META-ANALYSIS OF VISUAL INSPECTION ACCURACY FOR CERVICAL CANCER SCREENING: DOES PROVIDER TYPE OR TRAINING MATTER?

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Disclosures

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Global Health Inequity

Cervical Cancer

- 4th most common cancer in women worldwide

In 2012

- 528,000 women diagnosed
- 276,000 women died
- 70% living in low resource countries

Prat & Franchesci (2014)

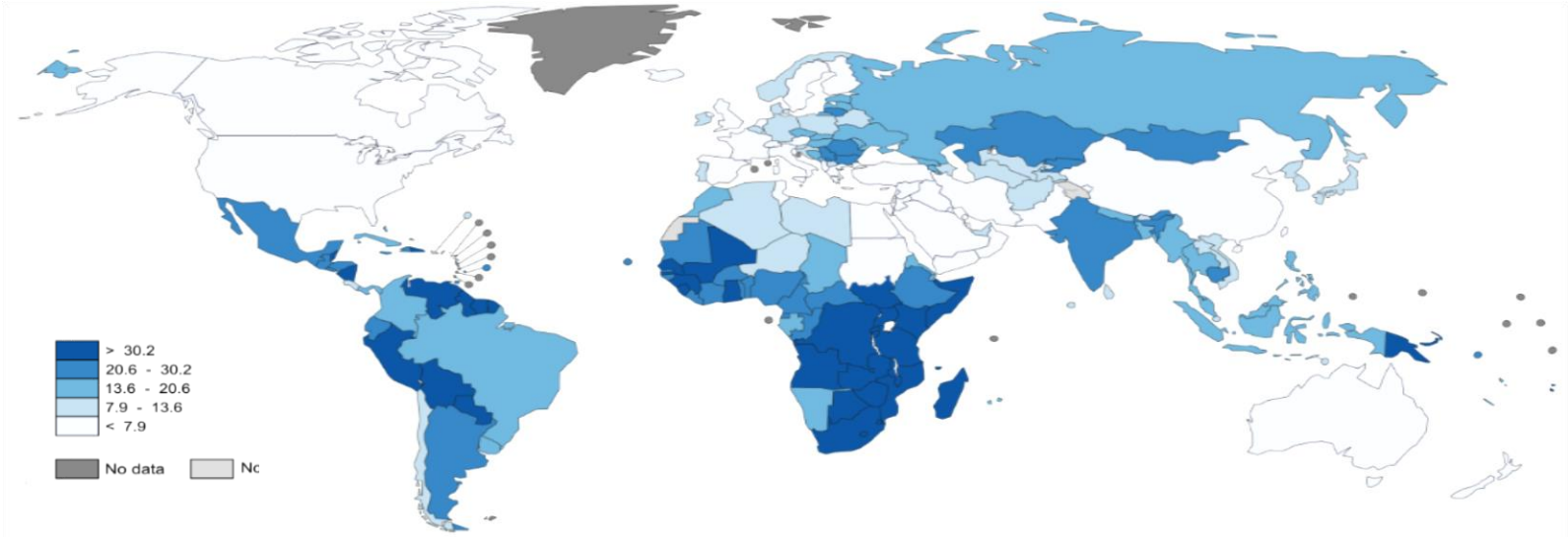
"The biggest gain in reducing cervical cancer incidence and mortality would be achieved by increasing screening rates among women rarely or never screened"

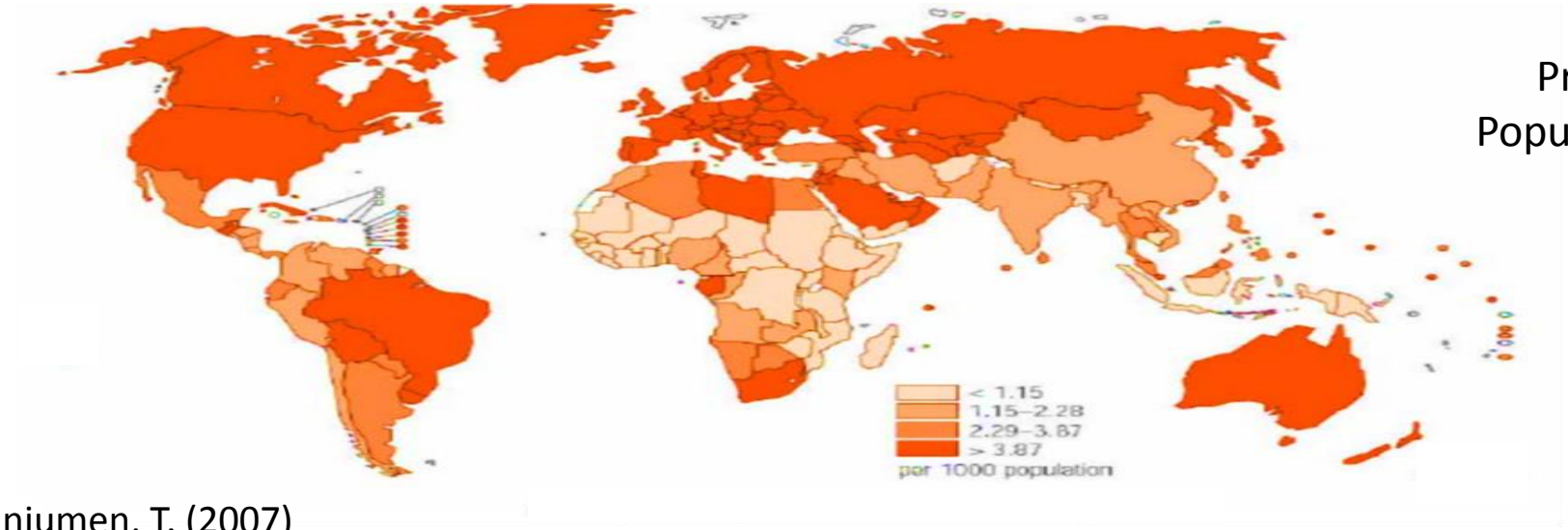
(Saslow, et al. 2012)

"Screen & Treat" approach with VIA and Cryotherapy (WHO, 2013)

High Cervical Cancer Incidence in Areas with Inadequate Provider Coverage

Cervical Cancer Incidence Rates





Provider to Population Ratios

Dal Poz, Kinfu, Dráger, & Kunjumen, T. (2007)

Aims

Primary aim

- To determine whether the accuracy of cervical cancer screening with visual inspection by CHWs was as accurate as visual inspection performed by nurses or physicians

Secondary aim

- To explore affects of visual inspection provider training on visual inspection accuracy

Systematic Review: Inclusion/Exclusion Criteria

Visual Inspection (VIA, VILI, and/or VIAM)

