

IE102 Fall 2019

Example 1: 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.

So to decide on the right treatment, you call each neurosurgeon to discuss the risks of surgery.

One neurosurgeon recommends removal under direct vision by an operation known as a laminectomy. It requires general anaesthesia. The operative mortality for this labourer 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 recommends another treatment in which the disc is injected with an enzyme called papain that dissolves the herniating disc. 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.

Taking the following utilities for each outcome we will now sketch the decision tree and solve and recommend the better treatment option out of the two we have at hand. Then sensitivity analysis will be performed.

<i>Outcome</i>	<i>Utility</i>
Complete recovery	1
Lifetime of back pain	0.6
Lifetime of back pain and footdrop	0.4
Operative death	0