

Prevention is better than cure

(Friday 10 June 2022, Page 1 – 26)

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Photo 1 Slide 1



Photo 2 Slide 2



Photo 3 Slide 3



Photo 4 Slide 4



Photo 5 Slide 5

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Introduction

The objective of this assignment paper is to provide public health responses to the topic 'Prevention [*through preventive lens*] is better than cure [*through curative lens*]'. Despite its limitations and benefits, there is a heightened interest in using photovoice as a participatory research method especially for research among vulnerable populations or related to sensitive topics (Gordon, 2020). The author John Ting, as a younger person migrant to Australia age <65 of Chinese ethnicity [thus belonging to Culturally and Linguistically Diverse (CALD) population (Australian Bureau of Statistics, 1999)], is using this popular research method in the assignment.

The term 'Aboriginal and Torres Strait Islander peoples' is hereby referred to as Aboriginal peoples [Australia's First Nations peoples]. As older Australian people and older Aboriginal peoples, they are defined socio-economically as, respectively, representing nominated chronological age ≥ 65 and ≥ 50 . Aboriginal peoples are not regarded as CALD population. As further explained below, *they also have significant heightened risk of developing cardiovascular disease and diabetes*. With a constrictive population pyramid, older Australians aged ≥ 65 years form 1 in 6 people or 16% (4.2 million) at 30 June 2020. This represents an increase from 15% (3.7 million) in 2016 and is predicted to increase to 22% (8.7 million) by 2056 (Australian Institute of Health and Welfare, 2021).

World Health Organisation (WHO) defines prevention as “approaches and activities aimed at reducing the likelihood that a [communicable or noncommunicable] disease or injury will affect an individual, interrupting or slowing the progress of the disease or reducing disability” (WHO, 2004). Developed in conjunction with WHO, Global Charter for Public’s Health provides (i) new insights into direction of public health and (ii) guidance for both ‘services’ viz, Protection, Prevention and Promotion [thus denoting Prevention as one of the *three main pillars of public health*], and ‘functions’ viz, Governance, Advocacy, Capacity and Information (World Federation of Public Health Associations, 2020).

Public health is complex due to many determinants/factors interacting rather than being simple linear cause-effect events with Promotion being another one of the three main pillars of public health. The first International Conference on Health Promotion meeting in Ottawa on 21 November 1986 presented *Ottawa charter for health promotion* (WHO, 2012) using three strategies *Enable, Mediate and Advocate* on fundamental conditions and resources (viz, the prerequisites: peace; shelter; education; food; income; a stable eco-system; sustainable resources; social justice, and equity) to achieve “Health for All by the year 2000 and beyond” – this involves five action areas: (1) Building healthy public policy (e.g., legislative, regulatory and organisational changes), (2) Creating supportive environments (e.g., increase ability of individuals to make healthy choices in their settings), (3) Strengthening community action (e.g., collective actions of the community to improve their health), (4) Developing personal skills (e.g., a health service/workforce that strengthen protective factors, reduce risk factors, and improve health determinants), and (5) Reorienting health services (e.g., supports personal and social development).

Cure [which could be *complete or incomplete*] refers to relieving a person of symptoms of a disease (illness), condition or injury, and to restore health. Total burden of a disease on a population can be defined as combined loss of years of healthy life due to premature death (viz, fatal burden) and living with ill health (viz, non-fatal burden). Preventions reduce the burden of diseases on healthcare budget, increase workforce participation and productivity, and improve health of future generations (Organisation for Economic Co-operation and Development, 2016). Consequently, preventions result in social, economic and health care benefits because of reduction in chronic conditions and healthier living with longer lives at population level.

Preventive health measures require addressing human health at all stages across a person’s life journey from preconception, infancy and childhood to adolescence, adulthood, old age and death. We said prevention is everyone’s business because it aims to maintain/improve population health and well-being in order to reduce health disparities between priority population groups and general population using five types of prevention as per **Box 1**.

Box 1. Five types of prevention (Wilcox, 2015, p. 12-13; The Association of Faculties of Medicine of Canada, 2020)

I. Primordial prevention aims to address the wider determinants of health by reducing the social factors, environmental factors, and hazards that impact disease and injury.

Examples include: creating supportive environments that promote health (e.g., physical activity, clean air and water, healthy foods, sanitation).

II. Primary prevention aims to prevent disease or injury before it occurs by reducing the behavioural, biomedical, and protective risk factors that impact disease and injury. This is achieved by preventing exposures to hazards, mitigating unhealthy or unsafe behaviours, and increasing resistance to disease or injury should exposure occur.

Examples include legislation and regulation to control or eliminate the use of hazardous products (e.g., asbestos) or to mandate safe practices (e.g., use of bike helmets and seatbelts); education about healthy lifestyle habits (e.g., eating well, exercising regularly, smoking cessation); pre-conception folate consumption; and immunisation against infectious diseases.

III. Secondary prevention aims to reduce the impact of a disease or injury that has already occurred. This is achieved by disease or injury detection and treatment to halt or slow its progression, encouraging individual strategies to prevent recurrence or reinjury, and implementing interventions to restore original health and prevent long-term problems.

Examples include early disease detection and screening programmes (e.g., cervical, bowel cancer screening initiatives, general health examinations); identification of risk factors for disease; advice on a healthy diet, physical activity and lifestyle factors; infant and mother postpartum check; and work modification for safe return to work.

IV. Tertiary prevention aims to reduce the impact of ongoing illness or injury and complications. This is achieved by assisting people in managing long-term and often complex health problems and injuries (e.g., chronic diseases, disabilities and impairments) to improve quality of life, life expectancy and function as much as possible.

Examples include cardiac/stroke/injury rehabilitation programmes, chronic disease management and treatment programmes; medications, lifestyle advice and education.

V. Quaternary prevention aims to reduce the harm caused by medical interventions for a disease or disorder (Martins et al., 2018).

“Health at any stage of life depends on the ability to respond - to resist, compensate, adapt to, and recover from environmental challenges. These responses may take place over different time scales: **homeostasis acting over a short time scale, developmental plasticity across life, and natural selection over generations**” (Kuh, 2019, p. 2). Cancer is fundamentally a genetic disease as a consequence of pathological changes in the information carried by DNA whereby mutations distinguish the cancer cells from other ‘normal’ cells that surround them. This is known as somatic mutations. In practical terms, the following excerpt is convenient to aid our understanding.

