1. Basic Information

1.1 CRIS Number: 2004/016-926.05.02

1.2 Title: Development of a Health Monitoring System for Cyprus

1.3 Sector: Social Policy and Employment (Health)

1.4 Location: Ministry of Health, Republic of Cyprus

2. Objectives

2.1 Overall Objective(s):
To develop modern organizational, functional and management capability in order to improve information and knowledge for monitoring health status, trends and determinants in Cyprus.
To provide timely, reliable, compatible and comparable health information to the Commission and international organisations.
To enable Cyprus participate in all European disease surveillance networks

2.2 Project purpose:
To develop a contemporary Health Monitoring System for Cyprus in order to generate health information in a timely manner to inform policy level to support decision-making and to monitor and evaluate impact of policy interventions. This will include the following:
Development of a set of health indicators with comparable definitions to those of the EU Member States, OECD and WHO-Euro.
Institutionalisation of the collection and analysis of data required to report indicators.
Enhancement of organisational structures and mechanisms to disseminate and share health monitoring information.
Promotion of the use of information to improve knowledge of the health system and assist formulation of health policies.

2.3 Justification

a. Accession Treaty
The proposed project is covered by the following Priority Sectors for the Transition Facility, as mentioned in Article 34 of the Accession Treaty:
Statistics (The HMS is intended to cover the bulk of health statistics. It will be developed in cooperation with other stakeholders including CYSTAT (Statistical Service of Cyprus). It will conform to EUROSTAT standards)

Environment (The HMS will include environmental indicators as determinants of health and will contribute towards improving the quality of data collection on environmental factors influencing health)

Strengthening public administration

The sectors relating to Food safety and Nuclear safety will also benefit from an effective HMS. It will collect and process health information relevant to policy formulation and decision making in these areas.

b. Comprehensive Monitoring Report

The Comprehensive Monitoring Report of November 2003, under Chapter 13 Social Policy and Employment, on page 32, paragraph 4, states: “In the field of public health, the legislative transposition of the tobacco and communicable disease Acquis remains to be completed. There is still a lot of work to do in order to guarantee successful incorporation of the country into the EU structures in the area of communicable disease surveillance and control. Efforts should continue in order to complete a health monitoring system with a view to obtaining health data and indicators comparable with the Community health monitoring system.”

3. Description

3.1 Background and justification:

Cyprus is already participating in the Programme of Community action in the field of public health, 2003-2008 (Decision No 1786/2002/EC) and has already established a Health Monitoring Unit (HMU) within the Ministry of Health (for more details on the HMU see Section 4: Institutional Framework).

The first strand of the above programme concerns the improvement of information and knowledge in the field of public health. It involves the development of a Health Monitoring System at Community level. Member states will be required to transfer comparable and compatible information to the Community HMS. Member States will, therefore, need to improve their national health information systems in order to bring them into line with the Community system.

The concept of health monitoring is described in detail in the Acquis (Decision No 1786/2002/EC of the European Parliament and Council). According to this, “… it is essential to collect, process, and analyse data at Community level for the purpose of effective public health monitoring at Community level. This requires objective, reliable, compatible, and comparable information that can be exchanged to enable the Commission and the Member States to improve the information available to the public and formulate appropriate strategies, policies, and actions to achieve a high level of human health protection. Data from the private sector should also be taken into consideration for the programme to be complete”.

The purposes of a Health Monitoring System as articulated in the Community Action Programme in the Area of Public Health are to: “(a) Establish comparable quantitative and qualitative indicators on the basis of existing work and of accomplished results; (b) Collect, analyse and disseminate comparable, compatible, age and gender specific information on human health concerning health status, health policies and health determinants, (including demography, geography and socio-economic situation, personal and biological factors, health behaviours such as substance abuse, nutrition, physical activity, sexual behaviour, living, working and environmental conditions) paying special attention to inequalities in health; (c) Develop an information system for early warning, detection and surveillance of health threats
due to communicable diseases, including cross-border spread of diseases (and resistant pathogens) (d) Improve systems for the transfer and sharing of health data and information for member states, official bodies and the public; (e) Develop and apply mechanisms for analysis, advice, reporting, information and consultation with Member States and stakeholders on health issues relevant at Community level; (f) Improve analysis and knowledge of the impact of health policy developments on health, and development of links between public health and other policies; (g) Review, analyse and support the exchange of experience of health technologies, including new information technologies; (h) Support the exchange of information and experience on good practice; (i) Develop and operate a ‘joint activities action plan’ drawn up under the e-Europe initiative to improve, through the internet, the availability to the general public of information on health matters and consider the possibility for establishing a system of recognisable Community ‘seals of approval’ for Internet sites”.

