

Electronic Transmission of Labs Results

“Lablinks”

Learning from the Glasgow & Clyde story

Colin Brown
GP Glenburn Paisley
GGC HB Lablinks program

What can Lablinks do for you?

1. What are the types of results provided by the labs in your Health Board?
2. Would you like lab results to automatically feed into the patient record in your EMIS or Vision practice system?
3. How to streamline the processing of results in your practice.
4. Who needs to do what to supply results in a full Lablinks system?

GIGO

“Garbage In Garbage Out”

On two occasions I have been asked

"Pray, Mr. Babbage, if you put into the machine wrong figures, will the right answers come out?"

I am not able rightly to apprehend the kind of confusion of ideas that could provoke such a question.

Charles Babbage

Passages from the Life of a Philosopher 1864

a Test journey.....

“Let’s do some tests.....”

- **What do GPs call them?**
- **Lab test request forms**
- **Reason for request - is it a consultation?**
- **Who is the Test Requestor?**

Identify the patient
Identify the tests
Identify the Test Requestor
Identify the sample

Keep it all together

- Handwriting
- Printing – Labeltrace now standard
- Labelling – now standard

1.

2.

3.

A

CH1: 1404657509 14/04/1965 F
 MACDONALD-MACPHERSON Margaret Cathie
 The Walkway, 25 Clyde Road, PA51 5EQ
 0141 884 4554
 Dr Alistair MacDonalD GMC: 1234567
 Dr Nugent & Partners, G15 7TS
 Practice: 43436
 26/04/2011 13:09 Practice: 43436

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Labels re-design

Now standard across GGC

The request is received in the lab...

- How do labs identify them?
“Profile Headers” / “Logical Test Groups” / Sets
- Conversion to PH / LTG, then Lab software manages

Issues:

- Use of barcodes not standard;
(even when printed not always scanned)
Manually transcribed
- How many labs do you use? 1 local collection point but
 - 1 Telepath system for S Glasgow, 1 Apex system for Clyde
 - but 14 Telepath systems in North Glasgow
 - various other labs across UK for special tests

Logical Test Groups in Biochemistry

(A) TELNET (10.251.232.16) - PowerTerm Lite/32

File Edit Terminal Communication Options Script Help

Extended Logical Test Groups

LTG Code : COREN Description : Routine Biochemistry

Active (Y/N) : Y Link Tests Mode : N

Read code :

GLU	LGFR	TNT	OSMO	SALI	ICHDL		
NA	TP	GGT	CKMB	DIGO	LDL		
K	ALB	AMY	TNTN	MISL	LDLC		
CL	ALP	CRP	GLOB	NAME	TRIG		
HCO3	BILI	CA	ZN	NCR	DGLU		
UREA	CBIL	ADCA	OAP	NGLU	LGENT		
CREA	AST	CCA	FAST	BSEP	LVANC		
RGFR	ALT	PHOS	NIL	CHOL	EGFR		
IGFR	LDH	MG	ALCO	HDL	BILP		
VGFR	CK	UA	PAR	CHDL			

1 Accept 2 Reject 3 Change 4 List 5 Guide 6 Std Patterns 7 REad code 8 exit Å

Routine Biochemistry: Created by Alistair Black on 24/08/2010 at 09:10
 Disc: BLOOD Sect: BC Alistair Black MLTGX/APEX Overtyp

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12

VT220-7 22:78 Caps Wrap Hold On Line

Start (A) TELNET ... Novell Group... Mail From: al... scriun - Note... scriun27101... FTP G:\APEX Co... 12:27

(A) TELNET (10.251.232.16) - PowerTerm Lite/32

File Edit Terminal Communication Options Script Help

Extended Logical Test Groups

LTG Code : CORER Description : General Biochemistry R

Active (Y/N) : Y Link Tests Mode : R

Read code :

ADCA	CL	LGFR	UREA	BILP			
ALB	CREA	MG	VGFR				
ALP	CRP	NA	NCR				
ALT	FAST	NGLU	GAP				
AMY	GGT	NIL	IH				
AST	GLOB	OAP	BSEP				
BILI	GLU	PHOS	LGENT				
CA	HCO3	RGFR	LVANC				
CCA	IGFR	TP	EGFR				
CK	K	UA	CBIL				

1 Accept 2 Reject 3 Change 4 List 5 Guide 6 Std Patterns 7 REad code 8 exit Å

General Biochemistry R: Created by Phyllis McCarte on 10/09/2010 at 15:28
 Disc: BLOOD Sect: BC Alistair Black MLTGX/APEX Overtyp

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12

VT220-7 22:78 Caps Wrap Hold On Line

Start (A) TELNET (10.251... Novell GroupWise - S... scriun - Notepad scriun271010 - Notepad Document1 - Microso... 12:39

“Order Comms”

- Electronic messaging for test ordering and management
- Automates many of these processes
- Adds new functions e.g.
 - which bottles?
 - live advice to clinicians from labs e.g.
 - timing e.g. hormones, post-dose for drugs
- Intelligent advice e.g.
 - “most users of test x also choose test y”
 - automatic re-routing
- Widespread in hospitals and worldwide

the Labs produce results....

