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COMPUTERIZED DRUG SUPPLY SYSTEM

CYPRUS

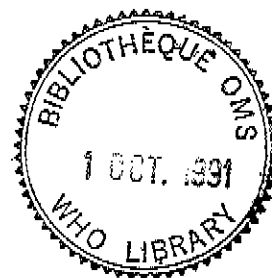
History and present situation



Dr Hans V. Hogerzeil

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World Health Organization
Action Programme on Essential Drugs



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List of abbreviations

CAS	Chemical Abstract System
CIF	Cost, Insurance, Freight
CMS	Central Medical Stores
CYPDIS	Cyprus Drug Information System
DAP	Drug Action Programme
DOD	Department Of Drugs
DPS	Drug Procurement System
DRA	Drug Registration Authority
EMRO	Eastern Mediterranean Regional Office
FOB	Free On Board
ICS	Inventory Control System
INN	International Non-proprietary Names
MOH	Ministry of Health
PC	Personal Computer
PTS	Pharmaceutical, Therapeutic and Diagnostic Substances
RB	Regular Budget
RD	Regional Director
SDC	SWEDIS Development Centre
SWEDIS	Swedish Drug Information System
TA	Temporary Adviser
WHO	World Health Organisation

EXECUTIVE SUMMARY

From 14 to 19 June 1991 Dr H.V.Hogerzeil (WHO/DAP) visited Cyprus to review and describe the computerized drug supply system that has been developed since 1986 in close collaboration between WHO/EMRO, the Pharmaceutical Department of the Ministry of Health, and the Department of Drugs (DOD) of the Ministry of Health and Social Welfare in Sweden (since July 1990 privatised as the SWEDIS Development Centre AB).

The comprehensive system in Cyprus includes software for the registration department (CYPDIS/DRA), drug procurement and tendering (CYPDIS/DPS) and for inventory control in the central medical stores (CYPDIS/ICS). The system was originally installed on four personal computers, but was transferred to a Microvax mini-computer with twelve terminals in April 1990.

The registration system in Cyprus was, after Gambia, the second of its kind in a developing country and its development was partly experimental. Several additions and simplifications have made the software more practical and user-friendly. There have been very few technical problems and the transfer to the Microvax was done without any problem. The staff is now fully competent and confident with the system. At present about 5000 drugs have been entered, with another 1500 (registered between 1972 and 1982) still to be done.

The main bottleneck has been the data entry, which proved to be a gigantic task. Part of the problem lies in the fact that both the INN and the CAS system are not complete, and that several active ingredients do not figure in either system. Another complicating factor is that all non-active ingredients are registered as well; the nomenclature of these ingredients and substances is not always standardised either and has sometimes to be verified from the literature before data can be entered.

The drug procurement system was the first of its kind and its development was completely experimental. Several additions and improvements were made; these changes mainly related to a better format of the reports, and making the programme more user-friendly.

Since October 1988 the system has been fully operational. It has greatly increased the speed, reliability and systematical administration of the governmental drug tenders and has resulted in a permanent saving of 1.5 secretaries. There are no technical or managerial problems with the system, which also runs on the Microvax.

The inventory control system was initially one of the first such systems specifically developed for drug storage. In the course of its development the DOD gained more experience with countries other than Cyprus. The system could not operate on a PC and this was the main reason why it was transferred to a multi-user (Microvax) system in April 1990.

After an initial period of about one year with several bugs and adaptations the system has been fully operational since 1990 for all 1300 drug items in CMS. It operates with nine terminals, plus three in the Ministry of Health for the registration system, the drug procurement system and for general management. There is a great potential for further extension with the 5000 non-drug items in CMS; this is mainly dependent on

standardisation and classification of these items before they can be entered into the system. It is expected that the manual system will be stopped by the end of 1991.

The computerized inventory control system is much easier to operate than the manual system, and produces many managerial and statistical reports which could not be produced by the manual system. Reports on stock level, outstanding orders, drugs close to expiry, non-moving items, estimated annual turnover and historical data on prices and drug consumption have been integrated in the stock management operations of CMS and have greatly improved their performance.

With an annual CMS budget of about \$ 15 million for drugs alone, every one percent savings in better procurement and stock management implies an annual saving of \$ 150,000. This means that one percent savings in one year have paid for the full development and installation of the ICS system. The (optional) annual maintenance fee for hardware and software amounts to about 0.1% of the annual drug budget.

INTRODUCTION AND TERMS OF REFERENCE

From 14 to 19 June 1991 Dr H.V.Hogerzeil (WHO/DAP) visited Cyprus to review and describe the computerized drug supply system that has been developed since 1986 in close collaboration between WHO/EMRO, the Pharmaceutical Department of the Ministry of Health, and the SWEDIS Development Centre (SDC) within the Department of Drugs of the Ministry of Health and Social Welfare in Uppsala, Sweden (since 1990 privatised as SWEDIS Development Centre AB).

The comprehensive system includes software for the registration department (CYPDIS/DRA), for drug procurement and tendering (CYPDIS/DPS) and for inventory control in the central medical stores (CYPDIS/ICS). The system was originally installed on four personal computers, but has been operating since April 1990 on a Microvax minicomputer with twelve terminals. Each of the three systems is described separately.

DRUG REGISTRATION SYSTEM (CYPDIS/DRA)

Development of the system

The registration system that was developed for Cyprus was the second of its kind in developing countries (after the system in Gambia) and its development was partly experimental. From the start it was intended that both WHO and the SDC would learn from this experience, and part of the costs were invested with the aim to develop a system that could afterwards be used in other countries.

During the first visit to Cyprus in June 1987 (see Annex 1 for chronology of events) an analysis of the administrative system was made by P. Manell and H. Mandahl of the Department of Drugs, in the capacity of WHO temporary advisers, together with Dr H.V.Hogerzeil of WHO/EMRO. Before their recruitment for this assignment WHO/EMRO had already made the principal decision that SDC would be requested to prepare the software specifically adapted to the situation in Cyprus. The visit therefore mainly served to make an inventory of the requirements of the system, as the basis for programme development.

Two staff members from the MOH were trained in the use of the DRA system in Uppsala in November 1987 (Koupepides and Liassidou), and the system was installed on an IBM/PC/AT in the MOH in January 1988. Mr Koupepides was in charge of data entry.

Data entry proved to be very tedious and time-consuming, mainly because Mr Koupepides remained responsible for his regular duties and because the retrieval of the necessary data from the registration files took much time. In October 1988 still only about 50 drugs had been entered and the system was not really used. There were no complaints or problems with the software.

In October 1988 a second pharmacist and an operator/secretary were added to the staff, and data entry was pursued with much more vigour. By March 1989 several thousands of drugs had been entered with all their active and inactive ingredients. Originally drugs were entered starting with 1970 (the beginning of the drug registration system in Cyprus), but after the data entry for 1970 and 1971 had been completed it was decided to start with all new registrations and work backwards.

In April 1990 the DRA system was transferred to the Microvax minicomputer in CMS. This implied that more than one PC or terminal became available. Connections were made through a modem and local telephone lines. Initially there was a technical problem with this connection because the PC's were situated at more than 15 meter distance from the modem, but this was solved by some additional equipment which was purchased and installed by the MOH.

During the developmental phase some additions and simplifications were made, which were not typical for the situation in Cyprus and which have basically improved the system. An example of such a change is the inclusion of the weight rather than concentration in the substance file; this reduces considerably the amount of typing required.

Table 1
Development costs for WHO (Jan.87 to June 91)

Situation analysis (2 WHO/TA's for 1 week; shared) *	\$ 2,250
Initial hardware (1 IBM/AT) plus basic software	\$ 12,500
Contract 21.12.87 for software development	\$ 9,000
maintenance/updates for 2 years	\$ 2,700
training costs Uppsala/Cyprus	\$ 1,300
Training two staff members in Uppsala (2 fellowships, 4 weeks)	\$ 8,000
Installation and local training (2 WHO/TA's for 1 week)	\$ 3,500
Follow-up visit (1 WHO/TA for 1 week)	\$ 2,250
Total cost registration system	\$ 41,500

* One visit for the three systems

NB: Since December 1989 (after two years) no other fees have been paid for maintenance and updates. Not included in this costing are the extra visits, paid for by SDC, that took place in June 1988 and August 1988. In April 1990 the system was transferred to a Microvax minicomputer; this was strictly speaking not necessary for the registration system. The costs of this transfer are therefore included in the development of the inventory control system.

Present situation

At present approximately 5000 drugs have been entered into the system, and only about 1500 drugs that were registered between 1972 and 1982 remain to be entered. This implies, of course, that any report from the system can only be 80% complete. The process of data-entry seems to have come to a temporary stand-still because of the many other duties of the staff in the department, and because the work is tedious and boring. However, with a little extra assistance it is estimated that these 1500 drugs can all be entered before the end of the year. An interim solution could be to enter data on active ingredients only, and add the non-active ingredients in a later stage.

The average number of new registrations is about 600 per year, plus 1000-1300 renewals. The summary form for registration is given in Annex 2 and 3. This information is used to prepare the computer data entry form (Annex 4) which is identical to the computer data entry screen.

