Connection with SDGs	Good health and wellbeing: if the implementation of NBS provide mental health benefits, NBS contribute to improved health and wellbeing.
Opportunities for participatory data collection	The questionnaires are self-reported and as such are reported by the citizens themselves.
Additional information	
References	Brazier et al. (1992). Validating the SF-36 health survey questionnaire: a new outcome measure for primary care. BMJ; 305,160.

21.5 Cardiovascular diseases (prevalence, incidence, morbidity and mortality)

Project Name: CONNECTING Nature (Grant Agreement no. 730222)

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Prevalence, incidence, morbidity and mortality of cardiovascular diseases (CVD)	**Health and Wellbeing**
Description and justification	Accumulating evidence supports the notion that ecological features such as the diurnal cycles of light and day, sunlight exposure, seasons, and geographic characteristics of the natural environment such as altitude, latitude, and green spaces are important determinants of cardiovascular health and CVD risk (Bhatnagar, 2017). Some of the beneficial cardiovascular effects of greenery might relate to a decrease in the levels of local air pollution, increased proximity to walking spaces, or lower levels of mental stress (Bhatnagar, 2017). Recent studies and systematic reviews of empirical evidence have found support for the association between access and use of green spaces, and the prevalence and mortality of cardiovascular disease and risk, as well as for improved rates of recovery from cardiovascular disease (Gascon, Triguero-Mas, Martínez, Dadvand, Rojas-Rueda, Plasència, & Nieuwenhuijsen, 2016; Grazuleviciene, Vencloviene, Kubilius, Grizas, Dedele, Grazulevicius,Ceponiene, Tamuleviciute-Prasciene, Nieuwenhuijsen, Jones, & Gidlow, 2015a; Kuo, 2015; Pereira, Foster, Martin, Christian, Boruff, Knuiman, & Giles-Corti, 2012; Tamosiunas, Grazuleviciene, Luksiene, Dedele, Reklaitiene, Baceviciene, Vencloviene, Bernotiene, Radisauskas, Malinauskiene, Milinaviciene, Bobak, Peasey,

	& Nieuwenhuijsen, 2014; Villeneuve, Jerrett, Su, Burnett, Chen, Wheeler, & Goldberg, 2012). Tamosiunas et al. (2014) brought forth evidence for the fact that distance from and use of urban green spaces are associated to lower risk of cardiovascular disease and improved chances of recovery from coronary artery disease in a study conducted on a sample of more than 5000 people which indicated that park users living at a distance of less than 350 meters away from a park had a significantly lower risk of fatal and non-fatal CVD. Living in a city presents numerous health hazards that contribute to CVD by constituting major obstacles to physical activity (i.e., lack of exercise, sedentary lifestyle), like heavy environmental pollution, high traffic, no sidewalks, fewer “green spaces,” or open land for public use (Laslett, Alagona, Clark, Drozda, Saldivar, Wilson, Poe, & Hart, 2012). Walking in a green environment for 30 minutes on seven consecutive days, as compared to walking on a busy city street, has been found to improve recovery from coronary artery disease (Grazuleviciene et al., 2015a). For pregnant women, increase in distance to green spaces was associated to an increase in blood pressure, risk of preterm birth, and decrease of gestational age (Grazuleviciene, Danileviciute, Dedele, Vencloviene, Andrusaityte, Uždanaviciute, & Nieuwenhuijsen, 2015b). A recent study on a sample of almost 250.000 American senior adults, aged 65 and older, found that higher neighbourhood greenness was associated with reduced heart disease risk independent of socio-demographic status and neighbourhood income, although the relationship was weaker when adding in cardio-metabolic risk factors (Wang, Lombard, Rundek, Chuanhui Dong, Marinovic Gutierrez, Byrne, Toro, Nardi, Kardys, Li Yi, Szapocznik, & Brown, 2019). Pereira et al. (2012) found that those living in neighbourhoods that had a high variability in greenness had a lower risk of stroke than those in either high overall greenness or low overall greenness. Gascon et al. (2016) conducted a systematic review of research concerning the relationship between residential green spaces and mortality in adults (stroke SMR, circulatory causes SMR, lung cancer, respiratory disease, diabetes, heart disease), and concluded on support for the hypothesis that living in areas with higher amounts of green spaces reduces mortality, mainly CVD.
Definition	**CVD** generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke (Heart Disease, n.d.). They include:

high blood pressure, hypertension, arrhythmias (abnormal heart rhythms), heart failure, heart valve disease, cardiomyopathy (heart muscle disease), vascular disease (blood vessel disease).

