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Final Report

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Report of the Systems Evaluation Project for Infection Control (ASEPTIC)

The Systems Evaluation Project for Infection Control (ASEPTIC) was commissioned by the Health Protection Agency under the terms of a Service Level Agreement between the Department of Health (DH) and the PHLS, which required 'a fixed term project to review existing HCAI surveillance systems for local use and evaluate whether they may be suitable for wider application across the NHS'. The ASEPTIC project was undertaken under contract, after a tender process, by the South Devon Health Informatics Service (SDHIS). The project was managed by a Project Board whose members were drawn from the Health Protection Agency and SDHIS as well as a representative from the Department of Health. The Board members were Dr. Andrew Pearson (Chairman), Dr. Georgia Duckworth, Dr.Nick Gaunt (Project Director), Dr. Hilary Heine, Dr. Deirdre Lewis (LARS), Sylvia Parnell (Project Manager), Sally Wellsteed (DH), and Megan Wiseman (Quality Assurance Co-ordinator). Part of the project remit was to establish a stakeholder group that included infection control practitioners, microbiologists, users of the surgical site infection surveillance scheme and relevant HPA staff. The project undertook to define and make recommendations on:

1. The user requirements relating to surveillance and management of infection control functions in acute hospitals (reported on the project web site as User Requirement Documents [URDs]).
2. An assessment against the URD of the currently available computer-based infection control systems
3. A recommendation from the project team as to which currently available computer-based infection control systems were suitable to pilot in acute hospitals,
4. The design of a suitable 'pilot' and the resources needed to undertake 'pilot' testing

The report of the project may be accessed via the Health Protection Agency web site (www.hpa.org.uk).
The report has identified that a suitable system would need to meet a range of infection control teams' requirements, defined in the URD . In summary, these include: collection of local surveillance data including those required by the Department of Health in the mandatory surveillance initiative (SSI surveillance, mandatory bacteraemia surveillance of Methicillin Resistant *Staphylococcus Aureus* (MRSA) and Glycopeptide Resistant Enterococci (GRE), and surveillance of *C. difficile*); infection control aspects of case-management; analysis of information required for outbreak investigation and an ability to document and report serious untoward events.

Nine IT systems for infection control were reviewed to establish whether they met the required surveillance and management outputs defined in the 'User Requirement Documents' (www.swdhis.nhs.uk/aseptic).

The key recommendations of the ASEPTIC project team endorsed by the Project Board were that:

'Three systems should be piloted as soon as practicable. The inclusion of three systems was dependent on some further development in the case of one supplier, which was subsequently undertaken. The three systems were: EpiQuest, ICEnterprise and ICNet.

Since the project was commissioned the Department of Health has instituted a ' National Programme for IT in the NHS', part of which, is the 'National Care Record Service', which will provide an electronic medical record for every patient in England.

Members of the ASEPTIC project Board met with DH colleagues and a lead from the Information Authority to discuss how the results and recommendations in the report of the ASEPTIC project could be taken forward. Subsequently it has been agreed that an evaluation of the three systems could be undertaken and agreement has been reached with the suppliers, to support a managed implementation and evaluation of their HCAI software systems.

In the meantime the suppliers will continue to respond to enquiries from other hospitals and regions that can make individual purchase decisions if local or regional funding is available. In order to inform local and regional procurement decisions made prior to our publication of the evaluation, we will post any relevant updates on the HPA website.

Andrew Pearson
Chairman of the ASEPTIC Project Board

Contact details

EpiQuest
USA: bonniet@epiquest.com,
(UK support from Howard Thomas, howardt@oraldent.co.uk 01480 862080/862084)

ICEnterprise
Australia: www.repat.com.au/ice/index.html
(UK support from www.prism-risk.com contact Jim Waters 01249 712158 email jimw@prism-risk.co.uk)

ICNet
UK: www.icnet.org.uk . Contacts: Michael Houghton and Katie Belton on 01242 821000 email: info@icnet.org.uk.

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Final Report Part 1: Main Body of the Report

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ASEPTIC FINAL REPORT PART 1: Main Body of Report

DOCUMENT CONTROL **4**

1 REFERENCES **5**

2 SUMMARY **6**

Purpose *6*
Approach *6*
Systems Reviewed *6*
Outcome of the Review *7*
Way Ahead *7*
Scope *7*
Recommendations *8*

3 INTRODUCTION **9**

3.1 PURPOSE OF THIS DOCUMENT 9
3.2 BACKGROUND 9
3.3 CONTEXT OF THIS DOCUMENT 9
3.4 EVALUATION APPROACH 9

4 REVIEW OF SYSTEMS **11**

4.1 REQUIREMENTS 11
4.2 SYSTEMS UNDER REVIEW 11
4.3 ASSESSMENT OF QUALITY 12
Overview *12*
User Requirements. *12*
System Requirements *13*
Supplier Capability *13*
Quality of Proposal *14*
4.4 COST 15
Cost of Piloting *15*
Acquisition Cost *16*
Cost of Ownership *16*
Note of Caution *16*
4.5 SUITABILITY FOR PILOTING 17
Selection *17*
Exceptions *17*
'Certificate of Merit' *17*

5 WAY AHEAD **18**

5.1 PURPOSE OF NEXT STAGE 18
5.2 GOALS 18
5.3 STRATEGY FOR ACHIEVEMENT OF GOALS 18
5.4 SCOPE 20
Systems *20*
Timescale *20*
Pilot Sites *20*
Technical Approach *20*
Organisation & Mgt *20*
Supplier Responsibilities *20*
Pilot Site Responsibilities *21*
Deliverables *21*
Evaluation *21*
5.5 RESOURCE IMPLICATIONS 21
Types of Resource *21*
Project Management *21*
Pilot Sites *22*
Software Suppliers *22*
Funding *22*

6 CONCLUSIONS & RECOMMENDATIONS **24**

Suitability of Systems *24*
Purpose of Next Stage *24*
Scope *24*
Recommendations *24*

7 ANNEX A: PRODUCT FLOW DIAGRAM 25

8 ANNEX B: DETAILED DESCRIPTION OF THE EVALUATION FRAMEWORK 26

8.1 EVALUATION FRAMEWORK 26
8.2 CONFIDENTIALITY 27

9 ANNEX C: SELECTED COMMENTS FROM THE SUPPLIER FORUM 28

10 ANNEX D: TERMS OF REFERENCE FOR ASEPTIC PROJECT 35

11 ANNEX E: STAKEHOLDER GROUP MEMBERSHIP 36

FIGURE 1: COMPARISON OF QUALITY CHARACTERISTICS 12
FIGURE 2: COMPLIANCE WITH USER REQUIREMENTS 13
FIGURE 3: COMPARISON OF SUPPLIER CAPABILITY 13
FIGURE 4: QUALITY VS SUPPLIER'S PRICE FOR PILOTING 15
FIGURE 5:QUALITY VS ACQUISITION COST 16
FIGURE 6: QUALITY VS ANNUAL COST OF OWNERSHIP 16
FIGURE 7: PRODUCT FLOW DIAGRAM 25

TABLE 1: CAPABILITIES REQUIRED 11
TABLE 2: STRATEGY FOR ACHIEVEMENT OF GOALS 19
TABLE 3: BUDGETARY ESTIMATE OF PILOT STAGE COSTS 22
TABLE 4: DELIVERABLES FROM NEXT STAGE OF WORK 23

ASEPTIC FINAL REPORT PART 2: Assessment of Commercial Systems

ASEPTIC FINAL REPORT PART 3: Assessment of In-House Systems

ASEPTIC FINAL REPORT PART 4: Evaluation Framework (Limited circulation – commercial-in-confidence)

Document Control

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This document requires the following approvals.

Release	Name	Post
Draft	Sylvia Parnell	Project Manager
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This is a controlled document. The master copy is held in the ASEPTIC Project File. Copies should be checked for release status before use. Controlled copies of this document have been released to:

Name	Post	Date of Issue	Version
Andrew Pearson	Chairman	2 August 2003	Publish version A
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Hilary Heine	Project Board Member with role of technical coordinator	2 August 2003	Publish version A
Meg Wiseman	Project Board Member with role of quality assurance coordinator	2 August 2003	Publish version A
Deidre Lewis	Project Board Member with role of user & stakeholder representative	2 August 2003	Publish version A
Sally Wellsteed	Project Board- Dept of Health Observer	2 August 2003	Publish version A

1 References

1.1.1 Project Initiation Document

1.1.2 Project Plan

1.1.3 Requirement Specification

1.1.4 Concept of Operation – User Requirements Document Part 1

1.1.5 Use Case Catalogue – User Requirements Document Part 2

1.1.6 Use Case Descriptions – User Requirements Document Part 3

1.1.7 Information Requirements - User Requirements Document Part 4

1.1.8 Request for Information

1.1.9 Request for Proposal

1.1.10 Procurement Assumptions

2 Summary

Purpose

2.1.1 The ASEPTIC project was commissioned by the Health Protection Agency as part of the Service Level Agreement with the Department of Health (Appendix D).

2.1.2 The purpose of the ASEPTIC Project is to make recommendations about: the suitability for piloting of the computer-based infection control systems that are currently available; the design of a suitable pilot; and the resources needed to undertake pilot testing.

2.1.3 To achieve its purpose the project has defined user requirements, identified systems in current use, assessed their technical compliance with the requirements and judged supplier capability to support piloting and rollout.

Approach

2.1.4 The characteristics required of an infection control surveillance system were defined in a Requirement Specification, with input from and validation by the stakeholder group (Appendix E). The specification focused on user requirements so as to avoid constraining the design solution unnecessarily. It was intended to keep the door open for as many potential design solutions as possible, leaving it for suppliers to justify how well a particular solution could satisfy the requirements.

2.1.5 An evaluation framework was developed. This allowed candidate systems to be compared by applying a weighted scoring system to their degree of compliance with requirements. Individual requirements were grouped under the headings of: user requirements; system requirements; supplier capability; and quality of proposal for piloting. Scores under these headings were aggregated into an overall 'quality' assessment and then plotted against the costs of piloting and ownership to produce a 'value for money' comparison.

2.1.6 While the estimates for 'acquisition cost' and 'cost of ownership' aid our comparison of systems, they should be treated with caution. The rollout of infection control systems may be handled through the aegis of the national programme for NHS IT, via the contract that each region will have with its Local Service Provider. It is possible, therefore, that the infection control systems under consideration in this report will be available in the portfolios of one or more of the LSPs. Prices will be a matter for negotiation – perhaps at national level – with LSPs.

2.1.7 A three-stage evaluation process was used. The first stage focused on the assessment of technical compliance against user and system requirements. Suppliers of infection control systems were issued with a Request for Information containing a Requirement Specification and a compliance check list. Suppliers responded by providing a self-assessment of technical compliance, by demonstrating their systems to the project team and by supplying evaluation copies of their software for detailed examination by the project team.

2.1.8 The second stage of evaluation focused on the management and commercial aspects of piloting and implementation. Evidence was gathered by means of a Request for Proposal.

2.1.9 The final stage of evaluation centred on stakeholder review of the findings put forward by the project team. This included the use of web-based conferencing to demonstrate each system to stakeholders and culminated in a Suppliers' Forum attended by 50 professionals from the infection control community.

Systems Reviewed

2.1.10 Nine systems were submitted for review by suppliers based around the world:

a. AICE! Millennium from the US
b. eICAT from Australia
c. EpiQuest from the US
d. HAI from E. Midlands CDSC
e. Hybase from Germany
f. ICEnterprise from Australia
g. ICNet from UK
h. IC-Surv from Guy's King's & St Thomas' School of Medicine
i. PathMan from Sysmed in the UK

2.1.11 Hybase dropped out of contention early in the evaluation because the supplier could not provide an English language version of the product. Another two systems – eICAT from Australia and IC-Surv from Guy's King's & St Thomas' School of Medicine - dropped out after the RFI stage because they had in-house development teams that could not support a

national rollout. HAI from CDSC E Midlands, was reviewed by the ASEPTIC project team, but the in-house development team were not able to provide an RFI response or evaluation copy of the software, and were therefore excluded from the detailed evaluation.

Outcome of the Review

2.1.12 The suitability of the five remaining candidate systems was judged by requiring each to pass through a sequence of filters. These were: compliance with user and system requirements; capability of the supplier; and affordability.

2.1.13 All except EpiQuest and ICNet were excluded at the first filter. These two systems also passed the 'supplier capability' and 'affordability' filters and were therefore the only outright selections for piloting.

2.1.14 ICEnterprise, ranked first equal with EpiQuest on overall aggregate score, was an extremely good candidate in all respects except two. These were a limitation with regard to manual input of data for alert organism and SSI surveillance and a rather costly pricing model. The system was especially attractive in terms of its modern, web-enabled and eGIF-compliant design and the supplier had already implemented real-time interfaces with associated systems in the hospital environment. It is therefore judged that ICEnterprise merits reappraisal when the pilot stage is being negotiated. If a promised software upgrade has been implemented satisfactorily by that time, then the system will certainly deserve to be considered for piloting.

2.1.15 AICE!, ranked fourth overall, also merits a mention because it was very well liked by most infection control professionals. It offers the benefit of a powerful toolset which can be configured extensively by the user and it is highly suitable for prototyping individual methods of surveillance and objective-based surveillance. For example, the NINSS data collection method and much of its reporting could very easily be implemented by user configuration of AICE!. However, the design has inherent limitations in its capability for future enhancement to provide more sophisticated, workflow-based functionality. These limitations make it unsuitable as a long-term platform for development of infection control functionality.

Way Ahead

2.1.16 At the outset of this project it was assumed that a main purpose for piloting would be to provide an objective test of how well the selected systems could satisfy user needs. However, the project chose to develop user requirements as the basis for selection of systems and these requirements were taken to the level necessary for an objective evaluation. Hence that purpose has already been achieved.

2.1.17 However, the project's work highlighted a need for the user requirements to be developed further in several important respects. It also crystallised the recognition that, for systems to be acceptable to hospital infection control teams in the fullness of time, a wider range of requirements must be met. Finally, it noted a growing recognition that surveillance is a QA tool and that QA goes well beyond infection control in a hospital context.

2.1.18 It is judged, therefore, that the overall suite of requirements for an infection control system should be seen within this broader context and gaps in requirement ought to be addressed in a coherent way. The infection control system should provide real benefit not only for the infection control team and the hospital but also the broader health community.

2.1.19 Hence it is concluded that the follow-on stage to this project should include further development of requirements as well as the conventional piloting activity.

Scope

2.1.20 This gives rise to the following goals for a next stage of work:

a. to pilot selected infection control surveillance systems so that they can be implemented early;

b. to refine the currently defined requirements for an infection control system by clarifying the business rules underlying them;

c. to develop areas of requirement which have not yet been defined fully and explore potential new user requirements.

2.1.21 This next stage of work should be timed so that its findings can influence the requirements definition and procurement activities now under way through the national programme for NHS IT. The following types of resource will be needed:

a. a Project Board, a project team and a Stakeholder Group;

b. staff, facilities and hardware at each pilot site;

c. infection control software and support from the software suppliers;

d. funding to pay for the above.

2.1.22 The level of funding needed to achieve the goals will be in the order of £180,000 if two systems are piloted and £230,000 if three systems are piloted.

Recommendations

2.1.23 It is recommended that EpiQuest and ICNet should be piloted in order to expedite the implementation of computer-based support for infection control surveillance. A third system, ICEnterprise, should be included in piloting if its planned software upgrade has been successful.

2.1.24 Piloting should ideally begin in October 2003 and complete within 8 months. This will provide feedback at the earliest opportunity into the national programme for NHS IT, maintain the momentum gained during the ASEPTIC project and maximise benefit from the excellent stakeholder group established during that time.

2.1.25 Work should not be restricted to conventional pilot testing activity but should include further development of the requirements for computer-based support of infection control.

