

## Article

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# Building Eminence through Evidence

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Healthcare professional · Antibiotics · Vaccine · Education · Value · Communication · Reimbursement

### Abstract

With modern-day medicine going the way it is – new developments, great science, the advent of personalised medicine and more – there's little doubt that healthcare can move in the right direction if everything is put in place to allow it to do so. But in many areas progress is being halted. Or at the very least slowed. Like it or not, many front-line healthcare professionals still do things the way they did things three decades ago, and are reluctant to adapt to new methods (assuming they are aware of them). Evidence exists that today's rapidly developing new medicines and treatments can positively influence healthcare in modern-day Europe, but a gap in education (also applying to patients and politicians), often exacerbated by "fake news" on the internet, is hampering uptake of new and often better methods, while even causing doubts about vaccines. More understanding at every level will inevitably lead to swifter integration of innovation into the healthcare systems of Europe. The time to look, listen and learn has come.

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### Survival Inequalities "Unacceptable"

Multiple challenges must be managed if the potential of personalised medicine is to be realised.

In addition to resolving the underlying scientific issues, it will be critical to address some of the obvious impediments in the circumstances of European health and healthcare.

The current European picture is disfigured by wide disparities in health status across countries, regions, and population groups, leading to unacceptable inequalities in survival

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(and the figures for cancer are shocking in this respect) [1]. This is in part due to insufficient awareness of risk factors.

It is also due in part to insufficient information about patient characteristics (including genetic profiles) to permit optimum stratification of patients at diagnosis. Prediction is sub-optimal regarding which patients may be managed safely without treatment and which patients will have the best outcomes with specific treatments. Moreover, there is a lack of meaningful engagement of key stakeholders (including patients) in securing early diagnosis and management of disease, and feedback loops are often missing in implementing the best care pathways [2].

### **Healthcare Professionals Must Be Well Informed**

Central to overcoming some of these conditions is a more active role for healthcare professionals. Safe and effective use of personalised medicines depends on their understanding of the special nature of these medicines. But at present there are gaps between the scientific community and medical professionals, and between medical professionals and the lay public, regarding perception and knowledge about pharmaceutical innovation [3].

Well-informed healthcare professionals are essential to the implementation of personalised medicine. But that is a condition that is not yet guaranteed across Europe [4].

Of all the answers that a parent can give a curious child who is seeking an explanation, perhaps the least satisfactory is "Because I told you so." It does not elucidate, and it does not even acknowledge the legitimacy of the question or the status of the questioner.

If such curt brevity may sometimes be pardonable in a harassed mother trying to get her shopping and the kids into the car before the rain gets any heavier, or an alarmed father insisting that his young son puts down the electric drill carelessly left plugged in, it hardly forms the basis of a mature relationship.

And between adults, it is a form of intercourse that flies in the face of decency, and even of common sense. People living in democratic societies rightly recoil from such arrogance, such disdain, such transactional strong-arm tactics. Behaviour of that sort is considered the hallmark of totalitarian societies, where authoritarianism triumphs over any considerations of the rights of the individual, and any such tendency in more enlightened environments is deprecated as an aberration.

If that is the case, why does contemporary practice in the medical world diverge so often from what might be considered appropriate in other fields?

Take the case of a local family doctor, with a long career behind him or her, who is set in established ways of diagnosing and prescribing – and will typically respond to challenge with the defence that "I know the family – I've treated three generations of them, brought some of them into the world, and this is the way I've always treated them."

Over three generations, medical science has moved on, and such consistency might be interpreted rather as stubbornness [5].

It may be considered unfair – and will certainly be unpopular – to caricature family doctors, to impugn the integrity of what is the backbone of the healthcare system in so many countries [6]. But it is not entirely unjustified. ECDC figures show wide variations in prescription of antibiotics across European countries, despite the growing concerns about – and increasingly high-profile campaigning to combat – antimicrobial resistance. How is it possible or defensible that daily defined doses per thousand inhabitants are more than 35 per day in the primary care sector in Greece, but less than 15 in the Netherlands? [6].

