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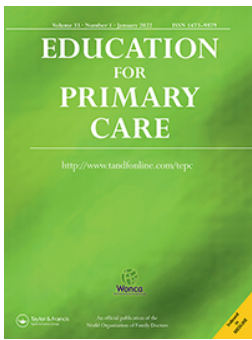
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Longitudinal integrated clerkship evaluations in UK medical schools: a narrative literature review

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ABSTRACT

Purpose: Longitudinal Integrated Clerkships (LICs) are a recognised model of curriculum design used internationally as an alternative to traditional block rotations in medical schools that have been shown to offer a multitude of educational benefits. As a relatively new development in the United Kingdom (UK), it is not yet clear whether these benefits will translate into a UK healthcare context. This article provides an early review of evaluations of UK LIC programmes.

Methods: A narrative literature review of LIC programme evaluations in UK medical schools.

Results: UK students and faculty found value in the LIC programmes with reported benefits including continuity of relationships, increased responsibility and purpose for students, a patient-centred approach and development of professional skills. However, students and GP tutors expressed initial anxieties adapting to the newness of the programme design and preparedness for exams.

Conclusions: UK LIC programmes appear to be offering benefits for UK medical students and faculty members including personal and professional development in line with international literature. However, the current data is limited with significant gaps that need addressing for the impacts to be fully realised.

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Longitudinal integrated clerkships; undergraduate medical education; general practice; family practice

Introduction

Longitudinal Integrated Clerkships (LICs) are a form of curriculum design used in medical education as an alternative to traditional block rotations (TBRs). Whilst there is not a single definition that describes all LIC programmes, an international consortium of longitudinal integrated clerkships (CLIC) agreed upon three defining characteristics for LIC programmes [1]:

- (1) Medical students participate in the comprehensive care of patients over time
- (2) Medical students have continuing learning relationships with these patients' clinicians
- (3) Through these experiences medical students meet the majority of the academic years core clinical competencies across multiple disciplines simultaneously

LICs were initially borne out of a need to meet healthcare workforce shortfalls in rural settings [2]. The first recorded LIC, described in 1971 at the University of Minnesota, was successful in addressing poor recruitment to the primary care workforce in rural settings [3]. LICs have since grown in popularity across Australia, North America and South Africa and now exist in many different forms globally [4].

As well as increasing recruitment to rural healthcare workforces, there is compelling evidence that LICs offer educational benefits for students. A recent comprehensive review of international LICs suggested benefits for students ranging from increased patient-centeredness, greater value in mentor relationships and readiness for both examinations and working life [5].

Relational continuity is considered one possible driver of these educational benefits, whether of the student-patient or student-mentor [6]. Continuity of the student-mentor relationship allows for increased learner-centredness with learning activities tailored to students' developing educational needs [7]. However, there is still uncertainty as to the mechanisms for learning that are triggered during LICs.

The UK context

Given the described benefits in the international literature [5], it is unsurprising that medical educationalists in the UK are keen to develop LICs. In 2019, a survey of UK medical schools found nine out of twenty-four respondents reported offering LIC programmes and a further six stated an intention to establish one in the near future [8]. Though the majority of the established programmes were also in general practice (GP), the programme length

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varied significantly from ten weeks to a full academic year, suggesting a loose definition of LIC was being used by some respondents. The authors suggest the internationally accepted definition of LICs sits awkwardly within our UK health and education systems and question whether the term is sometimes being used a fashionable way to describe a variety of curricular changes [8].

There are arguably several reasons why the popularity of LICs is increasing in the UK. The first reason is so that educational benefits of LIC programmes demonstrated in international literature can be replicated but much like the original LIC developments, an additional motivator may be rooted in a workforce crisis [4]. With an increasingly aged population with multiple comorbidities and an NHS drive towards increased community-based care, the pressures on the general practice workforce have never been greater [9]. LICs have been shown to influence students' career intentions towards general practice and community medicine [10]. However, it may be that contextual differences mean that the benefits of LIC programmes do not easily transfer to a UK context. For example, in the UK the majority of medical students are undergraduates [11] whereas much of the literature surrounding LICs originates from regions where medical students are postgraduate students who may be more accustomed to an adult learning style [12].

