CAREC
Central Asia Regional Economic Cooperation Program

21st Transport Sector Coordinating Committee Meeting

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22–23 апреля 2024 года • Алматы, Казахстан

Interactions between Climate and Road Safety action in the CAREC Region

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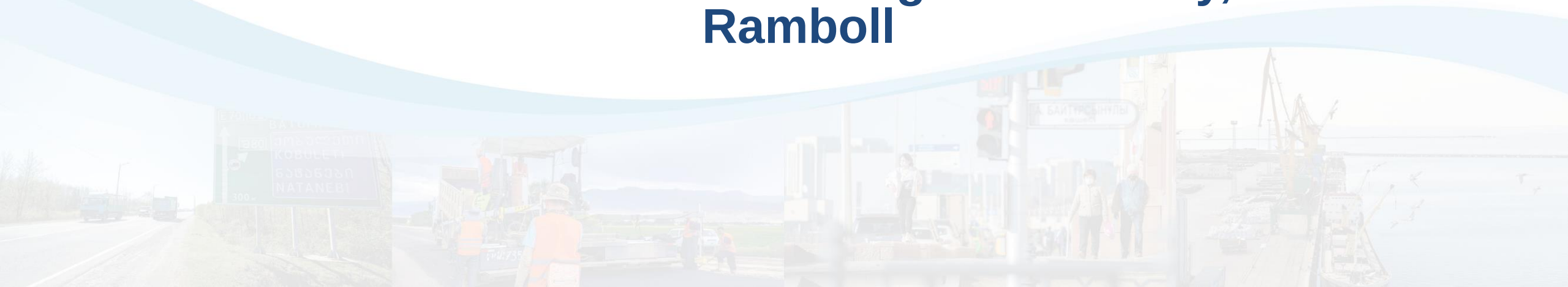
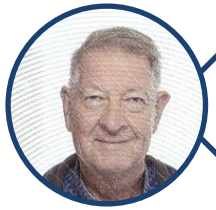


Project team

Olga Petrik - Transport Decarbonization Specialist (Team Lead)



Sverker Almqvist – Road Safety Planning Specialist

Janus Søgaard Kirkeby – Health Sector Greenhouse Emissions Specialist

Erik Hedman – Project Director/Manager

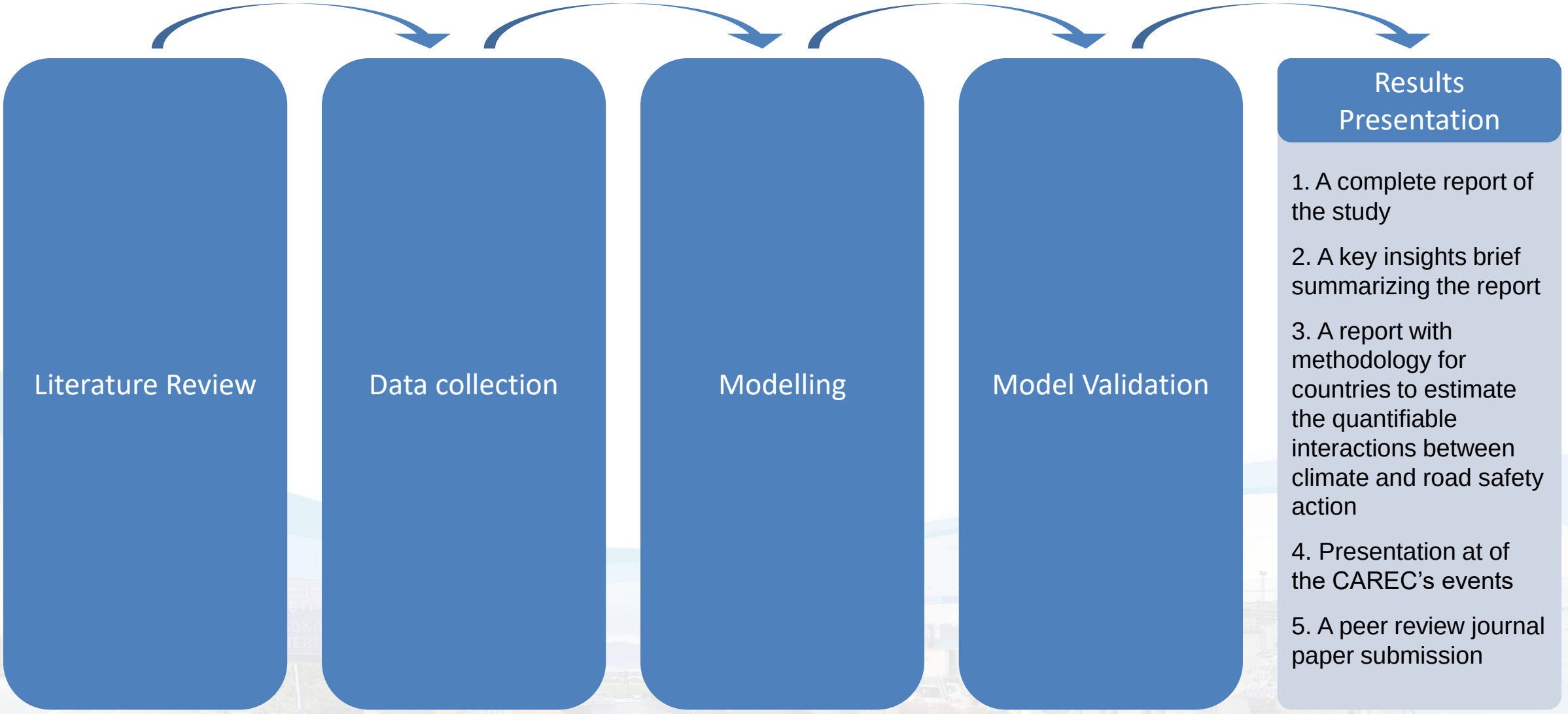
Project objective

The assignment will address three fundamental questions for the CAREC region

- What are the climate impacts of road safety action?
- What are the road safety impacts of climate action?
- What are the climate impacts of death and injury in road use?

