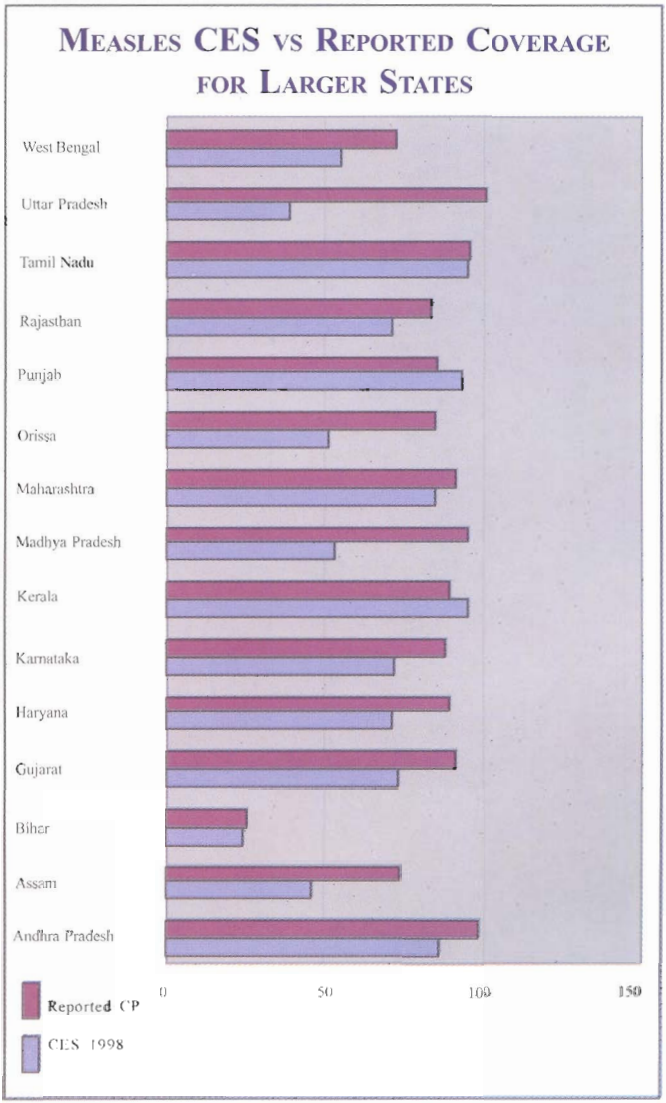
MEASLES CONTROL

An Urban Challenge


MEASLES CES VS REPORTED COVERAGE FOR LARGER STATES
West Bengal
Uttar Pradesh
Tamil Nadu
Rajasthan
Punjab
Orissa
Maharashtra
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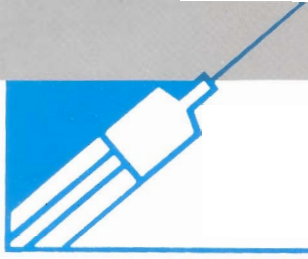


Dr G. S. Chhabra

NATIONAL IMMUNIZATION PROGRAMME IS A SOCIETAL MISSION AND IS COMMITTED TO THE GOAL OF IMMUNIZING:

a) At least 85% of all infants born, with one dose of BCG, three doses of DPT and OPV and one dose of measles vaccinations. This prevents infants and young children from contracting six common vaccine-preventable diseases, namely, measles, neo-natal tetanus, acute paralytic poliomyelitis, pertussis, childhood tuberculosis and diphtheria.

b) One hundred percent of all pregnant women with tetanus-toxoid.

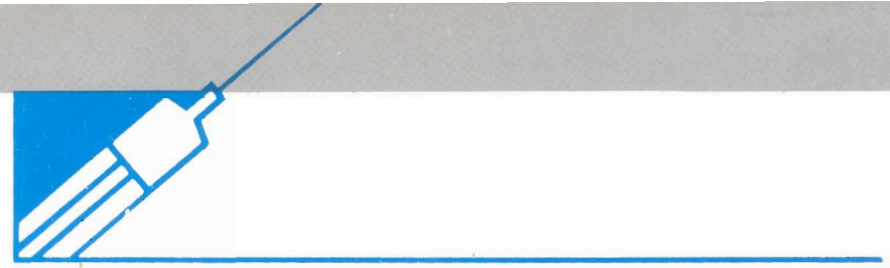
c) Making additional efforts of immunization like pulse polio immunization for polio eradication, urban measles immunization campaigns to move towards measles elimination, tetanus toxoid campaigns for child bearing age women to eliminate neonatal tetanus in endemic states.

INTRODUCTION

The World Summit for Children has set a goal of 90% reduction of measles cases and a 95% reduction in measles deaths compared with the pre-vaccine era, by the year 2000 AD. At mid-decade a reduction of 74% in measles cases and 86% in measles deaths has been reported, globally. Although, some countries have managed to nearly interrupt transmission of measles, many have managed to achieve low endemic levels. Despite this dramatic reduction, there are still about a million children under five dying of measles every year. The 20 developing countries contribute for 85% of this misery and India alone contributes 27% of global measles deaths.

While many of the 50 million children infected annually recover in about a week, suffering only an unpleasant rash, fever and temporary weight loss, others develop complications that can be fatal. For some, life is drained away by the dehydration caused by diarrhoea; others die from convulsions or bronchial pneumonia; in few pulse rates soars so high that their heart fails.

Many of those who survive measles are left with life-long disabilities, including brain damage, blindness and deafness.And because the disease depresses the appetite, burns energy in fevers, inhibits the absorption of food and drains away essential nutrients such as vitamin A through diarrhoea and vomiting, millions more children are left vulnerable to a continuning cycle of illness and poor growth.



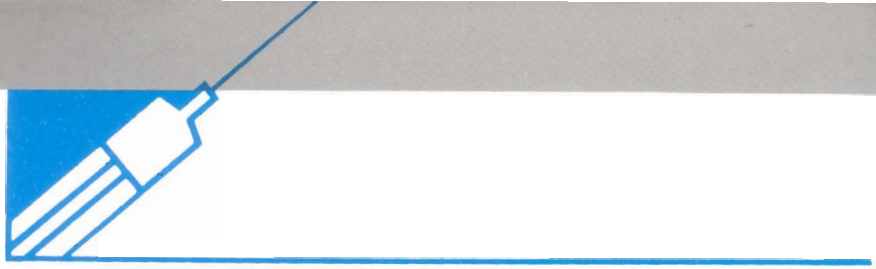
One of the main strategies for measles control, which focussed on "Urban measles control" was put forward by UNICEF and was endorsed globally as potentially having the greatest impact on preventing measles deaths and cases. The Ministry of Health and Family Welfare, Government of India has decided to implement urban measles control strategy.

INDIAN SCENARIO

Measles vaccine was introduced in the National Immunization Programme in 1985-86. The vaccine was made available to all the districts by 1989-90. Reported coverage levels have increased from 1.3% in 1985-86 to around 80% in 1990-91 and have been sustained. The reported measles cases for the year 1987 were 2,47,519 which has declined to 45,190 in 1997 (81.7%).

