JUNE 2022

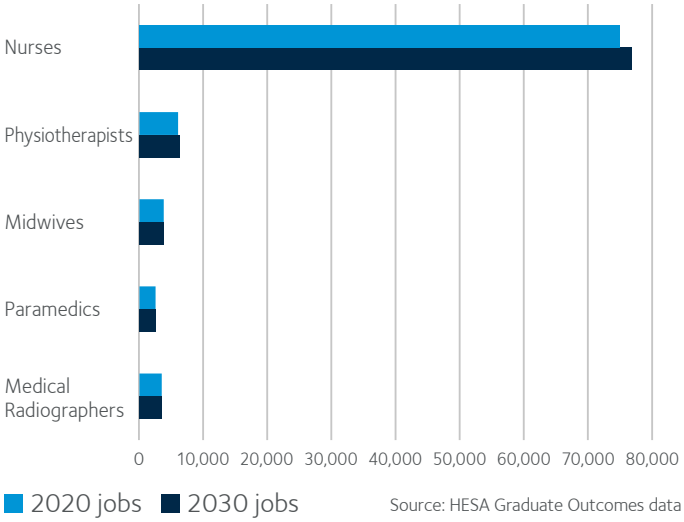
CONTRIBUTION OF PHYSIOLOGY EDUCATION AND TRAINING TO THE SCOTTISH WORKFORCE

Factsheet

To download the key findings report and the full report please visit **physoc.org/policy/higher-education/physiology-education**

The Physiological Society, the largest network for physiologists in Europe, and the Academy for Healthcare Science, commissioned Emsi Burning Glass to measure the contribution to the workforce of higher education provision of which physiology is a core component on the UK economy. This factsheet relates specifically to labour market data from students and graduates of Scottish higher education institutions.

Figure 1 Current and projected jobs in Scotland for top physiology occupation groups, 2020 and 2030.



Source: HESA Graduate Outcomes data

Figure 1 shows labour market data for Scotland around the top occupations in which students who study courses of which physiology is a core component are employed.

- Out of the top five occupations, nurses hold the most jobs, and as shown in Figure 3, the greatest number of graduates included in the analysis go on to enter the occupation.
- Physiotherapists and midwives hold the second and third most number of jobs, again similar to the UK as a whole.
- Between 2020 and 2030 the occupations listed are expected to grow between 2% and 5%, with physiotherapists expected to experience the highest percent change in jobs.

We can also look at occupations of graduates included in the analysis in terms of job postings, or online advertisements for jobs posted by companies trying to attract applicants. The jobs data in Figure 1 are insightful given the standardised data collection method, but job postings data allow for more real-time analysis of job demand. Figure 2 displays job posting information for the occupations of graduates.

- Nurses comprised 87% of the job postings related to the top five occupation groups employing graduates with a relevant degree, or 20,675 unique job postings from March 2021 to February 2022.
- The job postings data shows that these occupations are in high demand, with employers typically posting three job postings for every one position that needs filled, all other positions across Scotland typically have two job postings for every one position that needs filled.
- Medical radiographers, which is the fifth largest occupation for graduates who study courses of which physiology is a core component, is the third largest occupation in term of job postings.

The Physiological Society

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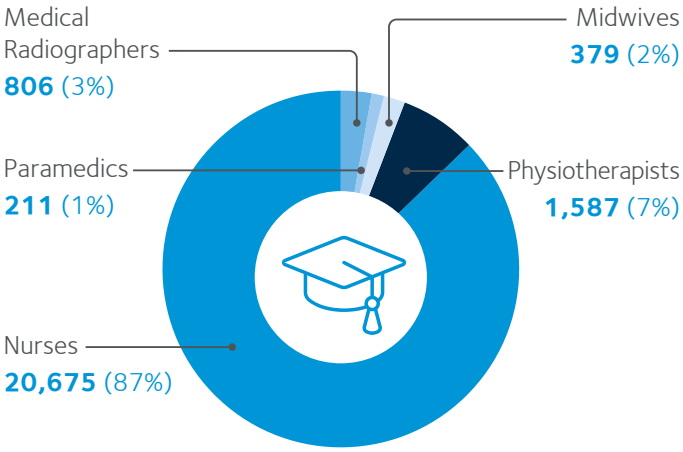
AHCS Academy for Healthcare Science INCORPORATING RCCP

Figure 2 Unique job postings in Scotland for top occupations of graduates who study courses of which physiology is a core component, March 2021 to February 2022.