It is equally evident, on the hot topic of antibiotics, that cultural variations – to put it politely – account for wide divergence in the use of non-prescribed antibiotics too. EU figures

released in July reveal persistent use of antibiotics in self-medication. The ARNA study estimates that 7% of antibiotics in the EU are taken without a prescription. The highest rates of non-prescription use of antibiotics are in Romania (20%) and Greece (16%) with high rates also found in Cyprus, Hungary, Italy, Romania and Spain. Over the counter selling of antibiotics in pharmacies and the use of leftover antibiotics were found to be the main causes.

Healthcare professionals may bridle at being pinpointed for slack governance, but if pharmacies are providing antibiotics without prescription – and they clearly are – then pharmacists must be held responsible. Of course there are also legislative and enforcement issues at play here: some countries have stricter rules in this area than others. But ultimately, if healthcare professionals are to be treated as professionals, then it is up to them to behave in a professional manner, even when legislation or enforcement is less rigorous.

The literature is full, in fact, of reports of the difficulties that are encountered in changing prescribing and dispensing habits, even across the prosperous EU. Tradition, custom, precedent, even a form of complacency still hold sway in many areas [7].

The hierarchical nature of the health professions has also tended to reinforce the “Because I told you so” approach. Europe’s grand tradition of medical education has served well in the past as a bastion of advancing health.

### **Time for a Review**

But medical schools have not always encouraged democratic dialogue between teachers and students, and most medical graduates doing their clinical practice experience a pretty robust form of direction from senior staff. It is time for a review of some of those hierarchical features [8].

Similarly, societies of healthcare professionals are not usually famous for radical departures from what has gone before. Eminence counts for a lot in influence in the world of medicine [9]. And of course fame or acknowledged superiority within a particular sphere is an important element of any organised society. But should it be the only element?

The Catholic church, an institution founded on authority – and even rejoicing in a doctrine of papal infallibility, has no difficulty in entitling its cardinals to the rank of “Your Eminence.” But the authority of the church comes not from evidence, but from faith.

Faith may not be quite such a relevant principle in healthcare. Eminence should be respected only insofar as it is compatible with evidence. And modern medical science is throwing up plenty of evidence so compelling about new ways of doing things that it would be a folly to ignore it [10].

The opportunities of modern medicine can be seized best if all stakeholders are prepared to acknowledge that evidence is an essential factor in conceding eminence. And that will require a deliberate move away from traditions of treatment that rely on hearsay, and towards treatment based on the outcome of testing and retesting to justify a particular course of action [11].

### **The Role of Education for All**

It will require a new emphasis on education – and on genuine education, in the original Latin sense of drawing out the skills of those being educated, rather than inculcating a sense of unthinking compliance with precedent. And it is a matter of education for all [12].

Healthcare – and particularly medical – professionals will have to take account of the most recent science. Politicians, officials and regulators who shape and govern the world of healthcare will also have to be better informed on how the best healthcare can be delivered.

And the duty does not stop there: it is just as important that the general public, the citizens, gain a more mature view of the realities of healthcare, both for their attitudes towards healthcare policy, and for their capacity to take more responsibility for their own health and for their interactions with professionals [13].

Such an approach is not to rob experts of their expertise. On the contrary, it is to ensure that expertise becomes more surely valued, and that the evidence on which expertise is based becomes the key factor in determining eminence [14].

Continued medical education of the highest quality can provide doctors not only with the parameters to treat effectively, but with a constant readiness to understand the latest science, and a commitment to rooting their eminence in evidence [15]. No matter how acutely and personally the patient may experience symptoms, and no matter how strategic a health minister may be over setting policy, it is the knowledge that the healthcare professional has of the science, biology, chemistry, technicality of modern science that will determine the quality of diagnosis and treatment.

