

Enhancing employability through hospital placements for Biomedical Science students: A Case Study from the University of Essex, UK

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Abstract

Collaboration between Universities and hospitals has provided the National Health Service (NHS) with many excellent Biomedical Scientists through the placement year scheme. Here, we document the number of students joining the placement scheme and the number and type of hospital departments offering student placements over a 10-year period.

Prior to 2012, students were able to join fully-funded placements through the Higher Education Funding Council for England (HEFCE). Since then, there has been a fluctuation in numbers completing a placement year at the University of Essex, but the employability of these graduates remains consistently higher than our 3-year graduates. We demonstrate the positive impact of completing a placement year in an NHS hospital laboratory for students, and the contribution to university metrics in good degrees and graduate outcomes as well as the provision of much needed, qualified biomedical science staff to hospitals.

Keywords: undergraduate students, placements in hospitals, employability.

Introduction

The University of Essex has run an Institute of Biomedical Science (IBMS)-accredited BSc Biomedical Science for twenty years. The course reflects the diversity of modules taught in all Biomedical Science degrees accredited by the Institute of Biomedical Science (IBMS) such as Biochemistry, Medical Microbiology, Haematology and Blood Transfusion, Cellular

Pathology, Cancer and Genetics. These subjects are studied so that graduates will be equipped with a wide

breadth of knowledge in order to meet the IBMS accreditation standards (IBMS¹ 2022). Our graduates can work as HCPC registered Chartered Biomedical Scientists in many departments with different specialities in both NHS hospitals and private laboratories. (HCPC 2022, IBMS² 2022)

Before 2011, more students were interested in joining the placement scheme as they were funded by the Higher Education Funding Council for England (HEFCE). Each year, about 50% of students registered on the course

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requested to do the placement year, compared with 30% following the cessation of the funded placement, in 2012/13. Although not commissioned or funded by the NHS anymore, these placements still attract great interest from many students as they understand the employability benefits these placements provide (Hejmadi et al 2011).

A key driver for continued hospital engagement with student placements and their willingness to offer placement opportunities is to provide appropriate competency-based training for students in order to meet the demands of the sector and provide a new generation of qualified Biomedical Scientists. Each year, approximately 100 students are enrolled on our BSc Biomedical Science course in the School of Life Sciences at the University of Essex, and approximately 50% of them show interest in going on a placement.

Students who do a placement year can also build up their networks with scientists and practitioners. They attend conferences, notably the IBMS Congress and many other activities such as the multi-disciplinary team meetings, the Grand round meetings when consultants talk about interesting clinical cases, and delivering oral presentations to enhance their knowledge. The laboratory practical skills they learn during their placement year are essential to help them progress in their careers. Students can also improve their CVs and many of them are motivated to work for the NHS and help patients. Hospital departments have established programmes for training such as rotations in different departments, shadowing and discussing case studies with specialists and consultants, working on projects, meetings with their training officers etc. to attract motivated students to the profession. Golos and Tekuzener found that placement

students improve their personal and professional skills however, they can be less satisfied with the setting and supervision based on their expectations pre-placement (Golos and Tekuzener

2019). From the University perspective, we value the importance of these placements for both student employability and satisfaction metrics, so demand for hospital placements has increased, especially amongst universities in the same region, to have more students trained in local hospitals.

Our students spend a year in a hospital laboratory, interacting with and working alongside healthcare professionals, to develop the required skills and knowledge to work as a registered Biomedical Scientist. Graduates who undertook the placement year and successfully completed the IBMS registration portfolio can be appointed as a Band 5 biomedical scientist, in contrast to those students who did not complete the placement year and portfolio, who can only apply for Band 3 or 4 laboratory positions.

There is evidence to suggest that providing students with the opportunity to work in a hospital laboratory for a year enhances their confidence and improves their attitude to work, which in turn enhances their employability (Jones et al 2015; Hejmadi et al 2011).

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Finding enough places for all students is not an easy task. Applying our criteria (good academic achievement, good attendance record and a good attitude towards their studies) to select suitable students has proven to be difficult at some points, especially for those who are really interested in going on a placement. The risk of allowing weak students to go on placements may create a pool of unknowledgeable Biomedical Scientists, so academic ability (overall performance in year 1, their progress and self-motivation) is used, along with other criteria such as commitments towards their studies, meeting deadlines, professionalism etc. To safeguard the effectiveness of training and student development, regular monitoring of students on placement is important, to ensure that they are meeting the deadlines for completion of portfolio work during the placement year. The Institute of Biomedical Science (IBMS) has issued a Registration Portfolio for the award of the Certificate of Competence, which is required for registration with the Health and Care Professions Council (HCPC) as a Biomedical Scientist. This involves compiling a portfolio of evidence to demonstrate that they meet the HCPC Standards of Proficiency for Biomedical Scientists.

