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1 **Commentary**

2 **The Time is Now: Making the case for a UK Registry of Deployment of**

3 **Radiology AI applications**

4

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24 **Conflict of interest**

25 The authors declare no conflict of interest.

26 **Abstract**

27 Artificial intelligence (AI)-based healthcare applications are rapidly evolving, and radiology is a target
28 specialty for their implementation. In this paper, we put the case for a national deployment registry
29 to track the spread of AI applications (AI-apps) into clinical use in radiology in the United Kingdom
30 (UK). By gathering data on the specific locations, purposes and people associated with AI-app
31 deployment, such a registry would provide greater transparency on their spread in the radiology field.
32 In combination with other regulatory and audit mechanisms, it would provide radiologists and patients
33 with greater confidence and trust in AI-apps. At the same time, co-ordination of this information
34 would reduce costs for the National Health Service (NHS) by preventing duplication of piloting
35 activities. This commentary discusses the need for a UK-wide registry for such applications, its benefits
36 and risks, and critical success factors for its establishment. We conclude by noting that a critical
37 window of opportunity has opened up for the development of a deployment registry, before the
38 current pattern of localized clusters of activity turns into the widespread proliferation of AI-apps
39 across clinical practice.

40

41 **Introduction**

42 Artificial Intelligence (AI)-based applications - AI-apps - are widely viewed as essential to modernising
43 healthcare systems. Such apps have great potential to improve productivity and performance by
44 supporting the analysis, interpretation, and categorisation of the enormous amounts of data
45 generated for diagnosis and treatment^{1,2}. Within the healthcare arena, radiology is seen as one of the
46 most promising fields for the near-term deployment of clinical AI. The rapid development of image-
47 based AI in the non-medical world offers ready applicability to the large volumes of stored imaging-
48 based radiology data that are required to train AI-apps³. Should AI indeed fulfil its potential, then the
49 resulting transformation of medical imaging and healthcare is expected to impact not only the work
50 practices of radiologists⁴ and outcomes for patients, but the whole field of radiology itself⁵.

51

52 Despite their potential, experience to date suggests that integrating AI-apps into daily clinical practice
53 will prove challenging^{6,7}. Certainly, the adoption and implementation of radiology AI-apps in the UK to
54 date is unevenly distributed, being more accessible to larger and more advanced hospitals. Major
55 implementation challenges include the pressing need for appropriate governance structures and
56 guidelines, unresolved ethical issues, and commercial sensitivity⁸⁻¹¹. Furthermore, the working
57 principles of the algorithms underpinning these apps may be so obscure as to create what is termed
58 a ‘black-box effect’¹². These issues jeopardise radiologists’ and patients’ trust in AI-apps, especially as
59 the implications for patient safety and outcomes remain uncertain¹³. In response, there are
60 widespread calls for greater transparency around the use AI in healthcare¹⁴. But, while efforts are
61 underway to increase the ‘explainability’ of the AI-apps themselves¹⁵, at the healthcare system level
62 such transparency is limited by a lack of information on what applications are deployed where, by
63 whom, and with what purpose¹⁶. In this commentary, therefore, we argue for the need to build a UK-
64 wide registry of deployed radiology AI-apps, discuss its benefits and risks, and consider critical success
65 factors relevant to realising its development.

66

67 **The need for a registry of deployed radiology AI-applications**

68 As a first step towards outlining the development of a such a registry, we need to situate it within the
69 current regulatory context. In the UK, the Medicines and Healthcare products Regulatory Agency
70 (MHRA) mandates that all medical devices are approved and registered with the agency prior to being
71 lawfully marketed in the UK. This includes AI-apps as a medical device¹⁷. As with other medicines and
72 devices, manufacturers are required to submit vigilance reports, including any incidents, as well as the
73 plan for corrective action. In addition, patients or users can utilise the well-established yellow card
74 system to report any unexpected findings or incidents related to using a medical device¹⁸. Further, as
75 part of its response to the introduction of AI, the MHRA has taken an important step forward in its
76 guidance document¹⁹ by establishing a major work programme on ‘Software and AI as a medical device
77 change programme’. This is evaluating the changes that are needed to ensure that the regulatory

78 framework provides a high degree of protection for patients and public, and to ensure that the UK
79 supports responsible innovation for medical device software.

