

# MEASLES IMMUNIZATION ACCEPTANCE IN SOUTHEAST ASIA: PAST PATTERNS AND FUTURE CHALLENGES

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**Abstract.** Despite substantial increases in immunization rates, measles remains a major health problem in developing countries of Southeast Asia. The authors of this paper undertook separate investigations which examined factors influencing measles immunization acceptance in the rural Philippines, Central Java, Indonesia, and an impoverished neighborhood in Bangkok, Thailand. We briefly summarize the findings of our three field investigations before presenting a synthesizing analysis of the psychosocial and demographic factors which affect measles immunization. We then review trends influencing measles acceptance in industrialized countries to anticipate possible future challenges to measles immunization acceptance in Southeast Asia in an era of increasing globalization and information transfer. We suggest that parental perceptions of the risks and benefits of immunization, philosophical and religious convictions and state and social regulatory policies will profoundly influence measles immunization in the new millennium.

## INTRODUCTION

Measles is a preventable disease, yet it remains a major health problem in many developing countries, including those of Southeast Asia, where it is a leading cause of morbidity and mortality especially among children under five years of age (Pervikov, 2000; Shann, 1999; WHO, 1999a). In the late 1990s case fatality ratios in developing countries were up to 100-fold higher than in industrialized countries (Cutts and Steinglass, 1998). The inability of many developing countries to develop or sustain high levels of immunization may account for these rates, but even countries successful in increasing vaccine uptake still experience pockets of measles epidemics.

Measles (rubeola, morbilli) is an acute airborne viral disease most commonly trans-

mitted through direct contact with an infected person. The high rate of mortality associated with the measles virus is due to suppression of the immune functions creating a susceptibility to the establishment of opportunistic viral or bacterial infections (Schneider-Schaulies and ter Meulen, 1999). Otitis media and pneumonia are common complications, with pneumonia being the more common cause of death. Acute encephalitis is another serious and potentially fatal complication occurring in approximately 0.1% of measles cases. An estimated 15% of encephalitis patients will die and another 25% will incur brain damage. Subacute sclerosing panencephalitis with progressive dementia, paralysis, and death occurs in about 1 per 100,000 cases (Katz *et al.*, 1998). However, overall, complications involving the central nervous system are not large contributors to the high mortality rates associated with measles (Schneider-Schaulies and ter Meulen, 1999).

A safe and effective measles vaccine has been available in developing countries since 1974 through the Expanded Program on Immunization (EPI) of the World Health Organiza-

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tion (WHO), United Nations Children's Fund (UNICEF) and the United Nations Development Program (UNDP). The EPI aimed to achieve full immunization coverage of at least 75 to 85% of children by 1990 (WHO, 1992), increasing to 90% by the year 2000 (WHO, 1993). At the start of the program, full immunization coverage was approximately 5%. By 1987, infant vaccination against tuberculosis (BCG), the three shots of diphtheria, pertussis and tetanus vaccine (DPT3) and the three oral doses of poliomyelitis vaccines (OPV3) attained rates of 63%, 57% and 58%, respectively, while only about 47% of under one-year old children were immunized against measles (Grant, 1989). By 1996, over 80% of the world's children had been immunized against diphtheria, tetanus, pertussis, poliomyelitis, measles and tuberculosis (WHO, 1998).

Globally, measles has consistently ranked last in immunization coverage among all the six immunizable childhood diseases. Between 1990-1996, approximately 80% of eligible children worldwide had received measles vaccine (WHO, 1998), 5% less than the EPI target. Since then coverage has declined from 79% in 1997 to 72% in 1998 (WHO, 1999a). Despite this recent decline, the annual number of all ages measles cases registered worldwide has substantially decreased from a pre-immunization rate of 120 million cases to less than 32 million in 1997. Nevertheless, in 1997 measles was still ranked eleventh by the WHO as the leading cause of all ages morbidity and mortality from selected causes, with 960,000 deaths recorded worldwide during that year (WHO, 1998), the vast majority occurring in developing countries (Cutts and Steinglass, 1998). By 2000 there were still about one million children dying from measles each year (Pervikov, 2000).

#### THE PHILIPPINE, INDONESIAN, AND THAI EXPERIENCE

The Philippines incorporated measles vaccination into the EPI in July 1982 (Department of Health, 1990). Following the WHO protocol, the Measles Control Program advocates

giving a single dose of measles vaccine at the optimum period of 9 to 12 months of age. A variety of campaigns promoted the program nationally. Between 1987 and 1997 the percentage of eligible children immunized for measles rose from 68 to 90% (WHO, 1999b) with the EPI target of 80% being reached in 1989 (Ramos-Jimenez *et al*, 1999). The situation in the Philippines was part of an overall trend for the Western Pacific Region, which continued to record the highest routine vaccination coverage for children 1 year and under (93%) for all WHO designated regions between 1997-1998 (CDC, 1999a).

