

# Canterbury DHB and Orion Health develop an Electronic Medical Record that is accessible in hospital, primary and community healthcare organisations South Island- wide

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Orion Health Case Study:  
Canterbury District  
Health Board

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## The Customer

Canterbury District Health Board (DHB) is the main planner and funder of health services in the Canterbury province of New Zealand's South Island. As the largest South Island DHB it provides hospital and specialist services for Canterbury and also other South Island Districts where not all specialised services are available.

Canterbury DHB is driven to be a centre of health care excellence for New Zealand and globally. Its vision is to create "an integrated health system that keeps people healthy and well in their own homes by providing the right care and support, to the right person, at the right time and in the right place."

The organisation has a strategic partnership with Orion Health to develop information technology that will help to realise this vision for the Canterbury District. It is also a member of the South Island Health Alliance, a partnership between the five South Island DHBs to support clinically and financially sustainable health services, including the development of shared information systems.

The work of the South Island Health Alliance supports the New Zealand Government's goal of "better, sooner, more convenient" health care. Part of this is a plan for each New Zealander to have a single Electronic Medical Record (EMR) that spans the hospital setting, community care and engages the patient and their circle of care.

Working with Orion Health, Canterbury DHB has developed Health Connect South, an EMR whose core components include Orion Health Clinical Portal, Clinical Data Repository and Rhapsody™ Integration Engine.

Health Connect South is taking significant steps towards realising Canterbury DHB's vision, the South Island Health Alliance's goal of shared information systems and the New Zealand Government's plan for a single national EMR by:

- Enabling comprehensive information sharing between Canterbury DHB clinicians that was not possible with the previous paper-based systems

- Reducing the risk of patient harm by giving clinicians timely access to all the information they need to make good decisions
- Sharing health records with primary care in Canterbury including General Practitioners, pharmacists and community carers

The next steps for Health Connect South include:

- Implementation in all five South Island DHBs and ultimately being part of a national EMR
- Making available specialist solutions for particular conditions including cancer, diabetes and mental health
- The ability to reconcile all hospital and community medications electronically
- Technology enhancements such as mobile access to the EMR

## Background

Canterbury District Health Board (DHB) is the main planner and funder of health services in the Canterbury province of New Zealand's South Island. It is New Zealand's second largest DHB, with 9,000 staff, 136 GP practices, 14 hospitals with 1,500 beds and a NZ\$1.4 billion budget serving over 600,000 people. Canterbury DHB is a tertiary provider of hospital and specialist services – both for the Canterbury population and also for the populations of other South Island DHBs, where more specialised services are unavailable.

Canterbury DHB's vision, launched in 2007, is to create "an integrated health system that keeps people healthy and well in their own homes by providing the right care and support, to the right person, at the right time and in the right place." This means the organisation is concerned with the Canterbury Health System as a whole – including secondary, primary and community health care. The executive team are committed to creating a world class health system for Canterbury.

Canterbury DHB is also a member of the South Island Alliance, a partnership between the five South Island DHBs to support clinically and financially sustainable health services in the region, including the development of shared information systems.

By introducing new electronic systems and tools, the South Island Alliance aims to fundamentally change current processes, not just in hospitals, but across the health sector, as well as to facilitate patients receiving safer, better quality care.

The five South Island DHBs are taking a collaborative approach to avoid duplication of effort, while also providing a more robust system for patients as they can transfer seamlessly between health care providers across the region.

## The Challenge

Canterbury DHB faces the same challenges as other health providers in New Zealand and around the developed world. Populations are aging, long-term conditions, such as type 2 diabetes, are becoming more prevalent, the needs of vulnerable populations are escalating, scientific advances offer more treatment options but these can be costly and there are systemic inefficiencies which need to be addressed to reduce costs and the risk of patient harm. At the same time as costs and complexity are increasing, Government funding, provided on a population-based formula, is decreasing.

Canterbury DHB has the additional challenge of rebuilding after the earthquakes of 2010 and 2011 in which 106 inpatient beds at Christchurch Hospital and 635 aged care residential beds in Christchurch were lost, general practices and pharmacies mainly in the central city and eastern suburbs were destroyed and 200 DHB buildings were damaged, destroyed or declared unsafe to occupy. The cost of earthquake repairs is estimated to be more than \$500 million, with repairs not expected to be complete until 2021. The earthquakes became a catalyst for new information systems.