80

81 A registry of AI-app deployment would be differentiated from the MHRA registration process, but
82 would enhance safety in their implementation. The need for, and potential workings of such a registry,
83 can be highlighted by a comparison with the drivers of existing UK-wide registries, which seek to
84 monitor the deployment and performance of some non-AI related healthcare innovations. In the case
85 of a deployment registry, the sites of deployment, rather than patient outcomes, would be recorded.
86 Nonetheless, important comparisons can be made with patient-based registries. One such example
87 is the renowned National Joint Registry (NJR) which is the largest orthopaedic registry in the world²⁰.
88 High quality and relevant data on the type of surgery, the implant used, and the patients receiving
89 surgery are collected into the NJR via a secure electronic data entry system. The NJR was established
90 in response to the high failure rate of a particular type of hip replacement: the 3M Capital Hip²¹. The
91 initial absence of a registry prevented the timely tracing of 3M Capital Hip patients, causing significant
92 complications for these patients and public concern. To avert incidents like these in the future, the
93 introduction of the NJR enabled the monitoring of the cost-effectiveness, quality, and safety of joint
94 replacement surgeries conducted in the UK²⁰.

95

96 Another example is the Breast and Cosmetic Implant Registry (BCIR), which captures data on breast
97 implant surgeries conducted in England, Scotland, and Northern Ireland²². Similar to joint
98 replacements, breast implants were introduced to the market without a supporting deployment
99 registry. However, safety and regulatory issues emerged, such as the unsafe Poly Implant Protheses
100 silicone breast implants, which had to be withdrawn from the market due to a high risk of rupturing
101 and complications in patients^{23,24}. To better monitor the safety of breast and cosmetic implants and
102 allow for the tracing of patients fitted with implants, the BCIR collects data on patient, implant,
103 surgery, and after-care details.

104

105 The case for a new AI-app registry is reinforced by more recent experience directly targeting such apps
106 in healthcare. The Kent Surrey Sussex Academic Health Science Network was commissioned by Health
107 Education England to map AI-apps ready for the UK healthcare market to understand their impact on
108 the workforce and patient care²⁵. The produced AI roadmap only includes publicly available data and
109 findings were not validated, but the efforts show the clear need for information on deployment of
110 such apps. For radiology specifically, the Scottish Radiology Transformation Programme, with support
111 from NHS Scotland, developed a Scotland-wide registry to foster a consistent and efficient approach
112 to the adoption of such applications²⁶. The registry holds data on those responsible for the
113 applications' deployment, manufacturer and regulatory details, the applications' intended purpose,
114 and the location and date of implementation. Rather than collecting identifiable patient data, such as
115 in the NJR and BCIR, this registry focuses on deployment information only. This helps to avoid the
116 duplication of piloting activity, and enhances opportunities for learning across the radiology
117 community. This pioneering work provides an excellent exemplar for the development of a UK-wide
118 registry.

119

120 **Current status in radiology AI-app deployment**

121 Apart from the aforementioned Scottish registry of AI-app deployment and the AI roadmap, the extent
122 of deployment of each radiology AI-app into clinical systems in the UK is not tracked and the authors
123 are not aware of any national registries of radiology AI-app deployment. However, there is
124 considerable interest in radiology AI-app deployment and several surveys have been undertaken, or
125 indeed are currently circulating, to investigate various aspects of AI-app usage in radiology. These
126 surveys explore ethical considerations, attitudes to use, expectations and hurdles encountered (Table
127 1)^{11,27-36}. An on-line overview of CE-marked or FDA approved tools was published as a resource which
128 is designed to be of interest to those wishing to identify a radiology AI-app for use in their

129 department³⁶. The authors found that only 18% of these had evidence of efficacy of level 3
130 (demonstrating added value to the diagnosis) or higher.

