

EXPANDED PROGRAMME ON IMMUNIZATION

LOGISTICS INVENTORY

July 2000

PROVINCIAL EPI DIRECTORATE

DEPARTMENT OF HEALTH

PUNJAB

TABLE OF CONTENTS

Sr. No.	Item	Page No.
1	Chapter 1 Introduction & Background	1
2	Chapter 2 Health System in Punjab	4
3	Chapter 3 Cold Chain	6
4	Chapter 4 Situation analysis	8
5	Chapter 5 Outcome	10
6	Chapter 6 Conclusion	22
7	Chapter 7 Recommendations	25
6	Annexure-1 Health Facilities in Punjab	27
7	Annexure-2 Cold chain Equipment in Rural Area	28
8	Annexure-3 Working cold chain Equipment	29
9	Annexure-4 Repairable cold chain Equipment	30
10	Annexure-5 To be Condemned cold chain Equipment	31
11	Annexure-6 Cold Boxes	32
12	Annexure-7 Vehicles	33
13	Annexure-8 Motor cycles in Districts	34
14	Annexure-9 Stabilizer	35
15	Annexure-10 Bicycles	36
16	Annexure-11 Generator	37
17	Annexure-12 Tables Thermos	38
18	Annexure-13 Vaccines Carrier	39
19	Annexure-14 Detail of Repairable cold chain	40
20	Annexure-15 Balance of Items present in Districts	41
21	Annexure-16 Distribution Plan of ILR	42
22	Annexure-17 Requirement	43

FOREWORD

Immunizing all the children less than five years of age against six vaccine preventable diseases is the main objective of Expanded Programme on Immunization (EPI). To achieve this objective out reach vaccination teams are working at union council / ward level supplemented by fixed EPI Centers at sentinel health facilities. Potency of vaccine cannot be ensured without an effective cold chain system, in other words effective cold chain is the backbone of the programme.

The Government of the Punjab and the donors are putting all the available resources for strengthening of cold chain throughout the province. To replenish the existing cold chain equipment and to make the distribution equitable it was mandatory to have a baseline data of cold chain inventory in the field. It was in this spirit that the members of Provincial EPI Directorate conducted a survey for the physical verification of cold chain equipment with UNICEF assistance. The main purpose of the survey was to assess the current situation of equipment in the field and to identify gaps and obstacles to make the equipment functional.

The report presents the result of the survey and documents the methodology adopted. One of the main objectives of this exercise was to ascertain the future needs of cold chain equipment for EPI in Punjab for an efficient and effective service delivery.

The institutionalization of this exercise will be a much-needed accomplishment that will greatly facilitate the department to make need based distribution beside tapping and allocating resources for procurement and repair. It is felt that such surveys provide an excellent tool for policy makers to address the quality issues and bottlenecks. However, its usefulness will depend on its objectivity and translation of findings into actionable steps. I take this opportunity to reiterate that the Government and UNICEF would work closely together in accomplishing the objectives.

I appreciate the efforts of all the members of Provincial EPI Directorate especially Dr. Mohammad Mazhar Hussain Qureshi for developing questionnaire and performing data analysis, Mr. Mazhar Hussain Shah for data entry, Dr. Azhar Abid Raza for write-up and Dr. Abdul Majeed Qureshi for overall guidance in accomplishing this task; and congratulate them for producing this valued reference document, which will ease the task of planners.

Dr. Naseer Nizamani
Programme Officer (Health & Nutrition)
UNICEF, Lahore.

EXECUTIVE SUMMARY

Expanded Programme on Immunization aims to reduce morbidity & mortality of six EPI diseases; **Poliomyelitis, Diphtheria, Pertusis, Tuberculosis, Tetanus & Measles**. Punjab is the most populous province of Pakistan with present population of 78.2 Million on the basis of 1998 census. The status of immunization coverage in Punjab has therefore a major impact on the programme coverage of entire country. The coverage was above 90% in 80s but there was a dip in mid 90s due to shortage of logistics resulting in re-emergence of EPI diseases. To clear this backlog crash programme was launched in 1999. Third Party Evaluation (TPE) of EPI coverage was conducted during June 2000 under UNICEF assistance. The results showed that 70% of children were found fully immunized. Government of Punjab is providing 100% preventive health care to the masses. Immunization is provided through outreach teams supplemented by fixed vaccination sites (EPI Centers) at health facilities.

The aim of the study is to improve and strengthen EPI Punjab for better service delivery with the objective to prepare inventory of EPI logistics in Punjab to find the condition of Cold Chain Equipment and other EPI logistics available at the various levels.

Various categories of cold chain equipment ranging from cold rooms and refrigerated vans to vaccine carrier and thermos are being used at various levels for the maintenance of cold chain. Provincial and Divisional Headquarters are equipped with cold rooms and refrigerated vans for storage and transportation.

Deep freezers and refrigerators are the most commonly used equipment at vaccine points. In urban area all the health facilities are well equipped except few run by local bodies, while in rural areas 2.4% RHCs and 61.2% BHUs are without cold chain equipment. In most of the districts more than 50% of BHUs are without any cold chain equipment. Despite electrification 36 (12%) RHCs and 307 (35%) BHUs are not working as static EPI Centers. Despite shortage of cold chain equipment in the field a bulk is lying in district EPI stores.

62% of the existing cold chain equipment although working, has completed their life as they were supplied during early stages of the programme i.e. late 80s and early 90s. A substantial quantity of equipment; 175 small refrigerators, 121 ILRs, 34 TCWs and 87 Deep Freezers are lying out of order for want of minor repairs. The District Health Officers are reluctant to get them repaired due to fear of audit objections. Similarly a large number of unserviceable equipment is dumped in stores for auction, which include 586 small refrigerators, 266 ILRs, 157 deep freezers, 25 TCWs, 1556 stabilizers, etc.

Vehicles and bicycles for the transportation of field and supervisory staff are again inadequate. Moreover, adequate quantity of POL is not provided for the vehicles and motorcycles.

The results conclude that majority of the cold chain equipment was procured during 80s and early 90s hence needs replenishment at the earliest. Repair and maintenance requires proper allocation and timely attention to compensate the shortage in the field. Electrification of BHUs is a major barrier to in establishing Static EPI Centers beside deficient cold chain. Measures should be taken to ensure that all the health facilities are electrified and all the resources / donors should be tapped to replenish cold chain.

CHAPTER 1

INTRODUCTION & BACKGROUND

1.1 Expanded Programme on Immunization (EPI) Punjab

Expanded Programme on Immunization aims to reduce morbidity & mortality of six EPI diseases; **Poliomyelitis, Diphtheria, Pertusis, Tuberculosis, Tetanus & Measles**. It was started as pilot project in 1978 limited to metropolis of Punjab that was later expanded to cover the entire province in terms of provision of immunization to all the children less than one year of age for all the target diseases and the pregnant women for tetanus. It was integrated in Punjab Health Services in July 1985.

