TECHNET is a 'Technical Network for Logistics in Health' run jointly by WHO and UNICEF.

TECHNET 'lives' through the desire for professional communication among more than fifty managers, consultants and engineers who make up the current membership of the network. All members are engaged full-time in various aspects of the logistics of health services at country or international level. Most are working on immunisation programmes. Communication is through annual meetings, a newsletter, electronic mail and conferencing (INTERNET), and correspondence. Through these channels, TECHNET has established global and regional priorities to solve technical problems, to develop managerial tools and to act as a forum to review the impact of changing programme goals and policies on the operations and equipping of the health service.
PREFACE

This update of the EPI Cold Chain Bibliography lists a number of new publications issued during 1993/1994, including an updated injection policy document, the 1994 Technet report, a major presentation on solar energy and health, and a range of new modules on training for logistics management and transport. Documents which are in the process of being finalised at the time of producing this update are listed although they will not be available until their scheduled dates of issue.

A new item produced this year by the Cold Chain group is a special presentation package on injection safety. Primarily for distribution to participants at EPI managers' meetings, the package includes standard LHIS cold chain documentation, two new posters, a new video on sterilisation procedures and the use of the auto-destruct syringe, plus a selection of relevant articles and reports from various sources.

Another new item is a package of transportation documents. Some of these documents still require field testing and will not be available in final form until the second quarter of 1995.

Mailing list
The Newsletter, Technet News, and selected new documents are sent out free of charge to addresses on a cold chain mailing list. Anyone wishing to receive this material on a regular basis should advise EPI/Geneva.

How to order documents:
Use the blank order form included in the Bibliography or send a request, clearly stating title, code, language and quantity required.

- All materials in English and/or French may be obtained from:
  World Health Organization
  Attention: EPI/Cold Chain
  1211 Geneva 27
  Switzerland
  Telephone: +22 791 43 75/73
  Fax: +22 791 41 93/92
  E-mail: Lloyd@who.ch / Zaffran@who.chUNICEF
  Unet: UNC371

- Other language versions are not stocked in Geneva. For materials in Arabic, write to:
  WHO Regional Office for the Eastern Mediterranean Region
  Attention: EPI
  P O Box 1517
  Alexandria 21511
  Arab Republic of Egypt
  Fax: +203 48 38 916

- For Spanish materials, contact:
  WHO Regional Office for the Americas
  Attention: EPI
  525, 23rd Street NW
  Washington DC 20037
  United States of America
  Fax: +001202 223 5971

Documents in the training series which have been translated into other languages have not been reproduced in quantity and no stocks are kept. A master copy, however, is on file in EPI/Geneva and limited numbers may be photocopied on request.

Costs

Small quantities of all materials are provided free of charge. Larger quantities, as indicated below, are billed and air-freight charges are added.

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Key to symbol and language abbreviations

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<tr>
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GENERAL DOCUMENTATION

NEWS UPDATES

TECHNET News - Logistics for health
A periodic review of items relating to the planning and management of logistic systems for health, primarily immunization programmes. It includes updates on equipment development, training, and logistics as well as feedback from major field studies and other relevant issues. Produced originally as the Cold Chain Newsletter, it has been adopted as the official newsletter of the TECHNET group. To obtain a free subscription, submit name and address to EPI/Geneva for inclusion in the Cold Chain Mailing List. Back copies are available from 1992 onwards. For issues prior to that, see Technet News Base.
2-3 issues per year, ±12 pages. E F
Most recent issue available on internet

TECHNET News Base
Selected articles from Cold Chain Newsletters issued between February 1988 and October 1991. These articles are still of interest and are reprinted here in order not to be lost as back issues go out of stock.
WHO/EPI/LHIS/93.5; 1993, 58 pages. E F

MEETING REPORTS

Report of 1994 TECHNET Consultation
At the 1994 TECHNET Consultation, held in Washington DC from 31 May to 4 June 1994, participants discussed practical issues of field operations for immunization services, focusing on the major challenges to immunization today. At the end of the meeting a vote on the recommendations established a priority list of TECHNET issues, identifying areas of action which TECHNET members consider to be of greatest importance to immunization today: ensuring safe injection practices, promoting the use of vaccine vial indicators, adopting a policy on using opened vials of vaccine at subsequent immunization sessions, establishing guidelines for conducting national immunization days, and promoting the introduction of low workload jet injectors.
WHO/EPI/LHIS/94.3; 1994, 70 pages. E(F) (*)

Report of 1993 TECHNET Consultation
Due to limited funds, the 1993 TECHNET consultation was conducted via an electronic network, using the UNICEF-UNET electronic mail system. The report is presented in two parts: First, a summary of discussions conducted over the network and second, the conference papers which formed the basis for discussions. Subjects include: vaccines out of the cold chain, vaccine supply issues, injection safety practices, refrigeration issues, solar energy for health, management, transport, and new equipment.
WHO/EPI/LHIS/93.1; 1993, 140 pages. EF

