

P643 - A Definitive Meta-analysis to Ascertain the Optimal Screening Method for Depression in Cancer and Palliative Care. Part II - Algorithmic Test Combinations

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OBJECTIVES We aimed to examine the validity of screening and case-finding tools used in the identification of any defined depression following cancer, according to an ICD10 or DSMIV criterion standard. In this part, we look at the merits of using each screening tool in combination with clinician judgement by oncologists (using data from Fallowfield et al Br J Ca 2001; 84, 1011-1015) or in an algorithmic combination with other tools. The latter is a simple two step approach which applies the initial screen to all individuals but the second step only in those who score positive in step one.

METHODS After excluding those tools without at least two independent validity attempts, there were 8 tools for comparison plus clinical skills alone. Assuming a maximum of two applications per tool in order to make a clear diagnosis there were 81 possible combinations of tests of tools. We tested each method at a prevalence of 19%, using the fraction correct statistic which shows overall accuracy (TP+TN / all cases). We divided the combinations into repeat application of the same test (table 1) and application of two different tests (table 2)

RESULTS After 81 combinations, the optimal test algorithm for diagnosing depression was repeat application of two simple screening questions (for example PHQ2). This achieved a sensitivity of 91.4% and a specificity of 98.8% and an overall accuracy (fraction correct) of 0.974. There was a 7.2% gain over a single application of this test. The least accurate algorithmic strategy was oncologists' clinical judgement (unaided) applied twice. Other methods and combinations achieved intermediate accuracy.

Table 1

DT alone						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.68374	Step One 80.76	80.2%	65.6%	35.4%	93.4%	
2x	Prev 0.19					
0.68374	Step One 78.67	80.2%	65.6%	35.4%	93.4%	
0.707616	Step Two 78.67	80.2%	65.6%	56.0%	85.8%	
0.830307	Combined	84.3%	88.2%	66.0%	91.3%	
Clinician alone						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.74179	Step One 80.76	28.9%	84.8%	30.8%	83.6%	
2x	Prev 0.19					
0.74179	Step One 78.67	28.9%	84.8%	30.8%	83.6%	
0.675587	Step Two 78.67	28.9%	84.8%	45.9%	72.8%	
0.807105	Combined	8.4%	97.7%	45.9%	82.0%	
MIDI						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.86678	Step One 80.76	83.6%	87.4%	60.9%	95.8%	
2x	Prev 0.19					
0.86678	Step One 78.67	83.6%	87.4%	60.9%	95.8%	
0.850662	Step Two 78.67	83.6%	87.4%	91.2%	77.4%	
0.920991	Combined	69.9%	98.4%	91.2%	93.3%	
HADS-D						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.78715	Step One 80.76	69.4%	80.9%	46.0%	91.9%	
2x	Prev 0.19					
0.78715	Step One 78.67	69.4%	80.9%	46.0%	91.9%	
0.750685	Step Two 78.67	69.4%	80.9%	75.6%	75.6%	
0.871981	Combined	48.2%	96.4%	75.6%	88.8%	
EPDS						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.79222	Step One 80.76	66.1%	82.3%	46.7%	91.2%	
2x	Prev 0.19					
0.79222	Step One 78.67	66.1%	82.3%	46.7%	91.2%	
0.747356	Step Two 78.67	66.1%	82.3%	76.6%	73.5%	
0.867639	Combined	43.7%	96.9%	76.6%	88.0%	
Single Q alone						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.84338	Step One 80.76	68.3%	88.1%	57.4%	92.2%	
2x	Prev 0.19					
0.84338	Step One 78.67	68.3%	88.1%	57.4%	92.2%	
0.707388	Step Two 78.67	68.3%	88.1%	88.5%	87.4%	
0.887103	Combined	46.0%	98.6%	88.5%	88.7%	
Two QO						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.90173	Step One 80.76	95.6%	88.9%	66.9%	98.9%	
2x	Prev 0.19					
0.90173	Step One 78.67	95.6%	88.9%	66.9%	98.9%	
0.933816	Step Two 78.67	95.6%	88.9%	94.6%	90.9%	
0.973669	Combined	91.4%	98.8%	94.6%	98.0%	

