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www.brain-ellis.be

The ELLIS project: Monitoring and Mitigating Environmental Health Inequalities in Belgium

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Objectives

1. **Study the extent** of socioeconomic differences in environmental burden of disease
2. **Develop a tool** to assess the impact of policy measures on the extent of and inequalities in environmental burden of disease



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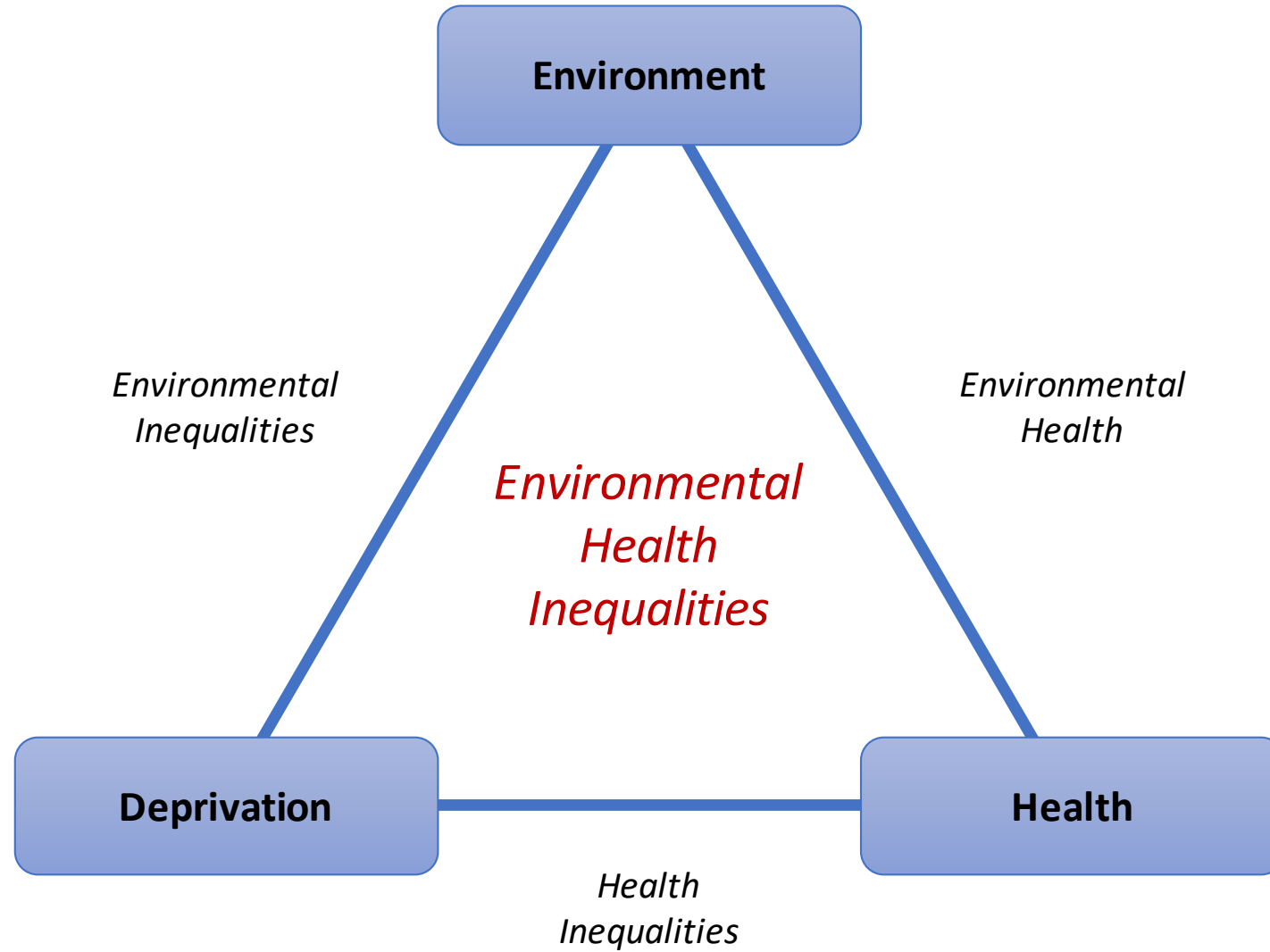
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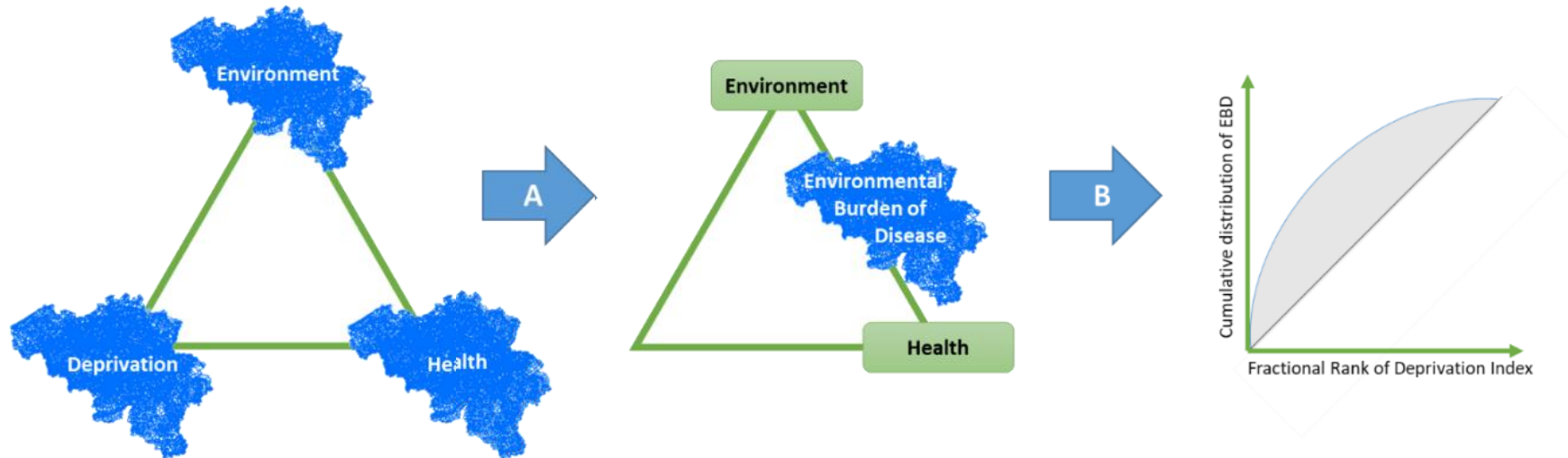
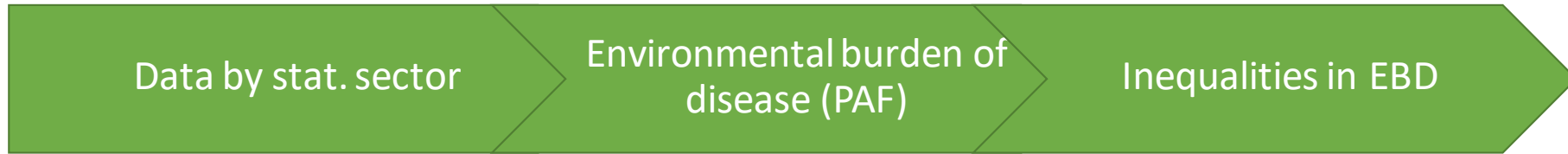


