



The effect of COVID-19 on radiology postgraduate training in Ireland

Caoimhe McDonnell¹ · Gerard Lambe² · Barry Hutchinson³

Received: 30 June 2022 / Accepted: 6 October 2022

© The Author(s), under exclusive licence to Royal Academy of Medicine in Ireland 2022

Abstract

Background The COVID-19 pandemic had a significant impact on the healthcare provision, and while it has also had unprecedented effects on medical education and training, the extent has not been fully evaluated.

Aims We wished to assess the effects of COVID-19 on postgraduate radiology training, and due to the structure of postgraduate radiology training in Ireland, this setting allows for the surveying of an entire national cohort of trainees due to the relatively small national population and centralised national training body.

Methods A 70-question survey, covering 11 areas of the training experience, was devised. The survey was reviewed by the national trainee committee and approved by the national training and education committee for radiology. This was distributed to all radiology trainees ($n = 124$), who were given 2 weeks to submit responses anonymously. The survey was not mandatory.

Results Out of 124 trainees, 64 (51.6%) submitted responses. A total of 37.5% of respondents felt that their workload had decreased, 23.5% reported that they had been required to take greater than 7 days of leave due to COVID-19 (either primary infection or required isolation due to ‘close contact’), 77% felt that their subspecialty rotations had been significantly impacted by COVID-19, and 56.3% of respondents reported a worsening in their sense of wellbeing due to the COVID-19 pandemic.

Conclusion Our survey, which, to our knowledge, is unique in its representation of the entirety of a national postgraduate training programme, has demonstrated trainees’ attitudes that there has been a significant, multifaceted impact of the COVID-19 pandemic on the quality of their training.

Keywords COVID-19 · Medical education · Postgraduate training

Introduction

The landscape of healthcare service provision internationally has been significantly impacted by the COVID-19 pandemic. However, the effects of the COVID-19 pandemic on medical training have been less widely discussed. The speciality of radiology has had a unique role during the COVID-19 crisis, given the function that diagnostic imaging and minimally invasive intervention have to play in the management of patients with COVID-19 and its secondary effects. However, concern has been voiced regarding

the possible deskilling of trainees due to a large volume of day-to-day acute reporting being primarily COVID-19-related. This complex area is difficult to accurately evaluate; however, internationally, groups of trainees have been directly consulted to quantify any effects that they have subjectively perceived [1, 2].

The Irish setting of radiology specialist training affords a unique opportunity to assess a national radiology training programme in its entirety due to the relatively small national population. With 124 trainees distributed throughout 9 major training centres, performing a survey with balanced representation of all trainees was achievable to evaluate the effect of the COVID-19 pandemic on training opportunities, workload, and burnout, on the entire national Irish radiology trainee cohort [3].

✉ Caoimhe McDonnell
caoimhe.mcdonnell@gmail.com

¹ Department of Diagnostic Imaging, St James’s Hospital, James’s Street, 8, D08 NHY1 Dublin, Ireland

² Radiology Department, Austin Hospital, Heidelberg, VIC 3084, Australia

³ Radiology Department, Mater Misericordiae University Hospital, Dublin, Ireland

Materials and methods

A 70-question survey was devised by the national radiology trainee committee and approved by the national radiology training and education committee. The survey covered

the topics of routine workload, on-call workload, subspecialty training, redeployment, teaching, examinations, conferences, multidisciplinary team meetings, COVID-19-specific reporting, trainee wellbeing, and trainee perspectives (Supplementary Material). The survey was created using Google forms and distributed online to all radiology trainees in the Republic of Ireland on the 7th of March 2021, with the survey remaining open to responses for 2 weeks until the 22nd of March 2021. The survey was not mandatory, and respondents could choose to omit answers to any questions they wished. Anonymity was protected, and all respondents consented to the processing of the data provided within the limits of the survey.

