Evidence translation for effective early childhood intervention

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Marmot Review

Fair Society, Healthy Lives
The Marmot Review
Strategic Review of Health Inequalities in England post-2010

- To give every child the best start in life, and to reduce inequalities
  - Universal family support services
  - Additional support for those with greater needs

  (Progressive universalism)

Evidence translation for effective early childhood intervention

- How do we best identify families 'in need' of additional support?

- Relevance of research question to service provision in SA and UK

- Using ALSPAC data as the resource to answer policy relevant questions - thus potentially improving translation

Early Child Development

- Children are born and remain healthy
- Children's environments are nurturing, culturally appropriate and safe
- Children benefit from better social inclusion and reduced disadvantage
- Children have the knowledge and skills for life and learning
- Children are engaged in and benefit from educational opportunities

Child health policy (UK)

- *Achieving Equity and Excellence for Children*

- *Public Health White Paper, Healthy Lives, Healthy People*

- Platform to develop services around children and young people, to give

> "…every child in every community the best start in life."

Programs for families needing support

UK

US

The Family-Nurse Partnership Programme in England

Australia

Evaluation of NFP (3 US trials)

	N	Inclusion criteria
Elmira, New York County	400	No previous live births, and either <19 y, of low ses, or had asked to take part. Excluded from analyses: women with still births or serious conditions likely to adversely impact on perinatal outcomes (n=20) and non-white women (n=46).
Memphis, Tennessee	1139	No previous live births, and at least two of unmarried, <12y education, or unemployed.
Denver, Colorado	735	No previous live births, and either qualifying for Medicare or with no private health insurance.

Evaluation of NFP (3 US trials)

Mothers

- Greater use of community services (29% vs. 20%, p=0.01) but no difference in number of prenatal visits or obstetric evaluations. [Kitzman et al. *JAMA* 1997;278:644-52]

- Reduced pregnancy-induced hypertension (13% vs. 20%, p=0.009) [Kitzman et al. *JAMA* 1997;278:644-52]

- Longer intervals between births of first and second children (34 vs. 30 months, p=0.01) [Olds et al. *Pediatrics* 2004;114:1550-9]

- More attempts at breastfeeding (26% vs. 16%, p=0.006), although no difference in duration [Kitzman et al. *JAMA* 1997;278:644-52]

- Smokers had greater reductions in cotinine levels from intake to the end of pregnancy (259.0 vs 12.3ng/mL, p=0.03) [Olds et al. *Pediatrics* 2002;110;486-96]

Evaluation of NFP (3 US trials)

Age 4

- 40% fewer injuries and ingestions (p=0.03) [Olds et al. 1994 Pediatrics 93;89-98]

- No effect of intervention on
  - Sensitive-responsive mother-child interaction
  - Children's emotional regulation
  - Externalising behaviour problems [Olds et al. *Pediatrics* 2004;114:1560-8]

- No effect of intervention on
  - Home environments that were more conducive to learning
  - Language development
  - Executive functioning

  except among mothers with low psychological resources
  [Olds et al. *Pediatrics* 2004;114:1560-8]

Evaluation of NFP (3 US trials)

Age 6

- Higher intellectual functioning scores (92.34 vs 90.24, p=0.03)
- Higher receptive vocabulary scores (84.32 vs 82.13, p=0.04)
- Fewer behaviour problems in clinical range (1.8% vs 5.4%, p=0.04)
- No effect on
  - Internalising or externalising behaviour problems
  - Reading achievement
  - Teacher report of child behaviour

[Olds et al. *Pediatrics* 2004;114:1550–1559]

Evaluation of NFP (3 US trials)

Age 9

- No effect on
  - Mother report of child's disruptive behaviour disorders
  - Teacher report of behavioural or academic adaptation to classroom

- No effect on
  - GPAs for reading or maths

  except among mothers with low psychological resources

[Olds et al. *Pediatrics* 2007;120;e832-e845]

Evaluation of FNP (UK)

- Well accepted by nurses and young parents

- Low attrition rates

  - 7% in toddlerhood

- ↓ smoking during pregnancy

  - 40% smoked in past two days at intake,
    vs. 34% at 36 weeks

- ↑ breastfeeding

  - 63% initiated (range across sites 38% to 86%)

  - 23% still breastfeeding at 6 weeks

- ↑ self-esteem of young parents, feel less excluded

Evaluation of FNP (UK)

- Mothers value programme and report positive changes in understanding how to care for their baby and their own aspirations for the future

- ↑ involvement from young fathers and other family

- Clients more confident as parents, doing activities with children likely to ↑ cognitive and social development.

- Clients had strong recall of nutritional advice they received.

Barnes et. al. (2008) *Nurse-Family Partnership Programme: First Year Pilot Sites Implementation in England.*

Barnes et. al. (2009) *Nurse-Family Partnership Programme. Second Year Pilot Sites Implementation in England. The Infancy Period.*

Barnes et. al. (2011) *The Family-Nurse Partnership Programme in England: Wave 1 implementation in toddlerhood & a comparison between Waves 1 and 2a of implementation in pregnancy and infancy.*

Effectiveness of programs

"When I was pregnant, I felt I didn't have anybody to lean on. I was so lucky to have a nurse like her."

www.nursefamilypartnership.org

"She [the family nurse] gives you that bit of extra support, confidence that you are doing things right with your child. She makes you feel better."

Barnes (2008) *Nurse-Family Partnership Programme: First Year Pilot Sites Implementation in England*

RCT of UK FNP

Evaluating the Family Nurse Partnership in England: A Randomised Controlled Trial

- **Pregnant women aged <20 years randomised to receive FNP or usual care**

- **Outcomes:**
  - ❖ Pregnancy and birth
  - ❖ Child health and development
  - ❖ Maternal life course and economic self-sufficiency

Eligibility criteria

	US NFP	UK FNP	Aus FHV	Aus NFP
First time mother	✓	✓		
Age <20		✓	✓	
Age 20-23 + other criteria		✓		
Low income	✓			
Socially isolated			✓	
Poor attribution			✓	
Aboriginal/TSI descent			✓	✓

Research on broader eligibility criteria

- **PREview project (Millennium Cohort Study)**
  - ❖ Kiernan & Mensah (2009) Maternal indicators in pregnancy and children's infancy that signal future outcomes for children's development, behaviour and health.
  - ❖ Hobcraft & Kiernan (2010) Predictive factors from age 3 and infancy for poor child outcomes at age 5 relating to children's development, behaviour and health

- **Avon Longitudinal Study of Parents and Children (ALSPAC)**

ALSPAC

- Women resident in Avon area of southwest England, delivery date Apr 1991-Dec 1992

- Core sample of 14,541 pregnancies

- Approximately 85% of eligible women participated

- http://www.bristol.ac.uk/alspac/

Child outcomes

	Age	N	Poor development definition
ALSPAC Developmental Scale (ADS)	18m	7546	Total score in lowest 10%
Strengths and Difficulties Questionnaire (SDQ)	47m	8328	Total behavioural difficulties score in highest 10%
School Entry Assessment (SEA)	4-5y	7345	Overall score on language, reading, writing, mathematics in lowest 10%

