

ment may be no better than placebo, but the study authors reported an inadequate power to detect a difference.<sup>4</sup> While it is true (for any behavior) that changes observed at 6 months do not persist for 8 years, Kvasnicka's conclusion that they would therefore have close to 0 effect on death rates does not follow. Ex-smokers may relapse, but health benefits accrue during periods of abstinence. Analyses that account for these factors have concluded that smoking cessation counseling surpasses all other recommended clinical preventive services in its ability to save lives and lower costs.<sup>6</sup>

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## Genomics and Public Health Research

**To the Editor:** Two Commentaries addressed important routes for translating scientific discoveries into practice: practice-based research, discussed by Dr Westfall and colleagues,<sup>1</sup> and community-partnered participatory research (CPPR), addressed by Ms Jones and Dr Wells.<sup>2</sup> Although not specifically addressed in these Commentaries, rapid advances in genomics illustrate the challenges of translating new technologies into health care and disease prevention. In 2006, National Institutes of Health Director Zerhouni<sup>3</sup> said, "I predict that comprehensive, genomics-based health care will become the norm, with individualized preventive medicine and early detection of illnesses." But as Lenfant<sup>4</sup> asked in a 2003 lecture subtitled "Lost in Translation," "Let's be realistic: If we didn't do it with aspirin, how can we expect to do it with DNA?" Research translation requires better connections among basic sciences, medicine, and public health along the translation highway. We believe that genomic medicine offers 4 opportunities to promote translation by enhancing partnerships among these disciplines.

First is a joint focus on prevention. Stratification by family history or genotype already provides a means for tailoring health promotion and screening tests for early disease detection (eg, colorectal cancer screening). However, mea-

suring the value that individualized prevention adds to population-level approaches (eg, for smoking cessation) is a research question that must be addressed at the individual, practice, and community levels.

Second is applying the methods of public health sciences, especially epidemiology and behavioral and social sciences. Genes are usually discovered in highly selected patient groups, but population-based epidemiological studies are crucial for characterizing genetic variation and gene-environment interactions as well as for estimating the effect of gene-based interventions on disease burden.

Third is the synthesis of evidence from multiple disciplines. More than 6000 articles on gene-disease associations are published each year and more than 1300 genetic tests are currently making their way to market.<sup>5</sup> Evidence-based knowledge synthesis is fundamental to evaluating the clinical utility of genomic applications.

Fourth, genomics research—like other areas of research discussed in the Commentaries—will not be translated successfully into practice without ways of assuring delivery of interventions and monitoring their effectiveness and safety.

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**In Reply:** We agree with Dr Khoury and colleagues. Human genomics is an excellent example of the need to improve the research roadmap and strengthen practice-based research and phase 3 (T3) translation. The best discoveries in human genomics mean little if they cannot be effectively and efficiently delivered to the patients who could benefit. Projects that might connect practice-based researchers with genomics researchers include identifying cancer links between phenotype and genotype and identifying genetic markers for predicting medication response. Identifying the best antihypertensive medication based on genetic disposition may help customize and improve hypertension management.

Moving new discoveries from the laboratory into routine clinical care is a much more complex challenge than has generally been appreciated. It is certainly larger than can be solved at current funding levels available for practice- and community-based research and phase 3 translation. The num-

ber of underused discoveries will continue to back up along the research interstate highways as long as research institutions and funding agencies fail to value and support construction and maintenance of the research blue highways as well.

We believe that funding agencies must be encouraged to support practice-based research so that new discoveries will move out into clinical practice. Substantial funding is required to educate a solid cadre of practice-based research investigators and to support the basic infrastructure costs of operating practice-based research networks and community-based alliances, the laboratories for this kind of research. Funding from the Agency for Healthcare Research and Quality is limited and often earmarked for specific activities. The Centers for Disease Control and Prevention has supported some community-based research but is not designed to be a major research funding agency. Private foundations may contribute, and some (such as the Robert Wood Johnson Foundation) have begun to do so. We believe it would be unfortunate and likely unsuccessful to expect industry to support this type of research. We look to the NIH to take the lead and support practice-based research.

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**In Reply:** Along with Dr Khoury and colleagues, others have called for a closer integration of genomics and public health research.<sup>1</sup> Community-partnered participatory research (CPPR) and other community-based participatory approaches hold promise to promote inclusion of diverse populations in genomics studies, increasing generalizability and knowledge of the distribution of risk factors, which is key to targeting prevention efforts. The CPPR model, through equalizing power sharing, may increase public trust and ownership of research, an important outcome given the distrust that may have resulted from historical research abuses such as Tuskegee.<sup>2</sup> Furthermore, CPPR may increase community participation in preventive interventions for genetically complex diseases such as diabetes; prevention inter-

ventions for such illnesses are available now, while corresponding new gene therapies may be a long time in coming. The CPPR approach, through mutual benefits that foster collaboration, offers a link between realizing the promise of genomics research for diverse populations and implementing urgently needed public health practice.

Community-partnered participatory research principles suggest that community participation goes beyond inclusion of advisors to involve active partnership in all phases of the scientific process. The public is the ultimate recipient of the application of advances in science to new services. For genomics research and practice, the CPPR perspective raises the social justice question of what role diverse populations can play as partners in this transformation.

For example, in the immediate future some genomics studies may not arrive at definitive answers but may perpetuate real or perceived risks of losing insurance coverage or creating discrimination and social stigma. Such concerns could increase as gene therapies become more routinely available. Populations may differ in their knowledge of the risks and benefits of such approaches and in their treatment preferences, raising concerns about the meaning of informed consent for research and services. In such cases, the CPPR model can facilitate development of an understanding of the complex phenomenon of genomics and public health practice in diverse communities. Moreover, when all players are actively involved, it may become easier to arrive at fair decisions regarding how such issues will be handled in an era of personalized medicine.

Research on diffusion of innovations suggests that underserved populations may experience increased disparities; more advantaged groups may have greater education and resources to identify, adopt, and implement innovations.<sup>3</sup> Because of health disparities, there must be equity in access to science information, participation, and application. The CPPR method offers a fair and transparent process for the necessary debates, including airing of distrust that can precede development of trust. Genomics as well as public health research and practice may be shifted toward a community-engagement model that builds the capacity to understand what such research is, what it offers, and whether and how it raises cause for concerns such as increasing disparities.

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