*Environmental
Health
Inequalities*

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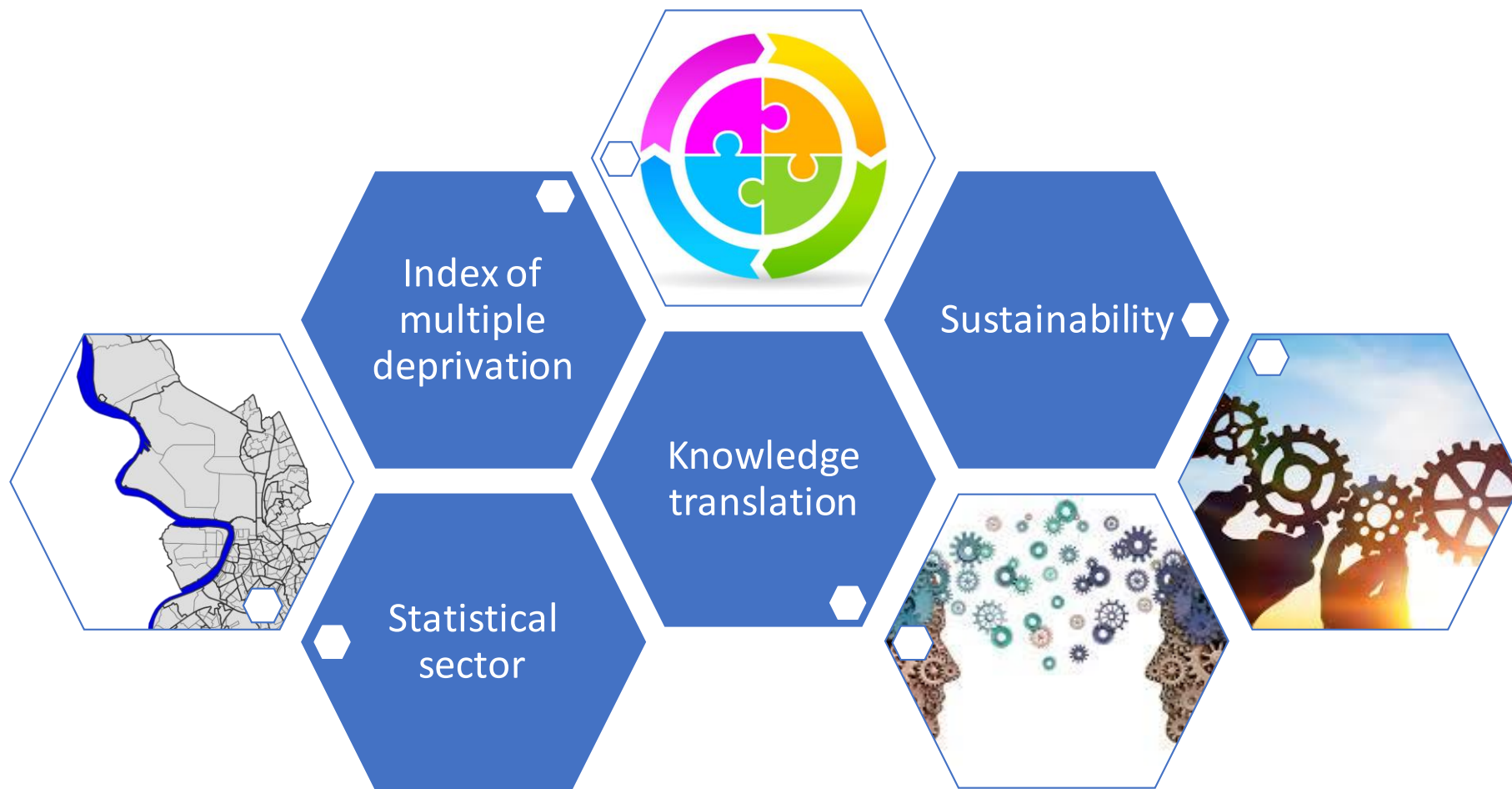
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PhD 1 — Multiple deprivation and health inequalities in Belgium

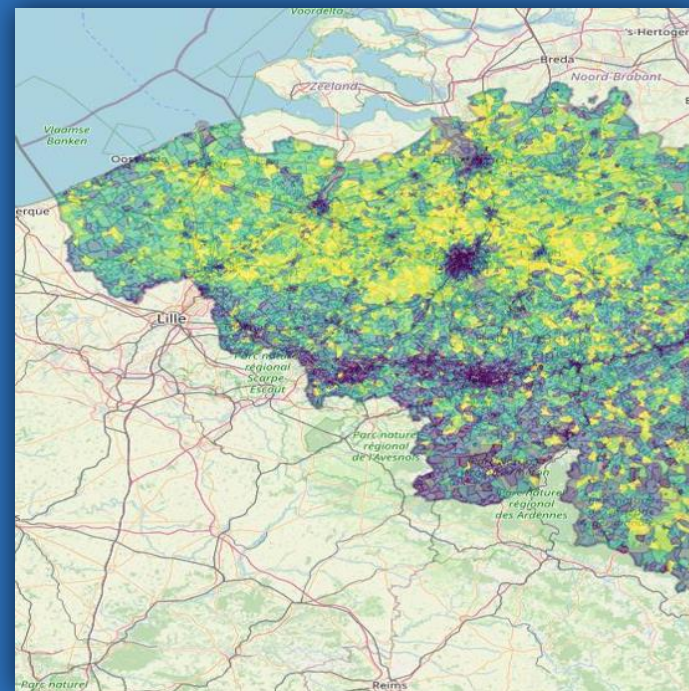
- [Y1] Socioeconomic deprivation
- [Y2] Health outcomes
- [Y3] Health inequalities
- [Y4] Ecological bias

PhD 2 — Environmental inequalities and burden of disease in Belgium

- [Y1] Environmental exposure
- [Y2] Policy scenarios
- [Y3] Comparative risk assessment
- [Y4] Scenario analyses

