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Title Workshop:

How to account for solidarity in treatment outcome prediction models? A case study from the 4D PICTURE project

Background

Increasingly, prediction algorithms are developed for healthcare settings to help predict expected treatment outcomes like survival, risk of complications or quality of life for individual patients. These data-driven decision-support tools (DSTs) aim to empower patients, support personalized care, improve health outcomes and promote health equity (by providing optimal decisions for underserved groups). The 4D PICTURE project will develop such data-driven DSTs for patients with breast cancer, prostate cancer and melanoma as part of care path redesign using a methodology called “MetroMapping”. These models will be developed to deliver input for shared decision-making in the treatment phase by predicting outcomes for different treatment options, in order to help patients make better informed treatment choices based on their personal characteristics, diagnosis and values.

Ethical Issue: unequal prevalence of risk factors across low and high socioeconomic status (SES)

To develop models that predict treatment outcomes and quality of life as accurately as possible for an individual patient, data points like COPD and diabetes may be relevant because they affect treatment outcomes. If included, the model will probably reflect this by calculating a lower chance of survival and quality of life for patients with COPD or diabetes after a certain treatment. As a consequence, the implementation of this model in clinical care could lead patients with COPD or diabetes to refrain from treatment because the risk of harm weighs more heavily than the chance of benefit, while patients who do not have these conditions may choose to take the treatment.

The ethical issue is that COPD and diabetes are more prevalent in demographic groups with a low SES. In most European countries, there is a life expectancy gap of about seven years between people with low SES and high SES. This is due to a complicated network of factors, e.g. health literacy, trust in healthcare, quality of housing and neighborhoods, financial stress, discrimination, working conditions etc. These factors interact and reinforce each other across generations and go beyond an individual’s ability to influence them. Together, they give rise to circumstances that stimulate the development of

COPD and diabetes, like an unhealthy diet and smoking behavior. Although this existing health inequality is very hard to counteract, most European countries consider it unfair and invest in prevention programs to decrease the health disparity between people with low SES and high SES, based on values like solidarity, equity and fairness. In this societal context, including COPD and diabetes in predictive algorithms to make the model more accurate may lead to a change in treatment choices for low SES patients as compared to high SES patients.

Workshop

In the workshop we will provide an ethical analysis of this issue based on the concrete questions we are faced with in the 4D PICTURE project. On the one hand, it is in the interest of both high SES and low SES patients to make the model as accurate as possible in order to make well-informed decisions. In low SES especially, this may prevent overtreatment (treatment with low chance of benefit but high risk of harm) resulting from overly positive predictions based on general patient population statistics. In addition, an advantage of these models is that they make the health gap between low and high SES more visible, which contributes to raising awareness. At the same time, implementation of prediction algorithms may lead to an increase in the value that is attached to outcome predictions and their cost-effectiveness in shared decision-making. If treatments are less cost-effective for COPD and/or diabetic patients due to their worse treatment outcomes, this consideration may unconsciously influence physicians in the way they present treatment options to the patients. At policy level, the use of algorithmic prediction may in the long run also create a greater focus on cost-effective allocation of treatment resources in light of rising healthcare costs. If cost-effectiveness plays a bigger role, this may result in less access to treatment for patients with less to gain from it.

In our workshop, we will consider these possibilities and their effect on solidarity, which is aimed at allocation of most benefit to the least advantaged and would advocate compensating low SES patients for the health loss they have suffered by treating even if it less cost-effective than for high SES patients. The best approach may be to make the influence of COPD and diabetes on treatment outcome predictions explicit, so physicians can consciously take into account the effect of current health disparities on health and how this might change cost-effectiveness considerations. Finally, we argue for regular retraining of prediction models in order to keep treatment outcome predictions as close to reality as possible, in the hope that prevention programs and other governmental efforts to reduce health disparities will lead to better treatment outcome predictions for low SES patients over time.