Delphic LIS Multilab Case Study

# Shared Health, Manitoba

# Contents

# Executive Summary

Established in 2002, Shared Health (formerly Diagnostic Services Manitoba) provides public diagnostic health services for the Canadian province of Manitoba, offering a province-wide integrated and standardised laboratory and rural diagnostic imaging service. The services on offer encompass the full spectrum of the healthcare system and while covered by only 3.5% of the provincial healthcare budget, the laboratory and imaging results can impact over 80% of clinical decisions[1].

With a vision to continually improve the quality, timeliness and sustainability of the diagnostic and digital imaging services provided to Manitobans, Shared Health is constantly seeking more effective processes by:
- integrating with the upstream and downstream providers of patient care
- standardising solutions across the province
- improving the flow of images and results
- delivering solutions and services efficiently[2]

Recognising the importance of a common technology and testing platforms to achieve this vision, Shared Health collaborated with Sysmex on a cornerstone project for the organisation - the implementation of a province-wide laboratory information system (PLIS).

In 2018, Shared Health completed the project with all 78 labs in the province now linked to the Delphic LIS multilab network and has realised both clinical and operational benefits that support its vision of improving services to the population of Manitoba.

The successful provincial LIS model is unique to Canada and the project was closely monitored by other provinces with a view to implementing their own provincial or regional diagnostic services[1].

*"We knew that the Delphic LIS was a highly scalable system, making it the ideal solution for a province-wide LIS."*

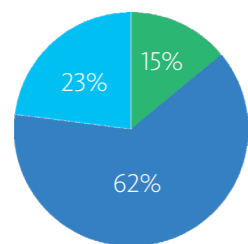Mark Curtis - Director IT Services, Shared Health

# Manitoba Snapshot

**649,950** square kilometres

**1.35** million people

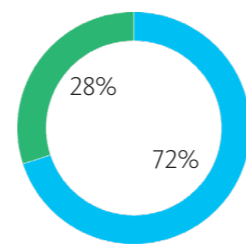**5** regional health authorities
Winnipeg
Interlake-Eastern
Prairie Mountain Health
Northern Health
Southern Health-Santé Sud

Population Age Groups[3]
- 15%
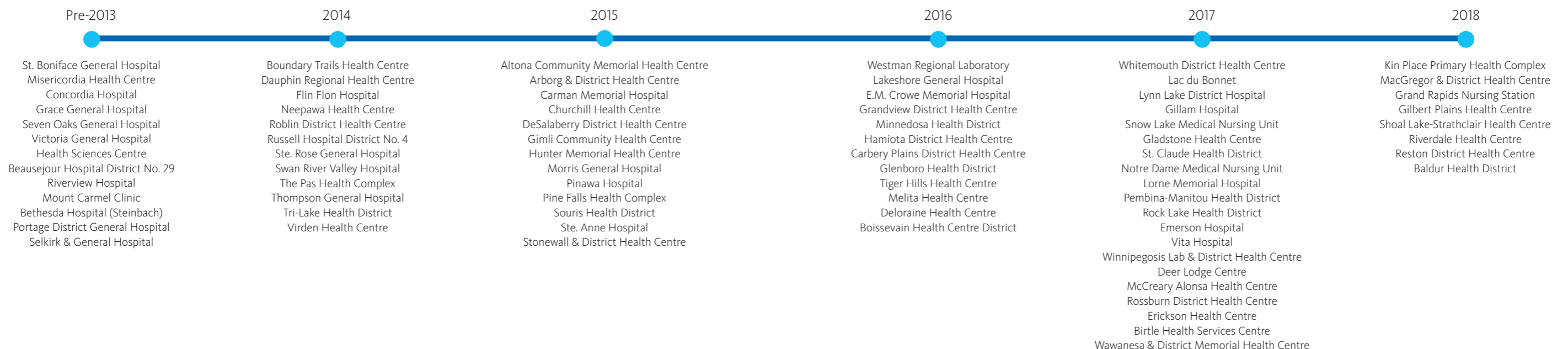- 23%
- 62%
- 0 - 17
- 18 - 64
- 65 +