Maternal predictors in pregnancy

	N	%
Age <20 years	14531	6.6
No partner or not cohabitating	13485	8.8
Financial difficulties	12011	10.0
Depression (EPDS score >12 at 18-20 weeks)	12177	13.9
Smoking in first 3 months	13189	25.1
Education less than O level	12340	30.1
At least 1 of the six predictors	10955	51.2
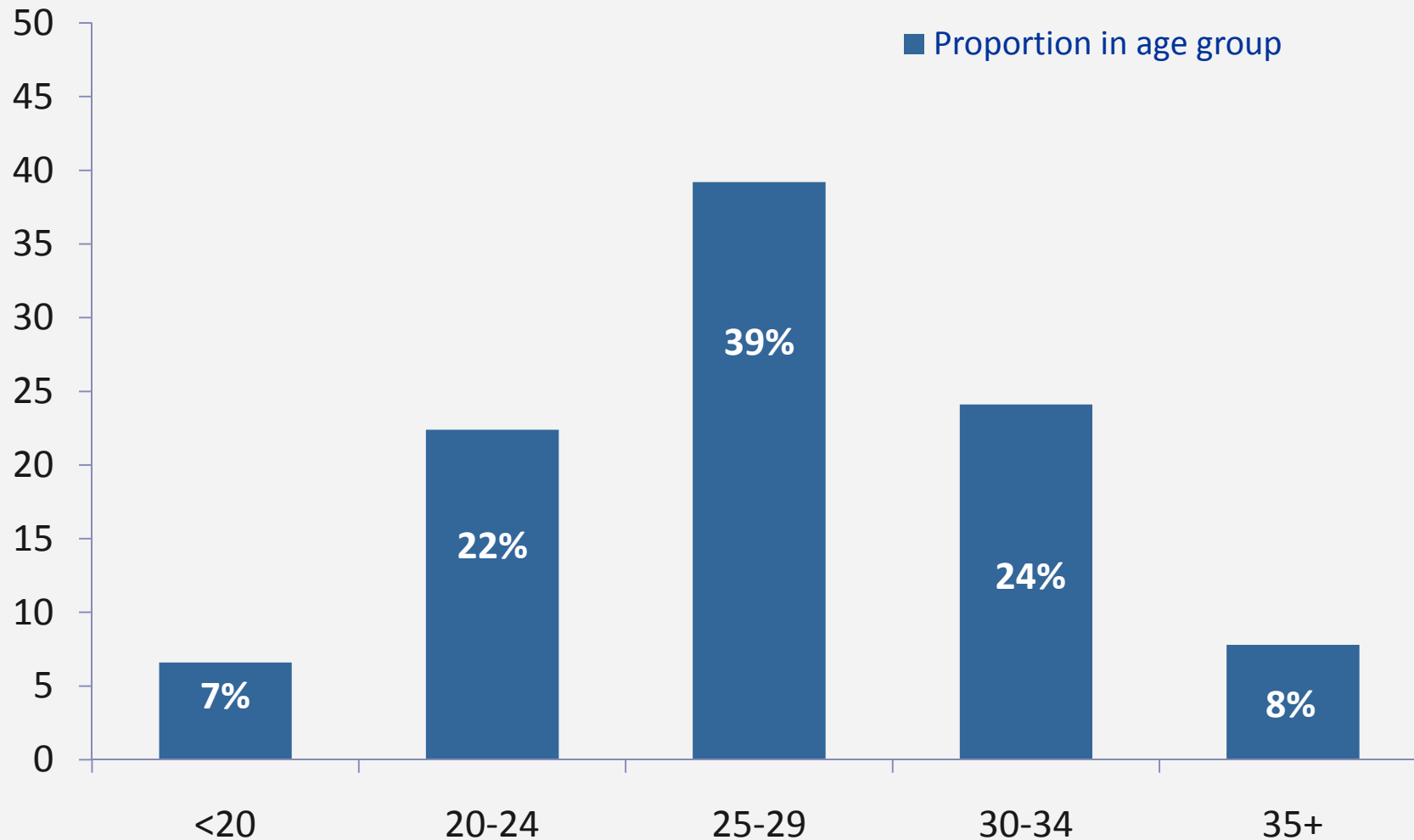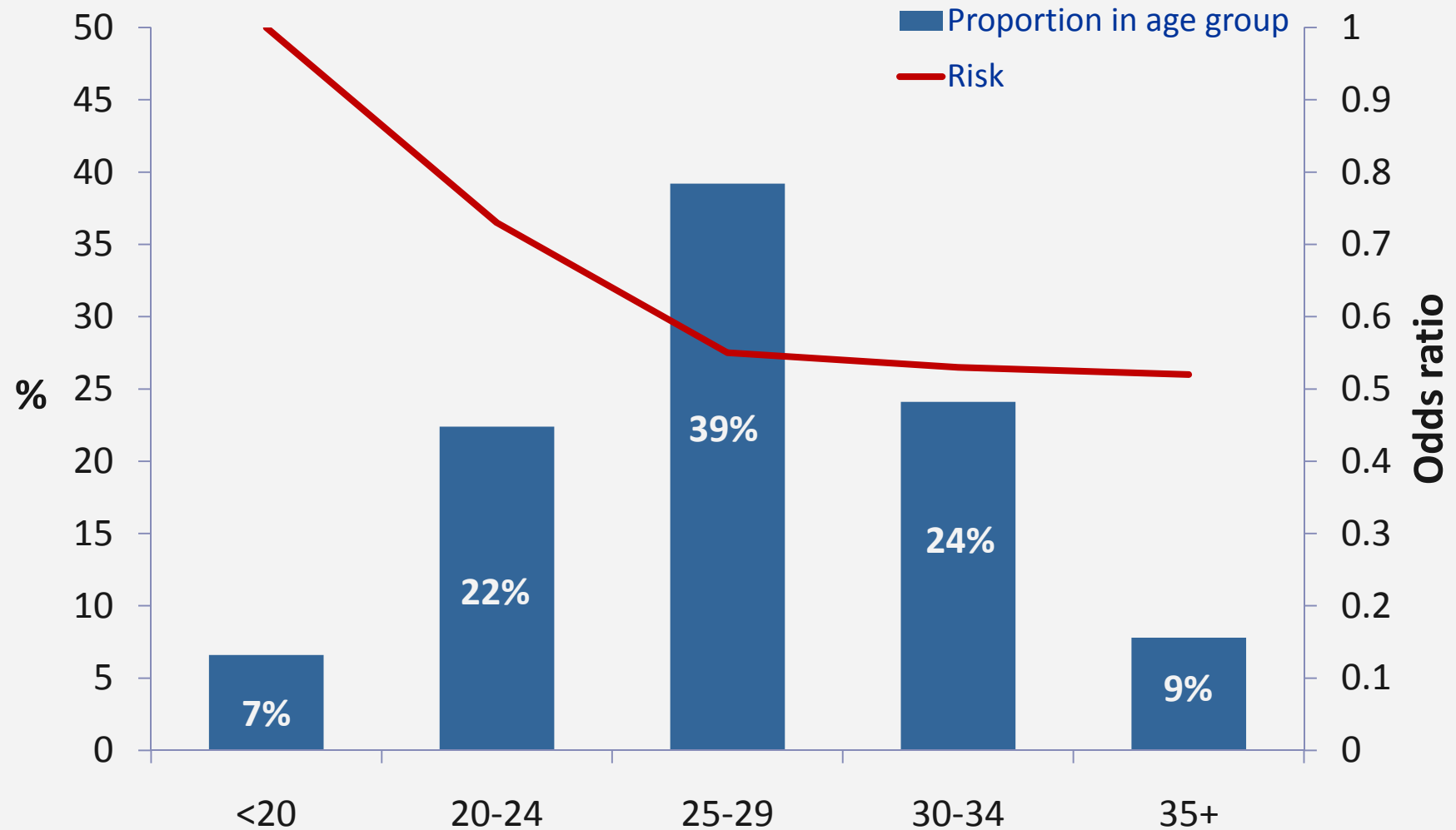
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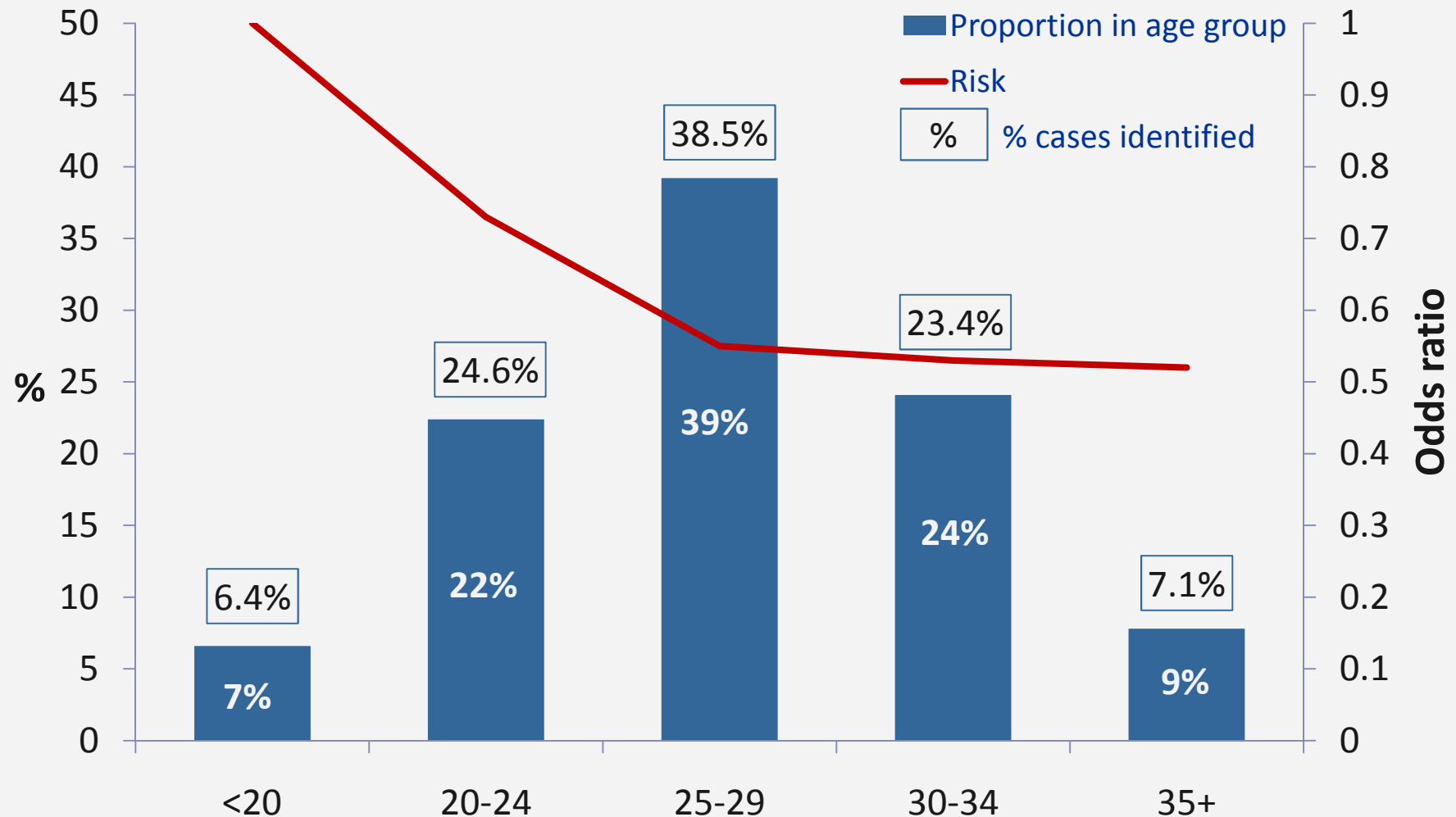
Proportion of children with behavioural difficulties
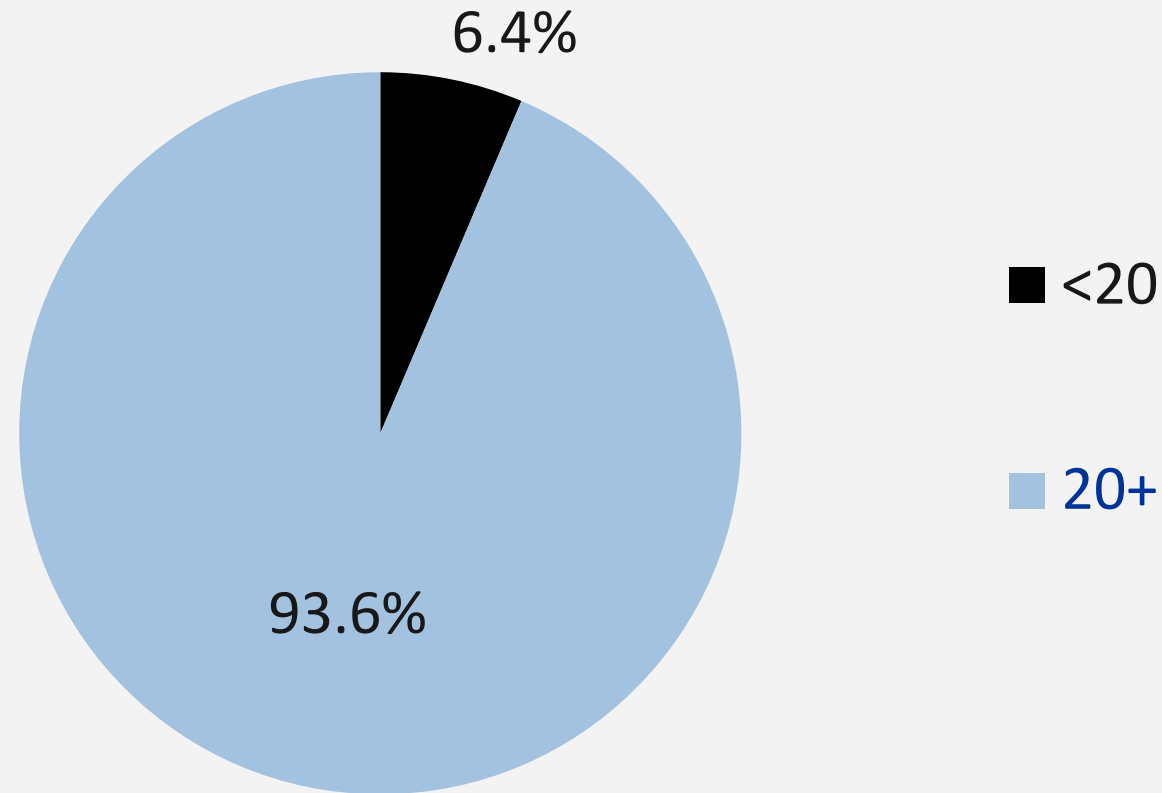
6.4%

