

### CASE STUDY

#### Overview

Country or Region: UK  
Industry: Health

#### Customer Profile

NHS North East is a Strategic Health Authority (SHA) with approximately 500 employees

#### Business Situation

The SHA wanted to centralise the recording and ongoing tracking of Paediatric ICU (PICU) referrals and retrievals across the region via an electronic solution to support the increasing volume of incoming referrals

#### Solution

Cloud2, the SHA and PICU staff worked closely together to develop a smart electronic form, together with an information repository based on Forms Server and SharePoint® Server 2007 to record and track all incoming PICU patient referral calls received

#### Benefits

The new e-referral form has increased patient safety by auto validating many of the entries on the previously paper based referral form .

In addition, the e-referral form provides operational improvements; it is much quicker to capture the required incoming patient referral details , PICU staff say that the e-form is easier to use than paper and the solution provides trend and outlier reporting that was previously unavailable.



#### Background

NHS North East serves a population of around 2.6 million covering an area from the Scottish border to North Yorkshire and across to the Cumbria border in the west. The region has eight hospital trusts, 12 primary care trusts, one ambulance trust and two specialist trusts providing mental health and learning disabilities services.

Within the eight hospital trusts, there are fourteen hospitals that make Paediatric ICU (PICU) referrals to Newcastle General. During each paediatric referral a detailed six page paper form questionnaire is completed by staff handling the case. PICU referrals need to be carefully managed due to their critical nature.

#### The problem

The existing paper form has 167 data entry fields; this complexity combined with the increasing volume of referrals represented a risk to patient safety that NHS

North East wanted to proactively resolve. The following risk areas were identified:

- No data entry intelligence and validation built into the solution due to the inherent limitations of using paper, with the risk of incorrect data entry
- Considerable time needed to complete each form, leading to incomplete forms and loss of clinical time
- Handwritten paper forms can be difficult to read
- No rapid management or clinical status

*“Cloud2 were swift to respond to our initial query and soon developed a prototype for us to review. They demonstrated a flexible and professional approach throughout the project which helped engender a mutual trust that contributed to a successful outcome”*

Colin Hockaday,  
Infrastructure Lead, NHS North East

The Newcastle upon Tyne Hospitals NHS Foundation Trust

**PAEDIATRIC INTENSIVE CARE REFERRAL FORM**

Date/Time of referral (dd/mm/yyyy) (24 hr format)	27/12/2009	16:58
Call taken by	Kerry Jones	
H1N1 Confirmed?	<input checked="" type="radio"/> Yes <input type="radio"/> No	

Surname	NHS No	Referring Hospital
Williams	1234567890	The James Cook University Hospital
Forename	DOB (dd/mm/yyyy)	Location within Hospital
Mark	27/09/2004	ITU
Address	Person making call - Job Function	
18 Long Meadows Middlesbrough	Paed SPR	
Postcode	Person making call - Surname	
T99 2TW	Singh	
Sex <input checked="" type="radio"/> M <input type="radio"/> F	Person making call - Contact Numbers	
	0773 556 4772	
	Responsible Paediatric Consultant - Name	
	Geoff Randall	
	GP Practice	
	Ashcroft Surgery	
	GP Name	
	Ian Smith	

**PROBLEM**

Respiratory Failure     Cardiac Failure     Sepsis     Neurology

Metabolic    Other - please specify

**CURRENT STATUS**

Weight in Kg 20.00    Temperature in °C 37.00    Blood Sugar 5

summaries of paediatric referrals, limiting trend identification and issue isolation

#### The Solution

The solution developed for NHS North East was based on two key technologies: SharePoint Forms Server (developed using Microsoft InfoPath) for recording the details of incoming PICU referrals and Microsoft® Office SharePoint® Server 2007 to store, organize and track the referrals.

The key elements of the solution are as follows:

- Intelligent data fields for entering clinical patient data
- Improved field labelling and interactivity during data entry
- Branching logic used where appropriate



## About Cloud2

Cloud2 are a specialised IT solutions provider operating in the health sector.

We are known for our high quality SharePoint based solutions, here is a selection:

- Information Governance for document management
- Rich search solutions
- Agile workflows
- Access database migration
- NHS Intranet, Extranet and Internet scenarios
- Programme and Project Management
- Business Intelligence Management
- E-Forms with ESR Integration

## What Next?

If you would like any further information on our SharePoint solutions or any other services Cloud2 offer please get in touch.

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- Data validation on data entry
- Improved and streamlined form design using InfoPath's rich form design tools
- Look up fields used to speed up data entry and reduce the risk of data entry errors
- An 'Outcome' field included to track ongoing status following patient retrieval
- Prominent 'Drug allergies' field
- Notes recording feature built into the form as standard, with Date/ Time stamp
- "Active" patient referrals, with key patient data highlighted, stored and displayed in SharePoint with custom views created for the PICU Team
- Details maintained of all patient outcomes
- Summary and trending capabilities now available

CURRENT STATUS		
Weight in Kg	20.00	Temperature in °C
		37.00
Blood Sugar	5	
Respiratory Status		
Self Ventilating <input type="checkbox"/>		
Respiratory Rate	27	Oxygen Litres per min (0-15)
		9
Cardiovascular Status		
Heart Rate	1	
Blood Pressure	Systolic	1.00
	Diastolic	1.00
	Mean	1.00
Blood Pressure Invasive?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Passing Urine?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Resuscitation Fluid - ml per kg	1.00	
Inotropes?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Adrenaline	<input type="checkbox"/>	
Dose - Micrograms/kg/min	1.00	
Central Venous Access	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Neurological Status		
Is Patient sedated and paralysed? <input checked="" type="radio"/> Yes <input type="radio"/> No		
Sedatives		
<input checked="" type="checkbox"/> Morphine	<input type="checkbox"/> Midazolam	<input type="checkbox"/> Other
Micrograms/kg/hour	Micrograms/kg/min	
1	1	
Muscle Relaxants		
Atracurium <input type="checkbox"/>		

## Benefits

The benefits fall into the three key categories of patient safety, clinical staff time saving and improved management information.

- The six page form has been reduced to 3 pages with an improved design layout making it faster and easier to complete
- Enhanced data field labelling reduces the risk of data entry errors and therefore increases patient safety
- Data validation on data entry reduces the risk of human errors
- Clinical time needed to complete the referrals has been reduced allowing the PICU team to spend more time with patients
- PICU team can now find the patient record and notes details much faster allowing the PICU team to spend more time with patients
- Management now have reporting information on referral numbers pending and patient outcomes. This is helpful for staff scheduling
- Better visibility for management on bed utilisation
- The Referral form and the status summaries are accessible, securely, through a browser interface, meaning they are accessible by any authorised user at any location on demand. This in turn improves both the ability of staff to update their area of the record without delays, so ensuring all staff have the most up to date and complete information for treating the patient.

"The NHS have no shortage of paper forms being used for corporate and clinical processes. The conversion of paper based forms and the associated business processes to e-forms with electronic workflows represents one of the great untapped opportunities for simultaneously transforming the efficiency of business processes within the NHS"

*Taran Sohal, Director, Cloud2*

## Conclusions

NHS North East have taken the opportunity to improve patient safety for PICU Referrals across the region by rapidly implementing a simple to use PICU referral solution that can record and track referrals and retrievals.

By using standard SharePoint related technologies they have provided a rich and consistent experience to users, at reduced cost and more rapid implementation than using other technologies.

The new form is providing more information about paediatric referrals and retrievals, with enhanced accuracy and vastly improved reporting while reducing the time spent to capture and analyse this information.