



Integrated Healthcare and SNOMED

**Creating
Integration**

**Using
SNOMED**

HCAS

**Middle
Earth**

**The
Future**

**Bending
the Curve**

**The
Canterbury
Journey**

So what do we know about Middle Earth



Gender

Life expectancy

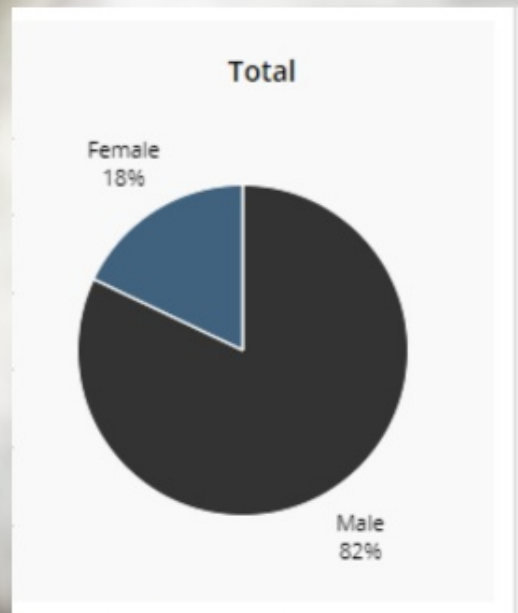
Distance Traveled

Character Mentions

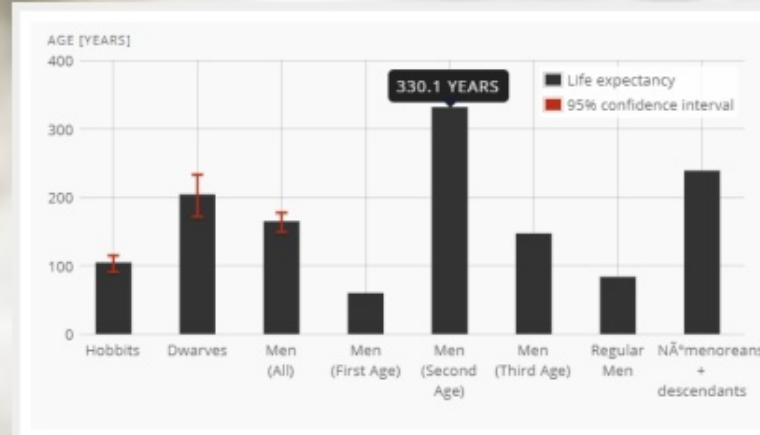
What do we really know?



Demographics



Life Expectancy



AGE [YEARS]

400

300

200

100

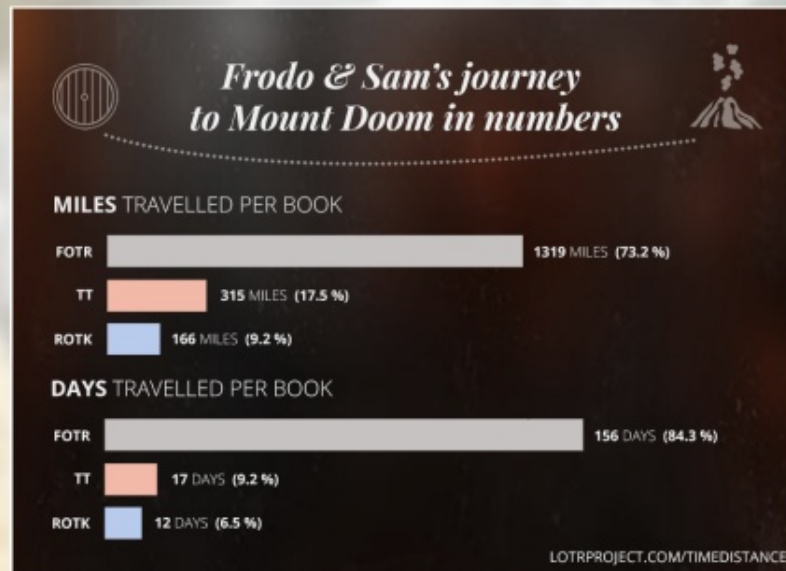
0

330.1 YEARS

■ Life expectancy
■ 95% confidence interval

Hobbits Dwarves Men (All) Men (First Age) Men (Second Age) Men (Third Age) Regular Men Nōmenoreans + descendants

Logistics

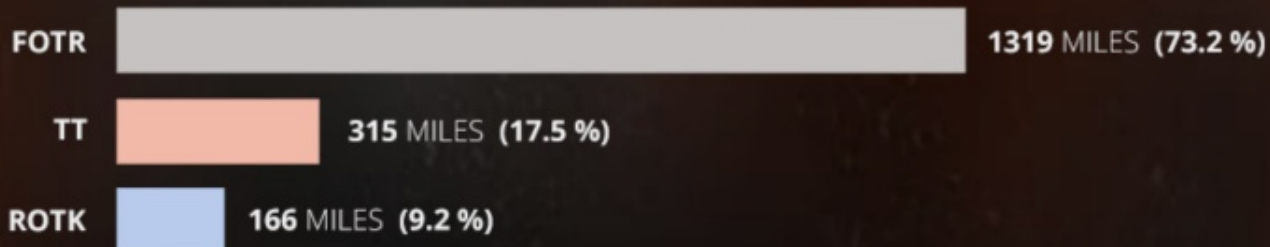




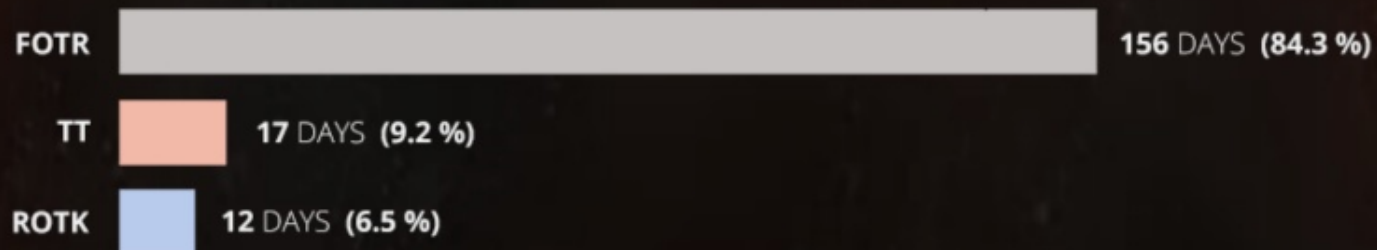
Frodo & Sam's journey to Mount Doom in numbers



MILES TRAVELLED PER BOOK



DAYS TRAVELLED PER BOOK

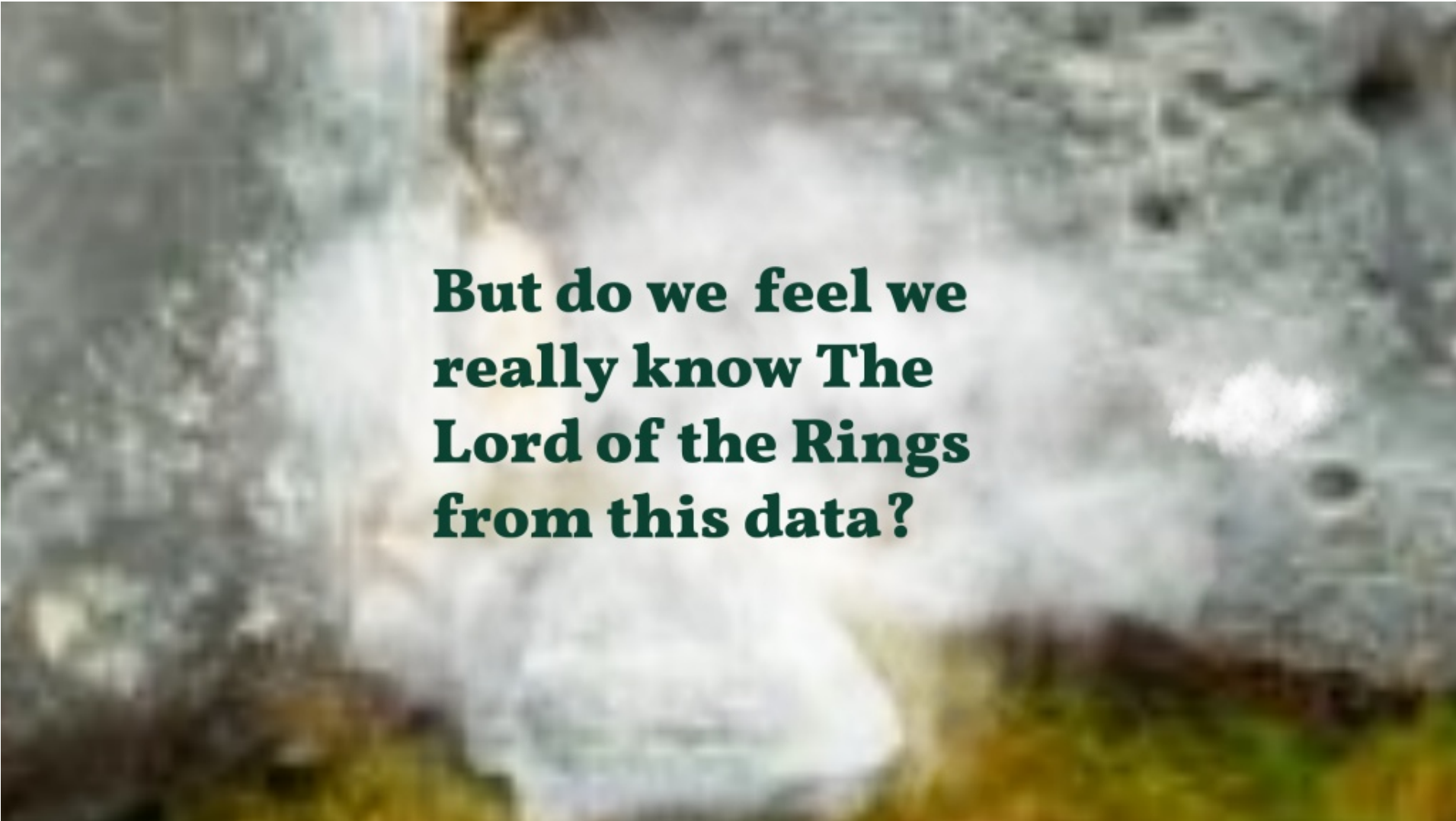


LOTRPROJECT.COM/TIMEDISTANCE

Staff Interactions

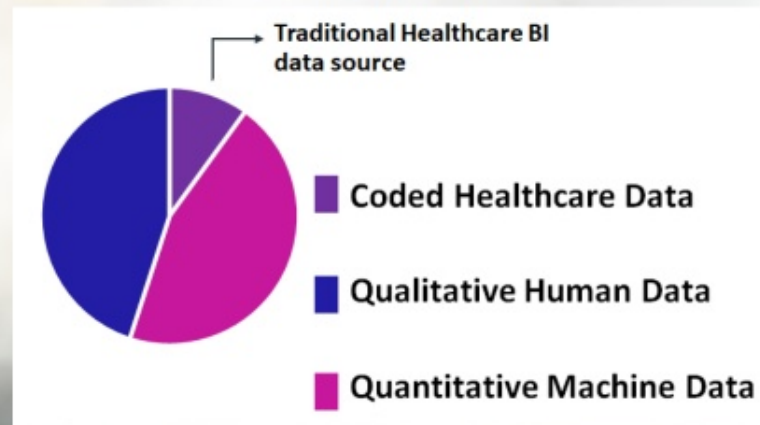






**But do we feel we
really know The
Lord of the Rings
from this data?**

Yet we try to understand our health systems the same way





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In the beginning

About
Us



Where we
started

Where
we were
going ...

What
Are we
doing...

About Us

Our Workforce

9,745 people are employed by the Canterbury District Health Board. We are the **largest single employer** in the South Island

46 is the average age of our workforce

52 is the average age of our oldest workforce group: **Support Services**

107 different ethnic groups across our workforce

9% turnover rate, compared to **9.5%** nationally

3.2% sick leave rate compared to **3.8%** nationally

48% of our workforce work part time

81% of our workforce are female

48% of our workforce are nurses

57% of DHB senior management roles (tier 1-3) are filled by females

Canterbury DHB

Key Population Stats

2019/20

578,830 people

Canterbury's population growth is exceeding expectations —already reaching levels predicted for 2022

Our population's growing

Our growth rate is **13.2%** over the past 10 years—higher than predicted for the rest of the region.



Our population's aging

Our population is older than the NZ average. By 2022, one in five people in Canterbury will be older than 65 (21.7% currently).

Largest population aged over 65 in NZ
55,192 people



Our population's diverse

Our population is becoming more diverse. In Canterbury, one person out of every five was born overseas.

5.2% are Māori

2.9% are Pacific

9.8% are Asian

Fastest growing population overseas born in NZ
11,830 people



Key Population Stats

2019/20

578,830 people

Canterbury's population growth is exceeding expectations
—already reaching levels predicted for 2022

Our population's growing

Our growth rate is 13.2% over the past 10 years—higher than predicted before the earthquakes.



Our population's ageing

Our population is older than the NZ average. By 2026, one in five people in Canterbury will be older than 65 (15.7% currently).



Largest
population aged
over 65 in NZ

93,150 people

Our population's diverse

Our population is becoming more diverse. In Canterbury, one person out of every five was born overseas.



Fastest
growing Maori
population in NZ

51,630 people

Based on the Stats NZ Dec 2016 Population Projections

Our Workforce

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Where we started

Then

CANTERBURY PATIENTS ARE MORE LIKELY TO WAIT FOR TREATMENT (PRESS 2003)

And to be left dangling over when they will get help – than patients elsewhere in the country

Canterbury cancer patients seemed to have suffered more than most from radiotherapy delays (Press 2003)

Over-crowded ED, Gridlocked hospital, Cancelled operations, Threatened industrial action

General practice and hospital clinicians disconnected

Locum medical costs skyrocketing ; nursing shortages

2005 – Press reports that the CDEB has been unable to meet its elective performance targets for four financial years .

2006- 5000 patients removed from waiting lists to meet waiting time targets



Then

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Where we were going



*400 more hospital beds
2000 more aged care beds
8000 more health workers*



*400 more hospital beds
2000 more aged care beds
8000 more health workers*

What are we doing





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Understanding the Population

Changes in population

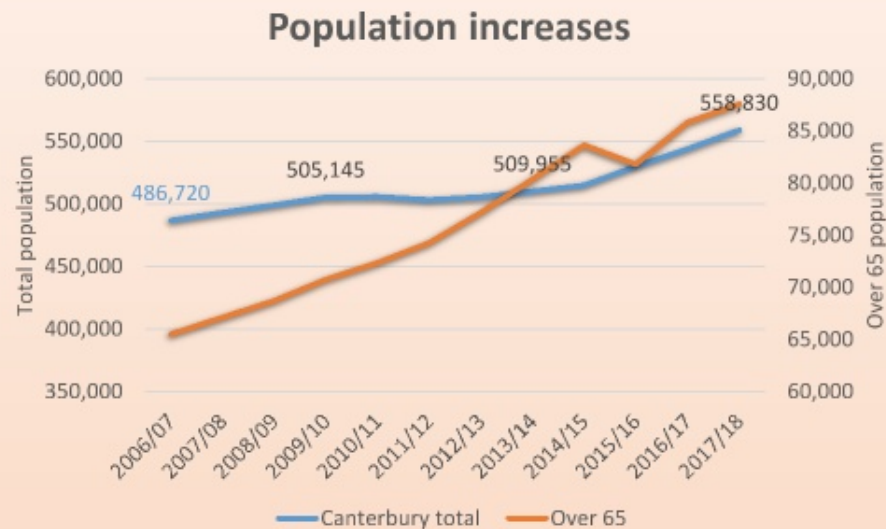


From 2006/07 to 2017/18:

- 14.8% increase – total population**
- 33.7% increase – over 65s**
- 18.9% increase – over 75s**
- 39.9% increase – Maori**

From 2012/13 our population has grown 30% faster than the national rate.
Maori is growing at twice the national rate.

Changes in population



From 2006/07 to 2017/18:

14.8% increase – total population

33.7% increase – over 65s

18.9% increase – over 75s

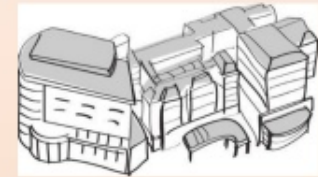
39.9% increase – Maori

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Maori is growing at twice the national rate.

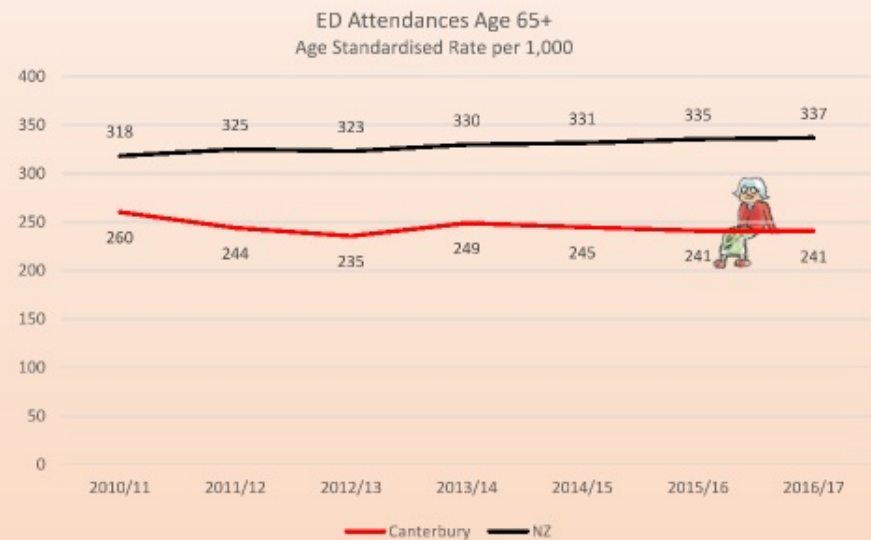
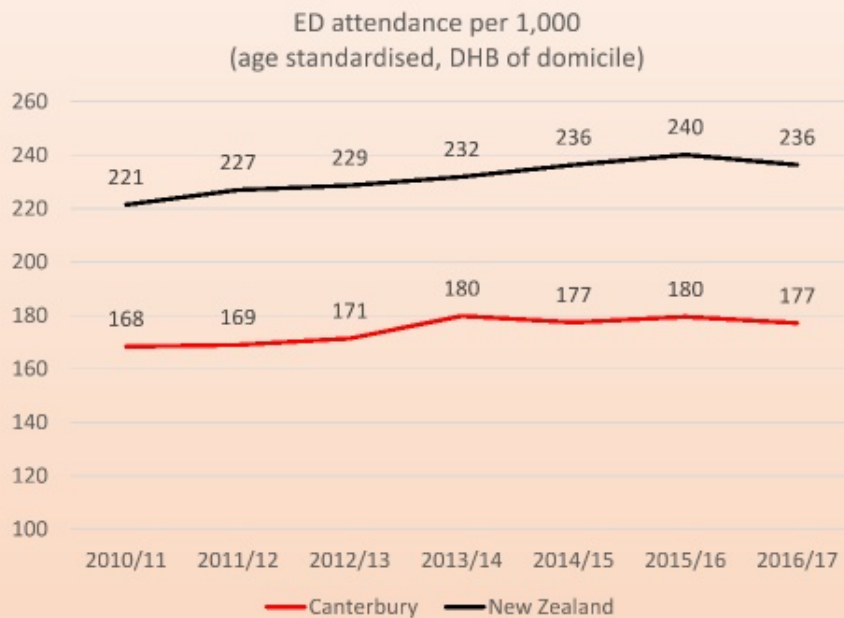
Delayed/avoided burden of long term conditions, decreased acute care

Key measure: Relative growth in acute medical admissions



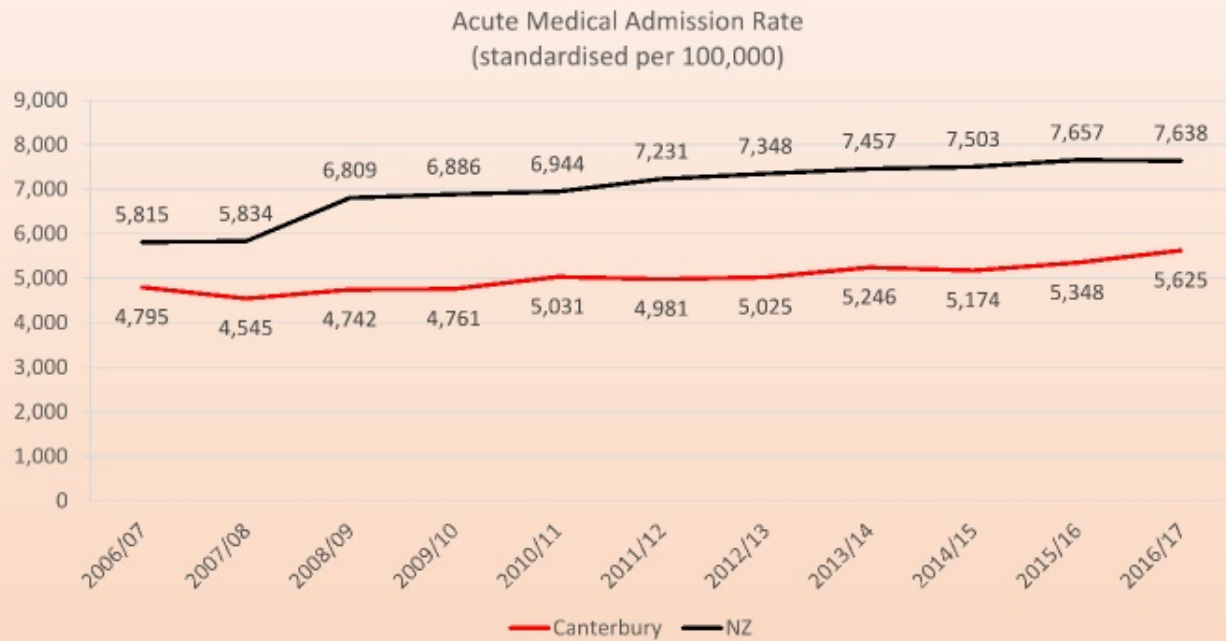
Increased planned care and decreased acute care

