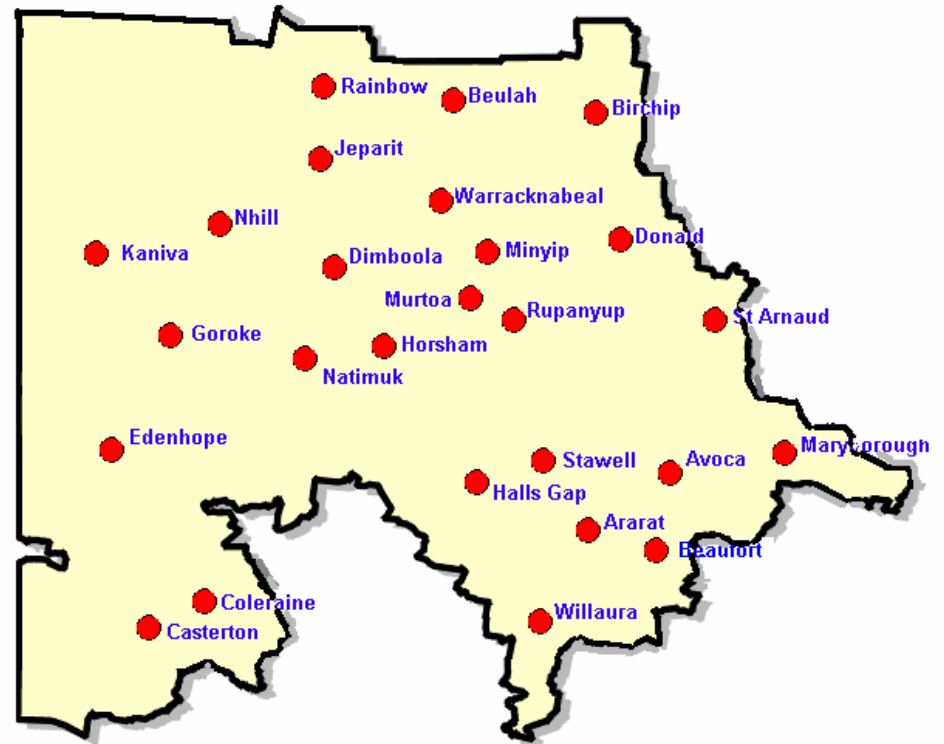
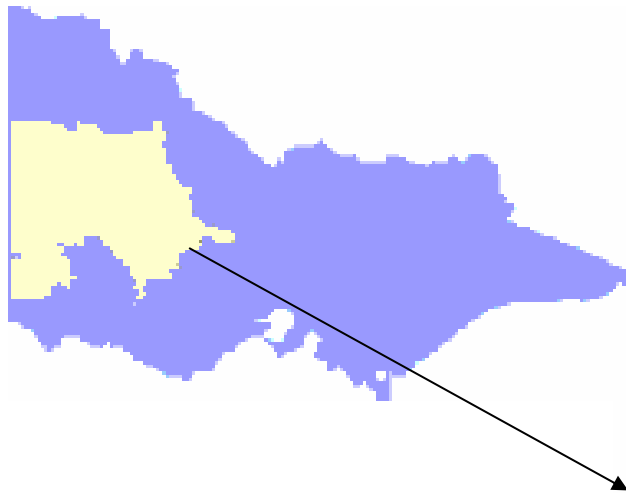


Diagnostic Imaging Referral

**A DIVISIONAL CASE STUDY
IN COLLABORATION TO
DEVELOP DECISION
SUPPORT SYSTEMS FOR
GENERAL PRACTICE**

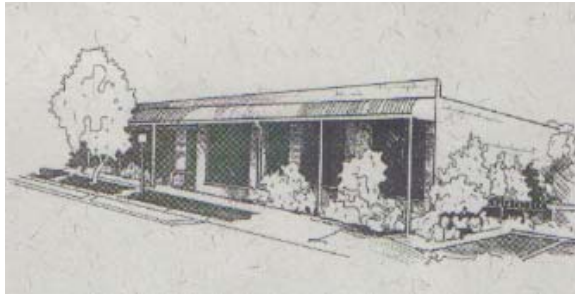


West Vic Division Region



Diagnostic Imaging Referral

A collaborative project



Ararat Medical Centre



East Grampians
Health Service
Moving Forward



Radsonic Diagnostic
Partners



Diagnostic Imaging Referral

Rural City of Ararat



Population: Approx 8000 in township 11,101 in Shire

**One medical practice:
Ararat Medical Centre**

**Acute Facility: East
Grampians Health Service**



Diagnostic Imaging Referral

Electronic Referral

- ⌘ **Patient does not have request form**
- ⌘ **Patient booked for incorrect procedure**
- ⌘ **Patient poorly prepared for procedure**
- ⌘ **Patient fails to present**

