

**Web-based Referral System
for Inter-hospital and Intra-Hospital
Cardiac Transfers**

About the system

- **Functionality**
 - Replace faxed referral forms with online record
 - Capture 100% of data for statistics
 - Clinical audit
- **Web-based**
 - System can be accessed by any authorised user from any hospital PC
 - Runs on NHSNet so no software needs to be installed on hospital PCs
 - Designed for ease of use to minimise training requirements
- **Security**
 - Encrypted connection via NHSNet
 - All users have individual user logon
 - Caldecott approval obtained
- **Modular**
 - Each cardiac network can configure system to their requirements
 - Integration with other systems at tertiary centres

Tertiary Centres using the System

- **North West London 2005**
 - Brompton, Harefield, Hammersmith, St. Mary's
- **South East London 2006**
 - Kings, St. Thomas'
- **North Central London 2007**
 - Heart Hospital, Royal Free
- **Oxford Heart Centre 2007**
 - John Radcliffe
- **South West London 2007**
 - St. Georges'
- **East Midlands 2008**
 - Glenfield
- **Hampshire 2008**
 - Southampton
- **West Midlands 2008**
 - Wolverhampton (Birmingham, Coventry & Warwick 2009)

How the System Works



- **All Users**
 - Logon
 - List of 'active' transfers with search facility for historic records

- **Referring Hospitals**
 - Create referrals
 - Supply additional clinical information and upload attachments
 - Reports

- **Receiving Hospitals**
 - Review referrals
 - Record date/time of transfer
 - Record date/time of procedure(s) and discharge
 - Reports

- **System administrators**
 - Manage user logons
 - Reports

Transfer List

- Users see the current 'active' list for their own hospital
- To create a new referral, click New Patient at the foot of the screen

Referring Hospital Transfer List

Transfer Id Search Id
 Name Search Name

All Procedure Types	Angio / PCI	Cardiology	Surgery
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Active Records	-	New	-	Pending Requests	-	On Hold	-	Transfers	-	Returned Inpatients
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ID	Ward	Hospital No.	Name	DoB	To	Risk	Procedure Req'd.	Requested	Transferred	Status	Updated
1166	MAU	242425	Day, Jeremy	25/03/1940		High	Angio Only			New patient	10/10/2007
▽ 1161	C7	M985325	Queen, Eleanor	01/01/1942	Heart Hospital	Low	Angio Only	11/09/2007		Hold	17/09/2007
➔ 1165	C1	M123123	Dent, Arthur	01/01/1950	Heart Hospital	Low	Angio Only	16/09/2007		Information Supplied	16/09/2007

Logoff	Receiving View	Discharge History	Reports	New Patient
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Creating a New Referral

- Some patient demographic details must be recorded
 - * or > indicates mandatory field

Patient

* Hospital No.

NHS Number

Title

* Forename

* Surname

* Sex Male Female Unspecified

* DoB (dd/mm/yyyy)

* Address

* Postcode

Referral Details

■ Essential details for managing referral process

Select Referring Hospital

* Specify Other Hospital

* Referrer

* Referrer Telephone No.

* Referrer Bleep No.

Already on elective waiting list * Hospital

Details

* Ward

* Ward Name

* Tel.

Fax

* Date of Admission (dd/mm/yyyy)

* Consultant

Consultant Name

Clinical Assessment

- Dataset developed in conjunction with tertiary centres
 - mandatory fields ensure data completeness

* Reason for Referral
 ✧ Details

* Procedure Required

Family history of IHD 1st degree relative under age of 60
 Family history of sudden death 1st degree relative under age of 40

* Smoking Status Years as Smoker Date Last Smoked

Is Patient on Aspirin? No Yes Stopped Date Stopped

Is Patient on Clopidogrel? No Yes Stopped ✧ Date Stopped

Current Statin Use Statin Drug / Dose

Other Current Medication LMWH B Blocker Diuretic CCB ACE Inhibitor
 ARB Fibrates Nicorandil Amiodarone

* Is Patient on Warfarin? No Yes Stopped ✧ Date Stopped

Medical History

- **Pick-lists and options used in preference to free text**
 - **Enables support for clinical audit**

Hypertension	<input type="text" value="None"/>			* PVD	<input type="radio"/> Y <input checked="" type="radio"/> N
* Diabetes Type I	<input checked="" type="radio"/> Y <input type="radio"/> N			CVD	<input type="radio"/> Y <input checked="" type="radio"/> N
* Diabetes Type II	<input type="radio"/> Y <input checked="" type="radio"/> N			CAD	<input type="radio"/> Y <input checked="" type="radio"/> N
* Renal Dysfunction	<input type="radio"/> Y <input checked="" type="radio"/> N			MI	<input type="radio"/> Y <input checked="" type="radio"/> N
Asthma	<input type="radio"/> Y <input checked="" type="radio"/> N	<input type="radio"/> NR		TIA	<input type="radio"/> Y <input checked="" type="radio"/> N
COPD	<input type="radio"/> Y <input checked="" type="radio"/> N	<input type="radio"/> NR		Stroke	<input type="radio"/> Y <input checked="" type="radio"/> N
Arthritis	<input type="radio"/> Y <input checked="" type="radio"/> N	<input type="radio"/> NR		Total Chol. : HDL >5	<input type="radio"/> Y <input checked="" type="radio"/> N
* NYHA Class	<input type="text" value="II Minimal"/>			Carotid Stenosis > 50%	<input type="radio"/> Y <input checked="" type="radio"/> N
* CCS Class	<input type="text" value="1 Angina pectoris on strenuous exercit"/>				

