comment

"Perhaps we've placed too much emphasis on hospital avoidance" **DAVID OLIVER**
"It's clear to me many of my patients are taking too much medicine" **HELEN SALISBURY**
PLUS The ethics of emergency bedside medicine; tackling childhood gambling

THE BOTTOM LINE Partha Kar

There are limits to aviation safety lessons

If we want to improve patient safety the healthcare sector should become more like the aviation industry. This, at least, is a common refrain we hear whenever the issue of patient safety comes up. It's certainly not fanciful to think that healthcare organisations should try to learn from a high risk industry with an enviable record in keeping people safe. With just 0.07 deaths per billion passenger miles, flying is currently the safest mode of transport, and trying to reach something equivalent to that level of safety in healthcare certainly isn't a bad aspiration.

The comparison has even brought some useful insights, particularly in terms of recognising how an understanding of human factors can help to improve safety. This has long been recognised in aviation, and there's much to learn from Martin Bromiley's work on the use of human factors in healthcare.

But, if you're going to use the airline industry as a barometer of safety, you can't pick and choose which bits you compare with the healthcare sector and which you conveniently ignore. After all, the aviation and healthcare sectors have many important differences that make such comparisons unhelpful.

One example is how the two systems deal with the mismatch between capacity and demand. The aviation industry's response to increased demand has not been to ask flight attendants to fly planes. It has instead been to increase the number of planes and trained pilots, as this is vital to safety.

Another key difference is how the two systems deal with fatigue. You can walk away from flying a plane. But, when you're short staffed, or a locum hasn't turned up, you can't walk away from a patient struggling for breath. And the fundamental challenge facing healthcare systems worldwide is the workforce—or more the lack of it.

So, what do we do? Do we simply brush aside examples of good practice from the aviation industry? Or do we choose to recognise that we can learn from them?

My gut feeling is that there is much to learn, and a genuine step away from soundbites may need to be the first step. We can all learn something from each other. And we'd do well to bear this in mind when comparing systems that are fundamentally different.

Aviation safety lessons have much to offer—as do other domains that showcase efficiency and safety, such as Formula One racing. The Aviation Safety Network stated that 16 airliner accidents occurred in 2018 and killed a total of 555 people—about a 900% increase on 2017, when only 59 people died. We should be open enough to learn from that and see what changes are being made that are adaptable, while also admitting that the biggest challenge to safety continues to be an inadequate workforce—not necessarily just the process or the tick box.

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The aviation industry's response to increased demand has not been to ask flight attendants to fly planes

ETHICS MAN Daniel Sokol

Navigating the complex ethics of emergency bedside medicine

Establishing common interests helps to avoid litigation

It came out of the blue. A former client contacted me with news of her sick father, who was in his late 70s. He had been admitted to hospital with severe pneumococcal necrotising pneumonia and septic shock, acute kidney injury, and respiratory failure. Two months on he was still in the critical care unit on a ventilator.

The family members were unhappy with the medical team's management plan, which was to continue aggressive treatment unless he suffered significant deterioration. In that case, there would be no escalation in support. The family wanted everything done unless the situation wasn't survivable.

I went to the bedside to see the patient. He could not speak. I asked him how he was and he gave a thumbs up. I asked him if he was in pain and he pointed to his abdomen. Determining his state of mind or quality of life from our brief interaction was impossible. The patient's two daughters and I discussed a plan of action in the only remotely private place in the hospital for members of the public: the canteen. Rather than adopting an adversarial stance, I suggested an urgent meeting with the treating clinicians.

The next day, the consultant intensivist and ward sister met us in a side room. The atmosphere was tense. Before my involvement, both parties had talked of applying to the High Court for a "best interests" declaration. I attempted to defuse the tension by pointing out we were all motivated by the desire to do what was best for the patient. There were nods of agreement.

Distributive justice

The intensivist then said, "We want to act ethically, so according to the principles of medical ethics: autonomy, beneficence, non-maleficence, and distributive justice." Internally, I disapproved of his mention of distributive justice, which could be construed as criticism of the use of scarce resources in prolonging the patient's life.

The daughters were worried the medical team were giving up on their father, and I feared a resources discussion would create further distrust. Keen to encourage a joint problem solving approach, I ignored the distributive justice reference.

After an earlier meeting with the family, the clinical team had produced a letter setting out their management plan. The letter was ambiguous, but I started by sharing a key area of agreement: the patient and family did not want treatment in the event of an irreversible and unsurvivable deterioration. They did not believe that life should be sustained at all costs.

The hospital's letter to the family had focused on what would not be done rather than what would be done, giving a false impression of abandonment

I then summarised the family's underlying concern: "The family are worried that the medical team will give up on their father too soon and not allow him a proper chance to pull through." This gave the clinicians an opportunity to reassure the relatives that they were not planning to "give up" on their father. Unhelpfully, the hospital's letter had focused on what would not be done—no ventilation, no inotropes, no vasopressor support, no additional organ support—rather than what would be done, giving a false impression of abandonment. By the end of the meeting the clinicians had provided

BMJ OPINION Sian Griffiths, Marc W Etches

Childhood gambling: It's too much of a risk to ignore the long term damage

There is an increasing understanding that gambling is a public health problem, yet insufficient mainstream effort is being used to tackle gambling related harms.

Gambling is not illegal. It generates considerable tax revenue for governments, provides employment, creates innovation in business communities, provides benefits to other leisure sectors, and gives pleasure and enjoyment to some participants. There are, however, considerable societal costs, often unseen and unacknowledged, arising from the harms associated with it, particularly in vulnerable and deprived communities.

