

Paediatric - Salbutamol

Reference No: MONO-PAEDS/501/23

| Presentation: | Injection - 500 micrograms/ml (1ml ampoules) Infusion - 1mg/ml (5ml ampoules) | | | | | | |
|---|---|-----|------|-------------------|-------------------------------|--------------|---|
| Indication: | Acute asthma, status asthmaticus | | | | | | |
| Dose: | <p>IV bolus (as a single dose)</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Dose</th> </tr> </thead> <tbody> <tr> <td>1 month – 2 years</td> <td>5 micrograms / kg over 5 mins</td> </tr> <tr> <td>2 – 18 years</td> <td>15 micrograms / kg (max 250 micrograms) over 5 mins</td> </tr> </tbody> </table> <p>IV infusion 1 month – 16 years: 1–2 micrograms/kg/minute, adjusted according to response and heart rate.</p> <ul style="list-style-type: none"> Doses above 2 micrograms/kg/minute should be given in an intensive care setting. Please note that local tertiary PICUs now rarely use doses above 0.5-1 microgram/kg/minute as higher doses are unlikely to improve efficacy and cause significant tachycardia and raised lactate. Discuss with consultant on call/CoMET if using more than 2 micrograms/kg/minute (Max 5 micrograms/kg/min) <p>In children who are obese, to prevent adverse effects consider using:</p> <ul style="list-style-type: none"> Ideal Body Weight (IBW) to calculate their infusion. <p>To calculate IBW - Obtain accurate recent weight in kilograms (total body weight (TBW)) and height (cm)</p> <ol style="list-style-type: none"> Calculate BMI and BMI centile (NHS Choices BMI healthy weight calculator can be used https://www.nhs.uk/live-well/healthy-weight/bmi-calculator/) If BMI <98th centile use actual weight (TBW), however: To avoid excessive dosage in obese patients (BMI ≥ 98th centile) use reverse BMI method to work out ideal body weight (IBW). $IBW = BMI_{50} \times (\text{height in m})^2$ where BMI_{50} represents the 50th centile of a BMI chart, which is the ideal BMI for their height, age and gender. <p>Adults: Initially 5 micrograms/minute, adjusted according to response and heart rate, usual dose 3–20 micrograms/minute, higher doses may be required.</p> <p>If transferring a young person to adult ICU be aware that dosing in adults is different, therefore consider using adult dosing Adult dosing: see adult monograph on net-i</p> | Age | Dose | 1 month – 2 years | 5 micrograms / kg over 5 mins | 2 – 18 years | 15 micrograms / kg (max 250 micrograms) over 5 mins |
| Age | Dose | | | | | | |
| 1 month – 2 years | 5 micrograms / kg over 5 mins | | | | | | |
| 2 – 18 years | 15 micrograms / kg (max 250 micrograms) over 5 mins | | | | | | |
| Route of administration : | <ul style="list-style-type: none"> Slow IV bolus over 5 minutes <u>or</u> Continuous IV infusion using a Baxter pump or syringe driver <p>NB: Salbutamol has a low pH and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely.</p> | | | | | | |
| Instructions for preparation and administration : | <p>For bolus injections: Dilute 1ml of 500micrograms/ml injection to a total of 10ml with glucose 5%, or sodium chloride 0.9% to give a concentration of 50 micrograms/ml then draw up appropriate dose. For doses less than 50 microgram, further dilute to 3-5ml to aid slow administration</p> <p>For IV infusion: Use 1mg/ml solution for infusion and dilute to 200micrograms/ml (see below):</p> <p>To prepare an infusion of 200micrograms/ml:</p> <ul style="list-style-type: none"> Withdraw 50ml from a 250ml bag of sodium chloride 0.9% - discard Measure 50mg of 1mg/ml salbutamol injection (= 50ml) Add the 50mg salbutamol to the sodium chloride 0.9% to give 50mg in 250ml (= 200micrograms/ml) Shake well to ensure thorough mixing | | | | | | |

