Cancer MDTM Research Analysis Plan (Interventional and Research Studies)

Study Title	Changing from face-to-face to virtual meetings during the COVID-19 pandemic: exploring the impact on cancer multidisciplinary (MDT) meetings
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IRAS number:	307410
Date Created:	27 January 2022

Version Number	2.0
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Version Number	Date	Reason for change
1.0	08 Feb 2022	n/a
2.0	22 Mar 2022	**4.1.1 Page 4 (Interviews):** The words ' for analysis' added and 'email' and telephone numbers' removed from list of data items collected **4.1.2 Page 4 (Questionnaire):** The words ' for analysis' added and 'email address' was removed from list of data items collected **4.1.3 Page 6 (Observations):** The words 'for analysis' added **6.1 (Descriptive information) Page 8:** wording simplified; clarified table would report 'aggregated' numbers **6.2. Page 9 (Primary endpoint):** Change from Bonferroni correction for multiple comparisons (questionnaire analysis) as can be overly stringent; set alpha value for statistical significance at 0.01 as alternative. Also clarified chi-square analyses will be run to compare any associations between MDT member's demographics, membership type (e.g. role) and responses to quantitative items; and to compare any associations between Cancer Alliance and response to quantitative items. The option to use logistic regression to test adjusted associations was also included in the event a large enough sample size is achieved.

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1. Introduction, study design and aims

The primary aim of this mixed-methods study is to explore how the change from face-to-face to virtual MDT meetings during the COVID-19 pandemic may have impacted the effectiveness of group decision-making in cancer MDT meetings. In addition, the study will aim to explore the following:

- To explore cancer MDT members' experiences of changing to, and participating in, virtual MDT meetings.
- To identify aspects of MDT meeting preparation, governance and engagement introduced by the change to virtual hosting, that improve either the experience or perceived effectiveness of group decision-making that could be retained for service improvement.

Full details of the study are given in the protocol. Briefly, participants are cancer MDT members in England. There are three parallel phases to the study:

- Semi-structured interviews with cancer MDT members
- A national cross-sectional survey of cancer MDT members
- Observations of cancer MDT meetings

See protocol for full description of data collection tool development. The findings will be used to co-produce pragmatic resource packs with MDTs representatives and patient representatives, to support MDT working. In doing so, these findings ultimately have the potential to improve cancer care for patients and the MDT working environment for healthcare professionals.

2. Study end points

2.1. Primary endpoint

- Factors influencing the effectiveness of group decision-making in cancer MDT meetings (interpreted as themes from qualitative data and quantified with quantitative data)

2.2. Secondary endpoints

- Experience of participating in virtual MDT meetings.
- Changes in MDT meeting preparation, governance, and engagement which should inform service improvement.

3. Sample size

3.1. Interviews

A sample of up to 40 participants will be recruited for the in-depth qualitative interviews, depending on data saturation (i.e., the point when no new themes are being interpreted from the data). This number has been chosen to ensure that the sample is representative of factors likely to affect participants' skillset and experience of virtual MDT meetings, including role/membership (chair/coordinator/core), discipline (CNS/radiologists/ oncologists/surgeons), and demographics (age).

3.2. Questionnaire

The questionnaire will be sent to all MDT leads, coordinators, and members within the NEL and NCL Cancer Alliance networks. We will also extend this to MDT members of cancer alliances within other regions of England but base our sample size on the NEL and NCL cancer alliances. With approximately 200 MDTs across these networks and an anticipated 50% responsiveness, we expect to be able to approach the members of 100 MDTs to invite them to complete the questionnaire. Each MDT will have at least 5 members

(range 5-25 across local and specialist MDTs). Factoring in a conservative 38% questionnaire response rate from MDT leads in a previous report (1), we anticipate achieving a minimum sample of 190 respondents. Based on the advice of Professor Stephen Duffy (Statistician), with 190 participants, if 50% report a specific outcome, the expected 95% CI on this would be 42-58%. For 70%, the 95% CI would be expected to be 63-77%. For 90%, the 95% CI would be expected to be 85-95%. Therefore, 190 would confer acceptable precision of estimation, though we expect to achieve a larger sample.

