

Economic evaluation of renal palliative care

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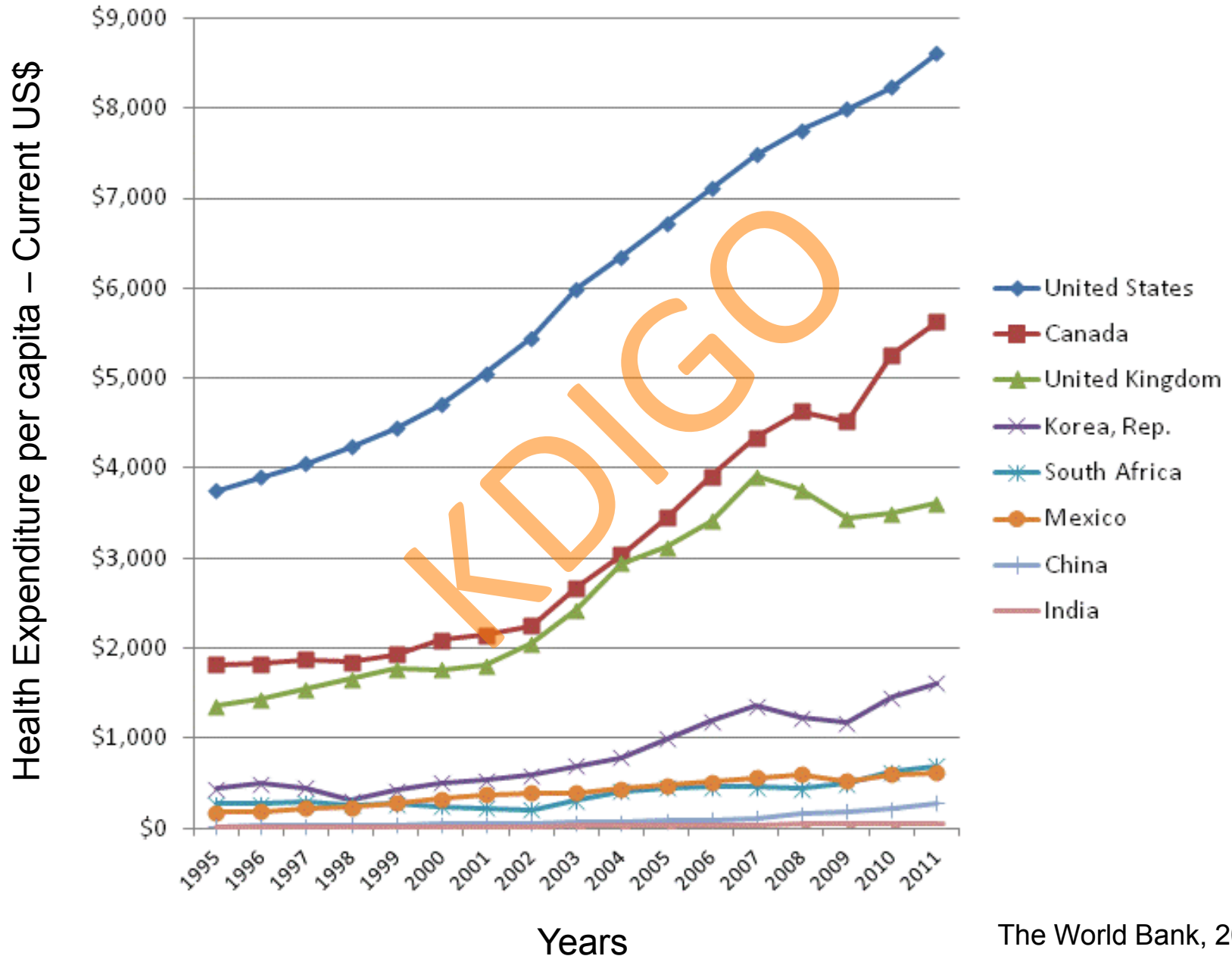