TEMPERATURE MONITORS

The Vaccine Vial Monitor
An information and training package on the introduction of the vaccine vial monitor (VVM), an indicator which is one of the most significant developments in the history of cold chain technologies. Designed in the form of a circular label, the VVM is applied directly to the vial by the vaccine manufacturer. With exposure to heat, it undergoes gradual colour changes which reflect the rate of degradation of the vaccine to which it is attached. A quick glance at the VVM thus enables the health worker to verify whether the vaccine is usable or not. The VVM will be attached to all vials of polio vaccine from January 1996; application to other types of vaccine will follow.
The package includes:
Training Guidelines: WHO/EPI/LHIS/94.2 (5 pages) E(F)
Questions and Answers: WHO/EPI/LHIS/94.7 (4 pages) E (F)

Vaccine cold chain monitor
Detailed description of the use and function of the vaccine cold chain monitor which is packed with shipments of DPT, BCG, measles and polio vaccine supplied by WHO and UNICEF. The monitor registers temperature changes down the cold chain, from manufacturer to final user. This document is aimed at manufacturers/suppliers who will be packing the vaccines as well as for the users on the receiving end. Health workers should use it in conjunction with the detailed training guide, Module 27 on how to use the monitor, in the Cold Chain and Logistics for Primary Health Care training series. A poster on the monitor is also available, CCPS/16.
EPI/CCIS/85.1/Rev.5; (Revised 1988); 10 pages. E F

Chemical Indicators for monitoring the cold chain
Status of field trials and feedback on routine use of the cold chain monitor, the DTT/TT vaccine shipping indicator, the freeze-watch indicator, the low temperature monitor (LTM) and the liquid crystal monitor. A description of each indicator, its function and use, and summaries of the results of laboratory tests are also included.
EPI/CCIS/83.8/Rev.1; (Revised 1987); 13 pages. E
Revision scheduled for 1st Quarter 1995
INJECTION SAFETY FOLDER

The materials listed below are available either separately or compiled within a special ring binder presentation package with a fitted container for the video cassette and samples of auto-destruct syringes.

Safety of Injections in Immunization services — WHO recommended policy
An important policy document outlining the type of equipment which can be used to safely administer injectable vaccines. It describes critical sterilization and disposal procedures, stresses the need for systematic supervision and evaluation and the importance of budgeting for an uninterrupted supply of sufficient injection equipment. This document revises and replaces the previous WHO/UNICEF guidelines on selection of equipment and safe injection procedures issued in 1986. Presented among the documentation for the 1994 SAGE meeting in Geneva. WHO/EPI/LHIS/94.1; 1994, 6 pages. E F *

Reducing the risk of unsafe Injections in Immunization programmes — The role of injection equipment
Review of the complications of unsafe injections, the potential risks of transmitting diseases and the financial/operational implications of using different types of equipment in the EPI. This document draws attention to the fact that incorrect immunization practices continue to occur and proposes strategies for the elimination of unsafe injections. [This document is based on an article by Bruce Aylward et al accepted for publication in the Bulletin of the World Health Organization and presented at the 1994 SAGE meeting in Geneva. It has been adapted with the author’s approval for reproduction in this form. Reprints of the original article are available from WHO/EPI].
WHO/EPI/LHIS/94.2; 1994, 17 pages. E (F) *

Syringes, needles and sterilization
Detailed instructions on the proper techniques for steam sterilizers and the use of reusable plastic syringes presented as a training module: Module 2 of the Immunization in Practice series. It complements the WHO policy document (Safety of Injections in Immunization Services) and the Slide Set on Sterilization.
EPI/PHW/84.2/Rev.1, Module 2, IM/2 Revised 1987, original issue: 1984; 49 pages. E F

Product Information Sheets: Injection and sterilization [Reprint of Sections 8.5, 9, 10]
Compiled specifically for inclusion in the EPI Presentation Package on Injection Safety, this reprint contains the sections with performance details and purchasing information on equipment for administering injections, sterilization and safe disposal.
WHO/UNICEF/EPLTS/93.1/8-10; 1994, 29 pages. E F *

Portable steam sterilizers
A basic trilingual document with step by step instructions/photographs on the procedure for steam sterilization with guidance on how to handle syringes before and after sterilization and cope with common problems. Produced by the sterilizer manufacturer, Prestige Medical, this document may be used for training purposes for 1 to 1½ day course.
Booklet CCXT/4; 1986, 20 pages. E F 9p

How to boil syringes and needles properly
Step by step instructions, with photographs, on how to boil equipment for immunization sessions. Boiling, it should be noted, gives a high level disinfection but does not destroy certain spores — unlike steam sterilization which kills all harmful viruses, bacteria and spores.
Booklet CCXT.1; 1986, 11 pages. E (F)

Selected articles/reports on injection safety *
WHO/EPI has obtained permission from the authors to reproduce the following material in limited quantities for inclusion in the EPI Presentation Package on Injection Safety:

• Model-based estimates of the risk of human immunodeficiency virus and hepatitis B virus transmission through unsafe injections (Bruce Aylward, Mark Kane, Robert McNaught S, Dale J, Hu) [Accepted for publication in the International Journal of Epidemiology.]

• The risk of transmission of Hepatitis B virus or human immuno-deficiency virus from jet injectors or needles and syringes (Mark Grabowsky, Steve Hadler, Bob Chen, Walter Bond) [Submitted for publication in the WHO Bulletin.]

