

Guidance for Clinical Commissioning Groups: Commissioning multi-parametric MRI before first biopsy for men with suspected prostate cancer

Contents:

Foreword	2	Supporting best practice	10
Overview	3	Setting standards to achieve	
The checklist	3	UK-wide consistency	10
Introduction	4	Quality Assurance	11
Population need for mpMRI before		When mpMRI before biopsy is	
first biopsy	4	not indicated	11
The PROMIS clinical trial	4	Case study	12
How mpMRI can benefit the prostate		The checklist	13
cancer diagnostic pathway	5	References	14
Case study	7	Appendix I	16
Requirements of prostate mpMRI		Appendix II	17
before biopsy.....	9	Appendix III	18
Service specification: mpMRI before		Appendix IV	19
first biopsy	10		
Training for radiographers and			
radiologists	10		
Equipment.....	10		
An effective MDT	10		
Effective links with primary care for those			
men not biopsied, but requiring PSA			
observation following discharge from			
pathway based on low probability			
mpMRI without biopsy	10		

**Dr Tony Brzezicki**

Chair, Cancer Commissioning Board,
Clinical Lead for the Healthy London Partnership,
Cancer Programme

Foreword

The results from the PROMIS trial make it clear that giving men with raised PSA an mpMRI scan before a biopsy can help increase the number of aggressive cancers detected whilst reducing the number of unnecessary biopsies for men – potentially removing the need for biopsy in around one quarter of cases of suspected cancer. The current diagnostic process for prostate cancer is infamous for its limitations, so any developments which offer improvements must be adopted as a matter of priority. This ‘checklist’ is intended to support commissioners and health professionals to make the necessary changes to resource and practice without delay.

However this complex technique can only become a routine part of the diagnostic pathway once it can be certain it can be rolled out safely and in a way that delivers the best outcomes for men. Whilst it’s clear that the roll out of mpMRI before biopsy can’t just happen overnight, it’s critical that urgent action is taken to make it available to men – bringing improvements to patient outcomes, experience, and to local health systems. This resource has been developed by Prostate Cancer UK in collaboration with a range of clinical experts, and will be a valuable tool for commissioners in making mpMRI a reality.

Overview

The published results of the Prostate MRI Imaging Study (PROMIS) trial have shown that giving a man a multi-parametric magnetic resonance imaging (mpMRI) scan before a biopsy can radically improve the accuracy of the diagnostic process for prostate cancer. Because of this it has the potential to drive improvements in patient outcomes and experience, as well as making health service improvements possible. To do this, it has to be done well.

This guidance combines the mpMRI before biopsy expertise of a breadth of relevant clinicians to set out – in a checklist format – what commissioners should aim to put in place to make sure that this new diagnostic imaging technique can be adopted successfully. It also highlights the support products that Prostate Cancer UK is developing to provide commissioners and men with quality assurance and England-wide consistency of practice.

By using the checklist below commissioners can have greater certainty that their adoption of mpMRI before biopsy will result in fewer unnecessary biopsies, reduced over-treatment, and better risk stratification of men.

The checklist

The following are important criteria to aim to have in place for mpMRI before biopsy to deliver effective results:

- Training undertaken by radiologists, with potential for newly trained radiologists to be paired with an expert radiologist.
- Training undertaken by radiographers.
- Appropriate equipment in place.
- Capacity to offer mpMRI to all men with a PSA above 3ng/ml and men with an abnormal feeling prostate on digital rectal examination.
- Effective multidisciplinary team in place.

To support all centres to achieve the best outcomes from mpMRI before biopsy, we are working to develop the following:

- A clinical consensus for mpMRI before biopsy that sets standards to achieve consistency of practice across the country.
- A digital quality assurance mechanism, similar to the one used for mammography.

Introduction

This guidance has been produced for the benefit of Clinical Commissioning Groups (CCGs) by Prostate Cancer UK. It sets out the conditions which we and our co-signatories believe should be in place for CCGs to commission multi-parametric MRI (mpMRI) before first biopsy effectively, for men with a clinical suspicion of prostate cancer. As outlined in this guidance, introducing mpMRI before biopsy can bring improvements to patient outcomes, patient experience, and to local health systems.

Multi-parametric MRI of the prostate is inherently complex and commissioning a service capable of delivering high quality examinations and meaningful reports requires an understanding of these complexities. The service relies on training for reporting clinicians, and MR platforms to be optimised and quality assured to produce diagnostic studies. Each of the conditions set out below has been developed in collaboration, drawing on the expertise of leading clinicians and researchers (see Appendix IV). This guidance aims to support CCGs to have the conditions in place which will deliver good outcomes for men, as well as meeting waiting time targets and delivering potential cost savings for the NHS.

