comment

"Perhaps the Surviving Sepsis campaign has led to fear and anger" **DAVID OLIVER**
"Will medical bestsellers make patients wary about talking to a doctor?" **HELEN SALISBURY**
PLUS Remembering that patients are people first; behind the Brexit soundbites

THE BOTTOM LINE Partha Kar

Technology and the NHS—false promises?

"Interoperability," "AI," "tech": these phrases fly around in discussions about the NHS. Are they just fancy buzzwords? Do they conjure up images of Skynet, the Terminator, and a desolate future world? Or do they suggest a much needed step change for an NHS stuck in a technological time warp? The reality is somewhere in the middle, with emotions in the NHS ranging from unbridled enthusiasm to jaded cynicism.

One fundamental issue—and this isn't necessarily a problem—is that the NHS can't be seen to fail. Any failure is seen as a waste of taxpayers' money that could have been spent better. The problem is that, in the world of innovation and technology, you first have to learn from failure. In a cautious NHS, this falters.

Another challenge is the NHS having to provide for all, which isn't such an issue in the private sector. Then you have the cheerleaders and enthusiasts, for whom it's all about absolutes. Any criticism is seen as negativity, opponents are branded Luddites, and the divide continues.

We also see a fundamental challenge around the evidence for innovations, in a health service steeped in a culture of evidence based medicine and randomised controlled trials (RCTs). This throws up the question of what constitutes evidence. "Real world data" is a fashionable phrase, but it has biases and challenges and can be met with sniffy disdain from purists.

Healthcare innovation rarely stands still long enough for anyone to undertake an RCT, let alone await approval from NICE. With this approach, and the pace at which the NHS works, NICE would probably have just approved Betamax videos while the rest of the world was contemplating the move from Blu-ray to streaming.

The challenge for those doing the daily grind is whether we're doing enough on the basics. Simple things—being able to log into a computer at work, decent wi-fi, or ensuring that we can see our patient notes in one place—would transform care. One can understand the scepticism as the latest iteration of AI is announced and is found to be rich with possibilities but little evidence.

The most sensible path may be a cautious approach while engaging with cynics and tackling the basics. If we think about devices and technology that prioritise self management and enable closer working, just maybe we'll get somewhere.

But we should remember examples of how technology is skewed towards certain socioeconomic groups. While technology can help the NHS improve care, we need to make sure that it does so for everyone, not just the digitally literate or the socioeconomically fortunate.

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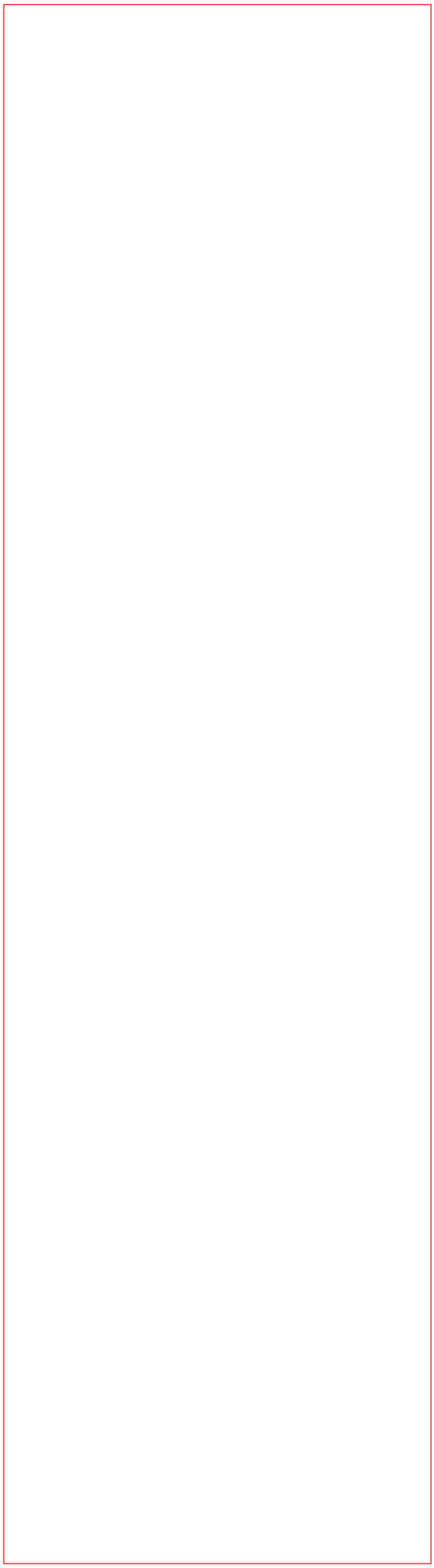
Being able to log into a computer at work, decent wi-fi, or seeing patient notes in one place would transform care



increases in knife related injuries rather than small fluctuations.

