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 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 ever 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 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 face clinical, personal, financial, ethical and other many 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.

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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 taxpayer, funding and political models of the NHS in England, Scotland, Wales and Northern Ireland.

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Printing: Portland Print

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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 airlines, nuclear power, transport, fire-fighting, and of 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 65 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 become payable 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.

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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 unearned 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’. The cost of the NHS pension scheme is more than £3 billion per annum. 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.

- 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 is expected to increase 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 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 below which plots the probability of dying against age in ancient Rome.

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, mortality and disability, overall health has improved substantially in absolute terms in the UK between 1990 and 2010.


<table>
<thead>
<tr>
<th>Age</th>
<th>Male life expectancy; years</th>
<th>Female life expectancy; years</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>40.3</td>
<td>43.6</td>
</tr>
<tr>
<td>45</td>
<td>35.6</td>
<td>38.8</td>
</tr>
<tr>
<td>50</td>
<td>31.0</td>
<td>34.1</td>
</tr>
<tr>
<td>55</td>
<td>26.6</td>
<td>29.5</td>
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<tr>
<td>60</td>
<td>22.3</td>
<td>25.1</td>
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<tr>
<td>65</td>
<td>18.3</td>
<td>20.8</td>
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<tr>
<td>70</td>
<td>14.5</td>
<td>16.7</td>
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<tr>
<td>75</td>
<td>11.2</td>
<td>13.0</td>
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<tr>
<td>80</td>
<td>8.2</td>
<td>9.6</td>
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<tr>
<td>85</td>
<td>5.8</td>
<td>6.8</td>
</tr>
</tbody>
</table>

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 deaths 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.

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.

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

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

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.

In gathering data they found that there were approximately 1900 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’ 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 academies 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.

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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.
4 This was established. The contributions
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 age\(^*\) should be automatically enrolled into a qualifying workplace pension scheme between 2012 and 2016. From October 2017, all private sector employers have to automate a minimum of 3% to an employee’s pension with the employee contributing at least 4%.

\(^*\)This is the age determined by government at which the basic state pension will be paid.

**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. Publicly 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 support for old age being the Poor Law. None but a small number of people receiving a proper pension in old age. 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 the population is growing and when most retirees do not live for too long.

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. It is calculated as:

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 hypotekated taxes for future use. Furthermore, even if there were contributory, means-tested pension to each person aged over 70 from the state pension age. On average, the 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 that the state pension represent over half the incomes of those currently retired [10].

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 long-term, superannuation scheme, with contributions built up over years of service. The schemes usually pay a lump sum when an employee retires. 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 beneficenaires, 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 a 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 eligible dependents. Combined, the schemes had 5.5 million members at 31 March 2009, comprising 2.75 million current staff, 1.59 million previous employees who have retired but were not yet eligible to draw them, and 2.13 million pensioners. i.e. there were fewer people contributing than there were 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% increase in the average pensionable pay in that scheme year) and is increased by a set rate linked to inflation (known as ‘revaluation’ of one year to 31 March of the following year. The future 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 that at that time, i.e. the normal NHS contributors’ pensionable age will increase as set by the future legislation that defines the state pensionable age. At present, this means it will be 66 for both men and women by 2020.
- Employees can contribute until they are 75.
- Members’ contributions vary from 5% to 14.5% (with increasing 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 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 accrued individually, it more 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 affect 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 increasingly be 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 considered.
4.0: Age, physiological changes and comorbidities

4.1: The ageing process and its impact on organ function

The ageing process

Aging 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, aging is very unpredictable and its effects are heterogeneous. Genetic factors interact with those of the environment to influence both rate and extent of aging. 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, 50% is due to environmental factors 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, 50% is due to environmental factors.

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].