Results

Responses were obtained from 64 of 124 (51.6%) of all radiology trainees in the Republic of Ireland, with representation from every major training centre in the country. There was a relatively even distribution of responses from each site (Fig. 1), varying from the smallest proportion of respondents from a single centre making up 6.3% of the entire cohort, in comparison to 17.2% being the largest proportion from a single centre. With regards to seniority of respondents, the largest proportion of respondents were in their first year of training (Fig. 2); however, there was representation from all 5 years of training.

Workload and absences

When asked about workload, 37.5% of respondents felt that the workload in their department had decreased overall, in comparison to 21.9% who felt that it had increased.

With regards to workload during on-call shifts, the majority (61%) of respondents felt that workload had not increased.

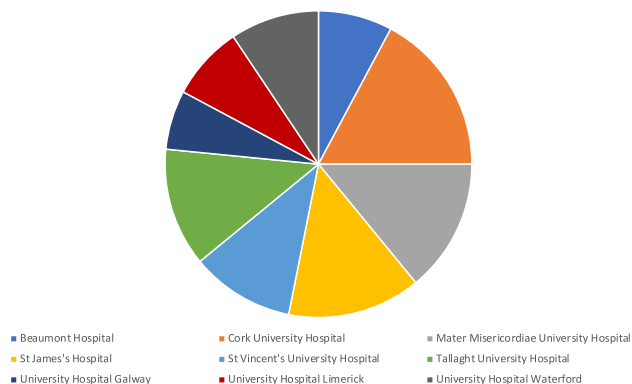


Fig. 1 Number and distribution of respondents by respective training sites

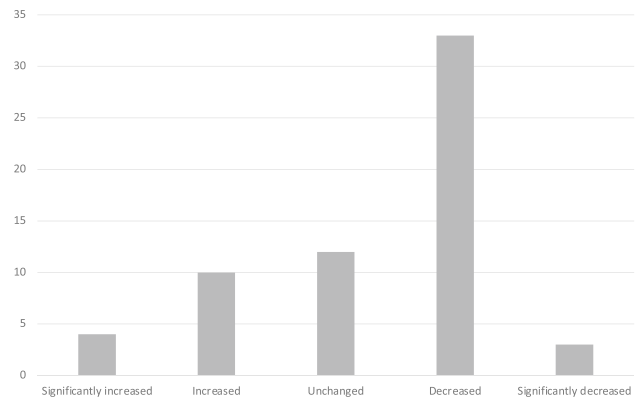


Fig. 2 Responses from trainees asked to comment on whether departmental workload had increased or decreased during the COVID-19 pandemic. Respondents who had not been working in their department prior to the department were not included

The minority who reported an increase in workload was, however, not negligible, at 38.6%. A total of 15.6% of respondents described an increase in frequency of on-call shifts due to absences secondary to COVID-19.

While the majority (56.3%) of respondents did not report any absence secondary to COVID-19 (including due to suspected or confirmed infection, or exposure to a known case necessitating self-isolation), almost a quarter (23.5%) reported a significant number of days (i.e. greater than 7 days) lost due to COVID leave, with 9.4% absent from work for over 14 days.

The majority of respondents (89.1%) reported that there is no contingency in place to cover COVID-related absence at their institution. Only 2 respondents out of 64 (3.1%) were offered locum rates when having to cover a colleague's on-call shift due to COVID-related absence.

Subspecialty rotations

There is particular emphasis on special subspecialty in both paediatric radiological and neuroradiology as part of the higher specialist training scheme in radiology in the Republic of Ireland. This is provided either locally in certain large centres, or in the form of off-site rotations in paediatric radiology in one of the two main paediatric hospitals in Dublin, and a rotation in Beaumont Hospital in Dublin, one of the country's two main centres and the main national referral centre for neurology and neurosurgery [4].

While the majority of respondents had not undergone their paediatric rotation during the pandemic (51.6%), 77% of those who had did not feel that the rotation had been significantly affected by COVID-19. Those who did feel the rotation had been negatively affected mainly referenced

the reduced exposure to patient-facing modalities such as ultrasound and fluoroscopy and, to a lesser extent, reduced consultant-led teaching. These modifications reflect recommended restrictions secondary to social distancing in workspaces. A single respondent stated that their rotation had been delayed, and another stated that the length of time spent on their rotation had been reduced.

