



**B. Braun Space  
Infusion Pump System**

## **DOTmed Industry Sector Report: Infusion Pumps**

**October 21, 2009**

**by Mary Kate Baumann, Staff Writer**

*This report originally appeared in the September 2009 issue of DOTmed Business News*

Recently, new preventive software has been developed for smart pumps, which is great news for health care facilities worried about lawsuits involving human error, but will facilities be able to infuse their practices with these new technologies, or will budgetary concerns prevent implementation from going more than skin deep?

Manual administration of medication can be impractical, expensive and sometimes unreliable due to human error. Thus, improvements for infusion pumps and new lines of smart pumps are popular for manufacturers to roll out to customers. There will always be a need for fluid administration in patient care (due to chronic conditions such as cancer, diabetes, neurological conditions, etc.), so the future development of new innovations for infusion and intravenous pumps appears to be a healthy one.

According to Jason Hess of KLAS Enterprises, a company that offers impartial vendor performance information, the most recent advancement in smart infusion pump technology has been the shift to wireless technology. He stated, "Patient safety is the overarching reason for the existence of smart pump technology, and the most important driver for patient safety is the functionality of the pump itself." Wireless technology and remote access are key players in functionality and ease of use in the pump.

The company Micrel recently introduced a wireless offering called Rhythmic Connect. It uses a General Packet Radio Service (GPRS) mobile phone integrated with an infusion device and allows the pump to communicate with a web server. This server provides access at any time through the web, sends warnings regarding the status of the infusion and can be remotely adjusted and controlled. This offers a higher level of convenience to staff and more mobility for patients as well as the ability to provide faster immediate care. Wireless pumps also contain dose calculations, error reduction software technology and drug libraries. This software monitors drug administration and initiates alerts to warn nurses of infusion issues and overdosing.

Because something as simple as a decimal point error can cause a potentially life-threatening discrepancy between a safe and unsafe dosage, infusion pumps must be designed to defend against medical errors, ensuring the correct medication gets to the right patient in the right amount every time.

The smart infusion pumps on the market right now deliver controlled rates of medication in addition to having the capacity to store entire lists of medications that a hospital contains. Pumps also store information on concentration and dose limits of each medication in the hospital's library. There are different dose limits based on different care units (i.e. operating

rooms, intensive care units, etc) and the smart pumps can tell the nurse when a dose limit is exceeded.

Dose limits and concentration levels aren't the only technological software programs that smart pumps contain; they now boast error reduction software like NHS's Dose Error Reduction Systems for infusion pumps (DERS) and Computerized Provider Order Entry systems (CPOE).

The main function of DERS is to decrease pump programming errors and injuries related to such errors. According to the National Patient Safety Agency (NPSA), adverse drug events (ADEs) are the cause of about 24% of the total number of medication incidents. It also turns out that 61% of the most serious ADEs are IV-drug related. The DERS intercepts medication errors, displays alerts and even prevents delivery of medication if the infused dosages exceed hospital-defined ranges.

Computerized prescriber order entry (CPOE) allows clinicians to directly enter a medical order from a computer or mobile device. CPOE systems allocate access to patient records and offers clinical support with drug administration - in terms of what drugs are safe to administer based on a patient's records. Software like CPOE eliminates medical error which is often caused by sloppy, illegible handwriting and transcription errors all while improving precision, thoroughness, and continuity of care. CPOE also helps clinicians avoid ADEs by alerting them about improper doses, allergies, existing conditions, drug-to-drug interactions and other key factors in the occurrence of an adverse drug event.

Due to recent recalls and device alerts, concerns over errors in pump malfunctions are increasing. Roger Strachota of BMX Medical says, "The most common problem with infusion pumps is with preventive maintenance which counters calibration of the pump. Preventative maintenance is necessary to make sure the pump has an accurate flow and infusion rate as determined by the manufacturer." This concern is thus pushing manufacturers to design improved pumps with new safety features to meet high demand. For instance, Smith-Medical's CADD ambulatory infusion pump has gained recognition for not only being easy to read, having occlusion sensors (designed to alert clinicians and patients if interruptions of fluid delivery occurs) containing an "air-in-line" detection system, but also for having an event memory of over 1000 events.

Though the United States economy has seen a downturn, the infusion pump market has not been significantly impacted. Although the current economic climate has slowed demand for new equipment, hospitals with smaller budgets have contributed to an increased demand for rental/lease and refurbished pumps.

Julie Gutterman of Pulse Consultants, an infusion pump repair and refurbishing company, says, "A lot of hospitals that usually go for new equipment are now starting to look for refurbished equipment because there is just no longer room in their budget for new equipment. There is a major many benefit to buying refurbished - it is much less expensive."

Even though it's less expensive, buyers can still feel comfortable with their purchases. "All the equipment we sell has a warrantee, and people realize that it's a good way to spend their money. It saves them more money for other equipment they might need," says Gutterman.

Strachota adds, "They are using refurbished pumps to save up for the software driven pumps because pump expenditure can be in the millions."

As a final note, Gutterman tells DOTmed that, "A lot of infusion pumps facilities might have purchased new a long time ago aren't being manufactured anymore. Since people need to stay consistent with their technology, they need to go for used, refurbished pumps."

Business in the refurbished and used market is booming, and the original equipment manufacturers and suppliers also seem to be doing well. Recently the Global Industry Analysts (GIA) announced that the infusion pump market is projected to reach \$6.8 billion by 2015. This statistic is a function of increased disease incidence, new technology and mobility.

Currently, the United States and Europe dominate the global infusion pump market. However, there has been a trend of emerging markets in South America and China - particularly with a strong budding interest in used and refurbished pumps. According to analysts from Marketstrat Inc, a research company that publishes reports on medical devices, "Diabetes and pain control are areas of potential high growth in countries outside the US. These markets are still under-penetrated and growth of disease rates, improved diagnosis and demand for better management will create immense market opportunities. Most notable will be the pain control market in Europe and diabetes market in Asia."

In the United States, one of the stronger sectors of the market is the homecare sector - infusion pumps that are patient controlled systems and ambulatory pumps. Also a leader in the infusion pump industry is the implantable infusion pump. This demand is due to rising incidences of diabetes and cancer. There is a shift towards this alternate care because most of the pumps are cost effective and emulate normal pancreatic functions.

The most influential leaders in the infusion pump market are Baxter Healthcare Corporation, B. Braun Melsungen AG, and CareFusion Corporation. In fact, the leading infusion pump supplier, B. Braun Melsungen AG, has received many awards for their part in making great advances in the medical infusion world. And, according to Carol H. Neubauer, Chairman and CEO of B. Braun Medical, "Despite the down economy, B. Braun grew 7.37% in the Parenteral category in 2008 while the overall market segment grew 7.45%, and 22.17% in the Solutions/Nutritional category in 2008, while the overall market segment grew 16.4%."

In general, market trends may be shifting due to "higher expectations from hospitals, specifically pertaining to wireless capabilities and interoperability with the hospital Clinical Information System," according to KLAS Enterprises. As KLAS says in its report on smart pumps, 29% of health care facilities report that integration with the hospital Electronic Medical Record (EMR) is the number one priority when considering the purchase of new infusion pump technologies.

The shift of focus on the market from new pumps to used pumps may delay new technological innovations for now, but a lot has to be done. Roger Strachota says, "IV pumps evolve and will be available forever due to hydration therapy. It is a mature market, and every health care facility will have one for every patient that shows up at the door." Because of this, it's not surprising that the success of business in this sector will continue to flow.