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By the People and for the People: Can Government Support Community-Based Health Programs in Indonesia?*

THE 1970s saw the widespread adoption of ambitious targets for upliftment of the poor majority in developing countries, under such slogans as basic needs and primary health care. The 1980s, in contrast, have often been characterized by fiscal stress and a sense of withdrawal from goals which exceeded the capacities of public systems (Akin, Birdsall, and de Ferranti 1987): primary health care became 'selective' (Walsh and Warren 1979) as the call for 'health for all' was judged by many to be unrealistic.

In many countries, the vanguard of primary health care was community-based programs, often using village or community health workers (Herman *et al.* 1987). Indonesia has developed such programs since the early 1970s. They have expanded rapidly in recent years, despite large cuts in public health spending. The goal is nothing less than universal coverage with a community-based package of basic health care, linking villagers with the formal clinic-based health system.

While villagers contribute much in the way of time and in-kind resources to these programs, active support and real inputs from government are essential to their initiation and continuing operations. A variety of departments and programs such as health, family planning, youth and women's affairs, and home affairs, among others, play significant roles in the organization and support of community activities. The health department bears the main government responsibility for coordinating activities.

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Can government systems maintain their support for these services in a time of shrinking budgets? This paper estimates the resource requirements for initiating and maintaining community-based programs that are achieving full coverage in one province of Indonesia. Resource needs are compared with what is available in the public system and implications for the future of such programs are assessed.

Community-based Health Programs in Indonesia and West Sumatra Province

For almost two decades, the public health services in Indonesia have supported development of such community-based health programs as a key strategy for improving the effectiveness, equity, and efficiency of primary health care (Rohde and Hendrata 1983). These efforts, using volunteer community health workers ('kaders') are said to be health development 'from the people, by the people, and for the people'. Many of these activities have now been joined under the rubric of the 'integrated service post' or Pos Yandu. The Pos Yandu is expected to provide a focal point, run by and belonging to the community, for a number of basic health, nutrition, and family planning activities supported by public services. These include growth monitoring, health and nutrition education, ante-natal care, immunization family planning, diarrheal disease control, simple curative care, and demonstration feeding,

In the last few years and despite budget cuts, development of Pos Yandu has accelerated. West S umatra province is one area experiencing rapid expansion in establishing Pos Yandu, with complete coverage of all villages expected during 1988.

Prior to the formal introduction of the Pos Yandu concept in the mid-1980's, village-based primary health care activities had been implemented for a number of years in West Sumatra through such programs as the 'Family Nutrition Improvement Program' (UPGK), the Community Health Development Program (PKMD), the Integrated Family Planning Nutrition Project (KB-Gizi) and others. These programs were all based on a similar model centering on a village child weighing and service post managed by volunteer community-based health workers (kader). Approximately 10-20 families are served by each kader—a village is likely to have a number of kaders. This post served as the forerunner of today's Pos Yandu, of which there may be several in a village.

Kaders receive one-week of formal training from the government health services. Their monthly activities in the Pos Yandu include weighing of infants and children under five years of age using a mother-retained growth chart, health and nutrition education for mothers, and distribution of oral rehydration solution (ORS) packets and Vitamin A supplements. Each monthly Pos Yandu session should be attended by at least one health center paramedical worker. Prenatal examinations are provided for pregnant women by this trained health center worker, including distribution of iron-folate tablets and appropriate health education. For post-partum women and members of eligible couples, distribution of contraceptives (including oral contraceptives, condoms, and injectables) is available, as well as nutrition, health and family planning education. Health center staff also provide children

1. West Sumatra province is located on the west coast of Sumatra in Indonesia. Its population was 3,736,000 in 1985.'ilic province contains 8 rural regencies and 100 sub-districts, with average populations of 380,000 and 37,0(X) respectively.

and pregnant women with appropriate immunizations at the Pos Yandu, including BCG, DPT (3 doses), Polio (3 doses), measles, and TFT. Occasionally, simple curative care is also available using health center supplies and demonstration feeding may be provided in some areas.

By 1985, 877 Pos Yandu of one form or another were in operation in West Sumatra. The total number of Pos Yandu increased to 1739 in 1986 and an estimated 3055 Pos Yandu in over two thousand villages were in operation by the end of fiscal year 1986/87.

Financial resources at the province, regency, and subdistrict level are provided for program planning, monitoring and supervision activities. In addition, a basic package of resources at the village level is made available for each Pos Yandu. This includes funds for 'village preparation', such as village meetings, a community self-survey, and kader training. It also includes physical inputs: for example, weighing scales, educational materials, recording and reporting forms, growth charts, cooking demonstration sets, and 'nutritional first aids' such as Vitamin A, ORS, and ferrous sulfate tablets. These inputs were provided in quantities sufficient to establish two Pos Yandu in each village.

The initial Pos Yandu were often established in villages nearer or more easily accessible to the health centers. As Pos Yandu converage expanded, additional posts established in villages tended to be less accessible to the health center. Thus each year the establishment of new Pos Yandu presented an increasing burden to health center staff disproportionate to the actual increase in total numbers, particularly in terms of time and transportation resources required.