2.1.26 Funding to the value of at least £230,000 should be made available for this purpose.

3 Introduction

3.1 Purpose of this Document

3.1.1 The purpose of the ASEPTIC Final Report is to make recommendations suitable for use by the Department of Health about:

a. the suitability of existing infection control systems for wider application;

b. the design of a suitable pilot including the number of systems to be tested and the number of pilot sites required for each system; and

c. the resources needed to undertake pilot testing of systems that have been found to be suitable.

3.2 Background

3.2.1 There is a nationally recognised need to reduce the incidence of hospital-acquired infection (HAI). The PHLS Communicable Disease Surveillance Centre was required, under the terms of a Service Level Agreement with the Department of Health, to undertake an independent review of computerised systems for alert organism and alert condition (surgical site infection) surveillance designed for local use in order to evaluate whether they could be used more widely for local, regional and national surveillance in England. (This requirement transferred to the Health Protection Agency). The PHLS therefore initiated the ASEPTIC project with the following objectives:

a. *Requirements*: To identify the surveillance outputs required of an infection control IT system and the criteria for evaluation of existing systems (including compatibility with existing hospital and national systems; generation of outputs to local, regional and national surveillance).

b. *Systems in current use*: To identify those systems in current use that may be suitable for wider application.

c. *Technical compliance of systems*: To undertake a preliminary analysis of these systems to identify whether they meet the required surveillance outputs.

d. *Supplier capability*: To determine the capability of the software producers to support a pilot study and, if this is successful, to support the wider implementation and continued development of the system

e. *Cost of ownership*: To determine the installation and support costs (real and opportunity costs).

f. *Recommendations*: To report to the DoH on the possible suitability of the systems for wider application, together with the resources necessary to undertake pilot testing of those recommended.

3.3 Context of this Document

3.3.1 The project has generated the suite of products shown the product flow diagram at Annex A, culminating in this report.

3.4 Evaluation Approach

3.4.1 As described in Annex B, the evaluation approach is centred on a framework designed to indicate the overall ranking of candidate systems by applying a weighted score to their compliance with each requirement. Individual requirements are grouped under the headings of:

a. user requirements;

b. system requirements;

c. quality of proposal for piloting; and

d. supplier capability.

3.4.2 The first stage of evaluation focused on the assessment of technical compliance against user and system requirements. Known suppliers of infection control systems were issued with a *Request for Information* containing a Requirement Specification and a compliance check list. Suppliers:

a. submitted their own assessments of system compliance against the specification;

b. demonstrated their systems; and

c. provided evaluation copies of the software for more detailed assessment by the project team.

3.4.3 This enabled the project team to make a thorough assessment of each system's compliance with technical requirements and complete parts 'a' and 'b' of the Evaluation Framework.

3.4.4 The second stage of evaluation focused on the management and commercial aspects of piloting and implementation. Evidence was

gathered by means of a *Request for Proposal* that was issued to suppliers. The project team used this evidence, clarified as necessary through further discussion with suppliers, to complete parts 'c' and 'd' of the Evaluation Framework.

3.4.5 The combined rankings of system and supplier were then plotted against the costs of piloting and the costs of ownership so as to highlight the comparative profile of each combination.

3.4.6 The final stage of evaluation focused on stakeholder review of the findings put forward by the project team. This made use of web-based conferencing to demonstrate each system to the Project Board and other stakeholders and culminated in a Suppliers Forum enabling them:

a. to find out the project team's view of how candidate systems compare;

b. to obtain hands-on experience of each system;

c. to question software suppliers about the issues of most concern;

d. to firm up their own views of how the candidate systems compare; and

e. to feedback their judgements to the project team.

4 Review of Systems

4.1 Requirements

4.1.1 The key characteristics required of the system are defined in a Requirement Specification. This is pitched at a level of detail appropriate to the limited objectives of this project rather than to the needs of a full-blown system procurement. Also, it is focused as much as possible onto the user requirements so as to avoid constraining the design solution unnecessarily. System technical requirements and architectural requirements have therefore been included only where there are good reasons to do so. It is intended to keep the door open for as many potential design solutions as possible, leaving it for suppliers to justify how well a particular solution can satisfy the requirements.

Table 1: Capabilities Required

Security	Login passwords Audit trail
System Configuration	Set-up local organisation Define ward types and wards Define other local reference data
Alert organism Surveillance	Import data View & record data Analyse & report Export data
Alert Condition Surveillance	Import data View & record data Analyse & report Export data
Case Management	Assign patient to case load View & record case notes Set alerts & reminders Discharge patient from case load
Archive	

4.1.2 The concept for the required Infection Control System is described in the *Concept of Operation* - User Requirements Document Part 1. Hospitals in England currently use a variety of ad hoc systems for infection control and surveillance purposes. The *ConOp* suggests that these ad hoc systems be replaced by an infection control system whose characteristics reflect nationally-agreed requirements:

a. its purpose will be to reduce the incidence of hospital-acquired infection;

b. it will be used primarily by infection control teams but, in due course, might also be used by ward and theatre staff;

c. its capabilities include support for alert organism surveillance, alert condition surveillance and the management of patients with infections or at risk of acquiring an infection during their hospital stay.

4.1.3 The system is required to be capable of deployment in any hospital with minimum impact on the existing systems already in place. To achieve this it will be loosely coupled to other hospital systems through the use of daily extracts from PAS, the theatre system and the laboratory system.

4.1.4 The system is required to deliver the suite of capabilities identified in Table 1; these are described in User Requirements Document Parts 2 & 3: the Use Case Catalogue and the Use Case Description.

4.1.5 Information requirements are defined in User Requirements Document Part 4.

4.2 Systems under Review

4.2.1 The systems considered for review and their suppliers are as follows:

AICE! Millenium	ICPA, Inc. 515 South, Capital of Texas Highway, Suite 240, Austin, TX 78746-4305, USA
eICAT	eICAT ? Princess Alexandra Hospital, Ipswich Rd, Woolloongabba, Queensland, 4102 Australia
EpiQuest	EpiQuest, LLC 96000 Overseas Highway, P-2 Key Largo, Florida 33037, USA
HAI	E Midlands, CDSC University Hospitals of Leicester
Hybase	Cymed AG Konrad - Zuse Str 14, D-44801 Bochum, Germany
ICEnterprise	Repatriation General Hospital Daws Rd, Daw Park, Adelaide, South Australia, 5041 Australia
ICNet	ICNet Ltd Cotswold Barn, Whittington, Cheltenham, Glos, GL54 4HA, UK
IC-Surv	Guy's King's & St Thomas' School of Medicine

PathMan Sysmed Ltd
Thorpe Court, Delta Way,
Crabtree Road, Thorpe,
Egham, Surrey, TW20 8RX, UK

4.2.2 The Hybase system does not have an English language version. It was therefore eliminated from the evaluation.

4.2.3 The HAI system from E Midlands CDSC did not submit an RFI response or a proposal, on the grounds that their system is not fully developed and is only just to be deployed in its first site.

4.2.4 eICAT and IC-Surv did not submit proposals for piloting on the grounds that they do not have the resources to support its widespread use in England.

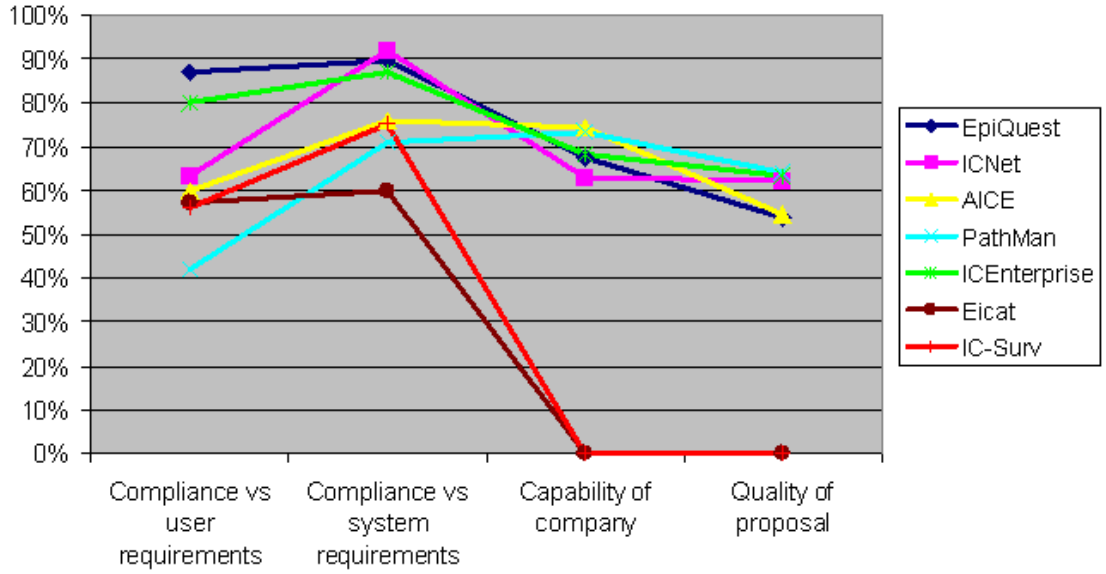

Figure 1: Comparison of Quality Characteristics

4.3 Assessment of Quality

Overview

4.3.1 The figure above shows an overview of how candidate systems and suppliers compare for:

a. compliance of software against the user and system requirements developed for this project;

b. the supplier's capability to support initially a pilot and then rollout to a national user base;

c. the quality of supplier proposals for piloting and subsequent rollout of their software.

The score for any single characteristic (eg compliance with user requirements) has been calculated by aggregating the scores obtained against a number of more detailed evaluation criteria.

4.3.2 eICAT and Guy's King's & St Thomas' School of Medicine did not submit proposals for piloting and national rollout as they did not have the commercial basis to support these activities.

User Requirements.

4.3.3 EpiQuest was a clear winner for compliance with user requirements, ICEnterprise coming a close second place and ICNet in third place a little ahead of AICE! and eICAT. PathMan fell appreciably short of the required level of compliance due to the fact that its current version does not support alert condition surveillance and case management is very limited.

4.3.4 Figure 2 shows how the front runners compare against the detailed user requirements. EpiQuest has a good level of

compliance against all areas of user requirement.

4.3.5 ICEnterprise was judged as good as or better than EpiQuest in many respects, notably 'case management' where it was the leading contender by a significant margin. However, it has poor capability for manual input of data, which adversely affects its ability to support alert organism surveillance and SSI.

4.3.6 ICNet showed some weaknesses in the areas of 'import', 'reporting' and 'export'.

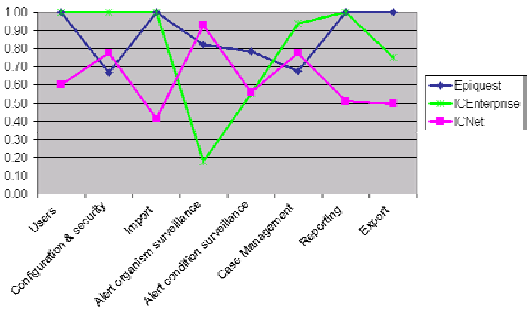

Figure 2: Compliance with User Requirements

System Requirements

4.3.7 ICNet, EpiQuest and ICEnterprise showed consistently good capability over all aspects of system requirement whereas other candidates were more variable. AICE!, Kings and Pathman were grouped in second place. eICAT was assessed as least compliant.

4.3.8 It is important to note that the design concept underlying AICE! is markedly different to that of the other candidates. The latter provide a fully relational database whose structure and content is almost entirely under developer control; this is the conventional approach used in most applications of this type. AICE! differs by providing a hierarchical structure of data tables which are populated and linked by the user at installation and can be evolved thereafter as required. The AICE! database structure allows vertical links between tables in adjacent levels in the same hierarchy, but there is little or no scope for links across branches in the hierarchy. Several different hierarchies can be created for different 'objectives', but there is no option to link tables in different hierarchies.

4.3.9 AICE! therefore offers the benefit of a powerful toolset which can be configured extensively by the user. That is why it has been awarded respectable scores for compliance with user and system requirements. However, the design also has inherent limitations in its extensibility, ie in its capability for future enhancement to provide more sophisticated, workflow-based functionality. These limitations make it unsuitable as a long-term platform for development of sophisticated infection control functionality.

Supplier Capability

4.3.10 Criteria for the assessment of supplier capability are shown in Figure 3. The most important were judged to be:

a. the company's general capability measured by length of time in business, scope of operation, and capacity to provide the level of support needed for piloting and rollout in UK;

b. their track record with infection control systems;

c. feedback from users at reference sites.

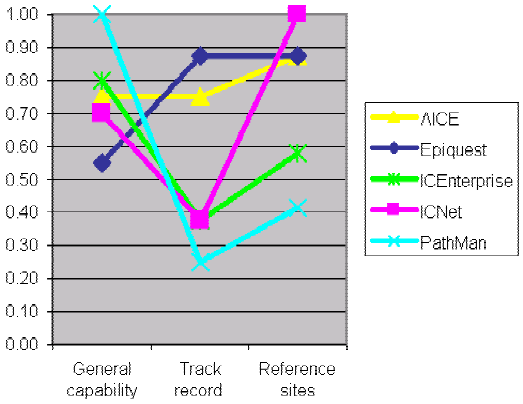

Figure 3: Comparison of Supplier Capability

4.3.11 Although Sysmed has a limited track record with its PathMan product, the company has been in business for a considerable time. They were judged to have a high level of capability by virtue of their established position as a software developer and their proven capability to support a sizeable user base of laboratory information management systems in England. They also have, or are negotiating, partnering agreements with potential Local Service Providers in the national IT programme, with a view to incorporating PathMan within ICRS.

4.3.12 Sysmed only provided a single reference site, and the user was still in the process of setting up and evaluating the product.

4.3.13 ICPA, supplier of AICE!, was judged comparable to Sysmed in software engineering capability and has a sizeable user base for its product. However it does not have an established presence in England from which to support piloting and rollout.

4.3.14 Three current users of AICE! in the US were interviewed and overall they were happy with the product and ICPA. They see the main purpose as Monitoring infections (2), Trend analysis (1), and in terms of how well Aice supports these aims they said "Lacks predictive ability" (1), and "Identifies trends well "(1). Overall two users were very satisfied and one moderately satisfied with AICE!.

4.3.15 EpiQuest is a small company but the product has some 5 years maturity and is believed to have a sizeable user base (though the company is puzzlingly coy about revealing the size of that user base). Although a few systems are now being brought into use in Scotland, EpiQuest does not yet have a UK base from which to support piloting and a national rollout. The company has provided an assurance that it will deploy staff to the UK to support piloting. If necessary, they will also team with a UK-based company, possibly to support piloting but especially to support rollout.

4.3.16 Two current users of Epiquest in the US were interviewed and the overall impression they gave was one of a respected system with no particular issues. They see the main purpose as Monitoring for prevention (1), Control of infection (1), and in terms of how well Epiquest supports these aims they said Very well (1). Overall both were very satisfied with Epiquest.

4.3.17 The developers of ICEnterprise are currently permanent employees of the Repatriation General Hospital in Australia and their product has a very small user base. However, the hospital executive has decided to spin-off a commercial company using the services of Mann Judd Consulting and BioInnovations SA. It is expected that this new venture will have Hospital Foundation shareholding and will have professional industry leadership. The hospital has agreed to transfer its intellectual property rights in ICEnterprise to the new venture. The already agreed teaming arrangement with World Class International (WCI) could then provide a strong UK base for the support of ICEnterprise during piloting and national rollout.

4.3.18 Since the product is only in use at the two hospitals where it was developed, there was no justification in conducting the user questionnaire.

4.3.19 ICNet is a small company and their product currently has a very small user base. They would struggle to support a national rollout of their system and provide the level of support needed thereafter. ICNet recognise this, however, and propose to overcome the difficulty through a teaming arrangement with Torex that would provide access to a well-established support capability.

4.3.20 Three current users of ICNet in Scotland were interviewed and they all cited the product and level of support as outstanding. While they are all new users and may still be in a "honeymoon period", clearly the product was more than adequate for their current needs and the users were very enthusiastic. They see the main purpose as Monitoring infections (2), and Trend analysis (1), and in terms of how well ICNet supports these aims they said Very well (2). Overall all users were very satisfied with ICNet.

