

# Decision Making in a Multidisciplinary Cancer Team: Does Team Discussion Result in Better Quality Decisions?

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To establish whether treatment recommendations made by clinicians concur with the best outcomes predicted from their prognostic estimates and whether team discussion improves the quality or outcome of their decision making, the authors studied real-time decision making by a lung cancer team. Clinicians completed pre- and postdiscussion questionnaires for 50 newly diagnosed patients. For each patient/doctor pairing, a decision model determined the expected patient outcomes from the clinician's prognostic estimates. The difference between the expected utility of the recommended treatment and the maximum utility derived from the clinician's predictions of the outcomes (the net utility loss) following all potential treatment modalities was calculated as an indicator of quality of the decision. The proportion of treat-

ment decisions changed by the multidisciplinary team discussion was also calculated. Insofar as the change in net utility loss brought about by multidisciplinary team discussion was not significantly different from zero, team discussion did not improve the quality of decision making overall. However, given the modest power of the study, these findings must be interpreted with caution. In only 23 of 87 instances (26%) in which an individual specialist's initial treatment preference differed from the final group judgment did the specialist finally concur with the group treatment choice after discussion. This study does not support the theory that team discussion improves decision making by closing a knowledge gap. **Key words:** decision making; multidisciplinary; team; cancer. (*Med Deci Making* 2004;24:602-613)

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**T**eam decision making in health care has been encouraged for several decades in both Europe and the United States. Although for some the benefits may be self-evident, the success of teams can vary. The *Challenger* disaster tragically underlined how decision making in teams is prone to significant biases that can derail its effectiveness.<sup>1</sup> Until now, group decision-making research has had a stronger tradition in psychology<sup>2</sup> rather than in applied health care settings. However, with the increasing complexity and multi-

modality of many treatments, in particular cancer treatments, the need for this type of research in clinical settings is becoming more evident.

In the United Kingdom in 1995, a report by the chief medical officer established a clear strategic direction for improving cancer services in England and Wales.<sup>3</sup> For lung cancer, it provided a broader framework than the earlier Standing Medical Advisory Committee Report<sup>4</sup> and was followed up by a succession of evidence-based reviews and guidelines on best practice from government working groups and professional bodies.<sup>5-7</sup> In one such report from the Clinical Outcomes Group,<sup>7</sup> much of the reviewed evidence was drawn from observational and epidemiological studies and, with the exception of palliative care, the evidence for the effectiveness of multi-professional teams was rated as weak. Nevertheless, a recurrent theme of policy has been the promotion of multidisciplinary team-based decision making.

More recent evidence, also from observational studies, has highlighted the wide variation in active treatment rates for lung cancer between and within districts<sup>8</sup> and the apparently better short-term survival among patients managed by specialists.<sup>9</sup> Although nei-

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ther of these studies addressed the process of decision making per se, it appears reasonable to presume that when a multidisciplinary team meets to discuss patient care, variations between team members in their treatment preferences will be “ironed out” and, with a pooling of knowledge and expertise, a higher quality of decision making will result.

Although the issue of consensus and how it is achieved has been considered more thoroughly in the creation of clinical guidelines,<sup>10</sup> few studies have compared expert judgments with more formal appraisal using decision analysis techniques.<sup>11–14</sup> The latter requires the experts to be explicit about their prognostication for individual patients in terms of both morbidity and survival. However, physicians often have difficulty with this activity, as demonstrated by Muers and others, who elicited prognostic estimates on a series of lung cancer patients from 2 clinical oncologists and 4 respiratory physicians.<sup>15</sup> The clinicians generally overestimated survival but were more successful in identifying patients with a poor prognosis than those with a moderate or good prognosis. Nevertheless, there are theoretical advantages to using a quantitative approach to appraise the quality of decision making by members of a team.

