

Automated Prospective Clinical Surveillance for Inpatients at Elevated Risk of One-year Mortality Using a Modified Hospital One- Year Mortality Risk (mHOMR) Score

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- **Speaker fees/honoraria**

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BMJ Open Access to palliative care by disease trajectory: a population-based cohort of Ontario decedents

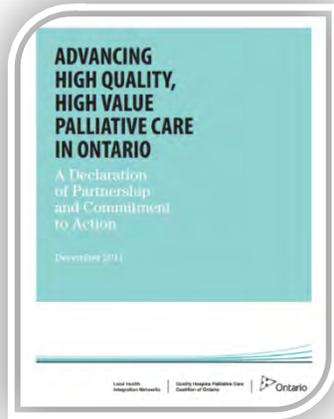
Hsien Seow,¹ Erin O'Leary,¹ Richard Perez,² Peter Tanuseputro³

Setting of PC	Terminal Illness (n=75657)	Organ Failure (n=72363)	Frailty (n=67513)
Any palliative care	88%	44.4%	32.4%
PC in community	68.6%	17.2%	15.1%
Median days between first PC and death (IQR)	107 (33, 246)	22 (6, 124)	24 (6, 132)
% of days receiving PC	37%	25%	23%

Why is Early Identification Important?

- Encourages introduction of a palliative approach to care
- Activates proactive care planning and discussions to define goals of care
 - Anticipate needs
 - More thoughtful and meaningful when conducted in an emotionally calm state
- Facilitates access to appropriate resources and supports required to meet patient needs
- Improves patient and system outcomes
 - More positive experience by patient, family and their health care providers
 - Reduced health care costs
 - minimize unnecessary emergency department visits and hospital admissions

Early Identification as a Priority in Ontario



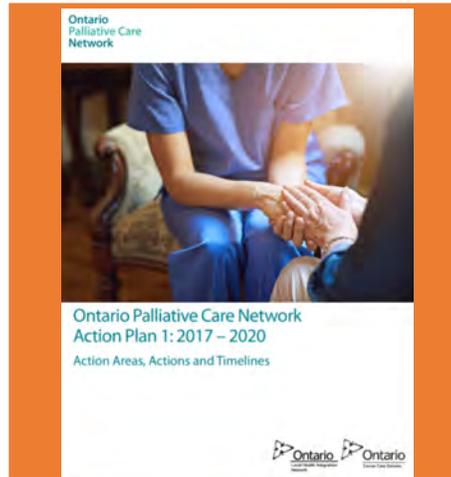
Declaration of Partnership (2011):
“Ensure early identification and access to services and supports”

Palliative & End-of-Life Care Provincial Roundtable Report (2016):

“The earlier we can begin delivering palliative services to patients who have been diagnosed with a life-limiting illness, the better for their health”



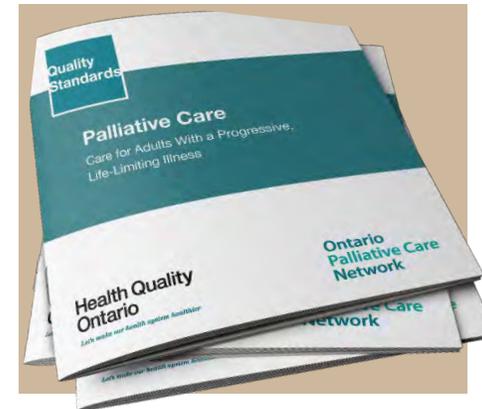
Early ID to Transform Palliative Care in Ontario



OPCN Action Plan:

Action Item C. Enabling Early Identification of People Who Would Benefit from Hospice Palliative Care

Palliative Quality Standard Statement #1: Identification and Assessment of Needs



ORIGINAL ARTICLE

Early Palliative Care for Patients with Metastatic Non–Small-Cell Lung Cancer

Jennifer S. Temel, M.D., Joseph A. Greer, Ph.D., Alona Muzikansky, M.A., Emily R. Gallagher, R.N., Sonal Admane, M.B., B.S., M.P.H., Vicki A. Jackson, M.D., M.P.H., Constance M. Dahlin, A.P.N., Craig D. Blinderman, M.D., Juliet Jacobsen, M.D., William F. Pirl, M.D., M.P.H., J. Andrew Billings, M.D., and Thomas J. Lynch, M.D.