Adapting a medical school curriculum to include a LIC component is a time consuming and expensive process and some medical schools have highlighted barriers such as lack of space within the curriculum and faculty interest [8]. As UK medical schools continue to develop LICs, it is important to be fully aware of published evaluations on the outcomes of LIC programmes in a UK context. This will help schools recognise how LICs are translating to the UK in practice and consider possible adaptations; to serve this purpose, this paper collates published evaluations of UK LICs thus far.

Aims and objectives

This narrative review aims to synthesise the literature published so far on the evaluations of LIC programmes based in UK medical schools. An additional objective is to formulate recommendations on how future evaluations of UK LICs may be designed to best inform further developments.

Methods

A systematic literature search identified articles describing evaluations of LIC programmes developed within UK medical schools. ER conducted searches using PubMed,

Scopus and British Educational Index in November 2020. The keywords 'longitudinal integrated clerkship' or 'longitudinal integrated placement', 'United Kingdom', and "outcomes or 'evaluation' or 'results' were combined using BOOLEAN operatives for each database. The PRISMA diagram checklist is shown in [Figure 1](#) [13]. The scope of this research did not allow for grey literature or alternative sources to be sought. These searches produced ninety-two papers of which three were duplicates. The titles and abstracts of the remaining eighty-nine papers were screened against the inclusion and exclusion criteria shown in [Table 1](#). ER and LE carried out screening independently with subsequent consolidation, supported by AP. The full texts of the remaining fourteen papers were then screened and four articles met the criteria for review. In order to satisfy the objectives, a narrative review was undertaken to identify key themes in these early-published evaluations. No formal quality appraisal method was used. These were reviewed using a thematic analysis approach by two researchers independently (ER and LE) [14]. Their separate analyses were then discussed to reconcile any discrepancies and categorise dominant themes and sub-themes. These reviewers had not been involved in any university undergraduate curriculum design and were previously naive to the concept of LIC programmes, therefore prior bias or expectations were minimal. In order to check coherence with medical education literature, these themes were then refined further after discussion with experienced medical educationalists (BJ and AP). BJ and AP were in the process of developing an LIC at the University of Sheffield medical school.

Results

The four studied UK LIC programmes took place at Keele [15], Dundee [16], Imperial [17] and Hull York Medical Schools [18] and varied in the design of both their curriculum and evaluation as summarised in [Tables 2 and 3](#).

Thematic analysis

All of the papers presented results from the students' perspectives and two of the four also presented GP and regional small-group tutors views. Key themes are presented for each group.

Student themes

Five themes for the students' perspectives are summarised in [Table 4](#).

