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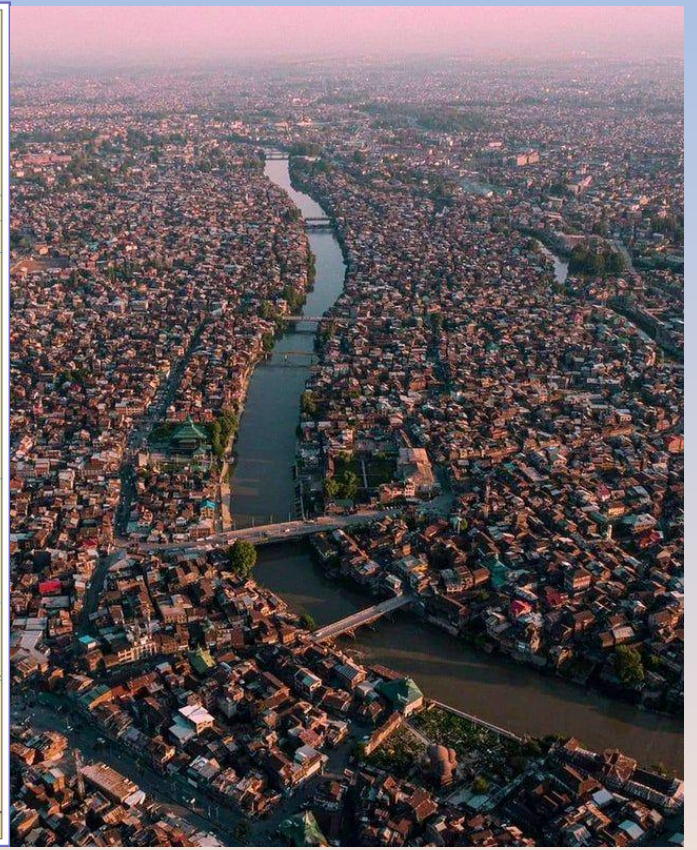

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Jammu and Kashmir, India

Seasons in Kashmir, India

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Education and Training

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My Primary Research Interests

Nephrotic syndrome

Vesicoureteral reflux and renal scarring

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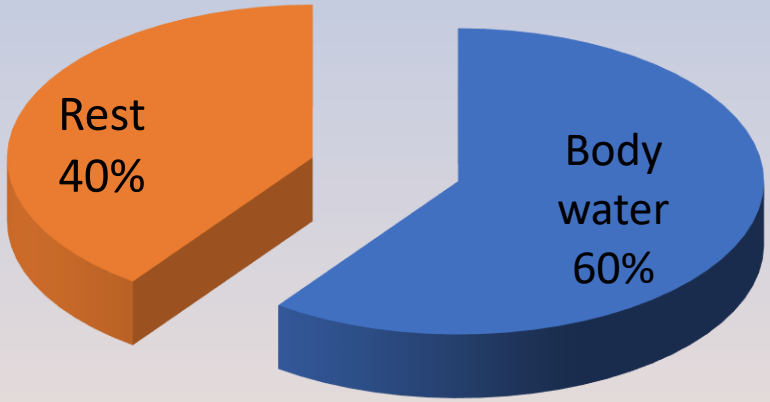
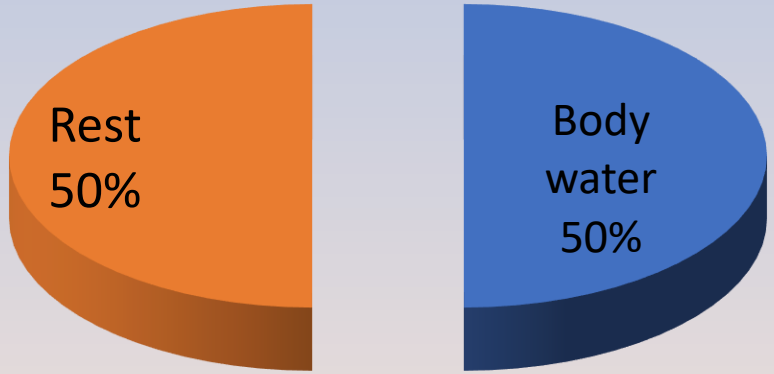
Body Water and Hydration

