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Instruments for economic evaluation: session 5

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Instruments for economic evaluation: session 5

Abstract

Powerpoint presentation presented at Managing and Measuring Health Outcomes, Menzies School of Health Research, Darwin

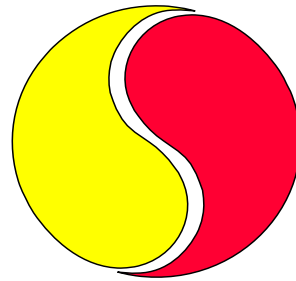
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Session 5



Part A: Instruments for Economic Evaluation

Jan Sansoni

Types of Economic Evaluation

A health treatment/ intervention may produce good health outcomes but at considerable cost...so we need to weigh up the cost in producing the level of health outcome.

Some approaches to economic evaluation in the health sector are:

- Cost of Illness Studies
- Cost Benefit Analysis
- Cost Effective Analysis
- Cost Utility Analysis

Types Of Economic Evaluation (Cont.)

- Cost of Illness Studies

Total value of all resources used or lost by society as a result of the condition or illness.

Direct Costs e.g. care and treatment costs

Indirect Costs e.g. lost wages for patients and caregivers, lost productivity

Intangible Costs e.g. value of pain and suffering and decreases in quality of life

Does not assess the outcomes of particular interventions

Types Of Economic Evaluation (Cont.)

- Cost Benefit Analysis

The resources used (costs) and the resultant benefits of different treatments/ programs are expressed in \$ terms. CBA assesses **the ratio of cost to benefit**

Monetary value of health and wellbeing outcomes are difficult to define – so is rarely used

However, does not consider health sector in isolation to other sectors, so can answer questions such as:

whether resources should be allocated to programs preventing road injuries in young drivers or aimed at preventing institutional admission for the incontinent elderly living in the community.

Types Of Economic Evaluation (Cont.)

- Cost Effectiveness Analysis (CEA): Compares different interventions (e.g. drugs, physiotherapy etc) for a particular condition/ illness. For comparison the outcome measures must be the same. It considers degree of outcome gained in relation to costs to achieve it in advising resource allocation and procurement decisions.
- Cost Utility Analysis: An extension of CEA but enables comparisons of different treatments with quite different outcomes. This is especially when interventions cause differences in the quantity (survival) and quality of life . It does this through combining these in the common metric of the Quality Adjusted Life Year. The costs data for achieving a QALY mean that different interventions for the same illness/ conditions can be compared as can interventions for other conditions. It can be used to assess whether drugs should be listed on PBS and to guide resource allocation decisions.

Cost Utility and Health Indexes

Possible Outcomes in Economic Evaluation

1. The outcomes of treatment A and B are the same for all outcome measures including HRQOL (no difference)
2. All outcomes are superior in treatment A compared to treatment B (clearly A preferred)

