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SPECIAL ISSUE: **AGE AND THE** **ANAESTHETIST**

A report of a working party of the AAGBI, endorsed by the Royal College of Anaesthetists, with a joint editorial by Andrew Hartle, President, AAGBI and Liam Brennan, President, RCoA

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Editorial

This issue of *Anaesthesia News* is devoted to print publication of 'Age and the Anaesthetist'. Why has the AAGBI taken this unusual step? It is simply this: the single biggest challenge facing the NHS is to respond to the vastly increased demands of an ageing population, not just for our patients but also for the staff on whom they depend. Quick fixes balance the books; but recent 'bailouts' mixed cash with efficiencies so this is not sustainable long term. As more patients live even longer, real term funding per person must increase to maintain current service provision. Lifestyle changes and new drugs may both extend life further; one costs little, one (inevitably) costs lots.

Commissioned and approved by the Board of the AAGBI, endorsed by Council of the RCoA, 'Age and the Anaesthetist' has a distinguished authorship led by former RCoA President Peter Hutton, whose original idea it was. What began as a lecture has evolved through being an AAGBI 'glossy' to the comprehensive analysis of the impact of age on the individual anaesthetist, their clinical practice, patients, retirement and the wider NHS. What has emerged is unlike anything produced previously by either the AAGBI or the RCoA; devoted to a single topic like a guideline, closer in size to one of the GAT or SAS Handbooks.

This publication could not be better timed. English trainees will soon have a new contract, although we now know it isn't one they have agreed. Negotiations on a new English consultant contract are advanced, but a final offer has yet to be made. Pension changes have already been introduced, with the ageing population as one of the major drivers. More people living longer with more comorbidities will undoubtedly put more strain on the affordability of healthcare and healthcare workers are not immune to these pressures.

The implications for anaesthetists of these demographic changes are not just theoretical. We will all face clinical, personal, financial, ethical and many other challenges. Contract and pension changes mean all consultants starting in post today will have to work until they are at least 68 to receive their pension in full. That extra eight years of service compared to the status quo may be crucial in determining how those affected cope with longer working hours, on-call, or shift work. We both (aged 51 and 56) take much longer to recover from disturbed nights on-call, and would not relish more of the same in ten years time (and neither may our patients!)

Anaesthetists are not age-immune. Increasing pensionable ages mean all stakeholders must acknowledge that consultants (or SAS doctors) at 35 and 65 have different and varying mental and physical strengths (particularly around 24/7 service) which must be intrinsic to job and career plans.

The NHS* evolves in response to the electoral cycle as much as service needs. It now needs a long-term, sustainable strategy agreed openly by all major political parties, or to be removed from party politics. Other areas affecting generations (climate change, pollution, energy and water supply, pensions) suggest it sometimes requires a disaster to effect change. Our specialty doesn't need to wait for a disaster; we hope 'Age and the Anaesthetist' may play a major part in guiding decision-making by our members, employers and politicians as they prepare themselves and the NHS for whatever the future holds.



Andrew Hartle
President, AAGBI



Liam Brennan
President, RCoA

*it is likely that the future will see divergence of the taxation, funding and political models of the NHS in England, Scotland, Wales and Northern Ireland.



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Age and the Anaesthetist



The report of a working party of the AAGBI*

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**'Every generation
Blames the one before
And all of their frustrations
Come beating on your door'**

Mike and the Mechanics, 1988

1.0: Executive Summary

- The effects of ageing are inevitable, but the rates of physical and psychological change are highly variable from person to person. A one-size retirement strategy cannot fit all and necessarily be compatible with patient safety. Although the volume of data is small, there is evidence emerging that the anaesthetist's age per se, could be a risk factor for anaesthetic safety.
- There are considerable benefits to be obtained from reviewing how other safety-critical industries, such as airline, nuclear power, transport, fire-fighting, and oil extraction, have managed the problems of the ageing employee. These have involved considerations of hours of work, optimisation of the workplace and competence testing.
- The NHS, as the major employer of anaesthetists, has an onus upon it to anticipate the demographic workforce changes that will parallel the planned increases in retirement age and to make appropriate adjustments to the working environment, working practices and the job plans of older workers.
- As the public ages, the proportion of patients with significant comorbidities who require anaesthesia will increase. Older anaesthetists will need to remain capable of managing this population. Given the current nature of annual appraisal and revalidation, the possibility of introducing processes to confirm workplace competency needs to be considered.
- The public has a reasonable expectation that professional groups will manage their practitioners to ensure they are capable of undertaking the duties for which they are employed. It is important that anaesthesia acts now to anticipate the problems of the future. Leaving things to natural evolution and chance is a too high-risk strategy to be compatible with both patient safety and the best interests of individual anaesthetists.
- The implications of increased life expectancy and economic projections have resulted in unprecedented pressures on the long-term payment of state and salary-related pensions.
- There are demonstrable positive returns in wellbeing and income from remaining in employment, but the effects of removing a mandatory retirement age on safety-critical jobs, such as that of an anaesthetist, have not been evaluated.
- Current retirement patterns in medicine may well reflect 'self-selection' in terms of an individual being able to carry out the demands of a consultant post safely. From the best available data, > 40% of consultants expressed an intention to retire between 56 and 60, with a similar percentage intending to go before 65 years. Only 3% intended to continue beyond 65 and at present the over-65s on the UK's General Medical Council (GMC) register represent <5% of doctors. The effects of a gradual blanket increase in the pensionable age up to 69 years superimposed on this demographic landscape are highly unpredictable and may adversely affect patient safety and clinical outcomes.
- The UK Government's response to this problem has been to increase the age at which public sector pensions can be paid without actuarial decrement and to change from final salary to average contribution schemes. By doing this, it has precipitated an open-ended, uncontrolled experiment in the safe delivery of medical care in general, and in anaesthesia in particular.

Note: All references in this document can be found with the online version of this issue www.aagbi.org/AgeandtheAnaesthetist



2.0: Introduction: what is the problem?

One of the most important problems facing developed societies is how to manage and support the increase in the elderly, economically inactive population through taxation levied on the younger, economically active population. This financial burden has come into sharp focus over recent years as the retirement patterns of the 55-65 year old group have remained unchanged in the presence of an increased period of uneconomic life expectancy.

The problem in the UK public sector is serious because of three issues:

- Salary-related retirement benefits for public sector workers are paid from current taxation. The last Government described this position as 'unsustainable'[1]. The cost of the NHS pension scheme is more than £3 billion per annum [2].
- All people over the state retirement age, including those with an employment pension, are entitled to a basic state pension, the value of which relates to the number of years of contributions that have been paid. This is a set figure, unrelated to employment income or work-related pensions. In one year, £102 billion (5.8% of gross domestic product) [3] will be spent on basic state pensions, again coming out of current taxation.
- Increases in longevity and the gradual accrual of treatable morbidities mean that those living longer in retirement are making more demands on the NHS and social services. This demand is increasing year-on-year. Current expenditure on the NHS is > £115 billion and is increasingly difficult to contain.

The combination of these factors and their projected costs is a huge burden for current and future governments. The single most effective

strategy to manage the increasing costs is simply to decrease the period for which government-funded pensions (work-related and basic state) are paid to individuals. Since it is not possible to affect the date of death, this has resulted in the UK Government increasing the retirement age for both the basic state pension [4] and public sector salary schemes, and increasing a person's monthly financial contributions to the latter.

These changes will impact on medical staff in two ways:

- In order to make adequate pension provision for their own future, they may have to stay in work longer than they had intended.
- The patient population will age and present with more comorbidities, adding greater complexity to routine surgical procedures.

Increasing the retirement ages of medical staff in the presence of greater patient complexity is an open-ended experiment with considerable potential for adverse outcomes for all concerned. It is important for those in work to understand the implications for themselves in providing finance for their retirement while retaining a high quality of delivery of care, and for employers to make changes that enable older workers to remain at work.

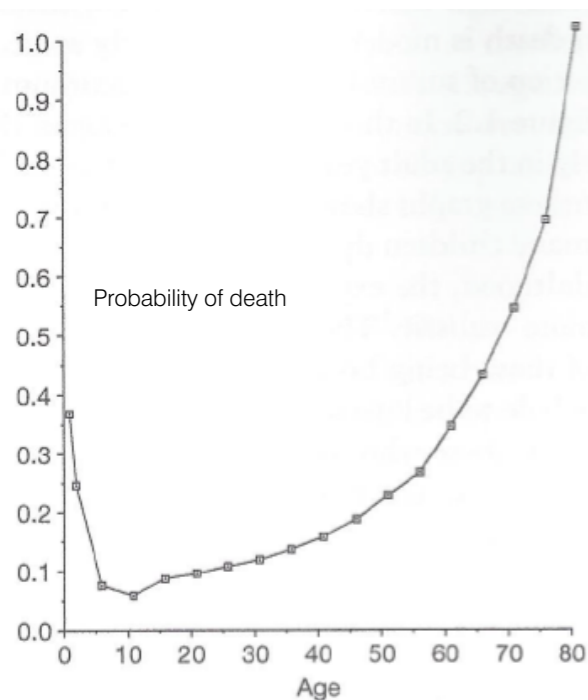
This report on Age and the Anaesthetist looks at the various facets of this new social and professional construct with a view to assessing and anticipating its impact on our specialty and its practitioners. In doing so, it not only evaluates the consequences for anaesthetists themselves, but also touches on the implications for the wider workplace environment and for other staff with whom we work.

3.0: Societal changes and financial issues

3.1: Life expectancy

Life expectancy is defined as the average number of years of life remaining at a particular age. It is a blunt metric that when applied to the newborn is used to describe the average duration of life of a defined population set. It includes many factors including infant mortality, country, profession, gender, the supply of food, the effects of wars and epidemics, and the diseases associated with age. Importantly, what total life expectancy at birth does not do is to predict with any accuracy the age at which those who have reached adulthood actually die.

It is frequently stated that over millennia, life expectancy has continued to increase. While statistically true, this unrefined statement conceals the causes of this trend. There are many cases in ancient history of people living to an age which would meet current expectations. Sophocles died aged 90 in 406 BC, and Socrates died aged 70 in 399 BC. This anomaly of the typical age at death differing from life expectancy is clearly explained in the figure below¹ which plots the probability of dying against age in ancient Rome.



The probability of dying at a given age in the Roman Empire

It can be seen that, at birth, the infant mortality rate was over 1 in 3, yet for those who survived birth, this rate of mortality did not return until > 60 years of age. The death rate from 15–35 years of approximately 10% was the effect of warfare on men and maternal death in women. Since antiquity, infant mortality has steadily decreased, and with it both the average life expectancy at birth and the size of the population have increased. In the UK, the infant mortality rate in England and Wales continues to decrease; in 2011, there were just 4.2 infant deaths² per

1000 live births – the lowest rate on record. This compares with 11.1 deaths in 1981, a 62% decrease. In the last 15–20 years, there has however, been a marked change in society's demographics that has been due to the increasing numbers of adults surviving into old age, i.e. a genuine increase in life expectancy based on longevity rather than improvements in child and maternal health. Data from the UK's 2011 Census [5] showed that in England and Wales, 1 in 6 of the population was aged > 65 years, whereas only 1 in 16 of the population was aged < 5 years. The current life expectancy in the UK as people age is shown in the table below.

Life expectancy by sex and age. National Life Tables, Office for National Statistics, UK, 2011–2013

Current age; years	Male life expectancy; years	Female life expectancy; years
40	40.3	43.6
45	35.6	38.8
50	31.0	34.1
55	26.6	29.5
60	22.3	25.1
65	18.3	20.8
70	14.5	16.7
75	11.2	13.0
80	8.2	9.6
85	5.8	6.8

This trend, first noted over two decades or so ago, continues. For both mortality and disability, overall health has improved substantially in absolute terms in the UK between 1990 and 2010. During this period, life expectancy increased by 4.2 years [6]. Illustrative projections are as follows:

- About one-third of babies born in 2012 in the UK are expected to survive to celebrate their 100th birthday.
- More than 95,000 people aged 65 in 2012 are expected to celebrate their 100th birthday in 2047.
- The total number of centenarians is projected to rise from 14,500 in 2012 to 110,000 in 2035.
- 10% of current 65-year-old males and 15% of current 65-year-old females will become centenarians.

As the population ages and more people become economically inactive (discussed more fully in Section 3.3), more of the burden of providing public finance from taxation falls on the young, who are decreasing in number. This is a major funding problem for the Government.



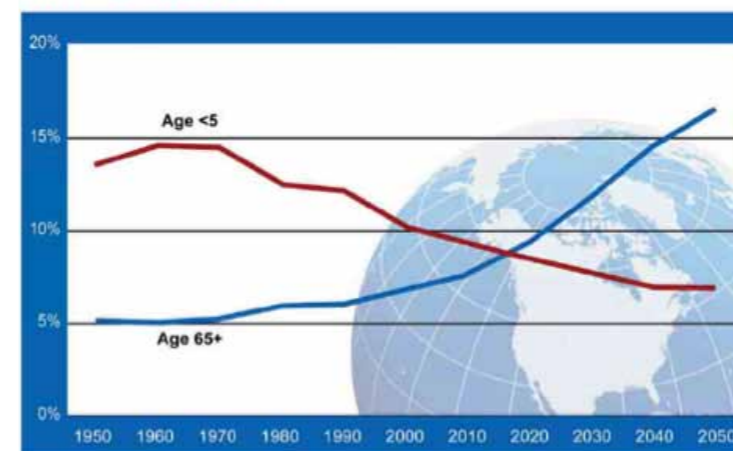
3.2: Financial provision for retirement

Private pensions

This trend towards an older population with a higher median age and requiring more taxable income from the young for its support is also true worldwide, as shown in the diagram below from the World Health Organization [7]. In 2010, an estimated 524 million people were aged 65 or older (8% of the world's population). By 2050, this number is expected to nearly triple to about 1.5 billion, representing 16% of the world's population. Although developed countries have the oldest population profiles, the vast majority of older people – and the most rapidly ageing populations – are in less developed countries. Between 2010 and 2050, the number of older people in less developed countries is projected to increase more than 250%, compared with a 71% increase in developed countries. This raises major issues for overseas aid policies.

