

SCREENING FOR
DEVELOPMENTAL DELAYS IN
PRIMARY CARE:

NIPISSING DISTRICT
DEVELOPMENTAL SCREEN (NDDS)

David P. Joyce, MD, CCFP,
Department of Family Practice,
University of British Columbia,
Vancouver, British Columbia.

Marjolaine M. Limbos, PhD, RPsych
Sunny Hill Health Centre
for Children
Vancouver, British Columbia

- Primary care physicians provide health care services to young children on a regular basis.
- Ideally suited to screen for developmental and behavioral problems in preschool children.

- While there is some controversy over the merits of screening for DD in primary care....
- There is mounting evidence that early intervention improves outcomes for children and their families.

- Current guidelines by the AAP, Best Start Early Learning Program and Ontario College of Family Physicians recommend routine developmental screening.
- Recommended Screening Tools:
 - ASQ
 - PEDS
 - NDDS
- These choices are largely recommended because of ease of use and potential for suitable application in primary care

- There is some literature to support relatively good accuracy of some of these measures:
 - ASQ (Sens: 70–90%; Spec: 76–91%)
 - PEDS (Sens: 74–79%; Spec: 70–80%)
 - NDDS (Sens: 50–100%; Spec: 68%)
- To date, however, there has been little if any research on the accuracy of these measures when used in primary care

The NDDS

- Parent or provider administered.
- 13 age specific versions from 1 – 72 months.
- ~18 questions ask parents if their child can complete certain tasks .

- Several Domains Assessed:
 - Vision
 - Hearing
 - Speech–language
 - Gross motor
 - Fine Motor
 - Cognitive
 - Self–Help
- Simple Yes/No Answers are given

- NDDS looks promising for use in primary care:
 - Parent administered = no office time used
 - Easy to score (Yes/No)
 - Simple decision tree
 - Allows opportunity to dialogue about child development
- But is it doing what it is supposed to do?

Purpose

- Determine the sensitivity and specificity of the NDDS for detecting developmental problems in preschool children.

334 Children Aged 12–60 months
(Mean = 32.4 months)
Presenting for Routine Primary Care



80 Primary Care Providers :

70 Family Physicians

7 Nurse Practitioners

3 Pediatricians

Criterion Measures:

Cognition/Development:

- Bayley III (12–30 months)
- WPPSI III (30–60 months)

Speech and Language:

- Preschool Language Scale IV

Adaptive Functioning

- Vineland II

Clinical Assessment by a Registered Psychologist

Developmental Delay

$\leq 10\%$ on any Subscale

AND

$\leq 10\%$ Adaptive Functioning

Screening Test : Nipissing District Developmental Screen

Accuracy of the NDDS



$$\text{Sensitivity} = \text{TP} / \text{TP} + \text{FN}$$

$$\text{Specificity} = \text{TN} / \text{TN} + \text{FP}$$

Demographic Characteristics

Gender – Female 147 (44%)

Ethnic Background

White 284 (85%)

Franco-Ontarian 49 (15%)

Aboriginal 42 (13%)

Other 8 (2%)

Languages Spoken 196 (58%)

English 68 (20%)

French 38 (11%)

Bilingual 36 (11%)

