Evaluation Report on the Pilot Project:

Electronic Communications between the Southern Health Board and General Practitioners

Southern Health Board
Bord Sláinte An Deiscirt

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Evaluation Findings

The pilot project on Electronic Communications between the Southern Health Board and General Practitioners, establishing electronic laboratory messaging, was a success.

As a result of electronic laboratory messaging:

- Results arrived in general practices two days earlier than by post;
- Results integrated into the individual patient record;
- The workload of general practitioners and their support staff decreased;
- Telephone enquires to hospital laboratories from general practices decreased;
- General practitioners and their support staff reported a positive effect on patient care in terms of:
    - quicker diagnosis;
    - more effective monitoring and treatment;
    - improved quality of the patient record;

In a questionnaire survey of the pilot general practices, ninety five percent of respondents judged the project a success and ninety percent believed it should be rolled out as a service to all general practitioners. The GP Software Vendors, hospital laboratories, Management Services staff and Primary Care Unit staff all reported the project as successful.

Recommendations

The laboratory messaging service should be rolled out as a service to all general practitioners and their support staff in the Southern Health Board.

The Southern Health Board should work to expand the range of healthcare messages exchanged between primary and secondary care.

Outstanding Issues

Work should continue with the GP Software Vendors with a view to receiving an acknowledgement message back from the Vendors to indicate they have received and can process each message file.

A quality audit comparing paper with electronic results, should take place in the first quarter of 2004 with a view to inviting general practitioners to accept cessation of printed reports.

The frequency of file downloads for practices should be increased to three a day and these should be made available at 11.30, 16.00 and 17.30.

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Description of the project

The Southern Health Board, in cooperation with General Practitioners and GP Software Vendors, commenced a pilot project on electronic laboratory messaging in May 2003. An evaluation of the pilot project took place in September and October 2003. This document is the evaluation report. Electronic laboratory messaging facilitates rapid communication of laboratory test results to general practitioners for viewing and integration into their patient records.

Forty one general practitioners in sixteen pilot sites were invited to participate in the pilot phase. These practices were from Counties Cork and Kerry, were a mixture of single handed and group practices, urban and rural, and had six different GP Practice Software systems in use. The GP Software Vendors represented were:

- Health One
- GP Mac
- GP Clinical
- Medicom
- Remedy
- Apollo Medical

Multi Agency Project

The provision of laboratory messaging is a joint project between the Southern and South Eastern Health Board. Structures are in place to communicate and coordinate between the two boards the information gained and lessons learned from the pilot phases in both boards. The projects share the same laboratory information systems, middleware, Health Boards Executive (HeBE) messaging standard and GP Software Vendors.

Implementation

During the five months of the pilot phase, laboratory messaging was implemented in 11 of the 16 pilot sites. Three sites were unable to implement because their practice software system had not developed a message viewing or integration capability. In addition, one site moved practice and one site needed a major hardware upgrade and this delayed their participation in the pilot phase. In all five GP Software Vendors participated in the pilot phase, four of them providing viewing and integration of results to their practices and one Vendor providing view only facilities for its GPs.

Technical Architecture

The technical architecture of the project involved cooperation between the Health Board laboratories in Cork and Tralee, Anglia Middleware, Health Board IT staff and GP Software Vendors. The flow of data can be described as follows: Results for the pilot practices output from the iSoft APEX laboratory information system in a format called PMEP (Pathology Messaging Enabling Project). PMEP was developed in the UK for laboratory messaging. The Anglia ICE middleware product gathers the results together by practice and formats the results in HL7 (Health Level Seven) version 2.4 with XML (Extensible Markup Language) encoding. The middleware forwards the XML files twice a day to a secure mail server on the SHB network. The secure mail

servers sends a notification email to the practices to let them know that a results files is available for download and gives them a unique Web address to access the file. At 11.30 and 16.30 each day the practices pick up their email, click on the unique address to take them to a secure download page, authenticate themselves and download the results file securely under SSL (Secure Sockets Layer). They point their practice software to the downloaded XML file and this allows them to view the laboratory results and integrate the results into the individual patient electronic record.

