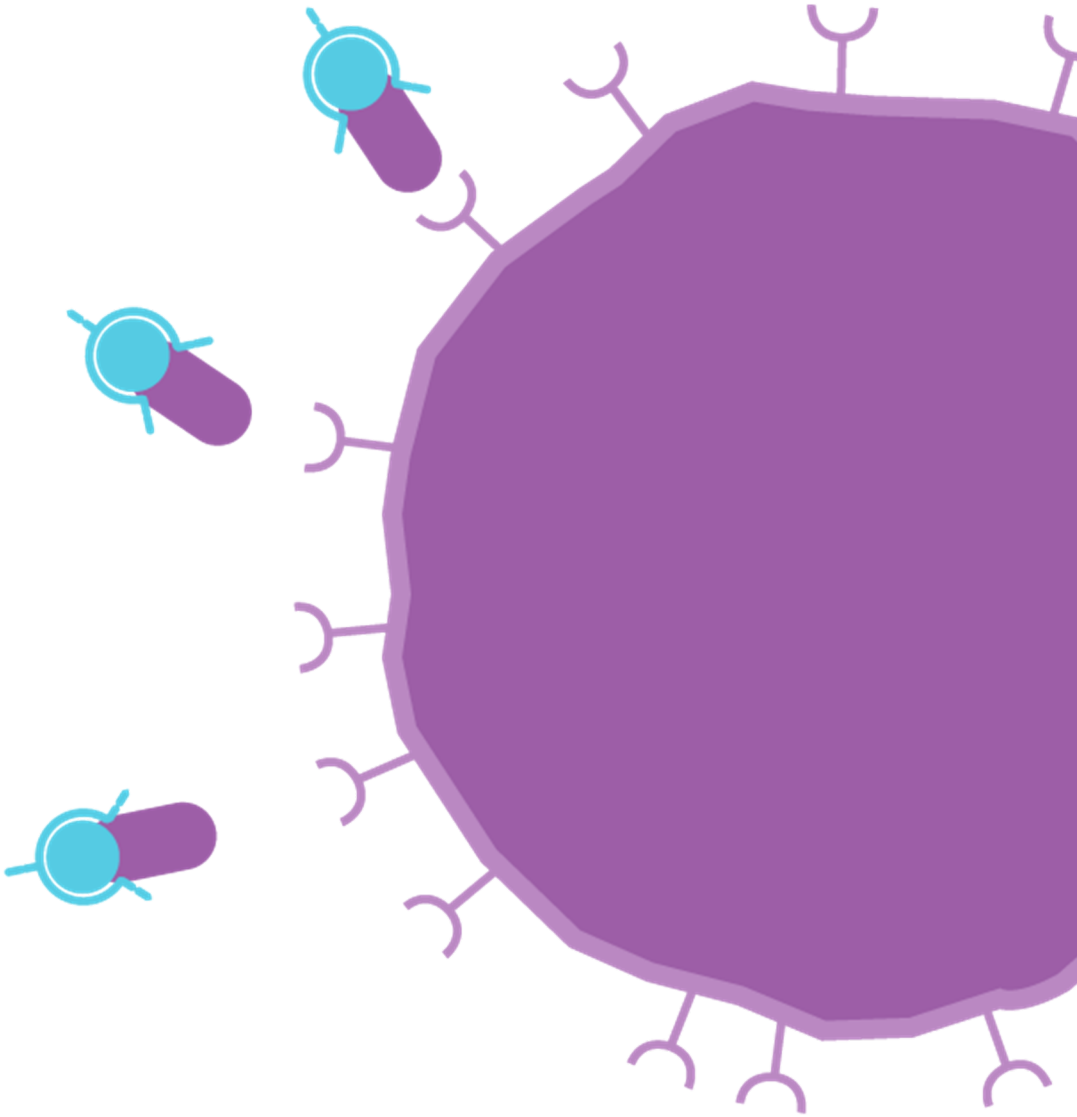

The Health Policy Partnership

[research, people, action]

Health system readiness for radioligand therapy in the UK

Regulation and reimbursement

Working paper

September 2021

This working paper has been developed by The Health Policy Partnership in collaboration with a UK Expert Advisory Group. The group has had full editorial control over all national-level outputs. The project is supported with funding from Advanced Accelerator Applications, a Novartis company, with additional support from Nordic Nanovector.

