

The Personalized Medicine Coalition (PMC), representing a broad spectrum of academic, industrial, patient, provider, and payer communities, seeks to advance the understanding and adoption of personalized medicine concepts and products for the benefit of patients.

FALL 2006

Letter from the Executive Director



Personalized Medicine Coalition members generally assume that personalized medicine represents more than the incremental changes in healthcare outcomes that will result from its adoption. We realize that personalized medicine points to an impending paradigm shift that will move medicine from reactive to preventive care and from a one-size-fits-all approach to one of targeted therapeutics that addresses patients' clinical needs from the start.

The PMC also recognizes that this paradigm shift will not occur overnight. It will require an enormous amount of educational and advocacy effort to ensure that the legal and regulatory systems are put in place to provide patients safer, faster, more efficacious, and perhaps less costly solutions in the future.

To that end, since our last newsletter, the PMC has been working diligently to educate the public about the promise of personalized medicine and to shape the public policies that govern it.

Last month we published a white paper entitled *The Case for Personalized Medicine*. The document outlines ten arguments, some tested and others inferred, that demonstrate the benefits of personalized medicine, and describes a realistic scenario for its evolution. In it we also list 13 personalized medicine diagnostics and therapies on today's medical market (see below).

Among the issues that will affect the necessary growth of that product portfolio is a better understanding of the business model that supports, or in some cases inhibits, the co-development of diagnostic and therapeutic products. The PMC, with the assistance of the University of California, San Francisco and the venture capital community in Silicon Valley, held a seminar on this critical

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PMC Issues *The Case for Personalized Medicine*

The release of *The Case for Personalized Medicine*, a comprehensive review from PMC assessing the state of personalized medicine and the evidence that it will become an integral part of the healthcare system, was announced on November 14th by Edward Abrahams, Executive Director of the Personalized Medicine Coalition, at the Second Annual Burrill Personalized Medicine Meeting in San Francisco, CA.

The report, underwritten in part by Applera Corporation (Applied Biosystems and Celera Genomics) and Illumina, Inc., presents evidence that personalized medicine has already proven its value and will continue to grow in importance, while at the same time acknowledging that uncertainties remain about the full extent of its ultimate impact. The report asserts that, at least in some cases, a personalized medicine approach to treatment has led to cost savings in the administration of healthcare, demonstrated itself to be a viable business strategy for product development, and, most importantly, proven its benefit to patients.

The report also details the ethical, legal, and societal questions being raised by genetic and other molecular tests, and the need for incorporating personalized medicine into medical education curricula.

To download the full report, visit

http://www.personalizedmedicinecoalition.org/communications/pmc_pub_11_06.php ■



PMC Urges CMS to Create Genetic Testing Specialty

In an effort to help ensure the accuracy and reliability of genetic tests, increase the public's trust in genetic testing, and foster the promise of pharmacogenomics, the Personalized Medicine Coalition (PMC) is urging the Centers for Medicare and Medicaid Services (CMS) to issue proposed regulation that would create a genetic testing specialty under the Clinical Laboratory Improvement Amendments (CLIA). PMC is also urging CMS to expeditiously issue a final ruling following an appropriate period for public comment.

CLIA requires the U.S. Department of Health and Human Services (HHS) to issue standards for laboratory certification that will ensure that laboratories consistently perform tests in a valid and reliable manner. These standards must include the laboratory's maintenance of a quality assurance and quality control program;

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subject in October that brought together senior executives from the diagnostic and pharmaceutical industries to explore and shed light on the issue (see page 5). Earlier in the summer at a seminar hosted by MIT, we also examined how personalized medicine is changing the landscape of mental and neurological illnesses, the first in a series of explorations of how personalized medicine is changing our understanding and treatment of various diseases (see page 4).

Regarding public policy, the PMC, after much deliberation, has published a set of principles that we suggest should govern reimbursement, including increasing the valuation placed on sophisticated diagnostic tests to encourage their development. The guidelines also contend that government and private payers should consider paying a premium for personalized medicine products (see page 5). These guidelines are beginning to shape thinking at the U.S. Department of Health and Human Services (HHS), which is actively looking into what it can do to stimulate the development of personalized medicine and has sought PMC's input.

The PMC also has two task forces presently working on a tight timeline to respond to specific requests from the Executive Branch. The first, headed by Patrick Terry of Genomic Health, is seeking to establish principles that protect public confidence in genetic testing while not stifling investment and innovation. These guidelines will shape the PMC's response to the FDA's request for comments on its draft guidance on Analyte Specific Reagents and *In Vitro* Diagnostic Multivariate Index Assays. The second task force, headed by Brett Davis of IBM, will respond to HHS's Request for Information on Health Information Technology and personalized medicine.