A Situation Analysis, conducted by a team of Consultants from Imperial College London (ICON) for the Ministry of Health, has shown that, although there are some examples of fairly good information systems in Cyprus, these are rather fragmented, with significant data gaps (inconsistent, incomplete or absent data sets) and substantial process gaps. These weaknesses have a negative effect on the quality and completeness of the information produced. In their present form, these systems cannot be used to meet the formal information needs of local organisations or the needs of the European Community. There is a necessity for integration of the systems and development of modern technological tools for collection, storage, analysis and reporting of health information.

The purpose of developing the Health Monitoring System in Cyprus is, precisely, to remedy the weaknesses described above. The HMS is not meant to be just a collection of datasets but a system where relevant information is generated in a timely manner to inform policy level, to support decision-making and to monitor and evaluate impact of policy interventions.

To achieve this, Cyprus, through the present project, will: (a) Develop a set of health indicators with comparable definitions to those of the EU Member States, OECD and WHO-Euro. It should be noted in this respect that the intention of the MoH is to adopt the Health Indicators developed by DG-SANCO. Since the development of health indicators by DG-SANCO is still in process, the existing definitions of the OECD or WHO-Euro HFA database frameworks may be used temporarily until such time as they are developed or modified and officially adopted by DG-SANCO. (b) Institutionalise collection and analysis of data required to report indicators, (c) Develop organisational structures and mechanisms to disseminate and share health monitoring information and (d) Use the information to improve knowledge of the health system and assist formulation of health policies.

Through the implementation of this project, the Ministry of Health will be strengthened in carrying out its role as strategic planner, policy maker and regulator of the national healthcare sector. The Statistical Service of Cyprus (CYSTAT) together with the forthcoming General Health Scheme is considered to be the most important stakeholders and collaborators in the development, operation and utilisation of the HMS. Therefore, whatever indicators are adopted by the HMS will have the approval of CYSTAT. The MoH considers that the necessary association of the Health Monitoring System with Eurostat will, most effectively, be achieved through its strong collaboration with CYSTAT since these two statistical Services are in close co-operation. The required flexibility of the Information System of the HMS will allow for the easy adaptation of health indicator definitions as they are gradually adapted by DG SANCO. Other stakeholders like health care providers and medical researchers will also have substantial benefits from the establishment and operation of the Health Monitoring System. Reliable health information will enhance the efforts for introducing systems of quality assurance in healthcare organisations.
3.2 Linked activities:

Experts from Imperial College London, in collaboration with the Ministry of Health, have already conducted a comprehensive study and prepared a ‘Situation Analysis Report’ and a detailed ‘Strategic Options and Plan’ for the development of such a system. They have also delivered a ‘Briefing Paper on Technical Engineering Options’ and a ‘Review of International Technical Standards and the EU Acquis Requirements’. The implementation of the HMS will be based on the conclusions and recommendations of this study.

The Office of the Commissioner for Personal Data Protection is in place and operational and relevant legislation is in force.

Cyprus participates in the meetings organised by DG-SANCO, within the framework of the Health Information Strand of the Public Health Programme 2003-2008.

A Communicable Disease Surveillance Network is already established and operational.

Cyprus has signed Letters of Attestation to participate, as a partner, in a number of health monitoring projects, co-financed by the European Commission, such as the Injury Surveillance System and Eurocat. Cyprus has also declared its readiness to participate in other projects such as the Hospital Data Project and the Rare Diseases Project when they are given approval for funding.

The European Health Insurance Card will be introduced in Cyprus as of 1 January 2006 or earlier.

The Ministry of Health website is ready and is on-line since May 2004. Its content is gradually growing and being improved.

The Health Monitoring Unit of the Ministry of Health has organised a workshop on ICD-10 (International System of Classification of Diseases) and on Medical Death Certification and Codification during the week 26-30 April 2004. This was done in collaboration with WHO-Euro. CYSTAST participated in the Workshop. The introduction of coding practices in the daily recording of health data within healthcare provider organisations is considered to be absolutely essential. Further workshops with a similar content are being planned.

Four nurses who have participated in the above mentioned initiation course in coding are continuing a program of self training under the supervision of the Coordinator of the HMU. They have already started actual codification of causes of death for the year 2003. This activity will continue for the coming years. Continuous engagement in coding is expected to gradually improve the quality of coding. Further training in codification will be part of the training activities of this project. Implementation of automatic coding systems such as ACME (to enhance but not completely replace manual coding) is under consideration.

The Ministry of Health is going through the process of awarding a contract for the installation of a new Integrated Hospital Information System at the New Nicosia General Hospital. The basic modules of this system are scheduled to go into operation in March 2005. A phased implementation of the remaining modules will follow. It will eventually be rolled-out to all the other government hospitals at a later stage.

The new General Health (insurance) Scheme (GHS) is in the process of implementation.

