

Chronic Disease Management Who Cares?

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The Information Group - Useful software for people in Healthcare

Introduction

- 21 years experience in Health IT
 - IT consultant at Singapore Health Services
 - Commenced with the successful implementation of Sunrise Clinical Manager (SCM) at Singapore General Hospital which lead on to the deployment of SCM across SingHealth.
 - Lead on to designing, developing and implementing the following applications:
 - » The Hospital Integrated Discharge Summary application
 - » A 'Coverage List' application used to alert doctors regarding critical and panic pathology results via SMS
 - » The Chronic Disease Management (CDM) Software
 - Project Director for the Electronic Medical Record upgrade project
 - Held roles with iSOFT and Eclipsys as
 - Product Manager for iCM
 - Manager Eclipsys Australia and Singapore
 - InfoHealth / HDWA
 - Order Entry Alerts using MLMs and the Pharmacy project

Background



Who is Singapore Health Services (SingHealth)?

- SingHealth is the largest provider of acute healthcare in Singapore. It is also known as the eastern cluster of public healthcare institutions in Singapore.
 - Comprised of Changi General (758 beds), KK Women and Children's Hospital (830 beds), Singapore General (1,516 beds) Hospitals, 5 National Specialty Centres and a network of primary healthcare clinics.
 - Each year, SingHealth institutions attend to over 3 million patients. The A&E departments handle about 350,000 cases and they perform over 170,000 surgeries annually, through a team of 12,000 dedicated and professional individuals.
- SingHealth has twice been awarded the prestigious Asia CIO award for their EMR implementation and benefits. First in 2004 and again in 2006.
- In 2004 it was reported that at SingHealth a total of 2,500 workstations had been installed with the EMR software and an estimated 6,200 users trained and accessing the EMR system cluster-wide. The 400 GB data in the EMR database contains 1.4 million records of patients seeking treatment from SingHealth's institutions.

Background

- In 2004, a National Health Survey in Singapore revealed that Diabetes Mellitus (DM) affected 8.2% of the Singapore population and was the 8th most common cause of death in Singapore.
- DM is associated with considerable mortality and morbidity from chronic complications. In Singapore, it is associated with a 3-fold increase in mortality, most of which is related to cardiovascular disease.
- Early diagnosis and aggressive treatment of DM and its associated metabolic derangements can prevent or delay the progression of major chronic complications.
- It is important to detect individuals with DM so that appropriate therapeutic measures can be taken to minimize the morbidity caused by this devastating disease.
- When a diagnosis of DM is made, the clinician must feel confident that the diagnosis is fully established since the consequences for the individual are considerable and life-long.

Background

- Diabetes (Australia)
 - 700,000 Australians diagnosed in 2004/5
 - For every case diagnosed 1 remains undiagnosed
 - By 2030, 3.3 million Australians and 380 million people worldwide are estimated to have diabetes
 - The most common chronic childhood illness in developed nations

Source: Diabetes Research Foundation of Western Australia (Inc) 2008
- COPD (Australia)
 - Recent Australia Institute of Health and Welfare estimates have doubled from 620,414 to 1.2 M persons aged 45–70 years
 - 4th most common cause of death in males and the 6th in females
 - 3rd leading cause of disease burden after ischaemic heart disease and stroke

Background

- The CDM software was developed through SingHealth's Clinical quality initiatives with funding contributed by the Ministry of Health
- The software was designed to demonstrate capabilities that can help to optimise health care delivery by leveraging:
 - Evidence-based clinical pathways and epidemiologic models.
 - A robust EMR platform.
- One of the goals for the system was that it would make it easier for clinicians and healthcare workers to proactively monitor patients' progress and make better decisions.
- This initiative was part of SingHealth's ongoing efforts to explore better and more cost-effective ways to provide quality and safe healthcare services for patients.

