MINISTRY OF HEALTH
MANATŪ HAUORA

New Zealand Government

Maternal Fetal Medicine (MFM) / Rongoā mō ngā whāea me ngā pēpi

Action Plan / Mahere Mahi

Delivering safe, sustainable MFM services to women and babies in Aotearoa New Zealand

Acknowledgement / Ngā mihi

The Ministry of Health would like to thank members of the MFM Improvement Advisory Group for their valuable contribution to this improvement action plan for MFM services in New Zealand.

Particular thanks is given to consumer representatives who provided valuable insights into aspects of MFM care that are important to women and whānau experiencing the service.

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Maternity care

In Aotearoa New Zealand, maternity care is funded by the Ministry of Health (the Ministry) and provided by district health boards (DHBs). Providers of maternity care may be community or DHB-based midwives, general practitioners (GPs), and public or private obstetricians.

Women have the right to choose whom they engage as their lead maternity carer (LMC). However, professional colleges and the Ministry provide guidelines about referral and appropriate care for high risk pregnancies (Ministry of Health, 2012).

Maternity services are organised around community-based care, supported by secondary, tertiary and quaternary hospital services. There are six tertiary obstetric providers in New Zealand (Auckland, Counties Manukau, Waikato, Capital & Coast, Canterbury and Southern DHBs). All of these providers support women with relatively complex maternity and obstetric needs.

A partnership improvement model has been developed to address a range of issues in maternity care. A five-year work programme has been created, led by maternity experts across the health sector. As women who need the most care often receive the least care, the focus of the work programme is on birthing at the right time in the right place and with the right care, regardless of where they live or how they might identify themselves. Improving responsiveness to Māori and better access to services for Pacific people are priorities.

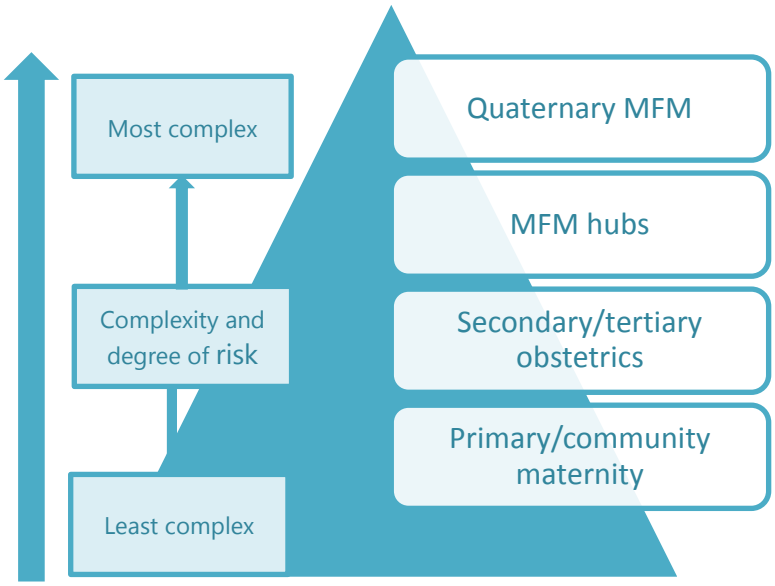
Maternal fetal medicine

Maternal fetal medicine (MFM) is a sub-specialty of obstetrics and maternity care for women where the pregnancy is considered highly complex (either because of a maternal condition or a fetal condition or abnormality). The service provides assessment, diagnosis and management which includes advanced fetal therapies or procedures where indicated.

MFM is part of a maternity pyramid of care, which may involve shared care across one or more of the tiers. While most women will be under the care of primary maternity service providers, some women will necessarily be under the care of a secondary or tertiary obstetric service. This may include shared care with the community LMC/GP.

The MFM service is at the apex of the pyramid, with MFM care provided through hubs, with referral to a single provider for complex fetal or maternal therapies. This informs the service configuration for MFM care, which is based around supra-regional and quaternary care.

Figure 1: The maternity continuum of care



Referral to MFM will improve the chance of an antenatal diagnosis and improve outcomes for women and babies by providing advanced clinical expertise to determine diagnoses, counselling and care for complex maternal and fetal conditions.

As shown in Australia (Tan, Guaran, & Challis, 2012), in some cases an MFM service will be able to prevent maternal, fetal or neonatal deaths, or reduce the impact of some fetal conditions through appropriately timed interventions. In others the value will be in early diagnosis of fetal abnormality allowing the family to determine whether to proceed with the pregnancy or not.

Despite recent advances in ultrasound technology, although structural abnormalities are seldom missed, some fetal conditions are not possible to diagnose in-utero. This can result in incomplete diagnoses, difficulty predicting the severity and progression of disease and limited information available for neonatal outcome. Sometimes a suspected diagnosis will not be confirmed until birth or later. This situation takes much time and counselling to provide the range of possibilities for outcome for the live born baby. Coordination with other disciplines such as genetics or paediatric specialties may be required. Discussion at a fetal medicine multidisciplinary meeting (MDM) is invaluable in such cases.

It is estimated around six percent of births (n~3500) are considered sufficiently complex to warrant a referral to an MFM sub-specialist each year ((Babu & Pasula, 2013; Bacino, 2017). In some cases the condition will be time critical, requiring assessment, diagnosis and treatment within 1–2 days to prevent death or disability. Other cases, while less urgent, may result in significant anxiety for parents who have been advised there may be an abnormality affecting their baby. Delays in access can be very stressful in these circumstances.

The case for change / Te take matua

The current MFM service configuration

New Zealand's MFM services have historically been configured into three regional 'hubs' with an Auckland-based quaternary service for highly complex pregnancies and some fetal procedures. The number and location of MFM sub-specialists has resulted in service vulnerability, and in 2014 the Ministry provided funding for an MFM network which was intended to provide clinical leadership, development of clinical practice recommendations and some coordination of MFM improvement activities (see **https://www.healthpoint.co.nz/public/new-zealand-maternal-fetal-medicine-network**). One of the outputs of the network was the development of four formal criteria for designating an MFM hub (NZMFMN, 2014). These are:

- Units run by CMFMs[1] or Obstetricians and Gynaecologists who possess the DDU[2]
- Paediatric surgery services and Level 3 neonatal services within the DHB
- Access to genetic services and perinatal pathology services
- Recognised regional provider of Maternal Fetal Medicine Services.

The network's criteria supported service provision along the historical lines, with Auckland, Capital & Coast and Canterbury DHB being 'recognised' hubs.

Figure 2 shows the hub boundaries. The Auckland DHB hub covers the Northern and Midland Regions (excluding Taranaki DHB); the Capital & Coast DHB hub covers the Central Region, as well as Taranaki and Nelson Marlborough DHBs. The Canterbury DHB hub covers the South Island (excluding Nelson Marlborough DHB).

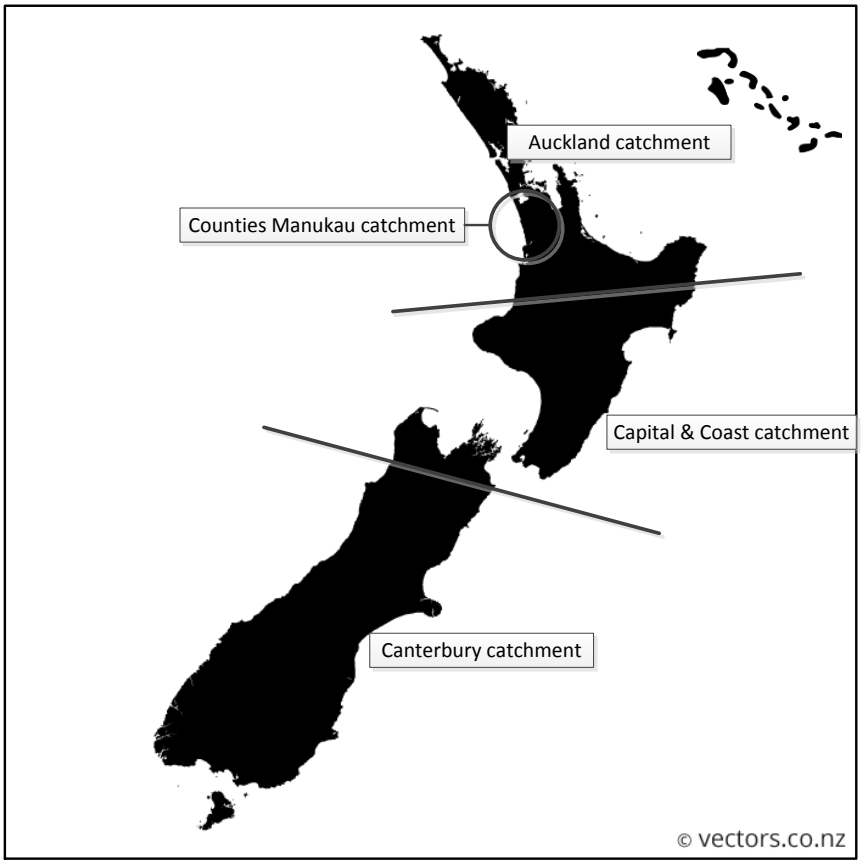
In addition to the recognised regional hubs Counties Manukau DHB provides some elements of an MFM service to their local population which has complex health needs.

Auckland DHB continues to be the quaternary provider for complex maternal conditions and some fetal therapies.

[1] Certificate in Maternal Fetal Medicine)

[2] Diploma of Diagnostic Ultrasound

Figure 2: Regional maternal fetal medicine catchment areas



The criteria for an MFM hub describe the requirement for clinical expertise and some critical relationships, but do not consider other elements of a safe, sustainable service. There is also no mechanism for designating a DHB as a clinically appropriate provider of MFM care.

MFM service scope

MFM services are sometimes described as those provided to women and babies with the following conditions (NZMFMN, 2015):

1. major fetal abnormalities
2. fetal intrauterine transfusions for rhesus incompatibility
3. fetal cardiac anomalies which are 'duct dependent'
4. provision of multi-fetal reduction
5. complex multiple pregnancy
6. severe fetal growth restriction
7. major maternal cardiac disease
8. major liver disease in pregnancy.

While provided by specialists with an MFM sub-specialty certificate, the service has two distinct disciplines.

- *Fetal* medicine – a possible or confirmed fetal abnormality requiring an expert sub-specialist opinion and sometimes treatments (1–6 above)
- *Maternal* medicine – women with a very high risk pregnancy because of a medical condition which may be made more complex because of the pregnancy (7–8 above).

In New Zealand many maternal medicine conditions are currently managed within secondary or tertiary DHB obstetric units. Women with a pregnancy that involves a fetal abnormality are more likely to be referred to an MFM hub for assessment, diagnosis or advice.

> Lack of clarity about who should be referred to MFM may result in some women who should see an MFM sub-specialist not being referred. Alternatively, some women may be referred who don't need to be, with a corresponding increase in anxiety about the potential outcome.

MFM specialist workforce

MFM services are led by specialist obstetricians with a formal sub-specialty MFM qualification, the Certificate in Maternal Fetal Medicine (CMFM), achieved through the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG), or an international equivalent. As at September 2019 all three MFM hubs and Counties Manukau DHB have at least one CMFM, but Auckland DHB has 1.5 full time equivalent (FTE) vacant.

