The views expressed are those of the presenter and are not necessarily those of UKHSA or other government departments

Noise Network Plus launch meeting

Current issues in noise pollution – perspective spotlight talks

Health effects of noise

18 March 2025

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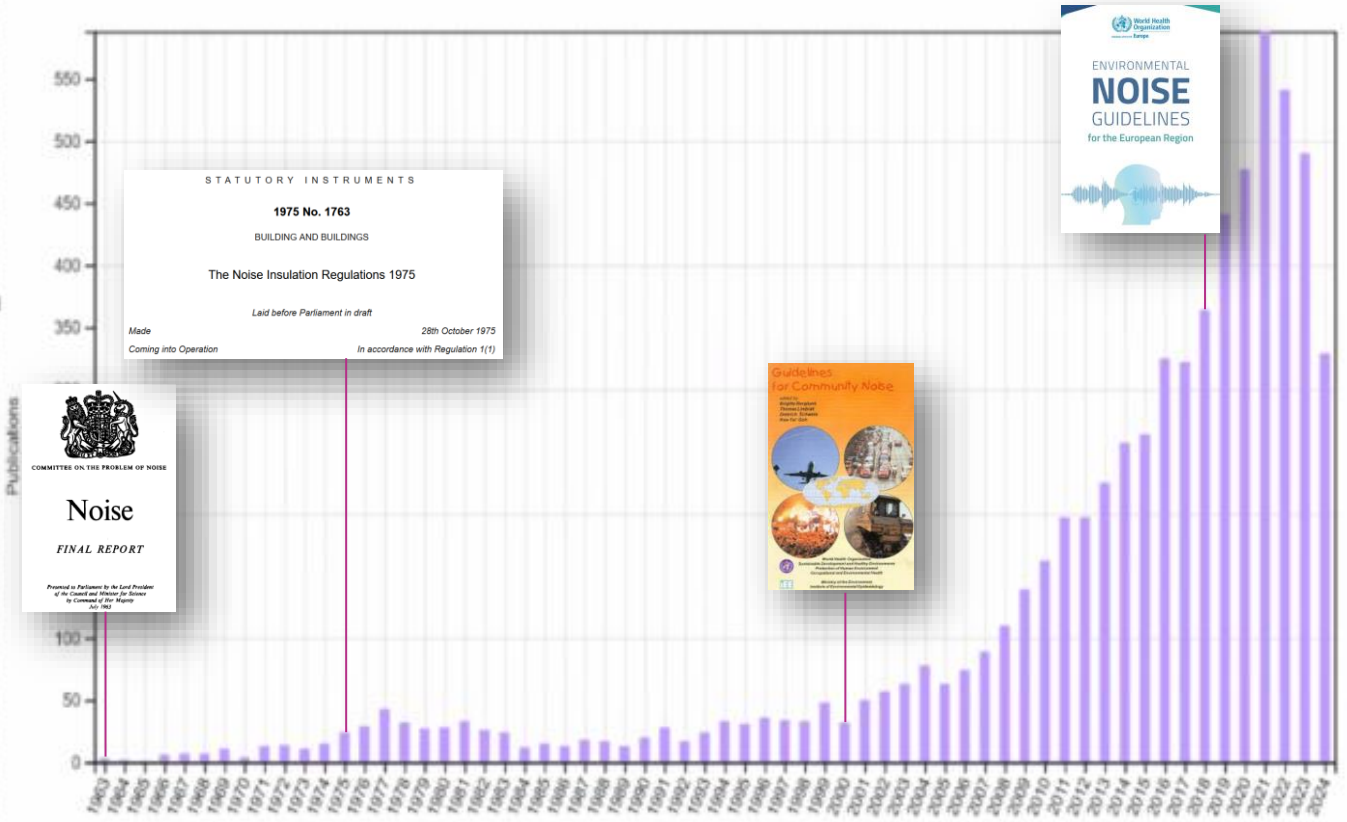
a tale of two cities

Generated using OpenAI on 12.03.2025

In RESEARCH land

Number of publications (20.09.2024): 6,686

Transportation noise, traffic noise, road traffic noise, railway noise, aircraft noise AND health



https://apps.webofknowledge.com/

Swiss TPH

"noise pollution is considered not only an environmental nuisance but also a threat to public health."