Participants with no history of HPV, CIN, or prior treatment

Reference to provider type and/or training

Reference test for disease threshold

- Colposcopy with directed biopsy or random biopsy

Criteria for positive visual inspection

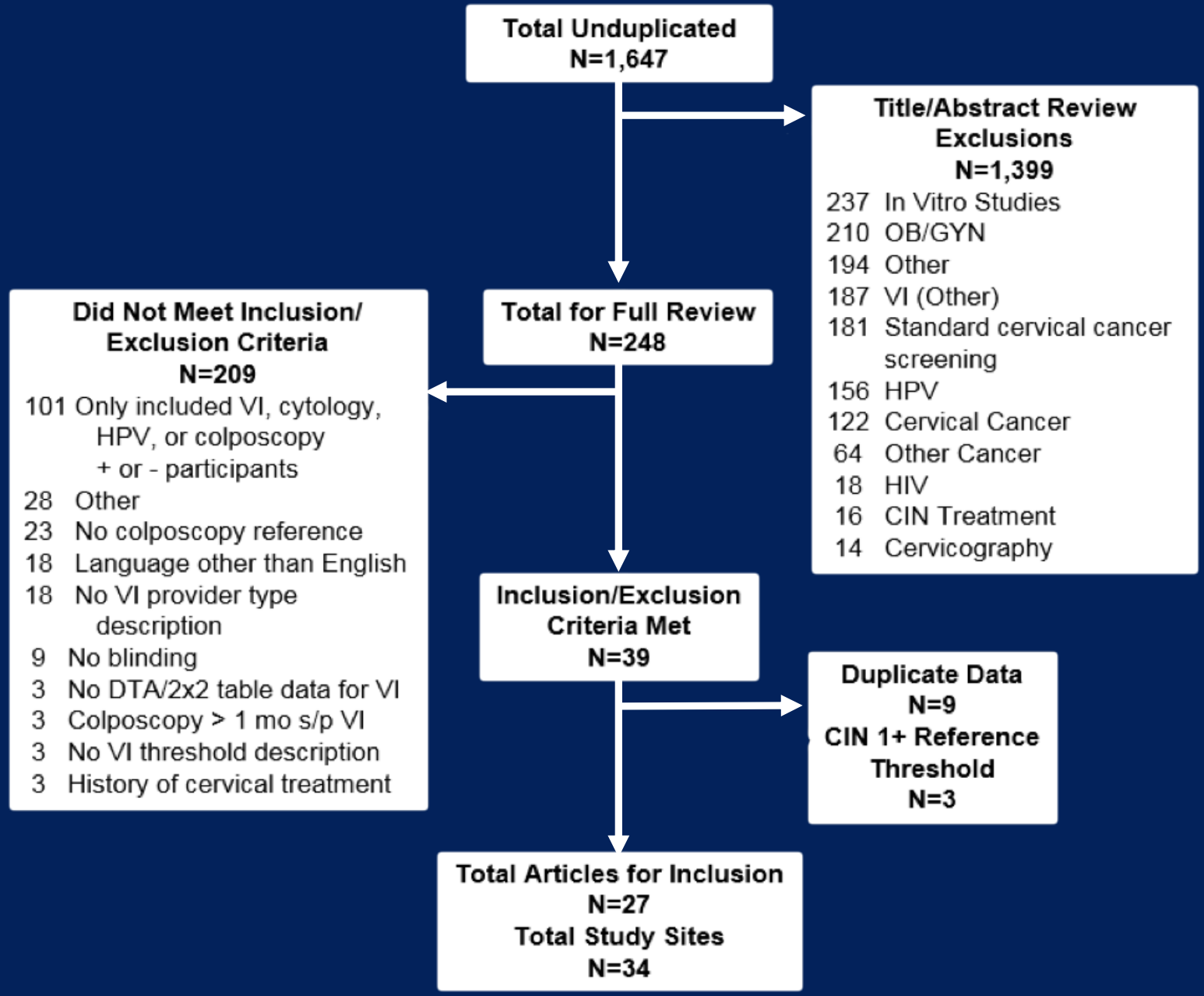
Test accuracy data

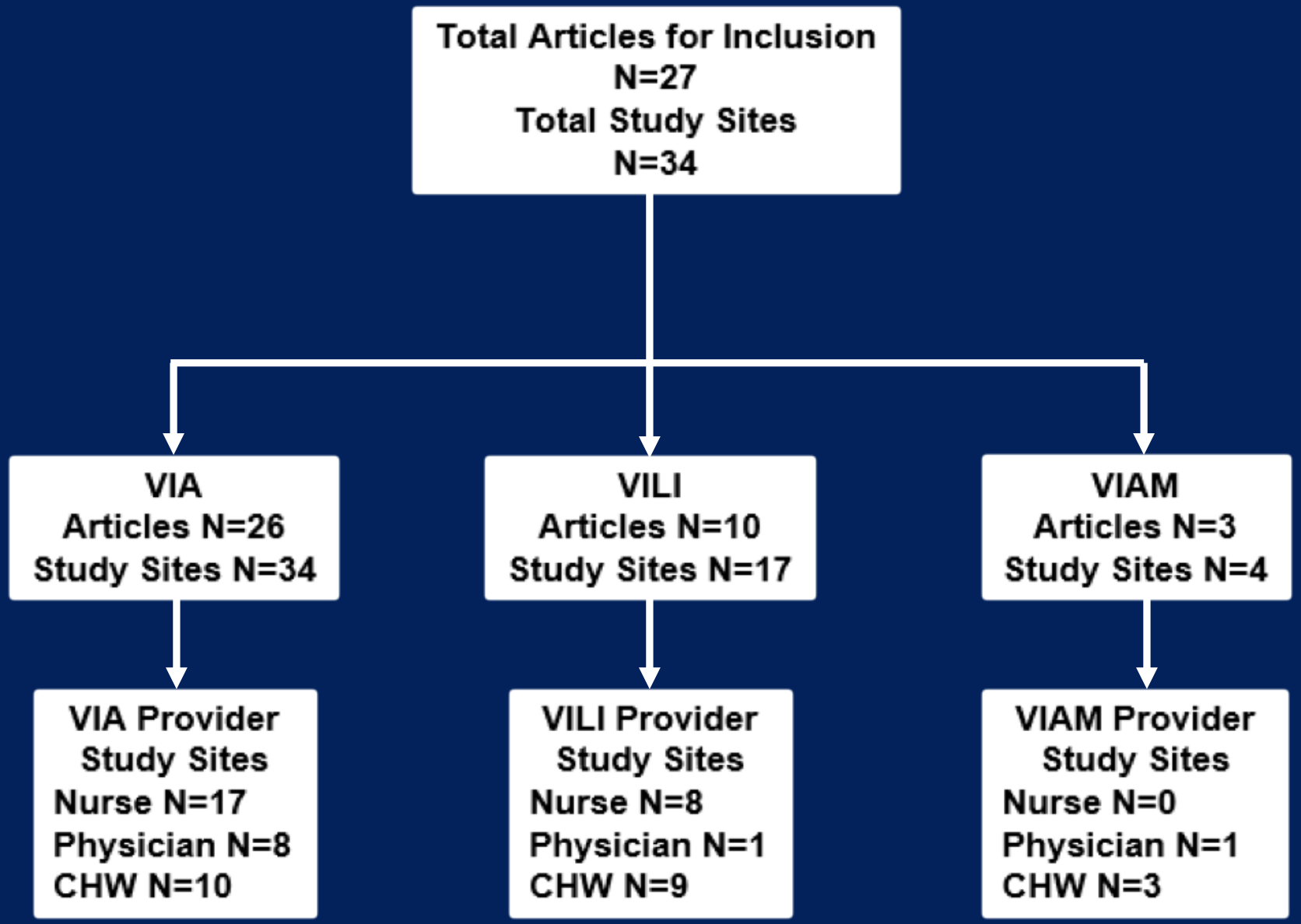
- 2x2 table
- Sensitivity and specificity