Other members of the core MFM specialist team are obstetricians with a Diploma of Diagnostic Ultrasound (DDU) and obstetric physicians. The core MFM team will also be supported by obstetricians with a special interest in MFM. The core MFM specialist workforce is listed below (Table 1).

Table 1: Maternal fetal medicine specialist workforce

	CMFM		Obstetric physician		Obstetrician with DDU	
	FTE	**People**	**FTE**	**People**	**FTE**	**People**
Auckland	6.1	6	3.7	7	0.86	6
Canterbury	1.0	1	0.9	2	1	1
Capital & Coast	0.92	1			0.2	1
Counties	1.0	2	0.1	1	1	2
Total	**9.02**	**10**	**4.32**	**10**	**3.06**	**10**

Note: Workforce in Table 1 is as at time of release. Capital & Coast DHB has one SMO who is about to complete a CMFM and will work 0.8 FTE when qualified, and another SMO who is about to complete a DDU who will work 0.1 FTE in MFM when qualified. The Capital & Coast SMO with CMFM also has a DDU qualification.

The CMFM workforce is considered highly vulnerable, with a number of factors contributing to this.

- **MFM training uptake** – returning trainees are the most effective source of future MFM sub-specialists, but there is only limited uptake of MFM training and concern that MFM sub-specialty training will not be attractive to new candidates.
- **Covering leave** – the two DHBs with only one MFM sub-specialist are not able to cover periods of leave with another MFM sub-specialist. Leave is covered by other members of the multi-disciplinary team.
- **Maintaining competency** – the small number of advanced fetal procedures provided means that practitioners may have difficulty completing enough procedures to meet credentialing requirements.
- **Burn out** – The stress associated with providing MFM care can be very high, involving discussion with highly anxious families about fetal abnormality and the management options.

The MFM service is heavily reliant on recruitment of specialists from overseas (three of the current specialists are overseas trained). RANZCOG has accredited Auckland, Capital & Coast and Counties Manukau DHBs for MFM sub-specialty training. Canterbury is in the process of seeking accreditation.

Other MFM workforce

As noted above, the multi-disciplinary team (MDT) includes obstetricians with a DDU, obstetric physicians, obstetricians with an MFM interest, MFM midwives, and sonographers.

DDU qualified obstetricians have enhanced skills and expertise to provide high risk maternity care, diagnose maternal and fetal conditions, triage and manage cases of moderate complexity. The MFM midwife will have a post-graduate complex care qualification and the obstetric physician should have a Certificate of Obstetric Medicine or equivalent recognition.

There is a close working relationship with other service providers, including general obstetricians, LMCs, anaesthetists, neonatologists, radiologists, geneticists, paediatric surgeons, and paediatric cardiologists.

> The MFM workforce is small, specialised and largely dependent upon overseas recruitment. Staff is vulnerable because of the nature of the work, difficulty in providing specialised CMFM leave cover, and the small number of fetal procedures that may be required each year.

Reporting of MFM activity

Maternity care is reported into the National Maternity Collection (MAT) which has undergone a recent upgrade and which has been rolled out to community LMCs. The MAT will provide a single record of maternity care for women.

Hospital care for maternity services is reported into national collections; outpatient activity is reported into the National Non-Admitted Patients Collection (NNPAC) and admitted activity into the National Minimum Data Set (NMDS).

MFM care is primarily an outpatient-based assessment service, with a small number of admitted fetal procedures. MFM is not a discrete, standalone service; it is reported as part of the broader obstetric service.

Outpatients

Activity is reported into NNPAC at a specialty level, which is not clinically coded. There are three dedicated MFM purchase unit codes (PUC). MFM may also be reported against general obstetric PUCs in which case it has not been identifiable as MFM activity.

The four MFM providers report activity inconsistently against these three PUCs. Table 2 shows all activity reported against these three PUCs by provider DHB.

- Auckland primarily reports against 'W03008 – maternity foetal medicine clinics', but reports a small number of women against 'W03007 – Rhesus clinics'
- Canterbury, Capital & Coast and Counties Manukau report MFM activity against 'W03009 – foetal medicine/anomalies clinics'
- Capital & Coast DHB also reports activity against 'W03008 – maternity foetal medicine clinics' the DHB has confirmed this is complex obstetrics rather than MFM
- Counties Manukau DHB commenced use of 'W03009 – foetal medicine/anomalies clinics' in October 2018. Prior to this MFM activity was reported in other PUCs
- Southern DHB also reports a small number of women each year against 'W03008 – maternity foetal medicine clinics'.

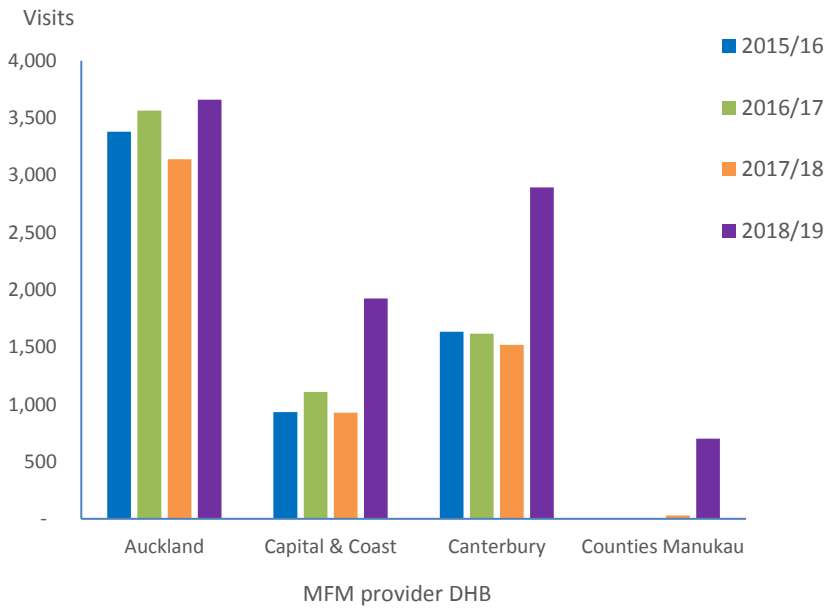
Table 2: Outpatient attendances reported against the three MFM purchase unit codes

Reporting DHB	Purchase unit	Women		Visits	
		2017/18	2018/19	2017/18	2018/19
Auckland	**Total**	**1,779**	**1,833**	**3,139**	**3,659**
	W03008 Maternity foetal medicine clinics	1,763	1,826	3,083	3,628
	W03007 Rhesus Clinics	16	7	56	31
Capital & Coast	**Total**	**1,846**	**2,027**	**4,688**	**5,991**
	W03009 Foetal medicine/anomalies clinics	490	496	925	1,924
	W03008 Maternity foetal medicine clinics	1,356	1,531	3,763	4,067
Canterbury	W03009 Foetal medicine/anomalies clinics	618	1,120	1,519	2,894
Counties Manukau	W03009 Foetal medicine/anomalies clinics	19	382	30	701
Southern	W03008Maternity foetal medicine clinics	76	80	190	183
Total MFM PUCs		**4,338**	**5,442**	**9,566**	**13,428**
Total MFM (excluding non-MFM activity)		**2,906**	**3,831**	**5,613**	**9,178**

Note: extracted from NNPAC 6 August 2019. Women are 'counted' if it is the first occurrence during a financial year. One woman might be counted once in one year and again in the second year if a pregnancy and attendance cross financial years. Capital & Coast DHB activity includes non-MFM activity reported against the 'Maternity fetal medicine clinics' PUC. Southern DHB activity is included but is not provided by an MFM sub-specialist. Non-MFM activity that is excluded is Capital & Coast and Southern Maternity foetal medicine clinics

Figure 3 shows just MFM attendances (ie, excluding complex obstetrics reported against the MFM PUCS) for each of the past four financial years (July to June) by MFM provider.

Figure 3: MFM attendances by provider – 2015/16 to 2018/19



Source: data extracted from NMDS on 6 August for PUC W03007, W03008 and W03009. Capital & Coast activity **excludes** W03008. The increase in Counties Manukau DHB can be attributed to a reporting change.

A new MFM health specialty code (HSC) was introduced in 2018 for use in NNPAC to support classification of clinical documentation. Use of this HSC (P39) by MFM provider DHBs will enable more reliably identification of MFM outpatient consultations.

Inpatients

Procedures are clinically coded which enables more detailed analysis of diagnosis and treatment provided. However, MFM related admissions may be identified through primary diagnosis, International Classification of Diseases (ICD) 10 clinical procedure code or diagnostic related group (DRG) code. For example:

- Maternal care for rhesus isoimmunisation is a primary diagnosis classification
- Intrauterine fetal intravascular blood transfusion is an ICD10 code
- Selective fetoscopic laser photocoagulation (SFLP) for Twin to Twin Transfusion Syndrome (TTTS) is a DRG classification.

These codes may have been used with general obstetric classifications (such as spontaneous or caesarean delivery or therapeutic amniocentesis) so an MFM query cannot be developed based on only one of the three code types. Instead a complex manual analysis is required.

Based on this type of manual analysis of data extracted from the NMDS it was identified that approximately 40 women are admitted for a fetal procedure each financial year, primarily to Auckland DHB (Table 3).

Table 3: Likely admissions for a fetal procedure

Conditions	2014/15	2015/16	2016/17
Intrauterine fetal transfusion	8	11	13
Fetal reduction	4	6	4
SFLP for TTTS	7	10	4
Drainage of fetal fluid cavity	3	3	1
Amnioinfusion	0	0	1
Care for rhesus or other isoimmunisation	9	13	6
Maternity care for fetal abnormality	12	8	13
Complications specific to multiple gestation	2	1	0
Polyhydramnios	8	9	0
Total likely admissions for a fetal procedure	**53**	**61**	**42**

Note: extracted from NMDS on 20 November 2017. Includes day case procedures and activity reported to NMDS, but excludes outpatient (non-admitted) procedures or activity reported to NNPAC. Some fetal procedures may not be identifiable, and data excludes admissions under an MFM sub-specialist's care for a maternal conditions affecting pregnancy.

Inconsistent reporting of MFM activity in outpatients and inpatients makes it difficult to reliably report on current service provision and service costs. It is not possible to use reported activity to project service demand or workforce requirements. In addition, the information that is available on MFM does not easily allow an understanding of the service, or of the clinical outcomes being achieved.

Referral pathways

To ensure women with complex maternal conditions or suspected fetal abnormality are able to achieve the best possible outcomes they need access to a specialist with the right level of expertise. The MFM service also needs to have effective processes for managing referrals to meet quality and timeliness standards.

DHB maternity service specifications describe minimum requirements for maternity care, including MFM, in New Zealand. However, these do not describe expectations for managing planned assessment by a DHB obstetric or MFM service such as referral processing standards or timeliness of assessments.

As a predominantly planned service, MFM care is accessed following a referral from a health practitioner to the MFM hub. Each of the MFM hubs accepts referrals direct to the obstetric service (rather than through a central booking office), and triage occurs daily (weekdays only). Despite MFM being a tertiary level service, referrals will usually be accepted from all maternity providers, including GPs and community LMCs. Referrals may be electronic or paper.