Having attained such an apparently high rate of vaccine coverage, the expectation was that the incidence of measles would decrease. However, contrary to the global experience, there has been no significant reduction in measles morbidity and mortality rates compared to the pre-vaccine era. Measles ranked ninth among the country's leading causes of morbidity with a rate of 69.2 per 100,000 population in 1990. It ranked tenth among leading causes of mortality for all ages, with an annual rate of 5.6 per 100,000 population and was the only vaccine preventable disease included in this group (Department of Health, 1990). In 1994 there were still over 3,000 cases of measles reported in the Philippines (WHO, 1996). Furthermore, a pattern has emerged of measles outbreaks every two or three years. Outbreaks of measles have been most dramatic in urban slum areas in Metro Manila, the most congested city in the Philippines (Ramos-Jimenez *et al*, 1999).

In Indonesia, the EPI has been in place since 1978. Prior to the late 1980s, overall coverage was low. During the 1979-1984 National Five Year Plan, measles immunization coverage reached only 1.6% (Sudarjat, 1987). In 1984-1985, that figure increased to 12.7%. Subsequently, nationwide coverage decreased to 7.9% in 1985-1986 (Anonymous, 1986) and then rose dramatically to 64% in 1988-1989 (Gunawan, 1987). The uptake in measles immunization during this period may be related to the fact that between 1984-1986 many areas of Indonesia suffered an epidemic

of measles. In 1984, epidemics occurred in Sumatra, Java, Irian Jaya, Kalimantan, East Nusa Tenggara, and Kupong, where the epidemic continued in 1985. In 1986, epidemics broke out in Java and Sulawesi. In March 1990, national measles coverage reached 68% (Center for Health Research, 1990). In children under five, coverage rates increased from 46% in 1987 to 92% in 1997 (WHO, 1999b).

In 1988, a Measles Working Group Newsletter estimated there were 59,997 measles cases reported out of 218,473 EPI diseases; a proportion of 27%. Measles mortality was associated with 1,600 (56%) of the 2,987 deaths reported (Center for Health Research, 1990). Between 1990 and 1997, reported cases of measles in children aged one year or less dropped from 92,105 to 15,313. Incidence per 100,000 dropped from 50 in 1990 to 7.5 in 1997 (CDC, 1999b).

Despite the dramatic increases in coverage, during the 1990s in particular, measles remains a major problem in Indonesia. Disparate results between nationwide surveys and reported vaccination rates suggest that actual coverage may be lower than reported. For example, a 1997 nationwide survey by the Indonesian Ministry of Health estimated vaccination among children between 12-23 months at 71% compared with reported coverage of 92% (CDC, 1999b).

Measles immunization was introduced into the Thai EPI schedule in 1984. Vaccine coverage for 1984-1987 was low compared with that for BCG, DPT2, DPT3, and OPV3. In 1987, measles immunization coverage in Thailand was 51.5% (WHO, 1999b) compared to 96%, 79%, 75% and 73%, respectively, for each of the other four vaccines (Ministry of Public Health Thailand, 1987). Between 1990-1996 reported vaccination coverage for measles for children under one year of age rose from 70% to 92% (CDC, 1999b). During the three-year period between 1984 and 1986 the annual incidence of measles declined from 94 per 100,000 population to 37 per 100,000 population but increased in 1987 to 78 per 100,000 (Ministry of Public Health, Thailand, 1988).

For children under one year, measles incidence per 100,000 dropped from 53 in 1990 to 25 in 1997 (CDC, 1999b).

Despite impressive progress in immunization coverage, measles remains a matter of serious concern throughout the Southeast Asian and Western Pacific Regions, and raises many questions about the nature of measles immunization acceptance. Three authors of this paper, Tuanchai Inthusoma, Laurie Serquina-Ramiro and Naniek Kasnyiah, independently undertook fieldwork in the rural Philippine municipality of Agno, Pangasian, the Bayan subdistrict in Central Java, Indonesia, and the Klong Toey slum in Bangkok, respectively, to examine the psycho-social and socio-demographic factors influencing measles immunization acceptance. A better understanding of these significant factors will permit insight into how and why vaccination becomes accepted in a particular society, whether this acceptance is related to the quality of the service offered, and when and why parents accept or reject vaccination (Streefland *et al.*, 1999).

