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REPORT ON TECHNICAL CONSULTANCY  
FOR SCHOOLS OF PUBLIC HEALTH, INDONESIA:  
EPIDEMIOLOGY COMPONENT

by

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GLOSSARY

Bahasa Indonesia	Indonesian language
BKKBN	National Family Planning Coordinating Board
R.Sc.	Bachelor of Science degree
CDC	Communicable Disease Control
CHS	Consortium for Health Sciences
DHF	Dengue hemorrhagic fever
DPH	Department of Public Health (of a School of Medicine)
FacMed	Faculty (= School) of Medicine
FETP	Field Epidemiology Training Program
FKM	Faculty (= School) of Public Health
KKN	Compulsory community service
MCH	Maternal and child health
MOEC	Ministry of Education and Culture
MOH	Ministry of Health
MPH	Master of Public Health
M.Sc.	Master of Science
Ph.D.	Doctor of Philosophy
Puskesmas	Health Center
Dr.P.H.	Doctor of Public Health degree
S1	B.Sc. degree in Indonesia
S2	M.Sc. degree in Indonesia
S3	Doctoral degree in Indonesia
UI	University of Indonesia
UNAIR	Airlangga University

UNDIP

Diponegoro University

UNHAS

Hasanuddin University

USAID

U.S. Agency for International Development

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## EXECUTIVE SUMMARY

The purpose of this consultation was to provide advice and assistance in the development of the epidemiology component of newly-established public health educational programs at Diponegoro, Airlangga, and Hasanuddin Universities in Indonesia. A team composed of Dr. Henry M. Gelfand of the U.S. and Dr. Henry Pardoko of Indonesia visited these Universities and operating public health facilities in Semarang, Surabaya, and Ujung Pandang, respectively, as well as the Faculty (= School) of Public Health, University of Indonesia, in Jakarta.

A standard, national curriculum for a four-year undergraduate (B.Sc.) program to produce public health generalists has been developed. This will run concurrently with, and gradually replace, a two-year program for experienced public health workers who take courses approximately the same as those prescribed for the last two years of the complete program. In addition, some of the Schools of Public Health (and eventually all) offer a two-year Master of Science (M.Sc.) specialist program, and a Ph.D. degree offering is planned for the future. The University of Indonesia, as the most experienced in this educational field, has been designated National Resource Center to provide leadership and assistance to the other universities.

At present, the new Schools differ in their levels of development and in the types of programs (two-year B.Sc., four-year B.Sc., and M.Sc.) they offer. Overall, however, the academic staffs in epidemiology are very deficient in numbers and in their practical and academic experience. Many of the senior personnel have unrelated administrative responsibilities, and many of the junior personnel have just graduated from academic programs in epidemiology, are still in training, or are scheduled to begin training this year. Fortunately, there is often good collaboration with Provincial and Municipal Health Departments, and the operational personnel of these institutions may participate actively and enthusiastically in course teaching. In some instances a useful contribution is made by lecturers from the Faculty of Medicine.

Detailed planning for the overall curriculum, including a practical field component, and for the content and teaching methods for individual courses, is very incomplete. There even remains some confusion about which courses, or combinations of courses, will be offered and in what sequence. Course and individual lecture outlines are generally not available, and teaching materials have not been prepared.

In general, instruction places major reliance on three approaches: lecture, observation of operational public health programs, and report writing and presentation. All of these are valid and necessary, and in the limited direct observation of the consultants, the latter is particularly well done. There appears to be a paucity, however, of two additional essential instructional elements: (1) practice and drill in the collection, assembling, and interpretation of primary data and (2) the critical examination of morbidity and services delivery data, particularly those now available at public health facilities, in order to assess their validity and to use them for recommending improvements in services.

Reference resource for students (and staff) are very limited, and those that are available are generally old and exclusively in the English language.

These limitations make it especially important that reference materials be prepared for the students locally and in Bahasa Indonesia. Until a good existing textbook of epidemiology is translated into Indonesian or, preferably, one is written by an Indonesian epidemiologist, handout sheets to accompany lectures would replace or supplement reliance on lecture notes. For the continuing development of staff, the availability of current specialized books and periodical journals which publish articles on epidemiologic investigation is essential.

Epidemiologic research by university staff, except as required for Master's degree work, is very limited. It should be an important faculty activity and, insofar as possible, should be pragmatic and applied in nature. The excellent plan to develop "community laboratories" accessible to each School of Public Health should provide many research opportunities.

Specific recommendations to address the problems noted above were made by the consultants at each university visited, and they are incorporated in brief in this report. It is highly likely that, with accumulating experience and feasible improvements, the new Schools will become valuable national resources for the improvement of public health.

## I. INTRODUCTION AND BACKGROUND

### I.1. Purpose of the Assignment

This short-term technical assignment was to assist the U.S. Agency for International Development (USAID) Jakarta to make final plans for a new project to develop Bachelor of Science in Public Health programs in three new Faculties of Health (FKM) in Indonesia. The project aims to assist the Ministry of Education and Culture (MOEC) increase the numbers of public health workers available for government health programs. USAID has been collaborating since 1983 with the National Family Planning Coordinating Board (BKKBN) in preliminary planning.

This assignment was one of five requested to assess each of the five academic disciplines in the FKMs and suggest strategies for utilizing inputs for the new project. Specifically, the consultant was requested to assist the development of the epidemiology curriculum at Diponegoro University (UNDIP), Hasanuddin University (UNHAS), and Airlangga University (UNAIR). The latter (UNAIR) was not included in the original scope of work but was added at the request of the USAID Mission in Jakarta. Furthermore, it was requested that the perspective be somewhat broadened to include all public health educational programs (at the Master's and Doctoral levels) and to address the issues of faculty development, faculty research, and commodity and technical assistance needs. Finally, it was requested that this consultant visit the Department of Epidemiology at the University of Indonesia (UI), to offer whatever assistance might be requested by its faculty and to explore the supportive role of UI for the benefit of the new institutions.

Specifically, the scope of work requested that the consultant (1) make recommendations on course selection and Department staffing levels, (2) assess and revise course content in light of prevailing scientific and empirical knowledge, (3) suggest ways to incorporate innovative teaching methodologies within existing curricula, (4) identify library and information resources to support the discipline, (5) suggest suitable faculty research strategies and topics, (6) assist in clarifying administrative departmental procedures, mechanisms, and relationships, and (7) introduce latest state of the art scientific and technological advances to counterparts (see Attachment B for further details on project background and the scope of work).

### I.2. Team Composition

Each major public health discipline area was represented by an American and an Indonesian consultant working as a team. For epidemiology, the Indonesian consultant partner was Dr. R. Henry Pardoko, a member of the Expert Staff of the BKKBN, formerly Deputy Director of BKKBN and Director of the Institute for Health Services Research, Surabaya. Except for the section on UI, which Dr. Pardoko was unable to visit, this report reflects the observations, views, and recommendations of both members of the team.

### I.3. Methodology

The working procedures consisted almost exclusively of discussion and

observation. All epidemiology staff available at each university were consulted for information and understanding of curricula and courses, students, research, instructional resources, health services and needs, and related subjects. Conversations were held with individual students and several class meetings were attended.

Visits were made to Provincial and Municipal Health Departments and urban and rural Health Centers, where discussions were held with operating staff at all levels. Where possible, documents were studied and some were translated into English. One seminar was held at a Municipal Health Department where both consultants led discussions in epidemiology for a group of Health Center personnel. A list of the principal persons contacted is attached as Appendix A.

#### I.4. Constraints

The only serious constraint was language. This consultant cannot read or speak Indonesian (Bahasa Indonesia) and therefore it was difficult (but not always impossible) to understand documents. Many persons consulted, meanwhile, were weak in English, particularly junior staff, making communication sometime difficult. Dr. Pardoko was of immense help at such times.

The only other significant limitation was time, that of the consultants and of those consulted. Although persons visited gave freely of their time, certain of their essential responsibilities could not be ignored, and there were sometimes interruptions and delays. On the other hand, the limited period of each visit, and particularly the initial need to become acquainted with new programs and circumstances, made it impossible to become fully knowledgeable about all of the details that are relevant to this mission.

## II. OBSERVATIONS AND FINDINGS

### II.1. General Review of Degree Programs

FKMs offer a Bachelor's of Science (B.Sc.) degree, called an S1 degree,<sup>1</sup> and a Master of Science (M.Sc.) degree, called an S2 degree. The S1 degree program is addressed to two categories of candidates: (1) those who have graduated from a three-year academy<sup>2</sup> and had at least two years of work experience. These follow a two-year program and (2) high school graduates, usually 18 or 19 years old, with no previous professional education or experience. These follow a four-year program.

The S2 degree program covers two years and a bachelor's degree is a prerequisite.

These three programs are being introduced at different times at the four universities observed. UI was the first to offer a two-year S1 program (1981) and an S2 program (1965) and UNAIR was the first to offer a four-year S1 program (1985) (see Table II.1).

A certain degree of similarity exists in these programs, since academic programs and standards and the organization of health services are basically uniform throughout the country. There are significant variations in detail, however, which will be described in Sections II.2 - II.5.

#### II.1.1 Four-Year S1 Degree Program

When the two-year program started at UI in 1981, it was begun in response to a request by the Ministry of Health (MOH) to the MOEC to find a way for academy graduates, with work experience but no academic degree, to advance professionally within government service. In 1983, to increase further the supply of S1 degree holders, the MOEC decided to develop a four-year program which would be suitable for graduates from high school.

A detailed curriculum for the four-year program was prepared by the FKM of UI, with input by representatives of other universities, at the request of MOEC's Consortium of Health Sciences (CHS). It has been published in draft form and was approved with modifications at an inter-University meeting in Malino in 1984.

A new draft was subsequently developed and has been submitted for final approval. It has not yet been distributed to the universities, however, and was not made available to the consultants. When approved, it will form the basis for S1 programs. In the interim, however, the universities must use as their guidance the original draft.

II.1.1.1 General Curriculum. The curriculum described below is that contained in the original draft proposal. It reflects the experience at UI with the two-year S1 program, and assumes that the last two years (Semesters V-VIII)

- 
1. Bachelor of Science or B.Sc. is used, as in the U.S., to indicate a four-year University degree.
  2. An academy is a three-year education program following high school. In public health, there are academies for nursing, sanitation and nutrition, all run by the MOH.

Table II.1

Degree Programs at Universities Visited

<u>University</u>	<u>D e g r e e   P r o g r a m</u>		
	<u>S1 - two years</u>	<u>S1 - four years</u>	<u>S2</u>
UNDIP	Scheduled to start August 1985 11 students	Scheduled to start August 1987	1990 (?)
UNAIR	Started August 1984 32 students	Scheduled to start August 1985 30 students	Started 1978 15 students 25 - 30 graduates to date
UINHAS	Started 1982 31 students 63 graduates	Scheduled to start August 1987 40 - 50 students	Scheduled to start 1989 or 1990
UI	Started 1981 20 students a year	-----	Started 1965 Currently 20 - 25 stu- dents a year

of the four-year program should be the substantially same as the two-year program.<sup>1</sup>

For the four-year program, as with the two-year program, the goal is to develop graduates with a broad general view of the five areas of public health, rather than specialists in any one area. The course credits<sup>2</sup> for the complete four-year program are distributed as shown in Table II.1.1.1-1.

Table II.1.1.1 - 1  
Course Credits for Four-Year S1 Degree Program

Original Draft

Course Class	<u>Public Health Disciplines</u>						Total
	Biostat	Environ. Health	Admin. Health	Health Educ.	Epid.	Other Faculty	
Basic Core	-	-	-	-	-	12	12
General							
Medical	-	-	-	-	-	14	14
Public Health	2	4	4	2	2	-	14
Non-Health	2	-	2	4	-	8	16
Introductory	4	6	8	7	3	11	39
Specialized	4	6	10	6	6	-	32
Electives	-	-	-	-	-	-	13
<b>Totals</b>	<b>12</b>	<b>16</b>	<b>24</b>	<b>19</b>	<b>11</b>	<b>45</b>	<b>140</b>

The basic core courses, which include behavioral science and what might be termed civics in American parlance, will occupy all of semester I. The general medical courses consist of the sciences such as anatomy, biology, chemistry and microbiology, and will occupy the entire semester II of the first year.

The introductory courses will provide the basic elements of the five public health disciplines and the specialized will offer more in-depth information on the components of the various disciplines. The electives permit the student to take additional courses in areas of special interest. Some universities choose to use some of these credits for mandatory field experience and/or a final report.

---

1. There are two semesters in each academic year, each extending for 16-18 weeks. This report uses the four-year numbering system for both two-year and four-year S1 students. Thus, two-year students' courses are identified in terms of semesters V-VIII.

2. Each credit unit implies one lecture hour per week.

The epidemiology courses were named, credited, and distributed in the curriculum as follows:

Table II.1.1.1 - 2

Core Epidemiology Curriculum - Four Year S1 Program  
Original Draft

Course Title	Credits	Semesters
Introduction to Epidemiology (General Courses - Public Health)	2	III
Basic Epidemiology (Introductory)	3	IV
Communicable Diseases and Control Programs ]	2	V
Epidemiology of Non-communicable Diseases ] (Specialized)	2	VI
Epidemiologic surveillance ]	2	VII

II.1.1.2 Content of Epidemiology Courses. Syllabi have been prepared giving the content of each course by topical heading and the level of competence to be attained. Following are brief descriptions and comments on each of the courses as originally proposed.