In 1987, national priority was placed on Pos Yandu implementation with West Sumatra targeted to achieve full coverage with a total of 7058 Pos Yandu. Physical resources to achieve this target were to be provided (with the exception of cooking sets for supplementary feeding), but staff levels and supervision funds remained essentially the same as in previous years. In response to this challenge, the provincial Department of Health developed an implementation plan to meet their target, based in part on the utilization of an additional 300 unemployed volunteer public health nurses who were to be placed in peripheral health subcentres or directly in inaccessible villages. Their primary function was to assist in the development and supervision of Pos Yandu in villages which were difficult for health-center-based staff to cover. The activities of these nurses were to begin in September and October 1987 with the arrival of program supplies from Jakarta, well after the data for this study was to have been collected. However, due to delays in the implementation of this study, these nurses were already in the field. New Pos Yandu established through their efforts were not included in the sample, although older Pos Yandu which they were supervising were.

A second event affecting the development of Pos Yandu in West Sumatra was the annual military-sponsored village development field activities (Manunggal Sakato), taking place in August through early October 1987. Local government placed priority for these efforts on family planning and immunization coverage. These activities included mass immunization and family planning campaigns, as well as efforts to motivate community to

establish new Pos Yandu, despite the fact that funds for the process of village preparation and supplies had not yet arrived. Once again, although new Pos Yandu established as part of these activities were not included in this study, the high level of health center staff field activities as.part of these campaigns no doubt biases upward the inputs of the health system to the routine operations of Pos Yandu.

Study Objectives

The questions addressed by this study are: (a) what are the health services resources in financial and real terms needed to support the initiation and routine operations of Pos Yandu in rural West Sumatra; (b) how large are these requirements relative to the resources available for Pos Yandu programs and the existing manpower in rural health facilities; and (c) are there likely to be important constraints to the achievement of complete coverage and higher efficiency with Pos Yandu in the province, given the available resources, and can such constraints be addressed now through better planning and budgeting?

The focus of the study was on the Department of Health, even though other government departments play an important role in supporting the program. Thus, the study does not estimate the total resources needed for Pos Yandu—omitted are inputs from other departments and valuation of unpaid community inputs. The objective was to assess the capacity of the health department, the main supporter of Fos Yandu outside the community, to support the goal of universal coverage. We also sought to identify important issues in planning and management of large scale community-based programs that might interfere with successful expansion of Pos Yandu activities. Specifically, the study:

(1) estimates the health sector resources required, in terms of both financial and real inputs, to start-up a Pos Yandu and to support the operations of existing Pos Yandu under current field conditions in West Sumatra;
(2) projects the demands on health center staff time of different patterns of Pos Yandu development and expansion, and compares these demands with current levels of staffing and staff availability;
(3) estimates the current level of service outputs at Pos Yandu in West Sumatra and hence, unit costs, in order to identify approaches to improving the efficiency of Pos Yandu services;
(4) proposes strategies for strengthening the province's use of available resources to improve Pos Yandu planning and implementation.

Study Design and Data Collection

Pos Yandu Resources

This study focused only on resources provided by the Ministry of Health. There is no effort to evaluate the contributions of other government departments, even though these are probably significant. Nor did we measure the time and resources donated by communities to the Pos Yandu program, although these are likely to he considerable and have been

estimated in other areas to be equal in value to government inputs. The requirements of Pos Yandu programs were divided into two categories: development of new Pos Yandu and support and operations of existing Pos Yandu. The first category represents investment costs, the second category recurrent or operating costs.

Investment costs included preparation at province, regency, and sub-district levels: village preparation activities such as kader recruitment, community self-survey, and village meetings; and initial kader training and supply. These are considered one-time expenses for each Pos Yandu. Operating costs included routine meetings to support Pos Yandu activities at province, regency, and sub-district levels; health worker lime for reporting and recording activities; costs of refresher training for leaders; and time, travel, and supplies costs for visits to Pos Yandu for service delivery and supervision. These costs are incurred each month for ongoing Pos Yandu.

In presenting the data two different breakdowns are used for both investment and recurrent costs. First, the financial value of inputs is given by the line item categories: cash grant, salary and honoiana, transport and travel, and supplies and equipment. These are cross-tabulated by the main acavities for which the resources were used. The second breakdown provides a few measures of the real inputs these resources purchased, again cross-tabulated by activities. These inputs include cash, health service personnel working hours; trips by staff from health facilities to villages and back; and actual supplies and equipment provided or used.

In addition to these accounts of average resource requirements per Pos Yandu, projections are given of the annual cost of Pos Yandu activities in a hypothetical or typical sub-district with different combinations of new and ongoing Pos Yandu. Investment costs are assumed to occur all at the initiation of a new Pos Yandu, followed by recurrent cost for each month of operation. This type of analysis allows one to determine whether the resources available for rural health services are sufficient to support Pos Yandu, including assessment of specific types of resources such as health manpower and travel and transport funds.