Contents

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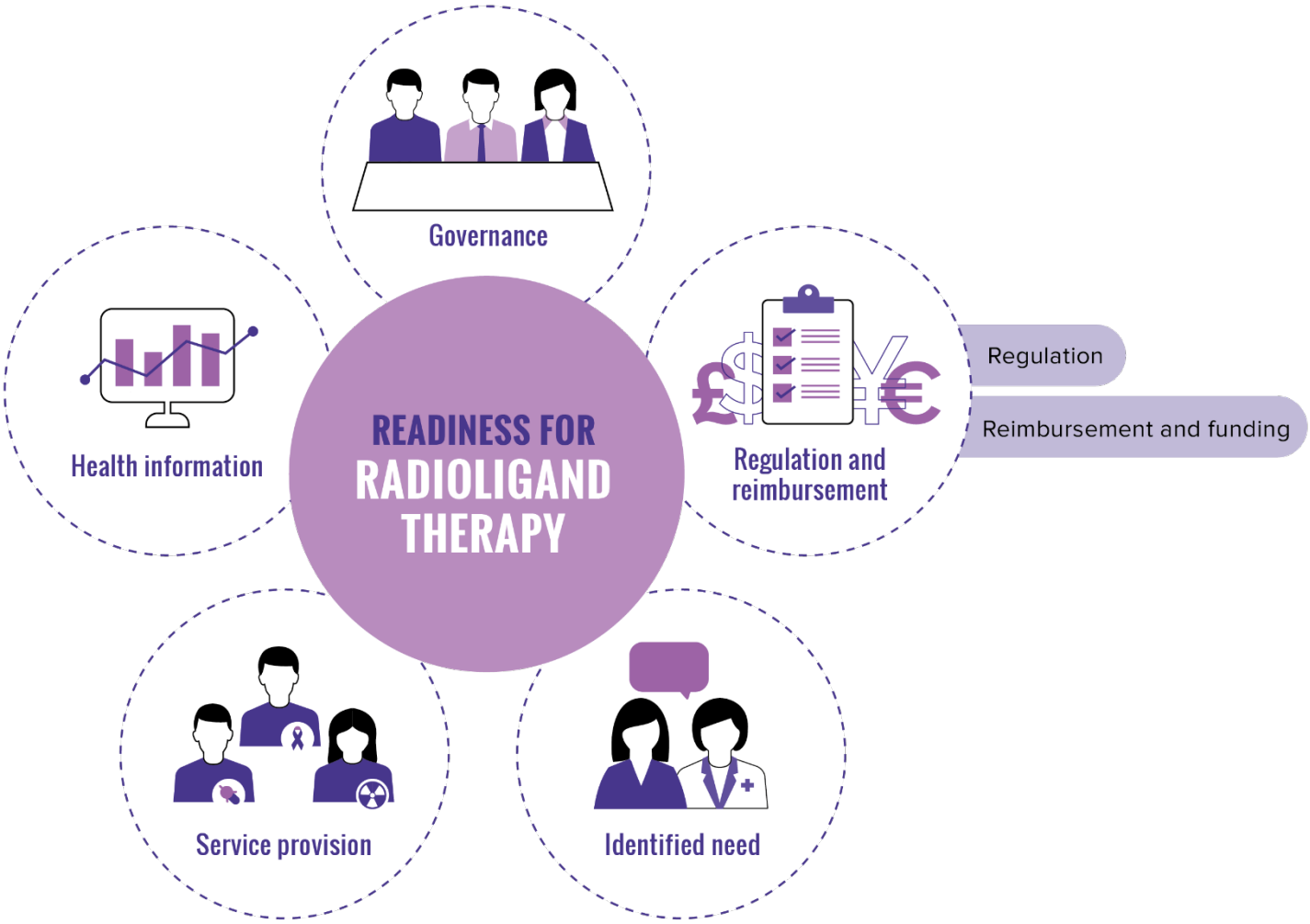
About this working paper

This working paper is part of a broader piece of work aiming to define what is needed to establish system-level readiness for radioligand therapy in the UK. It explores current integration and future readiness for the approach as it relates to regulation and reimbursement, one of the five domains of the Radioligand Therapy Readiness Assessment Framework (*Figure 1*). The working paper provides answers to questions from the framework, with key findings from relevant subdomains outlined in a summary assessment at the start of each section. We focus on the situation in neuroendocrine neoplasms, lymphoma and prostate cancer in England, though we also include examples from across the devolved nations. Many of the findings in this paper may be applicable across the UK and in other areas of cancer care.

