



University of Dundee

Dundee's Longitudinal Integrated Clerkship

Bartlett, Margaret; Dowell, Johnathan; Graham, Fiona ; Knight, Kara; Law, Susan; Lockwood, Penny

Published in:
Education for Primary Care

DOI:
[10.1080/14739879.2018.1564889](https://doi.org/10.1080/14739879.2018.1564889)

Publication date:
2019

Document Version
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

Bartlett, M., Dowell, J., Graham, F., Knight, K., Law, S., Lockwood, P., Muir, F., Robson, J., & Watson, E. (2019). Dundee's Longitudinal Integrated Clerkship: drivers, implementation and early evaluation. *Education for Primary Care*, 30(2), 72-79. <https://doi.org/10.1080/14739879.2018.1564889>

General rights

Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from Discovery Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Dundee's Longitudinal Integrated Clerkship: drivers, process and evaluation

Authors

Maggie Bartlett (corresponding author)

University of Dundee School of Medicine

{ HYPERLINK "mailto:m.bartlett@dundee.ac.uk" }

Jon Dowell

University of Dundee School of Medicine

{ HYPERLINK "mailto:j.s.dowell@dundee.ac.uk" }

Fiona Graham

NHS Dumfries & Galloway

{ HYPERLINK "mailto:fionagraham2@nhs.net" }

Kara Knight

University of Dundee School of Medicine

{ HYPERLINK "mailto:k.a.knight@dundee.ac.uk" }

Susan Law

University of Dundee School of Medicine

{ HYPERLINK "mailto:Susan.law@shearer-law.co.uk" }

Penny Lockwood

University of Dundee School of Medicine

{ HYPERLINK "mailto:p.lockwood@nhs.net" }

Fiona Muir

University of Dundee School of Medicine

{ HYPERLINK "mailto:f.e.muir@dundee.ac.uk" }

Jean Robson

NHS Dumfries & Galloway

{ HYPERLINK "mailto:Jrobson1957@sky.com" }

Emma Watson

NHS Highland

{ HYPERLINK "mailto:emmawatson@nhs.net" }

Abstract (200 words)

Introduction

Dundee University School of Medicine established a pilot for a 40 week long comprehensive Longitudinal Integrated Clerkship (LIC) in 2016.

Ten places for year 4 students are available which are shared between two regions of Scotland which are largely rural areas by UK definitions.

This paper describes the drivers for the pilot, its implementation and early evaluation.

Method

For the evaluation, data were collected using focus groups and semi-structured interviews from the first cohort of seven students, four health service employed staff (two with leadership roles and two with regional student facing roles) and 21 General Practitioner tutors, and from reflective audio-diaries kept by all students. Analysis was thematic, the themes being identified from the data. Summative assessment data were collated.

Results

Students reported positive learning experiences though access to secondary care learning linked to their patients was sometimes problematic. GP tutors were positive and enthusiastic about the programme and could see the potential benefits on recruitment to GP careers. Pre-existing workload pressures were a challenge. Summative assessment results were encouraging.

Conclusion

The Dundee LIC is successful in delivering Dundee's year 4 curriculum. Ongoing development has been focused on improving awareness of the programme in secondary care services.

Keywords

Longitudinal Integrated Clerkships

Undergraduate Medical Education

General Practice

Article

Word count 3508

Introduction

Longitudinal Integrated Clerkships (LICs) are a model of undergraduate clinical education which originated some 50 years ago in countries with widely dispersed populations and medical workforce shortages [1]. Supporting medical students to learn by contributing to the care of patients and living in their communities was predicted to encourage their return to these underserved areas after graduation. International literature increasingly demonstrates positive outcomes for medical students, teaching clinicians, patients and recruitment to community careers [2-6].

In this model of clinical education, students meet the core competencies of a curriculum across multiple disciplines simultaneously [7] by identifying their learning needs arising from their encounters with patients. A key principle is continuity; both of students' involvement with the care of patients over time and their educational relationships with those patients' clinicians [8,9]. In some models, the students' clinical base is in primary care while in others they are based in secondary or tertiary centres, but what is common to all is the departure from the block rotations used in many curricula and the integration of learning as a result of the focus being on the patient rather than clinical specialties.

Since 2000, the number of LICs worldwide has increased dramatically [1]. Though the majority are located in North America and Australia, they are starting to make more of an appearance in Europe, with many UK medical schools introducing variants of them or designing placements underpinned by LIC principles [10].