Punjab is the most populous province of Pakistan with present population of 78.2 Million on the basis of 1998 census. The status of immunization coverage in Punjab has therefore a major impact on the programme coverage of entire country. Due to non-availability of EPI logistics mostly vaccines and syringes, in 1993, 1994 and the first half of 1995, the EPI activities in Punjab as in the rest of the country declined. In 1994 and first half of 1995, the coverage figures had gone quite low as compared to the performance till 1991. The Federal Ministry of Health allocated sufficient funds in 1995 and adequate supplies were provided to Punjab in the second half of 1995. There was a visible improvement in the coverage in 1996. However, in 1997 the province once again faced a severe shortage of disposable syringes, at times bringing the programme to a virtual stand still.

The fall in immunization coverage has resulted in re-emergence of incidence EPI diseases. Although it is mandatory for all the health institutions to report the incidence EPI diseases but the figure verses the common observation are shockingly low. It would be highly probable to assume that only a few major institutions are reporting correctly. The situation warrants new strategy for recording, reporting and assessment.

Since 1994, 14 rounds of National Immunization Days (NIDs) have been conducted to achieve the target of Polio Eradication by the year 2000. A rapid evaluation of three districts after the first round of 1997-98 NIDs revealed that 92% of the children 0-3

years of age were provided Polio drops while 58% of children 12-23 months of age were immunized against measles, reflecting poor routine coverage.

EPI Programme continued to have low vaccination coverage during 1992 to 1995 due to shortage of vaccine and disposable syringes off and on. This resulted in huge backlog of unvaccinated children and pregnant women that warranted immediate action. To clear this backlog Punjab Health Department in collaboration with Federal EPI Cell, Second Family Health Project, UNICEF and WHO launched a crash programme from July to October 1999. The major objectives of the Crash Programme were:

1. To clear the immunization backlog.
2. To achieve and maintain above 95% coverage against all antigens.
3. To reduce the Infant Mortality Rate (IMR) by 9%.

Crash Programme was launched with great enthusiasm and with high commitment of the planners and staff. It looked like a battle against backlog and despite scorching heat of July the workers performed well. It was the first time when Medical Officers owned this programme. It would have been one of the successful stories and exemplary to other programmes, but unfortunately at the peak of the programme, the supply of vaccine became interrupted and the entire tempo was damaged. With all limitations and constraints, crash programme was successful to some extent. It not only cleared the backlog, but also woke up the vaccinators and conveyed a message that “EPI programme is the responsibility of Health Department as a whole and not of the vaccinators alone.

Afterwards Third Party Evaluation (TPE) of EPI coverage was conducted during June 2000 under UNICEF assistance. The results showed that 70% of children were found fully immunized. Keeping aside the extremes of Vehari (95%) and Rajanpur (28 %), most of the districts were around 60 %. Keeping in view the target of above 95% coverage set for the crash programme, these results were quite disappointing. Department of Health on probing found that availability of staff and cold chain equipment were the major differences among the poor and good performing districts beside geographical differences.

Most of the cold chain equipment is outlived because it was purchased in 1983 and afterwards only piecemeal, incomplete replenishment was made. To forecast the actual provincial needs and to tape the donors, department needs a clear-cut picture of the status of Cold Chain equipment in the field. Unfortunately, the existing record does not provide this information due to following reasons:

- Initial record of supplies at Provincial headquarter is missing.
- The provincial policy to supply the equipment to the districts had not been uniform. Initially the whole supply used to be distributed through divisional directorates and reshuffling among the districts was also possible. Later on all the supply was sent directly to the districts.
- Initially supplies were sent directly from the Provincial EPI Directorate. Later on the distribution was made through Government Medical Stores Depot.
- The creation of new districts also distorted the provincial record. The inheritance to new districts was from different sources and from the record of these districts the source of cold chain equipment cannot be traced.
- The outdated equipment has been condemned in some districts, the record of which is not available at the Provincial headquarters.

The above situation warranted physically checking and verifying the status of cold chain equipment in the field.

CHAPTER 2

AIMS, OBJECTIVES AND METHODOLOGY

2.1 Aim

To improve and strengthen EPI Punjab for better service delivery

2.2 Objective

To prepare inventory of EPI logistics in Punjab

2.2.1 Sub-objectives

2.2.1.1 To find the condition of Cold Chain Equipment and other EPI logistics available at the various levels of service delivery.

2.2.1.2 To ascertain the future needs of EPI Punjab regarding Cold Chain Equipment and other EPI logistics.

2.3 Study Methodology

2.3.1 Data Collection Tool

A Performa was designed for collection of data. In the light of field-testing in Vehari and Lahore, it was modified and updated. It has two parts. One part is to be filled in as per record of District Stores. The other part was to be filled in at the facility level. It basically counterchecked the entries of the main part. Performa is attached as Annexure-A

A work plan was prepared to collect data from the district, tehsil, and sub-stores at RHC / BHU and EPI Centers.

The investigators were identified among the senior EPI staff. In a one-day workshop, the investigators were trained at Lahore.

2.3.2 Data Collection

The data collected district wise. The investigators traveled to the districts, they reviewed the record available in the office of District Health Officers and recorded it. Later they went to individual facilities and recorded the type, availability and working status of any item pertaining to EPI. Whenever they found out of order equipment they tried to gather the information regarding defect.

2.3.3 Data Consolidation

Microsoft Excel Programme was used for data entry, consolidation and analysis at Provincial EPI Directorate.

CHAPTER 3

RESULTS

3.1 Health System in Punjab

Punjab Health Department is providing health facilities to people through multiple outlets. The department is providing 100% preventive care while curative care is patchy. Primarily curative care is provided through hospitals and preventive care through out-reach teams. In addition there is a battery of Rural Health Centers (RHCs) and Basic Health Units (BHUs) that provide both curative and preventive services.

Hospitals attached with teaching institutions, Divisional / District Headquarter Hospitals and Tehsil Headquarter Hospitals are the various types of health facilities located in urban areas. These are further strengthened by various auxiliary hospitals of Health Department, Local Government and Cantonment Board.

Rural Health Centers and Basic Health Units run by Health Department provide health services to vast majorities of rural population in Punjab further supported by Rural Dispensaries and Maternity & Child Health Centers of Local Government.

Annexure-1 shows the district wise distribution of health facilities in Punjab.

3.2 Status of Cold Chain Equipment in Rural Area

During survey, it was found that in urban area all the facilities except few run by local bodies are without refrigerator and hence they are unable to work as Static EPI Center. Annexure-2 shows the district wise distribution and working status of cold chain equipment in rural area.

