



Multidisciplinary Case Conferencing

Multidisciplinary meetings in medical service delivery

An examination of the case conferencing models used, technology available, and relevant enablers and barriers for improved care of injured workers

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CONTENTS

List of Tables	3
List of Figures	3
Acknowledgements	4
Abbreviations	5
Executive Summary	7
1. Introduction	10
1.1 Background	10
1.2 Research Purpose	10
1.3 Approach	10
2. Who is successfully delivering Multidisciplinary Meetings?	15
2.1 Success in delivering MDMs	15
2.2 Who is successfully delivering Multidisciplinary Meetings?	17
3. What models do clinicians engage with?	19
3.1 Models of delivery based on purpose	19
3.2 Models of delivery based on format	23
3.3 Models currently in use in GP Super Clinics	24
3.4 General practitioner engagement	26
4. Information Technology platforms and tools	28
4.1 Videoconferencing tools	29
4.2 Administrative software	37
4.3 Technology requirements to set up videoconferencing	40
5. Enablers and barriers	41
5.1 Critical success factors and enablers	41
5.2 Challenges and barriers	44
6. Insights and implications	48
7. Appendix 1 – Interview guide	50
8. References	51

LIST OF TABLES

Table 1. List of organisations covered in the Environmental Scan	11
Table 2. Benefits of MDMs identified in the desktop scan and interviews	15
Table 3. Costs associated with MDMs and issues identified around each one	16
Table 4. Super Clinics interview data	25
Table 5. Increasing GP engagement in MDMs	26
Table 6. Example of various IT tools used by organisations interviewed	28
Table 7. A high-level overview of web conferencing tools used by organisations interviewed ⁽¹²⁻¹⁷⁾	31
Table 8. How QOOL and QOOL-VIC utilise source data	38
Table 9. General guide to videoconferencing	40
Table 10. Enablers for MDMs identified by interviewees	43
Table 11. Enablers for Infrastructure	44
Table 12. Challenges for MDMs identified by interviewees	45
Table 13. Challenges for Infrastructure	46

LIST OF FIGURES

Fig 1. LaTrobe Regional Hospital Specialist Outpatient Telehealth Project	17
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This Environmental Scan is based on a website scan and key informant interviews. The intent is to provide a snapshot of information on current and emerging practices in the area of case conferencing, using all reasonable efforts within the timelines. It is not an exhaustive account of all current and emerging practices in the sector.

ABBREVIATIONS

Abbreviations	Terms
ACRRM	Australian College of Rural & Remote Medicine
AES	Advanced Encryption Standard
APIs	Application Program Interfaces
BAA	Business Associate Agreement
CanNET	Cancer Service Networks National Demonstration Program
DHHS	Department of Health and Human Services
ECHO	Extension for Community Healthcare Outcomes
EMR /eMR	Electronic Medical Records
EU	European Union
GP	General Practitioner
GPMP	GP management plan
HIPAA	Health Insurance Portability and Accountability Act
iCIMS	Clinical Information Management Systems
ICS	Integrated Cancer Service
IME	Independent Medical Examination
IP	Internet Protocol
IT	Information Technology
Kbps	Kilobytes per second
Mbps	Megabytes per second
MBS	Medicare Benefits Schedule
MDM	Multidisciplinary Meeting
MDT	Multidisciplinary Team
NSW	New South Wales
NTCS	National Telehealth Connection Service
PACS	Picture Archive Communications System (a medical Imaging tool)
QCCAT	Queensland Cancer Control Analysis Team
QOOL	Queensland Oncology Online
QOOL-VIC	Queensland Oncology On-Line-Victoria
SOC	Service Organization Control
SSL	Secure Sockets Layer
TCA	Team care arrangement
TLS	Transport Layer Security

UK	United Kingdom
USA	United States of America
VAED	Victorian Admitted Episodes Dataset
vMDT	Virtual Multidisciplinary Team
VoIP	Voice over Internet Protocol
WebRTC	Web Real Time Communications

EXECUTIVE SUMMARY

Introduction

Multidisciplinary care involves a group of professionals from a range of medical and allied health disciplines working together to deliver integrated, co-ordinated, and comprehensive patient care that meets patient needs.

Multidisciplinary case conferences are commonly called multidisciplinary meetings (MDMs), multidisciplinary team meetings, or interdisciplinary teams.

Research purpose

This research aimed to identify what current platforms for multidisciplinary clinical case conferencing are currently being used that demonstrate improved patient outcomes. The key questions were:

1. Who is successfully delivering multidisciplinary case conferencing?
2. What models do health care professionals, particularly general practitioners (GPs), engage with?
3. What are the information technology (IT) solutions utilised to achieve this?

Approach

An Environmental Scan was undertaken between April 2019 and June 2019 in order to answer the research questions. This comprised three integrated elements:

- Desktop scan of national and international research
- 11 key informant interviews
- 8 telephone surveys with GP Super Clinic practices

Success in delivering MDMs

- All of the interviewed organisations who conducted MDMs reported that their models are successful, even if that success was not always quantifiable.
- A range of patient, clinician, and institution benefits were identified from both the desktop scan and interviews, including shorter timeframe to treatment, reduction in duplication of services, increased access of patients to quality care regardless of geographical location and increased alignment of treatment plans with clinical practice guidelines.
- Interviewees reported a number of costs in conducting MDMs in terms of equipment, technology, facilities and administration but no formal cost-benefit analysis was available.
- Cancer and palliative care MDMs are the most visible types of MDMs in Australia. Now MDMs are also done in the areas of drugs and alcohol, fractures, mental health, and aged care.
- The national focus on telehealth via the Australian Digital Health Agency has seen new uses or purposes for MDM. Some disciplines have used the technology opportunities to develop telehealth MDMs, particularly in rural and regional areas in Australia.

Models of delivery that clinicians engage with

- There are two main characterisations of models: purpose and format.
 - Models based on purpose include diagnostic/treatment plan models, care co-ordination models, educative processes, and virtual versions of clinical practice (telehealth).

- Models based on format include face-to-face, hub and spoke models, and virtual MDMs.
- Interviewees suggested a number of ways to improve GP engagement, including direct communication, a focus on patient care, asking GPs what they prefer, using representatives, valuing GP contributions, and using technology where possible.
- Use of payments / Medicare Benefits Schedule (MBS) rebates to remunerate GPs has challenges.
- Half of the interviewed GP Super Clinics within Victoria use MDMs regularly, including face-to-face, videoconferencing and teleconferencing formats.

Information technology platforms and tools

- MDMs with videoconferencing are usually supported by two types of IT solutions:
 - Videoconferencing tools to see all participants and possibly share files
 - Administrative tools for scheduling, coordination and communication
- There are two types of videoconferencing tools:
 - IP-based videoconferencing, using dedicated videoconferencing equipment
 - Web conferencing, that increasingly uses Web Real Time Communications (WebRTC) technology without having to download and install software or plug-ins.
- A range of videoconferencing tools exist such as Healthdirect Video Call, WebEx, BlueJeans, Pexip, Zoom for Healthcare, GoToMeeting and Telstra Bridge.
- Administrative software such as CanMAP, QOOL, QOOL-VIC and proprietary systems, are used to capture, centralise and disseminate information around patient care.

Enablers for MDMs

Enablers for successful MDMs include:

- A strong leader and chairperson with clinical experience, who is clear on the purpose of the MDM
- A core group is identified to attend the MDM as part of patient care
- MDMs are perceived as a learning opportunity
- Champions on-site
- Fixed MDM schedule, for a full year where possible
- Dedicated space or rooms for MDMs
- Technology capabilities and clinical service needs match to facilitate the administration of MDMs
- User-friendly IT tools

Challenges for MDMs

A number of challenges for MDMs include:

- Administratively laborious in the preparation for an MDM
- Lack of communication between specialists and administrators in the preparation for MDMs
- Poor meeting dynamic and etiquette among MDM members
- Difficult to schedule GPs in MDMs
- Lack of governance around MDMs
- Lack of appropriate space and equipment
- Background noise distractions during MDMs
- Unrealistic expectations of users' IT knowledge
- Change management not well-considered

Implications

This Environmental Scan has identified a number of models of MDMs. The most common types and purposes of MDM are to develop a diagnostic or treatment plan and to coordinate care services for patients. MDMs were predominantly carried out face-to-face, although teleconference or videoconference was used when participants or a specific group of clinicians were unable to attend in person.

Overall, the critical success factors of MDMs for consideration are:

- A clearly stated, shared and measurable purpose that is aligned with individual members' goals
- Effective leader who has the clinical and operational skills and is empowered to drive implementation
- Appropriate membership, with clear roles and responsibilities
- Timely access to information, and mechanisms for timely exchange of information needs to be in place
- Documented processes for decision making and dispute resolution
- Opting for webRTC-based IT solutions for videoconferencing.

1. INTRODUCTION

1.1 Background

Multidisciplinary care involves a group of professionals from a range of medical and allied health disciplines working together to deliver integrated, co-ordinated, and comprehensive patient care that meets as many of the patient's needs as possible⁽¹⁾.

A multidisciplinary meeting (MDM) (also known as a multidisciplinary case conference, multidisciplinary team meeting, or interdisciplinary team) is defined as a meeting of multidisciplinary health care providers. Key principles of multidisciplinary care include⁽²⁾:

- a team approach, involving core disciplines integral to the provision of quality healthcare, including general practice, with input from other specialties as required
- communication amongst team members in treatment planning
- access to quality healthcare for all patients regardless of geographical remoteness or size of health care service
- provision of care in accordance with nationally agreed standards, and
- the involvement of patients in decisions about their care.

Factors such as whether the range of professionals are from the same or different organisations, the mix of private versus public healthcare funding models, and the relative stability of MDM membership, can make a significant difference to MDM processes and outcomes⁽³⁾.

In 2018, WorkSafe Victoria conducted a multidisciplinary clinical case conference project for a cohort of high-risk pharmacy patients. An evaluation of this program identified issues with: medical providers' use, engagement, and confidence with the IT platforms and tools used in the MDM, a lack of clear and concise communication and education processes to support MDM participation, and limited GP willingness to engage in MDMs due to competing priorities. Additionally, the scheduling of MDMs and coordination of clinician and specialists' availability required intensive and unsustainable project team resource use, which was found to potentially limit MDM integration into future business delivery processes.

1.2 Research Purpose

The aim of this research was to identify what current platforms for multidisciplinary clinical case conferencing are currently being used that demonstrate improved patient outcomes.

The specific research questions were:

1. Who is successfully delivering multidisciplinary case conferencing?
2. What models do health care professionals (particularly GPs) engage with?
3. What are the IT solutions utilised to achieve this?

1.3 Approach

An Environmental Scan was undertaken between April 2019 and June 2019 to answer the research questions. This comprised three integrated elements:

- Desktop scan of national and international research
- 11 key informant interviews
- 8 telephone surveys with GP Super Clinic practices

The desktop scan involved searching local and international publicly available online resources, including grey literature, relevant to MDMs. Websites for local and international medical and

healthcare providers, telehealth agencies and research bodies, government agencies, healthcare funders, and clinician support organisations were examined. Current and emerging work in the MDM area, policy and planning reports, industry standards, legislation and government action frameworks, as well as documented practices and trends provided information and context for the interviews.

Healthcare or medical sector organisations identified as key informants during the desktop scan were approached for an interview. Priority was given to interviewing organisations utilising videoconferencing technology as one of the objectives of this Environmental Scan was to find out what IT solutions were used. Semi-structured interviews were conducted using the interview guide shown in Appendix 1. Interviews were recorded with the consent of interviewees and transcribed by an external transcription service provider. All interviewees and organisations named in the following report have consented to being identified.

