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THE SCOTTISH OFFICE

National Health Service in Scotland
Management Executive

St. Andrew's House
Edinburgh EH1 3DG

Dear Colleague

A FRAMEWORK FOR THE DEVELOPMENT OF INFORMATION STRATEGIES

12 October 1992

Addressees

For Action:

Chief Executive and Chief Executive Designates, NHS Trusts

For Information:

General Managers, Health Boards

General Manager, Common Services Agency

General Manager, State Hospital

Health Education Board for Scotland

Summary

1. This letter draws the attention of NHS Trusts and others to a generic Framework for the Development of Information Strategies.

2. A copy is provided to each main addressee and further copies can be obtained from the Directorate of Information Services, Health Systems Division as shown below.

Action

3. All NHS Trusts and Prospective Trusts are invited to ensure that they prepare, or further develop, an appropriate Information Strategy. In doing so they should take account of the guidance and advice provided within this Framework.

4. In the case of Health Boards they should consider to what extent their Unit-based Strategies can be further developed and again may wish to use the Framework to assist them in this task.

5. Other NHS organisations which are required to prepare Information Strategies may also benefit from using the approach outlined in the document.

Yours sincerely

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N.H.S. in Scotland
Management Executive

A Framework for the Development of Information Strategies

Directorate of Information Services

An Outline Framework for the Development of Information Strategies for the NHS in Scotland

Health Systems Division
October 1992

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APPENDICES

1. PURPOSE OF THE FRAMEWORK

This framework is intended to act as a guide and a means of assistance to NHS Trusts in Scotland in the development of their Information Strategies. Although aimed at NHS Trusts, this framework can also provide the basis for the information strategies of Health Boards, Directly Managed Units and other NHS bodies.

The framework defines what an Information Strategy should cover and to what the Strategy must be related. It describes how to develop an Information Strategy and is written at a farily high level for rapid reference by busy Senior Managers. The bulk of the detail, with guidelines and examples, is consigned to appendices, for the reference of those who wish to use the framework further.

The aim of the framework is to provide practical assistance, not just to catalogue a list of potentially pertinent techniques. The important thing is to know why something needs to be done: the appropriate techniques can then be chosen in order to be able to perform the task in the most effective way. This framework therefore concentrates upon the reasons for undertaking each stage in an Information Strategy Study and offers guidelines and examples to show what can be expected.

The framework is geared towards those who wish to embark upon the exercise of developing an Information Strategy themselves. Developing an Information Strategy is, however, a senior management exercise, requiring:

- experience in senior management; and
- experience in the development and implementation of successful information systems.

People who do not have this combination of experience, or who, for instance, would not feel comfortable using and developing the questions, analyses, architectures etc described in this framework, may wish to consider employing external skills to assist with the development of their information strategies. Not only is the work driven at a senior management level: so are the impacts of the conclusions. To produce something which has the appearance of a strategy, but without the substance of reality, is a disservice to the organisation and can do lasting damage.

2. WHAT AN INFORMATION STRATEGY SHOULD COVER

A strategy - any strategy - is concerned with what should be put into place in order that objectives can be achieved. Therefore an Information Strategy must address all of these elements which need to be put into place for the handling of information. These elements include:

- information systems, both automated and manual;
- information services; and
- information management.

The Strategy must also define how all of these elements are to be achieved, the likely costs, timescales, resources required and the benefits to be gained. For Scotland, the result is required to be documented in two forms:

- the strategy itself, with general cost and resource implications; and
- the detailed cost and resource plan. This should be in detail for year 1 and in outline for years 2 and 3.

The Strategy must also contain the mechanisms for its own renewal. This is because a strategy is no more fixed than are the situations and capabilities upon which it is based. Therefore provision must be made for the strategy to be reviewed regularly and updated annually as an integral part of the overall planning cycle.

The Information Strategy must be keyed to:

- the business objectives of the organisation for which it is being developed;
- the understanding, perceptions, and capabilities of the organisation for which it is being developed;
- the practical capabilities of current information technology; and
- the facilities for handing information which already exist:
  - (a) within the organisation;
  - (b) within other organisations with which information must be communicated.

The Information Strategy must have the commitment of the Chief Executive and the Management Board of the Trust. Specifically, it should be authorised and owned by them.

Finally, Information Strategies for NHS Trusts in Scotland must conform with the overall 'Information Strategy for the NHS in Scotland', first published in May 1992.

3. HOW TO DEVELOP AN INFORMATION STRATEGY

General guidelines on the preparation of Information Strategies were issued by the NHS Directorate of Information Services earlier this year (see Appendix I). As indicated in these guidelines, an Information Strategy is best developed by following a systematic process. A diagram of the main elements of such a process is shown overleaf, and the timescales that would be typical are shown alongside it.

In addition to the main elements of the process, there are important preparatory and concluding elements to the development of an Information Strategy.

3.1 Ideally the Preparatory Stage should be completed some 3-4 weeks before the commencement of the interviews. In the preparatory stage, there is a need to:

- set up a Steering Group and the Working Group for the study;
- finalise the Terms of Reference for the study;
- establish the organisational relationship between the study and other developments involving information handling, such as a Resource Management project;
- plan the conducting of the study, in line with the principles of the PRINCE methodology;
- organise the administrative arrangements for the study; and
- select the interviewees, determine their interview dates, and send out preparatory information to them.

Further details and explanations of these Preparatory Stage tasks are given in Appendix II.

3.2 Stage 1 of an Information Strategy is concerned with establishing the broad information-handling needs of the organisation, and with putting a value on these needs.

A threefold approach is recommended:

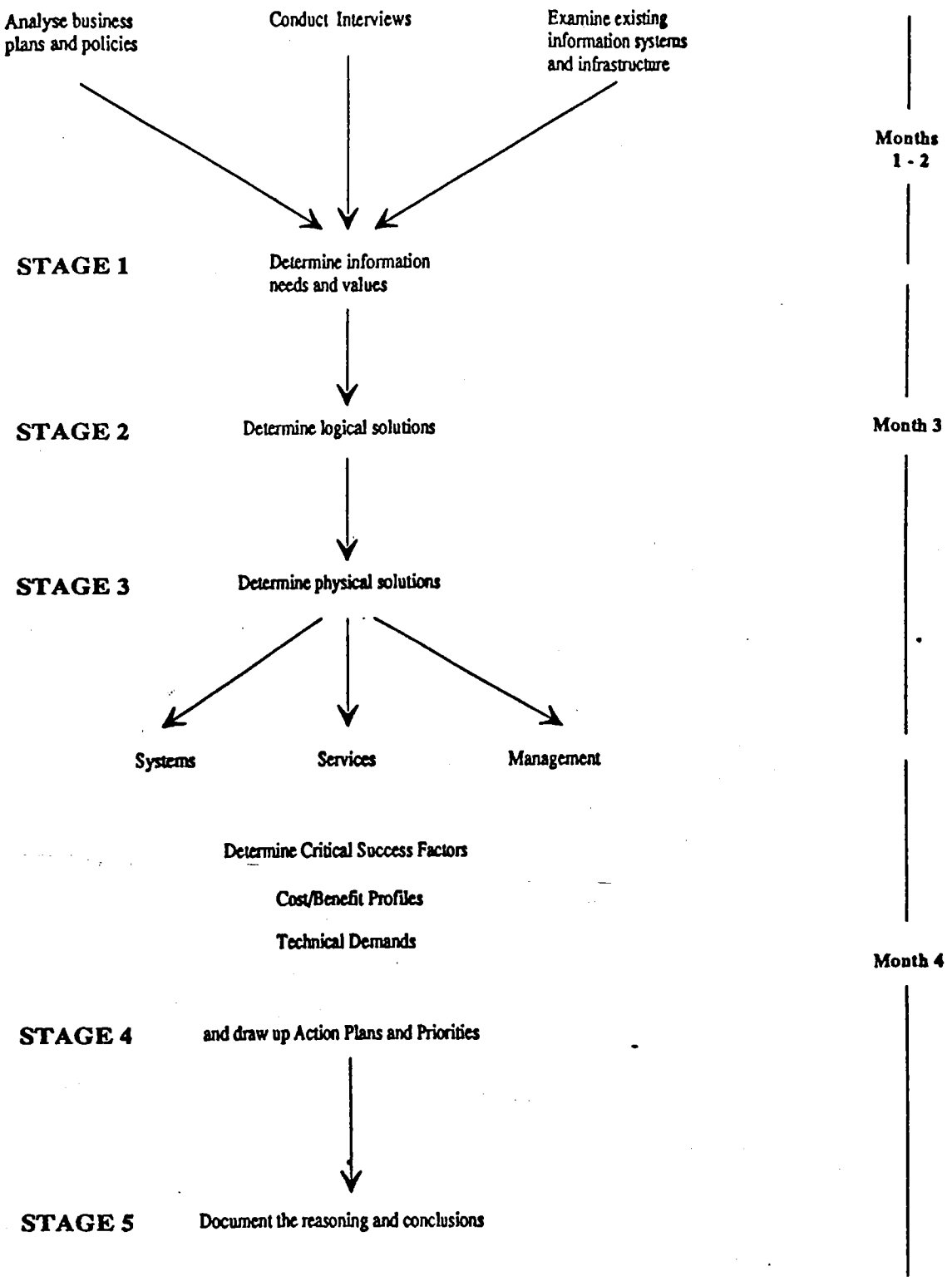
- a study of the declared business intentions, plans, and policies;
- a programme of interviews covering as wide a range of people as possible; and
- an examination of the existing information-handling facilities and plans.

Each approach will provide different perspectives on the needs. It is recommended that the approaches should be pursued in parallel and that the results from them should then be brought together and analysed to form a single, composite view. Appendix III provides guidelines and examples for the approaches to be followed.

Because of the amount of interviewing and information-gathering to be done, Stage 1 tends to occupy the longest period of time of all the stages of the study. Normally, 1-2 months would be taken between the start of the studying and interviewing, and the completion of the analysis of the information needs.

3.3 Stage 2 is concerned with deriving the logical solutions to the needs identified in Stage 1. Logical solutions are concerned with the system functions that are required, not with the physical forms of the systems - that follows in Stage 3.

Process for the development of an Information Strategy



In the current situation which information-handling has reached within the NHS, most Trusts in Scotland will be working towards the possession of:

- a number of discrete systems and facilities to support the working of individual departments; and
- a number of core systems and facilities, to support the working of the organisation as a whole.

Examples of the latter include:

- medical records;
- patient administration;
- clinical activity recording, eg casemix and case registers; and
- office automation, eg. electronic mail.

Examples of the former include:

- pharmacy systems;
- nursing systems; and
- systems for therapies and paramedical services.

Most of the systems within a Trust are likely to have been obtained from different suppliers and will not have been specifically designed or engineered to integrate with each other. Therefore amongst the concerns for an Information Strategy for an NHS Trust at this time, the main ones are likely to be:

- the linkages between the growing number of discrete systems within and without the Trust; these linkages would include not just data flows and timings, but also common reference data and code tables, costing algorithms, input data validation rules, and security/access controls; and
- responsibilities not just for the operation and use of the systems, and their interconnections, but also for the data and information flowing through them; these become acute when data on one system is transported to serve additional purposes on other systems.

Appendix IV gives guidelines and examples of the derivation of logical solutions to meet these needs.

3.4 Stage 3 of the process is concerned with the physical solutions that are required for the Information Strategy. A single physical system, for instance, might provide the separate logical functions of producing discharge letters and recording data for retrospective audit.

There are three main elements to the physical solutions:

- information systems;
- information services; and
- information management.

The solutions must take account of the existing information-handling facilities, defined in Stage 1 of the study. The solutions must also take account of the requirements and

guidelines of the overall Information Strategies for the NHS in Scotland, and any related technical standards, developed by the Directorate of Information Services.

The reasons for the choice of each physical solution must be stated. This allows the strategy to be re-examined and developed in the future.

Appendix V offers guidelines and examples for the definition of physical solutions.

3.5 Once the choices of the physical solutions have been established and agreed, there will then be the need to determine the priorities and action plans for putting them into place. There are 3 main factors which, in combination, influence the determination of the priorities and plans for action:

- critical success factors;
- cost/benefit profiles; and
- technical demands.

The action plans should be defined in the form of projects, each one with terms of reference, objectives, deliverables, resources, timescales, dependencies, and monitoring and control mechanisms. Guidelines for determining priorities and plans are given in Appendix VI.