In addition, with the imminent publication of our *Landscape Analysis and Strategic Plan* that will review the terrain of personalized medicine and outline its opportunities and barriers, we are preparing an even more robust agenda for 2007. With your participation and support, that agenda will also focus on the emerging issues of the personalized medicine economics, in particular the impact it could have on overall healthcare costs, and physician education, among the many on-going initiatives outlined here and below. ■

—Edward Abrahams

PMC Presents Awards at HPCGG Personalized Medicine Conference

Leadership in Personalized Medicine Award

In a presentation at Harvard-Partners Center for Genetics and Genomics's recent conference, *Personalized Medicine: A World of Opportunities*, the PMC presented its Second Annual Award for Leadership in Personalized Medicine to Dr. Elizabeth G. Nabel, Director of the National Heart, Lung, and Blood Institute (NHLBI) at the National Institutes of Health. "This award recognizes the contributions of a visionary individual whose actions in science, business, or policy have advanced the frontier of personalized medicine," said Wayne A. Rosenkrans, Jr., Ph.D., Scientific and Medical Strategy Director, External Scientific Affairs, AstraZeneca Pharmaceuticals, and Vice Chairman, PMC, who presented the award to Dr. Nabel.

A basic researcher and a cardiologist, Dr. Nabel's contributions have helped her cross the divide between basic laboratory innovation and success in clinical practice. On the laboratory front, she devoted nearly two decades to exploring genes that contribute to heart disease and strategies for gene therapy to benefit patients with cardiovascular disease. On the medical front, she helped to translate those discoveries to therapies for patients.

Dr. Nabel implements her vision of melding genetics and medicine through several large-scale population studies at the NHLBI. In February, she launched a comprehensive genetic research study as part of the long-running Framingham Heart Study (FHS) (www.nhlbi.nih.gov/about/framingham), which will identify genes underlying cardiovascular and other chronic diseases. The NHLBI also sponsors the Jackson Heart Study (JHS) (www.nhlbi.nih.gov/about/jackson/index.htm), which is a single-site prospective epidemiologic investigation of cardiovascular disease (CVD) among

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maintenance of appropriate records; equipment and facilities requirements; adherence to personnel standards; and compliance with proficiency testing requirements.

Currently, with the exception of cytogenetics, there is no specialty area covering genetic testing laboratories, and therefore no specified proficiency testing requirements, despite the fact that genetic tests are considered high complexity tests under CLIA regulations. In addition, today there are genetic tests clinically available for close to 1,000 diseases, and several hundred tests are in development, making genetic testing the fastest growing area of laboratory diagnostics.

For more information about the CLIA policy on genetic testing, and to read the position of the PMC, visit

http://www.personalizedmedicinecoalition.org/sciencepolicy/public-policy_clia.php ■

PMC in the Press

National Geographic News recently reported on the potential benefits of personalized medicine, as well as some of the barriers to its full implementation, including cost and privacy concerns. The article, "Personalized Medicine Promises Tailor-Made Diagnoses, Treatments," includes a quote from Edward Abrahams, Executive Director of the PMC, regarding the effects of personalized medicine on the medical paradigm. According to Abrahams, personalized medicine "promises to replace trial-and-error medicine with a more targeted get-it-right-the-first-time approach."

PMC continues to be recognized as an authority on matters relating to personalized medicine. To view PMC-related articles, including *RPM Report's* "Getting Personal: FDA's Plan to Save the Drug Industry," *The Chicago Tribune's* "Gene drugs languish in waiting room," *The Wall Street Journal's* "New Tests May Help Treat Lung Cancer," and *Proto Magazine's* "Medicine Gets Personal," visit the Communications section of our website at:

<http://www.personalizedmedicinecoalition.org/communications/overview.php> ■

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African-Americans from the Jackson, Mississippi metropolitan area. The study is investigating the causes of CVD in African-Americans to learn how to best prevent this group of diseases in the future.

In accepting the award, Dr. Nabel said that she sees a paradigm shift for the future of healthcare, in which medicine becomes “predictive, preemptive, personalized, and participatory.” To effect that change, she emphasized the importance of educating both healthcare providers and the public generally about the promise of personalized medicine to improve healthcare in the 21st century, and noted that she looked forward to working with the PMC to begin that effort. She added that legislation to protect the privacy of genetic information, particularly regarding employment and insurability, will also be critical to advance personalized medicine.

