

CHAPTER 3

THE GOVERNMENT OF THE
HONG KONG SPECIAL ADMINISTRATIVE REGION

GENERAL REVENUE ACCOUNT

GOVERNMENT SECRETARIAT

Health and Welfare Bureau
Finance Bureau

PUBLIC BODY

Hospital Authority

The implementation of the
Information Technology/Information Systems
Strategy of the Hospital Authority

Audit Commission
Hong Kong
3 October 1997

CHAPTER 3

THE IMPLEMENTATION OF THE INFORMATION TECHNOLOGY/INFORMATION SYSTEMS STRATEGY OF THE HOSPITAL AUTHORITY

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Summary and key findings

1. **Introduction.** It is a corporate strategy of the Hospital Authority (HA) to create a seamless health care system which will lead to maximum health care benefits for the community. To support this corporate strategy, the HA planned to develop and implement an integrated health care information system which would link hospitals and clinics together through communications networks. In order to implement this strategy, the HA would need to invest in information technology (IT).

2. **Information Technology/Information Systems (IT/IS) Strategy.** As early as 1991, the HA developed its IT/IS Strategy which provided for the implementation of IT/IS in three stages over a period of six years. In 1994, the scope and time span of the Strategy were extended to align with the HA's Corporate Plan to Year 2000. In early 1997, the Strategy was re-examined and extended to Year 2002. Up to 1997-98, the Government has allocated a total of \$726 million to the HA for the funding of the HA's IT activities.

3. **Audit review.** More than five years have elapsed since the initial implementation of the IT/IS Strategy. Audit reviewed the progress of the implementation of IT in the HA. The audit revealed that:

- there was a slippage of one to two years for some of the information systems under Stage 1 of the IT/IS Strategy;
- benefits to justify IT investments to the Government were not always stated in quantifiable terms;
- funding the HA's IT projects on a yearly basis under the Government's capital account block vote is not appropriate; and
- there is scope for improvement in the HA's progress reporting to the Government.

4. **Audit recommendations.** Audit has recommended that the HA should:

- define targets for operational efficiency and service improvement in quantifiable and measurable terms in order to adequately justify the HA's IT investments; and
- quantify benefits of the IT projects in sufficient detail in its funding submissions to the Government in order to facilitate the appraisal of its IT investments.

5. Audit has also recommended that the Government should:

- consider revising the existing arrangement for financing the HA's IT projects;
- consider approving financial commitments for the implementation of the HA's IT projects, similar to the established funding practice for the implementation of the Government's information systems strategies; and
- review and revise the existing arrangements for reporting the HA's IT activities, taking into account the deficiencies of the present procedures as observed by Audit.

6. **Response from the HA.** The Chief Executive, HA has pointed out that the individual IT projects are well-managed within the HA and that he is satisfied with the current approval arrangements. It is only a question of the amount of funding.

7. **Response from the Administration.** The Secretary for the Treasury and the Secretary for Health and Welfare have both agreed that the HA should conduct proper cost-benefit analyses for its IT projects and that there is scope for improvement in the progress reporting of the HA's IT projects. They have no in-principle objection to the audit recommendation of applying the Government's funding procedures to the HA, which would involve seeking approval of the Finance Committee of the Legislative Council of the HA's IT projects costing over a specified limit.

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The implementation of the Information Technology/Information Systems Strategy of the Hospital Authority

INTRODUCTION

3.1 The Hospital Authority (HA) was established under the Hospital Authority Ordinance (Cap. 113) in December 1990 as a statutory body to oversee the management of the public hospitals system and to recommend to the Government on policies relating to public hospital services in Hong Kong. In December 1991, the HA took over the management and control of all ex-government and ex-subvented hospitals. As at August 1997, there were 43 public hospitals and 49 specialist out-patient clinics under the management of the HA.

3.2 According to the Report of the Provisional Hospital Authority (PHA) of December 1989, which was endorsed by the former Governor-in-Council in March 1990, the HA should have maximum autonomy and flexibility in utilising its resources to fulfil its objectives. However, the PHA accepted the need for it to follow the Government's system of resource allocation and to compete for resources for new and improved services against other public expenditure needs.

3.3 While the Government remains responsible for the overall policy on the provision of public hospital services and for funding the activities of the HA, the HA is accountable to the Government for the effective and efficient delivery of public hospital services. The administration and operation of the HA are governed by the Memorandum of Administrative Arrangements (MAA) which has not yet been formally agreed and signed by the Government and the HA.

THE HA'S CORPORATE PLAN

3.4 According to the Corporate Plan to the Year 2000, which was endorsed by the HA in March 1994 and revised in October 1995, the corporate goal of the HA was stated as:

" The Hospital Authority will collaborate with other health care providers and carers in the community to create a seamless health care system which will maximise health care benefits and meet community expectations."

The HA's goal of a seamless health care system refers to the provision of continuous, holistic care to patients through intimate collaboration among all carers in the primary, secondary and

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tertiary health sector, welfare agencies, family members, individuals and community carers. To support the corporate strategy of developing a seamless health care system, the HA should, according to the Corporate Plan, work on the development of an integrated health care information system and communications network. To enable such an integrated health care information system and communications network to be developed, the HA would need to invest in information technology (IT). Hospitals and clinics would have to be joined together through the building of a digital communications infrastructure. A territory-wide public hospital patient database would also have to be created. These facilities would establish a basis that could be extended to other health care providers, when patient referral, service networking or shared-care programmes could be worked out and agreed upon.

THE HA'S IT/IS STRATEGY

3.5 **Strategy developed in 1991.** The HA's Corporate Plan was supported by an Information Technology/Information Systems (IT/IS) Strategy. The HA developed its first IT/IS Strategy in 1991. The Strategy was endorsed by the Sub-Committee on Information Technology (SCIT) (Note 1) in August 1991 and the Executive Committee (Note 2) of the HA in October 1991. The IT/IS Strategy in 1991 provided for the implementation of the HA's IT activities in three stages, as follows:

Stage 1 (1992-1994): The hospital databases and the network

Stage 1 was to establish the infrastructure for data collection and access, the initial networking to and between hospitals and the key corporate databases of patient, staff, finance and assets. The initial systems proposed for this stage were the Integrated Patient Administration System, the

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Human Resources/Payroll System, the Interim Management Information System and the Hospital Based Financial System;

Stage 2 (1993-1995): The Ward

Stage 2 was to introduce computerisation at the ward level to assist the providers of patient care (doctors, nurses and allied health personnel) in their delivery of patient care. This phase would greatly increase the size and scope of the network within the hospitals as computerisation would be introduced to diagnostic and therapeutic functions; and

Stage 3 (1995-1997): The Integrated Hospital Information System

Stage 3 was to complete the full integration of hospital information systems to provide detailed clinical costing and management information.

3.6 **Revision of Strategy in 1994.** The HA's IT/IS Strategy was reviewed in 1994 to ensure alignment with the Corporate Plan to Year 2000 (see paragraph 3.4 above). In line with the HA's corporate goal, the directions for the HA's IT/IS Strategy were updated, extended and included the following:

- (a) the establishment and building-up of four key databases comprising patients, staff, finance and assets;
- (b) the development of the requisite computer applications to support health service planning and operations, resources management and continuous quality improvement;

Note 1: *SCIT was a Sub-Committee under the Executive Committee of the HA to oversee major IT strategy planning and development, to set priorities for system development and implementation, and to monitor the impact and cost-effectiveness of the introduction of computerisation programmes. The SCIT was dissolved in 1994 as the HA considered that most of the policy issues on IT had then been agreed by the Sub-Committee.*

Note 2: *The Executive Committee, headed by the Chairman of the HA and consisted of the Chairmen and Vice-Chairmen of the various functional committees, oversaw the operation of the HA during the period from 1991 to 1993. The Committee was dissolved in April 1994.*

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- (c) the setting up of IT infrastructures such as corporate data centres and cluster-hospital data centres and digital communications networks within and between hospitals and specialist out-patient clinics;

- (d) the establishment of consistent corporate IT strategies, data standards, security measures and policies to facilitate the sharing of common data and information by hospitals and clinics, while ensuring protection of confidential patient and staff information;

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- (e) the extension of systems and infrastructures beyond public hospitals to other health care providers, where applicable and appropriate;
- (f) the development of integrated Computer-based Patient Record and intelligent medical cards for patients; and
- (g) the progressive development of relevant knowledge-based and decision support systems to channel information and knowledge (e.g. local and international databases, medical literature and research data) to health care professionals (e.g. clinical guidelines and protocols, drug toxicity information).

Together with these updated directions and a greater emphasis on organisational learning to sustain IT usage, and in order to align with the Corporate Plan, the time span of the three-stage IT/IS Strategy was extended to Year 2000. Table 1 below shows the systems planned for implementation under the three stages of the revised Strategy.

