

## Spanish Innovation: HEALTHIER FOR LESS

The Spanish health care system enjoys two remarkable accomplishments. It is among the least expensive per person among industrialized nations, in terms of the percentage of GDP it spends on health care. At the same time, it is ranked by the World Health Organization as among the best in the world, based on a number of parameters including effectiveness and financial fairness. Spain has achieved this because of successful partnerships between government authorities and private companies, producing innovations in patient treatment and technology solutions for managing the health care system.

Spain gradually introduced electronic health records (EHRs) during the past decade. By 2010, more than 95 percent of primary health care providers in Spain had used them, and more than 250 million prescriptions were being submitted electronically to pharmacies. These statistics place Spain among the leading users of this technology. A number of Spanish companies, including Informática El Corte Inglés, Everis, Indra, and Oesia, are international leaders in EHR technology.

The move to EHRs provides significant cost and time savings, facilitating coordination and use of resources and granting opportunities for improved treatment. Everis, whose health care solutions cover more than 20 million users, is now building software to improve chronic disease management. The new product helps determine the level of care required for a variety of chronic diseases and the types of technologies that can meet a patient's needs at home. Everis began implementing its solutions in Spain in 2011; business director Santiago Martín says that so far the range of savings for chronic patients is 20 to 40 percent over traditional care.

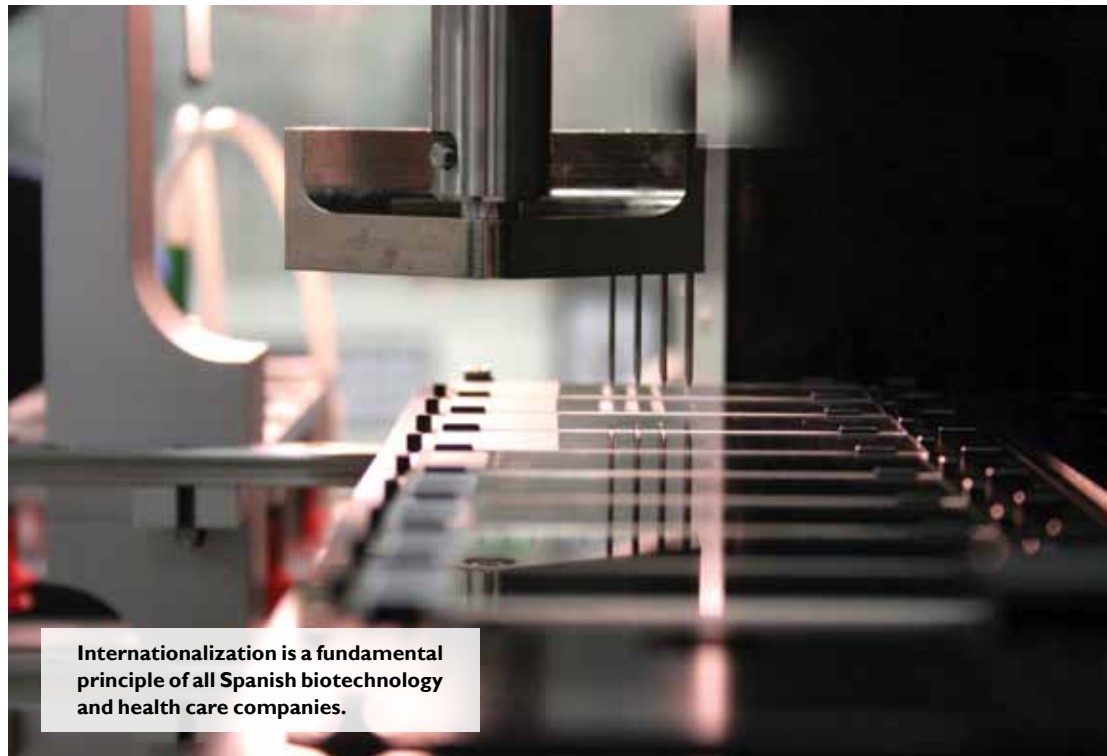
The vast amount of information that electronic records can amass and process will help advance the field of "personalized" medicine, where diagnoses or therapies for illnesses such as cancer will be individually tailored, assisted by data on a patient's genetic profile and other relevant information. This has the potential both to improve patient treatment and trim health care costs, avoiding trials of expensive medicines that won't work. The Indra information company has initiated a "FutureClinic" project to research new algorithms and genomic information processing systems to meet such needs.

In order to provide a personalized approach to cancer, many companies are developing approaches that tailor appropriate medications to a patient's individual genetic makeup. One, Vivia Biotech, created a platform that evaluates the most popular combinations of drugs to treat blood cancers (leukemias, lymphomas, and myelomas). The technology can analyze thousands of blood samples and medication combinations in 48 hours, then rank the samples by how many tumor cells the protocol has killed.

Internationalization is a fundamental principle of all Spanish biotechnology and health care companies. Vivia Biotech



**New approaches in personalized medicine have the potential to improve care and trim costs.**



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has signed drug-development partnership agreements with U.S.-based pharmaceutical companies, and plans to enter the American market after it launches its personalized medicine test in Europe this year.

Progenika, which is also well positioned in the U.S., has developed a DNA chip that analyzes blood for a number of blood type variants in addition to the typical A/B/O and Rh positive or negative types. The chip has already been adopted to test for rare antigens in blood banks throughout Europe: identifying these variants can help avoid reactions that a chronic patient might suffer from repeatedly receiving blood that doesn't match perfectly. From its satellite office near Boston, the company has received U.S. approval for its tests, and has signed distribution agreements with multinationals that include Pfizer and Novartis.

AB-Biotics has also created a DNA chip, one that analyzes the patient's saliva for genetic variations that indicate responses to various drugs for psychiatric and neurological diseases. The company has already patented a number of its products in the U.S.

Spain's National Cancer Research Center (CNIO) partnered with Stanford University and the Life Length company (a CNIO spinoff) in a study published in *Cell* in 2012 that focuses on what the human genome may eventually tell us about diseases. The Spanish team helped to analyze the personal molecular and health data of Michael Snyder, director of Stanford University's Center for Genomics and Personalized Medicine.

Says CNIO Director Maria Blasco, "This study shows that diseases are a product of an individual's genetic profile as well as interaction with the environment. So far we know little about this correlation, while the use of human genome information to prevent and treat disease is still clearly in its infancy. But what we can see—the tip of the iceberg—is fascinating."

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