HeBE Standard

The message files transmitted to GP practices in this project are the HL7XML (Health Level Seven Extensible Markup Language) format in line with the Health Boards Executive (HeBE) National Laboratory and Radiology Messaging Standard.

Volume of messages

The volume of laboratory result messages transmitted to the pilot practices over the period May 21st to October 20th 2003 (5 months) was as follows:

Discipline	Number of Results
Biochemistry	8,350
Haematology	4,563
Microbiology	2,125
Total	15,038

Feedback from Stakeholders

Formal and informal feedback was requested from all the stakeholders. Here are the details:

Laboratory staff in Cork and Tralee

The laboratory staff in Cork University Hospital have been central to the success of the project. Major work was undertaken by the laboratory IT staff in setting up the messaging and managing the middleware. It is not possible to document a reduction in telephone enquiries to the laboratory because the number of GPs in the pilot phase is too small. The ongoing monitoring of the middleware is not labour intensive but setting practices up on the middleware and troubleshooting problems that arise takes significant time and resources.

The laboratory staff in Tralee General Hospital were pleased with the project. They noted no significant increase in workload and noted a reduction in phone enquires from one of their large group practices. The final comment in the evaluation from Tralee laboratory was:

> *"The project as a whole has been very successful and staff and GPs alike are satisfied with its effect. I hope the rollout continues as quickly as is possible."*

GP Software Vendors

The GP Software Vendors were asked to complete a questionnaire on the pilot project, see Appendix A. Three of the six vendors completed the questionnaire. The questionnaire asked for comments in the areas of: support of GP Pilot sites, training, problems encountered, benefits gained, lessons to be learned, message delivery, structured file format, roll out, communications with health board staff, cessation of printing and preference for additional message types.

The tone and content of the replies from the three GP Software Vendors was positive. Overall they indicated no problems with the pilot phase. Here are examples of comments from the three GP Software Vendors:

> *Question: "What is your experience of the workload of messaging support issues generated by the pilot practices?"*
> *Answer: "Very few issues arose. Problems were mainly related to modem & email difficulties and were soon resolved with setup tweaking and by practice of staff members."*
>
> *Question: "What are your views on the structured HL7XML files available in the Southern Health Board?"*
> *Answer: "The best in the Country. The SHB HL7 implementation was first class. It appears to me that there was a close cooperation at all times between the project coordinator, the middleware and the users/software suppliers. This was the critical success factor."*

Question: "Have you any suggestions or general comments to make on the project?"
Answer: "The SHB has to be complimented in taking the lead role in implementing HL7 messages under the HeBE standard and making them available to GP's in their region. We hope the other Health Boards follow SHB lead and implement the same structured HL7XML files as the SHB."

One GP Software Vendor had problems, in the initial stage of the pilot, with integration of the message files in their reference site. Discussions took place with the Vendor and attempts by the Vendor to solve the problem at the practice and software level were successful.

Health Board IT staff

The Management Services staff in the Southern Health Board worked with the middleware company to configure servers and networks for the project. They also provided a secure delivery mechanism so the pilot sites could download their message files. They have been centrally involved in monitoring and maintaining the quality of service provided to pilot sites. Management Service Staff monitor systems in the Southern Health Board 24 hours a day and no major technical issues arose during the pilot phase.

Primary Care Unit

Staff in the Primary Care Unit were centrally involved in the project in terms of information gathering from GPs, training, ongoing communication with and support of practices and GP Software Vendors, and the evaluation process. During the five month period of the pilot phase, the Primary Care Unit logged seven support calls from practices and Vendors. Most of the support calls related to issues with message files which required them to be resent by the lab.

Quality Audit

In September 2003, seven pilot practices carried out a quality audit of the electronic laboratory results. Practices undertook two tasks.

1. For one week they kept track of laboratory requests and noted when the paper and electronic results came back.
2. They compared 100 paper and electronic reports and noted any discrepancies.

Practices found that, on average, they received the paper report by post between two and three days after the arrival of the electronic result. Some of the more rural practices received paper reports by post up to six days after the electronic results.

The comparison of paper and electronic reports generated issues in three areas:

Logical Test Group Comments

Some comments generated by laboratory staff were displayed on the paper result but not electronically. These included comments such as: "Normal tumour marker levels do not rule out malignancy." This problem relates to report template design issues and has been resolved.

