Appendix

Section 1: Further detail on professional categories for skill-mix

Diagnostic Medical Practitioner: includes radiologist, pathologist, nuclear medicine, clinical scientists

Surgeon: includes sub-specialist trainees, specialist registrars and consultants

Physician: includes junior doctors, consultant and staff grade doctors (medical students were excluded)

MDT Coordinator: includes individuals where the focus of their role is on facilitating the smooth running of the meeting, may have limited clinical input, prepare notes for patients discussed and take minutes (MDT Co-ordinator may not be their official job title)

Nurse: includes clinical nurse specialists, community psychiatric nurses, palliative care nurses and visiting crisis team nurses

Researcher: includes clinical research fellows, research nurses, clinical trials practitioners, and clinical trials co-ordinators

Social Worker

Allied Health Professional: includes occupational therapist, support workers and Age Concern representatives

Psychologist: includes assistant psychologists and clinical psychologists.

Section 2: Supplementary detail on Qualitative Methodology

We devised a strategy for qualitative data analysis which allowed us to:

- manage a very large volume of data within the project's time-frame and to
- achieve our research objectives while allowing new themes to emerge.

Our approach used both deductive themes (based on the main quantitative findings) and inductive coding (based on a larger qualitative analysis).

The analysis was an iterative process; analytic meetings were used to scrutinise and revise codes and themes, using ethnographic methods such as constant comparison and coding frame revisions. An overview of the steps taken to analyse each data source is described below.

2.1 MDT meeting nonparticipant observations

2.1.1 Inductive coding

- Observational field notes for the first 16 meetings observed for each of the 12 MDTs recruited to the study were analysed. These field notes were entered into a structured proforma, categorised according to the research objectives and previous literature. This included sections on organisational characteristics, features of the team and task, mediators of team processes and outcomes.

- The completed proformas were coded in NVivo 9. Recurring or salient issues were compiled into an initial coding framework, and exceptions were noted within the relevant codes.

- This coding framework was used to identify and selectively transcribe[1] at least two discussions illustrating each code.

- The transcripts were imported into the NVivo database and were read, re-read and coded using the initial coding framework. This was revised iteratively and additional codes were added where new issues arose. This process continued throughout the analysis.

[1] See Emerson, R., Fretz, R., & Shaw, L. Writing Ethnographic Fieldnotes. Chicago: University of Chicago Press. 1995

2.1.2 Deductive coding

Each main quantitative finding formed the basis for a deductive theme. We identified the inductive codes that were relevant to each of these quantitative results, allowing us to explore possible reasons for each finding. This analysis was conducted during regular analytic meetings between the researchers (CN, IW & PX) the PI (RR) and two co-applicants (AL & AC).

2.2 MDT Member Interviews

- We conducted 53 semi-structured interviews, which were transcribed verbatim and analysed thematically using NVivo 9.

- Deductive themes were generated from the research objectives (from which the interview guide was developed) as well as from the preliminary analysis of the observations of the MDT meetings.

- Two researchers initially independently coded 20% of the transcripts. Any discrepancies were discussed by the two coders, with input from a third researcher where there was disagreement. This process helped to ensure consistent coding of the remaining transcripts.

- These themes were then *inductively* analysed, generating sub-themes, which allowed relevant issues identified in the data to be explored. The example below illustrates these levels of analysis:

Deductive Theme	Examples of Inductive Sub-themes	Examples of Codes
Added value of MDT with respect to decision making	Improving decision making (short term)	Consistency of decision making (acting as a 'check')
		Having access to all the information to inform decision making
	Context within which MDT decision making is most helpful	When the `right` people attend
		When there is good leadership/management
		When people make meaningful, significant contributions
	Difference as strength	Sharing professional knowledge and expertise
		Providing a different perspective

2.3 Data Synthesis

The qualitative data obtained from non-participant observation of the MDTs (i.e. the audio-recordings and fieldnotes) and member interviews were triangulated to explain or provide additional information about the quantitative findings, and to assess the consistency and internal validity of the results. To achieve this, the themes derived from the analysis of interview and observational data were comprehensively charted for ease of comparison and to allow us to work back and forth between and within the different data sources.

2.4 Quality Assurance of qualitative data collection and analysis

Observations

The observational field notes focused on significant events and interactions observed by the researcher. Within 24 hours of each meeting, the researcher categorised these field notes according to an observation coding sheet. This provided a framework to map out the potential factors influencing implementation of MDT decisions. The researcher also listened to the audio recording of each meeting, which provided a further opportunity to add notes and the times of key events on the recordings for future reference. Although the field researchers were not clinicians, clinical members of the research team (the PI and several of the study co-applicants) were involved throughout data collection and analysis, and were available to respond to any specific queries the field workers had throughout the project (e.g. relating to specialist terminology).

