

RESEARCH ARTICLE

# Peer assessment as a method for facilitating cross-sector learning: A national pilot

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## Keywords

Early career  
Education  
Peer assessment  
Pharmacy

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## Abstract

**Background:** The delay of the General Pharmaceutical Council (GPhC) pharmacist registration assessments in England due to COVID-19 created a need for innovative assessment methods. Peer assessment was identified as a potential method for use across the sector and geographical boundaries. The aim was to establish a model for a national peer assessment tool to support Early Careers Pharmacists (ECPs) development. **Method:** Participating ECP submitted cases using a standard template to be anonymised and distributed to three peer reviewers. An external supervisor provided a final agreement on the feedback given. **Results:** Two hundred and fifty pharmacists participated in peer assessment from a range of sectors and locations. 75.5% (n=566) of potential peer reviews were completed with an average score at expected standard for an ECPs. Commonality of sector experience between submitter and peer did not affect scoring. **Conclusion:** These findings support acceptability and feasibility of asynchronous pharmacy peer assessment across sector and geographical boundaries.

## Introduction

Developments in National Health Service (NHS) healthcare delivery require the current pharmacy workforce to become more adaptable and flexible to deliver care across a range of healthcare settings in a variety of roles. The “Next Steps on the NHS 5 Year Forward View” (NHS, 2017) discusses the need for changes of roles for primary care pharmacists to “free up General Practitioner (GP) time to focus on those patients who need it most”. The NHS long term (NHS, 2019) plan outlines the expansion of roles for pharmacists into GP practice and within the community pharmacy. It was followed up by the Interim People plan (NHS, 2019) that described “training to ensure consistent standards of care across the clinical pharmacy workforce in primary and community care” alongside a more integrated programme for Early Careers Pharmacists (ECPs) to enable a more flexible workforce. These key NHS publications link to the national strategy for initial education reform within pharmacy. The General Pharmaceutical Council (GPhC) (the regulatory body for all pharmacists, pharmacy technicians and pharmacies in Great Britain) has recently approved new standards for

the initial training of pharmacists. These standards aim to “produce adaptable pharmacist professionals who will be confident and capable of operating in multi-professional teams across a variety of healthcare settings to meet diverse and changing patient needs” (GPhC, 2020a).

Education programmes and assessments need to reflect the future changes to the workforce aligning sectors and geographies in a common strategy. Health Education England (HEE) is a public body sponsored by the Department of Health and Social Care in England for education, training, and workforce development in the health sector. However, HEE has recognised that, currently, access to and funding for training for ECPs varies between sectors and locations (MEE, 2012) (HEE, 2019) and is generally only available to pharmacists working in hospital or community settings (HEE, 2019). This creates an operational barrier to pharmacists moving between sectors due to the differences in funding compounded by differences in sector experience (Pearson, 2021). The HEE document “Advancing pharmacy education and training: a review” recommends “a programme based on experiential

learning, with a common approach to assessment” demonstrating the need for future assessment strategies across sector boundaries for ECPs, which is funded appropriately between sectors (HEE, 2019).

The strategy for education and training across the pharmacist workforce needs to include high-quality training with access to quality supervision. However, ECPs often work in professional isolation with a lack of peer and Educational Supervisor (ES) support, particularly in the community setting in England, which may be compounded by a geographically remote location (Magola, Willis & Schafheutle, 2018). Often, those who have access to an ES have only one senior providing feedback, particularly in the community setting, and this magnifies the potential bias in feedback they receive. Feedback may be influenced by the relationship between the ES and the pharmacist, the halo effect, and the general leniency of the assessor (Govaerts & van der Vleuten, 2013). The halo effect relates to the evaluation of one characteristic of the ECP affecting the assessment of other traits, characteristics and knowledge of that individual (Lai, Wolfe & Vickers, 2012). This can be positive or negative and creates a bias in scoring when one supervisor is solely responsible for an individual’s global assessment.

The plan for education reform for pharmacists was in progress in early 2020 when the COVID-19 pandemic hit, and General Pharmaceutical Council (GPhC) pharmacist registration assessment was postponed (GPhC, 2020b). The delay in registration for pharmacists expedited the need for a change to training and education for ECPs. This cohort of pharmacists named provisionally registered pharmacists had a novel set of training requirements (GPhC, 2021). As a result, HEE designed a non-mandatory programme, the Interim Foundation Pharmacist Programme (IFPP), to support provisionally registered pharmacists as they transitioned to qualified pharmacists. These provisionally registered pharmacists were in the infancy of their careers and, as such, are classed as ECPs for this paper. It was essential that this programme was accessible and applicable for all sectors and all geographies across England. The programme was developed to include several low stakes assessments throughout the year to demonstrate progression and triangulation of feedback.

Low stakes assessments are often more frequent assessments that have a less direct impact on the test taker but offer an opportunity to reflect and improve over a period of time. High stakes assessments tend to be one-off and high stress, offering no feedback and therefore with no opportunity for improvement through reflection. Using multiple low stakes assessments provides a clearer picture of the individual’s ability at the end of programme sign off. Using repeated tests during

an individual’s development reflects their ability and, importantly, has been shown to improve learning (Larsen, Butler & Roediger, 2008). IFPP sign off was completed following review of the ECPs e-portfolio against the post-registration foundation curriculum, which was developed by the Royal Pharmaceutical Society (RPS). The RPS work to “support, promote, and lead the pharmacy profession across all sectors of pharmacy” and collaboration between the two organisations (HEE and RPS) was essential to best support these ECPs (RPS, 2021).

