

PARACETAMOL - SCH

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- Paracetamol is the drug most frequently administered to small children world-wide. It is a widely used analgesic and antipyretic agent and has a very long safety record when used in optimum dosage. However, it may be under or over-used in certain situations.
- All patients prescribed paracetamol at SCH must undergo a complete and accurate medical and medication history to assess their risk of hepatotoxicity.
- Well accepted indications for paracetamol use include analgesia and the prophylaxis and treatment of some immunisation reactions. The appropriateness of its use in the treatment of fever remains controversial.
- The oral route is preferred over rectal use which displays erratic absorption.
- Intravenous use is restricted to authorised prescribers under strict criteria outlined in IV Paracetamol - SCH
- Intravenous paracetamol has been associated with dosing errors relating to concurrent use of oral paracetamol, dose calculation errors, non-adherence to labelling directions and tenfold errors due to confusion between 'mg' and 'mL'.

CHANGE SUMMARY

- This document replaces SCH.C.20.08 and provides information on recent changes to safety recommendations for paracetamol IV in children and other recommendations based on up to date references.
- Maximum daily dose revised

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st March 2020	Review Period: 3 years
Team Leader:	QUM & AMS Pharmacist	Area/Dept: Pharmacy

READ ACKNOWLEDGEMENT

- This document should be read & acknowledged by clinical staff involved in medication handling and provision of medicines information education to patients and carers.

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1 Rationale

Paracetamol is the drug most frequently administered to small children world-wide. It is a widely used analgesic and antipyretic agent and has a very long safety record when used in optimum dosage.¹ However, it may be under- or over-used in certain situations.^{1,2,7} Evidence indicates that in sick children who receive multiple doses of four hourly or high dose paracetamol there may be an increased risk of toxicity. A “risk profile” for potential hepatotoxicity with therapeutic use includes: sustained administration of high doses to a sick child who is younger than 2 years for more than 1 day and administration of multiple doses of adult strength formulations.^{2,7}

These guidelines are intended to provide recommendations regarding appropriate indications and dosing regimens to ensure safe and efficacious use of paracetamol in hospitalised children.

2 Recommendations

Indications

Well accepted indications for paracetamol use include analgesia and the prophylaxis and treatment of some immunisation reactions.⁵ The appropriateness of its use in the treatment of fever remains controversial.⁷

Precautions

The risk of hepatotoxicity and recommendations for appropriate dosing may differ depending on the specific indication for which paracetamol is being used and any coexisting conditions. Therefore, all paracetamol prescriptions should be preceded by a careful risk assessment and accurate medical and medication history (see [Table 1](#)). If the risk benefit ratio is considered unfavourable, consideration should be given to no treatment or to cautious use of lower doses and shorter duration of therapy with frequent clinical review. If the risk benefit ratio is considered favourable, follow the dosing recommendations outlined below.

Overdose

Paracetamol overdose may be initially asymptomatic and can occur due to accidental ingestion, chronic suprathereapeutic dosing (see [Table 1](#)), intentional self-harm or administration error.^{2,3} If overdose with liquid or tablet paracetamol is suspected refer to [Paracetamol Overdose Assessment and Management Practice Guideline](#).

If IV paracetamol overdose is suspected consult SEATS – South-East Area Toxicology Service, Randwick Campus – contact via Switch as soon as practicable.

Table 1: Potential Risk factors for hepatotoxicity^{4,5}

1. Impaired liver function which *may* be associated with any of the following and compounded by previous paracetamol administration prior to admission
 - Prolonged fasting or dehydration (e.g. poor oral intake for greater than 24hrs)
 - Chronic under-nutrition
 - Intercurrent febrile illness
 - Underlying hepatic injury or metabolic problems
 - Younger age (*under 2 years has been suggested*)
 - Obesity
 - Genetic predisposition (e.g. family history of hepatotoxic reaction)
2. Co-administration of drugs which induce hepatic microsomal enzymes (Cytochrome P450 inducers)
 - Anticonvulsant e.g. barbiturates, carbamazepine, primidone
 - Anti-tuberculosis agents e.g. isoniazid, rifampicin
 - Alcohol
3. Co-administration of other products containing paracetamol (e.g. liquid cough/cold remedies)
 - These products are not generally recommended in young children. However, if they are used, the paracetamol component must be included in calculations for the maximum total daily dose.
4. Administration and dosing errors
 - Lack of awareness or understanding regarding the multiple different dose strengths of paediatric different formulations of paracetamol: e.g. infant drops (100 mg/mL), liquid paracetamol (120 mg/5 mL or 240 mg/5 mL).
 - Potential overdosing of an overweight child according to actual body weight OR underweight child according to age group on product
 - Exceeding the total allowable daily dose by dosing every 4 hours

Every effort should be made to educate parents and other caregivers on the appropriate use of paracetamol. "Adult strength" formulations (including "slow release" preparations) should not be administered to young children. Refer to [Appendix B](#) for paracetamol products available in the community.

