p**Appendix**

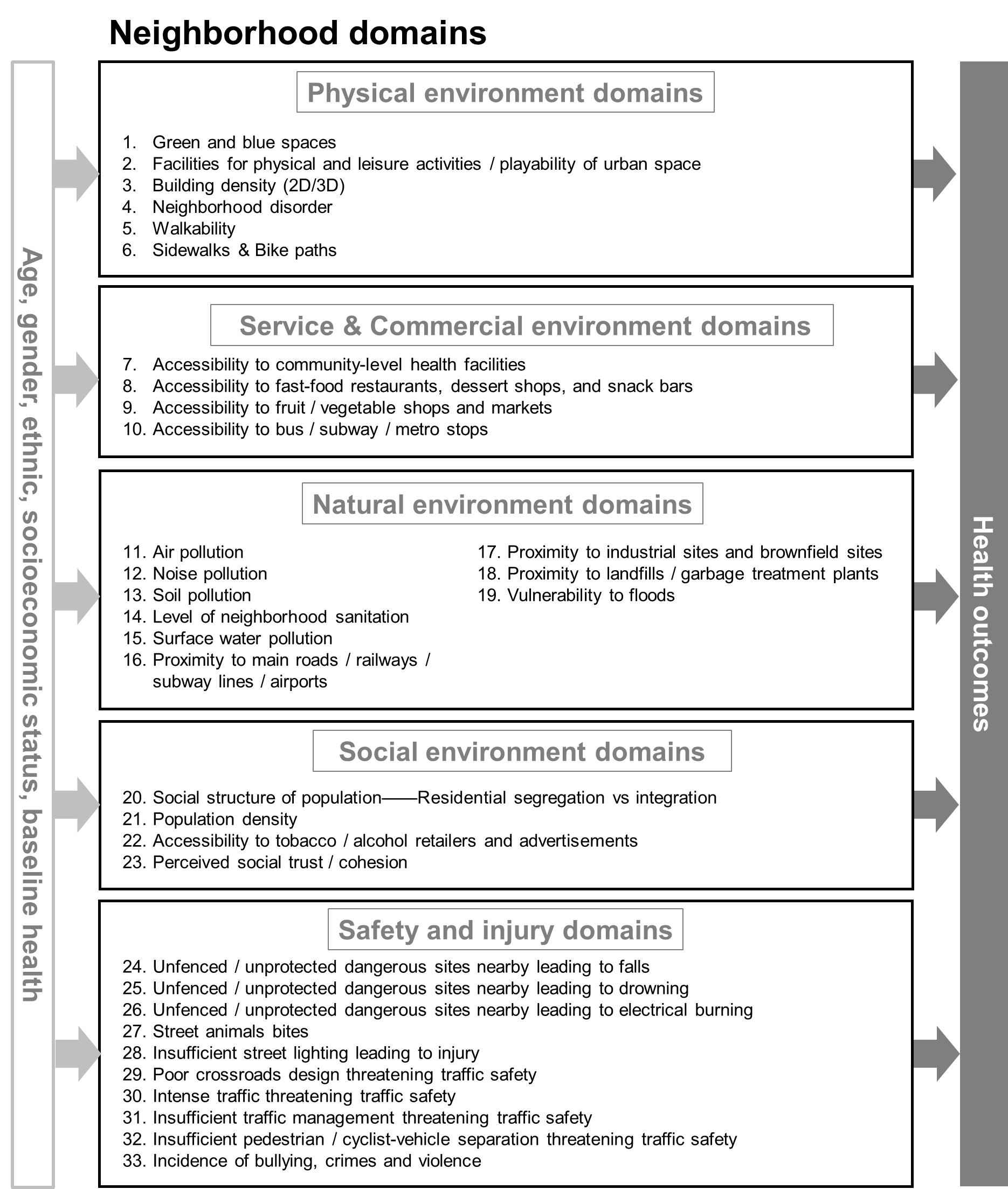
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Figure 1. The neighborhood domains

**Selection of studies into the evidence from PubMed was guided by the following principles**

**Search strategy**

For each variable, we searched the systematic review, meta-analysis, RCT (Randomized Controlled Trial), cohort studies, or case-control studies on the website of PubMed. We used keywords like ((systematic review) OR (meta analysis) OR (RCT) OR (cohort)) AND ((hazard ratio) OR (risk ratio) OR (odds ratio) OR (relative risk)) AND ((health) OR (disease)) AND (RISK FACTOR KEYWORDS). To guarantee the quality of literature, we just kept the literature from the journals which belong to the top 20% in its relevant fields. In addition, we carefully screened the systematic review and meta-analysis to examine if they assessed heterogeneity between studies and results through statistical methods and sensitivity analysis.