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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])

<table>
<thead>
<tr>
<th>Mechanism of change</th>
<th>Blood pressure</th>
<th>Pulse and cardiac output</th>
<th>Respiratory</th>
<th>Hormonal/Immuno-logical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular, structural and organ level changes and systemic effects</td>
<td>oxidative and mechanical damage to vascular endothelium</td>
<td>increased systolic blood pressure</td>
<td>decreased tidal volumes</td>
<td>decreased T-cell function with reduced immunity</td>
</tr>
<tr>
<td></td>
<td>heightened inflammatory response from cytokines, growth factors, collagen, elastases and proteases</td>
<td>increased left ventricular wall thickness</td>
<td>increased respiratory rates and decreased total volumes</td>
<td>changes in hypothalamic activity</td>
</tr>
<tr>
<td></td>
<td>decreased arterial wall pliability</td>
<td>diastolic dysfunction</td>
<td>increased residual volumes and decreased tidal volumes</td>
<td>increased night-time cortisol levels</td>
</tr>
<tr>
<td></td>
<td>increased left ventricular wall thickness</td>
<td>increased pulse pressure</td>
<td>increased respiratory rates and decreased tidal volumes</td>
<td>reduced ability to maintain body heat with less subcutaneous fat, reduced peripheral vasoconstriction</td>
</tr>
<tr>
<td></td>
<td>decreased arterial wall pliability</td>
<td>metabolic adaptations to hypoxic and hypercapnic conditions</td>
<td>decreased compliance</td>
<td>dysregulated circadian rhythm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>loss of muscle mass</td>
</tr>
</tbody>
</table>

Compensation to stress

- 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
- less sympathetic responsiveness hindered ability of cardiovascular system to adjust when stimulated
- less adaptability in heart rate is associated with falls, frailty
- weakened respiratory muscles, less compliant chest wall, increased work of breathing diminish ability to adapt to stress
- less sensitivity of chemoreceptors and mechanoreceptors causes decreased response to hypoxia and hypercapnia
- loss of heat maintenance and thermoregulatory mechanisms with heightened vulnerability to hot and cold stressors
- lower core body temperature hinders ability to regulate body temperature

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. Presbyacusis [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.

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 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])

<table>
<thead>
<tr>
<th>Mechanism of change</th>
<th>Blood pressure</th>
<th>Pulse and cardiac output</th>
<th>Respiratory</th>
<th>Hormonal/Immuno-logical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular, structural and organ level changes and systemic effects</td>
<td>oxidative and mechanical damage to vascular endothelium</td>
<td>increased systolic blood pressure</td>
<td>decreased tidal volumes</td>
<td>decreased T-cell function with reduced immunity</td>
</tr>
<tr>
<td></td>
<td>heightened inflammatory response from cytokines, growth factors, collagen, elastases and proteases</td>
<td>increased left ventricular wall thickness</td>
<td>increased respiratory rates and decreased tidal volumes</td>
<td>changes in hypothalamic activity</td>
</tr>
<tr>
<td></td>
<td>decreased arterial wall pliability</td>
<td>diastolic dysfunction</td>
<td>increased residual volumes and decreased tidal volumes</td>
<td>increased night-time cortisol levels</td>
</tr>
<tr>
<td></td>
<td>increased left ventricular wall thickness</td>
<td>increased pulse pressure</td>
<td>increased respiratory rates and decreased tidal volumes</td>
<td>reduced ability to maintain body heat with less subcutaneous fat, reduced peripheral vasoconstriction</td>
</tr>
<tr>
<td></td>
<td>decreased arterial wall pliability</td>
<td>metabolic adaptations to hypoxic and hypercapnic conditions</td>
<td>decreased compliance</td>
<td>dysregulated circadian rhythm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>loss of muscle mass</td>
</tr>
</tbody>
</table>

Compensation to stress

- 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
- less sympathetic responsiveness hindered ability of cardiovascular system to adjust when stimulated
- less adaptability in heart rate is associated with falls, frailty
- weakened respiratory muscles, less compliant chest wall, increased work of breathing diminish ability to adapt to stress
- less sensitivity of chemoreceptors and mechanoreceptors causes decreased response to hypoxia and hypercapnia
- loss of heat maintenance and thermoregulatory 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.

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 (6%), 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.

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].

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 homeostasis, 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.

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 retiree. Moreover, 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.

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].

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

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:

<table>
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</tbody>
</table>
5.3: Wellbeing at work: making work possible

The changes to pensions regulations not only affect medical staff – they also affect all workers in the NHS. Others in 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 more to 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 in detail in the Black Report [44]. This review was not instigated primarily to meet the future changes and challenges of pensions reform, but its findings and conclusions remain of 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 well-being
- Early intervention to address the sickness absence of employees
- 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 the importance of health and well-being. 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.

