# Decontamination of ambulances and emergency medical vehicles

# Date search conducted

20 April 2020

# Source(s)

All though [HDAS](http://hdas.nice.org.uk)

Medline

Cinahl

Embase

Emcare

Pubmed

Google – for additional sources

# Search strategy

|  |  |
| --- | --- |
| **MEDLINE** |  |
| (emergency OR hospital) ADJ transport\* | OR |
| (emergency OR hospital) ADJ vehicle\* | OR |
| ambulance\* |  |
|  | AND |
| "infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\* | OR |
| \*DECONTAMINATION/ | OR |
| \*DISINFECTION/ | OR |
| \*STERILIZATION/ | OR |
| \*FUMIGATION/ |  |
| **CINAHL** |  |
| (emergency OR hospital) ADJ transport\* | OR |
| (emergency OR hospital) ADJ vehicle\* | OR |
| ambulance\* |  |
|  | AND |
| "infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\* | OR |
| \*"EQUIPMENT REUSE"/ | OR |
| \*FUMIGATION/ | OR |
| \*"EQUIPMENT CONTAMINATION"/ | OR |
| \*"INFECTION CONTROL"/ | OR |
| \*"DECONTAMINATION, HAZARDOUS MATERIALS"/ |  |
| **EMBASE and MEDLINE** |  |
| (emergency OR hospital) ADJ transport\* | OR |
| (emergency OR hospital) ADJ vehicle\* | OR |
| ambulance\* |  |
|  | AND |
| "infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\* | OR |
|  | AND |
| \*DECONTAMINATION/ |  |
| \*FUMIGATION/ |  |
| \*"INFECTION CONTROL"/ |  |
| \*CLEANING/ |  |
| **PUBMED** |  |
| ((emergency).ti OR (hospital).ti) ADJ (transport\*).ti | OR |
| ((emergency).ti OR (hospital).ti) ADJ (vehicle\*).ti | OR |
| Ambulance\*.ti |  |
|  | AND |
| "infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\* | OR |

All results limited to English Language and Dates 2014-2020. In addition they were hand sorted to eliminate erroneous material.

# Audience/Context

Ambulance Service Managers and Research Paramedics.

# Additional material

Search Google. Ambulance AND Decontamination

BBC, Can you kill coronavirus with UV light? <https://www.bbc.com/future/article/20200327-can-you-kill-coronavirus-with-uv-light>.

CDC, Example: Standard Operating Procedure (SOP) for Decontamination of an Ambulance that has Transported a Person under Investigation or Patient with Confirmed Ebola <https://www.cdc.gov/vhf/ebola/clinicians/emergency-services/ambulance-decontamination.html>

COVID-19: Guidance for Ambulance Trusts. GOV.UK, [https://www.gov.uk/government/publications/covid-19-guidance-for-ambulance-trusts/covid-19-guidance-for-ambulance-trusts. Accessed 21 Apr. 2020](https://www.gov.uk/government/publications/covid-19-guidance-for-ambulance-trusts/covid-19-guidance-for-ambulance-trusts.%20Accessed%2021%20Apr.%202020).

DASA, COVID-19: Call for rapid sanitising technology for ambulances <https://www.gov.uk/government/news/covid-19-call-for-rapid-sanitising-technology-for-ambulances>

ECDC Technical Report. Infection prevention and control for COVID-19 in healthcare settings - first update. <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-infection-prevention-and-control-healthcare-settings-march-2020.pdf>

NHS. COVID-19 Ambulance Case Transport Response Service Framework. <https://www.england.nhs.uk/wp-content/uploads/2020/02/coronavirus-briefing-ambulance.pdf>

TSA, Infection Control & TEC Equipment Decontamination during COVID-19©. <https://www.tsa-voice.org.uk/downloads/covid-19/tsa_guide_infection_control_decontamination_equipment_v.1.pdf>

Welsh Ambulance Service. Innovating to find rapid solutions for ambulance decontamination. <http://www.ambulance.wales.nhs.uk/Default.aspx?gcid=1635&lan=en>

21 Apr 20 - 01:07

HDAS Export

Strategy Ambulance Decontamination2

[See full search strategy](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#historyanchor)

Strategy 839841/saved

Contents 25 of 25 results on Saved Results

[1. Rapid metagenomics analysis of EMS vehicles for monitoring pathogen load using nanopore DNA sequencing.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#171db725-8967-8d64-7466-6b99d6f46260-1)

[2. Efficacy of an ambulance ventilation system in reducing EMS worker exposure to airborne particles from a patient cough aerosol simulator](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#ea8dc5ea-50ed-d47b-fcc0-9bdf297cdf56-2)

[3. Environmental cleanliness of emergency ambulances: A prospective comparative study](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#86376087-5c3d-5464-7724-ee56383a716c-3)

[4. The State of Infection Control Among Los Angeles County (LAC) Emergency Medical Services (EMS) Providers...46th Annual Conference, APIC 2019, Philadelphia, PA.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#7aa21722-0173-2424-51db-e09d62eaa2b6-4)

[5. The impact of an ambulance vehicle preparation service on the presence of bacteria: a service evaluation.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#cbff89f1-2eab-f362-f7f8-c83182f085a5-5)

[6. Results of a survey of procedures for cleaning and disinfecting ambulances.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#5951b588-3473-c2ba-1cb7-d20b0c813a4e-6)

[7. Evaluation of Bacterial Contamination on Prehospital Ambulances Before and After Disinfection.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#3027840f-d8be-3f02-f85a-2c89ac2edc82-7)

[8. Emergency medical services oxygen equipment: a fomite for transmission of MRSA?](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#d430afa5-f65c-d138-6e7d-8e6d5e378d61-8)

[9. "Wipe with a damp cloth. Do not use bleach" - A review of the cleaning instructions of shared equipment used in a pre-hospital setting](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#99f43214-2697-b68e-61f3-fb60ebcf6d99-9)

[10. NSW ambulance - Make ready model environmental cleaning: The fight against healthcare associated infections](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#6c12100a-2bdf-c1df-c942-ec2b327622b6-10)

[11. Prehospital infection control and prevention in Denmark: a cross-sectional study on guideline adherence and microbial contamination of surfaces.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#60fb4655-faf8-b8ed-0c7a-af9f4035dd5e-11)

[12. Challenges for environmental hygiene practices in Australian paramedic-led health care: A brief report.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#f7acb1c9-e988-2385-6cb0-98dcb33220d4-12)

[13. Dirty ambulances; Adenosine triphosphate (ATP) bioluminescence measurement in the surveillance of ambulance cleanliness](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#f7f8c6dd-4720-a1ad-d921-7bcdf3bac559-13)

[14. Ambulance disinfection using Ultraviolet Germicidal Irradiation (UVGI): Effects of fixture location and surface reflectivity.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#d31765a3-ca10-54f5-60e0-1e5680e08376-14)

[15. Infection control on air ambulance](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#5fb8402a-b13f-5c9a-a051-226ce88d9225-15)

[16. Metagenomic characterization of ambulances across the USA.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#e08d6359-330d-0cc0-36be-9c08ad6a0b3e-16)

