Clinical Practice Procedures:
Access/Intraosseous – EZ-IO®

**Disclaimer and copyright**
©2016 Queensland Government

All rights reserved. Without limiting the reservation of copyright, no person shall reproduce, store in a retrieval system or transmit in any form, or by any means, part or the whole of the Queensland Ambulance Service (‘QAS’) Clinical practice manual (‘CPM’) without the prior written permission of the Commissioner.

The QAS accepts no responsibility for any modification, redistribution or use of the CPM or any part thereof. The CPM is expressly intended for use by QAS paramedics when performing duties and delivering ambulance services for, and on behalf of, the QAS.

Under no circumstances will the QAS, its employees or agents, be liable for any loss, injury, claim, liability or damages of any kind resulting from the unauthorised use of, or reliance upon the CPM or its contents.

While effort has been made to contact all copyright owners this has not always been possible. The QAS would welcome notification from any copyright holder who has been omitted or incorrectly acknowledged.

All feedback and suggestions are welcome, please forward to:
Clinical.Guidelines@ambulance.qld.gov.au

<table>
<thead>
<tr>
<th>Date</th>
<th>October, 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To ensure a consistent approach to Intraosseous – EZ-IO®</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Applies to all QAS clinical staff.</td>
</tr>
<tr>
<td><strong>Author</strong></td>
<td>Clinical Quality &amp; Patient Safety Unit, QAS</td>
</tr>
<tr>
<td><strong>Review date</strong></td>
<td>October, 2018</td>
</tr>
</tbody>
</table>

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.
**Intraosseous (IO) access** involves inserting a needle into the intramedullary space enabling the administration of medications and/or fluids. The intramedullary cavity is composed of vascular rich sinusoids that promote the rapid transportation of medications and/or fluids into the general circulation via the intramedullary venous system.

IO access is an invasive procedure and should only be considered when intravenous access is not available or feasible. Appropriate consideration must be given to its requirements in the pre-hospital setting.

The EZ-IQ®[1] is a battery powered intraosseous access device suitable for use in all age groups.

### Indications
- Emergent access for the administration of drugs and/or fluids when IV access is unavailable.

### Contraindications
- Known bone pathology including fracture/s of the insertion site limb.
- Whenever possible avoid sites of burn, infection or localised cellulitis.

### Complications
- Infection
- Drug/fluid extravasation into superficial tissues (e.g. compartment syndrome)
- Fracture and/or epiphyseal plate damage
- Air embolus
1. Identify appropriate EZ-IO® needle and landmarks for insertion:

**Adults**
- **Proximal tibia**: medial and 1–2 cm distal to the tibial tuberosity. See FIGURE A.
- **Distal tibia**: medial aspect of the distal tibia (two centimetres above the medial malleolus). See FIGURE A.
- **Humerus**: greater tuberosity, anterior to the lateral midline of the arm. See FIGURE B.
**Procedure – Intraosseous – EZ-IO®**

**Paediatrics 6 – 12 years**
- **Proximal tibia:** medial and distal to the tibial tuberosity (two finger widths below the patella, then medial along the flat aspect of the tibia). The tibial tuberosity can be difficult or impossible to palpate in younger patients.

**Paediatrics 0 – 5 years of age**
- **Proximal tibia:** medial and distal to the tibial tuberosity (one finger width distal to the tibial tuberosity, then medial along the flat aspect of the tibia).

2. Clean the intended insertion site with a 2% Chlorhexidine/70% Isopropyl Alcohol swab using a ‘back and forth’ motion in two different directions (cross hatch method) for 15 seconds in each direction (total 30 seconds). A risk benefit analysis in view of the patient’s condition is appropriate.
3. If clinically appropriate, allow insertion site to completely dry.
4. Prime Easy-Connect® extension set with sodium chloride 0.9%.
5. Attach the EZ-IO® needle to the driver and ensure it is securely seated.
6. Remove and discard the EZ-IO® needle set safety cap.
7. Position driver at insertion site with needle set at 90° angle to the bone.
8. Gently press needle set until needle set touches the bone (ensure at least 5 mm of the catheter is visible).
9. With a steady downward pressure gently squeeze the driver’s trigger to penetrate the bone cortex.
10. Release driver’s trigger and stop insertion process when:
   - a sudden ‘give’ or ‘loss of resistance’ is felt upon entry into the medullary space; or
   - desired depth is obtained.
11. Remove power driver.
12. Unscrew trocar and immediately dispose of in a ‘sharps container’.
13. If supplied, apply EZ-Stabilizer®
15. Attach primed Easy-Connect® extension set to catheter’s hub Luer-Lok™.
16. Confirm intramedullary needle tip position by:
   - Aspiration of bone marrow (marrow or blood may not always be present).
   - Ability to flush (adult 10 mL / paediatric 5 mL) sodium chloride 0.9% with no evidence of extravasation (failure to appropriately flush the IO catheter indicates limited or no flow).

17. Consider administration of lidocaine 1% (lignocaine 1%) (prior to drugs or fluid administration).

18. Administer medications and/or fluids as necessary.

19. Frequently monitor the insertion site for extravasation.

**Additional information**

- The potential for exposure to blood and body fluids during this procedure is **HIGH**. All precautions that serve to minimise risk to the clinician and patient are to be applied.
- Clinicians must remain vigilant when administering drugs via this route. It may take longer for the drug to take effect and it is important to avoid a cumulative toxic dose.
- All IO needles should be removed within 72 hours of insertion.[3]

**NUMBER OF ATTEMPTS**

- This procedure is limited to one attempt in each limb.