Amount of Total Body Water in Adults (By Weight)

Men



Women



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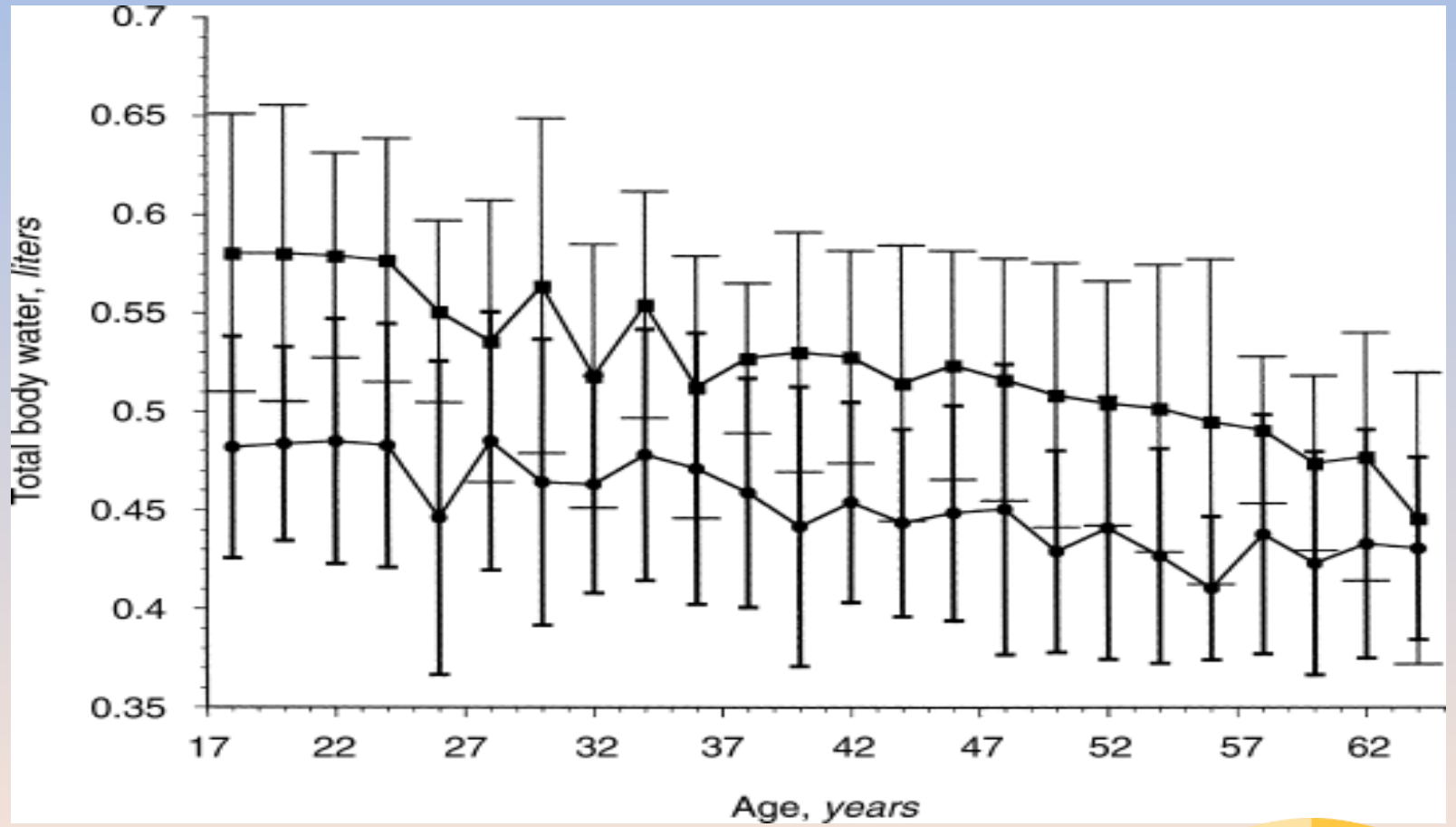
Factors Affecting Body Water Content