The changes in violence are small in magnitude and therefore seem inconsistent with the narrative of a national "violence epidemic." However, if these modest increases in national rates of knife related injuries were attributable to isolated pockets of violence in one region or city, such as London, this would be characteristic of concerning problem with local, rather than national, patterns of violence. We need further systematic analysis of violence trends, using a variety of data sources, to identify and respond to those communities most severely affected. Although the mortality and injury data we have presented have some limitations (see supplementary files),[11] they are widely considered to be more reliable than police data, which fluctuate as a result of recording changes.[12]

Reliability of police data

Data on long term patterns of violence can be difficult to interpret, whatever the source. Recent media reporting places considerable emphasis on an increase in police recorded violence, which includes a wider range of behaviours than hospital injury data. There seems to have been little scrutiny of the complexities and limitations of the police data, perhaps partly because in modern journalism tight deadlines and intense competition for audiences often preclude extensive analysis, reliability checks, or consultation with experts or additional data sources.[13 14]

One important concern not generally acknowledged by media reporting was the UK Statistics Authority's decision to downgrade police crime statistics in 2014, removing their gold standard "national statistics" status because of substantial evidence of inaccurate recording.[15] A subsequent inspection by Her Majesty's Inspectorate of Constabulary and Fire and Rescue Services found widespread failures in reporting by police forces, with an estimated 800 000 offences going unrecorded each year. Violent and sexual offences were most severely affected, with under-recording estimated to be around 33% for violent offences.[16 17]

Considerable improvements have occurred in police recording practices since 2014, which is thought to be one reason for the increase in recorded rates of violent crime.[18] Police forces have tightened practices and made several potentially important changes to counting

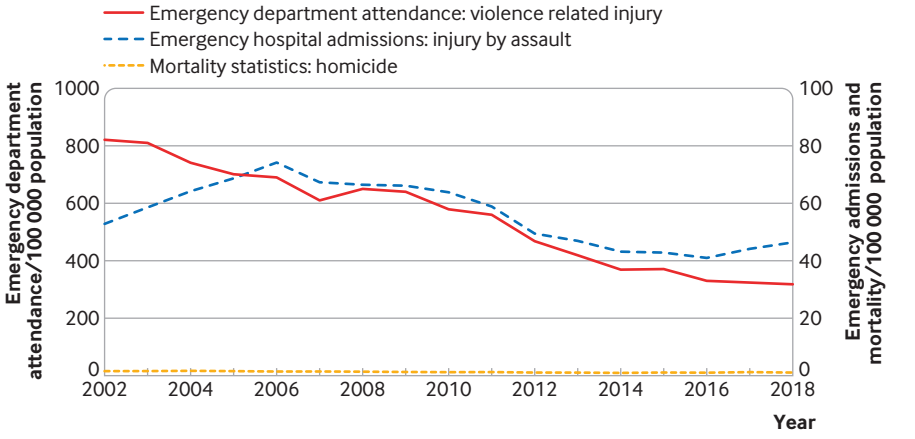


Fig 1 | Trends in injuries from serious violence in England and Wales from 2002 to 2018. Data on homicide from Office for National Statistics mortality statistics (include those with a pending verdict); emergency admissions from Hospital Episode Statistics; and emergency department attendances from National Violence Surveillance Network

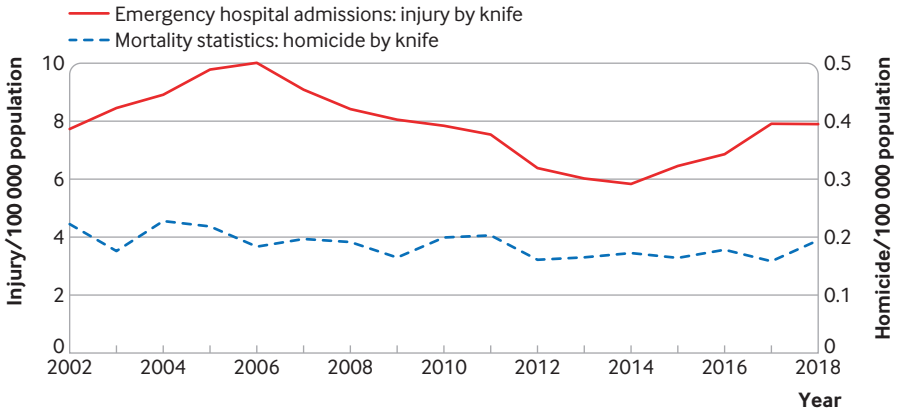


Fig 2 | Trends in homicide and emergency admissions related to knife injuries, 2002 to 2018

rules. For example, violent crimes can now be recorded from reports by professional third parties (eg, social workers) without requiring confirmation from the victim. Furthermore, there have been changes in the definition of violent crime, such as the inclusion of death by dangerous driving and the creation of a "stalking and harassment" subcategory of violence against the person. These changes make it difficult to determine whether the rise in police recorded violence is a result of recording changes or genuine increases in violence.

