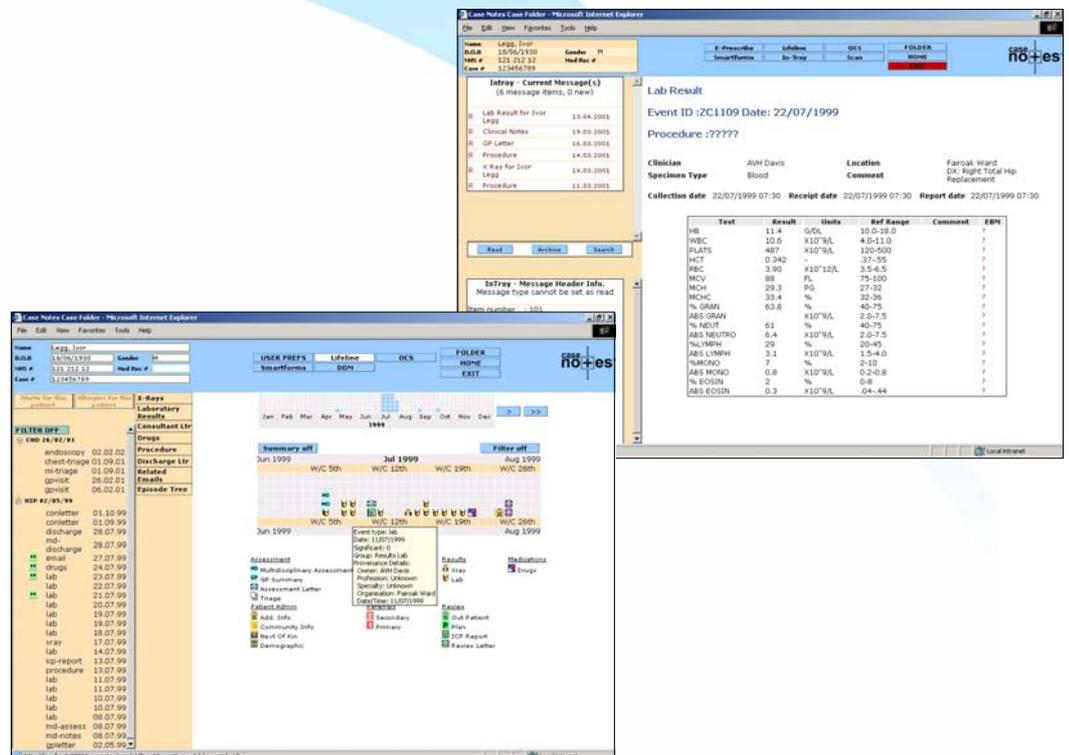


Case Study:

South Staffordshire Electronic Health Record (EHR)

Pan-Community EHR Delivers Cradle-to-Grave
Emergency Medical Records for South Staffordshire



The screenshot displays the EHR interface for a patient named 'Linda J'. The interface is divided into several sections:

- Top Panel:** Shows patient details including Name (Linda J), DOB (18/05/1970), Gender (F), and Case # (123456789).
- Message Tray:** Lists recent messages such as 'Lab Result for Liver', 'Clinical Notes', 'GP Letter', 'Procedure', 'X Ray for Liver', and 'LFP9'.
- Lab Result Section:**
 - Event ID: ZC1109 Date: 22/07/1999
 - Procedure: ??????
 - Specimen Type: Blood
 - Collection date: 22/07/1999 07:30
 - Receipt date: 22/07/1999 07:30
 - Report date: 22/07/1999 07:30
 - Table of results:

Test	Result	Units	Ref Range	Comment	EBM
HB	11.4	g/dL	10.0-15.0		?
WBC	10.0	X10 ⁹ /L	4.0-11.0		?
PLT	487	X10 ⁹ /L	120-500		?
HCT	0.342	-	0.37-0.5		?
RBC	3.90	X10 ¹² /L	3.5-5.5		?
MCV	88	fL	75-100		?
MCH	29.3	pg	27-32		?
MCHC	33.4	%	32-36		?
% GRAN	63.8	%	40-75		?
% NEUT	61	%	40-75		?
ABS GRAN	6.4	X10 ⁹ /L	2.0-7.5		?
ABS NEUTRO	29	%	20-45		?
ABS LYMPH	3.1	X10 ⁹ /L	1.5-4.0		?
% MONO	7	%	2-10		?
ABS MONO	0.8	X10 ⁹ /L	0.2-0.8		?
% EOSIN	2	%	0-8		?
ABS EOSIN	0.3	X10 ⁹ /L	0-4		?
- Calendar View:** A monthly calendar for July 1999 showing various events and procedures.
- Navigation Panel:** Includes filters for 'Lab', 'Procedure', 'Discharge Ltr', 'Referral', 'Emails', and 'Episode Tree'.
- Summary Panel:** Provides a high-level overview of the patient's health status, including 'Summary off', 'Filter off', and 'Event type'.

