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

by

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TABLE OF CONTENTS

GLOSSARY.....iii

ACKNOWLEDGEMENTS.....iv

EXECUTIVE SUMMARY.....v

I. INTRODUCTION.....1

 I.1 Background and Description of Assignments.....1

 I.2 Public Health Training in Indonesia.....3

 I.2.1 Existing Faculties of Public Health.....3

 I.2.2 Planned Increase in Public Health Faculties...4

II. FINDINGS AND OBSERVATIONS.....6

 II.1 General Observations.....6

 II.1.1 University Commitment and Support.....6

 II.1.2 Leadership of CHS.....7

 II.1.3 Collaboration between FKM and Health Service
 Agencies.....7

 II.2 Curriculum.....7

 II.2.1 S1 and S2 Programs.....7

 II.2.2 Current Biostatistics Curriculum.....8

 II.2.3 Suitability.....9

 II.2.4 Teaching Methods.....10

 II.2.5 Technical Accuracy.....11

 II.2.6 Special Courses.....11

 II.2.7 Curriculum Coordination.....13

 II.3 Library Resources.....13

 II.3.1 Location of Resource Materials.....13

 II.3.2 Journals and Non-commercial Books.....13

 II.3.3 Other Related Matters.....14

 II.4 Research Agenda.....14

 II.5 Faculty Development.....15

II.5.1	The Current Situation.....	15
II.5.2	Constraints and Problems.....	16
II.5.3	Strategy.....	16
II.5.4	Some Projections.....	17
III.	SUMMARY OF RECOMMENDATIONS.....	18
III.1	Curriculum Issues.....	18
III.2	Library Issues.....	19
III.3	Research Issues.....	19
III.4	Faculty Issues.....	19

APPENDICES

Appendix A	Bibliography
Appendix B	Persons Contacted
Appendix C	List of Supplementary Library Books in Biostatistics

GLOSSARY

BKKBN	National Family Planning Coordinating Board
BS	Bachelor of Science
CHS	Consortium for Health Sciences
FKM	School of Public Health
MEC	Ministry of Education and Culture
MKDK	Basic Requirement Courses
MKKU	General Specialty Courses
MPH	Master of Public Health
S1	Baccalaureate degree
S2	Master's degree
S3	PhD degree
UNAIR	Airlangga University
UNDIP	Diponegro University
UNHAS	Hasanuddin University
USU	North Sumatra University
WHO	World Health Organization

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EXECUTIVE SUMMARY

1. Background

The Government of Indonesia is developing four new Schools of Public Health (FKMs) in regional universities with assistance from USAID. To provide technical assistance in the preparation of the Bachelor of Science Program in Public Health in these emerging schools, five consultants were recruited representing major disciplinary areas of Public Health. This report relates to the biostatistics component.

This consultant was specifically requested to render consultancy service for two universities, Hasanuddin University (UNHAS), Ujung Pandang and Diponegoro University (UNDIP), Semarang. With the help of an Indonesian expert, Dr. I.G.N. Agung, the consultant visited Hasanuddin University from July 3 to 12, 1985 and Diponegoro University from July 14 to 25, 1985. The specific assignments in the consultancy were to (1) review existing curricula, (2) suggest library resources, (3) develop a research agenda, and (4) recommend faculty development strategies.

An FKM was established at UNHAS in 1982 while as of September 1985, UNDIP will start a study program with the aim of achieving FKM status in 1990. At present, only a two-year Bachelor of Science (S1) degree is being offered at either facility, but the plan is to phase in a four-year S1 program in 1987.

2. Curricula

The general curriculum at both UNHAS and UNDIP, as at the other FKMs, is quite similar, as they have all been developed to conform closely to that of the University of Indonesia (UI), which has had an FKM since 1965. While this system is reasonable at this point, eventually each FKM should be encouraged to exploit its regional characteristics and faculty strengths (Recommendation 1).

The two-year S1 program, which requires the completion of three-year academy training and at least three years' work experience for admittance, is similar in content to the Master's level (S2) program offered at UI. While this is a cause for minor concern, at least in biostatistics area, it is important that the four-year S1 program now being developed be designed at a distinctly more elementary and practical level, since entrants will be admitted directly from high school and will be young and without any work experience. Attention should be given to ensuring that the biostatistics component is appropriate for this

level (Recommendation 2). In addition to generic statistical topics, the curriculum must contain data collection, reporting, interpretation and use of health statistics to cover practical aspects of health services and research. Less emphasis may be placed on theory and technical calculations (Recommendation 3).

