

They should stimulate debate on the impact of pharmacogenomics on the clinical environment and, conversely, on the effect of clinical factors on the development and implementation of pharmacogenomics.

Other criteria and examples may well emerge in the course of such a discussion, and the clinical validity, utility, and uptake of these strategies may change along with advances in technology or revisions to how health professionals (particularly doctors and pharmacists) are trained. Pharmacogenomics and related genomic advances are clearly placing a unique lens on the multiple actors participating in the development, regulation, and prescription of drugs, as well as the complex interactions within our health systems. Finally, the ethical, legal, social, economic, and regulatory implications of such a framework require further investigation, including considerations of equity, distributive justice, and the particular opportunities and challenges presented by various health systems and their organisation.

I thank Tor Lezemore for critical reading of this manuscript, and the secretariat of the Nuffield Council on Bioethics for their hospitality during my research internship.

Funding: Research for this paper was made possible by a Commonwealth scholarship held in the Department of Social Policy, London School of Economics and Political Science.

Competing interests: None declared.

- 1 Evans JP, Skrzynia C, Burke W. The complexities of predictive genetic testing. *BMJ* 2001;322:1052-6.
- 2 Burke W, Atkins D, Gwinn M, Gutmacher A, Haddow J, Lau J, et al. Genetic test evaluation: Information needs of clinicians, policy makers, and the public. *Am J Epidemiol* 2002;156:311-8.
- 3 Birmingham K. Experts predict bleak post-genomic era for drug R&D. *Nature Med* 2001;7:262.
- 4 Norton RM. Clinical pharmacogenetics: Applications in pharmaceutical R&D. *Drug Discov Today* 2001;6:180-5.
- 5 Owens J, Ramster B, Lawrence RN. Impact of SNP genotyping could save millions by 2010. *Drug Discov Today* 2001;6:450.
- 6 Ward SJ. Impact of genomics in drug discovery. *BioTechniques (Euro Edition)* 2001;64-9.
- 7 Phillips KA, Veenstra DL, Van Bebber S, Sakowski J. An introduction to cost-effectiveness and cost-benefit analysis of pharmacogenomics. *Pharmacogenomics* 2003;4:231-9.
- 8 Bristol L. A regulatory protocol for pharmacogenomics services. *Pharmacogenomics J* 2002;2:83-6.
- 9 Issa AM. Ethical perspectives on pharmacogenomic profiling in the drug development process. *Nature Rev Drug Discov* 2002;1:300-8.
- 10 Rothstein MA, Epps PG. Ethical and legal implications of pharmacogenomics. *Nature Rev Genet* 2001;2:228-31.
- 11 Robertson JA, Brody B, Buchanan A, Kahn J, McPherson E. Pharmacogenetic challenges for the health care system. *Health Aff* 2002;21:155-67.
- 12 Shah J. Economic and regulatory considerations in pharmacogenomics for drug licensing and healthcare. *Nature Biotechnol* 2003;21:747-53.
- 13 Melzer D, Raven A, Detmer DE, Ling T, Zimmern RL. *My very own medicine: What must I know?* Cambridge: Department of Public Health and Primary Care, University of Cambridge, 2003.
- 14 Lindpaintner K. The importance of being modest: Reflections on the pharmacogenetics of abacavir. *Pharmacogenomics* 2002;3:835-8.
- 15 Moriguchi H, Uemura T, Kobayashi M, Chung RT, Sato C. Management strategies using pharmacogenomics in patients with severe HCV-1b infection: A decision analysis. *Hepatology* 2002;36:177-85.
- 16 Phillips KA, Veenstra DL, Oren E, Lee JK, Sadee W. Potential role of pharmacogenomics in reducing adverse drug reactions: A systematic review. *JAMA* 2001;286:2270-9.
- 17 Hughes AR, Mosteller M, Bansal AT, Davies K, Haneline SA, Lai EH, et al. Association of genetic variations in HLA-B region with hypersensitivity to abacavir in some, but not all, populations. *Pharmacogenomics* 2004;5:203-11.