1. The population need for mpMRI before first biopsy

Prostate cancer is the most common cancer in men, with over 47,000 new cases in 2013 in the UK. By 2030 it is expected to be the most common cancer overall in the UK.⁽¹⁾ One in eight men will be diagnosed with prostate cancer during their lifetime and there are over 11,000 deaths from prostate cancer each year.⁽²⁾

Most early prostate cancer has no symptoms, so the first sign of prostate cancer may be the symptoms of metastatic disease.⁽³⁾ Early diagnosis at the asymptomatic stage leads to better survival: diagnosis at stage I/II has a 99 per cent survival rate at five years compared to a 36 per cent survival rate for men diagnosed at stage IV.⁽⁴⁾ At present, around 40 per cent of men are diagnosed at an advanced stage (III or IV), with around 20 per cent having

metastases at diagnosis (stage IV).⁽⁵⁾ We estimate that around 190,000* prostate biopsies are done every year in the UK. It is difficult to be precise about these numbers as prostate biopsies are not fully coded and collected on Hospital Episode Statistics databases. These numbers may increase as a result of recent changes to the Prostate Cancer Risk Management Programme (PCRMP), which has removed age-related referral values to recommend that men aged between 50-69 are referred with a PSA of >3ng/ml.⁽⁶⁾ Previously different PSA cut-off points for detecting prostate cancer were recommended for different age groups.

This is estimated to equate to 196,266 men⁽⁶⁾, but would not be the actual figure for an MRI scan before biopsy each year. There will be some men who are contra-indicated for mpMRI and some men who would not be suitable for active treatment due to co-morbidities⁽⁷⁾ and therefore in whom an mpMRI would not be necessary as they would be unlikely to undergo a biopsy even if the mpMRI showed a suspicious area. Physicians will also take into account other factors such as a repeat PSA, free-total ratio and prostate size before requesting additional investigations.

2. The PROMIS clinical trial

The PROMIS trial set out to determine whether mpMRI prior to first prostate biopsy would improve detection accuracy of clinically significant cancer. The trial included men with a raised PSA, up to 15ng/ml, with no prior biopsy. Participants were given an mpMRI followed by both a transrectal ultrasound (TRUS) guided biopsy (which is current standard of care), and a template prostate mapping (TPM) biopsy, (which is more accurate and involves taking samples from the whole prostate at 5mm intervals).

The aim of the trial was to determine the proportion of men who could safely avoid biopsy without compromising detection of clinically-significant cancers.⁽⁸⁾ This is important because many men with elevated PSA levels will not have clinically significant prostate cancer.⁽⁹⁾ According to the British Association of Urological Surgeons (BAUS), 'with PSA levels between

3 and 10, only 20 per cent of men have prostate cancer on biopsy'.⁽¹⁰⁾ Biopsy can have risks such as infection/sepsis, bleeding in the urine and semen, and discomfort or pain.⁽¹¹⁾

The PROMIS trial included 11 centres in the UK with a mixture of academic and District General Hospital (DGH) settings. All centres were required to complete a qualification stage to ensure scanner quality and imaging quality, and all radiologists reporting had to abide by international criteria for training and reporting. For guidance on minimal standards, please refer to Barentsz et al 2012 and Kirkham et al 2013.⁽¹²⁾⁽¹³⁾ The results are outlined in section 3.2.

3. How mpMRI can benefit the prostate cancer diagnostic pathway

3.1. Overview of the prostate cancer diagnostic pathway

NHS England requires at least 85 per cent of cancer patients to have treatment initiated within 62 days of being urgently referred by their GP for suspected cancer. This target is often missed for patients with suspected prostate cancer. In London for example, the prostate pathway consistently contributes up to 34 per cent of all 62 day breaches.

In many instances a diagnosis of prostate cancer is made by TRUS biopsy and is followed by a staging MRI. This MRI is often delayed because it cannot be optimally performed until the artefact (bleeding/inflammation) caused by the diagnostic biopsy has stopped. These artefact changes can often take 3-6 months to resolve and can lead to staging errors.⁽¹⁴⁾ This in turn means that treatment plans are delayed. It follows that scanning patients prior to a biopsy will eliminate this delay in the pathway making the 62 day target more realistic.⁽⁹⁾

Equally importantly, a triage test that physicians and men can use to decide whether a biopsy is necessary or not will reduce numbers of biopsies. In turn, this will reduce the number of biopsy related complications and improve detection of clinically significant cancer whilst reducing

detection of clinically insignificant cancers. The latter is particularly important as insignificant cancers are often treated radically (leading to side-effects of incontinence, impotence and back passage symptoms) with little to no survival benefit.⁽¹⁵⁾ The high negative predictive value of mpMRI may remove the need for biopsy in 27 per cent cases of suspected cancer. See the pathway in Appendix 1 for reference.⁽⁹⁾

The distinction between a pre-biopsy and a post-biopsy mpMRI is very important. Doing the mpMRI after TRUS biopsy (the current standard) seriously detracts from the value of the mpMRI. Haemorrhage after biopsy reduces the accuracy of mpMRI in detecting areas within the prostate that may harbour cancer as well as leading to mis-interpretation of the T stage of proven cancer in between one quarter and one third of cases. Using mpMRI after biopsy also negates the ability of mpMRI to detect significant cancers, as pre biopsy mpMRI can help target regions of the prostate and influence the biopsy pattern.

Appendix 1 demonstrates the new prostate cancer pathway made possible by mpMRI before biopsy, which we developed in 2016, in collaboration with more than 42 healthcare professionals.

