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Usefulness and Impact of Online Prognostic Calculators

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INTRODUCTION

Guidelines recommend incorporating mortality risk into clinical decision-making for older adults, such as cancer screening.^{1,2} We previously published a systematic review of prognostic indices to estimate mortality risk for older adults.¹ To help clinicians, we converted the indices in our systematic review into an online repository of prognostic calculators (www.ePrognosis.org, launched in January 2012). This study aims to evaluate which online prognostic calculators are used in real world settings, if they impact clinical decision making or the perception of prognosis, and if they are rated as useful.

METHODS

We examined usage data collected between April 11, 2012 and April 11, 2013. Users selected a prognostic index based on: the location of the patient (hospital, is living at home, or in a nursing home); time frame of interest for the clinical decision at hand (<2 years, 2–3

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Conflict of Interest

The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper.

Author Contributions

Ms. McClymont (UCSF) and Dr. Smith (UCSF) conceptualized the study. Ms. McClymont drafted the manuscript. Ms. Miao (UCSF) performed the statistical analysis. Drs. Smith, Lee, Widera (UCSF) and Schonberg (Harvard) provided critical revisions to the manuscript. As the corresponding author, Ms. McClymont had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

years, >3 years); and quality of the index (moderate, good, very good, excellent) (the main landing page changed in August 2013, old landing page viewable under “Bubbleview”). Once an individual prognostic index was selected, users were asked if they were a healthcare professional. If users clicked “no”, a disclaimer explained that the tool was intended for healthcare professionals, and the results should be discussed with a healthcare professional. The user then entered prognostic risk factor data about an individual, such as age, disability, and comorbid conditions. The user was asked to provide their best guess of the mortality risk, and then the calculated mortality risk was displayed. Next, the user was asked: “Now that you have seen this information, what is your best guess of mortality risk?” The user was then asked: “Did you find this information useful?” and “Did the information affect a clinical decision?” Finally, the user had the option to click “print the report”, “email the report”, or “finish”. Users who clicked any of the three options had data saved in a completed visit dataset, used for the present study. Data collected were free of personally identifiable information and could not be linked to individual users.

The Committee on Human Research at the University of California San Francisco reviewed this study protocol and determined it was not human subjects research.

RESULTS

Between April 11, 2012 and April 11, 2013, there were 4,426 completed visits (see Table 1). Eighty-six percent of completed visits were made by healthcare professionals. Overall, 63% of indices used were those for community-dwelling residents. Non-healthcare professionals were more likely to use the community-dwelling indices than healthcare professionals (81% vs. 60%, $p < .001$), and less likely to use the nursing home (13% vs. 20%, $p < .001$) and hospital-based indices (9% vs. 18%, $p < .001$).

A similar proportion of users’ mortality risk guess agreed with the calculated risk estimate (33%), was more pessimistic (30%), or more optimistic (38%). When the user was shown the calculated risk estimate, 38% of those whose guess was more optimistic or pessimistic changed their guess to agree with the calculated estimate. Ninety-one percent felt the calculator was useful. Forty-seven percent of healthcare professionals reported that the calculated prognosis affected clinical decision making.

DISCUSSION

A limitation of this study was the lack of inclusion of partial users who did not click one of the three options at the end of each calculator to complete the visit. Among completed visits, most users of the online prognostic calculators were healthcare professionals interested in community-dwelling indices. A substantial minority of users changed their mortality risk guess based on the risk estimate generated by the prognostic calculators. Most of the healthcare professionals found the prognostic calculators useful.

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Table 1

Most Used Online Prognostic Calculators(n=4,426)

Index	Risk Index		Frequency of Visits*		
	Location of Patient	Time Frame of Interest	Overall (n=4426)	Healthcare Professional (n=3807)	Non-Healthcare Professional (n=619)
Schonberg	Community dwelling	5 & 9 years	25%	24%	33%
Lee	Community dwelling	4 & 10 years	21%	20%	27%
Porock	Nursing home	6 months	11%	11%	6%
Walter (after discharge)	Hospital	1 year	7%	8%	1%
Mazzaglia	Community dwelling	15months	6%	6%	8%
Flacker long stay	Nursing home	1 year	6%	6%	5%
Carey (3 yr)	Community dwelling	3 years	5%	5%	6%
Carey (2 yr)	Community dwelling	2 years	4%	3%	6%
Levine (after discharge)	Hospital	1 year	4%	4%	2%
Inouye (on admission)	Hospital	1 year	3%	3%	1%
Flacker new admit	Nursing home	1 year	3%	3%	2%
Gagne	Community dwelling	1 year	2%	2%	1%
Di Bari (for ED triage)	Hospital	1 year	1%	1%	1%
Drame (after discharge)	Hospital	2 years	1%	1%	1%
Fischer (on admission)	Hospital	1 year	1%	1%	1%
Teno (on admission)	Hospital	1 year	1%	0%	1%
Pilotto (on admission)	Hospital	1 year	0%	0%	1%

* Percentages may not add to 100% due to rounding.