The contribution of a multidisciplinary team case conference may be judged by whether the “quality” of individual clinicians’ judgments improves after discussion. The quality of their judgments could be assessed in several (arbitrary) ways. One approach would be to compare the expected utility of the clinician’s preferred treatment choice (derived using his or her case-specific predictions of morbidity and mortality with that treatment) with the best expected utility from all potential treatment options. For example, the clinician may have opted for chemotherapy for a particular case, whereas his morbidity and mortality predictions would have suggested that surgery might have yielded a better outcome. In such a case, there would be a net utility loss arising from his initial “global” preference. If the case conference narrowed this gap, then it might be judged to have improved the quality of the decision.

However, Poses reminds us that both the process dimension (as above) and outcome dimensions of decision-making quality are important,<sup>16</sup> and so a further measure of the quality of the multidisciplinary team process may be rather more straightforwardly derived according to the number of occasions on which the individually expressed treatment preferences of the participating doctors accord with the final group decision. This is important because, despite best intentions, individual team members find it difficult to attend every case conference, and the decisions they make on behalf

of their patients during the period of nonattendance will on those occasions lack the anchors provided by the group judgment.

In the context of a multidisciplinary lung cancer team, the present study addresses 2 main questions:

1. Do treatment recommendations made by clinicians concur with the best outcomes predicted from their prognostic estimates, and, thereby, does multidisciplinary team discussion improve the quality of decision making?
2. How frequently do the judgments (about treatment preferences) of individual specialists change after team discussion to reflect the final group decision?

## METHOD

The authors obtained the agreement of the Northern Ireland Regional Lung Cancer Team at the Belfast City Hospital to study, in real time, decision making on cases that were scheduled for discussion at a weekly multidisciplinary team meeting. The meeting was usually attended by a number of the respiratory physicians working in the greater Belfast area, specialist oncologists, thoracic surgeons, and radiologists. To study the impact of multidisciplinary team discussion, participants’ views on each study case were elicited before and after the discussion of clinical findings and treatment options. Fifty cases were recruited as a convenience sample between December 1999 and January 2003. The cases reflected the referral practices of the respiratory physicians and were selected according to the availability of pathology and radiology reports.

A research nurse (R. L.) abstracted the relevant clinical details and transcribed them onto a proforma (Appendix A) that was circulated to team members 24 h before the meeting. The views of the participating doctors were sought with an accompanying questionnaire (Appendix B) that they completed before case discussion at the meeting. Both this questionnaire and the patient proforma (which summarized the salient findings) were tested and modified in an early pilot study. Individuals were asked to estimate the patient’s chances of survival with and without treatment at 30 days, 6 months, and 1 year as well as the chances of the patient experiencing morbidity at least as severe as World Health Organization (WHO) performance status 3 (limited or no self-care and confined to bed or chair more than 50% of the time) at each of these time points. Each team member was asked to rate the appropriateness of each treatment option (surgery, radiotherapy, chemotherapy, combination therapy, or supportive care only) on a standard scale of 1 to 9 as used in other studies.<sup>11</sup> Nine respiratory physicians, 3 oncologists, and 3

thoracic surgeons participated in the study, with each specialty represented at each meeting.

Because of time pressures, only 1 case could be studied at each meeting. The responsible clinician presented the patient details at the meeting, and all participants were allowed the opportunity to view the radiological films before any group discussion. At that point, they were offered the opportunity to change any of their initial questionnaire responses. The consultants specifically did not share their questionnaire responses as a basis for discussion, the latter proceeding as normal unguided by the researchers. Following case discussion, participants individually completed an identical questionnaire eliciting their views on prognosis and treatment. In addition, for comparison, the treatment path down which the patient ultimately proceeded (the product of the group discussion) was also recorded.

The study was approved by the Queen's University of Belfast Research Ethics Committee.

### Statistical Methods

Basic descriptive statistics were calculated for the prognostic estimates and appropriateness ratings made on the 50 cases. Differences in prognostic predictions before and after multidisciplinary team discussion were tested using the Wilcoxon Signed Rank Test.

A decision analytic model was created to represent the treatment options for each patient with lung cancer (example shown in Figure 1). For each patient-doctor pairing, the expected utility (EU) of each treatment option was calculated using the 6-month survival and morbidity prognostic estimates made by the clinician. A figure of 0.8 (estimated from the literature) was used for the patient's utility of being alive with good performance status at 6 months, whereas a utility of 0.4 was applied for a WHO performance status of 3 or worse. The difference in the expected utility between the treatment with the highest calculated expected utility (model choice) and the treatment assigned the highest appropriateness score by the clinician (global preference) was calculated as the net utility loss, that is,

$$\text{net utility loss} = \text{EU of model choice} - \text{EU of global preference.}$$

A higher net utility loss would suggest that the outcome for the patient may be better if he or she underwent the treatment indicated by the model rather than the one initially preferred by the clinician.

For each doctor, the difference in the mean net utility loss (mean net utility loss after multidisciplinary

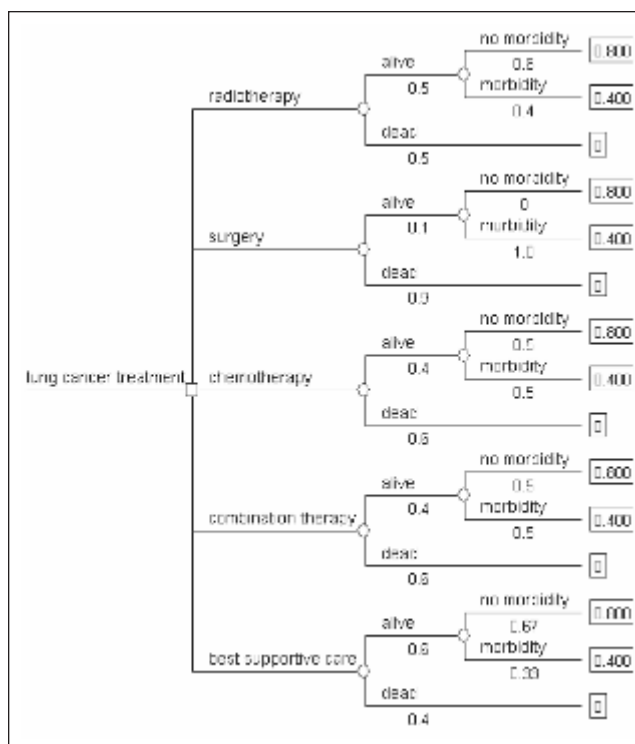


Figure 1 Sample decision tree for lung cancer treatment based on survival and morbidity predictions at 6 months.

team discussion minus mean net utility loss before the team discussion) and its standard error was calculated. A negative value would indicate that the mean net utility loss was lower after the meeting, suggesting that that individual doctor showed improved quality of decision making following discussion of cases with the multidisciplinary team. These results, across all doctors, were combined using a random effects model as described by Laird and Mosteller.<sup>17(p19)</sup> This analysis provided an estimate (and its standard error) of the mean of the population of such differences, with the doctors in the study being regarded as a random sample.

To describe how frequently the team discussion changed the individual clinician's judgments, the final group judgment (the treatment path down which the patient was ultimately directed) has been compared with the individual doctor's expressed treatment preferences before and after team discussion.

### RESULTS

The clinical and demographic details of the sample are given in Table 1. For some cases, doctors differed in their survival predictions (probability of surviving 6 months) by up to 7-fold, and the range across doctors

**Table 1** Demographic and Clinical Details of the Sample

	<i>n</i>	%
Age (years)		
Mean	68.2	
Median	70	
Range	46–83	
Gender		
Male	19	38
Female	31	62
World Health Organization performance status		
0	5	10
1	31	62
2	12	24
3	2	4
Stage		
I	6	12
II	2	4
III	10	20
IV	3	6
Extensive	4	8
Limited	4	8
Unknown <sup>a</sup>	21	42

a. Results of the computed tomography scan were not always reported prior to the multidisciplinary team meeting to allow staging to be included on the proforma. However, all films were viewed and commented on by a radiologist at the meeting, prior to completion of the prediscussion questionnaire.

was even greater for morbidity predictions. However, there were no significant differences between mean predictions before and after multidisciplinary team discussion (survival:  $P = 0.236$ ; morbidity:  $P = 0.916$ ).