The plight of those having insufficient funds to live out their life in relative comfort was first addressed in the 18th century by the Presbyterian Church in Scotland. Under the Law of Ann (1672), the widow and children of a deceased minister of the Church of Scotland received only half a year's stipend in the year of the minister's death. After that they faced penury. Two ministers, Robert Wallace and Andrew Webster, along with the Professor of Mathematics at Edinburgh, Colin Maclaurin, decided to tackle this injustice.

Young Children and Older People as a Percentage of Global Population: 1950-2050



In gathering data they found that there were approximately '930 ministers in life at all times', of whom '27 died yearly', leaving '280 widows living at any one time' [8]. From annual premiums paid by ministers, the *Fund for a Provision for the Widows and Children of the Ministers of the Church of Scotland*³ was established. The contributions were set at a level so that, when invested, there was sufficient income to meet the payments to the beneficiaries. This was the first actuarial forecast to determine what contributions had to be made during one's working life to provide for benefits during retirement or after death. As such, it formed the model for innumerable other 'fully-funded' independent schemes. The Universities Superannuation Scheme, and most industrial company and private pensions, are structured in this way. Many clinical academics are in the Universities Superannuation Scheme.

As a result of the increasing longevity of new entrants, most of these actuarially-determined private pensions are moving away from final salary benefits (where the pension is a proportion of the final salary determined by the number of years of contributions), to defined benefit schemes where the returns relate to the individual's total contributions made and estimated years of life rather than the final salary.

¹ Figure taken from the work of Parkin and presented by Harlow M, Laurence R. *Growing Up and Growing Old in Ancient Rome*. London: Routledge, 2002. Fig 1.1, p 9.
² An infant death is defined as the death of a child aged less than 1 year old.

³ This grew steadily from its inception to become the general insurance and pension fund now known as Scottish Widows.

The pace of private pension reform has accelerated over the past decade. The Pensions Act 2008 instructed that all employees over 22 years of age and below the state pension age⁴ should be automatically enrolled into a qualifying workplace pension scheme between 2012 and 2016. From October 2017, all private sector employers have to contribute a minimum of 3% to an employee's pension with the employee contributing at least 4%.

'Old-age' or basic state pensions

In the UK an 'old-age' or basic state pension is paid from current taxation to everybody reaching the state pension age who has made compulsory or voluntary National Insurance contributions during the whole or part of their working lifetime.

Publically funded pensions of this type, which aimed to provide support during the life remaining when work was no longer possible, were introduced (probably as a political manoeuvre to wrong-foot his socialist opponents) by Bismarck, the Chancellor of Germany, in the Old Age and Disability Insurance Bill of 1889. This provided a state pension funded jointly by those in work and the state for all those retired from work and > 70-years-old. Less than 10% of the population lived to benefit.

In Britain at the beginning of the 20th century, the only general support for old age was the Poor Law. None but a small number of people received a proper pension or had made private insurance provision. The consequent extent of poverty in the elderly resulted in Lloyd George's Old Age Pensions Act (1908) [9], which paid a non-contributory, means-tested pension to each person aged over 70 from 1 January 1909. Through a series of subsequent legislative initiatives over ensuing years, the pensionable age was set at 60 for women and 65 for men. The National Insurance Act (1946) created a universal social insurance system based around flat-rate benefits (at the same level for all contingencies) in return for flat-rate contributions. This still forms the basis for the current basic state pension. On average, the benefits from the basic state pension represent over half the incomes of those currently retired [10].

Of great importance in state-funded pensions is the 'support ratio', which is an important indicator of the pressures that demographics pose for a state pension system. It measures how many people there are of working age (20–64 years) relative to the number of retirement age (over 65 years): this is effectively the ratio of the number of economically active people in relation to those drawing benefits. Data from the Organisation for Economic Co-operation and Development [11] shows the following for the UK from 1950 to 2050.

Year	Support ratio
1950	7.2 to 1
1980	5.1 to 1
2010	3.5 to 1
2050	1.8 to 1

It is clear that the situation pertaining to when the welfare state started is very different from that today, and things will get steadily worse. Sometime before 2050, on average, two working people will be paying the full basic state pension for one retired person.

To manage these unprecedented trends, the Pensions Act (2007) introduced a number of changes to state pensions. The most important was to provide for gradual increases in the state pension age for men and women, from 65 to 68 between 2024 and 2046. The Pensions Bill (2011) speeded up the pace of the increases of the 2007 Act: women's state pension age would rise to 65 by November 2018 and for both

men and women would reach 66 by 2020. The 2013/14 Pensions Bill and the Chancellor's 2013 Autumn Statement set out a framework within which the state pension age would be regularly reviewed in the future. They anticipated that an increase to 68 years and, later, to 69 years would occur sooner than in previous estimates.



Public sector employment pensions

It has been the norm for many years for employees in the public sector to be enrolled automatically in a final salary pension scheme. However, there are no individual 'pension pots' with people's names on them; the pension contributions made over a professional lifetime are not saved as hypothecated taxes for future use. Furthermore, even if there were proper 'pension pots', the total contributions throughout life would not meet the lifetime benefits.

The NHS (and the public sector in general) thus has an 'unfunded', or 'pay-as-you go', scheme paid out of general taxation as part of the cost of providing public services. In its elemental form this is essentially a Ponzi scheme whereby younger workers pay taxes to support those who have retired. Long-term, such a scheme only works when the population is growing and when most retirees do not live for too long. When there is a national financial crisis or low economic growth combined with a simultaneous increase in beneficiaries, maintaining these payments is a major problem for the Government.

The four largest pay-as-you-go public sector schemes [12] are:

- The Armed Forces Pension Scheme (covering the UK).
- The Principal Civil Service Pension Scheme (for England, Scotland, Wales and some employees in Northern Ireland).
- The NHS Pension Scheme (for England and Wales).
- The Teachers' Pension Scheme (for England and Wales).

These four schemes have accounted for over 75% of total payments from UK public service pay-as-you-go pension schemes in recent years. They are all of the defined benefit type, in which the pension that a retired employee receives depends on the final salary earned and the number of years of service. In accordance with their terms and conditions, the schemes usually pay a lump sum when an employee retires, followed by a regular pension until the death of the pensioner and any eligible dependents. Combined, the schemes had 6.5 million members at 31 March 2009, comprising 2.75 million current staff, 1.59 million previous employees who had earned pensions but were not yet eligible to draw them, and 2.13 million pensioners, i.e. there were fewer people contributing than there were those eligible to draw benefits.

These schemes have a major current and future funding problem. Total payments to pensioners in the four schemes increased by 38% (a 26% real-terms increase), in the decade from 2000 to 2010, the dominant factor being the 23% increase in the number of pensions paid.

3.3: The current conflicted situation

Through legislation, the Government sets:

- An annual allowance for the maximum amount of pensionable contributions that qualify for tax relief in any one year.
- A cap (the lifetime allowance) on the maximum total pension assets an individual can hold without incurring extra tax on its benefits.

The Finance Act (2011) contained a number of changes to the tax regime for both private and public sector funded pensions of which the most important were:

- A decrease in the annual contributions allowance from £255,000 in 2010/11 to £50,000 from 2011/12 onwards.
- A decrease in the lifetime allowance from £1.8 million to £1.5 million from April 2012. Any amounts in excess of the lifetime allowance are subject to a tax charge of 25% (in addition to income tax) if the benefits are paid as a pension, or a 55% tax charge if they are paid as a lump sum.

For many NHS doctors (and especially those who have made additional private pension provision), the lifetime allowance is being reached in their late 50s or early 60s. It is calculated as⁵:

Private pension assets + NHS lump sum + (20 x the annual NHS pension)

For a doctor with no additional private pension, retiring from an annual salary of £100,000 per annum with 40 years' contributions results in a lifetime allowance of:

$$£150,000 \text{ (lump sum)} + (20 \times £50,000) = £1,150,000$$

The lifetime allowance was introduced in 2006 at a level of £1.5 million. It then increased each year to 2010, when it reached a level of £1.8 million. Since 2010, there have been a number of pension reforms that have led to the lifetime allowance being further reduced. The current level of the lifetime allowance in the 2015–16 tax year is £1.25 million and this will reduce further to £1 million from April 2016⁶ as the Government tries to decrease its expenditure on pension tax relief.

The financial paradox of this for doctors and other professionals (who in relation to the general population have earnings and pension benefits well into the upper quartile), is that whereas the Government would like them to continue to work and contribute to the economy through productivity and taxation (to optimise pension returns and minimise tax contributions), they are retiring on financial grounds while still fit for work. Some, but not all, return to work after retirement. In this situation, once having officially retired and returned, the new contract will have no continuation of time-accumulated benefits such as sick leave.

As a result of the progressive cost of meeting retirement benefits, public sector schemes have recently undergone significant modifications. Following changes for new joiners and existing members who opted to convert in 2008, on 1 April 2015 the NHS pension scheme was modified again [13]. The 2015 NHS Scheme is a Career Average Revalued Earnings scheme. This is a form of defined benefit pension scheme, which means you get a guaranteed level of benefit at retirement payable according to a fixed formula related to totalled annual contributions.

In a Career Average Revalued Earnings scheme, your pension reflects your pensionable pay throughout your career. The pension you earn each year is based on actual pensionable pay in that 'scheme year' and is increased by a set rate linked to inflation (known as 'revaluation')

each year up to retirement or leaving. A 'scheme year' runs from 1 April of one year to 31 March of the following year. The final pension payable is calculated by adding together the revalued pensions earned in each year of membership. Under these new arrangements:

- The normal pensionable age at which benefits can be taken without reduction is the same as the state pension age at that time, i.e. the normal NHS 'contributory' pensionable age will increase as set by the future legislation that defines the state pensionable age. At present, this means it will be 66 years for both men and women by 2020.
- Employees can contribute until they are 75.
- Members' contributions vary from 5% to 14.5% (increasing with salary), and the employer pays 14%. The Government has reserved the right to alter these figures.
- The Pensions Policy Institute estimates that reforms to the NHS pension schemes will decrease the average value of the benefit offered across all scheme members by more than a third [14].
- An important feature of the new scheme is that because pension benefits are accumulated annually, it more easily allows for career breaks and for reduced hours closer to retirement age.

In summary, the current situation is confusing. On the one hand, the imposition of the lifetime allowance on existing final salary schemes is encouraging earlier retirements for high earners such as consultants. On the other hand, the future will see higher contributions, lower benefits and an increasing age at which contributory and state pensions will be paid. Furthermore, the application of the lifetime allowance will decrease the appetite for making further conventional private pension provision.

It is clear that future arrangements will not match the traditional NHS pension benefits. The age of retirement will increase and individuals will be increasingly responsible for their own financial provision in retirement.

Very importantly, the effect of the proposed changes on the health of older consultants, their ability to maintain complex sophisticated skills and their ability to care for an increasingly complex patient population appears not to have been considered.



⁵ The annual pension is multiplied by 20 to calculate the 'virtual pot' that would be required to generate the value of the annual pension from an annuity at 5%. Since the global financial crisis there have been very low or zero interest rates, but the multiplier has not been adjusted. If it ever were to be adjusted, the effect on tax payable on pension income could be considerable.

⁶ Data from the Pensions Advisory Service. <http://www.pensionsadvisoryservice.org.uk>

4.0: Age, physiological changes and comorbidities

4.1: The ageing process and its impact on organ function

The ageing process

Ageing is a complex biological process that remains inadequately understood. It is characterised by a progressive decrease in organ reserve that increases the vulnerability of an individual to organ dysfunction and failure. However, ageing is very unpredictable and its effects are heterogeneous. Genetic factors interact with those of the environment to influence both rate and extent of ageing. Twin concordance studies suggest that 25% of ageing variation can be accounted for by genetics, while 50% is due to environmental factors [15–18]. While a range of environmental agents is known to play a role, how these will affect the ageing of each exposed individual is extremely difficult to predict. The average progress of ageing in a cohort is predictable, but the individuals within it show large and unpredictable variability.

Impact of ageing on organ function

Ageing may affect physical performance in three broad categories:

- 1. Disruption of physiological rhythms.** Physiological circadian rhythms such as sleep and endocrine axes are altered with ageing.
- 2. Loss of physiological complexity.** Results in functional decline of the organism by diminishing the range of available, adaptive responses to the innumerable stressors of everyday life [19].
- 3. Homeostenosis.** This represents the progressive loss of physiological reserves and inability to compensate for physiological stressors. Its most extreme manifestation is frailty. In the frail individual, most physiological reserves are employed to maintain basal organ function. A subsequent external challenge may result in loss of organ function. In the frail, this typically presents with failure of complex neurophysiological processes such as ambulation, balance, continence and cognition. This is shown as a conceptual graphic below [20].

The processes of ageing are diverse and, even before a state of frailty is reached, ageing can affect physical performance. Circadian rhythm disruption and an inability to adapt to changes in the sleep-wake cycle may have implications for 24-hour working in advanced age [21]. Cardiovascular changes include those of anatomical and decreased physiological variation in heart rate [22]. Both these lead to an overall reduction in cardiovascular peak performance [23]. Similar changes are seen across other key organ systems, e.g. ageing also affects parameters of pulmonary function with decreases seen in the forced expired volume in one second (FEV1) and the forced vital capacity [24].