Prescription Requirements

Indication for use (e.g. pain; symptomatic high fever [e.g. > 38.5°C]; immunisation)

Dose (in mg/kg) appropriate for: specific indication, risk factor status, route of administration, age and weight of child.

*If a patient is oedematous or obese, alert "Patient's BMI-for-Age is Above a Healthy Weight" is present in eMR **ideal body weight** should be used to calculate the dose. See Drug Dosing for overweight and Obese Patients-SCH*

Frequency of dosing

Route of administration (single route only: no IV/PO)

Maximum daily dose (in mg/kg) or number of doses per day

Maximum duration of therapy

3 Analgesia

- Children experiencing pain should receive appropriate analgesia. Optimum management involves individualised doses given at regular intervals. Ad hoc or “prn” doses should only be used if pain is truly of an intermittent nature.
- Suggested maximum doses are those above which analgesia is unlikely to be further improved and risk of toxicity increases.
- If pain AND fever are present concurrently, then lower doses (as for fever control) are recommended (and this should be specified in a single order).
- Other pharmacological methods (e.g. concurrent administration of NSAIDs or opiates) or non-pharmacological methods can be used in addition to the regular use of paracetamol in providing adequate pain relief.
- Single ingredient products are preferred.
- The use of multiple paracetamol containing products at any one time should be avoided where possible. When used, the total daily dose of paracetamol should not exceed the recommendations below. Prescribing must be clear to minimise risk of overdose.
- Paracetamol is not recommended for pain associated with procedures in neonates.⁶

DOSE and ROUTE for Analgesia

ORAL maintenance dose^{7,8}

Birth (at term) – 1 month: 15 mg/kg every 6 to 8 hours. **Maximum** 60 mg/kg/day.

1 month – 18 years : 15 mg/kg/dose (up to 1 g per dose), 4 to 6 hourly *PRN*

For regular (non-PRN) administration prescribe QID.

Maximum (oral maintenance) 60[#] - 75 mg/kg/day (do not exceed 4 g in 24 hours)

Patients receiving 75 mg/kg/day as an oral maintenance must be reviewed at 48 hours

The lower maximum oral dosage of 60 mg/kg/day is recommended for:

1. Younger infants (e.g., less than about 6 months of age)
2. Those with other risk factors for hepatotoxicity (see [Table 1](#)) or CrCl < 50 mL/min/1.73 m^{2.9}
3. Discharged home; reasons for any exceptions should be specifically indicated on the discharge script (e.g. management of post-operative pain, chronic pain and palliative care) where higher maximum daily dose may be required for defined periods of time

RECTAL maintenance dose

Rectal administration should be avoided if oral administration is at all possible.

The rectal route should not be used in the immunocompromised child or those with a coagulopathy¹⁰

1 month – 18 years 15 - 20 mg/kg/dose (up to 1 g) 6 hourly,

Maximum (rectal maintenance) 60 - 90 mg/kg/day (do not exceed 4 g in 24 hours)

Patients receiving 90 mg/kg must be reviewed at 48 hours

- Rectal absorption can be erratic and delayed; oral administration is preferred where possible. If the rectal route is necessary (e.g. peri-operatively), this route should only be used until oral dosing is possible.¹⁰
- Suppositories should not be cut. The calculated dose should be rounded to the nearest suppository strength.¹¹ If smaller doses need to be given, liquid paracetamol (100 mg/mL paracetamol drops) can be administered rectally. However, the rectal absorption of liquid paracetamol can be more erratic and suppositories are preferred. **Note:** Liquid paracetamol is not licensed for rectal administration

Loading dose (e.g. for pre-medication)

A loading dose may help to achieve the suggested target concentration for analgesia.¹²⁻¹⁵ A single loading dose may be given as long as the maximum daily dose (60-90 mg/kg/day) is not exceeded.

- Loading doses should be clearly documented on the medication chart and communicated at handover.
- No loading dose should be administered if a child has been receiving paracetamol containing products in the preceding 24 hours.

