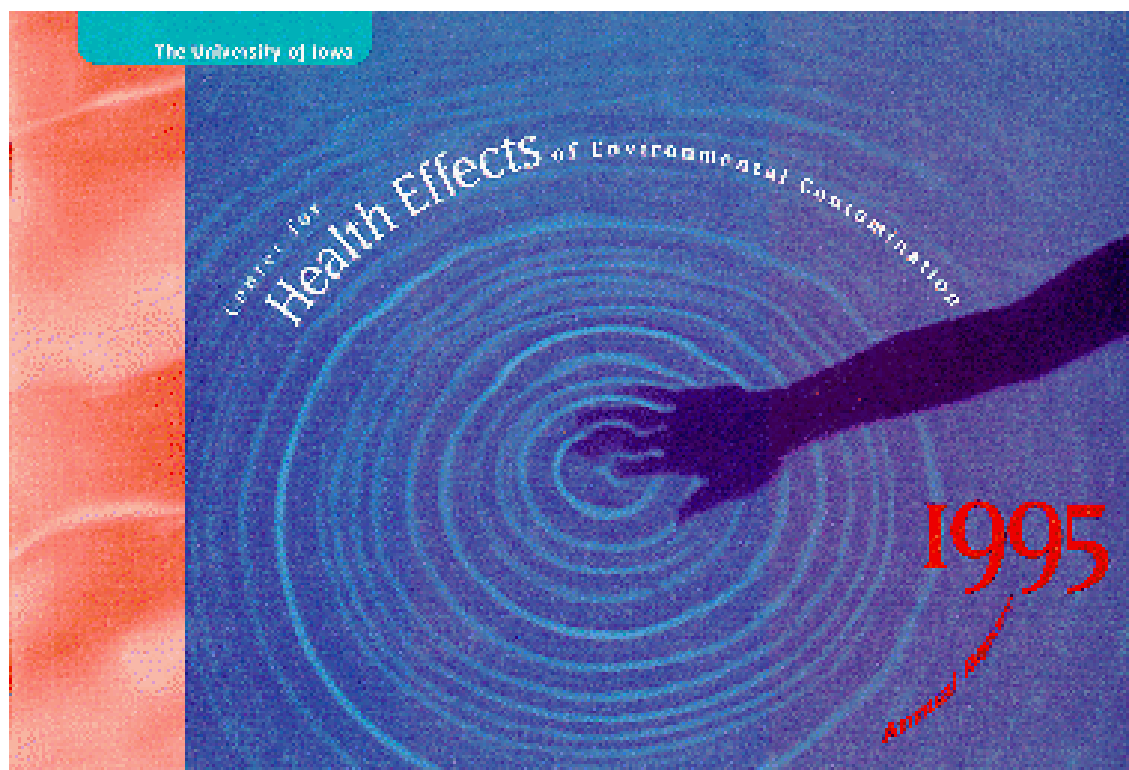
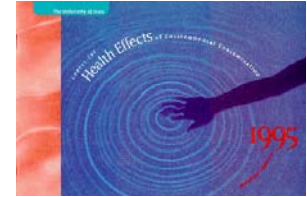


Center for Health Effects of Environmental Contamination | CHEEC

## 1995 Annual Report





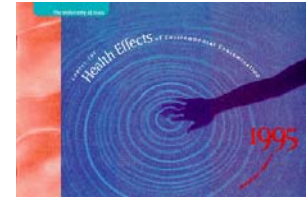
The general mission of the Center for Health Effects of Environmental Contamination (CHEEC) is to investigate the human health effects associated with environmental contamination. Our 1995 Annual Report provides summaries of the research activities of the CHEEC Data Management Center (CDMC), the many water quality databases managed by CHEEC, the seed grants awarded during 1995, and the seminars and workshops sponsored in 1995. A special focus is the description of the water quality databases for Iowa municipal water systems and private rural wells.

The CDMC continues to be involved in on-going health effects research. These activities include the Agricultural Health Study, the Residential Radon and Lung Cancer Case Control Study, the Mammography Surveillance Study, and the Nitrate in Drinking Water and non-Hodgkin's Lymphoma Study. These studies are assessing the effects of exposure to pesticides, radon, nitrate, and other environmental contaminants on human health. The CDMC provides data management expertise and services for these projects.