• Field evaluation of the Solo shot Non-Re-usable syringe, Karachi, Pakistan 1989 (by the Resources for Child Health Project (REACH) in coordination with the Ministry of Health, Sind Province and the National Institute of Health, Pakistan) A technical report on field trials conducted on Solo shot, a non-reusable syringe developed by Becton Dickinson. Compares the use of Solo shot with that of a conventional syringe in the hands of both experienced and inexperienced vaccinators. Based on the findings WHO approved the use of Solo shot within the EPI.)

Audio visual (described below, Audio Visual Section) *
• Video: Breaking the chain of cross infection
  Steam sterilizer
  Sterilization slide set
• Posters: Let’s make injections safe
  95% injections sterile by 1997
GUIDELINES

MANAGEMENT

Guidelines on international packaging and shipping of vaccines for the EPI
Joint WHO/UNICEF guidelines on standard procedures for international shipment of vaccines. It includes insulated packaging standards, storage volume standards, recommended package labeling and shipping procedures. Essential for anyone involved in EPI vaccine procurement and/or shipping.

Protocol for a cold chain survey using cold chain monitors
How to plan, set up and conduct a cold chain monitor study. The objective: to ensure that vaccine is stored, handled and used in such a way that it retains its potency; the strategy: to use cold chain monitors and/or freezewatchs to monitor consignments of vaccine over a specific period of time; the method: to record the heat exposure of the vaccine as it passes through each stage of the cold chain; and finally, to analyse data with the aid of two computer programmes specifically developed for the purpose.
WHO/EP/IHIS/94.9. 36 pages. E (F) *

A guide to estimating capacity of equipment required for storing and transporting EPI vaccines
How to calculate vaccine storage volumes at each level of the cold chain. An important document for anyone involved in planning and buying equipment for storing and transporting vaccines.
WHO/EP/CC/S/86.3 (1986); 11 pages. E F
Re-issue in revised format scheduled for 1st quarter 1995.

Guidelines for establishing national and regional vaccine stores
A complete review of problems and solutions in establishing vaccine stores. Includes guidelines on the amount of space needed, equipment required, purchasing and installing a cold room, and advice on improvements to existing cold rooms.
EP/CC/S/80.15/Rev 2 (Revised 1986); 26 pages. E F
Revision scheduled for January 1995.

Manage the cold chain
Described below under Mid Level Management.

EQUIPMENT

Product Information Sheets, 1993/1994
Updated every two years, this is an essential reference guide to selecting/buying equipment for use in the EPI and other primary health care initiatives. Previous editions focused exclusively on material for EPI; this issue, for the first time, covers a wider range and includes information on equipment for use in the Programme for Acute Respiratory Infections (ARI) and the Global Blood Safety Initiative. Detailed information gives performance data and purchasing information/price for 182 items of equipment which meet established performance criteria. Comprehensive guidelines assist buyers in the choice of certain types of equipment. Separate reprints on specific types of equipment are available for: Sections 8-10: Injection and Sterilization Equipment and Sections A1-2: ARI Equipment.

EPI equipment performance specifications, 1991
Standard performance specifications for equipment used within the EPI. This document provides guidance to manufacturers and suppliers of EPI equipment and serves as a purchasing aid for governments and donor agencies. It should be consulted in conjunction with the EPI Equipment Test Procedures (see below).

EPI equipment test procedures, 1994
Laboratory test procedures are outlined for the different categories of equipment used within the EPI. Produced primarily as guidance for testing laboratories, it is also an essential reference on qualifying criteria for manufacturers. New equipment must successfully pass these tests in order to qualify for inclusion in the EPI Product Information Sheets. To be used in conjunction with the EPI Equipment Performance Specifications (described above).
Scheduled for 1st quarter, 1996 *

REFRIGERATOR MODIFICATIONS

Modification kit to upgrade domestic refrigerators for vaccine storage
Instructions, with photographs, on how to fit a metal box into a domestic refrigerator to adapt it for use in immunization programmes. Domestic refrigerators are unsuitable for storing vaccines and yet many countries rely on locally manufactured domestic models for this purpose. Research over the past few years has focused on simple, low cost ways to circumvent this problem. This document describes a modification developed and successfully tested by the Universidad del Valle in Columbia.
EP/IHIS/94.4; (November 1994); 17 pages. E (F) *

How to convert a refrigerator from kerosene to gas operation
Instructions for a skilled technician on how to convert two types of kerosene refrigerator (Sibir K230T and Electrolux RAK100) to gas operation. Includes information on new parts, how to fit them and test the refrigerator before releasing it for use. [A new manual on the conversion of Sibir V240KE to gas operation is available from the manufacturer.]
CCX/12; (1983) 69 pages. E Ar
TRANSPORT

The documents listed below are either being field tested and/or in the final stages of completion. Advance drafts are available on request (in English only).

TRANSPORT GUIDELINES

Guidelines for Introducing motorcycles Into a Primary Health Care programme

The advantages of using motorcycles for transport in a health programme and the procedure to follow in introducing this form of transport is outlined. Topics include advance preparations, the type of motorcycle to choose, budget, supervision, ownership agreements, training for instructors and riders, assembly, servicing/repairs, spare parts and evaluation. Sample forms for ownership and service agreements are contained as annexes.