To make this happen, we need a combination of 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. While the nature and characteristics of the workforce are critically important in terms of satisfaction, reward and control. Good management also leads to good health, wellbeing and improved performance. Line managers are often 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. However, a balance needs to be struck between the need to promote health and morbidity seen globally, inequality is still substantial, and the Marmot Report calls for urgent action. In England, people living in the poorest areas have the lowest life expectancy and mortality rates than those living in the richest neighbourhoods. Even more disturbing, the average difference in disability-free life expectancy is 17 years. Thus, people in different areas have the highest rates of acute hospital medical staff are required alongside these changes is a wholesale change in the way

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, rating their performance against other lower performing colleagues. Despite having satisfaction on an individual basis remains high and, in May 2015, > 95% of patients treated by NHS Trusts and Foundation Trusts would have the same doctor again. Reflecting on the Marmot Report [43], which was commissioned on behalf of the NHS, where the terms of reference for this publication are: ‘How does the age of the medical practitioner affect the patient’s reasonable expectation to see the medical staff it sees are competent?’

In a series of Reith Lectures entitled A Question of Trust, Orson, 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 disappointments might arise, the essential factor in any lay-professional relationship was trust. If there was no trust and an innate responsibility to provide good care on the part of the patient, with both medical and surgical teams, was not good enough. This meant that it was important to have a relationship of mutual trust. Despite this, the media’s portrayal of the NHS has not helped to prevent short-term sickness absence from progressing to long-term sickness absence and ultimately incapacity 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 incapacity appears to be avoidable and is compatible with the work, although sometimes work patterns need to change. 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 staff (6.2%). By contrast, nursing, midwifery and health visiting have rates of less than 2% and, in May 2015, > 95% of patients treated by NHS Trusts and Foundation Trusts would have the same doctor again. Reflecting on the Marmot Report [43], which was commissioned on behalf of the NHS, where the terms of reference for this publication are: ‘How does the age of the medical practitioner affect the patient’s reasonable expectation to see the medical staff it sees are competent?’

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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 regulations realised several aspects of public and personal life with respect to the prevention of discrimination, and from October 2012 it was no longer legal 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 did not want to stop work, an old employee now has to be shown to be unable to satisfactorily undertake the content of their job for a period of at least three years. The cessation of that job has to be 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, 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 contrary to 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 old 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 individual variations in performance.

- The relationship between chronological age and performance is not linear, with some showing functional capacity for work, work demands, work environment, stress, shift work, expertise, and attitudes towards work and retirement to be 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 cope with individual variations in performance, such as their expertise, job knowledge, education and high motivation. However, many consultants who demand excessive hours may be over-demanding jobs for consultants of that age. The relationship is not linear, so any decrease in performance may be more likely if the job demands exceed the overall capacity of an individual worker to compensate.

- There is evidence of ‘healthy worker’ effects, whereby individuals self-select to leave their chosen occupation. Those who remain in their chosen occupation have demonstrated 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 ‘selective job leaving’ probability is unknown. The extent to which these effects act as a safeguard for the safety critical occupations is unknown. The extent to which these effects are a safeguard for the safety critical occupations is unknown.

- More longitudinal research is required in order to investigate decreases in performance over a working life.

The present position with regard to anaeasthesia

- The relationships between patients and doctors remain very good, with a high degree of trust. Part of that lies a reluctance 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 can 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 industries) have had to make a change in a job description ‘in a reasonable manner’ 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 contrary to 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.

Historically, national aviation authorities grew up in response to the increasing aviation activity after the Second World War. The International Civil Aviation Organisation was established in 2003. A European aviation Agency was created, but national membership states have their own national aviation 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 over 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 screening, which includes six-monthly competency checks in the simulators. This raised level of screening standards has 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 situationally complicated cockpit in the event of misjudging, misappraising or anxiety can, and sometimes does, cause degraded performance levels. Discouragingly, up to 50% of pilots who receive an admission from the pilot that the cause of the reduction in performance was as a result of ‘stressiness’ rather than cognitive degradation. In all airlines there have been cases of performance degradation stimulated by the pressure to work to medical standards. It is therefore important to try to differentiate between the causes so that retaining 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 maximum age for pilots of 60. However, in reaction to the removal of age-related compulsory retirement from clinical practice, British Airways and other airlines have modified the job content of an anaesthetist aged over 55 years, and 60 years, respectively. 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 only 1% per year, which approximately equates to 1 death per 1,000,000 hours. With two pilots, the probability of both dying is (1 x 10 -6) x (1 x 10 -6) = 1 x 10 -12 per hour, which is 1,000 times less than that set by the European Aviation Safety Agency [57]. Surveys on pilot performance [57] concluded similarly to the HSE that: ‘Overall, the scientific record has not resulted in a clear appreciation 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 the age for retirement is delivered.