Distinguished Service Award

At the HPCGG conference, PMC also presented its first Distinguished Service Award to Marcia Kean, Chief Executive Officer of Feinstein Kean Healthcare (FKH), which has served as strategic communications counsel to the PMC since the organization's inception. The award, given in grateful recognition to Ms. Kean and her staff in helping to fulfill the mission and goals of the PMC, was presented by Mara Aspinall, President of Genzyme Genetics and PMC Board Member. Ms. Aspinall noted in her presentation that communications plays a pivotal role in advancing the adoption of personalized medicine across all constituencies.

Ms. Kean, in accepting the award, expressed the firm's dedication to the field of personalized medicine, and its commitment to advancing the growth of the PMC. At FKH, she has built the nation's first Molecular Medicine communications practice, solely focused on assisting organizations with the myriad issues and opportunities inherent in this field. ■



Wayne A. Rosenkrans, Jr. (left), presents Dr. Elizabeth G. Nabel (right) with the PMC Leadership in Personalized Medicine Award.



Marcia Kean (center) receives PMC Distinguished Service Award from Edward Abrahams (left) and Mara Aspinall (right).

Major Biomarker Research Partnership Launched

In a major boost to targeted therapy research, the Foundation for the National Institutes of Health (FNIH), in partnership with the National Institutes of Health (NIH), the Food and Drug Administration (FDA), and the Pharmaceutical Research and Manufacturers of America (PhRMA), announced on October 5th the launch of The Biomarkers Consortium, a major public-private biomedical research partnership aiming to discover, develop, and qualify new biological markers to support new drug development, preventive medicine, and medical diagnostics. Results from consortium projects will be broadly available to researchers worldwide.

According to U.S. Health and Human Services (HHS) Secretary Mike Leavitt, the announcement is an “important landmark” that “represents a new step in sharing both the burdens and the fruits of fundamental scientific work and can help identify areas of opportunity, clarify responsibilities, and make important new findings openly available.”

Adding its support to the initiative, PMC was asked to participate. “The search for new biomarkers points in the direction of a more promising medical future based on targeted therapies,” said Edward Abrahams, Executive Director of the PMC. “The Personalized Medicine Coalition applauds this new public-private initiative that joins together government, academia, and industry efforts to unlock the potential of personalized medicine by concentrating attention at a key inflection point in the drug discovery and development process.”

The consortium's first project will be to qualify fluorodeoxyglucose positron emission tomography (FDG-PET), which measures glucose uptake by tumors, as a biomarker for gauging a cancer patient's response to treatment. Initially, the consortium will focus its FDG-PET efforts on non-Hodgkin's lymphoma and lung cancer.

For more information on the consortium, visit <http://www.fnih.org/home.shtml>. To view a video of the press conference announcing the launch of the consortium, visit http://www.innovation.org/index.cfm/NewsCenter/Briefings/The_Biomarkers_Consortium ■

PMC Hosts Seminar at MIT on the Changing Landscape of Mental and Neurological Illness

With a generous grant from AstraZeneca Pharmaceuticals, in-kind planning assistance from The Brain Resource Company, and the cooperation of the MIT Center for Biomedical Innovation, the Personalized Medicine Coalition hosted a seminar on August 17th entitled, *Personalized Medicine & CNS Disorders: The Changing Landscape of Mental and Neurological Illness* as part of the Biomedical Innovation Forum at MIT in Cambridge, MA. Gualberto Ruaño, M.D., Ph.D., President of Genomas and PMC Board Member, served as moderator for the panel discussion following the presentations.

Participants in this session discussed the effects of targeted therapies on Central Nervous System (CNS) disorders, including the challenges facing the application of personalized medicine to CNS disorders. The experts discussed two fundamental questions:

- Are we ready to do personalized CNS medicine?
- What are the priorities for making personalized CNS medicine a reality?

The experts also discussed a set of priority areas that must be addressed in order to make CNS personalized medicine a reality, including:

- **A need for standardization**, brought on by an increase in the amount of data openly available about new, post-market drugs among doctors and researchers, which would build a wider consensus about how to administer drugs and allow researchers to find meaningful trends among many studies.
- **More creative analyses** that combine or reinvent established research methods, in an effort to overcome the unique constraints imposed on the study of CNS disorders.
- **Better use of information technology tools**, which would allow for the accumulation, dissemination, and comparison of large bodies of data necessary to make informed decisions about treatment on the level of condition, population, individual, and gene.
- **Moving away from the "one-size-fits-all" drug development approach** in an effort to better understand drug effects on specific individuals.
- **A need for a better understanding of complex CNS disorders.**
- **A need for the development of widely accepted predictive animal models** for psychiatric and neurological disorders.