Another part of our analysis presents the total monthly cost of a Pos Yandu for comparison with outputs to estimate unit costs. In these calculations, investment costs are assumed to be amortized over 36 months, i.e. for each month of operations (and operating cost), 1/36 of the investment cost is added to estimate the monthly total cost of a Pos Yandu.

Description of Data Collection

To estimate costs and resources, detailed studies were done of a sample of Pos Yandu in West Sumatra province. The sample design was intended to permit estimation of the start-up or investment costs and resources for a typical new Pos Yandu, as well as the routine operational cost of both newer and older, functioning Pos Yandu. A major factor likely to affect costs was the accessibility of the Pos Yandu to the health center. Recently established Pos Yandu might be affected by the accelerated implementation of the program and more intensive activity in the first few months of operation.

2. See Frankenberg, E., 1987, Direct Costs of Pos Yandu: A Model for Analysis (Mimeo.), U. S. Agency for International Development, Jakarta, for a discussion of the value of community inputs to the program. In West Java, Frankenberg estimated that the value of volunteer's time contributed by the community equalled approximately 50 percent of the total cost of Pos Yandu operations. In other words, the unpaid community contribution approximately doubled the estimated cost of Pos Yandu if only government inputs were considered.

The sample included six rural sub-districts with four Pos Yandu selected in each sub-district. The four Pos Yandu represented the four cells in a two-by-two matrix: new and easy to reach from the health center, new and difficult to reach, older and easy to reach, and older and difficult to reach. The twenty-four Pos Yandu in the sample would include sufficient variation to estimate an average for the study area. In addition, this design allows subsidiary analysis by ease of access to the health center.

The six health centers were chosen from two regencies, Pesisir Selatan and Lima Puluh Kota. These regencies were selected to represent West Sumatra's mountainous inland and coastal areas. They have relatively high levels of village coverage with Pos Yandu services (greater than 50%), and good program recording and reporting, allowing adequate data collection. These regencies have also benefitted from technical and material inputs provided through the CHIPPS project, some of which have certainly influenced positively the management of Pos Yandu operations. Three health centers from each regency were chosen purposively by province health staff so as to exclude those where nursing and medical school field activities had been active in Pos Yandu development. These were health centers with 'average' program implementation and adequate recording and reporting.

The individual Pos Yandu forming the sample were selected by the research team in the field at the time of the initial visit to each health center. All Pos Yandu in the health center catchment area were listed by date of first implementation and each was classified by the Health center staff as being either accessible or difficult to reach. This classification was subjective in nature but accounted for a variety of variables including distance, available transportation, road conditions, and travel time. New Pos Yandu were defined as those established between January and March 1987 (FY 1986/87). More recently established Pos Yandu were not included so as to avoid selecting those starting without the normal preparation process or inputs during the previously mentioned Manunggal Sakato activities. Established Pos Yandu were defined as those commencing in fiscal year 1985/86 or before. One established and one new Pos Yandu were selected at random from both the more accessible and the less accessible lists of Pos Yandu. Pos Yandu which were inaccessible at the time of the study were excluded from the sample.

This sampling method allowed us to avoid unusual costs associated with new Pos Yandu started during the intensive activities which began in March, 1987 and unusual costs associated with the first several months of activity after any Pos Yandu is just established. Older Pos Yandu were operating long enough to be considered 'routine'. However, almost all Pos Yandu in the sample experienced some increase in health center activity during the last several months of routine operations, because of the accelerated targets. This means that routine operating costs may be overestimated — if we err it is on the side of higher costs than might occur in more normal times.

Data collection was conducted in October, 1987 by a research team consisting of ten individuals, including province Department of Health staff from all of the programs involved in Pos Yandu implementation, as well as consultants from the CHIPPS project. Data were obtained from interviews with Health Department staff involved in Pos Yandu implementation at the regency and health center levels, as well as through interviews with village leaders and community health workers (kader). Data were also collected from Pos Yandu, village and health center records and reporting forms and transferred to prepared data

collection forms. Data entry and analysis was done at the Faculty of Public Health, University of Indonesia (FKM-UI) in Jakarta.

Results

Investment and Operating Costs ofPos Yandu in West Sumatra

The data on investment and operating costs presented below are averages for one Pos Yandu, calculated from the sample of Pos Yandu studied. For investment costs, the average is taken only for the 12 'new' Pos Yandu, which combines those both easily accessible to the health center and those less accessible. For operating costs, the average is taken for all 24 Pos Yandu, since both the 'old' and 'new' Pos Yandu had been operating for at least six months. Operating cost data were collected from the previous *three* months of Pos Yandu operations, in order to correct for any unevenness in routine inputs. In other words, the monthly operating costs are the averaged operating costs from 72 'Pos Yandu months' of operation, taken from 24 different Pos Yandu. The use of averages means that some inputs will be calculated as fractions (.3 trips for example). While this is clearly not a real figure for a Pos Yandu, it represents the average resources put into these activities. Many communities did not receive the full complement of inputs intended for them by planners. The resulting averages, of material inputs in particular, are often below ideal or planned levels.

