From:	Matt Todd <ToddM@api.org>
Sent:	Thursday, November 13, 2003 7:22 PM (GMT)
To:	BHRC Technical Committee (E-mail) <benzconsort-tc@listserve.api.org>
Cc:	Clegg, Patsy M SCC-CHSE-PC <patsy.clegg@shell.com>; Brian E. Doll (E-mail) <brian.e.doll@exxonmobil.com>; Michael Johnston (E-mail) <mike.d.johnston@conocophillips.com>
Subject:	BHRC: SHS Documents for Review
Attach:	SHS Overview.doc; SHS Technical Overview_1-17-03.doc; Ethics_Review_Panel_Roles_and_Responsibilities_Summary_2-3-03.doc; Scientific Review Panel Roles and Responsibilities Summary 3-12-03.doc; 2003-11-13_draft_shanghai_health_study_annual_meeting_summary.doc

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BHRC Technical Committee Members:

The attached documents provide summary information about the Shanghai Health Study and are meant to be used in our recruitment and outreach efforts. Please review the attached documents to verify their scientific accuracy. Comments should be received by COB November 26th so that these documents are available for future NGO and govt. agency outreach efforts.

The documents are (recent changes in parentheses):

SHS Overview - "one-pager" summary of the study (removed Bill Frick as contact, added Don Burnett and Bruce Jarnot as contacts, should Myron Harrison and Chris Roythorne remain as contacts for the study?)

SHS Technical Overview - 5-page document that gives more technical information about program studies (changed some verb tenses to reflect study initiation)

ERP/SRP Summaries - explain roles of panels and identifies members (Nancy Mueller removed)

SHS Annual Meeting Summary - summary document meeting presentations

Best regards,

Matt
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SHANGHAI HEALTH STUDY
First Annual Meeting

August 25-27, 2003
Asilomar Conference Center
Monterey, California

The First Annual Meeting of the Shanghai Health Study was held August 25-27, 2003 at the Asilomar Conference Center in Monterey, California. The meeting was the first face-to-face gathering all the various groups involved with the study: the Principal Investigators (both Chinese and American research team members), Scientific and Ethical Review Panel members and the project sponsors.

Beginning with the welcome reception and dinner on August 25th and throughout the two full days of meetings that followed, the participants took advantage of the time to engage in an open and informative exchange of ideas related to the study.

The opening plenary session began with a welcome from Chair of the Benzene Health Research Consortium Oversight Committee, Dr. Donald Burnett of BP. In his brief remarks, Dr. Burnett set the tone for the meeting by inviting all of the participants to join in the discussions and freely engage in question and answer sessions with the panel members.

Dr. Burnett then introduced the moderator for the plenary session and Chair of the Benzene Health Research Consortium Technical Committee, Dr. Patrick Beatty of ChevronTexaco. Dr. Beatty laid out the expectations for the day noting that panelists representing the Scientific and Ethics Review Panels would be providing summaries of their work to date and that the Principal Investigators involved in the research would provide an up-to-date look at their progress in Shanghai. Each of the presentations was followed by a dynamic question and answer period in which the presenters and the audience members exchanged comments and views.

Ethics and Scientific Review Panel Activities

The first panelist was Dr. Jerry Rice, Chair of the study's Scientific Review Panel (SRP) and recently retired from the International Agency for Research on Cancer (IARC). Dr. Rice spoke on behalf of his colleague and Chair of the study's Ethics Review Panel (ERP), Dr. Baruch Brody of the Baylor College of Medicine who was unable to attend. Dr. Rice noted that the role of the ERP is to ensure that the research conducted under the study meets internationally accepted ethics standards and reflects relevant cultural norms in Shanghai. He highlighted the fact that the current study is based on standards set forth by the Council for International Organizations of Medical Science (CIOMS) – the only internationally accepted ethical standards for studies on human subjects. Dr. Rice also focused on key elements of the ERP review including:

- Payment to subjects – adequate, but to avoid concerns over a perception of exploitation, scalable (depending on the subjects level of participation);
- Informed consent – importance of forms in local languages;
- Information about HIV – HIV status is important to validate as another potential cause/risk factor for disease; HIV is included in the informed consent;
- Subject confidentiality; and
- Publication of the study results – study sponsors will have an opportunity to review and comment on the findings, but the principal investigators have sole control and responsibility for published paper.

