

TENTATIVE CURRICULUM OF THE IN-COUNTRY TRAINING PROGRAMME

4 YEAR-CURRICULUM

DURATION: 4 years (from JFY1998 to JFY2001 )

1st Year

Orientation,

Maintenance and Repair of Suction Apparatus, Blood Pressure Apparatus  
and Instrument Sterilizer

Management of tools and spare parts

Management of job record and periodical report

Safety Control(General)

2nd Year

Review of the 1st Year

Maintenance of hot water bath and nebuliser

Management of medical equipment inventory

Safety Control(Infection)

3rd Year

Maintenance of infant Incubator and Operation Lamp

Management of medical equipment history

Safety Control(Electric)

4th Year

In-hospital Preventive Maintenance (Other equipment)

Management of medical equipment (Data collection and report)

Safety Control(Inspection)

*[Handwritten signatures and initials]*

## **DETAIL CURRICULUM OF THE FIRST COURSE**

**1st day**

**Registration and opening ceremony.**

**Introduction to the training programme**

**Lecture on Suction Apparatus**

**2nd day**

**Lecture on Blood Pressure Apparatus**

**Lecture on Instrument Sterilizer**

**3rd day**

**Lecture on Safety Control (General)**

**Practical session on Suction Apparatus**

**4th day**

**Practical session on Blood Pressure Apparatus**

**Practical session on Instrument Sterilizer**

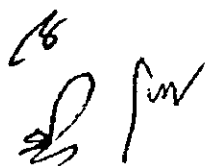
**5th day**

**Practical session for all equipment and questioning period**

**Management of tools and spare parts**

**Management of job record and periodical report**

**Assessment**



**SCHEDULE OF THE COURSE IMPLEMENTATION**  
**(FOR JFY 1998)**

| MONTH                | SRI LANKAN SIDE   | JAPANESE SIDE  |
|----------------------|---|--|
| Nov., 1998           | 1. Signing of Record of Discussions<br>2. Preparation of G. I.<br>3. Distribution of G. I. and Application Form                                   | 1. Signing of Record of Discussions                                |
| Dec., 1998           | 1. Submission of Bill of Estimate<br>2. Receipt of Application<br>3. Selection of the Participants<br>4. Notification of the results of selection | 1. Recruitment of Training Advisor(s)<br>2. Remittance of Expenses |
| Jan., ~<br>Mar. 1999 | Implementation of the Course  | Dispatch of Training Advisor(s)                                    |
| Mar., 1999           | Submission of Statement of Expenditures<br>Submission of Course Report  |  |

**TENTATIVE ESTIMATE OF EXPENSES**  
(FOR JFY 1998)

(US\$)

| Items                         | Breakdown   | Amount            |                 |
|-------------------------------|---|-------------------|-----------------|
|                               |   | Japanese side     | Sri Lankan side |
| <b>I- Invitation Expenses</b> |   |                   |                 |
| 1. Transportation             | 1US\$ × 80p   | 80                |                 |
| 2. Per-diem                   | 4US\$ × 80p × 7days   | 2,240             |                 |
| 3. Accommodation              | 15US\$ × 80p × 6days  | 7,200             |                 |
| Subtotal item I               |   | 9,520             |                 |
| <b>II- Training Expenses</b>  |   |                   |                 |
| 1. Employment Fee             | secretary   |                   |                 |
|                               | 100US\$/month × 1p × 4 months<br>(per-diem) 4US\$ × 1p × 7days × 6times<br>(accommodation) 15US\$ × 1p × 6days × 6times | 400<br>168<br>540 |                 |
|                               | staffs  |                   |                 |
|                               | (per-diem) 8US\$ × 7p × 7days × 6times<br>(accommodation) 15US\$ × 7p × 6days × 6times                                  |                   | 2,352<br>3,780  |
| 2. Transportation             | 125US\$ × 6 times   |                   | 750             |
| 3. Consumable supplies        | 25US\$ × 6 times (copy papers, detergent, lubricant, etc.)  | 150               |                 |
| 4. Meeting Expenses           | 250US\$ × 6 times   | 1,500             |                 |
| 5. G.I. printing Certificates | 6US\$ × 80p   |                   | 480             |
| 6. Teaching Materials         | 40US\$ × 80p (text book, cables, rubber mats, etc.)   | 3,200             |                 |
| 7. Others                     | 150US\$   | 150               |                 |
| Subtotal item II              |   | 6,108             | 7,362           |
| Total                         |   | 15,628            | 7,362           |
|                               |   | (68%)             | (32%)           |
|                               |   | 22,990            |                 |

スリ・ランカ現地国内研修「医療機材保守管理」対処方針及び協議結果

添付資料2：対処方針及び協議結果

| 項目        | 要請内容  | わが方の対処方針   | 協議結果  |
|-----------|---|--|---|
| 1. コース名称  | (和) 研修「医療機材保守管理」<br>(英) Training on Medical Equipment Maintenance and Troubleshooting   | 研修形態を加えて以下のとおりとする。<br>(和) 現地国内研修「医療機材保守管理」<br>(英) In-Country Training Course in Medical Equipment Maintenance and Troubleshooting  | 対処方針のとおり  |
| 2. 目的     | 本端地域病院職員が自ら医療機材を維持できるようにになる。  | 各医療サービス局地域の医療機材の保守の向上を図り医療機材の耐用時間の最大化と安全かつ最速の利用を実現する。それにより地方居住者の健康管理の質の向上を図る。  | 対処方針のとおり  |
| 3. 到達目標   | 記載なし  | 1. 簡易医療機材の修理、保守ができるようになる。<br>2. 医療施設の医療機材管理台帳を利用した管理ができるようになる。<br>3. 技術面、経済面において効率的な全国規模の医療機材保守管理システムの確立に寄与する。   | 対処方針のとおり  |
| 4. 研修期間   | 各医療サービス局地域約5日間<br>1998年7月から1999年10月まで毎月1地域5年間の実施を希望   | 各医療サービス局地域約5日間<br>1998年度は1999年1月から3月4年間の実施 (1998年度～2001年度)   | 各医療サービス局地域5日間<br>以下対処方針のとおり   |
| 5. カリキュラム | 初年度について<br>(1日目) 登録、開講式、自己紹介、講義 (吸引器)<br>(2日目) 講義 (吸引器、煮沸消毒器)<br>(3日目) 講義 (安全管理)、実技 (吸引器)<br>(4日目) 実技 (吸引器、煮沸消毒器)<br>(5日目) 質疑応答、評価会 | 1. 吸引器、血圧測定器、煮沸消毒器の保守・修理<br>2. 工具とレポートの管理<br>3. レポートと定期レポート作成<br>4. 安全管理 (一般)<br>(2日目)<br>1. 恒温槽と吸入器の保守管理<br>2. 医療機材目録の管理<br>3. 安全管理 (院内感染)<br>(3日目)<br>1. 未熟児保育器と手術灯の保守管理<br>2. 医療機材修理履歴管理<br>3. 安全管理 (電気)<br>(4日目)<br>1. 院内保守管理 (他の機材)<br>2. 医療機材 (情報収集と統計) 管理<br>3. 安全管理 (点検)<br>* 初年度の内容はプロポーザルどおり | 2年目以降の研修員は1年目の研修を受けていない者も含むため、2年目に1年目の復習を行う。また初年度については、工具や修理台帳の管理も含めるとし、以下のとおりとする。<br>(1年目)<br>オリエンテーション<br>以下対処方針のとおり<br>(2年目)<br>1年目の復習<br>以下対処方針のとおり<br>(3年目) 及び (4年目)<br>対処方針のとおり<br>* 初年度について<br>(1日目) ～ (4日目)<br>対処方針のとおり<br>(5日目)<br>工具の管理、管理台帳及び定期報告の管理<br>以下対処方針のとおり |

| 項目       | 要請内容  | わが方の対処方針   | 協議結果  |
|----------|---|--|---|
| 6. 対象地域  | 12都市(9地域)<br>Kurunegala(North Western), Vayniya(Northern),<br>Amparai(Eastern), Trincomalee(Eastern),<br>Kandy(Central), Rathnapura(Sabaragamuwa),<br>Galle(Sothen), Colombo(Western),<br>Kalutara(Western), Gampaha(Western),<br>Badulla(Uva), Anuradapura(North Central)<br>各医療サービス局地域10名 | 6 地域<br>Central, Southern, North Western, Nothen Central, Uva,<br>Sabaragamuwa<br>*なお、北部、東部地域からの参加の可能性も検討する。   | 対処方針のとおり<br>*6地域以外の要員の研修はスリ・ランカ側が独自に行う。                                     |
| 7. 定員    |   | 60名  | 保健省の医療セクター改革後の雇用人数をふまえ、以下のとおりとする。<br>約80名                                   |
| 8. 資格要件  | 記載なし  | 1.各医療サービス局長から推薦された者<br>2.GCE(O/L)の資格を有していること<br>3.現在当該分野の業務に従事している者が予定されている者<br>4.関連の分野の実務経験が2年以上の者<br>5.35歳以下の者<br>6.心身ともに健康である者  | 2.について、対象者はGCE(O/L)の資格を必ず有しているとする。<br>2.GCE(O/L)以上の資格を有している者。<br>他は対処方針のとおり |
| 9. 研修機関  | (和) 医療機材センター<br>(英) Bio-medical Engineering Services (BES)  | 要請どおり(正式名称について確認する)<br>(BESが各医療サービス局地域の主要病院で研修を行う)<br>*スリ・ランカ側著名者はBESの所長。立会人はERDと保健省の課長級以上   | 対処方針のとおり<br>*スリ・ランカ側著名者は保健省の次官、BESの所長、ERD(大蔵省対外援助局)の局長                      |
| 10. 募集方法 | 記載なし  | 他案件にて実施している現地国内研修の応募方法に即す<br>1.応募者所属地域の医療サービス局長は、BESに所属長の承認を得た応募書類を提出する<br>2.BESは応募者所属の医療サービス局長に対し応募者の受入可否について連絡する<br>*なお、人選については本研修に適した参加者が継続的に選出されるよう保健省医療サービス局長、BESと協議する。 | 対処方針のとおり  |

| 項目                          | 要請内容 | わが方の対処方針   | 協議結果   |
|-----------------------------|------|--|--|
| 11.<br>業務<br>分岐             | 記載なし | <p>スリ・ラカ側は以下の業務を行う</p> <ol style="list-style-type: none"> <li>1.ANNEX Iに示すカリキュラムを作成する</li> <li>2.G.I.を作成、印刷する</li> <li>3.医療サービス局長を通じ、G.I.を対象機関に配布する</li> <li>4.応募書類を受け付ける</li> <li>5.研修員を選考し、医療サービス局長を通じて対象機関とJICA事務所に結果を知らせる</li> <li>6.帰国研修員や日本人専門家のC/Pを含むスリ・ラカ人スタッフを講師として配置する</li> <li>7.研修に必要な施設や機材を準備する</li> <li>8.研修員の宿泊施設を準備する</li> <li>9.研修員に修了証書を授与する</li> <li>10.研修終了後30日以内にコースレポートと精算報告書をJICA事務所に提出する</li> <li>11.日本政府の負担分を除く研修経費を負担し、またコースウェアの率を30%まで引き上げるよう努める</li> <li>12.コースに関し、業務調整を行う</li> </ol> <p>日本側は以下の業務を行う</p> <ol style="list-style-type: none"> <li>1.必要に応じて研修指導員を派遣する</li> <li>2.ANNEX IIIに示す経費案に基づき経費を負担する</li> </ol> | <p>スリ・ラカ側の業務11.について、初年度の経費を概算した結果、スリ・ラカ側が全体経費の32%を負担できること、また保徳省は2000年度の予算に経費を計上する予定であることとから以下のとおりとする。</p> <p>11.日本政府の負担分を除く研修経費を負担し、またコースウェアの率を50%まで引き上げるよう努める</p> <p>他にについては対処方針のとおり</p>                                    |
| 12.<br>経費<br>関係<br>事務<br>手順 | 記載なし | <ol style="list-style-type: none"> <li>1.BESは本研修にかかる経費の為の口座を所長名義で開き、銀行名、口座番号、名義人をJICA事務所に知らせる。</li> <li>2.BESは研修開始の60日前までに研修にかかる日本側負担分の経費申請をJICA事務所に対し行う。</li> <li>3.JICAは申請を査定し、申請を受けてから30日以内に12-1で示した口座に経費を振り込む。</li> <li>4.BESは研修終了後30日以内に精算と支出証明書をJICA事務所に提出する。</li> <li>5.JICAからの送金分のうち未使用分があれば、JICAからの助言に基づいてJICA事務所に返金する。受入諸費から研修所費へ流用しない。</li> <li>6.JICAから要請があれば、BESは12-4に示す支出を証明する書類を提示する。</li> </ol>  | <p>11.について、現在スリ・ラカ政府は関係機関の新規口座開設を厳しく制限しているため、既存のBES口座を使用することとする。なお、この場合、本研修のための経費は他の目的に使用すべきでないことを明記し、以下のとおりとする。</p> <p>1.BESは本研修にかかる経費の為に既存の口座を使用し、銀行名、口座番号、名義人をJICA事務所に知らせる。本経費は本研修の目的以外に使用しない。</p> <p>他にについては対処方針のとおり</p> |

| 項目         | 要請内容 | わが方の対処方針   | 協議結果  |
|------------|------|--|---|
| 13. 負担経費内訳 | 記載なし | <p>スリランカ側に全体経費の約30%を負担させるよう自助努力を求め(初年度については、スリランカ側の負担は全体経費の約5%)</p> <p>受入諸費<br/> 交通費 (2US\$×10p×6 times) 120US\$<br/> 日当 (8US\$×10p×7days×6 times) 3360US\$<br/> 宿泊費 (25US\$×10p×6days×6 times) 9000US\$<br/> 保険料 0US\$<br/> 研修諸費<br/> 講師謝金 (10US\$/hrs×10hrs×2p×6 times) 1200US\$<br/> 備人費 (40US\$/5day×1p×6 times) 240US\$<br/> 国内移動費 (100US\$×6 times) 600US\$<br/> 消耗品 (25US\$×6 times) 150US\$<br/> 会議費 (650US\$×6 times) 3900US\$<br/> G.I.及び修了証書印刷費 (5US\$×10p×6 times) 300US\$<br/> 教材費 (40US\$×10person×6 times) 2400US\$<br/> その他 240US\$</p> <p>受入諸費 : 12,480 (US\$) (1,448,928円)<br/> 研修諸費 : 9,030 (US\$) (1,048,303円)<br/> 合 計 : 21,510 (US\$) (2,497,311円)</p> | <p>スリランカ側に全体経費の50%を負担させるよう自助努力を求め(初年度については、スリランカ側の負担は全体経費の32%)</p> <p>受入諸費<br/> 交通費 (1US\$×80p) 80US\$<br/> 日当 (4US\$×80p×7days) 2,240US\$<br/> 宿泊費 (15US\$×80p×6days) 7,200US\$<br/> 小計 9,520US\$<br/> 研修諸費<br/> 備人費 400US\$<br/> 秘書 : (100US\$/month×1p×4months) 400US\$<br/> +(日当4US\$×1p×7days×6 times) 168US\$<br/> +(宿泊費15US\$×1p×6days×6 times) 540US\$<br/> 職員 : (日当8US\$×7p×7days×6 times) 2,352US\$<br/> +(宿泊費15US\$×7p×6days×6 times) 3,780US\$<br/> 7,500US\$<br/> 国内移動費 (125US\$×6 times) 150US\$<br/> 消耗品 (紙、洗剤、潤滑油等) (25US\$×6 times) 1,500US\$<br/> 会議費 (250US\$×6 times) 1,500US\$<br/> G.I.及び修了証書印刷費 (6US\$×80p) 480US\$<br/> 教材費 (教科書、テープル、ラバーマット等) (40US\$×80p) 3,200US\$<br/> その他 150US\$<br/> 小計 6,108US\$<br/> 合計 15,628US\$ (68%)<br/> (32%)</p> <p>受入諸費 : 9,520 (US\$) (1,105,272円)<br/> 研修諸費 : 13,470 (US\$) (1,563,867円)<br/> 合 計 : 22,990 (US\$) (2,669,139円)</p> |