Canterbury DHB CEO David Meates said the 2011 earthquake destroyed paper records across the Canterbury Health System. “We needed to create a total electronic health record that connects the health system and is based on the patient.”

Another driver of change is the New Zealand Government’s plan for each New Zealander to have a single Electronic Medical Record spanning the hospital setting, community care

and a patient portal. This initiative is being driven by the Ministry of Health’s National Health IT board and all New Zealand DHBs are working towards this single EMR that individuals or their healthcare providers can log in to.

“The government’s plan is that within the next few years there will be one single Electronic Medical Record nationally,” says Orion Health client director Matthew Hemens. “So if we move house we don’t have to take our records with us. That information will be available to us and our health care providers.”

He says the government talks about health care being better, sooner, more convenient – better meaning higher quality care, sooner meaning more quickly, and more convenient meaning closer to home. “This applies to everything, not just electronic healthcare delivery, but with everything to do with healthcare.

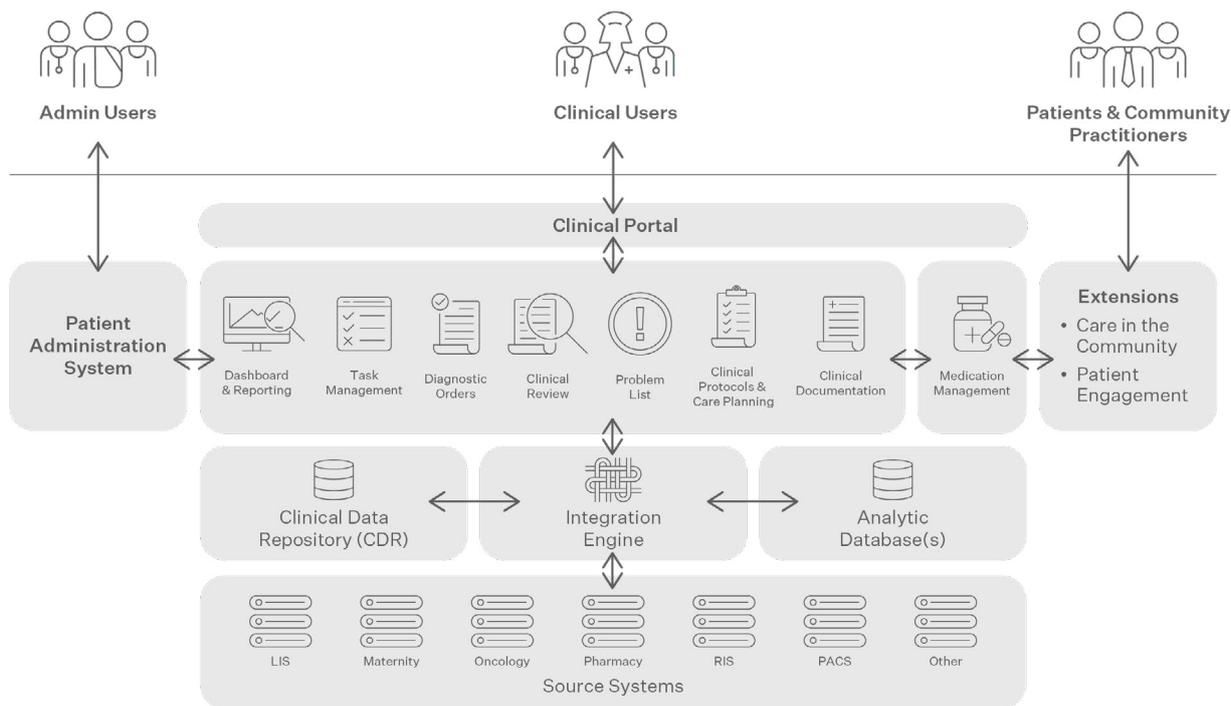
“In the hospital setting, electronic information systems can make health care ‘better’ by reducing the risk of harm to patients. This was a key driver for the Canterbury DHB to develop world class information systems. Currently adverse events occur in about 15 per cent of hospital stays for Canterbury DHB - its goal is zero harm.”