The effect of changes to recording practices can be examined by comparing police recorded violence with trends in violent victimisation captured by the crime survey.[19] Figure 3 shows data from ONS using the ratio of violence reported in the crime survey and a comparable subset of police recorded violence.[19 20] Between 2007 and 2013 the ratio falls below 1, indicating that a substantial volume of violent crime was not recorded in police statistics. After problems with police data were highlighted in 2014 the ratio rose steeply, with numbers of police recorded violent incidents exceeding what might be expected on the basis of violence reported through victim surveys.[20] This suggests that at least some of the rise in violent crime observed in police data is the result of changes in recording.

Although there are numerous complexities inherent in all violence surveillance data, recent media coverage seems to have overstated increases in violence without properly contextualising the figures within broader patterns of declining violence and without reference to important changes to recording practices that limit the interpretation of police recorded data. Both police and hospital data seem to confirm an increase in knife related violence since 2014, back to the levels seen between 2009 and 2011, but despite this, homicide and injury from serious violence remain comparatively low.

Are we fuelling the fire?

Media coverage of interpersonal violence, particularly knife crime, has increased against a backdrop of declining trends

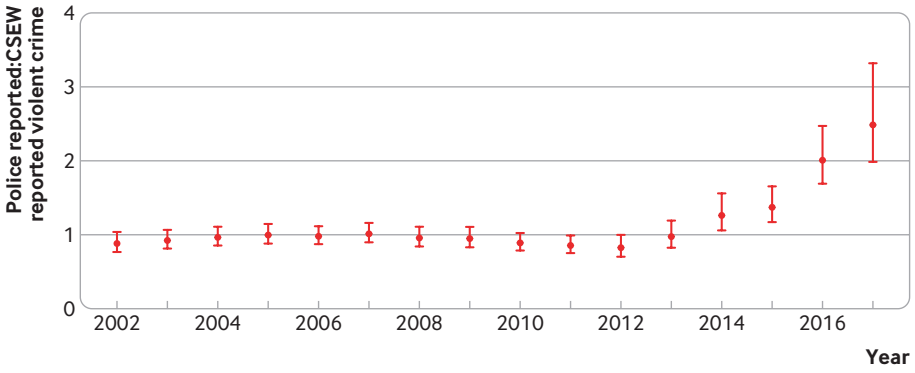


Fig 3 | Ratio of police recorded violent crime to comparable incidents reported in the Crime Survey for England and Wales, 2002 to 2017. Error bars are 95% confidence intervals based on complex standard errors, which represent the sampling error in the crime survey's estimates[19]

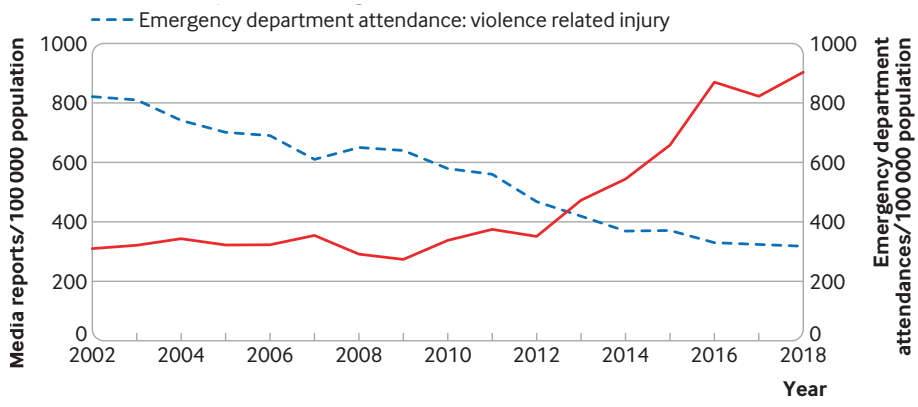


Fig 4 | Coverage of reports on increasing violence in the *Guardian* 2002-2018[17] overlaid with emergency department attendances for violent injury recorded by the National Violence Surveillance Network

in violence (fig 4).[1] This coverage is disproportionate to the magnitude of the problem. Apart from concerns about inaccuracies in the interpretation of data, we are concerned about the effect this coverage may have on the public debate, the political action it may motivate, and the public's perception of safety. Sensationalised coverage could potentially lead to adverse effects if political institutions (eg, through preventive policies conceived in haste) or members of the public (eg, increased weapon carrying) respond disproportionately to heightened fears of victimisation.