## B E S

( Biomedical Engineering Services )

政府機関による全公立病院の医療機材について集中管理する組織。

こういった組織は世界でも珍しい。

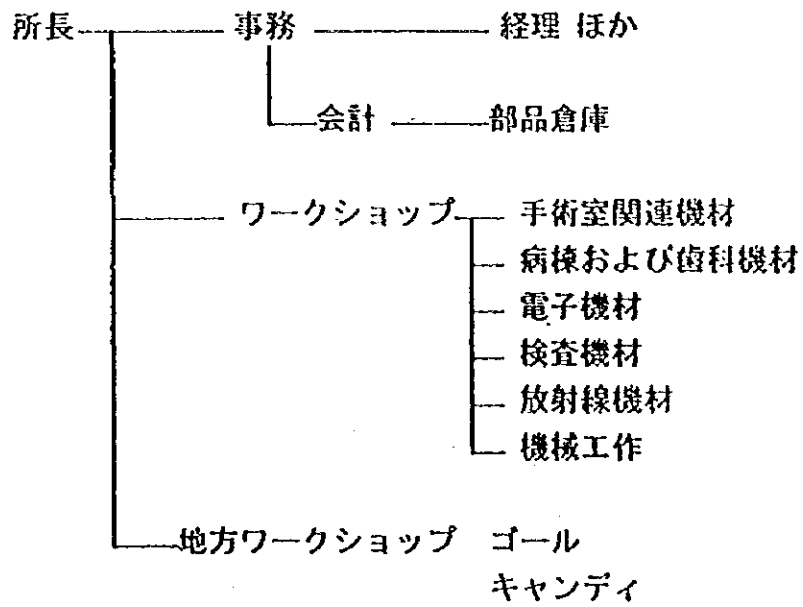
西南アジアの中で飛びぬけて優秀な保健医療指数を出しているスリ・ランカにおいて重要な役割を担っている。

|          | 乳幼児死亡率 | 医師一人当たりの人口 | 平均寿命 |
|----------|--------|------------|------|
| 日本       | 5      | 545        | 80   |
| スリ・ランカ   | 14     | 5,888      | 72   |
| インド      | 79     | 2,165      | 61   |
| ネパール     | 88     | 12,612     | 54   |
| パキスタン    | 88     | 2,000      | 62   |
| バングラデッシュ | 90     | 12,500     | 56   |

このような組織はスリ・ランカ程度の国土の国なら（車で1日でどこへでも移動できる）資本投下が少なく効果が高い合理的なシステムである。

例えばインドのような大国では実現は不可能。

## BESの組織



\* BESの組織:

職員数127名

|    |           |    |                |
|----|-----------|----|----------------|
| 所長 | 事務        | 事務 | 事務処理           |
|    |           | 会計 | 部品管理倉庫         |
|    | ワークショップ   |    | 手術室関連機材        |
|    |           |    | 滅菌装置・手術台・電気メス等 |
|    |           |    | 病棟機材           |
|    |           |    | 煮沸消毒器・ネブライザー等  |
|    |           |    | 電子機材           |
|    |           |    | 心電計・保育器・分析装置等  |
|    |           |    | 検査機材           |
|    |           |    | 遠心器・炎光光度計等     |
|    |           |    | 放射線機材          |
|    |           |    | X線装置等          |
|    |           |    | 機械工作           |
|    |           |    | 溶接・塗装・部品製作等    |
|    | 地方ワークショップ |    | ゴール            |
|    |           |    | キャンディ          |

\* BESの業務の実際:

(修理依頼の方法)

- a) 病院から故障修理依頼の通知を受ける。
- b) 病院の担当者がBESに直接持ち込んでくる。(近隣の病院・北東部地方の病院)
- c) BESが巡回修理チームを計画し、あらかじめそのエリアの病院に通知する。

(修理方法)

- a) 現場において修理(据え付け型の機器・簡単な故障など)
  - b) BESに持ち帰って修理(故障診断に手間がかかる機器など)
- ・各ワークショップで担当の機器が決まっているが場合によってはワークショップ間で連携して作業する事もある。
  - ・修理用交換部品が必要な場合には部品管理庫から調達する。なければ国内の市場またはメーカーに発注する。
  - ・巡回修理チームを送り、一定地域の小規模病院の機材を巡回して修理する。

\* ワークショップの技術:

- ・各ワークショップによってレベルに差がある。
- ・機械的故障に対する修理能力は高い。
- ・職長以下実務担当職員は経験豊かな者が多い。
- ・JICA無償援助による測定器及び工具の導入で修理可能範囲は広がった。
- ・電子回路構成部品の故障診断能力は平均して低い。

(表1) 96年度修理実績 (96年1月から12月まで)

|               | 修理依頼件数 | 修理完了件数 | 修理完了率 (%) |
|---------------|--------|--------|-----------|
| 病棟一般機材ワークショップ | 2,520  | 2,480  | 98.4      |
| 手術室関連ワークショップ  | 2,008  | 1,879  | 93.6      |
| 検査機器ワークショップ   | 515    | 503    | 97.7      |
| 電子機器ワークショップ   | 1,475  | 1,436  | 97.4      |
| X線機器ワークショップ   | 558    | 533    | 95.5      |
| 合計            | 7,076  | 6,831  | 96.5      |

Sheet1

| EL           | NO. OF REQUESTS | FINISH | %   | NOT FINISH | % |
|--------------|-----------------|--------|-----|------------|---|
| January 97   | 90              | 90     | 100 | -          | - |
| February 97  | 77              | 77     | 100 | -          | - |
| March-97     | 70              | 70     | 100 | -          | - |
| April -97    | 68              | 68     | 100 | -          | - |
| May-97       | 110             | 108    | 98  | 2          | 2 |
| June-97      | 90              | 86     | 96  | 4          | 4 |
| July-97      | 126             | 124    | 98  | 2          | 2 |
| August-97    | 91              | 90     | 99  | 1          | 1 |
| September-97 | 110             | 107    | 98  | 3          | 2 |
| October-97   | 94              | 93     | 99  | 1          | 1 |
| November-97  | 86              | 86     | 100 | -          | - |
| December-97  | 100             | 100    | 100 | -          | - |

Color Doppler - No spares available  
 Infusion Pump - No spares available  
 Shortwave Machine - No spares available  
 Syringe pump - No spares available  
 Ultra sound scanner - No spares available  
 ECG Monitor - No spares available  
 Weighing Machine - No spare available  
 Featus heart detector - No spares parts  
 Pulse Oxymeter - No spare parts  
 Blood Gas Analyser - No spare parts  
 Incubator - No spares available  
 Pulse Oxymeter - No spare parts  
 ECG Monitor - No spares available

NEW RECRUITMENTS TO BES

| SR. NO. | DESIGNATION | NUMBER | DATE OF APPOINTMENT |
|---------|-------------|--------|---------------------|
| 01.     | ENGINEERS   | 04     | 16.05.1997          |
| 02.     | FOREMEN     | 06     | 17.08.1998          |
| 03.     | TECHNICIANS | 09     | 01.01.1998          |
| 04.     | LABOURERS   | 15     | 12.07.1998          |

PRESENT STAFF INCLUSIVE OF NEW RECRUITMENTS

|     |                        |     |
|-----|------------------------|-----|
| 01. | DIRECTOR               | 01  |
| 02. | ENGINEERS              | 04  |
| 03. | FOREMEN                | 25  |
| 04. | TECHNICAIANS           | 63  |
| 05. | ACCOUNTANT             | 01  |
| 06. | ADMINISTRATIVE OFFICER | 01  |
| 07. | CLERKS                 | 12  |
| 08. | DATA ENTRY OPERATORS   | 03  |
| 09. | STORE KEEPERS          | 05  |
| 10. | STOREMAN               | 01  |
| 11. | PEON (K.K.S.)          | 03  |
| 12. | DRIVERS                | 14  |
| 13. | TYPIST                 | 02  |
| 14. | LABOURERS              | 34  |
|     | ----                   |     |
|     |                        | 169 |
|     |                        | === |

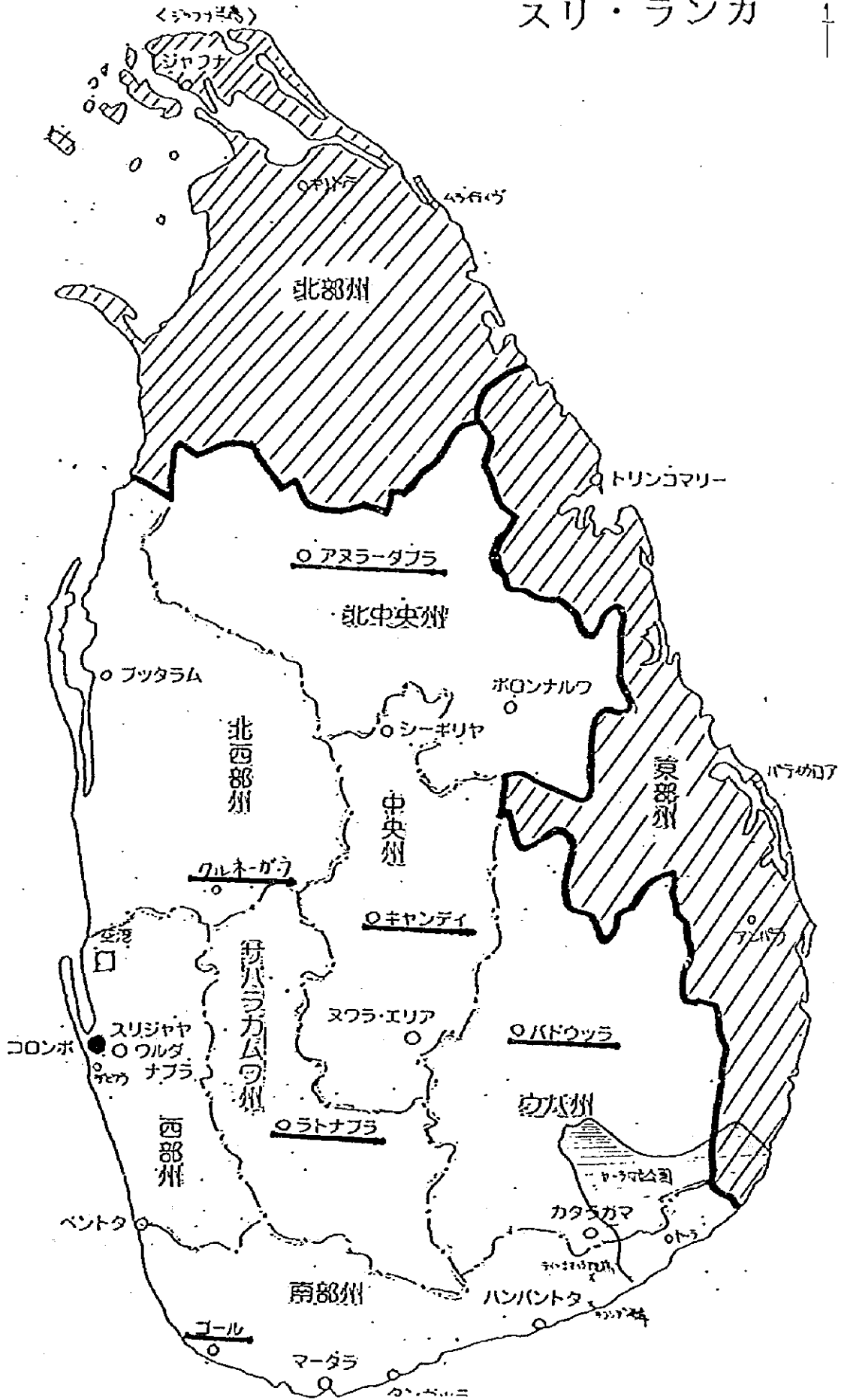
Final Plan.

**Proposed Provincial Careers**

|   | Engineers<br>(Electric/Electronics) | Officers Technological<br>Services | Mechanics | Unskilled<br>Labourers | Clerk<br>Health Clerical<br>Service |
|---|-------------------------------------|------------------------------------|-----------|------------------------|-------------------------------------|
| <b>Provincial Director of Health Services, Colombo</b>                |                                     |                                    |           |                        |                                     |
| 1. DPDHS Area Colombo   | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 2. DPDHS Area Gampaha   | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 3. DPDHS Area Kalutara  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| <b>Provincial Director of Health Services, North/East</b>             |                                     |                                    |           |                        |                                     |
| 1. DPDHS Area Vavuniya  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 2. DPDHS Area Ampara  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 3. DPDHS Area Trincomalee   | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 4. DPDHS Area Jaffna  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| 5. DPDHS Area Batticaloa  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| <b>Provincial Director of Health Service - Southern Province</b>      | 1                                   | 3                                  | 6         | 6                      | 1                                   |
| <b>Provincial Director of Health Service - Central Province</b>       | 1                                   | 3                                  | 6         | 6                      | 1                                   |
| <b>Provincial Director of Health Service - Uva Province</b>           | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| <b>Provincial Director of Health Service - Sabaragamuwa Province</b>  | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| <b>Provincial Director of Health Service - North Central Province</b> | 1                                   | 2                                  | 4         | 4                      | 1                                   |
| <b>Provincial Director of Health Service - North Western Province</b> | 1                                   | 2                                  | 4         | 4                      | 1                                   |

スリ・ランカ

1  
↑



U V A P R O V I N C E

Land Area of Uva Province - 8500 sq.k.m.  
 Land Area of Badulla District - 2861.3 sq.k.m.  
 Land Area of Moneragala District- 5638.7 sq.k.m.

Population of Uva Province  
 (Census 1996)

1114146

Badulla District  
Health Institutions

|                             |   |    |                              |
|-----------------------------|---|----|------------------------------|
| General Hospitals           | - | 01 |                              |
| Base Hospitals              | - | 02 |                              |
| District Hospitals          | - | 10 |                              |
| Peripheral Units            | - | 04 |                              |
| Rural Hospitals             | - | 12 |                              |
| Central Dispensaries & M.H. | - | 01 |                              |
| Medical Officer of Health   | - | 13 |                              |
| Central Dispensaries        | - | 13 |                              |
| Dental Clinics              | - | 32 | School - 15<br>Hospital - 17 |
| Specialized Clinics         | - | 02 | Chest Clinic<br>STD Clinic   |



B A D U L L A

(from January to June 1998)

| Infant Deaths | Live Births | Low weight Births | Still Births | Low Weight Births (%) | Still Births (%) |
|---------------|-------------|-------------------|--------------|-----------------------|------------------|
| 123           | 4680        | 315               | 51           | 6.72                  | 1.08             |

Indoor Morbidity & Mortality

(January to June 1998)

|                                 |                     |
|---------------------------------|---------------------|
| <u>No. of patients admitted</u> | <u>Total Deaths</u> |
| 74531                           | 812                 |

Badulla District  
Bio Medical Equipments

( Health Institutions - 80 )

Basic Equipments available

|   |                  |   |     |           |
|---|------------------|---|-----|-----------|
| * | Spygmomanometers | - | 800 | (Approx.) |
| * | Sterilizers      | - | 300 |           |
| * | Electric Suckers | - | 100 |           |
| * | Nebulizers       | - | 110 |           |

The Basic equipments are used in smallest Central Dispensaries to Provincial Hospital commonly.

