



THE INSTITUTE
for PEDIATRIC
INNOVATION™

ANNUAL REPORT

2008



our VISION

With a Consortium of national leaders in pediatric care, we identify those areas where new products are most needed to improve quality of care.

We qualify the needs identified by the Consortium and design products to meet these needs through the help of a unique resource network.

IPI offers product opportunities for commercial adoption by companies that seek to extend the fruits of medical innovation to our society's youngest beneficiaries.

from the CEO



To our friends, supporters, and stakeholders,

What a gratifying year it has been. The strong support we have received and the rapid pace of our progress reflect positively on our model of needs-driven innovation.

We start by asking clinicians in our collaborating hospitals to tell us what they need. Then we validate and quantify these needs through market research surveys. Next we work with clinicians, engineers and marketing professionals to imagine solutions to those needs and analyze the highest priority product opportunities in full detail. Only at this stage do we work with sponsors and collaborating organizations to fund and develop the ideas into products, with related intellectual property. Upon completion, or near-completion of product development, we will license commercial organizations to bring them to market.

We are well along this path with three products for the NICU currently being co-developed with our Consortium hospitals, and we have begun applying the approach to medical device needs in pediatric cardiology.

We have also made progress in developing drug products optimized for children. With financing from the Ewing Marion Kauffman Foundation and Children's Mercy Hospitals and Clinics in Kansas City, and collaboration with the University of Kansas Institute for Advanced Medical Innovation, we have defined a first portfolio of reformulated drugs for pediatric cardio-renal care, and our first reformulated drug product is ready for commercial development. We are also evaluating formulation requirements for multi-drug treatment of pediatric tuberculosis in the developing world under a grant from the World Health Organization (WHO).

At year's end we added two more children's hospitals to our Consortium — The Children's Hospital, Denver, and Children's Hospital of Wisconsin. Each of these elite institutions recognizes the promise of our shared goals and can contribute unique resources to our collaborative efforts.

On behalf of our Board, staff, and constituents, I officially welcome our newest board member, Una Ryan, Ph.D., O.B.E., President and CEO of Waltham Technologies, Inc.

We are optimistic that, together with our sponsors and strategic partners, we will continue to find innovative ways to improve care for these most precious — and most vulnerable — patients.

Donald Lombardi
President and Chief Executive Officer



Our Pediatric Hospital Consortium Continues to Grow

The IPI Pediatric Hospital Consortium provides the vital connection between IPI's mission and the daily realities of caring for sick children. Clinicians from the Consortium hospitals help identify the drugs and medical products that are most needed to improve the care of children and they work with IPI to set priorities, develop specifications, design product concepts, and test new products.

In 2008, the Consortium grew from three to five outstanding pediatric hospital systems. Our three founding members — Children's Mercy Hospitals and Clinics in Kansas City, Missouri, University Hospitals Rainbow Babies and Children's Hospital in Cleveland, and the Lucile Packard Children's Hospital at Stanford University — were joined by The Children's Hospital, Denver, and Children's Hospital of Wisconsin. All are leaders in quality of care innovation and in many aspects of research and medical education. With a combined total of 72,000 annual admissions and 1.1 million outpatient visits, they serve a broad and diverse cross-section of the nation's pediatric population.

New Funding and Leadership Advances Pharmaceutical Reformulation

Our Pediatric Pharmaceutical Reformulation Program moved into high gear in 2008 with financial and research support from the Ewing Marion Kauffman Foundation and Children's Mercy Hospitals and Clinics, and with Dr. Stephen Spielberg serving as its principal investigator.

We and our partner institutions are addressing a longstanding challenge — how to produce and market specialized medications suitable for children that have the same level of consistency and effectiveness as those available for adults. Because most drugs are unavailable in formulations and doses appropriate for young children, pharmacists often have to grind pills made for adults into powder and suspend them in liquid using extemporaneous recipes. Besides being inefficient and imprecise, the process results in medicines that have not been validated for efficacy, safety or stability.

IPI's initial focus is on reformulating medicines that already have FDA approval to ensure their safe, effective, and compliant use in the care of children. With our collaborators, we define product needs, specifications and initial reformulations, and then work with commercial entities to develop products that will be manufactured and marketed specifically for pediatric use.

“It's been an outstanding year in terms of progress toward our goals. We are working with exceptional partners and really smart people who all care as much as we do about getting better products and drugs on the market for kids.”

Ross Trimby
Chief Operating Officer

COLLABORATING HOSPITALS



USP Conference

We organized a stakeholder conference in conjunction with United States Pharmacopeia, which sets standards for all medicines and other health care products manufactured or sold in the U.S. Representatives from pharmaceutical companies, advocacy groups, public agencies, academia and IPI's Consortium hospitals had an opportunity to review past efforts to bring specially formulated pediatric drugs to the market. We also examined key changes in the regulatory environment in the U.S. and abroad, new approaches to financing, and programs of special interest to U.S. and international health agencies. The conference helped frame key issues and priorities for the reformulation initiative and criteria for selecting the first product portfolio.