Medical societies and associations can play a key role in this, by developing curricula that cater for the needs of practising physicians and that assist them in staying abreast of new science, so that avoid falling into the trap of treating patients in out-dated ways [16].

### **Keeping Science Reliable in the Modern World**

Conferring real and demonstrable and recognised expertise on experts would also help to counter a disturbing trend towards a form of intellectual anarchy in the population at large, a generalised scepticism that rejects authority but offers no useful alternative approach to decision-making [17]. Part of this trend is driven by the laudable democratisation of access to information: when nearly everyone has in their pocket a device that offers them immediate and cost-free access to virtually the entire sum of human knowledge (even if they use it mainly for looking at photographs of cats and arguing with people they have never met!), it is inevitable that some of the mystique attached in the past to experts will evaporate.

But the trend is also driven by the exposure that modern communication affords. This can lead to close and critical scrutiny of public figures, with occasionally unnerving results for any belief in the merits of elected leadership (just look at what can be learnt about Donald Trump from his tweets!). It can also lead to the elevation of figures of small merit to positions of great and disproportionate influence: television chefs, celebrity gardeners, fashion gurus or rap artists can nowadays carry more weight with the public than academics or politicians, impeding rational debate. (The seriousness with which the interventions of high-profile disc jockeys such as Russell Brand were accepted in the UK debate prior to the Brexit referendum is a classic example.)

Communications can also work against the interests of true expertise in the sphere of medical publishing [18]. The importance of publications in building an academic or research career has grown to the extent that there is now a fashion to publish for the sake of publishing, as a necessary device for climbing the ladder of respect and reputation [19]. There is questionable value in much of this ink on paper or words on screen, which often focuses as much on circular referencing as on advancing knowledge and reporting or commenting on tangible outcomes.

Here too, eminence is sometimes based on volume of publishing rather than on strength of evidence, and can lead to negative consequences for true learning. "Smart people working collectively can be dumber than the sum of their brains," Schwart and Walt argued in their NYT piece more than a decade ago, invoking the earlier coining by Irving Janis of the term "groupthink," denoting the phenomenon of members of a group striving so hard for unanimity

that it overrides their motivation to realistically appraise alternative courses of action – the triumph of concurrence over good sense, and authority over expertise [20].

This implies the need, over and above high education standards, for more systematic provision of analytical skills to healthcare professionals, to equip them to evaluate and re-evaluate studies, and to bring a critical eye to what is presented as received knowledge. The widely diverging conclusions from recent studies on the impact of e-cigarettes, commented upon recently in *The Guardian* by a leading Cochrane researcher, suggests that critical analysis can still not be taken for granted in published research. Constant questioning and testing of hypotheses is, after all, the only way to ensure that science remains reliable [21].

### The Example of Vaccination

That the current level of informed questioning by experts is not as healthy as it might be is clearly demonstrated by the rise of vaccine hesitancy – despite the dire consequences that are already emerging in terms of fatal outbreaks of measles, and reverses in the fight against other infectious diseases [22].

How much damage was done by the wayward and misguided doctor who raised unjustified fears of links between the MMR vaccine and autism! And how much more damage resulted from the publication of his paper, and the media frenzy that followed [23]! Even though Andrew Wakefield was subsequently struck off the UK medical register for his fraudulent research [24], the echoes of his distorted views, amplified by injudicious publication, continue to resonate with many of the general public, all too ready to take account of sensationalist views, and all too unready to reflect on the quality of the underlying information.

Concerns about fake news are entirely legitimate in these days of mass media (even if the very term has become sullied by its adoption by polemicists in the US) [25].

Vaccination – making people immune to diseases caused by viruses or bacteria – is unquestionably one of the most cost-effective public health measures available. Wide-spread vaccination has eradicated smallpox and made Europe polio-free [26]. But the success is imperilled.

