Matching residency numbers to the workforce needs

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Abstract Matching the number of surgeons to the demands for orthopedic services has been notoriously difficult. Not only does one need to evaluate current trends in the supply and provision of services but anticipate the impact of future reforms on these variables. The British Orthopaedic Association has aspired to provide consultant to population ratio of 1:15,000 by 2020. Currently, the orthopedic community is tasked with providing care for an aging population with soaring levels of obesity; with both of these factors set to grow and also with an overall decline in productivity. Orthopedic surgeons must brace themselves for an explosion in demand. At the same time, a paradigm shift has occurred in the delivery of services with the creation of specialist centers. We are amidst a generational shift in the demographics and psychology of the orthopedic workforce. The orthopedic community must be aware of the effects of these far-reaching changes when tailoring the supply of surgeons for the future needs.

Keywords Residency numbers · Surgeon numbers · Orthopedic services · Orthopedic workforce needs

Introduction

Workforce planning describes the management of employees in an organization, ensuring the right people are in the right place at the right time both now and in the future [1]. In medicine, planning for the future is a complex process. Current training pathways necessitates a minimum of 10 years from the beginning of medical school to obtaining a Certificate of Completion of Training (CCT) in Orthopedics. In reality, this process is often extended by at least 2–4 years because of higher degrees, research, and clinical fellowships. Planning for the future must take into account demands for

doctors across all specialties in order to train sufficient numbers to maintain optimum levels of patient care.

Changing population demographics, healthcare needs, and financial pressures mean that the importance of workforce planning is paramount. As the population ages, we are faced with an ever increasing prevalence of chronic disease and medical comorbidities. This leads to greater demands placed upon an antiquated healthcare system, already functioning beyond its capacity. The National Health Service (NHS) is currently undergoing the most significant reforms since its inception. A modern healthcare system, fit for purpose, necessitates the procurement, and training of a competent and capable workforce. At the heart of many of these reforms is an evolution in the structure and training of its workforce in order to meet the shifting requirements of the population it serves.

Current workforce challenges

The delivery of care in the NHS has undergone significant development over the last 20 years. This has been in response to a number of factors, including scientific advances, economic development, and the changing face of the population that it serves. This transition has required a succession of policy initiatives that have posed significant challenges for all bodies involved in matching the number of current trainees to current demands.

Repeated restructuring of surgical training has impacted heavily on the number of practicing Orthopedic specialists. Changes first initiated by Calman in 1993 were superseded by the Modernizing Medical Careers reforms in 2008. Both initiatives were aimed at streamlining medical training. They were implemented in conjunction with an expansion in the number of National Training Numbers (NTNs). This has resulted in a projected surplus in the number of doctors achieving Completion of Compulsory Training (CCT). The creation of a ‘sub-consultant’ grade (associate specialists) coupled with the British Orthopaedic Association (BOA)

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instituting a post-CCT transitional fellowship program has facilitated employment of trained specialists struggling to obtain substantive consultant posts [2•].

Although implemented in 1993 the full effects of the 48-h week recommended by the European Working Time Directive (EWTD) were not felt until the Jaeger Judgment in 2003. This governed that on-call duties were to be included within the EWTD irrespective of whether the doctor was a resident or not [3]. This necessitated a significant increase in the number of doctors in hospital departments in order to facilitate a compliant Rota.

The Department of Health (DoH) released a White Paper on the Musculoskeletal (MSK) Framework in 2006. This paper acknowledged the increasing demand for MSK services with an estimated 30 % of GP consultations based on MSK complaints. Key recommendations from the paper suggested the use of the multidisciplinary team (MDT) to address common Orthopedic complaints. In particular it advised greater use of physiotherapists to review referrals from primary care. This sought to reduce demand within secondary care, therefore, relinquishing the need for a greater number of practicing Orthopedic specialists. On the other hand, reductions in NHS pension schemes may well cause a large number of senior orthopedic surgeons, normally delivering highly efficient services, to consider early retirement. This coupled with the 18-week waiting list target, increases the requirement for the employment of high volumes of fully trained doctors.

In 2007 a seminal report of health care within London suggested that trauma services within the region required urgent reform. Amongst the authors' key recommendations was the centralization of trauma services [4]. Empirical knowledge gained from military expertise advocated a 'hub and spoke' framework for the delivery of trauma care. This has been fully realized throughout the NHS with the establishment of Major Trauma Networks (MTNs). Such fundamental redistribution of services has required simultaneous reform of the workforce.