Importantly, many children are exposed to gambling as part of their everyday lives, not least through social media. The proliferation of advertising around sporting events, particularly on TV and before the 9 pm watershed, is leading to the normalisation of betting behaviours.

Children and young people are growing up in a vastly different world from their parents. Theirs is a world dominated by technology, to which they are almost constantly connected by the internet. It cannot be right that one in eight 11 to 16 year olds is following gambling companies on social media. There are those who say that this amounts to grooming, and that the constant stream of gambling related promotion activity represents abuse.

A recent Gambling Commission report describes this world, one in which social media and online gambling are increasing, yet are poorly understood. Gambling's frequent coexistence with mental health problems and the impact of debt increase the importance of better understanding betting and how to prevent its incipient harms, especially the higher rates of suicide among problem gamblers.

greater clarity on the clinical situation and agreed to consider a proposed form of words to reflect the management plan at their next meeting. Until then, they would continue aggressive treatment.

Happy, despite the outcome

A few days later the patient had a stroke and died. Despite the poor outcome, the family were happy with the actions of the clinicians.

Alhough at first there was mistrust, both sides had more in common than they thought. The solution lay in bringing the parties together, acknowledging the concerns of the family (fear of abandonment) and of the clinicians (fear of overtreatment), avoiding talk of courts and conflict, and reframing the situation by identifying common interests. More often than not, collaboration can avoid litigation.

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At the same time there is a lack of education—for parents, policy makers, and providers of health services. And there is a significant treatment gap. Most specialised clinics are funded by the charity GambleAware, which, although independent, is funded by the industry.

It is only recently that NHS England and Public Health England have engaged in discussion about problem gambling and a brief, but important, reference to it is made in the new NHS ten year plan.

So, a good start is being made. But there is much more to do.

Sian Griffiths, visiting professor, Institute of Global Health Innovation, Imperial College London

Marc W Etches is chief executive of GambleAware

ACUTE PERSPECTIVE David Oliver

Is the holy grail of fewer hospital admissions worth the quest?

The first weeks of 2019 saw NHS England publish the long term plan for the NHS, the new five year GP contract framework, and the plan for universal personalised care. They all include an overarching idea that we should be trying to prevent people attending or being admitted to hospital.

The GP contract and the promised additional £4.5bn for primary and community services are linked to a requirement that the new GP networks will be given financial incentives to cut attendances and admissions. The plan aims to reduce acute bed use through a national roll-out of the NHS 111 advice line and web service, GP led urgent treatment centres, and enhanced support for care home residents.

We'd probably all agree that, wherever possible, people would prefer to avoid crises in the first place, have more responsive out-of-hospital services when they do get ill, and spend less time in hospital when they're admitted. And we've been seeking the holy grail of avoiding admissions and attendances for many years in the NHS, that reducing or managing demand would improve care and save money.

It's easy to see the drivers for these ambitions. Over the past three decades NHS bed capacity has been reduced continually, while demand has risen inexorably.

England has just about the lowest number of hospital beds per head of population of all countries in the Organisation for Economic Cooperation and Development. Access to intermediate care services outside hospital has not kept pace and is now worsening, social care has experienced sustained cuts, and numbers of GPs, community nurses, and health visitors have all fallen despite rising demands.

Hospital attendance and admission rates continue to rise—and more quickly than the percentage of admissions for potentially preventable ambulatory or primary care sensitive conditions. Performance against the four hour wait time target has worsened in recent years and reached a record low. Delayed transfer bed days hit a record high in 2016 and have fallen only slightly since.

Perhaps we've placed too much emphasis on hospital avoidance and too much hope on what it might deliver.

With the political and reputational damage that comes from a high profile part of our system publicly cracking under pressure this is no surprise. Initiatives to reduce demand and activity in urgent care go back through several parliaments. Despite local pockets of success among some patient groups they haven't delivered at scale across regions or nations, and expectations have always been unrealistic.

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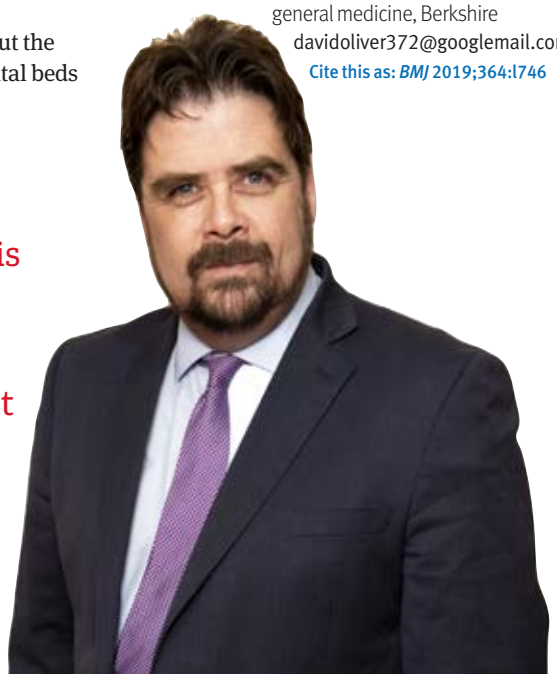
Perhaps we've placed too much emphasis on hospital avoidance and too much hope on what it might deliver



The perils of deprescribing

Imagine that my next patient is a 78 year old who's come about her back pain—it's no better, and she won't get the physiotherapy she needs for many weeks yet. She'd also like me to look at a funny mole on her back. I note that she has eight medicines on her repeat prescription list and is overdue a review.