3.3 Results:

The implementation of the HMS project will have the following results:

- Equipment and software of the Health Monitoring Unit delivered and fully operational (activities 3.4a and 3.4b).
- Personnel of the Health Monitoring Unit (HMU) fully trained on operating and maintaining the Health Monitoring System (activities 3.4c and 3.4d).
• System of Health Indicators established (activity 3.4e).
• Metadata Repository established (activity 3.4f).
• Health Data Quality improved (activity 3.4g).
• Prototyping of a Data Warehouse (DW) completed (activity 3.4h).
• Complete Package of Technical Specifications for the Comprehensive Data Warehouse (CDW) delivered (activity 3.4h).
• Comprehensive Data Warehouse implemented and operational (activities 3.4h and 3.4i).

3.4 Activities:
Implementation of the Health Monitoring System requires purchase of suitable equipment (hardware), purchase and development of contemporary software (Prototype Data Warehouse and Comprehensive Data Warehouse) and training of personnel. Data will be collected from a wide variety of existing sources and sources to be created. This involves data quality improvement and requires participation of all stakeholders in all the stages of the design and implementation process. It should be noted that training and other activities necessary for the development of the HMS will be organised in full collaboration with DG-SANCO and Eurostat through CYSTAT.

a. Purchase of equipment
All three sub-projects will need suitable equipment for their implementation. This will be done according to the recommendations of the Imperial College consultants (ICON). It will include the following: A database server for prototyping, several data analysis workstations, data entry workstations, a second powerful database server, database design workstations, and other equipment. (Details for the computer equipment to be acquired are shown in Annex 4).

(Contracts 1 and 3)

b. Purchase of software
Basic software will also be needed for the implementation of all three sub-projects. ICON has described the required software in detail. It will include the following: Database server software and OLAP tools for the prototype DW, a powerful database engine, OLAP tools, application server software and development software package for the CDW. (Details for the software to be licensed are shown in Annex 5).

(Contracts 1 and 3)

c. Provision of consulting services

Consulting services for sub-project 1 and sub-project 2 (contract 2).
For the implementation of sub-project 1, two types of consultant services are needed:

• Consulting on Health Monitoring Systems. The HMS consultant will provide strategic technical assistance for the activities related to the development of sets of HM indicators.
• Consulting on Health Information Systems. The HIS consultant will provide technical assistance for the activities related to the inventory of current data sources and development of technological solutions for the prototype metadata repository.

For the implementation of sub-project 2, two types of consultant services are needed:
• Consulting on Health Monitoring Systems.
  The HMS consultant will provide strategic technical assistance for activities related to
  the integration of data, derivation and interpretation of the Health Indicators
• Consulting on Data Warehouse Systems.
  The DW consultant will provide technical assistance for the activities related to the
development of technological solutions for the prototype systems.

**Consulting services for sub-project 3 (contract 4).**

For the implementation of sub-project 3, three types of consultant services are needed:

• Consulting on Health Monitoring Systems
• Consulting on Health Information Systems
• Consulting on Data Warehousing

These three consultants will be required to formulate the technical specifications and
evaluation of the outcomes of the project.

d. **Training**

This will involve training of the 12 members of the HMU staff in operating, maintaining and
using the Health Information System (HIS). It will include a ‘train-the-trainers’ module so that
it will be possible to provide training to other colleagues involved with data collection at source
level. Most of the training will be provided within the premises of the Health Monitoring Unit
by the consultants who will be providing the technical assistance (Contracts 2 and 4). The
training will be done in parallel with the development of the health indicator repository, the
prototype DW and the comprehensive DW. Seminars will be organised in order to train data
collection staff at source level. The experts will also be providing training to staff involved with
data collection and data entry in relation to activities aimed at improvement of data quality.

Training will also be provided to the users of the information system and key stakeholders
(including other officials of the government of Cyprus, particularly officers of other
departments of the Ministry of Health such as administrators, hospital doctors, hospital
managers, hospital administrative staff, clinical coders, private doctors, officials of the General
Health Scheme, officials of the Department of Information Technology Services of the Ministry
of Finance, the Statistical Service, the Population Registry of the Ministry of Interior, the Social
Security Department and possibly the Office of the Commissioner for Personal Data
Protection) must be trained to have a common understanding of how management and health
economics data can be extracted to generate useful information that can be used to support
decision-making and policy formulation. It is estimated that a minimum of 30 officials from
other departments will need some form of training.

e. **Development of a system of health indicators**

This is the first and most critical task of the implementation of the HMS. It involves initiating a
flexible, expandable prototype framework of health indicators based on the frameworks of the
European Union, OECD and WHO-Euro. Indicators developed by past and on-going EU
projects will be taken into account as appropriate. This ‘Cyprus framework’ will initially
include a limited list of available indicators. It will include their operational definitions,
description of the datasets and methods of data collection at source level. With gradual
expansion it will develop into a comprehensive set of Health indicators.