3.2. Improving patient outcomes with mpMRI

Early results from the PROMIS trial have verified outcomes⁽⁹⁾ that had previously only been reported in a few specialist UK centres, including UCH, Sussex University Hospital Trust, Cambridge and Southend as well as expert centres in the USA and mainland Europe.⁽¹⁶⁾ These results have shown clear clinical benefit of using mpMRI before biopsy, compared to the current practice of using TRUS biopsy as the first diagnostic test:

- The PROMIS trial showed that mpMRI had a significantly better negative predictive value than TRUS biopsy, at 89 per cent and 74 per cent respectively.⁽⁹⁾

In other words, one quarter of men with a negative TRUS biopsy were being falsely reassured that there was no significant cancer present, and possibly discharged, compared to only 1 in 10 men with a negative mpMRI.

- The PROMIS trial results showed that 27 per cent of men with suspected prostate cancer had a non-suspicious mpMRI and might safely avoid an immediate TRUS biopsy, as mpMRI has a high negative predictive value.
- The PROMIS trial showed that mpMRI before biopsy is significantly better at identifying clinically significant prostate cancer (93 per cent sensitivity) compared to TRUS biopsy (48 per cent sensitivity).

Findings from the trial and the accuracy of mpMRI did not differ between the main academic site which had led the study (UCH) and other sites, showing that the NHS was capable of delivering this high-quality diagnostic test provided that stringent criteria are set for scanners, scan protocols and training for radiology reporters are set, as outlined below.

3.3. Improving patient experience of the treatment pathway

Multi-parametric MRI can improve the patient pathway in the following ways:

Fewer biopsies: Multi-parametric MRI can be used as the ‘gatekeeper’ or triage test, so that TRUS biopsy and its associated morbidity can be avoided. This includes the ~2 per cent risk of serious infection associated with this biopsy type (transrectal).⁽⁷⁾

Fewer unnecessary treatments: Likewise, men can avoid the potential for over-diagnosis and over-treatment of prostate cancer that can result when a biopsy picks up a cancer which is slow growing or non-aggressive. This is because an mpMRI is unable to detect small, low grade indolent

lesions. The problem is once men are diagnosed with cancer they often choose or are advised to have treatment that can lead to side-effects, including incontinence, erectile dysfunction, bowel symptoms, and fatigue.^{(17) (18)} NICE guidance for prostate cancer suggests men are currently being over treated (although rates of unnecessary treatment are falling in line with adoption of NICE’s recommendation that men with low risk prostate cancer are encouraged to consider active surveillance).^{(7) (19)}

The ProtecT trial has recently compared treatment approaches for men with localised prostate cancer. In their comparison of men offered active monitoring, radical prostatectomy, and external-beam radiotherapy for the treatment of clinically localised prostate cancer, there was no difference in prostate cancer specific mortality rates or even any significant difference in death from any cause at 10 years. By establishing that in localised prostate cancer, over 10 years of follow up, prostate cancer-specific mortality is low irrespective of the treatment assigned, surveillance makes sense.⁽¹⁵⁾

Improved risk stratification:

A ‘suspicious’ mpMRI scan can help to target biopsies more accurately to a cancer. This increases the yield of clinically significant cancer with fewer biopsies and also gives a better representation of the amount of cancer and its grade (how aggressive the cells look microscopically).⁽¹³⁾

Cancer staging will be improved with mpMRI before first biopsy. Previous evidence has shown that a post-biopsy MRI, often done with only four weeks between biopsy and MRI, can lead to between one quarter and one third of men receiving an incorrect ‘T’ staging of the cancer. This error can lead to men being told they have more aggressive disease than they really do and then being offered treatment they don’t need or inappropriate treatment.

Case study: The Prostate Cancer Diagnostic Pathway: adoption of a one-stop service at University College Hospital (UCH)

UCH conducted a pilot study of an innovative service redesign to a one-stop prostate cancer referral service using a pre-biopsy mpMRI pathway followed by avoidance of biopsy in men with a non-suspicious mpMRI and transperineal targeted biopsy to a lesion (MRTB).

Between February 2015 and March 2016, a service innovation for men referred with an elevated PSA or other suspicion of prostate cancer was introduced incorporating:

- a one-stop pre-biopsy mpMRI with same-day reporting,
- clinical review,
- biopsy for those with lesions of suspicion on mpMRI.

Men presenting with a PSA or clinical suspicion of prostate cancer under the UK two week wait program, with negative urine cultures and estimated glomerular filtration rates (eGFR) of ≥ 30 micromol/L were eligible.

Upon referral the patient was contacted with a date for clinic and an mpMRI was arranged for the same day. This was reported prior to clinic where the patient was reviewed and offered MRTB if clinically indicated. Histology results were available within 48 hours and reviewed at a specialist multidisciplinary team meeting the following week in time for the patient to be seen with his results for treatment planning if necessary.

One hundred and twelve men attended the prostate one-stop clinic. One hundred and eleven (99.1 per cent) underwent subsequent mpMRI. Median presenting PSA was 9.4ng/ml [IQR 5.6 – 21.0]. 87 patients had a visible lesion on mpMRI. Multi-parametric MRI is rated from 1 through to 5 on a scale of suspicion. 3, 4, and 5, are regarded as suspicious; 1 and 2

as non-suspicious. 87/112 (78 per cent) were suspicious. Of these, 25 scored 3, 26 scored 4 and 36 scored 5. 57/112 (51 per cent) patients received a biopsy. 15/112 (17 per cent) chose not to have a biopsy due to a score of 3 which they found reassuring and 13 (15 per cent) did not for clinical reasons. Of those biopsied, 45/57 (79 per cent) had cancer detected; with 43/57 (75 per cent) having clinically significant cancer. Times to diagnosis and treatment were 8 and 20 days respectively which were significant improvements on the prior cancer waiting time targets.