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| **Risk factors**  **(Change difficulty)** | **Explanation**  [ I ]: Inside the neighborhood  [O]: Outside the neighborhood | **Evidence** | | **Data** |
| **Key health outcomes** | **Contents**  **[Grade/study design/country]** |
| **A. Physical environment domains** | | | | |
| **1. Green and blue spaces**  **(Medium)** | **[I/O]**  1. The green and blue space proportions (m2/km2);  2. The tree canopy proportions (m2/km2);  3. Tree proportions in human’s eyes (measured by street view image);  4. Normalised difference vegetation index (NDVI) in the neighborhood (Dimensionless)  All the four measurements can be used in the neighborhood and in the 300/ 500-m buffer.  **[O]**  1. The distance to the nearest green / blue space (≥5000 m2) (m);  2. The presence of green / blue spaces in 300/ 500-m buffer (Y/N). | All-cause mortality | **Seven** (78%) of the nine studies found a significant inverse relationship between an increase in surrounding greenness per 0·1 NDVI in a buffer zone of 500 m or less and the risk of all-cause mortality, but two studies found no association. The pooled HR for all-cause mortality per increment of 0.1 normalised difference vegetation index (NDVI) within a buffer of 500 m or less of a participant’s residence was 0.96 (95% CI 0.94–0.97; I², 95%). (Rojas-Rueda et al., 2019)  **[Meta-analysis, including 9 cohort studies]** | Street view image/ remote sensing image/ land use data |
| Cardiovascular diseases, all-cause mortality | The systematic review found that **the majority of studies** show a reduction of the risk of cardiovascular disease (CVD) mortality in areas with higher residential greenness [RR=0.96 (0.94, 0.97)]. Evidence of a reduction of all-cause mortality is more limited [RR=0.92 (0.87, 0.97)], and no benefits of residential greenness on lung cancer mortality are observed.  (Gascon et al., 2016)  **[Systematic review & meta-analysis, including 7 ecological studies, 3 cohort studies, and 2 cross-sectional studies]** |
| Birth weight | A systematic review and meta-analyses were conducted to synthesize **thirty-seven** studies on the association between residential green and blue spaces and pregnancy outcomes. Meta-analyses were performed for birth weight (BW), small for gestational age (SGA), low birth weight (LBW) and preterm birth (PTB). Increase in residential greenness was statistically significantly associated with higher BW [β = 0.001, 95%CI: (<0.001, 0.002)] and lower odds of SGA [OR = 0.95, 95%CI: (0.92, 0.97)]. Associations between green space and LBW and PTB were as hypothesized but not statistically significant (Akaraci et al., 2020).  **[Systematic review & meta-analysis, including thirty-seven studies]** |
| Type 2 diabetes mellitus | More green space tended to be associated with lower type 2 diabetes mellitus risk/prevalence (**n = 6**, OR = 0.90; 95% CI,  0.8–1.0; I2 = 95%).  (Den Braver et al., 2018)  **[Systematic review & meta-analysis, including 6 studies]** |
| **2. Facilities for physical and leisure activities / playability of urban space**  **(Easy)** | Relevant facilities: gym, playground (especially for children), stadium, swimming pool, facilities for physical exercises alongside the street  **[I]**  The presence / density of facilities and open space in the neighborhood (Y/N; facilities/ km2);  the facility richness (facility types per km2)  **[O]**  The distance to the nearest facility or open space (m), facility richness (facility types per km2) in 300/ 500-m buffer. | Physical activity level | Positive environmental correlates of PA, ranked by strength of evidence, were: walkability (p < .001), safety  from crime (p < .001), overall access to destinations and services (p < .001), **recreational facilities (p < .001)**, parks/  public open space (p = .002), and so on (P-values were interpreted as follows: .05 to .01 – evidence of an association; <.01 – strong evidence of an association; and <.001 – very strong evidence of an association).  (Barnett et al., 2017)  **[Systematic review & meta-analysis, including 100 studies]** | Street view image / High spatial resolution remote sensing image |
| **3. Building density:**  **plot ratio (for 2D) /**  **floor area ratio (for 3D)**  **(Difficult)** | **[I]**  1. For 2D, plot area, refers to the base area of buildings, divided by the area of the neighborhood (m2/km2);  2. For 3D, floor area ratio, refers to the total floor area of buildings, divided by the area of the neighborhood (m2/km2).  **[O]**  The building density (2D/3D) in 100/ 300-m buffer (m2/km2). | Birth weight | The odds ratio (OR) was 1.2 (95%CI: 1.1-1.4) for low birth weight in association with an IQR increase of building density (2D) in 300-meter buffer (IQR was 138.7 m2 built / km2). (Nieuwenhuijsen et al., 2019)  **[Six European birth cohorts based in nine cities]** | High spatial resolution remote sensing image / building data / Google map |
| Obesity, and overweight | Girls and boys who lived in neighborhoods with the higher (but not highest) residential density in 1998 showed lower obesity risk (OR=0.54 [95% CI=0.30–0.98]) and overweight risk (OR=0.54 [95% CI=0.30–0.95]) in 2007, respectively.  (Jia et al., 2019)  **[Cohort study, 9440 kindergarteners, USA]** |
| **4. Neighborhood disorder**  **(Difficult)** | **[I]**  The deterioration of landscape or the overall disorder of appearance of neighborhood, such as building façade damage / fouling / graffiti, unapproved construction, abandoned buildings, broken public space, unhardened road, abandoned cars, illegal street stalls, and so on. | Mental health outcomes, substance abuse, and overall health | The meta-analysis found that perceived disorder was consistently associated with mental health outcomes, as well as substance abuse, and measures of overall health. This supported the psychosocial model of disadvantage, in which stressful contexts impact mental health and related sequelae. There was no consistent evidence for disorder's impact on physical health or risky behavior.  (O’Brien et al., 2019)  **[Meta-analysis, including 198 studies]** | Street view image |
| Sedentary behavior | Insecurity during daytime hours, crime incidence, physical and social disorders, a higher neighborhood socioeconomic level, and time spent with peers were associated with higher levels of sedentary behavior.  (Parajára et al., 2019)  **[Systematic review, including 16 studies]** |
