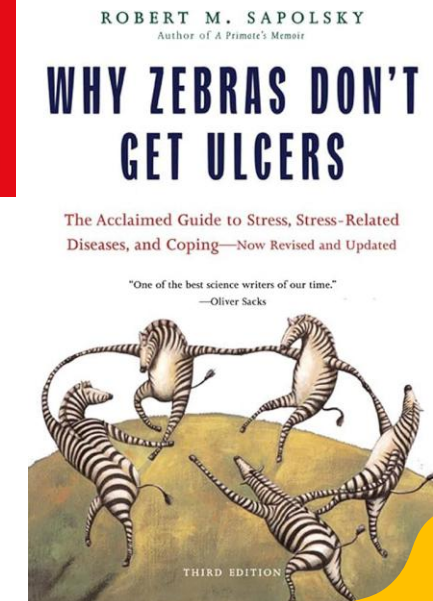
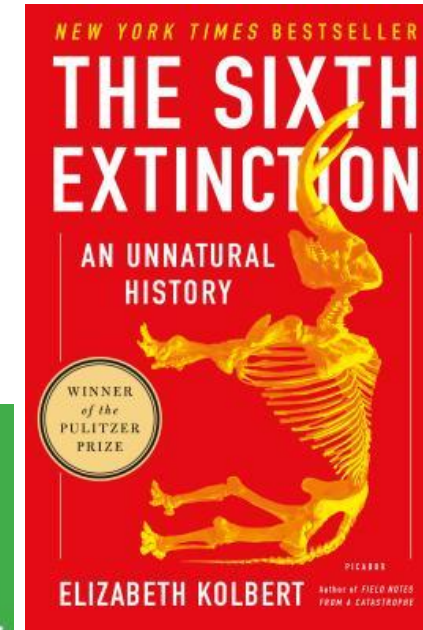
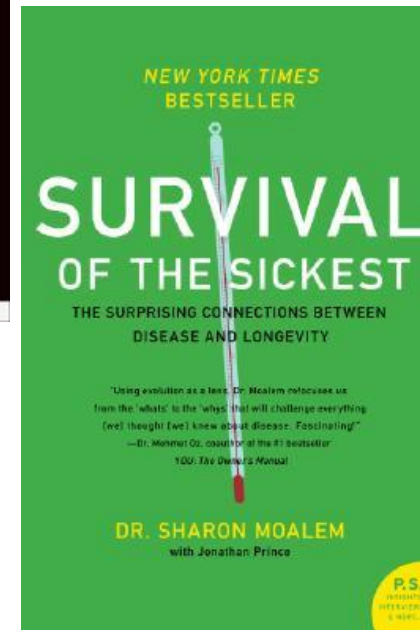
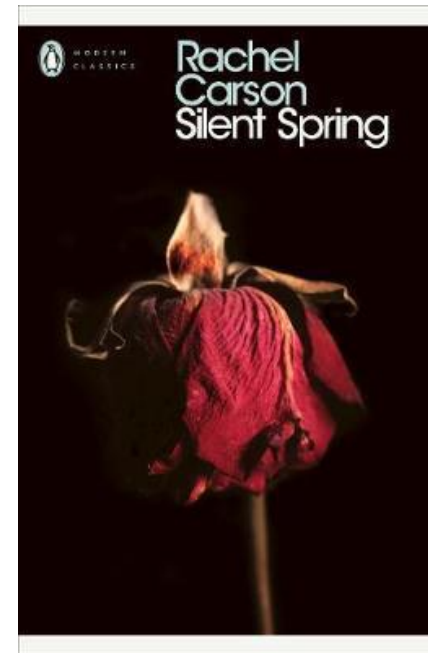
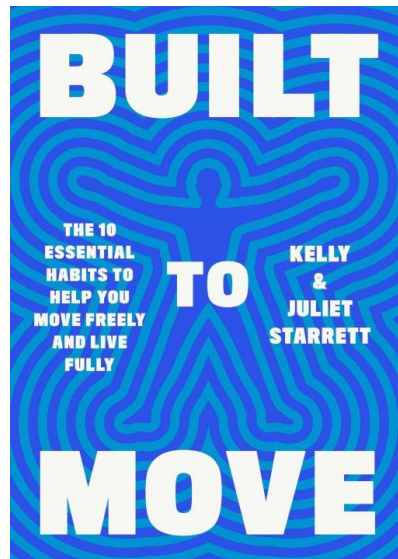
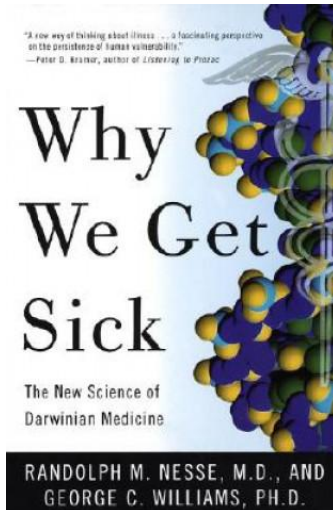
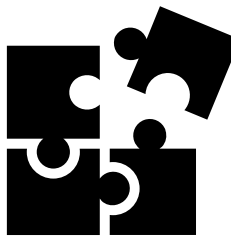
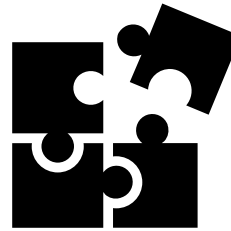


# Environmental medicine



# Book recommendation!





Food Inc. (2008)

[https://en.wikipedia.org/wiki/Food,\\_Inc.](https://en.wikipedia.org/wiki/Food,_Inc.)

A Plastic Ocean (2016)

<https://www.youtube.com/watch?v=yog7qmGZIIQ>

Erin Brockovich" (2000)

[https://en.wikipedia.org/wiki/Erin\\_Brockovich\\_\(film\)](https://en.wikipedia.org/wiki/Erin_Brockovich_(film))

"Deep Water Horizon" (2016)

[https://en.wikipedia.org/wiki/Deepwater\\_Horizon\\_\(film\)](https://en.wikipedia.org/wiki/Deepwater_Horizon_(film))

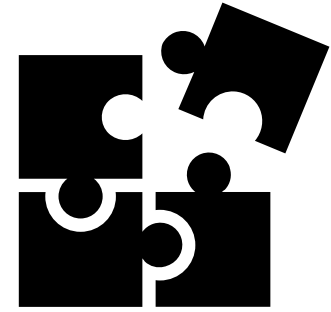
"My Octopus Teacher (2020)"

[https://en.wikipedia.org/wiki/My\\_Octopus\\_Teacher](https://en.wikipedia.org/wiki/My_Octopus_Teacher)



# Environmental medicine

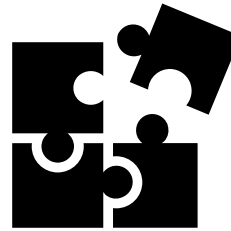
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**Environmental medicine** is defined as the science dealing with the relationship between **environmental factors** and **health problems** in humans, animals and plants.

The field of study is **complex** and requires a **multidisciplinary approach** using a **wide variety of specialists** from geologists, geochemists, medical doctors and biologists.

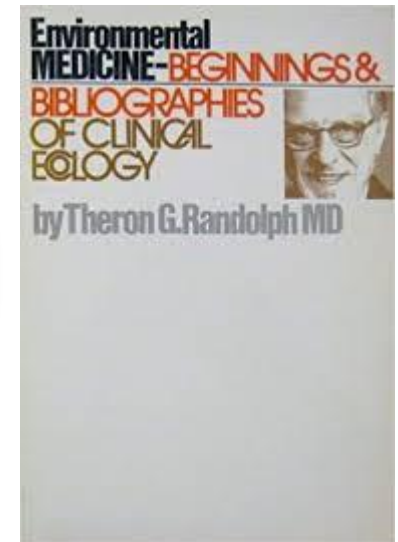




# Environmental medicine

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➤ **The concept of environmental medicine** was first born in the United States, in the 1970s, under the leadership of allergist **Theron G. Randolph**, who described **multiple chemical hypersensitivity syndrome** (MCS).