Population Location[4]
- 28%
- 72%
- Rural
- Urban

# Shared Health's Delphic Multilab Solution

MANITOBA

Winnipeg

**12** urban laboratories

**66** rural laboratories

**1700** staff*

**464** concurrent users

**200+** interfaced analysers

**58** HL7 ADT interfaces

**66** HL7 results reporting

*includes imaging staff

# Timeline

| Pre-2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|
| St. Boniface General Hospital | Boundary Trails Health Centre | Altona Community Memorial Health Centre | Westman Regional Laboratory | Whitemouth District Health Centre | Kin Place Primary Health Complex |
| Misericordia Health Centre | Dauphin Regional Health Centre | Arborg & District Health Centre | Lakeshore General Hospital | Lac du Bonnet | MacGregor & District Health Centre |
| Concordia Hospital | Flin Flon Hospital | Carman Memorial Hospital | E.M. Crowe Memorial Hospital | Lynn Lake District Hospital | Grand Rapids Nursing Station |
| Grace General Hospital | Neepawa Health Centre | Churchill Health Centre | Grandview District Health Centre | Gillam Hospital | Gilbert Plains Health Centre |
| Seven Oaks General Hospital | Roblin District Health Centre | DeSalaberry District Health Centre | Minnedosa Health District | Snow Lake Medical Nursing Unit | Shoal Lake-Strathclair Health Centre |
| Victoria General Hospital | Russell Hospital District No. 4 | Gimli Community Health Centre | Hamiota District Health Centre | Gladstone Health Centre | Riverdale Health Centre |
| Health Sciences Centre | Ste. Rose General Hospital | Hunter Memorial Health Centre | Carberry Plains District Health Centre | St. Claude Health District | Reston District Health Centre |
| Beausejour Hospital District No. 29 | Swan River Valley Hospital | Morris General Hospital | Glenboro Health District | Notre Dame Medical Nursing Unit | Baldur Health District |
| Riverview Hospital | The Pas Health Complex | Pinawa Hospital | Tiger Hills Health Centre | Lorne Memorial Hospital | |
| Mount Carmel Clinic | Thompson General Hospital | Pine Falls Health Complex | Melita Health Centre | Pembina-Manitou Health District | |
| Bethesda Hospital (Steinbach) | Tri-Lake Health District | Souris Health District | Deloraine Health Centre | Rock Lake Health District | |
| Portage District General Hospital | Virden Health Centre | Ste. Anne Hospital | Boissevain Health Centre District | Emerson Hospital | |
| Selkirk & General Hospital | | Stonewall & District Health Centre | | Vita Hospital | |
| | | | | Winnipegosis Lab & District Health Centre | |
| | | | | Deer Lodge Centre | |
| | | | | McCreary Alonsa Health Centre | |
| | | | | Rossburn District Health Centre | |
| | | | | Erickson Health Centre | |
| | | | | Birtle Health Services Centre | |
| | | | | Wawanesa & District Memorial Health Centre | |

# The Challenges

Shared Health's diagnostic services operate 78 laboratories across the province of Manitoba, following a hub and spoke model, with larger urban laboratories conducting more specialised analysis on behalf of smaller rural laboratories. Differing test menus and complexity between the levels require specimens to move between sites, depending on the tests ordered. Results must be reported back to healthcare providers and patients in a timely manner, regardless of their location.

Services provided by Shared Health need to cover 649,950 square kilometres and an uneven population distribution. "If you look at the map, we have pretty remote and isolated sites - sites which you can only fly into," says Shared Health CEO, Jim Slater. "If you look at our farthest northern site on the map, which is Churchill, it is only accessible by air travel and by ship for part of the year. So, it's a very big challenge[1]."

Prior to the roll-out of the province-wide LIS, several different information systems were in use in Shared Health's laboratories across the province. Sysmex's Delphic LIS was used at laboratories in the Winnipeg Regional Health Authority area; a separate LIS operated at Westman Regional Laboratory in Brandon; small-scale analyser-based systems were in use at the rural hub labs; while the remaining 50 rural labs relied on manual, paper-based systems.

Shared Health Project Manager, Catherine Moylan, explains that the use of different systems across the province led to a number of difficulties which made the situation unsustainable. "The disparity between systems meant that gathering different types of data from different locations was not efficient. Referring tests and tracking specimens between laboratories was a heavily manual process."

Other difficulties were caused by a lack of standardisation; with labs across the province following different processes, it was hard to standardise quality or track quality problems.