Telephone interviews were also undertaken with GP Super Clinic practices in Victoria to provide further information specific to their experience of MDM, including how often they are engaged in MDMs, the duration and format mode, who else is involved, and who is responsible for scheduling the MDM.

An overview of the organisations included in the Environmental Scan is provided in Table 1.

Table 1. List of organisations covered in the Environmental Scan

Organisation	Nature of organisation	Country	Desktop scan	Interview
Aboriginal Medical Services Alliance Northern Territory (AMSANT)	The peak body for Aboriginal Community Controlled Health Services in the Northern Territory	Australia	✓	✓
American Psychiatric Association and The American Telemedicine Association	Joint committee to examine best practices in Videoconferencing-based telemental health (guide produced April 2018)	USA	✓	
Australian Digital Health Agency	A statutory Commonwealth Agency from 1 July 2016 that oversees the national digital health framework	Australia	✓	
Australian Government Department of Human Services	Commonwealth Department who deliver Medicare	Australia	✓	
Australian Institute of Health and Welfare (AIHW)	A statistics agency on the country's health and welfare	Australia	✓	
Barwon Health	A healthcare provider	Australia	✓	✓

Organisation	Nature of organisation	Country	Desktop scan	Interview
Barwon South Western Integrated Cancer Service (BSWICS)	A clinical network delivering cancer care in the Barwon South Western Region.	Australia	✓	✓
Better Care Victoria	An innovation fund for healthcare	Australia	✓	
Birmingham Health Care for the Homeless	Advocacy service for the homeless	UK	✓	
BlueJeans	A software company in video conferencing service	USA	✓	
Cancer Australia (previously known as the National Breast Cancer Centre)	The lead cancer control agency to the Government of Australia	Australia	✓	
Cancer Care Ontario	An advisory body on cancer for the Ontario government	Canada	✓	
Cisco	A multinational technology conglomerate	USA	✓	
Comcare	A statutory authority of the Australian Federal Government	Australia	✓	
Department of Health	A government department of Australia overseeing the health system	Australia	✓	
Department of Health and Human Services Victoria (DHHS)	State department of health and social services	Australia	✓	✓
GoToMeeting	A web-hosted service created and marketed by LogMeIn	USA	✓	
Grampians Integrated Cancer Service	A clinical network delivering cancer care in the Grampians region.	Australia	✓	✓
Healthdirect Australia	A national public health information service	Australia	✓	✓
iCare	Workers compensation insurance in NSW	Australia	✓	
iCIMS	A software company based in NSW	Australia	✓	
Macmillan Cancer Support	A British charity that supports people affected by cancer	UK	✓	

Organisation	Nature of organisation	Country	Desktop scan	Interview
Med Health Group	A provider of independent medical advisory services	Australia	✓	✓
mlcoa	A provider of independent medical advisory services	Australia	✓	✓
MedHealth Group (mlcoa)	A provider of independent medical advisory services	Australia	✓	✓
National Breast Cancer Centre	A national body in breast cancer research	Australia	✓	
National Cancer Intelligence Network	Part of the National Cancer Registration and Analysis Service (NCRAS), operated by Public Health England	UK	✓	
North Eastern Melbourne Integrated Cancer Service (NEMICS)	A clinical network delivering cancer care in the north-eastern Melbourne region.	Australia	✓	✓
NSW Health	State department of health	Australia	✓	
Orygen	The national centre of excellence for youth mental health	Australia	✓	✓
CareSearch, Flinders University	Run PalliAGED, an evidence and practice resource for aged care	Australia	✓	
Pexip	A software company in video communication	Norway	✓	
Precedence Health Care	A digital health solutions company	Australia	✓	
Public Health England	The executive agency of the Department of Health and Social Care, who administer the National Health Service (NHS)	UK	✓	
Queensland Health	State department of health	Australia	✓	✓
Queensland Children's Health	State Department responsible for Children's health	Australia	✓	
South Australia (SA) Health	A state department of health	Australia	✓	
Telstra Health	A provider of software for healthcare providers and funders	Australia	✓	

Organisation	Nature of organisation	Country	Desktop scan	Interview
The Royal Australian College of General Practitioners (RACGP)	A professional organisation for GPs	Australia	✓	
Victorian Comprehensive Cancer Centre	A multi-disciplinary specialist cancer hospital and research centre	Australia	✓	✓

2. WHO IS SUCCESSFULLY DELIVERING MULTIDISCIPLINARY MEETINGS?

Key messages

- All of the interviewed organisations who conducted MDMs reported that their models are successful, even if that success was not always quantifiable.
- A range of patient, clinician, and institution benefits were identified from both the desktop scan and interviews.
- Interviewees reported a number of costs in conducting MDMs in terms of equipment, technology, facilities and administration but no formal cost-benefit analysis was available.
- Cancer and palliative care MDMs are the most visible types of MDMs in Australia.
- The national focus on telehealth via the Australian Digital Health Agency has seen new uses or purposes for MDM. Some disciplines have used the technology opportunities to develop telehealth MDMs, particularly in rural and regional areas in Australia.

2.1 Success in delivering MDMs

All of the interviewed organisations who conducted MDMs reported that their models are successful, even if that success was not always quantifiable.

“We have occasional reviews of how the system works. So we change processes over time. At no point has anyone said it's not worth sticking with. So the benefits are perceived even if they're not quantifiable.” ~Organisation B

2.1.1 What are the benefits of MDMs?

MDMs were perceived to have a range of patient, clinician, and institution benefits as listed in Table 2.

Table 2. Benefits of MDMs identified in the desktop scan and interviews

Benefits identified in the desktop scan	Benefits identified in interviews
<ul style="list-style-type: none"> • Increased survival of patients for some cancers and reduced variation in survival among hospitals for the same cancer type • Shorter timeframes to treatment • Increased alignment with clinical practice guidelines, including psychosocial support • Increased access to information • Improved patient satisfaction with treatment and care • Reduction in duplication of services • Improved coordination of care • Educational opportunities for health professionals • Increased clinical trial recruitment • Improved mental well-being of health professionals 	<ul style="list-style-type: none"> • Tailored plans for each individual patient • Increased alignment of treatment plans with clinical practice guidelines • Social benefits for clinicians • Increased access of patients to quality care regardless of geographical location • Knowledge sharing • Hear different views on care pathways • More likely to find out about clinical trials • Cross speciality advice/support • Time efficiency • Save money on clinician travel • Increased GP and clinician buy in • Collegiality (e.g. shared research, networking)

“One of the other really valuable things is that the pathology and radiology is reviewed for the meeting...sometimes things will be commented on in the reports (and) having a further review of the imaging might clarify what that is or there might be recommendation for some other sort of test to be conducted.” ~Organisation B

2.1.2 What are the costs of MDMs?

Interviewees reported a number of costs in terms of equipment, technology, facilities and administration, although often these were not mentioned directly as costs (see Table 3). However, while interviewees cited a range of costs in conducting MDMs, no formal cost-benefit analysis was available.

Table 3. Costs associated with MDMs and issues identified around each one

Type of cost	Issues raised by interviewees
Equipment	<ul style="list-style-type: none"> • Some MDMs have specific rooms (with dedicated videoconferencing equipment, or imaging display equipment) while others use portable equipment. • Equipment that is run by technicians is the most effective in terms of not having to worry about training or disruptions, but it is expensive (so depends on clients’ ability to pay).
Technology	<ul style="list-style-type: none"> • No money in health system to update technology for this which is not perceived as a patient care priority • To actually facilitate video conferencing requires more technology than we have or could afford (for small benefits – difference between seeing the imaging only if you are a remote participant, or being able to see faces too) • Licensing fees also apply, often as an ongoing cost • The more tailored the technology, the more expensive it is, particularly technology designed to bridge the gaps between systems which were not built to talk to each other
Facilities	<ul style="list-style-type: none"> • Dedicated meeting space is important.
Administration	<ul style="list-style-type: none"> • Administration role pulls together information from clinicians on cases, reports, organises the agenda, liaises with the chairperson, scribes during the meeting, and sends information out after the meeting to the treating team, including the patient’s usual GP.

Some of these costs are funded (wholly or partially) by government and their agencies, however there are sometimes residual costs for implementation and training that are borne by the MDMs, and funding can sometimes be offered only as a trial, or through specific time-limited funds.

“We have helped develop and test and keep administrative software and have supported the technological requirements of (their) highly technologically enabled rooms. One MDM room has six screens, and we’ve set up all the rooms with lots of microphones to really improve the audio.” .. this was part of a trial to see what these needs would be ~Organisation D

2.1.3 Evaluation of MDM effectiveness

Apart from cancer, and more recently palliative care, evaluation of MDMs is still limited. Research in the cancer sector seems to rely on retrospective studies of cancer survival rate changes, comparing only the presence of an MDM to historical survival rates from before the use of MDMs. According to an evaluation of the Cancer Service Networks National Demonstration Program (CanNET) in 2009, one of the achievements was that at least 12 new MDTs were established as a result of this initiative and more than 50% of the networks' local governing body members agreed that network development had positive impacts on service delivery, including improved multidisciplinary approaches to cancer care.

Interviewees from integrated cancer services (ICS) formed under CanNET typically talked about evaluation in terms of the quality assessments against expected patient presentation rates or the concordance between treatment plans and agreed quality care standards, a common part of healthcare evaluation.

“So there’s a lot of literature to support, in cancer at least, multidisciplinary case conferencing - there was a large (retrospective study) done in lung cancer that demonstrated that treatment plans agreed at MDMs led to a survival advantage” ~Organisation D

*“There’s actually not much literature around on how they’ve improved patient outcomes.”
~Organisation F*

The effectiveness of telehealth MDMs (that is, telehealth consultations which involve more than two clinicians), on the other hand, are often measured by the number of kilometres saved in travel by clinicians and/or patients. For example, LaTrobe Regional Hospital estimated that their Specialist Outpatient Telehealth Project had saved 101,131 patient kilometres since 2016 (Figure 1).

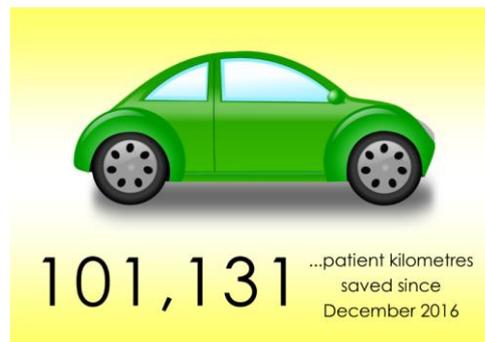


Fig 1. LaTrobe Regional Hospital Specialist Outpatient Telehealth Project

Source: LaTrobe Regional Hospital

Evaluation is often combined with quality assessments or is focussed more on outcomes than impacts, and the factors which are most likely to result in quality patient care. For these reasons, it may be more appropriate to consider MDM delivery success in terms of clinician engagement.

2.2 Who is successfully delivering Multidisciplinary Meetings?

Worker's compensation agencies such as Comcare and iCare have case conferencing models to assist their insurers and key stakeholders (injured workers, GPs, employers and other treatment providers) to plan and support injured workers' process of returning to work. However, it is not always multidisciplinary. For example, Comcare's model states that as a minimum, the stakeholders involved in a case conference need only be the GP, injured worker and employer or employer's representative.