4.3.21 When drawing conclusions from the above assessments, it is worth noting that the project team has made extensive and very successful use of web conferencing with individual suppliers as a means of exploring and explaining their products. This is now a mature technology with much potential value and it can help to remove many of the geographical obstacles to the support of software applications. Differences in time zone will still remain a problem, of course, when providing global support from a single base.

Quality of Proposal

4.3.22 The aspects of the proposal where suppliers had most scope to 'add value' were:

a. the description of their preferred approach to pilot testing, including timetable and milestones;

b. their analysis of risk.

4.3.23 These two aspects proved the main discriminators which resulted, overall, in PathMan, ICNet and ICEnterprise scoring some 10% better than AICE! and EpiQuest.

4.3.24 PathMan submitted a well-reasoned proposal which contained an interesting, three-stage approach. This was designed to use piloting as the vehicle for a major upgrade in the capability of the product, the purpose being to fill functional gaps that currently cause PathMan to score poorly against the ASEPTIC

user requirements. Although the case for such an approach was well argued, it would inevitably carry significantly more risk to the achievement of goals than the pilot testing of already-developed capability. This apart, PathMan showed a good appreciation of the causes of risk in a pilot stage and suggested a comprehensive range of risk management actions.

4.3.25 ICNet put forward a well-reasoned approach though its added value was focused mainly on the early phases of piloting; later phases were neglected by comparison. ICNet's analysis of risk to the pilot stage showed a good appreciation of the causes of risk and they suggested a reasonably comprehensive set of risk management actions.

4.3.26 ICEnterprise put forward a well-rounded proposal. Their approach was logical and showed good understanding of the issues associated with piloting. The risk assessment focused on the key issues and their suggested risk management actions were reasonably comprehensive. It should be noted that WCI joined ICE very late in our project and they produced a very worthy proposal under even tighter timescales than the other suppliers.

4.3.27 AICE! put forward a well-structured approach but it was somewhat sparse and didn't provide much insight into the supplier's level of understanding and scope of expertise. A key feature of the approach was their proposal to leave the implementation of data import functionality until the second half of the timetable. The project team judged this to be inadvisable, on the grounds: that data import is a key requirement for satisfactory use of the system; that its effective implementation carries significant risk (mainly for non-technical reasons); and that it should therefore be implemented early in piloting. The risk analysis offered by AICE! showed some commendable lateral thinking, identifying issues not addressed by any other candidates, but their analysis was not as comprehensive overall.

4.3.28 EpiQuest submitted a considerable amount of detailed information which indicated a good level of understanding about the needs of piloting. However, the overall approach was not well presented and their proposal was difficult to understand. They showed a mature appreciation of the causes of risk in piloting and offered a reasonably comprehensive set of risk management actions.

4.4 Cost

4.4.1 In the charts that follow, the quality axis shows an aggregate of the characteristics discussed in Section 4.3 above. This has the effect of reducing the difference between candidates because those with a lower score for one characteristic tend to have a higher score for another. For example, PathMan scores poorly for compliance with 'user requirements' but well for 'supplier capability'.

4.4.2 The price axis indicates comparative figures. Actual values are not shown here for reasons of commercial confidentiality; they can be found in Part 4 of this report, which is on restricted distribution.

Cost of Piloting

4.4.3 Figure 4 focuses on the pilot stage and compares candidates for their characteristics of quality versus the overall price charged by the supplier for the pilot stage. A notable feature is the marked difference in price between PathMan or ICEnterprise and the other candidates.

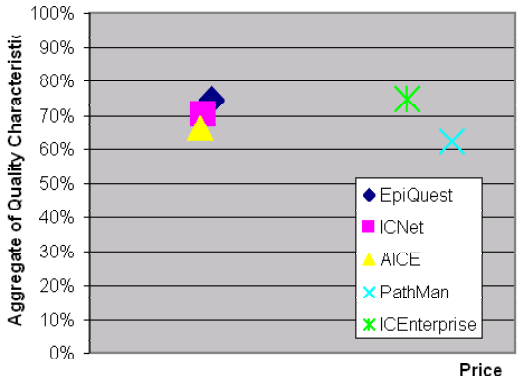

Figure 4: Quality vs Supplier's Price for Piloting

4.4.4 In the case of PathMan, since they are not charging a software license fee it is surmised that the price reflects their proposal, explained above, to use piloting as the vehicle for a major upgrade in the capability of the product. However, it could equally be that they have allowed for a more active engagement with the pilot sites than have some other candidates.

4.4.5 In the case of ICEnterprise there are two reasons for the price difference:

a. the system includes a sophisticated interface engine which is licensed as a separate item charged for in addition to

core software. It is understood that the interface engine has significant benefit in its own right as a versatile, eGIF-compliant means of providing batch upload or two-way, real time interfaces with other systems in the hospital environment.

b. there is substantial provision for support to pilot sites.

Acquisition Cost

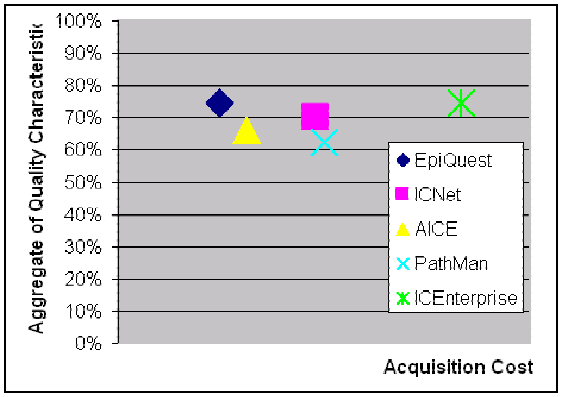

Figure 5:Quality vs Acquisition Cost

4.4.6 Figure 5 focuses on the Year 1 acquisition cost for rolling out the system to 50 hospitals. Candidates are compared for overall quality (an aggregate of the characteristics discussed in Section 4.3 above) versus Year 1 costs for the following:

a. licence fee for infection control software;

b. support for installation, configuration, technical & user help;

c. training for the initial cohort of users;

d. technical and user documentation;

There will be other costs associated with the rollout, eg hardware, but these have not being included in the comparison at this time as they are largely independent of the choice of system.

4.4.7 EpiQuest is a clear winner on this criterion, with ICEnterprise offering equally good quality but at substantially greater acquisition cost.

Cost of Ownership

4.4.8 Figure 6 focuses on the annual cost of ownership from Year 2 onwards. Costs include:

a. annual licence fees.

b. help desk support for day-to-day use of the system.

c. system maintenance (defect repair and minor modifications)

Other cost elements have not been assessed at this time as they are highly variable across installation sites.

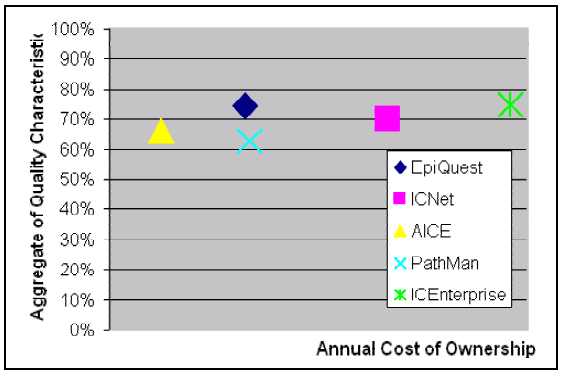

Figure 6: Quality vs Annual Cost of Ownership

4.4.9 EpiQuest maintains its position of offering good value for money, ICNet remains good quality at a premium and PathMan is priced competitively.

4.4.10 AICE! appears to be outstanding value for money, and this is true up to a point. As explained above, AICE! provides a powerful toolset which can be configured extensively by the user to create an infection control system. However, although it does not show up clearly in the overall score for quality the system thus created will have inherent limitations on its functional scope. Also, as knowledge about the configured system will reside more within the user community than the supplier, so will responsibility for much of the support needed by users. It is believed that this is the main reason why the support costs chargeable by the supplier can be low in comparison to those of other candidates.

4.4.11 ICEnterprise remains in the high quality, high cost sector of the chart.

Note of Caution

4.4.12 While the estimates for 'acquisition cost' and 'cost of ownership' aid our understanding of how systems compare, they should be treated with caution. The rollout of infection control systems may possibly be handled through the aegis of the national programme for NHS IT, via the contract that each region will have with its Local Service

Provider. It is possible, therefore, that the infection control systems under consideration in this report will be available in the portfolios of one or more of the LSPs. Prices will be a matter for negotiation – perhaps at national level – with LSPs.

4.5 Suitability for Piloting

Selection

4.5.1 Out of the nine systems considered for review:

a. Hybase was excluded from the outset as it did not have an English language version;

b. EICAT, IC-Surv and HAI were not proposed for piloting and rollout on the grounds that their suppliers could not provide the necessary level of support.

4.5.2 Judgement about the suitability of the five remaining candidate systems was made by requiring each to pass through a sequence of filters. These were:

a. compliance with user and system requirements;

b. capability of the supplier;

c. affordability.

4.5.3 All except EpiQuest and ICNet were excluded at the first filter:

a. AICE!! because it does not have sufficient capability for case management and has inherent design limitations on its extensibility;

b. eICAT because it does not have the required level of capability for data import nor does it support case management adequately;

c. ICEnterprise because, although excellent in other respects, it has a poor capability for manual input of data, which adversely affects the capability to support alert organism surveillance and SSI;

d. PathMan because it does not have the required capabilities for alert condition surveillance and case management.

4.5.4 EpiQuest and ICNet both passed the 'supplier capability' and 'affordability' filters and are therefore the only outright selections for piloting.

Exceptions

4.5.5 ICEnterprise, ranked first equal with EpiQuest on overall aggregate score, is an extremely good candidate in all respects except its limitation in regard to manual input of data for alert organism and alert condition surveillance and the rather costly pricing model proposed by its supplier. The system is especially attractive in terms of its modern, web-enabled and eGIF-compliant design; and it has already implemented real-time interfaces with associated systems in the hospital environment. In these respects it is well ahead of the other candidates. With regard to its shortcomings:

a. it will not be difficult for the supplier to improve the existing facilities for manual input of data and an upgrade is due for release in September;

b. market forces can be expected to resolve the pricing issue once LSPs enter the NHS arena.

4.5.6 ICEnterprise therefore merits inclusion in the pilot stage provided that it has successfully completed the planned upgrade, which is expected in September 2003.

'Certificate of Merit'

4.5.7 AICE! was very well-liked by many of the infection control professionals who reviewed it and the system earned a well-deserved fourth place overall. Although it has inherent design limitations which limit its use as a platform for the full complexity of infection control, it is judged that AICE! can play a valuable role in support of infection control surveillance at those hospitals where the complexities of case management are not required.

4.5.8 AICE! is also highly suitable for prototyping individual methods of surveillance and supporting objective-based surveillance. For example, the NINSS data collection method and much of its reporting could very easily be implemented by user configuration of AICE!.

5 Way Ahead

5.1 Purpose of Next Stage

5.1.1 The project brief sought recommendations for design of a suitable pilot, although it did not define the purpose of the pilot. The assumption was that piloting would objectively test fit versus user needs for selected systems. However, since this project has chosen to develop user requirements as a basis for the selection of suitable systems, that purpose has already been achieved.

5.1.2 Our work has defined the requirements for surveillance to the level necessary for objective evaluation of systems. But it has highlighted the need for those requirements to be developed further; for example it is important to clarify the business rules.

5.1.3 It also became clear that, for systems to be acceptable to hospital infection control teams in the fullness of time, a wider range of requirements must be met, including:

a. outbreak management;

b. healthcare worker surveillance;

c. management of workflow;

d. better ability for users, ie clinicians, to explore the data, for example through use of data mining and tools such as OLAP; these would allow clinicians to recognise associations that even the infection control team had not imagined.

5.1.4 Importantly, there is a growing recognition that surveillance is merely a QA tool and that QA goes well beyond infection control in a hospital context. The overall suite of requirements should be seen within that broader context. This is evidenced by the transition seen in the US from infection surveillance specialists to hospital epidemiologists whose remit extends beyond infection control.

5.1.5 These gaps in requirement ought to be addressed in a coherent way. The aim must be to ensure that whatever infection control system is put in place provides real benefit not only for the infection control team and the hospital but also the broader health community. This requires a follow-on stage of work that can include more detailed specification of requirements rather than be limited to a simple pilot. Conventional piloting activity would, of course, be a component of this follow-on work.

5.1.6 The pilot stage does not seek to establish whether each system meets the requirements, since this has already been established as part of the evaluation. However, the pilot should seek to confirm that the systems meet the usability criteria, and perform as expected, within a real working environment. To accomplish that, each supplier must be willing and able to adapt their system in a timely manner, to fulfil the specific needs of English hospitals. This purpose may be achieved through use of a single pilot site per system, provided that the experiences and benefits gained during the pilot are shared with a full stakeholder group. In this way the issues and results may be explored in great depth and also validated against a broad range of settings with different viewpoints and priorities.

5.2 Goals

5.2.1 We recommend that there should be three goals for the next stage.

5.2.2 Goal 1 is to pilot selected infection control surveillance systems so that they can be implemented early. This work will resolve areas of risk and document good practice. Benefits sought from use of an infection control system will be defined more fully and assurance obtained that they can be realised.

5.2.3 Goal 2 is to refine the currently defined requirements for an infection control system (such as support for surveillance) by clarifying the business rules underlying them. For example, there is a need to define and test a minimum dataset for MRSA surveillance and to establish the associated benchmark reports.

5.2.4 Goal 3 is to focus on the broader issues so as to develop areas of requirement which have not yet been defined fully (eg outbreak management) and to explore potential new user requirements for infection control systems (eg work flow management).

5.3 Strategy for Achievement of Goals

5.3.1 The proposed strategy for achievement of goals is outlined in Table 2.

Goal 1: to pilot selected infection control surveillance systems	
Resolve areas of risk	Use a preliminary risk assessment coupled with analysis of lessons learned to resolve areas of risk in a wider rollout. Encourage pilot sites to: ○ define any changes to working practice that may be needed for them to make optimum use of the technology; ○ specify the boundary issues for import and export; ○ recommend a range of helpful ways to use the system based on actual experience.
Document good practice	Use collated experience to suggest tailored improvements to the help, such as a FAQ section. Incorporate lessons learned into the technical and user manuals and update training material accordingly.
User group	Create the nucleus for wider establishment of a user group.
Verify that benefits are realisable	Define the benefits sought, with quantification wherever possible - eg time to manually record SSI surveillance vs time to perform the same using the pilot system. Link each benefit to its enabling requirements. Review achievement at each pilot site to determine how well the benefits have been realised. Identify the reasons for any shortfall. Change the requirements as appropriate. Where this is not sufficient in itself, place the issues involved before the relevant authorities.
Compare & contrast systems	Test every system being piloted against the full scope of requirements. Develop an evaluation framework that will allow a structured comparison of systems. Carry out a systematic assessment of each system against the evaluation framework. Compare and contrast the systems so as to enable Trusts to decide which system is best suited to their individual circumstances. Make assessment results available to health communities and their Local Service Providers so as to inform decisions about the delivery of infection control capability.
Goals 2 & 3: to develop the requirements	
Clarify	Conduct the pilot site selection process so that, taken over all sites, full coverage of the requirements for infection control surveillance is achieved. Identify the areas of requirement where clarification is needed and arrange for each to be addressed by one or more pilot sites. Verify the outcomes across all sites.
Define	List and agree the user needs that have been identified but not yet analysed in detail. Carry out a business analysis to define these additional requirements for an infection control system. Verify the requirements, where possible and appropriate, through prototyping.
Explore	Build on the greater understanding achieved through work outlined above to identify potential new user requirements for infection control systems, eg work flow management. Determine the scope and potential benefits of these. Recommend what priority they should be given in later work.
Validate	Establish a stakeholder group drawn from the infection control community. Use the stakeholder group to guide the development of requirements and validate the outcome of this work.
Document	Capture the improved definition of requirements in a composite suite of specifications that are documented in accordance with best practice.