A successful innovative peer assessment tool had recently been developed within the Yorkshire and Humber deanery for foundation dentists and had the potential to overcome some of the challenges within pharmacy (HEE Y&H, 2021). This tool utilised a web-based server to overcome the geographical barriers to assessment and created an opportunity to explore cross-sector learning by mixing peer reviews from different sectors, which was particularly beneficial during the COVID-19 pandemic, where new pedagogies have been essential to maintaining higher education (Devlin & Samarawickrema, 2022).

Peer assessment has been suggested to be “successful in any discipline area and at any level” (Falchikov & Goldfinch, 2000). Involving learners in any form of assessment method can increase engagement and an understanding of assessment standards and crucially has been shown to promote learning (Boud, 1988; Holfert, Kesting & Buchbender, 2022; Pound, Carroll & Nye, 2022). Using peer assessment has been shown to develop essential skills in the development of pharmacists, such as critical reasoning and reflection skills (Dochy, Segers & Sluijsmans, 1999; Hanrahan & Isaacs, 2001; Papinczak, Young & Groves, 2007). Peer assessment also created an opportunity to involve an external supervisor in the education journey of an ECP, adding further perspective to their development. Moreover, it creates two environments for learning. The first is about providing feedback to their peers, and the second relates to receiving feedback on their own work (Rotsaert, Panadero & Schellens, 2018). One key aspect of peer assessment is maintaining the anonymity of participants and reviews to create an environment for honest critique, which is possible using technology (Lin *et al.*, 2001; Papinczak, Young & Groves, 2007).

HEE developed an assessment strategy as part of the IFPP and included peer assessment as an essential aspect of it. The development of a peer assessment process and tool was critical for the success of the programme and would offer an insight into whether peer assessment could be utilised nationally as part of the broader educational reform within the pharmacy. This tool needed to be used by pharmacists across several sectors

to explore whether it could facilitate cross-sector learning. This study aimed to establish a model for a national peer assessment tool to support the development of ECPs and determine the feasibility, acceptability, reliability, and validity of this tool.

## Methods

### *Establishing a national peer assessment tool*

A web-based system was developed for provisional registrants to undertake peer assessment as part of their IFPP year. The system was created within the RPS e-portfolio for provisionally registered pharmacists. Using the e-portfolio had several benefits, including a distribution list for communication, familiarity for users, the ability to link the tool with IFPP learning outcomes, and a reflective summary in their portfolio. Key elements of the tool included the ability to anonymise cases and randomly allocate them to peers and an ES other than their own, named Remote Supervisors for the purpose of the tool (RS).

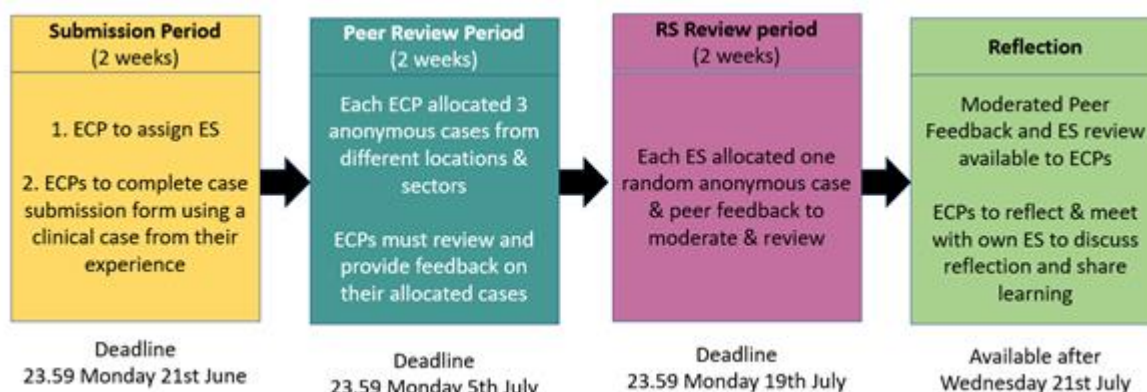
The peer assessment tool was adapted from a model used for foundation dentists in Yorkshire and Humber (HEE, 2021). Pharmacists participating in the process received three cases to review and provided feedback, encouraging both positive and negative feedback. RS were allocated one case with their focus on moderation of peer feedback, additional comments, and an overall assessment of the case. RS involvement was adapted from the dentistry model to reflect the structure within pharmacy of ES, sometimes supervising multiple ECPs.

A case submission template (see Appendix A) and a review template (see Appendix B) were created to standardise case descriptions and the review process, respectively. The case submission template was created to give a framework to participating ECPs in describing a case in which they contributed to patient care. Previous work had shown that this template facilitated subsequent reviews since pharmacists were familiar with the structure when reviewing cases, as all users were required to provide the same basic information (Clymer, 2020). A corresponding review template was created for users to outline areas of good performance, areas of improvement or future learning and whether the ECP had met the expected standard for each section of the submission template. Reviewers were required to formally assess whether the ECP had met the expected standard for the case overall.

The submitted case and corresponding reviews were allocated to a random RS for review. This ES was selected from a different geographical region to ensure anonymity. The review section was kept to a minimum of selecting an agreement level with each peer review to maximise engagement of RS.

### *Peer assessment process*

The process for the tool was mapped out to ensure clarity of information disseminated to potential participants and encourage engagement. The peer assessment tool was available from 7 June 2021 and closed for review on 19 July 2021, as illustrated in Figure 1.