This innovative pathway offers an alternative to standard and current prostate cancer diagnostic services. Attendance rates are high, acceptance of avoiding biopsies by patients was high and in those biopsied, clinically significant cancer detection rates are high. The use of an mpMRI led pathway allows for a significant proportion of men to avoid a biopsy. For those who undergo biopsy, the time to diagnosis and definitive treatment is kept particularly low.

If similar services can be offered in appropriate centres, they may offer value to patients with a potential diagnosis of prostate cancer.

3.4. Health service improvements with mpMRI

Currently most men with a diagnosis of prostate cancer on TRUS biopsy have an MRI for staging and to decide on the best course of treatment. The time to wait between a biopsy and an MRI can be at least four weeks with a standard biopsy procedure.⁽⁷⁾ An MRI four weeks after a biopsy is still affected by lots of artefactual changes, which can lead to mis-staging a cancer.

We know that some men who have an initial TRUS biopsy which is negative for cancer can in fact have a significant prostate cancer. This can be caused by a random or systematic error in the biopsy. NICE recommends that men requiring a repeat biopsy, after an initial negative biopsy, should be offered an mpMRI prior to their repeat biopsy, and that if their mpMRI is negative, they should not be offered a second biopsy. Evidence suggests significant numbers of men (up to 50 per cent over five years) with a negative biopsy end up having another biopsy due to persistent PSA elevation or urologist's lack of confidence in the TRUS biopsy. In effect, mpMRI is currently used in most men who enter the diagnostic pathway but at different times.

Using mpMRI before first biopsy in men with suspected prostate cancer moves the investigation to the start of the pathway. This avoids delays and inaccuracies introduced by having a biopsy first. More importantly, men who may not need a biopsy are identified and can be removed from the pathway, often to primary care follow-up, with more confidence than current practice which is based on TRUS biopsy results. Further, pre-biopsy mpMRI has a high accuracy in guiding the biopsy so that detection rates for significant cancers increases. This approach should not result in a large increase in mpMRI requests, as currently NICE recommends that, in men fit for radical treatment, mpMRI is done if the first biopsy is positive or negative.^{(20) (21)}

Overall, pre-biopsy mpMRI is likely to:

- assist in meeting targets (62 day treatment target),
- lay the groundwork needed to meet the new cancer target that requires 95 per cent of suspected cancer patients to be diagnosed with 28 days of referral by a GP by 2020,
- reduce over-investigation without any reduction in significant cancer detection (in fact the contrary).

3.5. Health economic impact of using mpMRI

Preliminary health economics estimates relating to mpMRI before first biopsy suggests that savings could be made across a number of areas:

- Around one in four men would no longer require a biopsy, reducing the associated costs, morbidity and management of complications. Sepsis, for example, can often lead to many days in hospital, often in ICU/ITU.
- The number of biopsy cores needed to target areas of suspicion is likely to be less than the current 12 (random biopsies).
- Fewer diagnoses of clinically insignificant cancers. This will avoid unnecessary treatment and the associated side-effects such as urinary incontinence, which require management with incontinence products, medication and sometimes operations.
- Most men who have a positive biopsy would no longer require an MRI scan afterwards to stage the cancer. A benefit of doing the mpMRI before biopsy is that it can act as a staging study, speeding up management.

- Men with positive biopsies being offered active surveillance will go on to this pathway having had the additional information from mpMRI in making this treatment choice.
- Men on active surveillance would no longer require the NICE mandated mpMRI within six months of enrolling onto active surveillance as this was recommended to overcome the lack of a pre-biopsy mpMRI.
- Defined mpMRI sequences, which are T2-weighted, diffusion weighted, and dynamically enhanced. These sequences need to be optimised by each imaging team for each specific scanner and a 'plug and play' system of taking other's sequences is not sufficient. Please refer to Appendix II for more details.

Refer to Appendix III for tariffs currently available for MRI.

4. Requirements of prostate mpMRI before biopsy

The outcome of a consensus meeting, published in March 2013, gives the most comprehensive outline of how to undertake an mpMRI scan before first biopsy and what is required to conduct one. The agreed requirements are as follows:

- MRI machines with a field strength of 1.5T (these are considered adequate with images at 3T field strength being considered as superior but not mandatory).
- Use of a multichannel pelvic phased-array coil, which the consensus considered to achieve mpMRI benefits. Performance might potentially be improved by the addition of an endorectal coil for both the detection of tumours and staging but this is not necessary.
- Anti-peristaltic drugs are strongly recommended for the scan, but are not essential.



Service specification: mpMRI before first biopsy

Critical components – the following are important criteria to aim to have in place for mpMRI before biopsy to deliver effective results:

1. Training for radiographers and radiologists

Multi-parametric MRI is a complex undertaking and it is essential that radiologists and radiographers have appropriate training. For radiologists, this includes the ability to define correctly a non-suspicious mpMRI so that a urologist in conjunction with the patient can make a decision about whether to biopsy or not – urologists have other factors such as free-total PSA ratio, age, family history and ethnic group risk to take into account.^{(13) (9)} For radiographers, training should include tutorials in prostate anatomy and pathology.

