Screening programme to test and treat *H. pylori* infection in New Zealand: a cost-utility analysis by age, sex and ethnicity

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Burden of Disease Epidemiology, Equity
and Cost-Effectiveness Programme – HRC funded

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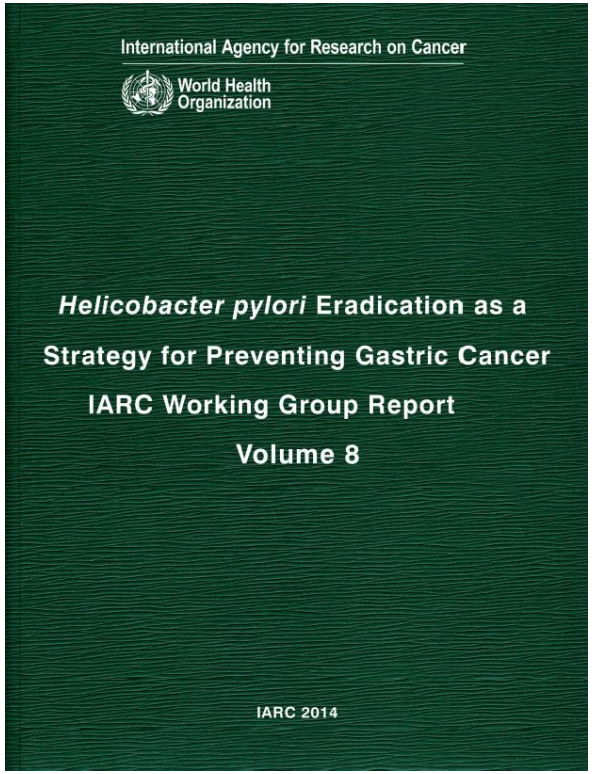
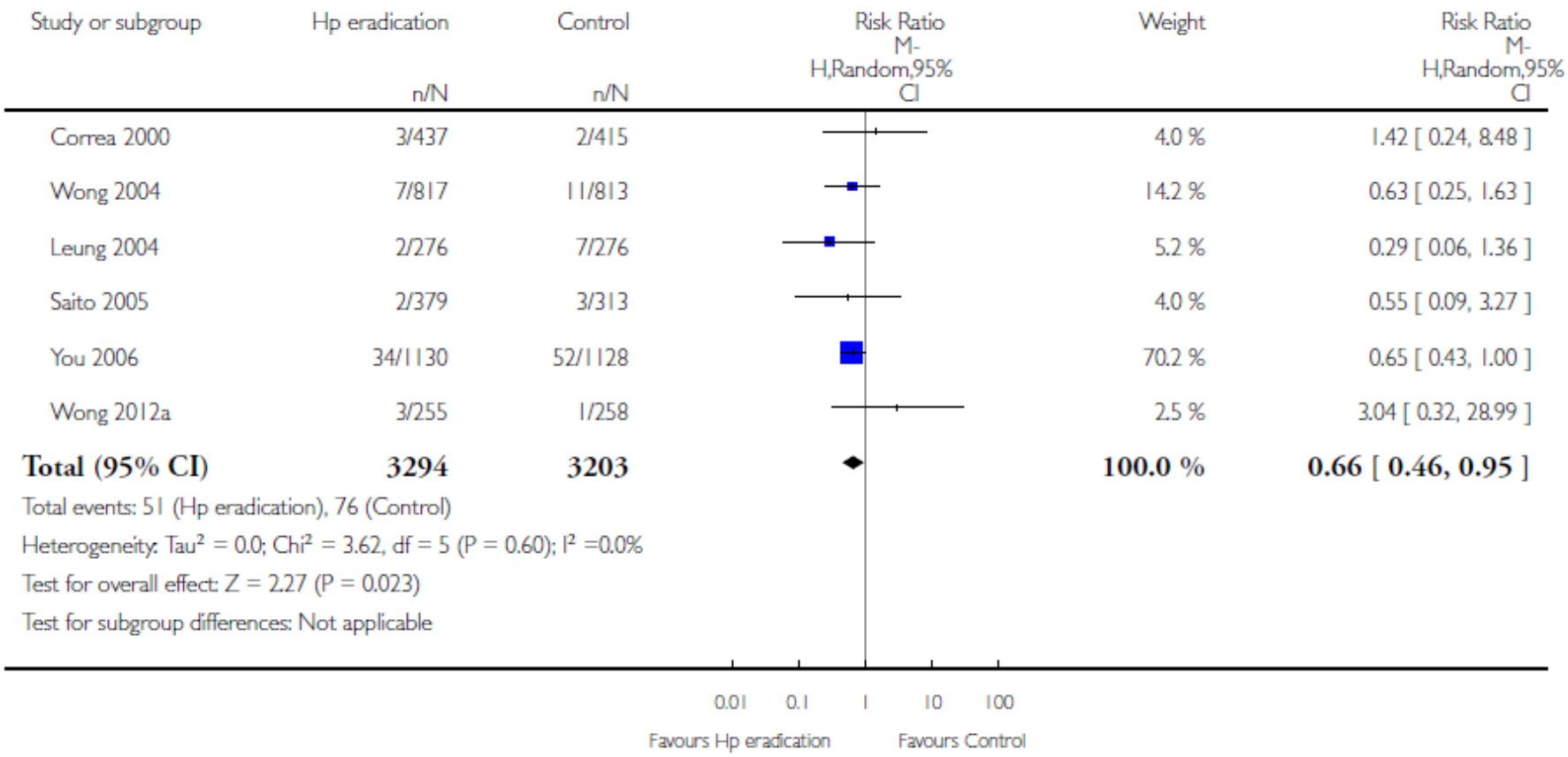
Background