- Age and weight
- Daily fluid intake
- Diet: Sodium (salt)/solute intake
- Climate/ambient temperature
- Physical activity
- Medications
- Comorbid conditions

Effect of Age on Body Water

Total Body Water/Body Weight in White Adults

W. CAMERON CHUMLEA et al, Kidney International, Vol. 56 (1999), pp. 244–252



Men
Women

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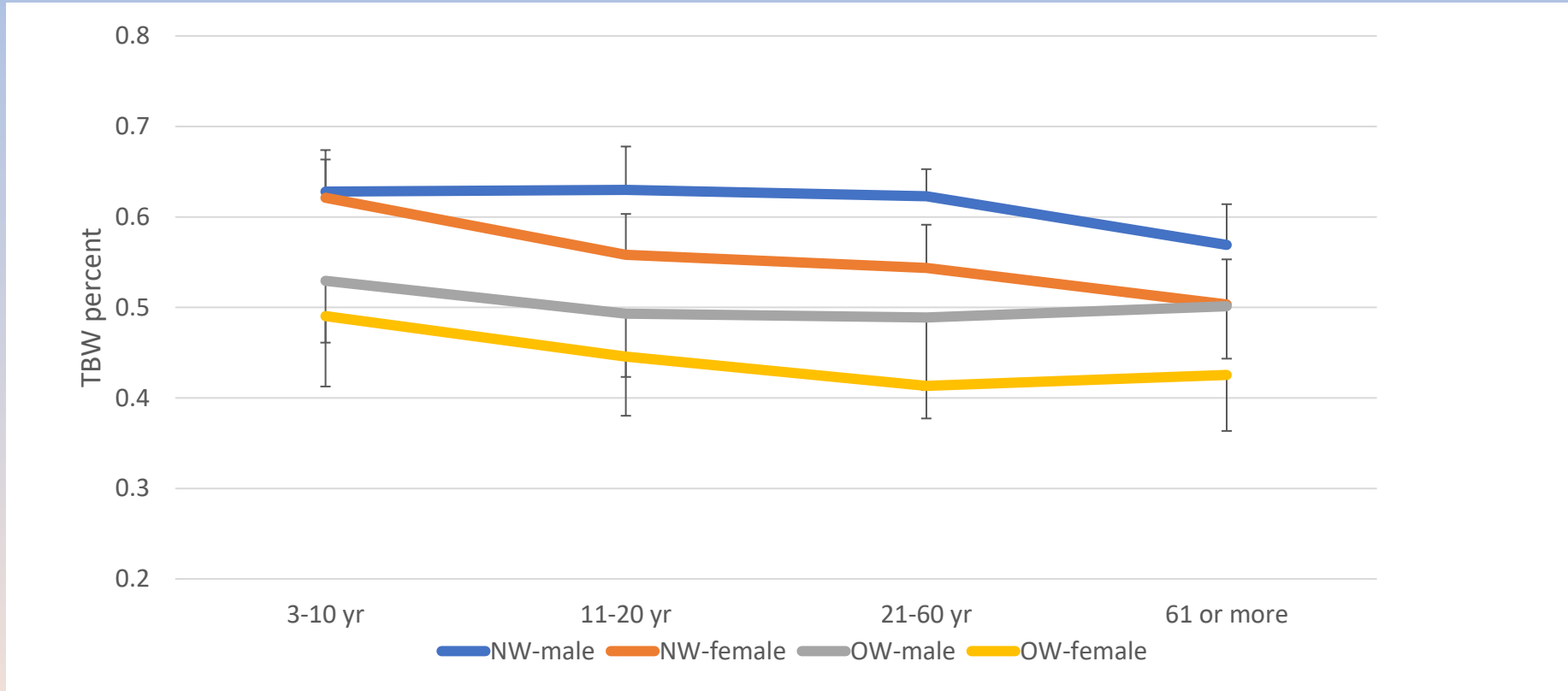
Trends in TBW Percentage by BIA