The 1995 Annual Report contains a detailed summary of all the water quality databases CHEEC maintains. These include a variety of both municipal and rural water quality databases. For example, CHEEC now has in its database WATSTORE data, data on radon levels in Iowa water supplies, and Safe Drinking Water Act data. These databases have been used by researchers in Iowa and around the nation in conducting a variety of health effects research. An ongoing CDMC activity is the updating of these databases as new data is generated.

CHEEC continues to strive to allocate approximately one-third of its annual budget to funding innovative health effects research and education projects. We have funded over \$560,000 worth of seed grants; results of these seed projects have been used to generate over \$3.5 million in external funds. In 1995 we funded research assessing the effects of lead exposure on workers and provided partial support for two educational activities.





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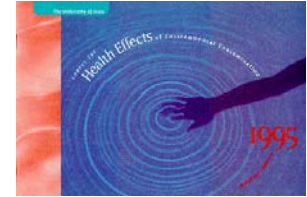
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## Data Management Center

The CHEEC Data Management Center (CDMC) has a staff of three full time database analysts who provide full support for system programming, local area network (LAN) administration, database design and administration and applications development. Environmental databases are designed and managed on the ORACLE database management system. The CDMC provides computer services for state and federally funded environmental health research. In order to meet the needs of the various research projects, the CDMC maintains a 25-user NetWare LAN which includes ORACLE Server for NetWare. Twenty-one desktop client workstations use OS/2 WARP or Windows. All computers and printers on the LAN use TCP/IP and SPX/IPX network protocols.

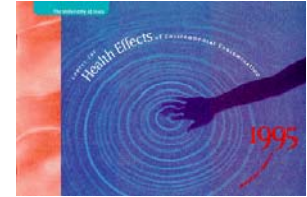
The workload on the CHEEC server has grown over the past two years as the CDMC became involved in additional activities. In order to meet the current and future needs of the CDMC, a Hewlett Packard J-200 workstation was purchased and installed in 1995. This workstation runs the HP-UX UNIX operating system.

### **CDMC Research**

#### **Agricultural Health Study**

CDMC staff provide ongoing computer support for the *Agricultural Health Study* being conducted in Iowa by the University of Iowa Department of Preventive Medicine and Environmental Health (PMEH). The study is also being conducted in North Carolina. The goal is to create a cohort of approximately 100,000 persons that can be followed for ten years or more to obtain detailed information on agricultural exposures, diet, and family and personal medical histories. The study is being jointly funded by the National Cancer Institute (NCI), the Environmental Protection Agency (EPA) and the National Institute for Environmental Health Sciences (NIEHS).

Working through the Pesticide Applicator Testing Program of the Iowa Department of Agriculture and Land Stewardship and the Pesticide Applicator Certification Program of the Iowa State Cooperative Extension Service, researchers plan to enroll 39,000 farm owners/operators (private pesticide applicators), 8,000 commercial applicators, and 28,000 spouses of private applicators during the



first five years of the study. An estimated 20,000 persons will be asked to participate in North Carolina. Information from these two states will provide data on agricultural practices that can be helpful to farmers nationwide.

CDMC staff developed an integrated computer system to support study activities. The team of researchers and administrative staff rely heavily on the system to support the enrollment process and track enrollment progress. From a systems point of view, it is a unique project because data must be shared between several different agencies, and the high volume during peak enrollment periods places a great demand on system resources.

### **Residential Radon and Lung Cancer Case Control Study**

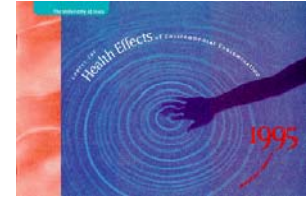
The CDMC provides database administration and systems support for the Iowa-based *Residential Radon and Lung Cancer Case-Control Study* being conducted by PMEH. The study's main objective is to evaluate the association between residential radon exposure and the incidence of lung cancer in Iowa women. Advisories have been issued indicating radon is the second leading risk factor for lung cancer and may be responsible for 7,000 to 30,000 lung cancer deaths annually. This NIEHS-funded study began in October 1992 and will end in October 1997.

Several factors made Iowa an ideal study site: its low population mobility, a population-based statewide cancer registry (State Health Registry of Iowa - SHRI) that allows rapid reporting of lung cancer cases, and the highest mean screening radon concentrations in the United States.

To be eligible for inclusion in the study, cases and controls must have resided in their current home for twenty or more consecutive years. Up to seven alpha track radon detectors are placed in each home for one year to measure contemporary radon gas exposure. Several historic radon detectors are employed for one year to measure contemporary and historic radon progeny concentrations. Additional monitoring is conducted in a subset of homes to examine yearly radon variations. The radon measurements are linked with historical temporal and spatial participant occupancy patterns to obtain radon and radon progeny exposure estimates.