Social scientists have long recognised the potential for mass media to influence population perceptions of risk, and this is particularly the case for violence and safety. An emerging body of research shows that increased exposure to media coverage of violent crime is associated with increased fears of being attacked.[21-24] In addition, numerous studies have found that fear of attack is an important predictor of people carrying weapons to protect themselves.[25] To date, few studies have directly examined the effect of media coverage on the uptake of weapons, but several recent US population studies have found that extensive media coverage is linked to increases in gun purchases and applications for gun licences in the aftermath of mass shootings.[26-28] While the evidence is at present limited to US studies, it suggests that mass publicity of violent events may prompt increases in self protective behaviours, including carrying weapons. Such findings align with the concept of "probability neglect"—the idea that, when confronted with rare events that provoke strong emotions (eg, a terror attack), people adjust their behaviour disproportionately in response, rather than considering the low probability of these events affecting them.[29]

Another risk from the recent coverage is that it encourages imitation.[30] In suicide prevention, researchers have repeatedly found links between mass publicity of suicides and copycat suicides in the general population—the Werther effect.[31] A similar effect has been shown for other forms of violence, such as mass shootings and violent disorder.[32-35] Recently the Metropolitan police has been criticised for publishing emotive images of seized weapons on its social media platforms. Community groups argue that this is helping to fuel an arms race among London teenagers, who are inspired to acquire and carry more lethal weapons.[36] If imitation is a pertinent factor in knife crime, the framing of the recent crisis as a "national epidemic" could export London's knife crime problem to towns and cities across the country.[37 38]

The effects of mass media coverage on interpersonal violence are not yet clearly established. Evidence of its effect on suicide have prompted media and health bodies, including the World Health Organization, to issue guidance to help organisations responsibly communicate information about suicide events to the public to avoid imitation.[39] Similar caution may be required for how we communicate the risks of interpersonal violence.

Proportionate response

Interpersonal violence places a considerable burden on society that stretches far beyond its immediate victims. Even small deviations in trends warrant careful attention and, where necessary, sensible political responses. The increased media attention devoted to recent violence has helped draw attention to the enduring social problems threatening health and safety in some urban communities and the lack of public resources available to deal with them.

It is, however, important to clarify the scale and concentration of these events so as not to cause disproportionate alarm. The size of the problem has been distorted by recent media coverage, which has failed to acknowledge the limitations of police data and the declining rates of violence and injury found in other reliable indices.[8] Failure to scrutinise recent coverage has allowed the problem to be framed as a national crisis, when this is unlikely to be the case.

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FEATURE, p 226

LETTERS Selected from rapid responses on bmj.com

LETTER OF THE WEEK

Pharmacies giving flu jabs

I have just finished our first flu jab clinic of the year. I have enjoyed the banter from patients ("You should line us up like they used to in the army") and competing with other clinicians for who can give the most jabs in the time allocated. Most of all I have enjoyed the essence of general practice, seeing my patients a year on, some of whom are well and others who seem a little frailer.

In its great wisdom NHS England decided that pharmacies should give flu jabs. I am sure this is appropriate to increase uptake, but the knock-on effects of poorly considered plans are beginning to show, with reports of a two week delay to supplies (This Week, 5 October).

We are told to order enough flu jabs for our population at risk. Fine, but then the pharmacy receives their flu jabs three weeks before us, so they have a head start. We must have annual immunisation update training—do the pharmacists? We have full resuscitation equipment on site—do pharmacies? The pharmacy has to inform us that it has given the flu jab but not the batch number or expiry date. This is not good communication.

If our practice makes a loss this year, we will not be sacrificing more of our Saturday mornings, we will not be signing the flu directed enhanced service, and the losers will be the patients. I am sure that pharmacists will not be doing home visits to housebound people, and I will lose my precious time for assessing whether my patients are ageing well or need extra vigilance in the year to come.

Shame on the Royal College of General Practitioners for allowing further disintegration of general practice. Sometimes the small things are just as important as the large issues.