For more information about the event and to read the session summary, visit <http://web.mit.edu/cbi/news/archives/forum06/index.html> ■



Personalized Medicine & CNS Disorders panel participants (from left to right): Evian Gordon, The Brain Resource Company; David Whitehouse, United Behavioral Health; Gualberto Ruaño, Genomas and PMC Board Member; Scott Rauch, Massachusetts General Hospital

PMC and Innovation.org Launch The Age of Personalized Medicine

The Personalized Medicine Coalition, in conjunction with Innovation.org, announced on August 17th that a new website dedicated to highlighting advances in the field of personalized medicine, individuals working to enable those advances, and the implications for health and healthcare policy had been launched. The new website, [AgeOfPersonalizedMedicine.org](http://www.AgeOfPersonalizedMedicine.org), was unveiled at the Biomedical Innovation Forum at MIT. The website is expected to serve as a resource to those interested in learning about the potential for the field of personalized medicine.

At the site, a case study in personalized medicine was recently launched, featuring the work of Christine Seidman, M.D., and Jon Seidman, Ph.D., at HPCGG and Harvard Medical School. The husband and wife team is working to identify the genetic "errors" that lead to the clinical condition cardiomyopathy. View the photo essay of this bench to bedside operation at http://www.ageofpersonalizedmedicine.org/personalized_medicine/today_case_hpcgg_0.asp

To view the website, visit www.AgeOfPersonalizedMedicine.org ■

Sign up

To receive the PMC Newsletter and other announcements from PMC, sign up at our website: www.PersonalizedMedicineCoalition.org

I PMC Hosts Seminar on Business Models for Personalized Medicine

Moderated by Michael Goldberg, General Partner, Mohr Davidow Ventures, and with key figures from all spectrums of the field of personalized medicine in attendance, the PMC held a seminar in San Francisco on October 19th that focused on the business models that connect molecular diagnostics and therapeutics. Representatives from large pharmaceutical companies, specialty pharma, research institutions, academia, and major investment firms united to identify serious issues that have and will continue to affect the development and adoption of personalized medicine. Topics included partnerships and alliances, the policy issues of reimbursement and regulation, and tension between regulation and innovation.

Kathryn Phillips, Professor of Health Services Research and Health Economics, University of California, San Francisco, opened the discussion with thoughts on what must occur for personalized medicine to improve patient outcomes. "Incentives must be aligned," she said, "within pharmaceutical companies, between pharmaceutical companies and diagnostic companies, and among industry, payers, and the government." She noted that value must be demonstrated, systematic and analytical tools must be used, and attention cannot be narrowly focused on the basic science alone – policy issues, regulation, reimbursement, political issues, contextual issues, and public perception will all play a critical role.

Partnerships and Alliances

Diagnostics and co-developed diagnostics/drugs are playing an increasingly important role in healthcare, but these industries have historically been divided and are regulated quite differently. In order for these partnerships to succeed and be mutually beneficial, both sides must be adaptive and flexible.

The panel offered case studies on partnership experiences, including: Genentech's work with Dako to develop the diagnostic test HercepTest™ for Herceptin®; Chiron's collaboration with Merck's sales force on its viral load assay; and Perlegen's partnership with Eli Lilly to find the marker that would predict weight gain response, affecting about 20 percent of patients taking Eli Lilly's anti-psychotic drug Cepraxa®.

From the pharmaceutical perspective, Ilya Oshman, VP & General Manager, Strategic Investments Group, Pfizer, stated the importance of collaborating for a common purpose – contributing to better health and more predictable medicine – in order to find common ground between drug and diagnostic companies.

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I PMC Establishes Payer Principles

In recognition of the potential impact that personalized medicine will have in healthcare, including improving health outcomes and healthcare delivery efficiency, and in recognition of the fact that it is frequently in the patient's best interest for payers to have a long-term, system-wide view when making coverage and reimbursement decisions, the Personalized Medicine Coalition (PMC) has established a set of principles to govern reimbursement decisions.

