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Training tomorrow's doctors

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ABSTRACT

The ability of our NHS to deliver world-class compassionate care is dependent on the quality of training and education of our staff. We know that the path of moving from novice to expert is far from linear. Instead, it is a complex journey that is domain specific with multiple variations reflecting the individuality of our learners. Within this complex journey, there is a need to train the doctors of tomorrow to be humanistic, competent, patient-centred, resilient beings who will thrive in a challenging environment, striving to advance medicine. We discuss two models of curricula, the longitudinal integrated programmes and the internal medicine curriculum, which are proposed to address the healthcare needs of the UK population. In this article, we look at the opportunities that exist, the future potentials for medical education, and the challenges to overcome as we endeavour to create the best education models for physicians in the 21st century.

KEYWORDS: Training, curricula, medical education, internal medicine

Teach me and I will forget;
show me and I may remember;
involve me and I will understand
Confucius on the nature of instruction and human learning

The ability of our NHS to deliver world-class compassionate care is dependent on the quality of training and education of our staff.[1] Since the time great minds of medicine were articulating the ground rules for medical training, we have progressed significantly in our clinical and technical knowledge. While our world is markedly different since Osler's time, what has not changed is the need to train the doctors of tomorrow to be humanistic, competent, patient-centred, resilient beings who will thrive in a challenging environment, striving to advance medicine. Medical education is an opportunity to transfer a set of beliefs and values on what it means to be a good physician. We now have a sophisticated knowledge of the cognitive science underpinning how humans learn.[2–7] Therefore, we have a responsibility to ensure we harness these strategies with the accelerating digital world to provide curricula and training programmes that are fit for purpose. Our future depends on it. In this article, we look at the opportunities that exist, the potentials for the future of medical education, and the challenges to overcome as we endeavour to create the best education models for physicians in the 21st century. Matching the needs for trainee-centred learning with the delivery of humanistic, patient-centred care in an era of accelerating technology is the focus of much curricula reform. It is a challenging, but exciting, time for educational transformation.

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Trainee-centred learning

Just as we strive for patient-centred care, so must we strive for trainee-centred learning; learning that is individualised and custom made. We know that the path of moving from novice to expert is far from linear. Instead, it is a complex journey that is domain specific with multiple variations reflecting the individuality of our learners. Understanding this learning curve and ensuring our resources target the high-need points will provide efficiency, productivity and cost-saving measures. In this way, we can create effective instructional design for maximum learning engagement and benefit.[8] This model will require assessments to be capability based, not time based – success measured by achievement of competence, a move away from fixed-time training. In this way, students can be maximally challenged for their individual stage, targeting their zone of proximal development for both cognitive and practical skills – the 'regimen of competence' principle.[9,10] A return, in some ways, to the age of the apprenticeship, where the trainee is immersed in learning a trade, which structures teaching by gauging the individual's skill and level. A model in which each trainee can have a programme adaptable to their needs: a trainee-centred learning plan.

The technology-driven era of medical education

Fortunately, the advent of technology and the digital age provides increasing ease in our ability to provide trainee-centred learning. We are surrounded by an abundance of online resources, allowing trainees access to on-demand learning that fits with their lifestyle and learning preference, and is accessible regardless of geographical location.[11]

Sophisticated tools that allow for location and positioning data (with motion sensors, digital capture and imaging) unleash a wealth of creative possibilities in defining the 'classroom'. Just as the technologies we use are increasingly cloud-based,[11] perhaps parts of our education model will become decentralised, using augmented reality. Learning spaces will need to be redesigned to include both virtual and state-of-the-art skills labs and simulators. Banks of information are available at the touch of a button, allowing students to come prepared and the teacher to move from being the knowledge bearer to collaborator and facilitator. This helps instil in trainees the self-directed learning skills that are essential for a profession where the learning never ends. Physicians of tomorrow will, however, need to be skilled in keeping pace with the rapid proliferation of information, separating quality from quantity and learning to efficiently retrieve evidence-based, accurate and reliable knowledge.

Efforts will need to be dedicated to exploring and developing applications of emerging technologies for learning, research and creative inquiry. Most importantly efforts will need to be focused on ensuring that doctors retain their humanistic, patient-centred values and drive. Without compassion there is no care. It can be dehumanising to be dealt with by technology. The next generation, therefore, have more of a challenge: to harness efficiencies of technology with humanistic care.

