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High costs of end-of-life care

Revisiting economic interpretations

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Glossary

EOL= end of life

LYOL= last year of life

Overview

- Background
- Methods
- Results
- Discussion

Overview

- **Background**
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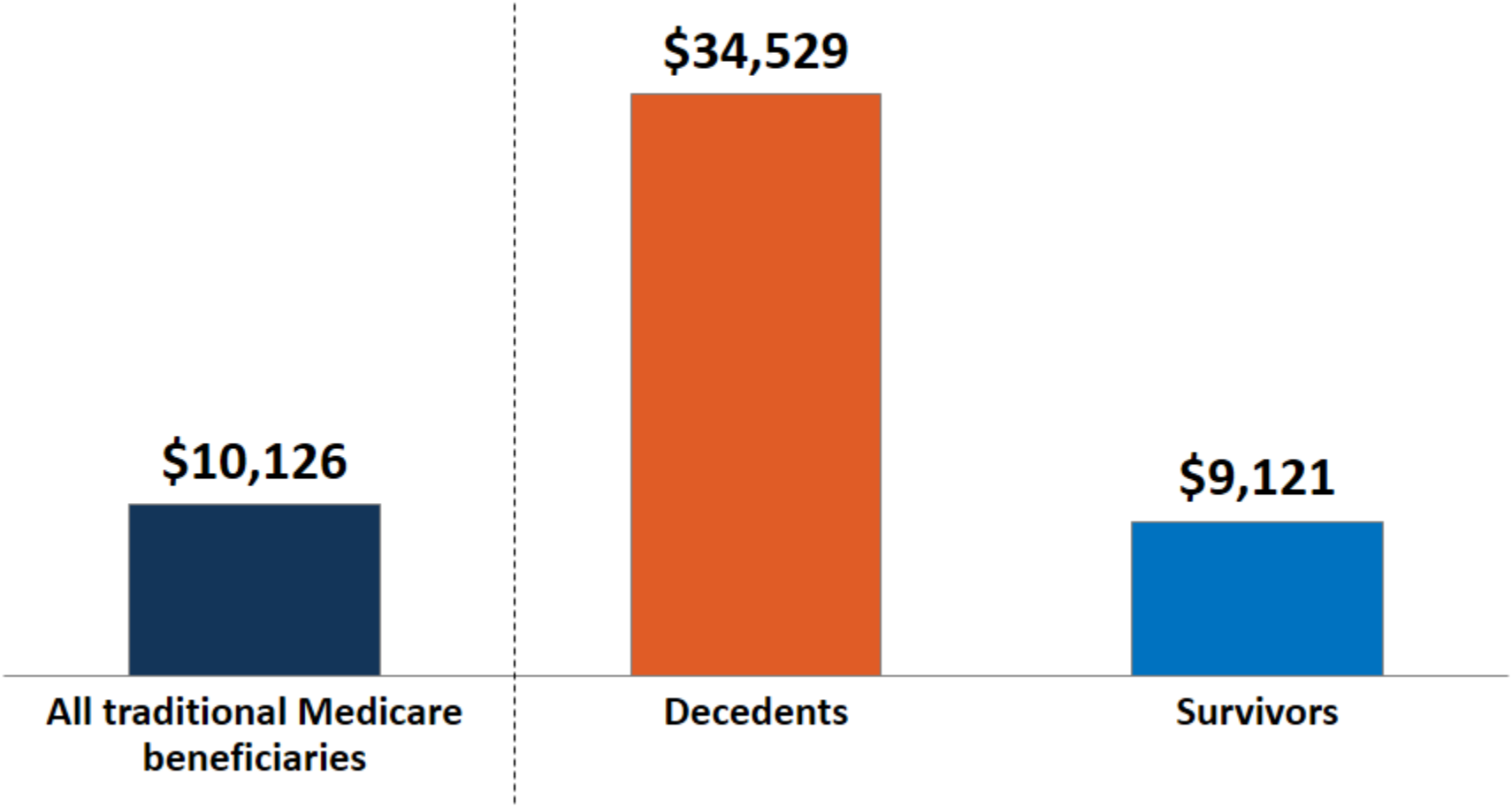
Background