3.3. Observation

A minimum of six MDT meetings will be observed, including specialist (e.g., Urology, Gynaecology, Head & Neck) and local (e.g., Breast, Colorectal, Upper Gastrointestinal) MDTs. These include some of the same MDTs observed prior to the pandemic by Professor Mughal's (collaborator) previous report (1) as it may be possible to qualitatively describe differences across the two sets of observational data. This is a resource intensive, in-depth method of study to collect exploratory data. The diversity of observed meetings is the most critical consideration for determining the sample, to ensure it is representative of a diverse multidisciplinary workforce across different MDTs (with respect to cancer type and specialist/local composition).

4. Data

4.1. Data items

4.1.1. Interviews

The data items obtained for analysis will include the following:

Characteristics and eligibility form before interview
Time taking part in cancer MDT meetings
NHS Trust
Type of cancer MDT concerns
Primary specialty or discipline
Role in cancer MDT meetings
Gender
Age
Ethnicity

Interview:
Audio-recording of interview
Transcription of audio-recording (source data)

4.1.2. Questionnaire

The data items obtained for analysis on the online questionnaire will include the following:

Basic information
Cancer Alliance working within
Gender
Age
Ethnicity
Type of cancer managed by MDT
MDT lead – Y/N
Role in cancer MDT meetings
Format of majority of MDT meetings pre-pandemic
Format of majority of MDT meetings currently
Perception of treatment management decision quality in virtual vs face-to-face MDT meetings

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The Team
Overall attendance of virtual compared to face-to-face MDT meetings
Likelihood of attending whole virtual meeting compared to face-to-face MDT meetings
Representation of clinical speciality at virtual meeting compared to face-to-face MDT meetings

Organisation and logistics
Amount of time needed to spend preparing for virtual meeting compared to face-to-face MDT meetings
Amount of time available to spend preparing for virtual meeting compared to face-to-face MDT meetings
Frequency of virtual meetings that overrun compared to face-to-face MDT meetings
Frequency of agenda prioritisation in virtual compared to face-to-face MDT meetings
Time to discuss each patient in virtual compared to face-to-face MDT meetings
Depth of discussion of each patient in virtual compared to face-to-face MDT meetings

Meeting infrastructure
Frequency of technology problems negatively affecting participation in virtual compared to face-to-face meetings
Types of technology problem routinely experienced in virtual MDT meetings
Frequency of having access to appropriate room or space to join virtual or hybrid MDT meeting
Frequency of having access to appropriate equipment to join virtual or hybrid MDT meeting

Governance
Confidence chairing a virtual compared to face-to-face MDT meeting
Prior training in chairing MDT meetings virtually and face-to-face
Recording of operational problems/serious incidents during MDT meetings
Audit of virtual cancer MDT meeting performance
Audit of patient outcomes following virtual cancer MDT meeting
Processes to monitor and evaluate virtual cancer MDT meetings
(Free text) Additional processes to monitor and evaluate virtual cancer MDT meetings
(Free text) Suggestions for how virtual cancer MDT performance could be monitored/audited
Checking and finalisation or MDT decisions following virtual MDT meetings
Adequacy of sign off and follow up of MDT outcomes following virtual MDT meetings