#### FACTORS INFLUENCING MEASLES ACCEPTANCE

Changing health behavior requires careful consideration of the social, cultural, and psychological factors that elicit and maintain such behavior. Merely offering immunization services is not enough; parents may still not take advantage of them (Heggenhougen and Clements, 1987). Studies in developing countries have found that a diversity of factors influence immunization acceptance. Socio-demographic characteristics such as the age, education level, and work situation of the mother, family size and household economic status are predictors of immunization acceptance, as are the age, gender, and health status of the child. Culture, traditions, and social norms, including traditional beliefs, influence of traditional healers, and religious expectations also play key roles in immunization acceptance. Vaccine uptake has also been linked to the motivations, atti-

tudes, personal health beliefs, and intentions of the people significant to the child. Other important social factors include language facility, membership of community organizations, social mobility, and pressure from religious, medical, and political leaders.

Structural factors such as the availability of health facilities, type of community (urban-rural), transportation facilities, government policies, and the level of poverty in the community, play a role in immunization acceptance. Health delivery factors including the availability and accessibility of facilities for immunization, distance of health centre from home, schedule of immunization, information campaigns, waiting times, and logistical resources also have been found to have an impact on levels of immunization (Streefland *et al*, 1999). Weather conditions and other seasonal variations may also influence immunization acceptance. Although many of these determinants are associated with broad social change and development, some, such as beliefs, education, and service delivery/availability factors, are amenable to programmatic change efforts.

## FIELD STUDIES OF IMMUNIZATION ACCEPTANCE

### **Measles immunization among slum children in Thailand**

The Klong Toey Slum Area is the oldest, largest, and most crowded slum in Bangkok. Its residents are of low socioeconomic status and have a low level of education. In 1993 it was reported that measles immunization coverage of children aged between one and five in this area was 51.5%, well below the UNICEF recommended rate of 80% coverage (Inthusoma *et al*, 1993). One of the authors (TI) undertook a survey study based on the Health Belief Model (HBM) to determine the social factors and health beliefs influencing the measles immunization rate among the children.

The HBM (Rosenstock, 1974; Becker,

1977) posits that preventive health behavior derives from the individual's perceptions of the seriousness of the illness and his or her susceptibility to it, balanced against the perceived benefits of, and barriers to, preventive action. Demographic and socio-psychological variables such as age, sex, ethnicity, personality, social class, and peer group pressure are seen as modifying factors affecting an individual's health motivations and perceptions, but are not considered as primary motivators for health action. More important are cues or actions that trigger the appropriate health behavior. These stimuli can be either internal (*eg*, symptoms) or external (*eg*, interpersonal interactions or mass media communications).

The investigation adopted the premise that understanding the way the community was organized and the measles immunization knowledge of the community's leaders was a vital first step in planning and developing programs to increase the measles immunization rate, change parents' behavior to improve their children's health, and enhance the quality of life in a low socioeconomic community. Qualitative data were collected from 42 community leaders and 12 health workers in public and private agencies in the Klong Toey Slum. Rapid ethnographic assessment was used to elicit cultural beliefs related to the etiology, treatment, and prevention of measles among children. The results showed that 72% of community leaders were from rural areas with low educational levels. In terms of measles knowledge, 97% were unaware of the cause of measles, 55% had heard about measles immunization, but only 13% had knowledge about measles immunization. Ninety percent used a Thai traditional drug to treat children in their own household who had contracted measles. These findings led to the conclusion that efforts should be directed towards increasing parents' and community leaders' understanding of measles in order to improve child health.

The results of the qualitative study were used to construct scales for a subsequent quantitative phase of the study. Two types of scales were developed to collect socio-demo-

graphic data and data related to perceptions of susceptibility and seriousness of disease, and perceptions of benefits, barriers, knowledge, and cues to action. The resulting survey was administered via personal interviews to 250 randomly selected parents or guardians of children one to five years of age in sections 1 to 6 of the Klong Toey Slum Area (Inthusoma *et al*, 1991).

The results showed that measles immunization coverage for children aged one to five years in this area was 51.5%, well below the EPI target of 80%. Eighty-three percent of parents or guardians had experienced measles in their household. The same percentage had used Thai traditional treatments for measles. Ninety-eight percent did not know the cause of the measles. Seventy-six percent of mothers played important roles in immunization decisions. Age, education level, number of children, and duration of stay in the community of the parents or guardians were among the social factors found to affect the immunization rate. Factors related to knowledge, perceived benefits, and perceived barriers were also found to impact on immunization coverage (Inthusoma *et al*, 1993).

### **Measles immunization acceptance in a Philippine rural community**

In 1991, another contributor to this paper (LS-R), conducted a study to assess the effects of various psychosocial and socio-demographic factors on measles vaccination uptake among mothers in Agno, a rural municipality in the Philippine province of Pangasinan (Serguino-Ramiro, 1994). The municipality of Agno is divided into two districts: Agno I is composed of nine *barangays*, or villages, located at the centre of the town, while seven of Agno II's eight villages are on the periphery.