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

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 ‘switching off’ [58]. The words of George Santayana, the Spanish philosopher – ‘Those who do not know the errors of their discipline, are apt to make the same mistakes again and again, sometimes over decades [60,61].’ Control, command and more regulation appear not to have significantly decreased failure of the doctor-patient interface. It is surely naive to think that if we go on
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 rules 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 stop 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 retrained.

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

Anesthesia 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 medicolegal 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 (ACECO). Their Welfare of Anaesthetists Special Interest Group has studied the Retirement and Late Career Options for the older professional [67].
There is good neuropsychiological 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 unrecognized by both the individual and their colleagues until well advanced.

- Quality of sleep worsens with age and sleep becomes shorter. On-going 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 ages, and 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 are less likely to be fatigued and are able to draw on previous experience. Older practitioners may rely heavily on previous experience, intuitively recognising patterns and giving innately 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 pathway towards eventual retirement (whenever that was) needed active management. Waiting passively for an adverse event to signal professional failure was definitely 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 only increase, 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 fail to spot and may go unrecognised by their peers [69]. Maintaining a commitment to teaching and learning from trainees can only be good.

- 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 recognize 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. Carefully considering the advisability of working in remote sites, including those in the independent sector.
- The design of OPD and remedial training should take into account the needs of the older workforce. Traditional, lecture-based OPD may be less useful to the older practitioner than group activities in which participants discuss clinical management and receive feedback from peers.

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 include lack of time, frequency 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 not aware of the emergency and hence cannot accurately rate an anaesthetist’s performance dynamics and oversensitivity to a person’s feelings influence the findings and conclusions?
- How would one manage an unsatisfactory outcome? If an ageing anaesthetist performs poorly, how should the process of learning 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 perhaps not annually. Another approach at greater age is to reduce 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 are transmitted 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 for crisis management and may not pick up subtle changes in performance.

- 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 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 workforce in the future, and we need to be prepared in plans 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 information they receive 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 practicability 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 must also act as a deterrent, the Government has created a funded, 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, OPD 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 to...
been established that an employee cannot demand changes to their job which convene them but do not meet the corporate objectives of the trust to have an appropriately skilled workforce to the terms of the employment contract. 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, 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, and the Department of Work and Pensions suggests 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 [66], recommends survey 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 to ensure representation and involve 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 week-end work instead of overnight on-call, flexible working, shorter hours, less isolated working and less demanding or less stressful jobs. A change of role might be appropriate for some, and may include retraining, reoccupation with reduced hours or more 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 recommended that 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 opportunities for 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 jobs. A change of role might be appropriate for some, and may include retraining, reoccupation with reduced hours or more postgraduate education, clinical governance or other non-clinical roles.

Irrespective of the increase in statutory retirement age, individuals may experience concerns about their suitability for their job, or that they are difficult or unreasonable for the department to accommodate. This can produce strains that will need to be overcome.

Mental resources.

Work ability in relation to the demands of the job.

Number of current diseases diagnosed by a physician.

Sick leave during the past year.

An employer’s own prognosis of work ability two years from now.

Mental balance.

This generates a useful matrix of information from which to discuss job plans with a trained appraiser who understands the needs of the older worker and the factors that influence continued enjoyment of work. Demand changes that may be considered include

- a change to a quieter environment;
- a change to a more computerised job;
- a change to part-time or flexible working hours;
- a change to the number of evenings or weekends worked;
- a change to responsibilities that are more administrative or clerical;
- a change to responsibilities that are more personal or hands-on;
- a change to responsibilities that are more physically demanding;
- a change to responsibilities that are more mentally demanding

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, is already in place in some jobs. These include: health care staff in acute care settings, professional fire-fighters, professional road drivers, engine drivers, oil rig workers, sailors, police, some trainers 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 valuable role for the anaesthetist to play in the wider health industry.

