

**Air Pollution, Poverty, and Health Effects in Ho Chi Minh City
(TA 4714-VIE)**

**Inception Report
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EXECUTIVE SUMMARY

This inception report assesses key program elements and local needs and capabilities in the context of an administratively abbreviated time frame for completion of the Ho Chi Minh City (HCMC) study. Based on extensive initial field experience it summarizes progress since official letters of agreement were signed between the Asian Development Bank (ADB) and HEI, and between HEI and the HCMC Department of Public Health in October and November 2006 respectively. Key local experts from all collaborating organizations have been actively engaged since the first official implementation visit for the study in early October, 2006 and the project is proceeding well and team esprit de corps is very positive.

Current state of progress:

- 3.1 Hospital study: We now have all data needed for the hospital study, which examines the effect of short-term exposure on hospital admissions for acute lower respiratory incidence (ALRI) in young children of HCMC. An interdisciplinary working group of Vietnamese investigators, HEI staff, and consultants has been formed to carry out this component, and has made considerable progress. Standard operating procedures for data collection, management, and descriptive analysis have been drafted, and plans for a May statistical workshop in Hong Kong to discuss the descriptive and preliminary analyses are underway.
- 3.2 Household study: The household study assesses the relationship between personal and district/city-wide ambient exposures in HCMC. The first stage of sampling for the study, which involves the administration of a detailed household survey to 1000 households, is currently in progress, and fieldwork should be completed in March. This survey includes an assessment of the prevalence of chronic respiratory symptoms among adults and young children of HCMC, as well as a targeted set of questions on public perceptions on air pollution. Necessary technical refinements to the study design based on the pilot study will be made in early April, and the main study will start in late April / early May. All collaborators agree that we will need to extend the sampling period to February 2008, in order to sample in both the dry and rainy seasons.
- 3.3 Capacity building: The local collaborators are all capable and enthusiastic, but the project involves applied training in many epidemiologic methods and exposure assessment techniques that are new to the local collaborators. This project presents a unique and exciting applied capacity building opportunity, and we must ensure that we do not compromise the quality of the results in the short term, or the sustainability of transfer of technology in the long term, by imposing an unrealistic period of performance with regard to training and technical assistance.

Financial summary:

Using the first increment of funding (\$100,000) from ADB together with funds committed by HEI, we have hired local staff and purchased air monitoring equipment and other laboratory supplies and equipment necessary for the studies. We have also sent HEI staff and consultants to Vietnam to work with the Vietnamese investigators to achieve the progress we detail in this report.

In summary, we have initiated active implementation of the project and concurrently have assessed the feasibility of producing high quality deliverables for the activities that comprise the TA given 1) the extremely truncated time-frame and 2) the current state of capacity and responsiveness of the local collaborators. We are confident that we can accomplish the activities as originally described, with the exception of a more targeted version of the public perceptions survey. As the household study will need to extend into early 2008, however, we do anticipate a minor delay in the submission of the final technical reports, but propose an approach that is consistent with administrative constraints on timing for project completion.

DETAILED SUMMARY OF PROJECT STATUS

A. Assessment of Air Pollution Impact on Respiratory Health of Children (Hospital Study)

A.1 Engagement of local collaborators

Local collaborators have been extremely timely and responsive overall. Dr. Giang has delegated Dr. Do Van Dzung from the University of Medicine and Pharmacy to take primary responsibility for this component. Local collaborators, HEI staff and consultants participate in weekly internet chat sessions, and all relevant documents are shared on a web-based message board for the project. These have proven to be productive modes of communication and coordination.

A.2 Scope and scale of activities: No changes in the scope and/or scale of activities are anticipated. An abstract summarizing the objectives of this component is attached (ATTACHMENT 1).

A.3 Timing of activities

With project data now in-hand, we are currently finalizing the Standard Operating Procedures (SOP) for the descriptive analysis, which we plan to complete in March 2007. The design of the epidemiologic analysis and SOPs for its implementation will be completed in March 2007 so that preliminary analyses can be conducted prior to a workshop scheduled to be held at the University of Hong Kong in May 2007. Analyses will be largely completed by August 2007, when a meeting will be held to discuss preliminary results. A draft final report will be prepared by November 2007. A detailed timeline for this component is attached (ATTACHMENT 2).