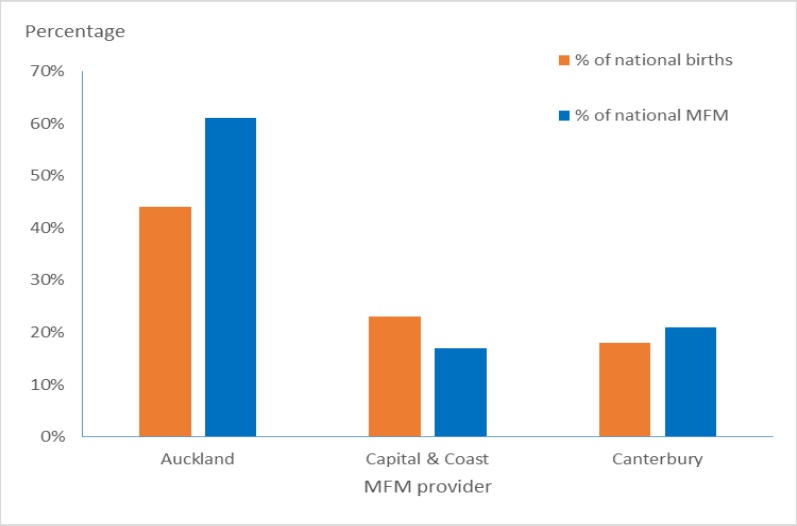
The health services directory website "Healthpoint" hosts an MFM page which provides information on how to refer to the service. This includes information such as phone and fax numbers and referral forms. The MFM page does not include information on referral to an MFM sub-specialist at Counties Manukau DHB. A separate Healthpoint page has advice on how to access the Counties Manukau DHB MFM midwifery service.

There are some tools that support maternity referral, but these do not guide referral to an MFM sub-specialist, are not extensive, or have not been widely disseminated.

- National Maternity Referral Guidelines are well established and used by LMCs to guide referral decisions for secondary or tertiary input (Ministry of Health, 2011). These do not make recommendations about referral to MFM.
- The Perinatal and Maternal Mortality Review Committee (PMMRC) has produced practice points in some areas to assist in the appropriate referral and management of a range of conditions. These practice points go a step beyond the maternity guidelines but do not differentiate between tertiary level obstetric care and MFM care (PMMRC, 2018).
- Canterbury HealthPathways have a community pathway for fetal medicine referrals, but the pathway contains less information than is on the Canterbury DHB Healthpoint MFM page.
- Healthpoint's MFM page contains guidelines and practice recommendations for a range of conditions which support appropriate, evidence based, clinical management of complex pregnancies and fetal abnormalities. Depending upon the subject these might be used by MFM sub-specialists or secondary obstetricians.
- The former MFM Network has developed algorithm referral pathways for three non-fetal abnormality conditions, but these have not been finalised.

MFM outpatient assessment data has been analysed so that current referral pathways for MFM are understood. Figure 4 shows where women are accessing MFM care, compared to where babies are born.

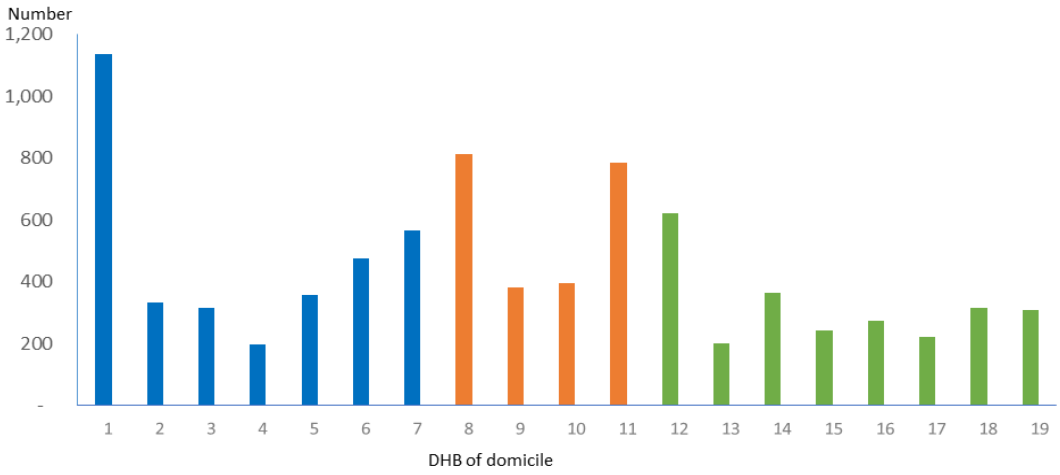
Figure 4: Referral flows to regional maternal fetal medicine hubs – 2017/18



Source: Birth data – Report on Maternity 2017: accompanying tables, published 11 April 2019. National MFM extracted from NMDS on 6 August 2019. Birth data includes Counties Manukau DHB births; MFM data for Auckand excludes Counties Manukau DHB provided MFM.

An alternative way of assessing access is to consider women attending MFM care per 10,000 births from within the DHB of domicile. This confirms the referral pattern that women from outside of an MFM hub are less likely to be assessed in an MFM clinic.

Figure 5: MFM women per 10,000 births by DHB of domicile and MFM hub



Blue:	Auckland provider	Orange:	Canterbury provider	Green:	Capital & Coast provider
1	Auckland	8	Canterbury	12	Capital & Coast
2	Bay of Plenty	9	South Canterbury	13	Hawke's Bay
3	Lakes	10	Southern	14	Hutt Valley
4	Northland	11	West Coast	15	MidCentral
5	Tairāwhiti			16	Nelson Marlborough
6	Waikato			17	Taranaki
7	Waitemata			18	Wairarapa
				19	Whanganui

Source: Birth data – Report on Maternity 2017: accompanying tables, published 11 April 2019. National MFM extracted from NMDS on 6 August 2019. Counties Manukau MFM activity and births have been excluded because of incomplete data

Based on the available information it appears that MFM is primarily provided to women who live in, or close to, an MFM regional hub. Further work is required to understand referral pathways to MFM from regional DHBs.

Shared care

Shared care is an essential component and enabler for MFM to provide woman-centred care. Depending upon the complexity of the pregnancy and ongoing needs, the lead maternity role may change but clinicians that initiate referral and that are responsible for subsequent care must be kept fully informed and engaged.

Of key importance in shared care is clarity about individual roles and responsibilities, with systems in place to ensure effective communication. Good communication is required between shared care parties to update clinical changes and between providers and women.

Documented shared care process and responsibilities will help to reduce potentially avoidable perinatal and maternal deaths. The PMMRC 12th Annual Report (PMMRC, 2018) has identified contributor factors as:

- organisational and/or management factors (such as lack of policies, inadequate staff numbers, delays)
- personnel factors (such as failure of communication between staff)
- barriers to access and/or engagement with care (such as cultural barriers, infrequent care or late booking).

Systems to support effective communication and provision of clearly described roles and responsibilities are required to optimise a safe model of shared care.

MFM and Māori

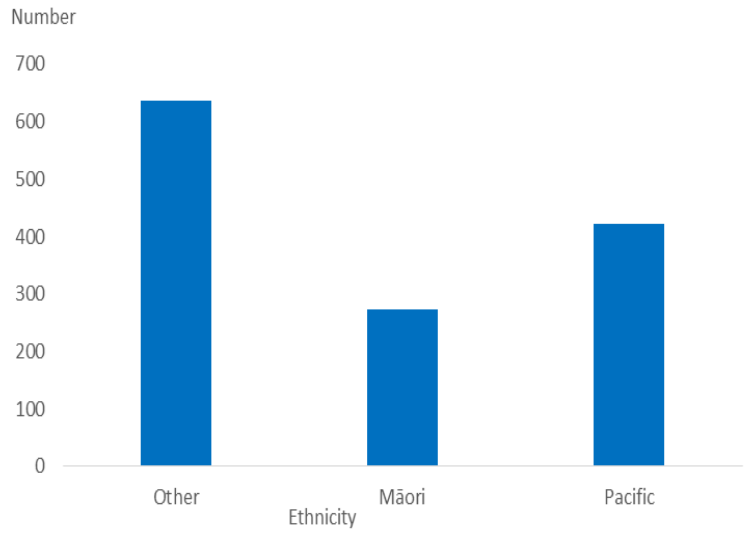
Internationally, New Zealand rates well in terms of overall population health but, despite this, Māori continue to experience poorer health outcomes than other New Zealanders.

Social determinant indicators published by the Ministry show that Māori are more likely to live in the most economically deprived communities, have less schooling, and are more likely to be unemployed or receiving income support. Māori also report experiencing discrimination, including by health professionals, at higher rates than non-Māori (Ministry of Health, 2015).

Within maternity care PMMRC has reported that outcomes for Māori (as well as Pacific and Indian) mothers and babies are less than optimal in a number of areas. These include experiencing inequity in access to antenatal care, being less likely to be registered with an LMC in the first trimester, and babies being less likely to have an attempt at resuscitation if born alive at 23-26 weeks gestation (PMMRC, 2018).

Figure 6 shows that Māori and Pacific women are less likely to attend an MFM assessment than women of 'Other' ethnicities (2.3 and 1.5 times respectively). Distance and cost are known barriers to accessing health services, particularly for people living in communities with high deprivation. The more centralised the MFM service model is the greater the likelihood is that some women and whānau may decline an MFM assessment because of these barriers.

Figure 6: Maternal fetal medicine assessments per 10,000 of live births, by ethnicity



Source: Birth data – Report on Maternity 2017: accompanying tables, published 11 April 2019. National MFM extracted from NMDS on 6 August 2019. (Average of births and women attending MFM over four years)

Cultural and socioeconomic influences are likely to contribute to inequity in access to MFM. This may be in the determination of whether to offer Māori an MFM assessment (which may be positively influenced by clinical guidelines or care pathways) and in whether Māori are likely to accept the offer (which may be positively influenced by culturally responsive hospital administrative processes).

> The Treaty of Waitangi imposes a constitutional imperative to achieve health equity for Māori, and to protect and promote the health of Māori. This includes the provision of maternity services.

The MFM service model / Te tauira tari

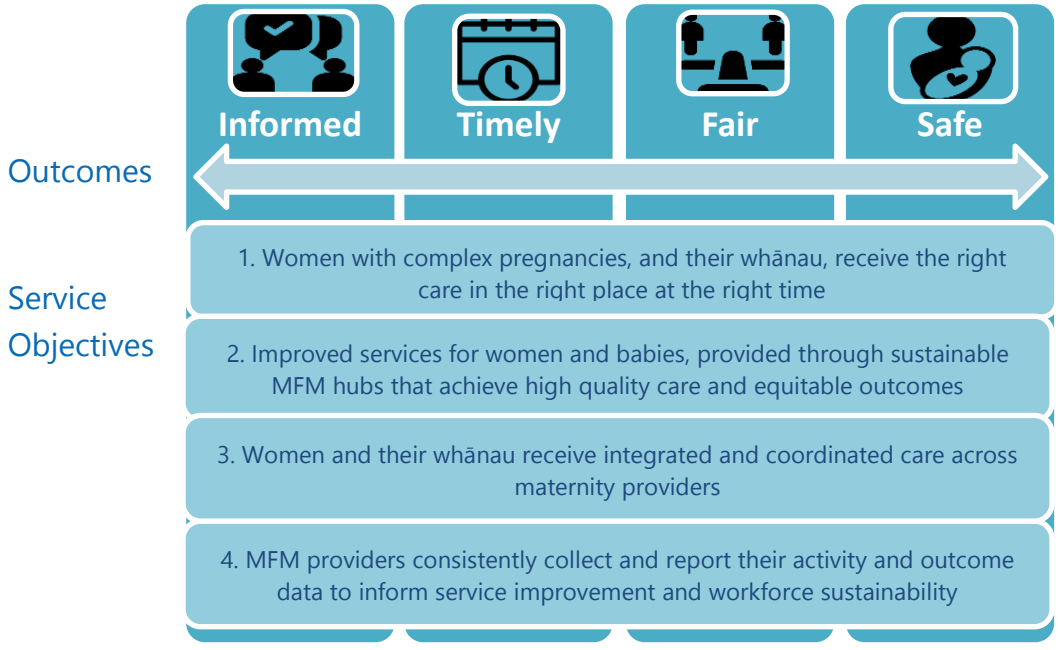
The service model for MFM aims to provide a framework through which women which will achieve the following goal, outcomes and objectives, underpinned by the health and disability system outcomes framework – Pae Ora – healthy futures.