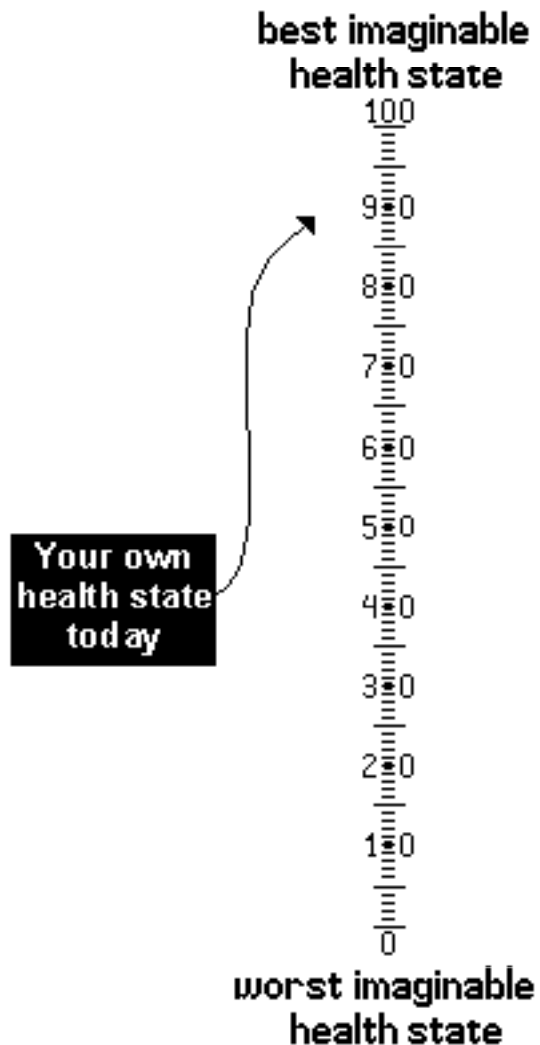
But what do we do if

3A. For Treatment A the HRQOL outcomes are better, but other outcomes such as survival are worse

or

3B. Outcomes differ by health dimension on the HRQOL measure between treatments A and B – one may improve physical functioning, the other mental – how do we weigh these up?

EuroQol EQ-5D



- MOBILITY
 - I have no problems in walking about
 - I have some problems in walking about
 - I am confined to bed
- SELF-CARE
 - I have no problems with self-care
 - I have some problems washing or dressing myself
 - I am unable to wash or dress myself
- USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)
 - I have no problems with performing my usual activities
 - I have some problems with performing my usual activities
 - I am unable to perform my usual activities
- PAIN/ DISCOMFORT
 - I have no pain or discomfort
 - I have moderate pain or discomfort
 - I have extreme pain or discomfort
- ANXIETY/ DEPRESSION
 - I am not anxious or depressed
 - I am moderately anxious or depressed
 - I am extremely anxious or depressed

EQ-5D Exercise

- Answer the 5 questions and then rate your health on the visual analog scale (VAS).
- Rate a person with severe dementia, largely confined to chair, resides in nursing home, needs to be fed and dressed, gets agitated if needs to be moved, has bouts of pain
- Rate a person you know with a health problem of your choice
- Is there a health state worse than death?

Example EQ-5D

Has 5 dimensions: mobility, self-care, usual activities, pain/discomfort, anxiety/ depression (please fill in your copy)

3 levels of response are available for each dimension 1 = no problems, 2 = some problems, 3 = extreme problems

Thus a person with extreme anxiety may respond 1,1,1,1,3 across these dimensions = a person's health state

Community values/ 'utilities' have been ascertained for a range of these health states based on a scale 1 = best imaginable health state to 0 = worst imaginable health state (usually death).

Various methods may have been used to do this (Standard Gamble, Time Trade Off, Visual Analog Scale etc)

Life

1.0

0.0

Death

QALYs

- Need a **generic health related quality of life** measure that describes a range of health states between life and death e.g. EQ-5D has 5 dimensions or questions and 3 levels of response possible. It thus has hundreds of health states (245) that can be described (this will vary by instrument).
- Each of these health states can be valued on a scale between 0 (death) and 1 (life) – usually using preference methods such as **standard gamble** or **time trade off**. This gives the utility value for each health state (more on this later).
- Thus improvement gained by a treatment can be classified on the same metric, e.g. a treatment moves incontinence patients from a health state valued at .6 to .7 (this is their improvement in health related quality of life).

QALYs

- However this needs to be adjusted for their period of survival/ life expectancy – lets say 10 years for the example of incontinence
- So the treatment has gained the patient one QALY ($10 \times .10 = 1$) for incontinence
- Costs data are added to this – lets say \$10K per QALY for incontinence and this can be compared with the cost per QALY for a different treatment for incontinence or a treatment for asthma or diabetes.
- It thus helps you to choose between various treatments for a condition or to compare the costs and benefits of treatments across conditions and so may advise resource allocation decisions

Multi-attribute Utility Instruments

	<i>Country</i>	<i>N. Items</i>	<i>N. Scales</i>	<i>Weight</i>	<i>Combination rule</i>	<i>Range *</i>
AQoL	Australia	12	4	TTO	Multiplicative	-0.04 – 1.00
EQ5D	Europe/UK	5	5	TTO	Regression	-0.59 – 1.00
HUI3	Canada	12	8	VAS/SG	Multiplicative	-0.36 – 1.00
15D	Finland	15	15	VAS	Additive	+0.11 – 1.00
SF6D	US/UK	12	6	SG	Additive	+0.30 – 1.00