#1 Primary prevention [targeting whole population]: Primary (upstream/distal) prevention aims to prevent disease or injury before it ever occurs e.g. using vaccination;

#2 Secondary prevention [targeting at-risk population]: Secondary (midstream) prevention aims to reduce the impact of a disease or injury that has already occurred e.g. screening for early diabetes, **Dr John Ting in 2017 - 2018 treating up to 123 Drug Dependent Person / Substance Use Disorder with Opioid Replacement Drugs such as Methadone and Buprenorphine [via Queensland Opioid Treatment Program] PLUS treating 11 Hepatitis C patients;**

#3 Tertiary prevention [targeting population with established disease or injury]: Tertiary (downstream/proximal) prevention aims to soften the impact of an ongoing illness or injury that has lasting effects e.g. evidence-based, community-based, integrated, person-centred quality healthcare and rehabilitation; healthcare management and planning.

Primary prevention of cardiovascular disease for Australian and Aboriginal peoples

Cardiovascular disease (CVD) includes all heart, stroke and blood vessel diseases. A full assessment of a patient's absolute cardiovascular risk requires taking into consideration the following factors outlined in **Table 1**.

Table 1. Factors required for full assessment of a patient's absolute cardiovascular risk

- Age† and sex†
- Smoking status†
- Serum lipids†
- Blood pressure†
- Waist circumference and body mass index
- Nutrition
- Physical activity level
- Alcohol intake††
- Family history of premature CVD
- Social history including cultural identity, ethnicity, socioeconomic status‡ and mental health
- Diabetes†
- Chronic kidney disease
- Urine for microalbumin and protein
- Familial hypercholesterolaemia
- Evidence of atrial fibrillation (history, examination, electrocardiogram†)

†Risk parameters that are included in the absolute risk calculator called **CVD calculator** (Australian Chronic Disease Prevention Alliance, 2022).

††Alcohol is a risk factor for elevated blood pressure (which is itself a major independent determinant of risk of atherosclerotic disease), stroke and cardiomyopathy.

‡Risk assessment requires consideration of socioeconomic deprivation as an independent risk factor for CVD. The Framingham Heart Study was commenced in 1948 in Framingham, Massachusetts, USA. The Australian CVD calculator is based on the Framingham Risk Equation (FRE) recalibrated for the Australian population (National Vascular Disease Prevention Alliance, 2012). It is likely to underestimate cardiovascular risk in socioeconomically deprived groups.

The probability that an Australian or Aboriginal individual will develop CVD within a given period of time depend on combination and intensity of all his or her identified risk factors, rather than on presence of any single risk factor (Nelson, 2020). Using an absolute risk assessment [based on FRE] in CVD calculator takes into account the cumulative and sometimes synergistic effects of these multiple risk factors; viz, the superiority of an absolute risk-based approach when compared with individual risk factor management for the primary prevention of CVD.

In CVD calculator, patient information is entered using 8 risk factors:

Gender [Female/Male], **Age** [Between 35 – 74 years], **Systolic blood pressure** [75 or more mmHg], **Smoking Status** [Smoker is defined as currently smoking or quit within last year Yes/No], **Total cholesterol** [2 or more mmol/L], **HDL cholesterol** [Between 0.2 – 5 mmol/L], **Diabetes** [Yes/No], and **ECG LVH** [Yes/No/Unknown]. Legend: ECG = electrocardiogram, LVH = Left Ventricular hypertrophy.

Resulting use of CVD calculator based on above-mentioned 8 risk factors in Australia epitomizes *primary prevention* of CVD [over next five years instead of the usual ten years] whereby calculated risk scores are given as:

- (i) If your risk score is **more than 15%** (about 1 in 7 chance), you are thought to be at **high risk of CVD** in the next five years.
- (ii) If your risk score is **between 10-15%**, you are thought to be at **moderate risk of CVD** in the next five years.
- (iii) If your risk score is **less than 10%**, you are thought to be at **low risk of CVD** in the next five years.

Absolute CVD risk assessment using FRE to predict risk of a cardiovascular event over the next five years should be performed for *all adults aged 45 and older (or 30 years and older for Aboriginal peoples)* without existing CVD or not already known to be at increased risk of CVD (see **Box 3** below).

For specific population groups, additional recommendations given in **Box 2** apply.

Box 2. Additional recommendations for specific population groups

1. Combined early screening for diabetes, chronic kidney disease and cardiovascular risk factors in **Aboriginal adults** from *the age of 18 years*.
2. Assessment of absolute cardiovascular risk in **Aboriginal adults** from *30 years at the latest (rather than 45 years)*. Although FRE might underestimate risk in this population, available evidence suggests that this approach will provide an estimate of minimum cardiovascular risk. *NOTE: Even though CVD calculator does not allow calculations using an age of less than 35 years; for Aboriginal adults from 30 to 34 years it is recommended that an age of 35 is used instead [which is unlikely to significantly inflate CVD risk].*
3. Assessments in adults with **diabetes** aged 45-60 years (rather than 45-74 years). Although FRE might underestimate risk in this population, available evidence suggests that this approach will provide an estimate of minimum cardiovascular risk.
4. In adults who are **overweight or obese**, the results of the assessment should be interpreted with the awareness that its predictive value has not been specifically assessed in this population.
5. In adults with **atrial fibrillation** (particularly those aged over 65 years), an increased risk of cardiovascular events and all-cause mortality, in addition to thromboembolic disease and stroke, should be taken into account. While CVD risk is known to be elevated for this population, it is not possible to quantify the degree of additional CVD risk in an individual. Clinical judgement is necessary when assessing overall cardiovascular risk.

Adults with any of the conditions in **Box 3** are already known to be at increased absolute risk of CVD and do not require further assessment using FRE.

Box 3. Adults already known to be at increased risk of CVD

- Diabetes and age > 60 years
- Diabetes with microalbuminuria (> 20 mcg/min or urinary albumin:creatinine ratio > 2.5 mg/mmol for males, > 3.5 mg/mmol for females)
- Moderate or severe chronic kidney disease (persistent proteinuria or estimated glomerular filtration rate < 45 mL/min/1.73 m²)
- A previous diagnosis of familial hypercholesterolaemia
- Systolic blood pressure ≥ 180 mmHg or diastolic blood pressure ≥ 110 mmHg
- Serum total cholesterol > 7.5 mmol/L

Example, Framingham Risk Equation [Calculator] in action for 10-year risk calculator:
Men

Risk score = (52.01 * ln(Age)) + (20.01 * ln(Total cholesterol)) + (-0.91 * ln(HDL)) + (1.31 * ln(Systolic BP)) + (0.24 * BP treatment) + (12.1 * Smoker) + (-4.61 * ln(Age) * ln(Total cholesterol)) + ((-2.84) * ln(Age) * Smoker) + ((-2.93) * ln(Age) * ln(Age)) - 172.30 where:

- **ln** - stands for natural logarithm
- **Risk score** - the total amount of points
- **Age** - given in years
- **Total cholesterol** - given in mg/dL
- **HDL level** - given in mg/dL
- **Systolic Blood Pressure** - given in mmHg
- **Smoker?**
 - Yes = 1
 - No = 0
- **Blood pressure treatment?**
 - Yes = 1
 - No = 0

¶ For men aged > 70 years use: ((-2.84) * ln(70) * Smoker).