(i) Introduction to Epidemiology was apparently intended to consist entirely of didactic lectures. Its content was very general, providing a background for later studies (see Appendix C). It is difficult to understand how an entire semester of 32 or more lectures could be productively filled with the very limited content of this course. Quite appropriately its content is incorporated with following course, Basic Epidemiology, for the two-year S1.

(ii) Basic Epidemiology provides a comprehensive overview of essentially all of the important concepts and methods of epidemiology. Whether this course is to consist only of lectures or whether the student will be exposed to actual practice in the assembling, analysis/interpretation, and use of data for the solution of real world problems is left to the individual university instructor. If properly and pragmatically presented, this course would be excellent, since it comprises the basic elements of epidemiology (see Appendix D).

(iii) Communicable Diseases and Control Programs has, as its name indicates, two principal components: (1) consideration of infectious diseases categorized by route of transmission and available control methods and (2) consideration of control approaches and control programs. Since the methods of instruction are not specified, instructors have wide latitude for incorporating field observations/participation and practical drill using primary field data (see Appendix E).

(iv) Epidemiology of Non-Communicable Diseases provides, in addition to discussion of the epidemiology of specific diseases (cancer, cardiovascular

and renal disease, diabetes, mental health, accidents, etc.), coverage of methodologies most frequently associated with such disorders (surveys, sampling, screening, questionnaires, retrospective and prospective investigations, etc.). to discussion of the epidemiology of specific diseases (cancer, cardiovascular Again, opportunity is provided for very practical drill in data handling and analysis.

(v) Epidemiological Surveillance covers the collection and use of routine reporting data, the surveillance of laboratory data and drug/vaccine utilization, surveys, and outbreak investigation. It is expected that this course will be used to introduce the student to practical programs in effect in local health departments, and will not be limited to lectures.

II.1.1.3 Integration of Two-Year and Four-Year S1 Programs. Practically speaking, all FKMs will inaugurate their two-year S1 programs before starting the four-year program. Therefore, the last two years of the four-year program will to all intents and purposes be in place upon inauguration of the four-year program.

Development of the first two years, however, may present some difficulties since these must serve to bring the high school graduates up to the same level of knowledge and experience as the academy graduates. Substantial field exposure during the first two years of the full program should be planned so that the high school graduates might have approximated the work experience of the academy graduates by the time they are in class together.

II.1.1.4 Field Experience. All FKMs are in agreement that graduated field experience must be incorporated into the four-year S1 degree program from the earliest point possible, preferably from the first year. This goal is feasible because the Faculty of Medicine (FacMed) in each University makes use of designated rural and urban Health Centers and Regency hospitals as field training sites for medical students in a program called Community-Oriented Medical Education (for further information on these and other administrative subdivisions mentioned below, see Appendix F). These sites can also be used for public health students. In existing two-year programs, field experience incorporates primary data collection and the writing of a report on a specifically assigned topic for investigation.

It is national policy that all students in university degree programs must undertake compulsory community service (KKN) for a period of at least two months near the end of their education. Although intended to acquaint students with community problems in general, and to have them participate in remedial programs such as the construction of roads or community meeting halls, this experience in the present two-year S1 programs has incorporated specifically assigned public health projects and data collection which culminate in a written report.

II.1.1.5 Future Professional Roles for S1 Graduates. Students in the S1 two-year program come mainly from jobs at subdistrict Health Centers (Puskesmas) and will return as mid-level managers mainly at Regency and Provincial levels. Plans for employment of S1 four-year program graduates are as yet not so clear. Discussions between the MOEC and the MOH have resulted in an informal agreement

that (one or more) S1 graduates will be used initially to augment the staff of the Regency doctor in his role as administrator and thus free him for greater involvement in preventive medical and public health program development. With 300 to 500 Regencies in Indonesia, it would take nearly 10 years to fill all such posts. In the future, managers may also be needed to help with the expanding activities and enlarging populations served at the Puskesmas. With several thousand Puskesmas in Indonesia, there should be no surplus of S1 graduates for decades.

If this projection is valid, S1 students must be made competent as supervisor-teacher-administrators at a practical operational level. They must be generalists with knowledge and ability in all of the preventive activities of the Puskesmas, capable of following routine procedures while remaining alert to detect problems and recommend solutions. Initially, at least, they will usually not be the initiators of new programs nor will they be acting independently. In their epidemiologic capacity they will not only be responsible for disease surveillance and control, but will also be the collectors of vital and program statistics, and they must be able to interpret/analyze the assembled data and use them for program evaluation and improvement. They must, therefore, develop a high level of competence in descriptive epidemiology and surveillance, but their role in research will be limited and will largely be as participants under the supervision of others.

#### II.1.2 S2 Degree Program

No curriculum for the public health S2 degree has been prepared centrally, and thus each university is free to devise its own. Most, however, will model it in general on the program at UI, with modifications based on the experience of their faculties. A bachelor's degree is a prerequisite for admission, and the academic program extends over two years (four semesters). Currently, in addition to UI, only UNAIR is offering an S2 degree.

II.1.2.1 Curriculum. M.Sc. in Public Health students major in a discipline area, but may be required to take core courses in other disciplines as well as in computer science and research methods. One semester is reserved for individual research and the preparation of a thesis which must be defended and approved (see Section II.3 for details on the UNAIR program).

II.1.2.2 S2 Degree Students. At the present time almost all S2 students are medical graduates (an S1 program in Indonesia). Graduates with the S1 degree in public health (non-medical) are eligible for admission, however, and in the future may well constitute the majority of S2 public health candidates. The integration of physicians (with a weaker public health educational preparation) and non-medical graduates (with a weaker biomedical background) is a matter of concern for the future.

II.1.2.3 Future Professional Roles for S2 Graduates. Traditionally, S2 graduates have returned to their former posts as health department officers or medical school faculty members after graduation. As S2 programs expand, however, an increasing proportion will be newly appointed to operational health programs at Provincial and Regency levels. Epidemiologists in these posts will serve a variety of functions in disease control activities and investigations, including supervising, supporting and working with S1 graduates at Regency and Puskesmas levels. In this capacity they will need the same or a higher level of skills in

descriptive epidemiology. In addition, however, they will be expected to initiate surveys, field trials, and applied research investigations. The latter will require competence in hypothesis formulation, protocol development, research implementation, and analysis. In this capacity they will need experience in analytic epidemiology.

These assumptions imply that public health S2 graduates in epidemiology must be prepared to work independently and to possess both a higher level and a broader range of skills than generalist S1 graduates.

### II.1.3 S3 Degree Program

Medical education in Indonesia culminates in the award of an S1 degree. Physicians who wish to conduct research in an academic setting become candidates for the degree "Doctor in Medicine," an S3 degree awarded in the name of a Faculty of Graduate Studies (although supervised by staff of a FacMed) and considered equivalent to a Ph.D. Work toward this degree previously required only individual research under the supervision of a professor, leading to an approved dissertation. Universities are now moving to a more formal structure for the S3 degree, including course work as well as research, and it will be called a Doctor of Philosophy. No S3 degrees in Public Health have been established to date, although two de facto S3 degree students are enrolled in UNAIR (Section II.3.1).

### II.1.4 Faculties

An FKM was formally established at UI in 1975 and at UNHAS in 1982. At UNDIP and UNAIR, public health faculty are members of Departments of Public Health (DPH) in the FacMeds. A recent MOEC directive states that a Faculty may not be established unless it offers a four-year program leading to a Bachelor's degree. The same academic staff may then obtain approval for offering S2 and S3 degrees through the Faculty of Graduate Studies.

All academic staff in FacMeds are physicians as are the vast majority in FKMs. Non-medical Ph.D.s are rare, and thus, for example, it is only physicians who teach epidemiology or biostatistics.

II.1.4.1 Faculty Rank or Grade. As government employees in state universities, faculty members have appointments in a civil service grade structure that has four classes numbered from 1 (the lowest) to 4 (the highest) and four subclasses within each class, from a (the lowest) to d (the highest). All faculty must possess at least a R.Sc. degree, and initial appointments are made at the 3a level. Promotion is by accumulated seniority, except for grade jumps made by acquiring S2 and then S3 degrees.

There are titles associated with each grade from 3a to 4d, but they are not used except for Professor. The latter is a 4d or 4e (a supergrade) appointment. Only the head of the department may be a Professor, and not all department heads hold that rank.

II.1.4.2 Full-time and Part-time. All university appointments are full-time within the Department/Faculty of primary affiliation. Part-time refers to the service provided to another Department, e.g., a Department of Natural Sciences staff member teaching ecology to a class in public health. Government salaries are very low, however, and the official workday ends at 2 p.m. (11 a.m. on

Fridays and 12 noon on Saturdays) in order to permit personnel to undertake second and third jobs. The vast majority of doctors have private practices, from which they derive income which may be at least 10 times as large as the university (or other government) salary. A result of this system is that faculty members have divided interests, responsibilities and loyalties and limited time for reflection, reading, and professional improvement.

II.1.4.3 Faculty Experience. It is very difficult, and rare, for individuals to transfer from academic appointments to jobs within operating health departments, and vice versa. The public health knowledge and experience of faculty members is thus often limited to what they learned as medical students and in post-graduate studies.

Many of the older faculty members have master's or doctoral degrees earned in foreign (most usually U.S.) universities, often 20 or more years before. With the recent increased interest in public health, and the movement to establish FKMs, many new junior faculty members have been recruited and many more will be in future years. A substantial proportion of these are in public health S2 training now, mostly at Indonesian universities. Advanced education in overseas (mainly U.S.) institutions is sought after but is limited by the availability of fellowships and even more by language limitations. For example, of nine selected young persons nominated for overseas education in public health at UNAIR last year, only four could pass the English language proficiency tests.

Public health faculties thus labor under three limitations: (1) lack of practical experience in public health, (2) post-graduate specialty education that is generally either many years old or is being acquired right now, and (3) paucity in the number of full-time faculty, exacerbated by the temporary withdrawal of many younger personnel to undertake post-graduate studies.

#### II.1.5 Facilities

Classroom and faculty offices and meeting spaces are generally adequate. Other facilities immediately relevant to the public health programs are briefly described below.

II.1.5.1 Libraries. Libraries in universities with FKMs are universally deficient in books and journals dealing with epidemiology. Senior FKM academic staff often have personal copies of a very few books, and these are sometimes assembled into small departmental libraries. The consultants were informed that students rarely, and staff infrequently, use library reference materials. A 1985 edition of the American Public Health Association book Control of Communicable Diseases in Man was eagerly photocopied at each university (the latest editions available were 1960, 1965, and 1975 at UNDIP, UNAIR, and UNHAS respectively) as was the 1980 edition of Lilienfield and Lilienfield textbook Foundations of Epidemiology at UNDIP and UNAIR.

II.1.5.2 Laboratories. Since all FKMs are associated with FacMeds, teaching laboratories are adequate, including microscopes needed for parasitology and microbiology. Nothing approaching modern research laboratories are present, however, and even diagnostic laboratories in FacMed hospitals are generally very limited in their bacteriological and seriological capacity. No virological laboratories are present in the universities but some studies have been undertaken

in collaboration with the (U.S.) Naval Medical Research Unit laboratory in Jakarta and the veterinary research laboratory near Surabaya.

II.1.5.3 Computers. Each university visited has a central computer facility, and in some instances a smaller unit is owned by the FacMed. The new FKMs do not have their own computers. The central facility is rarely used by public health faculty, because access and programming assistance are limited and computer maintenance is poor.

## II.2 Diponegoro University

Semarang, the fourth largest city in Indonesia with a metropolitan population of about one and one-half million people, is the capital of Central Java Province (population about 27 million). It is located on the north coast of the island Java.

UNDIP was established here in 1956 as a private university and became government-operated in 1961. It has Faculties in Law, Economics, Engineering, Medicine, Animal Husbandry, Letters (i.e. Humanities), Social and Political Science, Non-Degree Technology, and Graduate Studies. The latter is an administrative structure only, serving to coordinate and supervise programs leading to master's and doctoral degrees. Staff from the other Faculties implement these programs for individual students. Although UNDIP is a national academic resource, and has students from throughout Indonesia, the majority of its students come from Central Java Province.

### II.2.1 Status of the School of Public Health

Since an FKM has not yet been officially established at UNDIP, the program in public health is offered through the Department of Public Health (DPH) of the FacMed.<sup>1</sup> Personnel of this department have been and will continue to be responsible for the extensive public health instruction of medical students (which extends through the six years of the medical curriculum, including the two-year internship).

The FKM will initiate education for the two-year S1 degree in August 1985, with 11 students. This is referred to as a "Program of Study" within the DPH. It is hoped that the four-year S1 program can be initiated in August 1987, at which time an FKM should be approved formally. Little planning has been done for establishing an M.Sc. (S2) degree program; it may be inaugurated around 1990. The inauguration of a doctoral (S3) degree program has not yet been considered.

