



## Birmingham Children's Hospital

### Largest Paediatric Intensive Care Unit in the UK Improves Critical Communications and Patient Care

Birmingham Children's Hospital provides the widest range of health services for young patients in England's West Midlands County and beyond. Located in Birmingham's historic centre the 361-bed hospital serves more than 90,000 patients annually, with 34 medical specialties, a staff of 3,700, and the United Kingdom's largest and busiest single-site paediatric intensive care unit (PICU).

When the hospital expanded its PICU in 2010, it converted an adjacent ward located behind a double door entryway. The increased space and physical separation made it harder for nurses and physicians to quickly locate colleagues with a visual scan of the unit.

#### Enabling Real-Time Voice Communication

"It's a big physical footprint," explains Dr. Adrian Plunkett, a consultant at Birmingham Children's Hospital. "At any one time, we use up to 29 of our 31 beds. We have almost 400 staff and more than 20 consultants in the unit. After the expansion, I experienced communication delays because I was walking around trying to find people."

Fortunately, Dr. Plunkett had recent experience with the Vocera® Communication System, which includes the wireless, wearable, voice-controlled Vocera Badge and intelligent call routing to enable real-time voice communication among busy mobile care teams. "I had used the Vocera system for just a few weeks near the end of a posting in Melbourne," he says. "It helped me get timely responses from my colleagues and made a very good impression."

#### Measuring the Impact of Real-Time Communications

Dr. Plunkett launched an initiative to implement the Vocera system in the PICU and designed a research study to measure the solution's effect on communication efficiency. The hospital completed more than 200 hours of direct time-motion observation and a 50-member staff survey, both before and after the Vocera system deployment in June 2014.

The hospital enabled the Vocera system for a combination of bedside nurses, consultants, nurse managers, team leaders, registrars and tech team nurses with special training in medical equipment management, with higher priority for more mobile personnel. System configuration included a typical mix of role-based routing, broadcast calls and integration with the hospital's phone system and pagers.

#### Improving Inquiry Response Times

After deploying the Vocera system, the hospital recorded dramatic reductions in response times (Figure 1). Communication to bedside nurses dropped from 60 seconds to 10 seconds, and from 2 minutes to 9 seconds for roaming staff. The time required to connect incoming phone calls to staff fell by two-thirds.

Birmingham Children's Hospital   
NHS Foundation Trust

#### Key Benefits

- Improved inquiry response times
- Reduced incidence of emergency events
- Improved accessibility among PICU personnel
- Eased workplace tension and frustration

"The Vocera numbers speak for themselves, and they show this technology can dramatically reduce the time it takes to connect with a colleague and get a response. That has a real impact on the care we provide."

#### Dr. Adrian Plunkett

Consultant  
Birmingham Children's Hospital



“The Vocera system makes it easier for junior staff members to call senior staff. The time we save is instantly released for other urgent patient care tasks.”

**Dr. Fiona Reynolds**  
Chief Medical Officer  
Birmingham Children's Hospital

	Pre	Post
<b>Observation of Bedside Staff</b>		
Hours observed	169	131
Median time to response to verbal queries (IQR)	60 seconds (0–120)	10 seconds (5–18)
<b>Observation of Roaming Staff</b>		
Hours observed	28	52
Median time to response (IQR)	120 seconds (60–255)	9 seconds (7–30)
<b>Incoming Telephone Calls</b>		
Hours observed	13	23
Median time to connection (IQR)	35 seconds (20–80)	11 seconds (6.5–30)

Figure 1. Vocera system dramatically reduces Birmingham Children's Hospital staff response times.

“The Vocera numbers speak for themselves, and they show this technology can dramatically reduce the time it takes to connect with a colleague and get a response,” says Dr. Plunkett. “The Vocera system makes it easier for junior staff members to call senior staff,” adds Dr. Fiona Reynolds, chief medical officer at the hospital. “The time we save is instantly released for other urgent patient care tasks.”

### Improving Access to PICU Staff

Staff survey results are equally compelling. An electronic survey administered to all intensive care personnel before and after the Vocera deployment provides a vivid illustration of faster, more fluid interaction among staff using the Vocera system (Figure 2).