Table 2: Strategy for Achievement of Goals

5.4 Scope

Systems

5.4.1 It is recommended that the three infection control systems selected in Section 4.5, EpiQuest, ICNet, and ICE should be piloted. ICE should only be included if its functionality has been upgraded satisfactorily as promised by the supplier.

Timescale

5.4.2 Ideally, the findings from pilot testing should influence the requirements definition and procurement activities now under way through the national programme for NHS IT. It is therefore recommended that the pilot stage should begin in October 2003 and have a duration of 8 months.

Pilot Sites

5.4.3 Factors governing the selection of pilot sites should include:

a. the level of commitment offered by each candidate site;

b. their preferred choice of system;

c. their ability to provide good coverage of requirements.

Technical Approach

5.4.4 It is proposed that pilot testing should adopt a progressive approach offering users a manageable learning curve. Initial operation should therefore make use of a limited set of system functions, additional functionality being brought into service over a number of steps during the pilot stage.

5.4.5 The priorities underlying this approach will be site specific. A possible approach, given here for illustration only, might progress the focus of piloting activity through the following stages:

a. installation;

b. configuration to suit local organisation;

c. data import;

d. alert organism surveillance for a minimum set of organisms;

e. alert condition surveillance for SSI;

f. case management;

g. ad hoc analysis and reporting;

h. configuration and operation to accommodate additional alert organisms;

i. configuration and operation to accommodate additional alert conditions.

Organisation & Mgt

5.4.6 The proposed client-side organisation will have a project team that is accountable to a project board through a project manager.

5.4.7 Each pilot site will nominate one person to be their primary point of contact with the project team. This person will be responsible for the discharge of pilot site obligations and will represent the site at project meetings as required.

5.4.8 There will be a stakeholder group whose main purpose will be to guide and validate the development of requirements.

5.4.9 Each supplier will nominate one person to be their primary point of contact with relevant pilot sites and the project team. This person will be responsible for the discharge of supplier obligations and will represent the supplier at project meetings as required.

5.4.10 Progress meetings will be held every 6 weeks.

5.4.11 The Project Board will meet quarterly or more frequently if required.

Supplier Responsibilities

5.4.12 Mandatory requirements for systems to be piloted will be identified during the negotiations leading up to the pilot stage. The supplier will carry out any preparatory work, including system modifications and enhancements where appropriate, needed for compliance with the mandatory requirements. For example, EpiQuest will probably need to anglicise some screens where US terminology would cause confusion in England.

5.4.13 The supplier will:

a. supply the bespoke components of the system;

b. install these at each pilot site;

c. provide any advice and technical support needed by pilot sites to configure the system for local requirements;

d. train the users at pilot sites;

e. provide help desk and technical support for day-to-day use of the system.

5.4.14 The supplier will be required to play an appropriate role in the management of the project, including risk and quality management as necessary.

5.4.15 The supplier may be asked to modify and/or enhance the system during the course of pilot operation so as to achieve a better match with the Requirement Specification.

The supplier will be responsible for configuration management of the supplied system, including a formal change control procedure accommodating customer involvement

Pilot Site Responsibilities

5.4.16 Each pilot site will be responsible for:

a. providing the technical environment needed to install the bespoke components of the infection control system;

b. configuring the system to suit local requirements;

c. operating the system as an integral part of the day-to-day work of the infection control team;

d. ensuring that appropriate levels of security and confidentiality are maintained throughout pilot operation of the system;

e. working with the project team and other pilot sites to clarify and/or develop the requirements for an infection control system.

5.4.17 The pilot site will be required to play an appropriate role in the management of the project, including risk and quality management as necessary.

5.4.18 When the pilot stage has completed, the pilot site will be responsible for ensuring that confidential information generated during pilot operation is either disposed of securely or, if appropriately authorised, held under the custodianship of an authority which shall reliably undertake to maintain its confidentiality.

Deliverables

Table 4 lists the proposed deliverables from the next stage of work and indicates responsibilities for their production.

Evaluation

5.4.19 Pilot testing will be subject to a systematic process of evaluation drawing evidence from, amongst other things:

a. interviews with users;

b. observation of meetings;

c. observation of training sessions;

d. help desk statistics;

e. audit trail data, for example the number of patients handled by the pilot system.

5.5 Resource Implications

Types of Resource

5.5.1 The following types of resource will be needed for the next stage of work:

a. project management resources including a Project Board and a project team;

b. staff and facilities at pilot sites;

c. one or more infection control systems;

d. support from the system supplier(s);

e. funding to pay for some or all of the above.

Project Management

5.5.2 The membership of the Project Board should adequately represent the interests of:

a. the national programme for NHS IT;

b. infection control specialists and the system users;

c. health informatics specialists.

5.5.3 This is likely to require the Board to have at least three members, one of whom would take on the responsibilities of Project Director.

5.5.4 The project team will need to have expertise in procurement, project management, requirements analysis and software engineering. It is proposed that the team should comprise:

a. two people on a full-time basis to provide the required level of resource in procurement, project management and requirements analysis;

b. a third member on an as-required basis to provide the software engineering resource;

c. additional part-time resources to provide administrative support.

Pilot Sites

5.5.5 Each pilot site should nominate an infection control professional to act as the local project manager. This person will be the site's primary point of contact with the main project team. They will be responsible for the discharge of pilot site obligations and will represent the site at project meetings as required

5.5.6 Each pilot site should nominate an IT professional who will be responsible for all aspects of the local technical environment needed for piloting. This person will take part in the transfer of IT skills from the system supplier.

5.5.7 The infection control team at each pilot site will need to play an active role in using and assessing the system, investigating areas of difficulty and feeding back experience to the main project team.

Software Suppliers

5.5.8 Software suppliers will need to provide project, technical, training and help desk resources for the following:

a. the project management of all aspects of their involvement with pilot sites;

b. preparatory work to ensure a smooth installation at each pilot site;

c. installation of software;

d. advice and, if necessary, assistance with the configuration of the software to suit local circumstances;

e. training for pilot site users, staged to allow a manageable learning curve;

f. help with the day to day use of the system;

g. supply of data about support calls, technical problems, etc for use in the analysis of issues.

Funding

5.5.9 Section 4.5 identifies 3 systems that are suitable for piloting. Should ICE not be ready then only 2 systems should be piloted. Table 3 shows budgetary estimates for piloting three systems and two systems, each at a single site.

	3 systems	2 systems
Supplier charges	£50,000	£30,000
Pilot site costs		
Infection control team	£60,000	£40,000
IT	£15,000	£10,000
Interface to PAS etc	£6,000	£4,000
Expenses	£4,800	£3,200
sub total	£85,800	£57,200
Project team		
People	£72,000	£72,000
Facilities	£4,000	£4,000
Expenses	£6,000	£4,800
sub total	£82,000	£80,800
Stakeholder group	£12,000	£12,000
Total	**£229,800**	**£180,000**

Table 3: Budgetary Estimate of Pilot Stage Costs

5.5.10 Pilot site assumptions:

a. The additional workload associated with piloting will be covered by engaging an additional infection control nurse for the 8 month duration of the project. It has been assumed that the gross salary and other overhead costs for such a post will be £20,000.

b. The cost of additional IT hardware and software licences (excluding those for the infection control software itself) is estimated to be £5,000 at each site.

c. Provision has been made for 1 man-week of additional analyst programmer support at each pilot site to develop interfaces for extract and pre-processing of data from the laboratory, theatre and PAS systems.

d. Each site will send a representative to a progress meeting once per month.

5.5.11 Project team assumptions:

a. The team will consist of a project manager, an analyst and administrative support.

b. A contribution will be made to the cost of office facilities shared with an existing NHS organisation.

c. Expenses will cover attendance by two members of the team at monthly progress

meetings plus a visit to each pilot site every two months.

5.5.12 It is assumed that the stakeholder group will have 15 members who will be paid expenses to attend one meeting per month.

	Scope of Responsibility		
Deliverable Item	**Project Team**	**Each Pilot Site**	**Each Supplier**
Project Initiation Document	Produce the PID	Contribute to & agree content	Contribute to & agree content
Project Plan	Maintain the plan	Endorse changes	Endorse changes
Pilot Site Plan	Validate the plan against project goals	Produce and maintain the plan	Contribute to & agree content
Training Plan		Contribute to & agree content	Produce the plan
Definition of Host Environment			Define requirements
Host Environment		Provide environment	
Installation Package inc system handbooks			Supply the package
Installed & configured system		Configure to suit local requirements	Install infection control software and advise or assist with configuration as req'd
Pilot Site Report		Submit periodic report to project progress meetings	Provide supplier-side commentary on issues as required
Highlight Report	Submit periodic report to Project Board		
Pilot Site Findings		Produce report setting out user perspective on pilot operation of system	
Supplier Findings			Produce report setting out supplier perspective on operation of system at pilot site(s) with recommendations for resolving any issues.
Comparative Assessment of Candidate Systems	Produce report	Contribute to & agree content	
Updated Requirement Specification	Produce specification	Contribute to & agree content	Contribute to content
Project Closure Report	Produce report		

Table 4: Deliverables from Next Stage of Work

6 Conclusions & Recommendations

Suitability of Systems

6.1.1 Nine software systems for the support of infection control surveillance were evaluated as candidates for piloting. The criteria for judging their suitability were: compliance with user and system requirements; capability of the supplier; and affordability.

6.1.2 Three systems were found suitable for piloting; they were EpiQuest, ICNet and ICEnterprise. ICE should only be included in the pilot if its functionality for manual input of data has been upgraded satisfactorily, as promised by the supplier, and if an acceptable price can be negotiated.

Purpose of Next Stage

6.1.3 At the outset of this project it was assumed that a main purpose for piloting would be to provide an objective test of how well the selected systems could satisfy user needs. However, the project chose to develop user requirements as the basis for selection of suitable systems and these requirements were taken to the level necessary for an objective evaluation. Hence that purpose has already been achieved.

6.1.4 However, our work highlighted a need for these requirements to be developed further in several important respects. It also crystallised the recognition that, for systems to be acceptable to hospital infection control teams in the fullness of time, a wider range of requirements must be met. Finally, it noted a growing recognition that surveillance is a QA tool and that QA goes well beyond infection control in a hospital context.

6.1.5 The overall suite of requirements for an infection control system should be seen within this broader context and gaps in requirement ought to be addressed in a coherent way. The infection control system should provide real benefit not only for the infection control team and the hospital but also the broader health community.

6.1.6 Hence the follow-on stage to this project should include further development of requirements as well as the conventional piloting activity. This gives rise to the following goals for a next stage of work:

a. to pilot selected infection control surveillance systems so that they may be implemented early;

b. to refine the currently defined requirements for an infection control system by clarifying the business rules underlying them;

c. to develop areas of requirement which have not yet been defined fully and explore potential new user requirements.

Scope

6.1.7 The next stage of work should be timed so that its findings can influence the requirements definition and procurement activities now under way through the national programme for NHS IT.

6.1.8 The following types of resource will be needed to achieve the goals set out above:

a. project management resources including a Project Board, a project team and a Stakeholder Group;

b. staff and facilities at each pilot site;

c. infection control software;

d. support from the software suppliers;

e. funding to pay for the above.

6.1.9 The level of funding needed to achieve the suggested goals within this scope will be in the order of:

a. £180,000 if two systems are piloted;

b. £230,000 if three systems are piloted.

Recommendations

6.1.10 It is recommended that EpiQuest and ICNet should be piloted in order to expedite the implementation of computer-based support for infection control surveillance. A third system, ICEnterprise, should be included in piloting if its planned software upgrade has been successful and an acceptable price can be negotiated.

6.1.11 Piloting should begin in October 2003 and complete within 8 months so as to provide feedback at the earliest opportunity into the national programme for NHS IT.

6.1.12 Work should not be restricted to conventional pilot testing activity but should include further development of the requirements for computer-based support of infection control.

6.1.13 Funds of at least £230,000 should be made available for this purpose.

7 Annex A: Product Flow Diagram

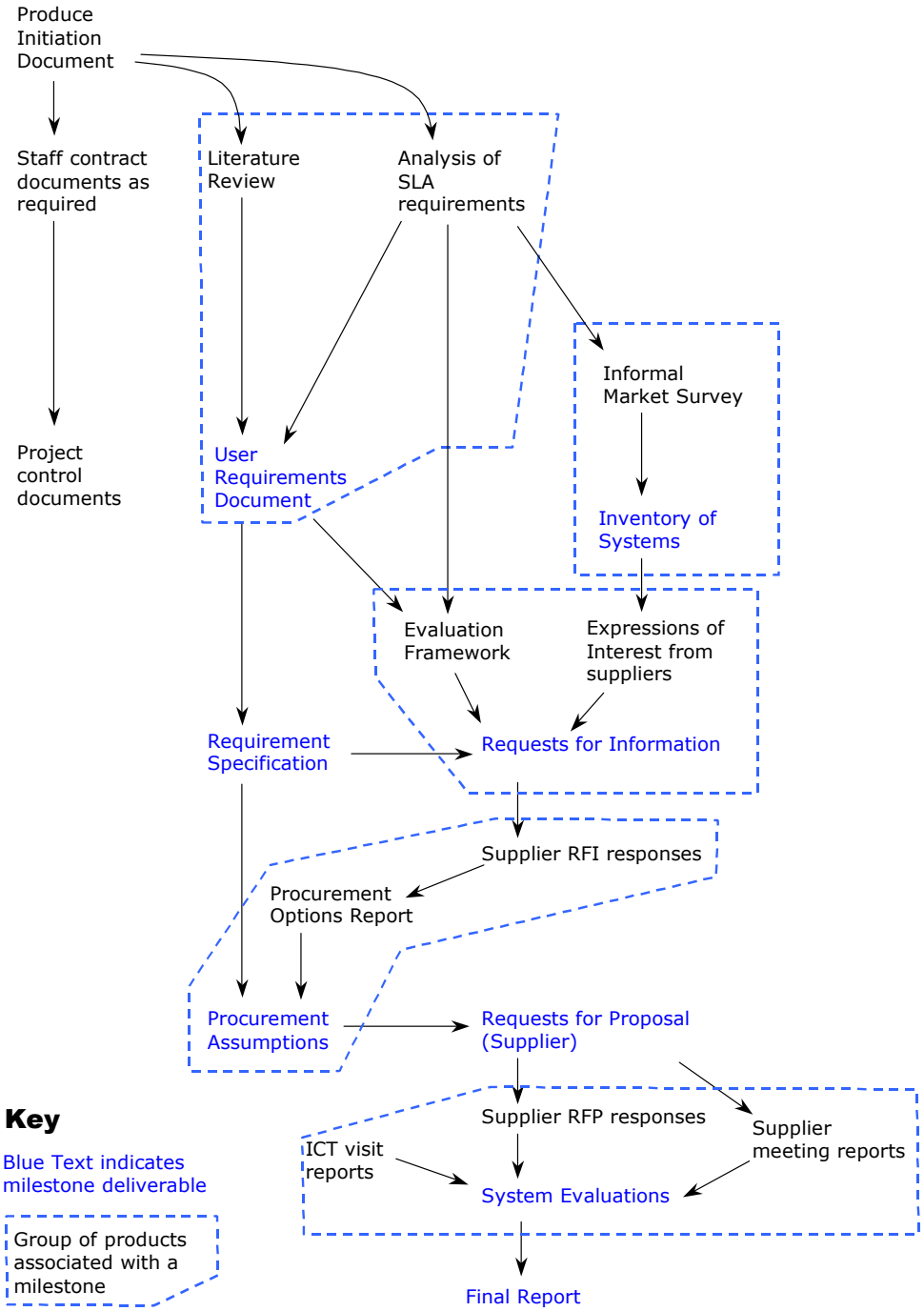

Figure 7: Product Flow Diagram

8 Annex B: Detailed description of the Evaluation Framework

8.1 Evaluation Framework

8.1.1 The ASEPTIC Project team has designed an evaluation framework that has been used to provide an overall assessment of the ranking of candidate systems based on a range of criteria. Individual requirements are grouped under the headings of:

a. User Requirements;

b. System Requirements;

c. Quality of Proposal for piloting;

d. Supplier capability.