Notes:

1.00 = Full health, 0.00 = Death

Note: MAU instruments (or health indexes) can also be used as generic HRQOL measures

Methods for deriving value or utility of health states

- Visual Analog Scale: Refer handout and Slide 9. Really a ranking of health states from 0.00 to 1.00 rather than a utility, as no preference or trade off made – simple but not preferred
- Magnitude Estimation: The respondent is asked to consider the distance of a health state from 1.00 (full health) – similar issues to VAS
- Time Trade Off: For any health state a person is asked how many years of life they are prepared to give up for a treatment that will return them to full health from this health state

Methods (Cont.)

- Standard Gamble: For any health state a person is presented with a treatment option that has 2 possible outcomes: the probability of either full health for the remainder of life (e.g. 0.90) or death (e.g. 0.10). Or they can choose not to have treatment and remain with the health state described for the rest of their life
- Person Trade Off. The participant is asked to estimate the number of people with this health state that would have to be treated to make a treatment worthwhile (e.g. choose between extending life of 10,000 people in full health by 1 year against a treatment that extended the life of N people with this condition for 1 year)

Generally SG and TTO are the preferred methods

Valuations

Remember the person with extreme anxiety? The result for this health state (11113) derived from EQ-5D = 0.42 whereas from another condition e.g (11112) the valuation/ preference could be .69

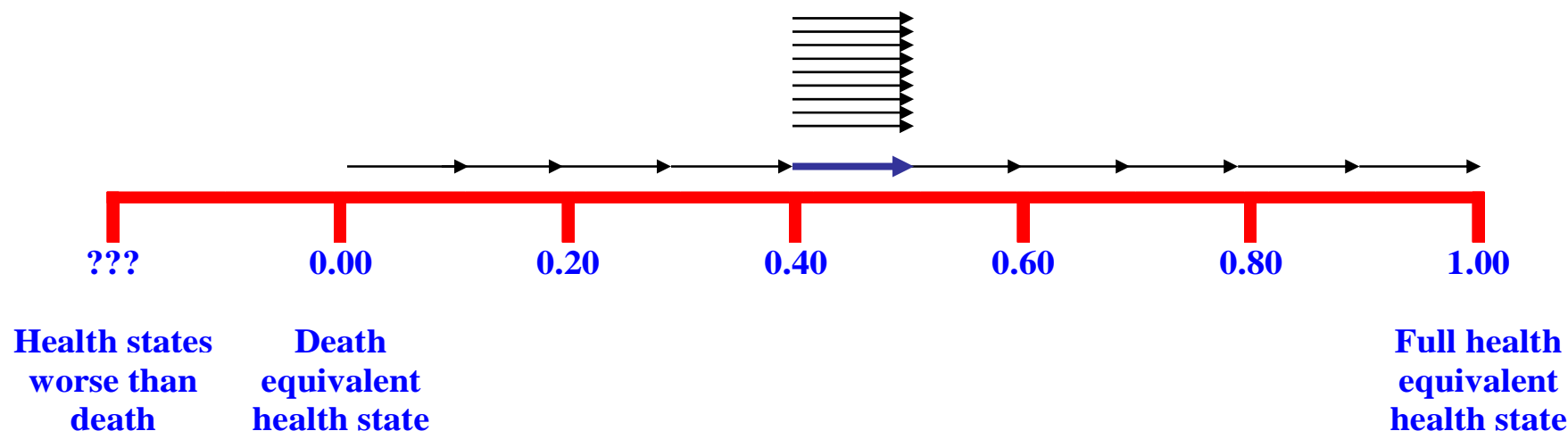
By this method we have derived one total health score and thus can compare the valuations for different health conditions (burden) and of the effect of different treatments on a condition

Utility for urinary incontinence could be .6. If treatment improves this to .7 over 10 years then the value of treatment = $.10 * 10 = 1$ QALY. If we add the costs of treatments to this then the treatment providing the lowest cost per QALY gained is preferred

As there is a common metric theoretically we can also compare different treatments for different conditions: QALY league tables