The teaching methods at UNHAS and UNDIP are traditional, with heavy reliance on lectures and problem-solving exercises for students. With microcomputers to be introduced under the project, the uses of computers as a teaching aid should be explored (Recommendation 4).

The team approach to teaching is in wide use throughout both universities, with a team of three instructors teaching the basic statistics course at UNHAS and a four-person team collaborating at UNDIP. Although this system has its advantages, one or perhaps two instructors would provide the optimal degree of continuity and efficiency for elementary biostatistics courses (Recommendation 5).

With regards to specific areas of the curriculum, three modifications are suggested. UNHAS's current practice of offering its basic statistics as two courses, basic statistics and statistical inference, does not provide as logical an approach to the subject matter as UNDIP's, which combines the information into one course. UNHAS should consider either adopting the UNDIP approach or otherwise restructuring the courses (Recommendation 6).

Family planning and population studies, which are now part of the biostatistics curriculum, might more appropriately be taught by the Health Administration Department or even become a separate department. Biostatistics could also be combined with epidemiology (Recommendation 7). UNDIP, which is designing specialty biostatistics courses for the 1986-87 school year, should keep in mind that these courses should be geared to generalist health professionals, not statisticians. It will also need to find qualified faculty to teach these courses (Recommendation 8).

Topics covered in biostatistics courses sometimes overlap those in epidemiology demography and others. At the same time, the curricula as now structured reveal some major omissions. These duplications and gaps could best be resolved if a curriculum committee were formed to facilitate course coordination among departments (Recommendation 9).

3. Library

Library resources and facilities for storing materials are

currently inadequate. Plans for translation of textbooks and microfiching public health journals are commendable and should be pursued (Recommendations 11 and 12). The consultant's suggestions regarding additions to the library have been provided separately to USAID/Jakarta, but plans for shipping, storage and procurement remain to be worked out (Recommendations 10 and 13).

4. Research

UNHAS and UNDIP should consider designing a system of collecting, processing and using basic demographic, health and social data as initial activities of research. This would address a current national need and could involve not only faculty but students and nearby health facilities as well. Other applied research activities with practical value might also be initiated (Recommendation 14).

5. Faculty

Faculty development is clearly a priority need and is addressed as such in the five-year development plan for the two universities. At present, only three of the six full-time biostatistics/family planning faculty at the two universities have S2-level degrees, with the others only at the Bachelor's level. Since it is unlikely that additional, more highly qualified faculty will be hired in the near future, an emergency measure might be to upgrade current faculty through short-term intensive training. Long-term development should include formal training of existing faculty members for higher degrees and attracting qualified graduates from related fields for advanced training in biostatistics (Recommendation 15).

I. INTRODUCTION

I.1 Background and Description of Assignments

Increasing demand for public health manpower in Indonesia has led the Ministry of Education and Culture (MEC) to explore the possibility of developing additional public health training at the baccalaureate level and research capabilities in regional universities. With assistance from USAID and the National Family Planning Coordination Board (BKKBN), the MEC's Consortium for Health Sciences (CHS) is developing four Faculties of Public Health (FKM), in addition to the original school at the University of Indonesia in Jakarta.

To assist the preparation of the Bachelor of Science Program in Public Health in these emerging FKMs, five consultants were recruited in the U.S., each representing one of the following academic disciplines: health education, biostatistics, epidemiology, environmental health, and public health administration. This consultancy covers provision of technical assistance in biostatistics for two universities, Hasanuddin University (UNHAS), Ujung Pandang, and Diponegoro University (UNDIP), Semarang. UNHAS has had a FKM since 1982 and UNDIP is to have its first class in September 1985. The assignment began July 1, 1985 and extended for 25 working days, including 10 days at UNHAS (July 3-12) and 12 days at UNDIP (July 14-25). The tasks as set forth in the scope of work were to:

- A. Make recommendations on course selection and departmental staffing levels.
- B. Assess and revise course content in light of prevailing scientific and empirical knowledge.
- C. Suggest ways to incorporate innovative teaching methodology within existing curricula.
- D. Identify library and information resources to support each discipline.
- E. Suggest suitable faculty research strategies and topics.
- F. Assist in clarifying administrative departmental procedures, mechanisms, and relationships.
- G. Introduce latest state-of-the-art scientific and technological advances to their counterparts.

The consultant received orientation from the USAID Training Officer, the USAID Chief of the Population and Health Office, and staffs of Faculty of Public Health, University of Indonesia. An Indonesian expert was provided to each of the external consultants. The writer's counterpart was Dr. I.G.N. Agung, the only PhD in biostatistics in Indonesia.