3.6 When the priorities and plans for action have been defined, the Information Strategy should then be documented, and formally accepted by the management of the Trust. The reasons for documenting the it are:

(a) to record what was examined, what was found, and what was decided as a result;

(b) to explain the analysis behind the deductions; and

(c) to seek authorisation, commitment, and funding to proceed the recommended courses of action.

Items (a) and (b) are essential, not only to win the commitment of both internal and external recipients of the document, but also to enable the strategy to be reviewed and updated in the future, as circumstances change.

There is no set form for an information strategy report, although for the NHS in Scotland, two documents are required:

- the strategy itself; and
- a detailed cost and resource plan, with timetables.

For the former, the intended readership of the strategy document needs to be considered. Many Trusts may wish to create a short summary document for the widespread distribution of the key points to members of staff throughout the organisation. Such Trusts would then, perhaps, limit the distribution of the full document to a relatively small number of managers, technicians, and users who would be directly involved with the implementation of the strategy.

Other Trusts may opt for a single-document approach, with all details available to everybody. A suggested list of headings and contents for the strategy report is contained in Appendix VII. Appendix VIII contains a checklist which would be used by the Directorate of Information Services for the NHS in Scotland when scrutinising the strategy report for completeness. Appendix IX provides a checklist for the completion of 3 year spending plans.

An important component in the completion of a strategy is its formal acceptance by the Chief Executive and Management Board of the Trust. Although the commitment of the Chief Executive and senior colleagues should have been gained throughout the process of developing the information strategy, via their involvement in the Steering Group, the final strategy will carry little weight, either within the Trust or with the Directorate of Information Services for the NHS in Scotland, unless it is formally authorised and adopted by the management of the Trust. Since this is likely to require tabling at a Board meeting of the Trust, allowance for this must be made within the timescale available for the strategy to be completed.

3.7 Finally, the strategy must contain the mechanisms for its own renewal. These mechanisms comprise:

- the process for reviewing and updating the strategy;
- allocation of the responsibility for ensuring that the process is carried out; and
- the trigger points at which the process should be initiated.

The process would follow a modified form of the procedures described in 3.1 - 3.6, the form being adapted to suit the circumstances of the time. For instance, a large round of interviews or a new analysis of architectural options might not be necessary if only the priorities of certain actions are to be revised. The appropriate process should be determined by the person who holds the responsibility for the maintenance of the information strategy. Normally, this would be the Head of Information Services for the Trust.

The trigger points for reviewing and updating an information strategy are:

- the annual planning cycle of the Trust, so as to ensure that the strategy is related to the updated business and operational plans, the latest organisational development strategy, and other planned developments for the organisation;
- the annual request for the submission of information strategies and IS/IT expenditure plans to the Directorate of Information Services;
- major changes to the business objectives or plans for the Trust such as might be brought about by a merger with another Trust, or an internal re-organisation to meet unexpected circumstances; and
- considerations of proposed investments in information facilities which do not conform with the information strategy; in such cases, the questions to be asked are:
  - should the proposal be revised;
  - or should the strategy be revised;
  - or both?

The upshot is that the Information Strategy should be reviewed and updated annually, and at times in between if necessary.

4. STRATEGY STUDY DELIVERABLES AND CHECKLIST

The deliverables which can be expected from an information strategy study for an NHS Trust are:

- Summary of the Trust's business objectives and a statement of the objectives for the information strategy;
- Analysis of the information needs arising from the business objectives;
- Analysis of the information needs arising from users' perspectives;
- Description of the existing information-handling facilities and management infrastructure;
- Technical and Communications architectures for the next 3-5 years, with systems configuration and network diagrams;
- Information-handling needs and solutions for:
  - general management information;
  - operational areas;
  - market information;
  - clinical audit;
  - office information;
  - micro computing;
- Management organisation and responsibilities for:
  - determining information-handling policies and standards;
  - co-ordinating priorities and the allocation of funding and resources;
  - conducting project management and procurement exercises;
  - determining responsibilities for the operation and usage of information handling facilities;
  - providing support and training;
  - providing information-handling services, eg analysis, presentation;
  - conducting audits and reviews of facilities;
  - maintaining the information strategy.
- Key information-handling policies and standards for the Trust;
- Priorities and plans for action, with cost and resource implications and indicated timescales;
- Information Strategy Report and 3-year IS/IT Expenditure Plans;
- Conformity with the National Information Strategy and formal acceptance by the Chief Executive and Management Board of the Trust.

Appendix VII contains a checklist for the contents of an Information Strategy, Appendix VIII sets out criteria for assessing strategies and Appendix IX contains a checklist for 3-year IS/IT Expenditure Plans.

APPENDIX I

DIS GUIDELINES ON THE PREPARATION OF LOCAL INFORMATION STRATEGIES

1. An Information Strategy should be based on the agreed strategy, objectives and business plans and should reflect the associated information and Information Systems requirements. It must be in line with the Information Strategy for the NHS in Scotland as approved and issued by the Management Executive.

2. For the purposes of the Information Strategy, the Trust objectives should be stated in broad areas such as general objectives and objectives related to the delivery of health care to categories of people. The plans which follow the objectives should be set out in more detail and be listed in general matters as appropriate eg hospital services and community services.

Information and System Requirements

3. A rigorous approach to determining information requirements and the information systems required to underpin the business plan may be unlikely during the preparation of the initial strategy document. However an analytical methodology must be applied to determining the information needs and information flows.

4. Some of the information needs and flows may be provided by an existing information system and the Strategy should refer to that system. For the remainder, analysis will identify system requirements which may be satisfied by manual systems or by software/hardware systems. Some of these may be adequate, some may require enhancement and some may be new systems.

Information Technology (IT) Strategy

5. Based on the system requirement, the IT strategy should then be set out. The strategy should relate back through the information system to the information requirement of a particular plan resulting from the Trust's objectives. At this stage, the Information Strategy document should set out the details of the approach to existing systems and new systems. It should also acknowledge the Unit's acceptance of any nationally set technical standards.

6. The application systems should be listed by function rather than by the earlier analysis and would include, as appropriate, the following:

   - Operational systems (including PAS, Laboratories, Nursing, Theatre Management, Pharmacy, Clinical, Medical audit, Community Nursing, CHI and related screening modules, contracting and MIS);
   - Administration systems (eg Finance, Payroll, Personnel, Supplies, WIMS, Electronic Mail); and
   - Information systems (eg viewdata systems such as VADIS and TOXBASE).

7. In addition consideration must be given to overall strategy relating to the development, operation, management and use of IT systems. Short sections should be included to cover the following heads:

   - IT Support (source of support for advice to users, identification of new and changed requirements, systems software maintenance, hardware maintenance);
   - Software Procurement (Use of 'national and DIS "approved" commercial systems, local development or other commercial systems);

- Hardware Procurement (Use of national/local contracts, standardisation of supplier and operating system);
- Communications (LAN, Structured cabling, WAN and national network);
- Training (Awareness, Users, Managers of Users, Computer Staff, OD and Management Development -use of central training resources);
- Technical (Technical standards for systems, Standards for Communications, Development methodologies, Development tools);
- Data (Adoption of ISD national data standards, local data management, data access arrangements and data ownership);
- Audit and Review (How the effectiveness of IS/IT systems is monitored);
- Management of IS/IT (Advisory arrangements for management, individual managerial responsibilities for aspects of IS/IT including expenditure authorisation, control of standards, confidentiality, procurement and data management); and
- Confidentiality/Security (Data Protection, Disaster Planning, Systems Access, Unauthorised Software).

8. The strategy and plans should be time related to cover a full planning cycle of 3-5 years.

AN EXPLANATION OF THE PREPARATORY STAGE

1. Set up the organisation

There are two components to the organisation of an Information Strategy study:

- a Steering Group, led by the sponsor; and
- a Working Group, led by the project manager.

A Steering Group is needed:

(a) to ensure that the conduct and conclusions of the strategy development mesh with other developments affecting the organisation; and

(b) to ensure that the organisation will support and fund the implementation of the strategy afterwards.

The Steering Group would therefore normally consist of some 5 or 6 of the leading figures in the organisation, including the Chief Executive.

A Working Group is needed:

(a) to conduct the study;

(b) to progress the implementation of the strategy afterwards; and

(c) to maintain the Information Strategy in the future.

The Working Group would therefore consist of some 4 to 6 prominent members of the Information, Finance, Business Development, and Business Management areas of the organisation. If external consultants are employed, it should be as members of the Working Group. The Working Group would normally be led by a Head of Information Services or equivalent.

(Note: membership of the Working Group requires fairly full involvement on the part of the individuals concerned, for the duration of the study. Clinical input to the organisation of the study is essential at the Steering Group level. Clinical input to the Working Group should certainly be incorporated, wherever possible.)

2. Finalise the Terms of Reference

Because there are so many aspects to information handling, and so many ways in which they may be considered, it is extremely important to define at the outset:

- exactly what will be examined; and
- exactly what will be delivered by the Information Strategy study.

The Terms of Reference need to be finalised and agreed with the sponsor of the study, who should also be the person who would formally approve its conclusions and recommendations at the end.

An example of Terms of Reference is attached as Annex A to this Appendix.

3. Establish the organisational relationship between the Information Strategy study and other developments.

The need here is to avoid - in advance - conflicts or confusions over responsibilities and recommendations with other developments involving information handling, which might be in progress at the same time. Examples of such developments are:

- Resource Management projects;
- medical audit projects;
- Telecommunications Strategy studies;
- sundry Information Committees and Working Groups;
- internal restructuring and organisational developments;
- external restructuring, amalgamations, etc.; and
- business and operational planning exercises.

The possibilities of any conflict or confusion need to be sought out, and arrangements made for their clarification and eradication, either explicitly via the terms of reference, or via liaison and co-ordination during the course of the study.

4. Plan the study

The standard planning methodology for the NHS is the Government approved PRINCE system. The important point is to ensure that the principles of PRINCE are followed.

Each stage of the study should have a clearly identified deliverable which can be formally reviewed by the Steering Group at the end of the stage. The objectives of the review would be to gain from the Steering Group:

- advice, comment, and correction upon the contents of the deliverable;
- approval of the result and, thereby, endorsement of the findings of the study thus far; and
- authorisation to proceed to the next stage.

This approval allows the Steering Group to influence the conduct and direction of the study, and ensures that their commitment is built into the development of the Strategy.

Because the members of the Steering Group will be busy people, the dates for these reviews should be fixed at the Preparatory stage. Indeed, the more dates that can be fixed at this stage, the more likely is the study to run to schedule and budget. Ideally, all activities on the study should be capable of being allocated to set dates, before the end of the Preparatory stage, and an exact timetable issued.

5. Organise the administrative arrangements

These go along with the detailed planning recommended above. Arrangements will or may need to be made for:

- accommodation for working, and also interviewing;
- accommodation for Working Group meetings;

- accommodation for Steering Group meetings;
- secretarial support for:
  - arranging interviews and meetings;
  - handling correspondence and telephone calls;
  - maintaining files;
  - recording minutes;
  - issuing notices;
- PCs and tools for:
  - word processing;
  - graphical presentation;
  - project management; and
- copying, printing, binding, and distribution of:
  - the draft report and appendices;
  - the final report and appendices.

6. Select the interviewees, and arrange for the interviews

The purposes of interviewing are stated in Appendix III, Section 2. The interviewees should be selected to obtain a representative view from all of the principal functional areas of the organisation, and also from a good cross-section of the levels of staff within the organisation. Group interviews can be used to increase the coverage of people interviewed, but the group has to have a common functional basis of interest, eg:

- a clinical committee;
- a clinical or administrative department; or
- a ward team.

Group interviews where interviewees do not have a common basis of interest are likely to produce unreliable results and are not recommended. In particular, members of the Management Board should be interviewed independently.

Typically, for a 500-bed acute hospital, some 15 to 20 interviews might be conducted, in which some 25 to 40 people might be interviewed.

At least 2 weeks before the interviews, a Preparatory Note should be sent to the interviewees, asking them to consider their information needs in advance. This will lead to interviews which are much more productive than those which are held with the interviewees unprepared. An example of such a Preparatory Note is attached in Annex B to this Appendix.

APPENDIX II

ANNEX A

SPECIMEN TERMS OF REFERENCE

1. By means of interviews, study and analysis, to establish and document the Information Needs of the Management Group, members of the Clinical Management Board, and their staffs at all levels throughout the organisation. The study should seek to relate all Information Needs to their revenue consequences.