Table 2

Single Q > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.84338	Step One 80.76	68.3%	88.1%	57.4%	92.2%	
2x	Prev 0.19					
0.84338	Step One 78.67	68.3%	88.1%	57.4%	92.2%	
0.527247	Step Two 78.67	28.9%	84.8%	71.9%	47.0%	
0.832852	Combined	19.7%	98.2%	71.9%	83.9%	
Two QO > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.90173	Step One 80.76	95.6%	88.9%	66.9%	98.9%	
2x	Prev 0.19					
0.90173	Step One 78.67	95.6%	88.9%	66.9%	98.9%	
0.676064	Step Two 78.67	28.9%	84.8%	79.3%	37.1%	
0.848828	Combined	27.6%	98.3%	79.3%	85.3%	
DT > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.68374	Step One 80.76	80.2%	65.6%	35.4%	93.4%	
2x	Prev 0.19					
0.68374	Step One 78.67	80.2%	65.6%	35.4%	93.4%	
0.650735	Step Two 78.67	28.9%	84.8%	51.0%	68.6%	
0.811688	Combined	23.2%	94.8%	51.0%	84.0%	
HADS-D > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.78715	Step One 80.76	69.4%	80.9%	46.0%	91.9%	
2x	Prev 0.19					
0.78715	Step One 78.67	69.4%	80.9%	46.0%	91.9%	
0.675587	Step Two 78.67	28.9%	84.8%	61.8%	58.3%	
0.824592	Combined	20.1%	97.1%	61.8%	83.8%	
BDI > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.86678	Step One 80.76	83.6%	87.4%	60.9%	95.8%	
2x	Prev 0.19					
0.86678	Step One 78.67	83.6%	87.4%	60.9%	95.8%	
0.807672	Step Two 78.67	83.6%	84.8%	74.7%	43.4%	
0.940392	Combined	24.2%	98.1%	74.7%	84.6%	
EPDS > Clinician						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.79222	Step One 80.76	66.1%	82.3%	46.7%	91.2%	
2x	Prev 0.19					
0.79222	Step One 78.67	66.1%	82.3%	46.7%	91.2%	
0.686977	Step Two 78.67	28.9%	84.8%	62.9%	57.7%	
0.824503	Combined	19.1%	97.3%	62.9%	83.7%	
DT > TwoQO						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.68374	Step One 80.76	80.2%	65.6%	35.4%	93.4%	
2x	Prev 0.19					
0.68374	Step One 78.67	80.2%	65.6%	35.4%	93.4%	
0.912887	Step Two 78.67	95.6%	88.9%	82.9%	97.4%	
0.924746	Combined	75.7%	96.2%	82.9%	94.6%	
Two QO > DT						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.90173	Step One 80.76	95.6%	88.9%	66.9%	98.9%	
2x	Prev 0.19					
0.90173	Step One 78.67	95.6%	88.9%	66.9%	98.9%	
0.786789	Step Two 78.67	80.2%	75.6%	86.9%	65.4%	
0.933737	Combined	76.7%	97.3%	86.9%	94.7%	
Two QO > BDI						
1x	Prev 0.19	SE	SP	PPV	NPV	
0.90173	Step One 80.76	95.6%	88.9%	66.9%	98.9%	
2x	Prev 0.19					
0.90173	Step One 78.67	95.6%	88.9%	66.9%	98.9%	
0.848828	Step Two 78.67	83.6%	87.4%	93.1%	72.5%	
0.950522	Combined	79.9%	98.6%	93.1%	95.4%	

CONCLUSIONS An algorithmic combination of two tests can have superior accuracy to one test applied alone. The optimal method so far studied appears to be a two question test, applied on two occasions. Clinician judgement alone, even after two consultations, is usually unsatisfactory.

LIMITATIONS Tables of accuracy assume that the sensitivity and specificity remain the same in two – step tests. Not all combinations have been tested in clinical practice, so results must be provisional

