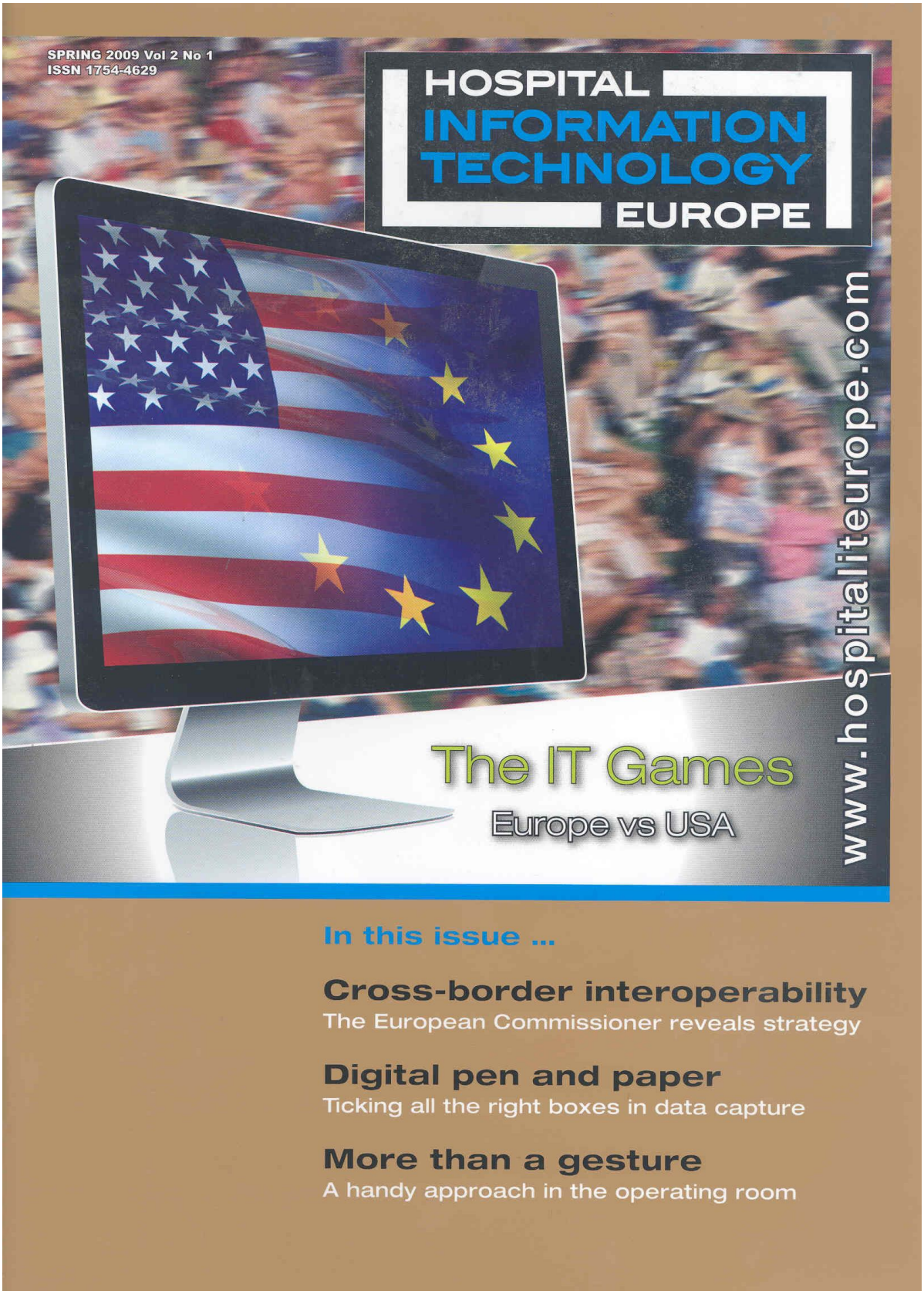
HOSPITAL INFORMATION TECHNOLOGY EUROPE
SPRING 2009 – VOL 2 – NO 1



Accelerating anaesthetics data capture and analysis

At the Städtische Kliniken Mönchengladbach in Germany a digital pen-and-paper solution has optimised workflow and made day-to-day routines more efficient for clinical and clerical staff alike

Petra Wiedmann MD

Head of Medical Informatics and Clinical Process Management

Städtische Kliniken Mönchengladbach
Germany

The Städtische Kliniken Mönchengladbach is the municipal hospital for the city of Mönchengladbach in the northwest of Germany. The hospital is spread across two sites with 600 beds available for patient treatment and rehabilitation. We employ 1,100 staff in eight specialist departments.

Whether it is broken bones, appendectomies or Caesareans, patients often need to be treated under anaesthetic. Documenting the entire anaesthetic process quickly and accurately is critical for medical and legal reasons. The core element of this documentation is the anaesthetic log. It keeps track of administrative data such as patient details as well as information on medication, anaesthetic procedure and supplementary measures.

Traditionally, our anaesthetics staff had to fill in the log forms with a ballpoint pen, and this information then had to be entered manually into the hospital's computer systems for further processing. Not only was this process labour-intensive and time-consuming, it was also prone to errors. Another drawback was that it was extremely difficult to evaluate the data because of their sheer abundance, as a typical operation lasts around four hours.

Consequently, we were looking for a technology solution to help us accelerate the documentation process and transfer handwritten information gathered during an anaesthetic procedure to the hospital information system (HIS) more efficiently.

Improving working routines, not reinventing them

Given the constant pressure on staff time and the need to raise our productivity, the goal was not to reinvent our familiar work processes but to improve existing routines.

