Preventive Care Through a Richer Policy Space: A Machine Learning Approach to Breast Cancer Screening

N. Meltem Daysal* Sendhil Mullainathan† Ziad Obermeyer‡
Suproteem Sarkar§ Mircea Trandafir¶

December 9, 2020

We study the welfare impact and distributional effects of targeting preventive care policy through machine learning. As the ultimate value of a preventive intervention is often tied to underlying health risks, machine predictions can help individualize value measures that are typically compared using averages. Focusing on preventive mammography, which aims to find breast cancers when they are easy to treat, we train and evaluate machine learning models for predicting cancer risk. On Danish administrative data, we find that reallocating cancer screens using these models, compared to policies that raise minimum invitation ages, could catch 13% more large tumors or reduce screening by 25%. Leveraging the staggered rollout of invited mammography programs across Denmark, we also find that screening high-risk women could diminish the long-term incidence of large tumors—while reducing the overdiagnosis of cancers that would likely not become deadly.

*University of Copenhagen, meltem.daysal@econ.ku.dk
†University of Chicago, sendhil.mullainathan@chicagobooth.edu
‡University of California, Berkeley, zobermeyer@berkeley.edu
§Harvard University, suproteemsarkar@g.harvard.edu
¶University of Southern Denmark, mircea.trandafir@sam.sdu.dk