

Best Practice Pathway for Pelvic Radiation Disease



PELVIC
RADIATION
DISEASE
ASSOCIATION

Lead Partner



“

When the problems did occur for me, doctors seemed unsure what to do and were slow to act, despite such a serious negative impact to my quality of life.”

Willie, person affected by Pelvic Radiation Disease

“

We must see people holistically, and think what range of organs may have been affected by their radiotherapy, and hence what questions we as professionals need to ask people about – bowel difficulties, bladder symptoms, sexual problems, fertility concerns, body image issues, fatigue, pain, skin problems, and very importantly – psychological issues.”

Dr Anthony Cunliffe, Macmillan National Clinical Adviser for Primary Care, Macmillan Lead Clinical Adviser and Clinical Adviser for London, Joint Clinical Chair South East London Cancer Alliance

“Pelvic Radiation Disease itself remains relatively unknown with no widely established standard for diagnosis and treatment. For patients presenting with symptoms, especially in primary care, there is often an inclination to treat the symptoms themselves instead of following diagnostic routes to establish the underlying condition. This can mean patients continue to suffer needlessly.”

“I Want My Life Back” report by Jo’s Cervical Cancer Trust and the Pelvic Radiation Disease Association

“PRD is constantly on my mind, and I am constantly worrying about things I need to do when I go out and pre-plan things a bit more. And the constant worry about what is going to go wrong with my health next. I am never just worry-free at any point.”

May, who had chemotherapy, radiotherapy and brachytherapy for cervical cancer

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Lead Partner



Established in 2009, Aspire Pharma has become one of the fastest growing pharmaceutical companies in the UK. Supplying a range of pharmaceuticals, medical devices and diagnostics, Aspire's products are carefully selected to deliver value and differentiation to both patients and prescribers. Thanks to the company's continued expansion, it is now a significant employer in the East Hampshire area, and continues to focus on extending its portfolio of innovative products, as well as furthering its position in the areas of ophthalmology and urology. For more information on the company and their products, visit aspirepharma.co.uk



Lymphoedema is a life-long risk for those who have pelvic radiotherapy. Much can be done to reduce that risk or to limit the severity if it does. The British Lymphology Society Charity exists to benefit people with lymphoedema through education, promoting awareness, knowledge and prompt and effective intervention. The Best Practice Pathway makes an extremely useful contribution to our goals by providing such helpful guidance to support the earliest possible recognition of lymphoedema and interventions to minimise both the risk and impact of lymphoedema, with potential to significantly enhance quality of life. thebls.com

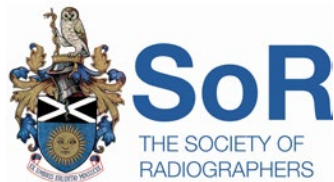


Pelvic Radiation Disease still remains relatively unknown. Those affected can struggle to access much needed diagnoses and treatments instead of ricocheting around the health system. Sadly we even hear from patients who have simply been told nothing more can be done for them. There is a severe lack of funding for services, training and standardisation in care. This pathway is incredibly important and will hopefully help pave the way for much needed improvements. jostrust.org.uk

Partners, Sponsors and Endorsements



Pelvic Radiation Disease can affect patients after treatment for bowel cancer. As a charity we aim to empower patients living with the effects of treatment for bowel cancer and to support healthcare professionals involved in their care. This pathway is an invaluable and much needed practical resource for those working with patients affected by Pelvic Radiation Disease. bowelcanceruk.org.uk



Society of Radiographers

We are pleased to support this unique document that provides holistic guidance on shared goals for patients with Pelvic Radiation Disease and health professionals. The role of the therapeutic radiographer in managing the consequences of pelvic radiation disease has been shown to be beneficial in terms of symptom control and service delivery so we thank Dr Lisa Durrant and Emma Hallam for chairing the Society of Radiographers' **Late Effects special interest group** and its strong input into this work.



Prostate Cancer UK are delighted to endorse the development of the Pelvic Radiation Disease Association's Best Practice Pathway. The document is a well-researched and valuable resource, which we have no doubt will have an incredible impact on those that need it the most. prostatecanceruk.org

The **UK Oncology Nursing Society (UKONS)** supports this document and regards it as best practice.

Applications are being made to other professionals societies for their endorsement. If obtained, these will be added in a refresh of the document in due course.

The Pelvic Radiation Disease Association

The Pelvic Radiation Disease Association (PRDA) is the only charity in the UK focused solely on Pelvic Radiation Disease.

By offering information, peer-to-peer support, and advocacy for patients, the organisation aims to improve quality of life for people who have been treated for cancer but are now living with the consequences.

The charity's key objectives are:

- Improved quality of life for people affected by Pelvic Radiation Disease
- Fewer people feeling alone while experiencing the debilitating symptoms of Pelvic Radiation Disease
- Tailored information on Pelvic Radiation Disease is made accessible to people prior to radiotherapy treatment.
- Better understanding among health professionals who are treating people with symptoms of Pelvic Radiation Disease
- Wider awareness of Pelvic Radiation Disease in the health professional and research communities of the need for more research on how to prevent and treat it.

This document is designed to meet these aims, by improving the level of knowledge amongst UK health professionals on how they can support people affected by Pelvic Radiation Disease. It can also be used by patients to help them better understand their current care options and how to advocate for better care for themselves.

PRDA is grateful to the generosity of its donors who have helped make this document possible, but the organisation needs ongoing support to ensure this document is widely disseminated and used to best effect.

You can help by:

- donating or fundraising
- applying to volunteer
- sharing our social media posts on **Linkedin, Twitter, Facebook and Instagram**
- sharing this document widely with colleagues, professional networks, commissioners, Cancer Alliances, Cancer Networks, Health Boards and policy makers.

Visit prda.org.uk to find out more about the charity's work.

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All suggestions and corrections are welcome to info@prda.org.uk

Disclaimer

Please read this before proceeding

The purpose of this document is to act as a reference tool for clinical decision-making for health services in the UK. We have made every effort to ensure the information in these pages is accurate and correct at the date of publication, but it is by necessity of a brief and general nature, and should not replace your own clinical judgement, or be regarded as a substitute for seeking specialist advice where appropriate. In particular, check any drug doses, side-effects and interactions in accordance with local NHS guidelines. The Pelvic Radiation Disease Association does not accept any liability in relation to the use of or reliance on any information contained in these pages, or third-party information or websites referred to in this document.

Note: This document is aimed at healthcare staff and therefore uses medical terminology. If you are a person affected by Pelvic Radiation Disease, or have any symptom that is concerning you, please contact your healthcare team.

Important

Late side effects may occur many months or years after radiotherapy. However, it is difficult to determine on history alone whether symptoms relate to previous treatment or new pathology.

It is therefore essential that recurrence or progression of cancer, or a second/subsequent primary cancer, are EXCLUDED before proceeding to manage the symptoms listed in this document.

If there is any concern that symptoms are attributable to

- non-radiation induced pathology, or
 - an acute medical condition requiring urgent treatment,
- then the advice contained within this document is NOT appropriate and the person should be referred appropriately.

For symptoms matching the urgent/rapid access/'red flag' suspected cancer referral criteria, please make the diagnostic and cancer service providers aware that this patient has previously had radiotherapy, and to what site, and that there are concerns for recurrence or new cancer.

This document does NOT provide guidance on how to investigate if any symptoms are due to recurrence or progression of cancer or the appearance of a second/subsequent primary cancer.

This document only covers the long term consequences of radiotherapy to the pelvic area and therefore does NOT cover (a) acute side effects of radiotherapy (b) late effects of cancer treatment caused by surgery or systemic therapies.

Foreword

Radiotherapy is a valuable, very effective treatment, particularly for cancers of the pelvis. It is often combined with surgery, chemotherapy, hormone and/or newer immunological therapies and, while advances in radiotherapy techniques have reduced the risk of some side-effects, with every innovative therapy comes the risk of a different spectrum of later side effects. There are over 100,000¹ people with symptoms of Pelvic Radiation Disease (PRD) whose problems are not going away. This Best Practice Pathway document is a practical step to help them and those caring for them.

It is 15 years since the first National Cancer Survivorship Initiative² marked the start of a national movement to address the needs of those dealing with the consequences of cancer treatment. The size and scope of PRD in England was established, and it was recognised how many health professionals were uncomfortable talking about bowel, urinary or sexual issues and also how many believed that “nothing could be done” to help.

There has been progress – more widely available patient information, education initiatives and publication of evidence-based guidance for specialists, generalists and patients. Diagnostic and management algorithms have been tested in trials and have demonstrated that a systematic approach can improve symptoms. Clinical research continued to be hampered by a lack of proven biomarkers of radiation-induced damage, but the validation of patient reported outcome measures (PROMs) for routine use were shown to enable earlier identification of individuals requiring help for PRD. A variety of new service models were tested, some of which have continued to flourish.

Much progress has been made in understanding how radiotherapy causes problems in the pelvis. Data suggest that manipulating the bacteria that live in the bowel, changes in diet during treatment to protect the gut or the use of anti-fibrotic therapies are the most promising non-radiological interventions to reduce the risk of side effects. Now that the need for research into treatment consequences has been identified as one of the top 10 James Lind Alliance priorities³, maybe the funding for the appropriate and much needed studies will become available.

However, even in the areas where research has clearly identified things which work and should constitute best practice, we know that when people develop the many symptoms related to PRD – chronic, difficult to manage, restricting lives and impacting on quality of life – they too frequently complain of ricocheting around health services, often seeing many different specialists with varying expertise in their problems. Others report getting no support at all or are still being offered ineffective or even harmful treatments.

¹ PRDA estimates 100,000 are affected by PRD in the UK in 2022. Teo et al (2015) estimated 90,000 people.

² Department of Health (2013) *Living With and Beyond Cancer: Taking Action to Improve Outcomes* (final report of the National Cancer Survivorship Initiative).

³ James Lind Alliance (2018) *Top Ten Priorities for Research in Living With and Beyond Cancer*.

We are beginning to understand that within the traditional healthcare system, clinics are organised with too narrow a focus, and need to be rearranged to address symptoms holistically. Without such a holistic framework, there will be no substantial progress for people affected by PRD. We need to develop a network of specialists who understand all the issues and are enabled to work collaboratively.

The PRD Best Practice Pathway addresses some of these challenges, describing a more holistic model to support clinical oncology, clinical nurse specialists, therapeutic radiographers and others. The document provides an easy format to navigate specific symptoms, identifies when and to whom professionals can refer, links to useful self-management resources and offers advice for those starting up a service.

We know this won't be enough. We have a mountain to climb if we are to improve people's experience in relation to PRD. We need more clinical research and education to implement what we already know and learn about new challenges presented by new techniques and medicines.

However, we warmly welcome this document and hope it will be widely used. It also deserves to provide a robust platform for the future conversations and initiatives.

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Purpose of this document

This document is designed to support the development of effective, high-quality, person-centred pathways of care in the UK for people with symptoms of Pelvic Radiation Disease (PRD).

It is not a fully self-contained clinical guidance document in itself, but instead points users to existing published guidance, and sources of information and support.

All corrections and suggestions for change are welcome to info@prda.org.uk.

The measure of the Best Practice Pathway's success will be:

- People are empowered to talk about PRD with their healthcare teams
- Equitable and timely access to high quality advice, care and treatment
- More pathways of care that integrate all symptoms of PRD, involving multiple services, settings and disciplines, and which address health inequalities
- PRD and its symptoms are recorded in health records and correspondence
- More is done to develop/refresh clinical guidance, service models, and training courses
- Growth in research studies about PRD, and more translation of research into clinical practice
- Health professionals having greater awareness, confidence and skills to identify and manage PRD
- Improved quality of life for people after pelvic radiotherapy.

The Pelvic Radiation Disease Association does not have sufficient resource to undertake a baseline survey or future evaluation of these success measures and welcomes any potential partnerships in this regard.



Audience

This document is primarily aimed at health professionals to provide information on the optimal ways to:

- Inform people about side effects of radiotherapy and self-care
- Identify people who have symptoms of PRD
- Manage people's care in a holistic, person-centred and multi-disciplinary way
- Access professional education and clinical guidance on PRD symptoms.



The document may be applicable if you work in any of the following professions, specialties or services:

- Any service that sees people who have had prior radiotherapy to the pelvic area
- Oncology/Radiotherapy
- Late Effects
- Psycho-Oncology
- IAPT/mental health services
- Emotional support
- Charity helplines
- Primary Care
- Acute Oncology
- Gastroenterology
- Colorectal Surgery
- Endoscopy
- Dietetics
- Nutrition
- Gynaecology
- Fertility
- Menopause
- Sexual Medicine
- Urology
- Erectile Dysfunction
- Pain
- Neurology
- Bone health
- Endocrinology
- Vascular Medicine
- Lymphoedema
- Dermatology
- Physiotherapy
- Cancer-specialist sports professionals
- Cancer-specialist complementary therapists

This document will also be useful to:



Health service policy-makers, commissioners, managers and researchers as it provides information that will support:

- A business case for integrated care for PRD symptoms
- Delivery of improvements in clinical outcomes, experience of care and quality of life
- Better recording of symptoms of PRD and identification of patients in hospital and GP records.



People affected by symptoms of PRD and their carers as it provides information on:

- How to seek help and what to ask
- Support to manage their own symptoms.

What is Pelvic Radiation Disease? Definition, terminology and coding

Definition

Pelvic Radiation Disease (PRD) is defined as one or more ongoing (chronic) symptoms of variable complexity that may affect people who have previously had radiotherapy to the pelvic region to treat their cancer. This includes pelvic radiotherapy for cancers of the colon, rectum, anus, prostate, testes, bladder, cervix, vagina, vulva and uterus, but also total body radiotherapy and radiotherapy in the pelvic area for other cancers such as lymphoma, sarcoma or secondary (metastatic) cancer.

Pelvic Radiation Disease symptoms arise because of damage to non-cancerous cells in the surrounding tissues, including one or more of:

- Gastrointestinal tract
- Urinary tract
- Reproductive and sexual organs
- Bone
- Vasculature
- Neurological systems such as Lumbosacral plexus and peripheral nerves
- Lymphatic system
- Skin

PRD differs from the acute side effects of radiotherapy. Acute symptoms often settle a few weeks after radiotherapy finishes but PRD can be defined as symptoms starting or continuing 3 months or more after the end of radiotherapy (**Figure A**). For some people, acute symptoms become chronic, but are no less severe. For some people, symptoms may begin suddenly or develop gradually many months, years or decades after radiotherapy.

Note that although pelvic radiotherapy will often be used alongside other forms of cancer treatment (surgery, chemotherapy, immunotherapy, hormonal treatments etc), which have their own profiles of potential late effects, this document does not cover symptoms which may be due to these.

Figure A. Features of Pelvic Radiation Disease (PRDA)

The following PRD features do not all appear together, and can range from mild to severe. Some are more common than others, but all tend to be under-recognised. Please see individual symptom sections for information on prevalence.

- Psychological consequences – stress, anxiety, depression, poor self-image and PTSD-type symptoms.
- Gastrointestinal (GI)⁴ – almost any GI symptom can be caused by radiotherapy, e.g. faecal incontinence, diarrhoea, urgency, constipation, rectal bleeding, pain, tenesmus, flatulence, reduced appetite, and malnutrition.
- Urinary – urgency, stress and urge incontinence, dysuria, and haematuria.
- Symptoms affecting genitalia, such as
 - vaginal bleeding and shrinkage, vulval pain
 - sexual difficulties
 - erectile dysfunction or ejaculatory failure
 - genital swelling (lymphoedema)
- Chronic primary and/or secondary pain (including fibromyalgia)
- Numbness, tingling weakness, paralysis
- Chronic fatigue
- Swelling (lymphoedema) in the lower limbs, lower abdomen and genital area
- Reduced mobility
- Blood circulation disorders
- Anaemia e.g. secondary to blood loss.
- Cutaneous features e.g. skin atrophy, hyperpigmentation and fibrosis
- Bone fractures, osteoporosis
- Hormonal symptoms e.g. hot flushes, vaginal dryness, mood changes
- Infertility
- Sleep disturbance

⁴ A full list of gastrointestinal symptoms can be found in 'The Practical Management of the Gastrointestinal Symptoms of Pelvic Radiation Disease'.

Pelvic Radiation Disease Terminology

The term ‘Pelvic Radiation Disease’ (PRD) is an over-arching one, and for each person affected it probably encompasses a unique combination of issues.

It is likely that professionals will wish to use more precise terms for individual organ symptoms (see **Figure B**) but there is no agreed, standard approach. This lack of standardisation is illustrated by the Wikipedia entries for **Radiation proctitis**, **Radiation colitis**, and **Radiation enteropathy**, by the results from a PRDA survey⁵ and in the inconsistencies in what terms have medical coding under ICD or SNOMED (**Table 1**).

Figure B. Terms that professionals currently (mid 2022) use to describe some of the chronic symptoms of Pelvic Radiation Disease

- | | |
|--|--|
| ■ Radiation enteritis | ■ Radiation cystitis |
| ■ Radiation proctitis | ■ Radiation cystopathy |
| ■ Radiation colitis | ■ Radiation-induced lumbar plexopathy |
| ■ Radiation enteropathy | ■ Pelvic insufficiency fractures |
| ■ Radiation proctopathy | ■ Radiation-induced pelvic vascular/arterial disease |
| ■ Radiation-associated vascular ectasia (RAVE) | ■ Late effects of pelvic radiotherapy |

However, it is recommended that, in addition to any organ-specific terms, the term ‘Pelvic Radiation Disease’ should be used in medical records and correspondence. This acknowledges that often more than one organ/tissue, as well as mental health, are affected, and this will encourage a multi-professional, holistic, long term condition approach to patient care.

PRDA recognises that for some people with symptoms, the term ‘Pelvic Radiation Disease’ may sound alarming. As there is no standardisation of terms, professionals may create confusion for patients by using the variety of terms in **Figure B**, or other newly-created terms. Therefore, careful explanation for the patient and their carers is needed.

The lack of consensus on terminology may impact on investigation and treatment choices by clinicians, may hold back research and education, and provides no incentive to address the spectrum of issues in people with PRD which seriously impact on their quality of life. It is hoped that this document will prompt wider debate in the health professional and PRD patient community about what language to use, and lead to greater standardisation.

⁵ Abstracts of the BSG Annual Meeting 2022 Gut 2022; 71(Suppl): A170 (poster 267)

Medical coding and search terms

The term 'Pelvic Radiation Disease' does not appear in the International Classification of Disease (ICD) or SNOMED codes, or Medical Subject Heading (MeSH) library search terms at the time of writing in mid 2022. **Table 1** gives codes that may be applicable.

ICD coding indicates that radiation proctitis/colitis should be standard terms – however the '-itis' suffix indicates localised inflammation in the gastrointestinal tract, but these terms do not acknowledge the complex co-existing ischaemic and fibrotic pathology of radiation-induced tissue damage.

The National Prostate Cancer Audit uses a range of diagnostic codes to identify people that are classified as having post-radiotherapy 'gastrointestinal complications' (indicating radiation toxicity) for their audit purposes. These codes are included in **Table 1**. For further information, see Appendix 4 of the **2021 National Prostate Cancer Audit report**.

PRDA welcomes any amendments to **Table 1** – please contact info@prda.org.uk.

Table 1. Diagnostic coding applicable to Pelvic Radiation Disease (not an exhaustive list)

Diagnostic terms in use	ICD-10 coding	ICD-11 coding	SNOMED coding
Gastro-intestinal			
Radiation enteropathy			235708000
Radiation enteritis			73817000
Radiation proctitis	K62.7	DB33.42	235760009
Radiation colitis		DB33.41	55809007
Chronic radiation colitis			235757002
Gastroenteritis and colitis due to radiation	K52.0		
Other specified/unspecified noninfective gastroenteritis and colitis	K52.8-9		
Anal/rectal fistula	K60.3-4		
Stenosis/haemorrhage/ulcer of anus and rectum	K62.4-6		
Other specified/unspecified disease of rectum and anus	K62.8-9		
Intestinal fistula	K63.2		
Vesicointestinal fistula	N32.1		
Urinary			
Radiation cystitis		GC00.Y	11251000
Chronic radiation cystitis			236629009
Sexual and fertility			
Post-radiation menopause			278064001
Infertility caused by radiation			53821008

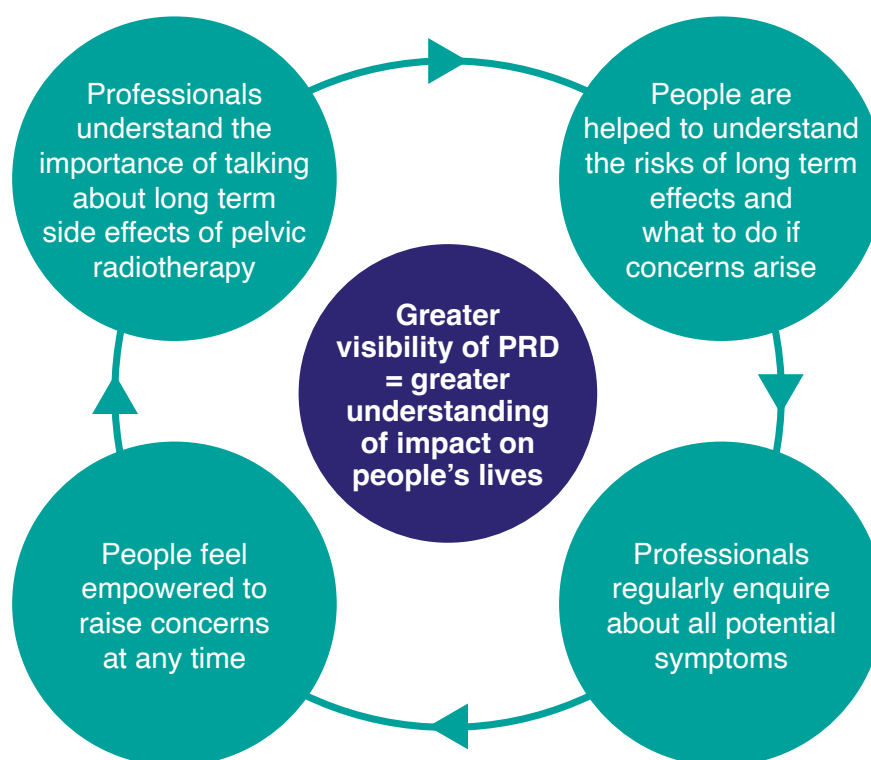
Table 1. **Diagnostic coding applicable to Pelvic Radiation Disease (not an exhaustive list)**

Diagnostic terms in use	ICD-10 coding	ICD-11 coding	SNOMED coding
Endocrine			
Premature ovarian insufficiency/failure			237788002
Neurological			
Radiation-induced lumbar plexopathy		8B92.0	724995009
Chronic Post Cancer Treatment Pain		MG30.11	
Bone			
Pelvic insufficiency fracture			702561005
Radiation injury to bone			109301001
Skin			
Chronic radiation keratosis		EK90	
Chronic effects of ionizing radiation on the skin		EJ71	
Chronic radiodermatitis following radiotherapy		EL61	
Vascular			
Radiation-induced pelvic vascular/arterial disease			
Lymphatic			
Lymphoedema			439128001
Psychological problems			
'Other specified fear of cancer'		MG24.0Y	
NB does not specify fear of cancer recurrence			
Anxiety about body function or health			
Single episode depressive disorder		6A70	
Recurrent depressive disorder		6A71	
Mixed depressive & anxiety disorder		6A73	
Generalised anxiety disorder		6B00	
Panic disorder		6B01	
Agoraphobia		6B02	
Social anxiety disorder		6B04	
Post traumatic stress disorder		6B40	
Generic			
Effects of radiation, not elsewhere classified		NF00	
Late effect of radiation			78523004

Let's start talking about Pelvic Radiation Disease!

This Best Practice Pathway document can only be of use if Pelvic Radiation Disease (PRD) symptoms are talked about and the impact on people's lives is understood. It is incumbent on health professionals to start conversations, as it is often stated that people are reluctant to mention embarrassing symptoms (Figure C).

Figure C. How to increase discussion about Pelvic Radiation Disease



Shared decision-making

Tailored information is an important part of shared decision-making, to make sure a person understands the risks of treatment, benefits and possible consequences⁶. Shared decision-making and clear shared experiences avoid future decisional regret.

Use numbers and words to communicate the probability of the risk the person has of potential late effects and how this balances against the benefits of treatment⁷. Also discuss ways of mitigating that risk during and after radiotherapy.

The timing and amount of information in discussing potential late effects is important in empowering people before treatment to inform action but also not to frighten or raise anxieties. Some people may prefer not to think about late effects during treatment so this needs to be reaffirmed at end of treatment and subsequently in primary care⁸.

⁶ NICE (2021) Shared Decision Making – NICE guideline.

⁷ Vromans RD et al (2020) Communicating tailored risk information of cancer treatment side effects: only words or also numbers? BMC Med Informatics and Decision Making 20, Article 277.

⁸ Boulton et al. (2015) A qualitative study of cancer survivors' responses to information on the long-term late effects of pelvic radiotherapy 1-11 years post treatment. European Journal of Cancer Care 24 p734–747.

Ensure that people understand the possibility of long-term problems after their pelvic radiotherapy⁹ and what to do should they have any concerns:

For example:

- **Radiotherapy consent forms** from the Royal College of Radiologists
- Information in accessible formats at various time points e.g.
 - Hospital patient booklets, **such as this one from Leeds**
 - Macmillan information in **different languages and formats**
- **End of Treatment Summary** which includes late effects information and contact details for any concerns (copied to person and their GP).

Ensure that people feel able, and are being helped, to talk about their symptoms after treatment

Consider permissions needed to discuss sensitive topics, and use open questions for exploring the person's priorities and goals for which symptoms may need managing first.

Assess health literacy and ensure all communications are individualised to age and cultural and other sensitivities.

Options for holding conversations include:

- Regular enquiry about all potential problems including mental health
- Person-centred conversations – “**What Matters To You?**”
- Use of personalised care approaches:
 - **Holistic Needs Assessments**
 - **Personalised Care and Support Planning** and
 - **Cancer Care Reviews in primary care**
- Questions such as:
 - Do you have any bowel problems that impact on your mood, social life, relationships, or any aspect of your daily life?”¹⁰
 - “Over the past two weeks has pain been bad enough to interfere with your day to day activities?” and “Over the past two weeks have you felt worried or low in mood because of this pain?”¹¹
- Patient-reported outcome (PRO) questionnaires
- Encourage people to complete the **Cancer Quality of Life Survey** at 18 months post-treatment (England) and obtain their personalised **summary report**
- Symptom checklists or diaries (see **Self Management section**)
- Signpost people to **peer support networks** such as the **PRDA online community** to help validate concerns.

⁹ In line with: Recommendations R7-R9 in **National Prostate Cancer Audit 2021 report**; Recommendation 1.2 in NICE guidance for colorectal cancer, and recommendations in the British Gynaecological Cancer Society guidelines for cervical and endometrial cancers

¹⁰ Taylor, S. et al (2016) **The Three-item ALERT-B Questionnaire Provides a Validated Screening Tool to Detect Chronic Gastrointestinal Symptoms after Pelvic Radiotherapy in Cancer Survivors**. Clinical Oncology 28 e139-e147.

¹¹ **Ask2Questions**. Faculty of Pain Medicine, Royal College of Anaesthetists (accessed 3 July 2022).

Be prepared – Five things for professionals to know

1 Know how to check for recurrence or progression of cancer, or a second primary cancer

Know the local/national clinical guidance and pathways.

Be aware that people on patient-initiated (self-managed) follow up should be able to get immediate access back to their oncology team.

2 Know how to have conversations with your patients

Conversations should be happening about treatment side effects at all stages in the pathway, but especially post-treatment when professionals need to find out what impact the radiotherapy has had – no matter how long ago the treatment happened. **See page 19**

3 Know how to use this Best Practice Pathway to manage symptoms

- Each section is self-contained and refers to pre-existing detailed clinical guidance published elsewhere where available
- Please note that management of pain is integrated into each section
- Be aware of how to manage symptoms outside of your specialty area – you may be able to provide support for these without the need for referral
- Always consider psychosocial needs

4 Know how to advise/signpost on:

Self-management of symptoms

Sources of information and advice

Sources of peer support

Advise according to need but especially check for needs* regarding:

- Diet and nutrition
- Toileting and continence
- Fatigue
- Mobility
- Mental health
- Social support
- Pain
- Sexual health
- Carer's needs

*See section on **Self Management**. Symptom diaries may be helpful.

5 How to make a referral to other services/clinics (outside of your specialty)

Establish connections and agree pathways with colleagues and services.

See section on **Optimising Referral Pathways**.

How to use the symptom diagnosis and management sections

Note that each of the following organ/symptom sections are not fully self-contained clinical guidance, but instead they point users to existing published guidance and best practice, and to sources of education, information and support where available.

If you have suggestions or amendments, please contact info@prda.org.uk.

Important

This document does NOT provide guidance on how to test if symptoms are due to recurrence or progression of cancer or a second primary cancer.

It is essential that recurrence or progression of cancer, or a second/subsequent primary cancer, are ruled out before proceeding to manage the symptoms listed in this document.

Holistic needs

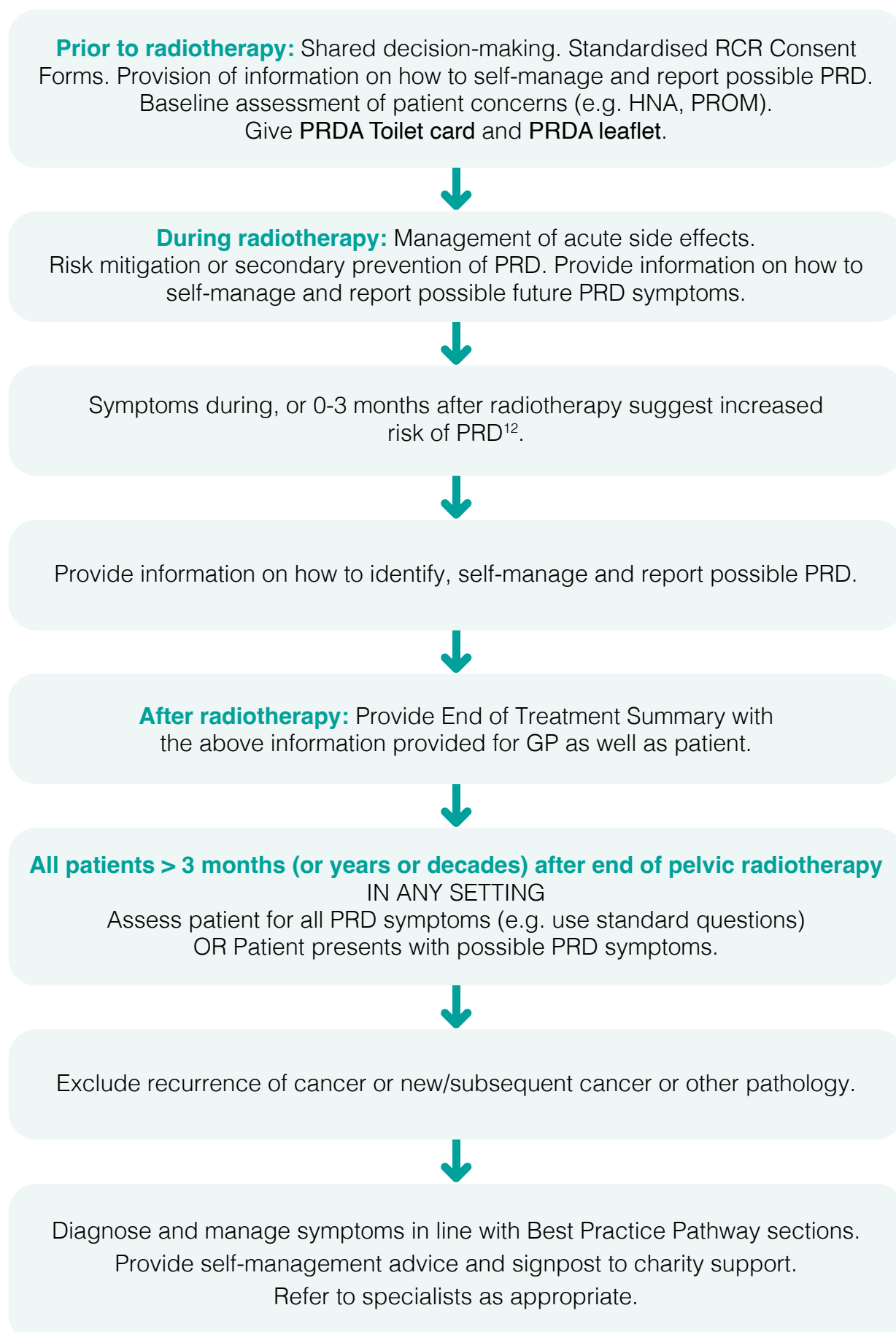
The following sections are designed to encourage professionals, whichever speciality or setting they work in, to consider each person's holistic needs and what actions could be taken to address problems across **all** their symptoms/issues. These are very likely to include psychosocial needs and the need for support for self-management, so the sections on **Mental Health** and Wellbeing and **Self Management** are recommended for everyone.