COVID-19 enforced a rapid change to ensure student safety whilst on placement, at the same time as managing the increased demand placed upon hospitals to deal with increased numbers of patients in their care. As an IBMS and HCPC accredited course, we had to follow their

rapidly changing guidelines, and to make sure that our students successfully completed their placements and were kept safe at work (HCPC 2023).

During the COVID-19 pandemic the demand for extra workers to help with sample testing dramatically increased (Binnicker 2020).

Most of the placements in hospitals are unpaid. Despite that, about 50% of students on our Biomedical Science course at the University of Essex would like to have this opportunity. It is not easy to find 50 places every year in hospital laboratories that have the IBMS training status. We try to find placements local to where students live to avoid renting separate accommodation, however this is not always possible. Some hospitals are facing staff cuts and therefore they don't always have enough experienced and suitably qualified Biomedical Scientists to train the new generation of staff, as well as to complete their own daily demanding tasks.

Another potential challenge when managing placements is the monitoring of students and dealing with their queries whilst on placement, therefore regular visits and continued contact with training officers and departments are essential for a good outcome. At Essex, we physically visit the students three times a year, however these had to become virtual appointments during the COVID-19 pandemic. The impact of the virtual meetings may be not as effective as the face-to-face ones, but it allowed for regular monitoring regardless.

For safety reasons, some students had to stay at home during the pandemic which had a negative impact on their progress especially in completing the IBMS registration portfolio. Instead, virtual meetings with their

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training officers were held to carry on working on the theoretical components of their registration portfolio. Meetings with hospitals were held to discuss the problems, and some students were granted extensions to finish their placement year.

This study is the first to examine the number of students trained in hospitals, the impact of removal of external funding on their numbers, the scientific disciplines offered, the effects of

placement on final year student performance and their employability at the School of Life Sciences University of Essex. Therefore, the aims of this paper are to a) determine the impact of placements on student outcomes, b) determine the impact of placements on employability

(graduate outcomes), and c) present the number of Essex graduates working as Biomedical Scientists in hospitals in our region.

Methods

To evaluate the impact of student placements in hospital laboratories on students' outcomes and graduate employability, we examined data on students' degree outcome and graduate employability from the School of Life Sciences at the University of Essex during the last ten years. We also considered the impact of the COVID-19 pandemic on their employability during 2020-2022, hereto referred by us as "peri-COVID-19" period. We have included a retrospective analysis on the

number of hospitals offering placements during the last 10 years. Outcome data for these cohorts were obtained from the School of Life Sciences Exam Boards and student careers department.

Figures were created in Microsoft Excel (2019). As a requirement for accreditation process, data were collected from the University marks database, and presented annually by the Biomedical Science team to the IBMS and the management committee. We include a student feedback survey and the IBMS analysis data on number of placement students across the UK. The employability data were collected by the careers department essential for the participation in the Times Good University Guide (TGUG) League Table. Regarding the graduates working as Biomedical Scientists, data were collected through a questionnaire circulated to hospitals and outcomes were collected by return including personal communication with the training leads in the Eastern region.

Results

A total of 265 students from the University of Essex were trained in hospital laboratories during the last 10 years (2013-2023; Figure 1). The highest number of students trained in a single year was 34 students in 2021/22 and the lowest number was 20 students in 2013/14. There has been a gradual upward trend in number of places during the last five years from 2018-2023. The number of placements offered under HEFCE funding

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in 2010-2011 was calculated as the highest (40 places) (data not shown). Unusually, there were more offers of placements than

there were students willing to go on placements in 2016/17 (28 places) and in 2017/18 (30 places).

The cessation of HEFCE funding had a negative impact on the final graduate degree outcomes and employability rate as well as the number of newly qualified students able to work as state registered Biomedical Scientists. As a response, we approached the University of Essex to help in resolving this problem, and two position papers were written to show the importance of placements as well as asking to partially fund the placement students. As a result, the University of Essex had agreed to pay each placement student £750 a year. Following that, the number of students interested in going on a placement year then increased, starting from 2018/19 as shown in Figure 1.