Decision-making
Accessibility of patient details during virtual cancer MDT meetings
Clarity of patient information during virtual cancer MDT meetings compared to face-to-face meetings
Concentration throughout virtual cancer MDT meetings compared to face-to-face meetings
Interaction with other specialists during virtual cancer MDT meetings compared to face-to-face meetings
Comfort contributing to discussions about patients during virtual cancer MDT meetings compared to face-to-face meetings
Frequency of contributions to decisions being made about patients during virtual cancer MDT meetings compared to face-to-face meetings
Dependency of decision-making process on complexity in virtual MDT meetings
(Free text) Decision-making process for complex cases compared to simple cases
Effect of complexity in the following domains on time spent discussing case:
Pathology of the tumour
Psychosocial characteristics of patient
Physical characteristics of patient
Treatment factors
Differences in patient service co-ordination following virtual MDT meeting compared to face-to-face meeting
(Free text) Description of differences

Advantages and disadvantages
(Free text) Three improvements that could be made to virtual cancer MDT meetings
Preference between virtual, hybrid and face-to-face MDT meetings

(Free text) Three most important advantages of virtual cancer MDT meetings compared to face-to-face meetings
(Free text) Three most important disadvantages of virtual cancer MDT meetings compared to face-to-face meetings
(Free text) What, if any, are the advantages of hybrid cancer MDT meetings compared to virtual and face-to-face meetings
(Free text) What, if any, are the disadvantages of hybrid cancer MDT meetings compared to virtual and face-to-face meetings

Follow up preference
Prefer to be followed up (Y/N)

4.1.3. Observations

The data items obtained for analysis on the electronic proformas will include the following:

Whole-meeting observation proforma:
Meeting start time
Meeting end time
Scheduled meeting length
Actual meeting length

The Team
Meeting chair assigned (Y/N) and job role (free text)
Meeting attendees present:
During meeting introduction
Join part-way through

Meeting infrastructure
Video-conferencing platform being used to host

Organisation and logistics
Presentation of meeting agenda (Y/N)
Number of patients on the agenda
Number of patients discussed during the meeting
Discussion of case prioritisation (Y/N)
Factors informing prioritisation (free text)
Virtual meeting etiquette discussed (Y/N)
Description of etiquette (free text)
Explanation from chair of how members should indicate they wish to participate (Y/N)
Method of inviting contributions (if other, free text)
Method of member contributions (if other, free text)
Recording of meeting decisions: how
Recording of meeting decisions: who

Field notes to capture:
Changes in decision making process
Changes in atmosphere and dynamics
Relative contributions of members
Joining and leaving the meeting
Adherence to etiquette protocol
Impact and management of case-complexity
Patient information (access, sharing, visibility)
Impact and management of technical issues
Observations and reflections on the meeting as a whole

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Case-by-case observation proforma:
Case start time
Case end time
Total case time

MDT-MODe (2)**:**
Provision of (score 1-5):
- Case history
- Radiological images
- Histopathological information
- Psychosocial issues
- Co-morbidities
- Patient view

Discussion quality (score 1-5)
- Chair
- Members

Outcome (Y/D/N)

Decision-making:
Method of making final-decision (if other, free text)
Disagreements/challenges (if yes, free text)
Final decision agreed by all
Implementation plan discussed and agreed by all

Meeting infrastructure:
Technical issues during information presentation (if other, free text)
Technical issues during discussion (if other, free text)
Technical issues during decision-reporting (if other, free text)

Field notes to capture:
Team atmosphere
Team member participation (relative contributions)
Case complexity
Factors affecting team ability to make a decision

5. Missing data

All attempts will be made to minimise any missing data.

In the questionnaire, all quantitative questions will be mandatory (with the option to answer 'Prefer not to say' for special category data). Only complete questionnaire responses will be included in the analysis.

MDTs will be observed by four researchers wherever possible to minimise information-recording burden to improve reliability of data recording. A minimum of two researchers will observe each meeting to improve reliability of recording. All observing researchers will be trained in using the proforma to ensure they are as familiar as possible with the data collection tools. In the event any items are not completed during data collection, the number of observed meetings on which each result is based will be reported. Missing data will be continually monitored to identify if there are any problematic measures which need to be adjusted or removed.