Layout of organ/symptom sections

Each organ/symptom section contains information on the following:

- Symptoms
- Incidence/Prevalence
- Identification
- Management guidance sources
- 'At a glance' summary box
- Table(s) of management guidance
- Service models, standards and professional education.

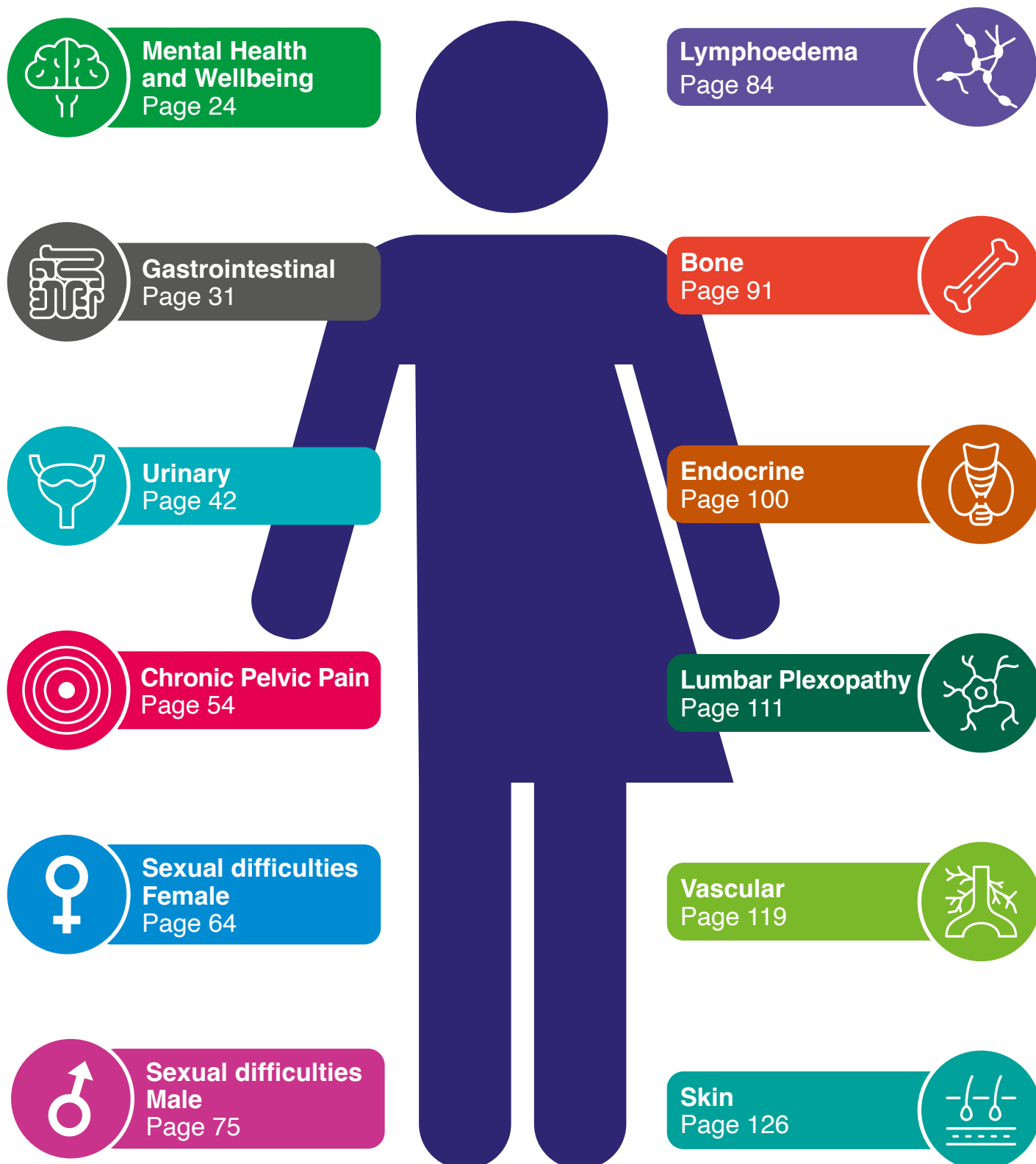
Figure D. **Best Practice Pathway outline**



¹² Ref Wedlake et al (2010) Predicting Late Effects of Pelvic Radiotherapy: Is There a Better Approach? IJROBP 78 p 1163-1170.

Best Practice Pathway Sections

Each section has a colour which is used on the edges of pages to aid navigation.



Mental Health and Wellbeing



“The biggest impact that PRD has had on me is the shock of being taken into hospital [*for symptoms of PRD*] after being given the all-clear. When you realise that the radiotherapy has caused such serious issues, your mental health just plummets, because it’s so unexpected.”

Rebecca, living with Pelvic Radiation Disease

“The role of psychological support in oncology is huge as soon as you put it on a par with the physical aspects of medicine.... we wouldn’t give people chemotherapy without anti-sickness drugs, so why would we treat someone with a disease which clearly has significant psychological impact, without offering psychological support.”¹³

Dr Matthew Williams, Consultant Clinical Oncologist,
Imperial College Healthcare NHS Trust

¹³ Healthy London Partnership and Macmillan Cancer Support Commissioning guidance for cancer psychosocial support: a guide to improving psychologically informed care and clinical outcomes for adults affected by cancer in London (2020).

Pelvic Radiation Disease (PRD) pathways should integrate physical symptom management and psychological support.

PRD can have a huge emotional impact on people that can range from mild to moderate concerns through to being a significant contributory factor for longer term mental health problems, including post-traumatic stress disorder (PTSD). PRD symptom severity is significantly associated with poorer overall quality of life and higher levels of depression¹⁴.

People often describe the psychological and emotional impacts of PRD as encompassing:

- decisional regret
- anxiety
- depression
- shame
- disgust
- changes in body image
- changes in sense of self
- feeling grateful for receiving life-saving treatment but guilt at seeking help for its consequences.
- adverse response to traumatic events either related to treatment or its consequences
- anger or relief at the often-delayed diagnosis of PRD
- additional difficulties for people with pre-existing mental health needs and/or cognitive difficulties (learning disabilities, autism, dementia, cancer-related fatigue, cancer-related cognitive changes).

The physical consequences of PRD increase the risk of mental health difficulties¹⁵. Investigations and treatments to the pelvic region can be traumatic and can compound pre-existing problems.

The impact on relationships and quality of life of both infertility and incontinence in social and sexual domains can be devastating, not only for the person with PRD, but also for their loved ones and their quality of life. For example, the anxiety of potential incontinence can lead people to be more withdrawn, sleep in a separate bed, stop seeing family members and friends or even experience severe challenges leaving their house.

¹⁴ Adams, E. et al (2014) *The Effects of Pelvic Radiotherapy on Cancer Survivors: Symptom Profile, Psychological Morbidity and Quality of Life*. Clinical Oncology 26(1) 10-17.

¹⁵ Niedzwiedz, C. et al (2019), *Depression and anxiety among people living with and beyond cancer: a growing clinical and research priority*. BMC Cancer, 19:943.

A 3-level framework for psychosocial care for those affected by (or at risk of) PRD

In line with the Macmillan–London TCST model, three levels of psychosocial support and care should be available: universal, enhanced and specialist¹⁶. Staff should be trained and supervised accordingly. Care can be offered pre-radiotherapy ('prehabilitation')¹⁷ and this provides continuity of psychosocial support from diagnosis through to post treatment. Early, proactive psychosocial care can reduce the likelihood of concerns becoming exacerbated or entrenched to the degree of needing a mental health specialist's input.

1. Offer everyone with PRD 'universal' psychosocial care:

- May be delivered by any level of staff including non-clinically trained, in all settings
- Should include
 - holistic needs assessment and personalised care and support planning
 - health and wellbeing information and support with focus on self-management (See **Self Management** section of this document.)
 - end of treatment summary
 - signposting to third sector support: the **Pelvic Radiation Disease Association** and other charities play a crucial role with access to resources, advice and peer support communities that can be vital in helping with adjustment to life with PRD, and how to cope with the psychosocial consequences.

2. For people with mild to moderate distress, provide or refer them to services at 'enhanced care' level:

- typically supported by staff with 'level 2' psychological skills¹⁸
- often delivered by Clinical Nurse Specialists (CNS) and Allied Health Professionals (AHPs) and within existing, trusting care relationships
- **IAPT (talking therapy) services** in England by referral or self-referral. IAPT teams may have long-term condition specific services which may be appropriate for people with PRD with milder anxiety and/or depression¹⁹.

IAPT may be appropriate for:

- people whose cancer is in remission and/or is 'in the background'
- people whose physical symptoms are well-managed
- where there are few routine hospital contacts
- where a uni-professional approach is appropriate to address mild to moderate problems of anxiety or low mood.
- Psychosexual clinics and other organisations such as **Relate** may also be beneficial. (See **Self Management** section of this document.)

¹⁶ Healthy London Partnership and Macmillan Cancer Support (2020) Commissioning guidance for cancer psychosocial support: a guide to improving psychologically informed care and clinical outcomes for adults affected by cancer in London.

¹⁷ Macmillan Cancer Support (2019). Prehabilitation for people with cancer: principles and guidance for prehabilitation.

¹⁸ National Institute for Health and Care Excellence. Guidance on Improving Supportive and Palliative Care for Adults with Cancer (2004).

¹⁹ NHS England. The Improving Access to Psychological Therapies (IAPT) pathway for people with longterm physical health conditions and medically unexplained symptoms (2018).

3. For people with moderate to severe psychological needs or where distress is related to more complex symptoms, refer to psycho-oncology specialist care:

- teams offer a range of interventions, usually within the acute hospital setting, regarding:
 - decision-making and accessing investigations or treatment
 - anxiety, depression and more complex reactions to traumatic experiences
 - complex adjustment to disease and treatment-related functional changes such as incontinence or sexual changes
 - cognitive and behavioural aspects of managing physical symptoms, such as pain and fatigue, amongst many others.
- If a person has (usually pre-existing) severe mental health difficulties, check whether they are already under the care of a mental health team who are often able to advise. Otherwise, liaise with their GP regarding appropriate further care. Mental Health Liaison Teams may be able to see inpatients, if needed.

How to integrate optimal psychosocial care into other PRD symptom pathways

Follow the five principles in Table 2.

- The overall aim is:
 - prevention of distress and promotion of adjustment
 - use both proactive and reactive approaches
 - integrate care at every point in a person's pathway.
- Ensure you are aware of all existing services and pathways, including what can be offered by cancer teams, primary care and the third sector.
- Allow for:
 - people needing different kinds of support at different times, including many years after cancer treatment.
 - people not proceeding through 'universal', 'enhanced' and 'specialist' support in a linear fashion.
 - support being accessible via secondary, primary and community care settings and through self-referral/self-management.

Well-coordinated multi-disciplinary teams (MDTs), with professionals working together are able to give parity of esteem to mental health and enable psychosocial care to be embedded and accessible throughout the cancer pathway. Leadership and training to help establish this should be provided by psycho-oncology services.

When designing integrated, multi-disciplinary services/pathways for people with long-term side effects of cancer treatment, optimal care will be supported by drawing on evidence-based behavioural science and psychological models of adjustment^{20,21}. All elements of the service/pathway should aim to maximise a person's autonomy, belonging and competence in coping.

²⁰ Brennan J and Moynihan C (2004) Cancer in Context: A practical guide to supportive care. Oxford University Press.

²¹ Zhao, c. et al (2021) The effects of acceptance and commitment therapy on the psychological and physical outcomes among cancer patients: A meta-analysis with trial sequential analysis Journal of Psychosomatic Research 140 p110304.

Table 2. Five principles for psychosocial care for people with Pelvic Radiation Disease

Key Principle	Rationale	Actions for improved psychosocial support
1 Focus on shared decision-making, quality of life and self-management	<p>Shared decision-making²², skilled communication and clear and shared expectations of treatment and its consequences are key to avoid decisional regret and ensure decisions are aligned with the person's priorities, particularly in the context of evidence that healthcare professionals and patients can be overly optimistic in such conversations²³.</p>	<ul style="list-style-type: none"> ■ Focus on person's goals and priorities for living well. ■ Use of shared decision-making principles (NICE Guidance). ■ Attention to impact on quality of life (QoL) of treatment, behaviour change and self-management work used in design, education and planning.
2 Early detection of psychosocial needs, mental health difficulties and cognitive difficulties	<p>Early identification of need, particularly depression and a lack of confidence to manage illness-related problems (low self-efficacy), is crucial to prevent concerns escalating in severity^{24,25}.</p> <p>This is particularly important for people with a previous history of significant mental health needs or cognitive difficulties. There is increasing evidence that psychosocial factors before treatment, particularly depression and a lack of confidence to manage illness-related problems (low self-efficacy), are as important as stage of disease for predicting people's long-term recovery of health and wellbeing after cancer treatment.</p>	<ul style="list-style-type: none"> ■ Screening and early detection of psychosocial needs to enable proactive care planning and consultation with relevant teams. ■ Particular attention to people more likely to face health inequalities, such as those with learning disabilities, pre-existing or severe mental health needs, or people from Black, Asian and minority ethnic backgrounds. ■ Early access to universal support such as that provided by PRDA and other charities can also be key.

²² National Institute for Health and Care Excellence. Shared decision making NICE guideline NG197 (2021).

²³ Tanco et al (2015), Patient perception of physician compassion after a more optimistic vs a less optimistic message: a RCT. JAMA Oncology, 1(2), 176-183

²⁴ University of Southampton Macmillan Survivorship Research Group. Personalising care for people with bowel cancer. Key findings from the Colorectal Wellbeing (CREW) study (2020). Accessed 18 September 2022.

²⁵ Foster C, et al (2019). HORIZONS protocol: a UK prospective cohort study to explore recovery of health and wellbeing in adults diagnosed with cancer. BMJ Open 9:e029662

Key Principle	Rationale	Actions for improved psychosocial support
3 Early availability of Level 2 psychological skills, resources and information	With appropriate training and supervision, healthcare professionals such as CNSs and AHPs, including those in Late Effects services, can provide enhanced support assessment and Level 2 psychological interventions, all provided in the context of skilled communication.	<ul style="list-style-type: none"> ■ Training in Level 2 psychological assessment and intervention skills, e.g, for CNSs and AHPs. ■ See Haque (2020)²⁶ for some suggestions for GPs. ■ Signposting to appropriate resources.
4 Access to specialist interventions	Early case conceptualisation of psycho-social needs, and facilitation of access to appropriate psychological care.	<ul style="list-style-type: none"> ■ Early referral to specialist services should have minimal barriers. ■ Case conceptualisation via clinical supervision and Level 2 psychological skills training. ■ Onwards referrals to community services for targeted interventions and to psycho-oncology services for specialist interventions.
5 Attention to social context – people’s social support and of the impact on family members	<p>Supportive relationships can mitigate and act as psychological “shock-absorbers” for the difficulties people face.</p> <p>PRD can also have significant effects on loved ones, so psychosocial support for partners and relatives in their own right and helping them to support the person with PRD can be key.</p> <p>It is also important to ensure wider social support is available in person or virtually, for example via the PRDA peer support community.</p>	<ul style="list-style-type: none"> ■ Social support enquired about and the impact on relationships attended to. ■ Access to services and support that maximise social support for people and their loved ones (e.g. from PRDA).

²⁶ Haque, S. Top tips: mental health and cancer in adults (2020). Accessed 18 September 2022.

Gastrointestinal



“My bowel symptoms are increased frequency, urgency, tenesmus, variable stool consistency and excessive wind. I was diagnosed with bacterial overgrowth (SIBO) but antibiotics did not help. I became increasingly upset and was prescribed anti-depressant medication [...]. Some days I find it difficult to contemplate leaving the house, and every single day I have to plan everything around how my bladder and bowel might ‘misbehave’ that day.”

Willie, living with Pelvic Radiation Disease

“The after effects of the radiotherapy were severe and left me with Pelvic Radiation Disease. I developed serious bleeding from my bowel, becoming anaemic. My health crashed. Eventually I underwent hyperbaric oxygen therapy which helped control my symptoms.”

Tim, living with Pelvic Radiation Disease

Symptoms

Long-term changes in gastrointestinal (GI) function impacting quality of life after pelvic radiotherapy treatment for cancer are common²⁷. Almost any GI symptom can be caused by radiotherapy, but the most common symptoms are faecal incontinence, diarrhoea, urgency, rectal bleeding, pain, tenesmus, reduced appetite and malnutrition.

Incidence and Prevalence

Because of the wide variation in severity and onset, it is difficult to estimate the true prevalence and incidence. The incidence has been estimated to be between 2% and 20% according to the type of cancer and the radiation dose received²⁸. The National Prostate Cancer Audit reports that 11% (range 0 to 23%) of people treated for prostate cancer with radical radiotherapy experience at least one gastrointestinal complication requiring a procedural/surgical intervention within two years²⁹. A study published in 2014 found that 59% of women and 45% of men had bowel urgency after pelvic radiotherapy, and that symptoms were just as frequent between 6 to 11 years as in the first 1 to 5 years after treatment³⁰. Symptom severity was significantly associated with poorer overall quality of life and higher levels of depression.

Identification

GI symptoms often occur during or soon after radiotherapy, and usually resolve in 1 to 3 months. Severe problems during radiotherapy can be a predictor of long term problems. Radiation-induced enteropathy causing chronic GI problems can occur many months, years or even decades after treatment³¹.

Management guidance sources

Studies have shown that a systematic approach is beneficial when seeking to identify, diagnose and manage GI symptoms associated with pelvic radiotherapy^{32,33}. This document reflects this approach and is based on the 'The Practical Management of the Gastrointestinal Symptoms of Pelvic Radiation Disease'³⁴ which is available in **printable format** from Macmillan and is referred to in the text below as the 'PRD GI Guidance'.

Gastroenterology professionals who are managing complex cases should refer directly to this **PRD GI Guidance** rather than follow the abbreviated guidance in this document.

Please note that this document does not cover stoma care.

²⁷ Ludlow H. Gastrointestinal symptoms of pelvic radiation disease (part 2): impact on patients and carers. *Gastrointestinal Nursing* 2020 18:3, 44-49

²⁸ Dalsania R et al (2021). Management of Long-Term Toxicity From Pelvic Radiation Therapy. *American Society of Clinical Oncology Educational Book* 2021 :41, 147-157

²⁹ National Prostate Cancer Audit. *NPCA Annual Report 2021*.

³⁰ Adams E, et al (2014) The Effects of Pelvic Radiotherapy on Cancer Survivors: Symptom Profile, Psychological Morbidity and Quality of Life. *Clinical Oncology* 26:1, p10-17.

³¹ Dörr, W. and Hendry, J.H., (2001). Consequential late effects in normal tissues. *Radiotherapy and oncology*, 61(3), p223-231.

³² Andreyev, H.J.N. et al (2013). Algorithm-based management of patients with gastrointestinal symptoms in patients after pelvic radiation treatment (ORBIT): a randomised controlled trial. *The Lancet*, 382 (9910), p2084 – 2092.

³³ Muls, A., et al (2020). A proposed tailored investigational algorithm for women treated for gynaecological cancer with long-term gastrointestinal consequences. *Support Care Cancer* 28, p4881–4889.

³⁴ Andreyev, H.J.N. et al (2015) Guidance: The practical management of the gastrointestinal symptoms of pelvic radiation disease. *Frontline Gastroenterol* 6 (1) p53-72.



At a glance Chronic GI Symptoms after Pelvic Radiotherapy

- Assessment and good history-taking are key.
- It is important to rule out recurrence but also second primary cancers.
- See flow chart steps below for management advice.
- Holistic care – the person is likely to have other PRD symptoms and mental health needs.

Rectal bleeding

Haemorrhage is an emergency if severe.

Other rectal bleeding – refer to Gastroenterology or the **PRD GI Guidance**.

Dietary or medication causes

May be managed in primary care/oncology but if symptoms remain for more than 3-6 months after radiotherapy with conservative management then refer to Gastroenterology or Late Effects service.

Self-management techniques are helpful. (see **Self Management** section)

Complex problems

Refer to Gastroenterology or Late Effects service who should use the full algorithmic approach to diagnosis and treatment in the **PRD GI Guidance**.

Suspected obstruction, perforation or infection need urgent referral to Gastroenterology and/or Colorectal team. See also Step 1 on **page 35** re emergency and urgent situations.

Six Step Approach to Chronic Radiation-Induced GI Problems

Step 1 – Exclude emergency/urgent causes

If any of the following is suspected or known

Action required

Acute GI side effects due to infection, perforation, haemorrhage or bowel obstruction

EMERGENCY – requires immediate attention if severe

Recurrent cancer
New primary cancer

Refer urgently to the relevant cancer team or pathway per local guidelines.

Currently undergoing cancer treatment

Refer/consult with cancer team or Acute Oncology service

Step 2 – Use ALERT-B TRIGGER³⁵ questions to ascertain impact on daily life

Ask these questions regularly to any patient who has had pelvic radiotherapy.

If any reply is 'YES' then proceed to Step 3 onwards.

If all replies are 'NO' then offer supportive **Self Management** advice.

1. Are you woken up at night to have a bowel movement?
2. Do you need to rush to the toilet to have a bowel movement?
3. Do you ever have bowel leakage, soiling or a loss of control over your bowels?
4. Do you have any bowel symptoms preventing you from living a full life?

If considering a diagnosis of PRD affecting the GI system, it may be prudent to ask about the following symptoms:

- | | |
|-------------------|--------------------------|
| ■ Abdominal pain | ■ Constipation/diarrhoea |
| ■ Rectal pain | ■ Faecal incontinence |
| ■ Tenesmus | ■ Passage of mucus |
| ■ Rectal bleeding | ■ Nocturnal defecation |

Review the person's Holistic Needs Assessment/Personalised Care and Support Plans and/or End of Treatment Summary.

³⁵ Taylor, S. et al (2016) The Three-item ALERT-B Questionnaire Provides a Validated Screening Tool to Detect Chronic Gastrointestinal Symptoms after Pelvic Radiotherapy in Cancer Survivors. Clinical Oncology 28 e139-e147.

Step 3 – If a person has rectal bleeding

See Step 1 – Haemorrhage (if severe) is an EMERGENCY and should be investigated immediately

Other rectal bleeding should always be investigated at least with flexible sigmoidoscopy to determine the cause and contributing factors. However, it is common and usually mild. For clinical management see the **PRD GI Guidance**.

Step 4 – Medical History and Diet

a) Identify and rule out any possible drug-induced GI side effects.

Common offending agents include:

- constipating medications such as opioids, anti-muscarinics, anti-emetics e.g. ondansetron and loperamide, and some anti-depressants e.g. fluoxetine, and amitriptyline.
- medications with a GI side effect profile such as proton pump inhibitors, broad spectrum antibiotics, iron supplements, metformin and selenium supplements.

A full medication reconciliation is recommended and local pharmacy advice sought where appropriate.

b) Identify any potential dietary causes including excessive fibre intake, caffeine, alcohol and foods with known laxative effects e.g. prunes, sorbitol etc. Sorbitol is in chewing gum and in nicotine gum for smoking cessation.

Proceed to management and referrals guidance on page 37

Step 5 – Basic treatment

Step 6 – Complex management and referral

Management and Referrals for Chronic Radiation-Induced GI Problems

Step 5 – Basic treatment

This will usually be alongside self-management of diet, toileting position and technique, pelvic floor exercise and stress and anxiety (**see Self Management section**).

- a) **Constipation or tenesmus** – Laxative therapy. Non-fermentable stool bulking agents and fibre supplements. Fluid management.
- b) **Excessive flatulence** – Non-fermentable fibre supplement such as Normacol (sterculia).
- c) **Diarrhoea and nocturnal defecation** – Take all reasonable measures to address any underlying causes using the PRD GI Guidance (page 15 of the **Macmillan version**). See note re use of loperamide below.

Loperamide can be used in cases of chronic diarrhoea where infective or inflammatory causes have been excluded. Liquid loperamide allows for finer dose titration than tablets allow. Higher doses may be used, but only under specialist guidance. Using smaller doses of Loperamide liquid (0.5 – 1mg) half an hour before meals can be helpful as it reduces the gastro-colic reflex, which is triggered by eating. An additional dose before bed-time or half an hour before leaving home may also be useful.

- d) **Pain** – It is important that abdominal pain is investigated appropriately, because if any underlying condition is managed effectively, the pain may settle. Hence, use the **PRD GI Guidance** to rule out any treatable causes of pain, such as constipation, small intestine bacterial overgrowth (SIBO), bile acid diarrhoea (BAD), gastritis etc.

Abdominal massage, TENS machine, acupuncture, relaxation, distraction and mindfulness techniques and avoiding perfumed soap in anal area may be of benefit.

Pharmacological pain management:

- For painful cramps/spasms/colic before, during or after a bowel movement – anti-spasmodic including buscopan, mebeverine or peppermint oil/tea.
- For anal/perianal pain when opening their bowels – local anaesthetic gels +/- a topical steroid, topical nitrate such as glyceryl trinitrate (GTN) or a topical calcium channel blocker (e.g. diltiazem cream).
- If symptoms persist, referral to a colorectal surgeon may be needed to consider more invasive options.
- If pain is severely impacting mood, QoL and function, referral may be indicated – pain team and/or pelvic floor physiotherapist.

Step 6 – Complex Management and Referral

If symptoms do not improve by using Steps 3 to 5 or **Self Management**, there are 2 main options:

- a) If you are in a position to use the full diagnostic and treatment algorithm in the **PRD GI Guidance**, please follow the steps within it carefully.

The guidance requires access to a range of tests including endoscopy, hydrogen breath testing and SeHCAT scanning and therefore would normally be undertaken by a hospital-based team. However, blood or stool tests could be initiated from primary care to save time – see the **PRD GI Guidance** for the appropriate circumstances. Breath testing is available in home testing kits.

OR

- b) Refer directly to an appropriate gastroenterology, colorectal or oncology team, or Late Effects of Radiotherapy service, ideally to professionals with prior experience of managing GI symptoms of Pelvic Radiation Disease who are an agreed referral route.

PRDA holds a partial list of clinics/clinicians – please email info@prda.org.uk.

Consider further referrals to dietetics, continence services, physiotherapy, pain team and psychology to manage the impact of GI symptoms – again, ideally to professionals with prior experience of managing GI symptoms of Pelvic Radiation Disease who are an agreed referral route.

Service Models, Standards and Professional Education

Service models for GI consequences of radiotherapy

- While there is no standardised service model, several well-established UK services that routinely treat GI consequences of radiotherapy have shown that many GI symptoms can be managed by trained nurses^{36,37}, dietitians or therapeutic radiographers³⁸, with support from medical professionals. However, it is much more common for gastroenterology doctors to manage patients as part of routine duties³⁹.
- Professionals treating GI consequences of radiotherapy should take a holistic view and assess for psychological issues, pain, and urinary, sexual and other problems as described in this document, and manage or refer accordingly.
- The NHS England **Service Specification for external beam radiotherapy** (2019) states: (section 2.6) “It is the responsibility of all the radiotherapy providers to prevent and minimise late effects through better targeted treatments, provision of information and the management of acute side effects. The vast majority of people that develop late effects following radiotherapy treatment should be managed locally as an integral part of rehabilitation or as part of locally stratified follow-up care pathways. These should include options for referral to local specialties/ services that have expertise to manage more common late effects. However, it is expected that specialist late effects centres will manage and co-ordinate the provision of specialist services for complex late effects of cancer treatments, and align to specialist cancer surgery and other treatment pathways as they arise.”
- **NICE guidance for prostate cancer**: ‘Section 1.3.42 Offer people with signs or symptoms of radiation-induced enteropathy care from a team of professionals with expertise in radiation-induced enteropathy (who may include oncologists, gastroenterologists, bowel surgeons, dietitians and specialist nurses)’. There are very few services that would appear to meet this multi-disciplinary model. The most well-known is within the Royal Marsden Hospital GI and Nutrition team⁴⁰.
- The above standard is also in the British Gynaecological Cancer Society **guideline for uterine cancer**⁴¹.
- The **Northern Ireland Cancer Strategy 2021– 2031** includes management of the GI side effects of pelvic radiotherapy.
- Referral may be needed to a Hyperbaric Oxygen (HBO) service. The ability to access HBO therapy on the NHS across the UK is very unclear.
 - Note the **NHS England clinical commissioning policy 2018** states that HBO therapy is not routinely commissioned for soft tissue radiation damage in patients with a history of pelvic irradiation for malignant disease.
 - Contact **DDRC Healthcare** for advice on what conditions they treat and what is funded on the NHS.

³⁶ Gee, C, Andreyev J and Muls A (2018) Developing advanced clinical practice skills in gastrointestinal consequences of cancer treatment. *British Journal of Nursing* 27(5), p237-247.

³⁷ Ludlow H, et al (2017). **Late gastrointestinal effects of pelvic radiation: a nurse-led service**. *British Journal of Nursing* 26(4), S15-S22.

³⁸ Grant Z (2021) ‘Late effects of radiotherapy’ a blog for MEDRADRESEARCH Accessed 18 September 2022.

³⁹ Gadhok R, et al. (2020) Gastrointestinal consequences of cancer treatment: evaluation of 10 years’ experience at a tertiary UK centre. *Frontline Gastroenterology* 12 p471-477.