To calculate 10 years risk of death due to coronary incident, use:

Death probability = 1 - 0.9402^{exp(Risk score)} where:

- **Risk score** is the number of points calculated in the previous step
- **exp** is an exponent

Women

Risk score = (31.76 * ln(Age)) + (22.47 * ln(Total cholesterol)) + ((-1.19) * ln(HDL)) + (2.55 * ln(Systolic BP))

+ (0.42 * BP treatment) + (13.08 * Smoker) + ((-5.06) * ln(Age) * ln(Total cholesterol)) + ((-3) * ln(Age) * Smoker) - 146.59 where:

- **Risk score** - the total amount of points
- **Age** - given in years
- **Total cholesterol** - given in mg/dL
- **HDL level** - given in mg/dL
- **Systolic Blood Pressure** - given in mmHg
- **Smoker?**
 - Yes = 1
 - No = 0
- **Blood pressure treatment?**
 - Yes = 1
 - No = 0

¶ For women aged > 78 years use: ((-3) * ln(78) * Smoker).

To calculate the individual 10 years risk of death, use:

Death probability = $1 - 0.98767^{\exp(\text{Risk score})}$, where:

- **Risk score** is the number of points calculated in the previous step
- **exp** is an exponent

Reports

Reports concerning Photo 1 Slide 1 to Photo 5 Slide 5 are given in **Table 2**.

Table 2. Reports on five photos used by Photovoice

I.	Antenatal care in prevention of preterm birth (Ting, 2022, Photo 1 Slide 1) Photo 1 Premature baby depicts “Premature baby girl Jelena born 13 weeks early on Monday 14 May 2012. Birth Weight 1010 grams. On nasal Continuous Positive Airway Pressure (CPAP) in Neonatal Intensive Care Unit (NICU) [Wednesday 16 May 2012]”.
II.	Oral health and diseases (Ting, 2022, Photo 2 Slide 2) Photo 2 Oral health status depicts “Too much Coke! Tooth decay causing toothache in unhappy 10 years-old Jelena on Monday 16 May 2022. Location: Home in Brisbane”.
III.	School zone times for motorists (Ting, 2022, Photo 3 Slide 3) Photo 3 School zone depicts “10 years-old Jelena at 3:45 PM Tuesday 17 May 2022 pointing to Road sign 40 km/hr during school zone time in Brisbane”.



IV. Physical activity and sedentary behaviour (Ting, 2022, Photo 4 Slide 4)

Photo 4 Physical activity for greener environment depicts “10 years-old Jelena involved in Brisbane City Council’s Free Native Plants program that offers a range of plants to enable the community to cultivate a greener and more sustainable Brisbane. Location: Home in Brisbane (Wednesday 18 May 2022)”.

V. Accidents and injury prevention (Ting, 2022, Photo 5 Slide 5)

Photo 5 Injury prevention depicts “Buildsafe was established in 2001 with its primary focus being height safety provider for the building industry. Location: New house being constructed in Brisbane close to a residential aged care facility (RACF) nearby author’s home (Thursday 19 May 2022)”.

Reflections

Reflections concerning Photo 1 Slide 1 to Photo 5 Slide 5 are given in **Box 4**.

Box 4. Reflections on five photos used by Photovoice

I. Expected Date of Confinement (EDC) when calculated using 40 weeks (9 months) term gestation was to be Friday 10 August 2012 for Jelena. This important date is utilized to calculate her ‘corrected gestational age’ and ‘corrected age’. These two terms are important to use for Premature “Premi” babies until the chronological age of 2 to 2½ years when they developmentally catch up with their term baby counterparts. For instance, neonate is defined as an infant less than 28 days or 4 weeks (1 month) old for a term gestation. This meant that Jelena as a Premi baby born 13 weeks early on 14 May 2012 will, by definition, only transition from being a neonate to an infant at 4 weeks (1 month) corrected age on 7 September 2012. However, 7 September 2012 also equates to her chronological age being 17 weeks (4 ¼ months).

Maternal history: 46 years-old female mother G₇P₅M₂ [Legend: G = Gravida, P = Para, M = Miscarriage] with EDC 10 August 2012. Antepartum haemorrhage was caused by placenta previa requiring emergency Caesarean section at 06:21 AM Monday 14 May 2012. Jelena birth weight = 1010 grams, head circumference = 26.2 cm, Apgar score: 1 min

= 2, 5 min = 6, 10 min = 8. In NICU for 7 weeks, then Special Care Nursery for 4 weeks. Intubated and ventilated for 2 days, Nasal CPAP for 35 days, Prophylactic Surfactant 200mg/kg given (Jena, 2019), Nasal cannula oxygen support for 45 days to treat Chronic Lung Disease. Primary diagnosis: Prematurity. Secondary diagnosis: Very low birth weight [commenced on intravenous Total Parental Nutrition on Day 1, enteral feeds 180ml/kg/day on Day 2, full orogastric feed on Day 13, 4 hourly breast milk with NAN complimentary feeds], Respiratory distress, Risk of sepsis [given empiric antibiotic therapy including 3 days chloramphenicol ointment for E. coli bacterial conjunctivitis], Anaemia [required two blood transfusions, iron supplementation, Pentavite 0.45 ml daily and Ferroliquid 1 ml daily with Haemoglobin 86 g/L at 09:00 AM 18 July 2012], Apnoea of prematurity [required caffeine 10 mg daily therapy which was weaned off at 34 weeks corrected gestation age], Patent ductus arteriosus [required Indomethacin for closure], and Varicella exposure. Nil complications on long term follow-up; viz, with chronological age = 2 months and corrected gestational age = 35 weeks, Jelena weight increased incrementally to 2345 grams on Friday 13 July 2012 and there was no Retinopathy of Prematurity on 13 July 2012 and 13 October 2012 ophthalmologist reviews with normal developmental milestones being reached when corrected for age. On Saturday 14 May 2022 (chronological age 10 years old): Weight 23.5 kg, Height 127 cm = 1.27 m, Body Mass Index = $\text{Weight} / \text{Height}^2 = 23.5 / (1.27)^2 = 14.57$, and Jelena is classified as a perfectly healthy child with ASA 1 (Abbreviation: ASA = American Society of Anesthesiologists).