Prevalence is a measure of the burden of disease in a population in a given location and at a particular time, as represented in a count of the number of people affected (Ward, 2013). Prevalence is a function of both the incidence and duration of disease. In turn, duration is affected by the availability and effectiveness of curative treatments and by survival times of afflicted individuals (National Institutes of Health. Autoimmune diseases coordinating committee—Autoimmune diseases research plan, n.d.).

Incidence represents how quickly new cases occur relative to population size and the passage of time. Incidence is calculated as the ratio of the number of new cases of a disease occurring within a population during a given time to the total number of people in the population (National Institutes of Health. Autoimmune diseases coordinating committee—Autoimmune diseases research plan, n.d.). While the prevalence represents the existing cases of a disease, the incidence reflects the number of new cases of disease within a certain period and can be expressed as a risk or an incidence rate (Noordzij, Dekker, Zoccali, & Jager, 2010).

Morbidity refers to the state of being diseased and the severity and impact of disease. Like prevalence, measures of morbidity represent the burden that a disease places on a population. In contrast to prevalence, morbidity estimates use more complex approaches that are potentially more informative than a simple count of cases (National Institutes of Health. Autoimmune diseases coordinating committee—Autoimmune diseases research plan, n.d.).

Mortality measures deaths caused by a specific disease, deaths resulting from treatment for a specific disease, or deaths in which a specific disease is a contributing factor, but not the primary cause. Mortality is the number of deaths due to a disease during a specific time divided by the number of persons in that population at the beginning of the time period. Hence, mortality is a rate in the sense that it represents how quickly deaths occur relative to population size and the passage of time. It can be interpreted as reflecting the risk of death from a particular cause faced by persons within the population being studied (National Institutes of Health. Autoimmune diseases

	coordinating committee—Autoimmune diseases research plan, n.d.).
Strengths and weaknesses	+ many recent studies indicating that even in modern urban environments of sprawling metropolises and congested conurbations, residential proximity to vegetation is associated with lower levels of stress, diabetes mellitus, stroke, and CVD (Dadvand, Bartoll, Basagaña, Dalmau-Bueno, Martinez, Ambros, Cirach, Triguero-Mas, Gascon, Borrell, & Nieuwenhuijsen, 2016; James, Banay, Hart, & Laden, 2015) - limited empirical evidence as to the contribution of mechanisms involved in the beneficial cardiovascular effects of greenery (i.e., decrease in the levels of local air pollution, increased proximity to walking spaces, lower levels of mental stress) (Bhatnagar, 2017)
Measurement procedure and tool	☒ *Quantitative*: epidemiological data (Health Data Administration/Cities) Incidence of CVD relevant for measurement, along prevalence, as it indicates the number of new cases of disease within a certain period (for example, since the implementation of the NBS), and can be expressed as a risk or an incidence rate. Recommended variables for CVD: o prevalence/incidence/morbidity/mortality of CVDs (coronary artery disease/coronary heart disease/narrowing of the arteries; heart attack; abnormal heart rhythms, or arrhythmias; heart failure; heart valve disease; congenital heart disease; heart muscle disease/cardiomyopathy; pericardial disease; aorta disease and Marfan syndrome; vascular disease/blood vessel disease) o blood pressure/hypertension HBP o stroke/cerebrovascular accident CVA o CRP (C-Reactive protein) levels (blood test)
Scale of measurement	-
Data source	
Required data	✓ Essential: NBS characteristics for each city/site
Data input type	Quantitative
Data collection frequency	Before and after NBS implementation (longitudinal)
Level of expertise required	☒ Methodology and data analysis requires high expertise in psycho-social research ☒ Quantitative data collection requires no expertise
Synergies with other indicators	P3 Perceived Quality of Green Spaces Sc5.1 Perceived Safety

	Sc5.2 Actual Safety SC7 Geographical Access to NBS SC8 Perceived Access to NBS HW3 General Wellbeing and Happiness HW4 Life expectancy and healthy life years expectancy HW8 Incidence of obesity/obesity rates (adults and children) HW10 Prevalence, incidence, morbidity of chronic stress HW11 Mental Health Wellbeing: Depression and Anxiety HW12 Restoration-Recreation: Enhanced physical activity and meaningful leisure
Connection with SDGs	Goal 3. Ensure healthy lives and promote well-being for all at all ages Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
Opportunities for participatory data collection	-
Additional information	
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