⁴⁰ Muls AC, et al (2016) The holistic management of consequences of cancer treatment by a gastrointestinal and nutrition team: a financially viable approach to an enormous problem? *Clinical Medicine* 16 (3), p240-246.

⁴¹ Morrison J, et al (2021) **British Gynaecological Cancer Society (BGCS) uterine cancer guidelines: Recommendations for practice**. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, 270, p50-89.

Suggested service quality standards and clinical audit measures

Service quality standards

The following standards and audit measures/recommendations are from cancer management guidelines and a national cancer audit. This therefore underlines the importance of GI professionals and oncology teams together co-creating clear referral and care pathways (see section on **Service models and service development**), and the development of specialist gastroenterology services for management of GI symptoms of PRD⁴².

- **NICE guidance for prostate cancer:** ‘1.3.44 Carry out full investigations, including flexible sigmoidoscopy, in people who have symptoms of radiation-induced enteropathy to exclude inflammatory bowel disease or malignancy of the large bowel and to ascertain the nature of the radiation injury. Use caution when performing anterior wall rectal biopsy after brachytherapy because of the risk of fistulation’.
- **NICE quality statement for prostate cancer** “People with adverse effects of prostate cancer treatment are referred to specialist services.”
- Note that the above clinical management principles enshrined within NICE Prostate cancer guidance may be applicable for other pelvic cancers.
- **British Gynaecological Cancer Society guideline for uterine cancer:** ‘Prevention, identification and management of complications, late effects and quality of life issues following a cancer of the uterus diagnosis and treatment are essential part of personalised care’, and ‘Patients with signs of radiation-induced enteropathy should have access to care from a team of professionals who may include oncologists, gastroenterologists, bowel surgeons, therapeutic radiographers, dieticians and specialist nurses’.

Clinical Audit Measures

- NICE guidance for prostate cancer. **Quality statement 4: Managing adverse effects of treatment** “People with adverse effects of prostate cancer treatment are referred to specialist services.” Measured as the proportion of people with adverse effects of prostate cancer treatment referred to specialist services. Numerator – the number in the denominator referred to specialist services. Denominator – the number of people with adverse effects of prostate cancer treatment.
- National Prostate Cancer Audit⁴³. The **2021 report** of the National Prostate Cancer Audit gives a recommendation and a performance indicator:
 - Recommendation 6: Consider establishing radiotherapy centre specialist gastrointestinal services to offer advice to people with bowel-related side effects of radiotherapy. Identification of these side-effects could be improved with the initiation of hospital-level PROMs programmes.
 - Performance Indicator no.4 ‘Proportion of patients receiving a procedure of the large bowel and a diagnosis indicating radiation toxicity (gastrointestinal (GI) complication) up to 2 years following radical prostate radiotherapy (data presented at the level of the **radiotherapy centre**)’.

⁴² Note there are close similarities in terms of patient need for services for post-colorectal cancer surgery Lower Anterior Resection Syndrome (LARS), therefore collaboration with colorectal teams would also be recommended.

⁴³ National Prostate Cancer Audit website accessed 18 September 2022

Professional Training and Education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

NICE guidance for prostate cancer recommends: '1.3.43 Include the nature and treatment of radiation-induced enteropathy in training programmes for oncologists and gastroenterologists'.

At the time of writing (mid 2022), there are no accredited UK-based courses or online education modules for managing the GI effects of PRD. In general, UK health professional oncology and gastroenterology societies do not provide guidance or education on this topic. The British Society of Gastroenterology produced general guidance on the GI effects of cancer treatments in 2012⁴⁴ but, at the time of writing (mid 2022), the topic is not part of the society's clinical guidelines.

The **Royal Marsden School** offer an occasional study day led by the Royal Marsden GI and Nutrition team. Contact school@rmh.nhs.uk.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 '**Late Effects of Radiotherapy: a Patient's Perspective**'.

An e-learning tool for therapeutic radiographers on pelvic radiotherapy late effects is being developed but is not yet publicly available⁴⁵.

Key Clinical Guidance Reference:

The **PRD GI Guidance** (formatted for ease of reading and printing by Macmillan) was initially published in *Frontline Gastroenterology*⁴⁶.

⁴⁴ Andreyev HJ, et al (2012) Practice guidance on the management of acute and chronic gastrointestinal problems arising as a result of treatment for cancer. *Gut* 61 p179-192.

⁴⁵ Oliver L, et al (2021). A novel e-learning tool to improve knowledge and awareness of pelvic radiotherapy late effects: qualitative responses amongst therapeutic radiographers. *BJR Open* 3:1.

⁴⁶ Andreyev HJ, et al (2015) **Guidance: The practical management of the gastrointestinal symptoms of pelvic radiation disease.** *Frontline Gastroenterol* 6(1) p53-72.

Urinary





My problems with my bladder began about a year after my treatment. One day I was fine, the next I wet myself. It began to happen more regularly and then I started to have pains almost like I had an infection. I was initially given antibiotics for thrush but they eventually referred me to a bladder specialist [...]. I was told that I had an over-reactive bladder due to scarring caused by my cancer treatment.”

Jess, contributor to the ‘I Want My Life Back’ report

Symptoms

Due to the proximity of pelvic cancers to the bladder, radiation treatment can cause radiation cystitis, lower urinary tract symptoms (LUTS), urinary incontinence, fistulae and strictures and lead to secondary malignancies. Urinary symptoms are not only debilitating, but they also impact on quality of life and contribute to poorer mental health and psychological distress^{47,48}.

Incidence and Prevalence

Radiation changes to the pelvis can occur during radiotherapy, continue afterwards, or emerge years later^{49,50}. The prevalence of urinary symptoms in PRD ranges from 3.7% to 52% dependent on extent of disease and type of treatment^{51,52}.

Identification

Cystitis and haemorrhagic symptoms often occur during or soon after radiotherapy, and usually resolve in 1 to 3 months. Radiation-induced fibrosis causing urinary late effects can occur many months, years or even decades after treatment.

Management guidance sources

There is currently a lack of evidence on the management and treatment of radiation-related changes to urinary function, and no comprehensive published guidance. Therefore, this section goes into more clinical management detail than other sections of the Best Practice Pathway.

Please note that this document does not cover stoma care.

⁴⁷ Leddy, L. S. (2018). Management of Lower Urinary Tract Symptoms After Pelvic Radiation in Females. *Curr Urol Rep* 19(12) p106.

⁴⁸ Wilding, S. et al (2019). Cancer-related symptoms, mental well-being, and psychological distress in men diagnosed with prostate cancer treated with androgen deprivation therapy. *Qual Life Res* 28(10) p2741-2751.

⁴⁹ Kim, S. et al (2013). Severe genitourinary toxicity following radiation therapy for prostate cancer--how long does it last? *J Urol* 189(1) p116-121.

⁵⁰ Bosch, R., et al (2020). "Can radiation-induced lower urinary tract disease be ameliorated in patients treated for pelvic organ cancer: ICI-RS 2019?" *Neurourol Urodyn* 39 Suppl 3: S148-S155.

⁵¹ Liberman, D. et al (2014). Urinary adverse effects of pelvic radiotherapy. *Transl Androl Urol* 3(2) p186-195

⁵² Lobo, N. et al (2018). Urologic Complications Following Pelvic Radiotherapy. *Urology* 122 p1-9.



At a glance Chronic Urinary Symptoms after Pelvic Radiotherapy

- Assessment is key – bladder diary, symptom questionnaires (IPSS⁵³ and ICIQ-SF⁵⁴) and other tests.
- It is important to rule out recurrence but also second cancers.
- Review the person's Holistic Needs Assessment/Personalised Care and Support Plans and/or End of Treatment Summary.
- See tables 3, 4 and 5 for full details of management advice.

LUTS⁵⁵

Can be managed in primary care but if symptoms remain for more than 3-6 months after radiotherapy with conservative management then refer to Urology – **Table 3 See Self Management section.**

Haematuria

Can be a difficult problem to manage in primary care and often needs referral to Urology – **Table 4.**

Complex problems

Suspected strictures and fistulae need urgent referral to a Urology team, ideally with experience in managing radiation-induced disease – this may require a tertiary referral – **Table 5.**

⁵³ International Prostate Symptom Score form, accessed from the following webpage

https://www.baus.org.uk/patients/conditions/9/prostate_symptoms_bladder_outlet_obstruction 14 April 2022. (accessed 18 September 2022)

⁵⁴ International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) (accessed 18 September 2022)

⁵⁵ Faithfull, S., et al (2015). Integrative review on the non-invasive management of lower urinary tract symptoms in men following treatments for pelvic malignancies. Int J Clin Pract. 69(10): p1184-1208.

Table 3: Lower Urinary Tract Symptoms (LUTS)

Note: Patient education prior to/during radiotherapy re pelvic floor muscle training and avoidance of caffeinated drinks.

*Referral to Urology should ideally be to a consultant or team known to be experienced in radiation cystopathy

History

- Symptom questionnaires IPSS and ICIQ-SF
- 3-day bladder diary
- Length of time since radiotherapy
- Comorbidities
- Existing medication

Reported symptoms

Storage symptoms

- Urinary frequency
- Urgency
- Urinary and stress incontinence
- Nocturia
- Pain with a full or filling bladder

Voiding symptoms

- Post micturition dribble
- Slow stream
- Hesitancy and straining to pass urine
- Pain due to bladder spasm

Post micturition symptom

- Feeling of incomplete emptying post micturition
- History of multiple UTIs

Assessment

Storage symptoms

- Urine dipstick
- Uroflowmetry and depending on severity conventional or video urodynamics
- Pelvic floor strength
- Electromyography (in limited circumstances)
- Pad Weight Assessment

Post micturition symptom

- Physical examination of pelvis for post voiding bladder residual
- Ultrasound of the Urinary Tract
- Urethro-cystoscopy and ascending descending urethrogram to identify location, degree of stenosis and length of stricture

Table 3: Lower Urinary Tract Symptoms (LUTS) continued

Conservative Management

Storage symptoms

■ Patient education and health promotion

■ Modification of fluid intake

■ Lifestyle modification

■ Bladder retraining

■ Self Management – see section on Self Management

■ TENS

■ Pelvic floor muscle exercises (preferably therapist-guided but could use Squeezy App)

■ Avoid caffeinated drinks

■ Relaxation/ distraction/ mindfulness

Post micturition symptom

■ Double voiding in sitting position in males and females

■ In male patients, advise urethral milking

■ Example of patient leaflet for male patients

Pharmacotherapy and medical management

Storage symptoms

■ Alpha blocker e.g Tamsulosin. Review 1-3 months. Not recommended after surgery and stricture should be excluded prior to starting alpha blockers

■ Local or systemic hormonal therapy, only in patients without hormone sensitive malignancy. There is **some reassuring evidence** that topical oestrogen therapies may be safe in hormone sensitive cancers

■ Antimuscarinic e.g Tolterodine

■ Anticholinergics e.g. buscopan and the B3 agonist mirabegron can be helpful in bladder spasm. Duloxetine/ amitriptyline have roles too. LUTS and Erectile dysfunction – use alpha blocker plus PDE5-I

■ Use combination of drugs to improve adherence and reduce side effects of the drugs⁵⁶

Post micturition symptom

■ Endoscopic urethral dilation if urethral or bladder neck stricture identified

When to refer to specialist

Storage symptoms

■ If symptoms do not improve with at least 3 months of conservative and/or medical management (either individually or in combination), then refer to Urology*

■ Refer to urinary continence services and/or pelvic physiotherapy

Post micturition symptom

■ If symptoms do not improve with at least 3 months of conservative and/or medical management (either individually or in combination), then refer to Urology*

⁵⁶ Abreu-Mendes, P. et al (2020). Pharmacology of the lower urinary tract: update on LUTS treatment. Therapeutic Advances in Urology 12: 1756287220922425.

Table 4: Haematuria/Radiation Cystitis

Note: Important to treat this condition early before pathological changes become irreversible.

*Referral to Urology should ideally be to a consultant or team known to be experienced in radiation cystopathy

History

- Symptom questionnaires IPSS and ICIQ-SF
- 3-day bladder diary
- Length of time since radiotherapy
- Comorbidities
- Existing medication

Reported symptoms

- Haematuria
- Frequency
- Urgency
- Pelvic pain

Assessment

- First exclude cancer recurrence or new cancer
- Dip stick analysis for haematuria
- Full blood count, renal profile, coagulation screen, CRP
- Flexible Cystoscopy
- Frequency and severity of symptoms, e.g.
 - Mild and spontaneously resolves?
 - Blood clots?
 - Painful?
 - Urinary retention?

Conservative Management

- Dietary support for anaemia
- Avoid constipation – increase fibre and fluid intake
- Avoid heavy lifting and physical activity
- Consider stopping anti-coagulants (eg. Aspirin, Clopidogrel, Rivaroxaban)

Pharmacotherapy and medical management

- Bladder irrigation, clot evacuation and transfusion if acute
- Transfusion support for anaemia
- Cystoscopy and fulguration using either cysto-diathermy or laser coagulation
- Oral or Intravesical bladder Hyaluronic acid
- Hyperbaric oxygen to treat severe haematuria
- Cystectomy for intractable haematuria

When to refer to specialist

- Haematuria/radiation cystitis usually requires direct referral to Urology*

Table 5: Complex Problems

Most often seen in people with cervical cancer, with a mean latency period of 17 years.

*Referral to Urology should ideally be to a consultant or team known to be experienced in radiation cystopathy

History

- Symptom questionnaires IPSS and ICIQ-SF
- 3-day bladder diary
- Length of time since radiotherapy
- Comorbidities
- Existing medication

Reported symptoms

Ureteric stricture

- Flank pain and presentation with impaired renal function +/- recurrent pyelonephritis

Vesicovaginal/Vesicoenteric fistula

- Vaginal urinary leakage
- Pneumaturia
- Fecaluria
- Cyclic haematuria
- Genital dermatitis
- Frequency/urgency
- UTIs

Radiation Prostatitis

- Dysuria
- Pelvic pain

Assessment

Ureteric stricture

- First exclude cancer recurrence or new cancer
- Retrograde contrast studies
- CT scan or MAG 3 renography

Vesicovaginal/Vesicoenteric fistula

- CT and MRI to identify fistula tract
- Examination under anaesthesia
- Cystoscopy
- 3 pad test

Radiation Prostatitis

- If infection suspected – MRI prostate together with seminal fluid culture

Conservative Management

Ureteric stricture

- Regular review of renal function for ureteric strictures
- Ultrasound of Urinary Tract

Vesicovaginal/Vesicoenteric fistula

- Good urinary drainage to reduce pressure within the urinary system and avoid leakage i.e., stenting or via a catheter
- Antibiotics for UTI
- Anti-inflammatory medication

Radiation Prostatitis

- Avoid constipation with regular laxatives, increased fluid intake and importance of regular bladder voids

Table 5: Complex Problems continued

Pharmacotherapy and medical management		
Ureteric stricture		
■ Ureteric stent insertion	■ Surgery with urinary diversion or reconstruction	■ Urethral dilation or urethroplasty surgery
Vesicovaginal/Vesicoenteric fistula		
■ Surgery		
Radiation Prostatitis		
■ Voltarol/Diclofenac Suppositories	■ Tadalafil 5mg once a day for 3 months before review	■ If seminal fluid positive for infection, treat with appropriate antibiotics for 2-4 weeks before review
When to refer to a specialist		
Ureteric stricture		
■ Requires immediate referral to Urology*		
Vesicovaginal/Vesicoenteric fistula		
■ Requires immediate referral to Urology*and/or Colorectal Surgery		
Radiation Prostatitis		
■ Requires immediate referral to Urology*		

Service Models, Standards and Professional Education

Service models for radiation-induced urological problems

- Primary care teams should be aware of how to manage LUTS and how to refer to local urology team experts.
- There is no standardised service model, but it is common for urology doctors to manage patients as part of routine duties. Secondary care urology cancer MDT requires pelvic physiotherapy and continence services and access to radiology and pathology as per tables above.
- Tertiary care is offered by highly specialised teams such as at **Guys and St Thomas' NHS Foundation Trust**.
- Hyperbaric Oxygen Therapy: Referral may be needed to a Hyperbaric Oxygen Therapy (HBO) service. The ability to access HBO therapy on the NHS across the UK is very unclear.
 - Note the **NHS England clinical commissioning policy 2018** states that HBO therapy is not routinely commissioned for soft tissue radiation damage in patients with a history of pelvic irradiation for malignant disease.
 - Contact **DDRC Healthcare** for advice on what conditions they treat and what is funded on the NHS.
- The NHS England **Service Specification for external beam radiotherapy** (2019) states: (section 2.6) "It is the responsibility of all the radiotherapy providers to prevent and minimise late effects through better targeted treatments, provision of information and the management of acute side effects. The vast majority of people that develop late effects following radiotherapy treatment should be managed locally as an integral part of rehabilitation or as part of locally stratified follow-up care pathways. These should include options for referral to local specialties / services that have expertise to manage more common late effects. However, it is expected that specialist late effects centres will manage and co-ordinate the provision of specialist services for complex late effects of cancer treatments, and align to specialist cancer surgery and other treatment pathways as they arise."
- Professionals treating urinary consequences of radiotherapy should take a holistic view and assess for psychosocial, GI, sexual and other problems described in this document, and manage or refer accordingly.
- PRDA holds a partial list of clinics and clinicians – please email info@prda.org.uk.

Suggested service quality standards and clinical audit measures

The following standards and audit measures/recommendations are from cancer management guidelines and a national cancer audit. This therefore underlines the importance of urology professionals and oncology teams together co-creating clear referral and care pathways (see section on **Service models and service development**), and the development of specialist services for urological symptoms of PRD.

Service quality standards

- **NICE guidance for prostate cancer:**
 - 1.3.39 Ensure that people with prostate cancer who have troublesome urinary symptoms after treatment have access to specialist continence services for assessment, diagnosis and conservative treatment. This could include coping strategies, pelvic floor muscle re-education, bladder retraining and pharmacotherapy.
 - 1.3.40 Refer people with prostate cancer who have intractable stress incontinence to a specialist surgeon for consideration of an artificial urinary sphincter.
 - 1.3.41 Do not offer injection of bulking agents into the distal urinary sphincter to treat stress incontinence in people with prostate cancer.
- Note that the above clinical management principles enshrined within NICE Prostate cancer guidance may be applicable for other pelvic cancers.
- **British Gynaecological Cancer Society guideline for uterine cancer:** ‘Prevention, identification and management of complications, late effects and quality of life issues following a cancer of the uterus diagnosis and treatment are essential part of personalised care’ and ‘Complex problems such as fistulae, haematuria and radiation induced interstitial cystitis require intervention from urology specialists.’

Clinical Audit Measures

- NICE guidance for prostate cancer. **Quality statement 4: Managing adverse effects of treatment** “People with adverse effects of prostate cancer treatment are referred to specialist services.” Measured as the proportion of people with adverse effects of prostate cancer treatment referred to specialist services. Numerator – the number in the denominator referred to specialist services. Denominator – the number of people with adverse effects of prostate cancer treatment.
- Other potential audit measures:
 - Number of assessments and number of patients requiring referral for cystitis and stricture i.e. grade 2 or above on a radiotherapy toxicity scale.
 - Number of referrals for Urology MDT services for people with PRD.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing, there are no accredited UK based courses or online education modules for managing the urinary effects of PRD although it may be included as part of courses such as postgraduate training in urology for nurses. In general, UK health professional oncology and urology societies do not provide guidance or education on urinary effects of PRD. There is a variety of learning resources on general bladder and bowel health, including from **e-Learning for Health** and the **Royal College of Nurses**.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 'Late Effects of Radiotherapy: a Patient's Perspective'.

An e-learning tool for therapeutic radiographers on pelvic radiotherapy late effects is being developed but is not yet publicly available⁵⁷.

Key Clinical Guidance References:

NICE (2015). Lower urinary tract symptoms in men: management **Clinical guideline CG97**.

NICE (2019). Urinary incontinence and pelvic organ prolapse in women: management. **NICE guideline NG123**.

Faithfull, S., et al (2015). **Integrative review on the non-invasive management of lower urinary tract symptoms in men following treatments for pelvic malignancies**. Int J Clin Pract. 69(10): 1184-1208.

⁵⁷ Oliver L, et al (2021). A novel e-learning tool to improve knowledge and awareness of pelvic radiotherapy late effects: qualitative responses amongst therapeutic radiographers. BJR Open 3:1.

Chronic Pelvic Pain



“Pain is like quicksand, the more you fight it, the more it drags you down.”

Rhea, who had radiotherapy for cervical cancer at age 34

“Many people are worried about taking opioids, as they fear becoming addicted to them or that their side-effects might cause worse problems. Telling your specialist team about these fears can help them to help you manage your pain more effectively. But of course, opioids are just one of many ways by which we can support you to self-manage your pain.”

Dr Claire Taylor, Chief Nursing Officer, Macmillan Cancer Support, Macmillan Nurse Consultant in Colorectal Cancer, London North West University Healthcare NHS Trust

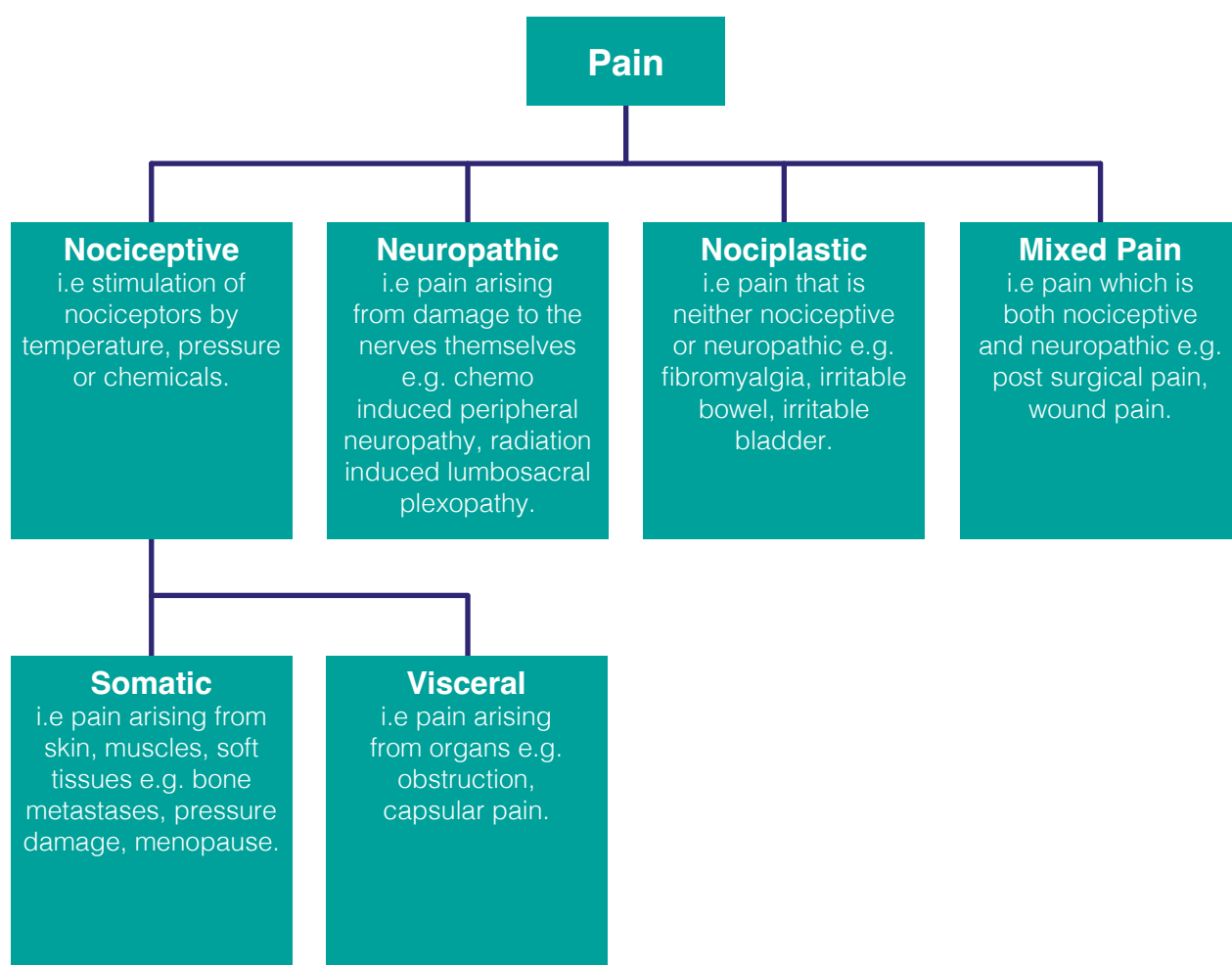
Symptoms

Pain is defined as ‘an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage’⁵⁸. In ICD11, chronic pain is defined as ‘pain that persists or recurs for more than 3 months’. Definitions can also be found on the International Association for the Study of Pain (IASP) [website](#).

Chronic cancer-related pain, which is a type of secondary chronic pain⁵⁹, is defined as chronic pain caused by:

- the primary cancer itself or metastases (chronic cancer pain) or
- its treatment (chronic post cancer treatment pain).

Figure E. Types of pain experienced by people with persistent radiotherapy-related pelvic pain



⁵⁸ Treede, R et al. (2019) Chronic pain as a symptom or a disease: the IASP Classification of Chronic Pain for the International Classification of Diseases (ICD-11), PAIN 160 (1) p 19-27.

⁵⁹ NICE (2022) Guideline NG193. Chronic pain (primary and secondary) in over 16s: assessment of all chronic pain and management of chronic primary pain.

Incidence and Prevalence

Pain is one of the most common symptoms experienced by those undergoing or who have undergone cancer treatment. It is also often one of the most feared, due to the potentially disabling bio-psychosocial consequences of its presence and, in those who have had cancer, its association with advanced or advancing disease⁶⁰.

Almost two thirds of patients receiving active cancer treatment and over one third of patients after treatment experience pain⁶¹. For a large proportion of these patients the pain will be moderate to severe and unmanageable⁶².

Identification and assessment

It is imperative that healthcare professionals take every opportunity to assess pain from diagnosis through to living with and beyond cancer⁶³. Quick, easy-to-use screening questions such as 'Ask2Questions'⁶⁴ can help identify people suffering with post cancer treatment pain.

1. Over the past two weeks, has pain been bad enough to interfere with your day-to-day activities?
2. Over the past two weeks, have you felt worried or low in mood because of this pain?

The answers can guide the health professional as to whether a more detailed assessment is required (see Table 6).

Management guidance sources

Management of cancer pain in adult patients: ESMO Clinical Practice Guidelines (2018).

Standards for the management of cancer-related pain across Europe—A position paper from the EFIC Task Force on Cancer Pain (2018).

National Comprehensive Cancer Network Adult Cancer Pain Version 3 (2019).

Management of Chronic Pain in Survivors of Adult Cancers: American Society of Clinical Oncology Clinical Practice Guideline (2016).

⁶⁰ Nijs, J. et al. (2019) Explaining pain following cancer: a practical guide for clinicians. *Brazilian Journal of Physical Therapy*. 23 (5), 367–377.

⁶¹ Van Den Beuken-Van Everdingen, M.H.J. et al. (2016) Update on Prevalence of Pain in Patients With Cancer: Systematic Review and Meta-Analysis. *Journal of Pain and Symptom Management* 51 (6), 1070–1090.e9.

⁶² Swarm, R.A. et al. (2019) Adult Cancer Pain, Version 3.2019, NCCN Clinical Practice Guidelines in Oncology. *Journal of the National Comprehensive Cancer Network* 17 (8), 977–1007.

⁶³ Paice, J.A. et al. (2016) Management of Chronic Pain in Survivors of Adult Cancers: American Society of Clinical Oncology Clinical Practice Guideline. *Journal of Clinical Oncology*. 34 (27), 3325–3345.

⁶⁴ Ask2Questions | Faculty of Pain Medicine (fpm.ac.uk)



At a glance **Chronic Pain after Pelvic Radiotherapy**

- Thorough assessment is required to gain an understanding of the cause, mechanism, timing and impact of post radiotherapy pelvic pain.
- It is important to rule out recurrence as well as new primary cancers.
- Ensure non-cancer related alternative pathology is excluded and appropriate referrals made.
- Follow the World Health Organisation (WHO) pain ladder, avoiding long term opioid prescriptions where possible.
- Refer to specialist pain teams or late effects services for patients with persistent or resistant PRD pain.
- **See Table 6** for full details of management advice.

Table 6: Chronic Pain Symptoms after Pelvic Radiotherapy**History**

- Previous abdominal or pelvic malignancy
- Treated with external beam radiotherapy and/or brachytherapy
- Pelvic pain present for 3 months or longer

Reported symptoms

See Figure E on page 56.

- Pain in the pelvic region and may be described in several ways.
- May be associated with other system-specific effects e.g. on the bowel (constipation, diarrhoea, per rectal (PR) bleeding), bladder (dysuria, urinary frequency, haematuria, incontinence) and genitalia (vaginal dryness, erectile dysfunction).
- Psychological and emotional difficulties - may manifest as low mood, poor concentration, anxiety, reduced sex drive, sleep disturbance and cognitive impairment.
- Widespread chronic pain syndromes can develop.

Clinical assessment – including consideration of differential diagnoses

- New or worsening pain and a history of cancer – urgent assessment to rule out recurrence or new primary cancer.
- Any unexplained, severe pelvic pain should be referred to an appropriate clinician to exclude unrelated pathology.
- Refer for any investigations that may be required to exclude recurrence or differential diagnoses and aid diagnosis e.g.
 - blood tests to check general health and aid diagnosis,
 - imaging to rule out recurrence or any pathology which requires more immediate medical or surgical intervention such as bowel obstruction
 - nerve conduction studies to diagnose neuropathy vs plexopathy
 - Note: if needing to ask regarding pregnancy status, please consider the psychological distress this may cause to many people, as it is unlikely (though not impossible) that a person will be able to conceive or carry a child after pelvic radiotherapy.
- Physical assessment should be performed as appropriate – all pelvic examinations should be offered a chaperone.

Clinical assessment and history take

- Review Holistic Needs Assessment / Personalised Care and Support Plans and End of Treatment Summary for potential red flags of recurrence and possible long term and late effects from treatment.
 - Discuss:
 - person's ideas or concerns regarding the cause of the pain and the meaning of the pain to them e.g. recurrence, treatment effect, non-cancer pain etc.
 - their expectations of pain management e.g. cure or fix versus support to self-manage.
- Review medical history including history of cancer and its treatment. Undertake a full pelvic health assessment including a review of urinary, gastrointestinal and gynaecological symptoms and function. Review current and previous medications, any allergies or sensitivities.
- Full cognitive, behavioural, emotional and sexual history, using validated tools such as PHQ-9, GAD-7, PCL-5.
- Assessment tools include **Patient Self-Efficacy Questionnaire (PSEQ)**, **Patient Catastrophising Scale (PCS)** and **Patient Activation Measures** (licensed questionnaire) .
- Important: consider negative sexual encounters. These are no more common in pelvic pain patients, but pain can trigger a resurgence and exacerbate psychological distress.

