1. **What the report is looking at**	A review of the quality of care provided to adults in hospital identified as having hyponatraemia (low blood sodium levels) or hypernatraemia (high blood sodium levels)
2. **What countries are covered**	England, Wales and Northern Ireland
3. **The date the data are related to**	All patients aged 18 or over who were admitted to hospital between 1st October 2023 and 31st December 2023 and identified as having hypernatraemia or hyponatraemia during their admission by retrospective ICD10 coding.

No.	Recommendation	Evidence in the report which underpins the recommendation	Guidance available
1	Implement processes to reduce variation in the assessment and management of abnormal blood sodium levels.* • Develop national care bundles. • Develop training for all healthcare professionals to be able to assess and treat patients with abnormal blood sodium levels and recognise when to escalate to specialists. **Promote existing information on hyponatraemia from the Society for Endocrinology and develop it into the care bundle.* *TARGET AUDIENCE:* Department of Health and Social Care/NHS England, Welsh NHS, Health Department of Northern Ireland, Government of Jersey	**CHAPTER 4 PAGE 13** There were 85/205 (41.5%) patients admitted with hyponatraemia, and 14/62 (22.6%) who developed postoperative hyponatraemia who did not have evidence of appropriate monitoring (essential for determining the type of hyponatraemia) and documentation of fluid balance (T4.1). **CHAPTER 4 PAGE 14** A higher proportion of postoperative hyponatraemia patients required additional investigations compared to those admitted as an emergency (47/83; 56.6% vs 116/265; 43.8%). **CHAPTER 4 PAGE 14** 48/270 (17.8%) emergency admission patients and 33/84 (39.3%) postoperative patients did not have paired (taken at the same time) urine and plasma/serum osmolality measured when it was indicated (F4.2 and F 4.3). **CHAPTER 4 PAGE 15** Only 25/150 (16.7%) patients had cortisol samples collected between 8:00am and 9:00am. The presence of an abnormal cortisol outside of 08:00am and 10:00am, should lead clinicians to repeat the test utilising additional resources (F4.6 and F4.7). **CHAPTER 6 PAGE 18** There were 11/53 (unknown in 12) patients with hypernatraemia where appropriate monitoring of fluid balance was not undertaken which if improved could have detected ongoing poor oral intake (F6.1).	Society for Endocrinology: Emergency management of severe and moderately severely symptomatic hyponatraemia in adult patients NICE: Hyponatraemia scenario management European Society of Endocrinology Clinical guideline for the management of hyponatraemia

		CHAPTER 7 PAGE 19 Training on hyponatraemia and/or fluid management was commonly provided to foundation doctors (97/115; 84.3%), although it was only part of mandatory training in 30/90 hospitals. Training for other grade and specialties was less common (37/100; 37.0%). Training for staff on the management of hypernatraemia was only provided in 14/99 (14.1%) hospitals. **CHAPTER 7 PAGE 19** Specialist advice for clinicians treating patients with hyponatraemia was available in 140/156 (89.7%) hospitals and was largely provided by services within the hospital or with a network. **CHAPTER 7 PAGE 19** Specialist advice for clinicians treating patients with hypernatraemia was available in 126/156 (80.8%) hospitals and largely provided by services within the hospital.	
2	Develop clear standards and tools for the assessment and recording of fluid status in all patients with abnormal blood sodium levels including, when appropriate, the use of point-of-care ultrasound.* **Point-of-care ultrasound is relatively new so should be considered as further research in its use is published and standards are developed.* *TARGET AUDIENCE:* Department of Health and Social Care/NHS England, Welsh NHS, Health	**CHAPTER 3 PAGE 12** The majority (258/392; 65.8%) of patients with emergency admission-related hyponatraemia had their lowest sodium level on presentation to hospital (120 (116 to 124) mmol/L) (F3.1). **CHAPTER 3 PAGE 12** The majority of hospitals (123/156; 78.8%) had guidelines for laboratory staff to escalate abnormal results and set values to trigger an alert (T3.1). **CHAPTER 4 PAGE 13** In total, 57/270 (21.1%) patients with hyponatraemia did not have a fluid status assessment documented in their medical records during the initial assessment, with no indication that any assessment had been undertaken and 11/270 (4.1%) had incomplete or inadequate assessments. **CHAPTER 4 PAGE 13** There were 85/205 (41.5%) patients admitted with hyponatraemia, and 14/62 (22.6%) who developed postoperative hyponatraemia who did not have	NICE: Hyponatraemia scenario management British Medical Ultrasound Society: Focused and Point-of-Care Ultrasound Intensive Care Society: FUSIC accreditation programme