WHO, 2011

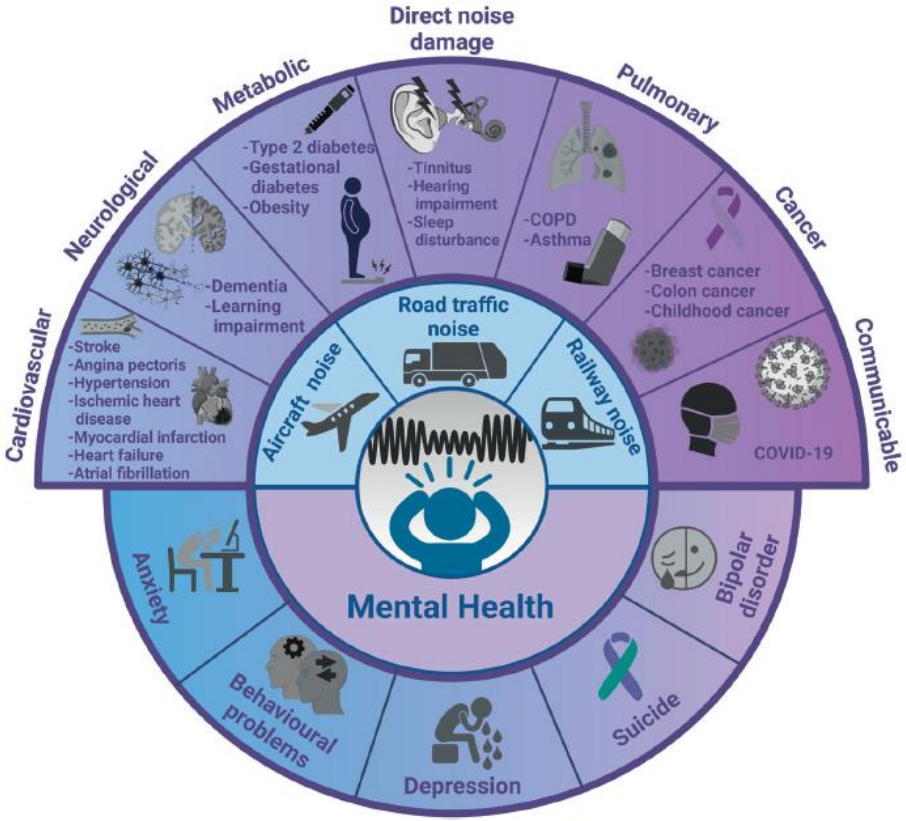


Fig. 2 The effects of noise on different organ systems and on the mental health. Noise from different sources was previously shown to likely affect different organ systems and promote a wide variety of diseases. Detrimental effects of noise can also play a prominent role in onset and progression of many aspects of mental health, like anxiety and depression. Data derived from the following studies: [49–51, 71–87].