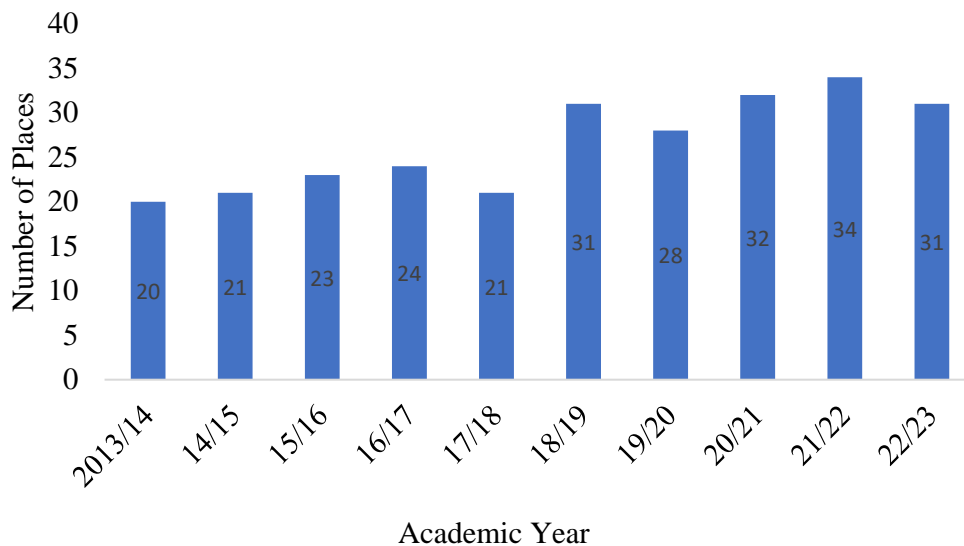


Figure 1: Number of placement students in hospital laboratories over the last 10 years (2013-2023) registered on BSc Biomedical Science at the University of Essex.

The increased number of placements correlates with the increased number of hospitals collaborating with the School of Life Sciences at the University of Essex. The highest number of different hospitals offering placements (18) was in year 2022-23 compared with the lowest number of hospitals offering placements (6) in 2013/14. This increase in number of hospitals

had a positive impact of providing more placements in the Eastern region and beyond (Figure 2 A and B).

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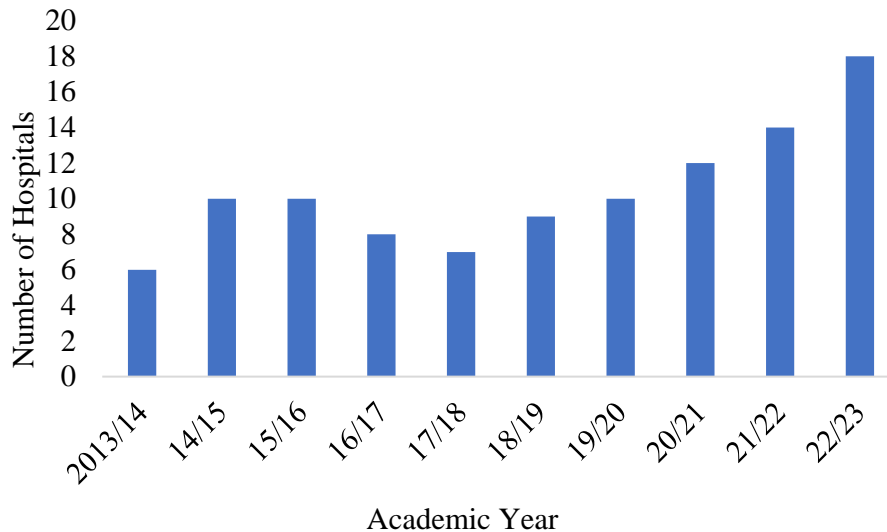


Figure 2 A: Number of collaborative hospitals providing student placements with the School of Life Sciences at the University of Essex 2013-2023.

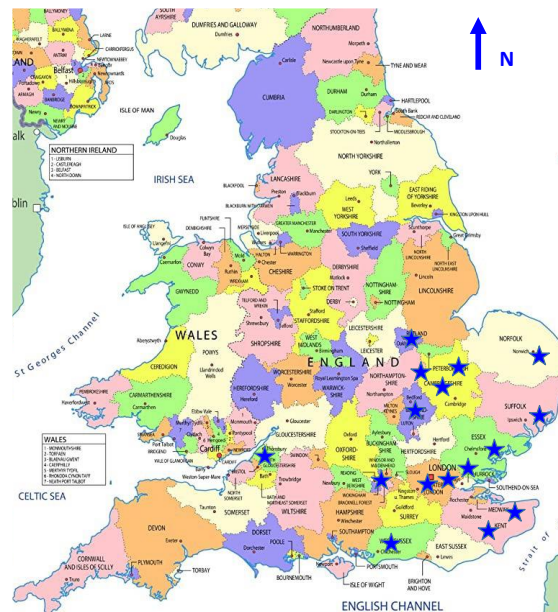


Figure 2 B: Locations of collaborative hospitals providing student placements with the School of Life Sciences at the University of Essex 2013-2023.