Blinding

Less than 1 month from index to reference test

English


Total Unduplicated
N=1,647
Title/Abstract Review Exclusions
N=1,399
237 In Vitro Studies
210 OB/GYN
194 Other
187 VI (Other)
181 Standard cervical cancer screening
156 HPV
122 Cervical Cancer
64 Other Cancer
18 HIV
16 CIN Treatment
14 Cervicography
Total for Full Review
N=248
Did Not Meet Inclusion/ Exclusion Criteria
N=209
101 Only included VI, cytology, HPV, or colposcopy + or - participants
28 Other
23 No colposcopy reference
18 Language other than English
18 No VI provider type description
9 No blinding
3 No DTA/2x2 table data for VI
3 Colposcopy > 1 mo s/p VI
3 No VI threshold description
3 History of cervical treatment
Inclusion/Exclusion Criteria Met
N=39
Duplicate Data
N=9
CIN 1+ Reference Threshold
N=3
Total Articles for Inclusion
N=27
Total Study Sites
N=34


Total Articles for Inclusion
N=27
Total Study Sites
N=34
VIA
Articles N=26
Study Sites N=34
VILI
Articles N=10
Study Sites N=17
VIAM
Articles N=3
Study Sites N=4
VIA Provider
Study Sites
Nurse N=17
Physician N=8
CHW N=10
VILI Provider
Study Sites
Nurse N=8
Physician N=1
CHW N=9
VIAM Provider
Study Sites
Nurse N=0
Physician N=1
CHW N=3

Summary of Included Articles (N=27)

Primary aim

- 22 evaluated the test accuracy of visual inspection alone, in parallel, or in combination with other screening tests
- 2 compared nurses to physicians, but no statistical comparisons
- 2 looked at age differences
- 1 was an HPV prevalence study

Geographic regions

- Asia, Africa, Central America, South America, and the Pacific

Community setting (n=17)

- 12 urban
- 1 suburban
- 3 rural
- 1 mixed

Summary of Included Articles (N=27), cont.

Clinical setting (n=20)

- 9 in primary care clinics
- 8 in specialty clinics
- 3 in hospital

Age range (15-79)

- Most between 30-40 years of age

Education

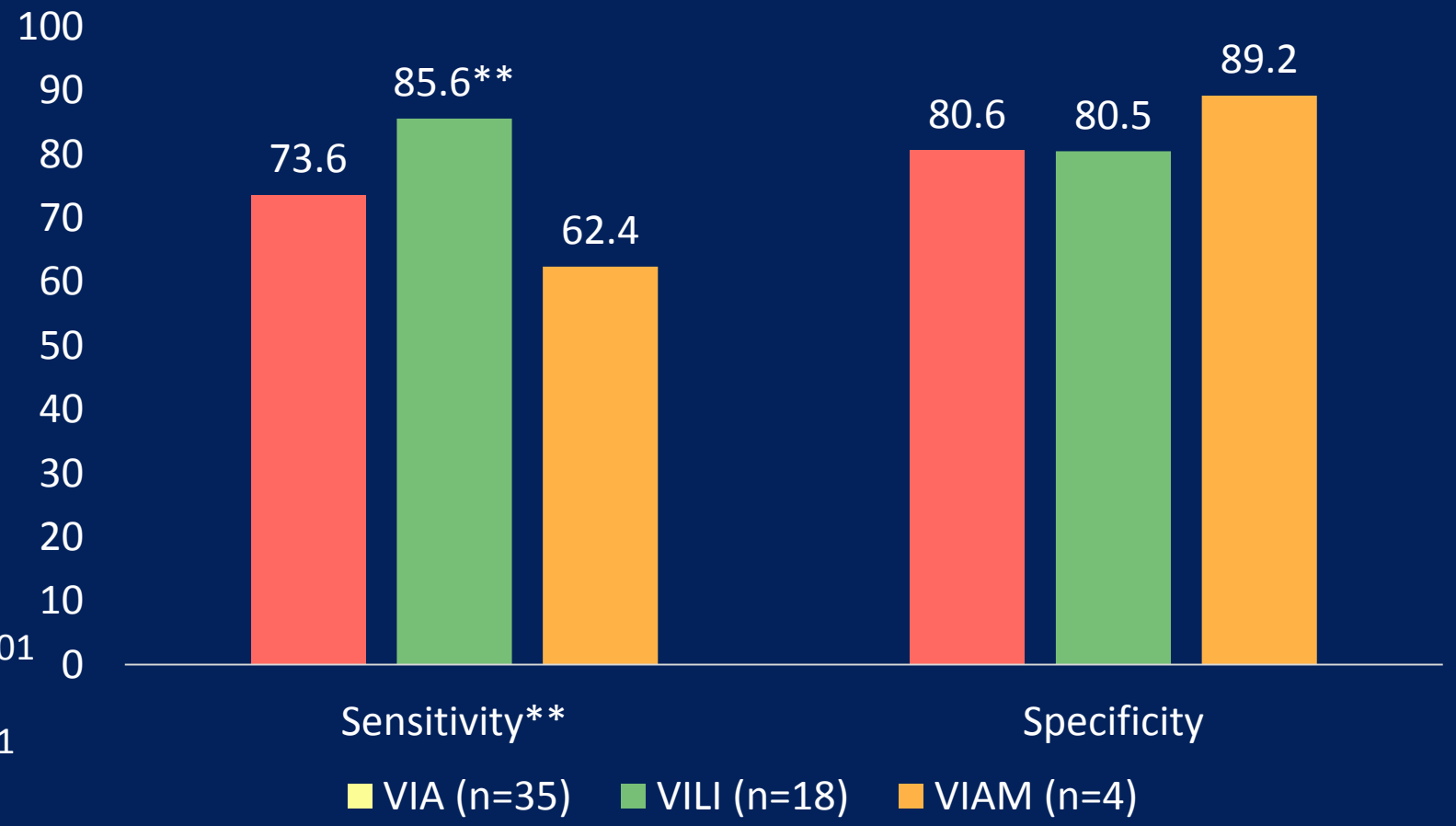
- 6 reported more than 30% of women with no formal education
- 8 had more than 50% of women with secondary or higher education