In 2016, Dundee School of Medicine, with the support of two Scottish Health Boards and the education and training body for the National Health Service in Scotland (NHS Education for Scotland or NES), introduced a pilot of a comprehensive LIC as described by Worley et al [1]; its duration is an entire academic year, all disciplines are covered and it is in the penultimate year of the MBChB programme.

This paper describes the drivers, the establishment of the Dundee LIC and its early evaluation.

Background/context

Dundee School of Medicine is located in the north east of Scotland. Its annual cohort size on entry to the undergraduate programme is around 160, 20% of whom are graduates. Around 70% of students come from Scotland.

Scotland has a land area of 78,000 km² and a population of 5.4 million, around 25% of whom live in settlements of fewer than 10,000 people and 9% in settlements of fewer than 500. Population density varies from 6.4 to 2809 people per km² [11].

The Drivers

There were three main drivers for establishing the Dundee LIC;

1. Medical workforce shortages in Scotland (see Table 1). Though workforce shortages apply across all specialties, they are particularly marked in general practice and even more so in rural and remote areas, and LICs are known to improve recruitment to community based careers [2,5].
2. Dundee faculty and Health Board leaders were convinced by the evidence regarding the educational benefits of LICs.
3. Dundee faculty believed that general practice was an under-used resource for undergraduate medical education.

[table 1 here]

The process of establishing the LIC

A small-cohort LIC pilot was approved by Dundee's Undergraduate Medical Education Committee in 2015 (up to ten students). Two risks were identified; the potential inadequacies of IT infrastructure in parts of rural and remote Scotland and the implications and practicalities of moving funds (Additional Cost of Teaching monies -ACT) [15] to support teaching to the Health Boards in which the students would be placed. Discussions were held with NES resulting in their agreement to support the project financially during the transition to ACT funding.

Discussions were held with the Directors of Medical Education in two Health Boards with particular rural recruitment problems; NHS Highland and NHS Dumfries & Galloway (which serve populations of 320,000 [16] and 150,800 of which the accessible rural populations are 9.5% and 24.1% and the remote rural populations are 41.8% and 22.8% respectively)[17].

It was agreed that the ACT monies linked to the students would be used to support teaching within the Health Boards' services, with flexibility to develop an organisational model that worked in their own circumstances. This was considered to be important for feasibility and sustainability.

An information giving session was held for third year students. Those interested were asked to submit a personal statement describing their reasons for wanting to do the LIC followed by individual meetings with faculty which were focused on the students' self-directedness. Poor previous academic performance was not a reason for exclusion; continuity of supervision and one-to-one teaching relationships were seen as potentially beneficial in these circumstances. 30 students came forward, however, due to changes in personal circumstances and decisions to take intercalated degrees, the initial cohort was of seven students in the academic year 2016-7. Of these, five opted to be placed in NHS Highland and two in NHS Dumfries & Galloway.

Practices were recruited by the Health Boards' Directors of Medical Education and Medical School faculty visited to support the educational development of the GP tutors as clinical supervisors.

Regional tutors were appointed by the Health Boards in discussion with faculty. The role of these individuals was threefold; to liaise with the local secondary care clinicians, to support the teaching practices, and to function as educational supervisors. Their posts were funded by the Health Boards with some support from ACT funds [15] held by the Medical School.

Structure and Practicalities

The students are based in a general practice, with a named clinical supervisor, for 40 weeks.

Students spend approximately 60% of the week working alongside and with the support of practice staff, having an active role in the provision of health care. They are expected to behave as an employee would; arriving on time, engaging with other team members and negotiating their annual leave (rather than having fixed university vacations). The majority of their time is spent in supervised consulting with an expectation that they will consult with a minimum of 72 patients per month.

40% of the week is un-timetabled; students choose what they do in response to the learning needs they have identified when seeing their patients. With the support of their Regional Tutor, students arrange to go to hospital clinics, acute admissions services, operating theatre sessions, community clinics run by other health care professionals and visiting patients at home. Ideally, they follow the patients they have seen in general practice into these services so that they can maintain continuity of care, though the constraints of the NHS, geography and other commitments have sometimes impacted negatively on this.

