interactions, which may in turn lead to cardiovascular diseases. For instance, physical activity and a healthy lifestyle can be promoted by better access to public green spaces and public transport, and by improving street safety.

Mental health

Complex environments, including both environmental hazards and the social environment, have been shown to affect mental health and cause behavioural disorders. Wang et al. (2023) conducted exposome-wide association analyses in a twin cohort and found that more than half of the exposures were significantly associated with depressive symptoms in young adulthood. More specifically, influences from the family domain and the social exposome were particularly important drivers of depressive symptoms in late adolescence and early adulthood. Other environmental exposures such as environmental noise can also affect mental health, possibly via sleep alterations and effects on the central nervous system (Hahad et al., 2024). In a recent study conducted near a military airport, Wicki et al. (2024) showed a strong link between exposure to loud military aircraft noise events and symptom exacerbations and medical prescriptions in patients with psychiatric treatments.

NCDs and health disparities

The impact of environmental contaminants on health varies across regions, sexes, and age groups. The contribution of NCDs compared to infectious diseases is greatest in the adult and elderly population, and in high-income countries. However, the health impacts of modifiable environmental conditions globally have a disproportionate effect on low- and middle-income countries. With the epidemiological transition to an increasing prevalence of NCDs in developing countries and with a growing proportion of the population living in urban settings, environmental inequities are likely to grow in the future. Promoting healthy living environments is therefore essential in reducing mortality and morbidity from chronic diseases worldwide and in stemming the ever-increasing associated healthcare costs (Hajat & Stein, 2018).

4.4. Exposome and infectious diseases

Environmental exposures, including exposures to endocrine disrupting chemicals (EDCs), can influence an individual's susceptibility to infection. Suspected to exert their effects via hormonal pathways, certain EDCs, including phthalates, bisphenols, organochlorine pesticides, and perfluorinated alkane

substances (PFAS), stand out as potential triggers for aggravated infections. Compelling evidence suggests that exposure to these substances may impact the immune defence mechanisms, potentially heightening vulnerability to infectious diseases such as COVID-19 (Tsatsakis et al., 2020).

Epidemiological findings underscore the significance of these concerns, particularly in the case of children exposed to PFAS, revealing, as they do, diminished immune responses to routine vaccines (Grandjean et al., 2012). Moreover, such exposure is associated with an increased risk of developing infectious diseases. As the exposome framework broadens our understanding of environmental influences on health, the complexity of the links between pollutants and infectious diseases clearly warrants careful exploration. The identification of these links not only furthers our understanding of disease pathways but also serves to underscore the importance of mitigating exposures to foster a resilient and responsive immune system in the face of infectious challenges.

Exposure to outdoor air pollution may impact the transmission, susceptibility to, and severity of infectious diseases such as COVID-19. Air pollution might affect the viability and movement of viral particles, potentially increasing the risk of infection by suppressing lung defences, altering receptor recognition, and affecting expression levels of key proteins involved in viral entry. Chronic exposure to air pollution could also worsen COVID-19 outcomes by exacerbating underlying chronic conditions and impairing immune function. A recent study in Catalonia (COVIDCAT) found that air pollution exposure was positively associated with the magnitude of antibody response among seropositive participants and that exposure to NO_2 and $PM_{2.5}$ was positively associated with COVID-19 disease and with the severity of the disease (Kogevinas et al., 2021).