New Biomonitoring Technologies Available by 2016 May be One Way to Reduce Health Disparities Related to Cancer and Diabetes

Forecasting the trajectory of biomonitoring technologies and targeting their impact to reduce health care disparities

SUMMARY

A research team at the Institute for Alternative Futures analyzed applications of electronic biomonitoring technology, which can be used by patients and their physicians to measure and track indicators of health and disease.

The goals of the project were to:

- Predict those biomonitoring technologies likely to be available in 2016.
- Identify those technologies with the greatest potential to reduce disparities in health care, particularly in cancer and diabetes.

The researchers completed a final project report summarizing their findings (available online).

Key Findings

- The research team identified a number of emerging biomonitoring technologies that it predicts will be widely available by 2016 and that show the greatest potential to reduce disparities in health care. These technologies include:
  - Electronic body monitors, such as wristbands, to help patients keep tabs on their weight, stress or glucose levels.
  - Blood tests to detect early signs of cancer, particularly colon, breast and lung cancers.
  - Software applications to allow cell phones to both collect and transmit physiological data, such as caloric expenditure, to computers of patients and their doctors.
Funding

The Robert Wood Johnson Foundation (RWJF) supported the project with a grant of $101,543 from June 2005 to October 2006.

THE PROBLEM

More than three times as many people living below the poverty level described their health status as fair or poor compared with people whose family income was more than two times the poverty level, according to a report by the U.S. Department of Health and Human Services (HHS), *Health, United States, 2004*.

The HHS data also revealed disparities based on race. The mortality rate in 2002 was 31 percent higher for African Americans than for whites. The death rates for some diseases in 2002 were higher for African Americans than for whites: they were 41 percent higher for stroke, 30 percent higher for heart disease and 25 percent higher for cancer.

There are many causes of disparities in health care, but a significant issue is the difference in the quality of medical care patients receive based on their ability to pay. Affluent Americans often have access to new medical technologies and treatments much sooner than do their low-income peers.

The Institute for Alternative Futures, through its Disparity Reducing Advances Project, is working to identify those breakthroughs in the prevention and treatment of disease that could be targeted at underserved patients to reduce disparities in health care. The project includes a network of organizations involved in health care policy, delivery and technology.

The institute is a nonprofit research and educational organization that specializes in predicting upcoming trends and in helping organizations shape their future.

CONTEXT

At the time the grant was made, RWJF's Pioneer Portfolio was supporting "Projects that can lead to fundamental breakthroughs in the health and health care of Americans. … [W]e are establishing mechanisms for systematically understanding future trends and forecasting their effects. … In 2005, the Pioneer Portfolio pursued this objective through a mix of projects aimed at helping us think more precisely about the trends and strategies that may define the future of health and health care." (RWJF 2005 Annual Report)

The purpose of the project described in this report was to help understand the likely trajectory of biomonitoring technologies, along with advances in disease prevention and treatment, and then specifically to target opportunities to take advantage of these
developments to reduce disparities in health. The project was valuable to the Foundation's programming because it was expected to:

- Inform the staff's strategy around health information technology and how it supports individuals in managing their care.
- Provide experience with a futures methodology.
- Catalyze development of biomonitoring technologies and their adoption in the service of reducing health disparities.

THE PROJECT

A research team at the Institute for Alternative Futures analyzed existing applications of biomonitoring in cancer and diabetes as well as the technologies likely to be available in 2016. The project was part of the institute's larger Disparity Reducing Advances Project.

The research team focused on breast, colon and lung cancers as well as diabetes because of the deadly impact of these diseases on underserved patients.

The institute's researchers focused on biomonitoring because it is an area in which they believe myriad breakthroughs are imminent both in the early identification of deadly diseases and in the provision of continuous physiological data to encourage healthy lifestyles.

Activities

During the project, the research team:

- Researched and wrote a series of background reports:
  - Current Best Biomonitoring Practices
  - Health Information Systems (available online)
  - Biomonitoring Platform Assessment (available online)
  - Cancer 2015 (available online)
  - Diabetes 2015 (available online)

- Presented a draft of its final report to an advisory committee in Alexandria, Va., on April 5, 2006.
  - Based on the data and forecast information presented by the research team, the advisory committee members identified key technologies for reducing disparities in health care and made recommendations to help bring those technologies to underserved patients. (See final report, available online.)
Hosted four focus groups for low-income patients and the providers who serve them to garner reactions to the biomonitoring technologies that researchers predict will be widely available by 2016. The focus groups discussed:

- Computer tracking and guidance software located in cell phones or computers to help patients identify when their blood sugar is too high.
- Blood tests to identify early signs of breast, colon and lung cancers.
- Electronic body monitors to track stress, caloric expenditure and glucose level.