WHO/EP/LS/94.10 (17 pages) E (P). *

Monitoring vehicle use: A guide for transport officers

A senior level training guide which addresses health officials responsible for transport from central to health centre levels. It outlines a system for planning and monitoring vehicle use with the goal of ensuring availability and efficient/cost effective use of vehicles. It focuses on three levels of supervision and describes the responsibilities of drivers and transport managers (unit, district and national). The system may be adopted in total or in part to improve an existing system.

WHO/EP/LIH/94.6 (46 pages) E (F). *

RIVER/RIDER TRAINING

Advanced driving for health: A manual for Instructors


Riders for health: Manual for motorcycle instructors


First aid in the field


Rider cards

Described below under Transport Training. No code. E F

SOLAR ENERGY

Solar energy and health—Report of the World Solar Summit Process

Outline of a strategy which focuses on the health sector as an entry point for large scale introduction of solar energy technologies into the rural areas of developing countries. Report prepared by WHO/EP/LI, with the help of a panel of 15 specialists; presented at the High Level Expert Meeting of the World Solar Summit at UNESCO in July 1993. This initial proposal will be refined in light of feedback and will be further reviewed at subsequent meetings on the Solar Decade.

WHO/EP/LIH/93.2 (1993); 45 pages. E *

Working papers for solar energy and health report

A selection of working papers which form the basis for the strategy outlined in the above report. Prepared by a number of experts in the field of solar energy, the papers are included in their original language of submission, English or F.

WHO/LIH/93.3 (1993); 248 pages. E+F *

Conclusions and recommendations on solar energy and health

Recommendations of the High Level Expert Meeting for the World Solar Summit Process held at UNESCO in July 1993 on the future role of renewable energies. The status of the various technologies and applications, their advantages, disadvantages, availability and potential are taken into consideration.

EP/LIH/93.4 (1993); 7 pages. E *

Infrastructure centrale ou regionale pour l'installation et la maintenance de refrigerateurs photovoltaiques, Guide de creation et de gestion

A practical guide on solar energy for the cold chain. Aimed at programme managers, it provides guidance on how to manage solar refrigeration implementation projects, including installation, maintenance and surveillance.

WHO/EP/MANSOL/1, F only

EPI Cold Chain Bibliography 1995
TRAINING MATERIALS

SENIOR LEVEL

A planning workshop for central-level operations officers
A Senior Level Logistic Training Module for a six-day course on improving cold chain and logistics systems. Participants perform situation analysis and identify problems in the cold chain and logistics systems of their respective countries; examine strategies and tools to improve these systems, identify the most important activities necessary to solve problems and begin to develop a plan for their implementation.
Scheduled for second quarter 1995.

Managing cold chain equipment: A guide for national logistics officers
A supporting document for the Senior Level Logistics Course, describing a system for managing equipment used in immunization programmes. The focus is on information to be recorded for refrigerators, freezers, generators and cold rooms. Equipment for which no individual records are kept, such as sterilizers and cold boxes, is not included.
Scheduled for 2nd quarter, 1995.

Monitoring vehicle use: A guide for transport officers
Described above (Transport section) This is a senior level guide but not a module of the Senior Level Logistics Course. WHO/EPILHIS/94.6 (46 pages) E (F).

TRANSPORT TRAINING

MANAGEMENT TRAINING

Manage the transport system for health
A module from the Mid Level Management Training Series which addresses supervisors of district health services. It describes how to manage health transport systems effectively, with a focus on route planning for routine and special trips and regular monitoring of vehicle use, availability and costs.
Scheduled for 2nd quarter, 1995.

Facilitator guidelines for Manage the transport system for health
Guidelines on how to teach and introduce the above module, with exercises and answer sheets.
Scheduled for 2nd quarter, 1995.

DRIVER/RIDER TRAINING

Advanced driving for health: A manual for instructors
A basic training manual for instructors in conducting 4-day driver training courses for health programme drivers in developing countries. Compiled to meet the need for a comprehensive guide, it covers areas of major concern: daily vehicle service, preventive maintenance and minor repairs, mechanical failures in the field, different types of self recovery equipment and techniques, and off-road and defensive driving technique.
Scheduled for 1st quarter, 1996.

Riders for health: Manual for motorcycle instructors
A manual with a dual purpose: (i) basic training for future instructors in the Riders for Health Scheme, and (ii) a reference guide for courses which the new instructors will plan and/or conduct. It includes instructions from basic balance and identification of the controls of the motorcycle to road riding and off-road techniques, with details on daily maintenance and repairs.
WHO/EPILHIS/94.1 (56 pages) E (F).

First aid in the field
A brief explanation for drivers or motorcycle riders encountering accidents in remote areas. Written simply, it explains what a person with little or no medical training should do in such a situation. Suggested as a basis for a 2-hour training session conducted by a doctor or a nurse.
Scheduled for 1995.