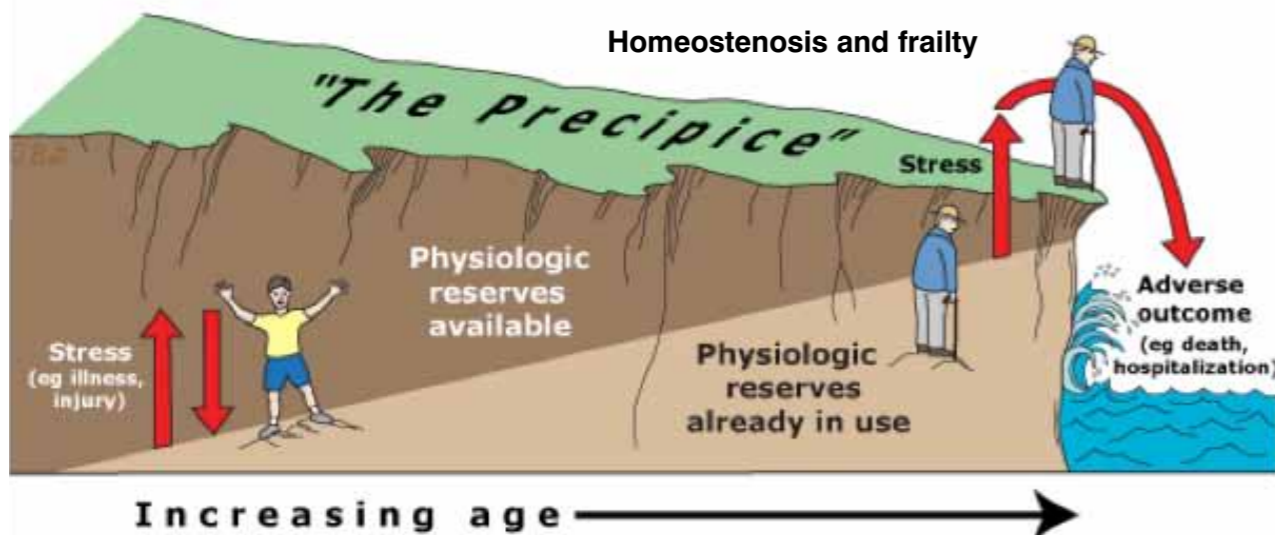
Neurological ageing is characterised by neuronal loss and decrease in white matter volume [25]. Changes also occur at a cellular level, with reduction in receptor expression and neurotransmitter function [26]. These factors translate into measurable neurocognitive parameters, including decreases in cognitive processing speed [27].

Decreased neurocognitive testing performance is seen with advancing age in a range of cognitive domains [28], but particularly within executive planning and function. Presbycusis [29] and presbyopia [30] may also affect sensory input into the ageing neurological system [31]; this may synergistically combine with neurocognitive ageing to affect physical performance.

The effects on the major organ systems are summarised in the table below [32].

While physical changes are unlikely to affect the ability of an anaesthetist to function on a day-to-day basis in the workplace, the equivalent subtle changes in neurological, sensory and cognitive function may be of greater significance. Also, individuals ageing even at normal rates [33] may only rarely be exposed to stressor events of sufficient magnitude to unmask the loss in neurophysiological reserve.

It would be bad for patient safety if such a situation arose unexpectedly during anaesthesia.



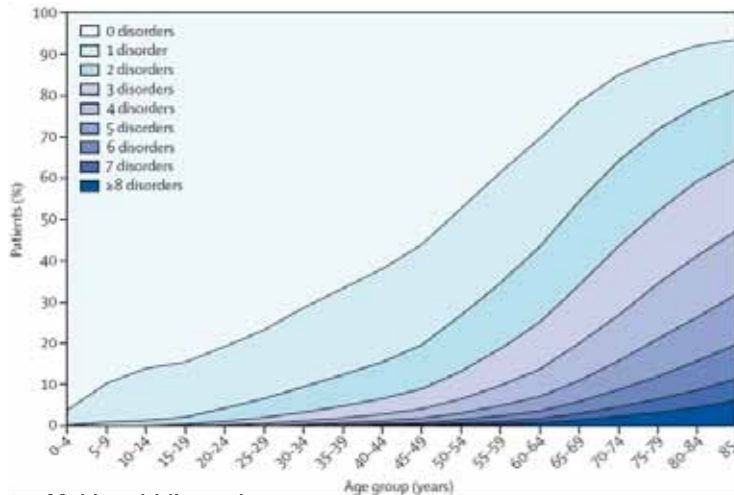
Age related physiological changes (adapted from Chester & Rudolph [32])

Mechanism of change	Blood pressure	Pulse and cardiac output	Respiratory	Hormonal/immunological
Molecular, structural and organ level changes and systemic effects	<ul style="list-style-type: none"> oxidative and mechanical damage to vascular endothelium heightened inflammatory response from cytokines, growth factors, collagen, elastases and proteinases decreased arterial wall pliability increased left ventricular wall thickness diastolic dysfunction increased pulse pressure 	<ul style="list-style-type: none"> desensitisation of sympathetic receptors disrupts intracellular signalling decreased baroreflexes delayed responses decreased cardiac output and increased resting heart rate maximum heart rate is more limited with age 	<ul style="list-style-type: none"> increased elastases degrade elastic tissue and reduce compliance with dilation of airspaces altered chest wall shape increased work of breathing altered diaphragm shape decreased compliance air trapping with increased residual volumes and decreased tidal volumes increased respiratory rate compensates for less tidal volume 	<ul style="list-style-type: none"> decreased T-cell function with reduced immunity changes in hypothalamic activity Increase in dysfunctional/deficient hypothalamic mineralocorticoid receptors increased night-time cortisol levels reduced ability to maintain body heat with less subcutaneous fat, reduced peripheral vasoconstriction dysregulated circadian rhythm loss of muscle mass
Compensation to stress	<ul style="list-style-type: none"> reduction in endogenous cellular repair capability due to damaged cardiomyocytes and vascular endothelium altered intracellular protein expression mitochondrial ageing and changes in signal transduction cascades loss of responsiveness to sympathetic stimuli 	<ul style="list-style-type: none"> less sympathetic responsiveness hinders ability of cardiovascular system to adjust when stimulated less adaptability in heart rate is associated with falls, frailty 	<ul style="list-style-type: none"> weakened respiratory muscles, less compliant chest wall, and increased work of breathing diminish ability to adapt to stress less sensitivity of chemoreceptors and mechanoreceptors causes decreased response to hypoxia and hypercapnia 	<ul style="list-style-type: none"> loss of heat maintenance and thermogenesis mechanisms with heightened vulnerability to hot and cold stressors lower core body temperature hinders ability to regulate body temperature

4.2: The role of comorbidity

The relationship between comorbidity and age

Though the processes of ageing result in loss of physiological reserve, primary organ failure and disease are not considered parts of the normal ageing process. However, the accumulation of chronic comorbidity, and importantly multimorbidity, is closely associated with advancing age. Not only is the presence of comorbidity associated with increased mortality, but so is poor health and physical function. Data reporting the prevalence of multimorbidity have historically been scarce. A recent landmark UK population study [34] reported that by the age of 50, half the population had acquired at least one comorbidity, with 65% having multimorbidity by the age of 65.



Multimorbidity and age

In addition to physical health problems, mental health disorders increase in prevalence with age. They are closely associated with combined physical and mental comorbidity, which is present in 18% of patients ≥ 65 . Although these patients are at or above current retirement age, this study also found that nearly two thirds of people with combined physical and mental health comorbidity were aged < 65 years. Although multimorbidity is more prevalent in older people, approximately half of the multimorbid population in the UK is aged below 65. This indicates that physical and mental health problems affect large numbers of the working-age population. These data are similar to rates of self-reported longstanding illness and disability for the UK population derived by the Office for National Statistics in 2013 [35].

Self-reported prevalence of longstanding illness and disability. Office for National Statistics, UK, 2013

Age; years	Male %	Female %	All %
24-44	19	22	21
45-64	42	42	42
65-74	59	55	57
> 75	68	70	69



Longstanding limiting illness and disability

Arguably, more important than knowing the prevalence of comorbidity or multimorbidity is understanding how these conditions affect the physical function and lifestyle of an individual. UK data from the Office for National Statistics provides information on self-reported limiting conditions, i.e. illnesses which require a change to life activities [35].

Self-reported prevalence of longstanding illness and disability that limit life activities. Office for National Statistics, UK, 2013

Age; years	Male %	Female %	All %
24-44	9	11	10
45-64	21	23	22
65-74	33	31	32
> 75	45	49	47

These data illustrate that although self-reported longstanding illness and disability is common within the working population, increasing from 21% (between ages 24-44) to 42% (between ages 45-64), the limitation of life activities associated with this is significantly less common. Only 10% of those aged 24-44 years and 22% of those aged 45-64 are limited by their condition. This increases a further 10% to 32% of those aged 65-74.

These data pertain to the entire UK population, and therefore are unlikely to be perfectly reflective of the working population of anaesthetists. They do not account for illness or disability starting in youth in people who never reach the workplace, nor does it account for socioeconomic status. Multimorbidity correlates closely with increasing social deprivation, and these data may therefore over-predict poor health and disability in the selected population that is the subject of this report.

Impact of ill health and comorbidity on the ability to work

The presence or absence of comorbidity is of limited use in determining its effect on an individual's ability to function in the workplace. Although reported limitation is more useful, this depends on the role fulfilled by that individual. The application of population-wide data to a highly selected population of anaesthetists with a very specific defined skillset therefore has its weaknesses. However, the data sources quoted above and immediately below describe high rates of impaired dexterity (8%), stamina (11%) and mobility (13%) within the working population, which, importantly, increase significantly after the age of 65. These may have implications for anaesthetists towards the end of their working life.

Effects of physical or mental health conditions lasting > 12 months. Office for National Statistics, UK, 2013

Percentage of physical parameters affected by physical or mental health, by age

Affected parameter	Age 25-44; %	Age 45-64; %	Age 65-74; %	Age > 75; %
Vision	2	4	7	16
Hearing	1	4	9	21
Mobility	5	13	22	42
Dexterity	3	8	11	21
Learning, comprehension and concentration	2	3	2	4
Memory	2	4	5	12
Mental health	5	6	2	2
Stamina, breathing and fatigue	4	11	16	25
Social skills and behaviour	1	1	0	0
Other	5	6	9	7

4.3: Healthy life expectancy and survivorship in good health

Despite the presence of significant longstanding disability and limitation of function, life expectancy in the UK continues to increase. At the age of 65, life expectancy ranges from 18 years for men to 20.7 years for women. Approximately 60% of this further life expectancy will be spent in good health, indicating that the current conventional retirement age does not reflect impending disability and poor health status. Data from the Office for National Statistics are shown below [36].

Projected survival, health status and disability at birth and 65 years. Derived from self-reported prevalence of limiting longstanding illness and disability data (2009-11) and life expectancy tables (2011-13). Office for National Statistics, UK.

Healthy life expectancy at birth				
Sex	Life expectancy; years	Healthy life expectancy; years	Actual years of 'not good' health	Proportion of life spent in good health; %
Male	78.4	64.2	14.2	81.9
Female	82.4	66.1	16.3	80.2
Healthy life expectancy at age 65				
Sex	Life expectancy; years	Healthy life expectancy; years	Actual years of 'not good' health	Proportion of life >65 years spent in good health; %
Male	18	10.7	7.3	59.3
Female	20.7	12.1	8.6	58.6

4.4: Summary of key factors

1. Ageing is a complex and heterogeneous process. Biological and chronological ageing are not synonymous, and the course of ageing in an individual is difficult to predict.
2. Ageing results in progressive loss of physiological reserve, which is characterised by homeostenosis, loss of physiological variability and disruption of native physiological rhythms.
3. Comorbidity is increasingly prevalent with advancing age. Variation in patterns of comorbidity is seen within populations between diverse socioeconomic groups.
4. Longstanding disability increases with age, but is significantly prevalent in the working age population. A large proportion of these people have limitations in their function.
5. Life expectancy in the UK is increasing, with approximately 60% of remaining life expectancy at age 65 expected to be characterised by self-reported good health.

5.0: Workforce patterns and workforce issues

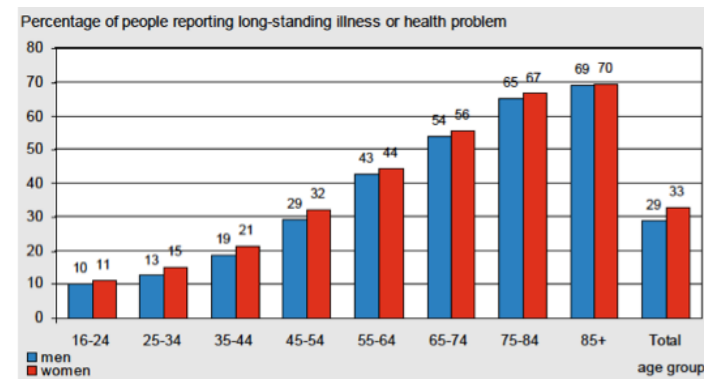
5.1: Time in employment and retirement patterns of the general population

It is important to review employment trends in the general population. As well as medical staff being part of this population and hence subject to its characteristics, the trends also describe the population whose health the Government will be responsible for managing with a view to keeping them economically active.

The European Commission, in preparing for the future needs of its ageing population, commissioned a study into the impact of chronic disease on the retirement age in the EU. This was undertaken by the Dutch National Institute for Public Health and the Environment and published in 2012 [37]. At the time of their survey, the normal retirement age across Europe varied from 57 years in Greece to 67 in Norway, with the UK then having 60 for women and 65 for men. They concluded the following:

- The burden of chronic diseases on Europeans of retirement age is substantial and will increase due to population ageing and prevailing lifestyle risks.
- Poor health has an impact on the labour participation of older workers.
- Chronic diseases among older European workers contribute to economic costs.
- Musculoskeletal and cardiovascular complaints were the main causes of early retirement in the health services⁷.

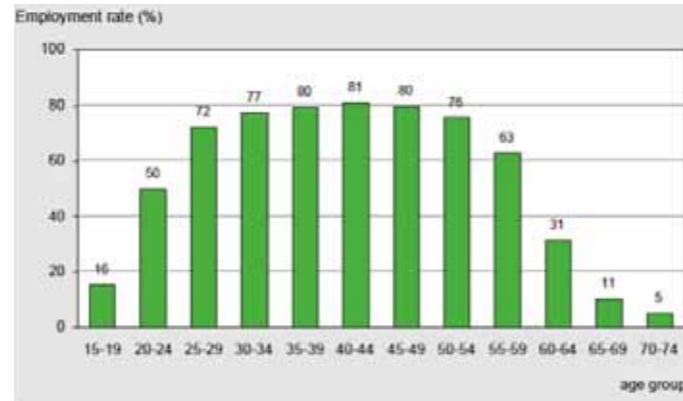
One metric was emphasised as being an important vector of whether or not people remained in employment. This was the percentage of each age group reporting a longstanding illness or health problem; this is shown in the figure below.



