DISABILITY-ADJUSTED LIFE YEAR

DALY

DISABILITY-ADJUSTED LIFE YEARS (DALYs), IAQ AND ERVs

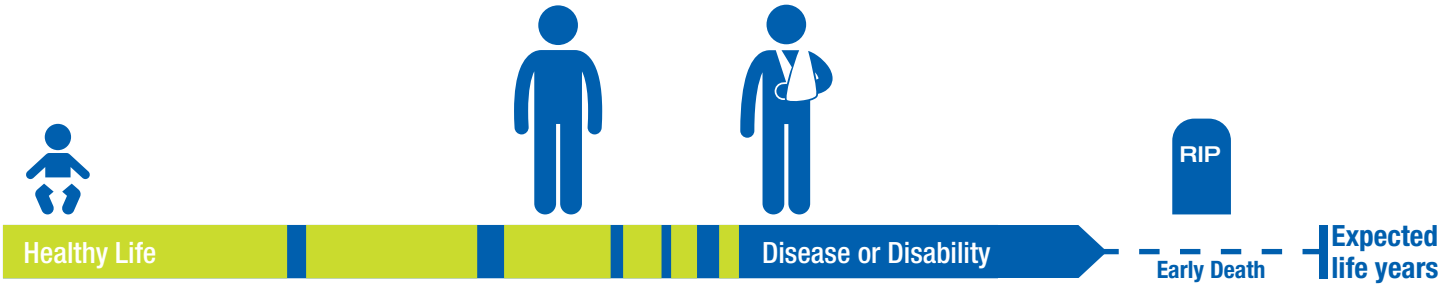
What: The overall burden of disease is assessed using the World Health Organization's (WHO) disability-adjusted life year (DALY). This time-based measure combines years of life lost (YLLs)[1] due to premature mortality and years lived with a disability (YLDs). For example, if a person's life expectancy is 100 years, but the last 10 are lived in a wheelchair, those are YLDs.[2]

Why: DALYs seek to give a more complete picture of the burden of disease faced in different populations. Specifically, the effect of diseases that cause premature death can be compared to those that don't cause death but do cause disability.[3]

DALYs and IAQ: Indoor air quality (IAQ) has a major impact on people's health and wellbeing. As such, DALYs can be used to measure the actual impact of IAQ on length of life. The European Union (EU) started to use DALYs in this manner and determined:

> "**DALYs** seek to give a more complete picture of the burden of disease...**[how] diseases that cause premature death can be compared to those that don't** cause death but do cause disability."

- An annual loss of 2.1 million DALYs in the EU's 26 nations is associated to indoor and outdoor originating pollutants: 1.28 million DALYs caused by exposures to outdoor air pollution indoors and 740,000 DALYs caused by indoor source pollutants.[4]
- Almost 80% of the total annual burden of disease of indoor exposures is estimated to be caused by PM2.5[5] (fine inhalable particles with diameters 2.5 micrometers and smaller that can cause health problems[6]).



DALY = **YLD** + **YLL**

Disability Adjusted Life Year is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death

Years Lived with Disability

Years of Life Lost

RenewAire®
Energy Recovery Ventilation

DALYs, IAQ and ERVs: The most effective way to enhance IAQ is increased and balanced ventilation. As long as enough controlled and filtered fresh outdoor air is coming in and stale indoor air is exhausted out, interior spaces will enjoy high-quality air. Therefore, because DALYs are related directly to IAQ as mentioned above, with increased and balanced ventilation, DALYs can be decreased.

However, increasing ventilation using conventional HVAC systems can lead to extra energy use and costs. IAQ and DALYs are positively impacted by increased ventilation via energy recovery ventilators (ERVs). ERVs precondition the outdoor air coming in with the otherwise-wasted exhaust air's heat and humidity. This leads to cleaner and healthier indoor air, as well as reductions in DALYs, energy consumption and expenses.

For more than 35 years, RenewAire®, Waunakee, Wis., has been an HVAC industry pioneer for improving human health, cognitive function, productivity and wellbeing by enhancing indoor air quality (IAQ) via energy recovery ventilation (ERV) technologies. This is accomplished energy-efficiently, cost-effectively and sustainably with fifth generation static plate enthalpy core energy recovery ventilators and dedicated outdoor air systems (DOAS). For more information, visit www.renewaire.com, email: ramarketing@renewaire.com or call (800) 627-4499.

RenewAire energy recovery ventilators (ERVs) enhance indoor air quality (IAQ) by exhausting out harmful indoor air contaminants—such as volatile organic compounds (VOCs), odors, bacteria and virus aerosols—and create cleaner and healthier indoor air.

Watch RenewAire's podcast, **Reducing the DALY Tally Through IAQ Improvements**, to learn more about how ventilation can influence DALYs.

[1] "Disability-adjusted life years (DALYs)," World Health Organization (WHO), https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158.

[2] Paul Reymer,"Reducing the DALY Tally Through IAQ Improvements," RenewAire, https://www.renewaire.com/ventilation-improvements-for-better-iaq-and-daly/.

[3] "Disability-adjusted life years (DALYs)," World Health Organization (WHO), https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158.

[4] Asikainen et al., "Reducing burden of disease from residential indoor air exposures in Europe (HEALTHVENT project)," Environmental Health, March 8, 2016, https://doi.org/10.1186/s12940-016-0101-8.

[5] Ibid.

[6] "Particulate Matter (PM) Basics," U.S. Environmental Protection Agency (EPA), https://www.epa.gov/pm-pollution/particulate-matter-pm-basics.