A group of people, including men and women, are gathered around a table in a meeting room. They are looking at documents and a computer screen. The scene is brightly lit, and the people are dressed in professional attire. The background is a dark green wall.

# **TRAINING IN THE ASSESSMENT OF CANCER MULTIDISCIPLINARY TEAM MEETINGS COURSE MANUAL**

**A comprehensive manual to  
facilitate the assessment of team  
decision-making in MDT meetings**

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- 1. Foreword**
- 2. Learning Objectives**
- 3. Course Outline**
- 4. Course Content**
- 5. Bibliography**
- 6. Appendices**
  - a. Successful strategies paper with MDT tools**
  - b. MDT-MODE scoring sheet**
  - c. Blank notes pages**

The care of cancer patients is complex: increasing numbers of diagnostic tests, treatments, and increased patient empowerment in decision-making means that care can no longer be given by one or two healthcare professionals. Multidisciplinary team (MDT) working is seen as the 'gold standard' in many countries. MDT working at its best provides a means of improving communication and coordination between healthcare professionals with the delivery of effective and appropriate treatments in a timely manner. However, when MDTs do not work together effectively care can be sub-optimal: recommendations can be clinically inappropriate, or not acceptable to patients, resulting in delays to treatment, distress for patients and frustration for healthcare professionals. Evidence suggests that effective MDT decision-making requires consideration of comprehensive patient-centred information at the point of decision-making, with true multi-disciplinary interaction and discussion, under good team leadership.

During this course we will highlight the basic principles of assessing the quality of team decision-making in MDT meetings. We will provide you with a validated framework to assess this process, the MDT Metric for the Observation of Decision-Making (MDT-MODE) instrument, and you will get hands on practice in using the instrument.

By the end of the training session, the attendees will:

1. **understand the principles behind team assessments and potential biases** of recognising and evaluating team skills in MDT meetings;
2. **be able to demonstrate a structured approach** for observing and assessing MDT meetings;
3. **understand how to apply** a validated framework, MDT-MODE, for observing team behaviours in MDT meetings; and
4. **have gained experience** of 'as live' MDT meeting assessment using MDT-MODE.

09:00 – 09:20	Registration and refreshment
09:20 – 09:30	Introductions and learning objectives
09:30 – 10:00	What is important about MDTs and their meetings
10:00 – 11:00	Principles behind team assessments and introduction to biases
11:00 – 11:15	Break
11:15 – 12:00	Introduction to MDT meeting assessments
12:00 – 13:00	Lunch
13:00 – 14:45	Practice rating videotapes: session 1 (different cases)
14:45 – 15:00	Break
15:00 – 16:00	Practice rating videotapes: session 2 (different teams)
16:00 – 17:00	Discussion & troubleshooting
17:00	Close



## Training in the assessment of multidisciplinary team meetings

**Dr Tayana Soukup** PhD  
**Dr Ben Lamb** MBBS PhD FRCS (Urol.)

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Core components of the training

1. **Importance of MDTs** in cancer care
2. **Principles behind** team assessment
3. **Introduction to** MDM assessment
4. **Training & Practice in** MDM assessment
5. **Discussion**

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**1. WHAT IS  
IMPORTANT ABOUT  
MULTIDISCIPLINARY  
TEAMS AND THEIR  
MEETINGS?**

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Getting the  
terms right

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# MDT v. MDM

**MDT, Multidisciplinary team** = a group of people from different health-care disciplines that coordinates care for patients



**MDM, Multidisciplinary team meeting** = a forum for the MDT; a major information processing infrastructure in cancer care



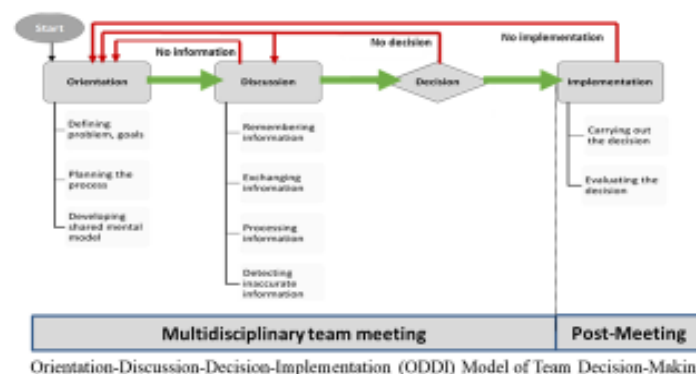
Department of Health, 2004

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## Making recommendations v. decisions

**Recommendation(s)** = suggestion(s) or proposal(s) as to the best course of action

**Decision-making** = cognitive process resulting in the selection of one or more courses of action among several alternative possibilities



Forsyth, D.R. (2014) *Group Dynamics* (8th ed.), US, Jon-David Hague.

Soukup/Lamb 2019. How multidisciplinary are multidisciplinary case reviews in cancer care? Analysis of team decision-making fidelity. *PsyArXiv Preprints*. <https://doi.org/10.31234/osf.io/3xwmd>

Soukup, T. (2017). *Socio-cognitive factors that affect decision-making in cancer multidisciplinary team meetings* [PhD Thesis; Clinical Medicine Research], Imperial College London, London, UK.

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Why care  
about  
teams in  
healthcare?



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1. Patient safety
2. Cost-effectiveness

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## 1. TEAMWORK & PATIENT SAFETY

- Institute of Medicine (2000): Increased awareness of medical errors
- Concluded that between 44,000 to 98,000 people die each year as a result of preventable medical errors
- **Key recommendation:** Teamwork as a mechanism for enhancing patient safety



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## 2. COST-EFFECTIVENESS

- The attendance register was completed in **14 MDMs**
  - **147 out of 294 consultants** on the register attended, 10 of 43 junior doctors and 41 of 100 'others'
- The total number of patients discussed was **431**
  - **total time allocated through the week for these 14 MDMs was 30 hours** (2.14 hours per MDM).
- The average salary of a consultant is **£115,4005**, the average salary of a specialist registrar is **£56,1005** and the average band 7 nurse specialist earns **£35,0005**
- The average consultant works **50.7 hours** a week, the average junior doctor should work **48.6 hours** a week and the nursing staff **37.5 hrs**
- The approximate cost of a **week's worth of MDMs** in salaries alone can be estimated at **£15,808.8**
- The average **annual cost of MDMs** in salaries alone is approximately **£822,057.6**
- In salaries alone the cost to discuss **each patient** is **£36.6**

Fosker et al. The cost of the MDT. *BMJ* 2010;340:c951  
<https://www.bmj.com/rapid-response/2011/11/02/cost-mdt>

## 2. COST-EFFECTIVENESS (CONT.)

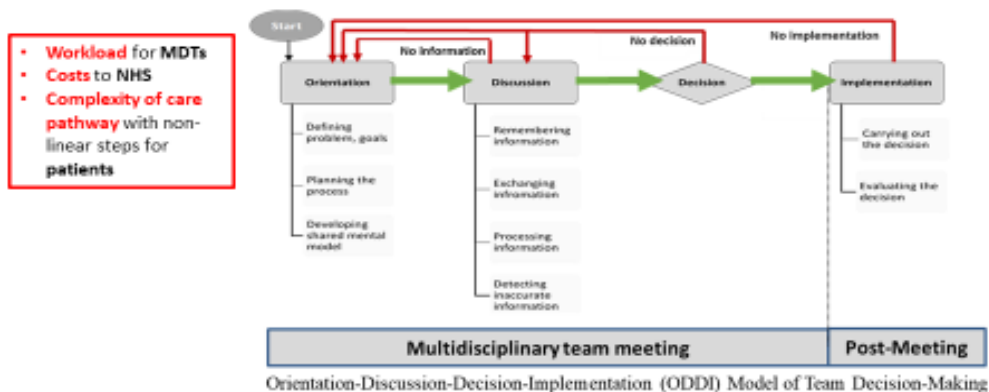
### Cost in relation to radiologists and pathologists:

There are approximately 1500 cancer MDTs in England, and based simply on data about the time taken for radiologists and pathologists to prepare for MDMs, it has been estimated they cost:

**£100 million a year for attendance and preparation time**

Kane B, Luz S, O'Briain DS, McDermott R. Multidisciplinary team meetings and their impact on workflow in radiology and pathology departments. BMC Med. 2007;5:15

## 2. COST-EFFECTIVENESS (CONT.)



Forsyth, D.R. (2014) *Group Dynamics* (8th ed.), US, Jon-David Hague.

Soukup/Lamb 2015. How multidisciplinary are multidisciplinary case reviews in cancer care? Analysis of team decision-making fidelity. *PsyArxiv*. <https://doi.org/10.31234/osf.io/9ewnd>

Soukup, T. (2017). *Socio-cognitive factors that affect decision-making in cancer multidisciplinary team meetings* [PhD Thesis; Clinical Medicine Research]. Imperial College London, London, UK.

## WHAT DOES THE MDT DO?

- Takes referrals
- Arranges investigation and diagnosis
- Discusses cases in the MDT meeting
- Plans treatment and follow-up
  
- Cases of suspected or diagnosed cancer
- All new, some recurrences

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## EFFECTIVENESS OF MDTs

- Some positive studies
- Generally variable evidence base across tumour types

Ann Surg Oncol (2015) 18:216–225  
DOI 10.1245/s12452-014-2875-4

Journal of  
**SURGICAL ONCOLOGY**  
AN INTERNATIONAL JOURNAL OF SURGICAL ONCOLOGY

ORIGINAL ARTICLE – HEALTHCARE POLICY AND OUTCOMES

**Quality of Care Management Decisions by Multidisciplinary Cancer Teams: A Systematic Review**

Benjamin W. Lumb, MRCST<sup>1</sup>, Katrina F. Brown, PhD<sup>2</sup>, Kamal Nagpal, MRCST<sup>1</sup>, Charles Vincent, PhD<sup>1</sup>, James S. A. Green, FRCS (Gen)<sup>1</sup>, and Nick Scudlark, PhD<sup>1</sup>

<sup>1</sup>Department of Surgery and Cancer, Imperial College London, London, UK; <sup>2</sup>Department of Urology, Whipps Cross University Hospital, London, UK

BMJ

RESEARCH

**Effects of multidisciplinary team working on breast cancer survival: retrospective, comparative, interventional cohort study of 13 722 women**

OPEN ACCESS

Steven M Kesson project manager<sup>1,2</sup>, Dawn M Alabazee statistician<sup>1,2</sup>, W David George school of medicine honorary professor<sup>1</sup>, Harry J G Burns chief medical officer for Scotland<sup>3</sup>, David S Morrison director<sup>4</sup>

ANALYSIS

**Multidisciplinary team working in cancer: what is the evidence?**

Cancer care is increasingly delivered by multidisciplinary teams. **Cath Taylor and colleagues** argue that stronger evidence is needed of their effectiveness

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## WHAT AFFECTS QUALITY OF MDT DECISION MAKING?

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Lamb et al, Ann Surg Oncol 2011;18:2116-25.

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## THE MDT PROCESS

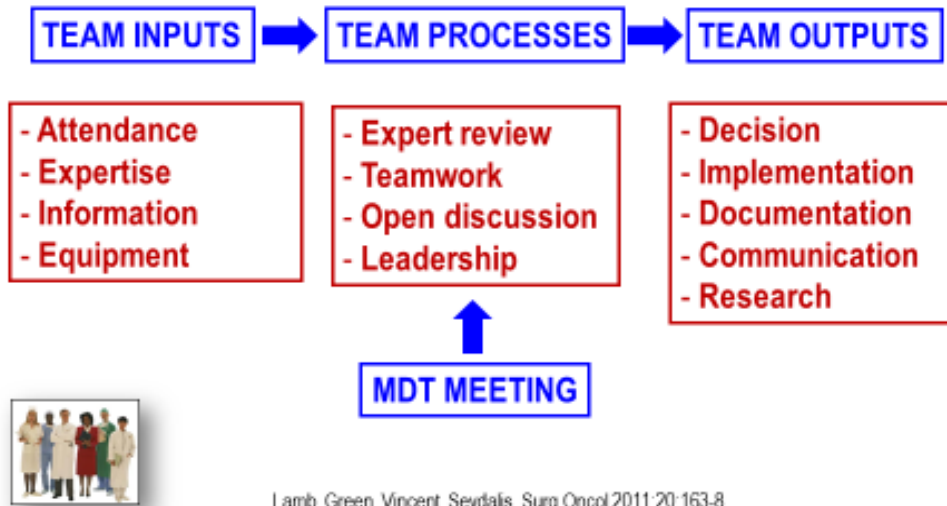
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Lamb, Green, Vincent, Sevdalis, Surg Oncol 2011;20:163-8.

26

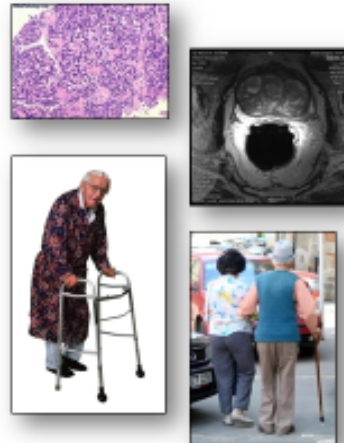
## THE MDT PROCESS



## INPUTS TO MDT

### Information

- To make clinical decisions (48-82%)
  - Radiological
  - Pathological
  - Personal Knowledge of patients
- To Implement decisions (81-96%)
  - Clinical Information
  - Co-morbidities
  - Patient preference



*Leo et al, 2007; Staffors et al, 2007; Davison et al, 2004; Delaney et al, 2004; Blazeby et al, 2006; Bunn et al, 2007; Leo et al, 2007; Lutterbach et al, 2005; Wood et al, 2008; Goolam-Hossen et al, 2011*

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## MDT PROCESS & FUNCTION

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### Consideration of holistic information

- Doctors and Nurses have different skills
- Combining biomedical and patient centred information



### Team working

- Hierarchies harm patient centeredness
- Collaboration, trust and respect improve members contribution



*Davies et al, 2006; Newman et al, 2006; Junnola et al, 2002; Lanceley et al, 2008*

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## MDT OUTPUTS

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### Dealing with disagreement

- Document
- Share with patients?