93.6%

- ■ <20
- ■ 20+

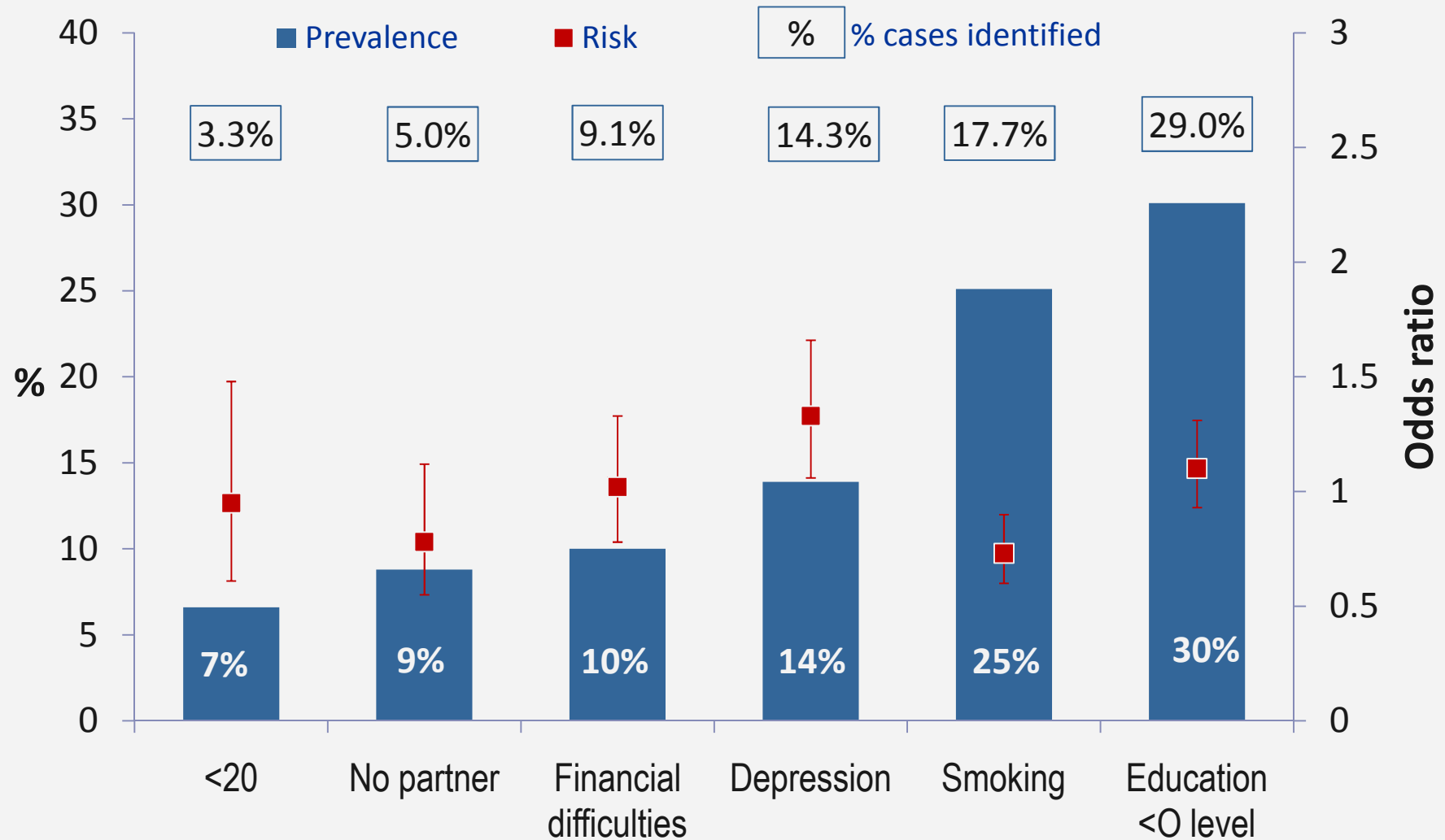# Association of SDQ with maternal characteristics
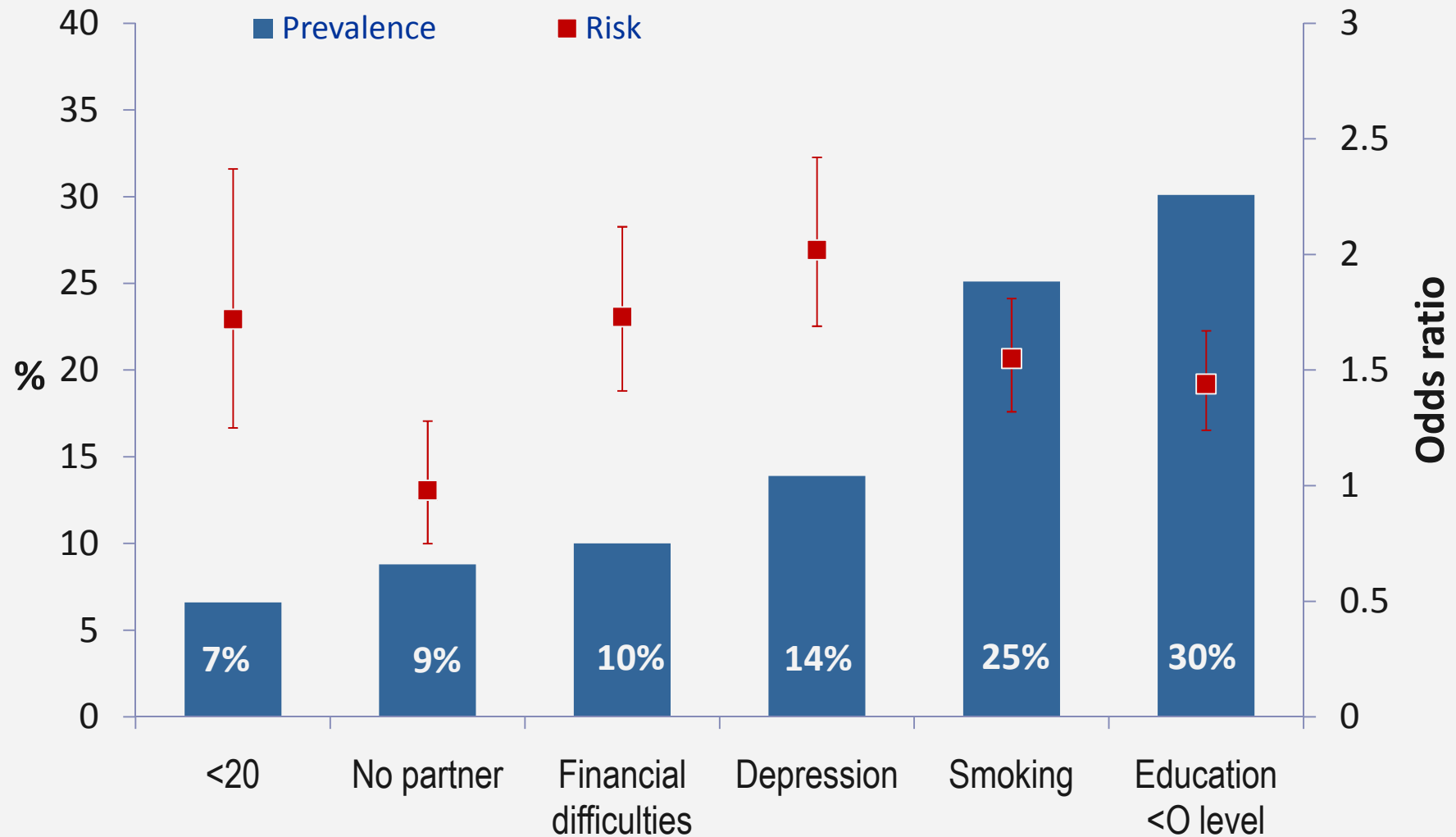
Mutually adjusted model