Utility instruments: the basic assumptions

- If treatment improves the utility of a person from 0.40 to 0.50, a gain of 0.10, and she lives in this better health state for 10 years, there is a gain of 1 QALY (quality-adjusted life year):
$$0.10 \times 1 \times 10 = 1 \text{ QALY}$$
- Providing this same treatment to 10 people, each of whom lives for 1 year in better health, is equivalent to 1 QALY:
$$0.10 \times 10 \times 1 = 1 \text{ QALY}$$
- If a person is saved from death (0.00) and returned to full health (1.00) and lives for 1 year there is a gain of 1 QALY



QALY LEAGUE TABLE

- Restrict cigarette sales to minors (\$1000/Q)
- Anti-depressants in patients with major clinical depression (\$3000/Q)
- Hypertension treatment elderly (\$3000/Q)
- Pap smear screening @ 4 years (\$16000/Q)
- Driver side airbag (\$27,000/Q)
- Chemotherapy in 75yo women breast cancer (\$58,000/Q)
- Screening and treatment for HIV in low risk populations (1.5 mil/Q)

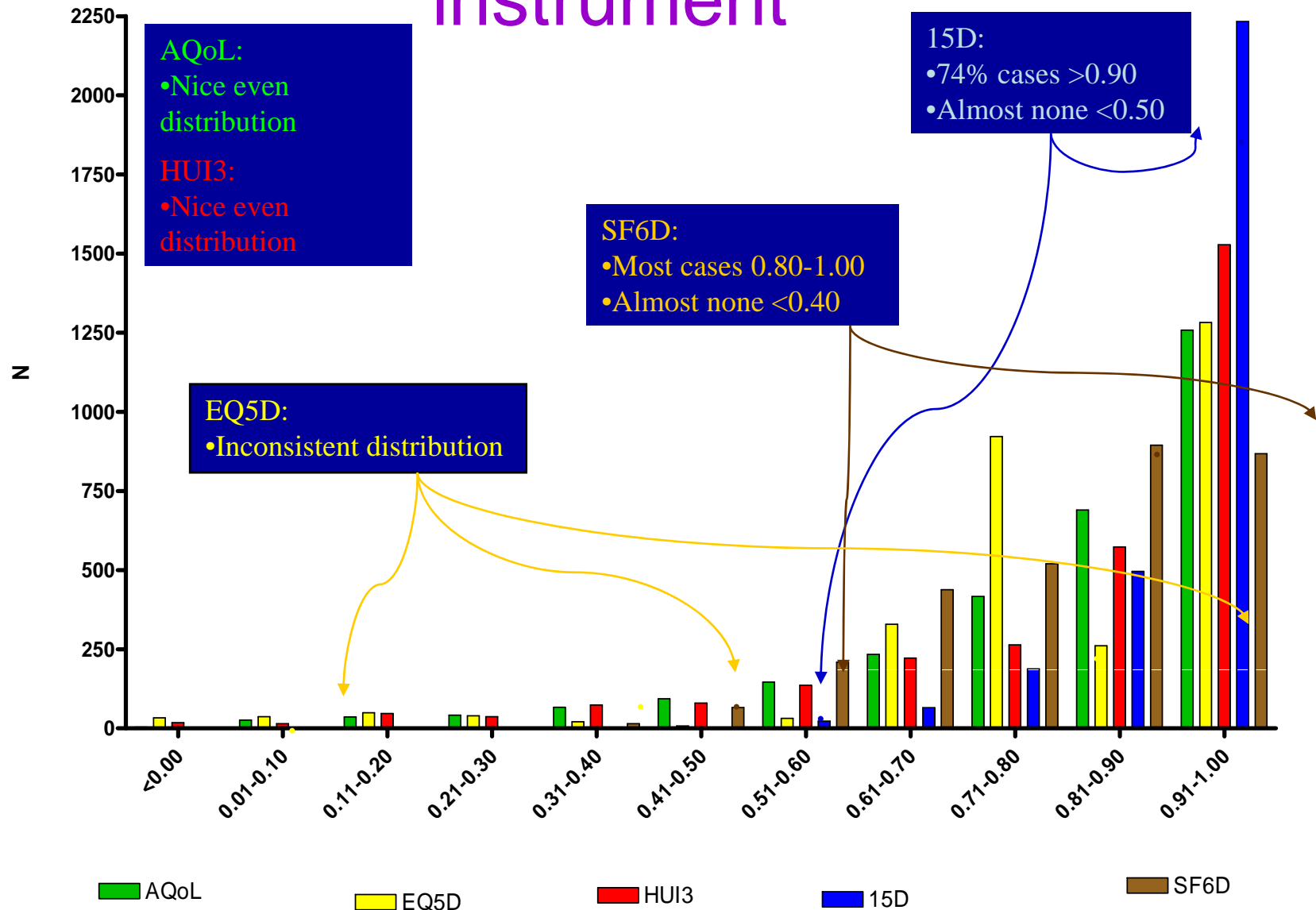
Which health care program is the most cost-effective?