Key measure: Emergency Department attendance



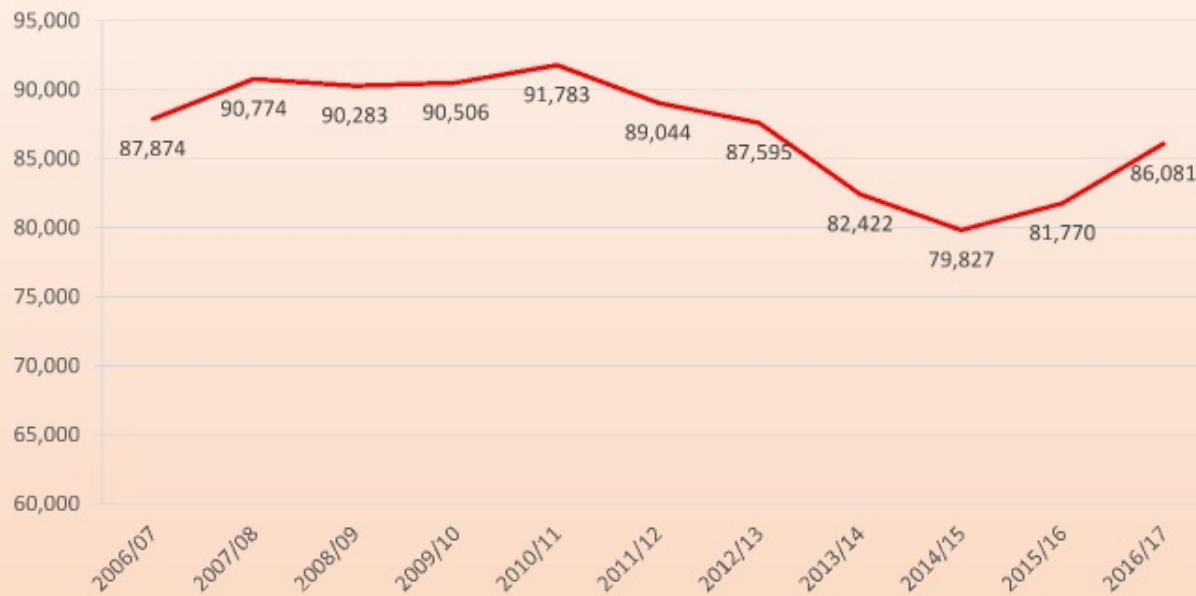
Delayed/avoided burden of long term conditions, decreased acute care

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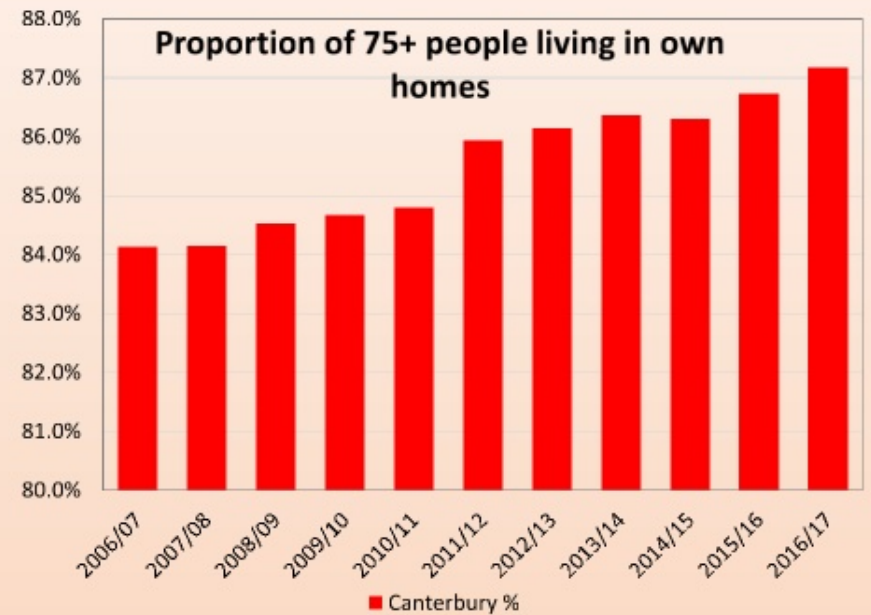
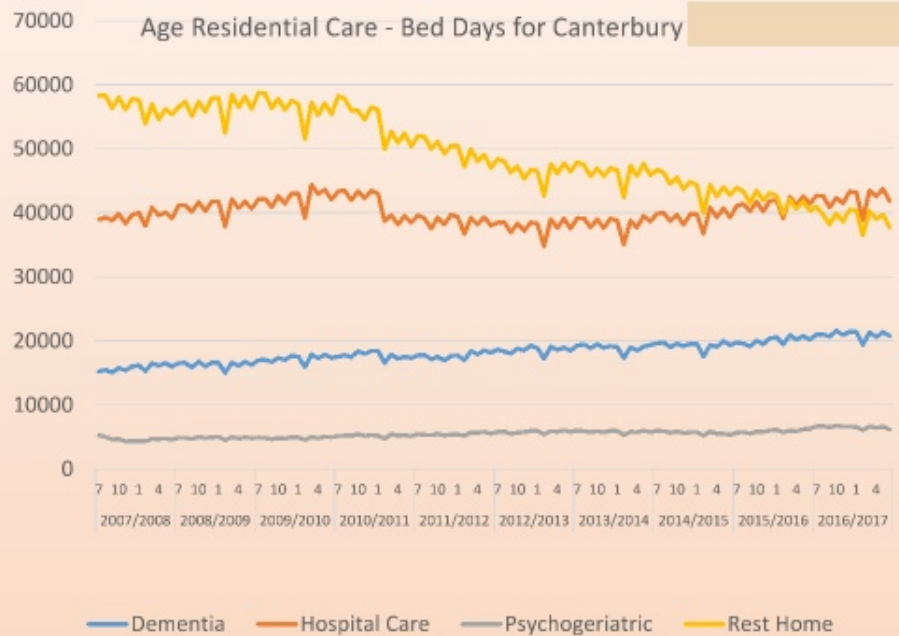


Increased planned care and decreased acute care

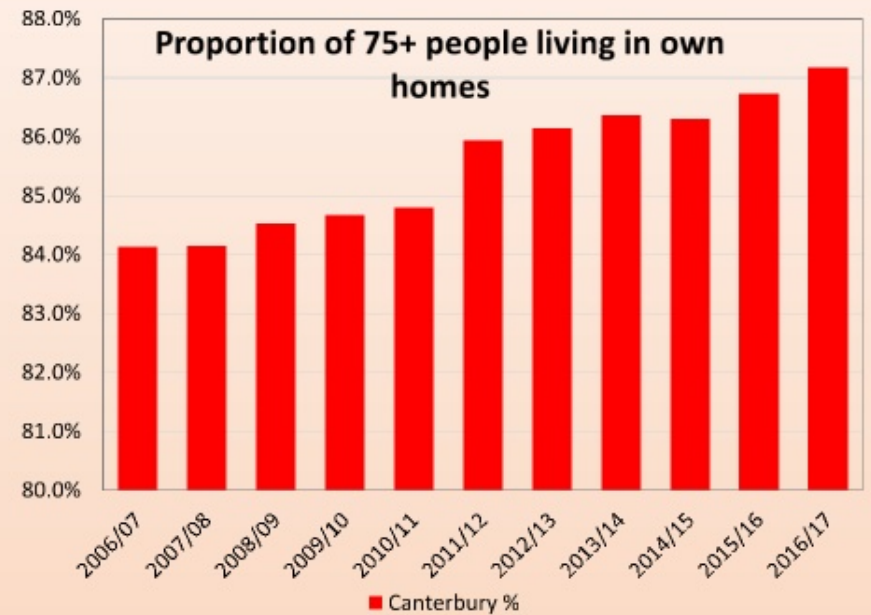
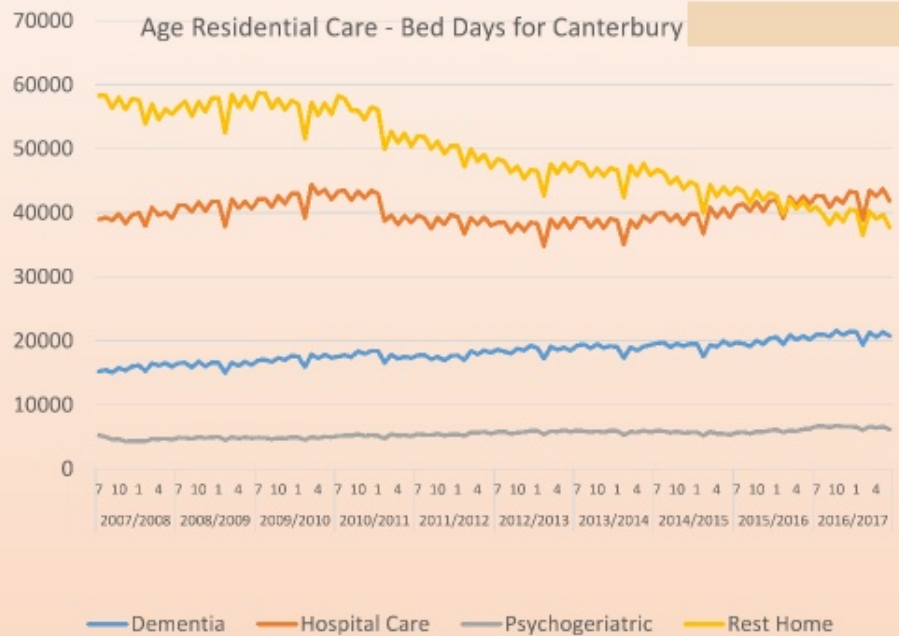
Key measure: Acute medical bed days



People living in their own homes



People living in their own homes



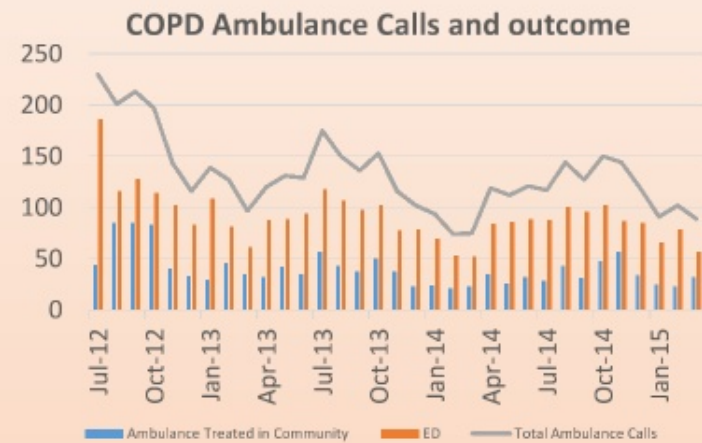
1000 empty aged care beds

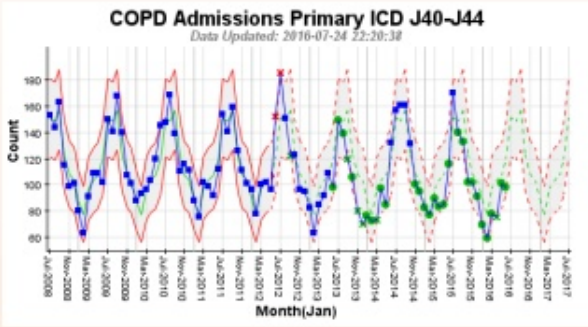
Balancing the Metric



Integrated Respiratory Services – COPD

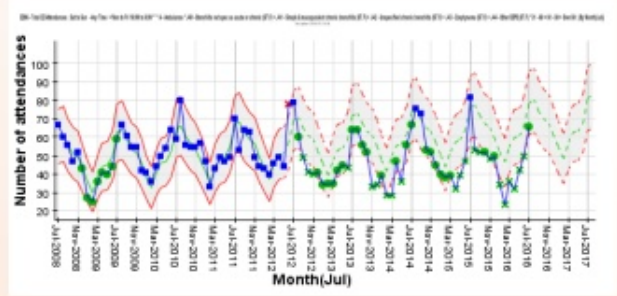
- Integrated response focusing on community management
- Around one third of 111 calls for respiratory issues are now diverted to community care
- Growth in admissions has been reduced
- Large reductions in bed days



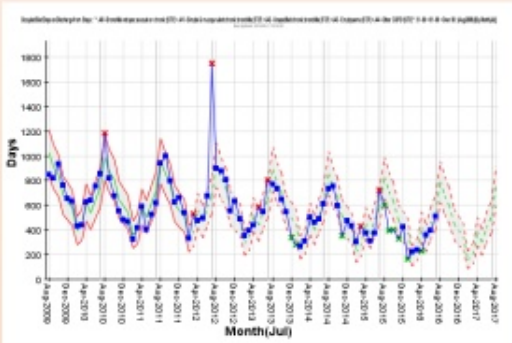


Fewer COPD Admissions

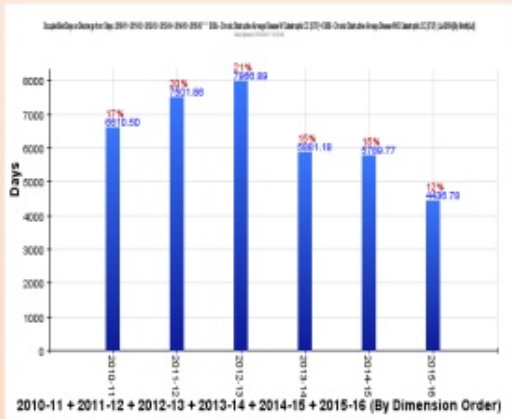
COPD INITIATIVE
 In the five years, compared with expected
 466 fewer admissions
 631 fewer ambulance arrival after hours
 6299 fewer bed days * (2009 baseline)
 139 fewer acute readmissions



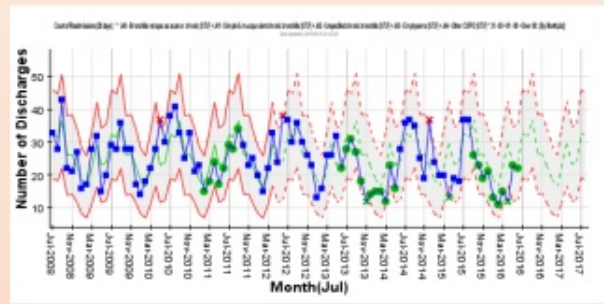
Fewer COPD ED Arrival by Ambulance After Hours (Mon – Fri 6pm-8am , Sat –Sun any time)



Fewer occupied beds# COPD

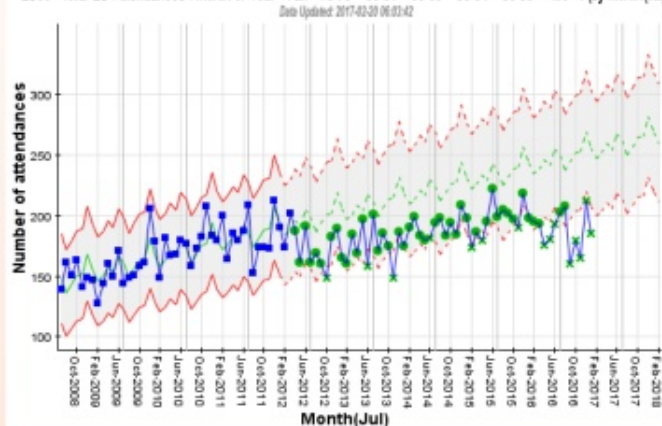


2010-11 + 2011-12 + 2012-13 + 2013-14 + 2014-15 + 2015-16 (By Dimension Order)



Fewer readmissions for # COPD

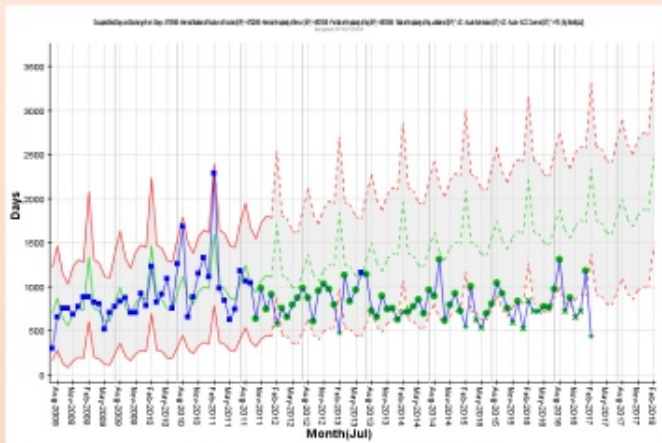
ED06 - Total ED Attendances : Month of Year * Fall * 75-79 + 80-84 + 85-89 + 90-94 + 95-99 + 100+ : (By Month(Jul))



Fewer ED attendances for a fall (75+)

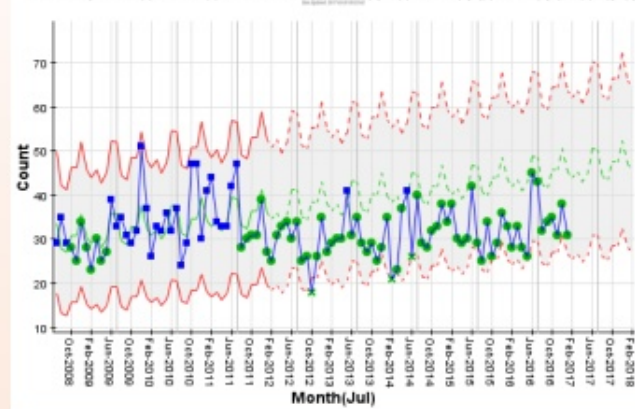
COMMUNITY FALLS PREVENTION

In five years, compared with expected (75+ years):
 2253 fewer ED attendances
 590 fewer fractured NOFs
 37,683 fewer NOF bed days
 222 fewer deaths at 180 days

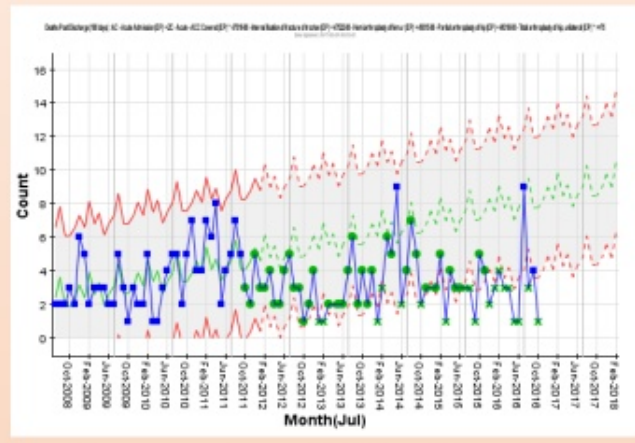


Fewer bed days for # NOF

Count (Month(Jul))



