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EXPANDED PROGRAMME ON IMMUNIZATION

GLOBAL OVERVIEW

ON

COMPUTERIZED EPI INFORMATION SYSTEM



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## A. INTRODUCTION

The EPI Information System was first computerized in 1984 in WHO Geneva on Lotus 123 to monitor, evaluate and report EPI activities. Until now, this system has remained in Lotus to accommodate requests at global level. In 1986, the South East Asian Regional Office took the initiative to computerize their existing manual immunization information system in Dbase and Lotus 123. The first computerized EPI Information System (CEIS) at Regional level was thus established. The CEIS at global level will be modified to accept data from Regions by the end of 1989.

As of April 1989, the CEIS has been installed in 5 WHO Regional Offices and in 18 developing countries. Six other countries have planned installations for 1989 and it is probable that the 25 most populous countries would have the CEIS by the end of this year if resources are available. In Indonesia, this system has also been installed at provincial levels in West Java. In India, it will be installed in the North Arcot district in Vellore. The information below shows the targeted countries for the CEIS and in bold, those countries which have already installed the CEIS.

**AFRO:** Algeria, Burundi, Congo, Ethiopia, Kenya, Nigeria, Senegal, South Africa, Tanzania, Zaire, Zimbabwe

**AMRO:** Argentina, Brazil, Colombia, Mexico

**EMRO:** Egypt, Iran, Morocco, Pakistan, Sudan, Tunisia.

**EURO:** Czechoslovakia, Turkey,

**SEARO:** Bangladesh, Burma, India, Indonesia, Nepal, Thailand, West Java (Province of Indonesia).

**WPRO:** China, Korea, Malaysia, Papua New Guinea, Philippines, Viet Nam,

Regional and country installations have been undertaken by 2 groups of consultants, REACH and Data Transport Systems (DTS). REACH has supported installations in the South East Asian Region and DTS has installed in the African, American, Eastern Mediterranean and Western Pacific Regions.

The CEIS is also being supported by international agencies outside WHO such as UNICEF, Save the Children's Fund, UK (SCF), USAID (both through REACH and, in Africa, the Combatting Childhood Communicable Diseases project (CCCD)) and the Organisation de Coordination et de Cooperation pour la lutte contre les Grandes Endemies (OCCGE) in West Africa. Close cooperation and coordination through WHO among these agencies ensures the compatible use of a single monitoring system and the prevention of duplicate installations or incompatible systems.

## B. PROPOSED STRATEGIES FOR 1989/90

(1) Continue and accelerate country installations in the 25 most populous countries.

Rapid growth for the CEIS in terms of expanded use and improved technologies are planned for this year. Two critical factors which affect the success of an information system are compatibility and an interested user/manager. Country installations will continue when requested by the Ministries of Health. It should be stressed to national managers that major augmentation from the basic programme is not recommended for the first installation which should be simple and easy to use. Excessive and detailed recording leading to extensive reports and graphs should be discouraged at this stage.

At present, the inhibiting factors of expansion are lack of hardware and manpower. Funding for computer hardware in developing countries is a critical problem. All countries have some form of a disease reporting system. However, the analysis and evaluation of the data collected is restricted partly by the lack of skilled people to make the evaluation and partly by the lack of computer facilities available for this task.

If resources are unavailable in the 25 most populous countries, these countries will be encouraged to seek aid through various donors. WHO Regional Offices are being encouraged to offer support to major countries to install the CEIS for more effective monitoring and surveillance especially in the context of the global eradication of polio. The African Regional Office has already informed countries in their Region to approach donors through their regular channels. EPI Geneva will also try to solicit extrabudgetary funds for them to the extent possible and this issue should be discussed at the 1989 Global Advisory Group meeting in Japan.

**(2) Continue and accelerate installations at provincial levels in the most populous countries.**

A computerized information system at provincial level can help rapid feedback and enhances motivation. The success of any information system is heavily dependent on feedback of the data collected, which ideally provides incentives for providing accurate, up-to-date data.