In addition, the electronic delivery of rural lab results to clinical data repositories or other information systems was not possible. Without comprehensive laboratory data, the province's electronic health record, eChart Manitoba, fell short of providing a valuable clinical tool. Provincial data mining for health research was not possible.

During planning for the provincial LIS, Shared Health faced a further challenge when it was announced that 15 lab sites were having their lab information systems 'sunset' and would no longer be vendor-supported so it was a matter of priority for these sites to be migrated to a new system.

# The Approach

A city-wide LIS 'multilab' network had already been established across Shared Health laboratories in Winnipeg using the Delphic LIS, developed and supported by Sysmex, prior to 2009. This meant that Shared Health already had an establised and trusted relationship with Sysmex and was familiar with Delphic's ability to provide a shared service across multiple laboratory sites using one central server.

"We knew that the Delphic LIS was a highly scalable system, making it the ideal solution for a province-wide LIS"," says Mark Curtis, Shared Health Director of IT Services. Shared Health' planned to connect the province's remaining laboratories onto the existing Delphic LIS multilab, so that all 78 laboratories would be operating a single, shared system.

Shared Health worked closely with Sysmex during the planning phase for the provincial roll-out, which included a pilot project at a rural lab in Beausejour, Manitoba in 2009. This assisted in identifying how rural labs operated compared to those in the city; information Sysmex used to make enhancements to the Delphic LIS specifically for the Shared Health project. In particular, Sysmex developed a Test Referrals module to manage the transfer and tracking of specimens between laboratories for referred analysis.

Mr Curtis says that having worked together successfully with Sysmex on several large and complex projects previously, Shared Health were confident in Sysmex's ability to deliver a project of this scale. "We've had such a great relationship with Sysmex over the years. They utilise strong project management practices and our Sysmex project manager is very adept at covering all angles during the planning phases. They've been very supportive knowing that from the onset of this project it would be a marathon, not a sprint."

> *"Sysmex support staff have an impressive level of knowledge of the Delphic product suite and understand the laboratory business and the workflows that align with their products."*
>
> Mark Curtis - Director IT Services, Shared Health

Shared Health also undertook planning to upgrade servers and associated infrastructure to ensure capacity for the new labs coming online, as well as the increased volume of data which would be generated. To accomplish this, Shared Health and Sysmex worked closely with Manitoba eHealth, who are the technical service providers for the Delphic LIS, providing support for the data centre, network, integration engine and service desk functions.

The roll-out of the provincial LIS got underway in 2012 and was completed in 2018. Implementation teams travelled to Shared Health lab sites across the province to transition them to Delphic and to train staff on the new system. Initially, each implementation at a new lab involved Sysmex staff travelling to the site to carry out the installation and staff training. Engagement within the organisation and scheduling deliberate breaks between site implementations to get feedback on what could be changed and improved greatly aided the change management and product innovation. As the roll-out progressed, Shared Health staff gained the expertise to manage the implementations themselves, with Sysmex providing remote support from New Zealand.

Mr Curtis says that the time difference between Manitoba and New Zealand as never an impediment, and Sysmex as been able to provide swift resolution to any issues during configuration and testing. "Sysmex support staff have an impressive level of knowledge of the Delphic product suite and understand the laboratory business and the workflows that align with their products. We have become accustomed to the 17 hour time difference, and now leverage the situation to provide information on issues and projects to Sysmex staff before the end of our workday, knowing they will continue to work on these topics through our evening."

# The Outcome

Shared Health has made a considerable investment in the province-wide laboratory information system which has seen enormous benefits[1].

## Operational Data

"Fifteen years ago, we used to have limited data that was very fragmented and we couldn't use it as effectively for decision making. We can now look at costing data, utilisation data, stocking data in an integrated way that allows us to make rational decisions, particularly when we're talking to shareholders," says Dr Amin Kabani, Shared Health Chief Medical Officer. "All our provincial sites are linked up to our information. It doesn't matter which site you're talking to, you're working from the same system. This allows us to actually be cost-effective and economic, but more importantly in our minds, it helps us make good decisions[1]."

## Standardisation

Mr Curtis says that one of the biggest impacts has been the increased level of process standardisation to the labs running the Delphic LIS and the ability for these labs to fully adopt Shared Health's standard operating procedures, helping to ensure compliance with accreditation processes. "Smaller sites can now take advantage of functionality that was previously only available in larger centres, such as auto-verification, serum indices review and electronic result reporting."

