## ESRD and Transplantation - Economy and Societal Expectations

Harri Sintonen
Professor of Health Economics (emeritus)
Hjelt Institute/Department of Public Health,
University of Helsinki
harri.sintonen@helsinki.fi

EWOPA 2010, May 6, 2010

---

## Contents

- What would patients with ESRD (and the society) expect?

- How do different treatments respond to these expectations?

---

## Expectations

- Patients with ESRD (and the society) would expect
- a treatment, that would produce
  - *more life years (longer survival)*
  - *better health-related quality of life (HRQoL)*
  - *at an acceptable cost and*
  - *health benefits and costs distributed in an equitable manner*

---

## Objectives of health care

- There is a wide agreement that health care has two major objectives:
  - to keep people alive as long as possible (to increase length of life), and
  - to improve their health-related quality of life while alive

---

## Effectiveness of health care

- Effectiveness of health care should therefore be assessed in terms of **gains** in
  - *length of life and/or*
  - *health-related quality of life,* and when combined, in
  - Quality-Adjusted Life Years (QALYs)

---

## QALYs gained
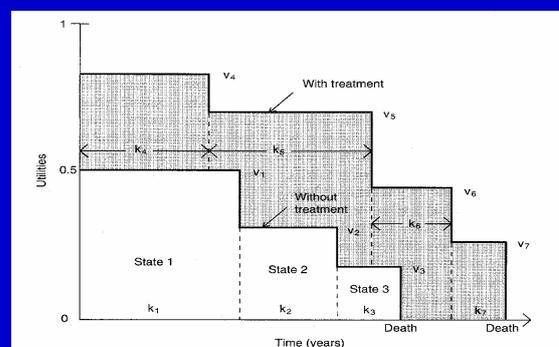
## Also money counts

- Society is not willing to pay whatever for a QALY gained by health care interventions

- Money and resources spent on the treatments of ESRD are away from other interventions in health care, that would produce health benefits

- These foregone benefits are the opportunity cost of ESRD treatments – and this cost must not become too large

## Also money counts

- As the ESRD patients are known persons, who would die without treatments, society is probably willing to pay much more for a QALY gained by ESRD treatment than for interventions enhancing purely quality of life or targeting anonymous groups

- Therefore, cost per QALY gained from ESRD treatments would probably be towards the maximum that society is willing to pay

## Also money counts

- ESRD has become a heavy economic burden
- For example, in Canada 0.1 % of population has ESRD, but the treatment costs of ESRD are 1.3% of total health care spending (Zelmer 2007)
- Societies would prefer better value for money, i.e., lower cost without compromising the QALY gain or more QALYs at the same or lower cost
- At least theoretically, children have most to gain both in terms of number life years and quality of life, i.e., in QALYs.

## Responses to the expectations: Dialysis

- **Dialysis** was a big, but not entirely satisfactory step in responding to the expectations

  A) QALYs to be expected by dialysis patients fall short of those by age-standardised general population for two reasons:

## Responses to the expectations: Dialysis

1) the life expectancy is clearly shorter
   - *the age-specific mortality for children with ESRD is about 30 times higher than in general population*
   - *overall mortality rates are about 4 times higher among children on dialysis than among those with transplantation (McDonald and Craig 2004)*

## Responses to the expectations: Dialysis

2) HRQoL is clearly poorer
   - *the mean HRQoL score (measured by the generic 15D) was 0.84 for adult patients on self-care hemodialysis compared to 0.89 in age-standardised general population (Malmström et al. 2008)*
   - *a lot of evidence that a significant difference exists also in children in favour of general population*

**Responses to the expectations: Dialysis**

B) Cost per QALY gained is high

*- the mean cost per QALY gained from dialysis for adults varies widely in the literature (from 30000 to 70000 Eur)*

*- an estimate by NICE (UK)): the cost for children may be twice as high*

*- cost per QALY gained from dialysis has become often a benchmark for society's maximum willingness to pay for such a health benefit*

---

**Responses to the expectations: Transplantation**

- A more satisfying response to expectations than dialysis

    A) QALYs to be expected by Tx patients are closer to those by age-standardised general population for two reasons:

---

**Responses to the expectations: Transplantation**

1) the life expectancy is clearly longer than for the dialysis patients

*- evidence by McDonald and Craig 2004*

*- "following Tx, life expectancy increased by 30 years for children aged 0 to 14 years, with a remaining lifetime expectancy of 50 years"* (Sudan et al. 2007 referring to US data)

---

**Responses to the expectations: Transplantation**

2) HRQoL is quite similar to that of age-standardised general population

*- after a mean of 3.9 years since Tx, the mean HRQoL scores of patients vs. population were*

*- 0.96 vs. 0.95 (15D score, aged 16-23 years)*

*- 0.96 vs. 0.95 (16D score, aged 12-15 years)*

*- 0.89 vs. 0.94 (17D score, aged 8-11 years)*

*(Apajasalo et al. 1997)*

---

**Responses to the expectations: Transplantation**

B) Transplatation produces more QALYs and is cost saving compared to dialysis

- Evidence from Belgium (Cleemput et al. 2004):

    *- patients, who remained on the immuno-suppressants, Tx dominated strongly dialysis, i.e., produced 5.2 extra QALYs and saved 49000 Eur during the remaining life expectancy*

    *- for patients, who did not remain on the immunosuppressants, produced 4.1 extra QALYs and saved 87 000 Eur*

---

**Responses to the expectations: Transplantation**

- Evidence from Greece for adults (Kontodimopoulos and Niakas 2008):

    *- Tx dominated strongly dialysis, i.e., produced ≈ 6.4 extra QALYs and saved ≈ 60000-80000 Eur during the remaining life expectancy (discounted at 5 %)*

- There is no reason to believe that the results would be worse for children, on the contary

## Responses to the expectations: Pre-emptive transplantation

- There is increasing evidence to suggest that even better results at a lower cost could be obtained with pre-emptive transplantation, especially from living donor source
- Although pre-emptive transplantation is already much more common among children than in adults, it is still relatively rare in absolute numbers

## Responses to the expectations: Pre-emptive transplantation

- **Survival advantages** for adults compared with Tx after initiation of dialysis, and
- increasing duration of pre-transplant dialysis is associated with increasing risk of mortality and allograft failure (Shrestha 2008)
- However, a significant difference in mortality was **not** found among children with different durations of pre-transplant dialysis (McDonald and Craig 2004)

**HRQoL advantage**: Decline in functional status/HRQoL associated with start of dialysis, recovery, then a secondary decline associated with Tx. Pre-emptive Tx, by reducing transitions from two to one, has the potential to decrease substantially the adverse impact on HRQoL (Hays 2007)
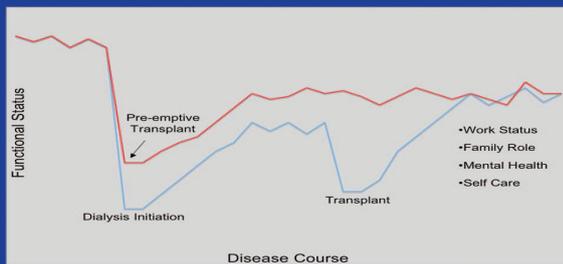
**Cost advantage**: Avoidance of high per-person per-month expenditures associated with transitions from one treatment modality to another. Example: transition from chronic kidney disease care to dialysis in 2003, by age (Abecassis et al.2008)
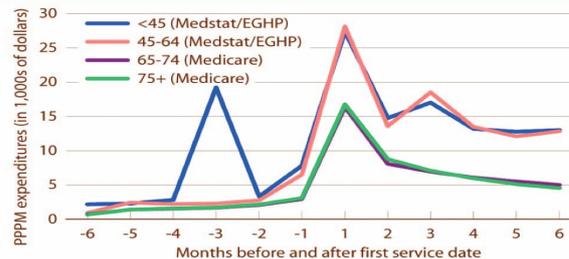
## Conclusions

- Compared to dialysis, Tx meets much better the societal expactations by reducing costs and producing better health outcomes for children and adults
- Yet, there is still much need for research and room for improvement in these respects

- Hopefully this worshop for its part finds ways in this direction