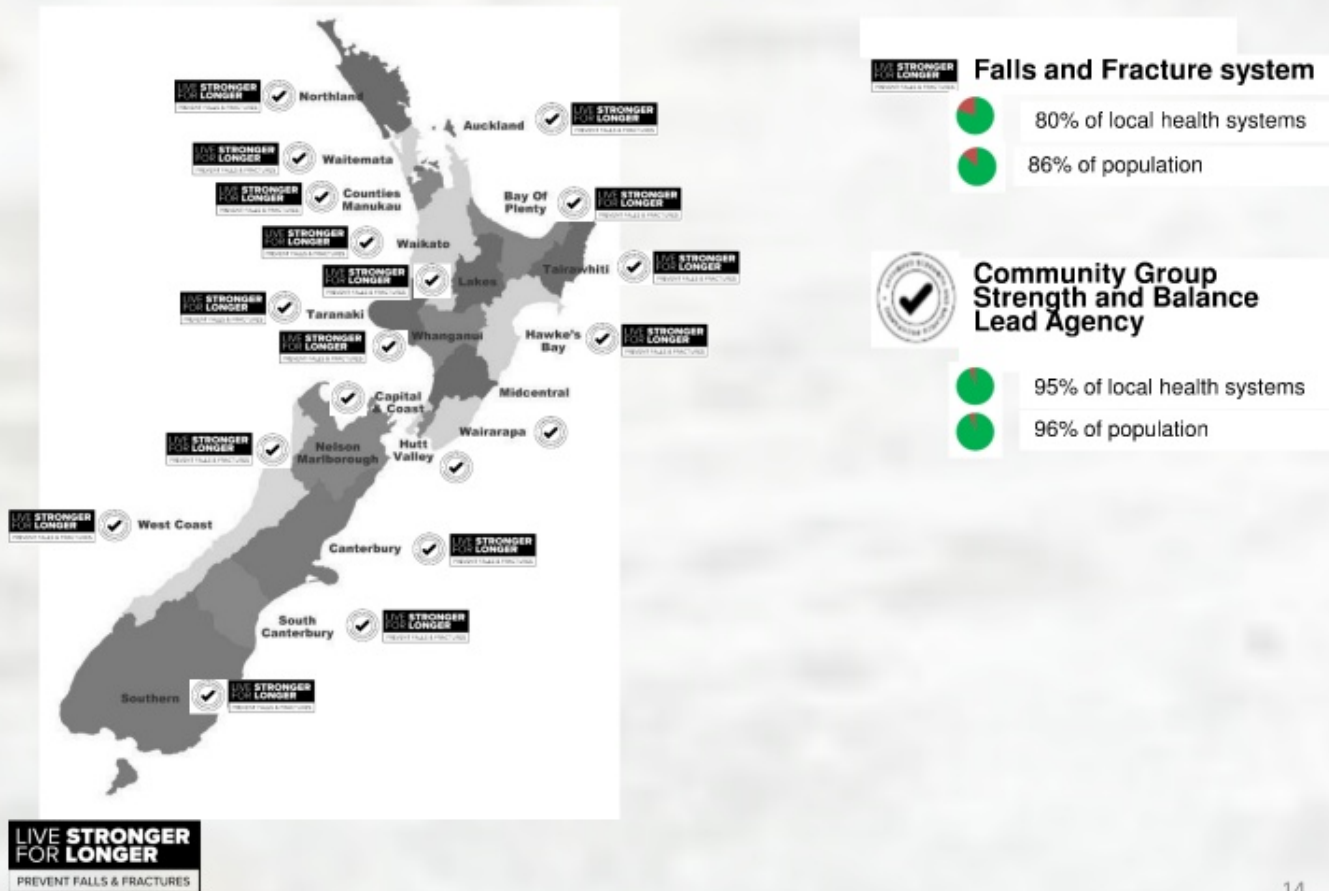
Fewer admissions for # NOF



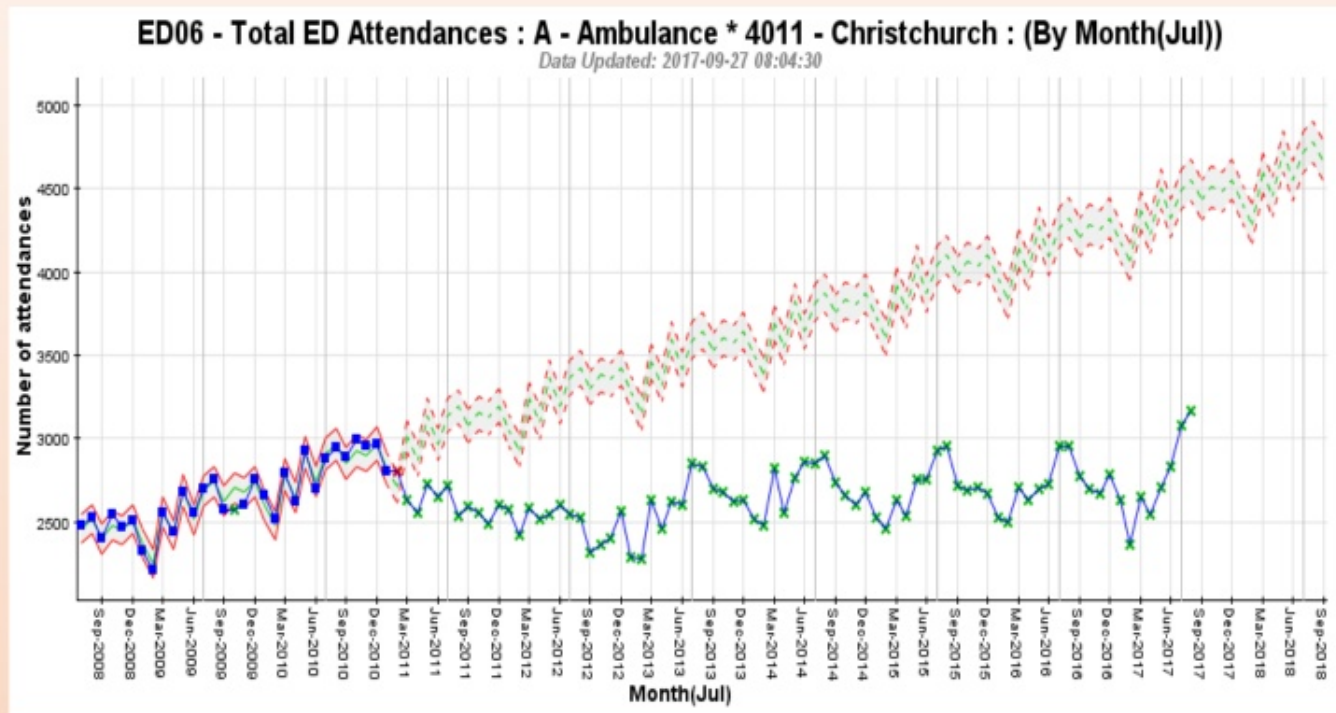
Fewer deaths at 180 days post # NOF

Agreed price (IDF) \$815 per rehab bed day
 \$8.212M costs foregone in last 12 months
 Cost: 6 Physios (\$650k pa)

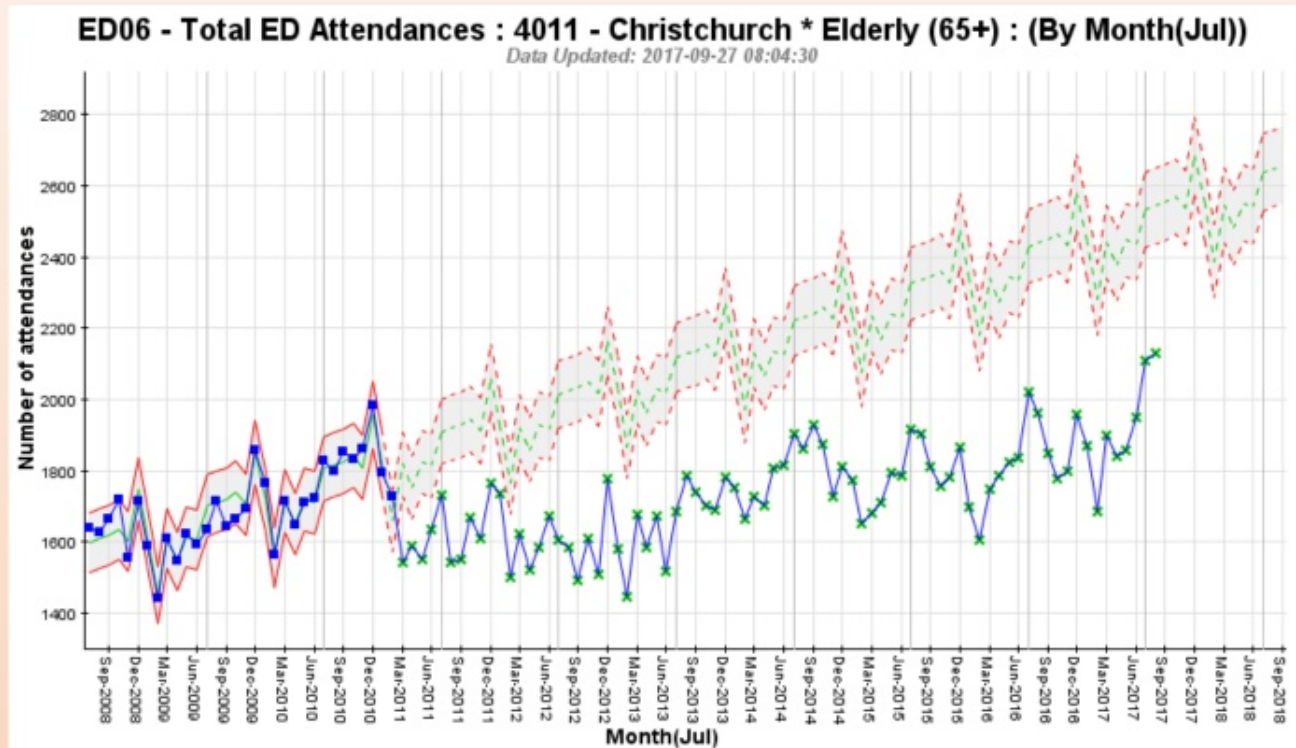
National Service Coverage August 2017



ED attendance by ambulance

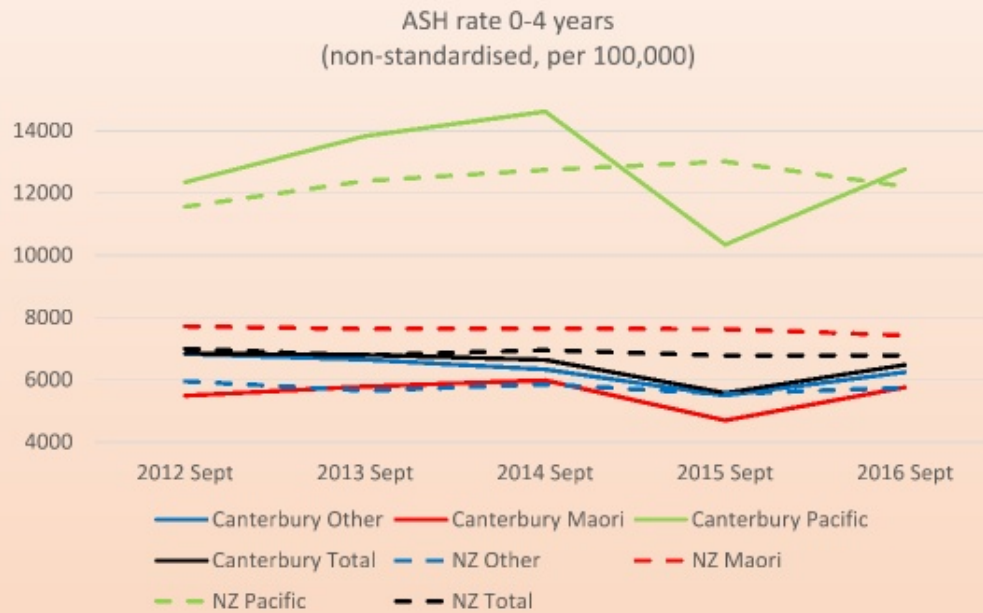


ED attendance – over 65s



Delayed/avoided burden of long term conditions, decreased acute care

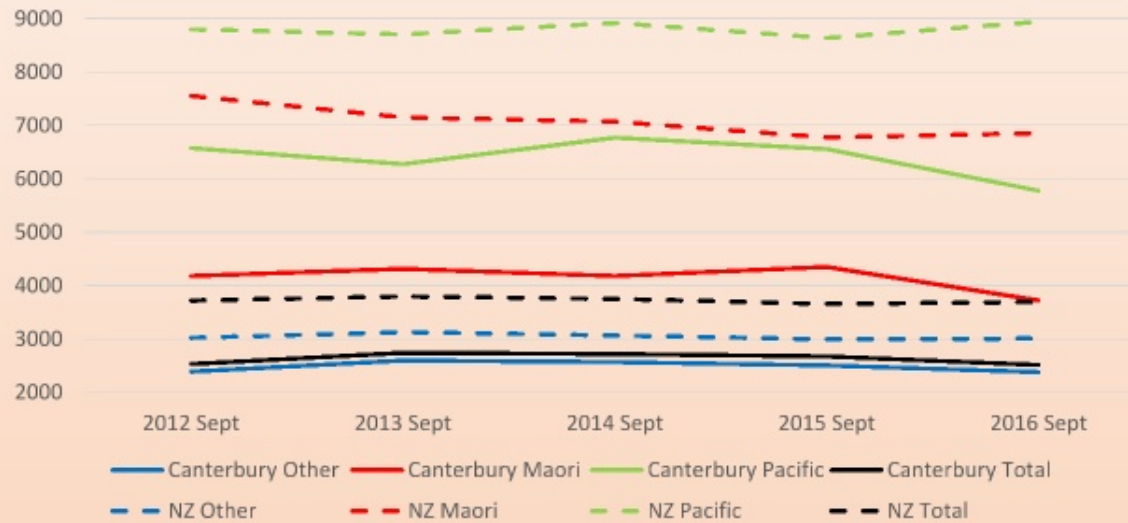
Key measure: Ambulatory Sensitive Hospitalisations



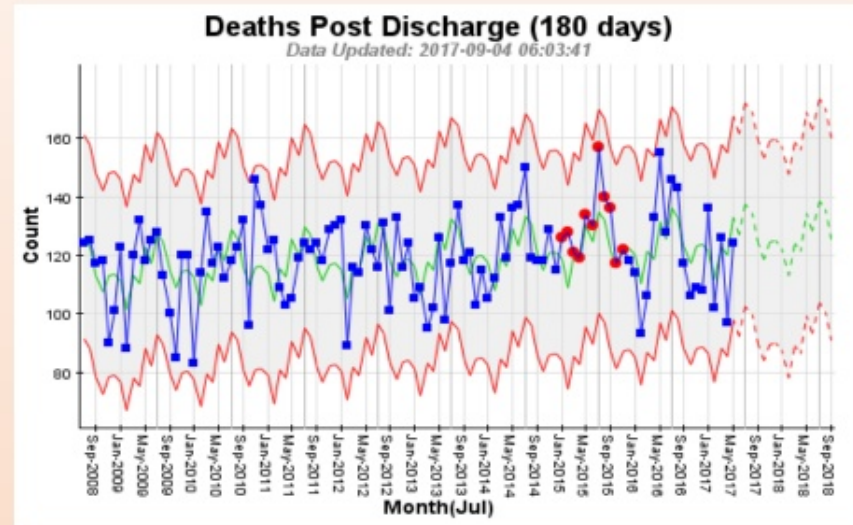
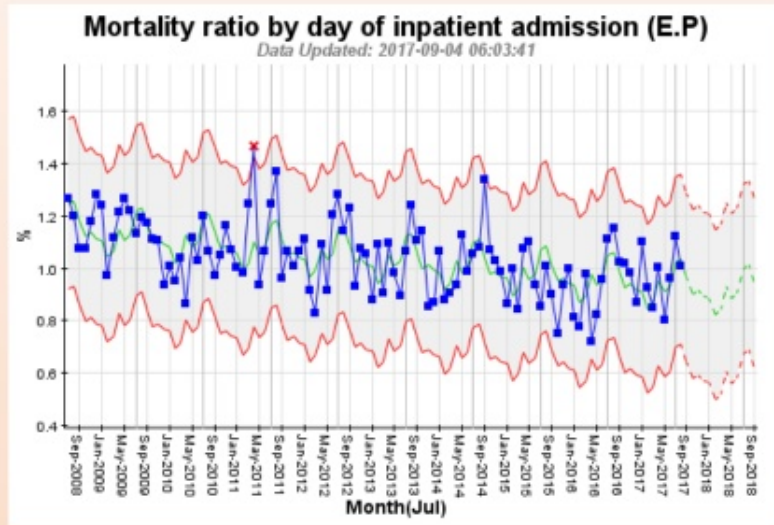
Delayed/avoided burden of long term conditions, decreased acute care

Key measure: Ambulatory Sensitive Hospitalisations

ASH rate 45-64 years
(standardised, per 100,000)



Hospital Mortality Ratio



ARC – reducing the growth

Canterbury's high historical ARC expenditure is coming back to national levels

Growth has been marginal for the last 7 years



September 2017

9

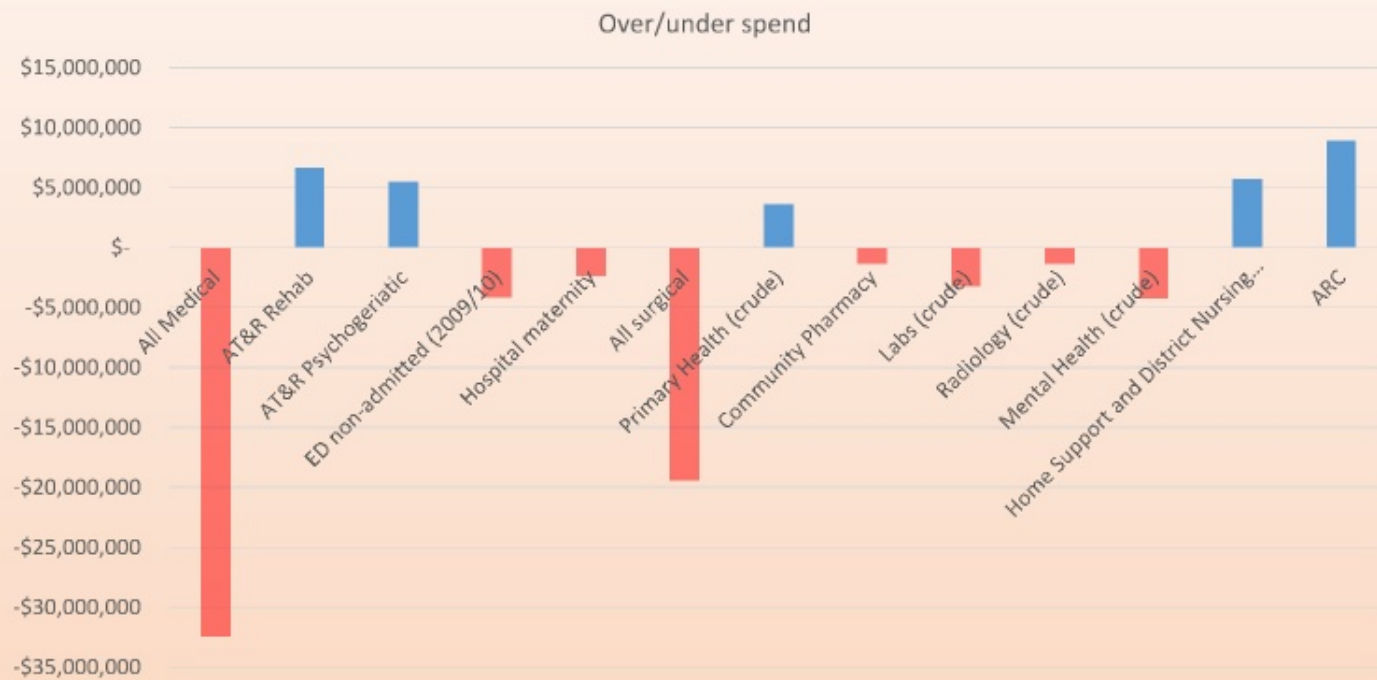
In summary...System Outcome 9 Living within our means

- Better services to keep people in their own homes and communities
- Better access
- More choices throughout life

Quantifying the avoidable costs:

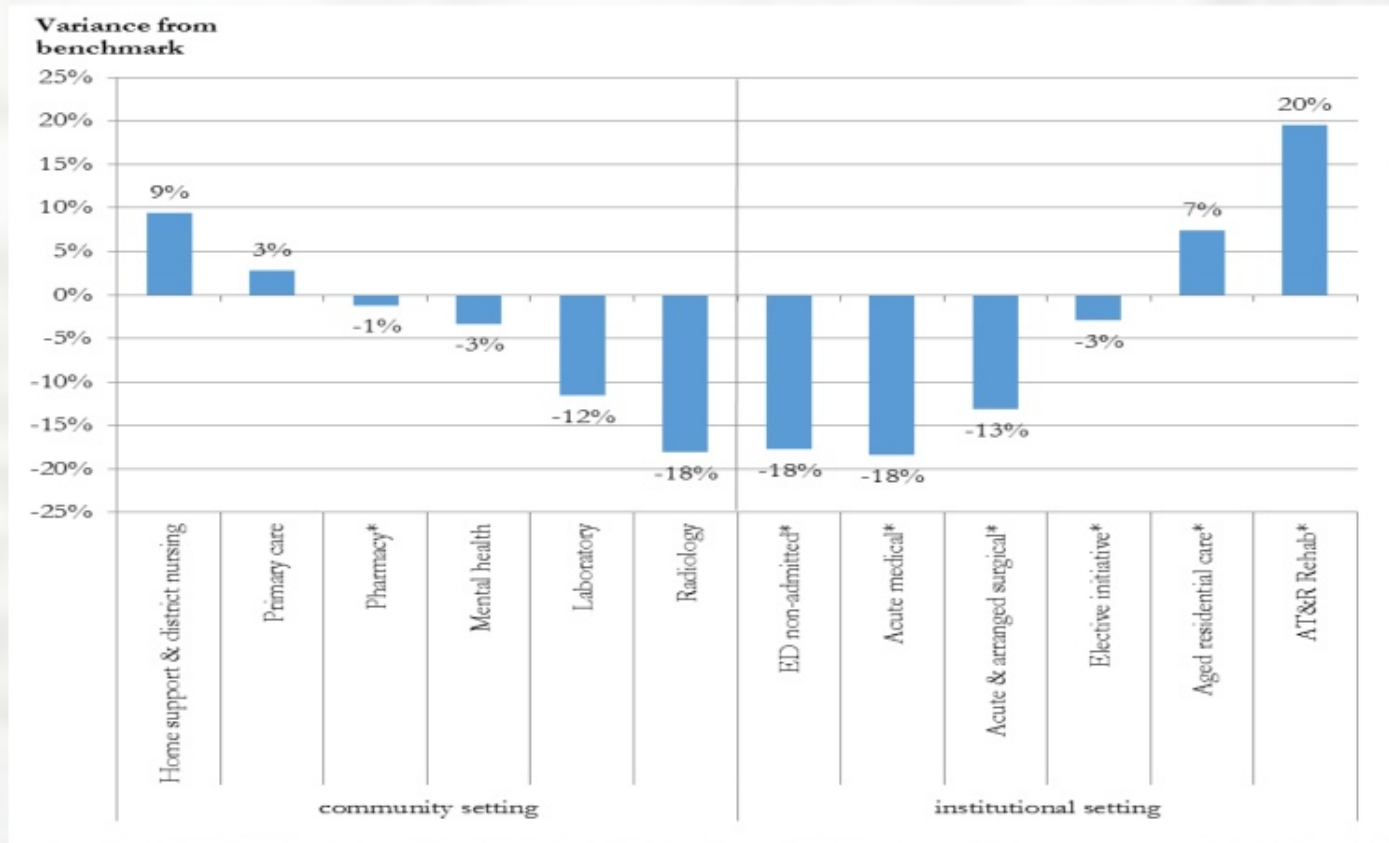
- Labs - **\$3.21M** below the national benchmark
- Pharmacy - **\$1.39M** below the national benchmark
- Radiology - **\$1.37M** below the national benchmark
- **\$9.98M** avoided costs for ED visits
- **\$14.49M** avoided costs for medical surgical bed days
- **\$12.81M** avoided costs for older persons rehab bed days
- **\$47.0M** avoided costs in aged residential care

Overall efficiency (large buckets)



This results in a net \$38.3M efficiency

13



September 2017

17



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Building a Platform



A shared vision

Three Strategic Goals

How did we respond?

