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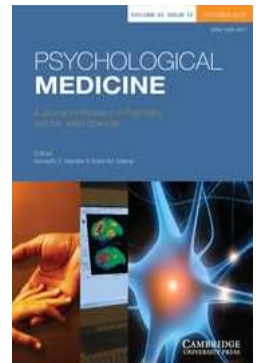
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Cost-effectiveness of combining systematic identification and treatment of co-morbid major depression for people with chronic diseases: the example of cancer

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Background. Co-morbid major depression occurs in approximately 10% of people suffering from a chronic medical condition such as cancer. Systematic integrated management that includes both identification and treatment has been advocated. However, we lack information on the cost-effectiveness of this combined approach, as published evaluations have focused solely on the systematic (collaborative care) treatment stage. We therefore aimed to use the best available evidence to estimate the cost-effectiveness of systematic integrated management (both identification and treatment) compared with usual practice, for patients attending specialist cancer clinics.

Method. We conducted a cost-effectiveness analysis using a decision analytic model structured to reflect both the identification and treatment processes. Evidence was taken from reviews of relevant clinical trials and from observational studies, together with data from a large depression screening service. Sensitivity and scenario analyses were undertaken to determine the effects of variations in depression incidence rates, time horizons and patient characteristics.

Results. Systematic integrated depression management generated more costs than usual practice, but also more quality-adjusted life years (QALYs). The incremental cost-effectiveness ratio (ICER) was £11765 per QALY. This finding was robust to tests of uncertainty and variation in key model parameters.

Conclusions. Systematic integrated management of co-morbid major depression in cancer patients is likely to be cost-effective at widely accepted threshold values and may be a better way of generating QALYs for cancer patients than some existing medical and surgical treatments. It could usefully be applied to other chronic medical conditions.

Introduction

A substantial proportion of patients with chronic medical conditions report depressive symptoms and approximately 10% meet criteria for a diagnosis of major depression (Moussavi *et al.* 2007). This co-morbid major depression severely impairs patients' quality of life, reduces their compliance with medical treatments and increases the costs of medical care (Katon & Ciechanowski, 2002).

The importance of co-morbid depression should make its effective management a priority; unfortunately, management is often inadequate in practice, with

shortcomings in both identification and treatment (Greenberg, 2004; Cepoiu *et al.* 2008; Mitchell *et al.* 2009; Coventry *et al.* 2011; Fann *et al.* 2012). Depression is frequently unidentified in the medical consultation because the relevant symptoms are normalized or are simply not discussed, in part because patient and clinician focus on the management of the medical condition (Cape & McCulloch, 1999; Nutting *et al.* 2000). When identified, depression is often inadequately treated with insufficient patient education, failure to prescribe minimally effective doses of antidepressant drugs, inadequate provision of psychological treatment and failure to monitor outcomes and adjust treatment accordingly (Fann *et al.* 2012).

New approaches have been developed to address these shortcomings in care. Systematic identification of cases by screening medical clinics is an important

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first step (NICE, 2009b; U.S. Preventive Services Task Force, 2009). However, it is ineffective in improving patient outcomes if used alone (Gilbody et al. 2001, 2006). Case identification therefore needs to be linked with systematic treatment integrated with medical care that typically includes: a multi-disciplinary approach, a structured management plan, a proactive approach to patient follow-up and enhanced interprofessional communication (Gunn et al. 2006). This approach has been called 'collaborative care' (Katon, 2012).

Although the systematic treatment for cases identified by screening has been found to be cost-effective for depression co-morbid with some chronic medical conditions, including cancer, heart disease and diabetes, the cost-effectiveness evaluations have not adequately addressed the cost-effectiveness of the screening component. Hence we lack data on the cost-effectiveness of systematic depression management comprising both systematic identification and treatment.

Two of the authors of this paper (J.W. and M.S.) have developed a systematic approach to the identification and treatment of major depression for cancer outpatients that combines systematic case identification by a two-stage screening system in cancer clinics with a systematic collaborative care type treatment integrated with cancer care, known as 'Depression Care for People with Cancer' (DCPC; Walker & Sharpe, 2009). The treatment was evaluated in the Symptom Management Research Trials in Oncology-1 (SMaRT Oncology-1) and found to be effective (Strong et al. 2008). However, as with other similar studies, the cost-effectiveness of the whole depression management system, including both systematic screening and systematic treatment, has not been determined.