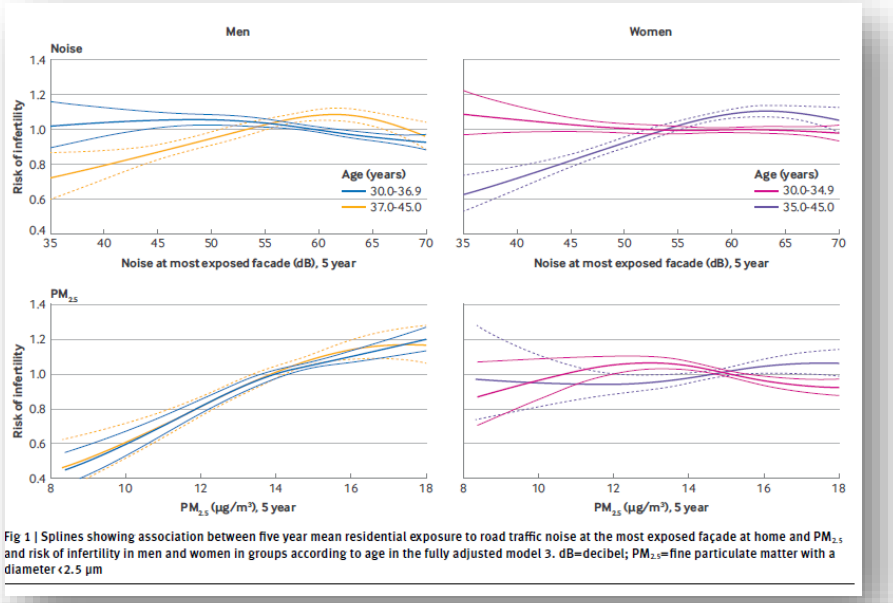


Fig 1 | Splines showing association between five year mean residential exposure to road traffic noise at the most exposed façade at home and $PM_{2.5}$ and risk of infertility in men and women in groups according to age in the fully adjusted model 3. dB=decibel; $PM_{2.5}$=fine particulate matter with a diameter <2.5 µm

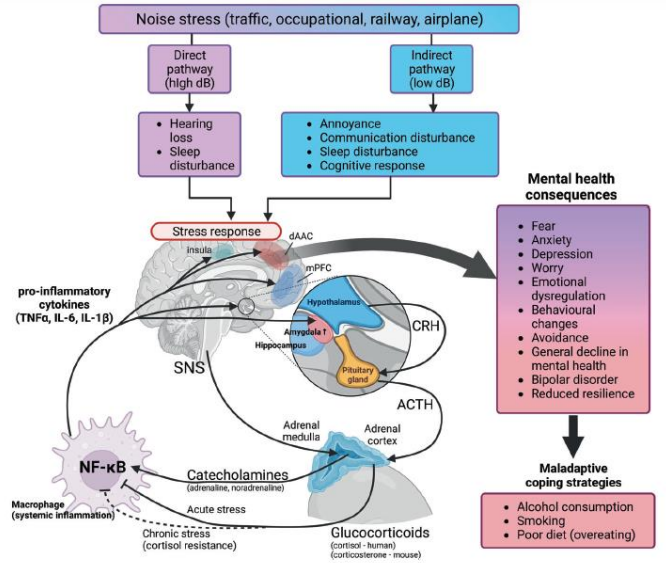


Fig. 3 The noise/stress concept and the associated adverse mental health consequences. Noise induces the stress response through either direct (hearing loss and inner ear damage) pathway or indirect (annoyance and sleep disturbance) pathway. The stress response results in the activation of the hypothalamic–pituitary–adrenal (HPA) axis and an increase in systemic inflammation that becomes neuroinflammation, resulting in the fear and anxiety response. Prolonged exposure to a high stress response leads to maladaptive coping strategies, such as smoking or alcohol consumption. CRH (corticotropin-releasing hormone), ACTH (adrenocorticotropic hormone), NF-κB (nuclear factor kappa-light-chain-enhancer of activated B cells), SNS (sympathetic nervous system), dAAC (dorsal anterior cingulate cortex), mPFC (medial prefrontal cortex), TNFα (tumor necrosis factor alpha), IL-6/1β (interleukin 6/1β). Adapted from [27].