Table 1 shows the monetary (Rupiah 1650 = $1.00) value of inputs to develop a new Pos Yandu in West Sumatra in 1987. The total amount required is aboutRp. 154,000 per Pos Yandu. In terms of line items (rows), the initial supplies and equipment given to communities accounted for almost 40 percent of total cost. The category 'cash grant' accounted for 36 percent This category includes all funds made available for meetings (purchase of food, drinks, writing pads, etc.) and other cash resources provided through budgets for local activities. It does not include the travel and other allowances paid to health workers, however, or the cost of items provided in kind. Health worker time and allowances accounted for 21 percent of the total investment cost, with the direct costs of transport and travel accounting for less than 4 percent.

TABLE 1: AVERAGE INVESTMENT COST FOR 1 POS YANDU, WEST SUMATRA 1987 (r. = 12)

Type of Cost	*Preparation at Sub-district*	*Preparation at Village*	*Kader Training and start up Implementation*	*Total*	*(%)*
Cash Grant		22,058	34,149	56,207	(36)
Salary/ Allowance	6,655	13,774	11,919	32,348	(21)
Travel: out of pocket	563	2,150	2,109	4,822	(3)
Travel: official vehicles	25	407	378	810	(.5)
Supplies/Equipment			60,029	60,029	(39)
Total	7,243	38,389	108,584	154,216	
(%)	(5)	(25)	(70)		

When these inputs are broken down by activities (columns), by far the largest share goes to kader training and supplies, about 70 percent. An additional 25 percent goes to preparation activities in the village.

Some examples of actual physical inputs are given in Table 2. Development of a new Pos Yandu requires about 50 hours of health center staff time on average and just over 9 separate 'person-trips' from the health center to the village. A 'person- trip' is defined as one person making one visit to the village, although these visits are often made in groups. This table also provides a list of the the supplies and equipment received by the average Pos Yandu, which is somewhat less than the full package of materials they are expected to receive. Some specific items which were missing or in short supply should be of concern. For example, we found that Vitamin A capsules are not being provided in adequate quantity to all Pos Yandu. In addition, the manuals, posters, cookings sets, and training sets provided were often not complete in new Pos Yandu.

TABLE 2: AVERAGE OF CERTAIN MAT ER1AL INPUTS PROVIDED FOR INVESTMENT IN 1 POS YANDU, WEST SUMANTRA, 1987 *(n* = 2)

Type of Input	*Sub-district Preparation*	*Village Preparation*	*Kadar Training and Start up Implementation*	*Total*
Cash (Rupiah)		22,058.0	34,149.0	56,207.00
Staff Person-hours	11.70	20.9	16.9	49.50
Person-Visits	0.75	5.4	3.1	9.25
Supplies/Equipment		Vit.A	: 25 caps (17%)*	
		FeS	: 750 tabs (75%)	
		Oralit	: 14 packets (56%)	
		SKDN	: 0.6(30%)	
		KMS	: 48 (48%)	
		Sarung/Dacin	: 1 (100%)	
		Buku Register	: .75 (75%)	
		Poster Set	: .60 (60%)	
		Home Econ. Set	:.17	

Numbers in parentheses equal to the percentage of the officially programmed initial suupply reportedly provided to an average Pos Yandu.

We discussed this problem with the province staff, who reported that more than enough supplies for all the new Pos Yandu were received during this budget year. The lack of supplies at the community level may have several causes. The rapid expansion of Pos Yandu by the province beyond the planned targets may have resulted in not all supplies arriving in time for all the new Pos Yandu being created. In addition, as activities were accelerated some supplies for new Pos Yandu may have been diverted to resupply older Pos Yandu

3. It is important to clarify that Table 1 presents the average cost of supplies *actually received* by the sample Post Yandu at their initiation. The value of this average package was Rp. 17,465. In contrast, the value of the full package of supplies planned for new Pos Yandu is Rp. 38,450, more than double what is actually received. In terms of total investment costs, this would represent an increase of 14 percent, from Rp. 152,216 per Pos Yandu to Rp. 173,201. If these initial investment costs are pro-rated over three years as they are in Table 5, the difference is only Rp. 583 per month or 3 percent of the total monthly cost per Pos Yandu.

whose initial supplies were exhausted. Projections of supply needs are based mainly on new Pos Yandu. In practice, rural health staff meet community needs as best as they can.

Inputs required for the routine operations of an average Pos Yandu are presented in Tables 3 and 4. Table 3 provides the monetary value of inputs. On average, Pos Yandus require about Rp. 16,000 in health system expenditures per month or about Rp. 193,000 per year. Over 60 percent of this cost goes towards the time inputs of salaried health personnel, who are expected to attend most of the community sessions of the Pos Yandu as supervisors and service providers.

