IMPROVING THE HUMAN CONDITION

RTI INTERNATIONAL

ANNUAL
REPORT
2005

IMPROVING THE HUMAN CONDITION • IMPROVING THE HUMAN CONDITION •

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RTI International, the nation's second largest independent nonprofit research organization, is dedicated to conducting research and development that improves the human condition by turning knowledge into practice. With a staff of more than 2,500 people, RTI offers innovative research and technical solutions to governments and businesses worldwide in the areas of health and pharmaceuticals, advanced technology, democratic governance, surveys and statistics, education and training, economic and social development, energy, and the environment.

RTI maintains nine offices in the United States, five international offices, and one international subsidiary, as well as project offices around the world. For more information, visit www.rti.org.

RTI International is a trade name of Research Triangle Institute.

The impact of RTI International's research—from our efforts to discover new medicines and develop new energy sources to our assistance in promoting democratic governance—is felt around the globe. Our Annual Report highlights some of our most significant achievements during 2005, describing how we are improving the human condition by turning knowledge into practice.

Victoria Franchetti Haynes, Ph.D.,
President and CEO, RTI International

2005

For nearly 48 years, researchers at RTI International have worked to improve the human condition by turning knowledge into practice. In 2005 we continued that tradition as our researchers celebrated significant scientific achievements and as we further invested in programs and facilities that will help us better serve clients and that will enhance our position among the world's leading independent nonprofit research organizations.

This year, RTI scientists continued their research to develop clean coal and other energy technologies as part of a national effort to move toward a hydrogen-based economy and reduce our dependence on imported petroleum. Working with industry and the U.S Department of Energy, we are demonstrating new technologies that effectively remove pollutants from coal syngas at costs below those of current technologies.

Our support of the Global TB Alliance helped bring the first anti-tuberculosis drug ever developed by a nonprofit to clinical trials—an important step in providing affordable medicines to people in the developing world. Our scientists also published findings on pressing topics ranging from women's and children's health and educational assessments to measuring the costs of obesity and the effectiveness of anti-smoking efforts. In some cases our health research led to improvements in clinical practices; in others it helped inform U.S. health care policy regarding services provided to American citizens by the Centers for Medicare and Medicaid Services, the Substance Abuse and Mental Health Services Administration, and other federal agencies.

Our survey research division continued to grow; these researchers provided valuable information to help policy makers understand educational disparities

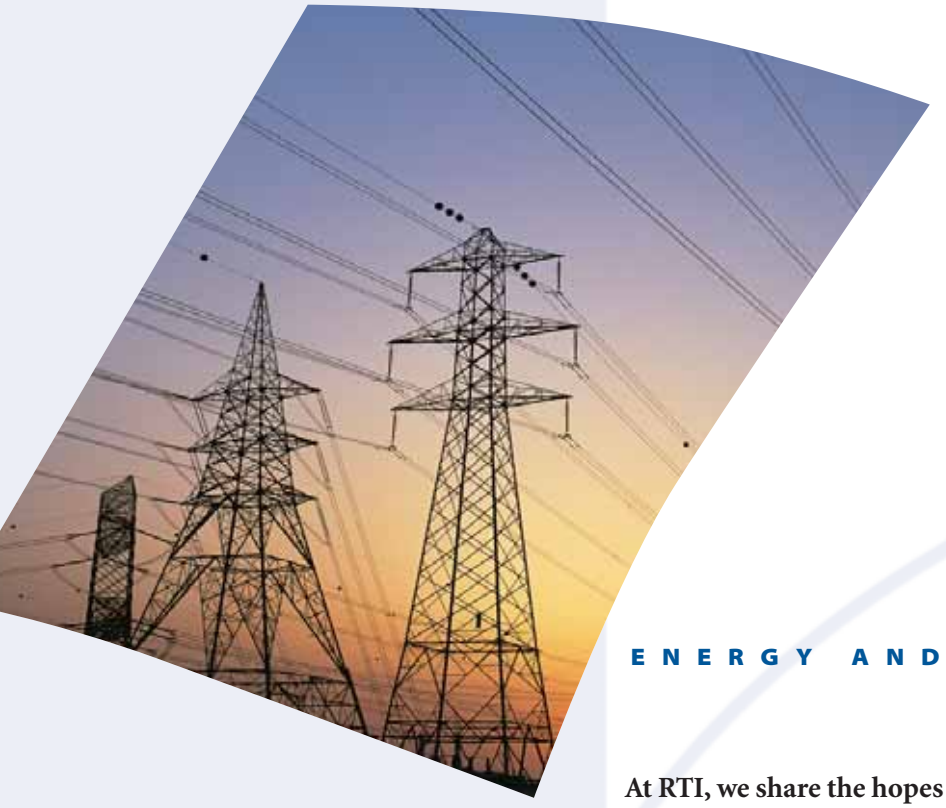
and better allocate scarce public health or educational resources. We are also conducting research to better understand and reduce violence in schools.

In 2005, we continued our support of efforts to establish democratic local governance throughout Iraq while also beginning a collaborative effort to design and implement a training and management program for 150 model primary health care centers throughout the country. In total, our researchers in the fields of health, education, and governance supported projects in more than 40 countries this year.

RTI enjoyed another successful business year, with annual revenue of $467 million. Although total revenue was slightly lower than in 2004, that decrease was anticipated, and we remain on track for growth and financial strength in all research areas in the coming year. As part of our strategy to commercialize technologies developed in our laboratories, Nextreme Thermal Solutions was spun off to carry our breakthrough thermoelectric technology to the marketplace. We also broke ground on a $20 million laboratory on our main campus. This facility, which represents a major investment in our future, is scheduled for completion in late summer 2006.

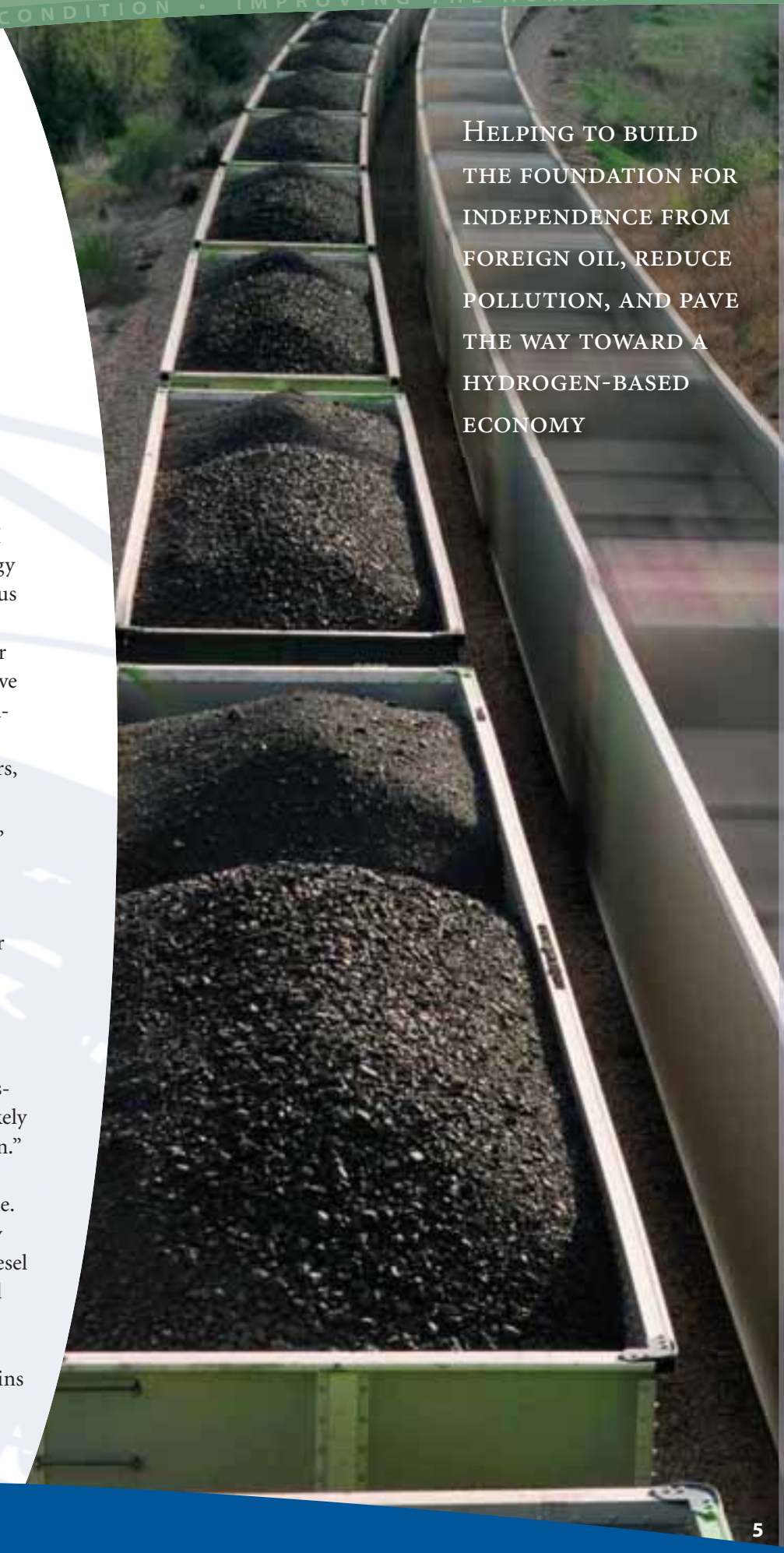
Though 2005 has been a good year for us in many respects, we are mindful that it has been a year of challenge and hardship for people in many parts of the world and in our nearby communities. I am proud to say that we did our part as an organization and as individuals to assist many in need. With contributions to hurricane relief efforts and the United Way, along with many individual volunteer efforts around the globe, RTI staff members have helped both professionally and personally to make the world a better place in 2005.

Victoria Franchetti Haynes



ENERGY AND THE ENVIRONMENT

At RTI, we share the hopes of people everywhere for healthier air to breathe and for energy sources that do not harm the environment. Advances in these areas have tremendous potential for improving the human condition. We have worked for years to develop clean energy technology and to reduce air, water, and soil pollution in countries around the world. In 2005, our efforts brought us closer to our vision of a cleaner environment and to our nation's goal of energy independence.



Helping to build the foundation for independence from foreign oil, reduce pollution, and pave the way toward a hydrogen-based economy

Engineering Clean Coal

In recent years researchers at RTI have sharpened their focus on energy technology because of its tremendous potential for improving quality of life for people around the world. For nearly 20 years, we have had an active R&D program in clean coal technology with the U.S. Department of Energy (DOE) and industry partners, led today by Raghubir Gupta, Ph.D. Through advancements in this area, RTI is not only helping to build the foundation for independence from foreign oil but also setting the stage for the global use of cleaner, greener energy.

"I look at energy as the currency of the world," said Dr. Gupta. "The growth of developing countries is straining the energy supply and raising prices worldwide, and it is unlikely that this problem is going away soon."

Not only is coal plentiful within the U.S., it is also incredibly versatile. It can be used to generate electricity and can be converted into liquid diesel fuel, hydrogen, value-added chemical products, and even a synthetic gas that can be used in place of natural gas. Each of these end products begins with the process of coal gasification, which converts coal into what is >

known as syngas. RTI is developing novel materials and processes to make coal gasification cleaner, safer, more reliable, and more cost-effective. Our work touches on nearly every step in the process of converting coal into syngas and using it to generate power, fuels, or chemicals: gasification itself, clean-up of the syngas, hydrogen separation and storage, sequestration of carbon dioxide, and refining of syngas into fuels and chemicals.

In 2005, RTI's work with DOE and industry in the area of syngas clean-up resulted in one of our greatest scientific achievements of the year. This fall in Tennessee, RTI and Eastman Chemical Company—the nation's largest user of coal for manufacturing chemical and plastic products—installed a pilot-scale industrial demonstration system that uses RTI's T-2749 technology for removing sulfur from coal syngas.

Recognized by *R&D Magazine* with the prestigious R&D 100 Award, T-2749 is a material that removes sulfur from syngas more efficiently and at a lower installation cost than existing technologies. Because it cleans the syngas before it enters into the industrial process stream, T-2749 also protects expensive downstream equipment from corrosion.

"If we can make coal a cleaner and more efficient resource," said Dr. Gupta, "we can reduce pollution, create jobs, and improve national security."

Several other projects under way at RTI also serve these goals, including development of a technology for storing hydrogen fuel and improvement of our hydrogen separation membrane. Both of these technologies could help make it technically and economically feasible to replace conventional gasoline-powered automobiles with nonpolluting alternatives that run on hydrogen fuel cells. RTI is also developing co-production of electricity and hydrogen from coal syngas and continuing work to produce useful syngas from biomass sources, potentially putting biomass on an equal footing with coal as an alternative to petroleum.

As with all our efforts, the driving force behind RTI's energy research remains our mission. By enabling the clean, economical use of coal and furthering hydrogen and biomass technologies, RTI is bringing us closer to national goals for energy independence and a cleaner environment and paving the way for a hydrogen-based economy.

"If we can make coal a cleaner and more efficient resource, we can reduce pollution, create jobs, and improve national security."

— Raghubir Gupta, Ph.D.

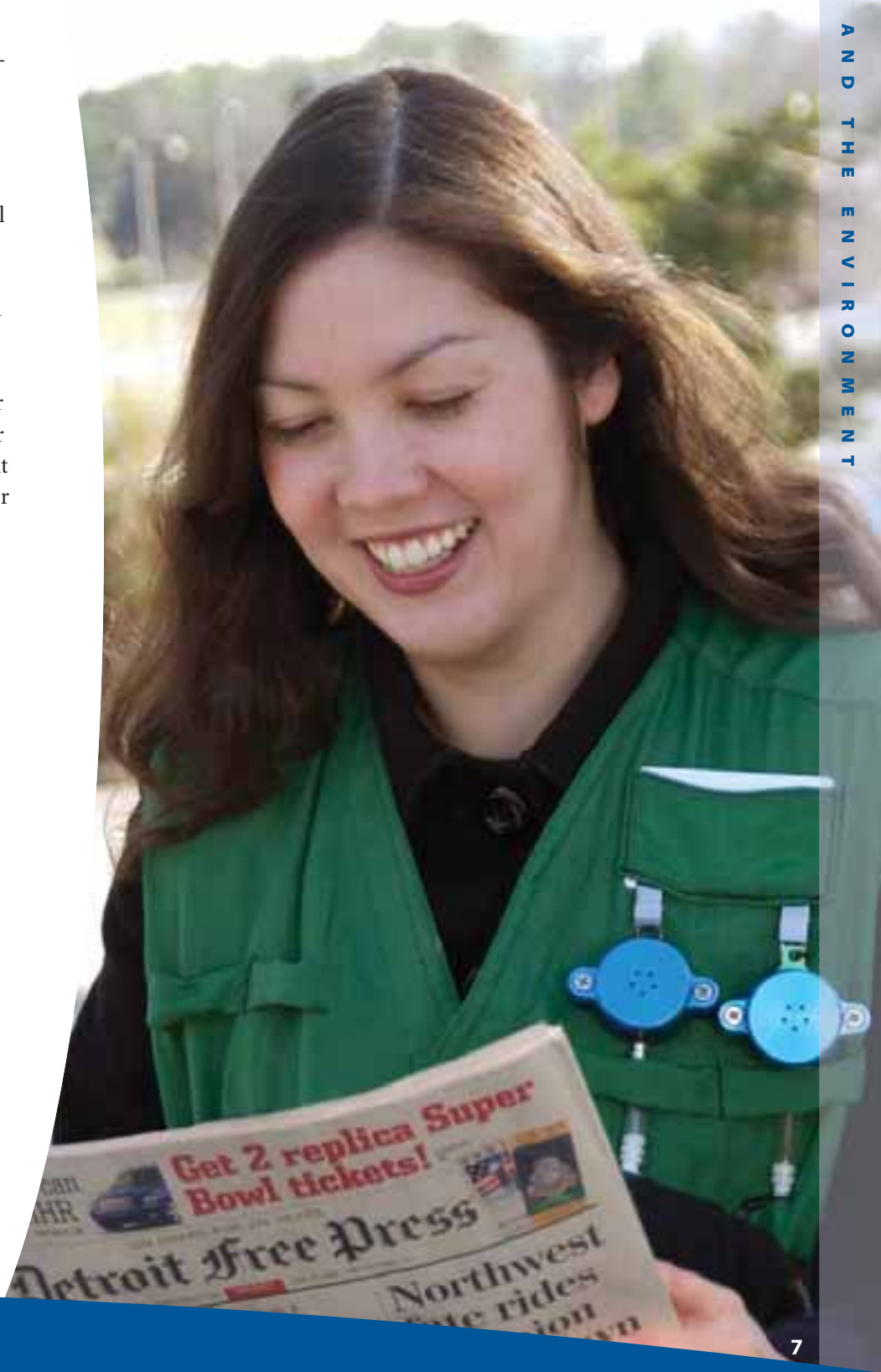
^ Above. Researchers at RTI are working on several promising energy technologies. Paige Jur (L) evaluates a sorbent designed to remove carbon dioxide produced when coal or natural gas is used to generate electrical power. Paul Box (R) tests a catalyst for the production of a premium diesel product. Rick Watson (center) works to develop a sorbent material that will remove sulfur from hydrotreated diesel.