(Contract 2)
f. Establishment of a metadata repository
The purpose of establishing a metadata repository is to make the definitions of indicators available in electronic format. This will facilitate the definition and establishment of the appropriate procedures for data collection, calculation and analysis of the indicators.
(Contract 2)

g. Data quality improvement
Another critical task of the implementation of the HMS is to initiate a continuous process of improvement of the quality of data produced in key source systems. A limited number of the most important source systems will be identified and efforts will, initially, be concentrated on them. Existing data will be analysed to identify characteristic misconceptions and inconsistencies within the datasets. Based on the findings of this analysis a data quality improvement strategy will be developed and implemented. This will be a continuous process.
(Contract 2)

h. Development of Information Technology (software)
This will be done by experts in Data Warehouse technology with the collaboration of and input from the staff of the HMU. The recommended method of information system development is to adopt a combined method of a cyclical prototyping process followed by a linear development process.

One of the purposes of prototyping a DW (sub-project 2) will be to develop a complete package of the technical specifications for the initiation of the Comprehensive Data Warehouse (sub-project 3). The cyclical prototyping process will start with a quick design and development of a prototype DW, followed by a number of iterations of a cycle, consisting of ‘implementation-evaluation-redefinition-redevelopment-reimplementation…’ and so on, until the final definition (specifications) of the required CDW are properly defined.

When these are ready, contracting for the (linear) development of the CDW, by an IT company, experienced in DW technology, will be launched (sub-project 3). Implementation of the CDW will involve refining and migration of the final prototype system to the appropriate technological platform.
(Contracts 2 and 4).

i. Operation of the Information System
This will be done by the trained staff of the Health Monitoring Unit, supported whenever necessary, by the consultants and in cooperation with the other stakeholders and users of the information produced (contract 4).

3.5 Lessons learned
Three useful studies, relevant to the development of health information systems, have recently been prepared for the Government of Cyprus. They have been a source of highly useful information and important lessons have been learned. The preparation of this Project Fiche, to a large extent, draws on these reports, predominantly the third one. The three studies are:

- ‘Assessment and Recommendations for the Enhancement of Registries and Health Informatics in Cyprus’, prepared by The School of Public Health, University at Albany, State University of New York (1999).
The study conducted by Imperial College London Consultants for the Cyprus Ministry of Health (2003). This study has delivered four important reports:

- ‘Strategy for Establishing a Health Monitoring System in Cyprus - Situation Analysis Report’
- ‘Strategic Options and Plan for Development of a Health Monitoring System in Cyprus’
- ‘Review of International Technical Standards and the EU Acquis Requirements for Development of Health Monitoring Systems’, a briefing paper

These three studies and past experience in development or reform of health information systems in Cyprus (such as the implementation of the Hospital Information System in most of the state hospitals and the development of a number of Registers) have taught many important lessons. Some of these are outlined below:

- The proposed Cyprus Health Monitoring System will consist of an extensive collection of component information systems, organisations, people in the organisations, the public, information flows and information interfaces.
- It must be designed to meet the information needs of the Ministry of Health, other Ministries, the General Health Scheme, non governmental organisations, the public, the Community Health Monitoring System and other international organisations.
- The HMS must be able to integrate the available information sources.
- It must help improve the quality of existing systems by identifying data gaps and process gaps and facilitate the design, development and integration of new systems.
- A number of governmental organisations in Cyprus already have reasonably good and usable information but they are highly fragmented. Integrating such systems will improve the quality and greatly enhance the production of information and knowledge.
- Important information systems that need to be improved or created include those of civil registration e.g. births and deaths registers and foetal death registers as well as registers of diseases of high public health impact such as cardiovascular disease, cancer, diabetes, injuries, mental disorders, neurodegenerative diseases, rare diseases and congenital malformations.
- Codification of diagnostic terms, medical procedures and administrative and financing terms, according to international systems of classification should be used in patient records in addition to the written descriptions. ICD-10 is well established for causes of death and for in-patient diagnoses. The International Classification of Primary Care (ICPC) should be adopted for primary care and the System of Health Accounts (SHA) should be used for administrative and financing terms.
- There is good potential for collaboration between government agencies and other stakeholders. The Health Monitoring Unit of the Ministry of Health should play a coordinating role in this respect.
- The existence of a unique personal identifier for all Cyprus citizens will facilitate integration. Issues of confidentiality and personal data protection are extremely important. They can be regulated and controlled by the new Office of the Commissioner for Personal Data Protection.
- A major gap is the lack of any information from the private sector which plays a significant role in healthcare service supply. In some sectors, there is also lack of timely information from routine data collection, necessitating the use of surveys.
• **Cooperation** with and support from other European countries, with previous experience in the field, and provision of **technical assistance** will be vital to the development of the HMS.

• Planning must be done within the **EU framework** by creating a health monitoring function as part of EU integration. This is a **golden window of opportunity** for Cyprus. The framework of health indicators being developed by the **ECHI project** should be the cornerstone of the metadata repository.

• Attempts to improve existing health information systems, or create new ones, without building the necessary **administrative capacity** are inefficient and wasteful.

