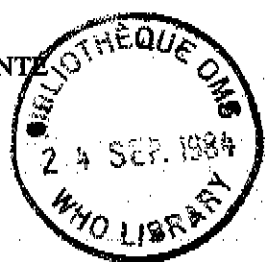


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SEVENTH GENERAL PROGRAMME OF WORK  
COVERING THE PERIOD 1984-1989



*WHO-Pros - M.T.P.*

Global Medium-Term Programme

*Tech, Med  
Tech, Radiologic*

WHODOC 315

Programme 12.1

CLINICAL, LABORATORY AND RADIOLOGICAL TECHNOLOGY  
FOR HEALTH SYSTEMS BASED ON PRIMARY HEALTH CARE

*WHO-Pros -  
cl. Lab, rad  
Tech-Pros per...*

Clinical, laboratory and radiological techniques are essential for the diagnosis and treatment of disease and injury, and thus for primary health care. However, the ever-increasing complexity of clinical care, and the laboratory and radiological procedures associated with it, while resulting in increasing costs, have not always resulted in corresponding improvements in health, even in the most affluent nations. It is thus necessary to identify those elements of clinical care that are essential, especially at the primary and immediate referral levels. This means concentrating on the commonest disease conditions and injuries, adapting, modifying and simplifying technology, emphasizing the role of allied medical professional and auxiliary personnel and improving their training.

The emphasis of the programme will be on the primary health care and first referral levels. In a first stage the programme will collaborate with countries in the selection and adaptation of the most essential clinical, diagnostic and treatment measures for providing effective patient care under varying national conditions, particularly through primary health care and the immediate support levels.

The aims of the clinical, laboratory and radiological technology programme for health systems based on primary health care are: (i) to further develop investigative procedures (mainly laboratory and radiological) that can support clinical diagnoses; (ii) to identify medical and surgical procedures that could be performed with adequate anaesthetic cover at the first referral level hospital; (iii) to promote the use of basic equipment necessary to maintain continuous satisfactory services; (iv) to maintain equipment at operational levels of efficiency and to strengthen maintenance and repair services of such equipment at first referral level; and (v) to develop training programmes for trainers and managers in the use and maintenance of appropriate laboratory and radiological technology and equipment.

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## 1. INTRODUCTION AND POLICY BASIS

The policy basis for the programmes for diagnostic, therapeutic and rehabilitative technology is found in: 1) Declaration of Alma-Ata at the International Conference on Primary Health Care; 2) Global Strategy for Health for all by the Year 2000; 3) Seventh General Programme of Work (Health For All Series Nos 1, 3 and 8).

Specifically, the Seventh General Programme of Work stresses the need for essential clinical care, basic laboratory and radiological services in support of primary health care, particularly at the first referral level hospital, so as to make this institution a viable referral system. Emphasis will be placed on a more integrated approach of diagnostic, therapeutic and rehabilitative technologies at the primary health care and intermediate levels.

Appropriate resolutions have been adopted regarding some of those technologies. WHA32.16 stresses the needs to intensify technical cooperation for the establishment and development of simple laboratory services for clinical and public health purposes. Similarly, Resolution WHA27.62, requests WHO to promote developments in the field of standardization of diagnostic materials, and Resolution WHA28.72 urges Member States to promote the development of national blood services in the field of blood transfusion.

Resolution WHA25.57 recognizes the need for radiological services to be improved as an integral part of basic health services.

## 2. SITUATION ANALYSIS

In almost all countries there exists a health system which is oriented towards service to the people. However, by force of circumstance, inadequate definition of priorities and lack of resources, an imbalance in the development of health systems at central and peripheral levels is discernible in most countries, with care mainly concentrated in city hospitals. The organization of health systems based on primary health care is designed to redress this situation. This implies the building up of sound systems, or the reorientation of existing systems, particularly at the primary care and first referral level hospitals. The health coverage of populations would thus be extended more equitably and the patient load at the different referral levels would be rationalized.

The level of development of clinical, laboratory and radiological services varies in all locales at country level and in the organization at regional offices and headquarters. A staggered approach is therefore suggested.

Clinical technology can be defined as the application of organized clinical knowledge and skills to serve the patients at points of delivery where they would be most useful, economic, time-saving and would produce end results which are satisfactory.

To achieve this, the Organization is synthesizing activities which involve the promotion of those elements of clinical care that are considered essential at the various levels with emphasis on the role of a first referral level hospital and support to primary health care. Such a hospital must include the skills required to meet the specific clinical needs of infants and children; general medical care, essential surgery and related anaesthesia; basic laboratory, radiological services, rehabilitative care, etc.

Appropriate technology in health care includes "good practice of clinical medicine and clinical surgery" where diagnosis is primarily made by correlation of presenting clinical signs and symptoms, appropriate laboratory investigation and radiological investigation when indicated.

Treatment of problems that occur at the periphery frequently require a knowledge of anatomy and simple surgical procedure to remove or redress the offending cause, early institution of drugs when indicated and steps to rehabilitate the patient to a normal situation as early as possible. Basic medical and surgical equipment for such procedures exist in most developing countries, but proper and skillful use of such equipment need to be emphasized in medical curricula in many developing countries, which should take into account local problems of importance. Mobilization of scarce local resources is an important segment of this exercise.

The application of clinical, laboratory and radiological technology must naturally be introduced through the infrastructure that has been developed in the country at the level of expertise that is available at the first referral level. The role of paramedical personnel at the first referral level needs specific emphasis, since in many situations qualified medical personnel in a significant number may not be available even at this level.

For example, anaesthetic and simple surgical techniques (such as suture of wounds, incision and drainage of an abscess) can be performed under supervision by well trained assistants or nursing personnel with specialized training for such interventions. Re-emphasis and wider practice of regional and local anaesthetic techniques would be a step in the right direction. Use of reliable sound general anaesthesia using simple equipment and techniques should be popularised. The promotion of basic laboratory and radiological services to enhance diagnostic skills needs no emphasis. To facilitate the expansion of first referral level services, it will be important to involve the private sector and this would include missionaries and institutions set up by other philanthropic bodies. These institutions play a vital role in health care delivery in many developing countries.