II. Product label for Standard 375 ml can of Coke (Coca-Cola): Ingredients = carbonated water, sugar, colour (150d), food acids (338), flavour, caffeine; Nutrition information for one serving (375 ml) = 38 mg sodium and provides 675 kJ (161 Cal) energy from 40 grams carbohydrate (sugars). Empty aluminium can could be recycled for 10 cents refund at collection depots/points in participating state/territory of purchase. This *environmentally friendly scheme* helps to socio-economically reduce the amount of drink containers that are littered, increase Queensland's recycling rate, and also provides benefits to social enterprises, communities, and regional and remote areas by creating new job, recycling and fundraising opportunities. *Primary prevention* of dental caries causing toothache for Jelena would involve reducing Coke consumption. Subsequent *secondary prevention* for this painful condition involved curative [emergency] treatment for dental caries by dentist.

III. There are three levels of government: federal, state and local. The local level is made up of more than 560 councils across Australia. Councils are responsible for issues such as local roads, parks, rubbish collection, library services, street signage, and pet control. Thus, the flashing school zone sign which was under responsibility of, and was erected by, local council in Photo 3 School zone consists of a standard school zone sign that incorporates a flashing red circle and twin alternate flashing yellow lights mounted above the 'school zone' plate. The red circle and twin yellow lights flash during operation of the school zone [40 km/hr speed limit 7 – 9 AM and 2 – 4 PM school days]. This sign is intended to draw motorists' attention to the hours of operation of school zone and to signal to motorists to slow down to the posted speed during those hours of operation. The overwhelming *primary prevention* goal by reducing speed limit during school days is to avoid vulnerable school children as pedestrians from being hit by moving road vehicles. Some school zones

can have hours of operation that are different from the standard 7–9 AM and 2–4 PM and/or have different speed limits that include (Queensland Government, 2019):
40km/h on roads where the existing limit is 50km/h, 60km/h or 70km/h
60km/h on roads where the existing limit is 80km/h
60km/h or 80km/h on roads where the speed limit is 90km/h or 100km/h, depending on the amount of school related activity on or near the road
80km/h on roads where the existing limit is 110km/h.

IV. The Free Native Plants program that offers a range of plants to enable the community to cultivate a greener and more sustainable Brisbane is under responsibility of local councils. Growing native plants in different environments could be regarded as a *primordial prevention* strategy helping promote physical activity and decrease sedentary or screen based-based activity in both the younger and the older persons. Like healthy eating, physical activity is a key behavioural determinant of population health that can protect against preventable chronic diseases – thus, the importance of *primary prevention* by complying with recommended minimum levels of physical activity and maximum amount of time one should spend on sedentary behaviour required for health benefits. These plants also provide food and shelter for wildlife. Eligible parties or organizations for this program include residential ratepayers, residential tenants, residential body corporates, schools, registered community groups, clubs on Council-leased land, and official citizenship ceremonies (Brisbane City Council, 2022).

V. The nation-wide organization *Buildsafe* (2021) has on-site health and safety / Occupational Health and Safety (OHS) as the main priority in building industry since its very nature is high risk. Striving to eliminate the risks associated with construction is achieved through innovated product design, engineering, and smart working methods. Example, relevant OHS Regulations requires measures such as temporary fence must be erected around a new incomplete house being constructed. This *primordial prevention* strategy serves as important physical barrier to stop the public such as vulnerable older persons perhaps living in nearby RACF from entering into a dangerous building site whereby preventable injuries such as falls could easily occur.

Discussions

Public health is mostly focused on primordial, primary and secondary prevention whereby my 5 photos used for photovoice also aid conceptualization of these three important public health principles to varying degree. Strong preventive health initiatives in Australia that have dramatically impacted on our health include immunisation and cancer screening programmes, tobacco and skin cancer exposure reduction strategies, gun laws, water fluoridation, safe driving measures, and the eradication of smallpox.

Childhood immunizations such as for diphtheria, tetanus, pertussis (whooping cough), influenza and measles, and COVID-19 vaccinations for SARS-CoV-2 virus to prevent various communicable diseases and reduce their morbidity and mortality are classical examples of *primary prevention*. Complying with risk reduction approach [thus *shifting high risk individuals into normal range*], Jelena had all her childhood immunizations plus two COVID-

19 vaccinations on 29 January 2022 and 27 March 2022 and I had all my past childhood immunizations plus three COVID-19 vaccinations on 13 August 2021, 4 September 2021 and 29 January 2022, and flu vaccination on 9 June 2022. As a health care worker, I would comply with population approach [thus *shifting whole population/distribution into lower risk category*] by, for example, encouraging everyone to be up to date with their childhood immunizations plus COVID-19 vaccinations.

Apart from non-modifiable chronological ageing; biological, psychological and social ageing are potentially modifiable kinds of ageing commencing *in utero* [example, due to maternal gestational diabetes], and also anytime from birth until death [example, due to *[primary] preventable* injuries/communicable diseases whereby the most vulnerable age groups are the very young and the very old]. Youth-onset Type 2 Diabetes is defined as diagnosis at age <25 whereby its prevalence is globally increasing because of higher risks in marginalised, socioeconomically vulnerable (with high unemployment rate, etc), First Nations communities [including Aboriginal peoples], and foetal exposures from maternal hyperglycaemia and obesity. With high incidence of positive family history of diabetes in first- or second-degree relatives, a new diabetic diagnosis will lead to more affected future offspring. All these elements would increase Aboriginal peoples of developing cardiometabolic conditions of CVD, overweight/obesity and diabetes at an even younger age [together with early onset of chronic kidney disease, diabetic neuropathy and diabetic retinopathy as known complications of diabetes]. Thus, there is a high prevalence of Type 2 Diabetes among Aboriginal families as well as in young Aboriginal women reporting at least one pregnancy (Titmuss et al., 2022).

Stolen Generations refers to Aboriginal children being removed from their families through government policies during mid-1800s to 1970s. Low levels of education, ageing population, overweight/obesity as BMI >22kg/m² (with poor diet and low physical activity), and psychological distress from forced removal as children are contributing factors that increase risk of Type 2 Diabetes in Aboriginal peoples (Reeve et al., 2014). Genetic inheritance, intergenerational and epigenetic factors are largely non-modifiable downstream or proximal determinants in early development of Type 2 Diabetes in Aboriginal peoples (Anderson et al., 2015). This relates to metabolism of Aboriginal peoples having been adapted to be efficient hunter-gatherers that is crucial for successful traditional lifestyle. With fewer Aboriginal peoples living traditional lifestyle being exposed to Western diet with low-fibre foods rich in fat and/or sugar, excessive alcohol consumption and smoking cigarettes with adopting sedentary lifestyle; their usually efficient metabolism is now disadvantaged with high rates of developing obesity, impaired glucose tolerance, hypertension, hyperlipidaemia and elevated blood insulin level. A can of soft drink like Coke that contains 40 grams of sugar is harmful to the diabetic person as it worsens glycaemic control. In addition, Coke is an example of sugar-sweetened drink (SSD) that is acidic in nature and contains caffeine. Around 400 mg of caffeine per day that is present in four cups of brewed coffee (or 10 cans of Coke) appears to be safe for most healthy adults. However, excessive SSD intake significantly increases dental caries burden in 10-year-olds with attenuated effects in 15-year-olds. As

primary prevention of dental caries, SSD consumption should be reduced especially in children and adolescents (Pitchika et al., 2020).