(545 participants aged 3 to 98 years)

Hong Lu, Eric Ayers, Pragnesh Pate, Tej K.Mattoo. Body Water Percentage from Childhood to Old Age Kidney Research and Clinical Practice, 2023 May;42(3):340-348.



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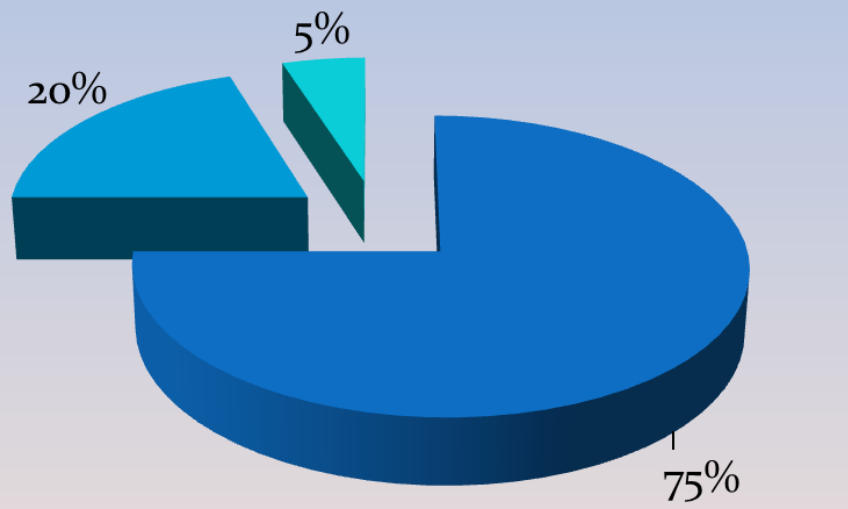
How Do We Meet Our Daily Hydration Needs



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Daily Body Water Losses

Intake: Food and drink (~ 2.5L)

Output:

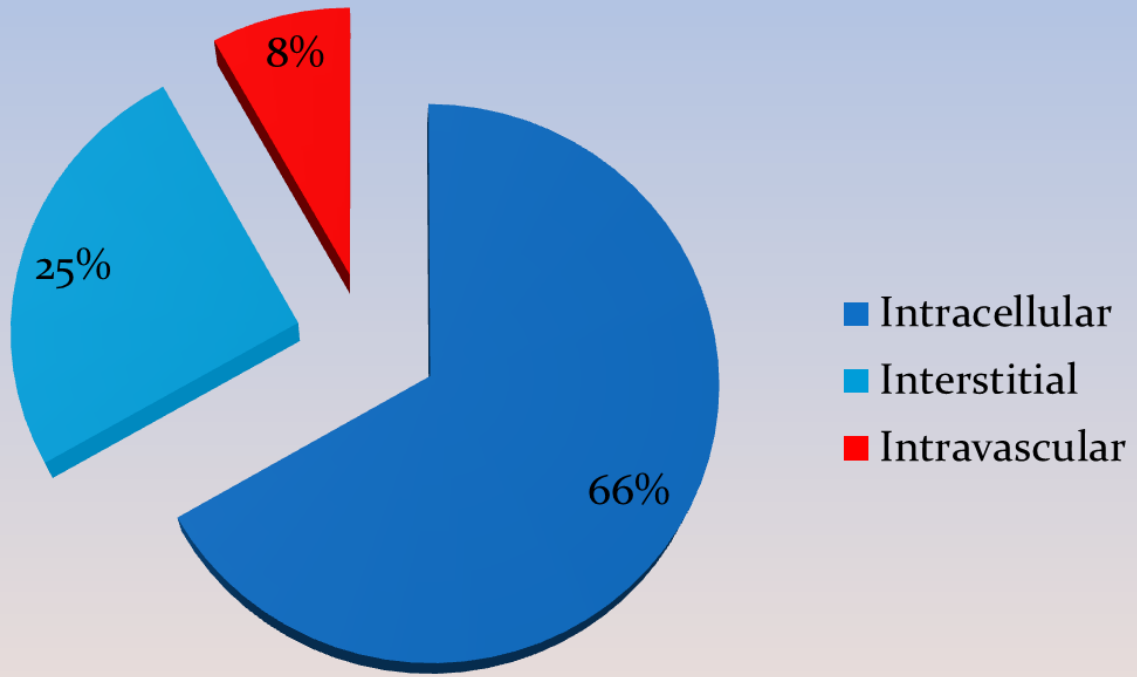
- Urine (60%),
- Insensible- skin and lungs (35%)
- Stools (4%)
- Sweating (2%)