As such required repairs frequently and urgently

In addition to the above, following equipments are also to be needed maintenance & repairs frequently.

|   |                                |             |
|---|--------------------------------|-------------|
| - | Laboratory Equipments          | D.H. & B.H. |
| - | Operating Theatre Equipments   | Base &      |
| - | Intensive Care Unit Equipments | Provincial  |
| - | Coronary Care Equipments       | Hospitals   |

Present Provincial B.M.E. Unit established for Uva Province at Badulla Deputy Provincial Director of Health Services Office premises during September 1998 with the help & instructions of D.B.M.E.S., Colombo for the following purposes.

1. Mostly Basic equipments are needed repairs frequently.
2. To save the time to carrying these items to Colombo for repairs.
3. Lack of Transport facilities
4. Has to spend the time of officers for this purpose neglecting their other important duties for 3,4 days to travel to Colombo & back.
5. Repairs ~~are~~ urgently needed for some equipments, as no replacement stocks of same items are not available at institutions.

Existing short comings at Provincial Bio Medical  
Engineering Workshop

- Lack of training for staff
- Non availability of standard tool kits
- Non availability of spare parts
- vehicle to collect unserviceable equipments from Institutions & to distribute after repairs





# BADULLA DISTRICT

## D.D.H.S. (M.O.H.) AREA

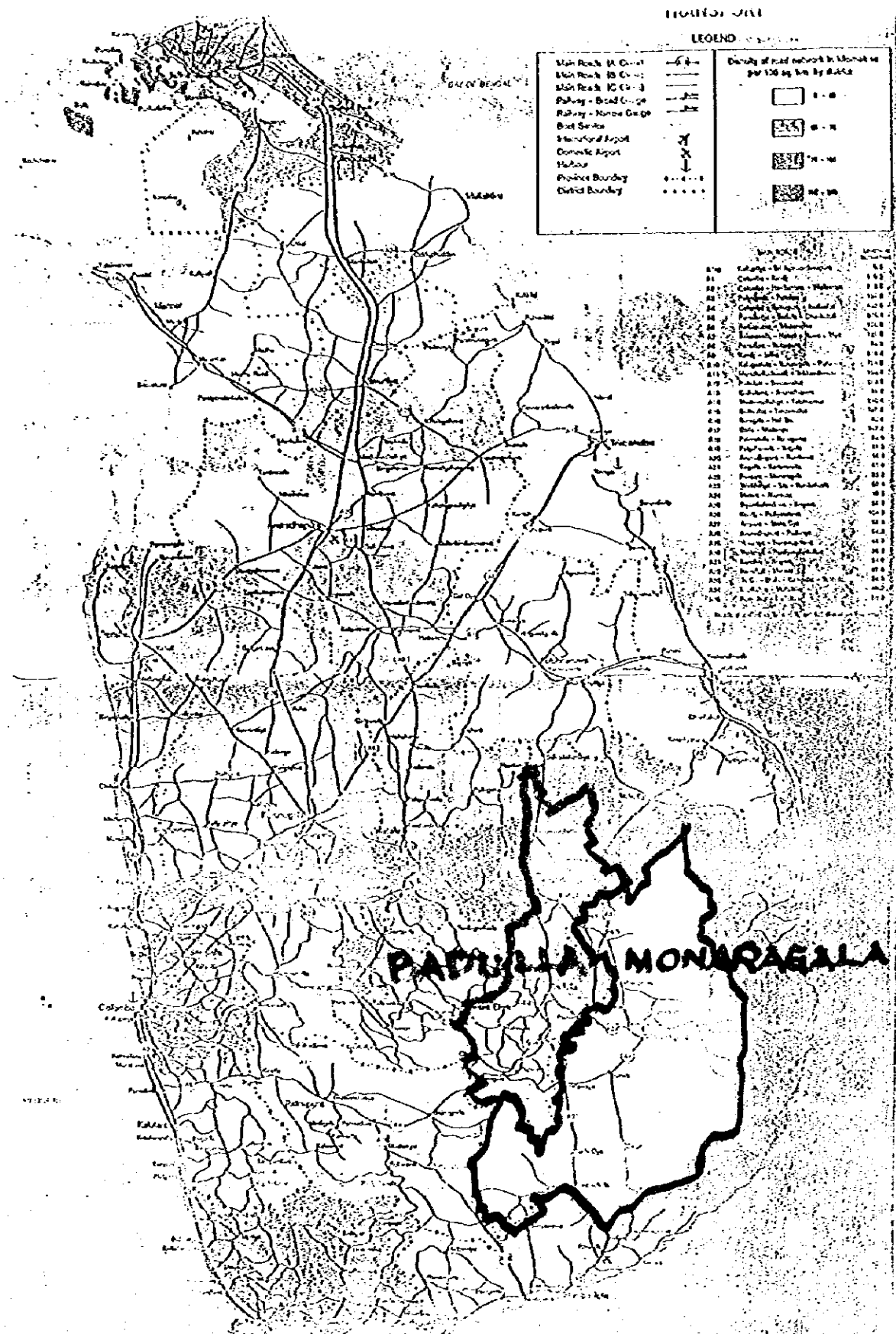
1. Girandurukotte
2. Mahiyangana
3. Ridimaliyadda
4. Meegahakiula
5. Badulla
6. Passara
7. Hali-ela
8. Ella
9. Haputale
10. Haldummulla
11. Welimada
12. Uva. Pararagana
13. Bandarawek
14. Kandaketiya
15. Soranatala



PROVINCE OF

LEGEND

|  |  |
|--|--|
| <p>Main Road - 40 Cms</p> <p>Main Road - 30 Cms</p> <p>Main Road - 10 Cms</p> <p>Road - Broad Gauge</p> <p>Road - Narrow Gauge</p> <p>Bus Service</p> <p>Standard Airport</p> <p>Domestic Airport</p> <p>Harbour</p> <p>Province Boundary</p> <p>District Boundary</p> | <p>Density of road network in Monragala per 100 sq km by R.A.C.</p> <p>0 - 10</p> <p>10 - 20</p> <p>20 - 30</p> <p>30 - 40</p> |
|--|--|



MONRAGALA

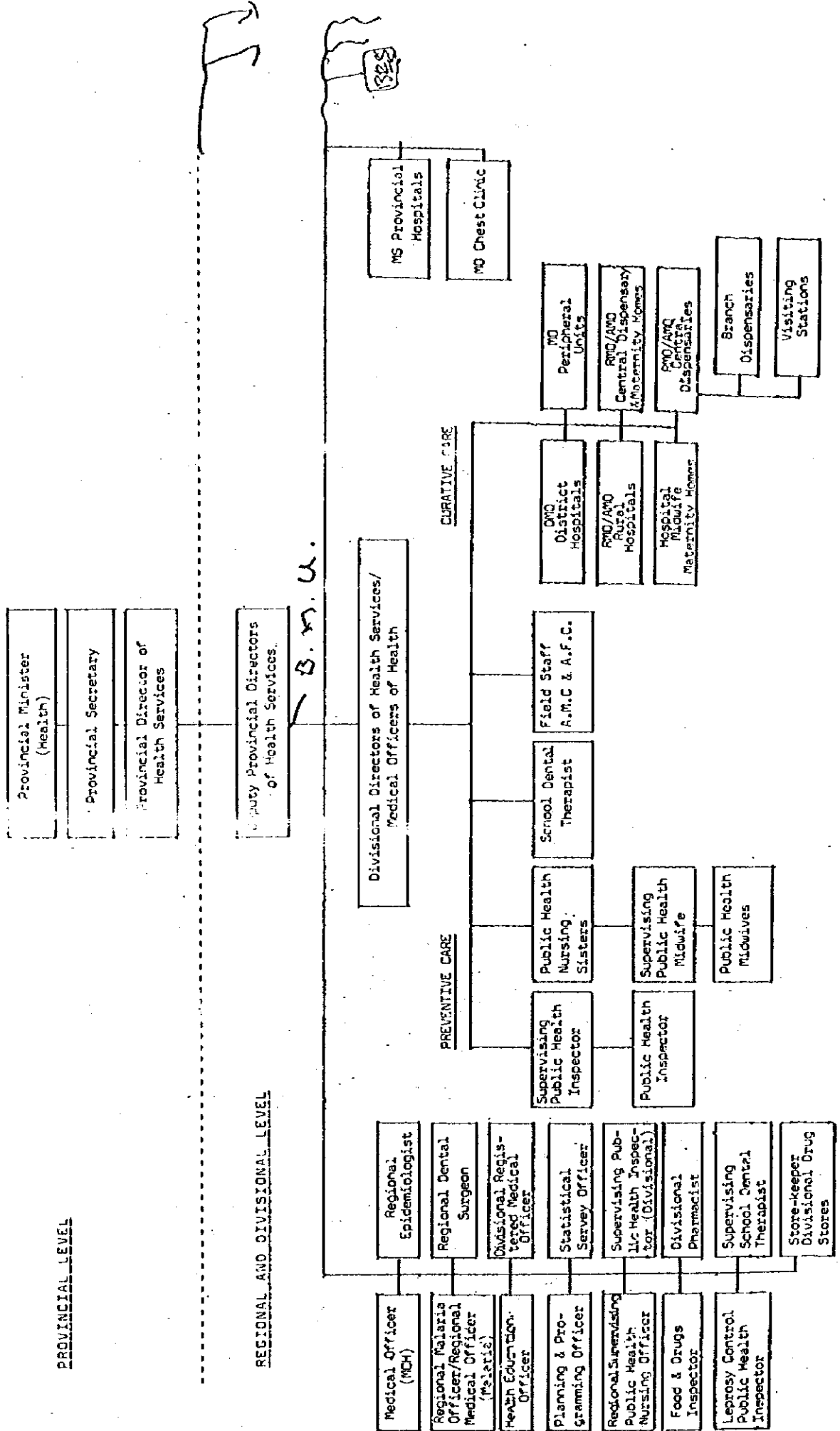
|     |                                 |      |
|-----|---------------------------------|------|
| 170 | Colombo - Sri Jayawardenapura   | 14.0 |
| 81  | Colombo - Kandy                 | 14.0 |
| 82  | Colombo - Peradeniya - Mahipala | 13.0 |
| 83  | Peradeniya - Peradeniya         | 12.0 |
| 84  | Colombo - Kandy - Peradeniya    | 11.0 |
| 85  | Colombo - Kandy - Peradeniya    | 10.0 |
| 86  | Peradeniya - Mahipala           | 10.0 |
| 87  | Kandy - Mahipala                | 10.0 |
| 88  | Peradeniya - Mahipala           | 10.0 |
| 89  | Kandy - Mahipala                | 10.0 |
| 90  | Peradeniya - Mahipala           | 10.0 |
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| 95  | Peradeniya - Mahipala           | 10.0 |
| 96  | Peradeniya - Mahipala           | 10.0 |
| 97  | Peradeniya - Mahipala           | 10.0 |
| 98  | Peradeniya - Mahipala           | 10.0 |
| 99  | Peradeniya - Mahipala           | 10.0 |
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| 134 | Peradeniya - Mahipala           | 10.0 |
| 135 | Peradeniya - Mahipala           | 10.0 |
| 136 | Peradeniya - Mahipala           | 10.0 |
| 137 | Peradeniya - Mahipala           | 10.0 |
| 138 | Peradeniya - Mahipala           | 10.0 |
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| 143 | Peradeniya - Mahipala           | 10.0 |
| 144 | Peradeniya - Mahipala           | 10.0 |
| 145 | Peradeniya - Mahipala           | 10.0 |
| 146 | Peradeniya - Mahipala           | 10.0 |
| 147 | Peradeniya - Mahipala           | 10.0 |
| 148 | Peradeniya - Mahipala           | 10.0 |
| 149 | Peradeniya - Mahipala           | 10.0 |
| 150 | Peradeniya - Mahipala           | 10.0 |

PATULLA MONRAGALA

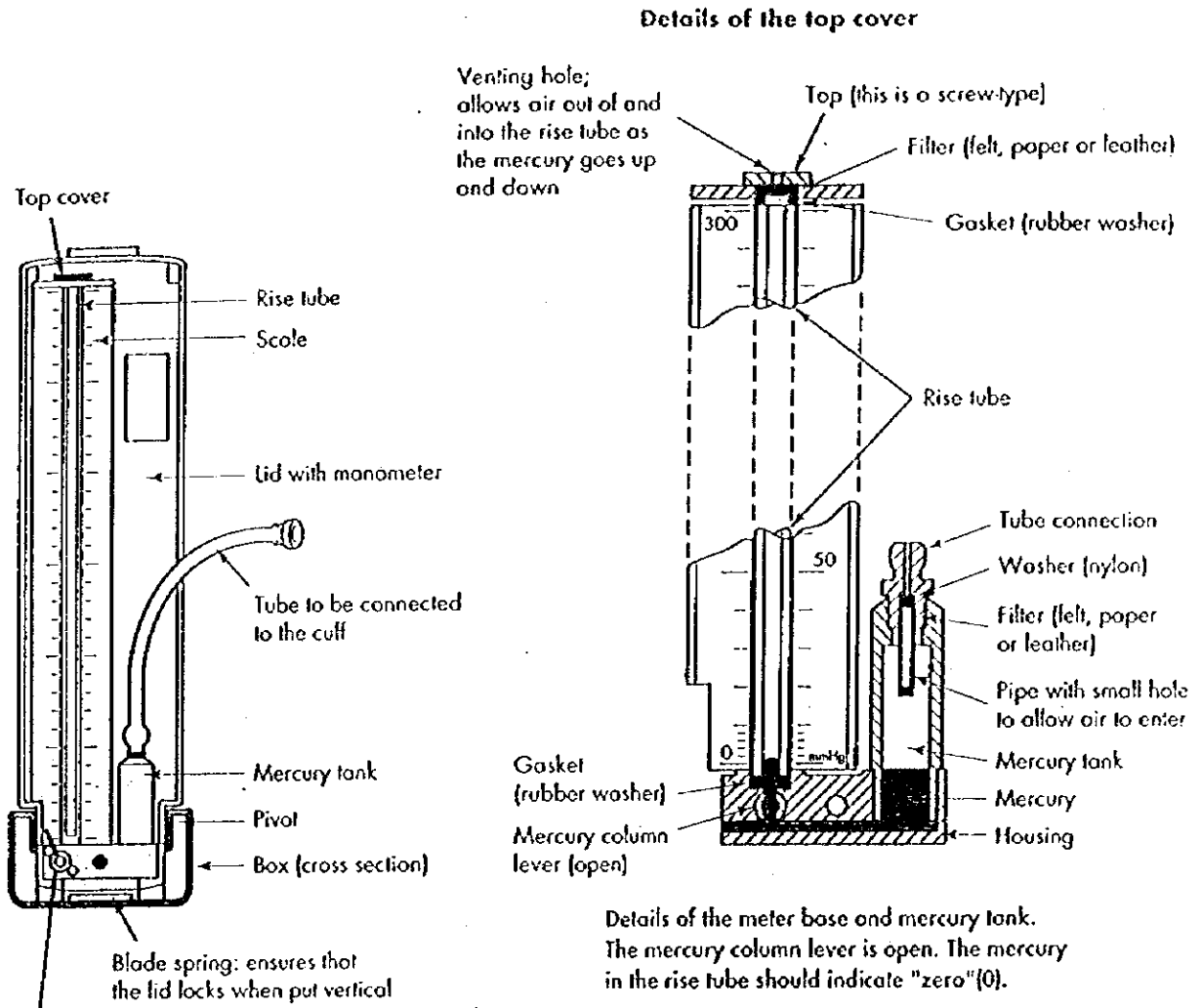
Standard Structure

ORGANIZATION OF HEALTH SERVICES UNDER PROVINCIAL COUNCILS

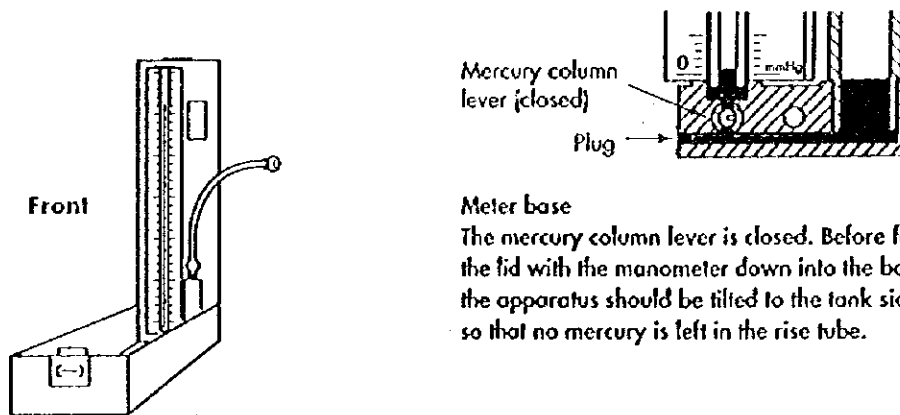
Figure 2.2







Mercury column lever (in "open" position)



**Meter base**  
The mercury column lever is closed. Before folding the lid with the manometer down into the box, the apparatus should be tilted to the tank side, so that no mercury is left in the rise tube.