8.1.2 The requirements can be broadly grouped into those that represent Technical Compliance with the published specifications (a and b above), and those that represent the suppliers ability to deliver a successful pilot project and thereafter roll out their product to a wider user base (c and d).

8.1.3 Each of the headings above has been further sub-divided into a number of particular "topics". These are based on the Requirement Specification, User Requirements Documents, Request for Proposal and Procurement Assumptions documents referenced in Part 1 of this Final Report.

8.1.4 User Requirements headings have been largely based on the Use Case Catalogue and have been grouped under the sub-headings of:

a. Users (roles etc.)

b. Configuration and Security

c. Import (covering facilities to import data from external Lab, Patient Administration and Theatre systems)

d. Alert Organism Surveillance

e. Alert Condition Surveillance

f. Case Management

g. Reporting

h. Export (the ability to send data to other applications such as Excel, or in other formats such as Co-surv or the NINSS required dataset).

8.1.5 Each of these sub-headings has been assigned an equal weight in reaching the overall score for User Requirements.

8.1.6 Each of the sub-headings themselves may also have a number of points of compliance below them, and a normalised score for each sub heading has been arrived at by awarding a mark of 1 for complete compliance for each point (adjusted accordingly where the ASEPTIC evaluation team feels complete compliance has not been demonstrated – down to 0 for not compliant at all), then dividing the total for each sub-heading by the number of points of compliance within that sub-heading.

8.1.7 In a similar way to the User Requirements, the System requirements have been grouped under a number of sub-headings, this time drawn largely from the Requirements Specification. These also may have a number of points of compliance below them, and a similar normalised scoring system has been applied to reach an overall score for System Requirements. The sub-headings for System Requirements are:

a. System Boundary

b. Data Import (does it comply with the specified two stage process)

c. Confidentiality

d. Performance

e. Usability

f. Availability

g. Configurability

h. Adaptability

i. Extensibility

j. User Interface

k. Constraints

l. Miscellaneous (includes help facilities, robustness of system architecture and use of recognised development tools/ databases).

m. E-GIF Compliance

8.1.8 Sub-headings for Quality of Proposal are as follows (weighting for each sub-heading in brackets):

a. Baseline assumptions (1)

b. Approach (5)

c. Organisation & management (1)

d. Supplier responsibilities (1)

e. Training (1)

f. Host environment (1)

g. Deliverables (1)

h. Risk assessment by supplier (5)

8.1.9 Sub-Headings for Supplier Capability are as follows (weighting in brackets):

a. General quality of RFI response (1)

b. General quality of RFP response (1)

c. The company's general capability (5)

d. Track record with infection control (2)

e. Reference sites (1)

8.1.10 The overall score is obtained by combining the scores from each section using weightings for each of these sections. These weightings are as follows:

a. User Requirements – 1

b. System Requirements – 1

c. Quality of Proposal – 1

d. Supplier Capability – 1

8.2 Confidentiality

8.2.1 The completed Evaluation Framework constitutes Part 4 of the Final Report. This document contains considerable detail about each system and supplier, and much of this information has been classed as "Commercial-in-Confidence". Therefore the initial circulation has been restricted to Project Board Members only and future circulation will be suitably controlled.

9 Annex C: Selected Comments from the Supplier Forum

AICE! Millenium

A selection of comments made by delegates at the Supplier Forum.

Benefits
PDA use Can add patients manually Sample receipt
Widely used
Very flexible for user Allows different reports to be generated. Can be used with palm tops if configured
Coded look up choices
Flexibility in design/query
Proven, but only in non UK environment Excellent potential for SSI reporting
Very simple system, similar to Access database we currently use
Good data management Use of different colours
Very flexible - really liked the calculate functions for data items - very useful for alert condition surveillance. Reports seem easy to run and very flexible Easy to configure for SSI and bacteraemia

Problems/barriers
Size of database with more data it will reach a possible 2gb of data (access limit)
Safeguards for consistent data for national reporting
Several downloads to coordinate
Need confidence and support
No pull down menus for patient info No company support for interfacing
Drilling down through data difficult
too flexible Scaleability System variation & installability
Seems largely geared largely to manual inputting
Manual input of data Quality of data match, data duplication
Not UK design Lack of proven interface technology Very USE orientated, in terms of working patterns of ICNs
Needs lots of local work, not clear how importing is going to work Manual import not very attractive
Some duplication of data entry
New alert organisms difficult to deal with

General Comments
Very flexible but could make some fields mandatory for national reporting, Well established supplier
It would be easy to use as a short term data tool, whilst the culture change (paper to IT) is being implemented. Some sophisticated users would find it frustrating. Could be useful as an interim solution. Lack of interfaceability reflects NHS systems, and lack of interface until the NHS IT strategy is enabled, then ICE system please
Lots of data, but does not look good for day-to-day management
Useful as a "stand-alone" for objective-based surveillance ie SSI or HAB, where data is collected on every at-risk patient. Don't think it's very good for alert organism or case management - too cumbersome

Epiquest

A selection of comments made by delegates at the Supplier Forum

Benefits
Password protection at different levels Flexible locally Wizard quick look
Large user base Comprehensive
Comprehensive
Good reporting facility easy to add alert organisms round the clock support widely used frequent upgrades pull down menus
All singing all dancing flexibility on import/export or manual entry
It's a searchable database, would allow a flexible enquiry
Text imports mean potentially Lims and other hospital systems can import info. Flexible export
Screen display clear Facility to copy & paste from other databases Good free text input faciliti8es Flexible data presentation
Good/easy/thorough report generation Outbreak mgt
Robust infrastructure Client prompted Good support
Flexibility, comprehensive details
Free text searches Multiple windows format Bed position tracked Table top inputting
Looked powerful and adaptable

Problems/barriers
? Case mgt
Very Americanised
Difficult terminology
Seemed quite a complicated system
Have to input date as yyyymmdd
Complex
Level of support required locally might be high use of Sybase not well known - may be support issue
Require active input to bring in raw data from records. Seemed messy & time consuming.
Output displays poor (horizontal scroll)
Appears a little complicated to input data
Needs some translation into UK environment Steep learning curve for users
Little experience with interfacing with current UK hospital and micro IT systems
Not so user friendly

General Comments
Less user friendly than say Aice Comprehensive, well established supplier
Covers all areas to complete alert organism surveillance
Whilst this may be useful for US Canadian approach, it requires too much input by users to get basic records started. This could become the focus of daily ICN work rather than being able to start with pre-sorted data. Demo was unfocussed and confusing. Presenter seemed to avoid detail in favour of extolling her searchable product.
Appears to be a robust system, but difficult to assess ease of use within my service at this time.
Impressive
One of my preferred ones
Complicated, potential for lots of unused function. Not sure about ICN input of activities/actions ?UK distributor(support)
Could probably work for both AO and AC if they would adapt for UK needs and deal with inflexible screens Seems a complex system - although it may have been the demonstrator

ICE

A selection of comments made by delegates at the Supplier Forum

Benefits
Patient reviews ward worksheet
Questionnaire to patients Calendar follow-up
Willing to adapt Very aware of current IT direction
Scheduling & questionnaires
Interfaces to key systems Company works with client to establish requirement Palm top capability
If system available good for pulling in & using data
Good pre-filtering for IC use Ability to sync to laptop is good
Can use third party tools to query database Web enabled parts of system
Questionnaire generation & scheduling
Very clearly laid out Detailed information
Easy to use, free text input for SSI, generate post discharge questionnaire
Would be ideal as a "slot in" with respect to the known IT strategy and EPRS
Good company involvement Future proof in terms of interface technology
Good for alert condition - reminders, questionnaires
Interfacing very good

Problems/barriers
No manual entry if hospital does not have appropriate IT systems
Underdeveloped
Relies heavily on theatre info
Limited
No UK users ? Level of support
Limited reports
we need to be able to manually input No ability for survey for UTI
Its too oriented towards SSI surveillance and not IC management
We're not there yet and won't be till 2008 Report system is not one we use Any local tweaking of database has to be done by company
Current lack of manual input - to be developed Lack of UK developments, not designed around UK way of working Lacks user set-up/configuration Flexibility for local definitions etc
Poor flexibility Do not think alert organism will be good
Data entered as comments is not easy to analyse Gets "outcomes" from PAS data, but these would be delayed in UK

General Comments
Not particularly easy to generate non std reports
Some good approaches but really applicable to broader way ICNs generally work in the UK. Would be VERY GOOD as an add-on to an existing IC system.
Appears to support ICN needs
Should be a good system
Well worth piloting
Very useful as an extra SSI surv package to support an IC mgt package
If the alert condition/case mgt were developed then may be OK. Interfacing not very useful for alert condition, as data is not accurate or up-to-date
I love it but it's too advanced for the current NHS IT systems - One for the future
Interesting post discharge possibilities for primary/secondary interface The way forward !

ICNet

A selection of comments made by delegates at the Supplier Forum

Benefits
Easy to use, web based, easy to learn & implement
Tick box Patient without specimen Outbreak mgt potential Multi user
Simplicity PDA link
Easy to learn to use
Excellent rep
Developed for local user reqts Web based (easy access for all) Output to Excel Could be used with formic, hand helds Set reports given/available
User friendly interface
Clear Can adapt to own needs
Good user interface Easy query tools for users Web browser based
Long history through development from inControl Web based
Web based, flexible output to Excel
Cheap
Easy to use
UK systems based, designed to be used by UK ICTs without culture shock
Easy to add tests & results etc
Screens are nice. Can see all options at the same time - easier to work out where you want to be

Problems/barriers
No continuous download Admission date manual entry
Not sure if it will link with PAS
Only configured for Path system SSI not complete yet
Slightly limited reporting features?
Cannot track issues with location as base, more structured towards patient base
Problem Extracting reports that are not part of pre defined sets
Navigation looks tricky, but first time viewing SSI not complete would need to be based on NINNS
Need to have stable internet system. NHS net is not stable
SSI not properly developed so hard to assess Not sure how easy it is to set denominators

General Comments
Little experience of working in PAS systems, lot of work to do Only path system linked if information needed from elsewhere, need to key in demographics, etc
Does not seem able to alert staff to organisms which are not classed as alert, ie in case trend in particular area is apparent
Clear useful system, would like ability to monitor outbreak material more closely
Based on design that has the ICT in mind, advantage over non-UK systems

IC-surv - Kings

A selection of comments made by delegates at the Supplier Forum

Benefits
easy to use UK based system
Work schedules for ICNs Patient oriented
Emphasises control over surveillance Outbreak mgt Mandatory MRSA reporting of blood cultures Surveillance activity recorded
Ease of use Designed around micro system SSI now added
Designed by & for ICN
Good local system in a tight knit team. Small scale low maintenance
Actually in use Easy to use from ICN perspective Palm based info for team
Actively used Ability of local system manager to write queries
Produces clear basic IC information
Exists in real world now Palm function works Tried and tested technology Simple user GUI
Function good Well presented
Designed by ICT Designed for UK ICT to use
Regular micro downloads including provisional reports, twice daily & all data for patients retrospectively Palm top good
Comprehensive Designed to deal with the problems of interpreting lab data for IC purposes

Problems/barriers
No SSI Not ready for development nationally in time for our pilot
Not available
No links to Pas or theatre Non commercial
In house Compatible to be used nationally??
Not compatible with PAS
No alert condition surveillance
Focussed on alert organism rather than alert condition
Difficult to scale up for larger sites
Configuring download from different Lims Relevant PDA software / download Lack of PAS link Scalability of Access
Palm OS only Working directly on DB Support Modifying for SQL
Non commercial Lack of expertise and lack of backup
In house system Access db would be a problem on our network (multi site Trust)
Flexibility
Not easy to see how it could be supported or set up in other hospitals access based system not easy to work with (SQL much nicer)

General Comments
Downloads from path system. Excellent local system ?? Able to develop for national use/support etc
This is an in house system but fulfils the criteria required for alert organism surveillance. Not sure how easy it would be to adopt to use across different hospitals
Credit to team for creating a good system
An interesting package providing basic IT solution for IC teams. In use and therefore proven usability and relevance to IC work. Limited support for aspects of SSI surveillance
Dependent on interfaces between LIMs and PDA used by trust / ICN Difficulties in mass rollout
This is good in house system with resulting limitations of scale
This system should be used as a template for the others. The report system is excellent but needs infrastructure and therefore scalability
Second best product here
Would be a very good system if it could be taken on by an IT company

Pathman

A selection of comments made by delegates at the Supplier Forum

Benefits
UK brand company, understand very well UK NHS SQL based, open source, limitless
Colourful
Same supplier as LIMS,
List all organism isolated enabling user to use traffic light system
Easy to use highlights organism across trust
Can import system other than winpath can highlight certain items in colour
Easy to use,
Flexible reporting easy navigation appears well integrated
Clear format useful feature to track bed movements, particularly as self defined location
Scaleable database Flexible user defined query Useful for admin to run SQL defined query not predefined Add on 3rd party to SQL database
Very configurable SQL based open database Tested technology, able to define locations to area
OK for those labs William Woodard
Built onto LIMS
Would like to use this system
Simple. Easy to use, UK design. Robust and tested on UK lab system
Good for what it does Good for viewing alert organisms

Problems/barriers
Not constant update to system
Support could be better
Not compatible with NINNS no theatre connection
Needs to support alert organism surv.
Lacking in case mgt
Needs more development in alert condition & SSI
Cost of integrating with existing systems - I'd like to know
Limited specific ICN fields
No mobile option
Limited to WW database, export to Co surve is very manual, Export to reports?
No SSI surveillance, limited case management, no user audit
Felt it was early stage of development
Limited
Would needs fields defined for alert condition and case management & for alert organisms (eg HAI y/n) Comment fields are no good for analysis Not sure how users would manage complex reporting needed for SSI

General Comments
Directed at surveillance rather than ongoing control
This system is excellent for highlighting results that are needed from an ICN control perspective, unfortunately does not support alert condition surveillance, the speaker is hoping this will change in near future
Interfaces to path system but not other hospital systems
User friendly and matched to ICT reqts. Very good match to teams basic reqts
Limited facilities
No really designed for SSI surveillance at all
People are familiar with card files, and this adopts an electronic version of this Case mgt can be configured for local use
Not for us given wishes of stakeholder group
One of the best systems here
Good system
Best security seen If development came on stream would be useful option Suggested reporting use Crystal or similar needs local IT commitment, not easy s/w to learn on
Maybe satisfactory if developed further Good for alert orgs - microbiologists would love it!

10 Annex D: Terms of Reference for ASEPTIC Project

This statement was published in the CDR in February 2003.

Evaluation of Infection Control IT Systems

The PHLS Communicable Disease Surveillance Centre is required under the terms of a Service Level Agreement with the Department of Health to undertake an independent review of computerised systems for alert organism and alert condition (surgical site infection) surveillance designed for local use and evaluate whether they could be used more widely for local, regional and national surveillance in England. This project is a part of a wider service level agreement to address the public health priorities set by the Department of Health in terms of the surveillance of healthcare-associated infection.

The project will require:

- Identification of surveillance outputs and criteria for evaluation of existing systems
- Identification of systems in current use that may be suitable for wider application
- Analysis of whether these systems meet the required surveillance outputs
- Determination of the capability of software producers to provide support to a pilot study
- Determination of purchase, installation and support costs
- A report to the Department of Health by 30 June 2003 on the possible suitability of the systems for wider application, together with the resources necessary to undertake pilot testing of those recommended.