Planned teaching addresses topics such as radiology, fluid balance, safeguarding and ethics, and students have the option of joining tutorials held in their regions for students from other Scottish medical schools. The Regional Tutors facilitate bespoke tutorials in response to the students' self-identified learning needs.

Assessments

Because the LIC students must meet the same curricular outcomes as all other Dundee year 4 students, the assessments were initially directly imported from the existing curriculum, with the exception of an academic project which was required to involve a health improvement activity in the practices (rather than a free choice of topic as in the standard year 4) and the addition of a specific community engagement project. They were required to submit a variety of pieces of written work or include them in their portfolios to be reviewed during appraisal meetings with their faculty supervisor.

For the academic year 2018-9, the amount of written work for the LIC students has been reduced and better aligned with the LIC principles (see Table 2)

[table 2 here]

Travel and accommodation

The Health Boards provided support in the first two years of the pilot; students did not pay for their accommodation and travel within the regions was subsidized. The University provided free accommodation while the students were in Dundee for assessments and funded a monthly return journey for social reasons.

In discussion with the Health Boards, it was decided that funding accommodation was unsustainable and inequitable, and therefore, from 2018-9, students are expected to pay the first £200/month of their accommodation costs. Where students are expected to live in areas with high levels of tourism in which it is not possible to find accommodation for this price, students are subsidized from ACT monies [15] administered by the Health Boards.

Costs

Table 3 shows the costs of the LIC in the first year of the pilot. These costs reduced in the following year and will reduce further with economies of scale.

[table 3 here]

Evaluation

The initial evaluation was designed by Dundee faculty in collaboration with the University of the Highlands and Islands (UHI). The evaluation was supported by a joint grant of £5000 from the Association for the Study of Medical Education and the General Medical Council.

Approval was granted by Dundee's Research Ethics Committee on 13 May 2016 (reference 16060) for student focus groups, individual semi-structured interviews, recording and transcription of students' audio diaries, interviews with practice staff and faculty and consideration of students' summative assessment outcomes.

Interviews were conducted by a post-doctoral researcher associated with the University of the Highlands and Islands who was not involved with the programme in any other way.

Analysis of the qualitative data was thematic. The data were independently analysed by two people.

[table 4 here]

Summary of findings from the formal evaluation of the first cohort

a) The students

Factors which drew the students to the LIC were the opportunities to direct their own learning and to spend time in a different region of Scotland. Factors which caused them anxiety were the newness of the educational method, being away from social networks and doubts about general practice as a location for teaching for a whole academic year.

Students reported feeling engaged with the communities in which they worked.

They valued

- the continuity of educational supervision
- being welcomed into the practices by staff, all of whom they perceived to be invested in their learning
- feeling part of the practice team with a useful contribution to make to patient care, though they recognized the responsibility this placed on them
- the opportunity to '*see the whole story, the whole big picture of a patient, of a community and of healthcare*'

The breadth of their experience and the opportunities for learning in general practice was a surprise to most of them.

For one student, being able to see himself and an 'agent of change' was a transformative experience [18].

Challenges were being away from social networks, variable internet connectivity, navigating access to and participation in secondary care services and logistical problems linked to the length of waiting times for non-urgent care. Some of the students expressed concern about going back into the more traditional programme in year 5, in that they perceived they would have less autonomy than they were used to and less involvement in clinical decision making.

There were some inevitable teething troubles related to administrative matters and lack of awareness of the LIC within the local medical communities, illustrated by the quote in figure 1.

[figure 1 here]

b) The GP tutors

The tutors were enthusiastic about the LIC and its potential as an effective model of clinical education as well as having benefits on recruitment to GP careers. This was a very significant driver for some and overrode their concerns about managing the workload of teaching.

...in spite of sort of hitting us at a time when we've probably never been busier...it's desperation cos there's no GPs in the area

They expressed enjoyment in seeing the development of the students over time and took pleasure from things going well for them. One described the learning relationships as '*more mentoring than teaching*' which may reflect the students' self-directedness. Another described the student as '*an asset to us*' and the LIC as being '*worth its weight in gold*'.

Many GP tutors talked about learning from the students as their knowledge was perceived to be more up to date in many areas and one described the student '*bringing stories back to the practice*' about their patient's experiences in secondary care which was a source of learning for the practice staff.

The GP tutors found that there was a lot to do in the early part of the year but that things settled with time.