TRAINING AIDS

Rider cards
A series of four cards: a blank form to register motorcycle maintenance, a fault-finding chart and a guide for mopeds and motorbikes respectively on road/off-road riding, recommended protective clothing and maintenance.
No code. E F
## LOGISTICS AND COLD CHAIN FOR PHC

### 27 module series

Designed for health personnel engaged in primary health care (PHC), this course concentrates on the logistics of five programmes: Malaria Action Programme, Diarrheal Diseases, the Expanded Programme on Immunization, Maternal and Child Health, and Essential Drugs. It is made up of independent booklets or modules which cover some of the tasks and techniques essential to the efficacy of primary health care. Since most of the modules are complete in themselves, courses of one to ten days can be given with modules selected in accordance with training needs and constraints.

Modules 1-27 (listed at right)

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<tr>
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<td>How to keep stocks of spare parts</td>
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<td>How to look after a cold store</td>
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<tr>
<td>25.</td>
<td>User’s handbook for photovoltaic refrigerator</td>
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<tr>
<td>26.</td>
<td>How to use the vaccine cold chain monitor</td>
<td>18</td>
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### User Handbook sub-series

A sub-series of modules within the above selection comprises detailed handbooks on the use and care of major items of cold chain equipment. These modules may be used independently of the other modules in the series and form the basis for a 1-3 day course to train health centre staff in how to look after their refrigerators/cold rooms and perform minor repairs with simple tools. Daily, weekly and monthly maintenance tasks are described in detail, with appropriate illustrations and fault-finding charts.

The organization of this course, is described in document EPI/CCIS/82.9 Rev.1, listed below.

Modules 14-27, listed at right.

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<td>15.</td>
<td>User’s handbook for compression refrigerators</td>
<td>27</td>
<td>Ar E F Sp Sw</td>
</tr>
<tr>
<td>16.</td>
<td>How to look after a kerosene refrigerator</td>
<td>22</td>
<td>Ar E F P</td>
</tr>
<tr>
<td>17A</td>
<td>User’s handbook for kerosene refrigerators, Electrolux RAK 1302</td>
<td>67</td>
<td>Ar E F</td>
</tr>
<tr>
<td>17B</td>
<td>User’s handbook for kerosene refrigerators, Sibir S2325</td>
<td>35</td>
<td>Ar E F</td>
</tr>
<tr>
<td>18.</td>
<td>How to look after a gas refrigerator</td>
<td>27</td>
<td>Ar E F P</td>
</tr>
<tr>
<td>19.</td>
<td>User’s handbook for gas refrigerators</td>
<td>51</td>
<td>Ar E F Sp Sw</td>
</tr>
<tr>
<td>21.</td>
<td>How to look after a cold store</td>
<td>15</td>
<td>Ar E F P</td>
</tr>
<tr>
<td>22.</td>
<td>User’s handbook for cold stores</td>
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<td>Ar E F Sp Sw</td>
</tr>
<tr>
<td>26.</td>
<td>User’s handbook for photovoltaic refrigerator</td>
<td>23</td>
<td>E F</td>
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</table>
REPAIR TECHNICIANS COURSES

A series of modules designed to help technicians make the most radical repairs to compression and solar refrigerators.

For conventional compression refrigerators

The following 7 modules (A,B,C,D,E,F,G) make up a 10-day training course for compression refrigerator repair technicians:

<table>
<thead>
<tr>
<th>Module/Title</th>
<th>Pages</th>
<th>Language</th>
</tr>
</thead>
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<tr>
<td>A Servicing and repair techniques</td>
<td>91</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>B Faults and fault finding</td>
<td>29</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>C Repair work</td>
<td>44</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>D Spare parts</td>
<td>34</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>E Task sheets and progress tests</td>
<td>46</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>F Instructors handbook</td>
<td>86</td>
<td>Ar E F Sp</td>
</tr>
<tr>
<td>G Spare parts lists [loose leaf file]</td>
<td>96</td>
<td>Ar E F Sp</td>
</tr>
</tbody>
</table>

Organizing a course on refrigerator repairs

Guidelines for management on how to organize a training course in refrigerator repair and maintenance based on the User Handbook Sub-Series described above (with the exception of the solar modules which were not written at the time these guidelines were produced). The document includes recommendations on the number of people per course and the facilities and tools required, together with a countdown of pre-course tasks. Guidelines for solar refrigerator repair courses are provided in Module F/Add.1 of the Refrigerator Repair Technicians Course, described below.

EPI/CCIS/82.9/Rev.1 1982, 23 pages. (Scheduled for revision in April 1995)

For solar refrigerators

The first three modules below (E/Add.1, F/Add.1 and H) provide the basis for a 5-day course for solar refrigerator repair technicians. Module I may be included as part of the course if circumstances require it.

<table>
<thead>
<tr>
<th>Module/Title</th>
<th>Pages</th>
<th>Language</th>
</tr>
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<tbody>
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</tr>
<tr>
<td>H Fault-finding and repair of photovoltaic refrigerator</td>
<td>56</td>
<td>E F P</td>
</tr>
<tr>
<td>I Installation handbook for photovoltaic refrigerators</td>
<td>110</td>
<td>E F</td>
</tr>
</tbody>
</table>

COMPUTER SOFTWARE

Three computer programmes have been especially designed for the EPI cold chain and can be used on any IBM or compatible machine with 640 KB of Random Access Memory. Each programme is available on a 5½ inch (HD) or 3½ inch (740KB or 1,410b) diskette and is accompanied by a detailed manual.