Co-owned Coordination

A Shared Orientation

Services that Support People in a Community

ICT to Support

Its all about the Data

A shared vision



A connected system, centred around people
that aims not to waste their time

Three Strategic Goals

Three strategic goals

- 1** **People take greater responsibility for their own health**
The development of services that support people/whanau to stay well and take increased responsibility for their own health and wellbeing.
- 2** **People stay well in their own homes and communities**
The development of primary care and community services to support people/whanau in a community-based setting and provide a point of ongoing continuity, which for most people will be general practice.
- 3** **People receive timely and appropriate complex care**
The freeing-up of hospital based specialist resources to be responsive to episodic events and the provision of complex care and support and specialist advice to primary care.

Three strategic goals

1

People take greater responsibility for their own health

The development of services that support people/whanau to stay well and take increased responsibility for their own health and wellbeing.

2

People stay well in their own homes and communities

The development of primary care and community services to support people/whanau in a community-based setting and provide a point of ongoing continuity, which for most people will be general practice.

3

People receive timely and appropriate complex care

The freeing-up of hospital based specialist resources to be responsive to episodic events and the provision of complex care and support and specialist advice to primary care.

One health system, one budget.

- Removing barriers and perverse incentives created by contracts and organisational boundaries by planning and working collaboratively across the public, private and NGO sectors.
- Getting the best outcomes possible within the resources we have.

It's about people.

- The key measure of success at every point in the system is reducing the time people waste *waiting*.
- Right care, right place, right time, delivered by the right person.

Focus on leadership.

- The DHB's role is to buy the right thing for the population.
- Clinicians are enabled to do the right thing the right way.

Take a 'whole of system' approach.

- Understand and respond to the needs of populations.
- Use information to plan and drive service improvement.
- Manage the short term in the context of the long term.
- Focus on improving productivity by doing the right thing the right way at the right time.
- Make decisions based on where services are best provided:
 - What is best for the patient?
 - What is best for the system?

Empowered Networks

Clinically led local and regional alliances established as vehicles for implementing system change and improving health outcomes

- High trust, low bureaucracy
- One health system, one budget
- Best for patient, best for system
- Everyone wins, or everyone loses



Adaptive Leadership

- clinicians are **trusted**
- care pathways are **re-designed**
- funding and resources are rearranged to **support**
- the person is in the **middle** of the process
- the system responds well to **external** shocks
- **adaptive** leadership **in action**



Working Differently



Supporting people to stay well
In their own homes and communities
Reducing acute demand
Freeing up hospital capacity

Co-owned Coordination

"The way we do it around here"

In our
Community



For our
community

HealthPathways



HealthPathways

Designed and developed in Canterbury - clinically led pathways developed by primary and specialist services for local health systems

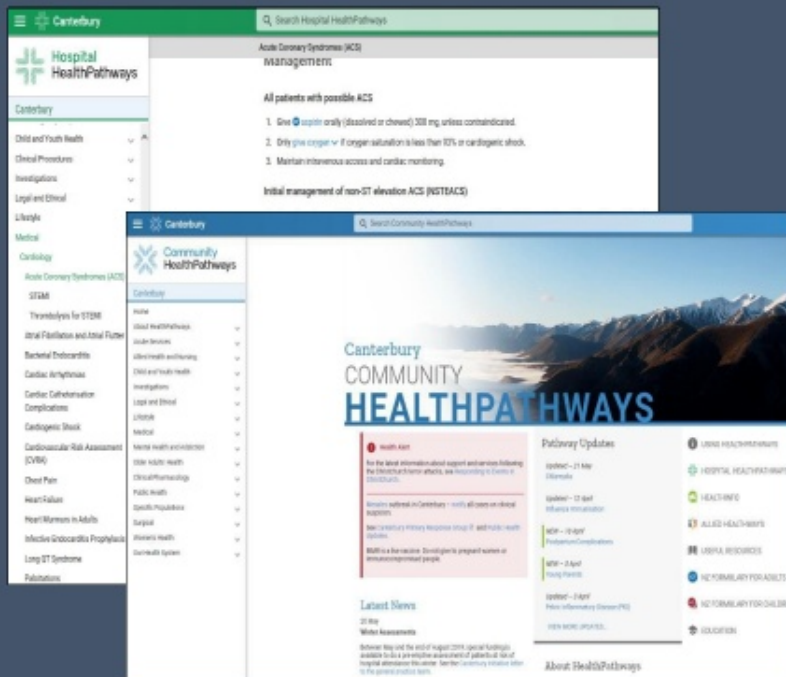
- Provides a standardised model of care for patients
- Supports timely, high quality care
- Regularly reviewed by clinical teams

700+ Community pathways
485 Hospital pathways
99% of GPs use HealthPathways every week*
70% of GPs use HealthPathways every day*

Now used in 43 health regions in four countries, supporting care for 28 million people*

Canterbury
HEALTHPATHWAYS

*Engloner E et al. HealthPathways: a cross-Quintiles and a case study. April 2018



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For our community



The infographic features a central image of a desktop monitor displaying the HealthInfo website. To the left, a tablet shows the Canterbury Resilience Hub. Below the monitor, there are icons for a laptop, a smartphone, and a tablet, all displaying the HealthInfo interface. The background of the infographic is dark blue with white text.

HealthInfo

Easy-to-use, patient-centred information website, contains high quality health information about a range of health conditions and diseases

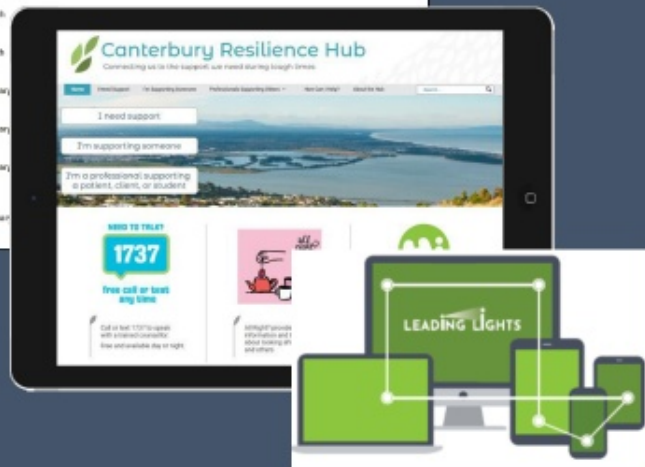
Content is checked, approved and regularly updated by the HealthInfo clinical advisers

Being used to support Mosque attack recovery

- 1,899 website pages
- 50,000+ page views per month
- 563,671 page views in one year (2018)
- 326 page views for support after the Mosque attack

Canterbury

HealthInfo image: Jan-Mar 2023



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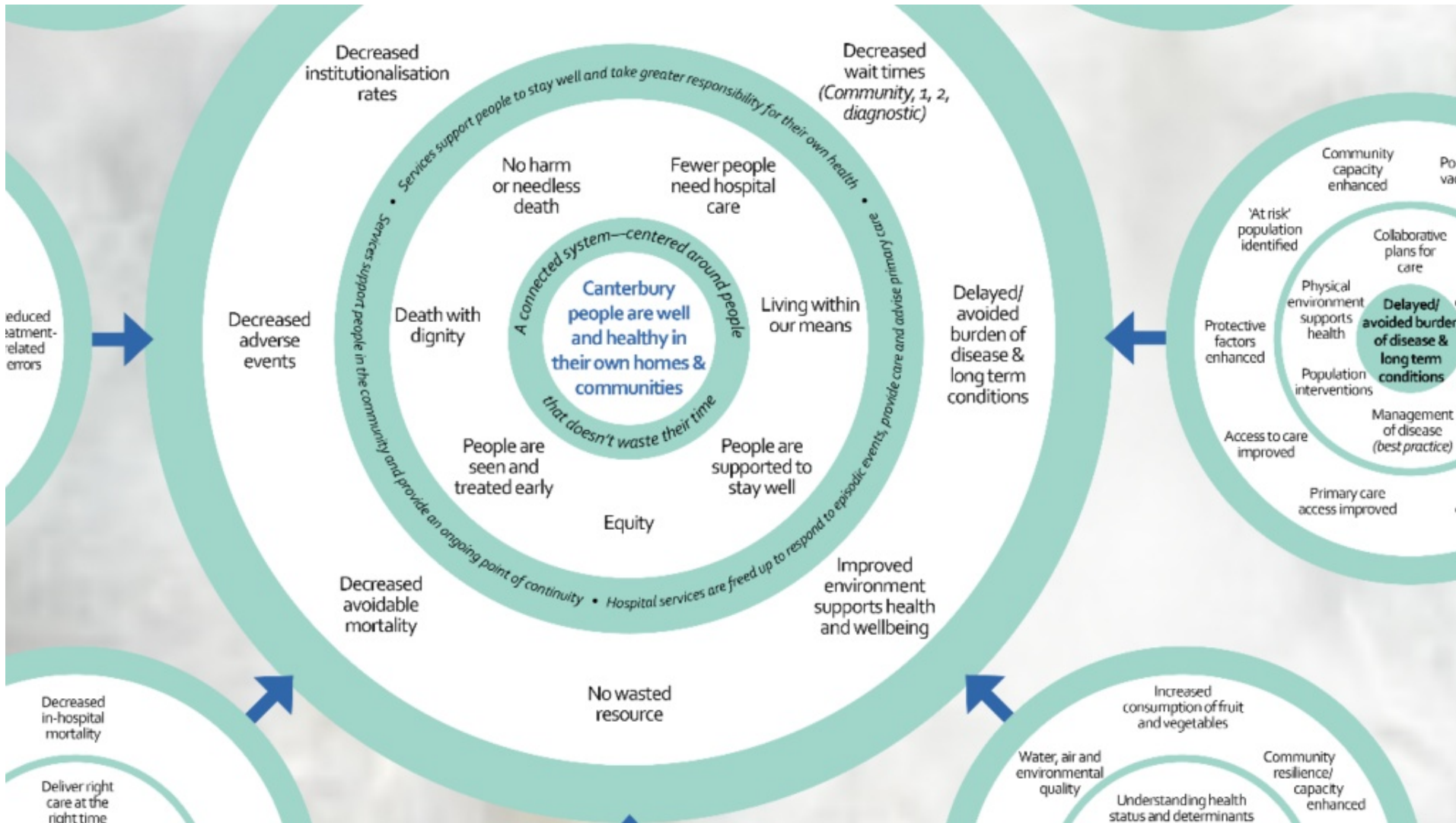
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A Shared Orientation





Services that Support People in a Community Based Setting

Acute Demand Management

Person centered

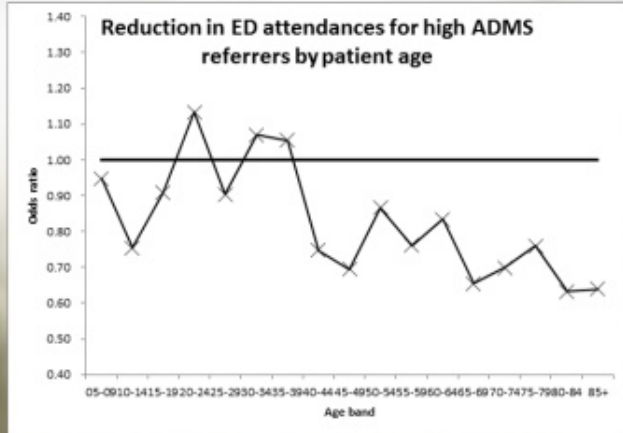
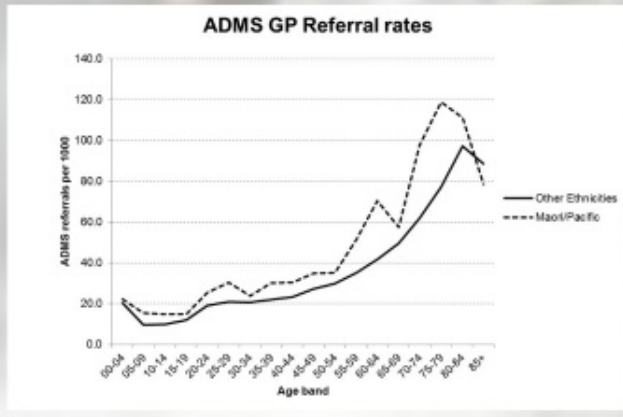
General Practice Enabled



Acute Demand Management



**32,000
Episodes
per year**



Person centred



We've invested in Community Services, to provide wrap-around care to support older people living in their own homes... with positive, measurable results

Community
Rehabilitation

Falls
Prevention

CREST

Restorative
Home Support

Medication
Management

General Practice Enabled



Activity shifting into Primary Care allows for fewer hospital admissions, which means better patient outcomes



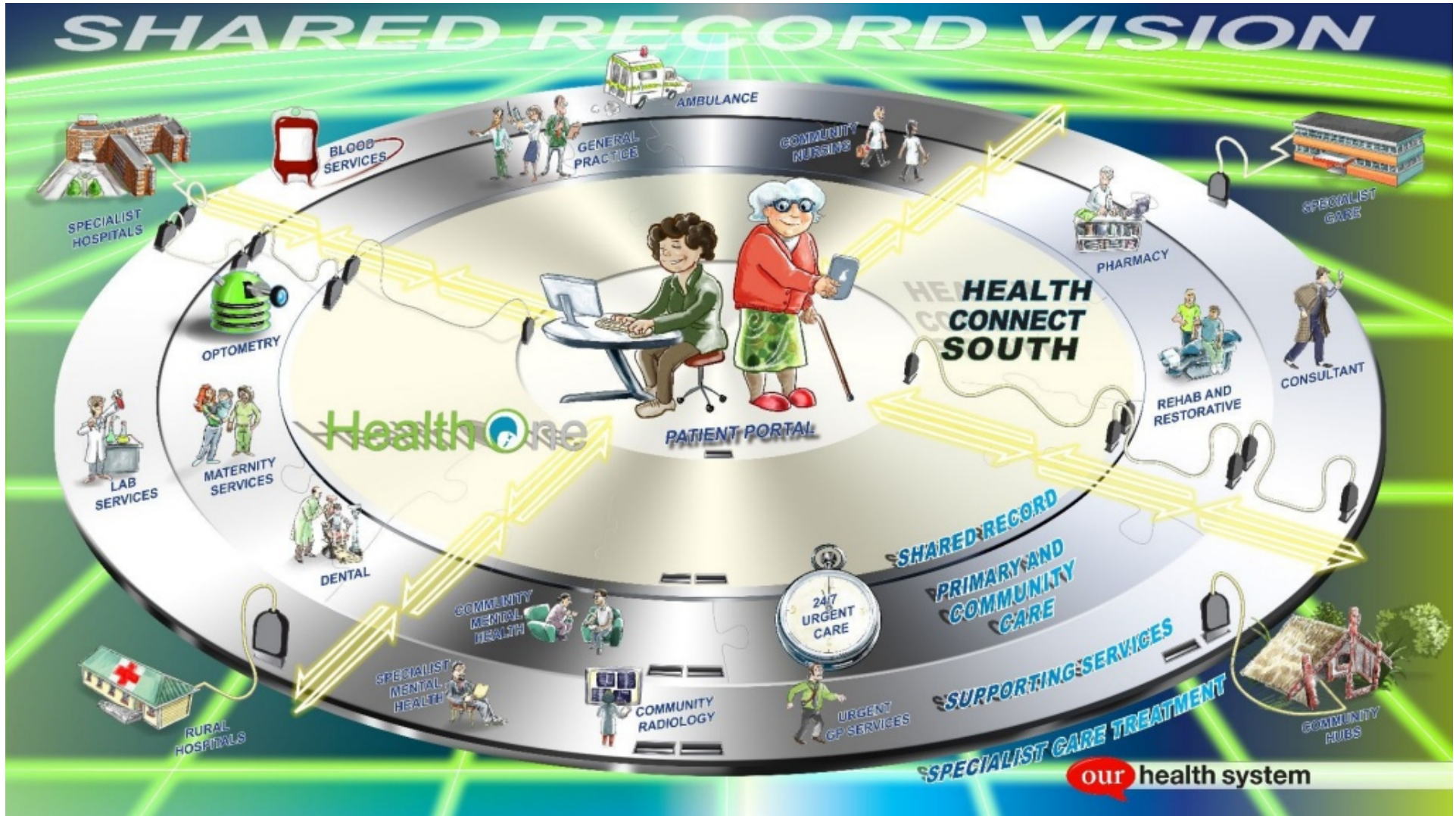
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ICT to Support



Connecting
a Whole
System

SHARED RECORD VISION



Connecting a Whole System



Shared records and shared planning for a million people

15,000+ unique users



Accessed more than 200,000 times every month

Its all about the Data


Seeing Our System

with Operations Centre Portal

[View Portal](#)



**A single source
of the truth**



“quality data leads to better
analysis; better analysis drives
insight and greater insight changes
behaviour”

Deloitte Report on Natural Disaster Resilience 2013

Using Data

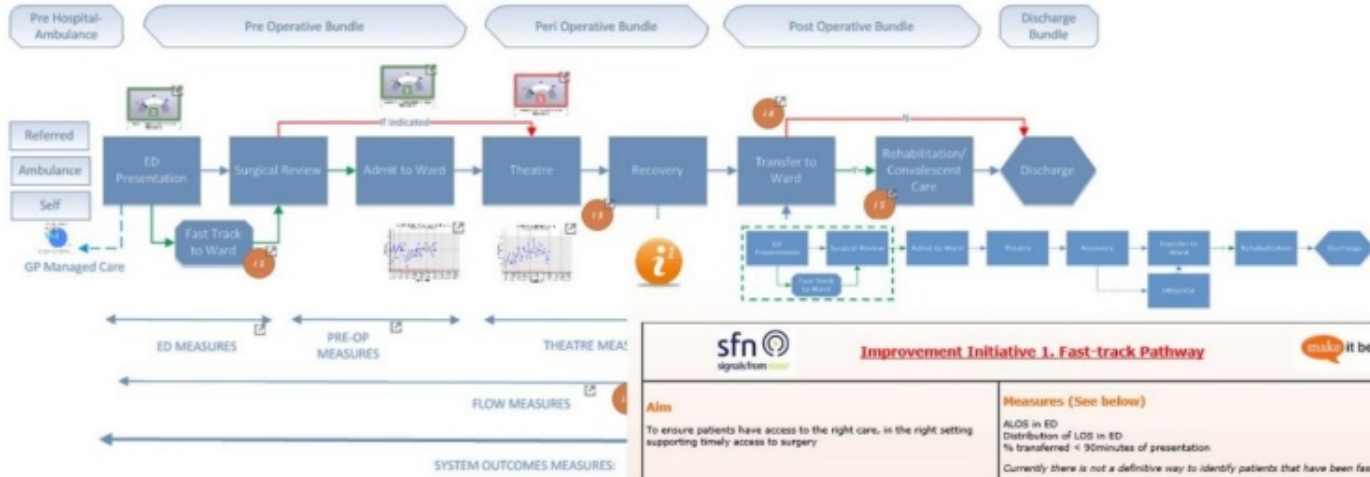
Clinical care of patient	Operational decisions	Planning services
Reactive Individual level Audit for quality	Real time	Proactive Populations Build quality in Forecasting and projections



Clinically-led





Acute/Emergency Care Initiatives




Improvement Initiative 1. Fast-track Pathway


Aim
To ensure patients have access to the right care, in the right setting supporting timely access to surgery