To underscore the fact that the research is being done under the highest international ethical standards, Dr. Rice introduced another member of the ERP, Dr. Juhana Idänpään-Heikkilä of the World Health Organization and Secretary General of CIOMS. Dr. Idänpään-Heikkilä briefed the meeting on the recently revised/updated *International Ethical Guidelines for Biomedical Research Involving Human Subjects* – the guidelines upon which the Shanghai study is based.

Dr. Rice then resumed his role as Chair of the SRP and provided an overview of the panel and its role in the Shanghai Health Study. Dr. Rice noted that SRP was charged with reviewing and approving the initial research protocol and continues to review all *significant* proposed protocol changes and issues that might impact the protocol. In addition, he noted that the SRP also intended to review scientific manuscripts and abstracts related to the study prior to presentation or submission to appropriate journals. In this regard, he explained that the SRP also serves in an Editorial Board-like capacity to provide "quality assurance" and help ensure that papers are more easily publishable.

An Update on the Study – Reports From the Researchers

Collaboration Between Academic and Governmental Agencies in China
One of the study's biggest strengths is in the level of cooperation and collaboration among the academic and health communities and the Chinese government in Shanghai. Professor Fu Hua, Deputy Dean of the Fudan University School of Public Health and one of the Co-Principal Investigators of the Case-Control Study of AML and NHL in Shanghai, provided a detailed overview of the Shanghai Health Study and the interrelationships and support structure that has been developed for the project in Shanghai. Professor Fu provided an extremely informative introduction to the various hospitals, academic institutions and medical societies, and government agencies that currently play a role in the study, including:

- Fudan University and the School of Public Health;
- Medical Center of Fudan University (and more than 20 other hospitals located throughout Shanghai);
- Shanghai Municipal Center for Disease Preventions and Control (Shanghai CDPC);
- Shanghai Municipal Institute for Public Health Supervision (Shanghai IPHS);

- Shanghai Hemotological Society;
- Lymphoma Society; and
- Society of Occupational Medicine

Professor Fu also explained the three-pronged approach of the study including a case-control study, a disease progression study, and a molecular epidemiological study of benzene exposure. All three elements of the study are supported by a single, state-of-the-art laboratory – the Joint Sino-US Clinical and Molecular Laboratory – based at Fudan University.

Case Control Study of AML and NHL in Shanghai

Dr. Otto Wong of Applied Health Sciences then provided an overview of the design and a status report on the case-control study in Shanghai. As one of the Co-Investigators in the study, Dr. Wong described, in detail, the hospital-based case-control study now underway in Shanghai. Prospective enrollment for the study began in June of 2003 and will continue in an effort to develop up to 2 individually matched controls for each acute myeloid leukemia (AML) and non-Hodgkin's lymphoma (NHL) case identified in the study. Dr. Wong described the identification process for study cases and controls, including the interview process and the patient consent procedures. He noted that all of the forms and the participant questionnaires were carefully pilot-tested for language and clarity and extensive training was provided to the interviewers. Dr. Wong also provided an overview of the various information sources for data on exposure levels and how the data would be used to inform the exposure assessment in the current study.

Molecular Epidemiology Studies in Shanghai

Next, Dr. Robert Schnatter, the senior scientific advisor for Occupational Health at ExxonMobil Biomedical Sciences, Inc. and a Co-Investigator in the Shanghai Study, described the two-phased molecular epidemiology study and its role in the project. Dr. Schnatter described the first phase as a retrospective study intended to define dose response relationships for past benzene exposure and identify the most sensitive measures of effect for items recorded in routine exams. Dr. Schnatter added that the study will initially focus on shoe workers but will be expanded to include a variety of workplace environments and sites where benzene is used. He described the second phase as exposure response analyses coupled with a study of the effects of current or recent benzene exposure and a measurement of the effects on blood and bone marrow. Dr. Schnatter concluded by describing a pilot test of the procedures and the worker questionnaire where 48 of 49 of the tested company's workers participated and the results were viewed as "very successful".