The main reports presently generated by the system are:

- 1 Whether a drug is registered or not, with all drug data
- 2 Which drugs in a specific therapeutic group are registered
- 3 Which drugs with a specific (in)active ingredient are registered

Examples of such reports are: a list of all insulins registered in Cyprus (Annex 5) and a list of all eye preparations containing chloramphenicol (recently it was decided that these preparations should carry a warning, and all agents received a letter to that effect).

As soon as the data entry is completed, a list of all drugs registered in Cyprus will be prepared and disseminated. Later drug information will be included in the system, and a national formulary will be produced.

Summary

The registration system in Cyprus was, after The Gambia, the second in its kind in a developing country and its development was partly experimental. Several additions and simplifications have made the software more practical and user-friendly. There have been very few technical problems with the software and the transfer to the Microvax was done without any problem. The staff is fully competent and confident with the system.

The main bottleneck has been the data entry, which proved to be a gigantic task. Part of the problem lies in the fact that both the INN and the CAS system are not complete, and that several active ingredients do not figure in either system. Another complicating factor is that all non-active ingredients are registered as well; the nomenclature of these ingredients and substances is not always standardised either and has sometimes to be verified from the literature before data can be entered.

DRUG PROCUREMENT SYSTEM (CYPDIS/DPS)

Development of the system

The drug procurement system in Cyprus (Cyprus-DPS) is the first of its kind and its development was requested by the MOH in view of the enormous administrative work that was involved in the many drug tenders that were executed every year. As with the registration system, it was agreed from the start that its development would be a joint WHO/MOH/SDC exercise in which all parties would learn from the experience, and after which a standard software package for drug procurement would become available.

During the first visit to Cyprus in June 1987 (see Annex 1 for chronology of events) an analysis of the administrative system was made by P. Manelli and H. Mandahl of the Department of Drugs, in the capacity of WHO temporary advisers, together with Dr H.V. Hogerzeil of WHO/EMRO. The visit therefore mainly served to make an inventory of the requirements of the system, as the basis for programme development and adaptation.

The first version of the DPS software became available in the spring of 1988, and Ms Cleo Liassidou was trained in its use in Uppsala in April 1988. In June 1988 the system was installed on an IBM/XT at the MOH and additional local training was given.

Table 2
Development costs for WHO (Jan.87 to June 91)

Situation analysis (2 WHO/TA's for 1 week; (shared)*	\$ 2,250
Initial hardware (1 IBM/XT)	\$ 12,500
Contract 21.6.88 for software development	\$ 9,000
maintenance/updates for 2 years	\$ 2,700
Training one staff member in Uppsala (fellowship 4 weeks)	\$ 4,000
Installation and local training (1 WHO/TA for 1 week)	\$ 2,250
Total cost drug procurement system	\$ 32,700

* One visit for the three systems

NB: Since June 1990 (after two years) no other fees have been paid for maintenance and updates. Not included in this costing is the extra visit in August 1988 that was paid for by SDC. In April 1990 the system was transferred to a Microvax minicomputer; this was strictly speaking not necessary for the procurement system. The costs of this transfer are therefore included in the development of the inventory control system.

In October 1988 the DPS system was operational in a crude form, and a first tender of about 50 drugs was performed. However, many discussions then followed between the MOH and SDC. These discussions concentrated on the lay-out of the printed reports, which initially was not very attractive and not reader-friendly (see Annex 6). Ms Liassidou insisted on an improved format in landscape orientation (130 column), which was finally included in the system (see Annex 7) and has greatly improved the quality of the output.

In April 1990 the DPS was transferred to the Microvax system in the Central Medical Stores. Connections are made through a modem and local telephone lines. Initially there was a technical problem with this connection because the PC's were situated at more than 15 meter distance from the modem, but this was solved by some additional equipment which was purchased and installed by the MOH.

Present situation

Since October 1988 all drug tenders have been executed by the DPS. In summary, the system operates as follows. First, a list of drugs and quantities that have to be tendered for is submitted by the Central Medical Stores. This list is entered into the system by the pharmacist Ms Liassidou herself. During data entry she can draw on the drug file, generic file, suppliers table and all other drug information that is already stored in the system; in practice she only has to type the first four characters of any product and choose between the alternatives presented by the system, indicating dosage form, pack size etc. She can also enter any additional specification, e.g. required shelf life.

All this information is combined into the "specifications table". This table lists the drugs in the tender in such a way that the report can be printed and sent to the prospective tenderers; they can write their offer in an open column on the same form and return it as a quotation.

After opening of the tender the pharmacist enters all offers into the procurement table of the system, indicating CIF or FOB price, currency, shelflife and any other specifications or remarks. The currency exchange rates are updated in a separate table. Then all offers are compared and printed on the "evaluation table" - this was the report whose format was subject to many discussions. An example is given in Annex 7.

In this evaluation table the original tender is presented in the same order, indicating for each drug the various offers in ascending order of price. For each offer the manufacturer, the agent, the original price and currency, the price in Cyprus pounds, the sample, the registration number and any remarks are printed. The system flags, upon request, the lowest offer within the specifications (looking at registration in Cyprus, shelf life, packsize, etc).

This table is the basis for the recommendation from the MOH to the Tender Board, and is attached to it for reference. In case preference is given to an offer which is not the lowest, an explanation is added.

The Tender Board reviews the evaluation table and the recommendations by the MOH, and makes the final decision. The pharmacist then enters these procurement decisions into the system by marking, for each selected offer, "Yes" in the table. The provisional list of positive decisions can then be printed and submitted to the Central Medical Stores to verify the quantities (the tender conditions include a plus or minus

30% of the quantity). When the CMS has confirmed or changed the quantities the final results are printed by the system. Upgrading of the system will allow for the retrieval of previous year's prices.

The final output includes a summary table of the awards (see Annex 8) which is used to inform the tenderers, the Chamber of Commerce, the Ministry of Finance, the CMS etc, and individual letters to each of successful tenderers. These letters include the awarded drugs and the quantity, and any standard or additional conditions of the delivery contract (see Annex 9).

The DPS system has resulted in a considerable reduction in time and administrative support needed for government drug tenders. Previously, tenders would include 50 items at most, and each tender would mean at least 6-10 weeks work for two secretaries. The last tender included 229 drug products and was executed within 4 weeks without any secretary at all. The computer system has made 1.5 secretarial position available for other tasks, which is, in financial terms, a large saving for the department apart from reduced delays in time and better administrative follow-up.

Summary

The drug procurement system in Cyprus was the first of its kind and its development was completely experimental. Several additions and improvements were made in the course of its development; these changes mainly related to a better format of the reports, and making the programme more user-friendly.

As from October 1988 the system has been fully operational. It has greatly increased the speed, reliability and systematic administration of the government drug tenders and has resulted in a permanent saving of 1.5 secretaries. There are no technical or managerial problems with the system, which is now linked to the Microvax used for inventory control and drug registration.

INVENTORY CONTROL SYSTEM (CYPDIS/ICS)

Development of the system

The inventory control system for the Central Medical Stores (CMS) was probably the first inventory control system that was specifically developed for pharmaceuticals, with the intention to make it available to other countries. The SDC within the Department of Drugs of the Ministry of Health and Welfare in Sweden had some experience with such systems, and it was decided that SDC, MOH and WHO would collaborate, in Cyprus, in the development of a simple system that could later also be used in other countries.

In 1986 the MOH had already requested support from WHO/EMRO in the computerization of the pharmaceutical department, including the CMS, and in June 1986 ISS staff from WHO/EMRO visited the country to make an analysis and recommend the selection of hardware and software. As a result of this visit, a total of 6 IBM XT's and AT's were supplied by WHO/EMRO, with the basic software (dBase, Lotus, Samna, etc) for several functions that needed to be computerized: registration, pricing, hospital pharmacy in the teaching hospital, etc. It was intended that three computers would be used for the CMS, and three copies of a commercial software package for inventory control ("Stock control" by COMPAQ/UK, for about \$ 400 each) were also supplied. IBM networking software, intended to link the PC's, was also included.

Early in 1987 the computers were installed and the inventory software was tried, but it proved to be inadequate for the purpose. It was not made for the administration of drugs, and it did not include any provision for batch numbers, expiry dates etc. Moreover, it could not be adapted and the capacity was much too small. Finally, one copy was kept for general training purposes and two copies were returned to WHO/EMRO. The IBM network software never worked. At this stage further technical support was requested from the PTS unit in WHO/EMRO.

During a visit to Cyprus in June 1987 (see Annex 1 for chronology of events) an analysis of the administrative system was made by P. Manell and H. Mandahl of the Department of Drugs, in the capacity of WHO temporary advisers, together with Dr H.V. Hogerzeil of WHO/EMRO. Before their recruitment for this assignment WHO/EMRO had already made the principal decision that the SDC would be requested to prepare the software specifically adapted to the situation in Cyprus. The visit therefore mainly served to make an inventory of the requirements of the system, as the basis for programme development.

The mission concluded that for the complicated operations of CMS, involving several different stores and departments, a multi-user mini-computer system was to be preferred. However, as the six PC's had already been supplied by ISS/EMRO and as WHO had specifically requested the development of a system within the existing hardware, it was agreed, in discussion with the Director of Pharmaceutical Services, Mr Kkolos, that the system to be developed should be an IBM PC/AT enhanced version with a XENIX Operating System allowing multi-user capability.

