

# Defining Common Renal Replacement Therapy (RRT) Terminology



KHI developed the [Technology Roadmap for Innovative Approaches to Renal Replacement Therapy \(RRT\)](#) to stimulate the innovation needed to improve the lives of patients with end stage renal disease (ESRD). The roadmap identified a need to clarify regulatory considerations for different RRT products—including devices, biologics, and biologics/device combination products—to accelerate patient access to innovative RRT solutions.

To accelerate RRT innovation and support the Kidney X Innovation Accelerator and its accompanying prize competitions, KHI is helping the community **define terminology for different RRT products to reduce current inconsistencies or ambiguities**. These common definitions will allow technology developers, patients, healthcare providers, and regulators to more easily communicate about RRT products and their different regulatory considerations. The goal of all solutions, regardless of complexity or approach, must be to help improve patient quality of life.

## RRT PRODUCT TYPES: REGULATORY FRAMEWORK

Innovative RRTs will likely take many forms—even innovative forms that have not yet been conceptualized or defined. Each product type may have different regulatory considerations and follow unique pathways for product development, commercialization, and patient access.

### DEVICE



An instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article that affects kidney structure or function, and does not achieve its primary intended purposes through chemical action within or on the body (defined in 21 CFR 321(h))

Regulated by the FDA Center for Devices and Radiological Health (CDRH)

### COMBINATION PRODUCT



A product composed of two or more regulated components (i.e., drug/device, biologic/device, drug/biologic, or drug/device/biologic), that are physically, chemically, or otherwise combined or mixed and produced as a single entity; packaged as a unit; or intended for use together (defined in 21 CFR 3.2(e))

Assigned to an FDA center (CBER, CDRH, or the Center for Drug Evaluation and Research [CDER]) based on a determination of the product's primary mode of action<sup>1</sup>

### BIOLOGICS



A virus, therapeutic serum, toxin, antitoxin, vaccine, blood, blood component or derivative, allergenic product, protein, or analogous product applicable to the prevention, treatment, or cure of a disease or condition of human beings. Examples of analogous products include cell and gene therapies, human tissue-derived materials, and live biotherapeutic products (defined in 42 U.S.C. 262(i))

Regulated by the FDA Center for Biologics Evaluation and Research (CBER); biologics regulated by CDER include monoclonal antibodies for in vivo use and other products<sup>2</sup>

- For more information, review [A Guide to Regulatory Resources for the Product Developer](#).

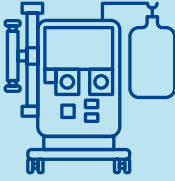

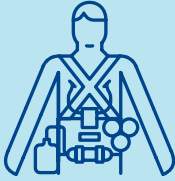

<sup>1</sup>If the most important therapeutic action cannot be determined (e.g., a combination product may have two independent modes of action, neither of which is subordinate to the other) an algorithm (see FDA's regulations at [21 CFR Part 3](#)) directs center assignment based on which center regulates combination products that raise similar types of safety and effectiveness questions, or, if there is no such center, based on which center has the most expertise to evaluate the most significant safety and effectiveness questions raised by the combination product.

<sup>2</sup>For a description of which categories of products are reviewed and regulated by CBER versus CDER, please refer to the [Transfer of Therapeutic Biological Products to the Center for Drug Evaluation and Research](#)

## INNOVATIVE RRT PRODUCT CATEGORIES AND CHARACTERISTICS

A **renal replacement therapy** acts in place of a patient's failing or diseased kidney to perform the functions of blood filtration, electrolyte homeostasis, fluid regulation, toxin removal/secretion, and filtrate transport and drainage. Currently available RRT approaches include dialysis and organ transplantation. With suitable organs in short supply, patients often have little choice but to opt for lifestyle-limiting dialysis treatments, the side effects of which often leave them feeling sick and longing for a better existence.

The potential innovative RRT product spectrum includes the following product categories, each of which is defined by unique patient-centered solution characteristics. Regardless of the category or type of product developed to replace the failed renal functions, all RRT products should improve patient quality of life, extend patient life, and be able to be manufactured at a scale that makes the products widely available to patients.

CATEGORY DEFINITION	PATIENT-CENTERED SOLUTION CHARACTERISTICS
 <p><b>Enhanced Dialysis:</b> Innovations to existing dialysis therapies (hemodialysis [HD], peritoneal dialysis [PD], vascular access) that improve patient quality of life, reducing disease complications and increasing treatment flexibility</p>	<ul style="list-style-type: none"> <li>• Non-invasive</li> <li>• Potential home use</li> <li>• Better ease of use for more patient self-care</li> <li>• Fewer complications compared with current dialysis therapy</li> <li>• Improved clearance to uremic toxins</li> </ul>
 <p><b>Portable:</b> RRT products that are transportable to expand treatment location options beyond the home and clinic (e.g., work, travel)</p>	<ul style="list-style-type: none"> <li>• Non-invasive</li> <li>• No bigger than a carry-on suitcase</li> <li>• Enables shorter duration, more frequent or continuous treatments, alleviating dietary restrictions and pill burden</li> <li>• Enables temporary leave from in-center dialysis</li> </ul>
 <p><b>Wearable:</b> RRT products that are worn on the body during use, allowing for continuous or near-continuous treatment and enabling increased ability to work and engage in other activities</p>	<ul style="list-style-type: none"> <li>• Non-invasive</li> <li>• No larger than a backpack</li> <li>• Increased patient freedom of movement and more normal daily activities</li> <li>• Replaces need for in-center dialysis</li> </ul>
 <p><b>Implantable:</b> A surgically implanted RRT product—device, combination biologic/device, or biological product, including xenotransplant (living cells or tissues from another species)—that closely mimics normal kidney physiology or restores endogenous kidney function</p>	<ul style="list-style-type: none"> <li>• More invasive</li> <li>• Reduced maintenance and interventions</li> <li>• Ability to completely resume normal daily activities</li> <li>• Low reversibility due to surgical intervention</li> <li>• Need for immunosuppression and anticoagulation varies</li> </ul>

\*See the [Technology Roadmap for Innovative Approaches to Renal Replacement Therapy](#) for RRT product design requirements.