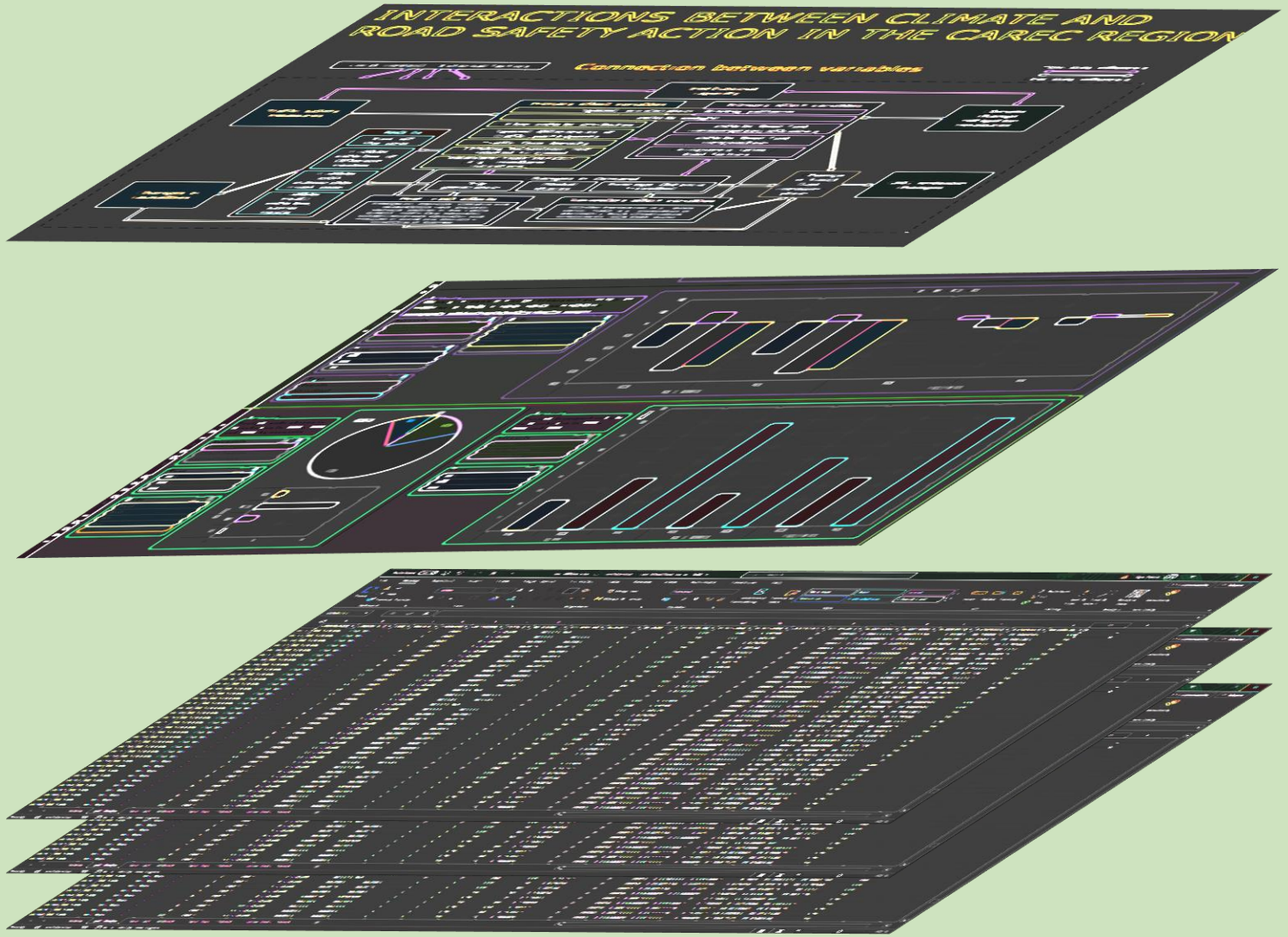
Modelling results will be performed for three CAREC countries, however the results are expected to be of relevance for all CAREC countries, and the region as a whole.

Study Methodology overview



Excel model

- **Cover sheet**
- **Scenario settings**
- **Scenario results presentation**
- **Input values (for each country)**
  - Socio-economic data
  - Transport Supply
  - Transport demand
  - Vehicle fleet composition and emissions
- **Intermediate calculations**
  - Modal split
  - Average distance travelled
  - Task 2 calculations (road crashes and CO2)
  - Task 3 calculations (road crashes and CO2)
  - Task 4 calculations (CO2)
- **Model outputs**
  - CO2 emissions for the scenario
  - Road crashes for the scenario



Literature review

Literature review process

Identifying and reviewing;

- Documentation on road safety measures to understand the efficiency of various measures related to road safety
- Documentation on climate mitigation measures in Road Transport to understand the efficiency of various measures related to climate impact
- CAREC country specific documents on road safety and CO2 emission reductions to understand countries planned measures
- Documentation on death and injury in road use studying post-crash effects
- Models and tools for assessing road safety and climate impact to calculate the effects of measures

Examples of shortlisted measures

Road Safety

- Road Design and Road Equipment,
- Road Maintenance, Traffic Control,
- Vehicle Design and Protective Devices,
- Vehicle and Garage Inspection,
- Driver Training and Regulation of Professional Drivers,
- Public Education and Information,
- Police Enforcement and Sanctions,
- Post-Accident Care,
- Organizational measures

Emission reduction

- Modal shift from private car to Public transport,
- Increase walking and cycling,
- Increasing the share of e-vehicles in the fleet,
- Spatial and time car restriction measures (e.g., low emission zones, parking restriction zones),
- Car sharing, carpooling, on-demand public transport