Daily Urine Output

Obligatory water loss

- Daily waste products (including urea, sulfate, phosphate) = 600-700 mOsm/day
- Maximum urine concentration = 1200-1400 mOsm/kg
- Normal urine output: 0.8 – 2.0L/day
- Minimum urine production ~ 0.5L/day

Distribution of Total Body Water



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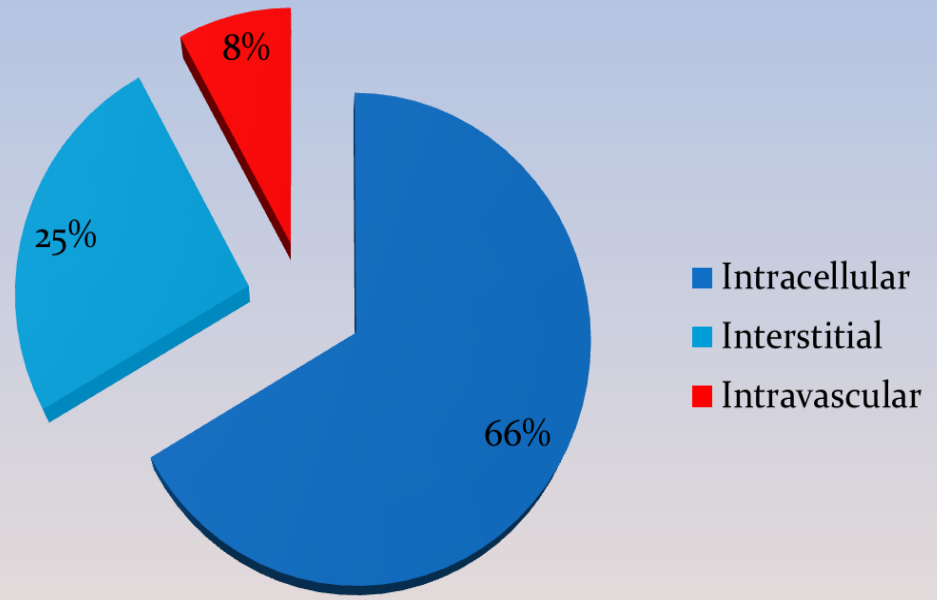
Fluid Shift Between the Compartments

