Informatics in Primary Care 2005;13:167–70

Editorial

Is the time right for direct entry into a career in health and biomedical informatics?

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Internationally there have been divergent trends for those looking to follow careers in health care. In medicine there have been moves towards graduate entry programmes, with some courses limiting entry to bioscience graduates, while others accept any first degree.[1,2] Meanwhile in nursing the converse is true, with direct entry now possible into community nursing roles, apparently without detriment to quality.[3] Historically, nurses undertook generic training first and specialised post-qualification. This editorial explores whether health informatics should be a career for those with prior experience or if the time is right for there to be direct entry for school leavers into careers in health informatics.

Like many new disciplines, medical informatics was initially the domain of those who developed computer applications to use in their clinical practice. Only later did it start to become defined as a science: evolving from medical to health to biomedical informatics.[4–8] This progression reflects how health is a broader and more appropriate label than the 'medical model'. More recently it has been recognised that genetics and proteomics (the study of proteins to understand cell behaviour and disease) are increasingly important in clinical practice.[9] Simultaneously there has been a growth and similar evolution in the many subspecialties of health informatics, including nursing, consumer and primary care informatics.[10–12] Details of these subspecialties can be found listed in the websites of the principal international informatics associations.[13–15]

The growth in health informatics is reflected in the increase in the number of jobs available. For example, the National Health Service (NHS) Careers website currently shows over 20 000 jobs in the NHS in health informatics; this suggests that in the UK alone there is a considerable requirement for health informatics professionals.[16]

There are currently three routes available via higher education for entry into a career in informatics: masters' degrees for those with previous clinical qualifications or equivalent qualifications or experience; bachelors' degrees primarily aimed at school leavers; and foundation degrees for people who wish to learn in their workplace or have previous relevant experience. Traditional informatics degrees are usually in 'medical' informatics and have had an emphasis on medicine, information processing and computer science. The Heidelberg-Heilbronn model provides a good example of such a course.[17] More modern courses tend to be labelled 'health' informatics; the national collaborative approach in the Netherlands provides an example of this.[18] Most recently courses have realised the necessity to prepare the next generation of informaticians to be conversant in genetics and proteomics; to reflect this they have labelled their courses 'biomedical informatics'.[19] The importance of biomedical informatics is being stressed within the European Union:[8,9]

> Traditionally, Medical Informatics has been focused on the intersection between computer science and clinical medicine, whereas Bioinformatics has been predominantly centred on the intersection between computer science and biological research. Although researchers from both areas have occasionally collaborated, their training, objectives and interests have been quite different. The results of the Human Genome and related projects have attracted the interest of many professionals, and introduced new challenges that will transform biomedical research and health care. A characteristic of the 'post-genomic' era will be to correlate essential genotypic information with expressed phenotypic information. In this context, Biomedical Informatics (BMI) has emerged to describe the technology that brings both disciplines (BI and MI) together to support genomic medicine.

MSc in Health Informatics

Masters' programmes have been the principal route for obtaining qualifications in medical and health informatics. There are several well-established MSc courses in health informatics in the UK, including City University, University of Central Lancashire, University of Central London, University of Derby, University of Surrey, University of Bath and University of Sheffield, as well as courses overseas. The University of Central Lancashire (UCLAN) experience is that students undertaking this type of course are equally divided between those from the clinical professions and non-clinical entrants (that is, those who do not possess a clinical qualification but have professional qualifications and/or relevant work experience). The programme at UCLAN is typical of this sort of course, comprising both core and optional modules delivered by blended e-learning and via local cohorts. Students enrol either as individual students, or as part of a local cohort designed to facilitate a critical mass of health informatics knowledge across a geographical area or organisation. The aim of the programme is to enable students to capture and critically evaluate the use of information within a health and social care context. Students develop and practise a range of information and research skills to enable research leading to improvements in professional practice and in the quality of patient care, including a critical knowledge of current issues in health informatics. UCLAN students are also offered opportunities to simultaneously undertake the NHS Professional Award Certificate in IM&T (Health) professional accreditation.[20] These approaches are combined with problem-solving strategies based upon critical evaluation of these issues and their relevance to the local environment of each student.

BSc/MSci in Biomedical Informatics

The idea of direct entry into a health informatics career from a degree course in the UK is new. In the USA and Europe these courses are much more commonplace, but they have not yet been established in the UK. St George's, in partnership with Kingston University and Royal Holloway, is offering the first such course in England starting in October 2006.[21] The course is different from traditional health and medical informatics courses, now including modules on genetics and proteomics, as we judge that these will be much more important to the next generation of informaticians. The course will also include more on consumer health informatics and information security.

This course aims to prepare school leavers to take up the expanding number of posts in health informatics. The course will teach eight subjects, with six integrating themes over the first three years. It uses a spiral curriculum, starting with simple concepts in the early years, then reinforcing learning and developing complexity in later years.[22] Modern teaching methods will be used, including scenario-based learning to encourage a team approach to problem solving. Students will learn about medicine and medical culture alongside computing and relevant information technologies. In the fourth year, students will be able to 'mix and match' modules or opt to study one subject in depth. Fourth-year options will include the opportunity to study primary care informatics.

Foundation Degree in Health Informatics

Another increasingly popular route into health informatics is via the foundation degree. The FdSc (Foundation Degree in Science) in Health Informatics at UCLAN is based on a range of national standards and has obtained full accreditation, achieving Sector Skills Council/Sector Bodies recognition. Similarly to UCLAN's postgraduate course, students are offered opportunities to simultaneously undertake the NHS Professional Award Certificate in IM&T (Health).[20] The first year of study is designed to meet the needs of the core of the Professional Certificate (modules A, B and C), and in year 2, modules have been designed to meet the needs of optional modules D, E, F and H. The final learning objects are designed to meet the needs of particular specialist groups.

Course content combines information management, communication, personal and transferable skills into a qualification to match the changing needs of the NHS. On completion of a foundation degree, there are further opportunities for continuous professional development onto a degree programme and beyond.

Accreditation

The accreditation of courses is important and in the UK the British Computer Society (BCS) and the NHS have an important role to play. The BCS provides recognition of learning towards Chartered status and the NHS towards its occupational standards.[23,24]

Increasingly, registration with the UK Council for Health Informatics Professions (UKCHIP) will become important for career progression.[25,26]

Summary

These three educational pathways appear to offer a range of complementary entry routes, targeting different student groups. However, we in the health informatics community need to consider what additional support potential students might receive to ease their passage from learner to a career in health informatics. Our suggestions for the UK, which could be replicated internationally, are:

- The BCS should consider improved access to its healthcare specialist groups and conferences for students on recognised courses.
- The NHS should systematically develop work experience placements for health informatics students on approved courses.
- UKCHIP could consider providing provisional registration for newly-qualified health informaticians while they acquire the necessary experience for full registration. It could approve specific courses for particular levels of registration.
- Journals and conferences associated with the major health informatics associations could consider much lower subscriptions for health informatics students.

Higher education is developing a professional health informatics community. The time is right for school leavers to have a direct route into this career. Within the next five years larger numbers of school leavers will start to move into health informatics *de novo*.

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