Supervisor Name: Jelena Lukovic, Radiation Oncologist

Additional study team: Rebecca Wong (Radiation Oncologist); Teo Stanescu (Radiation Physicist); Jasmine Chen (Radiation Therapist)

Project Title: Evaluation of conformal radiation therapy in the treatment of gastric cancer.

Hospital/Research Institution: Princess Margaret Cancer Centre

Email: Jelena.lukovic@rmp.uhn.ca

Field of Research (2 keywords): radiation therapy, gastric cancer

Department: Radiation Oncology

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: No

If YES, please name:
**Brief Project Description (<300 words):**

Radiation therapy (RT) plays an important role in the palliation of gastric (e.g. to control bleeding). Modern RT is delivering using either intensity modulated radiation therapy (IMRT) or volumetric modulated radiation therapy (VMAT) which enables delivery of the prescription dose to the stomach while avoiding surrounding organs-at-risk (OARs) including the duodenum, small bowel, liver, and esophagus. During treatment delivery a cone-beam CT (CBCT) is obtained to confirm positional accuracy prior to proceeding with treatment. Challenges during delivery of radiation therapy include organ motion due to breathing, gastrointestinal filling and gas (e.g. causing distention or distortion of the stomach), and peristalsis. The planning target volume (PTV) is a margin added during radiation planning, which accounts for set up variation as well as the internal motion described above. There is ongoing uncertainty about the optimal PTV margin.

Between 2010 and 2020, approximately 300 patients at the Princes Margaret Cancer Centre received RT for gastric cancer with either IMRT/VMAT and daily CBCT. The objective of this project is to determine an adequate PTV margin to ensure appropriate coverage of the entire stomach during radiation treatment. For the project a CAPCR application will be completed prior to the project start. Once approved, daily CBCTs will be imported into the treatment planning software. The stomach will be delineated on the CBCT by the research student and Jelena Lukovic, with additional support provided by Jasmine Chen (Radiation Therapist). Once the stomach is defined over the course of RT, variations in day-to-day positioning and distention will be compared to propose a standard PTV margin. The research student will lead writing of the relevant abstract and manuscript.

Finally, acknowledging the ongoing COVID-19 pandemic, this project can be fully completed remotely.