We considered a range of technologies to achieve this, including tablet PCs and document scanners. However, these technologies would have required us to change the documentation process. Ultimately, the only technology that ticked all our boxes was digital pen-and-paper (DP&P), and the benefits we have realised by rolling out the digital pens have confirmed our purchasing decision.

DP&P captures and converts the handwritten information in our anaesthetists' logs into digital format, eliminating the need to type them up after surgery. The digital pen looks like a ballpoint pen. A tiny infrared camera at the pen's tip tracks its movements relative to a grey dot pattern printed on the form, recording and storing what is being written. After surgery, the pen data are downloaded to our centralised HIS.

Because the technology does not modify how staff take notes during surgery, our documentation processes could remain unchanged – while still helping us boost productivity postsurgery.

From paper to pen

The digital pens are part of a comprehensive intensive care system that DP&P specialists Diagramm Halbach designed specially for the Städtische Kliniken.

The anaesthetics log forms, along with the grey dot pattern required for the pen to "read" information, are printed on normal laser printers.

The forms were created based on the standard log we previously used at the Städtische Kliniken, and mapped onto an A4 page printed on both sides. The patient's data, including their medical history, are documented on the front. An account of the anaesthetic procedure is entered manually on the reverse of the form.

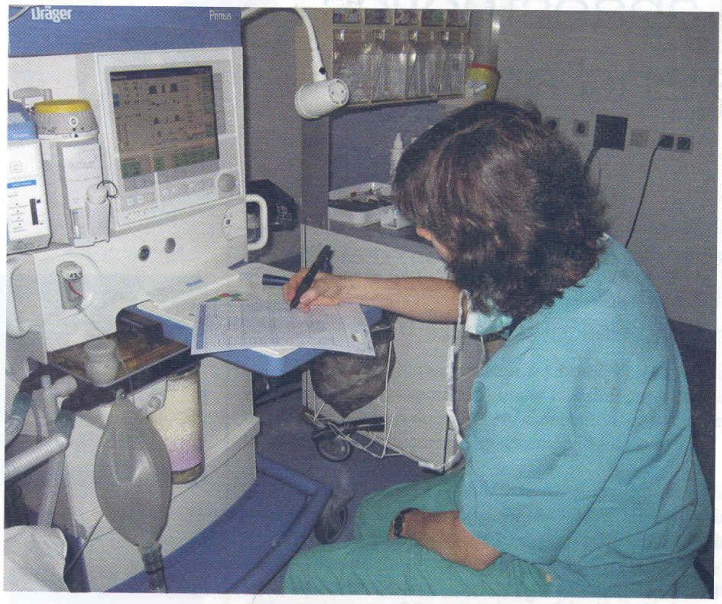
Have **your** say!

How has automation improved your practice?

Email us at:
hite-feedback@campden.com

More articles online at ...
hospitaliteurope.com

DATA CAPTURE



A member of clinical staff at Städtische Kliniken Mönchengladbach using the digital pen and paper

The anaesthetic log form has enough pages to cover a four-hour operation, and additional pages can be added if necessary. The log sheets are consecutively numbered and uniquely identifiable because each form has a different dot pattern.

Before surgery starts, a label with the patient's hospital barcode is put onto a new anaesthetic log form and then read-in via the digital pen. The form is thus uniquely assigned to the patient. It is also possible to enter the case number manually, also using the digital pen.

As the log form is being filled in during surgery, the camera in the pen's tip takes digital snapshots of the pattern on the paper at a rate of 75 images per second. Every snapshot contains enough data to determine the exact position of the pen and what it writes or draws, including the time each pen stroke was made as well as the particular log form being used.

... and from the pen to the HIS

The pen can store up to 40 full A4-size pages of handwritten data. All this data is retained in the pen's memory until the pen is docked after surgery and data are downloaded via a USB link and transferred to our HIS.

Within the HIS, all the data records relating to the same form are consolidated and all the notes are converted into keystrokes using handwriting recognition. The conversion is checked by an anaesthetic secretary before a HL-7 document of the log is created and added to the electronic patient record within the HIS. A PDF of the original notes is also stored within the HIS. No manual re-entering of data is required.

The safety of paper combined with the benefits of automation

We use 30 digital pens for the anaesthetists and their staff to record anaesthetic logs, and we feel that the pens have given us the best of both worlds. Effectively, we are still using a pen and paper process, so we have not really had to change our working processes. At the same time, we are reaping the benefits of automation:

- Lighter workload for clinical and clerical staff as the administrative effort associated with typing up anaesthetic logs has been reduced.
- Anaesthetics data can be made available much more quickly on our HIS, for other clinicians to access.
- As the pen can also read our patient barcodes, we can correlate the captured data easily and accurately with patients' medical histories. This also helps reduce the risk of mix-ups.
- Extensive patient data and analysis options are available throughout the hospital at any time.
- The data collected cover all the information needed by our accounting department to perform an accurate cost analysis.
- We are able to create and send core data to the DGAI (German Association of Anaesthetics and Intensive Care), an association that evaluates anaesthetic data from hospitals around Germany for quality assurance, to optimise processes and for research purposes.

As notes no longer have to be handed over to be typed up, a complete paper file can now remain with the patient throughout their stay at the hospital. Having this file accessible at all times means that every staff member – from the ward to the operating theatre – can see at a glance which treatments the patient has received. Compared with clinical systems where data are only kept electronically, there is no need to pull up the patients' electronic files before making decisions.

Conclusion

Overall, the digital pens have made our anaesthetics operation more productive by helping us optimise workflows and making day-to-day routines more efficient – all while retaining our familiar ways of working. ■

Resources

Städtische Kliniken Mönchengladbach:
www.sk-mg.de

Anoto Digital Pen & Paper:
www.anoto.com

Diagramm Halbach:
www.halbach.com/dotforms