**Figure 1: Process map for pharmacy peer assessment tool**

The ES for each ECP created a pool of supervisors that would be randomly assigned to cases ensuring that they were not allocated to the ECP supervised (in the RS Review Period). This method created a new perspective on the development of ECPs and ensured

their anonymity. It is also noteworthy that no extensions of the deadline dates for the peer assessment process were possible as all cases were required to move forward to the next stage at the same time to enable allocation of cases to ECP and RS.

Furthermore, the tool was part of the wider IFPP and therefore, timings needed to fit with the rest of the programme, enabling timely feedback.

### **Peer assessment communication**

Due to the novel nature of the tool to the pharmacy profession, it was imperative that any form of communication was clear, succinct, and easy to understand to encourage ECP participation. A range of communication routes were used to prompt ECPs to participate, including information in the regular IFPP updates from HEE and direct emails to all e-portfolio users from the RPS. As the submission deadlines were rigid, an email reminder was sent, including reminders on deadlines to prompt participants and RS to complete their submissions and reviews prior to each stage of the process. At the end of the RS review period, submitters were able to access their moderated feedback from peers and additional comments from the RS. Resources, such as a User Guide, learning resource for the tool, and links to a guide to providing written constructive feedback, were created and disseminated to users using the communication routes available.

### **Determining the feasibility, acceptability, reliability, and validity of the tool**

Four crucial aspects were to be explored within this study to determine the success of the tool. This includes feasibility, acceptability, reliability and validity of the tool. The number and demographics of participating ECPs were collected at the start to explore whether the tool was feasible across such a widespread area and across sectors within pharmacy. A helpline was available at the RPS to log and resolve any issues, and these were reviewed weekly during the process.

Acceptability was considered by retrieving data from the peer assessment tool to examine the attrition rate. This was further supported by two Jisc qualitative surveys. The first survey was disseminated to ECPs to explore their experience alongside any reasons for an individual's level of engagement and the learning that resulted from participation. The second survey was disseminated to RS, exploring reasons for levels of engagement of RS and the user experience. As RS involvement was not compulsory, engagement levels of RS would inform future iterations of the tool. Both questionnaires contained a mixture of binary yes/no questions, Likert scales, and multiple-choice options. The surveys were available for two weeks following the RS review stage of the process when ECPs received their peer feedback. Links to the surveys were sent via email to relevant e-portfolio user distribution lists.

Reliability for peer assessment relates to the degree to which peer assessment produces consistent results. Peers were asked to assess the extent to which the submitted case compared to the expected standard for an ECP by selecting from four options. For ease of data analysis, the selections were converted to a possible mark out of four (see Table 1).

**Table 1: Assignment of scores against overall comparison to expected standard options**

Overall comparison to expected standard	Score
Exceeds the expected standard of provisionally registered pharmacist	4
Meets the expected standard of provisionally registered pharmacist	3
Borderline for expected standard of provisionally registered pharmacist	2
Below the expected standard of provisionally registered pharmacist	1

Scores between peers were compared to see whether there was consistency between the scores to demonstrate inter-rater reliability.

Finally, the validity of peer assessment, as a tool to compare a participant with an expected standard, was explored. Validity is often expressed as a Pearson correlation between the supervisor and the learner, where the supervisor serves as the valid baseline. However, it is established that the practitioner assessment creates a bias of its own, particularly with single assessor feedback. In this iteration of peer assessment, it was imperative to keep RS involvement low, encouraging acceptability of the process, as peer assessment is in its infancy within the profession. As such, validity was explored by considering the level of agreement of the RS with the peer feedback (the basis of criterion feedback).

This study utilised anonymised data retrieved from the peer assessment tool and the survey data. The study formed part of the wider IFPP and was classed as a service evaluation; therefore, ethical approval was not required.

All learners and supervisors signed up to a privacy notice and consented to their data being used in the IFPP evaluation when they registered with the e-portfolio.

### **Analysis**

Data analysis was performed using Excel software for statistical analysis. Thematic analysis was planned for the qualitative data; however, due to the low uptake of the survey, it was decided to use narrative analysis

methods to find pertinent statements to back up the findings of the quantitative data.

## Results

### Feasibility

Two hundred and fifty ECPs submitted cases onto the peer assessment tool from a range of sectors and locations during the submission period in June 2021. Of these, 168 (67.2%) were submitted by community pharmacists, 79 (31.6%) by hospital pharmacists, and 3 (1.2%) by pharmacists from other sectors. The location and sector breakdown of these submitted cases is shown in Table II.

**Table II: Demographics of participants by sector and location**

	Community	Hospital	Other	Total
London & South East	55	32	2	89
Midlands & East of England	47	13	1	61
North	35	21	0	56
South West	31	13	0	44
TOTAL	168	79	3	250

### Cross-sector assessment

Data on the sector of the submitting pharmacist and corresponding peer reviewers enabled exploration of whether the commonality of sector experience affected the average score assigned.

An independent-samples paired t-test was conducted to compare scores assigned to community pharmacist submitters by fellow community pharmacists (similarly experienced peers) and hospital pharmacists (cross-sector peers). The mean score assigned was slightly higher for those with a similar experience ( $M=3.1$ ,  $SD=0.55$ ,  $N=233$ ) compared to cross-sector peers ( $M=2.99$ ,  $SD=0.54$ ,  $N=133$ ). However, the paired t-test showed no significant difference in scores assigned by the community or hospital pharmacists to community case submissions ( $t(364)=1.78$ ,  $p=0.075$ ).

