Title: **LOI3-RT-01-C Real-Time Analytics in the National Children's Study**

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Introduction: The focus of our research laboratories is the identification of biomarkers associated with childhood diseases coupled with development of assays for their quantitative detection. We routinely perform commercial assays for proteins such as cytokines, and also have the capacity when no commercial assays exist, to develop assays for the measurement of analytes by quantitative mass spectrometry using multiple reaction monitoring (MRM) without the need of antibodies, thus speeding up the new assay development timeline and providing enormous flexibility in the analytes measured.

Methods and Results: We use the Pharma grade MSD electrochemiluminescent sandwich immunoassay (Sector Imager 2400) platform which has the most sensitivity and largest dynamic range compared to other commercial immuno-multiplex assays (Fu et al, Clin Chem 2010). Another key feature of the MSD platform is that sample volumes are minimal which is critical for the rare samples in the NCS. We recently obtained a second, faster Q-TRAP LC/MS/MS/MS instrument (5000, ABI) as a result of a NIH large equipment grant award that will triple our capacity for analyte quantitation allowing analysis of large cohorts. The Q-TRAP LC/MS/MS/MS platform can augment commercial ELISA assays or provide a quantitative platform when no commercial assays exist.

Conclusion: We are prepared to assay 1000 NCS samples using commercial ELISA MSD assays (cytokines, inflammatory proteins, etc) and develop 10 new quantitative protein MRM assays/year for analytes where assays do not exist.