In our 12 minutes together I need to attend to her agenda but also to make sure that the cocktail of pills she's receiving is doing her more good than harm. Alas, the discussion we're likely to manage about each one will be along these lines: "Are you taking this one? Any problems?"—rather than the more detailed conversation I'd like to have about the indications for it and the risks and benefits. We'd then perhaps be able to rationalise her medication, reducing her risk and treatment burden, and saving some money too.

Apart from time, which I mostly don't have, what's stopping me? It's clear to me that many of my patients are taking too much medicine, but it's so much easier to start something than to stop it.

Using statins as an example, my patient may have had a QRISK calculation showing that her risk of a cardiovascular event was greater than 20% in the next 10 years despite being a non-smoker with normal blood pressure, no diabetes, and no family history. Someone (maybe me) will have explained that taking a statin tablet long term will help to prevent a stroke or heart attack. This may even have involved sharing a decision aid with her.

If I now tell her that she doesn't need it after all, what might she hear? That she's too old to be worth spending money on? That she hasn't long to live? That preventing her stroke or heart attack is no longer a priority in the cash strapped NHS? Or, possibly, that her previous doctor got it wrong.

I hope that I'll be able to tell her about new research showing that, as she's reached this age without having a heart attack or stroke, she's unlikely to benefit from cholesterol lowering medication. Some of my patients will be absolutely delighted to have one less pill to take; others will find this a difficult conversation, and they may feel a little less safe without their statin.

Perhaps we need to be more careful when starting medicines, to leave open the possibility that one day they should be stopped. We certainly need to build our confidence in how to have these conversations, to reduce the treatment burden on our patients and begin to tackle the huge waste of time and money that this overprescribing represents.

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Many of my patients are taking too much medicine, but it's so much easier to start something than to stop it

LATEST PODCAST

Safeguarding LGBT+ adolescents

A recent education article explored the risks facing young LGBT+ people and how frontline NHS staff are well placed to help them. In a new podcast *The BMJ*'s Kate Adlington talks to the authors about these points, including the risk of conversion therapy. One of the authors, Jessica Salkind, says:

"All forms of conversion therapy have been widely condemned for their potential to cause damage to the mental and physical health of a young person.

"We know from the government's national LGBT survey that 8% of 16-17 year olds have undergone or been offered conversion therapy. But, when Stonewall surveyed more than 3000 healthcare staff in 2015, 10% of the patient facing staff said that they'd witnessed somebody at work expressing the belief that a person could be cured of being LGB.

"Those members of staff are very unlikely to recognise conversion therapy as a serious safeguarding risk, which requires escalation."

Should we be screening for atrial fibrillation?

Our latest Head To Head debate questioned screening for atrial fibrillation." Mark Lown, who argued for screening, joined Patrick Moran, who was against, to discuss their stance in this podcast. Here, Moran describes his reservations:

"While it [screening] seems to make complete sense, what we're lacking is really the major piece of the puzzle, which is a demonstrable effect of screening on the incidence or severity of stroke among populations with atrial fibrillation.

"While I think we are going in the right direction, it's not a settled question and there are major uncertainties hanging over it, which can only really be answered by long term trials. I think it's really important that we let those trials take place before we rush to make policy.

"Once a public health intervention like a national screening programme is in place, it's very difficult to stop after that."

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Curated by Kelly Brendel, assistant web editor, *The BMJ*

PHARMA AT NICE APPRAISALS

Eroding trust in entrusted patients

We are repeatedly told that involving patients in all aspects of decision making related to their healthcare is essential. Nowhere do we find how to pay for this patient expertise.

Blaming the drug and medical device industries for providing resources to patient organisations to provide the competent advice that society requires is too easy. Blaming patient organisations for accepting such support is facile.

Mandeville and colleagues say that patients' potential biases must be taken into account (Research, 19 January). But this implies that patients are weak, influenced, or prone to offer advice that goes against their own interests when funded. The authors would have us believe that patients might argue in favour of expensive drugs they do not need when funded by industry and against expensive drugs they do need when funded by the government. The mere suggestion of potential bias erodes trust.

Patients need a structured, defined, responsible, and paid seat at the table of decision making. If we truly believe in the rhetoric of patient centred medicine, we need to restructure how we engage with patients and their organisations.

Francis P Crawley, executive director, Good Clinical Practice Alliance—Europe

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ABPI guidance on working with patient organisations

The ABPI Code of Practice for the Pharmaceutical Industry is clear on how companies should work with patient organisations to ensure the independence of patient organisations, facilitate legitimate collaboration, and ensure transparency of financial and other support.

Disclosure UK is not, and has never been, the main mechanism through which companies are required to disclose payments to patient organisations. It is a publicly searchable database showing certain payments and benefits in kind made by drug companies to healthcare professionals and organisations.

Jill Pearcy, director of code engagement, Association of the British Pharmaceutical Industry

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MALCOLM WILLETT

LETTER OF THE WEEK

NICE on patient representatives' financial interests

We welcome discussion of our approach to managing declarations of interest (This Week, 19 January). We want the arrangements we have in place for patient organisations to declare their interests to leave those who use our guidance feeling confident in its independence and objectivity.

Currently, we require a declaration of interests from patients and service users if they attend an advisory committee meeting to give evidence in person. We expect patients who work for a stakeholder organisation to declare their nominating organisation's interests, including any funding it receives from life sciences companies. Where they attend in a personal capacity, we cannot expect them to know the detail of the nominating organisation's interests, so we ask them to declare only their personal affairs.