This technique was repeated for scores assigned to hospital pharmacist submitters by community pharmacist reviewers (cross-sector peers) and hospital pharmacist reviewers (similarly experienced peers). The mean score assigned was slightly lower for peers from a hospital background ( $M=3.27$ ,  $SD=0.55$ ) compared to those from the community ( $M=3.33$ ,  $SD=0.56$ ). However, the paired t-test showed that this difference was not significant ( $t(183)=0.64$ ,  $p=0.52$ ).

### Acceptability

Each case was allocated to three peers for review, resulting in a potential of 750 peer reviews. Of the 750 potential peer reviews, 566 were completed at the end of the peer review period (75.5%). Thus, 184 (24.5%) peer reviews were not completed. Table III shows the number of uncompleted peer reviews and the attrition rate by location and sector.

**Table III: Uncompleted peer reviews and attrition rate by location and sector**

	Community	Hospital	Other	Total			
London & South East	39	23%	11	12%	0	0%	50
Midlands & East of England	62	44%	6	15%	0	0%	68
North	21	20%	10	16%	0	0%	31
South West	25	27%	10	27%	0	0%	35
<b>Total</b>	<b>147</b>	<b>29%</b>	<b>37</b>	<b>16%</b>	<b>0</b>	<b>0%</b>	<b>184</b>

### Participant acceptability

Of the eight respondents to the survey, seven completed the peer assessment process (87.5%). The most common reason selected for reasons for engagement with peer assessment was that the tool was an essential component of the IFPP programme ( $n=6$ , 85.7%), followed by the pharmacist feeling it would benefit their development ( $n=4$ , 57.1%).

Also, 71.5% ( $n=5$ ) found it quite easy or really easy to understand the cases allocated to them, which demonstrates the acceptability of applying assessment techniques across sector boundaries. Peer assessment facilitates learning at different stages of the process, from completing the initial submission form to reviewing peer cases and receiving peer feedback. This was shown by 57.2% ( $n=4$ ) agreeing that they learnt something new from reviewing other cases, and 86.7% ( $n=6$ ) selecting that they would use this new learning in future practice. Furthermore, 85.7% ( $n=6$ ) declared that they would recommend this tool in the future,

### Supervisor acceptability

Of the 26 respondents, 22 completed their peer assessment reviews (84.6%). The four that did not complete their reviews provided a range of reasons, including "I was on annual leave", "Time window too short - only had 24 hours on return from annual leave", "The requirements of the cases are unclear, so it is not clear what feedback is supposed to focus on", and "The cases assigned to me are from another sector, where I

have no experience.” Reasons for engaging with the tool reflected the responses from ECPs, with 86.4% (n=19) recognising the tool as an essential element of the IFPP and 72.7% selecting that “it would benefit another pharmacist’s development” (n=16). Also, 90.9% (n =20) found it quite easy or really easy to understand the cases allocated to them. This again reflects the responses from ECPs and demonstrates the acceptability of the programme across sectors. Moreover, 68.2% selected that they had learnt something new from reviewing the cases (n=15), with 90.9% of supervisors agreeing that they would recommend this tool in the future (n=20).

Additional comments from supervisors were: “The peer assessment tool would be useful for other groups of learners, e.g., trainee pharmacists, newly qualified, and consultant pharmacists”, supporting the use of the tool in the future. One respondent stated: “I would actively seek out opportunities to participate”. However, there were several comments regarding deadlines: “There needed to be more time for each stage of the process as some learners and education supervisors had a 2-week annual leave and were unable to participate”, and “Deadlines were a bit tight for both learners and supervisors.” Other key themes that emerged included issues around what is meant by “expected level of a provisionally registered pharmacist”, with one respondent commenting in the areas to be improved section that it is “unclear what is the expected level for foundation pharmacist across the profession, even with the examples provided” and another stating that the tool could be improved with “Clearer information on the expectation”.

### Reliability

#### Scores received

The average score received was 3.14 (95% CI 3.09 to 3.186) with a standard deviation of 0.56 across all sectors, demonstrating a mean of pharmacists meeting the expected standard of an ECP (Figure 2). Community pharmacists received an average score of 3.056 (95% CI 3 to 3.11), and hospital pharmacists had an average score of 3.29 (95% CI 3.21 to 3.37). Pharmacists from other sectors received an average score of 3 (95% CI 3).

#### Scores assigned

The average score assigned also differed between sectors (Figure 3). Community pharmacists assigned an average score of 3.18 (95% CI 3.12 to 3.24), hospital pharmacists gave a lower average score of 3.07 (95% CI 2.99 to 3.15), and pharmacists from other sectors allocated even lower scores with an average of 2.66 (95% CI 2.2 to 3.12).

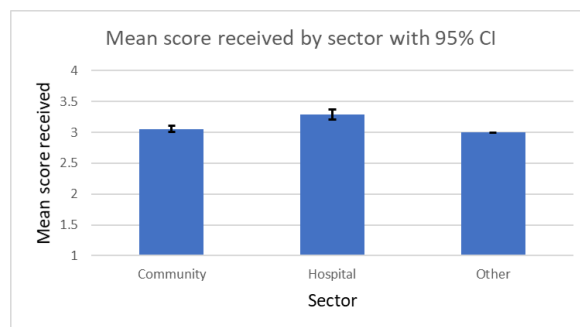


Figure 2: Mean score received by participants from each sector

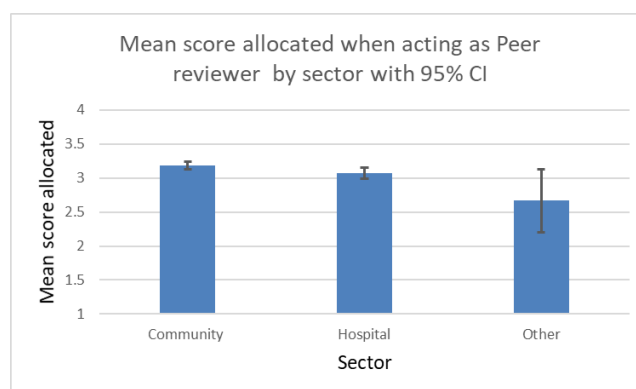


Figure 3: Mean score allocated by participants (in review stage) from each sector