During the first two weeks of May 1991, a household census was conducted in 16 *barangays* [one *barangay* (Macaboboni) was not included in the study since residents attended the health services of the adjacent town of Bani] to determine which mothers, with children aged 13 to 24 months, had immunized

their children against measles; and to obtain an unstructured observation of the study area. Of the 1,653 mothers contacted, 67 (4%) were excluded either because the interviewers were unable to confirm the measles immunization status of the child, the mother had not resided in the study area for at least two years, or consent was not obtained. Fifty-two percent (824) of the 1,586 mothers included in the sampling frame were found to have had their children aged 13-24 months immunized against measles (acceptors) while 48% (762) did not have their children of the same age group vaccinated against the disease (non-acceptors). These findings call into question the accuracy of full immunization rates of 45 -113% of the target population [The rate of higher than 100% indicates that the actual number of fully immunized children exceeded the target population] for various *barangays* in Agno from government reports.

Using a case-control design, 220 randomly selected acceptors served as cases and another 220 randomly chosen non-acceptors served as controls. The cases and controls were administered a pre-tested questionnaire measuring the following independent variables: maternal attributes, personal health beliefs, perceived social influences and perceived situational constraints. In-depth interviews and focus group discussions were carried out with acceptors and non-acceptors to better understand their responses to the questionnaire. In addition, key informant interviews and focus group discussions were conducted with a selected group of mothers not included in the random sample, fathers, health workers, local government officials, and teachers to obtain a more comprehensive picture of measles immunization acceptance in the community. Participant and nonparticipant observations were performed at the rural health centres and *barangay* health stations.

The qualitative results showed that community beliefs about measles were well embedded within the traditional modes of thinking characteristic of Northern Luzon. *Agpayso nga tikada* or true measles was said to be

caused by bad winds or by an airborne virus. The disease was normally managed at home through the application of conventional folk practices. It was considered unwise if measles was "opposed" by taking measures to prevent the rash surfacing. Sinking or suppression of the rash from measles was thought to lead to serious complications and possibly death.

A number of the mothers who had their eligible children vaccinated against measles (acceptors) thought of vaccination as a form of resistance against any type of disease such that: a) the vaccinations would make it more difficult for the child to succumb to the measles virus, or b) would make the measles easily curable once contracted. Others were of the opinion that vaccination is: a) good for health, or b) can make a child grow stronger. Many mentioned having 'a peace of mind' as a reason for obtaining immunization.

Non-acceptors, on the other hand, were more inclined to believe that measles was not a serious disease and that immunization is unnecessary and can make the children more sickly. Many non-acceptors claimed that although their children were not immunized nothing had happened to them. This experience of nothing negative happening to unvaccinated children reinforced their attitudes regarding the necessity of immunization.

Analysis of the quantitative results confirmed that mothers who perceived measles as a more serious disease are more likely to have their child immunized against measles compared with mothers who perceived measles as less serious. Similarly, mothers who perceived measles vaccination as effective and useful were more likely to have their children immunized against measles compared with mothers who perceived measles vaccination as less effective and useful. Beliefs in the efficacy of vaccination were found to have a stronger association with acceptance status in the more central district (Agnó I) than in the more peripheral district (Agnó II).

The questionnaire results also revealed that mothers with higher socioeconomic status

(as determined by number of household facilities such as a radio, television set, refrigerator), higher levels of education, and who lived closer to the center of the town were more likely to have their child immunized against measles compared to mothers with lower socioeconomic and educational background and mothers who lived in the peripheral areas. Among the three factors, education and socioeconomic status were the most significant predictors of measles immunization acceptance.

More than 50% of the mother-respondents indicated that government immunization campaigns and the opinions of husbands affected their decisions to immunize their children against measles. Aside from these two social influences, more acceptors were convinced by midwives and doctors to obtain measles immunization. Non-acceptors displayed more independence in their decisions, whereas acceptors were more likely to be pressured by external social factors. When stratified by socioeconomic status, mothers from the lower and the upper socioeconomic classes were more likely to have considered social pressures in their decisions to immunize their children against measles compared to mothers in the middle class because of the fewer number of perceived environmental and situational constraints.

From the in-depth interviews and participant observation, a number of environmental and situational factors were noted to affect immunization acceptance. These factors correlate with past studies on immunization and acceptance. The perceived barriers to measles vaccination among acceptors were related to information regarding the schedule of immunization, weather and season, and peace and order. Distance to health center from home, access to transportation, number of transportation facilities, economic conditions and competing work of the mother were seen as impediments among non-acceptors.