	Department of Northern Ireland, Government of Jersey	evidence of appropriate monitoring (essential for determining the type of hyponatraemia) and documentation of fluid balance (T4.1). **CHAPTER 4 PAGE 13-14** Accuracy of completion of fluid balance charts was audited in only 51/83 (61.4%) hospitals, and just 39/83 hospitals reported that any quality improvement projects had been undertaken in the previous five years related to fluid management. Where they had been completed, the improvement themes identified were around resident doctor training and support for the use of intravenous (IV) fluids in both general medicine and surgery, strategies to implement NICE CG174 (Intravenous fluid therapy in adults in hospital and training and compliance with fluid balance documentation. **CHAPTER 4 PAGE 14** In this study point-of-care ultrasound (PoCUS) was only used to assess fluid status in three patients as it is an emerging application amongst non-radiologist clinicians, not currently widely used due to the lack of availability of technology and appropriately trained clinicians. **CHAPTER 4 PAGE 14** It was reported from only 26/156 (16.7%) hospitals that there was an IV fluid lead in place as recommended by NICE and in 63/156 (40.4%) it was unknown, suggesting that the overall proportion of hospitals with an IV fluid lead was much lower. **CHAPTER 6 PAGE 18** There were 11/53 (unknown in 12) patients with hypernatraemia where appropriate monitoring of fluid balance was not undertaken which if improved could have detected ongoing poor oral intake (F6.1). **CHAPTER 6 PAGE 18**	

		For most patients, the treatment(s) administered were appropriate (61/65). Overall, the themes for improvement included not fluid restricting in hypernatraemia and appropriateness of fluid choice for IV rehydration. **CHAPTER 7 PAGE 19** Quality improvement projects on hyponatraemia been undertaken in only 46/103 (44.7%) hospitals (unknown in 53), and only eight in hypernatraemia, in the previous five years. Where undertaken positive actions included dedicated training for resident doctors, hyponatraemia investigation order sets/bundles, hyponatraemia assessment and management guidelines and protocols, guidance on use of hypertonic saline solution and development of electronic referral systems to specialist services for advice/clinical reviews and updating local guidelines on hypernatraemia management.	
3	Integrate point-of-care testing results into patient electronic records. *TARGET AUDIENCE:* Commissioners/integrated care boards, Department of Health and Social Care/NHS England, Welsh NHS, Health Department of Northern Ireland, Government of Jersey	**CHAPTER 3** PAGE 12 Using point of care testing, such as blood gas analysers, can reduce the time to obtain blood sodium results as there is no need to transport the sample to the laboratory. Most of the initial sodium results in patients with hyponatraemia recorded in the clinician questionnaires (357/386; 92.5%) (unknown for 6) and reviewer assessment forms (169/263; 64.3%) (unknown for 7) were from laboratory testing rather than point-of-care testing (e.g. blood gas analyses). **CHAPTER 3 PAGE 12** There were 90/183 (49.1%) first sodium results available for patients with hyponatraemia within an hour of time of arrival at hospital. This increased to 137/183 (74.9%) within 2.5 hours. **CHAPTER 5 PAGE 17** Delays occurred in the investigation or management of hyponatraemia in 17/64 (26.6%) emergency presentations and 5/18 (27.8%) of postoperative hyponatraemia patients (T5.11). These delays were attributed to the impact	NHS England: Clinical Messaging NHS England: High Quality Patient Records Welsh Government: Records Management Code of Practice For Health and Social Care 2022