Quantitative Meta-Analysis

Bivariate Linear Mixed Models (BLMM)

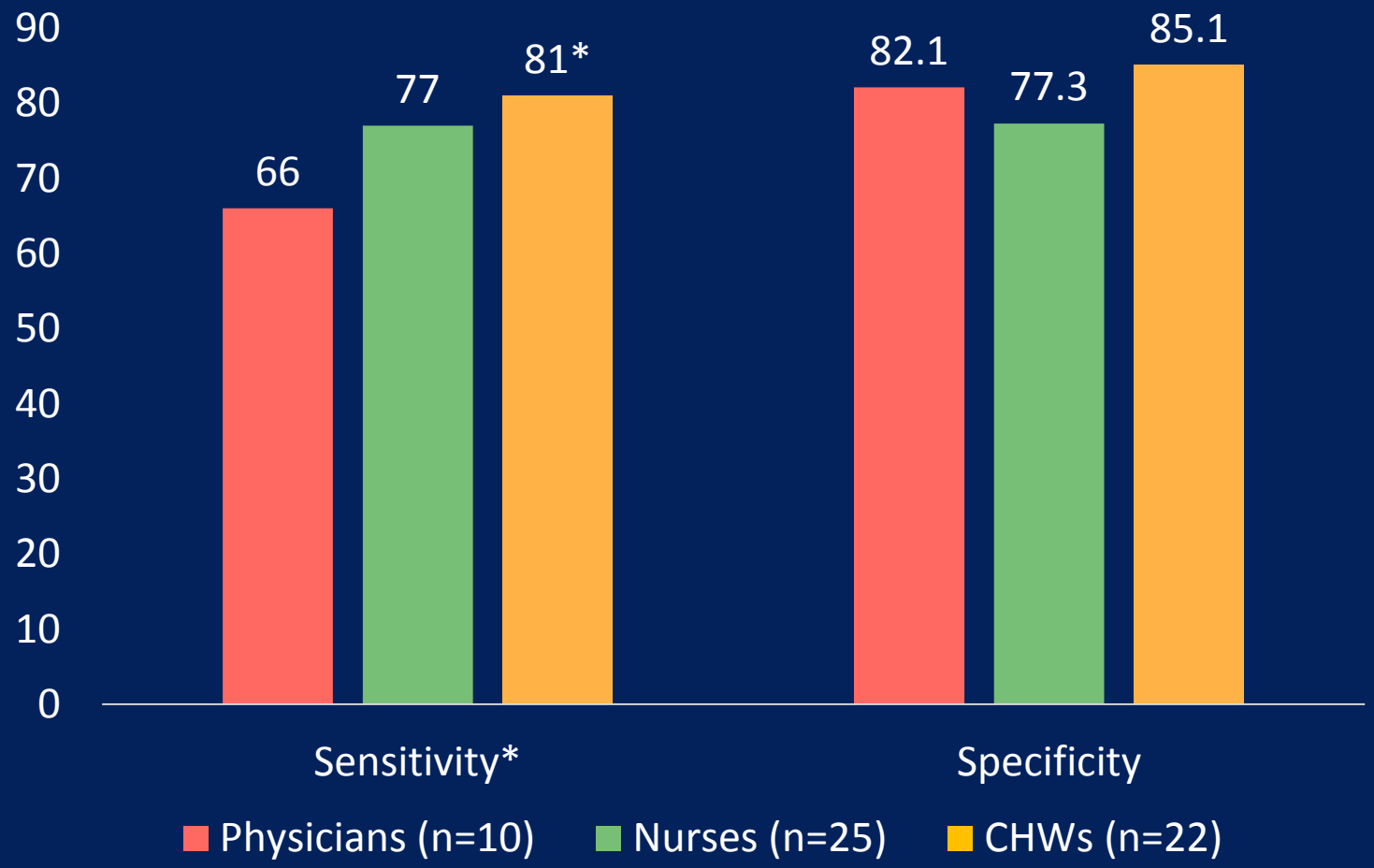
- Variation of bivariate random effects models (BREM) recommended by Cochrane
- Bivariate analysis of interdependent accuracy outcome measures
  - Sensitivity
  - Specificity
- Random effect: between study heterogeneity
- Fixed effect: predictor variables
- Unconditional and conditional models