There are about 540 medical schools in 70 developing countries. 320 of them exist in four countries - Brazil, China, India and Mexico. 28 countries have 2 or more schools up to a maximum of 15 in number. 38 countries have one medical school - 50% of them in Africa, 7 in Asia and 11 in the Americas.

An impact could be made on the teaching of essential surgical, medical, obstetric, gynaecological, paediatric procedures and anaesthetic coverage, if efforts are concentrated on those countries that have only one medical school. In this way, 23% of the above-mentioned 70 developing countries would be covered and about 12 000 physicians would thus have the right perspective and knowledge of clinical technology which could be adapted to the country problems and philosophy.\*

The role of nongovernmental organizations and national professional organizations is to furnish information on (i) the level of local expertise available; (ii) the state of clinical art as commonly practised; (iii) the relevant changes that could be made (if necessary); and (iv) specific problem areas which need particular attention.

Whilst in the industrialized countries the average number of laboratory tests per inhabitant per year varies from six to ten, and the number of tests per patient bed-day ranges from four to seven, in developing countries the number of tests per patient bed-day ranges from 0.05 to 1.5, and many laboratories lack the adequate strains used for detecting the most prevalent diseases such as tuberculosis, malaria, etc. In spite of the great prevalence of bacterial infectious diseases, bacterial examinations mostly cover less than 10% of the total laboratory workload in developing countries.

In most developing countries laboratory services are virtually non-existent at the primary health care level. In some regions, only 10% of the laboratory service benefits 70-80% of the population living in the rural areas. Radiological services are restricted to large city hospitals while rehabilitative activities are found only at the central level.

The equipment available for laboratory, radiology and other clinical technologies is mostly designed for use in industrialised countries and not adapted to the conditions prevailing in developing countries.

Logistic support and the maintenance and repair of medical equipment is either not organized or is unreliable in most developing countries. Figures indicate that as much as 60% of all medical instruments are not properly used due to the above factors.

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\* These figures are based on the World Bank Report of 1983 and the World Directory of Medical Schools, WHO, 1979.

Trained personnel able to perform laboratory, radiological and other clinical or surgical technologies are particularly scarce and restricted to urban hospitals. For a great number of developing countries training of such specialized personnel is not available and has to be performed abroad under conditions which are not appropriate for their future practice.

An evaluation of the quality of laboratory results in developing countries has shown that only 50% of the results obtained are reliable.

The following table gives comparative figures regarding population coverage.

|                            | Industrialized Countries | Developing Countries  |                        |
|----------------------------|--------------------------|-----------------------|------------------------|
|                            |                          | Category A            | Category B             |
| Population to be covered   |                          |                       |                        |
| <u>1. Radiodiagnosis</u>   |                          |                       |                        |
| 1 x-ray machine            | 1 500 - 10 000           | 20 000 - 50 000       | 50 000 - 1 000 000     |
| 1 diagnostic radiologist   | 10 000 - 30 000          | 50 000 - 100 000      | 100 000 - 2 000 000    |
| 1 radiographer             | 2 000 - 5 000            | 10 000 - 20 000       | 50 000 - 200 000       |
| <u>2. Radiotherapy</u>     |                          |                       |                        |
| 1 teletherapy              | 50 000 - 200 000         | 500 000 - 2 000 000   | 5 000 000 - 40 000 000 |
| 1 radiotherapist           | 100 000 - 200 000        | 1 000 000             | 1 000 000              |
| <u>3. Nuclear Medicine</u> |                          |                       |                        |
| 1 NM laboratory            | 100 000 - 500 000        | 1 000 000 - 5 000 000 | ?                      |
| 1 NM physician             | 200 000 - 500 000        | 1 000 000 - 5 000 000 | ?                      |

Category A of developing countries includes those which are much better off in terms of development of health services and the figures of coverage presented can be considered as a rational target for Category B of developing countries for the year 2000.

In terms of population, Category A could represent less than 1 billion people, while Category B constitutes approximately 2.5 billion.

In addition to the scarcity of resources there is an important misuse of medical technology (diagnostic and therapeutic) leading to unjustified increases in health care costs and to an imbalance in the distribution of resources between urban and rural areas in any country.

One of the priorities of the WHO programme will thus be to take into account in particular the deficiencies that exist now in developing countries, and to influence Member States to change their priorities to ensure that services will become accessible to the most needy. Consequently, the programme activities are largely centred on adaptation and simplification of technology rather than on basic research.

### 3. OBJECTIVE

#### Objectives of the Seventh General Programme of Work

The Seventh General Programme of Work defines the overall objective of the DTR programme as to promote and support the use, development and adaptation of diagnostic, therapeutic and rehabilitative technologies and the proper use of medicinal drugs, appropriate for specific national systems and institutions.

### 4. TARGETS

#### 4.1 Targets of the Seventh General Programme of Work

As defined in the Seventh General Programme of Work, the activities of the CLR technology programme will aim at fostering national and international activities so that by 1989:

(1) Most countries will have taken measures to identify and arrive at standards for clinical, diagnostic and treatment methods (including surgical and manipulative methods) that are appropriate for provision to individual patients through primary health care and the immediate supporting levels of the health system. These will include distribution of responsibility among various members of the health team for administering these measures, especially at the primary and secondary levels of the health system, and for promotion of self-care wherever feasible;

(2) most Member States will have developed and will manage clinical, public health, laboratory and radiological services as an integral part of their health systems.

#### 4.2 Specific targets

In support of the above targets, specific targets have been developed for each component of the CLR technology programme and for the joint activities of these components.

##### 4.2.1 Clinical technology targets

(a) By 1987 guidelines will have been prepared with the help of national and international nongovernmental organizations on how to identify (i) major clinical problems at primary health care and first referral levels; (ii) basic valid procedures necessary to meet these clinical problems. Essential supplies, equipment and training for all categories of health personnel will be enumerated in order to maintain the service at permissible and economically viable levels of efficiency;

(b) by 1987 a few selected countries will have applied and evaluated these guidelines and technology;

(c) by 1989 this will be extended to a larger number of countries.