Knowledge translation and policy transfer

Multiple deprivation and health inequalities in Belgium

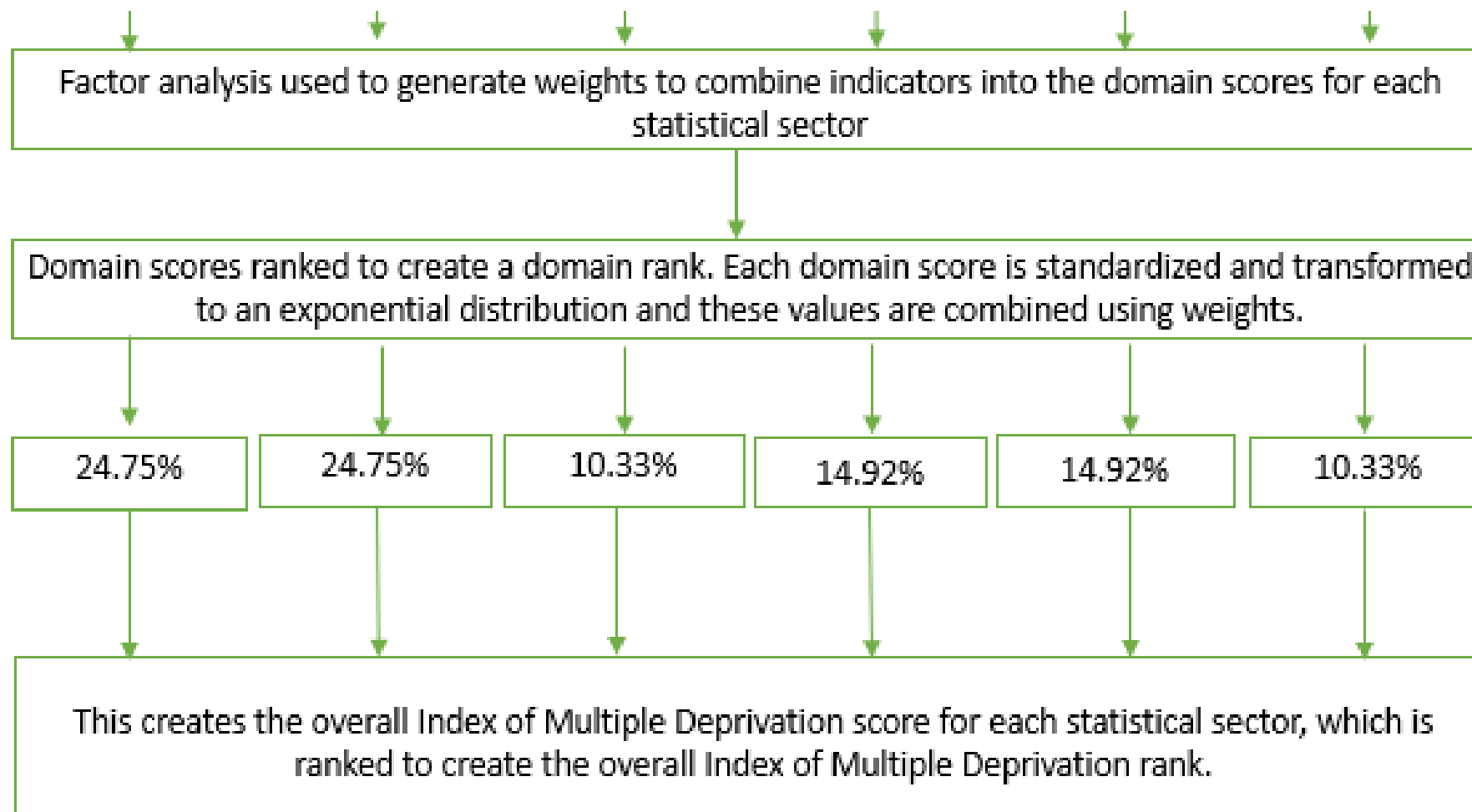


The Belgian Index of Multiple Deprivation 2001 & 2011

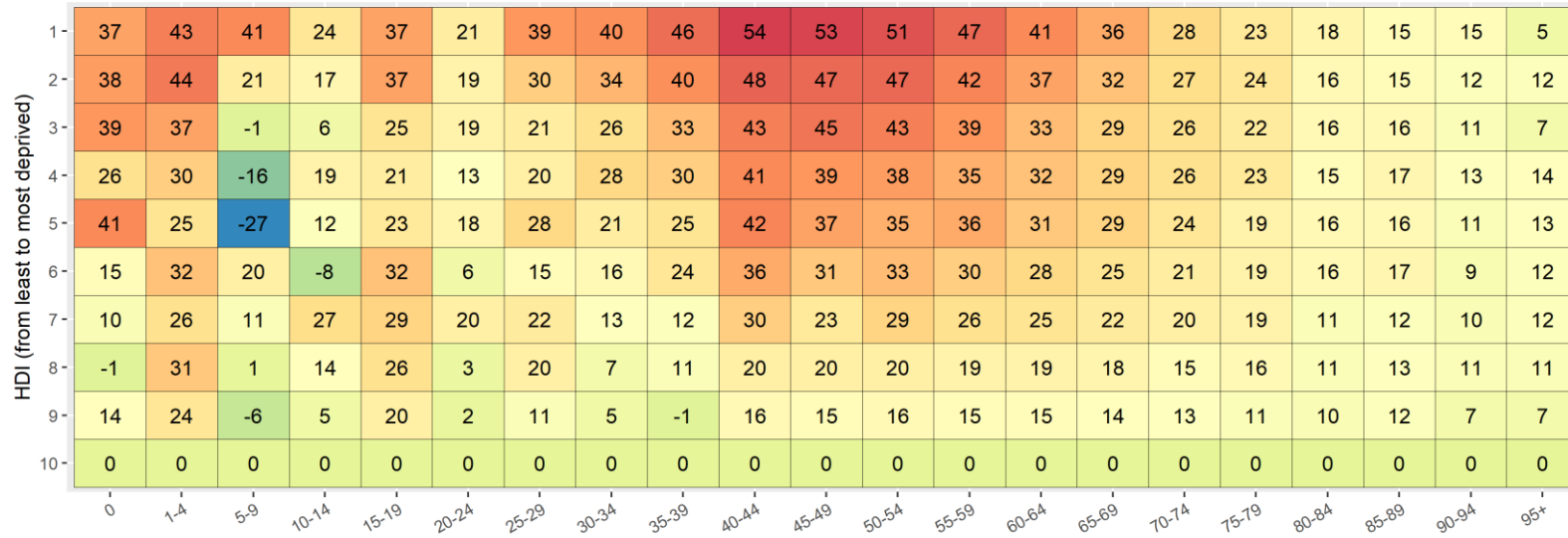
Employment	Income	Crime	Housing	Education	Health
<p>Working-age population who is unemployed (25-64)</p> <p>Working-age population who is classified as disabled or receiving long-term disability benefits</p>	<p>Individuals with low income</p> <p>Households with net taxable income below the minimum living wage</p> <p>Proportion of individuals with increased compensation in compulsory health insurance</p>	<p>Property crime</p> <p>Family violence</p> <p>Violent crimes</p> <p>Drug-related crimes</p> <p>Fraud</p>	<p>Proportion of dwellings with: less than 1 room per inhabitant</p> <p>smaller than 35 m²</p> <p>inhabited by tenants</p> <p>without central heating</p> <p>kitchen</p> <p>toilet</p> <p>bathroom</p> <p>internet</p>	<p>NEET indicator</p> <p>School leavers <18 years old</p> <p>School leavers between 18-24 years of age</p> <p>Working-age individuals without no or low levels of formal qualification</p>	<p>Standardized mortality ratio</p> <p>Standardized suicide rate</p> <p>Number of ATB packs reimbursed per 1000 beneficiaries</p> <p>Number of antidepressants and psychotics per 1000 beneficiaries</p>