An itinerary of field visits was given to each team. The scope of work was amplified with the following instructions from CHS and BKKBN:

1. Review existing curricula: A general standard curricula for the baccalaureate program including course and credit requirements was developed by the five FKMs and approved by CHS in 1985. Each FKM is currently elaborating this curricula according to its individual needs. The consultants were requested to review these curricula for suitability and technical accuracy, and to incorporate additional varied and participatory teaching methodologies and educational technologies.
2. Suggest library resources: Books had already been purchased for core libraries in each Faculty. Additional funds are available to expand these libraries. The consultants were requested to submit lists of library books in their respective areas of specialization to supplement existing library resources.
3. Develop research agendas: Dynamic research programs responsive to the data needs of regional health and family planning agencies are a 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. The consultants were to assess research capacities at each Faculty and recommend ways to improve them. The consultants were asked to discuss research priorities and suggest one research activity which could be undertaken in 1986/87.
4. Recommend Faculty Development Strategies: Faculty members must have Master's level education to teach at the baccalaureate level and PhDs to teach at the Master's level, but faculty at these levels are in short supply. Funds are available for staff development in the project. The consultants were requested to comment on existing staff, projections of additional staff needs, additional training needs, and a strategy to achieve optimum qualitative and quantitative staffing levels.

The consultant and his counterpart addressed all these issues during intensive discussions with the staff members of the universities. Relevant documents were also examined, health services infrastructure visited, and students interviewed. A debriefing for the MEC, BKKBN and USAID officials was held in Jakarta on July 27, 1985.

This report covers the consultant's technical assistance provided to the two universities. An additional list of books for libraries was submitted directly to USAID/Jakarta at a later date (Appendix C).

I.2 Public Health Training in Indonesia

I.2.1 Existing Faculties of Public Health

Two Faculties of Public Health ^{1/} are currently in operation in Indonesia, one at the University of Indonesia (FKM-UI) in Jakarta and one at Hasannudin 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 Bachelor of Science (BS) degree, called an S1 degree, and a Master of Science degree, called an S2 degree.

o The Bachelor of Science (S1) in Public Health: S1 degree programs include a four-year and a two-year program.

- Four-year S1 degree: This four-year program requires 140 credit hours. Applicants must be senior high school graduates. The four-year BS 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 two-year program requires 60 credit hours. Applicants must be graduates of a three year academy, having specialized in nutrition, sanitation, midwifery, or nursing, and have also had a minimum of three years work experience. The curriculum complements the academy curricula. Graduates are expected to achieve the same level of credit hours and academic attainment as graduates from the four-year

1/ Equivalent to an independent School of Public Health in the United States

S1 program.

o The Master of Science (S2) in Public Health: This two-year program requires 60 credit hours. Applicants must be graduates of four-year college courses in medicine, dentistry, pharmacy or veterinary medicine or possess an S1 degree in public health.

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.

I.2.2 Planned Increase in Public Health Faculties

The four institutions where programs in Public Health at the S1 and S2 level are being initiated are:

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

A Five-Year Development Plan for each Faculty was prepared in 1984, outlining 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 FKMs, with assistance beginning in late 1985. To sustain the momentum during the interim period, BKKBN is supporting these FKMs with fellowships for faculty and staff, procurement of library books, and technical assistance. Additional development of these new FKMs will be done in stages as follows:

2/ Although there was already an FKM at UNHAS, USAID includes it 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.

Phase 1: Establish programs of study within the Public Health Departments of Medical Faculties at UNAIR, UNDIP, and USU which will 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 FKMs to offer the four-year S1 degree. UNAIR will begin offering the four-year S1 degree in 1985. UI will begin to offer S3 (PhD level) for the first time in 1987.

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.

II. FINDINGS AND OBSERVATIONS

II.1 General Observations

This section discusses some general observations not specific to the biostatistics component only.

II.1.1 University Commitment and Support

Obviously a strong competent public health training program needs the full support and commitment of the hierarchy of the university, particularly when the program is in the initial stage of development. Although both the UNHAS and UNDIP administrations support the public health training programs in their own universities, further commitment would certainly strengthen their programs.

More specifically, UNHAS, with a total enrollment of 70 students and the added task of teaching medical students, has 17 faculty members while the UNDIP study program has only 13. Under normal conditions it is virtually impossible to effect a large increase in faculty in a short period of time. It is said that the entire UNDIP, with seven Faculties, receives about 13 new positions per year. The Faculty of Medicine, of which the public health study program is a department, is considered to be over-staffed by the University administration and thus may be allocated one or two new positions per year, at best. In 1985, UNHAS's School of Public Health acquired two new staff members while UNDIP hired only one for its study program. Even when the new positions are allocated, the processing of an appointment takes about a year. Fortunately the Deputy Rector of UNDIP has agreed to attempt to provide extra positions for the public health program.