Challenges which the tutors identified were

- the burden of responsibility arising from having the students in the practices for a whole year
- the need to 'grade exposure' in order to prevent the students being overwhelmed by the volume and complexity of the clinical experience
- managing relationship boundaries (the temptation to 'mother' or 'befriend' the students)
- time for teaching in an already pressured environment
- knowledge and understanding of the LIC , especially as it was new and rapidly evolving
- navigating a complex website to upload assessment reports
- not enough locally placed support
- early delays in funding reaching them

GP tutors reported that the patients valued the LIC students and some perceived that they 'got a better deal' when the students were involved in their care.

c) Health Board staff

The Directors of Medical Education were very supportive of the LIC principles and enthusiastic about hosting the students in their regions. Both were convinced of the potential impacts on recruitment to both GP and hospital based careers in remoter areas, but also the educational value.

They were concerned about capacity for teaching both in the practices and the hospitals and identified risks in asking clinicians to take on more.

...whilst they have really entered into the DLIC with great enthusiasm and real commitment, when I speak to the team out there about increasing numbers...people just go into the shell of "please don't make me do more".

The DMEs perceived their role as recruiting practices to host the LIC and facilitating the involvement of secondary care clinicians. For one, this facilitation had an added benefit of 'building bridges and links' between primary and secondary care which had 'been eroded over the years' because of changes in referral and communication processes, and that the work had restored a sense of 'a common goal'.

One commented on the need to do careful ground work with secondary care;

...I wish I'd more quickly got on to making sure that they had one contact for each specialty so they weren't getting knock backs by just contacting somebody cold...if we were starting again I would make sure that we raised the profile more of the whole programme...having that list of contacts that have all personally been tapped on the shoulder...is really key to [students] following their patients in and getting the secondary care experience.

This DME emphasised the value of being known in the local community in order to facilitate the LIC and identified the need for the recruitment of a secondary care champion.

d) Regional tutors

The regional tutors saw themselves as educational supervisors for the students, keeping an overview of their progress and guiding them to make sure they had an adequate breadth of experience. They described having a liaison role between students and secondary care services. They emphasized the need to support students in their self-directedness and to trust the students to use their time wisely.

The Regional Tutors commented that the students gained a lot from the expectation that they had a job to do, the support they gained from the continuity of working alongside practice staff for the whole year and having to identify their own learning needs and opportunities.

The Regional Tutors saw a value in being known in the local medical communities.

The principal challenges for the Regional Tutors were around the students' access to secondary care services because of the presence of other students in the clinical environments and clinicians' lack of awareness of the LIC.

Summative Assessment Results

All seven students passed the written knowledge test. One student did not pass the clinical examination and was required to re-sit year 4. All students who progressed to year 5 passed their final clinical examinations. We considered the numbers to be too small to draw any conclusions about the effects of the LIC on students' performance trajectories either as individuals or in comparison with their peers.

Evolution

The LIC continues to evolve in response to experience and feedback from students and tutors. For the academic year 2018-9, four main changes were made:

1. The Intended Learning Outcomes were reviewed and revised to align them better with the LIC principles as shown in Table 5
2. The assessments were revised as shown in Table 2.
3. New guidance regarding 'key patients' whose care should be followed up over time was included. This is analogous to the 'patient panels' described by Ogur et al [19] in the Harvard LIC model.
4. Improving students' experience of continuity of care within acute episodes of illness by providing formal 24-36 hour 'bursts' [19] in secondary care in which students work alongside medical and surgical teams managing acute admissions.

[table 5 here]

Discussion

We have described the drivers for and the process of establishing Dundee's LIC and our evaluation of its first year.

The groups of stakeholders generally report positive experiences and remain committed to it as an educational strategy for clinical students. Early challenges of workload for the GP tutors in the first few months and students' access to secondary care services are settling with time.

Students have reported that they feel engaged with their communities, useful in their practices and have successfully involved themselves in the care of their patients over time. These outcomes are aligned with those found in other LICs [2].

We have encountered similar problems to those described by others who have set up LICs [20-22], however, the length of waiting times for out-patient clinic appointments and planned investigations, procedures and follow up in the UK National Health Service [23] has had an impact; students have sometimes lost touch with their patients or the immediacy of their associated learning needs. The students, with the support of their tutors, have been creative and imaginative in dealing with this problem by going to clinics at which patients like theirs are seen or identifying other patients from their practices with similar problems but who are further along their journeys and following them to clinic instead. They perceive that this meets their needs very well, but it is not fully aligned with the LIC principle of continuity.

