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## **About Us**

The ICTCR facilitates patient-centered research through the combined strengths of its founders: Mercy Medical Center, and Des Moines University along with its partners Drake University College of Pharmacy and Health Sciences and Mercy College of Health Sciences and welcomes inquiries from interested clinicians and scientists.

For more information, please call (515) 247-4435.  
[www.iowatranslationalresearch.org](http://www.iowatranslationalresearch.org)

## **Remote ICU patient monitoring: ICTCR leads a hypothesis-driven study of the value of Mercy Health Network's eICU Program.**

A state of the art system that provides evidence-based medicine driven treatment of intensive care patients hundreds of miles away from Des Moines is being operated at Mercy Medical Center. This system, which is part of the Mercy Health Network, allows critical care patients at remote hospitals to be followed by a team of intensivist physicians and critical care nurses. The system enabling this specialized care, combines several technologies, including 2 way video linkage between remote ICUs and the Des Moines monitoring site, and physiologic monitoring by high speed telemetry, which has been instrumental in bringing critical care expertise to locations where intensivist physician availability may be limited. While systems in other parts of the country have been evaluated, information on benefits of the system implemented here at Mercy and its satellite ICUs has not been independently evaluated.

This research, sponsored by a grant from the Wellmark Health Plans, Inc., is using rigorous methods of objective analysis to determine what changes have occurred in severity-normalized patient outcomes, nursing satisfaction, staffing levels, retention and financial results before and after implementation of the program at two hospitals in the Mercy Health Network. In order to account for secular trends over the same time of observation (2007-2008), two control hospitals where eICU has not been implemented are being studied in the same way as a control group. The ICTCR is bringing the expertise of several investigators who are part of Des Moines University's College of Health Science to this project. This study promises to be the first of its kind and will bring a rigorous controlled research design to independently evaluate several aspects of the eICU and its implementation. Study findings will be presenting its later this year.

### **Iowa Center for Translational and Clinical Research Featured in "Iowa Medicine – The Journal of the Iowa Medical Society"**

Dr. Kendall Reed, Dean of the College of Osteopathic Medicine at Des Moines University has provided a nice summary of the history and purpose of the ICTCR for members of the Iowa Medical Society. It is clear that the ICTCR is of value both to the DMU-COM and other educational institutions as it not only serves to advance clinical research at Mercy Medical Center, but also as a conduit for medical and health care students and trainees to become part of the clinical and translational research process. Thanks goes out to Dr. Reed for bringing the ICTCR to the attention of physicians statewide.

Place, health and illness:  
Not entirely new concepts

Geographical Information Systems (GIS) and Medicine

In a 2003 article by Nancy Krieger (Epidemiology 14:384), the author noted that two millennia ago, Hippocrates opined on the importance of a person's location to his "constitution and habits".

Epidemiologists often claim John Snow as their forebear. Snow, in 1859, tracked a London cholera outbreak to the Broad street pump documenting his findings with maps that located cases and where they went to obtain their water. Thus, while one might consider Snow to have been primarily an astute epidemiologist, he was likewise one of the first users of the GIS concept, even though the technology proving so useful today had not yet been invented.

While historical hints of the concepts of GIS exist, some aspects are ultramodern.

Geographical information requires the map coordinates as part of the data needed to accurately map the medical features in space. In a recently published paper in Malaria Journal (9:96 2010), the movement of resources to outbreak areas was accomplished by updating maps of outbreaks using GIS software. In a very modern twist, the data to support proper mapping of malaria occurrences was done by mobile phones that are able to report their precise map coordinates even as medical data is transmitted by voice.

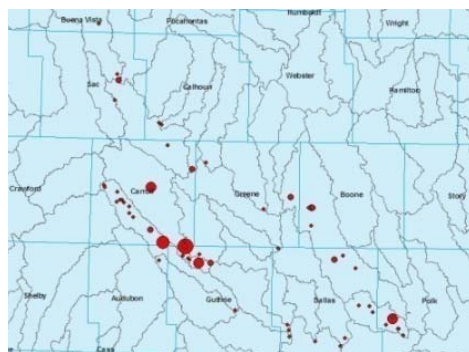
Integration of systems that report location as well as other data will exploit social networking web sites as sources of primary data. This type of sea change will make patients and healthy individuals who are not medically trained to become participants in research processes through previously untested methods.

Place Matters! That is the message from geographers who have begun to explore medicine and public health through their expertise in spatial concepts and by physicians and medical researchers who have re-discovered the value of applying geographical concepts to medicine. This connection between geography and medicine has largely resulted from the enabling technology known as Geographical Information Systems, or GIS which combines hardware, software and human intelligence to meld medical and spatial data into a visual representation that allows intuitive recognition of patterns that would otherwise require laborious mathematical correlations to discover subtle patterns. The use of GIS is made even more powerful by allowing statistical correlations to confirm the visual representation of data.

To give a quick idea of how rapidly this tool has been adopted by medical researchers, a PubMed search using the term "Geographical Information System" found 1657 publications and 85 of these were published in the first quarter of 2010.