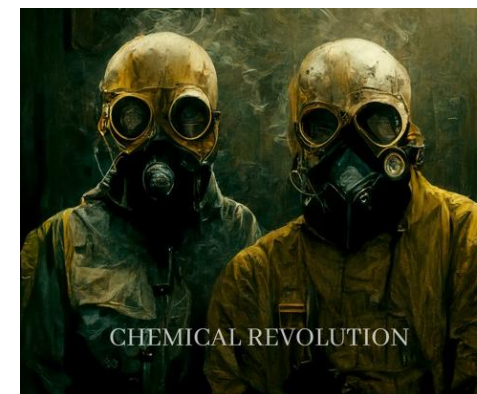
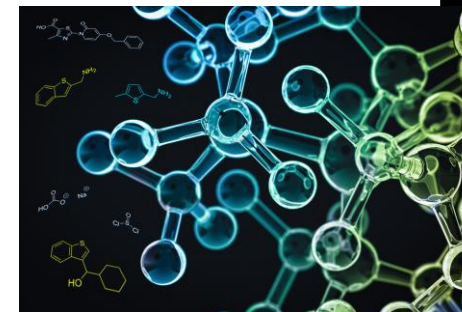
MCS - Controversial diagnosis characterized by **chronic symptoms** attributed to **exposure to low levels of commonly used chemicals**



# Environmental medicine

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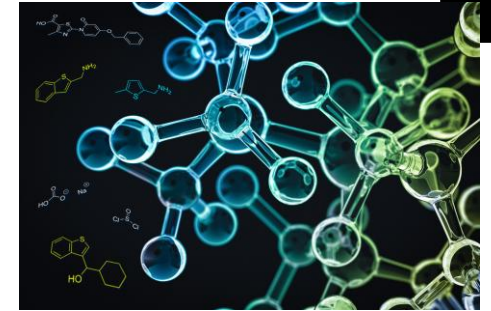
- Since World War II, the **production of synthetic chemicals** has increased exponentially.
- Today more than 70,000 **unique chemical moieties** and over 10 million **chemical mixtures, formulations and blends** are in **commercial use** and are registered with the U.S. Environmental Protection Agency.



# Environmental medicine

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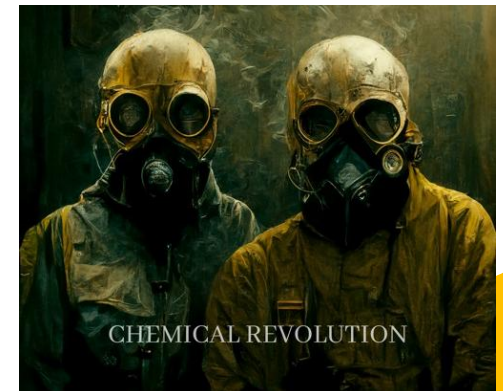
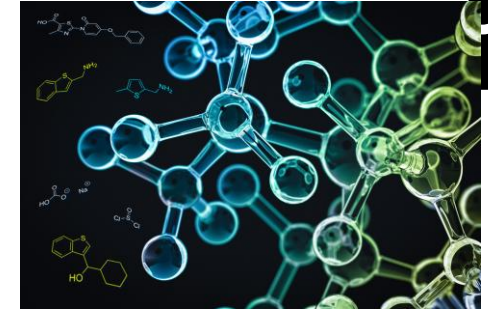
- A consequence of this 'chemical revolution' has been the release into the environment of an extraordinary variety of synthetic chemicals.



# Environmental medicine

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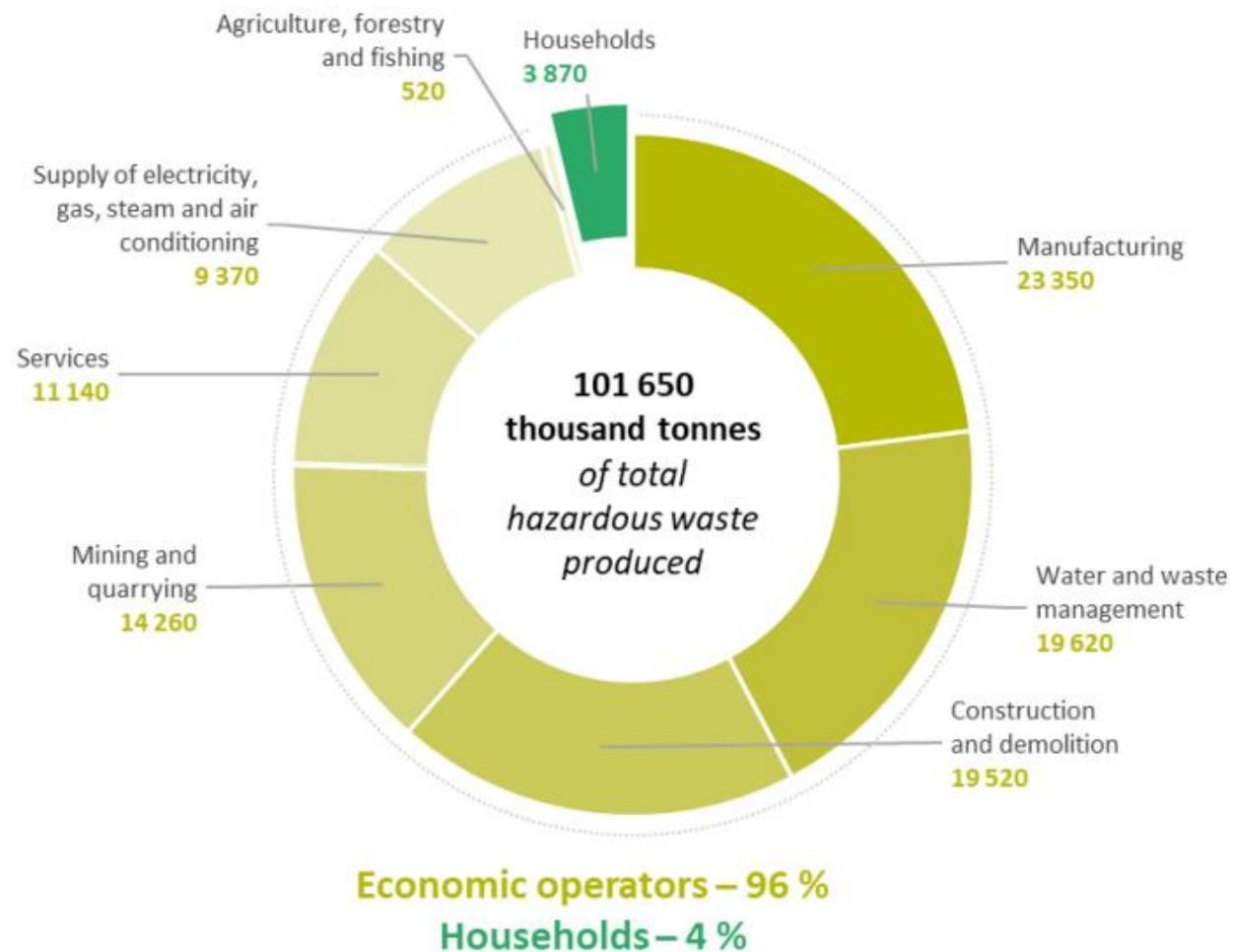
- According to Department of Community Medicine Mount Sinai School of Medicine, New York, **American industries** reported the **release of 3.39 billion pounds of chemical waste** into **air, water or soil**.
- These releases included **carcinogens, toxins**, as well as thousands of chemicals with **untested and unknown toxic potential**.