The neuroradiology subspecialty rotation appeared to be more significantly affected by COVID-19-related restrictions. Half of the respondents who had been due to undergo their rotation during the pandemic stated that the rotation had been negatively affected. A total of 82% of respondents who had been due to undergo their rotation stated that it had either been delayed or cancelled. One respondent stated that, due to delays, they will not carry out the rotation before pursuing a fellowship internationally and will, therefore, not receive the expected degree of exposure to neuroradiology.

There were some positive effects on subspecialty training secondary to COVID-19 described by respondents. Primarily, these involved the growth of online educational resources, as well as access over Zoom, Microsoft Teams, or other video conferencing software to lectures and tutorials provided by the Irish Faculty of Radiology and international educational resources.

Redeployment

Four out of 64 (6.3%) respondents underwent redeployment. Only 1 of these 4 respondents (25%) stated that they did not want to be redeployed but felt that they did not have a choice in the matter, whereas the remaining 75% were 'happy to help' where appropriate. Of note, no training (online or otherwise) was offered prior to redeployment, and respondents were provided with a maximum of 2 days' notice prior to redeployment.

Education and examinations

A total of 57.8% of respondents felt that consultant-led teaching had decreased during the pandemic. Fortunately, all respondents reported that formal teaching had continued to some extent throughout the pandemic, and video conferencing software appears to have played a significant role in allowing this. The Faculty of Radiologists in Ireland has provided all trainees with access to StatDx during the course of their training. A total of 96.8% of respondents stated that they have found this either helpful or extremely helpful, during the COVID-19 pandemic. A selected number of trainees have also been granted full access to the online resources of Radiopaedia. One hundred percent of these respondents (36 trainees) have found this either helpful or extremely helpful.

Of the 64 respondents, 24 (37.5%) had completed Fellowship examinations (either FFR RCSI primary (part 1) or final

part 2A/2B) during the COVID-19 pandemic. Of these 24, 13 (54.2%) stated that the experience of an entirely online-format examination went better than they had expected. There were 2 (8.3%) respondents who stated that they had a worse experience than they had expected. In comparison to a traditional exam format, 21 (87.5%) felt that the examination experience was similar or better, whereas 3 (12.5%) felt that the online experience was worse than a traditional experience.

Conference/multidisciplinary team meetings

We asked participants about their experiences related to scientific conferences (either national or international) and presenting local multidisciplinary team meetings (MDMs) during the pandemic.

Fifty-seven of 64 (89.1%) respondents had attended a scientific conference online during the pandemic, with 27 of these (47.4%) describing the experience as worse than a scientific conference in person. In contrast, 11 respondents (17.1%) described an improved experience than previous conferences in person.

The experience in relation to MDMs appears largely similar to that of scientific conferences. There were 35 of 64 (54.7%) respondents had presented at least one MDM during the pandemic, with 52.8% describing a worse experience than traditional MDMs presented in person. A large minority (41.4%) described the experience as similar, with 5.6% of respondents reporting an overall improved experience.

Reporting of COVID-19 imaging

Out of the 64 respondents, 43 (67.2%) felt confident in reporting chest radiographs with findings potentially secondary to COVID-19, with this number increasing to 57 (89.1%) in relation to CTs with COVID-19 features. This reflects 30 of 64 (46.9%) respondents stating that they received no formal intradepartmental training in COVID-19 reporting, with 13 (20.3%) describing teaching in their department to be primarily registrar-led, and a further 13 (20.3%) describing self-directed learning, such as the resources provided by the British Society of Thoracic Imaging (BSTI) [5]. The majority (56.3%) of respondents stated that there was no formalised or template format of COVID-19 reporting in their department. This increases to 81.7% of respondents who stated that BSTI COVID-19 report codes (such as CVCX0/PCVCX0) [6] were not utilised in their department, and only 2 respondents of 64 (3.1%) stating that all registrars and consultants consistently utilise the standardised report codes.