### **Mammography Surveillance Pilot Study**

CDMC staff are providing database design and applications support for the *Mammography Surveillance Pilot Study* being conducted in Scott County, Iowa. This NCI-funded project is evaluating the feasibility of performing population-based mammography

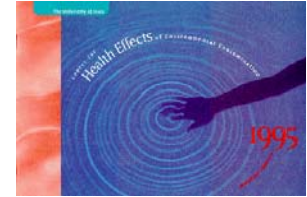


surveillance by identifying and linking patients receiving screening and diagnostic mammograms with their breast tissue pathology reports and breast cancer experience. Possible environmental risk factors for breast cancer include exposures to xenoestrogens and residential magnetic fields.

Specific aims are to assess the use and effectiveness of breast cancer mammography in Scott County, determine the need for changes in the practice of screening and in the workup of women with positive screening tests, and evaluate the feasibility of performing studies of biologic characteristics of screen-detected breast cancers and non-screen detected breast cancers. The Iowa *Mammography Surveillance Pilot Study* is participating in a national consortium of similar surveillance studies. The consortium is committed to sharing common protocol, study design, and research objectives as well as comparable data collection procedures.

#### **Nitrate in Drinking Water and non-Hodgkin's Lymphoma Pilot Study**

Compilation of historical data on nitrate and fluoride in Iowa municipal and private water supplies continued in 1995. The CDMC is working in collaboration with the University Hygienic Laboratory (UHL) and the Iowa Department of Natural Resources-Geological Survey Bureau (IDNR-GSB) on this NCI-funded project. Several historical surveys have been identified as sources of pertinent data and have been assimilated into CHEEC municipal analytical water quality database. Estimates of exposure levels for specific populations in Iowa were developed for a variety of time periods in order to study exposure to nitrate in drinking water supplies and the possible development of non-Hodgkin's lymphoma. Previous research in Nebraska reported an association of non-Hodgkin lymphoma in populations with high nitrate levels in drinking water.



## Water Quality Databases for Iowa Municipal Systems and Private Rural Wells

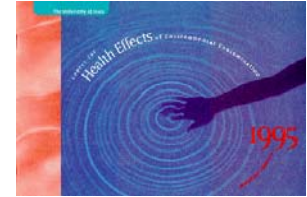
The Iowa Groundwater Protection Act specifically mandated that CHEEC *"assemble all existing data relating to Iowa drinking water supplies, including characteristics of source, treatment, presence of contaminants, precise location and usage patterns to facilitate data retrieval and use in research."* The CDMC has worked continually since 1987 on identifying sources of data on Iowa drinking water supplies and assimilating this information into the CHEEC system. These data provide historical information on human exposure levels to a wide variety of toxic substances from industrial and agricultural sources, byproducts of water treatment processes as well as naturally-occurring water contaminants such as radon. The CDMC has three drinking water databases which are maintained and updated on a regular basis. These include the historical municipal water supply and treatment database, the municipal analytical water quality database, and the Statewide Rural Well Water Survey (SWRL). In addition to providing data for environmental health research, the data have been heavily utilized by engineering consulting firms, state and federal environmental agencies, environmental educators and the public. Following are overviews of the databases, their development and applications for various types of research.

### **Historical Municipal Water Supply and Treatment Database**

In relating health effects data to water supplies, quite commonly questions arise concerning years of use, type of source and treatments, and amount of water obtained from these supplies. The necessity of this type of data in providing more powerful epidemiologic evaluations of potential relationships has been demonstrated in several studies. CHEEC has established a systematic process to accumulate and update historical information on municipal water supplies.

Municipal water data on source characteristics and treatment processes for communities over 1,000 population were the initial components of the historical municipal water supply and treatment database (1988-89). Partial support for the collection of these data came from the 1987 NCI-EPA funded project *A Case-Control Study of Cancer and Drinking Water Contaminants*. Other sources of historical source and treatment data which provided a base of information for Iowa communities include the 1979 NCI funded *National Collaborative Bladder Case-Control Study* in which Iowa participated, IDNR-GSB files, UHL water samples, IDNR's 1986-87 Statewide Public Water Supply Survey, Iowa Department of Public Health (IDPH) water supply data from the 1960s, and computerized records of municipal treatment practices from the early 1960s and the mid-1970s.





