

Optimizing Technology to Improve Care in the Delivery of CRRT

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The application of information technology improves accuracy and decreases errors in the delivery of CRRT, standardizes practice and documentation, improves communication, improves monitoring and promotes patient safety.

Lack of Standardization

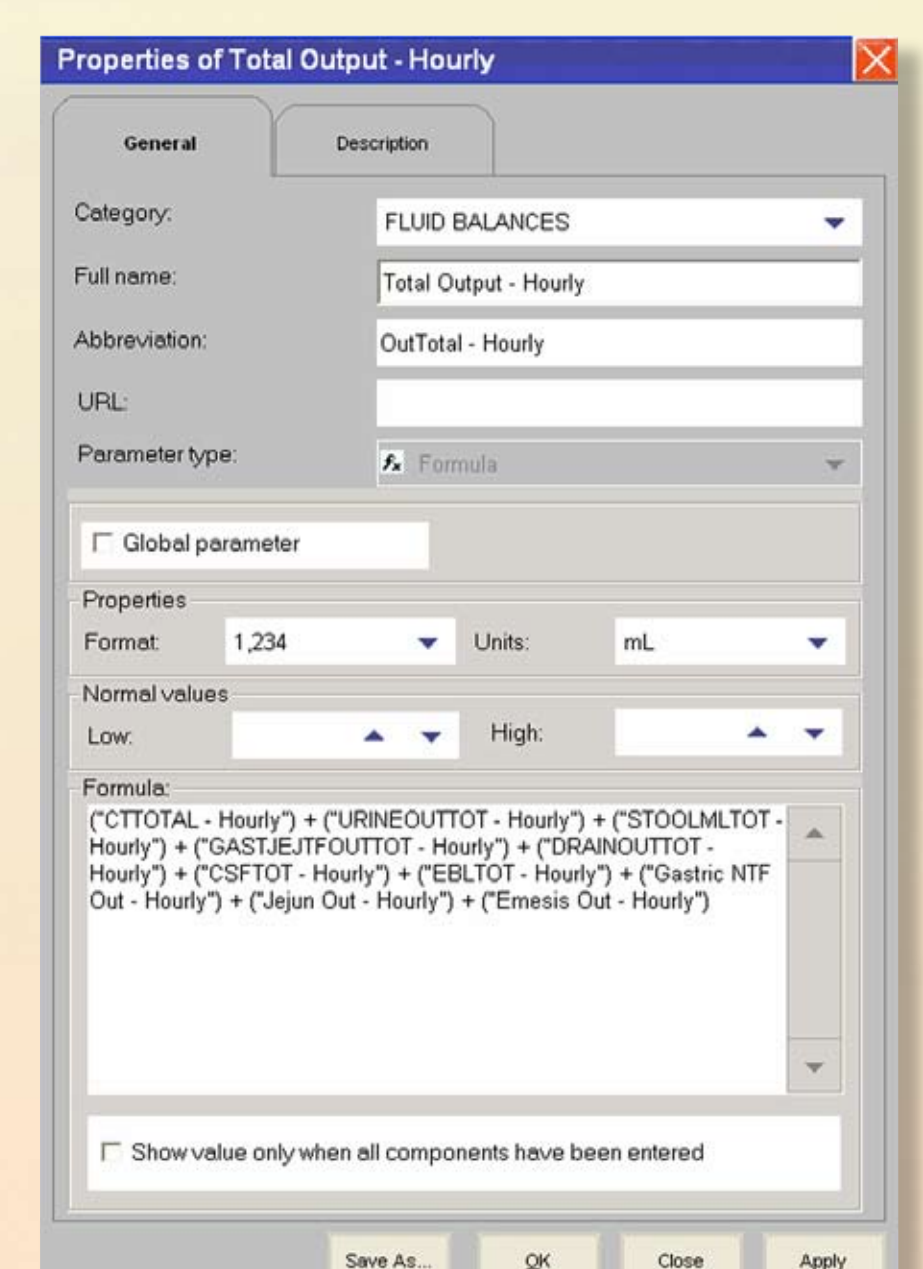
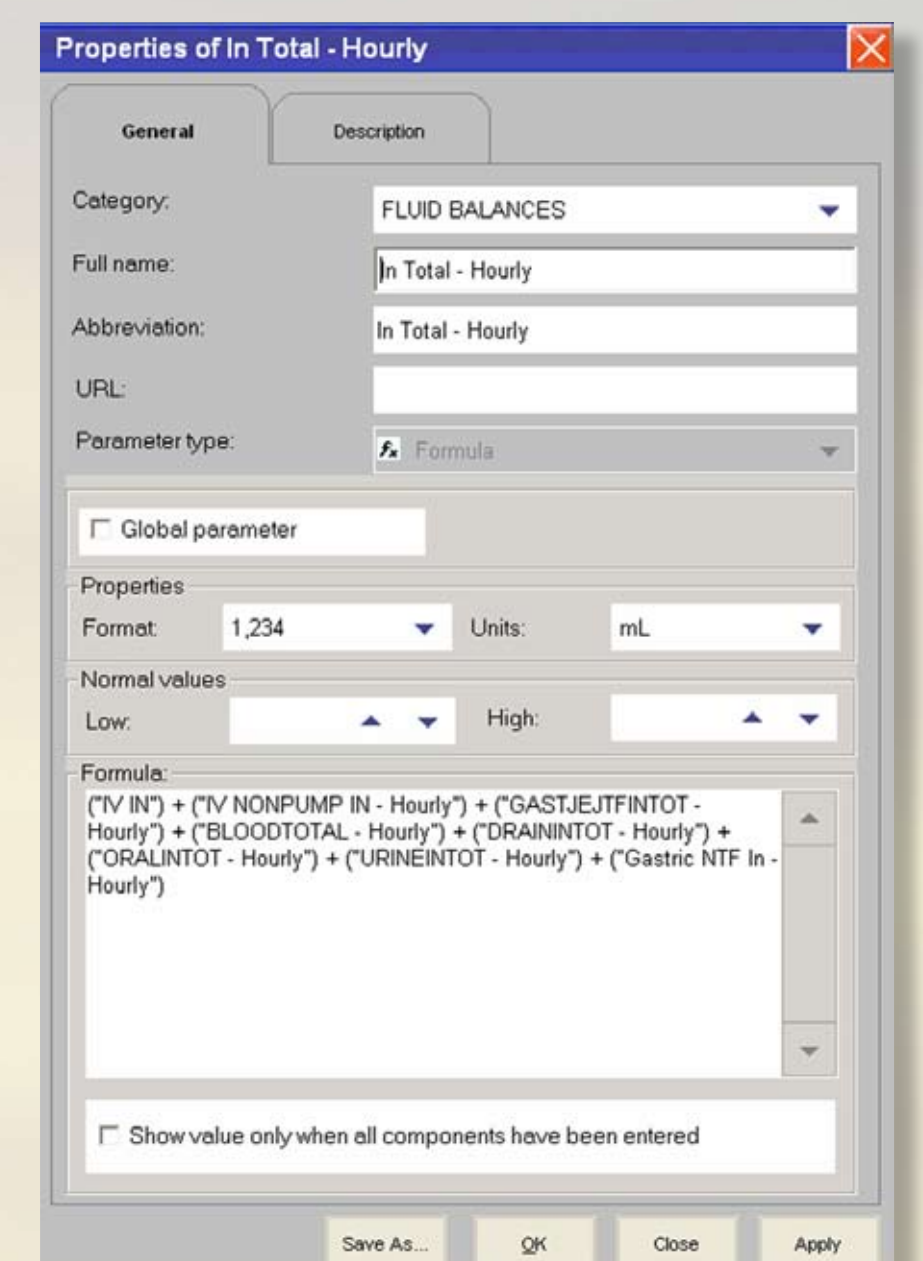