"The Working Group recommends that all countries consider including gastric cancer in their national cancer control programmes and that they conduct detailed assessments of its current and future human and economic impacts and of the potential value of prevention strategies."

International Agency for Research on Cancer, World Health Organization. *Helicobacter pylori* Eradication as a Strategy Cancer. In: Reports WG, ed. Volume 8. Lyon: International Agency for Research on Cancer, 2014.

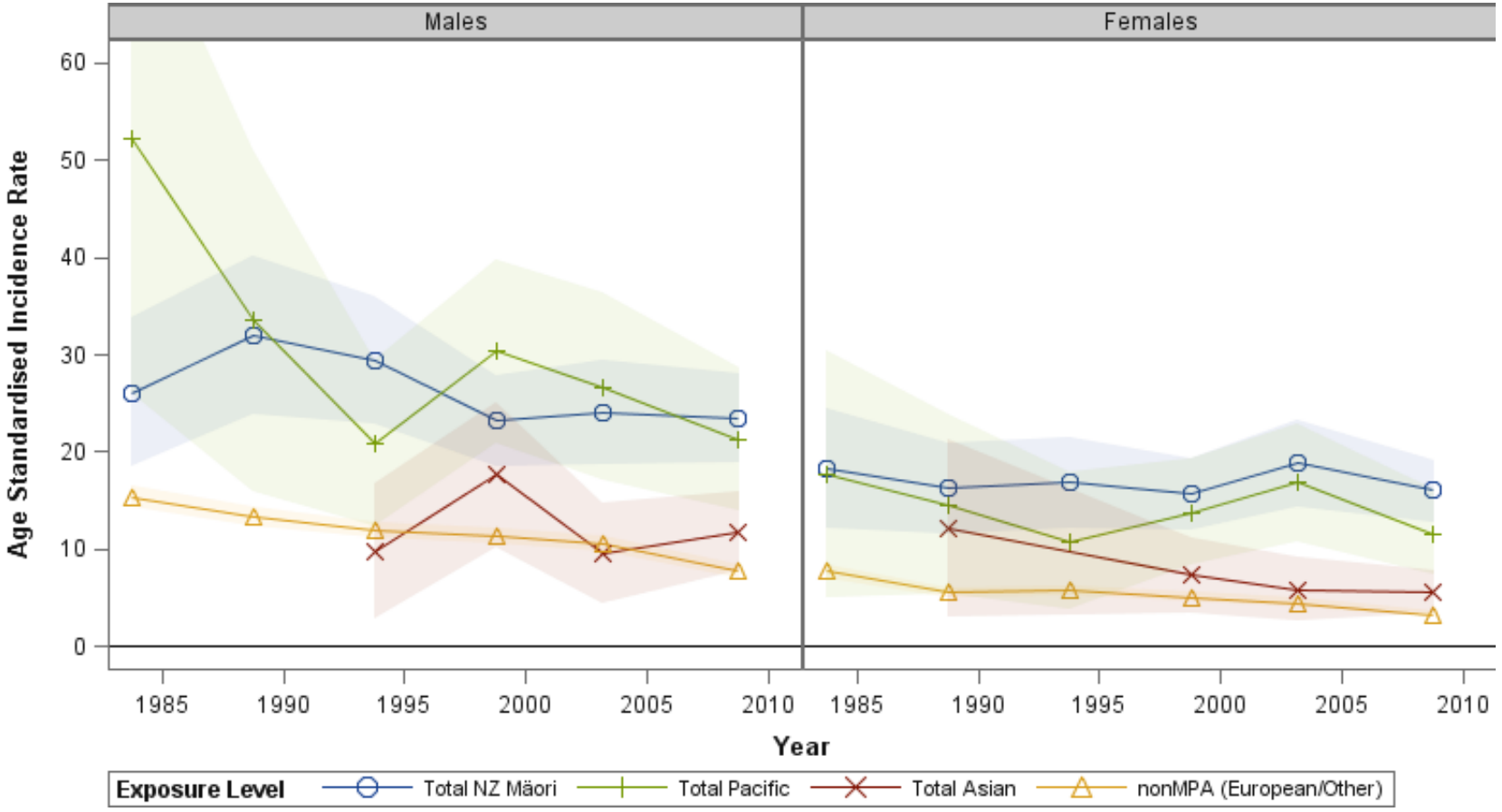
H. Pylori eradication & reduced stomach cancer risk