ORAL LOADING DOSE

1 month and older: 20 - 30 mg/kg (up to 1 g) ONCE ONLY

RECTAL LOADING DOSE⁸

Birth (term) and postnatal age less than 3 months: 30 mg/kg ONCE ONLY

3 months and older: 30 - 40 mg/kg (up to 1 g) ONCE ONLY

- If a loading dose is administered, subsequent (e.g., post-operative) doses should be prescribed as 15 mg/kg/dose PRN or 6-hourly (regular) with maximum of 4 such doses within the first 24 hours from the time that the loading dose was administered (i.e. total maximum dose not exceeding 60 – 90 mg/kg within 24 hours).
- In the following 24 hours maintenance paracetamol dosing should follow the standard recommendation.

4 Fever Control

The use of paracetamol in treating fever associated with acute infections is controversial.

In considering use of paracetamol for fever control, the following should be borne in mind:

- Fever as such is not harmful. Infants and children tolerate low-grade fever (e.g. $\leq 38.5^{\circ}\text{C}$)
- Antipyretic treatment has not been shown to prevent febrile convulsions and there may be no advantage to giving paracetamol in this situation. Evidence regarding the possible symptomatic benefits of antipyretic treatment (in terms of mood, comfort, feeding, activity and alertness) is weak.

- Fever generation may be a protective mechanism. Aggressive pharmacological efforts to reduce fever may be counterproductive to the body's efforts to mount an immunological response to viral agents. Antipyretic treatment may therefore prolong the course of illness.
- The risk of liver toxicity with therapeutic use of paracetamol appears to be higher in children with intercurrent febrile illness.^{4,5}

DOSE and ROUTE for Fever Control

ORAL or RECTAL: 15 mg/kg/dose 6 hourly (up to 1 g per dose)

Maximum 60 mg/kg/day (do not exceed 4 g in 24 hours. Review at 48 hours.

- Lower dosage and duration of treatment is recommended for younger infants and those with any recognised risk factors (see [Table 1](#)).
- Rectal administration should be avoided if oral administration is at all possible. Also see above for general recommendations regarding rectal administration for analgesia.
- **Alternating dosing of paracetamol with ibuprofen is not recommended.** Neither the clinical efficacy nor the safety of this regimen has been demonstrated. It can potentially be associated with higher risk of dosing error and hence toxicity.¹⁶

5 IV paracetamol

Authorised prescribers, indications and requirements for documentation, prescribing and administration are outlined in [Intravenous Paracetamol - SCH](#).