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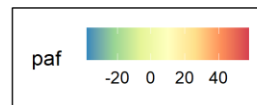
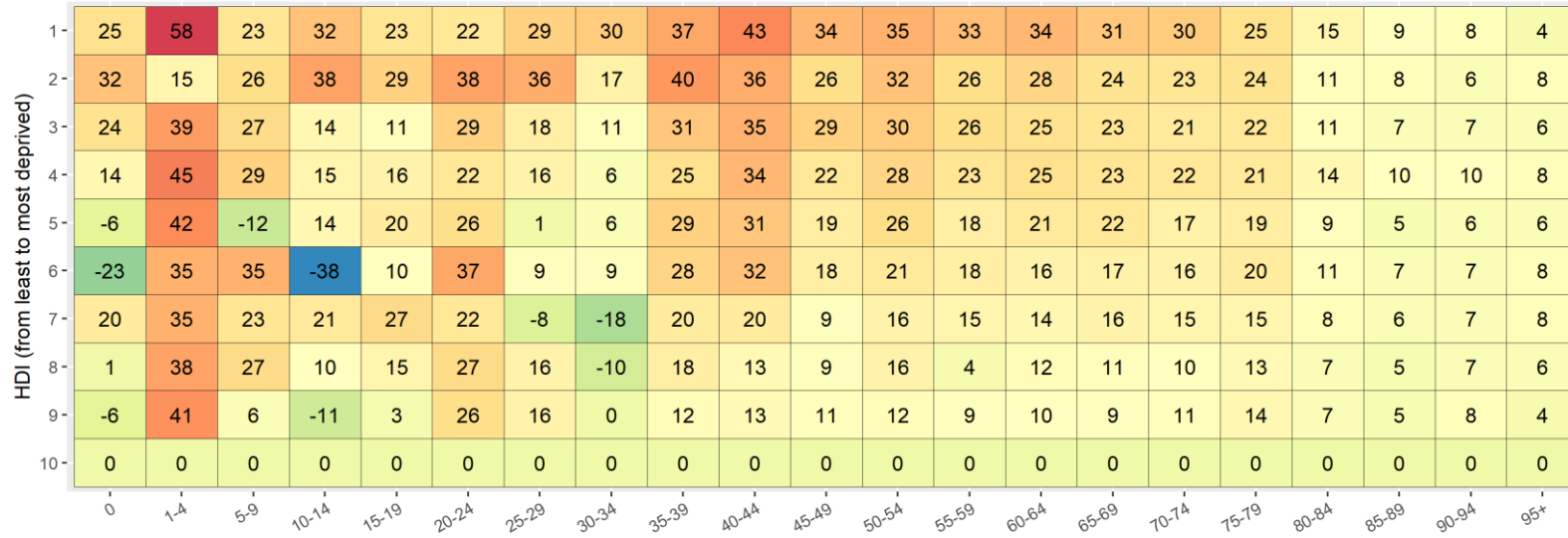
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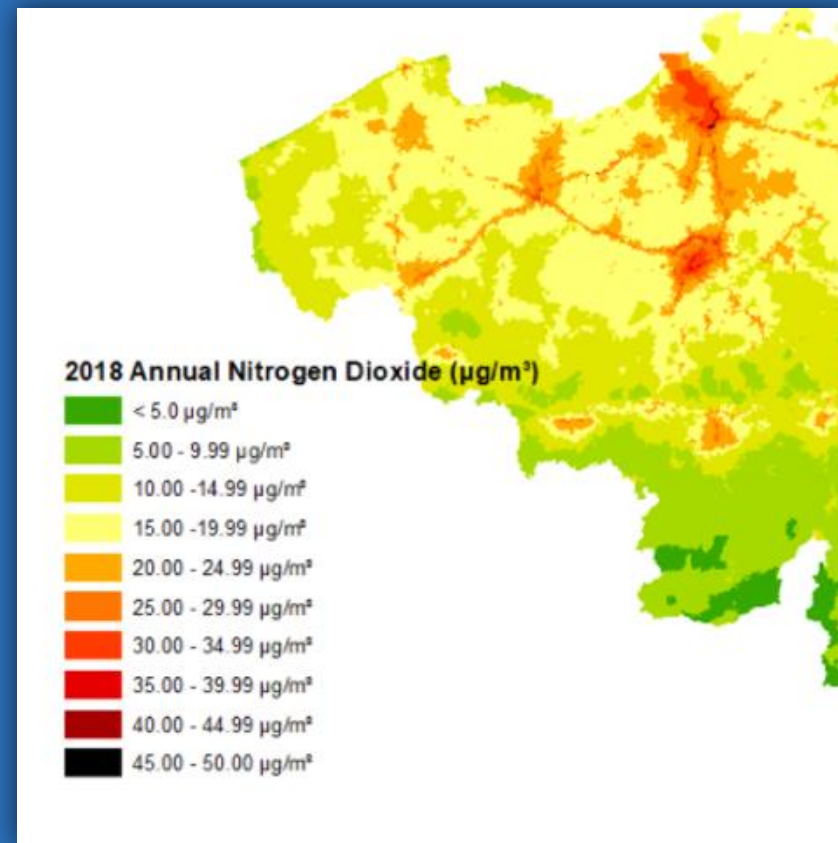
Males



Females



Environmental inequalities and burden of disease in Belgium



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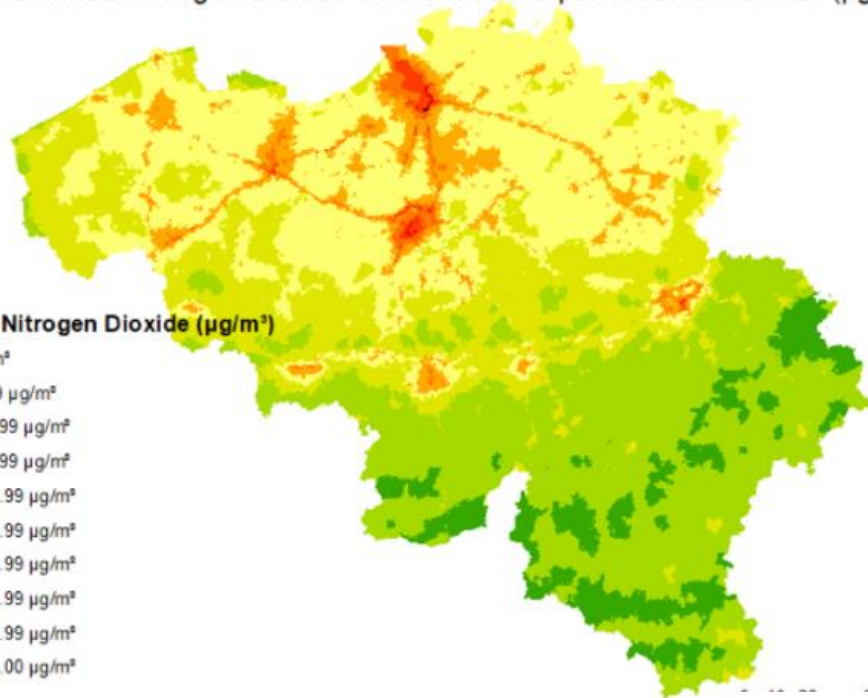
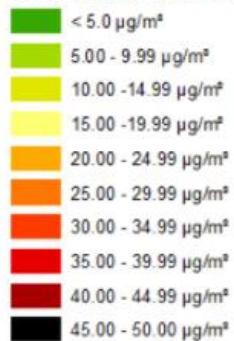
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- Spatial variability of environmental stressors
 - Identify co-occurrence & hotspots
 - Where are exceedances a problem?
- Environmental burden of disease
 - Disability-Adjusted Life Years
- Environmental inequalities in Belgium
 - Suite of inequality indices

