Linking Bio-Physical and Human Environments in ‘Pathways of Effects’

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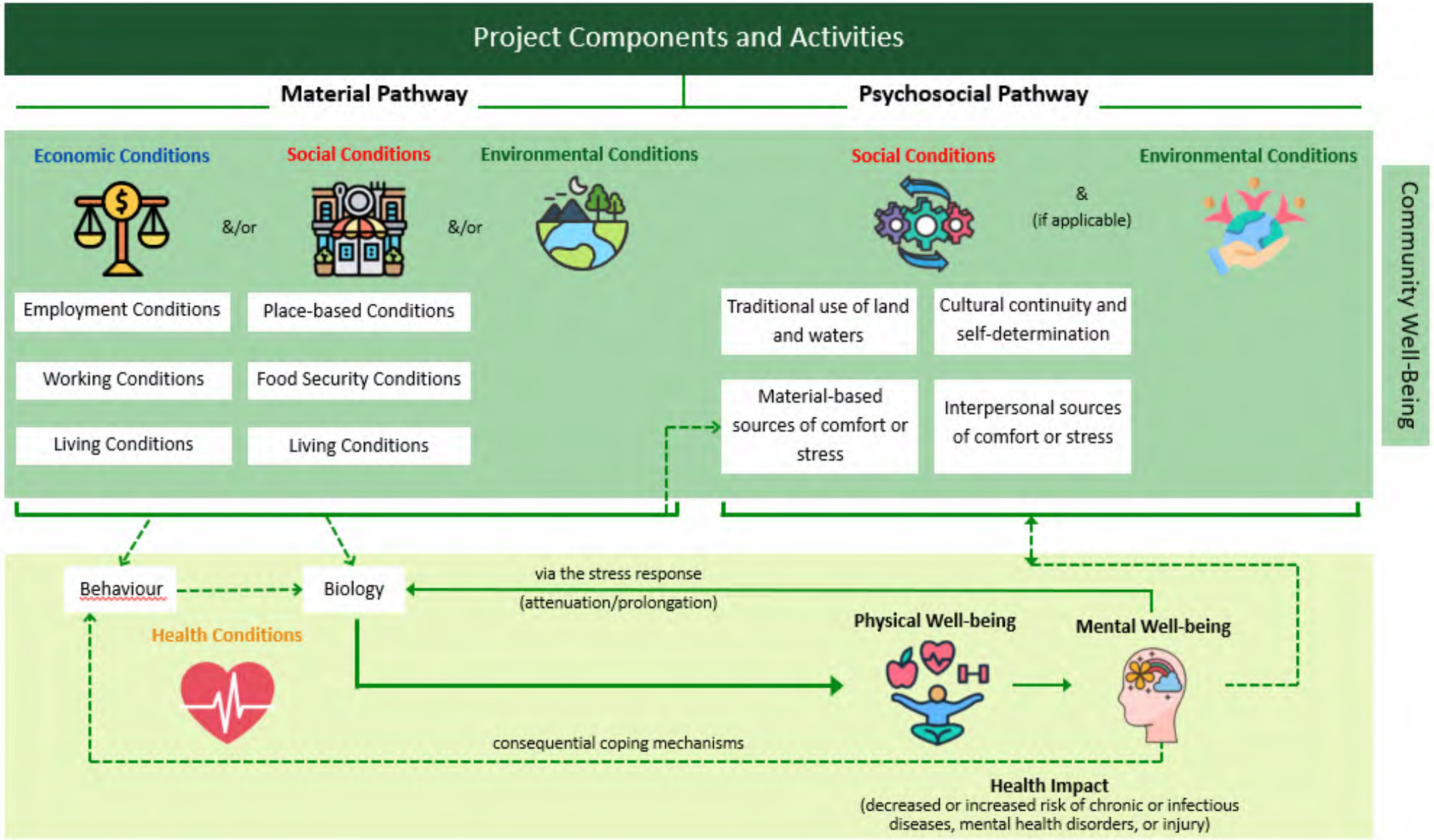
About the authors