In the current study we aimed to achieve the best estimate of the cost-effectiveness of systematic integrated depression management, including both systematic case identification and systematic treatment, when compared with usual practice for patients with major depression attending specialist cancer services by using multiple sources of data to supplement the data from SMaRT Oncology-1.

Method

Design

We conducted a cost-effectiveness analysis, using a decision analytic model and taking the perspective of a budget-constrained health-care system, to compare systematic depression identification and treatment (as an addition to usual practice) with usual practice alone. We focused on major depression because this denotes a severity and persistence of depressive symptoms that is generally considered to require treatment.

We used data from our screening system, individual patient data from our clinical trial of DCPC and data from other published reports (Table 1 contains a full list of data sources). Outcomes were quality-adjusted life years (QALYs) achieved and costs incurred to the health-care system.

Population

Our study sample comprised adult patients diagnosed with cancer (any type) attending specialist cancer outpatient services at any stage of treatment or follow-up, with an estimated life expectancy of ⩾1 year. The analysis was limited to adult patients with relatively good cancer prognosis because we considered that younger patients and those near the end of life require different types of treatment for depression.

Depression identification and treatment (Fig. 1)

Usual practice

(1) Identification of major depression by the patient's primary care physician (PCP) using their clinical skills (assisted by a standardized screening questionnaire if necessary).
(2) Treatment of depression based on the PCP's clinical judgement; any combination of 'watchful waiting', prescription of antidepressant medication and referral for psychological treatment.

Systematic identification and treatment

(1) Identification of major depression using a two-stage screening system in specialist cancer clinics. In stage 1, screening staff assist patients to complete the Hospital Anxiety and Depression Scale (HADS) while waiting for their clinic appointment (Zigmond & Snaith, 1983). In stage 2, patients whose total HADS score is ⩾15 are telephoned at home, soon after their clinic appointment, and a brief diagnostic interview for major depression is administered (First et al. 1996). (A HADS total score of ⩾15 has been found to be optimal for identifying cancer patients at risk of major depression; Walker et al. 2007.) At the end of the call, patients with major depression are advised to see their PCP or oncology clinician, both of whom receive a report from the screening service informing them of the diagnosis of major depression.
(2) Treatment of major depression using DCPC (Walker & Sharpe, 2009). We have described DCPC in detail elsewhere (Walker & Sharpe, 2009). In summary, DCPC is a multicomponent, systematic, team-delivered treatment programme integrated

