

The harm paradigm for IAQ and IEQ

Benjamin Jones

*Department of Architecture and Built Environment
University of Nottingham, NG7 2RD
United Kingdom
benjamin.jones@nottingham.ac.uk*

ABSTRACT

Exposure limit values (ELVs) are widely used to regulate indoor air quality (IAQ), but authorities set different values for the same contaminants. ELVs establish concentration thresholds without directly accounting for health impacts across a population, leading to inconsistent protection from chronic harm. A harm-based approach offers a more effective alternative. Disability-Adjusted Life Years (DALYs) quantify disease burden, where one DALY equals one year of healthy life lost. The new Harm Intensity metric links contaminant concentration to years of life lost from premature mortality and morbidity. By multiplying a contaminant's concentrations by its Harm Intensity, total population harm is estimated, allowing direct comparison of health impacts across contaminants. Contaminants are then ranked by the harm they cause, the most harmful are targeted for removal and regulated, and all others are ignored. This method prioritizes contaminants based on actual health risks rather than arbitrary limits, supporting more effective IAQ management and regulation.

The DALY and Harm Intensity metrics could also be used to consider the health impacts of factors that affect indoor environment quality (IEQ), such as lighting, thermal comfort, and acoustics.

KEYWORDS

DALY, exposure, population, regulation, standard, harm budget, ELV