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Table 1

Information systems under the HA's IT/IS Strategy (1992-2000) as revised in 1994

Stage	System Name
1 (1992 to 1995)	Integrated Patient Administration System
	– Hong Kong Patient Master Index
	– Admission/Discharge/Transfer
	– Out-patient Registration
	– Patient Billing/Revenue Collection
	Out-patient Appointment System
	Pharmaceutical Supplies System
	Interim Management Information System
	Medical Records Tracing System
	Medical Records Abstracting System
	Human Resources/Payroll System
	Hospital Based Financial System
	Asset/Materials Management Systems
	2 (1994 to 1998)
Laboratory Results Reporting System	
Radiology Information System & Radiology Order Entry	
Specialty Clinical Information Systems	
Ward Order Entry System (for Laboratory, Pharmacy Orders)	
Medical Electronic Data Interchange	
Out-patient Clinical Operations Support System for specialist out-patient clinics	
Decision Support/Executive Information Systems	
3 (1997 to 2000)	Remaining systems to provide integrated hospital information within an overall health information system to support seamless health care in Hong Kong

Source: HA's records

3.7 **Revision of Strategy in 1997.** In early 1997, the HA considered that it was an appropriate time to re-examine the IT/IS Strategy and to further define the three-stage approach of the Strategy for greater clarity. In the revised Strategy reported to

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the Planning Committee (Note 3) in February 1997, Stage 2 was further divided into Stages 2A, 2B and 2C. Stage 2A was concerned with the integrated clinical management and clinical departmental information systems for major acute hospitals (Note 4) and Stage 2B with these systems for medium-sized hospitals (Note 5). Stage 2C systems were planned to support the full integration and content of the Computer-based Patient Record and schedule services around the patients. The completion date of the Strategy was further extended from Year 2000 to Year 2002 for the following reasons:

- implementation of HA-wide systems and clinical support systems in new hospitals which were not planned for in the original Strategy;
- increase in the scope of the Strategy; and
- reduced level of the Government's IT funding as the level of funding of the IT Block Vote (Note 6) was then expected to drop by around 10% for 1997-98 as compared with 1996-97.

Table 2 below shows the systems under implementation or planned for implementation under the Strategy as revised in February 1997.

Table 2

Information systems under the HA's IT/IS Strategy (1992-2002) as revised in February 1997

Stage 1 (1992-98)	Stage 2 (1994-	Stage 3 (1996-2002)
--------------------------	-----------------------	----------------------------

Note 3: *The Planning Committee, headed by the Chairman of the HA, was formed in August 1995 to coordinate and advise on short-term and long-term strategies and plans for the provision of hospital services and supporting services.*

Note 4: *Major acute hospitals, also defined as Group 1 hospitals under the HA's revised hospital group classification, refer to general acute hospitals with 24-hour accident and emergency services. As at September 1997, there was a total of eleven Group 1 hospitals.*

Note 5: *Medium-sized hospitals, also defined as Group 2 hospitals under the HA's revised hospital group classification, refer to hospitals with a mix of acute and non-acute services. As at September 1997, there was a total of eight Group 2 hospitals.*

Note 6: *An IT Block Vote was created in 1991 by the Government for financing the HA's IT development (see paragraph 3.9 below).*

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System

Source: HA's records

*Note: Stage 2 systems were categorised into Clinical Management Systems,
Clinical Departmental Systems and Management Support Systems.*

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THE HA'S ANNUAL PLAN

3.8 Apart from the IT/IS Strategy, the Corporate Plan of the HA was also supported by an Annual Plan. This Plan set out the strategic directions of the Authority and the specific targets to be achieved in the year, including the specific annual targets to be achieved in the implementation of the HA's IT/IS Strategy.

FUNDING UNDER THE GOVERNMENT'S BLOCK VOTE

3.9 The HA's IT development was financed by the Government from the General Revenue Account (GRA). To provide the HA with adequate flexibility (see paragraph 3.2 above), the Finance Committee (FC) of the Legislative Council approved in 1991 the creation of a Capital Account Subhead "Hospital Authority - Information systems (block vote)" under Head 177 of the GRA with an initial allocation of \$25.9 million for 1991-92. The ambit of this Block Vote was to cover capital expenditure on all computerisation projects initiated by the HA costing over \$100,000 each. Because of the block vote nature of the Subhead, there were no commitment items under this subhead. The funding request each year under this Block Vote would be examined in the context of the Government's resource allocation exercise. The Secretary for Health and Welfare is the vote controller.

AUDIT REVIEW

3.10 Since the HA took over the management and control of all ex-government and ex-subvented hospitals in December 1991, more than five years have elapsed. It is an opportune time to review the progress of the implementation of IT in the HA. The audit revealed that there was a slippage of one to two years for some of the information systems under Stage 1 of the IT/IS Strategy (see paragraphs 3.11 to 3.20 below). The audit also revealed that:

- benefits to justify IT investments to the Government were not always stated in quantifiable terms (see paragraphs 3.25 and 3.26 below);
- funding the HA's IT projects on a yearly basis under the Government's capital account block vote is not appropriate (see paragraphs 3.34 to 3.39 below); and

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- there is scope for improvement in the HA's progress reporting to the Government (see paragraphs 3.45 to 3.47 below).

IMPLEMENTATION OF THE STRATEGY

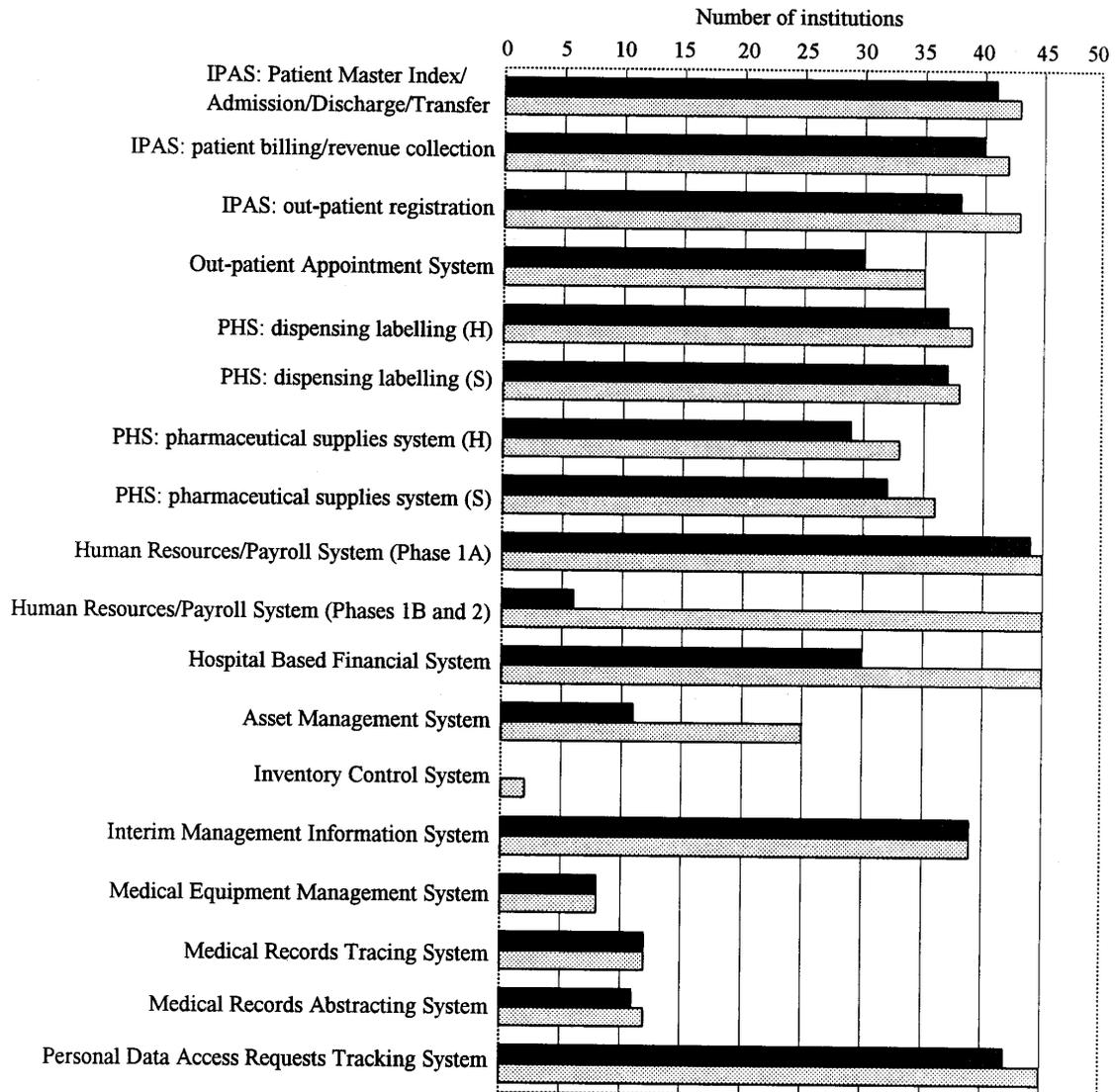
The progress of the implementation of the IT/IS Strategy

3.11 ***IT/IS Infrastructure.*** In order to build up a standard-based IT infrastructure on hardware, system software and network where new IT applications can be implemented, the HA has set up two mainframe data centres at two sites. They provide the computer capacity for existing and planned projects and allow the establishment of disaster recovery/backup facilities for computer operations critical to the HA. Cluster data centres have also been set up at cluster centre hospitals to provide local computing capability and to connect these cluster centre hospitals with the HA Head Office, other hospitals and clinics. They also provide the disaster recovery/backup facilities for mission-critical applications run on mid-range and personal computer local area network platforms. Up to August 1997, cluster data centres have been established in nine major acute hospitals. Local area networks have generally been established in all hospitals. In essence, a basic IT infrastructure of data centres and digital communications capability between hospitals and these data centres has been built up.