It was observed that out of 291 Rural Health centers, only 4 were not electrified, while out of 2463 Basic Health Units, 215 (10%) were non-electrified. Table 1 shows a summary of the observations regarding availability of cold chain equipment in the rural area.

TABLE 1
AVAILABILITY OF COLD CHAIN EQUIPMENT
IN ELECTRIFIED HEALTH FACILITIES OF RURAL AREA

Status / Availability of Cold Chain Equipment	Rural Health Center (n=291)		Basic Health Unit (n=2463)	
	Number	%	Quantity	%
Available	280	97.6	872	38.8
Not Available	7	2.4	1376	61.2
Total	287	100	2248	100

Majority of Rural Health Centers (97.6%) has cold chain equipment and they work as sub-stores. Most of these also function as static EPI Centers. In contrast only 38.8% of Basic Health Units have a cold chain equipment and they provide the services as sub-stores for out-reach teams. Some of these also function as static EPI centers. There are 7 Rural Health Centers and 1376 Basic Health Units, which are although electrified but have no cold chain equipment. These are the potential sites for future extension of cold chain equipment. 61.2 % of Basic Health Units are without cold chain equipment.

TABLE 2
ESTABLISHMENT OF EPI CENTER IN FACILITIES OF RURAL AREA
EQUIPPED WITH COLD CHAIN EQUIPMENT

EPI Center	Rural Health Center		Basic Health Unit	
	#	%	#	%
Established	254	87.6	565	64.8
Not Established	36	12.4	307	35.2
Total	290	100	872	100

Table 2 shows the proportion of health facilities with cold chain equipment in rural area, where static EPI centers are established. It is evident that 36 Rural Health Centers and 307 Basic Health Units are not working as EPI centers despite availability of cold chain equipment (refrigerator). This is against the policy that all the health facilities where cold chain equipment is available should function as static EPI center. Table shows that 12.4 % of Rural Health Centers and 35.2 % Basic Health Units are not providing the services as EPI centers although equipped with cold chain equipment.

CHAPTER 4

COLD CHAIN

4.1 The cold chain system

To be potent and effective for a longer time, vaccine requires to be kept at standard recommended temperature. OPV, BCG and Measles vaccines are highly sensitive to heat, while freezing damages DPT and TT vaccines. The cold chain system is essential to maintain the potency of vaccines right from the manufacturer to the vaccination point.

Equipment and personnel are the two essential components involved in cold chain system and both are equally important. The finest and state of the art technology alone cannot ensure that the vaccine would remain effective unless it is properly handled. Equipment is required for storage and transportation of vaccines, while a properly trained and committed store keeper deals and operates the equipment in a better way and as a result not only the equipment have a longer life, but it also keeps the vaccines potent.

The cold chain system contains a series of links during which adequate refrigeration is sustained to maintain the potency and efficacy of vaccine. As the vaccine moves from the manufacturer down to the field and to the vaccine site, the risk of cold chain disruption increases. This warrants that temperature of vaccine should be continuously monitored all the way.

4.2 Vaccine storage

To keep the vaccine potent; it should be kept at recommended temperature at different levels of the cold chain system. Table 3 shows the recommended temperature for various vaccines used in EPI.

Table 3**RECOMMENDED TEMPERATURE FOR STORAGE OF DIFFERENT VACCINES**

Vaccine	Central store up to 8 months	Regional store up to 3 months	Health center up to 1 month	Transport up to 1 week
Measles OPV	-20 Degree Celsius			YES
BCG, DPT & TT	0 to +8 Degree Celsius			

All the vaccines at any stage of the cold-chain are being transported at 0 to +8 degree centigrade. Measles and Polio vaccines are more stable when freezed, hence kept up to –20 degree Celsius. While DPT and TT vaccines are damaged on freezing hence stored between 2 to 8 degree Celsius. Once the potency of vaccine is lost due to exposure to extreme temperature, returning the vaccine to the correct storage temperature cannot restore it.

4.3 Cold chain equipment used in EPI

Different equipment is being used to maintain the desired temperature of vaccines at various levels. Vaccine is carried in refrigerated vans, from National Institute of Health, Islamabad to the provincial stores. Cold rooms are installed for storage of vaccine at the provincial and divisional level. From provincial stores, the refrigerated vans of divisional stores carry the vaccine to the divisional and district stores. From district store, it is carried in cold boxes to tehsil and facility stores. At Tehsil level there are two types of stores.

- Sub-stores at Rural Health Centers / Basic Health Units (RHC / BHU) from where only outreach teams take vaccine.
- EPI Centers; where the children get vaccinated.

Deep freezers, ILRs and refrigerators to store the vaccine at the recommended temperature at all above stores and vaccine carriers are used by outreach teams to maintain the cold chain.

CHAPTER 5

SITUATION ANALYSIS

5.1 Cold Chain Equipment at Provincial and Divisional Stores; Cold Rooms

EPI - Punjab has 19 cold rooms. Provincial store has 8 cold rooms while there are two cold rooms at divisional stores of Multan, Sargodha and Lahore and one cold room is installed at divisional stores of Rawalpindi, Sargodha, Faisalabad, Bahawalpur and D.G.Khan. These cold rooms supply vaccine to the respective districts within the divisions. Districts of Lahore Division sometimes receive vaccine directly from the provincial cold room. These cold rooms have the facilities of both minus and plus temperature to keep the vaccine potent for longer times. Three cold rooms provided by Second Family Health Project have been installed in December 2000. Other provincial cold rooms were installed in late 80s and early 90s. One Cold Room of Lahore was installed in December 2000 and the other in March 1998. Cold Room of Rawalpindi was installed in March 1998 and that in Faisalabad in December 2000. Second Family Health Project has provided all these equipments. One Cold Room provided by Second Family Health Project, although belongs to EPI is installed at Government Medical Stores Depot, Lahore. All other cold rooms were installed in early 90s.

5.2 Cold Chain Equipment at Districts and Lower Stores

5.2.1 Types of Equipment

The following equipment is being used to keep the vaccine potent and effective at all levels of service delivery in EPI:

1. Deep freezers
2. Ice Lining Refrigerators (ILRs)
3. TCW - 90
4. Small Refrigerators
5. PEL Refrigerators
6. Cold Boxes
7. Vaccine carriers

5.2.2 Working Cold Chain Equipment

Each district has a district vaccine store. Districts collect vaccine from the divisional cold rooms (sometimes from provincial cold room) according to their target population. Vaccine is stored in different type of equipment before distribution to the next level. To further facilitate the distribution process of vaccine, tehsil level and sub stores are opened within the districts. Sub-stores are located at Rural Health Centers or Basic Health Units (sometimes at Rural Dispensaries). Actually, it is the policy of Government of Punjab to open an EPI Center at each health facilities including all Basic Health Units, which should also work as sub-store for the outreach team/teams of the Union Council/Ward. Due to shortage of Cold Chain Equipment, at some selected Basic Health Units and at almost all Rural Health Centers, the equipment is available presently.