- Osmotic forces
- Starling forces



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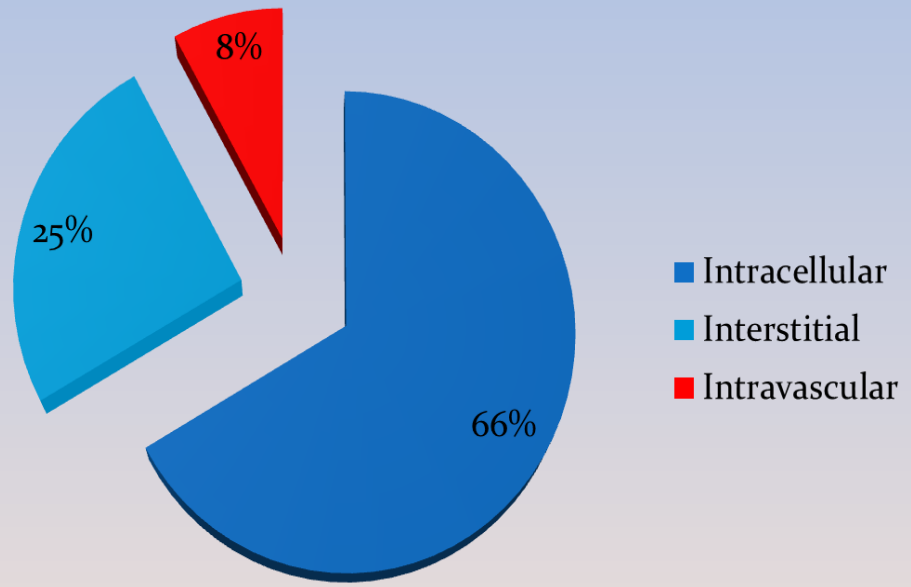
Osmotic Forces

The body fluids are in osmotic equilibrium as the osmolarities of intracellular and extracellular fluids are the same.



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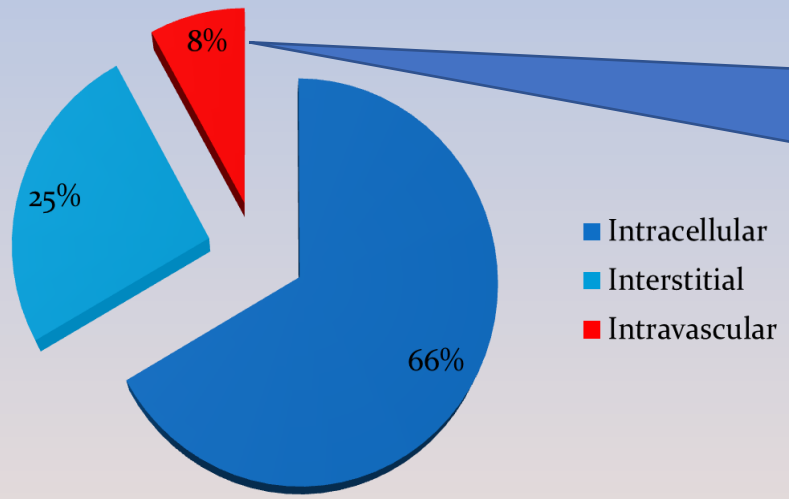
Serum Osmolality and Fluid Shifts



Change in serum osmolality

- **Increased:** Fluid shifts into the vascular compartment
- **Decreased:** Fluid shifts out of the vascular compartment

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Older Adults and Risk of Dehydration

Age-related Physiological Changes

Age related physiological changes

- Decreased thirst sensation (increased ANP)
- Decreased water content in the body (decreased muscle and increased fat mass)
- Increased urine production
  - Diminished renal concentrating ability
  - Increased loss of sodium in urine
  - Hormonal effects
  - Decreased renin/angiotensin/aldosterone secretion
  - Acquired nephrogenic DI (resistance to ADH)
  - Increased atrial natriuretic secretion