		of out-of-hours care where typically there was reduced medical, nursing and laboratory staff.	
4	Develop a national standard for the use of hypertonic saline in the management of hyponatraemia. This should include: • The indications for its use • The dose, route and location of administration • Monitoring the blood sodium levels, including the rate of correction • Actions to be taken if over-correction occurs • A consensus on the strength of hypertonic saline stocked in hospitals. *TARGET AUDIENCE:* Society for Endocrinology	**CHAPTER 4 PAGE 15** The reviewers determined that 105/260 (39.5%) patients should have had a diagnosis of hyponatraemic encephalopathy based on their symptoms (unknown for 10). **CHAPTER 5 PAGE16** Previous work has shown that administration of boluses of hypertonic saline is associated with better clinical outcomes. Bolus administration occurred in 33 patients (bolus alone in 31, combined boluses and IV infusion in 2) (T5.6). Typically, hypertonic saline was administered in a critical care area for 44 patients (ED resuscitation or level 2 or 3 critical care) (T5.7). **CHAPTER 5 PAGE 17** Of the 28 patients administered with hypertonic saline in an emergency department, only 11 were admitted to a critical care unit. The reviewers felt that five other patients were inappropriately admitted to a general ward area rather than critical care. **CHAPTER 5 PAGE 17** Blood sodium levels were monitored appropriately in 185/234 (79.1%) patients admitted as an emergency and 61/75 (81.3%) patients with postoperative hyponatraemia (T5.8). **CHAPTER 5 PAGE 17** When hypertonic saline was administered, blood sodium levels were not monitored appropriately in 9/44 (20.5%) patients (T5.9). **CHAPTER 5 PAGE 17** The issues with monitoring were due to blood sodium levels not being rechecked soon enough and/or inappropriate frequency of monitoring after administration of hypertonic saline solution.	Society for Endocrinology: Emergency management of severe and moderately severely symptomatic hyponatraemia in adult patients NICE: Hyponatraemia scenario management

5	Raise awareness of the importance of documenting and communicating all medication changes made in hospital to primary care as well as the patients and their family/carers. *TARGET AUDIENCE:* Royal Colleges of Physicians, Royal College of Emergency Medicine, Society for Acute Medicine, Royal College of Surgeons, Association of Surgeons, Royal College of Nursing, Faculty for Intensive Care Medicine, Intensive Care Society, Royal College of General Practitioners, Royal Pharmaceutical Society	**CHAPTER 5 PAGE 17** The majority of patients admitted on an emergency basis with hyponatraemia were taking one or more medications prior to admission that could have contributed to their hyponatraemia (225/270; 83.3%) (T5.10). **CHAPTER 5 PAGE 17** Given the potential relationship between certain medicines and the development of hyponatraemia 157/247 (63.6%) patients with emergency admission-related hyponatraemia had one or more changes to the medications they were taking on admission that may have contributed to the development of the condition. These changes may have occurred at the time of admission, at any point during the admission, or at the point of discharge. **CHAPTER 5 PAGE 17** Where medications were changed, most changes were communicated to the GP on discharge (140/151; 92.7%). Commonly the 'communication' to the GP that a medicine has been stopped is its absence from the patient's medication list at discharge. It can therefore be unclear whether this is an intentional discontinuation or an omission on discharge prescribing. **CHAPTER 5 PAGE 17** In those patients where no changes were made to medications during their hospital admission, reviewers identified that changes should have been made in 14/67 patients. These changes primarily involved stopping medicines associated with hyponatraemia (seven patients) and wider longer-term medication/disease management reviews (four patients).	NICE: Hyponatraemia scenario management Royal College of Physicians: Acute Care Toolkit 17- Managing Multiple Medications