Disclosure of Interests

No relevant disclosures

KDIGO

The rise in global healthcare spending

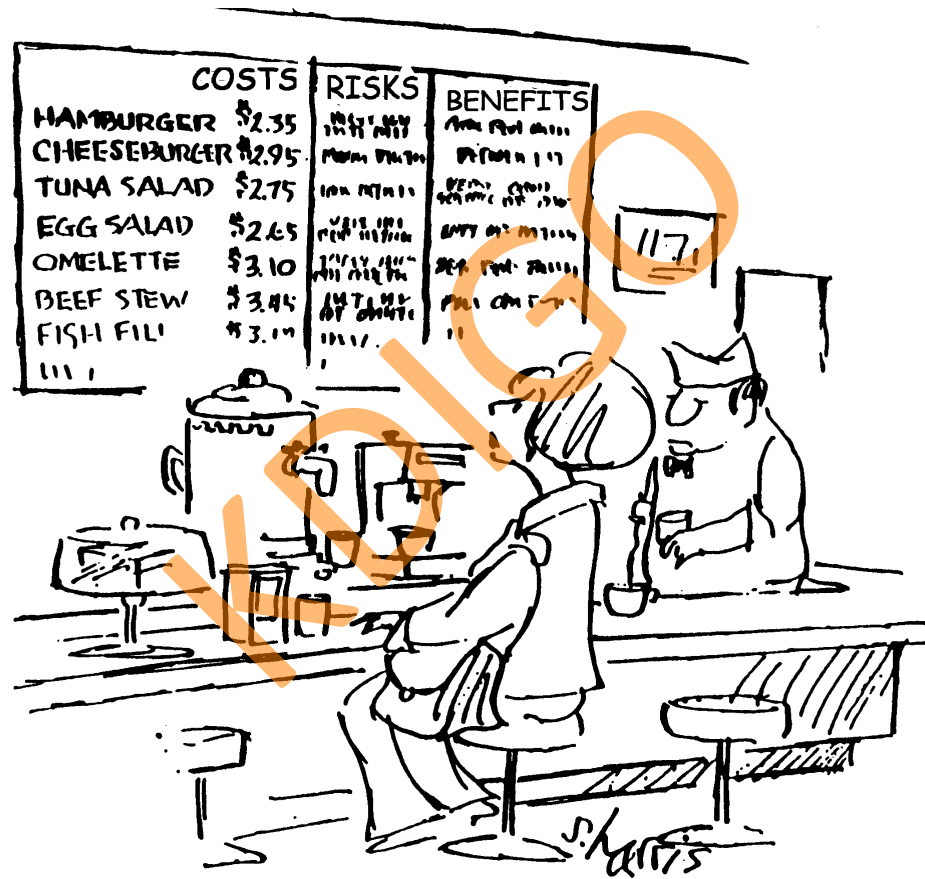


The Coming Fiscal Crisis: Nephrology in the Line of Fire

Costs of dialysis for elderly people in the UK

Life and Death Choices as South Africans Ration Dialysis Care

Why economic evaluation?



Health Economics

- Allocation of scarce health resources
- Efficiency, Equity, Opportunity Cost
- Dialysis may set the threshold for what society is willing to pay for a QALY¹⁻³

¹Weinstein MC et al 1980. *The Quarterly Journal of Economics*.

²Winkelmayer WC et al 2002. *Medical Decision Making*

³King JT, Jnr et al 2005, *Medical Decision Making* November 6-8, 2013 | Mexico City, Mexico



What is economic evaluation?

- Economic evaluation: a comparison of alternative options in terms of both their costs and outcomes
 - Costs – the value of the resources involved in providing treatment and managing symptoms and side-effects, and disease-related events
 - Outcomes – the health and wellbeing effects of the intervention
- Comparative methodology – interested in **incremental costs and outcomes**
- Can be expressed as an incremental cost-effectiveness ratio (ICER):