Data collection

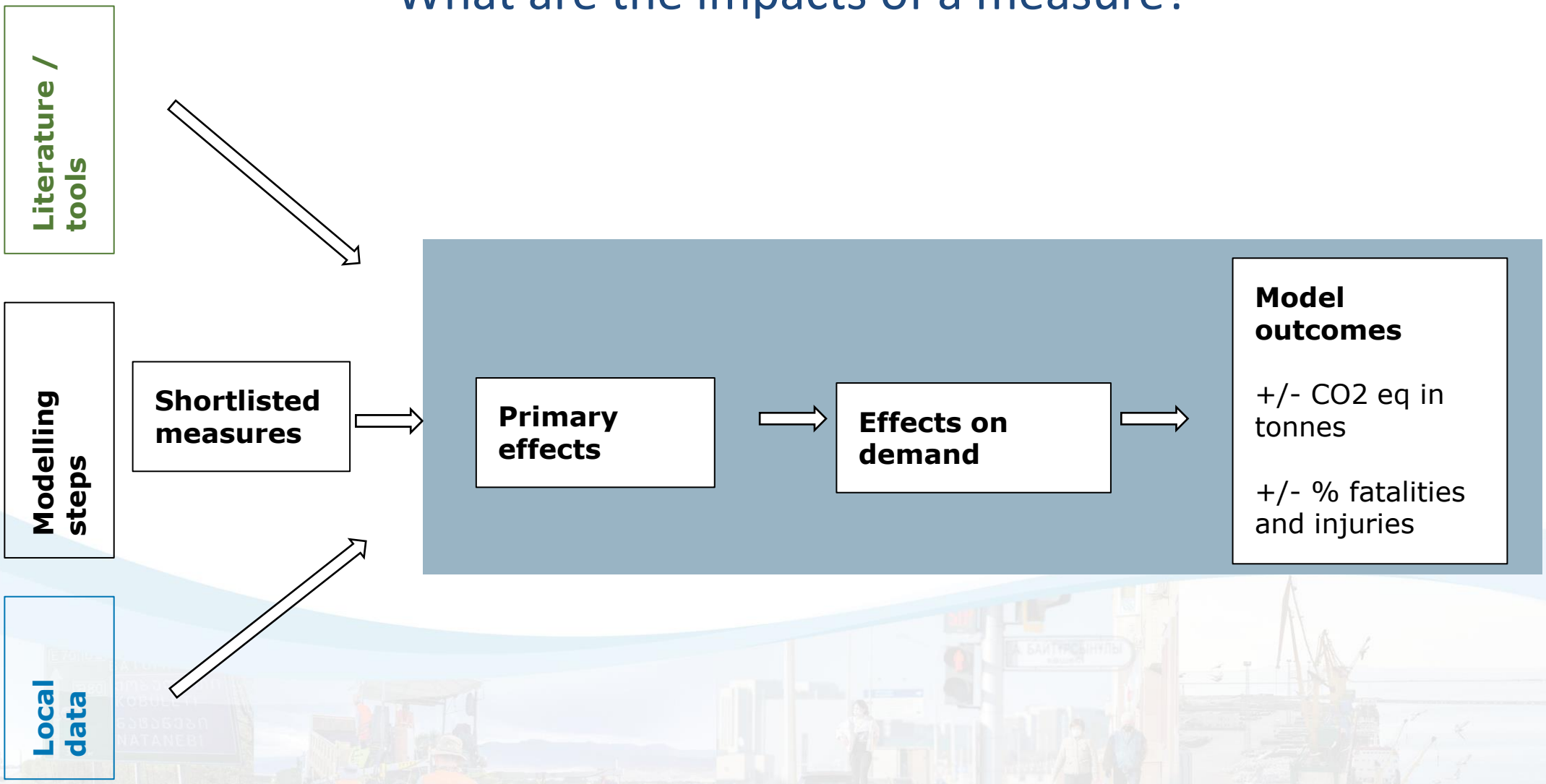
Data collection approach

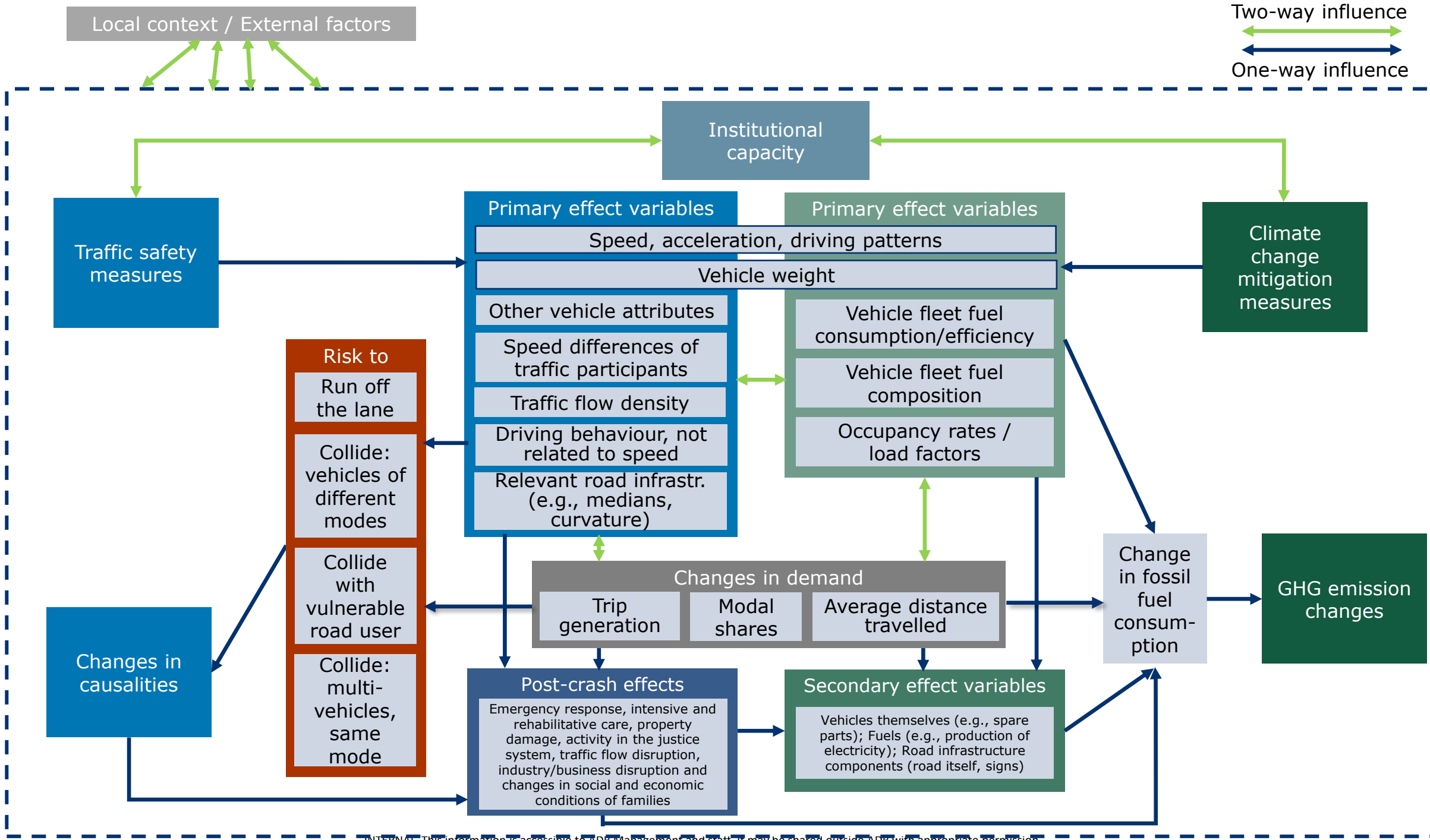
Combination of open-source data and country reported data will be used