- A new wheelchair for elderly
 - Increases quality of life = 0.1
 - 10 years benefit
 - Extra costs: \$ 3,000 per life year
 - $\text{QALY} = Y \text{ (years)} \times V \text{ (Value/Q)} = 10 \times 0.1 = 1 \text{ QALY}$
 - Costs are $10 \times \$3,000 = \$30,000$
 - $\text{Cost/QALY} = 30,000/\text{QALY}$
- Special post natal care
 - Quality of life = 0.8
 - 35 years benefit
 - Costs are \$250,000
 - $\text{QALY} = 35 \times 0.8 = 28 \text{ QALY}$
 - $\text{Cost/QALY} = 8,929/\text{QALY}$

What implicit bias might be evident here?

(Busschbach 2006)

Distribution of HRQoL utility scores by instrument



Summary

Health indexes provide one total health score rather than scores across dimensions as in a health profile.

This combined with survival data can provide a measure called QALYS – Quality Adjusted Life Years Saved

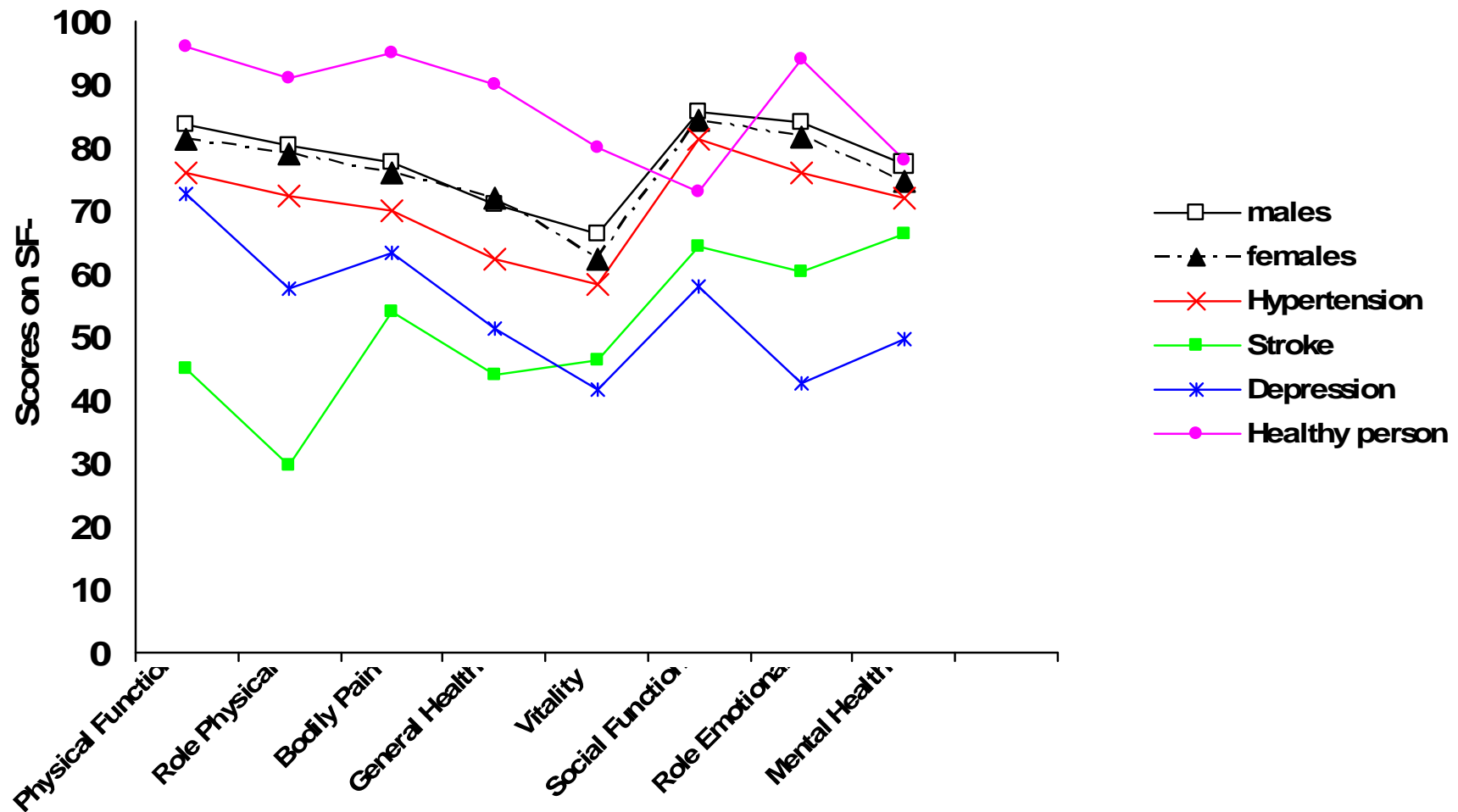
When this is combined with cost data for the treatments it can be used for cost utility analysis to determine which treatment may be best to invest in – cost per QALY.