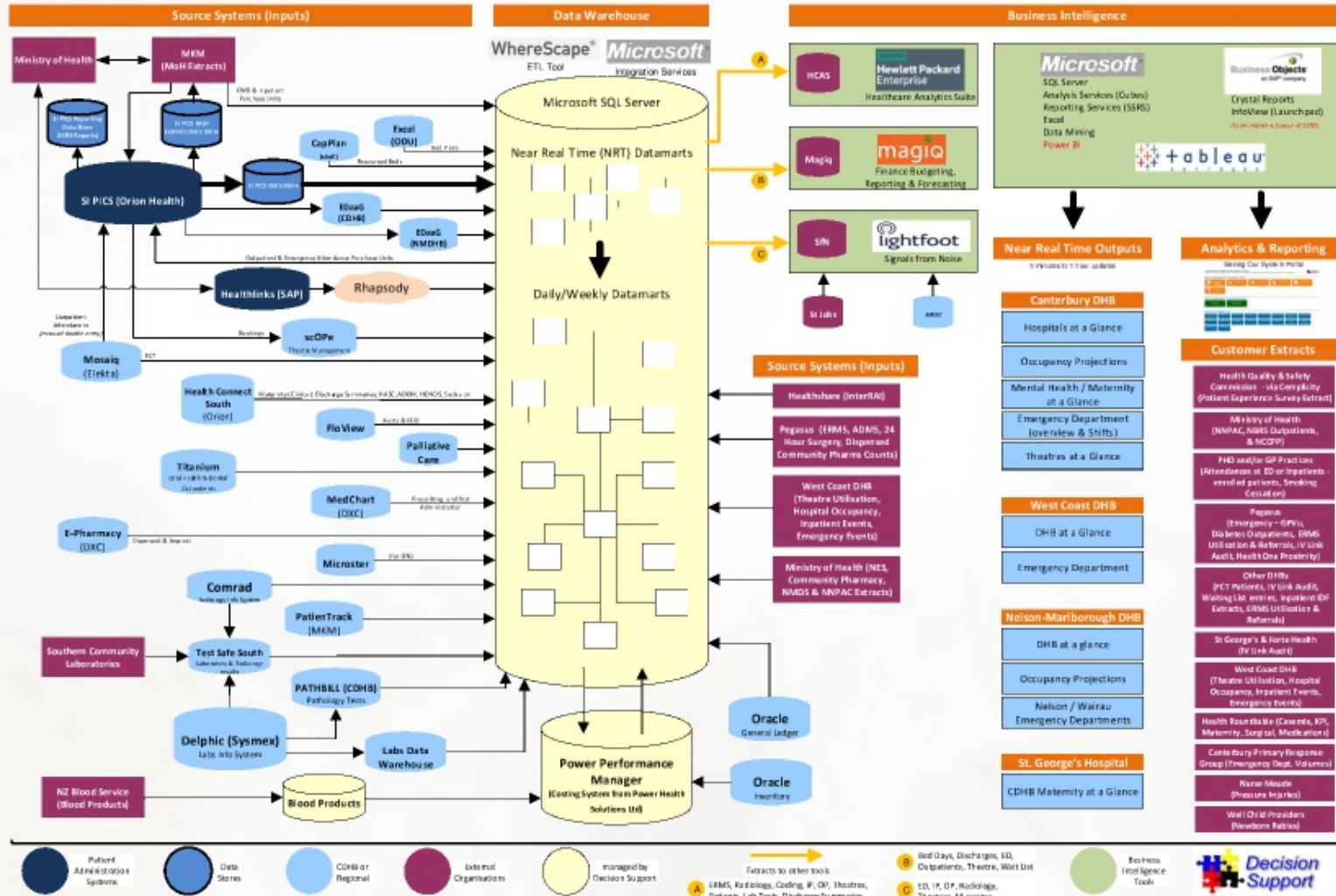
Measures (See below)
ALOS in ED
Distribution of LOS in ED
% transferred < 90minutes of presentation
Currently there is not a definitive way to identify patients that have been fast tracked

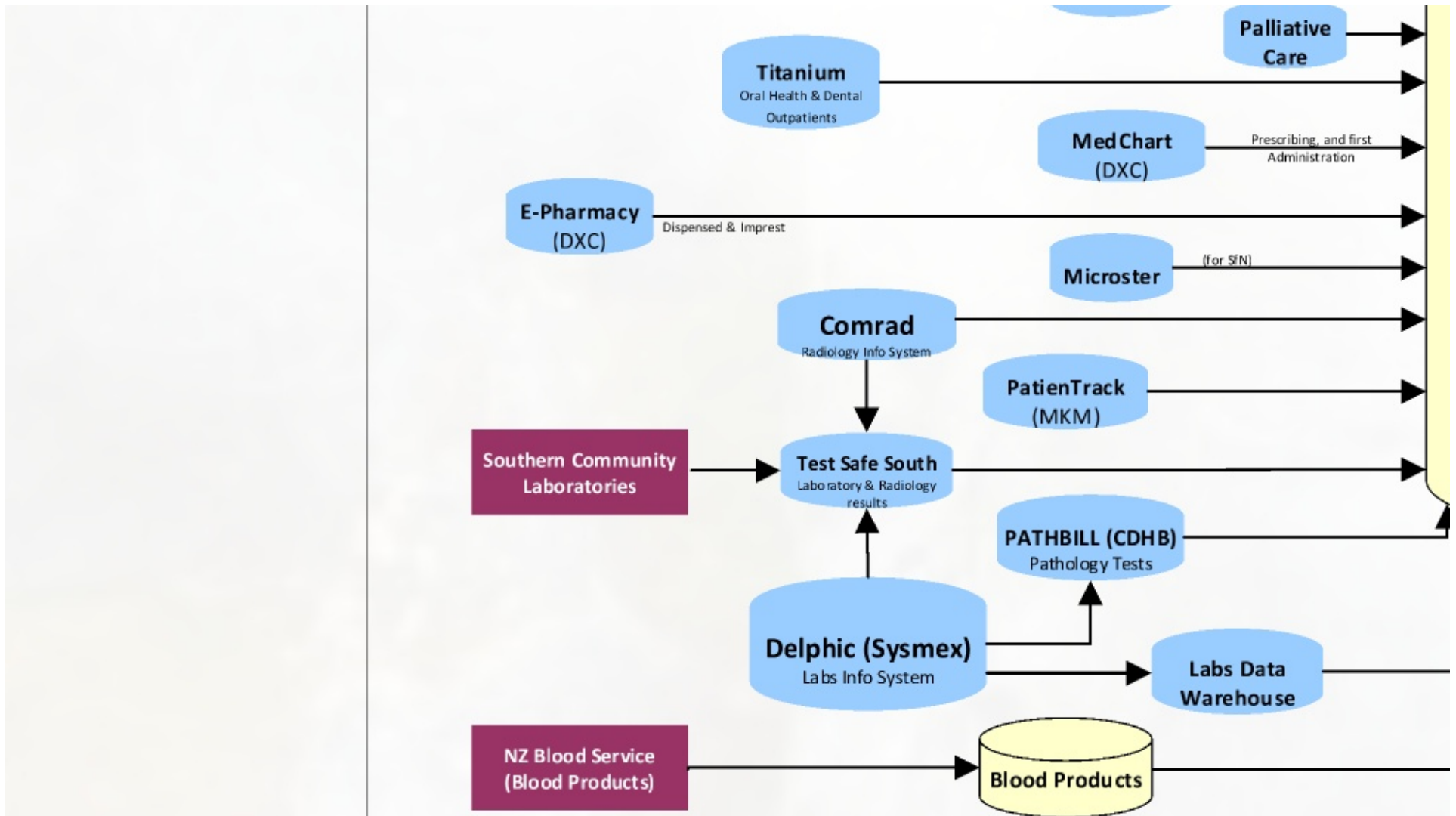
Changes to pathway

- Patients identified for fast-track will be coded in ED as fast-track patients
- For fast-track #HoF patients the "Fractured HoF Fast Track Pathway" documentation (C140037) will be completed by ED staff
- ED will contact Acute Orthopaedic Registrar of fast tracked patient to be admitted to ward
- ED will contact wards directly to arrange admission of fast tracked patient
- Assessment of patient by Orthopaedic team on ward
- Wards will advise Duty Managers of admission

Task	Who
Staff briefing	ED - Mark/Polly/Scott
	Ortho - Kris ORHSS - Nigel Nursing - Karen/Sandra
Swap pager for cell phone for Orthopaedic Registrar on call	Kris/David
Agree a protocol to keep Duty Managers informed of ward admissions	Deb Hamilton/Karen/Sandra/Tecky









Integrated Healthcare and SNOMED

**Creating
Integration**

**Using
SNOMED**

HCAS

**Middle
Earth**

**The
Future**

**Bending
the Curve**

**The
Canterbury
Journey**

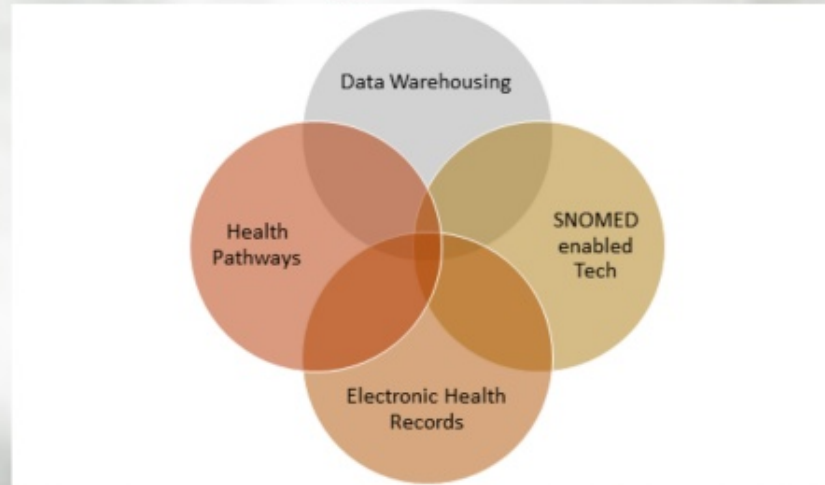


A pause on our journey to recap

- A flourishing integrated health system
- Belief in data to shape our destiny
- Collaborative ways of working
- Desire to do better; to do more

**The
alignment**

Bringing the pieces together



Clinician involvement

bringing together the data

Capturing the encounter

SNOMED adoption

Understanding the context

Standardising Workflows

Health pathways image (stones?)



Seeing the patient's journey

warehouse slide


The Clinician's knowledge captured

HCS screenshot

SNOMED CT in Middle Earth

- SNOMED CT is New Zealand's principle standard for quality data and interoperability (with HL7, FHIR & ICD-10)
- National strategy (Ministry of Health)
- Government Insurer (ACC) movement from READ codes
- Since 2015 new IS investments to include SNOMED CT
- SNOMED NZ Edition

The SNOMED NZ Edition includes all content from the SNOMED International Edition and New Zealand specific content in a separate package called the SNOMED NZ Extension.



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Moving beyond structured data

HCAS Data Size

Scope	Record Unit	Total Records	distinct patient	Concept tags	Unique concepts
patient	(patients)	1,875,070	1,875,070	603,675,107	79,396
inpatient	(admissions)	650,924	254,513	269,963,773	66,263
outpatient	(appointments)	6,444,630	457,832	99,610,432	32,747
radiology	(radiology events)	2,700,719	557,557	306,014,692	34,815
referrals	(referrals)	1,393,224	636,638	58,590,805	40,753
labs	(lab studies)	145,316,773	1,287,639		

HCAS Data Size

Scope	Record Unit	Total Records	distinct patient	Concept tags	Unique concepts
patient	(patients)	1,875,070	1,875,070	603,675,107	79,396
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Integrated Healthcare and SNOMED

**Creating
Integration**

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HCAS

**Middle
Earth**

**The
Future**

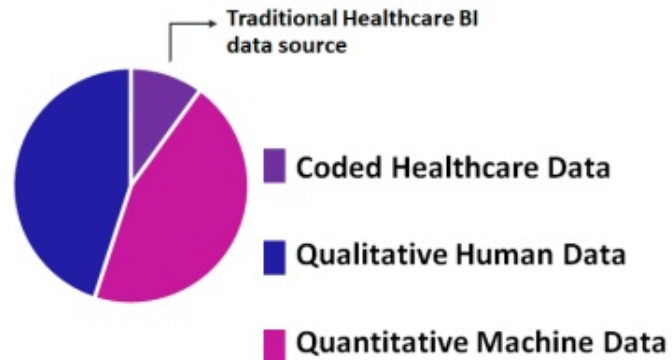
**Bending
the Curve**

**The
Canterbury
Journey**

Using our medical record to the full extent

Seamless integration of structured and unstructured data

Comprehensive use of available clinical data

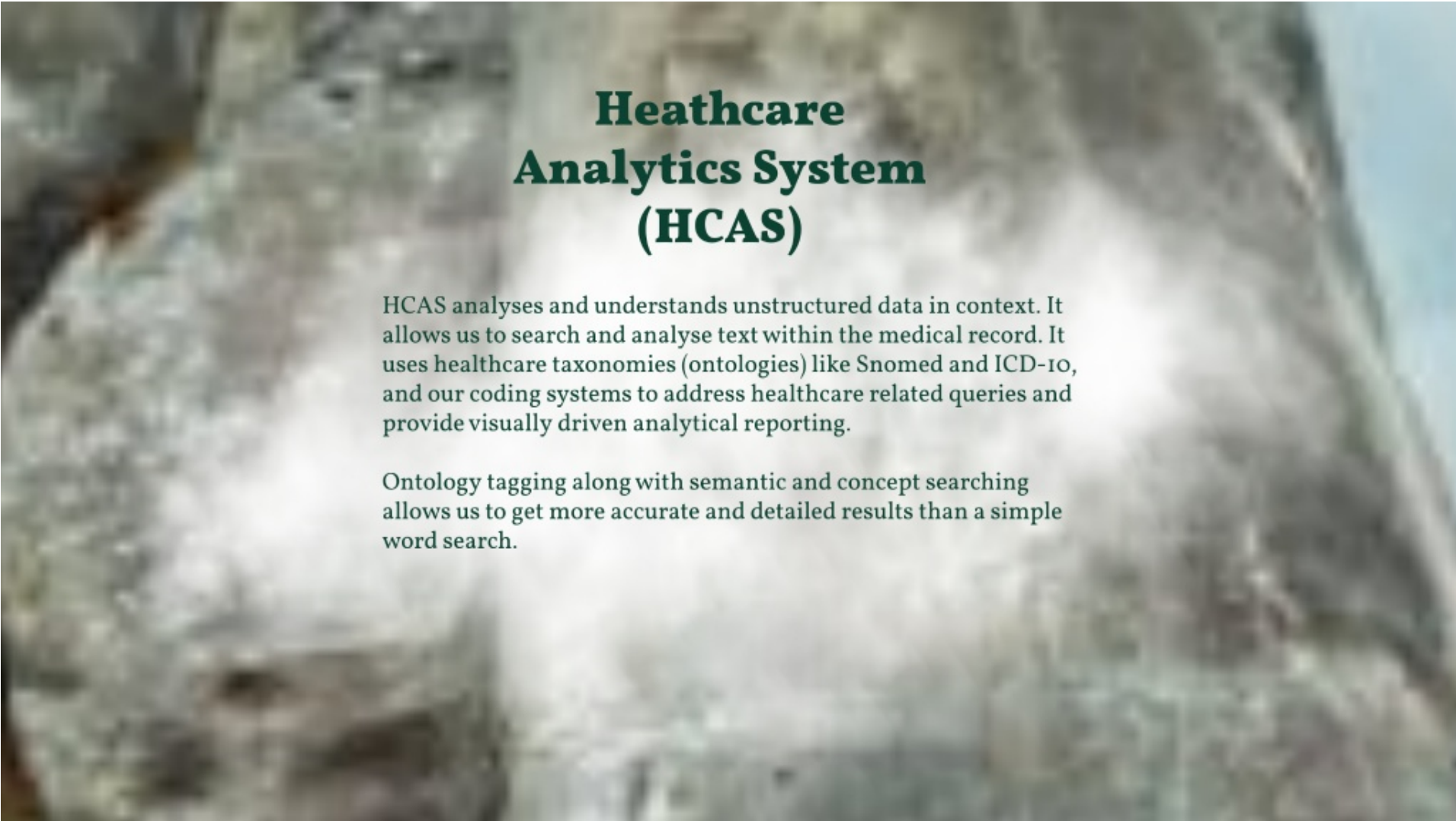


What is HCAS

Born out of a need

SNOMED enabled solution

Evolved in a NRT Analytics Tool



Healthcare Analytics System (HCAS)

HCAS analyses and understands unstructured data in context. It allows us to search and analyse text within the medical record. It uses healthcare taxonomies (ontologies) like Snomed and ICD-10, and our coding systems to address healthcare related queries and provide visually driven analytical reporting.

Ontology tagging along with semantic and concept searching allows us to get more accurate and detailed results than a simple word search.

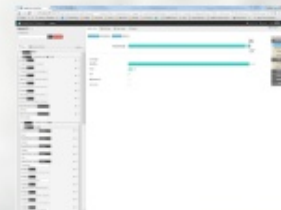


Our Issue (2016)

- Radiology Diagnostics
- Printer set up error
- 13,000+ reports over 5 years
- Not able to see if they had needed clinical follow up
- Review of all reports needed

Machine enabled Chart abstraction with SNOMED

- Data
 - 5 years of selected radiology reports (13601 records)
- System features
 - SNOMED CT ontology
 - Seamless structured/free-text filter creation
 - Cohort generation of reports with actionable findings
 - Collaborative workflow
 - Cohort assignment
 - Computer assisted chart abstraction
 - Cohort export for interoperability with other IT systems



Saved over a year of clinician time

- Data
 - 5 years of selected radiology reports (13601 records)
- System features
 - SNOMED CT ontology
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The screenshot displays a web application interface for 'Healthcare Analytics'. The browser address bar shows a URL with search parameters. The main content area is titled 'Search:' and features a search input field with 'Go' and 'Reset' buttons. Below the search bar, there are tabs for 'All Cases' and 'Document Filter'. A sidebar on the left contains a list of medical conditions, each with a 'Concept' label and a 'Filter' button. The main results area shows a 'Results Range' bar chart at the top, followed by a table of 'CaseType' data. A 'New Encounter' sidebar on the right contains buttons for 'Encounter', 'CaseType', 'Document', 'Visit', 'VisitType', 'ICD', 'Concept', 'Patient', 'Report', and 'Year'.

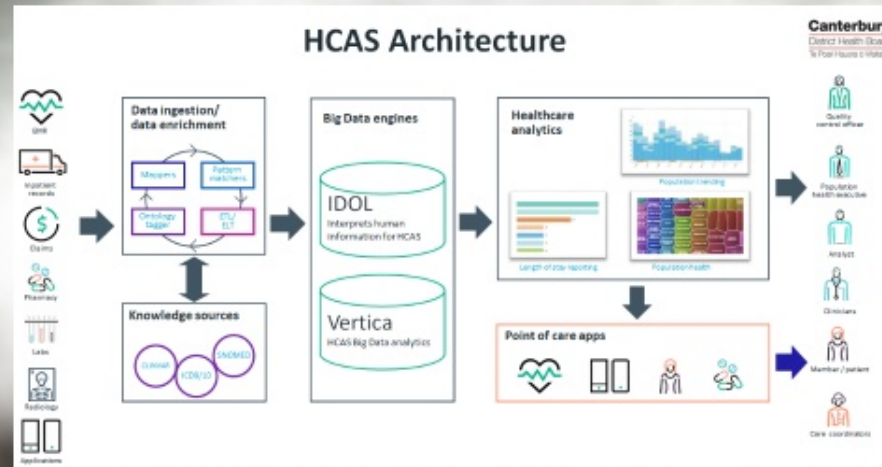
CaseType	Count
SEDFAC	2,175
PHS	47
ASC	4
WEDGADR	3
ADD WDR	3



Saved over a year of clinician time

A "first in the world solution" (2016)

So how does it work?