$$ICER = \frac{Cost_A - Cost_B}{Effect_A - Effect_B}$$

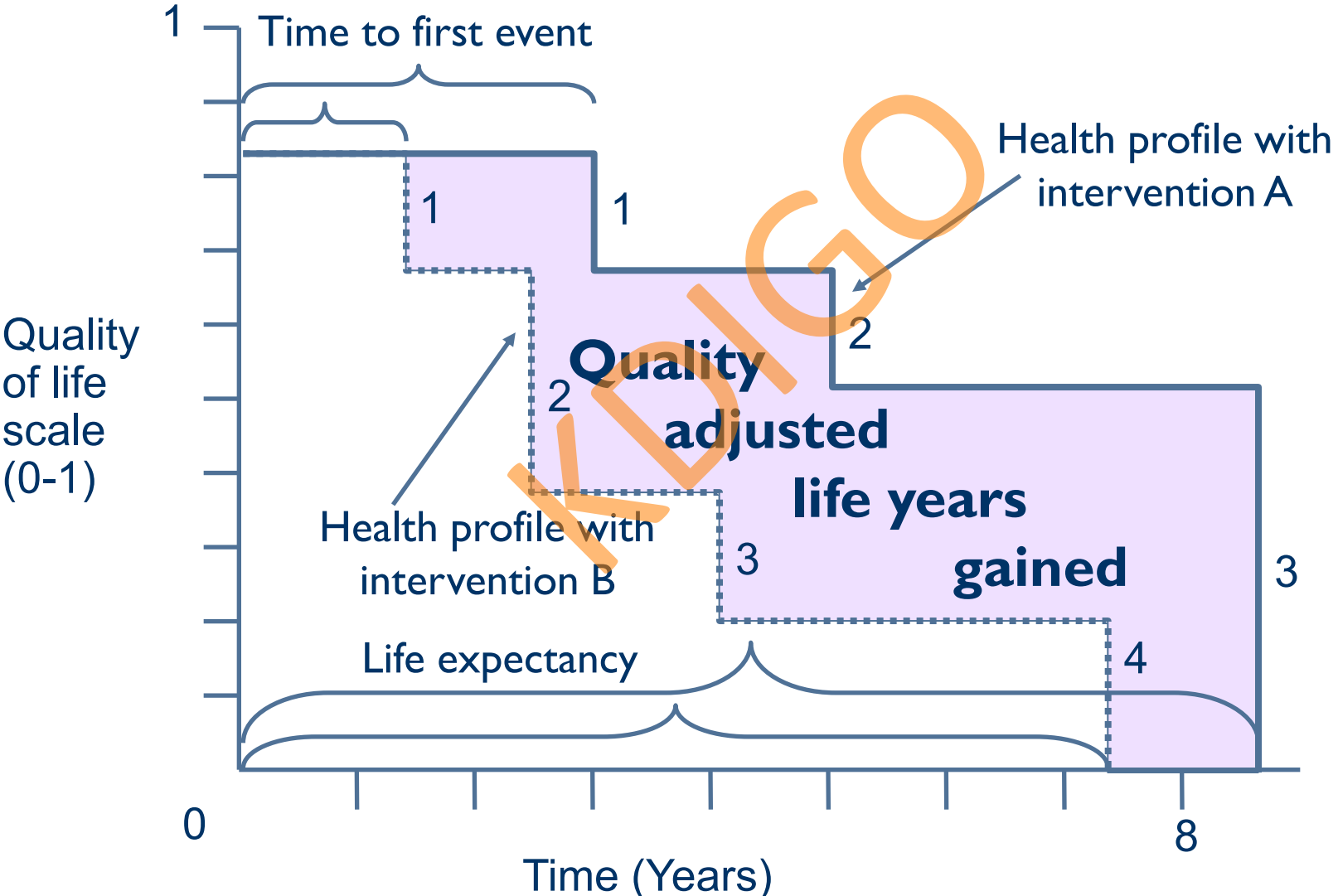
Types of economic evaluation

Type	Outcome measure
Cost-consequence analysis (CCA)	Multiple outcomes reported in disaggregated manner
Cost-effectiveness analysis (CEA)	Natural units (e.g. life years, hospital admissions avoided)
Cost-utility analysis (CUA)	QALYs (longevity and quality of life)