- ⌘ **Direct transfer of request from GP desktop to radiology provider**
- ⌘ **Acknowledgement of request**
- ⌘ **Patient education and information**

Problem

Solution



Decision Support

Imaging and low back pain

- ⌘ **Patient expectation of X-ray for lower back pain**
- ⌘ **Guidelines say imaging is not indicated**
- ⌘ **Risk of Chronicity**

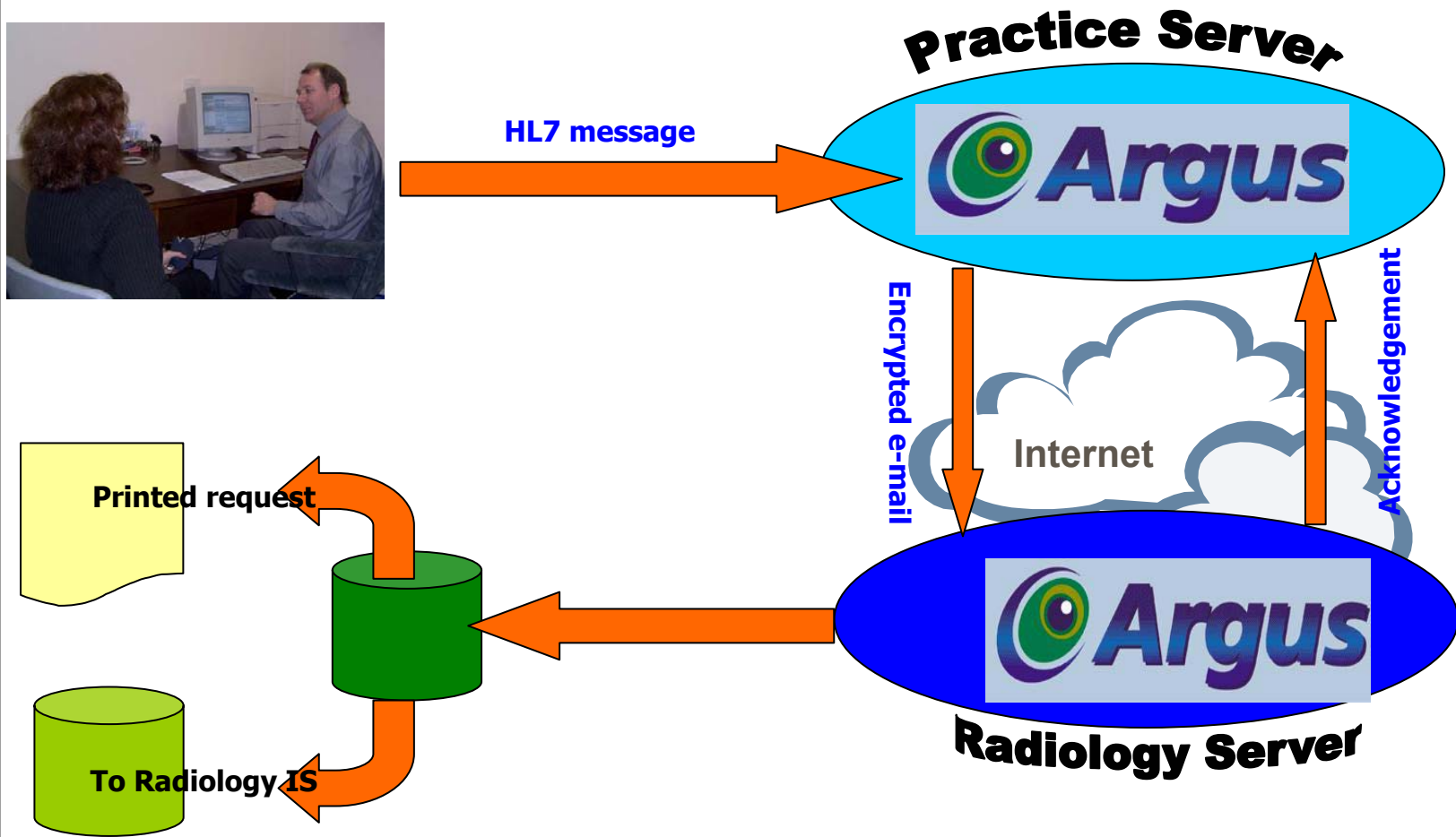
- ⌘ **Patient education**
- ⌘ **GP decision support during consult to assist in back pain diagnosis and management**