### **Measles immunization acceptance in Central Java**

Household survey and ethnographic data were collected in six villages in Bayan Sub-

district, Purworejo, Central Java, Indonesia in 1989 by a third contributor to this paper (NK) for a study designed to explore the relationship between sociocultural factors, the organization of health services, and measles immunization acceptance among Javanese mothers (Kasniyah, 1992). Bayan was chosen as the research site because of its low rate of immunization for measles. Based on records maintained by the Community Health Centers (*puskesmas*) only 27% of children under age five were immunized against measles in 1988/1989. Coverage increased to 48% in 1989/1990.

The study was carried out in two phases. First, a household survey was conducted among all 551 families in the six study villages who were identified as having children under five years of age. Among these families, 57% (315) were found to have completed measles vaccinations for all eligible children. In 236 (43%) of households, there was at least one non-immunized child. In terms of eligible children, 54% (431 of 803) were found to be immunized. This finding suggests under-reporting of measles immunization in government documents, and highlights, as does our Philippines fieldwork, the problem of inaccuracy in official record-keeping systems.

The second phase involved participant observation in the six villages and in-depth interviews with 60 mothers randomly selected from among the 315 acceptor and 236 non-acceptor households to determine why the overall coverage for measles immunization was low and why such striking variability was found to exist among villages tightly clustered together in a homogeneous cultural and socio-economic environment. Coverage ranged from 35% of eligible children in Grantung village to 69% in Ketiwijayan.

The ethnographic results revealed that immunization non-acceptance was related to mother's education, occupation, and illness beliefs. In addition, rural-urban migration, social pressure from local officials, influence of religious leaders as well as access to immunization services affected vaccination acceptance.

Observations found that, on the whole, Javanese mothers, like their Philippines' counterparts, do not perceive measles as a serious disease. Measles is considered a common disease which children should catch in order to develop immunity. Treatment is confined to traditional methods which encourage the spots to appear. Medical attention is sought when complications develop. However, there were differences in perceptions of seriousness of the disease between acceptors and non-acceptors. Among the 30 mothers whose children were immunized for measles, 40% considered it to be a dangerous illness, while only 17% of the 30 mothers who had unimmunized children felt that measles was dangerous.

Most of the mothers interviewed by the Indonesian fieldworkers were educated only at the primary school level or were illiterate. Their level of education may be a factor in the low rate of overall measles immunization coverage in the study area. None of the mothers was unemployed. The majority was involved in agricultural production. Others managed a household, were traders, or made kerosene lampwicks. Women engaged in agricultural work and those who were traders reported difficulty in leaving their place of work to bring their children to the *posyandu* (village level health posts) for immunization at designated times.

A high rate of rural to urban migration on a seasonal or permanent basis was found to be associated with a high rate of immunization coverage. The household survey revealed that 71% of children in the village of Ketiwijayan were immunized for measles - the highest coverage rate among the six villages. Ketiwijayan also had a high rate of migration to towns and the number of mothers with children under five was the smallest (6%). The level of education of Ketiwijayan residents is higher than that of residents in the other study villages. Urbanization may thus influence immunization rates because women may have greater access to educational opportunities in the city, as well as a wider and more diverse network of social contacts, greater exposure to a variety of sources of information about immunization,

and access to a range of health facilities. The migration patterns to and from urban areas, revealed by the ethnographic study, helped to explain the discrepancies between the apparently low rate of measles immunization for Ketiwijawan village, as recorded in the official health statistics, and the high rate recorded during the household survey.

Sources mentioned as advising mothers to seek immunization for their children included: formal religious leader (7%); hamlet leader (33%); nutritional cadre or midwife (20%); neighborhood leader (13%); civil defence person (17%); and others (10%). Most mothers felt pressured or coerced to accept or not accept immunization. Eighty-seven percent of mothers with immunized children, and 70% of mothers of unimmunized children, reported that someone had pressured them to have their child immunized. Hamlet and religious leaders, who had been briefed by program and government officials and favored immunization, were found to have considerable influence on compliance or non-compliance with immunization programs. However, not all leaders supported immunization and the more conservative religious leaders were likely to actively oppose immunization programs.

Finally, the ethnographic research revealed that many opportunities for vaccination are lost because of the organization of immunization services and misinformation about immunization from health workers. One vaccinator whose only means of transportation is a pushbike is expected to provide immunization services to 26 villages up to 20 km apart, and separated by dirt roads that become impassable during the rainy season. Mothers who are tired of waiting or unable to wait longer leave the clinic without receiving vaccination for their children. The quality of the vaccine, transported over long distances in an iced thermos bottle may also be affected.

Other aspects of immunization programs also contributed to low utilization. Most immunization services are provided in the morning of working days and women are unable to set aside their duties to attend. Until re-

cently, regulations stipulated that the vaccinator could not open a fresh container of vaccine if less than six children were waiting to be vaccinated (*ie*, requiring one ampoule). When fewer children were waiting, they would be turned away.