Ruth Clayton, GP partner, Whitchurch

Cite this as: *BMJ* 2019;367:l6269

GP PRESCRIBING GUIDANCE

New guidance does not trump clinical judgment

Wallace describes the pace at which GPs implement new prescribing guidelines as "suboptimal" (Research, 5 October), but a better term might be "appropriately cautious." GPs receive new guidelines on a frequent basis. To read all of them would mean relinquishing clinical duties and not seeing the patients to whom we are meant to apply the new guidance.

Prescribing guidance is particularly prone to change. I can remember being advised to prescribe co-amoxiclav by brand because it was cheaper than the generic. The same usually applies to new contraceptive pills when they are released to market.

Clinical guidelines are drawn from studies of patients who might share a demographic with mine, but they rarely apply to the patient sitting in front of me.

Slavishly adhering to new guidance does not necessarily improve patient care; far more important is to ask the right questions, listen, and take a good history.

Oliver D Starr, medical student tutor, London

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PRECISION MEDICINE

Erroneous data and drug industry bias

Two further obstacles should be added to the article on how preventive precision medicine can fulfil its potential (Analysis, 21 September).

First, erroneous data have great implications for machine learning algorithms. Precision medicine relies on real life data from sources such as electronic health records, where inaccurate data are abundant. In large datasets, random errors such as false diagnoses or incorrectly recorded symptoms are unlikely to matter much, as they distribute evenly. But when you refocus from group to individual, such errors can greatly influence algorithm predictions.

Second, drug industry involvement can cause bias to be built into machine learning algorithms. The Danish Health Act stipulates that doctors cannot work with or be affiliated with drug companies without permission of the Danish Medicines Agency. To prevent drug companies from biasing artificial intelligence, and thus personalised medicine, the same requirements should be applied when formulating machine learning algorithms.

Thomas Birk Kristiansen, medical doctor, Ishøj, Denmark

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IMPROVING QUALITY

Quality improvement is complex and contextual

Dixon-Woods is right that the effectiveness of quality improvement has been evaluated only recently and that many studies have methodological flaws (Quality Improvement, 5 October). A lot of these relate to the complexity of healthcare and the professional-patient encounter, the multifaceted nature of the interventions, and the time lag before some outcomes occur.

Health outcomes are the result of a complex care pathway, including primary, secondary, and self care. Quality improvement approaches in integrated care settings are rare, yet this is probably where a much larger effect could be achieved, given current deficiencies in timely referrals, continuity of care, and follow-up care in the community.

Quality improvement activities can't be easily disentangled from the countries in which they are implemented.

Including patient empowerment and co-production in quality improvement is the key to improving today's health systems. It would allow more reflexive learning and feedback about the nature of medical care.

Oliver Groene, honorary senior lecturer, London; Rosa Sunol, president, Avedis Donabedian Research Institute, Barcelona

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PAUL BOSTON

A MORE SUSTAINABLE NHS

Environmental rating system for drugs

Van Hove and Leng raise valuable points on reducing the environmental impact of metered dose inhaler propellants and anaesthetic gases (Editorial, 24-31 August).

When buying light bulbs, we look for A++ rating labels indicating low energy consumption. Drugs have no such rating. Although various matrices exist, they aren't included in product literature for clinicians.

The Anaesthetic Impact Calculator enables clinicians to compare the CO_2 equivalents of inhaled anaesthetic agents and carrier gases. We are not aware of any similar apps for metered dose inhalers. The NICE patient leaflet lists the CO_2 equivalent of inhaler actuations in relation to dry powder inhalers and car travel, but the source of the figure of 500 g CO_2 equivalent per actuation is unclear.

We need sector-wide collaboration to develop systems like EU energy rating labels. If rated today, metered dose inhalers and anaesthetic agents would carry a red E, and dry powder inhalers a green A++.

J M Tom Pierce, council member representing the Royal College of Anaesthetists; Laurence Bourton, communications manager, UK Health Alliance on Climate Change

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Cutting back on healthcare?

Achieving a carbon neutral system will be impossible until the wider economy is decarbonised. Some 58% of the healthcare system's carbon footprint derives from the supply chain of goods and services, and a substantial proportion of emissions that are attributed to "core" activities comes from such things as hospital electricity use or staff transport.

What can the NHS do to accelerate the necessary wider decarbonisation? Can we reduce the carbon intensity of healthcare fast enough? Do we need to cut back on supply of healthcare? Consuming less to achieve net zero is increasingly accepted in the wider economy. This is likely to be the case in healthcare as well.

No one is better placed than NICE to start calculating the carbon cost per quality adjusted life year of different interventions and to start the debate on which of them is affordable if we are to keep our planet habitable.