The following general principles & requirements apply:

- a common approach across the NHS, including appropriate linkages between surveillance required for hospital infection control purposes and that needed to protect the public health, should be utilised;
- the provision of a standard IT based surveillance system(s) that can be used by infection control teams will make a significant contribution to improvements in HCAI surveillance;
- the collection and analysis of data locally for local needs should be facilitated, whilst also contributing to regional and national surveillance;
- local surveillance, including the analysis and distribution of information, should be undertaken locally;
- the maximum benefit should be derived from the necessarily limited time available to infection control teams for surveillance;
- as a minimum provide a means to survey:
    - *S. aureus*, including MRSA;
    - *C. difficile*; and
    - Glycopeptide resistant enterococci (GRE).
    - with extensibility to other organisms
    - Enhanced clinical surveillance (surgical site infection surveillance in the first instance)
- confidentiality of the patient must be maintained;
- surveillance should be based on defined populations so that meaningful comparisons can be made.

11 Annex E: Stakeholder Group Membership

The project team express sincere thanks to the stakeholder group members. The project has benefited from an enthusiastic level of support and active involvement from a wide range of Infection Control Professionals throughout the project's five months duration.

A primary objective of the project was to gain advice and experiences from as many IC professionals as possible, and so membership of the stakeholder group was open to anyone with an interest in infection control within England.

Stakeholders were originally sought via the Hospital Infection Society's forum, the CDR and the project website. A number of persons also joined via networking within the IC Community. Representatives were also nominated from other professional organisations –

- ICNA - Neil Wigglesworth,
- HIS - Adam Fraise
- PHMEG - Bernadette Nazareth.

Any persons with systems that were likely to be evaluated were asked to declare their interest at the outset. We received clarification from Nergish Desai who developed the IC-Surv system in use at King's, and also Shirley Crawshaw, who was part of the team who commissioned the HAI system within E Midlands CDSC.

The project maintained an on-going dialogue and obtained feedback and validation, through use of:

- Three stakeholder meetings, (Exeter, Birmingham and London)
- Regular email discussions & validation of deliverables,
- Project web site – public site with final approved deliverables, plus a secure work-in-progress section with access limited to stakeholders and board only.
- Web conferences, and product demonstrations
- The Supplier Forum in London – open to the wider IC community

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ASEPTIC

A System Evaluation ProjecT for Infection Control

Final Report Part 2: Assessment of Commercial Systems

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CONTENTS

ASEPTIC FINAL REPORT PART 1: Main Body of Report

ASEPTIC FINAL REPORT PART 2: Assessment of Commercial Systems

DOCUMENT CONTROL 3

1 COMPARISON OF SYSTEMS 4

1.1 BACKGROUND 4
1.2 EVALUATION RESULTS 4
1.3 SUPPLIER FORUM RESULTS 5

2 APPENDICES 7

A. AICE! 7

B. EICAT 10

C. EPIQUEST 12

D. ICENTERPRISE (ICE) 13

E. ICNET 17

F. PATHMAN 19

ASEPTIC FINAL REPORT PART 3: Assessment of In-House Systems

ASEPTIC FINAL REPORT PART 4: Evaluation Framework (Limited circulation – commercial-in-confidence)

Document Control

Revision History

Release	Version	Date	Reason for Change
Draft 'A'	0.1	09 June 2003	
	0.2	23 June 2003	Changes to each supplier appendix in the light of observations following Supplier Forum. Inserted screen shots where appropriate.
Issue	1.0	24 June 2003	
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Publish	A	2 August 2003	Publish

Approvals

This document requires the following approvals.

Release	Name	Post
Draft	Sylvia Parnell	Project Manager
Issue	Sylvia Parnell	Project Manager
Publish	Andrew Pearson Georgia Duckworth	Project Board

Distribution

This is a controlled document. The master copy is held in the ASEPTIC Project File. Copies should be checked for release status before use. Controlled copies of this document have been released to:

Name	Post	Date of Issue	Version
Andrew Pearson	Chairman	2 August 2003	A
Georgia Duckworth	Project Owner	2 August 2003	A
Nick Gaunt	Project Director	2 August 2003	A
Hilary Heine	Project Board	2 August 2003	A
Meg Wiseman	Project Board	2 August 2003	A
Deidre Lewis	Project Board	2 August 2003	A
Sally Wellsteed	Project Board	2 August 2003	A

1 Comparison of Systems

1.1 Background

1.1.1 Six commercial systems for Infection Control Monitoring were identified which were judged suitable for evaluation (one system, Hybase, was excluded early on due to the fact that an English Language version was not available).

1.1.2 From a technical compliance point of view the systems were evaluated using a combination of live and web based demonstrations to a variety of audiences (stakeholders, project board members, infection control professionals and members of the ASEPTIC project team), as well as (in most cases) evaluation copies of the software being made available to the ASEPTIC project team in order that a more in depth view of the software could be taken than would normally be possible in a supplier demonstration.

1.1.3 Furthermore, the suppliers themselves were asked to submit their own evaluations of technical compliance based on a framework of questions that emerged from the published User and System Requirements.

1.1.4 These were cross referenced and validated as part of the ASEPTIC team's evaluation process to ensure that each system was fairly evaluated and to try to eliminate any misunderstanding of:

a. What the requirements actually are from the suppliers point of view and;

b. How the requirements can be met by each system from the ASEPTIC teams point of view.

1.1.5 The evaluation framework that was put in place is detailed in Part 4 of this report. It also included sections relating to the Supplier's overall capability and the Quality of their proposal.

1.2 Evaluation Results

1.2.1 The overall results and rankings of the commercial systems were as follows (from ASEPTIC evaluation framework version 5.6):

Rank	Supplier	Score
=1	EpiQuest	75%
=1	ICEnterprise	75%
3	ICNet	70%
4	AICE	66%
5	PathMan	63%
6	EICAT	29%

1.2.2 The results and rankings for individual sections were as follows:

1.2.3 User Requirements (from ASEPTIC evaluation framework version 5.6):

Rank	Supplier	Score
1	EpiQuest	87%
2	ICEnterprise	80%
3	ICNet	63%
4	AICE	60%
5	EICAT	57%
6	PathMan	42%

1.2.4 System Requirements (from ASEPTIC evaluation framework version 5.6):

Rank	Supplier	Score
1	ICNet	92%
2	EpiQuest	90%
3	ICEnterprise	87%
4	AICE	76%
5	PathMan	71%
6	EICAT	60%

1.2.5 Capability of Company (from ASEPTIC evaluation framework version 5.6):

Rank	Supplier	Score
1	AICE	74%
2	PathMan	73%
=3	EpiQuest	68%
=3	ICEnterprise	68%
5	ICNet	63%
6	EICAT	0%

1.2.6 Quality of Proposal (from ASEPTIC evaluation framework version 5.6):

Rank	Supplier	Score
1	PathMan	64%
2	ICEnterprise	63%
3	ICNet	62%
4	AICE	55%
5	EpiQuest	54%
6	EICAT	0%

1.3 Supplier Forum results

1.3.1 Further to the ASEPTIC Teams evaluation a Supplier Forum was held where all the potential Suppliers were gathered together to demonstrate their systems to an audience of Infection Control Professionals.

1.3.2 The IC Professionals were given a briefing on each system and asked to view the systems and fill in an evaluation questionnaire. They were asked about their overall view of the systems, categorising them as Very Good, Moderately Good, or Not Satisfactory.

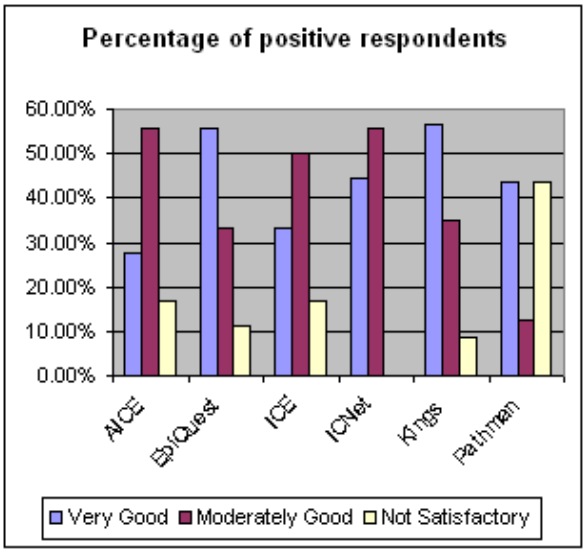
1.3.3 The eICAT system was excluded from this exercise since they had already excluded themselves from bidding by declining to submit a Response to the RFP.

1.3.4 One In-House system, from King's College Hospital (see section 3 of this report), was also included in the Supplier Forum and therefore included in the results of this questionnaire.

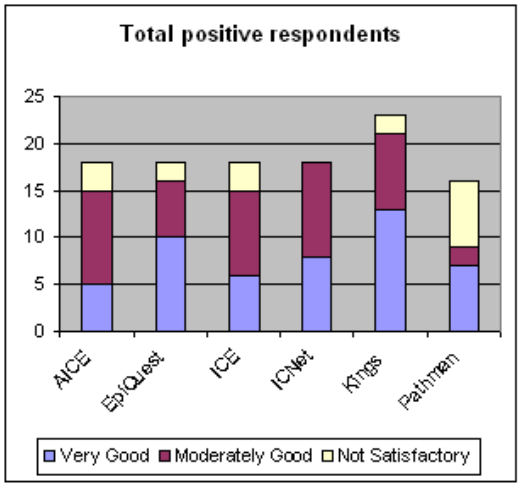
1.3.5 The results of the questionnaire are detailed below, giving the number of responses in each category, together with the percentage (of positive responses, excluding the "Unknown", that is no response) that this represents.

	Very Good	Moder-ately Good	Not Satis-factory	Unknown
AICE	5	10	3	9
	28%	55%	17%	
EpiQuest	10	6	2	9
	56%	33%	11%	
ICE	6	9	3	9
	33%	50%	17%	
ICNet	8	10	0	9
	44%	56%	0%	
Kings	13	8	2	4
	56%	35%	9%	
PathMan	7	2	7	11
	44%	13%	44%	

1.3.6 Viewed as a chart the percentage of positive respondents for each product for each category looks like this:



1.3.7 Looking at the raw numbers of respondents as a chart shows a slightly different position:



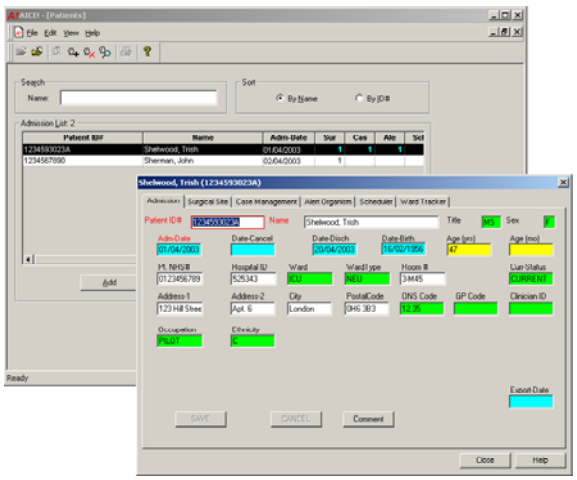
1.3.8 Clearly the King's system (discussed in Part 3 of this report) was well liked by the IT Professionals. Of the others, Epiquest and ICNet appear to lead obtaining a higher total of Very Good and Moderately Good scores than the other products. (Although Pathman scored a higher percentage of Very Goods, this was, as can be seen in the second chart above, from a lower base of actual respondents).

1.3.9 A selection of comments made by delegates at the Supplier Forum is contained in Part 1, Appendix C.

2 Appendices

A. AICE!

System Name	AICE! Millennium
Supplier Details – Software Manufacturer	ICPA, Inc. 515 South Capital of Texas Highway, Suite 240, Austin, TX 78746-4305, USA Phone +1 512-892-4594 Contact: Debbie Martin dmartin@icpa.net http://www.icpa.net
European Distribution and Support	Sananet BV Nieuw Eyckholt 282 6419 DJ Heerlen Nederland tel: +31(0)45-4001080 fax: +31(0)45-4001001 e-mail: info@sananet.nl Prinses Beatrixlaan 262 7312 AA Apeldoorn Nederland tel: +31(0)55 3558522 fax: +31(0)55 3558512 e-mail: info@sananet.nl http://www.sananet.nl Contact: Jan Ramaekers jan.ramaekers@sananet.nl
Response to RFP	ASEPTIC_RFP - AICE Response.doc
Where installed	A large number of hospitals in the USA, and 47 hospitals in the Netherlands. They claim more than 1300 healthcare facilities worldwide have purchased AICE!



a. Technology used

Based on Microsoft Access. They do offer a networked version, but again this is based on Access.

b. Functional Scope and features of interest

AICE! Is the least proscriptive of all the products that we examined.

The product allows the design of screens linked in a hierarchical fashion. Thus at the top level you would input patient details, then below that could be up to 9 "Objectives" screens. These could then be linked to "Outcome" screens, and then to a further level of "Detail" screens.

Data items can be defined and assigned to screens by the system administrator, and these can be codes (with an expandable list of acceptable code values), Text, Numeric, Time or Date fields.

Additionally, calculated fields can also be created with a calculation script to perform the actual calculation (e.g. given a date of birth and an admission date, the system could calculate age of patient at time of admission, and so on).

A number of standard reports are built in to the system, but AICE also has the ability to create new or ad-hoc reports.

Because of the flexibility inherent in the system there are possibilities for it to address many different functional areas, and in this respect it is less valid to talk about its functional scope than for the other systems surveyed. However, its ability to link different functional areas coherently is questionable.

The system has the ability to use PDAs as an input device through an additional software module – AICE! PDA Manager that allows collection of data on the PDA which can later be synchronised with the desktop application.

c. Assessment of strengths and weaknesses

The degree of flexibility in the AICE! Product leads to areas of both strength and weakness.

Strengths:

- The ability to quickly add in new data items and configure screens is obviously attractive in terms of lending a high degree of flexibility to the product. The product therefore scored highly in those areas relating to requirements to maintain and update specific items of data, for instance patient demographics and surgery details – plainly, even if a required data item did not exist AICE would be perfectly capable of being changed to incorporate new data items.
- Many of the required data items would take the form of coded lookups (i.e. drop down boxes or pick lists from which the user selects a coded item). This is one of the data types supported by AICE and is easily configurable and expandable.
- AICE has the ability to add calculated fields, as mentioned above.
- AICE has the ability to create new user defined reports and also has a wide range of pre-defined reports and supports a number of different statistical report types.
- Use of the PDAs allows easier and quicker gathering of information with less transcription errors, leading to an overall increase in quality of data available.

- Weaknesses:

- Not many users have links to a lab system, so limited experience of obtaining lab data.
- Limited role based access. The administration module that allows screens and data items to be tailored is a separate application - there is not a separate Administrator role. The coded lookups mentioned above can be amended from within AICE by any user, not just an administrator. This could lead to them being changed inappropriately.
- Data items cannot be linked using any sort of business rules. This is particularly a problem for data items that really should be linked, such as Ward and Ward Type (this is just one example, others that spring to mind might be associating a Hospital with it's region or a laboratory, and associating a procedure with it's category or OPCS code). Of course it is possible to include such items on a screen and allow the user to select them manually, but this could easily lead to inaccuracies which would later be reflected in inaccurate selection or reporting.
- Because of the hierarchical nature of the linked screens it would be very difficult to avoid duplication of data if AICE was to be used to address all aspects of the ASEPTIC requirements. For instance, if one had a screen for Alert Organism, and another for Surgical Site Infection, any test results that apply to both the Alert Organism and the causative organism for the SSI would probably have to be input twice in order to be available easily from both screens. Again, this is just one example - another might be the requirement to have a ward history, so you could construct a screen for ward history, however you might also need a "Current Ward" data item on the patient's main admissions record which would lead to duplication of data.
- Although you can define separate forms, these cannot respond dynamically to different inputs, for

instance if you had a screen that asked for an alert organism, you could not have certain mandatory fields for C diff, which are different for MRSA.

