2015/2016 Summer Studentship Project Application Form

Send to: Research Office, University of Otago Christchurch, PO Box 4345, Christchurch, by 5pm on **3 July 2015**

Supervisor Information (First named supervisor will be the contact):	
Supervisor's Name and Title(s): Prof GM Shaw, Dr S Connor, Dist Prof J Geoffrey Chase	
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Research Category (Choose one category only – to be used for judging the students' presentations):		
Clinical X	**Laboratory**	**Community**

Project Title (20 words MAXIMUM):

Early warning of the deteriorating patient

Project Description:

Introduction:

Patients exhibit compensatory physiological changes in response to deteriorating condition. However, these changes are frequently subtle and non-specific. In addition, each patient moves along their own unique trajectory, so what may be normal for one patient maybe quite abnormal for another. For Early Warning Scores (EWS) to effectively detect deterioration, they must be highly sensitive. Unfortunately their specificity is extremely low, yielding many false positive alarms that waste precious clinical resources, and render EWS systems of minimal to no use.

Traditional vital signs recordings (body temperature, blood pressure, heart rate, and respiratory rate) that make up many EWS methods are highly filtered, removing important information about the patient's clinical state. For example a loss of heart rate variability is known to correlate with stress, but is not typically available to the bedside nurse. In fact, information on change and/or rate of change of any physiological parameter is not readily available using standard, intermittent observations and recording methods – indicating that automation would have impact.

Finally we do not know the normal trajectory over time of any of these metrics. There is thus a need and an opportunity to automate measurement and it's processing to better understand the "normal" physiological changes in patients with resolving acute illness, leading to the development of effective EWS methods.

Aim:

To characterise a range of heart rate variability (HRV) metrics for a high risk surgical cohort, over of their hospital admission who have recently undergone (**i**) major emergency, or (**ii**) elective abdominal or (**iii**) vascular surgery, and to correlate these HRV measures with significant adverse outcomes for which patient outcome and cost would benefit from useful early warning.

Methods:

Following written informed consent, high risk surgical patients will be fitted with a simple heart rate monitor, strapped to their chest. The monitor wirelessly communicates with a bedside computer, which records the heart rate (ECG). This data will be continuously collected from the time the patient first arrives in the surgical ward, till they are well and independently mobilising. Data will be acquired from up to 30 patients, starting in August 2015, over a two to three month period. Any adverse event, e.g. wound infection, respiratory difficulties, transfer (back) to the surgical progressive care unit (SPCU) will be prospectively collected by research assistants.

The student will conduct a detailed examination of the medical records as they relate to the prospectively collected adverse events. Using standard statistical methods, significant clinical changes, e.g. severe unexpected hypotension from sepsis or aspiration lung injury, will be correlated with observational data and heart rate variability. The natural history of these physiological changes will also be characterised.

Anticipated outcomes of this research:

Statistically significant deviations from the expected physiological changes will be used to develop a more specific test to inform clinicians at a much earlier time of important and potentially life-threatening conditions, which if managed earlier will significantly improve patient outcomes and reduce cost of care

Student Prerequisites (eg. Medical Student) if applicable:
Medical student They will need to access patients records