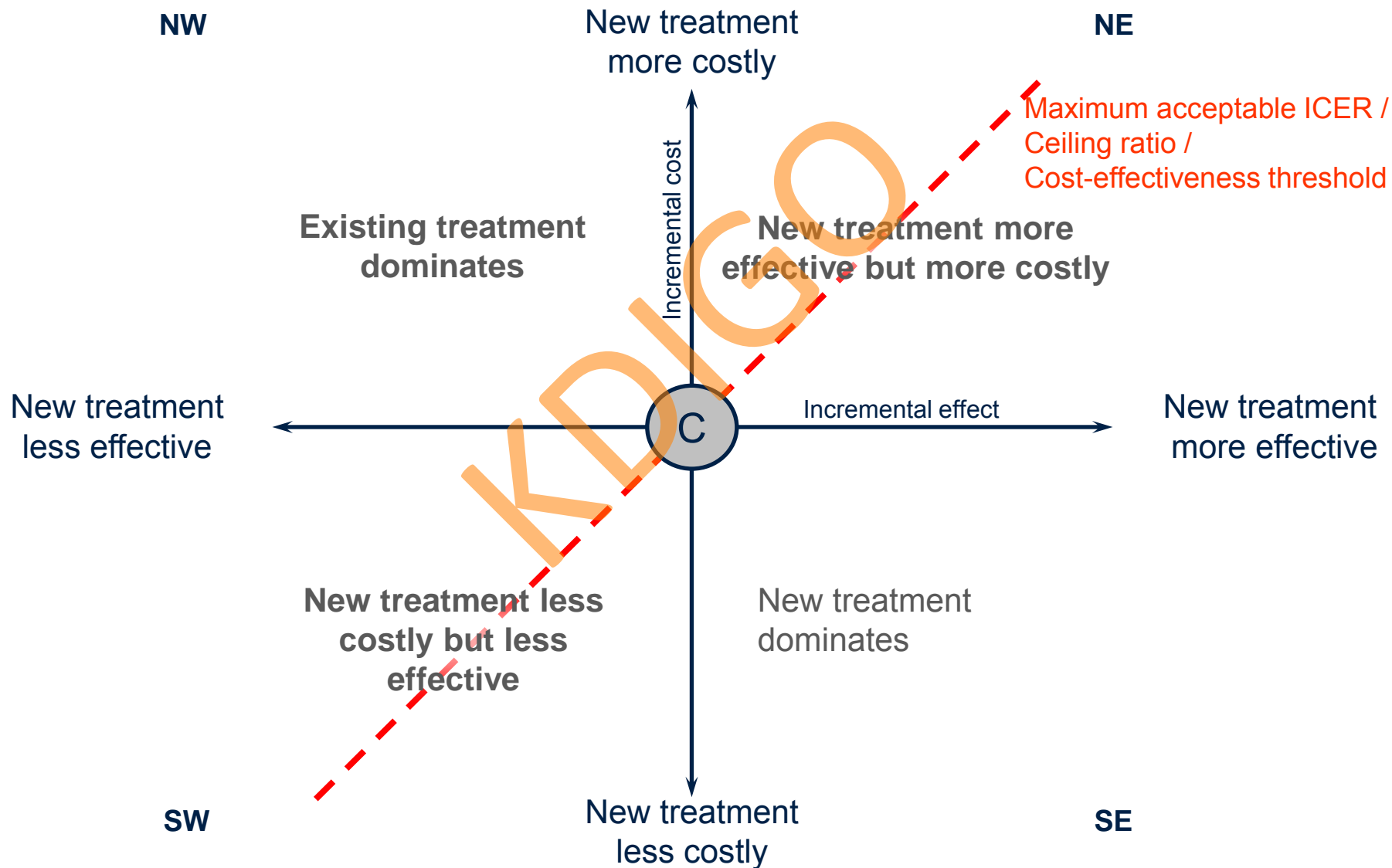
Measuring the Q in quality adjusted life years



Using QALYs to measure health gain



The Cost-Effectiveness Plane



ICER thresholds

- UK £20,000-30,000 per QALY¹
- US \$50,000-100,000 per QALY²
- AUS \$30,000 - \$70,000 per QALY dependent on level of certainty³
- Canada \$20,000-\$100,000 per QALY⁴
- Low-middle income countries:
 - Highly cost-effective (<GDP per capita)
 - Cost-effective (1-3 xGDP per capita)
 - Not cost-effective (>3 xGDP per capita)⁵

¹N.I.C.E. 2010. Measuring effectiveness and cost-effectiveness: the QALY

²Grosse SD, 2008. *Expert Rev Pharmacoecon Outcomes Res.* 8(2):165-78.

³Department of Health 2008. Access to Medicines working Group – Attachment B, Canberra

⁴Laupacis A et al. 1992. *CMAJ.* 146(4):473-81.