Prostate Cancer UK is currently supporting the development of an accredited Royal College of Radiologists' training programme. This is due to launch as a webinar in late 2017 and to be followed by a face-to-face module in 2017. Work is also underway to bring newly trained radiologists together with radiologists who are experts in performing mpMRI before biopsy so that trainees can gain confidence and proficiency. We are also exploring training modules for radiographers in collaboration with the Society and College of Radiographers. For more information on these training programmes please contact:

hpeducation@prostatecanceruk.org

2. Equipment

The PROMIS mpMRI sequences included: T2W, diffusion weighted imaging using 4 b values to produce ADC maps and a separate high b value sequence, and dynamic gadolinium contrast enhancement. These are also the minimum set of requirements set by international uro-radiology expert groups but the specifics of each type of functional sequence will differ by each scanner manufacturer and model. Further details are outlined in Appendix II.

3. An effective MDT

Radiologists should be linked with a proactive and supportive MDT so scan interpretations can be discussed and urologists can be given confidence to rule some men out of a biopsy.

MDTs should also be used as the means for radiologist engagement and mentoring to occur across the hospitals within a Trust.

4. Effective links with primary care for those men not biopsied, but requiring PSA observation following discharge from pathway based on low probability mpMRI without biopsy

For men with a low risk of prostate cancer on mpMRI, and the absence of other risk factors, such as a high PSA density, many will be advised and/or choose to avoid a standard biopsy. Some of these men may require no further follow up, whilst others may be advised by the urologist to have repeat PSA testing in general practice. The urologist should give a PSA threshold at which the patient should be referred back for further investigation and advise on how often PSA tests should be given.

Supporting best practice

To support all centres to achieve the best outcomes from mpMRI before biopsy, we are working to develop the following:

1. Setting standards to achieve UK-wide consistency

Prostate Cancer UK and University College Hospital started work in September 2016 on a clinical consensus that sets practice standards for mpMRI before biopsy. This is to achieve consistent practice of a high standard wherever mpMRI is adopted. This is in response to findings from a Prostate Cancer UK survey of radiologists, undertaken in Spring 2016 and summarised overleaf.

Of the 84 radiologists we surveyed, 79 per cent reported offering men an mpMRI scan before a biopsy. However:

- 50 per cent are using all four of the sequences needed to do it most effectively (T1, T2, DW and DCE) – in line with PROMIS and the UK consensus meeting paper.
- 39 per cent reported pre-biopsy MRI reduced the number of men having biopsies (and two-thirds of these were using all four sequences).

The practice standards set by the clinical consensus will aim to ensure that the potential benefits of mpMRI as the first test for men with an elevated PSA that the PROMIS trial and other evidence in the literature have shown (reduced biopsy, fewer treatments) are possible through a quality controlled and quality assured process to achieve the best outcomes for men. They should be available by Autumn 2017.⁽⁷⁾⁽¹⁹⁾

2. Quality assurance

We are in the process of developing a quality assurance mechanism for mpMRI before biopsy that is based on the system used for mammography. This will make sure that scans achieve a consistently high quality, that radiologists are interpreting them accurately, and that they are safely and accurately ruling some men out of biopsy. Quality assurance will limit the need for re-scans and support the reduction of biopsy rates.

Prostate Cancer UK will be progressing work on this digital quality assurance tool from Autumn 2016. In the interim, less formal mentoring arrangements between your radiologists, radiographers or urologists and others that have already adopted mpMRI before biopsy to best practice standards are possible. Contact policy@prostatecanceruk.org for more details.

When mpMRI before biopsy is not indicated

For men with a very high likelihood of metastatic disease (e.g. a clinically malignant feeling prostate and a high PSA), it may be appropriate to do a staging bone scan and/or CT scan as the first radiological examination. In men for whom hormone therapy alone is the only suitable treatment (e.g. due to co-morbidities), no further investigations may be required. In men with metastatic disease who are likely to be fit for other treatments, then cross-sectional imaging as per local guidelines can be used for staging of the abdomen and pelvis. It should be noted that the PROMIS upper PSA threshold was 15 although other studies include men with PSA of no upper limit or at 20ng/ml or 30ng/ml.⁽⁹⁾

Each centre will vary in its approach to men with very high PSA levels likely to have locally advanced or metastatic disease. As many trials require histological verification of cancer, a biopsy is often requested by the clinical team so men are not excluded from future clinical trials.

Relative contra-indication to mpMRI – some men will find the claustrophobia of a 30 minute mpMRI difficult to tolerate. In these cases consider mpMRI under sedation or moving directly to systematic TRUS biopsy or template biopsy depending on local practice.

Absolute contraindication to mpMRI – offer systematic TRUS biopsy, pre biopsy imaging (such as CT) is not indicated.

Case study

“In May 2016 I went to the doctor as I was feeling quite tired a lot of the time. The doctor said that at age 70 I was allowed to feel tired but that he would run a couple of tests just to check. During the process one of the tests that he did was a PSA test and a DRE. During the DRE my GP said he felt a slightly hard lump on my prostate so was going to send me to get checked out by a urologist. The urologist then told me that he would need to do an MRI scan.