Wellbeing

Non-consultant hospital doctor (NCHD) wellbeing has been an emotive and much-discussed issue in Ireland (and

internationally), in recent decades [7]. As such, we felt that it was integral to include an assessment on the effect that COVID-19 has had on radiology trainee wellbeing during these previously unexampled times.

The majority of respondents (56.3%) experienced a worsening in their wellbeing during the pandemic. There were 10 respondents out of 64 (15.6%) felt the need for additional support in their current role as a radiology trainee during the pandemic. While 77.5% of respondents who required time off during the pandemic felt supported in this situation, the remainder (22.5%) did not. Of note, the cause of time off (i.e. COVID-19 infection, self-isolation due to exposure or symptoms, or other need for time off) was not delineated in our survey.

Trainee perspective

Out of the 64 respondents, 35 (54.7%) felt that their training in radiology had been negatively impacted by the effects of the COVID-19 pandemic (Fig. 3), with a further 21 (32.8%) trainees feeling that it remains too early to comment on potential negative impacts.

Only 8 out of 64 trainees (12.5%) did not feel that their training has been negatively impacted. Fourteen trainees (21.9%) expressed an interest in the option of extension of the training scheme to mitigate the negative effects (Fig. 4).

Respondents were offered the opportunity to add any additional comments or suggestions in the final section of the survey. A number of themes were identified in the responses received. For instance, trainees requested that lectures provided online by consultants on behalf of the Faculty of Radiology be recorded. Trainees also requested access to more online resources (including paid subscriptions to services such as StatDx and Radiopaedia) and a preference for more structured teaching/curriculum. Concerns were also raised over the reduced case mix due to prevalence of

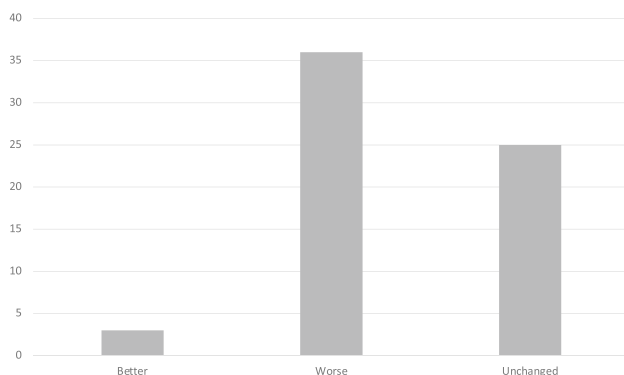


Fig. 3 Responses from trainees when asked if their overall wellbeing had improved or worsened during the course of the COVID-19 pandemic

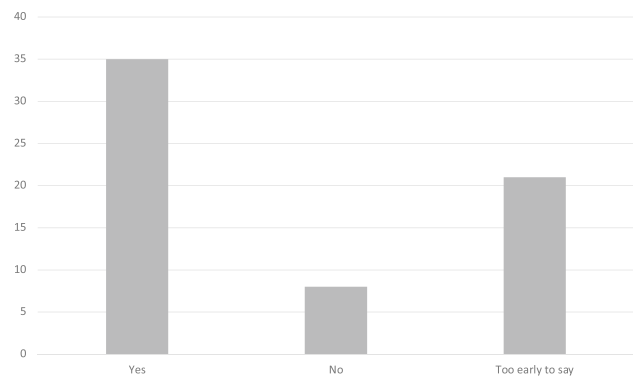


Fig. 4 Responses from trainees when asked if their training had been impacted negatively by the COVID-19 pandemic

COVID-relating imaging and a relative decrease in trainees having face-to-face time with consultants due to social distancing.

Discussion

Our study aimed to assess the impact of the COVID-19 pandemic on radiology training and on trainee wellbeing. The survey was distributed to every radiology trainee in the country. Responses were obtained from sixty-four trainees (52%). To the authors' knowledge, this makes our study the largest of its kind in radiology.