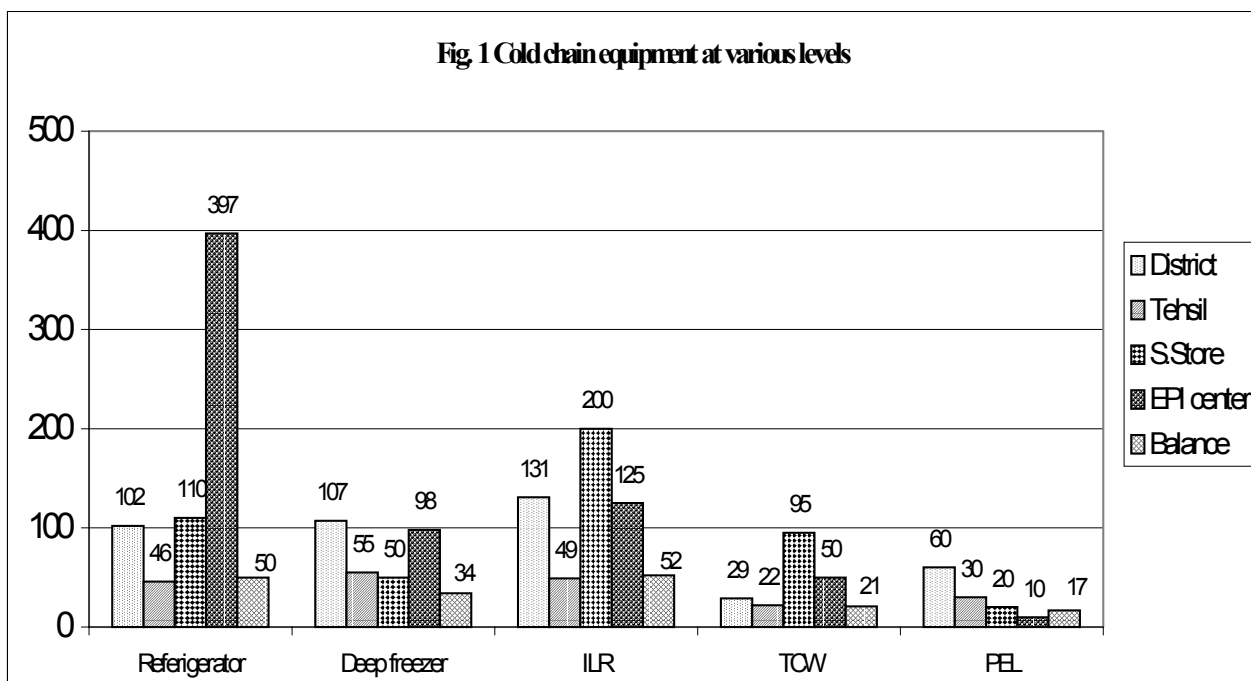
Table 4 shows different types of working Cold Chain Equipment available in the districts, tehsil and sub-stores and EPI Centers.

Table 4

Distribution of Working Cold Chain Equipment at Various Levels

S.No.	Name of Equipment	Total Number					
		District	Tehsil	Sub store	EPI Center	Balance	Total
1.	Small Refrigerator	102	46	110	397	50	705
2.	Deep Freezers	107	55	50	98	34	344
3.	ILR	131	49	200	125	52	557
4.	TCW - 90	29	22	95	50	21	217
5.	PEL Refrigerator	60	30	20	10	17	137

The above information is graphically represented in Figure 1 below.



It is evident from the above figure that still small refrigerators are catering a larger part of EPI system particularly the EPI Centers, although ILRs are more widely used equipment at sub-stores, tehsil and district stores for storage of vaccine. Bulk of available Deep Freezers is present at RHCs, District and Tehsil Stores. TCWs are the rarely used equipment as most of them were supplied during early 90s.

Table 5 tentatively reflects the year of supply of working cold chain equipment available at districts and peripheral level as well as those kept in balance.

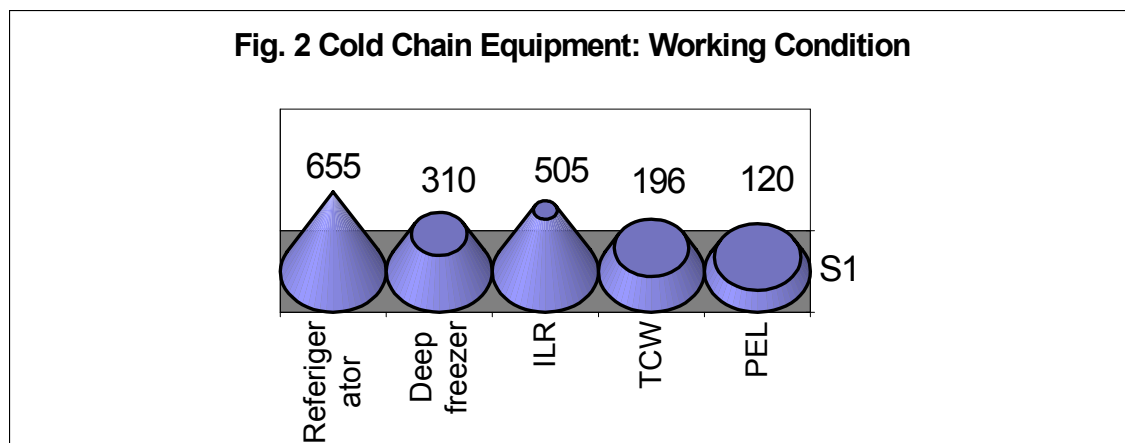
Table 5
Supply Phases of Working Cold Chain Equipment

Supplied	Small Refrigerators	Deep Freezers	PEL Refrigerators	ILR	TCW
Before 1990	655	233	0	111	217
After 1990	0	77	152	426	0
Total	705	344	137	557	217

The table shows that most of the equipment (62%) was supplied during early stages of the programme i.e. late 80s and early 90s except some medium size ILR supplied

during 1998-2000. This equipment is in use since then and it is presumed that almost all of them have completed their life and may stop working any time. This issue needs to be seriously considered both by the donors and government.

Figure 2 shows the type and quantity of working cold chain equipment available in for EPI in the province.

