Health problem addressed
Continuous renal replacement therapy (CRRT) units are used to treat patients suffering from acute kidney injury (AKI), a critical condition characterized by sudden temporary loss of normal kidney function. They are also used for the treatment of other critical diseases, such as refractory pulmonary edema, pericarditis, hypothermia, or poisonings with a dialyzable toxin.

Product description
The CRRT system is comprised of a machine and its consumables. Basic consumable components of a CRRT system include an artificial semipermeable membrane (also called the dialyzer or filter), an extracorporeal circuit, and therapy fluids such as dialysate and replacement fluid.

Principles of operation
In the most common filter configuration, blood from the patient enters the filter, traveling through hollow-fiber tubules that run the length of the filter. Microporous tubules are composed of a semipermeable membrane that allows for solute and fluid exchange between the two sides of the filter while ensuring that blood does not mix with the fluid side of the membrane. Metabolic wastes and excess fluid can cross over from the blood side of the filter to the fluid side to be discarded. And physiologic electrolytes can be introduced into the blood from the fluid side of the filter should low concentrations be present in the blood. Finally, the treated blood exits the filter and is returned to the patient.

Operating steps
- A nephrologist determines which renal replacement and fluid therapies will be used for the patient.
- The machine is primed and tested by an ICU, CIC, or OHR nurse at patient’s bedside.
- Machine is connected to the patient.
- Nurse will enable alarms and begin treatment by adjusting flow rates, anti-coagulant settings and fluid removal rate as ordered.

Reported problems
Hypothermia; air embolus; local or systemic bleeding; electrolyte imbalances; acid-base imbalances; infection

Use and maintenance
User(s): Dialysis clinicians; ICU nurses
Maintenance: Biomedical engineering staff and/or service contract with the manufacturer or third-party organization; dialysis clinicians
Training: Training by manufacturer and manuals; dialysis clinicians

Environment of use
Settings of use: Intensive care unit; cardiac intensive care unit
Requirements: Stable power source

Product specifications
Approx. dimensions (mm): 1257 x 483 x 495
Approx. weight (kg): 50
Consumables: Dialyzers; extracorporeal circuits; tubing; dialysate; replacement fluid
Price range (USD): 35,000-46,350 (38,500 typical); price covers all types and variations
Typical product life time: 8 years
Shelf life (consumables): 5 years for dialyzers; 72 hours for dialysate

Types and variations
- Gravimetric
- Volumetric