Jeremy Wight, retired public health physician, Hope

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Switching inhalers would be costly

Van Hove and Leng say that metered dose inhalers are a similar price to dry powder inhalers. But because of the far greater use of plain metered dose inhalers in the NHS, switching to dry powder inhalers would incur a considerable cost.

A rough calculation, based on the latest available primary care prescribing data (April to June 2019), for just salbutamol for all clinical commissioning groups in England and for the numbers of prescriptions and costs for each type of inhaler gives the following:

Number of metered dose inhalers: 4 624 000. Cost: £8 389. Average cost per item: £1.81.

Number of dry powder inhalers: 171 300. Cost: £771 000. Average cost per item: £4.50.

So, switching all metered dose inhalers to dry powder inhalers would cost approximately £12.4m a quarter or just short of £50m a year.

Clinical commissioning groups do not have this money, so making this switch would require funding from central reserves.

Andrew D Martin, strategic medicines optimisation pharmacist, Oldham

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NICE replies

Pierce and Bourton raise an important point on the need to emphasise the carbon impact of drugs. Summarised, accessible information for clinicians on the sustainability of treatments would be ideal. NICE is committed to collaborating with healthcare to improve information on environmental factors and to facilitate better decisions about the resources we use.

Wight says that switching inhaler types is insufficient, but we think it is one important first step towards a more sustainable NHS. Establishing a standard metric for measuring environmental impact is the second step, which will enable NICE to consider whether this could be included in the assessment of new products.

We agree with Martin that switching inhalers might incur a cost, but the basic drug tariff cost per inhaler gives a much lower incremental cost than Martin's estimate of £50m per year. We hope that local commissioners will consider environmental impact in their local purchasing decisions.

Maria van Hove, clinical fellow
Gillian Leng, deputy chief executive, NICE

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UTILITY OF MINDFULNESS

Make sure basic needs are met first

As Gerada says, the high rate of mental health problems and suicide among doctors is unsurprising given the stressors associated with their roles and the stigma that exists in the profession (Clare Gerada, 5 October).

Discussing the mental health of medical professionals is important, and finding solutions equally so. Mindfulness alone, however, will not solve these problems.

Maslow's hierarchy of needs posits that basic needs such as food and safety must be met before those higher up, such as self fulfilment and psychological needs, can be achieved. Mindfulness will not help medical professionals if they haven't had a break to eat or sleep in their 24 hour on-call shift or don't feel safe discussing their suicidal thoughts.

Strategies to tackle institutional causes and societal barriers to improving the mental health of medical professionals must accompany the well meaning push for mindfulness.

Matthew HV Byrne, junior doctor, Cambridge

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Patricia Arbuckle

Clinical medical officer (b 1933; q Edinburgh 1957), died from vascular disease on 18 August 2019

Patricia Arbuckle ("Pat") did house jobs in Edinburgh before moving to Manchester with her husband, Alex. After senior house jobs in paediatrics, she moved into community practice. She worked for Stockport Health Authority for 23 years, in child health clinics, cytology, and family planning. She headed up the medical side of the family planning service and was involved in training and assessing doctors and nurses. She retired to Melrose to be near her daughter, Gillian, a general practitioner, and her grandchildren. Pat was a keen bridge player, involved with the local church, and a regular supporter of Melrose Rugby Club. She was very proud of her granddaughter, Jennifer, in her final year at Dundee medical school. She leaves Alex, three children, and four grandchildren.

Gillian Arbuckle

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Peter Martin Sweeney

General practitioner Red House Surgery, Radlett (b 1961; q St Mary's Hospital, London, 1985; MB BS, DA, DRCOG, DFFP, DOccMed, FRCGP), died from metastatic rectal cancer on 19 August 2019

Peter Martin Sweeney became a partner at the Red House Surgery in 1991. For 28 years he was a dedicated GP there, providing outstanding continuity of care. He had a keen interest in education and training and was responsible for setting up the practice for GP training. In 2012 he was awarded fellowship of the Royal College of GPs in recognition of his contribution to education. Peter was the Aldenham School doctor for 20 years and GP to Saracens Rugby Club for the past 15 years. Despite having inflammatory bowel disease for more than 20 years, he missed only one day of work, but unfortunately developed metastatic rectal cancer in September 2018. He leaves his wife, Ingrid, and two children.