The estimate of measles deaths is based on the reported coverage levels. And, often there is a considerable gap between the reported and the evaluated coverage, therefore, the annual number of deaths attributable to measles may be more than the estimate. The nationwide coverage evaluation in March-May 1998 indicates that measles coverage is 66%.

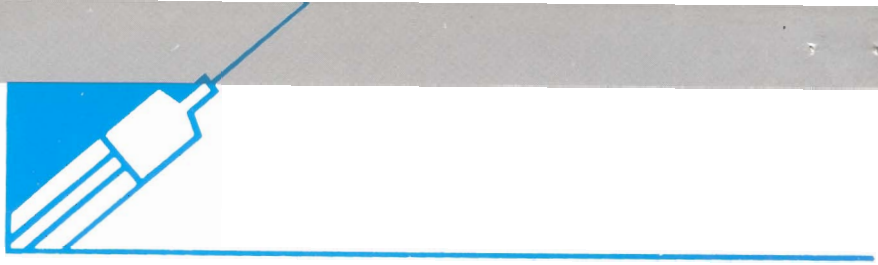
The evaluated coverage and/or the gap between reported and evaluated coverage clearly demarcates the States of Bihar, Assam, Arunachal Pradesh, Meghalaya, Manipur, Nagaland, Orissa, UP and West Bengal as the ones still unable to reach a large proportion of children with measles vaccine.



Similar surveys done in 74 cities during the same period, point to the cities having less than 50% coverage for measles, eg, Agra, Kanpur, Lucknow, Varanasi in UP; Bhavnagar, Jamnagar and Surat in Gujarat; Delhi; Guntakal in AP; and Guwhati, Assam, Patna, and Ranchi in Bihar. Twenty nine cities had the coverage between 50-75%. Naturally children in these cities children are at high risk of suffering from measles disease, its complications and consequences.

The outbreaks of measles in Madhya Pradesh (1995) in Uttar Pradesh (1996) demonstrate the consequences low measles vaccine coverage levels in rural areas. The CFR in the hospitalized cases was 4% with a range of 1.8% to 7.6%. Measles is one of the diseases to be reported monthly among the vaccine preventable diseases. However, the information is highly underreported. Also, deaths attributable to measles are generally not included as the system of recording deaths from all complications following measles (ie, pneumonia, diarrhoea etc) does not exist.

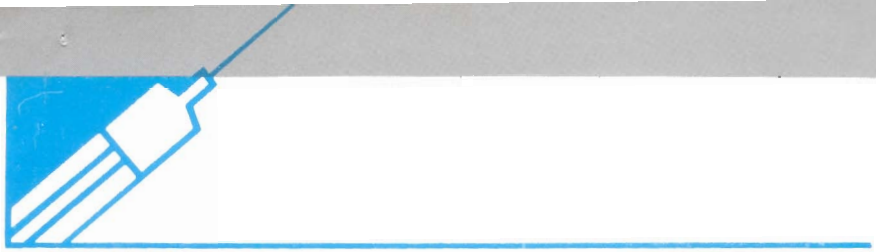
Under the UIP, Vitamin A supplementation is strongly recommended. The only study done in 1994 suggests that a 34% supplementation level was achieved in Maharashtra. Scientific evidence demonstrates that vitamin A supplementation reduces the duration, severity and complications associated with measles. Providing vit A to an infant twice-a-year can reduce death risk by 25-33% each year in the developing world. Many evaluations show the supplementation to be 30-50% in all states. Regular supply of vitamin A concentrate appears to be a major problem.



MEASLES DISEASE

Measles is a ubiquitous, highly infectious disease affecting nearly every person in a given population by adolescence in the absence of immunization programmes. Measles is primarily transmitted from person-to-person by large droplets, but can also be spread by the airborne route as aerosolized droplet nuclei. Measles is most infectious during the prodrome. First there is localized infection of the respiratory epithelium of the nasopharynx and possibly the conjunctivae, with spread to regional lymphatics. Primary viremia occurs 2 to 3 days following the exposure, and an intense secondary viremia sets in 3 to 4 days later. The secondary viremia leads to infection of and further replication in the skin, conjunctivae, respiratory tract and other distant organs.

These events correspond with an incubation period between exposure and the onset of symptoms of 10 to 12 days. The prodromal period begins, with fever, malaise, conjunctivitis, coryza, and tracheobronchitis. Koplik spots appear on the buccal mucosa 1 to 2 days before rash onset and may be noted for an additional 1 to 2 days after the onset of rash. The rash is an erythematous maculopapular eruption that usually appears 14 days after exposure and spreads from head to extremities over 3 to 4 day period. Over the next 3 to 4 days, the rash fades; in severe case desquamation may occur. Other constitutional signs and symptoms, such as anorexia, diarrhoea and generalized lymphadenopathy may also be present.



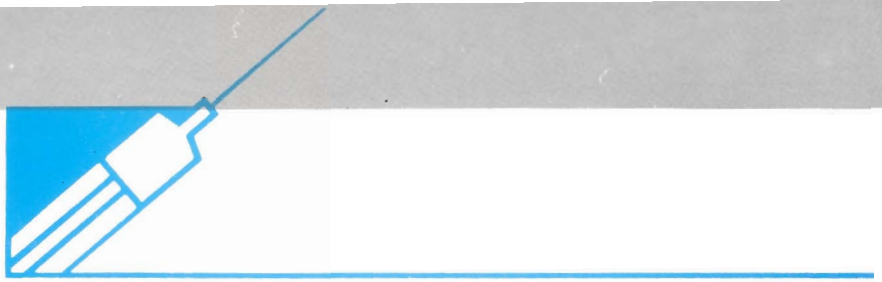
DIAGNOSTIC FEATURES FOR MEASLES DISEASE

* COUGH, COLD AND RUNNING NOSE
* FEVER 38 °C (100.4 °F) OR MORE
* PINK/RED AND WATERY EYES, SENSITIVE TO LIGHT
* CHARACTERISTIC BLOTCHY RASH WITHIN 3-7 DAYS, APPEARING FIRST ON FACE THEN ON ENTIRE BODY
* RASH LASTS FOR 4-7 DAYS, ENDS WITH SKIN PEELING
* KOPLIK'S SPOTS (WHITE WITH RED BORDER) APPEAR ON THE INSIDE OF CHEEK WITH THE ONSET OF RASH

LAB-TEST FOR MEASLES DISEASE

* NIV, PUNE HAS MADE AVAILABLE AN IGM ELISA TEST FOR LABORATORY CONFIRMATION OF MEASLES DISEASE.

The most commonly cited complications associated with measles infection are otitis media (7-9%), pneumonia (1-6%), post infection encephalitis (1/1000 to 1/2000 cases), Subacute Sclerosing Pan Encephalitis (1/1,00,000 cases) and death (1/10,000). The risk of serious complications and death is increased in young children and adults. SSPE is a rare degenerative central nervous disease caused by a persistent infection with a defective measles-like virus, which develops approximately 7 years after measles infection. Patients develop progressive personality changes, myoclonic seizures, and motor disability, leading to coma and death. SSPE is more common in males than females. Other common complications observed are diarrhoea and vit A deficiency.



