

An epidemiological approach to health planning and problem-solving in Indonesia

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Daerah Istimewa Aceh, with a population of 2.9 million, is located in northern Sumatra and is one of 27 provinces in Indonesia. Since 1982 a USAID-funded project (CHIPPS) has supported an experiment in Aceh involving decentralized health planning and problem-solving. Instead of following the usual Indonesian practice of rigidly adhering to strict health programme guidelines sent from Jakarta, Acehnese health officials tried to use an epidemiological approach in defining their most important health problems and in selecting the most appropriate interventions to solve those problems.

The fundamental approaches of the project were to provide training in applied epidemiology for health officials at province, district and sub-district levels, to carry out province-wide or district-wide surveys designed to identify the major preventable causes of death and to develop a population-based information system concerning births, deaths and cause-of-death. Provincial health officials carried out several major surveys which demonstrated that the pattern of morbidity and mortality in Aceh differed markedly from national estimates and that the provincial health department needed to develop specific disease control strategies tailored to fit the situation in Aceh. For example, a province-wide neonatal tetanus mortality survey found that 2.1 per cent of all infants born in Aceh died of tetanus, that neonatal tetanus mortality rates in some districts were 10 times higher than in other districts and that babies delivered by trained village midwives were nearly as likely to die from tetanus as babies delivered by untrained village midwives. Surveys like this had major implications for health planning and priority-setting in Aceh. The CHIPPS project in Aceh has demonstrated that province-level health officers, with training in epidemiology and with limited financial resources, can develop a simple but sound information base, determine their own local priorities and implement effective interventions, even when these priorities and interventions differ markedly from national norms.

Introduction

Indonesia's Ministry of Health (MOH) faces an immense task: the co-ordination and management of health services for a diverse nation of 160 million people, spread out over several thousand islands, and organized into 27 provinces. In recent years it has become clear to nearly everyone in the MOH that centralized management of the health system from Jakarta cannot continue. The MOH is acutely aware that Indonesia's infant mortality rate (IMR) of about 90 per 1000 is far higher than that of the other ASEAN countries.¹ It has been accepted that a gradual process of decentralization must occur, with individual provinces taking greater

responsibility for defining their priority health problems, assessing the magnitude of these problems, and devising appropriate strategies for their solution.

A major issue has become how to stimulate this process of decentralization. Provincial health officials in Indonesia have long been in the habit of waiting for instructions from Jakarta and then implementing whatever standardized programme has been sent to them. The three largest provinces, located on the island of Java, have begun to develop some autonomy in their planning and programming, but the 'outer islands' (outside of Java and Bali) have tended

to follow Jakarta's lead even when the national programme they have been carrying out has been irrelevant to the local situation.

In 1981 the MOH (with financial assistance from USAID) decided to try and support provincial autonomy in health management in three outer island provinces. The basic idea was for these provinces to use an epidemiological approach in order to decide their priorities, and to devise epidemiologically sound strategies for their solution, even when these strategies differed from the Ministry's own national guidelines.² The project was called CHIPPS (Comprehensive Health Improvement Programme - Province Specific) and involved the provinces of Aceh, West Sumatra and Nusa Tenggara Timur. This paper describes what has happened in Aceh.

Aceh province

Aceh province (technically known as Daerah Istimewa Aceh) is located on the northern tip of the island of Sumatra (Figure 1). It has an area of 55 390 km² and a population of about 2.9 million which is mostly concentrated in rice-growing areas along the coast. The sparsely populated mountainous interior still contains



Fig. 1. Map of Aceh Province (Sumatra) showing district boundaries (1985 population estimates)

large areas of primary tropical rain forest where elephants, tigers and orangutang can be found. Large deposits of oil and natural gas are being exploited on the coast, but the income derived from these activities goes mostly to Jakarta for nation-wide redistribution. The Acehnese are a proud, independent and strictly Islamic people with a long history of resistance to colonial rule.

At the time the CHIPPS project began in Aceh (1982) the provincial health officials lacked even the most basic health information. They had no reliable information on crude birth rate, crude death rate or cause of death. They had no system for determining province-wide health priorities and their budget was determined in Jakarta and based on national rather than provincial priorities.