2. To examine and document the existing Information Environment, including the principal Information Flows. The study should seek to explain why little Management Information is obtained from existing systems, and to consider if better use could be made of the Information Facilities which the Trust already possesses.

3. Without partiality towards any supplier, but in line with the Information Strategy for the NHS in Scotland, to define solutions to the Information Needs of the Trust, in terms of:

   - alternative Logical Systems Models, with their principal Information Flows and Data Dictionaries;

   - corresponding Physical Systems Models, with indications where enhancements to, or replacements of, existing systems may be required; and

   - appropriate arrangements for Management, Organisations, Resources, and Responsibilities required to carry forward the Information Strategy, implement its Facilities, and deliver its Services.

4. By means of establishing Critical Success Factors, and conducting Investment Appraisal and Technical Analysis, to determine the priorities for action for the Trust, and to define the portfolio of projects required to implement the Information Strategy.

5. To document the Information Strategy at a level of detail suitable for discussion and decision by Senior Managers, supported by documentation for study by Specialist Staff.

6. At key stages throughout the study, to review and ratify the findings and conclusions with the Steering Group for the Information Strategy study. Members of the Steering Group should be advised of the principal points and issues in advance of each review meeting.

APPENDIX II

ANNEX B

A PREPARATORY NOTE FOR INTERVIEWEES

The NHS Trust has determined to develop an Information Strategy for the Trust. The Trust has emphasised that the Strategy study must examine the information needs at all levels throughout the organisation. Accordingly, members of a working group formed to develop the strategy will be conducting a wide programme of individual interviews and a small number of group sessions amongst clinicians, nurses, managers and administrators within the Trust. A small number of interviews with people external to the Trust, eg GPs, Health Board Managers etc will also be conducted.

The interviews will be intended to gain an understanding of:

- what information is needed in order for responsibilities to be fulfilled effectively;
- the shortfalls in the information which is currently available, and what it would be worth to put it right; and
- the reasons for any shortfalls in information or in information handling facilities.

As an interviewee, you can help by considering the following before the interview takes place:

1. Determine whether you are answering for your individual position, your department, or both.
2. Determine the information needed to fulfil your and/or your department's responsibilities in:
   - planning;
   - enabling;
   - doing;
   - reviewing.
3. Determine how accurate, complete and timely the information really needs to be, bearing in mind the greater the quality the more expensive it will be to satisfy.
4. Determine where the information should, or does come from eg which department, which system.
5. Do not think just of computer-produced information. Medical Case Notes are one of the major sources of information in any hospital, and are almost entirely paper based and are likely to remain so for the foreseeable future, because cost effective computer-based systems have not yet been designed to replace them.
6. Consider what information-handling facilities are most needed eg:
   - rapid access to data via terminals;
   - regular reports and comparisons;
   - operational support eg process management, administrative support, word processing;
   - the ability to store and manipulate data;
   - an information retrieval and analysis officer.

7. Determine what the information is needed most for eg:

- records;
- management; or
- operation,

and if there are any statutory information requirements related to your responsibilities.

8. If there are shortfalls of information or information quality at present, try to identify:

- what is suffering;
- what it would be worth financially to put it right; and
- the causes of the shortfalls, as you see them.

9. Identify the computer systems used by you and your department, who runs them, and if there are any problems with them. Also try to establish if there are plans to get more computer systems, or enhanced systems in the departments.

10. Determine what information you and your department provide to others and whether it should be improved.

11. Consider what you would most want to see coming out of the Information Strategy for the Trust. An Information Strategy should define how an organisation's information should be handled as a whole. It should cover not just computer systems but manual ones, it should cover information-providing services and support, and it should cover the management organisation, policies, standards and responsibilities needed to handle the information overall.

GUIDELINES FOR THE ANALYSIS OF INFORMATION NEEDS

1. Study of the declared business intentions and plans

This study is essential, if the Information Strategy is to be keyed to the business's needs.

There are many sources from which the business's intentions and plans can be extracted, eg.:

- Mission and Vision statement;
- Application for Trust status;
- Business plan;
- Quality strategy; and
- Organisational Development strategy.

Some further information can be obtained from the:

- Operational plan;
- Costing strategy;
- Resource Management plans;
- Awayday/workshop notes; and
- Interviews with members of the Management Board.

It is important that all are studied carefully to identify the organisations' aims and objectives, how they are to be achieved and the information needed to support the achievement process.

Example: –

Aim/objective	How to be achieved	Information needed
Develop the Trust's facilities in a realistic and cost effective manner	(1) Determine where developments are needed	Information from: - clinical - nursing - operational
	(2) Develop a cost effective culture	A common and agreed means of evaluating costs and benefits
Meet the targets set in contracts and business plans	(1) Involve departmental managers in negotaiting contracts and determining the business plans	Facilities for planning, recording and monitoring work activities

(2) Create mechanisms monitoring & examining progress towards targets	Facilities for comparing achievements against targets & for modelling the consequences
(3) Monitor activities at the stage at which control can still be exercised	Facilities for monitoring work to be committed as well as work done

Many of the points extracted from the several sources will overlap. A composite list should be drawn up, structured upon each aim/objective. Some of the information needs may have to be deduced from the declared intentions; they should be added to the list nonetheless. Any discrepancies in aims, means, or needs, should be resolved before this exercise is completed.

2. Programme of interviewing

The purposes of interviewing people are to:

- understand their perceptions, and examine how closely their views align with those declared by the business;
- gauge the pressures and priorities competing for their time;
- explore their current information needs and problems; and
- assess their readiness and capability to handle change.

The question of who should be interviewed is addressed in Appendix II, section 6. Annex B to that Appendix provides an example of a Preparatory Note which should be sent out to the interviewees at least 1-2 weeks in advance of interviews.

For the interviews, a script is suggested, although it is neither practical nor necessary to follow it rigidly for every interview. A generic example is given in Annex A to this Appendix. For each interviewee, specific questions about that person's responsibilities should be added.

Because the paths taken by discussions in interviews are often somewhat variable, interviewers often find it useful to have a checklist for rapid reference at the end. An example of one of these is given in Annex B, following.

After the interview, coherent notes of what was expressed should be drawn up and returned to the interviewee for comment and correction. This not only improves the accuracy of the resulting understanding: it also increased the sense of involvement.

Writing up the notes can be a laborious process, and it would be unrealistic to expect to hold and write up more than 3 interviews per man-day.

3. Examination of the existing information-handling facilities and plans

The principal reason for examining the existing information handling facilities is to establish what can be built upon, when implementing the new Information Strategy. However, the presence or absence of existing facilities, and the way in which they have been implemented and used, can, when matched to problems identified in the interview programme (see 2. above), provide (a) valuable insights into the realities of the organisation's information needs, and (b) explanations of some of the difficulties underlying their resolution.

The existing facilities and plans could include:

- information systems, both automated and manual, and the departments running them;
- information processing and communicating technology;
- information handling standards and policies;
- information handling responsibilities and duties;
- experience, awareness, skills and practice in information handling;
- lines of communication and control, eg on the procurement of information systems; and
- information strategies, from the host and related organisations, and also from the previous administration.

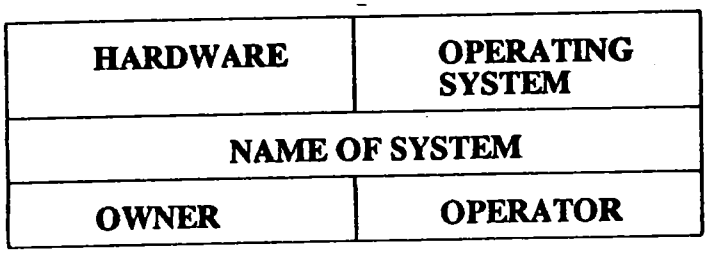
The sources of information about existing systems are usually twofold:

- interviews with the people responsible for the systems; and
- a general survey, coupled with a scrutiny of the capital assets register.

With regard to a general survey, it can sometimes be difficult to get a satisfactory response from a request for information to be supplied voluntarily. It can therefore help to combine the survey with one to which an obligatory response is required, eg that required for the Data Protection Act.

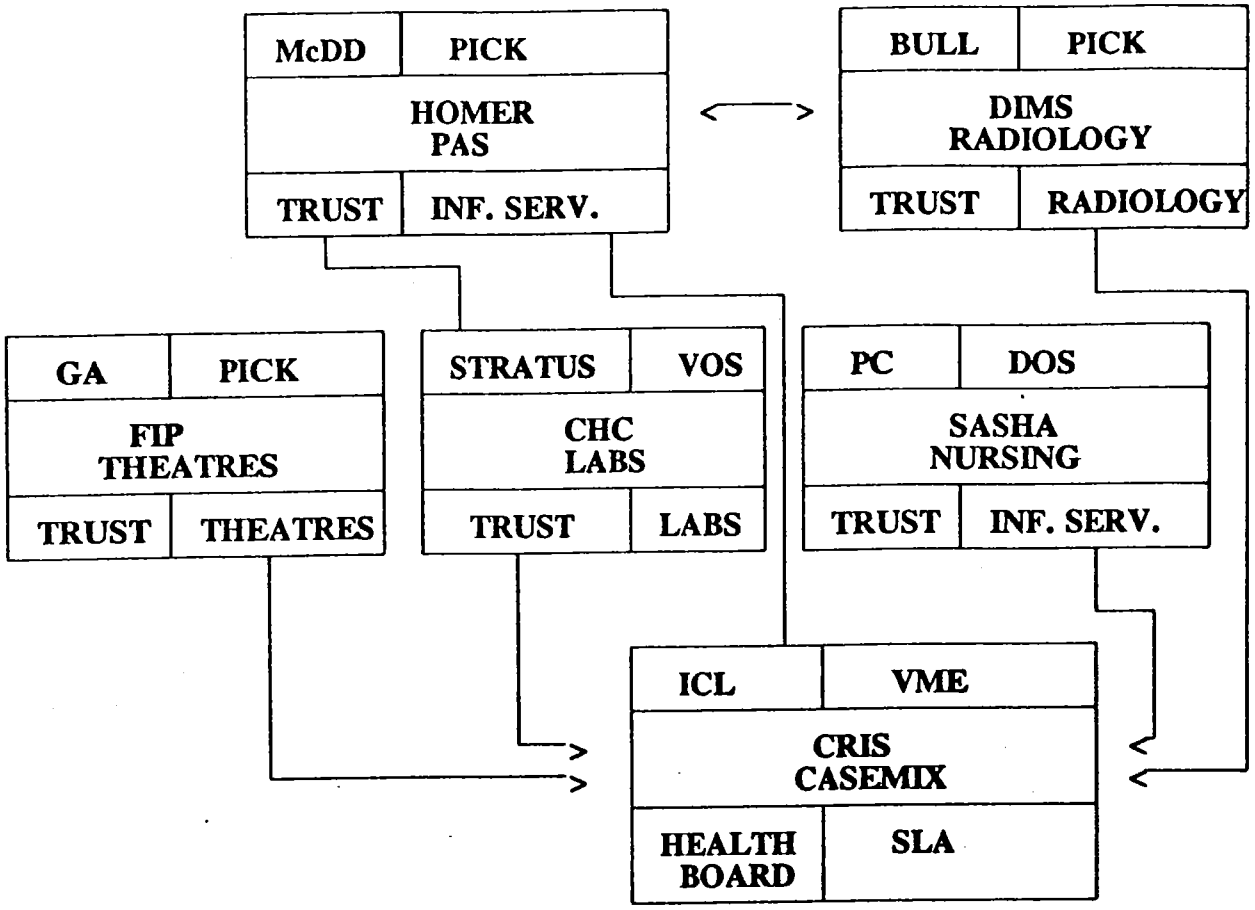
The existing information systems can be shown in both tabular and diagrammatic form. The latter tends to be confined to the principal systems, and should show the way in which they are interlinked. It thus becomes one form of configuration diagram.

The diagramming conventions should be explained; thus a computer system could be shown as



and a line between the systems should mean a programmed interface between the systems, whether the data is communicated by floppy disk, cable, or local area network.

Example:



The configuration diagram for the Local and Wide Area Networks should also be shown, and related to the topography of the Trust's sites. The diagramming conventions for this will be different from those of the systems configuration diagram, and are best adapted from those used by the supplier of the networks.

The tabulation of the individual systems is best done in a structured form. A sample layout is attached as Annex C to this Appendix.

Finally, the existing management controls, policies, and standards for information handling should be documented. A checklist is given as Annex D to this Appendix.