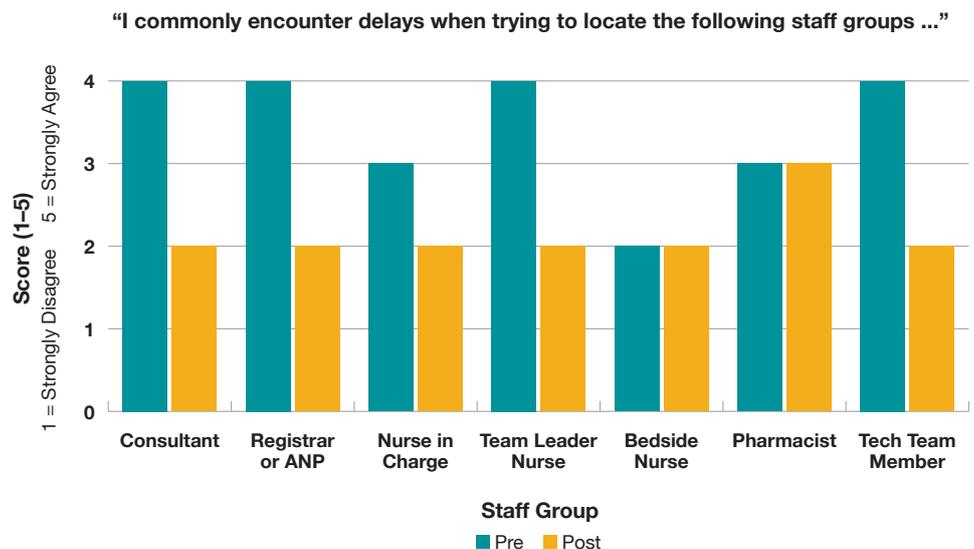


Figure 2. Survey depicts faster, more fluid interaction among staff.

Tellingly, the only two staff groups that show no change are those with fixed workspaces, where they can always be found: nurses, who are stationed at bedside, and pharmacists, who are stationed in their own department and are not on the Vocera system. The survey shows that all other groups are significantly easier to locate following the Vocera system deployment.

“The fact that our staff finds it easier to locate each other is a big step in the right direction,” says Dr. Plunkett. “It’s a personal interest of mine to improve the satisfaction of our colleagues because the more we improve our working environment the more timely care we can provide for our patients.”

## Dialing Down the Incidence of Emergency Events

Another impact that emerged from the clinical data assessment was a significant decline in the incidence of staff-initiated emergency events. These fell from a rate of 2.17 per 100 occupied bed days in the 12 months prior to the Vocera system implementation to just 1.69 in the following 12 months.

## Easing Workplace Tension and Frustration

While the quantitative metrics from Birmingham Children's Hospital's Vocera implementation are impressive, the qualitative response from staff may be even more meaningful. "We spend a lot of our time in intensive care having conversations that are very crucial to patient outcomes," says Dr. Plunkett. "If there are obstacles to those conversations – communications delays, colleagues we can't locate – it makes it harder to do our jobs. Vocera removes those obstacles. It definitely makes our lives easier."

## Looking to the Future

In the near term, Dr. Plunkett hopes to expand Vocera system coverage to the pharmacy that serves the PICU. He and the chief medical officer both expect other departments to ante up and join in. "I definitely see applications in our emergency department and other busy ward areas," says Dr. Reynolds. "We know there are opportunities to reduce communication delays and improve care delivery."

"We spend a lot of our time in intensive care having conversations that are very crucial to patient outcomes. If there are obstacles to those conversations – communications delays, colleagues we can't locate – it makes it harder to do our jobs. Vocera removes those obstacles. It definitely makes our lives easier."

**Dr. Adrian Plunkett**  
Consultant  
Birmingham Children's  
Hospital



**Vocera Communications UK Ltd.**  
100 Longwater Ave.  
Green Park  
Reading, Berkshire  
RG2 6GP  
United Kingdom  
Tel: 44-0-844-335-1237  
infouk@vocera.com  
<http://www.vocera.co.uk>