Table 6: Chronic Pain Symptoms after Pelvic Radiotherapy (continued)

Assessment methodology (continued)	
■ Assess using SOCRATES :	
Site	Where is the pain?
Onset	How did the pain start e.g. suddenly or more slowly?
Character	What does the pain feel like e.g. sharp, burning, gnawing, throbbing etc?
Radiation	Does the pain travel anywhere else?
Associated symptoms	Does the patient experience any other symptoms with the pain e.g. nausea, vomiting, diarrhoea?
Time-course	How long have they had the pain? Is the pain worse at any particular times of day or night? Is the pain constant or does it come and go?
Exacerbating/relieving factors	What makes the pain better or worse?
Severity	Rate on a scale of 0-10 or Mild, Moderate, Severe. Contextualise pain and pain interference as per ICD 11.

Detailed Assessment

Detailed assessment should focus on understanding of:

1. The cause of the pain e.g. cancer recurrence, infection, fibrosis, neuropathy.
2. The mechanism of pain e.g. nociceptive, neuropathic or neuroplastic pain.
3. Timing of pain e.g. constant background pain, breakthrough pain (pain despite round the clock analgesia), procedural pain i.e. pain during catheterisation.
4. The associated symptoms and their relevance to the pain. This may include system-specific symptoms (bladder, bowel), activity-related complications (effects on sex, social or work life) and emotional effects such as anxiety or depression.
5. Previous investigations and management.
 - When, where and how was their post cancer treatment pelvic pain identified? (services visited, if any, and which generalist or specialist clinicians).
 - What's the best it has ever been? Focus on the physical, activity related and emotional aspects of pain. When does the person feel they were least affected and what did that look like?
 - What's the worst it has ever been? When does the person feel they were worst affected? What effect has their pain had on them e.g. social life, sex life, ability to work? Have they ever required admission to hospital for pain control?
 - What is it like now? This should focus on the above metrics. Where does the person feel they are in relation to where they have been?
 - What treatments have they tried and are there any treatments they would like to try? This should address pharmacological therapies, interventional procedures, self-management techniques and any psychological services.

Table 6: Chronic Pain Symptoms after Pelvic Radiotherapy (continued)

Management – WHO Pain ladder	
<ul style="list-style-type: none"> Professionals should work at their skill level regarding pain management and refer appropriately. Please refer to Faculty of Pain Medicine guidance. Management should be multi-modal. Patient should be actively involved in the development of their management plan. Non-pharmacological self-management strategies should be used alongside medications. General principles of the WHO pain ladder⁶⁵ should be followed: <ul style="list-style-type: none"> Step 1 Non-opioid analgesics for mild pain including oral NSAIDs and Paracetamol are the most appropriate first line pharmacological agent. These can be combined with topical therapies such as NSAID gel. Other topical therapies such as lidocaine plasters (off label) and, in the case of localised neuropathic pain affecting areas in the pelvis other than the genitals, capsaicin cream or Capsaicin patches (Qutenza), may be used under specialist guidance. Step 2 Opioids for moderate pain should be used with or without non-opioid analgesics as an adjunct. This class of opioids include low dose morphine, codeine, tramadol and dihydrocodeine. Step 3 Opioids for severe pain. These include morphine, oxycodone, buprenorphine, fentanyl and tapentadol. 	
<p>Judicious prescribing of analgesia is required to minimise side effect burden and reduce the risk of drug dependency. Whilst strong opioids have a clear role in acute pain flares, in chronic pain syndromes they should be used with caution and the prescription kept under constant review. Please refer to the Faculty of Pain Medicine guidelines for more detail.</p> <p>Where opioids are needed, clinicians should have a clear plan for gradual up-titration on initiation and weaning in the event of treatment failure. If background analgesia is needed, when pain is present around the clock, it should consist of long-acting formulations with short acting 'as required' (PRN) prescriptions for breakthrough pain. The breakthrough analgesia dose should be 1/6 the total daily background dose. The recommended maximum daily dose is 120mg morphine or morphine equivalent dose of another opioid analgesic. Doses higher than this increase the risks significantly.</p> <p>Careful consideration of the benefits of treatment should be weighed against the side effects:</p> <ul style="list-style-type: none"> opioid analgesics are constipating; switching to a different agent or using concurrent laxative prescriptions may be of help (see GI section) opioid-induced hyperalgesia endocrine dysfunction urinary retention immune suppression. 	

⁶⁵ Annex 1 of WHO (2018) Guidelines for the Pharmacological and Radiotherapeutic Management of Cancer Pain in Adult and Adolescents

Table 6: Chronic Pain Symptoms after Pelvic Radiotherapy (continued)**Management – helpful tips****Gastro-intestinal pain**

Abdominal massage, TENS machines, mindfulness and distraction techniques

Cramp/colic pain: Anti-spasmodics e.g. buscopan or mebeverine

Perianal pain: Topical steroids, nitrates, calcium channel blockers or anaesthetic agents can be used.

Bladder pain and pain associated with the urinary system

Pelvic pain/dysuria related to radiation prostatitis/cystitis:

- Diclofenac/Voltarol suppositories for renal pain: risk of renal dysfunction
- Duloxetine, amitriptyline, imipramine: risk of urinary retention, anticholinergic action.
- Mirabegron may be an option

Bone pain

Electrical Nerve Stimulation (ENS), splinting and bracing.

Bisphosphonates – limited evidence long term

Possible referral to Orthopaedics

Skin pain

Focal, Allodynia: Lidocaine plaster (off label indication) or capsaicin cream (0.075%) or capsaicin patches (specialist initiation only)

Vascular pain

Sympathetic blocks have a limited evidence base

Nerve pain

Anti neuropathic medication such as amitriptyline, imipramine, duloxetine: risk of urinary retention, anticholinergic action

Gabapentinoids, such as gabapentin and pregabalin risk of addiction

See also

Table 14 on Radiation-Induced Lumbar Plexopathy (RILP)

Self-management section for appropriate resources

When and who to refer to a pain or late effects specialist service

- People experiencing significant distress, anxiety or trauma related to pain, may benefit from a referral for psycho-oncology or pain psychology depending on local service provision.
- Specialised pelvic pain clinics (such as UCLH) can provide support around intimacy when pain is the underlying issue.
- People with secondary chronic pelvic pain that remains moderate to severe, or pain which is interfering with function, despite optimal management in primary or secondary care.
- People who need specialist assessment and management regarding symptoms.
- Some people may need hospital admission to investigate and manage severe pain which is severely interfering with their ability to function.
- Significant drug-related adverse effects require further specialist assessment and management.

Service Models, Standards and Professional Education

Service models

Faculty of Pain Medicine, Association for Palliative Medicine, Association of Cancer Physicians and The Royal College of Radiologists (Faculty of Clinical Oncology) (2019) **Framework for Provision of Pain Services for Adults Across the UK with Cancer or Life-Limiting Disease**

NICE guideline (2020) on **Neuropathic pain in adults: pharmacological management in non-specialist settings** recommends access at any stage to specialist pain services.

International Association for the Study of Pain (IASP) – Various resources available on the **website**.

Suggested service quality standards and clinical audit measures

Royal College of Anaesthetics, Faculty of Pain Management (2021) **Core Standards for Pain Management Services in the UK**.

Clinical audit measures

NICE guidance for prostate cancer. **Quality statement 4: Managing adverse effects of treatment** “People with adverse effects of prostate cancer treatment are referred to specialist services.” Measured as the proportion of people with adverse effects of prostate cancer treatment referred to specialist services. Numerator – the number in the denominator referred to specialist services. Denominator – the number of people with adverse effects of prostate cancer treatment.

Professional education

Royal Marsden School **Exploring the complexity of cancer-related pain (module)**.

E-Learning for Health **Pain Management Programme**.

The Pain Relief Foundation events including the European Pain Federation Winter Cancer Pain School, see **website**.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 ‘Late Effects of Radiotherapy: a Patient’s Perspective’.

Key Clinical Guidance reference

Bennett, M.I. et al. (2019) **Standards for the management of cancer-related pain across Europe—A position paper from the EFIC Task Force on Cancer Pain**. European Journal of Pain 23(4) p660–668.

Sexual difficulties – Female



This 'Sexual difficulties – Female' section is designed to offer guidance for cisgender women, transmen, gender fluid and non-binary individuals.

“ I haven’t been given any help for the sexual issues. I tried to talk to the hospital staff about the intimacy side of things – the vaginal dilators were useless for me and painful to use. [...] I’m sure the radiotherapy has made things a lot less elastic.”

Milena, who had surgery and radiotherapy for endometrial cancer

“ I don’t think anyone really understands that I can’t “do it” ever again.”

May, who had chemotherapy, radiotherapy and brachytherapy for cervical cancer

Symptoms

Pelvic radiotherapy may cause vaginal dryness, adhesions and fibrosis, stenosis, and vaginal shortening, resulting in dyspareunia (sexual pain) and an inability to have penetrative intercourse. If treatment affects oestrogen levels, then this may also reduce vaginal lubrication, which can again cause dyspareunia, reduced enjoyment and orgasmic difficulties⁶⁶.

Please note that fertility and primary ovarian failure/insufficiency are covered in the **Endocrine section**.

Incidence and Prevalence

Prevalence rates of sexual difficulties associated with cancer and its treatment tend to be higher than those encountered in the general adult population. A survey of people after pelvic radiotherapy showed 24% of women experienced adverse impacts on their ability to have a sexual relationship, persisting for many up to 11 years post-treatment⁶⁷. A survey conducted by Jo's Cervical Cancer Trust showed that 80% of people treated with chemo-radiation were affected by changes to their sex life⁶⁸.

Identification

Problems may occur in any cancer type for which radiotherapy for cancer to the pelvic area has been given. Problems may occur months, years or decades after treatment. In common with other symptoms of Pelvic Radiation Disease (PRD), genital and sexual problems can often be embarrassing for people to raise with health professionals and therefore sexual health can be overlooked. People want information to be available should they wish to ask for it and would like the health professional to take the lead in offering information.

Although some changes following radiotherapy may be temporary, recovery is not certain, and damage could be permanent, therefore sexual issues should be reassessed throughout follow-up.

Assessment and identification of sexual issues by clinicians can be done efficiently and easily with short, validated tools using a style of inquiry which starts by acknowledging how common sexual dysfunction is amongst people, rather than asking direct questions⁶⁹.

⁶⁶ White ID and Butcher J. (2016) **Working with the Sexual Consequences of Cancer and its Treatment**. Sexual and Relationship Therapy, 31(4) p411-413

⁶⁷ Adams, E. et al (2014) **The Effects of Pelvic Radiotherapy on Cancer Survivors: Symptom Profile, Psychological Morbidity and Quality of Life**. Clinical Oncology 26(1) p10-17.

⁶⁸ Jo's Cervical Cancer Trust (2017). **Long term consequences of cervical cancer and its treatment**. Accessed 18 September 2022.

⁶⁹ Bober, S.L. et al (2019). **Sexual function after cancer: paying the price of survivorship**. Climacteric, 22(6) p558-564.

Management guidance sources

There is a lack of research on the effectiveness of interventions to help with female sexual difficulties and thus a lack of clinical guidance. A Cochrane review⁷⁰ in 2016 found “insufficient evidence for the effectiveness of topical pharmacological treatments, psychotherapeutic interventions and pelvic floor exercises”. Further studies have looked at different psychosexual/psychoeducation, pharmacological and medical interventions. Whilst all identify some improvement with interventions, most recognise the need for further research^{71, 72, 73}.

Talking about sexual difficulties

The WHO⁷⁴ identify having access to and receiving information relating to sexuality as a human right; sexual health is an essential part of quality of life and not addressing the topic can have considerable negative impact.

Conversations could include the person's partner(s), if appropriate and only if this is what the person wishes. These conversations should be started prior to radiotherapy with the **consent process**. The risk of changes in the reproductive organs needs to be discussed, making it an open topic moving forward.

Sexual dysfunction can be difficult to treat as it may have many causes, not all of which are a direct outcome of cancer treatment. For example, the emotional stress of having a cancer diagnosis has an impact on daily life and relationships. Many people also have pre-existing difficulties and/or their partner(s) may have sexual difficulties.

As sexual difficulties have multifaceted causes including physiological/biological, psychological, interpersonal and socio-cultural factors, a joint approach to addressing problems should be adopted. Having a multi-disciplinary team approach will hopefully allow healthcare professionals to feel safe in addressing this topic and refer the person on to colleagues if the issues are beyond their comfort or expertise.

Professionals who lack confidence in discussing sexual issues may benefit from:

- Education⁷⁵ including using frameworks (see PLISSIT section below)
- Familiarity with PROMs tools such as FSFI⁷⁶, EORTC-SHQ22⁷⁷ and SWELL-CE⁷⁸
- Support within the MDT to develop confidence
- Increasing their knowledge of all referral/signposting pathways to support services, charities and businesses that are tailored to supporting people affected by cancer with sex and relationships issues.

⁷⁰ Candy B, et al (2016). Interventions for sexual dysfunction following treatments for cancer in women. Cochrane Database of Systematic Reviews.

⁷¹ Sopfe, J. et al (2021). Interventions to Improve Sexual Health in Women Living with and Surviving Cancer: Review and Recommendations. Cancers, 13(13) p3153.

⁷² Perrone, A.M. et al (2020). Results of a phase I-II study on laser therapy for vaginal side effects after radiotherapy for cancer of uterine cervix or endometrium. Cancers, 12(6) p1639.

⁷³ Del Pup, L. et al (2019). Approach to sexual dysfunction in women with cancer. International Journal of Gynecologic Cancer, 29(3) p630-634.

⁷⁴ World Health Organisation webpage on Sexual health (accessed 8 July 2022).

⁷⁵ Verrastro, V. et al (2020). Medical and health care professionals' sexuality education: State of the art and recommendations. Int. J. Environ. Res. Public Health, 17(7), p.2186

⁷⁶ White ID et al (2016). Assessment of Sexual Difficulties Associated with Multi-modal Treatment for Cervical or Endometrial Cancer: a systematic review of measurement instruments. Gynecologic Oncology, 143 (3) 664-673.

⁷⁷ Oberguggenberger, A.S. et al (2018). Phase 1–3 of the cross-cultural development of an EORTC questionnaire for the assessment of sexual health in cancer patients: the EORTC SHQ-22. Cancer medicine, 7(3), pp.635-645.

⁷⁸ White ID et al (2020) Sexual Morbidity Assessment in Gyne-Oncology Follow-Up: Development of the Sexual Well-Being After Cervical or Endometrial Cancer (SWELL-CE) Patient-Reported Outcome Measure. The Journal of Sexual Medicine, 17:10, p 2005 - 2015



At a glance Female Sexual Difficulties after Pelvic Radiotherapy

- Assessment and identification of sexual issues by clinicians can be done efficiently and easily with short, validated tools.
- Use a style of inquiry which starts by acknowledging how common sexual dysfunction is amongst people, rather than asking direct questions.
- Healthcare practitioners should recognise their level of competency and ability to explore sexual issues and offer support to the level they are competent.
- The PLISSIT model allows the practitioner to establish and maintain a safe relationship with people, to allow them to discuss issues relating to sexuality, sexual function and body image.
- See Table 7 for full details of management advice.

Table 7: Female Sexual Difficulties after Pelvic Radiotherapy

History

- Assessment tool/PROM EORTC-SHQ22 (other tools may be validated such as SWELL-CE⁷⁹)
- Comorbidities
- Existing medication

Reported symptoms

- | | |
|-------------------------------------|-----------------------------------|
| ■ Pain – perineal, vulval, vaginal, | ■ Low sexual self-esteem |
| ■ Numbness | ■ Vaginal dryness |
| ■ Loss of libido | ■ Vaginal tightness or shortening |
| ■ Not enjoying sex | |

Assessment

Review the person's Holistic Needs Assessment/Personalised Care and Support Plan and/or End of Treatment Summary.
PLISSIT model (see Table 8)

⁷⁹ White ID, et al (2020). Sexual Morbidity Assessment in Gyne-Oncology Follow-Up: Development of the Sexual Well-Being After Cervical or Endometrial Cancer (SWELL-CE) Patient Reported Outcome Measure. The Journal of Sexual Medicine, 17:10, p 2005 – 2015. Note from Isabel White: SWELL-CE is for cervical and endometrial cancers only and would benefit from further validation. The questionnaire is available on request from Dr. Mike Horton, Director of Leeds Psychometric Laboratory for Health Sciences, University of Leeds.

Table 7: Female Sexual Difficulties after Pelvic Radiotherapy (continued)

Management
<p>If sexual difficulties are present, where possible provide specific suggestions – see ASCO guidance⁸⁰.</p> <ul style="list-style-type: none"> ■ Offer information as appropriate to support self-help – See Self Management section ■ Lubricants for all sexual activity or touch ■ Vaginal moisturisers to improve vulvovaginal tissue quality – may need to be applied three to five times per week in the vagina and on the vulva ■ Regular stimulation (including masturbation) is likely to improve sexual response ■ Vaginal oestrogen (see Endocrine section) ■ Pelvic floor physiotherapy ■ Vaginal dilators⁸¹ or vibrators ■ Counselling with the aim of improving intimacy and relationship issues ■ Counselling with the aim of improving body image issues (for example due to a stoma or vaginal stenosis) ■ Referral to a psychosexual service.
When to refer to a specialist
<ul style="list-style-type: none"> ■ Unless services are available within the cancer centre, you may need to make a referral for assessment by a psychosexual therapist when: <ul style="list-style-type: none"> ■ Sexual difficulties are persistent despite appropriate interventions and where there are high levels of individual/partner(s) distress. ■ The person has pre-existing sexual problems and psychological vulnerability prior to diagnosis. ■ If there are additional sexual difficulties within the relationship.

PLISSIT Model (Permission – Limited Information – Specific Suggestion – Intensive Therapy)

Healthcare practitioners should recognise their level of competency and ability to explore sexual issues and offer support to the level they are competent. The PLISSIT model allows the practitioner to establish and maintain a safe relationship with people, to allow them to discuss issues relating to sexuality, sexual function and body image.

In the PLISSIT or extended PLISSIT⁸² model, staff (e.g. clinical nurse specialists (CNSs), Specialist Radiographers) will use specialist knowledge and expertise to assess sexual function, analyse information to offer specific suggestions and, if necessary, interventions to address sexual dysfunction.

⁸⁰ Interventions to Address Sexual Problems in People With Cancer American Society of Clinical Oncology Clinical Practice Guideline Adaptation Summary (2018)

⁸¹ Miles T. and Johnson N. (2014). Vaginal dilator therapy for women receiving pelvic radiotherapy. Cochrane Database of Systematic Reviews. 2014(9).

⁸² Taylor, B., Davis, S. (2007) The Extended PLISSIT Model for Addressing the Sexual Wellbeing of Individuals with an Acquired Disability or Chronic Illness. Sex Disabil 25, p135–139.

Table 8 – PLISSIT model

Level	PLISSIT	Who	Aim	Rationale
1	P Permission	All healthcare professionals Basic knowledge	Person is able to discuss sexual concerns/difficulties with healthcare professional	First promoted when the person is asked about their sexual concerns or suggest that it is an appropriate topic for discussion. Gives the person permission to have (or not have) sexual feelings.
2	LI Limited Information	Experienced healthcare professional	Person is advised of the impact of treatment on sexual function to enable them to make informed choices about their proposed treatment	Continues to convey willingness to discuss sexuality and provides specific factual information to clarify concerns and misconceptions and eliminate myths.
3	SS Specific Suggestion	Advanced CNS; Healthcare professional with appropriate skills and knowledge	To provide people with specific suggestions promoting continued sexual satisfaction. Requires sexual history. Suggestions include strategies for enhancing sexual expression. Suggestions take into account the patients; and partner(s)' values, attitude towards sex. Referral for intensive therapy is indicated if sexual concerns remain unresolved.	Provided when support and limit information are alone are inadequate. Follow up is necessary to monitor effectiveness.
4	IT Intensive Therapy	Psychological or Psycho-sexual therapist	Person may need referral for more in-depth counselling if progress is not being made at other levels or if there are pre-existing sexual problems, dual dysfunction or relationship distress	Provides intensive therapy with appropriate qualified therapist to manage complex sexual and relationship issues that cannot be addressed at lower levels of interventions

Service Models, Standards and Professional Education

Service models for radiation-induced sexual difficulties – female

- Primary care and secondary care teams should be aware of how to manage sexual difficulties and how to refer to local expertise in cancer-related sexual problems. The referral should include a holistic needs assessment, the presenting issues and summary of the problem.
- British Gynaecological Cancer Society (BGCS) Uterine Cancer Guidelines: **Recommendations for Practice** (2021) and Cervical Cancer Guidelines: **Recommendations for Practice** (2020) include:
 - Access to a CNS or equivalent and psycho-sexual counsellors should be available as part of the multi-disciplinary team.
- Service provision:
 - Sexual difficulties arising from ovarian failure and vaginal changes are most commonly managed by a combination of psychoeducation and biomedical interventions such as HRT, topical oestrogen, vaginal moisturisers, vaginal lubricants and vaginal dilators.
 - People with other sexual difficulties are usually cared for by psychosexual therapists, sex and relationship therapists, pelvic floor physiotherapists, sexual medicine and women's health specialists as expert or specialist management. (For example, persistent low desire (not resolved by HRT), arousal difficulties, orgasmic difficulties, inability to resume intercourse, persistent sexual pain, relationship distress, and body image adjustment difficulties.)
- Examples of service models:
 - Radiographer-led 'Sexual Care after radiotherapy' service⁸³
 - **Psychosexual Therapy – East Suffolk & North Essex NHS Foundation Trust**
- The NHS England **Service Specification for external beam radiotherapy** (2019) states: (section 2.6) "It is the responsibility of all the radiotherapy providers to prevent and minimise late effects through better targeted treatments, provision of information and the management of acute side effects. The vast majority of people that develop late effects following radiotherapy treatment should be managed locally as an integral part of rehabilitation or as part of locally stratified follow-up care pathways. These should include options for referral to local specialties/ services that have expertise to manage more common late effects. However, it is expected that specialist late effects centres will manage and co-ordinate the provision of specialist services for complex late effects of cancer treatments, and align to specialist cancer surgery and other treatment pathways as they arise."
- Professionals treating sexual difficulties after radiotherapy should take a holistic view and assess for psychosocial, GI, bladder and other problems described in this document, and manage or refer accordingly.
- Oncology teams should know how to refer for Psychosexual services, and signposting to organisations such as **Relate** or **Pink Therapy**.

⁸³ Nisbet, H. et al. (2021) An evaluation of a therapeutic radiographer led "sexual care after radiotherapy" clinic. *Radiography*, 27(3) p897 – 902.

Suggested service quality standards and clinical audit measures

Service quality standards

The following standards are suggested; they are not taken from any national publication.

- All people receiving pelvic radiotherapy should be informed about the potential and actual impact of treatment on their sexual health, fertility, menopause status and sexual wellbeing prior to treatment.
- Information about socio-cultural norms, sexual orientation and gender identity and relationship status should be used as context for identification and individualised discussion of sexual wellbeing concerns and provision of appropriate sources of information and support.
- All people who have completed external beam radiotherapy or brachytherapy for a pelvic malignancy should be offered proactive vaginal health advice prior to, during and in the follow-up phase after radiotherapy treatment. Cancer MDT members should acknowledge that sexual dysfunction is common and actively enquire about symptoms during follow up.
- Information leaflets and sign-posting to self-management resources should be available.
- All people who have completed external beam radiotherapy to the pelvis and/or vaginal brachytherapy should be offered a set of graduated vaginal dilators and instructed in the rationale and technique for use, based on most recent published UK or international guidelines (**2012 International guidelines on vaginal dilation after radiotherapy; a clinical guideline**).
- All people offered vaginal dilators should have compliance with their use evaluated and be offered support with adherence to vaginal health strategies.
- All cancer centres should have identified clinical management pathways for the assessment and management of treatment-induced vaginal changes and sexual difficulties.

Clinical Audit Measures

Potential audit measures are within Holistic Needs Assessment items, identification of problems and number of patients requiring referral to specialist service for complex psychosexual difficulties (those with less complex issues can be managed by a clinical team with specific suggestions to address difficulties however the effectiveness of these issues should be recorded).

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing (mid 2022), there are no accredited UK based courses or online education modules for managing the female sexual effects of PRD although it may be included as part of courses such as postgraduate training for nurses. In general, UK health professional oncology, gynaecology or sexual medicine societies do not provide guidance or education on sexual effects of PRD.

The College of Psychosexual and Relationship Therapy has a range of **self-access online classes** with CPD points and **external training accredited by CORST** but none are specific for female pelvic cancers. **Pink Therapy** also offer training courses, but at time of writing, none are specific to cancer.

Cancer Institute New South Wales, Australia

- **Psychosexual care of women affected by gynaecological cancers** | eviQ Education (free e-learning)

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 '**Late Effects of Radiotherapy: a Patient's Perspective**'.

An e-learning tool for therapeutic radiographers on pelvic radiotherapy late effects is being developed but is not yet publicly available⁸⁴.

⁸⁴ Oliver L, et al (2021). A novel e-learning tool to improve knowledge and awareness of pelvic radiotherapy late effects: qualitative responses amongst therapeutic radiographers. *BJR Open* 3:1.

Key Clinical Guidance References

Carter J et al (2017) **Interventions to Address Sexual Problems in People With Cancer: American Society of Clinical Oncology Clinical Practice Guideline Adaptation Summary**. *Journal of Oncology Practice* 14(3) p173-179.

British Gynaecological Cancer Society (BGCS) **Uterine Cancer Guidelines: Recommendations for Practice** (2021).

British Gynaecological Cancer Society (BGCS) **Cervical Cancer Guidelines: Recommendations for Practice** (2020).

White ID (2015) **Sexual Difficulties after Pelvic Radiotherapy: Improving Clinical Management**, *Clinical Oncology*, 27: 647-655.

White ID & Grayer J (2017) Chapter 14 'Psychosexual Difficulties After Cancer' in: Velikova G, Fallowfield L, Younger J, Board R & Selby P (eds) **Problem Solving in Patient-Centred and Integrated Cancer Care**, Association of Cancer Physicians & ebn Health, UK.

Sexual difficulties – Male



This ‘Sexual difficulties – Male’ section is designed to offer guidance for cisgender men, transwomen, gender-fluid and non-binary individuals.

“

Due to the seriousness of my cancer, my surgery required removing about half of the nerves that control my erections. Since then, my radiotherapy has dealt a serious blow to the remainder, which may be permanent and is in any case very distressing to me as an otherwise healthy and happily married man in his early sixties.”

Jonathan, living with PRD

Symptoms

Please note that fertility issues and androgen deficiency are covered in the **Endocrine section**.

Male sexual difficulties include: low libido/sexual interest; difficulty getting and maintaining an erection; dry orgasm; painful orgasm; changes in intensity of orgasmic sensation; loss of bladder or bowel control during arousal or orgasm; and reduced/changed sensations during anal sex.

In addition, people may experience negative changes to sexual confidence arising from body image changes (e.g. due to penile shortening, genital lymphoedema or having a stoma) and reduced self-esteem which impact on their sexual wellbeing and relationships.

Symptoms reported by gay and bisexual men are often similar to those for heterosexual men. However, differences in sexual lifestyle and practices may mean some sexual difficulties will be more bothersome or challenging to manage for men who have sex with men, such as increased risk of developing long term problems, including chronic rectal bleeding⁸⁵.

Incidence and Prevalence

Estimates of prevalence vary by cancer type⁸⁶, but erectile dysfunction (ED) is likely to affect at least 50% and worsens with time due to radiotherapy affecting penile tissues in a progressive way. Erectile dysfunction prevalence after radiotherapy is estimated to be 67–85% and may take up to 24 months to develop. Prospective studies using validated questionnaires indicate erectile dysfunction rates of between 30 and 40% up to 60-70% at 1-2 years post-external beam radiotherapy for prostate cancer, with no further deterioration at 36 months. Rates after brachytherapy tend to be lower, ranging from 5 to 51%, with the highest rates seen in men who have received combined external beam radiotherapy and brachytherapy.

It is important to recognise that not only people after prostate radiotherapy may have problems. People after chemoradiation for anal cancer and rectal cancer may be affected, for example 76% of men reporting new or exacerbation of existing sexual difficulties after rectal cancer treatment⁸⁷.

⁸⁵ Ralph, S. (2021) **Developing UK Guidance on How Long Men Should Abstain from Receiving Anal Sex before, During and after Interventions for Prostate Cancer**. *Clinical Oncology*, 33(12):807-810.

⁸⁶ Pizzol, D. et al (2021). **Prevalence of erectile dysfunction in male survivors of cancer: a systematic review and meta-analysis of cross-sectional studies**. *BJGP* 71(706), e372–e380.

⁸⁷ Lange MM, et al (2009). **Risk factors for sexual dysfunction after rectal cancer treatment**. *Eur J Cancer* 45(9) p1578-1588.

Identification

People may have pre-existing sexual difficulties prior to cancer treatment. Erection problems may occur up to 2 years after finishing radiotherapy treatment, and it is well known that sexual difficulties are under-recognised⁸⁸.

Early intervention can help restore erectile function and may help to reduce the severity of treatment-related erectile dysfunction (ED) (see Table 9). Ideally, rehabilitation should start soon after cancer treatment, or in some situations before treatment e.g. within 3 to 6 months of starting radiotherapy.

To develop a more inclusive oncology service for LGBTQ+ patients, best practice for health professionals' behaviour, and questions to ask patients, have been published⁸⁹.

Talking about sexual difficulties

The WHO⁹⁰ identify having access to and receiving information relating to sexuality as a human right; sexual health is an essential part of quality of life and not addressing the topic can have considerable negative impact.

Conversations could include the person's partner(s), if appropriate and only if this is what the person wishes. These conversations should be started prior to radiotherapy with the **consent process**. The risk of changes in the reproductive organs needs to be discussed, making it an open topic moving forward.

Sexual dysfunction can be difficult to treat as it may have many causes, not all of which are a direct outcome of cancer treatment. For example, the emotional stress of having a cancer diagnosis has an impact on daily life and relationships. Many people also have pre-existing difficulties and/or their partner may have sexual difficulties.

As sexual difficulties have multifaceted causes including physiological/biological, psychological, interpersonal and socio-cultural factors, a joint approach to addressing problems should be adopted. Having a multi-disciplinary team approach will hopefully allow healthcare professionals to feel safe in addressing this topic and refer the person on to colleagues if the issues are beyond their comfort or expertise.

Professionals who lack confidence in discussing sexual issues may benefit from:

- Education⁹¹ including using frameworks (see PLISSIT section below)
- Familiarity with PROMs tools such as EORTC-SHQ22⁹², IIEF and SHIM
- Support within the MDT to develop confidence
- Increasing their knowledge of all referral/signposting pathways to support services, charities and businesses that are tailored to supporting people affected by cancer with sex and relationships issues.

⁸⁸ Dyer A, et al (2019) Management of erectile dysfunction after prostate cancer treatment: cross-sectional surveys of the perceptions and experiences of patients and healthcare professionals in the UK. *BMJ Open* 9:e030856.

⁸⁹ Berner, A.M. et al (2021) Education to Improve Cancer Care for LGBTQ+ Patients in the UK. *Clinical Oncology*, 33(4) p270-273.