| Drug use, chronic stress, depression and hopelessness, and infectious diseases | These results highlight the importance of viewing drug use, chronic stress, depression and hopelessness, and infectious diseases such as HIV and hepatitis C as interlinked epidemics that are fostered by neighborhood social and physical disorder.  (Latkin et al., 2007)  **[Cohort study, 838 participants, USA]** |
| **5. Walkability**  **(Medium)**  \* Walkability focuses on the quality of walkable streets created by various facilities along the streets, instead of focusing on road safety | **[I/O]**  A walkability index in the neighborhood and in 300/ 500-m buffer  \*The walkability index can incorporate part of indicators below: land use mix, street connectivity, net residential density, retail ﬂoor area ratios, population density, number of accessible destinations (banks, grocery stores, restaurants, etc.) and so on. | Type 2 diabetes mellitus | Higher neighbourhood walkability was associated with lower type 2 diabetes mellitus risk/prevalence (**n = 8**, OR = 0.79; 95% CI, 0.7–0.9; I2 = 92%).  (Den Braver et al., 2018)  **[Systematic review & meta-analysis, including 8 studies]** | Street view image/ land use data/ census data/ road network data/ walk score |
| Physical activity level | Positive environmental correlates of PA, ranked by strength of evidence, were: **walkability (p < .001)**, safety  from crime (p < .001), overall access to destinations and services (p < .001), recreational facilities (p < .001), parks/  public open space (p = .002), and so on (P-values were interpreted as follows: .05 to .01 – evidence of an association; <.01 – strong evidence of an association; and <.001 – very strong evidence of an association).  (Barnett et al., 2017)  **[Systematic review & meta-analysis, including 100 studies]** |
| Obesity, type 2 diabetes, and hypertension | Meta-analysis found **strong** evidence for longitudinal relationships of neighbourhood walkability with obesity **(p=0.003)** and T2D outcomes (p=0.003). Very strong evidence was found for the impact of walkability on hypertension (p<0.001) (P-values were interpreted as follows: .05 to .01 – evidence of an association; <.01 – strong evidence of an association; and <.001 – very strong evidence of an association)..  (Chandrabose et al., 2019)  **[Systematic review & meta-analysis, including 13 studies]** |
| Birth weight | The odds ratio (OR) was 1.2 (95%CI: 1.0-1.3) for low birth weight in association with walkability index in 300-m buffer.  (Nieuwenhuijsen et al., 2019)  **[Six European birth cohorts based in nine cities]** |
| Diabetes | High walkability was associated with lower diabetes incidence among adults aged <65 years (overall weighted incidence: 8.2vs9.2 per 1000; HR 0.85, 95% CI 0.78 to 0.93).  (Booth et al., 2019)  **[Cohort study, 958567 participants, Canada]** |
| Hypertension | Among the 1,057 propensity-score matched pairs there was a significantly lower risk of incident hypertension in the low to high vs. the low to low-walkability groups [hazard ratio = 0.46; 95% CI, 0.26, 0.81, p < 0.01].  (Chiu et al., 2016)  **[Cohort study, 2114 participants, Canada]** |
| **6.**  **Sidewalks & Bike paths**  **(Medium)**  \* Also related to safety & injuries | **[I/O]**  1.The presence / quality and materials of sidewalks and bike paths (Y/N);  2.The sidewalks / bike paths proportions in the neighborhood and in 300/ 500-m buffer  (m/km2) |  | **[No evidence from systematic review / meta-analysis / RCT / cohort studies.]** | Street view image |
| **B. Service & Commercial environment domains** | | | | |
| **7. Accessibility to community-level health facilities**  **(Medium)** | Relevant facilities:  community health center, pharmacy, clinic, AED equipment INSTEAD OF tertiary hospitals  **[I]**  The presence / density of relevant facilities in the neighborhood  (Y/N; numbers / km2)  **[O]**  The distance to the nearest relevant facility, or the presence of relevant facilities in 300/ 500-m buffer, if no relevant facilities exist in the neighborhood  (m; Y/N) | Out-of hospital cardiac arrests | The percentage of patients receiving public-access defibrillation increased from 1.1% in 2005 to 16.5% in 2013 (P<0.001 for trend). The percentage of patients who were alive at 1 month with a favorable neurologic outcome was significantly higher with public-access defibrillation than without public-access defibrillation (38.5% vs. 18.2%; adjusted odds ratio after propensity-score matching, 1.99; 95% confidence interval, 1.80 to 2.19).  (Kitamura et al., 2016)  **[Cohort study, 43762 participants, Japan]** | POI data/ Road network data |
| Perinatal mortality | Among 820 761 mothers delivering 827 504 neonates, travel distance had minimal effect on perinatal mortality. Compared with mothers travelling 0–9 km, the odds of adverse maternal outcomes was decreased for women travelling modest distances (20–49 km, odds ratio, 0.80 [95% confidence interval, 0.75–0.86]), and increased thereafter (50–99 km, 0.99 [0.89–1.10]; 200–299 km, 1.44 [1.10–1.87]; >400 km, 2.22 [1.06–4.63]). Relative to high-volume hospitals (>2500 deliveries/year), adverse maternal outcomes were less likely for hospitals with 1000–2499 (0.90 [0.86–0.95]), and roughly equivalent for hospitals with 200–499 (1.34 [1.22–1.48]) and 500–999 (1.27 [1.17–1.39]) deliveries/year.  (Aubrey-Bassler et al., 2019)  **[Cohort study, 820761 participants, Canada]** |
| Mortality | The mortality rates were 4.9% (138/2820) for those with delay and 3.2% (391/12 340) for those without delay (odds ratio [OR] 1.59, 95% confidence interval [CI] 1.30–1.93). Within the propensity-matched cohort, delay was significantly associated with mortality (OR 1.56, 95% CI 1.18–2.06), increased length of stay (incident rate ratio 1.07, 95% CI 1.01–1.11) and higher total costs (incident rate ratio 1.06, 95% CI 1.01–1.11).  (McIsaac et al., 2017)  **[Cohort study, 15160 participants, Canada]** |
| Out-of hospital cardiac arrests | The proportion of patients with a favourable neurological outcome was significantly higher in those who received public-access defibrillation than those who did not (845 [37·7%] vs 5676 [22·6%]; adjusted odds ratio [OR] after propensity score-matching, 1·45 [95% CI 1·24–1·69], p<0·0001). The proportion of patients who survived at 30 days after the OHCA was also significantly higher in those who received public-access defibrillation than those who did not (987 [44·0%] vs 7976 [31·8%]; adjusted OR after propensity score-matching, 1·31 [95% CI 1·13–1·52], p<0·0001).  (Nakashima et al., 2020)  **[Cohort study, 28019 participants, Japan]** |