- Transport demand data – vehicle-kilometres, passenger kilometre, modal shares, etc.
- Transport supply data – speed data, road length, infrastructure characteristics, etc.
- Vehicle fleet and fuel consumption data – Fuel consumption, Share of EV vehicles (%), number of registered vehicles, etc.
- Indicators related to road safety – statistics on driving affected by drugs/alcohol, speed control, seat belt laws, etc.
- Statistics on injury and accidents – fatalities, severely injured, lightly injured, etc.
- Post-crash and health data – CO2-emissions from healthcare system, cost of treatment, emissions from road treatment, etc.

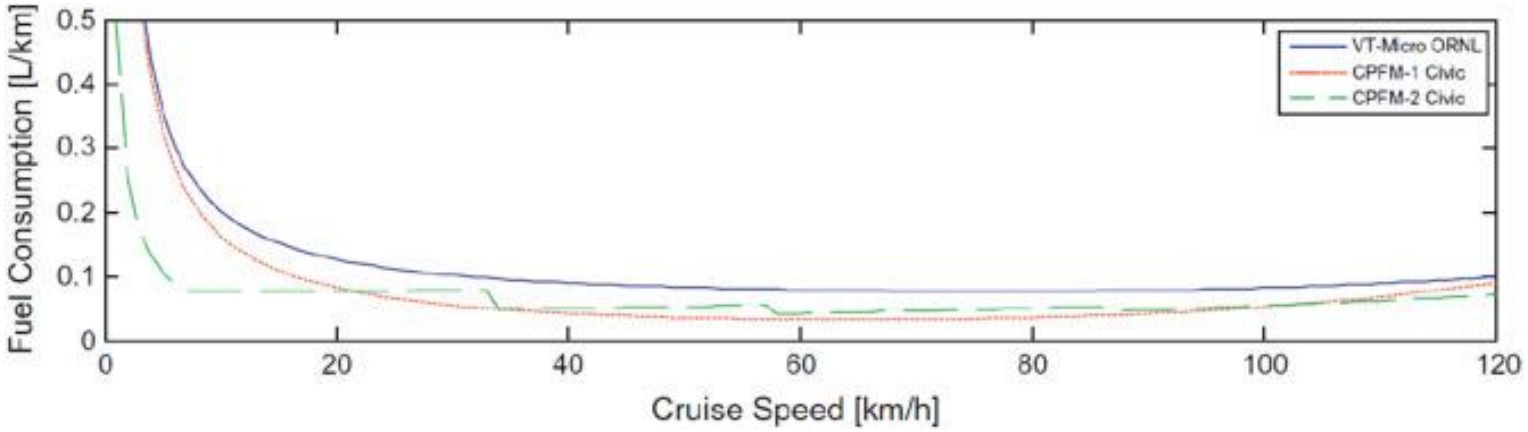
Modelling of measures

What are the impacts of a measure?

