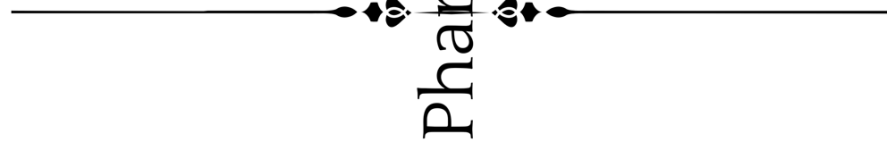


The Pharma Map

Source

Target



UNIVERSITÀ
POLITECNICA
DELLE MARCHE



UNIVERSITÄT
ZÜRICH
SEIT 1385



University
of Stavanger



UNIVERSIDADE DA CORUÑA



CSIC



Aquatic
Pollutants

THE PHARMA MAP

Objective of the Game

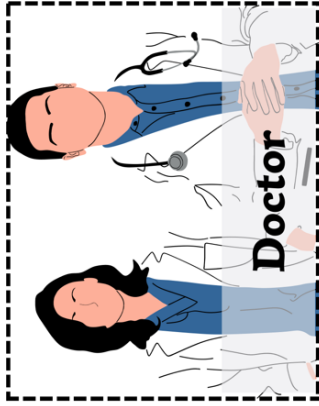
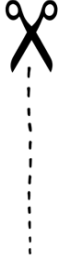
The goal of "THE PHARMA MAP" is to discover all stakeholders involved in the environmental issues of pharmaceuticals as contaminants of emerging concern, unravelling connections and relationships among them. Citizens will learn their role and contribution to this important network.

Game development

A set of cards, representing different elements related to pharmaceuticals (e.g., pharmaceutical industries, regulatory bodies, healthcare providers, citizens, sea), will be provided.

Players must place the cards on the board in the 'Source' or 'Target' section, depending on whether the element depicted on the card causes or is affected by pharmaceutical pollution, explaining the relationship between the element in the image and the pharmaceuticals.

An expert by guiding the player step-by-step through the game, will help the player understand the relationship between the various elements involved, particularly how citizens participate in this network. The expert will provide scientific explanations and information about good practices to adopt or bad habits to correct for reducing the environmental impact caused by pharmaceuticals.



