The Investigation of Hypernatraemia in Primary Care

- Hypernatraemia (Na>145mmol/L) is rare in primary care; clinical effects depend on speed of onset, severity & underlying cause
- Hypernatraemia (even mild) is a potent stimulator of thirst. It can also present with confusion, headache, N&V, lethargy, irritability, seizures or coma
- Individuals over 65 years, those with dementia or those living in institutions are at increased risk of hypernatraemia
- Hypernatraemia is always associated with an elevated serum osmolality >295mmol/kg

Causes of Hypernatraemia:
- Low fluid intake or loss from GI tract e.g. D&V
- Diabetes insipidus (rare, 1:25000)
  - Central DI usually from pituitary pathology affecting ADH production e.g. brain tumour or head injury
  - Nephrogenic DI which is a renal resistance to ADH e.g. electrolyte disturbance (hypercalcaemia or hypokalaemia), renal disease or drug toxicity (commonly lithium)
- Hyperosmolar hyperglycaemic state (HHS, formerly HONK)
  - Life-threatening diabetic emergency characterised by severe hyperglycaemia, high serum osmolality and dehydration
  - Other endocrine causes such as Conn's syndrome (primary aldosteronism) or Cushing's syndrome (pathological hypercortisolism)

Investigations for Hypernatraemia
- Serum osmolality is a measure of the concentration of different solutes in plasma and is primarily determined by sodium, glucose & urea. Normal range is usually 275-295mmol/kg and is tightly maintained by ADH which regulates fluid balance. An increase in serum osmolality results in secretion of ADH which increases water reabsorption in the kidneys to return serum osmolality to baseline
- Urine osmolality is a measure of urine concentration and whether this is appropriate for the clinical state of the individual. Normal range is usually 300-900mmol/kg water. After 12-14 hours fluid restriction, urinary osmolality should be >850mmol/kg water
- Serum urea is a marker of extracellular fluid volume. A raised urea may suggest dehydration
- Serum creatinine is useful as an assessment of renal impairment as a cause of hyponatraemia

Glossary of Abbreviations
- ADH: antidiuretic hormone
- CKD: chronic kidney disease
- DI: diabetes insipidus
- CRT: capillary refill time
- GI: gastrointestinal
- HONK: hyperosmolar non-ketotic syndrome
- N&V: nausea & vomiting
- Nephrogenic DI: renal resistance to ADH

References
2. “DKA & HHS” BMJ 2019;365:l1114