Cancer and palliative care MDMs are the most visible types of MDMs in Australia. Cancer MDMs have benefited from the legacy of 'Tumour Boards' (groups of specialists at a hospital who would gather to discuss treatment options for patients with a specific tumour type). In addition, a concerted policy and funding push, with a lead target of 100% of cancer patients having their case presented to an MDM for treatment planning, has resulted in heightened visibility and maturation of cancer MDMs.

There has been a number of key development projects to assist cancer MDMs ⁽⁴⁾:

- A three-year National Demonstration Project (2000-2003) examining the set-up, process, and impact of cancer MDMs at three sites in Australia
- A National Profile Study of cancer MDM in 2000-01 in Australia to provide a baseline for further auditing of MDM numbers
- An Observational Study (2002-2003) examining 'best practice' in a breast cancer MDM.

These projects also developed a range of guides and toolkits, as well as a process of national auditing of cancer MDMs. Concurrently, seed funding was provided to the states through the CanNET project to develop seven integrated cancer service (ICS) networks, online meeting software was developed (WebEx), and grants were provided to set up MDM facilities and staff to administer cancer MDMs.

This strategy has seen continued growth in the number of cancer MDMs in Australia, particularly in the public health system. A 2014 survey of 141 MDMs across 30 public health services/organisations indicated that there had been a 22% increase in the number of cancer MDMs since the 2006 survey ⁽⁵⁾.

Similar policy and funding opportunities has resulted in the growth of palliative care MDMs in Australia. There are a range of resources for palliative care MDMs on the palliAGED website, along with an app for GPs (palliAGEDgp) and nurses (palliAGEDnurse) to provide them with easy and convenient access to information on palliative care MDM planning.

More generally in health, the national focus on telehealth via the Australian Digital Health Agency has seen new uses or purposes for MDM. While one-on-one telehealth is still most common for this sector, some disciplines have used the technology opportunities to develop telehealth MDMs, particularly in rural and regional areas in Australia.

Better Care Victoria has funded a number of innovative telehealth MDMs:

- Remote drugs and alcohol recovery for the southern Otway region
- Virtual fracture clinics
- Geri-connect (geriatric services)
- Melbourne Young Onset Dementia
- Models of Care for robotics in the North-East region
- CALD-Assist
- teleDentistry
- Ophthalmic Outreach
- Aboriginal telehealth
- Stroke tele-rehab services
- Refugee Health Clinical Hub

3. WHAT MODELS DO CLINICIANS ENGAGE WITH?

Key messages

- There are two main characterisations of models: purpose and format.
 - Models based on purpose include diagnostic/treatment plan models, care co-ordination models, educative processes, and virtual versions of clinical practice (telehealth).
 - Models based on format include face-to-face, hub and spoke models, and virtual MDMs.
- Interviewees suggested a number of ways to improve GP engagement, including direct communication, a focus on patient care, asking GPs what they prefer, using representatives, valuing GP contributions, and using technology where possible.
- Use of payments / Medicare Benefits Schedule (MBS) rebates to remunerate GPs has challenges.
- Half of the interviewed GP Super Clinics within Victoria use MDMs regularly, including face-to-face, videoconferencing and teleconferencing formats.

3.1 Models of delivery based on purpose

There are four main reasons organisations hold MDMs in a healthcare setting. These include developing a diagnostic/treatment plan, the co-ordination or communication of care/services, educative processes, and MDMs that are virtual versions of clinical practice (such as some forms of telehealth consultations involving multiple clinicians).

3.1.1 Diagnostic / treatment plan development

MDMs for the purpose of developing a treatment plan, or a plan of further diagnostic processes are by far the most common in healthcare, and the most traditional format for these is still face-to-face. This is also very much the case with return-to-work case conferencing. For example, for iCare, case conferences should ideally be held as a face-to-face meeting, although they are not ruling out facilitation over phone or videoconferencing.

As previously noted, there are benefits for clinician participation in this form of MDM, mostly around networking opportunities, shared learning, and professional satisfaction arising from the provision of quality health care. It is, however, a time and resource intensive format, with an expectation that resources will be spent providing benefit for other clinician's patients (that is, there is a stable, core group of clinicians that provide expertise to all cases presented to the MDM by clinicians within the local healthcare region).

While specialists are generally well-engaged with this form of MDM, there are known issues with GP engagement. Interviewees indicated that they had considered or attempted to involve GPs but had experienced difficulties in terms of mismatched schedules, and a lack of interest by GPs.

"No, we don't. We've considered it but we don't. We send a summary to the GP. It's actually very difficult....because there's simply not enough time to include (them) and that's something that happens post-MDM." ~Organisation A

"Yes. There is often a GP representative present. That was arranged two years ago through the PHN and we communicate to the GPs of each patient and tell them that their patient is being presented and invite them to attend, either in person or via telehealth if they wish to..." ~Organisation E (but they note that take up is not as high as they would like, and that GPs who are involved often have a direct association with this health organisation as well as their own private practice)

In the National Cancer Framework⁽²⁾, it is noted that a representative GP from the local Division of Practice attends all cancer MDMs to represent all patients' GPs, liaising before the meeting to provide GP input to the MDM, and also feeding back recommendations following the meeting. This position was previously funded via CanNET. Where the GP practices in a rural setting, cancer care coordinators from the rural/regional health services provide links to specialists, and GPs are encouraged to attend, either in person or via videoconferencing.

3.1.2 Co-ordination of care

This is most common for palliative care where the focus of the MDM is optimising comfort for people with a progressive life-limiting illness. There is generally no need for a diagnostic element, but it would be usual for this form of MDM to occur at frequent intervals to discuss the same case.

Discussion relates more to co-ordination of care for the management of physical symptoms and reduction of psychosocial distress, as well as provision of personal supports (e.g. Spiritual care, quality of life issues), and plans related to communication, social and financial support, control and dignity in treatment choice, and cessation of life/interment arrangements.

Involvement of patients and their families, as well as the participation of treating doctors/GPs in these MDMs is considered not only usual, but optimal. Other members may include palliative care consultants, geriatricians, and any specialists relevant to the patient's diagnosis, as well as allied health professionals like pharmacists and social workers, and home and community care service providers such as district nursing staff, domiciliary care workers, and 'meals on wheels' staff or volunteers.

In a general health setting, this may also occur at points of treatment review (a monitoring of the treatment plan rather than any development of, or changes to, the plan), and in an Occupational Health and Safety/Return to work context. This type of MDM model would be most appropriate for informal conversations between clinicians rather than formal medical case planning.

Perceived value for participants is an important part of member commitment. While in a diagnostic/treatment plan MDM where the value is predominantly perceived as being for the patient, this model provides equal value for clinicians and patients. It is an efficient way for clinicians to update each other on progress without exhaustively contacting other service providers one by one. It also affords opportunities for shared support, information sharing about services available, and an immediate relationship with the patient and their family. This provides clear recognition of the benefits of the MDM, a key element of sustainability.

"GPs, when they bring a case referral, are generally seeking advice on the co-ordination of care. These case discussions tend to go longer and there's more information provided about what's happening for the young person. (The GP) is upskilling in terms of referral and care options.... Probably more happy to bring cases as they may be out of other strategies. Happy even to forego MBS rebates to get their cases heard as soon as possible (rather than wait to get approval of client) so we know it's truly out of concern about the young person" ~Organisation G

3.1.3 Educative (case study)

While the use of case studies to educate clinicians is standard practice, it is not usual for clinicians to 'conference' these case studies. This model encompasses forms of case study presentation that allow for clinicians to interact in relation to the case study using digital technology options.

There are two versions of this format:

1. Case studies can be provided via a process called "Telehealth Store and Forward", a form of virtual MDM which involves clinicians pre-recording case details for participants to access at a time of their choice, or to be sent out by the chair at a set time. This means that participants do not need to be available in the same location or at the same time. This format of MDM will be discussed in the next section.
2. Virtual MDT for the purposes of discussing a case study. Participants convene at the same time (regardless of time at their location) and are able to interact fully with the presenter and each other via videoconferencing tools in a digital MDM. An example of this is ECHO.

Example in practice: ECHO (Extension for Community Healthcare Outcomes)

How does this work?

- Hosting hospitals (hubs) set up a series of discussions on a topic, inviting community healthcare and other organisations (called spokes) such as Human Services, or Justice or education groups to join and bring de-identified cases to discuss with the experts at the hub.

How many hubs are there in Australia? Where?

- There are three hubs in Australia.
- Children's Health Queensland is the largest, with seven series on topics as diverse as ADHD, diabetes, obesity, and persistent pain.
- The other two hubs in Australia are Liverpool hospital in NSW (which has one series on Hepatitis C) and St Vincent's hospital in Victoria (which has one on opioid abuse).

How does ECHO work?

- ECHO uses a web-based videoconferencing technology (Zoom), as well as a proprietary case management system (called iECHO).
- The technology only enables the conferences, there is no further technology to record or plan the case conferences or series.

Has it been evaluated? What do clinicians think?

- The ECHO model has been evaluated as an effective means of building regional/rural healthcare capacity, and health professionals are enthusiastic about this model of learning and its benefits for care provision⁽⁶⁾.

3.1.4 Virtual clinical practice

This model is a consultation between at least two clinicians and the patient via videoconference. It is a form of telehealth in that it is clinical care focussed on the patient, but instead of just being a one-on-one consultation, there are multiple clinicians involved.

Telehealth is perceived to have a number of benefits:

- Improves equitable access to healthcare regardless of geographical location
- Upskills local, rural healthcare professionals
- Increases communication and coordination of care
- Facilitating home care and aging in place

Telehealth also offers advanced technological opportunities such as remotely assessing patients via monitoring apps (on tablets or smartphones) or patient wearables⁽⁵⁾. Integration of sleep quality data from iPhone watches is already used in the USA⁽⁷⁾.

The take up of telehealth in Australia has been slow due to:

- Difficulty persuading clinicians to change their delivery modes, work flow, and relationships
- The additional length of time required for telehealth consultations
- The need for technology and tools beyond the current IT levels of expertise of clinicians, who have little time to learn new skills, and limited incentive to
- Reluctance to change work roles to encompass additional roles (e.g. Telehealth coordinator)
- Concern for patient safety, particularly their psychological wellbeing if patients have had a difficult discussion with their psychologist or psychiatrist.

“With our tele-psych appointments, there's some psychiatrists won't use it. They do not like it at all. They're just, "It's not for me. I don't find it personal enough. I worry about the person at the other end, their support networks. We've going to talk about some traumatic things. How do I know what's happening at the other end, who's there for that person?" There is duty of care there, clearly, so some doctors are very unhappy to actually use the technology, so they won't do it.” ~Organisation I

Example in practice: Use of telepsychiatry by an Independent Medical Examinations (IME) provider that conducts telepsychiatry MDMs

Who is involved?

- For an IME, the consultant psychiatrist, examinee and their treating doctor are the main participants. If a treating doctor is unable to be present, then a health practitioner and/or support person would need to be present.
- For a Case Conference and where there is consent, the participants can also include the case manager, employer representative, rehabilitation provider or others (legal representatives, or a client representative/family member).

What is the purpose?

- The IME may be needed to help confirm/establish the correct diagnosis, advise of treatment and/or return to work planning, as well as provide any other relevant information or recommendations to aid decision making.
- The Case Conference is an opportunity for all relevant parties to discuss and agree the best approach to helping the examinee achieve optimal recovery and return to work. It can also help determine what steps are required to address biopsychological issues or other barriers impeding the examinee's progress.

Why telehealth/telepsychiatry?

- It can remove distance and access barriers in a way that is simple, convenient and cost effective for all parties.
- It makes it possible to fast track an appointment with a best matched psychiatrist across Australia.
- It is an effective way of involving of the treating doctor and any other appropriate parties in a collaborative team approach.