Table 1. *Parameter estimates used in the model*

Parameter	Mean value	Distribution for PSA	Source
Epidemiology of depression in cancer patients			
Prevalence of major depression	0.078	Beta	Sharpe *et al.* 2004
Incidence of major depression	0.021	Fixed	NICE, 2009*a*
HRQoL scores [anchored on 0 (dead) and 1 (good health)]			
Not depressed	0.86	Beta	Revicki & Wood, 1998
Depressed (identified or unidentified, initial or relapse)	0.447	Beta	Strong *et al.* 2008
Remission	0.685	Beta	Strong *et al.* 2008
Usual care: identification			
Sensitivity of PCP interview	0.501	Fixed	Mitchell *et al.* 2009
Specificity of PCP interview	0.813	Fixed	Mitchell *et al.* 2009
Cost of PCP interview (one consultation) (£)	36	Fixed	Curtis, 2011
Usual care: treatment			
Monthly probability of remission	0.1305	Beta	Strong *et al.* 2008
Monthly probability of relapse during treatment	0.0246	Beta	Strong *et al.* 2008
Monthly probability of relapse when treatment complete	0.0776	Beta	Geddes *et al.* 2003; Strong *et al.* 2008
Monthly cost of PCP treatment (£)	28.71	Gamma	Strong *et al.* 2008
Systematic management: identification			
Sensitivity of HADS cut-off 15	0.8667	Beta	Walker *et al.* 2007
Specificity of HADS cut-off 15	0.852	Beta	Walker *et al.* 2007
Probability of completing HADS	0.896	Beta	SMS data
Cost of HADS (5 min SMS assistant time) (£)	2	Fixed	SMS data; Curtis, 2011
Probability of completing structured diagnostic interview for depression	0.851	Beta	SMS data
Cost of structured diagnostic interview for depression (15 min SMS assistant time for depressed patients, 5 min for patients without depression)+6 min psychiatrist supervision time per interview (£)	10.35	Fixed	SMS data; Curtis, 2011
Systematic management: treatment			
Monthly probability of remission	0.1879	Beta	Strong *et al.* 2008
Monthly probability of relapse during treatment	0.0246	Beta	Strong *et al.* 2008
Monthly probability of relapse when treatment complete	0.0776	Beta	Geddes *et al.* 2003; Strong *et al.* 2008
Initial cost of DCPC treatment (£)	261.65	Gamma	Strong *et al.* 2008
Monthly cost of DCPC treatment (£)	40.91	Gamma	Strong *et al.* 2008
No treatment (unidentified depression)			
Monthly probability of remission	0.1020	Beta	Strong *et al.* 2008; Arroll *et al.* 2009
Monthly probability of relapse	0.0776	Beta	Geddes *et al.* 2003; Strong *et al.* 2008
Monthly cost (£)	20.35	Gamma	Strong *et al.* 2008

PSA, Probabilistic sensitivity analysis; HRQoL health-related quality of life; PCP, primary care physician; HADS, Hospital Anxiety and Depression Scale; SMS, Symptom Monitoring Service; DCPC, Depression Care for People with Cancer.

with the patient's cancer care. The treatment team comprises specially trained cancer nurses, consultation-liaison psychiatrists and the patient's PCP. The nurses provide education about depression and its treatment, deliver brief evidence-based psychological interventions (problem-solving therapy, behavioural activation) and monitor the patient's progress using the Patient Health Questionnaire nine-item depression scale (PHQ-9; Kroenke *et al.* 2001; Hopko *et al.* 2003; Mynor-Wallis, 2005). The psychiatrists supervise treatment with the aim of achieving and maintaining treatment targets, advise PCPs about prescribing antidepressant medication and provide direct consultations to
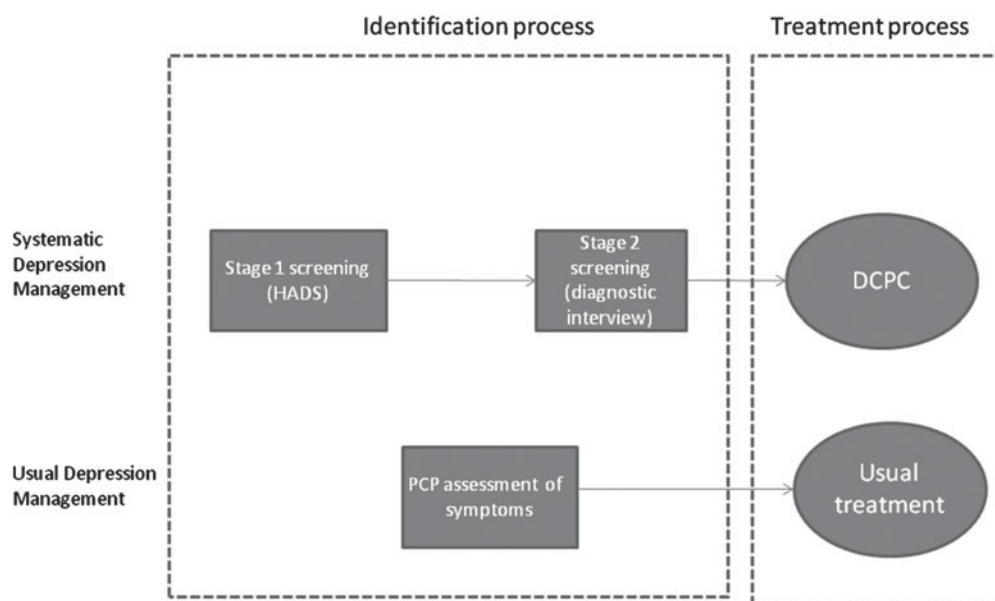
Fig. 1. Components of depression management. HADS, Hospital Anxiety and Depression Scale; DCPC, Depression Care for People with Cancer; PCP, primary care physician.

patients who are not progressing. The initial treatment phase comprises a maximum of 10 sessions with the nurse, given over 4 months. The patient's PHQ-9 scores are then monitored monthly by telephone and additional sessions are provided for patients who do not meet the treatment targets.