MFM goal

Mothers and babies achieve the best possible outcomes, through high quality MFM assessment and treatment, provided by expert practitioners

MFM outcomes and objectives

Figure 7: MFM outcomes and service objectives



MFM as a National Service

MFM will be provided as a National Service, under a national leadership, multi-provider model. This model is considered the most appropriate to support a nationally consistent and collaborative service while maintaining services in at least three centres to facilitate access for women and whānau.

Service leadership and governance

An MFM national leadership group (NLG) will be formed to provide direction, oversight and monitoring of the service. A strong and focused leadership group, supported with effective clinical leadership and diversely representative membership, is considered the most appropriate mechanism to lead change at a national level and across DHBs. The leadership group will have legitimacy as a commissioned group with defined membership, terms of reference, goals and authority and accountability for overseeing progress against the Action Plan and ensuring MFM services achieve the service goal, outcomes and objectives.

Membership of the NLG will include representation from each MFM hub, from referring DHBs and the Ministry, as well as from community LMCs and consumer advocacy groups. The NLG will be resourced in terms of leadership, consumer participation and administrative or secretariat support. Accountability will be to the Ministry, as funder.

DHBs that are MFM providers will be responsible for ensuring the safety and sustainability of the hub and MFM workforce, based on advice provide by the MFM NLG.

The Ministry, through the National Services and Maternity Services teams would provide the lever to effect change, if required. This would be through setting expectations, non-financial reporting, and direct intervention where appropriate.

The MFM national service team

The national MFM service team will sit within one of the three MFM hubs, appointed through a selective procurement process. There would initially be three funded positions, with two funded on an ongoing basis.

A National Clinical Director (NCD) will be appointed from one of the MFM providers. The NCD will be an obstetrician who can demonstrate leadership and the ability to build consensus across a range of disciplines.

The NCD will provide clinical leadership for the service and will have a significant role in facilitating the development and implementation of improvement actions, policies, protocols and standards of MFM care. This role will be 0.4 FTE until the Action Plan is delivered and the hubs have sustainable workforce, then 0.2 FTE on an ongoing basis.

The national service host DHB will also be funded to engage people into two positions, to support the NCD in their leadership role and to implement the MFM Action Plan. These positions are:

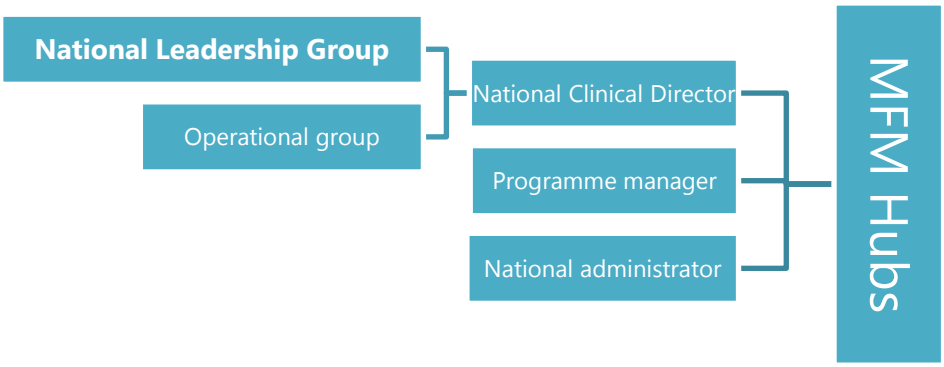
- a programme manager – this role is expected to be a fixed term position of at least 0.6 FTE and will be required until the Action Plan is delivered and the hubs have sustainable workforce.
- an MFM administrator – this will be a permanent position, of at least 0.4 FTE.

The NCD and programme manager will be supported by an operational group drawn from the MFM NLG who would work with them to progress development of policies, protocols and standards for MFM care in line with the Action Plan, and aimed at achieving the service goal, outcomes and objectives.

Members of the operational group and the NLG will need to have their participation supported by their employing DHB.

The proposed national service leadership structure for MFM is shown in Figure 8.

Figure 8: The National Service structure



Location of MFM services

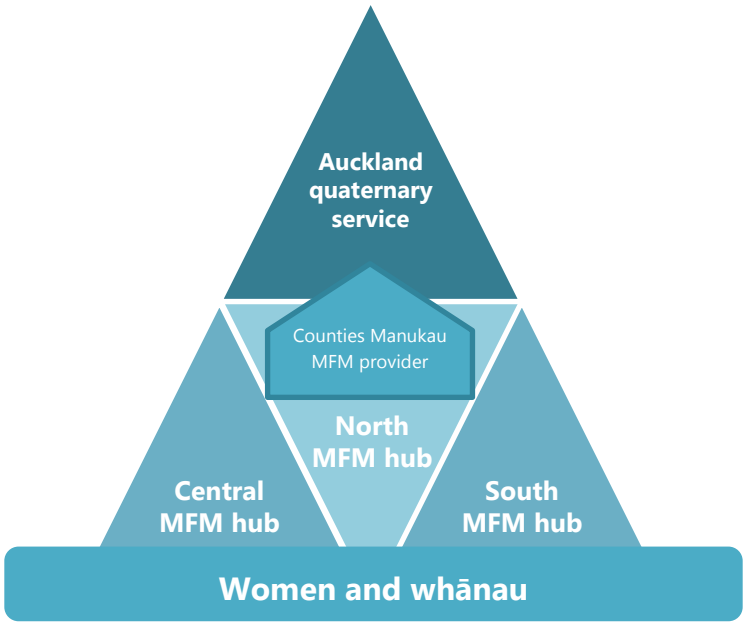
MFM services are, and will continue to be, provided through three regional MFM hubs located in Auckland, Wellington and Christchurch.

- The North MFM hub is situated in Auckland DHB. This hub will provide MFM care to the Northern and Midland Region DHBs (excluding Taranaki DHB which refers to the Central MFM hub in Wellington)
    - The Counties Manukau MFM provider will partner with the North MFM hub to provide MFM services to their local population, while referring complex cases to the North MFM hub
- The Central MFM hub is situated in Capital & Coast DHB. This hub will provide MFM care to the Central Region DHBs, and to Taranaki and Nelson Marlborough DHBs
- The South MFM hub is situated in Canterbury DHB. This hub will provide MFM care to the South Island DHBs (excluding Nelson Marlborough DHB which refers to the Central MFM hub in Wellington).

The quaternary MFM service is, and will continue to be, provided in Auckland through the North MFM hub. This service includes advanced maternal and fetal medicine assessments and fetal procedures.

Other DHBs will continue to provide obstetric services, with Southern and Waikato DHBs providing tertiary obstetric services for women with complex pregnancies.

Figure 9: Service configuration



Requirements for MFM hubs

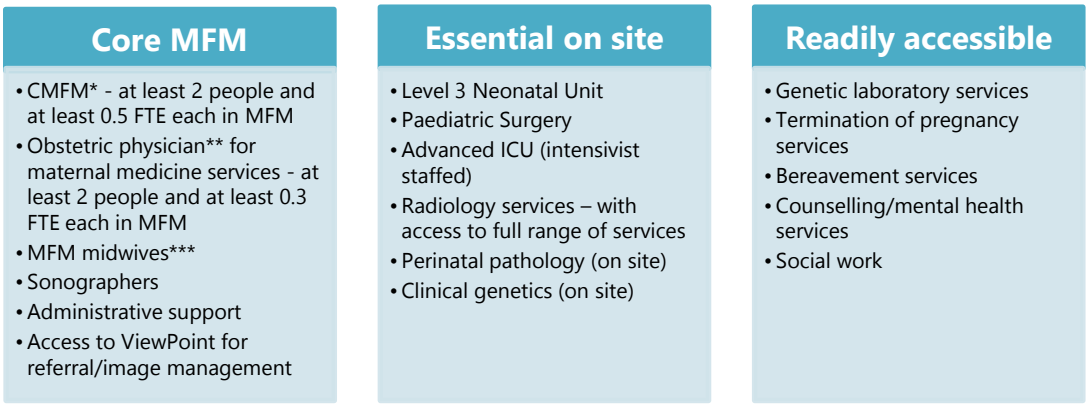
The determination about the number and location of hubs is based on the ability of the MFM providers to meet service requirements considered essential to provide safe, sustainable and high quality MFM care.

In some cases an MFM hub will require time to build up to the recommended minimum workforce but must have at least one CMFM in the short term and meet other 'core MFM' and 'essential on site' requirements.

- **Core for MFM**– the staff are employed within the service
- **Essential on site** – other services that have essential inter-dependencies; without these support services MFM care cannot be safely provided
- **Readily accessible** – other services that have significant inter-dependencies with MFM; contribute to the quality and effectiveness of MFM care.

The number of MFM hubs required in New Zealand, based on population needs and workforce capacity, is unlikely to change in the near future. However, should it be determined that an additional hub is warranted, the new MFM hub would be assessed against its ability to meet the criteria in Figure 10 and would need to demonstrate they can meet all requirements. The NLG will be responsible for confirming if a new MFM hub is endorsed or not. MFM hub requirements will be described within Ministry accountability documents.

Figure 10: Essential criteria for an MFM provider



Notes: *CMFM or equivalent international qualification
**Obstetric physician with Certificate of Obstetric Medicine (or recognition as such)
***MFM midwives with post-graduate Complex Care qualification

The core MFM workforce

There are workforce shortages or challenges in many areas of the workforce but working as a sole practitioner is not sustainable, especially if for a prolonged period of time.

The timeframe for an MFM hub to achieve the staffing levels identified as 'Core MFM' for MFM providers is three years, depending upon the area of shortfall. If not already in place the DHB should be progressing a business case to develop the required capability.

Collaboration between hubs to support a national MFM service

Given the small MFM workforce, there will be occasions when a provider is unable to meet the identified hub workforce requirements. MFM hubs will need to have appropriate workforce support and succession plans in place to minimise gaps in service.

To ensure women are not adversely affected by a workforce shortage MFM DHBs will need to have an escalation plan to ensure safe care for women is maintained.

In most cases short term leave of a CMFM may be managed within the hub, with a DDU qualified obstetrician covering fetal medicine services with supervision or support from another MFM hub.

Of key importance will be ensuring service coverage can be maintained if an MFM hub experiences a vacancy or long-term gap in CMFM cover. Hubs will need to consider what role other members of the MDT can fill within their scope of practice, and how they will ensure women and whānau are supported to travel for care if this is required. The NCD will have an important role in confirming clinically appropriate short and long term service coverage requirements.