6. Statistical and qualitative analyses

The statistical analysis will be carried out by Queen Mary University of London. The computer programme SPSS (version 24 or above) will be used. As this is a mixed-methods study, findings from the descriptive quantitative and statistical analyses will be triangulated with findings from the qualitative analysis following the methods described below. Qualitative analysis will be carried out using the computer programme NVIVO (version 11 or above).

6.1. Descriptive information - participant characteristics

Descriptive data reported will include the numbers accrued in the recruitment process for the interview and questionnaire, including:

Number invited (estimated based on number of invitations sent, and mailing list membership)
Numbers screened for eligibility in the interview phase
Number providing informed consent
Number completing data collection.

Descriptive data reported for the observation will include number of MDTs invited to take part, number of MDT meetings observed, and type of cancer MDT concerns. A table of aggregated numbers and percentages of demographic characteristics will be reported for participants in the interview and questionnaire, reporting:

Time taking part in cancer MDT meetings
NHS Trust (interview) or Cancer Alliance (Questionnaire)
Type of cancer MDT concerns
Primary specialty or discipline
Role in cancer MDT meetings
Gender
Age
Ethnicity

6.2. Primary endpoint

The analysis population for this is the recruited population.

To guide the triangulation of mixed-methods data to meet the primary end-point, we have developed a preliminary conceptual framework based on National Cancer Action Team MDT guidelines (3), the functional perspective of group-decision making (4), the ODDI model of decision making (5), and the NHS England MDT streamlining guidelines (6). The conceptual framework defines broad categories within which factors that influence the effectiveness of group-decision can be grouped. Table 1 shows this preliminary conceptual framework.

Table 1. Frameworks and guiding constructs

Functional perspective (see Soukup 2017)	Internal factors	External circumstances			Interaction processes		Decision-making		Case-complexity	Repeated consecutively
NCAT domains (2010)	The Team	Organisation and logistics	Meeting infrastructure	Governance	Decision-making					
ODDI model (Forsyth, 2014)					Orientation	Discussion	Decision	Implementation		
NHS Streamlining Guidelines (2010)		Streamlining SOCs		Audit						

Qualitative data from the observations, interviews and questionnaire will be analysed using Applied Thematic Analysis (7). Data will initially be deductively coded to constructs within the conceptual framework, and inductively coded within each construct to generate themes or categories. The conceptual framework will be iteratively adapted based on interpretation of the qualitative data. Initial coding will be carried out by one

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Researcher with a sub-set of randomly selected transcripts independently coded. There will be multiple opportunities for team discussion, disagreement, and iteration of the emerging coding framework.

Quantitative data from the questionnaire and observation proformas will be analysed descriptively to examine the frequency of each type of response. This will be presented as percentages in graphs and tables, and mapped to the constructs in the conceptual framework (following the categories described in Section 4.1.2 and 4.1.3 respectively).

Unadjusted associations between MDT member's demographics, membership type (e.g. role), Cancer Alliance and responses to quantitative items will be tested using Chi-squared analyses, and, if a large enough sample size is achieved, adjusted associations will be tested using logistic regression. A more stringent alpha level of 0.01 will be used to determine statistical significance, due to multiple testing.

7. Secondary endpoint

7.1. Experience of participating in virtual MDT meetings

Qualitative data from the interviews and free-text data from the questionnaire specifically relating to individuals' perceived experiences of participating in virtual MDT meetings will be analysed using applied thematic analysis.

7.2. Changes in MDT meeting preparation, governance, and engagement which should inform service improvement

The findings from the analyses described in Sections 6.2 and 7.1 will be used to inform the development of a set of practical recommendations to optimise virtual cancer MDT meetings. It will be highlighted where these recommendations may also translate to other MDT meeting formats (e.g., hybrid and face-to-face). The development of recommendations will be an iterative, discursive process led by the CI and Research Team in collaboration with all members of the Study Management Group.

8. Presentation of analysis

Before reporting for publication, the results will be discussed and agreed in full with the Study Management Group.

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9. References

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