### Communication with patients

- Medical and Nursing roles



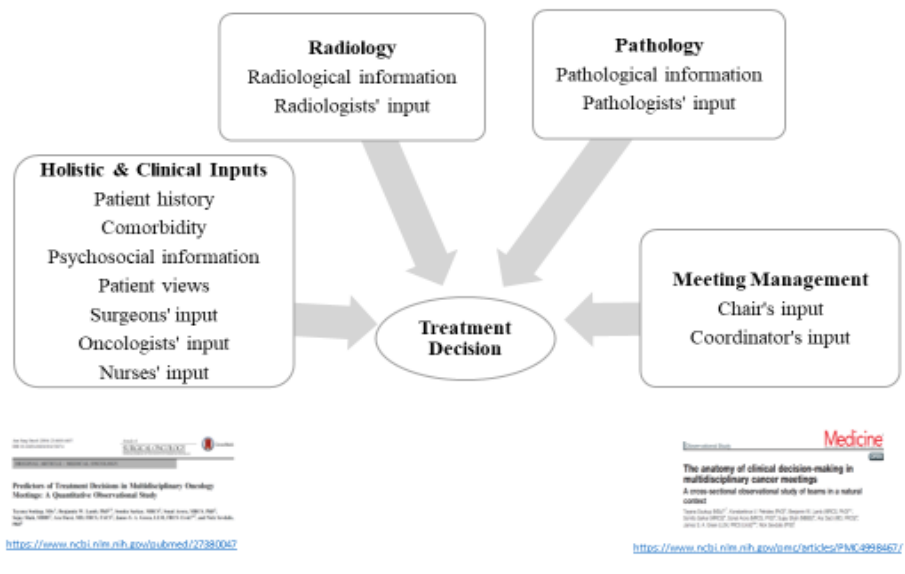
### Communication with Primary care

*Lamb et al/WCAT; Penel et al, 2007*

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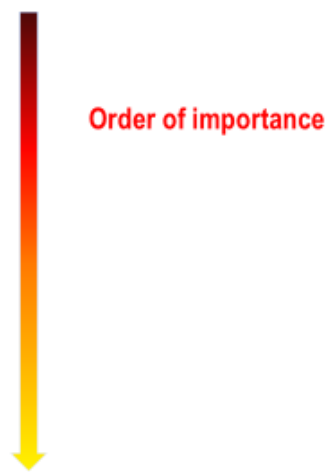
**Complete patient profile and input from all disciplines in MDMs are needed to reach treatment recommendation for a patient**



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**WHY DOES A MDT FAIL TO MAKE A DECISION?**

1. Lack of clinical or staging information
2. Lack of personal knowledge of patient
3. Lack of information on co-morbidities
4. Poor attendance
5. Disagreement
6. Case complexity



Lamb et al, World J Surg 2011;35:1970-6.

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*“We can only be sure to improve what we can actually measure”*

Professor A Darzi  
 High Quality Care for All  
 Department of Health (UK) 2008

### Tools and what they measure

Instrument/Tool	What it measures
1. MDT-MODe (today!)	Team decision-making process
2. MDT-ORAS	Team functioning as expressed in national UK guidance (18 components)
3. TEAM	Core functions of the team and their team meetings, based on the components defined in “the characteristics of effective MDT
4. MDT-MOT	Team attendance, leadership/chairing of the MDM, teamwork and culture
5. MDT-FIT	Encompasses validated components of MDT-MOT and TEAM, allows self-assessment of team working, combined with expert feedback from facilitator, and sharing of the outcome with the team as part of a team-reflective discussion
6. ATLAS*	Leadership and chairing skills
7. MeDiC**	Gauges complexity of cases for MDT discussion (streamlining workload)

\*\* MeDiC: A measure of case complexity for cancer multidisciplinary teams: development and early validation of the MeDiC tool. 2019. PsyArXiv Preprints. <https://psyarxiv.com/qzwf8/>

\*ATLAS: Quality of leadership in multidisciplinary tumor boards. World J Urol. 2018. <https://www.ncbi.nlm.nih.gov/pubmed/29502300/>

References to tools 1 to 5 can be found here: Successful strategies in implementing multidisciplinary team working. 2018. J Multidisc Healthc <https://www.ncbi.nlm.nih.gov/pubmed/29403284>

Questions?



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## 2. Principles behind team assessments

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**Non-technical skills**  
(e.g. communication, teamwork)

**70% of adverse events in health care**  
(as well as flight accidents in aviation)

The human factor: the critical importance of effective teamwork and communication in providing safe care  
M Leonard, S Graham, D Banasium

[https://qualitysafety.bmj.com/content/13/suppl\\_1/i85](https://qualitysafety.bmj.com/content/13/suppl_1/i85)

Soukup et al Aviation and healthcare: a comparative review. JRSO Open. 2016;7(1)  
<https://www.ncbi.nlm.nih.gov/pubmed/26770817>.

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**Airlines are required to evaluate crew (nontechnical) performance in simulated settings using an observational assessment approach**

NASA/TM—2003—212809

**A Gold Standards Approach to Training Instructors to Evaluate Crew Performance**

David P. Bolter and R. Key Davidson  
Ames Research Center, Moffett Field, California

**Training is important!**

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NASA/TM-2005-212809



**A Gold Standards Approach to Training Instructors to Evaluate Crew Performance**

David P. Baker and R. Key Donohue  
Aerob Research Center, Mojave Field, California

Most successful & meaningful evaluations are when evaluators are trained based on gold standards!!

## Gold Standards approach to training

- **Calibrate** new assessors to the expert/most experienced assessor
- Use **standardized/validated** tools
- Increase **reliability** of evaluations – by providing **introduction, instruction and practice** in scoring so that all assessors give **similar scores to similar performance**
- Score **videotapes with different scenarios**
  - 1) Identification & observation of behaviours
  - 2) Scoring of relevant behaviours

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## Nontechnical team performance in surgery is also evaluated using an observational assessment approach



**A Gold Standards Approach to Training Instructors to Evaluate Crew Performance**

David P. Baker and R. Key Donohue  
Aerob Research Center, Mojave Field, California

ORIGINAL ARTICLE

**Training Faculty in Nontechnical Skill Assessment**  
National Guidelines on Program Requirements

Leslie Hall, MSc; Simon Arora, PhD; Nicholas R.A. Symcox, MSc; Ashk Adel, MRCG, Anaesthetist, FRCR; Charles Vincent, PhD; and Neil Sewalke, PhD

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## Expert consensus on the training requirements

- Health care professionals and psychologists/human factor specialists best placed to do the assessments
- **Assessing others' skills is a skill in itself!**
- Evidence suggests **that considerable training** is required to use tools in a valid and reliable manner
- **Min. level of calibration** between new and experienced assessor is an intraclass correlation coefficient of:
  - **0.60** for the purpose of providing formative feedback
  - **0.70** for research purpose

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## Why are the gold standards in training and assessment important?

**“To prevent unreliable assessments which could be unfair and potentially damaging for the individual being assessed”**

ORIGINAL ARTICLE

Training Faculty in Nontechnical Skill Assessment  
*National Guidelines on Program Requirements*

*Leanne Dhill, MSc; Somaia Azzam, PhD; Nicholas R.A. Spence, MSc; Ruth-Jane MRCO, Ana Durzi, FRCO,  
 Charles Vincent, PhD, and Nick Sevdalis, PhD*

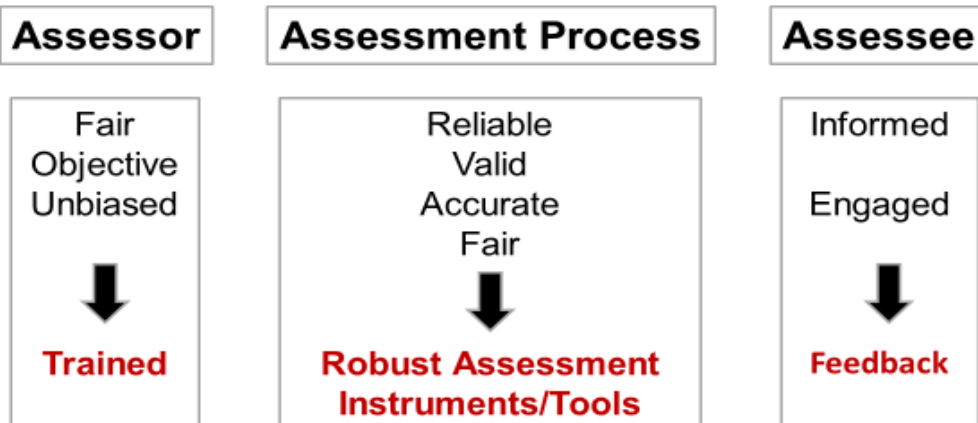
42

## Principles behind team assessments

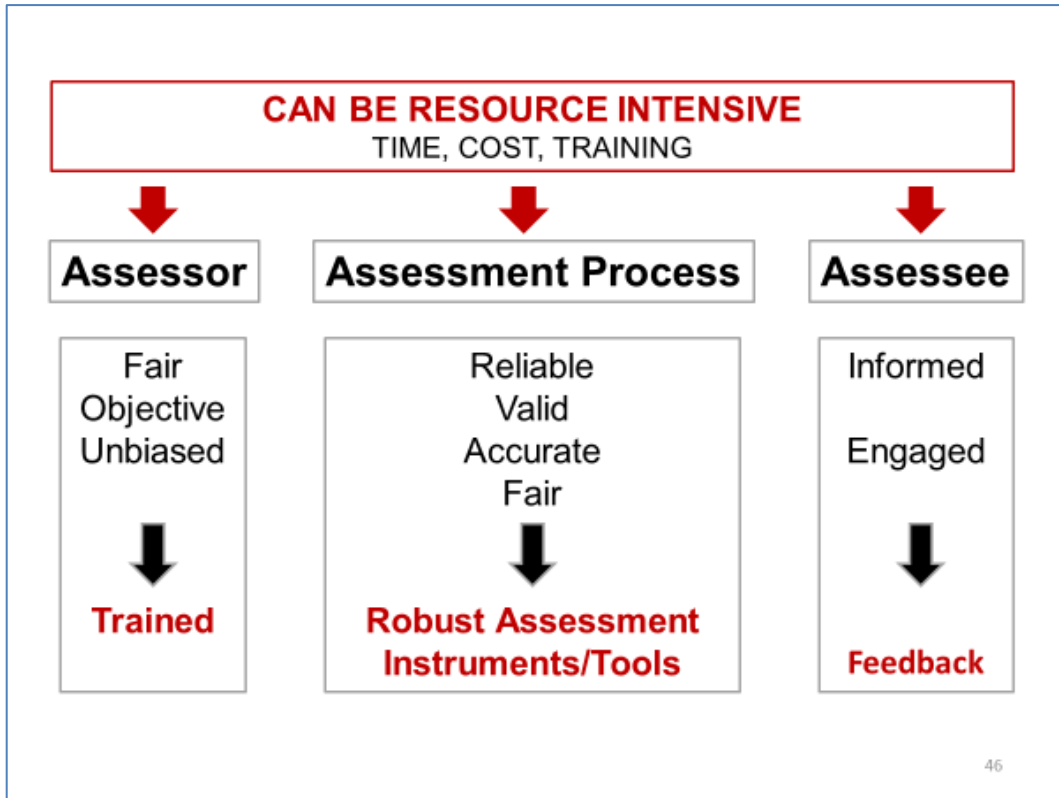


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## WHAT IS A **GOOD** ASSESSMENT?



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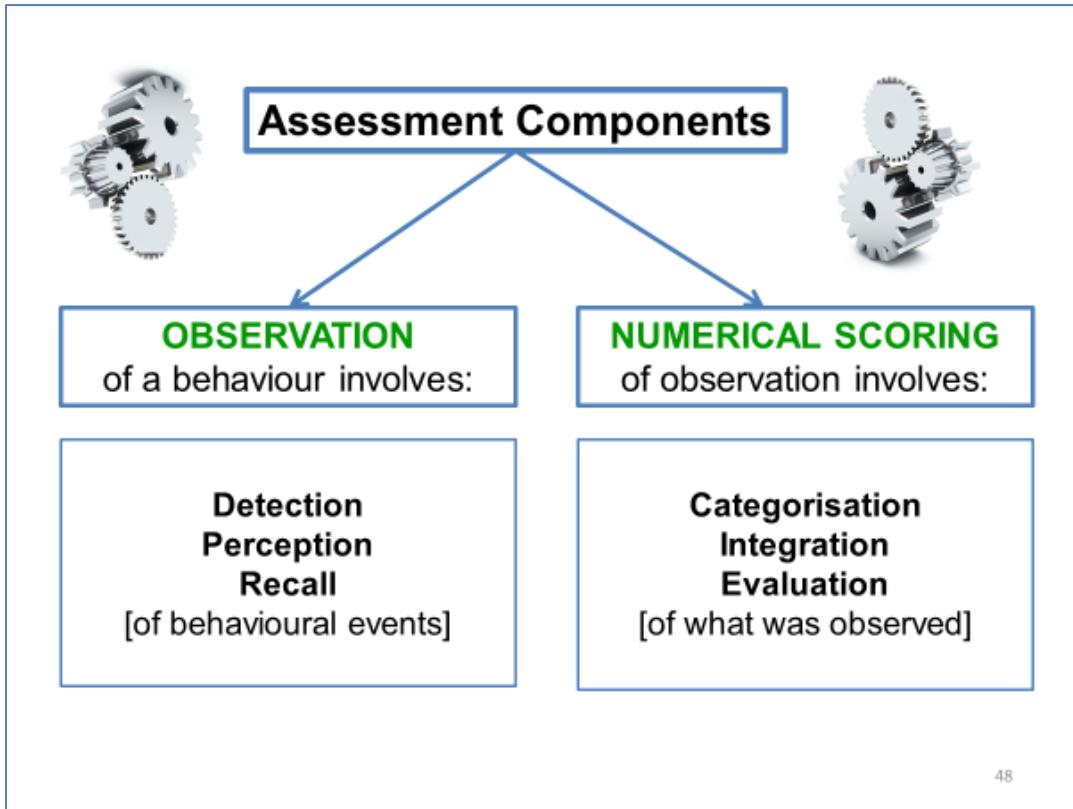
## WHAT IS AN ASSESSMENT (DEFINITION)?