131

132 The American College of Radiology (ACR) undertook a large survey²⁷ of their members which found
133 that 30% of radiologists are currently using AI-apps in their practice. They are most commonly used in
134 breast, thoracic and neurological imaging, and primarily for assisting with image interpretation. These
135 findings were consistent with a recent European Society of Radiology (ESR) survey³¹, where 40% of
136 members responding had experience with AI-apps, up from 20% from their 2018 survey³⁰

137

138 The ACR survey also found that many of the US FDA approved algorithms were not being used in
139 clinical practice. In fact, 10% of radiologists using AI-apps in clinical practice are using algorithms they
140 had developed locally, which, in aggregate, is a higher use rate than any of the commercially
141 developed algorithms (9%). They also found that large practices are more likely to be using AI-apps
142 than smaller practices. Overall, the survey authors felt the penetrance of AI in clinical practice was
143 limited by concerns about inconsistent results, productivity, and a lack of trust in the safety and
144 efficacy of AI-apps.

145

146 **Table 1:** Summary of literature review on surveys of AI in radiology.

Author/year of publication	Participants, design, and number of respondents	Topics covered	Results summary
Collado- Mesa³⁷	<ul style="list-style-type: none">• Radiology• US - local	<ul style="list-style-type: none">• Demographic information	<ul style="list-style-type: none">• 29% of respondents using AI in practice (N.B. predominantly

J Am Coll Radiol (2018)	<ul style="list-style-type: none"> Email with online survey Jul-Aug 2017 69 respondents (66% of invitees) 	<ul style="list-style-type: none"> Familiarity with AI medical literature Current use of AI (N.B. including voice recognition tools, rather than specifically radiology AI apps) Predicted impact of AI on jobs 	<ul style="list-style-type: none"> voice recognition rather than radiology AI apps) 67% willing to help train/develop AI 80% think AI will dramatically affect job of radiologists in the future
European Society of Radiology³⁰ Insights Imaging (2019)	<ul style="list-style-type: none"> Radiology EU Email to members with online survey Nov-Dec 2018 675 respondents (2.8% of invitees) 	<ul style="list-style-type: none"> Demographic information User feelings/forecasts about AI in radiology in the next 5-10 years Involvement in AI system development 	<ul style="list-style-type: none"> 20% of respondents using AI in practice Expect AI to impact on job opportunities, reporting workload and job profile of radiologists, though variation in what these impacts would be 30% are planning to use AI in the future
Ooi³⁸ Singapore Medical Journal (2021)	<ul style="list-style-type: none"> Radiology Singapore - national Email with online survey 	<ul style="list-style-type: none"> Demographic information Predicted impact of AI Perceptions of career prospects 	<ul style="list-style-type: none"> 17% of respondents involved in AI research 89% feel AI will drastically change practice

	<ul style="list-style-type: none"> • Dec 2018 • 125 respondents (25% of invitees) 		<ul style="list-style-type: none"> • 67% keen to be involved in an AI project
Waymel³⁹	<ul style="list-style-type: none"> • Radiology 	<ul style="list-style-type: none"> • Demographic information 	<ul style="list-style-type: none"> • 7% of respondents using AI in practice
Diagnostic and interventional imaging (2019)	<ul style="list-style-type: none"> • French - local • Email with online survey • Jan 2019 • 270 respondents (43.8% of invitees) 	<ul style="list-style-type: none"> • Level of AI knowledge • Expectations for use of AI in practice • Predicted impact of AI 	<ul style="list-style-type: none"> • 24% are planning to use AI in the future • 79% feel AI will have a positive impact on their practice • Main perceived advantages are lowering imaging-related medical errors (81%) and lowering interpretation time (74%)
Coppola²⁹	<ul style="list-style-type: none"> • Radiology 	<ul style="list-style-type: none"> • Demographic information 	<ul style="list-style-type: none"> • No data on use in practice
Radiol Med (2021)	<ul style="list-style-type: none"> • Italy - national • Email to members with online survey • April 2019 	<ul style="list-style-type: none"> • Level of AI knowledge • Attitude towards AI 	<ul style="list-style-type: none"> • 77% were favourable to the adoption of AI • Main perceived advantages included

