



14TH EAHP CONGRESS, MARCH 2009, BARCELONA, SPAIN

On the occasion of the 14th Congress of the European Association of Hospital Pharmacists, Soledad Gil from TKT Media Relations interviewed Gaspar DeViedma, one of the architects behind the i.v.STATION robot showcased at Health Robotics' EAHP Exhibition Booth.

Soledad Gil (SG). I read your ASHP interview with Katie Kimura. You and your company are being quite active this year with multiple presentations around the world, isn't that new for Health Robotics?

Gaspar DeViedma (GDV). Quite, but it is normal as I get to travel around the world and find partners for our company and also hospitals wishing to become early adopters of our new robotics technology. It is quite understandable that hospitals want to hear from one of the developers as to what i.v.STATION can do for them. I have been invited next week to do a main tent presentation at the DUPHAT Pharmaceutical Symposium in Dubai, and then several others in Asia-Pacific during April.

SG. What does the i.v.STATION robot that you have here in the Booth has been designed to do?

GDV. We have designed i.v.STATION to do what no other piece of automation has ever done before, which is to safely and automatically prepare ready-to-administer IV doses in syringes and IV Bags.

SG. What do you mean by safely, are these patient doses not safe without i.v.STATION?

GDV. There are numerous aspects to safety that are improved with robotic automation as compared to the typical manual compounding process for intravenous drugs. For example, giving the right medication to patients or what is commonly referred to in the industry as avoiding drug exchange errors, which unfortunately happens quite often in hospitals throughout the world and has been widely reported in the United States, for example as the cause of thousands of deaths per year, particularly among the pediatric/neonatal patient population, including the TV coverage of Dennis Quaid's twins.

SG. Exactly how does i.v.STATION prevent drug exchange errors?

GDV. Medications come on containers (drug vials) that are produced by drug manufacturers such as Pfizer, Novartis, Merck and others. These manufacturers do not coordinate with each other what the packages look like, and in many instances the drug names sound alike and the packages are very similar, causing pharmacists and nurses to select the wrong drug vial for the patient and giving the patient the wrong drug. i.v.STATION has optical recognition technology to ensure that there is no chance of a drug exchange error due to confusion on which drug vial to use.

SG. Other ways that i.v.STATION helps with drug exchange errors?

GDV. Sure, there is also the issue of the label identifying what was actually mixed into the syringe or IV Bag. Even if the drug preparation is done correctly in the manual preparation process of the intravenous drugs, especially outside North America there are many countries where the IV bag or the syringe does not have the correct label identifying which patient should get which medication and its dose.



I have seen scientific studies at University hospitals in Germany, France and the United Kingdom where anywhere between 40 and 75% of intravenous patient doses prepared by nurses do not have a



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label attached to them that identifies either the drug and/or the patient, obviously leading to drug exchange errors. i.v.STATION automatically places a computer-generated label on the syringe or IV Bag, including RFID or Bar-Code technology to ensure that either a clinician or an RFID or Bar-Code capable computer can accurately identify which patient needs to receive which medication.

SG. Are the other patient safety issues other than drug exchange errors that i.v.STATION helps with?

GDV. Sure, there is also the issue of the right drug quantity given to the patient, or what is commonly referred to the industry as medication overdoses or “underdoses”. While arguably this is a more important topic with hazardous Chemotherapy, which is addressed by our other robot CytoCare [please visit B Braun’s Booth to see it here in Barcelona], it is also an important issue with the non-hazardous medications than i.v.STATION processes, such as antibiotics, epidurals, pain therapy, etc. Unlike the manual IV compounding process, i.v.STATION uses the gold standard of specific gravities combined with precise weighing and liquid drawing mechanisms to ensure and document the % accuracy on each patient dose and warrant that medication will be at least 95% accurate compared to the physician’s prescription. In the manual process, there is no way of knowing how accurate the pharmacists or nurses manually mix the medications and there is no documentation on which quantity of medication is in the syringe or IV Bag. I’m not implying this is the fault of the clinicians than manually compound IV medications; the fact of the matter is that they do not have the right tools to prevent accuracy errors because the materials they have to work with such as the drug vials and the syringes have published manufacturing variances (anywhere between 5% error in syringe markers and up to 25% error in drug vials) that naturally lead to mistakes, even if they do their job correctly.

SG. Any other patient safety issues that i.v.STATION helps with?

GDV. Sure, we could be here all week discussing them. I suppose that the other one worth mentioning in the limited time we have is sterility of the IV Admixtures, especially because we are in Europe and arguably, this is more of a problem here than it is in America.

SG. What do you mean by sterility?

GDV. It is a foregone conclusion in medicine that we should “first, do no harm to the patient, whatever else we do”. Injecting a patient with an intravenous solution that is not sterile or has microbial contamination is a big problem especially because patients that need IVs are the sickest patients and more subject to complications and mortality if something goes wrong. Everyone in the industry knows that hospital-acquired infections are a large source of both financial expense and mortality in hospitals throughout the world. In Europe, most intravenous medications are prepared by nurses in wards without a “clean room”, an consequently on non-sterile conditions. While training helps somewhat with this issue, again clinicians are not given the right tools for their job when they are asked to prepare IVs in an environment that has microbial contamination. i.v.STATION provides a clean environment due to its airflow engineering and UV-lamp sterilization processes in order to ensure that all IVs prepared by the robot are sterile, and thus do not give infections to the patient that receives the medications.