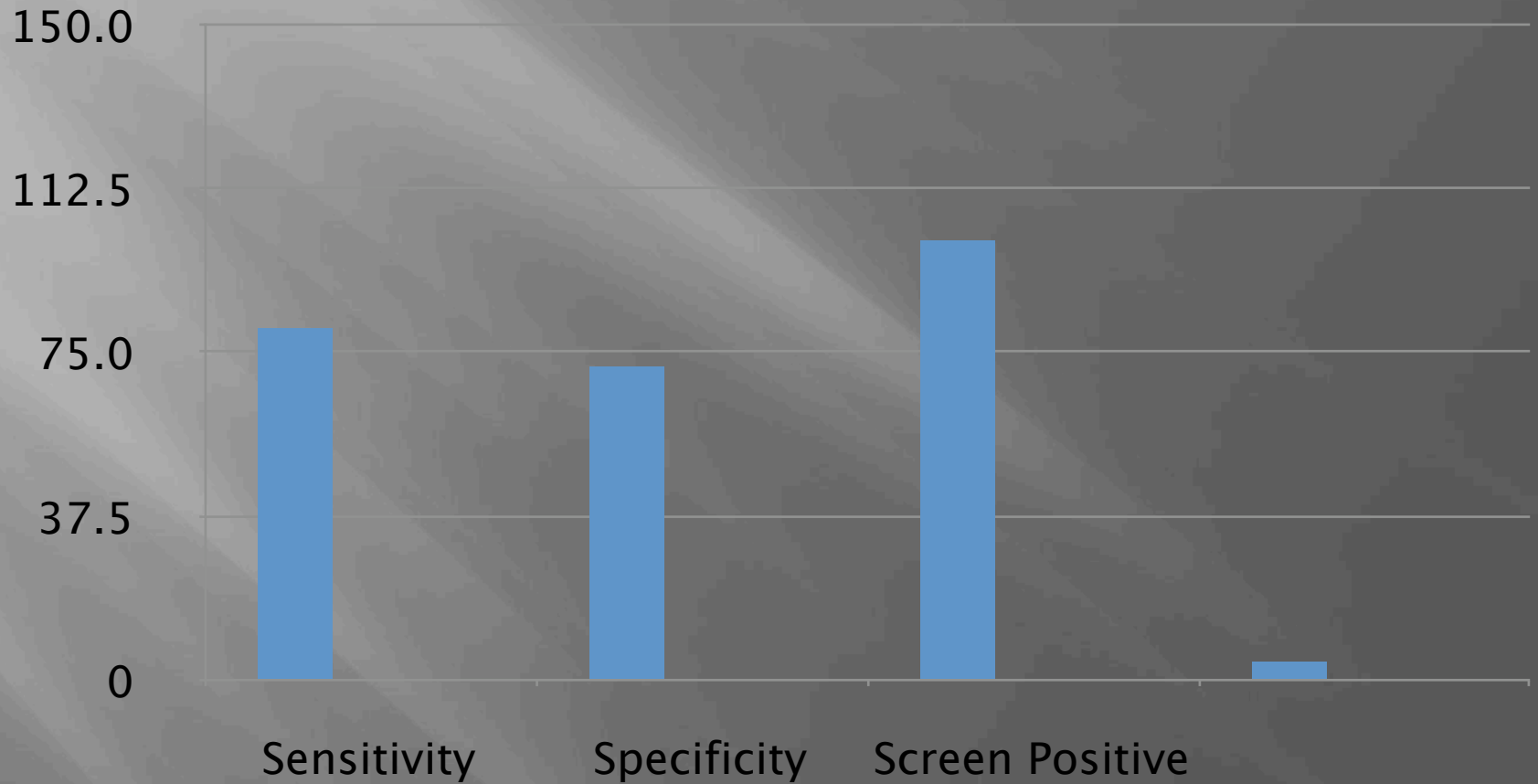
47 (59%)

33 (41%)