Middleware Issue

On a small number of thyroid function tests the normal range for the test result was not given. This problem was communicated to the middleware company and has been resolved.

Display of Specimen Source

Results that indicate a specimen source, for example, "swab left foot ulcer" are not displayed by one of the Practice Software Systems even though the information is contained in the electronic results file. This problem was communicated to the Software Vendor and solved.

The quality audit by pilot practices was extremely useful and should be repeated in the first quarter of 2004 with a view to supporting a decision on the cessation of printing of paper results.

Cessation of printing

Cessation of printing can bring about efficiency savings and save money. This is a key target for the project. It is dependent on providing an efficient, accurate, timely and consistent service to general practices. A dual period of paper and electronic results for six months is needed to allow confidence to build in both the laboratories and general practice. Quality audits comparing paper and electronic results should continue. The results of the quality audits will feed back to the messaging team and allow fine tuning of the system. The decision to dispense with the paper results should be taken at the practice level having due consideration of all of the issues pertaining. In order to facilitate practices arriving at this decision, a Southern Health Board position paper should be prepared and issued to all participating practices.

Questionnaire Survey of Pilot Sites

Here are the results of a questionnaire survey of 11 pilot sites in Cork and Kerry. In total, 56 questionnaires were sent out to GPs and practice staff in 11 pilot sites. We received back 40 completed questionnaires (71%) from 10 (91%) pilot sites.

1. Practice Name:

Practice Code	Number of questionnaires returned	Percentage
A	4	10.0%
B	4	10.0%
C	8	20.0%
D	9	22.5%
E	8	20.0%
F	2	5.0%
G	2	5.0%
H	1	2.5%
I	0	
J	1	2.5%
K	1	2.5%
TOTAL	40	100%

3. Please indicate your position in the practice. (please tick one only)

- GP
- Practice Nurse
- Practice Manager
- Practice Secretary
- Other, please specify: ……..

Position	**Frequency**	**Percentage**
General Practitioner	17	42.5%
Practice Nurse	6	15.0%
Practice Manager	5	12.5%
Practice Secretary	12	30.0%
TOTAL	40	100.0%

Workload

4. Has your workload changed with the introduction of electronic laboratory messaging? (please tick one only)

- Decreased workload
- Increased workload
- No change in workload

Workload	**Frequency**	**Percentage**
Decreased	28	71.8%
Increased	3	7.7%
No change	8	20.5%
TOTAL	39	100.0%

5. If your workload has **decreased**, please describe in what way:

There were 30 comments made in response to this question. The most common items mentioned were:

- No manual input of results into patient electronic record;
- No retrieving paper results from filing cabinets;
- No phoning the laboratory to request results;

One GP noted:

> *"My personal workload is unchanged, but the workload of support staff has decreased, which has freed up their time for much more important duties."*

6. If your workload has **increased**, please describe in what way:

There were six comments made in response to this question. Here is a sample of comments:

One Practice Nurse indicated her work had increased and noted:

> *"Before, the secretary typed in the results. Now I check the paper reports and email reports are corresponding, are in on time, etc. But I feel I now have more control and know what bloods are back etc."*

One GP noted:

> *"When printing off lab reports to send to consultant colleagues, each result has to be printed off separately rather than before when manually inputted by the secretaries and all the results for one day were entered under one consultation and printed off in one report."*

One Practice Manager noted:

> *"No, the workload has not increased in any way with the electronic laboratory messaging. As far as the Administrator's point of view, the work load has decreased by hours; allowing for time to be inputted into patient care, and other administration duties."*

Laboratory Communication

7. Before the introduction of electronic laboratory messaging, how often would you contact the laboratory by telephone for a laboratory result? (please tick one only)

- ☐ Never
- ☐ Once or twice a week
- ☐ Several times a week
- ☐ Several times a day
- ☐ Don't know

Previous Lab contact	Frequency	Percentage
Never	0	
Once or twice a week	10	25.6%
Several times a week	25	64.1%
Several times a day	3	7.7%
Don't know	1	2.6%
TOTAL	39	100.0%

8. Has the number of your telephone enquiries for laboratory results to the hospital laboratory changed since the introduction of electronic laboratory messaging? (please tick one only)