• Preparing a good **strategic plan** before the implementation of a new system is essential. Such a plan should include a clear definition of the content of the system, the organisational structure, the legal aspects, the approach to stakeholder management, definition of the IT strategy and a detailed implementation schedule.

• Failing to involve all the **stakeholders** in the initial stages of planning and implementation is a major risk factor.

• The **complexity** of the tasks needed to build information systems should not be underestimated. Moving too fast may encounter unforeseen obstacles and result in failures. Setting priorities, concentrating on building the most important basic elements and following a step by step implementation plan, is more likely to succeed than trying to achieve everything at once.

• Cyprus lacks a long tradition of good quality **data collection culture**. This needs to be cultivated gradually.

• The **HMU** must exploit the available Government **IT infrastructure** with the Government Data Network. This offers a platform on which the Cyprus HMS can build.

• Providing **feedback** to data suppliers is vital for the viability of information systems.

4. **Institutional Framework**

The beneficiary institution is the Ministry of Health (MoH). Its mission is “the continuous improvement of the health of the population of Cyprus, through prevention of disease, and provision to every citizen of a high level healthcare, under conditions that ensure the right of the patient to get high quality medical care with dignity”.

The main features of the Ministry’s strategy are: a) emphasis on the prevalence and incidence of diseases and mortality data, b) provision of equal opportunities for health care to all the citizens,
irrespective of their socio-economic status and place of residence, c) utilisation to the greatest possible extend of the co-operation between the public health services and the private health sector, and d) improvement of the effectiveness and efficiency of the public health services.

The main functions and activities of the Ministry of Health are: design and execution of disease prevention programmes, including training of personnel and public awareness campaigns, primary health care, including basic health care which is affordable by all the citizens, provision of sufficient immunisation coverage, health care to the mother and child, high levels of hygiene, dissemination of information regarding the main health problems aiming at prevention through awareness and provision of secondary and tertiary healthcare.

The Ministry of Health is organised into 5 Departments, Medical and Public Health Services, Psychiatric Services, Dental Services, Pharmaceutical Services and the State General Laboratory. The existing organisational structure of the MoH is shown in Annex 6. The newly established Health Monitoring Unit is under the direct control of the Permanent Secretary of the Ministry and is attached to the Administration section of the Ministry. (Its envisaged organisational structure is shown in Annex 7).

The Ministry of Health will establish a Project Steering Committee with the participation of the HMU and other stakeholders involved namely the General Health Scheme, the Statistical Service, the Department of Medical and Public Health Services and other departments of the MoH. One representative of the Planning Bureau will be participating.

Some of the information generated by the HMS will be useful in deciding the nature of the Institutional changes in the context of the ongoing efforts for reorganisation of the Ministry and its Services.
5. Detailed Budget (MEUR)

<table>
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<th>National Co financing *</th>
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* Joint co-financing

6. Implementation Arrangements

6.1 Implementing Agency

**Ministry of Health**

1448 Nicosia

Cyprus

Tel. +357 22 400108  
Fax. +357 22 434189  

Web site: to be announced shortly

**Project Authorising Officer (PAO)**

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Fax. +357 22 875021 (temporary - Attention Dr. Pavlou)  

E-mail: ppavlou@moh.gov.cy
6.2 Twinning
N/A

6.3 Non-standard aspects
N/A

6.4 Contracts

<table>
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<th>Contract</th>
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<td>Contract 2</td>
<td>Services for sub-projects 1 and 2</td>
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<td>Contract 3</td>
<td>Supply of computer equipment and software for sub-project 3</td>
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</table>

7. Implementation Schedule

7.1 Start of tendering/call for proposals
October 2004

7.2 Start of project activity
January 2005

7.3 Project Completion
July 2007

8. Sustainability

- The Coordinator of the Health Monitoring Unit is already positioned and is currently assisted by two supporting staff. Furthermore, it was decided to place to the Unit two Health Officers of the Ministry of Health that will assume the duties of the Health Economist and the Health management Specialist, as from September 2004. It was also decided to transfer from the Department of Informatics to the Unit a Data Analyst/ Liaison Officer, a Senior Database Administrator and a database Administrator. Three Data Analysts will also be hired and in the meantime these functions will be assumed by temporary staff. Expenditure related to administrative function is covered through the annual National Budget.
The required maintenance and update agreements will be covered by national funds through separate contracts that will be signed by the contracting authority. Adequate financial provisions will be included in the relevant financial year’s Government Budget. It should be noted in this respect that the provisional budget prepared by the Imperial College Consultants, on which the budgetary estimates of the Project Fiche were based, include detailed provisions for maintenance and expansion (including software and hardware) of the Health Monitoring Unit over the 5 years following the completion of this project.

9. Conditionality and sequencing

Sequencing:
- Sub-projects 1 and 2 will be implemented concurrently
- Sub-project 3 will be initiated after the completion of sub-projects 1 and 2.