Problem

Solution



Sending a request



The HL7 messages

Request


```
MSH|^~&|MDV2.3|AMC|RMS|EGHS|20030424105857+1000||ORM^O01^ORM_O01|001030424105856|P|2.3.1^AUS&Australia&ISO3166-1
PID||ZZZZZZ22^^^HCN^PI^030057~3500265121^^^AUSHIC^MC||ANDREWS^ANNA^^^MISS^L||19981208+1000|||2 KENNEDY RD^^DEMO
TOWN^^4523||^PRN^PH^^^07^91234567
PV1||O|||||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||PRIVATE
ORC|NW|00104241058-1^AMC||00104241058^AMC|||||||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||13 BEST ST.^PILL
LAND^SA^5000|^WPN^PH^^^02^99084888
OBR|1|00104241058-1^AMC|^X-ray - Jaw|||||||Unable to talk|||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||^20030424105857+1000
ORC|NW|00104241058-2^AMC||00104241058^AMC|||||||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||13 BEST ST.^PILL
LAND^SA^5000|^WPN^PH^^^02^99084888
OBR|2|00104241058-2^AMC|^X-ray - Larynx|||||||Unable to talk|||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||^20030424105857+1000
ORC|NW|00104241058-3^AMC||00104241058^AMC|||||||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||13 BEST ST.^PILL
LAND^SA^5000|^WPN^PH^^^02^99084888
OBR|3|00104241058-3^AMC|^X-ray - Mandible|||||||Unable to talk|||610234A^PRACTITIONER^A^^^DR^^^AUSPROV|||||||^20030424105857+1000
```

Acknowledgement

```
MSH|^~&~|Argus Server V1.0|Cceh|MDV2.3|AMC|20030424110643.0540+1000||ACK^R01|Argus1051146403540|D|2.3.1
MSA|AA|001030424105856|Normal Acknowledgment.
```



The printed request

		East Grampians Health Service Radiology Request Form						
East Grampians Health Service		P.O. Box 155, Ararat Vic. 3377 Phone No: 53529325 Fax No:						
Name: MRS JANE MOODBORY		<table border="1"><tr><td colspan="2">Your appointment</td></tr><tr><td>Date:</td><td></td></tr><tr><td>Time:</td><td></td></tr></table>	Your appointment		Date:		Time:	
Your appointment								
Date:								
Time:								
Address: 42 FICTICIOUS STREET NOWHERI SA 555	Tel.(H) (08)34567891	Medicare: 1 DOB: 23/10/1958 GP's UR -NO: MOODJANEA CSV File: MOOJ 1 9581023 -37915.6827119213						
Request For: X-ray - Ba Enema		Clinical Details: Checking to see that I can still send you a request, in preparation for tomorrow.						
DR A PRACTITIONER 13 BEST ST. PILL LAND SA 5000 (02)99084888 610234A		g@ @ 13/10/200 3	Results: Tel report to: Return films with patient Fax report to:					
Copies to:								
Ultrasound	Please have a full bladder. Drink 1 litre of water 2 hours before your appointment and do not go to the toilet.							
Pregnancy/Pelvis:								
Renal I/USound:	Fast for 4 hours. Do not empty your bladder for 2 hours before the appointment and drink 2-3 glasses of water in the hour before your appointment.							
Upper Abdomen USound:	Fast (food and drink) for the 12 hours prior to your appointment.							
Barium Meal I Swallow:	Fast (food and drink) for 6 hours prior to your appointment.							
Barium Enema:	Please come to the department to book this procedure and we will discuss the preparation with you at that time.							
Intravenous Pyelogram (IVP):	Please come to the department to book this procedure and we will discuss the preparation with you at that time.							
Barium Followthrough / Small bowel series:	Fast for 6 hours prior to your appointment. You may be in the department for 2-3 hours and occasionally longer so bring some reading material if you desire.							
Abdomen/CT Scanning Pelvis:	Fast for 4 hours prior to your appointment. You will be required to drink a solution in the hour before the procedure so bring some reading material if you desire.							
CT Brain:	Fast for 4 hours prior to your appointment.							
CT Spine:	No preparation required							