##### 4.2.2 Laboratory technology targets

(a) By 1986 at least three countries in each region will have developed models of integrated peripheral laboratories in support of primary health care and the related first referral hospital; and by 1989 these models will have been evaluated, adapted and applied in at least 30% of countries in each region;

(b) by 1986 ways and means for the systematic assessment and related exchange of technical information on appropriate technology in the field of health laboratory technology at the regional and global level will have been developed. By 1989 at least 50% of Member States will have introduced a laboratory improvement programme and 30% of those participating in WHO quality assessment programmes will have established a national scheme;

(c) by 1989 the majority of developing countries will, to promote self-reliance, have introduced a national programme for the preparation of essential reagents and developed a distribution system. Production of low-cost, basic equipment will have been initiated within a few countries, if possible through TCDC. Maintenance and repair centres for laboratory equipment will be established in a majority of developing countries.

#### 4.2.3 Radiological technology targets

(a) Training and manpower: By 1989 regional and national training centres for personnel specialized in radiodiagnosis, radiotherapy, nuclear medicine, medical physics and maintenance and repair of medical equipment will have been developed;

(b) quality and efficiency: By 1989 55-60 WHO Member States will have introduced quality assurance programmes in diagnostic radiology, radiotherapy and nuclear medicine with the purpose of decreasing costs and exposure and increasing the output of the given technologies;

(c) development in technology and policy-making: By 1989 progress in technology development will have been made in the following areas:

- (i) the evaluation of new technologies for application in developing countries;
- (ii) the development of comprehensive radiological services at the periphery (BRS), middle (GPRS) and central (SRS) levels;
- (iii) the production of adequate radiological equipment (with UNIDO);
- (iv) the radiation protection services in an additional 5-10 countries.

#### 4.2.4 Joint target

This target aims at coordinating all the activities of diagnostic, therapeutic and rehabilitative technology (Objective 12 of the Seventh General Programme of Work) in order to give a more sustained and homogenous support to primary health care; specifically:

By 1987 one or two countries in each region will have implemented, in at least one district or province appropriate diagnostic, therapeutic and rehabilitative technology for clinical care integrated as much as possible as a prime support for primary health care; and will have identified steps at the first referral level and sequential levels. The programme would then be evaluated and consequently expanded into other districts or provinces and/or countries so that by 1989 coverage of a reasonable percentage of the population in these selected countries could be envisaged.

## 5. APPROACHES

To achieve the above programme objective and targets, the following approaches will be used, consistent with the Seventh General Programme of Work:

WHO will collaborate with countries in the selection and adaptation of the most essential clinical diagnostic and treatment measures for providing effective patient care under varying national conditions, particularly through primary health care and the immediate support levels (both the first and secondary). This will include the specific clinical needs of infants and children, obstetric and gynaecological care, general medical care and essential surgery and related anaesthesia. These efforts will involve the assessment of various clinical technologies from the simplest to the most complex and the wide dissemination of these results.

WHO will promote the integration of appropriate clinical and public health laboratory and radiological technology within national health systems, particularly in support of primary health care. This will include laboratory support to epidemiological surveillance and, where applicable, blood bank technology and basic immunological techniques in the diagnosis and treatment of communicable diseases and diseases related to immunological factors. The development or improvement of systems for the local preparation of laboratory reagents and of manuals for local production and quality control of reagents and equipment will be part of the programme.

WHO will collaborate with Member States in the selection of appropriate clinical, laboratory, radiological and other diagnostic and therapeutic technologies, as well as the assessment of basic radiodiagnostic equipment particularly at the level of direct support to primary health care. Training materials will be provided and training offered on the correct use of these technologies to physicians and other health workers prescribing them. This will include orientation towards cost consciousness. Training will also be provided in the sound management of laboratories and radiological services.

The development of training programmes for trainers and managers in the use and maintenance of appropriate laboratory and radiological technology and equipment will include: the preparation of appropriate manuals; short-term training schemes for technicians and operators of such equipment and for general health personnel to enable them to interpret x-ray films, clinical laboratory findings and relevant information necessary for more adequate diagnosis and treatment of patients.

WHO will assist in the design, selection and procurement of basic and appropriate clinical, laboratory and radiological equipment and supplies for countries.

Professional organizations have accumulated an enormous expertise in the field, be it in international or national settings. Many of them are nongovernmental organizations in official relations with WHO. These professional bodies should be motivated to provide technical support to the Organization. One of the major approaches will thus be to work through them, not only because of their know-how but also because they shape the future of some of the concerned disciplines in the world. Similarly, contacts will be made between WHO regions and the national organizations.

Some developing countries have developed expertise in certain fields (for example, solar sterilization techniques). ICDC will then be extremely important, not only on an individual basis but also for all activities of DTR when an integrated approach is applied, thus avoiding too sophisticated and inappropriate techniques being adopted from more developed countries.

6 ACTIVITIES

The levels of development of three programme components, viz clinical, laboratory and radiological technology at the present stage of implementation has led to the presentation in three sequential segments. The ultimate aim is for integration at country level of all activities relevant to clinical care of a patient and this is the reason why the joint target is presented.