The most common score assigned was 3 (meets the expected standard), with 390 reviewers selecting this option (68.9%). Only four reviewers (0.7%) selected 1 (below the expected standard), and 43 (7.6%) selected 2 (borderline with the expected standard).

Calculations for the Intraclass Correlation Coefficient (ICC) were performed and analysed to assess the reliability of peer review scores. Data were only used for cases that received three peer reviews to improve the statistical significance of the calculation. ICC was calculated at 0.16. Cronbach’s alpha was also calculated on these ratings with  $\alpha=0.37$ .

### Validity

The 250 cases and their corresponding peer reviews were allocated to Remote Supervisors (RS), who were expected to select whether they agreed, partially agreed, or disagreed with the feedback given by the peer reviewer. Therefore, RS could only participate if their allocated case had received peer reviews. Of the 566 peer reviews, 291 were reviewed by an RS (51.4%). Of the 291 RS-reviewed peer reviews, 231 agreed with the feedback given by the peer reviewer (79.4%), 56

partially agreed with the feedback (19.2%), and 4 disagreed with the feedback (1.4%).

## Discussion

This study described a tool for peer assessment that was successfully implemented over a large geographical area and across several sectors of the pharmacy profession. The use of the tool will be discussed in greater detail under four key objectives, i.e., feasibility, acceptability, reliability, and validity.

The feasibility was examined to consider the practicality of peer assessment across a country and between different sectors. The demographic of participants shows that peer assessment is feasible across these sectors and geographical boundaries, with a relatively even split of participants from various areas. The ratio of community to hospital pharmacist participants was 2.1:1, which is slightly lower than the ratio from the GPhC survey of registered pharmacy professionals (2019), with a ratio of approximately 3:1. Furthermore, this study demonstrated that peer assessment does not need participants and peers to have the same sector experience, with no significant differences in scores allocated by reviewers from the same sector of practice as the submitting pharmacist. This result supports the idea that peer assessment could be a useful and practical tool to assess a large cohort of ECPs despite differences in sector experience.

The acceptability of peer assessment can be considered by the qualitative data from the qualitative surveys. Although response rates were low from both ECPs and supervisors, a high proportion found the cases easy to understand and provided feedback showing that the cross-sector nature of the tool should be viewed as a benefit rather than a challenge to peer assessment in the future. This finding is supported by the cross-sector analysis showing that the commonality of the sector between submitters and reviewers does not affect the scores given. Furthermore, a high proportion of participants (ECPs and supervisors) would recommend this tool in the future, supporting the acceptability of peer assessment within the pharmacy profession. There was attrition of engagement, with a quarter of peer reviews not completed, reflecting the tight timeframes mentioned in the qualitative surveys from supervisors and participants. Further consideration should be made on how to better engage supervisors in the process. Peer assessment can be perceived as a time-consuming process, and it was hoped that minimising the RS role would maximise engagement, but it may be required in future iterations to make their participation mandatory (Liu & Carless, 2016).

Reliability has often been shown to be poor for peer assessment in medical/clinical settings between peers and supervisors, with a low correlation of scores given (Falchikov & Goldfinch, 2000; Sluijsmans *et al.*, 2001; Li *et al.*, 2016). In this methodology, supervisors were not expected to allocate a score but to state their level of agreement with the peer reviews. The results showed a high level of agreement between supervisors and peers. However, the interrater reliability for the peer assessment was low, with an ICC of 0.16 and Cronbach's alpha calculated at 0.37 demonstrating a poor correlation between scores between peers and poor internal consistency. This is likely due to a reluctance to award low marks to peers (despite the anonymous nature of the assessment) or a lack of understanding of what 'good' looks like. Providing specific guidance on the assessment of peer cases and providing a rubric as guidance has been shown to improve reliability scores in peer assessment (Panadero, Romero & Strijbos, 2013; Steensels *et al.*, 2016).

Assessment of the individual within IFPP was programmatic, with a suite of tools providing information on the individual's development. This multi-modal approach means there is less reliance on each assessment tool, so reliability is less critical than in high-stakes single assessment methods. It is also important to acknowledge a key aim of the process was to gain multiple perspectives on cases from a range of sector experiences to gain a breadth of knowledge (Steensels *et al.*, 2016). Multiple perspectives through formative feedback on a pharmacist's case are still beneficial to their development, even if the summative scores assigned do not correlate.

Two aspects of validity were examined as part of this study. Firstly, face validity was gained through working collaboratively to design the structure, templates, and process for peer assessment. An initial group of cross-sector testers piloted the system to ensure cases from a range of sectors could be described. Secondly, validity was explored by considering the level of agreement between supervisors and participants (peers) feedback. Many of the other assessments used as part of the portfolio were completed by a single supervisor, which is historically the case for pharmacy assessments. The high level of supervisor agreement with the peer feedback within this study supports the validity of the tool, with 79.4% fully agreeing with the feedback given. The high level of agreement by the supervisors, seen as experts in the area, supports the validity of peer assessment.