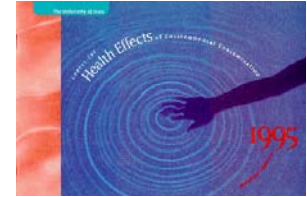
In 1990, the CHEEC Seed Grant Program funded an effort to collect similar data for communities with populations between 750-1,000, and communities of 400-750 persons were added in 1991. These projects involved mailing a summary of existing information (from sources described above) to water plant operators and following up with a phone call to verify that information and collect data on new water sources and any changes in treatment processes. Currently, the database contains municipal water source and treatment information through 1992; a project to update the entire database through 1996 is planned.

This database is utilized in ongoing analyses of information from death and birth certificates obtained from the IDPH and on birth defect and cancer data obtained from the SHRI. University of Iowa researchers have used municipal water supply and treatment data in studies of reproductive health outcomes, cancer incidence and dental health.

### **Municipal Analytical Water Quality Database**

Analytical data on municipal water quality provide a wealth of information for health researchers interested in long term population exposure levels to drinking water contaminants. CHEEC water quality data are being linked with statewide health outcome data on cancer and birth defects maintained by the SHRI. Historical information on nitrate, water treatment byproducts, synthetic organic compounds (SOC), volatile organic compounds (VOC) and other man-made contaminants, as well as naturally-occurring substances such as radon and fluoride has been gathered from a wide variety of surveys. In addition, CHEEC and the UHL have a cooperative agreement which provides for regular updates of the database with results of analyses required by the Safe Drinking Water Act. Sources of data for the CHEEC municipal analytical water quality database are described below.

***One Time Testing of Iowa's Regulated Drinking Water Supplies:*** In 1986, the Iowa General Assembly passed House File 2303, mandating that IDNR develop and implement a one-time analytical testing of finished water from Iowa's public and private water systems for 35 pesticide compounds and 35 VOCs. Eight hundred and fifty-six water systems were tested between November 1986 and November 1987, all analytical services being provided by the UHL. This was the first such monitoring program conducted in Iowa; IDNR's statutory authority restricts the implementation of analytical monitoring not specifically imposed by the Safe Drinking Water Act.

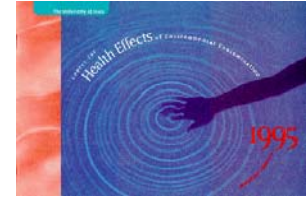


Results from this study documented the widespread presence of drinking water contamination. One or more pesticides were detected in 125 water systems; the most commonly found were atrazine, cyanazine, alachlor, metolachlor and 2,4-D. Five hundred and fifty systems tested positive for one or more SOCs; the most frequently found VOCs were trihalomethanes (THM). No measurable concentrations of pesticides or VOCs were found in 279 systems. A few water systems had pesticides or VOC levels that exceeded EPA health advisories or maximum contaminant levels, but contaminant levels high enough to cause an acute health risk were not observed.

**NCI-EPA Water Supply Surveys:** In 1987, a Municipal Water Sample Analyses Survey and an Historical Community Water Supply Survey were conducted in Iowa in conjunction with a large cancer case-control study funded by NCI and EPA. All communities with a population over 1,000 (1980 census) were included. Two hundred and ninety-nine water utilities serving a total population of 1,860,000 (about two-thirds of Iowa's population) were involved. CHEEC designed and managed relational databases for both surveys; the Historical Community Survey provided the basis for the CHEEC community water supply and treatment database previously described.

During the Municipal Water Sample Analyses Survey, drinking water samples were collected from utilities and analyzed by UHL staff. Analyses included several pesticides, THMs, trichloroethylene, trans-1,2-dichloroethene, cis-1,2-dichloroethene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, carbon tetrachloride, BTEX, MTBE, total organic carbon, total organic halide, pH, water temperature, total solids and dissolved solids.

**Safe Drinking Water Act:** In 1974, Congress passed the Safe Drinking Water Act (SDWA) to establish national standards for drinking water. Congressional action was initiated as the result of two studies (EPA, Environmental Defense Fund) documenting the presence of possible carcinogenic substances in drinking water supplies across the United States. The Act, enforced by EPA, was designed as a two part process: 1) identifying contaminants and establishing maximum levels in drinking water for those substances, and 2) listing all known contaminants for which there were no established maximum consumption levels, for further research. The Act required regular monitoring of drinking water supplies for all community water systems with 15 or more service connections serving 25 or more individuals. In Iowa, water samples were collected and analyzed by the UHL, under the authorization of IDNR. CHEEC cooperates with the UHL to assimilate SDWA data from 1988-present into the CHEEC system, with regular updates provided.