- Improved QOL (FACT-L 98 vs. 91.5)
- Less depression (16 vs. 38%)
- Improved survival (11.6 vs. 8.9 months)

Early palliative care for patients with advanced cancer: a cluster-randomised controlled trial

Camilla Zimmermann, Nadia Swami, Monika Krzyzanowska, Breffni Hannon, Natasha Leighl, Amit Oza, Malcolm Moore, Anne Rydall, Gary Rodin, Ian Tannock, Allan Donner, Christopher Lo

- 3 month outcomes
 - Improved satisfaction with care (FAMCARE)
- 4 month outcomes
 - Improved QOL (FACIT, QUAL-E)
 - Improved symptom scores (ESAS)
 - Improved satisfaction with care (FAMCARE)

Lancet 2014;383:1721-30.

ASCO Guidelines

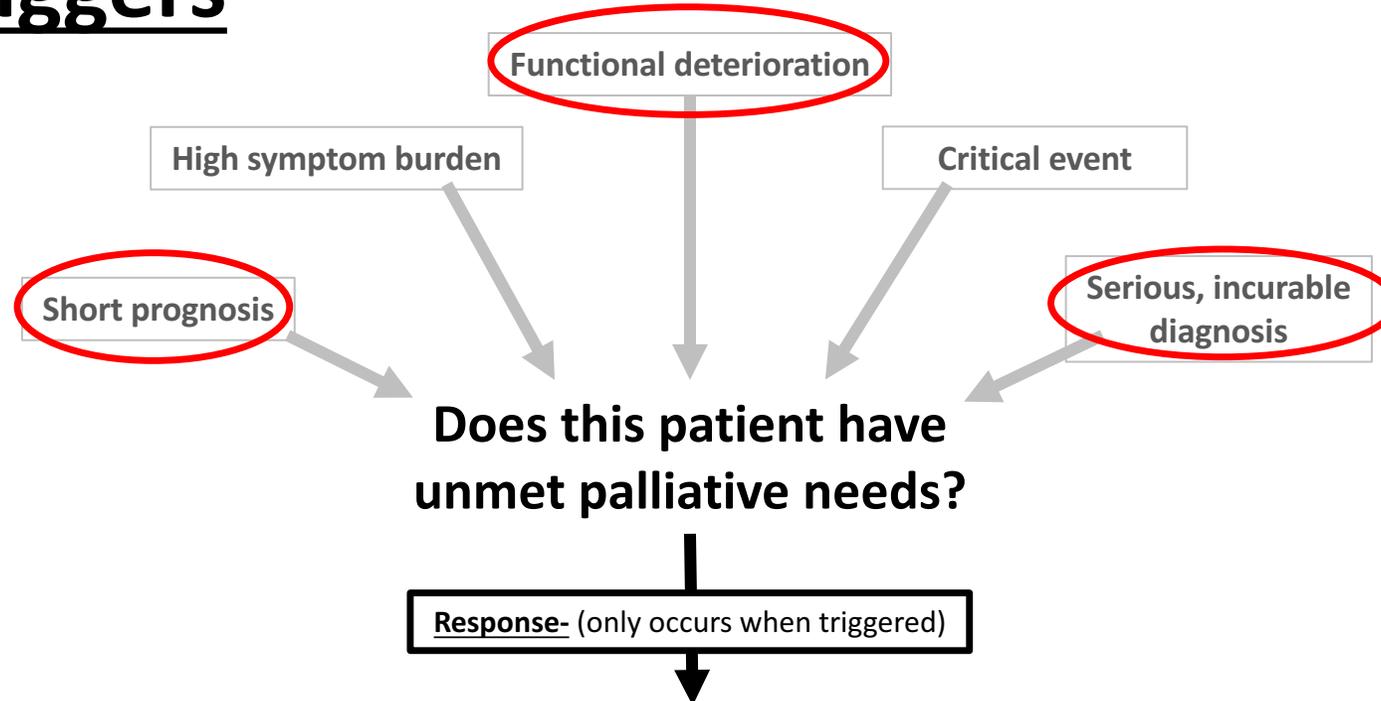
- Combined standard oncology care and palliative care should be considered **early** in the course of illness for any patient with metastatic cancer and/or high symptom burden.