⁹⁰ World Health Organisation webpage on Sexual health (accessed 8 July 2022).

⁹¹ Verrastro, V. et al (2020). Medical and health care professionals' sexuality education: State of the art and recommendations. *Int. J. Environ. Res. Public Health*, 17(7), p.2186

⁹² Oberguggenberger, A.S. et al (2018). Phase 1–3 of the cross-cultural development of an EORTC questionnaire for the assessment of sexual health in cancer patients: the EORTC SHQ-22. *Cancer medicine*, 7(3), pp.635-645.

Management guidance sources

The main source of guidance specifically following prostate radiotherapy is **Treating erectile dysfunction after radical radiotherapy and androgen deprivation therapy (ADT) for prostate cancer. A quick guide for health professionals: supporting men with erectile dysfunction** produced by Prostate Cancer UK and Macmillan Cancer Support⁹³. Many of the principles of ED management in the above document and the paper by White et al (2015) (see footnote) may also be useful in the management of ED arising from treatment of other pelvic malignancies.

The **practical guide on managing erectile dysfunction** (2018) is available from the British Society of Sexual Medicine but this is not specific to cancer.



At a glance Male Sexual Difficulties after Pelvic Radiotherapy

- Assessment and identification of sexual issues by clinicians can be done efficiently and easily with short, validated tools
- Use a style of inquiry which starts by acknowledging how common sexual dysfunction is amongst people, rather than asking direct questions
- Healthcare practitioners should recognise their level of competency and ability to explore sexual issues and offer support to the level they are competent.
- The PLISSIT model allows the practitioner to establish and maintain a safe relationship with people, to allow them to discuss issues relating to sexuality, sexual function and body image (see Table 8)
- Early intervention can help restore erectile function and may help to reduce the severity of treatment-related ED. Ideally, rehabilitation should start soon after cancer treatment.
- See Table 9 for full details of management advice.

⁹³ White ID, et al (2015) Development of UK guidance on the management of erectile dysfunction resulting from radical radiotherapy and androgen deprivation therapy for prostate cancer, International Journal of Clinical Practice, 69(1) p106–123.

Table 9: Male Sexual difficulties after pelvic radiotherapy

History	
<ul style="list-style-type: none"> Length of time since radiotherapy Comorbidities – especially cardiovascular and endocrine Existing medication Sexual orientation 	<ul style="list-style-type: none"> Assess patient's and partner's sexual function verbally or using validated sexual questionnaires such as: <ul style="list-style-type: none"> International Index of Erectile Function (IIEF) Sexual Health Inventory for Men (SHIM) EORTC Sexual Health questionnaire SHQ-22
Reported symptoms	
<ul style="list-style-type: none"> Reduced sexual activity Erectile dysfunction Orgasm difficulties Reduced libido 	<ul style="list-style-type: none"> Reduced satisfaction with sex See Bowel and/or Bladder sections if continence is a problem during sex. Early resolution of these issues will enable earlier start of sexual rehabilitation.
Assessment	
<ul style="list-style-type: none"> Review the person's Holistic Needs Assessment / Personalised Care and Support Plan and/or End of Treatment Summary. Assess the person's/couple's readiness to engage in an ED rehabilitation programme. Assess erectile function and sexual desire. The partner may also need support with their sexual function or wellbeing. Check baseline testosterone levels to exclude a deficiency Assess general health, comorbidities and concurrent medication which may affect sexual function. Once ED treatment is started, re-assess patient regularly – at least every three months. 	
Management	
<ul style="list-style-type: none"> Discuss sexual rehabilitation programmes with patient, and their partner, if possible. The benefits of ED rehabilitation are not immediately apparent to people, so it is important to clearly communicate the rationale behind any erectile function rehabilitation programme: to maintain blood flow to the penis; reduce damage to the muscle and tissue in the penis; and, provide a stimulus for erections. Start the rehabilitation programme early, ideally no later than 3-6 months after radiotherapy has commenced. In summary: <ul style="list-style-type: none"> Consider combination therapy of PDE5-I tablets and vacuum erection device (VED) as first-line treatment. Consider including daily low-dose PDE5-I tablets Consider using the most effective PDE5-I, as judged by treatment trial. If initial treatment fails, consider alprostadil pellets, injections or topical alprostadil, followed by a penile implant. Re-assess erectile function regularly Duration of treatment depends on response – avoid strict time limits. Encourage the person to schedule regular sexual contact with or without intercourse, to assist the management of low desire Encourage adoption of physical activity and lifestyle changes. Encourage use of pelvic floor muscle exercises. For full detail see the Prostate Cancer UK/Macmillan guidance 	

Table 9: Male Sexual difficulties after pelvic radiotherapy (continued)**When to refer to a specialist**

- Refer to ED service where available.
- Enable access to psychosexual therapy for people and or partner(s) who:
 - do not benefit from biomedical strategies alone, and/or
 - experience high levels of distress related to sexual changes, and/or
 - experience persistent low desire

Service Models, Standards and Professional Education**Service models for radiation-induced male sexual problems**

- Primary care teams should be aware of how to manage ED and how to refer to local urology team experts, ED services and Psychosexual services (ideally services designed for people affected by cancer).
- Oncology teams should know how to refer for Psychosexual services, and signposting to organisations such as **Relate** and **Pink Therapy**.
- There is no standardised service model, but it is common for urology or andrology doctors and nurses to manage patients as part of routine duties.

Suggested service quality standards and clinical audit measures**Service quality standards****NICE guidance for prostate cancer:**

1.3.36 Offer people who have had radical treatment for prostate cancer access to specialist erectile dysfunction services.

1.3.37 Offer people with prostate cancer who experience loss of erectile function phosphodiesterase type 5 (PDE5) inhibitors to improve their chance of spontaneous erections.

1.3.38 If PDE5 inhibitors do not restore erectile function or are contraindicated, offer people vacuum devices, intraurethral inserts or penile injections, or penile prostheses as an alternative.

Clinical Audit Measures

NICE guidance for prostate cancer. **Quality statement 4: Managing adverse effects of treatment** “People with adverse effects of prostate cancer treatment are referred to specialist services.” Measured as the proportion of people with adverse effects of prostate cancer treatment referred to specialist services. Numerator – the number in the denominator referred to specialist services. Denominator – the number of people with adverse effects of prostate cancer treatment.

Potential audit measures are within HNA, identification of problems and number of patients requiring referral to specialist service for complex psychosexual difficulties (those with less complex issues can be managed by clinical team with specific suggestions to address difficulties however effectiveness of these issues should be recorded).

Professional education

The Royal College of Radiologists’ **Clinical Oncology Speciality Training Curriculum** (2021) includes “Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required” (CIP 15) and “Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant” (CIP 13).

At the time of writing (mid 2022), there are no accredited UK based courses or online education modules for managing the male sexual effects of pelvic radiotherapy although it may be included as part of courses such as postgraduate training for nurses. In general, UK health professional oncology, urology or sexual medicine societies do not provide guidance or education on sexual effects of pelvic radiotherapy.

The College of Psychosexual and Relationship Therapy has a range of **self-access online classes** with CPD points and **external training accredited by CORST**. One online course is ‘**Living with the Sexual Consequences of Cancer: Adjustment & Rehabilitation after Breast Cancer and Prostate Cancer Treatment**’. Pink Therapy also offer training courses, but at time of writing, none are specific to cancer.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 ‘**Late Effects of Radiotherapy: a Patient’s Perspective**’.

An e-learning tool for therapeutic radiographers on pelvic radiotherapy late effects is being developed but is not yet publicly available⁹⁴.

⁹⁴ Oliver L, et al (2021). A novel e-learning tool to improve knowledge and awareness of pelvic radiotherapy late effects: qualitative responses amongst therapeutic radiographers. *BJR Open* 3:1.

Key Clinical Guidance References

White ID, et al. (2015) Development of UK guidance on the management of erectile dysfunction resulting from radical radiotherapy and androgen deprivation therapy for prostate cancer. *Int J Clin Pract.* 69(1):106–123.

Hackett, G et al.(2018) British Society for Sexual Medicine Guidelines on the Management of Erectile Dysfunction in Men - 2017. *The Journal of Sexual Medicine*, 15(4): 430-457.

White ID (2015) Sexual Difficulties after Pelvic Radiotherapy: Improving Clinical Management, *Clinical Oncology*, 27: 647-655.

Lymphoedema





Lymphoedema in the genital area, even what a healthcare professional may think is mild, may be seriously debilitating and life-changing, causing pain, difficulties with walking, sitting, urinating and sexual function.

It may be difficult for patients to find the words to explain the problems, so we must help them so it can be addressed as early as possible.”

Margaret Sneddon, Honorary Senior Research Fellow, University of Glasgow, Chair of the British Lymphology Society

Symptoms

Lymphoedema is a chronic, incurable inflammatory condition that occurs when the lymphatic drainage system fails. The lymphatic vessels collect fluid and cells from the interstitial spaces, then filter this lymph fluid through nodes before returning it to the circulatory system for excretion. The pelvic area is rich in lymph nodes that filter lymph from the pelvic structures and lower limbs. Damage to lymph nodes and vessels caused by surgery or scarring from radiotherapy can reduce/influence the flow of lymph locally and downstream of the damage⁹⁵. Damaged vessels will compensate by seeking collateral drainage routes and working harder to pump fluid onward, so there may be little outward sign of lymphoedema initially. But vessels may eventually fail. Failure will give rise to the symptoms of swelling and discomfort in whichever area is drained by the affected vessels. The degree of discomfort, pain, feelings of heaviness or bursting will depend on the affected area. Even slight swelling in the vulval area may cause acute discomfort, where the same amount of swelling in other areas may have less impact.

As lymph comprises not just fluid, but also fat cells, used proteins, dead/ dying cells, bacteria and macrophages which cannot be drained, there is a low-grade inflammatory response in the tissue spaces and an increased deposition of adipose cells. The physiological changes predispose the person to dry, cracked skin, as moisture is drawn from the dermal layers, congestion, thickening and increasing firmness of subcutaneous tissues caused by laying down of fibrin as well as adipose cells⁹⁶. This can occur in a non-uniform way, causing shape distortion and deepened skin folds⁹⁷. The longer such changes persist, the harder it is to reverse and the risk of other complications such as cellulitis and sepsis increases⁹⁸.

The impact on those who develop overt lymphoedema can be devastating. In addition to the physical symptoms, mobility and function may be affected. There may be practical, financial and social difficulties arising from e.g. getting suitable comfortable footwear and clothing, ability to continue in the same employment and the psychosocial effect of the appearance of a swollen limb or having to wear compression garments⁹⁹. It may seem like the last straw for someone who has already navigated the cancer journey. If the genital area is affected there may be difficulties with micturition and sexual function^{97,100}.

Damage caused to lymphatic nodes and vessels by radiotherapy increases the vulnerability of the lymphatic system and risk of developing lymphoedema. If other risk factors are present or develop, the burden on the lymphatic system and risk of lymphoedema is increased. These risk factors include obesity¹⁰¹, inactive lifestyle, family history of lymphoedema, circulatory problems, inflammation caused by insect bites, cuts and scrapes, fungal infections or sunburn¹⁰², the likelihood of lymphoedema increases further. Advice on prevention is key (see Table 10).

⁹⁵ Rockson, SG et al (2019) Cancer-associated secondary lymphoedema. *Nature Reviews Disease Primers* 5(1), 22.

⁹⁶ Azhar SH et al. (2020) The Unresolved Pathophysiology of Lymphedema. *Frontiers in Physiology* 11.

⁹⁷ Noble-Jones R et al (2021). Genital oedema. *Journal of Wound Care*. 30(Sup 2)12 p1-40.

⁹⁸ Keast DH et al (2014) Chronic oedema/lymphedema: under-recognised and under-treated. *Int Wound J*, 12 p328-333.

⁹⁹ Humphreys I and Thomas M (2017) Evaluation of the economic impact of a national lymphoedema service in Wales. *Br J Nurs*. 26(20) p1093-1100.

¹⁰⁰ Carlson et al (2020) The lymphedema and gynecologic cancer (LEG) study: Incidence and risk factors in newly diagnosed patients. *Gynecol Oncol*. 156(2) p467-474.

¹⁰¹ Pigott A et al (2020) Incidence and risk factors for lower limb lymphoedema associated with endometrial cancer: results from a prospective longitudinal cohort study. *Gynaecologic Oncology* 158(2), 375-381.

¹⁰² Woods M. (2019) Risk factors for the development oedema and lymphoedema *BJN* 28(4).

Incidence and Prevalence

Incidence and prevalence of lymphoedema following pelvic radiotherapy is not well understood. A study of endometrial cancer patients after radiotherapy showed around half had symptoms of swelling and heaviness at 12 months post-treatment, which could indicate lymphoedema¹⁰³. A study of gynaecological cancer patients showed similar incidence of lymphoedema symptoms of around 50% of which 60% were persistent – radiotherapy was identified as a risk factor¹⁰⁴.

Identification

It is imperative to take all steps to help the lymphatic system function as well as possible regardless of whether symptoms are present, thereby reducing any additional risks as early as possible (see Table 10). The risk of developing symptoms of lymphoedema does not diminish with time, so the need to employ risk reduction strategies is life-long. Lymphoedema and Chronic Oedema are long-term conditions and those living with it will need ongoing, holistic management and support.

Anyone reporting symptoms listed in Table 10 below should be promptly assessed to reduce the risk of symptoms worsening, and to ensure the patient is empowered to self-manage any early symptoms of lymphoedema. There is no justification for a 'wait and see' approach.

Management guidance sources

The main source of guidance is the **International Lymphoedema Framework** and the **British Lymphology Society**.



At a glance Lymphoedema after Pelvic Radiotherapy

- Anyone reporting symptoms listed in Table 10 should be promptly assessed to reduce the risk of symptoms worsening, and to ensure the patient is empowered to self manage any early symptoms of lymphoedema.
- There is no justification for a 'wait and see' approach.
- A physical examination of the legs and genitalia should be undertaken for swelling, leakage of fluid, and skin changes, plus symptoms that may indicate cellulitis – see Table 10 for detail plus management advice.
- It is important to rule out recurrence but also second cancers.
- Holistic care – the person is likely to have other PRD symptoms and mental health needs.

¹⁰³ Holmqvist, A. et al (2021) Urologic, lymphedema, pelvic pain and gastrointestinal symptoms increase after radiotherapy in patients with primary uterine tumors: a prospective longitudinal Swedish cohort study. Clin Transl Oncol 23, 1752–1760.

¹⁰⁴ Hayes SC et al (2017) Lymphedema following gynecological cancer: Results from a prospective, longitudinal cohort study on prevalence, incidence and risk factors. Gynecologic Oncology 146(3) p623-629.

Table 10: Lymphoedema after Pelvic Radiotherapy

Prevention	
<ul style="list-style-type: none"> ■ Support the individual to reduce risk factors as much as possible with appropriate advice, information and links to helpful organisations: ■ See Self Management section <ul style="list-style-type: none"> ■ Healthy weight ■ Healthy diet ■ Skin integrity ■ Physical activity: EveryBodyCan 	<ul style="list-style-type: none"> ■ Monitor and encourage individuals to self-monitor to enable early recognition and prompt action at the earliest possible signs of lymphatic drainage failure
History	
<ul style="list-style-type: none"> ■ Pre-existing risk factors e.g. obesity, immobility ■ Pre-existing lymphoedema ■ Sudden or gradual onset of symptoms 	<ul style="list-style-type: none"> ■ Drugs which may cause peripheral oedema or exacerbate existing chronic oedema. E.g.: calcium channel antagonists; corticosteroids; nonsteroidal anti-inflammatories (NSAIDs); alpha-blockers and sex hormones; etc
Reported symptoms	
<ul style="list-style-type: none"> ■ Swelling in legs, scrotum, penis, or genital area ■ Feeling of discomfort, heaviness ■ Skin tightness or stiffness ■ Aching or pain ■ Fluid leaking through skin ■ Difficulty passing urine 	<ul style="list-style-type: none"> ■ Red hot area/rash or 'flu-like, symptoms that may indicate cellulitis ■ Skin changes, growths, folds, thickening or peau d'orange changes ■ Self-assessment forms for lower limb and genital oedema: <ul style="list-style-type: none"> ■ male ■ female.
Assessment	
<p>Review the person's Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary.</p> <p>A physical examination of the legs and genitalia should be undertaken to determine:</p> <ul style="list-style-type: none"> ■ presence, site and extent of any swelling to be seen or perceived by the patient (note this may not 'pit' in later stages) 	<ul style="list-style-type: none"> ■ presence of leakage of lymph through the skin, more likely around the genitalia, if affected ■ dryness, cracking or deepening folds in the skin ■ thickening or firmness in the subcutaneous tissues ■ rash, redness or hypo- or hyper-pigmentation not already covered in the skin changes sections of this guidance, which may indicate cellulitis.

Management

Refer to a lymphoedema practitioner or service

While your patient is waiting to be seen, advise them:

- **Physical activity** – muscle activity will encourage lymph drainage. Swimming (water provides compression)
- Pelvic floor exercises may relieve or reduce risk of genital oedema
- Keep body weight within normal limits
- Drink plenty of fluids and avoid taking diuretics unless they have another medical condition that requires them to do so.
- Keep skin clean, moisturised and in the best possible condition
- Avoid injections, needles, blood tests and BP readings on the affected limb wherever possible
- Compression garments are a key component of ongoing treatment but it is vital that these fit well, are of an appropriate compression level and extend to above the level of the swelling. If a delay in referral is unavoidable, some people may find wearing a sports compression garment helpful, as long it does not dig into the tissues, causing a tourniquet effect

When to refer to specialist

- Any evidence of lymphoedema should prompt referral for comprehensive specialist assessment (local criteria vary), but always refer if any genital involvement.
- **Advice from the Lymphoedema Support Network** is available on what to do if no specialist service in your area

Service Models, Standards and Professional Education

Service models

Primary care and secondary care teams should be able to:

- Identify those at risk of lymphoedema¹⁰⁵ (high risk patients may need close monitoring)
- Review medication that may contribute to swelling
- Direct patients to appropriate 'reducing the risk' information¹⁰⁶
- Identify lymphoedema early in its development and initiate simple self-care strategies
- Identify when to refer on or to seek specialist advice and know the referral route to local lymphoedema services.
- The British Lymphology Society has a **Member Directory of lymphoedema practitioners and services**. You can also contact the **Lymphoedema Support Network**.
- Lymphoedema service models differ across the UK. **Commissioning guidance** is available and a **tariff guide**.

Suggested service quality standards and clinical audit measures

The National Lymphoedema Partnerships produced a **commissioning guidance** document in 2019 which lists various standards and measures for lymphoedema services.

¹⁰⁵ British Lymphology Society: **Who has a predisposition to lymphoedema and why**

¹⁰⁶ British Lymphology Society: **What information advice and support should be provided for those at risk of lymphoedema**

Professional education

The British Lymphology Society website lists **training courses and educational events**.

Health professionals can keep up to date with information and helpful resources by signing up to the **BLS Newsletter**.

Short courses:

- **BMJ Learning: Chronic oedema and lymphoedema online course** (1 hour, free)
- **BMJ Learning: Clinical pointers: Managing chronic oedema/lymphoedema in primary care online course** (1 hour, free)
- **Radiotherapy UK webinar 2020 ‘Late Effects of Radiotherapy: a Patient’s Perspective’**.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Key Clinical Guidance References

The International Lymphoedema Framework provide a range of **best practice publications** although some content may no longer be appropriate.

British Lymphology Society. **Consensus document on the management of cellulitis in lymphoedema**.

Noble-Jones R, Thomas MJ, Quéré I, Moffatt C, Borman P, DiCecco S, Gabe-Walters M, Gordon K, Bragg T, Morgan K. **Genital oedema**. Journal of Wound Care. 2021; 30(Sup 2)12:1-40

Resources for patients

- **Lymphoedema Support Network** information and support.
- The International Lymphoedema Framework videos for patients by **PocketMedic**, including for genital lymphoedema.
- The British Lymphology Society website resources
 - **What information, advice and support should be provided to those at risk of lymphoedema**
 - **Activity and exercise**.

Bone



**Including Radiotherapy-Related
Insufficiency Fractures (RRIFs)
and Avascular Necrosis (AVN)**

“ I have spoken to many patients with radiotherapy related insufficiency fractures and they tell me what a significant impact they have on their lives, in terms of pain, mobility problems and strain on relationships and family just when they are recovering from their cancer and trying to get their lives back on track. They often express frustration at the lack of appropriate care pathways for these fractures.”

**Dr Claire Higham, Consultant Endocrinologist,
Christie NHS Foundation Trust**

Symptoms

The specific bone complications related to Pelvic Radiation Disease are the development of Radiotherapy-Related Insufficiency Fractures (RRIFs) and, more rarely, fragility fractures of the neck of femur and avascular necrosis.

Anecdotal evidence reported in the literature¹⁰⁷ suggests that people develop sudden onset pain in the pelvis – they often describe that they feel like they had been “kicked by a horse”. The pain and immobility potentially increase the risk of infections, pressure sores and mortality.

Incidence and Prevalence

RRIFs occur at a median of 8-20 months following radiotherapy (range between 2 months and 8 years) in 4% to 20% of patients. Reported incidence is variable depending on the modality used for identification, whether both symptomatic and asymptomatic fractures are reported and the length of time since radiotherapy.

Identification

There have been a few risk factors for RRIFs identified; predominantly in patients with underlying gynae-oncology cancers, although the fractures occur in patients with any cancer type undergoing external beam radiotherapy. The likely risk factors include (i) age (ii) smoking (iii) osteoporosis (iv) menopause, especially premature menopause (v) low BMI^{108,109}.

While osteoporosis is associated with RRIFs, a substantial number of patients have normal bone mineral density (BMD) or osteopenia with normal Z-scores and low conventional fracture risk as assessed by **FRAX** scoring at the time of the RRIF.

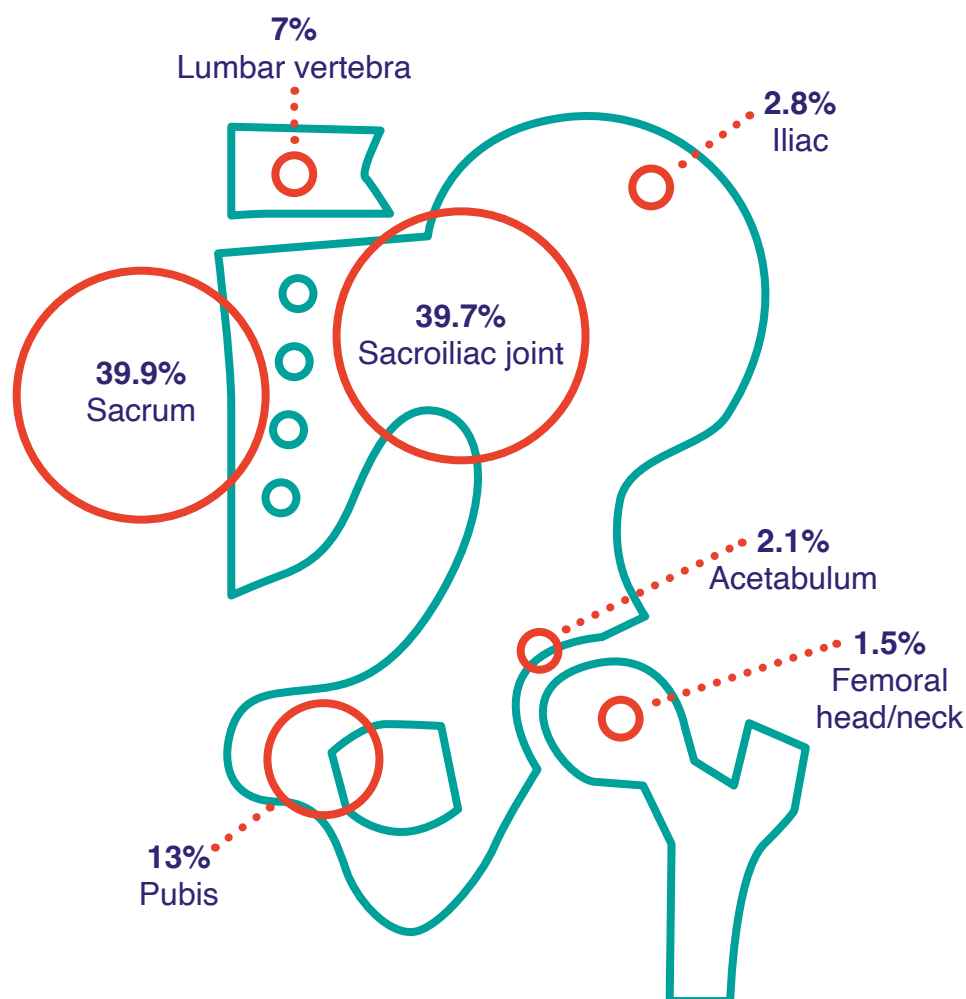
RRIFs most commonly occur in the sacroiliac region (up to 40%), followed by sacral (34%) and pubis (13%) (**see Figure F**). There are no qualified/specific symptoms checklists or PROMs for RRIFs.

¹⁰⁷ Kido A; et al (2016) Walking Disability in Patients with Pelvic Insufficiency Fracture after Radiotherapy for Uterine Cervical Cancer. *Prog Rehabil Med.* 1:20160009.

¹⁰⁸ Razavian N, et al (2020). Radiation-Induced Insufficiency Fractures After Pelvic Irradiation for Gynecologic Malignancies: A Systematic Review. *Int J Radiat Oncol Biol Phys.* 108(3) p620-634.

¹⁰⁹ Sapienza LG, et al (2020). Pelvic Insufficiency Fractures After External Beam Radiation Therapy for Gynecologic Cancers: A Meta-analysis and Meta-regression of 3929 Patients. *Int J Radiat Oncol Biol Phys.* 106(3) p475-484.

Figure F. Frequency of occurrence of Radiotherapy-Related Insufficiency Fractures (RRIFs)



From: Sapienza LG et al (2020). Pelvic Insufficiency Fractures After External Beam Radiation Therapy for Gynecologic Cancers: A Meta-analysis and Meta-regression of 3929 Patients. *Int J Radiat Oncol Biol Phys.* 106(3):475-484.

Fragility Fractures

Fragility fractures are much less common with modern radiotherapy techniques including a reduced field of radiotherapy that excludes lumbar spine and hip.

Avascular Necrosis (AVN)

Avascular necrosis (AVN) is also associated with radiotherapy but is rare, particularly with modern techniques where the femoral heads are not within the field of radiotherapy, as AVN mostly effects bones with a single blood supply and limited collaterals¹¹⁰.

Management guidance sources

There are no evidence-based management pathways for RRIFs. The optimal treatment is unclear.

¹¹⁰ Daoud AM, et al (2016). Avascular Necrosis of the Femoral Head After Palliative Radiotherapy in Metastatic Prostate Cancer: Absence of a Dose Threshold? *Cureus.* 8(3):e521.



At a glance Bone Symptoms after Pelvic Radiotherapy

- Assessment for RRIFs is based on reporting of pain that would be consistent with RRIF following pelvic radiotherapy (usually 3 months to 3 years)
- Imaging is needed to exclude recurrence of cancer or second primary cancer and confirm the diagnosis of RRIF.
- It is sensible to assess and mitigate risk factors for poor bone health once fracture confirmed e.g. Vitamin D and calcium; nutrition; smoking; alcohol; oestrogen.
- Refer for DXA scan and to specialist metabolic bone, rehabilitation, pain service and orthopaedics as required.
- Management with:
 - Explanation and reassurance to patient (once further cancer ruled out)
 - Pain control including non-pharmacological measures (**see Pain section**)
 - Rehabilitation:
 - based on how much pain is interfering with function not just severity of pain
 - initial offloading/reduced mobilisation and rest
 - slow mobilisation/low impact training once able.
- See Table 11 for full detail.

Table 11: Bone Symptoms after Pelvic Radiotherapy**History**

- No previous trauma necessary although may occur after fall/unusual movement.

Reported symptoms

- Pain localisation likely depends on location of fracture (Figure F)
- Described as “intractable lower back/pelvic pain”.
- Radiating pain into buttock/ groin/legs
- Pain often worse on movement or after weight bearing and settles on rest.

Assessment

Review the person’s Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary.

- All patients describing pelvic pain following radiotherapy should have imaging to exclude recurrence of cancer.

Exclude:

- Other soft tissue injuries
- Lumbar radiculopathy or Radiation-induced Lumbar Plexopathy

- MRI is the imaging modality of choice as it has been shown to identify more fractures than CT¹¹¹
- Technetium-99m-MDP bone scan can be helpful to distinguish fractures from metastatic disease/ recurrence; particularly if classic Honda sign is present.
- PET/CT may be helpful where there is uncertainty on MRI/CT imaging¹¹².

Management

Diagnosis of RRIFs is based on radiological confirmation of the presence of a fracture. MRI is the recommended first line of imaging where possible.

Radiological features of RRIFs (insufficiency fractures)

Adapted from Razavian 2020¹¹³

Imaging Modality	Diagnostic Features	Sensitivity/specificity
Plain Film X-ray	Linear areas of sclerotic	Low
Technetium-99m-MDP bone scan	Unilateral/bilateral (H-shaped) uptake in pelvis – “Honda sign”	H-sign in 30-40%
Magnetic Resonance Imaging	Focal regions with areas of low T1 weighted signal intensity (oedema) and high STIR signal intensity Bone marrow oedema indicated by high signal intensity on T2 weighted images	High
Computed tomography	Hyperdense lines on bone window	
Positron emission tomography/ computed tomography	Fracture lines with mild-FDG uptake	High

Explanation

The diagnosis and natural history should be explained, emphasising the fact that these fractures are not related to the cancer and that they usually improve over time. Macmillan Cancer Support [webpage on pelvic insufficiency fractures](#).

¹¹¹ Cabarrus MC, et al (2008). MRI and CT of insufficiency fractures of the pelvis and the proximal femur. Am J Roentgenol. Oct;191(4) p995-1001.

¹¹² Sabaliauskas, V. and Tiškevičius, S. (2021) Diagnosing sacral insufficiency fractures after radiotherapy in women with cervical cancer: Report of three cases. Radiology Case Reports, 16(10) p2938-2944.

¹¹³ Razavian N, et al (2020). Radiation-Induced Insufficiency Fractures After Pelvic Irradiation for Gynecologic Malignancies: A Systematic Review. Int J Radiat Oncol Biol Phys. Nov 1;108(3):620-634.

