

Aneurin Bevan University Health Board successfully introduces a new electronic growth chart solution to monitor children's development in South Wales

September 1, 2015 – CCube Solutions announces today that Aneurin Bevan University Health Board has installed its eForms software to create a computer-based system to display children's growth records. It is the first end-to-end system allowing medical users across multiple sites to record and view children's growth chart data via a portal, as well as allowing data to be easily shared¹ with other clinical, public health and third party analytical reporting systems.

Growth records are essential in the assessment of every child. Chronic diseases impact growth and therefore deviation from expected norms act as an early warning signal that something is wrong and medical investigation is required. Paediatricians and other health professionals have used them since the 1970s as a core tool to monitor children's development and well-being. They plot three key body parameters of the individual child - height, weight and head circumference - against national growth trajectories with this information then used to reflect illness or highlight other medical issues such as obesity which is a major issue today.

Aneurin Bevan University Health Board provides acute, community, mental and child health services from five sites for 693,000 people in South Wales, approximately 21% of the total Welsh population.

In October 2012, Aneurin Bevan was the first health board in NHS Wales to procure an electronic document and records management system (EDRMS) from CCube Solutions which was installed and operational by May 2013. The new growth charts application is fully integrated with this and accessed using a portal called Clinical Work Space (CWS).

Clicking on a button within the individual patient record launches the growth chart on a desktop PC. Authorised staff can then add in updated growth measurements into a dialogue box which automatically updates the chart displayed.

A pilot was started in June 2014 with the system fully implemented and in widespread use by October 2014. Children visiting Aneurin Bevan University Health Board are not issued with paper charts anymore. Within nine months of 'go live', growth data is available for 11,000 children.

Integrating growth charts with electronic medical records

Given the wholesale move to electronic patient records three years ago, a way of effectively managing children's growth records was required for two main reasons:

1. Growth charts were the last paper documents in use and had to be circulated around multiple sites – in some sense, negating the value of installing a computer-based medical records system;
2. Growth charts are dynamic documents which change constantly. Printing out individual graphs, adding a dot(s), scanning and then storing the chart again in the EDRMS was not practical given the time and impact on readability. Using a spreadsheet as alternative was also considered cumbersome.

¹ Data is held in a non-proprietary format to facilitate this

Aneurin Bevan University Health Board worked in close partnership with CCube Solutions to implement an IT solution using its eForms module which allows staff to record data points over a long period of time.

Dr. Tom Williams, consultant paediatrician (retired) and the clinical lead on the electronic growth records project, says "I've been involved in NHS IT for many years. This is not just about digitizing a process. IT must supplant existing activities but over this improve them which is what we are doing with our electronic growth charts application."

To develop the system, Aneurin Bevan University Health Board and CCube Solutions licenced national growth data from the Medical Research Council to create the background charts. The individual child's development information is then 'overlaid' on top with the actual data held in a Microsoft SQL database not embedded in the chart. Architecting the solution like this means easy integration with other clinical or research systems, enabling data to be re-used simply without wasteful IT support and integration costs.

Operational and clinical benefits

The electronic growth charts solution developed offers a range of benefits:

- **Simplicity.** The easy to use desktop system means it is straight forward for nurses, clinicians and other health professionals to input growth data in clinic such that they are enthusiastic about doing so. Charts are available for children aged 0 to 2, 0 to 4 and 0 to 18 years old along with charts for sufferers of Down Syndrome who have a different growth trajectory.

Additional features developed include the ability to display on the chart the "target height range" for a child (what they might reach in adult life) based on entered data of parental height, and the display of "bone age".

- **Improved accessibility.** Staff Trust-wide, in primary, secondary and community care, can easily view growth chart data from multiple locations via the CWS portal. This is important as often children visit two or more hospitals or clinics within the health board so easy access is of crucial importance. Over time, a read-only version could be made available to other agencies and even parents given Red Book paperwork is progressively moving to a digital format.
- **Guaranteed availability.** Creating an electronic version of the growth charts has avoided charts being mislaid or lost within the notes.
- **Improved accuracy.** Subject to data entry being restricted to those staff who have been properly trained to measure children, the electronic plotting and calculation of data onto graphs has improved accuracy of the information recorded. With paper, there were always manual errors. This is obviated using a computer.
- **Enhanced security.** Compared to paper charts where there was none, security policies and procedures have been established about who can view, input and approve growth chart data.
- **Added flexibility of the charts.** The chart scope has been broadened with the system designed so that units can easily be changed as well.

Dr. Jeff Morgan, consultant paediatrician, Nevill Hall Hospital, says, "I'm a supporter of the new electronic growth charts solution as it improves information accuracy and accessibility. With paper-based charts, there were a number of issues which slowed our clinics down. A child might have several incomplete growth records in their file charts and with inter-observer variability in data plotting, you could discover errors across the charts. Now, we have a neat solution which logs all the anthropometrical measures properly and displays the child's growth potential clearly on screen. The fact that it is computer-based means the growth chart is easy to access at anytime which is useful when discussing patients with colleagues."

Impact and future system developments

The system is designed to offer future flexibility and functionality. For example:

- Clinical alerts can be set up if a growth data point for a child is input into the system outside expected boundaries;
- Hyperlinks are being added into the charts so that clinicians can link data points with other documents in the EDRMS and cross reference treatment given which might effect development;
- The system is device agnostic and, in the future, other devices could be used to view and update data whether that is via tablets or smartphones.

Creating a national data base of child growth data

Aneurin Bevan University Health Board's electronic growth chart solution is currently used in the context of children presenting to its hospitals with an illness. It is not a record of all children within the region. If other Welsh health boards and NHS Trusts adopted the system, a national repository could be established which is where the true value of this system lies. Once data is electronic, it is easy to share, analyse and do statistics on.

Dr. Morgan says, " The electronic system has great potential. If this project were to be extended to a regional or national level, we would have access to clinical information for massive cohort of the paediatric population which would be very exciting for future child health monitoring studies."

At the moment, there is only widespread measurement of children when they start primary school at ages 4 or 5 years old and later in year 6 (this under the auspices of the National Child Measurement Programme).

Dr. Tom Williams agrees, "Whilst this is currently an aspiration, building a reference set of data nationally which documents child growth in Wales and beyond would provide clinicians, health officials, politicians and, of course, the public with broad insight into the health and development of children, especially in terms of obesity. Put another way, this project could evolve into a massive Big Data public health opportunity of national importance."

Vijay Magon, CCube Solutions' managing director, says, "The effective management of children's growth charts is an absolute requirement for every NHS organisation introducing electronic medical records systems. The NHS is often much maligned for how IT projects are procured and delivered. In contrast, we have worked hard together to develop and implement a cost effective, easy to use system which has the support of clinicians, such that the introduction of an electronic growth chart has totally replaced paper within the organisation."

About CCube Solutions

CCube Solutions is an award-winning provider of enterprise content management solutions, comprising electronic document and records management, workflow, electronic forms, portal software, and systems integration.

Founded in 1995, it has a proven track record working with the police, local government, NHS and in the private sector providing cost effective and scalable solutions, tailored to meet the individual requirements of customers. An AIIM Advisory Board member, CCube Solutions is active in developing and guiding the future direction of the ECM industry, and upholds AIIM's principles of good information management, know-how applied on every customer engagement. CCube Solutions is headquartered in Milton Keynes. For further information, please visit www.ccubesolutions.com

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