3.12 ***Implementation of IT applications.*** As pointed out in paragraphs 3.5 to 3.7 above, the IT/IS Strategy comprises three stages. Figures 1 to 3 below show the progress of implementation of the HA's information systems under the three stages of the revised IT/IS Strategy (1992-2002) as at April 1997. Detailed explanations of major IT applications are given in Annex A.

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Figure 1
**Progress of implementation of Stage 1 information systems of
the HA's IT/IS Strategy**



Legend: IPAS - Integrated Patient Administration System
PHS - Pharmaceutical Supplies System
H - Hospitals
S - Specialist clinics

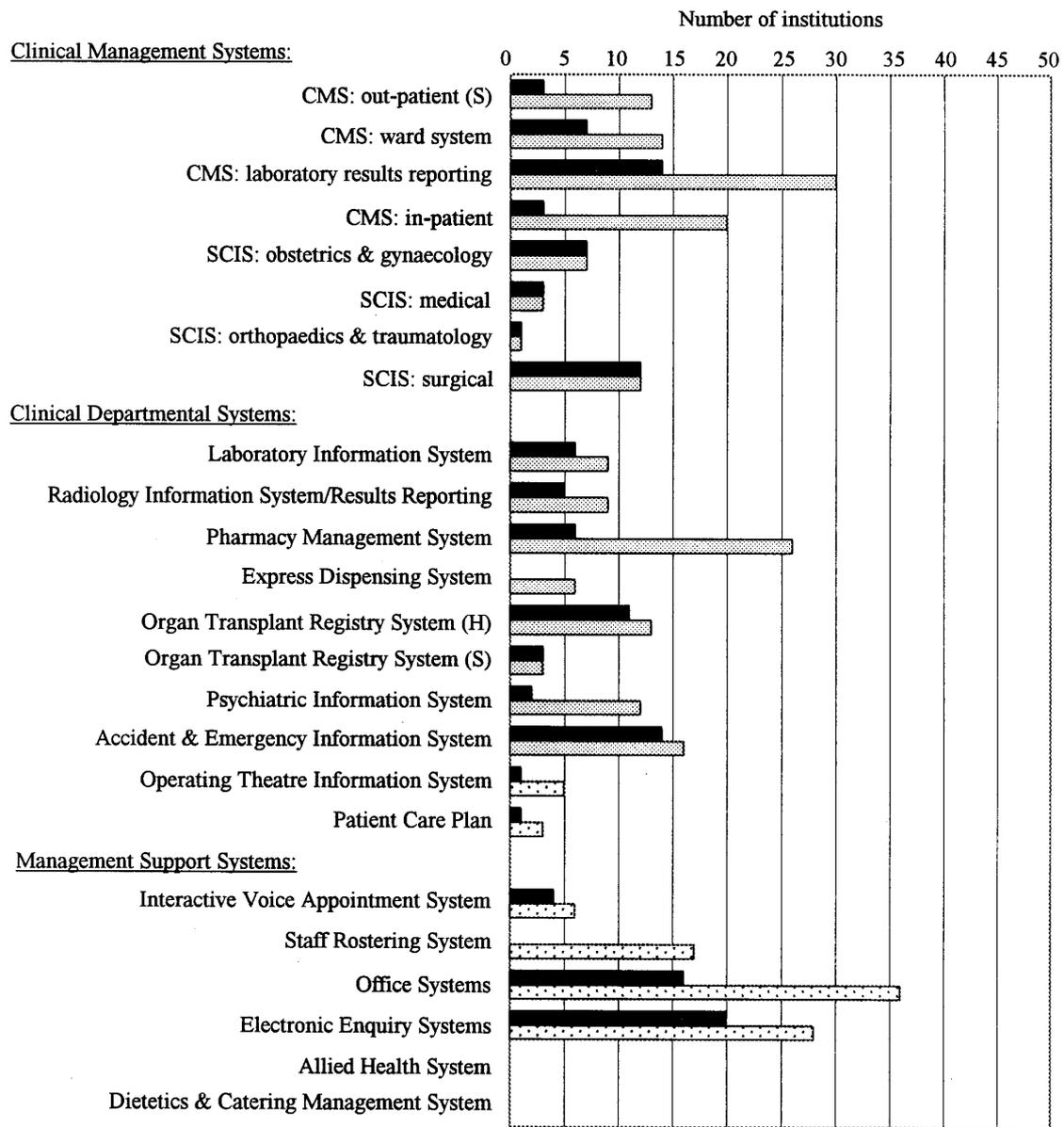
■ Implemented by April 1997
▨ Targets to be achieved by the end of 1997-98 according to the IT/IS Strategy (1992-2002)

Source: HA's records

Note: Those HA-wide systems were planned to be implemented in 45 hospitals, including new hospitals that were still under construction.

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Figure 2
**Progress of implementation of Stage 2 information systems of
the HA's IT/IS Strategy**



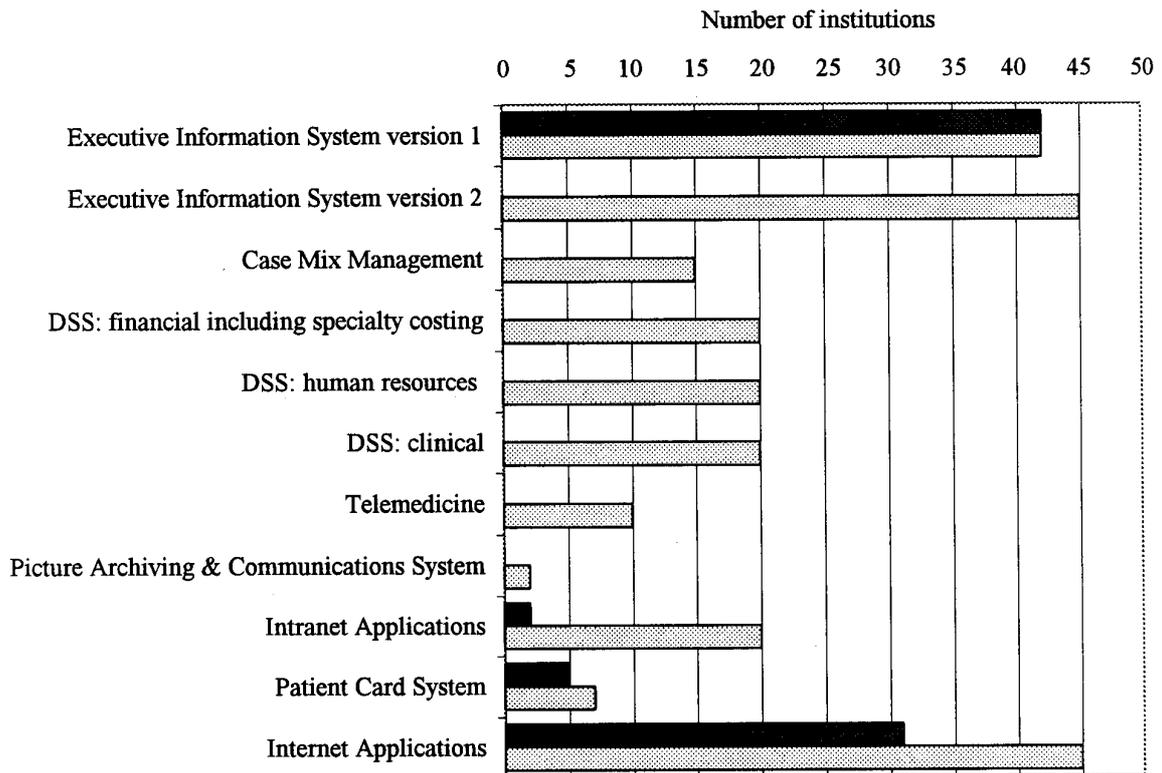
Legend: CMS - Clinical Management System
 SCIS - Specialty Clinical Information System
 H - Hospitals
 S - Specialist clinics

■ Implemented by April 1997
 ▨ Targets to be achieved by the end of 1999-2000 according to the IT/IS Strategy (1992-2002)
 ▩ Targets to be achieved by the end of 2001-2002 according to the IT/IS Strategy (1992-2002)

Source: HA's records

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Figure 3
Progress of implementation of Stage 3 information systems of
the HA's IT/IS Strategy



Legend: DSS - Decision Support System

■ Implemented by April 1997

▨ Targets to be achieved by the end of 2001-2002 according to the IT/IS Strategy (1992-2002)

Source: HA's records

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3.13 **Implementation of the Stage 1 systems.** Basically, the Stage 1 systems included:

- those HA-wide systems (such as the Integrated Patient Administration System, the Human Resources/Payroll System, the Hospital Based Financial System and the Pharmaceutical Supplies System) which needed to be implemented in all hospitals to establish the key corporate databases of patients, staff, finance and assets; and
- the initial wide area network among hospitals and data centres which allowed authorised users to have access to the corporate databases and the application systems developed.