Plots from Sørensen et al. (2024) *BMJ* 2024;386:e080664 http://dx.doi.org/10.1136/bmj-2024-080664 and Hahad et al. (2024) https://doi.org/10.1038/s41370-024-00642-5

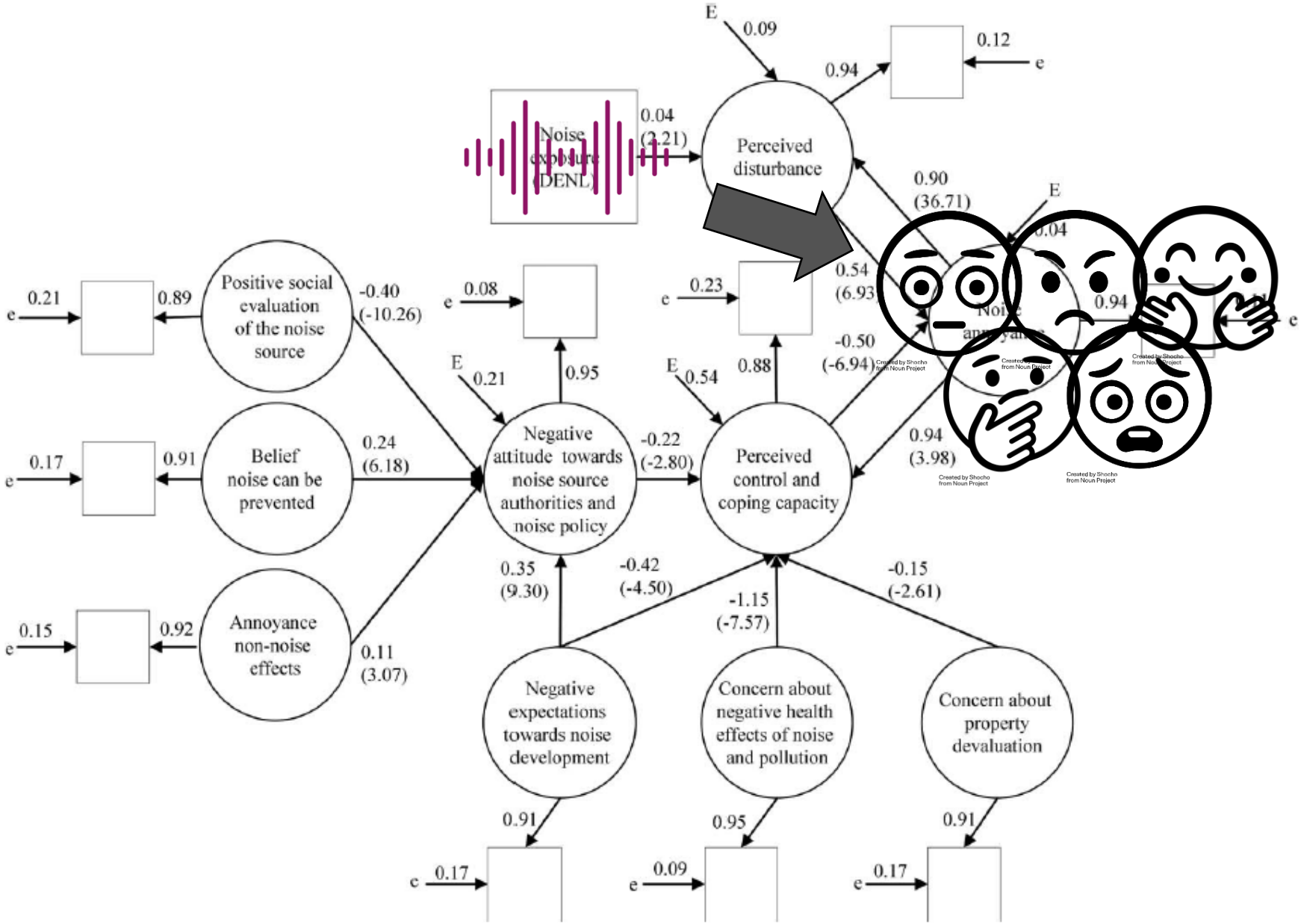
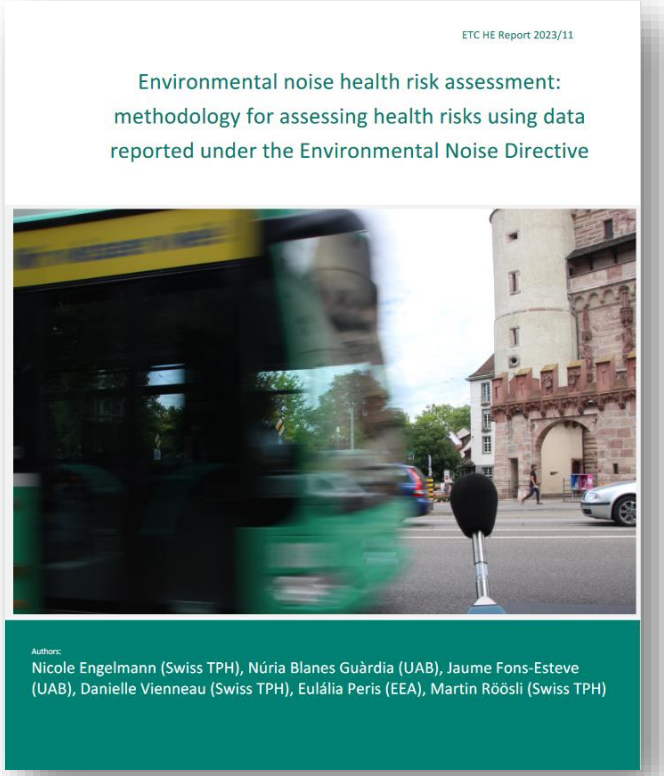