### II.2.2 Epidemiology Faculty for the S1 Program

The full-time faculty consists of three persons as follows:

(i) Dr. Suharyo joined the FacMed in 1972 to teach public health and epidemiology to medical students. He received specialty training in tropical and infectious diseases from 1975 to 1980 and then returned to DPH, although he be-

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1. For convenience, however, the public health Faculties at UNDIP and UNAIR will be referred to as FKMs.

came a part-time teacher of infectious diseases in the Department of Internal Medicine. He recently completed an intensive two-week course in epidemiology at UI and he will go to Mahidol University (Thailand) in 1985 for a six-month training course in tropical and infectious diseases. His special interest is malaria in Central Java and he is involved in descriptive epidemiology and studies of chloroquin and DDT assistance. He was a member of a team which investigated a malaria epidemic in 1984.

(ii) Dr. Bambang Basuki has had experience teaching medical students in the DPH, and is now completing a M.Sc. program in epidemiology at UI. He will return to UNDIP in time to participate in the S1 program in 1985-86.

(iii) Dr. Ludfi, the most junior member of the staff, has completed all course work for his S2 degree in biostatistics at UI. His research topic (currently underway) is a descriptive model of Japanese B encephalitis in Central Java.

In addition, many part-time FacMed staff will participate in the public health S1 program. Those who were met were: Prof. Dr. Sapardi (Head, Department of Microbiology, MPH. Tulane University 1956); Dr. Djokomoeljanto (Ph.D. UNDIP based on an epidemiological study of goiter and cretinism in Indonesia, and with continuing research interest in goiter, cancer and anemia); Dr. Sunarto (Dept. Internal Medicine, conducting a WHO-sponsored collaborative study of rheumatic/arthritis disorders in a field area near Semarang) and; Dr. Sudomo Hadinoto (a neurologist with no epidemiologic experience). Several non-faculty members of the Central Java Provincial Health Department will give individual lectures in their particular fields of activity.

### II.2.3 Epidemiology Curriculum in the Two-Year S1 Program

Although the first course in this discipline is to be taught in the semester starting in January 1986, plans for the epidemiology segment of the two-year S1 program still appear in flux. While an instructor assignment listing indicates that Introduction to Epidemiology and Basic Epidemiology will be taught separately, the consultants were informed that the courses would be combined. The weekly schedule of classes reflects this new plan, indicating that the combined courses would have five credit units, with one two-hour lecture period and one three-hour practicum/discussion periods each week. No lecture outlines have been made as yet, but the practicum/discussion periods will be based on Indonesian translations of Johns Hopkins University epidemiology exercises from some years ago. Generally, these exercises provide for the analysis and interpretation of tabular data from classical epidemiological investigations in the United States. They are thus only distantly relevant to the past and future experiences of Indonesian S1 students, and provide little opportunity for practice in the collection and management of primary data. They are good exercises (assuming good translation) but they do not meet Indonesian needs.

No consideration has been given to supplementing the lectures with hand-out materials in Bahasa Indonesia. The students will thus rely completely on lecture notes since few if any will consult textbooks which may be available in the library.

Other than the assignment of instructors, no planning has been done for the remaining three epidemiology courses described in Section I.1.1.2. Communica-

ble Disease and Control Programs will be offered by the most junior member of the faculty with the assistance/participation of three officers who are in charge of programs in the Municipal and Provincial Health Departments. It is to be hoped that lectures will be supplemented by field practice and observation. The Epidemiology of Non-Communicable Disease will be given by three of the part-time lecturers Drs. Djokomoeljanto, Sunarto and Sudomo. Two have had research experience adequate for much of the methodology covered in this course, but it is more appropriate for S2 than for S1 students. Epidemiologic Surveillance will be given by Drs. Suharyo, Hariyono (a pediatrician with a strong community orientation), and Bambang Basuki. No participation by Health Department staff is projected.

In general, UNDIP faculty do not appear to be well prepared, by academic or practical experience, to present strong applied, practice-oriented epidemiology courses. Furthermore, a considerable amount of work remains to be done in preparing for these course offerings for the first time.

Present plans call for a field assignment of two-year S1 students of about one and one-half months in villages and health centers. The students will be required to write reports of their experiences, perhaps in specifically assigned areas of group activity (e.g. communicable disease control).

#### II.2.4 Faculty Development

Several members of the public health faculty are projected to go for overseas training during the next several years. They include Drs. Ludfi and Bambang Basuki, who will be nominated for Ph.D. programs in epidemiology in 1987.

#### II.2.5 Faculty Research

Dr. Suharyo will continue his research interests in malaria and plans to pursue some initial inquiry into the reservoirs and transmission of leptospirosis in coastal areas where an association with domestic mice is suspected. Dr. Ludfi will complete his thesis studies on the distribution of Japanese B encephalitis and then may join Dr. Suharyo in studying leptospirosis. Prof. Sapardi is an enthusiastic promoter of faculty research development and will make available any opportunities that may appear, such as a recently completed, laboratory-supported investigation of a nosocomial outbreak of diphtheria.

Researchers in the FacMed who are concerned with non-communicable diseases appear to be more advanced in epidemiological investigations. Dr. Djokomoeljanto is continuing with intervention studies for prevention of goitre and cretinism by intramuscular injections and oral administration of iodine compounds, and with descriptive studies of other disorders. Dr. Sunarto's community-based studies of arthritic disorders in a defined sample of a subdistrict will permit precise calculations of prevalence when clinical diagnostic investigations are completed. Neither, however, has engaged in case-control studies, but it appears that a case-control study for risk factors in gouty arthritis might be feasible and productive.

#### II.2.6 Library Facilities

The library was described as very inadequate in epidemiology texts and lacking in journals. It is almost never used by students and rarely by faculty.

The USAID-ordered collection of epidemiology books (about which staff have heard nothing yet, not even the titles) will be housed in the general medical library.

### II.3 Airlangga University

Surabaya is the second largest city in Indonesia with a metropolitan population of about three and one-half million persons. It is the largest seaport and a major industrial center. It is the capital of East Java Province, which has a population of about 31 million, mainly rural. UNAIR, located here, has the oldest medical school in Indonesia, having been established in 1927 under the Dutch administration of the country.

#### II.3.1 Status of the School of Public Health

The instructional program in public health is still within the DPH of the FacMed. A formal proposal to establish an independent FKM was sent by the Rector of the University to the MOEC more than one year ago. Before it was acted upon, however, a Ministry directive was issued which prohibited the creation of a faculty unless it were responsible for a full four-year degree program offered to high school graduates. The proposal has therefore been held in abeyance up to this time. Perhaps for this reason, UNAIR is moving ahead rapidly in its planning. It will initiate the first Indonesian four-year S1 program in August 1985 with 30 students. These have already been selected from throughout the country.

The university began formal education in public health in 1978 with an S2 degree program for physicians (under the Faculty of Post-Graduate Studies). There have been 25 to 30 graduates to date. It accepted its first two-year S1 students (32) in August 1984, and a second group has been accepted for August 1985. It is expected that the number of two-year students will gradually decline while those in the four-year program will increase. When admissions stabilize, it is expected that 50 to 100 S1 students (including both tracks) will enter the program each year. For all practical purposes, an S3 program in public health is also in effect; as a Department in the FacMed, two of its staff (one in health education and the other in nutrition) are working for the Doctor in Medicine degree (Section II.1.3). Beginning in August 1985, therefore, UNAIR will become the first Indonesian School of Public Health to have all four academic programs in place: the two-year and four-year S1, the S2, and the S3.

UNAIR has perhaps the most community-oriented program for physician education in the country. Medical students not only have lecture courses during each year of school on general public health, biostatistics, epidemiology, environmental sanitation, etc.; they also have an extensive succession of community experiences. Over four years of the program, teams of students (including one from each of the four years) spend two weeks per semester living in a village and making a community diagnosis of health status, needs, and activities. During the first year of internship, they spend eight weeks at work in a Health Center, during which time they provide assistance to the students in the villages. In the final year they spend four weeks at a Regency Hospital, and provide support to the students at Puskesmas level. This totals seven months of community experience. In this tradition, the FKM intends to build an S1 public health program strongly based on field practice and experience.

### II.3.2 Epidemiology Faculty

The full-time faculty consists of four persons:

(i) Professor (Dr.) Sabdoadi is a lecturer in epidemiology as well as head of the DPH; he is therefore responsible at present for public health and community medicine education in both the FacMed and FKM. He holds an MPH from Tulane University (1962).

(ii) Dr. Eddy Pranowo Soedibyo is a full-time member of the epidemiology teaching staff, but has recently been appointed Assistant Dean for Academic Affairs in the FacMed. An increasing proportion of his time is therefore taken for administrative services.

(iii) Drs. Pryono and Susdini are junior members of the faculty and serve as assistants in epidemiology. Both completed two years as Puskesmas doctors (required by UNAIR for newly appointed academic staff) and then entered the S2 degree program at UNAIR. They will graduate this year.

The full-time faculty is thus very small and, to a large extent, very inexperienced. It will be reinforced however, by Dr. Marsetio Sariowan of the Communicable Disease Control staff in the Provincial Health Department, who is an enthusiastic participant in the epidemiology teaching program and is able to devote a considerable amount of time to that effort.

### II.3.3 Epidemiology Curriculum in the S1 Program

II.3.3.1 The Two-Year S1. During their first year, the entire class of 32 two-year S1 candidates took two courses in Epidemiology. Basic Epidemiology was given in the first semester by Prof. Sabdoabi and Dr. Eddy. It was for three credit units. Its content included the subjects originally planned for Introduction to Epidemiology and Basic Epidemiology (Section II.1.1.2) and it thus covered all of the basic concepts and methods used in epidemiology. It was given in lecture format only, with few handouts and no exercises requiring practice in data handling, interpretation, or analysis. Communicable Disease and Control was presented in the second semester by Dr. Marsetio and his staff from the Provincial Health Department with the participation of Dr. Susdini. It consisted of lectures on the epidemiology of specific diseases, and field practice by six teams of five to six students each for one-half day each week. The field practice activity was organized as follows (by numbers of weeks): introduction to the Health Department (one week), selection of topics (one week), methods to be used (two weeks), literature review (two weeks), seminar to critique study proposals (one week), field data collection, primary or secondary (four weeks), and presentation of reports (three weeks). The topics studied in 1984-85 were: tuberculosis (failure to continue out-patient treatment), dengue hemorrhagic fever (DHF) (factors associated with high incidence), malaria, leprosy, diarrhea, and immunization. In a class observed by the consultants, the reviews were impressively good by any standard; the presenters were mature, data were appropriately assembled, class participation was active, Health Department staff were helpful, and the report examined was extensive (30 to 40 pages) and included quantitative data and statistical analysis. The data, however, were either secondary (DHF) or anecdotal (tuberculosis). This exercise, therefore, needs supplementation by primary data collection and collation.

Epidemiology courses for the second year of the two-year curriculum have not yet been planned in detail, but will include the recommended Epidemiological Surveillance and Epidemiology of Non-Communicable Diseases. Dr. Sabdoadi expressed concern about the latter. He must rely on lecturers from the FacMed, and the latter are said to have neither experience with nor appreciation for an epidemiologic approach to their areas of medical interest.

II.3.3.2 The Four-Year S1. Although the first class of 30 high school graduates has been admitted to begin studies in August 1985, the epidemiology and other specialty area curricula for this program have not yet been developed. However, the first year will be devoted to civics (Pancasila) and social and medical sciences given by Faculties outside the FKM, so there is time for its preparation. Dr. Sumarto, lecturer in Health Administration (MPH University of California at Los Angeles and Doctor of Public Health University of North Carolina), has been given the responsibility for doing this and a preliminary workshop with other faculty has been scheduled. A problem is anticipated for the first year of this program: although teaching laboratories for the medical science courses are available, it may be difficult to arrange for teachers from other Faculties.

The entire recommended core curriculum in epidemiology provided in Table II.1.1.1 - 2 will be followed, including the separate Introduction to Epidemiology, probably in Semester III. Beyond this, there is great uncertainty. There has already been considerable discussion about the feasibility and desirability of complete integration of the two- and four-year students during the last two years (Semesters V through VIII). The high school graduates will be much younger and less experienced than the academy graduate-health workers. It will be necessary, if the two groups are to be integrated, to provide the four-year students with field experience. In addition, they must have a basic science background and be given introductory material in biostatistics, epidemiology, sanitation, etc. as well as some understanding of the diseases they will be considering. It has been decided, however, that this challenge must be met, and that the two groups of S1 students will have an integrated education, with the same final competence level at graduation. The 13 elective credits in the core curriculum (Table II.1.1.1 - 1) will largely be used for required field practice and a final report based on the students' field studies.

Practical field experience will be provided to four-year students in all four years, in graduated levels of activity analogous to the field experience for medical students, culminating in a field internship of one to two months' duration in the fourth year. A supervised externship of six months to one year after graduation might also be found desirable. If so, it would have to be proposed to the MOH since it would be conducted in Health Department facilities under the supervision of MOH personnel.