The ICS system was developed in the second half of 1987 and one staff member (pharmacist Andreas Manolis) was trained in its use in Uppsala in November 1987. In

January 1988 the system was installed on one IBM/AT and one IBM/XT in the CMS and data entry (supplier file, drug file, package file, etc) was started.

The first category for which the inventory control was computerized was that of the antibiotics; this was done as a shadow system together with the normal tally cards that were maintained. The other computer was used to enter more product specifications in the various files.

After about 100 antibiotics and their stock movements had been entered, the system became very slow and it became obvious that the RAM and disk space of the computer were insufficient. At the same time some bugs were discovered in the system. During visits by B.Dagerus in June 1988, August 1988 and June 1989 several changes and additions were made to the programme in an atmosphere of increasing resistance by some staff of the CMS. By March 1989 all 1300 drug items were entered into the system (although not their stock movements) and it became obvious that more powerful hardware would be needed.

In July 1989 the MOH requested WHO/EMRO to supply a Microvax minicomputer, for the comprehensive computer system (including the ICS, DRA and DPS systems). After extensive discussions between WHO/EMRO, SDC and MOH it was agreed in October 1989 that WHO/EMRO would approve, from RB and RD's funds, the local purchase of a Microvax 3300 system with eight terminals, to which the six existing PC's could also be connected as PC/terminals.

In December 1989 B. Dagerus visited Cyprus again to prepare the various programmes for the transfer to the Microvax system. The hardware was delivered to CMS in January 1990 and the three software programmes were installed by B. Dagerus in April 1990. From that moment the inventory data and stock movements of all 1300 drugs were entered on the system.

As soon as the new multi-user system was used for all drug stock movements a number of bugs became apparent, e.g. calculating mistakes in stock levels or statistics. Also the need for more reports was expressed, which, during additional visits in June and December 1990, were added to the menu. Unfortunately, after December 1990 a few calculating errors persisted in the historical records and annual statistics, and therefore the Auditor-General did not allow the shadow manual system to be stopped. He also requested that an additional facility be included, by which, for every mutation or activity in the system, an automatic record is kept, indicating which staff member made the mutation so that, if needed, administrative action could be taken against the one responsible.

In looking back we can estimate that about half of the software problems relate to real bugs, i.e. programming errors resulting in calculating mistakes, deleted lines in reports, etc.. About one third of the changes reflect an additional, but real practical need which became only apparent after the system was used. Most of these were additional reports or statistics. Examples are: the inventory report (presenting drug name, stocklevel, annual consumption over the last three years, outstanding orders); the tally card report (per drug a complete chronological record of stock movements, which is essential when the computer system is run parallel to the manual system); expiry statistics; list of transactions plus operator identification; budget report.

Less than 20% of the changes refer to situations or demands that are specific for the administrative system in Cyprus. An example is a cross-reference with the (manual) files of incoming goods and outstanding orders.

Table 3
Development costs for WHO (Jan.87 to June 91)

Initial hardware (1 IBM/AT, 1 IBM/XT, standard software)	\$ 24.000
Situation analysis (2 WHO/TA's for 1 week; (shared))*	\$ 2.250
Contract 21.12.87 for software development	\$ 9.000
maintenance/updates for 2 years	\$ 2.700
training costs Uppsala	\$ 1.300
Training one staff member in Uppsala (1 fellowship, 4 weeks)	\$ 4.000
Installation and local training (2 WHO/TA's for 1 week; shared)	\$ 3.500
Follow-up visit (1 WHO/TA for 1 week)	\$ 2.250
Definitive hardware (Microvax 3300 and 8 extra terminals)	\$ 70.000
 Total cost inventory control system	 \$ 119.000

* One visit for the three systems

NB: Since December 1989 (after two years) no other fees have been paid for maintenance and updates. Not included in this costing are the extra visits, paid for by the SDC, that took place in August 1988, June 1989, November 1989, April 1990, June 1990, December 1990 and March 1991. Not included are the \$ 5000 initial payment for the MIMER license for the Microvax, paid for by the SDC.

In looking at Table 3 it should be noted that WHO spent \$ 84.000 (70%) on hardware, \$ 11.700 (10%) on software development, \$ 8000 (7%) on travel for situation analysis and installation and \$ 5.300 (4%) on training.

Present situation

At present the system is fully operational for all 1300 drugs in CMS. It is not yet used for the 5000 non-drug items that are also stocked in CMS, but the specifications of about half of these are already entered into the system. This is extremely tedious and boring work; moreover, it also implies that the range of stock items be reviewed, reduced and standardised at the same time. The items that are left are those that are notoriously difficult to standardise: surgical instruments, spare parts for medical equipment, etc.

In summary, the system works as follows. When a requisition form is received from one of the hospitals or health centres, it is first entered into the system by one of the secretarial staff, with name of institution, date and requisition number. In practice this means that the staff member only has to type the first few letters of the name of the institution, and then indicates one of the alternatives presented by the system. About 30 requisitions are received each day.

The requisition is then passed on to one of the three medicine stores for further action. Each of the three stores is managed by a pharmacist, and each pharmacist has a terminal. Upon receipt of the requisition (s)he opens the requisition file from the system and starts entering the drugs requested, with the quantities. In practice, for each drug (s)he enters only the first few characters and then chooses from the alternatives the correct drug, dosage form and pack size. This means that the names, dosage forms and pack sizes do not have to be typed. Delivery can also be entered.

As soon as the drug is entered plus the quantity that was requested, the system indicates on the screen the present stock level (in total number of units and in pack size; both working stock and bulk stock; the requested pack size and any other pack size of the same drug) and the location. The storekeeper then decides how much (s)he will allocate, and types the quantity to be issued.

After this has been done for all drugs on the requisition, the system prints a picking list and an invoice for this requisition. The picking list is printed in the order of the physical location of the stock. These two papers are added to the requisition form. The goods are picked by the assistant in the order indicated on the picking list (at the same time the tally cards for the shadow system are adapted). After the pharmacist has verified the goods with the picking list the goods are packed and dispatched; the invoice is sent to the client together with a copy of the requisition.

The capacity of the system is potentially very large. The Microvax has a harddisk capacity of 300 MB, of which about 240 MB are utilized at present. Much of this memory is filled with the three years of stock transactions. For the future there are two possibilities. One is to store historical data from more than three years ago on a tapestreamer, and relieve the system. The other alternative is to procure an additional harddisk. Both solutions are very easy and relatively cheap.

Statistics and records

The number of standardised statistics and records that can be produced by the system is large, and a selection of the most important outputs is given in Table 4, together with their most important administrative use. Apart from these standardised records, which are available through the system menu, any other information or selected records can be produced by using the query language.

In addition to the standardised reports and statistics that can be produced by the system, one of the original PC's in the CMS, which is connected as a terminal, is used by the CMS management to down-load data from the ICS system and present them into separate reports, using commercial spreadsheet and graphics software. Examples are the analysis of drug expenditure in 20 health centres (see Annex 16) or annual deliveries to Ormidia Health Centre (see Annex 17).

Maintenance costs

The (optional) annual maintenance contract for the Microvax system amounts to 20% of the purchase price, i.e. about \$ 12.000 per year. The maintenance fee for the three SWEDIS software packages is \$ 4800 per year. This is optional, as there is no obligatory licensing fee. Both for the hardware and the software the Ministry of Health has decided to fund the maintenance contract from their own budget.

Back-up routines

Every day a back-up for all three systems (DRA, DPS and ICS) is made from the VAX computer to a tape streamer.

Table 4
Most important records and statistics produced by the Cyprus-ICS system

<i>Incoming goods</i>	Lists all incoming goods with quantities and prices. Used for financial management and annual statistics.
<i>Outstanding orders</i>	List of outstanding orders, indicating quantities, price, present stock, expected date of delivery, marking any orders that are overdue. Used by the procurement department to send reminders to suppliers.
<i>Stock level</i>	Stock level for any number of items, marking items below re-order level, items below safety level, items near maximum level, and outstanding order quantities. Used by the procurement department and CMS management (see Annex 10).
<i>Expiry statistics</i>	List of drugs that have already expired, or will expire in any given time period. Used by the CMS management to ensure timely issue (see Annex 11).
<i>Products not issued</i>	List of products that have not been issued over any given period (slow moving items). Used by the procurement department, and by the CMS management (see Annex 12).
<i>Inventory report</i>	Stock level for any number of items, including last incoming quantity, outstanding orders, expiry date, consumption in each of the last three years, estimated average annual need, last price. Used by the procurement department to define order quantities (see Annex 13).
<i>Ledger (tally card)</i>	Lists, per drug, in chronological order all incoming and outgoing quantities. Is essential for comparisons with the (shadow) manual tally card or ledger system (see Annex 14).
<i>Transactions</i>	Record of all transactions, and executing operator. Requested and used by Auditor-General to trace any discrepancies.
<i>Delivery by client</i>	Total value of all issues per health institution. Used by financial department, for monitoring expenditure, and for annual statistics.
<i>Delivery by product</i>	Total value of all issues in a given period. Used by the procurement department and the annual statistics.
<i>Budget report</i>	Financial report on total expenditure in comparison with annual budget, minus outstanding orders. Used by CMS management and financial department to monitor available funds (Annex 15).