Table 11: Bone Symptoms after Pelvic Radiotherapy (continued)

Management
<p>Address known risk factors</p> <ul style="list-style-type: none"> ■ Adequate calcium and vitamin D (1000mg calcium+ 800 IU vit D once daily) ■ Adequate nutrition ■ Smoking cessation ■ Alcohol intake within recommended limits ■ Oestrogen containing HRT (where there are no contraindications – see Endocrine section). <p>Pain control</p> <p>Depends on the severity of pain. Some require opioids and hospitalisation for pain management if pain is severe and severely interfering with function. See Pain section for advice on analgesia and non-pharmacological management such as heat, cold, TENS, splinting/bracing.</p> <p>Rehabilitation</p> <p>Provide advice and input with regards to rehabilitation.</p> <ul style="list-style-type: none"> ■ Base decision on how much pain is interfering with function not just severity of pain. ■ Initial offloading/reduced mobilisation and rest – crutches/aids if required/pain impacting function. ■ Slow mobilisation once able and pain not impacting function <ul style="list-style-type: none"> ■ low impact training – aquatherapy ■ followed by cycling/walking – alter-gravity treadmill ■ strength training – prescribed ideally by a sports physiotherapist ■ referral to physiotherapy. <p>Bone Mineral Density (BMD)</p> <ul style="list-style-type: none"> ■ Assessment of BMD by DXA imaging. ■ There is currently no clinical evidence that anti-resorptive therapy is effective at either primary or secondary prevention of RRIFs. ■ Teriparatide is contra-indicated in irradiated bone. ■ Anti-resorptive therapy could be considered where conventional fracture risk is found to be high based on DXA/FRAX assessment. ■ There is current evidence to include a RRIF as a previous fracture in the FRAX algorithm.
When to refer to specialist
<ul style="list-style-type: none"> ■ Refer people with RRIFs to secondary care Metabolic Bone or Rehabilitation services. ■ It is rare that RRIFs are unstable fractures, but if so, refer to Orthopaedics. ■ May require referral to Pain team for procedural management such as nerve blocks if pain severe and interfering with person's ability to function.

Service Models, Standards and Professional Education

Service models

- Primary care and secondary care teams should be aware of how to manage bone health and the referral route to a metabolic bone clinic, rehabilitation services, pain clinic and psychological support.
- Example of service model –
 - **Metabolic Bone Service** at Sheffield Teaching Hospitals NHS Foundation Trust

Suggested service quality standards and clinical audit measures

1. All patients with pelvic pain post pelvic radiotherapy should be referred for pelvic MRI scan.
2. All patients with symptomatic RRIF should be assessed for
 - a. Pain severity and pain interference using appropriate tool
 - b. Mobility, using Short Musculoskeletal Function Assessment (SMFA)
 - c. Quality of life using Hospital Anxiety and Depression Scale (HADS) and EQ-5D
3. All patients with symptomatic RRIF should be referred to
 - a. Metabolic bone clinic for DXA and risk assessment
 - b. Physiotherapy – mobility aids and rehabilitation pathways
 - c. Appropriate team for pain management if required.
 - d. Counselling for options that reduce distressing and debilitating symptoms which impact on ability to manage daily life.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing (mid 2022), there are no accredited UK-based courses or online education modules for managing the bone effects of pelvic radiotherapy. In general, UK health professional oncology and other medical societies do not provide guidance or education on fragility fracture management.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 'Late Effects of Radiotherapy: a Patient's Perspective'.

Key Clinical Guidance References

van den Blink QU, Garcez K, Henson CC, Davidson SE, Higham CE. (2018) Pharmacological interventions for the prevention of insufficiency fractures and avascular necrosis associated with pelvic radiotherapy in adults. Cochrane Database Syst 2018 Apr 23;4(4).

Research note

A research study is currently underway, addressing prevention of bone problems due to radiotherapy: the MRC funded feasibility randomised controlled trial “RadBone” ‘Bone Toxicity Following Pelvic Radiotherapy: A Prospective Randomised Controlled Feasibility Study Evaluating a Musculoskeletal Health Package in Women With Gynaecological Cancers Undergoing Pelvic Radiotherapy’¹¹⁴.

¹¹⁴ Chatzimavridou Grigoriadou V, et al (2022) RadBone: bone toxicity following pelvic radiotherapy – a prospective randomised controlled feasibility study evaluating a musculoskeletal health package in women with gynaecological cancers undergoing pelvic radiotherapy. BMJ Open 2022;12:e056600.

Endocrine



This 'Endocrine' section is designed to offer guidance for cisgender women, cisgender men, transwomen, transmen, gender-fluid and non-binary individuals.

“ Sex hormones have wide-reaching effects on well being, sexual function and have important effects on bone health. Imagine going into an early menopause and not being offered oestrogen replacement for over 10 years – it can be a life changing intervention. It is key to consider ovarian and testicular insufficiency to ensure people are offered hormone replacements as appropriate. Fertility can also be affected and should be discussed early so plans can be put in place as appropriate.”

**Dr Helen Simpson, Consultant Endocrinologist
University College London Hospitals NHS Foundation Trust**

Important: Amongst pelvic cancers, prostate, ovarian and endometrial cancers often involve treatments that can cause hot flushes but hormone replacement therapy (HRT) with oestrogen or testosterone replacement may be contraindicated if the tumours are hormone sensitive.

Symptoms

Endocrine consequences of treatment involving hormones produced in pelvic organs are common after pelvic or total body radiotherapy. Quality of life can be severely affected as a result of loss of fertility, sexual difficulties, fatigue, hot flushes, and other problems that interfere with daily life and relationships. These problems may be in part preventable, or, if they do happen, then they can often be overlooked due to their non-specific nature and, for some people, the length of time before an impact is felt.

Prevalence – Testicular insufficiency (hypogonadism)

The effects of radiotherapy on the testes are often temporary, and many people regain their fertility within a few months after treatment, but permanent infertility may occur and therefore preserving sperm before starting cancer treatment is an option. Testicular insufficiency causes low testosterone and/or effects on sperm due to damage to the testes^{115, 116}.

In males the Sertoli cells, which produce sperm, are very sensitive to radiotherapy, doses to the testicles of > 2-3Gy can impair spermatogenesis. The Leydig cells, which produce testosterone, are more resistant to radiotherapy and so testosterone deficiency is less common; and occurs after exposure of testicles to > 12 Gy of radiotherapy. The frequency of hypogonadism likely increases with higher doses of radiotherapy and age¹¹⁷.

Prevalence – Ovarian insufficiency

The effects of radiotherapy on ovarian tissue are usually permanent and usually occur within the first 12 months after treatment but can take years to develop depending on age and ovarian reserve. Ovarian insufficiency causes low oestrogen and irregular release of eggs due to damage to the ovary/ies.

In people who do not undergo ovarian transposition (moving ovaries to outside the field of radiotherapy), premature ovarian failure will occur in 90-100% of those who undergo pelvic radiotherapy where the ovaries receive > 15 Gy radiotherapy in those aged > 20 yrs. The risk increases with higher doses of radiotherapy, and age¹¹⁸.

There are several options for fertility preservation and fertility sparing procedures.

Oestradiol is important for the prevention of menopausal symptoms and bone protection.

¹¹⁵ Mortezaee K, et al (2020) **The Effect of Prostate Cancer Radiotherapy on Testosterone Level: A Systematic Review and Meta-analysis.** Anticancer Agents Med Chem. 20(6):636-642.

¹¹⁶ Farhood B, et al (2019) **A systematic review of radiation-induced testicular toxicities following radiotherapy for prostate cancer.** J Cell Physiol. 234: 14828– 14837.

¹¹⁷ Skinner R, et al (2017) **Recommendations for gonadotoxicity surveillance for male childhood, adolescent and young adult cancer survivors: A report from the International Late Effects of Childhood Cancer Guideline Harmonization Group in collaboration with the PanCareSurFup Consortium.** Lancet Oncology 18:e75-e9

¹¹⁸ van Dorp. W. et al (2016) **Recommendations for Premature Ovarian Insufficiency Surveillance for Female Survivors of Childhood, Adolescent, and Young Adult Cancer: A Report From the International Late Effects of Childhood Cancer Guideline Harmonization Group in Collaboration With the PanCareSurFup Consortium** Journal of Clinical Oncology 34:28, 3440-3450

Identification and Assessment

Ensure people are asked about potential endocrine symptoms as they may not realise these are due to cancer treatment and that there may be ways to improve them, either through medical management and/or self-management (see **Self Management section**).

Always ask about psychological issues as these are often associated with hormonal problems. See **Mental Health and Wellbeing section**. Consider referral to psychosexual services.

Management Guidance

Publications from the **International Guidelines Harmonization Group** for Late Effects of Childhood Cancer are helpful for people treated as a child, adolescent or young adult, and these recommend risk-adapted lifelong surveillance of endocrine functions.

Equivalent guidance for endocrine consequences of treatment of adult-onset cancers is less clear¹¹⁹. The guidance tables in this section are based on the **Macmillan Endocrine Late Effects one page guides (2017)**. Other guidance such as the section on premature ovarian insufficiency in the **NICE Menopause Guideline** is available.

¹¹⁹ Gebauer, J et al (2019) Long-Term Endocrine and Metabolic Consequences of Cancer Treatment: A Systematic Review, *Endocrine Reviews*, 40:3, P 711–767



At a glance **Endocrine Issues after Pelvic Radiotherapy**

- Assessment: Ensure people are asked about potential endocrine symptoms, which are often associated with psychological issues.
- Blood tests for testosterone or ovarian insufficiency.
- Management of Testicular insufficiency – refer to Endocrinology for testosterone replacement and Fertility service for discussion or treatment of infertility. For full details see **Table 12**.
- Management of Ovarian insufficiency
 - Consult with Oncology regarding contraindications for HRT. For full details see **Table 13**.
 - Refer young adults to Endocrinology.
 - If person wishes to discuss fertility in context of ovarian insufficiency, then refer to Fertility service.
 - If pregnant, refer to Obstetrics, as pregnancies are high risk after pelvic radiotherapy.

Table 12: Testicular Insufficiency

Following radiotherapy for pelvic cancers including childhood cancers

History

- Concerns about low testosterone
- Male Fertility concerns

Reported symptoms

Concerns about low testosterone

- Reduced libido
- Erectile dysfunction
- Decrease in hair growth on face/body
- Reduced muscle bulk
- Gynecomastia (enlarged breast tissue)
- Osteoporosis/fragility fracture
- Hot flushes
- Drenching sweats
- Palpitations
- Panic attacks
- Tiredness
- Problems with memory, concentration
- Mood changes, psychological problems
- Fertility concerns (see below)

Male Fertility concerns

- Reduced libido
- Erectile dysfunction
- Decrease in hair growth on face/body
- Reduced muscle bulk
- Gynecomastia (enlarged breast tissue)
- Osteoporosis/fragility fracture
- Hot flushes
- Drenching sweats
- Palpitations
- Panic attacks
- Tiredness
- Problems with memory, concentration
- Mood changes, psychological problems

Assessment

Concerns about low testosterone

Review the person's Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary.

For Low testosterone

If a young adult, have they progressed through puberty and grown to an appropriate height?

Bloods tests for testosterone insufficiency

NB Do not check testicular function at the time of significant other illness, or whilst undergoing active cancer-related treatment.

- LH, FSH, 9am testosterone, sex hormone binding globulin (SHBG) (to calculate free testosterone, which may be helpful, for example, in obese patients)
- Exclude other causes of low testosterone, e.g. elevated prolactin
- High FSH and normal testosterone can indicate Sertoli cell damage, which only affects sperm production (no effect on testosterone).

Male Fertility concerns

Elevated FSH in presence of normal testosterone may indicate Sertoli cell damage and fertility issues

Table 12: Testicular Insufficiency (continued)

Management	
<p>Concerns about low testosterone</p> <p>If blood tests show low 9am testosterone (on two occasions), refer to Endocrinology.</p> <p>Testosterone replacement</p> <ul style="list-style-type: none"> ■ Discuss fertility ■ Testosterone gel, short acting or long-acting injections. ■ Monitor: <ul style="list-style-type: none"> ■ testosterone level ■ FBC (due to risk of secondary polycythaemia) ■ prostate/PSA screening. <p>Non-pharmaceutical management for hot flushes</p> <ul style="list-style-type: none"> ■ Interventions to reduce stress if it is a trigger for hot flushes, e.g. Cognitive Behavioural Therapy (CBT) and acupuncture ■ Self-management such as reducing spicy foods, caffeine, alcohol, and sleeping in or wearing natural fibres. See Self Management section. 	
<p>Treatment of hot flushes in people with prostate cancer on ADT</p> <ul style="list-style-type: none"> ■ NICE recommends medroxyprogesterone 20 mg per day to be offered initially for 10 weeks ■ If medroxyprogesterone not effective, then consider change to cyproterone acetate, with a 50mg starting dose, and if necessary, upward titration within the range 50–150mg/day in 1 to 3 divided doses. 	
<p>Male Fertility concerns</p> <ul style="list-style-type: none"> ■ Arrange semen storage as appropriate. ■ Fertility should be discussed with the person at risk or with evidence of testicular insufficiency and before starting testosterone replacement. ■ If semen stored prior to cancer therapy, advise the person to contact the storage facility to arrange a check of current fertility status and confirm they have up-to-date details and consent. 	
<ul style="list-style-type: none"> ■ If person interested in knowing their fertility status, arrange semen analysis with appropriate counselling. ■ If sexually active, advise the use of contraception and discuss risks of sexually-transmitted infections. 	
When to refer to specialist	
<p>Concerns about low testosterone</p> <p>If blood tests show low 9am testosterone (on two occasions), refer to Endocrinology.</p>	
<p>Consult with oncologist if testosterone remains low, symptoms debilitating and ADT completed (testosterone replacement may be suggested).</p>	
<p>Male Fertility concerns</p> <p>If person is seeking fertility, or wishes to review options for future fertility, then refer to local fertility services with expertise in male factor infertility.</p>	
<p>Psychological support may be needed to discuss abnormalities in semen analysis and loss of fertility.</p>	

Table 13: Ovarian Insufficiency

Following radiotherapy for pelvic cancers including childhood cancers

History

- Concerns about ovarian insufficiency
- Female Fertility Concerns

Reported symptoms

Concerns about ovarian insufficiency

- | | |
|---------------------------------------|--|
| ■ Hot flushes | ■ Loss of bone mass – See Bone section |
| ■ Drenching sweats | ■ Muscle aches and pain |
| ■ Palpitations | ■ Breast tenderness/gynecomastia |
| ■ Panic attacks | ■ Memory/concentration problems |
| ■ Tiredness | ■ Mood changes |
| ■ Sexual dysfunction / lack of libido | ■ Amenorrhoea and oligomenorrhoea |
| ■ Vaginal dryness, Dyspareunia | ■ Recurrent urinary tract infections |
| ■ Weight gain | |

Assessment

Concerns about ovarian insufficiency

Review the person's Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary. Blood tests for:

- | | |
|--------------------------------------|---|
| ■ Luteinising Hormone (LH) | ■ Oestradiol (day 1–5 if menstruating) |
| ■ Follicle Stimulating Hormone (FSH) | ■ Consider exclusion of other causes of amenorrhoea e.g. Polycystic Ovary Syndrome (PCOS), elevated prolactin |

Concerns about female fertility

- | | |
|--|------------------------------|
| ■ Anti-Müllerian Hormone (AMH) for ovarian reserve | ■ Egg freezing pre-treatment |
| ■ Antral follicle count | |

Table 13: Ovarian Insufficiency (continued)

Management	
Concerns about ovarian insufficiency Ask oncologist for advice re risk of using HRT if person is having active treatment for ovarian or endometrial cancer. Otherwise: <ul style="list-style-type: none"> ■ If under 50 years of age, in the absence of contraindications start oestrogen replacement (see below). ■ Contraindications include breast, endometrial cancer, and presence of BRCA mutations; thrombophilia. ■ If oestrogen replacement contraindicated or not wanted, please review 'Hot flushes and HRT/ testosterone replacement contraindicated' guide ■ Contraception is recommended in premenopausal people. 	
Oestrogen replacement¹²¹ <ul style="list-style-type: none"> ■ Consider hormone replacement therapy (HRT) first line (more physiological). If contraception required then combined oral contraceptive pill (COCP) or HRT with alternative method of contraception. ■ For people who develop low oestrogen at younger ages, the risks of HRT are likely to be less than those in the usual post-menopausal age range. 	<ul style="list-style-type: none"> ■ People with a uterus must have progestogen (cyclical, continuous, or impregnated intrauterine contraceptive device (IUCD)) together with oestrogen replacement.
	Alternatives to HRT <ul style="list-style-type: none"> ■ Drug options: clonidine (25–75mcg orally twice daily or via patch), venlafaxine (37.5–75mg daily). ■ Weak selective serotonin reuptake inhibitors (SSRIs) such as citalopram (10–20mg once daily) or gabapentin (300mg three times daily). ■ Oxybutynin¹²⁰
	Non-pharmaceutical management for hot flushes <ul style="list-style-type: none"> ■ Interventions to reduce stress if it is a trigger for hot flushes, e.g. CBT and acupuncture ■ Self-management such as reducing spicy foods, caffeine, alcohol, and sleeping in or wearing natural fibres. See Self Management section.
	Vaginal dryness <ul style="list-style-type: none"> ■ Consider treatments such as topical oestrogen, a vaginal moisturiser or lubricant, and Dermol 500 (wash in the standard way).
Female Fertility Concerns <ul style="list-style-type: none"> ■ If sexually active, advise the patient to use contraception even if no periods as there is a small chance of unplanned pregnancy. ■ Discuss risks of STI if sexually active. 	
	<ul style="list-style-type: none"> ■ Discussion pre-treatment about future fertility may be by donor eggs if person develops premature ovarian insufficiency.
When to refer to specialist	
Concerns about ovarian insufficiency Ask oncologist for advice re risk of using HRT if person is having active treatment for ovarian or endometrial cancer. If unsure, seek specialist advice from a professional with expertise in menopause.	
Female Fertility Concerns <ul style="list-style-type: none"> ■ If person is seeking fertility or wishes to review options for future fertility in context of ovarian insufficiency, then refer to local fertility services or late effects clinic with expertise in reproductive medicine. 	If young adult, refer to Endocrinology or Gynaecology. With vaginal dryness, cervical smears may be challenging and painful – seek specialist advice as required.
	<ul style="list-style-type: none"> ■ If the person becomes pregnant then refer to obstetrics ensuring to state the person had pelvic radiotherapy.
	Pregnancies are high risk if person has had pelvic radiotherapy.

¹²⁰ Leon-Ferre RA, et al (2019) Oxybutynin vs Placebo for Hot Flashes in Women With or Without Breast Cancer: A Randomized, Double-Blind Clinical Trial (ACCRU SC-1603). JNCI Cancer Spectr.4(1):pkz088.

¹²¹ Hamoda H et al (2020) The British Menopause Society & Women's Health Concern 2020 recommendations on hormone replacement therapy in menopausal women. Post Reproductive Health 26 p181-209.

Service Models, Standards and Professional Education

Service models

Endocrine issues may be dealt with in primary care or in secondary care, such as an endocrine, menopause or fertility clinic.

Endocrine issues for people treated for cancer as a child or young person are often managed in Late Effects services dedicated for this patient group. Examples:

- Late Effects – Sheffield Children's NHS Foundation Trust
- Long-term-follow-up (LTFU): Late effects of Cancer: University College London Hospitals NHS Foundation Trust

Suggested service quality standards and clinical audit measures

- Patients should be informed of impact of treatment on testicular or ovarian function.
- At follow up patients should be asked for symptoms of:
 - testosterone or oestrogen deficiency, and if they are having periods
 - issues with sexual function
 - fertility.
- Patients should have access to referral to an endocrinology or menopause service so hormone replacement with testosterone or oestrogen can be discussed.
- Patients should have access to referral to specialist fertility services before and/or after treatment if patients wishes to discuss this.
- Patients should have access to erectile dysfunction service as needed.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing (mid 2022), there are no accredited UK-based courses or online education modules for managing the endocrine effects of pelvic radiotherapy

The British Menopause Society has **study events** on menopause care and a range of **tools** for clinicians.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 '**Late Effects of Radiotherapy: a Patient's Perspective**'.

Key Clinical Guidance references

Macmillan 'Endocrine Late Effects' 2017

NICE Guideline. **Menopause: diagnosis and management** 2019.

Lumbar Plexopathy



“

Living with my radiation-induced nerve and muscle damage is very frustrating, particularly since it is not something that people, including doctors, are generally aware of. It is a struggle to complete what used to be simple tasks. My husband is very supportive, but I do worry about what will happen when/if he cannot help me as much as he does.”

Debbie, who had two rounds of chemo-radiation for cervical cancer 13 years ago

“

Although classed as rare, the negative consequences of Lumbar Plexopathy can be many for the patient and their family. It is therefore imperative that health professionals do their best to understand as much as they can about the condition and resources to refer and signpost to in order to ensure patients receive the best care possible.”

Rhea Crighton, Clinical Matron for Cancer Services, Royal Devon University Healthcare NHS Foundation Trust

Symptoms

Important: If pain is the primary complaint or severe and having a profound impact on the individual's ability to function, malignancy should be suspected, and patient should be urgently referred.

RILP symptoms include: lower limb weakness, and in some cases paralysis, paraesthesia/dysaestheias, numbness and/or muscle fasciculations; lower back pain which may be worse when lying flat; radiating leg pain and foot drop, to name a few. Pain, if present, may be described as aching, burning, cramping, shooting, gnawing, electric, knife-like etc. (see Table 14).

Radiation-Induced Lumbar Plexopathy (RILP) can have multiple deleterious physical, social and psychological consequences for the individual and their family and therefore early identification, timely investigations, appropriate supported self-management and onward referral for specialist interventions are essential.

Incidence and Prevalence

RILP is classed as a rare consequence of radiotherapy treatment which is often slowly progressive and the true incidence of which is unknown.

Identification

Every individual receiving pelvic radiotherapy should be appropriately coded and receive an end of treatment summary to improve the possibility of highlighting and screening these patients as well as to improve patient and professional education regarding possible symptoms.

Dose per fraction (50-60 Gy) is an important factor to consider when looking at predicting those at a higher risk of RILP, especially in those who were also treated with brachytherapy and concomitant chemotherapy (particularly those known to be neurotoxic such as platinum, vinca alkaloids and taxane chemotherapy). Other risk factors include: extremes of age, obesity, smoking, pre-existing health conditions such as diabetes, high blood pressure, peripheral neuropathy, vascular disease etc. These patients should therefore be screened at each opportunity for any symptoms in order to rule out recurrence and start supported self-management as early as possible¹²².

The cause of RILP is thought to be due to radiation damaging endothelial cells, causing inflammatory cell migration and fibrosis, which can then lead to microvascular injury and ischaemia.

¹²² Delanian S, et al (2012). Radiation-induced neuropathy in cancer survivors. *Radiother Oncol.* 105(3):273-82

Management guidance sources

There are no management guidance sources, current service models, services quality standards or clinical audit measures as this is still an under-recognised condition.



At a glance Radiation-Induced Lumbar Plexopathy (RILP)

- See Table 14 for management guidance.
- Rule out cancer recurrence, progression or second primary cancer
- Rule out non-cancer related causes of plexopathy such as a sacral fracture, diabetes, sarcoidosis, infection, post-surgical, or other causes of symptoms such as cauda equina syndrome, radiculopathy etc.
- Assessment for RILP involves:
 - detail of signs and symptoms, including reduced mobility, trips and falls, drop foot, muscle fasciculations, back and/or lower limb pain, weakness, numbness etc.
 - upper and lower limb musculoskeletal examination including spine and upper and lower limb neurological examination
 - consider need for imaging and/or electrodiagnostic tests to exclude differential diagnoses.
- There is no specific treatment or cure for RILP. Individualised, symptom-based management is needed, potentially involving several specialties.

Table 14: Radiation-Induced Lumbar Plexopathy**History**

Treated for an abdominal &/or pelvic malignancy with external beam radiation

+/- brachy-therapy

+/- chemo-therapy

+/- surgery > 6 months ago

NB treatment could be decades ago.

Reported Symptoms

Important: If pain is the primary complaint or severe and having a profound impact on the individual's ability to function, malignancy should be suspected and patient should be urgently referred.

- Lower limb weakness
- Lower limb paraesthesia/dysaestheias
- Lower limb numbness
- Lower back pain which may be worse when lying flat
- Radiating leg pain

- Lower limb muscle fasciculations
- Lower limb paralysis
- Symptoms are more often bilateral, asymmetric and distal
- Symptoms can present decades after treatment.
- Pain, if present, is often mixed neuropathic, nociceptive, inflammatory and described as aching, burning, cramping, shooting, gnawing, electric, knife-like etc

Assessment

Review the person's Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary.

Upper and lower limb musculoskeletal examination including spine and upper and lower limb neurological examination should be performed in order to assess for any signs or symptoms, including:

- Tenderness over any bony prominences (high suspicion for fractures due to risk of RRIF)
- Muscle weakness, particularly related to hip flexion, adduction and knee extension
- Sensory changes or loss may occur at medial, anterior or posterior thigh, medial leg or dorsum of foot
- Reflexes at knee and ankle may be reduced or absent
- Rectal examination for any changes to tone or sensation

If patient has reduced tone or sensation this should be seen as a red flag for cauda equina syndrome as saddle anaesthesia and bowel and bladder incontinence are rare in RILP alone.

- Medication review as some drugs can cause symptoms of neuropathy, muscle pain/weakness etc.
- Pathology tests: in order to rule out other conditions which may cause similar symptoms: Vit B12, Folate, FBC, ESR, CRP, U&E's, LFT's, TFT's, blood glucose, HbA1C, bone profile (ALP, Albumin, Total Protein, Calcium), Vit D.
- Plain x-ray of lumbar spine and pelvis to rule out spinal and pelvic fractures

Referral to Neurology is required for: Lumbar MRI with contrast or CT with contrast if contra-indications to MRI – to rule out malignancy

- Electrodiagnostic – Nerve Conduction Study (NCS) and Electromyography (EMG) to aide diagnosis, as myokymic discharges are often present in RILP but not malignancy for example.

Table 14: Radiation-Induced Lumbar Plexopathy (continued)**Management**

The individual should be assessed for other aspects of Pelvic Radiation Disease alongside RILP due to the high incidence of multiple system involvement.

There is no specific treatment or cure for RILP. Individualised, symptom-based management involving a MDT approach is needed.

Cultural/Social

- Refer for appropriate social support for patients and their families/carers, including work, hobbies, interests, faith, religion, culture, community, finances etc.
- See **Self Management** section.
- Signpost to any appropriate support groups for peer support prda.org.uk/forum/

Physical symptoms

- Management advice
- See also the Self-management section.
- Discuss the importance of maintaining some physical activity – “Motion is Lotion”.
- Discuss importance of good sleep hygiene
- Signpost to apps and websites ‘**Getting a Good Night's Sleep**’ <https://painconcern.org.uk/wp-content/uploads/2016/06/Sleep-1.0.pdf>
- Discuss the use of topical heat/cold for pain and paraesthesia/dysaesthesia.
- Discuss potential for massage/reflexology/reiki – these may be helpful and many cancer centres offer these free or at reduced cost.
- **Non-opioids** including paracetamol and non-steroidal anti-inflammatory drugs (NSAID) should be considered first line for acute episodes e.g. flare ups, after assessing for contraindications and cautions. These medications, as with opioids, should be reviewed and a plan made to stop if of no benefit or risk of over use due to potential risks when used long term.
- **Topical** medications should be considered for localised pain such as focal areas of neuropathy where topical capsaicin or lidocaine plasters can be beneficial or pain due to inflammation such as back or hip pain may respond well to a topical NSAID and these are generally a lower risk for side effects.

■ **Opioids** including morphine, oxycodone, tramadol, codeine, buprenorphine etc. can have a place when managing acute pain due to surgery or injury however in long term pain (chronic or persistent) there is limited evidence that the risk outweighs the benefits¹²³ www.fpm.ac.uk/opioids-aware. If a patient has severe pain which is limiting their ability to function then a trial of opioids should be considered and discussed. A clear plan of how to slowly up titrate opioids to reduce the risk of side effects or slowly reduce and stop to reduce the risk of withdrawal, if not found to be beneficial, needs to be in place and regular reviews should be held. Shared decision-making tools and safety netting should be in place for all patients.

■ **Anti-neuropathic** – the nerve pain, paraesthesia, dysesthesia, fasciculations experienced in RILP may respond to medication such as amitriptyline, gabapentin, pregabalin, duloxetine, imipramine, carbamazepine etc. and should be considered as per guidance and local formularies¹²⁴. A clear plan of how to slowly up titrate to reduce the risk of side effects or slowly reduce and stop to reduce the risk of withdrawal, if not found to be beneficial, needs to be in place and regular reviews should be held.

■ Shared decision-making tools and safety netting should be in place for all people.

Some services offer the following treatments which may provide some benefit alongside other management interventions mentioned above although there is little research available regarding the efficacy for these treatments in RILP but good evidence for other forms of neuropathic pain:

Pharmacotherapy – lidocaine infusion, ketamine infusion, intrathecal opioid pumps, high dose capsaicin patch application.

Nerve Blocks – caudal epidurals, nerve root blocks.

Surgery – spinal cord stimulators.

¹²³ Royal College of Anaesthetists Faculty of Pain Medicine – ‘Opioids Aware’ Good practice in prescribing opioid medicines for pain.

¹²⁴ NICE (2013) CG173 Neuropathic pain in adults: pharmacological management in non-specialist settings

Table 14: Radiation-Induced Lumbar Plexopathy (continued)

When to refer to specialist	
Any concerns regarding metastatic cord compression (MSCC) need urgent referral via local MSCC pathways ¹²⁵ . E.g. to Acute Oncology, A&E.	
Referral options	
<ul style="list-style-type: none"> ■ Pain MDT service regarding possible interventions such as acupuncture, nerve blocks and pain management programmes including physiotherapy, occupational therapy, medication management and psychological support ■ Physiotherapy (pelvic or neuro-physiotherapy specialist if possible) regarding: <ul style="list-style-type: none"> ■ a full assessment and possibility of a rehabilitation programme to attempt to reduce further weakness and disability or help improve symptoms and quality of life. This may be offered via a cancer rehabilitation team, pain team or late effects service 	<ul style="list-style-type: none"> ■ Occupational Therapy and/or Podiatry for assessment regarding lifestyle modifications and assistive devices such as braces, splints, orthotics, wheelchair and household adaptations ■ Cancer Rehabilitation team, local Cancer Late Effects Service for those experiencing severe functional limitations and disability, and support with pacing and activity management. ■ Pain Related Cancer Late Effects Rehabilitation Service – National specialist rehabilitation service for those who have severe and persistent pain, reduced physical function in a limb – referral criteria ■ Hyperbaric Oxygen – Contact DDRC Healthcare for advice on what conditions they treat and what is funded on the NHS.

Service Models, Standards and Professional Education

Service models

There are no known established service models for management of RILP. As with many other features of PRD, primary care and secondary care teams should be aware of appropriate referral routes. For suspected RILP, referral may be needed to neurology, pain, rehabilitation and/or specialist late effects services, as well as to psychological support.

Suggested service quality standards and clinical audit measures

There are no acknowledged service quality standards or clinical audit measures.

¹²⁵ Royal College of Radiologists (2019) **Radiotherapy dose fractionation, third edition** - Section 21 on metastatic spinal cord compression.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing (mid 2022), there are no accredited UK based courses or online education modules for managing RILP. In general, UK health professional oncology and pain societies do not provide guidance or education on RILP.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Radiotherapy UK webinar 2020 'Late Effects of Radiotherapy: a Patient's Perspective'.

Key Clinical Guidance references

NICE (2013) CG173 **Neuropathic pain in adults: pharmacological management in non-specialist settings** – not specific to cancer and only include pharmacological management of pain.