According to Australian Institute of Health and Welfare (AIHW) in 2018, after adjusting for differences in age structures between the two populations, the incidence rates of Type 1 Diabetes were similar among Aboriginal peoples and non-Indigenous Australians; viz, 12 and 11 cases per 100,000 people respectively. After adjusting for the same; diagnosis of Type 2 Diabetes would be consistent with the finding in 2017–18 that there was a rate of 8,500 per 100,000 population with difference in rates between Aboriginal peoples and non-Indigenous Australians greater for females than males - 5.6 times as high for females and 3.2 times as high for males. Rate of diabetes hospitalisations among Aboriginal peoples was 4.3 times higher than rate for non-Indigenous Australians (AIHW, 2020a). The 2018–19 Health Survey indicated 13% of Aboriginal adults aged 18 and over self-reported as having diabetes or high sugar levels whereby this equates to 2.8 times rate of non-Indigenous adults. Aboriginal adults living in remote areas would report a higher rate of diabetes or high sugar levels (24%) than those in non-remote areas (15%) (AIHW, 2020b).

Healthy recommendations for food and physical activity for 10 years-old Jelena to comply with are outlined in **Box 5**.

Box 5. Healthy recommendations for food [Ages 9-11] and physical activity [Ages 5-17]

- Limit intake of foods and drinks containing added sugars such as confectionary, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks, and choosing from five food groups every day using the following criteria: 5 serves of Vegetables and legumes/beans; 2 serves of Fruit; 4 serves of Grain (cereal) foods, mostly wholegrain and/or high fibre cereal varieties; 2 ½ serves of Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans; and 3 serves of Milk, yoghurt, cheese and/or alternatives, mostly reduced fat (National Health and Medical Research Council, 2013).
In addition, only 0 to 3 serves are recommended for the approximate number of additional serves from the Five Food Groups or unsaturated spreads and oils or discretionary choices.
- As per Australia’s physical activity and sedentary behaviour guidelines (Department of Health, 2017), Physical activity: Several hours of light activities with at least 60 minutes of moderate to rigorous physical activity per day. Sedentary or screen-based activity: No more than 120 minutes of screen use. Break up long periods of sitting. Strength: Vigorous and muscle strengthening activities 2 times a week.

Premature babies

Annually, an estimated 15 million babies are globally born preterm (defined as birth before 37 completed weeks of gestation) with preterm birth complications being the leading cause of death among children aged <5 years. This equates to approximately 1 million deaths in 2015 (Liu et al., 2016). Survivors often face lifetime disabilities such as learning difficulties/disabilities, and visual and hearing problems. Some causes are iatrogenic from

early induction of labour or caesarean birth for medical or non-medical reasons. Common causes of preterm birth include multiple pregnancies, infections and chronic conditions such as maternal diabetes and hypertension. However, most preterm births occur spontaneously with unknown causes although there could be a genetic influence.

Preventing deaths and complications from preterm birth commences with healthy pregnancies whereby quality care before, between and during pregnancies ensure all women will have positive pregnancy experiences. Crucial *primary prevention* as outlined by WHO's antenatal care guidelines include key interventions to assist in preventing preterm birth. Examples: counselling pregnant women on healthy diet and optimal nutrition, ceasing tobacco and substance use; foetal measurements which include using ultrasound to determine gestational age and detect multiple pregnancies. A minimum of 8 antenatal contacts with health professionals is recommended throughout pregnancy to identify and manage other risk factors such as infections (WHO, 2018).

Essential care mainly as *secondary prevention* during childbirth and in postnatal period for every mother and baby is required. This may consist of providing antenatal steroid injections (given to pregnant women at risk of preterm labour under strict set criteria to strengthen babies' premature lungs), kangaroo mother care (whereby premature babies are carried by mothers with skin-to-skin contact and frequent breastfeeding) and [empiric] antibiotics to treat newborn infections. As example, continuity of midwifery-led care in settings with effective midwifery services has been shown to reduce risk of prematurity by approximately 24% (WHO, 2018).

Oral health

Most oral health conditions such as dental caries (tooth decay), periodontal diseases, oral cancers, oro-dental trauma, cleft lip and palate, and noma (severe gangrenous disease starting in the mouth mostly affecting children) are largely preventable and can be treated in their early stages (WHO, 2022). It is estimated by Global Burden of Disease Study 2019 that oral diseases affect almost 3.5 billion people worldwide with caries of permanent teeth being the most common condition (Global Burden of Disease Collaborative Network, 2020).

Common risk factors for developing oral diseases can be reduced through public health interventions by addressing common risk factors: Promoting a well-balanced diet low in free sugars and high in fruit and vegetables, and favouring water as the main drink; stopping use of all forms of tobacco, including chewing of areca nuts; reducing alcohol consumption; encouraging use of protective equipment when doing sports and travelling on bicycles and motorcycles (to reduce the risk of facial injuries); and provide adequate exposure to fluoride which is an essential factor in preventing dental caries. An optimal level of fluoride can be obtained from different sources such as fluoridated drinking water, salt, milk and toothpaste. Twice-daily tooth brushing with fluoride-containing toothpaste (1000 to 1500 ppm) should be encouraged (Walsh et al., 2019).

Injury prevention

Most injuries, whether unintentional or intentional, are preventable (WHO, 2014). Annually in Australia, thousands of people die and many more are admitted to hospital or attend hospital emergency departments because of injuries. People with minor injuries usually recover completely but people with serious injuries, if they survive, often have lasting health problems (Gabbe et al., 2017).

Accidents are predominantly regarded as chance events without taking into consideration that these events are preventable. Thus, injuries are preventable events that threaten life caused by acute exposure to exhort of energy or arising from consequences of a deficiency in a vital element that exceeds physiological thresholds (Bonilla-Escobar & Gutiérrez, 2014). ‘Accidents causing falls’ or ‘road traffic accidents’ are best described as ‘injuries from falls’ and ‘road traffic injuries’ in order to emphasize these are potentially preventable events that threatens life with major consequences on public health and represent a significant global issue. Intentional injury, whether self-inflicted [*suicide attempts*] or as direct consequence of interpersonal violence, is a substantial population health issue as leading causes of injury mortality and hospitalised morbidity with significant economic and societal cost. Its impact on individuals, friends, family and the community can be extensive. For example, in Australian children aged ≤ 16 years during 1 July 2001 to 30 June 2012 period with *self-harm* or *assault* injuries, there were 18,223 self-harm and 13,877 assault hospitalisations with a treatment cost of \$64 million and \$60.6 million, respectively (Mitchell et al., 2018).