A statement from the Faculty of Radiologists during the first wave of infection in March 2020 made a series of recommendations on patient screening for COVID-19 infection, reporting of imaging findings, prioritisation of imaging examinations, and infection control within radiology departments [8]. Among these recommendations was the advice that social distancing should be practised, elective and non-urgent examinations should be deferred, and conferences should be held using video conferencing software where possible. The wearing of masks at all times in the workplace soon became another feature of the pandemic response.

While earlier studies have assessed the impact of the first wave on radiology trainees [1] and radiographers [9], our study was conducted a year to the month from Ireland's first confirmed case of COVID-19 infection and also in the midst of Ireland's third and most severe wave to date. Conducting the survey at this time allowed us to capture the experience of first-year trainees who, having started their training in July 2020, had never known radiology training outside of the pandemic. We were also able to capture the responses of second- to fourth-year trainees and to compare their experiences both before and during the pandemic.

The 1-year time point allowed us to capture a full annual exam cycle, to explore trainees' experiences of the Primary

and Final Fellowship of the Faculty of Radiologists (FFR) exams using video conferencing software, and to compare these with their prior exam experiences. It allowed us to capture a full annual conference cycle, to explore trainees' experiences of online conferences, and to compare these with their experiences of traditional conferences. Finally, it enabled us to incorporate the intended period of subspecialty (i.e. neuroradiology and paediatrics) rotations for a large number of trainees and, therefore, to assess the impact of the pandemic on subspecialty training.

The experience of Irish trainees was similar in many ways to that of United Kingdom (UK) trainees [1]. The majority of respondents felt that the overall department workload had either decreased or stayed the same. This was most likely due to a combination of reduced emergency department attendances, postponed elective investigations, and increasingly labour-intensive image acquisition. For example, two radiographers were required to perform portable radiographs outside of the radiology department. A similar majority of Irish and UK trainees reported that their overall wellbeing was worse than before the pandemic began.

The pandemic has had an adverse effect on subspecialty training. Half of all respondents who were due to undergo their neuroradiology training during the pandemic said that their rotation had been affected. The most common reasons cited were a delayed rotation and a shortened rotation. Almost a quarter of respondents who were due to undergo their paediatric training during the pandemic said that their rotation had been affected. However, the most common reasons cited were reduced exposure to modalities such as ultrasound and reduced consultant-led teaching. The disproportionately large effect of the pandemic on subspecialty rotations may reflect the fear of cross-infection between hospitals.

Similarly to UK trainees, almost half of Irish trainees reported that they had received no formal departmental training on reporting COVID-19 imaging. A similar proportion reported that communication in relation to changing imaging pathways had been suboptimal. Trainees reported that some areas of their training had improved since the start of the pandemic. These were broadly similar to those of UK trainees and included less pressurised reporting, access to online resources such as Radiopaedia and StatDx, as well as tutorials and exams using video conferencing software.

In other areas, the experience of Irish trainees differed from that of their UK counterparts. A far smaller proportion of Irish trainees were redeployed to other areas of the hospital. This most likely reflected the greater severity of the UK's first wave. Irish trainees reported a larger reduction in consultant-led teaching than UK trainees but a similar reduction in peer-to-peer teaching. This may reflect adherence to the faculty's advice that departments should facilitate remote reading where possible. The overall reduction

in consultant-led teaching in Ireland, however, was likely balanced by the greater availability of trainees to attend whatever tutorials were available because of lower levels of redeployment.

Our study of Irish trainees offered some new insights compared with previous studies. There was a high level of satisfaction with the FFR exams which were conducted for the first time using video conferencing software. More than half of trainees felt that the experience was better than expected. Almost 90% said that the experience was similar or better than traditional exams. Online tutorials were also well received by trainees. Many reports have highlighted the different ways in which radiology training can adapt to the challenges of the pandemic [10, 11]. Video conferencing software may become the new normal for teaching and examining in postgraduate training, especially considering the flexibility it offers to trainees and trainers alike. The Faculty of Radiologists has adapted by providing scheduled lectures and course days online for the foreseeable future.