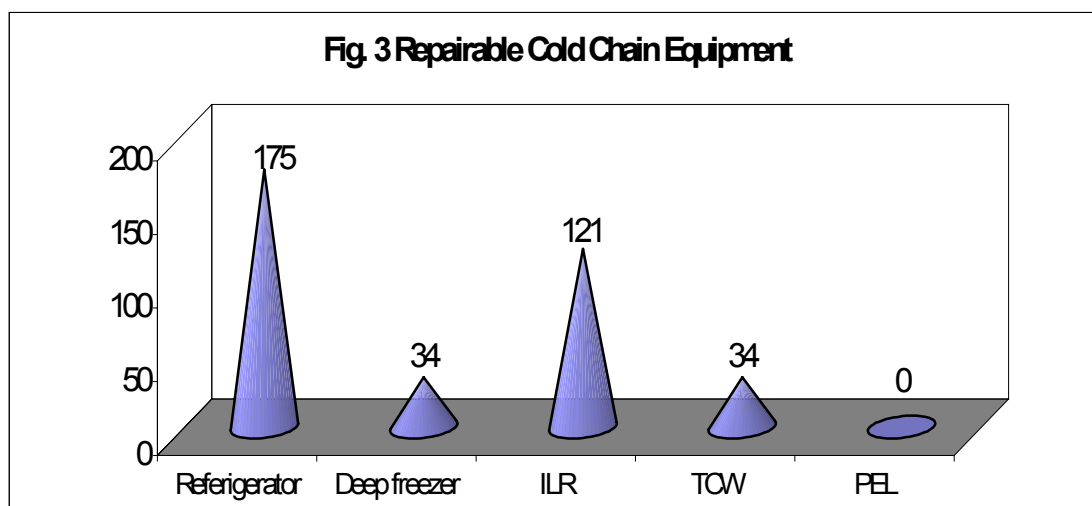


Recently Federal EPI Cell and UNICEF has supplied 280 and 420 ILRs respectively, which have been distributed among the district. The detailed distribution of these is attached as Annexure-16. As these 700 ILRs have been supplied after the data for inventory had been collected, so they will not be reflected in the analysis, although the reference to these will be made frequently during discussion. District wise distribution of working cold chain equipment is attached as Annexure-3.

5.2.3 Repairable cold chain Equipment

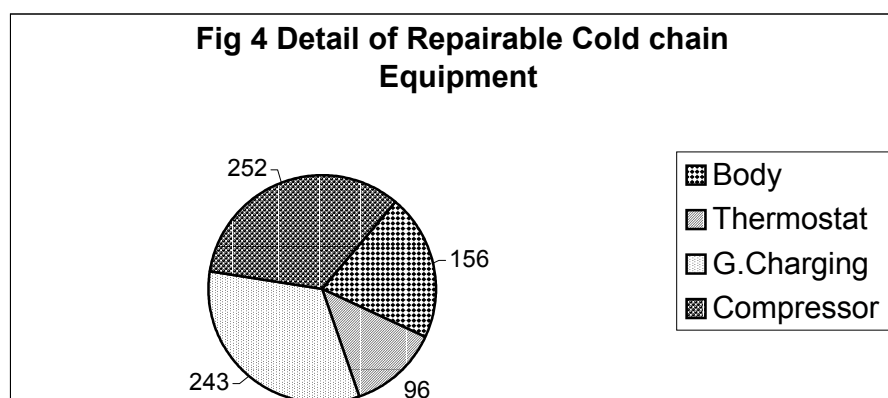
Among the total equipment available at present, a significant number of equipment is out of order and needs major/minor repair. District wise position of various out of order items is attached as annexure - 4.

Figure 3 shows repairable cold chain equipment of different types available in Punjab.



The graph shows that 175 Small Refrigerators are out of order as they were supplied before 1990. 121 ILRs, 34 TCW and 87 Deep Freezer are non-functioning. While none of the PEL refrigerator is out of order as they were supplied a couple of years back.

Out of order equipment are mostly lying at the district stores. While the tehsil, sub stores and even the static EPI centers have also out of order equipment. Some of the equipment is lying for want of just minor requirements. District wise detail of defects of repairable cold chain equipment is attached as Annexure-14. Figure 4 shows the detail of defects of repairable cold chain equipment.



5.2.4 To Be Condemned Equipment

Another category of cold chain equipment at the moment is the condemned equipment. This equipment has become out of order and can never be repaired or the

repair is not cost effective. This equipment unnecessarily occupies space at the district health offices and may be auctioned after completing necessary formalities.

District wise position of condemned equipment is attached Annexure-5 Figure 5 shows the division of out of order (repairable) cold chain equipment into different types available in Punjab.

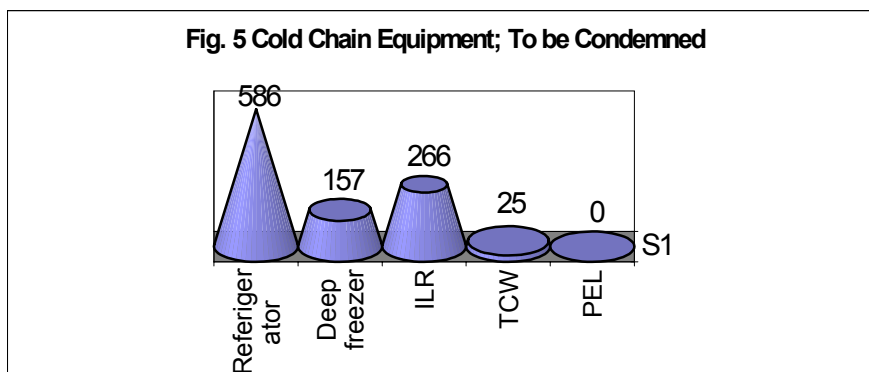


Table 6

Operational Status of Various Cold chain Equipment

No	Working Status	Small	PEL	ILRs	TCWs	Deep	Total
		Refrigerators	Refrigerators			Freezers	
1	Working	655	120	505	196	310	1786
		44.7 %	87.6 %	53.4 %	71 %	52.6 %	52.4 %
2	Repairable	175	0	121	34	87	417
		12 %		12.8 %	12.3 %	15 %	12.2 %
3	To be Condemned	586	0	266	25	157	1034
		39.9 %		28.2 %	9.1 %	26.7 %	30.3 %
4	Balance	50	17	52	21	34	174
		3.4 %	12.4 %	5.6 %	7.6 %	5.7 %	5.1 %
Total		1466	137	944	276	588	3411

Table 6 shows the operational status of various cold chain equipment in the province. All the PEL refrigerators are working. Majority of TCWs(71%) are still in working order, while Small Refrigerators are mostly either out of order or to be condemned. 5.1% different categories cold chain equipment are present in balance for further

distribution. In the critical situation, where more than 50% of rural facilities are without cold chain equipment, putting even this small amount in balance is not justified. A substantial proportion of PEL Refrigerators is kept in balance. It is clear that out of the total available equipment, 12.2% are not working at the moment. It needs immediate repair or replacement. Whenever equipment becomes out of order, it is being replaced by the district store with a new/operational one. Therefore, the non-working equipment is collected by the district store for the purpose of repair. It is repaired when the budget is allocated for repair & maintenance.