Our processes contain several safeguards, including external assessment of the evidence submitted to us and public consultation on draft recommendations. We think it unlikely that our recommendations have been compromised by a lack of disclosure by people nominated by patient organisations.

Our policy on declaring interests is based on international best practice and reflects our desire to reduce the risk of bias in decision making. This research indicates that we could do more to protect our guidance from this risk, so we will undertake a rapid review of this aspect of our relations with patient and user organisations.

Gillian Leng, deputy chief executive and health and social care director, NICE

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SOCIAL PRESCRIBING

Improving social prescribing programmes

Salisbury raises important points about the widespread rollout of social prescribing (Helen Salisbury, 26 January). Linking people with services seems sensible, but the approach rests on problematic assumptions. The current evidence on social prescribing is insufficient to judge either success or value for money.

We used evaluability assessment to examine social prescribing programmes and reported on the lessons learnt. These included ensuring that programmes are designed with stakeholder involvement and buy in; that information governance and data sharing agreements are in place from the start; that staffing levels are sufficient to cover the range of activities involved in service delivery and monitoring; that social prescribing programmes are co-located with primary care; and that linkage to health service data systems is established as part of the programme design.

NHS England is working to improve the evidence base for social prescribing, including funding projects to find out which models work best and developing resources to support the implementation and evaluation of social prescribing programmes.

To realise the potential benefits of social prescribing for patients, GPs, and the NHS, the underlying assumptions must be made explicit, and research efforts should be targeted towards these.

Kate E Hamilton-West, reader in health psychology; Erica Gadsby, senior research fellow; Sarah Hotham, research fellow, University of Kent

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PUBLIC HEALTH

NHS can't work alone

In recognising that the NHS 10 year plan "seeks to contribute what is within its compass," Chapman and Middleton explain why any plan constrained by organisational boundaries cannot be a comprehensive plan for "health, wellbeing, equality, and care" (Editorial, 19 January).

Although the plan is limited in tackling upstream determinants, much of the secondary prevention proposed, such as in-hospital support for smokers, should be welcomed. This comes as shrinking local authority budgets mean that smoking cessation services downsize or disappear.

We should expect the NHS to promote, protect, and improve health. But we shouldn't expect it to do this alone. A radical upgrade in prevention requires planning beyond the NHS tackling the "causes of the causes." Chapman and Middleton champion health in all policies, which, although far from new, still seems radical.

If the health of the people is the highest law, shouldn't we finally see an NHS plan as one part of a coherent, cross departmental approach with a consistent narrative and shared objectives?

Ryan C Swiers, specialty registrar, public health, Sydney

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ANALYSIS

Universal antenatal screening for group B streptococcus: more harm than good?

Routine testing in late pregnancy should not be introduced in the UK, as the potential damage of unnecessary antibiotic treatment may outweigh the benefits, argue **Farah Seedat and colleagues**

Group B streptococcus (*Streptococcus agalactiae*, GBS) is the most common cause of neonatal sepsis and meningitis in many developed countries.[1] In the UK, GBS causes invasive disease in the first six days of life (early onset GBS infection) in around one of every 2000 live births.[2] To prevent early onset disease, intrapartum antibiotic prophylaxis, usually intravenous penicillin, is the recommended treatment internationally. The UK recommends a risk based strategy, whereby pregnant women presenting with risk factors for early onset GBS infection are offered antibiotic prophylaxis in labour.[3-6]

The media and politicians regularly call for universal antenatal screening for GBS as an alternative means of selecting women for prophylaxis. Advocates point to countries across Europe and North America where screening is recommended[7-19] and where reductions in early onset GBS infection have been observed.[20-22] But the evidence shows that the effectiveness of screening, using established criteria,[23] is uncertain and that it has potential harms. Here, we explain why the UK National Screening Committee decided not to introduce routine screening[24 25]—namely, high levels of overtreatment, unknown potential hazards from screening and intrapartum antibiotic prophylaxis treatment, and uncertain benefit.

Only a small percentage of neonates born to women colonised with GBS get infected

Impact of GBS

GBS is a Gram positive bacterium that colonises the gastrointestinal and genitourinary tracts in approximately 20% of pregnant women.[26 27] It usually causes no harm,[8] but if a woman is colonised at the time of labour, around 36% will transmit the bacteria to the newborn child.[28] Crucially, the majority of neonates colonised with GBS remain asymptomatic, but about 3% develop early onset infection.[28] In the UK and Republic of Ireland the incidence is estimated at 0.57 per 1000 live births (n=517).[2]

Affected neonates present with sepsis in 63% of cases, pneumonia in 24%, meningitis in 13%,[29] and around 5-10% (n=27-38) die as a result.[30 2] Neurological impairment is reported in up to 16% of cases who survive infection,[31-33] though long term outcomes are not well researched. The true burden of infection is likely to be higher, as most of the research only describes cases confirmed by culture, and the infecting organism cannot be isolated in approximately half of neonatal sepsis cases.[34] It causes considerable morbidity and mortality.

