

USING UTILITY SKILL SCORES TO ASSESS THE ECONOMIC UTILITY OF DIAGNOSTIC TESTS

David J. Buckley¹, Garry A. Anderson², and Andrew L. Vizard²

¹ Performance Analysis Unit, Greater Southern Area Health Service, Wagga Wagga, Australia.

² Faculty of Veterinary Science, University of Melbourne, Australia.

The utility of a test depends on both the accuracy of the test and the individual preferences of the patient. Allowing for individual preferences in test evaluation is problematic. This study introduces utility skill score curves which demonstrate the utility of test for the full range of utility preferences. The utility skill score acknowledges the utility of the optimal action based on the *a priori* risk and normalises this value by the value of perfect knowledge. This creates a dimensionless metric that ranges between one and minus infinity and in doing so generalises the results to any potential action the patient or clinician may take. By graphing the utility skills score over the full range of decision probability thresholds, illustrates the utility of the test for all users, avoiding assumptions about utility preferences. By modelling the optimal action the utility score demonstrates the maximum utility a test can deliver. Clinicians and patients can immediately identify the value of the test, based on the probability threshold of the patient, and epidemiologists can use the curve to identify the utility of the test to populations. This approach unifies a number of techniques and delivers a natural extension to ROC curves by incorporating individual preferences into the evaluation of tests. To illustrate the methodology the utility of nuchal translucency screening for trisomy 21 in women of varying groups is examined.

KEY WORDS: decision making; epidemiological methods; healthcare economics; screening; receiver-operator curve