### 5-Stage Process

1. OBSERVATION
2. RECORDING
3. INTERPRETATION
4. EVALUATION
5. FEEDBACK







**ASSESSORS' BIASES / ERRORS**

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## Rater Error Training (RET)



- **Familiarise** assessors with errors and biases
- Increase their **error/bias awareness**
- Improve **assessors' skill** in recognising their own **prejudices** and in **discriminating and judging** behaviours
- Create **common standards** for what constitutes good or poor performance in order to avoid biases arising from **our personal standards or preferences**

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### Assessment Components



**Observation**  
of a behaviour



**Biases in Observation**  
of Behaviour

**We do not see/detect** a behaviour  
*e.g. Leadership behaviour shown, but assessor misses it*

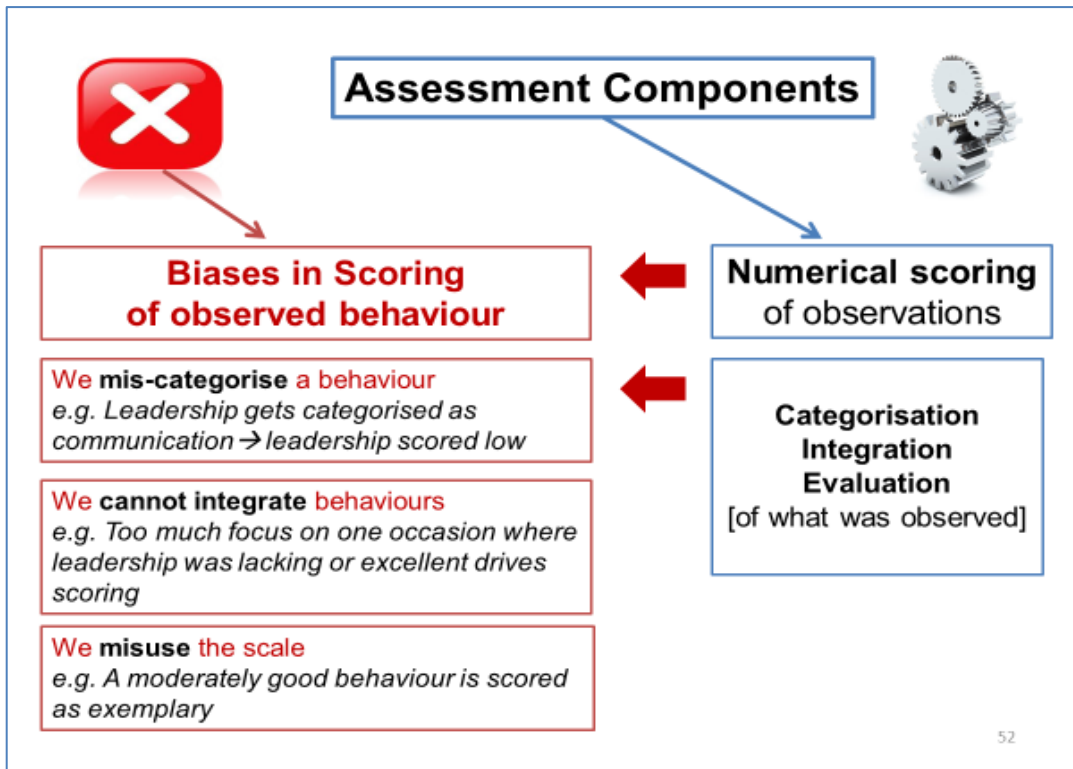
**We mis-perceive** a behaviour  
*e.g. Leadership behaviour shown, but assessor attributes it to communication*

**We forget** a behaviour  
*e.g. Leadership behaviour shown, but assessor forgets it*

**Detection**  
**Perception**  
**Recall**  
[of behavioural events]



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**COMMON RATING ERRORS**

**HALO EFFECT** - one particular **positive** aspect of behaviour is **overemphasised and enhances the ratings** on other behavioural dimensions

**HORNS EFFECT** - one particular **negative** aspect of behaviour is **overemphasised and reduces the ratings** on other behavioural dimensions

**CENTRAL TENDENCY** - ratings mainly given around the **mid-point** of the scale

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## COMMON RATING ERRORS (CONT.)



**LENIENCY** - tendency to give **favourable** (higher) ratings

**SEVERITY** - tendency to give **unfavourable** (lower) ratings

**PRIMACY** - remembering better/overweighting behaviours that were **observed first**

**RECENCY** - remembering better/overweighting behaviours that were **observed last**

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## ADDITIONAL POTENTIAL PITFALLS



### NON-BLINDED RATINGS

- Knowing team-members
- Previous knowledge of performance/ability

### TEAM-MEMBER & ASSESSOR

- Your behaviour will influence the behaviour of other team members
- Can interfere with the observation and assessment
- May be too demanding (workload)

### HAWTHORNE EFFECT / OBSERVER EFFECT

- Knowledge of being assessed → 'angel performance'

### TIME-ON-TASK EFFECTS

- Prolonged cognitive activity can lead to task detriments

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## REMEMBER...

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A **biased assessment** is one or all of the below:

**Unreliable**  
**Invalid**  
**Unfair**  
**Inaccurate**

A biased assessment is **WORSE** than no assessment at all !!

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## Because...

**“unreliable / invalid assessments  
could be unfair and potentially damaging for the  
individual clinician being assessed”**

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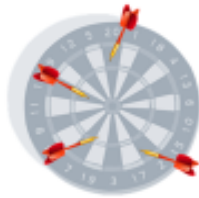
ORIGINAL ARTICLE

Training Faculty in Nontechnical Skill Assessment  
*National Guidelines on Program Requirements*

*Louise Hull, MSc; Sunal Arora, PhD; Nicholas R.A. Symons, MSc; Rich Jabl, MRCS; Ara Darzi, FACS,  
Charles Vincent, PhD, and Nick Sevdalis, PhD*

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Invalid/unreliable assessments are also **bad science**:  
psychometric properties of tools are **important!**



NOT reliable  
(no consistency)



Reliable NOT valid  
(consistent, but not accurate)



Reliable & Valid!  
(consistent & accurate)

A measure has to be reliable, before it can be valid,  
but reliability does not imply validity!

RATING SHEET



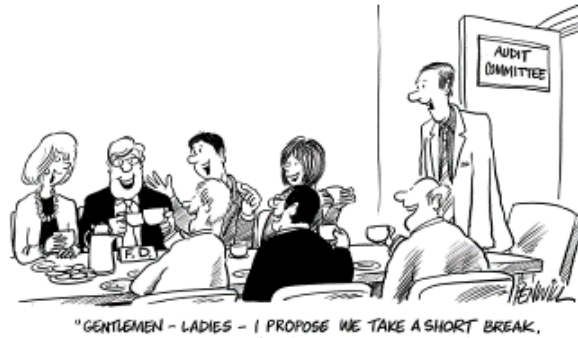
YOUR RATING



Questions?



Break time  
(15min)



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### 3. Introduction to MDM assessments

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## CAN TEAM PERFORMANCE IN MDT MEETINGS BE MEASURED SCIENTIFICALLY?

*“We can only be sure to improve what we can actually measure”*

Professor A Darzi  
High Quality Care for All  
Department of Health (UK) 2008

## DEVELOPING AN INSTRUMENT...

Original research

**Teamwork and team performance in multidisciplinary cancer teams: development and evaluation of an observational assessment tool**

Benjamin W Lamb,<sup>1,2</sup> Helen W L Wong,<sup>1</sup> Charles Vincent,<sup>1</sup> James S A Green,<sup>2</sup> Nick Sevdalis<sup>1</sup>

**MDT-MODE** Metric for the Observation of Decision-making

Ann Surg Oncol (2011) 18:355–364  
DOI 10.1245/s12453-011-1773-5

Journal of  
**SURGICAL ONCOLOGY**  
www.surgicaloncology.com

ORIGINAL ARTICLE – HEALTHCARE POLICY AND OUTCOMES

**Quality Improvement in Multidisciplinary Cancer Teams: An Investigation of Teamwork and Clinical Decision-Making and Cross-Validation of Assessments**

B. W. Lamb, MRCO<sup>1,2</sup>, N. Sevdalis, PhD<sup>1</sup>, H. Mosafid, FRCS (Urol)<sup>1</sup>, C. Vincent, PhD<sup>1</sup>, and J. S. A. Green, FRCS (Urol)<sup>2</sup>

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## HOW DO WE ASSESS MDT SCIENTIFICALLY?

**MDT-MODE** Multi-  
Disciplinary  
Observation of  
Decision-making

Assessing  
quality of  
information



Information					
Hx	X-ray	Path	Psych/soc	comorbid	Patient view

Discussion					
Surg	Phys	Oncolo	Nurse	Radiolo	Histopath



Assessing  
quality of  
contributions

Lamb et al, BMJ Qual Saf 2011;20:849-56.

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## Scales and scoring anchors for assessors



**MDT-MODE** Multi-  
Disciplinary  
Observation of  
Decision-making

Tumour		Tumour		
Pathway	Pre Rx	Pre treatment	Co-morbidity	5 Comprehensive past medical history and performance status
	Post Rx	Post treatment		3 Vague knowledge of past medical history or performance status
	R	Recurrence/surveillance		1 No knowledge of past medical history or performance status
History	5	Fluent, comprehensive case details (e.g. symptoms, relevant details of presentation)	Patient's views	5 Comprehensive knowledge of patient's wishes or opinions regarding treatment
	3	Partial case details		3 Vague knowledge of patient's wishes or opinions regarding treatment
	1	No patient case details		1 No knowledge of patient's wishes or opinions regarding treatment
X-ray	5	Radiological images explained in detail with 1 slide/pictures	Chair	5 Good leadership enhanced team discussion and decision making
	3	Radiological information directly from a report/ account		3 Leadership neither enhanced or impeded team discussion and decision making
	1	No provision of radiological information		1 Poor/inadequate leadership impeded team discussion and decision making
Pathology	5	Histopathological information explained in detail with 1 slide/pictures	Members	5 Clear contribution of speciality.
	3	Histopathological information directly from a report/account		3 Contribution inarticulate or vague
	1	No provision of Histopathological information		1 No contribution
Psycho-social	5	Comprehensive knowledge of patients' personal circumstances, social and psychological issues.	Decisions	5 Clear decision about treatment(s) to be offered
	3	Vague knowledge of personal circumstances, social and psychological issues.		3 Decision to defer to next MDT
	1	No knowledge of personal circumstances, social and psychological issues.		1 No decision/decision unclear

Lamb et al, BMJ Qual Saf 2011;20:849-56.

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## EXEMPLAR BEHAVIOURS & ANCHORS

- Observable
- Indicate better/worse performance
- Used to guide ratings

**\*LOOK AT THE MDT-MODE FORM\***



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## MDT-MODE RATING SCALE



- 5-point scale
- Anchors vary slightly



1	2	3	4	5
Poor, inadequate, no information, absent contribution		Average, with some vagueness or inconsistencies		Good, comprehensive information & fluid contribution

COMPROMISED ← - - - - Decision-Making - - - - → ENHANCED

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## STRUCTURE OF MDT-MODE

MDT-MODE Multidisciplinary  
Teamwork for the  
Observation of  
Decision-making

### Domains:

1. Type of case
2. Quality of Information
3. Quality of Contribution
4. Outcome



### Comprehensive assessment:

- **Every case** rated independently
- 13 Ratings/case (6,1,6)
- At **disciplinary group-level** with unit of analysis being the case-discussion



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MDT-MODE Multidisciplinary  
Teamwork for the  
Observation of  
Decision-making

## Disciplinary group-level assessment with the unit of analysis being a case-discussion (and not an individual team member!)

“Such approach has advantages when evaluating a team because it **ensures team safety** by **minimizing the risk of defensive routine and blaming** a particular team member for performance difficulties which could in turn distract the team from addressing their performance problems constructively.”

Soukup et al. Do multidisciplinary cancer teams suffer decision making fatigue? BMJ Open. <https://bmjopen.bmj.com/content/9/5/e027303>

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## QUALITY OF INFORMATION

### Case history

- Details of specific episode
- Background information e.g. symptoms, presentation

### Radiological information

- Explained in detail by radiologist
- CT/MRI/X-ray images
- Reports of radiological investigations

### Histopathological information

- Explained in detail by histopathologist
- Specimen slides
- Histology/cytology reports

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## QUALITY OF INFORMATION (CONT.)

### Comorbidities

- Other illnesses/conditions
- Medications
- Performance score (on a standardised test)

### Psychosocial (psychological and social aspects)

- Social circumstances e.g. cared for, carer, distance travel, deprivation
- Activities of Daily Living (ADLs)/independence
- Psychopathology e.g. mental illness, drug and alcohol problems

### Patients' views

- Regarding diagnosis
- Regarding treatment options

70

## QUALITY OF CONTRIBUTION

### Team members

Surgeon  
Physician  
Oncologist  
Nurse  
Radiologist  
Histopathologist



- Contribution to discussion/decision-making of team members of given speciality
- Including interpretation and evaluation of information

### Chairing

- Leadership behaviour of chair
- May be fluid
- Different chairing/leadership styles
- See ATLAS tool

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## ADDITIONAL DETAIL

### Pathway

- Pre-treatment/post-treatment/recurrence
- Point on patient journey at which MDM is taking place
- Helps to rationalise assessment

### Tumour

- Tumour type or site
- Helps to rationalise assessment

### Decision (has a decision been reached?)

- Observed from sitting in the meeting
- Recorded by MDT administrator
- Taken from meeting minutes

72

## SOME CAVEATS



MDT-MODEe Help to the  
Expansion of  
Morbidity

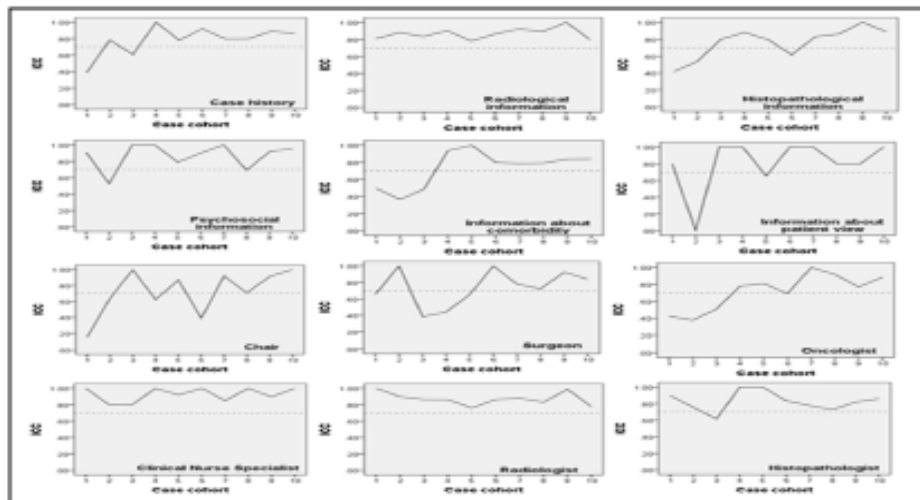
- Physicians not members of all MDTs
- Record co-morbidity and psychosocial factors separately from history
- Sometimes pathology or radiology are not applicable; please record N/A
  - E.g. pre-surgery MDM review of imaging
  - E.g. post-surgical MDM review of pathology

– Also...