A clear issue in the first year of the LIC was ease of access to secondary care services; this emphasized the need for continuity in building and maintaining relationships, raising awareness and communicating

widely in the medical communities. Having local support and known champions in secondary care were identified as important.

Where students have been able to follow their own patients they have reported wide ranging and valuable learning. For the student quoted in figure 1, who encountered resistance from hospital staff regarding seeing the patient, some of the learning was about navigating and negotiating difficulties (which are not always recognized by students as leading to useful learning [24]), and both this and the students' comments about the pressures and responsibilities of providing care demonstrate the need for effective support and de-briefing from supervisors.

Summative assessment data are encouraging but because numbers are small we are not yet in a position to draw credible conclusions such as those described elsewhere [2]. However, we have no reason at the time of writing to consider that students are disadvantaged. The student who did not pass the OSCE perceived that there had been benefits in undertaking the LIC that were not tested by the assessment and remained very positive about the experience, taking an active role in promoting it to subsequent cohorts of students.

For the future, we plan to build capacity to accommodate 65 students from 2020-21 involving two more Scottish Health Boards. This work is already under way and has arisen out of the establishment of a new Scottish graduate entry medical school (ScotGEM [25]) in autumn 2018. This is a joint endeavour between the Universities of Dundee and St Andrews which is focused on meeting the current and future workforce needs of Scotland by delivering graduates likely to choose rural, community and generalist careers. All 55 students will be placed in LICs for the third year of the four year programme and a further ten places will continue to be available for Dundee students.

The evaluation continues, and in 2018-9 we plan to seek the views of patients and secondary care clinicians who have worked with the students, and conduct follow up interviews with the original cohort to explore their perceptions about how well the LIC prepared them for post-graduate practice.

Strengths and Limitations

The strength of this evaluation is that it was based on interview, focus group and audio-diary data from the whole group of students in the first cohort of the LIC, and interviews with relevant stakeholders. The data was collected by a researcher independent of the programme and independently analysed by two people.

It concerns a single programme in a single medical school in one of the UK's devolved nations and in the context of the UK's National Health Service. We have reported on the evaluation findings relating to a single small cohort of students who were the first to experience Dundee's LIC in its pilot form. This limits the generalizability of the work. The evaluation does not include the views of patients, secondary clinical teachers or a longitudinal follow up of students' perceptions.

Conclusion

Dundee established its comprehensive LIC in response to workforce shortages in areas of Scotland with significant remote and rural populations. The process was complex and required effective liaison with a variety of other bodies. The evaluation of the first year showed that it was effective as a model of clinical education for year 4 medical students and led to rich learning, however it highlighted the need

for careful initial and ongoing communication with secondary care service providers. Dundee's LIC, which was based on successful international models, has had to adapt to the constraints of the UK National Health Service. The LIC continues to evolve and ongoing evaluation to include a wider range of stakeholders is needed.