⁵WHO-CHOICE cost-effectiveness thresholds 2005

Evidence of cost-effectiveness

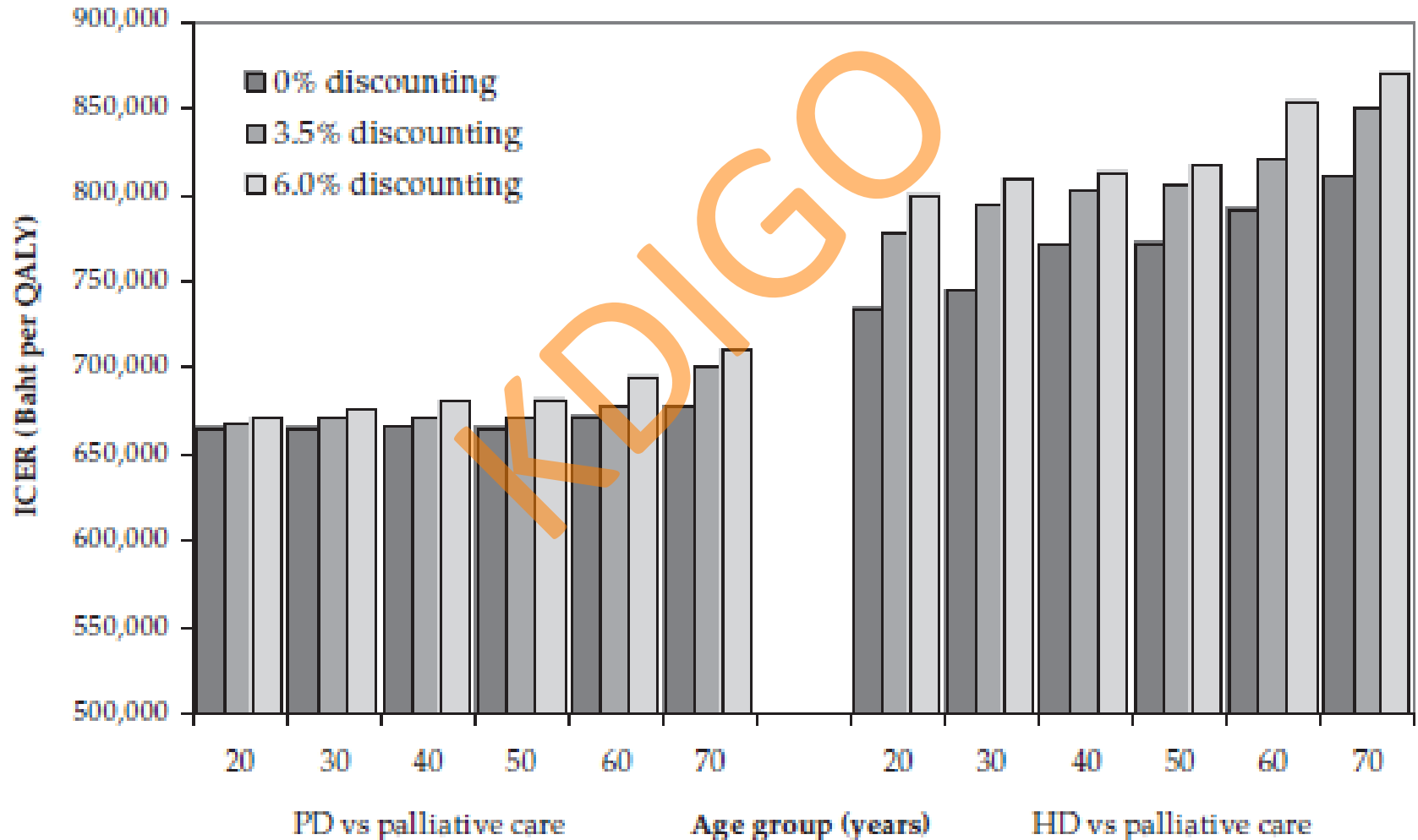
- Contemporary comparisons of renal palliative care vs dialysis
 - 2 modelled evaluations:
 - Teerawattananon Y et al 2007
 - Lee CP et al 2006 & 2009

Teerawattananon Y et al 2007

- Model: Comparing PD and HD to renal palliative care from the perspective of the Thai health system /society (2004 Baht/\$)
 - Palliative care treatment, 50% mortality in 1-3 months
 - Dialysis mortality extrapolated from registry, Life-long time horizon, survival analytic methods for 20-70 year olds
 - No transplantation
- Utility-based quality of life renal palliative care (0.60)
- Utility-based quality of life PD (0.72), HD (0.68)
- ICERs:
 - PD was US\$52,000 and HD was US\$63,000 per QALY gained compared to palliative care
 - Dialysis US\$43,000 per LYS compared to palliative care

