Reviewer's report

Title: Predicting Invasive Breast Cancer versus DCIS in Different Age Groups

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Reviewer: Steven Narod

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The article by Javaci is a scholarly analysis of the ability to discriminate between DCIS and invasive cancer on the basis mammographic and clinical features. The work is lengthy and the presentation is technical and will deter all but the most avid readers from looking at it and unfortunately the information, some of which is quite good, will be lost I fear nobody will get to the end.

Specific issues

The clinical justification for the study is over-wrought. Nobody is going to reassure a woman that a biopsy is not indicated just because of the high prior probability it is DCIS. Nobody is going to leave DCIS untreated outside of a clinical trial. Nobody is going to avoid treatment of a small non-palpable invasive breast cancer detected by mammography just because it has a high likelihood of being overdiagnosis. The clinical argument is an attempt to bolster the importance of the article. Why don’t the authors make specific recommendations of who not to biopsy. If they biopsy everybody what does this tell us.

Which goes back to the beginning. If one is going to avoid a biopsy one wants the probability out of 35,871 diagnostic mammograms not out of 1475 cancers after the fact. There is no logic to making a clinical decision under the premise that we know it is cancer beforehand because we don’t.

Nevertheless the article of interest from a scientific point of view. The authors have missed this by and large. If DCIS is a precursor of invasive cancer then why are they so different in character and not merely smaller? Could one predict which cases of DCIS might go on to invasive cancer using the same variable set? If yes then this would be wonderful.

Should be more informative in presenting statistics. P-values and AUC curves are interesting for statisticians but are pretty dry for clinicians.

What I want to know is what is the prior probability of having dcis. 28% What is posterior probability. 5%, 20% , 50%, 90%. How will one interpret this? What decision will be made?

What is the justification for the three subgroups? Can there be a simple model with one subgroup?

I don’t understand how these are diagnosis if they are not palpable. How did they come to attention. Were any based on suspicions raised buy an abnormal mammogram? Should really be two studies one for screening mammograms and one for palpable masses. This is far from clear
In summary I think the article presents some interesting scientific facts but it is inappropriate to put this into a clinical context. The odds ratios are not helpful one wants to know the posterior probability of a diagnostic mammogram being DCIS or invasive cancer.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interesets.