However some indexes used (EQ-5D, SF-6D) are often brief and simple measures of patient health status as compared with traditional health profiles.

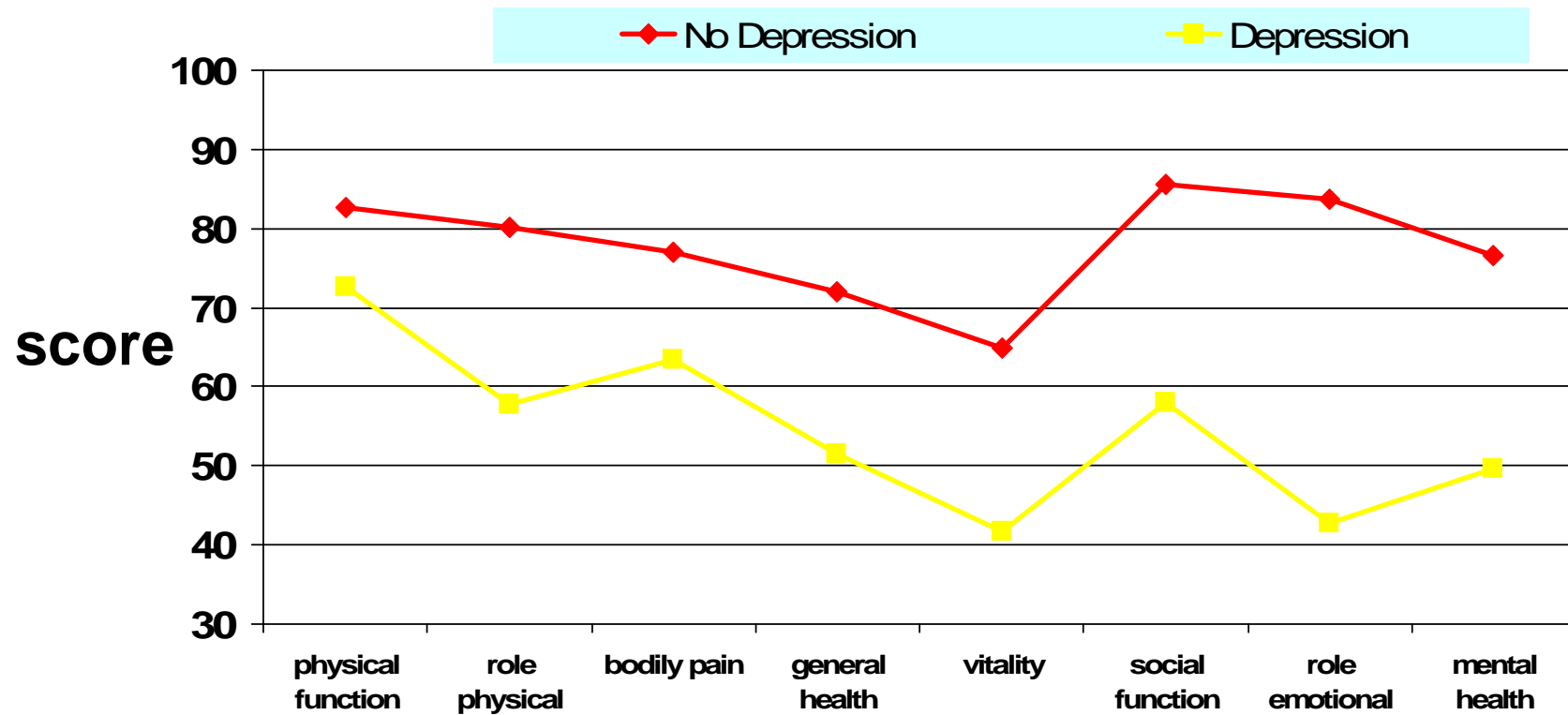
Approach may lack sensitivity when comparing 2 drugs for minor health problems, preventative interventions, chronic disease? (refer paper provided)