Table 2 shows the mean net utility loss calculated for each doctor before and after the multidisciplinary case discussion. Of the 11 doctors included in the analysis, the mean net utility loss decreased (modestly) after case discussion for 5 doctors. However, combining the doctors' results, the mean of such differences is estimated to be  $-0.00087$  ( $s_{\bar{x}} = 0.00204$ ) with 95% confidence limits of  $-0.00487$  to  $0.00313$  (i.e., on the basis of the available evidence, there are no grounds for rejecting the null hypothesis of zero mean difference).

Table 3 summarizes the occasions on which treatment choices of individual clinicians and the group agreed and when they differed. In 87 instances of the 221 patient-doctor pairs (39%), the initial treatment recommendation offered by the individual clinician before multidisciplinary team discussion was different from the final group decision. In 50 of these cases, the team discussion did not change the mind of the clinician about his or her preferred treatment. In 23 of the

remaining 37 cases (62%), the clinician subsequently concurred with the team choice of treatment.

## DISCUSSION

The purposes of this study were to investigate how well clinicians' appropriateness ratings of specific treatments for lung cancer concurred with the outcomes that could be derived from decision models that incorporated their own prognostic estimates and to determine whether multidisciplinary team discussion improves the quality and outcome of decision making. The results showed that for all doctors, the perceived optimum patient outcomes may not always be achieved when the treatment decisions are based on the global treatment preference of the clinician, rather than if a decision-analytic model approach had been taken. The effect of team discussion on the quality of the doctors' decisions (as judged by the combined estimate of the mean difference in utility of the global treatment preference and the treatment that would have had a maximum expected utility) was not significant. Furthermore, in 50 of 87 cases in which the initial treatment preference of individual doctors was different from the group-determined management, the multidisciplinary team discussion failed to change their mind about the preferred modality of treatment. In those cases in which they did change their mind, they reverted to the group-determined choice in only 23 of 37 cases (62%). However, one important issue in considering the results of this study is its modest power, and hence the findings must be interpreted with caution.

The method adopted for this study was chosen with a specific hypothesis in mind, that one of the effects of multidisciplinary discussion would be to change participants' views of prognosis and their appropriateness ratings of different treatment options. As prognosis underpins most management decisions, other investigators have derived a decision-analytic model of their participants' decisions to see if they are internally consistent. For example, in a study of the benefits anticipated for carotid endarterectomy, Oddone and others<sup>12</sup> found that the treatment recommendations implied by expected utility calculations correlated highly ( $r = 0.88$ ) with the panelists' ratings of the appropriateness of the treatment options. This was not the case in the previous RAND Corporation study for the same surgical intervention for transient ischemic attack.<sup>11</sup> On the other hand, in a study by Silverstein and Ballard<sup>18</sup> on indications for elective surgery for abdominal aortic aneurysm, judgments about appropriateness produced more agreement among panel members than did probability estimates (of decreased 5-year mortality with sur-

**Table 2** Mean Net Utility Loss: Before versus after Case Discussion Comparison

Doctor	<i>n</i> <sup>a</sup>	Mean Net Utility Loss before Meeting	Mean Net Utility Loss after Meeting	Difference in Mean Net Utility Loss	Standard Error of Difference of Means
1	35	0.0080	0.0114	0.0034	0.00290
2	8	0.0200	0.0400	0.02	0.01309
3	30	0.0047	0.0067	0.002	0.00363
4	19	0.0137	0.0168	0.0031	0.01387
5	11	0.0127	0.0073	-0.0054	0.00366
6	19	0.0121	0.0042	-0.0079	0.00443
7	3	0.0100	0.0200	0.01	0.01000
8	29	0.0062	0.0010	-0.0052	0.00220
9	9	0.0144	0.0000	-0.0144	0.01444
10	5	0.0480	0.0060	-0.042	0.04984
11	24	0.0058	0.0108	0.005	0.00500

a. Individual doctors who participated in less than 3 case discussions were not included in this analysis.