Risk factors

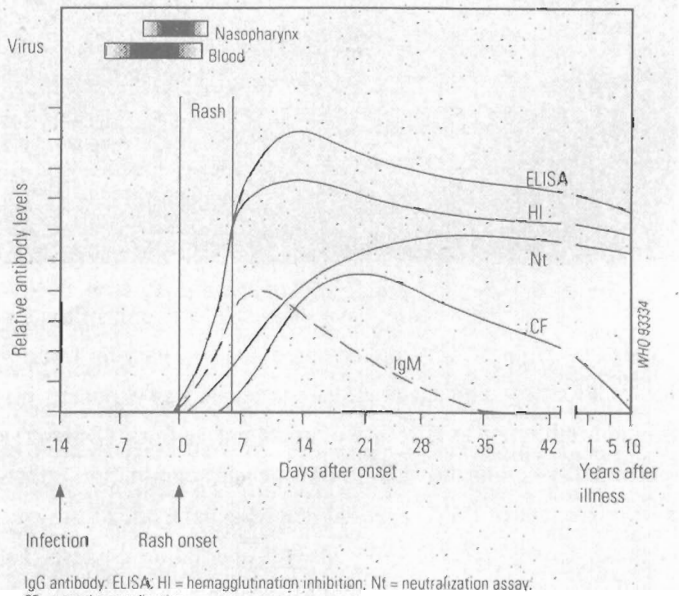
* Measles is more rapidly transmitted in large families, crowded homes and urban slums
* With high population density, it is apt to occur year-round, at times with seasonal peak
* Without immunization, almost every child acquires measles
* Although, measles can occur at any age, in India an unimmunized child may experience it before the third birthday. The reason could be over-crowding and increased contact especially among young children
* Secondary cases in homes are more severe.
* Measles is severe among infants and malnourished children.
* Post-measles complications are also more common in malnourished children

Community studies have shown CFRs in endemic situations to be around 1-2% and during outbreaks varying from 3-15%. CFRs vary with age at infection, intensity of exposure, nutritional status, and availability of treatment. In Surat (Gujarat) a recent study conducted as a part of measles elimination efforts by Department of PSM, Government Medical College, showed an incidence of 7.67% in 1997-98. This obervation suggests that measles is definitely a public health problem.

THE IMMUNOLOGICAL RESPONSE TO NATURAL INFECTION

In primary acute infection, both IgG and IgM antibodies are initially produced. IgM antibodies peak at 7-10 days after rash onset and fall rapidly, rarely being detectable more than 4 weeks after the rash onset. IgG antibodies become detectable in the serum soon after rash onset, peak within 4 weeks and subsequently decline, but persist for life (Figure1). Measles infection is diagnosed serologically by either detecting IgM or demonstrating

Figure 1. The antibody response in acute measles infection *(Preblud and Katz, 1987)*.



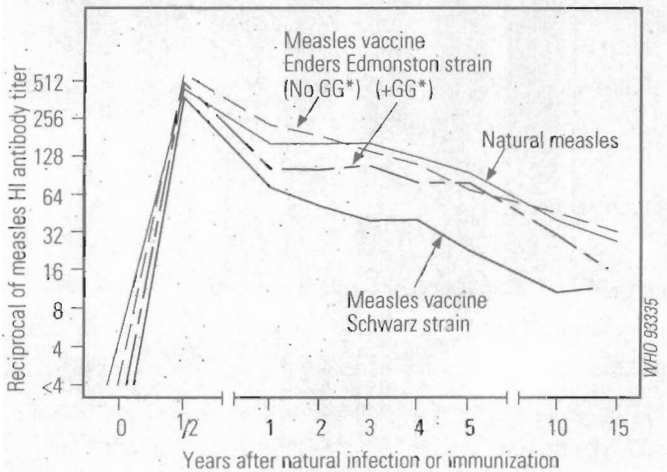
IgG antibody. ELISA; HI = hemagglutination inhibition; Nt = neutralization assay; CF = complement fixation

a significant rise in IgG between paired acute and convalescent sera.

THE RESPONSE TO IMMUNIZATION

The levels of antibody induced by immunization with attenuated measles virus vary with an approximately log-normal distribution (Figure2), and reach lower peak levels than those induced by wild virus. Antibody persists longer when there is boosting from exposure to circulating wild virus.

Figure. 2. Measles antibody response and persistence after natural infection or immunization *(Krugman 1977).*



*GG = gamma globulin

THE DETERMINANTS OF RESPONSE TO IMMUNIZATION

Host factors

Age

The response to immunization increases up to the age at which all children have lost maternal antibody (Table 1). The major reason for the age-dependent response appears to be the maternal antibody level pre-immunization. (Figure 3).

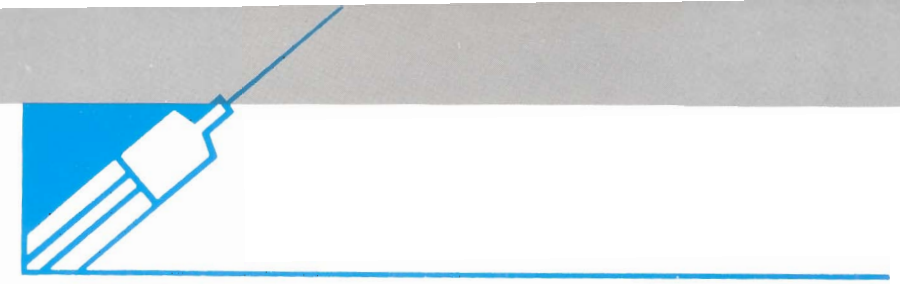
TABLE 1: SEROCONVERSION (%) BY AGE IN MONTHS

COUNTRY	05	06	07	08	09	10	11	12
HAITI*	-	45	71	77	84	94	95	100
KENYA**	60	90	67	100	93	-	-	100

*Hasleyet al 1985; **MOH Kenya 1979

Maternal antibody level

Reasons for earlier loss of maternal antibody in developing countries include lower antibody levels among mothers (particularly in the southeast Asia), decreased efficiency of transplacental transfer of measles IgG, increased catabolism of passive antibody due to frequent infections in infancy, and loss of antibody into the intestinal lumen during diarrhoeal illness. A recent study of NIV, Pune indicates that 22% of pregnant women tested did not have IgG antibodies, so also their newbons.