Older Adults and Risk of Dehydration

Decreased Total Body Sodium

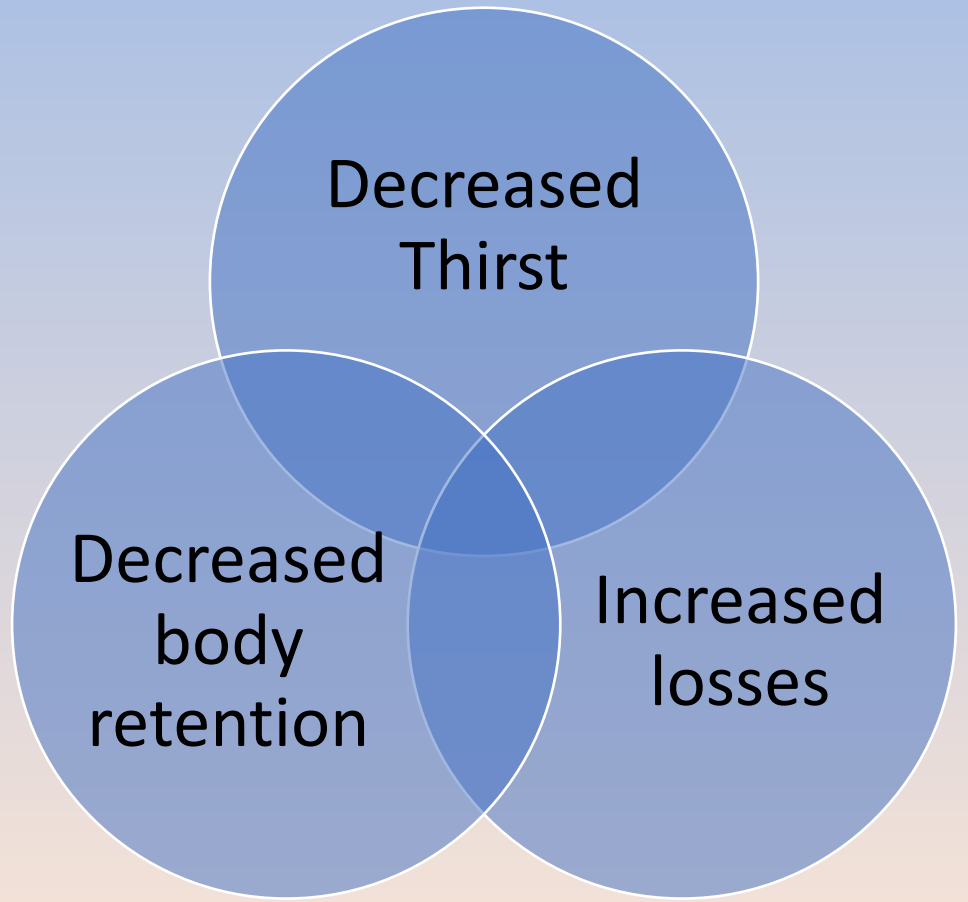
- Physiological increase in urinary sodium (Increased FeNa/24-hour urine sodium)
  - TAL Na reabsorption decreased
  - Decreased serum renin/aldosterone
  - Decreased response to renin/aldosterone
- Restricted dietary sodium intake (voluntary or medically advised)
- Medications: Diuretics and laxatives

Older Adults and Risk of Dehydration

Individual Factors

- Comorbid conditions: Diabetes, CKD, liver disease, cardiac condition or high fever
- Ambient conditions (temperature and humidity)
- Decreased mobility limiting access to fluids
- Swallowing difficulty
- Anxiety about nocturia and enuresis.

Physiological Risk Factors for Dehydration in Older Adults



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Consequences of Dehydration in Older Adults

- Attention deficits
- Orthostatic hypotension
- Constipation
- Risk of falls
- Impaired cognition
- Salivary dysfunction
- Kidney stones
- Increased risk of fluid and electrolyte disturbances
- Increased morbidity and mortality

