<center>Concept Paper Template</center>

Provisional Paper Title: High-need/high-cost users of public health and social services in 2 million New Zealanders

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P.I. Sponsor: Temi

Today's Date: 28 August 2018

Please describe your proposal in 2-3 pages with sufficient detail for helpful review.

Objective of the study:

Background
In 2016 we carried out a study to test the population-segmentation approach by integrating multiple nationwide administrative databases and electronic medical records in the Dunedin Multidisciplinary Health and Development Study 1972-73 birth cohort. We found that a segment comprising one-fifth of the 1000-member cohort accounted for 36% of the cohort's injury insurance-claims; 57% of hospital nights; 66% of welfare benefits; 78% of prescription fills; and 81% of criminal convictions (Caspi et al., 2017. A small segment of the population with large economic burden: Childhood forecasting. Nature Human Behaviour, 1).

However, the Dunedin sample size was small, and the approach needs to be rigorously evaluated at the national level in New Zealand. This new project aims to extend the Dunedin cohort analysis by testing the extent of service use concentration using whole population data in the Statistics NZ IDI. Specifically, we will test the hypothesis that the cost of public health and social services is concentrated in a relatively small proportion of the New Zealand population who use multiple public sectors at a high frequency. We will also test the elasticity of the finding in the IDI data, whether this concentration varies by type of service (hospitalisations, pharmaceutical use, ACC claims, MSD benefits, criminal court conviction), by sex, and by age/birthyear. How robust is it?

Aims

1. To test the hypothesis that the cost of public health and social services is concentrated in a relatively small proportion of the New Zealand population who use multiple public sectors at a high frequency.
2. To test whether this concentration varies by type of service, sex, and age/birthyear.

Data analysis methods:

IN the NZIDI: We have examined the cumulative distributions of each of the five outcomes. Using these distributions, we operationally define a high-cost group in each sector as individuals who have accounted for a disproportionate share of use in that sector. These outcomes are compared

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across the sexes, and across birth years.

We assess seven 5-year-band cohorts born from 1950-54 to 1980-84 and assess their service use from 2006-2016 in the following sectors:

- injury claims (ACC)
- benefits received (MSD)
- hospitalisations (MOH)
- pharmaceutical prescriptions (MOH)
- criminal convictions (COR)

Each of the seven birth cohorts contains approximately 300,000 individuals, and service use data cover the ages 22 (i.e., service use in 2006 for those born in 1984) to 66 (i.e., service use in 2016 for those born in 1950). We assess cumulative distributions for the whole population and separated by gender. We also control for exposure (i.e., time out of the country and the any deaths that occur during the exposure period). We compare distributions across sectors, and across cohort (controlling for demographic differences in the cohorts).

In the Dunedin Study cohort: Our analyses in the NZIDI show that the concentration of service use in high-need/high cost segment of the population does indeed apply across the seven historical birth cohorts, the two sexes, and the five public-service sectors in New Zealand. However, we do not wish to end the paper on a discouraging note, we want to end with a strong prevention message.

Our thinking is that we can add a "Study 2" to the manuscript, in which we identify a group of SM's that is parallel to the group defined in the NZIDI, (i.e., using just the 5 sectors in the IDI, omitting cigarettes, kilos of overweight, and fatherless child years, which were in the Pareto paper). We would like to show that these SM's have a history of problems that are treatable, or preventable, if there were the political will. We have selected risk predictors that are already the target of major prevention programmes in many developed countries. The analysis will be a simple chart to show attributable risk.

Variables needed from the Dunedin cohort at which ages:

We have selected risk predictor variables that are already the target of major prevention programmes in developed countries:

Mental health or substance abuse diagnosis between ages 11 and 18.
Brain Health at age 3
Leaving secondary school without qualifications
Began smoking tobacco by age 15
Unplanned teen parenthood
Juvenile police arrest

The admin-register data from Phase 38 to create a high-need/high-cost group

Significance of the Study (for theory, research methods or clinical practice):

Contribution to the development of policy

Policy-makers are interested in early-years interventions, hoping for improved adult outcomes in the long run, bringing government return on investment. Early-years interventions to promote health and development with the population segment who account for the greatest public expenditures could yield very large returns on investment.

References cited:

Data Security Agreement

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Proposing Author	Richmond-Rakerd, Milne, D'Souza, Moffitt, Caspi,
Today's Date	Aug 28 2018

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x	I am current on Human Subjects Training (CITI (www.citiprogram.org) or equivalent)
x	My project is covered by Duke or Otago ethics committee OR I have /will obtain ethical approval from my home institution.
x	I will treat all data as "restricted" and store in a secure fashion. My computer or laptop is: 　　　a) encrypted (recommended programs are FileVault2 for Macs, and Bitlocker for Windows machines) 　　　b) password-protected 　　　c) configured to lock-out after 15 minutes of inactivity AND 　　　d) has an antivirus client installed as well as being patched regularly.
x	I will not "sync" the data to a mobile device.
x	In the event that my laptop with data on it is lost, stolen or hacked, I will immediately contact Professor Moffitt or Caspi. (919-684-6758, tem11@duke.edu, ac115@duke.edu)
x	I will not share the data with anyone, including my students or other collaborators not specifically listed on this concept paper.
x	I will not post data online or submit the data file to a journal for them to post. *Some journals are now requesting the data file as part of the manuscript submission process. The Dunedin Study Members have not given informed consent for unrestricted open access, so we have a managed-access process. Speak to Terrie or Avshalom for strategies for achieving compliance with data-sharing policies of journals.*
x	I will delete all data files from my computer after the project is complete. Collaborators and trainees may not take a data file away from the office. The data remains the property of the Study and cannot be used for further analyses without an approved concept paper for new analyses.

Signature:　___Temi and all other authors_____

CONCEPT PAPER RESPONSE FORM

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Proposing Author	Richmond-Rakerd, Milne, D'Souza, Moffitt, Caspi,
Other Contributors	Richie Poulton, Sean Hogan, Sandhya Ramrakha
Potential Journals	To be selected
Today's Date	28 Aug 2018
Intended Submission Date	

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B. To be completed by potential co-authors:

	Approved
	Not Approved
	Let's discuss, I have concerns

Comments:

Please check your contribution(s) for authorship:

	Conceptualizing and designing the longitudinal study
	Conceptualizing and collecting one or more variables
	Data collection
	Conceptualizing and designing this specific paper project
	Statistical analyses
	Writing
	Reviewing manuscript drafts
	Final approval before submission for publication
	Acknowledgment only, I will not be a co-author

Signature:

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