Please study this diagram as a guide before removing any parts from the manometer.  
Although all the machines work on the same principle each manufacturer's designs are different therefore great care must be taken to note every step taken.  
Remember to place any parts removed in a clean cardboard box for safe keeping.

Figure 54: Disassembly of blood pressure apparatus

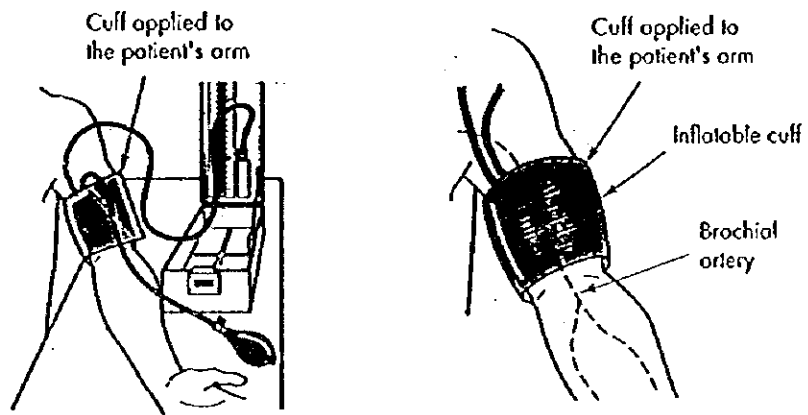
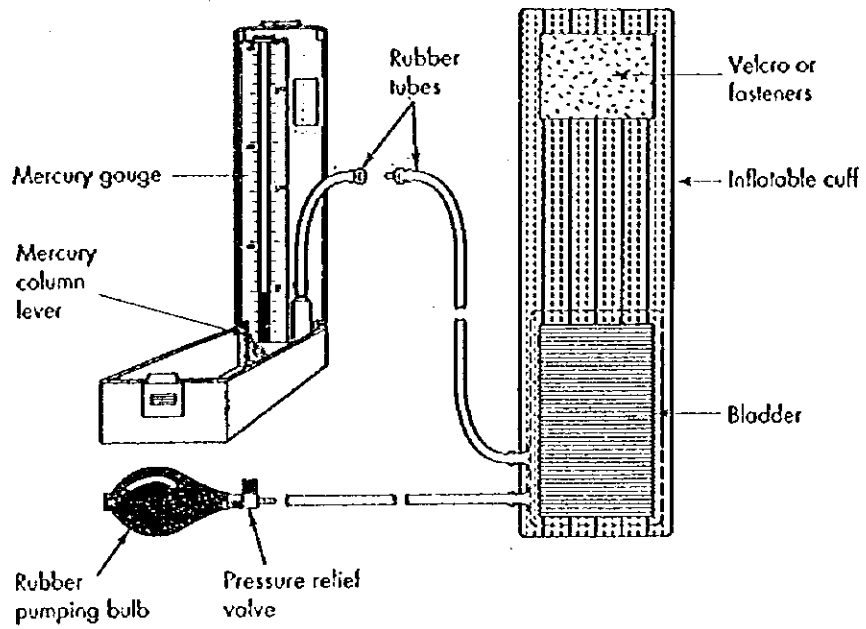
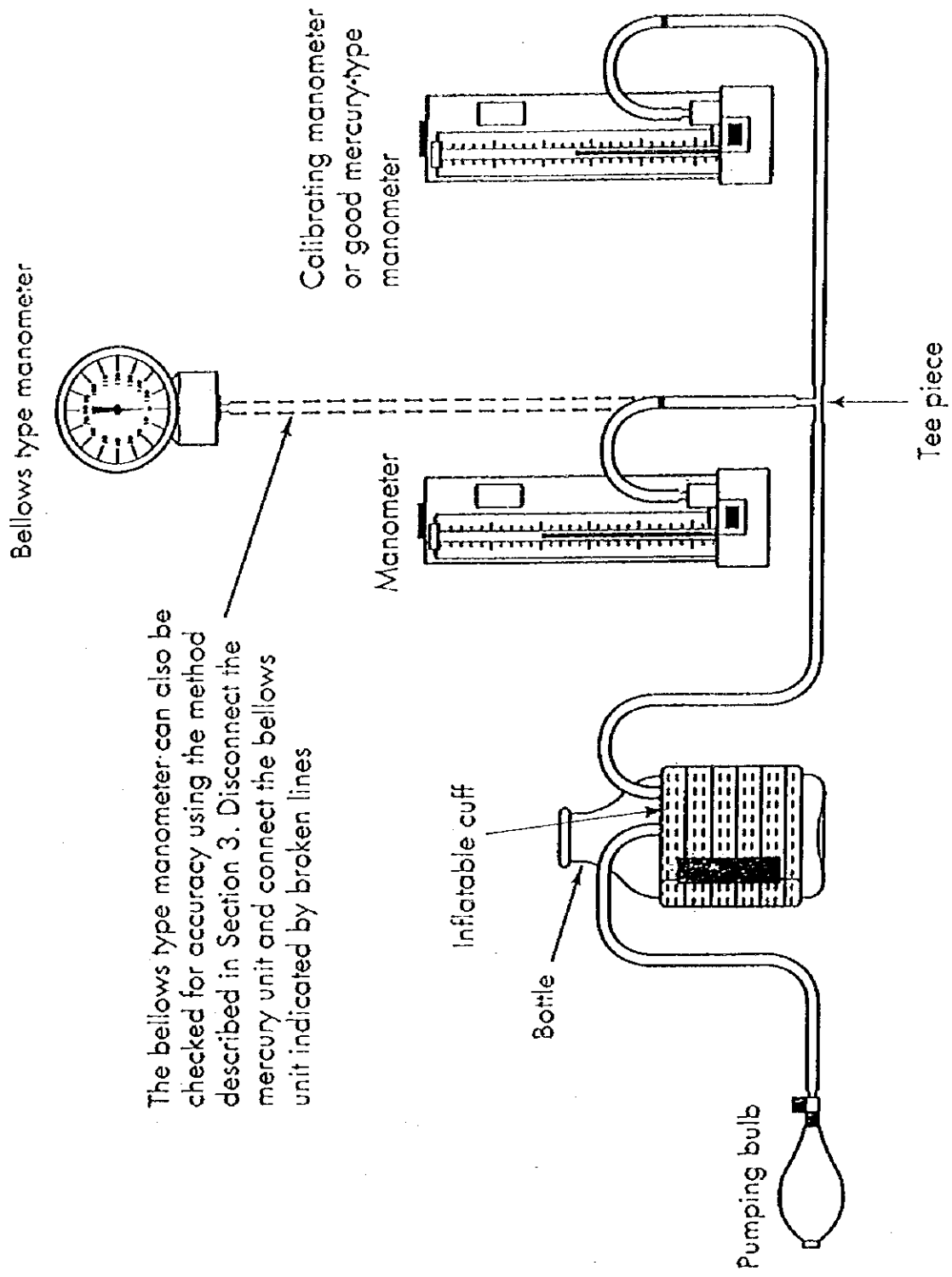


Figure 51: The mercury blood pressure apparatus



The bellows type manometer can also be checked for accuracy using the method described in Section 3. Disconnect the mercury unit and connect the bellows unit indicated by broken lines

Figure 52: Testing/calibrating manometer arrangements

### Method 1

In this method the mercury is cleaned by passing it through a funnel of rough paper. Requirements for this method are:

A sheet of rough paper. Normal newspaper, toilet paper or filter paper will do. Do not use shiny paper.

A bottle to catch the mercury.

Perform the following steps:

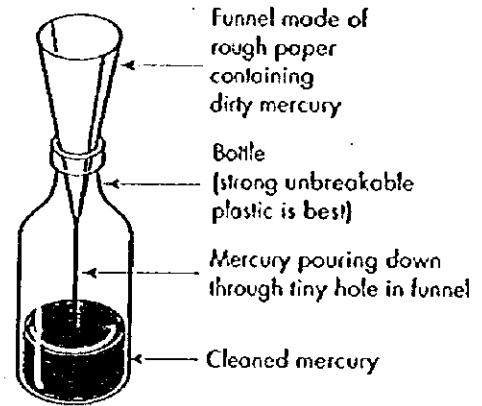
Roll the paper into a funnel as shown (right).

The pointed end should have a tiny hole.

Put the funnel in a bottle.

Pour the mercury into the funnel and let it pass through.

Most dirt will be caught by the paper.



### Method 2

In this method the mercury is pushed through cotton with a syringe.

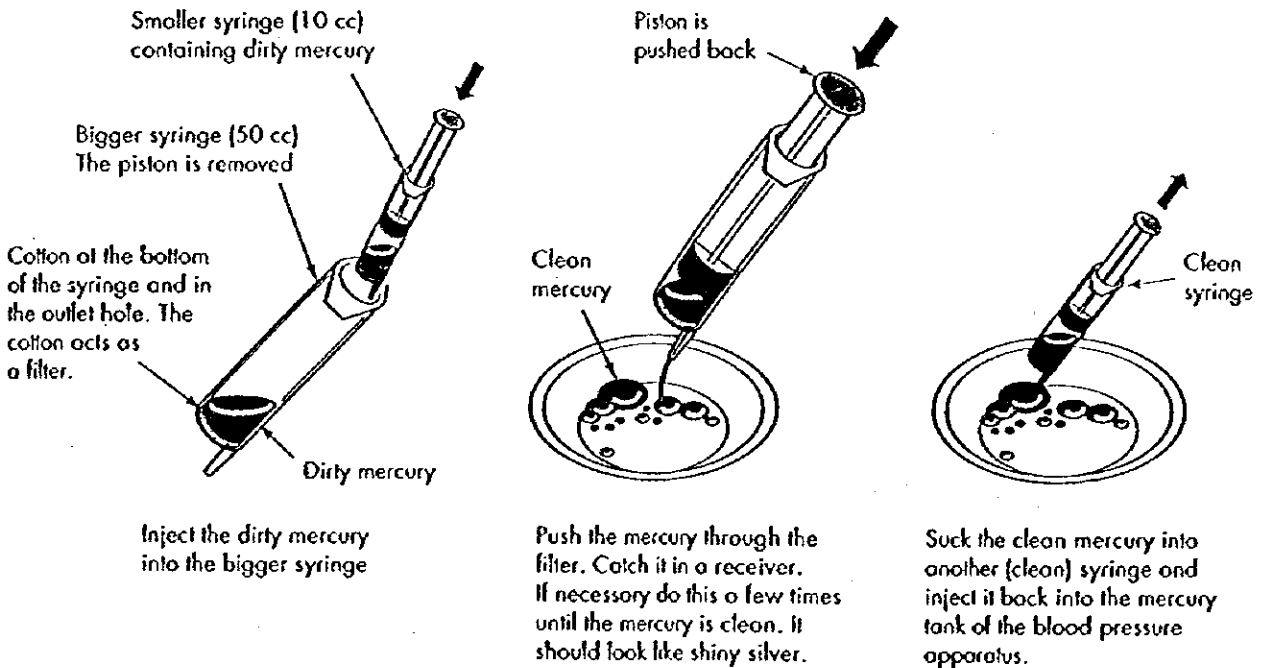
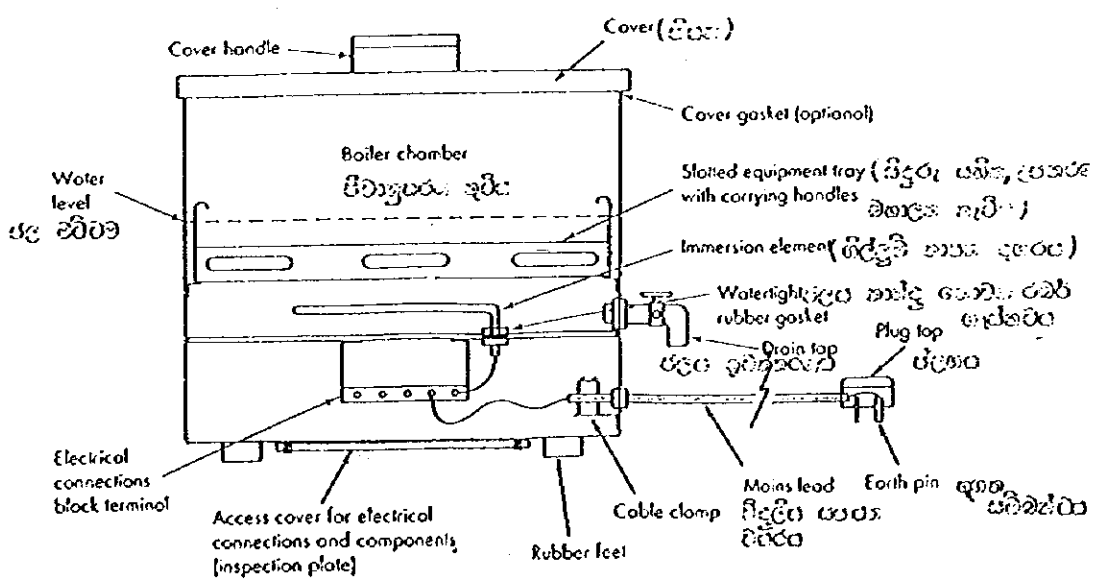


Figure 55: Cleaning mercury

## ජීවානුහරණ යන්ත්‍රය (Instrument Sterilizer)

- 1). යම් විටම යන්ත්‍රය හොඳින් වාතාශ්‍රය ඇති, සම්පූර්ණ ඔවස් මග තබන්න.
- 2). අවශ්‍ය ප්‍රමාණයට ජලය දැමීමට පෙර හෝ ජලය නොමැතිව යන්ත්‍රය ක්‍රියා නොකරන්න.
- 3). විදුලි යොදව්වුව (Socket) සහ භූගත සම්බන්ධතාවය (Ground connection) හොඳින් හිඬේද යන්න තැන සැලකිලිමත් වන්න.
- 4). දිනය අවසන්ද ජීවානුහරණ කුටිය පිරිසිදු කර, වියළා තබන්න.
- 5). ජීවානුහරණය කිරීමට අවශ්‍ය උපකරණ ජීවානුහරණ බඳුන තුළට ඇතුළු කිරීමට පෙර ඒවායේ ඇති ලේ පැල්ලම් වැනි අපවිත්‍ර දෑ ඉවත් කර පිරිසිදු කරන්න.
- 6). ජීවානුහරණ කුටියෙන් ජලය ඉවත් නොකරන අවස්ථාවන් වලදී එයින් ජලය කාන්දු නොවන ලෙස හොඳින් වසා තබන්න.
- 7). යන්ත්‍රය ක්‍රියා නොකරන අවස්ථාවන් වලදී විදුලි සැපයුම විසන්ධිකර තබන්න.
- 8). විදුලි සැපයුම ක්‍රියා විරහිත කර, උපකරණ බහාලන තැටිය ජීවානුහරණ කුටිය මග තබන්න.
- 9). උපකරණ බහාලන තැටිය මග අවශ්‍ය ප්‍රමාණයට වඩා ජීවානුහරණය කරන උපකරණ තැන්පත් නොකරන්න.
- 10). රබර් අත්වැසුම් සිදුරුසහිත හෝස් වැනි දෑ මෙමගින් ජීවානුහරණය කළ නොහැක.
- 11). උපකරණ බහාලන තැටිය යම් විටම සම්බරව තබන්න.
- 12). එක් වරක් උපකරණ තැන්පත් කළ පසු එහි ජීවානුහරණ ක්‍රියාවලිය අවසාන වීමට පෙර නැවත නැවත ඒමග උපකරණ තැන්පත් කිරීමෙන් වැළකින්න.
- 13). බොයිලරය රත් නොවන අවස්ථාවක එහි ජලය අවශ්‍ය ප්‍රමාණයට හිඬේද යන්නත්, ප්‍රධාන විදුලි සපයනය ක්‍රියාකරන්නේද යන්නත් බලන්න.
- 14). යන්ත්‍රය පාවිච්චි නොකරන විට ප්‍රධාන විදුලි සපයනය ක්‍රියාවිරහිත කර තබන්න. ජලගත (Plug) යොදව්වුවෙන් ඉවත්කිරීමේදී වයරයෙන් නොඅදින්න.
- 15). යන්ත්‍රය පිරිසිදු කිරීමේදී ජීවානුහරණ කුටියට හානිනොවන ද්‍රව්‍ය (Abrasive Powder, Metal Cleaner) පමණක් භාවිතා කරන්න. ජලය කාන්දු නොකරන රබර් තැස්සට (Watertight rubber gasket) යන්ට හානි නොකරන්න.
- 16). පිරිසිදු කිරීමේදී විදුලි අංශෝපාංග හෙම්මට ඉඩ නොතබන්න.