B. Household Survey

B.1 Engagement of local collaborators

Local collaborators have been very responsive and attentive overall.

- A pilot for the exposure study was conducted in January and February to refine technical study methods and protocols, and to serve as a training exercise for local field and laboratory staff. The pilot study involved monitoring in 20 households (including personal monitoring of 20 householders), and two fixed monitoring stations. Prior to this pilot, HEI staff corresponded with the local collaborators at the HCMC Environmental Protection Agency (HEPA) to ensure that 1) there would be an adequate space within HEPA to serve as a temporary laboratory until the new lab opens in March 2) an appropriate microbalance would be purchased for the study 3) appropriate field (6) and lab (3) staff would be hired for the project.
- A small laboratory space was dedicated within the HEPA office. While this room is perfectly adequate for preparation and storage of samples, it is too small for analysis. Thus, HEPA has decided to convert a second room (currently office space) into a lab for the project.
- HEPA ordered an appropriate microbalance for the study (part of their in-kind contribution). Due to delays in the mobilization of local funds and

shipping, the microbalance was not available for the pilot, but should arrive by the end of February.

- HEPA hired and/or seconded six field and three laboratory staff for the project.
- Dr. Loan and her staff at The Bureau of Statistics, who are coordinating the household survey work, have been consistently thorough and thoughtful as they assist with the development and translation of survey instruments (ATTACHMENTS 3A and 3B), the selection of households, and the development of the database for survey data. Prior to the start of the pilot study, Dr. Loan even sent a member of the survey team to HEPA to provide guidance on survey administration to the field staff.

B.2 Detailed Assessment of Exposure to Air Pollution among the Poor

B.2.1 Scope and scale of activities: No changes in the scope and/or scale of activities are anticipated. An abstract summarizing the component objectives is attached (ATTACHMENT 4).

B.2.2 Timing of activities: Following a detailed technical assessment all collaborators agree that since sources of exposure and activities vary seasonally, it is critical to sample in both the dry and rainy seasons in order to 1) develop an accurate assessment of people's personal exposures, and 2) compare differences by socio-economic position. Sampling for the main study will begin in late April, at the start of the rainy season. It is not feasible to start the main study any earlier than this, since the data from the pilot study will be used to finalize the design of the main study. Thus, we will need to extend the sampling period from December 2007 to February 2008, in order to sample in both seasons. A detailed timeline is attached (ATTACHMENT 5). Implications on timing are discussed later in this report.

B.3 Baseline Health Survey

B.3.1 Scope and scale of activities: No changes in the scope and/or scale of activities are anticipated. An abstract summarizing the objectives of this component is attached (ATTACHMENT 6).

B.3.2 Timing of activities: Dr. Loan and her staff are currently administering the Household Survey to the entire 1,000-household first-stage sample, and are developing the software for questionnaire data entry. We expect data acquisition to be completed by the end of February 2007 and data analysis to begin in March 2007. A detailed timeline is attached (ATTACHMENT 5).

B.4 Public Perceptions Survey

B.4.1 Scope and scale of activities: To accommodate the truncated timeline for the study, it was decided that the public perceptions component should be included as one section of the household survey rather than as a separate, time- and resource-intensive undertaking, thereby streamlining the process

and shortening the time required. HEPA, with its experience with environmental awareness campaigns in HCMC, took primary responsibility for drafting questions for the public perceptions section of the household survey, and these questions were reviewed by the other collaborators. The original lengthy list of questions was reduced, and targeted to a set of questions on perceptions and awareness of air quality and pollution. Depending on the full survey results, there may still be opportunities to explore whether the presence of respiratory symptoms is associated with a difference in perception.

B.4.2 Timing of activities: No changes in the timing of activities are anticipated. A detailed timeline is attached (ATTACHMENT 5).

CAPACITY BUILDING

A. Assessment of current state of local capacity:

A.1 Hospital study:

A.1.1 Hospital Data: Dr. Do Van Dzung, a statistician and physician at the University of Medicine and Pharmacy, has been working closely with international consultants and HEI staff to acquire necessary data, assess the quality of existing data through rigorous and pre-defined quality assurance procedures, and develop standard operating procedures for data management and analysis. Throughout this process, he has combined his existing expertise in clinical issues with an ability to quickly grasp new epidemiologic methods and statistical techniques. Indeed, he has already become fluent in 'R', a new statistical program used for these types of analyses. Most importantly, Dr. Dzung has worked closely with other collaborators from the children's hospital to ensure that we can maximize the use of existing data (especially given the challenges of linking data from clinical and financial records), and that we clearly understand any inherent limitations of these data.