Shared its work with 500 representatives of organizations interested in reducing health disparities to solicit their feedback and support. Organizations included:

- American College of Nurse Practitioners
- Center for Information Therapy
- World Future Society
- International Union Against Cancer
- University of Texas, MD Anderson Cancer Center

Created a Web page (no longer available) about the biomonitoring project with background information and online copies of the reports.

Findings

The research team reported the following findings in *The Biomonitoring Futures Project: Final Report and Recommendations* (available online).

- The research team identified a number of emerging biomonitoring technologies that it predicts will be widely available by 2016 and that show the greatest potential to reduce disparities in health care. These technologies include:

  - Electronic body monitors, such as wristbands, to help patients keep tabs on their weight, stress or glucose level. When combined with coaching from a health care provider or interactive computer software, the monitors can help patients manage chronic health conditions, such as diabetes.
  
  - Blood tests to detect early signs of cancer, particularly colon, breast and lung cancers. Although the project team analyzed emerging tests involving saliva and breath, it concluded that blood tests would be easier to implement because health care providers are already comfortable with the process of drawing blood and analyzing it.
  
  - Software applications to allow cell phones to both collect and transmit physiological data, such as caloric expenditure, to computers of patients and their doctors. Since people across numerous income levels have already embraced cell
phones, the devices could be cost-effective platforms for the collection and transmission of physiological data.

- **Patients who participated in the focus group discussions were generally enthusiastic about the biomonitoring devices discussed:**
  
  — Patients said they would prefer wristbands and other monitoring devices that look fashionable rather than clunky. They also said they would be tempted to unplug a monitor before doing something they are not supposed to do, such as eating sweets.

  — Patients liked the idea of low-cost and convenient cancer-screening tests, but they worried whether people who test positive would face discrimination.

  — Patients also worried about protecting the privacy of personal data transmitted wirelessly.

- **Health care providers who participated in the focus group discussions also were enthusiastic about the biomonitoring devices discussed:**

  — Providers liked the idea of using cell phones to provide tracking and transmission of patient data to monitor chronic diseases, such as diabetes. They warned that such devices would need to be easy to use and available in multiple languages. They also worried about whether patients would stop coming to their doctor's appointments.

  — Providers said they liked the idea of low-cost cancer screening but noted that the machines would have to be durable, easy to use and easy to transport.

**Recommendations**

In their final report, the researchers offered the following recommendations:

- **The Food and Drug Administration should encourage testing and evaluation of biomonitoring devices among underserved patients.**

- **Federal agencies that fund research—including the Department of Defense, the National Institutes of Health and the Department of Veterans Affairs—should adopt a coherent strategy to support adoption of biomonitoring devices at health clinics that serve low-income patients.**

- **The Health Resources and Services Administration and the Centers for Medicare & Medicaid Services should develop controlled studies to evaluate the effectiveness of biomonitoring systems at community health centers, which are federally funded clinics serving low-income patients.**
LESSONS LEARNED

1. **It is important to consider the cost of a given medical technology when assessing its viability for use in clinics that serve underserved patients.** Cell phones, which people across many income groups already use daily, may have more potential as a device to monitor routine indicators of individual health, such as weight or caloric expenditures, than new technologies developed specifically to fulfill that function. With new technology, there is usually a time lag between when a product is first introduced in the marketplace and when it evolves into a mass-market item affordable to people across numerous income groups. (Project Director)

2. **Share information about your project as early as possible with those outsiders who are likely to be supportive of your endeavors.** Their insight and expertise may help improve your final product. (Project Director)

AFTERWARD

As part of its larger Disparity Reducing Advances Project, the research team completed a series of additional reports addressing a number of issues concerning biomonitoring in greater detail. These reports are:

- **Cell Phones and Reducing Health Disparities** (available online)
- **Report of the Community and National Biomonitoring to Support Upstream Change Committee** (available online)
- Report of the Continuous, Passive Biomonitoring for Health and Prevention Committee (available online)
- **Report of the Early Detection of Cancer Using Blood Testing Committee** (available online)

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BIBLIOGRAPHY

(Current as of date of the report; as provided by the grantee organization; not verified by RWJF; items not available from RWJF.)

Reports


Grantee Websites

www.altfutures.com/BFP (no longer available). This Web page was created as a place to publish research from the Biomonitoring Futures Project.