73

## Team assessment has a learning curve

MDT-MODEe Help to the  
Expansion of  
Morbidity

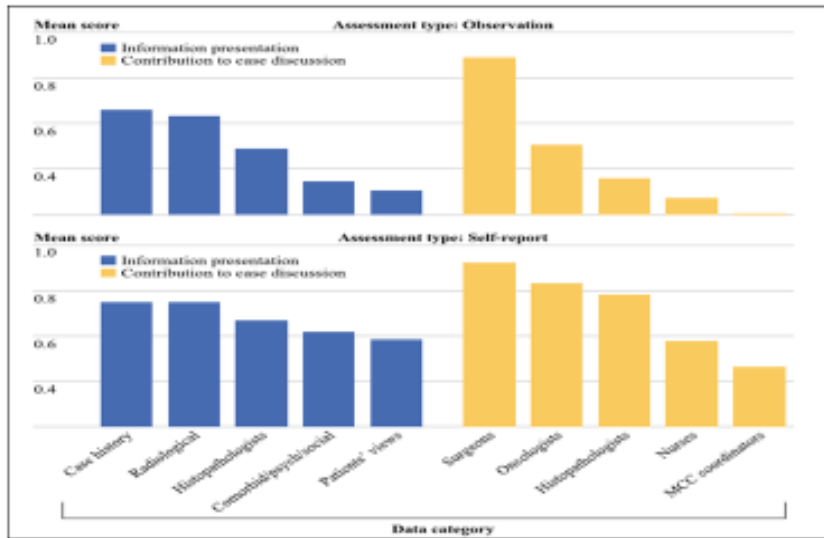


- Used by clinical and non-clinical professionals
- They ALL require training!

Jallil et al, J Urol 2014;192:191-8.

74

## Team assessment v. self-assessment



- MDT-MODE picks up similar pattern with self-assessment
- But self-assessment way more flattering!

Lamb, Sevdalis, Mostafid et al, Ann Surg Oncol 2011;18:3535-43.

75

## The most widely used MDT tool across different cancers, teams and countries

Across various cancer:

- ✓ Urology
- ✓ Colorectal
- ✓ Upper GI
- ✓ Head & Neck
- ✓ Breast
- ✓ Lung
- ✓ Gynaecological

Assessment can be done in:

- real time, or
- retrospective (from recording)



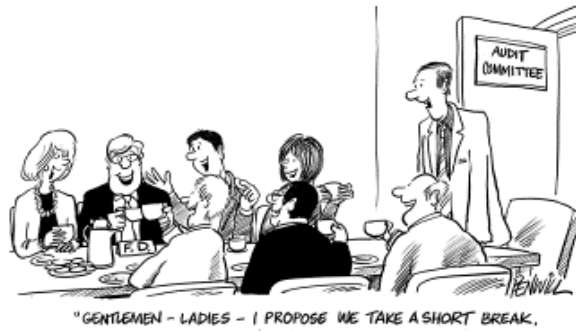
76

Questions?



78

Lunch time  
(60min)



79



## 4. Practical session



**\*LOOK AT THE MDT-MODe FORM\***

1

### MDT-MODE TRAINING

MDT-MODe Metric for the  
Observation of  
Decision-making

1. Please sign the **confidentiality agreement**
2. Please rate cases according to their **number on the score sheet**
3. Please retain your score sheet for **collection at the end of the day**
  - We will use the anonymised data to evaluate the effectiveness of the training

2

## MDT-MODE TRAINING (CONT.)

MDT-MODE MDT in the  
Department of  
Management

4. Finding out **who's who**
5. Rating **information** and **contribution**
  - Examples of **better** behaviours
  - Examples of **worse** behaviours
6. Rating
  - **Single cases** within one team
  - **Series of cases** within one team
  - **Single cases in different teams**

3

View MDT video



Independently rate the team  
using MDT-MODE



Group discussion



4

**Practical  
session 1:**  
Rating  
**different**  
cases

84

**Practical  
session 2:**  
Rating  
**different**  
teams

85

**Score** individually without discussion.

**Watch** video.

**See ratings on screen.**

**Discussion:**

- Who gave 5? Why?
- Who gave 1? Why?
- What challenges did you encounter?

9

**Practical  
application**

32

## Tools and what they measure

Instrument/Tool	What it measures
1. MDT-MODE (today!)	Team decision-making process
2. MDT-ORAS	Team functioning as expressed in national UK guidance (18 components)
3. TEAM	Core functions of the team and their team meetings, based on the components defined in "the characteristics of effective MDT"
4. MDT-MOT	Team attendance, leadership/chairing of the MDM, teamwork and culture
5. MDT-FIT	Encompasses validated components of MDT-MOT and TEAM, allows self-assessment of team working, combined with expert feedback from facilitator, and sharing of the outcome with the team as part of a team-reflective discussion
6. ATLAS*	Leadership and chairing skills
7. MeDiC**	Gauges complexity of cases for MDT discussion (streamlining workload)

\*\* MeDiC: A measure of case complexity for cancer multidisciplinary teams: development and early validation of the MeDiC tool. 2019. PsyArXiv Preprints. <https://psyarxiv.com/qzwf8/>

\*ATLAS: Quality of leadership in multidisciplinary tumor boards. World J Urol. 2018. <https://www.ncbi.nlm.nih.gov/pubmed/29502300/>

References to tools 1 to 5 can be found here: Successful strategies in implementing multidisciplinary team working. 2018. J Multidisc Healthc <https://www.ncbi.nlm.nih.gov/pubmed/29403284>

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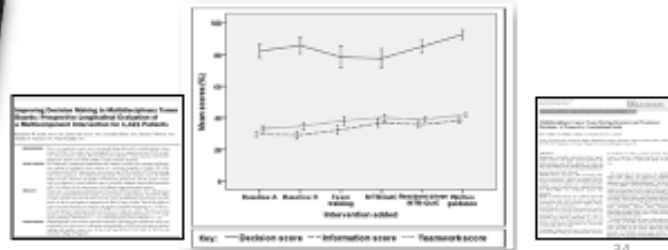
## IMPROVING MDT QUALITY

MDT-MODE Measures for the Observation of Decision-making



### Study example 1:

- 1421 cases studied
- Ability to reach decisions 82.2→92.7% (P<0.05)
- Quality of information 29.6→38.3% (P<0.05)
- Quality of teamworking 37.8→43.0% (P<0.05)
- The ability to reach decisions related to
  - quality of information (r=0.298, P<0.05)
  - quality of teamworking (r=0.348, P<0.05)



34

**Study example 1 (cont.):**

**Quality Improvement Checklist (MDT-QuIC)**

**Development:**

- Phase 1.** Literature review
- Phase 2.** Validation
- Phase 3.** Expert review
- Phase 4.** Evaluation by MDT members

**MDT-QuIC** Quality Improvement Checklist

Designed to assist with clinical decision making  
For use with every case discussion

**Before case discussion:**

- Are sufficient core members present?
- Is someone present who knows the patient?
- Is the patient's key worker present?

**Information:**

- Case History
- Comorbidities
- Radiological
- Pathological
- Psycho-social
- Patients' views
- Clinical trials
- Other

**Discussion:**

- Surgeons
- Physicians
- Oncologists
- Radiologists
- Pathologists
- Nurses
- Palliative care
- Allied Healthcare Professionals

**Outcome:**

- What are the recommendations of the MDT?
- Are there any objections?
- Does this patient need further discussion?

Lamb et al, Ann Surg Oncol 2012;19:1759-65.

35

**IMPROVING MDT QUALITY**

**BMJ Open** Do multidisciplinary cancer care teams suffer decision-making fatigue: an observational, longitudinal team improvement study

**Study example 2:**

Correlations			Meeting characteristics		
Ordinal position of patients Base within meetings	Information score	Contribution score	Average meeting duration (range)	Average No. of patients discussed per meeting (range)	Total No. of patients discussed over 10 weeks
Audit Cycle 1	-0.254*	-0.160*	3h (2h – 3h 30min)	42 (29-51)	346
Audit Cycle 2	-0.206*	-0.128*	3h (2h – 3h 30min)	51 (37-71)	467
Audit Cycle 3	-0.078	0.072	2h 53min (1h 30min – 3h 25min)	62 (52-70)	522

Note. **Ordinal position** is a counter that increases for each decision in the meeting. \* $p < .01$ , table entries are Pearson r coefficients.  $N = 1335$ .

<http://bmjopen.bmj.com/doi/content/full/bmjopen-2018-027303>

**MDT-MoDe** Multidisciplinary Decision Making

## Team Audit and Feedback

[Identify, Assess, Feedback, Improve]

**2. ASSESS:**  
Team's baseline performance  
MDT-MOCe

**1. IDENTIFY**  
a **problem** (an area that would benefit from improvement)

**3. FEEDBACK**  
results to the team, and **agree on improvements**

**4. IMPROVE:**  
Implement the change

**5. REPEAT**  
(steps 2 to 4)

**EVIDENCE-BASED:**  
Non-punitive and actionable feedback provided to professionals to allow them to assess and adjust their performance is effective in improving practice and supporting quality and safety in healthcare settings.  
Flottorp et al., 2010; Michie et al., 2005; Ivers et al., 2012

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## Team Audit and Feedback

[Identify, Assess, Feedback, Improve]

**2. ASSESS:**  
Team's baseline performance  
MDT-MOCe

**1. IDENTIFY**  
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results to the team, and **agree on improvements**

**4. IMPROVE:**  
Implement the change

**5. REPEAT**  
(steps 2 to 4)

**Benchmark performance against:**

1. team's baseline performance
2. recommendations
3. evidence

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## Analysis

#	Tumour	Pathway	INFORMATION						CONTRIBUTION						DECISION		
			Rx	Key	Path	Psych- social	Co- mark	Patient's view	Diagn	Surgeon	Physician	Oncologist	Nurse	Radiologist	Histopath	T/U/N	Notes
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	

\* If you are present in some MDT meeting e.g. lung and cancer teams (metastatic targets) \*\* Please do not include non-consultants and non-consultant trainees in scores. Scores in this column are not used in analysis. NOT APPLICABLE. PLEASE MARK 'N/A'.

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## Analysis (cont.)

Scores can be averaged by:

- **Individual variables** (red vertical lines)
- **Domains i.e. information score, and contribution score** (orange vertical lines)
- **Global MDT-MODE score** (aggregated across all variables; green horizontal line)

Some considerations:

- Pay attention to numerator and denominator when averaging scores to exclude N/A cases
- Consider converting to decimal fraction (e.g. 0.5, 0.7 etc.) or %

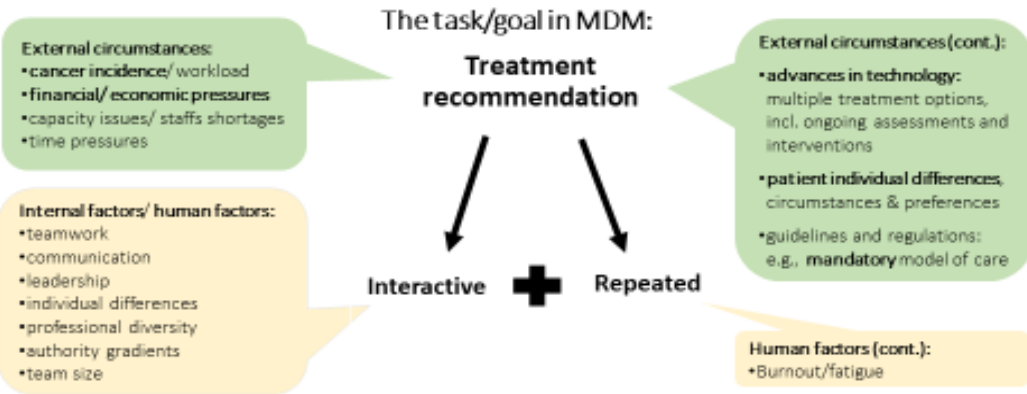
Compare MODE scores to other variables of interest:

- **Outcome of discussion** (decision; blue vertical lines)
- **Case order** (serial number; purple vertical line)
- Length of discussion, length of meeting
- Clinical information
- Attendance

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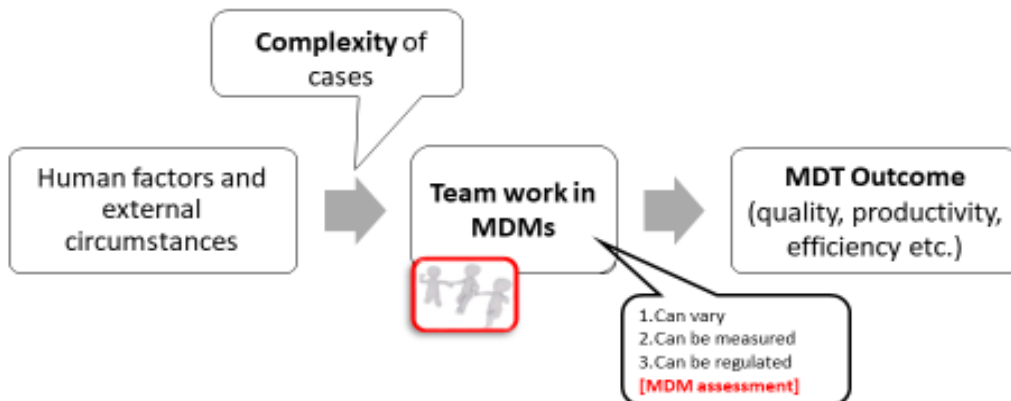
**MDMs are a unique part of the cancer care pathway with multiple underlying complexities impacting team performance**



Soukup/Lamb (2019) An integrated literature review with a pragmatic framework for understanding and improving decision making in MDMs. *Frontiers in Psychology*, 10:1245. <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01245/full>

Mistry et al 2011; WHO 2014, NHS England 2014; CRUK 2017

**Functional perspective of cancer MDT decision-making**



Soukup et al. (2016). The anatomy of decision-making in multidisciplinary team meetings. *Medicine* 95:24.

Forsyth, D. R. (2006) Effective group meetings and decision making. In: MacNair, R.M. (eds.) *Working for peace: A handbook of practical psychology*. Atascadero, Impact Publishers, pp. 88-97. / Forsyth, D.R. (2014) *Group Dynamics* (6th ed.). US, Jon-David Hague.

Soukup, T. (2017). *Socio-cognitive factors that affect decision-making in cancer multidisciplinary team meetings* [PhD Thesis; Clinical Medicine Research]. Imperial College London. London, UK.