According to the HA's records and as can be seen in Figure 1 above, by April 1997, the majority of the Stage 1 systems had been substantially completed, apart from the roll-out (extension of implementation) of some systems such as the Hospital Based Financial System, the Asset Management System and the implementation of the HA-wide systems in new hospitals. Compared with the target of completing Stage 1 of the Strategy by 1995 as projected in the Strategy (1992-2000) (as shown in Table 1 above), for some information systems, there was a slippage of one to two years.

3.14 **Implementation of the Stage 2 systems.** The Stage 2 systems consisted of hospital systems which were primarily clinical in nature and provided an integrated operational platform to support the delivery of patient care. They encompassed both in-patients and out-patients systems and provided the necessary data to build up the Computer-based Patient Record (see paragraph 3.6(f) above). The implementation of these systems provided the local area network within hospitals which would then connect to the wide area network for HA-wide communication and data-sharing. The Stage 2 clinical support systems were basically of two types, namely clinical management systems and clinical departmental systems:

- **clinical management systems** provided tightly integrated systems to support patient care via the clinical workstations located at in-patient wards, out-patient specialist clinics and accident & emergency departments; and
- **clinical departmental systems** were systems provided for clinical departments (such as Pharmacy, Laboratory, Radiology

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and Operating Theatre) which processed requests for diagnostic services or therapeutic services.

As early as 1993, the HA anticipated that funds available from the Government for IT implementation would be limited. The HA considered that because of limited funds, the Stage 2 clinical systems could only be implemented in a selected number of hospitals. As the major acute hospitals were regarded as having the greater need for these systems and the capacity to participate in their development and implementation, the HA started with implementing the clinical management and clinical departmental systems in major acute hospitals (Note 7) first. Stage 2 was therefore divided into Stages 2A, 2B and 2C (see paragraph 3.7 above). The clinical requirements for those systems in Stage 2B would vary significantly from those in Stage 2A.

3.15 According to the HA's records and as can be seen in Figure 2 above, the clinical support systems in Stage 2 were still under implementation in those major acute hospitals which had the greater number of patients (Note 8). Audit noted that although two modules of the Clinical Management System, namely the Ward module and the In-patient module, had only been installed by April 1997 in seven hospitals and three hospitals respectively, these two modules provided the system coverage as shown in Table 3 below:

Note 7: *The major acute hospitals accounted for over 85% of the total HA's in-patient and day-patient activity.*

Note 8: *According to the HA's IT/IS Strategy (1992-2002), clinical support systems in Stage 2 would only be implemented in major acute hospitals, medium-sized hospitals and selected smaller hospitals. It was not the HA's intention to implement clinical support systems in all hospitals.*

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Table 3

**System coverage for two modules of the Clinical Management
System**

	Ward module (Note)	In-patient module (Note)
System coverage		
- as percentages of all HA hospital beds	38%	18%
- as percentages of major acute hospital beds	73%	35%
- as percentages of total in-patient turnover	67%	33%

Source: HA's records

Note: See Annex A Stage 2 (ii) and (iv)

3.16 **Implementation of the Stage 3 systems.** Stage 3 involved the development of the final building blocks of the Integrated Health Information System, the development of the Community Health Information Network and the provision of informational or knowledge systems which depended on data extracted from the operational systems implemented in Stages 1 and 2. As can be seen in Figure 3 above, some progress has been made for the Stage 3 systems. This included the development of Patient Card System, Internet/Intranet systems and the establishment of an Executive Information System database developed from the Interim Management Information System of Stage 1.

Overall progress

3.17 According to the IT/IS Strategy in 1991, the HA aimed to complete the implementation of Stages 1, 2 and 3 by 1994, 1995 and 1997 respectively. The Strategy was subsequently revised and expanded in 1994, and the completion date of the Strategy was extended to Year 2000 to tally with the Corporate Plan. Stage 2 was planned to be completed by 1998 under the revised Strategy

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(see Table 1 above). In February 1997, the HA anticipated that, on the basis that the government funds for future years would be maintained at some \$120 million a year, it would take five years to substantially complete the implementation of Stages 2B and 2C. The HA expected that the government funds for the HA IT Block Vote for 1997-98 would drop from \$135 million to \$122 million. The Planning Committee of the HA was informed that this reduction in funding would have significant implications for the HA because:

- it would slow down the pace at which systems could be implemented in hospitals;
- the implementation of major Stage 2B systems would have to be deferred until, at the earliest, 1998-99; and
- the HA might need to consider financing IT projects of high priority from the HA's One-line Vote (Note 9).

As a result, the completion date of the Strategy was further extended to Year 2002. Therefore the total implementation time of the Strategy will span over a period of ten years (1992 to 2002).

3.18 Audit is concerned about the progress of IT implementation in the HA because this will affect the achievement of its corporate goal (see paragraph 3.4 above). As mentioned in paragraph 3.13 above, there was a slippage of one to two years for some of the information systems under Stage 1 of the IT/IS Strategy. In addition, there is a need to improve the progress reporting to the Secretary for Health and Welfare (see paragraphs 3.44 to 3.47 below) to ensure the timely achievement of the corporate goal. In view of the slippage of Stage 1, Audit is concerned about possible slippage of the implementation of those information systems under Stage 2 of the Strategy. Further slippage will cast doubt on whether the corporate goal of seamless health care will be achieved by Year 2000. There is therefore a need for the HA to be on the alert to carry out the IT implementation in a systematic and efficient manner to avoid possible slippage.

Note 9: *One-line Vote refers to the annual recurrent subventions provided to the HA under Head 177 Subhead 514 of the GRA to meet its shortfall in net operating income.*

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3.19 In response to Audit's enquiries, the HA advised that the IT/IS Strategy spelt out the overall objectives and directions to be followed in the long term. The implementation of this long-term strategy is achieved by annual increments which, in the HA's case, are presented as detailed targets in the Annual Plan. The Strategy, by its definition, needs to be regularly reviewed, revised and extended so long as the HA exists as an organisation. The time span established for each revision of the HA's IT/IS Strategy would involve the inclusion of additional functional components and the extended number of hospitals. Specific targets would change over time resulting in an overall review of the time span of the Strategy. The HA considered that resources permitting, targets within the directional framework of the Strategy would be achieved. The HA also advised that many of the targets in the Corporate Plan were substantially achieved in 1997.

3.20 Concerning the extension of the HA's IT/IS Strategy targets from Year 2000 to 2002, the HA advised that the 1992-2000 Strategy differed from the 1992-2002 Strategy in both scope and coverage as detailed in Table 4 below.