Comparison of Visual Inspection Techniques



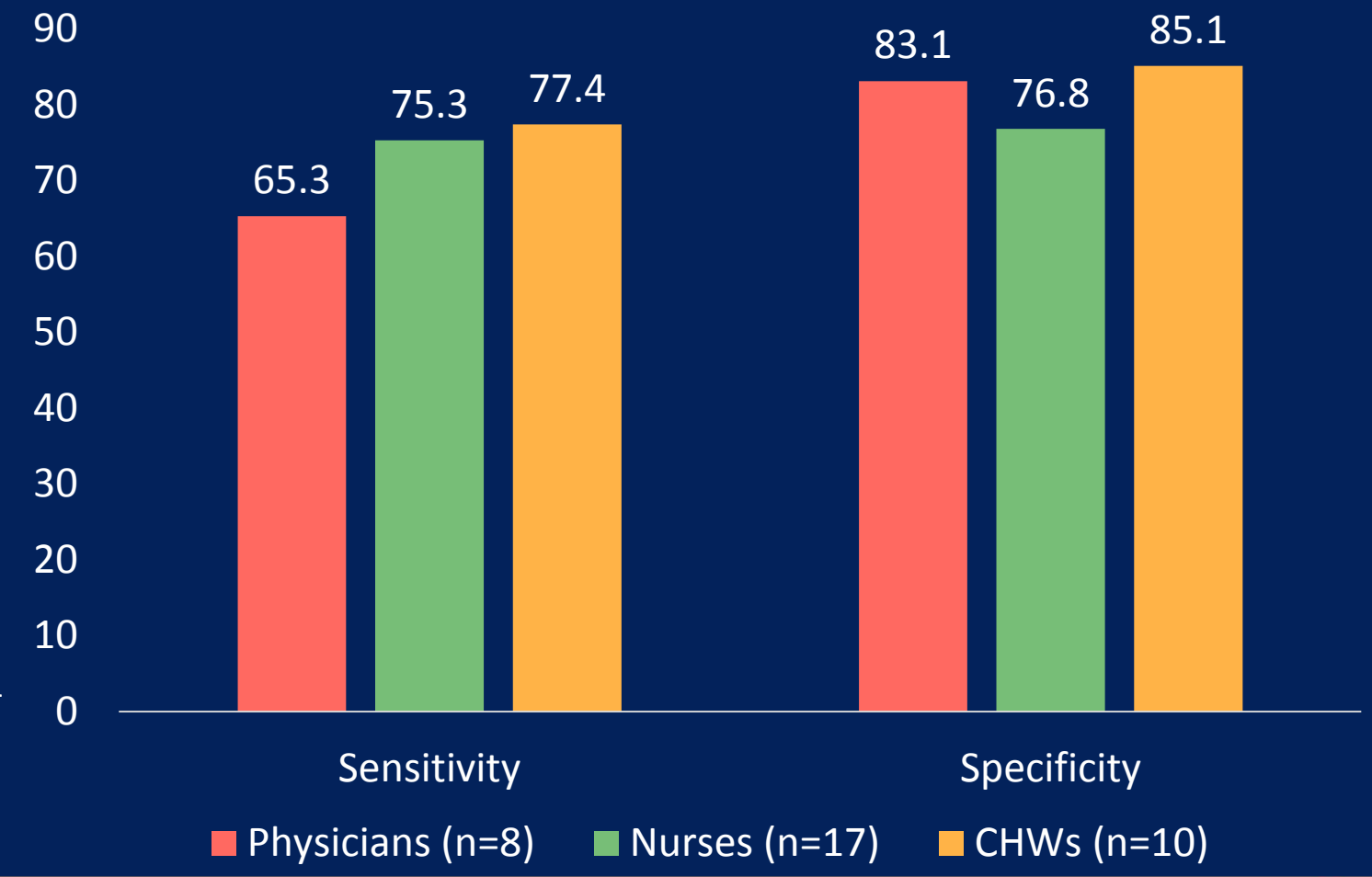
*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Provider Types



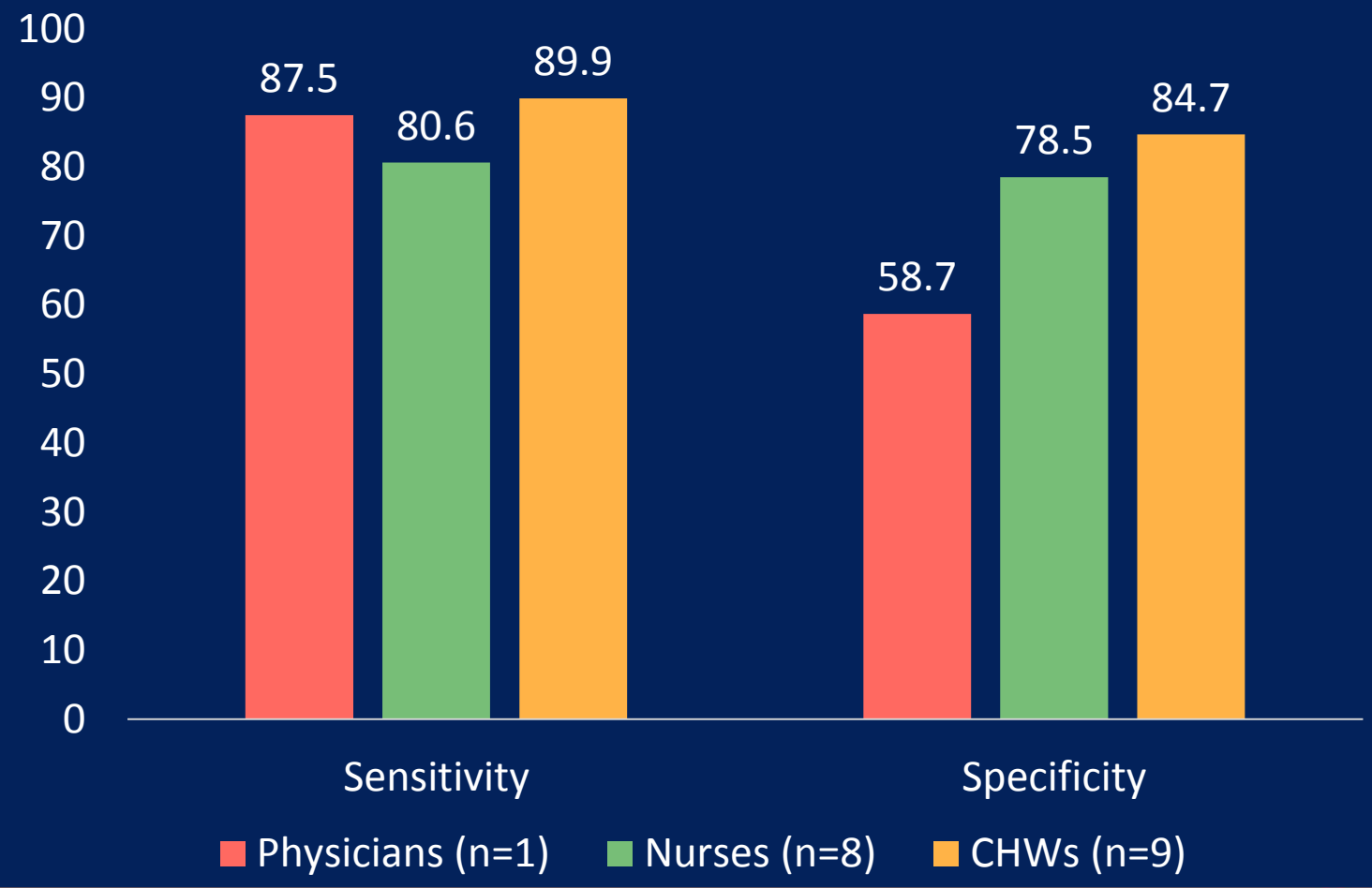
*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Provider Types for VIA