A recent European Commission report [27] noted the increased misconception about vaccination being driven by increased fear of possible adverse effects following vaccination, lower acceptance of risks associated to vaccines because they are administered to healthy persons (mainly children), and lack of reliable and trustworthy information. It also noted communication through mass and social media that further increases and multiplies public distrust and fear of possible adverse effects, as well as unclear communication on optimal options for vaccination (e.g. HPV), and insufficient engagement of healthcare professionals.

Vaccine hesitancy has been aggravated by media controversies on vaccine uptake and notorious communication of anti-vaccination activists. Studies have shown that delay or refusal of vaccination is significantly associated to internet-obtained information; that inexact or negative content is predominant; and that anti-vaccination websites share common strategies and arguments: distrust of healthcare practitioners and the government, false information on safety and effectiveness of vaccines put on equal footing with science, and association of vaccine refusal with values of choice, freedom and individuality [28].

Italy has had to resort to drastic measures to remedy the situation, threatening to debar unvaccinated children from infant school [29]. This issue could be better rectified if citizens trusted experts and there was more education among adults.

But education is needed too among healthcare professionals. Although healthcare workers should be a coherent and reliable source of vaccine-related information for patients, they too can be “vaccine-hesitant” [30]. A qualitative study by the European Centre for Disease Prevention and Control in 2015 showed that concerns expressed by doctors focus on vaccine



safety; new vaccines; lack of trust in pharmaceutical companies promoting vaccines; and sometimes even in the health authorities.

Other studies show that vaccine hesitancy among healthcare professionals is associated with lacking knowledge about the severity of vaccine-preventable diseases; misconceptions about their own risk from these diseases, vaccine effectiveness and vaccine safety; lack of convenient access to vaccines; or unawareness of vaccine recommendations [31].

While vaccination recommendations for healthcare workers have been in place for more than three decades in many countries, vaccination programmes for healthcare workers differ significantly between countries and mandatory vaccination is rare [32]. Available data suggest low vaccine coverage for a number of vaccine-preventable diseases in healthcare professionals in some EU countries [33].

### **Taking Note of Science's Evolution**

Fashionable attachment to alternatives also drives a resurgence of questionable complementary medicine techniques that thrive on gullibility – notably chiropractics. Though some chiropractors are now making an effort to introduce evidence-based practices into their treatment, chiropractic as a whole hasn't evolved like other areas of medicine – with hypotheses, experimentation, and peer review [34].

Instead, it was birthed by a strange combination of hocus pocus, guesswork, and strongly held religious beliefs. Daniel David Palmer, its founder, held séances to contact a dead physician named Jim Atkinson, and said that those séances helped him develop chiropractic. As he wrote in his 1914 book *The Chiropractor*:

The knowledge and philosophy given me by Dr. Jim Atkinson, an intelligent spiritual being, together with explanations of phenomena, principles resolved from causes, effects, powers, laws and utility, appealed to my reason. The method by which I obtained an explanation of certain physical phenomena, from an intelligence in the spiritual world, is known in biblical language as inspiration. In a great measure *The Chiropractor's Adjuster* was written under such spiritual promptings [35].

Society needs to take account of where science has evolved. And just as barbers are no longer considered to be appropriate healthcare professionals, so that same fate should befall other occupations that once enjoyed some reputation in a less scientific age but which have failed to produce evidence of their value – such as chiropractors.

Instead, the way ahead has to be in constant questioning and openness to reviewing established or fashionable positions.

High-level peer review among experts in a field is the best guarantee of consistent progress, and the best defence against false reputation being gained by irrational or idiosyncratic theories or practices. The EU has made advances here by creating European Reference Networks (ERNs), bringing together expertise in the diagnosis and treatment of rare and complex diseases. By definition, ERNs function on the basis of sharing of patients and patient data, so that second opinions are readily available, and the chances of optimal responses are improved [36].

### **Educating the Public**

Modern science is here supported by modern technology, for ICT is at the heart of the sharing of data and the concept of patient reviews across the best centres in Europe. Developing the capacity of healthcare systems is closely bound up with developing the IT

infrastructure to make possible the collection, curating and sharing of new volumes of data [37].