[17. Identification and characteristics of biological agents in work environment of medical emergency services in selected ambulances.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#349f522e-e018-8dc9-059f-e7831f4a5abf-17)

[18. Hygiene in the emergency medical services (EMS) calls for attention](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#dd3f4562-5234-d26e-5d37-28336b7b9d90-18)

[19. Detection and characterization of surface microbial contamination in emergency ambulances.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#a9e74153-24ad-dedf-f45a-4d7526447221-19)

[20. Providing a Cleaner Ambulance.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#eac45f05-cea7-8a43-4136-d9f159f557d2-20)

[21. POSAiDA: presence of Staphylococcus aureus/MRSA and Enterococcus/VRE in Danish ambulances. A cross-sectional study.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#4eed6384-be40-1931-0218-dd1b7eaaf88d-21)

[22. Prevalence of nosocomial pathogens in German ambulances: the SEKURE study.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#c83b8eb1-4fcb-4fdb-3f76-99349ef93a43-22)

[23. Microbial Air Quality and Bacterial Surface Contamination in Ambulances During Patient Services.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#2f90c7d4-56e9-3ce5-d8b4-e9642a73ffa1-23)

[24. Nosocomial infections in ambulances and effectiveness of ambulance fumigation techniques in Saudi Arabia. Phase I study.](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#ddefc099-c270-8c6f-79fd-7ac3daadf1fc-24)

[25. Do We Kill Our Patients?](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#93aa59d3-1225-de39-9182-eb049c6e8188-25)

[Full strategy](file:///C:\Users\Matt.Holland\Desktop\ambulance%20decontamination%20results.docx#historyanchor)

Results Saved Results

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**1. Rapid metagenomics analysis of EMS vehicles for monitoring pathogen load using nanopore DNA sequencing.**

**Author(s):** Sheahan, Taylor; Hakstol, Rhys; Kailasam, Senthilkumar; Glaister, Graeme D; Hudson, Andrew J; Wieden, Hans-Joachim

**Source:** PloS one; 2019; vol. 14 (no. 7); p. e0219961

**Publication Date:** 2019

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**DOI:** [http://dx.doi.org/10.1371/journal.pone.0219961](http://doi.org/10.1371/journal.pone.0219961)

**ISSN:** 1932-6203

**Place of Publication:** United States

**PubMedID:** 31339905

**Accession Number:** 31339905

Available at [PloS one](http://europepmc.org/search?query=(DOI:10.1371/journal.pone.0219961)) - from Europe PubMed Central - Open Access

Available at [PloS one](http://dx.plos.org/10.1371/journal.pone.0219961) - from Public Library of Science (PLoS)

Available at [PloS one](http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=31339905) - from EBSCO (MEDLINE Complete)

Available at [PloS one](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1932-6203&volume=14&issue=7&spage=e0219961) - from ProQuest (Health Research Premium) - NHS Version

Available at [PloS one](https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0219961&type=printable) - from Unpaywall

**Keywords: Subject Terms:** Ambulances -- standards; Biological Monitoring -- methods; Clostridium -- genetics; Clostridium -- isolation & purification; Cross Infection -- microbiology; Cross Infection -- prevention & control; DNA, Bacterial -- chemistry; DNA, Bacterial -- genetics; Metagenomics -- methods; Microbiota; Nanopore Sequencing -- methods; Staphylococcus -- genetics; Staphylococcus -- isolation & purification; Index Medicus; \*Ambulances -- standards; \*Biological Monitoring -- methods; Clostridium -- genetics; Clostridium -- isolation & purification; Cross Infection -- microbiology; Cross Infection -- prevention & control; DNA, Bacterial -- chemistry; DNA, Bacterial -- genetics; \*Metagenomics -- methods; \*Microbiota; \*Nanopore Sequencing -- methods; Staphylococcus -- genetics; Staphylococcus -- isolation & purification; Index Medicus

**Abstract:** Pathogen monitoring, detection and removal are essential to public health and outbreak management. Systems are in place for monitoring the microbial load of hospitals and public health facilities with strategies to mitigate pathogen spread. However, no such strategies are in place for ambulances, which are tasked with transporting at-risk individuals in immunocompromised states. As standard culturing techniques require a laboratory setting, and are time consuming and labour intensive, our approach was designed to be portable, inexpensive and easy to use based on the MinION third-generation sequencing platform from Oxford Nanopore Technologies. We developed a transferable sampling-to-analysis pipeline to characterize the microbial community in emergency medical service vehicles. Our approach identified over sixty-eight organisms in ambulances to the genera level, with a proportion of these being connected with health-care associated infections, such as Clostridium spp. and Staphylococcus spp. We also monitored the microbiome of different locations across three ambulances over time, and examined the dynamic community of microorganisms found in emergency medical service vehicles. Observed differences identified hot spots, which may require heightened monitoring and extensive cleaning. Through metagenomics analysis it is also possible to identify how microorganisms spread between patients and colonize an ambulance over time. The sequencing results aid in the development of practices to mitigate disease spread, while also providing a useful tool for outbreak prediction through ongoing analysis of the ambulance microbiome to identify new and emerging pathogens. Overall, this pipeline allows for the tracking and monitoring of pathogenic microorganisms of epidemiological interest, including those related to health-care associated infections.

**Database:** Medline

**2. Efficacy of an ambulance ventilation system in reducing EMS worker exposure to airborne particles from a patient cough aerosol simulator**

**Author(s):** Lindsley W.G.; Blachere F.M.; Mnatsakanova A.; Noti J.D.; McClelland T.L.; Martin S.B.; Neu D.T.; Mead K.R.

**Source:** Journal of occupational and environmental hygiene; Dec 2019; vol. 16 (no. 12); p. 804-816

**Publication Date:** Dec 2019

**Publication Type(s):** Article

**DOI:** [http://dx.doi.org/10.1080/15459624.2019.1674858](http://doi.org/10.1080/15459624.2019.1674858)

**ISSN:** 1545-9632 (electronic)

**Place of Publication:** United Kingdom

**Publisher:** NLM (Medline)

**PubMedID:** 31638865

**Accession Number:** 629664082

**Keywords: Subject Terms:** adult; aerosol; airborne infection; airborne particle; airflow; ambulance; article; artificial ventilation; controlled study; coughing; drug efficacy; emergency health service; expectation; human; infection control; influenza; pandemic; simulator; ventilator; worker; adult; \*aerosol; \*airborne infection; \*airborne particle; airflow; \*ambulance; article; \*artificial ventilation; controlled study; \*coughing; \*drug efficacy; \*emergency health service; expectation; human; \*infection control; influenza; pandemic; \*simulator; \*ventilator; \*worker

