The Silent Crisis :

Chronic Noise Exposure &
Its Overlooked Impact on Public Health

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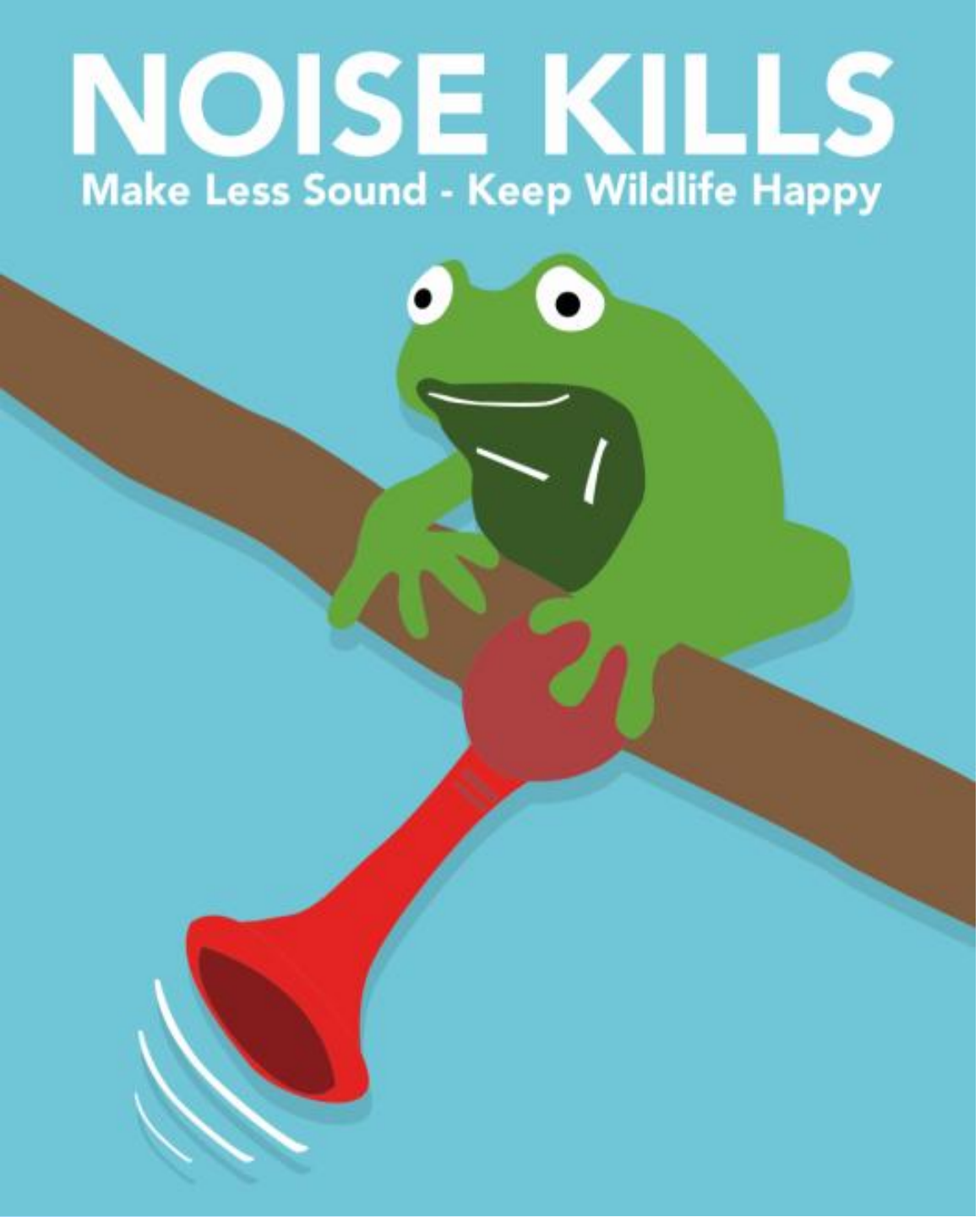


Carrying the reputation of silent killer of 21st century, World Health Organization (WHO) has estimated it dimensions and warned that 10% of the population is exposed to both short and long-term health-related issues due to noise.

You never turn your ears off; when you're asleep, you're still listening. So those responses, like your heart rate going up, that's happening whilst you're asleep

Learning objectives:

- Noise & its property
- Mechanism of Hearing
- Source of Noise pollution
- Effects of Noise pollution
- Awareness & Prevention of Noise pollution

Sound is what we hear . Noise is unwanted sound

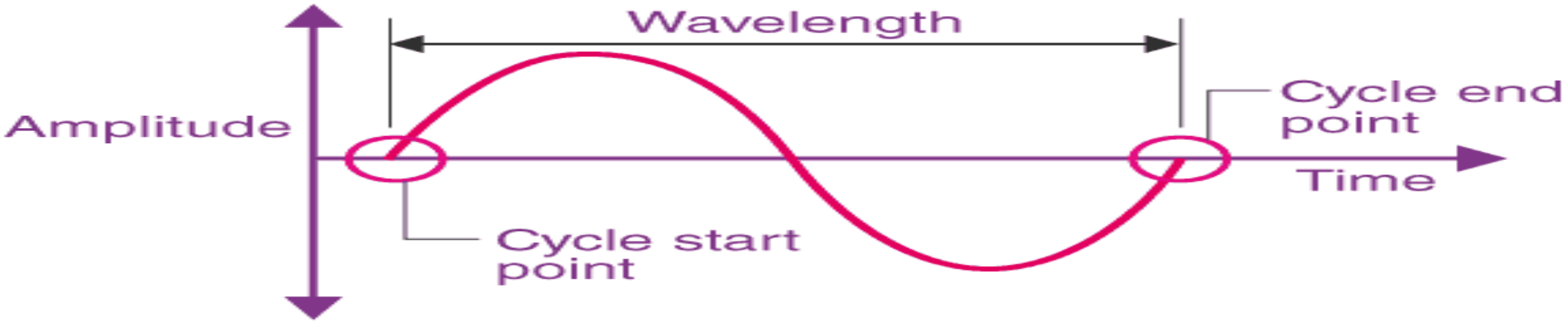
Noise:

The word noise is derived from the Latin word ‘Nausea’, which means sickness in which one feels the need to vomit.

wrong sound in the wrong place at the wrong time .

Noise Pollution:

Noise pollution refers to the excessive, unwanted, or disturbing sounds that disrupt the natural harmony of the environment.