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Table 4

Comparison of the HA's IT/IS Strategy as revised in 1994 and 1997

	1994 IT/IS Strategy 1992-2000	1997 IT/IS Strategy 1992-2002
Time span	37	45
Total number of hospitals	37	45
Stage 2 coverage	Coverage limited to major acute hospitals for most systems	Separated into three sections to emphasise the different requirements of the major acute hospitals versus the medium-sized hospitals and specialist hospitals (e.g. psychiatric)
Estimated total cost of implementation of strategy targets	\$1.3 billion	\$1.6 billion
Enhanced sophistication of functions and extension of implementation sites	Ward Order Entry for nine major hospitals (laboratory and discharge medication)	Full function Clinical Management System to 13 major acute hospitals and Clinical Management System to be implemented in 14 medium-sized hospitals
Extension of infrastructure and networking		<ul style="list-style-type: none"> - Networked Results Reporting - Infrastructure for Network Computing
Extension of original projects or replacement of government systems		<ul style="list-style-type: none"> - Extension of the Out-patient Appointment System to cover General Out-patient Departments - Replacement of the Laboratory Information System in the Prince of Wales Hospital
New projects not included in original scope		<ul style="list-style-type: none"> - Data Warehousing - Internet/Intranet projects e.g. CASH (Community Access for Seamless Healthcare) - Year 2000

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BENEFITS TO JUSTIFY IT INVESTMENTS NOT STATED IN QUANTIFIABLE TERMS

3.21 As IT systems entail considerable investment, it is necessary to ensure that IT investments provide the desired results. At the project planning stage of IT projects, an essential consideration is to ascertain the benefits expected to be gained from the proposed computerisation and how best they can be expressed in a measurable manner. This not only applies to realisable benefits (e.g. increases in revenue and staff savings as a result of deletion of posts), but also to notional or intangible benefits (e.g. staff cost avoidance and service improvement). In respect of notional or intangible benefits, appropriate productivity and performance indicators for measuring these improvements should be included. Two such examples are as follows:

" the average time required by counsel to identify case law precedents on one subject will be reduced from the existing level of XX minutes to XX minutes upon computerisation" ; and

" through better planning of delivery routes and a projected increase in average vehicle loading, the new computer system will give rise to a XX% reduction in the delivery fleet from XX vehicles to XX vehicles" .

*Source: Government's circular on computerisation
issued in February 1997*

In the funding submissions, the expected benefits from the IT investments should as far as practicable be quantified, together with delivery dates. This will facilitate effective project monitoring and evaluation to ensure timely achievement of the expected benefits.

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3.22 As mentioned in paragraph 3.2 above, the HA accepted the need to follow the Government's system of resource allocation and to compete for resources for new and improved services against other public expenditure needs. As the IT projects so far approved involved funding requirements of \$910 million (see Annex B), it is necessary to ensure that these projects represent good value for money. The HA's consultants (Note 10) in 1995 also indicated that, having regard to the keen demands for funds in the Government, the HA should make a strong case for funding based on the judicious use of funds and the value that would be created for the community of Hong Kong. However, an audit of the savings and benefits put forward by the HA to the Government to justify its IT investments revealed that the savings and benefits were not always stated in quantitative terms. This made it difficult for the Finance Bureau of the Government Secretariat to measure and evaluate the benefits of the HA's IT projects. The following are examples:

- the HA did not use quantitative terms to justify funds in 1997-98 for new projects and extensions of existing projects to cover more hospitals and specialist clinics. For example, in the extension of the Clinical Management System to five hospitals, the HA stated that the benefits were:

" reduce the patient queuing time before the pharmacy counters"

" no need for the staff to copy and extract the patient information from various sources"

" the accuracy of the clinical history and coding will be greatly improved"

" reduce prescription error rates ... saving of query and reply time by the Physicians and Pharmacists"

Audit noted that the HA had made reference in the submission to improvements achieved in pilot projects conducted elsewhere, such as saving ten to 15 minutes in patient

Note 10: *The HA commissioned consultants to conduct a review of its IT/IS Strategy in both 1995 and 1997.*

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queuing time from the pilot Out-patient Clinical Operations Support System in the Queen Elizabeth Hospital, improving the accuracy of captured diagnosis and procedure coding from 59% to 87% and saving five to ten minutes for each erroneous prescription case in the Prince of Wales Hospital. However, the HA did not state savings and efficiency and service improvements in more concrete terms to be achieved from the roll-out of the Clinical Management System to five hospitals; and

- the HA used qualitative terms in the proposal to extend the implementation of the Radiology Information System to six hospitals. The HA stated that the system was expected, among other things, to:
 - (i) improve the hospitals' ability to recall patients' examination history and previous X-ray films for radiographer and radiologist reference;
 - (ii) eliminate the wastage of duplicate examination for the same patient; and
 - (iii) provide more ready access of patients' examination results to any office installed with workstations.

Although notional savings of \$10 million a year were calculated in the submission on the basis of saving 1% of total examinations and reducing \$5 per examination through avoiding inefficient scheduling, other substantive improvement targets for the quality of services to patients and improvement to staff productivity were not stated e.g. how the patient record retrieval time would be reduced, how the patient care treatment would be improved, or how the patients' waiting time could be reduced.

3.23 Audit also noted that savings and benefits stated in the Half-yearly Progress Reports submitted to the Secretary for Health and Welfare (see paragraph 3.31 and the second inset of paragraph 3.44 below) were often quoted in general terms such as:

" Accurate identification of patients"

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" Reduction in staff grievances"

" The system will reduce turnaround time in processing medical record loan requests"

" There will be a reduction in the number of lost or misplaced records which will save staff time in trying to locate them"

" Post-implementation Review conducted. Result was satisfactory."

The savings and benefits quoted by the HA in the Half-yearly Progress Reports were usually notional and not realisable e.g. notional savings of \$2 million a year from stock reduction as a result of implementing the Pharmaceutical Supplies System. Similarly, in the post-implementation review returns of completed projects (Note 11), quantifiable savings and benefits were not stated and the project results usually indicated that, based on the user surveys, the system objectives and benefits had been completely or partially achieved. The Secretary for Health and Welfare also stressed to the HA recently that projects without any quantitative benefits would unlikely be supported for funding purposes.

3.24 Audit noted that, in connection with the HA's IT funding bids submitted recently for the 1998-99 Estimates, some improvements were made in that in some cases, the HA had attempted to include some quantitative performance indicators. Examples are shown below:

- estimated saving of one hour per day in each pharmacy, as a result of the introduction of the Pharmacy Management System to 30 pharmacies, which avoided duplicated work in maintaining the drug formulary, and improved efficiency in processing new medication orders, refilled/suspended/resumed orders and in reviewing patient profile to check for conflicting drugs; and

- estimated notional saving of one clerical staff in each

Note 11: *The HA has submitted post-implementation review returns for completed IT projects to the Secretary for Health and Welfare and the Finance Bureau since March 1995 (see the third inset of paragraph 3.44 below).*

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hospital, as a result of the introduction of the Operating Theatre Information System, which streamlined the booking and recording procedures for using operating theatres.

Nevertheless, there were still areas where benefits of the proposed systems were not expressed in measurable terms. For example, in justifying the implementation of the Radiology Information System/Result Reporting in six hospitals, the operational improvements to be achieved were not quantified (e.g. the reduction of the turnaround time for the completion of the diagnosis for an examination request). Similarly, in the proposed implementation of the Out-patient Appointment System for general out-patient departments and specialist out-patient departments, the reduction in the queuing time was not stated.

Audit observations

3.25 Audit considers that, in order to justify the HA's IT investments, there is a need to define targets for operational efficiency and service improvement in quantifiable and measurable terms. An example of the Administration's statement of expected improvements in measurable terms after IT implementation is shown below:

Table 5

**An example of improvements to be
achieved in the Government after IT implementation**

Activity	Existing performance	Expected performance after IT implementation
Supreme Court Registry:		
- Court queuing time for document submission	30 minutes (at peak hours)	15 minutes (at peak hours)
- Cause book search time	one hour	within five minutes
Judges/Judicial Officers:		
- Circulation of judgment	up to seven to eight weeks	within three days

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*Source: Submission to the FC in December 1996 on the
implementation of the Judiciary's information systems
strategy Phase II*

The absence of measurable indicators makes it difficult, if not impossible, for the Government to appraise the importance of the HA's projects and the extent to which they would contribute to improving the quality of patient care. It also renders it difficult for the top management of the HA and the Government to monitor and evaluate the extent to which the benefits have been reaped after implementation.

3.26 Audit notes that the HA has laid down various performance targets such as:

- maintaining the average waiting time for first appointment within three months for 90% of the specialist clinics;
- maintaining the average queuing time for consultation at specialist clinics at less than 90 minutes; and
- maintaining the average waiting time for cataract surgery at less than nine months.

The investment in IT may have contributed to the attainment of these targets. Therefore, Audit considers that it is important to relate the individual IT investments directly to the benefits that they will bring. This is particularly important for the HA's IT projects due to the significant amounts of investment involved. **Audit considers that for more effective appraisal, monitoring and evaluation of the IT investments, particularly as the HA has to compete with government departments, policy bureaux and other statutory bodies for funding, there is a need for the HA to define benefits of IT investments in clearer and more specific terms to justify such investments.**

Audit recommendations

3.27 Audit has recommended that the HA should:

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- define targets for operational efficiency and service improvement in quantifiable and measurable terms in order to give adequate justifications for the HA's IT investments; and
- quantify benefits, in sufficient detail, of the IT projects in its funding submissions to the Government in order to facilitate the appraisal of its IT investments.