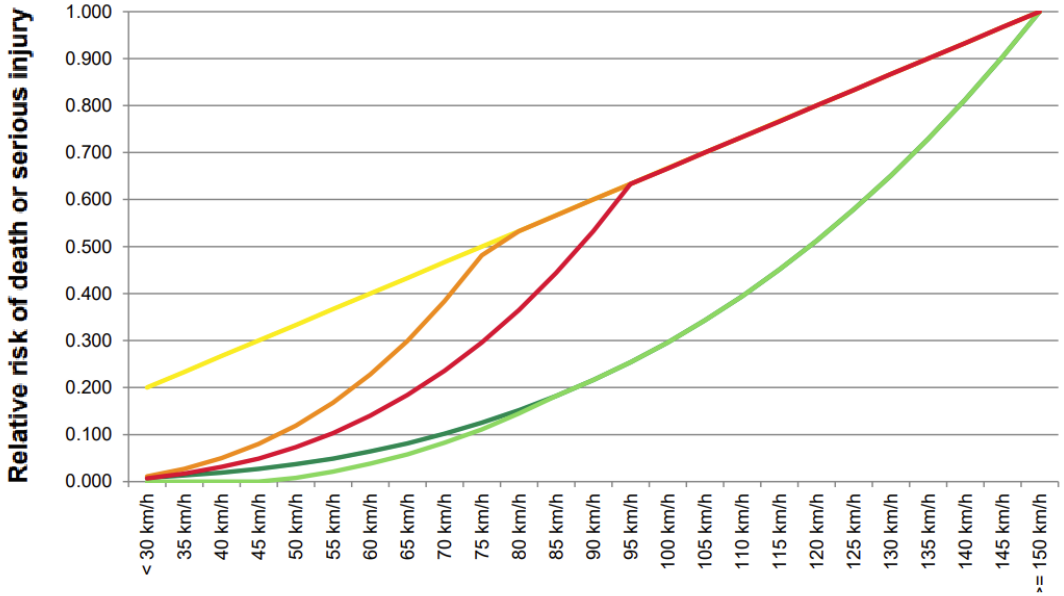




Example: speed reduction effects on emissions and road crashes



Source: The Impact of Vehicle Speed on Fuel Efficiency, Honda Civic



Risk factors by road attribute category, road user type and crash type

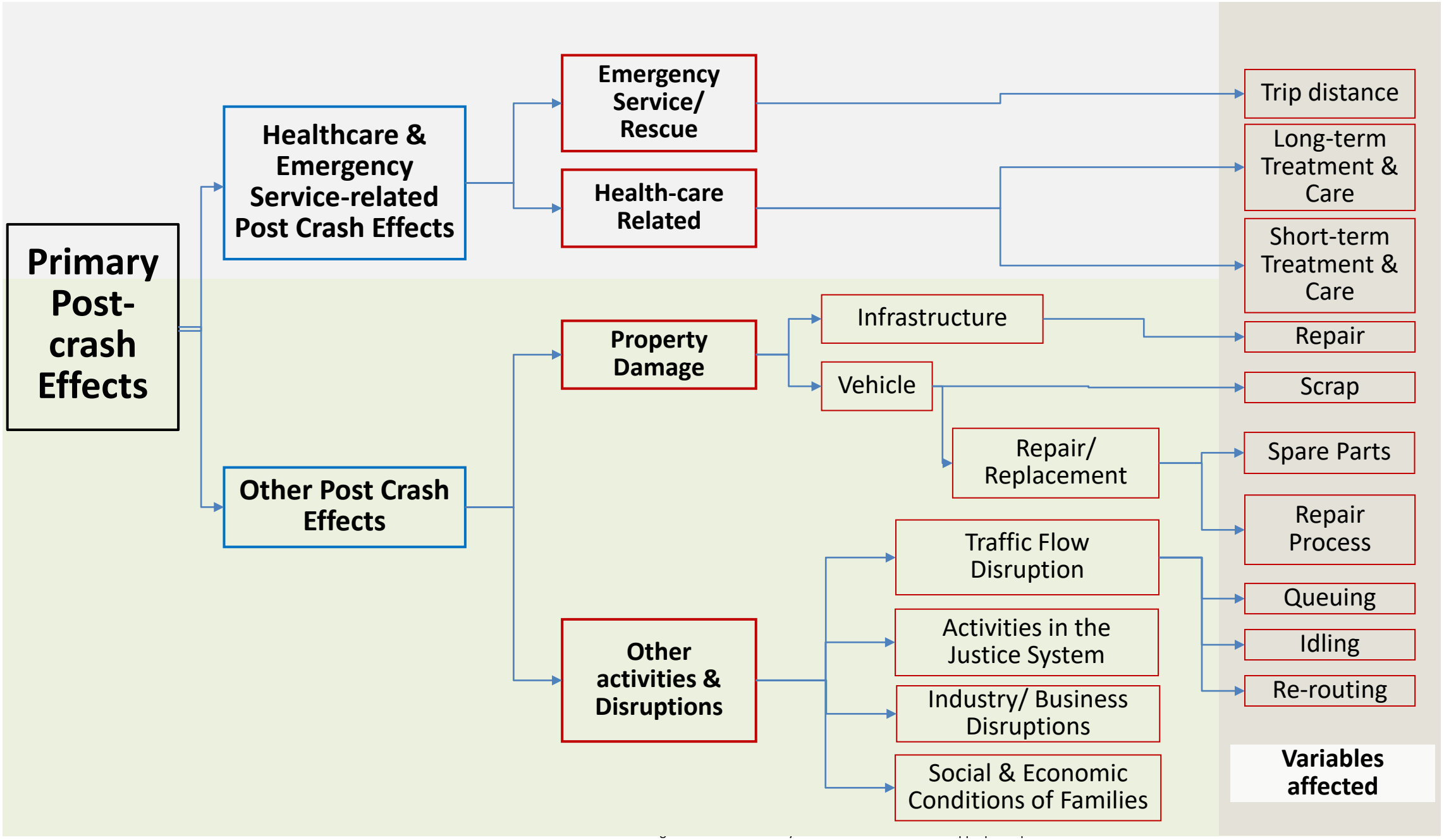
- Vehicle occupants and Motorcyclists (undivided and rural divided roads, head-on, run-off and intersection)
- Vehicle occupants and Motorcyclists (urban divided roads, head-on)
- Vehicle occupants and Motorcyclists (railway crossing, intersection, run-off, cliff)
- Pedestrians
- Bicyclists