Dr. Sumarto indicated his strong desire for the provision of a short-term foreign consultant to work with him in developing the four-year curriculum since his time is limited and he needs to share experience. The consultant should be available for three to four months, and should be experienced in field-oriented curricula; ability to read and speak Indonesian would be desirable but not necessary.

#### II.3.4 Field Training Sites

UNAIR now has an urban and a rural Puskesmas as field training sites

for medical students, which will be available for FKM students. The university provides and pays the salary of the Puskesmas doctors.

The FKM will develop additional field training areas (rural and urban), to be under its exclusive control. They would be used for intervention as well as observational studies and would be directed to the improvement of preventive services. The FKM students could be assigned for periods of time to live in the villages as well as to work at and out of the Puskesmas. Dr. Sumarto has been given the leadership responsibility for this development.

### II.3.5 Epidemiology Curriculum in the S2 Program

At the present time there are 15 students registered for the M.Sc. degree in public health at UNAIR, six of them in epidemiology. The epidemiology majors take courses separately from S1 students. Whether physicians and non-medical four-year S1 graduates will eventually follow the same S2 program is a matter for discussion and decision.

The epidemiology courses taken by epidemiology majors are as follows:

Basic Epidemiology (Semester I) required of all S2 students, covers all of the general concepts of epidemiology as well as methodology for descriptive and analytic studies. Teaching methods include lectures, reading assignments, practice in the use of secondary data, and seminar discussions with faculty.

Control of Communicable Diseases (Semester II)

Chronic Disease Epidemiology (Semester II)

Zoonoses (Semester II)

Disease Surveillance (Semester III)

Microbiology, Immunology, Virology (Semester III)

Parasitology (Semester III)

These courses are largely didactic in nature except for Disease Surveillance, in which students are assigned to the Communicable Disease Control Division of the Provincial Health Department for practical work in outbreak investigation and the management of routine and sentinel area disease reports. The use of hospital laboratories is optional in the microbiology and parasitology courses.

Research (Semester IV) is of course individualized to each student. All six epidemiology majors have selected topics dealing with infectious diseases: neonatal tetanus - a case control study of factors associated with fatal cases; measles - post-vaccination serological response; diphtheria - post-vaccination serological response; hepatitis B - relationship of HVB infection and hepatoma and cirrhosis; malaria - the use of chloroquin in treatment; and DHF - relationship of Aedes aegypti density and incidence of DHF.

### II.3.6 Faculty Development

The FKM now has five academic staff in overseas training at the S2 or S3 level, and three more will go during the 1985-86 academic year; none of these are or will be majoring in epidemiology. As mentioned above, Drs. Pryono and Susdini will complete M.Sc. programs at UNAIR this year. It is generally felt that they should go abroad for further training at S2 or S3 levels, but no specific plans have been made. Both have very limited comprehension and speaking ability in English, and it seems most unlikely that they could pass the language qualifying examinations at the present time.

There is no specific expectation for the recruitment of additional faculty in epidemiology at the present time.

### II.3.7 Faculty Research

Except for thesis research being conducted by the two junior faculty, no epidemiological research is underway at the present time. Dr. Sabdoadi would, however, like to submit several proposals by the end of August for funding under the BKKBN-USAID project. It was suggested that a long-range project in field research, which could serve both the academic need for experience in methodology and practical application for preventive services improvement, could be built around the field training area being planned. If this area were completely censused, it could serve as a base for descriptive studies (e.g. differential utilization of such services as immunization, the Puskesmas midwife, and curative services), sample surveys (e.g. for iron-deficiency anemia, hypertension, and household accidents), and case-control and intervention studies (e.g. for health education for nutrition, factors associated with low birth-weight babies, and the determinants for selecting traditional midwives).

Dr. Sumarto indicated his belief that faculty (at UNAIR and other FKMs) needed in-depth and continuing consultant assistance for the development of a research activity. An experienced person who could stay for three months each year for four to five years could be useful if continuous assignment for several years were not feasible. Initially, such a person would assist in developing a research strategy and locally relevant guidelines (extending from protocol development, including budget preparation, to project implementation, analysis, and report writing). Thereafter, visits could be made year-by-year to each of the FKMs to assist each Faculty in local implementation of the guidelines.

### II.3.8 Library

At the present time the central UNAIR library houses reference materials for all Faculties. It is large, comfortable, and well-organized for use. Its book and journal collections are scanty, however, and include only a very few, old (and, in the case of periodicals), incomplete items of epidemiological interest. Dr. Sabdoadi has a small collection of public health books in his office, and his secretary has had several weeks of training at the UI library in cataloguing. If the BKKBN-USAID acquisitions are addressed to him personally, they can be housed at the FKM, although they will be catalogued by the central library.

## II.4 Hassanuddin University

Sulawesi is divided into four provinces. Ujung Pandang is the largest city with a population of about 700,000, and is the capital of South Sulawesi Province whose population is about six million. The university is one of the oldest in the country, having been established here in 1956. It is presently located at its original site, and its current population of students has outgrown the facilities. A new campus is under construction some distance away; it will be occupied next year (1986) and will provide considerably more modern and extensive building facilities.

### II.4.1 Status of the Faculty of Public Health

The FKM was established in 1982 by Presidential degree. It was in that year that the first two-year S1 degree students were admitted, prior to the MOEC directive that an independent faculty could not be established until it was administering a four-year program. UNHAS is thus the second officially recognized FKM, after UI. The FacMed includes a separate Department of Preventive Medicine as an administrative entity, but the instruction and supervision of medical students is provided by the staff of the FKM.

The two-year class which entered in August 1982 consisted of 21 students who had been transferred from UI. They graduated in 1984. The second class admitted in August 1983 and just graduated, consisted of 42 students selected by the UNHAS FKM. They came mainly from eastern Indonesia. The 1984 entrants (28 candidates) were also selected by UNHAS, but the current admission (31 students to begin classes in August 1985) were selected centrally in Jakarta, a practice to be continued.

According to the present plans, the four-year S1 program should begin in August 1987 after the move to the new campus. It is anticipated that that group will consist of 40 to 50 students. Thereafter the S1 program should level off at 50 to 100 four-year admissions and 20 two-year admissions each year.

UNHAS has no S2 students in public health, and preferably none will be admitted until 1989 or 1990, after the four-year S1 program is well underway and additional academic staff (including the return of those away for S2 training) are in position. No serious consideration has been given to an S3 program.

### II.4.2 Epidemiology Faculty

The full-time staff for epidemiology consists of:

(a) Dr. Nur Nasri Noor is chairman of the Department of Epidemiology and also Deputy Regent of UNHAS for student affairs. He has been a student at the University of Hawaii on two occasions, received an MPH in 1969 and completed all work for a doctoral degree in epidemiology in 1976 except for writing of his dissertation (based on epidemiologic and virologic studies of dengue virus infections in Ujung Pandang). He is eager to return to Hawaii or elsewhere in the U.S. for a three- to six-month practicing externship in epidemiology teaching and research.

Dr. Nur was assigned for four years by the MOEC to the MOH, and he directed the smallpox eradication program in Sulawesi from 1970 to 1972. He also

organized regular surveillance for cholera and initiated the production of a monthly surveillance report for communicable diseases which has become a model for the country. Dr. Nur is the one of the few teachers of epidemiology who has had extensive practical experience in operational programs.

(b) Dr. Rasdi Nawi is secretary of the Epidemiology Department. He starts S2 training in epidemiology at UI in August 1985.

(c) Dr. Ibrahim is a junior instructor in epidemiology. He has been admitted to the MPH program at the University of Hawaii and should begin this year.

(d) Dr. Nadjib Busdam is a new instructor. He completed a six-month diploma course in tropical medicine at Mahidol University, Bangkok, in 1984.

In addition to the full-time staff, (for all practical purposes now limited to Dr. Nur), the UNHAS FKM has a formal agreement with PHD for a close collaborative association which results in the extensive participation of MOH staff in the instructional program. Dr. Nurdin (M.Sc. in epidemiology, UI) and Dr. Musaka (M.Sc. in nutrition, UI) work in the PHD, and Dr. Djohan (M.Sc. in epidemiology, UI) is in charge of communicable disease control in the Municipal Health Department.

It is the practice in the UNHAS FKM to leave newly recruited staff unassigned to departments for a year or more until their specific interests and abilities become manifested, and then to start on career development. Therefore, the Department of Epidemiology may have general assistance from others in its courses and fieldwork.

#### II.4.3 Epidemiology Curriculum in the Two-Year S1 Program

The two-year S1 program began at UNHAS before the inter-university core curriculum was developed. This program at this university does not, therefore, closely follow the draft recommendations. Instead of providing a generalist approach, the curriculum emphasizes specialization. Only one epidemiology course, Basic Epidemiology, is required. To date, it is the only epidemiology course which has been given. Furthermore, the epidemiology "special interest area" is entitled Communicable Disease Control and the courses and experiences are directed almost exclusively to infectious diseases. Very few students select this specialty. In the entering (1985) class, only three of the 31 students chose it. Environmental health is most popular, with 18, followed by health education with eight.

Basic Epidemiology, for three credit units, is given in Semester VI and follows Biostatistics in Semester V. It is felt that this course is sufficient for non-epidemiology two-year S1 students because they have had an introduction to epidemiology in their academy training and considerable practical experience. Its content is substantially that of the revised core curriculum (i.e., combining the first two courses described in section II.1.1.2). It is scheduled for one three-hour block of lecture time per week. The formal lectures are supplemented by locally developed exercise questions based on the Mausner/Bahn and Morton/Hebel textbooks and the self-teaching guide by Lewis Roht. These are distributed to the students as homework, and the students' work is discussed in ad hoc sessions called by Dr. Nur, as time allows. These exercise questions are interpretative; they do not constitute drill in the handling of primary data.

Further practical work in epidemiologic methods is required of all students as part of their Field Work Course in Semester VII and Compulsory Service (KKN) in Semester VIII (Section II.4.6).

Special interest courses in Communicable Disease Control will be offered for the first time in 1985 in Semester VII. All except the last in the list will consist of lectures only.

Epidemiologic Surveillance (one unit) by Dr. Nur

Epidemiology of Parasitic Diseases (one unit) by Dr. Kumar (FacMed)

Epidemiology of Bacterial Diseases (one unit) by Dr. Chaerudin (FacMed)

Epidemiology of Viral Diseases (one unit) by Drs. Nur and Djohan

Management of Communicable Disease Programs (two units) by Drs. Nurdin and Musaka. This consists of student observation (no participation) of PHD activities.

#### II.4.4 Plans for the Four-Year S1 Program

Although the four-year program is not scheduled to begin until 1987, because of the current requirement that FKMs must offer a four-year degree, MOEC might press for one to be initiated at UNHAS in 1986.

No specific curriculum plans have been made for the longer program, but it is certain that it will emphasize field experience. Even with an emphasis on field work, Dr. Nur believes it will be difficult to integrate the teaching of the four-year high school graduate with that of the experienced two-year S2 students. An inter-university meeting will be held on this issue but in the meantime UNHAS will probably separate the two groups, offering them different specialized courses.

#### II.4.5 Plans for an S2 Program

No specific curricular plans have yet been made, but the Epidemiology Department hopes that the S2 training will be able to accommodate both S1 graduates and medical graduates in the same courses. Four-year S1 students will need a strong medical background; physician graduates who will not have had an intensive public health background may also have some difficulties. It is hoped that the program could also accept S1 graduates in such related fields as chemistry or social sciences.

#### II.4.6 Field Work and Field Training Sites

Two field work courses (for two credit units in Semester VII and four credit units in Semester VIII) and a final program report (for three credit units) give the students both an opportunity to have practical experience under supervision and to collect and interpret their own primary data. The first course is given by Drs. Nur and Nurdin. It is divided into two rounds and the students are separated into two groups which interchange sites at mid-semester. It meets each Saturday (half day). Each round consists of assignments as follows: at Regency (one week), at municipality (one week), at an urban Puskesmas (two weeks), at a

rural Puskesmas (two weeks), and three days for student presentation (and class discussion) of results, interpretation, and analysis of observations. The presentations reflect the past supervisory experience of these two-year students; that is, they are primarily critiques of personnel performance rather than program effectiveness. Faculty have difficulty in attempting to redirect attention to interpretation of data.

The second course satisfies the KKN requirement; it originally extended over three months but was reduced to two in 1984 for lack of funds. Students are assigned to live in villages. Based on their areas of interest, they are assigned specific study projects (e.g., maternal and child health [MCH], nutrition, or immunization) and they collect qualitative and quantitative data. They also assist villagers in non-health-related development projects.

The final program report is based on the studies conducted during the KKN course. Final approval is based on faculty-student interaction almost equivalent to that given to a thesis.

Finally, on an ad hoc basis, students may participate in Provincial Health Department surveys and outbreak investigations for periods of up to two weeks. Lost class time is made up informally or formally, depending on the numbers of student involved.