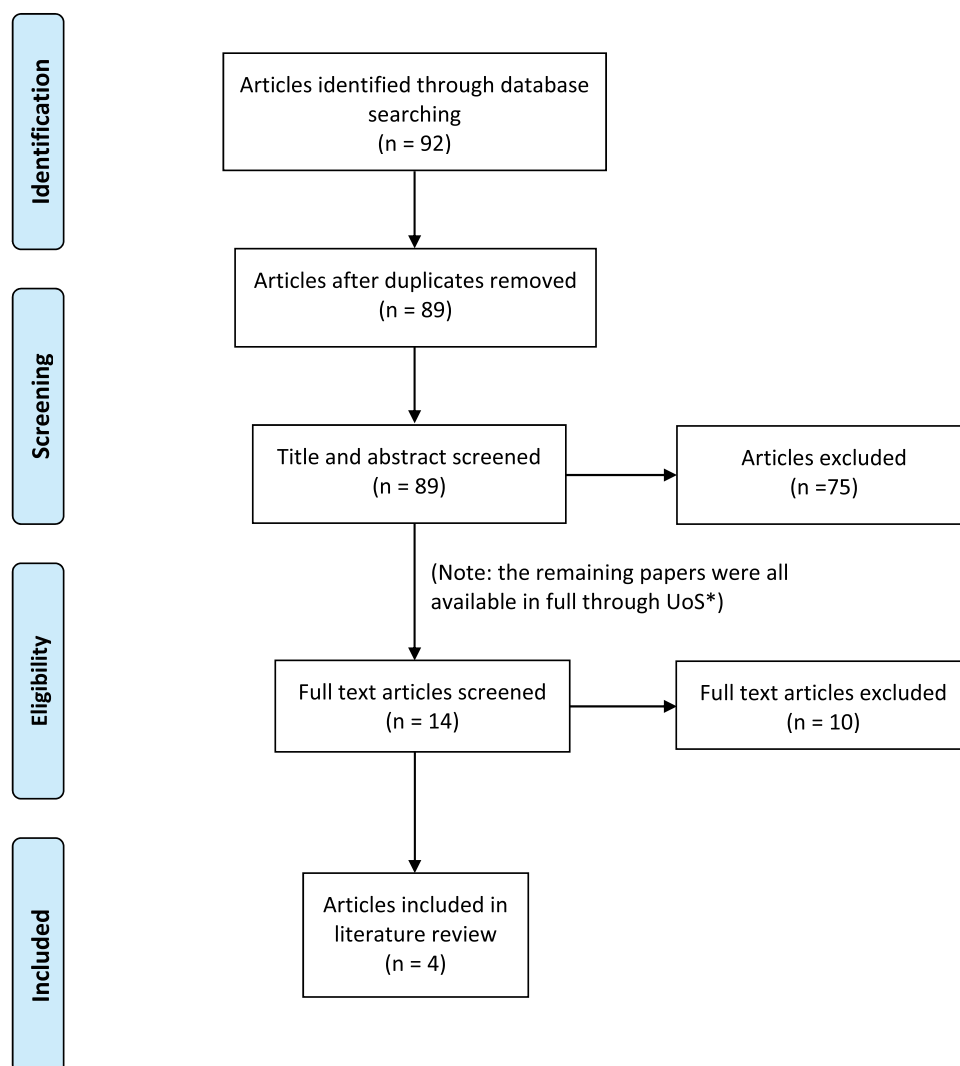


Figure 1. PRISMA flow diagram

Table 1. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
(1) Articles evaluating the outcomes of longitudinal integrated clerkships completed in the UK	(1) Non-English articles (2) No full text available through the University of Sheffield library (3) Articles reviewing longitudinal integrated placement which have taken place outside of the UK

Student theme 1: continuity

Appreciation of relational continuity by students was identified as a major theme with three dominant sub-themes [16–18]. These were continuity of the student-mentor relationships, of the student-patient relationships, and with the practice or community as a whole. Students reported finding great value in the consistent mentorship and educational supervision [16,17]. They also reported that the continuity of relationship with

patients developed an enhanced trust and valuable learning opportunities [15,17]. In one paper students also reported an important symbiotic relationship between students and patients that yielded benefits for both parties [17]. In two studies students described how they felt they became an integral part of the community and/or practice team [15,17].

Student theme 2: responsibility and purpose

Students described an increased sense of responsibility and purpose to their role [15–17]. This increased responsibility of taking ownership in patient care increased their confidence and helped them to feel like they were ‘already a doctor’ [15]. Others described finding greater meaning and purpose when helping patients navigate the healthcare system [17]. Students also expressed that they felt that they were making a useful contribution to patient care [16].

Table 2. LIC curriculum design outline.

	Curriculum Design		
	Student demographic	Selection process	Course design
Keele [15]	<ul style="list-style-type: none"> 10 fifth year students 5-year degree programme 	<ul style="list-style-type: none"> 10 students randomly allocated from whole cohort 	<ul style="list-style-type: none"> 15 weeks Rural general practice assistantship
Dundee [16]	<ul style="list-style-type: none"> 7 fourth year students 5-year degree programme 	<ul style="list-style-type: none"> Student voluntary application Recruitment target of 10 students 30 students expressed initial interest 7 students joined the cohort 	<ul style="list-style-type: none"> 40 weeks Rural general practice placement
Imperial [17]	<ul style="list-style-type: none"> 24 fifth year students 6-year degree programme 	<ul style="list-style-type: none"> 66 applicants 24 randomly selected from the pool of applicants 	<ul style="list-style-type: none"> One academic year Once weekly sessions in GP
Hull York [18]	<ul style="list-style-type: none"> 6 fourth year students 5-year degree programme 	<ul style="list-style-type: none"> 6 students voluntarily applied 	<ul style="list-style-type: none"> Full academic year (41 weeks of placement – only 32 weeks completed due to COVID-19 disruptions) Primarily in GP setting

Table 3. Evaluation design.