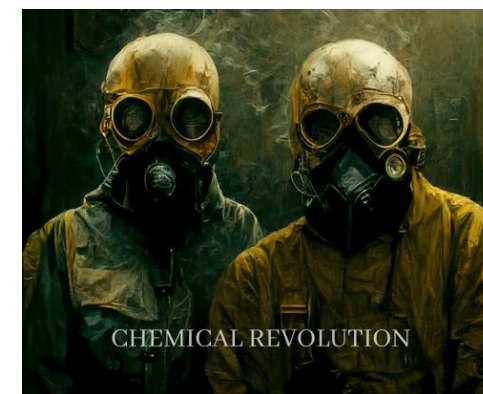


# Environmental medicine

E.U. 2018 – 101 650 tonnes of hazardous waste

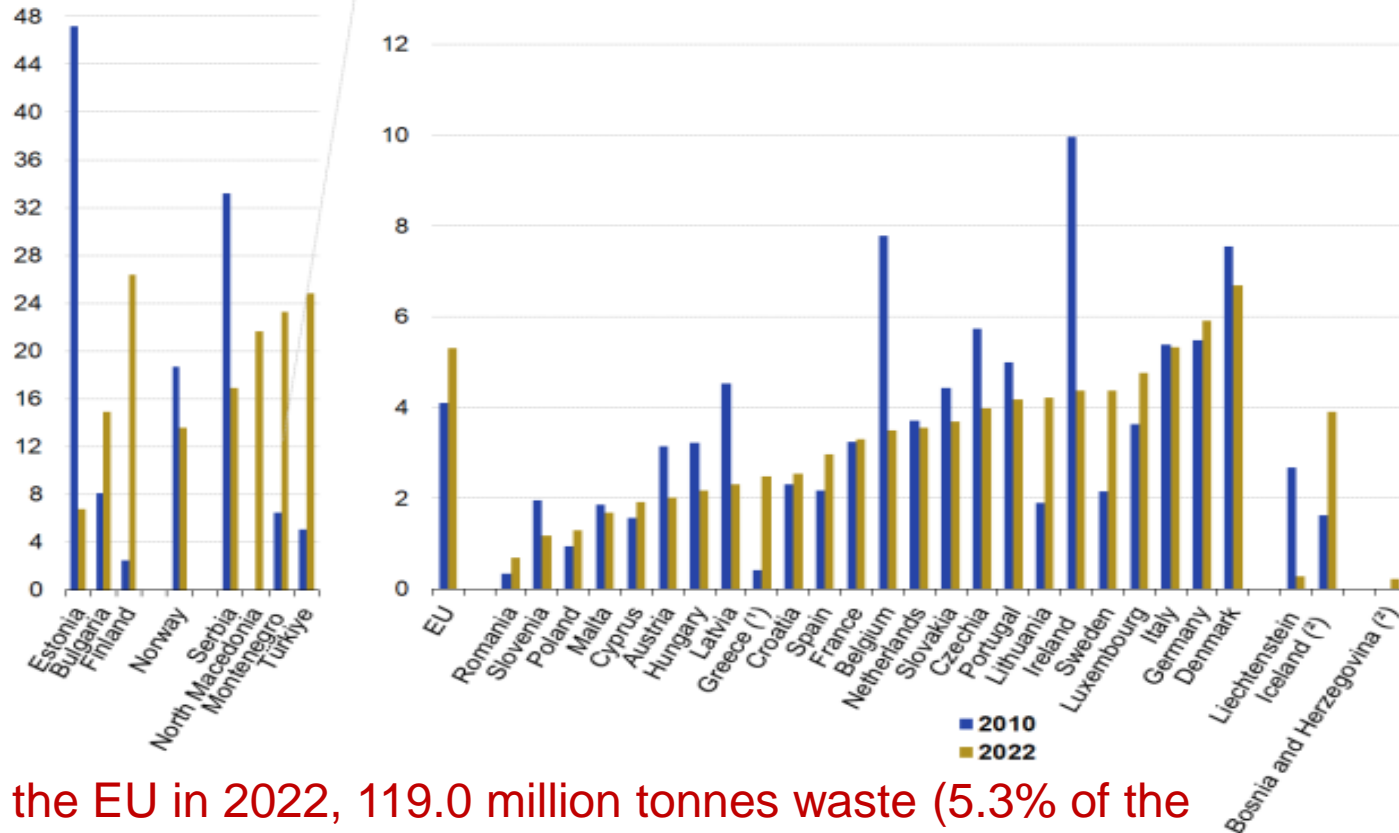


Source: ECA, based on Eurostat data.



# Environmental medicine

Hazardous waste generated, 2010 and 2022  
(% share of total waste)

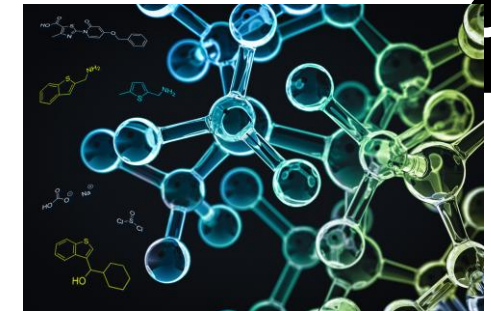


in the EU in 2022, 119.0 million tonnes waste (5.3% of the total) were classified as hazardous waste.

Note: sorted on 2022 data. The two parts of the figure have different scales for the y-axis

(\*) provisional data (\*\*) 2020 data (\*) 2010: not available.

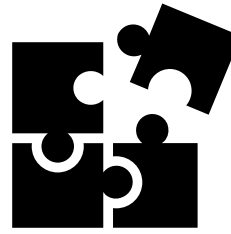
Source: Eurostat (online data code: env\_wasgen)



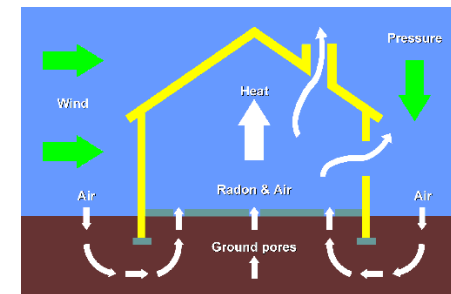
[https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste\\_statistics#Hazardous\\_waste\\_generation](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics#Hazardous_waste_generation)



# Exploring the Impact of Environmental Factors on Human Health



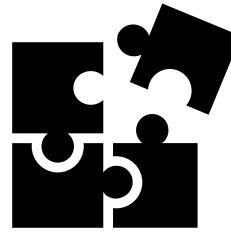
- Exposures to chemicals have been shown to **irritate the nose and throat**, and to produce a **wide spectrum of illnesses**.
- They include classic, well-described environmental diseases such as **cancer of the bladder in benzidine dye workers** (rubbers, and in the manufacture of plastic films), **leukaemia and lymphoma in people exposed to benzene** (plastics, lubricants, rubbers, dyes, detergents, drugs, and pesticides).





# Exploring the Impact of Environmental Factors on Human Health

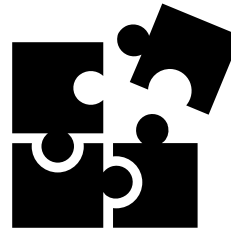
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- They also include more recently recognized entities such as:
- **asthma and respiratory problems** in children and adults chronically **exposed to particulate air pollution**,
- **reproductive problems** in men and women exposed to certain **pesticides**,
- **dementia** in people **exposed to solvents**.







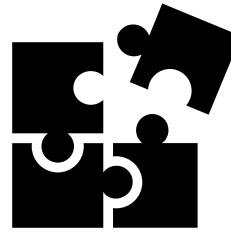
# Exploring the Impact of Environmental Factors on Human Health

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- Some of these diseases are **acute**; others are **chronic**.
- Some are manifested through **obvious symptoms**, whereas others involve **subtle degrees of dysfunction**.



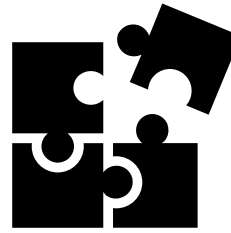
# Exploring the Impact of Environmental Factors on Human Health



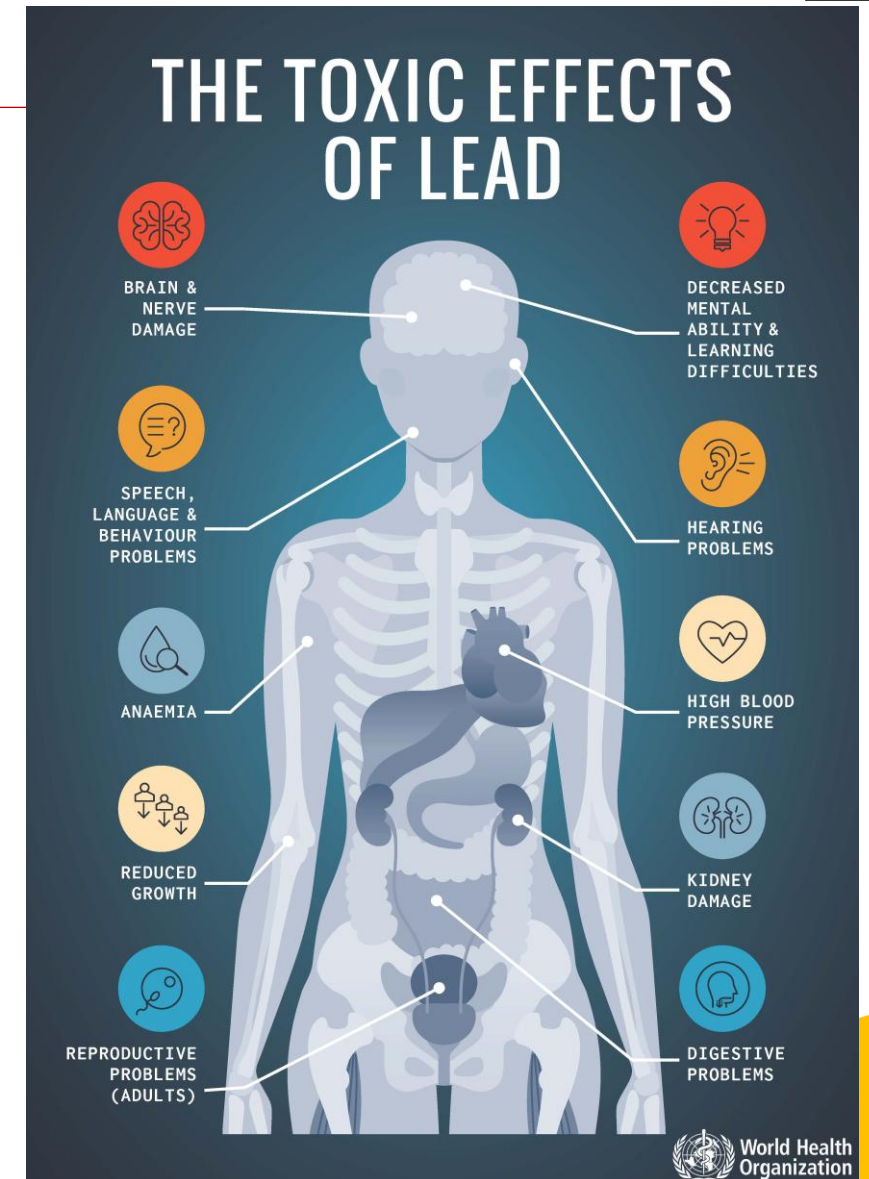
- Physicians often have **difficulty in recognizing the contribution of environmental factors** to the aetiology of disease.
- This difficulty reflects the fact that **most environmental illnesses** are not **clinically distinct from diseases caused by other factors**.