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:

- Possible 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 step by moving towards a situation in which private providers can provide for more of 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] stated that “the reduction in 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 said, “Useless are the old, always will be poor people in the land”[77] and Aristotle[78], who saw social differences as inevitable, said “The worst form of inequality is to try to make unequal things equal”. In 2014, a recent concerning health economics analysis by Bhopal and Hirshe [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 accommodate the 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 Fund, which is suggested by the BBC, has already been piloted in some health authorities. It is thought that this may be a way of providing care on a voluntary basis within the context of community care.
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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 the lead in improving your own health and care.
- 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 service more wisely, 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.

The NHS must be managed as a social concept through public education. This 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.

Appendix 1: Working party members

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<tr>
<th>Name</th>
<th>Position</th>
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<tr>
<td>Peter Hutton</td>
<td>Chair</td>
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<td>Richard Griffiths</td>
<td>(AAGBI)</td>
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<td>Tony Giddings</td>
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<td>Mary Baker MBE</td>
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<tr>
<td>William Harrop-Griffiths</td>
<td>(RCOA)</td>
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<td>David Shipway</td>
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<tr>
<td>Tony is a retired 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. He is currently Chair of the Royal College of Surgeons, and was also President of the Association of Surgeons of Great Britain and Ireland. He was a reviewer for the original Mid Stafford 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.</td>
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<tr>
<td>Following postgraduate clinical training in the East Midlands and completing an MD (1995) in Leicester, Richard was appointed to his present post of consultant anaesthetist at Peterborough &amp; Stamford Hospitals in 1998. 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 Burton medal by the Royal College of Anaesthetists for promoting the understanding of the science of anaesthesia in 2014.</td>
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<td>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 Organisation, and Co-Chair of the Research 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 Science and for Public Service, followed in 2014 by the Dana/EDAB Lifetime Achievement Award for Outreach on Behalf of Brain Research.</td>
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<td>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 National Audit Office. She is also a member of the Welsh Government’s Bevan Commission on Health in Wales, and Chair of the RIBSS’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 Practitioner Fellow 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.</td>
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<td>William is a Consultant Anaesthetist and Honorary Clinical Senior Lecturer at Imperial College Healthcare NHS Trust, London, UK. He graduated in 1981 from the Universities of Oxford 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 Richard and California and undertaking a BSc International Health Studies and Environmental Science. He graduated from the Universities of Oxford 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 special reference to orthopaedic surgery. He is a member of the Board of Directors of the British Society for Regional Anaesthesia and Pain Medicine. He has published extensively in the field of anaesthesia 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.</td>
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**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)
Dr Velu Guruswamy, Leeds, Organising Secretary
08:00 - 08:45: Registration, Coffee, Trade Stands
08:45 - 09:00: Welcome address - Dr Velu Guruswamy, Leeds, Organising Secretary

**SESSION 2**
(Chairs – Prof Rajinder Mirakhur & Dr Ravi Marthi)
10:30 - 11:00: Coffee break, Trade Stands, Posters
10:15 - 10:30: Discussion

**SESSION 3**
(Chairs – Dr Ranjit Verma & Dr Nalini Malarkkan)
12:15 - 12:30: Discussion

**SESSION 4**
(Chairs – Dr Abhiram Mallick & Dr Jayavanth Kini)
14:45 - 15:00: Discussion
13:55 - 14:20: Acute Brain Injury - Optimum management from DGH to Tertiary Center
Dr Premanand, BMJ, London, 3B00
13:55 - 14:20: Acute pain in Chronic pain patients
Dr Sameer Bhandari / Dr Vinay Shanthi
(Chairs – Dr Ranjit Verma & Dr Nalini Malarkkan)
11:50 - 12:15: Is Medical profession under threat in UK
Dr Hamish McLure, Leeds, 2B06, 3B00
11:50 - 12:15: Supporting the notion is the way forward for the NHS
Dr Simon Tomlinson, Manchester, 2B06, 3B00
Dr Anil Patel, President, DAS, 1B02, 3A01
14:20 - 14:45: Trauma Anaesthesia - lessons learnt & is there a fixed recipe
Dr Anthea Mowat, Deputy Chair BMA, London, 2A06, 2A07
Dr Sameer Bhandari / Dr Heather Gorton