. With an immersion-type heating element  
 ගිල්වුම් වර්ගයේ ජාන අභාරය

## පීචානුහරණ යන්ත්‍රය (Mini-Autoclave)

- 1). පීචානුහරණ යන්ත්‍රය (Mini-Autoclave) පිහිටුවීමේදී (Installation) සම්පූර්ණ පොදුවිස්මිත හොඳින් වාතාශ්‍රය ලැබෙන ස්ථානයක තබන්න.
- 2). විදුලි සපයනය පරීක්ෂා කරන්න.
  - a) විදුලි සපයනයේ භූගත සම්බන්ධය (Earth Connection) නිවැරදිව ගිබේදැයි බලන්න.
  - b) විදුලිය සපයන වයරයේ පලදුර්වී ඇඟිදැයි පරීක්ෂා කරන්න.
- 3). පීචානුහරණ යන්ත්‍රය ක්‍රියාකරන විට එහි උෂ්ණත්වමානයක් (Thermostat) හා පීඩනමානයක් (Pressure Gauge) සවිකර ඇත්නම්, එය අවශ්‍ය උෂ්ණත්වයට හා පීඩනයට ලඟාවන්නේදැයි පරීක්ෂාවෙන් සිටින්න.
- 4). හදිසි අවශ්‍යතාවයන් (Emergency) හැරුණුකොට, අතරමගදී යන්ත්‍රයේ ක්‍රියාවලිය නතර නොකරන්න. එසේ කළේනම් පීචානුහරණ ක්‍රියාවලිය නැවත කරන්න.
- 5). යන්ත්‍රය පිරිසිදු කිරීමේදී
  - a) සම්පතා යන්ත්‍රය පාවිච්චි කිරීමෙන් පසු හොඳින් පිරිසිදුකර ඇතුළත ඇඟි ජලය ඉවත්කර තබන්න.
  - b) පීචානුහරණ කුටියට භාණිනොකරන දූවිත බාවිතා කරන්න. (Abrasive Powder / Metal Cleaner බාවිතා නොකරන්න)
  - c) පීචානුහරණ යන්ත්‍රයේ ඇඟි රබර් සීලය (Rubber Seal) ට භාණිනොකරන්න.
- 6). යන්ත්‍රය ක්‍රියානොකරවන අවස්ථා වලදී විදුලි සපයනය විසන්ධිකර තබන්න. ජලගත (Plug) ඉවත්කිරීමේදී වයරයෙන් නොඅදින්න.
- 7). යන්ත්‍රය ක්‍රියාකරවීමට පෙර ප්‍රමාණවත්ව ජලය තිබේද බලන්න.
- 8). පීචානුහරණය කල උපකරණ දූවිත ඉවත්කිරීමට පෙර යන්ත්‍රය යම් වෙලාවක් සිසිල්වීමට ඉඩකරන්න.
- 9). ජලය ඉවත්කිරීමේ නලයෙන්, වැල්වයන්ගෙන්, හා මුඛයෙන් හුමාලය කාන්දුවන්නේදැයි සැලකිල්ලෙන් සිටින්න. එසේ කාන්දුවන්නේ නම් අදාල තැන් නිසිආකාරයට සවිකරන්න.
- 10). සහිසකට වරක්වත් ආරක්ෂක වැල්වය පරීක්ෂා කරන්න.
- 11). දූව සහිත දූවිත පීචානුහරණය කිරීමේදී, පීචානුහරණ ක්‍රියාවලිය අවසන්වීමෙන් පසුවත් පීඩනය නිදහස් කිරීමේ වැල්වය (Pressure Releasing Valve) හා වායුව නිදහස් කිරීමේ වැල්වය (Air Removal Valve) විවෘත නොකරන්න. පීචානුහරණ යන්ත්‍රය හොඳින් සිසිල්වීමට ඉඩකරන්න.
- 12). යන්ත්‍රය ක්‍රියාකරවීමෙන් පසු ජලය අවධානයෙන් සිටින්න.
- 13). පවිත්‍ර කිරීමේදී විදුලි අංශෝපාංග ගෙම්මට ඉඩ නොතබන්න.

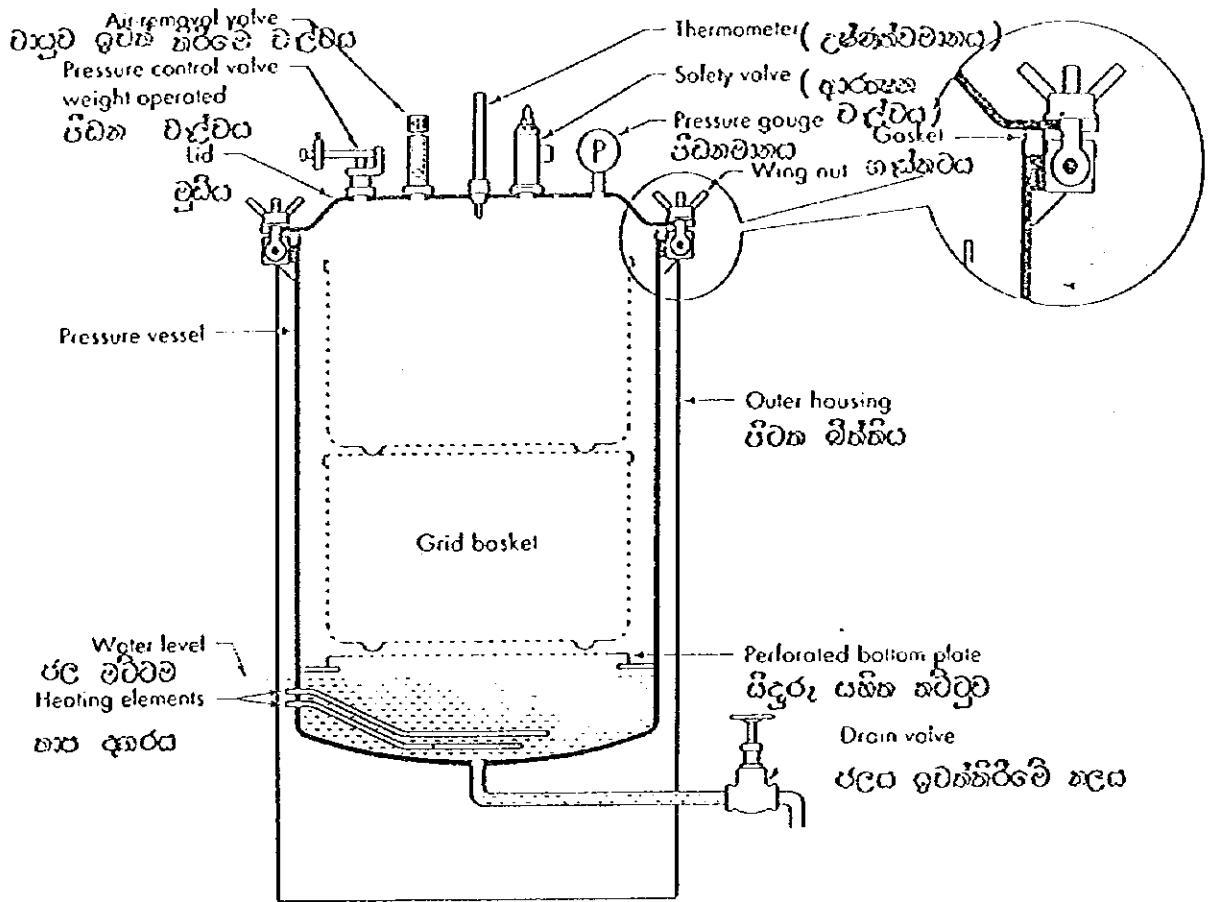


Figure . Vertical build, single-chamber, non-vacuum type autoclave; electrically heated  
 ( පීඩාණුකරණ යන්ත්‍රය )

විදුලි චූෂණ යන්ත්‍ර (Electric Suction Units)

විදුලි චූෂණ යන්ත්‍රයක් සමන්විත වන්නේ විදුලි මෝටරයකින් යහ එයට සම්බන්ධ කරන ලද රික්ත පොම්පයකින් (vacuum pump), අවශ්‍යතාවය අනුව චූෂණ ප්‍රමාණය අඩු වැඩි කිරීම සඳහා පාලන කපාටයක් (control valve) සහ පීඩන මානයක්/රික්ත මානයක් (pressure/vacuum gauge) සෑම යන්ත්‍රයකටම පාහේ සවි කර ඇත.

විදුලි චූෂණ යන්ත්‍රයක් පාවිච්චි කරන විට පහත සඳහන් දේ ගැන ඉතා සැලකිය යුතුමත් විය යුතු අතර එමගින් යන්ත්‍රය ක්‍රියා විරහිතවීම වළක්වා දිගු කලක් පාවිච්චි කිරීමට ද හැකියාව ලැබේ.

1. කළයුතු දේ.

1. සෑම පාවිච්චිකිරීමේ වාරයකටම පසු යන්ත්‍රය ඉතා හොඳින් පිරිසිදු කළ යුතුය. මෙහි දී යන්ත්‍රය සම්පූර්ණයෙන්ම විශේෂ නාශක දියරකින් සෝදා හොඳින් පිය දැමීමට අමතරව විශේෂයෙන්ම සැලකිල්ලක් දැක්විය යුත්තේ චූෂණ නළය (suction tube) හා බෝතලය කෙරෙහිය.
2. බෝතලය මුදුනේ සවිකොට ඇති ඉපිලුම් කපාටය (float valve) ඉතා හොඳින් පිරිසිදු කර එය නිසි පරිදි ක්‍රියා කරන්නේදැයි බලා හොඳින් සවිකළ යුතුය.
3. යන්ත්‍රයට බැක්ටීරියා පෙරණයක් (bacterial filter) සවිකොට තිබේ නම් එය තෙත්ව ඇති බව පෙනෙන්නට හෝ සෑම දිනකම වරක් හෝ මේ දෙකෙන් මුලින් සිදු වූ එකෙහි දී අළුත් පෙරණයක් හෝ හොඳින් පිරිසිදු කළ වියළි පෙරණයක් සවි කළ යුතුය.
4. යන්ත්‍රය පිරිසිදු කිරීම ආරම්භ කිරීමට ප්‍රථම ස්විචය නිවා දමා විදුලි ප්ලග් එක ද ප්‍රධාන විදුලි සැපයුමෙන් ගලවා දමන්න.
5. පාවිච්චි කරන බෝතල්වල හා චූෂණ නළවල තත්ත්වය සෑම විටම පරීක්ෂා කරන්න.
6. රෝගියකුට සම්බන්ධ නොකරන සෑම දිනකම අවම වශයෙන් විනාඩි 2-5 අතර කාලයක් යන්ත්‍රය ක්‍රියා කරවිය යුතුය.
7. චූෂණ යන්ත්‍රවලට යොදන බෝතල චූෂණ නළ හා බෝතල මුදුනේ සවිකර ඇති ඉපිලුම් කපාටය සහිත කොටස ඉතා ඉහළ වර්ගයේ ඉහළ ප්‍රමිතීන්ට ද්‍රව්‍යවලින් අධිපීඩන ජීවානුහරණයට (high pressure sterilize) යුරෝක්තු දෙන අන්දමින් සාදා ඇති නිසා සෑම පාවිච්චි කිරීමේ වාරයකටම පසු අධිපීඩන ජීවානුහරණයට භාජනය කළ යුතුය.

2. නොකළ යුතු දේ.

1. කිසි විටෙක බෝතලය සම්පූර්ණයෙන්ම පිරෙන්නට ඉඩ දෙන්න එපා.
2. කිසි විටෙක යන්ත්‍රය පැද ගෙන යාම සඳහා විදුලිය සපයන වයරය පාවිච්චි කරන්න එපා.
3. යන්ත්‍රය නැවති නැවති ක්‍රියාත්මක වේ නම් යන්ත්‍රය පාවිච්චි කරන්න එපා. වහාම ජීව වෛද්‍ය ඉංජිනේරු ශාස්ත්‍රඥයන් දන්වන්න.
3. පීඩන මානයේ පාඨාංක අඩු නම් හෝ චූෂණ ප්‍රමාණය අඩු නම් පහත සඳහන් දේ ගැන සැලකිලිමත් වන්න.
  1. පාලක කපාටය නිසි පරිදි ක්‍රියාත්මක කරන බව.
  2. බෝතලයේ ඉහළින් හෝ චූෂණ නළවලින් වාතය කාන්දු නොවන බව.
4. චූෂණ යන්ත්‍රය ක්‍රියා විරහිත නම්.
  1. ස්විචය නිවා නැවත දැමීමෙන්.
  2. වෙනත් කාරණයක දී විදුලි සැපයුමට සම්බන්ධ කිරීමෙන් (ප්ලග් කිරීමෙන්) ක්‍රියා විරහිත බව නිසැකවම දැන ගත හැකිය.



ශීතකරණය (Refrigerators)

ශීතකරණයක් පාවිච්චි කිරීමේ දී පහත සඳහන් කරුණු ගැන සැලකිලිමත් වන්නේ නම් යන්ත්‍රයට වන ආපදාවන් අඩුකරගත හැකිවාක් මෙන්ම දිගු කාලයක් කරදර රහිතව පාවිච්චි කිරීමට හේතුවක් ද වනු ඇත.