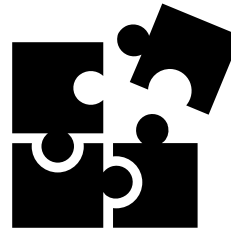


# Exploring the Impact of Environmental Factors on Human Health



- For example, the symptoms of:
- **lead poisoning** in **industrial painters** or by **ingestion of lead salts** from **lead glazed ceramics** used as **drinking vessels**, mainly in developing countries are nonspecific, namely, **headaches**, **abdominal pain** and **muscle weakness**.





# Exploring the Impact of Environmental Factors on Human Health

- The **esophageal, larynx and lung cancer** caused by **asbestos** (construction workers) is clinically and pathologically indistinguishable from that caused by **cigarette smoking**.



## The Effects of Asbestos Exposure

### ESOPHAGUS

Asbestos can cause esophageal cancer when fibers are inhaled or swallowed.

### NOSE AND MOUTH

Asbestos fibers can be inhaled through the nose and mouth or swallowed when eating or drinking.

### LARYNX

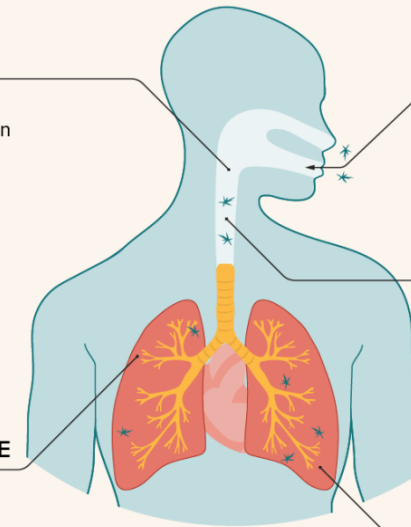
Cancer of the larynx, or voice box, can also be caused by long-term asbestos exposure.

### PLEURAL MEMBRANE

Asbestos exposure can cause scar tissue or cancer to form in the lining of the lungs, constricting them and making it very difficult or painful to breathe.

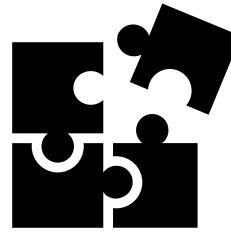
### LUNG TISSUE

Exposure to asbestos is a known cause of lung cancers, specifically mesothelioma.

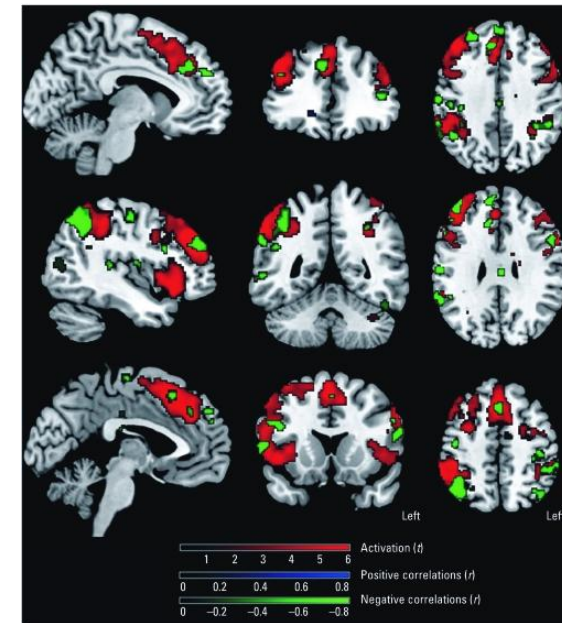
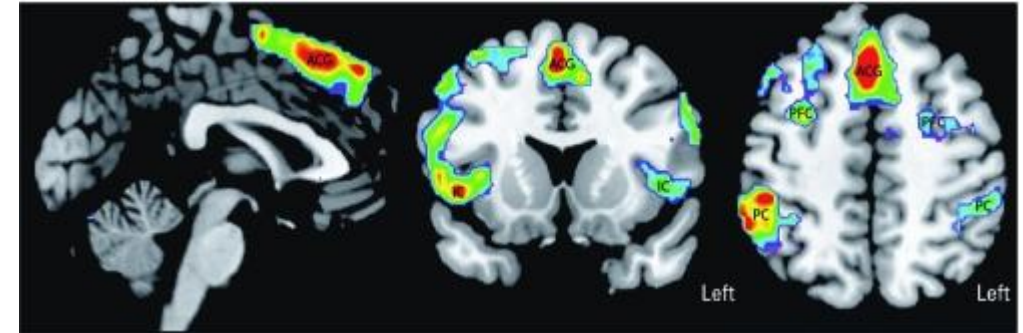




# Exploring the Impact of Environmental Factors on Human Health



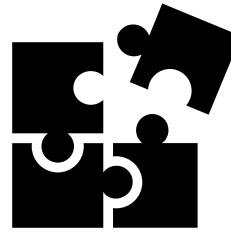
- **Dementia** caused by solvent exposure differs little in its presentation from idiopathic Alzheimer's disease.
- **Anatomical studies of solvent exposure** in humans have shown **diffuse atrophy** in the **cerebellar regions, brainstem, frontal cortex**.



Maps of significant correlations ( $p < 0.001$ ) between activation and lifetime solvent exposure in painters

# Exploring the Impact of Environmental Factors on Human Health

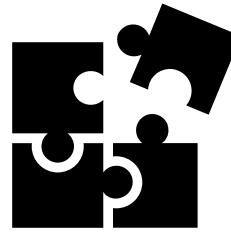
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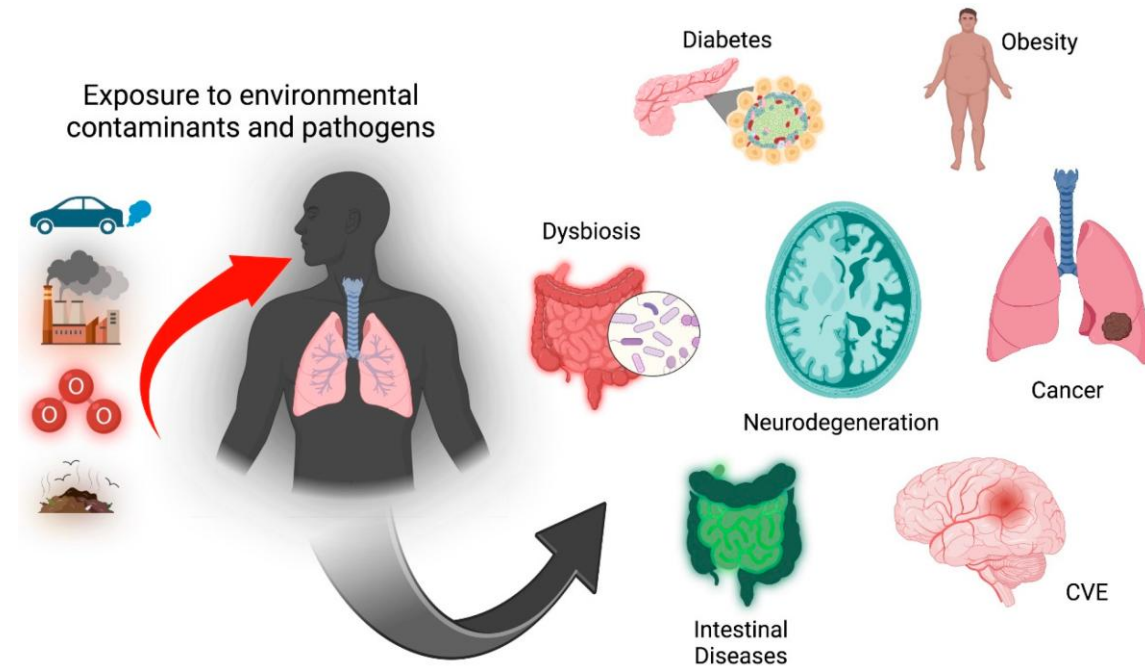
- The diagnosis of **environmental disease** is complicated further by the **long latency** period **between a toxic exposure** and the **appearance of illness**.
- **Asbestosis, mesothelioma, and lead poisoning in industrial painters**, are hardly likely to be anything other than **purely occupational in origin**.

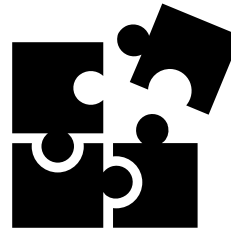


# Exploring the Impact of Environmental Factors on Human Health



- The **recording of injuries** is generally more reliable because injuries are **immediately obvious** and occur at a definable point in time.
- By contrast, **cause and effect in environmental diseases** may be far from obvious, and **exposure to hazardous materials** may have occurred many years beforehand.






