

2017/2018 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **3 July 2017**

Supervisor Information (First named supervisor will be the contact):

First Supervisor's Name and Title: Dr Melissa James

Department - UOC &/or CDHB (if applicable): CDHB

First Supervisors Phone: 0273160687

First Supervisors Email:

First Supervisors Mailing Address: Oncology Service, Private bag 4710, Christchurch

Co-Supervisors Name and Title(s): Dr Lisa Johannsen (Radiation Oncologist)

Research Category (Choose one category only – to be used for judging the students'

Clinical X

Laboratory

Community

Project Title (20 words MAXIMUM):

Investigation of the relationship between Body Mass Index and local recurrence following breast conservation treatment for early breast cancer

Project Description:

Introduction:

Obesity affects approximately 30% of women in New Zealand and this number is proposed to be increasing. Adverse breast cancer survival outcomes have been noted for women with a higher body mass index (BMI).

A number of studies and systematic reviews have investigated the relationship between obesity and breast cancer outcomes. A systematic review of 43 studies of patients with early breast cancer published between 1963 and 2005 found that a BMI greater than 30 increased the likelihood of death from breast cancer by 33% (1.33; 95%CI 1.19–1.50). Overall survival was decreased by a similar amount (HR = 1.33; 95% confidence interval (CI): 1.21, 1.47)². These poorer outcomes have also been noted in early breast cancer. One study found that premenopausal women with early breast cancer who were in the highest quartile of BMI at diagnosis were over 2 times more likely to die of breast cancer within the first 5 years compared with the lowest quartile³.

Despite the data for overall survival and breast cancer specific survival outcomes, the effect of obesity on local control of breast cancer within the breast has not been extensively studied. Adjuvant radiation therapy has an important role in the adjuvant management of early breast cancer. There is high level evidence that after breast conservation treatment for breast cancer, adjuvant radiation can decrease the risk of local recurrence by 50%¹. After breast conservation surgery adjuvant radiation treatment decreases the 15-year risk of breast cancer death from 25.2% to 21.4% (2p=0.00005)¹. Local control outcomes in breast cancer are important and a meta-analysis suggested that in breast conservation treatment, one breast cancer death could be avoided at 15 years for every four local recurrences prevented within the breast¹.

Aim:

Despite the data for overall survival and breast cancer specific survival outcomes, the relationship between BMI and local recurrence in breast conservation treatment has not been well defined. The aim of this study is to investigate the relationship between obesity and local control outcomes for women with early breast cancer in NZ.

Possible impact (in lay terms):

This study may show if women with a higher body mass index may have a worse outcome after surgery and radiation treatment for breast cancer.

Method:

This study proceeds from a study of "Body mass index at diagnosis in women with invasive breast cancer, associated clinicopathological features and exploratory study of biomarkers", using data from the New Zealand Breast Cancer Registers conducted in Christchurch hospital by Professor Bridget Robinson⁴. This study found that BMI information was available within the NZ breast cancer data registries for 5,458 new breast cancers, 27% of all registered breast cancer patients. Data was collected for this cohort regarding patient and tumour characteristics as well as all-cause mortality. Loco regional recurrence data was not collected. We aim to utilise this data base of patients with a known BMI to identify a subset of patients with early breast cancer who underwent a breast conservation treatment programme with adjuvant radiation. We will collect breast cancer outcomes for this cohort including loco regional recurrence free survival.

Statistical Analysis:

The primary outcome for the study is loco-regional recurrence free survival, defined as the time from the date of treatment initiation to the date of loco-regional recurrence. Secondary outcomes are overall survival (OS), which is defined as time from the date of treatment initiation to the date of mortality due to any cause; distant metastasis free survival, which is defined as time from the date of treatment initiation to the date of first reported metastasis and breast cancer specific survival which is defined as time from the date of treatment initiation to the date of mortality due to any cause. Data will be censored at the date of last contact.

The distributions of patient and clinical characteristics for those patients with a higher versus a lower BMI (including age, ethnicity, menopausal status, nodal status, tumour grade and size, receipt of chemotherapy/ hormonal therapy and receptor positivity) will be compared using χ^2 or Fisher's exact tests, as appropriate. All analyses will be two sided and $P < 0.05$ will indicate a statistically significant difference. Survival curves will be estimated using the Kaplan Meier product limit method and compared by the log rank test. Univariate Cox proportional hazard models will be fitted to identify factors significantly associated with local recurrence free and overall survival. For those factors with $P < 0.15$ in the univariate analyses, a multivariate Cox model will be constructed assess whether obesity (BMI > 30) was an independent predictor of loco-regional or overall survival. Two way interaction terms between obesity and other factors in the multivariate Cox model will also assessed.

Student Involvement

The student will be involved in updating the data for Christchurch hospital patients using the electronic medical record and radiation record and verify systems. The student would also be involved in combining this updated Christchurch data with data from the other registries in NZ (Waikato, Auckland and Wellington) and in presenting the data for analysis to the statistician. The student is offered the opportunity to be involved in the presenting of results at a local CME session, national conference and

participating in writing a journal paper in addition to the required summer student presentations of results.

Implications

This study seeks to add to the information regarding the relationship between obesity and local control in early breast cancer. If a correlation between BMI and local control in early breast cancer is found, this may lead to further studies to identify the potential mechanisms and potential therapies to counteract this.

Student Prerequisites (eg. Medical Student) if applicable:

Medical Student

Administration Details

1. Is ethical approval required?

If Yes: please circle or tick one of the following:

a) **Yes this has been approved. This is an amendment to h12/319**

2. **Are you able to provide the funding for this project (ie. \$5,000 for the student, incidental expenses should be met from departmental or research funds)** **No**

If Yes: Please provide name of the funder

If No: Please provide ideas of possible funding sources, including past funding agents and topics often associated with this research area, for the Research Office to contact.

The initial part of this project was funded by the NZBCF (New Zealand Breast Cancer Foundation) and they may well be happy to support this second part of the project

3. Medical Records or Decision Support accessed **Yes**

4. Health Connect South or other DHB records **Yes**

5. Signatures:

- I have read the 2017/2018 Summer Studentship programme handbook.
- I am prepared to supervise the project and will be available to the student during the studentship (including Christmas/New Year break if the student is working during this time).
- I agree to assume responsibility for the submission of the student's reports to the Research Office by the due date 29 January 2018.

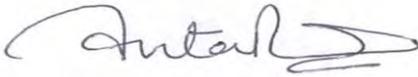
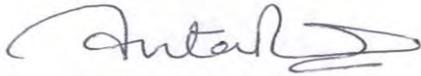


Signature of Project Supervisor(s):

Date:

29/6/2017

- I understand that I am responsible for hosting the Summer Student chosen for this project and will meet any costs incurred. I agree that incidental expenses will be met from departmental or research funds.

Signature of Head of Department: 	Date: 29/6/2017
Signature of Clinical Director: (if applicable) (Print Name) 	Date: 29/6/2017