Working to understand human exposure to air pollutants both inside and outside the home

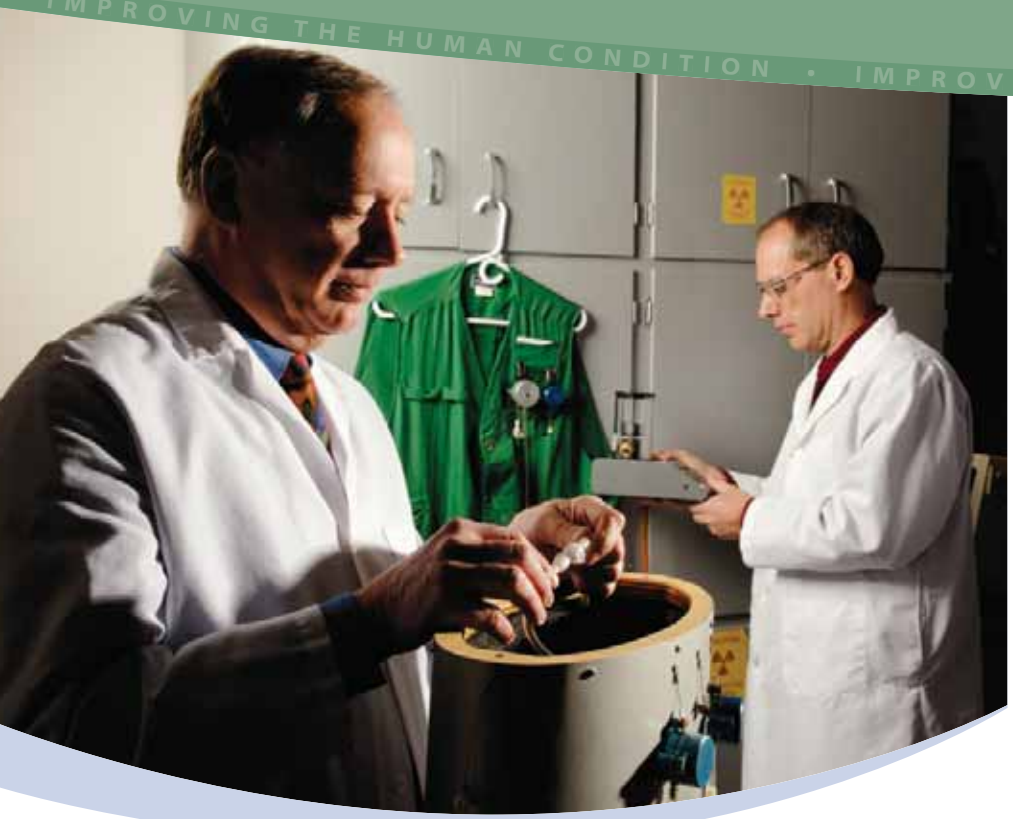
Monitoring Air Toxics

Looking beyond energy research, other RTI efforts to improve our environment include air pollution studies and research on new methodologies in measurement and monitoring. An exemplary project in this area is the RTI-led Detroit Exposure and Aerosol Research Study, or DEARS. Funded by the National Exposure Research Laboratory at the U.S. Environmental Protection Agency (EPA), DEARS seeks to improve our understanding of human exposure to air toxics. Over the course of three years, RTI's Center for Aerosol Technology will document the exposure of Detroit residents to air pollutants and take air samples inside and outside their homes.

For five days in the summer and five days in the winter, a total of 120 Detroit residents will wear miniature personal sampling systems developed by RTI. RTI staff will work with EPA to analyze the collected samples and data from these devices to determine the types and amount of pollutants the volunteers have been exposed to. Participants will also log their activities, giving researchers important clues about how a person's activity patterns can influence exposure to pollution and leading to steps to minimize exposure.



> Detroit residents who are part of the DEARS program wear RTI-developed sampling vests during normal activities for up to a week. The vests gather data about their exposure to air toxics; these data are then compared with data from stationary monitors.



< Charles Rodes, Ph.D. (L) prepares a monitor for outdoor operation while Randy Newsome prepares a personal exposure vest. RTI currently holds two patents in the low-burden technologies used in the vest samplers, with others pending. We are also developing a new mini-sampler that will replace much of the vest hardware in future studies.

DEARS is collecting data on particulate matter (such as soot, dust, salts, and metals), volatile organic compounds such as methane and benzene, carbonyls such as formaldehyde, and criteria pollutant gasses such as carbon monoxide and nitrogen dioxide.

"These pollutants may be playing a significant role in the respiratory health of those living in Detroit," said Charles Rodes, Ph.D., director of RTI's Aerosol Technology and Environmental Exposure Program and DEARS principal investigator. Indeed, toxic air pollutants have been linked to an alarming list of illnesses, including respiratory disease, cancer, infertility, and suppression of the immune system.

RTI is also working with EPA to identify the key sources of air toxics in the Detroit area—mobile sources such as cars and airplanes, stationary industrial sources, and natural sources—and operating a central monitoring station to provide comparison measurements. These comparison measurements serve the primary objective of DEARS: to determine if measurements of air pollution at central sites can be used to predict the exposure of people in the surrounding areas. If so, these central measurements could be used as "exposure surrogates" in community-based epidemiological studies.

RTI began work on DEARS in 2004, applying our expertise in survey research to help recruit participants. The study includes people living in the city center as well as those in outlying communities such as Dearborn. DEARS results will therefore represent the exposures of people who live in neighborhoods near various types of pollutant sources.

Since 2004, RTI has completed three rounds of monitoring and data collection, one in the winter and two in the summer. When DEARS concludes in 2007, its results will shed new light on earlier EPA findings that pollutant exposure may vary greatly among individuals living in the same area. The study will contribute to our understanding of how accurately air quality information collected at community monitors reflects what pollutants neighborhoods and the individuals living in these neighborhoods are exposed to every day. Likewise, it will substantially refine our understanding of the factors that affect an individual's exposure to toxic air pollution.

DEARS is the culmination of a series of studies of exposure to aerosol pollutants that started in earnest with the RTI-conducted National Human Exposure Assessment Study (NHEXAS) in 1996. More recently, RTI has led a series of studies of personal exposure of the elderly and children in metropolitan areas such as Baltimore, Fresno, Tampa, and North Carolina's Research Triangle area.

"EPA has consistently come back to RTI to conduct these efforts based on the breadth of our talent and capabilities in conducting multifaceted personal exposure studies," said Dr. Rodes. "It is gratifying to not only be considered leaders in a scientific discipline, but to feel that we are making such a significant contribution to an overall understanding of the factors that affect our health."

Monitoring Hurricane Katrina's Environmental Effects

Hurricane Katrina's effect on the environment, exacerbated by the subsequent arrival of Hurricane Rita, produced one of the worst environmental catastrophes in the U.S. to result from a natural disaster.

Not long after the hurricanes hit, the U.S. Environmental Protection Agency contracted with RTI on several projects to assess environmental conditions in the devastated regions. For one project, RTI environmental scientists are processing water quality data collected in the field by EPA scientists and exporting the data to STORET, EPA's STOrage and RETrival system, a database in the public domain. It provides researchers and others with access to data on environmental conditions in the areas in Louisiana, Alabama, and Mississippi that were affected by Hurricane Katrina. EPA has posted the results of analyses of this data on its website—http://www.epa.gov/katrina/index.html.

In another data collection effort for EPA, RTI researchers are monitoring airborne particulates in the three states affected by Hurricane Katrina. For more than six years, RTI has operated a national network that includes 220 $PM_{2.5}$ monitoring sites. Shortly after Hurricane Katrina, EPA officials contacted R.K.M. Jayanty, Ph.D., an RTI Senior Fellow and environmental and industrial sciences senior program director, to help develop a plan for monitoring particulate matter in the affected regions.

"We sent them filters to install at 20 different sites," he said. "State agencies received the filters, sampled continuously for 24 hours a day, and sent them to us daily for analysis. We analyzed the samples for particulate mass and for 11 toxic metals." Dr. Jayanty and his RTI colleagues reported the results of their analyses every few days and posted them in EPA's Air Quality System database—http://www.epa.gov/ttn/airs/airsaqs/index.htm—which, like STORET, is in the public domain.

RTI also is working with the National Institute of Environmental Health Sciences and Duke University on web-based mapping applications to support the collection, analysis, and dissemination of environmental and public health data. This effort will benefit NIEHS and other researchers seeking to understand the long-term public health impacts of these disasters in the Gulf region.

HEALTH AND PHARMACEUTICALS

Nowhere is RTI's goal of improving the human condition more apparent than in our health research. Our largest single field of study, health research topics at RTI range from the human genome to drug development to health education. Whether evaluating the economic benefits of new health coverage plans or looking for ways to control infectious diseases such as malaria in developing countries, RTI is working to enrich all aspects of human health.

TB Drug Development

One of our major accomplishments in 2005 resulted in the announcement in June by the Global Alliance for TB Drug Development (TB Alliance) that the lead drug in its pipeline, PA-824, had begun Phase I clinical trials. Research studies in animals indicated that this compound has the potential to shorten treatment of tuberculosis (TB) and to be effective against drug-resistant strains of TB. The announcement signaled the first time a TB drug developed by a nonprofit had begun clinical trials. It also provided evidence that a new model for developing drugs—through public-private partnerships—had the potential to bring new, affordable medicines to everyone, including those most in need.

"By working creatively with a variety of international public and private entities, we were able to move an extremely promising TB compound into human trials in near record time," explained RTI International's Doris Rouse, Ph.D., who managed the development of PA-824 for the TB Alliance under a contract with the U.S. National Institutes of Health's National Institute of Allergy and Infectious Diseases.

Developing a new affordable tuberculosis drug for the world's poorest populations

Photo: © WHO/P. Virot

"By working creatively with a variety of international public and private entities, we were able to move an extremely promising TB compound into human trials in near record time."

— Doris Rouse, Ph.D.

Since 2000, the RTI team has supported the TB Alliance's efforts to identify promising drug compounds and stimulate the involvement of pharmaceutical companies in developing new and affordable TB medicines. Rouse managed a global program for development of PA-824 that included 26 institutions in nine countries.

"Everyone recognizes the challenge of developing and providing new affordable medicines to the world's poorest populations," she said. "The drug development process used in this case may prove as significant in the long run as the drug itself. This project proves that a public-private partnership can succeed in ushering badly needed medicines through the drug development pipeline."

During 2002, the most recent data available, deaths resulting from TB in the United States increased by 5 percent; it was also the first time the number deaths from TB in the U.S. had increased since 1989. Equally alarming to U.S. and international public health officials, the disease is becoming increasingly resistant to existing drug treatments and is also a leading cause of death among people living with HIV/AIDS, whose compromised immune systems are unable to fight the disease.

For infectious, active TB, the current treatment takes six months and requires a combination of four medications as well as monitoring by medical personnel. Thus, any treatment that reduces the time required to treat TB cases could help reduce associated treatment costs and increase the number of people who complete the treatment.

"The start of Phase I clinical trials for PA-824 offers at least a bright spot on the long road to providing shorter and more effective TB treatments," Rouse said. "We at RTI are proud to have been a part of this effort."

Episiotomy Reports

The RTI International–University of North Carolina (UNC)Evidence-based Practice Center (EPC) continued in 2005 to develop rigorous evidence reports and technology assessments on a broad range of health care topics. One topic addressed this past year, which was nominated for review by the American College of Obstetricians and Gynecologists, was the use of the surgical procedure in obstetrical care known as episiotomy.

As reported in the May 4 issue of the *Journal of the American Medical Association*, RTI–UNC EPC researchers found that episiotomies, performed in up to 35 percent of U.S. vaginal births, usually provide no benefits. They also found that, in some cases, routine use of episiotomy causes more harm to mothers than avoiding its use.

"Our study concluded that any possible benefits of the procedure do not outweigh the fact that many women would have had less injury without the surgical incision," said Meera Viswanathan, Ph.D., an RTI senior health analyst. She and Katherine Hartmann, M.D., Ph.D., an assistant professor at UNC-Chapel Hill, led the team of researchers who conducted the study.

The RTI–UNC EPC is one of 13 such centers funded by the Agency for Healthcare Research and Quality. These centers develop scientific information for other agencies and organizations on which to base clinical guidelines, performance measures, and other quality-improvement tools.

Improving the health of women before, during, and after pregnancy

Pregnancy and Depression

The RTI–UNC EPC team also studied the prevalence of depression in women during and after pregnancy. They found that depression among pregnant women and new mothers is very common, and that depression is as common in women during pregnancy as it is after giving birth. This topic was requested by the Safe Motherhood Working Group, a coalition of Department of Health and Human Services (HHS) agencies that works to improve the health of women before, during, and after pregnancy by reducing illness and deaths.

According to the report, roughly 1 in 20 women who are pregnant or have given birth in the past 12 months suffers from major depression, defined as episodes lasting two weeks or longer and accompanied by impairments in a woman's ability to carry out normal daily functions. When combined with the number of women in the same population who experience episodes of minor depression, as many as 13 percent are affected.

"This report should serve as a wake-up call to health care providers, as well as to women and their family members," said AHRQ Director Carolyn M. Clancy, M.D. "The belief that depression is mostly a problem for women following childbirth is a myth stemming from the fact that postpartum depression has been studied more thoroughly. Enhanced detection of depression by primary care doctors and obstetricians-gynecologists can help improve women's quality of care."

The report is based on an evidence review conducted by Norma I. Gavin, Ph.D., an RTI senior research economist, and Bradley N. Gaynes, M.D., of UNC's School of Medicine.

Local Drug Abuse Data

Drug abuse is another topic of significant research at RTI. One of our perennial projects in this area is the National Survey on Drug Use and Health (NSDUH), which we have conducted since 1988. RTI currently is contracted to conduct NSDUH through 2009 for the Substance Abuse and Mental Health Services Administration (SAMHSA), an agency of the U.S. Public Health Service and a part of the Department of Health and Human Services.