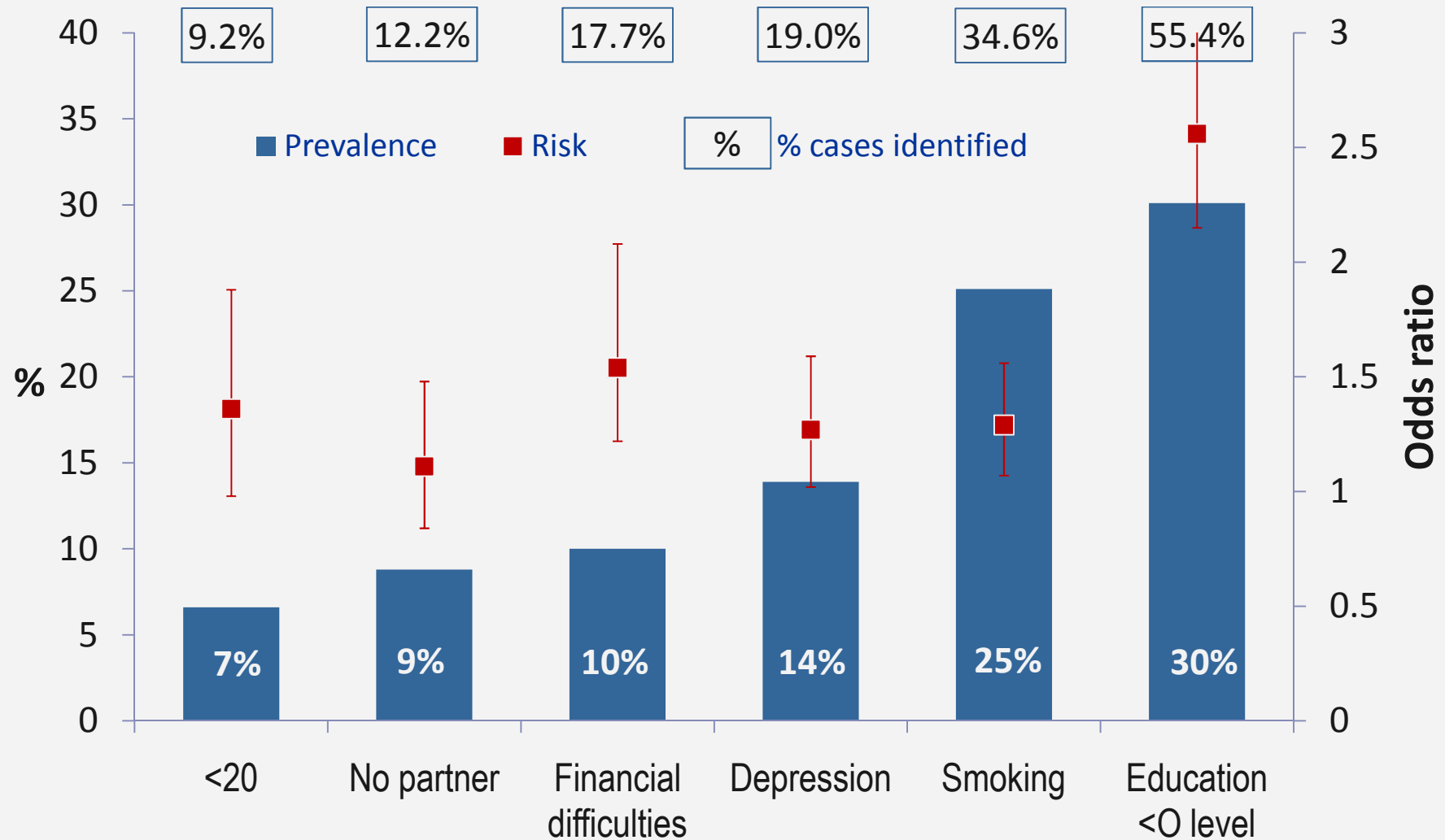# Association of SDQ with maternal characteristics
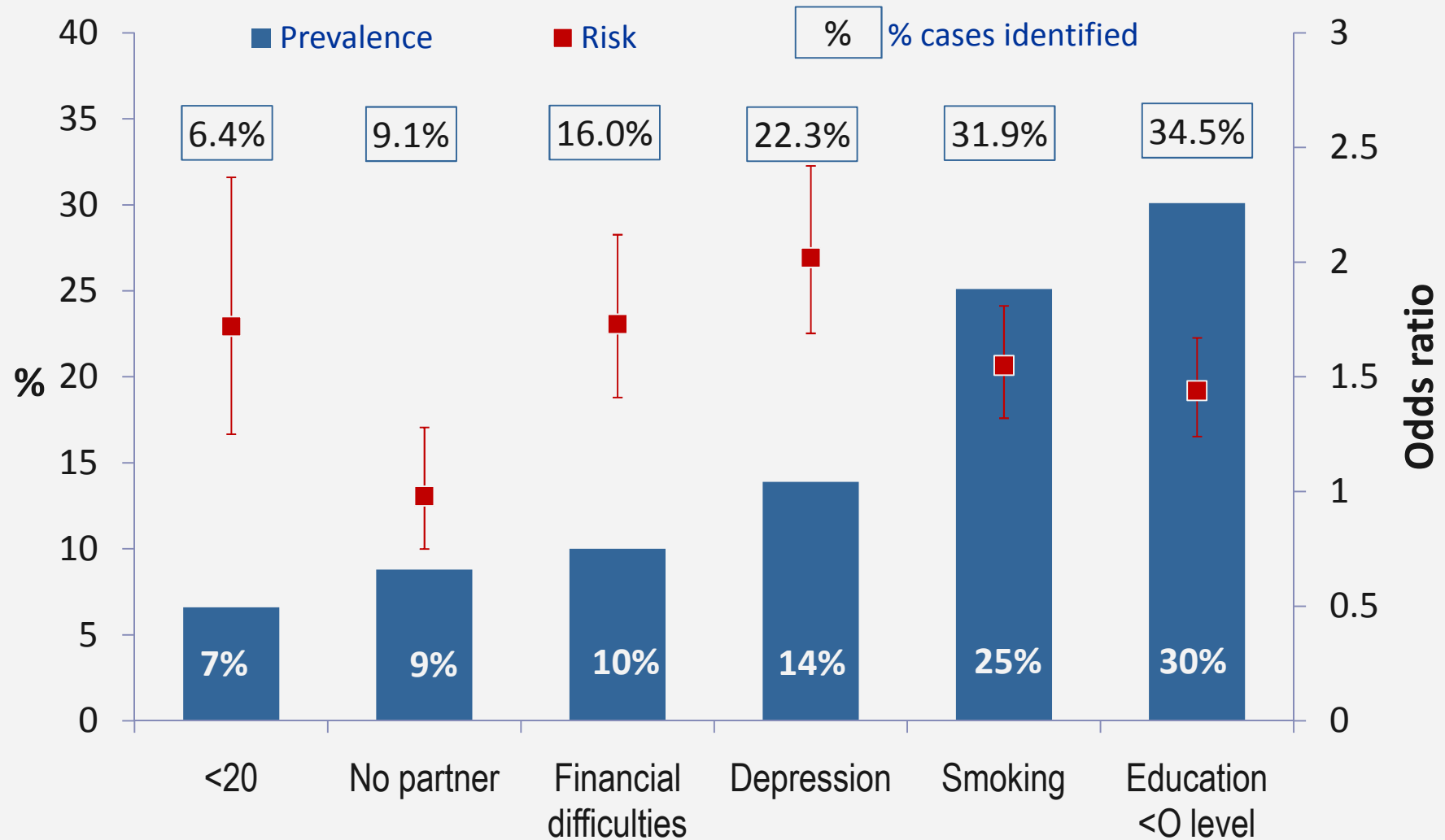
Mutually adjusted model
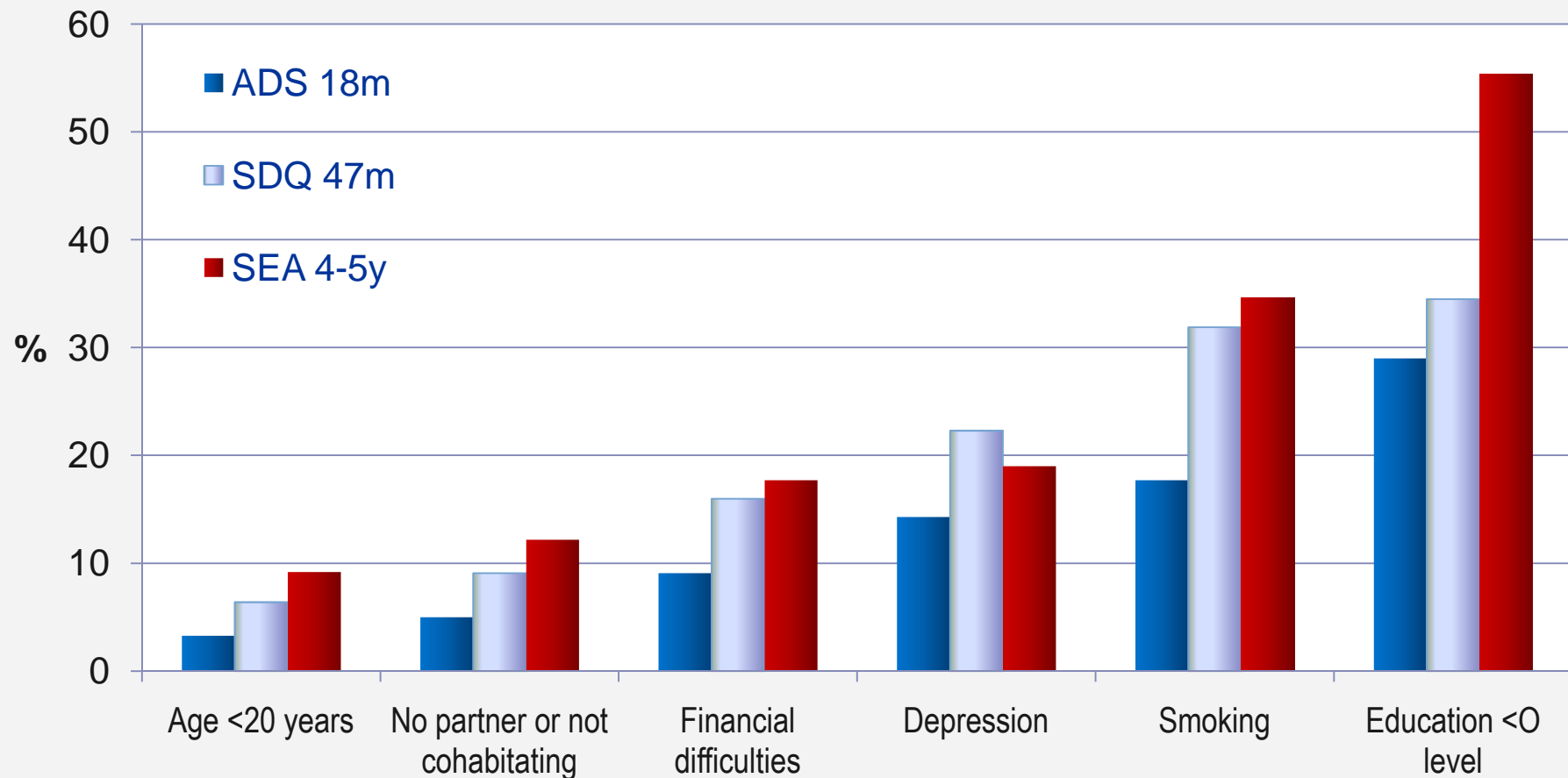
Association of ADS with maternal characteristics