- Smith et al. *J Clin Oncol* 2012

- Inpatients and outpatients with advanced cancer should receive dedicated palliative care services, **early** in the disease course, concurrent with active treatment.

- Ferrell et al. *J Clin Oncol* 2016

Triggers



Review current care and care planning (From SPICT™):

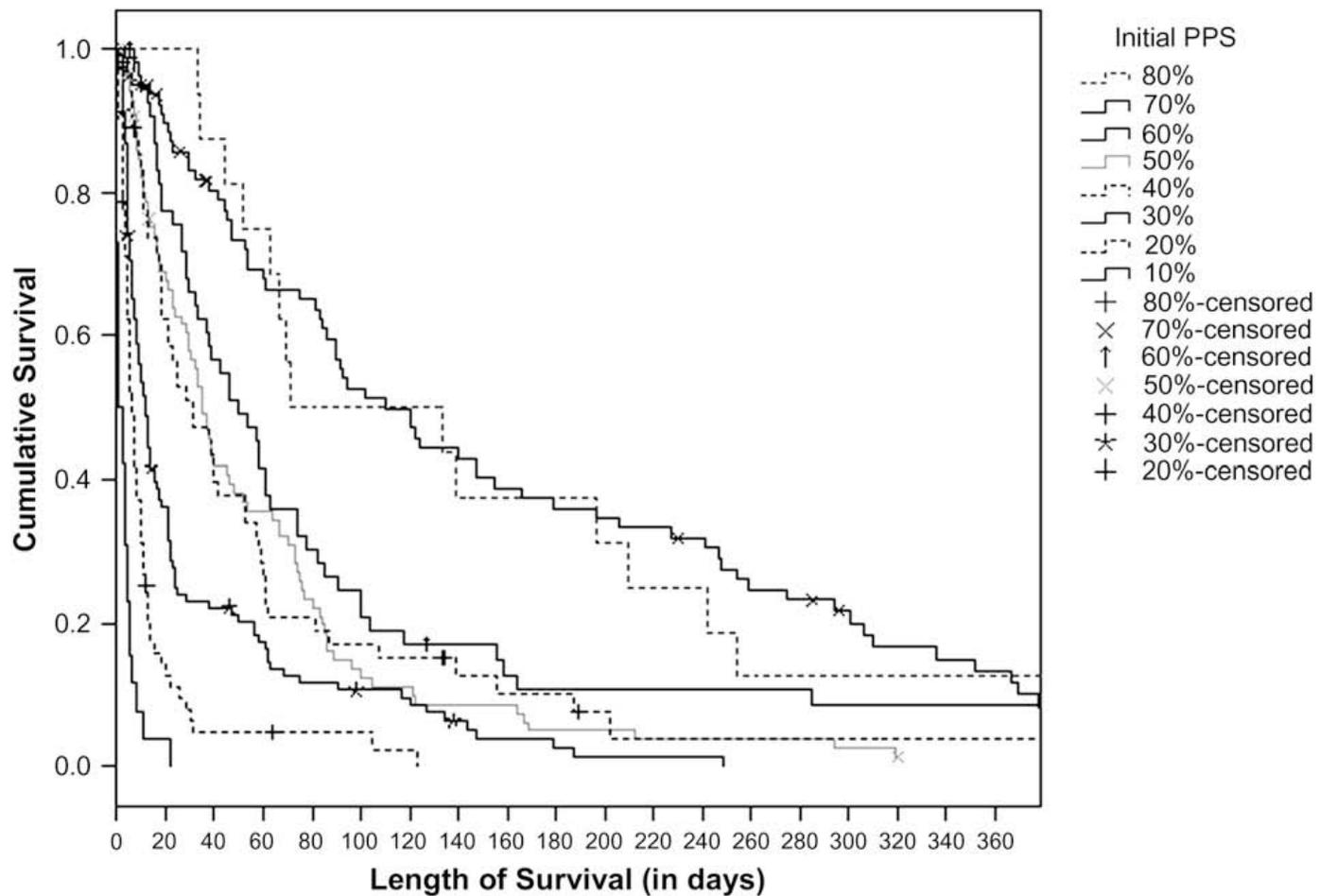
- Review current treatment and medication so the person receives optimal care
- Consider referral for specialist assessment if symptoms or needs are complex and difficult to manage.
- Agree current and future care goals, and a care plan with the person and their family
- Plan ahead if the person is at risk of loss of capacity.
- Record, communicate and coordinate the care plan.