The programme started with a series of meetings involving health officials at the provincial level. The following activities were selected as being of the highest priority:

- *Training in applied epidemiology* for provincial and district health officers as well as for health centre staff. A series of courses were planned, the goal being to develop an Acehnese training team that could conduct its own courses as the need arose.
- *Province-wide or district-wide surveys* aimed at determining incidence or prevalence rates of selected diseases. These surveys were to be followed by interventions at the district level (depending upon which districts had highest disease rates), since province-wide implementation was not considered feasible for logistical reasons.
- *Developing a basic information system* (in a defined population in nine selected sub-districts) which could provide data on births, deaths and cause of death on a continuing basis. These data would serve as a baseline (for infant and child mortality rates, crude birth rate, crude death rate and so forth) as well as a means of monitoring the impact of particular health, nutrition or family planning interventions.

A critical problem at this stage was the fact that provincial and district health officials in Aceh had no experience of epidemiological approaches to planning. Two events changed this situation. The first was that the MOH

announced that for the fourth 5-year plan beginning in 1984 an important national goal would be a reduction in the IMR from an estimated 90 per 1000 to 70 per 1000. This forced provincial health officials to ask themselves the following questions:

- What was the current IMR in Aceh province?
- What were the main causes of infant mortality in Aceh?
- What were the most effective and feasible interventions to reduce the IMR?
- How could they monitor changes in the IMR (and thus the impact of interventions) over the next five years in order to assess progress towards the goal set by the fourth 5-year plan?

Thus was community epidemiology born in Aceh.

The second critical event that influenced the development of an 'epidemiological style' among MOH officials in Aceh was to conduct a survey and understand the importance of its results. An essential element in this process was that the early efforts of provincial and district level health staff at obtaining data were strongly supported by the MOH in Jakarta. Without that support and encouragement the whole effort aimed at decentralizing health management would have failed.

Epidemiology training

There was general agreement that epidemiology training for provincial, district and health centre staff was essential. But who would do the training, what the objectives of the training would be and what sort of follow-up was needed were more difficult questions.

Two 10-day courses were held, each with 25 to 30 participants. The trainers for the first course came from three places: a medical school faculty, the MOH in Jakarta and a community health foundation. Several Acehnese health officials acted as co-trainers during the second course. The course participants were mostly physicians and included the 10 district health officers, health centre doctors and a few provincial health department staff. The course emphasized community epidemiology rather than clinical epidemiology and a key feature of both courses was a field survey which the

participants themselves planned and implemented and the results of which they interpreted. As a follow-up to the course each participant wrote a 'miniproposal' in which he or she identified a priority health problem in his or her district or sub-district. The miniproposals also included a brief statement of what data or information were needed in order to design a feasible solution. The 10 best miniproposals from the first course were each awarded a small grant (\$250) so that they could be implemented. Most involved either practical methods of increasing immunization coverage or developing more effective use of oral rehydration in the community. A major objective of both courses was to enable the participants to gain the necessary skills and self-confidence to plan and carry out small surveys which could provide them with basic information needed for more effective management and problem-solving.

What were the major lessons learned from this experience in Aceh?

- The first course should include senior health officials (such as district health officers) as participants. This helps to legitimize community epidemiology and provides a core group of influential health leaders and decision-makers with basic skills.
- A field survey (especially a household survey) conducted by the participants themselves is an essential component of a short course. Several of the district health officers had not been in an average villager's home for many years and were shocked at the level of poverty they found.
- The most useful aspect of the course took place after the course itself. The miniproposals and miniprojects that followed were of greater value in transmitting the skills of community epidemiology than the 10-day intensive course. One failure of the course was that inadequate supervision and support was given to the 10 individuals who implemented miniprojects. The course planners had failed to consider the importance of supervision and support for 10 busy field officers trying to do a miniproject on top of all their other responsibilities.
- Although the first course involved only trainers from outside Aceh, the second course had Acehnese co-trainers who would

eventually be able to manage epidemiology training in Aceh without outside help. Any reduction in the quality of training due to inexperience is counterbalanced in the long-run by having a permanent local epidemiology training team.

One controversial question was not settled by either course: Is it better for the participants to design and carry out their surveys completely on their own or should trainers intervene when they see the questionnaires or survey instruments becoming too long and complex or impossible to analyse with any validity? One view was that a survey which did not answer the questions it was posing might demoralize participants and discourage them from undertaking small 'quick and dirty' surveys. The danger then would be that they would not try to do a survey themselves once they returned to their jobs. The other view, which prevailed, was to allow participants to make mistakes in the household survey. It was felt that this was a better learning experience and all the problems and mistakes could then be discussed in class the next day.