## The Solution

Hemens says the approach Canterbury DHB is taking to address these challenges is guided by its vision of an integrated health system that keeps people well in the community wherever possible. “Canterbury is leading the way in making healthcare available closer to our homes and making hospital the last resort.”

Canterbury DHB has:

- Taken a whole-of-system approach where everyone in the health sector works together to do what is right for the patient
- Aligned pathways of care between hospitals and the community to improve information sharing across all providers of health care
- Strengthened partnerships and alliances to improve the way services are delivered, particularly through the Canterbury Clinical Network, an alliance of health professionals from across the health system



## Health Connect South EMR

The development of Canterbury DHB's Health Connect South Electronic Medical Record, is a key enabler of the organisation's vision. It is a web-based portal that uses Rhapsody Integration Engine to create and provide a unified view of a complete patient record across the organisation.

Multiple care providers and sites can simultaneously view a patient's medical record, facilitating collaboration and multidisciplinary team care. Authorised users can see full patient medical histories which, along with reminders, alerts and embedded decision-support, help clinicians to make informed, evidence-based decisions.

Its core components from Orion Health are:

- Clinical Portal
- Clinical Data Repository
- Rhapsody Integration Engine
- Clinical Documentation

Two key additional Orion Health components extend the solution across the health sector and into the homes of patients:

- Clinical Referrals
- Patient Portal

The modular nature of Orion Health's solution allows new clinical systems to be added over time, providing a scalable infrastructure for Canterbury DHB to respond to new requirements and implement new models of care.

Canterbury DHB had used Orion Health's software since 2007 and in 2011 this was enhanced and branded as Health Connect South, with South Canterbury DHB and West Coast DHB also joining the information sharing network at that time. Besides providing an in-hospital EMR, which is the primary clinical tool used by all clinical staff across the DHB, Health Connect South enables information to be gathered from and viewed by Canterbury General Practitioners, pharmacists and community carers. The February 2011 Canterbury earthquake, which destroyed five general practices and severely disrupted many other practices and pharmacies, created an urgent need for a shared care patient record system that did not sit at individual medical centres.

The electronic shared care record view (HealthOne) was commissioned by a partner alliance of the Canterbury DHB, Pegasus Health, the Canterbury Primary Healthcare Organisation (PHO), and Orion Health. HealthOne takes parts of the General Practitioner doctor's record, community pharmacy dispensing information and community care co-

ordination referrals into a centralised store. This can be viewed through Health Connect South by the patient's health care providers at the point of care. (For more information see our separate eSCR/V/HealthOne case study.)

## Clinical Portal

“The Clinical Portal is typically the first thing Canterbury DHB clinicians log onto in the morning,” says Hemens. “It has clinical information as opposed to the patient administration system which tends to be demographic, administrative or appointments. The Clinical Portal is the single source of clinical truth.

“The first page a clinician will log onto is the clinician homepage which has ‘my tasks’, and ‘my patients’ – all the things the clinician needs to attend to first and the core information of interest to him or her.

“The patient summary page gives information about individual patients and their recent encounters with Canterbury DHB. The patient summary has click-through tabs for further details on that patient. These tabs take the clinician to a number of different applications, some of which are Orion Health applications and some of which are from other third party vendors. “For example, the lab system is from another vendor, but clinicians still access patient lab results by clicking on a tab in the Health Connect South clinical portal. Another tab takes the clinician to stored digital images of x-rays and scans for that patient. Other medical documents can be accessed through the portal. “When a clinician has selected a patient to look at, any of the tabs then clicked on give information for that patient only. We call that “patient in context”. When the clinician has finished with a particular patient they can select another patient from their list, or search for another patient and again it is all patient in context for that person.

## Clinical Data Repository

The Clinical Data Repository (CDR) is Health Connect South's document store containing patients' lab results, discharge summaries, clinical letter and specialists' letters. “If I go to



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**David Meates**  
CEO,  
Canterbury District Health Board

a clinic with a consultant she will write a letter to my GP or the clinician that referred me. That letter will be sent to my GP but also will be stored in the CDR and can be accessed through the Clinical Portal,” says Hemens.

“The CDR allows clinicians to search on all of the records or documents relating to a particular patient. These could be any number of forms, letters, discharge summaries and medication summary forms.”