Properties of Noise:

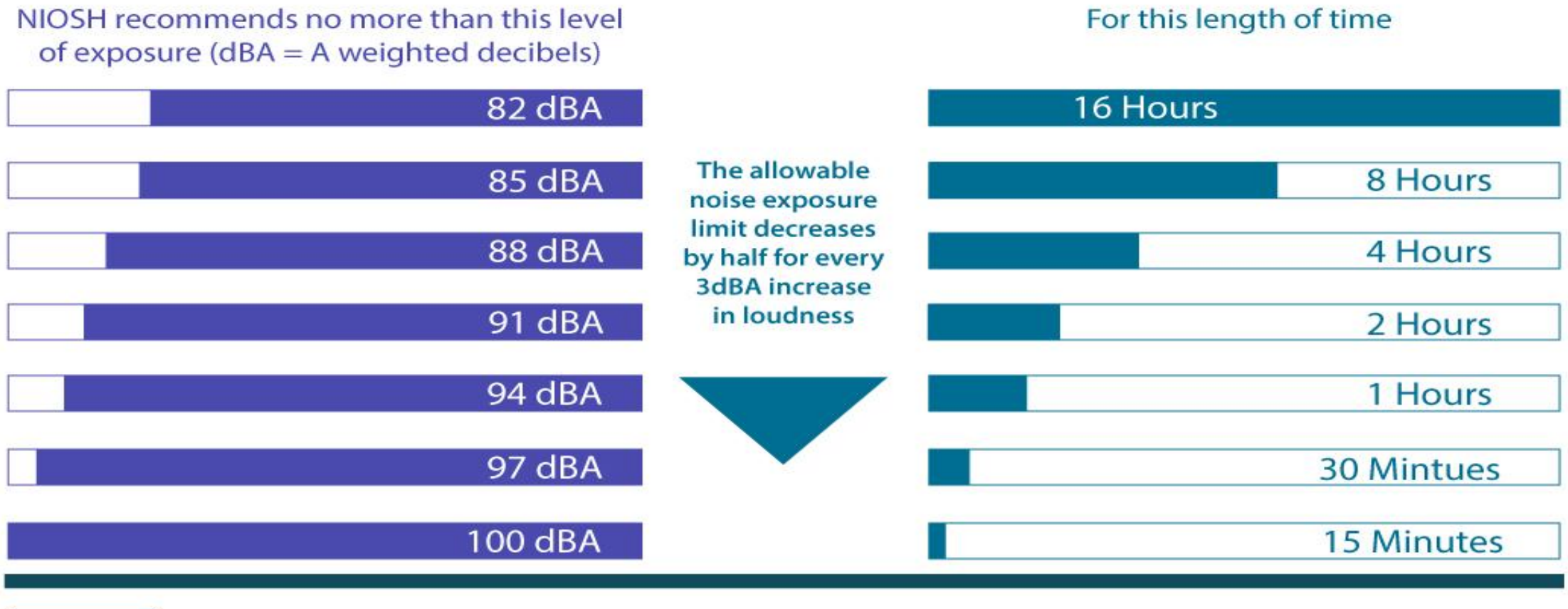
Intensity: A daily exposure of 85dB is about the limit people can tolerate without substantial damage to their hearing.

Frequency: The sound frequencies audible to human ear range from 20 to 20000Hz.

Nature: Refers to the distribution of the sound energy over time . Impulsive noise is particularly harmful.

Duration:

Exposure Level per NIOSH REL



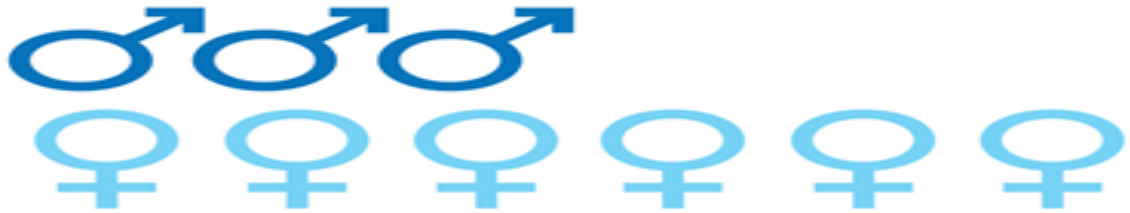
As sounds become louder than 85 dBA, the length of a daily exposure must be reduced. For each 3 dBA increase in noise level, NIOSH recommends reducing the exposure duration by half. This is called the exchange rate. Similarly, if the daily exposure is longer than 8 hours, the allowable noise level is lower.

National Institute for Occupational Safety and Health (NIOSH)

HEARING LOSS & AGE

GENDER & HEARING LOSS

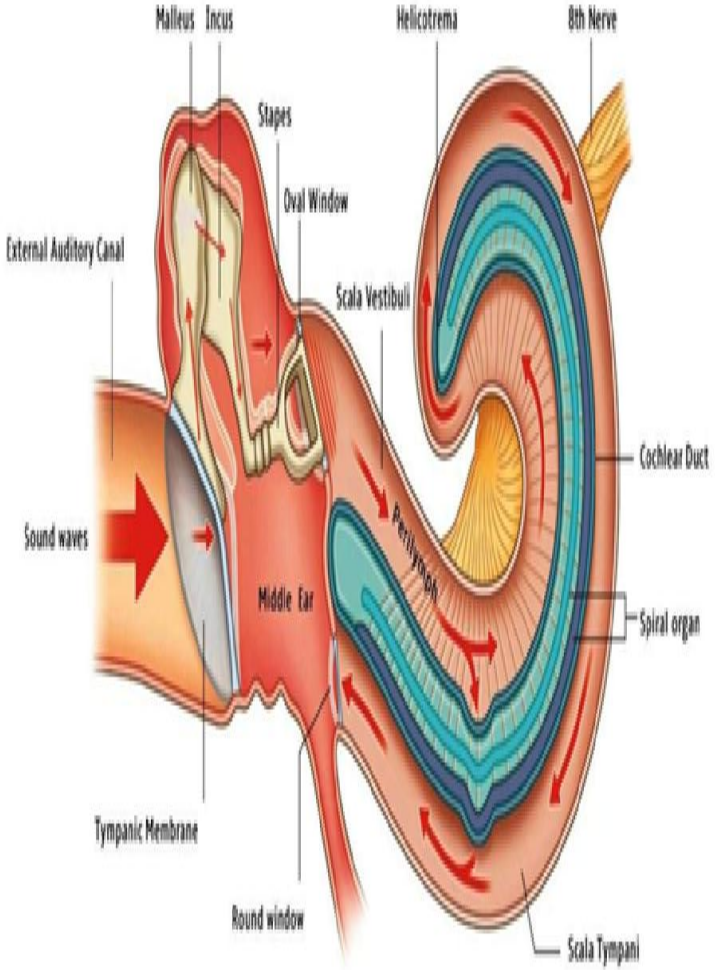
Adult men are **TWICE AS LIKELY** as women to experience hearing loss