TABLE 3: AVERAGE MONTHLY OPERATING COST FOR 1 POS YANDU, WEST SUMATRA, 1987(n = 12)

(Indonesian Rupiah)

Type of Cost	*Indirect Cost Regen-cylProv.*	*Indirect Cost Sub-district*	*Retraining Kaders (Monthly Cost)*	*Village Service Delivery*	*Total*	*%*
Cash Gram		51	1,371		1,422	(9)
Salary/allowance	1,363	2,373	682	5,418	9,836	(61)
Travel: out of pocket		321	189	1,250	1,760	(11)
Travel: official vehicle	370	31	89	94	584	(4)
Suplies/Equipment				2,478	2,478	(15)
Total	1,733	2,776	2,331	9,240	16,080	
(%)	(11)	(17)	(15)	(57)	(100)	

TABLE 4: AVERAGE OF CERTAIN MATERIAL INPUTS UTILIZED IN OPERATING 1 POS YANDU EACH MONTH, WEST SUMATRA, 1987 *(n* = 12)

Type of Input	*Indirect Cost RegencylProv.*	*Indirect Cost Sub-district*	*Retraining Delivery*	*Village service Kaders*	*Total*
Cash (Rupiah)		51	1,371		1,422
Staff Person -hours	0.73	4.03	1.71	7.4	13.33
Person visits Supplies/equipment			0.30	2.2	2.50
			Vaccine (vials)		
			DPT = .78 BCG = .54		
			Polio = .78 Measles = .39 TFT = .35 Oralit =0.8 packages Antalgin = .83 tables Paracetamol = 1 .72 tables Tetracycline = .83 capsules Vita. A = 1.74 capsules FeS = 43. 9 tablets		

In fact, our data show that about 80 percent of community sessions were attended by at least one person from the health center—reflecting a very high degree of coordination

between community-based activities and health center staff. While this no doubt included the impact of accelerated activities, we also recorded data on village sessions conducted months before the recent intensification. The high rate of attendance by health center staff is impressive.

The use of supplies and equipment made up a relatively small proportion of operating costs. This reflects the low level of outputs recorded for services provided at Pos Yandu, which is discussed further below.

The columns in Table 3 present the cost breakdowns by activities, including the indirect costs (mainly meetings and reporting/recording activities) at the province, regency, and sub-district levels). About 57 percent of total operating cost is spent on direct service delivery activities in Pos Yandu communities. These expenditures are mainly for health service staff salaries and the supplies expended in providing services. Kader refresher training accounted for about 15 percent of the average operating cost. In our sample, kaders received some refresher training about once a year on average. However, this training was not always explicitly funded by the program. Sometimes funds for training a few Pos Yandu were used to provide refresher training to a larger number.

Table 4 presents measures of physical inputs for Pos Yandu operations. Health personnel devote, on average, about 13 hours of work time to each Pos Yandu each month and make between 2 and 3 person-visits to a Pos Yandu during that period. We have also listed the average supplies used by a Pos Yandu each month. Very little is being used, related to low output levels discussed further below.

Accounting for transport and travel expenses to support Pos Yandu activities proved to be difficult. The study identified three types of expenses: 'operational funds' given to health center staff; the actual operating expenses of health center vehicles; and out-of-pocket expenditures by the staff for official travel. The health staff perceive that they spend their own money for work-related travel to Pos Yandu. They reported own spending for transport and travel averaging a total of Rp. 4822 per new Pos Yandu and Rp. 1760 per month for operating Pos Yandu. Much of this was for the purchase of fuel for their personal vehicles, usually motorcycles. Sometimes, however, they also spent their own money on public transportation. Clearly maintaining the health center's inputs to Pos Yandu through personal expenditure by paramedical staff is not likely to encourage adequate participation.

As we investigated this matter further, it turned out to be more complicated. Health centers receive money to support operational expenses such as staff travel each year. In the six study health centers, this averaged approximately Rp. 1,370,000 per health center per year. This money is intended to support a number of different programs, including but not limited to Pos Yandu. The funds are usually distributed to the staff according to some locale-specific methods: e.g. equally to all staff, graded according to salary or rank, graded according to subjective assessments of productivity or effort in Pos Yandu work, etc. In few centers are actual expenses reimbursed. Proper administration of the funds is constrained by uncertainty about when they will be available and by accounting restrictions. In fact, it is quite difficult administratively to manage frequent disbursements of small amounts of money, especially if they are intended to be repayments for personal spending.

Although these funds are intended to support staff travel, health center staff usually did not perceive them as reimbursement for their expenses. There were several reasons for this.

First, in the past there have been a variety of honoraria given to health workers for specific programs, not tied to travel expenses. They perceive these funds as a continuation of that practice. Second, the funds are usually not distributed in a way directly related to actual spending on travel. Some staff have their own vehicles, some use public transport. The latter appears much more expensive as an out-of-pocket expense. Usually distribution of the funds does not reflect these differences.

What is important about this issue is that health staff perceive themselves spending their own funds for travel, whether we would determine that they were adequately reimbursed or not. This is likely to be a serious impediment to maintaining adequate supervision of Pos Yandu and attendance by health personnel at village weighings. In accounting for these costs, we have included operational 'allowances' with salary and allocated to Pos Yandu activities only that part of salary and allowances associated with actual time inputs to the program. We have counted the reported out-of-pocket and official vehicle costs separately, as shown in Tables 1 and 3. In a sense, this is double counting, although as we have explained there are different views on this issue.

Are there enough operational funds being given to health centers to support Pos Yandu activities? Based on the actual transport and travel costs measured in this study, we estimate that approximately Rp. 1.1 to 1.4 million is required annually for travel to support Pos Yandu in a typical sub-district. This can be compared with the Rp. 1.37 million they currently receive on average. However, this Rp. 1.37 million includes allowances for a variety of different programs, including family planning and the civil servant's health insurance scheme. These programs also require inputs from staff over and above their Pos Yandu obligations. We feel, therefore, that the operational funds are still inadequate, perhaps of the order of 25 percent (perhaps an average per health center of Rp. 1.8 million). Increased funds as well as improved methods of administering these funds are needed to maintain Pos Yandu operations.

Pos Yandu Costs and Outputs

Pos Yandus provide a variety of different services simultaneously, making it difficult to estimate the unit costs of any one service. Costs and outputs are compared in Table 5.

On the cost side, the average monthly cost per Pos Yandu is estimated by pro-rating the average investment cost to a monthly figure and combining it with the monthly operating cost. The investment cost is pro-rated over three years (36 months) giving a monthly figure of Rp. 4,284. This, added to Rp.16,080 (monthly operating cost), gives a total of Rp. 20,364 for the average Pos Yandu.

In terms of outputs, we averaged all the monthly output reported over the previous three months by the 24 sample Pos Yandu to estimate a monthly average mix of Pos Yandu services provided. On average in one month, each Pos Yandu weighs about 20 children undcr-five, provides 13 immunizations of various kinds, and distributes small amounts of Vitamin A capsules and iron sulfate tablets. Just under four pregnant women per Pos Yandu receive some kind of pre-natal consultation and several women also receive family planning advice and contraceptives. Unfortunately, our data on family planning were incomplete, due to the existence of separate Family Planning Posts (Pos KB) in the communities, which continue to provide contraceptives separately to acceptors. Most family planning services are provided through that channel, resulting in a probably small underestimation of output in our study.

TABLE; 5-. AVERAGE MONTHLY POS YANDU TOTAL COST AND OUTPUTS

	< 5's Weighed	*Vaccination*					*Vil. A Capsules distributed*	*Women receiving FeS*	*Pregnant Women at lending*	*Beneficiaries, total cost, and cost per benejiciary (Children <5 + Pregnant women)*	
		BCG,	*DPT*	TFT	*Polio*	*Measles*					
Output	19.9	1.7	4.4	1.5	4.3	1.0	1.8	1.4	3.7	Children < 5	19.9
										Pregnant women	3.7 / 23.6
Costs (Rp)	Monthly investment (total prorated over 36 months)			Operating costs (monthly)						Total average monthly cost	= 20,364
	4,2X4			16,080						Cost per beneficiary	= 863

Overall, Pos Yandu coverage of target groups in their community was reported to be low: about 20-30%. While this accounts for some of the low outputs, it is also true that each Pos Yandu serves a small population anyway. Small, decentralized, community-based service activities are likely to have low outputs on a routine monthly basis. The level of activity could be tripled at least (and unit cost reduced to a fraction of its present level) by raising coverage within communities to 80-100% of the target population.

Unit cost is estimated as the cost per 'beneficiary', defined to equal the average number of children under five and pregnant women (we could not rely on our estimates of family planning users) attending Pos Yandu services. Dividing the 24 'beneficiaries' by the total monthly cost gave an estimate of about Rp. 860 per beneficiary per month. This figure seems high, although one should recall that the 'beneficiary' may receive several different services, usually including contact with a trained salaried health worker. To compare with the costs of clinic-based services, a recent rural health service cost study (Bureau of Planning, Department of Health, 1987) est'mated the cost per outpatient curative care contact in West Sumatra to be Rp. 1,217. The cost per MCH contact was Rp.1,351 (this included village-based weighings, however) and cost per immunization was Rp.753. Pos Yandu costs still compare well with these figures, especially if both coverage and equity of basic services is also being improved.

A Model of the Financial and Manpower Demands of Pos Yandu Program Development in a Sub-district in West Sumatra

West Sumatra province is likely to attain the goal of universal coverage of communities with Pos Yandu. One important objective of our study was to help province planners and managers estimate the burden such a system would place on the resources available for primary health care programs. We developed a simple model of the annual financial and manpower requirements for various levels of Pos Yandu program coverage implemented in an 'average' West Sumatra sub-district.

In developing this model, we have, of course, extrapolated from the data in our sample. Our 'average' sub-district is simply an average of our six sample sub-districts.

Table 6 presents the parameters, cost, and manpower estimates in the model. In calculating the subdistrict-level costs for Pos Yandu, we omitted the province and regency indirect costs, which are supported by budgets at those levels.

The model estimates the investment and operating costs for coverage of 100 percent of rural hamlets with Pos Yandu looking at different patterns of Pos Yandu program development. The first row assumes that 25 percent of the target was met at the beginning of the year and that 75 percent of the target would be met with 'new' Pos Yandu created during the year. This mix of new and old Pos Yandu was then varied to be 50/50 and 75/25 in the next two calculations. The fourth scenario assumes that 100 percent of new Pos Yandu were established by the preceding year, with only routine visits and supervision required.

In these estimates, we also assume that new Pos Yandu would be created evenly over the course of the year, meaning that their operating (as opposed to investment costs) would be gradually increasing as more new Pos Yandu were created. On average, this means that each new Pos Yandu would incur 6 months of operating costs during a year. This is likely

TABLE: 6: A MODEL. OF THE ANNUAL RESOURCE REQUIREMENTS OF POS YANDU ACTIVITIES IN AN AVERAGE SUB-DISTRICT IN WEST SUMATRA

Parameters of Model : Average sub-district

Population : 28, 000
No. of Villages : 25
No. of Potential Pos Yandu : 50

Pos Yandu Cost:

Investment Rp 152,21 6;
Operating Rp 172,164 / vear

Pos Yandu manpower requirements

Investment .0275 FTSE:
Operating 0.84 FTSE / year

Coverage Objective	*Situation of start of period*		*Annual Program Cost* (Rp Million)			*A verage subdistrict health resources*	*(5)/(7)*	*(6)/(7)*	*Annual Staff Required in FTSE*	*Average Kec. staff*	*(10)/(ll)*	*(12) x 2*
	OldPY	*NewPY Planned*	*Invest**	*Operating*	*Total*							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
100%	12.5	37.5	5,708.9	5,380.1	11,088.2	39,710.5	14%	28%	3.66	14	26%	52%
100%	25	25	3,805.4	6,456.2	10,261.6	39,710.5	16%	26%	3.84	14	28%	54%
100%	37.5	12.5	1,902.7	7,532.2	9,434.9	39,710.5	19%	24%	4.02	14	29%	58%
100%	50	—	—	8,608.2	8,608.2	—	22%	22%	4.2	14	30%	60%

* If Pos Yandu all received their full complement of initial supplies (see footnote (3) for explanation), investment costs would be 14 percent higher. This would increase the first three entries in coloumn (9) above to 30 percent, and 24 percent respectively—a negligible effect. The row representing operating costs only would not be affected.

to overestimate operating costs as there is a distinct tendency to cluster activities in the last quarter of each fiscal year, as delayed funds become available from earlier quarters and budgets must be used or lost.

The table presents the estimated annual investment and operating cost incurred for each program alternative and compares these with the average level of government health care expenditures in sub-districts estimated from the rural health service cost study. Columns 8 and 9 give the percentages of total health care spending that would go for Pos Yandu. Column 9 uses total Pos Yandu cost (investment and operating) as the numerator, while column 8 uses only the operating cost.

The different alternatives don't lead to a wide range in estimated costs. For 100 percent coverage of communities with Pos Yandu, the financial requirements for program development range from 22 to 28 percent of total government health expenditures in the sub-district. Once all the Pos Yandu were developed, operating costs would account for about 22 percent of total expenditures. These figures do not appear excessively high or unattainable, especially give" the integrated nature of Pos Yandu activities. Fifty percent coverage, which has already been exceeded in West Sumatra, would give figures about one half of our estimates.

The burden of Pos Yandu on the total government health sector budget would of course be much smaller than the percentages just discussed. The rural health service cost study estimated that sub-district level health spending accounted for about 23 percent of total government health spending. As shown above, Pos Yandu may account for only 22-28 percent of that, or perhaps about 5 percent of total government spending. Using the parameters of the simple model in Table 6, annual per capita expenditure on full coverage with Pos Yandu would be approximately Rp. 307, also a small fraction (6.7%) of estimated government per *capita* health spending of Rp. 4,588 per year (Brotowasisto *et al.* 1987).

While the financial resources needed for Pos Yandu were one matter of concern for province planners, there is also interest in the manpower requirements of developing and maintaining Pos Yandu activities. Based on the average inputs of health staff work-hours for investment and operating activities of Pos Yandu, we estimated the number of full-time staff equivalents (FTSE) that would be needed to support Pos Yandu activities, based on the number of hours in a full official working month. We compared these estimates with the average of fourteen paramedical and professional staff in our sample sub-district. Attaining 100 percent coverage would require about 25-30 percent of total sub-district level staff time and maintaining those Pos Yandu after they were set up would need about the same level of time inputs. This appears feasible. However, if one assumes, as several studies have shown, that health personnel devote less than half their working time to active service delivery activities, this 30 percent may imply 50-60 percent or more in terms of actual total work time. This is shown in column 13. This higher level of time input may be beyond the capacity of most health centers and would no doubt interfère with the implementation of other health programs. An alternative argument sometimes mentioned is that Pos Yandu activities may increase the productivity of rural health staff by making them visit communities in addition to their clinic-based duties. We are not convinced of the merit of this view, but it is worth further investigation.

Thus, it appears that without substantial increases in overall health worker productivity, full implementation of Pos Yandu may force a trade-off for health personnel between clinic-based work and primary care work in the villages. The future maintenance of these programs will depend in large part on how they resolve this trade-off. Some of the pressure on staff time could be relieved by the use of field workers focusing on Pos Yandu, as has been the experience in West Sumatra with the use of the 'volunteer' public health nurses described above. These workers have been placed in sub-health-centers, which are closer to the Pos Yandu they serve, also increasing their efficiency.