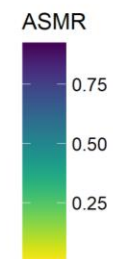
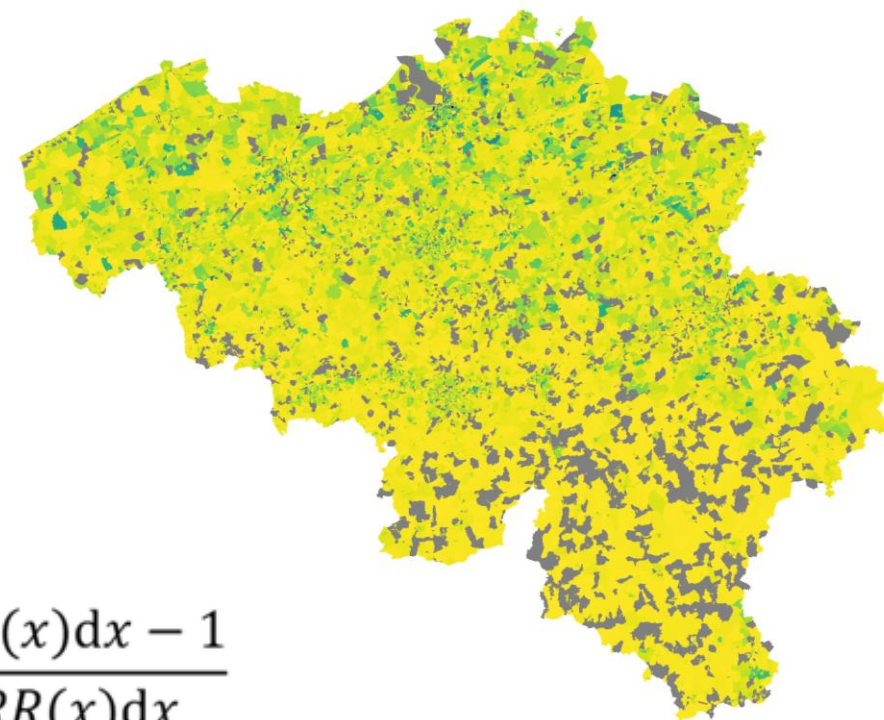
	Data Source
Particulate air pollution (PM _{2.5})	High-resolution air pollution maps for Belgium (10 x 10 meter resolution)
Gaseous air pollution (NO ₂)	High-resolution air pollution maps for Belgium (10 x 10 meter resolution)
Particulate air pollution (BC)	High-resolution air pollution maps for Belgium (10 x 10 meter resolution)
Road noise	Vector files indicating areas that exceed >55dB of noise level, subdivided in classes 55-60dB, 60-65dB, 65-70dB, >70dB
Green space provision	(Recreational/quality) Green space per m ² per inhabitant (per statistical sector) Derived from CORINE LAND-COVER MAPS
Trafficked roads	Percentage of addresses within 100 meters of primary OR secondary road per statistical sector
Summer heat islands/winter cold islands	Data Gathered for Flanders & Brussels at 100m resolution.
Percentage industry	Percentage of industry per statistical sector derived from CORINE Land Cover Maps 2018 (100m resolution).
Percentage agriculture	Percentage agriculture per statistical sector derived from CORINE Land Cover Maps.
Ozone (O ₃)	High-resolution air pollution maps for Belgium (10 x 10 meter resolution)

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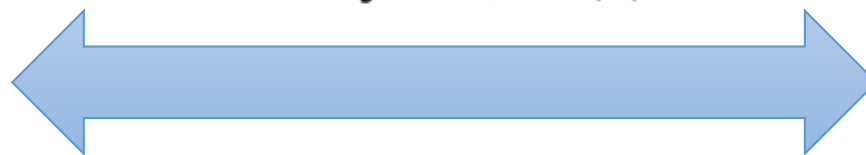
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2018 Annual Nitrogen Dioxide Concentrations per Statistical Sector ($\mu\text{g}/\text{m}^3$)2018 Annual Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)