Miscommunications also add to low acceptance rates. Mothers do not understand the biomedical names of diseases which health workers use to describe the purpose of immunization. The health posts are busy and it is difficult for a mother, preoccupied with the demands of her child, to ask the health worker questions in an informal way. Furthermore, immunization workers, health volunteers, and formal village leaders frequently told mothers that immunization would make their children healthy. Mothers have interpreted this message to mean that vaccination is a curative measure rather than a preventive one. Thus, if they considered their children healthy they might not seek immunization and if they accepted one vaccination, they may be less inclined to seek other immunizations in the EPI series because they regarded their child as already cured. For the most part, when mothers did accept immunization for their children, they did so, not because they understood the health messages being conveyed to them, but because of other extraneous factors.

An important study finding was that not all of these factors were of equal importance in each village. For example, in the villages of Suceu Juru Tengah and Sambeng, the informal religious leaders actively opposed immunization. In Krandegan village, however, where residents also adhered to conservative Islam, the religious leaders did not have a great deal of influence. In the village of Grantung, the heavy involvement of women in market trade may account for the fact that the village had the lowest rate of immunization coverage of the six study villages. In Pekutan, the hamlet leader played a significant role in achieving immunization acceptance among village mothers. Exposure to urban lifestyles may have facilitated immunization acceptance in the village of Ketiwijayan. Thus, each vil-



lage had a different pattern of factors that contributed to immunization acceptance.

## SUMMARY AND DISCUSSION

Results from our fieldwork in three Southeast Asian nations reveal that there is no single motivating factor for mothers to have their children immunized against measles. Social class, the level of education, personal beliefs about measles and immunization, the number of social pressures, and perceptions of environmental and other situational conditions acting as barriers to immunization influenced the kind of decisions that the Thai, Filipino, and Javanese mothers made and the action or inaction taken to fulfil those decisions. As our Central Java observations found, a different set of factors may operate in each locality. This finding has implications for further research into the problems of immunization program coverage, suggesting the unit of analysis for understanding immunization coverage should be the village or neighborhood, rather than the individual mother or household. Mass immunization interventions are blanket (nation-wide) programs targeted at mothers and are based on behavior models of individual decision making. They do not take into account the role of other influentials in the decision-making process nor community level social-cultural influences.

Our investigation in the rural Philippines suggests that many of the mothers investigated can be described as passive acceptors of immunization in general. Nichter (1993) defines *passive acceptance* as "...yield (ing) to the recommendations and social pressure, if not prodding, of health workers and community leaders *and other people significant to the mother* (italics supplied)". Active acceptance, on the other hand, entails adherence to immunization programs by an informed public which perceives the need for specific immunizations. In the latter case, the mother is assumed to understand the rationale behind her health behavior and seeks to have her child immunized mainly because she appreciates the

importance of a specific type of vaccination.

Passive acceptance was manifested among the Filipino mother-respondents by 1) their involuntary presentation at the health centers during immunization days; 2) their inability to identify the exact vaccine given; 3) their insufficient knowledge regarding etiology of vaccine-preventable diseases and the purpose of immunization; and, 4) their susceptibility to external pressures and incentives to have their child immunized. The majority of the Javanese mothers might also be described as passive acceptors according to these criteria.

The main factors perpetuating this passive acceptance style, we suggest, are ineffective health education interventions, the work-culture of health workers, economic incentives directed at the local health providers, and the sociocultural predisposition of the lower social status women in the area.

Among the Bangkok slum sample, just over half of the mothers were acceptors who, overall, reported being more pressured by external social factors than non-acceptors. However, the Thai fieldworkers found that 72% of mothers, whether acceptors or non-acceptors of immunization, took an important role in decisions about immunization. The key point is that while these decisions were not 'passive' they were usually made without adequate information since 98% of the parents or guardians did not know the cause of measles.

In Java, ineffective health education interventions played an important role in immunization acceptance. The vaccinators observed often showed a one-sided approach to service delivery and an inability to understand the perspective of the clients whom they regarded as obstructive. Moreover, immunization workers, health volunteers and formal village leaders often gave misleading messages about immunization. In the situation where most information about immunization is in the form of one-sided exchange, it is difficult for mothers to ask questions. The health posts are often understaffed and there are many distractions. Inthusoma recommended that interventions to

educate community leaders in slum areas about measles immunization would improve child health.

Finally, missed opportunities based on the organization of immunization services also contributed to reduced immunization acceptance rates. At both the Indonesian and the Philippine sites, staffing, scheduling, and location as well as difficulties maintaining the quality of the vaccine supply created dissatisfaction among mothers, making them reluctant to utilize immunization services.

