



To: Advanced Care Paramedics

From: Northwest Region Prehospital Care Program

Date: May 29, 2025

RE: Safe Dilution of Ketamine for Analgesia (ACP Medical Directive)

Background & Rationale

As part of our ongoing commitment to patient safety and medication standardization, a decision has been made to continue carrying only the 50 mg/mL concentration of ketamine on paramedic units.

This decision was made in consultation with the local service operator and aligns with other provincial base hospital programs, all of which will carry only the 50 mg/mL concentration. It also reflects current medication safety recommendations, which support standardizing concentrations to reduce the risk of medication errors.

While this requires field dilution for certain dosing scenarios, this approach is consistent with evidence-informed best practices and allows for safer, more accurate medication administration.

ACP Analgesia Medical Directive & Ketamine Use

Under the ACP Analgesia Medical Directive, paramedics may administer ketamine for analgesia in patients **≥1 year of age** with unaltered LOA, provided no contraindications exist.

Dosage Summary:

Age Group	Route	Dose (per kg)	Max Single Dose	Dosing Interval	Max # of Doses
< 18 years	IV	0.25 mg/kg	10 mg	15 minutes	2
< 18 years	IN	1 mg/kg	30 mg	15 minutes	2
≥ 18 years	IV	0.25 mg/kg	20 mg	15 minutes	2
≥ 18 years	IN	1 mg/kg	75 mg	15 minutes	2

⚠ Important Reminder:

Administration of ketamine to patients under 18 years of age is a Mandatory Provincial Patch Point. Always contact the BHP for authorization and dosage verification.

How to Dilute Ketamine to 10 mg/mL in a 10 mL Syringe

To prepare 10 mg/mL ketamine from stock 50 mg/mL:

1. Draw up 2 mL of ketamine (50 mg/mL) = 100 mg total
2. Add 8 mL of preservative-free 0.9% NaCl
3. You now have 10 mL of ketamine at 10 mg/mL

This allows for precise dosing, especially in low-weight or pediatric patients.

Why This Matters: Dosing Accuracy Examples

Case 1: Child, 16 kg (Age 5)

- IV Dose: $0.25 \text{ mg/kg} \times 16 \text{ kg} = 4 \text{ mg}$
- At 50 mg/mL: 0.08 mL → difficult to measure accurately
- At 10 mg/mL: 0.4 mL → safer, more precise

Case 2: Teen, 45 kg (Age 14)

- IV Dose: $0.25 \text{ mg/kg} \times 45 \text{ kg} = 11.25 \text{ mg}$
- Max = 10 mg
- At 50 mg/mL: 0.2 mL
- At 10 mg/mL: 1.0 mL

Case 3: Adult, 60 kg

- IV Dose: $0.25 \text{ mg/kg} \times 60 \text{ kg} = 15 \text{ mg}$
- At 50 mg/mL: 0.3 mL
- At 10 mg/mL: 1.5 mL

Clinical Tips

- Always clearly label diluted syringes
- Use aseptic technique with sterile saline
- Double-check weight-based calculations
- Administer sequentially, not concurrently, with morphine or fentanyl
- Wait appropriate dosing interval before re-administering



When to Use 50 mg/mL Concentration Without Dilution

In some cases, it is appropriate to use the original 50 mg/mL ketamine concentration without dilution, particularly when dosing volumes are within safe and measurable ranges.

Case 1: Adult, 90 kg

- IV Dose: $0.25 \text{ mg/kg} \times 90 \text{ kg} = 22.5 \text{ mg}$
- Max = 20 mg
- At 50 mg/mL: 0.4 mL → easily measurable and accurate

Case 2: Adult, 100 kg receiving IN dose

- IN Dose: $1 \text{ mg/kg} \times 100 \text{ kg} = 100 \text{ mg}$
- Max = 75 mg
- At 50 mg/mL: 1.5 mL for 75 mg → appropriate for intranasal atomization and measurable

⚠ Important Reminder:

Always assess volume accuracy and patient-specific context. If precise measurement is possible and volume is manageable, dilution may not be necessary.

Summary

- Standardizing to a single 50 mg/mL ketamine concentration is a deliberate, safety-focused decision that aligns with provincial and national guidance.
- Paramedics are expected to dilute as necessary using approved methods to ensure safe and effective analgesia.
- For pediatric ketamine administration, always patch prior to treatment.

Thank you for your continued commitment to safe and effective patient care. Should you have any questions regarding the ketamine dilution process or its application, please reach out to our program directly.

NW Region Prehospital Care Program