Mark Sweeney

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George Edward Foster

Consultant surgeon (b 1945; q Liverpool 1968; MD, FRCS), died from oesophageal cancer on 18 May 2019

George Edward Foster did his surgical training at Liverpool Royal Infirmary and Alder Hey Hospital and then rotated to Chester Royal Infirmary, where he was exposed to all aspects of general, abdominal, vascular, endocrine, paediatric, and emergency surgery. In 1976 he was appointed lecturer in surgery at Nottingham, and in 1983 he became consultant surgeon to the Chester hospitals. He initially also undertook breast surgery and urology; later he developed a department of colorectal surgery. He enjoyed teaching medical students, junior surgeons, and clinical nurse specialists. After retiring in 2011 he maintained an active interest in medicine and enjoyed spending more time with his family. He was diagnosed with oesophageal cancer in August 2018. He leaves his wife, Linda (a retired GP); three children; and four grandchildren.

Dale Vimalachandran, Linda Jane Fleming

Cite this as: *BMJ* 2019;367:l6163

Charles Christopher Smith

Consultant physician and infectious diseases specialist (b 1939; q Edinburgh 1963; FRCP, FRCPE, FRCPG), died from acute myeloblastic leukaemia on 9 July 2019

Charles Christopher Smith ("CC" to many friends and colleagues) was appointed as a consultant physician at the City Hospital, Aberdeen, in 1973 and established the infectious disease specialty in the north east of Scotland. Born in St Kitts he never lost his delightful Bajan accent nor his love of and consummate skill at cricket. He was a truly collegiate physician, having sat on several Edinburgh royal college committees and council. He chaired the advisory committee on hospital infection and wrote the Green Book. He retired in 2000 and applied his considerable intellect to studying anthropology at St Andrews University. He leaves his second wife, Sheila, a retired psychiatrist; three children from his first marriage; and eight grandchildren.

Stuart C Glover

Cite this as: *BMJ* 2019;367:l6123

Gholam-Ali Beski

Consultant obstetrician and gynaecologist, and head Dr Beski Hospital (b 1931; q Tehran University of Medical Sciences, Iran, 1966), died after complications from a stroke on 14 August 2019

Gholam-Ali Beski was a philanthropist, an environmentalist, a father, a brother, a grandfather, and a great grandfather. An advocate for a raw plant based diet, he founded a charity for environmental sustainability in his later life and became a fearless campaigner and a national celebrity. Alongside my grandmother, he raised four daughters, never teaching them how to cook but instead reinforcing the importance of education. When the political situation in Iran became untenable in the 1980s, my grandfather was instrumental in my family's safe passage to the UK. His legacy lives on in his hospital, his charity, and his family. He leaves three daughters, six grandchildren, and seven great grandchildren.

Golnar Aref-Adib

Cite this as: *BMJ* 2019;367:l6166

Ian McKim Thompson

Vice president BMA (b 1938; q Birmingham 1959), died from multiple carcinoma on 2 January 2019

Ian McKim Thompson was a senior registrar in Birmingham when a growing interest and commitment to medicopolitics led to his appointment in 1970 to a newly established BMA post based in Birmingham. Ian was an iconoclastic leader who worked from an office at the Birmingham Medical Institute, far enough away from London to avoid what he saw as the deadening hand of BMA House in Tavistock Square. After retiring in 1996 he was appointed a vice president of the BMA. A lifelong interest in canals led him to move to a Black Country canal cottage and become the resident managing owner of some 20 permanent moorings. Ian and Jane (who survives him) divorced in 1988. He leaves two brothers, three children, and seven grandchildren.

Norman Ellis

Cite this as: *BMJ* 2019;367:l6165

Michael Harrison

Clinical neurologist and stroke researcher

Michael John Gatfield Harrison (b 1936; q 1961; DM Oxf, FRRCP Lond), died from complications associated with a diagnosis of colon cancer on 9 July 2019

