

FROM THE ACTING CHIEF MEDICAL OFFICER  
Dr Ian Carson



Department of  
**Health, Social Services  
and Public Safety**

An Roinn  
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agus Sábháilteachta Poiblí**

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Your Ref:

Our Ref: iwc

Date: 21 April 2006

Dear Colleague

## PREVENTION OF HYPONATRAEMIA IN CHILDREN

In March 2002 the Chief Medical Officer issued Guidance on the Prevention of Hyponatraemia in Children. At that time it was recommended that fluid protocols should be developed locally to complement the guidance and provide more specific direction to junior staff.

A Regional Fluid Therapy Working Group established by the Chief Medical Officer and chaired by Dr Jarlath McAloon has now developed an appropriate protocol which I attach for your attention. This Parenteral Fluid Therapy protocol should be disseminated and used in all areas of your Trust in which children may receive intravenous fluids. It can readily be enlarged and/or laminated for display in clinical areas if required.

The National Patient Safety Agency recently established an External Reference Group on Hypotonic Fluids on which Northern Ireland professionals are well represented. The NPSA has issued documents for consultation on reducing the risk of harm when administering intravenous fluids to children. These included a template for intravenous fluid guideline development. It is anticipated that the NPSA will issue final documentation and a safety alert later this year, which will apply to Northern Ireland. Pending the NPSA alert, the attached protocol should be adopted in your Trust. When the NPSA alert and supporting documentation is issued it may need to replace the locally developed protocol and I will advise you accordingly at that time.

I would like to take this opportunity to thank Dr Jarlath McAloon and members of the Regional Fluid Therapy Working Group for developing the attached protocol on Parenteral Fluid Therapy and helping to further reduce the risk of hyponatraemia in children receiving fluids.

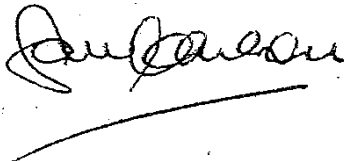
Working for a Healthier People



INVESTOR IN PEOPLE

The guidance issued by the CMO in 2002 complements the protocol and should continue to be displayed and used in your Trust. It can be accessed on the Department website: [www.dhsspsni.gov.uk](http://www.dhsspsni.gov.uk).

Yours sincerely



**DR IAN CARSON**  
Acting Chief Medical Officer

cc: Chief Executives HSS Boards  
Medical Directors HSS Trusts  
Directors of Nursing HSS Trusts  
Directors of Pharmacy HSS Trusts

# PARENTERAL FLUID THERAPY ( 1 month – 16 yrs )

Initial management guideline for previously well children

## Monitoring & observations essential

**All children**  
Admission Weight.  
12 Hourly – Assess In/ Out put, glucose  
Daily – Clinical reassessment.  
U&E initially (more often if a result abnormal).

**ILL children**  
May need:  
Hourly - HR, RR, BP, GCS.  
Fluid In/ Out put (urine osmolality if volume cannot be measured)  
2-4 Hourly – glucose, U&E, +/- blood gas.  
Daily - weight

Each shift  
Handover and review of fluid management plan.

If plasma  $\text{Na}^+$   $<130\text{mmol/l}$  ask for senior help

Is shock present?

YES

## Rapid Fluid bolus

10ml/kg 0.9% Sodium Chloride IV or IO

Reassess.

Repeat three times if needed while calling for senior help.  
(Up to 60 ml/kg may be needed. Use blood after 40ml/kg in haemorrhage)

Can child be managed with oral fluids?

YES

Prescribe oral fluids

Is there a fluid deficit?

YES

## Estimate & replace deficit

(% dehydration x kg x 10 = fluid deficit) mls of  
0.9% Sodium Chloride or Compound Sodium Lactate  
Subtract volume of fluid bolus from this calculated deficit

Calculate & prescribe this residual deficit separately from maintenance.

Give over 24 hours

(or over 48 hours if  $\text{Na}^+$   $<135$  or  $>145$  mmol/l)

Calculate ongoing losses at least 4 hourly & prescribe the replacement separately.

Be prepared to change fluid according to clinical reassessment and test results

**\*\*DKA/burns/renal/ cardiac patient? - Refer to appropriate protocol**

Prescribe maintenance fluids

## INITIAL choice of IV maintenance fluid

**Patients at particular risk of Hyponatraemia.**  
( includes peri-operative patients; patients with head injuries; CNS infection; severe sepsis; hypotension; intravascular volume depletion; bronchiolitis; low plasma Sodium, particularly if less than 135mmol/l ).

**Fluid:**

0.9% Sodium Chloride or  
Compound Sodium Lactate or  
0.9% Sodium Chloride with 5% Glucose

**Other patients**

0.45% Sodium Chloride with either 2.5% or 5% Glucose

**All patients**

Change fluid rate according to clinical assessment and change electrolyte and glucose content according to test results.

Commence oral fluids as soon as possible.

## Calculation of 100% maintenance rate

1<sup>st</sup> 10 kg = 4ml/kg/hr.

2<sup>nd</sup> 10 kg = 2ml/kg/hr

subseq kg = 1ml/kg/hr

max 2 litres per 24 hours in females

max 2.5 litres per 24 hours in males

If risk of hyponatraemia is high consider initially reducing maintenance volume to two thirds of maintenance

IV Maintenance  $\text{K}^+$  normally required after 24 hrs (be aware of potential for  $\text{K}^+$  deficit at presentation e.g. pyloric stenosis).  
Replace ongoing losses with the same volume of either 0.9% Sodium Chloride or Compound Sodium Lactate.

Oral intake must be considered in the fluid prescription calculation.

**Medications:** volumes of drug infusions and oral medications must be considered in the fluid prescription.

**Hypoglycaemia ( $<3\text{mmol/l}$ ):** give 5ml/kg bolus of 10% Glucose. Recheck after 15-30 mins; change maintenance fluid.

**Symptomatic Hyponatraemia:** features include nausea, vomiting, headache, irritability, altered level of consciousness, seizure, apnoea.