- This working paper is supported by other documents on health system readiness for radioligand therapy in the UK. For more details, please visit: www.radioligandtherapy.com/framework/UK

This working paper uses the term radioligand therapy, but there are various terms used for the approach, including: peptide-receptor radionuclide therapy (PRRT), systemic radiation therapy, targeted radionuclide therapy, targeted radiotherapy and molecular radiotherapy. When the ligand used is an antibody, the approach is known as radioimmunotherapy.

Figure 1. Domains of the Radioligand Therapy Readiness Assessment Framework



What are regulation and reimbursement?

Transparent and appropriate regulation is an essential pillar of a functioning health system. Regulation in healthcare is a broad and dynamic concept, largely linked to overseeing and shaping behaviour.[1] In this context, the goal of regulation is to clearly define whether an intervention is deemed to be safe and effective, in which circumstances and to which patients it should be provided, and how it can be delivered safely, including the appropriate rules and safeguards that need to be in place in clinical practice. Because radioligand therapy contains radioactive materials, regulation also looks to address environmental concerns related to radiation exposure and disposal of nuclear waste. There are numerous agencies involved in regulating radioligand therapy in England (*Box 1*).

Reimbursement is an important part of the process of making therapies available in clinical practice. In the context of health systems, reimbursement is the process by which institutions (such as hospitals) are paid for the services they provide to patients. In England, the National Institute for Health and Care Excellence (NICE) determines which therapies should be reimbursed by the NHS and integrated into care. If a therapy is not recommended by NICE, it may be funded by initiatives such as NHS England's Cancer Drugs Fund. Local and national commissioners and providers then work together to plan for, purchase and deliver the therapy. The goal of reimbursement policies is to ensure that the greatest health value is achieved with the resources available.[2]

Box 1. Regulatory agencies involved in radioligand therapy in England

A variety of regulatory bodies are involved in managing the safe delivery of radioligand therapy in England:

- The Medicines and Healthcare products Regulatory Agency is responsible for licensing new therapies for use in the UK based on evidence of safety and efficacy.[3 4]
- The National Institute for Health and Care Excellence (NICE) recommends which therapies should be funded by NHS England based on information about their clinical effectiveness and economic value.[3] NICE also develops guidelines, pathways, quality standards and performance metrics.[5]
- The Environment Agency regulates the disposal of industrial waste, including radioactive waste.[6]
- The Office for Nuclear Regulation plays a role in UK-wide safety and security standards.[6]
- The Health and Safety Executive enforces regulation on safe operation in workplaces wherein staff may be exposed to radioactive material.[7]
- The Administration of Radioactive Substances Advisory Committee regulates and licenses the administration of medical radioisotopes.[6 8]

What do good regulation and reimbursement look like?

Effective regulation and reimbursement of radioligand therapy requires agencies to complete objective, evidence-based assessments of the approach, consistently ensuring that safety is ingrained in all aspects of delivery. Regulation and reimbursement processes should be appropriate to different care settings and provide clear safety requirements that are appropriate for the unique qualities of each radioisotope.

Transparent approval processes can help ensure that people with cancer gain access to the most appropriate therapies in a timely manner. In England, regulatory agencies such as the Medicines and Healthcare products Regulatory Agency (MHRA) and the

Administration of Radioactive Substances Advisory Committee (ARSAC) clearly outline the requirements and pathway for gaining appropriate licences.[8-11] It is essential that all regulators communicate the values used when assessing applications for licensing.[12] This allows pharmaceutical companies, scientists, and healthcare providers to prepare for regulatory submissions from an early stage and avoid delays resulting from incomplete or inappropriate submissions.

Communication between all stakeholders is essential to ensure fit-for-purpose regulation of radioligand therapy. Because radioligand therapy bridges the health and energy sectors, numerous agencies contribute specialist knowledge to regulations. Interaction and harmonisation between these agencies can help ensure that personalised therapies such as radioligand therapy are appropriately regulated.[13] For example, the licensing requirements for radiopharmaceuticals should be developed with insights from the energy sector, to ensure that scientific understanding of nuclear materials is represented in the medical regulation. Moreover, regulatory agencies should create opportunities for early and ongoing engagement with patients as well as pharmaceutical companies.[14] This will ensure that regulations account for the unique challenges of personalised therapies[13] as well as the specific properties of nuclear medicine.