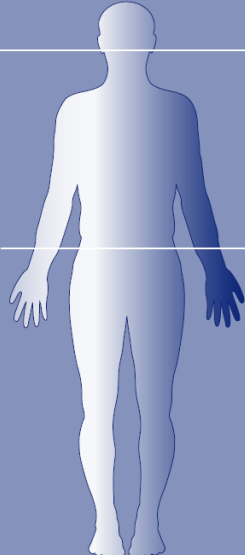
# Assessment of disease clusters

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- A **cluster of disease** is an **excess incidence in a defined population**, over a relatively short period (less than a day for acute complaints to several years for cancer).



ATSDR  
AGENCY FOR TOXIC SUBSTANCES  
AND DISEASE REGISTRY



*Case Studies in  
Environmental Medicine*

Course: SS3096  
Date: August 2002  
Expiration Date: September 30, 2008

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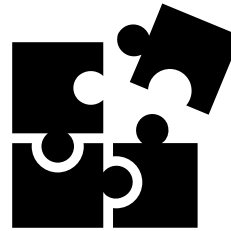
**DISEASE CLUSTERS:  
AN OVERVIEW**

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*Environmental Alert*

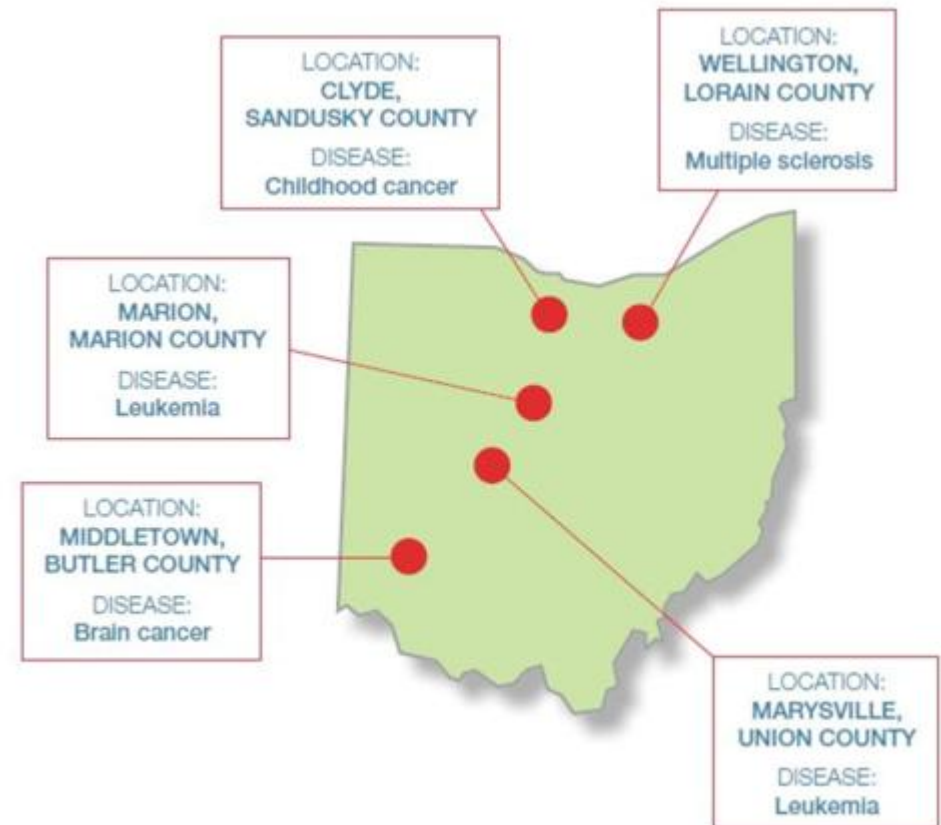
- Busy clinicians are often expected to respond to patient inquiries about disease “cluster” events in their practices.
- Cluster events are groupings of a particular disorder or a class of disorders that appear unusually frequent in a place.

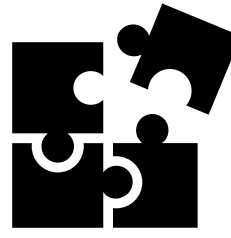




# Assessment of disease clusters

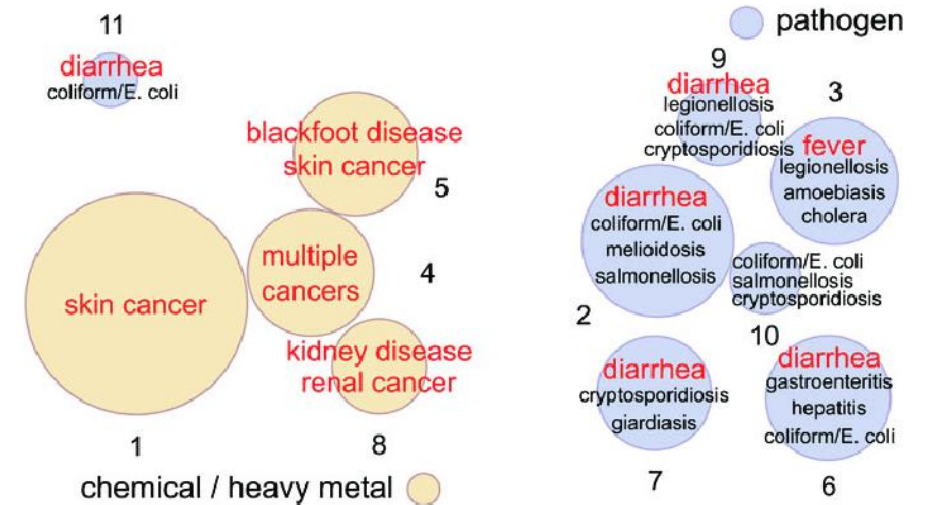
- The **extent** to which a cluster is investigated depends on the **level of suspicion of an underlying hazard**.
- For example, the link between **nickel refining** and **nasal cancer** was first discovered when **two cases occurred at the same factory** within a year.

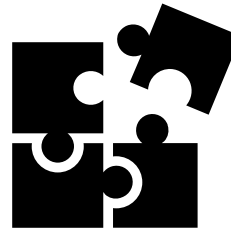




# Assessment of disease clusters

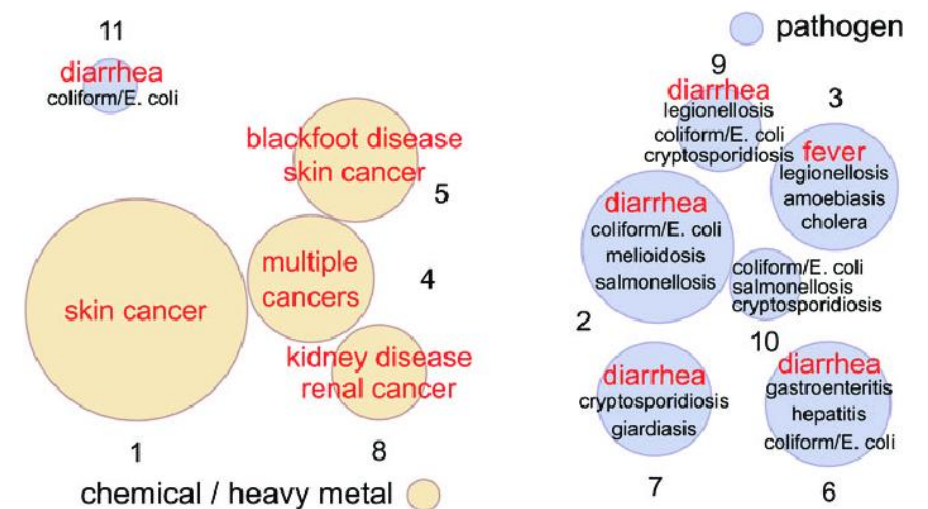
- Unusual events such as clusters occur all the time, especially in large populations.
- From a statistical perspective, it is almost inevitable that some schools, church groups, friendship circles, and neighborhoods will be associated with clusters of chronic diseases.



