Case study on „the use of Artificial Intelligence in healthcare“

Case study introduction

The aim of this case study is to better understand the complexities and controversies around applying the precautionary principle to the use of artificial intelligence (AI) in healthcare. The focus in the case has been specifically on the use of AI in clinical decision support systems. Clinical Decision Support System(s) (CDSS) are systems that support the decision making of healthcare professionals. CDSS for example provide clinicians with alerts or reminders, highlight guidelines during care, provide suggested courses of action and identify drug-drug interaction. CDSS have historically been one of the main applications of AI in the medical domain and their risks are in many respects exemplary for the risks of the use of AI in healthcare in general.

Relevance to the precautionary principle

The case indicates that the precautionary principle may be applicable to the use of clinical decision support systems, but only in specific circumstances. A variety of scientific research suggests that human rights and public health are at issue in some uses of CDSS. Because of the difficulty to define the specific outcome and statistical probability of the risks in many cases, the precautionary principle is more suitable than the principle of prevention.

The precautionary principle may point to appropriate regulatory and technical boundary setting for CDSS, for instance by limiting the medical procedures in which a CDSS can be used or the amount of human oversight that is necessary for important decisions in healthcare.

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Potential impact

Many different types of CDSS exist, which also differ with regard to their risks and benefits. The risks of a malfunctioning CDSS that is used for combatting a pandemic are much greater than a CDSS that merely fulfils a harmless supportive administrative task. Nevertheless, a few things can be said about the impact of CDSS in general.

CDSS are generally assumed to provide faster, more accurate decision making with lower costs and fewer human errors. In some cases, CDSS might even make new decision-making (on the basis of big data) possible that could improve the overall efficiency and effectivity in healthcare.

The use of CDSS is first of all accompanied by considerable risks because decisions in healthcare itself tend to have a large impact. A wrong decision can potentially have severe effects on individual health, human rights and – if a CDSS is implemented on a broad scale or if it supports decisions on groups – public health.

CDSS, however, also pose new types of risks to the extent that they transform how decisions in healthcare are made. Their decisions are exclusively based on data, they are based on machine reasoning (and therefore a possible lack of human considerations), they imply a delegation of control from the patient or healthcare practitioner to a machine, and their use is accompanied by a new division of labour in the healthcare domain.

The precautionary principle may be applicable to the use of clinical decision support systems in some circumstances.

Key uncertainties

The risks of CDSS are generally characterised by a high degree of uncertainty, both with regard to their precise effects and with regard to their probability.

First of all, this uncertainty is highly dependent on the specific technological properties of a CDSS. It can, for instance, display complex and uncertain behaviour, especially when it makes use of unsupervised machine learning.

Clinical Decision Support Systems have historically been one of the main applications of AI in the medical domain.

Secondly, the use of CDSS is characterised by uncertain risks due to the nature of the environment in which it is implemented. Healthcare systems can be complex and unpredictable. Some CDSS, for instance, have to be readable, understandable and helpful in the context of the daily tasks of a doctor, the specific needs of a patient and the oversight of a manager and/or a privacy officer.

A third cause for the uncertainty around the risks of CDSS is the variability in the nature of the risks. A good decision is considered to be transparent, explainable, accountable, supported by representative data, sufficient reflection, respect for the privacy, autonomy and dignity of the patient. As such, assessing if a decision of a CDSS was 'good' is in itself a difficult task.

Further information

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For the **references** used for the case study, please look into the full report available at:
www.recipes-project.eu/results/case-study-8-use-artificial-intelligence-healthcare

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