- 18 Tollman P, Guy P, Altshuler J, Flanagan A, Steiner M. *A revolution in R&D: how genomics and genetics are transforming the biopharmaceutical industry*. Boston, MA: Boston Consulting Group, 2001.
- 19 National Institute for Clinical Excellence. *Technology Appraisal Guidance No.34. Guidance on the use of trastuzumab for the treatment of advanced breast cancer*. London: National Institute for Clinical Excellence, 2002.
- 20 Wolf CR, Smith G. Pharmacogenetics. *Br Med Bull* 1999;55:366-86.
- 21 Veenstra DL, Higashi MK, Phillips KA. Assessing the cost-effectiveness of pharmacogenetics. *AAPS PharmSci* 2000;2:article 29.
- 22 Marshall E. Preventing toxicity with a gene test. *Science* 2003;302:588-90.
- 23 Branca M. FDA fosters pharmacogenomics. *Bio IT World* 2002. www.bioworld.com/archive/061202/horizons_lesko.html (accessed 18 May 2004).
- 24 Van Aken J, Schmedders M, Feuerstein G, Kollek R. Prospects and limits of pharmacogenetics: the thiopurine methyl transferase (TPMT) experience. *Am J Pharmacogenomics* 2003;3:149-55.
- 25 Krynetski E, Evans W. Drug methylation in cancer therapy: lessons from the TPMT polymorphism. *Oncogene* 2003;22:7403-13.
- 26 Roche Diagnostics. Roche diagnostics launches the AmpliChip CYP450 in the US, the world's first pharmacogenomic microarray for clinical applications: Roche Diagnostics, 2003. www.roche.com/med-cor-2003-06-25 (accessed 7 Jun 2004).

Corrections and clarifications

National screening programme for aortic aneurysm

Our press deadlines got the better of us with this editorial by Roger M Greenhalgh, and we were unable to include the author's two clarifying amendments in time (8 May, pp 1087-8). The first sentence of the third paragraph should start: "However, others say that the data from the MASS (multicentre aneurysm screening study) trial do not fulfil the criteria of the national screening committee." In the sixth paragraph, the reference for the data "about to be published in *Circulation*" is: Brady AR, Thompson SG, Fowkes GR, Greenhalgh RM, Powell JT. Abdominal aortic aneurysm expansion: risk factors and time intervals for surveillance." *Circulation* 2004 (in press).

BMJ Careers supplement

In one of the Career Focus section's articles, "How to pass the MRCGP," by Sabina Dosani and Peter Cross (15 May, p 195), we inadvertently reported the pass rate for the membership examination of the Royal College of General Practitioners (MRCGP) as eight per cent. Somehow, in the editing process, an all important "y" fell off—the pass rate is in fact eighty per cent.

Pathogenesis and treatment of varicoceles

A mix-up over the references at proof stage of this editorial by Jay Sandlow (24 April, pp 967-8) led to some referencing errors. Firstly, in the reference list, reference 12 should be: Dohle GR, Pierik F, Weber RF. Does varicocele repair result in more spontaneous pregnancies? A randomised prospective trial [abstract]. *J Urol* 2003;169:408. (This reference supports the penultimate sentence of the fifth paragraph.) Secondly, the reference list should contain a reference 13 (Schlesinger MH, Wilets IF, Nagler HM. Treatment outcome after varicocelelectomy. A critical analysis. *Urol Clin North Am* 1994;21:517-29), and the reference cited at the end of the first sentence of the sixth paragraph should be 13 (not 12).

Interactive case report

A 64 year old woman with knee pain

This case was described on 5 and 12 June (*BMJ* 2004;328:1362-3, 1425). Debate on her management continues on [bmj.com](http://bmj.bmjournals.com/cgi/content/full/328/7452/1362) (<http://bmj.bmjournals.com/cgi/content/full/328/7452/1362>).

On 5 July we will publish the outcome of the case, together with commentaries on the issues raised by the management and online discussion.