Ford AC, Forman D, Hunt R, et al. Helicobacter pylori eradication for the prevention of gastric neoplasia. Cochrane Database Systematic Review 2015;7:

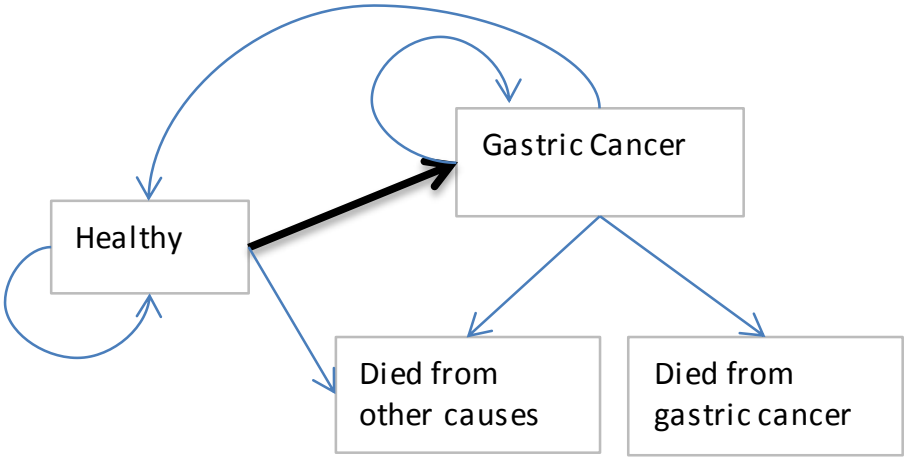
Stomach cancer incidence

NZ 1981-2011



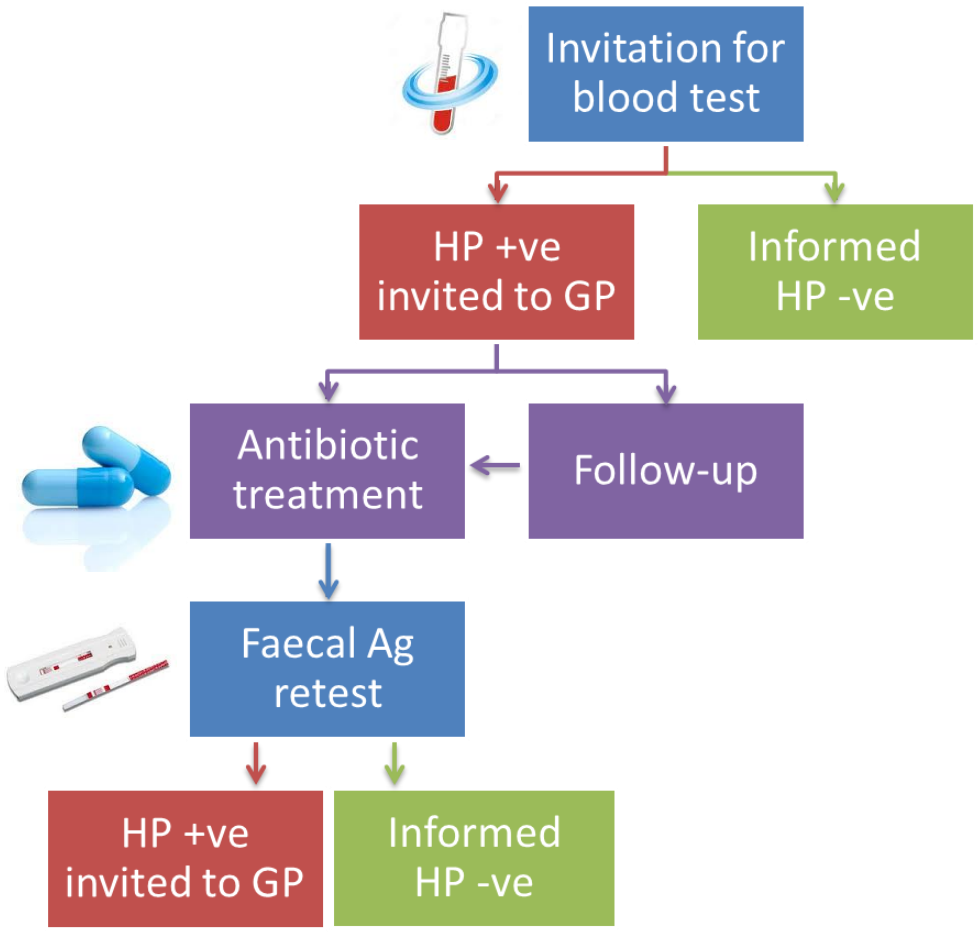
Methods

- NZ specific online cost-effectiveness calculator
- Markov model using lifetables and morbidity data from a national burden of disease study



$$ICER = \frac{Cost_{screening} - Cost_{current\ practice}}{QALY_{screening} - QALY_{current\ practice}}$$

Screening pathway & costs



- Fixed costs
  - Awareness raising
  - DHB overheads & coordination centre
  - Screening register
  - National screening unit
- Lab tests
- GP appointments
- Medications
- *Clostridium difficile* infection

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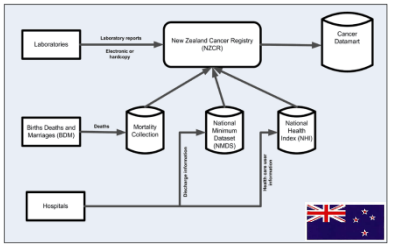
Model Inputs



- Background data

  (by age, sex & ethnicity)
  - Health system costs
  - Background mortality
  - Disability weights

- Effect size applied to;
  - Non-cardia stomach cancer, attributable to *H. pylori*, identified by serology test, given expected screening coverage

- Stomach cancer
  - Incidence & 2% decline
  - Cancer specific costs
  - Excess mortality/survival
  - Disability weights

- Screening programme cost depended on
  - *H. pylori* seroprevalence
  - Screening coverage
  - Eradication rate

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Total population

NZ$293 m
(272-314m)

14,200 QALYs gained
(5,100-26,300)

NZ$ **24,600** per QALY gained
(11,300-57,400)

Māori

NZ$41 m
(35-46m)

4000 QALYs gained
(1400-7400)

NZ$ **12,000** per QALY gained
(5,700-27,600)