- Accessing a particular set of patients from the front screen is cumbersome. You can order by name or ID, and type in a partial name to get to a patient, however you can't drill down from reports. Therefore if you wished to implement Case Management you would need to first have a line listing report that would identify those patients currently subject to Case Management (perhaps by a Y/N data field on the patients main record). Then you would need to access each of these patients separately from the front screen. Since all patients remain in the database (and therefore on the front screen list) until they are deleted this could become a long and unwieldy list.
- Export to Excel is possible from the "Save as" menu option, but this outputs a .txt file which then has to be imported to Excel.
- The underlying database is MS Access - this would lead to limited scalability. The demonstration system appeared not to support any concurrency, although the RFI indicated up to 5 concurrent users.
- No calendar/scheduling facility built into the product.
- Does not appear e-GIF compliant. Windows interface, and a proprietary data import facility which is not XML based.

B. Eicat

System Name	EICAT
Supplier Details – Software Manufacturer	eICAT Princess Alexandra Hospital, Ipswich Rd, Woolloongabba, Queensland, 4102 Australia Phone +61-7-3240 7706 Contact: Merrilyn Curtis e-mail: info@eicat.com http://www.eicat.com
Response to RFP	ASEPTIC_RFP_Response.pdf Nb. This response indicated that they would not be in a position to be considered to be taken forward to a pilot, so the following brief system description is included for completeness because we did study the system, however it will not form part of any recommendation.
Where installed	Approx 70 hospitals in Australia.

a. Technology used

Visual Basic

Microsoft Access

Excel

Seagate Crystal Reports

b. Functional Scope and features of interest

eICAT performs some areas of Alert Organism Surveillance and Alert Condition Surveillance, but does not cover Case Management.

Nice, easy to navigate interface with modules laid out in a tree structure

The system has the ability to download data to PDA's for recording of Surgical Site Infection details.

Although outside the scope of our particular User Requirements specification, this was the only system surveyed that had modules aimed specifically at monitoring Occupational Exposure to infections and Staff Health (Pre-employment screening, Allergies, Vaccinations etc.).

A wide variety of reports are available as standard with the system.

c. Assessment of strengths and weaknesses

Strengths:

- Nice clear navigation around the system by means of the tree view.
- Comprehensive security module – 10 levels of security are available which can be tailored so that particular levels are assigned to individual nodes on the "tree view". Users are then assigned a security level and can therefore only see those parts of the system that are available to people at or below their level of security.
- Modules for Occupational Exposure and Staff Health (although these are outside of our own User Requirements).
- Strong reporting, including a wide range of denominator values for statistical reporting which can be set by time period.
- PDA facility for remote data entry.

Weaknesses:

- Does not support Case Management. (Suppliers own assessment, confirmed by reference to evaluation software).
- Only partly supports Alert Organism Surveillance. Does not, for instance, allow access to or input of test results and antibiotic sensitivities.
- Only partly supports Alert Condition Surveillance. Allows logging of surgical procedures for observation (but does not store all the expected data for NINSS etc), does not appear to support any other form of Alert

Condition by means of local data items.

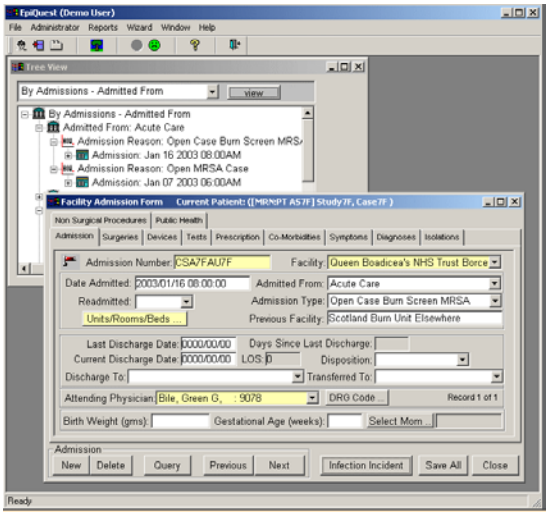
- The underlying database is MS Access - this would lead to limited scalability compared to that of the more "industrial strength" client/server relational database products such as Oracle, Sybase and Microsoft SQL Server. This has been acknowledged by some other suppliers who have started with products based on Access, but have later, due to experiences of implementing such products, been forced to port them to the more advanced technologies.
- Although there is a basic Ad-hoc report writer, most ad-hoc reporting would be by means of Seagate Crystal Reports or Excel. A separate licence for Crystal Reports would be required in this case (we assume Excel is more or less standard).
- Not e-GIF compliant; Windows indterface and import functionality from other systems is weak and not XML based.

C. EpiQuest

System Name	EpiQuest
Supplier Details – Software Manufacturer	EpiQuest, LLC 96000 Overseas Highway, P-2 Key Largo, Florida 33037, USA Phone: +1 305 853 5574 Fax: +1 305 853 5574 Contact: Bonnie Taggart e-mail: epiquest@bellsouth.net http://www.epiquest.com
UK distributor	Howard Thomas Phone: 01480 862080 01480 862084 e-mail: howardt@oraldent.co.uk
Response to RFP	ApproachAP2.xls Implementationref5.1AP5.xls PilotpriceAP4.xls EQICAEng8.doc InfContrlTrk7.doc PilotstageAP1.doc Track1AP6.doc TrainingAP3.doc
Where installed	100's of licences claimed, in USA, Canada and UK. We understand that the UK client has not yet implemented the system.

a. Technology used

Client/Server architecture based on Sybase as the underlying database, i.e. thick client – processing at the client end, talking to database server.



b. Functional Scope and features of interest

EpiQuest has modules which cover Alert Organism Surveillance, Alert Condition Surveillance, and to a lesser extent Case Management.

The user is able to define different alert organisms for particular patients, log the results of tests, and indeed associate different organisms with actual infection incidents.

Alert condition surveillance is enabled, with the system able to record details of surgical procedures and any subsequent Surgical Site Infection.

The system has the ability to associate a number of factors to an infection incident (for instance surgical procedures or devices) for future analysis.

The system has the ability to perform routine case management, however the mechanism for including/excluding particular patients from Case Management could be better (see below).

The product is particularly impressive in certain key areas such as import functionality, having the ability to configure import profiles and map the contents of an import file to the data structures within EpiQuest itself. Since any system that is rolled out will ultimately need to interface to other disparate Laboratory, Patient Admissions and Theatre systems this is a particular feature of interest. In principle it could obtain provisional and confirmed results if the lab system can export.

The system also has an underlying data dictionary that is extensible, with the ability to create user defined forms and reports, thus providing a degree of flexibility.

Partially e-GIF compliant. Currently does not have a browser interface, but can export to XML via middleware such as Excel XP which has a "Save as XML" feature.

c. Assessment of strengths and weaknesses

Strengths:

- Particularly good role based access model. Roles can be created and tailored so that each role may have access to a different combination of user functions. Each individual user is then assigned a role appropriate to their function. New roles can be created easily.
- Ability to create multiple Facilities (Hospitals), and within this Wards (including Ward Type) and bed labels – thus could be used to track individual patient movements right down to bed level.
- Import facilities – as mentioned above users are able to define different import profiles, there is a wizard available to help with this process. Thus the system is adaptable easily for different interface requirements.
- Wizard available to assist with inputting data for infection incidents.
- Efficient search/query facilities, allowing a number of different selections to be concatenated together to produce the required result set.
- Export to Excel – can be done in several ways. As well as the export menu function (which is limited to exporting the contents of a single table), any report or form, including user defined, can be saved using the "Save As" option.
- Wide range of pre-built reports available as part of the package, including statistical reports with a range of denominator values.
- Ability to extend the data set, and create user defined forms and reports.

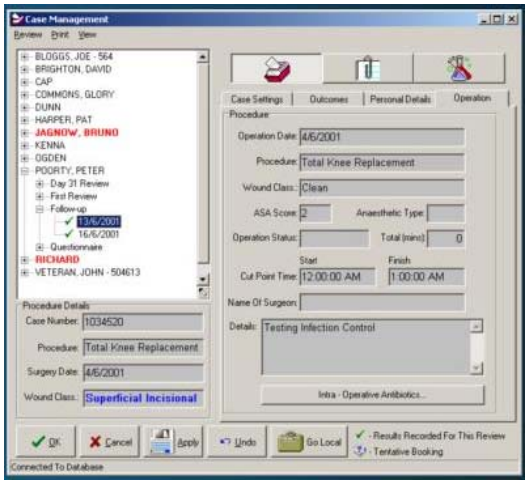
Weaknesses:

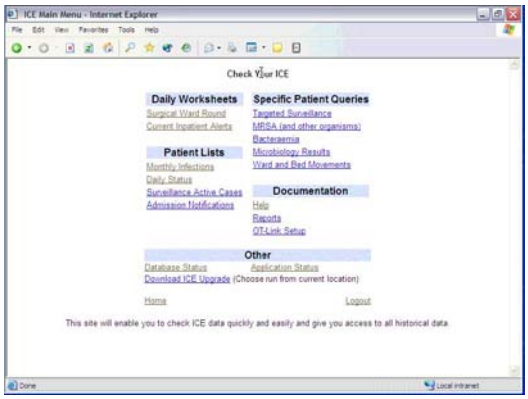
- Whilst the data set is extendable, the new data items can only be used on user-defined forms, new data items cannot be added by the users to the main controlling screens (Patient demographics, Admissions and Infection Incidents).
- Selecting and identifying Patients for Case Management within EpiQuest would not be straightforward. They suggest using the "Admission Type" field to hold this information, that is create a code for "Open MRSA Case". This will work, but is messy – this data item is also used for other purposes, for instance whether this was an emergency admission or not, therefore this will conflict with these other uses – the user may want to know both that it was an emergency admission, and that the it is an Open MRSA case.
- Somewhat inconsistent user interface within the dialogues for report selections.
- Whilst a range of denominators are available for statistical reporting, does not have the ability to create entirely new denominators.
- Epiquest has a significant American feel.
- The user interface appears complex and does not entirely conform to standard windows conventions.
-
- No calendar/scheduling facility built into the product.

D. ICEnterprise (ICE)

System Name	ICEnterprise (ICE)
European	

Distribution and Support	Prism Risk Management Limited 26, High Street Corsham Wiltshire SN13 0HB Jim Waters, Managing Director Phone No.: 01249 712158 Mobile: 07900 495086 Contact: Jim Waters jimw@prism-risk.co.uk sales@prism-risk.co.uk www.prism-risk.com www.repat.com.au/ice/index.html
Response to RFP	
Where installed	Repatriation General Hospital, Adelaide and Flinders Medical Centre, South Australia.





a. Technology used

Client/Server architecture based on Sybase as the underlying database. Written in Delphi.

Parts of the application have also been web enabled using Active Server Pages.

b. Functional Scope and features of interest

ICE covers the area of Case Management particularly well, and is capable of performing some parts of Alert Organism Surveillance and Alert Condition Surveillance as well.

The product has been designed from the ground up with the interfaces to other systems in mind. This has led to it not scoring as highly in some areas as perhaps it

could because the capability for manual update of records is reduced to a minimum, since in the environment in which the product currently operates most of this data would be fed from other systems (Patient Administration, Microbiology and Theatre systems).

The software's authors, however, do recognise that not all organisations will be as advanced in terms of having such systems in place and easily interfaced, and have instituted a program of providing manual update facilities. However this is not in place at present, apart from the ability to update patient demographics, which is currently available, but not in its finalised format.

Notwithstanding this, the fact that the product has been built with such an emphasis on interfacing capabilities does represent a feature of particular interest. Any product that is adopted will undoubtedly be required to interface to a wide variety of different systems, so technology which has been built with the ability to insert "plug and play" interfaces in this way has particular strengths.

ICE has a particularly interesting way of dealing with alert conditions and subsequent case management. At the interface level (i.e. when data is drawn in from other systems) a "decision support" module can be set to select procedures for surveillance based on a set of rules. Similarly rules can be set for other alert conditions, for example admission from a nursing home, patients over a certain age, admissions to a particular unit.

Patients meeting these criteria are then presented to the user who can select them for surveillance or not.

An automated scheduling facility then plans surveillance tasks based on IC best practice guidelines. Events are generated within the system for each case dependent on which stage surveillance is up to for that patient (for instance first review, follow-up, day 31 review, questionnaire, telephone follow-up).

Of all the systems we reviewed, this was the only one that had this sort of pro-active, workflow related functionality.

The system also has an interesting ability to highlight cross-infections. Patient movements can be tracked down to bed level, and a report can be produced which generates a timeline of ward and bed movements for selected patients to determine potential cross-infection occurrences. The report is colour coded to highlight these.

c. Assessment of strengths and weaknesses

Strengths:

- For hospitals where robust PAS, Microbiology/Lab and Theatre systems already exist, with the ability to interface to other systems, ICE represents a very attractive prospective Infection Control system. Its ability to automatically interface, sometimes in real time, to these systems should cut down a lot of manual data entry and duplication of data. This would allow the infection control practitioners to spend more time on their core duties and less on administration. (Conversely this could be seen as a weakness for those hospitals that do not have such systems in place, see below).
- Where such systems are in place, their data can be available to ICE almost instantaneously. In the current implementation of ICE at the Repatriation General Hospital, for instance, test result data is instantly available to ICE as soon as it is entered in the source Lab system.
- The system has the ability to run on a laptop which can be disconnected from the database in order to gather data on the ward, then reconnected to update that data to the database.
- Excellent role based access, with the capability to create/amend roles which are then assigned to users. The roles can be defined to have various levels of access to "Objects" (Screens, reports, buttons, menus, alerts etc.) within the system.
- Excellent workflow capabilities driving patient reviews and follow-ups.
- Very good executive reporting of infection rates through graphs showing trends over time (with exponentially weighted moving averages), and comparing these to Risk indices and expected rates.
- Web enabled for areas of the system that are likely to require remote

access – reports and updates available within the categories of Daily Worksheets, Patient Lists, and Specific Patient Queries. Could also be available on a PDA. This gives an alternative to the disconnected method of working when doing ward rounds if a web connected PC is available on the ward itself.
- ICE is largely e-GIF Compliant, with many of the screens being browser enabled, and the interface technology can use XML, and indeed HL7.

Weaknesses:

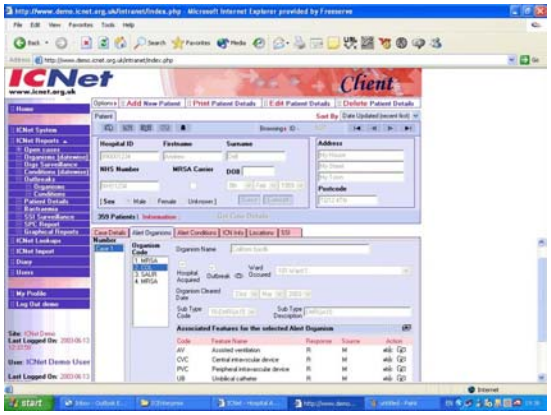
- As the ICE software stands ***at the moment***, the lack of ability to manually intervene to input data (apart from that required for routine case management, SSI surveillance, and patient demographics), would mean that the system would not be appropriate for those hospitals which do not have appropriate PAS, Lab and Theatre systems which could feed into ICE.
- Whilst the system has obviously been built with good software engineering practice in mind, as evidenced by the thoughtfully constructed interface technology and the careful design of re-usable software objects (for instance the search facilities), it is not a "shrink-wrapped" application which can be just dropped in to a hospital and work from day 1. The supplier's own assessment of its installability indicated that this would probably be one of the more difficult of the products reviewed to install in terms of time required and technical complexity.
- Built in reports (apart from the executive summary reports mentioned above) seem to be limited. Having said that, the reports that do exist are created using Seagate Crystal Reports, and other required reports could also be created relatively easily using this tool and added to the reports menu.