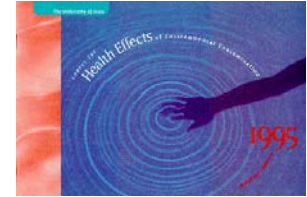
Historical Iowa SDWA data have been archived by the IDNR. CDMC staff are working with the IDNR Water Supply Section and to access those data.

**Ground Water Supply Survey:** In 1980-81, the EPA funded a survey to sample 945 groundwater-based public water supplies nationwide for 29 VOCs, trihalomethanes and total organic carbon. Data on other characteristics of the supply such as location, population served, aquifer source, treatment practice and proximity to industrial and commercial sources were also collected as part of the Ground Water Supply Survey. Half of the samples were taken from a random list of water systems, the other half from systems which were likely to show VOCs in drinking water. A total of 25 supplies were sampled in Iowa. Nationwide, the most frequently found compounds other than THMs were trichloroethylene, 1,1,1-trichloroethane, tetrachloroethylene, cis- and/or trans-1,2-dichloroethylene, and 1,1-dichloroethane. A number of herbicides were present in Iowa public water supplies, including atrazine, metolachlor, trifluralin, alachlor, metribuzin and cyanazine.

**Iowa Public Water Supply Data:** In 1964, a summary of Iowa Public Water Supply data from the mid 1950s through the early 1960s was compiled and published by the Division of Public Health Engineering at the Iowa State Department of Health. This report contained information on mineral analyses collected by the State Department of Health and the GSB, and was released as a reference for public use. CHEEC identified the 1964 summary as a source of historical nitrate data for the NCI funded project on nitrate in drinking water and non-Hodgkin's lymphoma, and assimilated that information onto the CHEEC analytical database. In addition, analytical results for sodium, calcium, magnesium, fluoride and hardness measured as calcium carbonate were also added to the system.

**Mineral Analysis of the Underground Waters of Iowa:** Published in 1938 as a joint venture of the Iowa State Planning Board, Iowa Geological Survey, and Iowa State Department of Health, this survey was developed in response to a need for information on water quality in Iowa following a severe drought in 1934. With support from the Emergency Relief Administration and the Works Progress Administration, almost 2,000 water samples were collected and analyzed over an 18 month period beginning in late 1934. This publication contains information on 1,357 of those samples, which were collected from municipal supplies across the state. CHEEC utilized this survey for historical information on nitrate for the NCI non-Hodgkin's lymphoma project. Data on fluoride were also added to the CHEEC database.





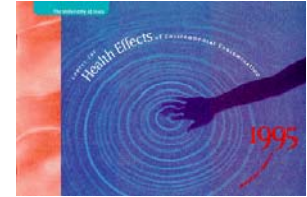
1974. WSFL contains data on pesticides, nitrate, VOCs, SOCs, inorganics and radiological contaminants. CHEEC will be assimilating WSFL data on nitrate levels in Iowa municipal water supplies for the NCI non-Hodgkin's lymphoma project, and is looking into the feasibility of accessing other data of interest.

**Radon ( $^{222}\text{Rn}$ ) Study:** In 1992,  $^{222}\text{Rn}$  analyses were completed on samples taken from 153 public water supplies using a single hydrogeologic formation for their source of drinking water. Samples were collected from both the source and the distribution systems. This study was conducted by the UHL through an IDNR grant. The analyses suggested that over 50% of the groundwater sources are naturally high ( $> 300$  pCi/L) in  $^{222}\text{Rn}$ . Very few sources (4 samples) exceeded 1000 pCi/L. Although the majority of groundwater sources were high in radon, only 28% of the public water supplies in the study exceeded the proposed drinking water standard of 300 pCi/L in samples collected from the distribution systems.

### Statewide Rural Well Water Survey

The IDNR, in conjunction with CHEEC, conducted the Statewide Rural Well Water Survey (SWRL) between April 1988 and June 1989. This survey was legislatively mandated in 1987 in response to concerns about the quality of drinking water supplies in rural Iowa. SWRL systematically selected and sampled 686 sites and provided a statistically valid assessment of the proportion of private rural wells affected by various environmental contaminants including pesticides, nitrate and coliform bacteria. The SWRL design framework also selected a subset of 10% of all sites for repeat sampling on a regular basis, in order to monitor water quality over time as an indicator of temporal change. The main survey was conducted during the driest consecutive two-year period in Iowa's recorded history. The objective of the resampling studies was to assess water quality during more conditions. Resamplings were done in 1989, 1990 and 1991.

Main survey results showed 44.8% of wells statewide exhibited the presence of total coliform bacteria, which are an indication that other pathogenic microbes may be able to enter a water system. In addition, up to 18% of Iowa's rural population were consuming water that contained high levels of nitrate. Data showed that 13.6% of private rural drinking water wells were contaminated with one or more pesticides, the most common being atrazine, metribuzin, pendamethalin, metolachlor, alachlor and cyanazine. The only water quality changes and trends from the main survey and first resampling (1988-89) to the 1990 and 1991 resamplings that were significant as estimates for all rural well water, statewide were: 1) a decline in the detection of dissolved organic-nitrogen in 1990 and



its increase in 1991; 2) an increase in fecal coliform positives in 1990 and 1991; 3) a decrease in NH<sub>4</sub>-N; and 4) an increase in atrazine detections in 1990, which subsequently declined in 1991.

In addition to water sampling, personal interviews and on-site inventories were conducted by field staff during the main survey. Data on wells, characteristics of the sites served by these wells, and the basic health status of residents were collected using four types of questionnaires. Inventory questionnaires were completed for 99% of sites; health assessment questionnaires were returned voluntarily from 85% of the sites. The inventory data have provided insights on the relationship between land use, well construction and water quality. An example of how SWRL data are being utilized in health research comes from the NCI non-Hodgkin's lymphoma study, where researchers are using nitrate data to extrapolate exposure levels for rural residents by geographic region across Iowa.

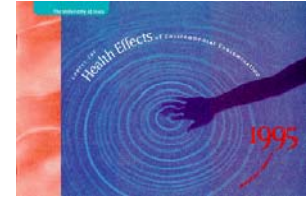
***Iowa Rural Radon Survey:*** A waterborne radon (<sup>222</sup>Rn) survey of private Iowa wells was conducted in 1991 using the SWRL sampling frame. A total of 352 collection sites were included in the analysis. In addition to collecting water samples, participants were asked to complete a questionnaire requesting information on collection site, collection time and factors that may reduce radon concentration between well and faucet, such as use of a charcoal filtration unit. Study findings reported a significant difference in <sup>222</sup>Rn concentration among the various unconsolidated aquifer types, which was not evident among bedrock aquifer types. In addition, <sup>222</sup>Rn concentrations tended to decrease as well depths increased.

### **Acknowledgments**

The CHEEC water quality databases were developed through the extensive efforts of the CDMC in consultation with the IDNR-GSB and the UHL. Special thanks to Kerry Sesker, Mark Gleaves, Melinda Cartwright, Michele West, David Riley, Jacob Sesker, Chuck Lynch, George Hallberg, Jiji Kantamneni, Burt Kross, Paul VanDorpe, Dick Talcott, Bill Field, Dari Shirazi and Bill Berger. Very special thanks to the drinking water treatment plant operators of Iowa.

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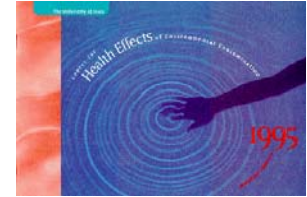
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## Seed Grant Program

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In 1995, the CHEEC Seed Grant Program expanded its request for proposals to include educational activities. Previously, CHEEC has co-sponsored conferences, workshops and other educational programs by special request; this is the first time educational proposals have been solicited for review on a competitive basis. In addition to grants for innovative environmental research projects, CHEEC will award partial support for public education projects on environmental health issues, particularly as they relate to providing information on identifying potential problems and preventing exposure to toxic substances in the environment. Professional education programs on environmental health issues which disseminate results of pertinent research, and provide settings to promote cooperation and collaboration between disciplines are encouraged.

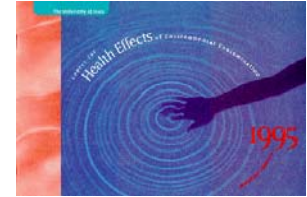
The following projects were awarded grants during 1995.

### **Characterization of lead exposure among bridge repair workers**

*Investigators:* SJ Reynolds, LJ Fuortes, Department of Preventive Medicine and Environmental Health, The University of Iowa

*Summary:* Exposure to lead is now being considered as a primary health hazard facing construction workers. Of particular concern are those activities that involve the demolition, repair and reconditioning of lead-based painted surfaces, such as bridge repair work, which generate significant airborne lead concentrations. Recently, several workers on an Iowa bridge renovation project were diagnosed as having medical problems associated with overexposure to airborne lead. This overexposure was determined to result from lead dust generated during the operations necessary for bridge renovation: cutting, blasting, scraping, and hammering of painted lead metal surfaces. More information is needed concerning the fate of lead dust generated during bridge renovation and repair activities. This project will attempt to establish baseline data on the lead concentrations found at bridge repair sites, and use these data in exposure assessment and characterization by personal exposure monitoring and sampling during each of the activities involved in bridge repair operations.





Partial support for the 8th International Workshop on Glucuronidation

*Chairperson:* TR Tephly, Department of Pharmacology, The University of Iowa

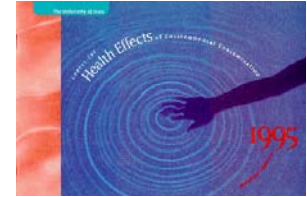
*Summary:* The 8th International Workshop on Glucuronidation will be held at The University of Iowa on May 19-23, 1996.

Workshops on glucuronidation have been previously held in Europe over the last twenty years. At these meetings, scientists have come together to informally discuss advances on the biology, biochemistry, and more recently, the molecular biology of the proteins catalyzing the glucuronidation of xenobiotics. Most chemicals (xenobiotics) are relatively fat soluble at body pH, and metabolic mechanisms are required to render these substances more water soluble, whereupon they can be excreted by renal and hepatic processes. Oxidation, reduction, hydrolysis and conjugation are the four chemical processes by which an animal organism can metabolize xenobiotics. Of the many means of conjugation, glucuronide formation is recognized as one of the most important means of disposing of chemicals from the body. The May meeting will bring scientists from Europe, Japan, Australia, Canada and the U.S. together to share information on current research in this area.

Partial support for the Johnson County Water Festival

*Chairpersons:* Johnson County Water Festival Organizing Committee

*Summary:* Planned as a pilot project for the state of Iowa, the Johnson County Water Festival is an effort to build partnerships in educational programs addressing water issues important to Iowans, and will provide a blueprint for educators, state, county and local agencies and an informed citizenry to develop larger scale events in the future. The Johnson County Festival will be held on March 29-30, 1996, at Northwest Junior High School and the Coralville Recreation Center in Coralville. Modeled after the Nebraska ChildrenGroundwater Festival, the Johnson County Festival will have demonstrations, hands-on activities, speakers, and classroom presentations by environmental and health professionals, artists, farm groups, historians and government officials all focusing on water and its importance in daily life. More than 1,000 area 7th graders will participate on the first day; the second day is planned as an event for the entire family. Support for the Festival is being provided by a consortium of university research centers, state and federal agencies, professional organizations, private businesses, and grassroots organizations.



## Education

CHEEC has sponsored a continuing seminar series at The University of Iowa since the fall of 1987. This series has included nationally and internationally known scientists, local and regional environmental experts, and federal and state agency representatives. Topics range from degradation of toxic substances and remediation of contaminated sites, to population studies of toxic exposures and health outcomes, to federal and state environmental regulatory policy development. Seminars sponsored by CHEEC during 1995 included the following:

*Demonstration of a database to accommodate management of exposure and environmental data within a Geographic Information System (GIS)*

U. Sunday Tim, Assistant Professor, Agricultural and Biosystems Engineering, Iowa State University

*Non-cancer health outcomes in the Agricultural Health Study*

Dale Sandler, Head, Environmental and Molecular Epidemiology Section, National Institute for Environmental Health Sciences (co-sponsored by the UI Environmental Health Sciences Research Center)

*Health aspects of the Rwandan refugee crisis*

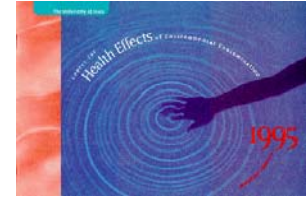
Alfredo Vergara, U.S. Centers for Disease Control and Prevention

(co-sponsored by the Department of Preventive Medicine and Environmental Health, UI Center for International Rural and Environmental Health, UI Environmental Health Sciences Research Center)

*Where are the errors in radon dose assessment? Implications for radon-lung cancer epidemiologic studies*

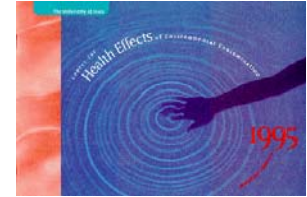
R. William Field, Research Scientist, Preventive Medicine and Environmental Health, The University of Iowa

(co-sponsored by the UI Environmental Health Sciences Research Center)



During 1995, CHEEC responded to information requests from the Iowa Attorney General's Office, Iowa state agencies, county health departments, EPA, NIEHS, NCI, the U.S. Department of Agriculture, the federal Agency for Toxic Substances and Disease Registry, area education agencies, water treatment plant operators, university researchers and students, engineering consulting firms, the media, environmental activist groups and the public.

*Publications:* Proceedings from two CHEEC conferences were published during 1995. *The Media's Role in Communicating Health Risks: What's in the Water?* was held on the University of Iowa campus in October, 1994, and was co-sponsored by the UHL, the UI School of Journalism and Mass Communication, and the R.I.S.K. Project. *Safe Drinking Water - Iowa's Future* was held at Kirkwood Community College in Cedar Rapids in November, 1994, and was co-sponsored by the Kirkwood Department of Environmental Sciences, the Leopold Center for Sustainable Agriculture and the Iowa State Water Resources Research Institute. Copies of these proceedings are available upon request.

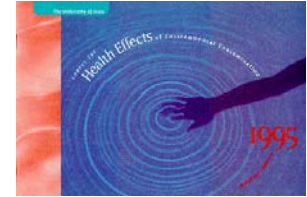


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## Conferences and Workshops

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Recent changes in Iowa's livestock industry, particularly in pork production, have resulted in a number of emerging issues involving rural environmental health, worker health and the sustainability of an industry which is vital for Iowa's environmental, social and economic well-being. In response to these issues a scientific workshop was held in Des Moines on June 29-30, 1995. Understanding the Impacts of Large Scale Swine Production: An Interdisciplinary Scientific Workshop was organized by IowaCenter for Agricultural Safety and Health (I-CASH) at The University of Iowa and the North Central Regional Center for Rural Development at Iowa State University, with support from the UI Environmental Health Science Research Center, CHEEC, and the Farm Foundation. Thirty-five leading scientists from the United States, Canada and Australia met to respond to questions posed by farmers and rural residents at a national meeting held in Kansas City in the fall of 1994, as well as questions compiled from a survey of pork producers conducted by a National Pork Producers Council Task Force on worker health. Public concerns addressed during the workshop included air quality, water quality, occupational health of workers, community social health and economic development. Prior to the workshop, each participant was asked to prepare a scientifically-based response in their area of expertise. During the workshop, these responses were integrated into group-authored documents in each area. Proceedings are available upon request.



## Who We Are

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### Executive Committee

Gene Parkin, Ph.D., Center Director  
George Hallberg, Ph.D.  
Burton Kross, Ph.D., P.E.  
Charles Lynch, M.D., Ph.D.  
Jeffrey Murray, M.D.  
Peter Thorne, Ph.D.  
Richard Valentine, Ph.D.

### Center Staff

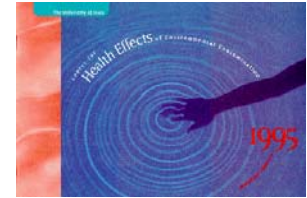
Melinda Cartwright, Senior Programmer Analyst  
Gregory Cross, Student Programmer  
Jiji Kantamneni, Senior Programmer Analyst  
Douglas Kelley, Senior Programmer Analyst  
David Riley, Program Assistant  
Jacob Sesker, Student Research Assistant  
Kerry Sesker, Senior Systems Analyst  
Gloria Wenman, Secretary  
Peter Weyer, Program Coordinator

### University of Iowa Participants

Department of Civil and Environmental Engineering  
Department of Pediatrics  
Department of Preventive Medicine and Environmental Health  
Institute for Rural and Environmental Health  
State Health Registry of Iowa  
University Hygienic Laboratory

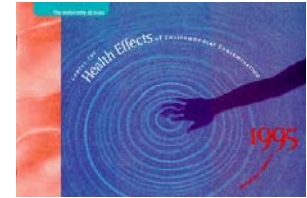
### Advisory Committee

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Trudy Burns, Ph.D., UI Department of Preventive Medicine  
and Environmental Health  
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Daryl Frey, Iowa Department of Agriculture and Land  
Stewardship  
Richard Kelley, University Hygienic Laboratory (Committee  
Chair)  
John Kelly, Iowa Department of Public Health  
Donald Paulin, Iowa Department of Natural Resources  
Wayne Paulson, Ph.D., UI Department of Civil and  
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