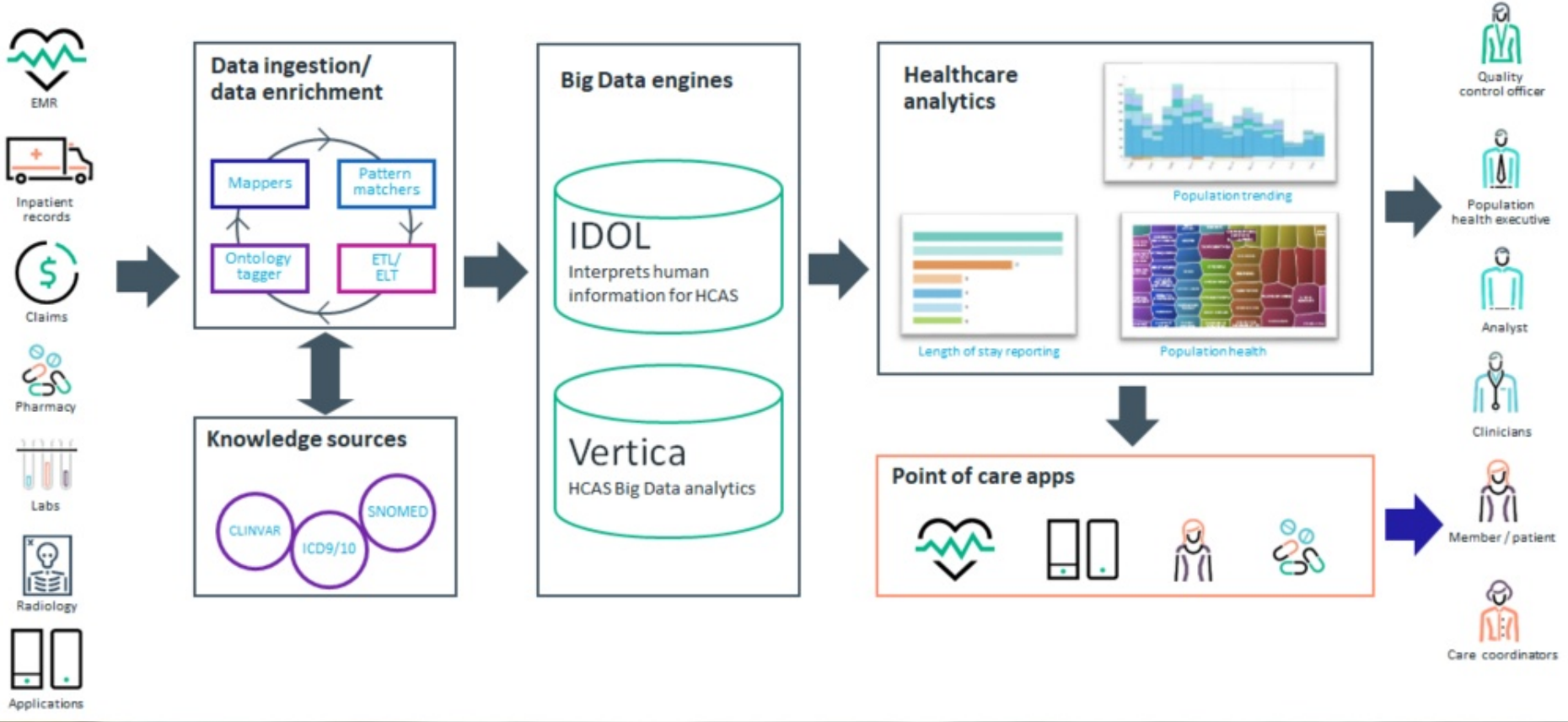


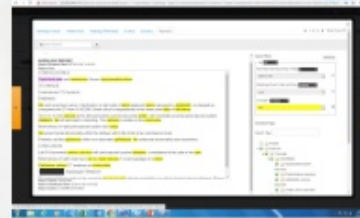
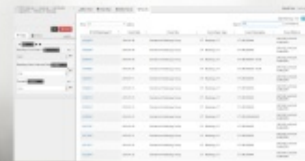
SNOMED Concepts comes to Life

How we use it

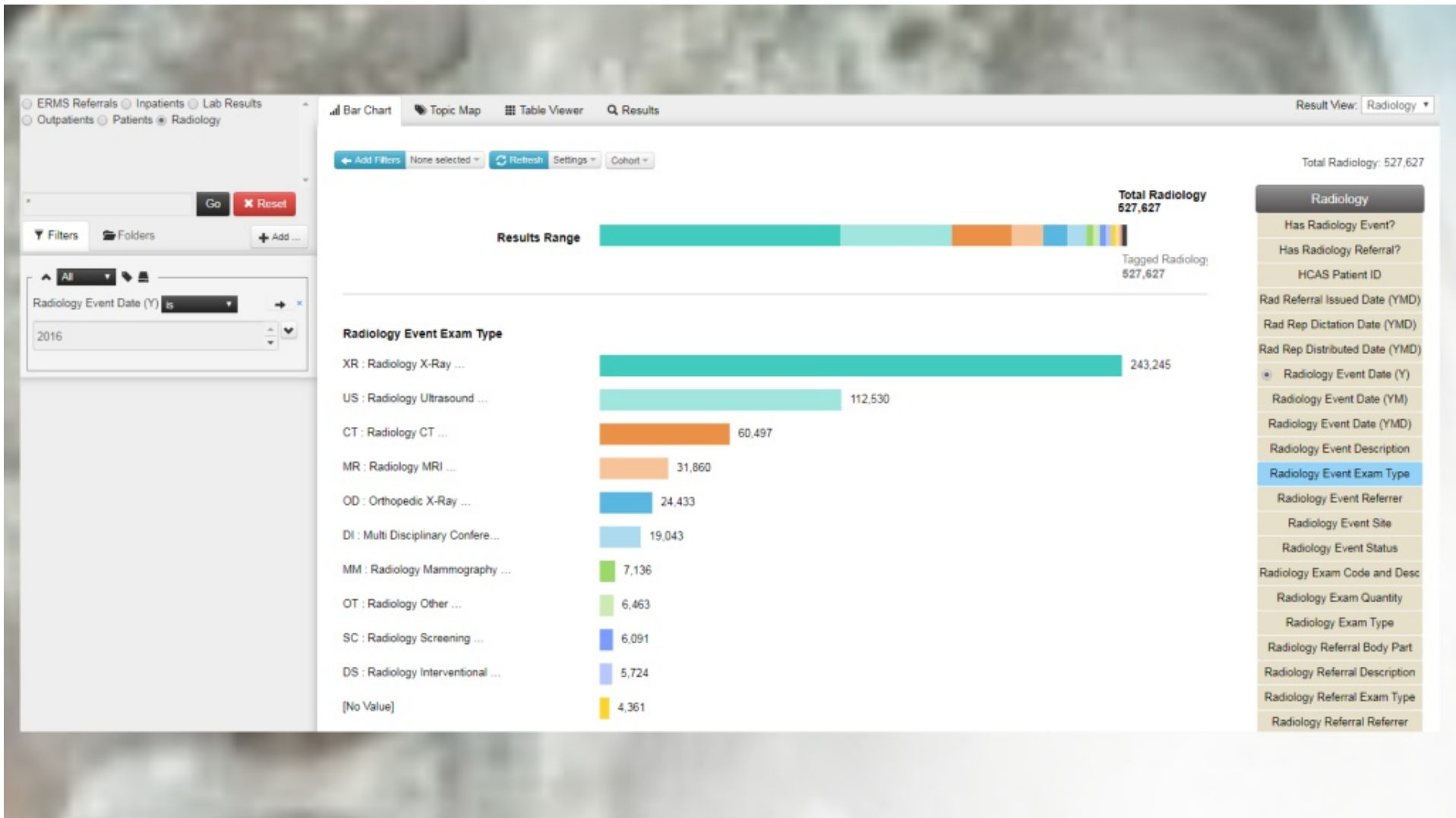
Making it better

HCAS Architecture





Pulling concepts from the written record that is not SNOMED CT coded (i.e not a problem list based analysis)



ERMS Referrals Inpatients Lab Results Outpatients Patients Radiology

Bar Chart Topic Map Table Viewer Results Result View: Radiology

Add Filters None selected Refresh Settings Cohort

Total Radiology 855 Tagged Radiology 855

Results Range

Radiology Event Exam Type

CT : Radiology CT ...	851
MR : Radiology MRI ...	4

Filters

Radiology Event Date (Y) is 2016

Radiology Exam Code and Desc contains urog

Concept+ contains calcu

- Calculus (morphologic abnormality)
- Calculus finding (finding)
- Calculus of upper urinary tract (disorder)
- Gallbladder calculus (disorder)
- Calculus in biliary tract (disorder)

Radiology

- Has Radiology Event?
- Has Radiology Referral?
- HCAS Patient ID
- Rad Referral Issued Date (YMD)
- Rad Rep Dictation Date (YMD)
- Rad Rep Distributed Date (YMD)
- Radiology Event Date (Y)
- Radiology Event Date (YM)
- Radiology Event Date (YMD)
- Radiology Event Description
- Radiology Event Exam Type
- Radiology Event Referrer
- Radiology Event Site
- Radiology Event Status
- Radiology Exam Code and Desc
- Radiology Exam Quantity
- Radiology Exam Type
- Radiology Referral Body Part
- Radiology Referral Description
- Radiology Referral Exam Type
- Radiology Referral Referrer
- Radiology Referral Site
- Radiology Referral Status
- Radiology Report Author
- Radiology Report Status

Demographics

ERMS Referrals Inpatients Lab Results Outpatients Patients **Radiology**

Bar Chart Topic Map Table Viewer Results

Result View: Radiology

Total Radiology: 164 Action

Show 25 entries Search: 24 Event Referrer

HCAS Radiology ID	Event Date	Event Site	Event Exam Type	Event Description	Event Referrer
12292678	2016-01-06	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12292684	2016-01-06	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12295722	2016-01-08	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM + KUB	DR THE 24 HOUR SURGERY
12295862	2016-01-08	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM + KUB	DR THE 24 HOUR SURGERY
12298197	2016-01-11	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12306019	2016-01-15	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12308133	2016-01-18	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12308183	2016-01-18	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12308362	2016-01-18	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM/KUB	DR THE 24 HOUR SURGERY
12311787	2016-01-20	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12313695	2016-01-21	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12317917	2016-01-25	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY
12320843	2016-01-26	Christchurch Radiology Group	CT : Radiology CT	CT UROGRAM	DR THE 24 HOUR SURGERY

Filters: Radiology Event Date (Y) is 2016; Radiology Exam Code and Desc contains urog; Concept+ contains calcu

Search Keyword

RADIOLOGY REPORT:

Report Dictation Date: 2016-01-06 14:42:00

Report Text:

CLINICAL DETAILS:

Right flank pain and haematuria. Known hyperparathyroidism.

TECHNIQUE:

Unenhanced CTU protocol.

FINDINGS:

No right renal tract calculi. Calcification in right side of pelvis adjacent uterus represents a phlebolith, unchanged as compared with CT from 19 9/2009. Small calculi in dependently in the lower pole calyx of left kidney.

10 x 8 x 12 mm **calculus** at the left pelviureteric junction/proximal ureter, with moderate proximal pelvicalyceal system dilatation. No left perinephric stranding. This **calculus** is visible on the scout view.

Mild fullness of right pelvicalyceal system and ureter.

No parenchymal abnormality within the kidneys within the limits of an unenhanced scan.

Partially calcified **gallstones** within non-distended gallbladder. No extrarenal abnormality seen elsewhere.

CONCLUSION:

Left PUJ/proximal **ureteric calculus** with pelvicalyceal system dilatation, contralateral to the side of her pain.

Mild fullness of right renal tract, but no **renal calculus** ? recent passage of a **stone**.

Gallstones without CT evidence of cholecystitis.

Radiologist FRANZCR

Recommendations made in this report do not necessarily indicate availability via publicly funded clinical pathways. Please

Report Status: Distributed

Report Distributed Date: 2016-01-06 14:47:00

Report Author: COMRAD SYSTEM

Query Filters

Check All

All

Rad Rep Distributed Date (YMD) is 2016-01-06

Radiology Exam Code and Desc contains urog

Concept+ contains calc

Document Tags

Search Tags:

- Folders
- Features
 - Concepts
 - DISORDER
 - Hyperparathyroidism (disorder)
 - Phlebolithiasis (disorder)
 - Gallbladder calculus (disorder)
 - Ureteric stone (disorder)

Search Keyword

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[REDACTED], Radiologist FRANZCR

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 - DISORDER
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 - Gallbladder calculus (disorder)
 - Ureteric stone (disorder)

Clinicians and Business Analysts think in terms of concepts to do their roles, not rows, columns, schemas

Healthcare data is rich with unstructured information, not leveraged by today's BI and big-data tools

IDOL is able to leverage taxonomies and ontologies to make the analysis "clinically aware", allowing business users to interact and discover

Automatic Classification and Entity Extraction turns unstructured data into structured information

Pulling concepts from the
written record that is not
SNOMED CT coded (i.e
not a problem list based
analysis)

A growth in data

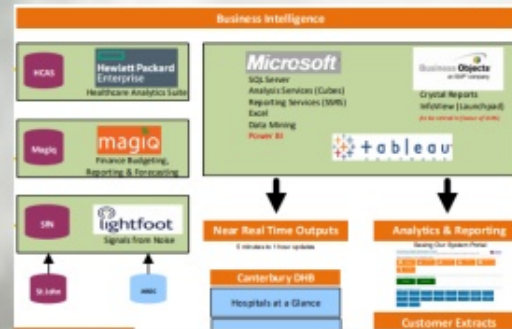
- Expanding digital clinical records
- Regional data warehousing
- Enhanced integration tools

HC

update to 2019

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patient	(patients)	1,875,070	1,875,070	603,675,107	79,396
inpatient	(admissions)	650,924	254,513	269,963,773	66,263
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referrals	(referrals)	1,393,224	636,638	58,590,805	40,753
labs	(lab studies)	345,316,773	1,287,639		

One of our tools - ensure fit for purpose



Data transparency – Because of the scale of both structured and unstructured data in HCAS, clinicians, administrators, and IT support have new visibility into issues which were difficult or impossible to identify with existing tools

Hypothesis testing

Digital enabled chart abstraction

Health Pathway review

Coding Quality

Connecting the patient journey

Business Intelligence

HCAS
Hewlett Packard Enterprise
Healthcare Analytics Suite

Magiq
magiq
Finance Budgeting,
Reporting & Forecasting

SfN
lightfoot
Signals from Noise

St John

AROC

Microsoft
SQL Server
Analysis Services (Cubes)
Reporting Services (SSRS)
Excel
Data Mining
Power BI

Business Objects
an SAP company
Crystal Reports
InfoView (Launchpad)
(to be retired in favour of SSRS)

tableau



Near Real Time Outputs

5 minutes to 1 hour updates

Canterbury DHB

Hospitals at a Glance

Analytics & Reporting

Seeing Our System Portal



Customer Extracts

Data transparency – Because of the scale of both structured and unstructured data in HCAS, clinicians, administrators, and IT support have new visibility into issues which were difficult or impossible to identify with existing tools



Hypothesis Testing

Rapid hypothesis testing – allowing clinicians and administrators to quickly assemble a cohort of patients to determine whether the data is likely to back-up their hypothesis

Digital enabled chart abstraction

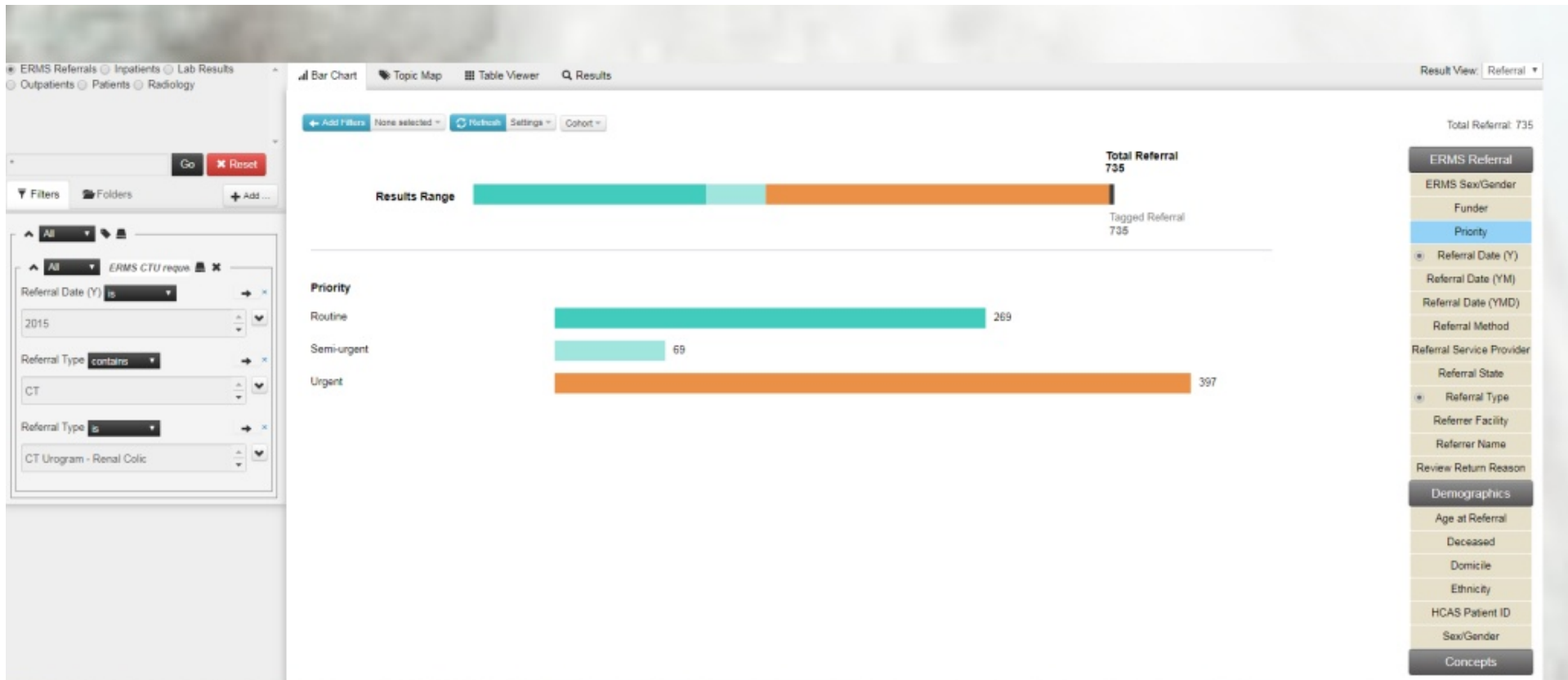
Audit and Research - speed and accuracy to allow for issue identification and actions.
Built in work-flow tools to ensure clinical efficiency and validation



Document Tags






Search Tags:

- [-] Folders
 - [+] CTU Audit 2015 Comm Pts
 - [+] CTU Audit 2015 Comm Stone pts
 - [+] CTU GP 2016
- [+] Features



Document Tags

Search Tags:

- ▲  Folders
 -  CTU Audit 2015 Comm Pts
 -  CTU Audit 2015 Comm Stone pts
 -  CTU GP 2016
- ▶  Features

Health Pathway review

Audit and changes to clinical pathways – significantly faster than manual processes because the system assists in chart abstraction. Using the same human resources, more auditing can occur, allowing more rapid determination of compliance and the impact of clinical pathway changes

Non-acute Urology Assessment

Request

Offer all referral options, even if the patient is eligible for DHD treatment, as per the HCC Code v1.

Christchurch Hospital Urology Department

1. Check criteria:

- [See within 4 months v1.](#)

Within 2 weeks

- Suspicious testis mass.
- Haematuria and abnormality on imaging or positive cytology.
- Abnormal imaging suggestive of malignancy.

Within 4 weeks

- PSA > 100 micrograms/L, or possible neurological symptoms suggest cord compression.

Within 8 weeks

Significant risk of malignancy, major functional impairment, moderate risk of permanent damage to organ or system, if consultation is delayed, or pain requiring narcotics of high analgesic dose to control:

- Severe lower urinary tract symptoms (LUTS) (IPSS > 15, QOL > 4) or complication of bladder outlet obstruction (BOO).
- Gross haematuria or persistent macroscopic or microscopic haematuria.
- Significantly elevated PNH on 2 measurements.
- Recurrent calculi colic with treatable stone.

Within 4 months

Moderate functional impairment, pain (controlled), restriction of social or economic activity:

- Moderate bladder outlet obstruction or prostatic.
- Gravel or stone abnormality if symptoms of significant pain or benign mass > 5 cm with significant impairment quality of life (Impact on LUTS score greater than 10).
- Asymptomatic diagnosed renal tract stone.

Non-acute Urology Assessment

Request

Offer all referral options, even if the patient is eligible for DHB treatment, as per the [HDC Code](#) ▼.

Christchurch Hospital Urology Department

1. Check criteria:

- [Seen within 4 months](#) ▲.

Within 2 weeks

- Suspicious [testis mass](#).
- [Haematuria](#) and abnormality on imaging or positive cytology.
- Abnormal imaging suggestive of malignancy.

Within 4 weeks

- PSA > 100 micrograms/L or possible neurological symptoms suggest cord compression.

Within 8 weeks

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- Severe [lower urinary tract symptoms \(LUTS\)](#) IPSS > 15, QoI > 4, or complication of bladder outlet obstruction (BOO).
- Gross [haematuria](#) or persistent macroscopic or microscopic haematuria.
- [Significantly elevated PSA](#) on 2 measurements.
- [Resolved ureteric colic with treatable stone](#).