There has been a concomitant increase in the proportion of female medical graduates, resulting in a rise in the number of female trainees. This necessitates flexible training in order to accommodate maternity requirements, along with a potential rise of less-than-full-time training. Alongside sex differences, generational changes must also be considered, as you cannot assume the career longevity of current trainees will be the same as their predecessors [5].

Increased freedom of movement within the European Economic area coupled with the recent expansion to include less economically developed countries has resulted in a net increase in the number of healthcare professionals seeking employment within the United Kingdom (UK). Combined with historic migration from Commonwealth Countries approximately 30 % of registered physicians in the UK were trained

abroad [6, 12]. Although currently European doctors can register with the General Medical Council (GMC) without any further assessment, there is ongoing debate regarding the need for English language tests and potential restrictions on registration for foreign nationals. In September, 2013 the GMC released a consultation document on suggested language assessments, ensuring all licensed doctors have the necessary knowledge of the English language to enable them to practice safely in the UK. It is unclear what impact these restrictions may have on levels of immigration but the free movement of doctors within the European Union must be considered when forecasting for the future.

Concepts of workforce planning

Scientific studies focusing on this challenge remain scant although surgical governing bodies have attempted to issue policies to assure supply meets demands without a surplus. The Centre for Workforce Intelligence (CWI) produced a lengthy report in 2011 discussing the numbers of medical trainees. They have used geographical dimension and weighted capitation to calculate the numbers and distribution of trainees according to location and associated population demographics. Weighted capitation is "a measure of health need for a region based on the population, including age profile, levels of existing illness and other factors" and is used to deduce the number of consultants required to manage expected patient demand. The same calculations are also used by the Department of Health when allocating resources. They advised a reduction of National Training Numbers (NTNs) in Orthopedics at the time, although this is currently being reviewed.

Further recommendations from The Shape of Training report [7] were designed to alter the structure of medical training in order to meet the demands of our changing population. The report advocates broad training in both community and acute settings, alongside increased flexibility in order to facilitate the movement of doctors to meet local service requirements. They advise decreasing the number and lengthening the duration of placements in order to support the integration of junior doctors into teams, encouraging relationships between trainees and their trainers, allowing closer supervision and mentorship. They advise the restriction of placements to places that are sanctioned by the GMC to provide "high quality training and supervision". The report emphasizes the importance of maintaining a level of core knowledge, ensuring doctors are able to manage the general care of their patients, and medical comorbidities regardless of their seniority or specialization. This will be regularly assessed by a robust revalidation program.

Both papers acknowledge the importance of recognizing changes in the population and how these changes need to be

reflected in workforce planning if we hope to provide the best possible care for all patients in the coming years.

Modeling systems to predict the number of specialists to meet the demands of the populous have been plagued with difficulty. The large number of uncontrollable and unpredictable factors has led to heuristic techniques being employed. In 1998 the RAND corporation produced a report on the predicted future supply and demand of orthopedic specialists in the USA [8, 9]. This was presented at the landmark symposium “Orthopaedic Workforce In the Next Millennium.” The RAND study divided supply and demand into separate components. The demand portion was further split into “current utilization rates” and estimates of “clinical time” required to treat the aforementioned utilization rates. The model also took into consideration the variation in the seniority of doctors working in the population. The study concluded that there would be an oversupply of orthopedic specialists in the United States by 2010. Despite their complex modeling methods they proved inaccurate. In 2008, a further study conducted on the Hip and Knee specialist workforce identified a chasm between the 23 % increase in the demand for services but only a 2 % increase in supply of specialists. The issues that beseech predicting future supply and demand models stem from the unpredictable shift in demographics and the evolving spectrum of chronic disease [10]. On the supply side restructuring of training schemes and large scale reform of working patterns result in difficulties in forecasting the functional capacity of the orthopedic community. In view of such difficulties the specialist surgical societies have reverted to a simpler target of ratios of surgeons to a given number of the populous.