4. Analysis of Information needs and values

The need here is to draw together the views of the information requirements, and their values, which will have been gained from the foregoing three approaches. A number of techniques can be employed.

One is to hold a workshop/analysis session with the Working Group, possibly with the inclusion of a clinical representative. This will allow the three dimensional perspective of the needs to be explored in further depth, and relative weightings to begin to be applied to the various aspects which emerge from the discussion.

An alternative method is to list the information-handling requirements which have been identified in each approach, and then merge them to produce a composite list. The merger process would need to combine requirements which prove to be the same need, seen from different viewpoints.

In the process of analysis, particular care should be taken to identify factors which will cause any information requirements to change, or which will substantially diminish the benefit which can be obtained from any solution to the requirements. Examples of such factors are:

- a switch to a rigorously cost-effective investment appraisal process by the Trust: this tends to call for 'wish lists' to be completely re-examined; and
- an inability to introduce revised working practices, eg at ward level: this weakness means that the value of any solution can be diminished to zero in practice, albeit that the technical demands can readily be satisfied.

The results of the analysis process are therefore best produced and presented under a structured list of headings, such as:

- Business situation changes;
- New information requirements;
- Needs for improved information-handling facilities;
- Needs for improved information-handling controls, co-ordination, policies and standards; and
- Key constraining factors.

At this stage, the values of such information to the organisation can best be ascribed to the needs in terms of 'High', 'Medium', or 'Low.

INTERVIEW SCRIPT

(Note: the questionnaire would be varied if necessary to suit the particular position or circumstances of the interviewee. The questionnaire would also be revised during the interview programme if it becomes apparent that certain issues need to be probed especially for the Trust.)

1. Explain the purpose of the interview and where it fits within the Information Strategy study.

2. Explain that notes will be written up from the interview, and returned to the interviewee for their information, and also for any comment and correction which they may feel to be necessary. The notes will not be intended for publication, but a copy will be lodged with the Working Group for further analysis, and therefore any comments and corrections should be sent to them. There will be no formal significance attributed to the notes, but through them (and any feedback) the Working Group hope to gain the fullest possible understanding of each interviewee's information needs.

3. Ask for the interviewee's position and responsibilities, and also for the responsibilities of his/her department.

4. Ask for the interviewee's aims, goals, and priorities, with regard to their responsibilities [or those of their department, if they are answering for their department]. Also ask if they consider that these aims and goals may change, and, if so, to what. Also ask to whom the interviewee is accountable, for their responsibilities.

5. Ask how the aims and goals are to be, or are being, achieved.

6. Ask what information is needed to support this achievement, eg:

   - in planning;
   - in enabling;
   - in doing; and
   - in reviewing, etc.,

   and the qualities necessary for the information to be usable, eg:

   - how accurate;
   - how complete;
   - how timely; and
   - how confidential, etc.,

   and from where it does, or should, come.

7. Ask what information facilities are needed to support this achievement, eg:

   - access to individual facts;
   - access to comparisons, summaries, routine reports;
   - operational support, eg in administration; and

- storage, retrieval, and analysis of data.

8. Ask what are the greatest information needs for:

   - research;
   - management; or
   - operations, etc.,

   and if there are any statutory information requirements.

9. Ask what information needs are not being met, what is suffering because of this, and try to obtain a revenue value on the shortfall.

10. Ask what are considered to be the reasons why the information needs are not being met.

11. Ask what computer systems are being used by the interviewee and the department, and who runs them, and if there are any problems with them. Also ask if there are plans to get more computer systems in the department.

12. Ask what information the interviewee and the department provide to others. Also ask if it should be improved.

13. Ask what the interviewee wants most to come out of the Information Strategy.

INTERVIEW CHECKLIST

- Responsibilities: (personal/departmental);
- Size, location, extent of activities;
- Accountability to whom, and now reported;
- Aims, goals, priorities: (now/future);
- How functions performed;
- What information needed:
  - purpose;
  - source;
  - form;
  - quality;
  - timeliness;
- What information systems used at present:
  - and what planned for future;
- Shortfalls in information at present:
  - nature of shortfall;
  - what is suffering;
  - value, to put right;
  - perceived cause of shortfall;
- What information provided:
  - to whom;
  - when;
  - in what form;
- What interviewee wants from Information Strategy.

APPENDIX III

ANNEX C

SPECIMEN SUMMARY OF APPLICATIONS

Item	Information	Comment
1) Application	Application title	Including internal Trust systems and external systems to which interfaces may need to be developed and supported. The application name should cross relate to the Data Protection Act survey database.
2) Application details	Application name: Supplier: System hardware: Location: Operating system: Application software language: Estimated life/replacement: Current owner of hardware: Owner of application software: When implemented: Source of funding/effort for initial implementation: Source of funding/effort for future support and enhancement: Terminals: number, type, location/distribution, connection mechanism Responsibility for: operation, data quality, integration	Application language is typically PICK, Assembler, C, Oracle, Cobol .... Owners may be Trust, Grampian Health Board, University, an external agency, etc
3) Functions	Functions performed: Modules implemented: System usage: . data entry: . data authorisation procedures / quality control (and when applied): . data archiving procedures (and when): . data back-up procedures (and when): . data analysis (when, frequency, procedures): Future	
4) Information held	Basic datasets: Codes used (patient, ward, consultant, department, GP ...)	
5) Linkages	For system: - linkage name or description - supplier - when implemented - functions supported - any special intermediate system/service used - software implementation language - type (batch file transfer/real time/integrated/terminal access) - timeliness requirements - sizing (where significant) - protocols used (human or electronic data communications) Network/Data comms:	
6) Problems/Issues	Problems with the application and issues arising from its usage.	

CHECKLIST FOR EXISTING MANGEMENT POLICIES

- Allocation of funding for information handing;
- Control over procurements and enhancements of systems;
- Control over internal connections to networks;
- Control over external connections;
- Monitoring of conformity with the Data Protection Act;
- Control over staff who extract, provide, or present information;
- Control over the provision of training in information handling;
- Common codes in use, eg for patient, consultant, ward, diagnosis, procedure, etc.;
- Communications protocols in use;
- Interface standards in use;
- Database standards in use;
- Software authorisation policy;
- Hardware and software standards in use:
    - mainframe;
    - minicomputers;
    - PCs;
- Toolset standards:
    - word processing;
    - graphical presentation;
    - statistical analysis;
    - man-machine interface;
    - spreadsheets;
- Data access and security policies;
- Disaster and contingency plans;
- An existing and applicable Information Strategy.

GUIDELINES FOR THE DERIVATION OF LOGICAL SOLUTIONS

1. The cost of linking systems

In formulating logical solutions to the information handling needs of NHS Trusts, i.e. systems functions without regard to their physical forms, the cost of linking systems must be borne in mind. Most of the systems obtained by NHS Trusts will have been designed as discrete solutions to particular needs, not as modules for future integration into an organisation-wide system. This poses particular problems for NHS Trusts, viz how far to go in trying to link these separate systems.

Broadly there are three kinds of interface which can be employed to link systems:

- batch communication;
- interactive communication; and
- integrated working.

Batch communication is the cheapest, and can be set up quite quickly, especially if the sending system has a report generator facility which can be adapted to write to a file. Periodically, a file of data is extracted from the sending system, transported to the receiving system, and loaded into it when appropriate.

Interactive communication requires both systems to be in real-time communication with each other, whilst performing their normal functions. The interface therefore has to have software developed, for both the sending and the receiving systems, that will manage the interruptions and the dialogues, and that will, for instance, cope with system failures and recoveries at either end. It can be imagined that this kind of interface would be quite expensive to develop, and to support and maintain.

Integrated working requires more fundamental software changes to either the sending or the receiving system, or both, in that an activity on one system would cause a corresponding sequence of activities to occur on the other system. For instance, the registration of a new patient on a nursing system could be made to cause an automatic updating of the patient's details on the PAS system before the transaction on the nursing system were resumed. It can be seen that such an interface could require quite extensive reprogramming of both systems. Because this reprogramming could be unique to the Trust, involve more that one supplier's system, and could need to be updated whenever either system were upgraded, it is likely that the cost of achieving and maintaining such integration is only likely to be worthwhile for a few of the application areas of the Trust.

2. Linking architectures

When considering the linkages between information systems, it is important to have the eventual systems architecture in mind. This is because each architecture represents a different approach to solving the problems, and an interface which is developed with one approach in mind may not have the appropriate characteristics for an alternative approach.

The attached diagrams illustrate three of the most commonly considered architectures, i.e. multiple access over a network (Fig A), interlinked systems (Fig B) and integrated systems (Fig C).

Figure A

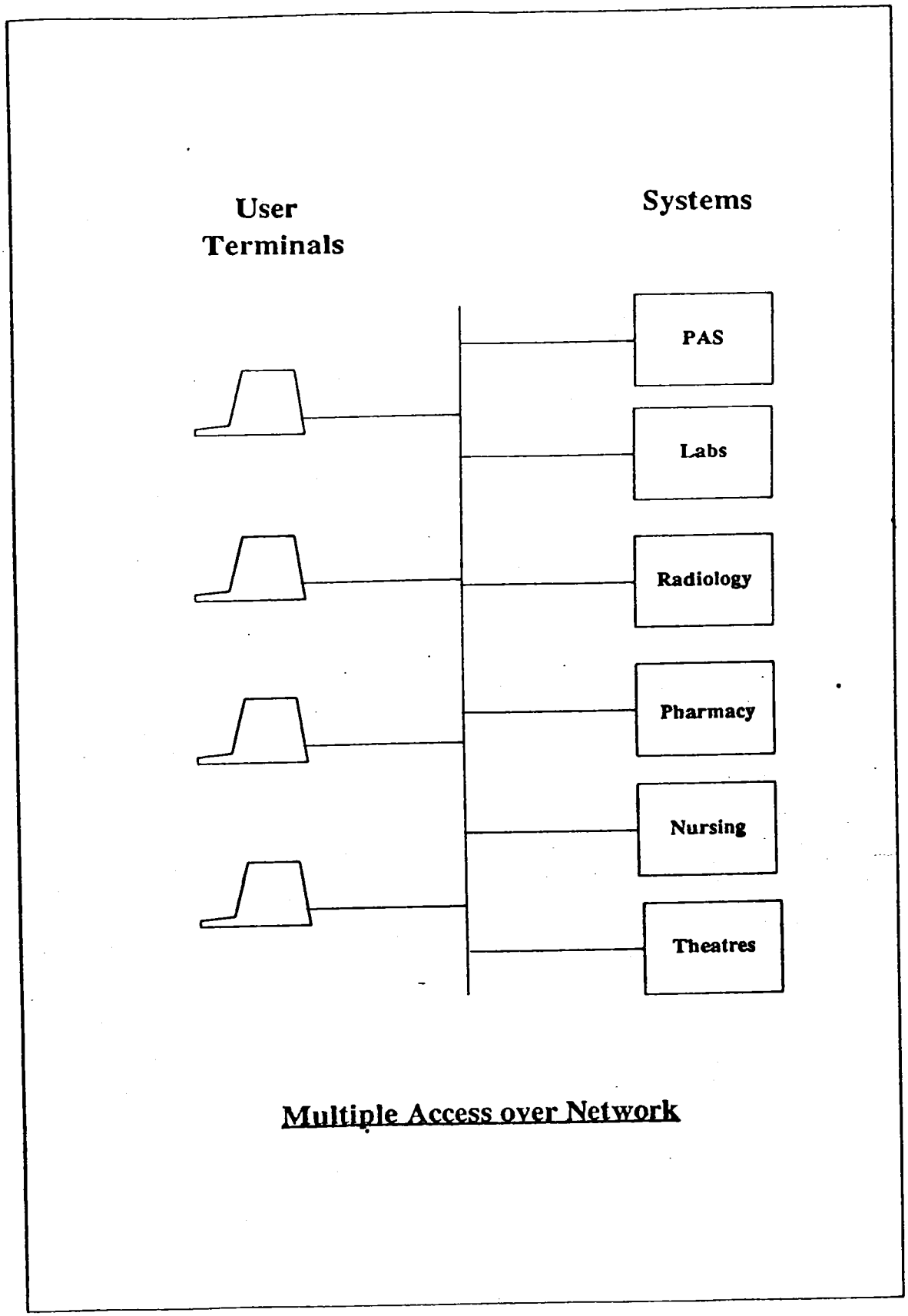
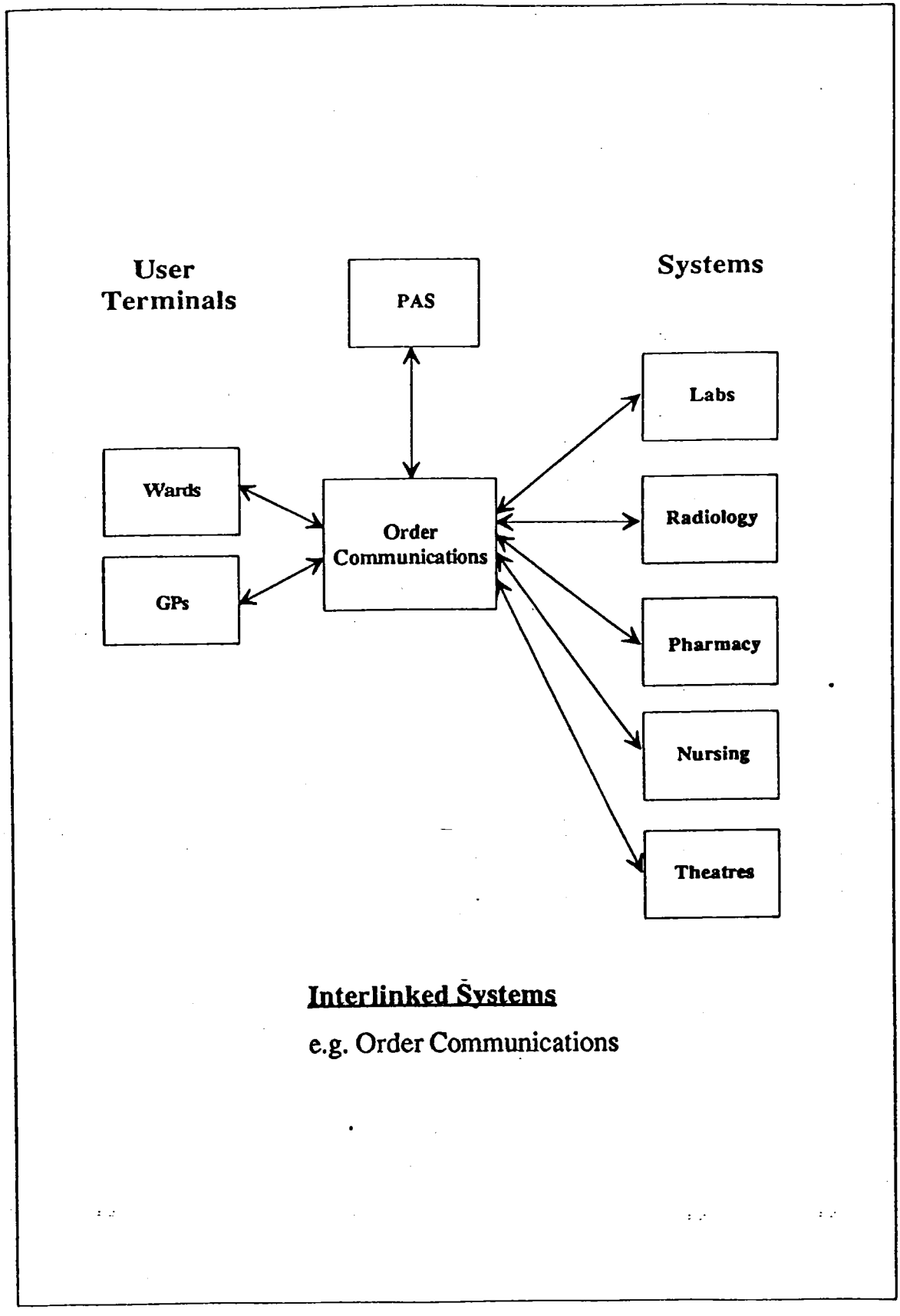