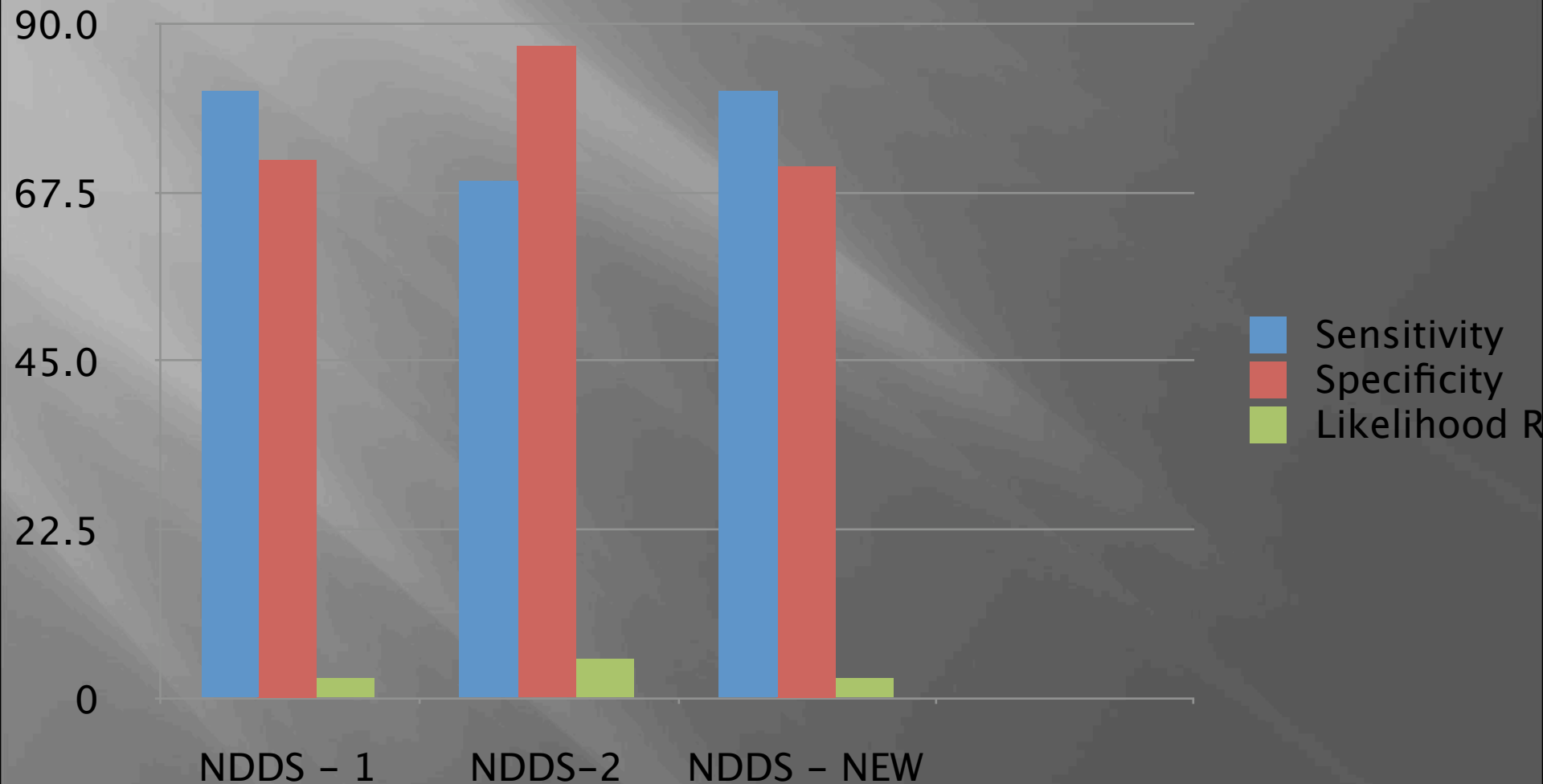
Type of Developmental Delay

Any	34 (10%)
Cognitive Delay	18 (5%)
Speech /Language Delay	13 (4%)
Motor Delay	3 (1%)
Suspected Autism	5 (1%)

Sensitivity and Specificity of the NDDS



Sensitivity, Specificity and Likelihood Ratio for Various Versions of the NDDS



- Approximately 10% of children presenting for routine primary care were identified as having developmental problems.
- The NDDS had good sensitivity (81%).
- Specificity of the NDDS (72%) was not ideal but may be acceptable for a screening tool.
- Use of the 2–Rule cut off for the NDDS improved specificity at the cost of sensitivity.

- The NDDS shows good promise for use in primary care settings.
- It has several benefits:
 - Opportunity for dialogue about development
 - Minimal impact on physician time
 - Easy to score
- Our findings support recommendations for routine use in primary care:
 - Good sensitivity