	Evaluation	
	Data Collection	Participants
Keele [15]	<ul style="list-style-type: none"> Invited to participate in three focus groups at week 0,7 and 15 	<ul style="list-style-type: none"> All 10 students attended the first focus group 5 attended the second focus group 8 attended the third focus group
Dundee [16]	<ul style="list-style-type: none"> Focus groups Individual semi-structured interviews Reflective audio-diaries 	<ul style="list-style-type: none"> All 7 students 21 GP tutors participated (100% representation of all participating practices) 2 regional tutors 2 Directors of medical education 5 University of Dundee faculty
Imperial [17]	<ul style="list-style-type: none"> Focus groups with independent researchers 60-minute sessions 	<ul style="list-style-type: none"> All 24 completed the year and were invited to provide feedback 17 students participated in the focus groups
Hull York [18]	<ul style="list-style-type: none"> Two focus groups – one held face to face and another via video GP tutors were invited to complete Google forms survey Faculty involved in implementing the LIC were also invited to take part in semi-structured interviews 	<ul style="list-style-type: none"> All 6 students attended focus group 1, and 5 attended focus group 2 8 out of 18 GP tutors responded (44%) 16 faculty members took part in the semi-structured interviews

Table 4. Student perspective of LIC programme.

Student Perspectives	
Key Themes	Subthemes
(1) Continuity	<ul style="list-style-type: none"> a. Mentor relationship/educational supervision over time b. Symbiotic student/patient relationship c. Part of a team/community d. Enhanced trust with continuity
(1) Responsibility and Purpose	<ul style="list-style-type: none"> a. Increased responsibility seeing patients leading to greater confidence b. Value and worth in roles c. Feeling like a doctor d. Making a useful contribution to patient care
(1) Patient-centredness	<ul style="list-style-type: none"> a. Patient viewed in a wider context including family and cultural environment b. Opportunity to see the whole story c. Benefits of the big picture over a snapshot of the disease process d. Immersion in patient-centred care e. Recognising the multi-domains and facets of the journey through the healthcare system
(1) Professional Development	<ul style="list-style-type: none"> a. Dealing with uncertainty b. Vast patient exposure c. Navigating own professional development d. Prioritisation/preparedness and increased confidence e. Adult learning opportunities
(1) Student Anxieties	<ul style="list-style-type: none"> a. Preparation for assessment b. Novelty of curriculum design c. Lack of integration with secondary care d. Isolation

Student theme 3: patient-centredness

Students reported the LIC programme afforded them the opportunity to develop a patient-centred focus [16,17]. Students identified being able to appreciate the ‘whole picture’ when seeing patients rather than just a snapshot of their disease, becoming immersed in patient-centred care [17]. Students also described that they were able to consider the wider context including a patient’s community and cultural environment [16].

Student theme 4: professional development

There was evidence to suggest that the LIC programmes provided opportunities to develop students’ adult learning skills [17,18]. Though students described initially finding it challenging to move towards a self-directed style of learning, they were able to adapt to this new way of learning [18]. Students described how such opportunities to direct their own learning increased their sense of independence and autonomy [17].

Students described developing professional skills which would prepare them for life as a junior doctor. For example, managing their timetable, patient lists, prioritising tasks and dealing with more uncertainty [17,18].

Student theme 5: student anxieties

Students raised concerns that LIC programmes did not prepare them well for summative exams [17,18]. Specifically, students reported that the style of learning in the LIC programme did not match the format of the assessments and expressed concerns that the nature of their clinical experience would lead them to fail summative assessments [18].

Other factors that caused student anxiety were the newness of the LIC curriculum and concern regarding general practice as a location for a full academic year [16]. However, difficulties were also identified on secondary care placements due to a lack of awareness and understanding of the LIC programme by supervisors [17,18].

When the LIC programme was based in a rural setting students expressed feelings of isolation and injustice [15,16]. A feeling of separation from facilities for learning (teaching hospitals and simulation equipment) was felt along with a sense of missing out on ad hoc teaching sessions their peers on standard programmes might be receiving [14]. Students in rural settings also experienced difficulties being away from their social networks and struggled with variable internet connectivity [16].

These initial anxieties reduced after a period of adjustment. One paper described a 'J-shaped learning curve' depicting an initial period of difficulty in adaptation, after which students flourished [18].