### **Implications for measles immunization program design**

Findings from our three field studies suggest that measles vaccination uptake may be improved by implementing the following strategies:

#### **1. Re-organization of vaccination services:**

Immunization services should be reorganized so that vaccination is available on a day, at a time, and in a place (such as workplaces or markets) that is convenient for the clients. It is important to adjust the service according to the work schedule of local women so that they do not have to wait long hours for the vaccinator to arrive. Employment of additional vaccinators for larger areas or a reduction in the number of health centers that a vaccinator is expected to attend each day should be carefully considered to improve efficiency. To maintain the quality of vaccine, emphasis should be given to accurate estimates of the amount of vaccine required during each service delivery, and to improving the cold-chain transportation process to ensure adequate storage and safety of the vaccine. Efforts should be made to re-orient the work attitudes of health workers by providing incentives based on the quality of consumer health education in addition to numbers of children immunized.

**2. Develop culturally appropriate educational messages about measles:** Health messages should be delivered in the language that is most familiar to the population. The content of the educational message and the program

materials which convey these messages should be simple and easily understandable. Preferably, they should make use of the actual experiences of the people in the community so that they will be more readily internalized. For example, stories from previous measles epidemics might be used as illustrations. Health workers should use informal communication techniques rather than an overly didactic style. In recognition that the biomedical disease etiology of measles is often different from the community's and health workers' conceptions of measles, the biomedical view should be more fully explained so as to avoid misunderstandings of immunization messages. Indeed, some would argue that the use of indigenous conceptions and metaphors or analogies to convey the value of protection from measles is of greatest value (Nichter, 1989). Messages should be directed not only at mothers but at the community as a whole. While mothers have the primary responsibility for child health and care, husbands, extended family, and other members of the community may influence mothers' decisions to seek out the non-traditional procedure of vaccination.

#### **3. Mobilizing community leaders and organizations:**

Formal and informal leaders should be included in health education efforts. Their aid may be sought, along with community groups and nongovernmental organizations, in organizing a community health day which could be used to launch a series of community mobilization strategies for health education.

Community members may be recruited as positive role models to encourage adoption of immunization programs. In Kasniyah's study the daughter of a religious leader who regularly used the immunization service provided a role model for other village mothers. Attention should be given to families migrating between rural and urban areas who might be used as brokers or interpreters of the program. This idea is supported by the fact that migrants' experiences during their time in urban settings have changed their perceptions of health. Whenever possible it may also be desirable to gain the co-operation of religious leaders.

Religious leaders who are supportive of new ideas can facilitate the introduction of new programs in the community and can be utilized as agents of change.

**4. Development of acceptance or inhibitor profiles:** Given the Javanese finding that a different pattern of factors occurring in each study villages influenced immunization, we suggest developing a separate acceptance inhibitor profile for each subdistrict, and, if practical, for each village. Such a profile would have four general dimensions. The first is the organization of immunization services and would include indices of availability, accessibility, and convenience of vaccinations. The second is the prevailing socioeconomic condition of the village. To what extent do education levels, type of employment, and rural-urban migration patterns enhance or inhibit use of services? Third is the influence of the village social network. Are the opinion leaders encouraging or discouraging program participation? Finally, what is the commonly held understanding of measles as an illness? Is it seen as a potentially serious illness to be avoided through vaccination? Is it regarded as trivial and commonplace? What is the substance of health education messages about the causes and hazards of infection?

Susan Rifkin (1988) created an analytical framework for process evaluation of community participation which suggests how the acceptance-inhibitor profile could be further developed. Her method uses participant-observation and semi-structured interviews along with a set of guidelines to characteristic a health service in terms of five dimensions of community participation (needs assessment, leadership, organization, resource mobilization and management). The resulting profile could be used at both the program design stage and implementation stage.

In summary, program design should be informed by the fact that a multiplicity of factors influence measles immunization acceptance, take into account the micro-level variations in socioeconomic conditions, allow for

a higher degree of community participation to be built into the planning process, and develop health education messages that are culturally-appropriate. Health policy makers should formally involve medical sociologists and anthropologists from the initial stages of projects designed to improve community health. These health social scientists are uniquely equipped to uncover the complexity of social, cultural, economic, demographic, and attitudinal factors underlying measles immunization acceptance.

#### **Worrisome future trends**

While progress has been made in increasing measles vaccination rates in Southeast Asia, what of the future? Evidence from industrialized nations, such as the United Kingdom and New Zealand, where measles, mumps, rubella (MMR) vaccination coverage rates have been declining recently (Mitchell, 1999; Mansoor *et al*, 1998), indicates that acceptance of measles immunization is by no means certain. The combination of political will, logistical resources, and extensive educational campaigns do not necessarily result in greater immunization acceptance. Rather, support for immunization acceptance waxes and wanes.