Results back to GP

- ⌘ **Essentially the reverse of a request**
- ⌘ **Argus handles the transfer**
- ⌘ **Leaves a results file for MD to pick up in the “normal” way that it handles other investigation results**
- ⌘ **Both request and results are clear to GP**



Decision support

⌘ XML based

⌘ Interfaces with clinical desktop

⌘ Incorporates Existing Guidelines

⌘ RANZCR

⌘ RCGP

⌘ RACGP

⌘ University of Queensland



Decision Support System

The screenshot shows a web-based medical decision support system. The main window is titled "ICP2 - Decision Support Viewer". On the left, a patient profile for Maureen Andrews is displayed, including her address (3 Best St, St. Kilda, 3107), allergies (SULFONAMIDES), and warnings (ON WARFARIN). The consultation date is 23/10/2003. The main content area is titled "Lower Back Pain" and is divided into several sections: "GENERAL", "WHAT DO YOU SUSPECT?", "OUTCOME", and "UNCOMPLICATED LBP". Below these is "PATIENT INFORMATION" with options for XRay, General Ultrasound, and Obstetric Ultrasound. A "WEB LINKS" section provides several URLs for further information. On the right, a checklist of clinical questions is shown, with the first question, "Is the patient over 70? (Increased risk organic illness)", checked. A "NEXT>" button is located at the bottom right of the checklist area. The bottom of the interface features navigation buttons for History, Examination, Diagnosis, Management, Comment, and Procedure, along with a logo for "australian doctor.com.au" and a link to the "MD Web Site".

Medical Director 2.75 B0707 - [Maureen Andrews] ICP2 - Decision Support Viewer

Maureen Andrews
3 Best St, St. Kilda, 3107
Allergies: SULFONAMIDES
Warnings: ON WARFARIN

Summary Rx Current Rx Progress

Consultation date: 23/10/2003

Thursday October 23 2003 16:35:50
Dr. A. Practitioner

Lower Back Pain

GENERAL

WHAT DO YOU SUSPECT?

OUTCOME

UNCOMPLICATED LBP

PATIENT INFORMATION

- XRay
- General Ultrasound
- Obstetric Ultrasound

WEB LINKS

- [Royal Australian & New Zealand College of Radiologists www.spine-health.com](http://www.spine-health.com)
- www.workcover.vic.gov.au
- www.dpp.org.uk
- www.spineuniversity.com
- www.backcare.org.uk
- [The University of Queensland - Guidelines for clinicians and consumers](#)

ANDREWS, MAUREEN (DOB: 23/06/1923, F)

Is the patient over 70? (Increased risk organic illness)

No improvement using conservative treatment

Recurrent Pain Following Surgery?

Has Osteoporosis?

Has been taking Corticosteroids?

Has Suffered Trauma?

Bladder Dysfunction?

Patients pain unchanged over one month

Previous X-Ray Inconclusive?

NEXT>

History Examination Diagnosis
Management Comment Procedure

australian doctor.com.au MD Web Site ?

Diagnostic Imaging Referral



Decision Support System

The screenshot shows a medical decision support system window titled "ICP2 - Decision Support Viewer". The patient information is for Maureen Andrews, DOB: 23/06/1923, F. The consultation date is Thursday, October 23, 2003, at 16:35:50, by Dr. A. Practitioner. The system has identified the condition as "Lower Back Pain" (UNCOMPLICATED LBP). The decision support tool has found the following: Suggested treatment for spinal fractures is CT, ± MRI. CT Scan may provide greater detail for minor fractures, especially CX Spine. MRI is contraindicated if patient has a pacemaker! The system also lists "ALSO CONSIDER" (Paget's Disease, Hyperparathyroidism, Myeloma, Other tumours of bone cartilage, muscle etc, Prostate, Breast, Lung, Thyroid, Kidney, GIT, Melanoma) and "PATHOLOGY" (Serum Calcium, Alkaline phosphatase, Acid phosphatase, Bone scan, IEPG, Imaging, Biopsy, Imaging, Biopsy, Prostate specific antigen, Bone scan, Acid phosphatase, Alkaline phosphatase, Serum calcium, ESR, GRP, CEA). The interface includes buttons for "<BACK", "FINISH", and "ORDER REQUEST".