| Death | Of the 16,082 patients included in this study, odds of death increased by 8.0% for every 5-mile increase in distance to the nearest trauma center (OR, 1.08; 95% CI, 1.01-1.15; P = .03). Compared with privately owned level 1 or 2 centers, odds of death increased by 49.9% when the nearest trauma center was level 3 (OR, 1.50; 95% CI, 1.06-2.11; P = .02), and by 80.7% when the nearest trauma center was publicly owned (OR, 1.81; 95% CI, 1.39-2.34; P < .001)  (Jarman et al., 2018).  **[Cross-sectional study, 16082 participants, USA]** |
| **8.**  **Accessibility to fast-food restaurants, dessert shops, and snack bars**  **(Medium)** | Relevant facilities:  fast-food restaurants, dessert shops, and snack bars  **[I/O]**  The density of relevant facilities in the neighborhood and in 300/ 500-m buffer  (numbers / km2) | Obesity | Although most studies suggested a positive association between fast-food restaurants (FFR) access and weight‐related outcomes, **none of the meta‐analyses demonstrated significant results.** The pooled odds ratio for the presence of FFRs and overweight/obesity was 1.01 (95% CI, 0.97‐1.05) based on 13 included studies. The pooled odds ratio for the number of FFRs and overweight/obesity was 1.00 (95%CI, 0.99‐1.01) based on 15 included studies.  (Jia et al., 2019)  **[Systematic review & meta-analysis, including 36 studies]** | POI data/ street view image |
| Body mass index | **Six adult studies** found higher body mass index was associated with living in areas with increased exposure to fast food; four studies, however, did not find associations (Fleischhacker et al., 2011).  **[Systematic review, including 40 studies]** |
| Obesity | This model revealed an association between neighbourhood socio-economic deprivation score and obesity (OR=1.014, 95%CI 1.004–1.025), as well as with the presence of fast-food restaurants at a walkable distance from the residence (OR=1.37, 1.06–1.77).  (Ribeiro et al., 2019)  **[Cohort study, 5203 participants, Portugal]** |
| Coronary artery calcification (CAC) | Each 1-SD increase in percentage of convenience stores was associated with a 1.34 higher odds of developing CAC (95% CI: 1.04, 1.72) after adjusting for individual- and neighborhood-level covariates; however, there was no significant association between increased percentage of fast-food chain restaurants and developing CAC (odds ratio=1.15; 95% CI: 0.96, 1.38).  (Kelman et al., 2019)  **[Cohort study, 5115 participants, USA]** |
| **9.**  **Accessibility to fruit / vegetable shops and markets**  **(Medium)** | **[I]**  The presence / density of fruit / vegetable shops and markets in the neighborhood  (none/≥1; numbers / km2)  **[O]**  The distance to the nearest fruit / vegetable shop and market, or the presence of fruit / vegetable shops and markets in 300/ 500-m buffer, if none exists in the neighborhood  (m; none/≥1) | Less overweight / obese | **Three studies** reported an association between FVM access and weight‐related behaviours. **Three studies** reported a negative association between the distance to the nearest fruit and vegetable markets (FVMs) and BMI. The review still found a negative association between access to FVM in children's residential and school neighbourhoods and weight‐related behaviours and an inconclusive association between FVM access and overweight or obesity (Yang et al., 2020).  **[Systematic review, including 8 cross‐sectional studies, 2 longitudinal studies, and**  **1 ecological study]** | POI data/ street view image |
| Lower mortality | Lower subjective availability of food stores (selling fruit and vegetables) within a 500-m or 1-km radius of a person’s residence was significantly associated with increased mortality. Compared with participants reporting the highest availability, the age- and sex-adjusted HR for those reporting the lowest availability was 1.28 (95% CI: 1.04–1.58; p = 0.02).  (Tani et al., 2018)  **[Cohort study, 49511 participants, Japan]** |
| **10. Accessibility to bus / subway / metro stops**  **(Difficult)** | **[I]**  The presence / density of bus / subway / metro stops in the neighborhood  (Y/N; numbers / km2)  **[O]**  The distance to the nearest bus / subway / metro stop, or the presence of bus / subway / metro stops in 300/ 500-m buffer, if none exists in the neighborhood  (m; Y/N) | Low birth weight | The odds ratio (OR) was 0.8 (95%CI: 0.7-1.0) for low birth weight in association with presence of bus stops in 500-m buffer.  (Nieuwenhuijsen et al., 2019)  **[Six European birth cohorts based in nine cities]** | POI data / Google map |
| **C. Natural environment domains** | | | | |
| C.1 Environmental pollution | | | | |
| **11.**  **Air pollution**  **(Difficult)** | **[I]**  Concentration of PM2.5, PM10, NOx, O3  (μg/m3) | All-cause mortality, cardiovascular mortality, and respiratory mortality | On average, an increase of 10 μg per cubic meter in the 2-day moving average of PM10 concentration, which represents the average over the current and previous day, was associated  with increases of 0.44% (95% confidence interval [CI], 0.39 to 0.50) in daily all-cause mortality, 0.36% (95% CI, 0.30 to 0.43) in daily cardiovascular mortality, and 0.47% (95% CI, 0.35 to 0.58) in daily respiratory mortality. The corresponding increases in daily mortality for the same change in PM2.5 concentration were 0.68% (95% CI, 0.59 to 0.77), 0.55%  (95% CI, 0.45 to 0.66), and 0.74% (95% CI, 0.53 to 0.95).  (Liu et al., 2019)  **[Multicentre time-series study, 652 cities around the world]** | Air quality data/ high spatial resolution remote sensing image |
| IHD, stroke, COPD, LC, and ALRI | We developed a fine particulate mass–based RR model that covered the global range of exposure by integrating RR information from different combustion types that generate emissions of particulate matter. assessments. The percent PAF attributable to AAP exposure varied among countries from 2 to 41 for IHD, 1 to 43 for stroke, < 1 to 21 for COPD, < 1 to 25 for LC, and < 1 to 38 for ALRI.  (Burnett et al., 2014)  **[Meta-analysis, including over 90 cohort studies]** |
