

## NBCC Statement on AI and Mammography January 3, 2020

As you likely have seen hyped in the popular press this week, there have been a number of articles about the use of artificial intelligence (AI) as a tool in breast cancer screening to improve the detection of breast cancer. From the Wall Street Journal, the New York Times, and Reuters, to TIME and the more informative reporting in STAT...all of the reporting this week revolves around a recent study by McKinney et al., titled "International evaluation of an AI system for breast cancer screening" published in the journal Nature on January 1, 2020.<sup>1</sup>

All of this must be evaluated in the context of the reason for screening: it is to reduce mortality. Not to detect cancer. Remember, screening is a public health intervention, in a healthy population.

In the McKinney study, investigators from Google Health and other institutions in the US and UK created and tested a machine learning algorithm to detect breast cancer based on the reading of thousands of previously confirmed breast cancer mammogram scans. The goal of this and many other similar AI studies currently ongoing is to develop systems that can identify breast cancer tumors earlier and more accurately (limiting false positives and false negatives), and thereby allow for the earlier initiation of treatment when treatment is thought to be curative. However, we also know that as many as 20 to 25 percent of all early breast cancers treated with curative intent recur, even 20+ years after initial treatment,<sup>2</sup> suggesting that in some cases, breast cancer cells have already disseminated even when tumors are exceedingly small and clinically undetectable. And while having a screening approach that limits false positives would be welcomed, the sad truth is that simply identifying more breast cancers at smaller and smaller sizes will likely not reduce mortality from breast cancer. Instead, it will lead to even more overdiagnosis and overtreatment than we already have with traditional radiologist-read mammography screening employed today. Overdiagnosis of breast cancer refers to the identification of a tumor through screening that would never lead to clinical symptoms during a person's natural life, and current estimates suggest that approximately 20 to 30 percent of breast cancer is overdiagnosed.<sup>3-5</sup>

We mustn't forget that mammography screening in a healthy population, which has demonstrated limited if any impact on overall survival, is a multibillion dollar industry with estimates in 2010 (10 years ago!) ranging from \$2.6 to as high as \$10.1 billion dollars.<sup>6</sup> Adding AI to the mix, in a higher cost system will only serve to increase the costs of a procedure with little clinical benefit. While AI's potential in the context of breast cancer screening is unlikely to be beneficial to individuals, it should continue to be a focus of ongoing research for its possible role in saving lives in other settings.

As a public health measure, one important way to stop women and men from dying of breast cancer, which should be our ultimate goal, is to prevent breast cancer in the first place. NBCC's Artemis project

is currently working on a preventive vaccine that may one day serve that purpose. Failing a strategy to prevent breast cancer, we need tools and strategies to identify which tumors will go on to become lethal and an intervention to stop that process. We can then stop the widespread overdiagnosis and needless and harmful overtreatment, and the massive, unsustainable spending. As widespread screening initiatives have demonstrated, simply identifying more tumors at earlier stages and smaller sizes has failed as a solution to ending or even significantly reducing breast cancer deaths. More of the same is not likely to help.

## References

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