FIG. 3. The estimated aircraft noise annoyance model. $n=646$, $\chi^2=54.45$, p-value$=0.000\,08$, $Df=21$, GFI$=0.99$, CFI$=1.00$, and RMSEA$=0.044$. The standardized path estimates are shown. The values in the parentheses represent the t-values of the structural parameter estimates. All parameter estimates are significant ($p<0.05$). (○) Latent variable; (E) error/unexplained variance of latent variable; (□) observed variable (based on single-item composite scale); (e) error/unexplained variance of observed variable.

"The body of evidence shows negative effects due to transport noise at much lower levels that those captured in the END exposure assessments (i.e. 55 dB L_{den}, and 50 dB L_{night}). We therefore suggest to assess the health risks of noise at levels of 45 dB L_{den} and 40 dB L_{night}).



https://www.eionet.europa.eu/etcs/etc-he/products/etc-he-products/etc-he-reports/etc-he-report-2023-11-environmental-noise-health-risk-assessment-methodology-for-assessing-health-risks-using-data-reported-under-the-environmental-noise-directive

Meanwhile, in PRACTICE land

Table 7.3: Effect thresholds a

Effect level	Time p
LOAEL	**Core hours works** • Mon-Fri, 07:00- • Sat, 07:00-13:0 **Out of hours work** • Mon-Fri, 19:00- • Sat, 13:00-23:0 • Sun[3], 07:00-23: **Night works:** • Mon-Sun, 23:00
SOAEL[4]	**Core hours works** • Mon-Fri, 07:00- • Sat, 07:00-13:0 **Out of hours work** • Mon-Fri, 19:00- • Sat, 13:00-23:0 • Sun[2], 07:00-23: **Night works:** • Mon-Sun, 23:00-07:00 (8hr).

Table 7.8: Impact magnitude and significance criteria for change in road traffic noise (operational traffic)[11]

Magnitude of Impact	Do-something noise exposure effect level			
	Day (07:00–23:00)		Night (23.00–07.00)	
	Between LOAEL and SOAEL		SOAEL or greater	
No Change	0	0	0	0
Negligible	0.1 – 2.9 dB(A)	0.1 – 0.9 dB(A)	0.1 – 0.9 dB(A)	0.1 – 0.9 dB(A)
Minor	3.0 – 4.9 dB(A)	**1.0 – 2.9 dB(A)**	1.0 – 2.9 dB(A)	**1.0 – 2.9 dB(A)**
Moderate	5.0 – 9.9 dB(A)	**3.0 – 4.9 dB(A)**	3.0 – 4.9 dB(A)	**3.0 – 4.9 dB(A)**
Major	≥ 10.0 dB(A)	**≥ 5.0 dB(A)**	≥ 5.0 dB(A)	**≥ 5.0 dB(A)**

NOTE: If the result for any property falls in the categories shown by the shaded boxes with text in bold, this indicates that the property is regarded as experiencing a significant adverse effect.