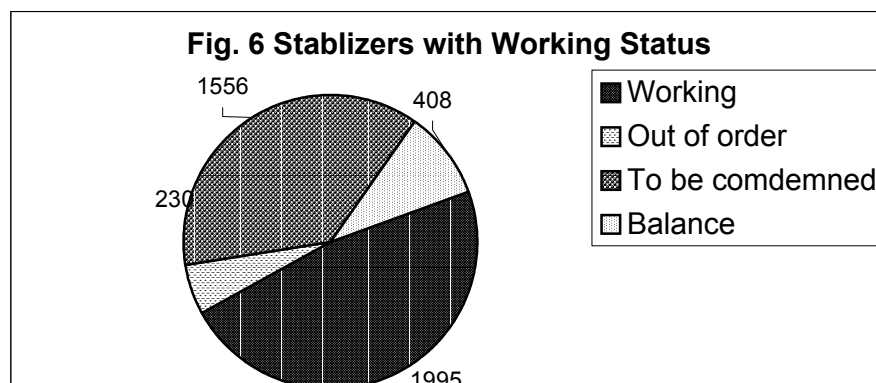
The most critical issue is the closure of static EPI centers having out of order equipment. This equipment especially needs repair/replacement on immediate basis for smooth running of vaccination activities.

It shows that the policy to work every facility in the rural area to work as static EPI centers is far from reach at present unless there is immediate supply of cold chain. 30.3 % of the available cold chain equipment is condemned and requires to be auctioned. In most of the districts, outdated equipment is being piled up and no one dare to auction, due to fear of audit objections.

5.3 Stabilizers

Stabilizers are ideally used with every electric equipment to control fluctuation of electricity. It also protects the high voltage flow towards the tools and saves it from any possible damage. EPI-Punjab has considerable number of stabilizers, some are out of order and other are condemned. District wise number of stabilizers, along with current working status is attached annexure-9.

Figure 6 shows available stabilizers with the existing working status.

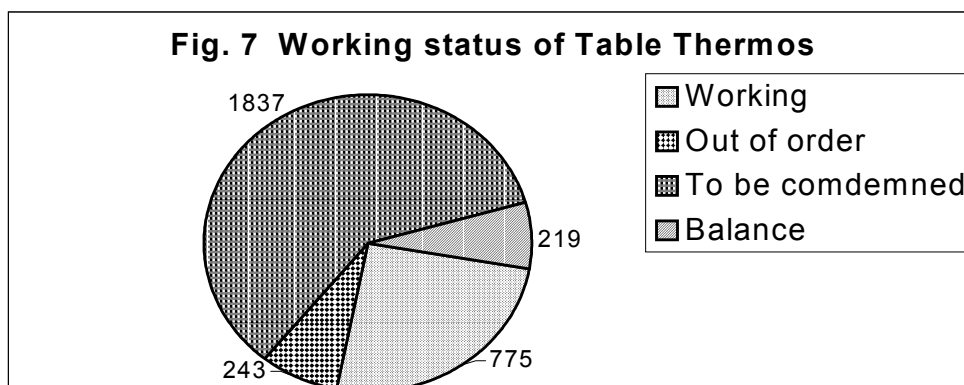


The above figure reflects that out of the total available stabilizers, 47.6 % are working while another 5.5 % are out of order and can be repaired to put in to work. 37.1 % of the total stabilizers are condemned which cannot be repaired and will go for auction. Further 9.8 % are lying in the stores.

If the total number of stabilizers is compared with the total number of available working cold chain equipment, presently there is no problem as more number of stabilizers is available than the working cold chain equipment. But the situation may change when the ILRs, received by UNICEF and Federal EPI cell will be supplied to the districts. A discrepancy is clearly foreseen. Every equipment should operate with a stabilizer. This situation is putting the credibility and safety of the equipment at stake. The shortfall of stabilizers needs to be immediately overcome on priority basis, for smooth, safe and efficient functioning of the tools.

5.4 Table thermoses

Table thermoses are used to maintain the temperature of vaccine during vaccination sessions at the static EPI centers as well as outreach. Ideally every static center and outreach team should have table thermos to be used during vaccination session. There are some districts having diminutive number of table thermoses while others have considerably high number. District/agency wise number of table thermos along-with the working status is annexed 12. Figure 7 shows the total number of table thermoses along-with the present working status.



The figure shows that out of the total available table thermoses, 25.3% are working, while 59.7 % are condemned and needs immediate replacement.

At present there are around 3000 potential static EPI centers and 3609 out reach teams operational in the entire province. It means that above 90 % vaccination sessions are being conducted without table thermoses.

5.5 Vaccine carrier.

Vaccine carriers are being used during outreach vaccination sessions in the field. This equipment has an insulated body and has the capability of maintaining the standard temperature for various intervals, depending upon the quality and make. While going for outreach session, ice packs are placed inside of the vaccine carrier all around with the vaccine in the center. Vaccine carriers are especially used for out reach purposes. Ideally each out reach team should have at least one vaccine carrier in perfect working condition. District wise number of vaccine carrier along-with the working status is annexed 13.

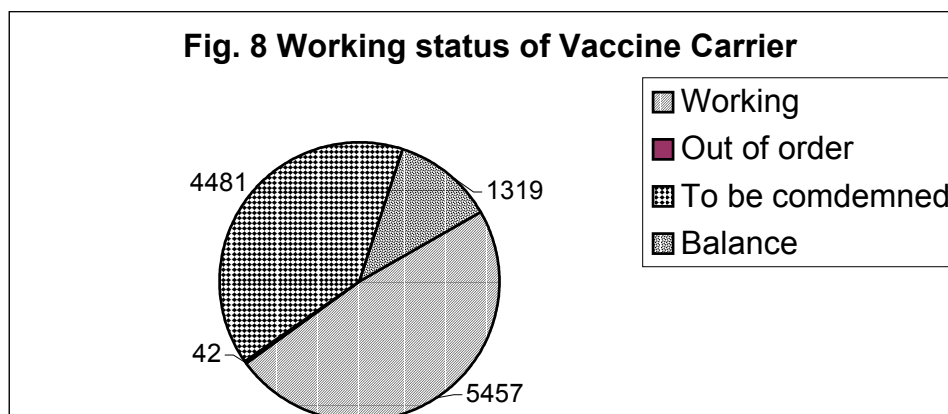
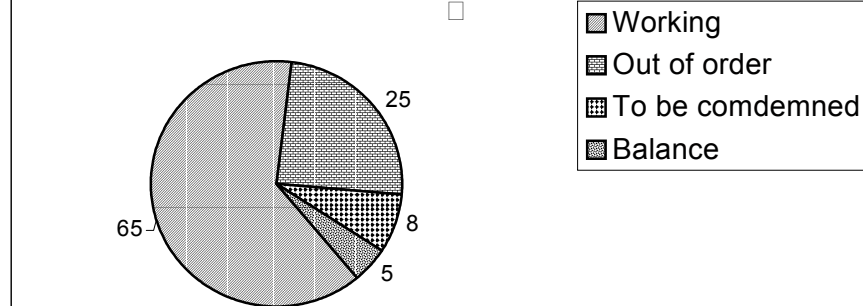