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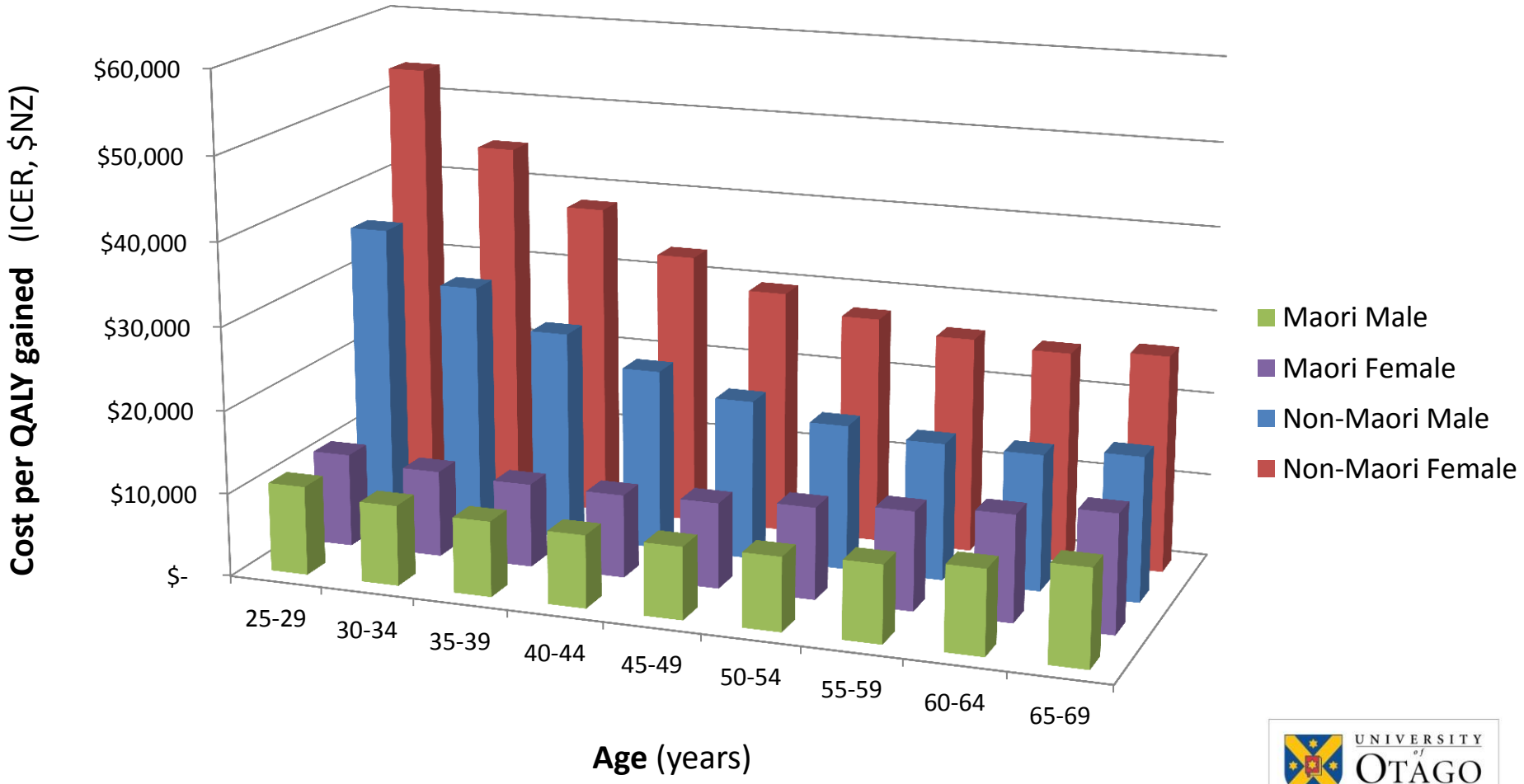
Cost per QALY gained by age, ethnicity & sex