Exposure Assessment for Shanghai Studies

Stepping in for his colleague Tom Armstrong, an industrial hygienist at ExxonMobil Biomedical Sciences, Inc. who was unable to attend the meeting, Dr. Schnatter also provided an overview of the exposure assessment processes and procedures to be used in the study. He described the two level process for exposure questionnaires – the first explores the work history and potential workplace exposures and is provided to all

workers who agree to participate; the second is triggered by specific pre-identified job categories to measure the exposure level in particular industries. The resulting data will be added to the database of the JCML at Fudan University.

China and OEL Standards

The final speaker for the morning was Dr. Liang You-xin of the Fudan University School of Public Health. Dr. Liang provided very interesting insights into the current state of occupational health improvement efforts in China. Dr. Liang reported that significant progress has been made in improving occupational health in China since the 1980's, particularly in the regulation and reduction of exposure to potentially hazardous materials in the workplace. He noted that the systematic development of occupational exposure limits began in 1981 with the establishment of two national standards-setting bodies: the National Technological Committee of Health Standards Setting (NTCHSS) and the Subcommittee of Occupational Health Standards Setting (SCOHSS). Dr. Liang also highlighted the *Occupational Diseases Prevention and Control Act, P.R. China, 2001* (ODPCAct) – the first comprehensive law on occupational health in China – which he compared to the OSHAct standards in the US.

Dr. Liang also discussed the historical changes to benzene Occupational Exposure Limits (OELs) both internationally and in China. He also pointed out that while the standards exist, workplace measurements, licensing and enforcement of the government standards is less than rigorous and Chinese workers continue to be exposed to higher levels of benzene. In closing, Dr. Liang stressed that increased enforcement of OELs "may be of equal or even greater importance than lowering the standard".

The Clinical and Molecular Laboratory – From Concept to Case Accrual

The final speaker for the plenary session was Dr. Richard Irons, Director of the Molecular Toxicology and Environmental Health Sciences program at the University of Colorado Health Science Center and Principal Investigator and Laboratory Director for the Shanghai Heath Study. Building on the information from previous presentations, Dr. Irons began by providing an integrated overview of the study and its goals. He described the overarching goal of the study as an effort to "characterize the relationship between benzene exposure and the development of specific hematopoietic diseases." He provided a detailed outline of the study and the specific disease states that it would address.

Dr. Irons then offered a unique first look at the new state-of-the-art laboratory facility that has been built, and is now up and running, at Fudan University. He described in detail the process to transform the original workspace at Fudan into the laboratory as it exists today (a process which began in early 2001). Dr. Irons was pleased to report that training for key clinical and laboratory personnel was complete and that the laboratory was fully functional. Asked to describe the current status of the study, Dr. Irons said that it had moved from the developmental stage into operational activities and the study has begun to accrue cases.

The remainder of the meeting provided time for the various committees and panels associated with the study to meet and to discuss both progress and future actions.

By all accounts, this First Annual Meeting was a complete success, providing an invaluable opportunity for everyone involved in the study to meet face-to-face and openly exchange information and ideas.

SHANGHAH HEALTH STUDY

Summary of Scientific Review Panel Roles and Responsibilities

SCIENTIFIC REVIEW PANEL (SRP)

The Scientific Review Panel consists of recognized, independent experts in scientific/medical fields relevant to the research program of the consortium. Initial membership was approved by the Business Oversight Committee. The SRP is responsible for naming additional qualified members. The SRP reviewed and approved the initial research protocols and would review any significant protocol changes proposed by the investigators, the Ethics Review Panel, or others. It determines what protocol changes are significant enough to require review. The SRP will review all manuscripts for publications and all abstracts for presentation. Their comments will be communicated to the investigators for their consideration.