Prognostication

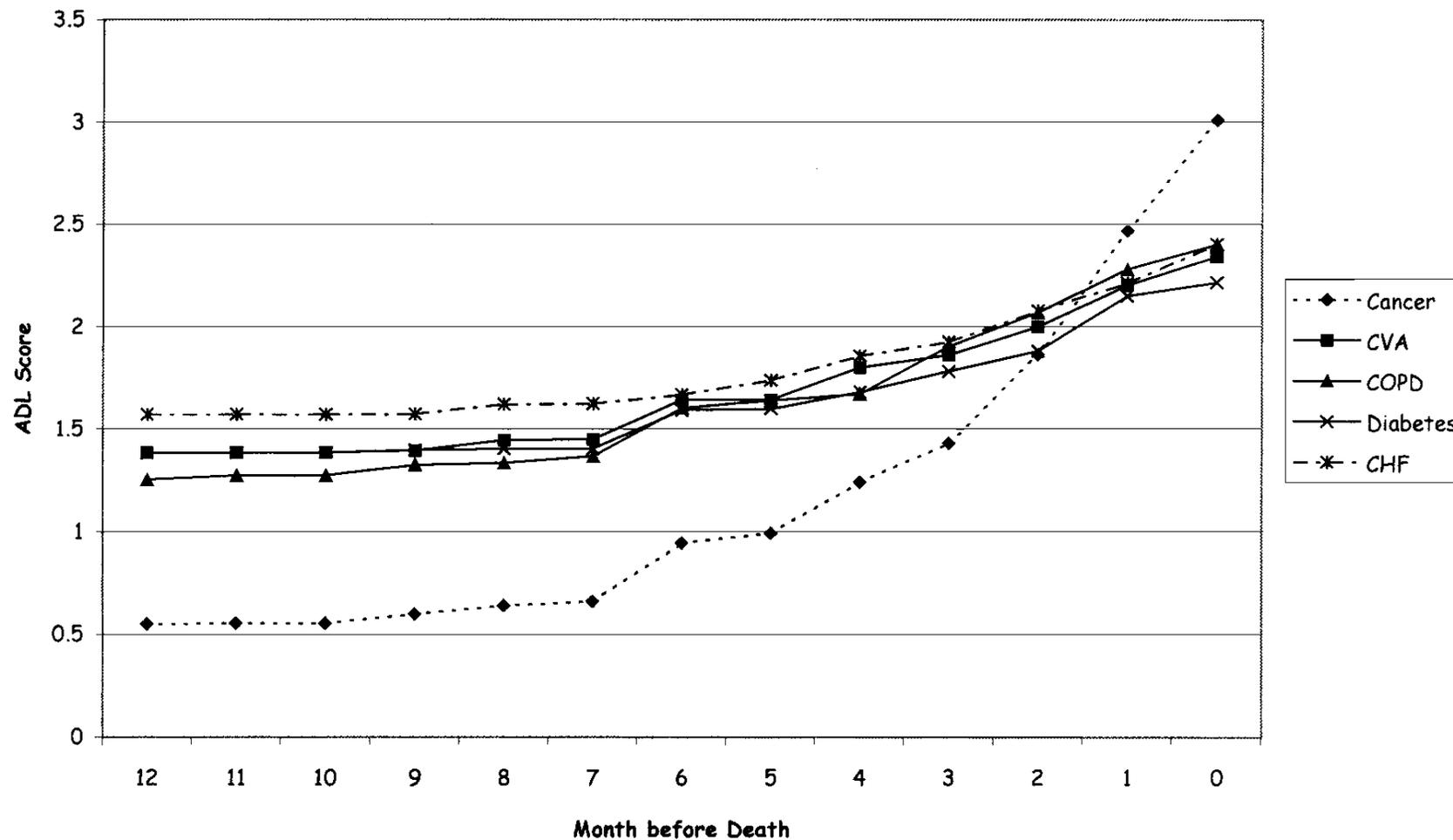
Table 4: Summary of point-based models for predicting risk of death among hospital patients