Models of curricula

It is essential that all training models are designed to address the challenges of the growing healthcare needs of an ageing population, with multiple comorbidities and a need for care across secondary, primary and community settings.[12] We look now to discuss two examples of curricula that are being developed, at undergraduate and graduate education levels, with this mission in mind. Currently, a significant proportion of both undergraduate and graduate physicians in training feel unprepared for the environment they are entering.[13,14] This necessitates a transformation of medical education to keep pace with the changing environment and resources that will require a large workforce with generalist training and a working knowledge of many care pathways.[1] Although there are additional curriculum changes, we will specifically highlight the longitudinal integrated programmes and the proposed internal medicine curriculum.

1) Undergraduate training – longitudinal integrated programmes

Longitudinal integrated programmes, which centre on relational continuity (with patients, clinician educators and fellow students) across care settings, have been shown to be viable and effective alternatives to traditional block rotations across a variety of venues and models: from highly specialised academic centres to remote rural clinics.[15–18] The continuity in clinical learning, with continuity in clinician mentors, appears to have a positive impact on learning and professional development with enhanced empathy, patient-centredness, feelings of preparedness in higher-order clinical and cognitive skills, confidence and satisfaction in comparison with students in traditional block rotations.[16,10,20] At a time when the healthcare system can be a fragmented journey, with limited continuity in care because of the shift-work system, patients report enhanced satisfaction, valuing their relationships with students and the support they feel this adds to their care.[21,22] Longitudinal models of training seek not only to enhance relationships between trainees, trainers and patients, but also to improve the trainee's ability to self-direct their learning needs and enhance engagement with patients, safety and learning systems; this is integral to developing the right people with the right skills and right values for 21st century medicine. Whatever the model, the clinical environment must be made more receptive to professional development. Learning must be embedded in caring for patients and improvements in educational quality becoming transparent metrics of the medical education system.[23]

2) Graduate training – proposed future changes to the internal medicine curriculum

Recently, there have been several changes to the graduate training curriculum and structure for physicians. Following the Modernising Medical Careers (MMC) programme in 2005, the most recent review of UK training was Professor Greenaway's *Shape of Training* review in 2013.[24] This review aimed to develop a framework for delivering a revised training programme. There was recognition that current training was not equipping tomorrow's doctors for the changing patient demographic population and complex comorbidity that was a consequence of effective chronic disease management. Included in their remit was to look at the balance of the medical workforce as specialists or generalists.

The response to the *Shape of Training* review, and particularly how to implement the suggested changes, has differed across the postgraduate medical specialty training boards. The Joint Royal Colleges of Physicians Training Board, governing the physicians' postgraduate training, responded with the proposed new internal medicine curriculum.[25] The aim of this new curriculum was to increase general medical training for physicians early in their specialty careers (years 1–3). The newly proposed curriculum is split into two phases (Fig 1):

1. stage 1 (years 1–3), which would replace core medical training
2. stage 2, which would encompass higher specialty training.

In stage 1, there will be a focus on mandatory items, such as acute medicine, outpatients, geriatric medicine and simulation; the final year of this stage will consist of a supported medical registrar year. Following this first stage, there will be competitive application into higher specialty training (stage 2) working towards Completion of Specialty Training (CST) in the chosen specialty. There are still many aspects of the two stages to be finalised.

This proposed model offers a strong grounding in general medicine for all higher medical specialties, which will be valuable in enabling tomorrow's doctors to manage the changing patient demographics where chronic comorbidities and multisystem disease are becoming more prominent. This requires an increase in generalism, but it is important to balance this with the increasing demand for specialism and super-specialism that patients equally expect. The challenge with this curriculum is to ensure it achieves its purpose by being deliverable within the current stretched climate of the

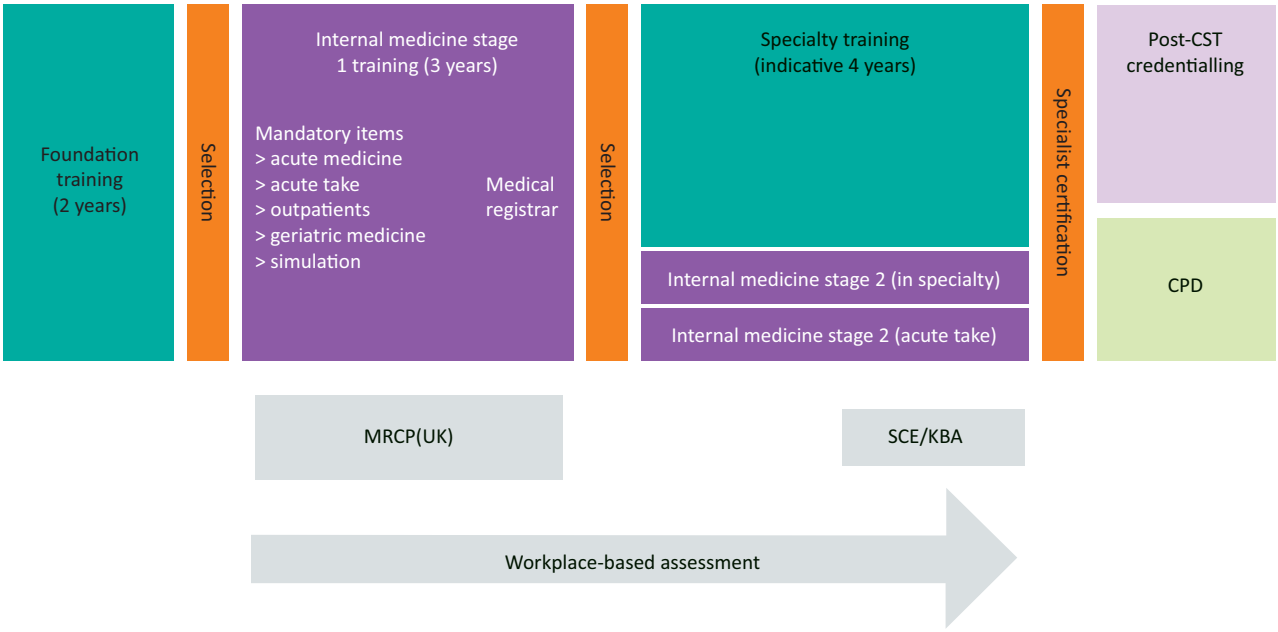

Fig. Proposed internal medicine curriculum. Reproduced with permission from the Joint Royal Colleges of Physicians Training Board.[25] CPD = continuing professional development; CST = Completion of Specialty Training; KBA = knowledge-based assessment; MRCP(UK) = full membership of the Royal College of Physicians; SCE = specialty certificate examinations.

NHS. The heart of the curriculum should be returning to an apprenticeship style model of training. This will ensure the trainees feel valued, with adequate exposure to the procedural skills and experiences they will need to thrive in their careers.[13]

Trainee-centred assessments for patient-centred care

In parallel with the design of effective training models comes the need for competency-based assessments that ensure designated standards are being met. Prior to MMC, training assessments were more informal between trainee and trainer. As we move further into the digital era of medical training and learning, a wealth of possibilities opens up to allow real-time documentation of competencies that are both trainee and trainer friendly. Following the introduction of the competency-based postgraduate medical education in 2004, there has been concerns that 'sign off' was becoming 'little more than box-ticking exercises'.[26] Indeed, the body of evidence exploring the impact of workplace-based assessments on doctors' education and performance is limited according to a 2010 systematic review.[27] We need to ensure that new training models move away from this 'tick-box' culture. The proposed internal medicine curriculum is a positive step for both trainee and trainer.[26] The curriculum, and thus the learning, will be centred on tasks deemed essential to competencies in practice or entrustable professional activities, which are 'a critical part of professional work that can be identified as a unit to be entrusted to a trainee once efficient competence has been reached'.[26,28] For instance, a trainee will be observed undertaking a task (outcome) and, if successfully completed, they will be deemed capable in that domain without requiring the multiple competency steps that inform that task to be assessed individually. The competencies in practice for the internal medicine curriculum will be guided by the generic professional capabilities (GPCs) proposed by the General Medical Council to guide all future outcome-based curricula development.[29] GPCs are 'broader human skills' required by doctors (across all specialties) to deliver safe patient care.[29] The GPC framework focuses on nine domains encompassing professional knowledge, professional skills, and professional values and behaviours.[29]

The future challenges

Generalism versus specialism

In recent years, the advances of evidence-based medicine driving further specialism and subspecialism has been a positive step in delivering safe and world-class patient care. However, there is a challenge in training enough generalists to deliver the required increase in generalism for our population while ensuring this is not at the expense of specialism. For those dual accrediting, specialist and generalist training can be mutually beneficial at deepening the individual's understanding. There is also a need not to lose that model, which produces well-rounded generalists with additional specialist experience.