**Table 3** Treatment Choices of Individual Clinicians versus Group

	Number of Scenarios	%
Total patient-doctor scenarios studied	221	
Treatment recommendation made by the individual clinician before team discussion was the same as the subsequent group treatment choice	133	60
Treatment recommendation made by the individual clinician before team discussion was different from the subsequent group treatment choice	87	40
Treatment recommendation of the individual clinician changed following team discussion	37	17
Changed to the group treatment choice	23	62
Changed to another treatment (not group choice)	14	38
Appropriateness rating for the group treatment choice changed after team discussion	92	44
Rating of the group choice increased (average increase = 1.96 points on Likert-type scale)	72	78
Rating of the group choice decreased (average decrease = 1.8 points on Likert-type scale)	20	22

gery). They concluded that agreements based on global judgments may conceal disagreements about the perceived effectiveness of interventions and speculated that decision-analytic models, complete with utilities (rather than just probability estimates), may improve the expert panel process. However, none of these studies tried to determine the impact of panel discussion by comparing prediscussion with post-discussion judgments.

Although there are those who maintain that the methods of decision analysis have intuitive appeal<sup>19,20</sup> for clinical problems, the difficulties in eliciting consistent probability estimates from clinicians have long been appreciated.<sup>21-23</sup> It is interesting to note that even specialists' judgments of the value of the treatments about which they have most expertise do not necessarily accord closely with their actual value, as evidenced

in published decision analyses.<sup>24,25</sup> Even among those who doubt that expected utility theory is normative for clinical decision making, there is agreement that decision analysis has an important place as an aid with which insights are gained during the process of building models and undertaking sensitivity analyses.<sup>26</sup> The structuring required may help avoid some of the biases that can creep into intuitive approaches and facilitate a common understanding of the decision problem at hand. Of course, our construction of the basic decision-analytic model was rather simplified, and the doctors' ratings of treatment appropriateness might have been better calibrated with a particular modality's perceived impact on, for example, specific symptoms or social function. Interestingly, some of our participants saw the main value of case presentations as vehicles for more precise description of the performance status of

the patients rather than to debate the superiority of different management approaches.

If the net utility loss demonstrated by our doctors was primarily related to a failure to appreciate a treatment's actual effectiveness, then one might surmise that team discussion could have remedied the situation by a sharing of knowledge and experience among the consultants. However, the combined estimate of the mean difference in net utility loss for our clinicians was not significantly changed by case discussion, which seems to argue against the theory that multidisciplinary team discussion is valuable for closing a knowledge gap and hence improves the quality of decision making. Interestingly, in the earlier McClellan and Brook study,<sup>11</sup> when the median of their panel's aggregated data was used, the correlations between expected utility-derived treatment preferences and global preferences actually decreased. Nevertheless, in preliminary analyses, we were able to bear out the significant correlations seen between doctors' baseline treatment preferences implied by expected utility calculations and their global ratings (data not shown), as earlier demonstrated in Oddone and others' study<sup>12</sup> (9 panelists rating 17 cases) and McClellan and Brooks' study<sup>11</sup> (8 panelists rating 45 cases).

Since change brought about by panel discussion was not reported in the earlier studies,<sup>11,12,17</sup> we had no real basis for an a priori power calculation. A post hoc power calculation for the combined estimate procedure would suggest that a change of 0.005 in the mean difference could be detected with a power of 70%, although we would have had insufficient power to detect such an effect for individual doctors. A change of 0.005 would be almost half of the median utility loss before the meeting, thus a fairly large change. The clinical significance of such an effect is uncertain, and even though previous studies have suggested that the discordance between utility-derived and globally preferred treatment choices may be important,<sup>11,12,17</sup> on the basis of our 95% confidence limits, we could be reasonably sure that larger effects have been excluded. However, in future studies, one should also take account of the possibility that power may be affected by the variability in the characteristics of patients discussed at the multidisciplinary team meetings, whether one believed that team discussion effects would be different for doctors from different specialties, in which the team was on its own learning curve and the way the team achieved consensus. Indeed, just as we recognize that good decisions can have bad outcomes and bad decisions, good ones, a measure of decision-making quality that takes account of the discordance between the utility-derived treatment

choices and the global treatment preferences, may still miss important distinctions between doctors who prognosticate well and those who do not and the possibility that even the latter group may express very sound global treatment preferences.

Although the previous studies could control the type, range, number, and format of cases presented to their panel, we wanted to reflect everyday realities and evaluate decision making in real time (which limited the number of scenarios studied). An alternative paradigm that has been found useful in the psychology and management literature is grounded in the theory of social decision schemes<sup>27</sup> (often applied to the judgments of juries) whereby a team comprising  $r$  members may decide on one of  $n$  possible alternatives. Prior to group discussion, the  $r$  members of a group may array themselves over the  $n$  alternatives in  $m$  different ways where  $m = (n + r - 1)! / (r!(n - 1)!$ . Although seldom used in clinical settings, this approach has allowed researchers, who have been able to control team membership and decision alternatives, to distinguish from among more than a dozen ways in which consensus may be achieved and therefore establish the impact of team discussion. Given the range of other factors involved in real-time clinical settings (the various types of cases, the mix and number of doctors, time pressure, etc.), it is likely that SDS-grounded studies of decision making in oncology settings would require even larger numbers of patients and teams.

That the apparent closure of a knowledge gap by group discussion could enhance the internal consistency of decision making has been shown in some studies with patients faced with treatment choices.<sup>28,29</sup> Studies such as these tell us that the type of discussion, its structure and format, the amount of information exchanged, and the style of leadership of the group can all affect the quality of decision making. However, the evidence for many of these factors is not new and is largely to be found in the psychology, operational research, and management literature, recently reviewed by Jones and Roelofsma.<sup>1</sup> Apart from the well-known cognitive biases and faulty heuristics that may bedevil individual judgment,<sup>30</sup> they describe the errors that can afflict team decision making, often dependent on contextual factors that affect the social interaction between team members. These include false consensus (a tendency to see one's own behavior or judgments as typical), group think (a tendency for groups to produce poorly reasoned decisions), group polarization (in which the initial average responses of group members are more extreme after discussion), and escalation of commitment (in which groups have a greater tendency than individuals to continue to support a course of action despite

evidence that it might be failing). Jones and Roelofsma concluded that it is time for empirical research to go beyond explorations of shared mental models<sup>31</sup> and further examine the specific features of tasks and environments that determine how different types of teams are affected by these biases in different ways and to varying degrees.<sup>1</sup> Unfortunately, this type of literature was largely ignored in the Clinical Outcomes Group Report.<sup>7</sup> There is precious little empirical research on clinical team decision making in routine practice, and what there is seems to focus on roles and communication in teams rather than the decision making itself.<sup>32,33</sup> However, as distinct from the present real-time study, there is certainly some research that shows how treatment appropriateness ratings made by RAND-type panels<sup>11</sup> (i.e., not a real-time clinical multidisciplinary team setting) are influenced by clinician specialty and the panel membership.<sup>34,35</sup> Getting the format for information exchange and discussion right, as well as the mechanisms for aggregating opinion,<sup>36,37</sup> may help overcome the dominance of a team meeting by a single powerful personality or the occasional absence of one of the experts. Although our own definition of decision quality is somewhat arbitrary, specific research in these areas among cancer teams has hardly begun.