Model/study	N (derivation)	Description of derivation cohort (recruitment period)	Cohort; C statistic	
			Derivation	External validation
Silver Code ⁵	5 457	Patients ≥ 75 yr admitted to medical ward from emergency department (2005)	0.66	–
SAFES ⁶	870	Patients ≥ 75 yr admitted to medical ward from emergency department (2001–2002)	0.72	–
CARING ⁷	435	All patients admitted to medical service (1999)	0.82	–
BISEP ⁸	525	Patients ≥ 70 yr admitted to general medical service (1989–1990)	0.83	0.73 ⁹
SUPPORT ¹⁰	9 105	Patients ≥ 18 yr with high-risk admission diagnoses (1989–1994)	–	–
Levine et al. ¹¹	6 534	Patients ≥ 65 yr discharged from general medical service (1997–2001)	0.70	–
MPI ¹²	838	Patients ≥ 65 yr admitted to geriatric unit (2004)	0.75	0.80–0.83 ¹³
				0.80 ¹⁵
				0.75 ¹⁶
				0.64 ¹⁷
				0.77 ¹⁸
HELP ¹⁴	1 266	Patients ≥ 80 yr admitted ≥ 2 d for nonelective reasons (1993–1994)	0.74	–
Walter et al. ¹⁹	1 495	Patients ≥ 70 yr discharged from general medical service (1993–1997)	0.75	0.72 ⁹
HOMR ¹	319 531	All adults admitted to nonpsychiatric hospital services (2011)	0.92	0.89–0.92

Functional Impairment



Functional Impairment



Teno et al. *J Pall Med* 2001;4:457-64.

Gold Standards Framework/Prognostic Indicator Guidance (GSF/PIG) Tool

1. Surprise Question (?)

- Would you be surprised if this patient died in the next 12 months?*

2. General Indicators of Decline

3. Specific Clinical Indicators

Would you be surprised if...



The “surprise question” for predicting death in seriously ill patients: a systematic review and meta-analysis

James Downar MDCM MHSc, Russell Goldman MD MPH, Ruxandra Pinto PhD, Marina Englesakis MLIS, Neill K.J. Adhikari MDCM MSc

- 16 studies- 11621 patients
- Sensitivity 67%, Specificity 80.2%
- LR+ 3.4, LR- 0.41, PPV 37%
- Better performance in cancer (LR+ 4.2)
- Very poor in non-cancer (LR+ 2.7, LR- 0.53)

Downar et al. CMAJ April 4, 2017.

Other problems with the SQ and PIG

- Kappa poor to fair (0.18-0.41)
- Poor response rate when applied to multiple responders
- "Screening" tool?
 - Up to 83% of patients SQ+ve
 - Up to 77% of patients PIG+ve
- NICE no longer recommends SQ as screening tool in UK
 - Dropped from SPICT

Downar et al. *CMAJ April 4, 2017.*

Yarnell et al. [Abstract] Presented at CCCF 2015.

Gomez-Batiste et al. *Pall Med 2016*

<http://www.telegraph.co.uk/news/2017/08/02/surprise-question-puts-thousands-premature-end-of-life-nhs-footing/>