Teerawattananon Y et al 2007

Effect of age on cost-effectiveness of dialysis compared to palliative care



Lee CP et al 2006 / 2009

- Model: comparing costs, life expectancy and quality adjusted life expectancy of current dialysis practice to *delayed start dialysis* and to no dialysis, from a US health system perspective (2003 US\$)
 - Dialysis survival and morbidity from USRDS, transplantation, Costs - Medicare
 - Dialysis mean survival 82 months, quality of life 0.630¹
 - Renal palliative care mean survival 48 months (source not defined), Costs ??
 - Renal palliative care quality of life 0.695¹

Mean of TTO and HUI 3 reported in Gorodetskaya I et al 2005, *Kidney International*.



Lee CP et al 2009

Table 4 Incremental cost-effectiveness between different pairs of strategies

Cost-effectiveness ratio (\$/QALY) for	No dialysis	Current practice with significant delay	Relative to: current practice with moderate delay	Current practice with slight delay	Current practice
No dialysis					110,814
Current practice with significant delay	40,446				129,090
Current practice with moderate delay	80,993	100,717			124,528
Current practice with slight delay	99,189		118,540		118,902
Current practice	110,814			129,090	—

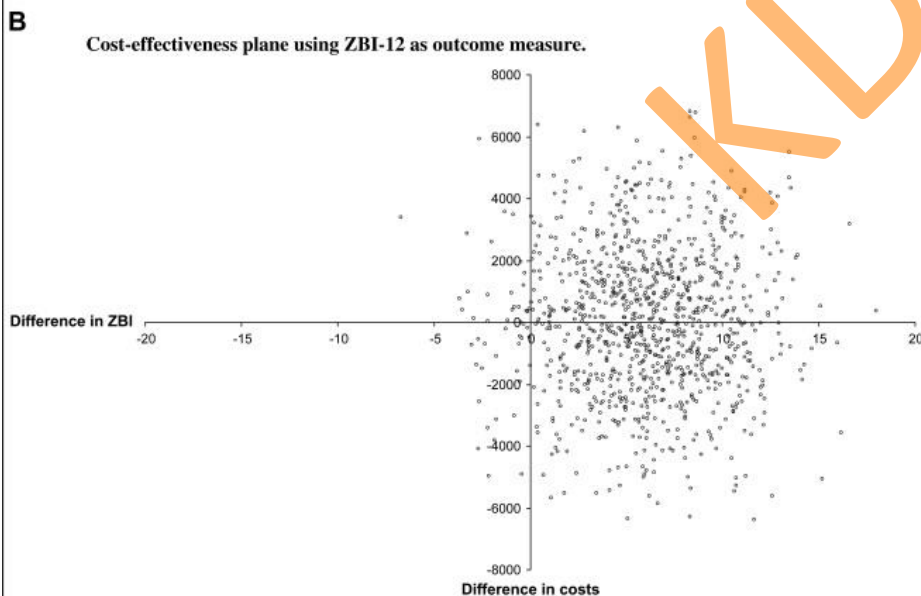
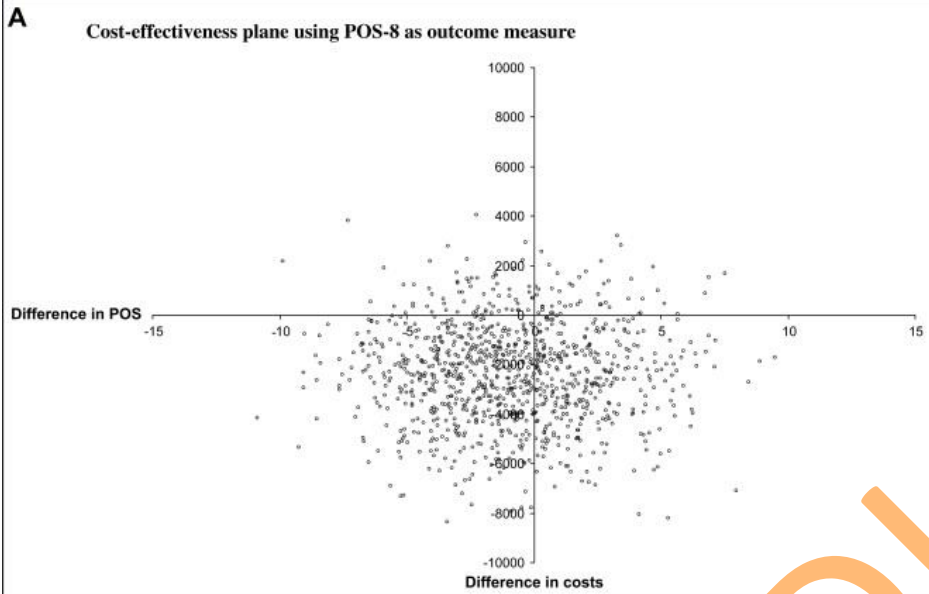
QALY, quality-adjusted life-year.