## Guidelines v. evidence/shortfalls (important for benchmarking)

Guidelines & Recommendations	Scientific Evidence
<ul style="list-style-type: none"> <li>• MDTs are gold standard (NICE, DoH):               <ul style="list-style-type: none"> <li>+ diversity brings best performance;</li> <li>+ best equipped to address complex needs in cancer;</li> <li>+ opportunity for expert review thus optimising care and improving patient outcomes</li> </ul> </li> <li>• Patient-centred holistic approach needed for high-quality care and efficiency</li> <li>• Integration of psychosocial factors into routine cancer care, from diagnosis to survivorship for every patient</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Diversity of expertise not utilised to full effect</b> <ul style="list-style-type: none"> <li>+ Unequal participation in discussion (cost! Also, fidelity!)</li> <li>+ "I am always amazed how very able staff can be so passive"</li> </ul> </li> <li>• <b>16% of decisions not implementable</b></li> <li>• <b>In 27-52% of cases decision not reachable in MDM</b></li> </ul>
<ul style="list-style-type: none"> <li>• More focus on complex cases</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Lack of consideration of patients views, their comorbidities and their psychosocial aspects</b> <ul style="list-style-type: none"> <li>+ negatively affects ability to implement recommendations</li> <li>+ Yet psychosocial information has a positive impact on the team ability to make recommendation</li> </ul> </li> <li>• Increased workload and meetings are taking longer (prolonged meetings becoming a norm for many teams)</li> <li>• Tool that can gaguge complexity of cases exists (see <b>MeDiC</b>)</li> </ul>
<ul style="list-style-type: none"> <li>• MDTs should be supported to use <b>validated tools</b> and streamline their processes where possible</li> </ul>	<ul style="list-style-type: none"> <li>• A number of <b>validated tools</b> for MDTs exist</li> </ul>
<p>e.g.: NICE; DoH, Manual for cancer services; NHS England: Everyone counts; Institute of Medicine 2008: Cancer care for the whole patient; NCAI 2010; Independent Cancer Taskforce 2015;</p>	<p>e.g.: Soukup et al Predictors of treatment decisions; Stalrands et al Consideration of comorbidity; Lamb et al 2011 Systematic review; Raine et al 2014 Determinants of treatment plan implementation; etc.</p>

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### Some practical considerations

Who is going to do the assessment?

Time and resources available for the assessment.

What MDT are you going to assess?

Get to know the team and **who is who**.

**Inform** the team about the assessments.

**Position yourself discretely in the meeting room** (to reduce bias).


Assessment of first one to two meetings should be **practice only** (to reduce bias).

Feed back the results to the MDT to keep them **engaged and informed**.


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5. Questions & Troubleshooting



How would you improve your MDM?



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 [@TayanaSoukup](https://twitter.com/TayanaSoukup) [@LambWBen](https://twitter.com/LambWBen) 

**National Cancer Institute:**  
Multidisciplinary Teams Cyber Discussion Series  
<https://healthcaresdelivery.cancer.gov/cyberseminars/>

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**MDT-MODE BACKGROUND EVIDENCE:**

1. Lamb B, Sevdalis N, Arora S, Pinto A, Vincent C, Green JSA. Teamwork and team decision-making in multidisciplinary cancer conferences: Barriers, facilitators, and opportunities for improvement. *World J Surg* **2011**;35:1970-6.

*This paper reports a qualitative interview study with members of MDTs assessing factors that affect team decision-making – including the environment, teamworking, information use and leadership.*

2. Lamb B, Green JSA, Vincent C, Sevdalis N. Decision making in surgical oncology. *Surg Oncol* **2011**;20:163-8.

*This review presents an ‘input-process-output’ model for the evaluation of cancer MDT working and decision-making.*

3. Lamb BW, Brown KF, Nagpal K, Vincent C, Green JSA, Sevdalis N. Quality of care management decisions by multidisciplinary cancer teams: A systematic review. *Ann Surg Oncol* **2011**;18:2116-25.

*This review systematically evaluates the available evidence base to identify the effectiveness of cancer MDT decision making and factors that impact on it.*

4. Jalil R, Ahmed M, Green JSA, Sevdalis N. Factors that can make an impact on decision-making and decision implementation in cancer multidisciplinary teams: An interview study of the provider perspective. *Int J Surg* **2013**;11:389-94.

*This paper describes a qualitative interview study that assesses factors considered important by experienced MDT members when reaching clinical management plans.*

**MDT-MODE DEVELOPMENT, VALIDATION & APPLICATION:**

5. Lamb B, Wong H, Vincent C, Green JSA, Sevdalis N. Teamwork and team performance in urological multidisciplinary cancer teams: Development and evaluation of an observational assessment tool. *BMJ Qual Saf* **2011**;20:849-56.

*This paper describes the development of MDT-MODE with initial validation and assessment of inter-rater reliability.*

6. Lamb BW, Sevdalis N, Mostafid H, Vincent C, Green JSA. Quality improvement in multidisciplinary cancer teams: an investigation of teamwork and clinical decision-making and cross-validation of assessments. *Ann Surg Oncol* **2011**;18:3535-43.

*This paper reports correlations between observational evaluations of cancer teams using MDT-MODE and team members' own self-assessments of their performance.*

7. Lamb BW, Sevdalis N, Vincent C, Green JSA. Development and evaluation of a checklist to support decision-making in cancer multidisciplinary team meetings: MDT-QuIC. *Ann Surg Oncol* **2012**;19:1759-65.

*This paper reports the development and expert validation of a checklist for use in MDT meetings, informed by the MDT-MODE elements.*

8. Lamb BW, Green JSA, Benn J, Brown KF, Vincent C, Sevdalis N. Improving decision-making in multidisciplinary tumor boards: Prospective longitudinal evaluation of a multi-component intervention over 1421 patients. *J Am Coll Surg* **2013**;217:412-20.

*This paper presents the results of a longitudinal study to assess the effectiveness of a quality improvement bundle for use in cancer MDTs, using MDT-MODE as the assessment tool.*

9. Lamb BW, Sevdalis N, Benn J, Vincent C, Green JSA. An investigation of the effect of organizational factors on treatment decisions in cancer multidisciplinary team meetings. *Ann Surg Oncol* **2013**;20:715.

*This study analyses correlation between quality of case review assessed via MDT-MODE and organisational factors affecting the team (incl. caseload, team-members in attendance, and others).*

10. Jalil R, Akhter W, Lamb BW, Taylor C, Harris J, Green JSA, Sevdalis N. Validation of team performance assessment for multidisciplinary tumor boards. *J Urol* **2014**.

*This paper reports MDT-MODE construct validation study that shows that cases where a cancer team makes a decision have higher MDT-MODE scores than those where a decision cannot be made. It also reports data on the validation of the tool for use with video-recorded MDT meetings.*

11. Soukup T, Lamb BW, Sarkar S, Arora S, Shah S, Darzi A, Green JSA, Sevdalis N. Predictors of treatment decisions in multidisciplinary oncology meetings: A quantitative observational study. *Ann Surg Oncol* **2016**;23(13):4410–4417.

*This paper reports how different elements of the decision process, from radiology and imaging to information on psychosocial aspects and comorbidities affect multidisciplinary teams' ability to reach a decision on a first case review in their meetings.*

12. Soukup T, Petrides KV, Lamb BW, Sarkar S, Arora S, Shah S, Darzi A, Green JSA, Sevdalis N. The anatomy of clinical decision-making in multidisciplinary cancer meetings: A cross-sectional observational study of teams in a natural context. *Medicine* **2016**;95:(24),e3885.

*This paper explores the underlying structure of multidisciplinary decision-making processes in the context of their weekly meetings on 1045 patients with cancer.*

13. Gandamihardja T, Soukup T, McInerney S, Green JSA, Sevdalis N. Analyzing breast cancer multidisciplinary patient management: a prospective observational evaluation of team clinical decision making. *World J Surg* **2019**;43(2):559-566.

*This paper presents an evaluation of clinical decision-making in breast cancer MDT meetings. It shows significant differences in the type of input and information considered during case reviews.*

14. Soukup T, Gandamihardja T, McInerney S, Green JSA, Sevdalis N. Do multidisciplinary cancer care teams suffer decision-making fatigue? An observational, longitudinal team improvement study. *BMJ Open* **2019**;9(5).

*This paper is relevant to MDTs with high workload and long meetings. It examines effectiveness of codesigned quality-improving interventions with a multidisciplinary team (MDT) with high workload and prolonged meetings to ascertain: (1) presence and impact of decision-making (DM) fatigue on team performance, and (2) impact of a short meeting break as a countermeasure of DM fatigue.*

15. Soukup, T., Lamb, B.W., Weigl, M., Green, J.S.A., Sevdalis, N. An integrated literature review of time-on-task effects with a pragmatic framework for understanding and improving decision-making in multidisciplinary oncology team meetings. *Front. Psychol* **2019**;10:1245.

*This paper is relevant for MDTs with very high workload and long meetings. It synthesizes theory, evidence and clinical practice across 167 scientific papers in order to bring current understanding of prolonged, repeated decision-making into the context of cancer MDMs. We explore how and why prolonged cognitive activity affects task performance in such settings, and what strategies can be employed by cancer teams to counteract negative effects and improve quality and patient safety.*

#### **FURTHER RELATED MDT PAPERS:**

16. Lamb BW, Allchorne P, Sevdalis N, Vincent C, Green JSA. The role of the cancer nurse specialist in the urology multidisciplinary team meeting. *Int J Urol Nursing*. **2011** 5:59-64.

*This paper presents a review the role of urology Cancer Nurse Specialists in cancer MDTs.*

17. Lamb B, Payne H, Vincent C, Sevdalis N, Green JSA. The role of oncologists in multidisciplinary cancer teams in the UK: An untapped resource for team leadership. *J Eval Clin Pract* **2011**;17:1200-6.

*This paper reports a survey study of urological oncologists in the UK assessing their views of current practice of cancer MDT working, including team leadership.*

18. Lamb BW, Sevdalis N, Taylor C, Vincent C, Green JSA. Multidisciplinary team working across different tumour types: analysis of a national survey. *Annals of Oncology. Ann Oncol* **2012**;23:1293-300.

*This paper present quantitative data from a UK national survey of MDT members regarding attitudes to MDT working, and makes statistical comparison between members of MDTs of different tumour types.*

19. Lamb BW, Taylor C, Lamb JN, Strickland S, Vincent C, Green JSA, Sevdalis N. Facilitators, barriers and patient-centeredness in cancer multidisciplinary care teams: Findings of a national study. *Ann Surg Oncol* **2012**;20:1408-16.

*This paper reports qualitative data from a UK national survey of MDT members regarding their attitudes towards the representation of patients at MDT meetings, and communication of decisions with patients.*

20. Jalil R, Lamb BW, Russ S, Sevdalis N, Green JSA. The cancer multi-disciplinary team from the co-ordinators' perspective: Results from a 2010 national survey in the UK. *BMC Health Serv Res* **2012**;12:457.

*This paper presents a study of UK MDT coordinators (administrative personnel) regarding their views on MDT working.*

21. Lamb BW, Jalil R, Shah S, Brown K, Allchorne P, Vincent C, Sevdalis N, Green JSA. Cancer patients' perspectives on multidisciplinary team working: An exploratory focus group study. *Urologic Nursing* **2014**.

*This paper reports a qualitative study with cancer patients regarding their views on and experiences of interaction with the cancer MDT.*

22. Kapur N, Parand A, Soukup T, Reader T, Sevdalis N. Aviation and healthcare: a comparative review with implications for patient safety. *JRSM Open* **2016**;7,(1),1-10.

*This paper explores the comparison between safety in aviation and healthcare, following set up of an Independent Patient Safety Investigation Service. It concludes that healthcare should emulate aviation in its resourcing of staff, and that professional and post-qualification staff training could specifically include Cognitive Bias Avoidance Training, as this appears to play a key part in many errors relating to patient safety and staff wellbeing.*

23. Soukup T, Lamb BW, Sevdalis N, Green J.S.A. Undertaking field research. *J Clin Urol* **2017**;10(1),58-61.

*This paper discusses importance of field research in healthcare, as well as some of the challenges encountered by researchers. It highlights greater need for field research in healthcare.*



**PREPRINTS (UPCOMING WORK):**

24. Soukup T, Murtagh G, Bali A, Gandamihardja T, Darzi A, Green JSA, Sevdalis N. Gaps and overlaps in healthcare team communication: analysis of speech in multidisciplinary team meetings. PsyArXiv Preprints **2019**. DOI: [10.31234/osf.io/za34e](https://doi.org/10.31234/osf.io/za34e)

*This paper explore communication between team members in cancer MDMs and how it is related to the quality of decision-making. It reveals difficulties in some teams in obtaining a turn to speak during case reviews.*

25. Soukup T, Murtagh G, Lamb BW, Green JSA, Sevdalis N. How multidisciplinary are multidisciplinary case-discussions in cancer care? Analysis of team decision-making styles. PsyArXiv Preprints **2019**. DOI: [10.31234/osf.io/3xwnd](https://doi.org/10.31234/osf.io/3xwnd)

*This paper examines the degree to which case reviews in MDT meetings are truly multidisciplinary. It concludes with 8 formats of decision-making with the least common being multidisciplinary.*

26. Soukup T, Lamb BW, Green J, Sevdalis N. Cognitive catch-22: Observational assessment of decision-making, interactions and team dynamics across two equal temporal halves of multidisciplinary oncology team meetings. PsyArXiv Preprints **2019**. DOI: [10.31234/osf.io/pvgfn](https://doi.org/10.31234/osf.io/pvgfn)

*This paper examines MDT meetings using three tools measuring quality of decision-making, interactions and clinical complexity across 822 patients. It reveals that while patient-discussions are significantly simpler in the 2nd half of the meeting, there is significantly less time left to discuss the remaining patients. Teams are rapidly attempting to close the time-workload gap and reach a recommendation, which adds to team cognitive load.*

**FURTHER TOOLS:**

27. Soukup T, Lamb BW, Arora S, Darzi A, Sevdalis N, Green JSA. **Successful strategies** in implementing a multidisciplinary team working in the care of patients with cancer: An overview and synthesis of the available literature. *J Multi Health* **2018**;11,4961.

*This paper contains a list of available tools for MDTs. It is also an up-to-date summary of the current knowledgebase on MDTs and their meetings that those planning or leading cancer services can use as a guide for service implementation or improvement. Copy of this paper is in the appendix.*

28. Jalil R, Soukup T, Akhter W, Sevdalis N, Green JSA. **Quality of leadership** in multidisciplinary cancer tumor boards: Development and evaluation of a leadership assessment instrument (ATLAS). *World J Urol* **2018**;36(7):1031-1038.

*This paper reports early validation and development of a tool for MDTs that measures leadership and chairing skills in MDT meetings.*

29. Soukup T, Morbi A, Lamb BW, Sevdalis N, Green JSA. **A measure of case complexity** for cancer multidisciplinary teams: Development and early validation of the **MeDiC instrument**. *PsyArXiv Preprints* **2019**. DOI: [10.31234/osf.io/qzwf8](https://doi.org/10.31234/osf.io/qzwf8)

*This paper reports first evidence-based and expert-driven tool that gauges the complexity of cancer cases, namely, MeDiC. The tool could be used to improve cancer MDM-working through case selection and prioritisation. For example, cases could be ordered by complexity with more complex cases receiving MDT discussion, and those that are less complex treated according to pre-defined guidelines and/or discussed in a smaller 'straightforward-case' MDM.*

*For more information on the MeDiC instrument, contact Tayana, [tayana.soukup@kcl.ac.uk](mailto:tayana.soukup@kcl.ac.uk).*

**Appendix A: Successful strategies paper with MDT tools**

**Appendix B: Copy of the MDT-MODE scoring sheet**

**Appendix C: Blank notes pages**

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# Successful strategies in implementing a multidisciplinary team working in the care of patients with cancer: an overview and synthesis of the available literature

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**Abstract:** In many health care systems globally, cancer care is driven by multidisciplinary cancer teams (MDTs). A large number of studies in the past few years and across different literature have been performed to better understand how these teams work and how they manage patient care. The aim of our literature review is to synthesize current scientific and clinical understanding on cancer MDTs and their organization; this, in turn, should provide an up-to-date summary of the current knowledge that those planning or leading cancer services can use as a guide for service implementation or improvement. We describe the characteristics of an effective MDT and factors that influence how these teams work. A range of factors pertaining to teamwork, availability of patient information, leadership, team and meeting management, and workload can affect how well MDTs are implemented within patient care. We also review how to assess and improve these teams. We present a range of instruments designed to be used with cancer MDTs – including observational tools, self-assessments, and checklists. We conclude with a practical outline of what appears to be the best practices to implement (Dos) and practices to avoid (Don'ts) when setting up MDT-driven cancer care.