The Haddon matrix combines public health concepts of host-agent-environment as targets of change that utilizes concepts of *primary*, *secondary*, and *tertiary prevention*. It was originally developed by William Haddon more than two decades ago when he applied basic principles of public health to the problem of traffic safety, and has since been used in injury prevention research and intervention. Applicable to injuries of many types, it consists of a grid with four columns and three rows whereby the rows represent different phases of an injury (pre-event, event, and post-event), and the columns represent different influencing factors (host, agent/vehicle, physical environment, social environment).

According to Runyan (1998, p. 302), “The host column refers to the person at risk of injury. The agent of injury is energy (for example mechanical, thermal, electrical) that is transmitted to the host through a vehicle (inanimate object) or vector (person or other animal). Physical environments include all the characteristics of the setting in which the injury event takes place (for example a roadway, building, playground, or sports arena). Social and legal norms and practices in the culture are referred to as the social environment. Examples include norms about child discipline or alcohol consumption or policies about licensing drivers or sales of firearms.” In **Table 3**, the Haddon matrix is created for vulnerable older persons age >65 from residential aged care facility (RACF) as a theoretical scenario.

Table 3. Haddon matrix studying injury causes and prevention when applied to problem of older persons >65 from RACF that may sustain falls at nearby house construction site.

Phase	Host (older persons from RACF)	Agent/vehicle	Physical Environment (nearby two-storey building site)	Social Environment (community norms, policies, rules)
Pre-Event	Age of adult >65	Upper Floor height (around 3 metres)	Installing Temporary Fence, Perimeter Fall guard, Balcony Fall guard, Void Platform Stair System, etc as per Occupation Health and Safety requirements	Educate older persons from RACF to not enter into building site. Builder to adopt and comply with relevant on-site health and safety policies that are set up by various government authorities.
Event	Muscle strength and coordination (with likely poor eyesight and impaired cognitive judgement)	Ground Floor hardness (whether concrete or wooden floor) that determine severity of injuries	Access to communication (alerts, mobile phones, etc) to ensure prompt notification to emergency services for help	Employ extra safety officers to patrol and monitor for unauthorized people entering the dangerous building site
Post-Event	Other medical problems (example, osteoporosis and atherosclerosis)	Nature of fall (life-threatening body injuries with or without head injuries)	Proximity to hospital that provide emergency care and definite treatment	Increase capability of hospital facilities to provide good trauma care and rehabilitation

Conclusions

Determinants/causes/risk factors that affect health can be described in three ways as proximal (downstream or directly affecting health), midstream and distal (upstream or indirectly affecting health). Examples: Income is regarded as distal (upstream) as it does not directly affect health, but it could influence more proximal factors like location of work and living accommodation which more directly affect health. Midstream determinants of overweight/obesity such as poor diet and low physical activity are more amenable/beneficial to change in motivated persons and are therefore logical focus for preventive medicine. Decreased access to affordable health services and decreased physical activity opportunities

due to poor government policies or fundings are upstream determinants of overweight/obesity. Non-modifiable risk factors such as genetic or ethnic predisposition to developing Type 2 Diabetes and obesity are usefully classified as downstream determinants of overweight/obesity. Thus, wider determinants of health would include social, environmental, economic, cultural, structural and biological determinants whereby prevention essentially refers to combating upstream causes of ill health.

The proverbial saying ‘Prevention is better than cure’ created around 1500 was attributed to Dutch philosopher Desiderius Erasmus (28 October 1466 – 12 July 1536). We can demonstrate using Evidence-based Medicine and Practice “a growing body of research findings suggests that prevention, risk screening, and early intervention strategies that capitalize on resilience and strengths in individuals and their developmental contexts may be the key to building healthier societies with happier people” (Overbeek, 2022, p. 614). The statement ‘*Prevention is the best cure*’ is then strongly advocated to reflect this stance whereby promotion of healthy lifestyles with prevention of ill health or injuries is a fundamental principle behind all public health measures. This principle is especially applicable to *priority population groups* which could be culturally-based [e.g. CALD and Aboriginal peoples], environmentally-based [example, rural and remote living people], age-based [e.g. older Australians], and economically-based [e.g. unemployed people experiencing housing insecurity]. Future goal of injuries and ill health prevention through healthy lifestyles promotion can be accomplished *en masse* by nurturing closer alignment and collaboration between stakeholders consisting of patients, the public, community, healthcare providers and public health professionals, industry, researchers, policymakers, and government to help build more effective and larger-scale prevention paradigm.

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Supplementary materials dated 26 April 2022:

The latest version of the American Society of Anesthesiologists (ASA) physical status classification system (ASAPS), as approved by the ASA House of Delegates on October 15, 2014. Note that there is no specific classification assigned to patients with moderate systemic disease, just assignments for patients with mild systemic disease (ASA 2) and those with severe systemic disease (ASA 3).

Abbreviations used: ASA: American Society of Anesthesiologists, BMI: body mass Index, CHF: congestive heart failure, COPD: chronic obstructive pulmonary disease.

ASA 1: A normal healthy patient. Example: Fit, nonobese (BMI under 30), a non-smoking patient with good exercise tolerance.

ASA 2: A patient with mild systemic disease. Example: Patient with no functional limitations and a well-controlled disease (e.g., treated hypertension, obesity with BMI under 35, frequent social drinker, or cigarette smoker).

ASA 3: A patient with a severe systemic disease that is not life-threatening. Example: Patient with some functional limitation due to disease (e.g., poorly treated hypertension or diabetes, morbid obesity, chronic renal failure, a bronchospastic disease with intermittent exacerbation, stable angina, implanted pacemaker).

ASA 4: A patient with a severe systemic disease that is a constant threat to life. Example: Patient with functional limitation from severe, life-threatening disease (e.g., unstable angina, poorly controlled COPD, symptomatic CHF, recent (less than three months ago) myocardial infarction or stroke).

ASA 5: A moribund patient who is not expected to survive without the operation. The patient is not expected to survive beyond the next 24 hours without surgery—examples: ruptured abdominal aortic aneurysm, massive trauma, and extensive intracranial haemorrhage with mass effect.

ASA 6: A brain-dead patient whose organs are being removed with the intention of transplanting them into another patient.