Predicting future demands

As of 2010 there were 2056 consultant Orthopedic surgeons practicing in the United Kingdom [11] serving a population of approximately 62 million (1:30,000) [11]. This is a 23 % increase on the number of consultants in 2005. In 2004 the BOA suggested a consultant workforce to population ratio of 1:25,000 with an estimated shortfall of 572 surgeons. In response to this, a nationwide expansion in training posts was implemented with a budget ring-fenced for training. An interim report later commissioned by the BOA revised its recommendation to 1:20,000 by 2015. Between 2000 and 2010 there has been a 76 % increase in consultant numbers, 10 times greater than the equivalent increase in the population. Recent analysis by the Centre for Workforce Intelligence [13••] has suggested consultant numbers will continue to grow by 48 % up to, and including, the year 2020.

Expansion of the Consultant workforce has been largely down to the increasing demand for musculoskeletal services. In 2008, Iorio et al. [14] conducted a study of the orthopedic workforce in the United States, with a particular focus on

those performing hip and knee arthroplasty. Their study predicted a significant increase in the number of patients suffering from osteoarthritis between the years 1995–2020. They also noted 350,000 admissions annually for hip fractures, which they expect to double by 2050. Both of these factors coupled with technological advancement in hip and knee arthroplasty have led to an exponential increase in the number of completed orthopedic episodes in the United States. Such trends have been mirrored throughout the developed world.

The increasing prevalence of obesity will affect an upward force on the incidence of osteoarthritis. Processes estimating the requisite number of orthopedic surgeons must factor in the aforementioned demographic changes.

Moreover, one must take into account future changes in productivity of musculoskeletal services as a result of the increased demands of an ageing population and increased numbers of less experienced fast tracked newly appointed consultants.

Financial unrest following the economic decline and global recession of 2009 has seen the implementation of austerity measures in the NHS. A report published by the Nuffield Trust in 2012 predicts a potential shortfall of between £44 and £54 billion by 2021/22 unless significant cuts can be made [15]. The Quality, Innovation, Productivity, and Prevention program is aiming to improve productivity by 4 % per year but even if they are successful the shortfall is expected to be at least £28 billion. Minimizing hospital admissions, reducing the duration of in-patient stay, and supporting patients with long-term conditions to “self-manage” have all been suggested as areas where savings can be made [16]. The impact these changes may have on the orthopedic workforce is difficult to estimate. Although there may be a reduced demand for ward-based doctors, these changes are likely to be associated with a concomitant rise in demand for out-patient and community review.

Research and development in Orthopedics continues to advance as demands on services increase [17]. New developments have the potential to improve outcomes, minimize complications, and reduce costs, both for the patients and the NHS. However, a vast amount of expensive and time-consuming research is often conducted prior to the formulation of significant developments. Involving clinicians in the research process bridges the gap between research and clinical practice. Although not all orthopedic trainees will take time out of their training in order to complete research, the importance of this should not be underestimated and must be appreciated when forecasting for the future.

Conclusions

Predicting future demands in orthopedics and appropriately matching the requisite number of trainees is a complex and challenging task. A number of factors that are in a continuous state of flux need to be understood.

Sixty years ago, the mainstay of orthopedic practice included poliomyelitis and bacterial bone infections namely Tuberculosis [8]. Medical advancement has meant such pathologies have become increasingly rare. One may have expected a diminution in the requirement for orthopedic specialists, but new technologies and diseases emerged that served to produce an unprecedented demand for orthopedic surgeons. Factors such as an aging population, historic levels of obesity, and osteoporosis ensure that musculoskeletal care will remain in high demand.

Several reports have been produced over recent years to deal with increased orthopedic needs. These reports have led to a variety of initiatives in order to ensure demands continue to be met while ensuring adequate and safe patient care.

Key suggestions include an overhaul of the current working week. To improve efficient use of resources and allow greater choice, recommendations have been made for the NHS to adopt a “7-day working week”. Such changes would have a profound effect on workforce planning. There has also been a move toward the establishment of specialist centers for both emergency and elective care. Increasingly, the NHS is seeking to concentrate specialist services at designated units in an attempt to streamline service provision and optimize patient outcomes. Specialist Trauma centers and networks have been developed as an extension of this. Although such initiatives have yet to be implemented, policies regarding the future supply of specialists must take them into consideration.

Historic predictions with regards to the demand for orthopedic services have proved inaccurate. Ultimately workforce planning needs to be continually reassessed to ensure training pathways and the number of trainees satisfy the demand for Orthopedic care in the future.

Compliance with Ethics Guidelines

Conflict of Interest S. Khan, L. Johnston, M. Faimali, and P. Gikas declare that they have no conflict of interest. T. W. Briggs has shares in Stanmore Implants Worldwide.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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