None of the below

Previous Angiogram Y N NR ... Date

PCI

CABG

Investigations

- Reports can be copied from other systems and attachments uploaded

Admission ECG

All EP Referrals: please supply a copy of ECG, description of symptoms, and correlation with ECG findings.

* Date Further ECG Changes Nil Recurrent

(comments)

Add

ECG Attached Reason not attached

Exercise Test

Date

(comments)

Add

Echo Test

All EP and Surgery referrals, please supply echo report

Date

Results

■ Results screen includes essential infection control data

* Hb (g/dl) Date
 * Creatinine (micromol/l) Date
 INR Date
 Troponin Date Troponin +ve
 Total Cholesterol (mmol/l) Date
 TG (mmol/l) Date
 HDL (mmol/l) Date
 Platelets Date

If any of the results are outside the following range:
 Hb < 10, Creatinine > 120, INR > 2
 please confirm that the patient is fit for transfer.

☆ Abnormal Results - Confirm patient fit for transfer

* Infection Risk
 * MRSA Status ☆ MRSA Site
 ☆ Latest Swab Date 3 Clear Swabs
 * C. Diff. Status
 ☆ Latest Sample Date

Risk Score

- **A risk scoring facility is provided based on TIMI Risk**
 - **Allows for override where inappropriate or there are other factors**

The CAD Risk settings are automatically derived from previous screens

Cholesterol	Family History	Hypertension	Diabetes	Current Smoker	CAD Risk Total
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="1"/>

The following settings are also automatically derived

Prior Aspirin Use	Known CAD	Elevated Cardiac Markers
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Please tick the checkbox settings below if conditions present

>= 2 Episodes Angina in last 24hrs

ST Deviation >= 0.5mm in any lead

Evaluation: Risk Category

The **TIMI Risk (Non-STEMI)** for this patient is shown below

TIMI Total Risk Score	<input type="text" value="5"/>
TIMI Percentage Risk Range	<input type="text" value="5-5"/>
TIMI Category Risk Range	<input type="text" value="4- (High)"/>

Please specify whether TIMI risk is appropriate for this patient

* TIMI Risk Appropriate Y N

EuroScore

■ EuroScore facility provided for surgery referrals

Patient Factors		Cardiac Factors	
Age in Years	0-59 <input type="button" value="v"/>	Unstable angina ^[6]	- <input type="button" value="v"/>
Female	No <input type="button" value="v"/>	LV function	- <input type="button" value="v"/>
Chronic pulmonary disease ^[1]	No <input type="button" value="v"/>	Recent myocardial infarct ^[7]	- <input type="button" value="v"/>
Extracardiac arteriopathy ^[2]	- <input type="button" value="v"/>	Pulmonary hypertension ^[8]	No <input type="button" value="v"/>
Neurological dysfunction ^[3]	- <input type="button" value="v"/>		Derived from Medical History
Previous cardiac surgery	No <input type="button" value="v"/>		
Serum creatinine > 200 mmol/L	No <input type="button" value="v"/>		
Active endocarditis ^[4]	- <input type="button" value="v"/>		
Critical preoperative state ^[5]	- <input type="button" value="v"/>		
		Operation Factors	
		Emergency ^[9]	- <input type="button" value="v"/>
		Other than isolated CABG	Yes <input type="button" value="v"/>
		Surgery on thoracic aorta	- <input type="button" value="v"/>
		Postinfarct septal rupture	- <input type="button" value="v"/>
			Derived from Clinical Assessment


Additive euroSCORE	2	Logistic euroSCORE (mortality %)	1.50	For euroSCORE information click here
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Referring Hospital Requests the Transfer

- **Once the referral details have been entered, transfer can be requested**
 - Depending on system configuration, transfer can be requested to one or more tertiary centres

* Date

* Time

* Procedure Required 

Notes

If Suitable for Same Day Treat and Return, please specify if patient is providing own transport. Please also specify the person who will escort the patient on discharge and who will care for the patient immediately after discharge, for example a named relative.

* Transfer Option Suitable for Same Day Treat and Return Not Suitable for Same Day Treat and Return

Will provide own transport on discharge

Can be discharged home with no social arrangements

Escort on Discharge

Carer on Discharge

If a patient hospital number has been allocated by the receiving hospital then please specify.

Receiving Hospital No.

