1. **Aim/Purpose of this Guideline**

   1.1. This guideline contains recommendations about general principles for managing intravenous (IV) fluids, and applies to a range of conditions and different settings. It does not include recommendations relating to specific conditions.

   1.2. The contents of the guideline follow closely the recommendations published by the National Institute for Health and Care Excellence (NICE) from their clinical guideline 174 (accessed 9th June 2021), with some modifications relevant to practice in RCHT.

   1.3. This version supersedes any previous version of this document.

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**Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team rch-tr.infogov@nhs.net

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2. **The Guidance**

   2.1. **Principles and protocols for intravenous fluid therapy**

      - When prescribing IV fluids, remember the 5 Rs: Resuscitation, Routine maintenance, Replacement, Redistribution and Reassessment.

      - Offer IV fluid therapy as part of a protocol (see Algorithms for IV fluid therapy)

      - Patients should have an IV fluid management plan.

   2.2. **Assessment and Monitoring**

   2.3. **Initial assessment:**

      - Using the ABCDE (airway, breathing, circulation, disability and exposure) approach, assess whether the patient is hypovolaemic and needs fluid resuscitation.
• Indicators of urgent requirement for fluid resuscitation include:
  ▪ Systolic BP < 100mmHg
  ▪ Heart rate > 90 bpm
  ▪ Capillary refill time > 2 secs (and/or cool peripheries)
  ▪ Respiratory rate > 20 breaths per minute
  ▪ National Early Warning Score (NEWS) ≥ 5

• Assess likely fluid and electrolyte needs from the history, clinical examination, current medications, clinical monitoring and laboratory investigations.
  ▪ History should include previous limited intake, thirst, quantity and composition of abnormal losses (eg drain losses, sweating, vomit: see Diagram of ongoing losses), and co-morbidities, including patients who are malnourished and at risk of re-feeding syndrome
  ▪ Examination should include an assessment of fluid status, including pulse, BP, capillary refill, JVP, presence of pulmonary or peripheral oedema, and postural hypotension
  ▪ Monitoring should include current status and trends in NEWS, fluid balance charts and patient weight
  ▪ Laboratory investigations should include status and trends in FBC and U&Es

2.4. Reassessment:

• If patients are receiving fluids for resuscitation, reassess using the ABCDE approach. Monitor respiratory rate, pulse, blood pressure and perfusion continuously, and measure their blood lactate and/or arterial pH and base excess.

• All patients continuing to receive IV fluids need regular monitoring. This should include at least daily reassessment of clinical fluid status, U&Es, and fluid balance charts, along with twice weekly weight measurements.

• Note:
  ▪ Patients with replacement or redistribution problems may need more frequent monitoring
  ▪ Urinary sodium monitoring may be helpful in patients with high-volume GI losses

• Monitor serum chloride daily and reassess IV fluid prescription if hyperchloraemia develops.

• Report clear incidents of fluid mismanagement through the Datix system.

• Reassess fluid status and IV fluid management plan if the patient is transferred to a new ward or location.
2.5. Resuscitation:

- If patients need IV fluids for resuscitation, use 0.9% Saline or Hartmann's solution in 500ml boluses over less than 15 minutes.

2.6. Routine maintenance:

- For patients requiring routine maintenance alone, restrict the initial prescription to:
  - 25 – 30 ml/kg/day of water AND
  - approximately 1 mmol/kg/day of potassium, sodium and chloride AND
  - 50-100 g/day glucose to limit starvation ketosis. (This quantity will NOT address nutritional needs: see the RCHT Nutrition guideline.

- This can be achieved using 0.18% Saline in 4% glucose with 20mmol potassium on day one (use caution if total fluid prescription exceeds 2.5 litres per day as this prescription may increase the risk of hyponatraemia).

- Use ideal body weight to assess fluid needs in obese patients.

- Consider restricting fluids to 20 – 25 ml/kg/day in frail, older patients, those with renal impairment or cardiac failure, and malnourished patients at risk of refeeding syndrome.

- Consider adjusting the prescription to deliver the fluids during daytime hours.

- Allow for any fluids taken orally and deduct this volume from the total prescription.

2.7. Replacement and Redistribution:

- Add to or subtract from maintenance needs to account for existing fluid and/or electrolyte deficits or excesses, ongoing losses or abnormal distribution (see Diagram of ongoing losses).

- Seek expert help for complex fluid and/or electrolyte issues (such as: gross oedema, sepsis, hypo/hypernatraemia, renal, liver or cardiac impairment, post-operative patients, and malnourished patients). The appropriate expert will depend on the clinical situation, but may be the medical registrar, Outreach practitioner, or other specialist.