This study has shown the feasibility of a widescale cross-sector peer assessment tool in pharmacy. A large number of pharmacists participated in the process,

with cases allocated across the sectors and regions, demonstrating the randomisation process worked. The tool has the potential to provide oversight of the quality of supervision by repeating cycles of peer assessment, with supervisors assigning an overall feedback score on cases. Oversight of training quality was highlighted as a failure in the current foundation pharmacist training in the “advancing pharmacy education and training: a review” (HEE, 2019) and recommended in an independent evaluation of frameworks for professional development in pharmacy by Wright and Morgan (2011).

### Limitations

Although this tool was used across a wide geographical area, not all eligible ECPs participated in peer assessment. As there were limited cases submitted from pharmacists from sectors other than the hospitals and community, the data from these cases were not analysed to demonstrate cross-sector feasibility as it would be unlikely to demonstrate statistical significance. Further work is required to broaden understanding of other pharmacy sectors. There was also a very low response rate for the qualitative surveys, which limited the ability to fully analyse the qualitative data retrieved. No identifiable patient or participating pharmacist data were requested for case submission, with participants’ identities remaining anonymous to their peers. However, cases were not individually checked for confidentiality and anonymity, which could have led to bias in scoring behaviours.

The assessment process showed good acceptability and feasibility; however, further work is needed to show good reliability with a higher ICC score. Other models for peer assessment have shown that repeated cycles of peer assessment help familiarise participants with the process, which, in turn, will improve the reliability of scores (Steensels, 2006; Papinczak, 2007). Further information needs to be disseminated to participants on the expected standard of cases with a rubric for assessment and example cases with corresponding feedback. In order for this tool to be used at different levels of professional practice (e.g., advanced practice), there needs to be increased engagement with sectors other than the community and hospital to ensure wider acceptability and feasibility. It was not possible to thematically analyse the qualitative survey results due to the low number of responses.

### Conclusion

This study established a successful model for peer assessment among ECPs in England across all sectors.

The findings from this study support the acceptability and feasibility of peer assessment as part of multi-modal assessment methods. More work is needed to show the reliability and validity of peer assessment as a tool for pharmacy, with repeated cycles, adjusted timescales, and more robust guidance on expected standards for the peer reviewers. Further work on the use of peer assessment at other levels of professional development and with a higher number of participants will add support to the use of the tool across the wider profession.

### Competing interests

The authors declare there are no competing interests in the publication of this paper.

### Authors' contributions

Many thanks to Helen Chang (Head of Professional Development at the Royal Pharmaceutical Society) for writing review and editing.

### Acknowledgements

The authors are grateful for the support of the Health Education England North School of Pharmacy and Medicines Optimisation foundation practice team and the Royal Pharmaceutical Society.

The authors wish to acknowledge the work done in dentistry within Yorkshire and Humber by Jason Atkinson (Associate Postgraduate Dental Dean at Health Education England) for conceptualisation of a widescale peer assessment tool.

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**Appendix A: Example case submission**

**Peer Assessment Case Submission**

Learner Details			
Full Name:			
Introduction			
Outline your area of practice and the nature of your encounter with the patient (max 400 words): I am a foundation pharmacist working at a large teaching hospital. I undertake 3 monthly rotations in a variety of clinical areas and have recently moved into surgery. This patient was on the ward I was covering for a period of 2 days. I completed her medicines reconciliation on arrival, discussed her medication changes due to her sleeve gastrectomy and then did discharge counselling following completion of her TTO.			
Detail a brief summary of the case (max 400 words): This patient was admitted for an elective laparoscopic sleeve gastrectomy due to morbid obesity. On admission she was on inhalers and antiepileptics which are critical medicines. It was essential that the form of these were changed in order to ensure that they could still be taken despite reduced stomach size. Patient discharged on liquid preparations			
Patient's Details			
Age: 20			
Sex: <input checked="" type="checkbox"/> F <input type="checkbox"/> M			
Allergies (include reaction where known): None			
Past Medical History (including presenting complaint where appropriate): Epileptic Asthmatic Obesity - increasing shortness of breath, decreased mobility and sleep apnoea			
Social & Family History: Non Smoker No alcohol intake Family history of obesity with father and uncle having had gastric bypass operations			
Current Medication List <i>including acute &amp; repeat medication and OTC drugs</i>			
Drug Name & form	Dose & frequency	Indication	Additional comments