Beginning in August 1985, the FKM will assume complete responsibility for operations at Puskesmas Bantimurung, about 40 kilometers from Ujung Pandang. The physical facilities, organization and operation of this Health Center, which has five subcenters each staffed with a junior nurse and a midwife, are about average (see Appendix F). A volunteer local health assistant system has been introduced at 58 posts in this subdistrict and these will provide contact points for community-based studies. The Puskesmas will provide not only additional placement sites for field experience of medical and public health students, perhaps in teams representing both disciplines, but also a field laboratory for studying the feasibility and impact of changes in service delivery procedures and programs. FKM activities should start in August 1985, including a complete census of the population of about 42,500 people, if funds are available.

#### II.4.7 Faculty Development

In addition to the graduate training planned for two of the junior faculty (Section II.5.2) Department of Epidemiology faculty may also be augmented both by the transfer of personnel from the MOH including perhaps Dr. Djohan, and by recruitment of several promising Puskesmas doctors.

The staff for the entire FKM will be increased in 1986 by up to 10 new appointees. In a move to broaden the base of public health teaching, new staff will include non-medical graduates in environmental law, economics, anthropology and entomology. At least the last two listed will serve part-time in epidemiology.

#### II.4.8 Faculty Research

Very little research has been undertaken in recent years by FKM faculty either in general or in epidemiology, outside of work for advanced degrees. Last year Dr. Rasdi Nawi was awarded a junior staff grant of US \$1000 by MOEC for a

study of the relationship between community environmental status and health status. Paucity of time and other commitments are given as the reasons for the limited amount of research done in the past, and they will continue to curtail work in the future.

UNHAS intends to submit proposals in August 1985 for research funding under the BKKBN-USAID project. One will request support for a baseline census in the Bantimurung field study area, which could include descriptive and case-control studies of service impact in this area.

A central university computer is theoretically available for FKM research use, but it is not often free for use, and programming resources are limited. The BKKBN-USAID-provided minicomputer will be greatly appreciated.

#### II.4.9 Library

The present central university and FacMed libraries are small and congested, and the supply of books and journals is very limited and out-of-date. At the FKM, only a few books are available; the epidemiology volumes are mostly the personal property of Dr. Nur. Prospects for the future, however, are very bright. The central library on the new UNHAS campus (to be occupied in 1986) will be modern and provide about 20 times the present area. Three master's level librarians and 26 three-year library academy graduates will be on staff. An Asia Development Bank grant of \$1.3 million has been approved for the purchase of 100,000 books and journals beginning in 1986, in natural science (including medicine and public health) and technology. Lists of books wanted have been prepared by relevant Faculties (including FKMs). Many of these books duplicate those on the BKKBN-USAID list, but duplicates will be useful. Journal subscriptions are for four years; university continuation thereafter is problematical.

In addition, a University of Australia grant recently provided a shipment of 1,100 books on medicine, agriculture, and technology and the Asia Foundation provides yearly book donations - 1,000 last year.

Library policy on the new campus will require the central holding and cataloguing of books and journals for all Faculties. Duplicates and copies, however, may be kept by the Faculties.

### II.5 The University of Indonesia

#### II.5.1 History of the UI FKM

A student was accepted as an S2 degree candidate by the Department of Preventive Medicine of the UI FacMed for the first time in 1965. Small numbers of S2 candidates in public health were admitted each year during the next decade and in 1975 an independent FKM was established to administer this increasingly popular program. (Medical students continued to receive instruction in preventive and community medicine from the FacMed). From 1965 through 1980, the S2 academic program was one-year in duration, but it was extended to two years in 1981, and remains so today.

In recent years, 20 to 25 students in public health have been admitted annually. Of these, usually only a few have majored in epidemiology, although there were 11 in one year. In 1984 one new admission elected epidemiology as a

major, while in 1985, there were three. All epidemiology students have been physicians, with the exception of two dentists, one veterinarian, and one S1 graduate in biology.

A two-year S1 program was started in 1981 for academy graduates, and it continues to the present time. Each class consists of about 20 students, most from the Jakarta area.

#### II.5.2 The Department of Epidemiology

There are nine full-time academic staff in the department, although two of these have appointments elsewhere which occupy most of their time. Dr. Nuning is Department Head (an elective position, for a term of three years). She received an MPH degree from Johns Hopkins University, and her area of special interest is infectious diseases. Dr. Bambang Sutrisna, also an MPH from Johns Hopkins, teaches chronic disease epidemiology. Dr. Sudarto Ronoadmodjo specializes in population and family planning problems.

Drs. Nuning and Bambang Sutrisna have recently completed the writing of a textbook, Epidemiology for Clinicians, which will soon be published commercially. Dr. Bambang has begun work on another book, Chronic Disease Epidemiology, based the content of the course of the same name that he teaches at UI. Both Drs. Nuning and Bambang recognized the need for a general textbook of epidemiology, for the use of students and public health practitioners, and have considered writing one. Time limitation has, up to now, prevented them from undertaking this task.

#### II.5.3 The Two-Year S1 Program in Epidemiology

The public health curriculum for academy graduates at UI emphasizes specialist training. Only Basic Epidemiology is required of all students, but those specializing in communicable disease control are required to take many others, as indicated below:

Basic Epidemiology	3 credit units
Epidemiologic Surveillance	2 credit units
Epidemiology of Parasitic Diseases	2 credit units
Epidemiology of Viral Diseases	2 credit units
Epidemiology of Bacterial Diseases	2 credit units
Communicable Diseases Control	2 credit units

In addition, these students are urged to elect the course Vector Control, given by the Department of Environmental Health.

The Basic Epidemiology course is similar to that which is offered at the other universities (Section II.1.1.2). In addition to lectures, the students have practicum-exercises emphasizing the interpretation of descriptive epidemiological studies. Several of these have been developed locally, such as one based on an Indonesian food-borne disease outbreak. Handout materials to accompany the lectures have also been prepared and are distributed to the students. There is

no drill, however, in the assembling of primary data.

The remaining courses offered are largely didactic in nature except for Communicable Disease Control, in which the students observe activities at the Municipal Health Departments, and Epidemiologic Surveillance, where they make use of Puskesmas data to write small-group reports on specific topics. Even in these two courses, however, lectures are an important component.

#### II.5.4 The S2 Program in Epidemiology

In the M.Sc. program, students frankly major in a discipline area. The two-year curriculum includes three semesters of course work and one semester of individual research. Many students, however, are unable to complete the research in the time allotted, and they may take an additional year or more to satisfy all requirements for the degree.

All S2 students regardless of major, must take all of the following courses:

Biostatistics	2 credit units
Health Administration	2 credit units
Health Education	2 credit units
Epidemiology	2 credit units
Environmental Health	2 credit units
Teaching Methods	2 credit units
Research Methods	2 credit units
Public Health Seminar	1 credit unit
Thesis Research	5 credit units

In Epidemiology, analytic procedures are stressed and descriptive epidemiology is covered very briefly on the assumption that the students (mainly physicians) have had introductory courses in their S1 training. Two lectures are given each week for the first several weeks, and then one lecture and one three-hour laboratory session per week. The latter covers three prepared exercises (for three weeks each), three journal reading discussion sessions, two open-ended seminar discussions, and two review sessions. In addition, epidemiology majors are required to take the following (which are elective for other majors):

Epidemiologic Surveillance	2 credit units
Communicable Disease Control Methods	2 credit units
Chronic Disease Epidemiology	3 credit units
Epidemiology in Health Service-Research	2 credit units

Population Epidemiology

2 credit units

Students from other disciplines often elect the last three courses and they are assimilated without difficulty. If there are few S2 students for the first two courses, they are placed in the S1 courses of the same name but are given separate attention and individual rather than group assignments.

The course Chronic Disease Epidemiology is given as one lecture and six hours of laboratory per week. Eight practicum-exercises are covered, almost all Bahasa Indonesia translations of Johns Hopkins University exercises. The course emphasizes methodology, but no handout materials are distributed.

Elective courses which are taken frequently by epidemiology majors include:

Epidemiology of Tuberculosis

Human Ecology

Viral Disease Epidemiology

Statistics for Epidemiologists

Introduction to Computers

Sampling Methods

Non-parametric Statistics

Advanced Biostatistics

II.5.5 Continuing Education Courses

At the request of UI S2 graduates in epidemiology, the Department has planned a series of intensive courses to be offered outside the regular academic year curriculum, as follows:

Epidemiology for Clinicians

Use of Computers in Epidemiologic Studies

Clinical Trials

Applied Epidemiology for Puskesmas Doctors

Epidemiology of Contraceptive Safety

Epidemiology of Sexually-transmitted Diseases and Infertility.

The first listed was given late in 1983, for about 20 participants mainly from Jakarta institutions. It ran for four weeks and met from 8 a.m. to 2 p.m. three times per week. It was well received. The second course has already been designed and will be offered soon. The third in the list is intended to be a

follow-up of the first.

The fourth course, Applied Epidemiology for Puskesmas Doctors, is probably the most important; it should be repeated many times throughout the country.

#### II.5.6 Relations Between UI and the Other FKMs

UI's leadership position is apparent at all the FKMs. Its two-year S1 program has been an example to the other universities and it was substantially involved in development of the four-year S1 core curriculum (and course syllabi) (Section II.1.1). Heads and Secretaries of Departments (or equivalents) from the various universities visit UI to review its curricula, courses, and teaching methods and materials. UI graduates are now (or soon will be) on the academic staffs of the new Faculties. The UI FKM has also offered to share its lecture outlines, class exercises and handout materials (where they exist) with the staffs of the other universities.

### III. RECOMMENDATIONS

#### III.1 Recommendations Applicable to all FKMs

##### III.1.1 The Two-Year S1 Curriculum

This program was designed to provide mid-level program managers with a basic competence in all public health activity areas. Therefore, specializing in epidemiology or other disciplines should be discouraged. Elective courses should be available, however, to permit individual students to take additional courses in areas related to the jobs to which they will return after graduation.

III.1.1.1 The Overall Curriculum in Epidemiology. Course syllabi suggest that the program for epidemiology (Table II.1.1.1 - 2) may be overambitious in breadth but inadequate in depth. Chronic (non-communicable) disease epidemiology, for example, and its investigational methods and problems, will probably be of little concern to S1 graduates for some years to come. This area should be covered briefly, for superficial acquaintance only, and more time should be given to ensuring competence in descriptive epidemiology and simple epidemiological approaches to program evaluation.

III.1.1.2 Practice Exercises and Drill. Long experience indicates students learn little from lectures and that these should serve only as a framework for practice in the application of principles. In the teaching of epidemiology, problems simulating field practice should be the basic classroom tool for learning data handling, interpretation, analysis and utilization for program improvement. Real or realistically-invented data that are based on Indonesian problems and experience should be assembled by the faculty into exercises that require the student to prepare tables and graphs, consider the impact of epidemiologic bias, subject the data to statistical analysis, interpret the meaning of the results, and suggest actions to be taken and/or further studies to be conducted. All materials should be written in Bahasa Indonesia. Even good exercises dealing with foreign experiences and borrowed from foreign universities are not satisfactory. Drills based on this approach should be repeated over and over, but should be given variety by being drawn from differing experiences in different program areas, e.g. infectious disease outbreaks, nutrition, midwifery practices, birth and death reporting, family practice acceptance and continuation.

Each FKM should set a goal of preparing at least two such exercises during the next academic year. The products should then be duplicated for review, discussion, modification, and use by all the other FKMs. If this is done for several years, a large bank of exercises will be available. Alternatively, or in addition, the BKKBN-USAID project should contract with a single qualified Indonesian individual to prepare a bank of exercises (Section III.4.4).

III.1.1.3 Handout Materials in Bahasa Indonesia. Until, or even after, students have their own copies of an epidemiology textbook in Bahasa Indonesia, lectures should be supplemented with brief, carefully prepared, mimeographed handout materials which summarize the salient points being made in lectures and record formulae, methods, and precautions. These can be assembled by the students into mini looseleaf textbooks to be kept for future reference. At present, students have only their lecture notes, which are almost certainly both incomplete

and filled with errors (both their own and the lecturers'). Prepared handouts also have a secondary value; they provide a self-discipline for the lecturer, who must himself prepare for the lecture and cover the entire subject matter intended. It may be argued that if the students acquire handout sets, they might not attend lectures. If the lecturer is effective and competent, that is not likely to happen; if he is not, good handouts would ensure that students who miss classes do not miss much.

III.1.1.4 Reference Textbooks in Bahasa Indonesia. This topic is included here only for completeness. Recommendations are given in Section III.1.9.

III.1.1.5 Lecture Plans and Outlines. The absence of long-term planning and the confusion regarding curriculum translates into a tendency to present lectures ad hoc, the overall topic only being considered in advance. Lecture plans, including prepared handout material (see Section III.1.1.3), should be developed for an entire course, and outlines should be available for each lecture - all before the course is presented. This practice has a number of advantageous effects: (1) it ensures that all of the subject matter intended is adequately included and in logical order, (2) it provides a framework for the lecturer to budget his time, (3) it permits collaborating and guest lecturers to put their presentations into the overall course context, and (4) it permits continuity if unanticipated substitutions of lecturers becomes necessary.