“It was explained to me that having an mpMRI scan before a biopsy could help give an indication as to whether or not there was cancer in my prostate that needed investigation through biopsy. I’d heard from a friend that a prostate biopsy could be extremely painful and uncomfortable so I was pleased to know that I wouldn’t be sent for one unless the doctors were confident I needed it.

“When the results of my MRI scan came back I was told that it had shown two spots on my prostate that would in fact need further investigation. I certainly wasn’t looking forward to it, but I decided that I would go ahead with the biopsy, as I needed to find out what was going on down there. The urologist told me that as a result of the MRI scan they would be able to use fewer needles in a targeted way because they knew where they needed to take samples from, so that helped.”

Chris, age 70, South East England



The checklist

The following are important criteria to aim to have in place for mpMRI before biopsy to deliver effective results:

- Training undertaken by radiologists, with potential for newly trained radiologists to be paired with an expert radiologist.
- Training undertaken by radiographers.
- Appropriate equipment in place.
- Capacity to offer mpMRI to all men with a PSA above 3ng/ml and men with an abnormal feeling prostate on digital rectal examination.
- Effective multidisciplinary team in place.

To support all centres to achieve the best outcomes from mpMRI before biopsy, we are working to develop the following:

- A clinical consensus for mpMRI before biopsy that sets standards to achieve consistency of practice across the country.
- A digital quality assurance mechanism, similar to the one used for mammography.