- Higher ICERs were associated with older age and more comorbid conditions
- No ICER reported for dialysis vs renal palliative care in older population

Cost-effectiveness of palliative care in non-ESRD population

- Cochrane Review, Gomes B et al 2013
 - Intervention: home palliative care services vs usual care
 - Cancer, CHD, COPD, HIV, MS
 - 6 studies: 2 RCTs cost-effective; 4 unclear if differences were statistically significant
 - Overall cost-effectiveness inconclusive
- Research in middle and low-income countries not found

Higginson I et al 2009



- CEA of 52 patients with multiple sclerosis
- Outcomes: POS-8, ZBI-12
- Less expensive similar effectiveness; less expensive and more effective
- Palliative care cost-effective

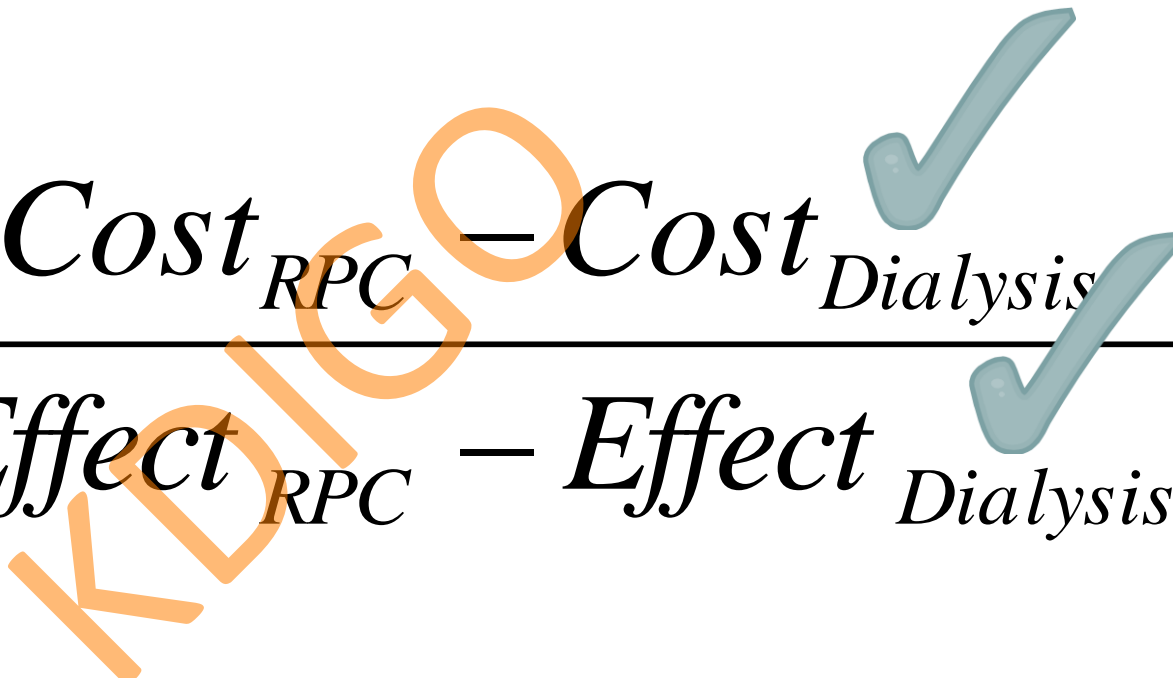
Evidence of costs / resource use

- Renal palliative care programs
- Components of programs
- Medications
- Symptom management and comorbidities
- Impression:
 - Good renal palliative care requires specialist and community resources
 - Cost offsets from reduced hospital admissions, patient transportation and hospice for end-of-life care