Clinical Practice Guidelines (CPG)

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<http://www.moh.gov.sg/mohcorp/publications.aspx?id=16426>

Paper based CPG Flow Chart

Figure 1 Flowchart for the diagnosis of diabetes mellitus

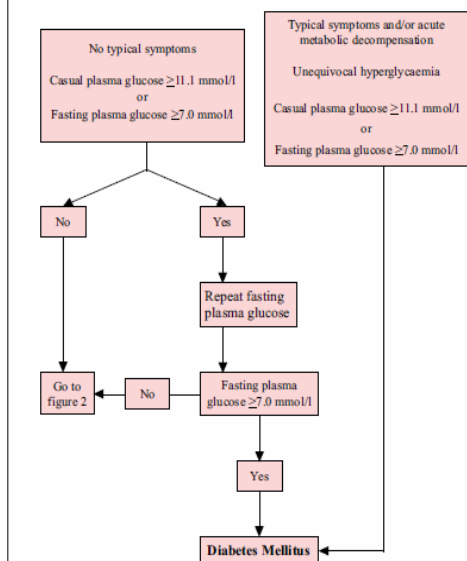
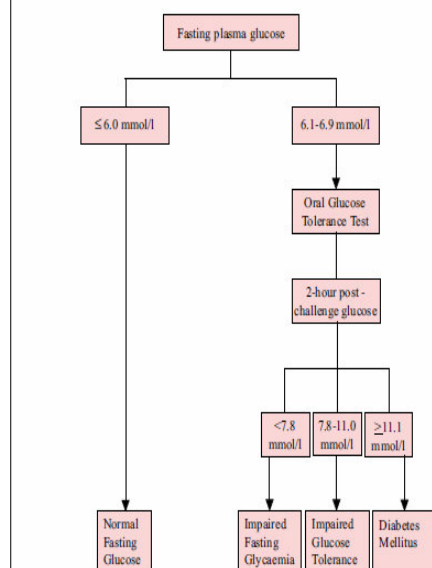
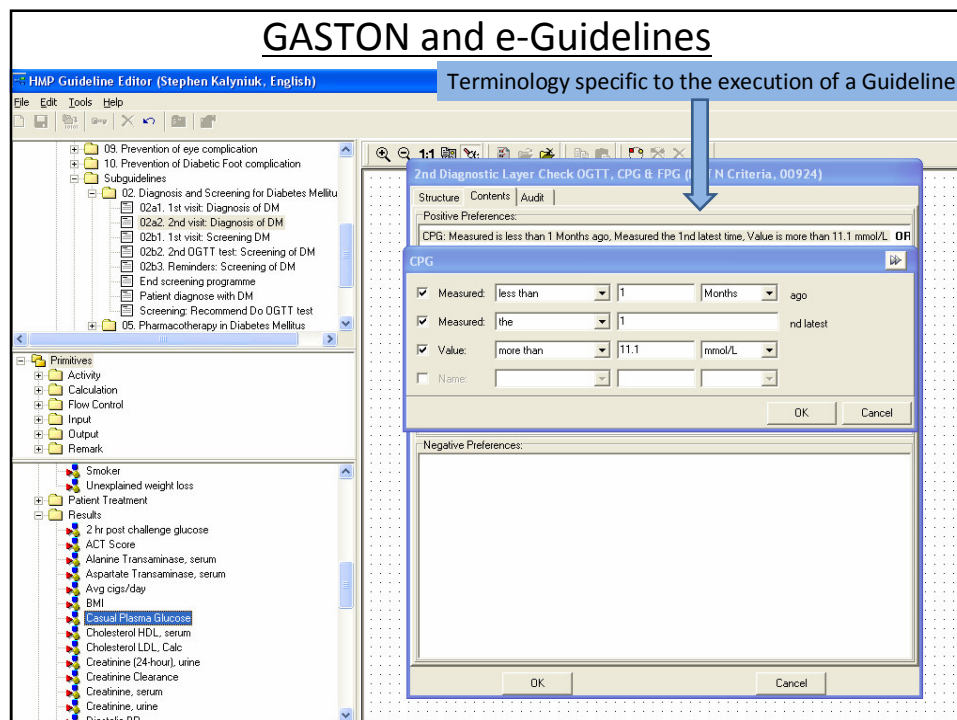
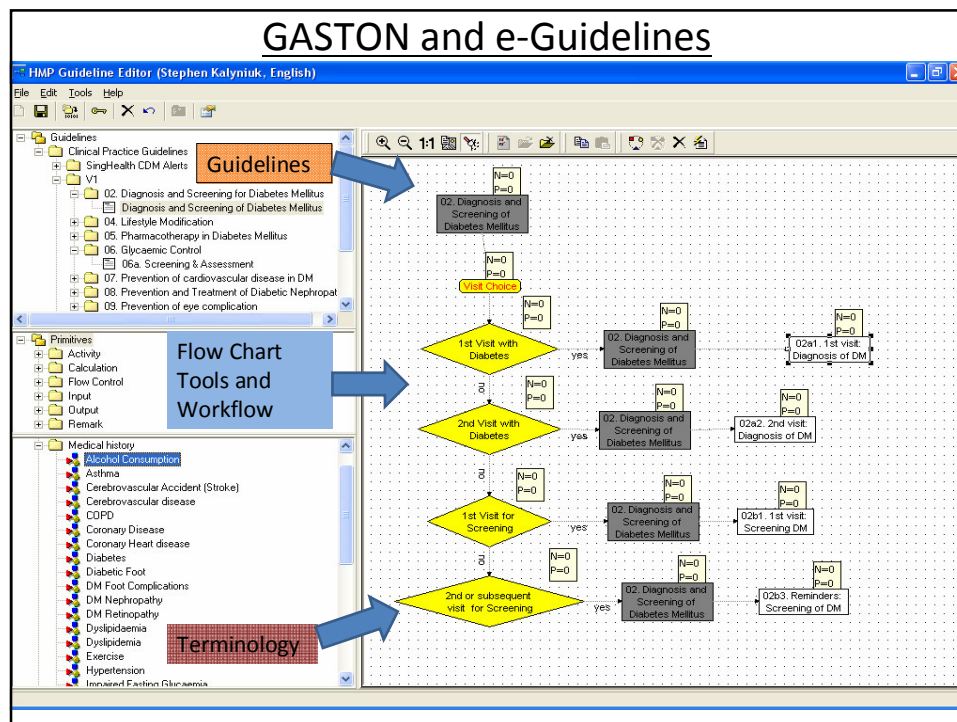
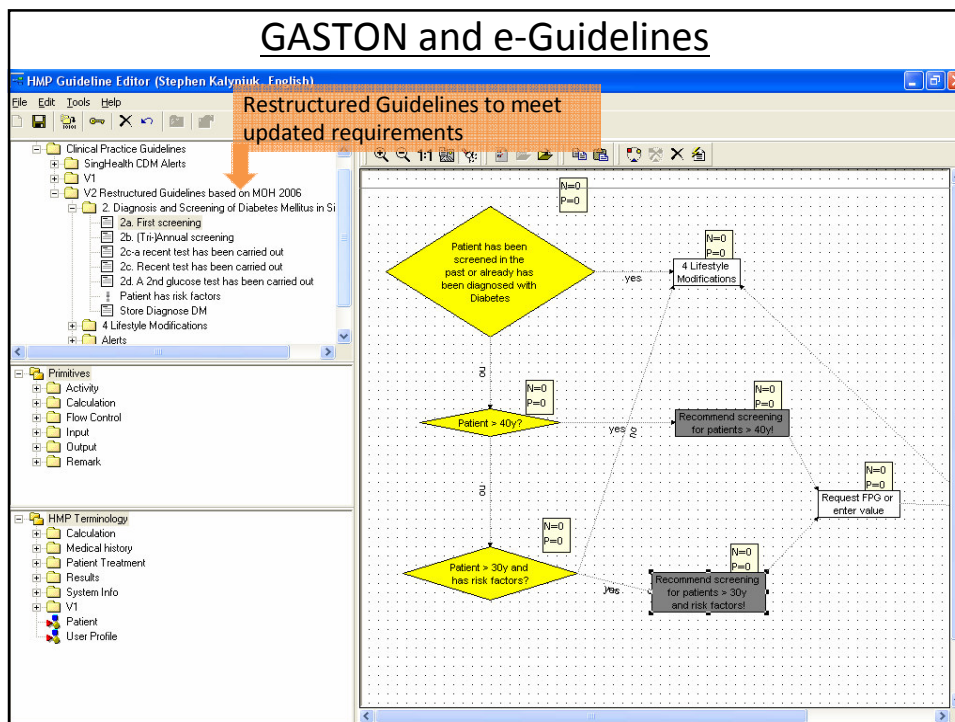