Women are **TWICE AS LIKELY** as men to disclose hearing loss to others and offer helpful communication strategies

Women tend to hear better at higher frequencies above 2000 Hz

MECHANISM OF HEARING



Mechanism of Hearing

- **Mechanical Conduction of Sound :** This initial stage involves the collection and transmission of sound waves through the external and middle ear

- **Transduction of Mechanical Energy to Electrical Impulses:** Here, the mechanical vibrations are converted into electrical signals by specialized hair cells within the cochlea.

- **Conduction of Electrical Impulses to the Brain:** Finally, these electrical impulses travel along specific neural pathways to the auditory canters in the brain for interpretation.

WHY IT'S OVERLOOKED

Invisible Threat:

Unlike other forms of pollution, noise is often invisible, making its impact less obvious and easier to ignore

Gradual Onset:

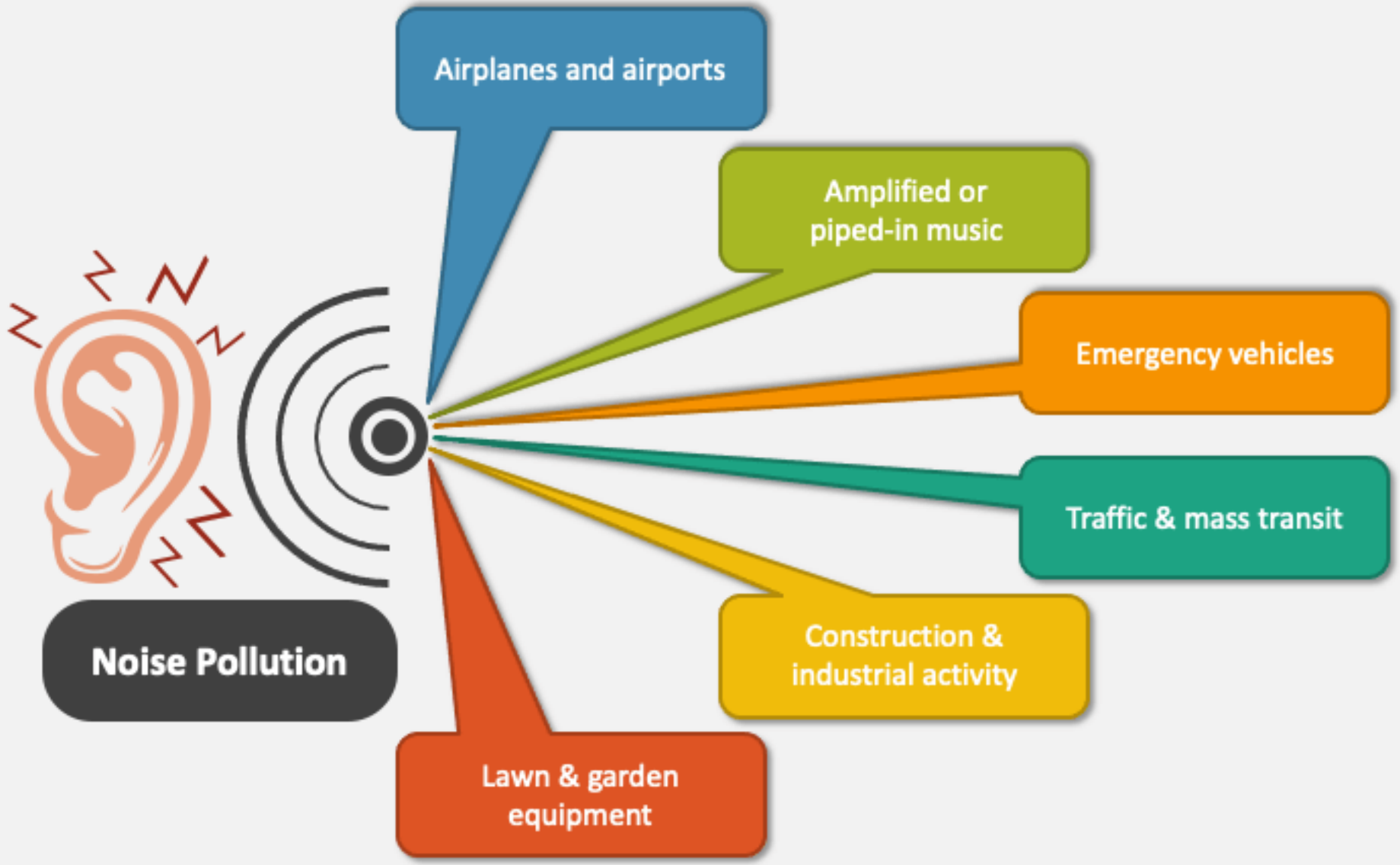
The health effects of noise exposure often develop gradually over time, making it harder to recognize the connection between noise and health problems

Normalization of Loud Environments:

In many urban and industrial settings, loud noise has become normalized, leading people to underestimate the potential harm