6 References

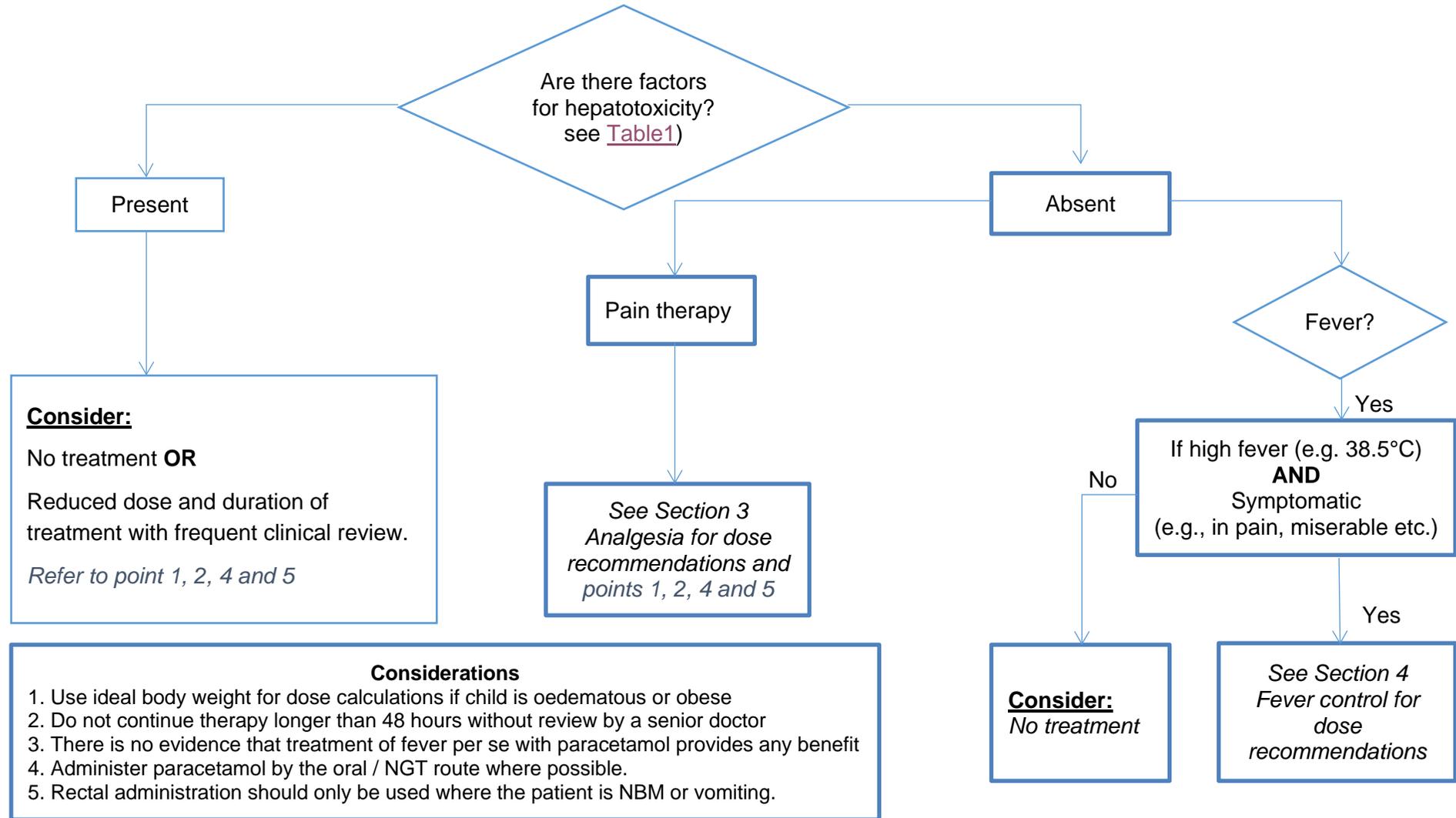
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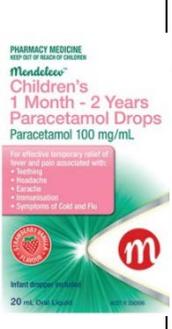
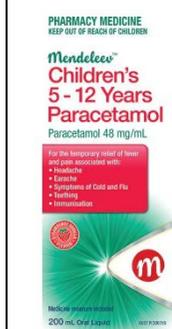
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Appendix A Paracetamol Treatment Algorithm



Appendix B Paracetamol products available in the community

Liquids and Suspensions									
100 mg/mL (20 mL)	100 mg/mL (20 mL)	24 mg/mL (200 mL)	24 mg/mL (100 mL)	24 mg/mL (100 mL)	48 mg/mL (100 mL)	48 mg/mL (200 mL)	48 mg/mL (200 mL)	50 mg/mL (60 mL)	50 mg/mL (200 mL)
									
Panadol Children 1 month to 1 year Colour free Baby Drop (Cherry)	Mendeleev Children's 1 month to 2 years, Drops (Strawberry)	Mendeleev Children's 1 to 5 years (Strawberry)	Panadol Children 1 to 5 years Colour-free Suspension (Strawberry, Orange)	Panamax Elixir (Tutti-frutti)	Panadol Children 5 to 12 years Colour-free Suspension, Elixir (Strawberry, Orange, Raspberry)	Mendeleev Children's 5 to 12 years (Strawberry)	Panamax 240 Elixir (Raspberry)	Dymadon Babies 1 month to 2 years Colour-free Suspension (Strawberry, Orange)	Dymadon Kids 2 to 12 years Colour-free Suspension (Strawberry, Orange)

Appendix B Paracetamol products available in the community *cont.*

Tablets			
120 mg tablets	250 mg tablets	500 mg tablets	665 mg <i>LONG ACTING</i> tablets
			
Panadol Children Chewable 3+ years (Cherry flavour)	Panadol Children Soluble 7+ years (Strawberry flavour)	Panadol Rapid Soluble (lemon flavour)	Panadol Osteo tablets **Should not be used according to the dose recommendations in these guidelines

Suppositories		
125 mg suppository	250 mg suppository	500 mg suppository
		
Panadol Children 6 Months to 5 years suppositories	Panadol Children 5 to 12 years Suppositories	Panadol 500 mg Suppositories (adult)