Death and taxes

- **Dying is an expensive business:**
  - From 1978-2006
    - 5% of Medicare beneficiaries died annually, accounting for ~25% of total costs (Lubitz & Riley, 1993; Riley & Lubitz, 2010)
  - From 2000-2014
    - Proportion of deaths falling slightly, proportion of costs more so (Cubanski et al., 2016)
  - Nevertheless, LYOL is the costliest

Medicare per capita spending was nearly four times higher for decedents than survivors in 2014

Average Medicare per capita spending for decedents and survivors in traditional Medicare, 2014



NOTE: Excludes beneficiaries in Medicare Advantage.
SOURCE: Kaiser Family Foundation analysis of a five percent sample of 2014 Medicare claims from the CMS Chronic Conditions Data Warehouse.

https://www.kff.org/report-section/medicare-spending-at-the-end-of-life-findings/

Background

Death and taxes

- **Discordance with economic theory:**
  - Marginal cost ≤ Marginal utility (= WTP)
    - Short payback period
    - Limited capacity for QoL improvement

➢ Questionable use of scarce resources

Background

Death and taxes

- Becker et al. (2007); Philipson et al. (2010) theorise that CEA systematically undervalues experience in face of death:
  - Wealth has no opportunity cost @EOL; 'hope' boosts WTP
    - Marginal utility of QALYs multiplied @EOL
      - Higher spending in LYOL
- 'Fischer et al. (2018) empirically demonstrate these & other assumptions using DCE on out-of-pocket expenditure for novel cancer drug
- Interesting implications:
  - 'QALY problem' and EOL utility measurement (Round, 2014)
  - Specific case of out-of-pocket costs (e.g. Banegas et al 2016)

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Background

Death and taxes

- More fundamentally, empirical study of EOL care finds:
  - Patient preferences ≠ High-intensity care* (Huynh et al, 2013)
  - Poor outcomes for patients and families (Teno et al, 2013)
  - Poor integration of patient preferences (Downey et al, 2013)
  - Highest costs managing multiple chronic disease (Davis et al, 2016)

➢ No empirical basis to interpret high EOL costs as reflecting

- Patient preferences for high-intensity treatment*
- High utility yielded by patients and families
- Informed, autonomous choices by microeconomic agents
- 'Explosive' response to short, sharp shocks

Summary

Background

- ‘WTP @EOL’ interpretation is weakly related to population-level reality:
  - Patients are neither informed nor autonomous
  - ‘EOL phase’ hard for clinicians and patients to foresee
  - LYOL costs less reflect discrete (life-extending) treatments than bundles of care (multi-site, supportive)
  - Bundles are not systematically assessed, rationally funded

- Alternative interpretation is:
  - Health care systems ill-equipped and unresponsive to complex needs and multimorbidity
    - High costs less reflect rational patient decision-making than incoherent and irrational decision-making in provision of care

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Methods

Starting point

If high costs less reflect rational patient decision-making than incoherent and irrational decision-making in provision of care, then:

Does decision-support mitigate high costs and high-intensity treatment among those with complex and life-limiting medical illness?

Methods

Intervention

- Palliative care is:
  - Interdisciplinary specialism to improve pain and symptom management, communication, and care planning
  - Not only EOL but across trajectory of life-limiting illness (WHO, 2018)
  - Associated with improved outcomes

- Hospital palliative care is:
  - Primarily provided as a consultation team, involved in care at invitation of primary physician
  - Advising on pain and symptom management, engaging patient in goals-of-care discussions and transition planning
    - ➢ Decision support in care of seriously-ill patients

Methods

Research questions: treatment effect heterogeneity from palliative care

- Let's consider two groups thought to be poorly served by the status quo:
  1. Multimorbidity -> more admissions, higher costs, adverse outcomes
  2. Minorities have more intensive EOL care than non-Hispanic whites, reflecting preferences but also lower health literacy, access, advanced care planning (Barnato et al., 2009, Carr 2012)
- Corresponding research questions:
  1. Does estimated effect of PC on hospital utilization vary by comorbidities?
  2. Does estimated effect of PC on hospital utilization vary by ethnic group?

Methods

Research questions: treatment effect heterogeneity from palliative care

1. Does estimated effect of PC on hospital utilization vary by comorbidities?
2. Does estimated effect of PC on hospital utilization vary by ethnic group?