Night (23.00–07.00)	LOAEL	40 dB L_{night} (free-field)
	SOAEL	55 dB L_{night} (free-field)

Notes:
[a] This is the average daily value (07:00 – 23:00 hours) at a position one metre from a residential building façade containing a window, ignoring the effect of an acoustic reflection from that façade.
[b] equivalent to 55 dB $L_{A10,18hr}$ façade.
[c] equivalent 68 dB $L_{A10,18hr}$ façade.

RESEARCH

PRACTICE

Educating and empowering

GOV.UK Menu

Home > Environment > Pollution and environmental quality

Press release

Better alerts to make air quality part of everyday conversation

Expert-led review published to boost public awareness about air quality.

From: Department for Environment, Food & Rural Affairs, UK Health Security Agency and Emma Hardy MP
Published 6 March 2025

At-risk groups will benefit from better access to information on air pollution as the Government publishes its Air Quality Information System (AQIS) review.

The expert-led review – working with respiratory experts, the charity sector, central government and local authorities - makes a series of recommendations aimed at informing the public about the link between poor air quality and ill health.

It found the UK has world-class tools that monitor poor air quality, but that there is a need to better explain why air pollution is a hazard and who is most at risk from harm.

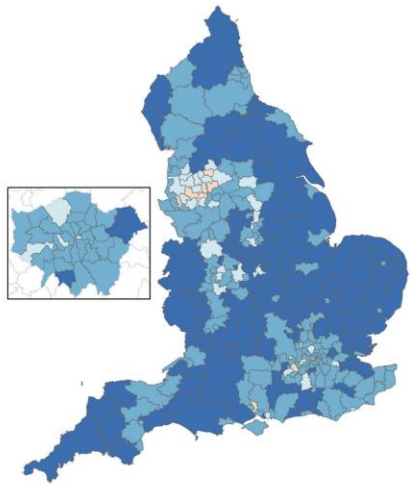
"… the UK has world-class tools that monitor poor air quality, but that there is a need to better explain why air pollution is a hazard and who is most at risk from harm."

Reducing the health burden

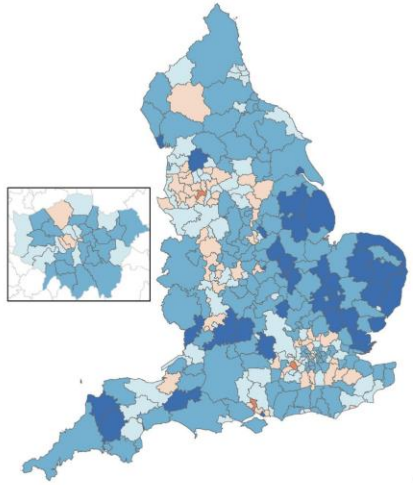
https://www.sciencedirect.com/science/article/pii/S0160412023002398?via%3Dihub#f0025

Attributable DALYs due to road traffic noise exposure

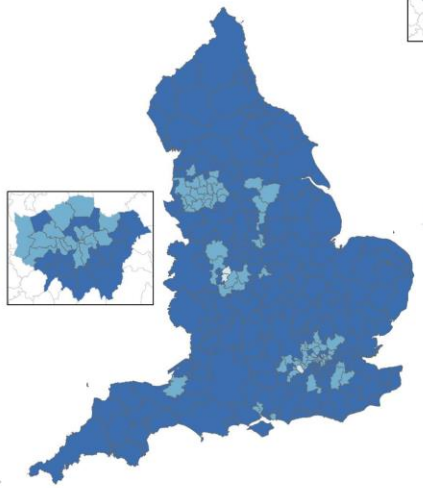
Ischemic heart disease (IHD)