Important Milestones:
- The signing of contracts 1 and 2 and the initiation of the implementation process of the relevant sub-projects
- Completion of the prototype health indicators framework and metadata repository.
- Initiation and maintenance of the process of data quality improvement at source level.
- Completion of the prototyping cycle and finalisation of the specifications for the Comprehensive Data Warehouse (CDW).
- The signing of contracts 3 and 4 and initiation of the development of the CDW software.
- Completion and acceptance of the CDW.
ANNEXES TO PROJECT FICHE

1. Logical framework matrix in standard format (compulsory)
2. Detailed time implementation chart (compulsory)
3. Contracting and disbursement schedule by quarter for full duration of programme (including disbursement period) (compulsory)
4. Description of the required computer equipment
5. Description of the required computer software
6. Organisational Structure of the Ministry of Health
7. Organisational Structure of the Health Monitoring Unit
8. List of relevant Laws and Regulations (optional)
9. Reference to relevant Government Strategic Plans and Studies (may include Institution Development Plan, Business Plans, Sector Studies etc.) (optional)

GLOSSARY

ACME       Automated Classification of Medical Entities
CDW       Comprehensive Data Warehouse
CMO       Chief Medical Officer
CYSTAT      Cyprus Statistical Service
DG-SANCO  Directorate General for Health and Consumer Protection
DMO       District Medical Officer
DMPHS     Department of Medical and Public Health Services
DW       Data Warehouse
GHS       General Health Scheme
HIS       Health Information System
HMS       Health Monitoring System
HMS-TWG’s Health Monitoring System Technical Working Groups
HMS-WG    Health Monitoring System Working Group
HMU       Health Monitoring Unit
I       Investment
IB       Institution Building
ICON Imperial College London Consultants
IFI
IT       Information Technology
MEUR  Million Euro
MoH    Ministry of Health
MoI    Ministry of Interior
MoLSI Ministry of Labour and Social Insurance
OECD Organization of Economic and Cooperation Development
PDW Prototype Data Warehouse
WHO-Euro  World Health Organisation – Regional Office for Europe
**LOGFRAME PLANNING MATRIX FOR**

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<th>PROJECT: Development of a <strong>Health Monitoring System</strong> for Cyprus</th>
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<td>CRIS number: 2004/016-926.05.02</td>
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| Contracting period expires: 15 December 2006  |
| Disbursement period expires: 15 December 2007  |
| **Total Budget**: 1,669 MEUR  |
| **EU Contribution**: 1,600 MEUR  |

### Overall Objective
- To develop modern organizational, functional and management capability in order to improve information and knowledge for monitoring health status, trends and determinants in Cyprus.
- To provide timely, reliable, compatible and comparable health information to the Commission and international organisations.
- To enable Cyprus participate in all European disease surveillance networks.

### Project Purpose
- To develop a contemporary Health Monitoring System for Cyprus in order to generate health information in a timely manner to inform policy level to support decision-making and to monitor and evaluate impact of policy interventions. This will include the following:
  - Development of a set of health indicators with comparable definitions to those of the EU

### Objectively Verifiable Indicators

<table>
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<tr>
<th>Overall Objective</th>
<th>Objectively Verifiable Indicators</th>
<th>Sources of Verification</th>
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<td>• To develop modern organizational, functional and management capability in order to improve information and knowledge for monitoring health status, trends and determinants in Cyprus.</td>
<td></td>
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<tr>
<td>• To provide timely, reliable, compatible and comparable health information to the Commission and international organisations.</td>
<td></td>
<td></td>
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<tr>
<td>• To enable Cyprus participate in all European disease surveillance networks.</td>
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<td></td>
</tr>
<tr>
<td>• Ability of Cyprus to produce, disseminate and use health information of sufficient quality to effectively support the functions of the Ministry of Health and other users by July 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ability of Cyprus to produce and supply high quality, standardised health information to the Commission and other international organisations and integration of Cyprus into the European health data networks by July 2007.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectively Verifiable Indicators</th>
<th>Sources of Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ability of Cyprus to produce, disseminate and use health information of sufficient quality to effectively support the functions of the Ministry of Health and other users by July 2007</td>
<td></td>
</tr>
<tr>
<td>• Steering Committee’s reports.</td>
<td></td>
</tr>
<tr>
<td>• Initial core set of available ‘Cyprus Health Indicators’ finalised and their descriptions formalised by May 2005.</td>
<td></td>
</tr>
<tr>
<td>• Monthly updates of progress reports by HMS-WG.</td>
<td></td>
</tr>
<tr>
<td>• Extended list of ‘Cyprus Health Indicators’ (benchmarked on all the OECD and WHO-Euro HFA indicators) defined and their descriptions formalised by September 2005.</td>
<td></td>
</tr>
<tr>
<td>• Monthly updates of progress reports by HMS-TWG.</td>
<td></td>
</tr>
<tr>
<td>• Extended list of indicators uploaded</td>
<td></td>
</tr>
<tr>
<td>• Monthly updates of progress reports by Consultants.</td>
<td></td>
</tr>
<tr>
<td>• Risk of Business environment failure: the system may become inappropriate to requirements due to changing the legal environment and practice.</td>
<td></td>
</tr>
<tr>
<td>• Support and guidance from Commission</td>
<td></td>
</tr>
</tbody>
</table>