- Inter-lab variations
 - “routine” = FBC = CBC?
- Non-standard Read codes
 - the “Bounded Read Code List”
 - > National Laboratory Catalogue
 - Both UK-wide
- QA of results, sign off issues:
 - what & when – serial processing
 - who
 - how – labs workflow e.g. batches
 - why

Electronic or paper? – Benefits for Labs i)

£m savings if no printing:

- kit, space
- faster
- convert any paper report to an e-document image
e.g. .pdf or .tif
- document-level software mature
e.g. with scanners
- compatibility with other labs across UK

Is paper-free ever 100%?

Lablinks - Benefits for Labs ii)

Supports automation:

- clarifies results e.g. terminology,
- simplifies workflow processes for labs
- reduces errors in manual processing
- reduces costs

All these save staff time and reduce errors for all lab service users – hospital & community

Lablinks - Benefits for Labs iii)

Barnsley Hospital foundation trust has found that replacing its paper-based laboratory test ordering system with an electronic system has produced efficiencies swiftly..... now has 40% fewer pathology staff processing 48% more work, with an investment of £46,000 in the system leading to £350,000 savings in staff costs since the first pilot was started a year ago.

www.guardian.co.uk/healthcare-network/2011/oct/25/barnsley-electronic-lab-system

De-duplication.....

Results transmission to SCI Store

Read codes + text + values, formatted in SCI-XML
Results “push” or stream as signed-off to SCI-Store:

- multiple simultaneous viewing on Store
- portal-compatible
- a “pull” system –the user decides when to view

Issues

- web interface access, usability
- governance
 - who actions the significant result?
 - how to track the partial or incomplete result?

Q1 Types of results

1. Coded: Read codes + text + values via SCI Store*
Haematology and Biochemistry – most
Microbiology – some only

All other results – can't be so coded, so remain as

2. Documents
 - paper > postman > scanner
 - electronic direct
 - email attachments
 - electronic document transfer “EDT”, LIFT software

How to get them? – pull or push systems

* or via Revive in Ayrshire & Arran; LIFT in Forth Valley

Q2 Import of results to GP system

- All 3 GP systems in Scotland comply with SEF, so can process coded data in SCI-XML format
- EMIS and Vision can process some other text
- Vary in handling of bad data e.g. in wrong bit of message

Glasgow project was intended to deliver Lablinks for GPASS, as Lanarkshire, but delayed by data quality issues of labs

So pilot continued with Vision and EMIS practices while working on the labs issues – now resolved

Example: Profile Header map to Read codes

The screenshot shows a software window with a title bar containing a close button (X). The window has two tabs: 'Read Code' (selected) and 'Units'. Below the tabs is a table with three columns: 'ProviderDescription', 'Read Code', and 'Read Term'. To the right of the table are three buttons: 'Add', 'Edit', and 'Remove'. At the bottom right of the window is a 'Close' button.

ProviderDescription	Read Code	Read Term
COREN	44...00	Blood chemistry
DOAN	46Q..00	Urine drug levels
Faeces Biochemistry	47...00	Examination of faeces
FESN	42d..00	Blood haematinic levels
haematinic	42d..00	Blood haematinic levels
Haematinics	42d..00	Blood haematinic levels
HELG	43w/9.00	Helicobacter pylori IgG ant
HYAL	46E..00	Urine microscopy - casts
Mic1	4J...00	Microbiology
Mic2	4J1..00	Sample - microbiological e.
Mic3	4J1..00	Sample - microbiological e.
PLPAM	42C..00	Autoantibodies

Microbiology part-results – Clyde only

Dr Colin Brown - Mail Manager

File Filter Message View Tools Help

Back Forward Refresh Actions Tick Staff Patient Lab Read Print All Find ConMgr View Appt

Unread

Status	Type	Read	Date	Staff	Patient	Action/Subject	Copy	From
Ready for Action	Microbiology		05/07/2010 09:10	Brown, Colin	[Redacted]		No	Greater Glas
Filed	Micu, culture & sen...		29/08/2010 17:01	Brown, Colin	[Redacted]		No	Greater Glas

All dates: All Mail

Staff (25)

