



Vaccination for accuracy

When it comes to packaging life-saving and expensive pharmaceuticals, robots provide a precision that not only meets stringent safety guidelines but also improves efficiency.

By Claudia B. Flisi
Photos Maurizio Camagna

> Certain diseases – rabies, meningitis, cholera and yellow fever, for example – are natural-born killers. Even a prosaic cold-weather flu can be fatal: As many as half a million people die from influenza every year. So a decision to specialize in vaccines against such diseases makes good sense socially and ethically as well as commercially.

In Rosia, a small town near Siena, in Italy's Tuscany region, vaccines for these and other threatening illnesses, including polio, diphtheria and tetanus, are produced and packaged by Novartis Vaccines & Diagnostics, a division of Swiss-based Novartis AG. Novartis is the fifth-largest vaccine manufacturer in the world and second-largest supplier of flu vaccines in the United States.

To preserve a safe and sterile environment, everyone at the Novartis plant in Rosia has to respect Good Manufacturing Practices. GMP recommendations are standard guidelines set out by the U.S. Food

>FACTS

Novartis history

Swiss-based Novartis (derived from the Latin *novae artes*, meaning “new skills”) was formed in 1996 from the merger of Ciba-Geigy and Sandoz, two companies with long histories in the pharmaceutical industry.

- In 2006, Novartis purchased the Chiron Corporation as the basis for a new vaccines and diagnostics division
- Chiron’s offices in and near Siena, Italy, became the new division’s R&D and vaccine production headquarters
- Today more than 1,100 employees conduct research in Siena, and an additional 700 are involved in production at the nearby Rosia plant, with its brand new, state-of-the-art facilities
- Novartis Vaccines is the only pharmaceutical company in Italy doing R&D and vaccine production. It encompasses more than 35 different vaccines for adults and children
- Read more at www.novartis.com

**Efficiency and precision key**

According to Carlo Romani, process engineering manager for secondary technical operations at Novartis Vaccines in Rosia, Italy, the IRB FlexPicker 340 and IRB 260 robot de-nester will:

- Allow complete control of tubs coming from the filling department
- Handle each nest of vaccines with the same level of accuracy
- Reduce safety issues close to the packaging machine

An automatic system with robots, he says, also enables:

- Better pallet management
- Additional control of materials
- Drastically reduced risk of cross contamination
- Reduction in manual activities involving a heavy ergonomic impact



Syringes and medication in production, top right and above, and the IRB 340 FlexPicker, left.

& Drug Administration to ensure that the development and manufacture of food and drugs are carried out safely. Here up to 35 different vaccines are prepared and packaged for shipment to 70 countries around the world. The only workers who don't have to follow the GMP-mandated dress code are three hard-working ABB robots.

The first to arrive was an IRB 660 Flex Palletizer in 2005. The IRB 660 is equipped with two scanners and sorts boxes arriving on a conveyor belt by reading their barcodes. Depending on their contents and destination, it places them on one of three pallets for shipping. “The shapes of the boxes change significantly for different markets worldwide,” says Carlo Romani, process engineering manager for secondary technical operations. The robot is designed to do the placement in a way that ensures maximum stability in the loading of the pallets. The palletizer has proved so fast and reliable (replacing the work of up to three employees) that it will soon be moved to a larger area, where it will load six pallets at a time.

An IRB 340 FlexPicker arrived in 2006 and is used primarily in packaging oral vaccines for polio. The IRB 340’s advanced vision system is an essential component of the production process because it has



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Carlo Romani, Novartis

to pick up each polio cartridge individually from a conveyor belt and position it correctly in a box of 20 cartridges. Here, as with the palletizer, several checks for accuracy and precision are built into the process.

The most innovative robot application is the IRB 260 robot de-nester that became operative in March 2008. “This is a very innovative and sophisticated application, and we are the first pharmaceutical company to implement it,” says Romani. The IRB 260 anchors a new 40-meter packaging line for flu and meningitis vaccines that handles up to 500 syringes a minute and involves three separate operations, formerly done manually, risking human error.

Flu syringes arrive from the aseptic department

(after an inspection phase) in lidded plastic tubs, each containing a nest of 100 syringes. The robot first removes the lid of each tub by vacuum, then lifts the nests and places them on a conveyor belt one at a time. “This is a delicate step because a tub’s contents may be worth thousands of euros,” Romani says.

The empty lids and tubs are then positioned separately on a pallet. The positioning has to be precise because, in the course of a year, several million lids and tubs will be handled, and GMP for the pharmaceutical industry requires strict separation of packaging materials and products. The telecamera on the robot’s head also matches the tubs and the contents through datamatrix code reading, to ensure that the right vaccines have arrived in the right tubs. This step is to avoid any risk of cross contamination. Three verifications are performed, and if something is amiss, the operator is alerted.

“This ABB robot is over-sized and can handle much heavier weights than are used here, but it is perfect because of its speed and precision,” says Claudio Boncompagni, in charge of validation for fill-finish operations.

An added plus: None of the robots have to change clothes after their shift, since they never have to wear sterile caps or clothing. ☉