Figure 2 Flowchart for individuals suspected to have diabetes but whose fasting plasma glucose < 7.0 mmol/l





GASTON and e-Guidelines



GASTON and e-Guidelines

Gaston Protocol Output - RATNAM S S/O SANTHAN S0026959H

Please select the guidelines which you wish to address some of the issues where evidence-based information pertaining to them is available.

- ☐ Apply: Diagnosis and Screening of Diabetes Mellitus
- ☐ Apply: Lifestyle Modification
- ☐ Apply: Pharmacotherapy in Diabetes Mellitus
- ☐ Apply: Glycaemic control Assessment and Targets
- ☐ Apply: Prevention of Cardiovascular Disease in Diabetes Mellitus
- ☐ Apply: Prevention and Treatment of Diabetic Nephropathy
- ☐ Apply: Prevention and Management of Eye Complications
- ☐ Apply: Prevention of Diabetic Foot Complications

Accept **Cancel**

Prior Protocol Recommendations for - RATNAM S S/O SANTHAN S0026959H

Patient Profile

- Casual plasma glucose, OR
- Fasting plasma glucose, OR
- 2-hour post-challenge plasma glucose

Advice for "RATNAM S S/O SANTHAN"

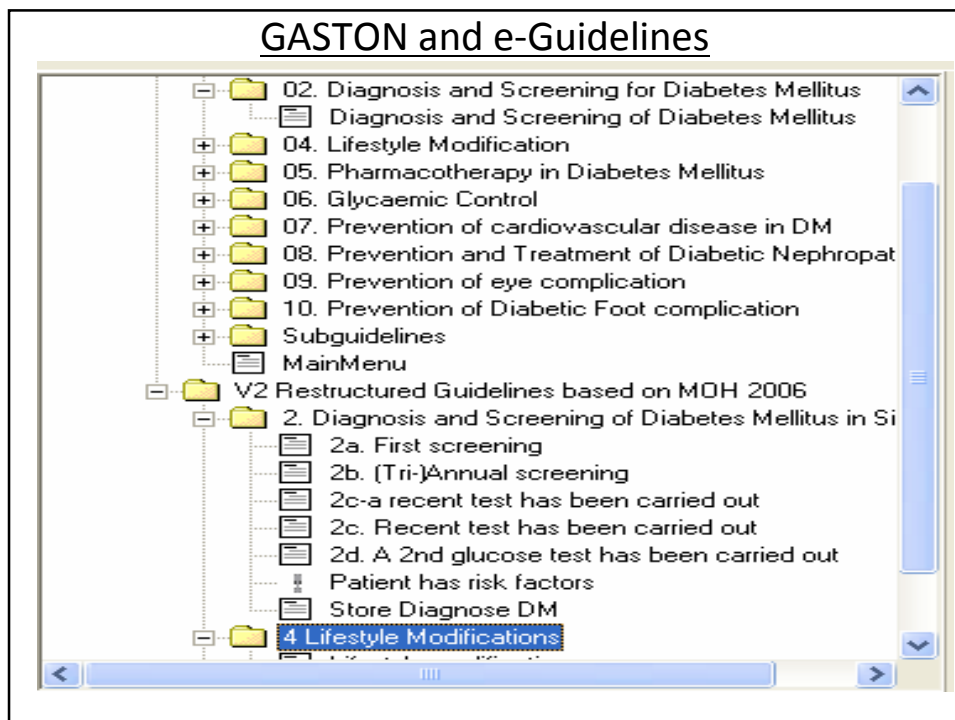
02. Diagnosis and Screening of Diabetes Mellitus for RATNAM S S/O SANTHAN S0026959H

First or Second Visit with Diabetes Mellitus or Screening Visit?

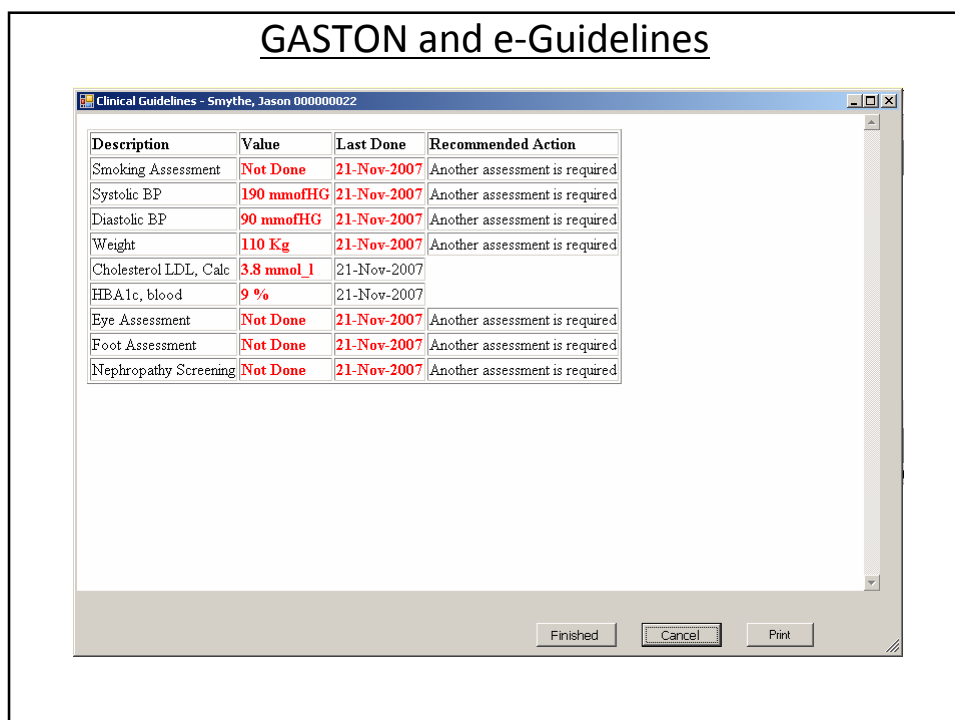
- ☒ 0 Visits: 1st visit with Diagnosis of Diabetes Mellitus
- ☐ 0 Visits: 2nd Visit with diagnosis of Diabetes Mellitus
- ☐ 0 Visits: 1st Screening Visit
- ☐ 0 Visits: 2nd and Subsequent Screening Visit

Close

GASTON and e-Guidelines



GASTON and e-Guidelines



CDM -Application Launch

Patient Name	Patient ID / Visit Number	Birthdate	Current Location	Visit Status	Admit Date	Admit Time	Provider	To Sign	To Verify	Unack Alerts
Smythe, Jason	000000022/000036	04-Aug-1...	1EST-116-A	ADM	06-Oct-99	12:35	Ames, Joan L			
Unger, Howard	PAT070903/MS070903	28-May-1...	Endocrine Clinic	ADM	03-Sep-07	11:25				
Funnel, Nita Marie	000100025/000005	29-Apr-19...	ICU-3	ADM	06-Apr-99	08:50	Delbrook, Ronald			

CDM Application – Medical History

Medical Condition	Yes	No	No Info	Diagnosis Year	No. of yrs	Remarks
Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Cerebrovascular Accident (Str...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
COPD	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Coronary Heart disease	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Diabetes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1990	18	
DM Foot Complications	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
DM Nephropathy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1996	12	
DM Retinopathy	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Hypertension	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1994	14	
Lipid Disorder	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

Treatment	Yes	No	No Info	Year Started	No. of yrs	Remarks
Condition: Diabetes						
Insulin	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
Oral medications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1990	18	
Condition: Hypertension						
Oral medications	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			

CDM Application and Context Management

- Using a technique called "context management", the CDM application provides the clinician with a view on the information held in iCM/ SCM and that entered and maintained in the CDM application.
- The CDM software is launched for the same person that the user has selected in iCM / SCM. This means that when a user signs on to iCM/ SCM, and opens the CDM software, by using Context Management that same sign-on can be executed on CDM. Similarly, the patient selected in iCM/SCM is the same patient that is opened in the CDM application.
- CCOW works for both client-server and web-based applications. The acronym CCOW stands for "Clinical Context Object Workgroup" (CCOW), a reference to the standards committee within the HL7 group that developed the CCOW standard
- iCM has context management features which have yet to be utilized in Perth.
- CCOW is not to be confused with "screen scrapping". Further information re CCOW is available at <http://www.hl7.org.au/CCOW.htm>

CDM Application – Clinical Indicators

CDM Data - RATNAM S/O SANTHAN S0026959H

RATNAM S/O SANTHAN S0026959H 01/Jan/1935 Male Indian

Height (m) Actual ☐ Estimated ☐ Current Smoker ☐ Started Smoking (YYYY)

Known Medical History / Clinical Indicators

Clinical Indicator Values

Please enter the new values for this patient - press the enter key after you have input /entered in all of the values

Entry Date	Glycaemia	Lipids	Blood Pressure (mm of Hg)	Lifestyle	Smoking	Annual Assessment	Data Input By
Date	HbA1c(%)	LDL UoM	SBP DBP	Weight(kg)	Avg cigs/day	Eye Foot Nephropathy Thromboembolism	User Id
27-Mar-2007	<input type="text"/>	<input type="text"/> mmol/L	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	james

Remarks

☐ Show indicators for past 6 visits ☐ Show indicators for all visits

Clinical indicator values from previous visits

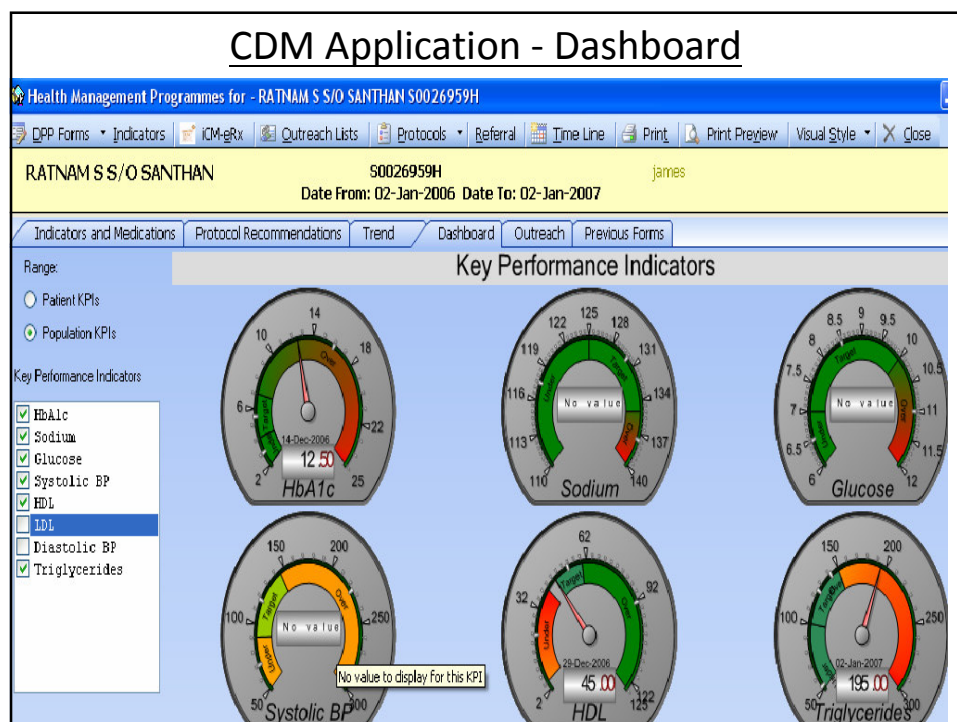
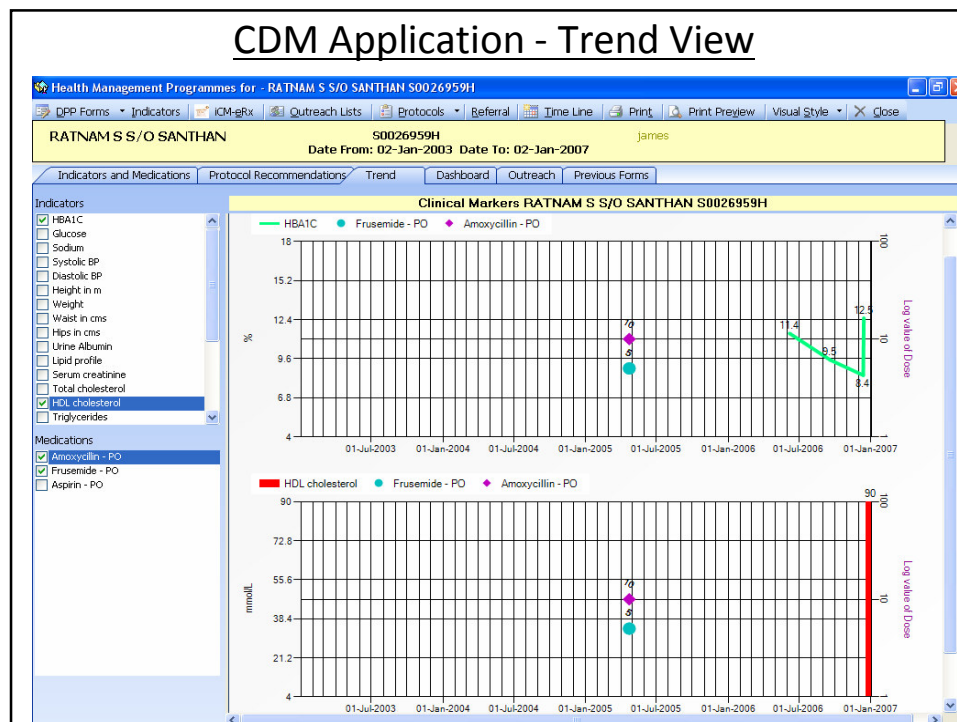
Entry Date	Glycaemia	Lipids	Blood Pressure (mm of Hg)	Lifestyle	Smoking	Annual Assessment	User
Date	HbA1c (%)	LDL...	SBP DBP	Weight (kg)	Avg cigs/day	Eye Foot Nephropathy Thromboembolism	User Id
08-Mar-2007	8.6	15.9	150 95	98	0	<input checked="" type="checkbox"/>	gsc100
06-Feb-2007	9.2	15.9	190 100	100	10	<input checked="" type="checkbox"/>	wcy125
12-Dec-2006	8.6	15.9	190 100	100	25	<input checked="" type="checkbox"/>	Acf1234
06-Nov-2006	11.2	25.9	210 150	100	45	<input checked="" type="checkbox"/>	wcy125
25-Sep-2006	13.6	35.9	225 100	100	80	<input checked="" type="checkbox"/>	Acf667
05-Sep-2006	15.6	35.9	225 100	100	80	<input checked="" type="checkbox"/>	Acf667