GP tutor themes

Four main themes were identified amongst the GP tutors and wider faculty as outlined below and further described in Table 5.

Tutor theme 1: continuity of mentorship

GP tutors valued maintaining a consistent mentor relationship with students and found enjoyment in watching the students develop [16,18]. They also described benefiting from their interactions with students who provided a source of learning, refreshing both their clinical knowledge and their understanding of up-to-date secondary care practices as students shared experiences [16].

Tutor theme 2: outcomes for students

GP tutors perceived that students struggled with assimilation into the new learning style at the beginning of their placement but recognised that after this period of difficulty, their outlooks improved. They perceived

Table 5. GP tutor and faculty perspectives.

GP Tutors and Faculty Perspectives	
Key Themes	Subthemes
(1) Continuity of mentorship	a. Enjoyment in seeing students' development over time b. Learning from students c. Bringing stories back from secondary care as a source of learning for staff
(2) Outcomes for students	a. Perceived student benefit b. Initial learning disorientation for students c. Improved sense of belonging and empathy in students' outlooks d. Initial period of difficulty and temptation to return to the familiar block model
(3) Outcomes for patients	a. Patients valued LIC students
(4) Faculty anxieties	a. Increased workload in already time pressured environment b. Managing relationship boundaries with students c. Period of adjustment required

students developed an increased sense of belonging and demonstrated more empathy in interactions with patients than they were used to seeing [18]. One study looked at academic performance and found that all seven students passed their written assessments, and one student failed the clinical examination and was required to re-sit the year [16]. All that progressed into the next year passed their final examinations [16].

Tutor theme 3: perceived outcomes for patients

GP tutors identified potential positive outcomes for patients perceiving patients valued their relationships with the LIC students, and that some thought they 'got a better deal' when students were involved in their care [16].

Tutor theme 4: tutor anxieties

Some GP tutors described the extra responsibility of teaching to be a burden and an increased anxiety from the extra workload of teaching in an already time-pressured environment [16]. In one LIC, central faculty also struggled with helping the students to complete assessments in primary care with difficulty adjusting the standard assessment to the LIC programme [18]. Some GP tutors also struggled with establishing boundaries in this new style of student relationship, expressing a temptation to 'befriend' students [16].

Summary of findings

This review identified four LIC programmes completed in the UK that have published an evaluation of their programme. This early review of the UK literature suggests that benefits described in the international literature are being seen in the UK context [4]. Students who

experienced LIC programmes highlighted value in the continuity of mentorship and consistency of patient relationships, as well as an increased sense of responsibility and purpose. Students also described an evolution towards a greater focus on patient-centred care and tutors described them demonstrating increased empathy with patients as well as other areas of professional development. However, these benefits did not come without challenges also identified outside the UK [5]. Students reported apprehension over the newness of the curriculum design and anxiety related to preparedness for examinations. GP tutors and medical school faculty also described value in the continuity of the student-mentor relationship and perceived positive outcomes for both students and patients. However, GP tutors also expressed additional anxiety (related to the burden that came with teaching and mentoring the students) and some described difficulties maintaining professional boundaries. Some faculty members described initial apprehensions were relieved after a period of adjustment to the new educational method.

Discussion

Student selection

Three of the four LIC programmes recruited students on a voluntary basis. This limits the generalisability of these results to those involving whole year groups as they will be affected by selection bias. It is highly likely that students who self-selected for a pilot LIC programme may have greater self-motivation, prefer an adult learning style or be more inclined towards a career in GP and are therefore not representative of the wider undergraduate population.

Conversely, it is possible that students who did not volunteer recognise that this type of programme would not suit their preferred learning approach or lack the motivation to adapt to an adult learning style. This selection bias might exaggerate the generalisable advantages LIC programmes can offer to UK medical education as a whole. We have already argued that the international data predominantly focus on postgraduate students who may well have developed greater adult learning skills, and this may not be true of a UK undergraduate population. If research remains focused on the results of self-selected cohorts, who likely share characteristics with this international pool, the potential of LICs for the wider undergraduate population will never be established. Could future programmes seek to better understand the learning behaviours of those recruited, or even randomly allocate students, with

consent, to their programmes once they are established? Such quasi-experimental studies of UK LICs could offer some light here.