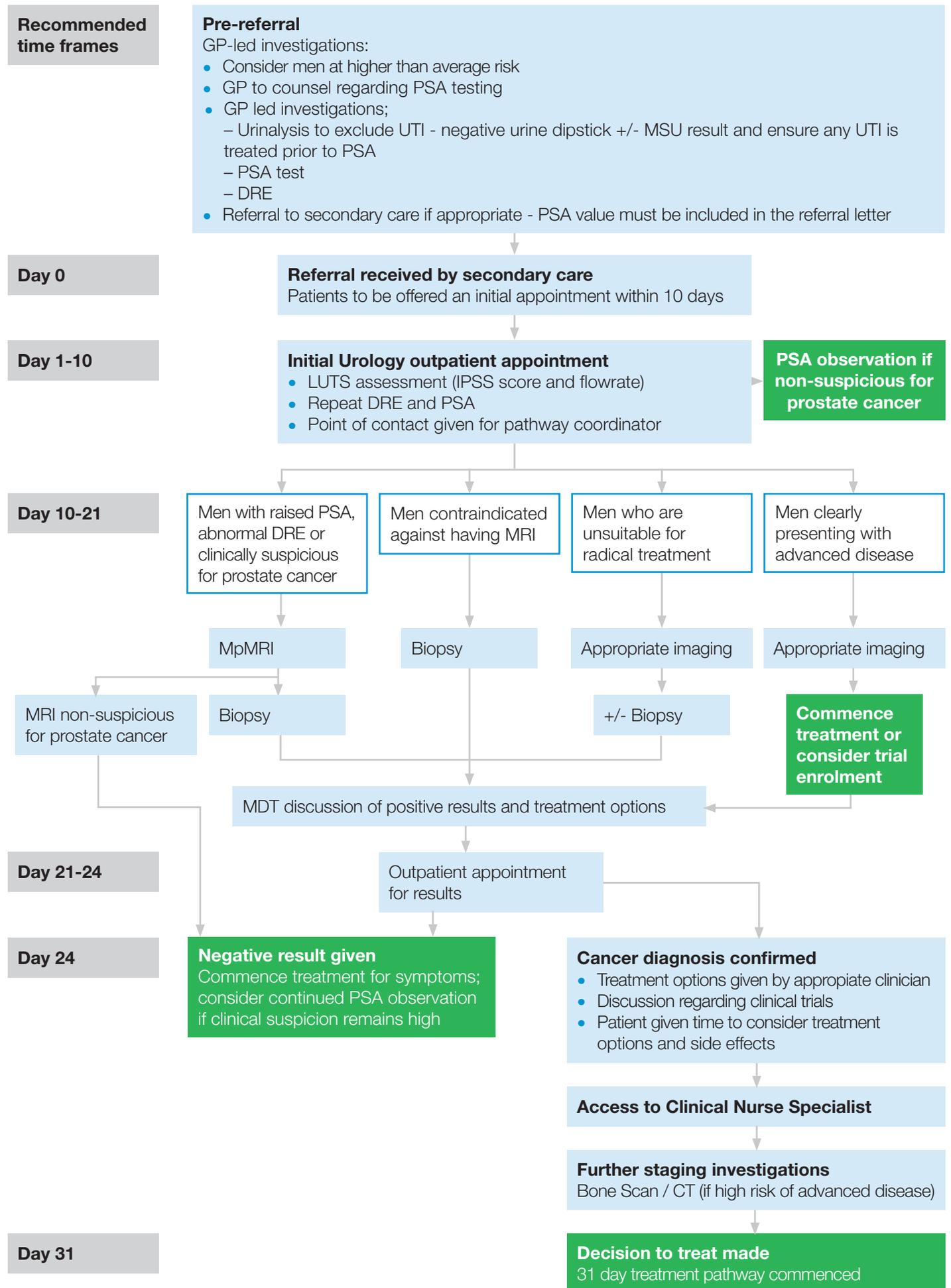


References

1. Mistry M, Parkin DM, Ahmad AS, Sasieni P. Cancer incidence in the United Kingdom: projections to the year 2030. *Br J Cancer*. 2011 Nov 22;105(11):1795–803.
2. Cancer Research UK. Prostate cancer mortality statistics: By country in the UK (2014) [Internet]. 2016. Available from: <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/prostate-cancer/mortality#heading-Zero>
3. Public Health England. Prostate cancer risk management programme (PCRMP): benefits and risks of PSA testing [Internet]. 2016 [cited 2016 Jul 11]. Available from: <https://www.gov.uk/government/publications/prostate-cancer-risk-management-programme-psa-test-benefits-and-risks/prostate-cancer-risk-management-programme-pcrmp-benefits-and-risks-of-psa-testing#the-psa-test>
4. Public Health England. One, five and 10 year prostate cancer survival by stage in England. 2000-2010 (depending on follow-up time). Data on request. 2013.
5. Cancer Research UK. Prostate cancer incidence statistics [Internet]. 2014. Available from: <http://www.cancerresearchuk.org/cancer-info/cancerstats/types/prostate/incidence/>
6. Schröder FH, Hugosson J, Roobol MJ, Tammela TLJ, Ciatto S, Nelen V, et al. Screening and prostate-cancer mortality in a randomized European study. *N Engl J Med*. 2009 Mar 26;360(13):1320–8.
7. National Institute for Health and Care Excellence. Prostate cancer: Diagnosis and treatment. NICE clinical guideline 175 [Internet]. 2014 [cited 2013 Apr 25]. Available from: <http://www.nice.org.uk/guidance/CG175>
8. MRC Clinical Trials Unit. PROMIS - Prostate MRI Imaging Study: Evaluation of Multi-Parametric Magnetic Imaging in the Diagnosis and Characterisation of Prostate Cancer [Internet]. [cited 2014 May 22]. Available from: http://icon8trial.org/research_areas/study_details.aspx?s=126
9. Ahmed HU & et al. The PROMIS study: A paired-cohort, blinded confirmatory study evaluating the accuracy of multi-parametric MRI and TRUS biopsy in men with an elevated PSA. [Internet]. 2016 [cited 2016 Jun 17]. Available from: <http://meetinglibrary.asco.org/content/163963-176>
10. Raised PSA | The British Association of Urological Surgeons Limited [Internet]. [cited 2016 Oct 26]. Available from: http://www.baus.org.uk/patients/conditions/10/raised_psa
11. Rosario DJ, Lane JA, Metcalfe C, Donovan JL, Doble A, Goodwin L, et al. Short term outcomes of prostate biopsy in men tested for cancer by prostate specific antigen: prospective evaluation within ProtecT study. *BMJ*. 2012 Jan 9;344:d7894.
12. Barentsz JO, Richenberg J, Clements R, Choyke P, Verma S, Villeirs G, et al. ESUR prostate MR guidelines 2012. *Eur Radiol*. 2012 Apr;22(4):746–57
13. Kirkham APS, Haslam P, Keanie JY, McCafferty I, Padhani AR, Punwani S, et al. Prostate MRI: who, when, and how? Report from a UK consensus meeting. *Clin Radiol*. 2013 Oct;68(10):1016–23.
14. Latifoltojar A, Dikaios N, Ridout A, Moore C, Illing R, Kirkham A, et al. Evolution of multi-parametric MRI quantitative parameters following transrectal ultrasound-guided biopsy of the prostate. *Prostate Cancer Prostatic Dis*. 2015 Dec;18(4):343–51.

15. Hamdy FC, Donovan JL, Lane JA, Mason M, Metcalfe C, Holding P, et al. 10-Year Outcomes after Monitoring, Surgery, or Radiotherapy for Localized Prostate Cancer. *N Engl J Med*. 2016 Oct 13;375(15):1415–24.
 16. Fütterer JJ, Briganti A, De Visschere P, Emberton M, Giannarini G, Kirkham A, et al. Can Clinically Significant Prostate Cancer Be Detected with Multiparametric Magnetic Resonance Imaging? A Systematic Review of the Literature. *Eur Urol*. 2015 Dec;68(6):1045–53.
 17. Prostate Cancer UK. Men's views on quality care in prostate cancer: What does good quality care mean for men with prostate cancer? Total sample size was 610 UK men. Fieldwork was undertaken between October 2011 and January 2012 [Internet]. 2012. Available from: http://prostatecanceruk.org/media/2491129/prostate_cancer_uk_quality_care_survey_report_june_2012.pdf
 18. Glaser AW, Fraser LK, Corner J, Feltbower R, Morris EJA, Hartwell G, et al. Patient-reported outcomes of cancer survivors in England 1-5 years after diagnosis: a cross-sectional survey. *BMJ Open*. 2013;3(4).
 19. Royal College of Surgeons of England. Second Year Annual Report – Further analysis of existing clinical data and preliminary results from the NPCA Prospective Audit [Internet]. 2015. Available from: <http://www.npca.org.uk/annual-report-2015/>
 20. Meng X, Rosenkrantz AB, Mendhiratta N, Fenstermaker M, Huang R, Wysock JS, et al. Relationship Between Prebiopsy Multiparametric Magnetic Resonance Imaging (MRI), Biopsy Indication, and MRI-ultrasound Fusion-targeted Prostate Biopsy Outcomes. *Eur Urol*. 2016 Mar;69(3):512–7.
 21. Willis SR, Ahmed HU, Moore CM, Donaldson I, Emberton M, Miners AH, et al. Multiparametric MRI followed by targeted prostate biopsy for men with suspected prostate cancer: a clinical decision analysis. *BMJ Open*. 2014 Jun 1;4(6):e004895.
- * This is an estimate based on the number of men diagnosed with prostate cancer per year (Cancer Research UK), the proportion of men with prostate cancer known to have a biopsy (National Prostate Cancer Audit) and the proportion of men who have a biopsy but turn out not to have prostate cancer (ERSPC, 2014).

