

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A network model of human aging: Limits, errors, and information SPENCER FARRELL, ARNOLD MITNITSKI, KENNETH ROCKWOOD, ANDREW RUTENBERG, Dalhousie University — The Frailty Index (FI) quantifies human aging using the fraction of accumulated age-related deficits. The FI correlates strongly with mortality and accumulates non-linearly and stochastically with age. Clinical data shows a nearly universal limit of $FI \leq 0.7$. We computationally model an aging population using a network model of interacting deficits. Deficits damage and repair at rates that depend upon the average damage of connected nodes. The model is parametrized to fit clinical data. We find that attribution errors, especially false negative, allow the model to recover the frailty limit. Mutual information allows us to assess how well the FI can predict mortality. Mutual information provides a non-parametric measure of how the FI predicts mortality. We find that attribution errors have a small effect on the mutual information when many deficits are included in the model. The mutual information of our model and of the clinical data are comparable.

Spencer Farrell
Dalhousie University

Date submitted: 06 Nov 2015

Electronic form version 1.4