Mutually adjusted model

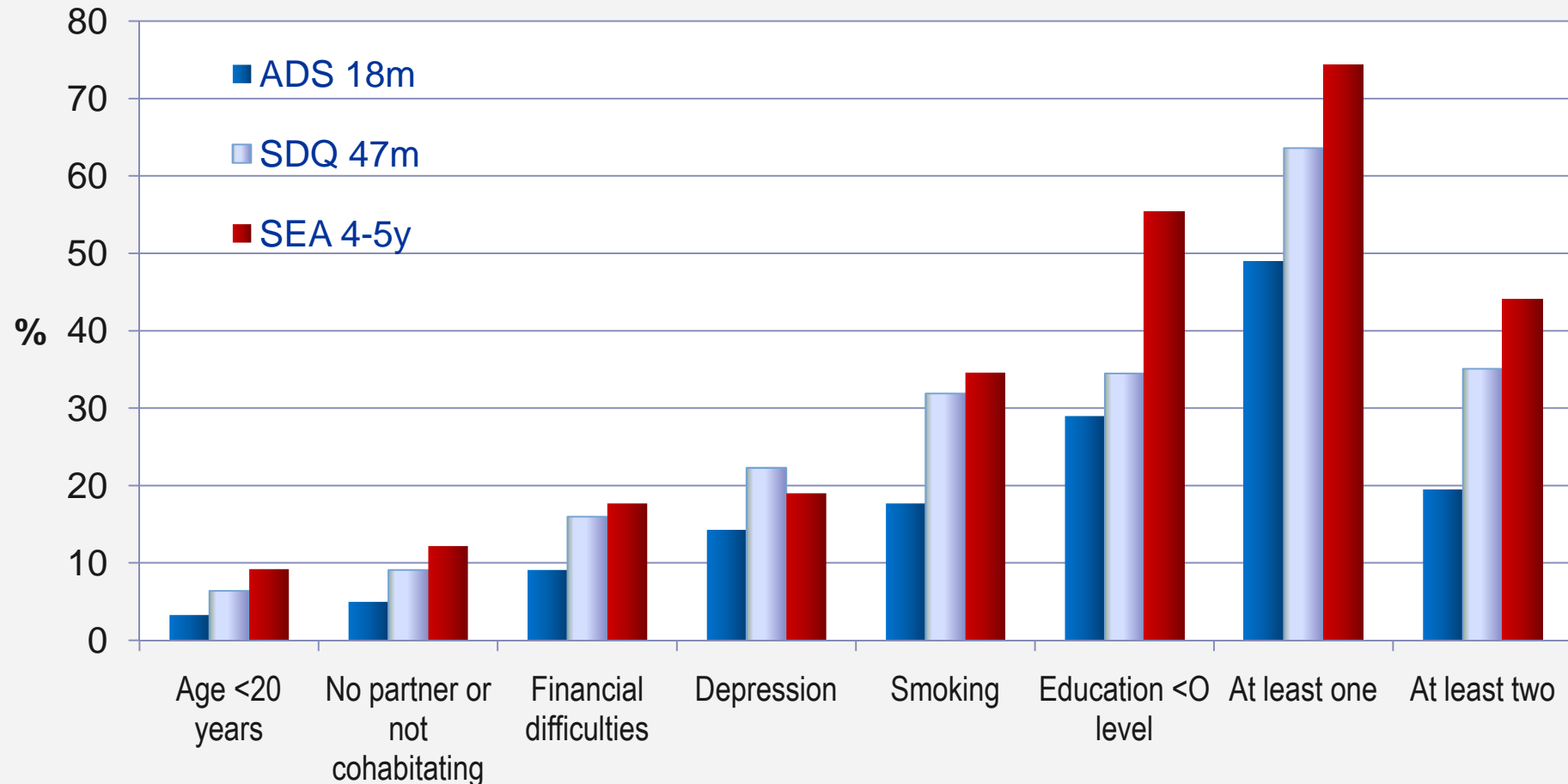# Association of SEA with maternal characteristics