Improvements in the physical environment are also needed. For instance, the UNDIP program occupies a small structure consisting of four tiny rooms and one slightly larger room, none of which can be considered a classroom. There is no space for teaching equipment or for additional books (they are currently kept in the hall and one of the four small rooms which is used for the preparation of coffee and tea). When the first group of 20 new students come this September, they will be taught at the Medical School which is about three kilometers away from the faculty building. With that much distance, there may be little contact between the faculty and students outside the classroom. A new campus is being developed, but it is expected to take five years to complete.

II.1.2 Leadership of CHS

The Consortium appears to be exercising strong leadership in every aspect of planning and implementing the training program in all emerging FKM's. The curricula are uniformly modeled after those of FKM-UI. Departmentalization takes an identical format, consisting of five units: public health administration, epidemiology, biostatistics/population, environmental health, and health education. In view of the early stage of public health training, firm leadership may be desirable and efficient. In the long run, however, the Consortium should consider providing broad guidelines only, rather than detailed specifics, so that each FKM may develop their own unique programs reflecting regional characteristics and faculty strengths. Likewise, while the FKM-UI now provides the model pattern for the new FKMs and serves as a national resource center for public health, some concerns were expressed about "UI dominance." Eventually each FKM should be encouraged to exploit its regional characteristics and faculty strengths (Recommendation 1).

II.1.3 Collaboration between FKM and Health Services Agencies

An FKM, as the professional school that produces health workers, should maintain close ties with health services agencies. In Indonesia, however, the FKM's staff members seem to be ill-acquainted with day-to-day handling of work at local health centers (PUSKESMAS). No record and reporting forms used in the health care networks are found in the universities. Although field study is a requirement in the S1 training, UNHAS has found that agencies where students are placed provide inadequate preparation, supervision, and evaluation. UNDIP has established a routine field training program for medical students in collaboration with a training center of the Ministry of Health.

II.2 Curriculum

II.2.1 S1 and S2 Programs

The curricula of the two-year S1 and the S2 programs are quite similar, particularly in the area of statistics. (The S1 statistics course [KMB-400] overlaps significantly with the S2 statistics course [KMB-600] in UI.) Because the requirements for the S1 degree include three years' work experience (see Section I.2.1), two-year S1 students, however, may be better prepared for formal public health training than some of the S2 students; they are therefore capable of handling material as advanced as that for students preparing for a master's degree.

On the other hand, it is important that the program for four-year S1 student be designed at a considerably more elementary level than the two-year program. The four-year students enter directly from high school, young and with no experience in public health. Development of a biostatistics curriculum specifically for this group should be considered (Recommendation 2). UNAIR is currently developing two-year and four-year S1 programs almost simultaneously. Their experience should be used by UNDIP and UNHAS which plan to admit four-year S1 students in 1987.

II.2.2 Current Biostatistics Curriculum

The biostatistics curriculum for the S1 two-year program at the UNDIP and UNHAS were found, on the whole, to be similar. Table 1 below provides a summary.

Table I
Comparison Between UNDIP's and UNHAS's
S1 Two-Year Program
Biostatistics/Population

<u>University</u>	<u>Units</u>	<u>Comments</u>
<u>UNDIP</u>		
Basic Statistics	3	(part of Basic Health Requirement Course - MKDK)
Basic Population Research Methods	2	(part of non-health MKDK)
	2	(part of General Special Courses - MKKU)
Specialty Courses (elective) (population/family planning)	12	(six courses)
Specialty Courses (elective) (biostatistics)	9	(four or five courses - still under consideration)
<u>UNHAS</u>		
Basic Statistics	2	(part of MKDK)
Statistical Inference	1	(part of MKKU)
Basic Population Research Methods	2	(part of non-health MKDK)
	2	(part of MKKU)
Specialty Courses (elective) (population/family planning)	6	(five courses)

Out of a total of approximately 60 credit hours, the Biostatistics/Population Departments at UNDIP and UNHAS allocate three units to the basic statistics course. UNDIP, like UI, offers it as a single course but UNHAS splits it into two courses, basic statistics (two units) and statistical inference (one unit). At UNDIP and UI, it forms a part of the basic health requirement course (MKDK - Mata Kuliah Dasar Kehalitan - Kesehatan Masyarakat) which in turn represents about 20 percent of the total credit units. In UNHAS, however, only the two-unit basic statistics course is included in MKDK while the statistical inference course is an ingredient of general special courses (MKKU - Mata Kuliah Keahlian Umum).