The addition of “E” to the ASAPS (e.g., ASA 2E) denotes an emergency surgical procedure. The ASA defines an emergency as existing “when the delay in treatment of the patient would lead to a significant increase in the threat to life or body part.”

Examples of ASAPS Classification

Patient 1. A 20-year-old college athlete from Brigham Young University is scheduled to undergo an elective ACL repair. Nonsmoker, nondrinker, no medications, BMI 23. This patient would be assigned ASAPS Class 1.

Patient 2. A 19-year-old college student from the University of California - Santa Barbara (a top “party school”) is scheduled to undergo emergency orthopedic surgery following a fall from his frat house roof after attending a weekly “kegger” party. The patient takes recreational medications only (mostly cannabis) and has a BMI of 29. This patient would be assigned ASAPS Class 2E by being a frequent social drinker and being scheduled as an emergency case. Note that the “full stomach” status of the patient does not figure into his ASAPS yet still adds considerably to his overall anesthetic risk.

Patient 3. A 30-year-old woman is scheduled to undergo elective surgery for the removal of a large ovarian cyst. Comorbidities include anemia from menorrhagia and type II diabetes

treated with metformin. She is a non-smoker, an occasional social drinker, and has a BMI of 42. This patient would be assigned ASAPS Class 3.

Patient 4. A 70-year-old woman is scheduled to undergo an emergency laparoscopic appendectomy. Comorbidities include severe COPD as a consequence of a life-long smoking habit, morbid obesity (BMI 46), and type II diabetes. She gets short of breath walking more than a few meters. This patient would be assigned ASAPS Class 4E.

Patient 5. A 55-year-old man is scheduled for emergency repair of a ruptured abdominal aortic aneurysm. He is brought to the operating room with CPR in progress due to asystole. He had been intubated earlier in the Emergency Department without the need for any drugs. This patient would be assigned ASAPS Class 5E as he would not be expected to survive beyond the next 24 hours with or without surgery.

Patient 6. A 25-year-old man sustained a severe head injury in a motorcycle accident. He was not wearing a helmet. After a neurosurgical decompression procedure and numerous other interventions in the intensive care unit, it is clear that there is no hope for recovery. He is unresponsive to all noxious stimulation. Testing for brain death is carried out according to the American Academy of Neurology guidelines for Brain Death Determination reveals a complete absence of central nervous system function, and his family agrees to make his organs available for transplantation. This patient would be assigned ASAPS Class 6.

New York Heart Association (NYHA) classification

NYHA grading MET*

Class I No limitations. Ordinary physical activity does not cause undue fatigue, dyspnoea or palpitations (asymptomatic LV dysfunction). MET >7

Class II Slight limitation of physical activity. Ordinary physical activity results in fatigue, palpitation, dyspnoea or angina pectoris (mild CHF). MET 5

Class III Marked limitation of physical activity. Less than ordinary physical activity leads to symptoms (moderate CHF). MET 2–3

Class IV Unable to carry on any physical activity without discomfort. Symptoms of CHF present at rest (severe CHF). MET 1.6

*MET (metabolic equivalent) is defined as the resting VO₂ for a 40-year-old 70kg man whereby 1 MET = 3.5 mL O₂/min/kg body weight.

Functional Capacity**

The **Functional Status** of the Patient. The Functional status of the patient can be divided into: POOR or MODERATE / EXCELLENT

PEARL of WISDOM

The functional status of the patient is a good predictor of both the cardiac and overall risk of the patient for surgery and hospitalization.

EXAMPLES OF

METS** ACTIVITY* Functional Capacity:

≤ 4 METS	-unable to walk ≥ 2 blocks on level ground without stopping due to symptoms - eating, dressing, toileting, walking indoors, light housework.	POOR
> 4 METS	-climbing ≥ 1 flight of stairs without stopping -walking up hill ≥ 1-2 blocks -scrubbing floors -moving furniture - golf, bowling, dancing or tennis -running short distance	MODERATE to EXCELLENT

* performance of any *one* of the activities would qualify the patient, not the ability to do *all*

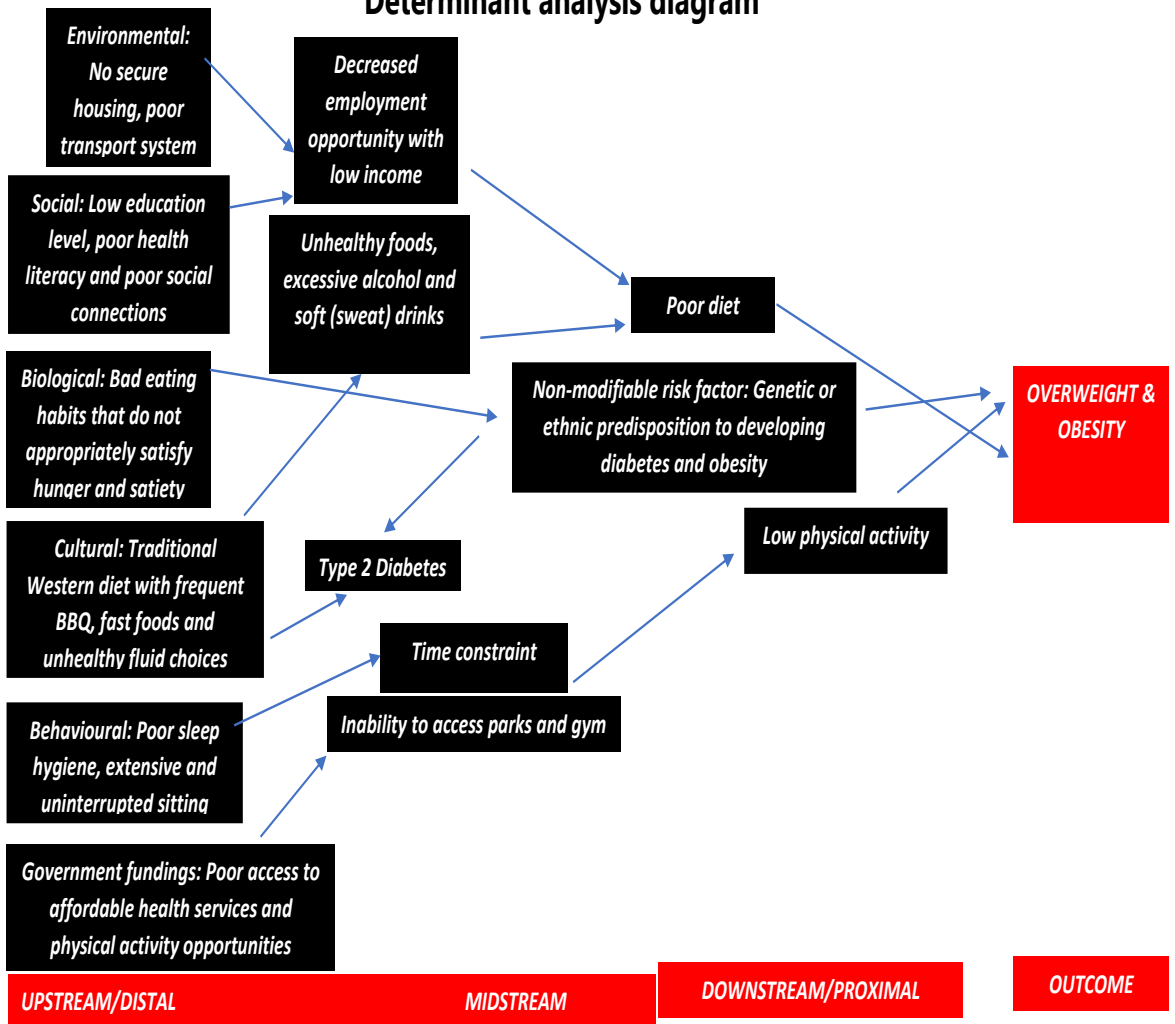
**METS; an abbreviation for "metabolic equivalents" that is a standardized measure of energy expenditure.