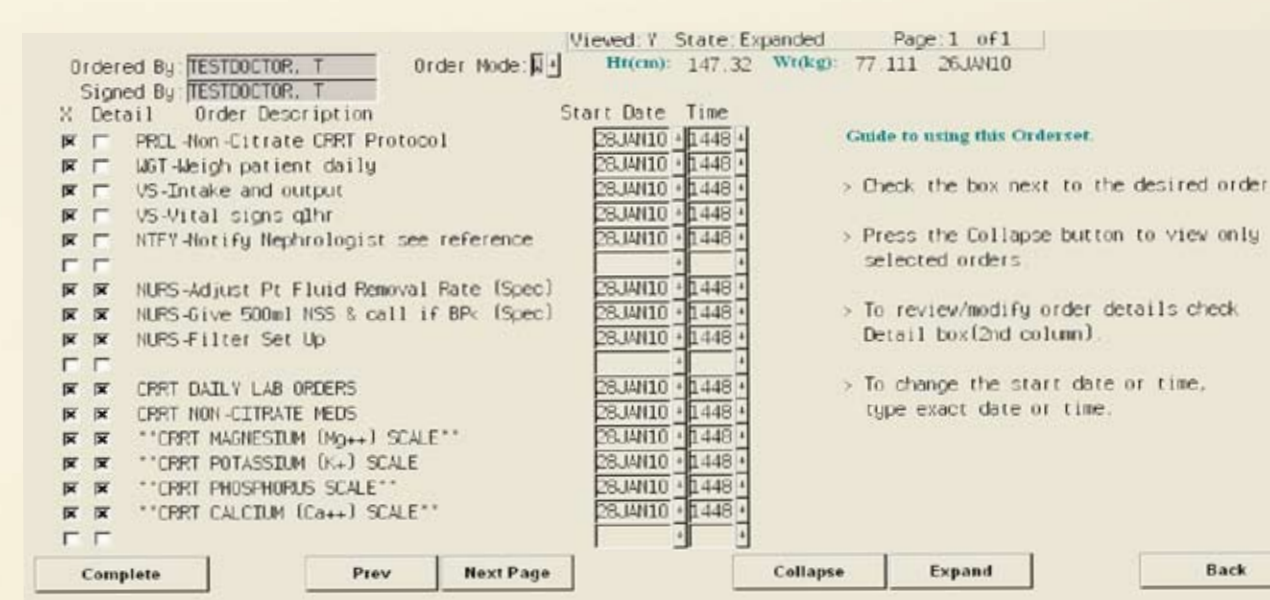
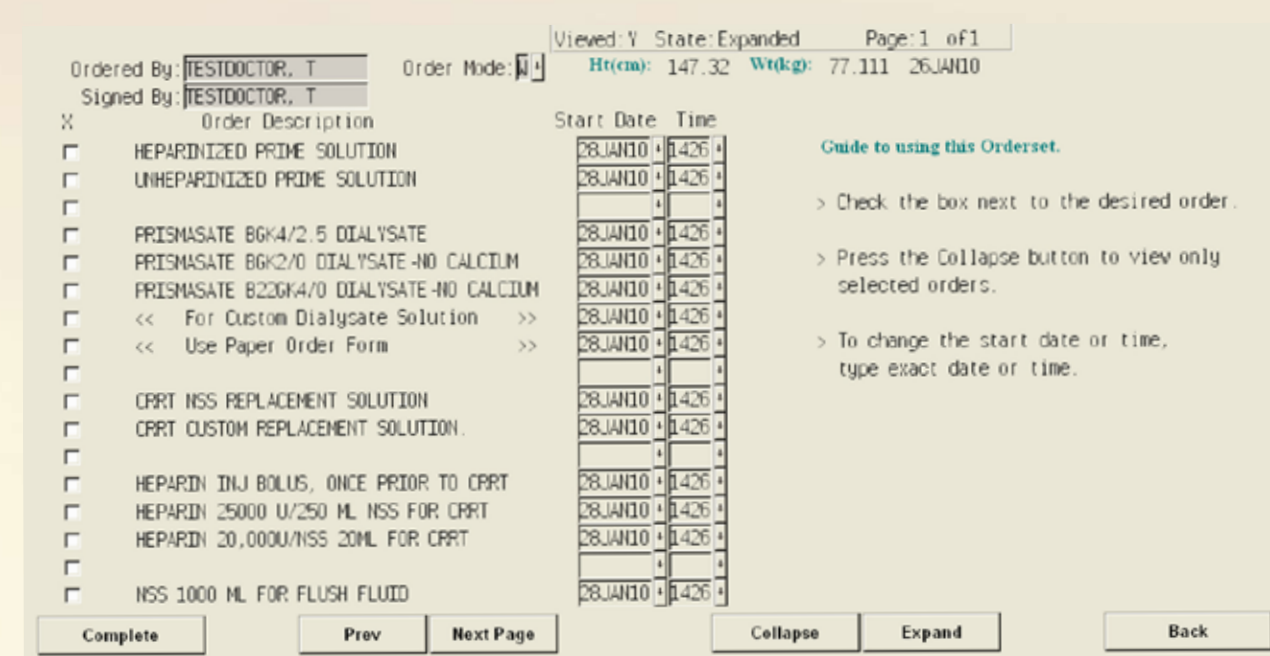
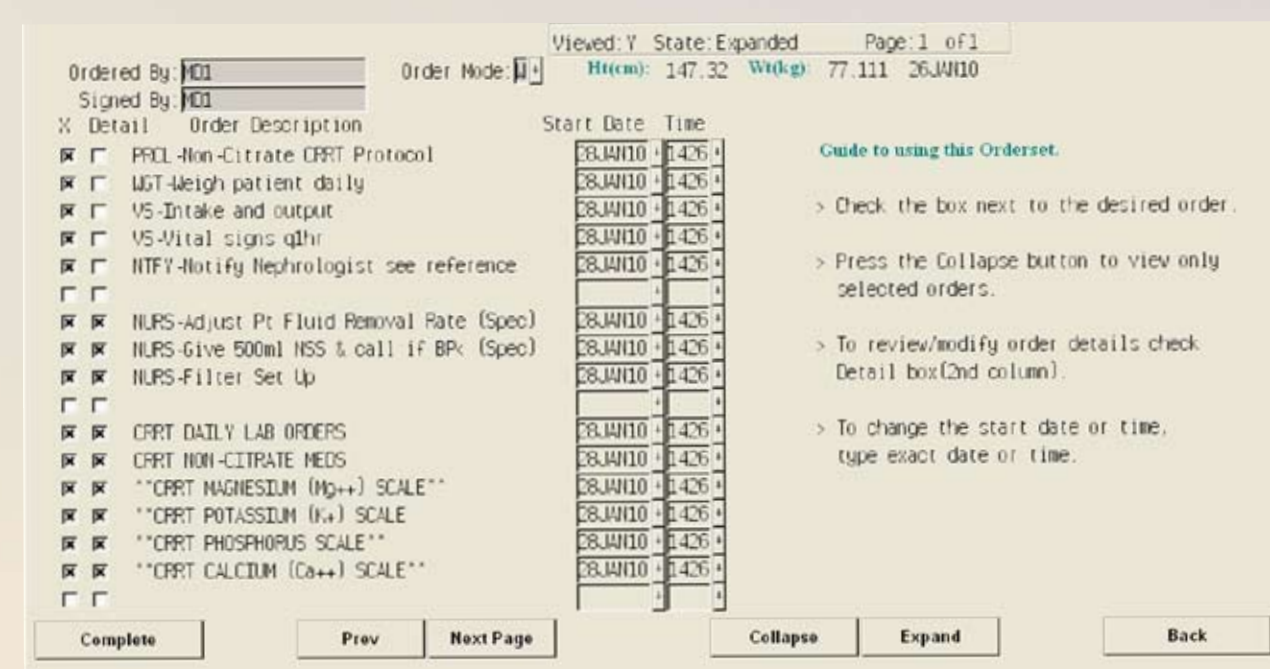
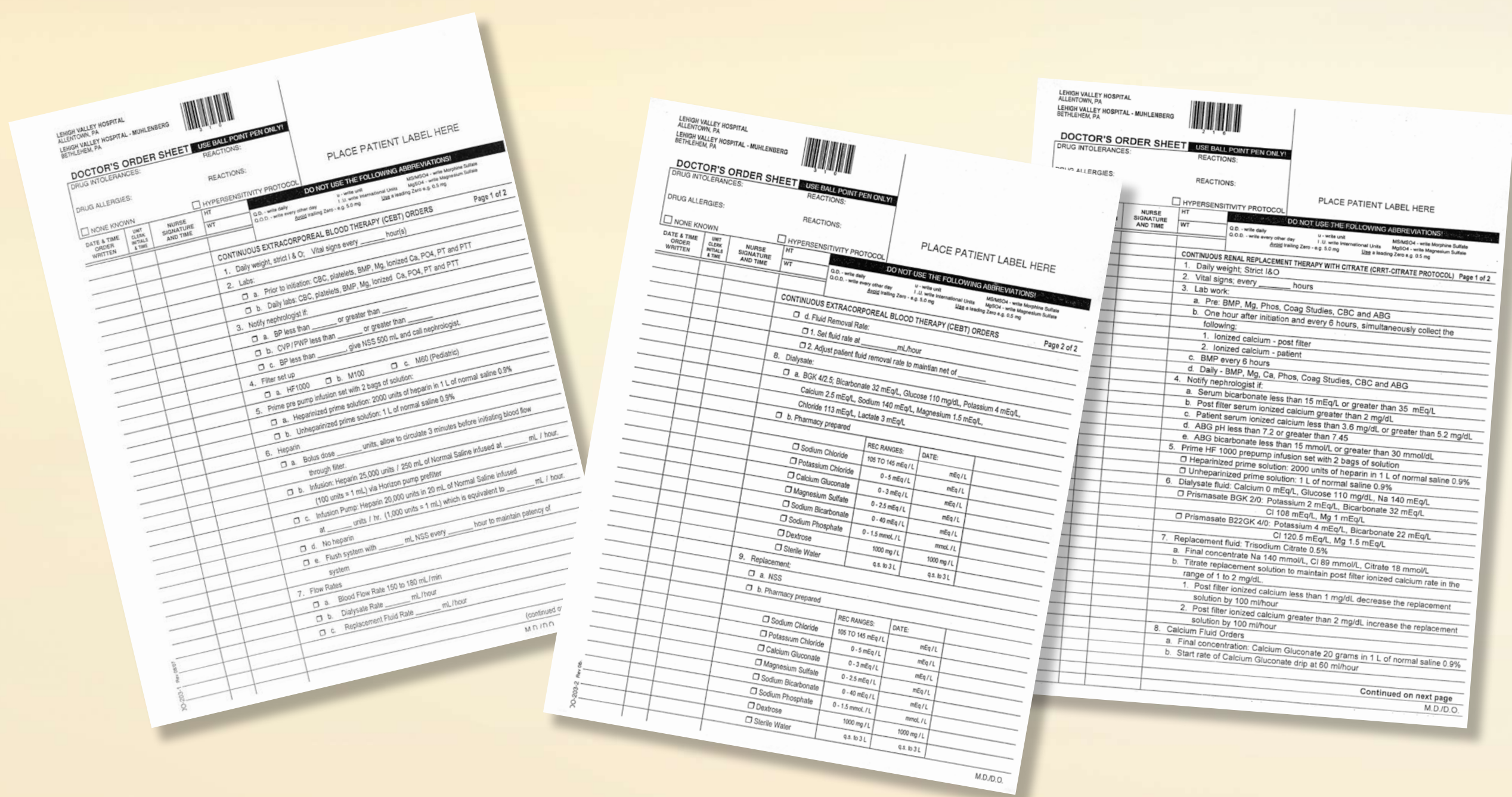
- Printed and handwritten physician orders
- Transcription of orders by pharmacists into EMAR
- Unit specific paper flow sheets
- Nurse specific calculations
- Inconsistency from unit to unit, shift to shift
- CRRT treatments performed in 7 critical care units in 2 hospitals