Phenytoin capsules	300mg ON	generalised epilepsy	Long term
Carbamazepine tablets (Tegretol retard)	200mg BD	generalised epilepsy	Long term
Beclomethasone 100mcg inhaler	2 puffs BD	Asthma prevention	Long term
Salbutamol 100mcg inhaler	2 puffs PRN	Asthma reliever	Long term
<b>Any compliance issues?</b>			
<b>None</b>			
<i>*Test results or supplementary information (such as weight/height) can be attached as a separate document</i>			
<b>Problem Identification</b> <i>(Maximum 5 problems. If patient has more problems, prioritise the most important for discussion below)</i>			
Problem	Assessment of problem <i>(including risk factors)</i>	Management options <i>(max 400 words)</i>	Plan
1. Patient is morbidly obese has undergone a sleeve gastrectomy resulting in a diminished stomach size (reduced by 75%). As a result of this, patients are advised to have a liquid diet only for 1 week then soft moist food for 2 weeks then moving to solid food thereafter. It is advisable therefore that medication is changed to liquid formulation.	Patient has become breathless walking upstairs with a tight chest on exertion. She has tried multiple diets but all have failed. Weight of 168.4kg, height of 161cm, resulting in a BMI of 65	Patient is on 2 inhalers which do not need changing as they can still be taken. Antiepileptic doses should not be missed as they are critical medicines and it is therefore important to convert these to liquid preparations. Patient is also at risk of vitamin deficiencies as there will be impaired absorption of vitamins with reduced stomach size. Vitamin B12 also essential to replace due to lack of intrinsic factor following surgery as it is made in the stomach.	Change antiepileptics to liquid formulations Prescribe multivitamins for discharge - soft and chewable ones. Ensure GP aware of need to continue prescription and check vitamin B12, calcium and other electrolyte levels Counsel patient to drink milk and eat dairy to keep calcium levels within range
2. Post operative nausea and vomiting following sleeve gastrectomy which is causing pain (due to gastric surgery) and distress	No prior surgery however has risk factors for post op nausea and vomiting (PONV) including obesity, sex (females more likely to suffer than males), non smoker and use of post operative opioids. Apfel score of 3 giving a risk of 60%.	Multiple antiemetics available for use. IV preferred option due to post operative drowsiness and risk of vomiting due to gastric surgery. Trust guidelines indicate use of cyclizine 50mg TDS IV first line followed by ondansetron 4mg 6hourly IV if no improvement then domperidone 30mg TDS PR. Cyclizine shown in trials to be equally as effective as ondansetron and significantly cheaper. Cost is a major factor in choice of antiemetic as the IMPACT trial has shown no agent was better than any other. Metoclopramide has been shown to be no better than placebo in preventing early or late onset PONV	Prescribe cyclizine 50mg TDS IV. Wait at least 20 minutes to ensure adequate time to full effect. Prescribe ondansetron if no improvement with cyclizine. If neither work, try an alternative that works on an alternative site of action such as prochlorperazine or metoclopramide
3. Post operative pain following gastric surgery	Pain score of 7 out of 10 post operatively, Patient groaning and vocalising pain	Using the WHO ladder, pain relief can start using paracetamol before working up to weak opioids and then strong opioids. However it is important to get pain under control and therefore post operatively, use of strong opioids is recommended. Patient	Prescribe Morphine PCA until pain controlled post operatively Discharge with paracetamol and codeine

			controlled analgesia is a good option for patients who have the capacity to control their analgesia, pain is deemed to be short term and use of the PCA can be used to assess pain. Pain can be less well controlled if administered intermittently by nurses due to the delay in making up and administering the drug. Morphine is the gold standard opioid with good evidence for us and reasonable cost.	
<b>Describe the pharmaceutical contributions you made to the patient's care</b>				
<b>Pharmaceutical Contribution to care</b>		<b>Rationale and references (max 400 words)</b>		<b>Outcome</b>
Nurse asked me to look into patient's medication to switch to liquid formulation as per advice post sleeve gastrectomy. Phenytoin was taken as a capsule at 300mg ON on admission. I calculated the dose and spoke to the doctor looking after the patient to get the form and dose changed on the prescription to ensure no errors occurred		Phenytoin - 90mg (15mL) of suspension is equivalent to 100mg of capsules or tablets due to the difference in bioavailability between the formulations (phenytoin suspension available as phenytoin base whereas capsules are phenytoin sodium). 300mg ON therefore equates to 270mg ON of suspension		Phenytoin prescription was changed to liquid formulation. No change in seizures. Levels checked and found to be within range
Nurse asked me to look into patient's medication to switch to liquid formulation as per advice post sleeve gastrectomy. I advised for Carbamazepine to be changed to 100mg QDS of liquid preparation		Carbamazepine has equivalent bioavailability for liquid and tablet formulations however patient was on MR preparation so more frequent administration is advised. 200mg BD means a total dose of 400mg therefore switched to 100mg QDS		Tegretol retard changed to carbamazepine liquid 100mg QDS with no increase in seizures or adverse effects
Doctors asked me what antiemetic to prescribe as patient struggling with PONV despite dose of cyclizine. I recommended that they tried ondansetron 4mg TDS IV as per trust guidelines and as this works on different receptors compared to cyclizine.		Used trust guidelines to guide decision but trials have shown equal efficacy between ondansetron and cyclizine. Both have been shown to be more effective than placebo in reducing PONV.		Patient prescribed ondansetron and by the end of following day, PONV was controlled and no further doses needed
<b>What follow up, monitoring or signposting did this patient need? (Max 400 words)</b>				
Patient was informed to seek GP to check electrolyte, calcium and vitamin B12 levels (after 3 months). Phenytoin levels were checked by GP 2 weeks after discharge Signposting back to GP if changes to diet and exercise start to become difficult				
<b>Reflections and learnings (Max 400 words)</b>				
I hadn't been working on surgery for long and was therefore daunted by the prospect of switching their medication. However I soon realised that my skills I had learnt on previous rotations could be applied in this setting for example, use of resources to switch patients to alternative formulations. I think generally this went well and I made some good contributions to care. However reflecting on the case has made me realise that I could have worked harder to think about transfer of care outside of the hospital in ensuring continuation of medication (does the chemist stock chewable vitamins, phenytoin suspension) and that the community pharmacist realises the importance of continuing liquid preparations. I need to know more about post discharge monitoring and follow up for these patients				
<b>References</b>				