| Hospital admission | Air pollution was noted to have an excessive risk of 3.46 (95%CI, 1.67, 5.27) of total hospital admissions. Cardiovascular admission was noted to have an increased risk of hospitalization for PM2.5 of 1.5 to 2.0; PM10 (1.007 to 2.7); NO2 (1.04 to 1.17) and SO2 (1.007). For respiratory admission, PM2.5 can cause an increased risk of hospitalization by 1.1 to 1.8; PM10 (1.007 to 1.13); NO2 (1.08 to 1.94) and SO2 (1.02). While O3 have minimal effect on COPD and stroke, CO does not influence in the effect of these hospitalization (Ab Manan et al., 2018).  **[Systematic review, including 22 studies**] |
| **12.**  **Noise pollution**  **(Difficult)** | **[I]**  Noise levels for 24 hours and for night  (dB) | Diabetes | The review observed a 6% (95% confidence interval (CI): 3%, 9%) increase in the risk of diabetes mellitus per 5 dB increase in noise exposure regardless of its source. Source-specific analyses were suggestive for stronger associations for air traffic noise (combined odds ratio: 1.17; 95% CI: 1.06, 1.29 per 5 dB increase in exposure) flowed by road traffic noise (combined odds ratio: 1.07; 95% CI: 1.02, 1.12).  (Zare et al., 2018)  **[Systematic review & meta-analysis, including 9 studies——five prospective cohorts, two cross-sectional and two case-control studies]** | Questionnaire / Noise mapping |
| Cardiovascular diseases | No increase in risk of cardiovascular diseases was found below 60 dB(A) for the average A-weighted sound pressure levels during the day. An increase in risk was found with increasing noise levels above 60 dB(A) thus showing a dose-response relationship.  (Babisch et al., 2008)  **[Meta-analysis, including five analytical (prospective case-control and cohort) and two descriptive (cross-sectional) studies]** |
| **13.**  **Soil pollution**  **(Difficult)** | **[I]**  The presence of soil pollution in the site of neighborhood  (Y/N; mg/kg pollutants in soil) | Overall cancer, lung cancer | Overall cancer risk was significantly associated with a doubling of 24-h cadmium excretion (hazard ratio 1·31 [95% CI 1·03–1·65], p=0·026. Population-attributable risk of lung cancer was 67% (95% CI 33–101) in the high-exposure area, compared with that of 73% (38–108) for smoking. For lung cancer, adjusted hazard ratio was 1·70 (1·13–2·57, p=0·011) for a doubling of 24-h urinary cadmium excretion, 4·17 (1·21–14·4, p=0·024) for residence in the high exposure area versus the low-exposure area, and 1·57 (1·11–2·24, p=0·012) for a doubling of cadmium concentration in soil.  (Nawrot et al., 2006)  **[Cohort study, 994 participants, Blegium]** | Municipal management data  (Soil pollution data usually responsible by the urban environmental protection department) |
| Fraction | Across the ten districts, mean cadmium concentration in soil ranged from 0·8 to 14·7 mg/kg, and from 0·1 to 4·0 mg/kg dry weight in vegetables. In postmenopausal women, a two-fold increase in urinary cadmium correlated with 0·01 g/cm2 decrease in bone density (p<0·02). The relative risks associated with doubled urinary cadmium were 1·73 (95% CI 1·16–2·57; p=0·007) for fractures in women and 1·60 (0·94–2·72, p=0·08) for height loss in men.  (Staessen et al., 1999)  **[Cohort study, 1014 participants, Belgium]** |
| Mortality, cancer incidence, and stroke | All cause cohort mortality was  lower than expected in both villages, although there was excess cancer incidence in both Shipham (SIR 167, 95% confidence interval (95% CI) 106 to 250) and Hutton (SIR 167, 95% CI 105 to 253). There was an excess of mortality from hypertension, cerebrovascular disease, and nephritis and nephrosis, of borderline significance, in Shipham (SMR 128, 95% CI 99 to 162).  (Elliott et al., 2000)  **[Cohort study, 918 participants, UK]** |
| Wheeze, asthma, and airway inflammation | The soil silt content (2–20 μm particle size) of the residential  area at birth was associated with childhood wheeze (adjusted OR 1.20, 95% CI [1.05; 1.37]), wheeze without a cold (1.41 [1.18; 1.69]), doctor-diagnosed asthma (1.54 [1.04; 2.28]), lung function (FEV1: beta −0.025 [−0.047;−0.001]) and airway inflammation (FENO: beta 0.15 [0.03; 0.27]) at age five, but not with allergic status or eczema.  (Devereux et al., 2014)  **[Cohort study, 1015 participants, UK]** |
| intellectual disability of infants | We found a significant positive association between mild intellectual disability and soil mercury (p=0.007). For severe intellectual disability, there was a significant positive association with the soil arsenic and lead (p=0.025).  (McDermott et al., 2014)  **[Cohort study, 10051 participants, USA]** |
| **14.**  **Level of neighborhood sanitation**  **(Medium)** | **[I/O]**  1. Availability to dustbins, the presence of waste disposal services in the neighborhood and in the 300/ 500-m buffer  2. Presence of solid waste or trash piles in the neighborhood and in the 300/ 500-m buffer  3. Presence of open gutters, open sewers, and other liquid wastes in the neighborhood and in the 300/ 500-m buffer  (Y/N). | Pro-social behavior | Parent perceptions of neighborhood cleanliness were associated with pro-social behavior (p<0.001) ([Edwards and Bromfield, 2009](https://www.sciencedirect.com/science/article/pii/S1353829215000155#bib48))  **[Cohort study, 4983 four-to-five-year old children growing up in 257 neighborhoods, Australia]**  **[No systematic review/meta-analysis/cohort study]** | Questionnaire / Street view image |

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| **15.**  **Surface water pollution**  **(Difficult)** | **[I/O]**  The presence of surface water pollution (Landscape water, rivers and lakes) in the neighborhood, and in the 300/ 500-m buffer, which is recognized by eyes or monitoring data.  (Y/N) |  | **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Street view data |
| C.2 Proximity to pollution sources | | | | |
| **16.**  **Proximity to main roads / railways / subway lines / airports**  **(Difficult)** | **[O]**  The distance to main roads/ railways / subway lines / airports, or the presence of facilities above in 100/ 300-m buffer  (km; Y/N) | Type 2 diabetes | The findings from the meta-analysis suggested residential proximity to major roadways significantly increased type 2 diabetes risk (Unadjusted RR = 1.24, 95% CI 1.07–1.44, p = 0.001). After adjusting for possible confounding factors, residential proximity to major roadways independently increased type 2 diabetes risk (Adjusted RR = 1.12, 95% CI 1.03–1.22, p = 0.01). Therefore, the meta-analysis suggested that residential proximity to major roadways could significantly increase risk of type 2 diabetes, and it’s an independent risk factor of type 2 diabetes (Zhao et al., 2017).  **[Meta-analysis, including eight individual studies with 158,576 participants]** | Road network data/ POI data |