III.1.1.6 Field Practice in Epidemiology. Although two-year S1 students have had work experience, they may not have worked in an epidemiologic context, or work they have done may have been of less than acceptable quality. It is necessary, therefore, that they have supervised practice in the FKM. This should consist of assigned problem topics which require the student to collect his/her primary data, assemble it meaningfully, interpret it, write a report, and present the subject orally for class critique.

### III.1.2 The Four-Year S1 Curriculum

Due to the uncertainty among the FKMs about the general and specific content of the four-year proposed curriculum, it is recommended that it be introduced slowly and deliberately, with careful and detailed planning prior to accepting students. The results of UNAIR's experiences in developing this curriculum should be shared with other FKMs.

In accordance with the request of Dr. Sumarto (Section II.3.3.2) a short-term consultant should be hired to assist in the development of the curriculum.

III.1.2.1 The Epidemiology Curriculum. Since high school graduates entering the four-year S1 program will have no background in epidemiology or infectious diseases, they should receive this training during the first two years in order to bring them up to the level of the entering two-year students and prepare them for the specialized work in this discipline that will follow. The consultants were informed that the revised curriculum (Section II.1.1) recognizes this by adding a two-credit unit course on the clinical and epidemiological presentation of communicable diseases. The course Introduction to Epidemiology has been expanded to three credit units and apparently broadened in content. These are appropriate moves. In addition, they should permit the deletion of some introductory material in the Basic Epidemiology Course which follows. The additional

time should be used for drill in simple epidemiologic methods (Section III.1.1.2). For the second two years of the four-year program, the recommendations in Sections III.1.1.1 - III.1.1.5 apply.

III.1.2.2 Practical Experience. Four-year S1 students should be given as much exposure to practical field work as time permits, beginning in the first year. They should be exposed to work at Puskesmas, Regency, and Provincial levels, and they should have specific project assignments rather than mere observation.

III.1.2.3 Integration of Two- and Four-Year S1 Students. Integration of the two- and four-year students should be attempted because the two groups should enrich each other. The high school graduates will obviously profit from working with more experienced students, but the latter should also profit from the younger students whose academic background is more recent and who are not encumbered by having worked in the health system as it is and who should therefore be more open-minded to change.

III.1.2.4 Uniform Final Examination at All FKMs. A terminal, end-of-program examination should be developed at the national level, with the participation of all FKMs. Such an examination would establish a minimum knowledge base for S1 graduates. This is important for two reasons: (1) faculty experience and background differ markedly at the various FKMs, and a uniform examination would set the minimum educational goals, and (2) since students are admitted to the universities centrally, and each FKM will have candidates from various parts of the nation, a uniform standard for graduation will help to ensure that personnel working together in the same province but who graduate from different universities will have equivalent backgrounds.

III.1.2.5 Externship in Public Health. The possibility of developing a one-year externship in public health should be explored with the MOH. It could be analogous to the rotating internship which is recognized as essential to the education of physicians. Under joint FKM and Health Department supervision, the S1 graduate would work for four months each at Puskesmas, Regency and Provincial levels in one or more positions at each level. This should be work experience, not observation, with assigned tasks and responsibility.

### III.1.3 The S2 Curriculum

III.1.3.1 Differences Between the S1 and S2 Curriculum in Epidemiology. Since S2 graduates in epidemiology will probably be supervisors of S1 graduates in health departments and will also be required to initiate investigations and preventive health programs, they will require expertise in the epidemiologic activities of their subordinates and also in research methods applicable to communicable diseases and, to some extent and increasingly in the future, to noncommunicable diseases. The epidemiologic training of S2 epidemiology majors must therefore be both intensive and broad. They must acquire a firm conceptual base and a high degree of methodologic skill rooted in practice and drill.

III.1.3.2 Acquaintance with Current Epidemiologic Literature. As future leaders in public health, S2 students must become aware of current thinking, methodologic advances, and new knowledge about the epidemiology of diseases as reported in the world literature and must be sensitized to the need to keep current. One effective way to accomplish this would be by regular meetings of an

Epidemiology Journal Club - in which recently published articles would be critically reviewed and discussed by students and faculty. Such a club should be established at each FKM with an S2 program.

III.1.3.3 Research in the S2 Program. S2 student thesis research topics should be practical and applied to Indonesian problems insofar as possible. Furthermore, since S1 investigations will have been, usually, descriptive in nature, S2 research should emphasize case-control, cohort, and intervention approaches.

III.1.3.4 Integration of S2 Students of Differing Backgrounds. As S1 public health graduates are admitted to S2 programs, their education should be integrated with that of medical graduates. S1 public health graduates will have a stronger methodologic background and medical graduates will have a stronger biomedical background; if taught and teamed together, they can enrich each others' academic experience.

#### III.1.4 The S3 Program

In the new FKMs, the epidemiology staffs are too small and too narrowly experienced to support S3 programs now or in the near future. Faculty members should receive doctoral level training in epidemiology at overseas universities until such time as Indonesian epidemiology departments include at least several staff members with Ph.D. or Dr. P.H. degrees in epidemiology.

#### III.1.5 Field Practice/Study Areas

All FKMs have access to urban and rural Puskesmas for public health field practices through their association with medical student community-oriented education. The FKMs should also involve the local Provincial, Municipal, and Regency health department staffs in the education S1 and S2 students to the greatest extent possible. In addition, the FKM should acquire supervisory privileges at selected Puskesmas and Regency health offices, in order to use those areas for health services research of a very practical nature. One of the first steps in the utilization of these "field laboratories" for research should be a complete and detailed census of the population and a detailed description and analysis of the health services delivery system. Thereafter, the introduction of changes for anticipated improvement should be done in an experimental fashion to permit comparison with unchanged controls.

#### III.1.6 Faculty Development

The FKMs should strive, with the assistance of BKKBN-USAID project, to ensure that all academic staff in epidemiology be trained to at least the S2 level. Ideally, about half of the staff should have this training at overseas universities. English language limitations have been and will continue to be a problem. The FKM should anticipate this, and begin intensive English training of junior staff well in advance of requests for training fellowships. Facility in English comprehension, at least at the reading level, is necessary in any case if staff are to take advantage of the epidemiology books and journals to be provided by the BKKBN-USAID project.

### III.1.7 Faculty Recruitment

FKMs are now grossly understaffed in epidemiology. Their universities should give high priority to the recruitment of additional staff for public health, and epidemiology departments should have high priority within the FKM. Serious consideration should be given to the recruitment of new faculty from disciplines other than medicine; a graduate in mathematics, for example, may have greater potential as a lecturer in biostatistics than the average physician, and many disciplines can make valuable contributions to teaching and research in epidemiology.

### III.1.8 Faculty Research

Little research is being undertaken by epidemiology staff in the FKMs at the present time. There must be greater realization that faculty members have an obligation to add to knowledge, understanding, and the improvement of health services through research, and that faculty who do not engage in research make poor role models and teachers when they supervise students in research. Long-term continuing research projects often provide opportunities for the limited research activities of S1 and S2 students, and should be given priority. Applied research at "field laboratory" health centers (see III.1.5) should be emphasized.

The FKMs may need assistance in developing a research strategy and in the development of specific research protocols. The BKKBN-USAID project should give serious consideration to the provision of a consultant to provide such assistance (see Section II.3.7).

### III.1.9 Reference Books and Journals

The FKMs visited by the consultants had never been informed of the list of books already on order by the BKKBN-USAID project. It is recommended that the project inquire as to the status of this order and notify the FKMs.

Dr. Gelfand will prepare a list of additional books and journals recommended for epidemiology departments after his return home. Since existing libraries are so deficient in epidemiology reference texts and journals, it is recommended that the list be given high priority.

An epidemiology textbook in Bahasa Indonesia is urgently needed. To meet this need, two actions are suggested. First, a standard textbook in English should be translated; that by Lilienfield and Lilienfield (1980 edition) is suggested. Because of the need for precision in translation of technical material, the following procedure is suggested, in full recognition of the fact that it will be costly: (1) translate from English to Indonesian, (2) independently retranslate the Indonesian version back to English, (3) compare the retranslated English version with the original, and (4) identify and reconcile discrepancies between the two English texts and ensure the correctness of the Indonesian text.

In addition to the above, it is highly desirable that an epidemiology textbook be written by a qualified Indonesian author. The new book would use all internationally recognized methods and standards, but would have the great advantage that Indonesian context and Indonesian example would be used. It is recommended that the BKKBN-USAID project seek and find a suitable author, and he/she be contracted for one year to work full-time on the project.

### III.1.10 The Indonesian Field Epidemiology Training Program

One local resource that could help the FKMs in a variety of ways in the training of epidemiologists appears to have been overlooked. This is the Field Epidemiology Training Program (FETP), a three-year old program in the General Directorate of Communicable Disease Control and Environmental Health in the MOH.

This two-year training program begins every year with a three-week intensive course in epidemiology and statistics, and the trainee health officers then spend their time in field investigations of outbreaks and other problems and programs throughout the country.

The possible avenues of collaboration between the FETP and the FKMs include (1) new epidemiology faculty could request participation in the introductory three-week course (no assurance can be given here that such participation would be approved), (2) when trainee officers conduct an investigation in a province with an FKM, the latter could invite the officer to present a seminar of his work, (3) the reports of field investigations could serve as the material for practical course exercises (see III.1.1.2), and (4) student participation in investigations could be requested. This is a resource too valuable to be ignored.

## III.2 Recommendations Specific to UNDIP

Almost all of the general recommendations made above apply to UNDIP. Following are some comments specific to the FKM at this university.

### III.2.1 Curriculum Planning for the Two-Year S1 Program

It is urgent that the overall epidemiology course plan, and its integration with biostatistics, be reviewed as soon as possible, and that detailed lecture outlines, handout materials and practice exercises be developed promptly. As soon as plans for the two-year S1 program are completed, planning should start for the four-year program.

### III.2.2 Practice Exercises Based on Central Java Experience

Specific examples of practical exercises (see Section III.1.1.2) suitable for UNDIP include a malaria outbreak in 1984 and malaria surveys, a nosocomial epidemic of diphtheria studied by Professor Sapardi with laboratory data, two measles outbreaks investigated by FETP in 1984, the distribution of goitre and investigations by Dr. Djokomoeljanto of the efficacy of injectable and oral iodine compounds for its prevention, and Dr. Sunarto's study protocol and questionnaires in the rheumatic disease study area, among many others.

### III.2.3 Collaboration with Provincial and Municipal Health Departments

Resources for involvement of personnel from the health departments should be more fully explored and exploited. Plans for S1 student field work in Puskesmas (in both the two-year and four-year programs) should also be worked out promptly.

### III.2.4 Faculty Development

Dr. Suharyo's plan to undertake refresher training in tropical and infectious diseases for six months in 1986 should be reconsidered. It would appear more urgent for him to apply for S2 training in epidemiology, perhaps through the Centers for Disease Control's intensive summer program or the summer epidemiology course at the University of Minnesota or the University of Massachusetts, or, at a minimum, to request participation in the next training course of FETP in Jakarta.

Tentative planning for overseas training for Drs. Ludfi and Bambang Basuki should be started now for their admission in time as doctoral candidates at an overseas university.

### III.3 Recommendations Specific to UNAIR

Refer to Section III.1 for general recommendations applicable to UNAIR.

#### III.3.1 Curriculum Planning for the S1 Program

There is still much to be done to lay down the full outline of the four-year S1 program and then to develop the details of each course. A workshop was planned to start this process; by the time of this writing it should have been held. This work should move forward without further delay, whether or not a short-term consultant is provided to render assistance (see Section III.1.2).

#### III.3.2 Practice Exercises Based on East Java Experience

Efforts should be made to collect existing data on local conditions for the development of practical exercises to permit computational drill. These might include theses written by the 25-30 S2 physician graduates based on local research and investigations conducted by the FETP locally of outbreaks of food intoxication, typhoid, and DHF during 1984. The good working association with the Provincial Health Department could also be exploited.

#### III.3.3 Field Study Areas

The development of additional field training areas under UNAIR FKM control should move forward as rapidly as possible. A priority activity should be the taking of a complete census of the population; the area should also be used for applied research in health services operations as well as for studies of disease incidence and prevalence.

#### III.3.4 Curriculum of the S2 Program

If S2 graduates are to be as competent as S1 graduates in the collection, handling, and interpretation of descriptive epidemiological data, they must have much more practice than the curriculum as currently designed would seem to offer. Having developed these skills, they should move on to analytic epidemiology in some depth, with practicum exercises utilizing case-control, cohort, and intervention studies based on local experience if possible. S2 student research should be directed to case-control studies as much as possible rather

than to descriptive and laboratory-oriented investigations.

### III.3.5 Faculty Development and Recruitment

The epidemiology faculty at UNAIR is dangerously limited for an FKM that is scheduled soon to include two-year and four-year S1s, as well as an S2 program. The recruitment of additional academic staff in this discipline should be given urgent priority. Dr. Sabdoadi should be given a fellowship for refresher study in the intensive epidemiology summer program at the University of Minnesota or the University of Massachusetts. As soon as possible, Dr. Pryono and/or Dr. Susdini should be granted a fellowship for S2 or S3 study at an overseas university, but both should start to prepare for this now with English language training.