A.1.2 Air Quality Data: Dam, the higher level HEPA staff who coordinated the air quality monitoring program, and actively participated in the planning for the project, has just left for a year-long (at least) study leave in Norway. Dam was available during the pilot study, however, and was actively engaged in helping us to train the field staff. Huy has taken over the responsibility for managing the ambient monitoring stations. He generated the necessary air quality inputs for the study, and he is technically competent. We are confident that as long as we have proper assistance with translation / communication, he will be able to work with us to address any questions about the air quality data.

A.2 Household study

A.2.1 Field staff: HEPA hired and/or seconded six field and three laboratory staff for the project. Several of them are recent college graduates in environmental engineering. In general, all appear to be sharp, enthusiastic and quick learners. In addition to taking over responsibility for managing

the ambient monitoring stations, Huy will also be part of the field staff for this project. He is well-suited to assume the leadership position among the field staff. None of the local staff have applied experience with the personal monitoring equipment, however, so careful training in the calibration, maintenance, and use of the equipment will be critical.

A.2.2 Laboratory Staff: The three people hired and/or seconded by HEPA to serve as laboratory staff for the project seem quite competent. They demonstrated careful attention to detail, hygiene, and organizational skills. They took copious notes on sample preparation, storage, and chains of custody. The laboratory staff were trained to prepare the PEM and Ogawa samplers. While it is not possible to further assess their analytical abilities in the absence of the glove-box, microbalance, and IC unit, there were no major concerns raised. None have applied experience in gravimetric or IC analyses however, so careful training prior to the main study will be essential.

B. Summary of ongoing and completed training activities

B.1 Hospital Study

- Until now, since the pediatric hospitals have been primarily focused on patient care, they have not been overly concerned with the ability to utilize their patient records for research purposes. Thus, as we develop protocols for data management, we are working carefully with hospital staff to carefully assess the quality of available data (including attention to data entry errors), as well as the ability to link data from different sources, to ensure that they will be well equipped to easily access and link hospital data in future studies.
- As mentioned above, Dr. Dzung and his colleagues have, with assistance from Dr. TQ Thach, already become fluent in 'R', a statistical program used for these types of analyses.
- Initially, it was unclear how the software used at HEPA was generating hourly and daily averages based on the existing data. In addition, 'problematic' values were being removed manually, rather than systematically, from the five-minute data. We are working with HEPA staff to ensure that they can generate hourly and daily estimates of air quality using automated data cleaning procedures and predefined data management and cleaning protocols.
- Upcoming capacity building activities are listed in the timeline for the hospital study (ATTACHMENT 2).

B.2 Household study

- A half day 'Introduction to Exposure Assessment' workshop was held in October, 2006. The workshop provided an overview of exposure assessment techniques, focusing on the estimation of personal exposures, and included a hands-on demonstration of personal sampling equipment. Approximately 15 people from HEPA, staff of collaborating agencies, and potential lab and field staff attended the workshop. The agenda for this workshop is attached (ATTACHMENT 7).

- The pilot study served as an important opportunity for training of laboratory and field staff. Table 1 provides a summary of the capacity building activities that took place during the course of the pilot study. Where appropriate, staff were trained together to ensure that the teams were well aware of the linkage between their responsibilities.

TABLE 1. Summary of training activities during January 2007 pilot study

Training Completed	Laboratory Staff	Field Staff
Sample Preparation/Handling / Tracking		
Ogawa NO ₂ /NO	√	√
Teflon Filters for PM Monitoring	√	√
Quartz Filters for PM Monitoring	√	√
Nicotine (Environmental Tobacco Smoke) Badges	√	√
PM_{2.5}/PM₁₀ Personal Exposure Monitors		
Set-up	√	√
Calibrating/Leak Testing	√	√
Loading of Filters	√	√
Cleaning	√	N/A
PM_{2.5} Personal Data Rams (pDRs)		
Set up (pumps, battery, logger, calibration)	N/A	√
Downloading	N/A	√
Fieldwork		
Setup, takedown, and transport of samples	N/A	√
Administration of household survey		√
Personal monitoring		√
Laboratory Infrastructure	√	N/A

- Upcoming capacity building activities are listed in the timeline for the household study (ATTACHMENT 5).