One might have argued that because our regional lung cancer team meeting had been in existence for more than 2 years before the study, the participating clinicians would have had a good appreciation of each others' approach and the knowledge gap would have been narrow. However, our study found significant variation in the prognostic estimates team members produced for the patients: All did not seem to "think alike," and in 40% of instances (patient-doctor pairs), the initial treatment recommendation they made before multidisciplinary team discussion was different from the final group decision. The assumption we made, that the quality of the doctors' individual decisions might be judged according to how often they reflected the final group decision, is of course only one possible aspect of the quality of their decision making. Its significance lies in part from the fact that although a doctor is expected to give all his cases the benefit of multidisciplinary team discussion,<sup>7</sup> in practice he may be unable to attend all case conferences (which are usually weekly), and so on those occasions, his decisions lack the calibration of the wider group. Where there were differences in our study between the doctors' individual treatment preferences and the group's final judgment, in the majority of cases, the doctor's view was not changed by discussion. One imagines that such doctors might claim that it remains to be demonstrated whether group decision making is actually a

significant determinant of better patient outcomes. In fact, all our participants were meant to attend every weekly meeting (reflecting the policy of their hospital and regional cancer services), but Table 2 quite clearly illustrates that they did not. It thus highlights the difference between a field study such as this and others in which panel membership, time, and patient mix have been artificially controlled. Perhaps policy makers should be more aware of the realities of multidisciplinary team functioning.

Although our findings are useful to highlight a neglected area of health services research, they cannot be generalized beyond this specific lung cancer team. Multidisciplinary teams at various stages of development and experience may adopt a different *modus operandi*, and the internal consistency of their decision making may differ on that account. This team has existed for approximately 15 years, comprising the current membership for more than 2 years prior to the commencement of the study. Yet despite the doctors' familiarity and collegiality, there were sizeable differences in their prognostications for individual patients. We know that clinicians are rather poor at judging quality-of-life and treatment outcomes in lung cancer,<sup>38</sup> but rather than at this stage conclude that multidisciplinary team discussion has no effect on the internal consistency of professionals' judgments about prognosis and treatment appropriateness, it would be more instructive to encourage further studies of a range of other cancer teams dealing with different conditions who conduct their business in different ways.

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APPENDIX A  
Panel 1

Please review the case below, which will be discussed at the next multidisciplinary team meeting, and give a view (now) on the questions posed.

Age	64 years
Sex	Male
World Health Organization performance status	2
Duration of history	2 episodes of hemoptysis in previous 2 weeks. Weight loss in last 6 months. Reduced exercise tolerance due to shortness of breath.
Nature of presentation	Hemoptysis, weight loss, poor appetite, shortness of breath on exertion. Stopped smoking 8 years ago (previously 40 per day for 35 years).
Primary or most problematic complaint now	Hemoptysis and shortness of breath
Lung function tests	Forced vital capacity = 55% predicted value, forced expiratory volume <sub>1</sub> = 45% predicted value
Usual exercise tolerance	20 yards (previously 1 mile, 6 months ago)
Principal clinical findings	Reduced air entry at right upper lobe. Cachexic.
Findings on X-ray/computed tomography (CT)/magnetic resonance imaging (MRI) scan	Chest X-ray: suspicious area of shadowing in right upper lobe. CT scan: large mass lying posteriorly in the right midzone that appears to involve both the posterior aspect of the upper lobe and also the lower lobe. It has a diameter of 8 × 5.9 cm. It extends down onto the right main bronchus and to within about 2 cm of the carina. There are a few small nodes in the pretracheal region. There is some lateral pleural reaction or thickening but no pleural effusion and no bony erosion. There is a small noncalcified density in the right lower lobe that is of doubtful significance. There is a further nodule in the left lower lobe that is not calcified and measures approximately 12 × 9 mm. Its significance is uncertain, but it could represent a significant nodule. No focal abnormality is seen in the liver or adrenals.
Presumed stage	Stage III
Findings on bronchoscopy	Marked distortion of the right upper lobe with an anterior bulge at the origin of the right upper lobe. The anterior segment was patent, but both the posterior and apical segments of the right upper lobe were markedly distorted and extrinsically compressed.
Cell type, differentiation	Bronchial washings and brushings: malignant cells from a non-small-cell carcinoma, probably squamous in type.
Other significant comorbidity	Previous cardiovascular accident with a history of transient ischemic attacks and bronchiectasis. Medications include aspirin, a diuretic, and bronchodilating inhalers.
Serum alkaline phosphatase	67 U/L