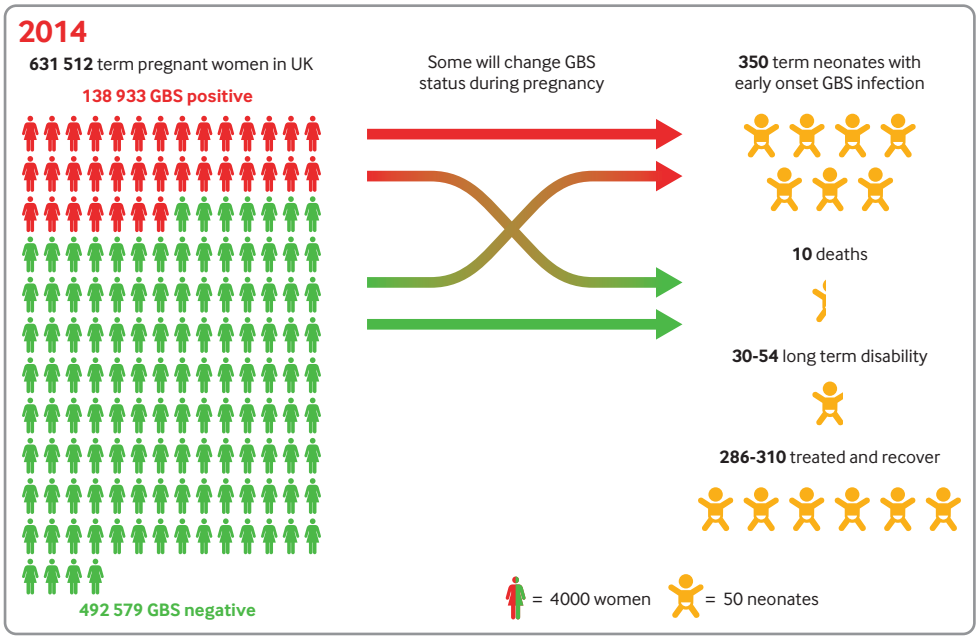
A risk based strategy to prevent early onset GBS infection has been recommended in the UK since 2003.[3-6] Pregnant women presenting with preterm labour, GBS colonisation, a previous infant with GBS disease, GBS bacteriuria, intrapartum fever, or chorioamnionitis are offered intrapartum antibiotic prophylaxis.[3-6] But 65% of neonates with early onset GBS infection are born to mothers who have no risk factors and are therefore not eligible.[2]

Universal GBS screening

Screening comprises the collection of specimens from rectovaginal swabs at 35 to 37 weeks' gestation, which are processed using selective culture media to identify women colonised with GBS.[35] Screening would be offered to all pregnant women at term and could detect some of the 65% of neonates with early onset GBS infection born to mothers without risk factors.

KEY MESSAGES

- Early onset group B streptococcus (GBS) disease is an important health problem and efforts should continue to better understand and prevent it
- Selective maternal culture is not an accurate test to predict early onset GBS disease in neonates, and we don't know why some colonised mothers have a neonate with early onset GBS and others don't
- The current approach to screening would lead to 99.8% of screen positive women and their babies receiving unnecessary intrapartum antibiotic prophylaxis
- Lack of high quality evidence on clinical outcomes makes it impossible to quantify whether universal GBS screening would have any benefit and assess whether large scale intrapartum antibiotic prophylaxis is safe
- A universal antenatal culture screening programme cannot currently be recommended



Natural history of GBS in a hypothetical cohort of term pregnant women in 2014 (risk based national prevention guideline). Owing to the uncertainties of the data, the numbers should be treated cautiously for a sense of scale but not as exact estimates. For data estimates and sources, see bmj.com

Screening was first introduced in the US in 1996, where the incidence of culture confirmed early onset GBS infection was around 1.7 per 1000 live births.[21] After the 1996 recommendation that either risk based or screening strategies could be implemented, the incidence fell to 0.4 per 1000 in 2001. After the recommendation that screening should be implemented in 2002, the incidence fell further, to 0.3 per 1000 in 2004.[22] Screening has continued since and the incidence was estimated at 0.22 per 1000 live births in 2016.[36] Most countries that recommend screening have seen a similar reduction or stabilisation in the incidence of early onset disease,[20 37] though some have not.[38]

In the UK and Republic of Ireland, which have risk based prevention rather than screening, the incidence is much lower than in the US before screening, at 0.57 per 1000 live births in 2014-15.[2] But it has risen significantly from 0.48 per 1000 in 2000-01, before national guidelines were published.[39 2] The reasons for this are unclear.

Overdiagnosis and potential harm

Given that only a small percentage of neonates born to women colonised with GBS get infected, the proposed screening programme would make many women eligible for prophylaxis whose babies would not have developed early onset infection if left untreated.

Based on UK data, antenatal culture would correctly predict early onset infection in around two of every 1000 pregnant women with a positive result (figure). In 2014-15, under risk based prevention, 138 933 term pregnant women were colonised with GBS, but only 350 term neonates developed early onset infection, meaning screening would have led to overtreatment of 138 583 (99.75%) women in labour.

This positive predictive value of 0.2% would deliver an extremely high rate of false positive results, all of whom would be overtreated with intrapartum antibiotics. A cost effectiveness model published in 2007 also estimated that adding screening to risk based prevention would result in around 99.8% overtreatment and would increase antibiotic use in pregnancy from 11% to 27%.[44]

Recently, an expert group convened by the committee published a modelling exercise concluding that adding screening to a risk based strategy in the UK would result in an additional 1675-1854 women receiving intrapartum antibiotic prophylaxis to prevent one case of early onset GBS infection, and 24 065-32 087 to prevent one death due to early onset GBS infection.[43] Although the models have some limitations because of evidence gaps, the estimates support the high levels of overtreatment that would occur.