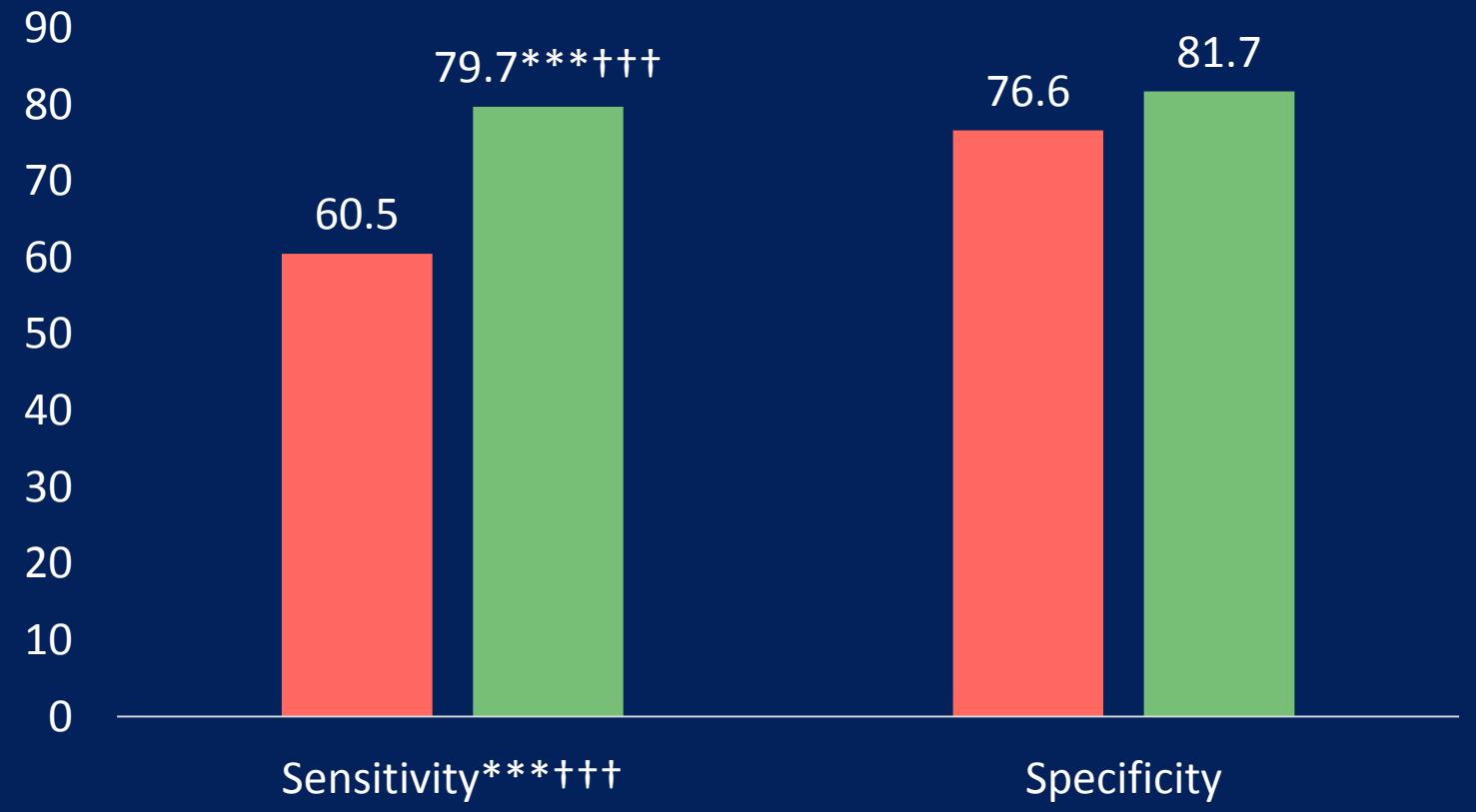
*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Provider Types for VILI



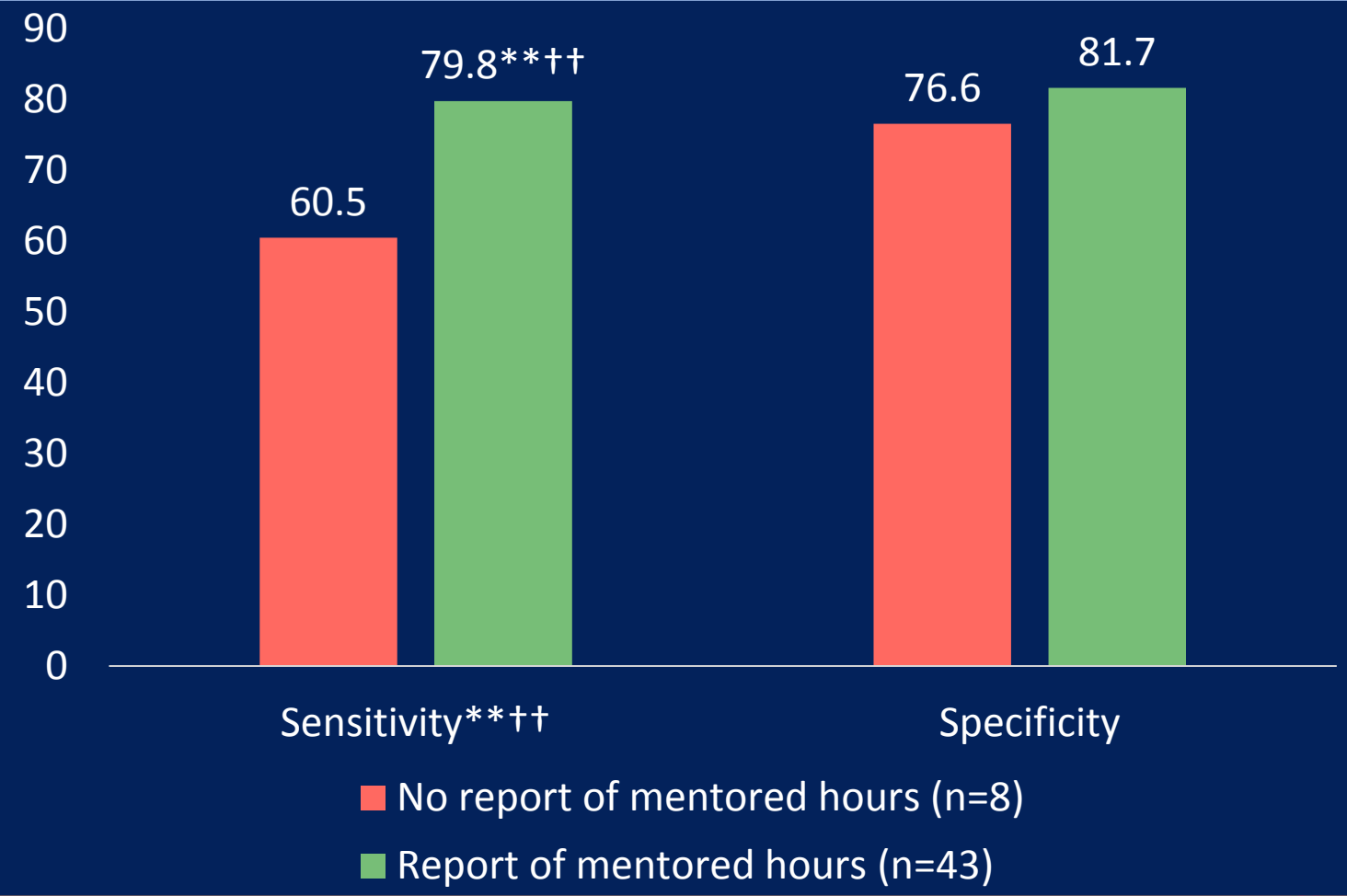
*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Didactic Hours