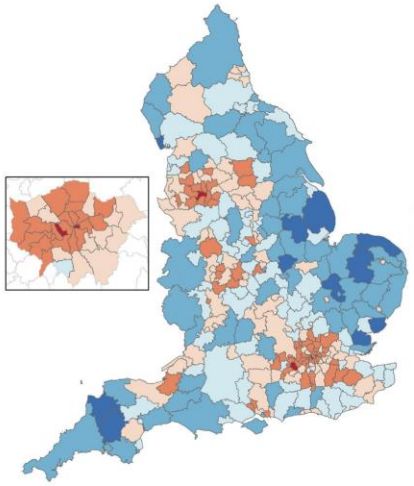
Stroke



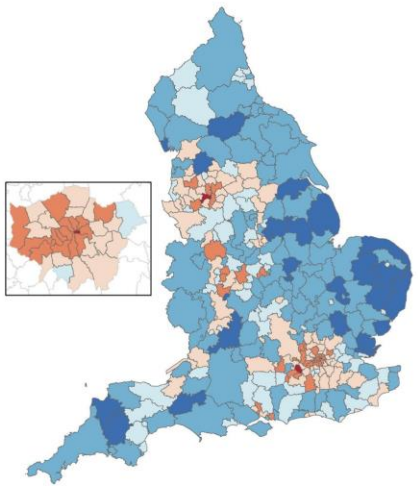
Diabetes Mellitus



Highly annoyed (HA)



Highly sleep disturbed (HSD)

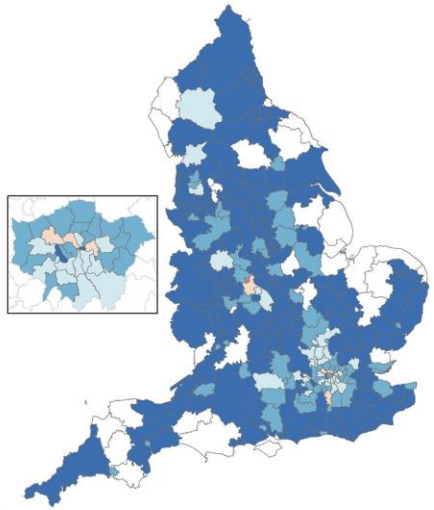


DALY rate per 100,000 people
0
>0 - 20≤
>20 - 40≤
>40 - 60≤
>60 - 100≤
>100 - 200≤
>200 - 330

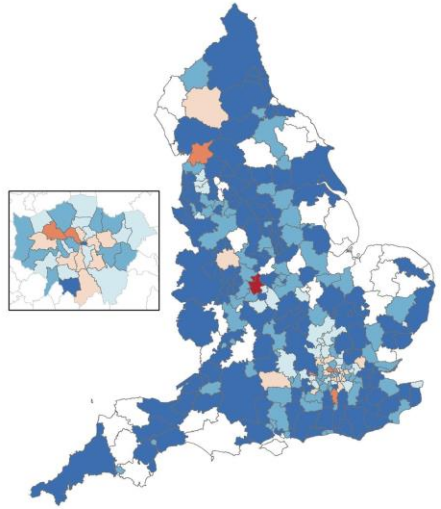
N

0 75 150 300 Kilometers

Highly annoyed (HA)



Highly sleep disturbed (HSD)



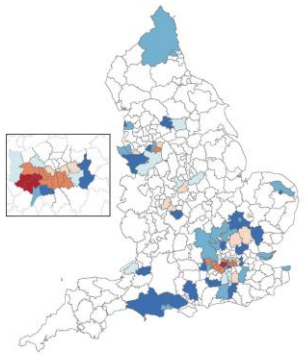
DALY rate per 100,000 people
0
>0 - 15≤
>15 - 30≤
>30 - 45≤
>45 - 60≤
>60 - 75≤
>75 - 100