Within 4 months

Moderate functional impairment, pain (controlled), restriction of social or economic activity:

- Moderate [bladder outlet obstruction or prostatism](#)
- Groin or [scrotal abnormality](#) if symptoms of significant pain or benign mass > 5 cm with significant impairment in quality of life ([Impact on Life](#) ▼ score greater than 10)
- Asymptomatic [diagnosed renal tract stone](#)



ERMS Referrals Inpatients Lab Results
 Outpatients Patients Radiology

Go Reset

Filters

All

All 2019_pneumonia

Date of Admission (Y) is

2019

All exclude NMDHB

All

Clinical Code Description is

(J189) Pneumonia, unspecified

All

Clinical Code Description not contains

J44

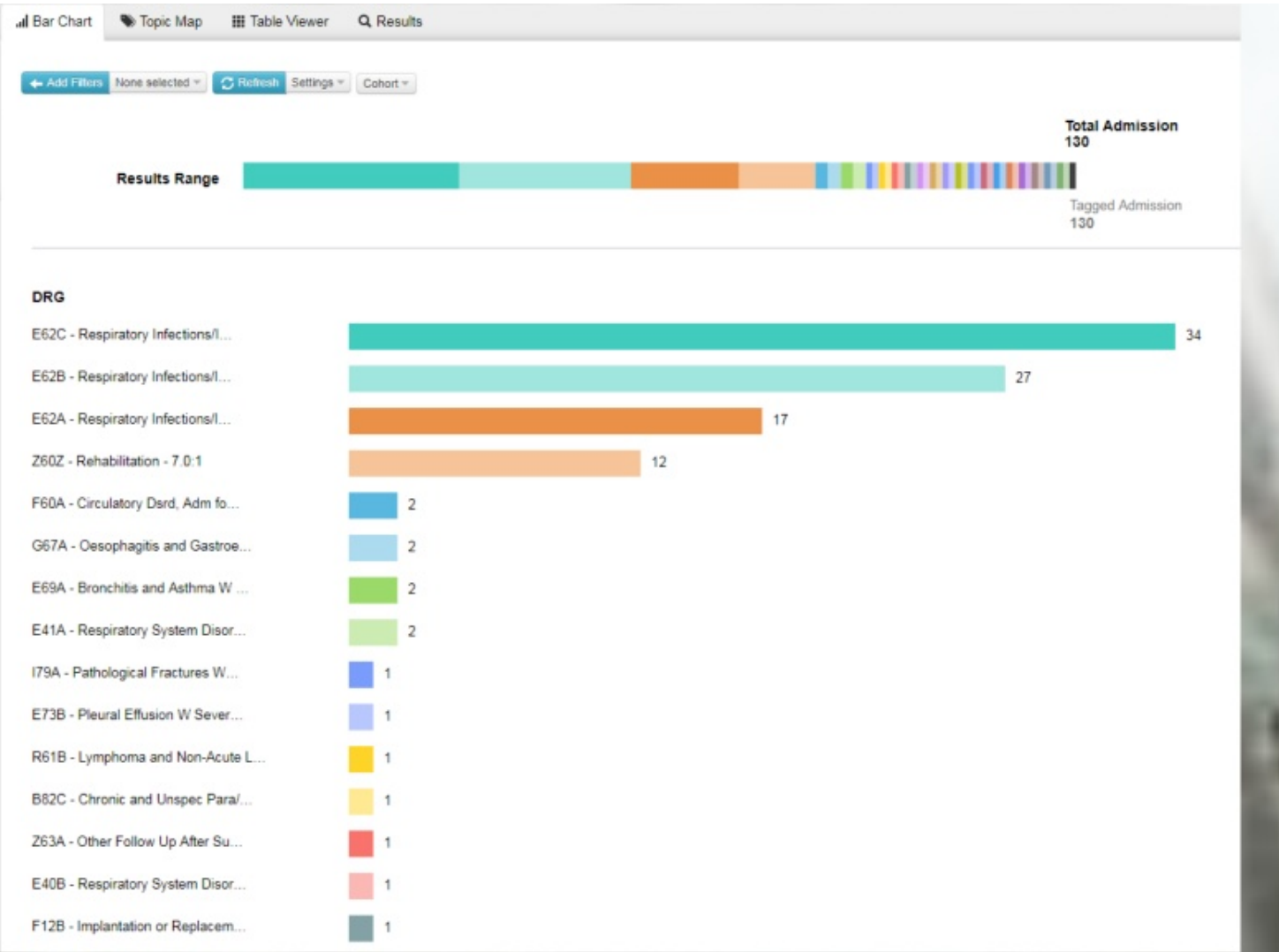
DRG not contains

E65

All

Concept+ contains

Chronic Obstructive



DOCUMENT:

HCAS Admission ID: 2648131

Document Event ID: [REDACTED]

Document Event ID: [REDACTED]

Document NHI: [REDACTED]

Document Type: EDS2MR - CDHB General Medicine Discharge Summary MR, General Medicine

Document Heading:

Document Content:

Document Status: Final

Document Responsible Clinician: [REDACTED]

Last Edited By: [REDACTED]

Text Obs ID: 254711520

Document Heading: GPMailbox

Document Content: This document will be delivered electronically when you press Finalise.

Text Obs ID: 254711521

Document Heading: MedicalHistory

Document Content: Chronic Myelomonocytic Leukemia, BCR-ABL negative, JAK2 V617F negative, normal cytogenetics, June 2017. -> Loss of appetite, weight loss, lymphadenopathy and painful left shoulder, increasing anaemia October 2018 - likely progression of CMML -> No response to treatment for one month with hydroxyurea. Commenced treatment with azacytidine, December 2018 -> Painful right lateral malleolus ?cellulitis, treated in Ashburton Hospital with flucloxacillin NSTEMI - Juvenile arthritis for medical management. COPD - right upper lobe nodule, with nil evidence of malignancy - for CT surveillance.

Text Obs ID: 254711522

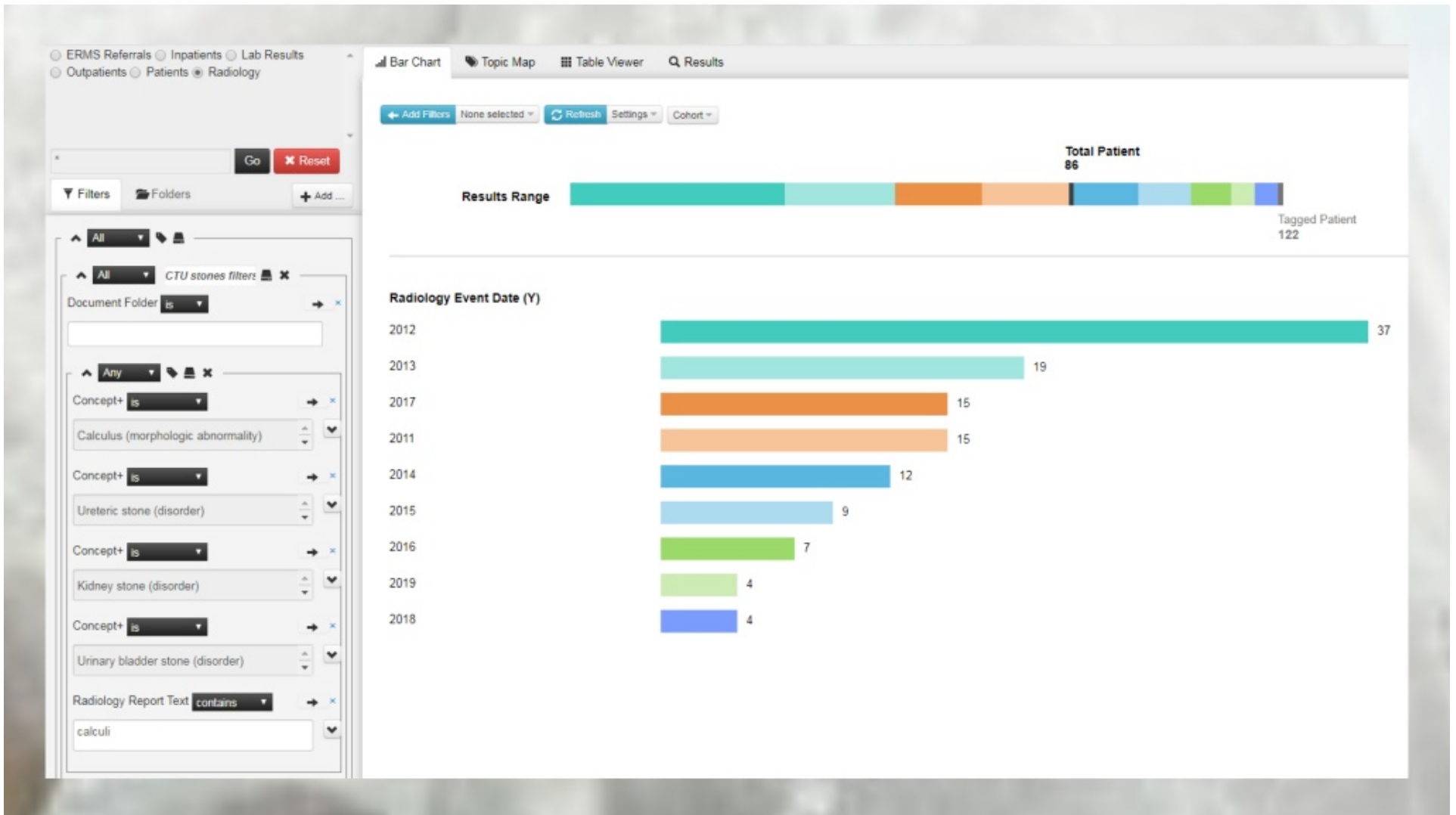
Document Heading: MedChartAllergies

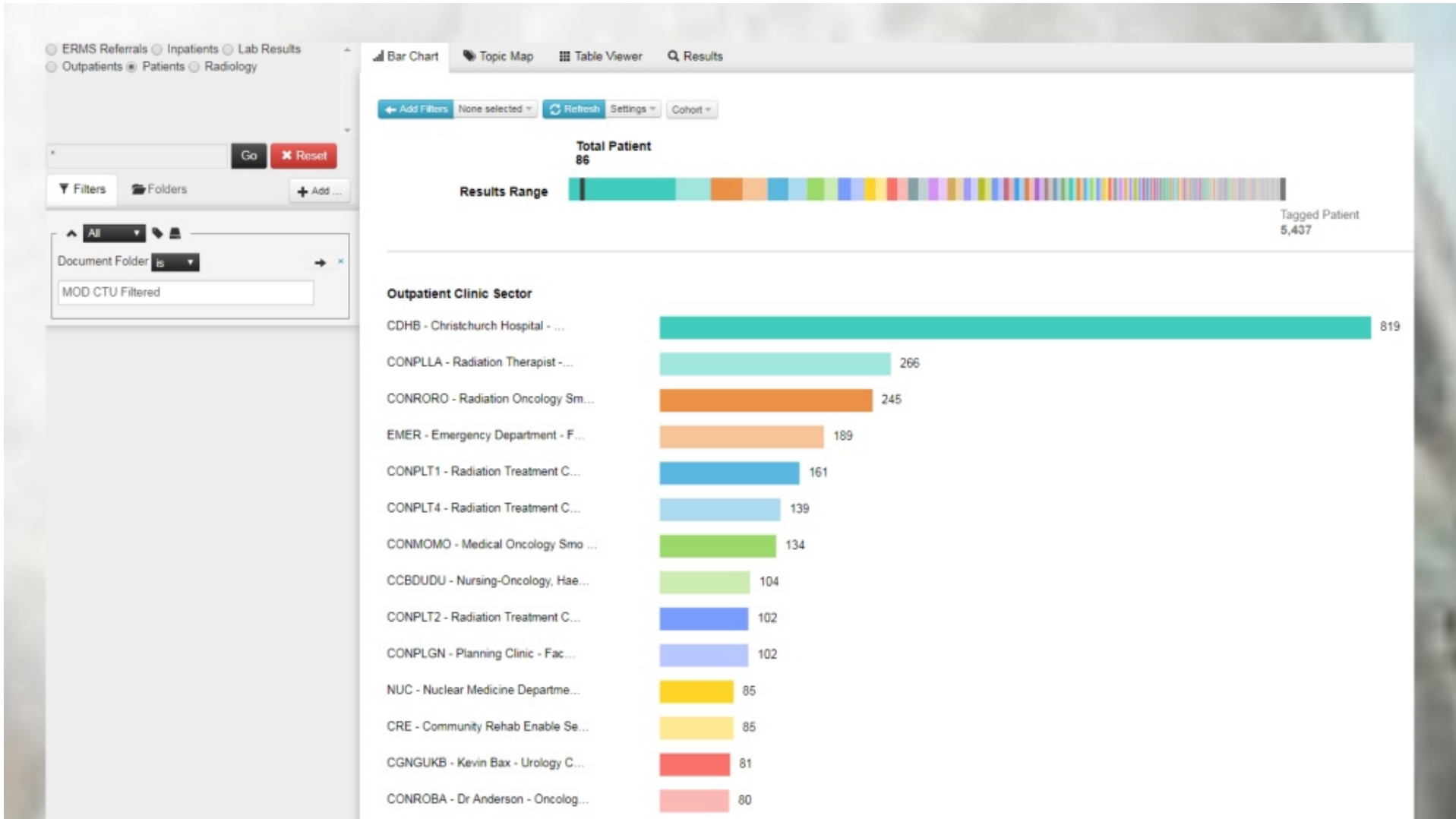
Document Content: No Known Allergies

Connecting the Patient Journey

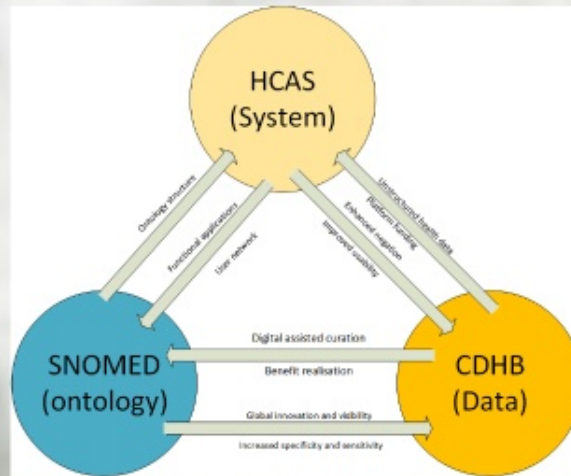
Allows the connection of individual IT systems together (structured and unstructured data) to follow a cohort of patients through the health system based on reported findings







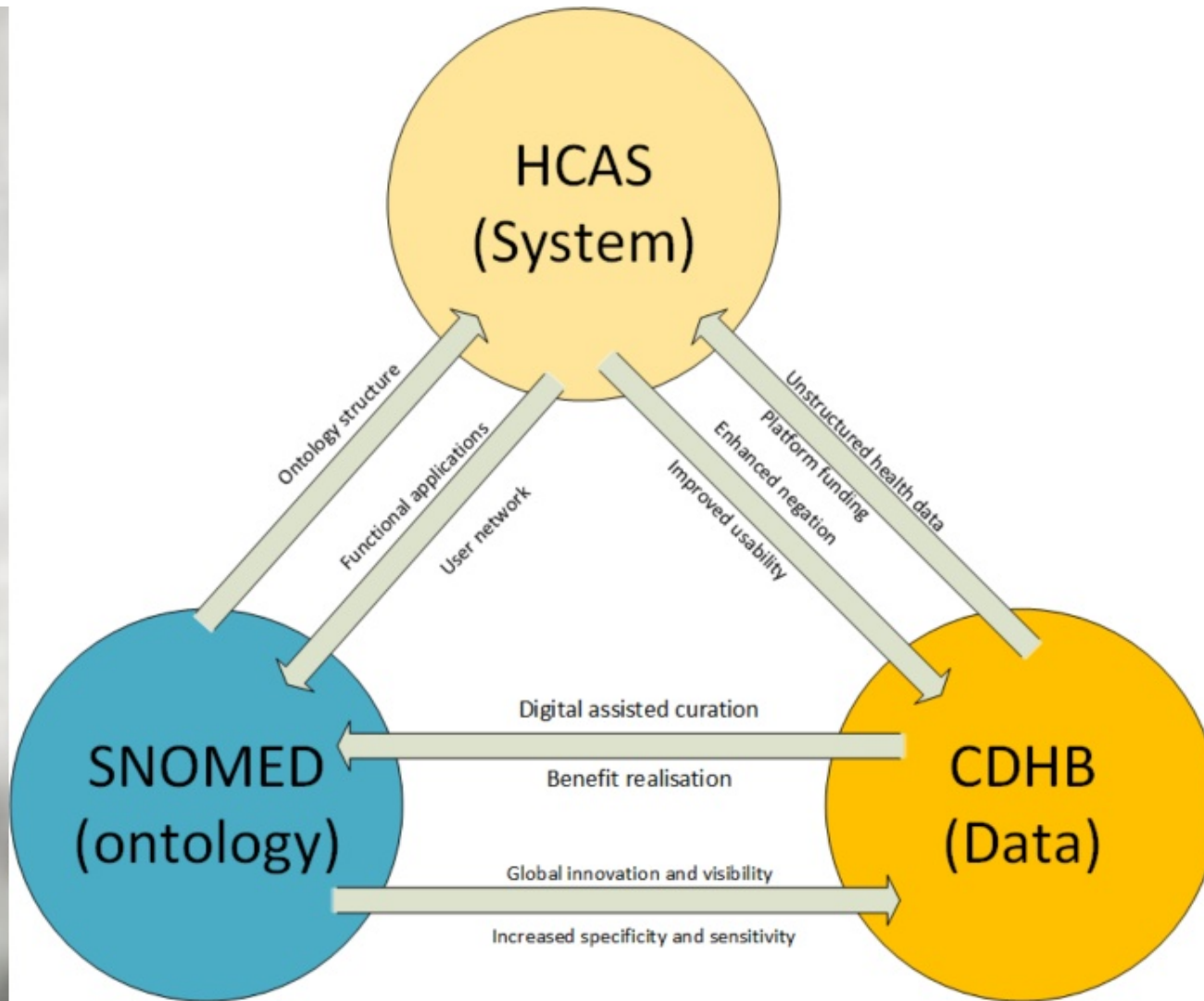
The sum of three parts



CDHB
Data

HCAS





SNOMED










CDHB Data

- | | | | |
|---|---|---|---------------------------------------|
|  | Format of how we store unstructured data |  | Regional warehouse gives data breadth |
|  | 1 Petabyte volume of unstructured currently |  | Clinician Trusted |
|  | Data science capacity |  | Source System integration |

HCAS

- | | |
|--|---|
|  Negation and Spelling mistakes |  Speed of query |
|  Choosing the right data elements |  Data democratisation |
|  Ingestion process |  Integrates different source systems |

SNOMED CT

- | | | | |
|---|---|---|----------------------------|
|  | Clinical notes vary
 |  | Standardised |
|  | Process of updating |  | Embedded into new systems |
|  | Early in adoption life-cycle |  | Human and machine readable |

Search Keyword

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Dr Andrew Laing, Radiologist FRANZCR

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Report Status: Distributed

Report Distributed Date: 2016-01-06 14:47:00

Report Author: COMRAD SYSTEM

Query Filters

Check All

All

Rad Rep Distributed Date (YMD) is 2016-01-06

Radiology Exam Code and Desc contains urog

Concept+ contains **calc**

Document Tags

Search Tags:

- Folders
- Features
 - Concepts
 - DISORDER
 - Hyperparathyroidism (disorder)
 - Phlebolithiasis (disorder)
 - Gallbladder calculus (disorder)
 - Ureteric stone (disorder)

calculi

Search Reset

Search in: All Hierarchies

All descriptions | Fully Specified Name Only | Concept Identifier

[Click here](#) for Advanced search help

Parent(s):

(Select a parent to make it the "Current Concept".)

[Kidney disease \(disorder\)](#)

[Kidney lesion \(finding\)](#)

[Urolithiasis \(disorder\)](#)

Current Concept:
Kidney stone (disorder)

Child(ren):

(N=10) (Select a child to make it the "Current Concept".)

[Calcium renal calculus \(disorder\)](#)

[Calculous pyelonephritis \(disorder\)](#)

[Calculus in renal pelvis \(disorder\)](#)

[Calculus of kidney and ureter \(disorder\)](#)

[Calyceal renal calculus \(disorder\)](#)

[Congenital calculus of kidney \(disorder\)](#)

[Matrix stone of kidney \(disorder\)](#)

[On examination - renal calculus \(disorder\)](#)

[Uric acid renal calculus \(disorder\)](#)

[X-linked recessive nephrolithiasis with renal failure \(disorder\)](#)

Current Concept:

Fully Specified Name: Kidney stone (disorder)

ConceptId: 95570007

Source: Core

Defining Relationships:

Is a Kidney disease (disorder)

Is a Kidney lesion (finding)

Is a Urolithiasis (disorder)

Group

Finding site (attribute) [Kidney structure \(body structure\)](#)

Associated morphology (attribute) [Calculus \(morphologic abnormality\)](#)

This concept is sufficiently defined.