Service provision and training

Ultimately, growing generalism and subspecialism is only truly possible if we train a sufficient numbers of doctors. Translating ideals into reality is always challenging within a highly pressurised working and training environment. The NHS is under immense pressure, with recognised rota

gaps both at trainee and consultant level.[30] The recognised tension between service provision and training is noticeable to many. However, we know that excellent training equals excellent patient care – upon which the future of the NHS relies. Service provision can create the right environment for excellent training, but the challenge is how to harness this. A medical working environment is unpredictable. Translating the key ingredients of a good medical education programme into training within an unpredictable environment can be challenging. We will have to be versatile in harnessing time seen traditionally as 'service provision' to become training opportunities. Examples of this include outpatient training clinics and educational ward rounds. This encompasses the apprenticeship model we all desire. A trainer and trainee need time within routine service delivery to teach and be taught. We need to look not just at the short-term impact on waiting lists but the long-term investment in training the future workforce.

Flexibility for individual learners

While the inquiry into MMC, the Tooke report, highlighted concerns about the structural changes in the delivery of training, some of these are important to consider for any new training system[31] – in particular, recognising the importance of striving for excellence while allowing flexibility for trainees. By valuing trainees as individuals we can recognise that moving from novice to expert is not linear, and is a complex heterogeneous journey that requires a training programme with flexibility to nurture expertise on an individual's learning curve. In the modern era, there is increased expectation for this flexibility and individualisation. There are many obstacles that trainees have to traverse on this complex non-linear learning journey. Simple changes that could nurture flexibility include appropriate, and timely, rota design to allow planning for training opportunities and recognition of previous skills if transferring from other specialties during training.

Harnessing technology while maintaining the humanisation of medical learning

Enhancement of technology for training, medical education and assisting with the delivery of patient care has been invaluable. E-learning and simulation are two examples of the use of technology for training. We must, however, ensure that the humanistic approach to learning and training for doctors is maintained and not threatened by the digital era. There is a concern that there will be reduced contact time with patients and a move away from bedside teaching, with the danger that the learner's experience of medicine focuses more on pathology, risking teaching 'the genotype of their patients, but less of their phenotype'.[32] Harnessing the rich benefits technology can bring to advancing and supporting training, without eroding the humanistic approach that is so integral to our profession, is of vital importance, but extremely difficult. One option that needs to be further explored is how to effectively involve the patient with the doctor's technology. One example would be bringing the technology to the patient's bedside to explain how we are using the technology to investigate and improve their care. Technology then becomes less of a barrier and more a tool that both physician and patient can appreciate.

Changing the culture from time-based to capability-based training

There is agreement that de-emphasising time-based training to focus on outcomes and promoting greater learner-centredness is an important shift that needs to be promoted in medical education. There is, however, inherent difficulty in meeting the assumption that 'medical education should be guided by pre-determined outcomes'[33] while moving away from the tick-box phenomenon that has become engrained in our culture for trainees and trainers. Capability is currently measured by multiple competencies within a set period of time. We will need to shift to a culture where capability (and competency) is seen as discrete from time, and where we develop key metrics that designate a trainee can be entrusted to complete a task unsupervised. Designing future curricula around the GPC framework (which incorporates behaviours, skills, knowledge and attitudes) will provide further challenges as we move to an outcome (capability)-based training model. One essential competency is professionalism (GPC domain 1 'professional values and behaviours'). Limited evidence exists for how to best address this in medical education as 'professionalism remains one of the most challenging competencies to define, teach and evaluate'.[34] Acknowledgment and thoughtful strategies (that engage trainee and trainer) to overcome these challenges will be essential as we shift a deeply-rooted culture from time-based to capability-based training.

Conclusions

There is no doubt that we are in an exciting phase of educational transformation as we seek to ensure our training models, at undergraduate, graduate and continuing education levels, produce doctors who can thrive in a challenging environment. We must ensure we create trainee-centred programmes to provide patient-centred care. These programmes should be designed to produce the correct mix of generalists and specialists – a workforce that can meet the demands of an ageing population that requires care across disciplines and settings. Emphasis needs to be placed on both clinical skills and humanistic attributes that are crucial for optimal care of patients. Improvements in mentoring, real-time feedback and competency-based assessments will be essential, as will ensuring trainees are seen and valued as crucial partners in the medical education system. As Confucius so aptly articulated: 'involve me and I will understand'. ■

Conflicts of interest

KEW sits on the Joint Royal Colleges of Physicians Training Board Internal Medicine Curriculum board in her voluntary role as chair of Royal College of Physicians Edinburgh Trainees and Members' Committee. Her views in this article are her own.

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