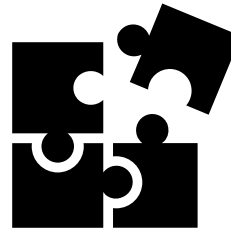


# Is there a true cluster?

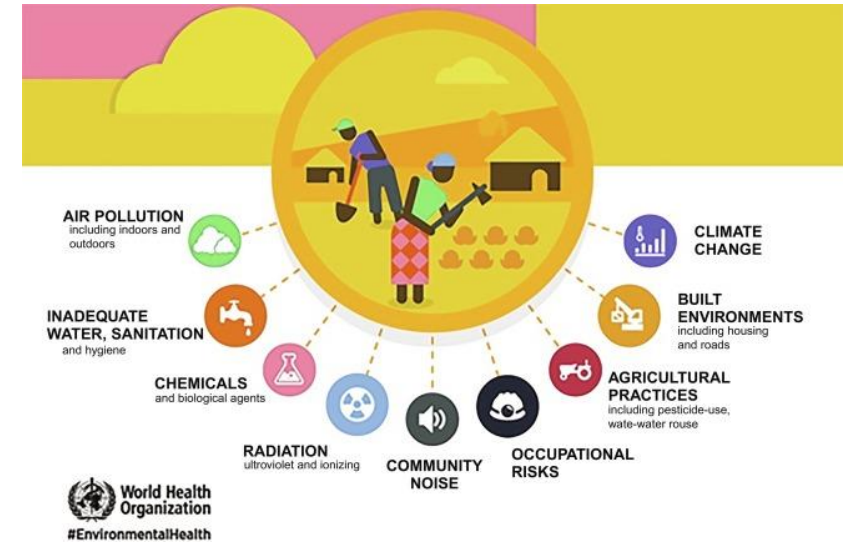
- The first step is to **specify the disease and time period of interest** and to confirm the diagnoses of the index cases that prompted concern.
- Of three cases of brain cancer, two might turn out to be secondary tumors from different primary sites.
- If **suspicion remains**, it is **worth searching** for further cases.



# Exploring the Impact of Environmental Factors on Human Health

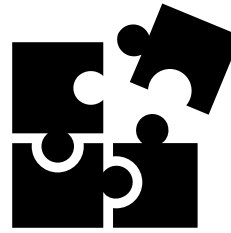


- Exploring the impact of environmental factors on human health encompasses a broad range of topics, including **air quality, water pollution, exposure to chemicals and toxins, climate change**, and more.
- We will explore this topics in more detail over the next few lectures:

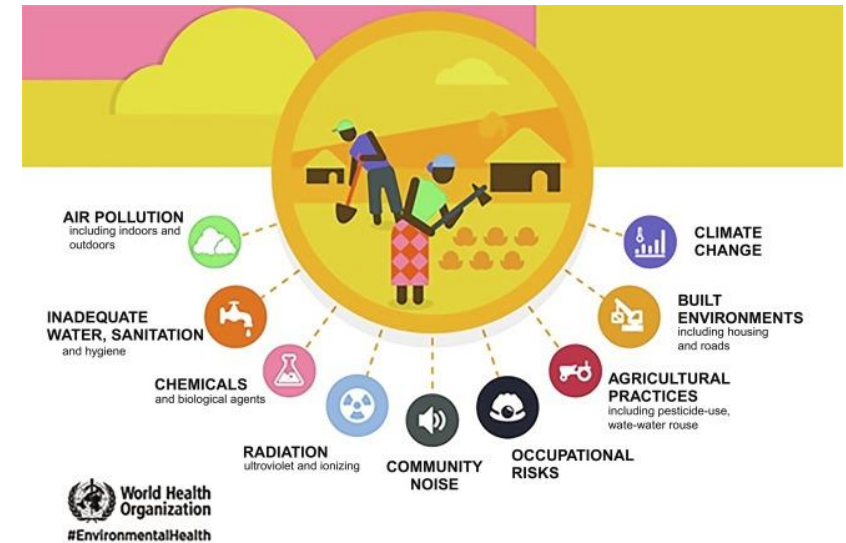




# Exploring the Impact of Environmental Factors on Human Health

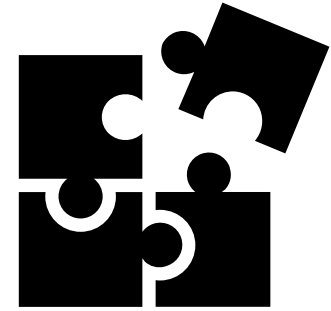


- Impact of air pollution on human health
- Effects of pesticides on the ecosystem and public health
- Contamination of drinking water and health risks
- Health risks associated with climate change
- Hazards of food contaminants and their effects on health
- Importance of environmental medicine in the prevention of chronic diseases



# Evaluation at the end of semester:

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- A **project tracking** the incidence of a **specific additive** in your **everyday food, cosmetics, or household cleaning** products.

Or

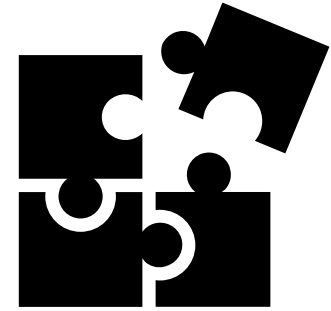
- An **analysis of air quality** over one week using **Windy app** for monitoring.
- [ivan.alexandra@umft.ro](mailto:ivan.alexandra@umft.ro)



# Evaluation at the end of semester:

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- **Windy** is a professional weather app.
- Weather forecast, live world wind map, and local weather reports
- Track the main air pollutants such as CO, NO<sub>2</sub>, SO<sub>2</sub>, surface ozon and particulate matter PM<sub>2.5</sub> and PM<sub>10</sub> with Air quality station

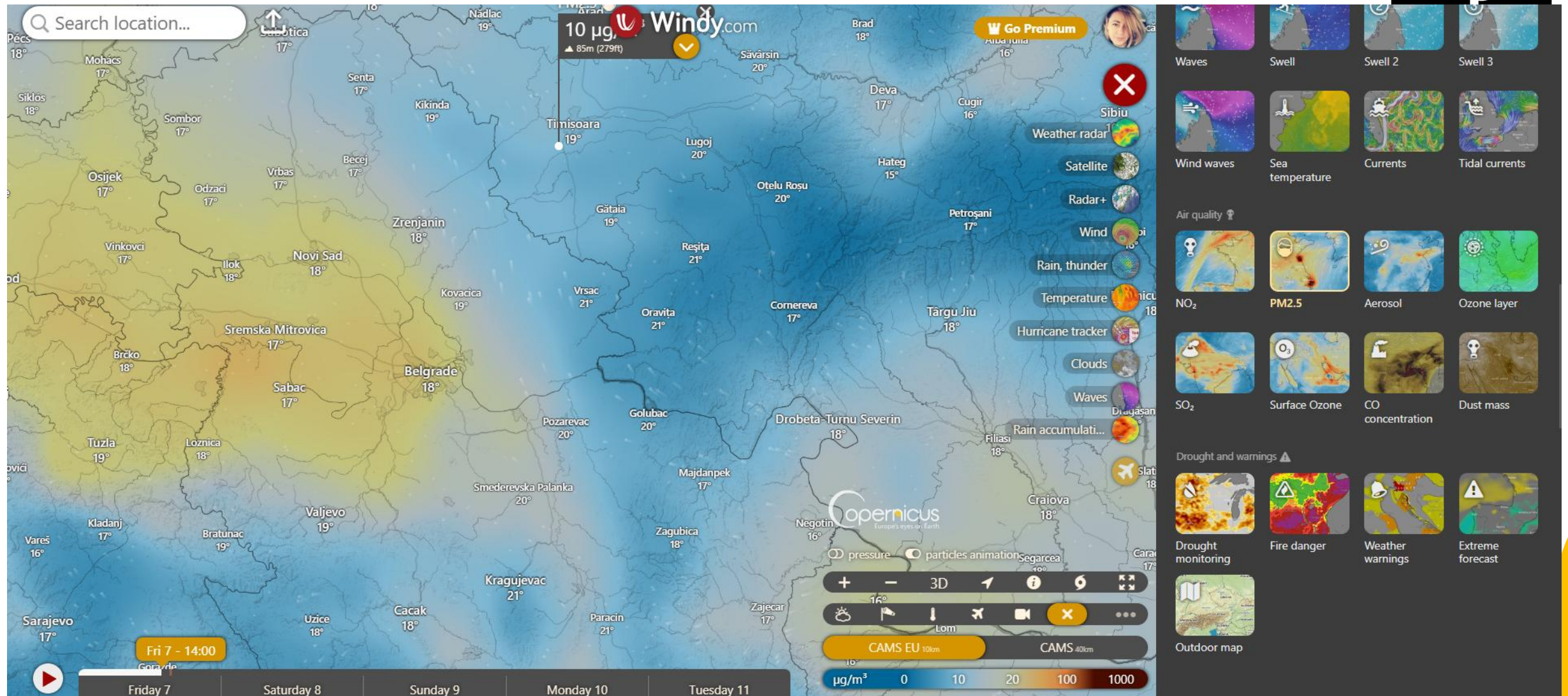
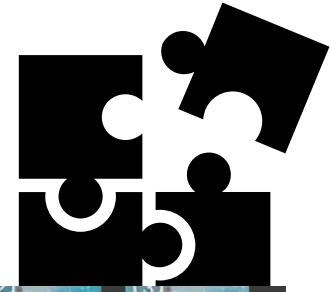