In developing these principles, PMC understands its shared interest with payers in improving the health of all beneficiaries by ensuring access to new personalized technologies, while still encouraging continued medical process. PMC is also convinced that the pathway to resolution of reimbursement issues is through multidisciplinary dialogue conducted in a transparent and deliberative fashion.

PMC affirms the following principles governing reimbursement decisions:

1. Reimbursement decisions covering new personalized medicine products and services should be evidence-based;
2. Third party coverage and reimbursement are essential to ensure appropriate access to personalized medicine products and services;
3. PMC encourages novel approaches by federal agencies to both promote research efforts for personalized medicine as well as the use of personalized medicine products and services to improve the quality and value of care. PMC notes that a number of federal agencies have recognized the potential benefits of PM and are currently exploring new roles for personalized medicine in their regulatory and research activities. PMC supports these activities;
4. Support the development of new policies and legislation to expand payer coverage and reimbursement of personalized medicine products and services focused on disease prevention;
5. Pursue great transparency and predictability of payment policy decisions by using a range of established evaluation methods;
6. Pursue changes in *in vitro* diagnostic coding and payment systems to remove reimbursement as a barrier to innovation; and
7. Work to ensure that no individual or group is discriminated against or stigmatized by payers on the grounds of personalized medicine assessment.

The full set of payer principles to govern reimbursement decisions is available in the Science & Public Policy section of the PMC website. To read a more detailed description of each principle, visit http://www.personalizedmedicinecoalition.org/sciencepolicy/payer_principles ■

PMC Hosts Seminar on Business Models for Personalized Medicine

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Reimbursement

Diagnostics face a complex reimbursement system. The panelists discussed the fact that it is often hard to measure the value of personalized medicine. According to Kathryn Phillips, "We haven't been good at putting value on prevention and on the diagnostics that are associated with prevention. And if it's hard to measure the value, it is harder to get reimbursement." Mickey Urdea, CEO, Tethys Bioscience, added: "Payers want to see clinical evidence and clinical utility, and healthcare cost implications are equally important."

Randy Scott, CEO, Genomic Health, Inc., provided an example of the economic issues around its diagnostic test, Oncotype DX™: "The test," he said, "which costs \$3,000, may seem expensive until one considers the fact that it will inform a decision regarding prescribing \$15,000 in chemotherapy to a patient, when only 4 out of 100 women will benefit from the treatment."

Regulation and Innovation

The panel agreed that FDA action in the area of pharmacogenomics has been proactive and is evolving. "The FDA's challenge is to balance competing concerns about innovation and safety," said Kathryn Phillips. Regarding increased regulation from the FDA, for example, applying medical device regulations to clinical laboratories, some panelists feared that potential bottlenecks in the system could slow progress in the field significantly. Other panelists felt that regulation is necessary, as long as it does not stifle innovation. Mikey Urdea noted potential unintended consequences that could result from the increased regulation, including the reduction of capital formation as well as driving research overseas.

Education

The importance of educating healthcare providers and patients came up throughout the day's discussions. Some panelists believe that if these two groups were better-informed, then the demand for personalized medicine diagnostics and therapeutics would increase.

While all of the challenges facing personalized medicine cannot be resolved within an afternoon, nor were they expected to be, Brook Byers, Kleiner, Perkins, Caufield & Byers, reminded participants that it was incumbent on all of us to be "rigorous" in setting standards for excellence in developing technologies and products that will define the new paradigm, and that as individuals as well as organizations, we must engage the political process, especially regarding its current efforts to regulate a changing field. He noted that at the end of the day, the most important thing one can do is to be active and engaged. The future of personalized medicine lies with the policy and decision makers, and it is incumbent upon us to seek to influence their decisions and make a difference, especially for the benefit of patients. ■

PMC Welcomes the Following New Members Since May 2006:

American Association for
Clinical Chemistry (AACC)

American Society of Human Genetics (ASHG)

Aviir

Bio Research Support, Inc.

Boston Healthcare Associates, Inc.

Boston Millennia Partners

Cincinnati Children's Hospital Medical Center

Clear Point Health

Defined Health

Diaceutics

DNA Direct, Inc.

Eli Lilly and Company

FasterCures

Luminex Corporation

Mayo Clinic

Nanosphere, Inc.

PGx Health (A Division of Clinical Data, Inc.)

Saffron Technology, Inc.

Science Futures, LLC

The Brain Institute at the University of Utah

The Ohio State University Medical Center

Vanderbilt University

Wilson Sonsini Goodrich & Rosati

To view the full PMC Member List, visit www.PersonalizedMedicineCoalition.org/about/pmc_members.php