CLINICAL TECHNOLOGY

Target 1:

- (a) By 1987 guidelines will have been prepared with the help of national and international nongovernmental organizations on how to identify:
- (i) major clinical problems at primary health care and first referral levels; and
  - (ii) basic valid procedures necessary to meet these clinical problems.
- Essential supplies, equipment and training for all categories of health personnel will be enumerated in order to maintain the service at permissible and economically viable levels of efficiency;
- (b) by 1987 a few selected countries will have applied and evaluated these guidelines and technology;
  - (c) by 1989 this will be extended to a larger number of countries.

| Activities  | 1984 - 1985              | 1986 - 1987              | 1988 - 1989      | Linkages <sup>1</sup>   |  |
|---|--------------------------|--------------------------|------------------|---|--|
| <p>1. <u>Technology assessment and appropriate use of technology</u></p> <p>(a) Identification and agreement on procedures (both emergency and elective) in surgery, medicine, paediatrics, obstetrics, and gynaecology, with corresponding anaesthetic and nursing support for primary health care and the first referral level. Working groups (comprising NGOs and experts) will be established to cover the specific areas mentioned above and development of suitable indicators for assessment of clinical performance in countries</p> <p>(b) Support to Member States in the selection of equipment corresponding to (a) above, its repair and maintenance and provision of spare parts</p> | HQ<br>ROs<br>countries   |                          |                  | <p>PHC* HST*<br/>other programmes as necessary.<br/>NGOs<sup>2</sup><br/>Universities</p> |  |
|   | EURO, HQ & other ROs     |                          |                  |   |  |
| <p>2. <u>Development of national programme and direct technical collaboration</u></p> <p>(a) Selection of a limited number of countries in each region for selective application (for example one hospital or one area) and testing of results of procedures to (1) above. Testing will be done element by element for a specific time sequence</p> <p>(b) Adaptation of the results of (1) above to the situation of selected countries and areas and implementation</p> <p>(c) Evaluation of the implementation</p>   | ROs & selected countries | ROs & selected countries |                  | <p>as above</p> <p>as above</p>   |  |
|   |                          |                          |                  |   |  |
| <p>3. <u>Dissemination of information</u></p> <p>(a) Identification of collaborating centres for dissemination of information, training and TCDC</p> <p>(b) Dissemination of validated information on (1) and (2)</p> <p>(c) Elaboration of guidelines for manuals in collaboration with NGOs and collaborating centres on 1.(a)-(c) above</p> <p>(d) Identification, adaptation and dissemination of teaching and training materials on essential clinical technology</p>  | HQ, ROs                  |                          |                  | <p>NGOs<sup>2</sup><br/>CMC, YCN</p>  |  |
|   |                          | HQ, regional offices     |                  |   |  |
|   | HQs, ROs                 |                          |                  |   |  |
| <p>4. <u>Extension of the approach</u></p> <p>Once the approach has been tested, as mentioned in (2) above, and improved if necessary, it will be extended, mainly on a TCDC basis, to a maximum of countries for immediate application at the primary health care and first referral levels, if possible with the other elements of DTR as mentioned in Target 8</p>   |                          | ROs                      | HQ               |   |  |
|   |                          |                          | Regional offices | HQ  |  |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined. (These refer to all targets in succeeding pages).

<sup>2</sup> In particular, IFSC, ICS, WPSA, LRCS, IPA, IFGO, IS81, WFNS, IATM, SICOT (see Annex)

LABORATORY TECHNOLOGY FOR HEALTH SYSTEMS BASED ON PRIMARY HEALTH CARE

Target 2:

By 1986 at least three countries in each region will have developed models of integrated peripheral laboratories in support of primary health care and the related first referral hospital; and by 1989 these models will have been evaluated, adapted and applied in at least 30% of countries in each region.

| Activities   | 1984-1985                               | 1986-1987      | 1988-1989 | Linkages <sup>1</sup>                            |
|--|---|----------------|-----------|--|
| 1. Identification of the most appropriate technology through permanent contact with other relevant units of science and technology that can be applied and integrated at the peripheral health laboratory level      | HQ                                      | HQ             | HQ        | PHC, DPC*,<br>VPH, PEH*,<br>MAP*                 |
| 2. Provision of support for the development of national strategies and activities leading to the development of peripheral laboratory services as an integral part of the national health service                    | SEARO, EMRO, EURO, PAHO, HQ             |                |           | PHC, DPC*, VPH,<br>PEH*, MAP*                    |
| 3. Initiation and participation in follow-up of field operational studies in peripheral laboratories at country level  | AFRO, EMRO, EURO, PAHO, SEARO, WPRO, HQ |                |           | PHC, DPC*, VPH,<br>PEH*, MAP*                    |
| 4. Participation in the evaluation of the results of field studies on peripheral laboratories and preparation of guidelines on laboratory services at primary health care level for country replication              | EURO, EMRO, PAHO<br>SEARO, WPRO, HQ     |                |           | PHC, DPC*, VPH,<br>PEH*, MAP*                    |
| 5. Promotion of peripheral laboratories with an active role in primary health care support and communicable disease surveillance and control   | AFRO, EMRO, EURO, PAHO, SEARO, WPRO, HQ |                |           | PHC, DPC*,<br>VPH, PEH, MAP*                     |
| 6. Preparation and distribution of guidelines and manuals for diagnostic methods appropriate to primary health care and the immediate supporting level of the health system, and testing them in the field           | PAHO, SEARO, HQ                         |                |           | PHC, TUB*,<br>PDP*, MAP*,<br>RMD*, DPC*,<br>IPCC |
| 7. Promotion of the expansion of blood transfusion services to peripheral hospitals based on voluntary non-remunerated donations, and selection of regional and/or national production of components and derivatives | AFRO                                    | EMRO, PAHO, HQ |           | BLG, LORCS,<br>ISBT*                             |
| 8. Organization of national workshop for development of blood transfusion services at primary health care level  | EMRO, PAHO, SEARO                       |                |           | LORCS, ISBT,<br>DANIDA*                          |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

**Target 3:**

By 1986 ways and means for the systematic assessment and related exchange of technical information on appropriate technology in the field of health laboratory technology at the regional and global level will have been developed.