NOISE POLLUTION

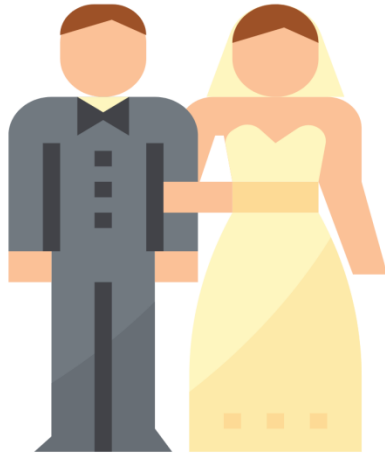
Common Sources of Noise Pollution



Industrialzation

civilspedia.com

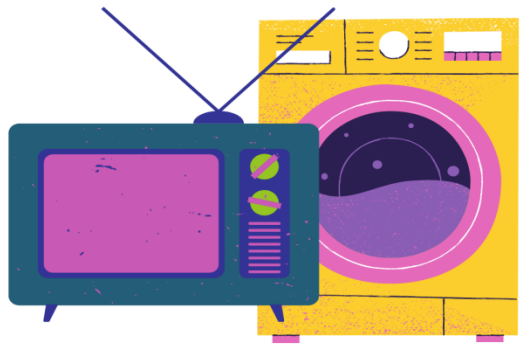
Poor Urban Planning



Social Events

Vehicles

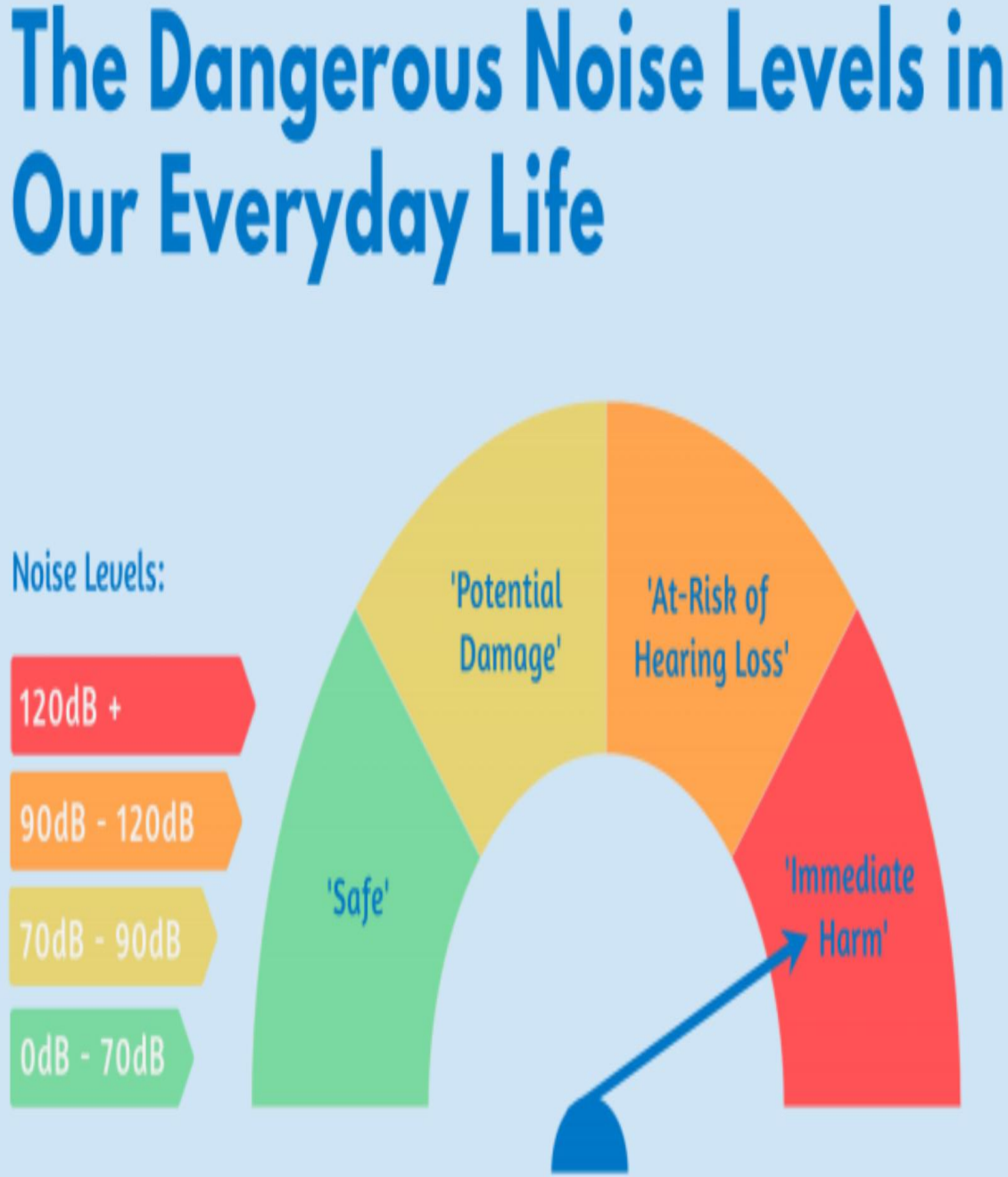
Construction

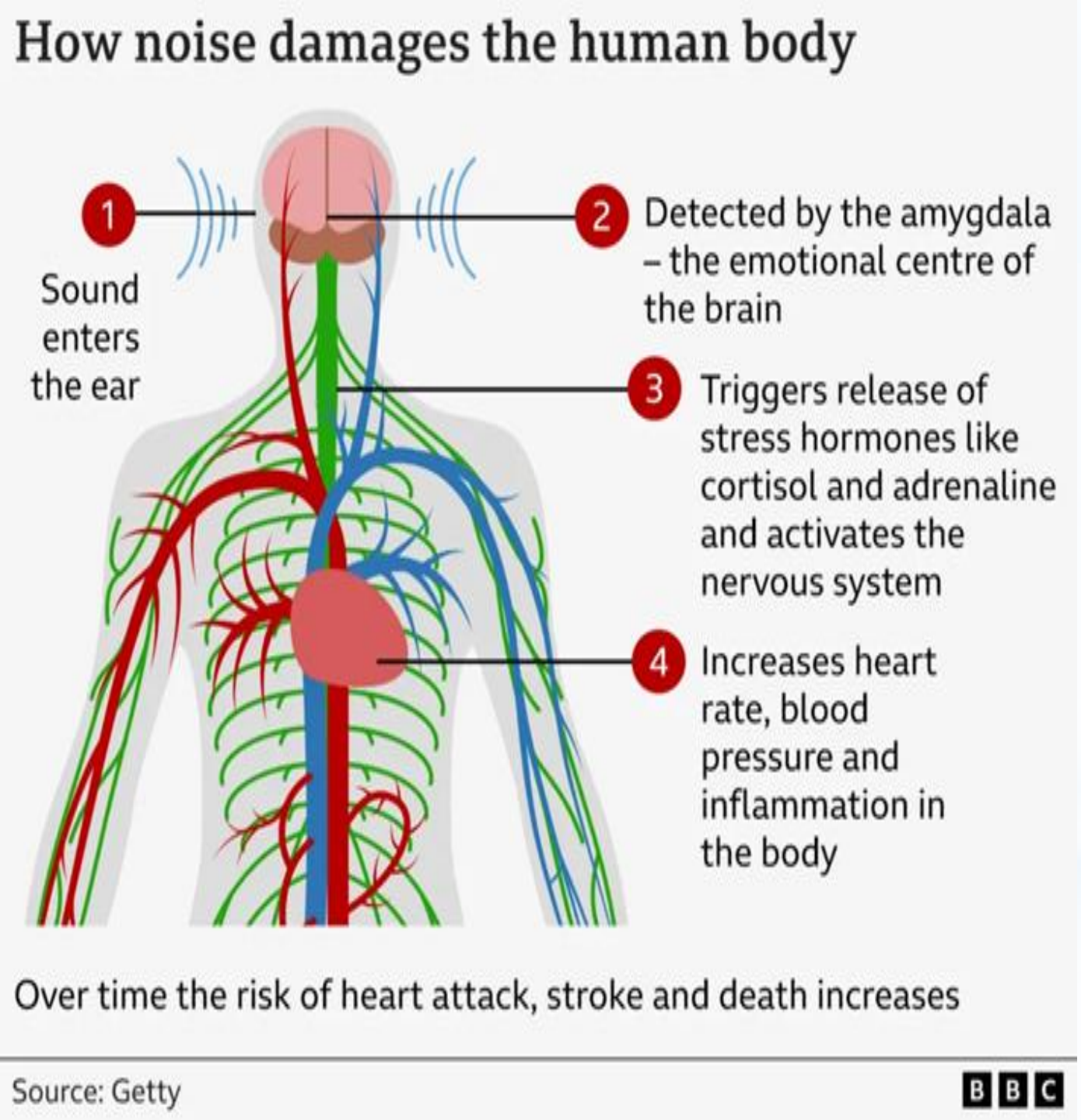


Appliances

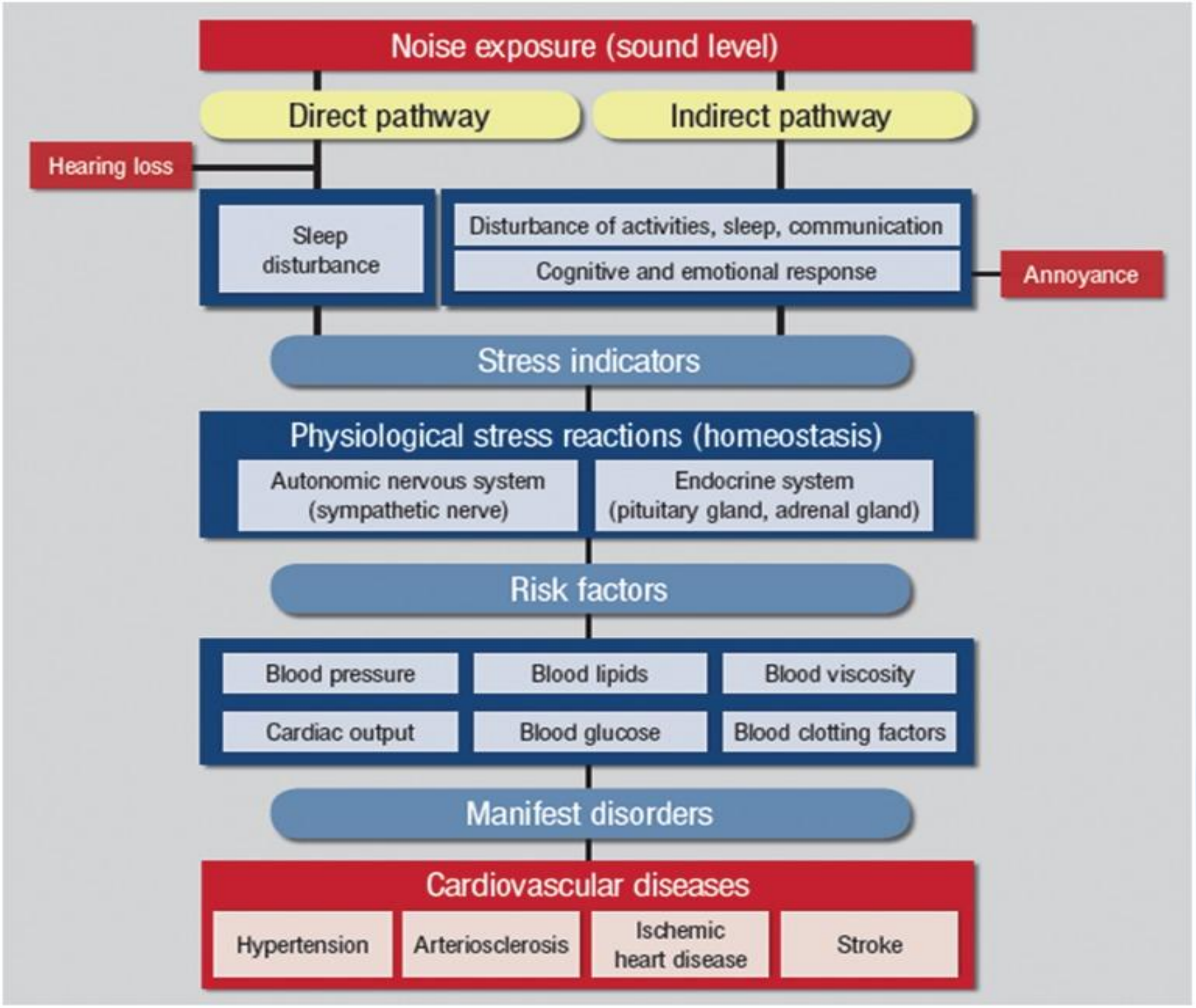
Effects of Noise pollution

- There are about 25000 hair cells in our ear which create a wave in our ear, responding to different levels of frequencies.
- With increasing levels of sound the cells get destroyed decreasing our ability to hear the high frequency sound





The brain is wasting resources on trying to tune out the noise, so the brain has less capacity to perform other complex tasks, leading to a temporary decline in cognitive performance. Attention and memory tend to be the cognitive domains most impacted by noise. The stress response leads to vascular changes that can pave the way for cardiovascular disease and vascular dementia.



Meta-analyses indicate that each 10 dB(A) increase in environmental noise increases the risk for adverse cardiovascular outcomes, including hypertension and heart attacks, by 7 to 17% . Due to the strong connection between heart health and brain health, these negative effects on the cardiovascular system may account for some of the increased dementia risk from noise pollution.