Costs and outcomes

Costs, from the perspective of the UK National Health Service (NHS) and Personal Social Services (PSS), were expressed in pounds sterling at 2010 prices. Outcomes were measured in QALYs, a generic measure that combines any effect of interventions on both life expectancy and health-related quality of life (HRQoL; Drummond *et al.* 2005). QALYs are the most widely used generic measure of outcome in health care.

Model structure

We constructed a model consisting of two linked parts: the first represented the process of identification of depressed patients from the cancer population; and the second captured patient outcomes and costs over a time horizon of 5 years including the effects of depression treatments. The model structure was based on reviews of other models in the literature and discussions with clinicians (Valenstein *et al.* 2001; Sobocki *et al.* 2006; Paulden *et al.* 2009; NCCMH, 2010). These models are shown in online Supplementary Figs S1 and S2.

In the first part of the model, patients entered the identification processes as either 'depressed' or 'not

depressed'. They emerged from these in one of three states: 'depressed-identified', 'depressed-not identified' and 'not depressed'. The proportion of patients in each of these states was dependent on the prevalence of depression in people with cancer and on the performance and uptake of the identification systems.

Patients then entered the second part of the model in one of these three states. They could remain in these states or move to other states, each of which had an associated HRQoL score and cost. For example, depressed patients could remain depressed or move into remission. The probabilities of making transitions between states differed by treatment, reflecting differential effectiveness. It was assumed that patients with unidentified depression did not receive any treatment. Patients incorrectly diagnosed with depression, which was assumed to only be possible through identification within usual practice because the diagnostic interview used in the second stage of systematic screening was a 'gold standard' instrument and therefore assumed to have 100% specificity (i.e. no false positives), were included in the 'not depressed' state but were assumed to receive treatment and therefore incur costs but derive no benefits.

Data sources

Identification

We obtained parameter estimates for identification of depression from the screening system and from published literature. Table 1 contains a list of data sources and parameter estimates. We estimated the

number of PCP consultations using published UK data, which indicated that patients with chronic medical conditions attended an average of nine PCP appointments per year (Department of Health, 2011*b*). We assumed that the PCP assessed patients for depression at each visit; the sensitivity and specificity of this assessment in diagnosing major depression was estimated from a meta-analysis (Mitchell *et al.* 2009). We assumed that the resource use involved in making a diagnosis of depression in usual practice was 2 min of a PCP's time to ask initial screening questions, plus a whole appointment (12-min duration) for the further assessment of those identified as having probable depression (Curtis, 2011). This assumption was based on clinical advice. The sensitivity and specificity of the HADS, used in the first stage of the screening system to identify patients at risk of major depression, was estimated from published data (Walker *et al.* 2007). We obtained data from the screening system to estimate the proportion of patients who complete each stage of screening and the associated costs based on resource use data. Estimates of the incidence and prevalence of major depression in people with cancer were taken from the published literature (NICE, 2009*a*; Sharpe *et al.* 2004).

Treatment

We derived parameter estimates (probabilities of remission and relapse, costs and HRQoL) of outcomes for depression treatment (in usual practice and DCPC) from an efficacy trial, SMaRT Oncology-1, that compared the outcomes of patients allocated to DCPC with those allocated to usual depression treatment (with the PCP informed of the major depression diagnosis) up to 12 months (Strong *et al.* 2008). We supplemented the trial data with data from published literature (where possible, estimates were taken from systematic reviews and meta-analyses). Treatment costs included all PCP and cancer clinic visits along with in-patient stays and out-patient appointments (medical and psychiatric). Costs were based on resource use measured in SMaRT Oncology-1 and valued using national unit costs (BMA/RPS, 2010; Curtis, 2011; Department of Health, 2011*a*). Where appropriate, unit costs included estimates for overheads and indirect time, such as training and administration. The costs of specific anti-cancer treatments (e.g. radiotherapy and chemotherapy) were excluded as we assumed these would be unchanged by depression management. The probability of relapse was assumed to be the same regardless of which treatment was received, based on SMaRT Oncology-1 data (Strong *et al.* 2008). Estimates of mortality rates were obtained from UK gender- and age-specific cancer survival rates (Walters *et al.* 2010).

Patients with unidentified depression were assumed not to have received treatment. The outcomes for these patients were estimated by combining the outcomes observed in the 'usual care' arm of SMaRT Oncology-1 with a meta-analysis that compared depression outcomes for those receiving antidepressant drug treatment with those receiving no treatment (Strong *et al.* 2008; Arroll *et al.* 2009). We estimated the costs associated with no treatment from the healthcare resource use recorded in the 'usual care' arm of SMaRT Oncology-1, minus depression-specific treatment costs (Strong *et al.* 2008).

Analysis

Base-case analysis

Although patients attend cancer clinics at varying intervals, it was assumed that they were formally screened for depression in the clinic only once a year. This assumption was based on expert advice of the logistical arrangements and the acceptability of screening. We used a time horizon of 5 years, chosen because this is the usual time after which patients successfully treated would be considered 'cured' and would no longer be followed up by cancer services (Parkin *et al.* 2001). The base case considered the case of a 63-year-old woman, reflecting the mean age of patients attending the depression screening service.

Sensitivity and scenario analysis

To reflect uncertainty in the inputs to the model, we conducted probabilistic sensitivity analysis, where distributions are placed on uncertain parameters. This analysis generates the probability of the alternative options being cost-effective for a given cost-effectiveness threshold. To reflect uncertainty in modelling assumptions, we also considered other scenarios including alternative assumptions about the sex and age of the patients, the time horizon and the sensitivity and specificity of PCP assessments. The estimate of the incidence of depression was based on the general population and can be considered to be conservative, as depression incidence would be reasonably expected to be higher in cancer patients; we therefore increased the incidence as a scenario analysis. As our estimate of treatment effectiveness was based on data from a single trial, we also explored the effect of using an alternative estimate of effectiveness derived from a meta-analysis of systematic treatment interventions for depression in primary care (Archer *et al.* 2012).

Economic analysis

We discounted both costs and outcomes at 3.5% per annum in accordance with current UK guidance from

Table 2. *Results*

	Costs (£)	QALYs	ICER (£ per QALY)	Probability that intervention is cost-effective at £20 000 per QALY threshold	Probability that intervention is cost-effective at £30 000 per QALY threshold
Base-case analysis (63-year-old woman, 5-year time horizon)					
Usual depression management	365.27	3.085 325 939		0.002	0
Systematic depression management	463.61	3.093 685 167	11 765.40	0.998	1
Scenario analyses					
Sex (63-year-old man, 5-year time horizon)					
Usual depression management	345.56	3.049 050 31		0	0
Systematic depression management	455.58	3.057 249 932	13 417.98	1	1
Age (50-year-old woman, 5-year time horizon)					
Usual depression management	383.78	3.213 711 974		0.001	0
Systematic depression management	483.53	3.222 384 569	11 501.80	0.999	1
Age (70-year-old woman, 5-year time horizon)					
Usual depression management	331.32	2.646 375 575		0.007	0
Systematic depression management	408.48	2.652 918 322	11 794.33	0.993	1
Depression incidence (63-year-old woman, 5-year time horizon, depression incidence doubled)					
Usual depression management	415.69	3.052 309 702		0.002	0
Systematic depression management	535.98	3.062 975 677	11 277.82	0.998	1
Time horizon (63-year-old woman, 10-year time horizon)					
Usual depression management	576.93	4.515 698 765		0.001	0
Systematic depression management	732.32	4.528 187 23	12 442.67	0.999	1
Time horizon (63-year-old woman, 20-year time horizon)					
Usual depression management	755.46	5.076 232 082		0.001	0
Systematic depression management	906.54	5.093 261 838	8871.31	0.999	1
Treatment effectiveness (63-year-old woman, 5-year time horizon, treatment effectiveness estimate from meta-analysis of primary care collaborative care trials)					
Usual depression management	424.10	2.987 777 361		0.001	0
Systematic depression management	556.32	3.000 314 444	10 546.20	0.999	1