Lessons learnt

In discussions with Mr E. Kkolos, Director of Pharmaceutical Services, and Mr Andreas Manolis, in charge of the ICS system in CMS, the following points were raised.

Only in very small central or regional medical stores will a PC or single-user system for inventory control be practical. In nearly all CMS situations a multi-user system will be needed. This is related to the fact that a CMS operation is, by nature, divided over several departments: procurement, storage, issue, finance, etc. This was already recommended during the first situation analysis in June 1987, but it was, at that time, decided to continue with a system of several PC's. The reasons were that the six computers were already available, and also because it was considered essential that computerization had to start by making a coregroup of staff "computer literate" without jumping directly into a main frame configuration.

Any hardware should be procured through a local agent. This was done with the Digital Microvax system, and although very few problems have occurred, it was essential that Digital personnel were always available at very short notice. At the same time it is essential that the MOH assumes a positive and flexible attitude. This became apparent when an amplifier for the telephone connection between CMS and MOH was suddenly needed. The MOH immediately borrowed and later procured this essential piece of equipment from their own resources (\$ 3270). It should be mentioned here that cheaper multi-user hardware alternatives are now available (e.g. UNIX systems).

When developing a new piece of software, as in the case of ICS, frequent and long visits by programmers are necessary. The visits by SDC staff, which usually lasted one week, seem too short as there was insufficient time to test the changes and additions. The X-25 connection, which is now being established, will be very useful for on-line diagnosis and maintenance without the need for costly visits.

The ICS system in its present form can be recommended for CMS operations in other countries. The system is so simple that it can be started without the need for a completely operational manual system.

It is essential that one staff member who has a feeling for computers be fully trained in the use of the system. (S)he can then supervise the total operation and train and supervise the other staff members who will work with the system. (S)he should especially act as a first line trouble shooter for these staff in the first period of introduction. (S)he should also keep a record of any problems, and act as a central contact point for software maintenance and updates.

The SWEDIS manuals have been updated regularly and are now much better than the first versions. The query language seems complicated for anyone who is not familiar with computers, but is, in practice, not difficult to learn.

With any change there are usually a number of people who resist. In this case some of the, mainly younger, staff members were eager to learn the computer operations and quickly picked it up. The Director of CMS and a few older staff were much more reluctant. They were not convinced of the merits of the system when it was operated on the PC only, and became very negative between April 1990 and December 1990 when the Microvax system was introduced and showed the initial bugs and inconveniences. It was only after these were corrected that the Manager of CMS became convinced that the system has many advantages over the manual system.

Summary

The inventory control system was initially one of the first of such systems specifically developed for drug storage. In the course of its development the SDC gained more experience with countries other than Cyprus. The system could not operate on a personal computer and was changed to a multi-user (Microvax) system in April 1990.

After an initial period of about one year with several bugs and adaptations the system is now fully operational for all 1300 drug items in CMS. It operates with nine terminals, plus three in the Ministry of Health for the registration system, the drug procurement system and for general management. A laser printer is located in the MOH and a dot-matrix printer in CMS; an additional matrix printer for the picking lists and invoices has been ordered. There is a great potential for further extension with the 5000 non-drug items; this is mainly dependent on standardisation and classification of these items before they can be entered into the system. It is expected that the manual system will be stopped by the end of 1991.

The ICS system is much easier to operate than the manual system, and produces managerial and statistical reports which could not be produced by the manual system. Reports on stock level, outstanding orders, drugs close to expiry, non-moving items, estimated annual turnover and historical data on prices and drug consumption have been integrated in the stock management operations of CMS and have greatly improved their performance.

With an annual budget of about \$ 15 million for drugs alone it should be realized that every one percent savings in better procurement and stock management implies annual savings of \$ 150.000. This means that one percent savings in one year have paid for the full development and installation of the ICS system. The annual maintenance fee for hardware and software amounts to less than 0.1% of the annual drug budget.

ANNEXES

- 1986
- Jul 5-10 Visit by N.Shariff, ISS/EMRO, to analyse computer needs for the pharmaceutical department. Recommends to purchase 3 IBM/PC/AT's and 3 IBM/PC/XT's, plus standard software plus 3 copies of COMPACT Stock Control software.
- 1987
- Jan Computers and software procured from INGYCO, Alexandria and delivered in Cyprus. Total cost \$ 75.304, paid from allotment EM/ISS/CYP/HST/RB (WHO/EMRO RB funds).
- May 28-5 Visit by Dr H.V.Hogerzeil (WHO/EMRO), Mr P.Manell and Mr H.Mandahl (both from Department of Drugs in Sweden, as WHO/EMRO/TA's) to analyse the situation and to prepare specifications for the development of computer software. Main recommendation is that a mainframe computer is to be preferred, but that within the given hardware configuration a comprehensive system could be started on a network of PC's.
- Nov 23-18 Training in Sweden of Mr Andreas Manolis (ICS), Ms Cleo Liassidou and Mr Vasilis Koupepides (DRA). Tuition fees included in contract; cost of travel and per diem approximately \$ 12.000, paid from EM/CYP/EDV/RB funds.
- Dec 21 Letter of agreement between WHO/EMRO and SWEDIS Development Centre, for development of software for DRA and ICS, including maintenance for two years, installation and training. Total cost \$ 26.000, paid from EM/CYP/EDV/RB funds (specification in Table 1 and 3).
- 1988
- Jan 23-6 Visit by P.Manell (1 week), P.Tellner (2 weeks) and B.Dagerus (1 week). Installation and additional local training. DRA installed on PC/AT in MOH (Koupepides), ICS installed on PC/AT and PC/XT in CMS (Manolis). Ticket and per diem paid for by WHO/EMRO (total cost approximately \$ 7000); salaries included in contract.
- Feb 28 EMRO RB funds for 1988-89 nearly exhausted. RD/EMRO agrees to an additional allotment of \$ 31.000 from RD's Development Fund for further computerization, in view of fact that the system in Cyprus will be used for regional training.
- Jun 1-21 Regional SWEDIS training course held in Cyprus. Visits by B.Dagerus (1 week), P.Tellner (2 weeks) and C.G.Wijnvoord (1 week). Installation of DPS software on IBM/XT in MOH, adaptations to DRA and ICS. Travel and per diem of Mr Tellner paid by EMRO (approximately \$ 4000); other costs paid by SDC.
- Jun 28 Letter of agreement between WHO/EMRO and Department of Drugs, for development of software for DPS, including maintenance for two years, installation and training. Total cost \$ 11.700, paid from EM/CYP/EDV/RB funds. For specification, see Table 2.
- Aug 22-28 Visit by B.Dagerus and C.G.Wijnvoord. Dagerus reviews and adapts ICS system; Wijnvoord adapts DPS and DRA systems. All costs paid for by SDC.
- Oct 17-18 Visit by Dr H.V.Hogerzeil (WHO/EMRO). Review of the systems. DRA not actively used, due to very limited data entry. Recommends to add more staff and to speed up data-entry. DPS operational, but needs some additions and improvements. The ICS is only used for about 50 antibiotics; the limited memory capacity of the PC is a serious bottle neck. Recommends to change to a mini computer.

1989

- Jun 5-23 Second SWEDIS training course held in Cyprus. Visits by several SWEDIS staff. B.Dagerus spends much time to improve the ICS system; recommends to change to minicomputer.
- Jul 12 Request from MOH to allocate WHO/EMRO funds for Microvax system.
- Oct 17 EMRO agrees to supply Microvax 3300 computer through local supplier. Total cost for minicomputer plus extra hard disk, 8 terminals, laser printer, UPS, cables, MUX server, etc: \$ 69,778, paid for from EM/CYP/EDV/RB and RD's fund.
- Nov Visit B.Dagerus (1 week) to prepare software for transfer to Microvax system. Visit paid for by SDC.

1990

- Jan 17 Microvax and VMS operating system installed in CMS building by Digital, Nicosia. Extra modems for telephone connections with MOH PC's and terminals procured by MOH (cost: \$ 3270).
- Apr Visit B.Dagerus (1 week) to install DRA, DPS and ICS on Microvax. Visit paid for by SDC. ICS for 1300 drugs started.
- Jun 1-20 SWEDIS training course held in Cyprus. During this period B.Dagerus makes further adjustments to the ICS system. Visit paid for by SDC.
- Dec 8-13 Visit B.Dagerus to make further adjustments to the ICS system. Visit paid for by SDC.
- Dec 31 ICS system operational for 1300 drugs, but some bugs remain. Auditor-General does not allow to stop manual system in CMS.

1991

- Mar 5-10 Visit B.Dagerus to make further adjustments to the ICS. system Visit paid for by SDC and MOH.
- May MOH agrees to fund X-25 line with SWEDIS-DC for on-line contact. Cost: \$ 10.138; maintenance fee \$ 945 per year.
- Jun 14-18 Visit Dr Hogerzeil for situation analysis. DRA system partly operational, with approximately 5000 drugs entered; 1500 drugs registered between 1972-82 remain. DPS system operational since 1988 and fully integrated in MOH procedures. Large savings in time and secretarial assistance. ICS system operational for all 1300 drug items and fully integrated into CMS procedures.