### Assumptions
- Risk of Business environment failure: the system may become inappropriate to requirements due to changing the legal environment and practice.
- Support and guidance from Commission.
<table>
<thead>
<tr>
<th>Member States, OECD and WHO-Euro.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Institutionalisation of the collection and analysis of data required to report indicators.</td>
</tr>
<tr>
<td>• Enhancement of organisational structures and mechanisms to disseminate and share health monitoring information.</td>
</tr>
<tr>
<td>• Promotion of the use of information to improve knowledge of the health system and assist formulation of health policies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Objectively Verifiable Indicators</th>
<th>Sources of Verification</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Personnel of the Health Monitoring Unit fully trained in operating and maintaining the Health Monitoring System.</td>
<td>• 12 members of the Health Monitoring Unit staff fully trained and engaged in implementing the data quality improvement action plan by September 2005.</td>
<td>• Regular review by senior management of the Ministry of Health.</td>
<td>• The most important basic assumption is political and senior management commitment to support the establishment of the HMS.</td>
</tr>
<tr>
<td>• Equipment of the Health Monitoring Unit delivered and fully operational.</td>
<td>• All 12 members of the HMU staff fully trained and engaged in extending the use of the PDW and expanding the sources of data.</td>
<td>• Comparative Situation Analysis (before and after introduction of the HMS).</td>
<td>• Support from DG-SANCO Information Unit C2.</td>
</tr>
<tr>
<td>• System of Health Indicators and Metadata Repository established.</td>
<td>• Ability of the HMU to deliver health information and reports, in a timely manner, to key stakeholders including local users, the Commission and international organisations.</td>
<td>• Comments by staff of source systems.</td>
<td>• Readiness and commitment of key stakeholders to be involved in the inception, design and implementation of the system.</td>
</tr>
<tr>
<td>• Prototyping of a Data Warehouse completed. Data Quality improved and Complete Package of Technical Specifications for the CDW delivered.</td>
<td>• Increased use of information provided by the HMU to key stakeholders.</td>
<td>• Comments by end-users.</td>
<td>• Effective management of key stakeholders</td>
</tr>
<tr>
<td>• Comprehensive Data Warehouse implemented.</td>
<td>• 12 members of the Health Monitoring Unit staff (as shown in Annex 7), plus a minimum of 30 officials from other organisations, fully trained and operational by July 2007.</td>
<td>• Regular review by senior management of the MoH.</td>
<td>• Coping with the volume and speed of change.</td>
</tr>
<tr>
<td></td>
<td>• All necessary equipment and basic software (as shown in annexes 4 and 5) of the Health Monitoring Unit delivered and operational according to implementation plan without delays.</td>
<td>• Regular review by senior management of the MoH.</td>
<td>• Skilful management of the HMU.</td>
</tr>
<tr>
<td></td>
<td>• Successful creation and maintenance of the metadata repository with incorporation of the European Commission’s current shortlist of ‘First Phase Core Indicators’, as selected by the ECHI-2 project (currently 45 regularly available, 36 partly available and 5 non-available</td>
<td>• Regular review by the Planning Bureau.</td>
<td>• Skilful coordination and</td>
</tr>
</tbody>
</table>
• Establishment and timely operation of a prototyping process for a data warehouse with finalisation of a complete package of technical specifications for the CDW by October 2005.
• Completion of the CDW by July 2007.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Means</th>
<th>Sources of Verification</th>
<th>Assumptions</th>
</tr>
</thead>
</table>
| Note: more extensive explanations on activities are given in the project fiche. | • Training workshops and seminars delivered by the consultants.  
• Development of locally adapted training courses in epidemiology, public health management and health information systems design.  
• Open tender procedures for consulting services.  
• Close supervision of the work of the HMU staff.  
• On-site training of staff of the HMU.  
• Training of and input from staff working in source systems.  
• Training of end-users by trained staff of the HMU.  
• Open tender procedures for equipment.  
• Open tender procedures for software.  
• Development of recommendations and measures to improve health data collection. | • Tender documents  
• Monitoring and assessment reports | • Timely availability and recruitment of human resources.  
• Risks of technical failures are minimised by choosing a sound technological platform and by developing a robust and smoothly functioning IT system.  
• Risks of data failure are minimised by providing adequate training and IT support to data entry personnel, by incorporating quality checks in the system and by effective management of public and private health sector involvement.  
• Risks of user failure are minimised by training and supporting the users and by designing a system that generates a variety of user friendly reports to meet disparate user needs.  
• Organisational failure: the multitude of stakeholders, multitude of needs, multitude of change processes happening simultaneously pose a risk. This will be mitigated by |
- **Purchase of equipment** (purchase of hardware for the information technology system of the HMS)
- **Purchase of software** (purchase of basic software and development tools for the IT system of the HMS)
- **Development of Information Technology** (development of new software for the HMS i.e. the prototype DW and the comprehensive DW)

- Open tender procedure for the development of the CDW by an IT company.