UK Health Security Agency

NOISE

The health effects of traffic noise

Our evidence shows that traffic noise **not only has a direct impact on sleep, stress** and how annoyed you feel, but it can also increase the risk of **more serious health conditions** as one of multiple factors:

- **Annoyance**
- **Sleep disturbance**

- **Stroke**
- **Ischemic heart disease**
- **Diabetes**

- **Depression**
- **Anxiety**

Effects of noise exposure on children

COGNITIVE

- Difficulty in speech development
- Impaired language comprehension
- Poor memory & reading ability

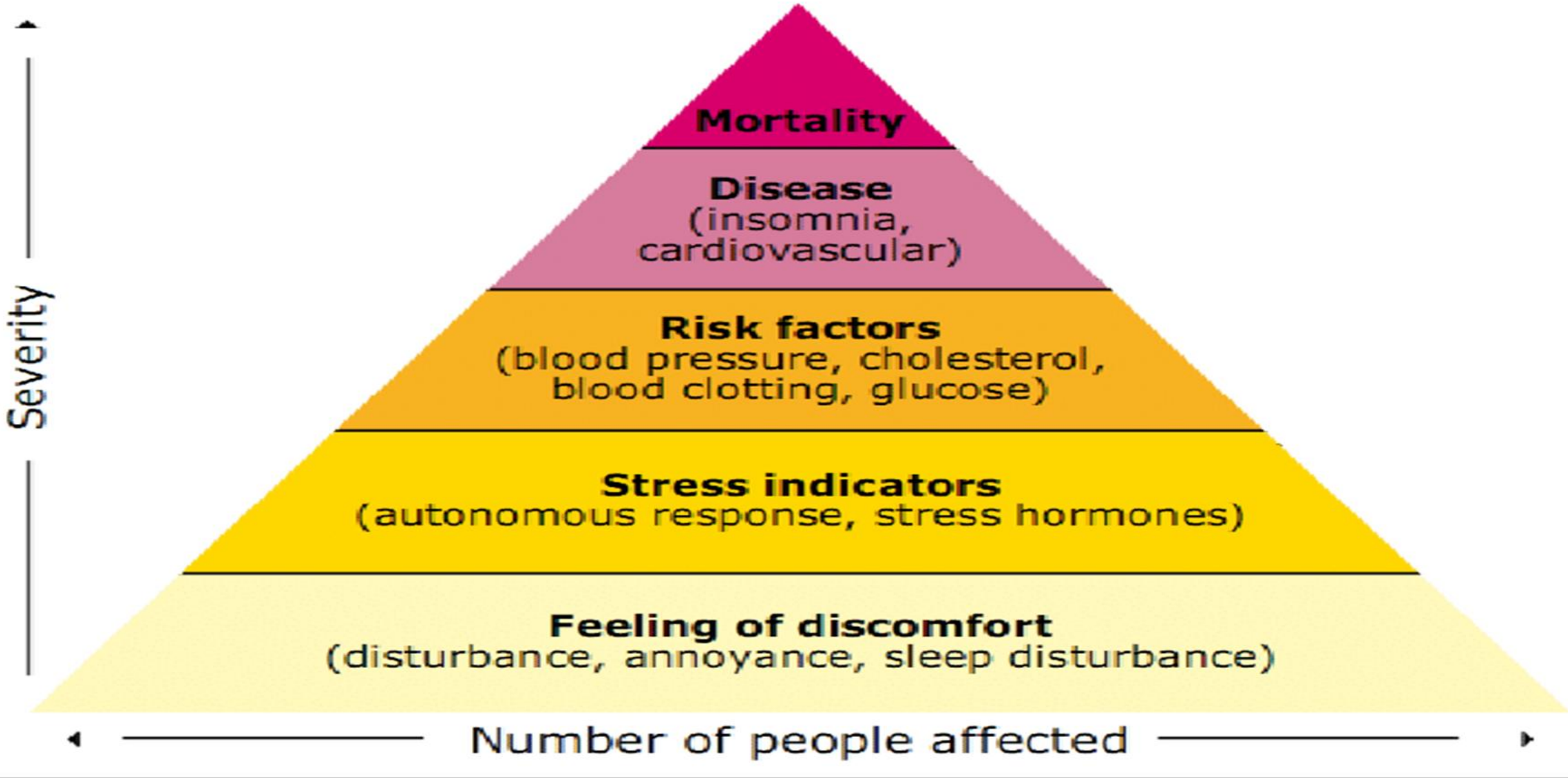
PHYSICAL

- Hearing loss
- Raised blood pressure
- Endocrine imbalance

BEHAVIOURAL

- Stress & Anxiety
- Lack of motivation
- Hyperactivity

WHO Pyramid of Health Effect of Noise:



Over 1.5 billion people worldwide suffer from hearing loss, according to World Health Organization (WHO).

It’s estimated that the number will rise to 2.5 billion by 2050

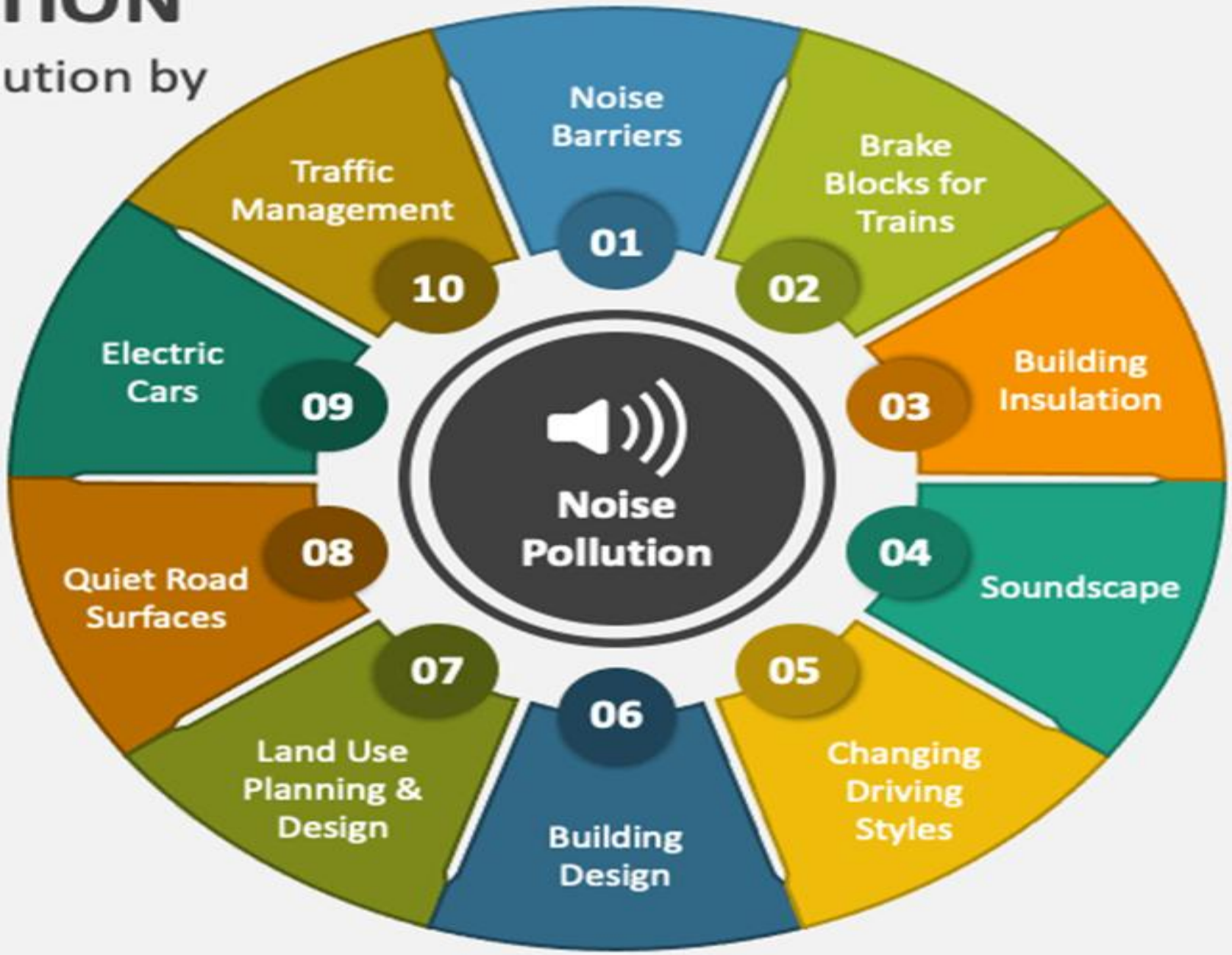
* Dhaka (Bangladesh)	119dB	57dB
* Moradabad (India)	114dB	29dB
* Islamabad (Pakistan)	105dB	47dB
* Rajshahi (Bangladesh)	103dB	55dB
* Ibadan (Nigeria)	101dB	59dB
* Algiers (Algeria)	100dB	79dB
* Kupondole (Nepal)	100dB	70dB
* Bangkok (Thailand)	99dB	48dB
* New York (USA)	95dB	56dB

City	Noise Level (dB)	References
Dhaka	80.56	Present study
Dhaka	77.50	Cowdhury *et al.* (2010)
Tangail	78.32	Hoque *et al.* (2013)
Sylhet	86.83	Amin *et al.* (2014)
Rajshahi	57.3-102.2	Bari *et al.* (2017)
Mymensingh	86.5-106.5	Islam *et al.* (2016)
Khulna	62.97	Hoque *et al.* (2011)
Jamalpur	70.21	Shahadat *et al.* (2015)

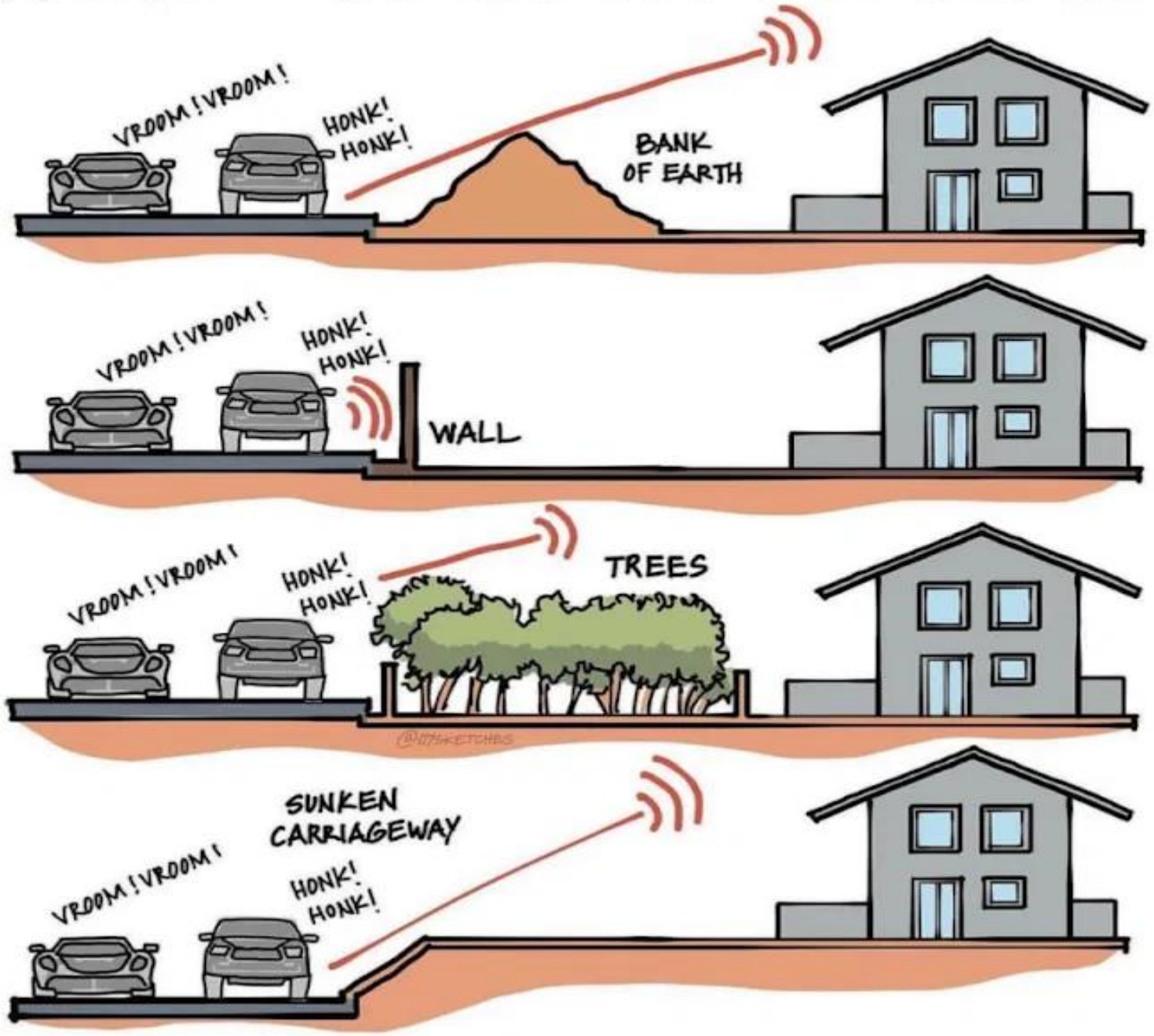
According to the WHO, around 5% of the world population is facing several kinds of health hazards due to complexities related to noise pollution. Around 11.7% of the population in Bangladesh have lost their hearing due to noise pollution.