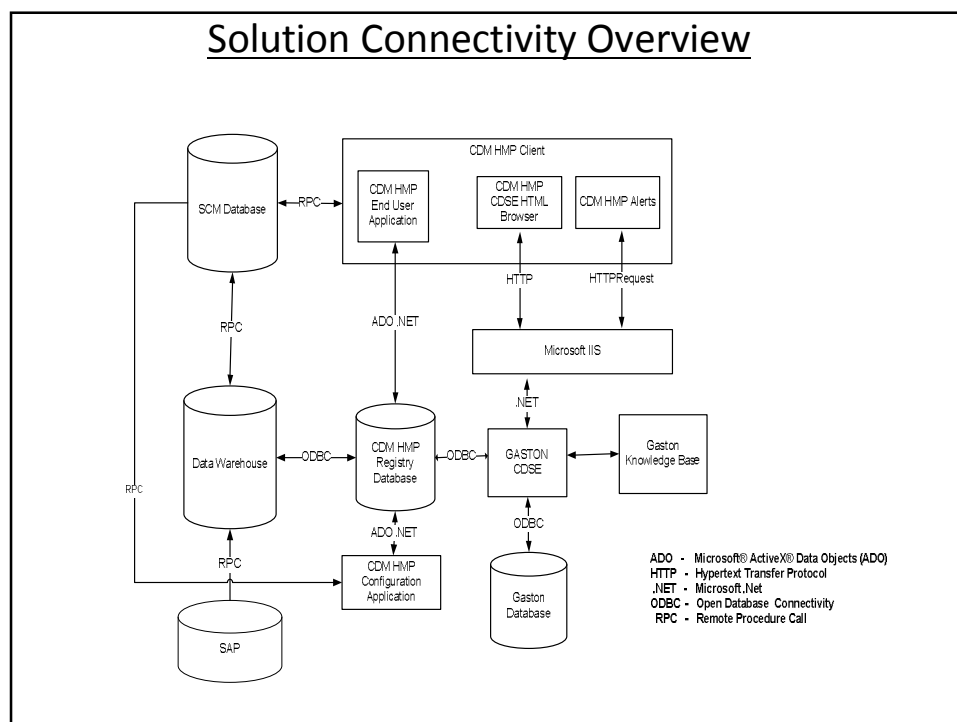
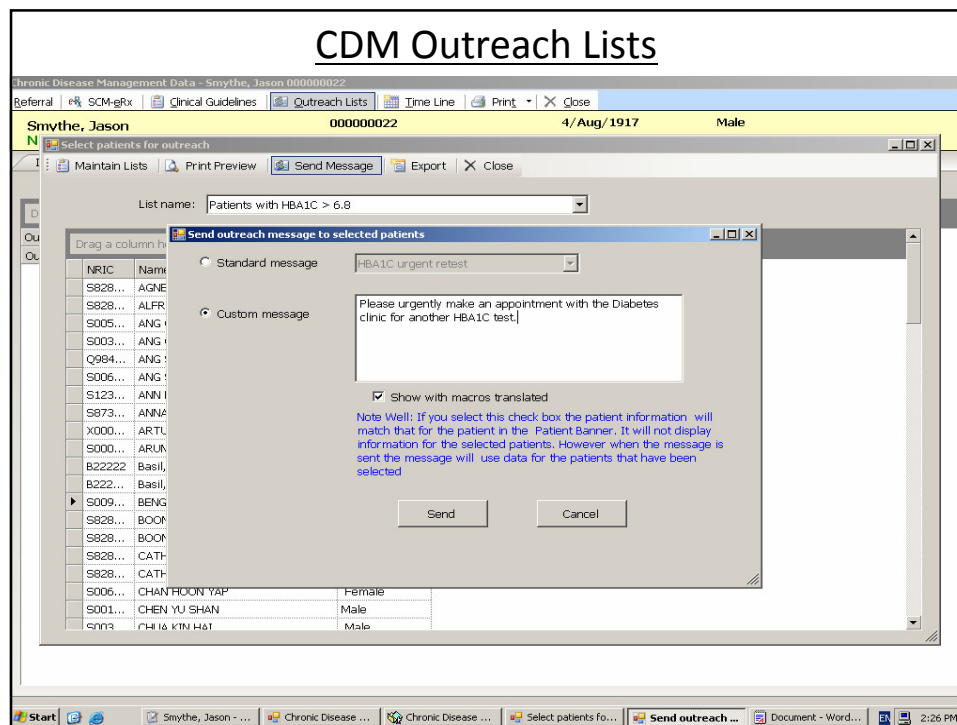
Care Provider Information