In addition, both the Biostatistics/Population Departments offer two other courses for all S1 students. The basic population course (two units) is included in the non-health MKDK, while the research methods course also has two units but it is classified under MKKU (total number of credits - 16).

On the other hand, the curricula of specialty courses (Mata Kuliah Keahlian Kekhususan) differ considerably between the two programs. Both UNHAS and UNDIP offer courses on population/family planning but UNDIP provides, in addition, biostatistics specialty courses. The UNHAS's population/family planning courses consist of five different courses for a total of six units; only one of them has two units and all others are single unit courses. In the case of UNDIP there are six courses, each having two units. Not only are there double the number of credit units; the general approach of the courses is somewhat different. While the courses of UNDIP are more quantitatively oriented, those of UNHAS are more sociologically oriented. Biostatistics specialty courses at UNDIP are still being developed (see II.2.6).

II.2.3 Suitability

The basic statistics courses (including UNHAS's statistical inference) cover the following topics: data collection and presentation, descriptive statistics (central tendency and dispersion), probability, population and sample, testing hypothesis, and regression and correlation. UNDIP also covers basic statistical distributions such as binomial, Poisson and normal. Ideally, far more emphasis should be placed on application to health issues; the practice is simply to discuss during the first hour of the course the role of statistics in health. UNDIP also offers a session on vital statistics, but its adequacy is debatable.

The key consideration in further developing the biostatistics component for the S1 degree is that graduates are to be

generalist health workers. Greater emphasis should be placed on practical issues such as source, use, kinds, reporting and compilation, interpretation and limitations of health statistics, which are either not covered at all or inadequately discussed. On the other hand, theoretical aspects and technical calculations are overemphasized. In view of the current data situations in Indonesia, it is not surprising that errors, completeness, and evaluations of raw health and population data seem to require much attention in the classroom. Because of the recent advance in calculation technology, however, emphasis should not be placed on tedious and painstaking hand calculations. Less emphasis should also be given to theory (Recommendation 3).

UNHAS and UNDIP approach population courses differently; UNHAS focuses on sociological aspects while UNDIP emphasizes analytic methods. While the sociological aspects certainly deserve attention at the S1 level, a Biostatistics/Population Department should also impart proficiency in analytical techniques. The course, however, shares the deficiencies of the basic statistics course in its failure to explore the source, adequacy and evaluation of demographic material. Equally essential and also lacking is coverage of the concepts of life table and stable population.

The research methods course is most appropriately a requirement in the S1 curriculum, although because of the level of students, the contents should not be too technical. In general, the coverage of topics seems adequate, although caution is needed not to overemphasize behavioral research. The degree of focus on biological, epidemiological research methods, however, will depend ultimately on the epidemiology course contents.

II.2.4 Teaching Methods

UNDIP plans a two-hour lecture followed by three hours of laboratory a week for the basic statistics course. UNHAS, on the other hand, offers only two-hour lecture periods with no laboratory work, although it has a series of homework assignments which involve problem-solving. In both universities these problem-solving exercises are done by teams of students. About six students form a team but presumably the level of participation varies. At UNHAS particularly, solutions for the assignments exhibited an exemplary neatness.

UNHAS and UNDIP rely extensively on chalk and blackboards with occasional use of overhead projectors. All the transparencies are hand-drawn by instructors. Although microcomputers are to be introduced under the present project, their use for teaching is not contemplated. For demonstration of sampling and probability theory, however, the computer simulation is extremely

useful. Student exercises and self-evaluation can also be done by computer. These and other uses of computers as a teaching aid should be explored (Recommendation 4).

Both universities employ a team approach in teaching all courses. In UNHAS three instructors participate in the basic statistics course and in UNDIP, there are four instructors and two guest lecturers. A team composed of the same instructors teach many different courses. For instance, in UNDIP the team of three full-time biostatistics faculty members, with some additional lecturers, teach basic statistics, basic demography, research methodology, health information systems, advanced statistics, population dynamics, and family planning administration. There are advantages and disadvantages in this approach. In elementary statistics, however, in the interest of efficiency, continuity and consistency, the number of instructors should be limited to one or perhaps two (Recommendation 5).

II.2.5 Technical Accuracy

The syllabus of the basic statistics course for both universities is appropriately structured, except for the omission of topics related to day-to-day work of health networks (paragraph II.1.3).

