

ONLY CONNECT **Nicholas A Christakis**

The anthroposphere is changing

What are the health implications of our changing population?

The human population is undergoing a rapid and inexorable demographic change in ways that will affect medicine and public health. I do not mean that our numbers are exploding—a topic that has been attracting attention since Malthus. Nor do I mean that life expectancy is rising—a fact that is widely appreciated. I mean a very modern and massive set of changes in the composition of the human population.

Changes in four aspects of population structure are key: sex ratio, age structure, kinship systems, and income distribution.

Sex ratios are becoming increasingly unbalanced in many parts of the world, especially in China and India (which account for 37% of the global population). The usual sex ratio at birth is roughly 106 males for every 100 females, but it may at present be as high as 120 for young people in China, or as high as 111 in India. This shift may arise from preferential abortion or the neglect of baby girls relative to boys. Localised sex imbalance may also have other determinants, such as large scale migration of one or the other sex in search of work. But this shift has many implications. For example, given the historical role of females as caregivers to elderly parents, a shortage of women to fill this role will induce large social adjustments. Moreover, an excess of low status men unable to find wives results in an easy (and large) pool of recruits for extremism and violence.

This shift in sex ratios may have other, less heralded implications, however. Some of our recent work suggests that this shift may actually shorten men's lives. Across a range of species, skewed sex ratios result in intensified competition for sexual partners, and this induces stress for the supernumerary sex. In humans, it seems, a 5% excess of males at the time of sexual maturity shortens the

survival of men by about three months in late life, which is a substantial loss.

On the other hand, the population worldwide is getting older, especially in the developed world. Globally, the UN estimates that the proportion of people aged 60 and over will double between 2000 and 2050, from 10% to 21%, and the proportion of children will drop from 30% to 21%. This change also has numerous implications, including for the “dependency ratio,” meaning that fewer young people are available to provide for the medical and economic needs of the elderly. Much less heralded, however, is the fact that war is a young person's activity, and it is entirely possible that, as populations age, they may become less aggressive.

The changing nature of kinship networks, such as the growth in blended families—whether due to changing divorce patterns in the developed world or to AIDS killing off parents in Africa—has implications for the network of obligations and entitlements within families. Changing kinship systems in modern American society (with complex mixtures of remarried and cohabiting couples, half-siblings, step-siblings, and so on) are having profound effects on caregiving, retirement, and bequests. Who cares for Grandma? Who gets her money when she dies?

One recent study of a random sample of Americans found that step-parents were not seen as family members when it came to traditional norms of helping with respect to healthcare needs. People face all kinds of conundrums, many of which are manifest during everyday clinical care. There is the woman whose elderly mother remarries a man without children. If her mother dies before the man, will she be expected to take care of this man she barely knows? There is the man who does not know what amount of grief is



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appropriate when his step-sibling, whom he met when he was 14, dies when they are both adults. There are the squabbling half-siblings, arguing about their standing to decide on life-support withdrawal for their parent.

Finally, it is not just the balance between males and females, or young and old, that is changing, but also the balance between rich and poor. Income inequality is reaching historic heights throughout the world. The top 1% of the people in the world receives 57% of the income. Income inequality in the United States is presently at its highest recorded levels, exceeding even that in the Roaring Twenties. And although economic development in China has proceeded with astonishing rapidity, income is not evenly distributed; the prospects for conflict in that country as a result seem very high in the coming decades. These forces may increase the propensity for violence and mental illness, and perhaps even poor physical health, judging from a string of intriguing studies of the impact of income inequality on health.

Lacking any real predators, a key feature of the human environment is other humans. In our rush to focus on threats such as global warming and environmental degradation, we should not overlook this fact. It is well to look around at who, and not just what, surrounds us. We are all embedded in an anthroposphere—the part of the material world that is us ourselves, the very thin bleeding line within the thin blue line—and it is changing. Our health, wealth, and peace depend on it.

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See **EDITORIAL**, p 899, and **RESEARCH**, p 920

BODY POLITIC **Nigel Hawkes**

Fools rush in?

We should be sceptical of panicked health initiatives that scream “do something—anything”

Initiatives designed to get ministers off the hook should always be scrutinised with a beady eye. They look good, they sound good, but do they do you good? All too often, given the political pressures to do something, what is done is ill considered, untried, expensive, ineffective, or all four.