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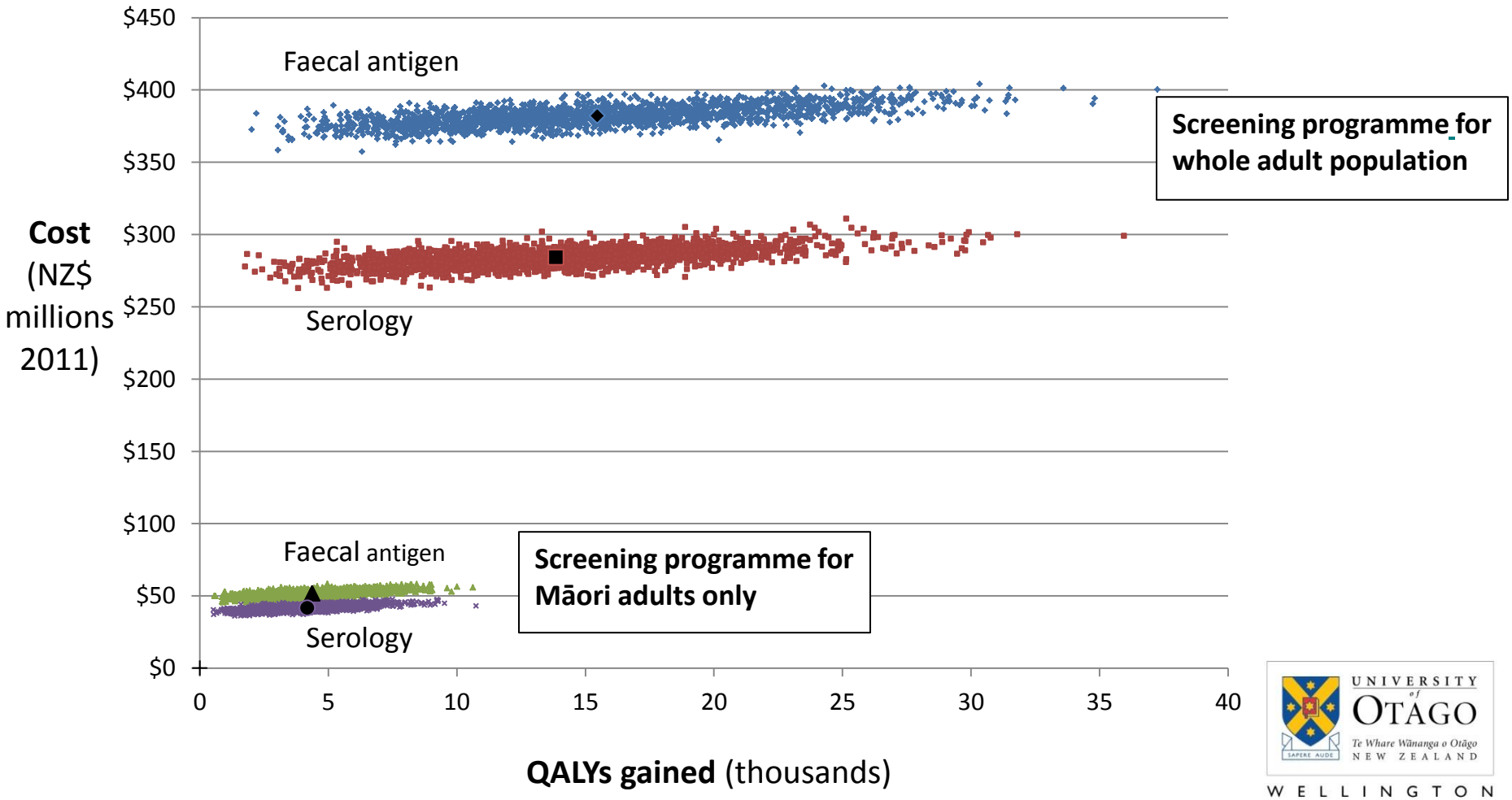
Uncertainty (probabilistic sensitivity analysis)



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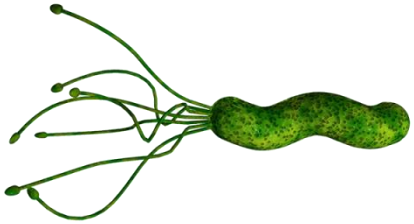
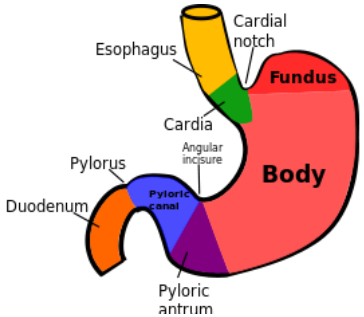
Scenario analyses





- Equity scenario (equal morbidity & mortality)
  - 7% increase Māori QALY gain
- Equal coverage (84%)
  - 4% increase Māori QALY gain
- Low coverage (M 45% nM 58%)
  - 40% less Māori QALY gain
  - 30% less total QALY gain