Response from the HA

3.28 The **Chief Executive, HA** has said that he believes that the most recent submission to the Secretary for Health and Welfare for the 1998-99 IT Block Vote funds has already met the audit recommendations. Before he approves projects for including in the funding submission, the cost-benefit analysis of each project proposal is examined carefully. He considers that the HA has complied with all government requirements in regard to IT projects funded under the Block Vote and has also followed the model of government practices for the control of internally funded projects.

Response from the Administration

3.29 The **Secretary for the Treasury** has said that:

- he agrees entirely that the HA should clearly demonstrate the benefits of proposed IT projects by conducting proper cost-benefit analyses and as far as possible, expressing those benefits in quantifiable terms; and
- he believes that the implementation of the audit recommendations would facilitate the HA Board and management in prioritising proposed IT projects, justifying its funding needs to Government in the annual Block Vote provision and deciding on the use of other resources at its disposal for IT investment.

3.30 The **Secretary for Health and Welfare** has said that:

- she agrees with the audit recommendations and that the HA should quantify benefits of IT projects for her effective appraisal, monitoring and evaluation of the HA's IT

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investment;

- in calling for the HA's IT funding submissions earlier this year, she had expressly pointed out to the HA that projects without any quantifiable benefits were unlikely to be given policy support. As reflected in the bids submitted, the HA has made improvements and tried to define benefits in concrete and measurable terms, including those realisable and notional savings, as well as other tangible benefits, such as reduction in waiting time; and

- she will continue to work closely with the Finance Bureau and the HA to see what more can be done to improve the quality of the HA's funding submissions.

FUNDING FOR THE HA'S IT DEVELOPMENT

3.31 As mentioned in paragraph 3.9 above, an IT Block Vote was created in 1991 by the Government for financing the HA's IT development. Each year, the HA would submit its estimate of expenditure for the IT Block Vote, including new projects to be financed during the year, to the Secretary for Health and Welfare for consideration. The HA was also required to submit, with effect from March 1995, to the Secretary for Health and Welfare Half-yearly Progress Reports on its IT systems under implementation. The Secretary, as the Controlling Officer of the Block Vote, would vet the HA's submission of funding bids and then forward the submission to the Secretary for the Treasury. In forwarding the HA's IT funding bids to the Finance Bureau, the Health and Welfare Bureau would need to confirm its support, in order of priority, for the HA's bids for new projects. Funds approved in the Government's Estimates for the IT Block Vote would then be used by the HA to meet the cash-flow requirements of ongoing and new projects for the year. The HA would also include in its funding bids its estimated cash-flow requirements for the second and third years, which were indicative only. The Government would approve IT funds to the HA on a yearly basis.

3.32 Since the establishment of the HA, the Government had allocated a total of \$726 million to the HA's IT Block Vote (see Table 6 below). The allocation did not cover the non-recurrent IT expenditure funded from the Government's recurrent subventions to the HA, i.e. from the One-line Vote. Projects so far approved under the IT Block Vote involved funding requirements of \$910 million in

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total. Total government expenditure incurred under the IT Block Vote amounted to \$608 million by August 1997 (see Table 6 below). Recurrent IT expenditure, including the staff costs of the core establishment of the HA's IT Division, is to be absorbed by the HA.

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Table 6

**Approved provision and actual expenditure under the HA IT
Block Vote**

Year	Approved provision (\$ million)	Actual expenditure (\$ million)
1991-92	26	26
1992-93	70	51
1993-94	108 (note)	127
1994-95	130	130
1995-96	135	135
1996-97	135	135
1997-98	122	4 (up to 31 August 1997)
Total	<u>726</u>	<u>608</u>

Source: Government records

Note: The figure did not include a supplementary provision of \$18.9 million approved by the FC in July 1993 to enable the HA to meet its outstanding payments which it had not made in 1992-93.

3.33 As shown in Table 6 above, except for 1992-93, each year the HA fully spent the approved provision under the IT Block Vote. Because the standard limit of 50% (by which approved provision may be over-committed under capital account block vote subheads) was not adequate to enable the HA to utilise fully the Block Vote provision each year, approval from the FC was sought for the following increases in the over-commitment level for the Block Vote in the past four financial years:

Financial year	Over-commitment limit
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1993-94	95%
1994-95	70%
1995-96	70%
1996-97	70%

Source: Government records

In June 1996, the Secretary for Health and Welfare considered that there was an established need to revise the over-commitment limit to 70% of the IT Block Vote. The FC approved this arrangement with effect from 1996-97 onwards.

Audit observations

3.34 Under the current arrangement, each year the Finance Bureau determines the funding provision for the HA's IT Block Vote on the basis of the cash-flow requirements of "committed" projects, new projects put forward by the HA and the overall availability of government resources. The HA regards these projects as "committed" under the Block Vote once they have been submitted by the HA in its IT funding bids and have been endorsed by the Secretary for Health and Welfare. **Audit considers that this arrangement will lead to a high level of commitment being phased over a number of years, although only a small cash-flow in the first year of funding may be requested.** Up to August 1997, such "committed" projects require funds totalling \$910 million.

3.35 Strategic investment in IT provides an opportunity for an organisation to improve its efficiency, quality of service and cost-effectiveness. In order to optimise the use of resources and to obtain the potential benefits from the IT investment, long-term planning is important. The IT investment for the HA involves a long-term development aiming at improving the hospital environment for the benefit of patients. Funding for this should be of a capital nature. The current arrangement of approving funds for the HA's IT development on a yearly basis does not recognise the special nature of investment in IT and does not facilitate long-term planning. **Audit therefore considers that the current arrangement for providing government funds to the HA on a yearly basis is not appropriate for funding the HA's IT development.**

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3.36 In the Government, an IT strategy is considered to be capital in nature and is financed by funds under Head 710 of the Capital Works Reserve Fund (CWRF), which was specifically created for controlling expenditure on IT. In seeking funding approval for the implementation of an Information Systems Strategy, the government department concerned would invite the approving authority to accept the financial implications of the whole strategy but to approve funding in phases. At the end of each phase, the department would conduct a post-implementation review to assess whether or not the phase was completed on schedule and the extent to which it had achieved its objective. The department would then commence a feasibility study of the succeeding phase and upon completion of the study, would seek funding for that phase. With the implementation of the IT programme by phases, changes in the financial implications and business requirements over time could be more accurately captured and made known to the approving authority. Annually, a Computer Strategy Group (Note 12) would decide the budgetary provision for actual expenditure on the Strategy in the light of the availability of funds, the implementation progress of the Strategy and project priorities. A monitoring mechanism is also in place to monitor the costs and benefits of computerisation projects and evaluate their results.

3.37 The funding of IT projects in other publicly-funded organisations is also very similar. Generally, only IT projects under \$2 million are funded from a block vote. For projects costing more than \$2 million, each project is shown separately as an item under Head 177 in the Estimates of the GRA. The financial commitments of these projects require approval by the Secretary for the Treasury or, if the commitment exceeds \$10 million, by the FC.

3.38 As mentioned in paragraph 3.9 above, funds to be allocated to the HA's capital account Block Vote for IT are considered annually in the context of the Government's resource allocation exercise. Funds for the Block Vote are approved by the FC under the annual Estimates for the GRA. There is no requirement to seek separate approval from the FC for the financial implications of the HA's IT/IS Strategy, as required in the case of funding departmental information systems strategies in the Government (see paragraph 3.36 above). Because no limit is set on individual IT projects chargeable to the Block Vote, funding approval from the FC is not

Note 12: *The Computer Strategy Group assists the Secretary for the Treasury in formulating the IT policies and strategies in the Government, prioritising computerisation projects for funding purposes and monitoring the overall expenditure of Head 710 of the CWRF.*

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required for individual IT projects. An analysis of the HA's IT projects shows that most projects involved significant amounts. Table 7 below shows examples of the HA's IT projects costing over \$30 million.

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Table 7

**Examples of the HA's IT projects under the IT Block Vote
with project costs over \$30 million**

Project	Project cost estimates (\$ million)
Integrated Patient Administration System	93
Human Resources/Payroll System	42
Hospital Based Financial System	65
Pharmaceutical Supplies System (Phases IIA and IIB)	31
Data Centre, Cluster Centres and Network	72
Laboratory Information System	78
Clinical Management System (Phases I & IIA)	133
Out-patient Appointment System	37

Source: HA's records

3.39 Block votes for capital account items under the GRA are normally used for financing small projects only. Because there are no commitment items under block votes, the recurrent nature of block votes does not facilitate funding major projects, which require long periods of time for implementation, and renders it difficult to monitor the outcome of the investment.

Audit recommendations

3.40 **Audit has recommended that the Government should consider:**

- revising the existing arrangement for financing the HA's IT projects; and
- approving financial commitments (as a capital account item of the GRA or as a capital subvention subhead under the CWRP)

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for the implementation of the HA's IT projects and determining each year the appropriate budgetary provision for IT expenditure on the projects under the approved financial commitments (i.e. similar to the established funding practice for the implementation of the Government's information systems strategies).