**Abstract:** The protection of emergency medical service (EMS) workers from airborne disease transmission is important during routine transport of patients with infectious respiratory illnesses and would be critical during a pandemic of a disease such as influenza. However, few studies have examined the effectiveness of ambulance ventilation systems at reducing EMS worker exposure to airborne particles (aerosols). In our study, a cough aerosol simulator mimicking a coughing patient with an infectious respiratory illness was placed on a patient cot in an ambulance. The concentration and dispersion of cough aerosol particles were measured for 15min at locations corresponding to likely positions of an EMS worker treating the patient. Experiments were performed with the patient cot at an angle of 0degree (horizontal), 30degree, and 60degree, and with the ambulance ventilation system set to 0, 5, and 12 air changes/hour (ACH). Our results showed that increasing the air change rate significantly reduced the airborne particle concentration (p < 0.001). Increasing the air change rate from 0 to 5 ACH reduced the mean aerosol concentration by 34% (SD = 19%) overall, while increasing it from 0 to 12 ACH reduced the concentration by 68% (SD = 9%). Changing the cot angle also affected the concentration (p < 0.001), but the effect was more modest, especially at 5 and 12 ACH. Contrary to our expectations, the aerosol concentrations at the different worker positions were not significantly different (p < 0.556). Flow visualization experiments showed that the ventilation system created a recirculation pattern which helped disperse the aerosol particles throughout the compartment, reducing the effectiveness of the system. Our findings indicate that the ambulance ventilation system reduced but did not eliminate worker exposure to infectious aerosol particles. Aerosol exposures were not significantly different at different locations within the compartment, including locations behind and beside the patient. Improved ventilation system designs with smoother and more unidirectional airflows could provide better worker protection.

**Database:** EMBASE

**3. Environmental cleanliness of emergency ambulances: A prospective comparative study**

**Author(s):** Somani T.; Simpson P.; Morris D.; Hipsley K.; Agho K.; Thyer L.; Bartolo D.; Johnson S.; Schrieber A.; Fierravanti G.

**Source:** Infection, Disease and Health; Nov 2019; vol. 24

**Publication Date:** Nov 2019

**Publication Type(s):** Conference Abstract

**DOI:** [http://dx.doi.org/10.1016/j.idh.2019.09.012](http://doi.org/10.1016/j.idh.2019.09.012)

**ISSN:** 2468-0451

**Place of Publication:** Netherlands

**Publisher:** Australasian College for Infection Prevention and Control

**Accession Number:** 2003728773

**Keywords: Subject Terms:** ambulance; bioluminescence; cleaning; comparative study; controlled study; cost effectiveness analysis; human; infection control; nonparametric test; outcome assessment; prospective study; randomized controlled trial; touch; workload; adenosine triphosphate; conference abstract; \*ambulance; bioluminescence; cleaning; \*comparative study; controlled study; cost effectiveness analysis; human; infection control; nonparametric test; outcome assessment; \*prospective study; randomized controlled trial; touch; workload; adenosine triphosphate; conference abstract

**Abstract:** Introduction: Traditionally, environmental cleaning of ambulances and equipment is the responsibility of paramedics. In 2016 NSW Ambulance introduced the Make Ready Model (MRM), whereby ambulances are routinely cleaned by trained, non-clinical support staff. This study aimed to 1) provide a baseline level of ambulance cleanliness; and 2) compare the MRM to a traditional cleaning model (TCM). Method(s): A prospective comparative study was conducted comparing cleanliness of ambulances in the TCM to MRM. Adenosine-triphosphate (ATP) bioluminescence testing was performed in a pseudo-randomised sample of ambulances. Six 'high touch' areas within each ambulance were systematically sampled. The primary outcome was 'overall bioburden', measured in relative light units (RLU)Non-parametric tests were used to assess differences in RLU values between each of the test points, while Poisson multivariate regression was used to compare median overall bioburden between the two groups, adjusting for the confounder variable of 14-day ambulance workload. Result(s): Sixty-eight ambulances were sampled, 32 TCM and 36 MRM. When comparing test points, the only high touch area showing a significant difference in RLU was the steering wheel (SCM 1578 v MRM 702; p=0.0012). With regard to the primary outcome, the MRM was associated with a 35% unadjusted decrease in overall bioburden, and 38% reduction after adjusting for 14-day ambulance workload (ARR 0.62 (95%CI 0.61-0.63); p=0.001). Conclusion(s): The innovative MRM suggests improved environmental cleanliness in ambulances, whilst contributing to effective infection control practice in paramedicine. Future research should focus on cost effectiveness of the MRM and applicability to broader ambulance service provision.Copyright © 2019

**Database:** EMBASE

**4. The State of Infection Control Among Los Angeles County (LAC) Emergency Medical Services (EMS) Providers...46th Annual Conference, APIC 2019, Philadelphia, PA.**

**Author(s):** Hartmann, Stacy; Eclarino, Christina; Forsyth, Elaine; Amara, Roel; OYong, Kelsey; Terashita, Dawn; Pucci, Alicia

**Source:** American Journal of Infection Control; Jun 2019; vol. 47

**Publication Date:** Jun 2019

**Publication Type(s):** Academic Journal

**DOI:** [http://dx.doi.org/10.1016/j.ajic.2019.04.143](http://doi.org/10.1016/j.ajic.2019.04.143)

**ISSN:** 01966553

**Place of Publication:** New York, New York

**Publisher:** Elsevier B.V.

**Accession Number:** Some(136691013)

**Keywords: Subject Terms:** Infection Control California; Emergency Medical Technicians; Congresses and Conferences Pennsylvania; Pennsylvania; California; \*Infection Control California; \*Emergency Medical Technicians; Congresses and Conferences Pennsylvania; Pennsylvania; California

**Abstract:** Infection control (IC) in the pre-hospital care setting by EMS providers is important to protect themselves and patients receiving emergency care and being transported between healthcare facilities. From 2016-17, LAC Department of Public Health (DPH) collaborated with LAC Emergency Medical Services Agency (EMSA) to assess and improve IC among EMS providers. DPH/EMSA adapted tools from the Centers for Disease Control and Prevention designed for healthcare facilities to assess EMS IC policies and practices. Large and small EMS agencies/companies were assessed to ensure a representative sample. Policies were reviewed, and observations made by DPH/EMSA nurses during ride alongs in >2 ambulances per provider. Fourteen providers were assessed. Eleven had a designated infection control officer (DICO). Thirteen had written IC policies; 12 reviewed and updated them annually. All required IC training for new staff, but only 59% assessed skills post-training and 31% audited across four IC topics. Twelve had written policies for cleaning/disinfection. Twelve had a policy for influenza vaccination; however, the median vaccination rate was only 55% (range 1-99%). Observations showed handwashing occurred before patient contact for 7% of assessments, glove use in 100% and hand hygiene after removing gloves in 79%. Staff cleaned the ambulance after each patient encounter; cleaning high touch surfaces in 79% and replaced cleaners/disinfectants when appropriate in 89%. EMS providers are an important part of the healthcare system as they transport patients in and out of hospitals and other healthcare facilities. Overall, findings were encouraging, but ensuring up-to-date policies for all areas of IC, monitoring competencies, and observing practices to assess adherence may improve IC. In 2018, LAC hosted an IC train-the-trainer course for DICOs to bring proper IC practices back to their agencies/companies. LAC DPH and EMSA will continue to work with EMS providers to improve IC policies and practices.

