**COMP4550 HONOURS THESIS DRAFT**

**1. Introduction**

This research is a multi-disciplinary study into the application of machine learning in the field of health economics. Specifically, the study explores the use of machine learning methodologies to assess the impact of legalising domestic sale of vaporised nicotine products (more commonly referred to as vape) on smoking-related outcomes. This research adopts New Zealand’s 2025 Smoke-Free Goal as a case study to evaluate these impacts. These smoking-related outcomes include (1) Quality Adjusted Life Years (QALYs), (2) Health System Costs (HSCs), and (3) Māori/non-Māori health inequities. This chapter provides an overview of existing research on the health economics of smoking, focusing on the methods employed to estimate these health outcomes. These methods include the Smoking and Vaping Life Table Model and the Proportional Multistate Life Table Model, both of which are used to predict smoking-related outcomes over time. The chapter also delves into the motivation for focusing specifically on the effects of vaping. Following this, the chapter introduces the field of machine learning, highlighting its potential in health economics research. Two central research questions are articulated to frame the study, and a review of related works is also included. Finally, the chapter concludes with an outline of the remaining structure of the thesis.

* 1. **Smoking in Health Economics**
     1. **Smoking and Vaping Model**
     2. **Proportional Multistate Life Table Model**
  2. **Vaping**
  3. **Machine Learning**
  4. **Research Question**
  5. **Related Work**
  6. **Thesis Organisation**