The only issue of technical accuracy relates to UNHAS's splitting basic statistics into two segments (paragraph II.2.2). The basic statistics course covers topics of statistical inference, such as testing hypothesis and confidence interval estimation. Techniques of calculations are given in basic statistics and concepts involved are given in statistical inference. The order is apparently reversed. Either the two courses should be combined, as done in UI and UNDIP, or they could remain separate if some adjustment were made in the syllabus (Recommendation 6).

II.2.6 Specialty Courses

There is some question as to whether the Biostatistics/Population Department has the expertise to be teaching the population/family planning units offered in the UNHAS and UNDIP specialty courses (see Table I). Although techniques of demographic analysis appropriately belong to biostatistics, most of the contents covered in these courses (e.g., reproductive health, planning and management of family planning programs, and contraceptive methods) belong to other disciplinary areas. In UNHAS many of the courses are conducted by sociology and BKKBN personnel, while to a lesser extent UNDIP also relies on outside faculty members. The current practice of using the Biostatistics

Department to present family planning courses should be reconsidered. These courses could be combined with health administration or even reconstituted as an independent department. The possibility of combining biostatistics should be studied (Recommendation 7).

At UNDIP, biostatistics specialty courses are to be offered from 1986. Plans were not firm at the time of consultant's visit, however, with at least two tentative curricula of courses having been proposed. The first included the following five courses:

- | | |
|--|---------|
| 1. Statistical Design in Health Research | 2 units |
| 2. Correlation | 2 |
| 3. Non-parametric Statistics | 2 |
| 4. Analysis of Variance | 2 |
| 5. Vital Statistics | 2 |

The more recent proposal included four courses:

- | | |
|------------------------------|---------|
| 1. Health Information System | 3 units |
| 2. Advanced Statistics | 2 |
| 3. Computer Application | 2 |
| 4. Vital Statistics | 2 |

Since these courses will be offered in 1986-87, firm planning must be completed soon. UNDIP is the only one of the five FKMs to offer biostatistics specialty courses to S1 students. An important consideration in planning these courses is that the goal of the S1 training program is not to produce statisticians but to produce generalist health professionals at mid-level. Thus, the courses should not be too technical. Several issues should receive special attention: handling, analysis and interpretation of statistical data as related to daily work; limitations and evaluations of data; and use of statistics in health planning and evaluation.

UNDIP will face difficulty in teaching the advanced statistics currently contemplated due to limitation of resources. Either technical assistance will be needed or these courses should be first developed in a Faculty (such as UI) with more resources and experience, with UNDIP phasing in at a later date (Recommendation 8).

II.2.7 Curriculum Coordination

Although many related courses are given in the quantitative area, they are not formally coordinated. The following courses have a variety of common topics: basic biostatistics, research methods, epidemiology, planning and evaluation of health services, demographic method and population dynamics. Duplication is inevitable but need not be considered a problem; in fact, if the topic is important enough, duplicate discussions may even be desirable. Of greater concern, however, are omissions. For example, standardization of rates is not covered in any of courses at UNHAS; life table is included in neither UNHAS nor UNZIP; and health information system, health index, vital registration and related subjects appear to require more attention. A curriculum committee should be formed to facilitate course coordination (Recommendation 9).

II.3 Library Resources

II.3.1 Location of Resource Materials

Both UNZIP and UNHAS have a central library and a medical library. In some cases the distance between the public health building and the library is quite far -- in UNHAS more than five minutes by car. An appropriate locale should be found for the books that are to be ordered through the project; it is doubtful due to space limitations, whether the public health building itself will serve this purpose (paragraph II.1.1). In the short term, however, they should perhaps be stored there. The location for the core books must be carefully specified. Otherwise books addressed to the University will be placed in the central library regardless of any agreement between USAID and the University (Recommendation 10).

II.3.2 Journals and Non-commercial Books

Subscriptions to overseas public health journals must be increased. In UNHAS, other than the Bulletin of the World Health Organization (displayed in the medical library), no public health-related journals were found. In its central library, there were two additional journals -- Bulletin of the Pan American Health Organization and Southeastern Asian Journal of Public Health and Tropical Medicine. On the other hand, a considerable number of population-related journals are being received, such as Demography, Population Studies, Population Reports, International Family Planning Perspectives, Journal of Biosocial Sciences and International Migration Review.

The journal collections of the UNDIP medical library are better than those of UNHAS. For public health, there are subscriptions to the American Journal of Public Health and American Journal of Epidemiology in addition to the WHO Bulletin. The central library however appears to receive no professional journals. USAID plans to microfiche selected public health journals and distribute the microfiche prints to the FKMs. This appears a very useful and cost-effective solution (Recommendation 11).