Medical Director 2.75 B0707 - [Maureen Andrews] ICP2 - Decision Support Viewer

Maureen Andrews
3 Best St, St. Kilda, 3107
Allergies: SULFONAMIDES
Warnings: ON WARFARIN

Summary Current Rx Progress

Consultation date: 23/10/2003

Thursday October 23 2003 16:35:50
Dr. A. Practitioner

Lower Back Pain

GENERAL

WHAT DO YOU SUSPECT?

OUTCOME

UNCOMPLICATED LBP

PATIENT INFORMATION

- XRay
- General Ultrasound
- Obstetric Ultrasound

WEB LINKS

- Royal Australian & New Zealand College of Radiologists www.spine-health.com
- www.workcover.vic.gov.au
- www.dpp.org.uk
- www.spineuniversity.com
- www.backcare.org.uk
- The University of Queensland - Guidelines for clinicians and consumers

ANDREWS, MAUREEN (DOB: 23/06/1923, F)

The decision support tool has found the following:

Suggested treatment for spinal fractures is CT, ± MRI

CT Scan may provide greater detail for minor fractures, especially CX Spine

MRI is contraindicated if patient has a pacemaker!

ALSO CONSIDER

- Paget's Disease
- Hyperparathyroidism
- Myeloma
- Other tumours of bone cartilage, muscle etc
- Prostate
- Breast
- Lung
- Thyroid
- Kidney
- GIT
- Melanoma

PATHOLOGY

- Serum Calcium
- Alkaline phosphatase, Acid phosphatase, Bone scan
- IEPG, Imaging, Biopsy
- Imaging, Biopsy
- Prostate specific antigen
- Bone scan
- Acid phosphatase
- Alkaline phosphatase
- Serum calcium
- ESR, GRP, CEA

<BACK FINISH ORDER REQUEST

History Examination Diagnosis
Management Comment Procedure

australian doctor.com.au MD Web Site ?



Diagnostic Imaging Referral

Decision Support System

The screenshot shows a medical decision support system window titled "ICP2 - Decision Support Viewer". The patient is identified as Maureen Andrews, DOB: 23/06/1923, F. The system is currently displaying a decision support tool for "Lower Back Pain".

Patient Information:
Maureen Andrews
3 Best St, St. Kilda, 3107
Allergies: SULFONAMIDES
Warnings: ON WARFARIN
Consultation date: 23/10/2003
Thursday October 23 2003 16:35:50
Dr. A. Practitioner

Decision Support Tool:
Lower Back Pain
GENERAL
WHAT DO YOU SUSPECT?
OUTCOME
UNCOMPLICATED LBP

PATIENT INFORMATION

- XRay
- General Ultrasound
- Obstetric Ultrasound

WEB LINKS

- [Royal Australian & New Zealand College of Radiologists](#)
- [www.spine-health.com](#)
- [www.workcover.vic.gov.au](#)
- [www.dpp.org.uk](#)
- [www.spineuniversity.com](#)
- [www.backcare.org.uk](#)
- [The University of Queensland - Guidelines for clinicians and consumers](#)

WHAT DO YOU SUSPECT?

Stenosis of Spinal Cord or Neural Foramin	<input type="checkbox"/>
Spinal Fractures	<input type="checkbox"/>
Spinal Infection	<input type="checkbox"/>
Metastatic Disease or Primary Bone Malignancy	<input type="checkbox"/>
Post Operative Lumbar Spine	<input type="checkbox"/>
Metabolic Bone Disease	<input type="checkbox"/>
Apophyseal Joint Disease	<input type="checkbox"/>
Uncomplicated Back Pain	<input type="checkbox"/>

<BACK NEXT> FINISH

Look for aggravating factors - back pain will commonly be aggravated by particular movements or activities of daily living.

Pain in the absence of aggravating factors is a sign to look for red flag conditions.



Decision Support System

The screenshot shows a medical decision support system interface. The main window is titled "ICP2 - Decision Support Viewer" and displays information for a patient named Maureen Andrews (DOB: 23/06/1923, F). The system is currently displaying the "Lower Back Pain" section, which includes a "GENERAL" overview, "WHAT DO YOU SUSPECT?", and "OUTCOME" information. The outcome is "UNCOMPLICATED LBP".