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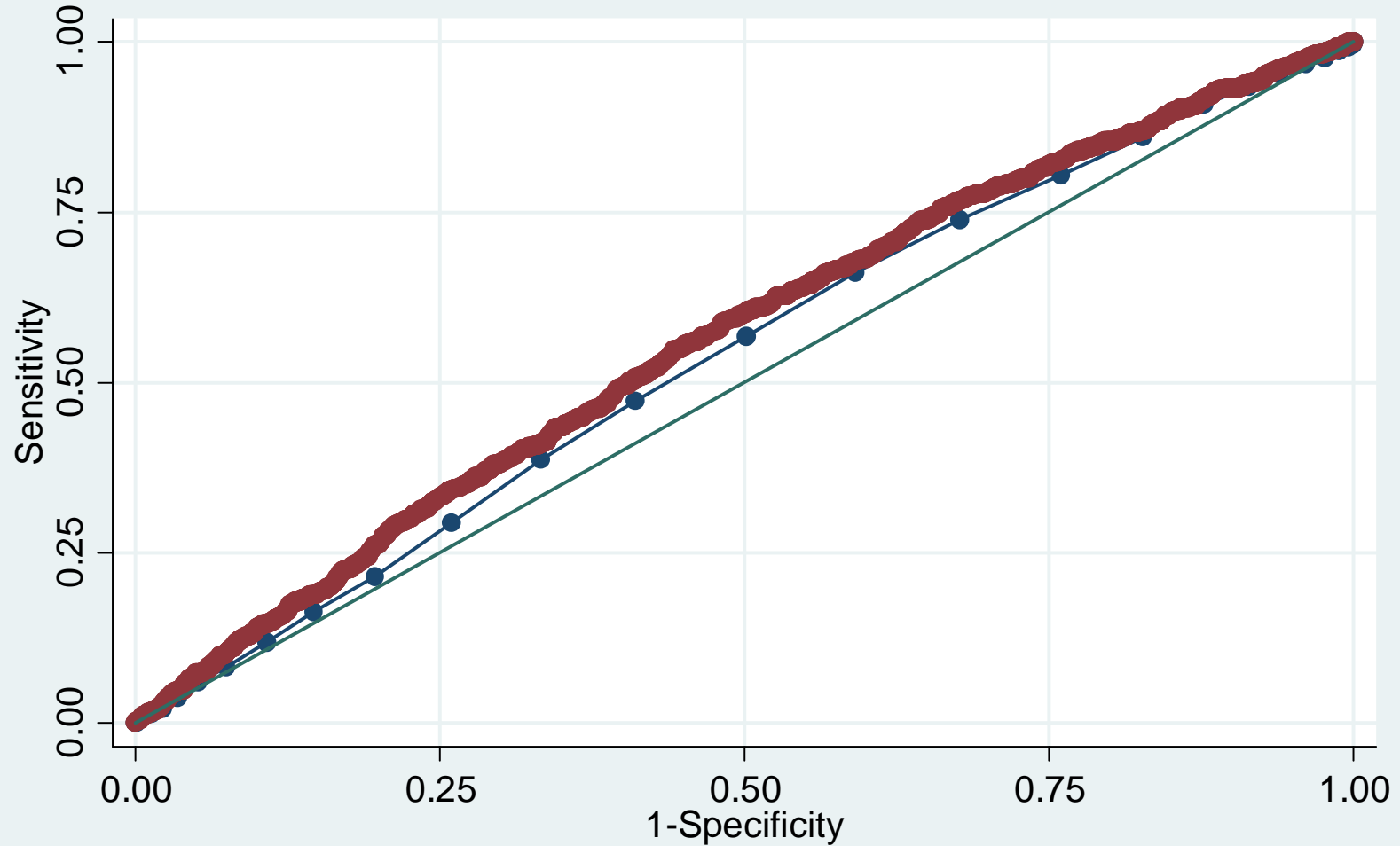# Proportion of child outcome cases identified with each predictor