All roads lead to Rome (or in this case, Bologna)

The Foundation:

Health Canada's Effect Pathways Framework for Health Impact Assessment



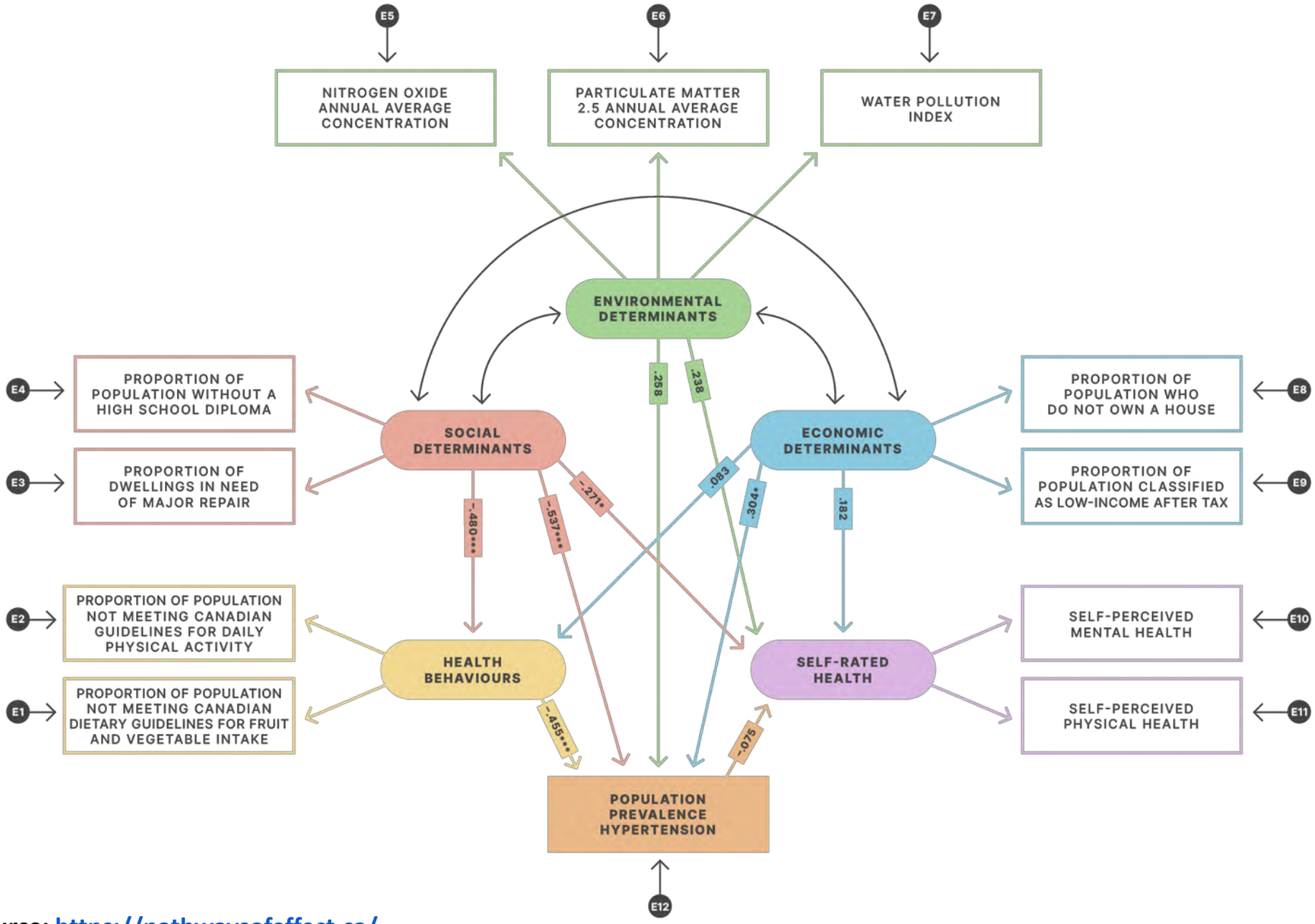
Source: Health Canada. 2024. Interim Guidance: Health Impact Assessment of Designated Projects under the Impact Assessment Act. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. Available at: https://www.canada.ca/en/health-canada/services/publications/healthy-living/interim-guidance-health-impact-assessment.html