CLM: Commodities Logistics Management
Software package developed by Management Sciences for Health (MSH) for stock control of vaccines/other supplies and inventory management of equipment/transport. The CLM user's guide is intended for warehouse staff who use CLM to enter, view, report and analyse commodities and logistics data. This guide assumes that the reader is familiar with the warehouse process and has basic computer skills.

Draft, January 1994, MSH

EPICost -- for costing an Immunization programme
Designed to give the experienced health professional a tool to estimate the costs of the EPI. Based on Lotus 1-2-3 version 2.1, it consists of a spreadsheet into which the programme manager types the capital and recurrent costs of the different parts of the EPI—at national, regional, district, health centre and outreach levels. The programme then calculates (in figures and percentages) where the EPI budget is being spent and enables the manager to investigate areas of the programme that seem to have costs which are unrealistically high or low. It also estimates the cost per fully immunized child and the funding requirements from external resources.

EPIC (and E-Mate)
Software specifically developed to enter, check and analyse data collected during a cold chain monitor survey. See Protocol for a cold chain survey using cold chain monitors and computer software, described above under Management Guidelines.

E-Mate -- for analysing cold chain monitor studies
E-Mate, companion to EPIC software, is an additional tool to analyse the data from vaccine cold chain monitor cards to give a detailed overview of the status of a national cold chain.

- Among the many possible outputs from EPIC, the principal ones are:
  - a profile of failures for the whole cold chain;
  - a profile of cold chain failures for each province or each district;
  - effectiveness of vaccine storage at each level of the cold chain;
  - delay in storage at each level;
  - effectiveness of, and delay in, vaccine transport.
AUDIO VISUAL MATERIALS

FILMS AND VIDEOS

How vaccines are made
The great care that goes into manufacturing vaccines for the EPI is shown in this 30 minute video which ends with the vaccine being taken to the airport for despatch to countries around the world. The story of the vaccine’s journey is continued in the sequence described below. How vaccines should be handled.
Video: CCVI/1; VHS type, 30 minutes.  E
Film version (16 mm) may be requested in special circumstances and will be provided on loan.

The Cold Chain (or How vaccines should be handled)
The journey of the vaccine is followed from the time of its arrival at the airport till it reaches a remote village in Ghana where it is used. The video portrays the precautions that have to be taken and the kinds of mistakes that can occur in transporting and storing vaccines. (This film was made more than ten years ago so techniques and equipment have changed considerably but the precautions that need to be taken are basically the same.)
Video: CCVI/2; VHS type, 30 minutes.  E F
Film version (16 mm) may be requested in special circumstances and will be provided on loan.

The Cold Chain
Short, animated colour film designed to reinforce the idea that, if vaccines are not kept cold, the children who receive them will not be protected against the diseases they prevent.
Film (16 mm): CC/3; 6 minutes.  Ar E F P Sp
Video: CCVI/3V; 6 minutes.  E Ar

SAFE INJECTIONS VIDEO
Two videos on one cassette, distributed either separately or as part of the Injection Safety Presentation Package, described above.
Video: CCVI/4V (1994). Approx. 6 minutes each.  E *

- Breaking the chain of cross infection
Raises awareness of the problem of unsafe injections through a series of interviews with world leaders in immunization. The purpose and function of auto-destruct syringes is explained, showing scenes where they are used effectively in both routine and special immunization activities.

- Steam sterilizer
Follows the procedures of preparation of injection equipment and sterilization using the standard EPI portable steam sterilizers. An excellent training aid, complimentary to the sterilization slide set and the current training materials described above.

SLIDE SETS

The Cold Chain
A set of 48 slides with a comprehensive accompanying text which concentrates on two aspects of the cold chain: how to look after vaccine and how to look after cold chain equipment. CCSS/1 (Revised 1988). E

Sterilization slide set
The sterilization slideset comprises 48 slides, packed in an A5 plastic folder with a bilingual commentary (French and English). It is intended to be used during the practical training of health workers in the use of steam sterilizers and reusable plastic syringes. Steam sterilization of reusable syringes and needles has been adopted as the preferred global policy of the EPI and over 100,000 portable steam sterilizers have been distributed to the field in the last two years. The first 26 slides are focused on the process of loading the sterilizer and conducting a sterilization cycle. The remainder of the slides are directed towards the sterile techniques to be followed when assembling syringes for use, and the mechanical cleaning of the syringes and needles.
CCSS/2 (1988). E F

STICKERS

EPI logo
The programme logo presented as a sticker can be attached to equipment or anything that needs to be identified with the programme.
CCST/4.