Lower Back Pain
GENERAL
WHAT DO YOU SUSPECT?
OUTCOME
UNCOMPLICATED LBP

PATIENT INFORMATION

- XRay
- General Ultrasound
- Obstetric Ultrasound

WEB LINKS

- Royal Australian & New Zealand College of Radiologists
www.spine-health.com
- www.workcover.vic.gov.au
- www.dpp.org.uk
- www.spineuniversity.com
- www.backcare.org.uk
- The University of Queensland - Guidelines for clinicians and consumers

ANDREWS, MAUREEN (DOB: 23/06/1923, F)

With Uncomplicated back pain NO imaging is recommended in the first instance.
Early intervention may reduce the risk of chronicity.
The **Screening Questionnaire** is designed to identify psychosocial issues that influence the ability of the patient to return to their normal activities. These include:

- Past history of back pain
- Experience of distress
- Low job satisfaction
- Conflict in workplace
- Impact of low back pain on activities of daily living in the home

Yellow Flag Definitions
Screening for psychosocial factors (Linton & Hallden)
Scoring Screening Questionnaire

PAIN MANAGEMENT

- GP Information
- Pain Management Strategies for patients

RETURN TO WORK

- GP Information
- Patient Information

PHYSICAL ACTIVITY

- Back Exercises for patients

The interface also shows a patient summary on the left, including allergies (SULFONAMIDES), warnings (ON WARFARIN), and a consultation date of 23/10/2003. At the bottom, there are navigation buttons for History, Examination, Diagnosis, Management, Comment, and Procedure, along with a logo for the West Vic Division of General Practice Inc.

Diagnostic Imaging Referral



Decision Support System Patient Information

⌘ DS provides easy access
to:

☑ Information pages for patients
on:

- back pain
- imaging procedures


☑ Guideline background for GP

⌘ All material can be printed
and reviewed on screen

CT or CAT SCAN

APPOINTMENT TIME hours prior to procedure
NO FAST / FAST of FLUIDS / FOOD for hours prior to procedure

CT (computed tomography), sometimes called CAT scan, uses special x-ray equipment to obtain image data from different angles around the body, and then uses computer processing of the information to show a cross-section of body tissues and organs. The CT Scan does not replace plain X-rays, but gives additional information with greater detail.



CT imaging is particularly useful because it can show several types of tissue—lung, bone, soft tissue, and blood vessels—with great clarity.

It can more easily diagnose problems such as cancers, heart disease, infectious disease, injury, and musculoskeletal disorders.

A CT examination often requires the use of different **contrast materials** to enhance the visibility of certain tissues or blood vessels. The contrast material may be injected directly into the blood stream or swallowed depending on the type of examination.

The examination will take between 10 to 40 minutes to complete.

RESULTS

A radiologist, who is a physician experienced in CT and other radiology examinations, will analyse the images and send a signed report with his or her interpretation to your GP. Your GP will discuss the results with you.

PREPARING FOR THE PROCEDURE

- If you are having a CT Scan of your abdomen, you may need to drink special fluid to outline the stomach and bowel which requires you to attend one hour before your examination time.
- Wear comfortable, loose-fitting clothing. As metal objects can affect the image, avoid clothing with zippers and press studs.
- You may also be asked to remove hairpins, jewellery, eyeglasses, hearing aids, and any removable dental work, depending on the part of the body that is being scanned.
- You may be asked not to eat or drink anything for one or more hours before the exam.
- Women should always inform their doctor or x-ray radiographer if there is any possibility that they are pregnant.

Advise the radiologist or radiographer
if you have any allergies, especially to medications or iodine,
Or if you have a history of:
Diabetes asthma a heart condition kidney problems thyroid conditions

**If you have any further queries speak to your doctor or call
East Grampians Health Service Radiology Department 5352 0238**

This information deals with matters of a technical nature in general terms only. People should contact the Radiology Department or their referring doctor for more details relating to preparation for radiological procedures. No responsibility for injury incurred by any person acting or refraining from action in reliance upon any material in this brochure can be accepted.



Key Lessons

- ⌘ Software development is a slow process –results take time to deliver
- ⌘ Divisions can provide excellent infrastructure/skills/management
- ⌘ Consumer Engagement is essential to ensure relevance
- ⌘ Individuals drive innovation, systems keep it going



The Near Future

- ⌘ Specialist letters to and from GP in secure format directly in and out of MDW and other medical software
- ⌘ Application of technology to pathology
- ⌘ Potential to incorporate multiple guidelines into decision support module



⌘ Presented by Catherine Mackay at the Divisions of General Practice Network Focussed on the Future Forum at Brisbane Convention and Exhibition Centre Saturday 22nd November 2003

Further information:

Catherine Mackay 03 5352 4804

Jane Measday

www.westvicdiv.asn.au