1. ශීතකරණය පාවිච්චි කිරීමේ දී

1. ශීතකරණය එහා මෙහා ගෙනයාමේ දී සෑම විටම එය සිරස්ව (vertical) සිටින සේ තබා ගැනීමට වග බලා ගන්න. තිරස්ව (horizontal) ගෙන පහසුවුවත් එය යන්ත්‍රයට ක්‍රියා විරහිතවීමටම හේතුවක් විය හැකිය.
2. ශීතකරණය කාමරයේ තැන්පත් කරන ස්ථානය හොඳින් වාතාශ්‍රය ඇති තැනක් විය යුතුය. ශීතකරණය ක්‍රියා කරන විට එය පිටුපස ඇති දැල් සහිත කොටස තදින් රත්වන බැවින් හැමවිටම ශීතකරණයේ පිටුපස සහ බිත්තිය අතර දුර අවම වශයෙන් අඩියක්වත් පමණ වන සේ තැබිය යුතුය.
3. ශීතකරණයේ අයිස් මිදෙන කොටසේ බඩු බාහිරාදිය තබන විට එහි දොර වැසීමට හැකිවන පරිදි පමණක් තබන්න. ශීතකරණයේ පහළ කොටසේ බඩු තබන විට ද ප්‍රධාන දොර වැසීමට හැකිවන පරිදි පමණක් තැන්පත් කරන්න.
4. ශීතකරණයේ දොර සෙමින් වසන්න. වැසුණායින් පසු නැවත සෙමින් ඇද කාන්දම් බලයෙන් (magnetic door seal) දොර වැසී තිබෙන බවට වග බලා ගන්න.
5. නිතර නිතර දොර පෑමෙන් වළකින්න. දිගු වේලාවක් දොර පැර නොතබන්න.
6. ශීත කළ යුතු දේ නැතත් හැකි සෑම විටම යන්ත්‍රය ක්‍රියා කරවන්න. මෙහි දී ශීත පාලන යන්ත්‍රය (thermostat) අඩුම ශීත ස්ථානයට දමා තැබිය යුතුය. යන්ත්‍රය නිතරම ක්‍රියා කිරීම නිසා යන්ත්‍රයේ පලුත් වැඩියාවන් ප්‍රමාණය අඩුවන අතර එය එම කාලය තුළ යන්ත්‍රය තහනම් කිරීමෙන් ඉතිරිවන විදුලිය හා සසඳන කල සැලසෙන ඉතිරියක් වේ.
7. හදිසියේ විදුලි බලය ඇත හිටිය හොත් ඒ විගසම ශීතකරණය නවත්වන්න. ඉන් පසු විදුලි සැපයුම සාමාන්‍ය තත්වයට පත්වී මිනිත්තු 3 ක් පමණ යන තෙක් යන්ත්‍රය ක්‍රියාත්මක නොකරන්න.
8. විදුලිබල වෝල්ටීයතාවය අඩු අවස්ථාවල දී (මේ කාලය තුළ විදුලි බැඳුණ ඉතා අඩු දීප්තියකින් දැල්වේ.) හැකි සෑම විටම ශීතකරණය නවත්වා තබන්න. (සාමාන්‍යයෙන් සවස 6.00 ක් රාත්‍රී 10.00 ක් අතර කාලය තුළ දී විදුලි බල වෝල්ටීයතාවය අඩුවෙන් පවතී.)

2. ශීතකරණ පිරිසිදු කිරීමේ දී

1. ශීතකරණය පාවිච්චි කිරීමේ දී එහි පිටත සහ ඇතුළත සෑමවිටම පිරිසිදුව තබාගත යුතුය. දිනපතා ඇතුළත සහ පිටත හොඳින් පිය දැමීමෙන් හා සහියකට වරක් යන්ත්‍රමත් ජලයෙන් තෙමන ලද රෙදි කඩකින් හොඳින් පියදැමීමෙන් ශීතකරණයේ පෙනුම මෙන්ම යාන්ත්‍රික තත්වය ද හොඳින් පවත්වා ගත හැකිය.  
කිසි විටෙක ශීතකරණය සේදීම සඳහා ස්ප්‍රිට් වර්ග සබන් හෝ වෙනත් සෑර ද්‍රාවන පාවිච්චි නොකරන්න. ඒවා යන්ත්‍රය ඇතුළත ඇති ජලාස්ථික් කොටස් දිය කිරීමට මෙන්ම පිටත ඇති ලෝහ කොටස්වල මල බැඳීම ඉක්මන් කිරීමට ද හේතුවිය හැකිය.

(ලිපි 30 බලන්න)

2. කිසිම විටෙක ශීතකරණය ද්‍රව්‍යවලින් ආරක්ෂා කිරීමට හෝ වෙනයම් දෙයක් සඳහා රෙදිවලින් හෝ වෙනයම් දෙයකින් හෝ ආවරණය කර නොතබන්න. ශීතකරණය මත බඩු බාහිරාදිය තැබීමෙන් වළකින්න. මෙසේ ආවරණය කර තැබීම මතුපිට මල බැඳීම ඉක්මන් කිරීමට හේතුවිය හැකිය.
3. සතියකට වරක් ශීතකරණය තුළ ඇති අයිස් දියකර හැරිය යුතුය. මේ සඳහා අලුත් ශීතකරණවල ස්වයංක්‍රීය ක්‍රමයක් හඳුන්වා දී ඇත. එහි දී යන්ත්‍රය තුළ ඇති ශීත පාලන ස්ථවය මත ඇති බොත්තම තදකර තැබීමෙන් ස්වයංක්‍රීයව ක්‍රියාවලිය ඇරඹේ. එසේ නැතහොත් ශීතකරණයට විදුලිය සැපයීම නවත්වා (ජලගය හලවා) තැබීමෙන් අයිස් දියකර හැරීම කළ හැකිය. ඉන් පසු සියලුම අයිස් දිය වූ විට එමගින් එකඟ වූ ජලය ඉවත්කර කම්බි රාක්ක (wire shelves) ද ආතුලුව යන්ත්‍රය හොඳින් පියදා නැවත ප්‍රධාන විදුලියට සම්බන්ධ කරන්න (ජලයකරන්න).

### 3. ඉතා වැදගත්

ශීතකරණයේ අයිස් මිදෙන කුටියේ (freezing chamber) තබා ඇති බඩු ඉවත්කිරීමට කිසිම විටෙක උල් ආයුධ පාවිච්චි නොකළ යුතුයි.

ඉවත්කළ යුතු දේ තදින් ඇලී ඇත්නම් යන්ත්‍රය වික වෙලාවකට නවත්වා අයිස් දිය වූ පසු අවශ්‍ය දේ ඉවත් කරන්න.

එම කොටසේ ඇති තහඩුව ආතුලු ශීතකරණ වායුව ගෙනයන සිසුම් බට ඇති නිසා උල් ආයුධ මගින් එම බටවලට හානි සිදුවුවහොත් අලුත්වාඩියාවේ දී අළුත්ම අයිස් මිදෙන කුටියක් සවිකළ යුතු වේ. තව ද එම ආපදාවේ යන්ත්‍රය තුළ ඇති ශීතකරණ වායුවත් මුලු මනින්ම පිටවන බැවින් අළුත් ශීතකරණ වායුව පිරවීමටත් ඒ හා සම්බන්ධ අමතර කොටස් දැමීමටත් සිදු වේ. මේ අලුත්වාඩියාවන් ඉතා මිල අධිකවන නිසා මෙය ඉතා සැලකිල්ලෙන් කළ යුතු කාර්යයක් වේ.

විද්‍යුත්කරණ යන්ත්‍ර (Sterilizers)

විද්‍යුත්කරණ යන්ත්‍රයකින් බලාපොරොත්තු වන්නේ රත් වූ ජලය (100°C/212 F°) භාවිතයෙන් බැක්ටීරියාවන් වධිජය කා දිලීර වැනි අපේ ඇසට නොපෙනෙන ජෛවජීවීන් විනාශ කර ඇවීමයි. මෙය ඉතාම පහසු ප්‍රමාණ නිසා වෛද්‍ය භවයුතු වල දී ඔවුලට භාවිතා කරනු ලැබේ.

ජලය රත්කර ගැනීම සඳහා ඉන්ධන හෝ විදුලිය භාවිතා කෙරේ. ඉන්ධන වශයෙන් - වසින් ස්ත්‍රිකා, භූමිකෙල්, ගැස් ආදී දේ ප්‍රයෝජනවත් භාජන ලැබේ. මේවා ඇල්වීමට සැලැස්වීමෙන් ජලය රත්කර විද්‍යුත්කරණය කරනු ලැබේ. විදුලිය මගින් රත්කිරීම ඉතාම පහසු පිරිසිදු ලාභදායී ප්‍රමාණයකි. විද්‍යුත්කරණය යන්ත්‍ර විශේෂයෙන් මල නොබැඳෙන විශේෂ ලෝහයන්ගෙන් නිමවා ඇත. විදුලි විද්‍යුත්කරණ යන්ත්‍රවල පහත සඳහන් උපාංගවලින් යුක්තයි.

1. විදුලි දහරය (Electric Heating Element)  
(මෙය කුලින් විදුලිය භලා යාමේ දී රත්වීම නිසා භාජනය පිරිසිදු කරයි.)
2. විදුලිය සහ සන්නිවේදන සහ ක්‍රමය. (Cord & Plug top)
3. වහරුව (ස්විච්) (Switch)
4. උෂ්ණත්ව පාලනය. (Thermostat Cutout)
5. අව ජල මට්ටම් පාලනය. (Low Water Cutout)
6. නියමු ලාම්පු. (Pilot Lamp) (තන පාට හෝ කොළ)
7. අනතුරු ලාම්පු. (රතු ) (Protect Lamp)
8. ස්වයං නිවැරදි කරන බොත්තම. (Restoring Button)
9. තරාම.

පහත සඳහන් කරුණු අනුගමනය ඉතාම වැදගත්ය.

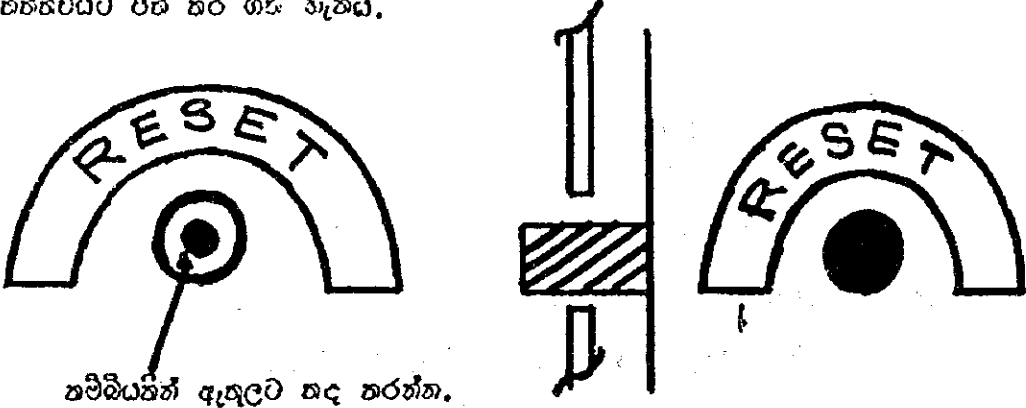
1. විද්‍යුත්කරණ යන්ත්‍රය සම්පූර්ණ ස්වයංක්‍රීයව කමින.
2. භාජනයේ 2/3 පමණ ජලයෙන් පුරවන්න.
3. යන්ත්‍රය විදුලි සැපයුමට සම්බන්ධ කරන්න. (Plug)
4. යන්ත්‍රයේ ස්විච් ON කර FULL අංකයට යොදන්න.  
(මෙහි දී නියමු ලාම්පු දැල්වේ.)
5. ජලය තැවීම ආරම්භ වූ පසු ස්විච් සුදුසු අංකයට කරකවන්න.  
(විනාඩි 10 - 25 ඇර කාලයක් සැමීමෙන් කමින.)

6. ජීවී OFF කර විදුලි සැපයුමෙන් ආලෝක. (Plug Off)
7. මෙවලම් අයත්වීමෙන් පසු ජලය පිරිසිදු කර පියන වසා සවිස්ත.
8. සන්නිවේදන මාර්ග පිරිසිදු වී පවා ගන්න.

සැලකිය යුතු කරුණු:-

1. විදුලිය සපයන වසරය කිසිව අවස්ථාවක දී පලුදු වන ලෙස හෝ අලාභකාරී වන ලෙස පවත්නා විය යුතුය.
2. නියමිත ප්‍රමාණයට ජලය තැන්පත් පාවිච්චි කරන්න විය යුතුය.
3. ජලය හෝ විදුලිය කාන්දු වීමක් ඇතිව පාවිච්චි කරන්න විය යුතුය.
4. දිරාගිය හෝ අවලක් විදුලි සපයන කම්බි පාවිච්චි කරන්න විය යුතුය.
5. අවලක් ජෝනි (Plug Top) පාවිච්චි කරන්න විය යුතුය.
6. විදුලිය සහ සම්බන්ධ කොටස් කිසි විටෙකදී ජලය සමඟ ගැටීමට ඉඩ නොතබන්න.
7. භූ භය කම්බිය කිසි ලෙස සම්බන්ධ වීම ඉවතට වැදගත්ය. (Earth Wire)

\* ජලය තෙමැතිට් හෝ එක දිගට වැඩි වේලාවක් රැඳී සිටීම නිසා උෂ්ණත්වය ඉහළ ගොස් (Over Heat) සන්නිවේදන ඇති (Thermostatic Cutout) ක්‍රියාත්මක වී සාමාන්‍ය දූෂණයට සහය වන විදුලිය නව නවී. මේ අවස්ථාවේ දී රතු මණ්ඩලය දැක්වීම හෝ රතු මණ්ඩලයක් පිටතට පලුදු වීම සිදු වේ. එවිට එම මණ්ඩලය නැවත ඇතුළු කිරීමෙන් පවා සන්නිවේදන පත් කර ගත හැකිය.



කම්බියකින් ඇතුළට තද කරන්න.

"තොසැලකිය යුතු කරුණක් හෝ පුළුල් වැරදීමකින් සිදුවන පාඩුව සත්යයෙන් තද නොගැන."

ഖേദപ്രാപ്ത വാക്യങ്ങൾ ഉൾപ്പെടെയുള്ള പരീക്ഷാ പാഠപുസ്തകം.  
 (Course of Repair of Medical Equipment)  
**QUIZ**

പരീക്ഷണം I:

1. ഉഷ്ണ വാക്യ (Suction Apparatus) പരിപാടി ചെയ്യാൻ ഉപയോഗിക്കേണ്ട ഭാഗങ്ങൾ, തിരഞ്ഞെടുക്കുക.

- (a) ഉൾക്കൊള്ളുന്ന എഞ്ചിൻ.
- (b) വായു സ്രവിക്കാൻ കഴിയുന്ന ഒരു തരം വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട ഭാഗം.
- (c) ഈ വാക്വം സൃഷ്ടിക്കാൻ കഴിയുന്ന ഒരു തരം വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട ഭാഗം.
- (d) ഓരോ വലിയ വൃത്തിയുമായി അനുബന്ധിച്ച് വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട ഭാഗം.

തെറ്റായ ഉത്തരങ്ങൾ തിരഞ്ഞെടുക്കുക.

- 1. a, b and c.                      2. a, b, c, d കഴിയാതെ.
- 3. a and d തെറ്റാണ്.            4. a, b, c, d കഴിയാതെ.
- 5. b, c and d.

2. ഉഷ്ണ വാക്യയിൽ ഉപയോഗിക്കേണ്ട വാക്വം വാൽവ് (Hoaling Valve)

- (a) വാക്വം (Suction jar) കഴിയാതെ വന്നാൽ ഉപയോഗിക്കേണ്ട.
- (b) വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.
- (c) വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.
- (d) വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.

തെറ്റായ ഉത്തരങ്ങൾ തിരഞ്ഞെടുക്കുക.

- 1. a, b and c.                      2. b and d.                      3. b, c and d
- 4. a and c.                        5. a, b, c, d കഴിയാതെ.

3. വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം വാൽവ്

- (a) ഉഷ്ണ വാക്യ വാക്വം (Suction Jar) ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.
- (b) വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.
- (c) വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട വാക്വം സൃഷ്ടിക്കാൻ ഉപയോഗിക്കേണ്ട.

- 1. a and c                      2. b and c.                      3. c and d.
- 4. a and c                      5. കഴിയാതെ.