| Dementia, Parkinson’s disease | The adjusted hazard ratio (HR) of incident dementia was 1·07 for people living less than 50 m from a major traffic road (95% CI 1·06–1·08), 1·04 (1·02–1·05) for 50–100 m, 1·02 (1·01–1·03) for 101–200 m, and 1·00 (0·99–1·01) for 201–300 m versus further than 300 m (p for trend=0·0349) (Chen et al., 2017).  **[Cohort study,6.6 million participants; Ontario, Canada]** |
| Cardiovascular disease | High density traffic, road proximity and high density of fast food restaurants were associated with major CVD outcomes (Malambo et al., 2016).  **[Systematic review, including 18 cross-sectional studies and one longitudinal study]** |
| Low birth weight | Living within 200 m of major roads was associated with a 46% increase in term Low birth weight (LBW) risk; an interquartile range increase in heat exposure with an 18% increase (Dadvand et al., 2014).  **[Cohort study, 6438 singleton term births; Barcelona, Spain]** |
| **17.**  **Proximity to industrial sites and brownfield sites**  **(Difficult)** | **[O]**  The distance to industrial sites and brownfield sites, or the presence of sites above in 100/ 300-m buffer  (km; Y/N) | Respiratory problems, eye irritations and dermatological problems | There was high level of air pollution with mean SO2 concentration of 115.2 μg/m3 at site I and 28.13 μg/m3 at site II when compared. Similarly, NOx concentration at site I was 117.09 μg/m3 when compared with control site II where it was found to be 19.46 μg/m3 with high prevalence of diseases particularly, respiratory problems, 97% suffered from eye irritations and 95% suffered from dermatological problems among population living in the neighborhood of cement factory at site I (Mehraj et al., 2013).  **[Case-control study, Khrew, India]** | Land use data / POI data |
| Adverse reproductive outcomes | There is suggestive evidence from the post-1990 literature that residential proximity to polluted sites (including landfills, hazardous waste sites and industrial facilities) might contribute to adverse reproductive outcomes, especially congenital malformations and low birth weight (Kihal-Talantikite et al., 2017).  **[Systematic review, including 10 cohort studies and 18 case–control studies]** |
| Respiratory diseases | During the 3-year follow-up, the risk of hospitalization for all diagnoses (Hospitalization Hazard Ratio, HHR = 1.55; 95% CI: 1.24–1.95) and for respiratory diseases (HHR = 1.80; 95% CI: 1.14–2.86) was greater in the children living close (<2 km) to the chipboard industries, with respect to the children who lived at ≥2 km from any wood factory. The children living close to the smaller wood factories were also at increased risk of hospitalization for respiratory diseases (HHR = 1.74; 95% CI: 1.06–2.85) (Marchetti et al., 2014).  **[Cohort study, 3854 participants; Viadana, Italy]** |
| **18.**  **Proximity to landfills / garbage treatment plants**  **(Difficult)** | **[O]**  The presence of landfills / garbage treatment plants in 100/ 300/ 500-m buffer, the distance to the nearest site above  (Y/N; km) | Adverse reproductive outcomes | There is suggestive evidence from the post-1990 literature that residential proximity to polluted sites (including landfills, hazardous waste sites and industrial facilities) might contribute to adverse reproductive outcomes, especially congenital malformations and low birth weight (Kihal-Talantikite et al., 2017).  **[Systematic review, including 10 cohort studies and 18 case–control studies]** | Municipal management data/medium spatial resolution remote sensing image / Street view image/ POI data |
| C.3 Natural disasters | | | | |
| **19.**  **Vulnerability to floods**  **(Difficult)** | **[I/O]** (km) |  | **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Municipal management data |
| **D. Social environment domains** | | | | |
| **20.**  **Social structure of population**  **——Residential segregation vs integration**  **(Difficult)** | **[I]**  The presence of segregation from the aspect of Ethnicity/race, income level (income distribution and poverty prevalence), employment rate, educational level, etc. in the neighborhood  (Y/N) | Pregnancy outcomes, mortality, etc. | Thirty-nine identified studies test an association between segregation and health outcomes. The health effects of segregation are relatively consistent, but complex. Isolation segregation is associated with poor pregnancy outcomes and increased mortality for blacks, but several studies report health-protective effects of living in clustered black neighborhoods net of social and economic isolation (Kramer & Hogue., 2009).  **[Review, including 17 cross-sectional ecologic studies, 16 cross-sectional multilevel studies, 5 follow-up data, and 1 time-series cross-sectional ecologic design]** | Census data |
| Low birth weight | Forty-two articles examined associations between segregation and adverse birth outcomes among Black and White mothers separately. Meta-analyses showed that among Black mothers, exposure was associated with increased risk of preterm birth (OR = 1.17, 95% CI = 1.10, 1.26), and low birth weight (OR = 1.13, 95% CI=1.06, 1.21), and Black racial composition was associated with increased risk of preterm birth (OR = 1.20, 95% CI=1.05, 1.37), among those living in most- compared to least-segregated neighborhoods. Few studies were conducted among White mothers and only exposure was associated with increased risk of preterm birth and low birth weight (Mehra et al., 2017).  **[Systematic review, including 42 articles examined associations between segregation and adverse birth outcomes among Black and White mothers separately]** |
| Cardiometabolic risk | Associations of segregation with cardiometabolic risk (CMR) among blacks remained (high vs low segregation: mean difference 0.17 SD units, 95% CI 0.02 to 0.32; medium vs low segregation: mean difference 0.18 SD units, 95% CI 0.03 to 0.33) (Mayne et al., 2019).  **[Cohort study, 5015 participants, USA]** |