Source: iRAP

Modelling of post-crash effects

Modelling of post-crash effects approach

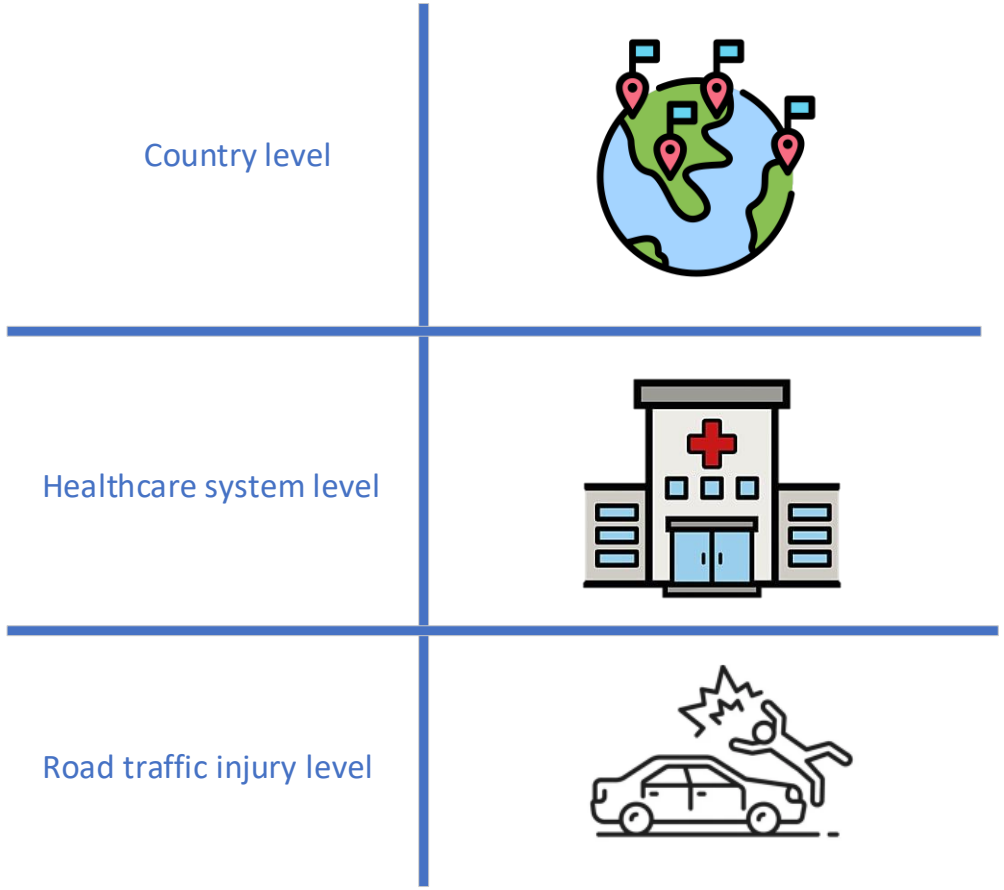
- Screening of primary and secondary post-crash activities
- Grouping of activities and methods of assessing emission levels
- Focus on modelling activities with good background data – initially health sector emissions related to road crashes
- Others will follow


Primary Post-crash Effects
Healthcare & Emergency Service-related Post Crash Effects
Other Post Crash Effects
Emergency Service/ Rescue
Health-care Related
Property Damage
Other activities & Disruptions
Infrastructure
Vehicle
Repair/ Replacement
Traffic Flow Disruption
Activities in the Justice System
Industry/ Business Disruptions
Social & Economic Conditions of Families
Trip distance
Long-term Treatment & Care
Short-term Treatment & Care
Repair
Scrap
Spare Parts
Repair Process
Queuing
Idling
Re-routing
Variables affected

Estimating the CO_2 impact of road accidents

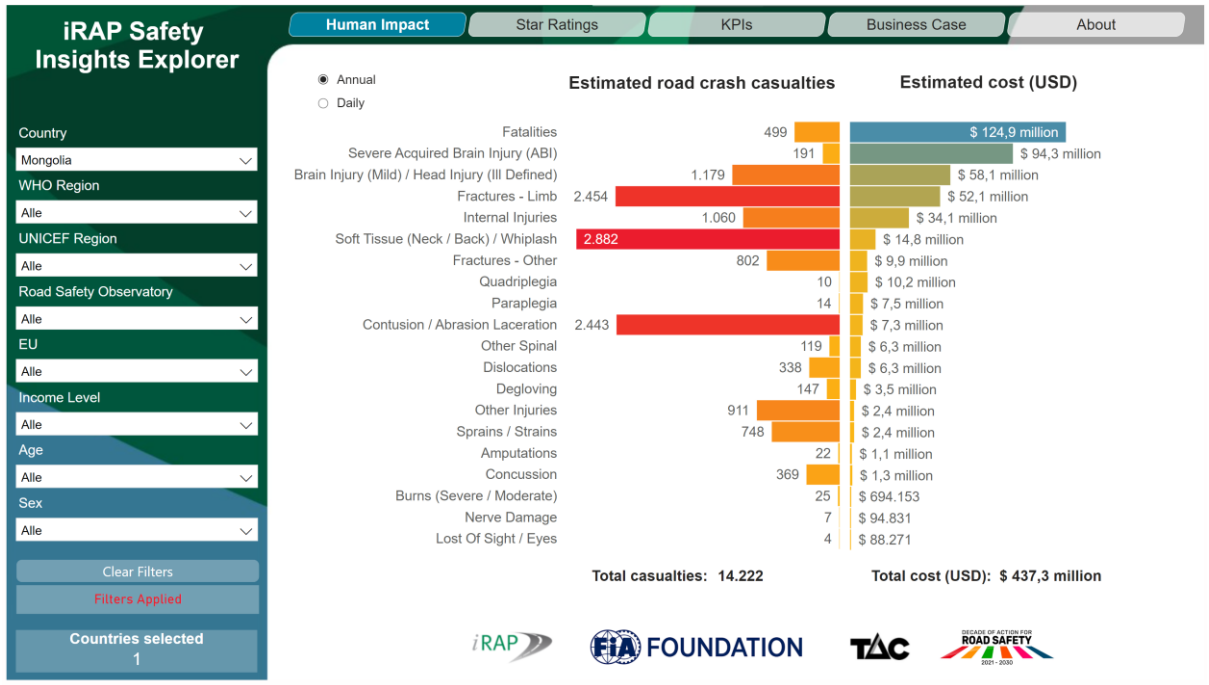
Purpose: To map the relationship between country level emissions and road accident emissions