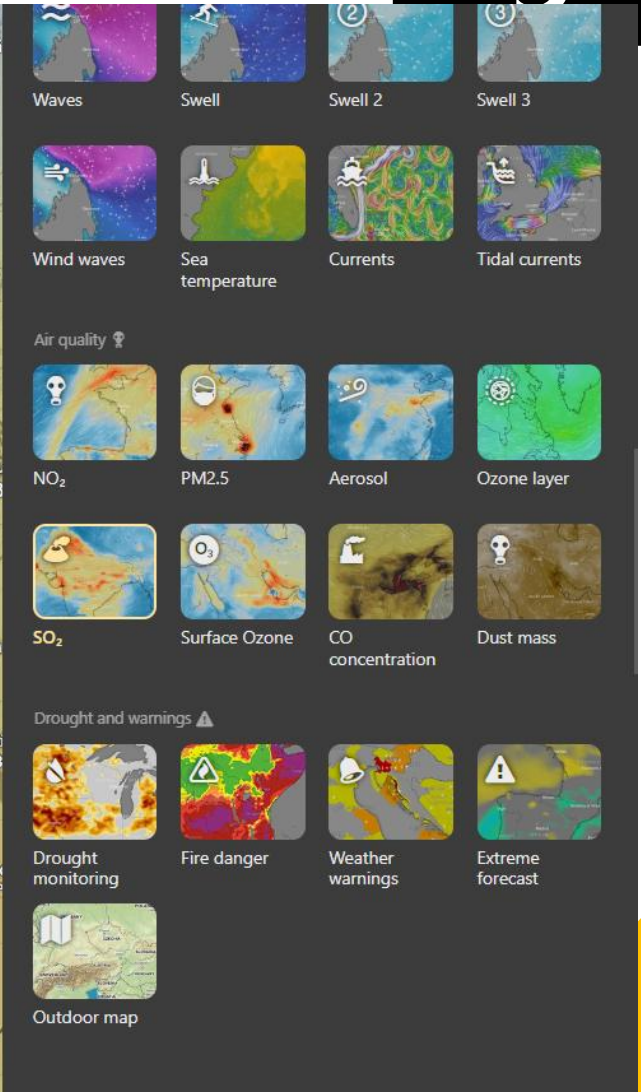
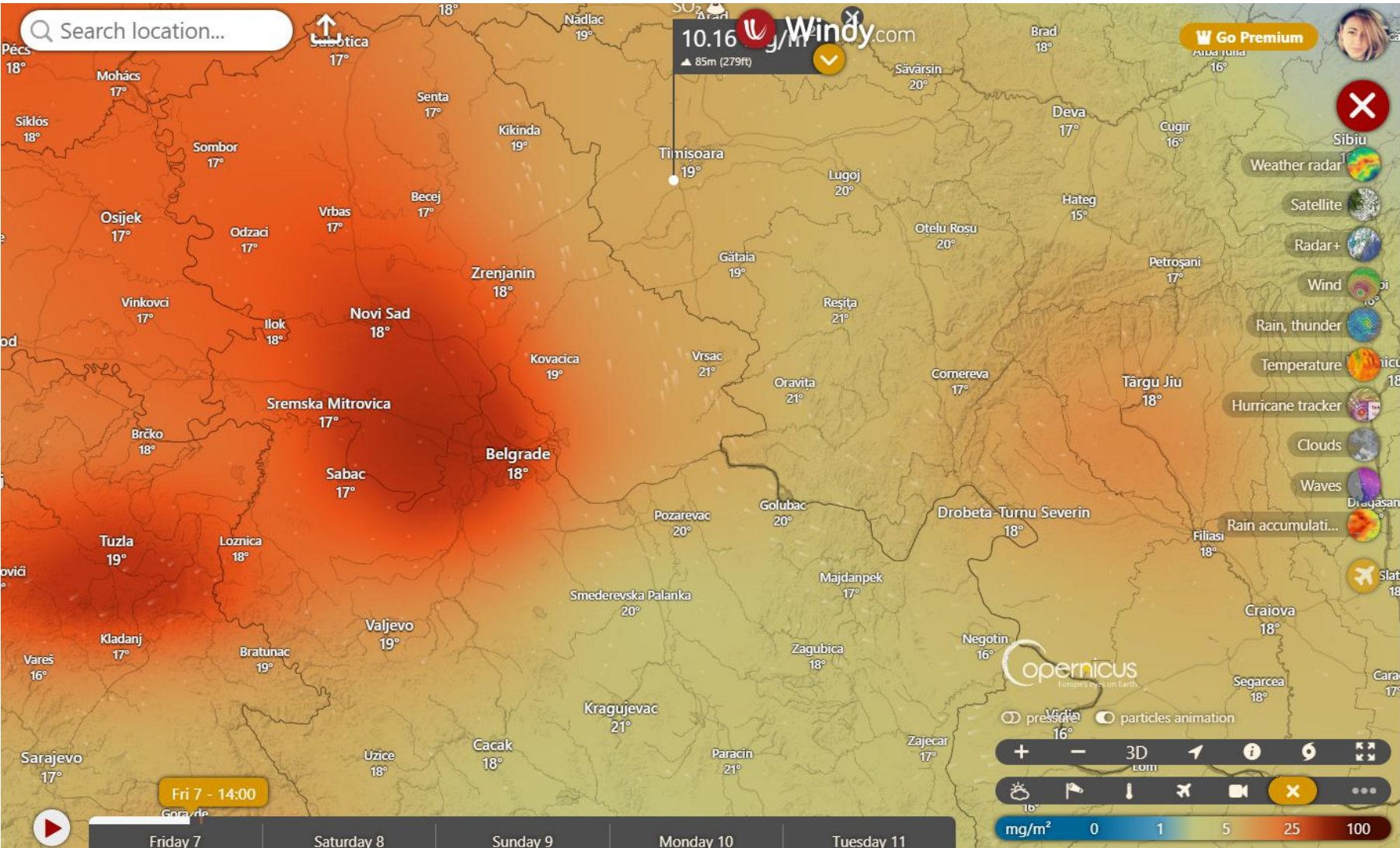
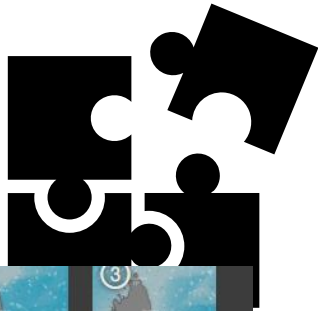