| **21. Population density**  **(Difficult)** | **[I]**  The total population proportion by the area of the neighborhood  (population/km2) | Traffic crash | In 6 of the 15 studies, the frequency of pedestrian traffic crashes and the population density were assessed. Several independent variables, such as population, population density and log of population density were used. In 5 studies, the correlation of frequency of pedestrian traffic crashes and the mentioned independent variables was statistically significant. In a study, the significance level was reported to be higher than that in other studies (P < 0.0001) ([Moradi](https://www.ncbi.nlm.nih.gov/pubmed/?term=Moradi%20A%5BAuthor%5D&cauthor=true&cauthor_uid=28144600) et al., 2016).  **[Systematic review, including 15 observational studies]** | Census data |
| Schizophrenia | The QIMR participants (15 544; 10 197 [65.6%] women; mean [SD] age, 54.4 [13.2] years) living in more densely populated areas (people per square kilometer) had a higher genetic loading for schizophrenia (r2 = 0.12%; P = 5.69 × 10-5) (Colodro-Conde et al., 2018).  **[Cohort study, 15,544 participants, UK, Australian, Netherlands]** |
| **22.**  **Accessibility to tobacco/ alcohol retailers and advertisements**  **(Medium)** | The density of tobacco / alcohol retailers and ads  **[I]**  in the neighborhood  **[O]**  in 300/ 500-m buffer  (numbers / km2) | Alcohol consumption (if exposed to alcohol marketing) | All 12 found evidence of a positive association between level of marketing exposure and level of youth alcohol consumption. Some found significant associations between youth exposure to alcohol marketing and initiation of alcohol use (odds ratios ranging from 1.00 to 1.69), and there were clear associations between exposure and subsequent binge or hazardous drinking (odds ratios ranging from1.38 to 2.15).  (Jernigan et al., 2017)  **[Systematic review, including 12 studies]** | POI data/ street view image |
| Cardiovascular diseases (if consuming alcohol) | Moderate alcohol consumption was associated with an immediately higher cardiovascular risk that was attenuated after 24 hours, and even protective for myocardial infarction and hemorrhagic stroke (≈2–4 drinks: relative risk=30% lower risk) and protective against ischemic stroke within 1 week (≈6 drinks: 19% lower risk). In contrast, heavy alcohol drinking was associated with higher cardiovascular risk in the following day (≈6–9 drinks: relative risk=1.3–2.3) and week (≈19–30 drinks: relative risk=2.25–6.2).  (Mostofsky et al., 2016)  **[Systematic review & meta-analysis, including 23 studies]** |
| **23.**  **Perceived social trust / cohesion**  **(Difficult)** | **[I]**  The presence of community-based organizations [Group activities, the proprietors' committee, regulations of neighborhood, etc.] (Y/N);  The vacant / turnover rates of housing |  | **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Social economic data/ Questionnaire |
| **E. Safety and injury domains** | | | | |
| E.1 Physical factors | | | | |
| **24. Unfenced / unprotected dangerous sites nearby leading to falls**  **(Medium)** | **[I/O]**  The presence of unfenced / unprotected railway, construction sites, drainageway, missing manhole covers, roofs, or slippery/broken ground surfaces nearby the neighborhood, puddles on the road in the 300/ 500-m buffer  (Y/N) |  | **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Street view image / Questionnaire |
| **25. Unfenced / unprotected dangerous sites nearby leading to drowning**  **(Medium)** | **[I/O]**  The presence of unfenced / unprotected water bodies nearby the neighborhood, including swimming pools, ponds and lakes in the 300/ 500-m buffer  (Y/N) | Mortality | We found significant, reduced risks of mortality in the range of 12-17% associated with living within of water in comparison with living farther away, among all causes of death examined, except with external/accidental causes. Protective effects were found to be higher among women and all older adults than among other subjects, and protective effects were found to be highest against deaths from stroke and respiratory-related causes (Crouse et al., 2018).  **[Cohort study; 1.3 million participants, Canada]**  **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Street view image / Questionnaire |
| **26. Unfenced / unprotected dangerous sites nearby leading to electrical burning**  **(Medium)** | **[I/O]**  The presence of the tangled mess of overhead power cables, the visible/exposed wires on the ground/wall, electromagnetic radiation protection zone, radio-TV transmission facilities, electric station zone in 100/ 300-m buffer  (Y/N) |  | **[No evidence from systematic review/meta-analysis/cohort study/case-control study]** | Street view image / Questionnaire |
| **27.**  **Street animal bites**  **(Medium)** | **[I/O]**  The presence of street animals in the neighborhood, such as dogs, snakes, and scorpions  (Y/N) | Human rabies | Factors significantly associated with human rabies were: age <15 years (p = 0.05), bite by stray dog (p = 0.002), deep wound (p = 0.02), bite in the head (p = 0.001), bite by unimmunized dog (p = 0.01), no use of soap and water (p = 0.001), and no post-exposure prophylaxis (p = 0.01) (Salomao et al., 2017).  **[Case-control study, 819 cases of animal bites were registered; Maputo and Matola cities. Mozambique]**  **[No systematic review/ meta-analysis/ cohort study]** | Street view image / Questionnaire |
| **28.**  **Insufficient street lighting leading to injury**  **(Easy)** | **[I/O]**  1.The coverage percentage of street lighting in the neighborhood and in the 300/ 500-m buffer  (m2/km2);  2.The number of street lights per length of road in the 300/ 500-m buffer  (counts / km) | Road traffic crashes, injuries and fatalities | Three trials compared street lighting with an area control on total crashes; pooled rate ratio (RR) = 0.45 (95% Confidence Interval (CI) 0.29 to 0.69). Two trials compared street lighting with an area control on total injury crashes (all severities); RR = 0.78 (95% CI 0.63 to 0.97). No trials compared the number of fatal crashes with an area control. Ten trials compared street lighting with a day time control on total crashes; pooled RR = 0.68 (95% CI 0.56 to 0.83). Five trials compared street lighting with a day time control on total injury crashes; pooled RR = 0.68 (95% CI 0.59 to 0.79). Three trials compared street lighting with a day time control on fatal crashes; pooled RR = 0.33 (95% CI 0.17 to 0.66). The results from this systematic review suggests that street lighting may prevent road traffic crashes, injuries and fatalities (Beyer et al., 2009).  **[Systematic review, 18 articles (94.4% (n = 17) were cross-sectional with one being longitudinal)]** | Nightlight data/ Street view image |