NICE (2021) NG193 **Chronic pain (primary and secondary) in over 16s: assessment of all chronic pain and management of chronic primary pain.**

Edwards HL et al (2019). **Cancer-Related Neuropathic Pain.** *Cancers (Basel)*. 11(3) p373.

Vascular



The following quotes are by Bruce Gilligan RIP. Thank you very much to his widow for her permission to use these. The first comes from Bruce's **blog** for **Radiotherapy UK**, the second from his **Twitter** account.

“ In 2016 my health suddenly and unexpectedly began to deteriorate when the long-term side effects of the radiotherapy I had received in 1986 began making their presence known. As my major arteries succumbed to radiation-induced vascular disease, multiple morbidities resulted in the need for the endovascular insertion of 14 arterial stents: surgical intervention was considered too high risk because of the radiation damage.”

“ They didn't SEE it being given, They didn't SEE the damage it was causing. Nor did they SEE their way to doing something about it! All because they'd never SEEN it before. #NHS please open your eyes to #RadiationInducedVascularDisease”

Radiation to the pelvis and lower abdomen can lead to long-term cardiovascular side effects of the pelvic vasculature that can occur months to years after initial cancer treatment. Atherogenesis can occur in blood vessels causing endothelial injury, inflammation, fibrosis, and can result in peripheral vascular disease, causing pathophysiological changes such as aorto-iliac atherosclerosis and renal stenosis^{126, 127}. These changes cause narrowing of the arteries reducing blood flow to the lower limbs and kidneys¹²⁸ which can result in symptomatic peripheral artery disease and hypertension^{129, 130}. Some people may have problems with healing of wounds on their legs and/or lymphoedema. Additional clinical risk factors are patients age, prior comorbidities, such as diabetes or one or more underlying cardiovascular risk factors for atherosclerosis¹³¹.

Symptoms

- Claudication from radiation induced peripheral arterial disease
 - Described by patients as muscle pain in the thigh, calf, or buttocks on walking or during increased physical activity
 - Swelling of the lower limbs
- Renal vasculature
 - Hypertension, worsening renal function.

Incidence and Prevalence

Pelvic Arterial Disease (PAD) and vascular effects of pelvic radiotherapy are an uncommon side effect but the true prevalence of vascular effects of radiotherapy to the pelvis is relatively unknown¹³². It is more likely to occur in individuals who have received a higher total dose of radiation to the pelvis and received cardiotoxic chemotherapy¹²⁹.

Management guidance sources

Treatment of the various manifestations of radiation-induced vascular disease is based on standard clinical practice guidelines for cardiovascular disease. Large scale clinical trials are not available to guide practice and studies thus far have focussed on cardiovascular side effects of thoracic radiation rather than pelvic radiation¹³³.

¹²⁶ Venkatesulu BP et al (2018) Radiation-Induced Endothelial Vascular injury: A Review of Possible Mechanisms. JACC Basic Transl Sci 3 p563-572.

¹²⁷ Rodemann HP and Bamberg M (1995) Cellular Basis of Radiation-Induced Fibrosis. Radiother Oncol 35 p83-90.

¹²⁸ Saka B et al (2003) Bilateral Renal Artery Stenosis after Abdominal Radiotherapy for Hodgkin's Disease. Int J Clin Pract 57 p247-248.

¹²⁹ Jurado JA et al (2008) Radiation-Induced Peripheral Artery Disease. Catheter Cardiovasc Interv 72 p563-568.

¹³⁰ Farrugia MK and Mattes MD (2020) Radiation-Association Hypertension in Patients Undergoing Treatment for Prostate Cancer. J Radiother Pract 19 p112-115.

¹³¹ Yang EH et al (2021) Radiation-Induced Vascular Disease—a State-of-the-Art Review. Frontiers in Cardiovascular Medicine 8:652761

¹³² Mitchell JD et al (2021) Cardiovascular Manifestations from Therapeutic Radiation: A Multidisciplinary Expert Consensus Statement from the International Cardio-Oncology Society. JACC CardioOncol 3 p360-380.

¹³³ Koutroumpakis E et al (2022) Radiation-Induced Cardiovascular Disease: Mechanisms, Prevention, and Treatment. Curr Oncol Rep 24, p543-553.



At a glance **Vascular Effects after Pelvic Radiotherapy**

- Screening for cardiovascular risk factors prior to receiving higher pelvic radiation doses, especially in those who are older (>65) and mitigation of existing risk
- Symptom assessment and examination in those with lower limb pain and poor healing following pelvic radiotherapy
- Rule out recurrence as a cause of vascular symptoms after pelvic radiation
- **See Table 15** for full details of management advice.

Table 15: Managing the Vascular Effects of Pelvic Radiotherapy**History**

- Clinical history of pelvic arterial disease (PAD) after pelvic radiation
- Worsening renal function

Reported symptoms**Clinical history of pelvic arterial disease (PAD) after pelvic radiation**

- Pain on exertion in lower limbs, ischaemia

Worsening renal function

- May be asymptomatic and picked up via routine blood test or as part of investigations for new or difficult to control blood pressure.

Assessment**Clinical history of pelvic arterial disease (PAD) after pelvic radiation**

Review the person's Holistic Needs Assessment/ Personalised Care and Support Plan and/or End of Treatment Summary.

- Pedal pulses and auscultation of aortic and renal artery bruits)

- Ankle-brachial pressure index assessment
- Doppler flow imaging
- Angiography

Worsening renal function

- Renal ultrasonography +/- CT
- Assessment for hypertensive end organ damage (if hypertensive)

Non-medical management**Clinical history of pelvic arterial disease (PAD) after pelvic radiation**

- Reduction of CVD risk factors
- Obesity reduction
- Smoking cessation
- Increase physical activity

Worsening renal function

- Dietary restrictions
- Removal of nephrotoxic drugs

Table 15: Managing the Vascular Effects of Pelvic Radiotherapy (continued)

Pharmacotherapy/Intervention	
Clinical history of pelvic arterial disease (PAD) after pelvic radiation	
■ Aspirin, P2Y12 receptor inhibitors, Statins, antihypertensive medications	■ Angioplasty
■ Symptomatic pain control following WHO pain ladder	■ Peripheral bypass surgery
Worsening renal function	
■ Anti-hypertensive medications (if hypertensive)	■ Renoprotective medication (depending on stage of kidney disease)
When to refer to specialist	
Clinical history of pelvic arterial disease (PAD) after pelvic radiation	
■ Refer to cardiology or cardio-oncology for diagnostic purposes and to initiate management	■ Refer back if worsening symptoms
Worsening renal function	
■ Refer early to specialist if renal impairment at a young age and if rapidly deteriorating renal function	

Service Models, Standards and Professional Education

Risk mitigation at point of delivery of radiotherapy in reducing existing cardiovascular disease (CVD) risk factors can have an impact on later adverse cardiovascular effects (but evidence is lacking).

Prior assessment of CVD risk for those who are older, and assessment and screening for those who are symptomatic post treatment should trigger specialist referral to cardiology/cardio-oncology services.

Early identification of symptoms and referral is important as symptoms are progressive and have substantive impact on patients' quality of life.

Management of radiation induced pelvic vascular disease is best managed using generic principles for cardiovascular disease (CVD) management.

Suggested service quality standards and clinical audit measures

The International Cardio-oncology Society (ICOS – see Mitchell et al reference below) provides recommendations for the assessment and management of pelvic arterial disease from pelvic radiotherapy.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognises and manages acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

Professional education is available from ICOS as **webinars**.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Key Clinical Guidance reference

Mitchell JD, Cehic DA, Morgia M, Bergom C, Toohey J, Guerrero PA, Ferencik M, Kikuchi R, Carver JR, Zaha VG et al: **Cardiovascular Manifestations From Therapeutic Radiation: A Multidisciplinary Expert Consensus Statement From the International Cardio-Oncology Society**. JACC CardioOncol 2021, 3(3):360-380

Skin



“An area with no clinical help has been my skin – genital area where the skin tears easily. An A4 area of my pelvis, front and back, from my hips to my thighs is ‘tanned’, and there are tiny blood vessels that get very hot, when I sit for any period. I’m unable to sit or lie in the sunshine without covering myself with a thick towel as it becomes unbearably hot. It’s just something I have to deal with – there has been no one to talk to about these, sometimes worrying, late effects of PRD!”

Fiona, member of PRDA’s Patient Advisory Group

“Long term pelvic skin changes such as fibrosis or ulceration make many tasks we take for granted very difficult. Sitting comfortably, twisting on a seat to get in and out of a car, or walking can become huge challenges. This guidance document gives us a starting point to identify skin changes, start conversations and offer support to our patients.”

Dr Lisa Durrant, Consultant Therapeutic Radiographer
Radiation Late Effects Service, Musgrave Park Hospital, Taunton

Symptoms

Chronic radiation skin problems not only cause cosmetic changes to the skin but impact quality of life. Skin changes can be painful, affect activities of daily living and be a distressing reminder of cancer therapy. Late radiation reactions result in skin discolouration, hair loss, dryness, skin tightness that can reduce joint mobility and impact body image after cancer¹³⁴. Visible skin changes include hypo and hyper-pigmentation, loss of hair follicles, skin texture changes (for example, feeling dense, uneven (hyperkeratosis), retraction of surface contours (atrophy)), numbness or altered sensation, ulceration, poor wound healing and lymphoedema¹³⁵. Lighter skin tones can see skin changes such as erythema (pinkness or redness), hypo or hyper pigmentation where as darker skin tones can see hypo or hyper pigmentation, such as purple, yellow or grey colour changes to the skin¹³⁶.

Radiation recall dermatitis is a drug-induced acute inflammatory skin reaction which occurs in people with a previously irradiated skin area and has symptoms of erythema (pinkness or redness on lighter skin tones or hyperpigmentation on darker skin tones), dry desquamation (dryness and flaking of skin), itching, maculopapular rash, and skin ulceration^{137,138}.

Chronic radiation-induced skin reactions (RISRs) are caused by an imbalance of proinflammatory and profibrotic cytokines, which starts after radiotherapy, resulting in increased connective tissue growth factors and a persistent inflammatory response¹³⁹. Increasing skin fibroblast proliferation, excessive extracellular matrix, inflammatory infiltrate, leads to fibrosis¹⁴⁰.

Associated radiation-induced endothelial damage impacts blood vessels in the skin, reducing blood supply which also contributes to the fibrosis and poor wound healing. Alterations to blood vessels result in telangiectasia (superficial blood vessels that are visible on the skin)¹⁴¹.

Much of the research on the pathogenesis of chronic RISRs is on those people who have been treated for head and neck or breast cancer. Studies on pelvic related chronic RISRs such as skin changes around the groin and vulval area are mainly case studies and this is an area in need of future research.

Please note that lymphoedema issues are covered in the **Lymphoedema** section.

¹³⁴ Spalek M: **Chronic radiation-induced dermatitis: challenges and solutions**. Clin Cosmet Investig Dermatol 2016, 9:473-482.

¹³⁵ Rossi AM, Hibler BP, Navarrete-Dechent C, Lacouture ME: **Restorative oncodermatology: Diagnosis and management of dermatologic sequelae from cancer therapies**. J Am Acad Dermatol 2021, 85(3):693-707

¹³⁶ Wang Y et al (2020) **Prevention and treatment for radiation-induced skin injury during radiotherapy**. Radiation Medicine and Protection. 1 p60-68.

¹³⁷ Burris HA, 3rd, Hurtig J: **Radiation recall with anticancer agents**. Oncologist 2010, 15(11):1227-1237.

¹³⁸ Wounds UK (2021) **Best Practice Statement: Addressing skin tone bias in wound care: assessing signs and symptoms in people with dark skin tones**. Wounds UK, London.

¹³⁹ Wei J, Meng L, Hou X, Qu C, Wang B, Xin Y, Jiang X: **Radiation-induced skin reactions: mechanism and treatment**. Cancer Manag Res 2019, 11:167-177.

¹⁴⁰ Straub JM, New J, Hamilton CD, Lominska C, Shnyder Y, Thomas SM: **Radiation-induced fibrosis: mechanisms and implications for therapy**. J Cancer Res Clin Oncol 2015, 141(11):1985-1994.

¹⁴¹ Bennardo L, Passante M, Cameli N, Cristaudo A, Patruno C, Nistico SP, Silvestri M: **Skin Manifestations after Ionizing Radiation Exposure: A Systematic Review**. Bioengineering (Basel) 2021, 8(11).

Incidence and Prevalence

Skin is particularly radiosensitive and RISRs are common during radiotherapy and experienced by >90% of patients¹⁴². Acute problems are transient and usually recover after radiotherapy treatment. Chronic RISRs are different and affect approximately 20-30% of people after radiotherapy, can be progressive and develop suddenly, months to years after radiotherapy¹⁴³.

Another problem is an increased risk of secondary cancers, including skin cancer, within the radiation treatment field, but prevalence figures are often based on historical radiotherapy treatments using old radiation machines and techniques and often with higher skin doses¹⁴⁴. In population with prostate cancer a 2% increased 10-year cumulative risk of skin cancer is reported¹⁴⁵. Large clinical studies of pelvic radiotherapy contradict this finding and have shown no increased risk for secondary cancer, including skin cancers, when compared to those people treated without radiotherapy¹⁴⁶. In general radiotherapy as a risk factor for future occurrence of skin cancer is very low compared to lifestyle factors such as smoking, and additional sunlight exposure which are important cofactors in increasing skin cancer risk^{141, 145} highlighting the need to provide smoking cessation and skin care advice during and after radiotherapy.

Radiation recall is an inflammatory skin reaction that can occur after certain anticancer drugs are given after radiation¹⁴⁷, occurs in approximately 6-8% of patients after radiotherapy, but prevalence is unclear after pelvic radiotherapy. Anthracyclines, doxorubicin, taxanes and antimetabolites can all cause radiation recall reactions as well as some antibiotics and immunotherapies¹⁴⁸. These symptoms can occur days to weeks after systemic anti-cancer therapy¹³⁷.

The prevalence of chronic RISRs after pelvic radiotherapy is unknown. In head and neck cancer prevalence of chronic RISRs is 24-29% of patients¹⁴⁹ and in 30% of people treated for cancers of the breast or chest wall¹⁴³. In a mixed group of patients undergoing radiotherapy those with darker skins (56%) reported more skin problems after radiotherapy, such as skin pigmentation changes than those patients with fairer skins (23%)¹⁵⁰. There is a scarcity of data on prevalence of chronic RISRs in different ethnic skin colours.

¹⁴² Burke G, Faithfull S, Probst H: Radiation induced skin reactions during and following radiotherapy: A systematic review of interventions. *Radiography (Lond)* 2022, 28(1):232-239.

¹⁴³ Borrelli MR, Shen AH, Lee GK, Momeni A, Longaker MT, Wan DC: Radiation-Induced Skin Fibrosis: Pathogenesis, Current Treatment Options, and Emerging Therapeutics. *Ann Plast Surg* 2019, 83(4S Suppl 1):S59-S64.

¹⁴⁴ Dracham CB, Shankar A, Madan R: Radiation induced secondary malignancies: a review article. *Radiat Oncol J* 2018, 36(2):85-94.

¹⁴⁵ Hegemann NS, Schlesinger-Raab A, Ganswindt U, Horl C, Combs SE, Holzel D, Gschwend JE, Stief C, Belka C, Engel J: Risk of second cancer following radiotherapy for prostate cancer: a population-based analysis. *Radiat Oncol* 2017, 12(1):2.

¹⁴⁶ Wiltink LM, Nout RA, Fiocco M, Meershoek-Klein Kranenbarg E, Jurgentliemk-Schulz IM, Jobsen JJ, Nagtegaal ID, Rutten HJ, van de Velde CJ, Creutzberg CL et al: No Increased Risk of Second Cancer After Radiotherapy in Patients Treated for Rectal or Endometrial Cancer in the Randomized TME, PORTEC-1, and PORTEC-2 Trials. *J Clin Oncol* 2015, 33(15):1640-1646.

¹⁴⁷ Bhangoo RS, Cheng TW, Petersen MM, Thorpe CS, DeWees TA, Anderson JD, Vargas CE, Patel SH, Halyard MY, Schild SE et al: Radiation recall dermatitis: A review of the literature. *Semin Oncol* 2022, 49(2):152-159.

¹⁴⁸ McKay MJ, Foster R: Radiation recall reactions: An oncologic enigma. *Crit Rev Oncol Hematol* 2021, 168:103527.

¹⁴⁹ Nevens D, Duprez F, Daisne JF, Laenen A, De Neve W, Nuyts S: Radiotherapy induced dermatitis is a strong predictor for late fibrosis in head and neck cancer. The development of a predictive model for late fibrosis. *Radiation Oncol* 2017, 12(2):212-216.

¹⁵⁰ Ryan JL, Bole C, Hickok JT, Figueroa-Moseley C, Colman L, Khanna RC, Pentland AP, Morrow GR: Post-treatment skin reactions reported by cancer patients differ by race, not by treatment or expectations. *Br J Cancer* 2007, 97(1):14-21.

Incidence and Prevalence (continued)

Several factors influence the prevalence and severity of chronic RISRs: treatment factors such as total dose to the skin (>50Gy to the skin), larger irradiated area, altered fractionation regimes (increased dose per fraction), radiotherapy technique such as treatment bolus which increases the dose to the skin. Comorbid conditions such as connective tissue disorders including systemic lupus erythematosus, scleroderma, and rheumatoid arthritis are associated with increased prevalence of chronic RISRs¹⁴¹. Individual factors such as age, nutritional status and smoking history may also have an impact on symptoms¹³⁴. The occurrence of acute skin reactions grade ≥ 3 RTOG during radiotherapy have been associated with chronic RISRs in head and neck cancer¹⁵¹ but no data is available for associations with pelvic radiotherapy and chronic RISRs.

Identification

Assessment of symptoms is essential and physical examination of the skin to observe colour changes, pain, palpation of the skin feeling for texture (hard, dense, uneven) and elasticity through pinching the skin¹³⁴. Methods for quantifying skin thickness changes such as ultrasonic imaging¹⁵², have been shown to be feasible but rarely used in practice. Examine the skin for telangiectasia. Measure and record area affected to compare against previous treatment field and to evaluate effectiveness of treatment. Take a history of recent medications or systemic anti-cancer therapy (SACT). As new agents are developed, radiation recall reactions may increase in those receiving secondary treatment so skin rashes within treatment fields may be an indication of a radiation recall reaction.

A full dermatological assessment is required if symptoms are moderate to severe. If the clinical presentation is unclear a biopsy and histopathological examination is required to rule out a secondary cancer. The Common Terminology Criteria for Adverse Effects (CTCAE) provides a detailed assessment criteria for grading chronic RISRs however RTOG/EORTC late morbidity scoring which is commonly used in practice accounts only for radiation fibrosis but not chronic RISRs. There is no grading system for radiation recall.

¹⁵¹ Ramia P, Bodgi L, Mahmoud D, Mohammad MA, Youssef B, Kopek N, Al-Shamsi H, Dagher M, Abu-Gheida I: **Radiation-Induced Fibrosis in Patients with Head and Neck Cancer: A Review of Pathogenesis and Clinical Outcomes**. Clin Med Insights Oncol 2022, 16:11795549211036898.

¹⁵² Liu T, Zhou J, Osterman KS, Zhang P, Woodhouse SA, Schiff PB, Kutcher GJ: **Measurements of Radiation-Induced Skin Changes in Breast-Cancer Radiation Therapy Using Ultrasonic Imaging**. Annu Int Conf IEEE Eng Med Biol Soc 2008, 2:718-722.

Management guidance sources

There is a paucity of management guidance for chronic RISRs in the literature or in clinical practice. Clinical practice is based on extrapolation from treatments for other skin conditions and interventions tested for efficacy in people treated for head and neck or breast cancer. Early involvement from a dermatologist and tissue viability service is valuable in managing radiation induced skin problems effectively.

Radiation Dermatitis Guidelines for Radiotherapy Healthcare Professionals is available from The Society of Radiographers.

Acute RISRs management guidelines are available from a variety of international societies however a recent comparison shows a lack of consistency among guideline recommendations¹⁵³. Few of the current guidelines provide recommendations for chronic RISRs management.

¹⁵³ Finkelstein S, Kanee L, Behroozian T, Wolf JR, van den Hurk C, Chow E, Bonomo P: **Comparison of clinical practice guidelines on radiation dermatitis: a narrative review**. Support Care Cancer 2022, 30(6):4663-4674.



At a glance Skin Problems after Pelvic Radiotherapy

- Assessment through symptom report and physical examination of the skin plus impact on altered body image and activities of daily living.
- Detailed history of any acute skin reactions, or connective tissue comorbidities. Consider any recent chemotherapy or medications to rule out radiation recall reaction.
- It is important to rule out secondary skin cancer
- See Table 16 for management advice.

Skin hyper or hypo pigmentation

Photoprotection (SPF 30+), may need a dermatology referral if severe. Psychological issues should be addressed.

Radiation induced fibrosis

Physical therapy and mechanical massage, pentoxifylline & Vit E (tocopherol). Pravastatin as secondary prevention for those at higher risk. Second line treatment autologous fat grafting (AFG) for serious radiation-induced fibrosis.

Radiation ulceration and poor wound healing

Good wound hygiene for area within radiation field to prevent injury, ulceration and necrosis require dermatological or surgical referral to rule out secondary cancer and requires specialist management.

Telangiectasia

Can be psychologically distressing. Management with pulse dye laser (PDL) therapy if distressing.

Radiation recall skin reactions

Topical steroids.

Secondary skin cancer

Skin biopsy and conventional treatment.

Table 16: Skin Problems after Pelvic Radiotherapy

Problem	
■ Skin hyper or hypo-pigmentation	■ Telangiectasia
■ Radiation-induced fibrosis	■ Radiation recall skin reactions
■ Radiation ulceration and poor wound healing within the radiotherapy treatment field	■ Secondary cancers

Reported symptoms	
Skin hyper or hypo-pigmentation	
■ Skin colour changes within the radiation field either darker or lighter than surrounding tissues	
Radiation-induced fibrosis	
■ Skin thickening	■ Lymphoedema
■ Textural changes, induration, and retraction of the skin	■ Joint motion restrictions
Radiation ulceration and poor wound healing within the radiotherapy treatment field	
■ Failure to heal, wound or chronic ulceration and necrosis	
Telangiectasia	
■ Superficial blood vessels visible on the surface of the skin	
Radiation recall skin reactions	
■ Erythema (redness), dry desquamation (dryness and flaking of skin), itching, maculopapular rash, and skin ulceration	
Secondary cancers	
■ Red/purple plaques or nodules with an ecchymosis/ purpura appearance within the radiation field (e.g., cutaneous angiosarcoma)	

Table 16: Skin Problems after Pelvic Radiotherapy (continued)

Assessments	
Skin hyper or hypo-pigmentation	
Review the person's Holistic Needs Assessment/Personalised Care and Support Plan and/or End of Treatment Summary.	
■ Observation CTCAE	
Radiation-induced fibrosis	
■ Clinical examination	■ Measurement of skin thickness with high frequency ultrasound ¹⁵⁴
■ Functional assessment	■ Measure blood fibroblast growth factors
■ Objective skin assessment ¹⁵⁴	
Radiation ulceration and poor wound healing within the radiotherapy treatment field	
■ Observation	■ CTCAE for skin
Telangiectasia	
■ Observation	
Radiation recall skin reactions	
■ Observation	
Secondary cancers	
■ Biopsy	
■ Generally, may occur from a few, up to several, years after radiotherapy. Early diagnosis is essential	

¹⁵⁴ Park S-Y, Kim JH, Chang JH, Park JM, Choi CH, Kim J-I: Quantitative evaluation of radiodermatitis following whole-breast radiotherapy with various color space models: A feasibility study. PLOS ONE 2022, 17(3):e0264925

Table 16: Skin Problems after Pelvic Radiotherapy (continued)**Management****Skin hyper or hypo-pigmentation**

- Prevention using broad spectrum sunscreens (SPF 30+)
- Hydroquinone, azelaic acid, under the guidance of a dermatologist however prolonged use is not recommended¹⁵⁵
- Make up camouflage to reduce distress

Radiation-induced fibrosis

- First line pain management and physiotherapy with mechanical massage of the skin area¹⁵⁶
- Maintain skin flexibility with skin moisturising cream
- Pentoxifylline and Vitamin E have been shown in head and neck patients¹⁵¹ and breast cancer¹⁵⁷ to reduce radiation fibrosis and improve function but was shown to have greater benefit in the first 6 months of chronic RISRs
- Statins (Pravastatin) have been shown to down regulate the fibrotic cascade in patient with head and neck cancer¹⁵⁸, but evidence is limited on chronic RISRs¹⁵¹.
- Autologous fat transplantation (AFT) can improve post irradiation fibrosis. Evidence for benefit in chronic RISRs is mainly reported in head and neck and breast cancers^{159, 143}

Radiation ulceration and poor wound healing within the radiotherapy treatment field

- Dressings to prevent infection with care re adhesive to prevent further skin damage^{134,160}
- Surgical management for ulceration and necrosis.
- Hyperbaric oxygen improves oxygenation of superficial tissues in chronic wounds but limited evidence in chronic RISRs¹³⁹
- CTCAE for skin

Telangiectasia

- Pulse dye laser treatment¹⁶¹

Radiation recall skin reactions

- Topical steroids, evidence poor, efficacy based on case studies¹⁶²

Secondary cancers

- Surgical management as recommended from histology

¹⁵⁵ Nautiyal A, Wairkar S: Management of hyperpigmentation: Current treatments and emerging therapies. Pigment Cell Melanoma Res 2021, 34(6):1000-1014.

¹⁵⁶ Warpenburg MJ: Deep Friction Massage in Treatment of Radiation-induced Fibrosis: Rehabilitative Care for Breast Cancer Survivors. Integr Med (Encinitas) 2014, 13(5):32-36.

¹⁵⁷ Delanian S, Porcher R, Balla-Mekias S, Lefaix JL: Randomized, placebo-controlled trial of combined pentoxifylline and tocopherol for regression of superficial radiation-induced fibrosis. J Clin Oncol 2003, 21(13):2545-2550.

¹⁵⁸ Bourgier C, Auperin A, Rivera S, Boisselier P, Petit B, Lang P, Lassau N, Taourel P, Tetreau R, Azria D et al: Pravastatin Reverses Established Radiation-Induced Cutaneous and Subcutaneous Fibrosis in Patients With Head and Neck Cancer: Results of the Biology-Driven Phase 2 5Clinical Trial Pravacur. Int J Radiat Oncol Biol Phys 2019, 104(2):365-373.

¹⁵⁹ Shukla L, Morrison WA, Shayan R: Adipose-derived stem cells in radiotherapy injury: a new frontier. Front Surg 2015, 2:1.

¹⁶⁰ Zasadzinski K et al (2022) Modern Dressings in Prevention and Therapy of Acute and Chronic Radiation Dermatitis – A Literature Review. Pharmaceutics 14 p1204.

¹⁶¹ Rossi AM, Blank NR, Nehal K, Dusza S, Lee EH: Effect of laser therapy on quality of life in patients with radiation-induced breast telangiectasias. Lasers Surg Med 2018, 50(4):284-290.

¹⁶² Bray FN, Simmons BJ, Wolfson AH, Nouri K: Acute and Chronic Cutaneous Reactions to Ionizing Radiation Therapy. Dermatol Ther (Heidelb) 2016, 6(2):185-206.

Table 16: Skin Problems after Pelvic Radiotherapy (continued)

When to refer to specialist
Skin hyper or hypo-pigmentation <ul style="list-style-type: none">■ Refer to dermatologist if skin appearance, cosmesis concern or causing psychological issues
Radiation-induced fibrosis <ul style="list-style-type: none">■ Refer to physiotherapy and/or specialist dermatologist
Radiation ulceration and poor wound healing within the radiotherapy treatment field <ul style="list-style-type: none">■ Surgical and wound specialist referral■ Hyperbaric oxygen currently not commissioned for soft tissue injury in the UK and is recommended in other countries¹⁶³
Telangiectasia <ul style="list-style-type: none">■ Dermatology referral when impacting QOL or bleeding
Radiation recall skin reactions <ul style="list-style-type: none">■ If skin reaction continues after drug therapy has finished refer to specialist dermatology
Secondary cancers <ul style="list-style-type: none">■ Dermatology/oncology referral

¹⁶³ Buboltz JB HS, Cooper JS: Hyperbaric Soft Tissue Radionecrosis. Treasure Island (FL) StatPearls Publishing; 2022

Service Models, Standards and Professional Education

Service models

Onco-dermatology services are developing in the UK and are often fragmented. Specialist services attached to oncology centres as part of post treatment management are mainly focused on skin cancers and immunotherapy skin reactions but are developing late-effects services for chronic RISRs.

Suggested service quality standards and clinical audit measures

There is a need to include chronic RISRs in NICE guidance for pelvic malignancies.

Professional education

The Royal College of Radiologists' **Clinical Oncology Speciality Training Curriculum** (2021) includes "Assesses patients following radical radiotherapy in the out-patient clinic, recognised and manage acute and late toxicities, and refers to relevant specialists if required" (CIP 15) and "Proactively manages and educates patients about the long-term sequelae of cancer treatments, in conjunction with other health professionals where relevant" (CIP 13).

At the time of writing (mid 2022), there are no accredited UK based courses or online education modules for managing the skin effects of pelvic radiotherapy although it may be included as part of courses such as postgraduate training for nurses or physiotherapists. In general, UK health professional oncology or dermatology societies do not provide guidance or education on skin effects of pelvic radiotherapy.

Sheffield Hallam University has 2 modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer:

- **Prehabilitation and Rehabilitation for people living with cancer**
- **Personalised Care And Supported Self-Management For Those Affected By Cancer**

Courses for massage techniques for physiotherapists.

Key Clinical Guidance reference

Radiation dermatitis skin care guidance is endorsed for acute RISRs has been developed by the SCoR but needs to extend to chronic RISRs in future reviews and include British Association of Dermatologists.

Multinational Association for Supportive Care in Cancer (MASCC): Wong RK et al (2013) Clinical practice guidelines for the prevention and treatment of acute and late radiation reactions from the MASCC Skin Toxicity Study Group. *Support Care Cancer* 21(10):2933-2948.

British Columbia Cancer Agency (BCCA): Post M et al. (2018) Symptom management guidelines: radiation dermatitis. Canada: British Columbia Cancer Agency.

Cancer Care Manitoba (CCMB): Johnston P (2018) Evidence based recommendations for the assessment and management of radiation-induced skin toxicities in breast cancer. Part 5 Management of long-term effects. In: Internet. Edited by Manitoba CC, vol. Part 5. USA: Cancer Care Manitoba.

Note, there are some differences between these guidelines. Whilst MASCC states there is insufficient evidence to use Vitamin E and pentoxifylline to manage radiation skin fibrosis, BCCA and CCMB suggest its use and also recommend hyperbaric oxygen for skin ulceration. Additionally, BCCA and CCMB provide guidance to prevent injury, manage pain and maintain skin flexibility while acknowledging there is a lack of research.

Guiding people on self-management



Guiding people on self-management

There has been a **global call for action** on provision of better support for self-management for people affected by cancer. Almost all people with Pelvic Radiation Disease will have to self-manage multiple symptoms. Supporting them to address **all their needs is essential**.