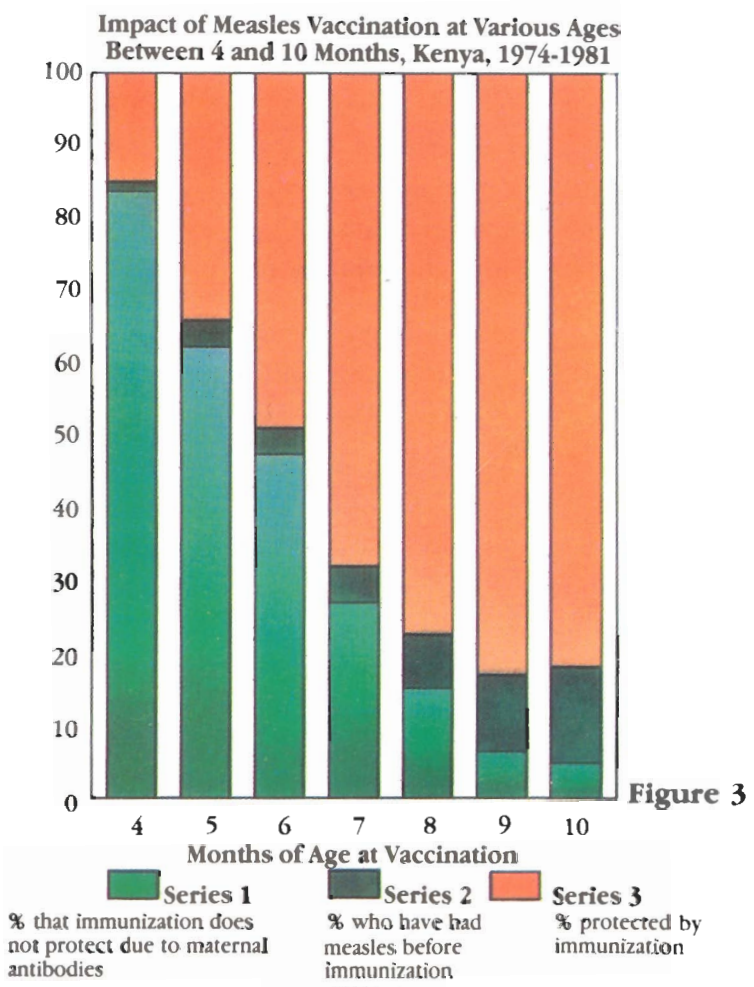
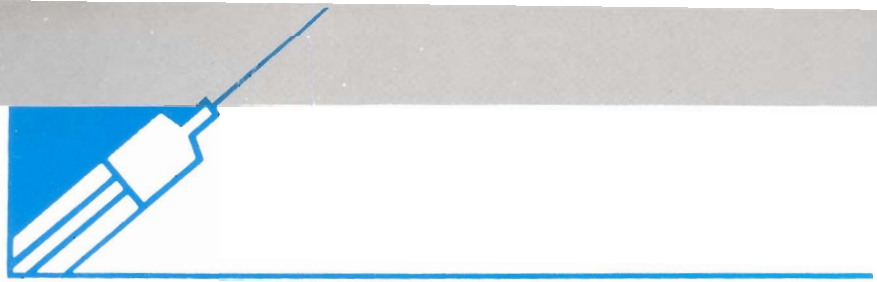


Figure 3

* Source : WER 1982; 12 : 89-91



Nutritional status

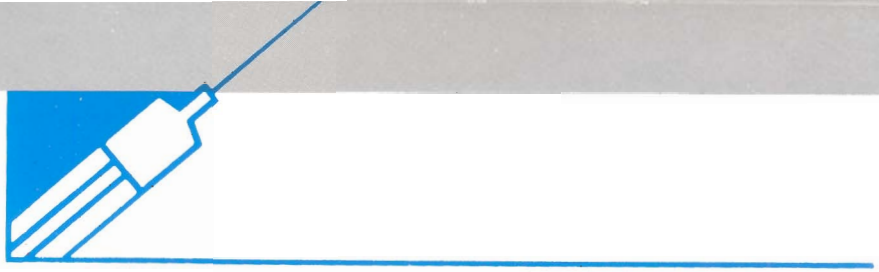
Several studies have reported seroconversion rates at least as high as in well-nourished children. THE UNIVERSAL IMMUNIZATION PROGRAMME (UIP), THEREFORE, RECOMMENDS THAT HIGH PRIORITY SHOULD BE GIVEN TO THE IMMUNIZATION OF MALNOURISHED CHILDREN AS THERE IS ALWAYS A HIGH RISK OF SEVERE DISEASE AND WORSENING OF NUTRITIONAL STATUS DURING OR AFTER MEASLES DISEASE.

Intercurrent illness

Measles immunization of children with acute illness in developing countries has been found to be safe and effective. THE UIP, THEREFORE, RECOMMENDS THAT MEASLES IMMUNIZATION SHOULD NOT BE WITHHELD FROM CHILDREN WITH AN ACUTE ILLNESS. The children requiring hospitalization should, however, be considered on a case-by-case basis. And, eligible children should get it on admission wherever possible, or at a minimum, prior to discharge.

Immunosuppression

Due to the risk of serious adverse events, measles immunization is generally contraindicated in immunosuppressed persons. An exception is children infected with human immunodeficiency virus. ROUTINE IMMUNIZATION OF ALL INFANTS WITHOUT SCREENING FOR HIV STATUS IS THE CURRENT RECOMMENDATION.



Agent factors

Several studies have found that Edmonston-Zagreb (EZ) vaccine gave superior seroconversion rates to Schwarz strain. Therefore, in India, UIP has accepted EZ strain for use.

Programme factors

Poor maintenance of cold chain has been implicated as a cause of low vaccine efficacy. New stabilizers have made the freeze-dried vaccine less heat-labile, reconstituted vaccine is still sensitive to heat and sunlight. Use of disinfectants to 'sterilize' the syringes/needles may also reduce the efficacy of vaccine.

Route of administration

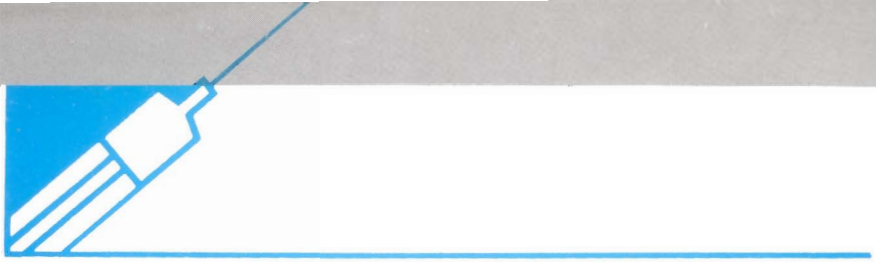
UIP at present, recommends only the subcutaneous route.

Dose

The recommended dose of measles vaccine in UIP is 0.5 ml subcutaneously.

Age for immunization

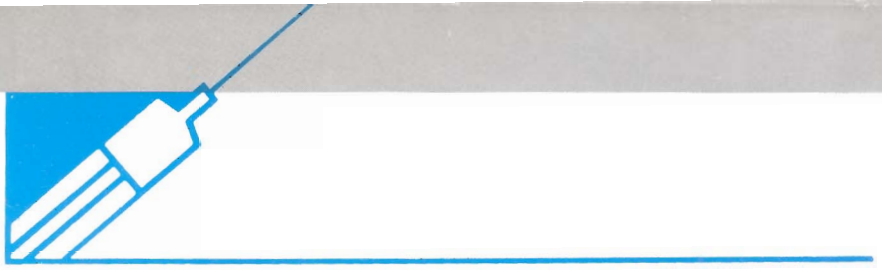
National immunization schedule recommends measles vaccine after 270 days and before 365 days.



How to give measles vaccination

Measles vaccine available in India is EZ strain manufactured in Pune. It is freeze dried, therfore, needs to be reconstituted by using the pyrogen-free double distilled water (supplied as diluent with the vaccine) before the administration. Always cool the diluent before use. And ensure the use of reconstituted vaccine within 4 hours.