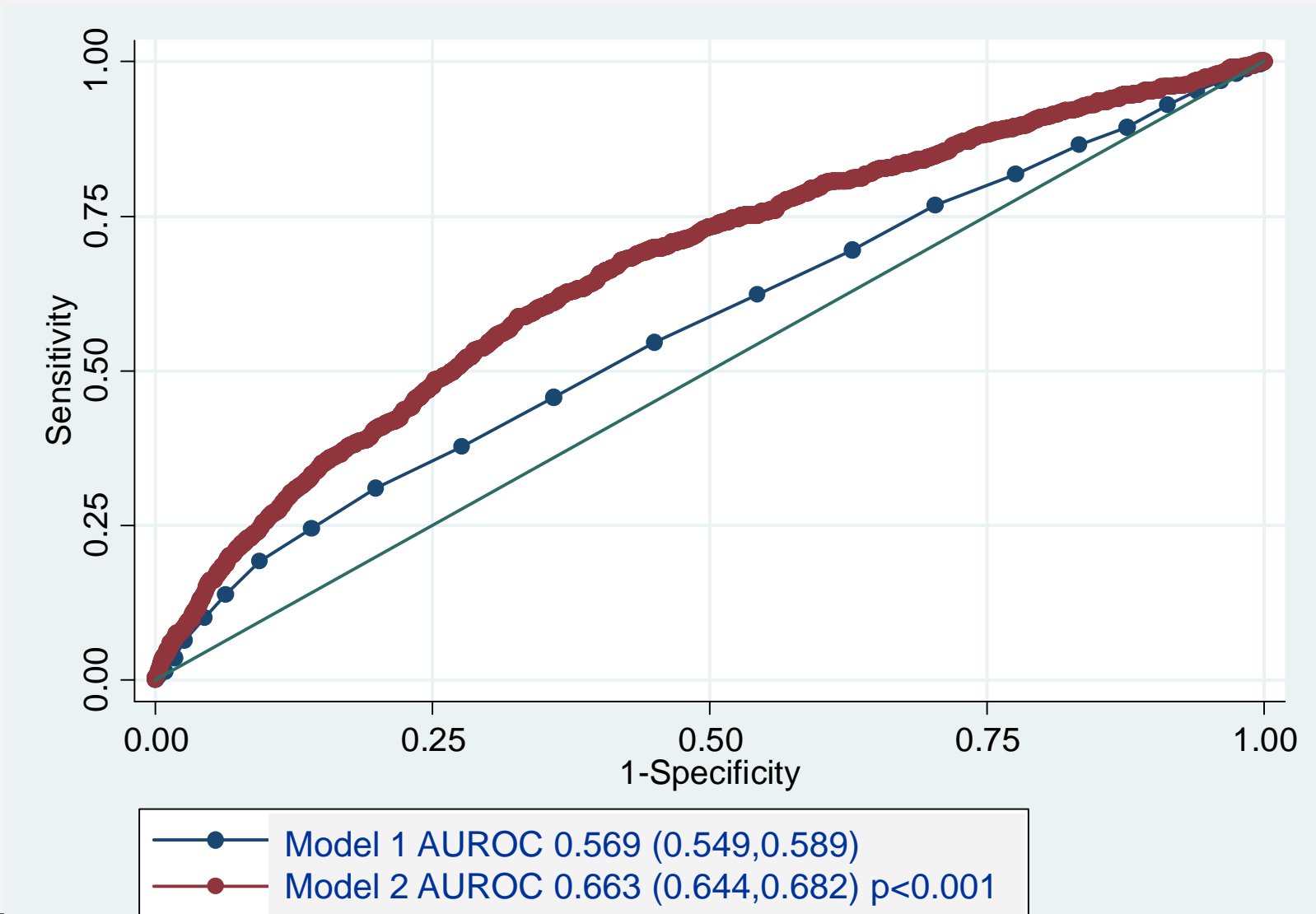# Proportion of child outcome cases identified with each predictor

Chittleborough, Lawlor & Lynch. 2011 *Pediatrics* In Press.

Models predicting ADS
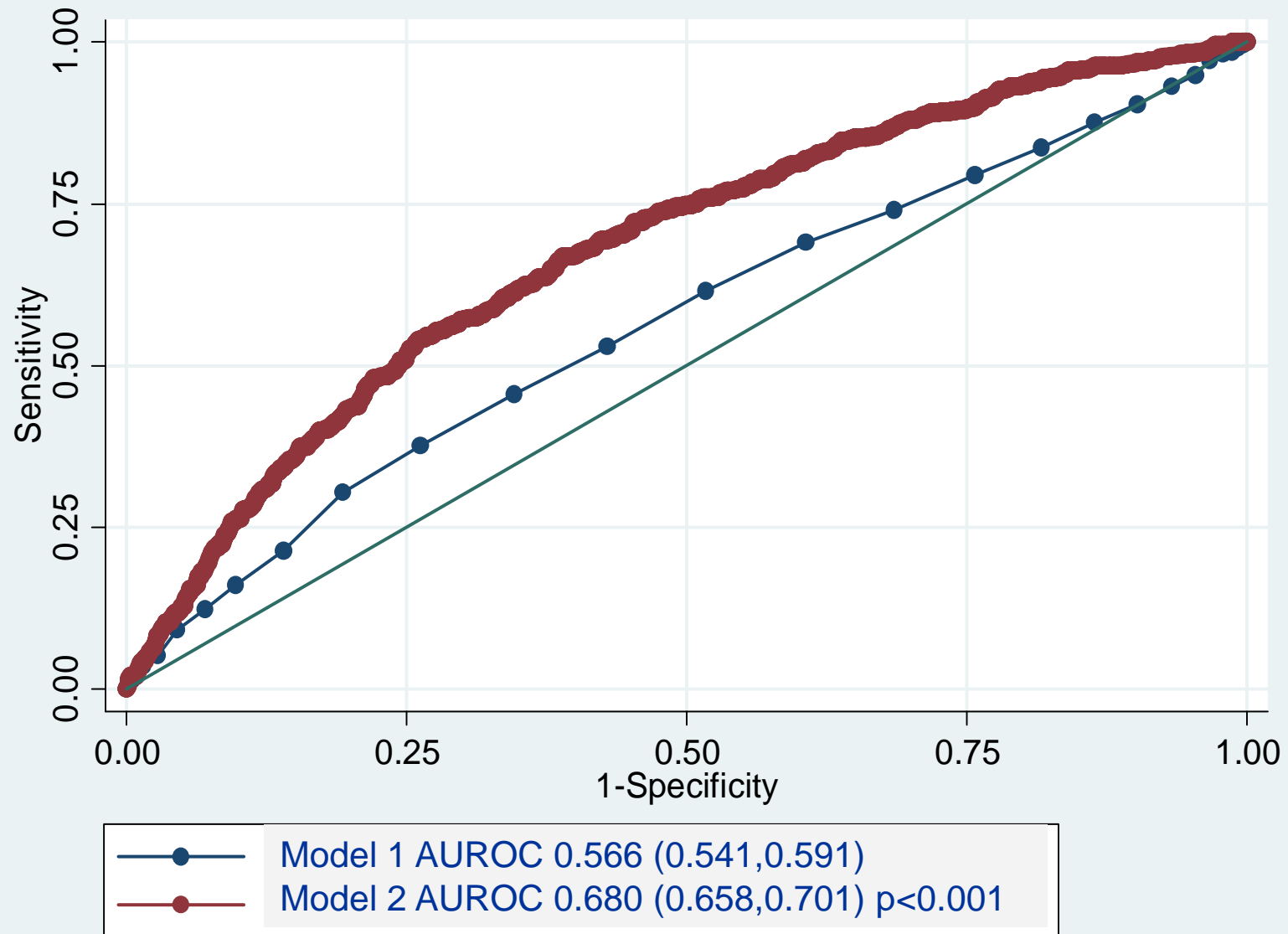

Model 1 AUROC 0.540 (0.518,0.561)
Model 2 AUROC 0.563 (0.542,0.585) p=0.020

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Models predicting SDQ

Legend:
- Model 1 AUROC 0.569 (0.549,0.589)
- Model 2 AUROC 0.663 (0.644,0.682) p<0.001

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Models predicting SEA

Legend:
- Model 1 AUROC 0.566 (0.541,0.591)
- Model 2 AUROC 0.680 (0.658,0.701) p<0.001

Conclusions from data

- Low sensitivity of teenage motherhood in predicting child development

- Including other factors measured during pregnancy (e.g. education, financial difficulties, smoking, depression) improves sensitivity and discrimination

Conclusions from data

- Maternal age <20 years identifies only 9% of the cases of poor development at 5 years, whereas 74% of these cases would be identified among mothers with one or more of the six predictors

Implications

- Programs aimed at teenage mothers as a high risk group are unlikely to improve child development outcomes at the population level.

- Other factors such as maternal education, financial difficulties, smoking and depression should be considered in recruiting women to preventive programs.

Future issues

- Feasibility of data collection

- Need simple tool for generating a 'risk score'

- Effectiveness of programs among different groups of women

- Resources for providing programs to families 'at risk'

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