Response from the HA

3.41 The **Chief Executive, HA** has said that:

- in regard to its IT/IS activities, the HA has always complied with all government requirements. In addition, the HA has an internal system of governance oversight, management structure, reviews, controls and internal audit;

- the HA regards the IT Block Vote as a capital vote and is satisfied with the current approval arrangements. It is only a question of the amount of funding. It is not clear to the HA as to why Audit has recommended changes to the funding mechanism already in place (Note 13). The HA was established as a statutory body and has been given a degree of flexibility and autonomy in its internal management. There does not appear to be a valid reason to change this arrangement for IT/IS matters which represent only a small percentage of overall HA activities. While the HA would welcome increased funding support through the IT Block Vote, it accepts that the HA has to compete for these resources annually;

- the Finance Bureau does not only review the annual cash-flow required for the HA's priority projects, but also takes into account the capital commitment which will be necessary to complete all approved projects. There is therefore an implicit commitment to the capital funding for each project, as well as the forecasted cash-flow;

- the audit conclusion that the HA can ask for a small initial cash-flow for new projects which have a high level of

Note 13: *As mentioned in paragraph 3.35 above, Audit considers that funding the HA's IT development on a yearly basis is not appropriate as it does not facilitate long-term planning.*

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commitment is quite incorrect (Note 14). The HA was requested to phase projects in order to reduce the capital commitment for that project. The HA is not asked to adjust the cash-flow as this is a matter for the HA to judge internally and for the HA to manage within the Finance Bureau's total allocation; and

- the approach recommended would slow down the implementation of the HA's IT/IS Strategy. It is worth noting that the existing planned completion date of Year 2002 for the IT/IS Strategy is still subject to the provision of funds. The HA is not sure whether any change in funding arrangement would result in delaying the existing planned completion date of Year 2002.

Response from the Administration

3.42 The **Secretary for the Treasury** has said that:

- funding for IT development in the HA has to be seen in the overall context of the financial arrangements for the HA. That is, the Authority should be given as much autonomy and flexibility in utilising its funds and resources as is compatible with the provisions of the Hospital Authority Ordinance (Cap. 113). In practice, to provide for this autonomy and flexibility, recurrent government subventions to the HA take the form of a one-line vote. The Authority is free to manage its finances, adjust its budget during the course of the year and deploy funds between the different components of its budget;
- to achieve the objective of giving the HA autonomy and flexibility in managing its resources, the Capital Account block vote for IT was approved by the FC in 1991, along with another GRA Capital Account block vote for plant, vehicles and equipment (for all items costing over \$50,000). It was mentioned in the FC paper that "the arrangement is that the Government will not be involved in any new hospital

Note 14: *Audit noted that with the HA's IT funding bids submitted recently for the 1998-99 Estimates, the estimated cash-flow for the first year for a number of new projects was less than 15% of the projects' total cash-flow requirements. For new projects in the Government, the cash-flow for the first year generally amounted to a significant proportion (say, over 40%) of the projects' total cash-flow requirements.*

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computerisation project, leaving the HA to develop its own systems" ; and

- he has no in-principle objection to the audit recommendation of applying the Government's funding procedures to the HA's IT proposals, namely, seeking the FC's approval of individual financial commitments for the HA's IT projects costing over a specified limit (currently the limit applicable to the Government's computerisation projects is \$10 million). However, he has said that it is necessary to consider the proposed revisions against the original intention of the block vote arrangement.

3.43 The **Secretary for Health and Welfare** has said that:

- she does not consider the existing funding arrangement an obstacle to the implementation of the HA's IT Strategy. Like other government departments, the HA has to follow the Government's system of resource allocation and compete for resources annually for its IT projects against other public expenditure needs. As pointed out in paragraph 3.34 above, the cash-flow requirements of "committed" projects as well as new projects would be taken into account when determining the funding provision for the HA's IT Block Vote; and
- she shares the views of the Secretary for the Treasury and has no in-principle objection to the audit recommendation of seeking the FC's approval of individual commitments for the HA's IT projects. However, this should be considered carefully against the original intention of allowing the HA to have more flexibility and autonomy in developing its IT/IS Strategy.

INADEQUACIES IN PROGRESS REPORTING TO THE GOVERNMENT

3.44 Because significant government funds were involved in the implementation of the HA's IT projects (see paragraph 3.32 above), the HA was required to report its progress in IT implementation to the Government. Progress reporting helps the Government monitor expenditure under the HA's IT Block Vote, thereby facilitating funding decisions to be made. The HA reported its IT implementation progress to the Government through the following channels:

- **Quarterly Progress Review Meeting.** The Chief Executive of the HA reported the activities of the HA to the Government

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through quarterly Progress Review Meetings with the Secretary for Health and Welfare. At each quarterly meeting, a Summary of the HA's Efficiency Initiatives was discussed. The Summary covered all areas of operations of the HA which included IT implementation. The Summary showed whether the targets set out in the Annual Plan (see paragraph 3.8 above) for the related quarter had been achieved;

- **Half-yearly Progress Reports on the HA's information systems.** In order to streamline the procedures for funding the HA's IT systems, the Secretary for the Treasury requested in March 1995 that the HA, in future, should report the progress of all existing IT projects funded under the HA's IT Block Vote to the Secretary for Health and Welfare at half-yearly intervals. The Half-yearly Progress Reports, covering half-yearly periods ending June and December, were prepared on a standard form providing information such as system objectives and functions, sites for implementation, benefits, cost estimates and progress/implementation review;

- **Post-implementation Returns.** The HA was also requested by the Secretary for the Treasury in March 1995 to submit Post-implementation Returns for computer systems which had been live run for six months. The purpose of such returns was to help ensure that the Government's investment in IT had achieved its intended objectives in a timely and cost-effective manner; and

- **Attendance of the HA Board meetings by a representative from the Health and Welfare Bureau.** The Secretary for Health and Welfare was represented by the Deputy Secretary for Health and Welfare at the HA Board meetings. The activities of the HA including progress in IT implementation were reported at these meetings.

Audit observations

3.45 Although the quarterly Summary of the HA's Efficiency Initiatives (see the first inset of paragraph 3.44 above) showed whether the implementation milestones set out in the Annual Plan had been achieved, Audit noted that it was difficult to relate the implementation milestones in the Annual Plan to the IT funds approved by the Finance Bureau. Furthermore, the Post-implementation Returns (see the third inset of paragraph 3.44 above) were only submitted to the Finance Bureau several years after the projects had

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commenced because most of the HA's information systems take a number of years to complete. As a result, the Half-yearly Progress Reports (see the second inset of paragraph 3.44 above) were necessary and provided a useful tool for the Government to monitor the progress of the HA's IT projects for which funds had been approved and to measure the costs incurred and benefits achieved to date against targets.

3.46 In this regard, Audit noted that there were deficiencies in the existing Half-yearly Progress Reports submitted by the HA to the Government:

- the Half-yearly Progress Reports did not show by each IT project:
 - (i) the estimated and actual expenditure on the project for the report period and up to the end of the report period;
 - (ii) the expected and realised benefits of the project, in both quantitative and qualitative terms, for the report period and up to the end of the report period; and
 - (iii) the scheduled and actual progress to date, suitably quantified (e.g. the number of hospitals in which the project had been implemented) and measured against the targets to be achieved;
- where there had been revisions to the target implementation dates, no mention was made of such revisions, with reasons; and
- the IT implementation targets in the Annual Plan could not be related to the progress reported in the Half-yearly Progress Reports because the Annual Plan covered the financial year ending March, whereas the Half-yearly Progress Reports covered the six-month periods ending June and December.

3.47 As the HA would take a number of years to complete the roll-out of clinical support systems and the implementation of the IT/IS Strategy, Audit considers that improvements in the IT progress reports would help the Government monitor, and make better informed funding decisions, thereby ensuring the timely implementation of the

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Strategy.

Audit recommendations

3.48 Audit has *recommended* that the Government should review and revise the existing arrangements for monitoring and reporting the HA's IT activities, taking into account the deficiencies in the present procedures, including deficiencies in the Half-yearly Progress Reports, lack of reasons for revisions to the target implementation dates and discrepancy in the period of progress reports and the period of the Annual Plan.

Response from the HA

3.49 The **Chief Executive, HA** has said that:

- he cannot see any reason for changing the existing arrangements. The individual projects funded under the IT Block Vote are well-managed within the HA under the existing governance arrangements. It is difficult to justify the "micro-management" of the HA projects outside of the governance already in place. Besides, both the Secretary for Health and Welfare and the Secretary for the Treasury are usually invited to attend meetings of the Planning Committee; and

- the HA follows the Government's format in reporting progress on the HA's IT/IS implementation. However, the HA is prepared to work with the Government to see what improvements can be made.