3.2 Models of delivery based on format

While the majority of MDMs are still face-to-face, there are other formats available. This includes the use of a hub and spoke model, and a multipoint model which seeks to replicate traditional working methods in a virtual space.

3.2.1 Face-to-face

Most MDMs are still face-to-face, with all clinicians present in one room, except in regional/rural locations or where the workforce model does not support this level of resourcing. If clinicians need to travel to the meeting, there are likely to be travel costs (as well as time lost from seeing other patients), and there may be payment issues surrounding payment or access to materials where clinicians are, for example, not employed by the host legal entity.

There are clear communication benefits to face-to-face meetings, where all participants have equal access to displayed material, can choose to participate in, or filter out side conversations happening in the room, as well as networking opportunities during breaks (which can be useful for dissemination of information about clinical trials, and for co-authoring papers etc). Clinician benefits are key elements that increase engagement, beyond desire to improve patient outcomes.

“... they work better face to face we find, but we can do so because they’re inside the health service largely, they are mostly face to face” ~Organisation A

3.2.2 Hub and spoke

This is an MDM format where the majority of participants are located in a hub, with one or multiple spokes using tele/videoconferencing to access the meeting. It generally occurs when face-to-face attendance is not possible due to location or scheduling challenges.

Example in practice: HealthOne NSW program

Who is involved?

- GPs, practice nurses, community nurses, health educators, allied health practitioners (physiotherapists, occupational therapists, dietitians, psychologists, social workers, podiatrists, Aboriginal health workers) and visiting health professionals

What does this look like?

- The main host hospital runs the MDM, with smaller site ‘spokes’ attending by videoconference.
- The number of spokes is typically only limited by the technology used

Benefits?

- Improved health outcomes for patients through access to healthcare not otherwise able to be provided
- Enhanced satisfaction for patients and clinicians

There have also been trials of using the HealthOne NSW platform for health promotion in the community. In Coonamble, a pilot project funded by the local council focussed on using videoconference MDMs to build the local community’s capacity to prepare and eat healthy meals through virtual expertise from outside the community⁽⁸⁾.

3.2.3 Virtual Multidisciplinary Teams (vMDT)

Virtual multidisciplinary teams (vMDTs) involve the use of multiple points of tele/videoconferencing for clinicians to share information in a virtual space. The teams may be remotely located from each other, there may be a time zone mismatch, or there may be other reasons why participants are unable to attend MDM in a face-to-face format. Effectively, vMDT is simply technology providing the ability for clinicians to overcome location challenges and work together online.

There are two related forms of vMDT: an 'always on' model, and a 'store and forward' model. The 'always on' model is where videoconferencing is, as the name suggests, always left on in all locations. This is not a model that is used in healthcare yet, being mostly used in multinational technology companies such as Google.

The 'store and forward' model, as previously discussed allows clinicians to provide input and seek feedback from MDMs via pre-recorded video. It is most effective for situations where scheduling mismatch is an issue (such as participating in an MDM while also seeing your own patients), or to obtain expertise from an international panel of clinicians (post a digital question to any expert anywhere in the world).

3.3 Models currently in use in GP Super Clinics

As an indicator of the level of involvement of GPs in MDM in Victoria, telephone interviews were undertaken with Practice Managers of Victorian GP Super Clinics as a high-volume proxy for GP clinics and medical centres. GP Super Clinics were developed by the DHHS to provide their patients with integrated multidisciplinary patient-centred care by providing for co-location of a range of primary health care services. The GP Super Clinics Program was part of the health reforms implemented by the Labor government in 2007 to build a stronger primary health care system that is more efficient, lowers rates of avoidable hospital admissions, reduces health inequalities and improves health outcomes. Primary health care services include:

- General practitioners
- Allied health professionals (e.g. Physiotherapists, dietitians, podiatrists, occupational therapists)
- Psychology services, and other relevant mental health support programs, including drug and alcohol counselling services
- Dental services – both public and private
- Diagnostic services (e.g. Pathology, imaging/radiology)
- Consulting rooms for visiting medical specialists
- Community health services funded by state and territory governments
- Facilities for practice nurses to provide primary health care or to run regular disease management programs and community health promotion activities
- A health resource library for patient education.

This population was chosen for interviews as it was envisioned that they would be most likely involved in MDMs, being co-located with a range of other healthcare services. Eight of the ten Super Clinics currently open in Victoria provided information on the frequency of their involvement in an MDM, the format used, other clinicians involved, the duration of MDM, and who was responsible for scheduling MDMs. Results are shown in Table 4.

Results were mixed, with half indicating that MDMs at their clinic were rare or very rare, while the remaining half said MDMs were held often, once a month to 2-3 times a week. Wodonga held the most, with 2-3 per week. Three Super Clinics used videoconferencing in combination with face-to-face and teleconferencing. Patients were involved in MDMs in all six Super Clinics who provided participant information. Two clinics provided details of the duration, and both were approximately 45 minutes.

Table 4. Super Clinics interview data

Clinic	Frequency	Mode	Involvement	Duration	Scheduling
Ballan GP Super Clinic	Once a month or six months	Face-to-face and teleconferencing. Rarely video conferencing.	N/A	N/A	N/A
Bendigo GP Super Clinic	One in six months	Mostly face-to-face	GP, patient and case manager. Other allied health professionals not included	N/A	N/A
Berwick GP Super Clinic	Very rare	N/A	N/A	N/A	N/A
Kardinia Health Geelong	Very rare	N/A	GP, patient and allied health professionals	N/A	N/A
Portland GP Super Clinic	Often	Face-to-face, teleconferencing, video conferencing	GP, patient, nurse and case manager, sometimes allied health professionals	45 minutes	Receptionist involved with scheduling
South Morang Medical Centre	Very rare	Face-to-face and teleconferencing	GP, patient, medical specialists, allied health professionals, case manager, case worker	45 minutes	GP
Wodonga Super Clinic	2 or 3 times per week	Face-to-face, teleconferencing, video conferencing	Usually GP, patient and medical specialist involved. Sometimes case worker and allied health professionals	N/A	Medical specialists organise the case conference
Wallan Super Clinic	Often	Face-to-face, teleconferencing, video conferencing	Patient, GP, medical specialists, nurse.	N/A	Medical specialist schedules the case conference and notifies the clinic

N/A = Information not available

3.4 General practitioner engagement

Many clinicians are already convinced that MDM and meetings of telehealth/telemedicine care teams via technology are a positive step for healthcare. A survey of US physicians by Deloitte (2018) showed that 9 out of 10 physicians see the benefits of virtual care, with access to care, patient satisfaction, and improved communication with their care team the main benefits perceived by physicians.

MDM participants are also convinced that GPs should be involved. An NHS National Cancer Action Team (2009) survey of MDM participants from cancer networks, the MDT coordinators forum and the Network Development Programme forum for Informatics and Pharmacy was carried out in the UK. Results showed that 48% of doctors, 66% of nurses, 67% of allied health practitioners, 59% of administration support, and 49.5% of MDT co-ordinators believe that GPs should be involved in MDM decisions about their patients.

Interviewees noted how difficult it was to schedule GPs with cancer MDMs (at which, it must be remembered, a large number of cases are presented – up to 20 an hour – unlike other MDMs). Nonetheless, cancer MDMs value GP involvement. When asked if participation by GPs was practical, the highest percentage of agreement in the NHS survey was from MDT co-ordinators (22%). Perhaps the bigger issue will be convincing GPs that it is practical for them to attend, as only 7% of GPs agreed in the same survey.

Interviewees in this study suggested a number of ways to increase GP engagement in MDMs and these are shown in Table 5. While these suggestions were not evaluated or measured, it was perceived that there was more awareness and higher acceptance than before.

Table 5. Increasing GP engagement in MDMs

Issues	Comments from interviewees
Communicate directly with GPs	<ul style="list-style-type: none"> • We send out regular newsletters with stories. We have a big workshop once a year. We engage individually with visits at services and actually talking to clinicians. • Regular site visits to the community is the number one way of actually getting buy-in. Just getting out there and talking to them face-to-face on their own turf.
Focus on patient care	<ul style="list-style-type: none"> • They all want to do the best for their patients. • There really is a commitment to really good patient care.
Ask GPs what they prefer	<ul style="list-style-type: none"> • Our feedback from GPs is that they are happier to get a summary and to provide input as needed, rather than participate real time during the MDM.
Use representatives	<ul style="list-style-type: none"> • Use GP representatives (such as the arrangement through the College of General Practitioners for cancer MDMs) to liaise with treating GP.
Value GPs contributions	<ul style="list-style-type: none"> • GPs need to feel valued by other clinicians.
Use technology where possible	<ul style="list-style-type: none"> • Use software like Healthdirect Video Call to help GPs participate (like a virtual waiting room until their case is discussed).

3.4.1 Payment of GPs / Medicare Benefits Schedule (MBS) rebates

There are a number of issues related to payment for GPs and allied health professionals⁽⁹⁾:

- Private clinicians are generally not paid by the MDM host unless there are specific arrangements in place (e.g. Some IME consultations).
- Where MDMs are a mixture of private and public practice clinicians, it will mean that some participants are paid to attend while others are not.
- Not all GP participation in MDMs is going to be eligible for the MBS rebate. GPs need be involved in an MDM for patients with a chronic or terminal medical condition and complex care needs in order to be eligible for the MBS rebate.
- Even when MBS rebates are possible, the process of applying for them is seen as complex in terms of meeting eligibility requirements
- Even with MBS rebates, GPs still have to weigh up lost opportunity to see additional patients
- There is some hesitation by GPs to claim for MBS rebates as multiple participants in the MDM may be eligible to claim, and there is a fear that this will be considered fraud.
- A position statement released by the Allied Health Professions Australia (AHPA) stated that the inability to claim rebates for allied health practitioners' participation in case conferencing leaves them either out of pocket or not able to contribute to care coordination.

"There are actually Medicare rebates, MBS items for this, but they are very, very difficult to utilise." ~Organisation D

"Particularly allied health providers and private providers are not able to access MBS items so are not being paid (and have to) weigh this up against time they could be conducting paid appointments in their own practice." ~Organisation G

3.4.2 Funding and support opportunities

There are a number of funding and support opportunities for clinicians who take part in the national telehealth programs. One example of this is funding for GPs called ePIP (Practice Incentives Program eHealth Incentive) and a related indigenous eHealth Incentive.

GPs that keep up with and adopt digital health strategies will be eligible for up to \$12,500 per quarter from DHHS. Practices must include an integrated healthcare identified in each of their electronic practice records, maintain standards-compliant secure messaging capability, record their diagnoses electronically, send their prescriptions electronically, and use My Health Record.

GP practices who provide indigenous health can also participate in an incentive that rewards practice and patient sign up to My Health Records, as well as uploading of digital health records and maintenance of certain levels of healthcare to patients.

4. INFORMATION TECHNOLOGY PLATFORMS AND TOOLS

Key messages

- MDMs with videoconferencing are usually supported by two types of IT solutions:
 - Videoconferencing tools to see all participants and possibly share files
 - Administrative tools for scheduling, coordination and communication
- There are two types of videoconferencing tools:
 - IP-based videoconferencing, using dedicated H.323 / SIP standards-based videoconferencing equipment
 - Web conferencing, that increasingly uses Web Real Time Communications (WebRTC) technology without having to download and install software or plug-ins.
- A range of videoconferencing tools such as Healthdirect Video Call, WebEx, BlueJeans, Pexip, Zoom for healthcare, GoToMeeting and Telstra Bridge were identified from the interviews and scan.
- Administrative software such as CanMAP, QOOL, QOOL-VIC, cdmNet and proprietary systems, are used to capture, centralise and disseminate information around patient care.
- For optimal user experience, various technologies have different recommended basic system requirements

Interviewed organisations were asked about the IT solutions they used to support MDM. In cancer care, MDM was predominantly carried out face-to-face. Teleconference or videoconference was utilized only when participants or a specific group of clinicians were unable to attend in person.