Developing the core MFM workforce

Each MFM hub will develop a workforce plan outlining a development and succession plan for the different team disciplines. Development should consider requirements to maintain currency in evidence-based MFM treatment and to meet any procedural skill credentialing requirements.

Facilitation of a training/education programme will be included as a requirement in any service agreement for the NCD, with appropriate project and administrative support.

Engagement with RANZCOG to attract and support additional CMFM trainees will be required given the need for at least two further MFM sub-specialists to meet the minimum requirements in Capital & Coast and Canterbury DHBs and to permit succession planning.

The model of care for MFM

Pae ora principles

The model of care for MFM is based on the availability of different service components that are part of a care pathway. Women will follow an appropriate pathway for their condition and/or diagnosis and treatment requirements. The model of care is framed around Pae Ora principles of care, as described in Table 4, below.

Table 4: Pae ora principles for the maternal fetal medicine model of care

Woman-centred and equitable	Women and whānau are empowered and have time to make informed choices about care and treatment options, and their preferences are taken into account MFM services value the needs of women and whānau, and appropriately utilises services such as the National Travel Assistance (NTA) scheme to ensure access fair and equitable Social media and digital platforms connect women and whānau to expert advice and information that will increase health literacy
Integrated and coordinated	Care is integrated and coordinated across providers and settings to ensure continuity and promote wellness MFM services are well connected to referrers so that women receive the right care in the right place
High quality, safe and sustainable	MFM services use continuous quality improvement so that women and whānau receive safe, high quality care The MFM team works collegially across hubs to support each other MFM services use technology to manage and monitor MFM care, improving equity and outcomes

Key elements of the model of care are:

- Provision of assessment, diagnosis and treatment by an MFM centre

- A multidisciplinary team approach to care
- A woman and whānau centred model of shared care between community, secondary and specialist providers.

Referral pathways

Who should be referred to MFM?

MFM includes both maternal and fetal medicine. There are a range of factors to be taken into account when considering who should be referred to the MFM service. These include the condition or diagnosis, the severity or risk associated with the pregnancy or delivery, the experience or expertise of general obstetricians, and the woman's preferences (based on an informed decision).

As a principle, all women with complex pregnancies should receive high quality care provided by expert maternity carers who treat sufficient cases to maintain clinical expertise. At the same time, women should, where possible, receive care as close to home as clinically appropriate.

Defining 'scope' for MFM is just an initial step. Development of referral pathways and guidelines is required to improve standardisation and facilitate timely referral to a MFM hub when appropriate, while providing LMCs and tertiary obstetricians with information to enable them to manage conditions within their scope.

Maternal conditions requiring MFM input into care

Maternal conditions requiring MFM expertise should be referred to the appropriate MFM provider. Failure to refer may contribute to poor outcomes.

There are a small number of conditions that would always be considered high risk, requiring MFM input. However, this may be dependent upon either the severity of the condition or presence of co-morbidities. Some conditions, such as maternal diabetes, would not normally require an MFM sub-specialist, but may in some circumstances.

Development of individualised care plans through a multidisciplinary team (MDT) approach for women with some conditions will improve outcomes and support care closer to home. For example, women with mechanical prosthetic heart valves, or some other cardiac/valve conditions could have anticoagulation therapy managed in an MFM centre in accordance with a care plan jointly developed with the quaternary MFM service.

If an MFM hub does not have an obstetric physician or an MFM sub-specialist is not available to care for a woman with a complex medical condition, referral to North MFM hub would be recommended.

Guidance on where women with conditions that complicate pregnancy should be referred to is provided in Appendix 1.

Fetal conditions requiring MFM assessment

Identification of a potential anomaly at ultrasound is likely to require consultation with an MFM sub-specialist. Some conditions are time-critical and need urgent referral and treatment. Many other conditions may be less urgent but are still likely to result in a high degree of anxiety for women and whānau.

General guidance is that any ultrasound that is a 'departure from normal' (including conditions such as ventriculomegaly and talipes which may be indicative of other conditions) should prompt a referral to a secondary obstetric service, who may refer to, or discuss with, the MFM service. Referrals triaged by the MFM service may result in advice only or an assessment may be indicated.

Where advice is provided clinical responsibility remains with the referrer. If a referral is accepted and an assessment occurs care may be transferred to the MFM provider, or there may be shared care between the MFM provider and the referrer, depending upon the condition and the experience or expertise of the local obstetric provider. If care is transferred to the MFM provider, there needs to be strong linkage with the LMC who will provide post-delivery care.

Guidance on referral for MFM assessment, and options for shared care is provided in Appendix 2.

Fetal procedures

In some cases a fetal, or in-utero, procedure is required. MFM hubs providing fetal procedures, such as in-utero transfusions or shunt insertions, must have an appropriately qualified CMFM sub-specialist available. Referral to another hub should occur if this is not the case as there is an evidential link between clinical outcomes and procedural volume (Hui, Tabor, Walker, & Kilby, 2016).and operator experience (Papanna, Biau, Lovepreet, Johnson, & Moise, 2011).

Some therapies require specific skills or equipment, or have such a small volume that they should only be provided in the Auckland quaternary MFM service or be referred to Brisbane, as part of a trans-Tasman agreement. In these circumstances the assessing MFM hub will liaise with the quaternary MFM service to facilitate referral and application for funding under the High Cost Treatment Pool (HCTP).

For situations where referral to the quaternary MFM service is required guidance is needed so that there is clarity about the appropriate approach and timing. The guidance will determine whether:

- assessment can be undertaken using telehealth and remote viewing of images
- referral and transfer should occur immediately to avoid adverse outcomes
- referral and transfer delivery and post-delivery care is required – relocation to Auckland should be at least four weeks ahead of the expected delivery date.

When care is shared between MFM hubs or an MFM hub and another specialist service (eg, the National Paediatric and Congenital Cardiac Service (NPCCS)), roles and responsibilities for communication and management need to be clearly defined.

Guidance on referral of women requiring a fetal procedure is provided in Appendix 3.

Clinical pathways, guidelines and practice recommendations

Clinical pathways (or guidelines and practice recommendations) are required to provide guidance to clinicians so that women with complex pregnancies can receive the best care in the right place and at the right time. These translate the information on 'who should be referred to MFM' into practical tools or guidance to inform referral behaviours.

If clinical pathways are to be of benefit they need to be readily accessible, customised for the local DHB environment, and incorporated into existing systems.

For primary care Canterbury Community HealthPathways are now used in most DHB regions in New Zealand. Canterbury is also developing HealthPathways for use by hospital specialists for management and/or referral from a secondary specialist to tertiary or sub-specialist care.

For maternity services the Maternity Referral Guidelines are the main mechanism to guide referral.

Once developed, MFM referral pathways need to be incorporated into these existing systems, and also made accessible through an updated MFM web portal.

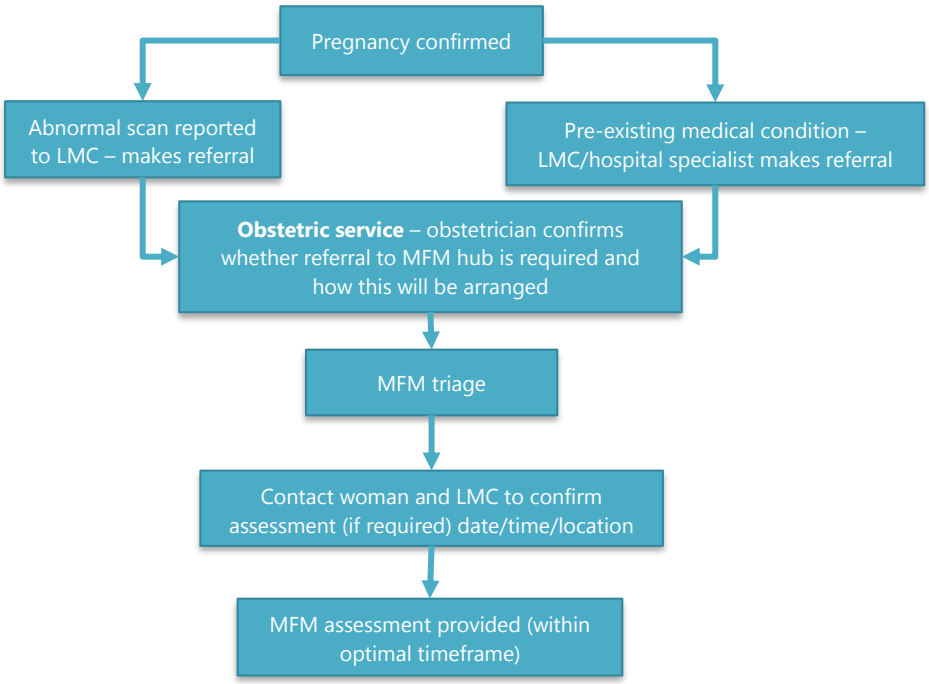
The referral process

The process for referral to MFM is described in Figure 11, below. The process is similar for fetal and maternal referrals but with different 'triggers'. Fetal referrals will be initiated following an abnormal scan result. Maternal referrals will usually be initiated if pregnancy is confirmed in a woman with a pre-existing complex medical condition. Referral may be initiated by the LMC or the woman's managing specialist (eg cardiologist).

If the referral is being initiated within the MFM hub's host DHB, the LMC may refer directly to MFM. The triaging specialist will determine if a general obstetric or an MFM assessment is required.

Obstetrician review and/or assessment may be provided by non-contact (a specialist to specialist plan of care) or telehealth (specialist assessment of a patient via a video link) if clinically appropriate and the MFM sub-specialist has appropriate access to clinical information and images.

Figure 11: MFM referral process summary



Note: Obstetric services will have local arrangements for how referral from LMC to the service occurs to ensure appropriate continuity of care for women. Within an MFM hub, the referral may be direct to an MFM sub-specialist rather than through a general obstetrician.

Referral timeframes

The potential risk associated with the maternal condition, pregnancy or fetal abnormality will determine the urgency of the consultation, but rapid referral, triage and communication is required in all cases. The agreed standards for referral triage and assessment are:

1. eighty percent of referrals to MFM to occur within one working day of the pregnancy/medical problem or abnormal scan being identified
2. eighty percent of referrals to be triaged and advice provided to the woman of the next step (which may include face-to-face or telehealth booking) within two working days of receipt
3. all referrals triaged as 'urgent' to be offered an assessment to occur within five working days of receipt of referral
4. all referrals triaged as 'non-urgent' to be offered an assessment to occur within three weeks of receipt of referral, **or** at the optimal timeframe, as determined by the condition and the stage of pregnancy.

Standards will be included within updated accountability documents, and MFM providers will be required to collect data and report on timeliness of referral processing. Information will be provided to the NLG who will oversee achievement against agreed service measures, and will work with hub DHBs to address any identified variation.

The MFM multidisciplinary team

MFM care is provided through an MDT approach. The MDT is based around the core MFM team, with the involvement of other team members, listed in Table 5, below, as appropriate to the clinical situation being discussed and whether a fetal or maternal assessment is being provided.