Our research found a range of factors affecting measles immunization acceptance in three developing world sites during the 1990s. Yet, common themes were the need for adequate information about immunization risks and benefits; the impact of government policy on immunization rates; and the importance of ensuring that information about vaccination could be integrated with individual and community level beliefs. In what ways do these trends resonate with experiences in post-industrial societies?

A key factor influencing parental acceptance of measles vaccination in developed countries is the weighing up of perceived risks and benefits. A 1998 Australian study found that the ability to access adequate, balanced and comprehensive information, particularly from health professionals, determined parental perceptions about the severity of a disease, the susceptibility of children, the risk of adverse

side effects, and whether or not the disease could indeed be prevented by vaccination (Bond *et al.*, 1998).

With globalization, health information disseminated by the electronic and print media also influences public opinion across industrialized societies. Recent media reports link MMR vaccines with serious diseases such as inflammatory bowel disease (Montgomery *et al.*, 1999) and idiopathic thrombocytopenic purpura (ITP) (Bolton-Maggs, 2000). Health promoters' fears that adverse media reports are influencing public perceptions of the risks and benefits of vaccination and reducing vaccination uptake rates (Anderson, 1999) are supported by research from Wales. In the wake of long running local newspaper stories during July-September 1997 about adverse side effects, MMR vaccination uptake declined by 13.6% in the newspaper's distribution area and by 2.4% in the rest of Wales, compared with the same period in 1998 (Mason and Donnelly, 2000).

Media coverage of adverse reactions to MMW may also reduce immunization coverage by influencing health professionals' attitudes and practices (Mansoor *et al.*, 1998; Zimmerman *et al.*, 1997). In the United States, a survey after a major measles epidemic in 1989-1991 revealed that 11% of 1,241 family physicians would not administer vaccines to children in an acute care setting due to beliefs about side-effects, parental objections and vaccine efficacy (Zimmerman *et al.*, 1997). Authorities observed that this was an important factor in "inadequate vaccination levels" which contributed to the measles epidemic (National Vaccine Advisory Committee, 1991).

Another key factor influencing immunization coverage is state or social regulation. Indonesian state regulation of immunization campaigns has improved coverage rates by tapping into locally legitimated relationships of authority and deference at the village level (Streefland *et al.*, 1999). However, our field studies in Java and Bangkok revealed that because parents were pressured, either by community leaders or health workers to have

their children immunized, decisions about immunization often occurred in the absence of adequate information, or even on the basis of misinformation. Access to information from other sources is likely to impact on coverage obtained by these methods.

Furthermore, legal or social compulsion may be counterproductive if it conflicts with strongly held political, philosophical or religious convictions. In 1995 in the Philippines, a widespread belief among Catholics that tetanus toxoid vaccination could induce abortions, and was part of a conspiracy by the state to impose contraception, affected immunization coverage rates for both TT and measles (Streefland *et al.*, 1999). On National Immunization Days in 1995, mothers of child-bearing age who refused to be vaccinated for TT also did not take their children to be immunized against measles, contributing to a drop in measles vaccination coverage rates from 114% in February to about 30% in March (Ramos-Jimenez *et al.*, 1999).

In the United States, laws requiring proof of immunization before children are allowed to attend school resulted in measles vaccination rates among school-aged youth of at least 98% in all states between 1985-1992 (Salmon *et al.*, 1999). In the Netherlands, immunization is not legally compulsory, but social pressure takes the form of persuasion through personal visits, letters and promotional material mailed to parents until they comply (Streefland *et al.*, 1999). Exemptions in the United States are offered for religious, philosophical or medical reasons. Nationally, between 1985-1992, the proportion of exemptors in the USA population was 0.44%, but efforts have begun to increase the availability of philosophical exemptions, a move which Salmon suggests reflects divergences in perceived risk-benefit between authorities and sections of the public (Salmon *et al.*, 1999).

In the Netherlands, resistance is mainly by Orthodox Protestants and highly educated, middle class groups who question the assumptions of biomedicine regarding the effect of immunization on the immune system (Streefland

*et al*, 1999). Among post-industrialized societies generally, there is a clear trend towards increasing "lay epidemiological knowledge"-epidemiological reasoning among lay people attributing morbidity to immunizations - as the basis for questioning "expert" opinion about vaccination (Streefland *et al*, 1999). We predict that the global flow of such "lay epidemiological knowledge," generated through processes of globalization (*eg*, Internet use) will fuel resistance to immunization acceptance, especially among educated middle class sectors in developing and newly industrialized societies.

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