References

- [1] Worley P, Couper I, Strasser R et al. on behalf of the CLIC Research Collaborative. A typology of longitudinal integrated clerkships. *Med Educ* 2016; 50(9): 922-932
- [2] Walters L, Greenhill J, Richards J et al. Outcomes of longitudinal integrated clinical placements for students, clinicians and society. *Med Educ.* 2012; 46:1028-1041
- [3] Hudson JN, Knight PJ, Weston KM. *BMC Fam Pract.* 2012. 13:72. [cited 2.10.18] { HYPERLINK "<https://bmcfampract.biomedcentral.com/articles/10.1186/1471-2296-13-72>" }
- [4] Ivory KD, Luscombe G, Kelin LA , Barratt A. "Thank you for giving me a voice!" a longitudinal evaluation of patients' experience of partnering with students in an Australian Medical School. *J Med Educ Curric Dev.* 2017: 4:1-9
- [5] Sullivan B, McGrail M, Russell D, Walker J, et al. Duration and setting of rural immersion during the medical degree relates to work outcomes. *Med Educ.* 2018; 52:803-815
- [6] Snow SC, Gong J, Adams JE. Faculty experience and engagement in a longitudinal integrated clerkship. *Medl Teach.* 2017; 39(5):527-534
- [7] Norris TE, Schaad DC, DeWitt D et al. Longitudinal Integrated Clerkships for medical students: An innovation adopted by medical schools in Australia, Canada, South Africa and the United States. *Acad Med.* 2009; 84 (7): 902-907
- [8] Hirsch D, Ogur B, Thibault G et al. New models of clinical clerkships: 'continuity' as an organising principle for clinical education reform. *N Engl J Med.* 2007; 356 (8):858-66
- [9] Walters L Brookes K. Integration, continuity and longitudinality: the 'what' that makes patient-centred learning in clinical clerkships. *Med Educ.* 2016; 50:889-895
- [10] Bartlett M, Muir F. A new model of undergraduate clinical education? *Br J Gen Pract.* 2018; 68:216-217
- [11] National Records of Scotland, mid-2016. 2018 [cited 2.10.18]; { HYPERLINK "<https://www.nrscotland.gov.uk/files//statistics/settlements-localities/set-loc-16/set-loc-2016-publication-updated.pdf>" } (accessed 2.10.2018)
- [12] National Health Service. Primary Care Workforce Survey Scotland. 2017 [cited 2.10.18]; Available at { HYPERLINK "<http://www.isdscotland.org/Health-Topics/General-Practice/Publications/2018-03-06/2018-03-06-PCWS2017-Summary.pdf>" } (accessed 2.10.2018)
- [13] National Health Service. NHS Scotland Workforce. 2018 [cited 2.10.18]; { HYPERLINK "<http://www.isdscotland.org/Health-Topics/Workforce/Publications/2018-06-05/2018-06-05-Workforce-Summary.pdf>" }

- [14] National Health Service. Medical Training Scotland. 2018 [cited 2.10.18]; { HYPERLINK "<http://www.scotmt.scot.nhs.uk/media/1377990/publication-july-2018-scotland-2018-scotland-2017-trends-recruitment-fill-rates-after-3-of-4-rounds-of-recruitment-.pdf>" } }
- [15] National Health Service. Scottish Report on Medical ACT. 2009 [cited 2.10.18]; { HYPERLINK "http://www.scotlanddeanery.nhs.scot/media/46872/scottish_report_on_medical_act_2009.pdf" } }
- [16] National Health Service Highland website 2018 [cited 2.10.28]; { HYPERLINK "<http://www.nhshighland.scot.nhs.uk/AboutUs/Pages/AboutUs.aspx>" } }
- [17] National Health Service Dumfries & Galloway website 2018 [cited 2.10.18]; { HYPERLINK "http://www.nhsdg.scot.nhs.uk/Resources/Health_Intelligence/Documents/The_Population_and_Its_Health_Jan_2014.pdf" } }
- [18] Mundell L. Being an agent of change: a student's view of the UK's first years long Longitudinal Integrated Clerkship. *Educ Prim Care*. 2018 [cited 3.10.2018].
<https://doi.org/10.1080/14739879.2018.1423643>
- [19] Ogur B, Hirsch D, Krupat E et al. The Harvard Medical School-Cambridge Integrated Clerkship: An Innovative Model of Clinical Education. *Acad Med*. 2007; 82: 397-404.
- [20] Ellaway R, Graves L, Berry S et al. Twelve tips for designing and running longitudinal integrated clerkships. *Med Teach*. 2013; 35:989-995
- [21] Heddle W, Robertson G, Mahoney S et al. Challenges in transformation of the "traditional block rotation" medical student clinical education into a longitudinal integrated clerkship model. *Educ Health*. 2014; 27:138-142
- [22] Poncelet A, Bokser S, Calton B et al. Development of a longitudinal integrated clerkship at an academic center. *Med Educ Online*. 2011; 16:5939-DOI:10.3402/meo.v16i0.5939
- [23] NHS Inform website 2018 [cited 2.10.18]; { HYPERLINK "<https://www.nhsinform.scot/care-support-and-rights/health-rights/access/waiting-times>" } }
- [24] Bartlett M, Rees E, McKinley R. Knowledge Leech to part of the team: students' learning in rural communities of practice. *Educ Prim Care*. 2018;29(1): 5-10
- [25] University of Dundee. 2018; [cited 2.10.18] { HYPERLINK "<https://www.dundee.ac.uk/study/ug/scotgem/>" } }