Drug Reformulation Collaboration

The Ewing Marion Kauffman Foundation made a grant to the University of Kansas, matched by University endowment funds, that includes funds designated to support IPI's development of two pediatric medications per year for the next five years. Scott Weir, Pharm.D., Ph.D., is director of the University's new Office of Therapeutics, Discovery and Development. By year's end, Dr. Weir and his team had completed the reformulation of a liquid form of Enalapril, which is used to treat hypertension and congestive heart failure. Hospital pharmacists compound Enalapril extemporaneously in liquid form for an estimated 20,000 pediatric patients a year. Weir says he is excited about the possibilities this new partnership presents. "What motivates us is not to develop the next big blockbuster drug, but to apply our expertise to these problems and help children," he says. "This collaboration allows us to do that."

Nationwide Survey on Pharmacy Compounding Launched

Although pediatric hospitals have long recognized the risks involved in formulating drugs for children extemporaneously, there is no up-to-date, national or international data on the scope of the problem. The last published information on the topic was from a survey conducted by the Pediatric Pharmacy Advocacy Group (PPAG) in 1997.

In mid-2008, IPI was awarded a \$50,000 grant by the University of Kansas to analyze the use of extemporaneously prepared liquid formulations in two-dozen children's hospitals. Each participating hospital has gathered an array of clinical, demographic, administrative and financial data related to the compounding of these medications and agreed to have it used in a blinded study. In total, the hospitals represent over 6.5 percent of the pediatric beds in the U.S.

The study has been supported by PPAG and members of IPI's Pediatric Hospital Consortium, and is led by Ralph Lugo, Pharm.D., Professor and Chair, Department of Pharmacy Practice, East Tennessee State University College of Pharmacy; Robert M. Ward, M.D., Director of Pediatric Pharmacology, University of Utah; and Stephen Spielberg, M.D., Ph.D., principal investigator for IPI. Lugo says IPI has played an invaluable role in moving this project forward. "IPI has tirelessly worked with hospitals across the country and followed up diligently to make sure the data were submitted in a timely and complete fashion," he says. "You need a champion to interface with the hospitals and they have been just that."

Results of the study will be published in 2009, and will add substantially to the nation's understanding of the most common extemporaneous medications; the patients who use them; and the hospitals' differing standards of practice, controls, dosing recipes and testing methods.



"Being a not-for-profit organization helps us be an honest broker between so many organizations: government, academic, industry, and others trying to make medicines for children better."

*Stephen Spielberg, M.D., Ph.D.,
Principal Investigator*



“IPI is succeeding where others have failed because they are bringing the appropriate parties together and engaging them in conversation about how to solve these problems. It is a very gratifying endeavor.”

*Brad Slaker
Engineering Manager*

IPI's Partnership with WHO Will Address Global Needs

UNICEF estimates that 4.5 million children under five years of age die each year from diseases that could be treated with child-specific medicines, if they were available – diseases such as tuberculosis (TB), pneumonia, diarrheal diseases, neonatal infections, malaria, and HIV/AIDS. IPI is working with the World Health Organization and its “Make Medicines Child Size” campaign to address the fact that many essential medicines have not been formulated for children or are not reaching the children who need them most.

In 2008, IPI received a generous grant through WHO to help determine what kind of formulations are needed for children internationally and to examine the many economic, cultural and social barriers that stand in the way. For instance, in those countries most in need, medications must be stable at high temperatures and in high humidity; they need to be easily transportable, especially if they are in liquid form; and they need to account for differences in the way that patients and family members view disease and medications, as well as their preferences for the flavor, color and size of the dose. Social and cultural issues are especially important with chronic illnesses like TB where a child has to be treated for months.

The first phase of the WHO project has included a detailed review of the medical anthropology by experts at Dartmouth College and Dartmouth Medical School. Their report will help advance pharmaceutical reformulation for children by sensitizing pharmaceutical developers and marketers to important cultural and social issues.

In addition, IPI is developing survey tools that will be used in three East African countries. Our goal is to get information from children, parents and health care providers that will help us understand what kinds of formulations are most likely to result in children taking the medications they need to survive curable illnesses.

New Product Concepts Refined for Improving NICU Care

One of IPI's first initiatives after our founding in 2007 was to work with our Consortium hospitals to identify critical unmet needs in neonatal intensive care units (NICU). By late 2008, IPI had presented three product concepts to Philips Children's Medical Ventures (PCMV) for licensing and development. PCMV specializes in products for the support of premature infants and hospitalized babies, and has collaborated with IPI on our needs assessment.

Much of the equipment in a typical NICU has not been designed for fragile infants, some of whom weigh only a few hundred grams. Medical device companies have shied away from developing NICU products because of the relatively small market for such devices and the challenges of conducting clinical trials in or with newborns.

In our role as a not-for-profit catalyst for change, IPI seeks to identify and facilitate new product opportunities for companies like PCMV, and also to induce companies that are currently making adult devices to extend their product lines to pediatric patients. Our first three product concepts will use new NICU technology or improve upon current technology to reduce the adverse effects that result from the highly invasive procedures and ongoing monitoring that is required to treat neonates.