## Specimen Workflow

The implementation of the Delphic LIS has enabled specimens to be registered at source, and tracked as they arrive at other labs, using the Test Referrals module. The enhanced specimen tracking has eliminated a significant amount of manual logging and provides additional confidence in accounting for each specimen.

## Electronic Results Reporting

The establishment of a provincial LIS also means that Shared Health has been able to significantly increase the volume of test results that electronically populate the provincial lab result repository, which is accessed by clinical providers across the province. The amount of manual logging and transcription has decreased significantly, reducing the risk of error inherent in those processes.

Lab results can now be delivered to the province's eChart Manitoba, helping to create a more useful patient record, as well as to cancer registries, the emergency department information system (EDIS), and the physician office electronic medical records (EMR), providing valuable information for medical staff across the province.

## Population Health

Shared Health can also share an anonymised version of the information it holds with the Manitoba Centre for Health Policy, where it is linked with data from other population databases and used for population-based health research. Catherine Moylan says that key to the success of the roll-out has been keeping a focus on the purpose of the project.

"It's all about patient care and making sure we do things properly and safely; always."

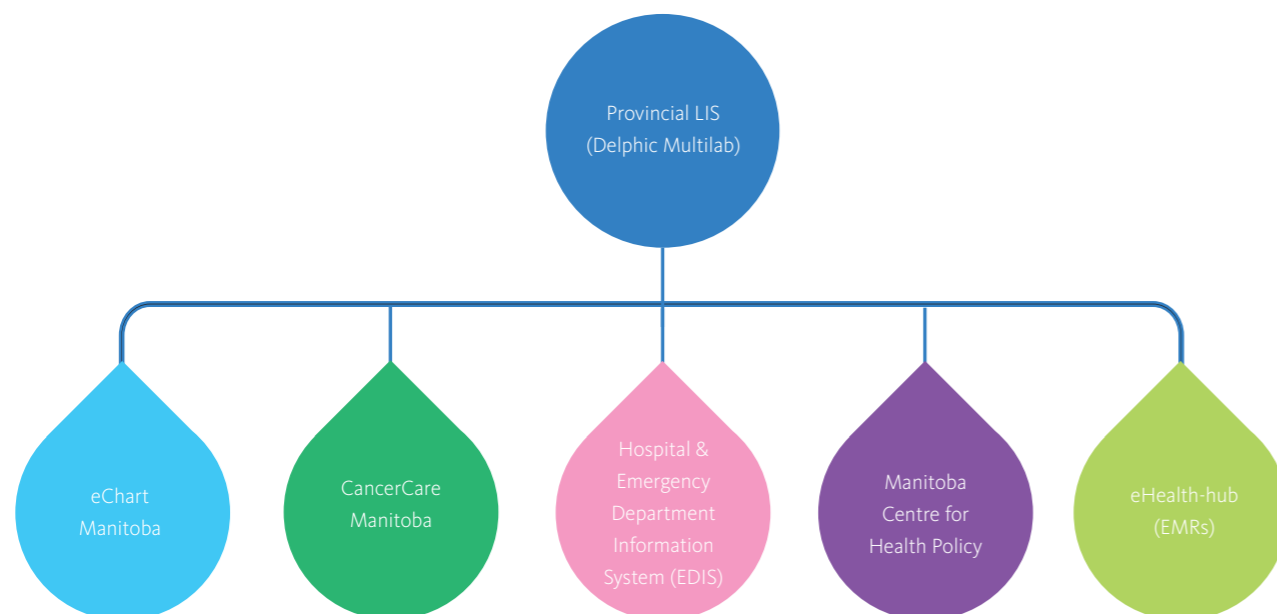Mark Curtis - Director IT Services, Shared Health



Provincial LIS
(Delphic Multilab)

eChart Manitoba

CancerCare Manitoba

Hospital & Emergency Department Information System (EDIS)

Manitoba Centre for Health Policy

eHealth-hub (EMRs)

Fig 1: Enabling the electronic delivery of lab results to external systems.