Population: Adults admitted to hospital in the US with one of seven life-limiting conditions (cancer, CHF, COPD, liver failure, renal failure, Alzheimer's and related dementias, AIDS/HIV

Intervention: Receipt of a palliative care consultation during index admission

Comparison: Received usual care only

Outcomes: Direct cost of index admission; utilization post-discharge (# and length of readmissions, time spent in ICU)

Methods

Research questions: treatment effect heterogeneity from palliative care

1. Does estimated effect of PC on hospital utilization vary by comorbidities?
2. Does estimated effect of PC on hospital utilization vary by ethnic group?

Data sources:

- Retrospective analysis of routinely collected data in US hospitals (2002-2015)
- For index admissions, meta-analysis of 131,188 unique inpatients (May et al., 2018)
- For post-discharge, 30,324 unique people for whom these data were collected

Methods

Research questions: treatment effect heterogeneity from palliative care

1. Does estimated effect of PC on hospital utilization vary by comorbidities?
2. Does estimated effect of PC on hospital utilization vary by ethnic group?

Data analysis:

- Segment the sample by factor of interest (comorbidities/ethnicity)
- Balance treatment and usual care groups on observed confounders using propensity scores
- Estimate treatment effects for given sample, GLM, bootstrapping SE
- Compare treatment effect estimates across samples using t-tests/ANOVA

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Results

Summary data adjusted for age, gender, insurance, ED admission, [race/Elix total]

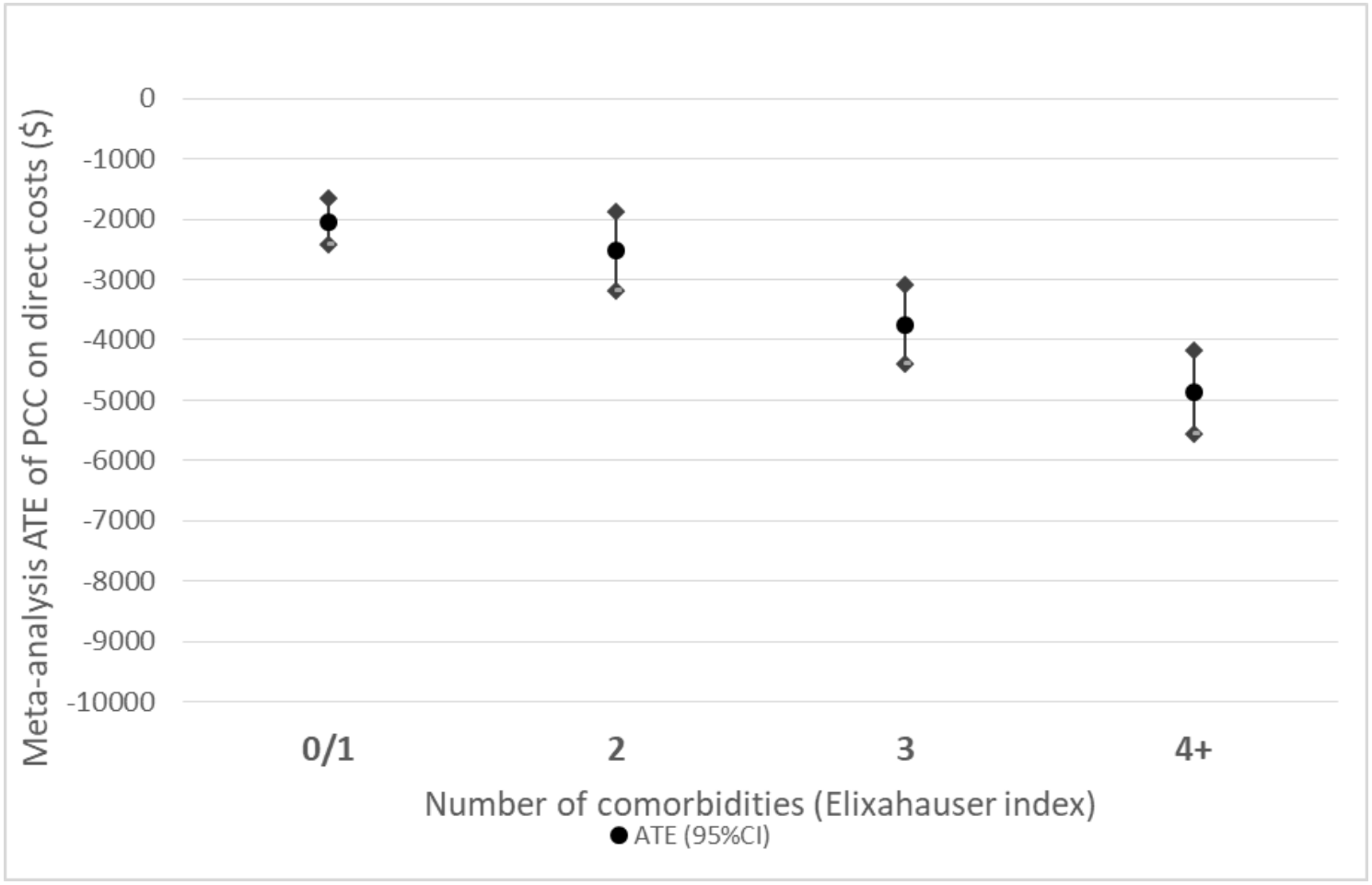
Elixhauser total	Mean (SD) Cost of admission (N=133,188)	Mean (SD) LOS readmissions (N=37,402)
0/1	10,060 (14,416)	5.5 (16.2)
2	11,512 (15,934)	5.9 (16.2)
3	14,675 (22,755)	7.2 (18.6)
4+	26,275 (40,911)	7.8 (19.4)

Race	Mean (SD) Cost of admission	Mean (SD) LOS readmissions (N=30,324)
Black (n=15,130)	N/A	6.0 (16.3)
White* (n=15,194)		7.7 (19.5)

* Non-Hispanic whites. In prior literature there are important differences between Hispanics and both African American and White populations but all ethnic groups except Blacks and NH Whites are too small a sub-sample in these data to incorporate as an additional group

Results

1. Does estimated effect of PC on hospital utilization vary by comorbidities? **Cost of index admission**



Significant differences for 3+ versus 0/1

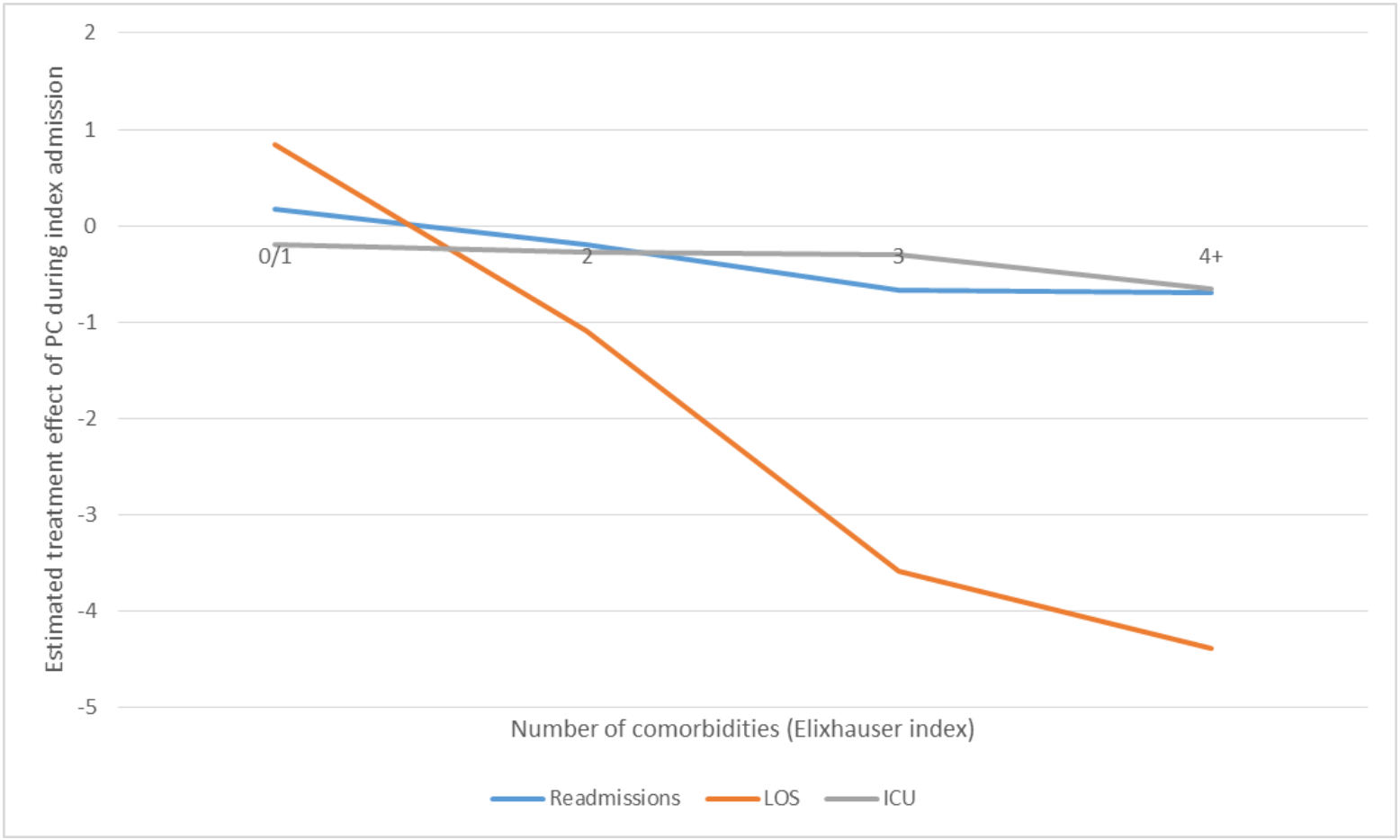
Adjusted *inter alia* for age, gender, race, insurance, ED admission

N=133,188

Source: May et al (2018)

Results

1. Does estimated effect of PC on hospital utilization vary by comorbidities? **Post-discharge hospital use**



Adjusted for age, gender, race, insurance, ED admission

N=37,402

Results

2. Does estimated effect of PC on hospital utilization vary by ethnicity? **Post-discharge hospital use**

		ATE	P value	95% CI		T-test
Total stay	Black	-5.8	**<0.01**	-7.4	-4.3	**0.01**
	NH White	-3.1	**<0.01**	-4.3	-2.0	
ICU stay	Black	-0.8	**<0.01**	-1.1	-0.4	0.50
	NH White	-0.6	**<0.01**	-0.8	-0.3	
Total readmits	Black	-0.9	**<0.01**	-1.1	-0.7	**<0.01**
	NH White	-0.5	**<0.01**	-0.6	-0.4	

Adjusted for age, gender, Elixhauser total, insurance, ED admission

N=30,324

Results

Summary

- For hospitalized adults with terminal illness in the US, palliative care has heterogeneity of treatment effect on costs:
  - Greater effect on both in-hospital costs and number of readmissions for those with multimorbidity
  - Greater effect on number and length of readmissions for African Americans versus non-Hispanic Whites

- Sensitivity analyses (not shown)
  - PC effects not due to higher mortality, propensity scoring, model choice

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Discussion

Decision support reduces costs among those with terminal illness

- Economics tends to interpret high EOL costs as a function of patient-centred decision-making
- This has poor face validity re: empirical evidence
- Today's presentation identifies treatment effect heterogeneity from hospital palliative care, with notable effects for groups poorly served by the *status quo*
  - People with multimorbidity
  - African Americans
  - ➢ Economist should broaden scope from how *homo economicus* attaches utility to (e.g.) OOP drug costs and bequeathment, and examine supply-side factors including decision-making

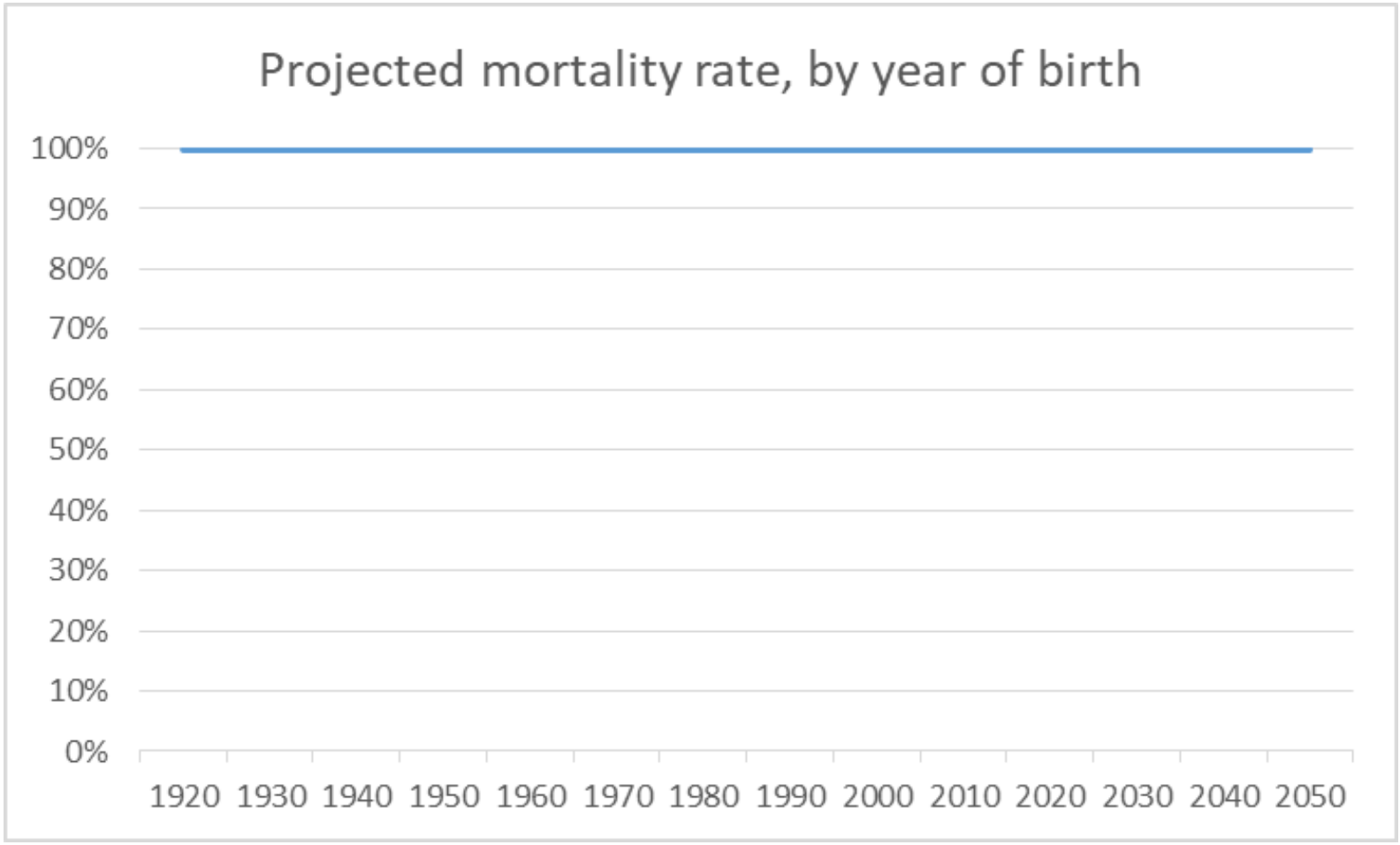
Discussion

Limitations

- Observational data, risk of unobserved confounding
- Routinely collected data only so no preferences or ACP
- Hospital costs only, not other services or unpaid care
- Participating hospitals only, not comprehensive networks/regions
- Non-comprehensive follow-up to death; not all subjects are LYOL due to bias (Bach et al., 2004). SA generally shows that limiting analyses to decedents increases treatment effect estimates.
- Not yet delineated dynamics by multimorbidity and race in these data
- More broadly, significant ambiguity over extent to which racial differences in EOL experience reflect informed preferences versus other factors
- Palliative care only on example of an intervention that improves decision-making in care of complex/elderly/frail/multimorbid patients