**Database:** CINAHL

**5. The impact of an ambulance vehicle preparation service on the presence of bacteria: a service evaluation.**

**Author(s):** Mackenzie, Mo; Pilbery, Richard

**Source:** British Paramedic Journal; Jan 2019; vol. 3 (no. 4); p. 27-31

**Publication Date:** Jan 2019

**Publication Type(s):** Academic Journal

**DOI:** [http://dx.doi.org/10.29045/14784726.2019.03.3.4.27](http://doi.org/10.29045/14784726.2019.03.3.4.27)

**ISSN:** 14784726

**Publisher:** College of Paramedics

**Accession Number:** Some(135070252)

**Abstract:** Introduction: Around 300,000 patients a year in England acquire a healthcare-associated infection (HAI) while being cared for by the NHS. The contribution from NHS Ambulance Services is not known, but previous studies have identified the presence of pathogenic bacteria such as Methicillinresistant Staphylococcus aureus (MRSA) and Enterococcus, including resistant strains in some cases, inside ambulances. To improve ambulance cleanliness, Yorkshire Ambulance Service NHS Trust (YAS) piloted an Ambulance Vehicle Preparation Service (AVPS) at two ambulance stations, where staff were tasked with ensuring every ambulance at these stations was cleaned every 24 hours. Methods: Adenosine triphosphate (ATP) bioluminescence testing was conducted on 16 ambulances at the two pilot AVPS stations and on 18 ambulances at four 'business as usual' (BAU) ambulance stations using a Hygiena SystemSURE luminometer. Swabs were obtained from 10 pre-selected locations inside each ambulance. Results: Between November 2016 and August 2018, a total of 690 swabs were obtained and recorded from 34 ambulances. Overall, median relative light unit (RLU) values for both groups were 100. However, when stratified by swabbing area, three areas had a median RLU of > 100 in the BAU group: suction unit handle, steering wheel and airway seat shelf. In addition, the upper quartile RLU values for the grab rail above the stretcher and the passenger seat in the BAU group were also > 100. No swab areas had a median RLU > 100 in the AVPS group. Conclusion: A dedicated AVPS results in better cleaning of ambulance vehicles than the existing cleaning system utilising operational crews. The areas most likely to be contaminated are the suction unit handle, steering wheel, airway seat shelf and grab rails. The position of equipment and the materials that equipment are constructed from should have infection prevention and control (IPC) as a consideration.

**Database:** CINAHL

**6. Results of a survey of procedures for cleaning and disinfecting ambulances.**

**Author(s):** Nobile, M; Pasquarella, C; Baldovin, T; Brusaferro, S; Casini, B; Cristina, M L; D'Errico, M M; Finzi, G; Montagna, M T; Mura, I; Novati, R; Privitera, G; Ripabelli, G; Schirripa, G; Sodano, L; Vitali, P; Tardivo, S; Teti, V; Torregrossa, M V; Torri, E; Zarrilli, R; Agodi, A; Auxilia, F

**Source:** Annali di igiene : medicina preventiva e di comunita; 2018; vol. 30 (no. 5)

**Publication Date:** 2018

**Publication Type(s):** Journal Article

**DOI:** [http://dx.doi.org/10.7416/ai.2018.2251](http://doi.org/10.7416/ai.2018.2251)

**ISSN:** 1120-9135

**Place of Publication:** Italy

**PubMedID:** 30374512

**Accession Number:** 30374512

**Keywords: Subject Terms:** Ambulances -- standards; Disinfection -- methods; Disinfection -- standards; Equipment Contamination -- prevention & control; Guidelines as Topic -- standards; Housekeeping -- standards; Humans; Hygiene; Italy; Societies, Medical; Surveys and Questionnaires -- statistics & numerical data; Index Medicus; \*Ambulances -- standards; Disinfection -- methods; \*Disinfection -- standards; Equipment Contamination -- prevention & control; \*Guidelines as Topic -- standards; \*Housekeeping -- standards; Humans; Hygiene; Italy; Societies, Medical; Surveys and Questionnaires -- statistics & numerical data; Index Medicus

**Abstract:** BACKGROUNDIn 2014, the Italian Study Group of Hospital Hygiene of the Italian Society of Hygiene, Preventive Medicine and Public Health (GISIO-SItI), in collaboration with the National Association of Medical Hospital Managers (ANMDO), conducted a survey on the availability of procedures for cleaning and disinfecting ambulances in order to assess the practices in use.METHODSAn online questionnaire was prepared through the Survey Monkey® platform and a web link access was sent to a convenience sample of ANMDO doctors working in healthcare management in public and private healthcare facilities.RESULTSNinety-six questionnaires were collected (26% response rate). In 73% of cases there was a procedure for cleaning and disinfecting ambulances, which had been produced at a company level (67%) and involved various professionals. In 21% of cases the procedure had been prepared in expectation of an epidemic or following an epidemic (5%). The recommendations had been presented to the staff (90%), in 28% of cases through training events with verification of the knowledge acquired. Monitoring of the implementation of the procedure is planned in the majority of cases (88%), mainly through direct observation (92%). In 67% of cases the tender specifications for ambulance services did not include a section dedicated to cleaning and disinfection and, in the absence of a procedure, this was provided by the hospital in only 51% of case.CONCLUSIONThis survey represented a first step towards the development of guidelines for standardising procedures and providing indications useful for their evaluation and monitoring their implementation.

**Database:** Medline

**7. Evaluation of Bacterial Contamination on Prehospital Ambulances Before and After Disinfection.**

**Author(s):** Farhadloo, Roohollah; Goodarzi Far, Jalil; Azadeh, Mohammad Reza; Shams, Saeed; Parvaresh-Masoud, Mohammad

**Source:** Prehospital and disaster medicine; Dec 2018; vol. 33 (no. 6); p. 602-606

**Publication Date:** Dec 2018

**Publication Type(s):** Evaluation Study Journal Article

**DOI:** [http://dx.doi.org/10.1017/S1049023X1800095X](http://doi.org/10.1017/S1049023X1800095X)

**ISSN:** 1945-1938

**Place of Publication:** United States

**PubMedID:** 30376910

**Accession Number:** 30376910

Available at [Prehospital and disaster medicine](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1049-023X&volume=33&issue=6&spage=602) - from ProQuest (Health Research Premium) - NHS Version

**Keywords: Subject Terms:** Ambulances; Cross Infection -- prevention & control; Disinfection; Emergency Medical Services -- standards; Equipment Contamination; Humans; Iran; Health technology assessment; \*Ambulances; \*Cross Infection -- prevention & control; \*Disinfection; Emergency Medical Services -- standards; Equipment Contamination; Humans; Iran; Health technology assessment

**Abstract:** BACKGROUND The contamination of the environment, ambulance equipment, and staff hands consequently are major factors which create nosocomial infections in emergency patients. The contamination of equipment and devices plays an important role in nosocomial infections.OBJECTIVESThe aim of this study was to determine the effectiveness of a disinfectant on the rate of microbial contamination of ambulances in Qom Emergency Medical Services (EMS), Qom, Iran.METHODSThis is a quasi-experimental study with a before-after design in order to determine microbial contaminations at the rear and front cabin of ambulances, as well as medical equipment being utilized in Qom EMS. Saya sept-HP-2% solution was used for disinfection. Bacteriological standard methods were used to identify the contaminations.RESULTSThe contamination rates before and after use of disinfection solution were 52% and eight percent, respectively. Coagulase-negative staphylococci were the most commonly isolated bacterial agent from the equipment (53%). In all equipment, the contamination level has shown a significant reduction after applying disinfectant.CONCLUSIONSIn spite of the fact that the rate of infection from ambulance equipment is high, the results showed that the use of the suitable disinfectant had an effective role in the reduction of bacteria. FarhadlooR, Goodarzi FarJ, AzadehMR, ShamsS, Parvaresh-MasoudM. Evaluation of bacterial contamination on prehospital ambulances before and after disinfection. Prehosp Disaster Med. 2018;33(6):602-606.