User Terminals
Systems
PAS
Labs
Radiology
Pharmacy
Nursing
Theatres
Multiple Access over Network

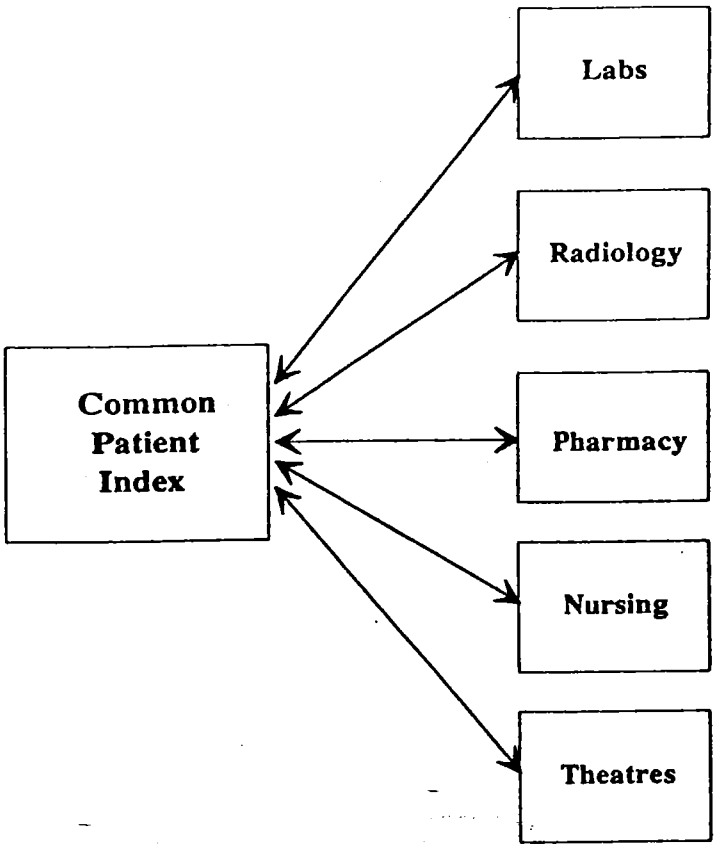
Figure B



Interlinked Systems

e.g. Order Communications

Figure C



Integrated Systems

e.g. Common Patient Index

The first architecture simply has all systems and users' terminals connected to a common network. This potentially allows any user's terminal to access any of the systems connected to the network. The systems themselves need not be integrated in any way, and therefore, for example, a patient's data on one system could be inconsistent with the same patient's data held on another system. However, on this basis, any one system could be updated or replaced without altering any of the other systems, and therefore, despite the cost of the network cabling and the end point connectors, this architecture represents the low cost, low risk option.

The second architecture would link several systems interactively. In the particular example illustrated, they are linked so as to exchange between each other, via an Order Communications Management system, the following:

- requests for tests, treatments, drugs, and supplies; and
- reports of the results of the tests and treatments and of the items supplied.

Such an architecture would not necessarily result in the data stored in each of the linked systems being wholly consistent, but the link to the PAS System should help to ensure that each transaction passing between the systems at least contained the latest information about the patient concerned. Such an architecture contains numerous interactive interfaces which would need to be developed and maintained, and therefore it would represent a medium cost, medium risk option for most Trusts.

The third architecture has several systems integrated, such that the data used by them would be consistent, in specific elements at least. The illustration shows several departmental systems linked to a common master index of patients' details. This architecture would require an integrated interface for each system, and would therefore represent a high cost, high risk option for most Trusts. In physical terms it would probably be a solution which would be best bought from a single supplier.

Before considering how a Trust's systems should be interlinked, therefore, it is important to determine the most appropriate architecture for the Trust's future information-handling needs and capabilities. A planning horizon of at least 5 years should be adopted for systems architectures.

3. Logical models of solutions (i.e. the systems functions required)

Once the scale and style of interfacing has been considered, then logical models of solutions can be drawn up which are appropriate to the context. Logical models should map the relationships between information sources and information-handling facilities, and the flows of information between them. Where significant, the sequences of activities may need to be mapped as well.

It can greatly help the presentation of a logical model if the business relationships which drive the information flows are also shown on the same diagram.

For hospital Trusts, the solutions which are particularly likely to require logical modelling are:

- management information;
- contract management;
- performance monitoring and costing; and
- coding, and production of discharge letters.

For community and psychiatric Trusts, the administrative and activity- recording arrangements are likely to require modelling.

An example of each of the above mentioned logical models is attached (see Figs 1 - 5 following).

(Caution: the attached logical models are examples for illustration purposes only. They must not be taken as sole logical solutions to the needs. Even at a logical level the solutions will depend upon such factors as working practices and organisational relationships within the Trust, and also those between the Trust and its various external bodies.)

Each logical model should be accompanied by a documentation of the analysis from which the solution has been derived. This documentation allows the analysis to be inspected and verified, and, if needs be, to be adjusted in the future.

Example: coding

There are at least 5 purposes for coding clinical diagnoses and procedures in a hospital Trust:

- for SMR returns;
- on departmental systems, for analyses and audits of the utilisation of the departmental facilities;
- on clinical audit systems, for auditing the handling of cases by clinicians, specialties or directorates;
- for the casemix (CRIS) system, for analysing clinical activities by case type;
- for contracting, for charging for services performed.

Although it is not absolutely essential that the same coding should be employed for each of these different purposes, it would be a help towards the closer integration of management if a common coding system could be adopted.

Some of the coding needs are more time-critical than others, and these are met by professional coders whose first responsibility is to attend to the coding without delay. Nevertheless, the coders often have to work on unclear reports of what was done, and therefore there is a need for the clinicians responsible to be able to examine and correct the coding, especially before it is used for contractual purposes.

The following arrangement appears to be the best way of achieving this:

(a) the central coders create the codes for the diagnoses and procedures, usually within 1 or 2 days of discharge;

(b) the codes are fed to the clinicians responsible via their departmental and audit systems;

(c) this gives the clinicians the opportunities to:

- inform the central coders of any errors, and of the corrections to be made;
- record their own details with the coding if necessary;

Figure 1

Example: Logical model of the administrative and activity-recording arrangements for community and psychiatric Trusts

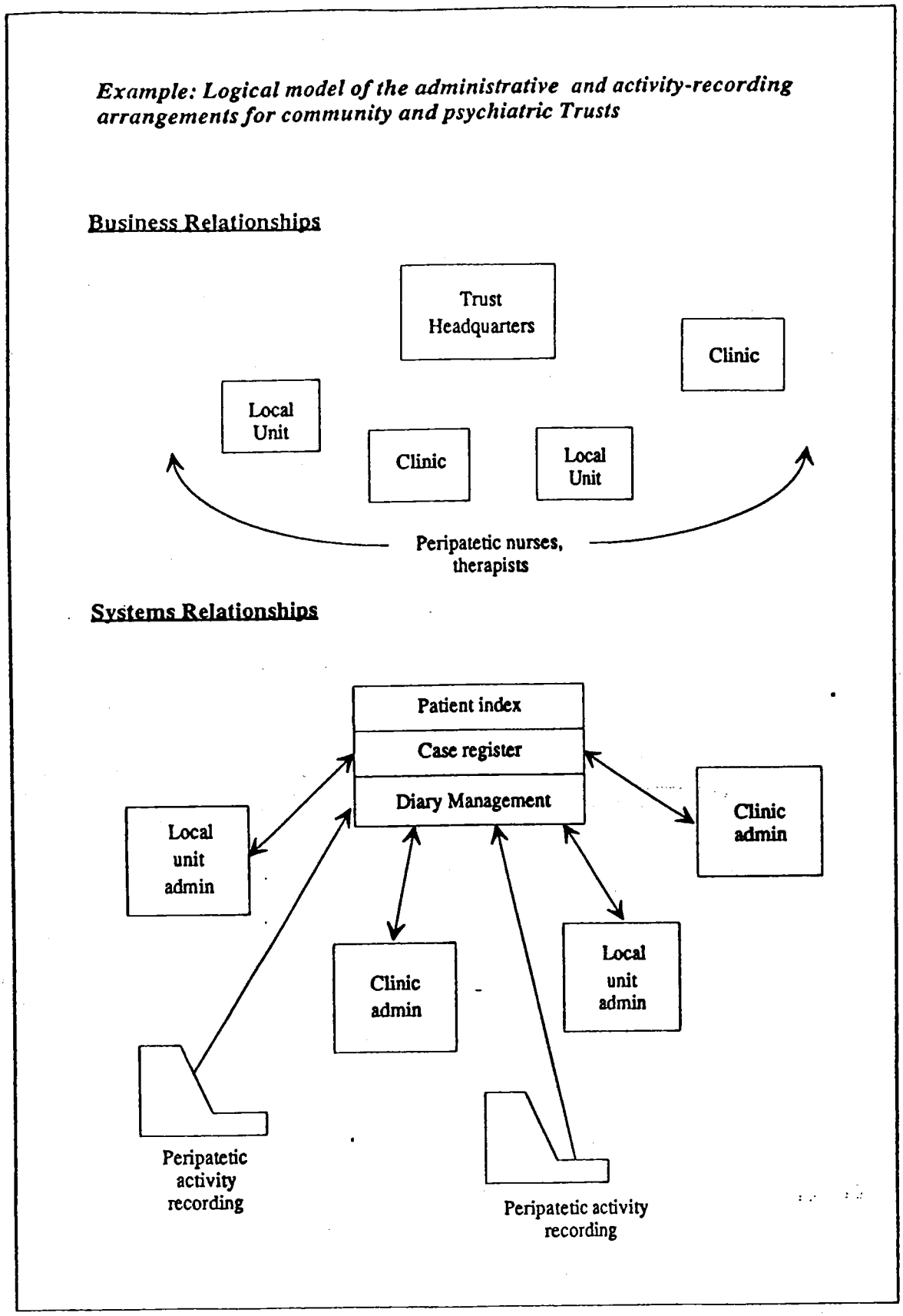
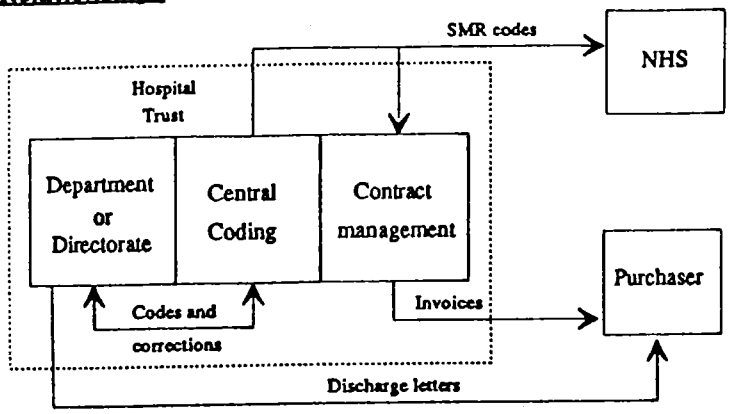