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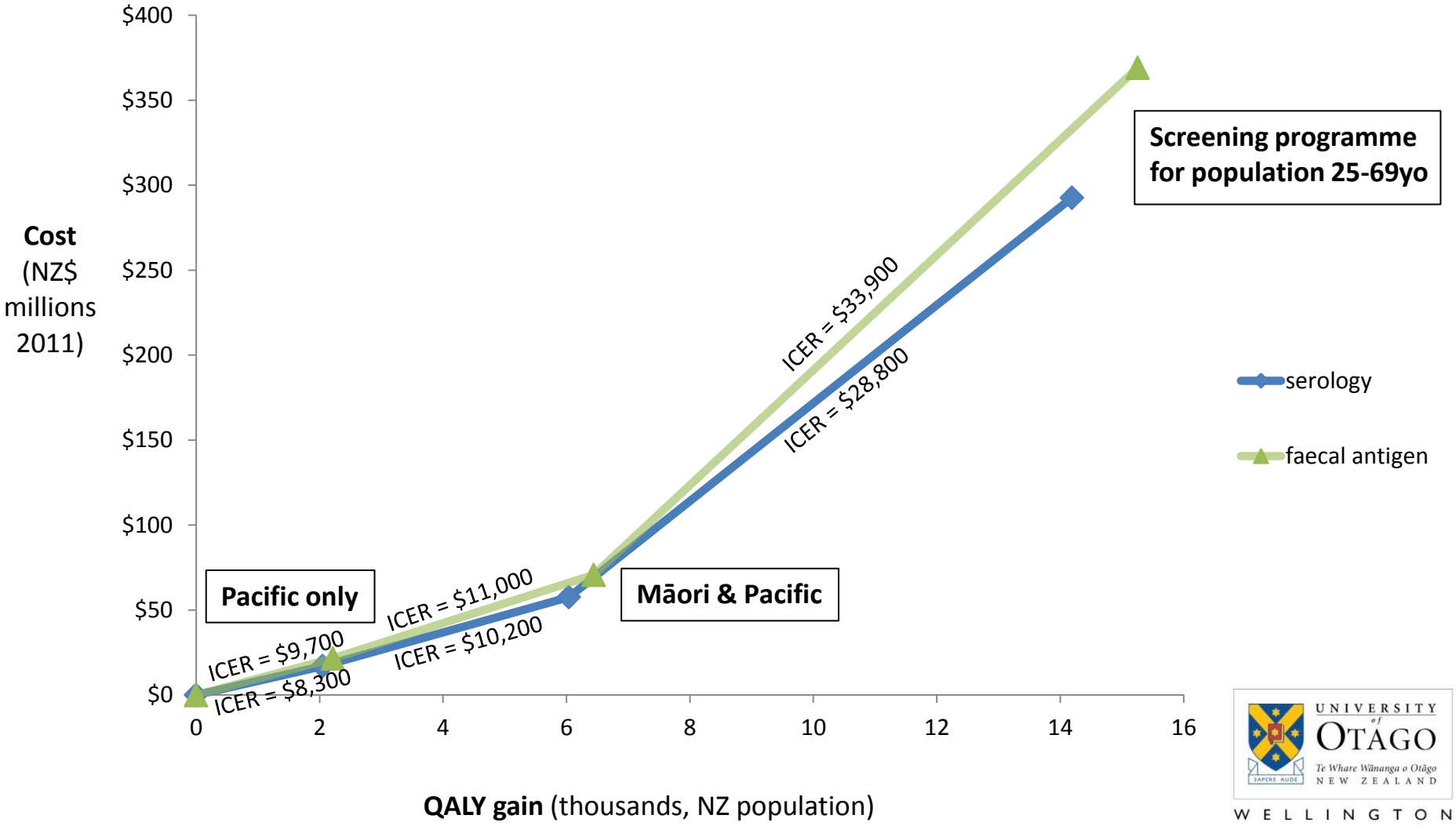
Strengths & limitations

- By age, sex & ethnicity (high quality NZ data)
- Latest meta-analysis Ford 2015
- Cost per QALY
- Probabilistic sensitivity analysis

- Reduced dyspepsia and peptic ulcers not modelled
- Baseline incidence from 2011 used, but it is decreasing
- Heterogeneity within groups e.g. non-Māori

Non-Māori heterogeneity



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Conclusions

- Screening appears cost-effective for Māori and probably Pacific, borderline for European Other
- We need more precise info on the benefits & adverse consequences of *H. pylori* screening
  - Including heterogeneity by age, sex, incidence, setting
- Other considerations incl. capacity, opportunity cost

Acknowledgements

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- Thank you to Dr Alan Fraser, primary care and community laboratory colleagues for the input into the screening pathway