Appendix I: Prostate Cancer UK Best Practice Diagnostic Pathway



Appendix II: Further information on undertaking an mpMRI

The benefits of mpMRI over TRUS biopsy for prostate cancer detection are:

1. superior sensitivity in identifying clinically significant cancer;
2. better negative predictive value;
3. it is non invasive.

To realise the first two benefits, the acquisition has to conform to a minimum standard so that there are high quality anatomical and functional sequences which are used in combination. This is especially pertinent when mpMRI is used to 'rule out' clinically significant cancer.

Multi-parametric MRI protocols vary according to clinical indication (detection, staging, follow up and post-treatment scenarios) and according to local resources and expertise and according to the manufacturer. In order to bring some clarity to this we will be producing a booklet based on real life protocols, which will outline detailed examples for different MRI machines. The protocols should take around 30 minutes to acquire. Naturally units may need to modify the parameters according to the MRI machines on site. Radiologists may also elect to include further sequences (for staging or increased diagnostic power) selecting an OPTIMAL (but longer) examination.

The extra cost and limitations on when the mpMRI could be conducted imposed by addition of contrast enhanced sequences (DCE) are believed to be justified by the additional diagnostic power that the second functional sequence (after diffusion weighted imaging) adds. The need for an examination with higher sensitivity becomes stronger when the investigation is being used as a gate-keeper: mpMRI becomes a key determinant in omitting or continuing to biopsy. DCE sequences can improve detection of possible significant cancers and may also suggest cases of prostatitis (mimicking cancer) which may be treated with antibiotics and surveillance without going direct to biopsy.

A more comprehensive list of suggested protocols are being developed by a Clinical Consensus expert group and will be made available once ratified.

In the interim, if you would like to receive a booklet which includes real life examples of protocols for prostate mpMRI, please contact: **policy@prostatecanceruk.org**

Appendix III Tariffs

The tariffs in the following tables are based on best available information at the point of publication. These should be seen as indicative, and we advise mapping against the best available information on tariffs locally.

Source: <https://www.gov.uk/government/consultations/nhs-national-tariff-payment-system-201516-engagement-documents>

Tariff (including cost of reporting) (£) for MRI	169
Cost of Reporting	22

Guidance on costs for biopsy based on best available figures from 2015/16. Data covers tariffs for admitted patient care and outpatient procedures	HRG code: LB06G
HRG name	Kidney, Urinary Tract or Prostate Neoplasms, with length of stay 1 day or less
Combined day case / ordinary elective spell tariff (£)	331
Ordinary elective long stay trimpoint (days)	5
Non-elective spell tariff (£)	563
Non-elective long stay trimpoint (days)	5
Per day long stay payment (for days exceeding trimpoint) (£)	201
Reduced short stay emergency tariff applicable?	Yes
Per cent applied in calculation of reduced short stay emergency tariff	100 per cent
Reduced short stay emergency tariff (£)	563

Appendix IV Collaborators

Adshead, Jim – Consultant Urological Surgeon,
East and North Hertfordshire NHS Trust

Ahmed, Hashim – Honorary Consultant
Urological Surgeon, Imperial College Healthcare
NHS Trust

Haslam, Philip – Consultant Interventional
and Uroradiologist, The Newcastle upon Tyne
Hospitals NHS Foundation Trust

Inderlal, Desiree – Superintendent
Radiographer, Brighton and Sussex University
Hospitals NHS Trust

Maughn, Sue – Clinical Advisor, Transforming
Cancer Services Team, NHS South East
Commissioning Support Unit

Moore, Caroline – Honorary Consultant
Urological Surgeon, University College Hospital

Punwani, Shonit – Honorary Consultant
Radiologist, University College Hospital

Richenberg, Jonathan – Consultant
Radiologist, Brighton and Sussex University
Hospital Trust

Walls, Darren – Lecturer in Diagnostic Imaging,
City, University of London

PROFESSIONAL SUPPORT

For more information on any of the content in this document
please contact: policy@prostatecanceruk.org

Released: May 2017



Follow us on Twitter: [@ProstateUKProfs](https://twitter.com/ProstateUKProfs)
Join us on LinkedIn: [Prostate Cancer UK Professionals](https://www.linkedin.com/company/prostate-cancer-uk-professionals)