**Problem Definition:** The health problem being addressed is how to increase the use of minimally invasive ear surgery. This enables patients to go home sooner and reduces the cost of surgery for the hospital. This, in turn, enables more patients to be treated. Transcanal endoscopic ear surgery (TEES), which employs an endoscope through the ear canal, is a minimally invasive ear surgery technique. The surgeon feeds instruments alongside the endoscope and operates single-handedly, as one hand is stabilizing the endoscope. This is a challenging surgical technique, and instruments have not been designed to facilitate it [1]. The **proposed solution** is to develop better instruments for TEES to enable surgeons to perform surgical manoeuvres single-handedly. Currently, companies such as Karl Storz and Grace Medical have made instruments that combine two surgical functionalities in one to ease surgery however they are not widely used by surgeons for a variety of reasons. Initial prototypes are being made by this team consisting of an engineer and an experienced endoscopic ear surgeon who is a key stakeholder of the project. TEES is not widely used, and there is a low response rate of surgeons when asked to communicate their opinions on TEES [1]. The KT will target ear surgeons and describe how these new tools would help perform TEES, a new and growing surgical technique used to treat various ear diseases with similar outcomes as traditional, invasive surgery [2][5].

**Identification and Involvement of Key Stakeholders:** The key stakeholders are ear surgeons, the users of the proposed solution and the engineers who will be designing and fabricating the instruments. Ear surgeons have been involved in the process by requesting them to fill out a survey that will ask what instrument functionalities TEES procedures require. As well indirect stakeholders include: companies who sell medical devices to hospitals, patients who will be operated on using the tools, patient families who will be positively impacted by having a shorter hospital stay and recovery time, hospitals who will have less cost per use of endoscopic ear surgery.

**Proposed Knowledge Translation Strategy and Activities:** The following KT activities and strategies will be completed throughout the course of the project.

1. Attend TEES courses, that are offered for surgeon trainees, and ask participants to use the instruments during the course. An endoscopic ear surgery course in October, 2016 was held at SickKids where company representatives from Karl Storz and Grace Medical brought their latest tools specialized for endoscopic ear surgery and participants practiced TEES with those tools.
2. Application for Research Ethics Board (REB) approval to conduct a surgeon survey that will ask ear surgeons what instrument functionalities are desirable to ease their experience of TEES. This consisted of a rigorous protocol to convey the project in a way that incorporated proper ethical procedures. This was submitted in December, 2016.
3. Application for a competitive commercialization grant offered by SickKids. In this competition, the judges were experienced businessmen, clinicians and engineers and the team prepared a pitch, presentation and demonstration to translate this project and its benefits to the panel of judges who had a wide range of backgrounds. This was applied for in December, 2016.
4. Present the results of the surgeon survey at a conference for endoscopic ear surgeons (IWGEES), and any future clinical testing results in otolaryngology journals (Journal of Otolaryngology - Head and Neck Surgery). The endoscopic ear surgery conference is in April, 2017 and the journal publications aim to be done in 2018.

**Planning, Management and Evaluation of Knowledge Translation:** The CIGITI lab at SickKids has the tool design and fabrication resources and the Master’s student is working closely with her PI, an endoscopic ear surgeon which would help the project penetrate the endoscopic ear surgery conference and the otolaryngology journals. If the journal submissions are accepted and published, and cited then they would be considered a success as it shows that the results of the publication are used by the academic world. If surgeons who attend the TEES courses use the new instruments and/or suggest modifications to improve the design, it would be considered successful. If the REB application is approved, then the project was successfully translated to the REB members at SickKids Hospital. This KT activity is monitored as the application would have to be renewed annually.

**References:**

[1] M. Yong, T. Mijovic, and J. Lea, “Endoscopic ear surgery in Canada : a cross-sectional study,” *J. Otolaryngol. - Head Neck Surg.*, pp. 1–8, 2016.

[2] Ã. A. L. James, Ã. S. Cushing, and Ã. B. C. Papsin, “Residual Cholesteatoma After Endoscope-guided Surgery in Children,” pp. 196–201, 2015.

[3] S. C. Prasad, A. Giannuzzi, E. A. Nahleh, G. De Donato, A. Russo, and M. Sanna, “Is endoscopic ear surgery an alternative to the modified Bondy technique for limited epitympanic cholesteatoma?,” *Eur. Arch. Oto-Rhino-Laryngology*, vol. 273, no. 9, pp. 2533–2540, 2016.

[4] L. Presutti, F. M. Gioacchini, M. Alicandri-Ciufelli, D. Villari, and D. Marchioni, “Results of endoscopic middle ear surgery for cholesteatoma treatment: a systematic review.,” *Acta Otorhinolaryngol. Ital.*, vol. 34, no. 3, pp. 153–157, 2014.

[5] M. Tarabichi, “Endoscopic management of limited attic cholesteatoma.,” *Laryngoscope*, vol. 114, no. 7, pp. 1157–1162, 2004.