



DHI SOLUTION

MANAGING HOSPITAL WATER AND WASTEWATER

Minimising health risks and environmental impact

Pharmaceuticals can pose a serious threat to aquatic environments. Hospital wastewater is a key source of this pollution, which local wastewater treatment plants are often ill-equipped to handle. In addition, clean potable water is necessary in order for hospitals to safeguard patients' health. As such, it is vital that hospitals keep their potable water supply safe and treat their wastewater before it is discharged. Using our knowledge and experience, we can assist you with developing cost-effective ways to manage and treat your water and wastewater. This will help you to have consistently high potable water quality, benefitting patients' health. It will also aid you in protecting the environment.

MINIMISING THE HEALTH RISKS IN POTABLE WATER

Pathogens such as Legionella, norovirus and cryptosporidium in potable water can pose a risk to the health of hospital patients as they are more susceptible to even low exposure to pathogens. For this reason, secure, high-quality potable water is essential. In order to keep potable water in hospitals safe, health risk assessments of the water supply and efficient water quality control technologies are vital.

We can help hospitals identify critical pathogens in their potable water network and ensure consistent high-quality potable water. In cooperation with different technology suppliers, we use an online sensor system that monitors potable water quality. Our monitoring system can send alerts to users via SMS, enabling hospitals to take necessary actions immediately. The same tool, which includes optical spectra measurement, can also be used to control effluent quality after wastewater treatment.



Collecting wastewater from the University Hospital of Copenhagen to test wastewater treatment methods. © DHI

SUMMARY

CLIENT

- Hospitals
- Environmental authorities
- Health sector institutions

CHALLENGE

- Difficulty assessing health and environmental risks of hospital wastewater
- Need for secure, high-quality potable water in hospitals
- Danger of waterborne infections for hospital patients
- Need to comply with local water emissions regulations

SOLUTION

- Efficient screening tools to assess the quality and environmental risks of hospital wastewater
- Customised and cost-effective treatment solutions for potable and wastewater
- Early warning monitoring system to identify waterborne pathogens

VALUE

- Minimisation of environmental impact on local water areas from hazardous pharmaceuticals and pathogens
- Cost-effective treatment of potable water and wastewater
- Decrease in risk of waterborne infections
- Compliance with water emissions regulations from local water authority
- Improved green image

In addition, we can set up a management plan that specifies the actions needed to minimise health risks, including:

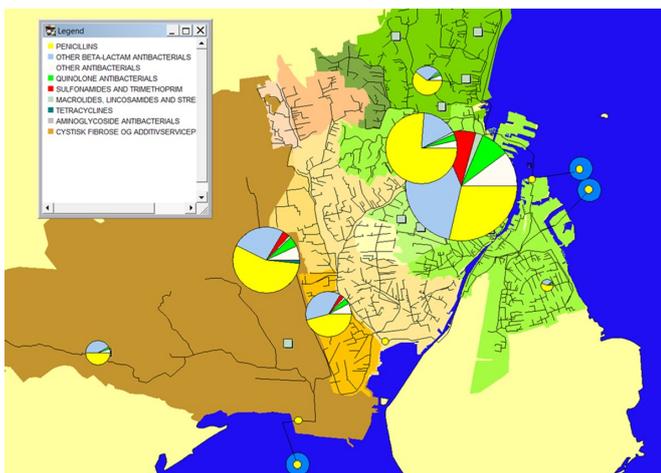
- implementation of disinfection technologies, placed at strategic locations – before intake, inside the network, and at endpoints, such as bathrooms
- strategic monitoring campaigns
- low-tech solutions, such as higher temperature or more frequent water changes in specific parts of the network

USING PHARMACEUTICAL CONSUMPTIONS MAPPING TO ASSESS ENVIRONMENTAL RISKS

Hospital wastewater contains a complex mixture of active pharmaceutical ingredients and microorganisms. Often, this wastewater is discharged to municipal wastewater treatment plants (WWTPs) without any pre-treatment. The municipal WWTPs are not designed to remove persistent pharmaceuticals. In addition, the hazardous wastewater may spread during flooding and combined sewer overflow events.

Internationally, there is increasing focus on the potential environmental effects of pharmaceuticals in water environments. Hospitals have been identified as a key source of pharmaceuticals that can act as potent micropollutants. Painkillers such as diclofenac and hormones, for example, can have fatal effects on fish, crustaceans and algae at very low doses.

Our PHARMACEUTICALS tool can help you perform an environmental risk assessment of your hospital's pharmaceutical contribution to the local WWTP and water area. It maps the use of pharmaceuticals in hospitals and the wider population. The results give documentation to support targeting efforts for the most environmentally dangerous substances.



Mapping and environmental risk assessment of discharges of pharmaceuticals from hospitals in the Greater Copenhagen area. © DHI

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COST-EFFECTIVE, ADVANCED WASTEWATER TREATMENT

We utilise a variety of methods to help you determine the best way to manage your hospital wastewater, as well as to satisfy local water emissions regulations including:

- collection of specific ingredients
- substitutions
- advanced treatment methods

Using our knowledge and experience, we can help you determine the most cost-effective wastewater treatment solution. We can analyse the efficiency of a broad range of advanced technologies to treat hospital wastewater, both in the laboratory and pilot scale. We have already tested the effectiveness of the following to remove persistent and toxic pollutants such as antibiotics, cytostatics and hormones:

- membrane bioreactor (MBR) as a pre-treatment
- oxidation through ozonation
- advanced oxidation process (O₃+H₂O₂)
- powdered activated carbon (PAC) & granulated activated carbon (GAC)

Based on our tests, we found that these can be used in different combinations to effectively treat hospital wastewater. After treatment, the concentration of pharmaceuticals was below the level at which organisms living in water would be adversely affected. This means that the wastewater quality was high enough to be:

- discharged directly into local water areas
- reused as technical, cooling or recreational water

IMPROVING HOSPITAL WATER & WASTEWATER SYSTEMS

Whether a hospital is under construction or being renovated, we can assist you in:

- integrating water quality measures into your distribution network design to ensure consistently high water quality
- integrating optimal wastewater treatment into hospital construction plans
- getting water authority permission to discharge treated wastewater into the local water area
- planning and identifying possibilities for reusing treated wastewater