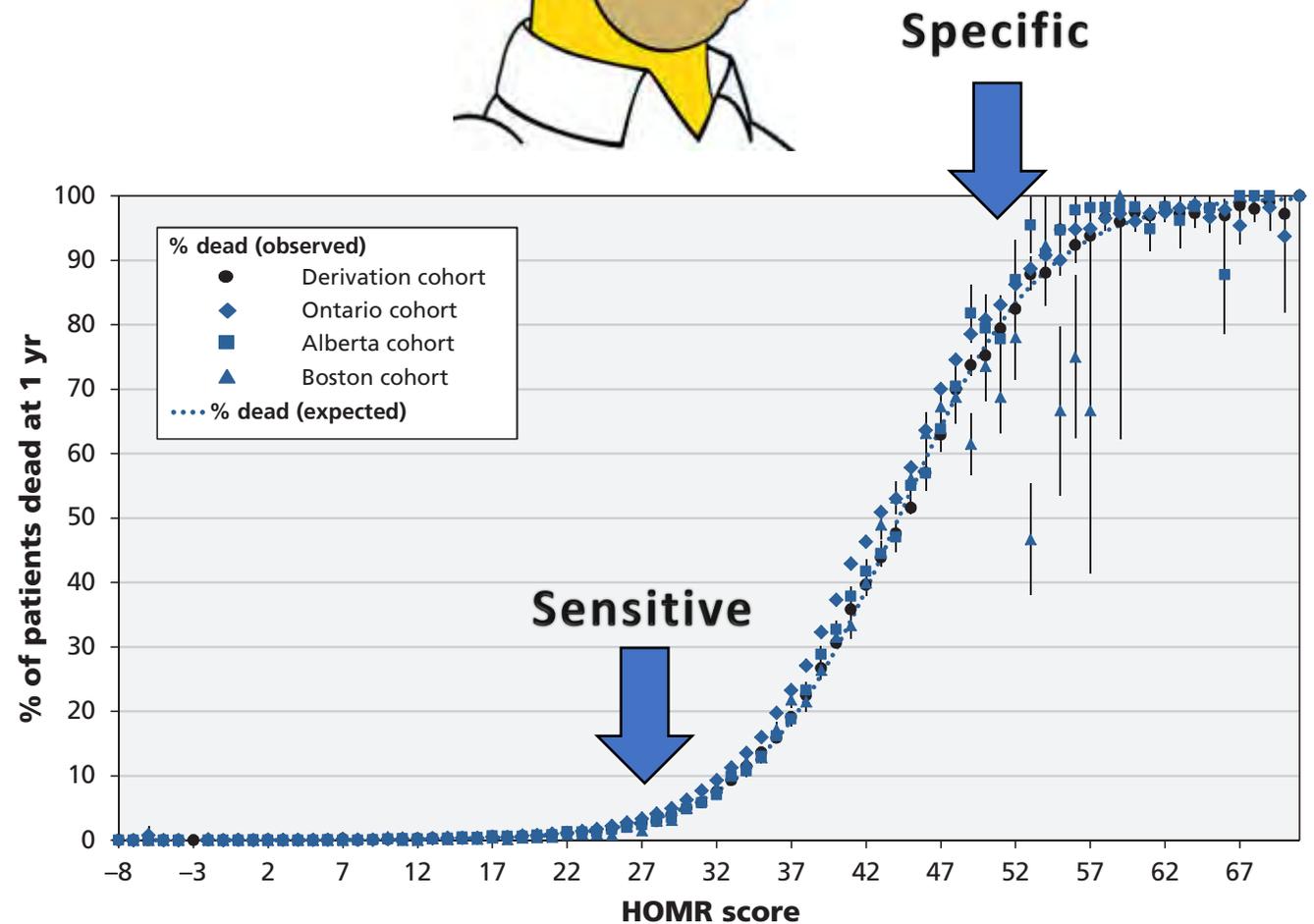
Identifying a dying trajectory- Ideal State

- **Accurate**
 - False positives- poor allocation of limited resources, alert fatigue
 - False negatives- untreated suffering
- **Not provider dependent**
 - Individual providers unreliable
- **Seamless integration with current workflow**
 - “BIG DATA”
 - Administrative, Symptoms

Automated Trigger Tool

- Hospital One-year Mortality Risk (HOMR)
 - Highly accurate (c=0.89-92)
 - Derived and validated in Ontario, Boston, Alberta (retrospective data)
 - Uses simple administrative data

CMAJ 2015. DOI:10.1503
/cmaj.150209



Variations of HOMR

HOMR (c=0.90-0.92)	mHOMR (c=0.89)	HOMR Now! (c=0.92)
Age	Age	Death Risk (Life Tables)
Sex	Sex	Sex
Home O2		
Admitting Diagnosis		
Charlson Comorbidity Index		Charlson (previous admission)*
Admitting Service	Admitting Service	Admitting Service
Urgent 30d readmission	Urgent 30d readmission	
# ED visits in past 12m	# ED visits in past 12m	# ED visits in past 12m
Adm by ambulance past 12m	Adm by ambulance past 12m	
Living Status (Home, LTC, etc)	(Living Status)	Living Status (Home, LTC, etc)
Admission Urgency/ Ambul.	Admission Urgency/Ambul.	Admission Urgency/Ambul.
Direct to ICU	Direct to ICU	
		Seen in cancer clinic past 12m
		LAPS Score**