**Database:** Medline

**8. Emergency medical services oxygen equipment: a fomite for transmission of MRSA?**

**Author(s):** Gibson, Cody Vaughn

**Source:** Emergency Medicine Journal; Dec 2018; vol. 35 (no. 12)

**Publication Date:** Dec 2018

**Publication Type(s):** Academic Journal

**DOI:** [http://dx.doi.org/10.1136/emermed-2018-207758](http://doi.org/10.1136/emermed-2018-207758)

**ISSN:** 14720205

**Publisher:** BMJ Publishing Group

**PubMedID:** NLM30504457

**Accession Number:** Some(133364544)

Available at [Emergency Medicine Journal](https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Femj.bmj.com%2Flookup%2Fdoi%2F10.1136%2Femermed-2018-207758) - from BMJ Journals

Available at [Emergency Medicine Journal](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1472-0205&volume=36&issue=2&spage=emermed) - from ProQuest (Health Research Premium) - NHS Version

**Keywords: Subject Terms:** Equipment Contamination; Equipment and Supplies; Oxygen Therapy Adverse Effects; Ambulances Statistics and Numerical Data; Equipment and Supplies Standards; Oxygen Therapeutic Use; Alabama; Emergency Medical Services Standards; Methicillin-Resistant Staphylococcus Aureus; Emergency Medical Services Methods; Oxygen Therapy Methods; Ambulances Administration; \*Equipment Contamination; \*Equipment and Supplies; \*Oxygen Therapy Adverse Effects; Ambulances Statistics and Numerical Data; Equipment and Supplies Standards; Oxygen Therapeutic Use; Alabama; Emergency Medical Services Standards; Methicillin-Resistant Staphylococcus Aureus; Emergency Medical Services Methods; Oxygen Therapy Methods; Ambulances Administration

**Abstract:** Objectives: The primary purpose of this study was to determine if methicillin-resistant Staphylococcus aureus (MRSA) was present on the surface of oxygen cylinders and regulators used in the prehospital setting and secondarily to assess other surfaces for MRSA within the ambulance compartment, as a comparison.Methods: On 17 March 2018, the surface of oxygen cylinders and regulators located in ambulances at an emergency medical services (EMS) station in North Alabama (n=9) and at an offsite oxygen cylinder storage area (n=70) were swabbed using sterile cotton-tipped applicators saturated in an 0.9% NaCl solution. These cotton-tipped applicators were then streaked across the surface of HardyCHROM MRSA plates, followed by incubation at 36°C for 24 hours. The growth of pink or magenta colonies was considered a positive indication for the presence of MRSA. The motivation for assessing oxygen cylinders at the offsite storage area was to outline the persistence of MRSA on stored oxygen cylinders.Results: Of nine oxygen cylinders tested in the ambulances, nine had MRSA colonisation (100%). MRSA was also present on 67 of 70 oxygen cylinders (96%) tested at the offsite oxygen cylinder storage area.Conclusion: Oxygen cylinders appear to act as a fomite for MRSA. The development of universal disinfection protocols for oxygen equipment could help reduce the risk of patient infection due to cross-contamination.

**Database:** CINAHL

**9. "Wipe with a damp cloth. Do not use bleach" - A review of the cleaning instructions of shared equipment used in a pre-hospital setting**

**Author(s):** Golling E.

**Source:** Infection, Disease and Health; Nov 2018; vol. 23

**Publication Date:** Nov 2018

**Publication Type(s):** Conference Abstract

**DOI:** [http://dx.doi.org/10.1016/j.idh.2018.09.040](http://doi.org/10.1016/j.idh.2018.09.040)

**ISSN:** 2468-0451

**Place of Publication:** Netherlands

**Publisher:** Australasian College for Infection Prevention and Control

**Accession Number:** 2001466587

**Keywords: Subject Terms:** ambulance; Australia; cleaning; disinfection; drug combination; household; hypochlorite sodium; conference abstract; ambulance; Australia; \*cleaning; disinfection; drug combination; household; \*hypochlorite sodium; conference abstract

**Abstract:** Introduction: Equipment used by ambulance services are at high risk of exposure to pathogens. While importance of the reprocessing of shared equipment is well documented for hospital settings, there is little research for reusable-equipment cleaning requirements for ambulance services. Method(s): A complete review of the cleaning instructions of the reusable-equipment carried in the ambulance, asking the following: 1) Is there a cleaning section in the Instructions for Use (IFU)? 2) When was the date of the IFU? 3) Are the manufacturers recommended cleaning products readily available in Australia? 4) Is sodium hypochlorite compatibility specified? 5) Are the cleaning instructions practicable for the pre-hospital environment? Results: 27 items of reusable equipment were identified - 12 of which have parts made from non-wipeable surfaces (fabrics, webbing, Velcro). The majority of the IFUs for items reviewed contained a section on cleaning and disinfection, and IFU dates ranged from 1996 to 2014. 5 IFUs specified compatible cleaning products readily available in Australia. 7 IFUs directly stated sodium hypochlorite must not be used on the equipment, and a further 9 IFUs did not specify bleach compatibility. Common instructions were "wipe down with damp cloth", and "mild household cleaners only". Only 5 pieces of equipment had cleaning instructions which are practicable in the pre-hospital setting. Conclusion(s): Comprehensive cleaning instructions with clear product compatibilities are required to reduce the risk of pathogen exposure in ambulances. More evidence is required to develop a standardised approach to improve management of this risk.Copyright © 2018

**Database:** EMBASE

**10. NSW ambulance - Make ready model environmental cleaning: The fight against healthcare associated infections**

**Author(s):** Somani T.; Morris D.

**Source:** Infection, Disease and Health; Nov 2018; vol. 23

**Publication Date:** Nov 2018

**Publication Type(s):** Conference Abstract

**DOI:** [http://dx.doi.org/10.1016/j.idh.2018.09.080](http://doi.org/10.1016/j.idh.2018.09.080)

**ISSN:** 2468-0451

**Place of Publication:** Netherlands

**Publisher:** Australasian College for Infection Prevention and Control

**Accession Number:** 2001466554

**Keywords: Subject Terms:** adult; ambulance; Australia; cleaning; controlled study; healthcare associated infection; hospital care; human; work environment; adenosine triphosphate; conference abstract; adult; \*ambulance; Australia; \*cleaning; controlled study; \*healthcare associated infection; hospital care; human; work environment; adenosine triphosphate; conference abstract