# Particulate Matter PM 2.5



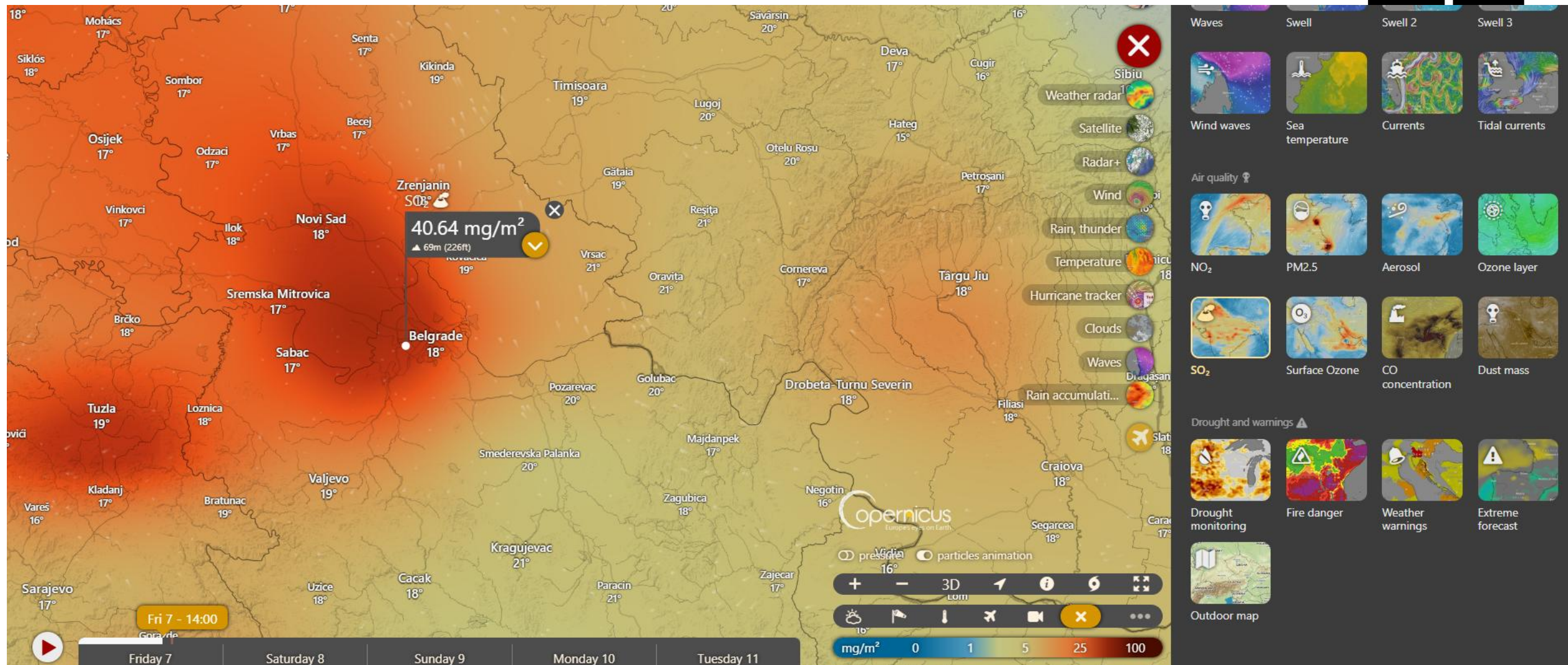


# Sulfur Dioxide - SO2



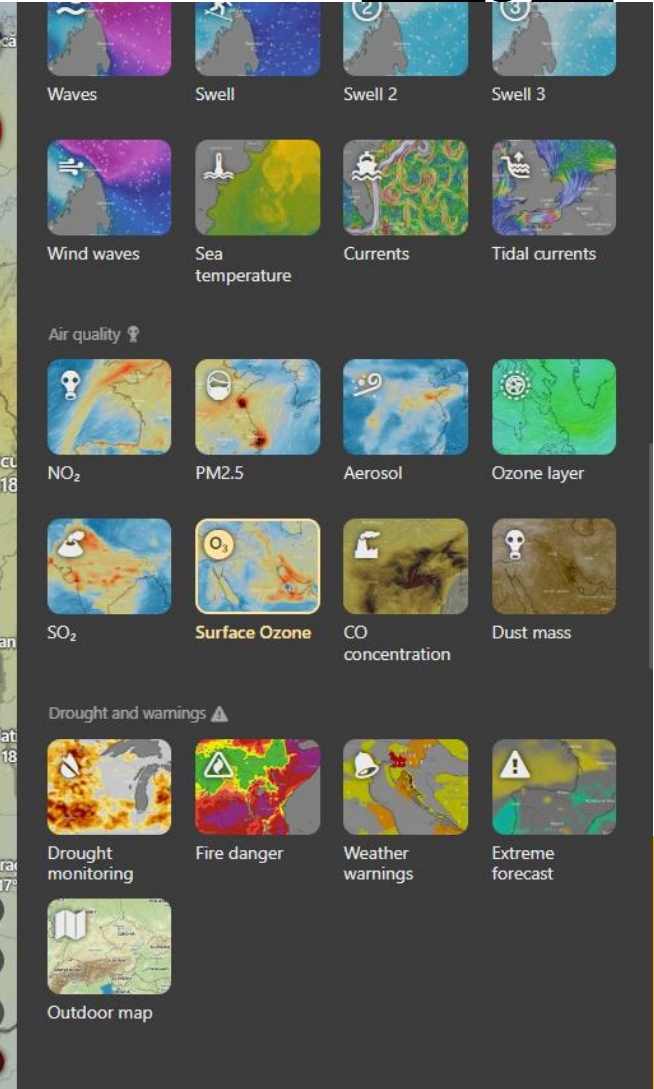
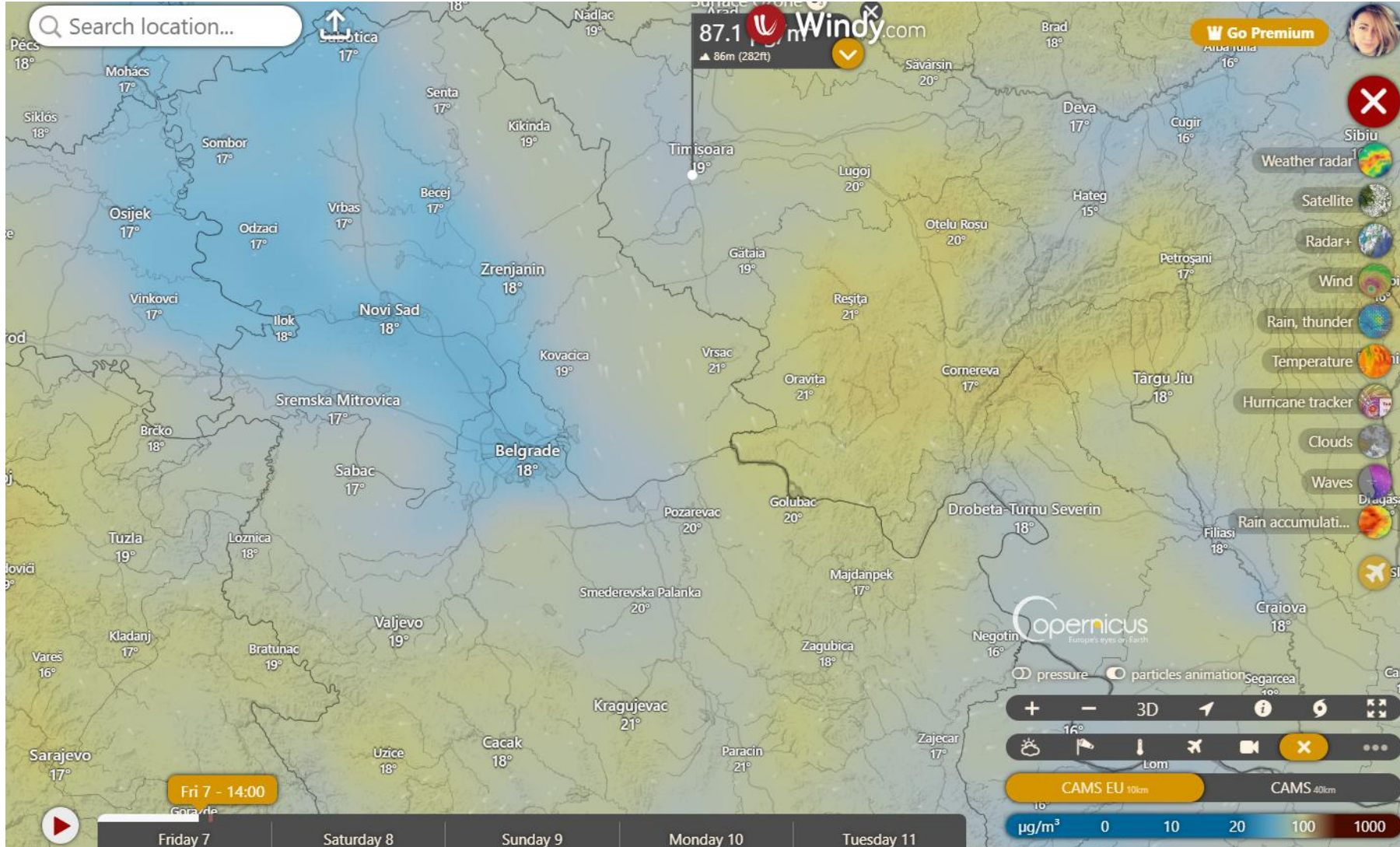
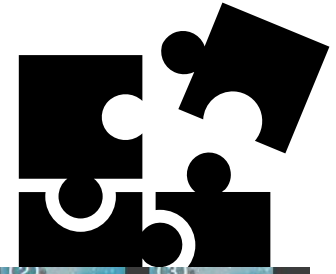


# SO2



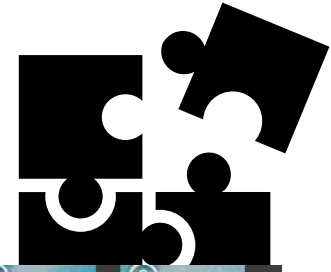


# Surface ozone





# Carbon monoxide - CO

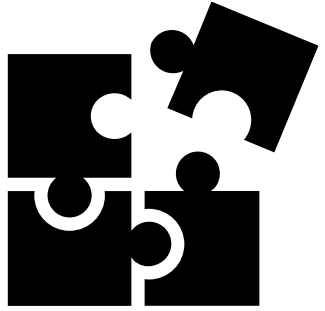






# Project structure

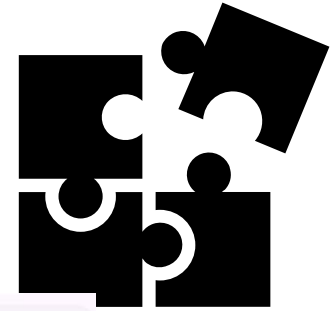
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**Download Windy** (laptop - [windy.com](https://www.windy.com) or phone)

- Identify and describe the chosen pollutant (**NO<sub>2</sub>, SO<sub>2</sub>, surface ozon, CO, PM 2.5, dust mass**), including its sources, potential interactions with other pollutants, and its environmental and health impacts.
- Choose a location and collect daily measurements of the pollutant over a two-week period.
- Organize the data in an Excel table and calculate the weekly averages.
- Create a chart to visualize the variations in pollutant levels over time.
- Interpret the findings and draw conclusions regarding the trends observed and potential contributing factors.

# Evaluation at the end of semester:



The Avoid Food Additives app

Is an application that helps you identify all those food additives that harm your health.

Or any alternative app.