Summary of three recent research projects

NOVEL TOOLS AND METHODOLOGIES FOR HEALTH IMPACT ASSESSMENT: PATHWAYS APPROACH TO EFFECTS ANALYSIS

Project 1:

Using Structural Equation Modeling (SEM) on existing public datasets



Source: https://pathwaysofeffect.ca/

Project 1: Structural Equation Modeling

KEY LIMITATIONS

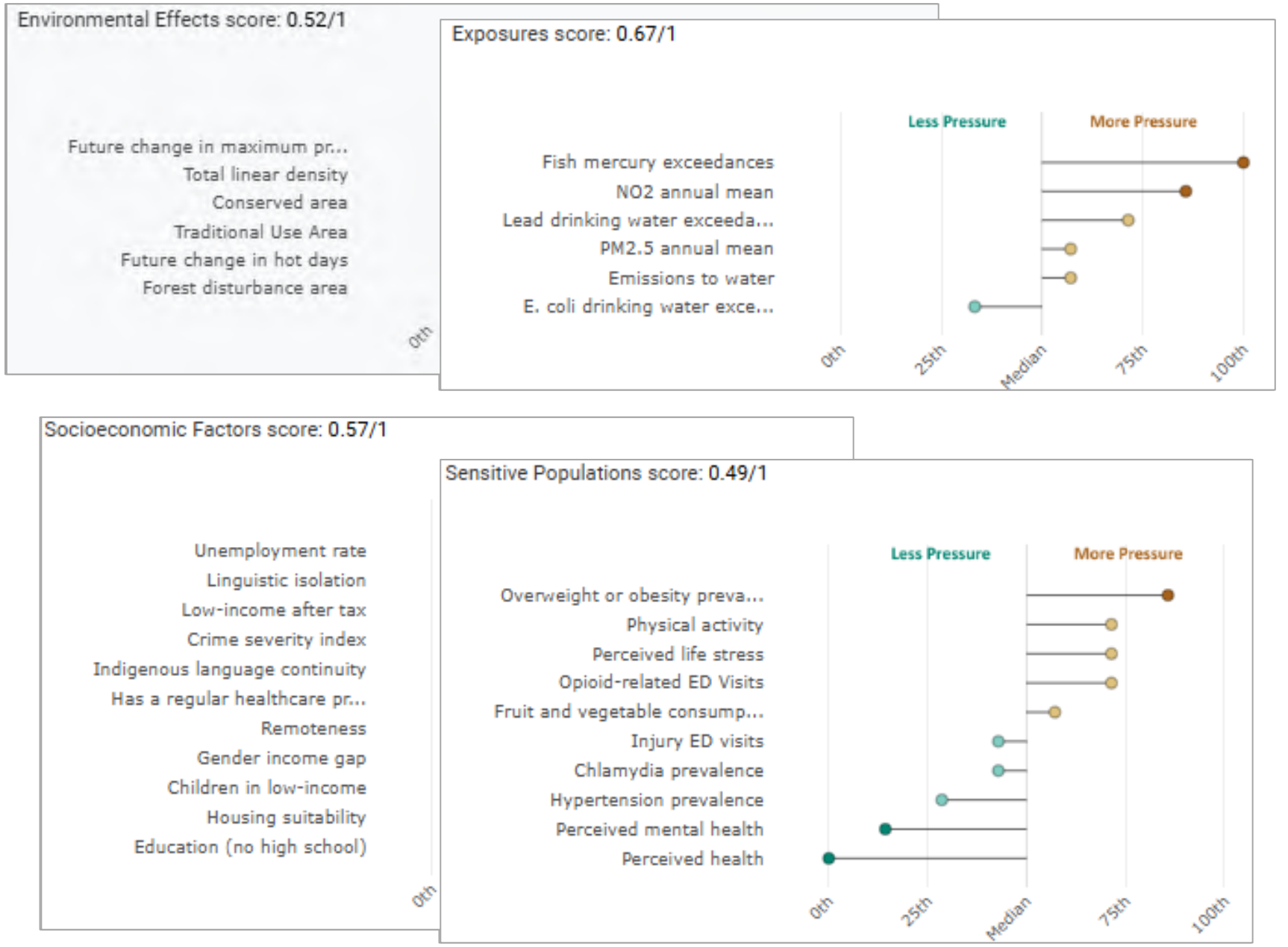
- Public health data only allow regional analysis
- Need for greater granularity raises risk of unethical data collection and use
- Cross-sectional datasets cannot demonstrate causality in complex effect pathways
- Subgroup analyses that consider multiple identity factors are financially and logistically difficult to achieve