But cost utility analysis can provide estimates which can advise resource allocation and advise registration of drugs for PBS

Quality of life profiles and burden of disease



SF-36 Subscale Scores by Depression (NHS)



Discussion

- How would you describe the burden of disease shown for the various groups
- Note these graphs reflect self – reported morbidity (illness) not clinical diagnosis – might there be a difference?
- In community/ household surveys who might not be included in these surveys?

Burden of Disease

- The previous slides show one can compare the burden of disease for particular health conditions by using a health status measure such as SF-36. The ABS has produced such profiles for Australia. The profile for depression reflects a greater burden for this condition as contrasted with others (Slide 21) and as compared with people with no depression (Slide 22). Such profiles may assist with health priority setting particularly combined with data concerning the prevalence of the condition.

Burden of Disease: DALYs

- Another approach to quantifying burden of disease is the measure of Disability Adjusted Life Years (DALYs) .
- DALYs are a summary measure of the years of healthy life lost due to illness or injury. One DALY = one lost year of healthy life. DALYs are calculated as the sum of the years of life lost due to premature mortality (YLL) and the equivalent years of healthy life lost due to poor health or disability.
- DALYs are calculated as weighted combinations of 4 components
 - Life expectancy
 - Value of life at different ages
 - The value of future time (3% annual discount rate)
 - The value of avoiding disability
- Thus for any condition you can calculate the number of DALYS which gives you a comparative estimate of the burden of disease for major health conditions in your population – and global comparisons can also be made

Burden of Chronic Diseases: Australia

1. CHD (mainly YLL)
2. Stroke
3. COPD
4. Depression (mainly YLD)
5. Lung Cancer (mainly YLL)
6. Diabetes (about 50:50)
7. Arthritis (mainly YLD)

Refer AIHW website: www.aihw.gov.au

Useful in that it includes disability as well as mortality in providing a picture of national health. Deaths data would ignore the impact of depression and disability.

May advise re priority setting at global and national levels, and be useful for international comparisons but is not particularly useful re resource allocation as it provides no information as to whether effective interventions are available and at what cost

There are numerous criticisms concerning the assumptions in the methodology (refer briefing sheet).

Health Outcomes and Funding: Some Issues

An extreme view might be to say only fund those interventions and health services that produce good health outcomes for their patients. Discuss!

While HO is an important aspect to consider with funding remember:

- social and economic determinants of health status and health outcome
- easier to measure in some settings vs. others
- inherent conservatism may lessen innovation
- maximal versus optimal outcomes, individual versus community
- whose values? (the community's, experts or those of patients with the condition?)

Materials

- 2* QALY internet briefing sheets
- 1* DALY internet briefing sheet
- Copies of Slide 9
- EQ-5D in instrument kit