For example, one interview participant estimated that 20% of the time their MDMs involved a remote party. Another participant currently only conducts face-to-face MDM but is open to videoconferencing in the future.

“One of the meetings uses this specific pathology group so they do it at every meeting which is once a fortnight. Other meetings, it’s probably, one in two meetings of the others that might have somebody linking.” ~Organisation E

When the interviewed organisations did use videoconferencing to engage with colleagues remotely in MDM, they were likely to use at least two types of IT solutions:

- Videoconferencing tools to see all participants and possibly share files.
- Administrative tools for scheduling, coordination and communication

Table 6 shows the various types of IT solutions used by organisations interviewed.

Table 6. Example of various IT tools used by organisations interviewed

Organisation	Videoconferencing tool	Administrative tool
Barwon Health	Healthdirect	CanMap
North Eastern Melbourne Integrated Cancer Service	GoToMeetings, Webex, BlueJeans	CanMap
Grampians Integrated Cancer Services	Webex, Bluejeans (mainly teleconferencing)	CanMap

Organisation	Videoconferencing tool	Administrative tool
Aboriginal Medical Services Alliance Northern Territory	Jabber	TeleConnect
mlcoa	Telstra Bridge (VC Centre)	Microsoft Outlook (for appointments only)
Orygen	GoToMeeting	Medical Director (for medical records only)
Victorian Comprehensive Cancer Centre	N/A	A proprietary system developed by iCIMS

4.1 Videoconferencing tools

There are many videoconferencing products on the market with varying degrees of ease of implementation, integration, interoperability, scalability and costs. The Australian College of Rural & Remote Medicine (ACRRM), who sees telehealth as an essential component of effective rural and remote practice, has compiled a directory of technology products including videoconferencing hardware, desktop and mobile software solutions, which can be found on their technology directory website.

Software companies regularly update and improve their technology to meet different and shifting organisational demands. As a result, many leading videoconferencing products today have similar features. Decision on which product to use largely depends on organisational needs, security requirements and the organisation's existing systems.

The two main types of videoconferencing technology used among the interviewed organisations were:

1. Internet Protocol (IP)-based videoconferencing

IP videoconferencing typically consists of dedicated videoconferencing equipment which operates purely over the internet. Most hospitals' video communications use the H.323 / SIP standards-based videoconferencing equipment that works very well within managed networks.

2. Web conferencing

Web conferencing connects people to a meeting using online technology via computer or mobile device. Web conferencing allows features such as desktop sharing, file sharing, application sharing and audio access via Voice over Internet Protocol (VoIP).

Many web conferencing tools use a type of technology called Web Real Time Communications (WebRTC), an open framework for the web that enables Real Time Communications in the browser⁽¹⁰⁾⁽¹⁰⁾⁽¹⁰⁾(WebRTC). It includes the fundamental building blocks for high-quality communications on the web, such as network, audio and video components used in voice and video chat applications. In simple terms, WebRTC videoconferencing solutions facilitate video calling between users' browsers without having to download and install software or plug-ins.

The number of peer-to-peer connections, i.e. participants in a meeting, depends on the capability of the bandwidth, web browsers and mobile applications. Supported browsers and platforms for WebRTC videoconferencing include:

- Google Chrome
- Mozilla Firefox
- Opera

- Microsoft Edge
- Android
- iOS

Some organisations used multiple videoconferencing tools because the other parties they were connecting with had another preferred tool.

“So we used Webex for a long time and now we use GoTo. We also use BlueJeans with another health service that we link into because that’s a product that they wish to use. There’s also another product Zoom, that is often used in research university connections.” ~Organisation D

A number of videoconferencing tools are listed in Table 7 and are further discussed in the following section. It is not an exhaustive list of videoconferencing tools in the market but what was identified during the Environmental Scan. They are not ranked in any order of importance or feasibility.

Regardless of the type of videoconferencing tool used, it is critical for all participants to have access to steady and reliable connections. This has sometimes been challenging for some of the regionally-based organisations interviewed. Over the years, Australian state governments have set up dedicated network infrastructure within the health industry.

In the Northern Territory, the state Department of Health worked with Telstra Health and developed a digital telehealth network known as the National Telehealth Connection Service (NTCS)⁽¹¹⁾. NTCS allows hospitals and external healthcare providers to link into health-grade telehealth networks through a common platform that also handles scheduling, referrals and clinical document exchange as well as a virtual meeting room for video conferencing.

In Queensland, over 300 hospitals and health facilities are connected to a private, enterprise grade IT network, where each hospital has a certain amount of guaranteed and dedicated bandwidth, based on their size and needs, to meet their technology requirements. At the minimum, these health services are able run reliable, standard-definition videoconferences, which are more than adequate to carry out approximately 90% of the different models of care in Queensland’s telehealth according to the clinicians.

Table 7. A high-level overview of web conferencing tools used by organisations interviewed⁽¹²⁻¹⁷⁾

Tool (Country of origin)	Features	Number of participants (concurrently)	Bandwidth requirement	Integration	Compatibility	Support / Training	Pricing model	Security
Healthdirect Voice Call (Australia)	<ul style="list-style-type: none"> • In-browser (WebRTC) video calling • Screensharing • Multimedia content sharing • No digital footprint remains in the system after consultation, ensuring the patient's privacy 	Up to 5	Minimum recommended: 384 Kbps Standard recommended: 768 Kbps Optimal: 1 Mbps and above WebRTC Peer connections can use up to 4 Mbps under unrestricted conditions Video calls can be sustained with bandwidth as low as 192 Kbps per remote party, but with a reduced quality experience	Standalone	Connects with Android, iOS, Mac and Windows	Support: Phone Training: webinars	DHHS-funded	AES 256-bit encryption between web browsers Compliant with government privacy policies in Australia and the UK
WebEx (USA)	<ul style="list-style-type: none"> • HD video with customizable layouts • Screen sharing • Recording 	Up to 100 (up to 100,000 on demand)	Video calls use approximately 3 Mbps	Integrates with third-party applications e.g. Microsoft Office 365, Google Calendar, and	Connects with Android, iOS, Mac, Windows, H.323 / SIP conference	Support: Phone, live support		Uses encryption technologies such as SSL and AES (essentially based on requirements set forth by the

Tool (Country of origin)	Features	Number of participants (concurrently)	Bandwidth requirement	Integration	Compatibility	Support / Training	Pricing model	Security
				Salesforce, with Custom Application Development & Integration (CADI) services	room systems	Training: Webinars		US federal government)
BlueJeans (USA)	<ul style="list-style-type: none"> • HD video and Dolby Voice® audio. • Screen sharing • Cloud recording and streaming 	up to 25 (up to 150 on demand)	<p>Content + Audio + Video being sent: Up to 4.5 Mbps</p> <p>Video Share & Video/Audio: 720p for video share, 240p for video & audio = 850+128+300+128 = 1.4 Mbps</p>	Integrates with third party applications such as Microsoft Teams, Workplace by Facebook, Office 365, Google Calendar, Slack, Splunk, Trello, etc with their application programming interface (APIs)	Connects with Android, iOS, Mac, Windows, Linux, H.323 / SIP conference room systems	<p>Support: Phone, live support, email</p> <p>Training: Webinars, online resources, instructor-led training, video tutorials</p>	Basic, Basic Plus, Advanced, Advanced Premier	<p>Meet EU's General Data Protection Regulation</p> <p>Complies with the EU-US Privacy Shield Framework as set forth by the US Department of Commerce</p> <p>Datagram Transport Layer Security (DTLS)</p>
Pexip for healthcare (Norway)	<ul style="list-style-type: none"> • In-browser (WebRTC) video calling • Can be hosted on-premises in a secure data centre, in the cloud or a 	From 2 onwards (depends on licensing)	<p>Full HD: 2.4 Mbps</p> <p>HD: 960 kbps</p> <p>SD: 64-448 kbps</p>	Native interoperability solutions allow Pexip to join Google Hangout Meet and Microsoft	Connects with Android, iOS, Mac, Windows, Blackberry, H.323 / SIP conference	<p>Support: web</p> <p>Training: training portal, webinars</p>	Monthly or annual plans, annual licensing agreements	<p>Complies with US Federal security requirements</p> <p>TLS certificate management</p>

Tool (Country of origin)	Features	Number of participants (concurrently)	Bandwidth requirement	Integration	Compatibility	Support / Training	Pricing model	Security
	<ul style="list-style-type: none"> combination of both Screen sharing 			<p>Teams (Skype for Business)</p> <p>Includes a management API that allows third parties to control, configure, and obtain status information on the Pexip platform</p>	room systems			<p>HTTP Strict Transport Security</p> <p>Certificate signing requests (CSRs)</p> <p>Support for multiple roles of access</p>
Zoom for healthcare (USA)	<ul style="list-style-type: none"> Screen sharing Group collaboration features such as breakout rooms, whiteboarding, group messaging Support for multiple camera inputs allowing medical professionals to share 	up to 100 (up to 500 with add-on)	<p>For 1:1 video calling: 600kbps (up/down) for high quality video 1.2 Mbps (up/down) for 720p HD video</p> <p>For group video calling: 600kbps/1.2Mbps (up/down) for high quality video</p>	<p>Extensions and plug-ins available for Microsoft Outlook, Google Chrome, Skype for Business (Lync)</p> <p>Allows work email, single sign-on (SSO) or Google login</p> <p>Integrates with third party applications such as Slack,</p>	Connects with Android, iOS, Mac, Windows, Blackberry, H.323 / SIP conference room systems	<p>Support: Email, phone, live support</p> <p>Training: webinars, video tutorials</p>	Plans start at US\$200 per month	<p>SSL encryption</p> <p>AES 256 bits encryption</p> <p>HIPAA compliant with BAA</p> <p>HTTPS access</p> <p>Role based access control</p> <p>Admin feature controls</p>

Tool (Country of origin)	Features	Number of participants (concurrently)	Bandwidth requirement	Integration	Compatibility	Support / Training	Pricing model	Security
	<ul style="list-style-type: none"> peripheral camera feeds Local desktop recording with HIPAA BAA for clinical application, or in the cloud for non-clinical applications 			Dropbox, Salesforce, Zendesk, etc				
GoToMeeting (USA)	<ul style="list-style-type: none"> Screen sharing Collaboration tools such virtual whiteboard, drawing tools, hand over control Recording 	Up to 10 (up to 250 depending on plan)	Webcam sharing (HD) = 700 Kbps Screen sharing = 40 Kbps Computer audio (VoIP) = 40 Kbps At least 1 Mbps of bandwidth to use all 3 features during a session	Integrates with Microsoft Outlook, Microsoft Office 365, Google Calendar and Chrome, with plug-ins	Connects with Android, iOS, Mac, Windows, Linux, H.323 / SIP conference room systems	Support: Phone, web Training: Live and on-demand training	Starter, Pro, Plus	End-to-end AES encryption Standards based cryptography HIPAA compliant

Note: This table is indicative only and software companies update and improve their products regularly.