Defrost when ice builds up
A maintenance reminder for the refrigerator door.
CCST/1. E F P Sp

Stop! Do you need to open it?
A caution to discourage unnecessary opening of the refrigerator to ensure stable temperatures.
CCST/2. Ar C E F Sp

Vaccine. Rush!
A warning to ensure proper handling of vaccine packages during shipment. Accepted by IATA for air transport.
CCST/3. Ar E F G Sp
**POSTERS**

**VACCINE CARE AND HANDLING**

Has your DPT or TT vaccine been frozen?
A multilingual poster showing a simple test that can be done in
a health centre to see if DPT or TT vaccines have been frozen
and, as a result, are no longer potent.
CCPS/2. E F 5p.

Look after your vaccines every day; Look after your
vaccines every week; Look after your vaccines every
month
A set of three comic strip style posters to remind field level
health workers of the steps to be taken every day, week and
month to ensure that vaccine is available in the proper quanti-
ties and is properly protected. Blank version available for
overprinting in any language.
CCPS/5, 6, 7. E F

**EQUIPMENT MAINTENANCE**

Look after your cold chain equipment
A foldout poster that uses photographs from the cold chain
slide set to show health workers how to get the best perfor-
mance from a vaccine refrigerator.
CCPS/4. E F P

Love your refrigerator
A poster designed to give the idea that a refrigerator should be
cared for - "it needs love too!" Blank versions available for
overprinting in any language.
CCPS/8. E F

This refrigerator protects lives
A poster intended for the door of a vaccine refrigerator, with
instructions on how to load the refrigerator to get the best
performance.
CCPS/12. Ar E F P 5p

Do ... Don't
DO/DON'T instructions on the care and maintenance of
kerosene refrigerators (Sibir S2325, Aladdin blue flame
burners). Designed to help improve the performance of these
refrigerators in health centres.
CCPS/15; Recto/verso. E F

**TEMPERATURE MONITORING**

Vaccine cold chain monitor
Clear explanations of the different parts of the vaccine cold
chain monitor card, what to write where and how to use it. A
useful poster for training purposes and a helpful guide to have
on a health centre wall.
CCPS/16. E F

Stop!watch
Guide to STOP!Watch which continuously monitors tempera-
tures within vaccine refrigerators.
CCPS/17. E F

**SAFE INJECTION PRACTICES**

Rinse, clean, then sterilize
Encourages better steam sterilization procedures in health
centres
CCPS/14. E F

One syringe, one needle for each
injection
Encourages better immuni-
zation procedures in health
centres.
CCPS/13. E F

Let's make injections
safe; 95% injections
sterile by 1997
A set of two posters
prepared to promote safe
injection strategies.
Included in the Safe
Injections Presentation
Package,
CCPS/18 & 19 (1994). E F

Vaccine vial monitor
The different colour ranges
of the monitor and how to
interpret them.
CCPS/20 (1994) E F
ANNEX 1: RECOMMENDED PUBLICATIONS

Recommended cold chain materials produced by other organizations.

AHRTAG Publications

Requests for the following should be addressed directly to:
Teaching Aids at Low Cost, P O Box 49, St AlbansHerts AL1 4AXUnited Kingdom

How to look after a refrigerator
Step by step instructions on the care and maintenance of kerosene, gas and electric refrigerators.

How to look after a health centre store
All aspects of storekeeping, including how to order and distribute supplies and maintain stocks.
Anthony Battersby (1983) AHRTAG publication, 72 pages, E

How to choose and make a cold box
Clearly presented instructions and illustrations on how to choose and make cold boxes for vaccine transport, appropriate for specific circumstances.
Anthony Battersby and Pual Jansscoa (1983) AHRTAG publication, 19 pages, E

Slide set: The Cold Chain -- Target diseases
A selection from EPI slide sets on disease recognition, equipment maintenance and vaccine storage.
48 slides, E

IT POWER Guides

The following Guides for Development Workers on Energy Technologies for Sustainable Development may be obtained from:IT Power Ltd., The Warren, Bramshill Road, Eversley, Hants RG27 0PR, United Kingdom.
Telephone +44 734 730073; Telex: 846852
Fax: +44 734 730820

Micro-hydopower - A guide for development workers
This book is intended to assist anyone with some general technical experience, but perhaps limited specific knowledge of micro-hydro systems, to arrive practical and soundly based decisions on such questions as:
• can a particular stream be utilized to generate power
• if so, what would be the most appropriate design concept to adopt and what equipment will be needed
• how can the cost and the economics of such a scheme be determined
• if it appears to be a viable project, how best should it be designed, procured and implemented

• after completion, what arrangements are likely to be needed to maintain it in reliable operation
[ Micro-hydro systems are defined in the book as systems of less than 300kW reated power, which will in most cases also be isolated (or stand alone) systems that are independent of the main electricity grid.]