GOVERNMENT OF CYPRUS
MINISTRY OF HEALTH

PHARMACEUTICAL SERVICES
 DRUGS REGISTRATION DEPARTMENT

DRUGID:
 DATE :

DRUG APPLICATION/RENEWAL FOR MARKETING LICENCE
 SUMMARY SHEET

PART I

A.

TRADE NAME	DOSAGE FORM	TLC CODE ¹	STRENGTH ²
------------	-------------	-----------------------	-----------------------

B.

GENERIC NAME (INN) ³	ROUTE OF ADMINISTRATION ⁴
---------------------------------	--------------------------------------

C.

STORAGE	SHELF LIFE IN MONTHS(M)	SALES CATEGORY ⁵	PRESCRIPTION ⁶	NARCOTIC CLASSIFICATION ⁷
Room (15-27 C) <input type="checkbox"/>	Weeks(W) or Days(D)	Pharmacy <input type="checkbox"/>	Prescr. <input type="checkbox"/>	Narcotic <input type="checkbox"/>
Cool (10-15 C) <input type="checkbox"/>	A. UNOPENED <input type="checkbox"/>	Gen. Sales <input type="checkbox"/>	Prescr. Rep. <input type="checkbox"/>	Psychotr. <input type="checkbox"/>
Cold (2-8 C) <input type="checkbox"/>	B. OPENED <input type="checkbox"/>		OTC <input type="checkbox"/>	None <input type="checkbox"/>
Freezer (<2 C) <input type="checkbox"/>				

D.

PREGNANCY CATEGORY ⁸ (A,B,C,D,X.)	WARNING(S) ⁹	OTHERS
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- 2 -

E.

NAME OF AGENT		NAME OF MANUFACTURER		NAME OF TRADE MARK OWNER	
ADDRESS		ADDRESS		ADDRESS	
P.O.Box		P.O.Box		P.O.Box	
CITY		CITY		CITY	
COUNTRY		COUNTRY		COUNTRY	
TELEX	TELEFAX	TELEX	TELEFAX	TELEX	TELEFAX
PHONE		PHONE		PHONE	

FILL BLOCK F ONLY IN CASE OF A RENEWAL OF MARKETING LICENCE

F.

FILE No. (DRUGID)	REGISTRATION No.	EXPIRY DATE ¹⁰
ATC CODE *	IS THE PRODUCT ¹¹ CIRCULATED IN CYPRUS YES <input type="checkbox"/> NO <input type="checkbox"/>	MINISTRY DRUG ¹² YES <input type="checkbox"/> NO <input type="checkbox"/>

* TO BE FILLED IN BY THE DEPARTMENT

- 3 -

PART II

COMPLETE COMPOSITION (per tablet, ml, g, % etc.)

G.

COMPOSITION PER (VOLUME/WEIGHT)	UNIT ¹³
--	--------------------

H.

COMPOSITION - ACTIVE INGREDIENTS					
	SUBSTANCE NAME (INN)	PLACE IN THE FORM ¹⁴	CAS No. ¹⁵	QUANTITY	UNITS
1					
2					
3					
4					
5					
6					
7					

I.

COMPOSITION - INACTIVE INGREDIENTS						
	SUBSTANCE NAME (INN)	PLACE IN THE FORM	US-AGE ¹⁶	CAS No.	QUAN-TITY	UNITS
1						
2						
3						
4						
5						
6						
7						
8						
9						

- 4 -

PART III

PACKAGES AND PRICES

FILE No.		
TRADE NAME	DOSAGE FORM	STRENGTH

a.

PACK ID *			
17 SIZE	18 UNIT	19 WHOLESALE PRICE	20 RETAIL PRICE
21 Package description in brief			

b.

PACK ID *			
SIZE	UNIT	WHOLESALE PRICE	RETAIL PRICE
Package description in brief			

c.

PACK ID *			
SIZE	UNIT	WHOLESALE PRICE	RETAIL PRICE
Package description in brief			

* TO BE FILLED IN BY THE DEPARTMENT

INSTRUCTIONS ON HOW TO FILL IN THE FORM1. TLC Code:

"Three letter code" is a classification by form of medication worked out jointly by IFMRG and EPHMRA.

2. Strength:

Fill in the strength of the product or the concentration of the active ingredient in case of liquids. If the product is in injectable form state the volume of the product as well. In case of combination products leave the block empty.

3. Generic Name:

Or INN (International Non Proprietary Name). If not applicable you can fill in the BAN (British Adopted Name) or USAN (U.S. Adopted Name). In case of combination products give an own descriptive generic name e.g. Multivitamins, Cold or Cough preparation etc.

4. Route of Administration:

In this field you have to fill in the route of administration for the specific drug form i.e. in case of tablets, capsules fill in "oral" in case of rectal or vaginal suppositories fill in "rectal" or "vaginal" respectively. For dermal creams and ointments fill in "External use" for injectable preparations state I.V. I.M. S.C. etc. as the case may be.

5. Sales Category:

Refers to where the drug can be sold e.g. Pharmacy or General Sales List. Drugs that can be sold as G.S.L. products are mentioned in the Pharmacy and Poisons (Amended) Law No. 59 of 1962.

6. Prescription:

Fill in this field according to the recommendations of Resolution AP(87)3 of the Committee of Ministers -Council of Europe. According to the resolution, medicines can be supplied (i) on prescription, (ii) on prescription repeatable for six (6) months or (iii) OTC. For further information consult the administrative and legal departments of your organization.

7. Narcotic Classification:

In this block you have to state if the preparation is controlled according to the Single Convention on

- 2 -

Narcotic Drugs, 1961 or according to the Convention on Psychotropic Substances, 1971. For further information consult the administrative and legal departments of your organization.

8. Pregnancy Category:

In this field you have to fill in the pregnancy category of the preparation according to the FDA Classification System (A, B, C, D, X).

- A: Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).
- B: Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.
- C: Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
- D: There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
- X: Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

9. Warning(s):

Fill in the recommended Cautionary and Advisory labels for the dispensed preparation e.g. "may cause drowsiness" etc.

- 10. "Expiry date" date is the date until which the Marketing Licence is valid (usually for 5 years).
- 11. State whether the preparation is actually sold in the private sector or is registered for other purposes e.g. tenders, exports etc.

- 3 -

12. Ministry Drug:
State if the preparation is available or not through the Governmental Hospitals.
13. Composition per unit:
In this block fill in the weight/volume of the dosage form or to which the composition is referred e.g. 600 mg (= the weight of a tablet, capsule etc.) or 5ml (the dosage unit of a syrup etc.)
14. Place in the form:
State if applicable, whether the substance is present in the core (1), in the coating (2), in the capsule shell (2) etc.
15. CAS No.:
Chemical Abstracts Service Number. A number unique for every substance. CAS Number differs between a substance and the substance's salt(s). If CAS No is unknown state a reference book where the substance appears i.e. B.P., U.S.P., Martindale etc.
16. Usage:
In this column fill in the usage-properties of the inactive substances in the preparation e.g.:
- | | |
|------------------------|------|
| Antioxidant | - AQ |
| Coating agent | - CA |
| Colourant | - CO |
| Emulsifying Agent | - EM |
| Flavouring | - FL |
| Inactive agent, others | - IN |
| Preservative | - PR |
| Propellant | - PP |
| Suspending Agent | - SU |
| Sustained action agent | - SA |
- 17-18. Size - Unit:
Fill in the quantity (pieces, volume, weight) present in each container e.g. 30 - CAPS.
- 19-20. State the approved wholesale and retail prices in Cyprus Pounds. In case of a new drug application, prices information can be given in due time.
21. Give a brief description of the package i.e. "20 pcs in strips" or "100 pcs in plastic container with outer carton pack" etc.

SWEDIS/DRA	Drug table		
Drug id:	Drug:		
Generic:			
Name:			
Form:			
Strength:	Route of adm.:		
Manufacturer:			
Agent:			
Storage:	Shelflife in month:	Sales category:	
Prescription:	Narcotic:		
Application date:	Registration date:	No:	Expiry:
Withdrawal/rejection date:	Reason:		
Essential drug code, WHO:	Ministry:	TLC:	
ATC:			
Classification:			
Warning:			

SWEDIS/DRA	Ingredient table		
Drug id:	Drug:	Total Weight:	Unit:
Type I Casno Substance		Weight	Unit

91-05-23

MINISTRY OF HEALTH
PHARMACEUTICAL SERVICES, Nicosia Cyprus

A10AA01 : FAST ACTING INSULINS

Approved pharm. spec.

8300299 HUMULIN S (SOLUBLE OR REGULAR)
INJECTION 40IU/ML, 10ML VIALS

* Generic name: SOLUBLE INSULIN, HUMAN

ATC-code: A10AA01 ANTIDIABETIC THERAPY

Appl. date: 830808 Appr. date: 840613 Licence Number: 009380

Expiry date: 890612

Manufacturer: ELI LILLY S. A

Agent: PHADISCO LTD

Pharmacy only

OTC Drug

Storage: Cold

Shelf life: 24M

Classification: PRB

Route of administration: IM IV SC

Composition per: 1.0 ML

Complete composition:

AC 1 INSULIN HUMAN, BIOSYNTHETIC 40.0 IU

IN 1 GLYCEROL 16.0 MG

IN 1 HYDROCHLORIC ACID ADJ FH

IN 1 M-CRESOL 2.5 MG

IN 1 SODIUM HYDROXIDE ADJ FH

IN 1 WATER FOR INJECTION Q.S.