| E.2 Traffic-related factors  \* This domain focuses on traffic-related factors about road safety (negative perspectives), while *walkability* and *Sidewalks & Bike paths* in physical environment domain focuses on those traffic and accessibility factors about whether to create a high-quality or comfortable urban environment (positive perspectives). | | | | |
| **29.**  **Poor crossroads design threatening traffic safety**  **(Medium)** | **[I/O]**  The presence of traffic lights, crosswalks, roundabouts, overpass / underpass, median refuge island, etc. in the neighborhood and in the 300/ 500-m buffer.  (Y/N) | Injuries | The conversion of intersections into roundabouts produced a significant 27% increase in the number of injury accidents involving bicyclists on or nearby the roundabouts. The increase was even higher for accidents involving fatal or serious injuries (41–46%). (Daniels et al., 2008)  **[Before and after observational study, a sample of 91 roundabouts; Flanders, Belgium]** | Street view image/ high spatial resolution remote sensing image |
| Traffic injury | Barriers and fences, which were designed to channel pedestrians to safe crossing areas and prevent them from running into traffic, it had been found to reduce midblock crossings and substantially decrease crash rates (Retting et al., 2003).  **[Review, including before–after, case–control, and cross-sectional studies of the effects of speed reduction, separation, or visibility enhancement measures on the occurrence of pedestrian–vehicle collisions or conflicts]** |
| **30.**  **Intense traffic threatening traffic safety**  **(Medium)**  \* Also related to air and noise pollution | **[I/O]**  The number and average speed of each type of vehicle (bus/ truck/coach/car) on the road per day in the neighborhood and in the 100/ 300-m buffer  (vehicles passing by in a day). | Cardiovascular disease | High density traffic, road proximity and high density of fast food restaurants were associated with major CVD outcomes (Malambo et al., 2016).  **[Systematic review, 18 articles (94.4% (n = 17) were cross-sectional with one being longitudinal)]** | Origin-Destination survey data/ Google map |
| Pedestrian traffic crashes | In 6 of the 15 reviewed studies, the relationship between the frequency of pedestrian-related traffic crashes and traffic volume was investigated. These studies used different indicators for traffic volumes including traffic volume, sum of annual average daily traffic, Ln (average annual daily traffic), average daily traffic flow × 1000 and Ln (daily vehicle volume). In all 6 studies, the correlation of the mentioned variables was statistically significant and the significance level ranged from P < 0.04 to P < 0.0001 (Moradi et al., 2016).  **[Systematic review, including 15 observational studies]** |
| **31.**  **Insufficient traffic management threatening traffic safety**  **(Medium)**  \* Also related to air and noise pollution | **[I/O]**  The presence of traffic management includes timing of traffic signal, signs, speed limit, traffic volume, limitation of trucks, etc. in the neighborhood and in the 300/ 500-m buffer  (Y/N) | Pedestrian and bicycle crashes | Adequately timed yellow and all-red clearance signals are necessary at traffic signals to ensure that drivers have sufficient time to clear the intersection before the display of pedestrian walk signals. One study showed that combined changes in the duration of yellow and all-red signal timing reduced the risk of pedestrian and bicycle crashes at intersections by 37% relative to control sites (Retting et al., 2003).  **[Review, including before–after, case–control, and cross-sectional studies of the effects of speed reduction, separation, or visibility enhancement measures on the occurrence of pedestrian–vehicle collisions or conflicts]** | Street view image/ high spatial resolution remote sensing image/ Questionnaire |
| **32.**  **Insufficient pedestrian / cyclist-vehicle separation threatening traffic safety**  **(Difficult)** | **[I/O]**  The presence of pedestrian / cycling-vehicle separation design in the neighborhood and in the 300/ 500-m buffer  (Y/N) | Injury from low-speed vehicle runover (LSVRO) | There are a number of modifiable vehicular, environmental, and behavioural factors associated with LSVRO injuries in young children that have been identified in the literature to date. Strategies relating to vehicle design (devices for increased rearward visibility and crash avoidance systems), housing design (physical separation of driveway and play areas), and behaviour (driver behaviour, supervision of young children) are discussed (Paul Anthikkat et al., 2013).  **[Systematic review, including 41 studies]** | Street view image/ high spatial resolution remote sensing image |
| E.3 Social factors | | | | |
| **33. Incidence of bullying, crimes and violence**  **(Difficult)** | **[I]**  The incidence of bullying, crimes and violence in the neighborhood  (incidence /km2) | Mental health and walking behavior | Four domains of neighborhood safety were identified: overall/general neighborhood safety; crime-related safety; traffic-related safety; and proxies for safety (e.g., vandalism, graffiti). Overall/general neighborhood safety appeared most relevant to mental health and physical function. Traffic-related safety was most pertinent to physical activity, while crime-related safety was more consistently associated with mental health and walking. While all safety variables were significantly associated with mental health, no significant associations were found for obesity (Won et al., 2016).  **[Systematic review, including 32 studies (71.9% were cross-sectional)]** | Questionnaire/ Street view image/ Police record |

**\* The sizes of buffers choose 300 m, 500 m, 1000 m in these domains, which refers to the distance people walk for about 5, 10, 15 minutes, respectively.**

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