**Abstract:** Introduction: The NSW Ambulance Make Ready Model (MRM) is an innovative ambulance environmental cleaning solution that has been implemented into nine ambulance superstations throughout the Sydney Metropolitan Area. This new way of conducting business has provided a platform to introduce refreshed standards for environmental cleaning specifically for the ambulance. Dedicated logistics staff clean ambulances using evidence-based cleaning practices to achieve hygiene standards in accordance to both the Clinical Excellence Commission and Centre for Disease Control & Prevention assessment guidelines for a health environment. Method(s): Prior to the introduction of the MRM, paramedics were required to clean and restock their allocated ambulances during the shift with little standards in place. The standardised practices encompassed by MRM logistics teams aim to reduce the bioburden inside the ambulance potentially reducing the risk of HAI transmission between patients and provide a safer working environment for paramedics. Result(s): The MRM is a first for any ambulance service nationally in Australia which currently has 113 ambulance vehicles inducted into the model. Within the first 12 months 24,000 professional cleans have been performed. Auditing and assessment of the cleaning has taken place with visual audits as well as using Adenosine Triphosphate (ATP) testing. Conclusion(s): The MRM is an innovative model of operations designed to improve environmental cleaning of ambulances, allowing paramedics to deliver out of hospital care in a safer environment and potentially reduces the risk of HAI's in the patients who are treated and transported within NSW Ambulances.Copyright © 2018

**Database:** EMBASE

**11. Prehospital infection control and prevention in Denmark: a cross-sectional study on guideline adherence and microbial contamination of surfaces.**

**Author(s):** Vikke, Heidi Storm; Giebner, Matthias; Kolmos, Hans Jørn

**Source:** Scandinavian journal of trauma, resuscitation and emergency medicine; Sep 2018; vol. 26 (no. 1); p. 71

**Publication Date:** Sep 2018

**Publication Type(s):** Journal Article

**DOI:** [http://dx.doi.org/10.1186/s13049-018-0541-y](http://doi.org/10.1186/s13049-018-0541-y)

**ISSN:** 1757-7241

**Place of Publication:** England

**PubMedID:** 30185205

**Accession Number:** 30185205

Available at [Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine](https://sjtrem.biomedcentral.com/articles/10.1186/s13049-018-0541-y) - from BioMed Central

Available at [Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine](https://link.springer.com/10.1186/s13049-018-0541-y) - from SpringerLink - Open Access

Available at [Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine](http://europepmc.org/search?query=(DOI:10.1186/s13049-018-0541-y)) - from Europe PubMed Central - Open Access

Available at [Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine](http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=30185205) - from EBSCO (MEDLINE Complete)

Available at [Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine](https://doi.org/10.1186/s13049-018-0541-y) - from Unpaywall

**Keywords: Subject Terms:** Cross Infection; Cross-Sectional Studies; Denmark; Emergency Medical Services; Enterobacteriaceae -- isolation & purification; Enterococcus -- isolation & purification; Equipment Contamination -- prevention & control; Guideline Adherence; Humans; Infection Control; Prevalence; Staphylococcus aureus -- isolation & purification; Index Medicus; Cross Infection; Cross-Sectional Studies; Denmark; \*Emergency Medical Services; Enterobacteriaceae -- isolation & purification; Enterococcus -- isolation & purification; \*Equipment Contamination -- prevention & control; \*Guideline Adherence; Humans; \*Infection Control; Prevalence; Staphylococcus aureus -- isolation & purification; Index Medicus

**Abstract:** BACKGROUNDPrehospital acute care and treatment have become more complex, and while invasive procedures are standard procedures, focus on infection control and prevention is scarce. We aimed to evaluate guideline adherence, microbial contamination, and associated risk factors.METHODSIn a nationwide cross-sectional study, we evaluated guideline adherence to thorough cleaning (TC) once a day, and moderate cleaning (MC) in-between patient courses. Microbial contamination on hand-touch sites (HTS) and provider-related sites (PRS) was assessed by total aerobic colony forming units (CFU) and presence of selected pathogens, using swab and agar imprints. Also, microbial contamination was assessed in relation to potential risk factors.RESULTS80 ambulances and emergency medical service (EMS) providers were enrolled. Adherence to guidelines regarding TC was 35%, but regarding MC it was 100%. In total, 129 (27%) of 480 HTS presented a total CFU > 2.5/cm2 and/or pathogenic growth, indicating hygiene failures. The prevalence of selected pathogens on HTS was: S. aureus 7%; Enterococcus 3% and Enterobacteriaceae 1%. Total CFU on the PRS ranged from 0 to 250/cm2, and the prevalence of pathogens was 18% (S. aureus 15%, Enterococcus 3% and Enterobacteriaceae 0.3%). Methicillin-resistant S. aureus was found in one sample, and Vancomycin-resistant Enterococcus in two. No Enterobacteriaceae with extended-spectrum beta-lactamases were recorded.CONCLUSIONGuideline adherence was suboptimal, and many HTS did not comply fully with proposed standards for cleanliness. Pathogens were demonstrated on both HTS and PRS, indicating that the EMS may be a source of infection in hospitalized patients. Moreover, cleaning effort and time appears associated with microbial contamination, but a comprehensive investigation of risk factors is needed.

**Database:** Medline

**12. Challenges for environmental hygiene practices in Australian paramedic-led health care: A brief report.**

**Author(s):** Barr, Nigel; Holmes, Mark; Roiko, Anne; Dunn, Peter; Lord, Bill

**Source:** American journal of infection control; Jun 2018; vol. 46 (no. 6); p. 723-725

**Publication Date:** Jun 2018

**Publication Type(s):** Journal Article

**DOI:** [http://dx.doi.org/10.1016/j.ajic.2017.11.007](http://doi.org/10.1016/j.ajic.2017.11.007)

**ISSN:** 1527-3296

**Place of Publication:** United States

**PubMedID:** 29305280

**Accession Number:** 29305280

**Keywords: Subject Terms:** Adolescent; Adult; Aged; Aged, 80 and over; Allied Health Personnel -- psychology; Attitude of Health Personnel; Australia; Disease Transmission, Infectious -- prevention & control; Female; Guideline Adherence; Health Facilities; Humans; Infection Control -- methods; Male; Middle Aged; Surveys and Questionnaires; Young Adult; Adolescent; Adult; Aged; Aged, 80 and over; \*Allied Health Personnel -- psychology; \*Attitude of Health Personnel; Australia; \*Disease Transmission, Infectious -- prevention & control; Female; \*Guideline Adherence; Health Facilities; Humans; \*Infection Control -- methods; Male; Middle Aged; Surveys and Questionnaires; Young Adult

**Abstract:**This study explored the self-reported behaviors and perceptions of Australian paramedics in relation to their environmental hygiene practices. A national online survey was conducted with Paramedics Australasia members (N = 417). Participants reported working in ambulances often contaminated with body fluids. Widespread noncompliance with routine and deep cleaning of ambulances, and misunderstandings about environmental hygiene practices were apparent. Improvements to environmental hygiene practices of Australian paramedics are recommended to avoid pathogen transmission and ensure patient safety.