SRP Members:

Dr. Jerry M. Rice, (Chair), IARC (Retired)
Dr. Harvey Checkoway, Washington University
Dr. Helmut Greim, Technical U. of Munich
Dr. Howard Rockette, University of Pittsburgh
Dr. John Cherrie, Aberdeen University, Institute of Occupational Medicine
Dr. Robert F. Herrick, Harvard University, School of Public Health
Dr. Richard Larson, University of Chicago Medical School
Dr. Mark Minden, University of Toronto
Dr. Li Guilan, Academy of Preventive Medicine, China
Dr. Richard Albertini, University of Vermont, College of Medicine

SHANGHAI HEALTH STUDY

Summary of Ethics Review Panel Roles and Responsibilities

ETHICS REVIEW PANEL (ERP)

Initial membership of the ERP was determined by the Business Oversight Committee. Members have expertise in bioethics. The ERP members are responsible for adding appropriate members. It should consist, at a minimum, of members drawn from the U.S., from Europe, and from China. The ERP makes recommendations to ensure that the research meets internationally accepted ethics standards and reflects relevant cultural or other patterns in Shanghai. It reviewed the protocols, recommending changes that were incorporated to meet international guidelines. It has also reviewed the consent forms, and other aspects of the research ethics, to ensure that recommendations of the ethics review process had been incorporated. It will review any relevant changes before they are implemented. It will also periodically review the conduct and progress of the research to see that the ethics standards are being followed. ERP members are available to respond as needed to issues raised by the investigators, the Scientific Review Panel or the company sponsors.

ERP members:

Dr. Baruch Brody, Director, Center for Medical Ethics and Health Policy, Baylor College of Medicine

Dr. Xu Zong-Liang, Dean, Faculty of Humanities and Social Sciences, Fudan University Medical Center; Director, Bioethics Research Center, Fudan University Medical Center

Dr. Juhana Idanpaan-Heikkila, World Health Organization, Geneva, Switzerland

SHANGHAI HEALTH STUDY
Technical Overview

This document describes a project that is investigating the dose-response and mechanistic aspects of the hematological effects of benzene exposure in a population of workers in Shanghai, China. The project described below includes parallel case control studies of Non-Hodgkin's lymphoma (NHL) and acute myelogenous leukemia (AML), an investigation of the role of non-neoplastic diseases such as aplastic anemia (AA) and myelodysplastic syndrome (MDS) as a progression to AML, and determination of the dose-response relationship between benzene exposure and selected biomarkers of both exposure and effect.

Data Gaps and Uncertainties

There are a number of areas of uncertainty regarding hematopoietic disease and benzene that, if answered, have the potential to improve the accuracy of estimates of benzene-related risks. These are:

1.) The shape of the dose-response relationship between benzene exposure and selected hematological diseases (including the possibility of a true threshold).
2.) Clearly identifying those types of hematopoietic cancer that can be causally related to benzene exposure. Currently, only acute myeloid leukemias have a strong relationship, but regulatory agencies still assume that all leukemias can result from benzene exposure, basing risk estimates on this assumption.
3.) Clarification of the role of non-cancer hematological diseases in the etiology of benzene-induced leukemia. If bone marrow toxicity is a prerequisite for subsequent leukemia, then there must *a priori* be a threshold below which leukemia cannot be induced.
4.) Identification of similarities between leukemia secondary to benzene exposure and the much better understood and studied leukemias secondary to administration of certain chemotherapeutic drugs used to treat some primary cancers. This category of uncertainty includes the ability to identify a marker or other characteristic of leukemia induced by exposure to benzene, rather than those resulting from errors in DNA repair or other "natural causes".
5.) Clarification of the quantitative relationship between benzene exposure and potential indicators of exposure or of effect. This includes determining which of these two categories potential indicators actually represent. This is important because of an apparent interest by some regulators in using "biomarkers" to extend the dose-response curve for cancer to lower exposures by using surrogates for the actual leukemogenic response.

Project Description

The project consists of three highly integrated aspects:

SHANGHAI HEALTH STUDY
Technical Overview

1.) A population-based case-control study investigating the potential relationship between benzene exposure and both NHL and AML including an attempt to define a quantitative potency for the AML response.
2.) A hospital/clinic-based investigation of the relationship between non-neoplastic diseases of the bone marrow and AML to determine if there is a progression through stages of bone marrow cytotoxicity to an ultimate leukemogenic response. This disease progression study is attempting to define both potency and the shape of the dose-response for these "precursor" diseases.
3.) A molecular epidemiology study investigating the quantitative relationships between benzene exposure and potential early indicators of both exposure and effect in a focused population of benzene-exposed manufacturing workers.

All three study aspects are highly integrated in that a central laboratory has been created through which all clinical samples will be analyzed. This state-of-the-art hematology/oncology laboratory provides the diagnostic information to determine the subtype and viral status for the potential cases for the case control studies, ensuring accurate and consistent categorization of all the cases, and conducts the cytogenetic analyses which are part of the molecular epidemiology project. The progression study, the second portion of the project, uses the shared laboratory facilities, and many of the cases in the AML case-control study may also be included in the progression study.

Case-Control studies

This project initiates a case-control epidemiology study of NHL and AML in the population of Shanghai. The case-control design allows a focused examination of earlier claims that benzene exposure can cause NHL. NHL is not a single disease but, rather, is a collective of over a dozen phenotypically distinct hematopoietic cancers. The consortium study design includes subtyping each individual case to determine if a positive response is associated with any of the NHL components. In addition, the viral status of each case is being determined because it is known that active infection with any of a number of viruses has been related to increased risk of NHL. This portion of the project, as well as the other two listed above, includes independent analysis of benzene exposures. If the quality of the exposure data permit, an estimate of the quantitative potency (slope factor) will be made for any cancer type with a positive association with benzene exposure. This study is being done in collaboration with the Departments of Public Health and Hematology of Fudan University Medical School. There is also a close working relationship between the investigators and the Shanghai Tumor Registry at the Shanghai Center for Disease Control, which is the governmental repository for workplace exposure information. And the investigators have the cooperation of the Institute for Public Health Supervision in Shanghai which can provide investigators with access to factories in Shanghai for industrial hygiene monitoring.

Mention Otto? Irons mentioned in next example.

Disease Progression/Molecular Epidemiology Study

SHANGHAI HEALTH STUDY
Technical Overview

This project utilizes individuals identified as part of the case-control epidemiology study to investigate genetic effects and disruption of regulatory processes on the hematopoietic system. This study also allows an independent evaluation of the exposure-response nature of these effects in a concentrated population that has been more highly exposed to benzene than populations in the U.S. or Europe. This study identifies those individuals with hematopoietic disease, MDS or AML, which can be reliably associated with benzene exposure, in order to identify unique characteristics of benzene-induced disease. Due to the highly controlled nature of benzene exposure in North America and Western Europe, researchers have not had the opportunity to bring modern medical and molecular biological techniques to bear on a single case of AML, MDS or aplastic anemia in which benzene could be considered the probable causative factor. This study may allow a definitive identification of hematopoietic effects unique to benzene exposure, and may establish a link between benzene-induced leukemias and other leukemias secondary to chemical exposure (mainly alkylation chemotherapy) about which much is already known. The study is being performed by Dr. Richard Irons of the University of Colorado with the collaboration and assistance of investigators from the Departments of Hematology and Public Health of Fudan University Medical School and from ExxonMobil Biomedical Sciences for epidemiological and industrial hygiene.

The above investigators are also involved in an examination of the relationship between AML and other non-neoplastic hematopoietic diseases. The presence of a population that is relatively stable geographically combined with both hospital and occupational records of bone marrow related disease has created the possibility of investigating this relationship. Workers in benzene-related areas have been monitored for excessive exposure (reported to the Shanghai Center for Disease Control and Prevention as "benzene poisoning") by means of annual blood counts. It has been hypothesized that AML must be preceded by some degree of toxicity to the hematopoietic system. Validation of this hypothesis would provide critical support for a nonlinear (sublinear) dose response of hematopoietic effects due to benzene exposure, and would imply a non-zero threshold exposure to benzene below which there would be no risk of AML, etc. It is not clear at this time how reliably individuals with benzene poisoning can be located, but cases of MDS or aplastic anemia (AA) treated in hospitals may be more easily located. These issues will be resolved during the course of the investigations. (isn't reporting of benzene poisoning required?

Transitional Study of the Manufacturing Industry

One area of benzene research that has received a lot of attention in the last few years is the attempt to identify early biological indicators that predict a later event such as AML or serious forms of bone marrow toxicity such as MDS or AA. These early indicators have also been referred to as "biomarkers". Some endpoints which have been measured, such as protein adducts of benzene metabolites, are clearly indicators only of exposure to benzene (although there may be some complicated relationship with biological responses). Some endpoints, such as certain cytogenetic abnormalities, have been claimed to be indicators of future effect. One challenge is distinguishing between the two

types of indicators. At this time no biological predictor of benzene-induced leukemia has been unequivocally identified. And to date there is no publication in the scientific literature that has attempted to establish an exposure response relationship for genetic effects that is based upon several sets of data points. This study is designed to address both points.

The objective of this series of studies is to investigate the relationship between benzene and various blood dyscrasias and cytogenetic abnormalities as demonstrated by the Shanghai manufacturing industry. Sites included in the study are being selected based on existing exposure and clinical records. The dose-response is being investigated in relation to various types of benzene exposure metrics. This integrated Shanghai Health Study will take advantage of the wide range of benzene exposures in the Shanghai manufacturing sector, which will maximize the possibility of seeing non-linearity of any dose response that exists. Specific aims of this facet of the overall project are:

1.) To define benzene dose-response patterns for alterations in blood cell counts, bone marrow cytotoxicity and selected chromosomal alterations;
2.) To define the most relevant exposure indicators for each of the effects noted above;
3.) To assess if the dose response patterns are affected by the presence of other environmental compounds such as toluene or xylene which commonly are co-exposures with benzene;
4.) To assess if the dose response patterns are altered by the presence of reported susceptibility factors in exposed individuals; and
5.) To define the relationship between external benzene exposure and selected internal measures of exposure.

Location

The location for the project is Shanghai, China. Shanghai is a major population center with approximately 14 million individuals living in the local area. Shanghai presents the unique situation of a large number of workers with documented exposures to benzene at levels that have not existed in North America or Western Europe since the 1940's or 50's. A feasibility study has shown records of industrial hygiene monitoring of work areas where benzene was routinely used. Although many air samples indicated exposures of less than 10 ppm, concentrations in the range of 10 – 50 ppm were also found. The regional agency in charge of maintaining occupational health records, the Shanghai Center for Disease Control and Prevention, has a computerized database of industrial hygiene (IH) monitoring data extending back to the mid 1980's. In addition to air monitoring data, blood counts of exposed workers are routinely made on an annual basis. These data are also maintained in computerized form by the local CDC offices. Shanghai also contains a major medical school, Fudan University Medical School, with a School of Public Health and Hematology Department associated with a teaching hospital. This hospital is one of the major hospitals in Shanghai and is serving as a source for identifying potential cases for the studies.

The Investigators

The principal co-investigators leading the project are:

Epidemiology

Otto Wong, D.Sc. – Applied Health Sciences, San Mateo, CA

Robert Schnatter, Ph.D. – Exxon/Mobil Biomedical Sciences, Annandale, NJ

Fu Hua – Deputy Dean, Fudan University Medical School, School of Public Health, Shanghai, PRC

Hematology/Molecular Biology

Richard Irons, Ph.D. – University of Colorado Health Sciences Center, Denver, CO

Lin Guowei, M.D. – Director, Center of Clinical Epidemiology, Hua Shan Hospital, Shanghai, PRC

Industrial Hygiene

Lu Wei – Deputy Director General, Shanghai Municipal Center for Disease Control and Prevention, Shanghai, PRC

Thomas Armstrong, C.I.H. – Exxon/Mobil Biomedical Sciences, Inc., Annandale, NJ

Roy Rando, Ph.D., C.I.H. – Professor of Industrial Hygiene, Tulane University .

SHANGHAI HEALTH STUDY
Overview

Purpose: To gain an accurate understanding of the true relationship between benzene exposure and the risk of certain hematopoietic diseases. This study is an important element in the product stewardship programs of participating companies. It can also lead to improved benzene-driven, health-based regulatory (e.g., ambient air, water & occupational) standards worldwide, by providing the regulatory and scientific communities with information for more accurate assessment of the risks from exposure to benzene.

A unique set of circumstances exists at this point in time in Shanghai to conduct meaningful benzene research. These include a database of occupational exposures in a different regulatory environment, and willing and qualified co-investigators influential in local scientific medical, and regulatory establishments. Therefore, questions that have plagued benzene health risk assessment for decades appear to be answerable in Shanghai.

The Studies: The program involves three inter-related studies:

- Case-Control Study - A hospital-based case control study investigating the potential relationship between benzene exposure and both Non-Hodgkins Lymphoma (NHL) and Acute Myelogenous Leukemia (AML), including an attempt to quantify the potency of benzene for the AML response.
- Disease Progression Study - A hospital/clinic-based investigation of the relationship between non-cancer diseases of the bone marrow and AML (cancer) to determine if effects on bone marrow progress through non-cancer stages to an ultimate leukemia. This study is also attempting to define the shape of the dose response for possible "precursor" diseases and could result in characterization of unique identifiers of benzene-induced AML.
- Molecular Epidemiology Study - Investigating if there is a quantitative relationship between benzene exposure and potential early indicators of both exposure and effect in a focused population of workers.

The investigators are leading experts in their fields, coming from such well-known institutions as the University of Colorado Health Sciences Center and Fudan University Medical Center. The combined studies apply cutting-edge, 21st century technologies in ways that will not only advance our understanding of benzene-induced disease, but may also identify potential prevention strategies for benzene-induced disease in individuals.

Benefits: Information gained from this project will have a direct relevance for worldwide regulatory standards designed to protect workers and the general population from benzene-induced disease. These include air and water quality standards, as well as hazardous waste and site remediation standards. These studies will assist contributing companies in achieving the highest product stewardship goals and in oversight of their risk management programs.

Challenges: The proposed studies meet several technical, ethical, and cultural/political challenges.

- Technical - In order to stand up to scientific scrutiny, studies must be large, well-managed, and incorporate the latest technology. State-of-the-art research is absolutely necessary to make real progress in developing sound benzene risk assessments. To that end, a Scientific Review Panel made up of leading experts from a number of fields relevant to these studies has reviewed and endorsed the research protocols. Additionally, the protocols have been reviewed by Use of Human Subjects Committees (IRB) both in the US and China.

SHANGHAI HEALTH STUDY
Overview

- Ethical - To address the ethical issues, the study protocols have all undergone a thorough analysis to ensure that they meet international standards for research involving humans, including that the subjects and participating communities benefit from participating in the study; that confidentiality is preserved, and that researchers are working with local regulatory authorities to improve worker safety. An Ethics Panel is part of the oversight for the project and includes a Chinese bioethicist.
- Cultural/Political – A key to this program's success is local partnerships. Collaborators on these studies include researchers from the Medical School at Fudan University, the Institute for Public Health Supervision, and the Shanghai Municipal Centers for Disease Control and Prevention (the latter two are responsible for occupational exposure monitoring and enforcement in Shanghai).

Funding: Funding for the project is being provided by a consortium of interested stakeholders, with shares determined by the size of the benzene related operations of the contributing organization. The funding formula was devised based on the assumption that most of the support will come from the petroleum and petrochemical industries. It is anticipated to take five years to complete the project, and that the costs are highest in the first years of the project.

For More Information: Please contact any one of the following individuals.

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