Unlike the positive experiences trainees report with online exams, respondents were less enthusiastic about online multidisciplinary team (MDT) meetings. The majority of respondents found this experience worse than traditional meetings. Better integration of video conferencing software with the National Integrated Medical Imaging System (NIMIS) is one measure that may help to improve trainees' experiences. Most trainees also found online conferences to be a worse experience to traditional in-person conferences.

The size of the trainee cohort is one potential limitation of this study. Sixty trainees did not respond and were therefore not represented. However, 51.6% was considered an adequate response rate, particularly given the survey was voluntary and anonymous and considering that there was representation from every Irish training centre. The highest proportion of responses came from first years who had only experienced radiology training during the pandemic. Their experiences and responses may not be representative of many more senior trainees who did not respond. Six of the nine training centres surveyed were in Dublin. There have been regional variations in COVID-19 infections across the country, but the highest number of cases and deaths overall has occurred in Dublin [12]. For this reason, our results may not be fully generalizable. In addition, there were significant variations in the way each individual hospital responded to the challenges of COVID-19 in terms of training, rotas, redeployment, and day-to-day work practices. Any individual's experience of the pandemic will have been affected to some extent by factors unique to their own training centre.

Our nationwide survey of postgraduate trainees shows that the COVID-19 pandemic has had a significant effect on radiology training and trainee wellbeing. However, online training resources, tutorials, and exams conducted remotely

using video conferencing software have been enthusiastically embraced by trainees. The lessons learnt from the last 12 months should serve to prepare radiology trainers and trainees for the future challenges of this and other health crises.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11845-022-03190-9>.

Declarations

Informed consent and ethics Participants provided informed consent prior to undertaking the survey, and permission was granted for publication of results. Ethical approval was not required due to the observational nature of the study.

Conflict of interest The authors declare no competing interests.

References

1. Veerasuri S et al (2020) Impact of COVID-19 on UK radiology training: a questionnaire study. *Clin Radiol* 75(11):877.e877–877.e814
2. Alvin MD et al (2020) The impact of COVID-19 on radiology trainees. *Radiology* 296(2):246–248
3. HSE National Doctors Training & Planning (2021) Medical Workforce Report 2020–2021
4. Beaumont Hospital - Welcome (2021) Beaumont.ie. Available from: <http://www.beaumont.ie/aboutus>. Accessed 3 May 2021
5. COVID-19 Resources (2021) The British Society of Thoracic Imaging. Bsti.org.uk. Available from: <https://www.bsti.org.uk/covid-19-resources/>. Accessed 3 May 2021
6. COVID-19 BSTI Reporting templates (2021) The British Society of Thoracic Imaging [Internet]. Bsti.org.uk. Available from: <https://www.bsti.org.uk/covid-19-resources/covid-19-bsti-reporting-templates/>. Accessed 3 May 2021
7. Feeney S et al (2016) Practise what you preach: health behaviours and stress among non-consultant hospital doctors. *Clin Med (Lond)* 16(1):12–18
8. Faculty of Radiologists (2020) The Faculty of Radiologists statement on COVID-19 management in radiology departments. https://radiology.ie/images/Covid_19_24.02.2020.docx. Accessed 5 May 2021
9. Foley SJ, O'Loughlin A, Creedon J (2020) Early experiences of radiographers in Ireland during the COVID-19 crisis. *Insights Imaging* 11:104. <https://doi.org/10.1186/s13244-020-00910-6>
10. Chong A, Kagetsu NJ, Yen A, Cooke EA (2020) Radiology residency preparedness and response to the COVID-19 pandemic. *Acad Radiol* 27:856–861. <https://doi.org/10.1016/j.acra.2020.04.001>
11. England E, Kanfi A, Flink C et al (2020) Radiology residency program management in the COVID era - strategy and reality. *Acad Radiol* 27:1140–1146. <https://doi.org/10.1016/j.acra.2020.05.001>
12. Ireland's COVID-19 Data Hub. COVID-19 Ireland, Government of Ireland. Available at: <https://covid19ireland-geohive.hub.arcgis.com/>. Accessed 13 Oct 2022

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.