- Incoming Mail
- Mail Categories
- Brown, Colin
 - Unread
 - Read
- Unallocated Mail
- Bar, Lynne
- Boyce, Marion
- Brown, Ann
- Cassidy, Cathy
- Chambers, Sharon
- Cooper, Anne
- Cummings, Pat
- Doctors
- Glenburn, Janene
- Gracie, Susan
- Gray, Jackie
- Hayes, Jane
- Henderson, May
- Locaine, .
- Macdonald, Haina
- Nowatt, Carly
- Niles, Jacqueline
- Niles, Paul
- Ritchford, Karen
- Steen, Annemarie
- Smith, Joanne
- Students, Medical
- System Supervisor, S
- Wilson, Richard
- Outgoing Mail
- Mail Categories
- Brown, Colin
 - Unallocated Mail
 - Bar, Lynne
 - Boyce, Marion
 - Brown, Ann
 - Cassidy, Cathy
 - Chambers, Sharon
 - Cooper, Anne
 - Cummings, Pat
 - Doctors
 - Glenburn, Janene
 - Gracie, Susan
 - Gray, Jackie
 - Hayes, Jane
 - Henderson, May
 - Locaine, .
 - Macdonald, Haina

WARNING: This Test Result contains unresolved Read Codes.

[Redacted] (Unknown)(Details)

Sample Details

Mid Stream Urine

Description: Mid Stream Urine Date/Time Sampled: 30/06/2010 13:07 Date/Time Tested: [Redacted]

Laboratory Id: M011272115 Date/Time Received: 01/07/2010 13:20 Biohazard Alert: [Redacted]

Micro, culture & sensitivities

Code	Description	Value	Normal Range	Comments
Mic1	* Microbiology Test1*	Urine Culture & Sensitivity		
		No Growth		
4808.00	* White Blood Cells (WBC <36) * = Urine microscopy: white cells	Automated Analysis Unavailable		
4009.00	* Red Blood Cells (RBC <20) * = Urine microscopy: red cells	Automated Analysis Unavailable		
46H.00	* Bacteria * = Urine microscopy: orga/RB's	Automated Analysis Unavailable		
40G.00	* Squamous Epithelial Cells * = Urine microscopy: cells	Automated Analysis Unavailable		Automated urine microscopy currently unavailable [Specimen has been cultured] If microscopy directly indicated, please contact lab.

Patient Details

Name: [Redacted]

Address Type: [Redacted]

Address: [Redacted]

Date of Birth: [Redacted]

Sex: [Redacted]

Marital Status: Unknown

Registered Gp: BROWN, COLIN

Practice: GLENBURN HEALTH CENTRE

HB of Res: [Redacted]

Identifiers

CHI: 3003040310

NHS: 646/04/206

Results Lab Summary Actions Audit

Alerts: [Redacted]

No prompts for this patient.

All dates: All Mail CAPS NUM

Results from SCI Store to GP Practice

- How often?
 - was x2 now x4 daily
 - more frequent? e.g. streaming as in rest-of-UK
- To whom?
 - Issues:
 - errors in Requestor ID
 - when our staff change, tell the labs!
 - use a messaging system as well as a store?



a barn door.....

Q3 i) What about un-coded results? - other “Delivery channels”

1. Documents as paper or electronic image e.g.
 - i) paper locally scanned into Docman
 - ii) docs sent as images for manual import to Docman
e.g. by email, (or LIFT in Forth Valley)
 - iii) docs sent as images by “EDT” for automatic import to Docman (Lothian, Grampian, Tayside)
2. Web access - unscheduled, “pulled” on clinical need.
 - by SCI Store
 - by Portal?
3. Documents remain as paper :
 - not for scanning e.g. size, too faint, privacy, multi-page
 - if technical failure of any of above methods

Q3 ii) Streamline your workflows

- Documents as paper > postman > scanner
all manual, per-item
- Electronic pull – SCI-Store web, or Portals
all manual, per-item
- Electronic push
 - email attachments: *all manual, per-item*
 - LIFT: *pt-matching is manual, per-item*
 - Electronic Document Transfer: *automatic*
- Full Lablinks / ETLR
Read codes + text + values via SCI Store: *automatic*

Saving time

How much staff time?

1-2hrs/wk per 1000pts for per-item paper scanning, + other per-item?

How much clinical time?

- Pull = clinical time spent if not seamless
- Push = “ “ saved if it can be automated

Full Lablinks also delivers:

- no re-typing into GP Systems, automatic ID matching to patient record - *save staff time*
- enables more “add-ons” within sample life at lab - *faster results; reduces further sampling*
- de-duplication of recent tests - *efficient*
- no risk of transcription or wrong-patient errors - *saves more staff time; safe*
- local processing is fast enough for live clinical use so:
 - all historic results for graphs, timelines - *safe*
 - decision support e.g. clinical-Rx interactions - *safe*
- use for audit between patient groups, practices - *efficient*



The Key

Jackson Pollock

1947

Q4 Who needs to do what?