Thus, examining the potential harms of GBS screening is important. A systematic review of 30 studies of intrapartum antibiotic prophylaxis found little evidence to quantify the potential harms to mothers and babies.[46] Although a range of adverse effects was investigated, the 11 studies in which the authors explicitly stated that they examined prophylaxis for GBS were observational and at risk of bias. The 13 randomised controlled trials at lower risk of bias investigated antibiotics and regimens different from GBS prophylaxis. Key findings were around gut microbiota,[47-54] long term functional impairment,[55] and antibiotic resistance.[52-60]

There was observational evidence that intrapartum antibiotic prophylaxis for GBS alters neonatal gut microbiota

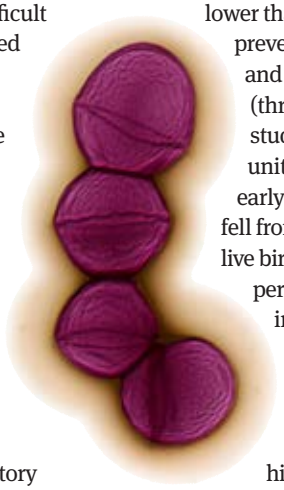
There was consistent observational evidence that intrapartum antibiotic prophylaxis for GBS alters neonatal gut microbiota.[47-54] Changes to gut microbiota have been associated with metabolic problems (such as obesity and diabetes), atopic, inflammatory, and autoimmune problems (such as asthma and necrotising enterocolitis), and autism.[61-63] Early antibiotic exposure has also been associated with these long term clinical outcomes.[61-64] Causal links, however, have not been established, and we don't know whether microbiota alterations specifically from GBS prophylaxis are associated with any long term clinical outcomes.

The review found inconsistent results for the effect of prophylaxis on antibiotic resistance, with evidence of increased resistance for some antibiotics and pathogens and no increase for others.[52-60] Globally, the overwhelming majority of GBS isolates are susceptible to penicillin,[65] but in the US in 2005, 0.2% of GBS isolates were reaching the upper level of susceptibility for one or more β lactams.[66] Widespread prophylaxis may go against the Department of Health and Social Care for England's antimicrobial resistance strategy to reduce unnecessary use of antibiotics.[67] Finally, the review reported a lack of information on the long term outcomes of intrapartum

The harm from widespread prophylaxis to thousands of pregnant women and their babies is unknown

antibiotic prophylaxis.

Maternal anaphylaxis is another important harm to consider, as it has potentially fatal consequences. But its rarity makes it difficult to explore in well designed studies other than very large randomised controlled trials. The rate of all cause maternal anaphylaxis in the UK has been reported at 1.6 per 100 000 maternities—37 cases in three years, 11 due to penicillin and one the result of GBS prophylaxis.



Other reported harms include neonatal respiratory distress,[71] maternal thrush,[72] and childhood atopic dermatitis.[73] Antibiotic prophylaxis in labour may also limit birth choices for women and contribute to the medicalisation of labour.[4] Drawing conclusions on the harms of screening is difficult, however, as the evidence is based mainly on small observational studies, subject to bias, or has applicability concerns.

Uncertain evidence on effectiveness

The evidence on clinical effectiveness of GBS screening is observational and focuses on incidence rather than clinical outcomes. No randomised controlled trials have assessed the effects of screening on the incidence of early onset GBS infection, clinical outcomes, or mortality. In the absence of randomised controlled trial data, quantifying the potential impact of adding screening to risk based practice is difficult.

Most observational evidence shows no difference in mortality due to early onset GBS infection between risk based and screening prevention,[74-76] and we do not know the difference in the long term clinical outcomes of early onset GBS infection between the two strategies. These studies, however, may be underpowered to detect differences in these rare outcomes. Studies examining all cause early onset sepsis have been contradictory.[77-79]

A systematic review of nine observational studies from Turkey, Australia, and the US found that the odds of early onset GBS infection under universal screening were 55% lower than under risk based prevention for all neonates and for term neonates (three studies).[80] A 2017 study in a UK maternity unit found that the rate of early onset GBS infection fell from 0.99 per 1000 live births in the risk based period to 0.33 per 1000 in the screening period, although this was not statistically significant, and screening was instigated based on high incidence so there may have been regression to the mean.[81] In a follow-on study, the authors found that incidence of early onset GBS infection rose to 1.79 per 1000 live births after screening stopped—statistically significant when adjusting for ethnicity.[82]

The well documented risk of bias in observational study designs is due to confounding and the inability to determine cause and effect.[83 84] The majority of studies on GBS screening compare the incidence of early onset infection in a period of screening against a historical control period (that is, risk based prevention).[74-88] Risk of bias is higher in these studies because participants in the two arms are not contemporaneous, so other differences between these periods may contribute.

The few observational studies that compare screening with concurrent controls often retrospectively compare women who have a culture result to all other women[89 90]; this may be biased due to the risk of misclassification and because people who accept screening are systematically different from those who do not.[80 91] Finally, as most studies only assess early onset GBS infection confirmed on culture, changes in disease incidence may actually reflect a decreased likelihood of culturing GBS in the laboratory, owing to the presence of antibiotics in neonates' blood.[92] This could distort the effect of screening and may explain why studies examining early onset GBS infection confirmed on culture find a reduction in incidence between screening and risk based prevention, when studies assessing mortality or all cause neonatal sepsis find no difference. Because of these limitations, the effectiveness of universal GBS screening is uncertain.

Conclusions

GBS infection is an important health problem, and we need more work to understand and prevent neonatal disease. Universal GBS screening is a complex area, and the current uncertain evidence about whether screening would do more good than harm highlights the problem of introducing a new programme.