QALY, Quality-adjusted life year; ICER, incremental cost-effectiveness ratio.

the National Institute for Health and Care Excellence (NICE, 2008). Standard decision rules were used to identify the most cost-effective interventions in each analysis. Specifically, we calculated incremental cost-effectiveness ratios (ICERs), which express the additional cost per QALY gained from an intervention compared to the next most effective. We then applied the current range of the UK NICE cost-effectiveness threshold (£20 000–£30 000 per QALY) and defined the cost-effective intervention as the most effective option with an ICER below this threshold (NICE, 2008).

Results

Tables 1 and 2 show the key parameters and the results of modelling. In the base-case analysis, the addition of systematic depression identification and treatment generated more QALYs than usual practice alone (3.094 *v.* 3.085) but at an additional cost (£464 *v.* £365). This resulted in an ICER of £11 765 per QALY gained. The probability of systematic depression management being cost-effective at a threshold of £20 000 per QALY was more than 99%.

The results were consistent across sex and age; the ICER for a 63-year-old man was £13 418 per QALY gained whereas the ICERs for a 50-year-old woman and a 70-year-old woman were £11 502 and £11 794 per QALY gained respectively.

Varying the estimated incidence of major depression had little effect on cost-effectiveness; doubling the incidence to 4.2% only slightly reduced the ICER to £11 278 per QALY gained.

Changing the time horizon from 5 to 10 and 20 years, by which time the majority of patients would be expected to have died, resulted in ICERs of £12 443 and £8871 per QALY respectively. The probability of systematic management being cost-effective remained in excess of 99%, regardless of the time horizon considered.

In the scenario analysis we considered what the sensitivity and specificity of usual depression identification by PCPs would have to be for the addition

of systematic identification not to be cost-effective. We found that even if the estimated sensitivity and specificity of usual identification were increased to an improbable 100%, usual practice was still not cost-effective at commonly accepted thresholds. In this scenario all patients with depression will be identified in both arms and the result shows that DCPC is more effective and cost-effective than usual depression treatment.

Using the estimate of treatment effectiveness from other trials of collaborative care treatment of depression in primary care did not significantly change the results and generated an ICER of £10 546 per QALY.

Discussion

We found that a combined systematic approach to the identification and treatment of co-morbid major depression that is integrated with cancer care is likely to be cost-effective, when compared with usual practice. This finding was robust to variation in key parameters.

As far as we are aware, the analysis presented here is the first to adequately address the cost-effectiveness of a depression management system combining integrated case identification and treatment for major depression co-morbid with a medical condition. Few previous studies of the systematic identification of co-morbid depression have used methods appropriate to inform resource allocation decisions (Pignone *et al.* 2002). Those that have used QALYs suggest that systematic screening for depression, without systematic treatment, is not cost-effective (Paulden *et al.* 2009; Valenstein *et al.* 2001).

Previous evaluations of the cost-effectiveness of systematic treatment of co-morbid depression have reported improved outcomes with increased costs in cancer patients and patients with other chronic conditions (Strong *et al.* 2008; NICE, 2009*b*), and improved outcomes with reduced overall costs for depression co-morbid with several other medical conditions (Simon *et al.* 2007; Katon *et al.* 2012; Ladapo *et al.* 2012). One of these studies also included a simple estimate of screening costs (Simon *et al.* 2007). The results of our study show that a more systematic and structured approach to identification should be more explicitly considered in future evaluations and service developments.