4.1.1 Healthdirect Video Call⁽¹²⁾

Many DHHS-funded health services in Victoria are equipped with Healthdirect Video Call, which started off as a telehealth platform in 2012. Healthdirect Video Call supports up to five participants, so hospitals which already have this platform in place are able to use Healthdirect Voice Call as a meeting tool for MDMs.

Healthdirect Voice Call uses the open source WebRTC standards for real time video, audio and data communication. As a telehealth platform that needs to cater for clients in regional areas, it has been designed to work well even in low-bandwidth environments. Healthdirect Video Call's design ensures no digital footprint remains in the system after the consultation to ensure patient's privacy is maintained.

Healthdirect Voice Call supports multiple screens and screen sharing. At one of the health organisations interviewed, their case conferencing room is set up with three different computers that syncs into the displays at the front of the room. One would have the Healthdirect host on it and the other would either be radiology or pathology. All parties would be able to see it on their end.

Every year, DHHS provides funding to Healthdirect Australia for DHHS-funded health services to access the platform. Healthdirect Australia is also working with WA Health to make Video Call available to state health services, as well the Commonwealth Department of Health who is funding the implementation of video call in the nationwide Pregnancy, Birth and Baby service and running trials to June 2020 with Primary Health Networks. There are currently approximately 200 organisations using Healthdirect nationwide and about 2000 consultations every month. To date, Victoria has embraced the platform the most.

"[Healthdirect] We've held meetings, we've held seminars with doctors in New York and Spain where those presenting at their end and we've got a crowd of doctors at our end just listening to their presentation and then throwing questions back at them so it's been really good." ~Organisation E

4.1.2 WebEx⁽¹³⁾

When CanNET was rolled out in Australia in 2007, WebEx was largely introduced as the online meeting technology for linkage to cancer multidisciplinary team meetings. WebEx, an enterprise solution by Cisco Systems, offers a suite of tools such as WebEx Meetings, WebEx Teams and WebEx Events to facilitate online videoconferencing.

Although WebEx has started to adopt WebRTC technology, it is also a software application that can be downloaded onto a computer, tablet or smartphone. For example, health practitioners on South Australia Health Digital Telehealth Network need to download WebEx Team in order to connect and communicate with other health practitioners and users from different locations.

Unlike Healthdirect Voice Call which is set up as a standalone platform, WebEx can be integrated into many industry-leading applications. For example, users can schedule WebEx video conferences from the apps they work in every day, such as Google Calendar. Also, WebEx not only joins users from a computer, tablet or smartphone, WebEx can also be connected to H.323 / SIP-standards telecommunication equipment.

Jabber, another Cisco Systems product that allows users to communicate using video, instant message, voice, voice message and conferencing, was also identified and used by the Aboriginal Medical Services Alliance Northern Territory (AMSANT) on their proprietary network NTCS.

4.1.3 BlueJeans⁽¹⁷⁾

BlueJeans is similar to WebEx in that it supports video meetings or web conferences through H.323 room systems, like Cisco and Polycom. It is also possible to integrate with other applications and supports screen sharing and Real-Time video sharing.

One feature of BlueJeans is that its videoconferencing platform is supported by Dolby Voice. BlueJeans maintains that Dolby's innovative engineering suppresses background noise and keeps volume consistent across soft and loud talkers, allowing attendees to 'hear clearly and communicate naturally, as if they were in the same room'.

Unlike Healthdirect Video Call, BlueJeans offers basic recording service for free. There is an option for enhanced recording for a fee. As audio, video and any shared content can be saved for future reference or sharing, confidentiality of information under discussion needs to be taken into consideration when using BlueJeans as an MDM platform.

4.1.4 Pexip⁽¹⁴⁾

Pexip uses WebRTC technology like Healthdirect Video Call, ensuring easy and straightforward connections to videoconferences without any downloads. Queensland Health has chosen to use Pexip because Pexip also joins standards-based video conferencing from vendors such as Cisco, Poly, Lifesize and many others, which a lot of hospitals in the state are equipped with.

Pexip is highly invested in the interoperability between video meeting solutions using a range of application program interfaces (APIs), allowing users to use the technologies they already own to meet with others. Apart from native interoperability with Microsoft Teams, Skype for Business, and Google Hangouts Meet, Pexip for healthcare also offers flexible APIs to integrate with patient records such as electronic medical records (eMR). While Pexip allows recording customisation, the version that Queensland Health uses as their telehealth platform does not support recording at this stage.

4.1.5 Zoom for Healthcare⁽¹⁶⁾

Zoom is another web and app-based video conferencing service that is used in Australia. Similar to some of the earlier-mentioned videoconferencing tools, Zoom combines cloud video conferencing, group messaging, and collaboration tools such as screen sharing, co-annotation, and remote control into one simple platform. Project ECHO sessions all occur via Zoom.

Zoom has a dedicated platform to support healthcare. Like Healthdirect Video Call, Zoom also promises high quality video even in low-bandwidth environments. Zoom's recording function is encrypted and HIPAA BAA compliant. A feature that Zoom for Healthcare offers is its ability support for multiple camera inputs allowing medical professionals to share peripheral camera feeds.

4.1.6 GoToMeeting⁽¹⁵⁾

GoToMeeting, one of LogMeIn Inc.'s cloud-based remote connectivity services, has similar features as WebEx, Bluejeans and Zoom such as screen sharing, recording and online collaboration tools.

4.1.7 Telstra Bridge

Telstra Bridge offers a service via their VC centre where they initiate direct called between videoconference units with dedicated equipment. This is an example of IP-based videoconferencing

tool. Mlcoa, an IME provider who also provides telepsychiatry MDMs, uses this service. According to mlcoa, to set up a room with dedicated equipment, the cost ranges from \$5,000 to \$15,000.

The VC centre has a network of rooms around Australia and overseas. They manage the sourcing, organizing and connection between two sites. Also, the VC centre would arrange to have a technician onsite to make sure that the videoconference is safe and secure. As such, there is an hourly fee for each videoconferencing session.

4.2 Administrative software

Various administrative software with a range of functions are used to support MDMs. While some may have features for organising a meeting such as scheduling or sending out emails, the main use of administrative software is to capture, centralise and disseminate information around patient care.

4.2.1 CanMAP^(18, 19)

All the Integrated Cancer Services interviewed used CanMap for the management and administration of cancer care coordination services and MDMs. It is fully customisable to meet the needs of service providers and can be integrated with existing hospital or patient management systems. CanMap is a secured, standalone, web-based system that can be accessed by users anywhere, anytime.

Essentially, CANMAP is a database system used during cancer MDMs for:

- Submitting patients for discussion, which is possible to do at any computer with internet access via a logon and password
- Generating an agenda that is easily sent to all participants of the meeting
- Recording the discussion and recommended treatment plan during the meetings
- Producing a summary of the discussion and recommendations that is placed into the Medical Record
- Viewing previous discussions
- Faxing a copy of the discussion and recommended treatment plan to the patient's GP

While CanMAP has been used to support MDMs for years, it was implied during interviews that it was not a very intuitive program and not easy to navigate. There is a possibility that the health organisations using CanMAP in Victoria may be moving to a new platform known as QOOL-VIC, which will be elaborated in a later section.

4.2.2 Queensland Oncology Online (QOOL) ^(20, 21)

Developed by the Queensland Cancer Control Analysis Team (QCCAT), Queensland Oncology Online (QOOL) is designed to support multidisciplinary teams by assisting in meeting preparation, communication and documentation of essential clinical information such as diagnosis, cancer stage and recommended treatment plans.

Moving away from the concept of a traditional silo database, data such as prior cancer history and pathology are saved into a repository which can be viewed and updated by other QOOL users and other QOOL data sources (see Table 8) in real time. Effectively, it is able to provide online clinical summary of patient journey regardless of patient, clinician, hospital location. This facilitates communication between cancer care providers. As it is web-based, QOOL is widely accessible by registered users 24/7. According to Cancer Alliance Queensland, 67 MDTs across 14 public and private facilities in Queensland are using QOOL to support multidisciplinary care.

4.2.3 Queensland Oncology On-Line-Victoria (QOOL-VIC)⁽²⁰⁻²²⁾

QOOL-VIC is built on the version of the existing software used in Queensland, with enhancements agreed to and requested by Victorian regional health services following a pilot project. QOOL-VIC also leverages off the existing infrastructure used by pathology labs to report cancer notifications to the Victorian Cancer Registry, the e-path system. QOOL-VIC is structured in a way that interfacing with other systems such as electronic medical records and patient administrative system is possible.

DHHS holds the license agreement with Queensland Cancer Alliance for this software. In March 2019, DHHS invited Expression of Interest for QOOL-VIC from metropolitan Victorian health services that conduct cancer MDMs. Health services can access QOOL-VIC by entering into a sub-licensing arrangement with DHHS.

Implementation costs for QOOL-VIC are fully funded for regional health services that are implemented by July 2019 and competitive rates are being offered to the metropolitan health services. There will be an annual service fee associated with the use of QOOL-VIC.

Table 8 shows the data sources that feed into QOOL and QOOL-VIC. Shaded data sources are those that have been linked to QOOL and QOOL-VIC successfully. It is a work in progress and more data sources may be added.

Table 8. How QOOL and QOOL-VIC utilise source data

Queensland	Linked to QOOL	Victoria	Linked to QOOL-VIC
Demographics	✓	Demographics – ePath, legacy systems	✓
Diagnosis – primary site, morph	✓	Diagnosis – VIC cancer registry (potential source)	
Pathology – reports	✓	Pathology – ePath	✓
Radiology – reports		Radiology – reports	
Surgery – coded procedures	✓	Surgery – Victorian Admitted Episodes Dataset (VAED) (potential source)	
Systemic therapy – protocols, drugs, coded in admitted patient episodes	✓	Systemic therapy – VAED and treatment systems (Oncology Information Management System CHARM)	
Radiation therapy – prescription	✓	Radiation therapy – treatment systems (MOSAIIQ)	
Death – date and cause	✓	Death – VIC cancer registry	

Source: Cancer Alliance Queensland (as of November 2018)

Note: Shaded data sources are those that have been successfully linked to QOOL and QOOL-VIC.

4.2.4 Clinical Research Information Management System

Victorian Comprehensive Cancer Centre, comprising the Royal Melbourne Hospital, Royal Women's Hospital and Peter MacCallum Cancer Centre, runs multidisciplinary clinics across the three organisations for breast cancer patients. Together with a NSW-based software company Innovative Clinical Information Management Systems (iCIMS), they have developed and are using a proprietary administrative tool called the Clinical Research Information Management System to support MDMs.

The system is linked to the hospital's patient administration system iPM and can be integrated with any electronic medical record. Collating information in the system, it generates an output in a template for the MDMs. During MDMs, recommendations can be entered live into the system so that they are available for use immediately afterwards. For example, if a patient was going to a clinic on the same day after the MDM, the clinician would have access to those results. The MDM summary could also be sent to the patient's GP by the data manager.

From the interview, it was understood that while it is fundamentally a data management system built to support MDMs, data is routinely, comprehensively and accurately collected in a meaningful way so that they can be used for other clinical or research purposes as well.

While this system is currently used by the breast tumour stream, it has the scalability for other tumour streams to build their own version. The requirements for MDM data collection vary dramatically from cancer to cancer and the system has the flexibility for modifications.

4.2.5 TeleConnect⁽²³⁾

TeleConnect is essentially a scheduling engine to create appointments and it has been tailor-made for health service delivery. It is designed with a strong configurable architecture to suit various medical workflows. One of its advantages is that its technology supports high and low bandwidth connections, making it a solution for providing care to those in rural and less connected areas.