WHO and Regional Offices need to identify countries where the possibility exists for CEIS at provincial level such as, Bangladesh, Brazil, China, India, Indonesia, Mexico, Nigeria, Pakistan, Philippines, Viet Nam, etc. The experience of West Java is needed for this expansion. Support by country level for provinces is of utmost importance. The focal persons at country level have to be able to support their provincial counterparts technically and administratively. This support should be in the form of regular communication exchange and technical expertise provided from country level to the provinces.

At provincial level, the key person is the health worker who collects and records the data. If this person does not receive immediate feedback on how the information he has transmitted has been used, his motivation will be diminished and the quality of subsequent information will be poor.

**(3) Plan for follow up visits by consultants to refine and augment CEIS.**

Users are advised to use the CEIS for a few months after installation before further requests are made for refinement and augmentation. The potential to expand the CEIS is practically unlimited but it is crucial to limit the system to include only the most useful indicators.

During follow up visits, screen formats can be refined, report formats can be expanded and graphics can be improved. New modules can be added and other sections of the CEIS can be enlarged. It should be stressed that source codes should be available to countries to allow them to modify their own programmes. Countries which modify their programmes should be warned against changing the file structure. Compatibility of file structures enables the possibility of future electronic data transfer.

In the longer term future, by the end of 1989, modification and augmentation may be simplified through the use of a "tool kit" or immunization language. A tool kit would be a programme containing parameter files which would allow faster and simpler modification of software to country needs. Modifications would be standardized and duplicate programming would be avoided.

A separate and more ambitious step would be to develop an immunization language to simplify modifications to the CEIS. This would involve extensive and expensive programming to create a sub-set of programmes. These issues will be further explored.

**(3a) Introduce compiled and runtime versions of CEIS to speed access and data analysis.**

During follow-up visits, the CEIS can be compiled for faster access and data manipulation. Users would be encouraged to upgrade to Dbase IV if it has its own compiler or purchase Foxbase or Clipper which are recommended WHO standards for compilers. It is noted that the West Java CEIS is compiled with Foxbase and if this is found to be successful, this experience should be shared. Regional Offices and countries that have a large database system with extensive report formats are advised to use a compiled version. DTS consultants should have user's knowledge of these compilers and will maintain knowledge on compilers for EPI.

**(4) Provide training and recommendations on technical support.**

The development of the CEIS requires training. Users often require the latest equipment and this needs technical support and retraining. Much thought has been put in to create a user friendly system that requires minimal training. However as users become more sophisticated, short cuts (bypassing menus) are often sought which requires a change in the programme. A more sophisticated programme can be maintained if staff turnover is low and the person working with the system is well trained. Training of local operators and strong technical support are critical factors at country level.

Training issues should also consider the management aspect of an information system. A wide array of issues must be addressed such as:

- specifying the purpose and objectives of an information system at country and provincial levels; it is important for countries to recognize the need for improved data systems for effective management decisions.
- understanding the organizational issues that will have to be resolved, as a result of introducing an information system, including managerial and administrative changes needed to support the effective operation of the system;
- defining the most useful indicators of programme effectiveness and efficiency including specific age groups and vaccine dosage, and the procedures for generating and reporting regularly on such indicators;
- specifying reporting requirements and procedures for generating and using processed data that health staff can understand and interpret;
- clarifying the national immunization programmes' capacity to absorb technological innovations; and
- determining personnel requirements for operating and utilizing an information system and microcomputer equipment, including experience, training, supervision and incentives.

DTS and EPI will have reciprocal exchange on new technologies. EPI Geneva will encourage the use of tested hardware to enhance computer equipment. Turbo cards should be installed in XT's to speed up disk operation and hard disk expansion cards should also be used.

A CEIS Update is planned to be produced from Geneva to inform users of new modules in the CEIS, outstanding formats or graphics, tips, hardware enhancements or software upgrades.

Discussions of CEIS at EPI Regional Manager's meetings will also be noted and shared among users. Extended use of electronic mail and data transfer through UNICEF's UNET will be made. DTS is exploring the feasibility of this telecommunication facility. A list of user's addresses will be compiled in EPI Geneva. All users from Regions, countries and agencies should send information on improvements, amendments, etc to EPI Geneva where it will be co-ordinated and shared.