*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Report of Mentored Hours



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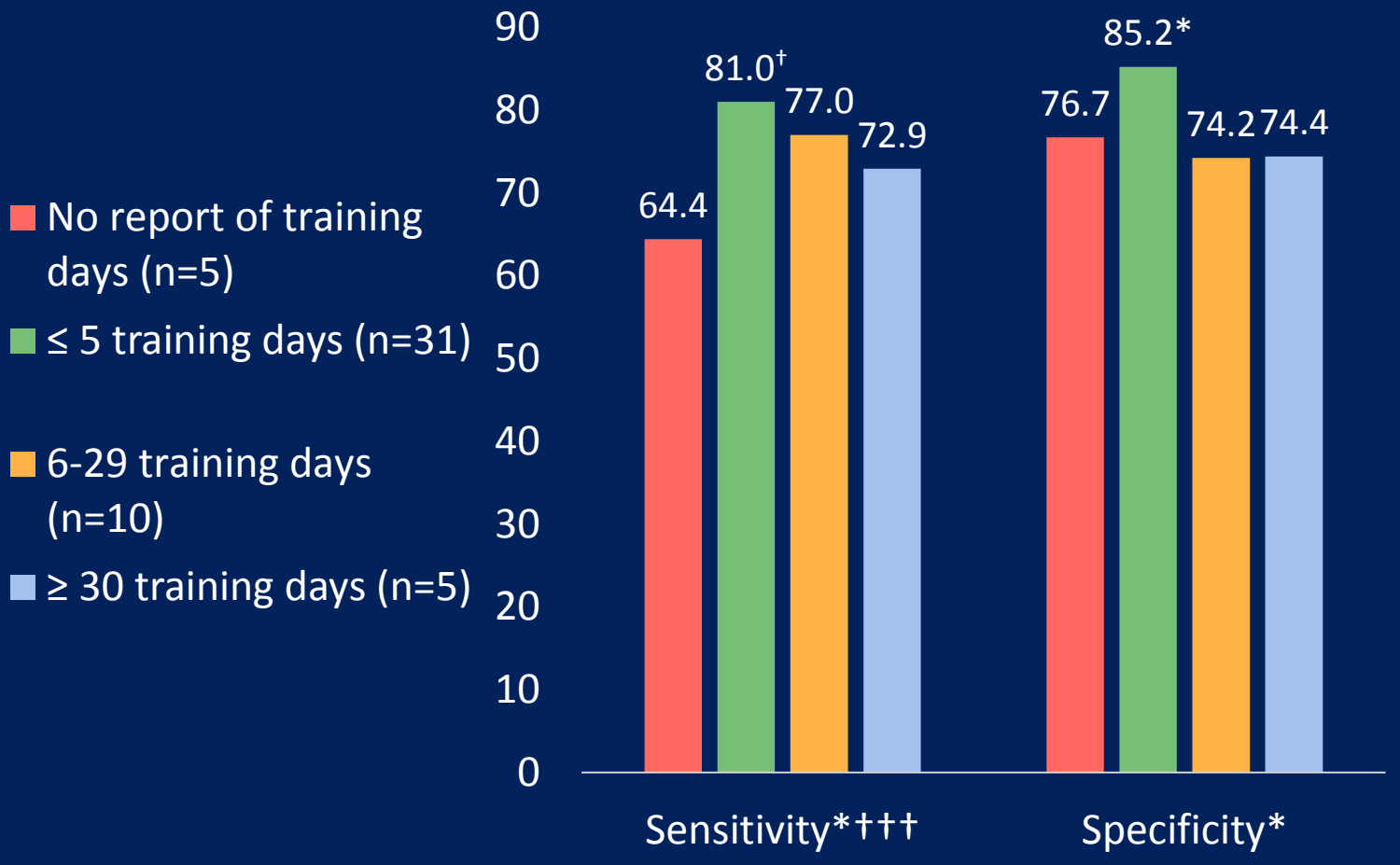
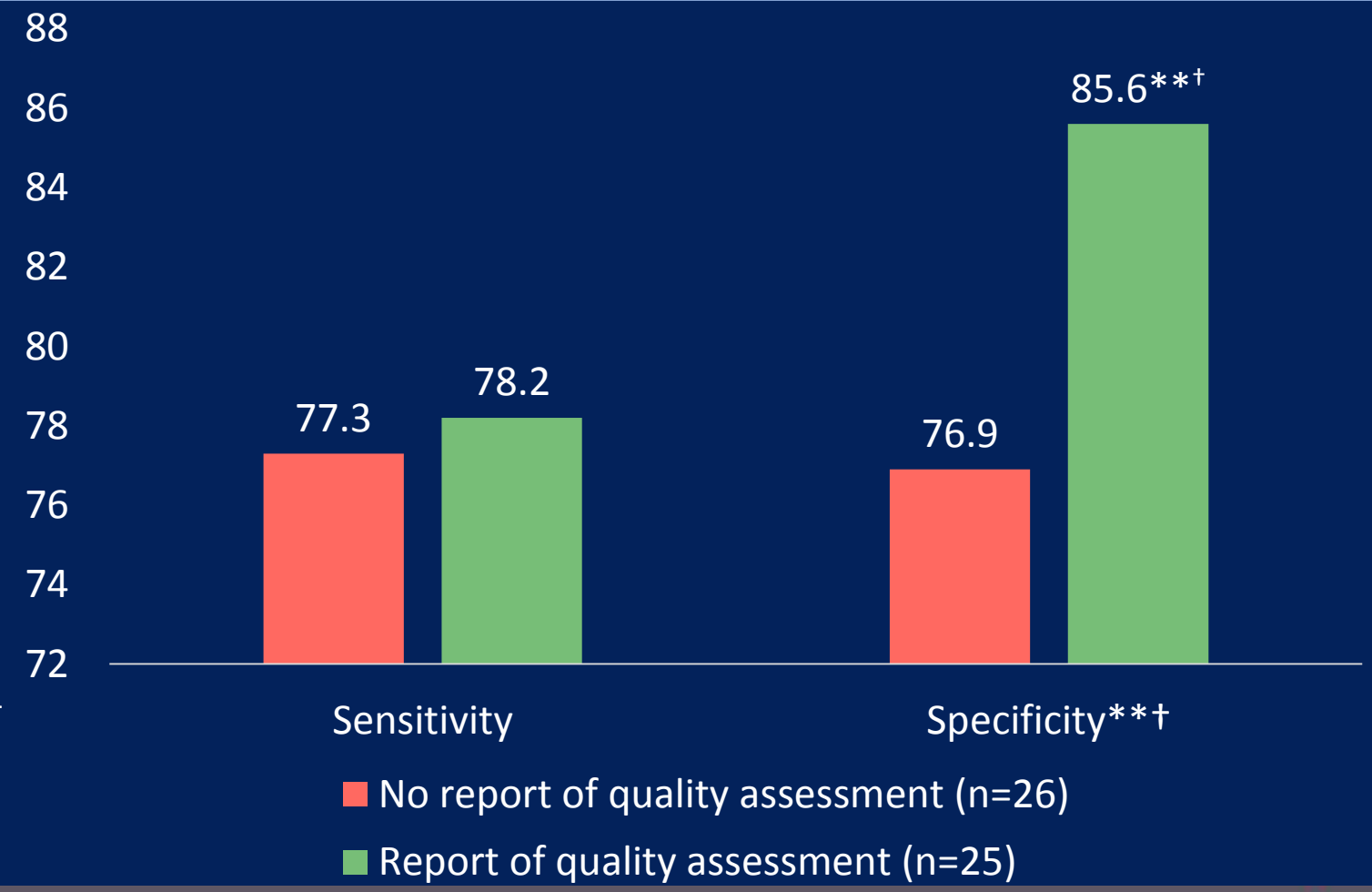
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Number of Training Days