Figure 2

Example: Logical model for coding, and production of discharge letters

Business Relationships



Systems Relationships

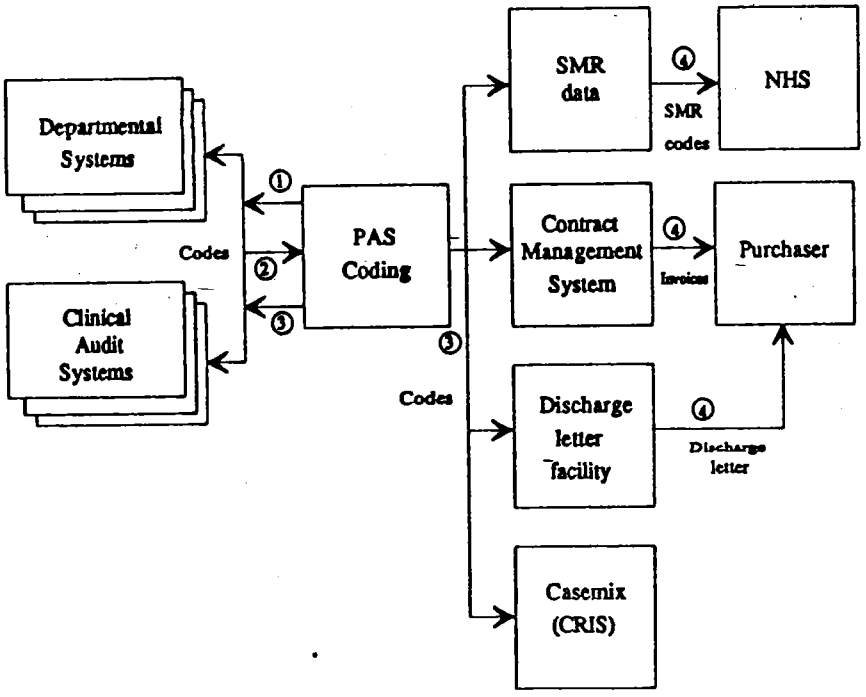
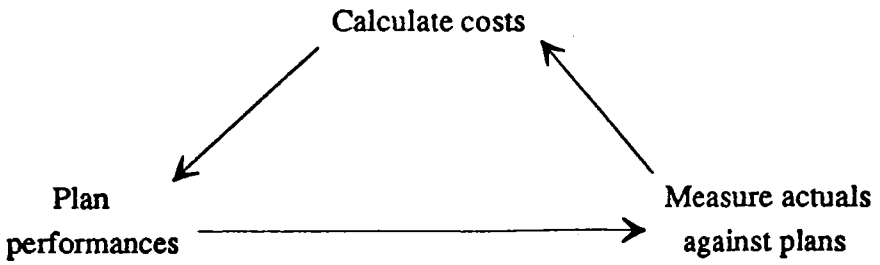


Figure 3

Example: Logical model for performance monitoring and costing

Business Relationships



Systems Relationships

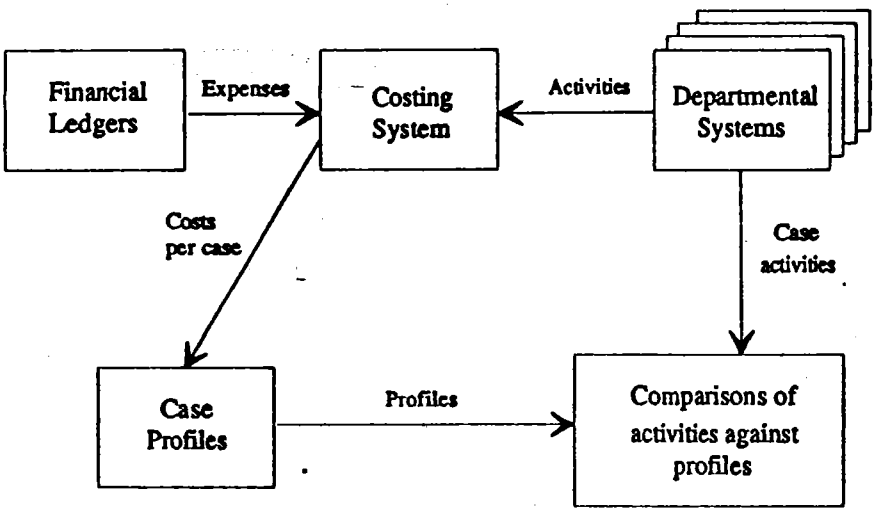
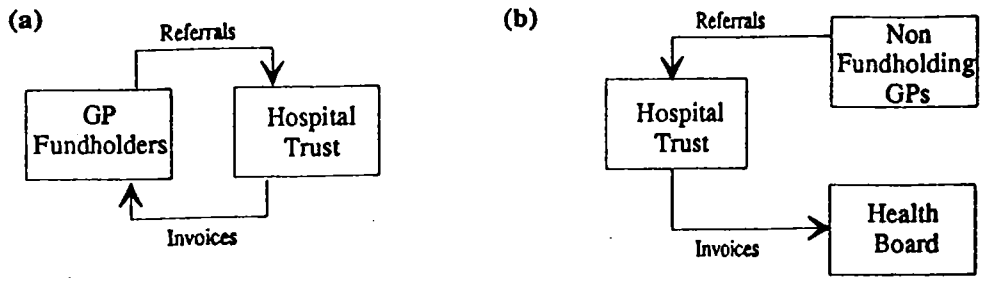


Figure 4

Example: Logical model for contract management

Business Relationships



Systems Relationships

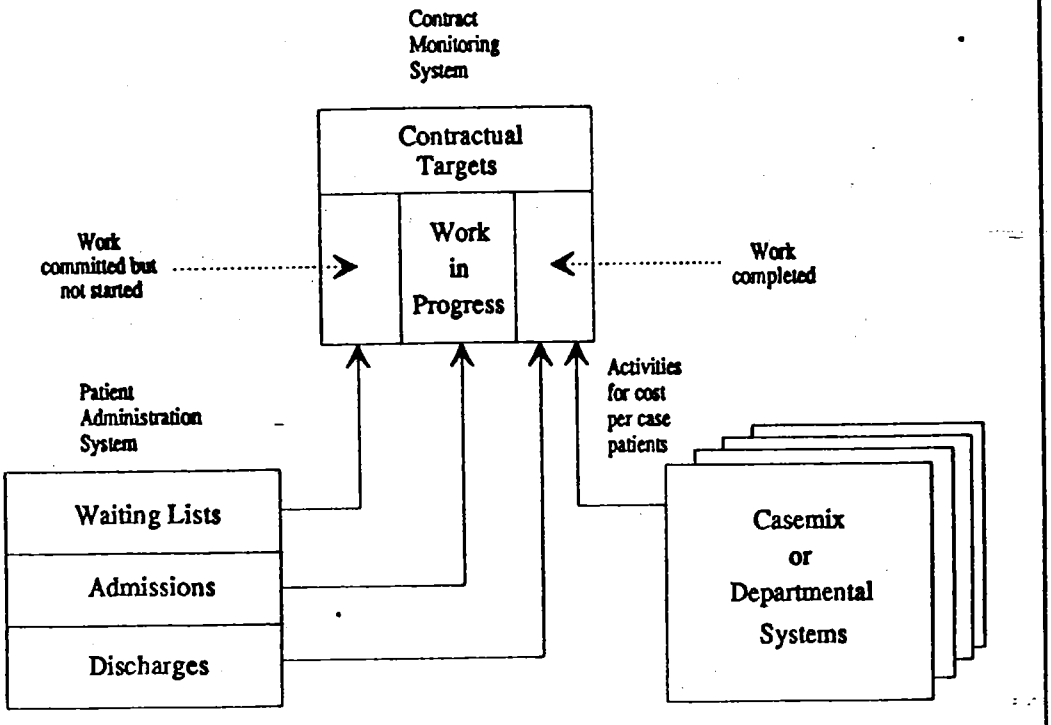
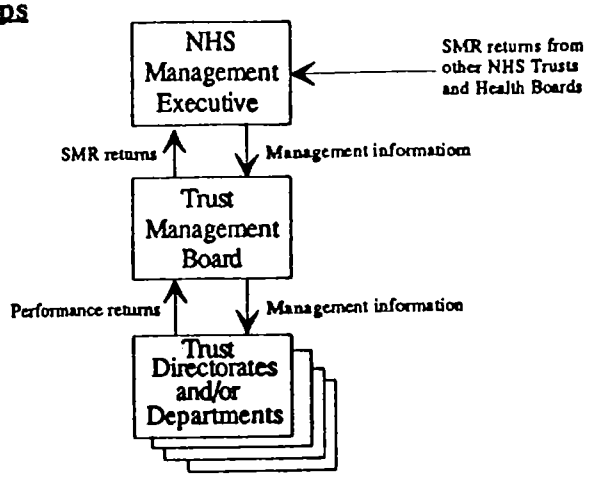


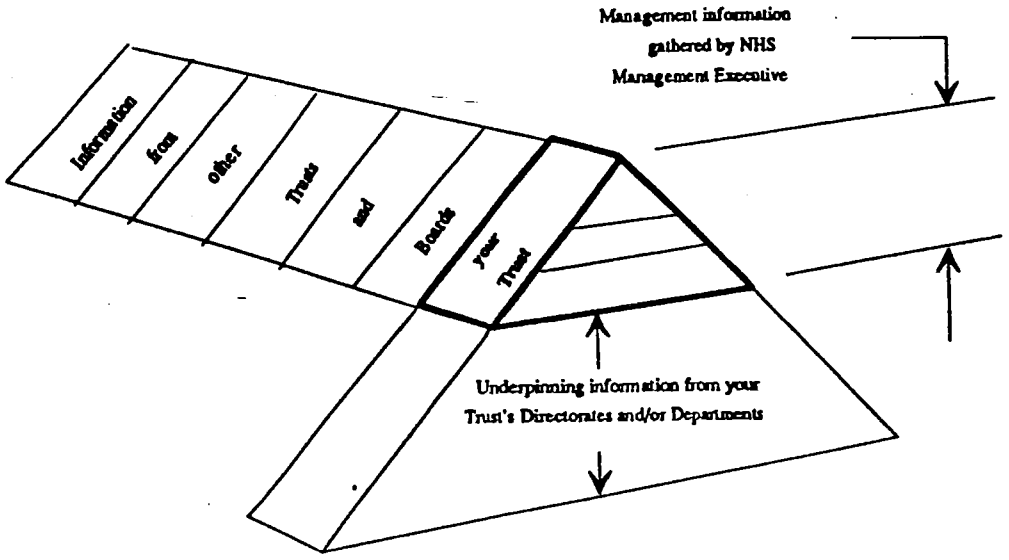
Figure 5

Example: Logical model for management information

Business Relationships



Systems Relationships



(d) the coders make any changes requested, and then release the codes to the SMR, contracting, and casemix (CRIS) systems.

