

DECISION TREE EXAMPLE

A 40-year-old labourer has had severe back pain for 2 months, and there are unmistakable signs that he has a herniated intervertebral disc (which causes pain by pressing on the roots of the sciatic nerve). He has been dragging his left foot and has a definite footdrop.

Several neurosurgeons agree that the disc should be treated but disagree on the preferred treatment. The choice is between an operation known as laminectomy and injecting the disc with an enzyme.

The patient comes to you, his primary care physician, for help in choosing between these treatments.

(1) Should you recommend laminectomy?

or,

(2) Should you recommend injecting the herniated disc with an enzyme called papain?





So to decide on the right treatment, call each neurosurgeon and discuss.

The neurosurgeon who recommends removal under direct vision by an operation known as a laminectomy gives you these information: The treatment requires general anaesthesia. Due to the fact that the labourer is susceptible to cardiac arrest, the operative mortality for him is as high as 5%. The surgeon estimates that, if the patient lives, there is an 80% chance that the labourer will be pain-free with no footdrop, a 10% chance of residual chronic back pain without footdrop, and a 10% chance of operation being ineffective.



The other neurosurgeon who recommends another treatment in which the disc is injected with an enzyme called papain that dissolves the herniating disc gives you these information: there is no operative mortality in this treatment. The surgeon estimates that there is a 70% chance of recovering perfect health, a 10% chance of residual chronic back pain without footdrop, and a 20% chance of operation being ineffective.

- What is the choice that has to be made?
 - Open surgical removal of disc (laminectomy)
 - Papain injection of disc

- **What are the possible outcomes?**
 - Complete recovery (utility = 1)
 - Lifetime of back pain (utility = 0.6)
 - Lifetime of back pain and footdrop (utility = 0.4)
 - Operative death (utility = 0)

What are the possible outcomes?

- If the first option is chosen:
 - If patient survives: complete recovery, lifetime of back pain or lifetime of back pain and footdrop
 - Operative death
- If the second option is chosen:
 - Complete recovery, lifetime of back pain or lifetime of back pain and footdrop

What if the utility of lifetime of back pain and footdrop changes? (One-way Sensitivity Analysis)

Sensitivity Analysis on utility of back pain and footdrop