By 1989 at least 50% of the Member States will have introduced a laboratory improvement programme and 30% of those participating in WHO quality assessment programmes will have established a national scheme.

| Activities   | 1984 - 1985                   | 1986 - 1987                       | 1988 - 1989 | Linkages <sup>1</sup>              |
|--|-------------------------------|-----------------------------------|-------------|------------------------------------|
| <u>Training</u>  |                               |                                   |             |                                    |
| 1. Organization of training courses for laboratory tutors introducing methodology for teaching peripheral health laboratory workers  | AFRO                          | EMRO, PAHO, HQ                    |             | HMD, DANIDA, IAMLIT, MAP*          |
| 2. Organization of training programme on health laboratory technology including procedures on biosafety on a continuing basis  | SEARO                         | EMRO, PAHO, WPRO, AFRO            |             | IFCC*, ICSH*, DANIDA, SMM*         |
| 3. Preparation and field evaluation of self instruction material for peripheral laboratory workers   | PAHO, HQ                      |                                   |             | HMD                                |
| 4. Organization of training courses for laboratory managers introducing cost control, supervision and skills for efficient use of resources  |                               | EMRO, PAHO, WPRO                  |             | PHC, CDC, DANIDA                   |
| 5. Organization of training in health laboratory technology assessment   |                               | EURO, PAHO                        |             | Collaborating Centres              |
| 6. Organization of an Expert Committee Meeting to review training of health laboratory personnel   |                               | AFRO & HQ                         |             | HMD, IAMLIT, NGOs, CDC             |
| <u>Quality assessment and standardization</u>  |                               |                                   |             |                                    |
| 7. Establishment of collaborating centres for quality assurance activities in microbiology, clinical chemistry, haematology and blood transfusion  | EURO                          | EMRO, PAHO, SEARO                 |             | NGOs & Collaborating Centres       |
| 8. Preparation of guidelines on the organization of national quality assurance schemes and the preparation of test materials for the various laboratory disciplines  | HQ & PAHO                     |                                   |             | NGOs & Collaborating Centres       |
| 9. Promotion of national quality assurance programmes and organization of training courses for this purpose  |                               | EMRO, PAHO, SEARO, WPRO, HQ, AFRO |             | HMD, NGOs, & Collaborating Centres |
| 10. Development of international reference preparations and methods, recommended methods and specifications with respect to diagnostic material and information on exchange on health laboratory standards |                               | PAHO & HQ                         |             | IFCC*, ICSH*, CDC, NCCLS*, ECCLS*  |
| <u>Technology assessment</u>   |                               |                                   |             |                                    |
| 11. Provision of logistic and technical support to collaborating centres undertaking research and development of appropriate technology including exchange of scientists                                   |                               | AFRO, EURO, PAHO, HQ              |             |                                    |
| 12. Determination of needs of countries with regard to laboratory technology in support of primary health care and classified them by problems and priorities  |                               | AFRO, EMRO, PAHO                  |             | NGOs, DPC*                         |
| 13. Preparation of an inventory of appropriate technology in the field of health laboratory services with emphasis on technology applicable at the peripheral level  |                               | AFRO, EMRO, PAHO, HQ              |             | NGOs, Collaborating Centres        |
| 14. Designation of collaborating centres, development of mechanisms for the assessment of laboratory technology, and dissemination of information on this subject and appropriate technology identified    | AFRO, EMRO, EURO, PAHO, SEARO |                                   | HQ          | Collaborating Centres              |
| 15. Development of guidelines on national policies and a system for health technology assessment   |                               | EURO, PAHO                        |             | Collaborating Centres              |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

Target 4:

By 1989 the majority of developing countries will, to promote self-reliance, have introduced a national programme for the preparation of essential reagents and developed a distribution system. Production of low-cost, basic equipment will have been initiated within a few countries, if possible through TCDC. Maintenance and repair centres for laboratory equipment will be established in a majority of developing countries.

| Activities   | 1984-1985 | 1986-1987       | 1988-1989 | Linkages <sup>1</sup>                       |
|--|-----------|-----------------|-----------|---|
| <u>Reagent production</u>  |           |                 |           |   |
| 1. Preparation of lists of essential reagents required on the basis of the essential tests and appropriate methods, identified in close collaboration with expert panels and NGOs  | HQ, PAHO  |                 |           | NGOs, DPC*, MAP*                            |
| 2. Preparation of manuals on methods for production and control of reagents  |           | HQ, PAHO        |           | NGOs, HMD*, MAP*                            |
| 3. Designation of collaborating centres for distribution of reference material used in the control and standardization of reagents produced locally  | SEARO     | HQ, PAHO        |           | Collaborating Centres                       |
| 4. Cooperation with countries in establishing reagent production, and organizing a reliable system of supply and control   | AFRO      | HQ, PAHO, SEARO |           | NGOs, UNIDO*, UNICEF*                       |
| 5. Cooperation with countries in the establishment and good management of laboratory animal breeding   |           | SEARO           |           | Collaborating Centres, NGOs                 |
| <u>Equipment, development, maintenance and repair</u>  |           |                 |           |   |
| 6. Identification of causes of breakdown of laboratory equipment, reasons for poor laboratory results related to inappropriate operation and faults and the development of equipment specifications aimed at overcoming these weaknesses       |           | HQ, PAHO        |           | Industry*, Collaborating Centres, NGOs      |
| 7. Promotion of research and design of simple appropriate laboratory equipment on the basis of determined specifications, and organization of the evaluation of this equipment through collaborating centres, research workers and field staff |           | HQ, PAHO        |           | Collaborating Centres                       |
| 8. Preparation of guidelines on the organization of maintenance repair services, including design of equipment record cards  | HQ        |                 |           | IFCC*, ICSSH*, IMALT* Collaborating Centres |
| 9. Identification of the most efficient set-up for the establishment/or expansion of maintenance and repair facilities for laboratory equipment  |           | PAHO, SEARO     |           | Collaborating Centres                       |
| 10. Development of a network of training centres for maintenance and repair of laboratory equipment  | AFRO      | HQ, PAHO        |           | Collaborating Centres, NGOs                 |
| <u>Management</u>  |           |                 |           |   |
| (Please see activities 3 and 4 under Target 4).  |           |                 |           |   |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

RADIOLOGICAL TECHNOLOGY FOR HEALTH SYSTEMS BASED ON PRIMARY HEALTH CARE

Target 5:

Quality and efficiency: By 1989, 55-60 WHO Member States will have introduced quality assurance programmes in diagnostic radiology, radiotherapy and nuclear medicine with the purpose of decreasing costs and exposure and increasing the output of the given technologies.