Labs

- invest in Order Comms systems incl. bar-code readers
- upgrade lab software
- comply with UK Natl Lab Catalogue terminology
- liaise with iLabs users in Scotland & UK

HBs and IT depts.

- roll out to GP practices – education/training
- integrate all test requestors' IDs to practice teams
- QA for data going to SCI-Store
- upgrade messaging infrastructure

GP system suppliers

- develop software e.g. normal ranges for all tests, ignore uncoded data
- integrate workflow functions with those of Docman

GP practices

- change workflows
- advise labs of each staff change

Let's join the club

- Full: Tayside, Grampian, Lanarkshire, Forth Valley
Partial: Lothian, Highland, GGC, Fife, A&A, D&G)
? – Borders, WI, Orkney, Shetland
- England, Wales, NI
- International



Any time, any place, any where...

The End



Understanding Your Tests

[Inside the Lab](#)

[In the News](#)

[Article Index](#)

[About the Site](#)

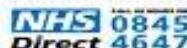
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Our Commitment



We comply with the HONCode Standard for trustworthy health information. **Verify compliance**

Our Health Network



www.nhsdirect.nhs.uk



Lab Tests Online-UK

Lab Tests Online-UK is written by practising laboratory doctors and scientists to help you understand the many clinical laboratory tests that are used in diagnosis and treatment. The about this site page describes how the site can help you. Search under conditions and diseases and find lab tests used for particular diagnose and manage or alternatively, if you know the test name, just search under tests.

Let us know what you think of the site and how we might improve it. If you found Lab Tests Online UK useful, please spread the word!

Topics in the News

Tests for Cancer Genes – Update

8 August 2011

We reported in a news item last year that patents held on two genes used in a lab test to assess the inherited risk of breast and ovarian cancer had been ruled invalid by a US District Court because the genes exist naturally in the body. A US Federal Appeals Court has now affirmed the validity of the patents because "isolated" gene DNA has a different molecular structure from DNA in the body.

Automated DNA test for TB is useful in children, too

4 August 2011

In December 2010 the World Health Organization endorsed the rapid automated DNA test for tuberculosis (TB) of the lung that we wrote about last September. However, it had not been studied in children. Researchers have now tested children who were admitted to hospital in Cape Town with suspected TB and found that it can detect twice as many cases as routine screening by microscopic examination of sputum (phlegm).

Promising dried saliva test for cytomegalovirus infection in newborns

13 June 2011

Congenital cytomegalovirus (CMV) infection can cause hearing loss and other problems in childhood, but there is no lab test that is suitable to screen all newborns for infection. *The New England Journal of Medicine* of 2 June

Use the search box and menus below to quickly navigate Lab Tests Online

Tests

List of all tests and acronyms

Test not listed?

5-HIAA
17-Hydroxyprogesterone
ACE
ACR
ACT

Conditions/Diseases

List of all conditions/diseases

Acidosis/Alkalosis
Acromegaly
Addison's disease
Adrenal Insufficiency
AIDS
Alcoholism

Screening

List of screening tests

Newborns
Infants
Children
Young Adults
Adults
Adults 50+

Structured Data Areas now have value, unit of measure and normal range boxes:

B12 & Folate level

Drug levels

Blood lipids

Bone studies

Liver Function tests, Liver enzymes

Female sex hormone profile, Male sex hormone profile, Gonadotrophin

Thyroid function, Urea and Electrolytes, Serum electrolytes

Urine dipstick for glucose, Urine dipstick for protein, Urine dipstick for ketones, Urine dipstick for blood, Urine Dipstick for Nitrites, Urine Leucocytes

Toxicology

Urinalysis – Glucose, Urinalysis – Protein

Spirometry

Blood group antibodies

Full blood count

Clotting tests

RBC red blood cell shape, RBC colour/staining, RBC clumping, RBC enzymes

Ante natal blood tests

Anti Nuclear antibodies, Anti Mitochondrial antibodies, Anti smooth muscle autoantibodies, Parietal cell autoantibodies, Adrenal autoantibodies, DNA binding autoantibodies, Other autoantibodies, HLA Tissue Typing

Syphilis test, SH-antigen (hepatitis B) test, HIV Test, Legionella antibody test, Infectious titres and antibodies, Hepatitis A Test, Hepatitis B Antibody, Viral studies

CAP (RAST), Immunology Screening Tests

Serology, Plasma electrophoresis, LE cells, Immuno-electrophoresis

Order Comms software

- Sunquest ICE and tQuest integrate OK with both Vision and EMIS
- Vision now integrates with Technidata and Cyberlab