This study has both strengths and limitations. Its strengths are: the use of estimates based on the best available data from clinical trials, other published data and real clinical services; the use of conservative assumptions (that is, in favour of usual practice); and the use of sensitivity analyses to address areas of uncertainty. There are some limitations: first, the

estimate of sensitivity and specificity of depression identification by PCPs was taken from a systematic review that included studies from several countries. However, when the sensitivity and specificity parameters for usual practice were increased to 100% in a scenario analysis, systematic depression management was still cost-effective. Second, there is little evidence to inform our estimate of the incidence of depression in cancer patients; we therefore used the general population incidence rate of 2.1% (NICE, 2009*a*). As the incidence in cancer patients is likely to be higher than this, we also determined the effect of a rate twice that of the general population and found that it enhanced, rather than lessened, the case for systematic management. Third, our analysis was simplistic in assuming that screening is simply conducted annually; it did not consider when screening should best be conducted in relation to clinical events such as diagnosis and relapse and more work is needed to assess the best times to screen individuals for depression. Fourth, estimates of the relative effectiveness of usual and systematic treatment of major depression were taken from a clinical trial that may not necessarily generalize to routine care. The outcome of depression with usual treatment taken from the trial may be superior to that achieved in practice because patients in the trial were told of their diagnosis of depression and encouraged to see their doctors for treatment. However, if that was the case it would only make our estimates of the relative effectiveness of DCPC more conservative. Fifth, not all parameters in the model were estimated from exhaustive systematic reviews. However, those parameters to which cost-effectiveness is particularly sensitive were either identified using such methods, or subject to extensive scenario analysis. Sixth, the analysis only applies to patients attending specialized cancer clinics. We acknowledge that some people with cancer will not attend such clinics and the results may not apply to non-ambulant populations. Finally, the model assumes that depression does not have an effect on mortality. There is some evidence that depression may influence life expectancy in cancer patients, possibly by influencing adherence to cancer treatment (Katon & Ciechanowski, 2002; Pinquart & Duberstein, 2010). However, our assumption of no effect is conservative with respect to the cost-effectiveness of systematic management and relaxing it would be unlikely to change our conclusions.

We have studied depression management in adult patients with good prognosis cancers attending specialist cancer out-patient clinics. The findings may generalize to younger cancer patients and also to those near the end of their life. Similarly, this may have important implications for the management

of depression co-morbid with other chronic medical conditions in which systematic collaborative care treatment has already been found to be both effective and cost-effective (Simon *et al.* 2007; Katon *et al.* 2012; Ladapo *et al.* 2012). However, in both cases further research is needed to determine if this is the case. Although randomized controlled trials of the whole process of systematic identification and treatment would be informative, the cost and difficulty of organizing such trials may be prohibitive. Research, therefore, may most suitably take the form of clinical trials to inform the effectiveness and cost-effectiveness of systematic treatment for co-morbid depression, and other types of study design to generate evidence on the systematic identification component (e.g. diagnostic accuracy studies to generate evidence on sensitivity and specificity and costs of identification processes). These data could then be combined by modelling so as to fully consider the effectiveness and cost-effectiveness of a systematic approach to the management of co-morbid depression.

Conclusions

Health systems should consider the implications of our findings when deciding on the balance of services they commission for cancer patients. Although there is an inevitable focus on surgical, radiological and pharmaceutical interventions to improve cancer prognosis, the cost of generating health improvement through a systematic approach to both identifying and treating patients with co-morbid major depression is likely to be appreciably lower than that associated with some of these treatments. We have studied depression management in patients with cancer. It is reasonable to hypothesize that our findings may apply to other chronic medical conditions, although further research is required to test this.

The most cost-effective precise specification of the systematic management system may depend on local circumstances. Some of the parameters could be varied, including frequency of screening and the number and content of treatment sessions.

We conclude that combining the systematic identification of major depression with systematic integrated collaborative care treatment is cost-effective. The combined uncertainty in the available evidence results in a very small probability that this conclusion is not valid at the cost-effectiveness thresholds used by NICE. More work is required to determine the optimal specifications of this service, including the frequency of screening, choice of screening instrument and cut-off score, the intensity and duration of depression treatment and the extent to which this approach is also cost-

effective for patients with major depression co-morbid with other chronic diseases.

Supplementary material

For supplementary material accompanying this paper visit http://dx.doi.org/10.1017/S0033291713002079.

Declaration of Interest

None.

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