During field work in West Sumatra, we were impressed with the level of organization of health center staff to support Pos Yandu activities. Many health centers involved almost all their medical and para-professional staff in Pos Yandu work. They often had fixed schedules to attend community activities. These schedules were posted and known to all. With this kind of organization at the health center, the task of supporting community-based programs is likely to be feasible and not place an impossible burden on other health center activities. Whether this level of organization and commitment can be maintained remains to be seen.

Conclusion

Community-based health programs have been developed in many countries in the decade since the Alma Ata declaration. They are the most visible embodiment of the primary health care approach. In recent years, however, doubts have been raised about the value of these programs. A review of six national community-based health worker programs, including the one in Indonesia, found that these efforts were meeting some of their objectives (equity, cost) but not others (quality of care, impact). One of the main causes of poor performance is the low level of support given to community-based programs by the formal public health system (Herman *et al.* 1987).

Indonesia's rapid expansion of Pos Yandu activities seems to invite further problems of this type. In West Sumatra, province officials were concerned about whether the financial, manpower, and material resources in the public health system were adequate to support universal community-based activities.

This study has shown that government financial resources are adequate to support universal community-based services as they are currently being implemented in Indonesia. The total cost requirements of these programs are only about a quarter of what is being spent now on rural primary care services in West Sumatra and a much smaller fraction of total government health spending. However, Indonesia's model for community-based health programs depends heavily on voluntary community contributions. Paying for these inputs might double the estimated costs.

Although finances are not a major constraint to full coverage with the existing model of Pos Yandu, other significant problems did emerge. Maintaining community activities with regular attendance from trained health center staff may require 50 percent or more of their active working time at current levels of staff productivity. This may interfere with other health programs, resulting in poorer performance in other services or ultimately less support for Pos Yandu, Either additional staff will be needed to maintain and enhance Pos Yandu

activities or staff productivity must be raised. Given the current low levels of staff effort, we support greater emphasis on increasing productivity.

Substantial resources have been made available to support staff travel and transport requirements for visiting Pos Yandu, although we suggest these may still need to be increased. More troubling, however, is the perception by health center staff that they are spending their own money for travel. Improving the way in which transport and travel funds are administered and satisfying the concerns of the paramedical staff may be at least as important as the actual level of funding available for transport and travel. This problem needs immediate attention in order to avoid a drop-off in staff support for Pos Yandu.

Assuring adequate quantities and timely arrival of supplies for large numbers of dispersed Pos Yandu has also proved difficult. New Pos Yandu need their initial supplies and equipment to begin operating, existing Pos Yandu will need resupply if they are functioning adequately. This problem has been exacerbated in West Sumatra by the rapid expansion of the program, but will still need to be dealt with in maintaining full coverage with Pos Yandu. There was evidence from the study that the existing supply system needs to be substantially improved.

Lack of health center support and lack of supplies are likely to discourage public use of services at the Pos Yandu, leading to low productivity, inefficiency, and high unit costs for the whole system. Low coverage with Pos Yandu services was evident in the study. The causes of low coverage were not assessed. However, continued low coverage calls into question how much public resources should be devoted to Pos Yandu versus other modes of health service delivery. More work is needed to understand the causes of low coverage and to identify program interventions to remedy this problem.

This study provides encouraging evidence that large-scale community-based health programs can be adequately supported by the public health system in rural Indonesia. However, the problems identified are significant constraints to successful maintenance of the program. Their solutions are not mainly to be found in increasing resources, but rather in better use of what is already there through improved management and simplification of administration. These constraints may be more difficult to overcome than simple lack of funds.

References

Akin, J., Birdsall, N. and D. de Ferranti, 1987, *Financing Health Services in Developing Countries: An Agenda for Reform,* a World Bank Policy Study, World Bank, Washington, D.C. Berman.P. A.,Gwatkin, D. R.,andS. E. Burger, 1987, Community-based health workers: Head start or false start

towards health for all?, *Social Science and Medicine* 25 (5), 443-459. Brotowasisto, Ridwan Malik, Paramita Sudharto, Priono Ashrai, and Oscar Gish, 1987, *Health Care Financing in*

Indonesia, Report prepared for the ADB Regional Seminar on Health Care Financing, Manila, July 27- August 4, 1987. Bureau of Planning, Department of Health, Republic of Indonesia; School of Public Health, University of Indonesia;

and Department of International Health, Johns Hopkins University, 1987, *Total, Per Capita, and Unit Costs of Public Health Services in Rural Indonesia: National and Province-wise Estimates,* Indonesia Rural Health Services Cost Study Report # 2, manuscript.

Rohde, J, and Hendrata, I., 1983, Development from Below: Transformation from Village-based Nutrition Projects to a National Family Nutrition Program in Indonesia. *In:* D. Morlcy, J. Rohde and G. Williams : *Practising Health for All,* Oxford Medical Publications, Oxford, U.K.

Walsh, J. and Warren, K., 1979, Selective primary health care: An interim strategy for disease control in developing countries, *New England Journal of Medicine* 301, 967-974.