Table 5: Maternal fetal medicine multidisciplinary team

Core MFM team	CMFM sub-specialists	Sonographers
	Obstetric physicians	Administrative staff
	MFM midwives	
Other members of the MDT	LMCs	Perinatal pathologists
	Core (DHB) midwives	Paediatric surgeons
	Obstetricians	Paediatric cardiologists
	Obstetricians with DDU	Bereavement counsellors
	Neonatologists	Psychosocial counsellors
	Radiologists	Social workers
	Anaesthetists	Palliative care
	Nurses (neonatal, etc)	Specialist physicians
	Geneticists/genetic counsellors	Specialist surgeons

Multidisciplinary meetings

An MDM framework will be developed to better support shared decision making and planning of care for women with complex pregnancies, using the well-established Cancer MDM model (Ministry of Health, 2012).

The specific focus of the MFM MDM will be to provide input into recommended treatment plans for the more complex situations where a decision is required on the most appropriate management plan for a woman or where there may be care shared across DHBs and MFM hubs. Contributors to an MFM MDM may include neonatologists, geneticists, anaesthetists, paediatric surgeons and other specialists (eg cardiologists).

Woman and whānau support

A key aspect of the model of care is supporting women and whānau. Being faced with a potential abnormality identified on ultrasound can be a very stressful event for women. It is essential that women and their whānau receive both emotional and practical support at this time. Some of the important areas of support that have been identified for women and whanau are described below.

Communication – 'knowing' helps allay anxiety while 'uncertainty' increases it. Maintaining the connection with the LMC is an important communication link as women may feel uncomfortable asking questions of the specialist or need time to digest the information provided. The LMC can help with 'translating' medical information, being available for follow up questions, or to act as an interface with the specialist.

Health literacy – 'information is power' and increasing health literacy will help women feel more in control and will contribute to improved outcomes. Information can be provided in a range of media, and languages to meet a wide range of needs. This information needs to be culturally relevant, use plain language, and meet the needs of of all health care users.

Peer support – connection to non-governmental agencies (NGOs) such as SANDS, Women's Health Action Trust and Multiples NZ provides women with opportunities to access support from peers, especially for women and whānau experiencing a complex pregnancy or the loss of a baby.

Bereavement care and counselling – many women under the care of MFM services will face difficult decisions or bereavement. Development of bereavement services is required across all of maternity care but is particularly relevant in MFM. Strategies to improve bereavement care need to take into account the specific needs and considerations of Māori, including recognition of the need for whānau members to stay with the tūpāpaku from death to burial.

Cultural support – to meet cultural needs a holistic approach is required. For Māori, culturally appropriate care includes pae ora, and three inter-connected elements of mauri ora (healthy individuals), whānau ora (healthy families) and wai ora (healthy environments). Some practical approaches include encouraging whānau participation, eg through karakia, providing non-clinical navigators, and a providing a whānau space.

Travel assistance – many women required to attend an MFM hub may also be faced with the challenge of attending an appointment at an unfamiliar hospital that may be several hundred kilometres from home. To ensure travel is not an obstacle that prevents women accessing the best possible health care, referring DHBs should have good processes in place to register a woman for assistance under the NTA scheme, and should adopt a case by case approach to determining support for people on the margins of eligibility. There should be flexibility in the provision of petrol vouchers or approval of NTA for people travelling shorter distances.

Shared care

In New Zealand the recommended model is that if delivery is planned to occur in one of the regional MFM hubs the lead clinician will be an MFM-based specialist and/or midwife. If the delivery is planned to occur locally in the woman's home DHB/hospital, the LMC would remain the lead clinician, with MFM input as required. Following delivery, if the baby requires neonatal intensive care then shared care arrangements and responsibilities need to be developed and documented to ensure appropriate post-natal care is provided.

In the case of maternal medicine, where a woman has a condition that results in pregnancy related risk, ongoing care from the local specialists and the LMC, with planned intermittent MFM input, may suffice. However, where the risk to the mother is high, transfer of care may be necessary to ensure the best outcome.

The Royal Women's Hospital in Victoria, Australia, has produced guidelines for shared maternity care (Royal Women's Hospital, 2015). Key roles and responsibilities identified by the Royal Women's Hospital for effective shared care are described in Table 6. These need to be developed into locally agreed protocols that ensure everyone is aware of their role and responsibility in the model.

Table 6: Shared care responsibilities

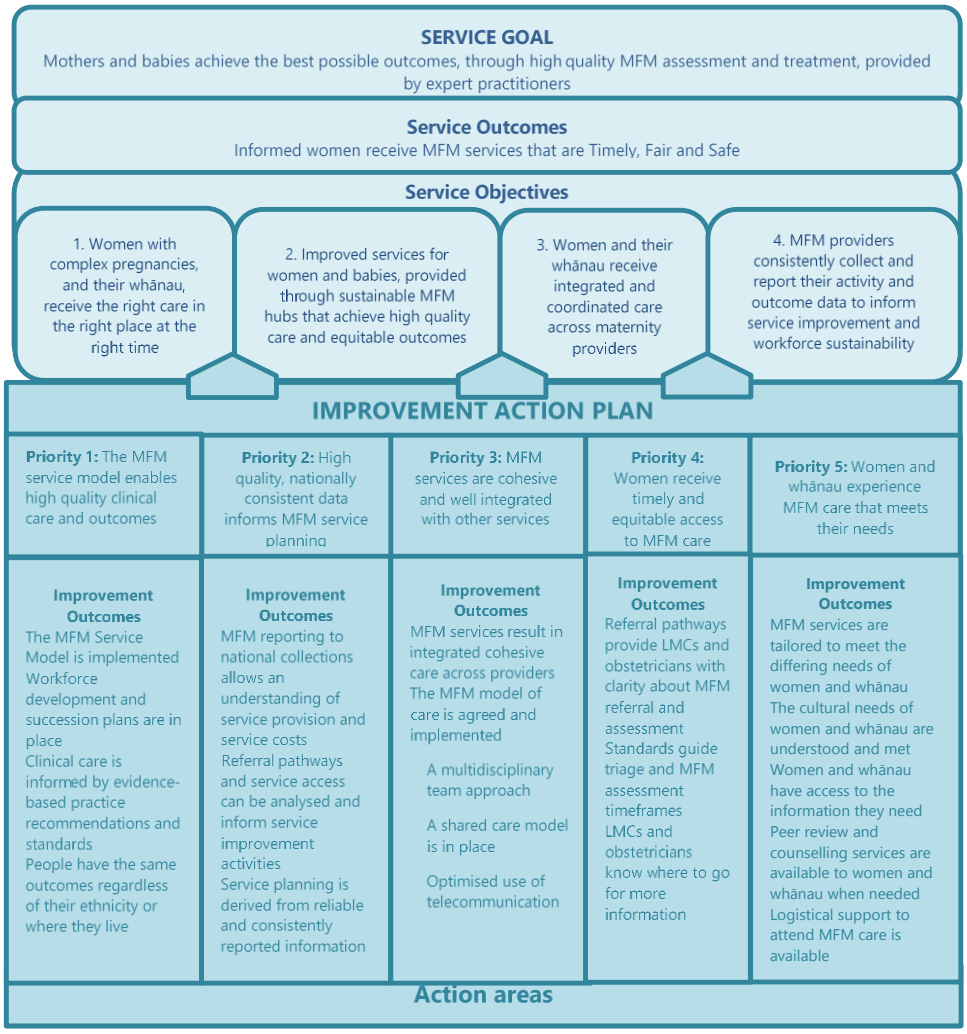
MFM hub responsibilities	**LMC and obstetric service responsibilities**
Notify referrer, LMC and woman of appointment details	Notify the MFM hub if the woman doesn't attend planned visits
Notify referrer and LMC if the appointment is not attended	Contact the woman if she doesn't attend MFM hub or LMC appointments or has a poor attendance history
Develop the shared care plan and update as required	Work with the woman to understand barriers to attendance and agree plans to support access
Notify the referrer and LMC of the outcome of all hospital visits	Keep contact details up to date
Ensure the woman has information about her pregnancy, treatment and plans	Manage identified elements of the care plan
Ensure hospital appointments are negotiated with the woman to find a suitable time	Act as a navigator to facilitate access to MFM care if required
	Interpret information so it can be understood
Shared responsibilities	**Women and whānau responsibilities**
Participate in MDT and MDMs that relate to the woman's care	Agree appointments with both LMC and MFM hub in line with the maternity plan
Update health records with test and scan results	Attend appointments or agree alternative dates/times if unable to attend
Ensure all results and new clinical information is made available to all shared care partners (particularly if they don't have access to a shared health record)	Ask questions or seek information if unsure of any aspect of the plan
Review investigations ordered in a timely way and follow up abnormal results	

The MFM improvement action plan / Te mahere mahi

Improvement framework

The MFM Action Plan supports implementation of the MFM model of care so that the service goal, outcomes and objectives are achieved.

Figure 12: Maternal fetal medicine improvement framework



Priority 1: The MFM service model enables high quality clinical care and outcomes

Why this needs to happen

MFM is a highly specialised area, with a small and vulnerable workforce; two of the regional providers of MFM have only a single sub-specialist.

Criteria for MFM providers must include the broad requirements for a safe and sustainable service that provides high quality clinical care, and equitable outcomes.

Improvement Outcomes

1. The MFM Service Model is implemented
2. Workforce development and succession plans are in place
3. Clinical care is informed by evidence-based practice recommendations and standards
4. People have the same outcomes regardless of their ethnicity or where they live.

Table 7: Action areas for Priority 1

Action areas	Leads
The MFM service model is implemented	Ministry
The NLG is established, with membership, purpose and responsibilities described in the terms of reference of the group	MFM hubs
The national service team/resources are appointed through a selective procurement process to appoint the NCD and through collaboration with the appointed host DHB to recruit other team members: • the service specification, roles and responsibilities will be defined with input from the NLG	
Ministry Accountability documents will be updated to describe essential elements of a safe and sustainable MFM service, including identified hub requirements and process for formal recognition/endorsement of any new providers that can meet the described requirements	
The agreed location and configuration of MFM hubs and providers will be formalised: 1. hubs and the areas they serve are confirmed – specifically pathways for Taranaki and Nelson Marlborough are reviewed to ensure these arrangements contribute to best access and outcomes 2. hub configuration is confirmed and agreements for service arrangements between Auckland and Counties Manukau DHBs are in place	

Action areas	Leads
Workforce development and succession plans are in place Each MFM hub has a workforce development and succession plan that: • identifies workforce requirements across the MDT • includes a training plan to develop the team to fill critical workforce gaps • includes a continuing medical education (CME) programme so that team members maintain clinical currency within their scope of practice, including procedural competence • includes a recruitment plan to maintain or grow the CMFM workforce Collaboration arrangements are developed/agreed to support practitioners working in isolation and to ensure service continuity	MFM hubs
Clinical care is informed by evidence-based practice recommendations and standards Practice (guidelines) recommendations are reviewed and updated, based on current evidence Standards for provision of MFM care, and for sharing of clinical information and images between carers are developed and implemented Each hub considers recommendations from the Health and Disability Commissioner (HDC) and PMMRC while reviewing processes and protocols to ensure organisational policies do not contribute to negative health outcomes	NCD/ Operations group MFM hubs
People have the same outcomes regardless of their ethnicity or where they live The MFM model of care considers the specific needs of at-risk populations to facilitate timely and appropriate access Service improvement activities and performance actions are informed by outcome metrics	NCD/ Operations group NLG

Priority 2: High quality, nationally consistent data informs MFM service planning

Why this needs to happen

Inconsistent reporting of MFM activity in outpatients and inpatients means there is no reliable information on who is accessing MFM care (and who is not).

