

# Time to antibiotic administration in open fractures. An audit across pre-hospital and emergency care

Authors: Hadyn L. Everson, Jonathan D. Bennett, Kristofer Lawson, Philip Dowson



## Background

Open fractures represent significant and life-changing injuries. NICE guidelines recommend treatment with intravenous antibiotics within 60 minutes of injury. The Great North Air Ambulance Service (GNAAS) open fracture policy advises treatment with IV Cefotaxime within 60 minutes of injury, in line with NICE guidance. Delayed administration of antibiotics has been associated with higher rates of infection, though evidence remains mixed [1-2]

*"In the pre-hospital setting, consider administering prophylactic intravenous antibiotics as soon as possible and preferably within 1 hour of injury to people with open fractures" - NICE Guidance NG37, 1.1.10. [3]*



## Discussion

Early antibiotics in open fractures have been shown to reduce wound infections, associated complications and potentially reduce length of stay. While neither group met the standards set out by NICE, the pre-hospital group were able to deliver antibiotics significantly faster. With UK on-scene and transfer times, pre-hospital resources seem best placed to deliver antibiotics to patients with open fractures within 60 minutes of injury. Additionally, our results showed no adverse drug reactions in either group. We believe that the delivery of pre-hospital antibiotics can be cost-effective, safe and easily deliverable.

## Methods

This single-centre audit looked at time to antibiotics in open fractures within two settings; pre-hospital care and the emergency department. They were compared against the NICE standard of antibiotic delivery within 60 minutes of injury. Patients were identified using the TARN database between January 2017 and September 2018. All open fractures were included and allergic drug reactions were recorded.

## Results

188 patients presented to a North East MTC with a suspected open fracture. 71 presented via GNAAS, 105 by other emergency services and 12 were excluded for incomplete data. When the time to antibiotics was measured from the time of the 999 call, the average time was 79.77 minutes (72.16 – 87.39) in the HEMS group and 241.08 minutes (200.45 – 281.71) in the Emergency Department group. This result was statistically significant at  $p < 0.00001$ . There were no drug reactions recorded in either group.

## Recommendations

- Further research/QIP involving other local pre-hospital partners to trial antibiotics administered by paramedics and recent changes to JRCalc limb trauma guidelines may provide a basis for this [4].
- Re-education and optimisation of existing GNAAS open fracture care with subsequent re-audit.

## Limitations

- Any future research should distinguish between open fractures, as small joint fractures develop infection at lesser rates than large joints.
- The study period included transitioning to paperless systems at the MTC, resulting in incomplete data for some patients.



✉ [hadyn.everson@nhs.net](mailto:hadyn.everson@nhs.net)  
✉ [jonathan.bennett6@nhs.net](mailto:jonathan.bennett6@nhs.net)  
☎ 07786551260

1. "Delay of Antibiotic Administration Greater than 2 Hours Predicts Surgical Site Infection in Open Fractures" Roddy et al. Injury, 51(19) 2020.
2. "Type III open tibia fractures: Immediate antibiotic prophylaxis minimizes infection". Lack et al. Journal of Orthopaedic Trauma. 29 (1). 2015
3. Fractures (complex): assessment and management. NICE guideline NG 37, February 2016.
4. JRCalc Updates 2019, Limb Trauma. November 2019. <https://aace.org.uk/jrcalc-updates-2019/limb-trauma/>