



Science and Innovation at Baxter

One of Baxter's competitive strengths is its diverse technological expertise and commitment to scientific innovation. The company's unique combination of capabilities in medical devices, pharmaceuticals and biotechnology, including specialty biologics, sets it apart from other companies in the healthcare industry.

Increasingly, technologies and scientific disciplines are converging, resulting in more new therapies for patients and clinicians. The combination of these disciplines and technologies offers great promise in addressing issues like medication errors and hospital-acquired infections, as well as improving quality of life and clinical outcomes in chronic care and moving therapy from the acute care center to outpatient and home care.

Baxter has research and development (R&D) centers around the world, including facilities in Austria, Belgium, Japan and the United States. Principal areas of strategic focus for R&D include recombinant and plasma-based therapeutics, vaccines, initiatives in regenerative medicine, kidney dialysis, small molecule drugs, enhanced packaging systems for medication delivery, drug formulation technologies and pharmacy compounding.

Core Technical Competencies

Baxter has six "core technical competencies" that differentiate the company and provide competitive advantages in the marketplace. Each represents a specialized area of technical expertise and leadership that enable the company to develop and manufacture unique healthcare products. Baxter's core technical competencies are:

Medical Plastics

Baxter revolutionized blood collection decades ago when it introduced the first flexible plastic blood-collection container, paving the way for the first flexible plastic IV solution container for intravenous (IV) therapy, which became and continues to be the industry standard. Soon to follow were the MINI-BAG container systems for IV drugs, and the flexible plastic containers used in peritoneal dialysis, the first portable dialysis therapy. Today, medical plastics are integral to many Baxter product lines. FLEXBUMIN, the first and only albumin packaged in a flexible plastic container, is the result of combining Baxter's expertise in medical plastics with its expertise in biologics to create a truly unique product in the marketplace.

Biologics

Baxter's groundbreaking work in the processing and separation of blood plasma and its components is at the foundation of many contemporary biologically derived therapies, including the treatment of hemophilia and primary immune deficiency. Baxter also is involved in leading-edge research and development in recombinant therapeutics, vaccines and regenerative medicine. Baxter offers unique capabilities in the production of genetically engineered therapies and vaccines in a variety of bacterial, yeast and mammalian cell culture systems; and protein-based processes to perform biological separation and purification.





Drug Delivery

Baxter introduced the first premixed drugs in IV solution containers, and was the first company to form alliances with pharmaceutical companies to package their drugs in IV containers and provide them to hospitals in premixed form. Today, Baxter's drug delivery expertise extends beyond premixed drugs and drug-reconstitution systems to include formulating and packaging injectable drugs in vials and syringes, and advanced drug formulation technologies.

Solutions

As manufacturer of the world's first commercial IV solutions, Baxter's expertise in the formulation, production and purification of solutions extends back more than 78 years. Since then, Baxter has applied its expertise in solutions to develop a variety of therapies, including parenteral nutrition and peritoneal dialysis. Therapeutic solutions such as these may seem basic, but in fact present a variety of scientific and technical challenges including stability, chemical degradation, compatibility of ingredients and precipitation. Baxter uses a variety of techniques to overcome these challenges and ensure quality, consistency and ease of use.

Sterilization

Baxter has pioneered and utilized a range of sterilization platforms to meet the unique requirements and characteristics of its biopharmaceutical, IV and injectable pharmaceutical and medical device products. These technologies include the use of steam or heat, ethylene oxide, gamma and electron-beam radiation to sterilize finished product, and the use of proprietary in-line technologies for aseptic manufacturing. Baxter's technology is the only commercially available aseptic filling process for premixed drugs in flexible IV bags. In 2005, Baxter combined this proprietary flexible plastic container technology with its expertise in biologics to introduce the world's first albumin (a plasma-based protein) in a flexible plastic container. Baxter's sterilization capabilities include systems for validation and assurance, and development of novel chemical and biological indicators and barrier technologies.

Hardware and software development

Baxter also offers unique capabilities in the design, development and integration of hardware and electronic systems and the software that controls them. Many of the therapies that the company has pioneered over the years – including the administration of IV and dialysis solutions – require the use of a device for the controlled delivery of fluids. Baxter also incorporates human factors (the manner in which a clinician or patient interacts with or uses a device) into the design of products to ensure ease of use, and safe and effective delivery of therapy.

Advancing its Pipeline

In 2009, Baxter increased its spending on R&D to \$917 million – the highest level in the company's history and an 11 percent increase from 2008. The company plans to continue to grow R&D spending, with an increasing percentage of investment in exploratory and early-stage initiatives. Baxter advanced 13 Phase III clinical trials and numerous early-stage programs that have the potential to profoundly impact the treatment and delivery of care for chronic diseases like Alzheimer's disease, hemophilia, end-stage renal disease, immune deficiencies, as well as public health threats like pandemic and seasonal influenza.

2009 activities included:



- Initiated a Phase III clinical trial evaluating the use of ARTISS [Fibrin Sealant (Human)] in facial surgery in the United States.
- Completed Phase III confirmatory study of Baxter's Vero cell-derived seasonal influenza vaccine in healthy adults, and Baxter's Vero cell culture-based prepandemic (VEPACEL) influenza vaccine is in Phase III clinical trials.
- Completed enrollment in the first Phase III clinical trial on a subcutaneous delivery of GAMMAGARD LIQUID [Immune Globulin Intravenous (Human)] (IGIV) in patients with Primary Immune Deficiency.
- Expanded the patient enrollment in a Phase III clinical trial evaluating the use of GAMMAGARD LIQUID therapy for treatment of mild-to-moderate Alzheimer's disease.
- Received marketing authorization from the European Commission for CELVAPAN H1N1, the company's Vero cell culture-based pandemic influenza vaccine.
- Launched OLIMEL, the company's latest triple-chamber container system for parenteral nutrition in certain European markets.
- Launched HYLENEX recombinant (hyaluronidase human injection) in October 2009, coinciding with the publication of data from Baxter's first HYLENEX recombinant clinical trial in the medical journal *Pediatrics*.
- Continued research on combining Baxter's TISSEEL fibrin sealant with complementary technology to potentially regenerate skin and bone.
- Continued development of a home hemodialysis platform to provide another option for patients seeking home dialysis for end-stage renal disease.
- Begun work in pediatric rehydration with the INFUSE PEDS-2 trial, which is a head-to-head comparison of subcutaneous rehydration versus IV rehydration in dehydrated children.
- Conducted two clinical studies testing the effectiveness of Baxter's V-Link Luer-Activated Device with VitalShield Protective Coating on patients.