

Developing genetics for developing countries

Understanding human genome function and variation will require developing genetics capacity in population-rich as well as resource-rich regions of the globe. Medicine based in genetics provides a route for developing countries to improve healthcare, from primary care, via prevention of genetic diseases to opportunities for new research.

Happily, the number of deaths of young children worldwide has fallen steadily to a record low level, according to the United Nations Children's Fund (http://www.unicef.org/media/media_40855.html). Sadly, though, this still means that 9.7 million children under the age of five died last year—mostly from readily and economically preventable causes—and the probability that a child lives to celebrate her fifth birthday in one of the wealthiest countries is 25 times greater than in one of the poorest countries. Malnutrition underlies over half of the deaths, so improvements in agriculture and in the logistics and equity of food production, storage and distribution are clearly important international priorities.

Neonatal causes, including preterm birth and congenital abnormalities, accounted for 37% of the mortality in 2006, and as infectious and nutritional causes are addressed, the contribution of genetics will become evident. Anticipating this in their landmark paper (*Nat. Rev. Genet.* 4, 61–68, 2003), Ala' Alwan and Bernadette Modell recommended that developing countries introduce genetics services through primary pediatric healthcare, initially concentrating on prevention of genetic diseases. They emphasized deploying DNA diagnostics, building research capability around local priorities and then addressing common diseases with a genetic component.

Building healthcare infrastructure around genetics is more than bridging a technology gap, it is literally making sense of the world's population. Rich countries can generate genome sequences, but the genome's variable content will only make sense in the context of the whole human race, and most of us live in less well-resourced countries. Demographic patterns that make populations distinctive and informative are sometimes, but not necessarily, compatible with rich urban populations in the Northern hemisphere. So there are many relatively poor and relatively poorly studied populations with a history of admixture or with long records of local residence, contrasts of traditional and new urban environments, large family sizes (the global distribution of fertility is shown on the map on this month's cover) and high consanguinity.

Two meetings this month bring together organizations that have been particularly successful at combining the expertise of well resourced and developing countries to build capacity in the latter countries. The 5th Annual Meeting of the African Society of Human Genetics (<http://www.afshg.org>) on "Genomics Research in Africa: Implications for Disease Diagnosis, Treatment and Drug Development" is being held November 3–5, 2007 in Cairo in conjunction with the First Annual Meeting of the Division of Human Genetics and Genome Research and the National Society of Human Genetics of Egypt. Then the 2nd Pan-Arab Genomics Conference focuses on prevention and ethics November 20–22 in Dubai (<http://www.cags.org.ae/2ndpahgc.html>).

Local priorities and problem solving are key, and it is imperative that widely acceptable ethical standards for the practice of genetic medicine and research are established. In this context, we are watching the West African Bioethics group (<http://www.westafricanbioethics.net/wabcms>) with interest. On (p 1293) Aida Al-Aqeel summarizes the components of an ethical framework for prevention of genetic diseases and for genetic research in Islamic countries from a Saudi Arabian perspective. Although empirical evidence ensures sound science, respecting rules of precedent and cultural norms is a way to ensure that the medical benefits of science are readily accepted by those it aims to help, paving the way for sustainable enthusiasm for and pride in genetics research.

Researchers from rich and developing countries will benefit from discussing the ethics of interaction with one another. In attracting international collaborators, a developing region needs to put its own and its immediate neighbors' priorities first. So, international collaborators must commit, so far as they can, to return benefits, training and information to the developing region as the price of collaboration. Ideally, DNA should be genotyped and sequenced locally and not languish in a forgotten freezer overseas. ■

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