## Rhapsody Integration Engine™

The Rhapsody Integration Engine is a piece of technology, also known as ‘middleware’, that links different systems together and gets them talking in a common language. “When a non-Orion Health system is accessed through the Clinical Portal, it is talking via Rhapsody to the Clinical Data Repository,” says Hemens.

The external systems Health Connect South links through the Rhapsody Integration Engine include:

- Sysmex for laboratory results
- Lots and Toniq for community pharmacy
- Intelerad for x-rays and CT scans
- Mosaiq for cancer care
- Plato for clinical coding

Other systems, including cancer and diabetes care systems under development, Orion Health's mental health system, developed for the West Coast DHB (for more information see separate Mental Health case study), and electronic medications reconciliation system, developed with Counties Manukau DHB (For more information see separate Medication

Reconciliation case study), will be made available through the Health Connect South Clinical Portal.



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**David Meates**  
CEO,  
Canterbury District Health Board

## The Results

Health Connect South is a prime example of how Canterbury DHB is working with its local DHB cluster – the South Island Health Alliance – and the Ministry of Health to develop a single Electronic Medical Record for patients that is accessible in a hospital, primary and community health care through a shared system.

CEO David Meates says Canterbury DHB and Orion Health have worked together as true partners. “Orion Health has been able to bring together all the technical aspects in what is a really complex and difficult area and bring our vision to life. They have been tolerant and patient – and most of all they have listened to what we are trying to achieve. We now have a partner who is embedded with our clinical teams in hospital and primary care and is intuitively working with us to create something that works for both patients and our community.”

Canterbury DHB’s Executive Director of Allied Health, Stella Ward, says the organisation’s vision is for a connected system, centred on people. “One measure we really focus on is people’s time wasted waiting in our system. In the last three years we have saved 1.5 million days of time for people in our community by being more efficient and effective.”

## Comprehensive information sharing

The comprehensive sharing of information provided by Health Connect South among clinicians within Canterbury DHB hospitals was

not possible with the previous paper-based systems. “Paper gets lost,” says Hemens. “Instead of clinicians writing on paper, they now enter the information onto the EMR and their colleagues on the next shift have full visibility of exactly what they have done. In the paper-based world that didn’t happen. The EMR removes the need to write things multiple times on multiple different forms.”

## Speed of data retrieval

With the push of a button clinicians can now have a document on any patient open within seconds, immeasurably faster than was possible with paper-based records. “Paper is like a horse drawn carriage,” says Ward. “It can’t go any faster or any further. We are drowning in paper. The electronic systems we are putting in place are vital for transforming care, and delivering a safer, more effective and more efficient patient experience.”

A unified view of patient records means a single sign on for viewing, reporting and forwarding information. Clinicians spend less time logging on to multiple systems, orders can be entered and stored for prescriptions, tests and other services. Senior clinicians and managers attest the electronic system has become progressively faster and easier to use as new versions have been installed.

## Multiple sites across the South Island

The Health Connect South EMR has extended beyond Canterbury DHB to operate across West Coast DHB and South Canterbury DHB and will be extended to Nelson Marlborough DHB and Southern DHB in 2015. “If I am in Nelson on holiday, for example, and I get sick and go to hospital there, Nelson hospital doctors will have access to my records which, historically, they wouldn’t have,” says Hemens. “Previously my record would be a paper folder sitting in Christchurch, or electronic record stored within the siloed solutions within the various healthcare providers who have provided me with care. In the new Electronic Medical Record world our health professionals will be able to access a single medical record for patients across the

South Island, effective and more efficient patient experience.”

## Reducing the risk of patient harm

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There is a risk of patient harm when clinicians don't have the right information to make decisions. “The Electronic Medical Record gives clinicians access to all the information they need at the point of care. That means they have access to lab results, medication history and previous hospital visits.” Efficient, secure and readily accessible communication among health providers improves the continuity of care, increases the timeliness of diagnoses and treatments and reduces the frequency of adverse events.

## Future Developments

### National coverage

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Currently three South Island DHBs are on Health Connect South. By mid-2015 all five South Island DHBs will be on Health Connect South and that will lead the country for the uptake of a shared EMR. It means wherever a person is in the South Island, health care professionals from any of the 5 South Island DHBs will have full visibility of their record.