This past year, in addition to gathering nationwide data on tobacco, alcohol, and illicit drug use and on the nonmedical use of prescription drugs, RTI researchers helped SAMHSA develop a new series of reports.

These reports combine three years of NSDUH data (1999–2001) to produce regional estimates of drug use within each state. They mark the first time the government has looked at drug use by sub-state region, rather than by state. Government officials hope these new analyses will help states more effectively allocate funds for treatment and prevention programs.

In conducting this drug use study for SAMHSA, RTI played a crucial role in developing research methods that have the potential to change how drug use is looked at and to eventually change the way prevention efforts are planned.

Providing employers with information to help reduce obesity and related costs among employees

Obesity and the Workplace

In 2005, RTI researchers continued to study the costs associated with obesity. In September they and researchers at the U.S. Centers for Disease Control and Prevention used econometric methods and data from two nationally representative surveys to estimate the costs of obesity among full-time employees. According to their findings, annual overweight- and obesity-attributable costs, including medical expenditures and absenteeism, ranged from $500 to nearly $2,500 per obese employee, with costs increasing as the degree of obesity increased.

The study results, which appeared in the September/October 2005 issue of the *American Journal of Health Promotion*, showed that for men employed full time in the labor market, excess body weight (relative to normal-weight men) increased annual per capita costs by $500 to $2,000. For women, excess body weight increased annual per capita costs by $1,400 to $2,500. The larger cost for obese women is driven in part by their increased frequency of absenteeism. To put the issue into perspective, the authors estimate that the cost of obesity at a firm with 1,000 employees is about $285,000 per year.

"As the prevalence and cost of obesity in the workplace continue to increase, so does the financial motivation to search for strategies to reduce these costs," said Eric Finkelstein, Ph.D., the study's principal investigator at RTI International.

"It is becoming increasingly difficult for employers to ignore these costs," he added. "The results of this study, combined with information on the effectiveness of specific interventions, will allow employers to make more informed decisions about the best strategies for reducing obesity and related costs among their employees."

"As the prevalence and cost of obesity in the workplace continue to increase, so does the financial motivation to search for strategies to reduce these costs."

— Eric Finkelstein, Ph.D.

^ RTI chemist Larry Brieaddy is shown making a sample of a kappa opioid receptor antagonist developed at RTI, JDTic, that holds promise as a potential treatment for cocaine relapse, depression, and other disorders.

CNS Drug Discovery

Much of RTI's drug design and synthesis research has focused on central nervous system (CNS) targets. Through our drug addiction research, we've gained expertise with numerous related CNS targets such as biogenic amine transporters, nicotinic receptors, cannabinoid receptors, and opioid receptors. Several years ago we modified the structure of cocaine to study its biochemical mechanism of action. One of our analogs developed in this study was RTI-55. This compound, also known as Dopascan®, is now a diagnostic agent that has been used to diagnose thousands of patients around the world who have Parkinson's disease.

Also, with funding from the National Institute on Drug Abuse, we recently developed a kappa opioid receptor antagonist (KOR), which we named JDTic. Animal studies conducted with colleagues at the University of North Carolina at Chapel Hill, Virginia Commonwealth University, and Howard Associates show that this novel compound has potential as a treatment for cocaine relapse, depression, and other CNS disorders. JDTic has a good toxicological profile and a novel mechanism of action and is orally active and more KOR-selective than previously reported KOR antagonists.

RTI holds several patents for JDTic, and we are currently exploring opportunities to work with other companies to develop it and related analogs through licensing arrangements or joint development.

Preclinical Drug Development

The demand for the development of safe and effective drugs quickly and at a low cost continues to exert pressure on the pharmaceutical and biotech industries. As a result, companies are looking to establish partnerships with organizations like RTI that can provide resources and technical expertise to expedite the drug discovery and development process in a cost-effective manner.

In 2005, RTI scientists collaborated closely with client drug discovery teams to perform toxicology, pharmacokinetic, and pharmacodynamic screening for drug candidates across therapeutic areas. These partnerships helped our clients make program-level decisions about their pipeline candidates.

Also this past year, RTI was selected by a rapidly growing small pharmaceutical company to be its drug discovery and development outsourcing partner. To support this company's Investigational New Drug (IND) applications, RTI provided preclinical research capabilities, such as chemistry synthesis services, pharmacokinetics, metabolite profiling and identification services, and toxicology services.

RTI researchers helped advance novel therapeutics through the development cycle and, ultimately, to patients through work we did for a large pharmaceutical company. We used isolated perfused tissue experiments as a substitute for clinical studies to support a New Drug Application (NDA), accelerating the advancement of a critical therapeutic into the clinic. We also worked for multiple biotechnology companies in 2005, supporting their IND submissions and NDAs through pharmacokinetic disposition and metabolism studies, metabolite identification, quantitative whole-body autoradiography, and toxicology studies.

Genetics and Immunity

In late 2004, the National Institute of Allergy and Infectious Diseases awarded RTI a five-year contract to study the extent to which genetics affects a person's immune response to cholera and typhoid vaccines.

Researchers are immunizing 2,000 residents of Kolkata (formerly Calcutta), India, and their family members against cholera or typhoid. Then they will attempt to correlate the relationships between the subjects' genetic makeup and expression of those genes with the person's response to the vaccines.

"Each genotype is different, and the RTI team will look at how the type of gene relates to the body's response to the vaccines and how proteins are expressed in the body following vaccination," said Diane Wagener, Ph.D., research project director. By the end of the study, RTI will have obtained data on 300 to 400 proteins and protein forms, adding to its growing genomics database.

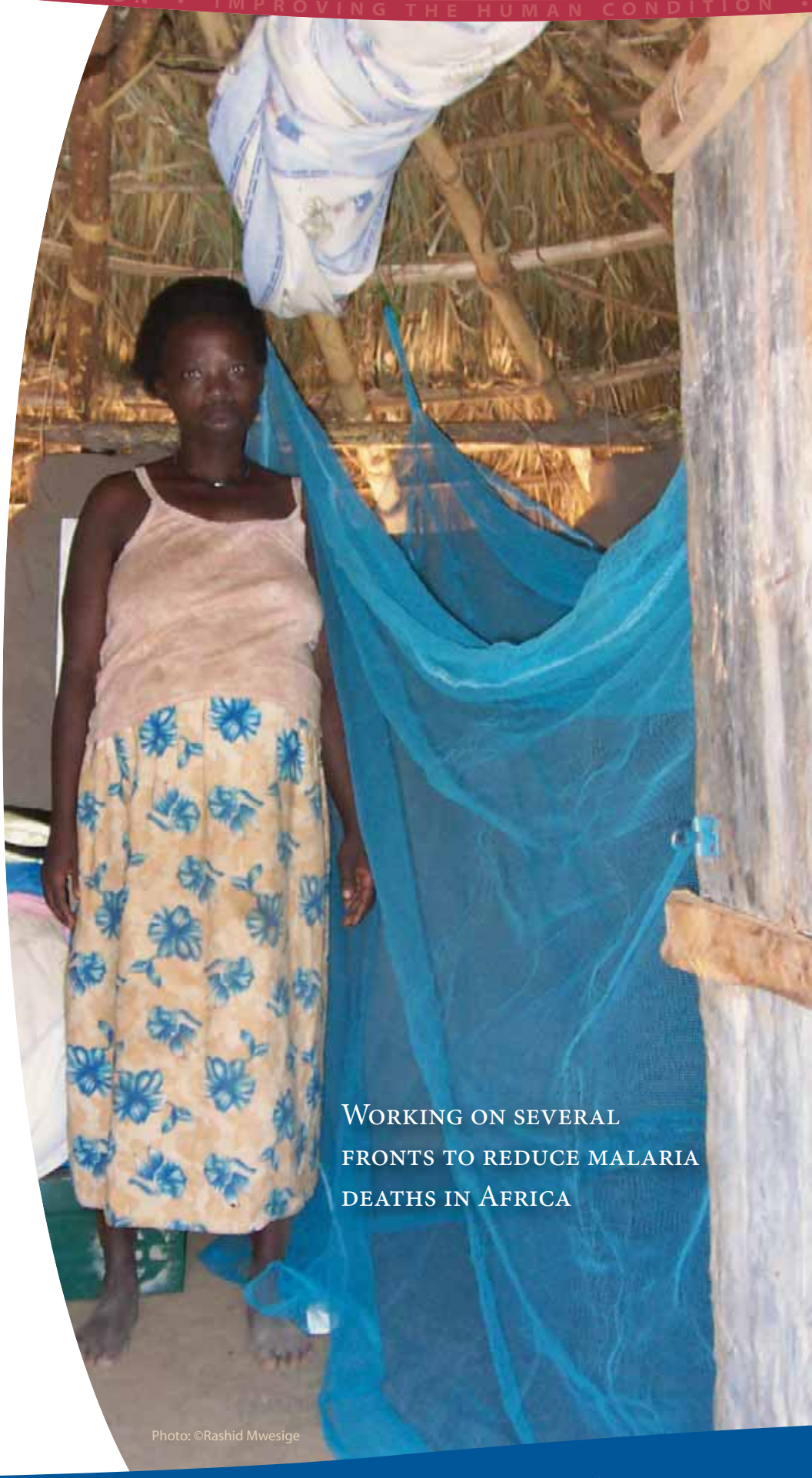
"All of us involved in this initiative are proud of the fact that we are able to provide immunizations for so many people while also helping to further genetics research and improve future vaccines," she added. "This project is a great example of using research to benefit people."

WORKING TO UNDERSTAND THE EXTENT TO WHICH GENETICS AFFECTS AN INDIVIDUAL'S IMMUNE RESPONSE TO CHOLERA AND TYPHOID VACCINES

> RTI biochemists Amy Siu and Mike Gardner analyze saliva for the presence of defensin, a small peptide with antimicrobial activity, in RTI's proteomics laboratory.

The project is also an excellent example of our ability to partner with other organizations around the world, as well as our ability to put together multidisciplinary teams within RTI. Our partners include Duke University and, in India, the Center for Population Genomics of the Institute for Molecular Medicine (IMM) and the National Institute of Cholera and Enteric Diseases. At RTI, the project is drawing on the expertise of RTI survey researchers, statisticians, epidemiologists, biomathematicians, computer technologists, and genomics researchers. The project also makes use of our premier proteomics laboratory, where our scientists will characterize protein/peptide expression associated with specific genes.

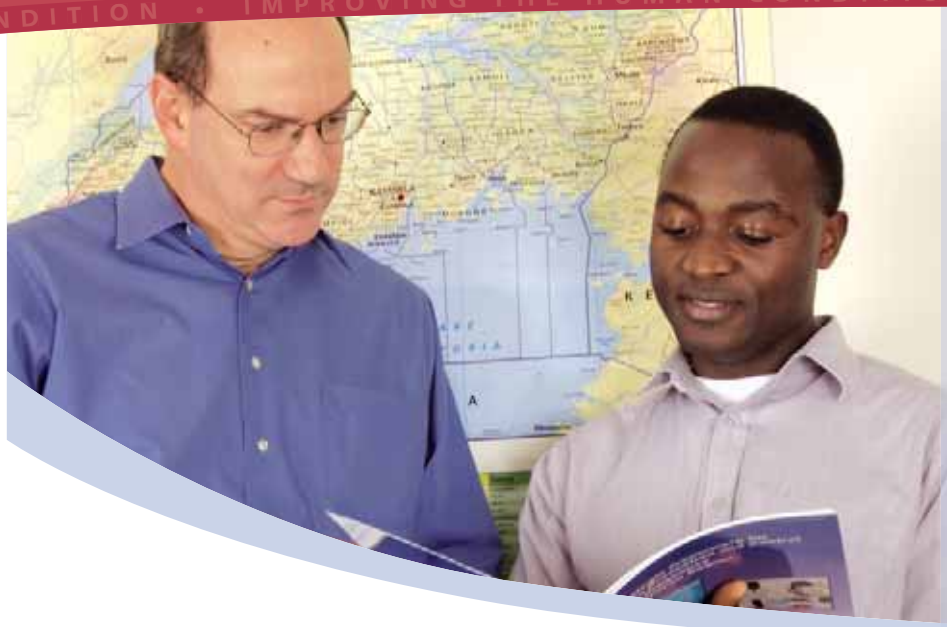
Data from analyses conducted in RTI's laboratory will be statistically analyzed for an association between response status and genotype to identify important proteins that impart degrees of immunity to vaccination. Besides helping researchers understand the efficacy of vaccinations, the core capabilities of RTI's proteomics laboratory also make it possible for RTI researchers to study many disease states—cancer, diabetes, pulmonary, liver, kidney, and cardiovascular diseases—in a variety of biological systems.



Working on several fronts to reduce malaria deaths in Africa

> Insecticide-treated bed nets are one of several techniques used to control malaria.

Photo: ©Rashid Mwesige



Controlling Malaria's Spread

For the past 10 years, RTI has worked in Asia and Africa to reduce the morbidity and mortality of malaria, a devastating disease that kills more than 1 million people every year. Our efforts in sub-Saharan Africa have focused on Angola, Eritrea, Ethiopia, Kenya, Mozambique, South Africa, Tanzania, Uganda, and Zambia.

"Malaria control programs need a variety of methods—including indoor residual spraying, insecticide-treated nets, environmental management, and larvicides," explained Eugene Brantly, J.D., manager of RTI's international environmental health program. "The best programs are based on extensive control of *Anopheles* mosquitoes, broad access to effective antimalarial drugs, and good surveillance."

Eritrea is now recognized as one of a few dramatic success stories in the recent history of malaria control in Africa, and RTI played a key role in making that happen. We worked with the Ministry of Health and others in Eritrea from 1998 to 2005, helping build a comprehensive foundation of data on malaria incidence, vector distribution and ecology, climatic variation, and malaria transmission patterns. We also helped Eritrea improve its protocols for malaria surveillance, epidemic forecasting and detection, and use of larvicides.

In 2005, President Bush announced a commitment to reduce malaria deaths in Africa over the next five years. RTI will participate in this effort, as well, by supporting vector control programs and by improving malaria surveillance, epidemic detection, and response in Angola, Tanzania, and Uganda.

Robert Ssengonzi, Ph.D., an RTI research health analyst, is managing two of the projects in Uganda, his native country. In one, funded by the U.S. Centers for Disease Control and Prevention, RTI is using community education to increase the use of insecticide-treated bed nets in camps for internally displaced persons in northern Uganda. In the other, funded by the U.S. Agency for International Development, RTI is using indoor residual spraying to reduce malaria transmission in the southern highlands of Uganda.

^ Gene Brantly, J.D. (L), who heads RTI's malaria research, and Robert Ssengonzi, Ph.D., who manages RTI's two malaria projects in Uganda, discuss approaches to malaria control.

Addressing Post-Katrina Public Health Problems

When Hurricane Katrina ravaged the Gulf Coast in late August 2005, the skills of several RTI researchers were sought to help alleviate public health problems in the hurricane's aftermath.

Shortly after Katrina hit, the U.S. Agency for Healthcare Research and Quality (AHRQ) requested that RTI researchers quickly produce a special edition of their nursing home atlas. Officials in the Department of Health and Human Services (HHS) command center used the atlas to identify potential medical resources close to the disaster zone. Besides producing a special version of the atlas, RTI researchers Lucy Savitz, Ph.D., and Elisabeth Root were asked to travel to Washington, DC, to provide onsite technical support after Hurricane Katrina. One result of their work was a set of databases that were used to generate tailored maps and reports on relief efforts.