Observation notes and selective transcripts of the meeting discussions were coded and analysed in a constant comparative manner, with repeated inspection of each data source between three researchers, and at regular analytic conferences with other members of the research team. As new codes were introduced, they were assigned a working definition to ensure they were used consistently by the different researchers. These definitions were debated and revised repeatedly throughout the process. The analytic conferences allowed the researchers to check whether codes were being applied according to the definition, and that definitions were iteratively revised where appropriate. The analytic conferences also facilitated group reflexivity and safeguarded against individual bias by providing opportunities to make each researcher's assumptions explicit and open to challenge. Together with regular meetings between the field researchers, the chief investigator and other members of the team, these formed an audit process, ensuring that interpretations were firmly supported by the data.

Professional interviews

In order to establish consistency of coding for the interview data, two researchers initially independently coded 20% of the transcripts. Following this, the researchers met to discuss any incongruence, going through each transcript line by line to check for differences both in terms of sections coded, and the specific code applied in each case. Differences were resolved by discussing the differing interpretations, identifying any misunderstandings, and refining code definitions as necessary. A third researcher was present to give an independent perspective if the two coders failed to reach agreement.

Steering group meetings

Throughout the study, we convened four steering group meetings (between July 2011 and March 2013) which provided a mechanism for peer review and guidance. In these meetings, as well as providing general support and advice (i.e. with recruitment), the steering group members discussed methodological issues, reviewed the definitions of variables and outcomes and the interview topic guides, and helped to develop data auditing strategies, hence providing further quality assurance. The Steering Group included two Patient and Public Involvement representatives who were actively involved throughout. They attended steering group meetings, and provided in depth and valuable contributions to our study design and analysis.

Section 3: Reasons for non-implementation for decisions in the first treatment plan by specialty (Number (%))*

	Gynaecological Cancer	Haematological Cancer	Skin Cancer	Community Mental Health	Heart Failure	Dementia	Total
Reason for non-implementation of treatment decision	**N=40**	**N=109**	**N=48**	**N=102**	**N=25**	**N=31**	**N=355**
Patient / carer / family choice	7 (18%)	12 (11%)	10 (21%)	16 (16%)	3 (12%)	6 (19%)	54 (15%)
Change in circumstances***	5 (13%)	12 (11%)	0	19 (19%)	4 (16%)	0	40 (11%)
Patient did not attend	2 (5%)	6 (6%)	3 (6%)	25 (25%)	0	0	36 (10%)
Decision was conditional and condition was not met	6 (15%)	6 (6%)	5 (10%)	4 (4%)	0	0	21 (6%)
Patient died	3 (8%)	7 (6%)	1 (2%)	0	8 (32%)	0	19 (5%)
Comorbidity arising post MDT meeting or deteriorated post MDT meeting	2 (5%)	3 (3%)	1 (2%)	0	0	0	6 (2%)
Comorbidity not discussed	2 (5%)	4 (4%)	1 (2%)	0	0	0	7 (2%)
Other**	4 (10%)	36 (33%)	17 (35%)	29 (28%)	4 (16%)	8 (26%)	98 (28%)
Non-implementation recorded but reason not given	9 (22%)	23 (21%)	10 (21%)	9 (9%)	6 (24%)	17 (55%)	75 (21%)

* For 306 decisions there was no record of whether or not the decision was implemented. In analysis these were considered as non-implemented decisions.
** e.g. new information or test results emerged after the MDT meeting; incorrect or missing information at the MDT meeting; decision was implemented outside of the 3 month follow-up period.
*** e.g. patient left the care of team

Section 4: Qualitative Results - illustrative quotes

Below we provide illustrative quotes to support the findings discussed in the Qualitative Results section of the paper. These are taken from transcripts of interviews and MDT meetings.

3.1 Quotes illustrating the importance of clear MDT meeting goals

Teams with clear goals

'The role [of the meeting] is to make patient decisions and in particular treatment decisions or management decisions for patients here.' (Haematology Consultant, interview)

Teams without clear goals

'I am never quite sure what the purpose of the meetings are … It was the thing that was done and therefore I did not have any say on whether it was done or not done.' (Community Psychiatric Nurse, interview)

3.2 Quote illustrating frequently referencing protocols and guidelines

'In our guidelines we do acknowledge that we can offer 6 ABVD [chemotherapy treatment] instead and no radiotherapy and of course we don't know if it's equally efficacious but that is the alternative isn't it from our guidelines' (Haematology Consultant, observational data)

3.3 Quote illustrating importance of dedicated administrative support

'She's great [MDT co-ordinator]. And she will remind everyone why people weren't discussed when or what they do or how they should be going. She's brilliant. She really is. She holds the meeting together very well I think.' (Clinical Nurse Specialist, interview)

3.4 Quote illustrating the value of strong permanent Chairs

'I think one of the weaknesses is everyone chairing … [senior people chairing] makes a little bit more sense because then that person can (deliver) their control of the group a bit more.' (Community Psychiatric Nurse, interview)

3.5 Quote illustrating difficulties in engaging patients

Transcript from Community Mental Health Team (CMHT) meeting:

Social Worker: *we haven't managed to make a difference at all actually. We're just chasing him and trying to make him take medication, which he doesn't want to take.*

Nurse: *Not very successfully...*

Psychologist: *It seems destined to fail*

3.6 Quote illustrating belief that patient preferences, health behaviours and other clinical factors are considered where appropriate

'*I think we discuss it when it's important … yes we do bring in physical problems as well which we need to if necessary'* (Dementia Occupational Therapist, interview)

3.7 Quotes illustrating different opinions regarding the most appropriate time to elicit patient preferences

'We always ask [the person presenting the case] "What does the client want, what do they want, what do they expect from coming here?"... sometimes the person doesn't know because they didn't ask the client ... it makes them think, "Well I should have checked. I have to go back and check this now," so the decision will be that they might have to see the client again ... It makes you look like you did an incomplete assessment because that's a basic thing you should be checking.' (Community Psychiatric Nurse, interview)

'One of the values of the MDT meeting is to allow the clinician to actually go into a consultation [after the meeting] with a patient and tell them what the options are, tell them how the decision has been reached and what the advantages and disadvantages are, and I think that that's more useful to a patient than actually giving patients a list of options beforehand ... and then having the MDT meeting decide that half those options are off the table anyway' (Medical Oncology Consultant, interview)

Section 5: Team and meeting characteristics

	Haematological Cancer		Gynae. Cancer	Skin Cancer	Dementia		Community Mental Health				Heart Failure	
MDT characteristics	**Team 1**	**Team 2**			**Team 1**	**Team 2**	**Team 1**	**Team 2**	**Team 3**	**Team 4**	**Team 1**	**Team 2**
TCI score	4.32	3.79	3.49	4.11	4.10	3.89	4.01	3.31	3.64	4.01	4.00	3.75
Meeting characteristics	**N=38**	**N=36**	**N=18**	**N=31**	**N=43**	**N=25**	**N=15**	**N=20**	**N=55**	**N=23**	**N=42**	**N=24**
Number of patients discussed per meeting: Mean (SD)	14.5 (4.1)	14.2 (4.8)	34.5 (5.0)	21.7 (5.6)	11.2 (5.4)	4.3 (1.3)	29.1 (11.5)	14.6 (4.4)	14.0 (4.9)	49.3 (12.1)	8.0 (2.3)	6.0 (2.2)
Adjusted Teachman's score: Mean (SD)	1.38 (0.14)	1.29 (0.10)	1.70 (0.12)	1.52 (0.12)	1.75 (0.14)	0.86 (0.33)	1.26 (0.17)	1.34 (0.14)	1.34 (0.13)	1.47 (0.08)	1.36 (0.13)	0.89 (0.14)
Number of professional categories represented: Median (25^{th}-75^{th} percentile)	5 (4-5)	5 (5-5)	6(6-6)	6 (5-6)	5 (5-6)	3 (2-3)	3 (3-4)	4(3-4)	4(3-4)	4 (4-4)	4 (4-5)	2 (2-2)
Number of MDT members at the meeting*: Mean (SD)	11.79 (1.65)	28.25 (4.43)	18.28 (2.89)	17.48 (2.66)	9.23 (1.60)	6.92 (1.75)	7.73 (2.60)	8.35 (2.13)	9.09 (2.21)	9.70 (1.94)	15.02 (2.96)	5.38 (1.58)
Number of patients discussed during observation period (at least once)	**390**	**371**	**324**	**384**	**403**	**106**	**231**	**134**	**314**	**169**	**225**	**133**
Patients with at least one treatment plan: Number (%)	330 (85%)	321 (87%)	281 (87%)	335 (87%)	356 (88%)	106 (100%)	145 (63%)	71 (53%)	251 (80%)	131 (76%)	197 (88%)	130 (98%)

Section 6: Meeting characteristics

Team	No. of patients discussed	Approximate duration of meeting (hours)	No. of professional categories in attendance (min-max)	No. of core team members	Chair	Administrative support for meeting
Gynaecological Cancer	35	2.5	5-7	28	Doctor	MDT coordinator
Haematological Cancer 1	15	1	4-5	17	Doctor	MDT coordinator
Haematological Cancer 2	14	1	5	45	Doctor	MDT coordinator
Skin Cancer	22	1.5	5-6	21	Doctor	MDT coordinator
CMHT 1	29	2.5	3-4	12	Social Worker	None
CMHT 2	15	1	3-4	12	Rotating Chair	Administrator records minutes
CMHT 3	14	1	3-4	15	Rotating Chair	Administrator records minutes
CMHT 4	49	2.5	4	16	Social Worker	None
Heart Failure 1	8	1.5	4-5	30	Doctor	None
Heart Failure 2	6	2	2	8	No formal Chair – varied throughout discussion	None
Dementia 1	11	1	4-6	15	Doctor or Nurse	Provided by Team Manager
Dementia 2	4	1.5	1-4	13	No formal Chair – varied throughout discussion	None