	<ul style="list-style-type: none"> • 1032 respondents (9.5% of invitees) 	<ul style="list-style-type: none"> • Expectations of potential benefits and disadvantages 	<ul style="list-style-type: none"> • lower diagnostic error rate (73%) and optimising workload (68%) • Main concern is negative impact on professional reputation of radiologists (60%)
Huisman^{32,33} Eur Radiol (2021)	<ul style="list-style-type: none"> • Radiology International Survey distribution by radiology societies, websites and social media • Apr-Jul 2019 • 1041 respondents (estimated 3.9% of society invitees) 	<ul style="list-style-type: none"> • Demographic information • Fear of replacement, knowledge, and attitude • Expectations, hurdles to implementation, and education 	<ul style="list-style-type: none"> • No data on use in practice • Higher levels of knowledge of AI are inversely associated with fear of AI • 85% willing to use AI in the clinical setting • Expected roles of AI are as a second reader and work-flow optimisation • Ethical, legal issues and a lack of knowledge were most common barriers mentioned

<p>Scheetz³⁵</p> <p>Scientific Reports (2021)</p>	<ul style="list-style-type: none"> Ophthalmology, dermatology, radiology & radiation oncology Australia & New Zealand – national Jun-Aug 2019 632 respondents (9.4% of invitees) 	<ul style="list-style-type: none"> Demographic information Perceived impact of AI on the profession Expectations of potential benefits and disadvantages Preparedness for the introduction of AI in clinical practice 	<ul style="list-style-type: none"> 31% of respondents were in radiology, of those 5% have used AI in practice Ophthalmologists most likely of specialties included to use AI in practice (16%) Most common perceived advantage was improved patient access to disease screening Most common perceived disadvantage was divestment of data to technology companies 14% felt adequately prepared for introduction of AI into clinical practice
<p>Allen²⁷</p>	<ul style="list-style-type: none"> Radiology US - national 	<ul style="list-style-type: none"> Demographic information 	<ul style="list-style-type: none"> 30% of respondents using AI in practice

J Am Coll	<ul style="list-style-type: none"> Email to members with online survey Apr-May 2020 1427 respondents (7% of invitees) 	<ul style="list-style-type: none"> How they were using AI as part of clinical work Evaluate AI models in their practice 	<ul style="list-style-type: none"> Large practices more likely to use AI than smaller ones Most common use was for enhancing interpretation Of those not using AI, 20% plan to in the next 5 years
MacCormick¹¹ Clinical Radiology (2021)	<ul style="list-style-type: none"> Radiology UK- regional Email with online survey Date unknown 88 respondents (58.6% of invitees) 	<ul style="list-style-type: none"> Whether and how often they used radiology mobile AI What devices they used to access the AI Awareness of and practices around assessment of reliability 	<ul style="list-style-type: none"> 55% of respondents used radiology mobile AI and 35% used this daily Respondents mentioned a total of 33 phone apps which they predominantly used on their phones (53%) 33% of respondents assessed the AI for reliability
Rainey³⁴ Front Digit Health (2021)	<ul style="list-style-type: none"> Radiography UK - national 	<ul style="list-style-type: none"> Demographic information 	<ul style="list-style-type: none"> 1% of respondents using AI in practice 80% respondents were in diagnostic