Care Provider Details - Double Click row for advanced search and add / update features

Doctor Name	Doctor MCR	Specialty / Training	Facility	Role	Primary
Fong Eugene	W6757198	General Practice	SHS Polyclinics	GP	<input checked="" type="checkbox"/>
Ng Catherine	A43198	Cardiology	SGH	Attending	<input type="checkbox"/>

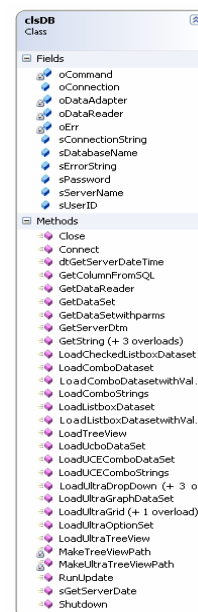
Save, Preview Save, Print, Close Save, Close Cancel





Technical Overview

- Object Orientated framework for:
 - All database access
 - Patient data, User Security
 - All data bound controls are loaded via the framework
 - Benefits
 - Rapid application development
 - Application and data consistency
 - Reusable objects
 - Improves software maintenance timeframe
 - Extended software life
- Developed a Reporting sub system for local report processing (SQL Server Reports without having to have a Report Server)
- VB and SQL Server



Summary

- Keep the individual e-guideline sections small
- Spend time on developing the application framework (i.e. object layer) first
- Project not achievable in the same timeframe (if at all) without Gaston (or similar product).
- Ability to keep e-Guidelines in synch with clinical practice requires a tool such as Gaston. Cannot imagine being able to keep up with changes in clinical practice trying to use traditional development tools such as VB and SQL.
- Technical integration of the guidelines requires IT staff while the content of the guidelines requires clinical staff.
- Able to reuse the CDM object framework as the basis for other applications. For example in a Mental Health Admission Register and Documentation framework
- Establish 'Registers and Register Rules' to replace Outreach lists.
- Regardless of the development platform and or development language the components provided (i.e. Data grids, Calendar controls, List Boxes) within Visual Studio are only a subset of the controls that are required to provide an application that meets the demands of end users. Microway (www.microway.com.au) and ComponentSource are suppliers of advanced developer components.