HOMR as Prospective Trigger

- Data entered on admission
 - “Invisible” process
- Adjustable threshold depending on response
 - More sensitive for scalable interventions
 - More specific for resource-limited interventions
- Auditable
- Objective

HOMR as Prospective Trigger- Feasibility

- Specific threshold
 - Sens 59%, Spec 90%
 - LR+ 5.9, LR- 0.46
 - Site #1- 19 pts/d (15.8% of admissions)
 - Site #2- 7 pts/d (12.2% of admissions)
- Qualitative
 - Some enthusiasm from staff, minimal concern from patients
 - NO EMAILS!

HOMR as Prospective Trigger- Feasibility

Group or Variable	Phase 1 (no notification)	Phase 2 (notification)	P value for difference
Age, mean (SD)	83.8 (7.9)	83.0 (7.8)	0.3 ^a
Length of Stay, median (IQR)	5 (6)	6 (7)	0.8 ^b
“No CPR” order on admission, n (%)	79 (40%)	75 (38%)	0.7 ^c
Proportion with PC consult or documented early GOC discussion			
Site 1 - integrated notification, n (%)	20 (20)	35 (35)	0.02^c
Site 2 - email notification, n (%)	53 (53)	45 (45)	0.26 ^c

- 89% Survived to hospital discharge
- 227/401 patients admitted (56.8%) with frailty-related condition
- 94/401 patients admitted (23.5%) chronic organ failure condition
- 80/401 patients admitted (20%) with cancer-related condition



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**Healthcare
Improvement**

Fondation canadienne pour
**l'amélioration des
services de santé**



**Canadian
Frailty
Network**

Qualitative Results

- Some physicians found prompts helpful, others expressed concerns of redundancy/frequency
 - *“As long as it’s not mandated, I think it’s a very good thing to have a reminder.”*
 - *[The notifications] would be most useful if they gave me information that I wasn’t already aware of. [...] And I suppose if there was a patient who I didn’t really think was at significantly high risk, and then, you know, this score tells me that they have a very high risk of dying in some short period, that might alter my approach.*
- Patients and family hoped mHOMR would prompt more communication with physicians
 - *“Notifications might benefit those who were less vocal in advocating for themselves.”*



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HOMR as Prospective Trigger- PC Needs

- Surveyed pts identified by HOMR tool
 - Severe Symptoms (ESAS Score >6)
 - Desire to speak to MD about ACP (ACP Engagement Tool)
- Comparison of different HOMR thresholds
 - HOMR >0.21 (Sens 59%, Spec 90%)
 - HOMR >0.10 (Sens 83%, Spec 77%)

HOMR as Prospective Trigger- PC Needs

- 76% agreed to complete questionnaire
 - 91% patients, 9% family/SDM
- 10 week enrollment on general internal medicine ward:
 - HOMR threshold >0.10 flagged 22.6% of admissions
 - HOMR threshold >0.21 flagged 8.5% of admissions

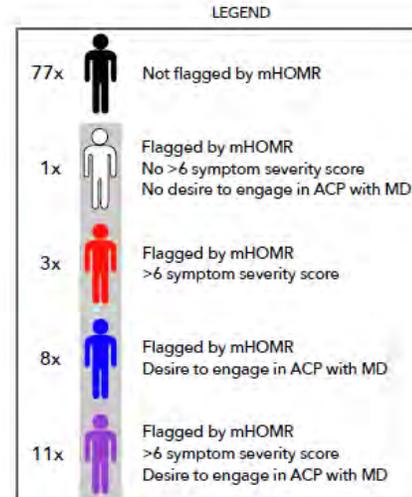
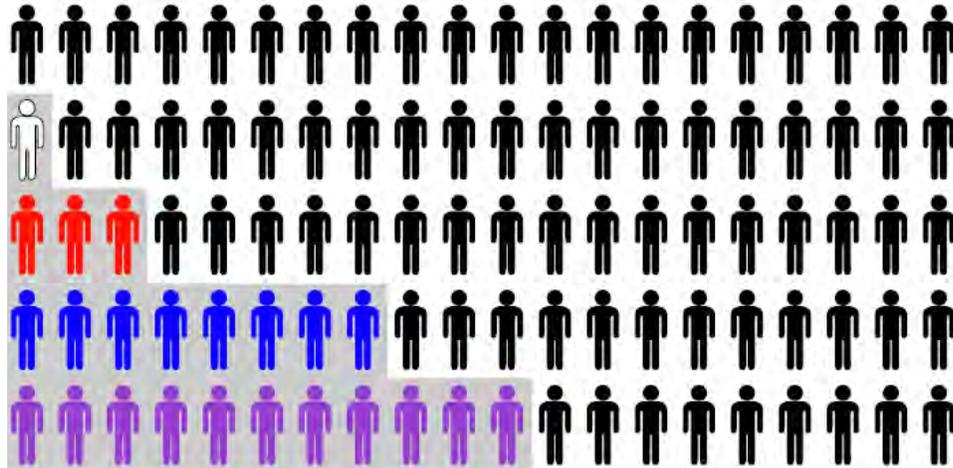
Illness Trajectory	HOMR >0.10 (n=201)	HOMR >0.21 (n=75)
Cancer	73 (36%)	18 (24%)
Organ Failure	64 (37%)	30 (40%)
Frailty	40 (20%)	26 (35%)
Other	14 (7%)	1 (1%)