Additional Challenges

- Consensus amongst 21 nephrologists
- Physician specific sometimes conflicting instructions
- Paper flow sheets only available on units
- Delayed treatments based on processing paper orders
- Delayed documentation due to patient's care

Standardization of Documentation

- Electronic flow sheet designed with assistance of end users and available to all 7 critical care units in 2 hospitals
- Automatic hourly I&O calculations increased accuracy and provided nurse with more time for patient care
- Electronic record provided real time access to all caregivers and promoted efficient evaluation and treatment



Standardization of Orders

- Physician enters all CRRT orders including custom orders via CAPOE
- Transcription of the orders to EMAR is automatic
- Medication orders are programmed to be included or excluded from I&O calculations

| | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 |
|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| FLOW RATES | | | | | | | | |
| Blood Flow | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 |
| Replacement Solution | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Dialysate | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 | 2,600 |
| Pre-dilution Rate | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 350 |
| CRRT Response | | | | | | | | |
| ORDERED | | | | | | | | |
| Current Pressures | | | | | | | | |
| CRRT Access Pressure | -143 | -140 | -137 | -137 | -135 | -145 | -192 | |
| CRRT Return Pressure | 282 | 243 | 228 | 229 | 243 | 239 | 228 | |
| CRRT Filter Pressure | 150 | 150 | 150 | 150 | 150 | 150 | 150 | |
| CRRT Ultrafiltration | 156 | 143 | 131 | 135 | 159 | 144 | 151 | |
| IONIZED CALCIUM | | | | | | | | |
| IONCALCALDIRECT | 4.16 | | | | | | 4.2 | |
| Adjust Ca Glucose | | | | | | | | |
| ICALCEBIC | | | | | | | | |
| Adjust Creatinine | | | | | | | | |
| CRAT | | | | | | | | |
| Hourly I&O Balance | | | | | | | | |
| Hourly Fluid Balance | 286,5793 | 294,0547 | 284,9376 | 315,0293 | 300,2581 | 299,5081 | 281,5394 | 279,4951 |
| Day I&O Balance | | | | | | | | |
| Day Balance | 200 | 162 | 84 | 61 | 269 | 362 | 282 | 162 |
| HOURLY INTAKE | | | | | | | | |
| In Total - Hourly | 287 | 294 | 287 | 316 | 300 | 297 | 282 | 279 |
| Blood In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urine In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gastric In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diets In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drugs In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ESL In - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| IV In - Hourly | 167 | 174 | 187 | 196 | 188 | 180 | 162 | 159 |
| Non-Pump In - Hourly | 120 | 120 | 100 | 120 | 112 | 117 | 120 | 120 |
| HOURLY OUTPUT | | | | | | | | |
| Out Total - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gastric Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Diets Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drugs Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ESL Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| IV Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Urine Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blood Out - Hourly | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |