Water Works For You
The Value of Water
Water is vital for the body

Water is the largest component of the human body and the major constituent of cells, tissues and organs, accounting for roughly 60% of body weight.

Water maintains fluid balance in the body

It is:
- Essential for cellular homeostasis
- The basis for the key transport systems (e.g., blood, lymphatics, urine and digestive fluids)
- A thermal buffer which acts to regulate body temperature

Geriatric patients

Age-related changes make older adults even more vulnerable to shifts in water balance that can result in dehydration.

Risk factors in elderly patients include:
- Decreased thirst sensation
- Total body fluid decrease
- Decline in kidney function
- Functional limitations (dysphagia, stroke, etc.)

Fluid needs must be individualized, communicated, and monitored, and care plans continually evaluated for progress. Improving hydration daily can go a long way in keeping your patients and residents healthy—including the prevention and treatment of pressure ulcers and other chronic wounds.

Dehydration impairs the body’s inflammatory response, alters metabolism, inhibits tissue regeneration, and depresses the immune function (which increases risk for infections).

Hydration is important to maintain blood volume, and adequate blood volume is needed for proper circulation. Proper circulation keeps tissue healthy and viable.

Aging and Body Composition

<table>
<thead>
<tr>
<th>Body Composition (%)</th>
<th>25 Year-Old</th>
<th>70 Year-Old</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>14%</td>
<td>30%</td>
</tr>
<tr>
<td>80</td>
<td>61%</td>
<td>53%</td>
</tr>
<tr>
<td>60</td>
<td>19%</td>
<td>12%</td>
</tr>
<tr>
<td>40</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>20</td>
<td>14%</td>
<td>30%</td>
</tr>
<tr>
<td>0</td>
<td>19%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Hickson, 2006; Hayes and Roberts 2006

Fluid needs must be individualized, communicated, and monitored, and care plans continually evaluated for progress. Improving hydration daily can go a long way in keeping your patients and residents healthy—including the prevention and treatment of pressure ulcers and other chronic wounds.

Dehydration impairs the body’s inflammatory response, alters metabolism, inhibits tissue regeneration, and depresses the immune function (which increases risk for infections).

Hydration is important to maintain blood volume, and adequate blood volume is needed for proper circulation. Proper circulation keeps tissue healthy and viable.
Clinical Challenge

Tube clogging
When small-bore feeding-tube (SBFT) occlusion occurs, substantial charges for the replacement of the feeding tube are incurred and the removal and replacement of the tube adds to patient discomfort and interrupts nutrient delivery.\(^2\)

Consequences of clogged feeding tube
If a tube becomes occluded, a patient could miss multiple feedings before the tube is unclogged or replaced. Some additional consequences of a clogged feeding tube include:

**Nutritional and hydration deficiencies**
- Missed or delayed feedings and free water flushes

**Hospital readmission**
- Dehydration and tube replacement

**Increased cost**
- Hundreds of dollars per incident for tube replacement, material, labor, and x-ray

**Increased nursing time and intervention**
- Between 10 and 60 minutes of nursing time per day for the average manual flush
- Need to identify and attempt to unclog feeding tube

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**DID YOU KNOW?**

- Small-bore enteral feeding tubes may become clogged in up to 35% of patients.\(^3\)

- Tube blockage may result in increasing nursing time, interrupted nutrition and medication delivery, patient discomfort and trauma (if the tube requires removal), and higher costs.\(^3\)
Kangaroo™ Pump Solution

**Tube Patency**
Enhanced tube patency from meeting proper flushing protocols can lead to improved clinical outcomes, nursing efficiencies and decreased cost. Programmable flush helps you comply with A.S.P.E.N.* guidelines.

Flushing to maintain tube patency

**A.S.P.E.N. Guidelines**
- Flush feeding tubes with 30 mL of water every 4 hours.
- Flush feeding tube with 30 mL of water after residual measurements.
- Adhere to proper tube flushing protocols before and after medication administration.

Kangaroo™ Enteral Feeding Pump Capabilities

**Programmable Automated Flush**
The fully variable hydration function of the Kangaroo™ pump saves nursing time and allows clinicians to set a distinct flush rate and interval based on a patient’s specific needs.

“Flush Now” after Gastric Residual Volume (GRV)
The Kangaroo™ solution offers the “flush now” feature to clear lines after GRV checks.

“Flush Now” before and after medication delivery
The Kangaroo™ pump solution offers the “flush now” feature to clear lines before and after medication delivery.