In a parallel effort, RTI supported efforts to develop the Critical Infrastructure Data System. This system maps all hospitals, community health centers, mental health and substance abuse facilities, federal medical shelters, and a number of other facilities in the region affected by Hurricane Katrina. RTI staff worked with EMSystems, a firm based in Minneapolis, MN, to capture and integrate surveillance information from numerous facilities. These data capture and display services provided HHS Secretary Mike Leavitt with trending information on facility status and possible disease outbreaks for early detection. This information was shared with state and local authorities.

Also under contract with AHRQ, RTI began work in 2005 on designing a mass casualty medical treatment tracking system that can be used to track patients evacuated in response to natural, industrial, and transportation disasters, as well as terrorist attacks. The system RTI is designing, called the Integrated Patient Tracking/Locator Model, will make locating and tracking casualties and coordinating relief efforts following a disaster easier and more efficient.

Detecting disease outbreaks early is another capability that is needed in the aftermath of a disaster. In September 2005, as part of the BioSense Initiative, a research team led by RTI was awarded a three-year grant from the U.S. Centers for Disease Control and Prevention to develop and refine standard terminology used by physicians and public health officials to identify and report outbreaks. Besides RTI, the team includes researchers at the University of North Carolina at Chapel Hill and North Carolina state public health officials. Their goal is to improve the reporting, classification, and transmission of information concerning patient symptoms by applying a rigorous scientific approach to study communication used throughout emergency medical surveillance and reporting systems.

During the coming year, through these and other projects, RTI will work to better prepare the United States for future disasters.

RTI Health Solutions

RTI Health Solutions (RTI-HS) focuses on assisting clients in the pharmaceutical industry. Founded in 2000, this separate business unit of RTI has shown considerable growth in people, reputation, and financial strength. RTI-HS experts collaborate with their colleagues in industry to design and implement risk management programs, evaluate economic and disease burden, develop questionnaires, perform statistical analyses, and understand the safety and efficacy of pharmaceutical products.

Some of RTI-HS's major accomplishments in 2005 include:

- Providing the first cost-utility model and appraisal dossier to be submitted to the UK National Institute for Health and Clinical Excellence (NICE) under its new, rapid process for assessing drugs, the Single Technology Appraisal (STA) process.
- Quantifying women's willingness to accept elevated risk of heart attack and breast cancer in order to avoid symptoms of menopause. The findings are useful in helping physicians communicate treatment risk to patients and in designing effective risk management programs.
- Implementing a novel, multi-national, Internet-based survey to study the health care utilization and costs associated with obese individuals.
- Developing patient-reported instruments for use in clinical trials to demonstrate patient-perceived advantages of new treatments. Therapeutic areas included bipolar disorder, generalized anxiety disorder, depression, chronic pain, and women's health.

DEMOCRATIC GOVERNANCE

Working with countries around the world to create a foundation for democratic governance has been a growing part of RTI's work in recent years. In 2005, we worked on democratic governance projects in Armenia, Benin, Bulgaria, El Salvador, Guyana, Indonesia, Iraq, Kosovo, Mexico, Morocco, Peru, South Africa, and Ukraine. In each of these countries our goal is to help build more effective, accountable, and responsive governmental institutions at the local and national levels. Our approach to democratic governance is born of a long-standing commitment to improving the delivery of basic services at the local level and to reducing, where appropriate, excessive central control. The goal is to help citizens gain control over governmental institutions and increase the legitimacy of government as perceived by citizens.

Iraq Governance

Our largest and most visible democratic governance project continues to be our work for the U.S. Agency for International Development (USAID) in Iraq. We are supporting Iraq's efforts to establish local governments throughout the country that are efficient, transparent, and accountable to their constituents.

RTI's first project in Iraq began in 2003 with a dual focus on restoring basic services—such as water and electricity distribution, sewerage, solid-waste removal, primary health care, and education—and building local political institutions. The results of these efforts, which were carried out by an in-country team of nearly 230 international development specialists and 3,000 Iraqi nationals, reached as many as 21 million Iraqis.

By 2005, our efforts focused more on support of newly elected council members in Iraq's 18 provinces by providing them with training concerning their roles and responsibilities while continuing to sustain other local government reform efforts. USAID awarded RTI a second contract in May 2005 to focus on improving government management and administration in Iraq at the sub-national level, providing technical assistance

Supporting efforts to establish efficient, transparent, and accountable local governments

and training to local government officials, and supporting efforts by the newly elected Iraqi government to create a legal framework for democratic, representative, and participatory local governments.

"One of our most successful efforts this past year was the training of more than 650 newly elected provincial council members throughout Iraq's provinces," said Ronald Johnson, Ph.D., executive vice president of RTI's International Development Group. "We also were pleased to witness the Iraqis' adoption of a constitution that establishes the legislative council as a governmental institution at province, district (*qada*), and sub-district (*nahiya*) levels, creating the foundation for a stable society at the local government level."

Indonesia

RTI has also worked to create a foundation for democratic governance in Indonesia. Since 1989, we have supported the development of democratic, effective, and accountable governance there, beginning with national-level policy reform and gradually moving to the local level, where we now provide direct technical assistance to local governments in cities and districts country-wide.

In 2005, RTI completed a USAID-sponsored multiyear effort to support the effective implementation of the Government of Indonesia's historic decentralization program. We helped Indonesia establish a policy environment that enabled the development of participatory and effective local government. We also helped selected local governments develop capital investment plans that incorporated the aspirations and needs of local stakeholders into the planning and budgeting process. This work has

PROVIDING TECHNICAL TRAINING AND ASSISTANCE TO ENABLE THE DEVELOPMENT OF PARTICIPATORY AND EFFECTIVE LOCAL GOVERNMENT

now expanded with two new projects USAID awarded RTI in May 2005: the Local Governance Support Program and the Democratic Reform Support Program (DRSP).

Under the first project, RTI is continuing to work with local governments to strengthen the local legislative process, to engage citizens in planning and strategic decision-making, and to link participatory planning, performance budgeting, and financial management to improve the delivery of municipal services.

RTI also is working with 50 partner organizations and 500 local nongovernmental organizations to develop the capacity of strategic partners to deliver services to local governments and communities.

"Building capacity to establish and maintain productive relationships is central to the long-term success of this project," said project manager James McCullough, Ph.D., of RTI's International Development Group. "Our goal is to build a capacity in a range of Indonesian institutions, leaving in place trained people, tools, and institutions to carry on the work. Rather than create a purely project-based structure, we are contracting the majority of the work through Indonesian organizations to develop and position those institutions to continue the work."

Under the second project, RTI is helping key institutions promote critical democratic reforms and strengthen national-level checks and balances. We are also helping to safeguard critical democratic rights and to support national-level policies that deepen decentralized governance. Some of the specific activities in which RTI has been involved during 2005 include strengthening Indonesia's Constitutional Court, helping Indonesia protect its journalists and media independence, and improving the legal framework for civil society and the protection of activists.

RTI is working with the Indonesian Parliament to strengthen the Legislative Committee to help Parliament process its workload. In this work, we are mindful of increasing the transparency and visibility to citizens of Parliament's decision-making process, according to Gordon West, leader of RTI's DRSP effort in Indonesia.

"Our goal is to build a capacity in a range of Indonesian institutions, leaving in place trained people, tools, and institutions to carry on the work."

— James McCullough, Ph.D.

Bulgaria

Bulgaria is another country where RTI researchers have provided assistance in democratic governance. More than eight years ago, RTI began working there on the USAID-funded Local Government Initiative. Since then the relationship between the central and local governments in Bulgaria has changed significantly. Where national ministries once dominated politics, Bulgarians today enjoy the strongest network of local government organizations in southeastern Europe.

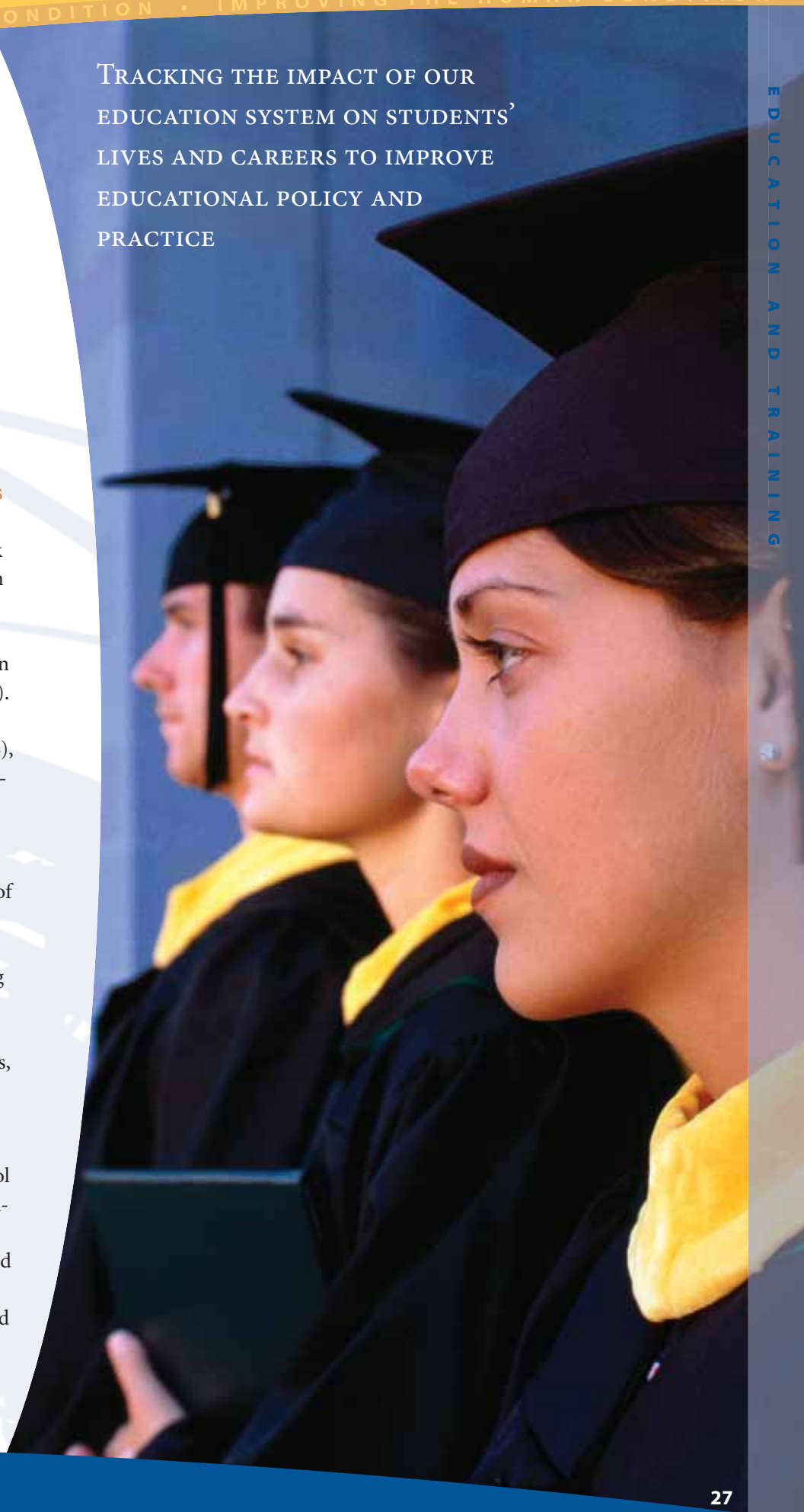
Some observers have called the National Association of Municipalities the most powerful nongovernmental organization in the country. Through this and other associations, municipal officers share experiences, develop skills, and lobby for their interests in regional and national venues. RTI has fostered the health of such associations for the past eight years through guidance in strategic planning, fund-raising, media relations, and member services.

This year, RTI continued to support local governments in Bulgaria as they narrowed the gap between resources and responsibilities and engaged the central government on policies and laws related to local governance. For example, several organizations asked us to review proposed amendments to the Municipal Budgets Act that will significantly change intergovernmental relations and bring greater autonomy to local governments. We were also asked to review and help draft sections of the Local Elections Act, the Local Self-Government and Local Administration Act, and the Regional Development Act.

EDUCATION AND TRAINING

Today's children are destined for an increasingly diverse, competitive, and connected world and working environment. As a nation, it is our job to prepare them to participate in the global economy and to navigate the significant demographic, cultural, and technological changes occurring in our society. In order to adapt our educational system to meet these challenges, RTI conducts educational surveys to show educators, administrators, and policy makers what's working in our schools and what's not. Education research under way at RTI also focuses both on making schools safer for children and teachers and on implementing lifelong learning as the new paradigm for U.S. soldiers and leaders.

Tracking the impact of our education system on students' lives and careers to improve educational policy and practice



Longitudinal Education Surveys

RTI has conducted decades of work for the U.S. Department of Education and other agencies. In 2005, we released a number of key reports as part of one such survey, the Education Longitudinal Study of 2002 (ELS:2002). Conducted on behalf of the National Center for Education Statistics (NCES), ELS:2002 is part of a series of longitudinal studies—meaning they follow the same subjects over time—of high school students.

ELS:2002 monitors the transition of more than 15,000 young people from 10th grade to college (or not) and on to the world of work. RTI is gathering information from the students and their academic transcripts, as well as from their parents, teachers, librarians, and school administrators.

ELS:2002 data files and reports prepared by RTI and released by NCES in 2005 shed light on the school environment and on students' participation in extracurricular activities, achievement in reading and math, and educational expectations and plans. These and other results are being used to help develop educational policies and practices intended to increase student performance and decrease >

drop-out rates. As a publicly available dataset, RTI's results will be a major resource for the research community.

"These datasets are being used to pose and answer the big questions," said Steven Ingels, Ph.D., RTI's principal investigator for ELS:2002. "These include questions about the impact of course-taking choices, the consequences of dropping out, and the impact of the high school experience on postsecondary access, choice, and attainment."

In the years to come, RTI will continue our work with ELS:2002, mapping the students' path out of high school and beyond. In addition, we are managing the U.S. components of two international studies focusing on math, reading, and science literacy. These studies will enable the U.S. and other nations to determine how well their students are performing compared to peers in other countries.

Given their unique ability to generate policy-relevant trend data, longitudinal studies are a major component of RTI's work to improve education in the U.S. and elsewhere. As Dr. Ingels put it, "We work in this area out of deep respect for the power of these designs to inform our understanding."

Preventing Violence in Schools

Even before students reach high school, they may encounter some form of school violence, from bullying and fighting to assault and even homicide.

In 2005, we continued our work to help combat violence in schools, launching the first study on school violence conducted for the Institute of Education Sciences. Under this study, RTI will evaluate the effectiveness of a violence-prevention program in middle schools through a randomized controlled study. Currently, only limited information is available about violence-prevention programs in U.S. middle schools; however, more middle school students report being victims of crimes at school than high school students.

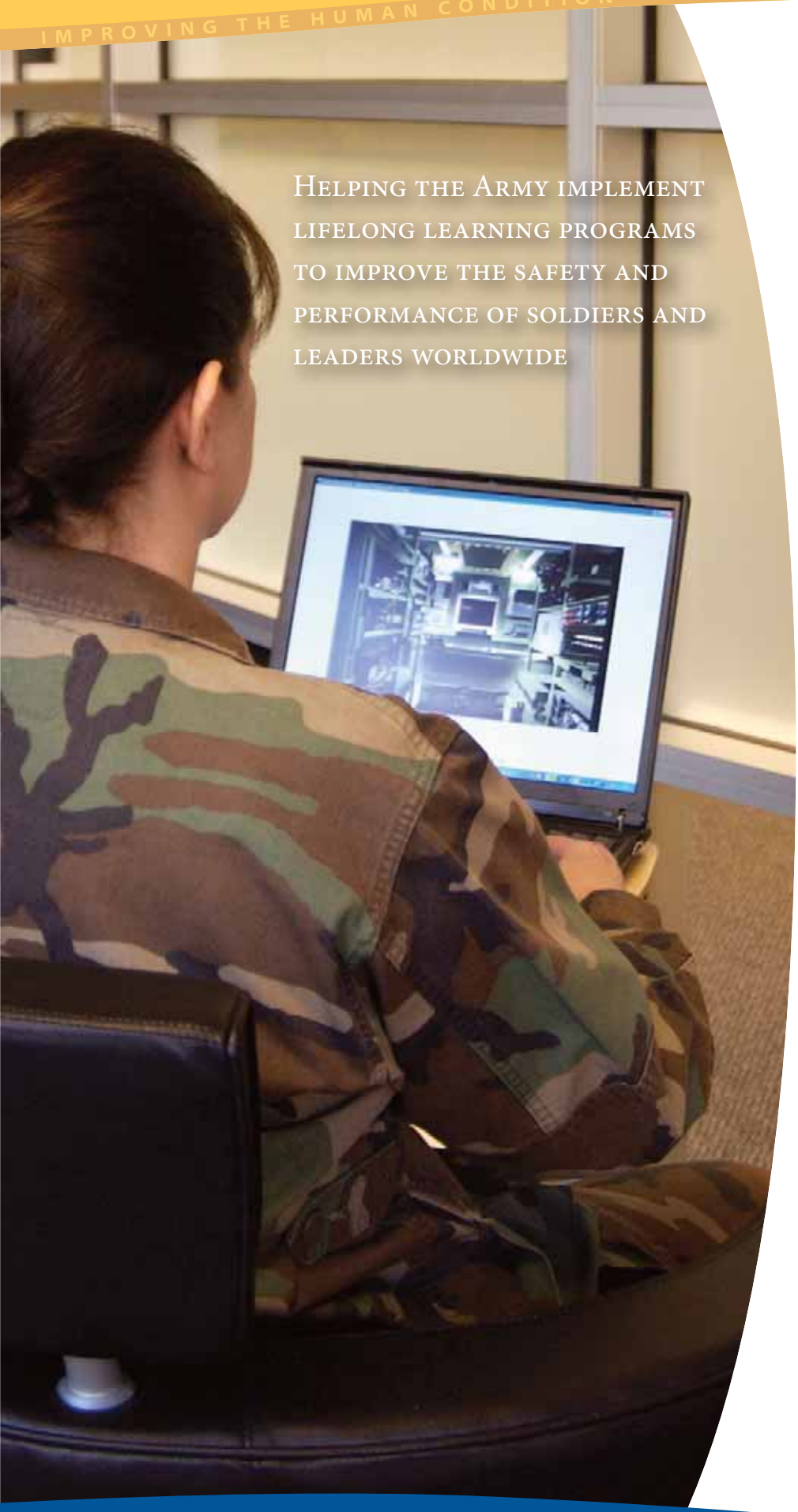
"Despite the past efforts to combat crime and violence in schools," said project director Suyapa Silvia, Ph.D., "significant challenges remain in middle schools and high schools of every type, size, and setting. With this particular study, our goal is to learn more about approaches that facilitate academic achievement and healthy social development by promoting a safe environment."

This year RTI selected two complementary violence-prevention programs for this study: a curriculum-based component that teaches social competency, problem solving, and self-control and a whole-school component focused on policies, rules, and reward systems. We are leading efforts to select 40 middle schools across the nation to participate in the study, and we will work with the study team to implement the programs at half these schools. Over the course of the project, the RTI team will evaluate how the programs are implemented and assess the impact on violence, truancy, and other factors. We will also compare outcomes at schools that implement the program and those that do not and determine whether decreases in problem behaviors warrant the cost of the program.

Through projects like this, RTI is continuing more than three decades of work to help make schools the safe haven every child—and every teacher—deserves. "My hope is that our research will show schools and communities what works so they can institute programs that will make a difference," said Dr. Silvia.

"My hope is that our research will show schools and communities what works so they can institute programs that will make a difference."

— Suyapa Silvia, Ph.D.



Helping the Army implement lifelong learning programs to improve the safety and performance of soldiers and leaders worldwide

Lifelong Learning

In many fields, education does not end with formal schooling but continues throughout one's career. Since the early 1990s, RTI has performed a key role in implementing lifelong learning as the preferred approach for America's soldiers and leaders worldwide. Our work combines virtual reality, advanced learning environments, and technology-assisted learning.

Georgia's Ft. Gordon is home to the Army's pilot program for lifelong learning, the University of Information Technology. In 2001, together with Ft. Gordon staff, RTI drafted the master plan for the university. Four years later, this program has been adopted by the Army and expanded, with RTI's help, to three more Army bases.

Lifelong learning goes beyond the institution's walls and provides soldiers and units with training accessible from any location. RTI's lifelong learning portal can also be used by Army commanders to follow soldiers' progress and to identify areas where they need more training. This approach improves the performance and safety of America's soldiers and leaders.

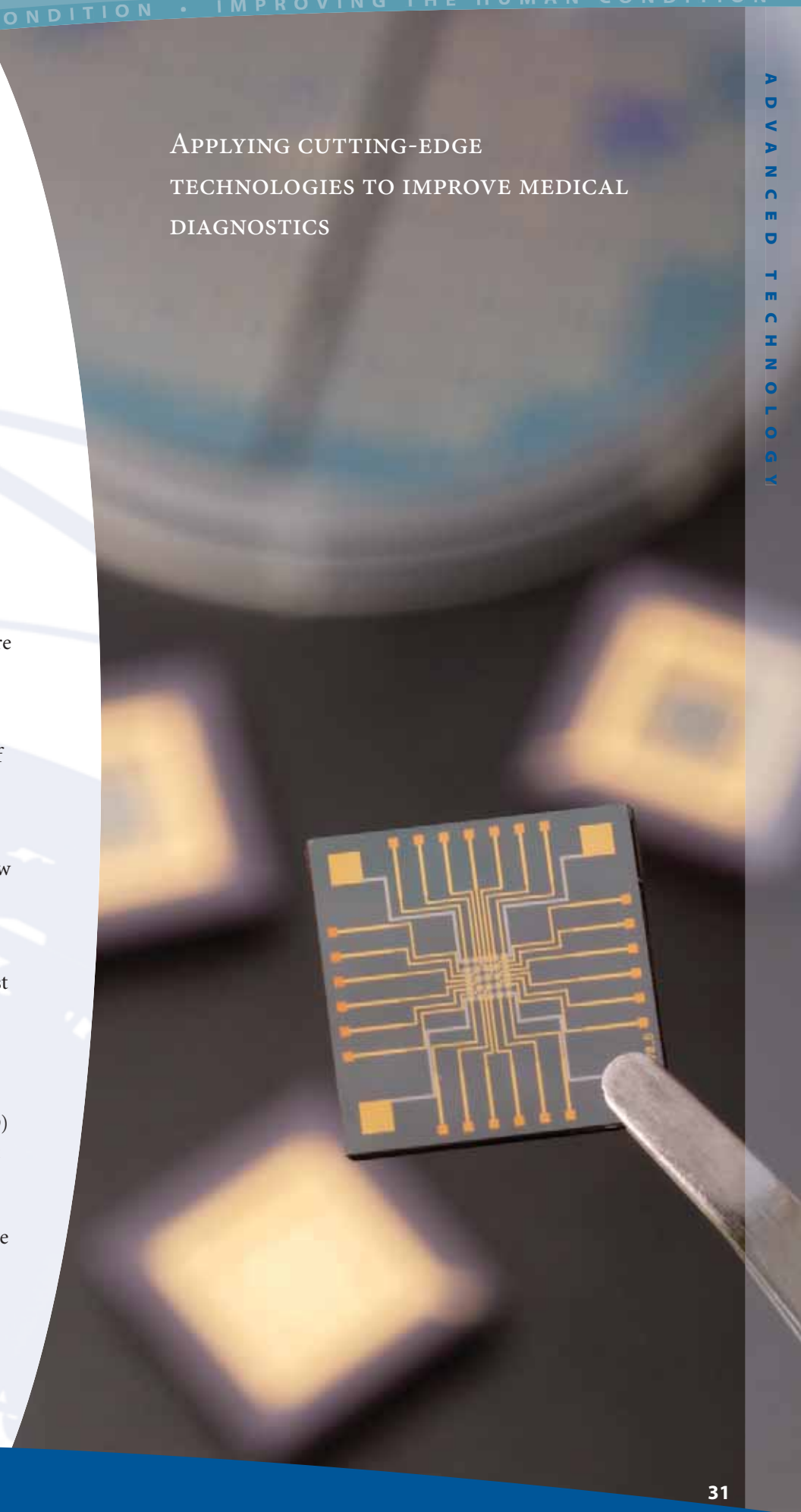
RTI developed many of the lifelong learning tools, including information technology elements, learning management system interfaces, and virtual reality simulations for training IT technicians, telecommunications specialists, and others.

"The lifelong learning program makes it possible to get better-trained soldiers to the field faster, and it supports ongoing training to reduce skill decay," said William Wilson, who heads the RTI team working on this program. "Also, it provides on-demand training for new skills and technologies 'at the location of the soldier' and uses less equipment and fewer facilities than older methods."

ADVANCED TECHNOLOGY

The promises of advanced technology are legion. It holds great potential for revolutionizing every aspect of our lives—the treatments we receive to fight disease, the safety of the planes we fly, and much more. At RTI, our engineers and scientists collaborate with university researchers, industry partners, and government agencies to develop technologies with real-world applications. Across the board, our goal remains the same: to tap into the promises of technology to make our lives better and help make those promises come true.

Applying cutting-edge technologies to improve medical diagnostics



Improving Ultrasound Technology

With the acquisition of three divisions from the MCNC Research and Development Institute in March of 2005, RTI joined forces with a cadre of scientists who conduct ground-breaking R&D in microfabrication, signal electronics, and network systems and security. One example of the cutting-edge capabilities brought by our new colleagues comes from the field of microfabrication. David Dausch, Ph.D., a member of RTI's new Center for Materials and Electronics Technologies, is working with Duke University to develop a tiny device with huge promise in the fight against heart disease and other debilitating conditions.

With funding from the National Institutes of Health, the RTI–Duke team is creating two-dimensional (2-D) arrays of ultrasound transducers that are small enough to fit inside the tip of a cardiac catheter. Until now, arrays were too large for this use, were expensive to produce, and did not provide sufficient performance for medical imaging.

In 2005, the RTI–Duke team demonstrated a proof-of-concept device that was five times more

sensitive and may ultimately provide better resolution than current technology. Also this year, RTI's technology passed a critical milestone, producing what is known as pulse-echo images—the first ever reported for this type of device.

Looking ahead to 2006, Dr. Dausch and his team will work to integrate the arrays with control electronics, which previously has not been possible for 2-D arrays. Ultimately, RTI's ultrasound device will enable doctors to study heart function in real time and in three dimensions, perhaps helping them develop more effective treatments for heart disease. The technology could also improve the diagnostic capabilities of angiography, colonoscopy, and gynecological exams.

"Our goal is to develop a miniaturized, more manufacturable, higher-performance probe than is available today, allowing physicians to use ultrasound in ways that they never have before," said Dr. Dausch. "My hope is that this will lead to earlier, more accurate diagnoses for cardiovascular disease, cancer, and other disorders."

Clearly, adding talented researchers like Dr. Dausch and his colleagues is enabling RTI to pursue exciting opportunities to improve the human condition in new ways. The synergy between our research activities will no doubt create many more possibilities, not only in the life sciences but also in homeland and health security and aerospace technology.

"My hope is that this will lead to earlier, more accurate diagnoses for cardiovascular disease, cancer, and other disorders."

— David Dausch, Ph.D.

DEVELOPING A SYNTHETIC VISION SYSTEM TO REDUCE AIRCRAFT ACCIDENTS CAUSED BY LIMITED VISIBILITY

Developing Synthetic Vision

In June of 2005 in the skies over Virginia, RTI proudly showcased a technology that will help conquer an all-too-common cause of fatal aircraft accidents: limited visibility.

Known as a synthetic vision system (SVS), RTI's technology was developed with funding from the National Aeronautics and Space Administration (NASA) as part of its Small Aircraft Transportation System (SATS) project. SATS was conceived to provide the foundation for viable air service using rural and suburban airports across the country. RTI has been a key participant in SATS, a public-private partnership of NASA, the Federal Aviation Administration, and the National Consortium for Aviation Mobility, since its inception.

A key SATS technology, SVS is a computer-based cockpit display system that enables a pilot to navigate safely and accurately to airports that lack ground staff or radar facilities to direct air traffic. SVS integrates global positioning system (GPS) navigation, a flight path depiction, a worldwide terrain database, and—optionally—weather and traffic information, into a single cockpit display. The end result offers pilots an electronic picture of what's outside their windows, no matter the weather or time of day. In tests with both experienced and novice pilots, SVS has been proven to enhance situational awareness, reduce workload, and increase flight accuracy.

Today, RTI is working to make the system available for general

< Computer scientist James Henion demonstrates a flight simulator used to develop and test RTI's synthetic vision system.

aviation. "It is our hope that a low-cost commercial product based on RTI intellectual property can reduce aviation accidents while providing the traveling public with a reliable and cost-effective transportation option," said Michael Heck, Ph.D., director of RTI's Center for Aerospace Technology.

Our contribution to synthetic vision R&D was only one of RTI's many roles in the SATS program. We also researched and assessed the real-world effects of integrating SATS aircraft into the national airspace, and we provided systems engineering support, technology assessment, program planning, project management, and market analyses for the program. Additionally, RTI developed a software program known as MCATS for simulating air taxi service. MCATS was used extensively by SATS project managers to evaluate the impact of new SATS technologies, such as synthetic vision, and is already available commercially.

By helping increase the safety and reliability of general aviation aircraft through technological innovation, RTI honors the spirit of our mission and supports NASA's overarching goals for SATS: to reduce the fatal aircraft accident rate and protect air travelers and the public from security threats, while also achieving greater mobility, access, and equity for the flying public.

"It is our hope that a low-cost commercial product based on RTI intellectual property can reduce aviation accidents while providing the traveling public with a reliable and cost-effective transportation option."

— Michael Heck, Ph.D.

TechEval: Commercializing University Technologies

In collaboration with RTI, Duke University's Pratt School of Engineering launched a new program called TechEval designed to identify and evaluate research with commercial potential. TechEval pairs researchers with experienced business leaders and students from Duke's Master of Engineering Management program. Working together, these teams evaluate each technology in a practical, real-world environment—in just three months.

Like our own synthetic vision system, every new technology begins as an idea and, typically, must make its way through many experiments before it emerges as a useful product or process accessible to the market. This path—known as commercialization—can be long and winding. With our experience in R&D and commercialization, RTI may be the most qualified "trail guide" that a technology could hope to find.

In 2005, we shared our expertise in technology commercialization with students at Duke University in the hopes of training new guides for technologies that could improve the lives of people around the world.

Since its inception, TechEval has assessed a number of innovative medical and environmental technologies, as well as inventions from other fields. The program's greatest contribution to date, however, may be to a culture shift under way across the university.

"By broadening faculty and students' understanding of the commercialization process," said Brent Ward, senior business development manager in RTI's Department of Commercialization, "TechEval has increased the chance that technologies with social and commercial value discovered by Duke researchers will reach the companies that can help bring their promise to fruition."

The shared goal of RTI and Duke for TechEval is to propel beneficial technologies out of the university lab and into the hands of industries and people around the world. The potential for improving the human condition is virtually limitless.

^ RTI's Brent Ward (R) and Jeff Glass, Ph.D., director of Duke's Master of Engineering Management program, review TechEval program materials. TechEval supports Duke's educational mission and goals of societal impact for university research, while also furthering RTI's mission.

COMMERCIALIZATION

For some RTI projects, commercialization marks the final step on the path toward the manifestation of our mission to improve the human condition. We work hard to identify and transfer valuable discoveries and intellectual property from our laboratories to the commercial marketplace where they can benefit others. Commercialization also has the potential to generate income for investment in RTI research, facilities, and people—investments that will, in turn, lead to even more opportunities for our researchers to turn knowledge into practice.

Strategic Brownfield Solutions

The problem of what to do with so-called brownfield properties—sites that are idle or under-used because of the presence or potential presence of environmental contamination—has plagued companies and communities for decades. Today, a number of economic and legislative factors are driving companies to get these properties off their books, through divestiture or redevelopment. Many companies, however, lack the requisite expertise to formulate a successful plan of action.

Enter a new suite of technology-based services from RTI known as Strategic Brownfield Solutions[SM] (SBS), launched in 2005.

RTI's Glenn Osmond, P.E., leads the SBS initiative. "Communities are highly motivated to return brownfields to productive use," he said, "but they don't own the properties. What's more, existing tools and resources for dealing with brownfields have been historically directed at communities. Very little effort has gone toward helping the property owners—companies—figure out what to do. We have the technology and expertise to help companies see the possibilities and make it simple."

HELPING UNLOCK THE VALUE OF BROWNFIELDS AND BRING THEM BACK INTO PRODUCTIVE USE

> Anthony Marimpietri (L), director of RTI's Environment, Health, and Safety Division, and Glenn Osmond are leading RTI's efforts to bring SBS to companies with idle properties in their portfolios. SBS enables corporations to transform environmental liabilities into productive assets for the companies and their communities alike.

To create SBS, RTI began with a robust decision support system developed by our own experts in remediation and environmental information systems. Together with the University of North Carolina and a major U.S.-based, multinational company, we integrated best practices in finance, community development, and real estate. As a result, SBS is able to determine the market potential of a brownfield site, the difficulty and costs of cleanup, and the financial gains and potential liabilities associated with redevelopment.

SBS serves RTI's mission by unlocking the value of brownfields and bringing them back into productive use. Communities and companies alike reap tangible benefits in the form of new jobs, an increased tax base, revitalized neighborhoods, and enhanced relationships between corporations and the communities in which they operate. "There's so much hidden value in these properties," said Osmond. "If we can unlock it, we can help bring back jobs that were associated with these properties years ago."

Initial feedback from key industry participants has been positive. Ultimately, we envision a day when most of the world's multinational companies collaborate with their local communities to make SBS work for them.

Trinity Sight™

In the field of law enforcement, the ability to effectively deploy officers or agents can mean the difference between life and death. In 2005, RTI took steps toward helping agencies optimize the use of their often limited resources in the name of improving public safety. We provided the analytical framework for a map-based software tool, created by partners SPSS and Information Builders, that predicts where crime is most likely to occur in a specific time period.

Developed by RTI's Colleen McCue, Ph.D., that analytical framework is called Trinity Sight™. Trinity Sight combines data mining and predictive analytics—a branch of data mining that focuses on the prediction of future probabilities and trends—

"At RTI we have a unique opportunity to make a difference by bridging the divide between academic research and the applied setting."

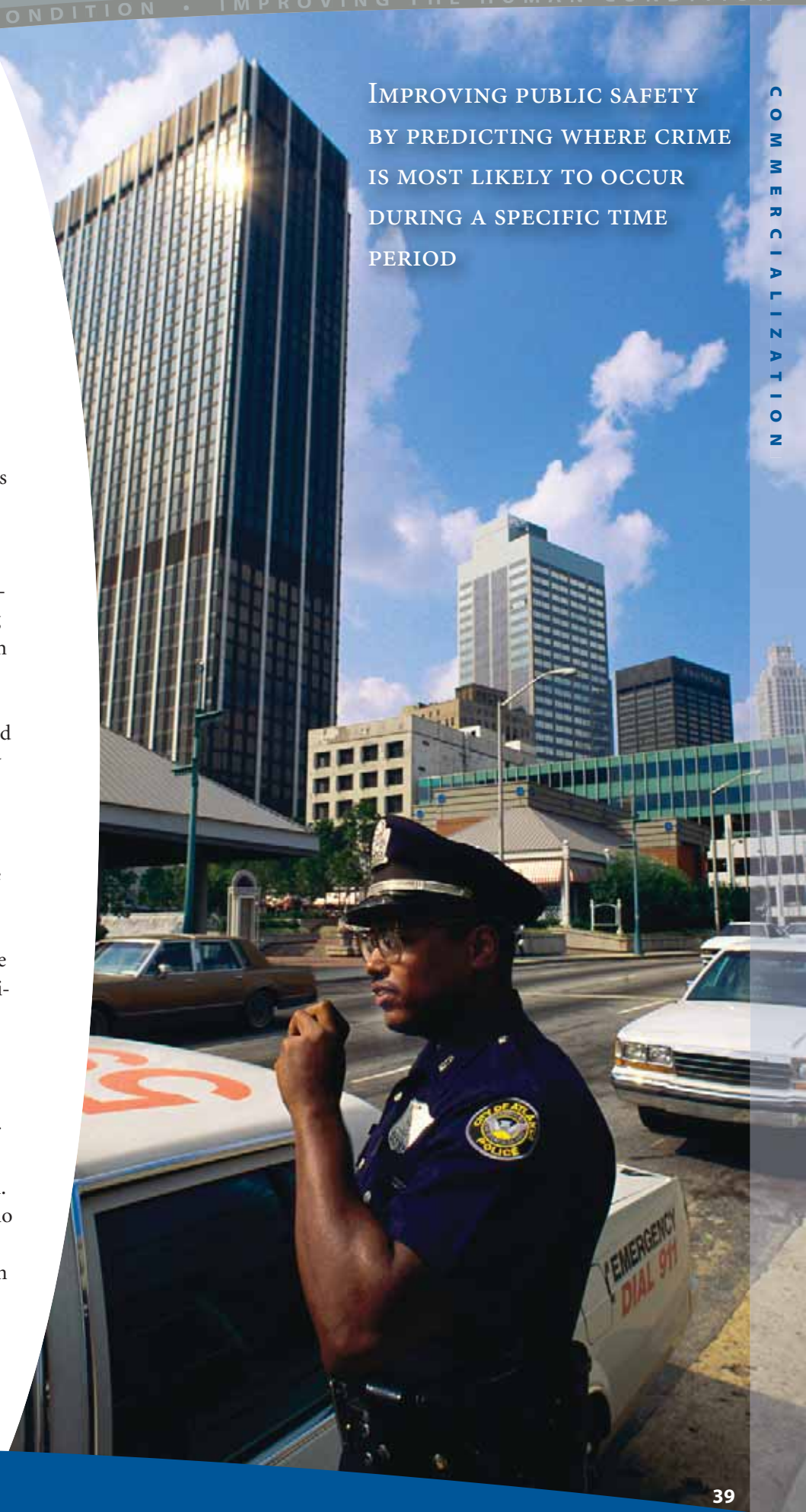
— Colleen McCue, Ph.D.

to forecast future threats to public safety. Trinity Sight is able to import existing data from disparate sources such as 911 records and citizen complaints, weather patterns, schedules for city-wide events, and other factors that can influence crime. The data can then be mined, analyzed, and presented in a usable format.

"At RTI we have a unique opportunity to make a difference by bridging the divide between academic research and the applied setting," noted Dr. McCue. "Through this project and others, we are taking our research and creating actionable information. Law enforcement agencies and others can then take that information and do good with it."

Trinity Sight is already helping the Richmond, Va., Police Department, which installed the new software in November of this year. The prototype software was also unveiled to enthusiastic response at the 2005 conference of the International Association of Chiefs of Police.

"So far our methodology has resulted in increased public and officer safety," Dr. McCue said, alluding to the driving force behind her research. "I personally know a lot of people who are directly involved in the war on terrorism," she added. "Keeping them safe is very important to me."



Improving public safety by predicting where crime is most likely to occur during a specific time period

Nextreme

In early 2005, RTI launched a new spin-off company, Nextreme Thermal Solutions, to take our thin-film superlattice thermoelectric technology from the lab into commercial production. To date, Nextreme secured $8 million in Series A financing from investment firms SpaceVest, Aurora Funds, and Harris & Harris Group, Inc., as well as RTI.

Nextreme manufactures thermoelectric devices that address the thermal management needs of the electronics, photonics, biomedical, and aerospace industries. This unique thin-film superlattice technology provides an industry first—the embedding of an active cooling device directly into an integrated circuit's package. Today's faster microprocessors generate hot spots that can reduce reliability and lead to chip failures. Nextreme's superlattice device, when placed directly under a hot spot, can efficiently pump that heat out.

Pioneered and developed at RTI by a research team led by Rama Venkatasubramanian, Ph.D., Nextreme's founder and chief technology officer, the Nextreme technology was developed in collaboration with the Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research.

"Nextreme marks the transition of what began 12 years ago as a fundamental research effort," said Dr. Venkatasubramanian. "Today we are exploring many commercial possibilities and looking forward to near-term products that have an impact on computation, efficient automobiles, battery-free communication devices, and perhaps even pacemakers. There is significant potential to make a positive difference in the human condition through Nextreme's technologies."

In addition to continued work with DARPA, Nextreme is also collaborating with RTI researchers on a contract with General Motors to convert wasted heat from automobiles into energy. Under this contract, RTI will help develop prototype devices that incorporate its superlattice thermoelectrics with a view toward making vehicles more fuel-efficient. By capturing energy typically lost through exhaust and cooling systems as excess heat, these modules will provide additional electricity—to run the air conditioner, for example. With this technology, vehicles could use less fuel and emit fewer greenhouse gases.

Nextreme has garnered recognition from the Council for Entrepreneurial Development, which honored the company with the 2005 Technology of the Year Award, echoing the 2003 accomplishment of RTI's earlier spin-off, Ziptronix.

^ Above. Nextreme researchers Geza Dezsi (L) and Brooks O'Quinn (R) and RTI's Peter Thomas (center) are exploring many possible applications of Nextreme's thin-film superlattice thermoelectric technology.

"There is significant potential to make a positive difference in the human condition through Nextreme's technologies."

— Rama Venkatasubramanian, Ph.D.

RTI PUBLICATIONS—*October 2004 to September 2005*

Below is a sample of publications by RTI staff members (alphabetical by title) during FY2005. For a more complete list of RTI research publications, visit our website at www.rti.org/publications. Also, if you would like to sign up to receive periodic notification of new RTI publications, go to www.rti.org/newsletters.

7 alpha,11 beta-dimethyl-19-nortestosterone: A potent and selective androgen response modulator with prostate-sparing properties. ***Bioorganic and Medicinal Chemistry Letters*, 15(4):1213-1216.**

Access for pregnant women on Medicaid: Variation by race and ethnicity. ***Journal of Health Care for the Poor and Underserved*, 16(1):74-95.**

Addressing intimate partner violence in substance-abuse treatment. ***Journal of Substance Abuse Treatment*, 29(1):5-17.**

Adolescent help-seeking for dating violence: Prevalence, sociodemographic correlates, and sources of help. ***Journal of Adolescent Health*, 36(1):25-31.**

Adverse neurodevelopmental outcomes among extremely low birth weight infants with a normal head ultrasound: Prevalence and antecedents. ***Pediatrics*, 115(3):673-680.**

Alcohol dependence and use of treatment services among women in the community. ***American Journal of Psychiatry*, 161(10):1790-1797.**

Alcohol use, human capital, and wages. ***Journal of Labor Economics*, 23(2):279-312.**

Analytic strategies to adjust confounding using exposure propensity scores and disease risk scores: Nonsteroidal antiinflammatory drugs and short-term mortality in the elderly. ***American Journal of Epidemiology*, 161(9):891-898.**

Big and bendable. ***IEEE Spectrum*, 42(9):50-56.**

Bipolar patients' stated therapy preferences and likely adherence. ***Value in Health*, 8(6):A19.**

Blood collection and transfusion in the United States in 1999. ***Transfusion*, 45(2):141-148.**

Bupropion increases striatal vesicular monoamine transport. ***Neuropharmacology*, 49(6):820-830.**

The case for earlier treatment of HIV infection. ***Clinical Infectious Diseases*, 39(11):1699-1704.**

Changes in hospitality workers' exposure to secondhand smoke following the implementation of New York's smoke-free law. ***Tobacco Control*, 14(4):236-241.**

Changes in neurodevelopmental outcomes at 18 to 22 months' corrected age among infants of less than 25 weeks' gestational age born in 1993-1999. ***Pediatrics*, 115(6):1645-1651.**

Child welfare reform in the United States: Findings from a local agency survey. ***Child Welfare*, 84(1):5-24.**

Cocaine self-administration and locomotor activity are altered in Lewis and F344 inbred rats by RTI 336, a 3-phenyltropane analog that binds to the dopamine transporter. ***Brain Research*, 1055(1-2):186-195.**

Cognitive performance and autonomic reactivity in abstinent drug abusers and nonusers. ***Experimental and Clinical Psychopharmacology*, 13(1):25-40.**

A comparison of immobilized pH gradient isoelectric focusing and strong-cation-exchange chromatography as a first dimension in shotgun proteomics. ***Proteomics*, 5(1):24-34.**

Consequences of declining survey response rates for smoking prevalence estimates—Author's response. ***American Journal of Preventive Medicine*, 28(2):241-242.**

A correlation study of organochlorine levels in serum, breast adipose tissue, and gluteal adipose tissue among breast cancer cases in India. ***Cancer Epidemiology, Biomarkers and Prevention*, 14(5):1113-1124.**

Cost-effectiveness of herpes simplex virus type 2 serologic testing and antiviral therapy in pregnancy. ***American Journal of Obstetrics and Gynecology*, 191(6):2074-2084.**

The cost-effectiveness of lifestyle modification or metformin in preventing type 2 diabetes in adults with impaired glucose tolerance. ***Annals of Internal Medicine*, 142(5):323-332.**

Cost methodology of COMBINE. ***Journal of Studies on Alcohol*, Supplement (15):50-55.**

The costs of obesity among full-time employees. ***American Journal of Health Promotion*, 20(1):45-51.**

The day-to-day relationship between episodes of male partner violence and alcohol use: The moderating effects of antisocial personality disorder. ***Journal of Consulting and Clinical Psychology*, 73(2):239-248.**

Delayed-type hypersensitivity reaction with iscador M given in combination with cytotoxic chemotherapy. ***Journal of Clinical Oncology*, 23(6):1337.**

Dementia subtypes in China—Prevalence in Beijing, Xian, Shanghai, and Chengdu. ***Archives of Neurology*, 62(3):447-453.**

Determination of methylene blue and leucomethylene blue in male and female Fischer 344 rat urine and B6C3F(1) mouse urine. ***Journal of Analytical Toxicology*, 29(1):28-33.**

Developing a computer algorithm to identify epilepsy cases in managed care organizations. ***Disease Management*, 8(1):1-14.**