The Centers for Disease Control and prevention have, for many years, published their epidemiologic reports in the form of maps as well as tables and other figures. These have been useful in following year to year trends in diseases and changes in geographical distribution. Much of this data, however, is organized by political boundaries (state and county lines). But GIS is now going beyond linking prevalence to states or counties, and is able to place disease conditions on maps that illustrate relative proximity to land features such as waterways, elevation, potential hazards such as manufacturing plants, dump sites, confinement animal feeding operations or highways and population centers. The potential for correlations is almost endless.

A study conducted at Des Moines University in 2007 used more than 800 water samples from the Raccoon River watershed and identified vancomycin resistant *Enterococcus* in water samples. Using GIS software, the location and concentration of the organisms was placed on a map. Not shown are other views of this data that also provide information on animal confinement facilities, human populations and other features



including estrogenic activity in the same surface waters as contained *Enterococcus*. In the figure to the left, the size of the dots indicates the concentration of the bacteria in the water samples from that location.

Publications related to the location of disease outbreaks are abundant, but some other uses of GIS demonstrate great novelty. For example, an online course on the use of GIS locates the rate of breast cancer mortality in the U.S. and uses correlation statistics to link elevation and temperature to the mortality rates above the mean. While there are several limitations in this presentation of GIS data (for example, stability of the population where higher mortalities occurred), it is interesting that the findings lead the authors to consider the role of latitude, daylight and melatonin in relation to breast cancer risk. (see <http://iier.isciii.es/supercourse/lecture/lec10671/index.htm>).

In addition to linking ecological and spatial conditions to medical conditions, GIS is being used in health delivery studies, such as distance to certain types and levels of health care. Linkages between health disparities, neighborhoods and other ecological circumstances are readily visualized through GIS methods. Certainly, GIS has limitations, both in terms of data available to create the location-based correlations, and also in terms of creating correlations that are not statistically significant or clinically relevant. Nevertheless, this is a powerful tool that can advance medicine. -Bryan Larsen

**Featured Researcher:**

**Dr. Dan Ellsbury**



Dr. Ellsbury is the Medical Director of the Mercy Medical Center Neonatal ICU and serves as Director of Continuous Quality Improvement for the Pediatrix Medical Group.

**Investigators Please Note:**

*The ICTCR will be pleased to feature recently published articles, books, chapters or national / international presentations made by Mercy affiliated physicians, residents and staff. The increasingly robust research enterprise at Mercy Medical Center deserves the attention of medical and scientific colleagues within our community and throughout CHI. Please inform us of your research by email: [blarsen@mercydesmoines.org](mailto:blarsen@mercydesmoines.org)*

**Mercy Neonatologist Contributes to Practice Improvements with Textbook and Paper**

Dr. Dan Ellsbury, Director of the Neonatal Intensive Care Unit at Mercy Medical Center, published an article in the Journal of Perinatology (currently in electronic form ahead of print publication) in collaboration with additional investigators. In his role as Director of Continuous Quality Improvement and findings from the Center for Research, Education and Quality of the Pediatrix Medical Group he has organized a research group that mined data from the extensive experience of the Pediatrix Medical Group to demonstrate the growing use of inhaled nitric oxide among premature infants and correlated this treatment with the demographic and other features of these cases. The robustness of their data set is illustrated by the fact that they examined records of almost a half-million cases. In addition, the study illustrates the fact that valuable clinical data can be gained by research conducted in community hospitals.

Dr. Ellsbury's has also served as co-editor of an issue of Clinics in Perinatology, with personal contribution of several chapters. This work serves as a text on quality improvement in perinatology and provides guidance on how to translate the medical knowledge that has developed from academic and clinical research in recent years to clinical practice for the benefit of patients and for the overall increase in quality of neonatal units nationwide.

Working at the Intersection of Continuous Quality Improvement and Medical Practice in a large nation-wide pediatric practice network, Dr. Dan Ellsbury has distinguished himself as someone who is developing important research that touches the key areas of translational research and health systems studies. In this role, Dr. Ellsbury has access to the Clinical Data Warehouse of de-identified data comprising information from neonatal intensive care units in 244 hospitals in 32 states and Puerto Rico.

The Mercy Medical Center Neonatal Intensive Care Unit is both an important venue for patient care, and is continuing to contribute to advancing medical knowledge through its participation in the Pediatrix data warehouse and the national programs in neonatal research and the National Children's Study (see December 2009 and February/March 2010 Updates )

**Statement of Purpose**

The ICTCR is a research enterprise that facilitates productive research collaboration between its partners by sharing intellectual and infrastructure resources for the purpose of advancing patient-centered research that seeks better health for our communities and education and research opportunities for our faculty, staff, students and trainees. We believe the comprehensive training of medical students, residents and other health care professionals must be accompanied by a working knowledge of clinical research methods and best practices and that the best way to accomplish this is through active research endeavors. The ICTCR is dedicated to ethical and compassionate care for all individuals who participate in clinical research studies and actively supports the principles of autonomy, beneficence and justice in clinical research programs.