In a broader practical perspective, society will have to buy into the idea of health education not just for healthcare professionals, but for the public too. And this has to start at an early age. Standard school education provides plenty of opportunity for learning about science – but it is all too often regarded as an academic exercise, rather than related to the lives of individuals.

There is little merit in learning valency tables or theories of Brownian motion but disregarding some of the understanding of human physiology, or basic information about healthy lifestyles, nutrition, or disease prevention.

Curiously, issues of personal health are not widely regarded as a major issue in school curricula, despite the obvious practical relevance they would have for populations [38].

Better education on personal health will also help people understand and handle a diagnosis better. It will assist people in adhering to prescribed treatments, and will give them a clearer view of how medical science advances – thus, for instance, making them more willing to permit the use of their tissue samples for research [39]. The frequently contentious debate over informed consent could be more productively managed if there was already a wide public understanding of the purpose of research and the value of shared data. It might make it possible for much to be the subject of implicit agreement, without further ado [40].

Effective information about medicines is also essential to achieve partnership in medicine taking – or “concordance” – where patient and professional come to an agreement about their medicines [41]. It is well known that people prefer verbal information from health professionals about their medicines as a priority, with written information as an important back-up [42].

Personalised information about medicines is not just a task for specialist in genetics but will to a growing extent be the responsibility of family doctors and primary healthcare units. The output of genomic data from new sequencing platforms will be extraordinary [43].

Prospective genotyping in the clinic implies communication of complex benefit/risk information and advice to patients. Information aimed at a group of patients needs to be tailored to individual patient needs, taking into account the differences in lifestyle patterns, additional disease risk, etc. Based on sound research, clinical models need to be elaborated for balancing of efficiency and privacy interests in communication of genetic risk information in the clinic [44].

Better personal understanding of health, allied with the more refined information that modern science can generate about individuals’ characteristics, predispositions and susceptibilities, could also play a role in public as well as personal health [45]. Early awareness of a disease, familiarity with likely symptoms, readiness to seek early diagnosis could serve physicians and individuals in early treatment, and at the same time could ease the burden on society of late-stage treatment [46].

### **Politicians Need to Know More, Too**

The same goes for politicians – particularly those responsible for healthcare systems. Armed with a better understanding of the opportunities of innovative science and its potentially beneficial impact on the dynamics of medicine and of public health, they could act to promote effective policies based on evidence.

The growing awareness of the importance of health policy among economic affairs ministers – always much more powerful than health ministers – could be a turning point here [47]. The concerns over financing that have brought them into the picture over the last decade

have tended to lead to austerity measures – but at the same time they have given a new and often valuable emphasis to efficiency in healthcare provision.

This contains the seeds of what could be a useful switch in the approach to healthcare, because it is a process that is likely to be driven by evidence rather than eminence.

The EU has already shown how, with the European Semester initiative, it is able to concentrate minds in national governments on public financing in general, and increasingly on public financing of healthcare. It is also progressing with a joint exploration of health system performance assessments, and building up a clearer picture of the health status of the EU and its member states. These are elements of a framework that could and should be developed.

And the reflections currently underway on the future of Europe offer a perfect opportunity to push forward with some of the radical thinking that could ensure that eminence no longer trumps evidence as Europe moves forward with healthcare for the 21st century.

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### References

- 1 Council of the European Union: Council conclusions on common values and principles in European Union health systems. Off J EU 2006/C 146/1–3 (accessed June 22, 2006).
- 2 Horgan D, Jansen M, et al: An index of barriers for the implementation of personalised medicine and pharmacogenomics in Europe. *Public Health Genomics* 2014;17:287–298.
- 3 Council of the European Union: Council Conclusions: Innovative Approaches for Chronic Diseases in Public Health and Healthcare Systems. Brussels, Council of the European Union, 2010. [http://www.consilium.europa.eu/uedocs/cms\\_Data/docs/pressdata/en/lisa/118282.pdf](http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/lisa/118282.pdf).
- 4 Council of the European Union: Council Conclusions: Reflection Process on Modern, Responsive and Sustainable Health Systems. Brussels, Council of the European Union, 2013. [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/lisa/140004.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lisa/140004.pdf) (accessed January 8, 2015).
- 5 Pravettoni G, Gorini A: A P5 cancer medicine approach: why personalized medicine cannot ignore psychology. *J Eval Clin Pract* 2011;17:594–596.
- 6 Antimicrobial Resistance and Causes of Non-Prudent Use of Antibiotics in Human Medicine in the EU. [https://ec.europa.eu/health/amr/sites/amr/files/amr\\_arna\\_report\\_20170717\\_en.pdf](https://ec.europa.eu/health/amr/sites/amr/files/amr_arna_report_20170717_en.pdf) (accessed July 16, 2017).
- 7 European Commission: Special Eurobarometer 445 – Antimicrobial Resistance, Brussels, European Commission, 2016.
- 8 Veroff D, Marr A, Wennberg DE: Enhanced support for shared decision making reduced costs of care for patients with preference-sensitive conditions. *Health Aff* 2013;32:285–293.
- 9 Armstrong D: Clinical autonomy, individual and collective: the problem of changing doctors' behaviour. *Soc Sci Med* 2002;55:1771–1777.
- 10 Ford S, Schofield T, Hope T: What are the ingredients for a successful evidence-based patient choice consultation? A qualitative study. *Soc Sci Med* 2003;56:589–602.
- 11 Irvine D: Doctors in the UK: their new professionalism and its regulatory framework. *Lancet* 2001;358:1807–1810.
- 12 McKinlay JB, Marceau LD: The end of the golden age of doctoring. *Int J Health Services* 2002;32:379–416.
- 13 Medical professionalism in the new millennium: a physician charter. Project of the ABIM Foundation, ACP-ASIM Foundation, and European Federation of Internal Medicine. *Ann Intern Med* 2002;136:243–246.
- 14 Parker M: Whither our art? Clinical wisdom and evidence-based medicine. *Med Health Care Philos* 2002;5:273–280.
- 15 Sackett DL, et al: Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71–72.
- 16 Straus SE, et al: Evidence-Based Medicine: How to Practice and Teach It. London, Churchill Livingstone, 2010.