So it may be with the programme to cut hospital acquired infections, which is being driven from number 10 Downing Street. The UK prime minister first ordered a “deep clean” of hospitals, an initiative that played well with the public even if infection control specialists were less convinced. He followed up with a promise to screen every elective patient for methicillin resistant *Staphylococcus aureus* (MRSA) before admission to hospital, with £130m (€140; \$190) to get the programme launched at the beginning of this month.

If MRSA screening is so self evidently a good thing, it is puzzling that the National Health Service in Wales and Scotland has so far declined to adopt it. So has the independent sector in England. The extremely low level of MRSA bloodstream infections in private hospitals suggests that they might know what they are doing, but that seems to have cut very little ice at number 10.

The private sector has a risk based policy that has served it well. It screens specific categories of patient—including those who have already had an MRSA infection, patients who have been in and out of NHS hospitals, patients with cancer, and injecting drug users, for example. It also screens patients whose operations are deemed to be high risk for MRSA.

But appeals to number 10 to allow this policy to apply also to patients paid for by the NHS but treated in independent hospitals were rejected. About a fifth of the patients treated in independent hospitals fall into this category, and since 1 April they are being screened mandatorily, just as they would be if they were being treated in an NHS hospital. This applies to day cases, as well. Who will actually pay for the

tests, at up to £60 a patient, is unclear. In the long run, the independents will look to the NHS to shoulder the cost by adjusting contracts.

Never reluctant to wave a big stick, the health minister Ann Keen warned that any NHS patient who declined to be screened could be denied their operation. Go on, you know it's good for you! But is it?

Evidence on the effectiveness of mandatory screening is not, in fact, entirely persuasive. Small single hospital trials have shown benefits not confirmed by bigger studies. For example, a substantial study carried out in Switzerland compared rates of infection in 22 000 patients, some screened and some unscreened. The results, published in *JAMA*, showed no significant difference between the groups (2008;299:1149-57). In the screening group, 93 patients developed MRSA, a rate of 1.11 per 1000 patient days, compared with 76 (0.91 per 1000 patient days) in the control group.

Stephan Harbarth of the University of Geneva, who led the study, said, “The trial did not show an added benefit for widespread rapid screening on admission compared with standard MRSA control alone. To increase effectiveness, MRSA screening should be targeted to surgical patients who undergo elective procedures with a high risk of MRSA infection.” This describes pretty accurately what the independent hospitals in England have been doing.

Unlike in England, where policy by kneejerk is the norm, NHS Scotland has carried out a lengthy and detailed analysis of mandatory MRSA screening. Its conclusion, in *Health Technology Assessment Advice 9*, published in October 2007, was less negative than Dr Harbarth's. Given the high prevalence of MRSA in the United Kingdom, it concluded that screening might help. But it recommended a pilot study in one health board area to see if it actually worked. That study, funded by the Scottish government, is now going on and has yet to report.

The study found that screening



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all patients in Scotland would cost £55m over five years. This cash would cover the cost of the tests, and the consequences— isolation of patients, decolonisation, and so on. Given that the population of England is roughly 10 times greater, that means a cost of £550m over five years—hardly peanuts even to a secretary of state for health who has been known to dismiss the odd hundred million as “small change.”

Sceptics have attempted to derail ministerial enthusiasm, but without effect. The BMA called for more evidence, as did the editor of the *Journal of Hospital Infection*, Stephanie Dancer. “As with many other interventions imposed in the name of infection control,” she wrote in an editorial in her journal, “the evidence for benefit remains controversial . . . there is no doubt that universal screening should be explored as a mechanism for controlling MRSA, but more evidence is required before it becomes routine” (2008;69:315-20). Mark Enright, from Imperial College London, an expert on MRSA, said that he thought targeted screening would be better, saying that the contamination of the hospital itself was more of a cause of infections than the patients coming into it.

Since the programme was planned—but before it was implemented—MRSA infections in UK hospitals had already started falling. Cases of MRSA bloodstream infection halved between 2004 and 2008, meeting the government's target. Clearly, further improvements are desirable, but the figures call into question whether mandatory screening is needed to achieve them. Meanwhile, say some infection experts, the obsession with MRSA has allowed other hospital acquired infections that are not the subjects of targets to increase.

It wouldn't be the first time that the desire to be seen doing something—anything—led to the wrong thing being done. Nor will it be the last.

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