Male ASMRs per 100,000 person-years



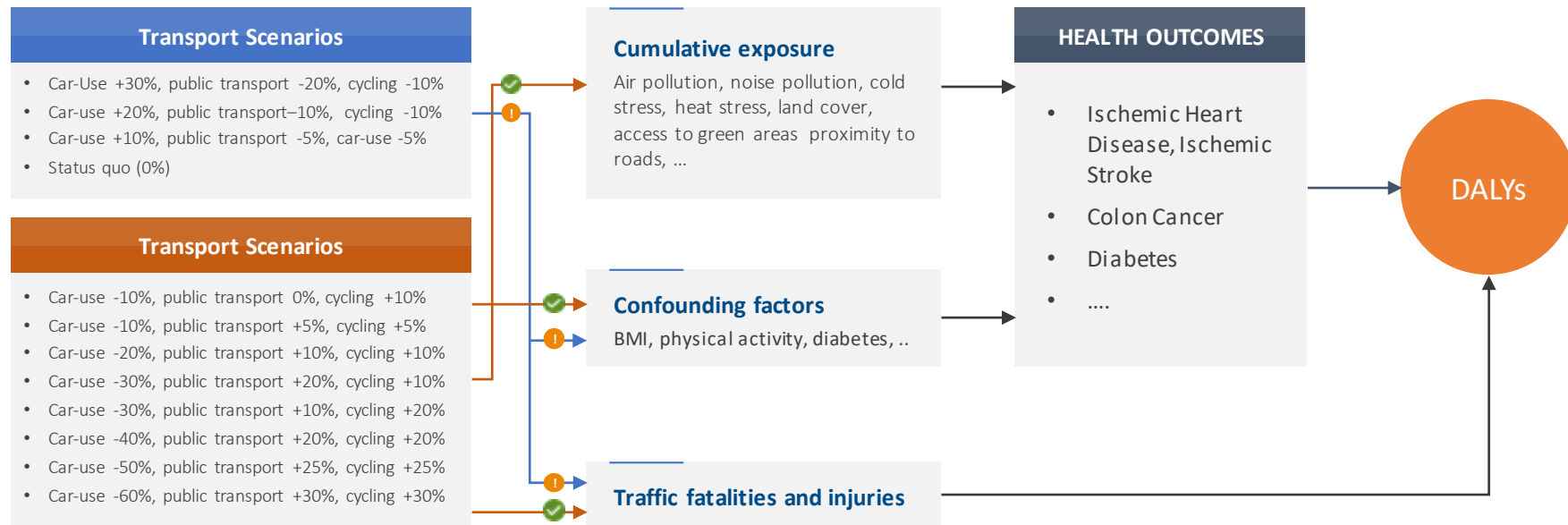
$$PAF = \frac{\int P(x)RR(x)dx - 1}{\int P(x)RR(x)dx}$$



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Mitigation Model : Generic Model - Modal Shift Scenario's



Suitable to put in interactive monitoring and simulation tool in the framework of the ELLIS project

- In cooperation with stakeholders: define scenario's, Different methods to reach the percentages of the modal shift can be included in the model (e.g. road pricing, investment in public transport, investment in bicycle infrastructure, ...)
- **For all the interventions, it can be assessed 1) how the environmental burden of disease can be mitigated and 2) how environmental health inequalities can be mitigated**

Next steps

- Publish Belgian Index of Multiple Deprivation
- Estimate Environmental Burden of Disease
- Estimate Environmental Health Inequalities
- Implement mitigation model
- Develop online visualisation tool



Bram Vandeninden

Published: 28 September 2021

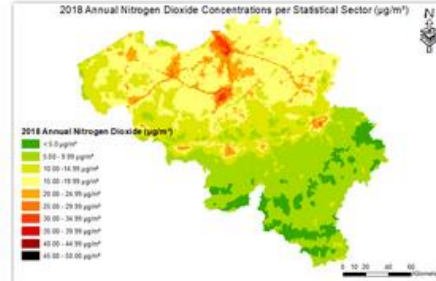
Increased car use and decreased public transport use post-COVID could structurally elevate hospitalisations and death



Martina Otavova

Published: 12 August 2021

Inequalities in mortality associated with housing conditions in Belgium between 1991 and 2019



Bram Vandeninden

Published: 11 June 2021

The importance and availability of data on environmental stressors in Belgium



Bram Vandeninden

Published: 21 April 2021

The opportunity for mitigation co-benefits and the importance of 'ONE HEALTH'



Martina Otavova

Published: 06 March 2021

Towards the development of the Belgian Index of Multiple Deprivation



follow our progress

<https://www.brain-ellis.be/blog>

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