Figure 3 shows that the main four departments, Medical Microbiology, Cellular Pathology, Clinical Biochemistry and Haematology and Blood Transfusion have offered the highest number of places to our students, with Medical Microbiology offering the most placements

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with 61 places in the last ten years. There are also nine other departments offering student placements such as Neuropathology with the highest number of placements (14) between 2013-23 (Figure 3).

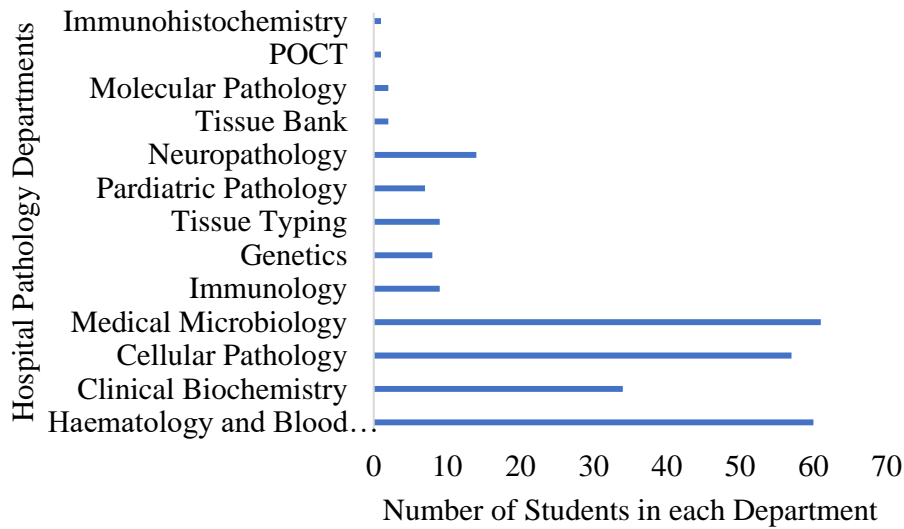


Figure 3: Number of offered placements for BSc Biomedical Science students from the University of Essex in different departments 2013-2023.

It is interesting to note that the grades of those students who have done placements are higher than students who did not do placements (Figure 4).

Figure 4 shows that the students who have completed the 4-year course (with a placement year) achieved a higher-class degree compared to students who have graduated from the 3-year course (no placement). In 2018/19, 77.3% of placement students got a 1st class degree compared to just 27.7% of students who completed the 3-year course. The rest of the placement students (22.7%) achieved a 2.1 class degree compared to 50.8% of the 3-year students (Figure 4). In 2019/20, the number of placement students with a 1st class degree was slightly lower (63.2%) however, the % was much higher compared to the 3-year student results (36.7%) (Figure 4). In 2020/21, the same picture was reflected with 69.2% of placement students achieving a 1st class degree compared to 28.9% of students on the 3-year course (Figure 4). In

2021/22, 78.1% of placement students achieved a 1st Class degree compared to 31.7% of non-placement students. It is worth noting that 100% of students who have been on a placement year achieved either a 1st or a 2:1 Class degree compared with 40% of the 3-year course students over the years 2018/19 – 2021/22.