Surveys

Field surveys conducted by public health officials frequently fail for one of two major reasons:

- The survey results are never analysed.
- The survey results are analysed, but no new or revised health intervention (based on the results) is implemented.

Surveys conducted by public health officials usually differ somewhat from those conducted by academic institutions in that they are concerned primarily with increasing the efficiency or effectiveness of a particular health intervention rather than with answering a research question, getting a paper published or providing research experience for students. Thus a survey performed by public health officers can be said to fail if the survey results do not change the specific health intervention under question. During the early stages of the CHIPPS project in Aceh (1982/1983) most health officials at provincial, district and sub-district levels were very reluctant to conduct surveys unless they were part of a national survey with a clearly defined survey protocol. Also, many health officers avoided doing surveys because they felt

they were too difficult, expensive and time-consuming to be done on a provincial or sub-provincial level.

Neonatal tetanus mortality survey

The first survey in Aceh which really changed the thinking and outlook of provincial and district health officers concerned mortality from neonatal tetanus. Of all the major causes of death, neonatal tetanus is one of the least visible. Before the CHIPPS project began in Aceh, most health centre or hospital physicians saw cases of neonatal tetanus only rarely and therefore did not consider it a major health problem (Yusuf et al, unpublished observations). The first Aceh epidemiology course (December 1983) was significant in that the results of the simple household health survey (conducted by the participants themselves, including all 10 district health officers) found that neonatal tetanus was the main cause of infant death in the survey population.³ This was astonishing to many of them. When they asked the villagers why they had not brought their sick babies to a health centre or hospital they were told that tetanus was a direct punishment from God and treatment would not help.

In May 1984 a province-wide neonatal tetanus mortality survey was conducted in Aceh. With assistance from the Directorate General of Communicable Disease Control in Jakarta a 30-cluster sample was chosen using a standard WHO methodology. Household interviews were conducted by 60 health centre midwives, all from Aceh. Provincial and district health officers actively participated as supervisors. The survey was extremely significant from the point of view of community epidemiology in Aceh because of the sense of confidence and achievement that developed in those who participated. Furthermore, the fact that the survey found very high neonatal tetanus mortality rates in some districts and very low rates in others clearly demonstrated its value in planning and implementing a neonatal tetanus control strategy.³

Conducting the survey also helped Acehnese health officials to understand more clearly the epidemiological approach to problem-solving. The survey allowed them to define a problem and determine its magnitude as well as develop a post-survey strategy for solving the problem.

Some of the key aspects of the survey are summarized below.

Objectives

- To determine if neonatal tetanus was a major cause of infant death in Aceh.
- To find out *where* the high incidence areas were (i.e. which districts).
- To help in deciding what control strategy would be most effective in reducing neonatal tetanus mortality.

Method

- 30-cluster survey.
- Each cluster consisted of a sample of 153 infants born during the previous 13 months.
- Two interviewers (midwives) per cluster.
- All infant deaths were investigated in detail and followed up by physician supervisors.

Criteria for neonatal tetanus deaths

- Full-term pregnancy with normal size infant at birth.
- Infant sucked and breast-fed normally at birth.
- First sign of a problem was the infant refusing to breast feed.
- Symptoms were rigidity, spasm and trismus.
- There were no other significant signs or symptoms (such as high fever, diarrhoea or cough).
- Death occurred between the third and twenty-eighth day after birth.
- Infant deaths thought to be caused by neonatal tetanus were checked in the home by a physician supervisor.

Aggregated results

• Households visited:	20 880
• Infants born in previous 13 months:	4836
• Deaths from neonatal tetanus:	101
• Neonatal tetanus mortality rate:	20.9/1000
• Neonatal tetanus deaths per year in Aceh:	2200
• Neonatal tetanus deaths per day in Aceh:	6
• Infant mortality rate: (IMR was 91/1000 according to 1980 census)	110/1000
• Crude birth rate:	45/1000

Health officials in Aceh were not particularly affected emotionally by the province-wide neonatal tetanus mortality rate of 20.9/1000 live births. What really struck them, and what was often talked about, was the fact that six Acehnese babies died *every day* from neonatal tetanus. This was something that could be clearly visualized. It was this that moved health officers to take action.