Approved pharm. spec.

8300300 HUMULIN S (SOLUBLE OR REGULAR)
INJECTION 100IU/ML, 10ML VIALS

Generic name: SOLUBLE INSULIN, HUMAN

ATC-code: A10AA01 ANTIDIABETIC THERAPY

Appl. date: 830808 Appr. date: 840430 Licence Number: 009246

Expiry date: 940429

Manufacturer: ELI LILLY S. A

Agent: PHADISCO LTD

Pharmacy only

OTC Drug

Storage: Cold

Shelf life: 24M

Ministry drug

Classification: PRB

Route of administration: IM IV SC

Composition per: 1.0 ML

Complete composition:

AC 1 INSULIN HUMAN, BIOSYNTHETIC 100.0 IU

IN 1 GLYCEROL 16.0 MG

—Cypdis—

Item 3 : 1
SALBUTAMOL Spray 0.1 MG Shelf life: 30 months
Total offers on this Item: 2

Agent: XANTHOS LYSIOTIS & SON LTD Manufact: GLAXO LABS LTD
Trade name: VENTOLIN Pack. size:
Comment 1:
Sample: Y Certificate: AP Approved: 3425 Terms: Invoice
Shelf life: 30
Quantity: 9000 Price: 1.670 GBP CI Comp. price: 1.670 CYP
Comp. price/DDD: - 0.000
Comment 2:
Outcom: **

Agent: C.G.CHRISTOFIDES L.T.D Manufact: GLAXO LABS LTD
Trade name: VENTOLIN Pack. size:
Comment 1: SOFAREX EXPORTER
Sample: N Certificate: AP Approved: 7658 Terms: Invoice
Shelf life: 30
Quantity: 9000 Price: 146.000 BEF CI Comp. price: 146.000 CYP
Comp. price/DDD: - 0.000

M.H.5/1990/2 TENDER FOR ANTINEOPLASTIC AGENTS

15 tenders received
Closing date: 910412

Agent	Manufact	Cur Price	Type Cyp	Sam RSG ple or PSC	Remarks
Item 1 : 52 X 10 Vials BLEOMYCIN SULPHATE USP Injection 15 MG Shelf life: 30 months Total offers on this Item: 3					
MUNRO WHOLESAL	MED. SUPPLIES LTD	GBP 14.350	CIF 117.21	Y	18 months 400 X 1 Vials Air freight
M.P. MICHAELIDES LTD	NIPPON	USD 30.000	CIF 144.00	**Y 12860	BLEOCIN 18 months 400 X 1 Vials Air freight
C.G. PAPALOISOU LTD	LANDEBECK	DKR 2392.000	CIF 171.59	N 6607	BLEOMYCIN Air freight
Item 2 : 595 X 6 Amps X 1 ml LEUCOVORIN CALCIUM USP Injection 3 MG/ML Shelf life: 18 months Total offers on this Item: 2					
PHARMACEUTICAL TRADING CO LTD	DAVID BULL LABS	GBP 4.500	CIF 4.41	**Y 12088	714 X 5 Ampoules Air freight
CYPRUS PHARM. ORGANIZATION LTD	LEDERLE LABS	USD 11.400	CIF 5.47	Y 8050	9 months Air freight

MINISTRY OF HEALTH

Our Ref.: M.H.5/1990/2

Nicosia 91-06-17

Chief Pharmacist
i/c Medical Stores,

TENDER FOR ANTINEOPLASTIC AGENTS

Please note that the following awards were made:-

Tenderer: C.A. PAPAELLINA & CO LTD
LAXIA P O BOX 4018
NICOSIA

Item 9	: ENDOXAN Injection 200 MG 400 X 10 VI	@ DEM 22.300
Item 21	: HOLOXAN Injection 500 MG 100 X 1 VI	@ DEM 31.000
Item 22	: HOLOXAN Injection 1 G 280 X 1 VI	@ DEM 57.000
Item 23	: HOLOXAN Injection 2 G 300 X 1 VI	@ DEM 103.000
Item 24	: UROMITEXAN Injection 400 MG/4ML 80 X 15 AM	@ DEM 28.000

Tenderer: C.G. PAPALOISOU LTD
9 CONST. PALEOLOGOU AVE P.O.BOX 1148
NICOSIA

Item 1	: BLEOMYCIN Injection 15 MG 52 X 10 VI	@ DKR 2392.000
Item 31	: ESTRADURIN Injection 80 MG 60 X 10 VI	@ SEK 410.000

Tenderer: M.P. MICHAELIDES LTD
11 DIGHENIS AKRITAS AVE P O BOX 2315
NICOSIA

Item 8	: CISPLATIN USP Injection 50 MG 50 X 1 VI	@ USD 15.500
Item 16	: ETOPOSIDE Capsules 100 MG 500 X 10 CA	@ USD 12.600

Tenderer: MUNRO WHOLESALE MED. SUPPLIES LTD
3, BRAEVIEW PLACE, NERSTON EAST,
EAST KILBRIDE, GLASGOW G74 3XJ

Item 13	: DAUNORUBICIN HCL Injection 20 MG 200 X 1 VI	@ GBP 4.450
Item 17	: VEPESID Injection 100MG 560 X 1 VI	@ GBP 7.200
Item 36	: VINBLASTINE SULPHATE BP I.V. Injection 10 MG 130 X 1 VI	@ GBP 5.200
Item 38	: VINDESINE SULPHATE Injection 5 MG	

150 X 1 VI @ GBP 58.300

Tenderer: PHARMACEUTICAL TRADING CO LTD
11 ARCH. MAKARIOS AVE
LARNACA

Item 2	: LEUCOVORIN CALCIUM USP Injection 3 MG/ML	
	714 X 5 AM	@ GBP 4.500
Item 3	: LEUCOVORIN CALCIUM USP Injection 50 MG	
	3000 X 1 VI	@ GBP 6.500
Item 5	: CARBOPLATIN Injection 150MG	
	500 X 1 VI	@ GBP 43.000
Item 18	: FLUOROURACIL BP Injection 250 MG/5ML	
	1600 X 5 AM	@ GBP 4.800
Item 26	: METHOTREKATE SODIUM PARENTERAL BP Injection 50 MG	
	200 X 5 VI	@ GBP 10.000
Item 27	: METHOTREKATE SODIUM PARENTERAL BP Injection 500 MG	
	450 X 1 VI	@ GBP 11.200

Director
Pharmaceutical Services

Copy to: Director-General,
Ministry of Finance,
Director-General, Ministry of
Commerce & Industry,
Acct-General,
Aud.-General,
Commiss. of Income Tax,
Notice Board.

PHARMACEUTICAL SERVICES

M.H.5/1990/2

Nicosia, 910610

Dear Sirs,

I wish to inform you that the Tender Board has accepted your tender for the supply of:-

- Item 2 : 714 X 5 AM
LEUCOVORIN CALCIUM USP Injection 3 MG/ML
@ GBP 4.500 CIF Air freight
Shelf life not less than 18 months
DAVID BULL LABS
- Item 3 : 3000 X 1 Vial
LEUCOVORIN CALCIUM USP Injection 50 MG
@ GBP 6.500 CIF Air freight
Shelf life not less than 16 months
DAVID BULL LABS
- Item 5 : 500 X 1 Vial
CARBOPLATIN Injection 150MG
@ GBP 43.000 CIF Air freight
Shelf life not less than 16 months
DAVID BULL LABS
- Item 18 : 1600 X 5 AM
FLUOROURACIL BP Injection 250 MG/5ML
@ GBP 4.800 CIF Air freight
Shelf life not less than 18 months
DAVID BULL LABS
- Item 26 : 200 X 5 VI
METHOTREXATE SODIUM PARENTERAL BP Injection 50 MG
@ GBP 10.000 CIF Air freight
Shelf life not less than 18 months
DAVID BULL LABS

Messrs,


PHARMACEUTICAL TRADING CO LTD

LARNACA

Item 27 : 450 X 1 Vial
METHOTREXATE SODIUM PARENTERAL BP Injection 500 MG
@ GBP 11.200 CIF Air freight
Shelf life not less than 16 months
DAVID BULL LABS

2. Expiry date should be printed on each container.
3. Delivery as soon as possible and not later than three months from receipt of this letter.
4. Payment CAD through the Central Bank of Cyprus, free of any bank charges. Original invoice essential.
5. Tender reference No. should be quoted on all correspondence relative to the tender, e.g. invoice, packing list, package note etc.
6. Shipment documentation should be despatched promptly.
7. Kindly acknowledge receipt of this letter and confirm the order by returning the duplicate to this Ministry, duly signed.