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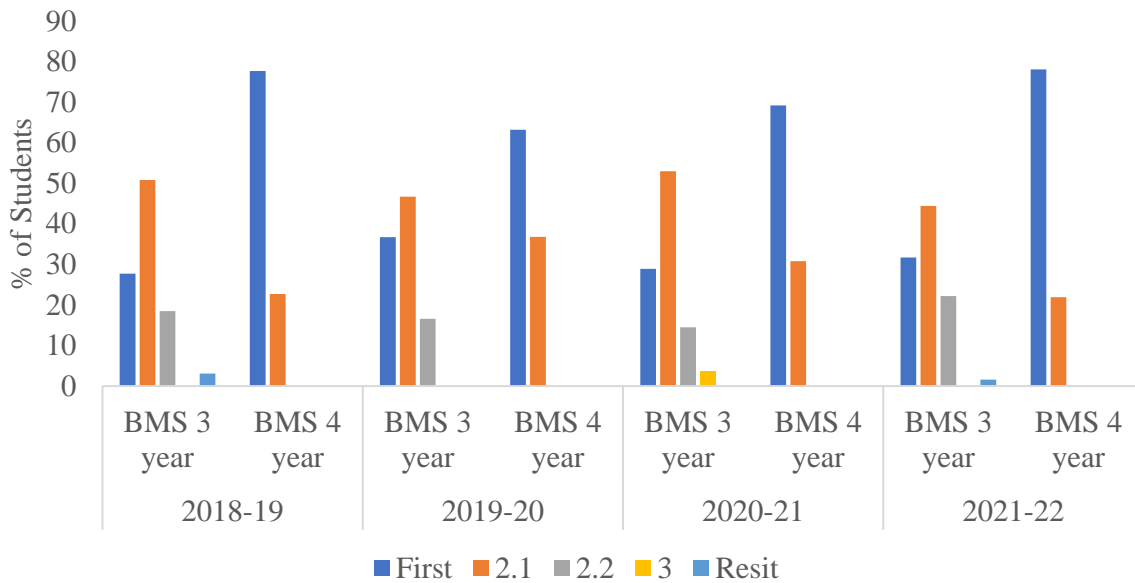


Figure 4: BSc Biomedical Science degree classifications for 3 and 4-year (placement) students between 2018/19 - 2021/22

Figure 4 data was shared with all participating hospitals, to illustrate the usefulness of the training process in relation to student outcomes, but also to indicate to hospitals the calibre of our students to encourage them to continue to offer placements.

Our statistics show that between 2012 and 2020 nearly 100% of students who have completed placements are employed upon graduation (Table 1). The Table shows that the highest % of employment in the 4-year graduates was 100% in 2014/15, 2016/17, and 2019/20, and the lowest employment was 86% in 2017/18 compared with the 3-year graduates; highest employment was 84% in 20-16/17 and lowest employment was 36% in 2012/13.

Improved graduate outcomes and increased student satisfaction (as measured by the NSS- National Student Satisfaction survey) increases league table rankings for universities.

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Table 1: Percentage of Biomedical Science 3-year and 4-year graduate level work or study between 2012-2020.

Leaver year	Biomedical Science (3yr) graduate level work or study	Biomedical Science (NHS Placement) graduate level work or study
2012/13	9/25 students (36%)	26/27 – 96%
2013/14	15/21 students (71%)	31/32 – 97%
2014/15	22/28 – 79%	24/24 – 100%
2015/16	25/35 – 71%	17/18 – 94%
2016/17	36/43 – 84%	17/17 – 100%
2017/18	28/46 – 61%	19/22 – 86%
2018/19	15/34 – 74%	25/28 - 95.5%
2019/20	36/43 - 83.7%	28/28 - 100%

Data collected through survey completion analysed by Essex Planning and Data Insights team as well as anecdotal information through LinkedIn indicate that nearly 50% of Essex graduates with placement experience continue to work as Biomedical Scientists in the Eastern region and beyond. The number of Essex graduates working as Biomedical Scientists (Including Quality Managers) across both sites (Ipswich and Colchester) was 26 between 2011 and 2022. Nine of these are in senior posts and two are now in Band 8a roles. It is worth mentioning that some of these graduated within the last 10 years, and one of them was a trainee in 2011 at Ipswich hospital. Three of our graduates are working as Band 5 Biomedical Scientists in Basildon University Hospital, three Band 5 and above at West Suffolk Hospital, and 5 are now Band 5 Biomedical Scientists at Norfolk and Norwich University Hospital. Over one hundred of our graduates are working in other regions including London, Kent, Manchester etc.

Medical Schools have attracted Essex graduates (Figure 5). Between 2009-2022, about 3.5% of our graduates progressed to study Medicine. Of note is that 27% of these graduates completed a placement year in one of our partner hospitals. The highest number of students continuing into medicine in any year was 9 in 2011 and the lowest number was 1 in both 2013 and 2022 (Figure 5).