Development of a rationally designed, low abuse potential, biogenic amine releaser that suppresses cocaine self-administration. ***Journal of Pharmacology and Experimental Therapeutics*, 313(3):1361-1369.**

Development of an interactive bioterrorism and emerging infections curriculum for medical students and internal medicine residents. ***Public Health Reports*, 120 Suppl 1:59-63.**

Dextofisopam improves bowel function in men and women with IBS. ***American Journal of Gastroenterology*, 100(9):S344.**

Differential effects of the novel kappa opioid receptor antagonist, JDTic, on reinstatement of cocaine-seeking induced by footshock stressors vs cocaine primes and its antidepressant-like effects in rats. ***Psychopharmacology*, 183(1):118-126.**

Estimating prevalence, incidence, and disease-related mortality for patients with epilepsy in managed care organizations. ***Epilepsia*, 46(2):311-319.**

Evaluating the performance of Medicare fee-for-service providers using the health outcomes survey—A comparison of two methods. ***Medical Care*, 43(7):699-704.**

Evaluating the truth® brand. ***Journal of Health Communication*, 10(2):181-192.**

Evidence of a dose-response relationship between "truth" antismoking ads and youth smoking prevalence. ***American Journal of Public Health*, 95(3):425-431.**

Extremely low birthweight neonates with protracted ventilation: Mortality and 18-month neurodevelopmental outcomes. ***Journal of Pediatrics*, 146(6):798-804.**

A framework for examining sustained acceptability of microbicides. ***AIDS and Behavior*, 61(1):193-205.**

Galanthamine analogs: 6*H*-benzofuro [3a,3,2,-*e*,*f*][1]benzazepine and 6*H*-benzofuro[3a,3,2-*e*,*f*][3]benzazepine. ***Tetrahedron*, 61(30):7144-7152.**

The generation of knowledge for reproductive health technologies: Constraints on social and behavioral research. ***Journal of Social Issues*, 61(1):193-205.**

HIV and syphilis testing among men who have sex with men attending sex clubs and adult bookstores—San Francisco, 2003. ***Journal of Acquired Immune Deficiency Syndrome*, 37(2):1324-1326.**

The impact of the "incarceration culture" on reentry for adults with mental illness: A training and group treatment model. ***Psychiatric Services*, 56(3):265-267.**

Inhalant abuse and dependence among adolescents in the United States. ***Journal of the American Academy of Child and Adolescent Psychiatry*, 43(10):1206-1214.**

RTI PUBLICATIONS *(continued)*

Inhaled nitric oxide for premature infants with severe respiratory failure. ***New England Journal of Medicine*, 353(1):13-22.**

Lamotrigine and the risk of malformations in pregnancy. ***Neurology*, 64:955-960.**

Liquid chromatography-electrospray tandem mass spectrometric assay suitable for quantitation of halofuginone in plasma. ***Journal of Chromatography. B, Analytical Technologies in the Biomedical and Life Sciences*, 810(1):35-40.**

Milk thistle and prostate cancer: Differential effects of pure flavonolignans from *Silybum marianum* on antiproliferative end points in human prostate carcinoma cells. ***Cancer Research*, 65(10):4448-4457.**

A model designed to enhance informed consent: Experiences from the HIV prevention trials network. ***American Journal of Public Health*, 95(3):412-419.**

Modification of the incidence of drug-associated symmetrical peripheral neuropathy by host and disease factors in the HIV outpatient study cohort. ***Clinical Infectious Diseases*, 40(1):148-157.**

Monitoring STI prevalence using telephone surveys and mailed urine specimens: A pilot test. ***Sexually Transmitted Infections*, 81(3):236-238.**

The most widely recognized mushroom: Chemistry of the genus *Amanita*. ***Life Sciences*, 78(5):532-538.**

Neurocognitive skills moderate urban male adolescents' responses to preventive intervention materials. ***Drug and Alcohol Dependence*, in press.**

Neurodevelopmental and growth outcomes of extremely low birth weight infants after necrotizing enterocolitis. ***Pediatrics*, 115(3):696-703.**

New colchicinoids from a native Jordanian meadow saffron, *Colchicum brachyphyllum*: Isolation of the first naturally occurring dextrorotatory colchicinoid. ***Journal of Natural Products*, 68(2):173-178.**

New directions in plastic debris. ***Science*, 310(5751):1117.**

A note on separation in mean-lower-partial-moment portfolio optimization with fixed and moving targets. ***IIE Transactions*, 37(10):901-906.**

On pharmacogenomics and cost-effectiveness analysis at the individual level. ***PharmacoEconomics*, 23(5):527.**

On the physical and logical topology design of large-scale optical networks. ***Journal of Lightwave Technology*, 21(4):904-915.**

Outcomes of routine episiotomy: A systematic review. ***Journal of the American Medical Association*, 293(17):2141-2148.**

Oxygen delivery through nasal cannulae to preterm infants: Can practice be improved? ***Pediatrics*, 116(4):857-861.**

Personalized exposure assessment: Promising approaches for human environmental health research. ***Environmental Health Perspectives*, 113(7):840-848.**

Pharmacokinetics and disposition of the kavalactone kawain: Interaction with kava extract and kavalactones in vivo and in vitro. ***Drug Metabolism and Disposition*, 33(10):1555-1563.**

Polymerase chain reaction detection of Y chromosome sequences in vaginal fluid: Preliminary studies of a potential biomarker for sexual behavior. ***Sexually Transmitted Diseases*, 32(2):90-94.**

Postinfectious IBS. ***American Journal of Gastroenterology*, 100(3):729.**

The potential effectiveness of warning labels on cigarette packages—The perceptions of young adult Canadians. ***Canadian Journal of Public Health. Revue Canadienne De Sante Publique*, 96(5):353-356.**

Predicting pharmacy costs and other medical costs using diagnoses and drug claims. ***Medical Care*, 43(1):34-43.**

Prediction of death for extremely low birth weight neonates. ***Pediatrics*, 116(6):1367-1373.**

Psychometric properties of virtual reality vignette performance measures: A novel approach for assessing adolescents' social competency skills. ***Health Education Research*, 20(1):61-70.**

Public perceptions of childhood obesity. ***American Journal of Preventive Medicine*, 28(1):26-32.**

Quality-Adjusted Survival in a Crossover Trial of Letrozole Versus Tamoxifen in Postmenopausal Women with Advanced Breast Cancer. ***Annals of Oncology*, 16:1458-1462.**

Race/ethnic disparities in utilization of lifesaving technologies by Medicare ischemic heart disease beneficiaries. ***Medical Care*, 43(4):330-337.**

Rebuilding governance in failed states and post-conflict societies: Core concepts and cross-cutting themes. ***Public Administration and Development*, 25(1):3-14.**

Reducing bias in telephone survey estimates of the prevalence of drug use: A randomized trial of telephone audio-CASI. ***Addiction*, 100(10):1432-1444.**

Restless legs syndrome prevalence and impact: REST general population study. ***Archives of Internal Medicine*, 165(11):1286-1292.**

Risking health to avoid injections: Preferences of Canadians with type 2 diabetes. ***Diabetes Care*, 28(9):2234-2235.**

Risky decision making and the anterior cingulate cortex in abstinent drug abusers and nonusers. ***Cognitive Brain Research*, 23(1):119-136.**

The role of training in global tobacco control research. ***American Journal of Public Health*, 95(6):946-949.**

Sale of public databases puts biological data at risk. ***Nature*, 435(7045):1028.**

The SCREEN study: An integrated approach to increasing colorectal cancer screening. ***Cancer Epidemiology, Biomarkers and Prevention*, 14(2):549.**

State tobacco control spending and youth smoking. ***American Journal of Public Health*, 95(2):338-344.**

Synthesis and ligand binding of tropane ring analogues of paroxetine. ***Journal of Medicinal Chemistry*, 48(1):336.**

Synthesis and pharmacological characterization of exo-2-(2 '-chloro-5-pyridinyl)-7-(endo and exo)-aminobicyclo[2.2.1]heptanes as novel epibatidine analogues. ***Journal of Medicinal Chemistry*, 48(23):7491-7495.**

Synthesis of long-chain amide analogs of the cannabinoid CB1 receptor antagonist *N*-(piperidinyl)-5-(4-chlorophenyl)-1-(2,4-dichlorophenyl)-4-methyl-1*H*-pyrazole-3-carboxamide (SR141716) with unique binding selectivities and pharmacological activities. ***Bioorganic and Medicinal Chemistry*, 13(18):5463-5474.**

Syphilis increases HIV viral load and decreases CD4 cell counts in HIV-infected patients with new syphilis infections. ***AIDS*, 18(15):2075-2079.**

The theory of "truth": How counterindustry media campaigns affect smoking behavior among teens. ***Health Psychology*, 24(1):22-31.**

Tritiation of the cannabinoid receptor antagonist SR144528 involving lithium aluminum tritide reduction; Assessment of the kinetic isotope effect by H-3-NMR. ***Journal of Labelled Compounds and Radiopharmaceuticals*, 48(8):589-596.**

Use of colonoscopy for colorectal cancer screening: Evidence from the 2000 National Health Interview Survey. ***Cancer Epidemiology, Biomarkers and Prevention*, 14(2):409-416.**

Use of dissolved and vapor-phase gases to investigate methanogenic degradation of petroleum hydrocarbon contamination in the subsurface. ***Water Resources Research*, 41(2).**

Use of the serologic testing algorithm for recent HIV seroconversion (STARHS) to identify recently acquired HIV infections in men with early syphilis in Los Angeles County. ***Journal of Acquired Immune Deficiency Syndromes*, 38(5):505-508.**

Very low birth weight preterm infants with early onset neonatal sepsis—The predominance of Gram-negative infections continues in the National Institute of Child Health and Human Development Neonatal Research Network 2002-2003. ***Pediatric Infectious Disease Journal*, 24(7):635-639.**

Violence against substance-abusing South African sex workers: Intersection with culture and HIV risk. ***AIDS Care*, 17(S1):55-64.**

Vitamin A supplementation for extremely low birth weight infants: Outcome at 18 to 22 months. ***Pediatrics*, 115(3):E249-E254.**

Water quality co-effects of greenhouse gas mitigation in US agriculture. ***Climatic Change*, 71(3):341-372.**

Whole-body hypothermia for neonates with hypoxic-ischemic encephalopathy. ***New England Journal of Medicine*, 353(15):1574-1584.**

AWARDS AND HONORS

Through their work at RTI, our researchers consistently distinguish themselves as leaders in their respective fields. In many cases, individual contributions to the advancement of science have been recognized by their peers.

A partial list of FY2005 honors conferred on RTI staff members by professional organizations, governments, and the community is shown below.

2005 Council for Entrepreneurial Development Technology of the Year Award

Nextreme Thermal Solutions, a company spun off from RTI International in 2005, was presented with the 2005 Technology of the Year Award from the Council for Entrepreneurial Development. The award, which was presented to Nextreme's Jesko von Windheim, Ph.D., by RTI President and CEO Victoria Franchetti Haynes, represents the second time an RTI spin-off technology company has received the award. The first time was in 2003, when it was awarded to Ziptronix.

Fellow of the American Association for the Advancement of Science

Vice President of Statistics and Epidemiology Sally Morton, Ph.D., was named a Fellow of the American Association for the Advancement of Science (AAAS) in fall 2005. Dr. Morton was elected by her peers as an AAAS Fellow in the statistical science category for her many innovative applications of meta-analysis to public policy decision-making and for her years of valuable service to professional societies.

Avedis Donabedian Outcomes Research Lifetime Achievement Award

Distinguished Fellow Kathleen Lohr, Ph.D., was honored in 2005 with a lifetime achievement award for her significant contribution to improving health care outcomes during her 30-year career in the fields of health care and health care policy research. Dr. Lohr is the third person to receive the Avedis Donabedian Outcomes Research Lifetime Achievement Award, which was presented by the International Society of Pharmacoeconomics & Outcomes Research at its annual meeting in Washington, DC.

University of California, Riverside 2005 Distinguished Alumnus Award

The University of California, Riverside awarded Derick Brinkerhoff, Ed.D., an RTI Senior Fellow in the International Development Group, its 2005 Distinguished Alumnus Award. The most prestigious of the UCR alumnus awards, it is based on national and international distinction in one's field and significant contribution to society.

SAE's first place award for Environmental Excellence in Transportation (E2T)

The Society of Automotive Engineering (SAE) honored RTI engineer Molly Dix and three NASA engineers for their work involving a high-strength aluminum alloy that is being used to create cleaner and quieter outboard motors. The team received SAE's first place award for Environmental Excellence in Transportation (E2T), which recognizes significant innovations in reducing the environmental impact caused by the transportation industry.

^ RTI's Kathleen Lohr, Ph.D. (R), and UNC-Chapel Hill's Timothy Carey (L), M.D., M.P.H.—co-directors of the joint RTI–UNC Evidence-based Practice Center—discuss issues related to their most recent systematic review on clinical and epidemiologic evidences pertaining to cesarean birth on maternal request. Dr. Lohr received a lifetime achievement award from the International Society of Pharmacoeconomics & Outcomes Research (see center column).

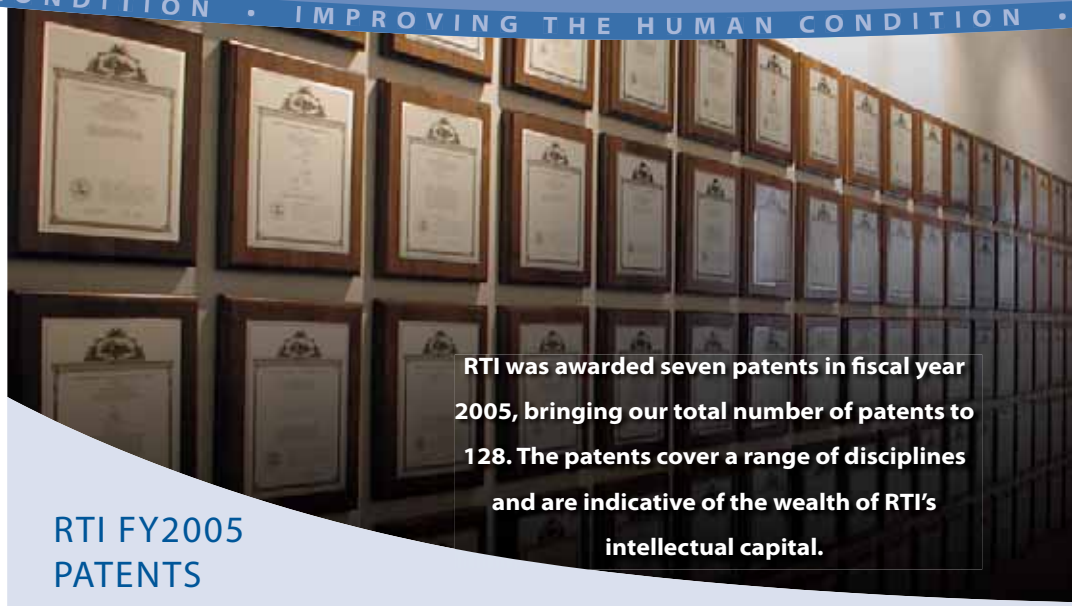
RTI FELLOWS—
Stewards of Our Mission

The highest scientific honor and greatest responsibility bestowed by RTI is the designation of RTI Fellow. Launched in 2001, the RTI Fellow Program recognizes and integrates the best scientific talent at RTI into our business strategy. In many ways, members of the RTI Fellows program are the stewards of our mission, ensuring that we never lose sight of its importance.