- ☐ Less telephone enquires
- ☐ More telephone enquiries
- ☐ No change in telephone enquiries
- ☐ Don't know

Change in Lab contact	Frequency	Percentage
Less telephone enquiries	36	92.3%
More telephone enquiries	1	2.6%
No change in telephone enquiries	0	
Don't know	2	5.1%
TOTAL	39	100.0%

9. Since the introduction of electronic laboratory messaging, how often do you contact the laboratory by telephone for a laboratory result? (please tick one only)

- ☐ Never
- ☐ Once or twice a week
- ☐ Several times a week
- ☐ Several times a day
- ☐ Don't know

Present Lab contact	Frequency	Percentage
Never	12	30.8%
Once or twice a week	24	61.5%
Several times a week	1	2.6%
Several times a day	0	
Don't know	2	5.1%
TOTAL	39	100.0%

Discussion:
There is a marked change in reported telephone contact with the laboratories before and after the introduction of this project. Ninety two percent of respondents noted decreased telephone enquiries since the introduction of electronic messaging and thirty one percent now report they never telephone the laboratories for result enquires.

Patient Care

10.What do you think are the **two most important** features of electronic laboratory messaging for your clinical practice? (please tick two boxes only)

- Rapid return of laboratory reports
- Integration into the patient electronic medical record
- Avoidance of errors from data entry or telephone messages
- Other, please specify: ……..

Most important feature	Frequency chosen
Rapid return of laboratory results	34
Integration into patient record	27
Avoidance of errors	14
Other	0

11. Has the introduction of electronic laboratory messaging improved patient care in your practice? (please tick one only)

- Yes
- No
- Don't know

Improved patient care	Frequency	Percentage
Yes	32	88.9%
No	1	2.8%
Don't know	3	8.3%
TOTAL	36	100.0%

12. Please indicate how electronic laboratory messaging has impacted on patient care. (please tick all that apply)

- Allows us to diagnose patients more quickly
- Allows us to monitor and treat patients more effectively
- Supports anticoagulant clinics in the practice
- Improves the quality of the individual patient electronic medical record
- Allows us keep patients out of hospitals and A&E Departments
- No impact on patient care
- Don't know
- Other, please specify: ……..

Impact on patient care	Frequency chosen
Quicker diagnosis	31

More effective monitoring & treatment	28
Supports anticoagulant clinics	16
Improves quality of patient record	28
Keeps patients out of hospitals	11
No impact on patient care	1
Don't know	1
Other	1

Discussion:
The most important features of electronic laboratory messaging for clinical practice are rapid return of laboratory reports and integration into the patient electronic medical record.

Eighty nine percent of respondents believe that the introduction of electronic laboratory messaging has improved patient care in the practice. The most significant impact has been on quicker diagnosis, more effective monitoring and treatment and improvement in the quality of the patient electronic record. Eleven respondents, of whom eight were GPs, believe that the electronic laboratory messaging helps them to keep patients out of hospitals and A&E Departments.

Quality of Service

13. The project aims to make laboratory results available to practices twice a day. How would you rate our service in this regard. (please tick one only)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

Quality of Service	Frequency	Percentage
Excellent	22	55.0%
Good	11	27.5%
Fair	6	15.0%
Poor	1	2.5%
TOTAL	40	100.0%

14. Have you encountered any problems using the electronic laboratory reporting? (please tick all that apply)

- ☐ Difficulties receiving email notification of message files
- ☐ Difficulties downloading files from the Internet
- ☐ Difficulties viewing reports in the practice software
- ☐ Difficulties integrating reports into individual patient files
- ☐ Problems with practice software system
- ☐ Unhappy with the times files are available to download
- ☐ No problems
- ☐ Don't know
- ☐ Other, please specify: …….

