

## Decisions depend on preferences

Alice ... went on “Would you please tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where –” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.

Lewis Carroll (1832–1898)

*Alice’s Adventures in Wonderland*, 1865

Always be suspicious of a program or person that tells you what to do if it does not ask you what you want to do!

# Choosing Utilities

When building a recommendation system for medical treatment, whose utilities do we use?

When building a recommendation system for medical treatment, whose utilities do we use?

- the patient
- the doctor
- the payer
- the provider of the recommendation system
- experts
- voters on the Internet
- society?

When building a recommendation system for medical treatment, whose utilities do we use?

- the patient
- the doctor
- the payer
- the provider of the recommendation system
- experts
- voters on the Internet
- society?

Whose utility does it try to assess?

- How can we design utilities and rewards so that the policies have desirable properties?

- How can we design utilities and rewards so that the policies have desirable properties?
- What about for unobservable constructs such as socioeconomic status, teacher effectiveness, and risk of recidivism? What measurement model should we use?

- How can we design utilities and rewards so that the policies have desirable properties?
- What about for unobservable constructs such as socioeconomic status, teacher effectiveness, and risk of recidivism? What measurement model should we use?
- What are effective ways to acquire utility/rewards?

# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life.



# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life. The utility can be negative for outcomes that are considered worse than death.

# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life. The utility can be negative for outcomes that are considered worse than death.
- The QALY provides a measure that incorporates the quantity and quality of life.

# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life. The utility can be negative for outcomes that are considered worse than death.
- The QALY provides a measure that incorporates the quantity and quality of life.
- When there are limited resources the cost/QALY ratio is used as a cost-effectiveness measure for decision making in many countries.

# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life. The utility can be negative for outcomes that are considered worse than death.
- The QALY provides a measure that incorporates the quantity and quality of life.
- When there are limited resources the cost/QALY ratio is used as a cost-effectiveness measure for decision making in many countries.
- Controversial: utility of going blind.

# Quality-adjusted life year (QALY)

- The **quality-adjusted life year (QALY)** is a utility-based measure for evaluating medical interventions, such as (expensive) drugs or surgeries.
- The utility is: 1 for a healthy life for a year and 0 for death, summed over each expected year of life. The utility can be negative for outcomes that are considered worse than death.
- The QALY provides a measure that incorporates the quantity and quality of life.
- When there are limited resources the cost/QALY ratio is used as a cost-effectiveness measure for decision making in many countries.
- Controversial: utility of going blind.  
Does it imply the blind people are less valued than sighted people?

## Example: earthquake-proofing public schools

- It is possible to compute the probability of an earthquake in a location and the probability that a particular structure will collapse when students are present.
- Money can be spent to reduce than chance of a collapse.

## Example: earthquake-proofing public schools

- It is possible to compute the probability of an earthquake in a location and the probability that a particular structure will collapse when students are present.
- Money can be spent to reduce than chance of a collapse.
- Deciding whether to spend the money requires trading off money with children's lives.

## Example: earthquake-proofing public schools

- It is possible to compute the probability of an earthquake in a location and the probability that a particular structure will collapse when students are present.
- Money can be spent to reduce than chance of a collapse.
- Deciding whether to spend the money requires trading off money with children's lives.
- Many decision makers are reluctant to explicitly trade off money and the lives of children.



## Example: earthquake-proofing public schools

- It is possible to compute the probability of an earthquake in a location and the probability that a particular structure will collapse when students are present.
- Money can be spent to reduce than chance of a collapse.
- Deciding whether to spend the money requires trading off money with children's lives.
- Many decision makers are reluctant to explicitly trade off money and the lives of children.
- However, when they don't make an explicit tradeoff they tend to undervalue children's lives.