

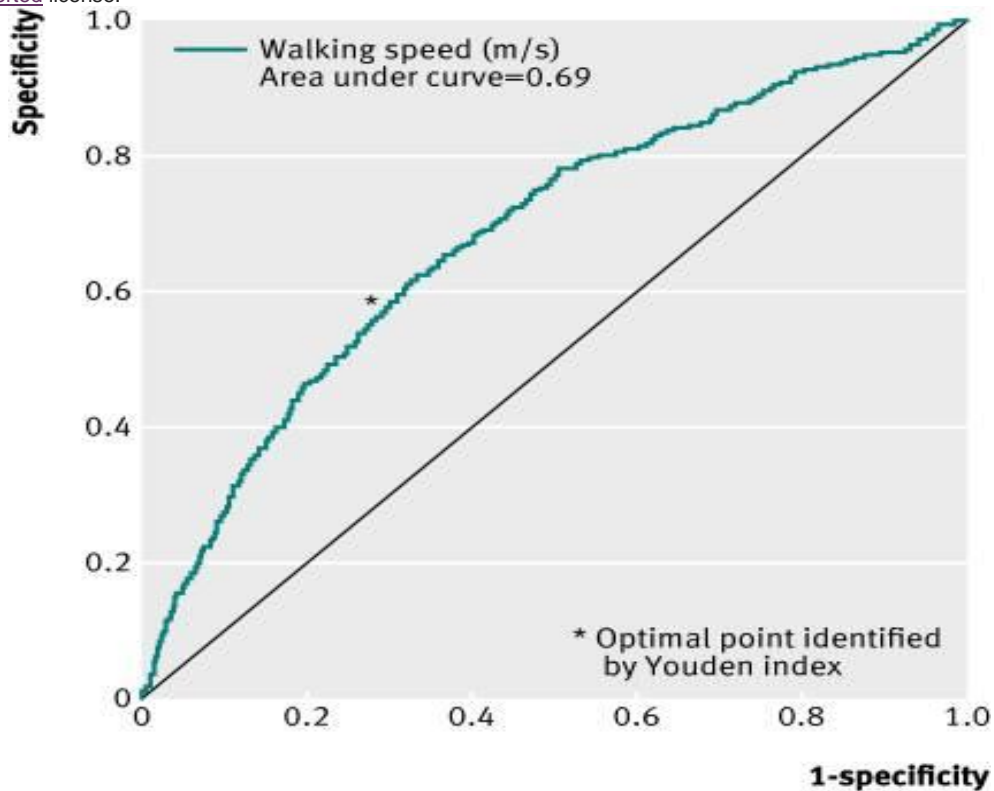
3.05 A Grim Reaper's Walking Speed



Grim Reaper at the Cathedral of Trier

To estimate the walking speed of the Grim Reaper, Stanaway et al[1] studied walking speed as a predictor of mortality in 1705 Australian men at least 70 years old. Of the 1705, 266 died during follow up, so $1705 - 266 = 1439$ survived. They treated walking speed (in meters/sec) as a continuous diagnostic test and created the ROC Curve for mortality below: Slower walking speed was a predictor of higher mortality in this study.

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a) What are two errors in the labeling of this figure?

b) What part of the ROC curve refers to the slowest walking speeds?

The authors found that although there were 266 deaths during follow-up, no one in the cohort who walked faster than 1.36 m/sec (about 3 miles per hour) died. They proposed the following explanation: "This supports our hypothesis that faster speeds are protective against mortality because fast walkers can maintain a safe distance from the Grim Reaper."

c) **(Extra Credit)** About how many men walked faster than 1.36 m/sec? (Again, of the 1705, 266 died during follow up, so $1705 - 266 = 1439$ survived.)

1. Stanaway FF, Gnjjidic D, Blyth FM, Le Couteur DG, Naganathan V, Waite L, et al. How fast does the Grim Reaper walk? Receiver operating characteristics curve analysis in healthy men aged 70 and over. *BMJ*. 2011;343:d7679.