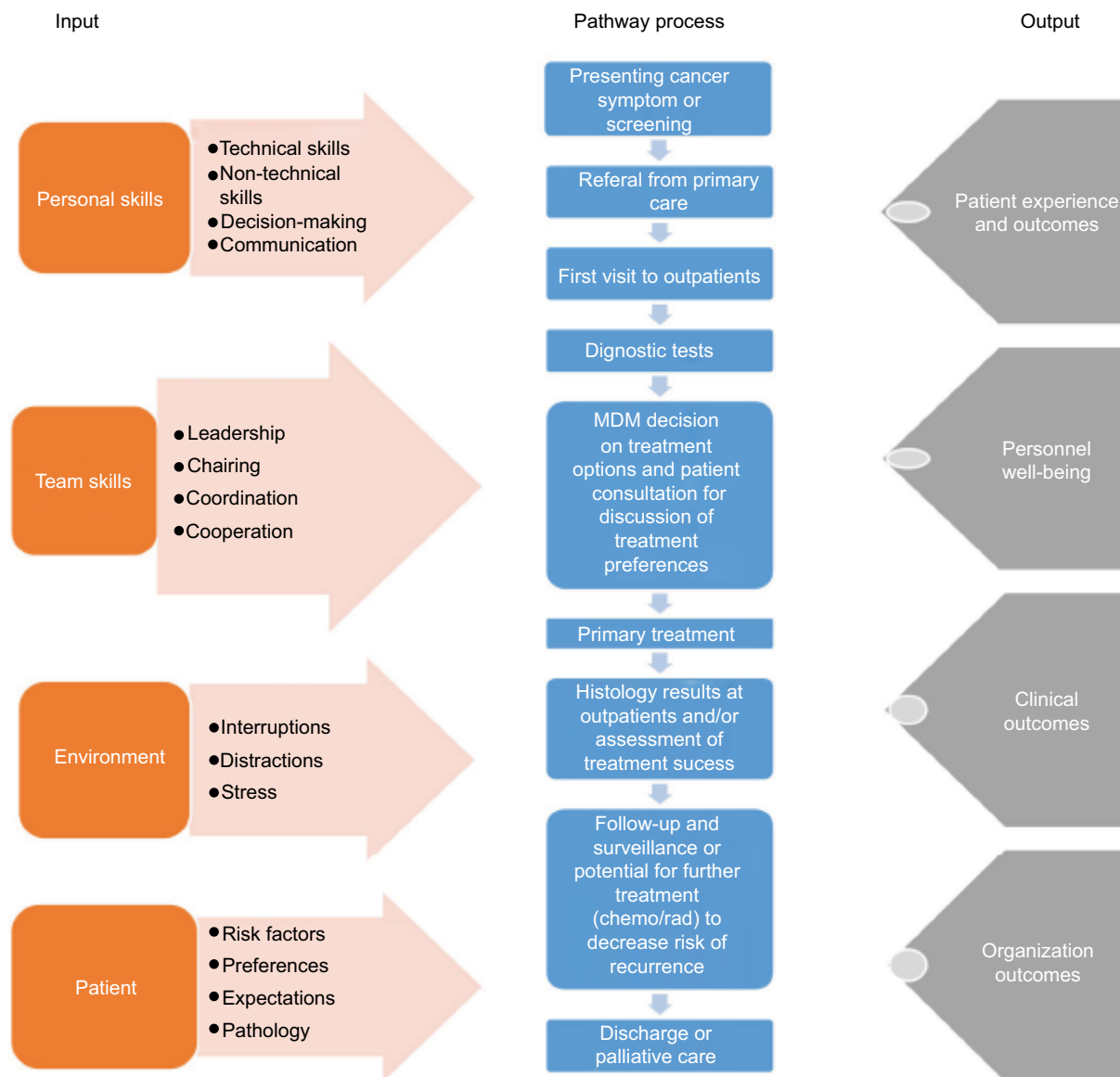
**Keywords:** cancer MDT, MDM, cancer meeting, patients with cancer

## Introduction

The concept of multidisciplinary team (MDT) working is widely accepted as the “gold standard” of cancer care delivery across the world. The cancer MDTs, and MDT meetings (MDMs) in particular, are at the center of an increasingly complex health care system. Figure 1 offers our conceptualization of modern MDT-driven care, which we apply to an extent to the rest of this paper. Effective MDT-driven care depends on a multitude of inputs (individuals, teams, environment, and patients) and processes (interactions, tests, results). It subsequently results in a range of outputs (patient experience, outcomes, organizational outcomes), which taken together are aspired to achieve high-quality, efficient care for patients.

The literature describing MDT working in cancer care is diverse and increasing in scope and volume with an increasing number of systematic<sup>1–3,8</sup> and other reviews.<sup>4</sup> The field is growing, as many disciplines alongside traditional health care effectiveness reviewing methodology are becoming involved in understanding MDT working, including psychology, improvement science, organizational science, and others. The diversity of the evidence base in itself presents a challenge to health care professionals,

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**Figure 1** A systems model approach to improve the delivery of cancer care representing the cancer pathway with the MDM embedded within it, and various inputs and outputs that affect the whole of the pathway, along with the factors that can impact on the inputs (in the arrows).

**Abbreviations:** Chemo, chemotherapy; rad, radiotherapy; MDM, multidisciplinary team meeting.

patients and their advocates, as well as those involved in health care organization, who want to improve the care of patients with cancer.

There is, therefore, need for the diverse evidence we have on what “works” in implementing MDTs in cancer care and what factors impact on care delivery to be reviewed in an integrated manner. This is what the present review aims to achieve in offering an integrative overview of diverse studies on cancer MDTs and their functioning. Specifically, the aim of our literature review is to synthesize current scientific and clinical understanding on cancer MDTs and their

organization; this, in turn, should provide an up-to-date summary of the current knowledge that those planning or leading cancer services can use as a guide for service implementation or improvement.

## Methods

In order to identify the relevant literature, we undertook a literature search of PubMed using the search terms “decision-making”, “cancer”, “multidisciplinary”, and “team”; we also hand-searched studies by consulting with experts in the field and by scrutinizing reference lists of retrieved papers, exist-

ing reviews, guidelines, and governmental documents. The search was limited to human beings, English language, and dates of publication ranging from 1999 to September 2017.

## Overview of evidence

The retrieved evidence is organized into the following five domains that appear critical for effective cancer MDT working:

1. Background to multidisciplinary teams in cancer care.
2. Key performance indicators of effective teams and their meetings.
3. Factors that are known to affect team processes.
4. Assessment of cancer MDT working.
5. Improvement of cancer MDT working and its impact on patient care.

## Background to multidisciplinary teams in cancer care

Cancer MDTs are made up of surgeons, oncologists, radiologists, pathologists, specialist cancer nurses, physicians, and meeting coordinators who usually meet on a regular basis (e.g., weekly) in cancer MDMs in order to discuss and agree on the care plan for patients with suspected or confirmed cancer. One of the core team members, often the MDT lead, tends to also chair the meeting, although variations between teams exist, with some not having a chair. The diagnosis and treatment of cancer involves a complex care pathway.<sup>5</sup> To ensure consistency, the UK's Department of Health<sup>6,7</sup> has made MDMs obligatory in order to ensure reliable and equitable delivery of safe and high-quality care that is necessary to improve patient outcomes – to all cancer patients. The MDM (sometimes termed a cancer conference or tumor board) is thus an integral part of cancer care services in the UK, where it is embedded in the cancer care pathway (Figure 1) and in other countries globally. It is intended to improve the consistency and quality of cancer care locally, regionally, and nationally. Even in countries where MDMs are not mandated, a need for a multi-team system for effective coordination of cancer care has been identified.<sup>1</sup>

The efficacy of the MDT-based approach to cancer care is poorly understood, however. Indeed, the empirical evidence for MDMs is mixed and unclear,<sup>8</sup> and their impact on patient outcomes, and in particular on the survival of patients with cancer, is uncertain. For instance, one study showed improvement in survival of patients with inoperable lung cancer from 3.2 to 6.6 months as a result of MDTs, although the authors noted that this could be due to other factors as

well since cancer care is complex.<sup>9</sup> The MDT approach was found to encourage positive changes to care management,<sup>10</sup> where it was found to outperform diagnostic tests<sup>11</sup> and lead to modification of diagnosis.<sup>12</sup> Other researchers, however, have found no difference in diagnosis pre- and post-MDM review.<sup>13,14</sup> More recently, research has also focused on MDMs identifying and improving various aspects of MDM working, such as the quality and efficacy of clinical decisions using methodologies ranging from surveys and interviews to observation and checklists (see also Table 1 for a list of tools available to assess MDTs that was generated from this evidence base).<sup>8,15–17</sup>

One reason for inconsistent results in research examining the functioning of cancer MDMs, however, could be the fact that novel treatments, technology, and service changes have all evolved in parallel to MDMs and potentially have confounded the findings.<sup>15</sup> What is more, designing studies to assess effectiveness has proven difficult; for instance, in the UK, MDMs are mandatory in cancer care and, therefore, orthodox comparative studies, i.e., randomized controlled trials, are not possible.<sup>15,16</sup> In addition, implementation of the MDT model of care in itself has some inherent variations since it relies on health care providers delivering it at the frontline, and this introduces human factors into the equation. For instance, in MDMs, decision-making process, team working and interactions, leadership (including chairing), team climate, treatment implementation, team ability to reach a care plan on a first case-presentation, and also waiting times, appropriate use of resources including technologies, as well as patient and health care professional satisfaction with care and quality of life, could be further examined.<sup>15,16,18</sup> Periodic survival evaluation of the population as a whole as well as prospective longitudinal studies of treatment implementation may also be useful indicators of team effectiveness.<sup>19</sup>

It is, therefore, crucial to advance our understanding of the intended advantages of MDMs through the in-depth study of the behaviors, processes, context, and organization of this approach to patient care.<sup>19–22</sup>

## Performance indicators of effective teams and their meetings

For a number of years after the inception of MDTs, there was an absence of empirical evidence about the potential factors that made MDTs effective. This changed in 2010 when the National Cancer Action Team (NCAT) in England defined indicators for highly functioning MDTs, termed “the characteristics of an effective MDT”,<sup>23</sup> including effective team meetings (these characteristics are outlined in Table 2).

**Table 1** A list of instruments used to assess and improve MDT working

Instrument (authors or source)	Brief instrument description	Instrument methodology
MDT-OARS (Taylor et al <sup>24</sup> )	“The MDT Observational Assessment Rating Scale” assesses 18 elements of good team functioning as expressed in national UK guidance	Observation
TEAM (Taylor et al <sup>49</sup> )	“The Team Evaluation and Assessment Measure” assesses core functions of the team and their team meetings, based on the components defined in “the characteristics of effective MDT”	Team self-assessment
MDT-QuIC (Lamb et al <sup>65</sup> )	“The MDT Quality Improvement Checklist” is designed to aid decision-making in MDMs by ensuring that all aspects of a case are reviewed by the team	Checklist
MDT-MODe (Lamb et al <sup>43</sup> )	“The MDT Metric of Decision-Making” measures the quality of presented patient information, contribution to case review per specialty, and team ability to reach a decision in the team meeting	Observation
MDT Quality Improvement Bundle (Lamb et al <sup>22</sup> )	A team improvement bundle including checklist application, team skills brief training, and guidance implementation	Quality improvement bundle
MDT-MOT (Harris et al <sup>48</sup> )	“The MDT – Meeting Observational Tool” assesses team attendance, leadership/chairing of the MDM, teamwork and culture	Observation
MDT-FIT (www.mdtfit.co.uk <sup>66</sup> )	“The MDT Feedback for Improving Team Working” encompassing validated components of MDT-MOT and TEAM allows self-assessment of team working, combined with expert feedback from facilitator, and sharing of the outcome with the team as part of a team-reflective discussion	Team self-assessment and observation

**Abbreviations:** FIT, feedback for improving team-working; MDM, multidisciplinary team meeting; MDT, multidisciplinary team; MODe, metric of decision-making; MOT, meeting observational tool; OARS, Observational Assessment Rating Scale; TEAM, Team Evaluation and Assessment Measure.

**Table 2** Characteristics of an effective multidisciplinary team for cancer patients

### I. The Team

- Level of expertise and specialization
- Attendance of MDMs
- Leadership (e.g., chair or leader of the MDMs)
- Team working and culture (e.g., mutual respect and trust, equality, resolution of conflict, constructive discussion, absence of personal agendas, ability to request, and provide clarification)
- Personal development and training

### II. Infrastructure for MDM

- Appropriate meeting room
- Availability of technology and equipment

### III. MDM organization

- Regular meetings

### IV. Logistics

- Preparation for meetings
- Organization during meetings
- Post-meeting coordination of services for the patient

### V. Patient-centered clinical decision-making

- Who to discuss, i.e., having local mechanisms in place to identify all patients where discussion at MDM is needed
- Patient-centered care (e.g., patient’s views and preferences are presented by someone who has met the patient, and the patient is given sufficient information to make a well-informed decision on their treatment and care)
- Clinical decision-making process
- The information the team needs to make informed decisions/recommendations at team meetings are as follows: pathological, radiological, comorbidities, psychosocial, palliative care needs, patient history, and patient views
- The decisions/recommendations at team meetings need to be evidence-based (in line with NICE and/or cancer network guidelines), patient-centered, and in line with standard treatment protocols (unless there is a good reason against this)

### VI. Team governance

- Organizational support (e.g., funding and resources)
- Data collection during team meetings, analysis, and audit of outcomes (e.g., patient experience surveys); the results of these investigations are fed back to MDTs to support learning and development
- Clinical governance (e.g., there are agreed policies, guidelines, and protocols for MDTs; performance assessment and peer review against similar MDTs using cancer peer review processes and other tools)

**Abbreviations:** MDM, multidisciplinary team meeting; MDT, multidisciplinary team; NICE, National Institute for Health and Care Excellence.