# Solution Overview

| Delphic Provincial LIS | Improved Processes | Benefits |
|---|---|---|
| Multilab | Delphic multilab enables multiple laboratories to run off a single instance of the LIS. | • Ensures redundancy in the system by providing back-up in the event of instrument failure or staff shortages<br>• Ability to re-route specimens to another site for testing without the need for re-registration |
| | Standardisation of test codes and processes across all lab sites. | • Improved quality control<br>• Enables accreditation compliance |
| Reporting database | Management reporting functionality. | • Ability to monitor turnaround times, identify bottlenecks and manage staffing levels |
| Test Referral module | Manages the referral of specimens and tests between sending and receiving laboratories, e.g. rural to regional hub. | • Removes the need to re-register specimens<br>• Reduces manual data entry<br>• Immediate electronic reporting by originating lab on completion of analysis at referral lab |
| | End-to-end tracking of lab specimens. | • Improved specimen identification<br>• Fewer lost specimens<br>• Easier follow-up on delays |
| Decryptic analyser interfaces | Electronic upload of test requests to analyser and download of results to LIS. | • Reduces manual data entry and transcription errors |
| | Directs testing to the appropriate instrument depending on workload. | • Reduces processing time |
| ADT interfaces to Delphic LIS | Directly updates the LIS, automating patient demographic entry. | • One time data entry ensures accuracy of patient information at the outset<br>• Improved specimen identification |
| Fax server | Centralised management for automated fax delivery of reports from the LIS. | • Ensures accurate delivery of faxed laboratory results to providers |
| Electronic reports | Management and monitoring of HL7 reporting from the LIS. | • Enables fast, accurate results distribution to external information systems |
| HL7 order receipt | Electronic lab test order requests are received directly into the Delphic LIS from hospital patient administration systems.* | • Improves accuracy of orders received<br>• Reduces manual data entry<br>• Reduces processing time |

\* In use for inpatient biochemistry and haematology requests at Westman Laboratory in Brandon.

# Technical Overview

| | |
|---|---|
| Hardware | IBM x3650 M4 8C, dual-2.6GHz CPU, 384 GB RAM, SAN connected |
| Operating System | Red Hat Enterprise Linux V5.7 |
| Database Software | Oracle 11gR2 X86_64 RDBMS for Linux |
| Application Server | Micro Focus Application Server V4 |
| Environment | Data centre hosted by Manitoba eHealth for production environment<br>Separate hosted data centre for test environment<br>VMWare Sphere V5 |
| PC Client | Intel Pentium 4 3GHz 1 GB RAM<br>Microsoft Windows XP (32 bit) SP2, Windows 7 (32 or 64 bit)<br>Internet Explorer 7/8/9 .NET framwork V4 |

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Mark Curtis - Director IT Services, Shared Health

# Partnership

Reflecting on the working relationship between Shared Health and Sysmex, Mr Curtis said, "Sysmex has been helpful to Shared Health in planning and executing this large and complex project, utilising strong project management practices, and involving appropriate technical, programming and application resources as required.

Sysmex continues to be responsive to Shared Health's requirements, provide a great level of support, and are strategic partners with us as we plan future enhancements to our LIS environment."

Sysmex and Shared Health continue to innovate together and actively work on new health IT projects to enhance the laboratory services from a business and healthcare perspective.

# Delphic LIS
## Total Laboratory Information Systems

The Delphic LIS is the backbone for the medical laboratory streamlining all processes with accuracy, efficiency and realiability.

Delphic optimises the workflow of the lab and is suitable for single-site facilities through to multi-site regional systems across integrated networks.

Delphic's core system is complemented by a range of specialised work area managers offering 'Total Laboratory Information Systems' across all medical laboratory and pathology disciplines.

**References**

[1] Staff Writer. "Diagnostic Services Manitoba: Providing the results that matter." Healthcare Global, 8 Nov. 2017, https://www.healthcareglobal.com/company/diagnostic-services-manitoba-providing-results-matter# Accessed January 2019.

[2] Charles Conway and Catherine Moylan, "Manitoba's Provincial Lab Information System, The Clinical and Operational Benefits of Bringing a Province Together" (Powerpoint presentation), August 2015

[3] https://www.gov.mb.ca/health/quickstats/demographics.html (Accessed online January 2019)

[4] https://www.statista.com/statistics/608702/population-distribution-of-manitoba-by-rural-urban-type/ (Accessed online January 2019)