CIVITAS indicators

Citizen health – Version 1 (SOC_HL_HL1)

DOMAIN

Transport	Environment	Energy	**Society**	Economy

TOPIC	**Health**	
IMPACT	**Improving respiratory health** *Reducing the incidence of bronchitis, pneumonia, and asthma*	**SOC_HL**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

Respiratory health refers to the condition of individuals' respiratory systems, reflecting the presence or absence of diseases such as bronchitis, pneumonia, and asthma. It is influenced by multiple environmental, behavioural, and socio-economic factors, including air quality, exposure to pollutants, smoking habits, occupational hazards, access to healthcare, housing conditions, and climatic variables. Poor respiratory health can also be exacerbated by long-term exposure to traffic-related emissions and other forms of urban pollution.

This indicator measures the prevalence of select respiratory conditions, namely bronchitis, pneumonia, and asthma, among citizens in the pilot area. It provides an indication of the population's respiratory health status, and it allows to track how respiratory health in the pilot area evolves in response to changes in transport-related emissions. **The indicator is relevant when the policy action aims to reduce the incidence of respiratory conditions. A successful action is reflected in a <u>LOWER</u> value of the indicator.**

DESCRIPTION

The indicator is a **score** representing the incidence and severity of respiratory conditions in the pilot area, namely bronchitis, pneumonia, and asthma. The indicator is **dimensionless**.

METHOD OF CALCULATION AND INPUTS

The indicator is calculated as a weighted score reflecting the incidence and severity of respiratory conditions reported by a sample of citizens in the pilot area who responded to a survey on respiratory health. **The indicator should be computed exogenously** based on the specified inputs, and its resulting value should be coded into the supporting tool.

Method		
Calculation of the indicator based on a sample survey	Significance: **0.50**	

INPUTS

The following information is needed to compute the indicator:

- **Responses of a sample of individuals to survey questions regarding respiratory health.** The questions should ask respondents to indicate whether they suffered from bronchitis, pneumonia, or asthma in the past six months, and the severity of the illness.

A suggested formulation of the questions regarding the incidence and severity of bronchitis, pneumonia and asthma is provided in the Guidelines for surveys which are part of the MUSE Evaluation Framework.

METHOD OF CALCULATION

Assuming that the formulation of the survey suggested in the Guidelines for surveys is used, the indicator should be computed **exogenously** according to the following steps:

- **Association of a numeric level to each option of response proposed in the survey.** In the suggested formulation of the survey, each question corresponds to a specific respiratory condition, with three response options representing increasing levels of severity. A numeric value is assigned to each response option, reflecting the severity level indicated. The numeric levels assigned to each response option would therefore be as follows:

  Question 1: Have you suffered from bronchitis in the last six months?

  Available responses:
   a) Yes, I even needed hospitalization
   b) Yes, but I did not need hospitalization
   c) No

  Numeric levels associated:
   a) Yes, I even needed hospitalization → 2
   b) Yes, but I did not need hospitalization → 1
   c) No → 0

  Question 2: Have you suffered from pneumonia in the last six months?

  Available responses:
  a) Yes, I even needed hospitalization
  b) Yes, but I did not need hospitalization
  c) No

  Numeric levels associated:
  a) Yes, I even needed hospitalization → 2
  b) Yes, but I did not need hospitalization → 1
  c) No → 0

  Question 3: Have you suffered from asthma in the last six months?

  Available responses:
  a) Yes, I even needed hospitalization
  b) Yes, but I did not need hospitalization
  c) No

  Numeric levels associated:
  a) Yes, I even needed hospitalization → 2
  b) Yes, but I did not need hospitalization → 1
  c) No → 0

- **Association of a numeric weight to each question in the survey.** The weights should represent the relative severity of each condition accounted for in the survey. Between bronchitis, pneumonia and asthma, the latter is considered the most severe, as it is typically chronic. It can significantly impair quality of life, and it may require continuous treatment or emergency care during acute episodes. Pneumonia has an intermediate level of severity, being an acute but generally short-term respiratory infection that can lead to serious complications if untreated. Bronchitis is weighted lowest, since it is generally a transient inflammatory condition of the airways, typically treated effectively with standard medical care. Therefore, question 1 on **bronchitis** is

assigned **weight 1**, question 2 on **pneumonia** is assigned **weight 2**, and question 3 on **asthma** is assigned **weight 3**.

- **Calculation of the respiratory disorder score per respondent based on the numeric levels and weights of each answer** (see equation below).

- **Calculation of the respiratory disorder indicator by aggregating the responses provided by each respondent** (see equation below).

EQUATIONS

Each respondent's answers to the three respiratory health questions are combined into a respiratory disorder score per respondent, calculated as:

$$RsHl_r = \sum_c w_c * A_{r,c}$$

Where:

$A_{r,c}$ = Answer by respondent *r* to the survey question on respiratory condition *c* (numerical score 0-2, as discussed in the *Method of calculation* section)

w_c = Weight of respiratory condition *c* (numerical value 1-3, as discussed in the *Method of calculation* section)

Then, **the respiratory disorder indicator is computed as**:

$$RsHl = \frac{\sum_r RsHl_r * 100}{R * RsHl_{max}}$$

Where:

R = Total number of respondents

$RsHl_{max}$ = Maximum individual respiratory disorder score, representing the value that is obtained by the respondent which reported suffering from all three respiratory conditions and required hospitalization for each. This value serves as normalization constant, and is computed as: $RsHl_{max} = \sum_c w_c * A_{max,c}$
Using the weights proposed in this factsheet and in the Guidelines for surveys, $RsHl_{max}$ equals 12, as which results from summing the severity weights for bronchitis, pneumonia, and asthma (1, 2, and 3 respectively) and multiplying the result by the value attached to hospitalization (2).

ALTERNATIVE INDICATORS

This indicator measures the respiratory health of residents of the experiment city based on survey data. Alternative indicators for assessing transport-related health dimensions are **SOC_HL_HL2**, and **SOC_HL_HL3**.

SOC_HL_HL2 measures respiratory health in the experiment area using data from local medical authorities, accounting for consultations and hospitalizations due to respiratory conditions. This alternative indicator is more significant, because it relies on medical records rather than self-reported sample survey results; however, it is not suitable to analyse local experiments because medical data are typically aggregated at the city level due to strict privacy regulations. **SOC_HL_HL1** may therefore be preferred when assessing local experiments or if medical data is not available. Meanwhile, **SOC_HL_HL3** draws on medical data to measure the incidence of insomnia in the experiment city.