1 Regulation

Summary assessment

Indicators	Assessment
Are regulatory approval processes in the UK suitable for radioligand therapy?	Radioligand therapy has been licensed for use in certain types of neuroendocrine neoplasms (NENs) and lymphoma in the UK, indicating that the regulatory approval process can be adequately applied to the approach. However, the process could be further improved to suit the particulars of radioligand therapy. At present, regulatory approval of any given diagnostic and therapeutic pairing is not linked, which may cause issues with access.
Are regulations for the production and supply of radioisotopes in the UK appropriate for radioligand therapy?	Some radioisotopes used for imaging are produced in cyclotrons in the UK, but most diagnostic radioisotopes are developed in nuclear reactors outside of the UK. The supply of therapeutic radioisotopes is managed by pharmaceutical companies. The Department of Health and Social Care has plans to ensure the continued and consistent supply of radioisotopes, but regular evaluation of supply chains is required by both the UK government and pharmaceutical companies.
Are regulations for the administration of radioisotopes in the UK appropriate for radioligand therapy?	The ARSAC licenses practitioners and employing institutions for the administration of medical radioisotopes. Licensing requirements are comprehensive and stringent to ensure safe delivery. These regulations should be regularly reviewed and updated to ensure they remain appropriate in light of changing workflows and norms, for example those caused by the COVID-19 pandemic.
Are regulations for the management of medical radioactive waste in the UK applicable to radioligand therapy?	Radioactive waste is classified by the Department for Business, Energy and Industrial Strategy (BEIS) based on level of radioactivity, including the type of radiation emitted and the half-life of the radioisotopes. The definitions are applicable to radioligand therapy. Waste must be disposed of in line with guidance from BEIS, the Environment Agency and the Office for Nuclear Regulation. Regulations for the disposal of radioactive waste are proportionate to the level of risk posed by the material.

1.1 Licensing approval processes

Radioligand therapy is assessed in line with the UK's regulatory approval process for medicines. The MHRA is the public body which evaluates new therapies and medical devices before they are adopted in the UK. It also plays an important role in enforcing drug licensing regulations, and ensures the safety and effectiveness of approved medicines.[3 4] Before Brexit, the European Medicines Agency (EMA) also played a role in regulating medicines in the UK, but this is no longer the case (*Box 2*).[11] The MHRA classifies radioligand therapy as a medicinal product and treats it as such in the regulatory approval process.[15 16] To gain MHRA approval, a medicinal product must demonstrate safety, quality of manufacturing and efficacy, and must show that its benefits outweigh its risks.[3 17] An expert has highlighted that the MHRA approval process was not designed with consideration for highly targeted and personalised medicines.[18] As such, it may not be prepared for approaches such as radioligand therapy, which work best with individualised rather than standardised doses.

Box 2. Impact of Brexit on regulatory approval of medicinal products

The European Commission, acting on the recommendation of the EMA, can grant EU-wide market authorisation of a given therapy. Prior to Brexit, these EU regulations were systematically included in UK law and the UK provided guidance to EU regulatory decision-making.[19 20]

From January 2021 the UK is not subject to European pharmaceutical law,[19] and all new applications for marketing authorisation in the UK must now be made to the MHRA.[21]

Until 1 January 2023, the MHRA may choose to follow the decision of the EMA when granting market authorisation.[22] However, it reserves the right to make its own recommendation. As a result, licensing of medicines in the UK and the EU may diverge and lead to differences in availability.

Radioligand therapy has been licensed for use in the UK in certain types of neuroendocrine neoplasms (NENs) and lymphoma. The therapies licensed for use in the UK are:

- lutetium oxodotreotide (Lutathera) was licensed by the EMA for the treatment of people with unresectable or metastatic gastroenteropancreatic NENs in 2017[23]
- ibritumomab tiuxetan (Zevalin) was licensed by the EMA for the treatment of people with CD20 positive relapsed or refractory follicular lymphoma in 2004.[24] In 2008, the market authorisation was expanded to include its use as a consolidation therapy for certain people with previously untreated follicular lymphoma.[25]

There are ongoing clinical trials investigating the use of existing and novel radioligand therapies in NENs and lymphoma.[26 27] Clinical trials for prostate cancer are also ongoing.[28 29] These could be the first radioligand therapies evaluated by the MHRA post-Brexit.