In 2005 we named three new RTI Fellows: Subhrendu Pattanayak, Ph.D., RTI Fellow; Lee Mobley, Ph.D., RTI Fellow; and Thomas Hoerger, Ph.D., RTI Senior Fellow. These distinguished researchers joined 11 of their peers as strategic scientific leaders—enhancing our scientific reputation, managing research projects, mentoring early-career scientists, and serving as scientific advisors to RTI President and CEO Victoria Franchetti Haynes.

RTI Fellows are also charged with helping bring the fruits of RTI's research to the scientific community and the public at large. For example, in May of 2005, RTI Senior Fellow Derick Brinkerhoff took part in a conference on international development—cohosted by RTI—at George Washington University, sharing insights gained by RTI through nearly 25 years of experience working in fragile states and post-conflict situations.

Other efforts pursued by RTI Fellows to enhance the impact of RTI's research include hosting seminars and symposia where RTI scientists and others share their results and explore emerging issues facing researchers around the globe. This year the RTI Fellows sponsored seminars on two such issues: synthesis and labeling of nanomaterials, and the use of adaptive sampling in clinical trials, telephone surveys, and surveillance for evidence of bioterrorism.



RTI was awarded seven patents in fiscal year 2005, bringing our total number of patents to 128. The patents cover a range of disciplines and are indicative of the wealth of RTI's intellectual capital.

RTI FY2005 PATENTS

Inventor(s)	Patent title	Number
Raghubir P. Gupta, Brian S. Turk, Albert A. Vierheilig	Attrition resistant, zinc titanate-containing, reduced sulfur sorbents	6,812,189
Brian F. Thomas, Herbert H. Seltzman, Maria Elena Y. Francisco	Compounds having unique CB1 receptor binding selectivity and methods for their production and use	6,825,209
Michael P. Gamcsik, David J. Adams, Michael O. Colvin, Monroe E. Wall, Mansukh C. Wani, Govindarajan Manikumar, Yves Pommier	Camptothecin compounds with a thioether group	6,825,206
Mark W. Roberson	Impedance control devices for use in the transition regions of electromagnetic and optical circuitry and methods for using the same	6,832,029
C. Edgar Cook, John A. Kepler, Yue-Wei Lee, Mansukh C. Wani	Androgenic steroid compounds and a method of making and using the same	6,864,248
Mark W. Roberson, Philip A. Deane, C. Kenneth Williams	Three dimensional multimode and optical coupling devices	6,906,598
Scott H. Goodwin	Layered photonic crystals	6,924,921

The Fellows also began preparing for their 2006 symposium, which will look at such issues as chronic health disorders, nanotechnology, energy sustainability, and democratization in the Muslim world. This event will bring together representatives from industry, government advisors, and researchers from around the world, with a particular focus on engaging the next generation of researchers in the dialogue.

Through these and other efforts, the RTI Fellows play a critical role in RTI's ability to make a difference in the world.

GIVING BACK

RTI International's mission—to improve the human condition by turning knowledge into practice—says a lot about our organization and the people who work here. We believe in doing good. So, in addition to our project work, we give back to the community in more direct ways.

For example, in FY2005, RTI's Corporate Contributions Board distributed $150,000 to 70 charitable causes in various locations—including Research Triangle Park, NC; Baltimore, MD; Chicago, IL; Cocoa Beach, FL; Hampton, VA; Waltham, MA; Washington, DC; El Salvador; and South Africa. The types of organizations funded cover a broad range of service delivery areas, such as health, seniors, disability assistance, basic needs, children's programs, domestic violence prevention, and the environment.

To meet the urgent needs of the victims of the tsunami in Indonesia, the earthquake in Pakistan, and Hurricane Katrina in the U.S., RTI made corporate contributions to relief organizations providing aid to victims of these events. RTI donated $10,000 to the International Federation of Red Cross and Red Crescent Societies for tsunami relief and $20,000 to relief funds for the Pakistan earthquake. RTI also matched RTI employee contributions to the American Red Cross for Hurricane Katrina relief, for a combined total of $264,755. In addition, after both Hurricane Katrina and the Pakistan earthquake, individual staff members took time off from their normal RTI duties to provide onsite assistance.

Jonathan Mitchell was one of those individuals. He traveled to Pakistan for project work shortly after the earthquake, and with vacation days donated by his colleagues, he was able to spend additional time in the earthquake-stricken area of Pakistan to help with the rebuilding effort.

^ Victoria Franchetti Haynes, Ph.D., RTI International president and chief executive officer (R), presents a check to Lynn Sherrill, manager of the Central North Carolina Chapter of the American Red Cross, to assist relief efforts along the Gulf Coast. The money was raised through donations by RTI employees that were matched with corporate funds.

^ Jonathan Mitchell, Ph.D. (R) helps distribute tents to earthquake victims in Pakistan. More than 10,000 tents were distributed. Now back in the United States, he is continuing to raise money for relief efforts in Pakistan.

FINANCIALS

Financial Summary

RTI enjoyed a successful business year, with annual revenue from contracts and grants totaling $467.7 million for the fiscal year ending September 30, 2005 (FY2005). Although total revenue declined by 8.2% from FY2004 revenue ($509.5 million), we anticipated that decrease, which resulted primarily from reductions in contracts and grants for work performed overseas. Consequently, our net revenue decreased to $15.3 million for FY2005, a decrease of 11% from FY2004 ($17.2 million).

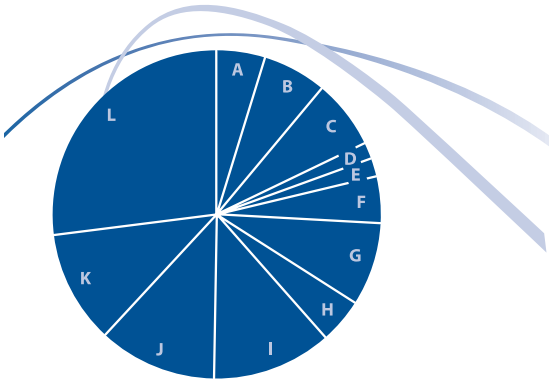
RTI's financial position and outlook remain strong, with equity increasing to $135.3 million as of September 30, 2005 (a 12.8% increase). RTI received $669 million in new contract and grant funding during FY2005, a 25.8% increase over FY2004 ($531.9 million).

As a nonprofit corporation, RTI invests its net revenue in facilities, programs, and capabilities to further its mission of conducting research that improves the human condition by turning knowledge into practice.

The following financial statements show the results from FY2005 and FY2004:

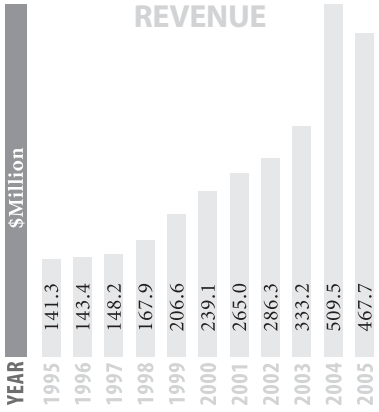
For the year:	FY2005	FY2004
Income Statement (in thousands of dollars)		
Revenue from research operations	$467,697	$509,467
Direct and indirect labor	(211,597)	(207,554)
Other direct costs	(186,647)	(228,959)
Other indirect costs	(53,108)	(55,044)
Other income (net of interest expense)	(1,031)	(703)
Net revenue	$15,314	$17,207
Balance Sheet (in thousands of dollars)		
Assets		
Current assets	$150,130	$124,764
Property and equipment, net	70,931	60,960
Other noncurrent assets	3,383	2,949
Total assets	$224,444	$188,673
Liabilities and Institute Capital		
Current liabilities	$84,936	$65,142
Long-term liabilities	4,204	3,541
Total liabilities	89,140	68,683
Contributed equity (unrestricted)	5,061	5,061
Contributed equity (restricted)	1,804	1,672
Accumulated net revenue	128,439	113,257
Total Institute equity	135,304	119,990
Total Liabilities and Institute Equity	$224,444	$188,673

REVENUE BY SOURCE

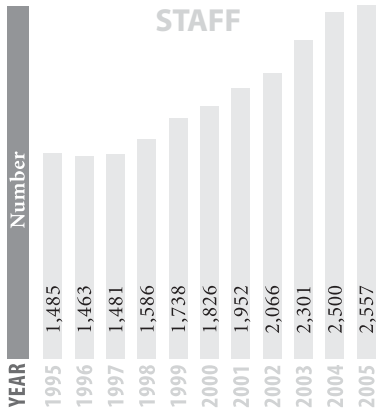


A	Environmental Protection Agency
B	Department of Defense
C	Department of Education
D	National Aeronautics and Space Administration
E	Department of Justice
F	Other Federal
G	Commercial
H	Other Non-Federal
I	National Institutes of Health
J	Substance Abuse and Mental Health Services Administration
K	Other Department of Health and Human Services
L	U.S. Agency for International Development

REVENUE



STAFF



CLIENTS

U.S. Government Clients

Corporation for National and Community Service
Department of Agriculture
Department of Commerce
Department of Defense
Department of Education
Department of Energy
Department of Health and Human Services
- Administration for Children and Families
- Agency for Healthcare Research and Quality
- Agency for Toxic Substances and Disease Registry
- Centers for Disease Control and Prevention
- Centers for Medicare and Medicaid Services
- Health Resources and Services Administration
- National Institutes of Health
  - –National Cancer Institute
  - –National Center for Research Resources
  - –National Eye Institute
  - –National Heart, Lung, and Blood Institute
  - –National Institute on Aging
  - –National Institute of Alcohol Abuse and Alcoholism
  - –National Institute of Allergy and Infectious Diseases
  - –National Institute of Child Health and Human Development
  - –National Institute on Deafness and Other Communication Disorders
  - –National Institute of Diabetes and Digestive and Kidney Diseases
  - –National Institute on Drug Abuse
  - –National Institute of Environmental Health Sciences
  - –National Institute of Mental Health
  - –National Institute of Neurological Disorders and Stroke
- National Toxicology Program
- Substance Abuse and Mental Health Services Administration

Department of Homeland Security
Department of Housing and Urban Development
Department of the Interior
Department of Justice
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Novartis
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Ford Foundation
Health Canada
Inter-American Development Bank
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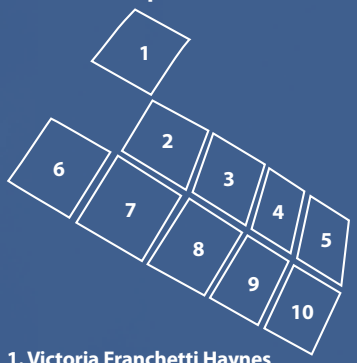
National Multiple Sclerosis Society
North Carolina Utility Commission
People's Republic of China
Project Bread—The Walk for Hunger
Robert Wood Johnson Foundation
Rockefeller Foundation
Samueli Institute
State of California
State of Florida
State of New York
State of North Carolina
State of Vermont
United Nations
World Bank
World Health Organization

LEADERSHIP

RTI Leadership



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Board of Governors

The governing body of RTI International is the Board of Governors, which formulates operating policy consistent with RTI's mission to improve the human condition by turning knowledge into practice.

The Board meets at least bimonthly and consists of up to 15 Governors who represent the University of North Carolina campuses, Duke University, and the business and scientific communities. The Members of the Corporation meet annually as the nonprofit equivalent of stockholders. The Members represent Duke University and The University of North Carolina.

RTI's President and CEO, Victoria Franchetti Haynes, Ph.D., directly supervises the senior officers, who are in charge of research operations and all administrative functions (finance, accounting, and infrastructure; contracts and legal affairs; human resources, communications, and public affairs). Dr. Haynes meets with these senior officers biweekly to set and review RTI's strategic direction and operating policies. In addition, a Senior Leadership Team, comprising both the senior officers and additional members of management, meet quarterly on business issues facing the organization.

In summary, it has been RTI's policy to use the organizational structure at all levels to directly support the program technical structure and ensure that program objectives are met in the most appropriate, efficient, and timely manner possible.

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Corporate Members

Members are the equivalent of RTI shareholders. They elect the governors, who represent the business and scientific communities.

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Duke University

RTI Headquarters

Research Triangle Park, NC
3040 Cornwallis Road
Post Office Box 12194
Research Triangle Park, NC 27709-2194
Phone: 919-541-6000
1-866-RTI-1958 (Toll-free)
Fax: 919-541-5985
E-mail: listen@rti.org

Regional U.S. Offices

Atlanta, GA
Atlanta Koger Center
Oxford Building, Suite 119
2951 Flowers Road South
Atlanta, GA 30341-5533
Phone: 770-234-5021
Fax: 770-234-5030
E-mail: hetland@rti.org

Chicago, IL
230 West Monroe Street, Suite 2100
Chicago, IL 60606-4901
Phone: 312-456-5240
Fax: 312-456-5250
E-mail: jloft@rti.org

Cocoa Beach, FL
3000 North Atlantic Avenue, Suite 208
Cocoa Beach, FL 32931-5029
Phone: 321-799-1607
Fax: 321-799-0948
E-mail: jenr@rti.org

Hampton, VA
One Enterprise Parkway, Suite 310
Hampton, VA 23666-5845
Phone: 757-827-1160
Fax: 757-827-3273
E-mail: lmp@rti.org

Rockville, MD
6110 Executive Boulevard, Suite 902
Rockville, MD 20852-3907
Phone: 301-230-4640
Fax: 301-230-4647
E-mail: rwebb@rti.org

San Francisco, CA
28 Second St., Suite 300
San Francisco, CA 94105-3461
Phone: 415-538-7852
Fax: 415-538-0879
E-mail: changarc@rti.org

Waltham, MA
411 Waverley Oaks Road, Suite 330
Waltham, MA 02452-8414
Phone: 781-434-1700
Fax: 781-434-1701
E-mail: ndivito@rti.org

Washington, DC
One Metro Center
701 13th Street, NW, Suite 750
Washington, DC 20005-3967
Phone: 202-728-2080
Fax: 202-728-2095
E-mail: joan@rti.org

International Offices

Dubai, United Arab Emirates
Dubai Knowledge Village
Post Office Box 500721
Dubai, United Arab Emirates
Phone: +971-4-362-5270
Fax: +971-4-362-5343
E-mail: nissa01@rti.org

Jakarta, Indonesia
Jakarta Stock Exchange Building Tower 2
Suite 2303
Jl. Jend. Sudirman, Kav. 52-53
Jakarta, Indonesia 12190
Phone: +62-21-515-0010
Fax: +62-21-515-2332
E-mail: rti-indo@rti.org

Manchester, United Kingdom
Williams House
Manchester Science Park
Lloyd Street North
Manchester, M15 6SE
United Kingdom
Phone: +44-161-232-3400
Fax: +44-161-232-3409
E-mail: sbeard@rti.org

Pretoria, South Africa
1st Floor, Southern Life Plaza
1059 Schoeman Street, Hatfield
Pretoria, South Africa
Phone: +27-12-342-5318
Fax: +27-12-342-5358
E-mail: ppillay@rti.org.za

San Salvador, El Salvador
Boulevard del Hipodromo Pasaje 10
Casa No. 110, Colonia San Benito
San Salvador, El Salvador
Phone: +503-243-2678/2679
Fax: +503-243-2678/2679
E-mail: amiranda@rti.org

Subsidiary

Warsaw, Poland
RTI-Polska Sp z o.o.
Ul. Walecznych 19/7
03-916 Warszawa
Phone: +48-22-827-0444
Fax: +48-22-826-0375
E-mail: office@rti.pl

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www.rti.org