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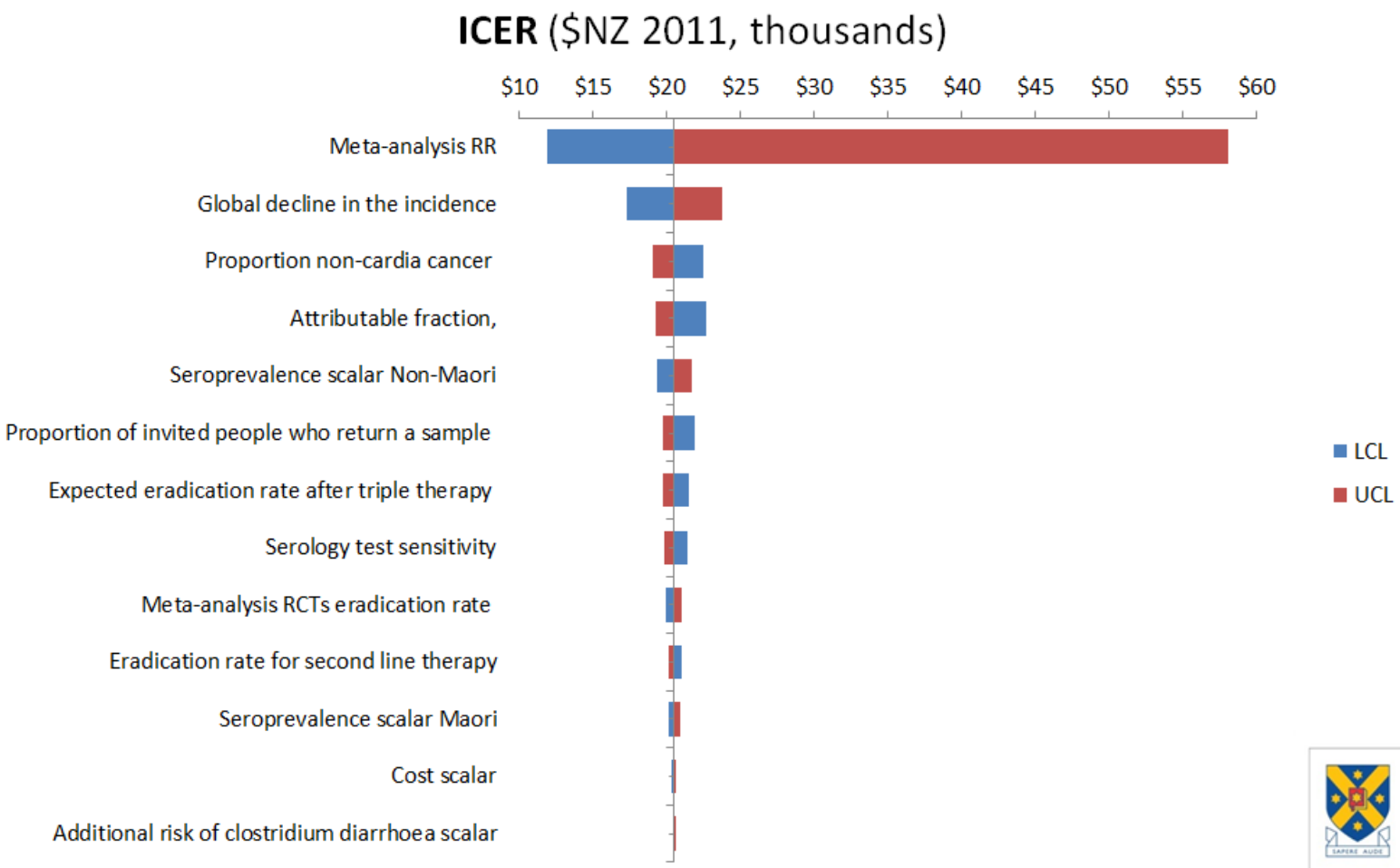
What next?

- Review update of the evidence in 2-5 years?
- OR collect country-specific epidemiological evidence
  - Better define local epidemiology eg. *H. pylori* prevalence?
  - Trial screening in the local context to quantify benefits & adverse consequences?
  - Pilot screening in NZ?

Contributions to uncertainty



Non-Māori

NZ$252 m
(233-272m)

10,200 QALYs
(3,700-19,000)

NZ$ **29,600** per QALY gained
(13,400-69,800)

Māori

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4000 QALYs
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Some assumptions

Ambitious

- All who tested positive saw GP for treatment
- Same non-cardia cancer incidence in those screened & not screened
- Lifetime effect & minimal reinfection

Conservative

- Māori incidence declined over time at same rate
- Fixed costs were high