	<ul style="list-style-type: none"> Survey promoted on social media Feb-Apr 2021 411 respondents (1.3% of workforce) 	<ul style="list-style-type: none"> Perceived knowledge, skills, and confidence in AI in radiography 	<ul style="list-style-type: none"> radiography, 20% in radiotherapy 79% of diagnostic and 52% radiotherapy felt they understood AI in general 57% of diagnostic and 49% radiotherapy felt not adequately trained to implement AI clinically
Banerjee²⁸	<ul style="list-style-type: none"> Postgraduate doctors UK – regional Email with online survey Oct-Dec 2021 210 respondents 	<ul style="list-style-type: none"> Demographic information Current use of AI and exposure to AI Perceived impact on AI on training and education Expectations of potential benefits and disadvantages 	<ul style="list-style-type: none"> 2.4% of respondents were in radiology 16% of respondents using AI in practice 61% felt AI would reduce their workload 59% felt AI will improve education and training Radiology respondents had more AI positive perceptions than other specialties

European Society of Radiology³¹ Insights Imaging (2022)	<ul style="list-style-type: none"> • Radiology • EU • Email to members with online survey • Jan-Mar 2022 • 690 respondents (2.5% of invitees) 	<ul style="list-style-type: none"> • Demographic information • Experience with AI-based algorithms • Technical integration, confidence in diagnostic performance, quality control mechanisms • Impact on workload • Intentions to use AI in the future 	<ul style="list-style-type: none"> • 40% of respondents using AI in practice • Most used in diagnostic interpretation, image post-processing, and prioritisation of workflow • 76% considered the results of algorithms to be generally reliable • Minority (23%) experienced significant reduction in workload
MONAI Deploy Working Group⁴⁰ Unpublished	<ul style="list-style-type: none"> • Radiology, medical physics, radiography • International • Social media with online survey • Mar 2022-current 	<ul style="list-style-type: none"> • Demographic information • Priorities for clinic AI • Current use of AI • Challenges in AI deployment • Quantifying imaging studies processed by AI 	<ul style="list-style-type: none"> • Unpublished

147

148 The AI roadmap shows that in 2021 a total of 14 AI-apps were implemented in an NHS site, but limited

149 information on the deployment process is provided by the roadmap²⁵. The Scottish registry of AI-app

150 deployment has currently identified 18 radiology AI-apps, which have been deployed or are in the
151 process of deployment on the basis of research (n=7) or clinical validation (n=11). No radiology AI-
152 apps have been identified that are being used in routine clinical practice. Although the Scottish
153 initiative is encouraging, it may be that the scale of creating a UK-wide registry of radiology AI-app
154 deployment is a challenge. Nonetheless, the range of surveys demonstrate significant variation in
155 radiologists' attitudes, expectations and knowledge of AI-apps. However, there is limited evidence on
156 the scale of deployment of AI-apps, as well as their impact on patient outcomes and radiologists'
157 workloads. The benefits of such a registry should therefore be considered.

158

159 **Opportunities and challenges**

160 A registry for clinically deployed radiology AI-apps would provide many opportunities, but also comes
161 with challenges. The balance of opportunities and challenges is summarised in Table 2 below. In
162 relation to the opportunities, post-marketing surveillance would be enhanced by allowing
163 independent bodies to collect and analyse multi-site information concerning the experiences of
164 technical deployment and usage as well as any suspected safety concerns that could be linked to the
165 deployment or clinical use of a radiology AI-app. This would be a valuable addition to the MHRA's
166 voluntary yellow-card reporting system, not least because this system is not uniformly used by all
167 patients or app-users. Indeed, an app-related problem encountered at one site may not be recognised
168 at that site as being potentially a wider problem. The registry could also serve as a basis for audits,
169 helping bodies such as the Clinical Radiology Audit and Quality Improvement Committee of the Royal
170 College of Radiologists (RCR) to identify when and where an audit is needed and to coordinate the
171 audit. For example, if large numbers of a particular AI-app have been deployed, the audit committee
172 may wish to prioritise a national audit of the performance of this app. In the longer term, well-
173 developed independent post-marketing surveillance and auditing contributes to the quality and safety
174 of radiology AI-apps, thereby assisting in the monitoring of patient safety.

