**Letters**

Edited by Jennifer Sills

**Passport power: Entrenching inequality**

IN 2015, GLOBAL media fixated on the plight of migrants crossing the Mediterranean Sea in search of better lives in Europe. While thousands of lives were lost at sea (1), many European citizens called for tighter immigration restrictions (“Tensions of refugee politics in Europe,” R. Hansen and S. Randeria, Policy Forum, 2 September, p. 994; published online 25 August). The Brexit referendum result and the popularity of Donald Trump’s anti-immigrant rhetoric (2) exemplify how anti-immigrant sentiments continue to grow across the developed world.

Protectionist attitudes not only negatively affect scientific progress in rich nations (3) but also impede much-needed socioeconomic progress in developing nations. Despite sending substantial resources for development aid to poor nations, rich nations simultaneously impose harsher hurdles for citizens of those poor nations who wish to enter rich nations (4), thereby impeding capacity-building opportunities for those they profess to help. Because scientists from poor countries are increasingly subjected to expensive visa application fees, visa delays, and denials, they may reconsider short-term visits to developed countries.

In addition, students fear attending international conferences; given that a visa does not guarantee entry to a country [e.g., (5)], they could be denied re-entry into their developed host countries at the discretion of a customs agent. Anti-immigrant policies thereby exacerbate already strong inequalities between rich and poor nations.

Streamlined immigration policies could better facilitate travel by scientists. For example, developed nations could adopt programs to allow third-country access for holders of visas issued by countries with stringent vetting standards, similar to developing countries that accept U.S., U.K., Canadian, Australian, and Schengen visas as substitute visas for short-term visitors that would otherwise require travel authorization [e.g., (6)]. Alternatively, European countries could follow the example of the U.S. visitor visa, valid for 10 years, alleviating the burden of current Schengen visas, which seldom extend beyond 6 months.

Science is enriched when people with different cultures come together to solve challenging problems. Developing countries strengthen their scientific capacity, and developed countries receive an injection of ideas. Immigration policies that impede scientist travel weaken innovation and progress, leaving both developed and developing countries short-changed.

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**Precision medicine: Fantasy meets reality**

IN THEIR POLICY Forum “Countering imprecision in precision medicine” (29 July, p. 448), S. F. Hey and A. S. Kesselheim discuss the many combinations of biomarkers and treatments that drive precision medicine research. They propose that “Funding agencies could award responsibility for specific regions of the [biomarker x treatment] parameter space through their grants.” However, this is an extremely inefficient way to search such a large number of combinations. Researchers should be able to rapidly and adaptively refocus their research efforts as results become available. Bureaucratic funding agencies cannot react quickly enough to facilitate this dynamic process. Electronically connected networks of collaborating scientists can.

Several researchers have proposed, and some have piloted, a Global Cumulative Treatment Analysis (7). In this giant prospective trial, all patients with a given condition who enroll in the trial are tracked and treated based on the best available knowledge, and when there is uncertainty about whether a treatment will be beneficial, the decision algorithm (be it computational, human, or more likely a combination) randomly assigns treatments to patients in real time, integrating response information as soon as it becomes available and updating the

**References**


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This strategy would allow biomedicine to operate as a gigantic distributed robotic discovery system (2) or air traffic control system: New hypotheses injected into the system by pharmaceutical companies or researchers would be validated or refuted by being pushed through a huge distributed and rapidly intercommunicating network, which would integrate information nearly instantly.

This may seem like a fantasy that would require a giant connected computer system over many sites, but the Veterans Administration has just such a system and is in the process of piloting exactly this idea, in what they call a “Point of Care” trial (3). If Apple, or some other organization, has its way in centralizing medical records for the rest of us (4), that system could operate the same way. Interdisciplinary doctors already meet to discuss the best precision treatment options for patients on panels referred to as “molecular tumor boards.” A centralized system could network the tumor boards of the world.

There are, of course, many complex issues that need to be worked out in creating such a model for treatment, and treatment discovery (5), but something like a Global Cumulative Treatment Analysis is the only way that the increasingly enormous combinations of biomedical parameters can possibly be searched with any efficiency.

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Public feedback at risk in Brazil

IN HIS POLICY Forum “Brazilian politics threaten environmental policies” (19 August, p. 746), P. M. Fearnside discusses the risks that recent environmental policy reforms pose to the conservation of Amazonian biodiversity. He calls for continued input by the scientific community but fails to point out that PEC 65/2012, the proposed constitutional amendment, threatens public participation in environmental decision-making.

If passed, PEC 65 would violate human rights of participation in environmental decision-making by bypassing public hearings (7). In the current licensing system for large construction projects, public hearings are a mandatory step. Before the project is approved for a license, environmental impact assessments are conducted and presented to the public. Based on the results of the assessment and public feedback, procedures for compensation and mitigation of impacts may be assessed, adjusted, and monitored. Society has the right to be consulted about actions that might affect the country’s environmental well-being. Public participation in environmental matters is also granted by international policies of which Brazil is a signatory, including International Labour Organization Convention 169, which requires free, prior, and informed consent by indigenous peoples for projects that affect their well-being (2).

Without local peoples’ input and participation, not only are ecological systems threatened by authorizations of mining, hydroelectric dams, and other projects, but so too are interlinked social-ecological processes that have protected Amazonian biomes for millennia (3). Scientists’ input is essential to inform environmental decisions, but the complexities of social-environmental licensing in Brazil need to be addressed by enhanced dialogue and coproduction of knowledge across diverse groups such as local actors, scientists, governmental and nongovernmental institutions, private sector, and public prosecutors.

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