Some LIC programmes appeared to have difficulty recruiting students. Dundee's LIC programme aimed to recruit 10 students; despite 30 students registering an interest, only seven went on to be part of the LIC [16]. Similarly, in the LIC completed at Hull York Medical School only six students from the cohort voluntarily applied for the programme [18]. There has been speculation around the reasons for this hesitancy in student's engagement with LIC programmes [12]. We might speculate they are simply concerned about the novelty of the LIC programmes, but there may be hidden factors to which medical educators are blind, related to LIC programmes being less suitable for an undergraduate population. Further research into why students are not volunteering for LIC programmes is required.

Outcomes for students

Only one study looked at students' academic outcomes, though the number of students was too small to extrapolate any reliable data from their assessment results or comparison with the students on the standard programme [16]. This clearly needs exploration if LICs are further developed in the UK to establish the true academic outcomes of participating students. Perhaps this narrative has not been examined as a driving force in the creation of LIC programmes was an increased focus on non-technical skills. However, we clearly need the data to reassure all stakeholders (including students) that there are at least equivalent academic outcomes to those following the tradition curriculum.

Finally, all studies gathered their data from students and faculty who directly participated in a LIC programme. None of the studies compared these findings to a control group of those on the standard curriculum. This means we are unable to conclude that the positive outcomes described in these studies are directly attributable to the LIC programmes themselves. For example, all of these programmes were completed in the later years of the undergraduate programme and it is possible that students may have developed skills such as patient-centredness and adult-learning styles as they naturally progressed throughout the course. Future research into UK LICs should, as has been reported internationally, aim to directly compare the observed outcomes of students on the LIC programme with students on the traditional programme in the same academic year.

Table 6. Recommendations for future research.

Recommendation for Future Research	
Selection process	(1) Students should be randomly assigned to LIC vs TBR programmes. (2) Wider selection of stakeholders included in the review of outcomes such as patients.
Data Analysis	(1) Analysis of students' reasons for non-participation. (2) Longitudinal follow-up of students' perspectives and career intentions. (3) Explore students' academic attainment in all methods of assessment. (4) All outcomes should be compared to a non-LIC programme control group matched for the same academic year.

Career intentions

It was also noted that none of the studies explored the effect of the LIC programme on students' career aspirations. If one driver for LIC programmes in the UK is to develop the attraction of a career in general practice, this should be addressed in future work. This has recently been explored outside of the UK on graduate-entry students, where an association was found between participation in the LIC programme and engagement with a career in general practice [19]. This type of longitudinal follow-up of UK students may give a better understanding of the effect of LICs on future careers as well as assessing how the students' perspectives on the learning gained from LIC programmes evolve over time.

Wider stakeholders

All of the papers focused on the outcomes of the students and GP tutors with no consideration of the wider stakeholders. There are obviously other important stakeholders involved in a student's medical education. Arguably the most important of these is patients. Work overseas has demonstrated that patients favour LIC programmes, and this too needs further exploration in the UK context [20,21].

Future research and evaluation

This paper identifies a number of gaps in the published evaluations on UK LIC programmes. Therefore, several recommendations for the evaluation of future programmes have been generated below. A summary of these recommendations is seen in Table 6.

Conclusion

Early data suggest LIC programmes seem to be offering similar educational benefits to UK medical students as found elsewhere in the world. However, this review has highlighted gaps in evaluation and

research data from UK LICs. The UK is at the beginning of its LIC journey, with many UK medical schools planning to integrate LIC programmes into their curricula. Such re-structuring is time-consuming and requires significant resources. As these developments emerge, further research and evaluation into UK LICs is imperative to better understand how to fully realise the benefits of LIC programmes seen internationally within a UK context. Despite the limited literature published, this review provides some useful suggestions on where educational research on UK LICs might further complete the picture.

Limitations of this review

A narrative review is naturally exposed to the subjective interpretation of the authors. In order to minimise this effect, two separate authors (ER and LE) completed the review and established the common themes separately before discussing these together to derive the final categorisation.

This review also suffers from the current lack of published formal evaluations of UK LIC programmes in the medical education literature. A more extensive search, involving grey literature and additional hand searching would have mitigated this. As LIC programmes are still relatively novel within UK medical schools, more evidence about the outcomes of UK LIC programmes will naturally emerge and develop with time. A further broader review of UK LICs will be useful as more data emerge.

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