*American Society for Parenteral and Enteral Nutrition

Program your Kangaroo™ pump to meet A.S.P.E.N. guidelines!
Clinical Challenge

Dehydration
In 2008, annual hospital spending related to dehydration for a patient 65 years and older was estimated to be approximately $1.6 billion.¹

It is estimated that 12–25% of residents in long-term care facilities are dehydrated, and 52% of patients admitted into the hospital with a diagnosis of dehydration will come from a nursing home.¹

Post-Admission Dehydration (PAD)
PAD has a potential to add significant burden to hospital costs and resources. Adopting strategies aimed at avoiding PAD may help in reducing hospital costs and resource burden and may improve patient outcomes.

The economic burden of inpatient post-admission dehydration⁵

The economic burden of inpatient post-admission dehydration has a potential to add significant burden to hospital costs and resources. Adopting strategies aimed at avoiding PAD may help in reducing hospital costs and resource burden and may improve patient outcomes.

Increased risk of hospital-acquired conditions
Poor fluid management can lead to dehydration which has a direct impact on pressure ulcers, CAUTIs, SSIs, DVTs and falls.⁶,⁷,⁸

Risk factors associated with decubitus ulcer in an institutionalized elderly population (n=827)⁹

<table>
<thead>
<tr>
<th>Decubitus Ulcer</th>
<th>% ABSENT</th>
<th>% PRESENT</th>
<th>% INCREASE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehydration</td>
<td>12.5</td>
<td>22.9</td>
<td>83%</td>
<td>0.0002</td>
</tr>
<tr>
<td>Immobility</td>
<td>45.4</td>
<td>87.4</td>
<td>93%</td>
<td>0.0000</td>
</tr>
<tr>
<td>Edema</td>
<td>30.3</td>
<td>50.5</td>
<td>67%</td>
<td>0.0000</td>
</tr>
<tr>
<td>Poor Circulation</td>
<td>54.4</td>
<td>71.1</td>
<td>31%</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Casimiro et al. Collected information from 827 elderly institutionalized patients and investigated the prevalence and risk factors of decubitus ulcers. In this study, poorly hydrated individuals were twice as likely to develop pressure ulcers.
Kangaroo™ Pump Solution

Hydration is needed to maintain fluid balance in the body. Our pumps feature variable programmable hydration capabilities that are flexible enough to meet the challenge of your patient’s unique hydration needs.

Meet total hydration needs for a variety of common flushing orders.

**Fluid deficiency corrections**
- For patients who require large volumes to correct fluid deficiencies

**Bolus flush orders**
- For patients who require bolus flushes

**Fully programmable feed and hydration pump**
- Flushing intervals of 1 to 24 hours and rates of 10 to 500 mL

**Variable flushing**
- “Flush Now” feature that delivers water at volumes as low as 10 mL per interval
Clinical Application

Case study
The below scenario highlights the development of a free water flush order to meet the hydration needs of a patient.

A mechanically ventilated ICU patient with euvolemic hypernatremia requires enteral nutrition.

Estimated nutrient needs are:

<table>
<thead>
<tr>
<th>Kilocalories</th>
<th>2300-2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid mL</td>
<td>2250-2600</td>
</tr>
</tbody>
</table>

Tube feeding order is:

- Standard 1.2 formula
- Continuous at 85 mL/h

Tube feeding provides:

- 2448 kcals
- 1672 mL formula free water

Water deficit needs are:

<table>
<thead>
<tr>
<th>Formula deficit</th>
<th>776 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free water deficit</td>
<td>1100 mL</td>
</tr>
<tr>
<td>Total deficit</td>
<td>1876 mL</td>
</tr>
</tbody>
</table>

Free water flush order is:

- 240 mL every 3 hours

Estimated nutrient needs are: 2300-2500 kilocalories, 2250-2600 mL fluid.
Tube feeding provides 2448 kcals and 1672 mL of formula free water.
Water deficit needs: 776 mL from formula deficit, 1100 mL from free water deficit, totaling 1876 mL.

Free water flush order: 240 mL every 3 hours.

Program your Kangaroo™ pump to meet feed and hydration orders!
References

1. Zwiefelhofer, Debbie. RD, LD. Hydration Dietary Manager October 2007:18-21
3. Williams, NT. Medication administration through enteral feeding tubes American Journal of Health System Pharmacy 2008; 65:2347-2357