The path to Electronic Health Records (EHR)

After a comprehensive selection process, South Staffordshire Health Community was chosen to develop and demonstrate the operational use of EHR for emergency care and Out of Hours services as part of the NHS Electronic Records Development and Implementation Programme (ERDIP).

The EHR pilot team at South Staffordshire started work on the project in July 2000, with the objective of delivering a key summary of patient-based information from all participating NHS organisations in the region in one, accessible record. This involved making information from GPs, Accident and Emergency Departments, Out of Hours (OOH) Services, Ambulance Services and a Minor Injuries Unit available in one place.

Meeting the challenges

The key objective of the EHR was to support clinicians in emergency and OOH situations, by providing them with key elements of the patient record, such as alerts, allergies, medication and significant events. But before the project could be initiated a number of problems had to be dealt with first.

The first was the technical challenge of integrating information between numerous disparate NHS organisations in South Staffordshire. Serving a population of 580,000 across an area of 750 square miles, local community healthcare is provided by several constituent NHS organisations, including Burton Hospitals NHS Trust, Good Hope Hospital, Mid Staffs General Hospital Trust, 5 PCTs, BURDOC Minor Injuries Unit and Staffordshire Ambulance Services Trust. The operational EHR had to be interfaced to the various PCT systems, GP systems, community and mental health systems, Acute EPRs, as well as bespoke systems supporting Direct Access and 24 hour emergency care.

Outlining the barriers to integrated information Tony Bell, Lead Officer, Care Co-ordination across Staffordshire commented: *"All organisations in Staffordshire have their own IT systems, but they don't talk to each other. This means that we have lots of data, but without it being integrated there is not much meaningful clinical information."*

The second challenge was the ethical and cultural issue of patient consent. Because of the innovative nature of the South Staffordshire EHR pilot, the project team was breaking new ground in the issue of patient consent. It became clear very

quickly that this issue was going to have a major impact on the pilot project and in September 2001 South Staffordshire received funding from the Department of Health and NHSIA to test different methods of obtaining patient consent for the re-use of their data.

The General Medical Council ruled that you do not need consent to create an EHR, but you do to share it. To overcome this challenge South Staffordshire has undertaken a campaign to widen patients' knowledge of how medical records are used and to gain evidence of practical methods of gaining consent for the use of data within the NHS. The project team embarked on two regional test projects, with the Burton region testing methods of patients opting-in to the scheme and the Tamworth region testing methods of patients opting-out.

Though an extremely time-consuming and challenging task, the South Staffordshire team has had tremendous success with its work on patient consent, with only 24 patients out of 3,500 in the Tamworth region opting-out of the EHR project. The work done has not only laid the foundations for the South Staffordshire EHR pilot, but will also be used as a learning project to inform the wider NHS community over this difficult issue.



Objectives

Each patient's EHR had to contain a summary of key information, from all NHS organisations they had come into contact with, including demographic details, important medical history, current conditions, medications and known allergies. The EHR also had to contain information on lifestyle, previous conditions and a history of family illness.

In addition, the EHR had to meet a number of clinical objectives, including:

- Improving the delivery of emergency care through the provision of a consistent summary of health information to all agencies.
- Supporting clinical networking and new patterns of service delivery.
- Exploring ways to improve the co-ordination of care between health and social services, in

support of the mental health National Service Framework (NSF).

- Improving chronic disease management by sharing information across NHS sectors.
- Supporting the achievement of local HIMP targets, such as coronary heart disease, cancer, mental health, waiting lists and times and emergency care demands.
- Enabling clinical governance, both within and between organisations.

At the same time, the EHR had to meet a number of organisational objectives, including:

- Supporting organisational change, specifically the re-organisation of trusts, the development of PCTs and cross-organisational working with social services.
- Developing a learning community through enabling stakeholders to contribute to and learn from a collaborative project, regardless of their current state of technical or organisational readiness.

The technical solution

The pilot EHR project has been a shared development, with the South Staffordshire EHR project team and CSW Health working in partnership to define user requirements and deliver the solution.



The EHR for South Staffordshire is based on CSW Case Notes™, CSW Health's XML-based product suite for e-Records which can be accessed through a standard web browser. Case Notes provides the middleware that aggregates information held within existing medical systems. In addition, Microsoft's BizTalk Server has been deployed as the messaging backbone for the EHR, to integrate both existing and new applications within and between organisations.

As well as providing the infrastructure for the EHR, Case Notes provides a way of implementing bespoke modules and functionality that has proved to be invaluable for the South Staffordshire project. CSW Health and the project team worked together to develop specific plug-in modules for clinical content required through the EHR, including medication alerts, immunisations/vaccinations, GP summary information and patient-centered information. At the same time, some very specific modules were

required for patient consent and Case Notes was also used to develop this.