A user's manual will be available for Regions and countries. This will differ from a technical manual. Parts of the EPI user's manual will be compatible with REACH's user's manual.

A French version of the CEIS exists for Zaire. This version could be customized for other Francophone countries. French user and technical manuals would eventually be produced if the demand exists.

**(5) Maintain close liaison and co-ordination with REACH, Rotary International, SCF, UNICEF, and other agencies on changes and upgrades.**

One of the goals of EPI is to establish a global standard of the CEIS with SCF, REACH, UNICEF etc, for the collection and transfer of immunization data. To date, REACH and UNICEF have worked closely with WHO on establishing this global standard. REACH has installed the SEARO system in 5 South East Asian countries and 2 provinces. UNICEF has their information system on INFORMIX software but has worked closely with DTS consultants to transfer this to the WHO Dbase format. UNICEF Nigeria and Sudan will have the WHO Dbase format this year and UNICEF is supportive in encouraging their field offices to install the CEIS in its standard form.

EPI keeps external agencies up to date with changes in the CEIS and upgrades of software used. Modifications, augmentations and improvements on the CEIS are shared with them. However, WHO also needs the reciprocal effort from these agencies as well to be kept informed of their modifications and innovations. Agencies should be responsible for informing EPI on any system changes especially enhancements and improvements.

**(6) Expand CEIS to merge with other EPI software (EPIC, COSAS, EPICost, and the Polio surveillance programme from PAHO).**

EPI should have a user friendly interface or shell to access all EPI software easily. Hence the main menu would give a selection of CEIS, EPIC, COSAS, EPICost and Polio surveillance programmes for users to access. Merging these programmes is feasible as they are all on Dbase or Lotus 123. These programmes could also share a common database file such demographic data or location names, etc. Extensive programming should not be done to achieve this.

Considerations should be made to link the CEIS at national level with information systems of other WHO programmes such as the Global Programme on AIDS (GPA), Control of Diarrhoeal Diseases (CDD), and the Maternal and Child Health Programme (MCH). These WHO programmes would share a common database using the same demographic data, for example, which would mean one data source for denominators. This system will be actively promoted in 1989.

(7) Develop, where feasible, electronic data transfer through regular telecommunications networks.

EPI recommends that UNICEF's UNET should be used to the extent possible. It is a large and established network where critical organizations and persons already have a mail box. This is a field of enormous potential for the electronic transfer of data and information. DTS is working on electronic data transfer using TYMNET to send data from Manila to Geneva and from New York to Geneva. TYMNET, TELENET, and DIALCOM are the carriers which could be used to access UNET. Once the electronic network is established for the CEIS, training of users will have to be planned by EPI in co-operation with Regions and countries. The first priority of electronic linkage would be to the Regional Offices. The WHO Local Area Network (LAN) already has access to AMRO and EURO. This potential has to be further explored before we commence on the second phase of linking electronically with countries.

(8) Establish methods for funding hardware and installations by donors.

The funding of hardware to countries is a critical problem. Installation costs are also beginning to be a problem. Past experience shows that each country installation costs \$2000 and a basic configuration of hardware costs \$2600. EPI managers wishing to have the CEIS should be encouraged to approach donors through the regular channels in their own countries. Donors attending the EPI Global Advisory Group meetings should be specifically approached on the explicit needs of this area. A computerized information system could provide better information to donors and a donor's module could be included into CEIS to produce reports.

Other WHO programmes should be approached to "share" both hardware and software in the countries. Programmes with intensive monitoring priorities such as the Global Programme on Aids or the Diarrheal Disease Programme which also have their own computerized information system may be possibilities to be considered. This same concept should apply also to other agencies such as SCF, UNICEF, Rotary, etc.

### C. CONCLUSION

It is proposed that there should be an annual meeting of selected computer users and programmers to advise on the further development of the CEIS. These meetings may be combined with the annual EPI Global Advisory Group meeting or the 6 monthly meeting of the EPI Research and Development Group. Regional Manager's meetings in some regions already include the CEIS in its agenda. Efforts will be continued to install the software at country level and to maintain standardized systems sufficiently to promote the free exchange of data among local, country, regional and global levels and among various international agencies (including WHO and UNICEF).

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