Problems encountered	Frequency chosen
Email difficulties	6
Download difficulties	4
Difficulties viewing reports in software	6
Difficulties integrating reports	3
Problems with practice software	5
Unhappy with download times	8
No problems	9
Don't know	3
Other problems	3

15. How would you rate the quality of the support for laboratory messaging provided by your GP Software Support Company (please tick one only)

- ☐ Excellent
- ☐ Good
- ☐ Fair
- ☐ Poor

Quality of GP Software Support	Frequency	Percentage
Excellent	20	54.1%
Good	16	43.2%
Fair	0	
Poor	1	2.7%
TOTAL	37	100.0%

16. Have you encountered any technical, security or confidentiality problems with the electronic laboratory reporting? (please tick one only)

- ☐ No
- ☐ Don't know
- ☐ Yes, please specify: ……

Technical, Security or Confidentiality Problems	Frequency	Percentage
No	27	73.0%
Yes	5	13.5%
Don't know	5	13.5%
TOTAL	37	100.0%

Discussion:
Eighty two percent of respondents believe the quality of the SHB's message delivery service to be Excellent or Good. Three of the five respondents who rated the service as Fair, noted they were unhappy with the timing of the afternoon file download. One Practice Nurse commented:

"Download times, especially in the evening, should be around five o clock and not later as the practice is getting ready to close for the evening. Anticoagulant results should be available earlier."

The need for earlier download times also features as the joint leading problem in the problems encountered with the project. The other main issue is a difficulty some respondents note in viewing the results in their specific software package before integration. Overall the level of reported problems is low and this is confirmed in that 73% of respondents report no technical, security or confidentiality problems. Four respondents note technical problems, two in relation to file integration, one in relation to an integrated viewer in the practice software and one in relation to a corrupt file that was resolved. No respondents noted security or confidentiality problems.

Printed Reports

17. How does your practice now handle printed laboratory reports? (please tick one only)

- File reports in individual patient record
- File reports alphabetically or chronologically
- Destroy reports by shredding or other means
- Don't know
- Other, please specify: ……..

Handling of Paper Reports	Frequency	Percentage
File in patient record	12	31.6%
File alphabetically or chronologically	5	13.2%
Shred	20	52.6%
Don't know	0	
Other	1	2.6%
TOTAL	38	100.0%

18. Would you like the hospital laboratory to stop sending you paper laboratory reports? (please tick one only)

- Yes
- No
- Don't know

If you answer No, please comment on why you wish to continue to receive paper reports:

Preference for Stopping Paper Laboratory Reports	Frequency	Percentage
Yes	16	42.1%
No	15	39.5%
Don't know	7	18.4%
TOTAL	38	100.0%

Discussion:
There is variability in how respondents and practices deal with paper reports. The most common method is to shred reports, often after storing them for a period of two or three months. Respondents are split on whether they would like the hospital laboratories to stop sending them paper reports. Comments by respondents who answered No include:

> *"As some Consultants, especially Ante-natal Clinics, require original paper reports and don't accept photocopied reports or printouts from the computer."*
>
> *"Ability to pass record to hospital or consultants if there is a need for referral."*
>
> *"Paper reports required for antenatal visits."*
>
> *"To back up computer system in case of errors in sending."*
>
> *"We still have to view the manual results due to the lack of an effective viewer in our software package."*
>
> *"Some results don't come through electronically – like blood groupings."*

Respondents who answered Yes wished to be reassured that all reports are transmitted electronically:

> *"As long as we are assured all reports will be received electronically."*
>
> *"Yes, eventually. Not all results are electronically sent."*

Overview

19. Overall, how do you view the SHB GP Electronic Laboratory Messaging Project? (please tick one only)

- Absolutely fantastic
- Successful
- Failure
- Waste of time and money
- Don't know

Project Overview	Frequency	Percentage
Absolutely fantastic	20	50.0%
Successful	18	45.5%
Failure	1	2.5%
Waste of time and money	0	
Don't know	1	2.5%
TOTAL	40	100.0%

20. Do you believe the laboratory messaging project should be rolled out to all Southern Health Board general practices? (please tick one only)

- Yes
- No
- Don't know

If you answer No, please comment on why the project should not be rolled out:

Roll out to all GPs	Frequency	Percentage
Yes	36	90.0%
No	1	2.5%
Don't know	3	7.5%
TOTAL	40	100.0%

21. In terms of future services, what **three health messages** would you most like to receive electronically in your general practice? (please tick three boxes only)

- Radiology reports
- A&E attendance
- Out of Hours Co-op reports
- Notification of hospital admission and discharge
- Hospital discharge summaries
- Notification of death in hospital
- Notification of Outpatient appointment
- Other, please specify: ……..