FINANCIAL REPORT

The Statement of Expenditures for the period October, 2006 – January 31, 2007 shows the expenditure of both ADB and HEI funds in support of the objectives of the project. The first \$100,000 of ADB funds have been used to purchase equipment, design and conduct the household survey, support the local coordinators and field personnel and send HEI staff and consultants to the region. Expenditures of both ADB and HEI funds are included in the Liquidation of Advance Statement of Expenditures and expenditures of ADB funds are detailed in the Expense Category Statement of Expenditures. Backup materials to support the expenditures are attached.

Equipment purchases for this reporting period included three specialized scientific instruments which are only able to be procured from single (sole-source) vendors. These include: personal data rams (pDRs) for measuring real-time continuous indoor-outdoor PM_{2.5} measurements at the homes and fixed sites and only supplied through ThermoFisher Scientific; PM_{2.5} and PM₁₀ personal exposure impactor monitors (PEMS) which are vital for performing integrated measurements of personal and ambient PM exposures fabricated only through MSP corporation;

and a sample handling glovebox, a device for storing, conditioning, and preparing filters used in the personal exposure monitors cost effectively fabricated only by Professional Plastics in Oregon. These items accounted for the \$23,071 in equipment expenses from the ADB budget.

Approximately \$43,000 of the costs incurred were expenditures by the local coordinators to support local personnel, develop the Household Study and conduct a workshop. The remainder of the ADB funded expended was for travel for HEI staff and consultants to the region, and personnel costs for these individuals.

TIME-LINE RELATED ISSUES

- A. Need for adequate training: While this project presents a unique and exciting applied capacity building opportunity, achieving a sustainable technology of transfer within a limited time frame certainly has its challenges. The local collaborators are all capable and enthusiastic, but the project involves applied training in many epidemiologic methods and exposure assessment techniques that are new to the local collaborators. We must ensure that we do not compromise the quality of the results in the short term, or the sustainability of transfer of technology in the long term, by imposing an unrealistic period of performance with regard to training and technical assistance.
- B. Extension of the household survey: As mentioned earlier, we will need to extend the sampling period for the household study to February 2008, in order to sample in both seasons. We will then need several months to analyze the data and write-up the results. In order to accommodate the administrative requirements of the project in the context of a truncated timeframe and still complete a comprehensive and viable project we will retain the current submission date for the final programmatic report by providing a detailed but not fully comprehensive summary of the results of the household study. In addition, while the extension of the sampling period will not affect the submission of any of the progress or programmatic deliverables, we anticipate a minor extension three months in the completion of the final technical reports. HEI will meet any additional expenses associated with the extension

C. A revised timeline for the project is provided below.

	Start Date	End Date	Deliverable to ADB	3.1 (Hospital Study)	3.2 Household Study
2007	January			Acquire meteorological data	Finalize survey instrument for household monitoring, including detailed household questionnaire, monitoring questionnaire, and time activity pattern assessment
					Obtain human subjects/ethics approval for the proposed study in HCMC
					Validate and finalize Stage 1 household survey instrument
	January	February			Conduct Stage 1 household survey
	January	February			Pilot study
	February		Inception Report	Produce full, cleaned dataset	
	February	March		Draft SOP for descriptive analysis, conduct descriptive analysis	Results of household survey used to select homes for the main study
					Refine protocols and questionnaires based on pilot study results
	March			Write-up summary of descriptive analysis	
				Write-up summary of demographic analysis	
	February	October			Analysis of stage 1 household survey
	March	May		Draft SOP for analysis	
				Preliminary analysis	
	May			Statistics workshop (Hong Kong)	
			Outline draft final report		
	May	August		Sensitivity Analysis	
	April	February 2008			Main household study
	June			Assign writing tasks	
	August		Programmatic Progress Report	Epidemiologic Methods workshop	
				Meeting to discuss analysis	
	June	November		Draft final report	
	November		Draft Reports		
2008	March		Final Programmatic Report		
	March	June			Analysis of exposure data
	July				Draft final report
	December		Final Technical Report		