2.8. Algorithms for IV fluid therapy

- Algorithm 1: Assessment
- Algorithm 2: Fluid resuscitation
- Algorithm 3: Routine Maintenance
- Algorithm 4: Replacement and redistribution
Guide to IV fluid prescription (by body weight) for routine maintenance over a 24-hour period (this is total fluid requirement: a deduction may need to be made if the patient is also taking oral fluids).

<table>
<thead>
<tr>
<th>Body weight (kg)</th>
<th>Volume of water (ml)</th>
<th>Body weight (kg)</th>
<th>Volume of water (ml)</th>
</tr>
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<tbody>
<tr>
<td>40-44</td>
<td>1000-1320</td>
<td>70-74</td>
<td>1750-2220</td>
</tr>
<tr>
<td>45-49</td>
<td>1125-1470</td>
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<td>55-59</td>
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<td>2125-2670</td>
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<td>60-64</td>
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<td>90-94</td>
<td>2250-2820</td>
</tr>
<tr>
<td>65-69</td>
<td>1625-2070</td>
<td>95-99</td>
<td>2375-2970</td>
</tr>
<tr>
<td>≥100</td>
<td></td>
<td>2500-3000</td>
<td></td>
</tr>
</tbody>
</table>

Add 50-100g/day glucose (eg 5% Glucose contains 5g/100ml.
Add 1mmol/kg of each of sodium, potassium and chloride
3. Monitoring compliance and effectiveness

| Element to be monitored | Adherence to guideline  
<table>
<thead>
<tr>
<th></th>
<th>Appropriate intravenous fluid prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr R Evans</td>
</tr>
</tbody>
</table>
| Tool                    | NICE approved audit tool:  
| Frequency               | Initial monitoring 6months after introduction of guideline, thereafter annual or after substantial amendments to guideline |
| Reporting arrangements  | Intravenous fluid guidance committee, minuted meeting |
| Acting on recommendations and Lead(s) | Intravenous fluid guidance committee |
| Change in practice and lessons to be shared | Educational responsibilities lie within the intravenous fluid committee. Decisions as to how to implement changes in practice to be made by this committee |

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Inclusion & Human Rights Policy’ or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Intravenous Fluid Therapy for Adults in Hospital Clinical Guideline V2.0</th>
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</thead>
<tbody>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Clinical Guideline for Intravenous Fluid Therapy for Adults in Hospital V1.0</td>
</tr>
<tr>
<td>Date Issued/Approved:</td>
<td>9 June 2021</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>August 2021</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>August 2024</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr R. Evans Consultant Anaesthetist</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 258195</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Summary of NICE CG174 guideline for intravenous fluid administration in adults</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Intravenous Fluid prescription Fluid calculator</td>
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<tr>
<td>Target Audience</td>
<td>RCHT</td>
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<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
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<tr>
<td>Approval route for consultation and ratification:</td>
<td>Intravenous Fluid committee</td>
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<tr>
<td>General Manager confirming approval processes</td>
<td>Doug Riley</td>
</tr>
<tr>
<td>Name of Governance Lead confirming approval by specialty and care group management meetings</td>
<td>Anneka McBride</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>NICE CG174 (2013)</td>
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<td>Related Documents:</td>
<td>NICE CG174 (2013)</td>
</tr>
<tr>
<td>Training Need Identified?</td>
<td>Yes</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Critical Care and Resuscitation</td>
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Version Control Table

<table>
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<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job)</th>
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<tr>
<td>07 Nov 2014</td>
<td>V1.0</td>
<td>Initial Issue including revisions following discussion at fluids committee</td>
<td>Dr J Paddle</td>
</tr>
<tr>
<td>07 June 2021</td>
<td>V2.0</td>
<td>Routine Review and update against NICE guidelines</td>
<td>Dr Evans, Anaesthetic Consultant</td>
</tr>
</tbody>
</table>

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.
This document is only valid on the day of printing

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### Appendix 2. Initial Equality Impact Assessment

#### Section 1: Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Intravenous Fluid Therapy for Adults in Hospital Clinical Guideline V2.0</th>
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</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Critical Care and Resuscitation</td>
</tr>
<tr>
<td></td>
<td>Is this a new or existing Policy?</td>
</tr>
<tr>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>Name of individual/group completing EIA</td>
<td>Dr R. Evans, Anaesthetic Consultant</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 253147</td>
</tr>
</tbody>
</table>

1. **Policy Aim**
   - Who is the strategy / policy / proposal / service function aimed at?
   - Medical and nursing staff of RCHT

2. **Policy Objectives**
   - Improve intravenous fluid prescription and administration

3. **Policy Intended Outcomes**
   - Improved fluid management for patients requiring intravenous fluids