Ideally your institution should produce self-management information tailored to your area in a comprehensive, localised booklet/app/webpages for people after pelvic radiotherapy/TBI.

The following pages include a selection of resources, which are therefore not an exhaustive list of suitable sources of advice and information. PRDA welcomes feedback and suggestions to info@prda.org.uk.

When signposting and supporting people to self-manage, consider the following:

- Health literacy varies widely between patients.
- Overall skills, confidence and knowledge to manage their own health also vary widely.
- Do they have support from a partner, family member or friend? If so, they may also benefit from self-management advice.
- Ensure that people understand that, should self-management not be helpful, they should seek professional advice.
- Does the person already have a **personalised care and support plan and/or End of Treatment Summary**?
- Issues which may all affect a person's ability to self-manage include physical disability, access to the internet and a computer/tablet/smartphone, language and cultural barriers, sensory impairment, cognitive difficulties (including dementia, learning disability, autism and cancer related cognitive impairment).
- Self-management may work on its own or in tandem with medical management.
- Ensure medical causes of problems are fully investigated e.g. hormone insufficiency as cause of low libido or anaemia as cause of fatigue.

Always consider how other teams can support with signposting as they may have comprehensive local options already:

- Cancer team, e.g. Cancer Support Worker, CNS.
- Primary Care, e.g. Link workers (social prescribers).

Please note, PRDA is not responsible for the content of external websites.

Options for supporting self-management

Peer support

- For online advice, tips and chat with other people with PRD:
PRDA Online Community
 - For the opportunity to meet and video-chat with other people with PRD:
PRDA Chat Together
 - Local cancer patient support groups may be available such as for prostate, bowel and gynaecological cancers. However, they are often focused on those recently diagnosed than those living with long term effects
 - Other groups/charities providing online networking can be found on **Healthunlocked.com** or on the individual charity websites such as **Macmillan** and **Jo's Trust** or via the **Cancer Care Map**
 - Social media (Twitter, Instagram, Facebook) help people connect via hashtags such as **#PelvicRadiationDisease**
-

Cancer support services directories & centres

- **Cancer Care Map**
 - **Macmillan Cancer Support In Your Area**
 - **Maggie's** cancer support charity (see below)
 - **Penny Brohn UK** cancer support charity
 - Local cancer information and wellbeing centres usually offer a range of services focusing on living with and beyond cancer.
-

Local Health and Wellbeing Events/Courses for people affected by cancer

- Various options for local activities may be available that cover topics listed below, but also give the opportunity to meet people, take part in art, gardening, choir etc
 - Examples from **Surrey and Sussex Cancer Alliance** and the **Christie hospital**
 - Local Health and Wellbeing partnerships such as **Shropshire**
-

Late Effects of Pelvic Radiotherapy

- Macmillan provide **comprehensive information** on their website.
-

Options for supporting self-management (continued)

Employment and Finance

- Macmillan money, finance and insurance advice
 - Macmillan employment advice
 - Macmillan benefits advice
 - Macmillan grants may be available for people, e.g. who need to replace clothing, bedding, washing machine
 - Maggie's Centres can help with money worries.
 - Working With Cancer provide coaching and career advice.
-

Pain

- Pain Toolkit
 - Cancer Research Webpage on Pain
 - My Live Well With Pain
 - Macmillan webpage on pain
 - PRDA Conference talk 2021 – self management of Pain
 - Ask the expert webinars (e.g. pain, menopause, intimacy and sex) from Mummy's Star charity
 - Pain diary, example from Macmillan [here](#)
-

Sleep

- Macmillan webpage on insomnia
 - The Sleep Charity and sleep diary
 - The Pain Concern charity leaflet on sleep
 - Apps e.g. Sleepio app, sleep tracker, sleep sounds
-

Options for supporting self-management (continued)

Sex

- **Sex and cancer** – Macmillan Cancer Support
 - International Urogynecological Association **patient leaflets** in various languages on a variety of female pelvic topics
 - **Sexual Advice Association**
 - **Relate** – relationship support
 - College of Sexual and Relationship Therapists' information on **Cancer, Sex and Relationships**
 - **COSRT Register** of sex and relationship therapists
 - Jo's Cervical Cancer Trust **Sex and Intimacy advice**
 - Prostate Cancer UK **Sexual Support service**
 - **Balance** – menopause website
 - **Maximising Sexual Wellbeing: Cancer Care** – online self-management module for people and partners living with cancer
 - **Pink Therapy** – provides listings of therapists working with gender and sexual diversity clients.
-

Diet and nutrition

- PRDA leaflet on diet and nutrition (due late 2022/early 2023)
 - World Cancer Research Fund UK **online cookery classes**
 - **Royal Marsden Cookbook**
 - Food diary – **example**
-

Bowel

- Macmillan information on **Managing bowel late effects**
 - Bowel diary – **example**
 - 'Squatty potty' or similar aids to raise the feet whilst sitting on the toilet
 - Macmillan **webpage on stomas**
-

Options for supporting self-management (continued)

Bladder

- Macmillan information on **Bladder Late Effects** and **Radiation Cystitis**
 - International Urogynecological Association **patient leaflets** in various languages on a wide variety of female pelvic topics
 - **Squeezy App**
 - Bladder and fluid diary – **example**
-

Toileting

- PRDA leaflet on the recommended position for toileting (due late 2022)
 - **PRDA Out and About Toolkit** – gives confidence to access public toilet facilities - toilet card, RADAR key, sunflower lanyard, Apps showing toilet locations
 - **The Great British Toilet Map: Find Toilet**
 - **WheelMate** – accessible toilet finder app
-

Pelvic Floor Exercises

- **NHS webpage** on pelvic floor exercises
 - Apps, e.g. **Squeezy**
-

Fatigue

- **Macmillan webpage** on fatigue
 - **Cancer Research UK webpage** on managing fatigue
 - Web-based self-management tool **RESTORE**
-

Memory, concentration

- **Macmillan webpage** on cognitive changes
 - See **Hot Flushes** section on **page 145** for support re menopause
-

Options for supporting self-management (continued)

Hot flushes

- Women's Health Concern is part of the British Menopause Society. Leaflet on Cognitive Behavioural therapy
 - The Daisy Network for people with premature ovarian insufficiency
 - Cancer Research UK have advice for the management of hot flushes in people with treatment related hypogonadism.
 - Balance booklet on **menopause** after cancer treatment
 - Menopause Matters
-

Loss of muscle mass

- See Physical activity below
-

Bone health

- Macmillan webpage on bone health
-

Physical activity

- Local physical activity schemes e.g. run by the local authority, or by organisations such as **ParkRun**, **Walking for Health**, **Move Against Cancer**
 - **We Are Undefeatable** website for people with long term conditions
 - Macmillan webpage on Move More
 - EveryBodyCan (those at risk of, or who have, Lymphoedema)
 - NHS Couch to 5K
 - 5K your way
 - Mens Sheds
 - Man vs Fat
 - Green Gym
-

Options for supporting self-management (continued)

Skin care

- Society of Radiographers' **Skin care leaflet** for patients
 - British Association of Dermatologists – patient leaflet on **vulval skin care**
-

Infection

- COVID vaccination and other advice from the NHS
 - Macmillan **webpage** on infection
-

Lymphoedema

- Lymphoedema Support Network information and support
 - Videos for patients by **PocketMedic**, including for genital lymphoedema
 - Macmillan booklet on **Lymphoedema**
-

Alcohol and smoking

- NHS Webpage – Live Well
 - NHS Ten self – help tips to stop smoking
 - NHS Alcohol Support
-

Other information

- Questions from professionals and public about locations of NHS and private services for PRD (not exhaustive): Contact PRDA by email **info@prda.org.uk**
-

How to optimise referral pathways

Professionals may feel reluctant to ask about post-radiotherapy symptoms if they do not know where to refer the person to.

Setting up established referral routes is therefore important as:

- they give professionals confidence to ask about all potential symptoms of Pelvic Radiation Disease (PRD), and other consequences of cancer treatment
- it helps prevent people 'bouncing around' the system, prevent unnecessary investigations, or prevent people being told 'nothing can be done'.

The guidance below is designed to encourage small-scale change between local teams, in order to ensure that people with PRD symptoms quickly reach professionals with the most experience with PRD.

The highest priority referral route to establish is from lower GI, uro- and gynae-oncology teams to gastroenterology – ideally to a named gastroenterology doctor(s) and/or nurse(s) with a specialist interest in PRD.

- 1. Find out if the oncology team already has established referral routes to ALL key clinics and services listed, see page 150.** Gastroenterology is the priority. PRDA holds a database of professionals which may be helpful (contact info@prda.org.uk).

IF YES:

- Do not assume everyone knows these!
- Ensure this information is documented and shared to everyone who may need to know it, e.g. across Radiotherapy operational delivery networks, Acute Oncology teams and primary care.

IF NO:

- Aim to set up a working group to establish one or more referral routes. The reason for having a working group is to have collective understanding and adoption of the pathways across the team. It is also important to avoid having one person responsible for making change happen – it should be a team effort.
- Finding a senior 'sponsor' for the working group is crucial - ideally someone who can influence change at a senior level.
- If a working group is not possible, then it may be appropriate to identify a role in the oncology team (e.g. CNS) who can act as advocate for people with PRD and who will establish referral routes.

2. Tasks for the working group:

- a. Check whether your trust, health board, Cancer Alliance, Cancer Network, Integrated Care System, commissioners, etc. need to be involved:
 - Contact details for Cancer Alliances in **England** and Cancer Networks in **Northern Ireland**, Scotland (**South East, West, North**) or **Wales**.
 - Funding or contractual requirements may need to be taken into account e.g. England Specialised Commissioning **service specification** for External Beam Radiotherapy paragraph 2.6
- b. Referral routes for PRD will probably overlap with other cancer treatment modalities, so you may be able to share the workload with others, e.g. routes to gastroenterology are also required for immunotherapy-induced colitis and anterior resection syndrome.
- c. Consider using quality improvement methodology by **testing small changes first**. It may be easier to tackle one symptom/problem/specialty at a time perhaps focusing on one that affects quality of life severely (e.g. GI symptoms, or across gynae-oncology) and trying this for one patient.
- d. Spend time 'understanding the problem' with patients and other stakeholders from different services, taking a person-centred approach.
- e. Discuss and then gain agreement as to nominated contacts, referral criteria, referral form, pre-referral work up, clinical coding, what to tell the person with symptoms etc. This may take a long time – be prepared for setbacks!
- f. Ensure the agreed referral pathway detail is documented and 'signed off'.
- g. Set up data collection as required, in order to monitor success.
- h. Promote the agreed referral routes widely. Ideally on an intranet/website. e.g. if a pathway is established to 1 or 2 nominated leads for PRD in gastroenterology, make sure staff in all relevant teams are made aware – Gastroenterology, Oncology, Colorectal surgery, Urology, Acute Oncology, Endoscopy, Dietetics/Nutrition, Primary Care, A&E and other services that people with PRD symptoms may present to.
- i. If possible, share this information with the Pelvic Radiation Disease Association who can use this to connect professionals and patients into pathway routes that they may not otherwise have been able to find out about.
- j. Once established for a period of time, use the **Plan-Do-Study-Act** cycle to review the implementation of each pathway and gather patient feedback. Make changes to the pathway as required and keep it under review with regular audit.
- k. Publish and share your successes. Keep promoting the pathways.

3. Who or what else could help?

a. People with PRD

- i. Having patients advocating for your work can help considerably.
- ii. Talk to local people with PRD to understand the issues that are important to them.
- iii. Seek advice from your organisation's Patient and Public Involvement manager.
- iv. There may be a cancer patient involvement group in your organisation that can help.
- v. Having patient representatives on your working group is important for co-production and to ensure pathways are person-centred.
- vi. PRDA may be able to put you in touch with people with PRD in your area.

b. Colleagues

- i. Talk to colleagues to find out what their views and priorities are, including primary care.
- ii. Your Cancer Alliance or Network may be able to support the work.
- iii. Borrow ideas from pathways other parts of the country have in place.
- iv. Raise with management – you may need a business case for change.
- v. See if **NIHR research** is going on in your area on late effects.

c. Data

- i. What data can you use to show the demand? E.g. Conduct a baseline casenote audit.
- ii. Use a quality improvement (QI) approach to collect small amounts of data repeatedly over time in a run chart, annotating with timings of introduction of change ideas, so you can see if a change leads to an improvement. This approach is more informative than a traditional 'before and after' audit. Work with local QI teams for advice to focus data collection on a few measures, including process, outcome and balancing measures.

d. National organisations

- i. Seek advice via the **Society of Radiographers Late Effects** special interest group.
- ii. Local or national charities may have resources.

4. Repeat 1-2 with the next symptom/problem/specialty!

Table 17. Referral routes needed for people with Pelvic Radiation Disease symptoms – to be adapted to local arrangements

Service
Gastrointestinal
Gastroenterology
Dietetics
Biofeedback
Ano-rectal Physiology
Intestinal Failure
Colorectal Surgery
Stoma care
Continence service
Pelvic Physiotherapy
Service
Urological/Gynaecological/Sexual medicine
Urology
Uro-gynaecology
Fertility
Erectile dysfunction
Psychosexual therapy
Sexual medicine
Gynaecology
Menopause clinic
Service
Other medical
Endocrinology
Pain clinic
Neurology
Lymphoedema service
Cardio-Oncology
Hyperbaric Oxygen Therapy

Table 17. Referral routes needed for people with Pelvic Radiation Disease symptoms – to be adapted to local arrangements

Service

Late Effects Specialists

Radiotherapy Late Effects service

Children/Young Person Late Effects service

Service

Mental health

Counselling

IAPT/Talking Therapies

Psycho-Oncology

Liaison Psychiatry and other local mental health teams

Service

Primary, community and social care

General Practice

Social Care

Social Prescribing

Tissue viability

Smoking cessation

Physical activity referral schemes or similar

Other health and wellbeing opportunities

Signposting

Third sector organisations/groups which offer direct support/advice and also access to peer support

Cancer charities which cover all cancers, e.g. Macmillan; Maggie's; Penny Brohn

Cancer-type charities, e.g. Bowel Cancer UK; Prostate Cancer UK; Jo's Cervical Cancer Trust

Charities that support people with the specific impacts of cancer treatment, e.g. Pelvic Radiation Disease Association; Lymphoedema Support Network

Peer support groups, e.g. Pelvic Radiation Disease Association Online Community and Chat Together groups; local cancer patient groups

Service models and business cases development

See the individual symptom sections for service model information relating to those symptoms. Some areas of the UK have developed or are developing multi-disciplinary, multi-symptom services. Examples include:

- The Beatson Cancer Centre (Glasgow) Late Effects service for Pelvic Radiation Disease
- Radiotherapy Late Effects Services such as in Nottingham, Taunton, Derby, Preston and Gloucester
- Velindre Cancer Centre (Cardiff) Gynae-oncology Late Effects service.

See 'Additional Information' on **page 154**.

Finance

Unfortunately, due to lack of research and publications, this document cannot provide a defined economic case for the development of services for PRD. However, there is a prevailing view amongst professionals who care for people with PRD that NHS resources could be much better deployed by earlier recognition and intervention for people with PRD. This has the potential to save NHS resource in preventable hospital admissions, GP visits, diagnostics, continence care, blood transfusions etc. and provide other economic benefits such as return to work.

PRDA is aware that the few late effects services/pathways that exist in the UK have mostly been initiated via charitable funds, but this risks them closing after a few years if NHS funds cannot be found, thus placing considerable strain on the staff and patients involved. This approach is unsustainable, and therefore PRDA urges health service commissioners to review how people with PRD are cared for, and how this is funded¹⁶⁴.

Collaboration

Service improvement does not have to be 'big bang' – positive changes can still be made through progressive small gains, which can build up momentum by using emerging evidence of how needs are being met and by engaging more staff. Collaboration across wider geographical areas has the potential to create and commission sustainable services involving networked, multi-disciplinary, person-centred pathways of care (**see Figure G**). In England, Radiotherapy Operational Delivery Networks and/or Cancer Alliances working with Integrated Care Systems could be routes for this to happen. Wales, Scotland and Northern Ireland have Cancer Networks.

¹⁶⁴ Jo's Cervical Cancer Trust and the Pelvic Radiation Disease Association (2020) **I Want My Life Back** report.

Key documents

A range of national policies and recommendations which require professionals and organisations to address long-term side effects of cancer treatments:

- The Royal College of Radiologists' Clinical Oncology **Speciality Training Curriculum** (2021) – see CIP 13 and CIP 15
- The Royal College of Radiologists' **radiotherapy consent forms**
- NICE guidance
 - **Patient experience in adult NHS services:** improving the experience of care for people using adult NHS services which includes recommendations on:
 - knowing the patient as an individual
 - essential requirements of care
 - tailoring healthcare services for each patient
 - continuity of care and relationships
 - enabling patients to actively participate in their care, including communication and information.
 - **Shared Decision Making**
 - **Colorectal cancer**
 - **Prostate Cancer:** diagnosis and management
 - **Lower urinary tract symptoms in men: management**
 - **Urinary incontinence and pelvic organ prolapse in women: management**
 - **Chronic pain (primary and secondary) in over 16s:** assessment of all chronic pain and management of chronic primary pain
 - **Neuropathic pain in adults:** pharmacological management in non-specialist settings recommends access at any stage to specialist pain services.
- National Prostate Cancer Audit **recommendations 2021**
- British Gynaecological Cancer Society **guidelines** for vulval, cervical, ovarian and uterine cancers.
- NHS England External Beam Radiotherapy (adult) **service specification**
- NHS England **Long Term Plan policy** re:
 - personalised care in cancer (holistic needs assessments, personalised care and support plans, end of treatment summaries, health and wellbeing information and support, and cancer care reviews)
 - personalised stratified follow up
 - improvement in quality of life
- **CQC Standards** (not cancer-specific).

Additional information

- A list of services that provide care for people with Pelvic Radiation Disease is being collated for the PRDA website prda.org.uk. In the interim, please email info@prda.org.uk.
- Therapeutic radiographers may wish to join the Society of Radiographers' **Radiotherapy Late Effects Special Interest Group**, which has Q&A documents about setting up a Radiotherapy Late Effects Service.
- The eLearning for Health **PRosPer programme** includes training for professionals in personalised care and support planning, cancer rehabilitation and prehabilitation. It also covers managing the consequences of cancer and its treatment, workforce development and service redesign. To accompany the programme and help staff develop services, a '**How To**' guide to the design, development and funding of cancer prehabilitation and rehabilitation has been produced which includes many different case study examples of services from across the UK, a health economic framework and cost consequence calculator. (NB does not contain specific advice re PRD services but much of the information in the How To guide is transferable to PRD.)
- Macmillan Cancer Support and Movember (via Prostate Cancer UK) have been involved in funding services for radiotherapy late effects and maybe able to advise.
- Local charities working with individual radiotherapy centres may be able to offer support in setting up/providing a pilot or initial service.
- The Marsden Gastrointestinal (GI) and Nutrition team found that the average cost per patient for their service (in 2015) was £1,563 and that the service improves the outcomes for people living with and beyond cancer in terms of GI symptom burden, impact on daily activity and quality of life¹⁶⁵. This cost is "substantially less than the original cost of treatment for cancer, which causes the symptoms in the first place. Additionally, the costs are substantially less than those for patients with chronic GI disorders unrelated to cancer but experiencing very similar symptoms".
- A systematic review¹⁶⁶ of the costs of gastrointestinal toxicity of cancer treatment (not just radiotherapy) offered a sense of the cost to the NHS/third party payer e.g. cost per patient varied from £1,606 to £120,440.
- Extensive resources from the Movember True NTH project to develop supported self-management and follow up care for people after prostate cancer treatment are available on the **University of Southampton website**.

¹⁶⁵ Muls AC et al (2016) The holistic management of consequences of cancer treatment by a gastrointestinal and nutrition team: a financially viable approach to an enormous problem? *Clinical Medicine* 16 (3) p240-246

¹⁶⁶ Longo M et al (2019) A Systematic Review of the Economic Costs of Gastrointestinal Consequences of Treatment for Cancer Patients and Healthcare Providers. Abstracts from the NCRI Cancer Conference.

The Pelvic Radiation Disease Association warmly welcomes offers of material that supports PRD/late effects service development across the UK, and which can be posted on the PRDA website, e.g.

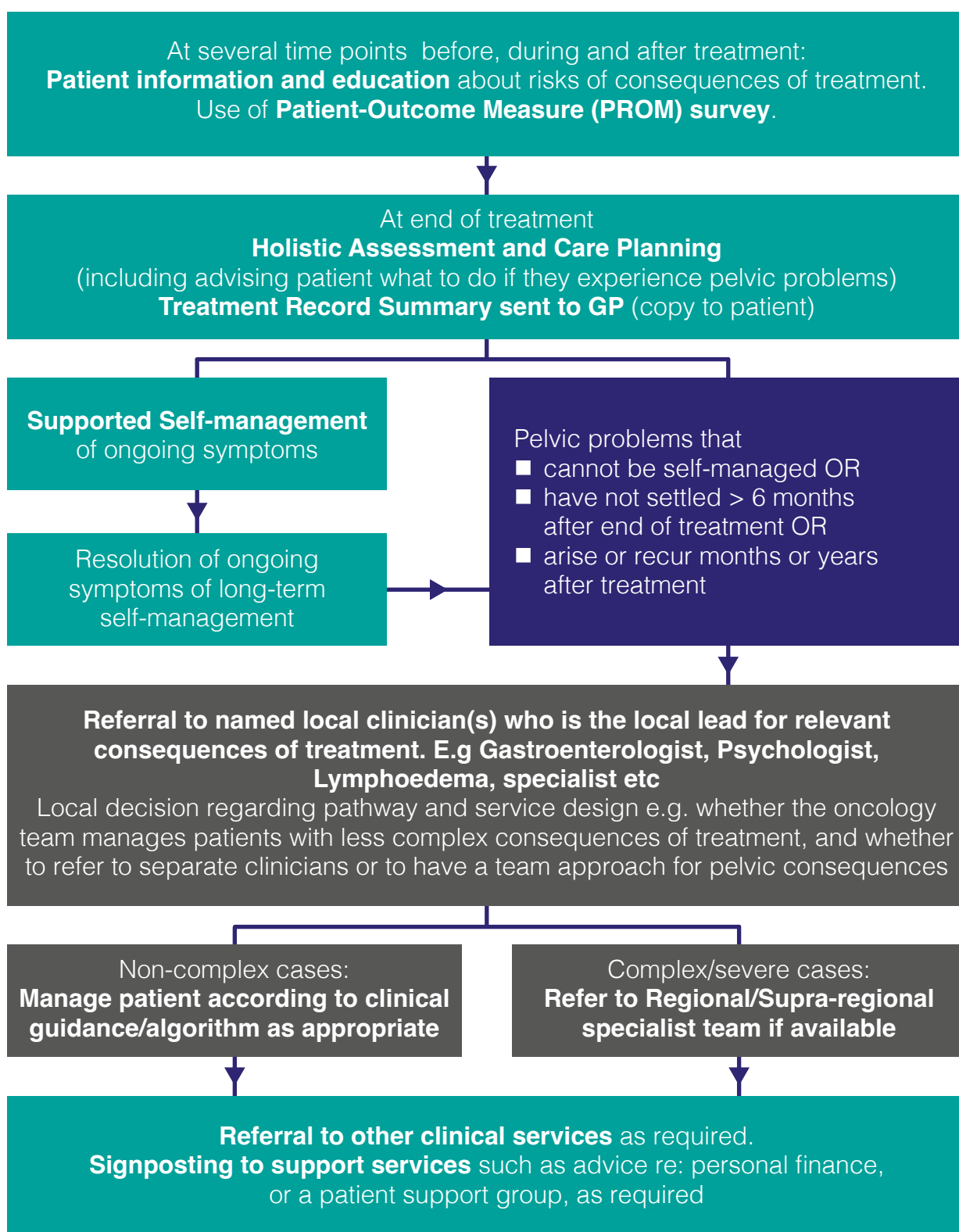
- local service launch news items
- local service information webpage
- outline business case
- commissioning body's service specification
- staffing structure and costings
- pathway diagrams within trusts and/or across wider geographies
- referral forms
- patient leaflets
- audit or quality improvement data
- patient and staff feedback results
- service evaluation studies
- project reports
- case studies
- research methodologies
- conference posters/presentations
- articles and publications
- education events.

Please forward to info@prda.org.uk marked 'Best Practice Pathway'.

Proposed multi-disciplinary service model

The following service (Figure G) model was devised for the National Cancer Survivorship Initiative's 2013 report 'Living With And Beyond Cancer: Taking Action To Improve Outcomes' and is endorsed in Macmillan's 'Throwing Light of the Consequences of Cancer and its Treatment' report (2013).

Figure G. Generic outline pathway for consequences of pelvic cancer treatment



Potential data sources for evidence and evaluation of outcomes regarding Pelvic Radiation Disease

- England Cancer Quality of Life Survey – results split by cancer type
- England National Cancer Patient Experience Survey – results split by cancer type
- National cancer audits – Prostate and Bowel
- Locally available data from Macmillan eHNA or other electronic holistic needs assessments data for pelvic cancers

It is possible the datasets may be available to researchers from studies such as:

- CREW study (longitudinal study of people after colorectal cancer diagnosis)
- Life After Prostate Cancer Diagnosis study (Patient Reported Outcome study)
- RCTs that examine new modes of pelvic radiotherapy treatment, and assess quality of life outcomes.

Professional education and networking

The Pelvic Radiation Disease Association would like to support professional networking. Please contact info@prda.org.uk if you are interested in joining any planned meetings.

The Society of Radiographers has a **Special Interest Group for Radiotherapy Late Effects**.

There may be service development work or networking within Cancer Networks or Cancer Alliances. Contact your network or alliance:

- Cancer Alliances in **England**
- **Northern Ireland** Cancer Network
- Cancer Networks in **Scotland**
 - **South**
 - **West**
 - **North**
- **Wales** Cancer Network

Summary of Professional courses and events, suitable for all professions

Courses are likely to be free unless indicated with '£'. Some may provide Continuing Professional Development (CPD) points.

At the time of publication (September 2022) there are no training courses in the UK specifically on PRD. An e-learning tool for therapeutic radiographers on pelvic radiotherapy late effects is being developed but is not yet publicly available¹⁶⁷.

The options listed below are largely generic. If you are a member of a professional society and would like to see more PRD education offered, please contact your society.

The only UK annual event dedicated to Pelvic Radiation Disease is the annual PRDA conference. The 2021 conference presentations are available.

The 2022 conference presentations will be available following the event on 1st October 2022 – please visit prda.org.uk/prda22. Please sign up to the PRDA newsletter for information on future events and professional networking.

Institution/Organisation	Course/event
Pelvic Radiation Disease Association	PRDA 2021 Annual conference PRDA 2022 Annual conference
Radiotherapy UK (Formerly Action Radiotherapy)	Webinar: Radiotherapy Late Effects – A Patient's Perspective – YouTube (webinar 2020)
British Institute of Radiology	Pelvic Radiation Disease Exposed (webinar 2017) – focus on GI effects
Marsden School	Various courses, study days and events (£)
Christie School of Oncology	Various courses, study days and events (£)
Personalised Care Institute	Personalised Care and Support Planning
Health Education England (e-Learning for Health)	PRosPer – The PRosPer programme provides elearning on supporting people with cancer in personalised care and support planning, prehabilitation and rehabilitation. It also covers managing the consequences of cancer and its treatment, workforce development and service redesign.
Macmillan Cancer Support	Various courses, study days, events and professional networking via their Learning and Development Hub
Prostate Cancer UK, TrueNTH, Ulster University and Health and Social Care in Northern Ireland	Maximising Sexual Wellbeing: Cancer Care

¹⁶⁷ Oliver L, et al (2021). A novel e-learning tool to improve knowledge and awareness of pelvic radiotherapy late effects: qualitative responses amongst therapeutic radiographers. BJR Open 3:1.

Institution/Organisation	Course/event
Sheffield Hallam University	Two modules that cover late effects of cancer treatment as part of developing specialist knowledge and skills to support people living with and beyond cancer: Prehabilitation and Rehabilitation for people living with cancer Personalised Care And Supported Self-Management For Those Affected By Cancer (15 credits level 7) (£)
British Lymphology Society	Collation of Lymphoedema courses (£) offered by various training providers
BMJ Learning	BMJ Learning module on Chronic Oedema and Lymphoedema. (£) or your institution may offer free access
Society of Radiographers (SoR)	Special Interest Group on Late Effects of Radiotherapy including a highly recommended webinar
Royal College of Radiologists (RCR)	Conferences, courses and study days may include late effects of pelvic radiotherapy (£ or events may be free to members)
Society of Radiographers (SoR)	
British Gynaecological Cancer Society (BGCS)	
UK Gynae Oncology Meeting (UKGOM)	
National Network of Colorectal Cancer Nurses (NNCCN)	
Association of Coloproctologists of UK and Ireland (ACPGBI)	
British Society of Gastroenterology (BSG)	
British Uro-Oncology Group (BUG)	
British Association of Urological Nurses (BAUN)	
British Association of Urological Surgeons (BAUS)	
Faculty of Pain Medicine (FPM)	
British Pain Society (BPS)	
British Menopause Society (BMS)	
Pelvic Obstetric and Gynaecological Physiotherapy (POGP, affiliated to the Chartered Society of Physiotherapy)	

Acknowledgements

This document has been produced through consensus by a group of healthcare professionals and people with lived experience, making reference to the current body of evidence and guidance relating to Pelvic Radiation Disease and living with and beyond cancer.

This document was conceived in 2019 by the Pelvic Radiation Disease Association (PRDA) Professional Engagement team[§] and PRDA Medical Advisory Panel[‡] members, and produced in 2021–22 by a steering group[¶]. Contributions were made by, and/or the document was reviewed by, the people listed below. Lead authorship of a section is denoted with *

PRDA wishes to express its sincere gratitude and appreciation for all the work involved.

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Designed by **Hornett Design Ltd.**



Thank you so much for the Pelvic Radiation Disease Best Practice Pathway – it has provided new knowledge, and confidence for me to better express my problems with my GP and Consultants. As a PRD sufferer for 14 years, I have radiotherapy late effects in Gastroenterology, Urology and Gynae areas.

For years I have had GP referrals (after much persuasion on my part) to separate clinical areas – Gastro, Urology, Renal, Gynae – with no communication between each other. I essentially self-manage as best I can now.

The document is superb, extremely comprehensive, full of the knowledge and experience of clinical and related experts. I can see it already as a PRD Quality Standard, with guideline recommendations and audit measures – already cross referencing existing NICE evidence.

I think that this document will make a huge difference to the services available to PRD patients and promote GP referrals to the right clinical help. In turn this will increase PRD patients Quality of Life – at last!

It will give me and others confidence to seek help and hopefully be understood. I'm so very tired of trying to explain to clinical staff and not being taken seriously, or being referred to multiple, or no, services.

I truly hope that my regional and local NHS Primary, Secondary and other services will be inspired by this PRD Best Practice Pathway, to form a multidisciplinary service for PRD patients, sadly lacking previously and currently.”

Fiona, member of the Pelvic Radiation Disease Association Patient Advisory Group



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