People in the EU reporting chronic health issues by age categories in 2010 (Eurostat⁸ 2012)

It can be seen that between the ages of 60 and 65, the 50% rate is passed. This does not indicate that all these people will be unfit for work, but may mean that earlier employment may have to be modified to accommodate a change in health status. It is a very important to note that the review indicated that self-perception of poor health –

rather than the condition itself – is by far the main predictor of leaving work. In addition, the presence of three or more doctor-diagnosed conditions is strongly related to cessation of work. Another key factor that will influence the ability of the Government to modify the public sector pension bill is the current retirement pattern. To change this requires a massive culture shift. The current data on employment rates are shown below.



The EU average employment rate (%) by age category in 2011 (source: Eurostat 2012)

It is very important to note that for whatever the various causes, labour participation decreases progressively after the age of 50.

Putting the above findings together results in these conclusions:

- When the state pensionable age is increased, as is planned in the UK, if people continue to work, the number of older workers with a chronic disease and activity limitations due to health problems will also increase.
- Effective interventions will be needed to improve the work participation of people with a chronic disease.
- The reasons for retirement will not be entirely determined by health or the self-perception of health. Some of those retiring will be doing so because they are economically able to, or because they need to care for a loved one, or simply because they dislike their work.

The crucial point is that in order to meet the Government's planned intentions for the normal pensionable age in the NHS pension scheme to become equal to the state pensionable age (so as to allow retirement without an actuarial penalty), a huge change to current retirement patterns is required. It means that approximately three times as many people at present in the 60–64 age group and nearly ten times as many as are at present in the 65–69 age group would have to remain in employment. It is highly unlikely that this will be the case and many individuals will end up taking reduced benefits when compared with the present retirees. Perversely, it may also encourage an increase in attempts to retire on grounds of ill health so that the pension entitlement is 'made-up' to what it would be at the state pensionable age.

⁷ This includes all health workers, not just medical staff.

⁸ Eurostat is a directorate of the European Commission responsible for the collection of data. This was the data source used to inform the 2012 RIVM report referenced in reference 37. It can be accessed at <http://www.ec.europa.eu/eurostat>



5.2: Employment patterns and the retirement intentions of medical staff

Getting data on the retirement intentions of consultant medical staff is difficult. The most basic approach is to look at the age distribution of doctors registered with the GMC. The current situation is shown in the table below [38].

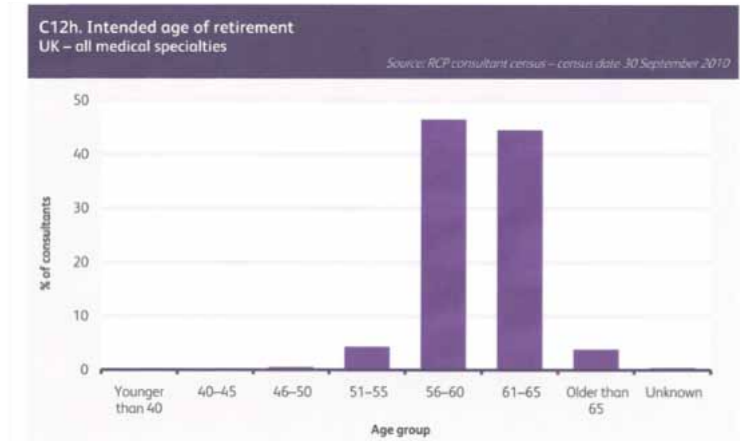
Age group	Number of doctors	Proportion of the workforce
≤ 25	10,715	3.9%
26–35	76,139	27.8%
36–45	80,350	29.3%
46–55	57,796	21.1%
56–65	31,672	11.6%
> 65	13,344	4.9%
No birth date	3,837	1.4%
Total	273,853	100.0%

Doctors (all grades) registered with the GMC in 2016

Clearly these data must be interpreted with caution since, over time, there has been an increasing number of doctors registered per year. At present there are nearly 86,000 doctors on the specialist register, of whom 11.5% are anaesthetists. The number of specialist registrants

has increased by over 50% from 2005. These will however be occupying the earlier years in the table below. The important figure to note is that between the decade 46–55 years to the decade 56–65 years there is a reduction of nearly 50% in continued employment, and between the decade 56–65 years to over 65 years there is a further nearly 60% reduction. These reductions will have a number of confounding variables buried within them, but the decrements are so great that for medical staff to continue in employment as the Government intends requires a massive change in end-of-career decisions.

Accepting that there will be some specialty differences, probably the best information to date on retirement intentions is that from a survey undertaken by the Federation of the Royal Colleges of Physicians of the UK in 2011 [39]. The intended ages of retirement are shown below.



These data clearly confirm the discrepancy between the retirement intentions of the consultant workforce and the objectives of public sector retirement policy. A total of 47% expressed an intention to retire between 56 and 60, and a further 43% intended to retire before 65. Only 3% intended to work beyond that age. The two most common reasons cited for wanting to retire were pressure of work and domestic reasons, with dissatisfaction with the NHS following close behind.

Voluntary early retirements were also studied in a 2011 survey published by the British Medical Association [40], which found that retirements before the age of 60 had increased by 72% in the previous year. The proportion of retiring consultants each year who took retirement early had almost doubled from 7.3% in 2006 to 14% in 2011. If these figures remain unchanged as retirement intentions, possibly also stimulated by the financial problems associated with exceeding the lifetime allowance, there is a very significant professional problem ahead that affects both the service capability of the NHS and doctors' personal lives.

5.3: Wellbeing at work: making work possible

The changes to pensions regulations not only affect medical staff – they affect all workers in the NHS. Others in doctors' workplaces will also be increasing in age and, in interacting with them, mutual allowances may have to be made. As a result of this and other considerations, wellbeing at work relates to more than just the individual: it includes their health, colleagues, and the matrix of hours and facilities within which they carry out their job. There is considerable financial and social loss to those absent from work, and going to work needs to be recognised as the healthier option. The importance of work and health in people's lives was explored by Dame Carol Black's report *Working for a healthier tomorrow* [41]. This review was not instigated primarily to meet the future changes planned in pensions reform, but its findings and conclusions have considerable impact on them. In essence, it sought to establish the foundations for a broad consensus around a new vision for health and work in the UK. At the heart of this vision were three principal objectives:

- Prevention of illness and promotion of health and wellbeing.
- Early intervention for those who develop a health condition.
- An improvement in the health of those out of work so that everyone with the potential to work has the support they need to do so.

A shift in attitudes is necessary to ensure that employers and employees recognise not only the importance of preventing ill health, but also the key role the workplace can play in promoting health and wellbeing. Over the past decades, the focus has been on health and safety in the workplace – and great strides have been made in this regard – but little was done to address positive health and wellbeing. Research specially commissioned for the Black Report found considerable evidence that health and wellbeing programmes produced economic benefits across all sectors and all sizes of business; in other words, good health is good business.

The review identified that health and wellbeing are not just medical issues. The nature and characteristics of the jobs people do are critically important in terms of satisfaction, reward and control. Good management also leads to good health, wellbeing and improved performance. Line managers have a role in identifying and supporting people with health conditions to help them to carry on with their responsibilities or to adjust responsibilities when necessary. In the future this could become a critical path towards keeping all grades of older workers in the NHS in employment. Medical staff will need to play their part in this process.

For those who develop health conditions, their roles will need to be underpinned by changes in ideas of fitness for work. It is inappropriate to be at work unless you have the appropriate fitness; being at work when unwell normally impedes recovery. Employers have significant scope to facilitate an employee's early return from sickness absence.

Early, regular and sensitive contact with employees during sickness absences can be a key factor in enabling an early return. Tackling stigma around ill health and disability is key to enabling more people with health conditions to stay in work. This is particularly true for those with mental ill health, as many organisations fail to recognise the full value of the contribution they can make.

Changing perceptions will also require greater public engagement with the benefits of work to health, increasing expectations of what makes a job good and of the support people with health conditions should expect to enable them to remain in or return to work. A lack of understanding about the relationship between work and a person's health, and the omission of this evidence from professional training, has meant that despite best intentions, the work-related advice that healthcare professionals give to their patients can be overly cautious and may not be in the best interests of the patient in the long term. Emerging evidence suggests that, for many people, early interventions help to prevent short-term sickness absence from progressing to long-term sickness absence and ultimately the inability to work. In a subsequent report [42] that tackled the issue of absence from work because of sickness, it was noted that much sickness absence and inactivity follows common health conditions that, given the right support, are compatible with work, although sometimes work patterns need to change. Sickness absence in the NHS varies significantly. Sickness absence data in the NHS are presented in terms of percentage of working time lost, and different NHS workforces have markedly different absence rates. Ambulance staff have the highest aggregated sickness absence rate (6.3%) followed by healthcare assistants and other support staff (6.21%). By contrast, nursing, midwifery and health visiting learners had the lowest rate (1.05%) followed by medical and dental staff (1.21%). Generally, NHS absence rates have decreased in recent years, particularly in those job areas exhibiting above average absence. One of the great social conundrums of our time has been revealed by the Marmot Report [43], which was commissioned on behalf of the Department of Health. This studied the effects of inequalities on health. These are reflected in the NHS workplace through the wide spectrum of people working there. There is a social gradient in health: the lower a person's social position, the worse his or her health. Health inequalities result from social inequalities, so action on health inequalities requires action across all the social determinants of health. While within England there are nowhere near the extremes of inequalities in mortality and morbidity seen globally, inequality is still substantial, and the Marmot Report calls for urgent action. In England, people living in the poorest neighbourhoods will, on average, die seven years earlier than people living in the richest neighbourhoods. Even more disturbing, the average difference in disability-free life expectancy is 17 years. Thus, people in poorer areas not only die sooner, but they will also spend more of their shorter lives with disability. The combined effect of social class and the importance of employment (as described above in the Black Report) can be seen in the figure below⁹.



⁹This is reproduced in the Marmot report and is taken from: Bethune A. Unemployment and Mortality. In Drever F and Whitehead M (Eds.) *Health inequalities: Decennial supplement*. ONS Series DS no. 15. London: The Stationery Office, 1997.p 156-67.

There is an important link between the findings of the Marmot Report and the planned changes to state and public sector pensions in the UK. Assuming that the late 60s is the pensionable age towards which England is moving, > 30% will have a limiting disability when aged > 65 years. The Marmot Report concludes that if society wishes to have a healthy population working for longer, it is essential to take action to increase the general level of health and to flatten the social gradient.

It can therefore be inferred that alone, the planned pensions legislation changes will probably fail to meet their intended targets. What is required alongside these changes is a wholesale change in the way society views health and work. For people to work longer, the workplace needs to promote health and wellbeing and make sure that everybody with the potential to work has the support they need to do so. The NHS employs persons from all social classes; to enable them all to play their part as economically active members of society, there also needs to be attention focused on the reduction of inequalities in order to transform illness, disability and dependency into continued good health and social engagement through work.

5.4: The public's expectations of older professionals

Trust and professional regulation

The relationship between medical staff and patients is in constant evolution and, if the media are to be believed, appears to be moving away from 'blind faith' towards accountability, challenge and measurement of competence. This is encouraged by individual doctor performance league tables and the sort of user, infection and mortality ratings shown on the NHS Choices website. Despite this, patient satisfaction on an individual basis remains high and, in May 2015, > 95% of inpatients treated by NHS Trusts and Foundation Trusts would have recommended their provider to friends or family [44]. The question for this publication is: 'How does the age of the medical practitioner affect the public's reasonable right to expect that the medical staff it sees are competent?'

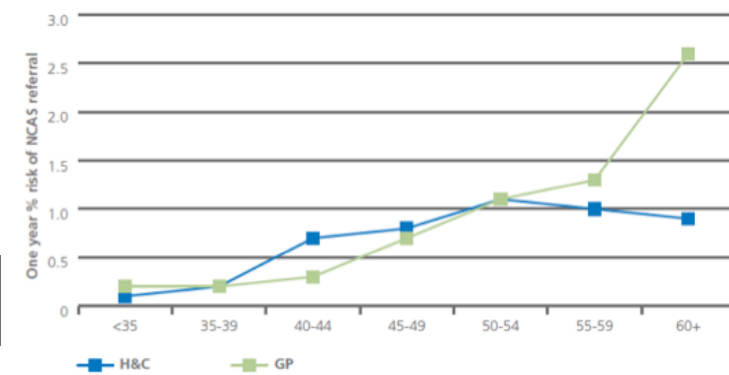
In a series of Reith Lectures entitled *A Question of Trust*, Onora O'Neill examined the relationship between those receiving and those providing professional services [45]. She argued that although at times the relationship would break down and disappointment would result, the essential factor in any lay-professional relationship was trust. If there was no trust and an innate responsibility to provide good care on trust, all the possibly recordable numerically accountable data could not substitute for it. In her view, the need for, and acceptance of, trust is both crucial and self-evident, and any erosion of it is to everybody's detriment. While trust is still possible on a person-to-person basis, the public, Government and media nevertheless (and with good reason) require certain groups, of whom the medical profession is one, to be regulated within the law and to adhere to specified standards and behaviours. The need for this is well accepted by society as a means of containing at least the worst of professional lapses through control of the Medical Register. More recently, with the introduction of annual appraisal and revalidation, the GMC is now seen as not only regulating serious offences but also managing ongoing quality control throughout a professional lifetime. Unfortunately, although the public may see revalidation as providing a guarantee of minimum satisfactory quality standards, there is evidence that the process at times has considerable gaps. People still present to the GMC who have had a series of satisfactory annual appraisals and a few even end up subsequently in jail. The question is: How should the public be reassured about an older doctor's competence?

Evidence relating age to competence

A good starting point is to review available evidence of when things have gone wrong. Perhaps the first point to make is that whatever

correlation is being looked at with respect to underperformance or reporting, males always outnumber females, both in absolute numbers and proportionately. The National Clinical Assessment Service¹⁰ has been collecting data since its inception in 2001. Referrals made in 2009/10 (the latest data available), show patterns similar to those observed in earlier years [46], and the incidence of referral related to age is shown below [47]. In this diagram, H & C are specialist medical staff working in hospitals and the community.

Chart F – One year risk of NCAS referral



It can be seen that for hospital consultants, unlike general practitioners, there is no strong correlation with age. On the other hand, in terms of GMC referrals [48], between 2010 and 2013 for those on the specialist register in the 30–50 year old group, the referral rate was 7.6%, as compared with 13% for those aged > 50. These rather unrefined GMC metrics do not give any information about the subset close to or above the usual retirement age. In the UK, there is currently little information on the relationship between doctors' age and their competence, particularly around and above the 'normal' retirement age.

In the USA, the situation is different because there are no equivalent pensions similar to those of the UK public sector. Consequently, there are greater financial drivers to keep people at work, but these are not necessarily in the public's best interest, and this has been a regular topic of discussion in newspapers such as the *Washington Post* [49], in which continued employment of elderly medical staff has been questioned. It reports that 42% of physicians are > 55-years-old and 21% are > 65-years-old – a considerable contrast with the UK. Probably the oldest clinically practising living physician was Ephraim Engleman, who worked until his death at the age of 104 [50] as Director of the Rosalind Russell Medical Research Centre for Arthritis at the University of California. At a different medical centre, the dangers of being too respectful to age and reputation were demonstrated when a patient bled to death during a routine cholecystectomy [51]. When the hospital investigated this event, which was caused by a revered mentor of several generations of surgeons, they found that for six years, junior staff had always ordered extra blood for his laparoscopic procedures, and the anaesthesia department always put an experienced consultant with him because it was common knowledge that the surgical risks were greater. The surgeon's colleagues and the hospital were essentially accommodating his deficiencies rather than tackling the root of the problem.

The problem of the ageing surgeon was reviewed in some detail by Blasier, an American orthopaedic surgeon [52], during a symposium on clinical risk and judicial reasoning. He concluded that both anecdotal evidence and objective testing suggest that age causes a deterioration in physical and cognitive performance, and that surgeons were reluctant to plan for retirement. In addition, he indicated that conventional outcome measures are unable to detect a progression of substandard outcomes that are unacceptable clinically but insufficient to trigger an institutional response.

¹⁰Since 2013, NCAS has been an operating division of the NHS Litigation Authority.

The removal of an age-related retirement date in the UK

The problems in the UK are further complicated by the combination of the pressure to work longer to meet the criteria for a full pension in the presence of anti-age discrimination legislation. The Equality Act 2010, and the Employment Equality (Repeal of Retirement Age Provisions) Regulations 2011, came into force on 6 April 2011 in England, Scotland and Wales [53]. These regularised several aspects of public and personal life with respect to the prevention of discrimination, and from October 2012 it was not possible for employers to require employees to retire on the grounds of age alone. At a stroke this removed the safety valve of being able to remove employees known or thought to be underperforming when they reached the accepted retirement age for their employment. If they do not want to stop work, an older employee now has to be shown to be unable to satisfactorily undertake the content of their job description. The situation is further complicated because there is an onus on the employer to respond to a request to make a change in a job description 'in a reasonable manner' [54], and guidance has been issued by the Advisory Conciliation and Arbitration Service [55]. Changes to a job description can be requested by the employer or the employee. Case law is developing on disputes in which these requests have not resulted in mutual agreement. It is now established that an employee cannot demand changes to their job that are convenient to them if they do not meet the corporate objectives of the employer. Similarly, the employer has to make 'reasonable' efforts to accommodate a request if the corporate objectives can still be achieved if the request were granted.

The impact of the removal of the fixed retirement age has been reviewed by the Health and Safety Executive (HSE) in relation to 'safety critical work' [56]. This included occupations in the airline, nuclear power, transport, fire-fighting and oil extraction industries. Anaesthesia is clearly 'safety critical work' but no medical specialties were specifically reviewed by the HSE. Their methodology and analysis is nevertheless highly relevant. In summary, their key messages relevant to an older consultant were:

- While there is evidence that cognitive and physical abilities decline with increasing age, these do not necessarily have a negative impact on performance at work. Studies of age have found huge inter-individual variations in performance.
- The relationship between chronological age and performance is neither simple nor straightforward. A number of factors including functional capacity for work, work demands, work environment, stress, shift work, expertise, and attitudes towards work and retirement are relevant. There was a critical age for increasing intolerance to night work as age progressed, but this was again individually variable.
- It is the specific combination of demands and complexity required by a job that makes it potentially highly demanding, as opposed to the job title itself. Individuals are able to use different strategies to compensate for age-related declines in performance, such as their expertise, job knowledge, education and high motivation. However, when job demands exceed the overall capacity of a worker, they may no longer be able to compensate for any decline.
- There is evidence of 'healthy worker' effects, whereby individuals self-select to move into less demanding jobs, or retire as their ability to carry out a job decreases. There is also evidence of 'safe worker' effects where rigorous screening standards mean that workers lose their licence to work, e.g. pilots and offshore workers.
- There is a paucity of information about the performance of older workers in very demanding jobs. For example, the extent of 'healthy worker' effects or 'safe worker' effects within demanding jobs is unknown. The extent to which these effects act as a safeguard against safety critical outcomes is also unknown.
- More longitudinal research is required in order to investigate decrements in performance over a working life.



The present position with regard to anaesthetists

- The relationships between patients and doctors remain very good, with a high degree of trust. Part of this places a responsibility on doctors both individually and collectively to ensure a high standard of clinical practice is delivered.
- The changes in the public sector pension arrangements, coupled with the removal of age-related compulsory retirement from clinical practice, create a situation in which doctors who are underperforming because of age may go undetected. Current audits lack the sensitivity to identify subtle but significant changes in performance, and there have been many situations in which clinicians have been inappropriately 'carried' by colleagues and institutions when they should have ceased clinical practice.
- There is no simple relationship between age and performance, and there are huge individual variations. While there is evidence that cognitive and physical abilities decline with increasing age, these do not necessarily have a negative impact on performance at work. However, there will come a point when the job demands exceed the overall capacity of an individual worker to compensate.
- In employment outside medicine, there is evidence that individuals self-select to move into less demanding jobs, or retire as their ability to carry out a job decreases. The safety implications for the public of the ability to modify the job content of an anaesthetist with age are obvious. So also is the need to detect those without the insight to 'self-select' when their workplace performance is declining.
- Although the volume of literature is small, there is however increasing evidence that within anaesthesia, older age per se could be an independent risk factor for safe practice. Should this risk become established as true by continuing audit and evidence collection, and what can be done about it, is considered in Section 6.

5.5: Other professional groups and human factors

Other professional groups

As acknowledged above, several 'high-stakes' industries (airline, nuclear power, transport, fire-fighting and oil extraction), have taken steps to try to ensure that their professionals are performing to proper standards throughout their working lives and have had to modify their processes as regulations and legislation have changed. There are lessons to be learned from this and it is useful to take the airline industry, which has long had age, fitness and competency barriers to continued employment, as an example.

Historically, national aviation authorities grew up in response to the increasing aviation activity after the Second World War, and in 1947 the International Civil Aviation Organisation was established. In 2003, a European Aviation Safety Agency was created, but individual member states have their own national authorities. In the UK, this body is the Civil Aviation Authority, which works closely with the European Aviation Safety Agency to promote the highest common standards of safety and environmental protection.

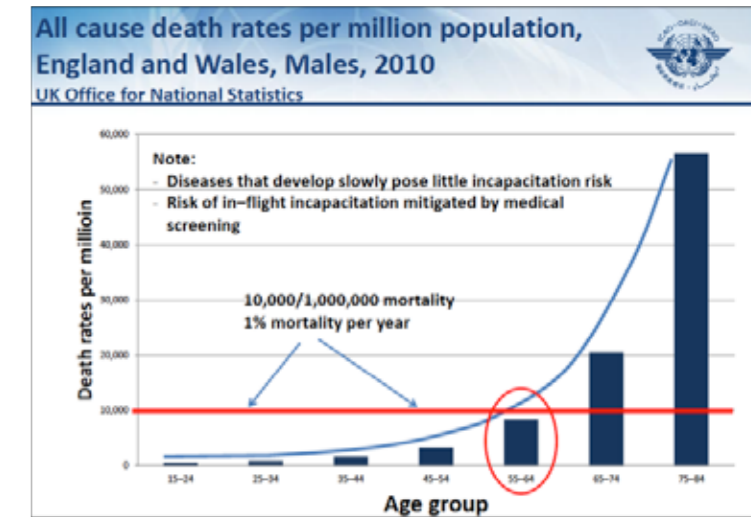
A pilot's competence on a specific aircraft is confirmed by the granting of a licence by the Civil Aviation Authority. The pilot is subsequently checked on a six-monthly basis for technical, handling and crew resource management (equivalent to team management) competence over a two-day period. This time is also used to refresh skills in dealing with abnormal and emergency situations on a rotational basis, so all possible scenarios are covered every three years. Every training pilot is checked either by a Civil Aviation Authority inspector or a senior examiner every three years, as well as by ad hoc standardisation checks. In addition, all pilots have a two-yearly line check in which an authorised training captain observes a crew operate a commercial flight. Medical checks covering past medical events, eyesight, hearing, ECG, lung function, haematology, biochemistry and urine are mandatory. These have to be repeated at yearly or six-monthly intervals, depending on the class of aircraft.

It is worthy of note that pilots generally get apprehensive about their six-monthly competency checks in the simulators. This raised level of anxiety can, and sometimes does, cause degraded performance levels. Debriefing after the event usually precipitates an admission from the pilot that the cause of the reduction in performance was as a result of 'life stresses' rather than cognitive degradation. In all airlines there have been cases of performance degradation stimulated by more sinister medical issues. It is therefore important to try to differentiate between the causes so that retraining and remedial actions are appropriately instigated.

Until 1 October 2006, British Airways had a maximum age for pilots of 55 even though their Civil Aviation Authority licence allowed for a maximum age of 60, and most other British and international airlines had a policy of a maximum age of 60. Issues of restraint of trade and ageism subsequently forced British Airways to fall in line with the Civil Aviation Authority's maximum age limit. Now, in the UK, pilots, like all other workers, have been freed from an upper age limit by legislation, although they still have to pass regular competency tests. The 'effects of age' problem has been tackled internationally by the International Civil Aviation Organisation. It developed the concept of an 'incapacitation risk' occurring to a pilot during the cockpit on any given flight, and made the important point that:

- Not all causes of death or fatal conditions posed an incapacitation risk because the disease develops slowly, e.g. most malignant disease.
- Not all incapacitations necessarily pose a risk of death, e.g. a faint or a transient ischaemic attack.

Accidents due to simultaneous double incapacitation from physical disease, i.e. both pilots incapacitated at the same time, are extremely rare; none having occurred for > 40 years. European Aviation Safety Agency aircraft design standards state that the average probability per flight per hour of a 'catastrophic failure' must be 'extremely improbable', with a probability per flight hour of the order of $< 1 \times 10^{-9}$. Its presentation of this concept is shown in the figure below.



Deaths per million in UK males which impacts on the incapacitation risk with age

It can be seen from the figure that up to age 65, the mortality rate is still < 1% per year, which approximately equates to 1 death per 1,000,000 hours. With two pilots, the probability of both dying is $(1 \times 10^{-6}) \times (1 \times 10^{-6})$, which equals (1×10^{-12}) . This probability is 1,000 times less than that set by the European Aviation Safety Agency¹¹. Surveys on pilot performance [57] concluded similarly to the HSE that: 'Overall, the scientific record has not resulted in a clear specification of the relationship between age, cognitive function, and pilot performance'.

Further data demonstrated that although there was a measurable reduction in performance in those aged > 60 years, it still stood significantly above the licence requirements. It was recognised that there was considerable individual variation but that performance up to the age of 65 years is not now seen as an issue by the industry. As a result of these reviews, the Civil Aviation Authority now specifies that in two-pilot civilian passenger aircraft, pilots can be licensed up to the age of 65 years, but either the pilot in charge or the co-pilot must be < 60 years [58].

It is clear from the measured experiences of the airline industry that there are many similar findings to those observed anecdotally in medicine and to the conclusions of the Health and Safety Executive review (see ref 56 earlier). With ageing, there remains very wide individual variation. Health has a measurable impact, there are regular competency checks, and risk is mitigated by combining professionals of different ages.

Human factors

Human error is known to occur during the practice of medicine, but for > 20 years, its genesis has been known more as a problem of psychology or engineering rather than medicine [59]. The words of George Santayana, the Spanish philosopher – 'Those who do not remember the past are condemned to repeat it' – are particularly apposite because doctors make the same mistakes again and again, sometimes over decades [60,61]. Command, control and more regulation appear not to have significantly decreased failure at the doctor-patient interface. It is surely naïve to think that if we go on

¹¹ These calculations are based on population death rates, which are not the same as 'incapacitation incidents' while flying, but the methodology establishes the principle. Transfer of the principle to anaesthesia has important messages for being the only anaesthetist on site out of hours.



prescribing the same remedies, we will get a different result. As Cicero observed around 140 BC, 'Any man can make mistakes, but only an idiot persists in his error'. His view was supported over two thousand years later by Einstein in his observations on experimental science when he said 'Insanity is doing the same thing over and over again, and expecting a different result'. We need the help of better systems and a change in organisational culture.

In other high-risk industries, research into human factors and safety science has substantially changed the culture of organisations and the management of risk because their leaders have realised that their future, their jobs and their profits depend on it. The same impact of human factors research has not yet been felt in hospitals. Perhaps this is because consultants usually go unchallenged and, as they age, they persist with established mental pathways. After all, accepted practice is where the majority of errors and harm arise.

Medical experts are quick and productive, and most of the time they get it right, but when they don't, perhaps due to an incorrect perception, assumption or communication, or because they are the victims of confirmation bias, the risks are much greater than in those of the novice who is full of self-doubt. In his book *Thinking Fast and Slow* [62], Daniel Kahneman has helped us to grasp how we make decisions and the benefits and risks of each process. Being mindful of this science is an important safeguard in understanding what we and others do, especially when, as experts, we make rapid, intuitive choices that feel effortless and right. In these conditions, our normally competent but possibly ageing brain does not invite us to pause and consider. That step requires another team member, a 'second brain', to challenge us. This is a crucial benefit of team working and of open relationships in medicine and in management, and as we age these become of much greater potential importance. Established consultants are particularly vulnerable to delusions of adequacy and resistant to change, particularly if it means unlearning a cherished habit. They may need to be rewired.

Unlearning and relearning are complex and time-consuming processes. Furthermore, new behaviours commonly revert to older habits when there is distraction, stress or urgency, so there may be a particular vulnerability for retrained doctors faced with these conditions. It is difficult but at times necessary to change one's habits and what one believes; only by recognising the importance of human factors in the workplace can this be achieved.

Human factors optimisation is about designing systems that are resilient to unanticipated events and addressing problems by modifying the design of the system to support people better [63]. In a nutshell, the aim of human factors optimisation is 'modifying systems to make it easy for people to do the right thing'. Such interventions develop environments that are intrinsically safer than before, and have great potential to mitigate the errors and changes associated with ageing. For them to be introduced first requires an acceptance that error is normal and is only a moral issue when it is known to be avoidable or undeclared. When it occurs, it is never just one person's fault, it is a system failure and the primary determinant of safety is one of organisational culture. To quote Don Berwick [64], 'In the end, culture will trump rules, standards and control strategies every single time and achieving a vastly safer NHS will depend far more on major cultural change than on a new regulatory regime'. Some in leadership positions in healthcare have yet to understand and adopt these principles; they think that identifying culprits is corrective. They blame individuals alone for errors and ignore the cultural and systems factors that are so contributive. Such leaders need help because although they are probably doing their best they 'don't know what they don't know'. It is a risk for all of us, and especially those older members in the workplace.

Conclusions

Medicine is not unique in having to address the continued employment of an ageing worker who has to perform to a highly sophisticated professional standard. Other industries have, through systematic research and audit, found and solved problems that medicine has, to date, really only recorded at an anecdotal level. There is much that can be learned from them both in their approach and in their solutions.

Two things come through as constant themes. The first is that while there is evidence that cognitive and physical abilities decline with age, these are highly individually variable and do not necessarily prevent continued employment at a safe level. The second is that human factors are increasingly being recognised as vectors for error, and that working in properly functioning teams and modifying the environment can have very considerable safety advantages. This is particularly relevant to ageing professionals who may warrant some special consideration in this regard: perhaps at the end of one's career there should be an appreciation that a safe working environment is one with which one is familiar.



6.0: Implications for the future: practical aspects to be addressed

Anaesthesia is a safety-critical occupation that in the UK has very high standards of practice and very low levels of morbidity and mortality. It is clear from this review that the plan to maintain more people in work to an older age than at present, in the presence of an increasingly complex patient population, has significant, potential safety implications. The actual effect on patient safety cannot be calculated in advance with any accuracy. There are four key stakeholder groups involved, each of which has responsibility and a contribution to make in trying to maintain the current levels of safe practice. These are:

- The anaesthetists themselves.
- The organisations that employ anaesthetists and maintain their workplaces.
- The Government, through national and health policies.
- The public who use the health services.

The sections below try to identify the factors relevant to each of these groups. It should be emphasised that these are rapidly developing areas of consideration and what is written is in no way definitive in its scope: recommendations are highly likely to change over time.

6.1: Considerations for the anaesthetist

The first and greatest commandment for anaesthetists, both individually and as a professional group, is to accept that extending their clinical working lives will bring problems, and that planning for the consequences of change is essential. Although the evidence for age-related problems is still emerging, there are clear trends.

Evidence that there is a problem

In 2012, Tessler et al. [65] reviewed a ten year period of anaesthesia activity in British Columbia, Quebec and Ontario with respect to the age of anaesthetist and litigation events. In general, older anaesthesiologists tended to care for fewer patients and were involved in less complex procedures. They found that when compared to anaesthesiologists < 50 years of age, those > 65 had an incidence of being involved in litigation that was 50% higher and, of those medico-legal cases, almost twice as many had a disabled patient outcome.

In 2013, a survey of Canadian anaesthesiologists [66] reviewed the age of those practising. It found that:

- 68% were < 54 years old.
- 22% were 55–64 years old.
- 7% were 65–74 years old.
- 3% were > 75 years old.

Canada, like the UK, has anti-age discrimination legislation, and the review discussed the personal and institutional problems that the removal of a statutory retirement age is bringing. The problem of ageing in the workplace has also been highlighted by the Anaesthesia Continuing Education Committee (ACECC). Their Welfare of Anaesthetists Special Interest Group has studied the *Retirement and Late Career Options for the older professional* [67].

These three publications incorporate and discuss several common themes:

- There is good neurophysiological evidence that after the age of approximately 60, processing speed (dealing with incoming information quickly and efficiently), short-term memory, the ability to retain new information and vigilance all decline. However, there is great inter-individual variability and the impact of ageing on each individual's performance at work is different: many older anaesthetists in good health will be able to continue to perform well.
- Age-related physical health problems can impact on performance. The incidence of many chronic conditions (e.g. musculoskeletal problems and cataracts), and of acute illness (e.g. ischaemic heart disease) increases with age, as does a decrement in visual acuity, hearing loss and some aspects of cognitive function. Some health problems (e.g. hypothyroidism), are not always easy to spot and may go unrecognised by both the individual and their colleagues until well advanced.
- Quality of sleep worsens with age and sleep becomes shorter. Tiredness has an effect on older doctors' performance and mood. Being on-call can be highly disruptive to sleep, even when not called out. There is a decrease in the capacity to adapt to shift work with increasing age: older workers' cognitive performance may be more impaired during night work but they may be less aware of their degree of impairment.
- Decreased job satisfaction, irritability, burnout, anxiety, depression and fatigue are more common in older practitioners, and these, combined with fear of failure and challenges to self-esteem, can impact on the decision to retire.
- Older anaesthetists may be slower at recognising and managing new situations, but can be quick to respond when they are not tired and are able to draw on previous experience. Older practitioners may rely heavily on previous experience, intuitively recognising patterns and making 'routinised' automatic rapid responses to developing situations without employing conscious analysis and reasoning [68]. As physicians age, they are perhaps more likely to make errors from placing undue weight on first impressions, i.e. premature closure.
- There was complete agreement that the path towards eventual retirement (whenever that was) needed active management. Waiting passively for an adverse event to signal professional failure was definitively not the way forward.

Detecting and managing underperformance

While the conclusion is that ageing anaesthetists can present problems to themselves and their patients, and that problems with ageing anaesthetists will become more frequent, it is far from clear what should be done to address the situation and to protect patients. Tessler and Shrier [65] demonstrated that older anaesthetists are more likely to make errors in even simple cases. A frequently stated assumption then follows that older anaesthetists should not undertake complex cases, but where is the hard evidence for specific individuals? While it is true that, on an individual basis, a number of practitioners choose to try to scale down the complexity and intensity of their workload, and are probably showing laudable insight in doing so, does this have to be applied as a rule at a particular age?

Baxter et al.[66] suggested ways in which anaesthetists could tailor their practice to address their individual situations, and how hospital management could get the best from the older clinician. They concluded that 'a more structured approach to tapering clinical activities and planning retirement may benefit both individuals and departments of anaesthesia and may ultimately improve patient safety'. This proactive methodology was echoed by the ACECC and also discussed by Redfern and Gallagher [68]. Examples of suggested actions are:

- Progressively scaling-down activities, with a gradual move to a shorter working week, elimination of on-call night shifts, more time for assessment of patients with complex medical problems, help with more complex cases, or, when appropriate, a modification in the scope of practice to avoid predictable difficulties.
- Older individuals typically receive less feedback on their performance, but may find it more difficult to recognise when their skills deteriorate because they rely more on pattern recognition than analytic cognitive processes. Doing a list with a consultant colleague, observing and discussing each others' practice, is useful and can assist in overcoming potential errors.
- Always working in a theatre complex where there are other anaesthetists readily available to advise or assist in crises, whether with clinical issues or with personal health, is helpful. This also overcomes the 'incapacitation incident' discussed in Section 5.5. Careful consideration should be given to the advisability of working in remote sites, including those in the independent sector.
- The design of CPD and remedial training should take into account the needs of the older workforce. Traditional, lecture-based CPD may be less useful to the older practitioner than group activities in which participants discuss clinical management and receive feedback from peers [69]. Maintaining a commitment to teaching and learning from trainees can only be good.

The big issue to be addressed is that given the impact the ageing anaesthetist can have on patient safety, how are they to be confirmed as being fit for purpose within their clinical job plan? Although there are several tools used for the cognitive assessment of physicians, these do not evaluate crisis management and may not pick up subtle changes in performance. Workplace assessments are an obvious possibility, but these can be fraught with numerous problems, not least of which is the lack of accepted methodology and frequency of review. Does the 'assessment situation' (either in real time or by retrospective review of cases) replicate the 'real thing'? What if the assessor was once the trainee of the ageing 'examinee'? Would inappropriate power dynamics and oversensitivity to a person's feelings influence the findings and conclusions? How would one manage an unsatisfactory outcome? Would patients deserve to be informed about any limitations on the scope of an individual's practice? It is however, in principle, surely important for both the older anaesthetist and their colleagues to regard peer observation and confirmation of competence (or otherwise) as helpful and in patients' interests, and not as a challenge to their personal professionalism. This may in the future become a professional commitment, with confirmations of competence from observation etc. starting at five-year intervals earlier in a career but progressing to perhaps bi-annually at greater ages. Another factor in reducing anxiety in older workers is the minimisation of changes to their working environment, both in terms of location, equipment and personnel.

To overcome some of the disadvantages of workplace assessment, simulation training has been suggested for older anaesthetists in the pre-retirement phase of their careers. Evidence exists that knowledge and skill sets are transferred from the simulated environment to the clinical setting, both for procedural skills, and non-technical skills for crisis management. However, using simulation as a summative assessment tool might be problematic, as validity has not been tested in this age group. Boulet and Murray [70] conclude that 'it is not clear how judgments of minimal competence should or could be made'.

Return to work after illness

Another problem that already exists is that of anaesthetists returning to work from non-trivial illness (e.g. myocardial infarction, transient ischaemic attacks and depression). Such an event is more common in the older age group, and diseases recur. Measures that could be put in place that would enhance patient safety with respect to older anaesthetists in this situation could include:



- A gradual and planned return to work, at an appropriate pace to allow stamina and confidence to re-build.
- Never working in an isolated site or alone without anaesthetists in adjoining theatres.
- Identification of a younger buddy.
- Having known support readily available to assist in crises (clinical events or personal health).
- Specifying appropriate clinical duties more closely.
- Considering changes (perhaps temporary) to job plans.
- Considering changes to the annual appraisal process and combining them with a medical report of fitness for employment.

Summary

A reasonable summary of the present position is to say that:

- There will be an increase in the number of older anaesthetists in the workplace in future, and there need to be plans in place to manage this demographic shift.
- There is evidence emerging that some older anaesthetists may have a reduced clinical performance that can be adverse to patient safety.
- There is a widespread belief that older anaesthetists need enhanced monitoring of their workplace performance.
- It would be valuable to introduce some sort of process to confirm competence within the individual's job plan before problems arise.
- Annual appraisal needs to be tailored specifically to the older practitioner so as to allow a genuine two-way interchange of information both to optimise the anaesthetist's job plan and to maximise patient safety.
- Older anaesthetists need to recognise that performance deteriorates with age, and they need to be both self-aware and proactive in addressing concerns they have about themselves. Individual anaesthetists have a responsibility to demonstrate insight into the potential impacts of ageing, and to ensure that their health remains compatible with their job requirements.
- Older anaesthetists should comply with reasonable requests from their department with respect to their planned duties. If changes are needed, it is vital that the clinical director ensures

the older anaesthetist understands the reasons for change, and that their perspective is taken into account in decision-making.

- Although ageing processes are known to be individually variable, it may be necessary for the purposes of practicality to introduce some arbitrary age ranges or limits within or at which age-related factors are reviewed.

For a successful outcome, there will be complementary features of departmental policy that need to be introduced that will mirror the responsibilities of the individual practitioner, and these are considered in the next section. To plan a good future for patients, individual anaesthetists and departments, older workers must be supported and not left to form yet another 'lost tribe'.

6.2: Considerations for the employer

In increasing the age at which NHS pensions can be withdrawn without actuarial decrement, the Government has created an open-ended, uncontrolled experiment for departments and hospitals that have to accommodate the demographic shift in retirement age while maintaining patient safety. In addition, if the NHS is to have enough staff to meet ever-increasing demands, it will need to retain older workers. As with anaesthetists themselves, the first thing departments and hospitals have to do is to recognise the problems ahead, plan for them and be prepared to commit resources in terms of time and cost to maintaining safety.

General principles

A passive 'wait and see' and 'hope for the best' approach cannot be justified on the available safety data related to ageing. Organisations must therefore ensure that job plans, CPD and the work environment are designed and adapted to meet the needs of older workers. Clinical directors and departments that take a strategic approach, with effective job planning and appropriate involvement of human resources and occupational physicians, are likely to get the most from their older workforce.

All employers ought to be able to trust anaesthetists to adhere to professional standards. With more people in the future working

beyond the age at which they would choose to retire, there is a potential for this trust to be broken more frequently than it is at present, since older physicians are less likely to follow guidelines [66]. Current GMC guidelines (Good Medical Practice Domain 2 [71]) make it clear that there is an inherent responsibility to comply with workplace policies. Adherence to these by medical staff is a reasonable expectation of the employer.

Departments and Clinical Directors have a responsibility to ensure that the working environment addresses the needs of older workers. Equipment should be easy to see and hear. Hearing becomes progressively less sensitive, and cataracts, glaucoma and macular degeneration are all more common with advancing age. Beeps and alarms need to be sufficiently flexible to cater for normal age-related hearing loss [68], and drug labels and monitor displays should be high-contrast and in large print [72].

When an anaesthetist has a chronic or relapsing condition, it is useful for the Clinical Director to involve the Consultant Occupational Physician in ensuring the individual is well enough to meet the demands of their job, to help in redesigning job plans when needed, and to optimise the working environment. A formal assessment of the workplace to identify an individual's specific needs may be helpful, e.g. provision of appropriate seating in theatre for someone with musculoskeletal problems.

Job plans

Individual job plans must take appropriate account of the impacts of ageing. Over time, older anaesthetists' work patterns will need adjustment. Changes made should play to the individual's strengths, and ensure continued involvement in the department. Job satisfaction and a sense of being valued by colleagues are important in retaining older colleagues in the workforce. Appropriate job planning might include daytime weekend work instead of overnight on-call, flexible working, shorter hours, less isolated working and less demanding or less stressful lists. A change of role might be appropriate for some, perhaps involving pre-operative assessment clinic work, undergraduate or postgraduate education, clinical governance or other non-clinical roles.

Because the impact of ageing is very variable, the timing and nature of changes to job plans will be different for different individuals. It is therefore difficult to provide indicative age ranges at which such changes should be considered. It is also possible that some individuals may demand changes that suit them, but that are difficult or unreasonable for the department to accommodate. This can produce strains that will need to be overcome.

Irrespective of the increase in statutory retirement age (as described in Section 5.4), the Repeal of Retirement Age Provisions Regulations 2011 came into force on 6 April 2011 in England, Scotland and Wales. One of the consequences of this was that, from October 2012, it was not possible for employers to require employees to retire on the grounds of age alone. This means that an enforced retirement would have to be a proportionate means of achieving a legitimate aim of the employer. In practice, justifying such a retirement is likely to be difficult unless the employer can provide evidence that there is a decline in either intellectual or physical performance, which is linked to an increase in age that prevents the job being done properly.

The current situation is that if a person is performing satisfactorily and wishes to continue to work in the same post without change, they cannot be prevented from doing so on the grounds of age alone. If changes are desired to the job description, these can be requested by the employer or the employee. Case law is developing on disputes in which these requests do not result in agreement. However, it has been established that an employee cannot demand changes to their

job which convenience them but do not meet the corporate objectives of the employer. Similarly, the employer has to make 'reasonable' efforts to accommodate a request if the corporate objectives can still be attained if the request were granted. The Department of Work and Pensions [73], in its description of good employment practice, says:

'Part-time or flexible working can be an important way of enabling employees of all ages to stay in work, or return to work, while meeting their wider personal needs. For many older employees flexible working is a popular option as it allows them to make a gradual transition between full-time work and retirement. 60 per cent of over 50s would like to continue working past State Pension age, but on a part-time basis... Flexible working options can help employers to retain skilled and experienced staff. It can also help employers to manage the flow of work, whether on a day to day basis or over the longer-term. Benefits can include less downtime...or covering peak business periods'.

In summary, a person at or over retirement age has identical rights and limitations to a younger person who requests a change to their job description, and it is good practice for both parties to approach the situation appreciating the objectives and views of the other.

The approach of other industries

The HSE, in its review of the management of safety critical occupations [56], recommends surveillance for, and the development of, intervention strategies for employers of older workers to be complemented by an assessment tool.

The Work Ability Index [74], developed by the Swedish Institute of Occupational Health, is an example of a validated instrument used by occupational physicians to assess work ability during health examinations. This questionnaire asks the employee about:

- Current work ability compared with lifetime best.
- Work ability in relation to the demands of the job.
- Number of current diseases diagnosed by a physician.
- Estimated work impairment due to diseases.
- Sick leave during the past year.
- An employee's own prognosis of work ability two years from now.
- Mental resources.

This generates a useful matrix of information from which to discuss future plans with a trained appraiser who understands the needs of the older worker and the factors that influence continued enjoyment of work. The decision to continue working or to retire is influenced by workplace performance, personal health, job satisfaction, working hours, financial status, pension arrangements, family commitments, peer-retirement norms, employer attitudes and availability of work.

While not recommending this tool above others, it has had wide usage and is validated: it is an example of how other safety critical occupations have approached assessment. Assessment is common in other industries and, although well-recognised for airline pilots, analogous processes are already in place for such occupations as miners, professional road drivers, engine drivers, oil rig workers, sailors, air traffic controllers and nuclear power workers. 'Why are anaesthetists not subject to something similar?' is a legitimate question to ask. This will need a change of culture to one of acceptance by both anaesthetists and employers that peer monitoring and assessment is not a challenge to personal professionalism. Instead it is, or should be, an essential part of professionalism, and it needs to be recognised that this is a considerable time commitment for all concerned. To achieve the right outcome, it needs to be done properly, not squeezed in or fitted between existing commitments. At present, once consultant grade is achieved, there appears to be little or no appetite from either employee or employer to make consultant staff subject to regular workplace scrutiny of their clinical performance.

6.3: The role of the Government

It is clear from this review that the Government has the unenviable task of managing the increasingly complex health needs of an ageing population whose expectations of what is possible are rising in the presence of:

- Probable future low economic growth.
- A shortage of natural resources and energy.
- An increasing ratio of economically unproductive to productive members of the population.

The Government is in a difficult position. It has made an understandable start by moving towards a situation in which people provide more for their own retirement. In making savings in public expenditure by reducing pension costs, it has gone directly to the biggest lever it can pull. In addition the Government is already subject to recommendations of its own making. In 2004, the English Department of Health [75] said that 'the reduction of inequality in health outcomes is a key objective, which is to be achieved through local action as well as national planning'. In 2007, the Office of Science and Technology [76] made it clear that 'Health inequalities result from many interlinking factors, of which relative poverty and socioeconomic grouping are the main drivers. The greatest variations are seen in the elderly'.

As previously described (Section 5.3), in 2010 the Marmot Report echoed these views. However, it is important to question whether a reduction in inequality is politically achievable, and whether there is an acceptable cost in achieving it. Approximately 2,700 years ago, it was written that 'There will always be poor people in the land'¹² and Aristotle¹³, who saw social differences as inevitable, said 'The worst form of inequality is to try to make unequal things equal'. In 2014, a rather concerning health economics analysis by Bogner and Hirose [77] concluded that, in a developed democracy operating within a limited financial envelope, the pursuit of health equality may be counterproductive to many. They asked: 'How much overall health should society sacrifice (i.e. in the better-off) for reducing the social inequality in health?' These are political rather than health questions and the answers are not obvious. The Government's stated policy on health equality, although laudable, may have a major impact on the service but not deliver the goals it intends. It is clear that the balance between health need and health expenditure requires constant review. It is certain that modifications to policy and solutions that limit demand will inevitably arise. How the Government will develop those policies that limit demand, or even if this is politically possible, is by no means clear. Some of the most contentious measures, which are currently not officially being considered, are:

- Allowing co-funding of care within the NHS when a patient can afford it and wants it.
- Facilitating and encouraging 'self-help' by local groups on a voluntary basis within the context of community care.
- Setting a maximum cost for any specific pathway of care, and in particular for terminal illness. A fixed NHS Personal Maternity Care budget has recently been suggested [78].
- Establishing a hypothecated health tax to augment health expenditure raised from general taxation. This possibility is receiving increasing consideration within parliament [79].
- Admitting publically that everything cannot always be delivered to everybody on all occasions, i.e. there needs to be an ethical policy on healthcare rationing.

Whatever approach the Government and politicians take, underlying the whole issue of quality is the fact that clinical honesty will not be achieved in practice without political honesty of purpose for the NHS. Watch this space.

¹² Deuteronomy 15:11 – 7th century BCE.

¹³ Paraphrase from Aristotle, Book VII 3.5, 1325.b.



6.4: The role of the public

The responsibilities of the public are more difficult to describe than their interests. Lifelong, free at the point of service 'cradle to grave' healthcare has existed for over 60 years in the UK, and is now embedded as a part of British expectation. The NHS Constitution [80] was launched in an attempt to try to clarify what patients' and employees' rights and responsibilities were. Section 3b describes the patients' and public's responsibilities. These are:

- Recognise that you can make a significant contribution to your own, and your family's, good health and wellbeing, and take personal responsibility for them.
- Register with a GP practice – the main point of access to NHS care as commissioned by NHS bodies.
- Provide accurate information about your health, condition and status.
- Keep appointments or cancel within reasonable time.
- Follow the course of treatment that you have agreed, and talk to your clinician if you find this difficult.
- Participate in important public health programmes such as vaccination.
- Ensure that those closest to you are aware of your wishes about organ donation.
- Give feedback – both positive and negative – about your experiences and the treatment and care you have received.
- Treat NHS staff and other patients with respect.

These are all laudable responsibilities, but what is lacking is an open public discussion about the quantity and content of healthcare that can be provided across the NHS with the current funding. Many visits to primary care and A&E departments are known to be unnecessary and waste resources. For the NHS to be able to pursue better methods of managing serious illness, the public will have to use the services more sparingly, and have a better understanding of the costs of what is provided.



Introducing this as a social concept through public education will be difficult but necessary. If the public does not respond to calls for better usage, funds will inevitably dry up, and rationing without rationale will become the norm unless there are personal funds to bridge the gap. There is evidence that rationing is already happening internationally [81]. With the increased use of pre-assessment clinics because of the increased age and complexity of patients, these locations could gradually become the places where 'worthwhile use of resource' decisions are taken [82]. To be able to retain the trust of the public, discussions with patients and relatives need to be open and honest. This again requires proper public information and education to allow conversations to be undertaken against the background of an ethical framework acceptable to society and supported by the Government.

Appendix 1: Working party members



Peter Hutton (Chair)

Peter is a consultant anaesthetist with a focus on neuroanaesthesia and trauma at the University Hospital Birmingham, and Honorary Professor of Anaesthesia at the University of Birmingham. He also undertakes Medical Examiner duties. During his career he has served on a number of national bodies such as the GMC and from 2007–2009 was joint clinical lead for unscheduled care for NHS London. He is a past Council Member of the AAGBI and was formerly President of the Royal College of Anaesthetists (2002–2003) and Chair of the Academy of Medical Royal Colleges (2002–2004). He established and chaired a Home Office Ethics Group to manage the ethical aspects of forensic DNA Analysis (2008–2010), and in the recent past was the Independent Hospital Consultant Advisor to the two Mid-Staffs inquiries. In 2014 he was appointed by the Home Office to lead a review of Forensic Pathology services in England and Wales.



Mary Baker MBE

Mary is a sociologist whose professional life has been spent representing the interests of patients and relatives, culminating as the former CEO of the Parkinson's Disease Society. She is the Immediate Past President of the European Brain Council, Past President of the European Federation of Neurological Associations, a Consultant to the World Health Organization and Chair of the Working Group on Parkinson's Disease. Academic appointments include Associate Membership of the Health Services Research Unit, University of Oxford and Visiting Fellow within the London School of Economics Health Centre. For her work, Mary has received Honorary Doctorates from the Universities of Surrey and Aston. She had Honorary Fellowship conferred by the Faculty of Pharmaceutical Medicine. In 2009 she received the prestigious British Neuroscience Association Award for Outstanding Contribution to British Neuroscience and for Public Service, followed in 2014 by the Dana/EDAB Lifetime Achievement Award for Outreach on Behalf of Brain Research.



Carol Black DBE

Dame Carol Black is Principal of Newnham College Cambridge, Expert Adviser on Health and Work to the Department of Health England and to Public Health England, and Chairman of the Nuffield Trust for Health Policy. She is also a member of the Welsh Government's Bevan Commission on Health in Wales, and Chair of the RSSB's Health and Wellbeing Policy Group. In November 2011 when National Director for Health and Work she completed as Co-Chair an independent review for the UK Government of sickness absence in Britain. The recommendations of this report are now being put in place, with for example a national Fit for Work Service. Professor Black is a Past President of the Royal College of Physicians, and a past-Chair of the Academy of Medical Royal Colleges. The Centre she established at the Royal Free Hospital in London continues to be internationally renowned for the research and treatment of connective tissue diseases such as scleroderma.



Tony Giddings

Tony is a retired a consultant general and vascular surgeon who also holds a pilot's licence. He has had a long-term practical and research interest in surgical organisation, performance and safe systems. A former Council Member of the Royal College of Surgeons, he was also President of the Association of Surgeons of Great Britain and Ireland. He was a reviewer for the original Mid-Staffs inquiry and a special adviser to the Parliamentary Health Committee.

He continues to research and teach on patient safety and in promoting a better understanding of the opportunities for improvement in health services and the wellbeing of practitioners. Through films he has helped to show healthcare staff their familiar world with new eyes, and with new insights into human factors. He believes that we have much more to do to apply what we already know to make better use of our skills and to reduce inappropriate blame and avoidable harm.



Richard Griffiths (AAGBI)

Following postgraduate clinical training in the East Midlands and California and undertaking a BJA Research Fellowship and completing an MD (1995) in Leicester, Richard was appointed to his present post of consultant anaesthetist at Peterborough & Stamford Hospitals in 1996. He was an examiner for the FRCA (2003–2012) and was elected to the Council of the AAGBI in 2008. Here he served as Honorary Secretary and is currently a Vice President. He chaired AAGBI working parties into Proximal Femoral Fractures and Surgery in the Elderly.

Richard has pursued a major interest in peri-operative medicine in older adults, specifically around hip fractures. He founded the NHS Hip Fracture Perioperative Network in 2007 and co-led the observational study, Anaesthesia Sprint Audit of Practice (ASAP). He was awarded the Dudley Buxton medal by the Royal College of Anaesthetists for promoting the understanding of the science of anaesthesia in 2014.



William Harrop-Griffiths (RCoA)

William is a Consultant Anaesthetist and Honorary Clinical Senior Lecturer at Imperial College Healthcare NHS Trust, London, UK. He graduated in 1981 from Oxford University and St Thomas's Hospital, London and trained in London and Seattle. He was President of the AAGBI from 2012–2014, and is a Council Member of the Royal College of Anaesthetists. He is the Chair of NHS England's National Safety Standards for Invasive Procedures Group, and has great enthusiasm for regional anaesthesia with clinical interests in orthopaedic, obstetric and vascular anaesthesia. William is an Associate Editor of the journal *Regional Anaesthesia & Pain Medicine*. He is fond of speaking in public, and his lectures have often been described as 'a victory of style over content'. He takes this as a compliment.



