

## **Meade, V. Sensitivity and Specificity of a two step screening procedure for four to six month old infants.**

### **Abstract**

**Background:** The United States federal government recognized the importance of early and accurate identification of children with developmental delay or disability and established the Individuals with Disabilities Education Act (IDEA), requiring states to set up methods to find eligible children (child find activities). Unfortunately, these children are not always identified in a timely manner. Current screening relies on either surveillance or tests for early detection; both strategies are expensive and may over- or under- identify children. The purpose of this study was to select infants initially identified by parents' concerns and then test the infants using an observational screening tool requiring parent participation. These two steps actively involve parents and may result in a more sensitive and specific process of child find during community surveillance.

**Methods:** The study design was correlational and observational over a one year time period. Parents in Houston Co. MN, with eligible infants aged 4 to 6 months, were invited to attend an area screening clinic. In step one of the screening process, parent concerns were measured during participation in the clinics and completion of the Parent Concerns Survey. Parents who attended the screening were compared to a random group of parents who chose not to participate. Step two consisted of active parent involvement during a structured observational screening test, the Meade Movement Checklist (MMCL). All infants were then independently evaluated at 6 months using the Bayley Scales of Infant Development II (BSIDII) and the Movement Assessment of Infants (MAI). Scores on the MMCL were compared to BSIDII and MAI and to parent descriptions of their infant's development on the Ages and Stages Questionnaire (ASQ) at 8 to 9 months of age. Sensitivity, specificity, positive predictive (PPV) and negative predictive values (NPV) of parent concerns and the MMCL were calculated.

**Results:** Of the 213 eligible families invited to attend screening clinics, 55 (25.8%) infants attended, and parents completed the modified PEDS and MMCL. Forty three (78.2% of infants screened) were evaluated by the principal investigator (PI), who was blind to all screening information. Parents attending the clinics had significantly more concerns on the modified PEDS ( $\chi^2=6.43$ ,  $p=.011$ ) than parents who did not attend. (Specificity 81%, Sensitivity 60%). Sixty percent of parents expressed concerns about feeding issues. Significant correlation was found between the MMCL and MAI ( $r=.58$ ,  $p=.01$ ) and BSID II. ( $r=-.48$   $p=.01$ ) No correlation occurred with scores between 4 and 6 months and the pass/fail on the ASQ between 8 to 9 months. The specificity of the modified PEDS was 48% and sensitivity was 80%. The specificity of the MMCL was 88.2% and sensitivity was 77.8%; PPV was 63.6% and NPV was 93.8%. When both BSIDII scores and medical diagnosis categories were combined to determine referrals, 15 infants were referred for further evaluation (27.7%). Referrals represented 7.04% of the 213 families' invited and 34.8% of the independent evaluations completed.

**Summary/ Conclusions:** Screening 25% of a birth cohort identified by parent concerns, resulted in high specificity (88.2%) and high sensitivity (77.8%) in identifying infants at 4 to 6 months of age. Combining the two measures of parent concerns in step one and an observational screening test in step two effectively increased PPV to 63.6% and NPV to 93.8% in this community screening program.