- 17 Dukić N, Arbula Blečić A, Cerović LJ: Economic implications of insufficient health literacy. 6th Int Sci Conf, Pula, May–June 2013.
- 18 Nutbeam D: Health literacy as public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int* 2000;15:259–267.
- 19 Bornmann L, Mutz R: Growth rates of modern science: a bibliometric analysis based on the number of publications and cited references. *J Assoc Inf Syst* 2015;6:2215–2222.
- 20 Janis IL: *Victims of Groupthink: A Psychological Study of foreign-Policy Decisions and Fiascoes*. Boston, Houghton Mifflin, 1972.
- 21 Roy ED, Morsillo AT, Seijo F, Reddy SMW, Rhemtulla JM, Milder JC, et al: The elusive pursuit of interdisciplinarity at the human-environment interface. *Bioscience* 2013;63:745–753.
- 22 Rémy V, Zöllner Y, Heckman U: Vaccination: the cornerstone of an efficient healthcare system. *J Market Access Health Policy* 2015;3:27041.
- 23 Larson HJ, de Figueiredo A, Xiaohong Z, Schulz WS, Verger P, Johnston IG, Cook AR, Jones NS: The State of Vaccine Confidence 2016: Global Insights through a 67-Country Survey. *EBioMedicine* 2016;12:295–301.
- 24 Farthing M, Horton R, Smith R: UK's failure to act on research misconduct. *Lancet* 2000;356:2030.
- 25 Horton R: A statement by the editors of *The Lancet*. *Lancet* 2004;363:820–821.
- 26 Luyten J, Beutels P: The social value of vaccination programs: beyond cost-effectiveness. *Health Aff* 2016;35.2: 212–218.
- 27 Vaccine hesitancy [https://ec.europa.eu/health/amr/sites/amr/files/amr\\_arna\\_report\\_20170717\\_en.pdf](https://ec.europa.eu/health/amr/sites/amr/files/amr_arna_report_20170717_en.pdf) (accessed July 18, 2017).
- 28 Taylor E, et al: Cross-cultural household influence on vaccination decisions. *Med Decision Making* 2016;36.7: 844–853.
- 29 Bechini A, et al: Strategies and actions of multi-purpose health communication on vaccine preventable infectious diseases in order to increase vaccination coverage in the population: The ESCULAPIO project. *Hum Vaccin Immunother* 2017;132:369–375.
- 30 Politi MC, Jones KM, Philpott SE: The role of patient engagement in addressing parents' perceptions about immunizations. *JAMA* 2017;318:237–238.
- 31 Let's Talk About Hesitancy: Enhancing Confidence in Vaccination and Uptake <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/lets-talk-about-hesitancy-vaccination-guide.pdf> (accessed July 18, 2017).
- 32 Verger P, et al: Vaccine hesitancy among general practitioners and its determinants during controversies: a national cross-sectional survey in France. *EBioMedicine* 2015;2.8:891–897.
- 33 Derrough T, et al: Immunisation information systems – useful tools for monitoring vaccination programmes in EU/EEA countries, 2016. *EuroSurveill* 2017;22:30519.
- 34 Gray B: How should we respond to non-dominant healing practices, the example of homeopathy. *J Bioeth Inq* 2017;14:87–96.
- 35 Folk H: *The Religion of Chiropractic: Populist Healing from the American Heartland*. Chapel Hill, UNC Press Books, 2017.
- 36 Ray-Coquard I, et al: Improving treatment results with reference centres for rare cancers: where do we stand? *Eur J Cancer* 2017;77:90–98.
- 37 Rinaldi G (ed): *New Perspectives in Medical Records: Meeting the Needs of Patients and Practitioners*. Berlin, Springer, 2017.
- 38 Liu H-Y, Kobernus M: Citizen science and its role in sustainable development: status, trends, issues, and opportunities; in Ceccaroni L, Piera J (eds): *Analyzing the Role of Citizen Science in Modern Research*. Hershey, IGI Global, 2017, pp 147–167.
- 39 Horne R: The human dimension: putting the person into personalised medicine. *New Bioeth* 2017;23:38–48.
- 40 Grady C: Enduring and emerging challenges of informed consent. *N Engl J Med* 2015;372:855–862.
- 41 Kee JWY, et al: Communication skills in patient-doctor interactions: learning from patient complaints. *Health Prof Educ*, in press.
- 42 Bo M, et al: Delivery of written and verbal information on healthcare-associated infections to patients: opinions and attitudes of a sample of healthcare workers. *BMC Health Services Res* 2017;17:66.
- 43 Timmermans S, Stivers T: The spillover of genomic testing results in families: same variant, different logics. *J Health Soc Behav* 2017;58:166–180.
- 44 Phillips KA, et al: Making genomic medicine evidence-based and patient-centered: a structured review and landscape analysis of comparative effectiveness research. *Genet Med* 2017, Epub ahead of print.
- 45 Rehm HL: Evolving health care through personal genomics. *Nat Rev Genet* 2017;18:259–267.
- 46 Shinan-Altman S, Werner P: Is there an association between help-seeking for early detection of Alzheimer's disease and illness representations of this disease among the lay public? *Int J Geriatr Psychiatry* 2017, Epub ahead of print.
- 47 de Groot F, et al: Ethical hurdles in the prioritization of oncology care. *Appl Health Econ Health Policy* 2017; 15:119–126.