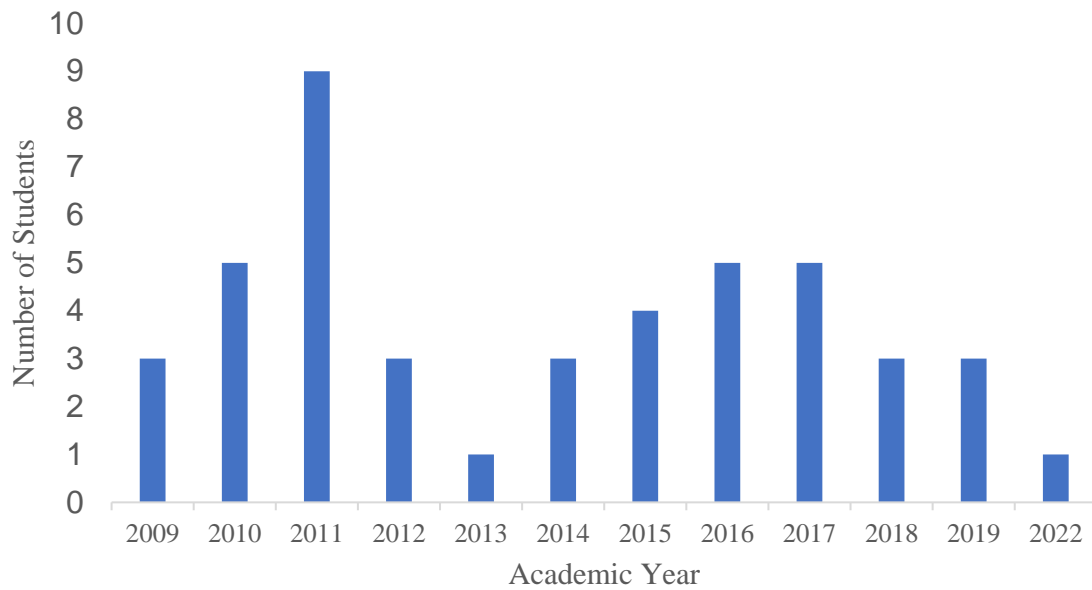


Figure 5: Number of BSc Biomedical Science University of Essex graduates progressing to study Medicine between 2009-2022

Figure 6 shows that Essex graduates have studied at 20 Medical Schools in the United Kingdom. Queen Mary University London has accepted the highest number of Essex graduates (a total of 9) followed by Aberdeen (7 graduates).

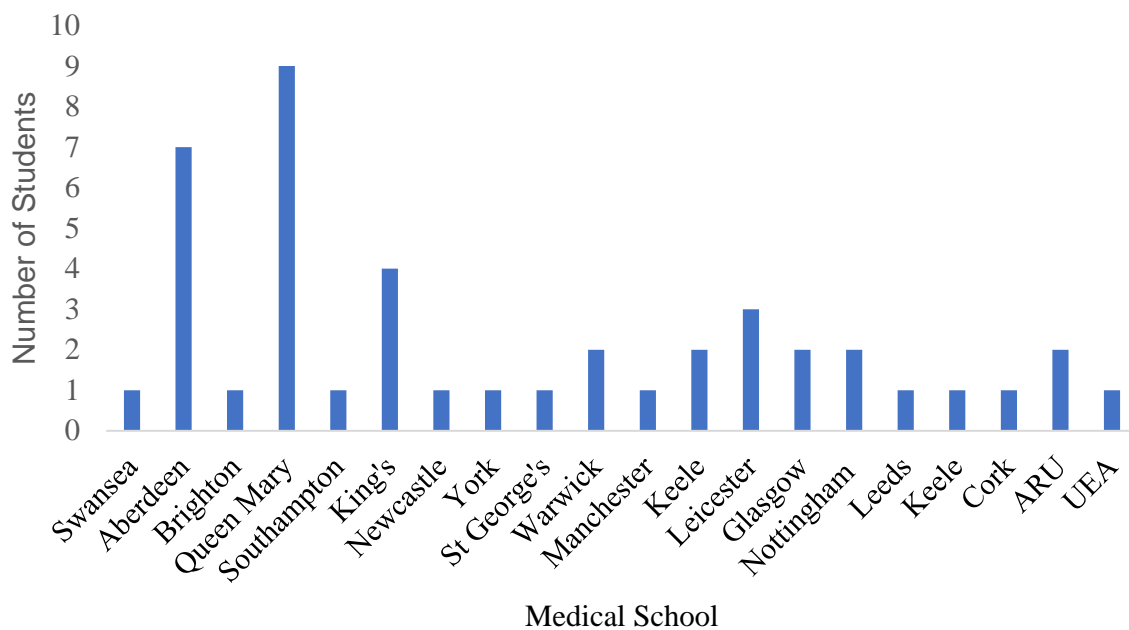


Figure 6: Number of students accepted by UK Medical Schools between 2009 and 2022.