Yours faithfully,


Director
Pharmaceutical Services

CENTRAL MEDICAL STORES
NICOSIA, CYPRUS
ANTIBIOTICS BELOW SAFE LEVEL

9

Drug:	Total	stoc	Safe level	Order	quan	Outstandin	Identity
	0	15	15	0	0	0	88005 AMPHOTERICIN-B INJ 50 MG
	0	0	10	0	0	0	88006 AMPHOTERICIN-B SUSP 100 MG/ML
	0	0	0	0	0	0	60022 BECLMETHASONE DIPROP. BP OR BUDESON
	0	0	0	0	0	0	60021 BECLMETHASONE DIPROP. BP OR BUDESON
	0	0	0	0	0	0	60023 BETAMETHASONE SOD PHOSPH. BP OR PRE
	0	0	0	0	0	0	60054 CALCIUM DOBESILATE TAB/C 250 DR 100
	0	0	400	0	0	0	88078 CEFAMANDOLE NAFATE USP INJ 1 G
	0	0	100	0	0	0	88079 CEFAMANDOLE NAFATE USP INJ 2 G
	0	0	300	0	0	0	88071 CEFOPERAZONE SODIUM I.V. INJ 1 G
	0	0	75	0	0	0	88066 CEFOTAXIME SODIUM I.M. INJ 500 MG
	0	0	400	0	0	0	88076 CEFOXITINE SODIUM USP INJ 1 G
	0	0	15	0	0	0	88095 CEFTAZIDIME I.M. INJ 500 MG
	142	0	400	0	0	593	88072 CEFTAZIDIME I.V. INJ 1 G
	0	0	100	0	0	0	88073 CEFTAZIDIME I.V. INJ 2 G
	0	0	300	0	0	0	88068 CEFTRIAXON I.V. INJ 2 G
	0	0	100	0	0	0	88075 CEFUROXIME SODIUM INJ 1.5 G
	0	0	20	0	0	0	88021 CHLORAMPHENICOL BP SUSP 125 MG/5ML
	20	0	250	0	0	0	88020 CHLORAMPHENICOL SODIUM SUCCINATE BP
	0	0	0	0	0	0	60051 CLOFIBRATE OR BENZAFIBRATE TAB/C 50
	300	0	500	0	0	1200	88026 CLOXACILLIN BP INJ 250 MG
	0	0	300	0	0	4800	88027 CLOXACILLIN BP INJ 500 MG
	0	0	0	0	0	0	60055 DANTRONINE SODIUM OR BACLOFEN TAB
	0	0	2000	0	0	0	88023 DOXYCYCLINE BP CAPS 100 MG
	31000	0	36000	0	0	299000	88028 ERYTHROMYCIN STEARATE BP TAB 250 MG
	0	0	200	0	0	0	88039 FLUCLOXACILLIN BP CAPS 250 MG
	0	0	0	0	0	0	88040 FLUCLOXACILLIN BP INJ 250 MG
	0	0	50	0	0	0	88041 FLUCLOXACILLIN BP INJ 500 MG
	0	0	0	0	0	0	88001 FLUCLOXACILLIN BP SYR 125 MG/5ML
	0	0	5	0	0	0	88099 FLUCLOXACILLIN BP SYR 250 MG/5ML
	0	0	0	0	0	0	60035 MALATHION 0.5% / CARBARYL 0.5% LIQU
	0	0	0	0	0	0	60034 MALATHION 1.3% / CARBARYL 0.5% SHAK
	0	0	0	0	0	0	60052 METOPROLOL TARTRATE OR ATENOLOL TAB
	0	0	0	0	0	0	60031 MICONAZOLE NITRAT. 2XW/W / ISOCONAZOL
	0	0	0	0	0	0	60036 NON IONIC IRON(AS POLYMALTOSE) ODR
	0	0	250	0	0	0	88056 PENICILLIN G CRYSTALLIN(SODIUM SALT
	0	0	0	0	0	0	60002 SECOND GENER.CEPHALOSPORINS HIGH DO
	0	0	0	0	0	0	60001 SECOND GENER.CEPHALOSPORINS LOW DOS.
	0	0	0	0	0	0	70022 SODIUM LUSIBATE SUSP 175 MG/5ML
	0	0	0	0	0	0	88053 THEOPHYLLINE OR AMINOPHYLLIN SRT 20
	0	0	0	0	0	0	60004 THIRD GENER.CEPHALOSPORINS INJ 1 GN
	0	0	0	0	0	0	60006 THIRD GENER.CEPHALOSPORINS INJ 250
	0	0	0	0	0	0	60005 THIRD GENER.CEPHALOSPORINS INJ 500
	0	0	0	0	0	0	60032 TIMDL 0.5%/LEVOPUNDOLO.5%/BETAXOLOL.5
	0	0	0	0	0	0	60033 TIMOLOL 0.25% / METIPRANOLOL 0.5% E
	0	0	0	0	0	0	60003 TORRAMYCIN OR NETILMICIN INJ 80 DR

not used

Report on vaccines within 6 months of expiry,
from Cyprus/ICS system

Annex 11

CENTRAL MEDICAL STORES
NICOSIA, CYPRUS
VACCINES EXPIRED WITHIN 6 MONTHS

Bacillus Calm Guer Vacc, 1 Vial Total stock:		250			
Batches	Exp. date	Number			
ES155	19911130	200	No. exp.:	200	< 6 m
D0703	19901130	200	No. exp.:	50	150 issued; 50 expired
Diphther Antit. Inj 200000U, 1 Vial Total stock:		40			
Batches	Exp. date	Number			
RED 159/89	19911130	20	No. exp.:	20	< 6 m
Measles Vacc Live Att., 1X1 Dose Total stock:		630			
Batches	Exp. date	Number			
RED 159/89	19910130	2500	No. exp.:	430	Expired
Rabies Vaccine, 1 Vial X 1 Dose Total stock:		65			
Batches	Exp. date	Number			
RED 159/89	19900730	10	No. exp.:	10	Expired
103770102	19900130	20	No. exp.:	5	Expired

CENTRAL MEDICAL STORES
NICOSIA, CYPRUS

ITEMS NOT ISSUED FROM 1.1.1990

Drugs:									
88094	TORAMYCIN SULPHATE USP INJ 1.2 G								0.00
0001	Stock: 30 Last Is.: 890300 Last Inc.: 000000 Last Pr.:								
88304	SUCCINYL SULPHATHIAZOLE TAB 500 MG								0.00
0001	Stock: 571 Last Is.: 891205 Last Inc.: 000000 Last Pr.:								
88306	SULPHAMETHIZOLE BP TAB 100 MG								0.00
0001	Stock: 20 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88420	EUNETANIDE INJ 2 MG/4ML								3.20
0001	Stock: 392 Last Is.: 000000 Last Inc.: 890302 Last Pr.:								
88424	CHLORIDIC GONADOTROPHIN EP INJ 1000 IU								0.00
0001	Stock: 747 Last Is.: 891207 Last Inc.: 000000 Last Pr.:								
88435	CYCLIZINE LACTATE EP INJ 50 MG/ML								0.00
0001	Stock: 80 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88449	GALLAMINE BP INJ 80 MG/2ML								3.56
0001	Stock: 83 Last Is.: 891220 Last Inc.: 890403 Last Pr.:								
88481	GESTRADIOL BENZOATE EP INJ 5 MG/ML								0.00
0001	Stock: 65 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88499	EDROPHONIUM EP INJ 10 MG/ML								0.00
0001	Stock: 85 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88513	MONOBASIC POTASSIUM PHOSPHATE IV.NUT.(ADIPHUS) SOLU								2.66
0001	Stock: 50 Last Is.: 000000 Last Inc.: 890411 Last Pr.:								
88514	POLYGELENE SODIUM IV.INF.(HAEMACCEL) SOLU 3.5%								3.56
0001	Stock: 50 Last Is.: 890310 Last Inc.: 900529 Last Pr.:								
88615	BRETYLIUM TOSYLATE (BRETYLATE) INJ 100 MG/2ML								0.00
0001	Stock: 90 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88617	HYDROXYPROSEST CAPROAT 250MG/0.5ML VALER 5MG INJ								0.00
0001	Stock: 45 Last Is.: 891208 Last Inc.: 000000 Last Pr.:								
88660	UROKINASE INJ 5000 PLU								0.00
0001	Stock: 9 Last Is.: 890714 Last Inc.: 000000 Last Pr.:								
88721	TENIPOSIDE INJ 50 MG								6.40
9999	Stock: 110 Last Is.: 000000 Last Inc.: 901128 Last Pr.:								
88731	HUMAN BLOOD PLASMA DRIED EP IV INF								0.00
0001	Stock: 246 Last Is.: 000000 Last Inc.: 000000 Last Pr.:								
88905	DIPHThERIA ANTITOXIN EP INJ 20,000 Units								3.35
0001	Stock: 20 Last Is.: 000000 Last Inc.: 890204 Last Pr.:								
89219	LOMUSTINE BP CAPS 10 MG								0.00
0001	Stock: 23 Last Is.: 891102 Last Inc.: 000000 Last Pr.:								
89460	CLOFAZIMINE EP(LOMPRENE) CAPS 100 MG								0.00