**APPENDIX B  
Questionnaire**

**APPENDIX: Questionnaire**

Patient Code \_\_\_\_\_ Consultant \_\_\_\_\_

You are asked below to give a view on the prognosis for this patient, by estimating the chances of survival at different intervals. To help do this, consider a cohort of 100 identical patients and estimate how many you believe would be alive at the end of the interval. Please also estimate how many of the survivors at the end of each interval would have reached a state of morbidity such as would require care and support for virtually all activities of daily living (a WHO Performance Status score of no better than 3).

**Without treatment**, what do you estimate this patient's chances are of being alive after 30 days, 6 months and 12 months (we recommend you make this survival prediction for all 3 intervals before answering the morbidity questions).

		NOW Estimate	
<b>At 30 days:</b>	Survival		What is your best guess prediction of survival (without treatment)  _____ months
	Of these survivors, how many have Performance Status no better than 3		
<b>At 6 months:</b>	Survival		
	Of these survivors, how many have Performance Status no better than 3		
<b>At 12 months:</b>	Survival		
	Of these survivors, how many have Performance Status no better than 3		

Which modality of treatment are you likely to consider as your preferred / first management option. [Indicate your view on the appropriateness of the modality for this patient on the 9 point scale below]

**Radiotherapy**

Highly inappropriate	1	2	3	4	5	6	7	8	9	Highly appropriate
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**Surgery**

Highly inappropriate	1	2	3	4	5	6	7	8	9	Highly appropriate
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**Chemotherapy**

Highly inappropriate	1	2	3	4	5	6	7	8	9	Highly appropriate
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**Combination or Sequential Therapy** (please specify) \_\_\_\_\_

Highly inappropriate	1	2	3	4	5	6	7	8	9	Highly appropriate
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(continued)

APPENDIX B (continued)

**Best supportive care**

Highly Inappropriate 1 2 3 4 5 6 7 8 9 Highly appropriate

Please estimate this patient's chances of being alive after the alternative treatment options (ie. the number out of 100 identical patients alive after the interval). Please also estimate how many of the survivors at the end of each interval would have reached a state of morbidity such as would require care and support for virtually all activities of daily living (a WHO Performance Status score of no better than 3).

	Radiotherapy	Surgery	Chemotherapy	Combination or Sequential Therapy	No treatment/ best supportive care
<b>After 30 days</b>	Estimate	Estimate	Estimate	Estimate	Estimate
Survival	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Of these survivors, how many have WHO Performance Status no better than 3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>After 6 months</b>					
Survival	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Of these survivors, how many have WHO Performance Status no better than 3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>After 12 months</b>					
Survival	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Of these survivors, how many have WHO Performance Status no better than 3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

What is your best guess prediction of survival with your preferred treatment option?  
 \_\_\_\_\_ months

How confident do you feel in the accuracy of your prognostication for this patient ?

[Indicate your view on the following 9 point scale]

Not confident at all 1 2 3 4 5 6 7 8 9 Very confident

At this point in the care of the patient and other things being equal (e.g. your views coinciding with the patient's, family circumstances etc), what is the relative priority which you would accord to the possible treatment objectives. Allocate points to the options below ensuring that the sum adds up to one hundred.

**Before MDT**

Maximising quality of life over the remaining life-span

(continued)

Appendix B (continued)

Extending survival	<input type="text"/>
Achieving a good death	<input type="text"/>
Other	<input type="text"/>
Please specify	<input type="text"/>

Please give your appraisal to the research nurse or Fellow before the MDT discussion.

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