- Country level emission for each of the CAREC countries
- CO_2 data from healthcare sector
- CO_2 from health care related road crashes will be estimated
- iRAP etc. data on the cost of road crashes



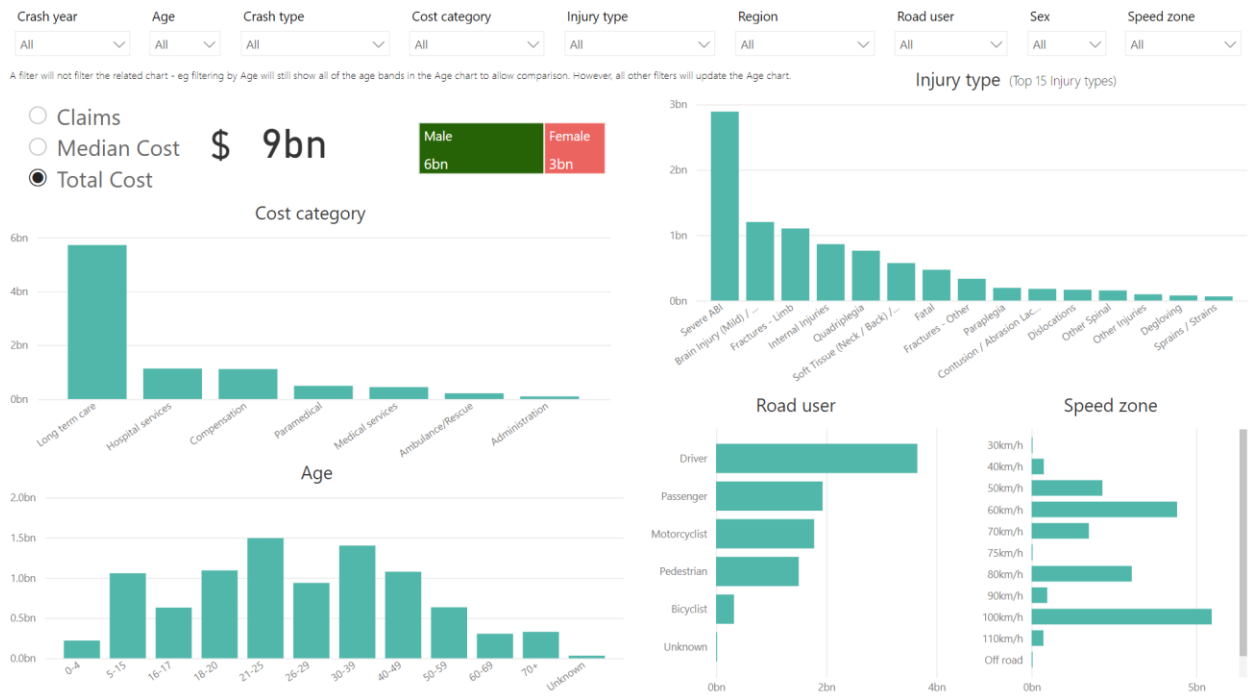
Casualties and costs of treatment

iRAP data on estimated number of casualties and related costs for treatment and long-term care



Source: iRAP Safety Insights Explorer

iRAP and Transport Accident Commision (TAC) data on estimated costs for treatment and long-term care