| Activities   | 1984-1985                                | 1986-1987                                   | 1988-1989  | Linkages <sup>1</sup>                                  |
|--|--|---|--|--|
| 1. Development and implementation of the Quality Assurance Programme in Diagnostic Imaging in cooperation with IAEA, NGOs, and Regional Offices by organizing workshops and seminars at the Regional level; at least 55 countries will have Q.A. programmes in Diagnostic Radiology and Nuclear Medicine by 1989   | HQ, IAEA, NGOs, AMRO, EMRO, EURO & SEARO | HQ, IAEA, NGOs, AFRO & WPRO                 | HQ, IAEA, NGOs, AFRO, AMRO, EMRO, EURO, SEARO & WPRO | IAEA; Intl. Soc. of Radiology; IOMP, ICRP, ISRTT,      |
| 2. Development of a comprehensive programme on Quality Control in Radiotherapy, with the involvement of IAEA, the network of SSDLs; Regional Offices; the Intl. Society of Radiographers and Radiological Technicians; at least 25-30 countries will have Q.A. programmes in Radiotherapy by 1989  | HQ, IAEA, NGOs, AMRO EURO & SEARO        | HQ, IAEA, NGOs, SSDLs in AMRO, EMRO & SEARO | HQ, IAEA, NGOs, SSDLs in AFRO & WPRO                 | CAN; IAEA; SSDLs; Intl. Soc. of Rad; ICRU, IOMP, ISRTT |
| 3. Continuation of the efforts towards the increase inefficacy/efficiency of radio-diagnostic and nuclear medicine procedures with the aim of promoting further studies & of implementing the recommendations made by the Scientific Group Meeting held in 1982; action to reduce routine radiological investigations in non-sick persons will be taken in 40-50 countries by 1989 | HQ, IAEA, NGOs, AMRO & EURO              | HQ, IAEA, NGOs, EMRO & SEARO                | HQ, IAEA, NGOs, AFRO & WPRO                          | IAEA, Intl. Soc. of Radiology; WFNM                    |

Target 6:

Training and manpower: By 1989, regional and national training centres for personnel specialized in radiodiagnosis, radiotherapy, nuclear medicine, medical physics and maintenance and repair of medical equipment will have been developed.

| Activities  | 1984-1985                     | 1986-1987       | 1988-1989 | Linkages <sup>1</sup>              |
|---|-------------------------------|-----------------|-----------|------------------------------------|
| 1. Cooperation with Member States in the development of national, inter-country and regional training programmes in the field of radiation medicine and maintenance of medical equipment; at least 2 regional training centres will be operational in AFRO and WPRO by 1989 | HQ, Regional Offices and NGOs |                 |           | HMD, Intl. Soc. of Radiology (ISR) |
| 2. Evaluation of the training component of the BRS project and design of an adequate training programme for tutors used in the training of BRS personnel; at least 25-30 field projects will be thoroughly evaluated and corrective actions recommended by 1989             | HQ, AMRO, EMRO & SEARO        | HQ, WPRO & EURO | -         | HMD (EEV & EPM); ISRTT             |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

Target 7:

Development in technology and policy-making: By 1989 progress in technology development will have been made in the following areas:

- (i) the development of comprehensive radiological services at the periphery (BRS), middle (GPRS) and central (SRS) levels;
- (ii) the production of adequate radiological equipment (with UNIDO);
- (iii) the evaluation of new technologies for application in developing countries;
- (iv) the radiation protection services in an additional 5-10 countries.

| Activities   | 1984-1985                         | 1986-1987                    | 1988-1989                                       | Linkages <sup>1</sup>                                   |
|--|-----------------------------------|------------------------------|---|---|
| 1. Implementation of the BRS project on a larger scale with the aim of having the BRS adopted by 60-70 countries by 1989. With a view to obtaining reasonably-priced BRS machines, an attempt will be made, in cooperation with UNIDO, to arouse the interest of 3-4 developing countries in the production of BRS machines  | HQ, AMRO, EMRO, EURO & SEARO      | HQ & All Regional Off.       | HQ & All Regional Off.                          | HSC, UNIDO; Intl. Soc. of Rad; ISRRT                    |
| 2. Preparation of a comprehensive planning of radiological services at the country level - Basic Radiological Service (BRS) at the first referral hospital level; General Purpose Radiological Service (GPRS) at the general hospital level (secondary referral hospital); and Specialized Radiological Services (SRS) at the level of university hospitals or specialized medical institutions, and study of the application of this concept in 25-30 countries | HQ & All Regional Off.            | HQ & All Regional Off.       | HQ & All Regional Off.                          | PHC; HSC; Intl. Soc. of Rad; ISRRT                      |
| 3. Elaboration of the concept of the General Purpose Radiological Service (GPRS), including the technical specifications for the GPRS machine, staff requirements and tasks. Attempts to introduce the GPRS in 8-10 countries after the construction of appropriate GPRS machines  | EMRO; EURO                        | Regional Off.                | Regional Off.                                   | Intl. Soc. of Rad; ISRRT; X-ray manufacturers           |
| 4. Elaboration, in cooperation with CAN/HQ IAEA and NGOs, of recommendations for radiotherapy equipment, (teletherapy and brachytherapy) adapted to the needs of developing countries  | HQ, IAEA & NGOs                   | HQ, IAEA & NGOs              | HQ, IAEA, NGOs, UNIDO Radiotherapy Equip.Mnfcts | CAN*; IAEA; UNIDO; Intl. Soc. of Rad; ICRP, ICRU, IOMP, |
| 5. Scientific Group Meeting on perspectives of the utilization of new diagnostic imaging technologies (ultrasound, digital radiology, etc.) in the developing world  | HQ, NGOs & All Regional Offices   | -                            | -   | RPD; Intl. Soc. of Radiology; IOMP; other NGOs involved |
| 6. Scientific Group Meeting on the use of diagnostic imaging technologies in endemic liver diseases  | -                                 | -                            | HQ, NGOs & All Regional Offices                 | RPD   |
| 7. Technical cooperation with IAEA, NGOs and Member States in the development of Radiation Protection services and better utilization of such services offered by WHO  | HQ, IAEA, NGOs, AFRO, AMRO & WPRO | HQ, IAEA, NGOs, AMRO & SEARO | HQ, IAEA, NGOs, EMRO & EURO                     | IAEA; ICRP, IOMP  |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

JOINT DTR TARGET

Target 8:

This target aims at coordinating all the activities of Diagnostic, therapeutic and rehabilitative technology (Objective 12 of the Seventh General Programme of Work) in order to give a more sustained and homogenous support to primary health care and to avoid overlapping, specifically:

By 1987 one or two countries in each region will have implemented, in at least one district or province appropriate diagnostic, therapeutic and rehabilitative technology for clinical care integrated as much as possible as a prime support for primary health care and identified steps at the first referral level and sequential levels. The programme would then be evaluated and consequently expanded into other districts or provinces and/or countries so that by 1989 coverage of a reasonable percentage of the population in these selected countries is envisaged.

| Activities  | 1984-1985               | 1986-1987                                      | 1988-1989            | Linkages <sup>1</sup>  |
|---|-------------------------|--|----------------------|--|
| 1. Identification of <u>essential clinical needs</u> at primary health care and first referral levels and development of an integrated approach to <u>diagnosis</u> with supportive laboratory and radiological services and <u>therapy</u> with essential drugs, traditional medicinal practices (where desired and indicated) essential vaccines, essential medical, surgical instruments and equipment (for surgical intervention when necessary) and rehabilitation | HQ<br>all regions       |  |                      | PHC, MCH<br>JMD, EPI,<br>EDV, DFC,<br>and other<br>divisions<br>as appropriate<br>JCHP, H/2000<br>group & NGOs |
| 2. Selection of and contact with appropriate countries for implementation of the above approach   | HQ and regional offices |  |                      | As above   |
| 3. Preparation of necessary guiding principles and helping countries to put together existing guidelines taking into account country situations   | HQ and all regions      |  |                      | As above   |
| 4. Training in maintenance and repair of appropriate infrastructure and equipment   | HQ and all regions      |  |                      | As above   |
| 5. Implementation of the programmes in the selected geographical areas  |                         | HQ, regional offices<br>and selected countries |                      | As above   |
| 6. Evaluation of the above  |                         | HQ, ROs,<br>selected countries                 |                      | As above   |
| 7. Extension of the activities to provinces and countries and identification of collaborating centres (TCDC)  |                         |  | HQ, ROs<br>countries |  |

<sup>1</sup> Linkages resulting in activities undertaken by two or more programmes are identified by \*. Those activities budgeted by two or more programmes are underlined.

## PROGRAMME MANAGEMENT AND RESOURCES

In the implementation of this programme a prominent role is to be played by nongovernmental organizations and regional offices and Member States. The nongovernmental organizations will provide the backbone of the programme and, as outlined extensively under the linkages, will provide technical expertise and know-how for the proper implementation. Regional offices will collaborate with Member States for the testing and implementation of appropriate techniques.

Specific management mechanisms have been developed for each of the components of the programme. For example, for the programme of radiological technology various task forces and working parties established by the International Society of Radiology, the International Society of Radiographers and Radiological Technicians, the International Commission on Radiological Protection, the International Commission of Radiation Units and Measurements, as well as a number of specialists at the country level, have agreed to cooperate actively in the implementation of the WHO programme in this field. Similarly, the International Federation of Clinical Chemistry, the International Society of Medical Technologists, the International Committee for Standardization in Haematology and many others are contributing to the implementation of the programme of the Health Laboratory Technology unit. Moreover, the clinical technology programme will base most of its activities on collaboration with nongovernmental organizations, as indicated under Section 9. Finally, encouragement will be given to the secondment of experts in various specific fields (primarily from developing countries) to developing countries where the need is greatest, and for varying lengths of time.

WHO's programme budget reached a level of US\$13.69 million in 1982-1983, of which extrabudgetary resources accounted for US\$5.25 million. It is anticipated that this budget level will be maintained during 1984-1989. It will continue to be necessary, as activities develop, to mobilize extrabudgetary resources from bilateral or multilateral donor agencies or from voluntary bodies or professional associations to support activities at the country level.

### 8. MONITORING, EVALUATION AND INDICATORS

Progress will be monitored for each of the components of the CLR technology programme.

#### 8.1 Clinical technology

(a) Overall progress will be monitored against specific target 4.2.1.

(b) As mentioned in Target 1, Activity 1(c), techniques for the evaluation of the programme at the country level as well as at the global level will be developed and their use promoted. Suitable indicators will be developed for the assessment of clinical performance in countries along the principles suggested in "Development of Indicators for Monitoring Progress Towards Health for All by the Year 2000" (Health for All Series, No. 4), paragraphs 89-94 inclusive. Examples of such specific indicators are tentatively:

- Number of health centres that have benefited from the first referral level.
- Hospitals at first referral level associated with institutions and/or medical schools.
- Length of time spent by students (in various disciplines) at the first referral level.
- Referrals to secondary and tertiary levels of health care.
- Resource outflow at the primary health care and first referral levels in proportion to urban hospitals.

## 8.2 Laboratory technology

(a) The progress of the medium-term programme will be based on the degree to which actual implementation complies with the targets specified;

(b) the efficiency and effectiveness of peripheral laboratories will be evaluated according to the indicators included in the protocol for field operational studies.

(c) Further to the evaluation methods mentioned above, the following indicators will be used to assess the impact:

- the number of major diseases detected through peripheral laboratories and the improvement achieved in disease surveillance and control;
- improvement of the quality of laboratory results assessed on the basis of variance index;
- the increase in the number of tests per in- and out-patient;
- improvement in laboratory management, which should result in a reduced risk of depletion of stocks of commonly used reagents, a decrease in the incidence of equipment breakdown, achievement of optimal number of tests per laboratory technician, etc., and consequently an increase in efficiency which may be expressed by the diminution in the cost of tests.