CENTRAL MEDICAL STORES
NICOSIA, CYPRUS
INVENTORY REPORT 910614

Drug Name	Shelf life	Subst. order	Stock on hand	Reorder level	Last incomm.	Quantity	Expiry date	Issues -2 year	Issues -1 year	Issues sofar	Estim. usage	Last price
Morphine Sulphate 50mg, 1000 Tabs Identity: 91009 0001	30	0	0	50	0	0	19930430	0	0	0	0	0.00
Morphine Sulphate 30mg, 1 Tab Our ref: MH 473/52/31, Supp.ref: 2P/79, 52/108, Order id.: 101135, Identity: 91010 0001	30	10000	7320	15000	900911	10020	19930430	17360	15240	7830	17188	0.17
Morphine Sulphate 50mg, 1 Tab Our ref: MH 473/52/31, Supp.ref: 2P/79, 52/108, Order id.: 101135, Identity: 91003 0001	30	3000	150	6000	850916	8400	19910630	3600	3500	2750	5037	0.37
Morphine Sulphate 10mg, 1 Amp Our ref: MH 473/52/31, Supp.ref: 2P/79-80, 52/106, Order id.: 101134, Identity: 91002 0002	30	7000	0	4800	910314	4000	19950228	4630	7360	4010	8802	0.08
Morphine Sulphate 10mg, 100 Amps Identity: 91003 0001	30	0	0	48	0	0	0	0	0	0	0	0.00
Morphine Sulphate 30mg, 1 Amp Identity: 91021 0001	30	0	0	600	0	0	0	0	0	0	0	0.00
Nalbuphine 10mg/ml, 1 Amp Identity: 91017 0001	30	0	0	10	850487	20	19910430	30	0	0	0	1.43
Opium Infusure, 160x250ml Identity: 91007 0002	30	0	39	0	0	0	0	2	0	0	0	0.00
Papaveretum 20mg, 10 Amps Identity: 91007 0001	30	0	0	270	0	0	0	0	0	0	0	0.00
Papaveretum 20mg, 1 Amp Our ref: MH 473/52/31, Supp.ref: 2P/79, 52/111, Order id.: 101137, Identity: 91022 0001	30	7000	0	2700	900502	4000	19920930	3540	2820	1380	3029	0.08
PapaveretumHyoscine, 1 Amp Identity: 91005 0001	30	0	0	250	910402	30	19930430	250	0	30	66	0.13
Pethidine 100mg, 1 Amp Our ref: MH 473/52/31, Supp.ref: 2P/79-80, 52/108, Order id.: 101134, Identity: 91003 0002	30	25000	260	13000	900502	20000	19930930	17208	18927	8610	18500	0.08
Pethidine 10mg, 100 Amps Identity: 91004 0001	30	0	0	100	0	0	0	0	0	0	0	0.00

CENTRAL MEDICAL STORES
NICOSIA, CYPRUS88417 0001 HYOSCINE BUTYLBROMIDE BP INJ 20 MG/ML
1 Amp X 1 ml

910411	9102009 ✓	KATO PYRGOS RURAL HEALTH CENT	6 ✓	622
910412	9103126 ✓	KOFINOU RURAL HEALTH CENTER	6 ✓	616
910412	9103181 ✓	ATHIENOU RURAL HEALTH CENTER	6 ✓	610
910416	9102090 ✓	NICOSIA GENERAL HOSPITAL P.I.C.P.	120 ✓	490
910416	9102299 ✓	AVDEMOU RURAL HEALTH CENTER	6 ✓	484
910417	9103313 ✓	LIMASSOL GENERAL HOSPITAL N.1	60 ✓	424
910418	9103036 ✓	PEFOULAS RURAL HEALTH CENTER	6 ✓	418
910418	9103007 ✓	LATSIA HEALTH CARE CENTER	6 ✓	412
910418	9102632 ✓	OMODOS RURAL HEALTH CENTER	6 ✓	406
910424	9103240 ✓	NEW LARNACA GENERAL HOSPITAL	60 ✓	346
910425	9103535 ✓	MAKARIOS HOSPITAL NICOSIA	18 ✓	328
910426 Stock movements to CMS From ZZADJ			Number 600 ✓	Rem. stock 928
910429	9103416 ✓	PARALIMNI GENERAL HOSPITAL	12 ✓	916
910430	9103904 ✓	NICOSIA GENERAL HOSPITAL DISP	60 ✓	856
910430	9102070 ✓	LIMASSOL GENERAL HOSPITAL N.1	30 ✓	326
910430	9103065 ✓	LIMASSOL GENERAL HOSPITAL N.1	240 ✓	586
910430	9103719 ✓	LIMASSOL GENERAL HOSPITAL N.1	30 ✓	356
910430	9103646 ✓	KATO PYRGOS RURAL HEALTH CENT	6 ✓	350
910502	9103690 ✓	LIMASSOL GENERAL HOSPITAL N.1	60 ✓	490
910503 Stock movements to CMS From INC			Number 31200 ✓	Rem. stock 31690
Inc. date, no., price:		910502 , , 31200 ,	0.10	
Orderid, ERN no.:		101000 , 910605		
Our ref., Supp. ref.:		MH 402/62/55 , 51/107, 2P/51		
Supplier:		BOEHRINGER INGELHEIM		
Batch no., Exp. date:		05868 , 19960101		
910506	9103495 ✓	POLIS RURAL HEALTH CENTRE	100 ✓	21570
910507	9104110 ✓	NICOSIA GENERAL HOSPITAL DISP	2100 ✓	29410
910507	9104057 ✓	PAPHOS GENERAL HOSPITAL	1000 ✓	29330
910509	9103853 ✓	AGEOS RURAL HEALTH CENTER	10 ✓	29318
910514	9104180 ✓	NATIONAL GUARD HOSPITAL	300 ✓	29018
910517	9104349 ✓	NEW LARNACA GENERAL HOSPITAL	1000 ✓	26938
910520	9103889 ✓	NEW LARNACA GENERAL HOSPITAL	60 ✓	26878
910523	9104588 ✓	LIMASSOL GENERAL HOSPITAL N.1	2100 ✓	24718

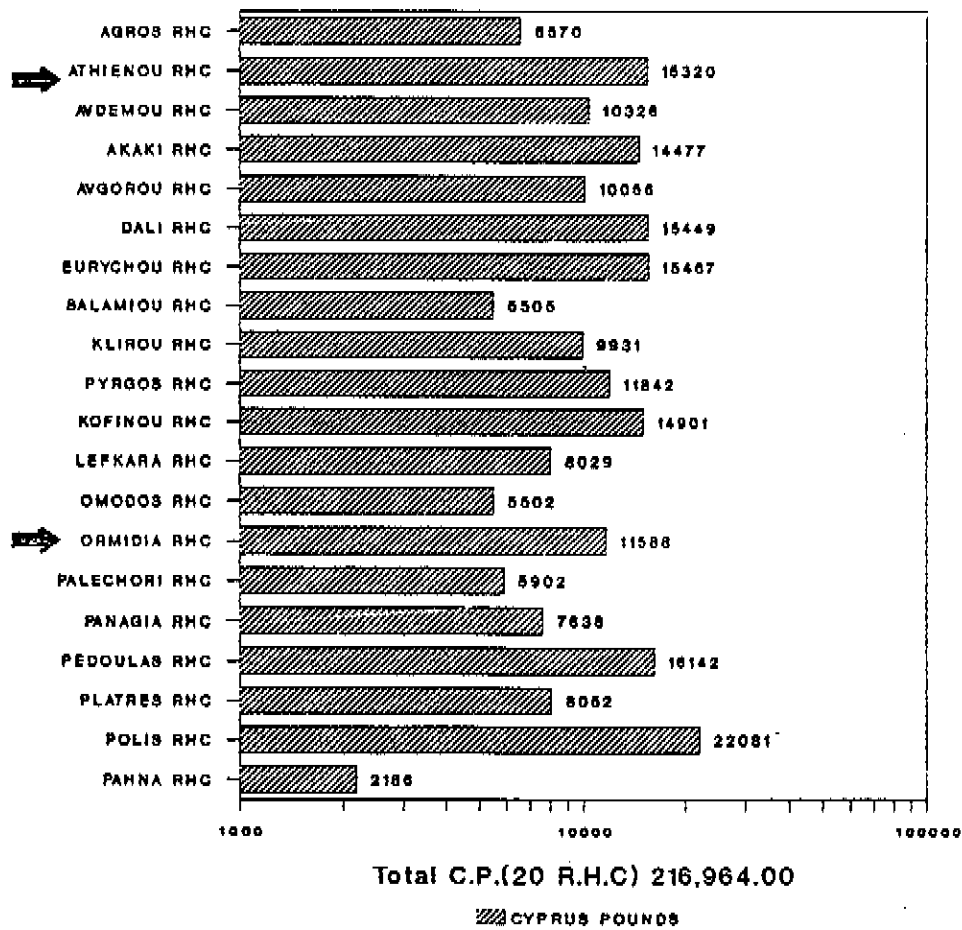
Total number of deliveries: 10334

CENTRAL MEDICAL STORES.
NICOSIA, CYPRUS
BUDGET 91.06.14

	600			
				<i>drugs</i>
Total budget:		6000000		
Cost:		2252492		
Sub result:		3747508		
Reservations:		0		
Outstanding at 31.12.90:		1107197		
Result:		2610311		
910101 BUD	+	6000000	DRUGS	BUDGET FOR 1991
910614 INC	-	2252492		910101-910614
910614 CDD	-	1137197		910101-910614

COMPARISON CHART

Considering 20 R.H.C For 1990



AI.

ORMIDIA RHC DELIVERIES DURING 1990