175

176 Opportunities for research and evaluation could also flow from an AI-app deployment registry since
177 this would reduce duplication and repetition in studies of radiology AI-apps, supporting more efficient
178 allocation of the NHS's scarce resources. Multi-site research studies would also be easier to coordinate
179 by using the information held in the registry. The potential of the registry to support research would
180 increase as the registry matures and holds more data on the deployment and adoption of AI-apps in
181 radiology.

182

183 One less tangible but nonetheless valuable opportunity of a deployment registry would derive from
184 connecting the individuals involved in similar AI projects⁴¹. Building such links facilitates the
185 emergence of communities of practice and the sharing of tacit knowledge and best practice which
186 may prove invaluable to the successful adoption of radiology AI-apps⁴². In addition, the spread of the
187 most valued apps might be boosted by the registry by enabling greater awareness and knowledge of
188 their use in the radiology community⁴³.

189

190 All the aforementioned opportunities contribute to increased transparency around the deployment
191 of radiology AI-apps, which in turn can contribute to public and practitioner trust in the quality and
192 safety of the applications¹⁴. This transparency is dependent on the availability and accessibility of the
193 data held in the registry. Public availability of data, though risking frictions around commercial
194 sensitivity and confidentiality, would undoubtedly enhance transparency. To fulfil this potential,
195 however, it is key that the registry remains up-to-date, complete and accessible. This may be
196 particularly challenging to achieve if inclusion of deployed apps on the registry is voluntary.

197

198 In identifying the challenges of developing a registry that is fit for purpose, we were conscious of the
199 additional burdens of collecting, curating and storing data that might be placed on different
200 stakeholder groups. One concern, for example, would be to prevent over-regulation of AI deployment.
201 There is a risk that keeping the registry up-to-date is seen as an onerous undertaking due to

202 administrative time and costs, particularly in the early stages of setting up the registry when the
 203 benefits may not be instantly available. If mandatory, the administration of adding each site to the
 204 registry could take too much time from stakeholders in an already pressured healthcare system such
 205 as the NHS and this could potentially hamper the implementation of AI-apps altogether⁴⁴. Conversely,
 206 if inclusion on the registry is voluntary, the information would be incomplete, thereby decreasing,
 207 though not negating, its reliability and value as a representation of current practice^{24,44}.

208

209 **Table 2.** Opportunities and challenges of a registry for deployed radiology AI-apps.

	Opportunities	Challenges
Surveillance and audit	<ul style="list-style-type: none"> • Post-market surveillance can be conducted by an independent body • Possibility to audit by the RCR audit committee • Possibility to monitor patient safety 	<ul style="list-style-type: none"> • Over-regulation of AI deployment
Efficiency and cost-effectiveness	<ul style="list-style-type: none"> • Improved use of resources • Shared learning from deployments • Greater awareness of AI-apps 	<ul style="list-style-type: none"> • Administrative costs
Research	<ul style="list-style-type: none"> • Possibility for (multi-site) research 	<ul style="list-style-type: none"> • Incomplete data if the registry is voluntary

Trust

- Increased transparency
 - Confidentiality of data
- and trust
-

210

211 **Critical success factors**

212 As the development of a national registry is resource intensive and complex, it will inevitably require
213 the construction of a detailed business case. Although this task is beyond the scope of this
214 commentary, we will discuss a few critical success factors relevant to such a business case. A first such
215 factor is the engagement of stakeholders, such as manufacturers, purchasers, radiologists, and
216 patients¹⁶. Registries such as the BCIR teach us that stakeholders can provide invaluable clinical input,
217 advice on the content of the registry, the way the registry can contribute to governance, and the
218 presentation of outputs coming from the registry²². For the radiology AI-apps registry, this suggests
219 that there is a valuable role to be played by professional networks such as the Royal College of
220 Radiologists (RCR) in reaching out to, and engaging, its members, as the end-users of these AI-based
221 innovations. Industry would also need to be fully engaged as essential stakeholders and the registry
222 would need to work in tandem with the MHRA.

