



A systematic review of stability of medicines used in emergency medical service settings

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ABSTRACT

Background: Temperature, among several environment conditions like humidity, is known to impact medicine stability^{1,2}. In emergency medical service (EMS) settings, it is often challenging to control these conditions. In the GCC region including Qatar, temperature and relative humidity values may rise over 50°C and 80%, respectively, according to climate data from the Qatar Civil Aviation Authority³. The aim of this systematic review is to collate and analyze data on the stability of EMS medicines exposed to temperature excursions beyond recommended limits (20-25°C with excursions up to 15-30°C) and provide evidence-based best practice recommendations on storage of medicines in EMS settings.

Method: Literature on stability studies in EMS settings were obtained from PubMed, Embase, Web of Science and grey literature. Data from articles that met inclusion and exclusion criteria were collected using developed data collection forms then analyzed following PRISMA statement. The quality of articles were assessed using the Health Evidence Tool.

Results: Thirteen studies were included (Table 1). Results were variable depending on the region and whether the study was done in an EMS setting or simulated in laboratory. Studies affirmed that medicines were exposed to temperatures beyond limits in EMS settings (Table 2). Medicines recommended to be refrigerated were not stable in a temperature-dependent manner. Although many medicines were stable, temperature-sensitive medicines degraded faster, while extreme cold produced various effects. No study has explored the biological effects of degradation and degradation products.

Conclusion: EMS medicines are exposed to temperature extremes which may affect their stability and decrease their shelf-life. Therefore, routine stability testing during storage, replacement of exposed medicines and inclusion of temperature monitoring devices are paramount to validate the content of EMS medicines administered to end-users. We aim to collaborate with Hamad Medical Corporation Ambulance Service in Qatar to study the stability of EMS medicines in several settings including ambulances and paramedic bags of indoor and outdoor bike units.

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Keywords: drug stability, prehospital setting, ambulance, heat, humidity

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