computer scientists and engineers (Annavaram, Mitra, Narayanan, Sukhatme) with an expert in pediatric obesity and metabolic health (Spruijt-Metz), will develop a body area network, the Mobile Metabolic Monitoring Network, that will provide children with continuous, intelligible, cognitively appropriate information on energy expenditure and an assessment of the child’s emotional activation/valence state from both implicit physiological cues and any communicative information obtainable from vocal or visual gestures. We believe that this will enable a scientific and rigorous evaluation of how children (socially, emotionally and cognitively) respond and how these responses influence the desired outcome of juvenile health. In summary, it will enable

- Complete measure of energy expenditure, emotional state, context
- Personalized feedback to participant in evidence driven ways
- Bridges qualitative & quantitative analyses
- Accessible, low cost measurement in real time & real life settings