Predicting the **long-term effect** of e-cigarette use on **population health**
A systematic review of modelling studies

Lisbon Addiction 2022

Impacts of e-cigarettes use: the use of modelling studies

- E-cigarette use: evidence suggested both potential benefit and harm

- Lack of epidemiological evidence on the long-term effects

- Modelling studies: Utilizing **empirical data and mathematical simulation** to project population health impact

- Addressing uncertainty via sensitivity testing

➔ **A systematic review of modelling studies:** synthesize findings and identify potential gaps
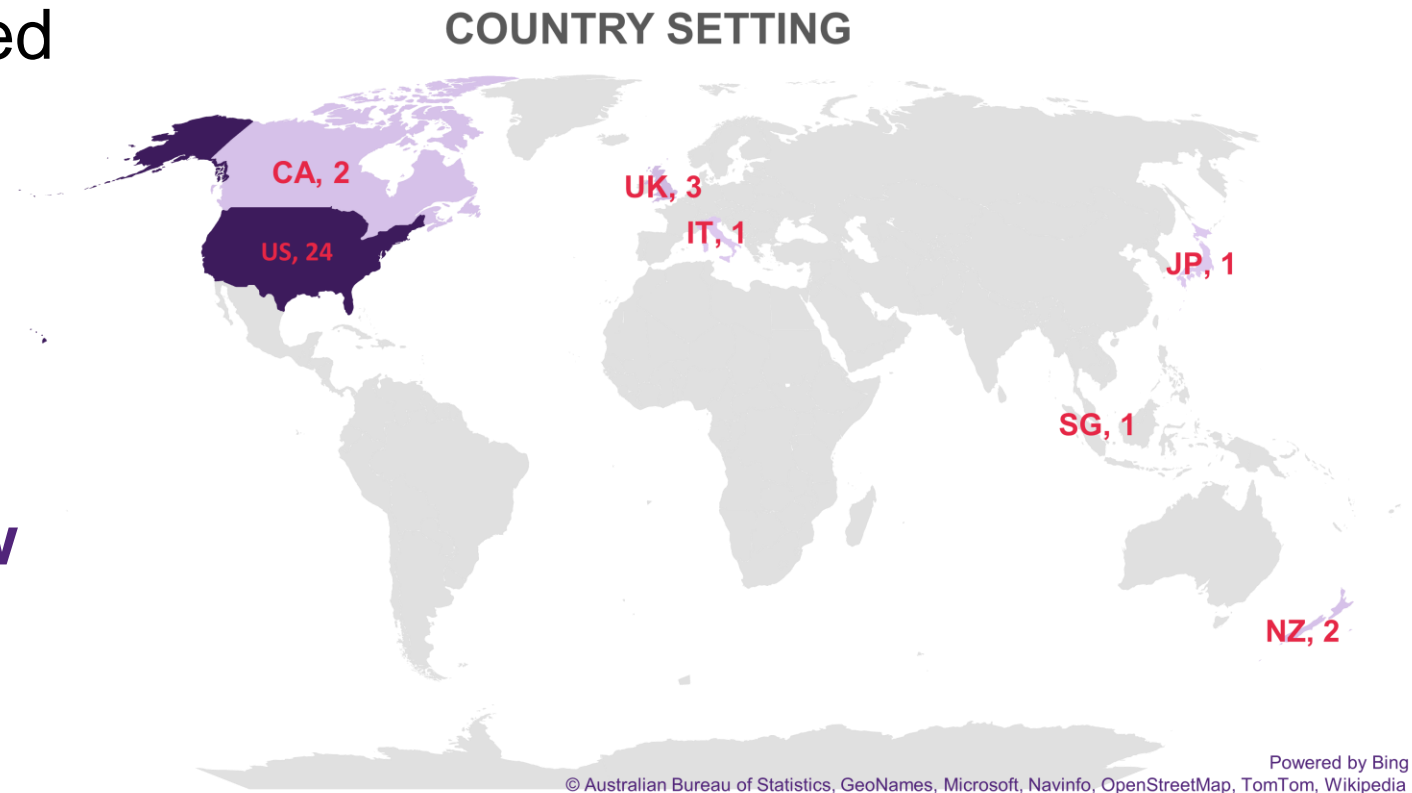
Methods

- Design and protocol
  - PRISMA

- Eligibility criteria (PECO)

Population	Exposure	Comparison	Outcomes

General population	E-cigarette use	Status quo (e-cigarette unavailable) vs alternative scenarios (e-cigarette available)	➤ **Health outcomes:**
			  • Mortality-related (e.g., deaths, YLLs)
			  • Morbidity-related (e.g., QALY, QALE)
			  • General health lost/gain, monetary health costs
			➤ **Smoking prevalence outcomes**

Results – Studies characteristics

- 3,836 publications identified
- 55 assessed for full-text eligibility
- 3 additional identified via snowballing
- **32 included in the review**
- **7 affiliated with tobacco industry – 4 with PMI**

COUNTRY SETTING

CA, 2
US, 24
UK, 3
IT, 1
JP, 1
SG, 1
NZ, 2

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Results – Improved outcomes

- **Improved population health outcomes projections: 28/32 studies**
  - Decreases in death estimates or increases in deaths averted
  - Decreases in years of life lost or increase in years of life saved
  - Improvement in QALY and QALE
  - General (unitless) population health gain
  - Reduced costs for the health system
- **Lower rate of cigarette smoking projections: 18/32 studies**

Results – Detrimental outcomes

- **4/32** studies projected additional YLLs, lower life expectancy, zero deaths averted, higher health system costs or net population health harms
- **4/32** studies projected higher rates of tobacco smoking

Discussion

- Outcomes are assumptions-dependent

  - Possibility of e-cigarettes initiation, switching to cigarette smoking, quitting smoking via e-cigarette use

  - Relative risk of e-cigarette to smoking: 5%

  - Risk factors other than smoking state?

  - Developing countries context?

- Relevancy in policy informing?

  - Simple scenarios (e-cigarette not permitted vs available)

Discussion

➔ **What next?**

- More studies recommended
  - Use best and most current data
  - Improve estimates
  - Consider LMICs setting

Thank you

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