## 8.3 Radiological technology<sup>1</sup>

A number of direct indicators can be derived with the aim of evaluating the radiological technology programme. These are:

- (a) Indicators of coverage: the ratio of x-ray diagnostic machines, radiological personnel and radiodiagnostic procedures to population. For example, in developing countries at present 20-50 procedures/ 1000 population/year are performed with a range of 2-10 procedures: 1000/year in rural areas, and approximately 60-100 in urban areas. A change in these indicators, as well as in the ratio of machines/ population, would demonstrate a positive result of the programme.
- (b) Indicators of quality of the activity, which are usually more difficult to determine: these indicators can evaluate the number of countries and the number of facilities in each country where quality assurance programmes were applied, and the results of such programmes, e.g. decrease in the number of wasted procedures (procedures of non-diagnostic quality).
- (c) Indicators of efficacious and efficient utilization of radiological facilities, which constitute the final target of the programme, but are most difficult to determine, particularly in developing countries with inadequate records and lack of skilled manpower. Such indicators can be expressed in simple terms as number of procedures/machine/year, number of procedures/specialist/year, cost per procedure, or in more complex ways such as the number of procedures with a direct influence on the patient health outcome, the number of procedures which have altered the diagnostic and therapeutic decision, etc.

Evaluation of the total CLR technology programme against targets 4.1 and 4.2.1 will be carried out both at country and secretariat levels through regular reviews and appraisal of country information.

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<sup>1</sup> These indicators constitute a suggestion for consideration and adaptation for use at all levels.

## 9. LINKAGES

The CLR technology programme has evident linkages with PHC and other WHO programmes, including MCH, HME, EPI, EDV, and DPC. Other CLR components will provide technical and diagnostic support from the required laboratory and radiological tests. Strong links also exist between this programme and the Accident Prevention Programme. The CLR programme along with the RHB programme would collaborate with the Accident Prevention Programme, particularly in the management of road accidents and burn injuries and industrial and agricultural accidents.

The approach by WPC&Rs, regional offices and headquarters should be one of sharing a learning experience, and hence linkages are vital between the various programmes mentioned.

The nongovernmental organizations that would provide the backbone of the programme would include the International Federation of Surgical Colleges, International College of Surgeons, World Federation of Societies of Anaesthesiologists, International Federation for Medical and Biological Engineering, International Association of Accident and Traffic Medicine, International Society for Burn Injuries, International Diabetes Federation, International Federation of Gynecology and Obstetrics, International Hospital Federation, African Medical and Research Foundation, Christian Medical Commission, World Federation of Neurology, World Federation of Neurosurgical Societies, International Council of Nurses, International Paediatric Association, League of Red Cross Societies.

Professional organizations like the World Orthopaedic Concern, the International Society of Prosthetics and Orthotics, International Organization for Standardization, the Society of International Congress of Orthopaedic Surgeons and Traumatology have lent support to many developing countries in know-how and adaptable technology. The AHRTAG group in London, PATH in the United States, the European Federation of Medical Physics have their specific role in technology assessment in close collaboration with the EURO office. International organizations like UNIDO and IAEA, have shown interest in appropriate development of tools in the fields of manufacture of essential surgical equipment and tissue banking respectively. (A number of voluntary bodies like the Aga Khan Foundation - who were responsible for the conduct of the workshop on the Role of the First Referral Hospital in Primary Health Care - lend a valuable hand both in expertise and fiscal support).

The Federal Drug Administration of the United States (Medical Devices Division), the Medical Devices Programme of the Canadian Government, the EEC Centre in Holland for Technical Devices, the Danish Hospital Federation, and the United Kingdom Department of Defence have also shared their knowledge and skills in the field of transfer of relevant technology.

The Laboratory Technology programme contributes to the efficiency of programmes such as PHC, CDS and EHE by providing diagnostic capabilities with the coverage and quality appropriate to local needs, e.g. field testing facilities for the evaluation of health programmes such as quality assessment of drinking water, information for surveillance of communicable diseases. Linkages for appropriate technology are established with nongovernmental organizations such as the IFCC and bio-engineering institutions.

The Radiological Technology programme collaborates mainly with HMD, RPD, PHC and a large number of nongovernmental organizations as listed in Section 6.

ANNEX

AHRTAC Appropriate Health Resources Technology Assessment Group  
AMREF African Medical Research and Educational Foundation  
CDC Center for Disease Control  
CMC Christian Medical Commission  
DANIDA Danish International Development Agency  
EuFMP European Federation of Medical Physics  
IAEA International Atomic Energy Agency  
IAMLT International Association of Medical Laboratory Technologists  
IATM International Association of Traffic Medicine  
ICN International Council of Nurses  
ICRP International Commission on Radiation Protection  
ICRU International Commission on Radiations Units and Measurements  
ICS International College of Surgeons  
ICSH International Committee on Standardization in Haematology  
IDF International Diabetes Federation  
IFCC International Federation of Clinical Chemistry  
IFGO International Federation of Gynecology and Obstetrics  
IFMBE International Federation of Medical Bio-Engineers  
IFSC International Federation of Surgical Colleges  
IHF International Hospital Federation  
IOMP International Organization of Medical Physicists  
IPA International Paediatric Association  
ISBI International Society for Burn Injuries  
ISBT International Society of Blood Transfusion  
ISO International Organization for Standardization  
ISPO International Society of Prosthetics and Orthotics  
ISR International Society of Radiology  
ISRRT International Society of Radiographers and Radiological Technicians  
LRCS League of Red Cross Societies  
NCCLS National Committee on Clinical Laboratory Standards  
SICOT Society of International Congress of Orthopaedic Surgeons and Traumatology  
SSDL Secondary Standard Dosimetry Laboratory  
UNICEF United Nations International Childrens Emergency Fund  
UNIDO United Nations Industrial Development Organization  
WFN World Federation of Neurology  
WFNM World Federation of Nuclear Medicine  
WFNS World Federation of Neurosurgical Societies  
WFSA World Federation of Societies of Anaesthesiologists

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