**SESSION 5**
(Chairs – Prof Monsukh Popat & Dr Pawan Gupta)
16:00 - 16:30: Discussion
15:55 - 16:20: Oxygen Insufflation in Difficult Airway
Dr Tista Chakravarthy-Gannon, Lead Regional Advisor, GMC, London, 3E00
14:55 - 15:00: Discussion
15:00 - 15:30: Coffee, Trade Stands and Posters

**SESSION 6**
(Chairs – Prof Ravi Mahajan & Dr Mahesh Shah)
Dr Velu Guruswamy, Leeds, Organising Secretary
15:00 - 15:30: Coffee, Trade Stands and Posters
14:45 - 15:00: Discussion
15:00 - 15:30: Coffee, Trade Stands and Posters

**SESSION 7**
(Chairs – Dr Abhiram Mallick & Dr Jayavanth Kini)
14:45 - 15:00: Discussion
13:55 - 14:20: Acute pain in Chronic pain patients
Dr Sameer Bhandari / Dr Vinay Shanthi
Dr Sameer Bhandari / Dr Heather Gorton

**WORKSHOPS on 1st October 2016**

**WS 1 - Airway workshop (AW)**
Dr Sameer Bhandari / Dr Heather Gorton
Regional Anaesthesia (RA)
Dr Sameer Bhandari / Dr Vinay Shanthi
WS 2 UL (UPPER LIMB / TRUNK)
WS 3 LL (LOWER LIMB / CND)
WS 4 - Simulation workshop (SW)
Organiser TBC

**WS1 - Airway workshop (AW)**
09:00-12:30: AW - UL - SW
13:30-16:30: AW - LL - SW
Each delegate can attend 2 of 4 workshops

**TRAVEL GRANTS/IRC FUNDING**

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-lrcfunding-travelgrants or email secretariat@aagbi.org or telephone 020 7631 1650 (option 3)
Closing date: 19 September 2016

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

**Essentials of Anaesthesia in the Developing World**
- **Date:** 15th September 2016
- **Course Details:** 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.
- **Course Fee:** £150 (including lunch/refreshments)

**Focused Intensive Care Echocardiography (TOE) Course**
- **Date:** 18th October 2016
- **Course Details:** 4.5 day professional education course offering 10 CPD points for those interested in Simulation Education.
- **Course Fee:** £240 (including lunch/refreshments)£100 (including lunch/refreshments)

**Resuscitation Update for Consultants**
- **Date:** 22nd November 2016
- **Course Details:** A half day refresher course on managing cardiac arrest in adults.
- **Course Fee:** £60 (including lunch/refreshments)

**Cardiff Ultrasound Guided Regional Anaesthesia with Cadaveric Anatomy**
- **Date:** Course Full
- **Course Details:** 2 day practical hands-on course that enables you to perform perioperative transoesophageal echocardiography.
- **Course Fee:** £230 (including lunch/refreshments)

**Cardiff Postgraduate Transoesophageal Echocardiography (TOE) Symposium**
- **Dates Available:** 20-22 September 2016, 10-17 November 2016
- **Course Details:** A 3 day practical course for all specialists who wish to gain expert knowledge of transoesophageal echocardiography.
- **Course Fee:** £450 (including lunch/refreshments)£450 (including lunch/refreshments)

**Research & Statistics Courses**
- **Date:** 1st October 2016
- **Course Details:** A 1 day course open to all health care workers who wish to gain statistical experience.
- **Course Fee:** £380 Earlybird price by 1st Oct or £410 thereafter (including lunch/refreshments)

**Introduction to Research**
- **Date:** 15th & 16th December 2016
- **Course Details:** A 2 day course covering all research competencies of the 2010 high syllabus in research.
- **Course Fee:** £150 Earlybird price by 20th Nov or £180 thereafter (including lunch/refreshments)
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

Only 2 months to go!

In this Olympic Year, help us save thousands of lives around the world by donating to Lifeboxes for Rio. Help us to reach our target of £96,000 to buy 600 Lifebox Pulse Oximeters - that’s the same as the number of Team GB athletes attending the Olympic and Paralympic Games in Rio. Become a Lifeboxes for Rio fundraiser today www.aagbi.org/LifeboxesForRio

Together we can save thousands of lives around the world where patients are at risk of death from hypoxia.