Figure 8 shows that out of 9938 vaccine carriers 55% are in working condition. But still they are in sufficient number because at present 3312 outreach teams are delivering immunization services. Moreover Federal EPI Cell has recently supplied most of these vaccine carriers.

5.6 Cold boxes.

Cold box is the equipment that can maintain the temperature up to 72 hours with out electric inputs as it is made up of specialized insulated material. Hence they used for transportation and storage of vaccine in case of power failure. Different types of cold boxes are used in EPI. Out of 815 cold boxes; 601 (74%) are in working condition.



Hence sufficient number is available. District wise number of cold boxes, along-with the present working status is annexed-6.

5.7 Generators.

Generators are used to provide back up for cold chain equipment particularly at vaccine stores in the case of power shut down. It is of paramount importance in the Immunization programme especially in the rural areas due to frequent interruptions/breakdowns in electricity distribution or load shedding for longer durations. Ideally every vaccine store must have a standby generator to run the equipment in case of power failure. District wise number of generators, along-with the working condition is attached annexure-11.

Figure 9 shows that 65 generators are available in working condition while 136 district and Tehsil EPI stores are operational. This shows that generators do not back up 50% of EPI stores.

5.8 Bicycles

EPI vaccinators and CDC supervisors are using bicycles for out reach duty in their areas of operations. This is the most cost-effective vehicle to be used for field duty in catchment area of the health facility, in vaccination programme.

There are 3609 EPI vaccinators and 2210 CDC supervisors working in EPI at the moment. Ideally, each EPI vaccinator and CDC supervisor should have one bicycle for outreach duty in his operational area. According to the available data, bicycles are sufficient and in the future only replacement would be required. District wise number of bicycles is attached annexure-10

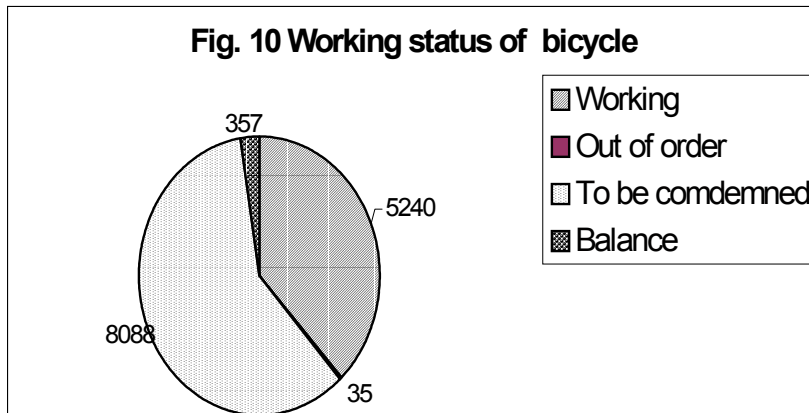


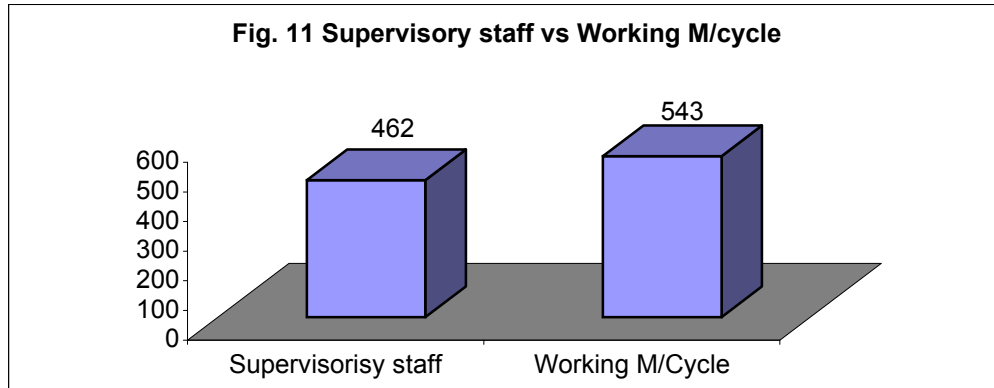
Figure 10 shows the working status of Bicycles in the Punjab.

5.9 Motorcycles

District wise position is attached annexure-8. At the moment, Suzuki, Yamaha and trial motorcycles are available with the programme. The trail motorcycles are very difficult to maintain. Its POL consumption is high and the spares are not locally available. Whenever it becomes out of order it is permanently parked and at present no trail is on road.

Sufficient numbers of Motorcycles are available in the field and if we compare the number available with the number of supervisory staff, it is clear that all the supervisory staff of EPI and CDC has motorcycles. Some districts have shifted old motorcycles to the vaccinators and instead of being changed into scrap in the store, they are maintained by the vaccinators and are on the road, helping a lot in out reach activities.

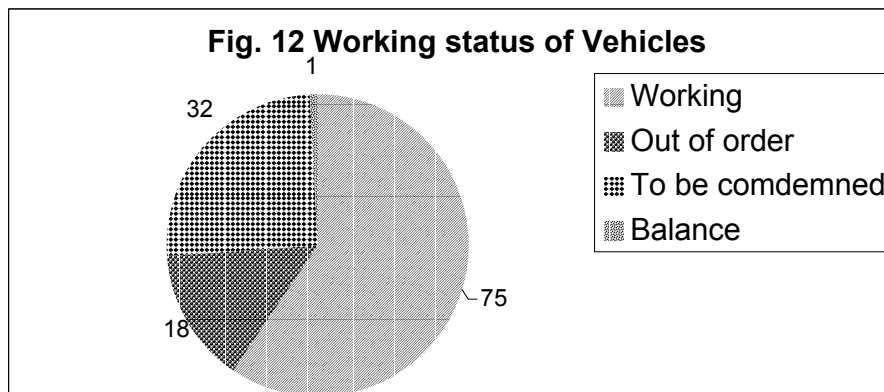
Figure 11 shows the number of supervisory staff and working motorcycles.