* Wait until at least one child of eligible age has arrived.
* Take a sterile 5ml syringe and a 20G sterile needle. Open a cool ampoule of diluent and draw 5 ml of distilled water for 10-dose vial *(Check the label, for expiry date before opening)*.
* Empty the diluent into the vaccine vial. Gently roll the vial between the palms of your hands for mixing. *(Do not vigrously shake or leave the needle in the vial)*.
* Position the child. Load a 2 ml sterilized syringe with 0.5 ml of reconstituted vaccine using 23 G sterilized needle.
* Pinch the skin on the outer part of the child's upperarm (left or right) with your fingers. Push the needle into the pinched skin--not straight in, but sloping and not, too far. To control the needle, support the adaptor end of the syringe with your thumb & finger while pushing in.
* Withdraw the plunger to check for blood. After ensuring that the needle is not in any vein, press the plunger with your thumb and inject the vaccine.
* Withdraw the needle and keep syringe as well as needle in a separate tray for sterilization.



SAFETY OF MEASLES VACCINE

Measles vaccine is very safe, if reconstituted vaccine is used within 4 hours, with 'one sterilized syringe and sterilized needle for one injection'. However, about 30% of those vaccinated develop malaise, mild fever and/or a rash 4-10 days after the vaccination. The parents need to be informed about this possibility. Severe complications like convulsions have occurred in 0.02 to 190 per 1 lakh vaccinated individuals, compared with 500 to 1000 per 1 lakh measles cases. Similarly encephalitis has been observed in 1 per 1 lakh vaccinated individuals, against 500 to 4000 per 10 lakh measles cases.

PROTECTION AFTER IMMUNIZATION

Proportion of vaccinees who are protected

Protection from disease has been defined either in serological or in epidemiological terms. In the former, seroconversion after immunization has been equated with protection from disease. In the latter, vaccine efficacy is estimated as the percentage reduction in disease incidence attributable to immunization, calculated by means of the following equation:

$$\text{Vaccine efficacy (\%)} = \frac{ARU-ARI}{ARI} \times 100 = (1-R) \times 100$$

ARU = attack rate in unimmunized population

ARI = attack rate in immunized population

R relative risk

ARI/ARD

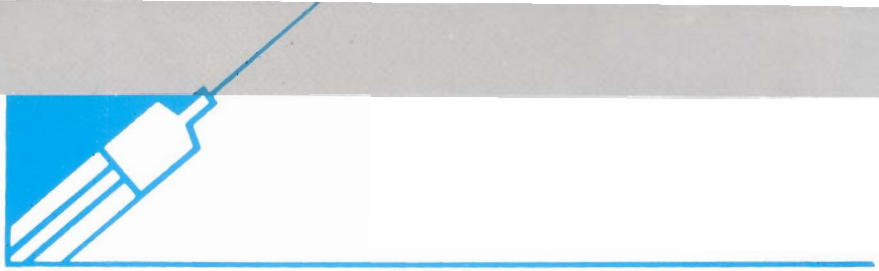
Serological studies performed in developing countries have shown seroconversion rates after immunization at age 9 months of 80-90%.

Duration of immunity

Several prospective studies of antibodies persistence after measles immunization have identified antibodies in over 85% of vaccinees 8 to 16 years post-immunization. Immunity after measles immunization appears to be varying from full, partial minimal to no protection. But, when measles cases do occur in immunized persons, many reports suggest that the disease is milder than in unimmunized persons.

CURRENT RECOMMENDATIONS UNDER UIP

To obtain the optimal immune response to immunization, measles vaccine should be administered at an age when all children have lost maternal antibodies. However, the immunological response must be balanced against the risk of measles at a given age, and this is reflected in measles immunization policies. CURRENT RECOMMENDATIONS ARE, THEREFORE, TO CONTINUE TO ADMINISTER MEASLES VACCINE AT AGE 9 MONTHS (270+ DAYS), EXCEPT IN SPECIAL SITUATIONS WHERE YOUNGER INFANTS ARE AT HIGH RISK OF EXPOSURE TO MEASLES.



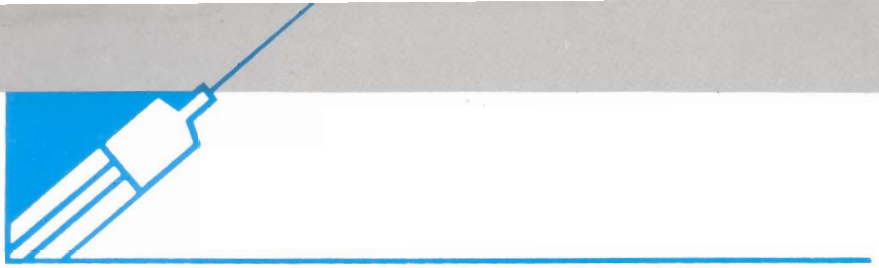
Simultaneous administration and combination of measles with other vaccine

Measles vaccine has been shown to be effective when given simultaneously with DPT and/or polio vaccine, with yellow fever vaccine, and with hepatits B vaccine. Also, it can be given with BCG vaccine safely on the same day. If not given on the same day a gap of 4 weeks should be observed because of the cell-mediated immune response to BCG reduces the humoral response to measles vaccine. THE UIP, THEREFORE, RECOMMENDS SIMULTANEOUS ADMINISTERATION OF MESLES VACCINE WITH OTHER UIP ANTIGENS FOR WHICH A CHILD IS ELIGIBLE.

UIP does not recommend use of MMR vaccine in the childhood immunization schedule in developing countries which have not achieved and sustained coverage approaching 100%. Also, the UIP does not recommend mixing measles with other vaccines such as DPT vaccine or yellow fever vaccine, in the same syringe for several reasons. Some preservatives reduce measles vaccine viability and indiscriminate mixing of vaccines could reduce vaccine potency.

Two-dose schedule

A two-dose schedule is used in two situations, 1) the first dose must be given at an age at which seroconversion is known to be suboptimal because the risk of early measles morbidity and mortality is high (eg, refugee camps, outbreaks); 2) In countries



with measles elimination goals, to help achieve the very high levels (98%) of herd immunity required. IN MOST DEVELOPING COUNTRIES, IT IS PREMATURE TO ADOPT A TWO-DOSE SCHEDULE. THERFORE, IN INDIA ONLY FIRST DOSE IS GIVEN.

MEASLES VACCINATION DURING EPIDEMICS

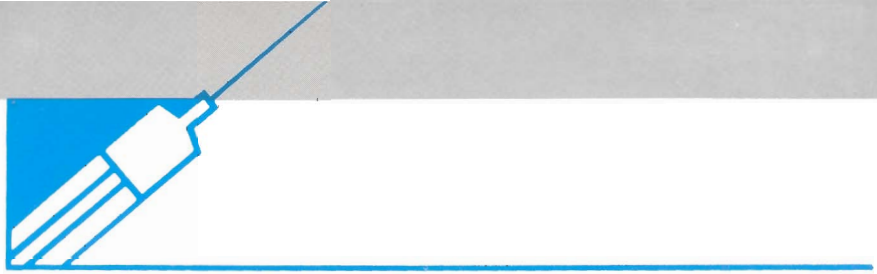
Measles vaccine can protect children who have been exposed to measles, and prevent the disease from occurring. But this is possible, only when the children receive the vaccine within the first 72 hours after exposure. The vaccine given beyond 3 days after exposure will do absolutely no harm, but may not protect the children. Thus, mass measles vaccinations during epidemics are useful if vaccination can be completed within 3 days of the first case.

REASONS FOR LOW MEASLES COVERAGE

Even though capable health workers and viable vaccines are available, adequate immunization is often not done. Many field studies and observations have unearthed the socio-cultural, operational or technical reasons for the prevailing low coverage levels. The reasons may be summarized as following:

Socio-cultural

- Measles is not considered to be a serious disease by some parents, health personnel and even few doctors.

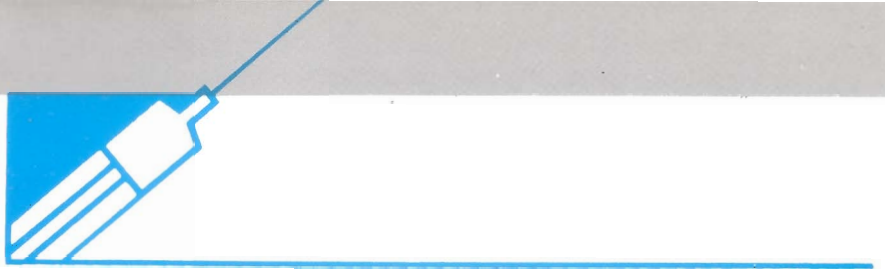


Operational

* Few adverse reactions and unfortunate deaths after improper measles vaccination have been highlighted by the media that has led to the restrictive directives, such as measles vaccine be administered in the presence of a doctor, only.
* Medical institutions and health workers accustomed to shortages and accountability are reluctant to open a 10-dose vial for 1 or 2 eligible infants for the fear of wasting other doses.
* Malnourished child of 9 months age may appear younger, so, health workers and even doctors may decide not to vaccinate.
* The age window (9-12 months) in the UIP gives only 3 months' time for the service provider/parent to get a child immunized.
* The interval between DPT3/OPV3 and measles vaccination is 5-6 months that may lead parents and even health workers to forget about the vaccine. This results in poor compliance.

Technical

* In about 10-30% of immunized children, fever and mild measles-like rashes appear after the measles vaccination. Health workers are often afraid to explain this for the fear of putting the parents against immunizing their children.
* A service provider may withhold the vaccine due to a minor illness, eg, mild fever, diarrhoea, etc (30% children fail to get vaccinated due to sickness.
* The mother may give a history of measles occurrence (20% wrong) and thus no vaccine may be thought necessary.
* Some pediatricians prefer to give measles vaccination after 12 months of age.



THE URBAN MEASLES CONTROL INITIATIVE IN INDIA (1998-2002)

Goal

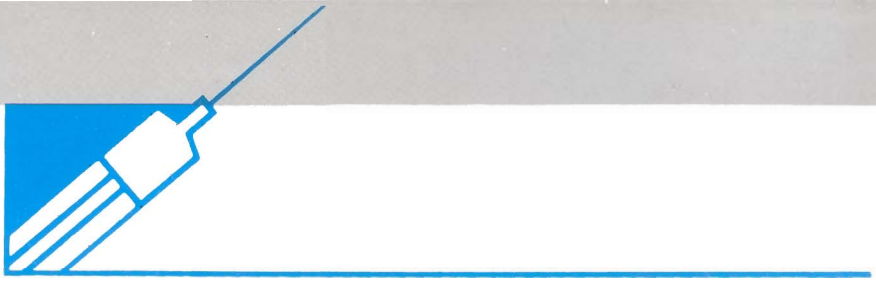
The overall goal of the initiative is to interrupt measles transmission in major cities especially in urban slums.

Why focus in urban areas?

* A large proportion of measles cases and deaths occur in urban areas. Over-crowding puts children at risk of contracting the disease.
* Measles immunization rates have not been high enough to control measles. Fewer than 80% of children under-one are immunized against measles in urban slums. To reduce transmission rates > 90% of the children need to be vaccinated.
* Cities act as 'seedbeds' for the virus. Children often visiting from rural areas become infected in crowded market, trains, buses, etc and take the virus back to the villages.

Specific objective

Routine measles immunization should be improved by involving NGOs and private sector to provide additional immunization sessions in the under-reached or un-reached areas. Measles immunization campaign will be conducted in under-



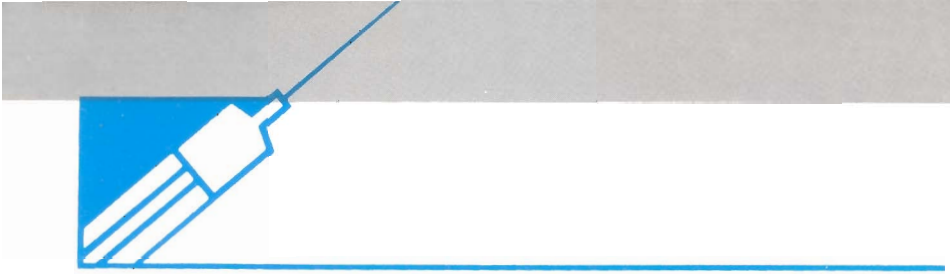
served, densely populated urban and peri-urban areas for children in high-risk age groups in 1-2 cities per major state. Vitamin A supplements and household skills in caring for children with measles should be promoted more. Surveillance system and standard case management practices both in public and private sectors to assess the impact of the initiative in terms of incidence and CFRs should be built. The National Consultation held in October 1998 has recommended following strategies:

STRATEGIES FOR ACCELERATED MEASLES CONTROL

1. Improve routine measles immunization services and increase routine coverage levels:
   Measles immunization services in urban areas are generally restricted to hospitals, dispensaries and private clinics. Through a systematic purposive survey, one needs to identify the slum/urban poor/middle class/ congested pockets and organize immunization services at least once a month and additional immunization services where already routine immunization services exist. *(This strategy should not be limited to urban areas only, in other words it should include both rural and urban areas).*

Measures to improve measles vaccination coverage:

- Orient the medical colleagues with requisite technical details to stress upon the magnitude of the measles problem and the need for its immunization.
- Let doctors know that in the present situation, the country can derive best

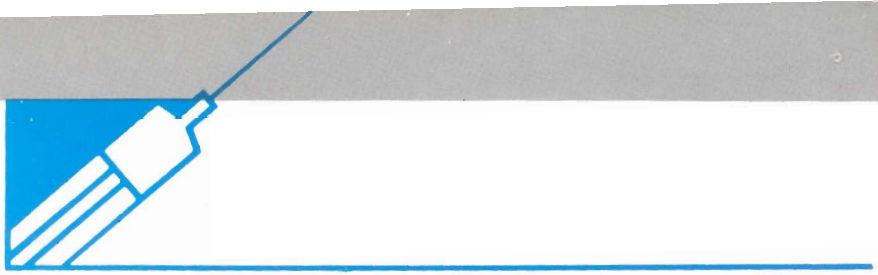


results by administering measles immunization immediately after 9 months (270 days) of age.

- Promote community awareness through mass media, interpersonal communication and action, to identify each child and to get her fully immunized.
- Promote measles immunization for all children in the age group of 9-12 months, even if, they are malnourished.
- Ensure that immunization card (home-based) is issued to parents of every child and counter-foil is kept with medical institution or health worker. Ensure review of the card for immunization status (actively or passively) until measles immunization is given. This will help in achieving high coverages of full immunization.
- Ensure provision of measles vaccination services in all immunization sessions. And, let the institutions/subcentres open a vial of measles vaccine, even if, there is a single eligible child on the fixed day of the session.
- Also, immunize children above the age of 12 months, if they have not already been protected.
- If required, promote intensive measles immunization once every 3 months to supplement routine services.

2. Improve routine Vitamin A supplementation:

Majority of the surveys indicate routine Vitamin A supplementation coverage to be around 30-60% in the urban slums. Though, the main reason is availability of Vitamin A, lack of outreach services can also contribute to the low coverage. Lack of understanding in the private sector on the need and utility of Vitamin A supplementation may also be one of the reasons. Actions on all these fronts need to be taken.



3. Organizing special immunization campaign:

Identify cities having high risk for measles, by:

a) Existing data on incidence either in the Government/private sector

b) House-hold surveys for measles incidence and immunzation coverage.

c) A quick participatory assessment of incidence and immunization coverage in the community.

After assessing the situation of measles immunization and identifying the cities for the initiative, have intersectoral planning meeting. Identify partners and allocate responsibilities with mutual consultation. Campaign will be organized in the entire city for children in the age 9 months-5 years (local adjustment to be made depending on the epidemiology and age distribution of measles cases in the locality) with special attention to the urban poor and uncovered children. As a follow up undercovered areas will be identified and responsibilities to these pockets will be allocated to different Government/municipal/NGO agencies for additional immunization quarterly. The main features of these campaigns will be:

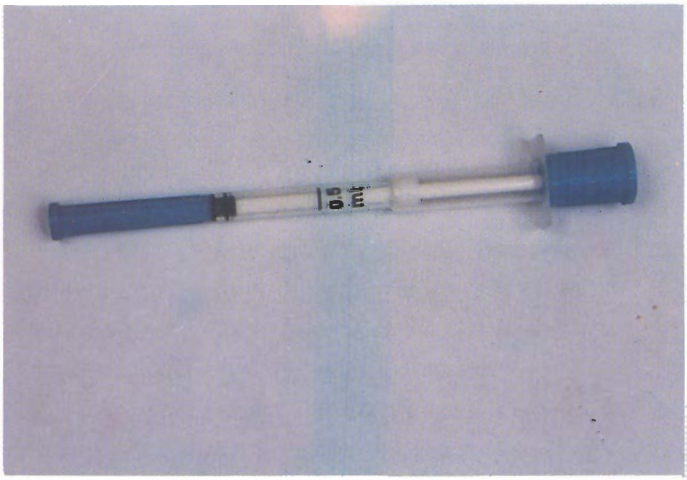
* Target all children in 9-59 months age (adjust the age according to local epidemiological needs) regardless of prior vaccination status.

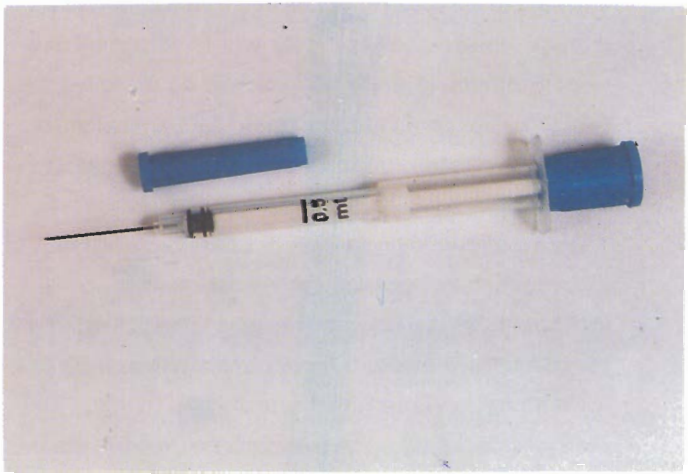
* Immunize all children in the identified age group without asking for the previous immunisation status (children who have been immunized in last one month can be avoided as this will not be effective).

* Mobilize NGOs, professional bodies and neighborhood committees under

SJRY for demand generation and active participation, especially to reach the children unreached by the routine immunization services.

* Immunisation is given in the campaigns using autodestructible syringes only and arrange for the safe disposal of these syringes.





4. Disease Surveillance:

- Strengthen surveillance of measles cases and deaths in the Government/ Municipal hospitals both in Outpatients and Inpatients ward.
- Involve private practitioners to report measles cases and deaths.
- Conduct community based surveys/participatory diagnostic campaigns.

5. Develop standard case management practices for the clinicians managing measles complications.

6. Consider serological diagnostic tests:

- IgM ELISA test is easy and can be performed at the district laboratory or where ELISA set is available and the technician is trained. It includes coating of polystrene microtitre strips with purified meales virus, adding the serum samples of the patients to the wells, followed by addition of anti-human IgM conjugate substrate, reading OD values with ELISA reader. This test distinguishes the cases in 2 categories: a) Confirmed infection-- clinical features with IgM antibody detection: b) Subclinical infection-- detection of IgM antibodies without clinical features. Siblings of measles case can get subclinical infection.
- Detection of IgG antibodies indicate either a natural infection, immunization or maternally transferred antibodies (infants only). Serological surveys for assessment of immunity to measles can be done with the help of IgG ELISA for detection of seroconversion after immunization. At the mass level, IgG antibodies detection by serological surveys before and after 1-2 months of mass campaigns.
- If the pregnant women do not have IgG antibodies, the maternal antibodies would not be available to pass on to the newborns and such infants are at high risk for want of protective antibodies.

FORM I

PROTOCOL FOR HOUSEHOLD MEASLES INCIDENCE SURVEY

Cluster Number.....Locality:.....District:.....

1 Age group in months	2 Male children	3 Male children with measles	4 Female children	5 Female children with measles	6 Total children	7 Total children with measles
0-11						
12-23						
24-35						
36-47						
48-59						
>59	Don't fill this column	Fill this by tally mark	Don't fill this column	Fill this by tally mark	Don't fill this column	Fill this by tally mark

Note: Tally mark number of children according to sex and age groups
Please fill up name of case and details (in format II) for each measles case

FORM II

LINE LIST OF MEASLES INCIDENCE IN THE COMMUNITY SURVEY

Cluster Number.....Locality.....District:.....

Case Details	Child Number					
	1	2	3	4	5	6
1 Sex: Male/Female						
2 Name						
3 Address						
4 Rural(R)/Urban(U)/Urban slum(US)						
5 Age (months) at illness						
6 During illness, was there: -a rash for 3 days or more? -a fever of 38 °C -any cough, cold/URTI -conjunctivitis/red eyes -Did the rash start from face and progress down to abdomen and legs? -Was there a discoluration of the skin after the rash?						
7 Had the child got measles vaccine before illness?						
8 Was Vit A given: i) After diagnosis? ii) Before illness?						
9 Was there another case in the same household within a month before this?						
10 Was (s)he malnourished before illness?						
11 Was illness within the defined time?						
12 Did the child live in the defined area for at least 10 days before the illness?						
13 Was (s)he alive 1 month after illness?						

Signature of the investigator and Date

For questions 6-14, enter as Y-Yes, N-No, DK-Don't know & CA-Couldn't assess

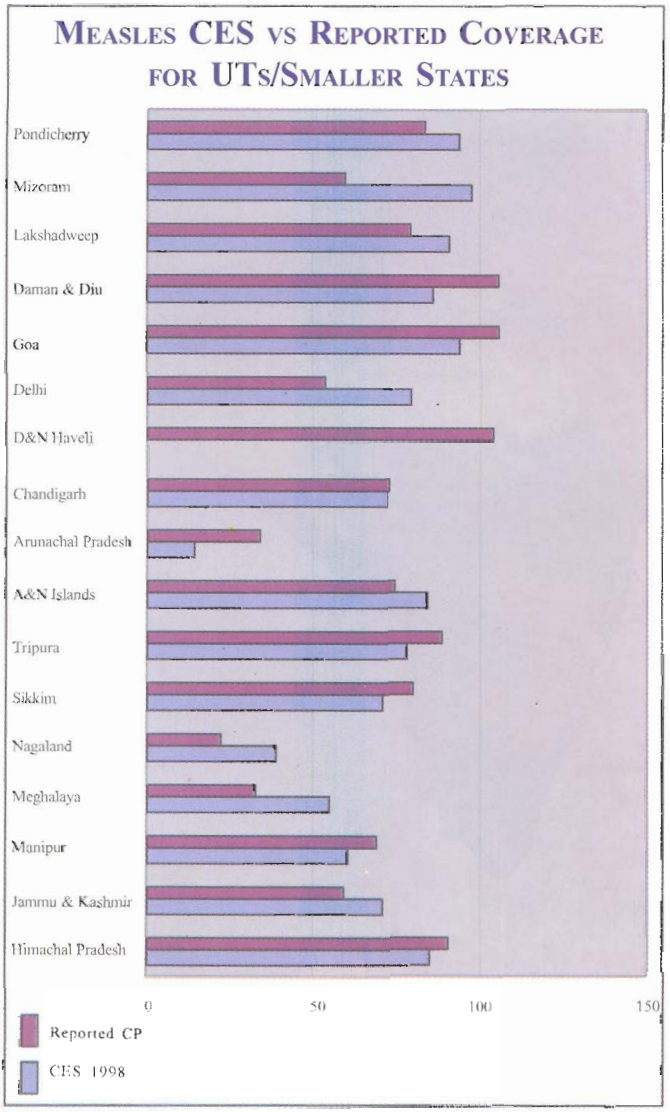
FORM III

LINE LIST OF MEASLES SURVEILLANCE AT HEALTH FACILITIES

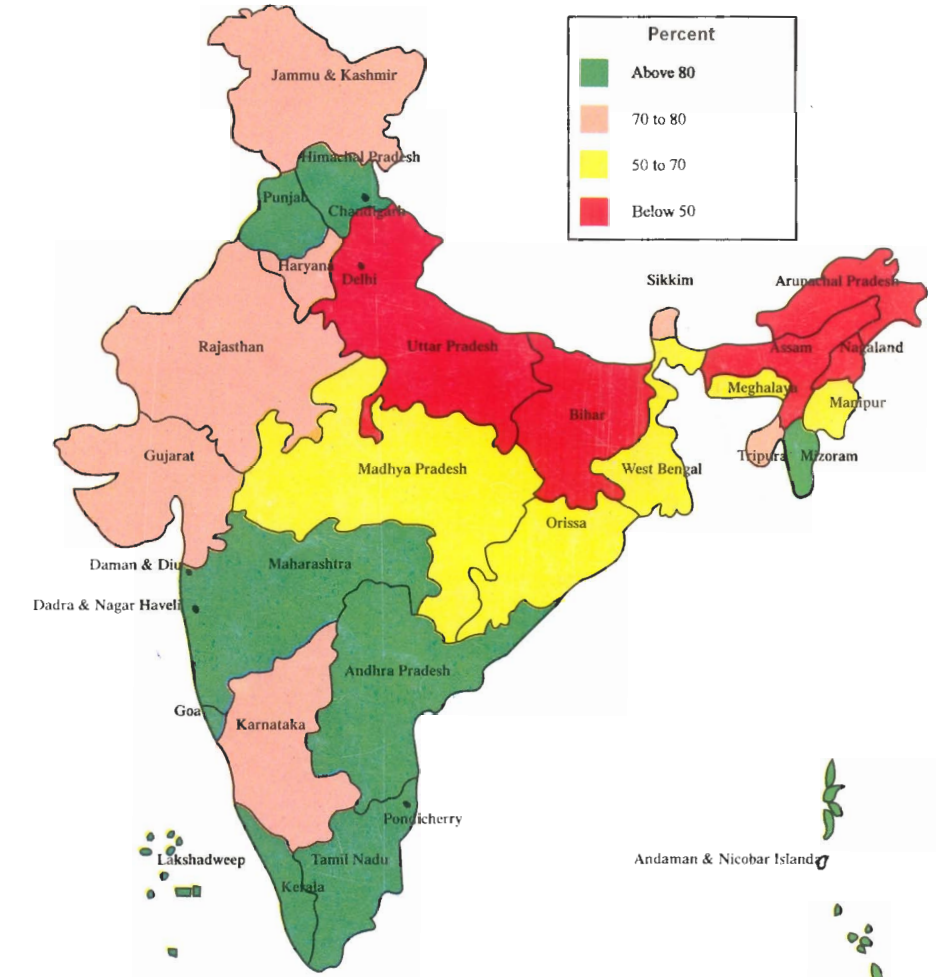
Cluster Number.....Locality:.....District:.....

Case Details	Child Number					
	1	2	3	4	5	6
1 Dateattended						
2 Presenting compliants: D-Diarrhoea, A-ARI ED-Ear discharge EP-Eye problem M-Measles without complications MN-Malnutrition Others (specify)						
3 Sex:Male/Female						
4 Rural(R)/Urban(U)/ Urban slum(US)						
5 Immunized for measles Y-Yes, N-No, CA-Could not assess						
6 Was Vit A supplement given? i) Before onset of measles ii) After onset of measles (actual number of doses, CA)						
7 Malnutritioned on examination N-None, 1-GrI, 2-GrII, 3-GrIII						

Signature of the investigator& Date


MEASLES CES VS REPORTED COVERAGE FOR UTS/SMALLER STATES
Pondicherry
Mizoram
Lakshadweep
Daman & Diu
Goa
Delhi
D&N Haveli
Chandigarh
Arunachal Pradesh
A&N Islands
Tripura
Sikkim
Nagaland
Meghalaya
Manipur
Jammu & Kashmir
Himachal Pradesh
0
50
100
150
Reported CP
CES 1998

MEASLES COVERAGE IN INDIA
1997-98



Source : CES 1998

NATIONAL IMMUNIZATION PROGRAMME

Government of India