Paired diagnostics must undergo the same licensing process as their associated therapeutic; however, the review of radioligand therapy pairs is not linked. Radioligand therapy is a theranostic approach to cancer care, which means that it can be used for both diagnostic and therapeutic purposes (*Box 3*). Like therapeutic radioisotopes, the MHRA classifies paired diagnostics as medicinal products.[16] This may mean that paired diagnostics and therapies are held to the same evidence standards, which is a challenge, as the purpose of a paired diagnostic is different from that of its therapeutic pair. Moreover, the value of the paired diagnostic may only be evident when used in conjunction with the associated therapeutic.[30] However, the processes to grant approval of diagnostics and their therapeutic pairs do not appear to be linked.[17] As such, it is possible that a therapy is licensed for use but the paired diagnostic is not. In this situation, a clinician might have access to radioligand therapy, but would not be able to accurately identify the people who would most benefit from it.

Box 3. Theranostics

Theranostic approaches can help clinicians accurately assess people's eligibility for specific therapies, ensuring they are only used in cases when they are most likely to be effective. This targeted approach can reduce unnecessary treatment costs and improve patient outcomes.

Radioligand therapy is a theranostic approach to treatment. Depending on the purpose of the intervention, different radioisotopes can be used to achieve distinct aims. Imaging radioisotopes can be used to help diagnose and visualise cancer in the body, and therapeutic radioisotopes can be used to treat cancer cells.

1.2 Production and supply regulations

The UK's supply of diagnostic radioisotopes relies heavily on other countries' technology, which creates uncertainty in access to care. Some imaging radioisotopes used in positron emission tomography–computed tomography (PET-CT) for eligibility assessments are produced in cyclotrons (a type of particle accelerator) across the UK.[31] However, production of many other diagnostic radioisotopes is concentrated in a few reactors outside of the UK, many of which are ageing and unreliable.[32-35] In 2009, one of these reactors unexpectedly shut down owing to a leak, contributing to a multi-year shortage in the supply of certain radioisotopes.[36] Disruptions to flights caused by the COVID-19 pandemic have been another source of uncertainty in these complex supply chains.[37] Inconsistent access to diagnostic radioisotopes can make it difficult to diagnose certain cancers and to identify people who would benefit from radioligand therapy. This situation may be exacerbated if increased use of the approach is not carefully planned for.

The supply of therapeutic radioisotopes used in radioligand therapy is predominantly managed by pharmaceutical companies. For example, various pharmaceutical companies have secured a supply of lutetium-177 for use in investigational and licensed radioligand therapy.[38-40] Each radioisotope has specific characteristics, including unique decay times, that must be accounted for when planning supply chains. As such, the logistics must be seamless to ensure that the therapy arrives at the delivery site at the appropriate time with sufficient radioactivity to treat the cancer.[36] Pharmaceutical companies therefore

carefully plan and manage the various unique supply chains to ensure the availability of each type of radioligand therapy.[36]

Brexit will invariably impact an already challenging supply chain. Additional import requirements, delays and associated costs could lead to issues in the sustainable radioisotope supply.[31] For example, possible requirements for batch testing of diagnostics and medicines imported from Europe might impact radioisotopes with shorter half-lives, causing further possible disruption.[41] Should larger quantities or new types of medical radioisotopes be required in the future, these supply chain issues may become increasingly complex and lead to difficulties in access. Pharmaceutical companies and the UK government must plan for this.[42] The UK government is currently seeking to resolve issues around access to diagnostic radioisotopes, and may develop a national medical research reactor to ensure reliable production of the material (*Real-world example 1*).[43] Constant evaluation of all medical radioisotope supply chains will be essential to ensure consistent availability of radioisotopes.

Real-world example 1. UK government response to possible radioisotope supply issues

In response to the end of the Brexit transition period in January 2021, the UK government laid out plans to stockpile raw materials and re-route radioisotope supplies to ensure the short-term continuity of supply.[44] This included considerations for air freight of medical products,[45] among them medical radioisotopes. The government also put in place a National Supply and Disruption Response service to support healthcare providers in managing potential supply chain issues.

As a longer-term solution, the government is seeking to address supply issues by developing a medical research reactor in Wales.[43]

1.3 Regulations for working with radioisotopes

Healthcare professionals and institutions must meet stringent licensing requirements to administer radioligand therapy. ARSAC regulates and licenses the use of medical radioisotopes and provides guidance on the use of radioactive substances in clinical practice and research.[8] It requires that both health practitioners and employing institutions are licensed to deliver therapies that use radioactive substances. Practitioner licences dictate whether a healthcare professional can administer radiopharmaceuticals for imaging, therapeutic or research purposes.[8 46] A practitioner's licence can be used in multiple hospitals. Licences for employing institutions, known as employer licences, define the range of services that can be delivered at any given hospital or institution.[46] Both practitioner and employer licences must be renewed every five years.[47]

Although the pathway for obtaining an ARSAC licence is clear, the number of physicians who hold a licence is limited. As of 2018, an estimated 1,100 clinicians and 280 care or research settings in the UK held ARSAC licences.[47] Two hundred new practitioner applications were submitted between April 2019 and February 2020.[48] One expert has suggested that the limited uptake of these licences is due to the extensive requirements around training and experience.[49] Staff members must complete time-intensive training alongside their existing responsibilities, which can be challenging.[8 9 49] Institutions seeking to obtain a licence may need to reassess or modify existing hospital infrastructure to align with regulations.[10 30]

The COVID-19 pandemic has presented unique challenges to the licensing process. One important requirement of practitioner licensing is on-site observations.[9] However, such observations have not been possible during the COVID-19 pandemic and the current licensing guidance does not suggest any alternatives.[50] This may result in a decrease in the number of new practitioner licence applications. As radioligand therapy can only be delivered by an ARSAC licence holder, this would have a direct impact on its future delivery. Ensuring that the requirements for gaining an ARSAC licence are appropriately adaptable will help secure a constant supply of new licence holders.

- For more information about the radioligand therapy workforce capacity, read the working paper on service provision.

1.4 Waste management regulations

Multiple organisations are involved in managing radioactive waste disposal in the UK:

- The Department for Business, Energy and Industrial Strategy defines what is included within the scope of radioactive waste substances,[51] and categorises radioactive waste into high-, intermediate-, low- and very low-level risk categories.[52]
- The Environment Agency is responsible for controlling the accumulation and disposal of radioactive waste in England by enforcing the Radioactive Substances Act 1993.[7] Hospitals and institutions must be registered under this Act and are responsible for adherence to the regulations.[53]
- The Office for Nuclear Regulation is responsible for regulating the transportation of radioactive materials in a safe and secure manner under the Ionising Radiation Regulations 2017.[54] It develops guidance on requirements for waste packaging, in-transit storage and loading alongside conducting inspections.[54]

Waste from radioligand therapy is defined as radioactive waste and must be securely disposed of in line with relevant guidance. Under current guidance, nuclear waste is divided into categories based on the level of radioactivity, including the type of radiation emitted and the half-life of the radioisotopes.[51 55] No considerations are made for the differences between inpatient or outpatient procedures. Most waste from nuclear medicine procedures such as radioligand therapy is classified as very low-level waste or low-level waste, but higher-risk categories of waste exist.[52 56] Very low-level waste is stored securely in hospitals while the radioactivity decays to the point where it is below prespecified safe levels. It is then safely disposed of alongside other medical waste.[57] Low-level medical nuclear waste is transferred to national storage facilities, where it can be stored or incinerated alongside waste from other industries.[55 56] These disposal processes ensure that nuclear waste management is proportionate to the risk of radioactivity in each material.

Coordinated planning by all institutions involved is essential to ensure that future waste disposal can meet increasing demands. The UK Radioactive Waste Inventory maintains a record of the volume of radioactive waste produced in the country.[58] While medical waste makes up a very small proportion of the UK's radioactive waste,[56] hospitals must still adhere to specific limits on the total level of radioactive waste that they produce

and store on site.[49 57 59] Long-term increases in the production of medical radioactive waste could place pressure on hospital waste management capacity.[60] We must continue planning waste capacity to ensure that institutions can maintain safe radioactive waste disposal processes.

2 Reimbursement and funding

Summary assessment

Indicator	Assessment
How are existing UK reimbursement and funding mechanisms applied to radioligand therapy?	Radioligand therapy is reviewed by NICE, which recommends which medicines should be available through NHS England. NHS England Specialised Commissioning is responsible for reimbursing all radioligand therapy which has been recommended for funding by NICE. When the use of radioligand therapy is not recommended in routine care within the NHS, it can be funded through the Cancer Drugs Fund or the NHS Individual Funding Request scheme; it may also be funded privately.

2.1 Reimbursement of radioligand therapy

NICE determines whether radioligand therapy should be available on the NHS. Once cancer therapies are licensed for use, NICE recommends the circumstances where a therapy may be made available by assessing clinical and cost-effectiveness compared with current clinical practice.[61-63] It can be difficult to evaluate the economic benefit of personalised medicines, which include radioligand therapy, based on standard-dose clinical trials;[12] this is something that NICE is working to overcome.[2 12] Based on its assessment, NICE may recommend that the therapy is used in routine care, or limit use to selected patient groups or research. If NICE does not recommend the therapy, it may still advise that the therapy be made available through the Cancer Drugs Fund.[62] While medicines are available through the fund, resubmissions to NICE can be made if additional clinical and economic data emerge. The Cancer Drugs Fund is currently used to make a highly personalised approach, chimeric antigen receptor (CAR)-T cell therapy, available to people with lymphoma and represents a useful 'alternative' funding mechanism (*Real-world example 2*). It is currently in the process of being replaced by the Innovative Medicines Fund, which will also support non-cancer therapies.[14 64] The impact this may have on funding available for cancer therapies, including radioligand therapy, is unclear.[65]

Real-world example 2. Reimbursement for CAR-T cell therapy through the Cancer Drugs Fund

CAR-T cell therapy is an innovative personalised immunotherapy that can be used for people with certain types of lymphoma.[66] While it is considered promising, there were challenges to the NICE appraisal process due to issues with data: data on overall survival and the need for follow-up treatments were unclear, there was a lack of data comparing the approach to other therapies, and cost-effectiveness estimates were high.[67 68] As a result, NICE recommended that the therapy be reimbursed through a managed access agreement under the Cancer Drugs Fund.[67 68]

Under this scheme, the pharmaceutical company which submitted CAR-T cell therapy to NICE has five years to collect further evidence on clinical and cost-effectiveness.[66 67] Long-term data are being collected through clinical trials, and real-world evidence is being collected through data sets, such as the Systemic Anti-Cancer Therapy Dataset.[67] In 2022/23, the data will be used by NICE to reassess reimbursement of the therapy.[67 69 70]

At present, the Cancer Drugs Fund is only applicable to England, but similar initiatives are available in the devolved nations: Wales has introduced the New Treatment Fund, Scotland has a New Medicines Fund for rare and end-of-life conditions, and Northern Ireland has announced a similar early-access scheme.[71-73]

NHS England funding for the use of radioligand therapy in NENs is nationally coordinated. Based on a technology appraisal, NICE has recommended that radioligand therapy be made available on the NHS for certain types of NENs.[74] Because radioligand therapy is highly specialised and only used to treat a relatively small number of people, NHS England Specialised Commissioning is responsible for planning, purchasing and monitoring the approach.[75 76]

The use of radioligand therapy in lymphoma is currently limited and requires exceptional funding. Experts indicated that they were not aware of the approach being regularly used in clinical care for lymphoma today.[18 77] Prior to 2012, some cancer networks funded the use of licensed radioligand therapy in lymphoma,[78 79] even though the approach was not recommended for use at a national level in the UK. NICE has not completed a health

technology assessment of radioligand therapy in lymphoma;[80] however, one was conducted by the Scottish Medicines Consortium, which decided not to recommend it due to a lack of robust economic data.[79 81] As such, currently licensed radioligand therapy can only be used in lymphoma if exceptional funding is approved by the NHS following submission of an Individual Funding Request (*Real-world example 3*). It is likely that these challenges have contributed to the decline of its use in lymphoma over the years. Novel applications of radioligand therapy are being investigated for lymphoma and,[26] should these be licensed, reimbursement may be reassessed.

Real-world example 3. Availability of treatments via Individual Funding Requests

Medicines which have been licensed for use in the UK but are not reimbursed by the NHS or Cancer Drugs Fund can be accessed via Individual Funding Requests.[82] If a clinician believes that there are special circumstances which mean a person they are treating would benefit from a product that is not usually reimbursed, they can submit a funding request. Applications must explain the circumstances of the request and be supported by the trust's medical director and either the multidisciplinary team or the trust's drugs and therapeutics committee.[83] Applications are reviewed by an independent multidisciplinary team which includes representatives from the public and NHS England.[82]

While Individual Funding Requests are successful in some circumstances, they are not a reliable means of accessing therapies.[84] For example, in 2016–17, 1,808 Individual Funding Requests were submitted in England; approximately 97% of these were screened out or declined.[85] The exceptional circumstances required for approval of an Individual Funding Request mean that it is infrequently used, and is not a reliable source of funding for radioligand therapy.

New funding mechanisms may come into play if radioligand therapy is recommended for NHS funding in larger patient populations. NHS England's specialised commissioning aims to ensure equal access to therapies for complex or rare conditions across England.[86] The number of people who would benefit from a therapy is considered when determining whether it will be funded through this route.[86] At present, the demand for radioligand therapy

is limited to NENs, which are rare cancers. However, their incidence is growing,[87] and radioligand therapy is currently being explored in a number of other indications.[28 29 88 89] If demand for radioligand therapy grows, it may no longer be appropriate for funding through NHS England specialised commissioning and new funding mechanisms will need to be agreed.

- For more information about the incidence of NENs in the UK, read the working paper on identified need.

2.2 Funding and reimbursement of imaging for radioligand therapy

Adequately funded imaging is essential to ensure the most appropriate use of radioligand therapy. PET-CT imaging is an essential step for assessing whether people with NENs and prostate cancer are eligible for radioligand therapy. PET-CT imaging is used to confirm who might benefit from radioligand therapy before it is administered. This can ensure that only the most appropriate people are treated, improving patient outcomes and reducing unnecessary treatment costs. Imaging can also be used to measure the impact of radioligand therapy on cancer progression. Radioligand therapy imaging tracers have been found to be more sensitive than the 'gold standard' imaging procedures in NENs and prostate cancer.[90 91]

Funding for diagnostic and therapeutic radioligands should be routinely linked to ensure access to both. NICE may consider companion diagnostic technology in the context of paired therapeutics when making funding decisions.[92] However, this does not always translate into funding in clinical practice: although radioligand therapy and the paired diagnostic are funded by the NHS for use in NENs, funding for imaging is inconsistent and uncertain.[93] Many diagnostic radiotracers have not received funding, as commissioning of PET-CT depends on demonstration of clinical efficacy through direct improvements in patient outcomes, which is difficult to assess in diagnostic radiotracers.[63] Without adequate funding for imaging agents, providing a comprehensive radioligand therapy service will be complicated. Issues around access to and funding of paired diagnostics may be further exacerbated should radioligand therapy be licensed and recommended for use in prostate cancer (*Real-world example 4*).

- For more information about imaging services in the UK, read the working paper on service provision.

Real-world example 4. Lack of funding for radioligand therapy imaging in prostate cancer

Radioligand therapy imaging, gallium-68 prostate-specific membrane antigen (PSMA) PET-CT has been available in the UK since 2015.[90] It has been shown to have higher accuracy than existing PET-CT tracers.[90] However, PSMA tracers are associated with a higher cost and require additional infrastructure compared with currently available imaging services.[90]

Some providers suggest that the potential benefits of more accurate scanning using PSMA tracers may offset the increased cost and infrastructure investment.[90] However, providers, commissioners and policymakers do not agree on the most appropriate way to measure these benefits.[90] So far, no consensus has been reached on funding of radioligand therapy in prostate cancer.

Conclusion

The regulatory and licensing processes for delivering radioligand therapy in the UK adequately ensure its safe and effective use, but could be refined to account for the unique attributes of the approach. Clear licensing approval processes apply to radioligand therapy, and licensing regulations for both professionals and employing institutions clearly outline roles and responsibilities to ensure safe production, administration and disposal of radioisotopes. However, linking the MHRA review of associated diagnostic and therapeutic radioligand pairs would help ensure logical licensing is in place. Moreover, ongoing communication between the environmental and health sectors could also help improve regulation and risk assessments of radioligand therapy. Finally, all regulations should be regularly reviewed and updated to ensure they remain appropriate in light of changing workflows and norms resulting from the COVID-19 pandemic.

New reimbursement and capacity issues may emerge if demand for radioligand therapy increases. Current reimbursement policies seem appropriate to support use of radioligand therapy on a relatively small scale. However, if the approach is licensed and recommended for use in a larger population, this reimbursement process may no longer be suitable. Finally, Brexit may have an impact on the supply of therapeutic radioisotopes imported from outside the UK, and the UK government must continue to invest in and support the development of a national radioisotope supply. Establishing a new nuclear generator in the UK may provide opportunities for research and collaboration in the future.

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