Selective maternal culture is not an accurate predictor of early onset GBS disease in neonates. If a screening programme was implemented, it would offer all term pregnant women the culture test, but around 99.8% of mothers who screen positive (and their babies) would experience overdiagnosis and would be offered intrapartum antibiotic prophylaxis unnecessarily. The harm from widespread prophylaxis to thousands of pregnant women and their babies is unknown, and the evidence for benefit from screening is uncertain owing to lower quality studies.

The Health Technology Assessment programme recently launched a call for a randomised controlled trial assessing the effectiveness of GBS screening, which may tackle this uncertainty. But we also need research assessing the potential harms. Being able to more accurately identify the women at most risk of having a neonate with early onset GBS infection could reduce the amount of overtreatment. Alternatively, advances are under way in the development of a GBS vaccine, which would affect all antibiotic based preventive strategies and have the potential to prevent early and late onset GBS infection.[93]

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Donald Irvine

The only GP to date to become president of the GMC

Donald Irvine (b 1935; q Durham 1958; CBE, MD, FRCGP, FMedSci), died peacefully at his home on 19 November 2018

Born in 1935 in Ashington, Northumberland, in a coal mining community where his father was a family doctor, young Donald Irvine was educated at King Edward VI Grammar School in Morpeth.

His father's surgery was part of the house, and medicine was discussed every day. Irvine remembered travelling to and from primary school in the early 1940s with miners on the bus still covered in coal dust. At the age of 10, Irvine developed rheumatic fever and spent nearly a year in hospital.

He always remembered the excellent care he received from the doctor who looked after him. His lifelong interest in ornithology also developed during this time; he would listen to birds and learn to identify them, "because other than reading, there was not a lot else to do."

He read medicine at Durham University and qualified in 1958. Ignoring pressure to specialise, he joined his father's practice and was an exemplary family general practitioner in Ashington for 35 years, just as general practice was changing from a cottage industry to today's modern specialty. Later he became a partner in one of the first multidisciplinary teaching family practices in the UK.

Passion for improving care

Irvine chaired the Royal College of General Practitioners (of which his father was a founder member) between 1983 and 1985. He became secretary to the college at the age of 33 and inherited his father's passion for improving general practice with a more patient centred approach. He was highly regarded within the GP community, where at times it was felt that general practice was a poor relation to hospital practice. Irvine is perhaps best remembered for his role as president of the GM, to which he was elected in 1995—the only GP ever to hold the office. As chairman of the GMC's standards committee he introduced the patient centred Good Medical Practice guidance, which doctors continue to follow.

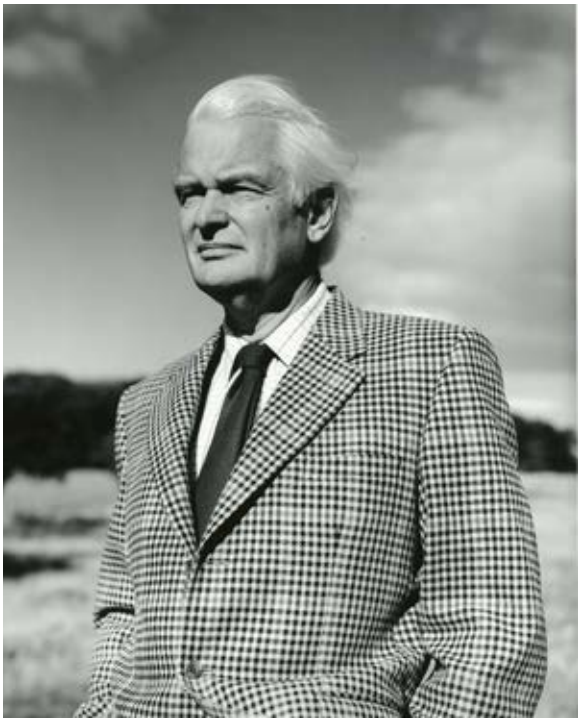
After the Bristol inquiry, which followed a whistleblower pointing out that the results for children's heart surgery in Bristol were much poorer than they should have been, Irvine called for extensive reform of professional regulation. He chaired the disciplinary panel that found against the three Bristol doctors; two were struck off. Irvine felt that Bristol exposed a "club" culture in the medical profession—characterised by intolerance and bullying—which he was determined to overhaul.

Regulating medical practice

Irvine was instrumental in setting medical regulation on a new course—focused firmly on protecting patients—by setting out what good practice should look like and ensuring those standards were met. Until then, it had largely been left to doctors themselves to ensure they were practising safely and appropriately.

The Bristol case raised the matter of how patients and employers could know whether a doctor was fit to practise. Irvine pushed hard for "revalidation"—a five yearly test of doctors' fitness to practise, which was eventually introduced in 2012. This consequent reform of the GMC was controversial at the time but is now generally accepted.

In 1999 Irvine survived a leadership challenge at the GMC from obstetrician Wendy Savage, the first time anyone had opposed an incumbent president. He stepped down 10 months early, however,



NICK SINCLAIR

After the Bristol inquiry, Irvine called for extensive reform of professional regulation

in 2002, as the GMC agreed to ask the government for legislation to introduce revalidation. The day afterwards, Irvine told a press conference that he felt he had taken his reforms as far as he could. The enduring legacy of his presidency was the refocusing of the GMC's purpose on protecting patients and the public.

Honours

Irvine's work with the Picker Institute in the US earned him acclaim abroad, and in 2017 he was awarded the ABMS healthcare quality and safety award by the American Board of Medical Specialties. He received an OBE in 1979, CBE in 1987, and was knighted in 1994 in recognition of his service to medicine and ethics. He was awarded honorary doctorates by seven universities.