NOISE POLLUTION

Overcome Noise Pollution by



NOISE MITIGATION MEASURES



Legislative Measures

Urban Planning

Technological Innovations

Public Awareness

PROTECT YOUR HEARING, PROTECT YOUR HEALTH

30th INTERNATIONAL NOISE AWARENESS DAY

April 30, 2025

Help raise awareness of the harmful effects of noise on hearing, health and quality of life, and inspire positive action in your community.

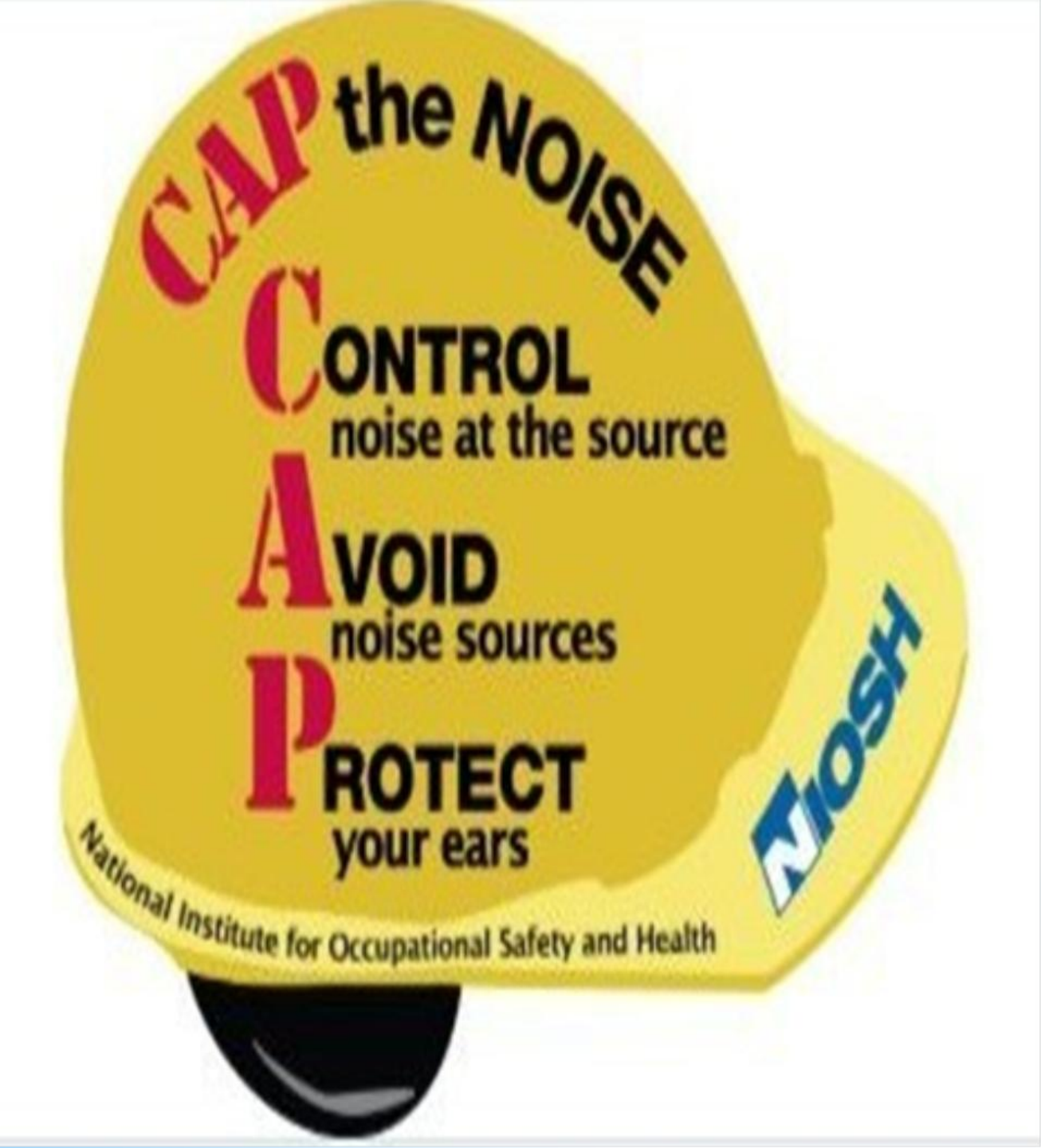
"We are used to understanding that chemicals can affect health and they are toxic, but it's not so straightforward to understand that a physical factor, like noise, affects our health beyond our hearing,"

In order to check noise pollution, the government has introduced Bangladesh Sound Pollution (Control) Rules, 2006. According to the guidelines, exceeding the maximum noise level in a certain area is a punishable offence.

Maximum noise levels in different areas

Areas	Maximum noise level
Residential zones	55dB at 6am-9pm; 45dB at 9pm-6am
Hospitals, education institutions, places of worship	40-50dB
Public areas, i.e. markets, playgrounds, parks	60-70dB
Commercial or industrial areas	70-75dB

Source: Bangladesh Noise Pollution (Control) Rules, 2006



Noise pollution, a pervasive environmental issue, poses health risks & disrupts the quality of life.

Its adverse effects on mental & physical well-being underscore the urgency for effective regulation and public awareness.

Implementing sound mitigation measures, promoting urban planning & fostering responsible community practices are essential.

By recognizing its impact and adopting the preventive strategies, we can create a quieter, healthier environment, ensuring a harmonious coexistence between human activities and the natural world