MFM data does not allow benchmarking between providers to ensure the service is appropriately planned and resourced.

Improvement Outcomes

1. MFM reporting to national collections allows an understanding of service provision and service costs
2. Referral pathways and service access can be analysed and inform service improvement activities
3. Service planning is derived from reliable and consistently reported information.

Table 8: Action areas for Priority 2

Action areas	Leads
MFM reporting to national collections ensures an understanding of service provision and costs Reporting of MFM activity is standardised to allow reliable assessment of the size, scope and location of services: • use of the MFM HSC is promoted in NNPAC • agreement is reached to enable the MFM HSC to be used in NMDS • purchase units for MFM are reviewed to ensure they adequately define the service activity MFM reporting conventions are agreed and DHB activity mapping is reviewed to align with the reporting requirements A review of MFM pricing (inpatient and outpatient) is included in the work programme of the National Pricing Programme so that provider DHBs are able to appropriately resource the service	Ministry MFM hubs NLG NCD

Action areas	Leads
Referral pathways and service access are reviewed and inform service improvement activities Reports are developed that allow MFM activity, referral pathways and achievement of identified service standards to be analysed Reports are used by the MFM providers and the NLG to understand referral pathways so targeted interventions can be initiated if required to improve access Outcome and quality measures are agreed and monitored: • metrics need to consider maternity outcomes for populations where there is a known inequity – particularly Māori, Pacific and Indian women and babies	NCD NLG MFM hubs
Service planning is based upon reliable and consistently reported information MFM DHBs regularly review MFM activity and waiting time/access indicators to ensure there is sufficient capacity to meet demand: • where an MFM hub comes under pressure through increased demand or reduced capacity, the host DHB works with the NLG to develop and agree service plans to ensure the service remains safe and sustainable	MFM hubs NLG

Priority 3: MFM services are cohesive and well integrated with other services

Why this needs to happen

Woman-centred MFM services need to be well integrated so that women have the best opportunity to access the right services, in the right place. The LMC is vital to ensure continuity of care, advocacy and sharing of information for women.

Improvement Outcomes

1. The MFM model of care is agreed and implemented
2. A shared care model is in place
3. A multidisciplinary team approach is developed
4. Use of information technology supports integrated care
5. MFM services are integrated, enabling cohesive care across providers.

Table 9: Action areas for Priority 3

Action areas	Leads
The MFM model of care is agreed and implemented	NLG
Implementation of the model of care by MFM hubs is overseen by the NLG so that the model of care supports an integrated, cohesive service to women, regardless of where they live	NCD/ Operations group
Pathways are in place that enable women to access MFM when required	MFM hubs
The role of members of the MDT is described to provide clarity for how the MDT will support integrated care for women	
The MFM service and leadership group contribute to training and development of LMCs and other maternity providers to ensure a consistent understanding of the MFM model of care	
A shared care model is in place	NCD/
A New Zealand MFM model of shared care is developed: • the model describes responsibilities for the MFM hub, neonatal intensive care unit staff (when involved following delivery), the LMC, the woman/whānau and any shared responsibilities • the model of shared care is socialised with stakeholders so that all are aware of their roles	Operations group MFM hubs
Health pathways and information provide guidance on the opportunities for share care and where care should be transferred – these are incorporated into the referral guidelines and health pathways	

Action areas	Leads
A multi-disciplinary team approach is developed Ministry guidance for well-functioning MDMs is reviewed and adapted to describe the model of delivering an MDM process in MFM. The goal is that: • treatment planning is improved because health professionals consider the full range of therapeutic options, with improved outcomes • improved equity of outcomes for women and babies is achieved • there is greater continuity of care and less duplication of services • services are better coordinated and integrated • communication between care providers improves, as clear lines of responsibility are developed between members of the MDT • time and resources are used more efficiently	NLG NCD/ Operations group MFM hubs
Use of information technology supports integrated care MFM care is coordinated across providers making the best possible use of technology Telehealth options for provision of care are in place to support remote clinical assessment Options for shared access to electronic health records across regions are explored so that all MFM clinicians have access to the same health information, images and results	MFM hubs
MFM services are integrated, enabling cohesive care across providers A clinician information website that hosts information on the MFM service, model of care and the service goal, outcomes and objectives is developed Clinicians working with women with complex pregnancies across all disciplines are made aware of the website through a communications plan Arrangements for how MFM hubs will collaborate to deliver cohesive MFM services across hubs, particularly when management sits with one DHB and delivery is planned at another centre or where more than one clinical specialty is involved in the care of a woman and baby, eg if the NPCCS is involved	NCD/ Operations group MFM hubs

Priority 4: Women receive timely and equitable access to MFM care

Why this needs to happen

Lack of clarity about who should be referred to MFM may result some women who should see an MFM sub-specialist not being referred. Alternatively some women may be referred who do not need to be, with a corresponding increase in anxiety about the potential outcome.

Improvement outcomes

1. Referral pathways provide LMCs and obstetricians with clarity about MFM referral and assessment
2. Standards guide triage and MFM assessment timeframes
3. LMCs and obstetricians know where to go for more information.

Table 10: Action areas for Priority 4

Action areas	Leads
Referral pathways provide LMCs and obstetricians with clarity about MFM referral and assessment The recommendations for maternal assessment, fetal assessment, and fetal procedures are endorsed and published Health pathways for MFM referral are reviewed where these exist, or are developed where not available and implemented with LMCs and obstetric referrers The NLG contributes to updating of general guidelines or practice recommendations, eg if the Maternity Referral Guidelines are being updated there is MFM representation	NLG NCD/ Operations group MFM hubs
Standards guide triage and MFM assessment timeframes Service standards are agreed for: • timeliness and quality expectations for receipt, triage and booking of referrals for MFM care • expectations for referrals from non-DHB specialists Referral management processes are reviewed and updated in each of the three hubs to ensure these align with the agreed service standards Service specifications/operational policy framework and service coverage schedule for maternity care are updated to include requirements for managing non-urgent referrals to MFM care Information is provided to LMCs on referral timeliness standards required of them	NLG NCD/ Operations group MFM hubs

Action areas	Leads
LMCs and obstetricians know where to go for more information Referral pathways are incorporated into existing DHB and Community Health Pathways and incorporated into DHB regional referral sites, such as Health Navigator, Healthpoint, HeathPathways The MFM website includes practice recommendations, and clinical guidelines specific to MFM and links to general referral guidance documents, such as Ultrasound Guidelines and Maternity Referral Guidelines	NCD/ Operations group MFM hubs

Priority 5: Women and whānau experience MFM care that meets their needs

Why this needs to happen

Women and whānau advised of a potential risk to their baby experience high levels of anxiety and stress, and have identified that information is of vital importance.
Travel to an assessment should not present a barrier to accessing the right level of care.
Women and whānau may need access to support services such as peer review or bereavement counselling if a normal delivery does not occur.

Improvement outcomes

1. MFM services are tailored to meet the differing needs of women and whānau
2. The cultural needs of women and whānau are understood and met
3. Women and whānau have access to the information they need
4. Peer support and counselling services are available to women and whānau when needed
5. Logistical support to attend MFM care is provided and barriers to travel and/or relocation are minimised.

Table 11: Action areas for Priority 4

Action areas	Leads
MFM services are tailored to meet the differing needs of women and whānau	MFM hubs
Referral management processes are reviewed to ensure a woman-centred approach is taken to MFM scheduling and communication: • letter content and formatting is reviewed with a consumer council to ensure it is consumer friendly • standards for acknowledgement of receipt and notification of triage outcome are implemented so that women know what the next step is • Patient Focused Booking is the standard in all MFM centres, either through a phone call to negotiate an appointment or through an 'invitation to contact' • DNA protocols are developed that support attendance	NCD/ Operations group

Action areas	Leads
The cultural needs of women and whānau are met The NLG includes consumer and Māori health advisors who can provide feedback on changes required MFM services incorporate a Pae Ora vision - health futures for women and babies All protocols and practice recommendations recognise and respond to differing needs of some groups to ensure the same outcomes Staff undertake cultural awareness training and development Whānau involvement in consultation and care is encouraged and actively facilitated Booking information, including appointment letters are reviewed and redesigned so that these can be easily understood	Ministry NLG MFM hubs
Women and whānau have access to the information they need An information platform is established in Health Navigator so that women and whānau can access the information they need Consumer information is reviewed and regularly updated adopting a health literacy lens, and based on Rauemi Atawhai principles which provide best practice advice for the development of health education resources Information developed contributes to increased health literacy, providing information on complex medical conditions in plain language Information is available in multiple languages	NLG MFM hubs NCD/ Operations group
Peer support and counselling services are available to women and whānau when needed Women who experience, or expect to experience, a bereavement will be linked to counselling services or NGOs that can provide peer support and access to counselling from people with similar experiences Health Navigator includes information of support services that may be available in regions to support women and whānau Core standards for bereavement care that provide wrap around support for women and whānau experiencing fetal or neonatal loss are adopted within MFM MFM personnel have education and training to assist them in the delivery of compassionate bereavement care DHB facilities provide a suitable physical environment to enable grieving families the privacy and comfort required Bereavement care meets the cultural, religious, ethnic and social values of the whānau	MFM hubs
Logistical support to attend MFM care is provided Logistical support to attend MFM care is available – support takes into account the contributory factors that may influence whether women and whānau take up the offer of an MFM assessment including communication, DHB processes, cultural and operational factors Referring centres are encouraged to consider the NTA and other support systems they provided to women so that barriers to travel are reduced Referring DHBs are provided with data to demonstrate inequity where this is found Hub staff are familiar with NTA eligibility and advocate for women and whānau	MFM hubs All DHBs

System enablers

System enablers are activities that can be applied across all areas of the plan or system to support achieving the objectives and priorities.

Table 12: System enablers

Area	How	Requirements
Leadership	Clinical leadership over the transformation process will be in place to support consistent achievement of the service objectives, in line with the Action Plan A strategic NLG will oversee the quality and effectiveness of the service Planning and performance will be oriented to drive improved equity in access and outcomes	For the leadership model to be effective, DHBs (both providers of MFM and those providing secondary obstetric care) need to have robust maternity systems in place to support achievement of standards and performance indicators endorsed by the NLG
Workforce	All members of the MFM workforce will strive to support women to receive the best possible care Primary and secondary maternity providers will contribute to the development of improvement resources that will support women to access MFM care in the right place, at the right time	Development of an MFM workforce will be dependent upon DHBs, Colleges and Health Workforce New Zealand (HWNZ) taking a long term view of requirements for a sustainable workforce, including how sub-specialist training is supported MFM care is also dependent upon a sustainable workforce in other key positions such as sonography.
Information technology	Telehealth technology will support improved equity of access to MFM services, timely clinical decision making, and will facilitate communication between women and maternity carers Technology will support collection of outcome data by treatment teams, allowing evaluation of the service for quality and effectiveness	DHBs will need to consider how to best integrate the ViewPoint system used by MFM services with other DHB systems such as the electronic clinical record, and patient management system Technology to support shared care, including regional and national shared records will be linked to the Information Technology Roadmap of Interoperability

Measures of MFM service effectiveness

Measures of the effectiveness of MFM services in meeting the outcomes and service objectives will be developed as part of the Action Plan. These will be dependent upon multiple sources of information, including national collection and local MFM hub data, clinical audit, and questionnaire (both on line and face-to-face interviewer, depending upon participants and requirements).