There are limited volumes of recent monographs at the UNDIP public health building. Otherwise, practically no usable health-related books were found. Exceptions are those monographs published by WHO and the Southeastern Asian Medical Information Center, Tokyo, which are distributed free of charge. New FKMs should be placed on the mailing list of U.S. health agencies. Many publications from U.S. Public Health Services or the Environmental Protection Agency are free (e.g., Public Health Reports), as are some journals emanating from the private sector: (e.g., Studies in Family Planning and Population and Development Review).

II.3.3 Other Related Matters

USAID/Jakarta is currently involved in arranging translation of standard textbooks. At this stage this may be as worthwhile as acquisition of foreign books; reproduction and binding are inexpensive in Indonesia. Some mechanism should be devised, however, to assure the selection of the appropriate books for translation (Recommendation 12).

Instructional resource material is also being procured under the current project. It appears, however, that procurement is being handled separately by the various disciplinary departments. Utilization and economy would be better served if a centralized plan were developed (Recommendation 13).

II.4 Research Agenda

The research experience and activities of the faculty staff are limited and these will be further curtailed by the additional burden of new teaching responsibilities. Research programs, however, are a requirement for FKM accreditation - "dynamic research programs responsive to the data needs of regional health and family planning." 3/

3/ from USAID's instructions, paragraph I.1, subparagraph 3

This requirement should be viewed as an opportunity. A research agenda, however, should not be drawn up in a vacuum; rather, activities with immediate practical value should be selected. For example, in Indonesia basic demographic, social and health data are often unavailable and when available, often unreliable. Although a new national health information system was put into effect recently (Departemen Kesehatan, 1983), it does not appear to work smoothly in many parts of the country. In some cases the system is simply not enforced. Many PUSKESMAS do not observe the designated document-flow. Report forms are often handwritten on any blank paper available. The filing system is non-existent in some health centers; records are simply piled up. Retrieval of old records is very difficult, if not impossible. Deaths and births are reported from several different sources and they do not match each other. BKKBN has its own reporting system. An applied research project to establish a useful and workable health information system might improve the situation.

The existing system of data collection, compilation, flow, dissemination and use should be reviewed, and new strategies built on the existing national system could be recommended. The data collected would provide the basis for comprehensive health planning. This endeavor might serve as the first step in an applied research project, followed perhaps by a specific innovative health program, or an epidemiological study.

Faculty, local health networks, and students should all participate. Students now are rarely exposed to innovative health activities, and they do not have much opportunity to participate in research. One or two areas, urban, rural or both, could be selected and the health center(s) or health department(s) in the area(s) be affiliated with the university, with at least the chief doctor of the health agency being given some kind of university appointment (Recommendation 14).

II.5 Faculty Development

II.5.1 The Current Situation

UNHAS and UNDIP each theoretically has three full-time faculty members in biostatistics/population (paragraph II.2.4). All are identified as biostatisticians rather than demographers, although some have worked in analytical aspects of population and family planning. Because in both schools the senior member is heavily involved in administration, (in UNDIP as head of the Study Group [equivalent to Dean], and in UNHAS as Associate Dean for Academic Affairs), in reality total staff time available for these disciplines is equivalent to somewhat less than 2.5 full-time staff members. The academic preparation of this

staff is also limited. In UNHAS two staff have S2 training from UI while in UNDIP only the senior staff member has an S2 (Master of Public Health [MPH], Columbia), although one of the junior staff is also getting an S2 from UI. Teaching experience is also limited to training of medical students by one staff member at UNHAS and two at UNDIP.

II.5.2 Constraints and Problems

Faculty strengthening, obviously a priority, is envisioned in the five-year development plans of the two universities. UNHAS's target is to increase the biostatistics faculty members from the present three to eight by 1990. (The entire staff force of the FKM is also scheduled to increase from 17 to 42 during this period, an increase which represents an increment of one staff in each of the five departments a year.)

It is doubtful these plans will materialize. In the first place, unless the university administration authorizes a new position, recruitment of a new staff member is impossible (paragraph II.1.1). Furthermore, virtually no qualified S2 or S3 candidates are available. Therefore, if new positions are approved, they would have to be filled by fresh college graduates (S1). Obviously, strong university commitment to the program will be needed to ensure hiring of needed staff.

II.5.3 Strategy

To circumvent these obstacles, three strategies are proposed: intensive short-term courses; use of part-time staff members; and recruitment of non-health professional school graduates.