4. රුධිර ජීවිත රහත වෘත්තීයයන්හි පහත වැදගත් වාතාවරණයන් හඳුන්වා දීමට

- (a) පොරොන් පාලන ක්ෂේත්‍රයේ පවතින කොළ ප්ලීර (Column Layer) සහ වාත තුළින් වාත ප්‍රදාය.
- (b) රුධිර ප්‍රවාහ (Pumping Build) තුළ ඉදිරි දෙසට යාම (Unidirectional Valve).
- (c) පහත සර්පිලාකාර පෘෂ්ඨයක් (Flat Surface) මත තුළුම් ආකාරයෙන්.
- (d) වාත ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහ (Bladder) වැනි වාත ප්‍රවාහය.

- 1 a b හා c                      2 a, c හා d                      3 වාත ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- 4 a හා c                              5 b, c හා d

5. රුධිර ජීවිත රහත වෘත්තීයයන්හි පහත වැදගත් වාතාවරණයන්

- (a) රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- (b) රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- (c) රුධිර ප්‍රවාහයේ (Pumping Build) පවතින රුධිර ප්‍රවාහය.
- (d) රුධිර ප්‍රවාහයේ (Connecting tubes) වල පවතින රුධිර ප්‍රවාහය.

- 1 a හා b                              2 a, c හා d                      3 a, b හා d
- 4 a හා c                              5 b, c හා d

6. පහත වැදගත් වාතාවරණයන් හඳුන්වා දීමට,

- (a) රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- (b) රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- (c) වාත ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.
- (d) රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය.

- 1 වාත ප්‍රවාහයේ පවතින රුධිර ප්‍රවාහය                      2 a හා b                      3 a, b හා c
- 4 a, b හා d                              5 b, c හා d

①. 1000 W നിലവിലുള്ള ഉപയോഗത്തിന് ഉപയോഗിക്കേണ്ടിയിരിക്കുന്ന (Sterilizer) വാട്ടറിയുടെ അളവ് കണക്കാക്കി. 1000 W നിലവിലുള്ള ഉപയോഗത്തിന് ഉപയോഗിക്കേണ്ടിയിരിക്കുന്ന (Sterilizer) വാട്ടറിയുടെ അളവ് കണക്കാക്കി.

- ① 5A      ② 13A      ③ 15A      ④ 4.35A

⑤. ഈ ഓട്ടോമറ്റഡ് വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക.

②. താഴെ പറയുന്നവയിൽ ഏതെങ്കിലും രണ്ട് തിരഞ്ഞെടുക്കുക.

- (a). ലെഡ് അസിഡ് ബാറ്ററി (Lead Acid Battery) വാട്ടറിയുടെ അളവ് കണക്കാക്കി. (Low water cutout) കമ്പോളം കണക്കാക്കി. (Low water cutout) കമ്പോളം കണക്കാക്കി.
- (b). ഈ ലെഡ് അസിഡ് ബാറ്ററി കമ്പോളം കണക്കാക്കി. (Fuse or MCB) ഈ കമ്പോളം കണക്കാക്കി.
- (c). ഈ ബാറ്ററി കമ്പോളം കണക്കാക്കി. (Trip Switch) കമ്പോളം കണക്കാക്കി.
- (d). പ്ലഗ് ടോപ്പ് (Plug top) വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക. (Earth Wire) കമ്പോളം കണക്കാക്കി.

- ① b, c and d      ② c and d തിരഞ്ഞെടുക്കുക.      ③ d തിരഞ്ഞെടുക്കുക.  
 ④ a, b and c.      ⑤ കമ്പോളം കണക്കാക്കി.

③. താഴെ പറയുന്നവയിൽ ഏതെങ്കിലും രണ്ട് തിരഞ്ഞെടുക്കുക.

- (a). വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക. ഈ കമ്പോളം കണക്കാക്കി.
- (b). ലെഡ് അസിഡ് ബാറ്ററി (Lead Acid Battery) കമ്പോളം കണക്കാക്കി. (Lighting & Plug Points) കമ്പോളം കണക്കാക്കി.
- (c). 15A പ്ലഗ് ടോപ്പ് വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക. (One Circuit) കമ്പോളം കണക്കാക്കി.
- (d). 13A പ്ലഗ് ടോപ്പ് വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക. (One Circuit) കമ്പോളം കണക്കാക്കി.

- ① a, b and d      ② a b and c      ③ a, c and d  
 ④ b, c and d      ⑤ a and b തിരഞ്ഞെടുക്കുക.

④. 100 W വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക. 10 W വെലവുമായി ബന്ധപ്പെട്ട് തിരഞ്ഞെടുക്കുക.

- ① 2A      ② 3A      ③ 4A      ④ 8A      ⑤ 10A

## 5. ECONOMIC AND SOCIAL OVERHEADS

### 5.1 Overview

The Government has been the provider of most economic and social infrastructure services in Sri Lanka. Public investment in this area has been declining over the last fifteen years in the wake of increased resource constraints due to the growth in security expenditure and structural weaknesses of the budget from both revenue and expenditure sides. Total public investment on economic and social infrastructure has declined from 16.5 per cent of GDP in 1980 to 5.0 per cent of GDP in 1997. As a per cent of total government expenditure, infrastructure investment declined from 36.1 per cent in 1980 to 18.9 per cent by 1997. Meanwhile, it is increasingly recognized that many economic infrastructure services are not public goods and that these could be provided more efficiently through the private sector. The policy environment for private sector participation in economic infrastructure has been strengthened through a general improvement in the macro economic conditions as well as through the privatisation programme. In addition, various fiscal incentives such as import duty exemptions for project related imports, income tax holidays and provision of government land for the building of related infrastructure have been granted during the past few years to attract private investment to these sectors. To provide financial support, the Private Sector Infrastructure Development Company Ltd. was established in 1997, with the assistance of the World Bank. The private sector has gradually entered this field in some areas such as health, education, postal services, mass media, telecommunication, transport etc. on its own initiative as well as a result of the Government's conscious policy of promoting private sector led growth. Despite all these efforts, the current levels of investment in these sectors are still inadequate. Considerable improvement is necessary in key areas such as roads, the transport network including railways, supply of energy, ports, and social infrastructure, over and above what has already been achieved.

In 1997, attempts were made to enhance private sector participation in economic infrastructure, improve commercial viability and expand existing infrastructure stock. The power generating capacity of the national electricity grid was increased by 177 MW of thermal power, the first increase during the past five years, thereby reducing the reliance on hydro power and improving the reliability of the power supply. Coverage of telecommunication facilities was enhanced greatly with increased participation by the private sector. Restructuring of Sri Lanka Telecom Ltd. progressed further in an open and competitive manner with the

divestiture of 35 per cent of the shares of the company to a strategic partner. Negotiations were in progress to expand the existing capacity of the Colombo Port with private sector participation on a BOO/BOT basis. Addressing prolonged management deficiencies in the transport sector, popularised bus companies were restructured to form 11 cluster companies during the second half of the year.

TABLE 5.1  
Government Investment in Infrastructure

| Year | Economic Services |          | Social Services |          | Total   |          |
|------|-------------------|----------|-----------------|----------|---------|----------|
|      | Rs. Mn.           | % of GDP | Rs. Mn.         | % of GDP | Rs. Mn. | % of GDP |
| 1980 | 9,712             | 14.6     | 1,249           | 1.9      | 10,961  | 16.5     |
| 1985 | 18,950            | 11.7     | 1,826           | 1.1      | 20,776  | 12.8     |
| 1990 | 18,793            | 5.8      | 3,019           | 0.9      | 21,817  | 6.7      |
| 1991 | 26,022            | 7.0      | 2,964           | 0.8      | 28,986  | 7.8      |
| 1992 | 20,444            | 4.8      | 6,137           | 1.4      | 26,581  | 6.2      |
| 1993 | 29,600            | 5.9      | 6,075           | 1.2      | 35,675  | 7.1      |
| 1994 | 29,304            | 5.1      | 7,677           | 1.3      | 36,981  | 6.4      |
| 1995 | 36,106            | 5.4      | 9,854           | 1.5      | 45,960  | 6.9      |
| 1996 | 31,403            | 4.1      | 10,322          | 1.3      | 41,731  | 5.4      |
| 1997 | 33,014            | 4.3      | 11,552          | 1.2      | 44,556  | 5.0      |

Source: Central Bank of Sri Lanka.

Vital policy reforms were introduced in respect of the education sector in order to develop a sustainable education system, which is suitable for the contemporary needs of society. With a view to improving the efficiency of the health care delivery mechanism and addressing the emerging issues in the sector, policy reforms have been suggested during the year by a Presidential Task Force.

Despite these favourable developments on the supply side, the growing demand for economic infrastructure, particularly for transport, telecommunication, housing and water supply, created a mismatch, exerting extra pressure on the existing facilities. In view of the growing demand for port services, a comprehensive port development programme has been proposed which will help to expand the capacity and to improve the efficiency of port services and management of the ports (Box 3). The proposed plan, when implemented, is expected to enhance competitiveness and Sri Lanka's market share. In the case of transport, close monitoring and supervision of Regional Transport Companies is essential to avoid any recurrence of managerial deficiencies and to improve commercial viability. Similarly, early and prompt implementation of the proposed reforms with respect to the education and health sectors is needed to reap the expected benefits. Adequate allocation of



resources is a pre-requisite for the success of these reforms. There is also a need to further improve the targetting of benefits under existing welfare programmes with a view to ensuring that benefits are granted only to the deserving. Private investment in economic infrastructure increased in 1997. The Government maintained its investment, as a percentage of GDP, in the case of social services. Investment in economic services increased marginally in 1997.

## 5.2 Health

The country has been able to maintain and preserve the earlier achievements in the health sector without a serious setback. The demand for health services has been rising sharply, not only due to the natural growth of population, but also due to emerging and re-emerging diseases, the presence of a large number of casualties and disabled persons as a result of the civil war and a relative ageing in the population. The health status is also threatened by diseases associated with poor environmental conditions. The re-emergence of cholera and continuous occurrence of Dengue, Japanese Encephalitis, Malaria etc. emerged as the most serious hazards to the health status of the people. Meanwhile, non-communicable diseases that emerge with the transition in the demographic profile and improvement in life styles are also on the increase, indicating the possible health expenditure burdens that could occur in the foreseeable future. A marked increase in mental disorders, drug and alcohol dependence, suicide rates and poisoning are some adverse developments that have emerged in the health sector, which require serious attention. Newly emerging diseases such as HIV/AIDS also further threatens the health status of the country compelling the Government to allocate more resources for control and awareness campaigns. Heart diseases, cancer, liver diseases and pesticide poisoning continued to be the leading causes of mortality in the country.

In the context of the emerging health situation, the major thrust of the health policy in 1997 was to consolidate the earlier achievements and further improve the health status of the people through an efficient health care delivery mechanism. Maternal and child health care, nutritional deficiencies, poverty related diseases, Malaria, problems of the elderly, mental health, suicide, heart diseases, physical disabilities and diabetes were identified as the priority areas, which required attention. The key strategies were the promotion of preventive health care, equitable allocation of resources among regions, a rational drug policy and promotion of health research.

The need for promoting the private sector in accommodating the growing demand for health services was duly recognised and strong incentives were offered, signalling

the vision for the health sector in the foreseeable future. As it appeared that the existing health care delivery mechanism had not effectively addressed the emerging issues in the health sector, a Presidential Task Force was appointed in 1997, in order to prepare an action plan for the health sector and to make recommendations to address the glaring issues in the sector. The major areas of concern identified by the Task Force were identification and prioritisation of health needs, services required to meet the health services of the community, organisation and the management of the health sector and mobilisation of resources for the health sector. Some of the recommendations made by the Task Force were the setting up of a National Health Commission, setting up of a regulatory and institutional framework to monitor private sector health care, effective decentralisation of health sector activities, allocation of resources based on regional needs, improvement in revenue earning capabilities of health institutions, enhancing regulatory powers, offering incentives to work in rural areas, restructuring existing health institutions etc. A Unit to implement the recommendations made by the Task Force has already been set up in the Ministry of Health. Initial steps were taken to establish a National Health Commission empowered with more regulatory authority to design, direct and implement health policies and co-ordinate and monitor health related activities between Provincial Councils and the Ministry. Action has been taken to draft the Medical Institutions Act giving powers to the Ministry of Health to monitor the operations and quality of the services provided by the private sector. The effectiveness of the recommended reforms will rely largely on their early implementation, with close monitoring of procedures.

In 1997, total government investment in the health

TABLE 5.2  
Public Health Services

| Item   | 1995      | 1996   | 1997 (a) |
|--|-----------|--------|----------|
| Hospitals<br>(practising Western Medicine) (no.) | 535       | 540    | 548      |
| No. of Beds                                      | 52,528    | 52,613 | 55,441   |
| Central Dispensaries (No.)                       | 356       | 377    | 383      |
| Total No. of Doctors                             | 3,986     | 4,391  | 5,316    |
| Total No. of Asst. Medical Practitioners         | 1,324     | 1,464  | 1,405    |
| Total No. of Ayurvedic Physicians                | 14,874    | 14,808 | 15,078   |
| Total No. of Nurses                              | 13,310    | 13,846 | 15,976   |
| Total No. of Attendants                          | 5,579     | 5,758  | 6,178    |
| No. of In-Patients ('000)                        | 2,953(b)  | 3,339  | n. a     |
| No. of Out - Patients ('000)                     | 32,084(b) | 35,348 | n. a     |
| Total Health Expenditure (Rs. Mn.)               | 10,952    | 11,913 | 12,135   |
| Current Expenditure (Rs. Mn.)                    | 8,818     | 9,260  | 9,581    |
| Capital Expenditure (Rs. Mn.)                    | 2,134     | 2,538  | 2,554    |

Sources: Ministry of Health and  
Indigenous Medicine  
Central Bank of Sri Lanka

(a) Provisional.  
(b) Excludes Jaffna, Killinochchi,  
Mullaitivu and Ampara Districts

sector increased marginally to Rs.2,554 million. Total expenditure in relation to GDP declined from 1.5 per cent to 1.4 per cent between the two years. More than three fourths of the resources were spent on maintenance of health infrastructure, while the balance was spent on new investment. Considering both the need to further consolidate the recent macroeconomic achievements and the compelling need to allocate more resources for preventive health care, it is of paramount importance to implement an efficient health care management system early. Exploitation of the revenue earning potential of public health institutions and improvement of the operational efficiency of large institutions by giving them more autonomy to be run as separate entities, are some effective measures to be considered in this regard. Ensuring the quality of drugs, as well as timely availability, is also considered a crucial issue that needs to be addressed on a priority basis.

In general, over 3 million in-patients and 36 million out-patients are treated annually in the 540 government hospitals. The average number of beds available per 1,000 persons increased from 2.8 to 3.0 in 1997. A total of 3,926 health personnel, including 1,063 intern and post intern medical officers, were recruited during the year under review. The availability of doctors improved from 24 to 29 per 10,000 population, while the nursing staff strength improved from 76 to 86 per 10,000 population between the two years. A wide disparity in the regional distribution of health personnel, with a high concentration in the Colombo District and an acute shortage of specialist doctors continued to be major problems in 1997.

Public investment in health infrastructure was further strengthened in 1997. Initial steps were taken to construct a National Nurses Training School with JICA assistance at the Sri Jayawardenapura Hospital with a capacity to train 300 nurses per year. The estimated cost of the project is Rs.722 million. Construction work on a ten storied building complex for the Lady Ridgeway Hospital (LRH), with a bed capacity of 390, was in progress during the year and the estimated cost of this project is Rs.320 million. An agreement was signed with the Korean Government to improve the patient care services of the Base Hospitals at Gampaha and Negombo at a cost of Rs.224 million and to provide clinical facilities for teaching medical students at the Colombo South Teaching Hospital at a cost of Rs.108 million. The Health and Population Project funded by the Asian Development Bank at a cost of Rs.1,259 million was in progress to improve the health care system in rural areas. A health service project at a cost of US dollars 22.6 million funded by IDA was also initiated in 1997. This aims at eradicating Malaria, sexually transmitted diseases (STD), malnutrition among lower income groups and promoting health education.