HOMR as Prospective Trigger- PC Needs

Unmet PC Need (n=186)	HOMR score 0.10- 0.21	HOMR score >0.21	P value for difference
ESAS Symptom score >6 (%)	62	77	0.03
Desire to speak to MD about ACP (%)	82	74	NS
Either (%)	94	91	NS

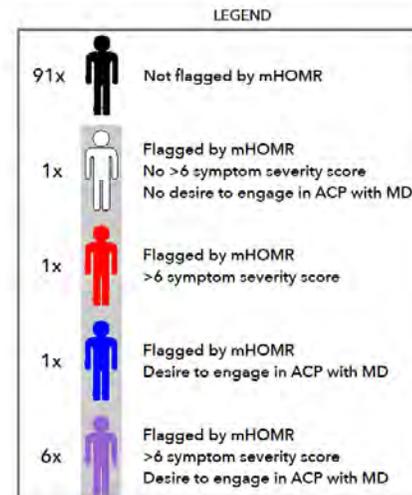
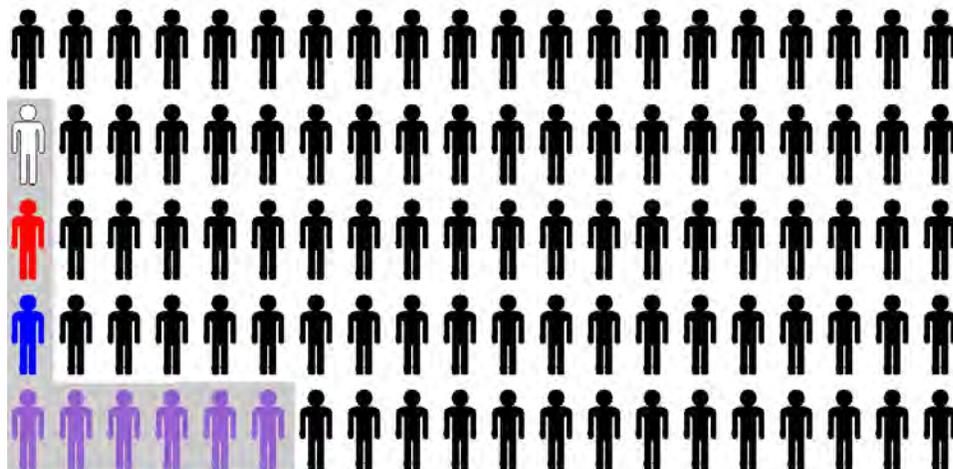
HOMR as Prospective Trigger- PC Needs

For every 100 admissions to GIM



HOMR >0.10

For every 100 admissions to GIM



HOMR >0.21

Conclusion

- Feasible and acceptable
- Identifies a small # of patients with high burden of unmet needs
- Preferentially identifies neglected groups (e.g. frail)
- Versatile- can adjust sensitivity based on capacity
- Possibly effective for changing care
 - Utility if connected to specific intervention- results pending
- Future direction
 - QI tool to drive specific interventions

Questions?

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