Source: TAC iRAP Road Injury Dashboard

Healthcare CO_2 footprints

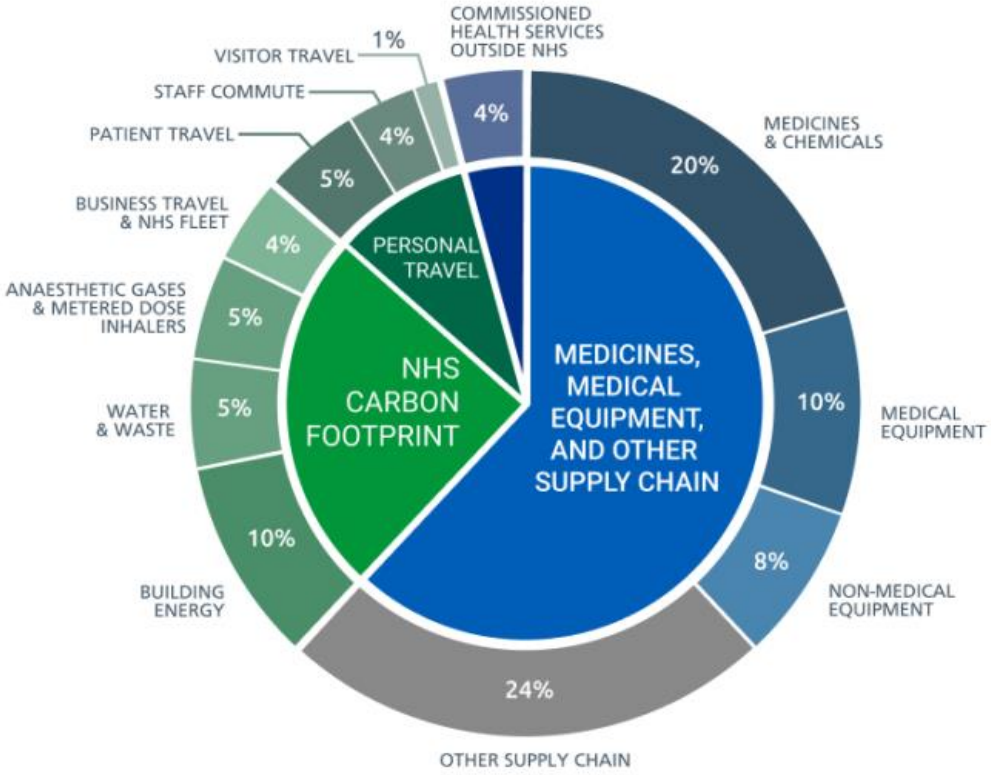
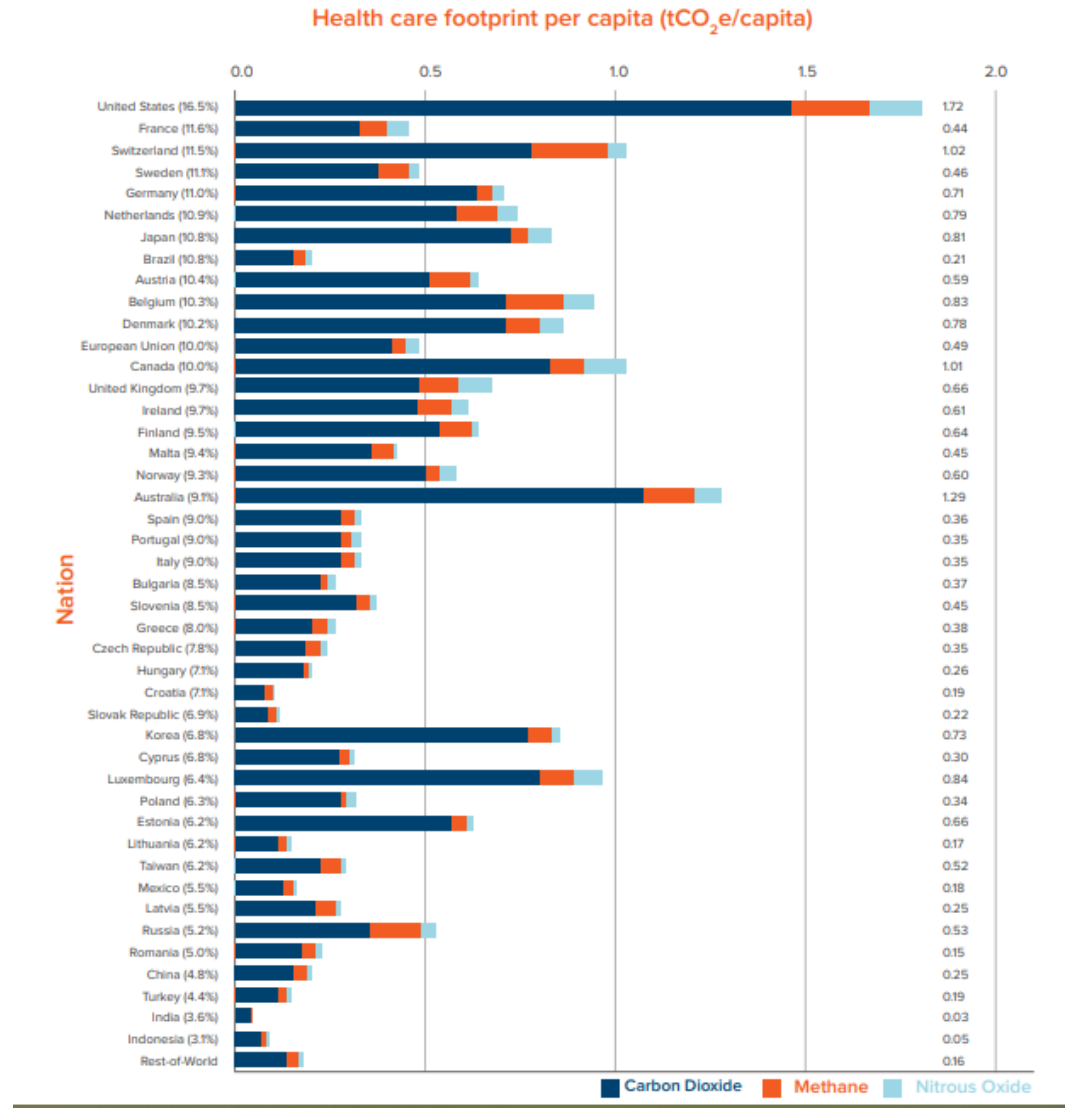


Figure – Example of carbon emissions by proportion of NHS Carbon Footprint (Ref. NHS, Delivering a 'Net Zero' National Health Service)



Source: Health Care without Harm, HEALTH CARE'S CLIMATE FOOTPRINT

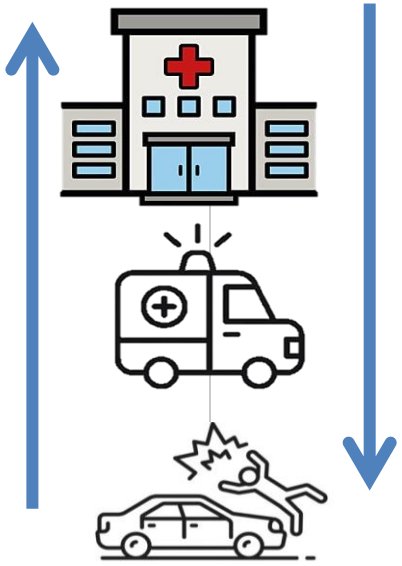
Estimating CO_2 emissions from health care

Bottom-up approach – Based on 'injury type'

Purpose: Evaluating CO_2 emissions from treatment of casualty types

Steps:

1. Identify casualty types (iRAP)
2. Assess treatment for casualty types
3. Calculate CO_2 footprint of treatment



Top-down approach – Based on national spends and CO_2 emissions from health care

Purpose: Evaluating the overall level of CO_2 emissions from health care related to road crashes

Steps:

1. National spends and CO_2-emissions from healthcare/hospital sector
2. Allocate the total national spending to the *casualty cost* from road crashes
3. Allocate total CO_2-emissions from healthcare/hospital sector to road crashes

Next steps and expected outcome

1) Effects on each selected measure will be calculated – road safety and climate impact
2) National level estimations of climate impacts of death and injury in road use will be calculated
3) Excel tool developed to apply country specific actions and measures for other countries in the regions
4) Development of main report and technical brief

Thank you for listening!