POTENTIAL SOLUTIONS

- Clearly communicate tool's purpose (i.e., early scoping of issues)
- Collect complementary local health data
- Rely on evidence-based conceptual frameworks for possible causal links and intersecting effects

Project 2:

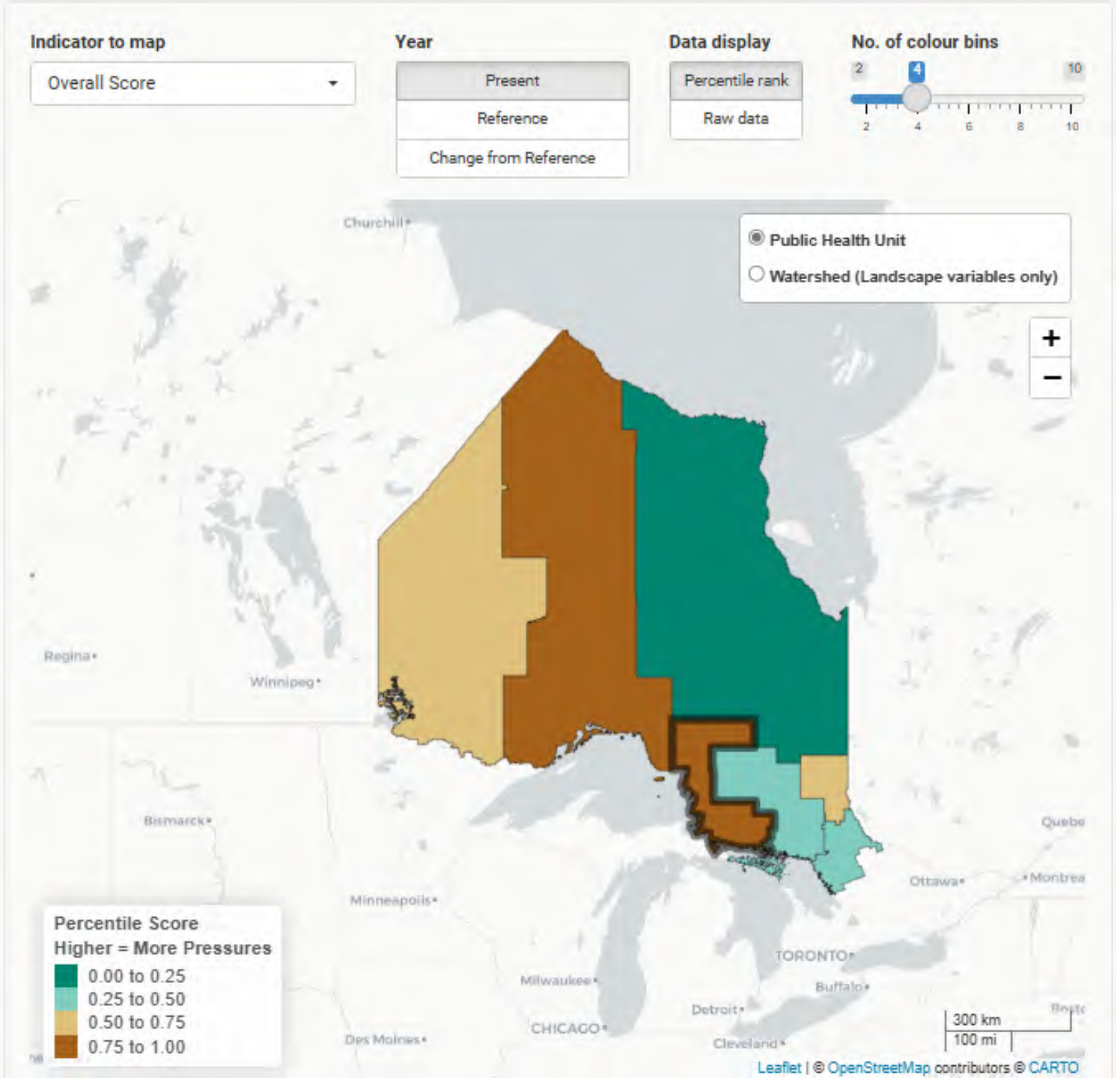
Using EnviroScreen to integrate environmental, economic, social and health data