Irvine married Margaret McGuckin in 1960, and they had a daughter and two sons but divorced in 1983. He then married Sally Fountain in 1986, but they divorced in 2004. In 2007 he married Cynthia Rickett, and the couple were devoted to one another. He leaves Cynthia and his three children.

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Francis Mills

Consultant physician Guildford, Surrey (b 1927; q St Andrews 1955; DTM&H, MRCP), died from pneumonia on 16 November 2018

Francis Mills was born in Ghana, west Africa, and moved to Scotland in 1949 to study medicine at the University of St Andrews. He then started his medical career at Halifax General Hospital as house surgeon, initially in general surgery and subsequently in rheumatology and physical medicine. In 1957 he took up the post of medical officer in general surgery, obstetrics, and gynaecology at the Ghana Medical Service. On returning to the UK, he progressed his career in various posts in general and tropical medicine and later specialised in neurology. He subsequently became consultant physician in the department of geriatric medicine at the Royal Surrey Hospital in Guildford, Surrey and retired in 1992. He leaves his wife, Teresa; two daughters; and two grandchildren.

Florence Mills, Muriel Mills

Cite this as: *BMJ* 2019;364:l409

Ruth Isabel Hooper

Medical officer National Blood Transfusion Service (b 1929; q Glasgow University 1952) died from a cerebral vascular accident and Alzheimer's disease on 28 August 2018

After graduating, Ruth Isabel Rankin worked at Addington Hospital in Durban and then with Natal Blood Transfusion Service, travelling hundreds of miles to donor sessions. On return to the UK, she married Bill and had two children. She took up work again with the blood transfusion service, this time travelling all over Somerset. She also did sessions in accident and emergency medicine at Bridgwater Hospital. She had been inspired to study medicine by medical missionaries who visited her parents as a child, and although she felt not brave enough to work abroad again, her Christian faith continued to motivate her. She was a proficient pianist and continued to enjoy singing hymns until her demise. Predeceased by Bill, she leaves two children and four grandchildren.

Alison Stoneley

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Jack J Kanski

Ophthalmologist (b 1939; q London Hospital Medical College, 1963; MD, MS, FRCS, FRCOphth), died from cancer on 5 January 2019

When Jack Kanski was appointed consultant surgeon at the Prince Charles Eye Unit in Windsor in 1973, he had already published 17 articles on retinal detachment. He started using automated vitrectomy devices for posterior segment conditions in the 1970s. Another important aspect of his clinical career was his work on childhood uveitis in juvenile idiopathic arthropathy. Early on, he realised the importance of well organised teaching materials, and he created a series of tape slide presentations in the mid-1970s. As a resident, he had started to collect a series of interesting cases with clinical photographs. These were the precursors of more than 30 books, the first of which, *Clinical Ophthalmology*, was published in 1984. Jack leaves his wife of more than 42 years, Valerie Ann Shannan. The couple had no children.

Richard B Packard

Cite this as: *BMJ* 2019;364:l347

Huma Changez

Consultant medical microbiologist (b 1979; q Khyber Medical College, Pakistan, 2003; MRCP, FRCPath, DTM&H), died suddenly at home in Islamabad on 1 October 2018

After a successful undergraduate career in Pakistan, Huma Changez moved to the UK in 2008 to train in general medicine and microbiology. She trained in Cardiff and then in Glasgow, where she was appointed consultant in 2015. She swiftly developed a reputation as a dedicated colleague, establishing close friendships and excellent working relationships with clinical colleagues, and becoming a valued source of advice. Her vibrancy, optimism, and sense of humour were motivational. Her pragmatism allowed her to see the heart of a problem and to deliver sensible solutions. Huma's interests included world cuisine, music, and travel, but her true passion was her family, with whom she returned to Pakistan in 2018. She leaves her husband, Imran, and three children.

Brian Jones, Aleks Marek, Mairi Macleod

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Rachel Mulcahy

General practitioner Banbury (b 1972; q Bristol 1997; MRCGP, DRCOG, DFFP), died from metastatic breast cancer on 3 November 2018

Rachel Mulcahy was born and grew up in Wimbledon and loved playing and watching tennis. She was also a keen skier and met her husband on a trip to Whistler, Canada. After qualifying as a GP, she worked in Manchester and Oxford before joining West Bar Surgery in Banbury, where she was much loved by her patients and well regarded for her keen diagnostic skills. She was diagnosed with metastatic breast cancer in 2012, retired on medical grounds, and devoted her remaining years to her family, her youngest daughter being 1 year old at the time. She completed several triathlons and continued to ski and play tennis. Rachel developed leptomeningeal metastases a few months before her death. She leaves her husband, Graham Smith (an orthopaedic surgeon), and three daughters.

Graham Smith, James Mulcahy, Michelle Wright

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Robin Irvine Russell

Consultant physician and gastroenterologist (b 1936; q Glasgow 1960; FRCP Ed, FRCP Glas, PhD Glas, MD), died from melanoma on 21 November 2018

Robin Irvine Russell was a consultant physician and gastroenterologist, head of department of gastroenterology at the Glasgow Royal Infirmary, and honorary professor at the University of Glasgow. The author of 325 original papers, two books, and more than 20 chapters, he presented well over 250 guest lectures at meetings and conferences around the world. A member of various professional organisations, he was international chair and adviser in research development in gastroenterology for the National Institutes of Health in Washington, USA, for several years. He was also editor of the journal *Current Opinion in Gastroenterology*. Predeceased by a son and a daughter, Robin leaves his wife, Ann; son in law; and granddaughter.

Anna Dominiczak, Peter Mills

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