**Database:** Medline

**13. Dirty ambulances; Adenosine triphosphate (ATP) bioluminescence measurement in the surveillance of ambulance cleanliness**

**Author(s):** Butterbaugh M.W.; Wesley K.; Washick M.

**Source:** American Journal of Infection Control; Jun 2018; vol. 46 (no. 6)

**Publication Date:** Jun 2018

**Publication Type(s):** Conference Abstract

**ISSN:** 1527-3296

**Place of Publication:** Netherlands

**Publisher:** Mosby Inc.

**Accession Number:** 622943023

**Keywords: Subject Terms:** ambulance; bioluminescence; case report; cleaning; clinical article; education; human; human experiment; infection control; stretcher; student; touch; adenosine triphosphate; conference abstract; \*ambulance; \*bioluminescence; case report; cleaning; clinical article; education; human; human experiment; infection control; stretcher; student; touch; \*adenosine triphosphate; conference abstract

**Abstract:**Background: Compared to hospitals, there is a relative dearth of literature regarding ambulance sanitation. Studies have demonstrated the contamination of ambulances by drug resistant organisms. Measurement of ATP bioluminescence is an accepted method for sanitary assessment in the food industry and has potential in healthcare. Studies have shown that the implementation of standard work and education results in cleaner hospital rooms. Here, we compiled average ATP measurements and examined the before and after effect of new cleaning protocols on ambulance cleanliness during mandatory education for ambulance crews. Method(s): Study setting was a metropolitan ambulance service consisting of 37 ambulances. Locations within each ambulance were selected a priori for measurement. Surfaces were sampled for the presence of ATP using an ATP bioluminescence monitor and reported as Relative Light Units (RLU). A measurement of less than 200 RLU defined a surface as sanitary. During surveillance, five ambulances were selected at convenience and sampled over a four week period. Crews were educated on the importance of infection control and a new standard cleaning practice. Measurements were taken before and after crews performed the new standard. Means were compared using a two-tailed students T test. Results were tabulated in Open Office spreadsheet. Result(s): 6% of surveillance samples resulted in less than 200 RLU. Overall Mean/Median RLU was 3357/1307. Mean/Median RLU for each location was: Steering Wheel: 11959/12446; Front Computer: 2822/2269; Trash Railing: 3582/2044; Ceiling Rail: 1091/773; Rear Controls: 753/466; Bench Seat: 1952/921; Left Stretcher Rail: 2682/1890; Stretcher Mattress: 836/492; IV Cabinet Handle: 764/532; Rear Door Rail/Handle: 7131/3758. Educational pre/post-cleaning measurements for BLS and ALS ambulances were 2421/383 RLU (P <.001) and 2749/539 RLU respectively (P <.001). Conclusion(s): ATP bioluminescence demonstrates a small percentage of ambulance high-touch points meet accepted standards of cleanliness. Standardized cleaning practices significantly reduces the amount of organic material on high-touch surfaces.

**Database:** EMBASE

**14. Ambulance disinfection using Ultraviolet Germicidal Irradiation (UVGI): Effects of fixture location and surface reflectivity.**

**Author(s):** Lindsley, William G; McClelland, Tia L; Neu, Dylan T; Martin, Stephen B; Mead, Kenneth R; Thewlis, Robert E; Noti, John D

**Source:** Journal of occupational and environmental hygiene; Jan 2018; vol. 15 (no. 1); p. 1-12

**Publication Date:** Jan 2018

**Publication Type(s):** Journal Article Research Support, U.s. Gov't, P.h.s.

**DOI:** [http://dx.doi.org/10.1080/15459624.2017.1376067](http://doi.org/10.1080/15459624.2017.1376067)

**ISSN:** 1545-9632

**Place of Publication:** England

**PubMedID:** 29059039

**Accession Number:** 29059039

Available at [Journal of occupational and environmental hygiene](http://openurl.ebscohost.com/linksvc/linking.aspx?genre=article&issn=1545-9624&volume=15&issue=1&spage=1&atitle=Ambulance%20disinfection%20using%20Ultraviolet%20Germicidal%20Irradiation%20(UVGI):%20Effects%20of%20fixture%20location%20and%20surface%20reflectivity) - from EBSCO (CINAHL Plus with Full Text)

Available at [Journal of occupational and environmental hygiene](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6379899) - from Unpaywall

**Keywords: Subject Terms:** Ambulances; Bacillus subtilis -- radiation effects; Cross Infection -- prevention & control; Disinfection -- instrumentation; Disinfection -- methods; Paint; Spores, Bacterial -- radiation effects; Ultraviolet Rays; \*Ambulances; \*Bacillus subtilis -- radiation effects; Cross Infection -- prevention & control; Disinfection -- instrumentation; \*Disinfection -- methods; Paint; Spores, Bacterial -- radiation effects; \*Ultraviolet Rays

**Abstract:**Ambulances are frequently contaminated with infectious microorganisms shed by patients during transport that can be transferred to subsequent patients and emergency medical service workers. Manual decontamination is tedious and time-consuming, and persistent contamination is common even after cleaning. Ultraviolet germicidal irradiation (UVGI) has been proposed as a terminal disinfection method for ambulance patient compartments. However, no published studies have tested the use of UVGI in ambulances. The objectives of this study were to investigate the efficacy of a UVGI system in an ambulance patient compartment and to examine the impact of UVGI fixture position and the UV reflectivity of interior surfaces on the time required for disinfection. A UVGI fixture was placed in the front, middle, or back of an ambulance patient compartment, and the UV irradiance was measured at 49 locations. Aluminum sheets and UV-reflective paint were added to examine the effects of increasing surface reflectivity on disinfection time. Disinfection tests were conducted using Bacillus subtilis spores as a surrogate for pathogens. Our results showed that the UV irradiance varied considerably depending upon the surface location. For example, with the UVGI fixture in the back position and without the addition of UV-reflective surfaces, the most irradiated location received a dose of UVGI sufficient for disinfection in 16 s, but the least irradiated location required 15 hr. Because the overall time required to disinfect all of the interior surfaces is determined by the time required to disinfect the surfaces receiving the lowest irradiation levels, the patient compartment disinfection times for different UVGI configurations ranged from 16.5 hr to 59 min depending upon the UVGI fixture position and the interior surface reflectivity. These results indicate that UVGI systems can reduce microbial surface contamination in ambulance compartments, but the systems must be rigorously validated before deployment. Optimizing the UVGI fixture position and increasing the UV reflectivity of the interior surfaces can substantially improve the performance of a UVGI system and reduce the time required for disinfection.