**Appendix B: Template for case review**

<p><u>Documentation and summary of case</u></p> <p>Has the pharmacist provided all relevant information needed for the case?</p> <ul style="list-style-type: none"> <li>• All relevant patient details</li> <li>• Description of medical history, social history, family history, compliance and any relevant test results</li> <li>• A detailed list of medication including acute, repeat and OTC drugs</li> </ul> <p>Has the case been clearly summarised?</p>	
<p>Areas of good performance (Free text box of 100 words limit)</p>	<p>Areas of improvement or future learning (Free text box of 100 words limit)</p>
<p>Does the pharmacist meet your expected standard?</p> <p>Drop down options –</p> <p>Exceeds the expected standard of provisionally registered pharmacist (numerical score 4)</p> <p>Meets the expected standard of provisionally registered pharmacist (numerical score 3)</p> <p>Borderline for expected standard of provisionally registered pharmacist (numerical score 2)</p> <p>Below the expected standard of provisionally registered pharmacist (numerical score 1)</p>	
<p><u>Assessment &amp; Management options</u></p> <p>Has the pharmacist outlined and prioritised the relevant patient problems?</p> <p>Has all relevant assessment information (including risk factors) relating to these issues been included?</p> <p>Has the pharmacist considered all possible management options</p> <p style="padding-left: 40px;">Documentation of advantages and disadvantages of options</p> <p>Has an appropriate plan been formulated, tailored to the individual patient factors and needs</p>	
<p>Areas of good performance (Free text box of 100 word limit)</p>	<p>Areas of improvement or future learning (Free text box of 100 words limit)</p>
<p>Does the pharmacist meet your expected standard?</p> <p>Drop down options –</p> <p>Exceeds the expected standard of provisionally registered pharmacist (numerical score 4)</p> <p>Meets the expected standard of provisionally registered pharmacist (numerical score 3)</p> <p>Borderline for expected standard of provisionally registered pharmacist (numerical score 2)</p> <p>Below the expected standard of provisionally registered pharmacist (numerical score 1)</p>	
<p><u>Pharmaceutical Contributions to care</u></p> <p>Has the pharmacist used their professional judgement to make balanced and holistic contributions to care?</p> <p>Does the rationale provided justify their contributions to care?</p> <p>Are there any other factors that have not been considered in this intervention?</p> <p>Has the outcome been summarised?</p> <p>Has the Multidisciplinary team &amp; patient been involved in a shared decision process where appropriate?</p>	
<p>Areas of good performance (Free text box of 100 word limit)</p>	<p>Areas of improvement or future learning (Free text box of 100 words limit)</p>
<p>Does the pharmacist meet your expected standard?</p> <p>Drop down options –</p> <p>Exceeds the expected standard of provisionally registered pharmacist (numerical score 4)</p> <p>Meets the expected standard of provisionally registered pharmacist (numerical score 3)</p> <p>Borderline for expected standard of provisionally registered pharmacist (numerical score 2)</p> <p>Below the expected standard of provisionally registered pharmacist (numerical score 1)</p>	
<p><u>Follow up, Monitoring and Signposting</u></p> <p>Has the pharmacist provided follow up advice to the patient and other healthcare professionals involved in their care?</p> <p style="padding-left: 40px;">Is this follow up advice explained and justified?</p> <p>Has suitable monitoring been considered for the patient and communicated where necessary?</p> <p style="padding-left: 40px;">Is the monitoring explained and justified?</p> <p>Has the patient been signposted to any services?</p> <p style="padding-left: 40px;">Is the signposting explained and justified?</p> <p>Has any safety netting been considered and information given to the patient and other healthcare professionals involved in their care?</p>	
<p>Areas of good performance (Free text box of 100 word limit)</p>	<p>Areas of improvement or future learning (Free text box of 100 words limit)</p>
<p>Does the pharmacist meet your expected standard?</p> <p>Drop down options –</p>	

Exceeds the expected standard of provisionally registered pharmacist (numerical score 4) Meets the expected standard of provisionally registered pharmacist (numerical score 3) Borderline for expected standard of provisionally registered pharmacist (numerical score 2) Below the expected standard of provisionally registered pharmacist (numerical score 1)	
<u>Reflection &amp; Evidence Base</u> <ul style="list-style-type: none"> <li>• Has the pharmacist considered the outcome from the case and reflected on their contributions to care?</li> <li>• Has a model of reflection been used to structure their learning?</li> <li>• Has the pharmacist demonstrated critical thinking skills in their decision making?</li> <li>• Has relevant evidence been referenced appropriately to support decision making?</li> </ul>	
Areas of good performance (Free text box of 100 word limit)	Areas of improvement or future learning (Free text box of 100 words limit)
Does the pharmacist meet your expected standard? Drop down options – Exceeds the expected standard of provisionally registered pharmacist (numerical score 4) Meets the expected standard of provisionally registered pharmacist (numerical score 3) Borderline for expected standard of provisionally registered pharmacist (numerical score 2) Below the expected standard of provisionally registered pharmacist (numerical score 1)	
<u>Summary</u> Overall does the pharmacist meet your expected standard? Drop down options – Exceeds the expected standard of provisionally registered pharmacist (numerical score 4) Meets the expected standard of provisionally registered pharmacist (numerical score 3) Borderline for expected standard of provisionally registered pharmacist (numerical score 2) Below the expected standard of provisionally registered pharmacist (numerical score 1)	
Summary of feedback (free text box)	
Case complexity (drop down of 3 options) Case at expected complexity level to demonstrate standard for provisionally registered pharmacist Case partially at expected complexity level to demonstrate standard for provisionally registered pharmacist Case below expected complexity level to demonstrate standard for provisionally registered pharmacist	
Any further comments? (free text box)	