Table 13: Measures of effectiveness

Area	Measures	Data source	Baseline	Goal
Timeliness	Referrals received within one working day of the pregnancy/medical problem or abnormal scan being identified	MFM hub system	TBD	80%
	Referrals triaged and advice provided to the woman of the next step within two working days of receipt	MFM hub system	TBD	80%
	Referrals triaged as 'urgent' are offered an appointment that will occur within five working days of receipt of referral	MFM hub system	TBD	100%
	Referrals triaged as 'non-urgent' are offered an appointment that will occur within three weeks (21 days) of receipt of referral (excludes referrals where the optimal timeframe is informed by the condition or stage of pregnancy)	MFM hub system	TBD	100%
Access	The number of first MFM assessments (face-to-face or non-contact) provided per 10,000 live births by DHB region	NNPAC	TBD	TBD
	The number of first MFM assessments (face-to-face or non-contact) compared to DHB forecast/plan	NNPAC	TBD	+/-5%
	MFM assessments offered and declined	MFM hub system	TBD	TBD
	Did not attend rates	NNPAC	TBD	TBD
Equity	The number of first MFM assessments (face-to-face or non-contact) provided per 10,000 live births by ethnicity	NNPAC	TBD	TBD
	MFM assessments offered and declined by ethnicity	MFM hub system	TBD	TBD
	Did not attend rates by ethnicity	NNPAC	TBD	TBD

Area	Measures	Data source	Baseline	Goal
Quality	Quality indicators will be developed to understand a range of factors influencing quality and outcomes (all patients and by ethnicity), for example: • discussion at MDM • late referral	NMDS Clinical audit MFM hub systems	TBD	TBD
Experience	Referrer (LMC and obstetrician) rated experience of MFM services • ease of contact • shared care arrangements • communication	Survey	TBD	TBD
	Woman and whānau rated experience of MFM services: • communication • partnership • coordination • physical and emotional needs • satisfaction with access	Survey/ interview	TBD	TBD

Note: Timeliness measures can be reported from National Patient Flow if the scope of this collection is expanded to include MFM – health specialty code P69

Implementation

Implementation of the MFM Action Plan will be led by the NCD, supported by the programme manager, the Ministry and the Operations group (a sub-group of the NLG). Oversight will be provided by the NLG and the Ministry.

An action tracker will be developed to identify progress against each action, which will be monitored by the NLG. The NCD will provide quarterly reports to the Ministry and NLG outlining progress, challenges and risks. An escalation process will be in place to support progressing actions where required through Ministry accountability arrangements.

Post implementation evaluation

Process evaluation

The first stage of the review of implementation is a process evaluation which will assess the extent to which the agreed service model has been implemented. The Ministry, in consultation with the NLG, will develop questions to help us understand how and where MFM is provided. These should include:

1. To what extent has the service model been implemented?
2. Have all components been delivered?

3. Can the service model be fine-tuned to improve efficiency and effectiveness?
4. Are staff and referrers satisfied with the service?

The process evaluation will provide an opportunity to adjust or revise any components of the service model or action plan that are not considered to be operating effectively. The provisional timeframe for the process evaluation is December 2021, which would inform the national resource requirements for 2022/23 and beyond. An updated evaluation may be required by December 2022 if some parts of the Action Plan remain undelivered.

Summative evaluation

Following implementation, a summative evaluation will be completed, to see if the stated outcomes, particularly quality improvements, have been achieved. The planned timing of the summative evaluation will be two years after the change is fully implemented.

This evaluation will consider the measures of benefit that are developed for the service under Priority 2, and should include an assessment of woman and whānau experience of the service, clinical outcomes, and service effectiveness.

Appendices

Appendix 1: Maternal assessment referral guidance

Area	Condition	Referral guidance
Cancer	Advanced malignancy	Refer to MFM hub
Cardiac – congenital	Complex congenital heart disease with or without pulmonary hypertension	Refer to MFM hub, who will: • liaise with NPCCS • consider referral to North MFM quaternary service
Cardiac – valve	Mechanical heart valves or cardiac valve disease with: • a severe obstructive lesion • severe regurgitant lesions	Refer to MFM hub, who will: • liaise with NPCCS • consider referral to North MFM quaternary service
Other cardiac	Complex arrhythmias Ischaemic heart disease	Refer to MFM hub
	Other cardiac conditions, including: Systemic ventricular dysfunction (LVEF[3] < 30%, NYHA[4] III–IV) Marfan syndrome with aortic dilatation > 40–45mm or aortic dilatation > in aortic disease associated with bicuspid aortic valve Pulmonary arterial hypertension	Refer to MFM hub, who will: • liaise with NPCCS • consider referral to North MFM quaternary service
Hepato-billary	Oesophageal varices	Refer to North or South MFM hub
	Advanced liver disease or cirrhosis	Refer to North or South MFM hub

[3] LVEF: left ventricular ejection fraction

[4] NYHA: New York Heart Association classification

Area	Condition	Referral guidance
Immune system or haematology	Antiphospholipid syndrome refractory to standard therapy	Refer to MFM hub
	Severe systemic lupus erythematosus (SLE)	Refer to MFM hub
	Autoimmune disease on biologics (irritable bowel disease, rheumatological conditions)	Refer to MFM hub
	Severe thrompocytopenia refractory to conventional therapy	Refer to MFM hub
	Sickle cell disease	Refer to MFM hub
Neurological	Myasthenia gravis	Refer to MFM hub
	Spinal cord lesions above T6[5] level	Refer to MFM hub
Pregnancy related	Cerebral anoxia or cardiac arrest, if maternal survival and continuing pregnancy	Refer to MFM hub
	Severe hypertension or pre-eclampsia with a pre-viable fetus requiring consideration of termination	Refer to MFM hub
Renal	Stage IV kidney disease, on renal replacement therapy (dialysis and/or transplant)	Refer to MFM hub
Transplant	History of heart, lung or liver transplant	Refer to North MFM hub

[5] T6: sixth thoracic vertebra

Appendix 2: Fetal assessment referral guidance

Condition	Referral guidance	Shared care
Major fetal abnormalities	Refer to local MFM hub if ultrasound shows 'departure from normal'	Dependent on condition and availability of local obstetric expertise.
Fetal cardiac anomalies	Refer to local MFM hub MFM will discuss with the NPCCS and determine treatment plan.	NPCCS
Duct dependent fetal cardiac anomalies	Refer to local MFM hub who will refer to NPCCS and the North MFM hub quaternary service Delivery scheduled in Auckland	MFM hub, North hub and NPCCS
Red cell antibodies	Refer to MFM if: • Rhesus D and Rhesus c titre of > 1:16 • any level of anti-Kell • any other red cell antibodies considered at risk for fetal disease or a titre of ≥ 1:32.	If stable and local specialist maternity ultrasound expertise with clear obstetric clinical leadership
Fetal and neonatal alloimmune thrombocytopenia (FNAIT)	Refer to MFM if: • intravenous immunoglobulin	MFM hub
Multiple pregnancy requiring pre-natal testing	Refer to MFM for • chorionic villus sampling (CVS) • amniocentesis	Yes
Severe intra-uterine growth restriction (IUGR)	Refer if pregnancy is at ≤ 28/40 May be managed through telehealth	Yes
Triplets or higher order multiple	Refer to MFM hub	Yes
Acardiac, conjoined and monochorionc-monoamniotic twins	Refer to MFM, who may refer to North MFM quaternary service if therapeutic intervention considered	Depends on prognosis
Dichorionic twins	Refer to MFM if significant discordance at ≤28/40 – referral not required if no significant discordance.	Yes
Monochorionic twins	Refer to MFM if: • complications; **or** if scan requires expertise in identification of TTTS; **or** early onset IUGR discordance; **or** other complications relating to chorionicity • invasive procedure (amniocentesis, CVS) required • significant discordance at ≤ 28/40, ie one twin < 10th percentile and/or > 20% discordancy of estimated fetal weight MFM will refer to North MFM quaternary service if laser intervention or selective reduction is required	Yes, depending upon condition

Appendix 3: Fetal procedure referral guidance

Conditions		Refer to
1.	Diagnostic ultrasound scan	MFM Hub
2.	Fetal magnetic resonance imaging (MRI)	
3.	Invasive testing (CVS & amniocentesis)	
4.	Termination/feticide	
5.	Selective reduction of dichorionic-diamniotic multiples	
6.	In utero-transfusions	
7.	Management of FNAIT	
8.	Fetal shunt insertions	
9.	Selective reduction of monochorionic twins	Refer to MFM hub Referral to North MFM quaternary service may be recommended
10.	Fetoscopic laser treatment for TTTS	
11.	Interstitial laser for some anomalies (eg. sacrococcygeal teratoma)	
12.	Ex-utero intra-partum treatment (EXIT) procedure requires input from Auckland DHB paediatric otolaryngoscopy service	Refer to MFM hub Referral to North MFM quaternary service may be recommended
13.	Pregnancies where the neonate may require extra corporeal membrane oxygenation (ECMO)	
14.	Duct dependent fetal cardiac abnormalities	
15.	In-utero spina bifida surgery and fetoscopic endoluminal tracheal occlusion (FETO) for diaphragmatic hernia is provided in Brisbane.	Refer to MFM hub Referral to North MFM quaternary service may be recommended, and/or referral to Brisbane under HCTP

Appendix 4: Abbreviations

Abbreviation	Description
CME	Continuing medical education
CMFM	Certificate of Maternal Fetal Medicine
CVS	Chorionic villus sampling
DDU	Diploma of Diagnostic Ultrasound
DHB	District Health Board
DRG	Diagnostic Related Group
ECMO	Extra-corporeal membrane oxygenation
EXIT	Ex-utero intra-partum treatment
FETO	Fetoscopic endoluminal tracheal occlusion
FNAIT	Fetal and neonatal alloimmune thrombocytopenia
FTE	Full time equivalent
GP	General practitioner
HCTP	High Cost Treatment Pool
HDC	Health and Disability Commissioner
HSC	Health Specialty Code
HWNZ	Health Workforce New Zealand
ICD	International Classification of Diseases
IUGR	Intra-uterine growth restriction
LMC	Lead maternity carer
LVEF	Left ventricular ejection fraction
MAT	National Maternity Collection
MDM	Multidisciplinary meeting
MDT	Multidisciplinary team
MFM	Maternal fetal medicine
MRI	Magnetic resonance imaging
NCD	National Clinical Director
NGOs	Non-governmental agencies
NLG	National Leadership Group
NMDS	National Minimum Data Set
NNPAC	National Non-Admitted Patients Collection
NPCCS	National Paediatric and Congenital Cardiac Service
NTA	National Travel Assistance scheme
NYHA	New York Heart Association
NZMFMN	New Zealand Maternal Fetal Medicine Network
PMMRC	Perinatal and Maternal Mortality Review Committee
PUC	Purchase Unit Code
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
SFLP	Selective fetoscopic laser photocoagulation
SLE	Systemic lupus erythematosus
T6	Sixth thoracic vertebra
TTTS	Twin to Twin Transfusion Syndrome

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