The IMR found in the survey was 110/1000. The IMR was highly significant to provincial health officials since they knew they were going to be judged in the fourth 5-year plan by the impact they had made on the IMR. The Ministry of Health used the IMR figure of 91/1000 for Aceh, based upon indirect estimates from 1980 census data on age distribution of the population. A baseline IMR of 110/1000 rather than 91/1000 meant that it would be easier to demonstrate a significant reduction of the IMR by the end of the fourth plan. On the other hand, the finding of a crude birth rate of 45/1000 was somewhat embarrassing to family planning officials who were claiming continuing contraceptive acceptor rates of 40 per cent for the province. These sorts of political implications helped keep the survey on the 'front burner'.

The most important results of the neonatal tetanus mortality survey can be seen in Tables 1 to 3. These results can be summarized as follows:

- The district with the highest neonatal tetanus mortality rate (Aceh Selatan 35.8/1000 live births) had a rate over 20 times higher than the district with the lowest rate (Aceh Besar 1.6/1000). This raised the question of why there was such a large difference (a question which was unanswered by the survey). Secondly, it pinpointed those districts which should initially be involved in a mass campaign to reduce neonatal tetanus mortality in Aceh.
- Table 2 reveals that babies delivered by trained dukun (traditional birth attendants) had nearly the same neonatal tetanus mortality rate as babies delivered by untrained dukun. This raised the issue of the effectiveness of dukun training, since a major objective of that training had been to convince dukun to use hygienic methods of cord care after delivery.

- If Table 2 was bad news for those responsible for training dukun, Table 3 was equally bad news for those responsible for immunization. Pregnant women going twice or more often for prenatal care to a health centre should have received two injections of tetanus toxoid. The data show, however, that the babies of these women were nearly as likely to die of tetanus as those of women who never received any prenatal care.

As a result of this survey a plan was developed to begin a mass campaign to give two injections of tetanus toxoid (one month apart) to every woman of reproductive age in the high-mortality districts. This campaign was to be followed by passing a law requiring proof of tetanus immunization before issuing marriage licenses. If properly enforced, such a law would mean that future mass campaigns for preventing neonatal tetanus should not be necessary.

Table 1. Neonatal tetanus mortality by district

Kabupaten (district)	Number of clusters	Number of live births	Neonatal tetanus deaths	Neonatal tetanus mortality per 1000
A. Selatan	3	475	17	35.8
A. Pidie	4	655	21	32.1
A. Utara	7	1 148	34	29.6
A. Tengah	1	159	4	25.2
A. Tenggara	2	333	6	18.0
A. Barat	4	631	11	17.4
A. Timur	5	799	7	8.8
A. Besar	4	636	1	1.6
Total	30	4 836	101	20.9

Table 2. Neonatal tetanus mortality by source of birth assistance

Birth assistant	Number of births	Neonatal tetanus deaths	Neonatal tetanus mortality per 1000
Midwife	891	5	6
Assistant midwife	23	0	0
Trained dukun	2 213	60	27
Untrained dukun	581	17	29
Doctor	40	0	0
Family member or other	1 088	19	17
Total	4 836	101	21

Table 3. Neonatal tetanus mortality by number of prenatal visits

Number of prenatal visits	Number of women	Neonatal tetanus deaths	Neonatal tetanus mortality per 1000
0	1 910	44	21
1	502	12	24
2 or more	2 427	45	19
Total	4 839	101	21

Tuberculosis prevalence survey

A second example of a field survey which helped to reinforce the concepts of community epidemiology in Aceh was the tuberculosis prevalence survey, begun in 1983. As in the case of the neonatal tetanus mortality survey, the tuberculosis prevalence survey helped to increase the self-confidence of provincial health officials, especially in their ability to plan and manage health programmes on the basis of local data rather than national norms.

The Indonesian national estimate for TB prevalence (sputum positive) was 3 to 6 per 1000 population at the time the Aceh survey began. Out of approximately 5500 villages in Aceh, 100 were chosen at random and all adults (15 years of age or older) living in these 100 villages had their sputum stained and examined with a fluorescent microscope to detect active TB.

The objectives of the survey were to determine in which districts the TB prevalence rates were highest, to learn which age and sex groups were at the highest risk in order to set priorities for active case-finding, and to understand better the dynamics of TB transmission.

Again, as in the neonatal tetanus survey, very significant differences in prevalence were found between districts. Table 4 shows this range of TB prevalence rates (from 2.3 per cent in Aceh Tenggara to 0.3 per cent in Aceh Besar and Aceh Timur). Although the reasons for the differences are uncertain, the policy implications are clear. Aceh Tenggara and Pidie where the rates are highest are logical places to begin intense efforts at active case-finding and case-holding.