Source: Emsi Burning Glass 2021.2 Job Postings data

Many students who study these courses go on to have successful careers in health and care occupations. One in seven jobs in Scotland are in health and care occupations, which highlights physiology's importance to the nation's economy and health and wellbeing of its residents.

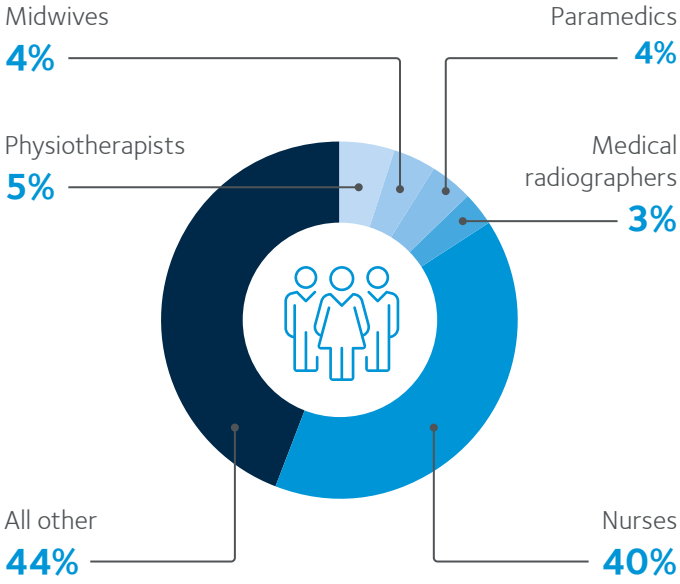
Emsi Burning Glass completed a study in early 2022 focused on the economic value of current and former students. This study uses a two-pronged approach of an economic impact analysis and a benefits analysis. A link to the full report can be found on the websites of both The Physiological Society and Academy for Healthcare Science.

Top occupations of students who study courses of which physiology is a core component

Figure 3 shows the top occupations graduates who study courses of which physiology is a core component are employed in six months after receiving a qualification. It is based on the *Graduate Outcomes* survey and represents all students who study courses of which physiology is a core component, not just Scotland students.

- Graduates who study courses of which physiology is a core component are in a range of exciting and fulfilling careers that put their education into practice.
- The largest occupations for graduates included in the analysis are nurses (40%), physiotherapists (5%), and midwives (4%). Around 44% of students who study courses of which physiology is a core component are employed in all other occupations.

Figure 3 Top occupation groups for the UK as a whole.



Source: HESA Graduate Outcomes data.

CASE STUDY

An appetite for health – research transforming the food we eat

Obesity and associated comorbidities are a major public health burden. Protein nutrition and satiety research carried out by the University of Aberdeen's Rowett Institute has informed and supports the food sector, underpinning developments for several commercial brands. Rowett research has contributed to multi-partner collaborations to find innovative strategies to tackle obesity, taking science to the supermarket shelf.

Research led by Professor Alexandra Johnstone, of the Rowett Institute at the University of Aberdeen, has been fundamental in understanding that high protein in the diet is the key to satiety. These findings underpinned a contract and consultancy partnership with retailer M&S, who launched their "Balanced For You" health food brand in 2010.

Dietary protein has been shown to be an effective means of reducing hunger and achieving weight loss in obese individuals. Consideration of sustainable protein sources must also be reconciled with the need for high protein in the diet. The research of Professor Johnstone is leading food industry health initiatives and incorporating these themes, collectively.

Professor Alexandra Johnstone
University of Aberdeen

CASE STUDY

Physiology curricula within pre-registration nursing education in Scotland

An expert group of physiologists and nurse educators developed and agreed a core curriculum of physiology outcomes which identified the physiology all nurses require to know on qualification for safe practice and patient care and also supporting the achievement of the Nursing and Midwifery Council (NMC) standards for future nurses.

The project, funded by the physiological society, provides those in nurse physiology education a structure and guide of learning outcomes divided into a systems approach to structure their physiology teaching across the nursing degree.

In the end, there were 177 outcomes agreed. These learning outcomes do not suggest how they should be delivered, but gives the basic level required for qualification as a nurse commensurate with the Nursing and Midwifery Council new standards for the "future nurse."

In Scotland, the numbers for student nurses and midwives continues to increase. For 2022-23 has been set at 4,837 – a rise from 4,449 in 2021-22 and 4,206 in 2020-21.

At Queen Margaret University, offering a four-year Master's degree and Adult nurse registration, our target is 101 for 2022/23, having been 82 for 2021/22. This means we have over 300 students actively engaging with physiology across their nursing programme.