223

224 All stakeholders would need to make critical decisions on key issues in the design and scope of the
225 registry, such as its key purpose, the domain it focuses on and the type of radiology AI-apps that will
226 be included in the registry. Designing the registry appropriately in terms of scope and data collection
227 is crucial to ensuring that it is usable and adds value over and above the time and resources required
228 to build and maintain it. This is especially the case since any subsequent changes to the initial design
229 may be costly to implement. A pilot is likely to be an important first step, and the Scottish registry
230 could be used as an initial template.

231

232 Regarding purpose, while the registry may have multiple purposes, it is important to establish its
233 primary purpose, be this patient safety, resource efficiency, or learning capture as well as targeting

234 the primary audience, such as professionals, healthcare providers, industry or regulators. The
235 overarching purpose will inform not only what data are collected in the registry, but also how this data
236 will be used and by whom.

237

238 Another important scoping decision relates to the choice of domain, including, as follows: the research
239 domain (where AI-apps are subjected to initial research and not used in clinical practice), the clinical
240 evaluation domain (where an AI-apps are subjected to an evaluation of their performance when used
241 as intended; usually part of pre-market surveillance), or the clinical use domain (where AI-apps are
242 implemented in clinical practice and its use evaluated continuously; usually part of post-market
243 surveillance).

244

245 Regarding the scope of the registry, the decision on the type of radiology AI-apps for inclusion is also
246 crucial. Although AI-apps come in many shapes and forms, we can roughly distinguish between
247 software-based applications (e.g. medical image analysis) and hardware-based AI, such as medical
248 devices augmented with AI⁴⁵. The aims of these two types of AI-apps potentially overlap (e.g. to
249 increase early diagnosis of disease and improve decision-making processes in healthcare), but when
250 it comes to building a registry, the different types of applications would pose significantly different
251 challenges in terms of scale, data collection and maintenance. Hardware-based AI, for example,
252 proliferates much more widely in healthcare and is more difficult to monitor as it is embedded within
253 devices rather than identified as a discrete entity. This form of AI would therefore likely not be the
254 focus of a deployment registry.

255

256 A final consideration is how to demonstrate the value of a registry. Periodic evaluation of the
257 functionality and use of the registry is crucial to making sure the registry is up-to-date and
258 continuously meets the need of stakeholders and users.

259

260 Once stakeholders agree on the design and scope of the registry, resources will need to be mobilized
261 to realize it. These include ICT-support to digitalise and embed the registry in a secure platform and
262 financial support, especially to maintain the registry long-term. Finally, clear ownership and leadership
263 are important as it clarifies who is responsible for the maintenance and monitoring of the registry.
264 Once the registry is ready to go live, the RCR can play an invaluable role in creating awareness of the
265 registry amongst its membership and in approaching those members who are working with AI in
266 radiology themselves or know of colleagues in their networks who do so.

267

268 **Conclusion**

269 Since radiology AI-apps are evolving and spreading rapidly, there is a need for a UK-wide registry to
270 track the deployment of these applications. As we have shown, smaller-scale initiatives as well as
271 national registries for non-AI medical innovations can provide useful models. In conclusion, however,
272 it is also important to stress the urgency of the case for a deployment registry. A critical window of
273 opportunity currently exists whereby the design and scope of such a registry could be trialled and
274 tested with limited resources around currently localized clusters of activity. One important lesson
275 from examples such as the NJR and BCIR highlighted above is that early development of a registry is
276 key to patient safety outcomes. Stakeholders can and should play a key role in decisions on the
277 purpose, design, and scope of the registry to ensure its functionality and usability. Such a registry could
278 then provide the robust platform required when AI-apps become much more widely spread across
279 clinical practice; the point at which tracking their deployment becomes both immensely more
280 challenging and immensely more important to patients and the NHS in general.

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