That is going to extend nationally so, in a few years' time when North Islanders are in the South Island, their patient records will also be visible to South Island clinicians should they need health care. At the moment patient information is not available to hospitals nationally and patients away from home may be harmed because clinical decisions have to be made with a lack of information.

## Cancer care solution

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Orion Health is working on a national solution for tracking the care of cancer patients, Multidisciplinary Meeting (MDM) Management and Faster Cancer Treatment reporting. This solution will be fully integrated with Clinical Portals, regionally to start with and, ultimately, nationally. Cancer patients will have an additional tab on their record which will allow the effective tracking of cancer care by clinicians and other carers, such as Cancer Nurse Specialists. The project links back to the Government's national

health goals and will be a collaboration with the Cancer Networks and the Ministry of Health.

Currently, tracking cancer patients is done many different ways, often manually with paper or using a combination of spreadsheets and databases. “Our solution will automate the Government's reporting on cancer and ensure that people don't slip through the cracks,” says Hemens. “This is absolutely going to improve the quality and speed of cancer care that patients in New Zealand will receive.”

## Diabetes care solution

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A solution to track and monitor the treatment of diabetes patients has been created but more development is required to gain the support of the clinicians who use the system. Hemens says, “We went from a paper based solution to an electronic based solution and, during that transition, it was decided it would be easy to gather a lot more information electronically than was being gathered on paper. But that turned out to be more time consuming for clinicians than expected – this is what the Orion Health and Canterbury DHB development teams are now addressing.”

## Mental health care solution

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New Zealand's first fully integrated clinical record for mental health was developed by Orion Health for West Coast DHB as a pilot for the other partners in the South Island Health Alliance. The system, which integrates mental health clinical records with the patient administration system, will be implemented by Canterbury DHB and other South Island DHBs and made available to clinicians through the Health Connect South Clinical Portal.

## Medication reconciliation solution

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Canterbury DHB also plans to make Orion Health's Medication Reconciliation software available through the Health Connect South Clinical Portal. This system supports clinicians as they record and check patients' medications as they enter hospital. It then highlights, tracks and reports medication changes during their

hospital stay and provides GPs and patients with an electronic medications record as they leave hospital. The system automatically pulls all the information on what medication changes have occurred during the hospital stay, along with allergy and adverse drug reaction status so clinicians can make valid, informed decisions about patients' medicines at the point of discharge.

### Desktop delivery project

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Canterbury DHB's information technology team is working on a 'desktop delivery project', using thin clients linked to a server instead of traditional personal computers. When clinicians are on their ward rounds they use their Canterbury DHB ID cards to log on to, and log off from, a thin client computer in each ward by tapping on a device on the screen. They then move to the computer in the next ward, tap on to the system and their session comes back exactly where they left it. This innovative technology allows clinicians to move around the hospital and have their sessions follow them.

### Mobile devices

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Another upcoming option will be for clinicians to connect to the Clinical Portal using mobile devices, such as an iPad, providing true mobility. The Clinical Portal software version that Canterbury DHB is using is already iPad compatible and has been tested, so a clinician could stand at the patient's bed and access the Clinical Portal and access that patient's information on the iPad now. User interface improvements and support for multiple device types, as well as infrastructure and security upgrades to Canterbury DHB's IT systems, will enable widespread mobile access to the Clinical Portal.

### Patient portal

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Canterbury DHB ultimately plans to extend Health Connect South to give patients access to their own health records. The Orion Health Electronic Medical Record can be extended with modules that provide interactive patient education and help to carry out home monitoring and self-testing, improving control of chronic conditions such as diabetes. Secure messaging systems between patients and health providers ensures patient data is secure. A pilot patient portal for Canterbury DHB has been developed by Orion Health and is currently being trialled in a limited Proof of Concept with a number of patients in the Canterbury District. The plan is to further develop the patient portal in 2015, as we move towards widespread availability and uptake of a patient portal in Canterbury and the South Island.

### Orion Health

At Orion Health, we are building thinking software for life. Our new generation eHealth software provides an open platform that seamlessly integrates local, regional, and national data, making it more readily available to doctors, nurses, specialists and patients themselves. We believe that our software, built on new generation technology, will give everyone healthier, happier and longer lives.

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