The potential role of community epidemiology in making health policy decisions is illustrated by Table 5. Because health centres in Aceh have typically found a male:female sex ratio among diagnosed TB patients of 5:1 it was widely assumed that TB was primarily a problem of adult males. Table 5 shows that the adult male:female ratio for TB prevalence is only 1.4:1. This means that males have been going to the health centres for diagnosis and treatment while females have not. The TB programme therefore needs actively to seek out female suspect cases not diagnosed by a passive case-finding approach.

Table 4. Tuberculosis prevalence survey in Aceh (adults > 15 years)

Kabupaten (district)	Adults > 15 years examined	Number with sputum positive	Percentage with sputum positive
A. Pidie	2 605	55	2.1%
A. Tenggara	1 302	30	2.3%
A. Utara	4 386	37	0.8%
A. Tengah	1 142	4	0.4%
A. Besar	1 118	3	0.3%
A. Barat	998	4	0.4%
A. Timur	1 416	4	0.3%
Total	12 967	137	1.1%

Table 5. Tuberculosis prevalence according to age and sex (age > 15 years)

Age	Sputum positive males	Sputum positive females	Sputum positive total
15-19	0.4%	0.4%	0.4%
20-29	0.8%	0.8%	0.8%
30-39	1.2%	0.8%	1.0%
40-49	1.8%	1.0%	1.4%
50-59	1.5%	1.9%	1.7%
60+	2.2%	1.0%	1.7%
	n = 6 093	n = 6 874	n = 12 967
Total	1.25%	0.89%	1.06%

The second main result shown in Table 5 is that TB prevalence consistently increases with age. This is also important for active case-finding since villagers trained to look for suspect cases must understand who is at highest risk so that they can identify the largest possible number of active cases. If these individuals are then treated and convert to sputum negative, the transmission and prevalence rates of TB will be reduced.

Population-based information system

A third example of an epidemiological approach being used in Aceh was that of the development of a simple, population-based information system to provide a continuing source of data on births, deaths and cause of death.

The routine system for collecting vital statistics in Indonesia is managed by the Interior Ministry. All village chiefs are supposed to report births and deaths monthly. Typical crude birth rates obtained from this system range from 10 to 15 per 1000 while crude death rates average 2 to 3 per 1000. There is no on-going system for providing population-based cause of death information.

Since most births and deaths occur at home and are unreported, Indonesia has relied on periodic household surveys (as well as the census) to obtain more reliable data. Information on cause of death has come primarily from two household surveys (1972 and 1980) which retrospectively asked about deaths occurring in the past year and attempted verbal autopsies.

The idea of a population-based information system initially met with confusion as well as resistance. Provincial health officials could see the point of a special survey, but a *routine system* going on year after year, added to all the other 'routine' systems and programmes they had to administer (by order of Jakarta), seemed unnecessary. They were unmoved by the argument that vital data, especially cause of death data that came from a defined population and not from hospital records, was essential for establishing rational health priorities and deciding how to target limited health resources. Government health officials had been deciding priorities for years without such a system, so why did they need one now?

Despite a lack of enthusiasm it was decided to try out the system on a small scale and see if it proved useful to province, district and sub-district level health officials. Three districts were chosen, and in each of them three sub-districts were selected (making nine sub-districts in all). Each village chief completed a simple village census in July 1984 and the system became operational in August 1984. The basic idea (borrowed from Dr Ratna Budiarto of Indonesia's National Institute of Health Research and Development) was for the village *dukun bayi* (TBA) to report to the health centre births occurring in the village and for the village chief to report every death. The health centre midwife would then visit the home where the birth occurred and the doctor would visit the household with a recent death and try to determine cause of death. The *dukun* and village chief would be paid a small amount for each report (if verified by health centre staff) and the midwife and doctor were paid for each home visit. It was hoped that these incentives would improve the reporting and investigation of vital events.

Results

Data from the first six months (August 1984–January 1985) are summarized below.

- Total population covered: 51 933
- Reported live births: 616
- Crude birth rate: 27.3/1000
- Deaths reported: 175
- Crude death rate: 8.5/1000
- % deaths in children < 5 years old: 43%
- % deaths in infants < 1 year old: 33%

Table 6. Major causes of death in sub-districts (August 1984–January 1985) as determined by verbal autopsy

Causes of death	< 1 Year	Total deaths
Diarrhoea	8	19
Hypertension	0	17
Pneumonia	11	15
Tetanus	12	14
Tuberculosis	0	13
Diseases associated with old age	0	12
Accidents	2	9
Septicaemia	2	7
Liver disease	0	7
Measles	2	7
Other causes	21	55
Total	58	175

Crude birth and death rates are lower than expected, suggesting that there is still under-reporting despite payments. It remains to be seen whether this system will prove to be valuable for decision-making. At present there is no indication that local health officials are paying much attention to the data coming in except for the crude birth rate which is of relevance to the family planning programme.