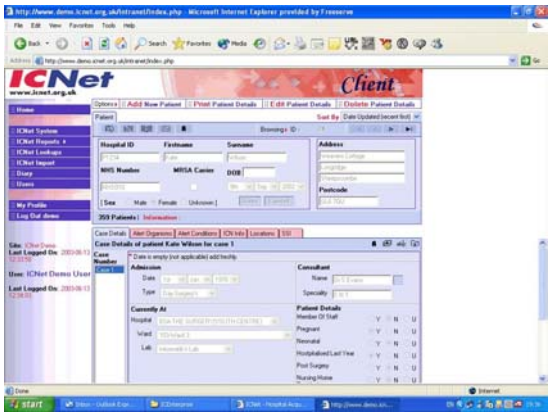
E. ICNet

System Name	ICNet
Supplier Details – Software Manufacturer	ICNet Ltd The Meal House, Whittington, Cheltenham, Glos, GL54 4HA, UK Contact: Katie Belton Phone:01242 821000 Fax: 01242 821122 e-mail: katieb@epinet.co.uk http://www.icnet.org.uk
Response to RFP	ASEPTIC Procurement Response_v1.doc Appendix_A_Costs for Pilot.doc Appendix_B_Standard ICNet Pre-Installation Questionnaire_v2.doc
Where installed	Llandough Hospital, Wales, Victoria Infirmary and Southern General Hospital, Glasgow, and a number of hospitals in the Ayrshire/Arran region in Scotland.

a. Technology used

Web based technology, written using PHP and the MySQL open source database product.





b. Functional Scope and features of interest

ICNet covers Alert Organism Surveillance, Alert Condition Surveillance and Case Management.

The product scored particularly well on Alert Organism Surveillance, coming out top on that section of all the commercial products surveyed.

ICNet also scored well on Case Management, only really lacking a scheduling facility (a rudimentary diary object has been included, but this was not felt sufficient to score well on that particular point).

Alert condition surveillance is supported, but this section was slightly marked down because of the comparative inflexibility of the SSI screen. Programming resources would be required to amend this to include new data

items, and some of the existing data items, although table driven, could not also be amended by the user (linking of Surgical Procedure to OPCS codes).

The product is the only one of those surveyed that has been built exclusively for web deployment, all of the others are based on standalone or client/server Windows models. Where the other products have been web enabled this has been after the initial Windows development rather than as a development from the start, and only part of the application has been re-written for the web.

This would, of course, make deployment of ICNet much more straightforward, once installed it would be available to any computer with a web browser.

The system is presented as a single web page which is attractive and very easy to navigate – a menu in a panel at the left hand side gets you easily to Reports, Lookups (configurable tables for items such as alert organisms, wards, alert conditions, consultants etc.), Imports and User maintenance, whilst in the main system screen the top of the page clearly displays the patient demographic details and the lower section has tabs for Case Details, Alert Organism, Alert Conditions, ICN Info, Locations (ward history), and SSI.

A consistent interface for adding, amending and deleting items is maintained throughout, and search and filtering facilities are good, allowing selection of patients on a wide range of criteria.

A particularly nice concept is that of "Associated Features". These are user defined features which can be associated with both Alert Organisms and Alert Conditions. Thus an example of an associated feature for an alert organism might be an antibiotic type, against which can be recorded the results of the particular antibiotic sensitivities.

c. Assessment of strengths and weaknesses

Strengths:

- Scored particularly well for Alert Organism Surveillance. Easy to add in new organisms if required, and to characterise those by means of the "Associated Features".
- Clear easy navigation around the system, consistent interface, good searching and filtering criteria. These all lead to enhanced ease of use.
- Web deployment. This would mean that there would be no client software installation issues, all that is required is a browser.
- Good set of standard reports available with a wide range of selection criteria, includes some graphical and statistical process reports.
- Many user amendable lookup tables for such things as Alert Organisms and Alert Conditions, together with their Associated Features make it very easy to configure large parts of the system.
- System built with e-GIF compliance in mind.

Weaknesses:

- Data import facilities appear lacking in flexibility, and would require programming effort to accommodate different import file types. It currently only accepts confirmed results and not provisional. Since, only the alert organism results are downloaded as it currently stands, there would be no way to use the system to identify organisms that are "potentially on alert".
- Limited role based access to the system. Really only supports Administrator and User roles.
- Any reports that are required but do not form part of the supplied set would require programming effort to produce – no built in report creation facility.
- Export to Co-surv and NINSS would require programming.
- There is no mechanism to merge duplicated patient records.

F. PathMan

System Name	PathMan
Supplier Details – Software Manufacturer	Sysmed Ltd Thorpe Court, Delta Way, Crabtree Road, Thorpe, Egham, Surrey, TW20 8RX, UK Contact: Matthew Fouracre Tel: 01784 744111 Fax: 01784 434807 e-mail: matthew.fouracre@sysmed.co.uk http://www.smsol.com
Response to RFP	Sysmed response to ASEPTIC RFP.doc @Licence Agreement for Software (2000).doc @Standard Terms for Support Services (2000).doc @Standard Terms of Business (2000).doc
Where installed	Royal Liverpool Hospital (only current site with the SQL Server version of Pathman) Earlier versions of the software and future planned installations of the latest SQL version creates a PathMan Infection Control client base of a dozen sites. These are mainly situated in London and the South East but do cover the whole of England with sites in Gateshead and Staffordshire in the North

a. Technology used

Client/Server architecture based on SQL Server as the underlying database, i.e. thick client – processing at the client end, talking to database server.

b. Functional Scope and features of interest

Pathman addresses a large part of Alert Organism Surveillance, but does not cover Alert Condition Surveillance or most of Case Management.

The supplier is a major provider of Laboratory Information Management Systems, and Pathman is closely coupled to it's WinPath system.

Data on laboratory tests for organisms is passed from WinPath into Pathman for analysis. No manual entry is required or allowed.

Although interfaces to other systems could theoretically be designed and built this would require programming expertise. However, a large number of interfaces to WinPath do exist, so a way around this would possibly be to include modules from the WinPath package in an overall package for deployment.

c. Assessment of strengths and weaknesses

Strengths:

- What it does, it does well. Batch interfaces of results from the lab system are passed into Pathman for review.
- Parameters can be set to specify which organisms are of interest and these can be easily filtered out for the attention of the Infection Control Practitioner.

- User defined colour coding can be applied to highlight those patients and results that are of particular interest.
- Good security module with up to 9 different security levels, and password parameters to support minimum password lengths, case sensitivity, mixed alpha/numeric characters and lock out after n failed attempts to access the system.

Weaknesses:

- Does not support Alert Condition Surveillance.
- Support for Case Management is limited.

South Devon Health Informatics Service
N15 ITTC Building 1,
Tamar Science Park,
Plymouth, Devon
PL6 8BX

ASEPTIC

A System Evaluation ProjecT for Infection Control

Final Report Part 3: Assessment of In-House Systems

Release: Publish | Version A

Authors: Andrew Dell

Owner: South Devon HIS

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Project Manager

CONTENTS

ASEPTIC FINAL REPORT PART 1: Main Body of Report

ASEPTIC FINAL REPORT PART 2: Assessment of Commercial Systems

ASEPTIC FINAL REPORT PART 3: Assessment of In-House Systems

DOCUMENT CONTROL 3

1 COMPARISON OF SYSTEMS 4

1.1 BACKGROUND 4
1.2 EVALUATION RESULTS 4
1.3 SUPPLIER FORUM RESULTS 4

2 APPENDICES 6

A. IC-SURV 6

ASEPTIC FINAL REPORT PART 4: Evaluation Framework (Limited circulation – commercial-in-confidence)

Document Control

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Approvals

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Distribution

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Deidre Lewis	Project Board	2 August 2003	A
Sally Wellsteed	Project Board	2 August 2003	A

1 Comparison of Systems

1.1 Background

1.1.1 Only one In-House system was evaluated in detail, this was IC-Surv developed by the Infection Control Team at King's College Hospital in London.

1.1.2 The ASEPTIC Team did look at the HAI system that is under development in Leicester by the East Midlands CDSC, but access to that system was very restricted, meaning that the team were not able to perform a detailed evaluation. It did appear, however, that the system (which is still under development and not yet actually in use) did not add anything over and above other systems that have been evaluated.

1.1.3 Several other systems were identified in the early stages of the project, but these all dropped out of the evaluation process very early on.

1.1.4 From a technical compliance point of view the King's system was evaluated in much the same way as the commercial systems, using a combination of live and web based demonstrations to a variety of audiences (stakeholders, project board members, infection control professionals and members of the ASEPTIC project team). An evaluation copy of the software was made available to the ASEPTIC evaluation team.

1.1.5 The evaluation framework that was put in place is detailed in Part 4 of this report. It also included sections relating to the Supplier's overall capability and the Quality of their proposal.

1.1.6 Recognising the limitations that they would have, In-House suppliers were not requested to submit full answers to the RFP in the same way that commercial suppliers were. This is reflected, therefore in the scores for Supplier Capability and Quality of Proposal, and consequently in the overall score.

1.2 Evaluation Results

1.2.1 The overall results for the In-House system that was evaluated was as follows (from ASEPTIC evaluation framework version 5.6):

Point of Compliance	Score
Compliance vs User Requirements	56%
Compliance vs System Requirements	75%
Capability of Supplier	0%
Quality of Proposal	0%
Overall Score	33%

1.3 Supplier Forum results

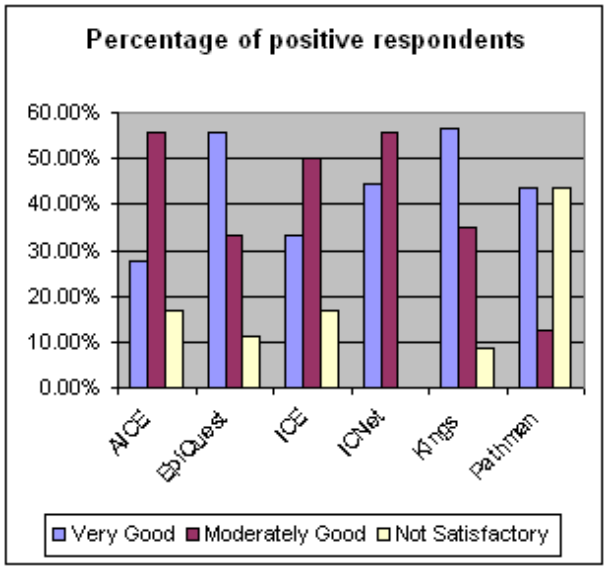
1.3.1 Further to the ASEPTIC Teams evaluation a Supplier Forum was held where all the potential Suppliers, including King's, were gathered together to demonstrate their systems to an audience of Infection Control Professionals.

1.3.2 The IC Professionals were given a briefing on each system and asked to view the systems and fill in an evaluation questionnaire. They were asked about their overall view of the systems, categorising them as Very Good, Moderately Good, or Not Satisfactory.

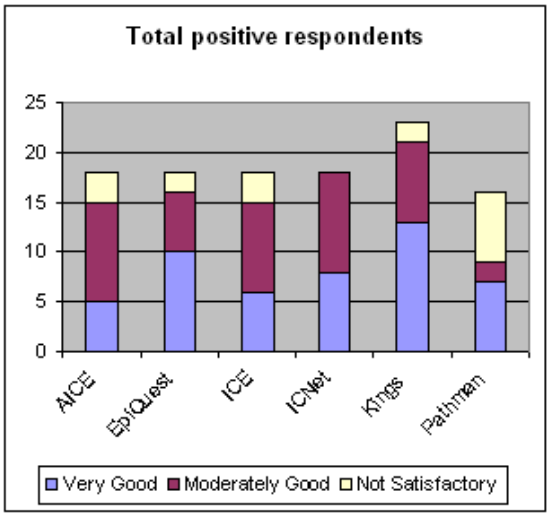
1.3.3 The results of the questionnaire are detailed below, giving the number of responses in each category, together with the percentage (of positive responses, excluding the "Unknown", that is no response) that this represents.

	Very Good	Moder-ately Good	Not Satis-factory	Unknown
AICE	5	10	3	9
	28%	55%	17%	
EpiQuest	10	6	2	9
	56%	33%	11%	
ICE	6	9	3	9
	33%	50%	17%	
ICNet	8	10	0	9
	44%	56%	0%	
Kings	13	8	2	4
	56%	35%	9%	
PathMan	7	2	7	11
	44%	13%	44%	

1.3.4 Viewed as a chart the percentage of positive respondents for each product for each category looks like this:



1.3.5 Looking at the raw numbers of respondents as a chart shows a slightly different position:

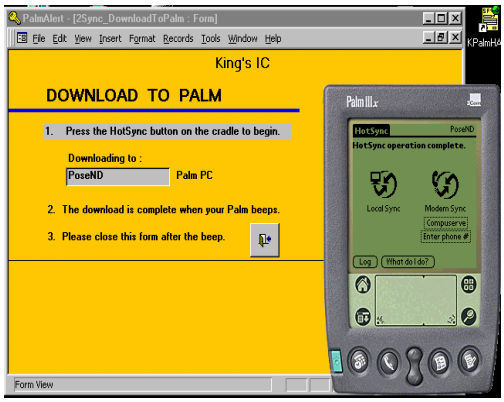


1.3.6 The King's system was clearly well liked by other IC professionals who appreciated the fact that it was produced by a working Infection Control Team, and focussed on the way that the IC Team works. However many comments were made about the difficulties that would be presented in terms of both technical platform and support in taking this system to a wider audience.

2 Appendices

A. IC-Surv

System Name	IC-Surv
Supplier Details – Software Manufacturer	King's College Hospital, Denmark Hill London SE5 9RS Contact: Nergish Desai e-mail: nergish.desai @kingsch.nhs.uk
Response to RFP	None
Where installed	King's College Hospital



a. Technology used

The system is based on Microsoft Access. Data is also collected on Palm PC's using Puma Technologies Satellite Forms.

b. Functional Scope and features of interest

The system covers Alert Organism Surveillance and Case Management, but not Alert Condition Surveillance.

The system interfaces to the King's College Hospital Microbiology Laboratory system, and on a twice daily basis downloads data about Patient Demographics, Specimen details and Cultures and Sensitivities.

The criteria for download is based on a table containing organism type and resistance pattern (bug + drug) – this is easily amendable to incorporate newly identified resistance patterns.

Reports of new patients and specimens and current inpatient activity are available.

Data is then downloaded to Palm PC's (handheld computers or PDA's) that the Infection Control Nurses take on to the wards to log Admission data and Ward changes, Infection status, Diagnosis and Advice given, as well as isolation precautions.

This data is then uploaded again to the main IC-Surv system and merged with the patient's main record.

In this way advice given on the ward is made easily available to all the IC Team.

c. Assessment of Strengths and Weaknesses

Strengths:

- Tight coupling with the hospital microbiology system allows interim and confirmed test result data to be readily available quickly.
- Use of the PDA's allows easier and quicker gathering of information with less transcription errors, leading to an overall increase in quality of data available.
- PDA screens have been designed to mirror the screens in the main IC-Surv system, leading to lower training needs for the system to be adopted.
- Nice model for deciding "Alert patients" – the concept of an Alert Organism matrix (bug + drug combination.
- Good range of standard reports available, including monthly feedback to wards, Quarterly feedback to Care Groups and the Infection Control Committee, and Annual Infection Control Report to the Trust.

Weaknesses:

- Does not support Alert Condition Surveillance and Surgical Site Infection details. These are a major part of the User Requirements and would take some considerable effort to incorporate into the system.
- The underlying database is MS Access - this would lead to limited scalability compared to that of the more "industrial strength" client/server relational database products such as Oracle, Sybase and Microsoft SQL Server. This has been acknowledged by some other suppliers who have started with products based on Access, but have later, due to experiences of implementing such products, been forced to port them to the more advanced technologies.
- Data import is currently only from the King's system, and would presumably require programming effort to produce import functionality from other systems.
- Reports that are not available would require programming effort to produce.
- Extension of the current data set would not be possible without programming effort to amend the underlying database schemas and the appropriate forms and reports. Whilst this is relatively straightforward in Microsoft Access for an experienced user, it does not constitute an end-user activity, and would therefore require a higher level of technical knowledge than may be available to the IC unit.
- Whilst the team that have produced this system have done a very good job In-House, they do not have the commercial infrastructure in place to support an extended pilot phase, possibly in several hospitals, followed by a major role out to potentially several hundred hospitals.
- Not e-GIF compliant - no browser interface, and customised downloads (not XML).