Response from the Administration

3.50 The **Secretary for the Treasury** has said that he supports the audit recommendation that there is room for improving the reporting and monitoring of the HA's IT projects to ensure that the desired benefits are achieved. The Secretary has further pointed out that the present reporting arrangements on the HA's IT implementation progress to the Health and Welfare Bureau were put in place on his suggestion in 1995 by reference to the system adopted for the Government's computerisation projects. As regards the attendance of representatives of the Secretary for Health and Welfare and the Secretary for the Treasury as observers to meetings of the HA's Planning Committee (see the first inset of paragraph 3.49 above),

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the Secretary does not see the relevance of this to the issue.

3.51 The **Secretary for Health and Welfare** has said that:

- she agrees that there is room for improvement in the existing arrangements for the HA to report progress on IT projects; and

- she would consider the audit suggestions and convene meetings with the Finance Bureau and the HA with a view to strengthening the contents of the HA's returns and enabling the Government to monitor the use of the IT Block Vote more effectively.

refers)

**Detailed explanations of major IT applications under
the HA's IT/IS Strategy and their progress of implementation as at
April 1997**

Stage 1

- (i) **Integrated Patient Administration System (IPAS).** The objective of the system is to provide essential support to meet both operational and management needs of the patient care services in hospitals and establish an infrastructure for the development of an integrated hospital information system. As at April 1997, the IPAS had been substantially implemented throughout the HA.
- (ii) **Out-patient Appointment System.** The objective of the system is to make appointment for follow-up visits both for in-patients at the time of their discharge and out-patients, and schedule the workload of doctors at clinics. As at April 1997, the system had been implemented in 30 hospitals.
- (iii) **Pharmaceutical Supplies System (PHS).** The objective of the system is to provide an effective and efficient system for controlling the provision and usage of pharmaceutical supplies. As at April 1997, the system had been substantially implemented.
- (iv) **Human Resources/Payroll System (HRPS).** The objective of the system is to replace the interim systems and provide additional functions in human resources management which will allow the Corporate Staff Database to be constructed. The HRPS project was split into three phases. Phase 1A of the HRPS, providing an integrated Personnel Administration and Payroll System to manage the HA's staff resources, went into production in January 1996. Phase 1B, involving the automation of leave administration functions, had been implemented in the HA's Head Office and five hospitals as at April 1997. Phase 2, providing human resources functions such as training and development, performance appraisal and manpower planning, had not yet been implemented.
- (v) **Hospital Based Financial System.** The objective of the system is to replace the interim systems, provide additional functions, decentralise the management of financial systems to hospital level, and provide facilities for the effective

refers)

management and utilisation of the HA's assets. As at April 1997, the system had been implemented in the HA's Head Office and 29 hospitals. The system was expected to be fully implemented by December 1997.

- (vi) **Asset Management System.** The objective of the system is to register the particulars, locations and movements of asset items, and provide accounting functions on the acquisition, disposal and valuation of assets. As at April 1997, the system had been implemented in eleven hospitals.

- (vii) **Interim Management Information System.** The objective of the system is to establish a central database which is accessible to hospital management and the HA Head Office in providing timely management and statistical information in regard to service activity, service quality, utilisation and productivity, human resources, physical resources and finance. The system had been fully implemented.

- (viii) **Medical Records Tracing System.** The objective of the system is to provide timely tracking of the location of medical records and increase the availability of medical records by improving the operational procedures and reducing late returns. The system had been implemented in 12 major acute hospitals.

- (ix) **Medical Records Abstracting System.** The objective of the system is to capture major diagnoses and procedures in coded format and generate their associated diagnosis related groupings for the analysis of hospital services utilised by individual hospital episodes. The system had been implemented in eleven major acute hospitals and was to be implemented in one more hospital.

Stage 2

- (i) **Clinical Management System - Out-patient module.** The objective of the module is to capture patient diagnostic and procedural data during consultation, retrieve patient clinical information, make medication order and provide management reports. As at April 1997, it had been implemented in three specialist clinics.

refers)

- (ii) **Clinical Management System - Ward module.** The objective of the module is to generate ward discharge and transfer summary, and reply reports to private practitioners. As at April 1997, it had been implemented in seven hospitals.
- (iii) **Clinical Management System - Laboratory Results Reporting module.** The objective of the module is to receive laboratory test results electronically at the wards. As at April 1997, it had been implemented in 14 hospitals.
- (iv) **Clinical Management System - In-patient module.** The objective of the module is to facilitate direct capture of core clinical data at discharge, to allow electronic transfers of discharge medication orders to the pharmacy and to generate a variety of reports to support clinical and administration tasks. As at April 1997, it had been implemented in three hospitals.
- (v) **Specialty Clinical Information System.** The objective of the system is to improve operational procedures and provide essential operation support in selected functional areas by providing timely and accurate clinical information and statistics. As at April 1997, the system had been implemented in the obstetrics and gynaecology unit in seven hospitals, the medical unit in three hospitals, the orthopaedics and traumatology unit in one hospital and the surgical unit in 12 hospitals.
- (vi) **Laboratory Information System.** The objective of the system is to provide authorisation of laboratory tests, specimen registration, work scheduling and result entry, and to automate the generation of result analyses, test reports and pathological statistics. As at April 1997, it had been implemented in six hospitals.
- (vii) **Radiology Information System.** The objective of the system is to provide registration and appointment for examination, film tracking, result capture and retrieval, billing information and workload statistics. As at April 1997, it had been implemented in five hospitals.
- (viii) **Pharmacy Management System.** The objective of the system

refers)

is to develop a Corporate Patient Dispensed Drug History System with the capability to store all the drug prescription information generated by all HA pharmacies and to develop an enquiry function to meet the immediate clinical need of medical and pharmacy staff. As at April 1997, the system had been implemented in six hospitals.

refers)

- (ix) **Psychiatric Information System.** The objective of the system is to create and maintain the psychiatric patient database to support the clinical operations of the clinicians in hospitals with psychiatric units. As at April 1997, the system had been implemented in two hospitals.

- (x) **Operating Theatre Information System.** The objective of the system is to provide facility for on-line booking of operating theatre, staff, equipment, consumables and other resources. It also provides facility for the capture of patient's location and time and actual usage of the operating theatre, staff, equipment and consumables. As at April 1997, the system had been implemented in one hospital.

Stage 3

- (i) **Executive Information System.** The objective of the system is to provide management with intelligent management information extracted from various systems developed in Stages 1 and 2 above. Version 1 of the system had been fully implemented.

- (ii) **Case Mix Management System.** The objective of the system is to provide clinicians with decision support and enable them to plan the provision of services for groups of patients requiring a similar mixture of treatments. As at April 1997, the system was under development.

Cost estimates for IT projects approved under
the HA IT Block Vote for the period from 1991-92 to 1997-98

IT projects (Number of hospitals/specialist clinics to be implemented)	Project cost estimates (\$ million)
Integrated Patient Administration System (37H)	93
Interim Management Information System (37H)	18
Human Resources/Payroll System (37H)	42
Hospital Based Financial System (37H)	65
Pharmaceutical Supplies System (Phase IIA/B)	31
(17H/22C) Data Centre (N/A)	25
Cluster Centres and Network (N/A)	47
Laboratory Information System (7H)	78
Laboratory Results Reporting (8H)	50
Medical Records Tracing System (12H)	15
Medical Records Abstracting System (12H)	15
Out-patient Appointment System (26S)	37
Clinical Management System (Phase I) (5H)	84
Specialty Clinical Information System (Phase I)	11
(14H) Radiology Information System/Results Reporting	20
(Pharmac. S.) (2H) Pharmaceutical Supplies System (Phase IIC-A)	9
(10H/7C) Out-patient Clinical Operations Support System	16
(Pharmac. S.) (2C) Infrastructure for mainframe (N/A)	22
Pharmaceutical Supplies System (Phase IIC-B)	11
(10H/9C) IT/IS Projects for new hospitals (7H)	63
Clinical Management System (Phase IIA) (3H)	49
Out-patient Clinical Operations Support System	25
(Pharmac. S.) (5C) Radiology Information System/Results Reporting	39
(Pharmac. S.) (6H) Infrastructure for network computing (Phase I)	27
(17/2) Executive Information System and Office Systems	18
(42H)	<hr/>
Total	<u>910</u>

Legend: H - Hospitals
S - Specialist Clinics
N/A - Not applicable

Source: HA's records

Acronyms and abbreviations

CWRF	Capital Works Reserve Fund
FC	Finance Committee
GRA	General Revenue Account
HA	Hospital Authority
IT	information technology
IT/IS	Information Technology/Information Systems
MAA	Memorandum of Administrative Arrangements
PHA	Provisional Hospital Authority
SCIT	Sub-Committee on Information Technology