N

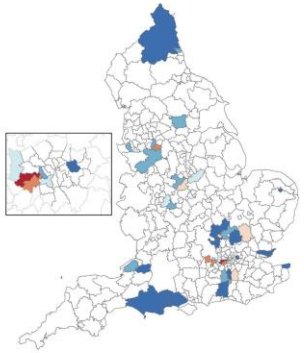
0 75 150 300 Kilometers

Attributable DALYs due to aircraft noise exposure

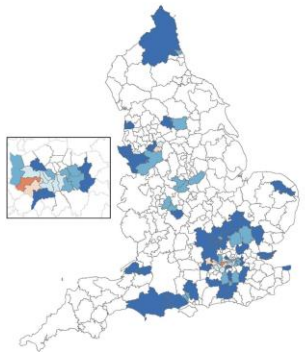
Highly annoyed (HA)



Highly sleep disturbed (HSD)



Ischemic heart disease (IHD)



DALY rate per 100,000 people
0
>0 - 5≤
>5 - 20≤
>20 - 50≤
>50 - 100≤
>100 - 500≤
>500 - 1100

N

0 75 150 300 Kilometers

What are the most effective interventions to reduce the health burden?

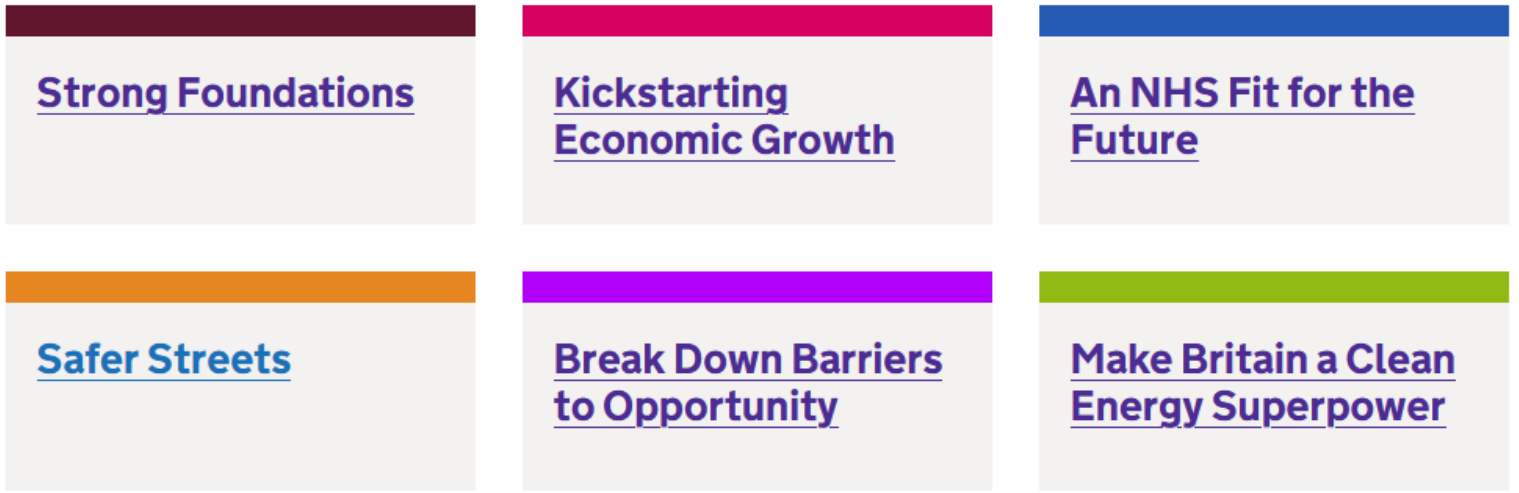
Do certain population subgroups need a different approach?

Are there any unintended consequences?

Are there opportunities for health promotion?

Monitoring and evaluation

Maximising impact



- Building 1.5 million homes
- Fast-tracking infrastructure projects
- Make Britian a clean energy superpower
- Accelerating the UK to Net Zero
- From sickness to prevention

https://www.gov.uk/missions