Health Message Preference	Frequency chosen
Radiology reports	36
A&E attendance	11
Out of Hours Co-op	19
Notification of admission & discharge	15
Hospital discharge summaries	26
Notification of death in hospital	8
Notification of OPD appointment	2
Other	3

Discussion:
The overall rating for the project is enthusiastic. Ninety five percent of respondents rate the project as Absolutely Fantastic or Successful and ninety percent believe it should be rolled out to all SHB GPs. One GP respondent believes it should not be rolled out and comments:

"I think there are a few bugs yet to be sorted."

Further discussions with the GP reveals that his outstanding issues are related to lack of an effective viewer in his software package, work involved in manual integration of

results which are not automatically matched and concerns around raised patient expectations of same day results.

One site rated the project a failure and the questionnaire from this site indicated negative responses to every question asked. In discussions with the staff in this practice, it was clear the GP Software System was not handling the messaging well and in the process was generating duplicate patients, duplicate messages and incomplete results. These issues were subsequently addressed by the vendor and the latest information, at time of writing, is that the problems have been resolved.

The highest preference for additional health messages are given to radiology reports, hospital discharge summaries and out of hours co-op messages.

22. What suggestions do you have to improve the electronic laboratory reporting project?

Fourteen suggestions were received, four of which suggested an earlier download time for the afternoon file download.

"Would be more efficient if we received sample results before 17.30,"

Another suggestion relates to a sample collection service:

"A specimen collection service would give us a guarantee that samples arrive the day they are taken and eliminate the delays caused by posting or patient delivery of same."

23. We would be happy to receive any general comments you wish to make.

Sixteen general comments were received and include:

"Very successful overall. Got more than I anticipated (extra software and reprogramming of practice software package). Now needs to be extended to other message types."

"Delighted with the service!"

"Excellent initiative – very helpful team."

"Good service, but will have much greater impact on the practices further out from the central hospital."

"It's a great system."

"In future, all communications between hospitals and GPs should use this system."

"The most successful venture yet! At last a project doesn't involve multiple reports/meetings and no action!"

“In general our practice finds the electronic system very successful and has had great benefit in our surgery. Results on the same day, the patients are even shocked.”

“As I’m sure you are all aware, I think this system is wonderful, simple to operate and of great benefit to the practice. But what happened to the free 6 month high speed Internet connection we were to get?”

“I have to include that I personally have worked with this project since May and as a user I am exceptionally impressed with all the work and effort contributed to this project. It is truly a fantastic service. Many thanks from a user. Very impressed.”

Appendix A

Evaluation Questions put to GP Software Vendors

The evaluation of the SHB GP Electronic Communications Project is underway. Questionnaires have gone out to the pilot practices and they are conducting a quality audit. I think it is very important to document your experience of the pilot project. Could I please ask you to consider the following questions? You may wish to answer them in a general rather than a specific sense, the underlying aim is to get your views on the project so that you can have an input into the evaluation process. The questions are there to help, but drop them if you wish to provide feedback in another format.

1. Practice Support:
What is your experience of the workload of messaging support issues generated by the pilot practices?

What are the main support issues?

2. Problems:
What problems have you encountered during the life of this pilot project?

Are there any outstanding issues that need resolution?

3. Benefits:
Has involvement in this project provided any opportunities or benefits to your company?

4. Training:
What is your experience of training the practices to use your integration software?

Are there any lessons to be learned?

5. What are your views on the message delivery system in place in the Southern Health Board?

6. What are your views on the structured HL7XML files available in the Southern Health Board?

7. General Rollout:
Do you favour a general rollout of this service to all interested GPs?

Have you any views on how the Health Board should organise this?

8. Communication with Health Board:
What are your views on the level and quality of communications between your company and the Health Board in relation to this project?

9. Printing:
What are your views on cessation of printing of laboratory results?

10. Additional Messages:
What additional messages would you like to see being made available electronically for GPs?

What messages would you like to see being generated at practice level and transmitted to Health Agencies?

11. Comments:
Have you any suggestions or general comments to make on the project?