5.10 Vehicles

Annexure-7 shows the district wise position of EPI vehicles. Although there are 75 working EPI vehicles, yet in many districts there are no EPI vehicles. However, as EPI programme is integrated with the health system and District authorities have many different channels of supply of vehicles, there is no problem of vehicles in the districts as far as the EPI supervision is concerned. Recently, second family health project has provided vehicles to the District Health Officers and Deputy District Health Officers.

Figure 12 shows the working status of Vehicles present in the districts of EPI Punjab.



CHAPTER 6

CONCLUSION

EPI Punjab has a strong cold chain network, from the province down to the static EPI centers. At provincial and divisional level, staff is involved in the maintenance of cold chain system to keep it operational round the clock.

Majority of the cold chain equipment with the programme was procured during 80s and early 90s. After very first supply, there was generally a downward trend. Since then, no proper planning has been carried out for replenishment of the aging equipment as well as for additional requirement.

Almost all the major donors withdrew their support of cold chain equipment. Only UNICEF continued to supply the same. UNICEF supplied ILR to EPI during the recent years. These have been immediately distributed down to the district and are used in EPI static centers and as sub-stores for out-reach teams. It is worth mentioning that this equipment does not actually cater the needs of the immunization programme. It works only as refrigerator and there is no freezing compartment to freeze ice packs, which are essential to be used during outreach vaccination session.

The distribution of the cold chain equipment to the districts as a matter of fact was not need based because all the districts required them as a result most of the facilities were deprived of cold chain equipment to establish vaccine point.

Practically there is no monitoring system to assess the actual operational status of the equipment. Moreover, no appropriate system exists for their repair. Most of the District Health Officers are reluctant to get their out of order equipments repaired due to fear of audit objections. The financial power of District Health Officers is limited. If he repairs equipment in installments, it is audit objection. If he gets approval from higher quarters, it usually delays the case to an undesirable period so that after sanction the situation has changed and the cost may increase.

Government allocates exquisitely insufficient budget for maintenance and repair of the cold chain equipment. Moreover, the allocated budget is not according to the

actual needs of the districts. It may be reasonable in some districts, while at others it is ridiculously low.

The cold chain technicians deployed at the divisions are sitting idle and are under utilized. They have neither established workshops at the divisional level for repairing the equipment nor they visit the districts falling in their jurisdiction. The staff involved in the cold chain maintenance has not been trained since long.

Due to less number of available cold chain equipment, out-reach teams in the rural area have to travel long distances for taking vaccine before they reach the community. Sometimes the vaccinator takes the vaccine required for next few days from the sub-store and keeps in domestic refrigerator either at his own residence or in the community. This practice severely endangers the vaccine and it is possible that by the time vaccine reaches the child, it may have lost its potency due to interruption of cold chain.

Stabilizers are insufficient for all the working cold chain equipment. Non-availability of stabilizers makes the equipment more vulnerable to damages due to electric fluctuation.

Table thermoses are far less than those required for the on going immunization programme. It has been observed that above 90% vaccination sessions have been conducted with out proper use of table thermoses. In such a situation credibility of vaccine cannot be certified.

Keeping in view all the above deficiencies, it is apprehended that the vaccine may not remain potent and effective. The incidence of the target diseases in fully immunized children further strengthens this trepidation. During the year 2000 wild poliovirus has been isolated from the stool samples of 42 children who received full course of polio immunization. Some of these children received more than 3 doses of Oral Polio Vaccine. The ratio of fully immunized crippled children in the total confirmed polio cases is 57.14 % that is alarmingly high. Similarly 144 cases of Measles have occurred in the vaccinated children out of the 440 total reported cases. It certainly is a point at moot.

Presently cold chain equipment is far less than that is required. EPI Directorate has chalked out minimum requirement criteria at each level of health facility. EPI Directorate is tapping many potential sources for provision of cold chain equipment. It has been planned to get complete cold chain in two steps. In the first step, keeping in view of the present working status of cold chain equipment, all the health facilities in the rural area will be supplied with the cold chain equipment. In the second step, all the cold chain equipment supplied before 1990 will be replaced. Annexure-17 shows the requirements for the two steps of cold chain equipment renovation in Punjab.

CHAPTER 7

RECOMMENDATIONS

1. Majority of the cold chain equipment is outlived as it was supplied during the initial phase of the programme (early 80s). ***All the outlived equipment should be replaced.***
2. The ILRs available in the field only works as refrigerators. Since they have no freezing section, hence they can neither be used for storage of OPV and Measles nor for preparation of ice packs used during vaccination session by the out reach team. Therefore, ***small size refrigerator is the ideal equipment to be used at the static EPI center.***
3. It is mandatory for the programme that all the BHUs should function as EPI center, which ideally requires small refrigerator. The small refrigerators were supplied in 1987 only and majority of them is out of order. ***Emergency arrangements are required for to equip all the BHUs with a small refrigerator.***
4. ***Otherwise EPI centers with ILRs should be supplemented with a deep freezer*** to full fill the desired requirement, but it will not be a cost effective remedy.
5. ILRs with in built deep-freezer (Twin cabin) are the immediate requirement in the field otherwise small refrigerator is the only substitute to increase the number of static EPI centers. ***Resources should be taped for procuremet of Twin cabin ILRs & / or small refrigerators.***
6. For the safety of equipment in the prevailing condition of power fluctuation it is mandatory that ***all equipments should be protected with stabilizers.***
7. Similarly ***all the EPI stores should be equipped with generators*** as back up apparatus in case of power failure with adequate allocation of fuel.
8. At east ***10% additional equipment should be made available at the district level as buffer stock*** to be used in case emergency replenishment.
9. ***No more vaccine carriers are required,*** as they are available in sufficient quantity in the field.
10. Maintenance and regular update of temperature record of every cold chain equipment is the only tool for monitoring of cold chain integrity. ***All the cold chain equipment must have a thermometer.***

11. *All efforts should be made to get the health facilities electrified.*
12. *Solar / kerosene oil refrigerators should be arranged for un-electrified health facilities to establish EPI center.*
13. *The cold chain technicians at the divisional level should be made responsible for the maintenance of the cold chain equipment in the entire division.*
14. *Regular training of staff involved in the maintenance of cold chain equipment should be the top priority.*
15. *Inventory records should be maintained as per instructions circulated by EPI Directorate to ensure need-based allocation to the facilities and to minimize misuse of equipment.*
16. *Government should be approached for earmarking of budget for the repair and maintenance of cold chain equipment.*