GUIDELINES FOR THE DEFINITION OF PHYSICAL SOLUTIONS

1. Information systems

Physical solutions are those that would actually be implemented as Information Systems. Many of these systems need not be automated, but they should be itemised and described nonetheless. Examples could include:

- a system for the publication of a prospectus of services;
- a system for the regular review of healthcare purchasers' needs;
- a system for the regular reporting of service developments;
- on-going surveys of public and staff opinions;
- a system for logging and analysing complaints and compliments; or
- a system for publishing indications of costs.

The automated systems should be described, with their key features emphasised. For instance, in order to be able to fit in with an order communications management system in the future, all departmental systems, eg. for laboratories, should have the ability to accept requests by file transfer as well as by input from users' VDU screens.

A strategy would not normally make a specific choice of a supplier's system for a functional area.

The configuration of the automated systems, and of the interfaces between them, should be documented using the same diagramming conventions employed in Stage 1 (see Appendix III. para 3).

Likewise the configurations of the Local Area (LAN) and Wide Area (WAN) Networks, and their links to the national and any international networks, should be charted in the same fashion as that adopted for stage 1. If a number of logical LANs is proposed, then their application areas should be indicated.

Information and technical standards are covered in section 5, following.

2. Information services

Four kinds of information services are normally required:

- information extraction, analysis, interpretation, and presentation;
- user system support;
- technical system support; and
- system operation and performance monitoring.

The functional responsibilities for each of these areas needs to be defined, and allocated to individuals' roles within the organisation.

Information extraction and provision is normally performed by one or more Information Officers, who would be familiar with query languages, data manipulation, statistical analysis,

modelling, and graphical presentation packages. One of these Officers would be well placed to undertake the responsibility of Database Administrator for the Trust, and also to undertake the administrative activities required for the Trust to comply with the Data Protection Act.

User system support is likely to cover a number of functional areas, including:

- business systems analysis, in liaison with support from finance and from organisational development;
- definition of information-handling requirements;
- preparations of business cases and Operational Requirements;
- support for procurements, including contract negotiating and acceptance testing;
- support for the implementation of systems, including the training and initial 'hand-holding' of users; and
- audits of the effectiveness of systems and of the security arrangements.

Technical system support is likely to cover:

- diagnosis and resolution of local technical problems, particularly with terminals, PCs, and networks;
- first level technical support, and co-ordination of second level support, for core systems;
- technical advice and guidance on the procurement, disposition, and installation of systems, and for the interfaces between them; and
- maintenance of the technical standards.

System operation and performance monitoring is likely to cover:

- the operation of core systems and networks, including file management, creation of back-ups, restorations, logging of faults, etc.;
- organising and overseeing the operation of the interfaces between systems;
- contingency planning for operational failures of all kinds;
- monitoring the performance of core systems and networks, including response times, workloads, down times, availabilities, etc.; and
- where appropriate, overseeing the quality and timeliness of data shared between systems, and organising the correction of errors and the eradication of their causes.

It should be stated if any of the foregoing functions is to be obtained under a service level agreement or a facilities management arrangement, and also if the services are to be provided by directorates or departments, as well as centrally.

3. Information management

The handling of information needs to be managed or co-ordinated in several ways. Solutions should be defined for the:

- co-ordination of funding and expenditure on information-handling;
- direction and control of the procurements of information handling facilities;
- management of the information services;
- allocation of responsibilities for the ownership of data, and operation of information systems;
- determination of the policies for information handling (see 4. below);
- determination of the standards for information handling (see 5. below);
- maintenance of the Information Strategy; and
- representation of the interests of the Trust's information-handling capabilities when dealing with external organisations.

4. Information policies

It is usually impractical for the Information Department of a Trust to try to provide and operate all of the information-handling facilities of the organisation. Therefore the details of the policies which it determines are particularly important , if users' information-handling needs are to be met with effectiveness and efficiency.

Policies on information handling are likely to be required for:

- operation of systems;
- quality and timeliness of the data on the systems;
- making corrections to data which is shared between systems;
- access to internal and external networks and systems;
- the allocation of the costs and benefits of facilities which are shared between departments;
- the levels at which approval is required for the procurement of any information-handling facility;
- the extent to which departments can acquire their own information services personnel;
- dealing with external organisations, including GPs;
- the development of interfaces between systems;
- the timing of the running of operation-critical systems;
- arrangements for support and maintenance;

- the use of unlicensed or unauthorised copies of software; and
- the development, operation, and support of 'own-grown' systems.

The need for several more policies is likely to arise in practice, and it is useful to maintain a policy register.

5. Information and technical standards

The main purpose of setting standards is to minimise the effort which has to be devoted to managing and supporting commonly-used facilities. Therefore, for an NHS Trust, standards are likely to be required for:

- data codes;
- databases and enquiry languages;
- interfaces;
- file transfer protocols, and communications standards generally;
- hardware platforms;
- operating systems;
- software;
- networks;
- security measures and security review procedures;
- access controls and confidentiality of personal data; and
- micro-computers, and their facilities for:
  - word processing;
  - spreadsheet calculations;
  - data management;
  - man-machine interface, eg. as GUI, and graphical presentation;
  - printers.

In addition, consideration needs to be given to the use of, and standards for:

- EDI (for contracting and for stores and supplies);
- electronic mail, fax and answerphones (for rapid general communication); and
- bar code readers (for rapid data capture).

APPENDIX VI

GUIDELINES FOR DETERMINING PRIORITIES AND PLANS

1. Priorities

Priorities are normally determined by considering a combination of:

- critical (or key) success factors;
- cost/benefit profiles; and
- technical demands.

Examples of each are given in turn below. All of the factors, profiles and demands for the Trust are examined in order to be able to determine the sequence in which actions

(a) must be taken, ie where there is no choice, and

(b) should preferably be taken, ie for the maximum benefit of the Trust.

An example of (a) could be an item of computer or telecommunications equipment, which has to be obtained and working before other developments can go ahead. An example of (b) could be an implementation of a computer system which gives a faster rate of return or greater strategic benefit to the Trust than another computer system.

2. Critical success factors

Critical success factors are those factors in which success is critical to the achievement of given objectives. Two kinds of critical success factors should be considered when determining priorities for an information strategy:

- those pertaining to the business of the Trust;
- those relating to the implementation of the information strategy.

Examples of the former include:

- financial control, (eg: in contract management and in cost control);
- clinical performance, (eg: in achieving the maximum quality of care within the resources available);
- working practices, (eg: in achieving the effective integration of working practices and information-handling facilities);
- staff morale and motivation, (eg: maintaining commitment and enthusiasm);
- management and control;
- customer relations, (eg: providing a good service response to customers' needs).

The needs for information-handling solutions can be derived from these factors, eg:

- a contract management facility;
- a change management mechanism;
- a forum for communication of developments;

- an analysis team to examine clinical directorates' information needs; and

- a system for monitoring the feedback from customers on the service that they are receiving.

In many ways this exercise would revisit much of the ground covered in Stage 1 of the work, but at this stage it provides a valuable second check that the study has proceeded in the right direction, and that it has not omitted to address important requirements in the process.

Examples of factors which could be critical to the success of implementing the information strategy itself include:

- the setting up of the management structure and controls for information-handling within the Trust; this could be especially important for a newly-formed Trust;

- gaining acceptance, from management generally within the Trust, that the responsibilities are theirs for the realisation of benefits from information-handling facilities;

- establishing the concepts within the Trust that:

  (a) each information-handling facility must be seen to be only a part of a wider scheme, involving working practices and management responsibilities as well and

  (b) that the costs and benefits of the whole scheme must be considered and presented in the form of a business case to the Trust when seeking authority to proceed; and

- recruiting the necessary information-handling skills and resources for the Trust.

3. Cost/benefit profiles

For the purposes of determining priorities, it is important to form a high-level estimation of the likely costs and benefits, an the timescales, of each potential investment in information-handling facilities. A fully-worked out cost/benefit analysis for any investment would come later, once resources had been committed to the project. At the priority-setting stage, the need is to determine where the available resources should best be directed, in order to be most likely to achieve the optimum effect for the Trust.

It is recommended that the costs and benefits should be evaluated on a 5-year basis. This is because the heaviest costs tend to be incurred in the earliest years (although there are likely to be significant on- going costs as well), whereas the full benefits are usually only attained slowly, and perhaps only in the 4th or 5th year after the inception of a project. Thus a 5-year viewpoint tends to give a better perspective of the complete picture of costs and benefits, and their relative flows within the period.

For costs, the elements to be considered include:

- information-handling facilities, licences, installation, support, maintenance, consumables, operations;

- physical accommodation, structural alterations, power supply control, secure storage cabinets/safes, fire and safety equipment;

- network and telephone connections, cabling, communications equipment, line charges, network management;

- recruitment, staffing, consultancy, training, help desk and user support, documentation, and the management of these activities, together with all of the users' inputs and necessary management involvements; and

- project development team and facilities, internal promotion, cutovers and parallel running, post-implementation reviews.

For benefits, it is important to concentrate upon those which will be realizable and measurable, in the first instance.

Examples include:

- reduced consumptions and holdings of stock and materials, including drugs and medical supplies;

- reduced repair and replenishment of equipment; and

- reduced costs of staff and bought-in services.

These may be calculated not just on the basis of displaced costs (ie savings in current costs) but also on the basis of avoided costs (ie those costs which would be incurred if the investment were not made).

Consideration should also be given to the benefits which can arise from the reduction of risk, (eg: of litigation, loss of business or accidental loss or damage). For example, a 5% risk of the loss of £1m business per year = £50,000 per year.

Finally, the unquantifiable benefits should be examined. Examples include:

- improved morale amongst staff;

- improved customer satisfaction;

- greater flexibility;

- better public and national image; and

- better relationships with other health care providers.

It is entirely valid to include unquantifiable benefits in a cost/benefit appraisal, but the weight which is to be ascribed to the unquantifiable elements has to be judged by the senior management of the Trust, in the context of all of the other developments upon which the Trust is engaged.

Perhaps the most difficult area in which to estimate probable benefits is that concerned with management information systems, especially those in which the capability offered by an information-handing facility is so much superior to that which any manual facility could provide that, really, no comparison can be made: the managers either have the new capability, or they do not In these cases the value of the benefits is probably best related to the value of the business for which the manager is responsible. For instance, if a manager is responsible for an area of business with an annual turnover of £10m, and can see ways in which more timely, accurate, or complete information would enable him or her to expand the business by an extra 1% per year, then the value of such a facility (and all associated arrangements involved in working it) would be £100,000. Of course, the manager would

have to be prepared to accept responsibility for the realisation of this figure if the investment were to go ahead.

4. Technical demands

As with any other form of development, whilst the superstructure represents the visible form of the achievement, the foundations have to go in first. With information-handling facilities, the technical foundations which could affect the determination of priorities might be:

- an upgraded central computer or operating system;
- the installation of a local area network, including physical cabling;
- the procurement of a standard database facility;
- the completion of the development of national standards, or facilities such as a national management information system and electronic mail network; and
- the determination of common technical policies and standards for the Trust.

Clearly, such demands will be different for each Trust. They can readily be determined by examining the difference between the agreed physical solutions for the information strategy and the existing systems in use in the Trust.

5. Plans for action

These should be cast in the form of project definitions. Following the principles of the PRINCE methodology, each project definition should contain specifications of the:

- scope and terms of reference;
- business objectives;
- deliverables;
- organisation, resources, and skills required;
- timescales;
- prerequisites, dependencies, and risks; and
- monitoring and control mechanisms.

An example of a Plan of Action (e.g. for the Development of a Management Information System) is attached at Annex A of this Appendix.