Commenting on the technical infrastructure of the EHR, Dave Nurse, Technical Director at CSW Health stated: *"Systems integration has been crucial to this implementation. We have had to ensure that the previously disparate primary, community and acute systems can interface with each other, so that each EHR can draw on a subset of information from different systems, whilst being viewed by users as one record."*

"The key to the success of the technical framework is XML. All content is managed in XML, which is then transformed into HTML to be viewed by the user using XSLT, the stylesheet language for XML. We have used this open and interoperable technology to deliver a hybrid model that brings together repository-based information and a virtual EHR in one seamless view. CSW has worked in partnership with South Staffordshire to harness eGIF-compliant technology to deliver a patient-centred clinical portal for e-records, NSFs and Integrated Care Pathways."

The Case Notes solution has also been harnessed to address the issue of security and confidentiality. Confidentiality of patient information is a key driving issue, for both NHS organisations and patients. At South Staffordshire, the Tees Model of confidentiality has been built into the EHR. This ensures that only authorised medical personnel have access to individual patient's records, with a full audit trail of all people that have accessed the record. In addition, all records are encrypted, with information protected via personal passwords.

Reaping the benefits

The benefits that the EHR will deliver to South Staffordshire will be immense. Clinical and clerical staff from all participating NHS organisations will have access to the right patient information at the right time, but the main beneficiary of the EHR will be the patient. The main concept of the EHR is to enable clinical staff to look at an individual's records whenever and wherever that person needs treatment - making it easier for them to give each patient the medical care they need.

Martin Collins, Community Paramedic Officer at Staffordshire Ambulance Service said: *"In Staffordshire we transport 90,000 patients per year. Some of these patients are unable to provide information on their medical history or medications and this can sometimes make the difference in a life or death situation. The EHR is*

being implemented to benefit patients – it will influence their treatment, speed up processes and enable us to deal with patients appropriately. Paramedics are at the sharp end and more information can save lives.”

But it's not just the life and death situations that depend on the EHR, as Martin Collins explains: *“The EHR will have a huge impact on our ability to deliver the most appropriate care to our patients. Most of the patients we see would prefer not to be admitted to hospital, and access to the right information at the point of care means that we can reduce the number of admissions to hospital. For example, the best course of treatment for a mental health patient having a serious episode would probably not be to admit them to a busy A&E. An EHR would make us aware of previous episodes and ensure the best treatment is given. As well as delivering the best care, the EHR will also enable us to deal with patients with dignity and respect.”*

The benefits of the EHR, both to patients and NHS staff are clear. It will enable information to be retrieved quickly in an easy-to-read and secure format, whilst enabling the best decision on treatment for the patient. This will lead to more appropriate emergency treatment with fewer or shorter delays, better information for research and the opportunity for patients to check and view (and even input into) their own EHR.



The EHR project will also play a major role in South Staffordshire's Shared Care Project, which bridges that gap between social and mental care. Shared Assessment Forms are currently used in the referral and assessment of patients and these forms will be posted as episodes of the EHR. This will have a significant impact on the delivery of a seamless and patient-centred service to mental health patients.

Commenting on the benefits of the EHR, Chris Thorley, Mental Health NSF Project Manager stated: *“The EHR will help us build an efficient and*

effective new care co-ordination process for our patients. For the patient, this reduces the number of professionals seen, resulting in less repetition and a better quality of care. For healthcare professionals it is enabling us to meet the NSF mental health guidelines by developing inter-agency information sharing protocols. It is also ensuring that we have the right information, to make the right decisions for our patients.”

Other benefits that will be delivered to the Shared Care Project include reduced risk to staff and patients through alerts about potentially aggressive individuals, reduced duplication, saved time, minimising the risk of misinterpretation, overcoming medication mismanagement and enabling patients to become actively involved in their own care and recovery.

Moving forward

As the EHR project at South Staffordshire moves forward, the benefits harnessed by NHS staff and patients will continue to grow. The national EHR project will develop over the years and become a lifelong summary of health and illnesses from any NHS source for individual patients. The EHR at South Staffordshire will support Emergency Integrated Care Pathways (EICP) and NSFs, enabling them to meet national guidelines, whilst delivering ever-improving care to patients.

In addition, South Staffordshire is now part of the national Health Record Infrastructure (HRI) project which is owned by the NHSIA, to bring together various pan-community EHRs into a national portal.

As an ERDIP project, the South Staffordshire EHR pilot is paving the way for the NHS to truly achieve EHR and deliver a joined-up, modernised and patient-driven service. National lessons have been learnt, both technical and cultural and these can now be harnessed to deliver benefits where they are needed most – in the delivery of the best possible treatment and care for patients.

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