This definition was based on data from a national survey of over 2000 MDT members' perceptions of effective MDT working. Responses showed that 90% of respondents were in agreement that an effective MDM results in improved clinical decision-making, more coordinated patient care, improvement in overall quality of care, more evidence-based treatment decisions, and improved treatment. NCAT recommended assessing areas of team meetings such as team working and leadership. Key performance indicators have subsequently been generated from the NCAT document to serve as a benchmark against which MDTs can appraise and develop their practice.<sup>23</sup>

Moreover, the responses from the NCAT national survey were further analyzed by Lamb et al.<sup>15</sup> They revealed high agreement between different cancer teams (116 out of 136 agreements) in terms of what constitutes effective MDT working. Nonetheless, subtle variations in team working and clinical decision-making were evident across different tumor types and in relation to the preparation for and organization of MDMs, case selection, and clinical decision-making process.<sup>15</sup>

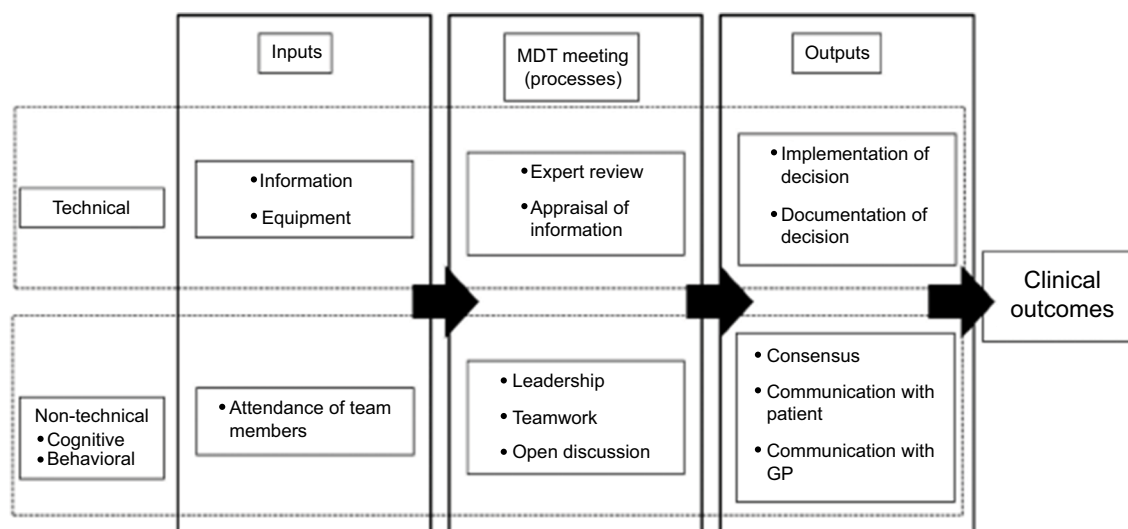
The "characteristics of an effective MDT" were further examined a few years later by Taylor et al<sup>49</sup> while developing a series of teamwork formative assessment tools: MDT MOT, TEAM, and MDT FIT (Table 1). When testing these tools, Taylor et al<sup>49</sup> confirmed the robustness of the characteristics as a benchmark that was applicable to rarer cancers (such as pediatric, brain, and hematology) in teams that faced challenges or complex situations and in MDMs that video-conferenced using multiple sites.<sup>49,24</sup>

More recently in 2017, a Cancer research UK report on cancer MDTs reiterated that team members expressed a high regard for MDMs, their structure, and process.<sup>25</sup> The majority of participants valued the meetings stating that they not only facilitated patient care but also saved them considerable time elsewhere in their clinical or administrative practice.

## Factors that are known to affect team processes

A number of studies have explored factors that have an impact on how well cancer MDMs function; these are related to the "input" element of the input-process-output diagram presented in Figure 1. Research into their working was greatly advanced by Lamb et al who developed a systems approach in 2010 to understand the multiple factors that can affect MDMs (Figure 2).<sup>26</sup> This ordered structure was then used as a basis for assessing the efficient functioning of an MDM and designing assessment tools for MDMs to improve team working and the delivery of cancer care (Table 1). They also performed content analysis on the responses to free-text (open) questions pertaining to the effectiveness of MDM working from the 2009 national survey of MDT members in the UK.<sup>27</sup> These questions covered three topics: effective team-working in the meetings, efficacy of team decision-making, and patient centeredness. This analysis aimed to further define aspects of effective team working in MDMs, with an emphasis on the similarities and differences in views between different professional groups.

The authors raised specific questions/issues regarding MDM functioning that could provide an evidence base



**Figure 2** A systems approach to describe and evaluate the functioning of an MDM. Reprinted from *Surgical Oncology*. 2011;20(3):163–168. Lamb BW, Green JSA, Vincent C, Sevdalis N. Decision making in surgical oncology with permission from Elsevier.<sup>26</sup>

**Abbreviations:** GP, General Practitioner; MDM, multidisciplinary team meeting; MDT, multidisciplinary team.



on which MDTs can develop their practice. Specific areas highlighted included the following: 1) how best to represent patients' views in MDM, 2) how disagreements within the team should be dealt with, and 3) what are the factors that facilitate participation in the decision-making process in team meetings, including organizational (e.g., lack of time to prepare) and interpersonal factors (e.g., steep hierarchies and lack of trust or respect between team members). It is argued that failure to optimize these factors can have an effect on clinical decision-making and could account for the variability seen in how well MDMs work.

Another contribution to our understanding of the factors that affect the impact of cancer MDTs on patient care comes from a systematic review<sup>8</sup> performed on 37 studies published between 2000 and 2008. It was found that MDTs failed to reach a decision for 27%–52% of cases and that when decisions were made they could not be implemented in 1%–16% of cases. The study showed that 1) care management decisions are made predominantly by medical personnel (usually surgeons), while nursing personnel have less of an active role in decision-making and defining treatment options, and patient preferences are rarely discussed and 2) time pressure (including lack of protected time to prepare for meetings), excessive caseload, low attendance, poor team working, and lack of leadership lead to lack of information and deterioration of decision-making. Some of these factors were reiterated in the 2017 Cancer Research UK (CRUK) report (time pressure, expanding workload, and lack of protected time) nearly 10 years later.<sup>23</sup>

In what follows, we describe in detail the factors affecting MDT working, including factors that impact on MDMs as per “input” in Figure 1.

### Personal and team skills

Good relationships between team members and adequate non-technical skills are important for smooth effective MDT functioning (i.e., communication and leadership). In particular, communicating effectively with colleagues at various levels of hierarchy and managing conflict within teams are recognized as key contributors to safe, high-quality care delivery across specialities.<sup>23</sup> However, evidence shows unequal participation in discussions on treatment options with medical personnel (including, e.g., oncologists and surgeons) tending to base their care management decisions primarily on biomedical information, seldom considering patient choice. It was also shown that nurses contribute to the meetings with the information about the patient's views and psychosocial aspects of care, although traditional professional hierarchies often lead to the exclusion of nurses and bias toward biomedical information.<sup>8,27</sup> An interview study

exploring the views of surgeons, oncologists, nurses, and administrators on various characteristics of MDMs has found that patient discussions do not encompass the contributions of different disciplines equally, i.e., nurses are underrepresented and surgeons, who dominate discussion, are biased toward biomedical information.

Effective leadership of an MDT, which includes chairing of team meetings, can play an important role in ensuring equality and inclusiveness of participation that may enable better decision-making. Nontechnical skills (e.g., communication skills) as well as clinical expertise were cited as key characteristics of an effective meeting chair. Training in nontechnical skills may be of benefit, in particular because the chair does not necessarily need to be a surgeon since other core members with adequate skill could take on this role.<sup>28</sup> Some of the best MDMs observed during the development phase of the MDM assessment tools mentioned earlier (Table 1) were chaired by specialist cancer nurses – core team members in MDMs.

When nurses are actively involved in care planning in the meetings, the team is perceived as performing at a higher level. Similarly, teams report that presence of nursing staff and larger and more diverse teams is associated with increased effectiveness.<sup>8,29</sup> Nurses tend to involve patients' views in the decision-making process more than medical personnel do. This is important since only 4% of MDM discussions involve patient's holistic information directly in the decision-making process.<sup>29</sup> In addition, evidence shows that decisions that take into account patients' preferences, performance status, and comorbidities are more likely to be implemented since such decisions are more clinically appropriate and acceptable to patients.<sup>30,31,27</sup> A more recent study showed that a complete patient profile (including, the biomedical aspects of the disease, as well as the information on patients' co-morbidities, their psychosocial aspects, and views on treatment options), and input into the discussion by all core disciplines (including, the nurses') are essential for the team to formulate a treatment recommendation for a patient.<sup>18,32</sup> And the need for a higher level information on patient comorbidities and nursing input may actually be indicators of more complex discussions<sup>18</sup> and validates the inclusion of specialist cancer nurses in the core membership of the MDMs.

The coordinators in cancer MDMs (for systems that afford this role within the team) also have an important role in improving the quality of care delivered by MDTs through their effect on team effectiveness and climate. However, their administrative role, as an intrinsic part of the cancer team, is often undervalued. The job is often used as an initial entry

into working in the health system and many of the coordinators, therefore, have little previous health service experience. A survey has found that coordinators feel that their job plan does not reflect their actual duties.<sup>33</sup> They identified needs for further areas of training in oncology, anatomy, physiology, and leadership skills to improve their team performance and consequently cancer care. Their role is central to the care of patients, both locally and through the coordination and sharing of data on wider level. Since coordinators role is pivotal in MDMs, it is important to devise and provide them with adequate training in order to improve team performance as a whole, something further research could focus on.<sup>33</sup>

Another issue raised by Lamb et al<sup>27</sup> was the importance of recording the disagreements when they occur and potentially discussing them with the patient. Although disagreements are uncommon in MDMs, dissent is not detrimental to a team as it can enhance critical thinking and evaluation during decision-making. However, teams that do not tend to dissent are at risk of “group think”, where disagreement exists but are not openly expressed; this may indicate poor team climate and lack of open communication within a team that can lead to poor decision-making. Within an MDM, ensuring open communication where dissent is acknowledged and effectively managed may be a key element of the chair’s role. Further research is nonetheless needed to evaluate how often and where dissent occurs in meetings and how it should be managed and collated and how it should be communicated to the patient.<sup>27</sup>

Team members report that MDMs are generally highly positive with an open culture for discussion, optimal management plans, coordinated treatment, and low risk of error. Moreover, a rotating leadership, which refers to team members taking turns at chairing the meeting, was found to be highly effective in terms of improving team work and team morale and reducing inter-professional conflict, although MDMs are most commonly led by surgeons. However, the role of the chair is unequally (and irregularly) distributed across disciplinary groups within a MDM, although, disciplines other than surgeons may be able to undertake this role.<sup>8</sup>

To illustrate this fact, a recent study from Scotland, examining the efficacy of a specialist nurse leading a cancer MDT by comparing clinical outcomes, showed that the nurse-led MDT performed as well if not better than other local units with comparable resources and patient population led by surgeons.<sup>35</sup> Other disciplines such as oncology have high levels of contribution to MDM decision-making. But regarding their role in leadership, when surveyed, they thought that they could chair the team meeting as readily as any other professional group. However, they are not taking leadership

role at the level that they expect; for example, only one in four oncologists has been chair of the MDT they attend and <40% of the MDMs they attend have a rotating chairmanship, further reducing the opportunity to lead. This prospect is further complicated by the finding that the oncologists who responded tend to participate in at least three MDMs, placing more demand on their time and ability to prepare and attend.<sup>18</sup>

It may, therefore, be useful to have a clinically non-contributing member chair the meeting to avoid detriments in performance as a result of a dual-task interference, as the job of chairing the meeting, by a clinician, has the potential to diminish the contribution that the clinician can then make to decision-making, during the meeting.<sup>18</sup>

### Environment

While non-technical skills are important, they are not sufficient on their own. Support at an organizational level is also important in the form of protected time in the participants’ job plans to prepare for, attend, and take action on the workload of the meeting. Lamb et al<sup>34</sup> found that lack of protected time for team meetings and competing demands or frequent conflicts with other responsibilities were barriers to effective meetings. In particular, team members without protected time for meetings were less likely to attend,<sup>27</sup> and that the most frequently cited organizational improvement to MDT working was more time dedicated to prepare for and attend the MDM.<sup>25</sup> Further research or audit is needed at an organizational level to ensure that protected time is available and supported organizationally.<sup>27,25</sup>

Excessive time pressure and lack of, or inadequate, information available at the time of decision-making (including imaging, investigations of tumor stage, review of pathology, and comorbidities) was found to negatively affect team ability to reach definitive care management plan, and lower team morale, resulting in reduced attendance and rushed decision-making. Compounding this, lack of protected time for MDMs to prepare for meeting contributes to excessive workload, time wasting during meetings, and inefficiency.<sup>8,25</sup>

Technology and decision support systems also play an important role. Telemedicine improves meeting attendance and it is cost-effective. However, it can slow down the team by reducing the number of patient discussed per meeting<sup>34</sup> and can negatively affect team’s decision-making.<sup>16</sup>

### Patient

Lack of patient-centered information presents a barrier to decision-making too; that is, failure to consider such information inhibits decision-making, renders decisions clinically inappropriate or unacceptable to patients, and is therefore detrimental to patient care.<sup>27</sup> Patients should be represented

**Table 3** A list of factors impacting and improving decision-making and implementation**I. Factors impacting decision-making and implementation**

- Lack of necessary information
- Lack of considerations of patient comorbidities, choices, and disease progression
- Non-attendance of key team members (as this can delay the decision and/or making a decision without the key team member can lead to an inappropriate treatment plan)
- Time pressure, i.e., not enough time to discuss all the patients, and so some get deferred (this can also negatively impact the patients)
- Technological problems with video conferencing

**II. Factors improving decision-making and implementation**

- Better case preparation, e.g., with a pro forma
- Effective team leadership (and chairing)
- Involvement of an anesthetist in the MDM (to immediately discuss whether patient is fit for surgery)
- Not discussing all patients, i.e., refining the inclusion criteria for MDT discussion either by splitting MDM into smaller meetings (logistical difficulties with this approach) or by excluding patients that fall under clear protocol/guidelines (although outside mandatory practice, this should be considered in future)
- Inclusion of patients in MDMs – however, there are mixed findings as to the benefit to the patient, and due to practical difficulties, patients in the UK do not attend

**Abbreviations:** MDM, multidisciplinary team meeting; MDT, multidisciplinary team.

by team members who know them well. Findings suggest that the clinical nurse specialist is the preferred team member to represent the patients' views in meetings, but consultant and attending surgeon or other members could also share the duty. Having patients present in MDMs might arguably inhibit the process; hence discussions between the patient and team members following the main MDT discussion may be preferable.<sup>27</sup> Nonetheless, patient-centeredness is important; a more recent study showed that patient psychosocial information is a significant predictor of team ability to reach a decision<sup>32</sup> and that a complete patient profile is needed for the treatment recommendation to be formulated.<sup>18</sup>

Further research is needed to gain better understanding of how to best integrate patient-centered information into MDM decision-making – a task that is not necessarily straightforward. This is because patient preferences will vary according to the disease itself, personal values, and circumstances.<sup>27</sup> Moreover, it is not clear whether it is in the patient's best interest that their preferences form part of the decision-making process or whether the team should initially discuss clinical options before patient preferences are considered.<sup>27</sup> In addition, any preferences patients express before the full MDM might change according to the advice and reflections emanating from the meeting.<sup>27</sup>

As a final point, Jalil et al<sup>16</sup> investigated views of expert urology and gastrointestinal cancer service providers in relation to the effectiveness of their MDMs in reaching a decision for each patient, with a particular emphasis on identifying the barriers to implementing MDT decisions into patient care and how these can be overcome. The researchers used semi-structured interviews with MDT members of urological

and gastrointestinal tumors. It was found that 92% of patient management plans are formed at MDMs and 95% of these are subsequently implemented. The list of factors impacting decision-making and implementation and those that can help improve it are given in Table 3.