<table>
<thead>
<tr>
<th>Choosing the method of development and design of the system to meet multiple objectives of key organisations involved.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Failure in the business environment:</strong> the system may become inappropriate to the market requirements due to changing business practice instigated by others or by not supporting or changing business strategy adequately or simply not coping with the volume and speed of business process needs economically. The mitigation of these external risks is more to do with top level consistent stakeholder management through creating a high profile for the HMS, interdepartmental collaboration, and involvement of key stakeholders in the design circle.</td>
</tr>
</tbody>
</table>
# Detailed Time Implementation Chart for the Project

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-project 1 - Health Indicators and Metadata Repository</td>
<td>D D C I I I I I I I I X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-project 2 - Prototype Data Warehouse</td>
<td>D D C I I I I I I I I I I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-project 3 - Comprehensive Data Warehouse</td>
<td>D D D D D D D D C C I I I I I I I I I I I I</td>
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</tr>
</tbody>
</table>

D = Design  
C = Contracting  
I = Implementation  
X = Closure
CUMULATIVE CONTRACTING AND DISBURSEMENT SCHEDULE

Project title: Development of a Health Monitoring System for Cyprus

Project number:

All figures in million EURO

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTED</td>
<td>0.425</td>
<td>0.425</td>
<td>0.425</td>
<td>0.425</td>
<td>1.600</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DISBURSEMENT</td>
<td>0.162</td>
<td>0.290</td>
<td>0.383</td>
<td>0.425</td>
<td>0.929</td>
<td>1.143</td>
<td>1.296</td>
<td>1.450</td>
<td>1.600</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

NB: 1. All contracting should normally be completed within 6-12 months and must be completed within 24 months of signature of the FM.

2. All disbursements must be completed within 36 months of signature of the FM.
DESCRIPTION OF THE REQUIRED COMPUTER EQUIPMENT

Specific hardware systems for maintenance and administration of the HMU Prototype and Comprehensive Data Warehouses. (It does not include user-end hardware or data source hardware. These will be provided by the infrastructure project of the Ministry of Health using client-server technology).

<table>
<thead>
<tr>
<th>Sub-project</th>
<th>Contract</th>
<th>Description</th>
<th>Purpose</th>
<th>Number of items</th>
<th>(MEUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-projects 1 and 2</td>
<td>Contract 1</td>
<td>Database Server</td>
<td>for prototyping</td>
<td>1</td>
<td>0.078</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Analysis Workstations</td>
<td>for data analysis</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Entry Workstations</td>
<td>for data entry</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sub-project 3</td>
<td>Contract 3</td>
<td>Powerful Database Server</td>
<td>for maintenance of the server-side of the Data Warehouse</td>
<td>1</td>
<td>0.078</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Database Design Workstations</td>
<td>for renewing the computers of the database administrators</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total for computer equipment 0.156
### DESCRIPTION OF THE REQUIRED COMPUTER SOFTWARE

Specific software for maintenance and administration of the HMU Prototype and Comprehensive Data Warehouses. (It does not include user-end software or data source software).

The budget for the software licenses is developed with the assumption that basic software, such as operation systems and standard office applications, will be included in the computer hardware price.

<table>
<thead>
<tr>
<th>Sub-project</th>
<th>Contract</th>
<th>Description</th>
<th>Purpose</th>
<th>Number of licenses</th>
<th>(MEUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-project 1 and 2</td>
<td>Contract 1</td>
<td>Database Server Software including the database engine software and OLAP tools</td>
<td>for prototyping</td>
<td>1</td>
<td>0.012</td>
</tr>
<tr>
<td>Sub-project 3</td>
<td>Contract 3</td>
<td>Powerful Database Engine</td>
<td>for the maintenance of databases comprising the Data Warehouse</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OLAP tools</td>
<td>for creation of data structures, data presentation and analysis</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application server software package</td>
<td>for integration of data presentation and analysis with web technology.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development software package</td>
<td>for developing the business intelligence toll</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total for computer software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.118</td>
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</tbody>
</table>
ORGANISATIONAL STRUCTURE OF THE MINISTRY OF HEALTH
ORGANISATIONAL STRUCTURE OF THE HEALTH MONITORING UNIT

Health Monitoring Team

- HMS Coordinator
  - Coding /Metadata/ Training Specialist
  - System Analyst/ Liaison Officer
  - Health Economist
  - Health Management Specialist

Data Administration Team

- Senior Database Administrator
  - Data Entry Specialist
  - Database Administrator
  - Data Analyst
  - Data Analyst
  - Data Analyst

System Support