£25,000 still to raise. Help us achieve our target

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

The final lap of Lifeboxes for Rio draws closer, we still have £25,000 left to raise

The Association of Anaesthetists of Great Britain & Ireland

WINTER SCIENTIFIC MEETING

WSM LONDON

QEII CENTRE, WESTMINSTER

11-13 JANUARY 2017

The largest anaesthetic conference in central London

- Keynote lectures - core topics - poster competition
- extensive industry exhibition - networking opportunities

www.wsmlondon.org

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
18th Current Controversies in Anaesthesia & Peri-Operative Medicine
Dingle, Co. Kerry, Ireland
5th - 7th October 2016
We are delighted to announce that the 2016 conference will be in collaboration with:
- The Intensive Care Society of Ireland’s 37th Autumn Meeting,
- Saturday 8th October 2016, and
- The South of Ireland Association of Anaesthetists (SIAA) Annual Scientific Meeting, Sat 8th October 2016

Speakers include:
- Harry McNeice, Southampton, UK
- Sue Anderson, North Carolina, USA
- Annie Ballhouske, Newcastle, UK
- George Calise, London, UK
- Jon O’Donnell, London, UK
- Mark Hamilton, London, UK
- Helen Kostel, Durham
- Denny Levitt, Southampton, UK
- Mike Margerson, UK
- Dan Martin, London, UK
- Tim Miller, North Carolina, USA
- Hugh Montgomery, London, UK
- Moira Neild, Birmingham, UK
- Ramani Kumaran, London, UK
- Monique Matthews, London, UK
- Jan Weale, North Carolina, USA

For further information about the conference visit: www.icisiireland.com

Regional EBPOM 2016
Newcastle
Hilton Gateshead
3rd November 2016
- Dr Chris Snowdon, Newcastle (Chair)
- Dr Dan Candey, Manchester
- Dr Jonathan Grice, London
- Prof Mike Giscomb, Southampton
- Prof Ellen Kramer, Newcastle
- Dr Gary Mistry, Plymouth
- Prof Moony Mathew, London
- Mr Rob Thompson, RECSA

Booking Open - use code ANA20 for a 10% discount

15th Peri-Operative CPET Course
Montague Hotel, London
28th and 29th November, 2016
Cardiopulmonary Exercise Testing For pre-operative Assessment Course
- Only 40 delegate places per course
- Facility to Debrief individual tests
- Lectures, small group tutorials and workshops
- Understanding Pre-exam
- Test Interpretation
- Respiratory and Cardiac abnormalities
- Testing protocols
- Setting up the room

For further information visit: www.cpetcourses.co.uk

Holiday Inn Hotel (soon to be Crowne Plaza)
Stratford upon Avon, CV37 6YR
Visit the SIVA website for the latest information
siva.ac.uk/asm

Scientific programme includes:
- TIVA in Clinical Practice
- End Organ Protection
- Pharmacogenomics, Post-op Analgesia in Chronic Pain, Hyperalgiesia
- CNS and Pain Monitoring
- PK Variants in Pumps
- The SIVA Debate - 1 Syringe, 1 Drug?

Registration fees:
- Registration fees from £215 (£145 for trainees)
- (No fees for trainees whose posters are accepted for presentation)
- Accommodation £85 – Bed & Breakfast at the Holiday Inn Hotel
- Free parking on site
- See website for other transport options

There will be a complimentary coach from the venue to
- Birmingham International Railway Station/Airport at 3pm on Friday (c.45 mins)

Extended half day workshop for novices only - limited places available

The first 100 registrants may choose from 5 complimentary workshops.
The Association of Anaesthetists of Great Britain & Ireland

ANNUAL CONGRESS

BIRMINGHAM

14 - 16 September 2016

JUST OVER A MONTH TO GO - HAVE YOU BOOKED YOUR PLACE YET?

Sessions include:
- ICS for non-intensivists • Blood pressure • Ethics
- Workforce • Tools of the trade • Hot topics in training

Keynotes:
Andy McCann, Performance Coach, DNA Definitive – Walking the tightrope: dynamic resilience in action
Professor Alistair Burns, Manchester – Dementia: a challenge for everyone
Professor Paul Myles, Melbourne – Quality of recovery and disability-free survival

Practical workshops, poster presentation, social events and more!

BOOK NOW
www.annualcongress.org

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