

## Garrett, Elizabeth

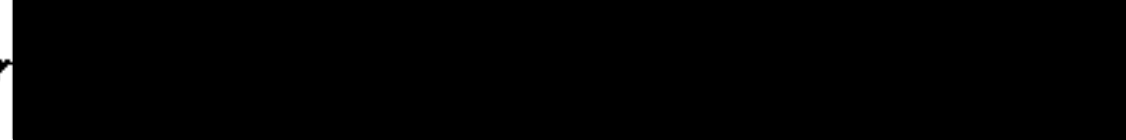
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**From:** Garrett, Elizabeth  
**Sent:** 23 October 2001 13:34  
**To:** McCarthy, Miriam  
**Subject:** FW: PREVENTION OF HYPONATRAEMIA IN CHILDREN RECEIVING INTRAVENOUS FLU IDS



LowNa guidelines.doc

-----Original Message-----

**From:** Loughrey, Clodagh [mailto:Clodagh.Loughrey@  
**Sent:** 22 October 2001 14:23  
**To:** 'Garrett, Elizabeth'  
**Subject:** RE: PREVENTION OF HYPONATRAEMIA IN CHILDREN RECEIVING INTRAVENOUS FLU IDS

Miriam,

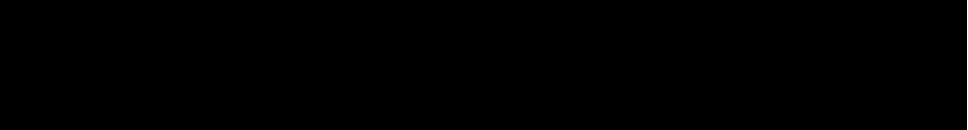
A very good start. However I have taken the liberty of playing around with this draft a bit. I have particular issues with

1. Use of the word "sick" in the intro: the child who died would not have been perceived to be sick in the critical 24 hrs before she died.
2. We need to state somewhere that hyponatraemia is really most often a problem with failure to excrete water, so I've put this in at the beginning.
3. Should we be more specific about what are "appropriate fluids"? Or at least "suggested replacement fluids"? (Which might keep everybody happy!)
4. Need to say that the child must be clinically monitored too, including hydration status. Should we mention here what the signs of low Na are? (non-specific but 125-130: nausea and malaise first observed, lower leading to headache, lethargy and obtundation, with seizures, coma, and respiratory arrest at <115-120 mmol/L)
5. I've deleted the line about near-patient testing, partly in the interests of space conservation, but mainly because rapid turnaround time is not the issue here.
9. Urine: measure Na as well as osmolarity. High urine osmolarity doesn't indicate hyponatraemia! I'm going to give you a little algorithm for those results, but have to run off to a CREST meeting now. Will send my modified version tomorrow morning, but here's the so-far one to keep you busy

Please feel free to ignore!

All the best.

Clodagh

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## PREVENTION OF HYPONATRAEMIA IN CHILDREN RECEIVING INTRAVENOUS FLUIDS

### INTRODUCTION

- Hyponatraemia most often reflects failure to excrete water. Stress, pain and nausea are all potent stimulators of anti-diuretic hormone (ADH), which inhibits water excretion.
- Hyponatraemia is potentially extremely serious, a rapid fall in sodium leading to cerebral oedema, seizures and death.
- Complications of hyponatraemia most often occur due to the administration of excess or inappropriate fluid to sick children, usually intravenously, but potentially with excess dilute oral fluids.
- Hyponatraemia can occur in a variety of clinical situations, even in children who are not overtly "sick". Those at particular risk include:
  - Post-operative patients.
  - CNS injuries
  - Bronchiolitis
  - Burns
  - Vomiting

### BASELINE ASSESSMENT

Before starting IV fluids:

- **Weight:** accurately in kg. [In a bed-bound child use best estimate.] Plot on centile chart or refer to normal range.
- **U&E:** take serum sodium into consideration.
- **Fluid needs:** calculate accurately including:

Maintenance Fluid For first 10kg – 4 mls/kg/hr  
For second 10kg – 40mls + 2mls/kg/hr  
For each additional kg – 60 mls + 1ml/kg/hr

Replacement Fluid Must always be considered and prescribed separately.  
Must reflect fluid loss.  
Must replace loss with most appropriate fluid.

### MONITOR

- **Clinical state:** including hydrational status. Pain, vomiting, general well-being should be documented.
- **Fluid balance:** must be assessed at least daily by an experienced member of clinical staff.  
Intake: All oral fluids (including medicines) must be recorded and IV intake

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reduced by equivalent amount.

Output: Measure and record all losses (urine, vomiting, diarrhoea, etc.) as accurately as possible

- **Biochemistry**: Regular blood sampling for U&E may be difficult but remains **essential**.
  - At least once a day but more often if there are significant fluid losses or if clinical course is not as expected.
  - The rate at which Na<sup>+</sup> falls is as important as the actual plasma level. A Na<sup>+</sup> that falls quickly may be accompanied by rapid fluid shifts with major clinical consequences.
  - Consider using an indwelling heparinised cannula to facilitate repeat U&Es.
  - Do not take sample from the same limb as the IV infusion.
  - Capillary samples are adequate if venous sampling is not practical.
  - **Urine osmolarity/Na**: Very useful if hyponatraemic. Compare to plasma osmolarity (measure or calculate: = 2Na + 2K + glucose + urea)  
(Algorithm to follow.....)

### CHOICE OF FLUID

Fluid and electrolyte requirements vary as a function of metabolic activity.

- The choice of maintenance fluids will be influenced by anticipated sodium, potassium and glucose requirements.
- The choice of replacement IV fluids will depend on replacement needs, eg fluid loss for vomiting etc.

Hyponatraemia may occur in children receiving **any** IV fluid. Vigilance is needed for all children receiving fluids.

### SEEK ADVICE

Advice and clinical input may be obtained readily from a senior member of medical staff including:

Consultant Paediatrician  
Consultant Anaesthetist  
Consultant Chemical Pathologists

- In the event of problems that cannot be resolved locally, help should be sought from consultant paediatricians/anaesthetists at the PICU, RBHSC.

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