Receiving Hospital Reviews the Transfer Request

- Online discussion of transfer request

Review Request

* Date

* Time

* Status

Planned Date

* Comments

Receiving Hospital Records the Patient Transfer

- This step ensures accurate reporting of request-to-transfer times

Please complete the details shown below and confirm the patient transfer to the receiving hospital.

Transfer Appropriate	<input type="text" value="Yes"/>
* Receiving Hospital	<input type="text" value="Heart Hospital"/>
* Date	<input type="text" value="16/09/2007"/>
* Time	<input type="text" value="15:00"/>
* Timescale Met (no delays)	<input checked="" type="radio"/> Y <input type="radio"/> N
* Reason Delayed	<input type="text"/>
Days Delayed	<input type="text"/>
* Consultant	<input type="text" value="Please select..."/>
Consultant Name	<input type="text"/>
* Receiving Ward	<input type="text" value="Please select..."/>
* Ward Name	<input type="text"/>
* Receiving Hospital No.	<input type="text"/> (hospital no. of patient at receiving hospital)
Ambulance	<input type="text" value="Please select..."/>
Escort	<input type="text" value="Please select..."/>

Receiving Hospital Records the Procedure(s)

- Procedure recording is designed to require minimal data entry

Please record the procedure details

* Procedure Type

Details of Procedure

* Date

* Time

Please select...

Please select...

Angiography only

Angiography + PCI

PCI, Angiography already undertaken

Heart Catheter L + R

EPS/ablation

Cardioversion

ICD

Permanent Pacing

Temporary Pacing

Change of Pacemaker

CRT PPM

CRT ICD

Other Cardiology

Surgery (CABG)

Surgery (AVR)

Surgery (MVR)

Surgery (Valve Other)

Surgery (CABG + AVR)

Surgery (CABG + MVR)

Surgery (CABG + Valve Other)

Surgery (Redo CABG)

Surgery (Redo AVR)

Surgery (Redo MVR)

Surgery (Redo Valve Other)

Surgery (Redo CABG + AVR)

Surgery (Redo CABG + MVR)

Surgery (Redo CABG + Valve Other)

Surgery (VAD)

Surgery (Heart Transplant)

Receiving Hospital Records the Discharge

- Once patient is discharged, the transfer is removed from the 'active' list but can be retrieved for reference or if further transfer required

Discharge

Please record the discharge details

* Discharge Type	<input type="text" value="Please select..."/>
* Discharge Date	<input type="text" value="Please select..."/>
* Discharge Time	<input type="text" value="Please select..."/>
Ambulance	<input type="text" value="Please select..."/>
Escort	<input type="text" value="Please select..."/>

OP Follow-up
Other Admission
Discharged To GP Care
Discharged Home
Discharged to Referring Hospital

Online Management of Transfer Process

- **Each step of the process can be view in the system journal**
 - **Journal shows actual event date/time as well as date/time recorded**

Journal			
Status	Details	Date/Time	Recorded
Procedure	Angio Only	09/11/2007 13:37	09/11/2007 14:37
Patient transferred	To Radcliffe	07/11/2007 21:15	08/11/2007 08:23
Accepted for immediate transfer	Planned date:07/11/2007. please organise transport for arrival onto cardiology ward at the JR	07/11/2007 17:08	07/11/2007 17:09

Summary Record

- A printable summary of all data input on the system is available to referring and receiving hospitals

Referral

Hospital: Barnet	Admission Date: 20/08/2007
Ward: Cardiology Ward	Ward Name: C1
Ward Tel: 0208 333 4444	Fax:
Consultant: Cardiologist	
Referrer: Dr Jones	Referrer Tel: 3031
Referrer Bleep: 1231	

Clinical Assessment

Reason for Referral: ACS
Smoking Status: Never Smoked

Warfarin: No

Patient Medical History

NYHA Class I Asymptomatic
 CCS Class Asymptomatic
 PVD

Investigations

Admission ECG: T Wave Changes 20/08/2007 *Further ECG Changes: Nil*

[Logoff](#)
[List](#)
[Print](#)

Reports

- **Each referring and receiving hospital has access to reports for their data**
 - Total number of transfers grouped by selected categories including: hospital, reason for referral, procedure required, first procedure
 - Performance data including: average days request to transfer, transfer to first procedure, admit to discharge
- **Data available for download**
 - Authorised users can download data for their hospital
 - Excel-compatible data format for pivot tables and charts
- **Clinical Audit**
- **Cardiac Network Data Sharing**
 - Options for sharing anonymised data intra-network and inter-network

Options

- **Demographics and Results Interfacing**
 - PAS interfaces for patient demographics
 - Other interfaces can be developed including upload from results systems
- **Discharge Summaries**
 - Discharge summaries can be published from tertiary centres to referring hospitals
- **Whiteboard**
 - Ensure personnel at tertiary centres are instantly alerted to updates on the system – showing new referrals and information supplied from referring hospitals
- **Clinical Audit**
 - MINAP dataset for ACS