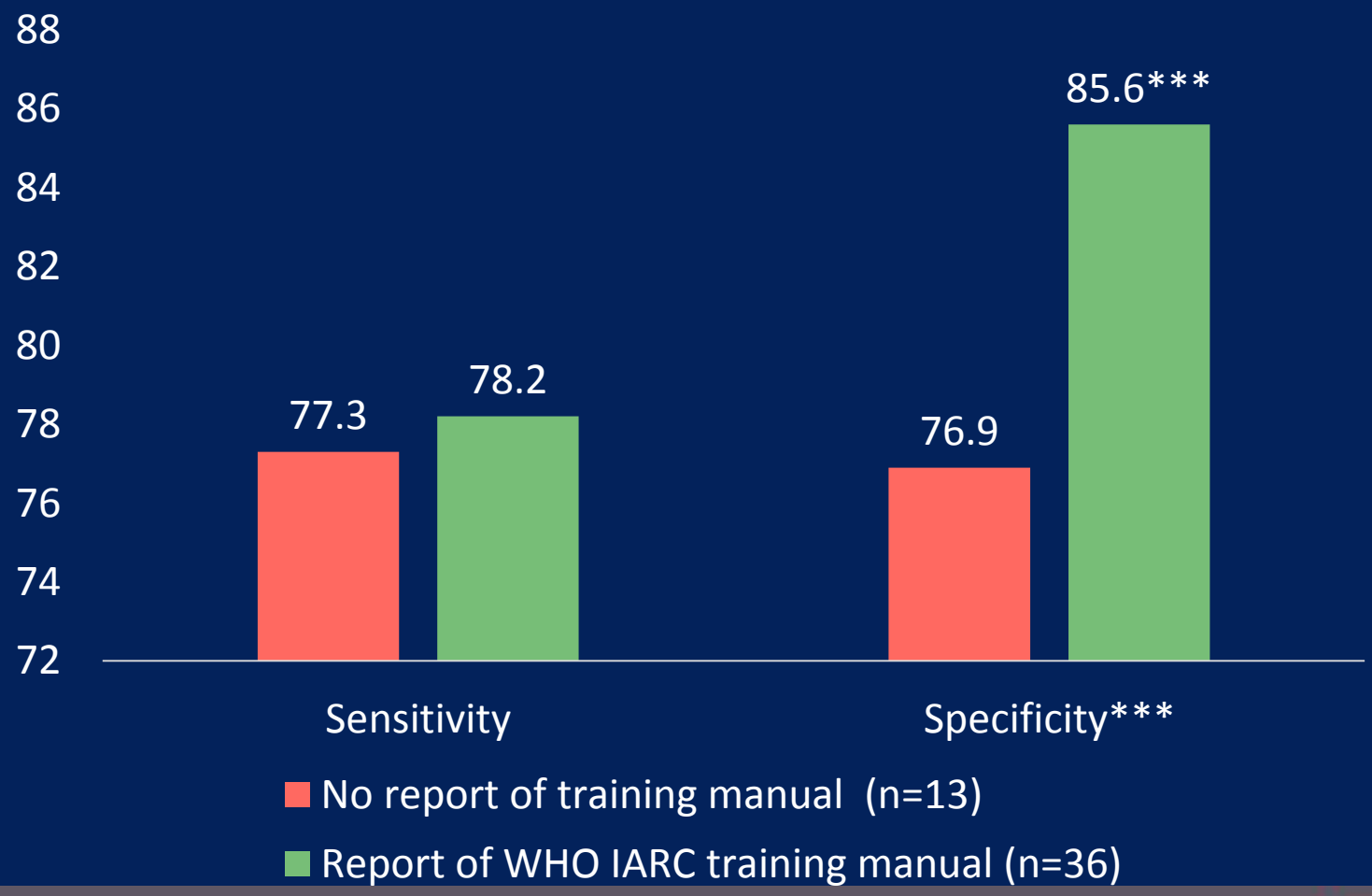
*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Training Quality Assessment



*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Comparison of Use of WHO IARC Training Manual



*p<.05. **p<.01. ***p<.001 unconditional model
†p<.05. ††p<.01. †††p<.001 conditional model

Conclusions

- VIA and VILI accuracy (sensitivity and specificity) is similar among physicians, nurses, and CHWs
- Visual inspection by CHWs was significantly more sensitive than those performed by physicians and nurses when all visual inspection techniques were combined
- Components of visual inspection provider training (didactic hours, mentored hours, number of training days, quality assessment, and use of WHO IARC training manual) were all significant predictors of visual inspection sensitivity and/or specificity

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