Discussion and conclusions:

The data presented in this paper condenses our findings on the impact of placements on final year degree outcomes. These findings agree with Mansfield (2011) who examined the links between placement and academic achievement from property management and development students at Nottingham Trent University. This study provides strong evidence to demonstrate that placements at NHS departments are associated with higher academic performance by final year students at the School of Life Sciences, University of Essex.

More than 1000 students are included in this study, all of whom had the option to apply for a placement year. The successful students were interviewed by the NHS staff from each hospital, so there is no self-selection bias by the University staff. There is some debate on whether work placements improve final year academic performance, or high-calibre students choose to do work placements (Jones et al, 2015). Regardless, this study confirms that there was a significant difference in degree outcomes between those who undertook a placement and those who did not (Figure 4).

Between 2018/19-2021/22, an average of 72% of graduates with work placements achieved a 1st Class degree which is significantly higher than the average % of graduates who did not complete a placement (31%). This is compared favourably with Jones et al. (2015) who confirmed that work placements do have an impact on student performance across two UK Universities, Aston and Ulster. Our findings are also in line with studies at the University of Bath (Hejmadi et al 2011), which confirmed that students who had undertaken a placement consistently obtained better marks compared with those who had not. It is not possible to generalise these findings to the Eastern region of the UK, and additional research in this area is needed to determine whether this interpretation of our results is correct for other Universities in the area. If this has been confirmed, more placements should be offered to a wider range of students.

Our findings revealed that there is clear evidence that the successful completion of a work placement year is associated with a much better employability of our Biomedical Science students at the University of Essex over the last ten years.

Our data shows that graduates with work placements are more likely to be employed in graduate-level roles than non-placement graduates (Table 1). Between 2012/13 – 2019/20, the average employment rate of Biomedical Science graduates with a work placement was 96% compared to 70% for those who did not go on a placement. These placements have definitely contributed to the increased employment rate by enhancing students' learning and discipline-based skills and preparing them for the work environment. This is in line with Hejmadi et al's finding who highlighted that students with placements are more likely to be employed, when compared with their peers in Biochemistry department (Hejmadi et al 2011).

This study also included the number of graduates working as Biomedical Scientists. About 130 (12.4%) of our graduates are working as Biomedical Scientists in the UK. In a selected number of hospitals in the Eastern region, our statistical analysis showed that 3.7% of our graduates are working in five hospitals in Ipswich, Colchester, West Suffolk, Basildon and Norwich.

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It is our experience at the University of Essex that when students return from the placement year, they are more confident, more engaged with their studies, they feel that they have more time, they talk like scientists and they are more appreciative for the opportunity compared to their counterparts who did not go on a placement year. This is in agreement with Neill and

Mulholland (2003) findings at Ulster University in which they discussed why work placements should be incorporated within undergraduate courses.

All 34 (100%) students who had finished their placement in 2021/22, 28 (82%) completed a student experience survey run by the Course Director. This indicated that 100% of students found the placement experience ‘*amazing, insightful, enjoyable, but challenging*’. All 100% appreciated the placement experience and found it useful. In response to a question on whether the placement year was essential for their understanding, 27/28 students (96%) found it essential and 4% said ‘not essential but helpful’. One student thought that the placement year was financially challenging.

It is important to note that every student on the Biomedical Science course had the option to apply for a placement. This study includes 265 out of 1046 (25.3%) students who went on a placement after their second year of study over the period 2013-2023.

Based on data from the IBMS, there are 44 Universities in the UK offering sandwich placement routes including the University of Essex. Between 2020-2022, the number of students who went on placement from all these Universities was 181, 180 and 176 respectively. This means that the University of Essex contribution was 18% (32/181) in 2020, 19% (34/180) and 18% (31/176) in 2021-22 (IBMS 2023).

The results of this paper have shown that the withdrawal of external funding for these placements has impacted on the number of students who choose to select the placement year (Figure 1). The average number of students trained in hospitals during the first 5 years of this study was 21.8, and the highest number was 24 in 2016/17, compared with an average of 31.2 in the second half of the study from 2018-2023, and the highest number of 34 students in 2021/22. This increase in the number of students could be attributed to the University offering financial support to those who are interested in going on a placement year. This finding slightly disagrees with Hejmadi et al (2011) when they reported a decrease in the number of students in recent years. As can be seen in Figure 2, there was an increase from 7 to 18 hospitals offering placements between 2017/18-2022/23. It is worth mentioning that there is a limit on the number of placement opportunities available and some NHS departments are unable to offer student placements due to high workloads with the increased workload in recent years.