Discussion

Conclusion



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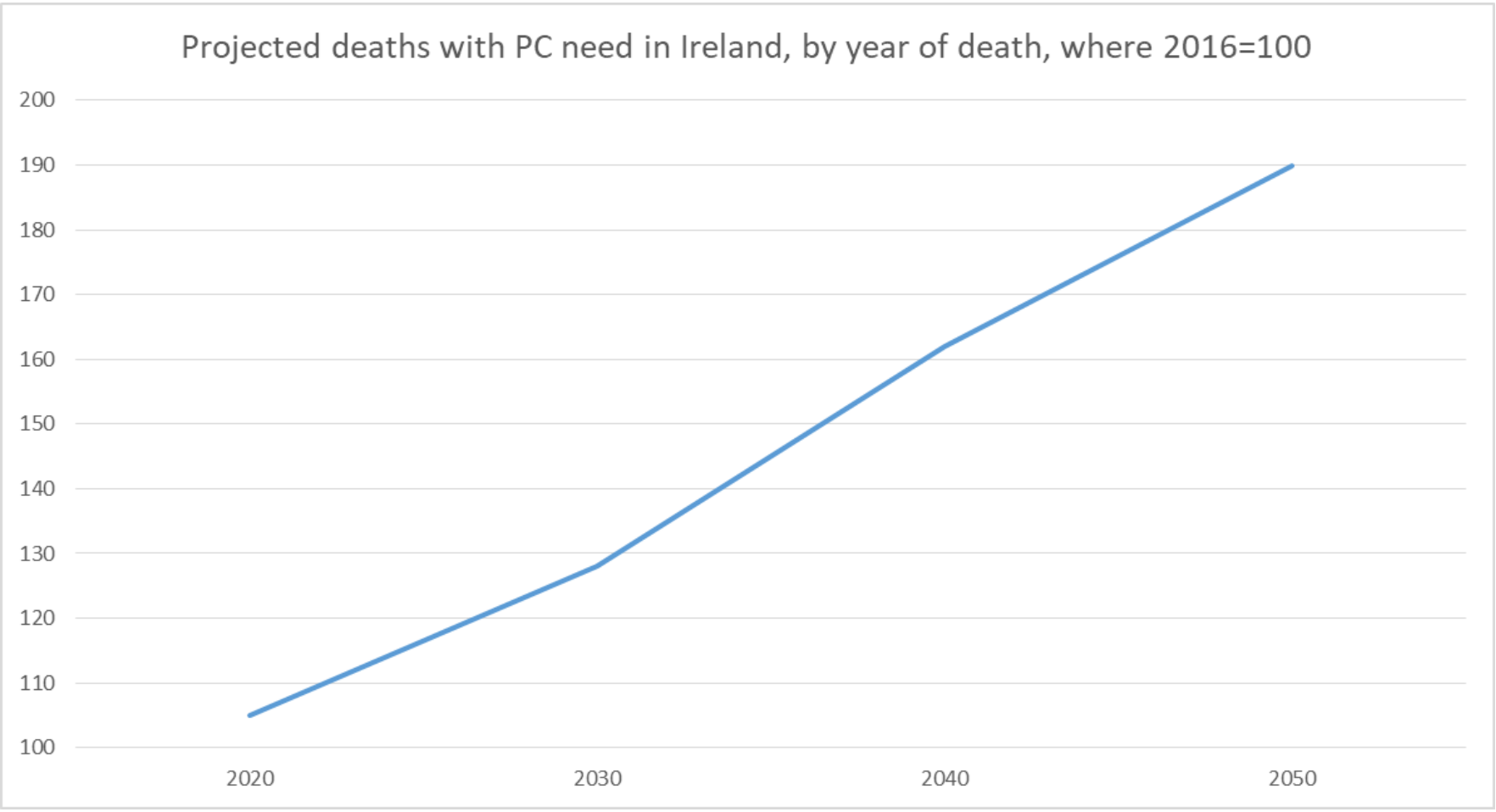
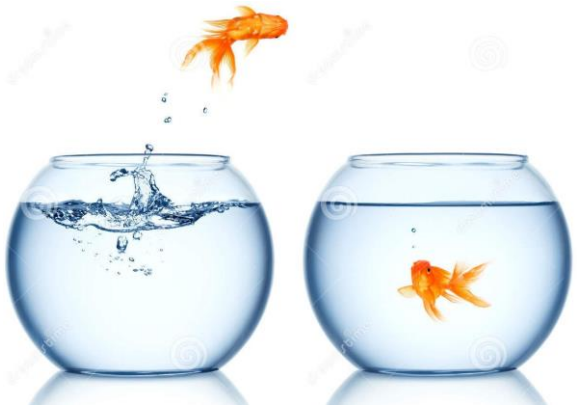


Discussion

Conclusion

- Appropriate end-of-life care is a global priority
- Despite policy recognition, economic research activity is low
- Vast gap between economic frameworks and empirical evidence
- EOL phase should not be distinct and unknowable, but part of reorienting health systems to the era of multimorbidity
- High health system costs @EOL one of many enduring mysteries
  - Join our SIG!



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Thank You

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