### III.3.6 Faculty Research

Faculty research projects should be initiated, preferably along the lines suggested by Dr. Sabdoadi (Section II.3.7).

## III.4 Recommendations Specific to UNHAS

Refer to Section III.1 for general recommendations applicable to UNHAS.

### III.4.1 Specialization in the S1 Program

The highly specialized nature of the current S1 program, with its minimal coverage of epidemiology, may not be in the best interests of the public health services, since graduates, as mid-level managers, will need a good understanding of this discipline. Therefore, the FKM should seriously consider whether to increase the epidemiology exposure of non-epidemiology students.

### III.4.2 Integration of Two-Year and Four-Year S1 Students

The UNHAS FKM should reconsider its decision to teach these two groups separately when the four-year program is introduced (Section III.1.2.3).

### III.4.3 Practice Exercises Based on South Sulawesi Experience

As at all other FKMs, UNHAS should develop practicum and drill exercises based on local experience. The successful eradication program here, which was directed by Dr. Nur, will alone provide many useful examples. Dr. Nur's personal experience in the Provincial Health Department, and those of the other health program directors who are intimately involved with the teaching program on public health, should provide many others.

### III.4.4 Faculty Development and Recruitment

Plans are well in hand to increase the size and academic experience of the academic staff (Section II.4.7), and these should be moved forward expeditiously.

In addition, Dr. Nur has expressed an interest in a RKKBN-USAID sponsored externship for six months at an American university. This plan to update

his knowledge and exposure to current epidemiology thinking and literature and to teach a course in a U.S. School of Public Health is enthusiastically endorsed and recommended, particularly since he would have time during the externship to prepare several practicum exercises (as recommended in III.1.1.2) and to produce handout notes in Bahasa Indonesia to accompany the Basic Epidemiology course (see III.1.1.3). Such an externship could therefore accomplish several important objectives. Dr. Nur could be spared from UNHAS without serious loss during the first semester of the academic year 1986-87.

#### III.4.5 Faculty Research

Faculty research activities should be developed and concentrated in the Bantimurung Puskesmas area, in line with comments in Sections II.4.6 and II.4.8.

### III.5 Recommendations Applicable to UI

#### III.5.1 Additional Interchange Between UI and Other FKMs

Contacts to date between UI's FKM and the other FKMs should be considered only preliminary. Considerably more help can and should be given. Additional interchanges should take place particularly between the epidemiology staffs, perhaps by visits in both directions, before new courses are started at UNDIP and UNAIR, and again after they have been presented. Specifically, the new Faculties should take advantage of UI staff lecture outlines, handout materials, and Indonesian exercises (where available).

#### III.5.2 Development of Course on Data Collection

An additional course should be developed and required of all S1 students, to be titled Epidemiology for Health Services Improvement. Such a course would cover the improved collection, collation, and interpretation of the record of services provided by a Puskesmas in order to identify specific population targets to improve the coverage and effectiveness of preventive health programs such as immunization and nutrition.

#### III.5.3 Leadership in Materials Development

UI should accelerate the development of new exercises and handout materials, should consider the production of drill exercises using real or simulated data based on Puskesmas records (with emphasis placed in the critical evaluation of their quality and completeness), and should attempt to produce a locally relevant introductory textbook in general (particularly descriptive) epidemiology. It should be in Bahasa Indonesia.

APPENDICES

APPENDIX A

PRINCIPAL PERSONS WITH WHOM DISCUSSIONS WERE HELD

APPENDIX A

PRINCIPAL PERSONS WITH WHOM DISCUSSIONS WERE HELD

1. Diponegoro University (UNDIP)

Professor (Dr.) Moeljono, Vice-Regent (former Dean, Faculty of Medicine [FacMed])

Dr. Saleh Mangunsudirdjo, Dean, FacMed

Dr. Soebono, Vice Dean (Academic Affairs), FacMed

Dr. Budioro, Head, Dept. Public Health, FacMed

Professor (Dr.) Sapardi (MPH, Tulane Univ.)  
Head, Dept. Microbiology (former Head, Dept. Public Health)

Dr. Ludfi Sentoso, Assistant in Epidemiology

Dr. Suharyo, Lecturer in Epidemiology

Dr. Djokomoeljanto (Ph.D. UNDIP), Lecturer in Internal Medicine and Epidemiology

Dr. Sunarto, Lecturer in Internal Medicine and Epidemiology

Dr. Sudomo, Lecturer in Internal Medicine and Epidemiology

Dr. Istiana, Lecturer in Environmental Health

2. Airlangga University (UNAIR)

Professor (Dr.) Sentot Suatmaji, Dean FacMed

Professor (Dr.) Sabdoadi (MPH, Tulane Univ.), Head Dept. Public Health, FacMed

Dr. Eddy Pranomo Soediby, Lecturer in Epidemiology and Asst. Dean

Dr. Pryono, Assistant in Epidemiology

Dr. Susdini, Assistant in Epidemiology

Dr. Sumarto (MPH, UCLA, Dr. P. H. UNC), Lecturer in Health Administration

Dr. Koenti, Behavioral Science Dept., FacMed

Dr. Marsetio Sariowan (MPH, Tulane Univ.), East Java Provincial Health Dept.

Dr. H. Widodo Sutopo, Director, Institute for Health Services Research

3. Hasanuddin University (UNHAS)

Professor (Dr.) Fachruddin, Rector

Dr. Sirajuddin (M.Sc., UI), Dean FKM

Dr. Nur Nazri Noor (MPH, U. Hawaii, 1969) Head, Dept. Epidemiology

Dr. Rasdi Nawi, Secretary and Assistant in Epidemiology

Dr. Nurdin (M.Sc., UI), Planning Board, Provincial Health Department

Dr. Musaka (M.Sc., UI), CDC, Provincial Health Department

Dr. Djohan (M.Sc., UI), CDC, Municipal Health Department

Dr. Latief (M.Sc., UI), Lecturer in Biostatistics and Research Coordinator

Dr. Armin Nurdin, Doctor, Puskesmas Bantimurung

4. University of Indonesia (UI)

Dr. Alex Papilaya, Dean, Faculty of Public Health

Dr. Nuning (MPH, Johns Hopkins Univ.), Head, Department of Epidemiology

Dr. Bambang Sutrisna (MPH, Johns Hopkins Univ.), Lecturer in Epidemiology

Dr. Sudarto Ronoadmodjo, Lecturer in Epidemiology

5. Jakarta Institutions

Dr. Dus Sampoerno, Chief, Public Health Secretariate, CHS, MOEC

Dr. Ruang Pak Sumarno, Chief, Center for Personnel Training and Education,  
BKKBN

Dr. E. Voulgaropoulos, Chief, Office of Population and Health, USAID/Jakarta

Dr. Thomas D'Agnes, Training Advisor, BKKBN

Dr. Douglas Klauke, WHO Advisor, Field Epidemiology Training Program

Mr. John McEnaney, Project Officer, USAID/Jakarta

Dr. Richard Arnold, Immunization Project Advisor, USAID/Jakarta

APPENDIX B

BRIEFING PAPER FOR CONSULTANTS TO NEW FACILITIES OF PUBLIC HEALTH

APPENDIX B

BRIEFING PAPER FOR CONSULTANTS  
TO NEW FACULTIES OF PUBLIC HEALTH

There are currently two Schools or Faculties of Public Health in Indonesia, one at the University of Indonesia (FKM-UI) in Jakarta and one at Hasanudin University (FKM-UNHAS) in Ujung Pandang. FKM-UI was established in 1965, and has been Indonesia's Center for Public Health education and research since its inception. FKM-UNHAS was established in 1982 in response to the urgent need for more Public Health Manpower.

Faculties of Public Health offer a Bachelors of Science degree, called an S1 degree, and a Master of Science degree, called an S2 degree. There are two types of S1 degree programs :

Four-year S1 degree : this program requires 140 credit hours and takes 4 years to complete. Applicants must be senior high school graduates. The four year B.Sc. degree in Public Health is considered the benchmark qualification for middle level managers and technicians in Indonesia's national public health system.

Two-year S1 degree : this program requires 60 credit hours and takes two years to complete. Applicants must be graduates of three years academy programs in nutrition, sanitation, midwifery, or nursing. The curriculum complements the academy curricula. Graduates should have achieved a similar level of credit hours and academic attainment as graduates from the four year S1 program.

The Masters of Science (S2) in Public Health requires 60 credit hours and two years to complete. Applicants must be physicians, dentists, veterinarians, pharmacists, or possess an S1 degree in Public Health. It should be noted that graduates from professional schools, such as physicians, dentists, or veterinarians, are considered to have S1 or bachelors level education in Indonesia.

At present FKM-UI graduates 50 persons annually from its two year S1 program and 25 persons from its S2 program. FKM-UNHAS graduates approximately 30 persons annually from its two year S1 program, and has no S2 program. Neither FKM has a four year S1 program at this time.

Increased demand for Public Health graduates at the S1 and S2 level has led the Ministry of Education and Culture (MEC) to explore the possibility of developing additional public health training and research capacities at regional universities. With assistance from USAID and BKKBN feasibility studies were commissioned by the MEC's Consortium for Health Sciences (CHS) in 1983 to develop new Faculties of Public Health at the following universities :

1. Airlangga University, Surabaya (UNAIR)
2. Diponegoro University, Semarang (UNDIP)
3. North Sumatera University, Medan (USU)
4. Hasanuddin University, Ujung Pandang (UNHAS) \*

These feasibility studies resulted in Five Year Development Plans for each Faculty stating each institution's mission and projected requirements to achieve Faculty status. CHS is the agency within the MEC with responsibility for coordinating development of higher education in the medical and health sciences. As such, it has played the lead role in these efforts up to this time.

USAID Jakarta has recently completed formulation of a new project with the MEC to develop these four new FKM's, with assistance beginning in late 1985. To sustain the momentum begun in 1983, BKKBN has continued to support these FKM's with fellowships for Faculty and staff, procurement of library books, and technical assistance during the interim period.

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\*Although there is already an FKM at UNHAS, it will be included under the rubric of new Faculties of Public Health because of its relative youth and still rudimentary infrastructure. It will receive assistance similar to other universities in this project.

The development of these new FKM's will be done in stages as follows :

- Phase 1 : establish "programs of study" within the Public Health Departments of Medical Faculties at UNAIR, UNDIP, and USU which enable them to offer two year S1 degrees. The two year S1 degree program was begun at UNAIR in 1984, and will begin at USU and UNDIP in September 1985.
- Phase 2 : establish by 1987 a second "program of study" allowing all four new FKM's to offer the four year S1 degree. UNAIR will begin offering the four year S1 degree in 1985, the first institution to offer this degree program in Indonesia.
- Phase 3 : fulfill MEC accreditation requirements to achieve Faculty status by 1990.

FKM-UI will be strengthened to become a National Resource Center in Public Health to assist the regional universities in their efforts.

With new 2 year S1 programs beginning at UNDIP and USU in September 1985, a new 4 year S1 program beginning at UNAIR in September 1985, and a new project to develop the new FKM's scheduled to come on line in late 1985, the present time was considered propitious to assemble teams of consultants representing each of the five academic disciplines in Indonesian Schools of Public Health to assess curricula and suggest strategies for utilizing inputs for the new project. Accordingly consultant teams consisting of an Indonesian and external consultant have been assembled with expertise in the following areas :

1. Health Education
2. Biostatistics
3. Epidemiology
4. Environmental Health
5. Public Health Administration

This technical assistance is being funded through the interim project by BKKBN.

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The consultants have received scopes of work. In particular CHS and BKKBN would like the consultants to :

1. Review existing curricula : standard Curricula for the SI program were developed by the five FKM's and approved by CHS in 1985. However, this was a general curriculum with course and credit requirements. Detailed elaboration is being done by the individual FKM's. The consultants should review these curriculum for suitability, technical accuracy, and the incorporation of more varied and participatory teaching methodologies and educational technologies. Teaching at Indonesian Universities is predominantly lecture/question/answer and the project aims to introduce more varied and appropriate teaching approaches.

We would like to have your opinion of existing curricula, and how additional technical assistance could be used to improve them. We would also like your suggestions on how innovative teaching methodologies and instructional resources can be introduced into existing curricula.

2. Suggest library resources : during the interim BKKBN supported project books were purchased to establish core libraries in each faculty. Lists of the books already purchased are enclosed with this packet. In the new project resources are available to expand these libraries. Most books are in English. We would like to see more books in Indonesian, but resources are admittedly limited.

We would like the consultants to submit lists of library books in their respective areas of specialization to supplement existing library resources.

3. Develop research agenda's : dynamic research programs responsive to the data needs of regional health and family planning agencies is one requirement for accreditation. During the 1986/87 fiscal year about \$ 150,000 will be available for research. The Faculties need to develop research programs to utilize these funds.

We would like the consultants to assess research capacities at each Faculty and recommend ways to improve them. We would also like the consultants to discuss research priorities and suggest one research activity which can be undertaken in 1986/87.