Source: https://northernontarioenviroscreen.weebly.com/

Project 2:

Using EnviroScreen to integrate environmental, economic, social and health data



Project 2: EnviroScreen Model and Tool

KEY LIMITATIONS

- Needs comprehensive data sets that cover the entire study area and over time
- Indicators are limited to what can be counted and often focus on deficits
- Data bias for major population centres vs rural hinterland
- Implications of data sharing and data sovereignty with Indigenous communities

POTENTIAL SOLUTIONS

- Increase data sourcing options / Increase sample size
- Complement quantitative models with participatory methods
- Clearly communicate known limitations and allow customized interfaces
- Promote and support self-determination when designing public-facing tools

Project 3:

Categorizing health effect pathways for Health Impact Assessment

Complex Pathway Categories

Economic upturn and social change

- ↑ local economic activity
- In-migration of workers (with or without families)
- Greater or strained access to resources/services
- Potential issues with community cohesion/community safety

Economic downturn and social change

- ↓ local economic activity
- Out-migration of workers (with or without families)
- Reduced community resources/ services, but increased need
- Reduced issues with community safety

+/- Affected health factors: health-related behaviours, mental well-being and coping responses

Project 3:

Categorizing health effect pathways for Health Impact Assessment

Complex Pathway Categories (continued)

Employment, working conditions and social spillover

- ↑ wages (greater spending ability)
- ↑ standard of living for families
- ↑ economic growth for communities
- Challenging working conditions
- Potential for unhealthy coping, affecting others

+/- Affected health factors: Health-related behaviours, mental well-being and coping responses

Project 3:

Categorizing health effect pathways for Health Impact Assessment

Complex Pathway Categories (continued)

Land use and culture

- ↑ community investments for traditional and cultural activities
- ↓ land use, linked to traditional food systems, cultural and spiritual practices, and cultural identity

+/- Affected health factors: physical, cognitive, emotional and spiritual well-being

Project 3: Pathways of Health Effects

KEY LIMITATIONS

Links between project components/activities and health outcomes not evident

Challenging to assess health effects with high certainty in multi-faceted pathways

Low predictive value of effect assessments, especially further down complex pathways

POTENTIAL SOLUTIONS

Focus on project-linked health factors contributing to health outcomes

Use simplified effect pathways to strategically select mitigation measures (i.e., emphasizing the causes of the causes)

Gain greater understanding of early effects and mitigating measures by searching publicly available literature

Artificial Intelligence in Health Assessments

UNLOCKING THE PROMISE OF AI

Using Artificial Intelligence in Health Assessments

POTENTIAL

- Quantitative data harvesting and trend analysis
- Optimizing predictive models
- Automated literature reviews on effect pathways and mitigation
- Task management adapted to specific audiences

CHALLENGES

- Accuracy and availability of inputs and outputs
- Intellectual property, data privacy and transparency
- Unintended biases
- Ethical practice of data harvesting and use

Let’s continue the conversation!

Message me your questions or comments in the IAIA25 app.

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