Guy Hirst

Guy was a British Airways pilot from 1972 until 2006, during which time he flew over 18,000 hours and was a Training Captain on DC 10 and Boeing 747-400 aircraft. In 1999 he was promoted to be a Training Standards Captain, responsible for training, developing and revalidating British Airways training pilots on behalf of the Civil Aviation Authority. Guy was one of the pioneers of the introduction of Human Factors (HF) Training into Airline culture.

Since 2001 Guy has been running training and coaching programmes in association with many healthcare organisations in the UK. He has also been involved with several research projects, particularly in the operating theatre environment. Guy is the co-founder of Risky Business (<http://www.risky-business.com>) He is the Aviation Expert for ITV news and recently appeared in a BBC Horizon programme entitled How to Avoid Mistakes in Surgery.



Nancy Redfern (AAGBI)

Nancy is Honorary Membership Secretary of the AAGBI and a Consultant Anaesthetist. Throughout her 29 years of consultant practice, her interests have been in education and professional development. Following a stint as College Tutor and Programme Director, she worked part-time as Associate Dean managing flexible training and developing a system to support and manage doctors who became ill. This led to work on the 'expert group' of the National Clinical Assessment Service. For her Diploma in Education she reviewed ways of managing and supporting doctors in difficulty. As Specialty Dean Director, she managed 56 different disciplines, contributed regularly to the Conference of Postgraduate Medical Deans and was Lead Dean for two specialties. She established mentoring both in the Northern Deanery and at the AAGBI, and now reaps the benefit, using mentors to ensure she contributes in ways she enjoys in her senior years.



David Shipway

David is a Consultant Physician and Gerontologist at St Mary's Hospital, Imperial College Healthcare NHS Trust, London. He is an atypical geriatrician, and subspecialises in the peri-operative care of old and multimorbid patients undergoing surgery. David trained at Oxford University, and completed his postgraduate medical training in London. He undertook specialist fellowship training in peri-operative medicine at Guy's and St Thomas' NHS Foundation Trust. Since his appointment at St Mary's Hospital, he has established a new service delivering embedded peri-operative geriatric medical care within the department of surgery. He has published in the field of peri-operative medicine and the implications of the ageing population for surgical services and training. His specialist interests are frailty and cognitive impairment in the peri-operative setting.



15th Anaesthesia, Pain and Critical Care Update



Friday 30th September & Saturday 1st October 2016
Royal Armouries, Armouries Drive, Leeds LS10 1LT



REGISTRATION

08:00 - 08:45: Registration, Coffee, Trade Stands
08:45 - 09:00: Welcome address - *Dr Velu Guruswamy, Leeds, Organising Secretary*

SESSION 1 (Chairs – Prof Ravi Mahajan & Dr Mahesh Shah)

09:00 - 09:25: **Management of Critically unwell parturients**
Dr Audrey Quinn, Middlesborough 2B06, 3B00
09:25 - 09:50: **Day to day challenges in Paediatric Anaesthesia**
Dr Stephanie Bew, Leeds 2D02, 3D00
09:50 - 10:15: **Trauma Anaesthesia - lessons learnt & is there a fixed recipe**
Dr Martin Drezner, Leeds 2A02, 3A10
10:15 - 10:30: Discussion
10:30 - 11:00: Coffee break, Trade Stands, Posters

SESSION 2 (Chairs – Prof Rajinder Mirakhor & Dr Ravi Marthi)

11:00 - 11:25: **Paediatric Anaesthesia in India - remembering 'Taare Zameen Par'**
Prof (Retd) Rebecca Jacob, India 3J00
11:25 - 11:50: **Patient safety first**
Dr Liam Brennan, President RCoA 3I00
11:50 - 12:15: **Is Medical profession under threat in UK**
Dr Anthea Mowat, Deputy Chair BMA, London 3J00
12:15 - 12:30: Discussion
12:30 - 13:30: Lunch, Posters, Trade Stands

SESSION 3 A (Chairs – Dr Roop Kishen & Dr Shivkumar Singh)

13:30 - 14:45: Free paper presentation

SESSION 3B (Chairs – Dr Ranjit Verma & Dr Nalini Malarakkan)

13:30 - 13:55: **Acute Brain Injury - Optimum management from DGH to Tertiary Center**
Dr Tonny Veenith, QEH, Birmingham 2F01, 3F00
13:55 - 14:20: **Acute pain in Chronic pain patients**
Dr Barani Ganesan, Leeds 3E00
14:20 - 14:45: **Why people fail in Revalidation**
Ms Tista Chakravarthy- Gannon, Lead Regional Advisor, GMC, London 3J00
14:45 - 15:00: Discussion
15:00 - 15:30: Coffee, Trade Stands and Posters

SESSION 4 (Chairs – Dr Abhiram Mallick & Dr Jayavanth Kini)

15:30 - 15:55: **Peri-operative Medicine**
Dr Ramani Moonesinghe, London 2A06, 2A07
15:55 - 16:20: **Oxygen Insufflation in Difficult Airway**
Dr Anil Patel, President, DAS 1C02, 3A01
16:20 - 16:30: Discussion

SESSION 5 (Chairs – Prof Monsukh Popat & Dr Pawan Gupta)

16:30 - 17:15: **Debate – This house believes consultants being resident on call is the way forward for the NHS 3J00**
Supporting the notion - Dr Simon Tomlinson, Manchester,
Against the notion - Dr Hamish McLure, Leeds

(RCOA Approved 6 CPD points)

Organised by BAOIA. Charity Dinner with Mr Sunil Gavaskar.
Further details and registration, visit www.baoia.co.uk

Workshops on 1st October 2016

WS 1 - Airway workshop (AW)

Dr Sonal Sonwalkar / Dr Heather Gorton

Regional Anaesthesia (RA)

Dr Sameer Bhandari / Dr Vinay Shanthy

WS 2 UL (UPPER LIMB / TRUNK)

WS 3 LL (LOWER LIMB / CNB)

WS 4 - Simulation workshop (SW)

Organiser TBC

	WS1	WS2	WS3	WS4
09.00-12.30	AW	UL	-	SW
13.30-16.30	AW	-	LL	SW

Each delegate can attend 2 of 4 workshops

(RCOA Approved 6 CPD points)



DIFFICULT AIRWAY SOCIETY ANNUAL SCIENTIFIC MEETING 2016

EARLY BIRD BOOKING CLOSES 26 SEPTEMBER 2016

BOOKING NOW OPEN
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ABSTRACTS SUBMISSION DEADLINE 05 SEPTEMBER 2016

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The International Relations Committee (IRC) offers travel grants to anaesthetists who are seeking funding to work, or to deliver educational training courses or conferences, in low and middle-income countries.

Please note that grants will not normally be considered for attendance at congresses or meetings of learned societies. Exceptionally, they may be granted for extension of travel in association with such a post or meeting. Applicants should indicate their level of experience and expected benefits to be gained from their visits, over and above the educational value to the applicants themselves.

For further information and an application form please visit our website:
<http://www.aagbi.org/international/irc-fundingtravel-grants>
or email secretariat@aagbi.org
or telephone 020 7631 1650 (option 3)

Closing date: 19 September 2016

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ABSTRACT FOR PRESENTATIONS OR POSTERS TO BE SUBMITTED BY 9TH SEPTEMBER 2016

Open to all healthcare professionals involved in the preoperative assessment of the surgical patient. For full details and to book your place, please contact us:

W: WWW.PRE-OP.ORG / T: 020 7631 8896



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RA-UK Member (15% discount) £238

SW Peninsula Deanery Trainee (50% discount) £140

10% Early booking discount off above prices until 1/9/15

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- Interventional radiology in the management of strokes
- Pre-hospital health emergency management system
- Fast track total knee arthroplasty
- Analgesia for acute surgical pain
- The GMC: working for patients
- The GMC: working with doctors
- How doctors cure crime



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21st Annual Scientific Meeting 2016

Friday, 4th November 2016
Oxford Town Hall, Oxford

Improving patients' outcomes

Sessions:

- Pain in orthopaedic patients: whose pain is it?
- Pushing the boundaries of regional anaesthesia for orthopaedic surgery
- Working together to improve patients' outcomes

Abstract submission deadline: 23rd September

Register at www.bsoa.org.uk
Registration fees from £ 50.

Approved by the RCoA for 5.0 CPD credits



Courses for Clinicians

	Date	Course Details	Course Fee
Essentials of Anaesthesia in the Developing World	15th September 2016	A 1 day fun, interactive and informative course offering an introduction to working in the developing world. There will be simulation demonstrations and participants can experience equipment used applicable to the developing world.	£100 Earlybird price by 26th Aug or £120 thereafter. (including lunch/refreshments)
Focused Intensive Care Echocardiography (FICE) Course	11th October 2016	FICE accreditation course for the Intensive Care Society (ICS) and British Society of Echocardiography (BSE).	£150 (including lunch/refreshments)
Training the Trainers	13th & 14th October 2016	A 2 day multi professional simulation course offering 10 CPD points for those interested in Simulation Education.	£240 Earlybird price by 20th Sept or £280 thereafter.(including lunch/refreshments)
Resuscitation Update for Consultants	22 November 2016	A half day refresher course on managing cardiac arrest in adults.	£60 (including lunch/refreshments)
Cardiff Ultrasound Guided Regional Anaesthesia with Cadaveric Anatomy	Course Full NEW date coming in Autumn!	A 2 day practical hands-on course that course enables you to optimize and interpret the ultrasound machine's information and to apply it to real-world clinical procedures.	£260 (including lunch/ refreshments)
Cardiff Perioperative Transoesophageal Echocardiography (TOE)	Hands-on Dates Available are: 20-22 September 2016 15-17 November 2016	A 3 day practical course for all specialists who wish to perform perioperative transoesophageal echocardiography.	£400 (including lunch/refreshments)
	Symposium	Symposium Course Details A 2 day lecture based course for all specialists who wish to gain expert knowledge of transoesophageal echocardiography.	£450 (including lunch/refreshments)
Research & Statistics Courses		Statistics Course Details A 1 day course open to all health care workers who wish to gain statistical experience.	£80 Earlybird price by 1st Oct or £100 thereafter. (including Lunch/Refreshments)
Simple Statistics Excel & SPSS	21st October 2016	Research Course Details - 10 CME Points from the Royal College of Anaesthetists. A 2 day course covering all research competencies of the 2010 high syllabus in research	£150 Earlybird price by 20th Nov or £180 thereafter. (including lunch/refreshments)
Introduction to Research	15th & 16 December 2016		

To Register: click on this Link: <https://form.jotformeu.com/cmhabc/Courses>
Website: For more information www.bmc.wales

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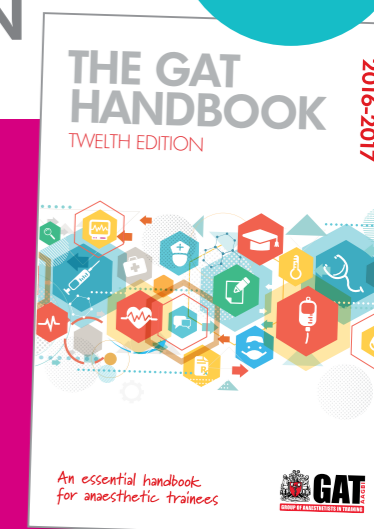
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Second City Cycle: bike ride to Annual Congress Birmingham 2016



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For the last four years, our fearless team of cyclists have peddled up and down the UK, to the AAGBI Annual Congress. This year is no different! The Annual Congress 2016, is being held in the second city: Birmingham. In aid of the AAGBI's fundraising campaign, Lifeboxes for Rio, the bike ride will navigate its way along the towpaths of the longest canal in England: The Great Union Canal.

The proposed starting day will be Saturday 10 September, leaving from AAGBI HQ in London and arriving in Birmingham 12 September. The stopovers will be in:

Day 1: Tring Day 2: Harpole Day 3: Birmingham



For further information and a route map please visit
www.aagbi.org/cycle

Each year the AAGBI celebrates, recognises and awards the work of individuals and teams within the anaesthesia profession.

Abstract Submission

You're invited to submit an abstract for poster presentation at WSM London 2017. The deadline to submit an abstract is **Wednesday 31 August 2016**. A preliminary review of abstracts received will determine which abstracts will be accepted for poster presentation. If accepted, your abstract will be published in a fully referenceable online supplement to the *Anaesthesia* journal. Authors of the best poster(s) will be awarded 'Editors' Prizes.

NELA Prize



NELA will also be sponsoring a Trainee poster prize at the WSM London 2017. This prize will be for the best poster that uses your hospital's NELA data to bring about an improvement in care.

To find out more and start planning your abstract submission, visit www.wsmlondon.org/content/abstract-submissions

AAGBI Innovation Award

The annual AAGBI Prize for Innovation in Anaesthesia, Critical Care and Pain.

The AAGBI Prize for Innovation 2017 promotes innovation in anaesthesia and intensive care. The award is open to all anaesthetists, intensivists and pain specialists in Great Britain and Ireland and will be presented at WSM London 2017. The emphasis is on new ideas contributing to patient safety, high quality clinical care and improvements in the working environment.

The deadline to apply for the AAGBI Innovation Award is **Friday 30 September 2016**. Find out more about the AAGBI Innovation Award visit www.aagbi.org/innovation

Find out more – visit www.wsmlondon.org

SIVA

Society for Intravenous Anaesthesia

Annual Scientific Meeting 24th and 25th November 2016

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Stratford upon Avon, CV37 6YR
Visit the SIVA website for the latest information
siva.ac.uk/asm



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Registration fees:

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- The Intensive Care Society of Ireland's (ICSI) Autumn Meeting, Saturday 8th October 2016, and;
- The South of Ireland Association of Anaesthetists (SIAA) Annual Scientific Meeting, Sat 8th October 2016

Speakers include

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Sol Aronson, North Carolina, USA
Anna Batchelor, Newcastle, UK
George Collee, London, UK
Jim Down, London, UK
Mark Hamilton, London, UK
Henrik Kehlet, Denmark
Denny Levett, Southampton, UK

Mike Margaron, UK
Dan Martin, London, UK
Tim Miller, North Carolina, USA
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www.dingleconference.com

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