A Population and Reproductive Health Programme, funded by the UNFPA, was also started this year.

Strenuous efforts were made to preserve the earlier gains achieved in the field of primary health care and to restrain the adverse impact of emerging outbreaks of disease to a minimum level. The immunisation coverage of infants against the six vaccine preventable diseases was sustained at a high level (above 90 per cent) during the year under review. The National Immunisation Programme for Polio was conducted for the third consecutive year and was able to cover almost the entire child population under 5 years. During the year, the Rubella Immunisation Programme was further extended, covering five provinces. A fresh outbreak of cholera, the first after 1993, caused 12 deaths and 412 reported cases by end 1997. An efficient disease surveillance system, together with effective awareness programmes contained the outbreak to a large extent. Despite the implementation of the National Dengue Control Programme and various awareness programmes, the recurrence of Dengue since 1989 has continued to be a major problem and more than 1,000 cases were reported in 1996 as well as in 1997. The incidence of Japanese Encephalitis was reduced in 1997, while the vaccination programme was extended to the Colombo, Kalutara and Gampaha Districts. Malaria still continues to be a major health problem in Sri Lanka. Despite the various control activities undertaken, the incidence of Malaria continued to increase by 19 per cent to 218,544 cases confirming the trends observed in the previous year. The main reasons for the setback were the operational problems encountered in carrying out control activities in war affected areas and the large influx of refugees to neighbouring areas. With a view to controlling Tuberculosis, a new method, DOT (Directly Observed Therapy) has been initiated in selected districts under the respiratory diseases control programme. Screening, counselling, surveillance and dissemination of information about STD are the major strategies adopted by the STD/AIDS control programme.

### Private Sector Health Care

An efficient private health care system, which is competitive and complementary to state health services is long overdue, considering the ever growing demand for health services and the capacity limitations and inefficiencies in the public sector health services. A well established regulatory framework, a rational incentive structure, an affordable price and a clear and convincing vision of where the health system should be moving are key elements for its success. Having recognised these needs, initial steps have been taken during the year to make private sector health care more acceptable to the community and attractive to investors. Exemption of health services from turnover taxes and GST.

exemption of medical equipment from import duty and reduction of import duty on drugs were introduced with a view to lowering the cost of medical bills as well as the cost of investment. The proposal to provide free land for private hospitals and exempt them from taxes for a reasonable period will further attract investors into this area.

According to Health Ministry sources, the private sector presently caters to about 50 per cent of the total patient load, while the provision of in-patient care is still insignificant compared to the public health sector. The services are provided through a general practitioner network and an institutional network covering private hospitals and nursing homes. According to the Ministry, at present, there are 118 private hospitals with a bed capacity of 2,467. More than half of these hospitals is located in the Western Province. According to a survey covering 23 private hospitals carried out by the Central Bank (1996), in-patient as well as out-patient services provided by these hospitals were less than 5 per cent of the total number of in-patients and out-patients handled by the government hospitals. These private hospitals had a bed capacity of 1,300 and, in respect of all major hospitals, the bed occupancy ratio was almost 80 per cent. There are 103 permanent doctors, 222 part-time doctors, 1,479 nurses and 280 technicians serving in these hospitals. However, of these hospitals, 9 major hospitals, including two in the outstations, accounted for more than 75 per cent of the total bed capacity, 84 per cent of the nursing staff strength and 95 per cent of the technical staff strength. Extensive consultancy services were also provided in almost all hospitals. However, private sector participation in health services is plagued by some major problems such as the high cost of infrastructure, high cost of health care, a shortage of qualified and skilled personnel and low quality of service.

### 5.3 Education

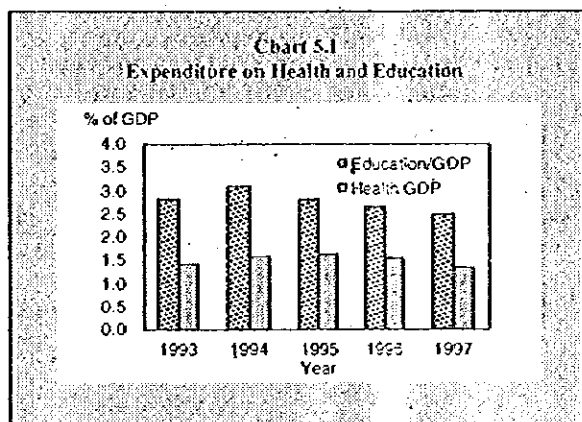
The need to establish a sustainable education system, which will effectively respond to the private sector needs, has been strongly felt over the last two decades. Addressing some of the issues, but only in some specific areas, various policy measures have been introduced from time to time over the last 20 years. Nevertheless, most of these measures did not yield positive results and some were short lived, as they were not designed as a comprehensive package that would address all the issues in the sector simultaneously. Having recognised this need, a set of far reaching educational reforms was introduced in 1997 to address the crucial issues in the sector, such as low-quality, low efficiency and little relevance of educational attainment to labour market requirements. The core of the new educational reforms is the identification of competence and development of practical skills of students and promotion of those skills. The key strategies are the improvement and expansion in qualitative and quantitative inputs, strengthening teacher education and improvement in organisation and management of the schools system. A special unit has been set up in the Ministry of Education to implement and direct the reforms relevant to general education. Early and timely implementation of the proposed reforms with proper monitoring procedures is essential to reduce the mismatch between labour market requirements and educational attainment. Adequate allocation of resources to provide qualitative and quantitative inputs are prerequisites for effective implementation of the proposed reforms. Nevertheless, as the sustainability of the reforms would depend entirely on the commitment and quality of the teaching staff, teacher education and deployment issues have to be addressed on a priority basis.

#### Reforms of General Education

The reforms are focussed on five major areas, namely, extension of educational opportunities, improvement in quality of education, improvement in quality of teaching strength and rationalisation of the profession, development of technical and practical skills and improvement in organisation and management of education.

A proposal has been made to enforce compulsory education regulations under the new reforms, aiming at improving school participation rates. In 1997, an all island survey was launched to identify the magnitude of non-participation to take remedial action.

Quality improvement in education is expected to be undertaken at four different levels: pre-school, primary level, junior secondary and senior secondary stages. These are to be achieved through syllabus revisions, provision of teaching materials, provision of quantitative inputs such as buildings



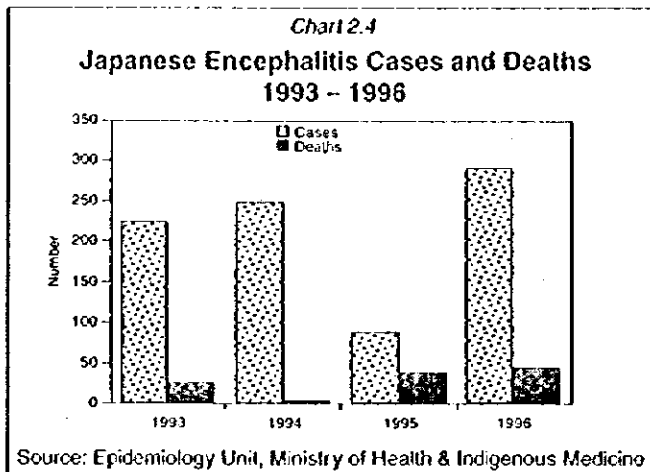
- Prepared system for National Trade Testing and Certification.
- prepared guidelines for Administration and assessment of National Trade Tests.
- prepared draft criteria and instruments for evaluation of training institutions.
- Four international and six local consultants are now working on the following work assignments.
  - # Manpower Planning and Labour market analysis.
  - # Evaluation of Training programmes and Techniques
  - # Training standards and certification
  - # Occupational Mapping
  - # Evaluation of Associate Degree Awarding Institutions.

The Project is expected to end in 1998.

## 2.3 HEALTH

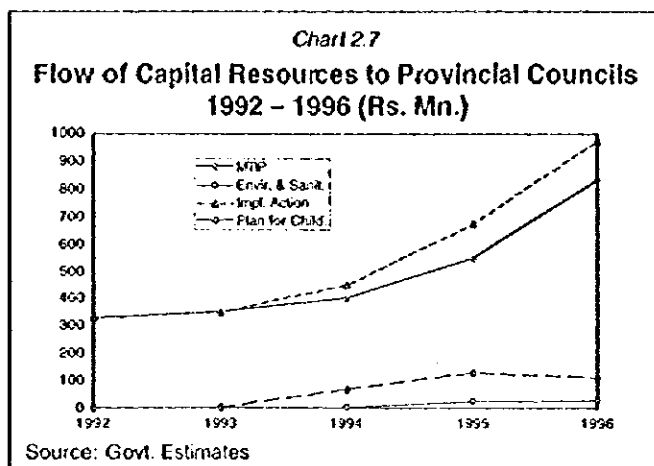
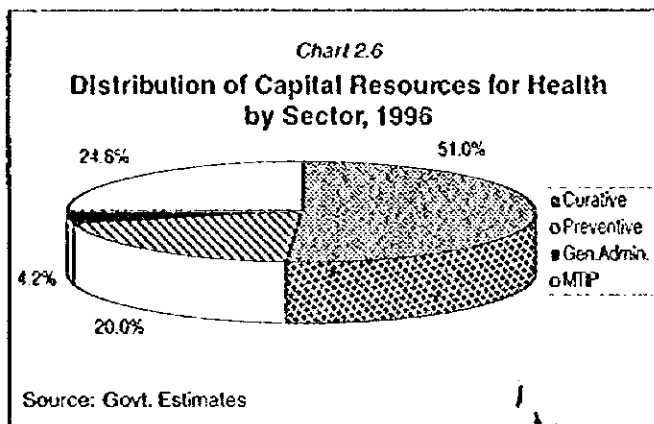
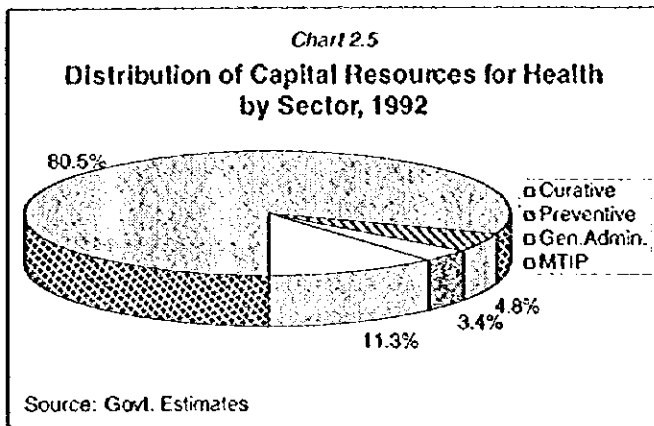
### Achievement Highlights, 1992 - 1997

- Around 178,000 families in 1992 had started to practice some method of family planning and this had increased to 183,726 in 1995.



- National Immunization Days (NID) were held in 1995 and 1996 especially to eradicate poliomyelitis by giving all children below 5 years of age two doses of oral vaccines; 96 - 100 percent coverage was achieved.
- A Rubella vaccination programme was started in 1996 in Gampaha district and expanded to Colombo, Kalutara and Galle districts during 1997.

- Around 567,000 doses of Japanese Encephalitis (JE) vaccines were administered to children 1-10 years of age in RDHS divisions of Anuradhapura, Polonnaruwa, Puttalam, Kurunegala and high risk areas in Gampaha in 1993; this programme has been expanded to other high risk areas in 1996 (Chart 2.4). It is also planned to administer 2.0 mn. doses of JE vaccination in 1997.
- A programme for immunization of pigs against JE was carried out in 1993.
- A Presidential Task Force was appointed in 1996 and has developed a National Plan of Action to control Dengue Haemorrhage Fever (DHF).
- All donated blood samples are tested specially for Hepatitis B and HIV/AIDS to ensure blood safety. Antibody screening tests are being carried out at the National Blood Transfusion Centre (NBTC).
- The NBTC has collected 47,411 units (500 ml) and 23,367 units (250 ml) of blood from 71,046 donors in 1996.
- In the area of health manpower, 1084 Intern Medical Officers, 1193 Post-Intern Medical Officers, 59 Dental Surgeons, 1,131 Nurses, 537 Public Health Midwives, 197 Para Medical Officers, and 2,478 other staff have been recruited during 1995 and 1996.
- Over 130 Pharmacists, 65 Public Health Inspectors, 51 Dental Therapists, 133 Medical Laboratory Technologists, 1,500 Pupil Nurses, 63 Dispensers, 10 Occupational Therapists and 25 Radiographers were trained during 1995 and 1996.
- The MCH unit has organized a series of training programmes in 1996, i.e. 11 programmes on maternal and neonatal care for Nurses and Public Health Midwives in Anuradhapura, Puttalam, Kalutara and Galle DDHS areas, 12 programmes for Medical Officers, Public Health Inspectors and Public Health Midwives on family planning counselling. In addition, 35 Medical Officers were trained in inserting intra uterine-devices, 550 health staff on growth monitoring and 25 Registered Medical Officers, Assistant Medical Officers, Estate Medical Assistants on breast feeding management.
- The budgetary allocation for the health sector has increased from Rs.5,285 mn in 1994 to Rs.9,074 mn in 1996.
- In the past, capital expenditure gave more emphasis to curative medicine than preventive or promotive medicine. However, that situation has been improved significantly over this period (Charts 2.5 & 2.6).
- Capital Grant to Provincial Councils has been increasing since 1992 (Chart 2.7).



### Major Policy Thrust, 1997 - 2001

- Reduction of inter and intra provincial disparities in distribution of health resources.
- Quality improvement of health services.
- Expansion of health services.
- Strengthen training and research activities.

### Proposed Health Reforms

- A new health policy was developed in 1996 and the government has also approved that policy document. A Presidential Task Force has been appointed to develop these policies further and recommend action plans for their implementation.
- Four major areas have been identified by the Task Force for future development :
  - identification and prioritization of health needs,
  - provision of services to meet the health needs of the community,
  - improvement in the organization and management of the health sector,
  - increasing the mobilization of resources and their efficient use in the health sector.

- The Task Force proposals will be presented to the President after discussion with concerned unions etc.

### **Benefits and Outputs of On-going and Proposed Projects**

- Asian Development Bank funded Health and Population Project, 1993 – 1998. The total project cost is US\$ 33.26 mn. The main objectives of this project are to upgrade health services through health manpower development and strengthening 48 health institutions.
- Korean assisted Medical Equipment project, 1996 - 1997. The total project cost is US\$ 10.0 mn. Essential medical equipment will be provided to provincial hospitals under this project.
- Korean assisted Hospital Rehabilitation Project, 1996 - 1999. The total project, costing US\$ 12.6 mn covers Colombo South General Hospital and Negombo and Gampaha Base Hospitals.
- French assistance will provide Cardiology equipment to Kandy General Hospital, 1996 - 1997, at a cost of Rs. 160 mn.
- Development of Lady Ridgeway hospital with Chinese assistance. 1993 - 1998. The total project costing Rs. 320 mn. will strengthen infrastructural facilities at this hospital.
- World Bank funded Health Services Development project, 1997 - 2001. The total project cost is US\$ 22.6 mn. This will strengthen government ability to address major public health problems, such as Malaria and STD/HIV/AIDS; strengthen nutrition, non-communicable disease and health education programmes and improve capacity for health policy development through setting up a management information system, mapping of health assets and health management research.
- JICA funded Nurses Training Institute project, 1996 - 1998. The total project cost is Rs. 210 mn. The Nurses Training Institute at Sri Jayawardenapura hospital will be expanded under this project.
- UNFPA will render its assistance to improve reproductive health, advocacy and population control activities. The total project cost is US\$ 7.5 mn. during 1997 and 1998.
- WHO will assist 28 different projects during 1997 and 1998 at a cost of US\$ 3.194 mn.











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