Additional analysis was implemented on the number of students in each discipline. It is important to make clear that the four main disciplines in all hospitals are; Medical Microbiology, Haematology and Blood Transfusion, Cellular Pathology and Clinical Biochemistry. As far as we know, no other study has looked at the number of trained students across disciplines in the Eastern Region in the UK. The results are reported in

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Figure 3. Approximately 80% (a total of 212) of our students were trained in the four main disciplines with the highest number in Medical Microbiology (61 students- 23%). This increase was noticed peri COVID-19 when hospitals had a huge increase in demand to test for coronavirus. The other nine disciplines (Immunohistochemistry, Point of Care Testing (POCT), Molecular Pathology, Tissue Bank, Neuropathology, Paediatric Pathology, Tissue Typing, Genetics and Immunology) have trained the remaining 53 students, with the highest number in Neuropathology (a total of 14 students - 5.3%).

Greater managerial and organisational skills have been developed during the years of having placement students outside the University. The acquisition of Biomedical Science skills required by employers is pivotal for the success of our students and the reaccreditation process of our course (Medhat 2008).

The School of Life Sciences at the University of Essex does not just produce Biomedical Scientists for the NHS, we also support other clinical practices by encouraging our graduates into further studies, such as Medicine. More than forty graduates were accepted to study medicine during the last twelve years (Figure 4). Our Biomedical Science graduates studied medicine at twenty Medical Schools in the UK with the highest number of nine students (20%) at Queen Mary University London, followed by Aberdeen (16%) and King's College London (9%) (Figure 5). This is an excellent outcome regarding progression from the Biomedical Science course, taking into account the increased pressures on hospitals and medical settings especially peri- and post COVID-19.

Despite all the benefits of work placements mentioned in this paper, there are some challenges and problems. However, good management and the University financial support has minimised these challenges in order to supply the NHS with excellent Biomedical Scientists.

In conclusion, this paper has provided the first empirical data of work placement students who received training in the Eastern Region and beyond. It also explored the benefits of work placement years for our Biomedical Science students, for the NHS as well as the University of Essex. However, more research is required in the Eastern region and beyond to support the NHS in order to increase the number of placement students and maintain the employment pipeline of essential NHS biomedical scientists.

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References

- 1- Binnicker, M.J. (2020). Challenges and Controversies to testing for COVID-19. *Journal of Clinical Microbiology*. Volume 58, Issue 11.
- 2- Golos A, & Tekuzener E (2019). Perceptions, expectations and satisfaction levels of occupational therapy students prior to and after practice placement and comparison of practice placement models. *BMC Medical Education* 19, article number 324.

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- 3- HCPC (2022). <https://www.hcpc-uk.org/about-us/who-we-regulate/>
- 4- HCPC (2023). <https://www.hcpc-uk.org/covid-19/advice/advice-for-education-providers/>
- 5- Heijmadi, M., Bullock, K., Gould, V., Lock, G. (2011). Is choosing to go on placement a gamble? Perspectives from bioscience undergraduates. *Assessment and Evaluation in Higher Education*. Volume 37, Issue 5.
- 6- Hodges, D., Eames, C., Coll, R.K. (2014). Theoretical perspectives on assessment in cooperative education placements. *Asia-Pacific Journal of Cooperative Education*. Volume 15, Issue 3.
- 7- IBMS¹ (2022). <https://www.ibms.org/registration/hcpc-registration/>
- 8- IBMS² (2022). <https://www.ibms.org/resources/documents/criteria-and-requirements-for-the-accreditation-and-re/>
- 9- Jones, C.M., Green, J.P., Higson, H.E. (2015). Do work placements improve final year academic performance or do high-calibre students choose to do work placements? *Studies in Higher Education*. Volume 42, Issue 6.
- 10- Mansfield, R. (2011). The Effect of Placement Experience Upon Final-Year Results for Surveying Degree Programmes. *Studies in Higher Education*. Volume 36, Issue 8.
- 11- Neill N, & Mulholland G (2003). Student placement – Structure, skills and e-support. *Education and Training*. Volume 45, Issue 2.
- 12- Rolfe V, & Adukwu E (2021). Bioscience laboratory practicals, projects and placements in a Covid-19 world. *Journal of Biological Education*.