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SG: There is an American company here in Barcelona advertising some of the same features and benefits that you speak of, but they do not have a robot in their Booth. Is this RIVA robot [marketed in Spain by PALEX] a competitor of i.v.STATION?

GDV: Yes and no. They share a similar general concept to manufacture ready-to administer patient IV doses, but with diametrically opposed size, price, architecture, throughput, software workflow, and other characteristics. The RIVA robot is not here because it could not possibly fit in the space provided in the Exhibition Booth, it needs a very large room just for itself.

SG: Why does the size of the robot matter for hospitals?

GDV: Size matters most because space at both pharmacies and patient wards (nurse stations) is at a premium and you can probably fit 8 to 10 i.v.STATION units in the same space of a single RIVA unit. It is not just an issue of the cost per square meter, it is the fact that the kind of space needed for RIVA is simply not available at any hospital I know of in Europe, and very few, if any, throughout the world.

SG: How about price differences?

GDV: i.v.STATION's full price to the end customer averages €300.000 to €350.000, depending on configurations. RIVA's manufacturing costs alone are almost double i.v.STATION's end-customer price to the hospital pharmacies, thereby having a huge competitive price advantage. By the time RIVA gets to the end-customer through Palex's distribution channel in Spain and Portugal, it has been offered to hospitals at a price of €1.5 to €2 million.

SG: What do you mean by throughput?

GDV: I mean the manufacturer's warranty on how many intravenous (IV) doses can the robot make on a given timeframe, for example, per hour or per daily shift. Health Robotics warrants that i.v.STATION can make approximately 60 syringes per hour or 40 IV Bags per hour. RIVA on the other hand is not offering any warranty to customers or distributors, and have publicly stated in American purchase tenders that they believe it could do 38 doses per hour. Even if you give RIVA the benefit of the doubt and consider their estimate as a warranty, when you factor in the equation the different prices of the robot, the comparison is extremely favorable to i.v.STATION.

SG: You mentioned architecture as a difference with RIVA. Is this related to the size discussion?

GDV: No this is not about size at all, it is about the ability to utilize the robot in a centralized architecture in the pharmacy, to deploy the robot in patient care locations (nurse stations, wards, or satellite pharmacy areas), or a mixture of centralized and decentralized locations. RIVA was designed only for centralized pharmacy operations while i.v.STATION can operate centrally for non-urgent medications, decentralized for urgent medications for example in Critical Care or Emergency Room, or a mixture of centralized and decentralized architectures.

SG: How about workflow differences?

GDV: While i.v.STATION does address the preparation, compounding, and dispensing of non-hazardous drugs, it was designed with a much distinct philosophy (in addition to very different technological advances) than RIVA. RIVA designed with Batch IVs in mind as opposed to patient-



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specific preparations. While i.v.STATION is designed to product both Batch and patient-specific IVs, it attempts to, where possible, eliminate Batch IV preparations and therefore, the waste associated with them.

SG: To which factors do you attribute such distinct price, size, architecture, and throughput advantages over RIVA?

GDV: Three main reasons. First, i.v.STATION is new technology developed in 2008 and 2009 and it takes advantage of recent robotic technology advances, while RIVA's design originated more than 20

years ago¹. Second, this is our second robot (after CytoCare) and we learnt a lot after the first R&D cycle, which we applied to i.v.STATION, while RIVA is still developing their first robot and trying to bring it to market after 20 years of R&D. Finally, our company was a worldwide perspective and experience (for example I was Managing Director for Pyxis International and I know how hospital pharmacies operate around the world, including their size constraints and workflow differences versus Canada, while RIVA, being a Canadian company with no international experience whatsoever, naturally focused on developing a robot for their core market in Winnipeg.

SG: I have heard people describe i.v.STATION as the Pyxis of IVs or as to dealing with whatever you cannot dispense out of Pyxis or similar ADM cabinets. Is this correct?

GDV: There is no black and white answer to this question. Pyxis is a good target to shoot at in terms of market acceptance, but i.v.STATION not only dispenses medications as Pyxis does for oral drugs; it also prepares and compounds the IVs which is a big difference with Pyxis. Like Pyxis or other cabinets, i.v.STATION attempts to provide the best combination of centralized pharmacy control with decentralized just-in-time production and dispensing close to the patient care areas. i.v.STATION maybe implemented in the central or satellite pharmacy locations, or in nurse station [wards in Europe] or ambulatory infusion centers. Due to regulations and pharmacy practices we expect the former to mostly occur in the United States and the latter mostly in the rest of the world.

SG: Where and when we should expect to see the first i.v.STATION units operate at hospital pharmacies?

GDV: Our objective is to have anywhere between 10 and 20 early adopter sites utilize the technology before we bring the product out for general release, and for this to occur anywhere between the last half of 2009 and the first half of 2010, considering that we would like these early adopter sites to be geographically dispersed throughout the world and consequently we would need the time and span of control to adapt i.v.STATION to regional differences such as for example, Japanese software translation or accommodation of many different syringes, drug vials, and IV Bags. We have signed contracts for 15 hospital pharmacies already [for a full list please visit our web site) and I expect to complete the list of 20 as I travel around the world during the remainder of 2009.

¹ **Am J Hosp Pharm 46(11):2286-93 1989**