**Introduction**

Breast cancer is the most common cancer in women worldwide and the second most common cancer overall after lung. Radiation therapy is often used after surgery to prevent recurrence and increase survival of those affected, leading to a great need for radiation therapy to treat a large number of patients. Over the past decade, several strides have been made in the improvement of postmastectomy radiation therapy to treat a large number of patients affected, leading to a great need for radiation therapy to treat a large number of patients. Over the past decade, several strides have been made in the improvement of the management of breast cancer in low- and middle-income countries (LMICs). Due to the scarcity of oncology specialists and limited access to radiotherapy treatment, South Africa holds a contrasting 5 year survival rate of 53% for breast cancer compared to 88% found in the U.S. With such high demand on the machines and limited trained staff, there is often a delay in treatment, and while many curable patients are partially treated, those needing palliative radiation suffer unduly.

In an effort to reduce these inequities in cancer care while improving patient treatment outcomes, our research is focused on providing high quality automated PMRT plans that can be completed by personnel with limited experience in radiation treatment planning or those with limited time to produce treatment plans.

**Methods and Materials**

A total of 19 simulated breast cancer patients' data sets were provided from our partners in South Africa for this study. Only patients with left sided lesions were chosen given the increased complexity due to the proximity of the heart to the targets. Their computed tomography (CT) scans along with planning directives were run through an in-house automated planning tool integrated with the Eclipse TPS called the Radiation Planning Assistant (RPA). The automated planning tool utilized algorithms integrated with Varian’s Eclipse TPS. The tool created PMRT plans that used mono-isocentric tangents and supraclavicular (SCV) fields with a mix of high and low energy photon beams along with field-in-field (FIF) segments.

**Results**

In the majority of the plans (80%), all preferred dose objectives were met post-optimization, however in 20% of the plans, preferred heart dose constraints were not met but were deemed clinically acceptable by an MDA radiation oncologist as adequate target coverage is considered a higher priority. This discrepancy in dose received by the heart and ipsilateral lung could be attributed to patient anatomy and the limitation of free breathing treatments. The auto-generated plans in conjunction with our guidelines have shown to significantly reduce the time required to manually contour and produce a clinically acceptable PMRT plan from an average of 120±60 minutes to just 13±11 minutes (Pinnacle) and 12±7 (Eclipse) minutes, saving 108±51 minutes per plan. 100% of the cases post-optimization were deemed clinically acceptable.

**Conclusion**

In conclusion, the automated chest wall radiotherapy treatment plans generated through Eclipse and imported into other TPS's (Eclipse and Pinnacle) for post-mastectomy breast cancer patients provided clinically acceptable, quality, efficient and consistent treatment plans. The APPT in conjunction with the TPS specific guidelines developed for optimization resulted in a significant reduction in treatment planning time by 108±51 minutes. Due to a shortage of qualified radiation personnel and availability of radiotherapy treatment in low- and middle-income countries, these automated plans can be utilized by individuals with limited time or limited clinical experience to produce quality patient-specific treatment plans for breast cancer patients.

**References**