In the Northern Territory, Telstra Health uses a customised TeleConnect platform on the National Telehealth Connection Service (NTCS) to provide an interoperable scheduler/meeting system that would work across browsers, PCs, phones, tablets and hardware. 15 services in the Northern Territory are connected to NTCS. Although it was described as 'easy and only three steps to create a video consult', videoconferencing was understood to be used on the network on odd occasions only.

4.2.6 cdmNet⁽²⁴⁾

Released by Precedence Health Care, a Melbourne-based digital health solutions provider, cdmNet is an online service for GPs to create GP management plans (GPMP) and team care arrangements (TCA) to manage chronic disease and preventive care with practice nurses and other healthcare providers. As it is an online service, health professionals and patients can access it anywhere, anytime. However, in order to link to a clinical desktop software such as Best Practice, Medical Director or ZedMed, GPs and practices would need to download and install the cdmNet desktop component.

Precedence Health Care charges a fee (between \$5.00 and \$17.50) to GPs for some services that include a rebate from MBS. Otherwise, basic services such as care plan creation, shared electronic health record (controlled by the patient in collaboration with the GP), and support for patient self-management, are free to all health care providers and patients.

4.3 Technology requirements to set up videoconferencing

For optimal user experience, various technologies have different recommended basic system requirements. Some requirements may be specific to the platform and tool. Table 9 is a general guideline to the minimum technical requirements for conducting a videoconference online.

Table 9. General guide to videoconferencing

Component	Minimum technical requirements
Web browser Note: Some videoconferencing tools may not function or have limited features in some web browsers. It is good practice to have several browsers, although Google Chrome and Safari generally have fairly high compatibility.	Either one: <ul style="list-style-type: none"> ● Google Chrome 8.x and up ● Firefox 1.x and up ● Opera 7.11 and up ● Safari 5.05 and up ● Microsoft Edge ● Microsoft Internet Explorer 8.0 and up (this web browser will be phased out)
Operating systems	Either one: <ul style="list-style-type: none"> ● Window 7 or later ● Mac - OS X 10.9+
System requirements	<ul style="list-style-type: none"> ● Dual-core processor or better ● 1GB of RAM or higher
Hardware	<ul style="list-style-type: none"> ● A web camera, either built-in or USB ● A microphone, usually built-in to most laptop computers and external webcams ● Speakers and headsets, if required ● Recommend a second monitor for providers, to display the video consultation on one monitor and patient information on the other.
Internet connection	<ul style="list-style-type: none"> ● ADSL or 3G/4G ● If the user is connecting from a mobile device, ensure there is sufficient data allowance for video calls.

“Our best MDM room has got six screens and on that will be PET scan and a CAT scan and a pathology slide as well as the software and various bits and pieces. [some] scans and slides are really, really high res images ... So the medical imaging or the radiologist will connect into their PACS system, their own medical imaging system in the room, and pull up the images as they require. The pathologists tend to bring the pathology slides into the room and use a microscope that’s connected via a camera to the screen. Having six screens enables the people themselves to prep the next one and next one so that there’s a very quick move right from one speaker to the next, which means that they’re efficient.” ~Organisation D

5. ENABLERS AND BARRIERS

Key messages

- Critical success factors for MDMs include a clear and measurable purpose, a culture that integrates expertise, and good decision-making processes.

Enablers for MDMs and infrastructure:

- A strong leader and chairperson with clinical experience, who is clear on the purpose of the MDM
- A core group is identified to attend the MDM as part of patient care
- MDMs are perceived as a learning opportunity
- Champions on-site
- Fixed MDM schedule, for a full year where possible
- Dedicated space or rooms for MDMs
- Technology capabilities and clinical service needs match to facilitate the administration of MDMs
- User-friendly IT tools

Challenges for MDMs and infrastructure:

- Administratively laborious in the preparation for an MDM
- Lack of communication between specialists and administrators in the preparation for MDMs
- Poor meeting dynamic and etiquette among MDM members
- Difficult to schedule GPs in MDMs
- Lack of governance around MDMs
- Lack of appropriate space and equipment
- Background noise distractions during MDMs
- Unrealistic expectations of users' IT knowledge
- Change management not well-considered

5.1 Critical success factors and enablers

There are a number of underlying factors or supporting principles that aid in the development of successful MDMs, identified in a DHHS report ⁽⁵⁾. They include having a clear and measurable purpose for the MDM, a collective culture that integrates the expertise of MDM members, and processes and procedures that enable good decision-making.

Enablers for MDMs and infrastructure were also identified by interviewees and are presented in Table 10 and Table 11.

5.1.1 Clear and measurable purpose

Improvements in patient outcomes are often the reason for the implementation of an MDM, but there needs to be careful consideration of what its purpose is. More detailed or specific outcomes or impacts will be easier to measure (for example, 'improve access to X treatment regardless of geographic location' or 'improve time from diagnosis to commencement of treatment', rather than 'improve the clinical outcomes of X patients'). The purpose may also be driven by needs that are not necessarily directly related to individual patient outcomes (such as the need to better understand the biopsychosocial issues around pharmaceutical misuse in order to triage these earlier and more effectively in future). Some questions to consider are shown below:

Why is an MDM being considered and what is it intended to achieve?
What is the problem that needs to be solved?
How will the MDM contribute to our organisation's overall vision/mission?
What outcomes are anticipated and how will these be measured?

5.1.2 Collective culture that integrates expertise

MDM membership should reflect the breadth of knowledge and expertise necessary to develop quality care outcomes for presented cases. It is important for all members of the MDM to feel that their expertise is valued. Developing a collective culture that respects different skillsets and opinions to improve patient care is not only beneficial to patients, but also has other collegiate benefits for the clinicians involved.

Birmingham Health Care for the Homeless (an addiction services clinic in the UK) found that the use of MDMs had a particularly beneficial outcome for patients with mental health and substance use comorbidities, with 75% of clients maintaining abstinence six months after completing the program as well as increased uptake of other services such as transportation, childcare, healthcare, and housing. Professional differences presented a challenge, however, to routinely achieving these outcomes. Medical staff preferred to treat addiction with a drug therapy and psychologists preferred to use psychotherapies. To get staff to accept combined treatment modalities, prominent psychiatrists were invited to speak at monthly staff training ⁽²⁵⁾.

A collaborative MDM culture depends on having:

- A clearly stated, shared and measurable purpose that is aligned with individual members' goals
- Appropriate membership, with clear roles and responsibilities
- Effective leadership
- Mechanisms for timely exchange of information
- Documented processes for decision making and dispute resolution
- Joint responsibility to engage with the wider community

It may also be useful for MDMs to consider training in inter-professional collaboration and to develop practices to orientate new members to the MDM processes, practices and culture.

5.1.3 Processes and procedures that enable good decision-making

Good decision-making encompasses not just decisions about patient care, but also decisions about how best to come to consensus about treatment, timing and the need for any further case review. Principles of clinical decision-making should be documented for MDMs and may include the following, according to the NHS National Cancer Action Team ⁽³⁾:

- An agreed set of information to be provided to each MDM (including expectations around diagnostic images and information presentation, provision of psychosocial and substance use comorbidities, and patient views and preferences, especially in relation to comorbidities)
- The need to consider all clinically appropriate treatment options even if they are not offered by the clinicians present or cannot be offered locally
- That MDMs have access to information on current and relevant clinical trials where feasible
- An agreed protocol for use of evidence-based standard treatment guidelines (including conflict resolution processes)

- A practice of patient-centred care by considering patient views and preferences where possible
- Agreed documentation standards for outcomes (including the agreed treatment or care to be provided, timings or sequence in which treatment/care will be provided, and by whom) as well as clear roles about who is responsible for communicating those outcomes to the patient, GP, or other external clinicians as well as receiving any feedback on implementation

Table 10. Enablers for MDMs identified by interviewees

Theme	Quotes
A strong leader and chairperson who is clear on the purpose of the MDM, with clinical experience.	<p><i>"You need a fairly strong, sort of a clinical leader and someone who knows what they're trying to achieve, who is keen to achieve it." ~Organisation A</i></p> <p><i>"Most conversations are surgical-led and a lot of the meetings are chaired by surgeons. They're the driving force and the central navigators of where the patient goes next." ~Organisation E</i></p>
Fixed schedule, for a whole year where possible	<p><i>"We do have a lot of public and private patients presented and a lot of enthusiastic clinicians attending. It has taken a long time to settle down the timetable of these meetings and any changes to those timetables cause huge ripple effects which we've already had... Set routine every week, every fortnight and it's scheduled at the beginning of the year and we stick to that." ~Organisation E</i></p> <p><i>"It's for 52 weeks of the year and then the schedule is done. The room and the location, everything in it's posted, everybody knows where it is." ~Organisation D</i></p>
A core group is identified and attends MDM as part of patient care. Among the organisations interviewed, the number of people involved in a typical MDM ranged from 8 to 35. Often a core group is required for the MDM to proceed.	<p><i>"There is a core group who would not schedule anything else for this time. it's accepted that it's a critical part of patient care" ~Organisation A</i></p> <p><i>"We have a number of specialists in the room. there will be surgeons, medical and radiation oncologists, pathologists, radiologists, so they're like our core group and there will be usually at least two of each of those." ~Organisation B</i></p> <p><i>"Obviously you'd want 80% of the core team there 80% of the time really. That would be the thing, but you can't go ahead if you don't have a radiation oncologist and you need an opinion on radiation." ~Organisation D</i></p>
When MDMs are perceived as a learning tool and opportunity	<p><i>"And there was a huge informal learning opportunity in there... for surgeons in particular to work with pathologists... Yeah, there's a lot of education in those meetings for the specialists but also to their registrars and interns who are exposed to this every week." ~Organisation D</i></p> <p><i>"The other one is sort of an alliance focus on this is actually a benefit to the patients so they [clinicians] attend knowing or agreeing that it is a beneficial thing..."</i></p>

Theme	Quotes
	<i>The other thing is that collegiate arrangement where they recognise that they're a group of people working for the same cohort of patients and so it becomes a network amongst them."</i> ~Organisation E
Champions on-site	<i>"A champion who really drives it. So, you want a clinician that's genuinely invested in it."</i> ~Organisation H

Table 11. Enablers for Infrastructure

Theme	Quotes
User-friendliness. The easier an IT solution is to use, the more often it will be used, even for other purposes.	<i>"I love it. If somebody tells me I'm going to have a web conference, I'd say, 'Can we do it via Healthdirect?' because I know how to work it and it allows me to share with confidence the screens."</i> ~Organisation E
Dedicated space or rooms for MDM as well as strong IT resources, encompassing both equipment and personnel, and a good infrastructure.	<i>"The rooms that we have for them to meet in have great infrastructure so that they have a comfortable network and the options to display to a dual monitor at the front of the room and the connections to outside. So that's one of the enablers."</i> ~Organisation E
Technology capabilities and clinical service needs match. A proprietary administrative system would be more useful in MDMs than an off-the-shelf meeting management system which is likely to be just a basic software that captures superficial data.	<i>"The complexity of cancer care and the differences between the various tumours and how they're managed means that... a somewhat bespoke system I believe is essential because what we do in cancer care is fairly bespoke."</i> ~Organisation A

5.2 Challenges and barriers

5.2.1 Communication, value, and competing interests

A Victorian survey⁽²⁶⁾ found that there were 7% of cancer MDMs where the treatment recommendations are never provided to GPs. This was down from the last surveys in 2008 (15%) and 2006 (38%), but there is obviously still work to be done. GPs are also not considered to be a core multidisciplinary member for cancer MDMs, which no doubt influences both attendance and communication.