Fluid Requirement In Children

100 mL/kg for first 10 kg BW

50 mL /kg from 10-20 kg BW

1500 for first 20 kg BW

20 mL/ kg thereafter to a maximum of **2400**

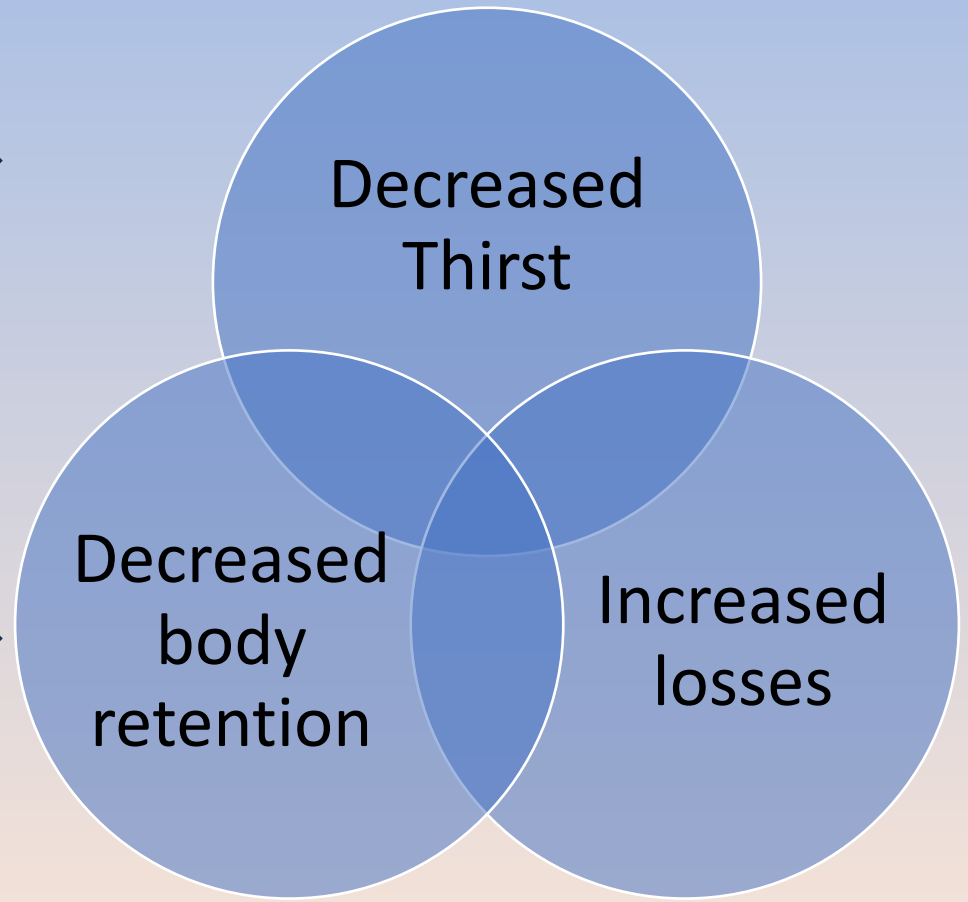
Recommended Daily Fluid Intake in Adults

National Academy of Sciences	3 L (100 oz.) for men 2 L (67 oz.) for women
Based on Body Weight Approximately 35 mL/Kg	2.3 L (77 oz.) for 65 kg person
Based on weight (Pediatric formula)	2.4 L (80 oz.) for > 65 kg person
Popular Literature Rule of eight (8 cups of 8 oz./day)	2 L (64 oz.)
Half of body weight in pounds	2.1 L (71 oz.) for 65 kg (143 lbs.) person

Hydration in Older Adults

Don’t wait to feel thirsty

Drink smaller amounts more frequently



Meet your daily fluid goal and be aware of the factors that may require a change in fluid intake

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Summary

- Age-related physiological factors increase the risk of dehydration in young children and older adults.
- Under normal conditions, body fluids maintain osmotic equilibrium.
- Any disruptions in serum osmolality (such as changes in sodium or glucose levels) can cause significant fluid shifts with serious clinical consequences.
- Serum sodium level is not a reliable measure of total body sodium.
- To meet daily hydration needs, especially for older adults, it’s best to take small, frequent sips of fluids throughout the day

Thanks

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