4. Recommend Faculty Development Strategies : Faculty members must have S2 level education to teach at the S1 level and Ph.D's to teach at the S2 level. Departmental staffing is usually quantitatively and qualitatively inadequate. Funds are available for faculty development in the new project.

We would like the consultants' comments on existing staff, projections of additional staff needs, additional training needs, and a strategy to achieve optimum qualitative and quantitative staffing levels.

TDA/n

APPENDIX C  
INTRODUCTION TO EPIDEMIOLOGY

INTRODUCTION OF EPIDEMIOLOGY

## A. I. INTRODUCTION :

- (1) Definition of epidemiology
- (2) Principle and concepts in epidemiology
- (3) Brief history of development of epidemiology

## II. SCOPE AND OBJECTIVE OF EPIDEMIOLOGY

- (1) Scopes of epidemiology
- (2) Objective epidemiology
- (3) Uses of epidemiology

## III. MEDICAL AND HEALTH CONCEPTS EPIDEMIOLOGY

- (1) Principles of medical concepts
- (2) Principles of health concepts

## IV. THE EVOLUTION DEVELOPMENT OF EPIDEMIOLOGY CONCEPTS

- (1) Natural history of diseases from Hypocrates - 17 th century
- (2) Natural history of diseases from 17 th century to now

## V. THE NATURAL HISTORY OF DISEASES

- (1) The concepts of pathogenesis and pre-pathogenesis
- (2) The concepts of "triad of Gordon", agent, host and environment
- (3) The concepts of epidemiological variables : person, place and time

## VI. DEFINITION (DESCRIPTION)

- (1) Definition of health, healthy, ill, sickness, incubation periods etc
- (2) Leavell and Clark concepts of prevention  
( five level preventions)

## B. VII. USE OF EPIDEMIOLOGY :

- (1) For special groups : military, hospital etc
- (2) For social medical problems
- (3) For communicable diseases and non communicable diseases
- (4) For acute and chronic diseases
- (5) For special cases
- (6) For nutritional problems
- (7) For mental health
- (8) For health services
- (9) For population problems
- (10) For environmental health (sanitation)
- (11) In industrial problems etc.

N.B. This and Appendices D and E were translated into English for this report.

APPENDIX D  
BASIC EPIDEMIOLOGY

B A S I C - E P I D E M I O L O G Y

- I. INTRODUCTION :
  - (1) Principles, concepts, development and scope of epidemiology
  - (2) Brief history of development of epidemiology
- II. USES OF EPIDEMIOLOGY (GENERAL)
  - (1) Thesis and practice of epidemiology
  - (2) Epidemiological approach
  - (3) Relations epidemiology with another subject
- III. CONCEPTS AND DISEASE CAUSES
  - (1) Definition of "disease cause" (something causing diseases)
  - (2) Concepts of infection / communicable diseases, immunity etc
- IV. IMPORTANT FACTORS OF AGENT THAT CAUSING DISEASES
  - (1) The aegbtial factor that related diseases causes
  - (2) Classification of diseases agent
  - (3) Characteristics of diseases agent
- V. IMPORTANT FACTORS OF HOST THAT CAUSING DISEASES
  - (1) Host parasite relationship
  - (2) Defance mechanism of host immunity
  - (3) Important of factors : age, sex, ethnic family etc that related to diseases
  - (4) Concepts of immunity
- VI. IMPORTANT F-CTORS OF ENVIRONMENT :
  - (1) Physical enviro
  - (2) Biological enviro.
  - (3) Chemical enviro.
  - (4) Socio-economical enviro.
- VII. VIT-L STATISTICS AND INTERNATIONAL CLASSIFICATION OF DISEASES
  - (1) Vital statistics which important due to epidemiology
  - (2) I.C.D.
- VIII. MEASURING FREQUENCY OF DISEASED AND SOURCES OF DATA
  - (1) Rate, ratio, proportion
  - (2) Incidence, prevalence (point,period prev)
  - (3) Epidemologic data and sources of data
  - (4) Attack rate etc
- IX. INTERPRETATION OF DATA & EPIDEMIOLOGICAL BIAS :
  - (1) Method to interpretate an epidemiological data
  - (2) Probobly of false and misusing data
  - (3) Probobly of bias interpretaion due to epidemological bias



APPENDIX E  
COMMUNICABLE DISEASE CONTROL AND CONTROL PROGRAM

APPENDIX E

COMMUNICABLE DISEASE CONTROL AND CONTROL PROGRAM

I. INTRODUCTION

1. Definition of Communicable-Disease Control.
2. Definition: Communicable/Infectious Disease.  
Non-infectious disease (what are the differences).
3. Disease Control Program in Indonesia.

II. THE WAY OF SPREADING OF INFECTION DISEASE

1. Types of Infection disease.
2. Infection types of disease.
3. Important factors that due to spreading of diseases.
4. Epidemical curve/Epidemic curve.
5. Characteristics of diseases which easier to eradicated and difficultier eradicated.

III. EPIDEMICAL INVESTIGATION I

1. What is epidemic?
2. What is endemic?
3. Steps for epidemical investigation, specially for infectious diseases.

IV. EPIDEMICAL INVESTIGATION II

1. Structuring/constructing epidemical curve (epidemic curve).
2. Natural history of the disease.
3. Role of laboratory finding.
4. Epidemical decision making, a hypothesis.

V. EPIDEMICAL INVESTIGATION III

1. Differentiation between "Epidemic" and "Out-break".
2. Sampling methodology.

VI. MEASURING FOR COMMUNICABLE DISEASES CONTROL

1. Measures of diseases frequencies.
2. Measuring for Communicable disease control.

VII. PLANNING, APPLICATION AND EVALUATION OF CDC

1. Planning: Man, Money, Material, Method, Machine.
2. Application: variable person  
variable place  
variable time
3. Evaluation for CDC.

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VIII. CDC FOR DISEASES INFECTED DIRECTLY

1. Diseases that infected directly.
2. The control program for the disease.
3. The objective of the program.
4. Application the program in the field.

IX. CDC FOR DISEASES INFECTED THAT SOURCE ANIMAL ORIGIN

1. Diseases that infected source animal origin.
2. The control program for the disease.
3. The objective of the program.
4. Application the program in the field.

X. THE QUARANTINE

1. Epidemic Regulation: International Health Regulation.  
Indonesian Health (Epidemic) Regulation.
2. Strategies for the quarantinable diseases.
3. Surveillance for the quarantinable diseases.

XI. DIARRHEAL DISEASE CONTROL

1. The diarrheal diseases.
2. Program for diarrheal diseases: short term program.  
long term program.

XII. MALARIA

1. The history of Malaria Control Program in Indonesia.
2. Methodology for Malaria Control Program.
3. Constraints in Malaria Control Program.

XIII. DENGUE HAEMMORRHAGIC FEVER

1. Situation the DHF as an epidemic and endemic diseases in Indonesia.
2. The control program.

XIV. IMMUNIZABLE DISEASES CONTROL

1. Immunizable diseases: Tuberculosis, Smallpox, Diphthery, Pertusis,  
Tetanus, Poliomyelitis, Measles.  
Cholera, Typhoid, Disentery.  
Etc., etc.
2. PPI (Pengembangan Program Imunisasi = Immunization Program Development)
3. The Role of laboratory finding/confirmation for CDC.

XV. TUBERCULOSIS AND LEPRA

1. History of Tuberculosis and Leprosery control program in Indonesia.
2. Control Program for the diseases.

XVI. HELMINTHIC DISEASES

1. Soil transmitted helminthic diseases.
2. Filariasis.
3. Schistosomiasis.
4. Control Program for the diseases.

XVII. RELATED AND INTER-CONNECTED PROGRAM FOR CDC

1. The institutions that concern for CDC in Indonesia.
2. Application the related and inter-connected programs in the field.

XVIII. MONITORING SYSTEM FOR THE PROGRAMS

1. The constraints on each program.
2. Monitoring system in the field.
3. Decision making for CDC in the field.

XIX. VECTOR CONTROL

1. What are vectors?
2. Vector control method for each vector.
3. Methodology.

XX. MISCELLANEOUS

APPENDIX F  
ORGANIZATION OF INDONESIAN PUBLIC HEALTH SERVICES

## APPENDIX F

### ORGANIZATION OF INDONESIAN PUBLIC HEALTH SERVICES

FKM education is being offered in the S1 and S2 degrees to train staff for Indonesia's public health services. Following is a brief description of the organization at all levels, from the central government (MOH) to the provinces (27 in Indonesia, including Jakarta as one Province), to the regencies (10 to 30 in each province, including the municipalities as separate Regencies) to the sub-districts where a Health Center (Puskesmas) is the basic health service unit.

#### National and Provincial Levels

The MOH has both policy-making (including research, development, and training) and operational responsibilities for health services delivery. It appoints the Directors of Provincial Health Departments who have two responsibilities: (1) representing the national government for the implementation and supervision of MOH policies, and feedback to the MOH and (2) overall responsibility for services delivery within the Provinces.

For preventive services, the Provincial Health Department is organized into five units: Disease Prevention (communicable disease control, [CDC]), Rehabilitation, Health Education, Environmental Health, and Maternal and Child Care/Family Planning. CDC has three subunits: Disease Surveillance, Vector Control, and Immunization.

The surveillance subunit is, in turn, organized into offices for individual disease reporting and control programs, such as tuberculosis, malaria, diarrheal diseases, leprosy, helminthic infections, ect. Each office receives and collates case reports, analyses disease status, investigates outbreaks and other problems, and provides technical guidance, supervision and training for lower echelons. As an example of the latter, its laboratory examines all malaria-positive blood slides from the Regencies and 10 percent of all negative slides. The Disease Surveillance Unit publishes a monthly Bulletin.

The official disease reporting system may be exemplified by the reporting of diarrheal diseases. Volunteer reporters in villages/hamlets/urban sectors report individual cases weekly to the Puskesmas. The Puskesmas tabulate case reports on a form sent monthly to the Regencies, and the latter prepare a report sent monthly to the Province. Reports of individual cases in greater detail are prepared in the instance of cholera and dengue hemorrhagic fever (DHF). Even more complete surveillance records are kept for special programs: tuberculosis, leprosy, yaws, venereal diseases, malaria, filariasis, and rabies.

#### Regency Level

Each Regency operates a hospital for which it has a staff including doctors in a number of specialties. All other non-curative, public health services are the responsibility of the Regency Health Administrator (formerly: Regency Doctor), assisted by a staff. His duties include: planning (including budgets, personnel and services), evaluation and special studies, disease surveillance and control. In general, this office provides supervision and assistance to the

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Puskesmas and is responsible to the Provincial Health Department.

Subdistrict Level

An Urban Puskesmas in Surabaya

Puskesmas Semambir may be used as an example of an urban institution. It serves a population of about 150,000 in a poor area which also has about 20 doctors with private practices and a large Moslem Private Hospital. The Puskesmas has an average of about 100 outpatient visits and about 125 non-ill Maternal and Child Health (MCH) visits per day. Attendees pay R 150 (= U.S. 14 cents) per visit for all services.

The Puskesmas consists of a compound of several buildings (no beds), and there are two satellite subcenters, one of which is served by the Puskesmas staff. There is a small pharmacy, a small laboratory, a working refrigerator, but no ambulance or other vehicles. Staff includes the following:

<u>Category</u>	<u>At Puskesmas</u>	<u>At Subcenter</u>
Doctor	1	1
Dentist	1	1
Midwife	2	] - 10
Male Nurse	2	
Sanitarian	1	
Vaccinator	1	
Auxillaries	2	
(pharmacy and lab, technicians, clerks)	24	

Vaccines available are diphtheria-pertussis-tetanus, diphtheria-tetanus, tetanus toxoid (for pregnant women), BCG, oral polio, and, recently, measles. The midwives conduct MCH activities, family planning, and deliveries (although 60 percent are performed by traditional midwives who are trained at the Puskesmas).

The Puskesmas is open from 7 a.m. to 2 p.m., but most attendees come early. At our 11 a.m. visit, no work was being done except record-keeping.

A Rural Puskemas Near Semarang

Puskesmas Klepo is a typical example of a rural Health Center. It serves a population of about 33,000 people living in 5 large villages and many small hamlets. The compound was clean, spacious, well organized, and included housing for the doctor, nurse and midwife. In addition to the main center there are two subcenters served by the same personnel. The latter include: 1 doctor, 1 male nurse, 1 midwife, 1 sanitarian, 2 vaccinators, and a clerical staff.

This health center functions generally as does Puskesmas Semambir, but with some modifications. It possesses an ambulance which is available for transporting patients to the Regency Hospital but also operates a circuit service to localities in the subdistrict every afternoon, visiting each once monthly. The sanitarian has a motorcycle. Measles and polio vaccines are not available officially, but the doctor purchases and sells the latter. The doctor conducts a

private practice in the same premises from 4 to 6 p.m. daily.

In addition to health records kept at Puskesmas, village and hamlet heads keep detailed records of their populations and birth and death counts. They also have detailed map of their areas, including the location of each residence, that would be very useful for sample surveys.