

## **Developing and validating a predictive model on breast cancer survival**

Elwood, Mark <sup>1</sup> [Tawfiq, Essa](#) <sup>1</sup> Tin Tin, Sandar <sup>1</sup> Marshall, Roger <sup>1</sup>

<sup>1</sup>The University of Auckland, Auckland, New Zealand

E-mail: [e.tawfiq@auckland.ac.nz](mailto:e.tawfiq@auckland.ac.nz)

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We developed and validated a predictive model for breast cancer specific 10-year survival in women with breast cancer in New Zealand. We used the data collected through a regional breast cancer registry in the Auckland region of New Zealand. This is a cohort study of 12461 women diagnosed with breast cancer between 2000 and 2014. Using a multivariate Cox survival model, we studied 9358 women with invasive breast cancer, of whom 865 were known to have died. We assessed risk factors based on their clinical importance and statistical significance on mortality. We developed the predictive model, and compared estimated probability of 10 years survival against observed 10 years survival. Different indices of validity were used in the assessment of model validity. The risk factors used in the model were age, tumour grade, tumour size, number of positive lymph nodes, metastatic disease at diagnosis, estrogen receptor (ER) status, progesterone receptor (PR) status, and HER2 (human epidermal growth factor receptor 2) status, histology of cancer, and patient ethnicity. Lymphovascular invasion was also assessed. Overall validity of the model was measured by the C statistic which was high, 0.84. The predicted 10-year survival in the percentile groups ranged from 0.10 to 0.99. Differences between predicted and observed survival probabilities were within 95% CI. The results show the validity and potential clinical value of the model. We plan to further define and test predictive models, and compare the results with those of other models which have been developed overseas and have not yet been tested in New Zealand. We will then explore potential clinical applications.

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