Evidence of effectiveness


- Outcomes:
 - Hospitalisations avoided
 - Survival (life years)
 - Quality of life
 - QALYs
 - Capabilities / wellbeing
 - Place of death
 - Family satisfaction with death


Gaps

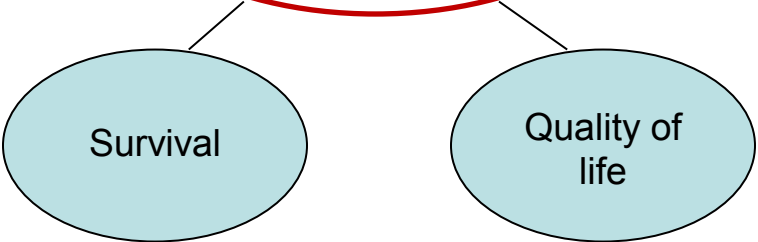
$$ICER = \frac{Cost_{RPC} - Cost_{Dialysis}}{Effect_{RPC} - Effect_{Dialysis}}$$


Gaps

$$ICER = \frac{Cost_{RPC} - Cost_{Dialysis}}{Effect_{RPC} - Effect_{Dialysis}}$$









Survival

Quality of life

Gaps

$$ICER = \frac{Cost_{RPC} - Cost_{Dialysis}}{Effect_{RPC} - Effect_{Dialysis}}$$


The equation for Incremental Cost-Effectiveness Ratio (ICER) is shown. The numerator is $Cost_{RPC} - Cost_{Dialysis}$ and the denominator is $Effect_{RPC} - Effect_{Dialysis}$. A teal checkmark is placed above the $Cost_{Dialysis}$ term. Red circles highlight the $Cost_{RPC}$ and $Effect_{Dialysis}$ terms. An orange watermark 'KIDNEY' is overlaid on the equation.

Gaps

$$ICER = \frac{Cost_{RPC} - Cost_{Dialysis}}{Effect_{RPC} - Effect_{Dialysis}}$$

Survival

Quality of life

Gaps

- Prospective costing analysis
 - Detailed identification of renal palliative care items (e.g. nephrologist / specialist nurse consultations, medications)
 - Detailed measurement, i.e. count of resource use (e.g. number and duration of consultations, drug dose, frequency and duration)
 - Valuation of items of resource use (e.g. senior staff specialist @\$100 per hour, DRGs/HRGs)

Priorities for health economic evaluation in renal palliative care

- Prospective longitudinal quality of life analysis
 - Utility-based measures
 - Wellbeing / capability measures
 - Other measures of QoL and effectiveness
 - Preferences of patients and families

Considerations

- Perspective – health system or societal?
- Comparator – incentre HD?; assisted PD?; usual care
- Time horizon – starting point?; end point death / carer bereavement
- Country / region(s)

Further research

- Cost analysis for program financing
 - Example: NICE palliative care project for cancer patients (2004)
 - Specific country / funder perspective
- Prospective cohort study using linked data for resource use and outcomes
 - Utilise existing cohorts and extend follow-up

Issues of comparative effectiveness research for decision making / allocation of resources

- Randomised controlled trials
- Survival benefit is implicit in effectiveness outcomes
- Obtaining longitudinal quality of life data near end of life
- Cost per QALY framework
 - Cost consequence
- Inclusion of disadvantaged groups

Ways in which E/E can be implemented alongside service development

- Addition of resource use questionnaires / diaries
- Incorporation of utility-based quality of life instruments eg. SF-12, EQ-5D
- Longitudinal measures of other relevant outcomes eg. capabilities ICECAP-O, SCM
- Data linkage: eg. CKD registry (eGFR) + admitted patient data and primary care data

Next steps to take E/E forward

- 1) Identify most pertinent economic question
- 2) Consider available datasets / and opportunities alongside planned clinical trials or large cohort studies
- 3) Set aside some funds for i) set up & data linkage ii) analysis
- 4) Project grant applications / Program grant applications / Charities

Thank you

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