There is a push by the Australian government to better support communication between GPs, specialists, as well as with patients. In August 2010, Medicare Benefit Scheme (MBS) benefits for online consultations involving two or more clinicians were introduced, with a specific focus on video-consultations and the pre-eminence of GPs in these meetings. Multidisciplinary telehealth consultations have the potential to reduce geographical inequities in healthcare provision, as well as supporting GPs to take the lead in providing quality healthcare to their patients. Considerable financial and education support, as well as leveraging economies of scale are still needed, however, to ensure the effectiveness of this strategy in Australia⁽²⁷⁾.

GPs, particularly private-practice GPs, often have competing interests related to maintaining their practice where any activity that takes them away from their practice takes a lower priority. There are a number of ways that the value of GPs and the value of MDM can be leveraged to create impetus for GPs to be more engaged. The roll out of national eHealth programs will assist to create momentum around care plans that are created by multidisciplinary care teams.

5.2.2 Medico-legal issues

Health practitioners are concerned about sending health information via tele/video-conferencing technologies, as well as health record storage, privacy of information and images, and the potential for litigation risks from misdiagnosis, service provision and medical treatment (or failure to provide medical treatment) via telehealth because of the inherent limitations of clinical assessment using these technologies. There may be legal implications around duty of care, informed consent, privacy and confidentiality, insurance and indemnification.

DHHS has provided information about mitigating these risks in a document by DLA Piper called “Medico-legal aspects of telehealth services for Victorian public health services”. Provided the risks are identified, acknowledged and dealt with appropriately, this should not be a barrier to a successful Victorian telehealth system.

5.2.3 Technology capacity and capability

Despite being supportive of MDM via telehealth/videoconference, and other forms of virtual care, nearly half of all physicians in the US are yet to commence providing this form of care. According to Deloitte 2018 Survey of US Physicians, the primary barrier nominated is still due to a lack of access to technology (35%), followed by security and privacy of patient data concerns (33%) and lack of interest from patients in using this technology (23%)⁽⁷⁾.

Familiarity breeds comfort. The same survey suggests that the intent to use technologies in the future is strongly predicated on current adoption of technology. Over two-thirds (69%) of those physicians whose organisation has already adopted at least one virtual care technology expect to increase use in the next year to two years. Once clinicians have adopted at least one form of technology, this should cease to be a barrier for other uses.

Challenges involved in the provision of MDMs and infrastructure identified by interviewees are presented in Table 12 and Table 13, respectively.

Table 12. Challenges for MDMs identified by interviewees

Theme	Quotes
Administratively laborious	<i>“I would say probably 80% of the time the coordinators are working to gather all of the bits together ready for the meeting. The actual data entry and collection is less time compared with that coordination and preparation for each meeting.” ~Organisation E</i>
Lack of communication between specialists and MDM administrators	<i>“Some of the difficulties we come across are communication. There will be patients presented and then the presenter will say, “We’re all here to look at the pathology.” ... [But] we haven’t actually prepared the pathologists and advised them to get the information ready for presentation.” ~Organisation E</i>
Poor meeting dynamic and etiquette	<i>“If the majority of the team don’t happen to agree with the proposed things from the lone practitioner... and they just don’t know each other really, really well. Where</i>

Theme	Quotes
	<i>you've got two teams coming together, that's also hard because you've just got that group dynamic."</i> ~Organisation D
Scheduling MDMs with GP can be tricky	<i>"Timing a GP attendance when he's free and when everybody else is free is really difficult. Then you have, is he in for the entire meeting or only part of the meeting for his patient? There's a number of pressures to address."</i> ~Organisation E
Lack of governance around MDMs	<i>"I think one of the success factors that we haven't quite met is proper governance of the meetings. We have 11 very different meetings and we have no correlation across the group as to how things are being managed... That needs to be brought together and have some sort of control over because as I said, there's a lot of surgeons who chair the meetings."</i> ~Organisation E

Table 13. Challenges for Infrastructure

Theme	Quotes
Lack of appropriate space and equipment. Not every organisation has dedicated space for MDM and this may incur cost to set up infrastructure in an ideal way.	<i>"Ideally you have two screens and a setup... It should be in a way that people can see each other whereas ours is set up theatre style so people have to turn around to see the others. That does not facilitate communication but there's nothing I can do about that."</i> ~Organisation A <i>"We've experimented over time with a theatre style seating arrangement, we prefer to have round table, but we have a lot of attendees so we have a bit of a mixture really. Some people at the main table and some people sitting around."</i> ~Organisation B
Lack of integration with existing hospital systems	<i>"Between palliative care and mental health and cancer, none of our systems talk to the hospital. In some cases, neither does the ED system so until they overhaul everything at once we're all in these individual boxes... MDMs are down the list of what we want integrated."</i> ~Organisation E
Background noise distracts MDMs	<i>"We've set up all the room with lots of microphones to really improve the audio, but like many collegiate meetings there's a lot of side conversations and phones and things and it is really challenging."</i> ~Organization D
Unrealistic expectation of IT knowledge	<i>"There is an expectation that the host, so say the group in the meeting room, that's the host, is familiar with the technology and can connect or assist the remote participants to connect. Also there's an expectation that the remote participant or clinician has a degree of IT knowledge, just enough to use online meeting tools, and that's not guaranteed."</i> ~Organisation D

Theme	Quotes
<p>Implementation of any technology needs to go hand in hand with well-considered change management strategies. One of the organisations reported that a few health services had not adopted the technology due to changes to their work process.</p>	<p><i>“The new version that we got had a lot more data items in it so we had to change the way we were doing some of the stuff. Like any stuff for a system there are advances and it’s two steps forward and one back.” ~Organisation E</i></p> <p><i>“Quality data entry is really important if you want to start to have a really good look at the effectiveness and patient outcomes for your data.... And a lot of it over the time has been free text, so really just trying to be reworking some of that to create the data fields so we're getting better quality data through that.” ~Organisation F</i></p> <p><i>“Getting the equipment set up, getting the room set up, sitting with them [patients] and then having a chat afterwards and then recording everything on the clinical information system... Services estimated between one and two hours of extra time for their staff where they’re doing it; whereas previously they would have had that time free because the patient would have been heading into town to see the specialist face-to-face.” ~Organisation C</i></p>

6. INSIGHTS AND IMPLICATIONS

This Environmental Scan has identified a number of models of MDMs. The most common types and purposes of MDM are to develop a diagnostic or treatment plan and to coordinate care services for patients. It was found that MDMs are predominantly carried out face-to-face. Teleconference or videoconference was utilized only when participants or a specific group of clinicians were unable to attend in person.

In Australia, cancer MDMs have benefited from the legacy of 'tumour boards' and supported by a number of key development projects such as the CanNet program. As a result, MDMs are quite established in cancer care and, more recently, increasingly in palliative care. The interviewed organisations who conducted MDMs considered their models successful but they had not undertaken any formal or informal evaluation. The role of MDM in relation to return to work and other recovery measures was not indicated in the interviews or seen in the desktop scan.

More generally in health, the national focus on telehealth via the Australian Digital Health Agency has seen new uses or purposes for MDM. While one-on-one telehealth is still most common for this sector, some disciplines have used the technology opportunities to develop telehealth MDMs, particularly in rural and regional areas in Australia.

There is, as far as we know, limited information on the use of MDM in OHS or RTW settings. This means that using this format of care planning may be a novel concept and thus presents some challenges in understanding what elements of MDM will contribute to success, in terms of the health, wellbeing and timely return to work of injured workers.

It also means, however, that there are opportunities to build an approach that focusses more on patient-centred care than perhaps some of the cancer MDMs have been able to do due to their size and the volume of cases they process at any one meeting. It would seem to be appropriate to look to palliative care models of MDM, rather than cancer MDMs as this is another discipline which focusses more on patient involvement in MDMs as well as GP engagement. Flinders University's CareSearch (which runs the palliAGED web portal) is a relatively singular source of information for this discipline who could be contacted for advice on the engagement of GPs and patients. There is an app available for GPs via palliAGED that assists them in conducting palliative care MDMs.

From the desktop scan and interviews, benefits of MDMs for patients, clinicians and healthcare services were also identified. For example, reports from the National Breast and Ovarian Cancer Centre, HealthOne NSW program and US Deloitte Insights revealed that there was increased patient satisfaction with treatment and care as a result of MDM. Patient health benefits such as more consistent and clinically-guided care plans, shorter timeframes to treatment, and better diagnosis, are transferable to any healthcare discipline. The use of MDMs have expanded to now cover drugs and alcohol, fractures, mental health, and aged care.

While clear benefits exist for MDM in healthcare, there are some remaining barriers relating to GP's full engagement. These include communication, value, competing interests, and the technology capacity and capability of GPs. Other barriers include that MDMs are administratively intensive, and appropriate space and equipment are required.

A range of IT solutions to facilitate MDMs via videoconferencing were identified. It was common to find different videoconferencing tools being used within the same organisation. Nonetheless, what is becoming more apparent is that webRTC-based videoconferencing tools such as Healthdirect Video Call (supported by DHHS) and Pexip (supported by Queensland Health) are taking over the market. They are user-friendly because they allow users to join a video meeting over almost any browser (see Table 9) without needing to download anything.

Overall, the critical success factors of MDMs for consideration are:

- A clearly stated, shared and measurable purpose that is aligned with individual members' goals
- Effective leader who has the clinical and operational skills and is empowered to drive implementation
- Appropriate membership, with clear roles and responsibilities
- Timely access to information, mechanisms for timely exchange of information needs to be in place
- Documented processes for decision making and dispute resolution
- Opting for webRTC-based IT solutions for videoconferencing.

Suggestions to increase GP engagement in MDM include:

- Communicate directly with GPs via newsletters with success stories on MDMs, face-to-face catch up with GPs, etc
- Focus on the benefits of MDM on patient care
- Encourage GP representatives, either in person or via an IT tool e.g. videoconferencing
- Value GP contributions, ensure MDT meeting treatment recommendations are communicated to the patient's GP to promote enhanced care coordination and patient safety
- Use appropriate IT tool, e.g. use a videoconferencing tool that has a virtual waiting room for GPs to wait until their case is being discussed.

7. APPENDIX 1 – INTERVIEW GUIDE

Multidisciplinary case conferencing model

1. What is your organisation's aim in holding a multidisciplinary case conferencing?
 - How long have this program been running within your organisation?
2. Please describe your organisation's multidisciplinary case conferencing program.
 - Structure of meeting, membership, duration, frequency, etc.
3. What are the benefits of conducting a case conferencing?
4. What are the barriers to effective case conferencing?
5. Have any formal or informal evaluations of your case conferencing model been undertaken? Are we able to obtain a copy of any findings?

Technology

6. How is a case conference conducted at your organisation? Face-to-face, phone or video conference, or a combination?
7. What IT tool is used for video / phone conferencing?
 - Minimum system requirements, licensing, implementation, maintenance
8. What security features does this IT tool have?
9. What are the approximate costs associated to the implementation of this tool?
10. What are the benefits of the technology used?
11. What are the limitations of the technology used?
12. How would you describe your overall experience with videoconferencing technology?
 - Any feedback from patients and providers on their end-user experience?
 - What are some of the critical success factors and lessons learned from implementing this system?
13. What other technologies do you use to support case conferencing? E.g. Patient record system, information sharing system, meeting organisation software, etc.

Other information

14. Are you aware of any emerging initiatives or programs beyond your organisation who has conducted effective case conferencing successfully, either locally or internationally?

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