Implementing this information system in Aceh has taught several valuable lessons:

- Health officers prefer to conduct special surveys that are completed quickly rather than establish information systems which they perceive as a permanent burden for which they are responsible.
- An information system that pays for each report or investigation of a vital event can become an administrative nightmare unless carefully planned.
- Under-reporting of vital events can still be a problem even when a payment is made for each report. Under-reporting, however, would seem to be less than in voluntary, unpaid reporting systems.
- Understanding how to use data from a population-based information system takes time since for most health officials it will be a new experience.

Implications of the Aceh experience for training in community epidemiology

The CHIPPS experiment in Aceh has provided an opportunity to examine what special skills are needed by public health decision-makers to enable them to plan, implement and evaluate health programmes more effectively. Most public health decision-makers in developing countries are physicians and many have had advanced training (such as an MPH) which has taught some of the essential skills needed in practising community epidemiology. If province, district and sub-district level health officers were all trained in basic epidemiological skills they would gain a great deal of confidence and would be able to manage their health programmes more effectively and efficiently. They would concentrate on programme impact and reduction of IMR rather than on budgets and routine reports. They would be practising community epidemiology.

One of the rewarding aspects of the CHIPPS project in Aceh has been the interest and enthusiasm of health officials for the power of epidemiology. Most had already made the leap from clinician focusing on individuals to public health officer focusing on the community. Now they were making a second leap: from community physician to community epidemiologist.

The CHIPPS project in Aceh has applied the epidemiological approach to problem-solving to a number of other problems besides neonatal tetanus, tuberculosis and vital events reporting. These have included diarrhoeal disease (how to increase the effective use of oral rehydration in the home), rabies, protein-energy malnutrition, the irrational use of drugs and how to develop community-oriented field training for medical and nursing students. Health staff have learned that the same problem-solving approach can be useful, regardless of the nature of the health problem being discussed.

What are some of the implications for training in community epidemiology?

- Most practising health officers (at province, district and sub-district level) are keenly interested in learning the skills of community epidemiology in order to increase their effectiveness.
- Intensive, applied, in-service training courses for health officials are invaluable but must include a substantial field component and be followed up by small projects that can be implemented after the course, while working at their regular jobs.
- Where medical schools or schools of public health are located near government health departments, students can be assigned to work with health officers. It may be of value for the students to be assigned miniprojects that can be of practical benefit to the health department unit to which they are assigned.

Although the CHIPPS project has helped to establish epidemiology as a basic tool for health managers in Aceh, it should be understood that this result has not come about without difficulties and considerable effort. For example:

- Intensive efforts were required by USAID staff in Jakarta to identify outer island provinces that were interested in the CHIPPS

approach. Not every province was willing to take risks and accept a donor that was not providing buildings, drugs or equipment.

- Once CHIPPS got under way in Aceh, West Sumatra and NTT province, it took a long time before health officials understood that CHIPPS did not represent a donor resource which could be used for any priority health programme of their own choosing. CHIPPS resources were to be used to support an *epidemiological approach* to planning and problem-solving and their use had to be justified in these terms.
- CHIPPS input in Aceh fell into 3 categories.
 - 1 *Technical assistance*. Indonesian and foreign short-term consultants and one long-term consultant.
 - 2 *Training*. Health staff were provided short-term training both in Indonesia and abroad. There are also plans for sending several candidates for long-term training abroad. In addition CHIPPS funds have been used for training additional classes of nursing students in Aceh and for supporting expanded field training for nursing and medical students.
 - 3 *Field studies and trials*. CHIPPS has provided grant and loan funds to implement surveys, field trials and innovative small-scale local projects.
- Considerable efforts have also been made by Ministry of Health staff in Jakarta who have been very supportive of CHIPPS.

Conclusion

The CHIPPS project in Aceh has tried to demonstrate the feasibility of decentralizing health management in Indonesia by supporting an epidemiological approach to health planning and problem-solving at the provincial level and below. Epidemiology has proved to be useful, not so much as a technical tool, but as a means of generating self-confidence and a sense of control on the part of local health officials.

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