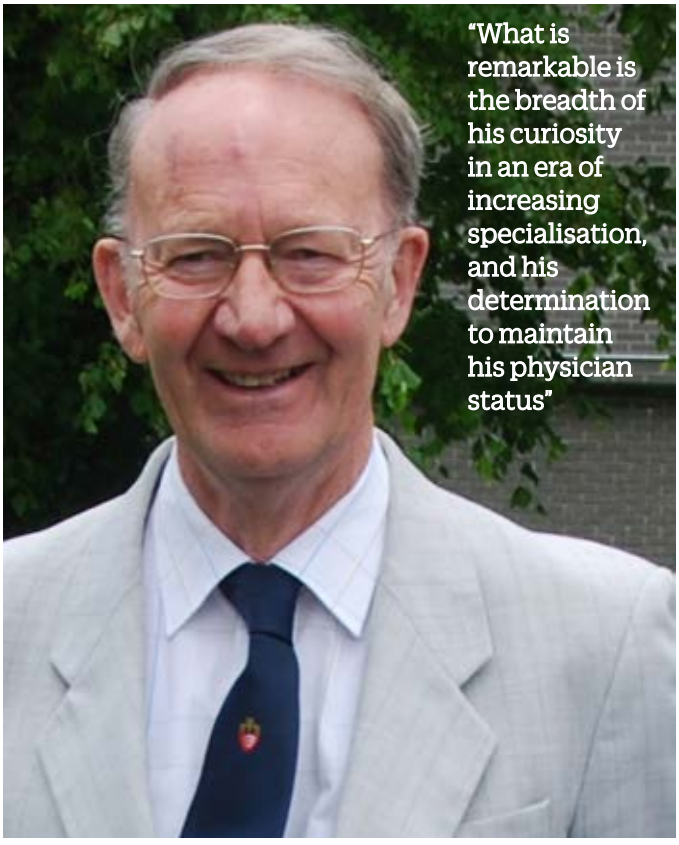
Neurologist Michael Harrison is best known for his research into stroke and the neurological complications of HIV/AIDS. He is a former director of the Reta Lila Weston Institute for Neurological Studies at the Middlesex Hospital in London.

"Physician neurologist"

A former colleague, Andrew Lees, professor of neurology at the National Hospital for Neurology and Neurosurgery, at Queen Square, London, says: "What is remarkable in looking back over his contributions to neurology is the breadth of his curiosity in an era of increasing specialisation, and his determination to maintain his physician status. He was an inspirational teacher for both medical students and his junior staff."

Harrison produced numerous "clinically relevant" papers on cerebrovascular disease in the 1970s and was one of the first doctors to investigate the effects of aspirin in reducing transient ischaemic attacks. He was the epitome of the "physician neurologist"—now viewed as something of a rare breed—and conscious of the importance of preserving neurology's links with general medicine.

He won an open scholarship to Magdalen College, Oxford, from where he graduated with first class honours in physiology. He studied at Middlesex Hospital Medical School in London from 1959 to 1961, where, apart from a spell back in Oxford at the Radcliffe Infirmary, he would spend the whole of his working career.



During Harrison's time back at Oxford the Regius professor of medicine, George Pickering, was pursuing interests in hypertension and vascular disease of the heart and brain, which in the early stages often presented as transient ischaemic attacks.

Pickering was of the view that such attacks might be attributed to repeated transient blockage of small cerebral or retinal arteries by platelet aggregates, rather than focal vasospasm. Harrison's doctoral thesis in 1968 was on drugs that modified platelet aggregation, such as dipyridamole. His interest in neurology stemmed from his general medical training, at a time when it was common for general physicians and geriatricians, rather than neurologists, to look after people with strokes.

After completing his neurological training at the National Hospital, he became part of a stroke group at Queen Square that sought to develop stroke services, stroke rehabilitation, and research. Former colleague Charles Warlow, emeritus professor at the University of Edinburgh, says that in the 1970s and 80s, this group were "the only UK neurologists remotely interested in stroke research despite it being such a common brain disorder. Their interest was hugely influential for my generation of neurologists who took up stroke research."

The clinical antithrombotic effects of aspirin, which is an effective and low cost emergency treatment for patients with acute ischaemic stroke, were not widely recognised until the 1970s. Harrison played a key part in investigating the optimal dose of aspirin to prevent stroke and minimise risks. At the Middlesex, where he was appointed consultant neurologist in 1973, he cared for patients with a range of neurological and general medical conditions. "He taught us that you couldn't be a neurologist without being fully proficient in the general physical examination," says Lees, who worked as a registrar with Harrison in 1976-77, "and you needed to be up to speed with advances in general medicine."

HIV/AIDS

From the early 1980s, the Middlesex Hospital became a leading AIDS centre and opened the first dedicated ward—Broderip.

Harrison's broad range of interests resulted in influential research papers on idiopathic generalised dystonia, the dementias, chronic subdural haematomas, neurosyphilis, and diabetic amyotrophy. In 1987 Harrison published *Neurological Skills*, which became a standard undergraduate text, and in 1995 he co-wrote *AIDS and Neurology* with leading US neurologist Justin McArthur. In 2001 Harrison was made a fellow of the American Heart Association and its stroke council and in 2002 was elected honorary fellow of University College London, having held the UCL professorial chair in neurology since 1988.

He retired gradually but spent the past few years struggling with complications of chronic lymphocytic leukaemia. He leaves his wife, Heather; two sons; and three grandchildren.

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