Determinants Analysis Table [relevant to the author John Ting]

Determinant category	Diet	Physical Activity
Social	Stable marriage with five children. Belong to middle class family. Highly educated with a bachelor degree and usual job being a health care worker with stable income. Aware of choosing nutritious foods from the five food groups as per Australian Dietary Guidelines.	Socially connected with selected circle of friends and relatives that actively participate in various social bush-walking events. High level of health literacy with encouraged motivation to be physically active as per Australia's Physical Activity and Sedentary Behaviour Guidelines.
Cultural	Prefer food with Chinese culture influence instead of unhealthy Western-style fast foods.	Sense of belonging to the church community by participating in weekly Saturday group bicycle ride.
Environmental	Home owner of a house located in a highly liveable suburb in Brisbane. Nearest supermarket located 1 km from home with available good choice of healthy food to choose from. Avoid nearby fast-food chains such as KFC and McDonald. Occasionally eat out at restaurants that provide healthy food.	Well-developed walking paths and safe road conducive to regular walking and cycling. Nearby community parks 0.5 km from home which encourage active family activities. Has home swimming pool. Gym 1 km from home.
Behavioural	Nil financial pressure, nil loans, minimal family conflict. Being an active medical and mathematical researcher who sufficiently understands health risk factors in developing chronic non-communicable diseases associated with serious underlying morbidity and mortality that contributed to high personal and national health cost. Involved in active home gardening that yield healthy vegetables and fruits for ready consumption.	High interest in sport participation. Minimize biopsychosocial stress and abnormal sleep patterns or mood that may cause excessive eating and/or reduce physical activity.
Biological	Endeavour to cultivate healthy eating habits involving tasty, highly palatable healthy food that appropriately satisfy hunger and satiety. Middle-aged, male gender. One non-modifiable risk factor: Family history of father diagnosed with Type 2 Diabetes at age 80. Nil significant modifiable risk factors.	Classified as ASA 1 person having nil chronic non-communicable disease such as diabetes, hypertension, obesity and osteoarthritis [with chronic pain and impaired mobility] that will impede active participation in healthy physical activities.

Diet and Physical Activity are immediate proximal determinants of obesity risk. ASA: American Society of Anesthesiologists.

Determinant analysis diagram



Approval under Sections 18(1) and 122(5) of the
Health (Drugs & Poisons) Regulation 1996



Queensland
Government

Department of Health

I, Dr Susan Ballantyne Delegate of the Chief Executive, Queensland Health, and a person duly authorised to grant an endorsement pursuant to Section 18 of the Health (Drugs & Poisons) Regulation 1996, and being duly authorised to give a written approval pursuant to Section 122(5) of the Health (Drugs & Poisons) Regulation 1996, give notice of my decision to grant a treatment approval for:

Dr John Ting
Dental and Medical Surgery, 729 Albany Creek Road ALBANY
CREEK QLD 4035 Woody Point Medical Centre, 28 Lilia Street
WOODY POINT QLD 4019

to prescribe to:

a class of patients, namely, persons on the Queensland Opioid Treatment Program for opioid drug dependence the following Schedule 8 controlled drugs:

- methadone
syrup/liquid; or
- buprenorphine
tablets/film

subject to the following conditions:

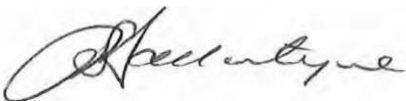
1. Discharge forms must be forwarded for each patient to Medicines Regulation and Quality within two weeks of ceasing treatment for that patient.
2. Written instructions must not be given directly to patients. All written instructions must be faxed to the relevant pharmacy for supply and then posted to that pharmacy to be faxed to the pharmacy and then posted.
3. This approval is valid for the treatment of a maximum of 135 private patients in total.
4. No further admissions onto the Queensland Opioid Treatment Program are permitted under this approval.
5. All patients you treat, and prescribe for, on the Queensland Opioid Treatment Program must be treated in accordance with the "Queensland Opioid Treatment Program: Clinical Guidelines 2012"
6. Medicines Regulation and Quality must be notified immediately if you, for any reason, cease prescribing for persons on the Queensland Opioid Treatment Program.

This approval does not authorise the prescribing of any Schedule 8 controlled drugs or Schedule 4 restricted drugs of dependency not listed in the approval.

This approval expires immediately on your notification to Medicines Regulation and Quality that you have ceased prescribing for persons on the Queensland Opioid Treatment Program.

Date of Effect: This approval takes effect on 30 June 2018

Date of Expiry: This approval expires on 31 July 2018 unless it otherwise expires immediately on your notification to Medicines Regulation and Quality that you have ceased prescribing for persons on the Queensland Opioid Treatment Program.



Dr Susan Ballantyne
Delegate of the Director-General
Queensland Health



Approval under Sections 18(1) and 122(5) of the Health (Drugs & Poisons) Regulation 1996

Queensland
Government

Department of Health

NOTICE

HEALTH (DRUGS AND POISONS) REGULATION 1996

Section 122(5)

"If the chief executive is reasonably satisfied that, for the welfare of the drug dependent person or class of drug dependent person, it is necessary for the relevant practitioner to treat the person or persons with a controlled drug, the chief executive may give the relevant practitioner written approval to administer, dispense, prescribe, supply or give an oral or written instruction to supply a stated quantity or volume of the controlled drug."

Office: Medicines Regulation & Quality Postal: Locked Bag 21 Fortitude Valley BC QLD
4006 Phone: 13 78 46 Fax: 07 3708 5431