APPENDIX VI

ANNEX A

EXAMPLE PLAN OF ACTION FOR MIS DEVELOPMENT

a. Scope and Terms of Reference

- to determine and evaluate the Trust's requirements for a Management Information system.
- to determine the most appropriate solution to meet the Trust's requirements, and establish the business case to obtain and update it.
- subject to approval of the business case, to obtain, implement, and operate the appropriate solution.

b. Business Objectives

- to provide the Trust with management information and facilities that will cost-effectively contribute to the running of the Trust, both (a) internally, and (b) in relation to external bodies including the NHS Management Executive, and competitors in the marketplace.

c. Deliverables

- a definition of requirements.
- the specification of the most appropriate solution, and supporting business case.
- procurement and recruitment of the approved facilities and resources.
- an effectively working solution that meets the Trust's agreed requirements for management information.

d. Resources and skills required

- x months of a Business Systems Analysts' effort would be require to establish the information requirements, the most appropriate solution, and the business case for it.
- The effort and skills required thereafter to obtain, implement, and operate the solution would form part of the business case.

e.- Timescales

- The analysis phase could occupy y months, because of the possible need to experiment with options in order to define the requirements and select the most appropriate solutions. The timescale for the implementation phase would be defined in the business case.

f. Prerequisites, dependencies and risks

- The establishment of the Management Information requirements for the Clinical Directorates can not be finalised until each Directorate's management processes and requirements had been defined.
- The choice of the optimum solution could depend on what the NHS Management Executive are prepared to make available from their own MIS system.

g. Monitoring and control of the project

- This would be performed by the Head of Information Services. In addition, a review of progress would be held at each meeting of the Information Working Group.

SUGGESTED HEADINGS FOR THE INFORMATION STRATEGY

1. INTRODUCTION

Background and purpose of strategy, terms of reference, approach followed, status of document.

2. OBJECTIVES AND PLANS

2.1 Introduction

Trust's functions and activities, organisation, locations, size, etc.

2.2 Unit Strategies, Objectives and Business Plans

High level descriptions of business objectives, staff perspectives, and existing information-handling facilities, together with an analysis of the key components of the information needs of the Trust.

2.3 Information Systems Strategy

Key aspects of the recommended solutions for the information needs of the Trust.

3. MANAGEMENT

3.1 Policy

List of policies for information-handling in the Trust.

3.2 Managerial Responsibilities

Overall responsibilities for information-handling, setting of policies and standards, allocating funding and authorising and monitoring projects, and provision of central departmental services.

3.3 Project Management

Project structure and control mechanisms, methodologies, etc.

3.4 Security and Confidentiality

Standards and accountability for access control, data security and protection, and handling breaches thereof.

4. THE TRUST'S INFORMATION SYSTEMS

4.1 Introduction

Chosen architecture, system configuration and network diagrams.

4.2 General Management Information

Overviews of the systems described in 5.

4.3 Operational Information

Overviews of the systems described in 6.

4.4 Market Information

Overviews of the systems described in 7.

4.5 Clinical Audit

Overviews of the systems described in 8.

4.6 Office Information

Overviews of the systems described in 9.

4.7 Micro Computing

Overviews of the systems described in 10.

5. GENERAL MANAGEMENT INFORMATION SYSTEMS

MIS, personnel, payroll, stores, SMR returns, quality, casemix, contract management, etc.

6. OPERATIONAL INFORMATION SYSTEMS

PAS, laboratories, radiology, pharmacy, A & E, theatres, etc.

7. MARKETING INFORMATION SYSTEMS

Complaints and compliments registers, customer surveys comparative performance monitoring, etc.

8. CLINICAL AUDIT SYSTEMS

Surgery, medicine, nursing, paramedical services, etc.

9. OFFICE INFORMATION SYSTEMS

Electronic mail, viewdata systems, diary management, word processing, fax and answerphone facilities, etc.

10. MICRO-COMPUTING SYSTEMS

Chief uses, and standards set for future uses.

11. COMMUNICATIONS

11.1 Introduction

Outline of communications strategy, existing facilities, and planned extensions.

11.2 Management

Responsibilities for communications management.

11.3 Local Networks

Existing uses, and plans and standards for future uses.

12. TECHNICAL STANDARDS

12.1 General

Relationship to national standards, mechanisms for adoption and review.

12.2 Hardware Standards

For platforms, operating systems, terminals, peripherals, etc.

12.3 Software Standards

For databases, enquiry languages, man-machine interfaces (GUIs) etc.

13. IS/IT MANAGEMENT AND STAFFING

13.1 Introduction

Organisational arrangements for the management of information by the Trust, within the overall structure of the Trust.

13.2 Production of IS Strategy

Arrangements for the production, review, and maintenance of the strategy.

13.3 Resource Management

Relationship to the resource management programme, organisational development initiatives, and other agents of change.

13.4 Unit IS/IT Organisation

Structure, functions, and responsibilities of information department, and sub-contracted services.

14. HARDWARE

14.1 Hardware

Existing and planned platforms and peripherals.

14.2 Provision of Service

In-house operations, service level agreements, facilities management arrangements, etc.

15. SYSTEM DEVELOPMENT

Plans and standards for.

16. PROCUREMENT

Policies and plans for.

17. DATA STANDARDS

17.1 Introduction

Policies, responsibilities, organisation for.

17.2 Data Input

Responsibilities, flows, timeliness.

17.3 National Data Standards

Relation to.

17.4 Local Data Standards

Local definitions, not covered by national standards.

17.5 Data Administration

Responsibility for data definitions, standards, and audits.

17.6 Access Standards

Common access standards (where applicable).

18. SECURITY

18.1 Introduction

Policies, responsibilities, organisation for including security review procedures.

18.2 Access to Data

Data ownership, usage, and control of.

18.3 Communications Security

Policies, responsibilities, and organisation for.

18.4 Disaster Planning

Policies, responsibilities, and organisation for.

18.5 Data Protection Act

Policies, responsibilities, and organisation for.

18.6 Physical Security

Policies, responsibilities, and organisation for.

18.7 Software Licensing

Policies, responsibilities, and organisation for.

19. TRAINING

19.1 Introduction

Responsibilities and organisation for.

19.2 Awareness Training

Responsibilities and organisation for developing the awareness of managers and staff.

19.3 Systems Training

Policies, responsibilities, and organisation for the training of users of systems.

19.4 Technical Training

Policies, responsibilities, and organisation for the training of information staff.

20. AUDIT AND REVIEW

Policies, responsibilities, and organisation for the audit and review of existing facilities and projects under way and for the audit of security arrangements.

21. PRIORITIES AND PLANS FOR ACTION

Priority activities, project definitions.

ASSESSMENT OF IS/IT STRATEGIES

Basis of Strategy

Is there a documented strategy?

What is the last update?

Scope and Status

Does it cover all sections for which the management is responsible?

Is it an agreed document by the Trust Chief Executive/Unit General Manager?

Has the document been approved by the Trust/Health Board?

Business Strategy, Objectives and Plans

Is the IS Strategy based on the agreed strategy, objectives and business plans of the trust/unit?

Is the strategy integrated with the National (and Board) IS Strategy?

Information System Strategy

Is there a summary of the key aspects of the document in strategic terms?

Does the summary provide the framework for the strategy?

Management

Does it set out the key policies for the management of IS/IT:

- The linking of IS to business objectives?
- The implementation of cost effective IT?
- The general management relationships for IS/IT?
- Management of corporate data?
- The need to review existing provision to ensure it remains relevant and cost effective?
- Training, job design, ergonomics and safety of IS/IT systems?
- Confidentiality, integrity and availability of information?

Does it set out the management infra-structure and responsibilities for IS/IT:

- Trust Chief Executive/Unit General Manager?
- IS Manager?
- Policy advisory group?
- Co-operation with other Health Service 'Units'?
- Project management?

- Security?
- Data management?
- Management of hardware and software standards?
- Audit of systems?
- Provision of hardware services?
- Communications management?

Strategies and Plans for Information and Systems for Trust/Unit General Management

Are the information system requirements specified?

Is the information comprehensive? Does it identify local priorities?

Are the longer term requirements specified as well as the more immediate (1 - 3 year) requirements?

Is there a comprehensive inventory of existing systems covering hardware, software, status, enhancements required, expected life and replacement plans?

Strategies and Plans for Information and Systems for the Provider Function

Are the information system requirements specified?

Is the information comprehensive? Does it identify local priorities?

Are the longer term requirements specified as well as the more immediate (1 - 3 year) requirements?

Is there a comprehensive inventory of existing systems covering hardware, software, status, enhancements required, expected life and replacement plans?

Strategies and Plans for Operational Systems

Are the information system requirements specified?

Is the information comprehensive? Does it identify local priorities?

Are the longer term requirements specified as well as the more immediate (1 - 3 year) requirements?

Is there a comprehensive inventory of existing systems covering hardware, software, status, enhancements required, expected life and replacement plans?

Strategies and Plans for Information and Systems for Clinical Audit

Are the information system requirements specified?

Is the information comprehensive? Does it cover the requirements of medical audit, nursing audit and other clinical audit activities?

Are the management arrangements for audit systems set out? Does the strategy include integration of audit with other systems including those in other units?

Is there a comprehensive inventory of existing systems covering hardware, software, status, enhancements required, expected life and replacement plans?

Strategies and Plans for Information and Systems for Office Automation

Are the information system requirements specified?

Is the information comprehensive? Does it identify local priorities?

Are the longer term requirements specified as well as the more immediate (1 - 3 year) requirements?

Is there a comprehensive inventory of existing systems covering hardware, software, status, enhancements required, expected life and replacement plans?

Micro-Computing

Is there a comprehensive policy for hardware and packages for running on these machines?

Does the strategy cover the interfaces between microcomputing systems and other systems?

Communications

Does the strategy cover the use of communications networks for audio, data and video communications?

Are wide area networks covered including links to nodes on the Board Network?

Are local area networks covered including the need for structured cabling within local buildings?

Are the technical and operational standards set out?

Technical Standards

Are the trust/unit hardware standards specified? Do these conform to the National Standards and Strategy?

Are software standards specified? Do these conform to the National Standards and Strategy?

Hardware

Does the strategy cover the provision of the following services:

- Mainframe services?
- Mini computer services?
- Support and maintenance?

System Development

Are the arrangements for the development of new systems specified including:

- Identification of new or changed requirements?
- Arrangements for specifying IS?
- Procure/develop strategy?

Procurement

Are the arrangement for the purchase of IS/IT supplies and services clearly set out including the commitment to adhere to National, Central Government and EEC legislation and guidelines?

Data Standards

Are the principles of data collection specified?

Is there a commitment to adopting the National Data Definitions?

Are the arrangements for local definition of data specified?

Are data access standards specified?

IS/IT Staffing

Are the responsibilities for each aspect of IS/IT clearly set out?

Are the following responsibilities covered?

- Management?
- Development?
- Support?
- Maintenance?
- Training?
- Resource Management?
- Operations?

Security

Is there a statement about data ownership and access?

Are communications security arrangements specified?

Is disaster planning included? What risks have been considered?

Is there a statement about confidentiality and data protection?

Are the physical security arrangements specified?

Does the strategy deal with software piracy and licensing?

Are there arrangements for security reviews?

Training

Is the strategy and policy relating to the following training set out:

- Awareness training?

- User training?
- Technical training?

Audit and Review

Are there satisfactory arrangements for auditing IS/IT?

Is there a report on the outcome of recent audits?

Is there a report on the Security Audit?

New System Requirements

Has the requirement for new systems been fully covered? Does it include all systems which the Trust/Unit may require?

THREE YEAR SPENDING PLAN CHECKLIST

Each 3 year running plan should follow logically from and tie in to the NHS Trust's local Information Strategy. The plan should take account of the ability to manage or implement the various system together with the likely availability of resources and must reflect national as well as local priorities.

The first part should relate to the implementation of national priority systems which are notified annually and should explain which system is to be introduced, the site(s) which it will serve and the costs. The latter should be broken down into "capital" (i.e. hardware and software) and "non-recurring revenue" (e.g. implementation costs). Where an implementation is phased over a number of years, the costs should relate to the year in which payment is likely to fall.

The second part relates to other systems seen as high priority within the Trust and details should be set out as for the first part.

All systems however funded should be included in the submission.

The information for year 1 should be given in detail and should be taken from the implementation plan which will have been prepared as part of the strategy development. The information for years 2 & 3 should be given in outline except where the implementation runs over more than one year when detailed plans and costs should be shown.