### Assessment of cancer MDT working

Studies show that MDM's decision-making ability and the success in reaching a treatment plan when first reviewing a patient are good markers of the quality of teamworking.<sup>16,8,34,36</sup> Teams' choice of treatment and the implementation of these recommendations (rather than survival rates which are difficult to directly attribute to MDM working) can also be measured. Hence, a number of observational assessment tools have been designed to help measure and subsequently improve the impact of cancer MDMs on patient care. As such, observational approaches to MDM working are useful, feasible, and non-intrusive (i.e., do not intrude on patient time or add to team workload), providing an opportunity to perform out assessments in real-life setting and understand areas in which the MDMs are doing particularly well and those that need further improvement. Such approaches were developed on the backdrop of a growing tradition within health care for the use of observational evaluations of team skills and performance in both clinical environments, e.g., operating theaters,<sup>37</sup> intensive care units,<sup>38</sup> emergency departments,<sup>39</sup> and within simulated settings.<sup>40</sup> Overall, this is based on the premise that team assessment and feedback can help teams reflect on their own performance and improve their working.

However, observational methodology has its drawbacks. For example, it can be time consuming, lacks insight into

what participants think or feel, lacks control over extraneous factors, can present with limited replicability, and poses a challenge for a researcher to be accepted (non-clinical researcher) or to distance themselves from the environment (clinical researcher). Using structured and validated observation instruments by trained observers and ensuring good interobserver reliability can help adequately address these drawbacks. This is important, because, on balance, observation of MDTs is an important methodological approach to study such complex organizational behavior and to help improve safety and quality. Table 1 presents a list and description of tools designed and used for assessing MDTs together with study examples.

In the past few years, numerous studies have been performed applying observational techniques to better understand, assess, and improve MDT working. A number of studies have used a validated observational tool, MDT-MODE (Metric for the Observation of Decision-making in cancer multidisciplinary teams), to assess decision-making processes across different specialties, including the breast, urology, lung and colorectal cancers.<sup>18,32,41,42,44-47</sup> For instance, Lamb et al<sup>22</sup> revealed that the ability of an MDT to reach a clinical decision was positively associated with high-quality comprehensive and necessary information available at the point of decision-making (from case history, radiology, pathology), team contribution, and cases that are discussed at the beginning of meetings. However, high-quality information and team contribution were positively correlated with the larger team size, higher number of cases per meeting, and longer case discussions. Furthermore, using MDT-MODE, Soukup et al<sup>18,22</sup> found that a complete patient profile and representation by all core disciplines are necessary to maximize the ability of an MDM to reach management recommendations for all cases. More recently, MDT FIT has been developed as a web-based self-assessment tool for use by UK cancer teams to assess themselves locally and regionally by using validated instruments such as MDT MOT<sup>48</sup> and TEAM<sup>49</sup> embedded within them (Table 1).

In addition, there are developed and validated instruments within the social sciences that, although have not been specifically developed for cancer MDMs, could be profitably used in this context. For instance, the Team Climate Inventory,<sup>46</sup> a short questionnaire, can provide insight into individual members' perspectives of their team dynamics and has been successfully used with cancer MDTs.<sup>17</sup> Bales Interaction Process Analysis<sup>51</sup> is an observational coding system developed with small groups engaged in a problem-solving task (a context that resembles MDMs). It measures socioemotional (e.g., showing solidarity or tension) and task-related areas

(e.g., giving suggestions and asking for opinion), and it has been successfully used as an observational assessment tool with MDTs.<sup>50-54</sup> Team interactions can also be assessed using conversation analysis, which allows detailed examination of communication between members from audio- or video-recorded data transcribed using Jefferson notation system<sup>55</sup> that captures not only what is said but also how it was said with symbols indicating various aspects of talk, including intonation, pauses, overlaps, gaps, pace, loudness, and cut-offs, for instance. It has been previously used to study MDTs in the context of weekly meetings,<sup>56-57</sup> as well as in the operating theater.<sup>58,59</sup> Overall, these are untapped translational resources that could be profitably used to gain better understanding of team processes and dynamics and allow effective assessment of different levels of MDT working.

## Improvement of cancer MDT working and its impact on patient care

Some of the assessment tools described earlier has been used in intervention packages. For instance, Lamb et al<sup>22</sup> performed an intervention study that encompassed the following: 1) half-day training session on the evidence for improved clinical decision-making followed by an interactive workshop and discussion, 2) MDT QuIC to support decision-making, 3) training session for surgical residents on how to use MDT QuIC to prepare and structure cases in advance of the team meeting, and 4) guidance to the team by providing hardcopy and via e-mail setting out how team members could draw optimal clinical information required for decision-making. These interventions were found to improve decision-making and the likelihood of the team formulating a clinical management plan, both necessary for high-quality patient care. Decision support tools, such as the MDT-QuIC, were also shown to improve patient care and increase compliance with clinical practice guidelines. MDT FIT, a self-assessment tool mentioned earlier, was also designed to be an intervention to improve cancer team working and thus ultimately the delivery of enhanced patient care. Since its inception, it has proven useful to all UK cancer teams that have used it and everyone has found areas for improvement.<sup>60</sup>

Based on the flourishing area of team assessment and improvement tools that have been developed and applied in the past few years, we are optimistic that interventions that combine best evidence as found elsewhere in health care, such as combinations of skills training and checklist application, possibly using simulation as a training approach<sup>61</sup> will find their way into MDM improvement in the coming years.

Health services have changed significantly since MDTs were introduced 20 years ago. There has been a sustained

increase in the workload of MDTs as a result of growing number of patients to be discussed in MDMs, along with the complexities of an aging population and growing number of treatment options available.<sup>25</sup> The increase in the demand for MDT working has not been matched by greater availability of resources, with only minor increases in capacity seen. One potential solution, which has been identified by researchers and policymakers alike, is to streamline MDM working<sup>62,63,25</sup> to allow more straightforward cases to assign less discussion time. This strategy might allow more time and resources in MDMs for discussion of complex or rarer cases, where patients have unusual or multiple problems requiring a truly multidisciplinary approach. Combined with the initiatives to improve the quality of MDT working, such a strategy, could help optimize the MDT approach for those patients in need of it.<sup>64</sup>

## Summary

As a central part of the care pathway, cancer MDMs are a clinically valued resource allowing a diverse range of health care experts, necessary for an increasingly complex cancer care, to come together and discuss treatment options for patients. They are an expensive resource, however, and with an increase in the health and economic pressures, its value has been progressively placed under scientific scrutiny.

The past decade has thus seen research on cancer MDTs rapidly evolving. The lack of empirical evidence led to the NCAT's characteristics of effective teams. This was followed by an array of studies examining various aspects of team functioning; they encompass observational approaches and tool developments, but also surveys and interviews assessing the team members' and patients' perspectives on MDTs. The importance of weekly MDMs for cancer MDTs was further reiterated recently in the report by the CRUK.

While evidence has consistently shown variations in team working and clinical decision-making across different cancers, we have learned that certain factors pertaining to personal and team skills, the environment and patient-centeredness can impact team functioning and decision-making (Tables 3 and 4). Hence the importance of a team-centered approach to improving cancer MDMs; led by a clinically feasible, observational methodology, and adequate training opportunities in non-technical skills.

What is more, we have also grown to think of MDMs as an input-process-output model. This provides a necessary framework that allows the design and execution of studies necessary for producing and accumulating the knowledge base, thereby steadily building our understanding of what practices MDTs should reinforce and avoid. Table 4 below presents a summary of these practices as mentioned within our review.

**Table 4** Practices to implement (Dos) and those to avoid (Don'ts) when setting up MDT-driven cancer care

Dos	Don'ts
Good relationships between team members	Unequal participation in discussion on treatment options
Communicating effectively with colleagues	Basing decisions primarily on biomedical information
Managing conflict within teams effectively	Seldom considering patient choice
Incorporating patient choice into decision-making	–
Incorporate patient views on the treatment options into decision-making	–
Incorporate patient psychosocial factors into decision-making	–
Incorporate patient comorbidities into decision-making	–
Ensuring equality and inclusiveness of team participation, in particular nurses	–
Rotating chairing duties within and between disciplines and, where possible, have a clinically non-contributing individual chair the meeting	–

**Abbreviation:** MDT, multidisciplinary team.

## Strengths and limitations of the review

Regarding limitations, this review is a summary of current understanding – academic and clinical – of cancer MDT working; due to the heterogeneity of the studies, metrics, and outcomes we reviewed, a fully systematic review methodology was not feasible. Furthermore, in being inclusive of different designs and methods and adopting a descriptive approach, we did not assess the methodology and analyses undertaken within the studies that form the evidence for this review. Strengths of the review include that it offers a summary of a very disparate evidence base and it covers validated metrics for the evaluation of MDT work processes.

## Conclusion

This review presents an up-to-date summary of the recent literature on the impact of cancer teams on the management of patients with cancer. We hope that this review will serve as a comprehensive reference document for health care professionals, patients, and their advocates, as well as those involved in the organization of cancer services, to enable them to critically evaluate and improve multidisciplinary team working in their own domain. MDTs are essential to



cancer care, and cancer MDMs are a particularly important part since they allow the team with a diverse range of clinical specialties to come together and formulate treatment recommendations for patients with suspected or confirmed cancer. A range of factors pertaining to teamwork, availability of patient information, leadership, meeting management, and workload can affect the impact of an MDM on patient care. Studies to date have demonstrated that measuring and improving MDM working is possible and that improvements in patient care can be achieved as a result.

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## Disclosure

Nick Sevdalis is the Director of London Safety and Training Solutions Ltd, which provides patient safety and quality improvement skills training and advice on a consultancy basis to hospitals and training programs. James Green is a Director of Green Cross Medical Ltd that developed MDT FIT for use by National Health Service Cancer Teams in the UK. The authors report no other conflicts of interest in this work.

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ASSESSOR INITIAL:

HOSPITAL:

NAME OF MDT:

DATE OF MDM:

START TIME OF MDM:

FINISH TIME OF MDM:

#	Tumour	Pathway	Hx	X-ray	Path	Psych-social	Co-morb	Patient's view	Chair	Surgeon	Physician	CONTRIBUTION					Y/D/N	Notes	
												Oncologist	Nurse	Radiologist	Histopath				
1																			
2																			
3																			
4																			
5																			
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20																			

\* Physicians are present in some MDT meeting e.g. Lung and Upper Gastro Intestinal surgery. \*\* Please do not include co-morbidities and psychosocial factors in scoring History as they are scored separately. \*\*\* If information or contribution are NOT APPLICABLE, PLEASE MARK "N/A".

ASSESSOR INITIAL:

HOSPITAL:

NAME OF MDT:

DATE OF MDM:

START TIME OF MDM:

FINISH TIME OF MDM:

#	Turnour	Pathway	Hx	X-ray	INFORMATION			Chair	Surgeon	CONTRIBUTION				Y/D/N	DECISION
					Path	Psych-social	Co-morb			Patient's view	Physician	Oncologist	Nurse		Radiologist
21															
22															
23															
24															
25															
26															
27															
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\* Physicians are present in some MDT meeting e.g. Lung and Upper Gastro Intestinal surgery. \*\* Please do not include co-morbidities and psychosocial factors in scoring History as they are scored separately. \*\*\* If information or contribution are NOT APPLICABLE, PLEASE MARK 'N/A'.

ASSESSOR INITIAL:

HOSPITAL:

NAME OF MDT:

DATE OF MDI:

START TIME OF MDI:

FINISH TIME OF MDI:

#	Turnour	Pathway	Hx	X-ray	INFORMATION				Chair	Surgeon	CONTRIBUTION					Y/D/N	DECISION
					Path	Psych-social	Co-morb	Patient's view			Physician	Oncologist	Nurse	Radiologist	Histopath		Notes
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\* Physicians are present in some MDT meeting e.g. Lung and Upper Gastro Intestinal surgery. \*\* Please do not include co-morbidities and psychosocial factors in scoring History as they are scored separately. \*\*\* If information or contribution are NOT APPLICABLE, PLEASE MARK 'N/A'.

Turnour		Tumor			
	Pre Rx	Pre treatment	Co-morbidity	5	Comprehensive past medical history and performance status
Pathway	Post Rx	Post treatment		3	Vague knowledge of past medical history or performance status
	R	Recurrence/ surveillance		1	No knowledge of past medical history or performance status
History	5	Fluent, comprehensive case details (e.g. symptoms, relevant details of presentation)	Patient's views	5	Comprehensive knowledge of patient's wishes or opinions regarding treatment
	3	Partial case details		3	Vague knowledge of patient's wishes or opinions regarding treatment
	1	No patient case details		1	No knowledge of patient's wishes or opinions regarding treatment
	5	Radiological images explained in detail with ± slides/pictures		5	Good leadership enhanced team discussion and decision making
X-ray	3	Radiological information directly from a report/account	Chair	3	Leadership neither enhanced or impeded team discussion and decision making
	1	No provision of radiological information		1	Poor/inadequate leadership impeded team discussion and decision making
	5	Histopathological information explained in detail with ± slides/pictures		5	Clear contribution of speciality.
	3	Histopathological information directly from a report/account		3	Contribution inarticulate or vague
Pathology	1	No provision of Histopathological information	Members	1	No contribution
	5	Comprehensive knowledge of patients' personal circumstances, social and psychological issues.		Y	Clear decision about treatment(s) to be offered
	3	Vague knowledge of personal circumstances, social and psychological issues.		D	Decision to defer to next MDT
Psycho-social	1	No knowledge of personal circumstances, social and psychological issues.	Decision	N	No decision/decision unclear