4. **How will you measure the outcome?**
   - Planned audit programme

5. **Who is intended to benefit from the policy?**
   - Adult Patients requiring intravenous fluids

6a). **Who did you consult with?**
   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other
   - X

   **Please record specific names of groups:**
   - Intravenous Fluid committee

b). **Please list any groups who have been consulted about this procedure.**
   - Agreed

c). **What was the outcome of the consultation?**
   - Agreed
7. The Impact

Please complete the following table. If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy could have a positive/negative impact on:

<table>
<thead>
<tr>
<th>Protected Characteristic</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (male, female non-binary, asexual etc.)</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender reassignment</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Race/ethnic communities /groups</td>
<td></td>
<td>✓</td>
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<tr>
<td>Disability (learning disability, physical disability, sensory impairment, mental health problems and some long term health conditions)</td>
<td></td>
<td>✓</td>
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<td></td>
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<tr>
<td>Religion/other beliefs</td>
<td></td>
<td></td>
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<tr>
<td>Marriage and civil partnership</td>
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<tr>
<td>Pregnancy and maternity</td>
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<td></td>
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<tr>
<td>Sexual orientation (bisexual, gay, heterosexual, lesbian)</td>
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<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If all characteristics are ticked ‘no’, and this is not a major working or service change, you can end the assessment here as long as you have a robust rationale in place.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Dr R Evans, Anaesthetic Consultant

If you have ticked ‘yes’ to any characteristic above OR this is a major working or service change, you will need to complete section 2 of the EIA form available here:

Section 2. Full Equality Analysis

For guidance please refer to the Equality Impact Assessments Policy (available from the document library) or contact the Human Rights, Equality and Inclusion Lead india.bundock@nhs.net
Appendix 3. Combined Algorithms for IV fluid therapy

Using an ABCDE (Airway, Breathing, Circulation, Disability, Exposure) approach, assess whether the patient is hypovolaemic and needs fluid resuscitation. Assess volume status taking into account clinical examination, trends and context. Indicators that a patient may need fluid resuscitation include: systolic BP <100mmHg; heart rate >90bmp; capillary refill >2s or peripheries cold to touch; respiratory rate >20 breaths per min; NEWS ≥5; 45⁰ passive leg raising suggests fluid responsiveness.

Assess the patient’s likely fluid and electrolyte needs:
- History: previous limited intake, thirst, abnormal losses, comorbidities.
- Clinical examination: pulse, BP, capillary refill, JVP, oedema (peripheral/pulmonary), postural hypotension.
- Clinical monitoring: NEWS, fluid balance charts, weight.
- Laboratory assessments: FBC, urea, creatinine and electrolytes.

Assess for complex fluid or electrolyte replacement or abnormal distribution issues. Look for existing deficits or excesses, ongoing abnormal losses, abnormal distribution or other complex issues.

Ensure nutrition and fluid needs are met—see Nutrition and Hydration Policy for Adults.

Give maintenance IV fluids:
- Normal daily fluid and electrolyte requirements are:
  - 25-30 ml/kg/day water
  - 1 mmol/kg/day sodium, potassium and chloride
  - 50-100 g/day glucose
- For the first 24 hours an appropriate first line fluid would be:
  - 25-30 ml/kg of 0.18% Saline with 4% glucose and 20 mmol/l potassium

Reassess and monitor the patient:
- Stop IV fluids when no longer needed.
- Nasogastric fluids or enteral feeding are preferable when maintenance needs are more than 3 days.

Ensure nutrition and fluid needs are met—see Nutrition and Hydration Policy for Adults.

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- Normal daily fluid and electrolyte requirements are:
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Reassess and monitor the patient:
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Appendix 4. Algorithm 1: Assessment
„Algorithm 1: Assessment“ has been published separately as Appendix 1 and can be accessed via the Document Library by searching for „Intravenous Fluid Therapy“ or [click here](#).

Appendix 5. Algorithm 2: Fluid resuscitation
„Algorithm 2: Fluid resuscitation“ has been published separately as Appendix 1 and can be accessed via the Document Library by searching for „Intravenous Fluid Therapy“ or [click here](#).

Appendix 6. Algorithm 3: Routine Maintenance
„Algorithm 3: Routine Maintenance“ has been published separately as Appendix 1 and can be accessed via the Document Library by searching for „Intravenous Fluid Therapy“ or [click here](#).

Appendix 7. Algorithm 4: Replacement and redistribution
„Algorithm 4: Replacement and redistribution“ has been published separately as Appendix 1 and can be accessed via the Document Library by searching for „Intravenous Fluid Therapy“ or [click here](#).