Rural lighting, A guide for development workers
by Jean-Paul Louineau, Mobido Dicko, Peter Fraenkel, Roy Barlow and Varis Bokalders, Intermediate Technology Publications in association with The Stockholm Environment Institute 1994. This book aims to provide information both on lighting needs in general and on the technologies, performance and economics of various available lighting systems. The objective is to assist development workers and project managers working in rural or semi-urban development, health, farming and small subsistence sectors to decide:
• what level of light is necessary to meet the needs
• which type of lighting sources would be most suitable
• how to implement cost effective lighting systems

Solar Photovoltaic Products, A guide for development workers
by Anthony Derrick, Catherine Francis and Varis Bokalders, Intermediate Technology Publications in association with The Swedish Missionary Council and the Beijer Institute, 1989
A handbook which aims to assist anyone with a little technical experience but possibly no previous knowledge of photovoltaic systems to decide:
• if a power supply is suitable for the purpose in mind
• the type of equipment needed
• how to proceed in implementing a project using PV products

MISCELLANEOUS

Energy from nature - Renewable energy handbook
Compiled by Peter Pedals, Rainbow Power Company, Nimbin Australia
Primarily a reference book on harnessing energy from nature; this book focuses mainly on why and how to use alternate energy and what appliances are available.
[EPI/Genve has limited stocks; otherwise obtainable from: Rainbow Power Company Ltd., 1 Alternative Way, Nimbin NSW 2480 Australia. Telephone 066 891430; Fax: 066 891 109]
ANNEX 2: PUBLISHED ARTICLES

Selected articles on the EPI cold chain printed over the past years in various publications.

**WHO Weekly Epidemiological Record (WER)**

- Cold chain evaluation, Hungary, WER 24, 1990
- Cold chain evaluation, Nepal, WER 9, 1988
- Cold chain evaluation, India, WER 26, 1988
- Joint WHO/UNICEF statement on immunization and AIDS, WER 9, 1987
- Changing needles but not the syringe, WER 46, 1987
- Choice of injection equipment, WER 6, 1986
- Fiberglass wicks, WER 40, 1986
- Cold chain evaluation, Tunisia, WER 21, 1984
- Icelined refrigerators, WER 9, 1984
- How much does cold chain equipment cost, WER 31, 1983
- Freezing ice packs, WER 46, 1983
- Vaccine cold chain management indicators, WER 2, 1982
- Stability of freeze-dried measles vaccine, WER 23, 1981
- Maintaining and improving the cold chain, WER 45, 1981
- Heat stability of vaccines, WER 33, 1980
- Effects of freezing on the appearance, potency and toxicity of adsorbed and unadsorbed DPT vaccine, WER 51, 1980
- Improved stability of freeze-dried measles vac., WER 46, 1979

**Other publications**

- Le soleil c’est la santé, Jean-Paul Louineau and Jean-Michel Durand -- a review of IT Power’s activities in supporting Zaire’s solar energy programme. Zaire has installed 850 photovoltaic systems for use within its health programme. *Systèmes Solaires* No. 73/4, 1991, pp. 21-27.
ACCESSORIES, Conversion kit: kerosene to gas (Sibir), Dec-93
Generator (solar): Naps Powerman, Dec-93
Generator sizing, ready reckoner, NB-1
Generator, small light (Electrolux): Travel Power, Dec-93
Micronutrient pump dispenser, Dec-93
Vacuum trays for Electrolux RCW42EK refrigerators, NB-1
ACCESSORIES/NON, EPI, Oxygen concentrator, Dec-93
AUDIO VISUAL, Feedback re zero requests for AV materials in Searo, Dec-93
Solar refrigeration poster, 92-1
BLOOD, Boxing blood, 92-1
Cold boxes/carriers for blood cold chain, NB-1
Solar energy for blood safety, 92-1
CFC, CFC update, Dec-93
Developments in industry, 93-1
Reclaiming system for CFCs, NB-1
COLD BOXES/VAC CARRIERS, Best buys in vaccine carriers (1991 performance/cost data, NB-1
Foam pads, NB-1
Thermos carriers improved, 92-1
CVI, Statement from Kyoto - 3rd meeting CVI Consultative Group, Dec-93
Vaccine independence initiative, 93-1
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Peru: Cost and inventory survey, Dec-93
WPRO monitors the cold chain, Dec-93
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Immunization cards, lifetime, tetanus, 92-1
Immunization credit card, NB-1
Oman, field trial with lifetime immunization cards, Dec-93
INCINERATOR BOXES, Incinerator boxes, trials in Pakistan, NB-1
KEROSENE, Burner, low grade kerosene burner modification succeeds!, NB-1
Conversion kit: kerosene to gas (Sibir), Dec-93
Effect of water in kerosene tanks, NB-1
Kerosene & gas refrigerators, performance of Brazilian Consul, NB-1
Refrigerator monitoring, NB-1
Stoves, Hippolito instructions, NB-1
Waxing re use of kerosene absorption refrigerators, Dec-93
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Wicks, cotton or fibreglass for Sibir kerosene refrig., NB-1
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1993 - post meeting summary, Dec-93
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Polio potency and cold chain monitors, NB-1
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Stop!Watch survey of kerosene refrig. in Chad, NB-1
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Eutectics, poor replacement for water ice in ice laden freezers, NB-1
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Mobile workshop for cc refrigerators, Chad, Dec-93
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Please write clearly:

Name
Address
City
Country

First name

Title

Code

- Please add my name to the Cold Chain Mailing List to receive:
  ➔ Technet News (Newsletter)  Yes  No
  ➔ New cold chain documents  Yes  No
  My special topic of interest is: .................................................................

- I am interested in becoming a member of Technet. Please send me an application form.