A new medical adhesive will allow clinicians to attach and remove bandages and monitoring devices without damaging the delicate skin of premature infants; an endotracheal tube configured for neonatal applications will have a feature that indicates the precise location of the end of the tube in the infant's trachea; and a new device will improve clinicians' ability to locate veins in the limbs of neonates for sample taking.

Medical Device Needs Assessment Focuses on Cardiac Care

When cardiologists, cardiac surgeons and interventional radiologists care for pediatric patients using devices that were not specifically designed for that purpose, there can be major long-term consequences, especially as the children grow. With this in mind, the IPI team decided that the next major assessment of unmet needs should be in pediatric cardiology.

Adapting the successful model used for our assessment of neonatal intensive care, we are working with cardiac care clinicians from our Consortium hospitals and others to identify and prioritize critical gaps in the availability of commercially available devices for the care of pediatric cardiac patients. We began by engaging BioEnterprise, a non-profit medical technology organization, to interview clinicians from six hospitals about the cardiac care issues they face; the devices they need to have and would like to have; the products that are used for pediatrics but not made for pediatrics; and their perspectives on the opportunities for new or modified commercial applications.

Based on these interviews, IPI will assemble a master list of needs, ideas and opportunities that we will validate and refine using an online survey of four-dozen additional pediatric cardiac clinicians. Once we receive a report on the survey findings, we will convene an expert advisory panel with clinical, business and regulatory representatives to discuss the results and make recommendations on the different potential business models that could address the most urgent needs with the most promising solutions.

As is the case with our NICU program, we expect that IPI's cardiac care assessment will be a catalyst for business, clinical and regulatory interests to collaborate in reducing long-standing barriers that have hindered the development of top-quality products for children.

financial SUMMARY

Through 2008 the total for IPI Support, Revenue and Reclassification was \$742,517. This was a 63% increase over the comparable 2007 figure, and after expenses resulted in a total net change in Unrestricted Assets of -\$72,085. IPI finished the year with \$169,570 in cash and total net assets of \$36,914.

Some of the key contributions to revenue were:

- Contracted with two new hospitals— Children's Hospital, Denver and Children's Hospital of Wisconsin—to join the IPI Pediatric Hospital Consortium, each for two-year \$200,000 memberships, bringing the total participation to five pediatric hospitals.
- Completed the final \$100,000 phase of a \$300,000 contract for a neonate intensive care-focused project, and delivered three product opportunities to Philips Children's Medical Ventures.
- Received a \$47,900 grant from the World Health Organization to help guide the development of needed children's medicines in developing countries, including appropriate dosing guides for chronic therapy of diseases such as tuberculosis.
- Completed 80% of a \$300,000 Drug Reformulation Development grant supported by Ewing Marion Kauffman Foundation and Children's Mercy Hospital and Clinics of Kansas City.
- Received a \$50,000 grant from Kansas University to study the dosing patterns and the extemporaneous compounding processes for generating liquid reformulations for specific drugs in pediatric hospitals.

In addition, IPI completed our first full audit covering FY 2007, resulting in a clean opinion.

We also welcomed a new Director of Operations, Julia Ferrara, to the Cambridge staff and a new Engineering Director, Brad Slaker.



"Working at IPI has revealed to me in a new way both the need and the enthusiasm for improving pediatric care. The greatest contribution we can make as an organization is to shed light on areas of pediatric need, and work to fill those needs in ways that create broad impact."

Julia Ferrara
Director of Operations

MANAGEMENT TEAM

Donald P. Lombardi
President and Chief Executive Officer

Ross L. Trimby
Chief Operating Officer

Julia R. Ferrara
Director of Operations

Stephen Spielberg, M.D., Ph.D.
Principal Investigator

Brad Slaker
Engineering Manager

ACCOUNTING ADVISOR

Linda M. Smith
CPA
Smith Sullivan & Company PC

BOARD OF DIRECTORS

Ellen Baron, Ph.D.
Partner
Oxford Bioscience Partners

Philip A. Cola
Vice President for Research and Technology
University Hospitals Case Medical Center

Christopher G. Dawes
President and Chief Executive Officer
Lucile Packard Children's Hospital at Stanford

Charles Homer, M.D., M.P.H.
Chief Executive Officer
National Initiative for Children's Healthcare Quality

Donald P. Lombardi
President and Chief Executive Officer
Institute for Pediatric Innovation

Randall L. O'Donnell, Ph.D.
President and Chief Executive Officer
Children's Mercy Hospitals and Clinics

Una Ryan, Ph.D., O.B.E.
President and CEO of Waltham Technologies, Inc

Stephen Spielberg, M.D., Ph.D.
Principal Investigator
Institute for Pediatric Innovation

Ross Trimby
Chief Operating Officer
Institute for Pediatric Innovation

LEGAL ADVISOR

Karin A. Gregory, Esq.
Partner
Furman Gregory, LLC