Descriptions (Synonyms):

Fully Specified Name: Kidney stone (disorder)

Synonym: Kidney stone [158296018]

Synonym: Renal stone [158297010]

Synonym: Nephrolith [158298017]

Synonym: Renal calculus [158299013]

Synonym: Calculus of kidney [512193015]

Synonym: Nephrolithiasis [512194014]

Synonym: Kidney calculus [512195010]

Synonym: Renal calculi [71011000009116]

US English:

Preferred: Kidney stone [158296018]

Acceptable: Renal stone [158297010]

"Calculi" is absent

^ All

^ All CTU stones filters

Document Folder is

Any

Concept+ is

Calculus (morphologic abnormality)

Concept+ is

Ureteric stone (disorder)

Concept+ is

Kidney stone (disorder)

Concept+ is

Urinary bladder stone (disorder)

Radiology Report Text contains

calculi



Integrated Healthcare and SNOMED

**Creating
Integration**

**Using
SNOMED**

HCAS

**Middle
Earth**

**The
Future**

**Bending
the Curve**

**The
Canterbury
Journey**

SNOMED CT is integral in our future

**Transfer
of Care**

**Managing
new data**

**Health
Pathways**

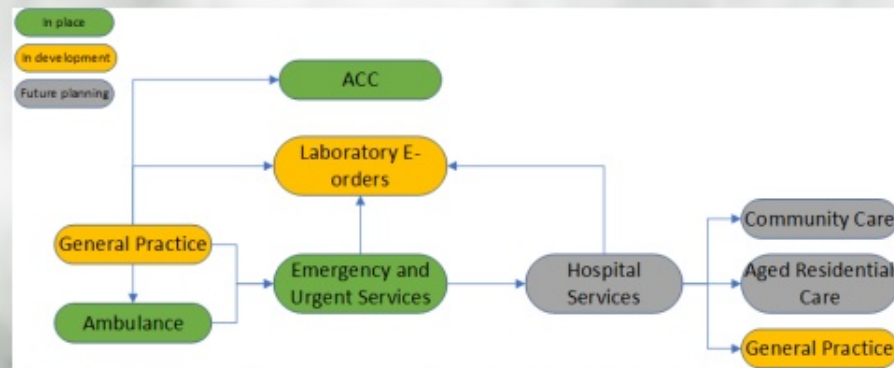
**Central
Leadership**

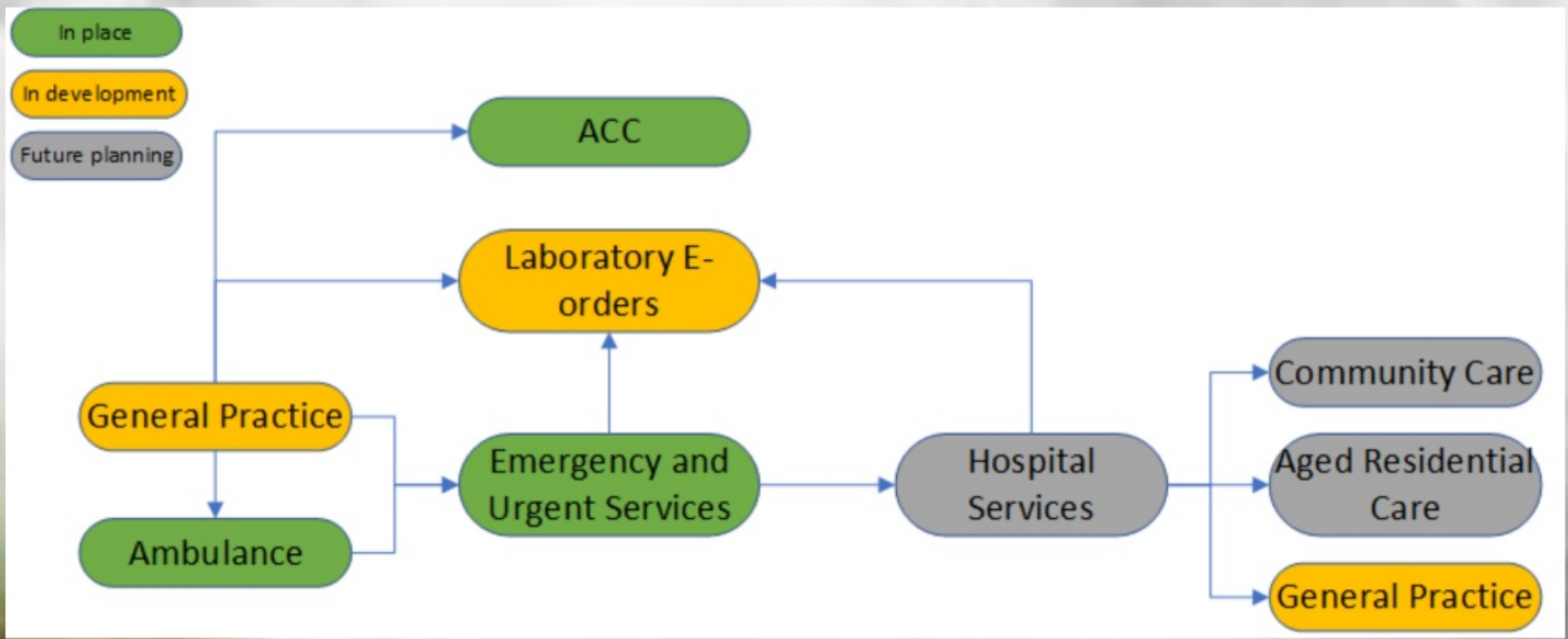
**Journeys
End**



Enabling better transfer of care in integrated systems

Structured presenting complaints/problem/diagnosis/
order lists





**Predictive
Analysis**



**The New
Data**

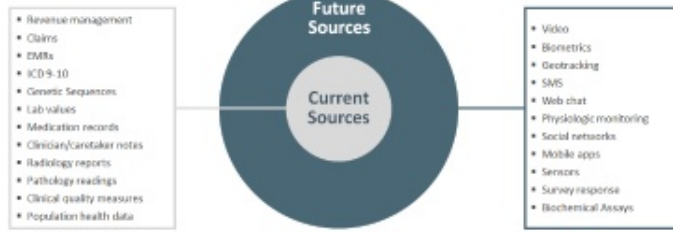
Solve a myriad problems
“Why” vs “What”

**New
Solutions**

The new data in health

Current and future healthcare data

Turning data into insight



Traditional HLS data can be *structured* or *unstructured*, and *limited*, or *voluminous* in nature

Nontraditional healthcare data will challenge current methods of *data capture* and *analytics*

We want to turn data into insight

Challenges in health and life sciences analytics

Data is in multiple systems and not normalized

Structured data can be immense (eg, genomics)

Unstructured clinical data is not leveraged effectively

Free-text is not standardized nomenclature - users have individual styles and terminology preferences.

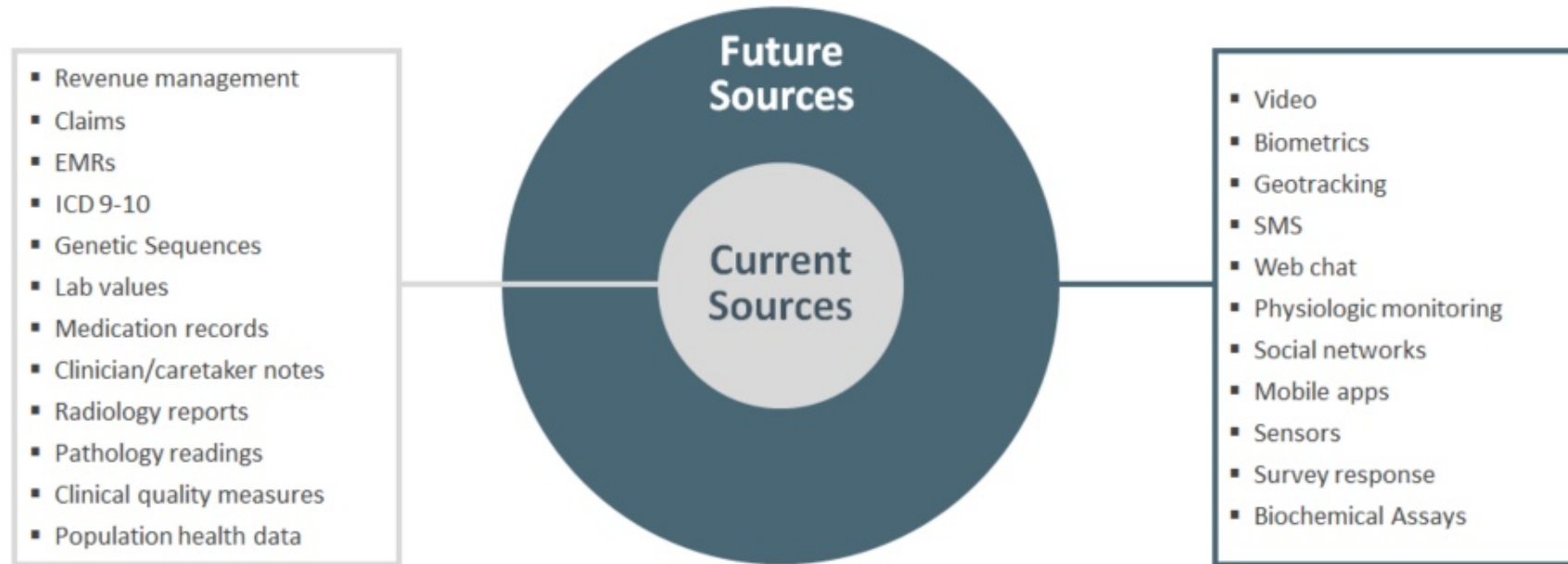
A large portion of clinical records are unstructured (free-text)



Business users need to take actions based on their data.

Current and future healthcare data

Turning data into insight



Traditional HLS data can be *structured* or *unstructured*, and *limited*, or *voluminous* in nature

Nontraditional healthcare data will challenge current methods of *data capture* and *analytics*

We want to turn *data* into *insight*

Challenges in health and life sciences analytics

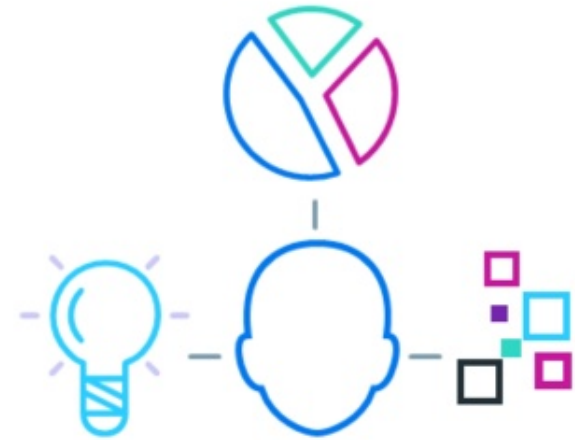
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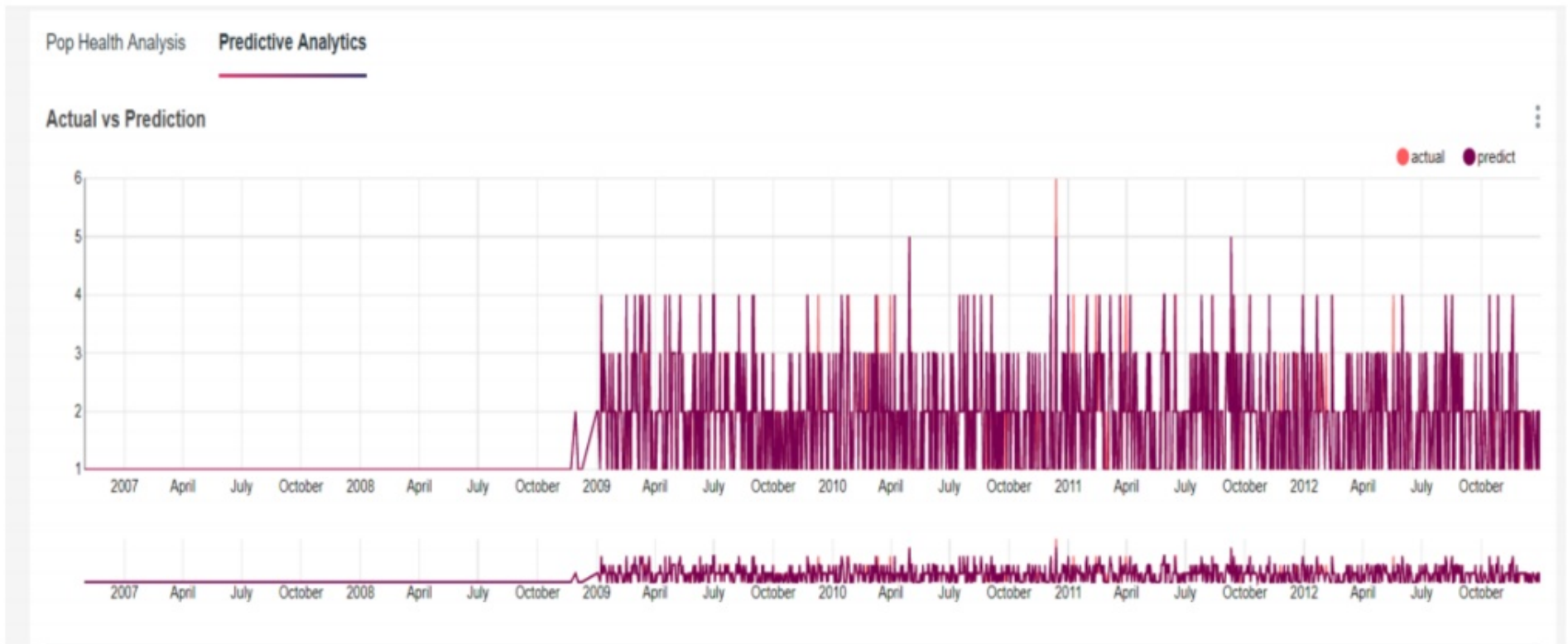
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A large portion of clinical records are unstructured (free-text)



Business users need to take actions based on their data.

Predictive Model Validation



Pharmacist Prioritisation Report

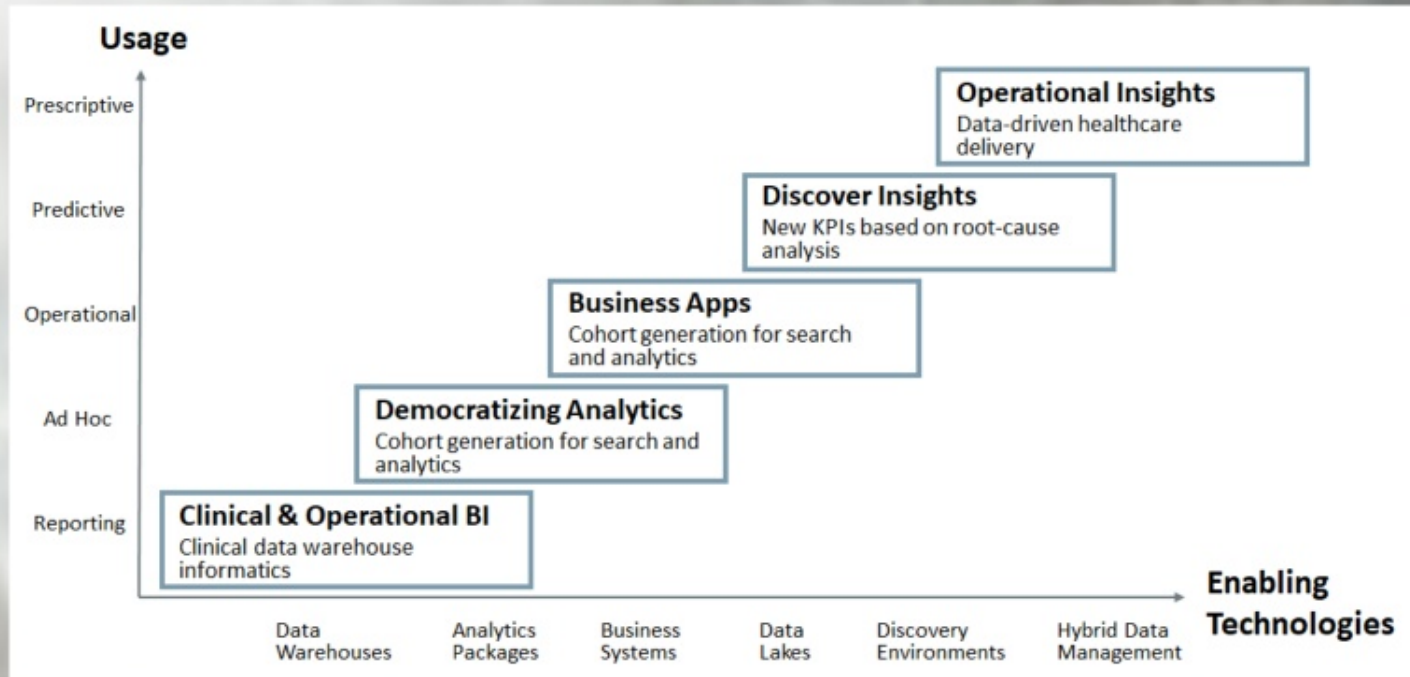
6 Jun 2019

Score	NHI	Patient Name	Age	Ward	Room/Bed	Admit Date	Demographics	> 3 Admits in 12 months	Readmit within 7 days	Number of Community Medications	High Risk Medication in Community
General Medicine Team											
32				WD28	03-01	5/06/19	3	Y	Y	20	Y
								Neurology			
26				WD27	12-03	5/06/19	3	Y		20	
25				WD24	08-04	5/06/19	3	Y	Y	21	Y
23				WD27	03-01	5/06/19	2	Y		21	Y
20				WD23	06-04	5/06/19	3			20	
								Dyspnoea			
19				WD27	09-04	5/06/19	3	Y		24	
18				WD24	08-02	5/06/19	5	Y		17	
								Asthenia			
17				WD24	09-05	5/06/19	3	Y	Y	17	
								Cough			
17				WD23	10-03	5/06/19	5			17	Y
15				AMAU	00-18	5/06/19	3			18	Y
								Headache			
15				AMAU	00-26	5/06/19	3			15	Y
14				AMAU	00-19	6/06/19	3	Y	Y	12	
								Chest pain			
13				WD27	08-04	5/06/19	6			17	
								Dyspnoea			
12				AMAU	00-05	5/06/19	3			12	Y
12				AMAU	00-03	5/06/19	5			17	
								Traumatic and/or non-traumatic injury of back			



Notes : This report is produced automatically each weekday morning
 - Patients previously unknown to CDHB will not have a name displayed, or demographic weights calculated, until the following weekend
 - The Ward the Patient was in on the previous report - Shows (in grey) under the Ward, if different to the current ward
 - Presenting Complaint shown in grey for new admissions

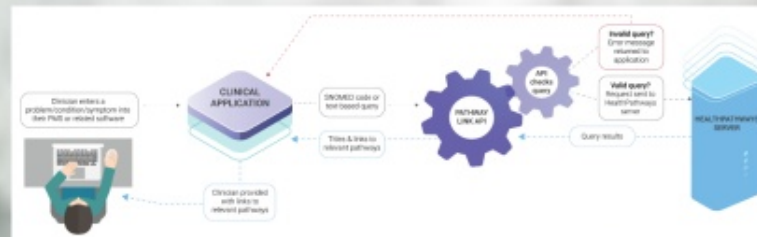
List of High Risk Medications:
 buprenorphine + naloxone, ciclosporin, clozapine, dabigatran, levodopa + benserazide, levodopa + carbidopa, methadone, methotrexate, rivaroxaban, tacrolimus, warfarin

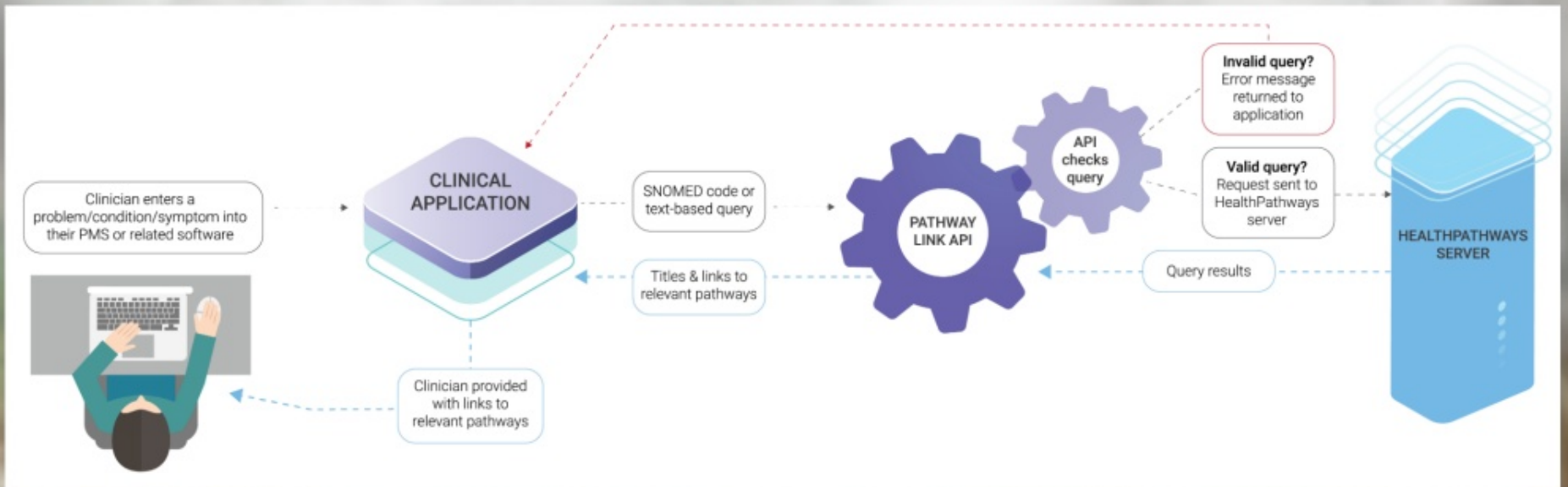


Streamline Health Pathways

The Pathway Link API interface to present best pathway options to clinicians with:

- quick access to relevant information in HealthPathways
- stable and reliable links to HealthPathways from clinical applications
- the ability to access HealthPathways from their clinical app, rather than having to log in separately.





Government Standards

- Adopted in Health and Social services
- National IT vendor strategies driving changes in incumbent vendor behaviour
- National Electronic Health record
- National Accident Insurer (ACC)

It is a continuing journey to a common vocabulary for clinical care

“Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has.”

Margaret Mead



Goalcast





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