Photo credit: QMU students completing cardiopulmonary resuscitation training (Queen Margaret University)

At QMU, we are embedding these outcomes across our four year programme for adult nursing registration. The Master's programme is based on the person-centred practice framework, therefore physiology is incorporated throughout some of the module streams rather than being within one distinct module.

We are continuing to ensure our programme includes the required breadth and depth of physiology content within new person centred curriculum framework.

Physiology knowledge underpins clinical skills which are key in the nursing curriculum; eg cardiopulmonary resuscitation and venepuncture – the requirement to understand the physiological response for cardiac cycle and perfusion and clotting underpin being able to carry out these skills safely.

The Pre-registration outcomes provides a benchmark for considering those who are post-registration require in further qualifications e.g. advanced clinical practice roles.

Dr Alison Wood
Queen Margaret University

CASE STUDY

Insulin centenary event: glucose monitor demonstration to public

As part of the centenary anniversary of the discovery of insulin, researchers from the University of Aberdeen hosted an event at the Aberdeen Science Centre on 16-17 October 2021. The centenary of the discovery of insulin was well suited to being promoted in Aberdeen as the Nobel prize was awarded to University of Aberdeen alumnus Prof John Macleod in 1923 for this discovery.

We aimed to engage with children under 16 and encouraged participation in our educational events through publicity and advertisement of the event. These events aim to educate children about the physiological role of insulin in the body. Some of the volunteers of the event wore continuous glucose monitors which can be scanned by a mobile phone app. A phone was connected to a screen and 2 event volunteers either ate sweets or performed star-jumps. The audience guessed if the next glucose reading was higher or lower than the previous reading. Between readings, there was an interactive presentation on the physiological role of insulin in the body and how blood sugar is regulated. Prizes were provided to audience members who correctly guessed right and engaged with the presentation.

Photo credit: University of Aberdeen academics celebrate 100 years since the discovery of insulin (University of Aberdeen)

This event introduced continuous glucose monitors to the general public and helped to normalise their use, which are becoming more prevalent in the management of Type 1 Diabetes. Many of the children had not seen continuous glucose monitors before, and we hope this event might have introduced them in a positive light.

Feedback was very positive on the day from both the public and the organisations we collaborated with such as the Aberdeen Science Centre. Given the success of this event, we plan to run more events on other physiological mechanisms, for example, the biological communication between fat and muscle tissue. The scientists that engaged in this event also participated in a series of podcasts conducted by undergraduate physiologists that are now available to the public who wish to learn more about this topic.

Dr Brendan Gabriel
University of Aberdeen

CASE STUDY

Development of an accurate and sensitive antibody test against SARs-CoV-2 virus

Professor Delibegovic led the Scottish Government's Chief Scientist Office (CSO) Rapid Response in COVID-19 (RARC-19) research programme to develop an accurate and sensitive antibody test against SARs-CoV-2 virus, in collaboration with an SME, Vertebrate Antibodies Limited (VAL) and NHS Grampian.

In this project they used an artificial intelligence (AI) application and bioengineered a novel antigen display platform for development of accurate Covid-19 antibody screening tests. The University of Aberdeen team worked with VAL, using VAL's proprietary AI platform to identify the specific elements of the virus that trigger the body's defence systems.

The approach was successfully used for the development of a combination of sensitive tests that could be used for mass screening of Covid-19 cases, identification of high-risk patients/carriers, providing data on the prevalence of Covid-19, surveillance of vaccination programs and evaluating the efficacy of vaccines against circulating SARS-CoV-2 strains.

The team developed a "game changing technology" with the tests successfully passing Phase 2 independent validation by the National Institute for Biological Standards and Control (Department of Health and Social Care). This led to international interest including from the Tony Blair Institute for Global Change, that believes these tests will be crucial in low- and middle-income countries where vaccines are scarce.

The platform has received worldwide media attention and is now available for research purposes through several international distributors. Two tests are in final rounds of independent verification at the National Institute for Biological Standards and Control (Department of Health and Social Care): Universal EpitoGen test intended to identify cases with an antibody response to SARS-CoV-2 following infection or vaccination; Differential EpitoGen test intended for use to distinguish between vaccine-induced and infection-induced antibody response to aid ongoing vaccine and virus surveillance efforts.

Several international stakeholders are evaluating the platforms to roll out in their respective countries including the USA and South Africa.

Professor Mirela Delibegovic
University of Aberdeen

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