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| | <p>This will provide:</p> <p style="text-align: center;">1 microgram / kg / minute if infused at a rate of 0.3 x weight (kg) ml/hour</p> <p>Alternatively, the infusion rate can be calculated as follows:</p> $\text{Rate of infusion (ml/hour)} = \frac{\text{dose (micrograms/kg/min)} \times \text{weight (Kg)} \times 0.3}{1}$ <p>Discard all diluted salbutamol solutions after 24 hours May be given undiluted through a Central venous access device if fluid restricted. Flush with sodium chloride 0.9%</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <u>Prescribing</u> | <p>Prescribe on Lorenzo, Meditech or paper chart as per Trust Medicines Code</p> <p>For example, for a 12 kg child:</p> <table border="1"> <tr> <td>Drug</td> <td>Drug amount</td> <td>Diluent</td> <td>Total volume (ml)</td> <td>Route</td> </tr> <tr> <td>Salbutamol</td> <td>50mg</td> <td>sodium chloride 0.9%</td> <td>250ml</td> <td>IV</td> </tr> <tr> <td>Start date</td> <td>Drug concentration per ml</td> <td>Infusion range</td> <td>Min</td> <td>Max</td> </tr> <tr> <td>18/12/19</td> <td>200 microgram/ml</td> <td>Dose/kg/time</td> <td>1 microgram/kg/min</td> <td>2 microgram/kg/min</td> </tr> <tr> <td>Pharm</td> <td>mg / micrograms / units</td> <td>ml/hr</td> <td>3.6</td> <td>7.2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>Name, Sig, Bleep</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td><i>A.Doctor</i></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td><i>#1234</i></td> </tr> </table> | Drug | Drug amount | Diluent | Total volume (ml) | Route | Salbutamol | 50mg | sodium chloride 0.9% | 250ml | IV | Start date | Drug concentration per ml | Infusion range | Min | Max | 18/12/19 | 200 microgram/ml | Dose/kg/time | 1 microgram/kg/min | 2 microgram/kg/min | Pharm | mg / micrograms / units | ml/hr | 3.6 | 7.2 | | | | | Name, Sig, Bleep | | | | | <i>A.Doctor</i> | | | | | <i>#1234</i> |
| Drug | Drug amount | Diluent | Total volume (ml) | Route | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Salbutamol | 50mg | sodium chloride 0.9% | 250ml | IV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Start date | Drug concentration per ml | Infusion range | Min | Max | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18/12/19 | 200 microgram/ml | Dose/kg/time | 1 microgram/kg/min | 2 microgram/kg/min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pharm | mg / micrograms / units | ml/hr | 3.6 | 7.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Name, Sig, Bleep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <i>A.Doctor</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <i>#1234</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Known compatibility issues | <p>Incompatible with aminophylline See Medusa for additional information on compatibility</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Additional Comments: | <p>Potentially serious hypokalaemia may result. Particular caution is required in severe asthma, because this effect may be potentiated by concomitant treatment with theophylline and its derivatives, corticosteroids, diuretics, and by hypoxia.</p> <p>Cardiovascular parameters should be monitored, including heart rate and rhythm, blood pressure particularly in older/heavier children. Urea and electrolytes should be reviewed regularly, especially plasma potassium, glucose, and lactate levels. Caution in patients with diabetes as there is a risk of hyperglycaemia and ketoacidosis</p> <p>Nebulised salbutamol should normally be continued alongside an IV infusion. This helps to limit the infusion rate required (and the side effects which are common with IV infusion). It also aids weaning of the infusion as the patient's condition improves.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note: The contents of this monograph should be read in conjunction with information available in the BNFC and Medusa

References:

British National Formulary for Children accessed via <https://www.medicinescomplete.com/#/content/bnfc/867541028?hspl=salbutamol#content%2Fbnfc%2F867541028%23pot-indications> Dose (accessed 07/12/23)

Medusa Paediatric Intravenous Guideline accessed via <https://medusa.wales.nhs.uk/IVGuideDisplay.asp> on 07/12/23

SPC Ventolin injection accessed via <https://www.medicines.org.uk/emc/product/2192/smpc> on 18.12.19

Nottingham Hospitals – PICU monograph for Salbutamol 07/12/23

Document control sheet

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|---|------------|
| GUIDELINE NUMBER | |
| AREA IN WHICH THIS MONOGRAPH APPLIES | Paeds/NICU |

| DIVISIONAL AUTHORISATION | |
|-----------------------------------|------------|
| GROUP | DATE |
| Paediatric monograph review group | 12/12/2023 |

| AUTHORS | | |
|-------------|-----------------------|---------------|
| Author | Position | Date |
| Written by: | Version 1 (anonymous) | December 2016 |

If review:

| | Position | Date |
|---|--|---------------|
| Updated and transferred to new template by: | Maya Daas (Specialist Clinical Pharmacist, Rotational) | 15/11/19 |
| Checked by: Sharon Conroy | Advanced Pharmacist, Paediatrics | 22/01/20 |
| Reviewed by: | Ellie Cheale, Womens and Childrens pharmacist | December 2023 |
| Checked by: | Lamia Ahmed Advanced Prescribing Pharmacist- Women's and Children's | December 2023 |

Change history:

| Changes Reference | Change details | Date |
|-------------------|---|---------------|
| 1 | Transferred to new template | 15/11/19 |
| 2 | Discuss with consultant if using >2 micrograms/kg/minute | 08/07/20 |
| 3 | Advice around transfer of young persons to adult ITU, Removal of definite 50kg weight to define obese child, note around tertiary centres using lower doses than maximum dose | 08/07/20 |
| 4 | Added IBW calculator link | 28/10/20 |
| 5 | Added caution for diabetic patients. Removed instruction to make up with water for injection as this isn't included in Medusa. Added Meditech and paper chart into prescribing information and flush information into preparation instructions. In compatibility issues, added incompatible with aminophylline as per Medusa and removed reference to Y site compatibility guideline. Amended example prescription chart to have a maximum of 2mcg/kg/min in line with dose recommendations | December 2023 |