- o Intensive Short-Term Courses. Instead of formal training, which takes two or more years, short-term intensive training courses should be instituted. For instance, four- to eight-week programs could be conducted during summer vacation. Several courses could be offered simultaneously so that a trainee could select courses to suit his level and interest. Such courses would enable the current faculty quickly to attain the S2 level in biostatistics.
- o Use of Part-time Staff. Although widely practiced, the use of part-time staff is equivalent really only to the employment of a guest lecturer. Ideally, a system should be devised to ensure more commitment on the part of the part-time staff members. This would permit permanent faculty to leave for formal training or

an assignment in another country.

- o Recruitment of Non-health Professional School Graduates. In the United States, most biostatisticians come from fields other than health, such as mathematics or biology. Because these related disciplines offer a larger pool of eligible candidates, this practice might also usefully be introduced in Indonesia. Many Sis from non-professional schools, however, appear to be unaware of the fact that positions are available in health. Active recruitment of these candidates should be undertaken to increase the number of competent biostatisticians in Indonesia.

II.5.4 Some Projections

At this point, faculty development is more urgent in UNDIP than in UNHAS. The teaching load is heavier and the curricula more quantitative and analytic, requiring a higher level of statistical expertise. In each school, especially in UNDIP, it would be desirable to have one S3 level staff as soon as possible, especially in general statistical methodology. Faculty development in demography is also called for at UNHAS. Another specific area requiring immediate attention is the application of computers in the training of staff. The introduction of micro-computers to this project is imminent, and mainframe computers in UNDIP and UNHAS are used for administrative purposes only

On the other hand, it is impossible to recommend the specific number of additional staff needed, as this depends on teaching load, research responsibilities, and community service. Nonetheless, as a high priority, both schools should aim to increase their staff gradually in the coming years (Recommendation 15).

III. SUMMARY OF RECOMMENDATIONS

III.1 Curriculum Issues

1. CHS should encourage each FKM, in due time, to develop according to its own regional characteristics and faculty strengths (paragraph II.1.2).

2. Development of a biostatistics curriculum specific to the four-year S1 program should be contemplated (paragraph II.2.1).

3. The curriculum of biostatistics should focus more on practical topics related to health services and research, with less stress on theory and technical calculations (paragraph II.2.3).

4. Use of computers as teaching aids should be studied (paragraph II.2.4).

5. Although a team approach is used to teach elementary statistics, it is recommended that the number of instructors for such a course be limited to one or two, in order to optimize efficiency, continuity and consistency (paragraph II.2.4).

6. UNHAS should consider either combining basic statistics and statistical inference into one course, as is done at UI and UNDIP, or restructuring them to ensure logical continuity (paragraph II.2.5).

7. The current practice of offering family planning courses as part of the biostatistics discipline should be re-considered. Organizationally, population studies could be an independent department or it could be combined with health administration. Biostatistics might be combined with epidemiology (paragraph II.2.6).

8. UNDIP should firm up its plans for biostatistics specialty courses for S1 two-year students, gearing these courses to generalist health professionals, not statisticians. UNDIP's lack of qualified biostatistics faculty for advanced training must also be addressed (paragraph II.2.6).

9. The organization and use of a curriculum committee is recommended for innovation and coordination of related courses (paragraph II.2.7).

III.2 Library Issues

10. Strengthening library resources is important. The problem of storage of the books and other resource materials must be solved. The permanent location must be convenient to both public health faculty and students (paragraph II.3.1)

11. USAID's plan to microfiche selected public health journals and to distribute the prints to the FKMs should be carried out (paragraph II.3.2).

12. A system should be devised to assure that textbooks selected for translation are needed and appropriate (paragraph II.3.3).

13. A centralized procurement plan for instructional resource material for the project should be worked out (paragraph II.3.3).

III.3 Research Issues

14. Research must be encouraged. Projects with practical value should be initiated through affiliated health care networks and should involve faculty, students, and the community. The first step could be the improvement of the existing health information system (paragraph II.4).

III.4 Faculty Issues

15. Faculty development is needed. Additional faculty is essential and the training of existing faculty should be upgraded. Strong university commitment and support are necessary for increasing faculty numbers. Short-term intensive training should be encouraged to improve the skills of existing faculty and formal long-term training programs could be arranged if suitable committed substitutes can be found. Graduates from related fields should also be encouraged to specialize in biostatistics (paragraph II.5).

APPENDIX A
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APPENDIX A

BIBLIOGRAPHY

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APPENDIX B
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APPENDIX B

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APPENDIX C
LIST OF SUPPLEMENTARY LIBRARY BOOKS
IN BIOSTATISTICS

Submitted by
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APPENDIX C

Introductory Level

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