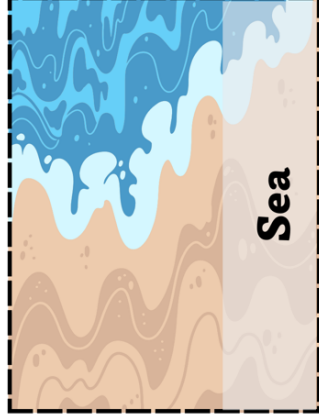
Doctor



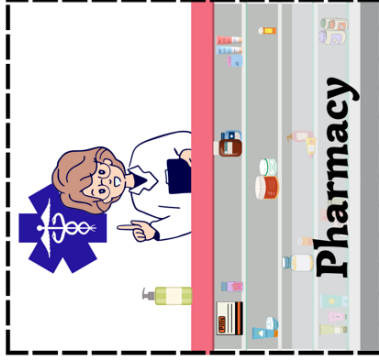
Scientific community



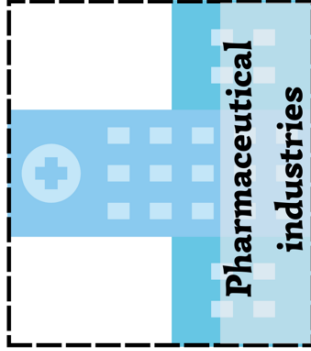
Lawmaker



Sea



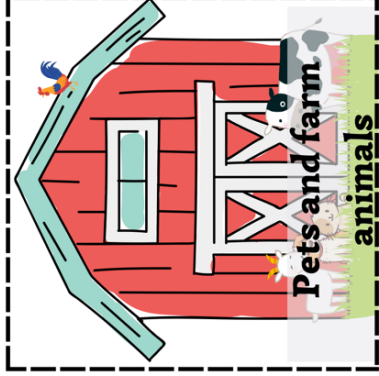
Pharmacy



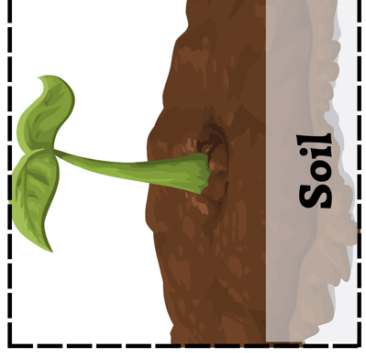
Pharmaceutical industries



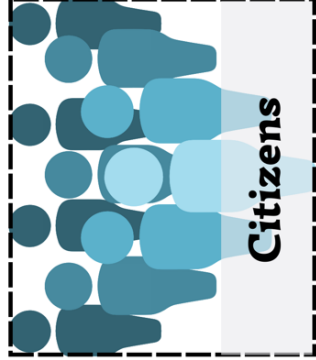
Veterinarian



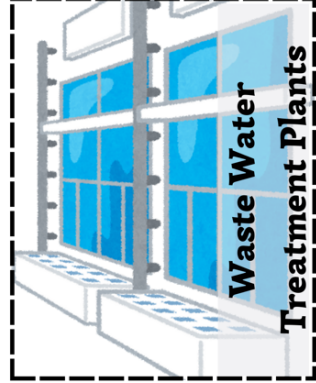
Pets and farm animals



Soil



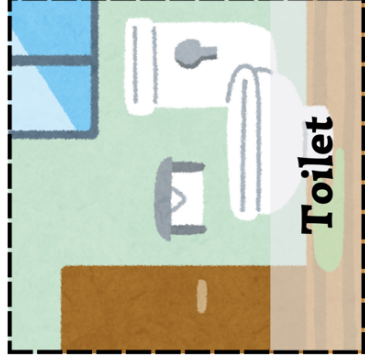
Citizens



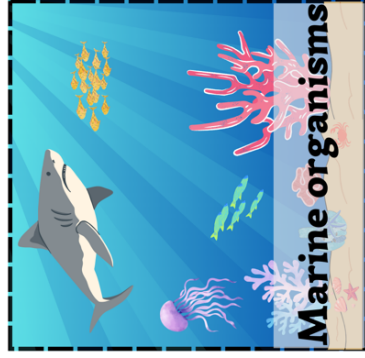
Waste Water Treatment Plants



Terrestrial animals



Toilet



Marine organisms

Game Resolution – Cards disposition

As can be seen, some cards are placed as both 'Source' and 'Target'. This is because some cards, (e.g. citizens), can represent both a cause and a target of drug pollution. By placing both in source and target we can better explain the complicated relationship between all elements.

The cards with highlighted edges in the next page can be placed in both areas of the map.

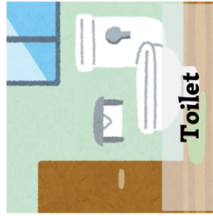
Source



Doctor



Pharmacy



Toilet



Veterinarian



Scientific community



Pharmaceutical
industries



Waste Water
Treatment Plants



Pets and farm
animals



Lawmaker

Pharma



Lawmaker



Waste Water
Treatment Plants



Citizens

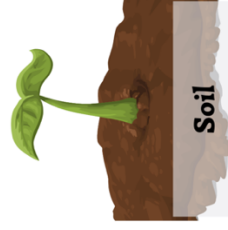


Terrestrial animals

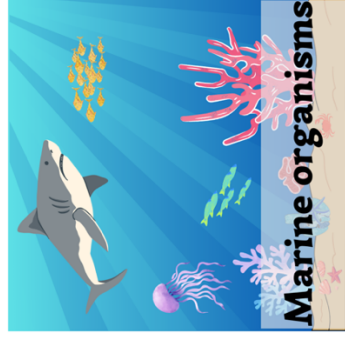
Target



Sea



Soil



Marine organisms

Source: This section contains all the elements related to the consumption or release of pharmaceuticals into the environment.

Target: This section includes all the elements that are subject to pollution from pharmaceuticals.

Doctors, scientists, veterinarians, pharmacies, and pharmaceutical industries are the elements involved in drugs development, production, prescription, or deliver. **(source)**

Citizens, pets and farm animals are pharmaceuticals end-users, but can also contribute to drugs reintroduction into the environment, through feces/urines or, in the case of citizens, through improper disposal. **(source/target)**

The **toilet** represents an incorrect medications disposable element or, simply, it is where human feces and urines containing not fully metabolized pharmaceutical active principles passes. **(source/target)**

Wastewater treatment plants receive urban and industrial wastewater where human and animal pharmaceuticals can be present. Since they are not designed to remove pharmaceuticals, they can contribute to their release into environment. **(source/target)**

Although still lacking, regulation of pharmaceutical compounds in the environment is crucial for reducing the impact of this class of contaminants in aquatic ecosystems. For this reason, the element "**lawmaker**" is considered both a **source** (the lack of laws in this field can represent a possible cause of their widespread release) and a **target**.

The **sea** and **soil**, along with their inhabitants (**marine and terrestrial animals**), are considered elements that suffer from pharmaceutical pollution. **(target)**