**Database:** Medline

**15. Infection control on air ambulance**

**Author(s):** Dissayasriroj S. (sunisa@aircharterthailand.com)

**Source:** Antimicrobial Resistance and Infection Control; 2017; vol. 6

**Publication Date:** 2017

**Publication Type(s):** Conference Abstract

**DOI:** [http://dx.doi.org/10.1186/s13756-017-0176-1](http://doi.org/10.1186/s13756-017-0176-1)

**ISSN:** 2047-2994

**Place of Publication:** Netherlands

**Publisher:** BioMed Central Ltd.

**Accession Number:** 619524812

Available at [Antimicrobial Resistance & Infection Control](https://aricjournal.biomedcentral.com/articles/10.1186/s13756-017-0176-1) - from BioMed Central

Available at [Antimicrobial Resistance & Infection Control](https://link.springer.com/10.1186/s13756-017-0176-1) - from SpringerLink - Open Access

Available at [Antimicrobial Resistance & Infection Control](http://europepmc.org/search?query=(DOI:10.1186/s13756-017-0176-1)) - from Europe PubMed Central - Open Access

Available at [Antimicrobial Resistance & Infection Control](https://aricjournal.biomedcentral.com/track/pdf/10.1186/s13756-017-0176-1) - from Unpaywall

**Keywords: Subject Terms:** adult; air medical transport; air sampler; caregiver; cleaning; communicable disease; controlled study; disinfection; education; employee; employment; female; habit; health care personnel; human; infection control; infection rate; infection risk; instrument sterilization; male; monitoring; patient care; patient visitor; personal hygiene; prevention; responsibility; satisfaction; sound; wing; adult; \*air medical transport; air sampler; caregiver; cleaning; communicable disease; controlled study; disinfection; education; employee; employment; female; habit; health care personnel; human; \*infection control; infection rate; infection risk; instrument sterilization; male; monitoring; patient care; patient visitor; personal hygiene; prevention; responsibility; satisfaction; sound; wing

**Abstract:**Background The introduction of ASEAN Economic Community (AEC) and Thai government's policy in creating an international center for medical treatment, there has been a significant increase in number of patients travelling into Thailand for treatments. Patients are travelling on commercial aircrafts as well as air ambulance when their conditions are urgent or critical. Air ambulance is a well-recognized method of transportation by the insurance company which Medical Wings has been serving patient from around the world since 1999. At Medical Wings, we focus on Safety, quality care and infection control. On occasion, we receive patient from facility which is not able to adequately assess infectious disease so our medical team are the first group to meet patient and preparation is the utmost important in a successful mission. We aimed to prevent the exposure of patients, visitors and healthcare workers to communicable or infectious diseases by stressing maintenance of sound habits in personal hygiene and individual responsibility in infection con-trol, monitoring and investigating potentially harmful infectious exposures, providing care to personnel for work-related illnesses, identifying infection risks related to employment and instituting appropriate preventive measures. Materials and methods 1.Employee health, 2.Post-handover surveillance, 3.Isolation Precautions, 4.Disinfection & sterilization, 5.Patient care, 6.Education & train-ing, 7.Environmental control, 8. Research Results: 1. Patient's infection rate 0%, 2.HAIs rate 0%, 3. Results of swab test and microbial air sampler: pre & post deep cleaning effective more than 99.9%, 4. Employee satisfaction rate more than 90% Conclusions We focus directly to prevent infection. Educating medical and non-medical caregivers are our key strategy.

**Database:** EMBASE

**16. Metagenomic characterization of ambulances across the USA.**

**Author(s):** O'Hara, Niamh B; Reed, Harry J; Afshinnekoo, Ebrahim; Harvin, Donell; Caplan, Nora; Rosen, Gail; Frye, Brook; Woloszynek, Stephen; Ounit, Rachid; Levy, Shawn; Butler, Erin; Mason, Christopher E

**Source:** Microbiome; Sep 2017; vol. 5 (no. 1); p. 125

**Publication Date:** Sep 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Research Support, U.s. Gov't, Non-p.h.s. Journal Article

**DOI:** [http://dx.doi.org/10.1186/s40168-017-0339-6](http://doi.org/10.1186/s40168-017-0339-6)

**ISSN:** 2049-2618

**Place of Publication:** England

**PubMedID:** 28938903

**Accession Number:** 28938903

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Available at [Microbiome](https://link.springer.com/10.1186/s40168-017-0339-6) - from SpringerLink - Open Access

Available at [Microbiome](http://europepmc.org/search?query=(DOI:10.1186/s40168-017-0339-6)) - from Europe PubMed Central - Open Access

Available at [Microbiome](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=2049-2618&volume=5&issue=1&spage=125) - from ProQuest (Health Research Premium) - NHS Version

Available at [Microbiome](https://microbiomejournal.biomedcentral.com/track/pdf/10.1186/s40168-017-0339-6) - from Unpaywall

**Keywords: Subject Terms:** Ambulances; Bacteria -- classification; Bacteria -- genetics; Bacteria -- isolation & purification; Bacteria -- pathogenicity; Cross Infection -- microbiology; Genome, Bacterial; High-Throughput Nucleotide Sequencing; Hospitals; Humans; Metagenome; Metagenomics; Microbial Consortia -- genetics; Microbiota -- genetics; United States; Index Medicus; \*Ambulances; Bacteria -- classification; Bacteria -- genetics; \*Bacteria -- isolation & purification; Bacteria -- pathogenicity; Cross Infection -- microbiology; Genome, Bacterial; High-Throughput Nucleotide Sequencing; Hospitals; Humans; \*Metagenome; \*Metagenomics; Microbial Consortia -- genetics; Microbiota -- genetics; United States; Index Medicus

**Abstract:**BACKGROUNDMicrobial communities in our built environments have great influence on human health and disease. A variety of built environments have been characterized using a metagenomics-based approach, including some healthcare settings. However, there has been no study to date that has used this approach in pre-hospital settings, such as ambulances, an important first point-of-contact between patients and hospitals.RESULTSWe sequenced 398 samples from 137 ambulances across the USA using shotgun sequencing. We analyzed these data to explore the microbial ecology of ambulances including characterizing microbial community composition, nosocomial pathogens, patterns of diversity, presence of functional pathways and antimicrobial resistance, and potential spatial and environmental factors that may contribute to community composition. We found that the top 10 most abundant species are either common built environment microbes, microbes associated with the human microbiome (e.g., skin), or are species associated with nosocomial infections. We also found widespread evidence of antimicrobial resistance markers (hits ~ 90% samples). We identified six factors that may influence the microbial ecology of ambulances including ambulance surfaces, geographical-related factors (including region, longitude, and latitude), and weather-related factors (including temperature and precipitation).CONCLUSIONSWhile the vast majority of microbial species classified were beneficial, we also found widespread evidence of species associated with nosocomial infections and antimicrobial resistance markers. This study indicates that metagenomics may be useful to characterize the microbial ecology of pre-hospital ambulance settings and that more rigorous testing and cleaning of ambulances may be warranted.

**Database:** Medline

**17. Identification and characteristics of biological agents in work environment of medical emergency services in selected ambulances.**

**Author(s):** Bielawska-Drózd, Agata; Cieślik, Piotr; Wlizło-Skowronek, Bożena; Winnicka, Izabela; Kubiak, Leszek; Jaroszuk-Ściseł, Jolanta; Depczyńska, Daria; Bohacz, Justyna; Korniłłowicz-Kowalska, Teresa; Skopińska-Różewska, Ewa; Kocik, Janusz

**Source:** International journal of occupational medicine and environmental health; Jun 2017; vol. 30 (no. 4); p. 617-627

**Publication Date:** Jun 2017

**Publication Type(s):** Journal Article

**DOI:** [http://dx.doi.org/10.13075/ijomeh.1896.00816](http://doi.org/10.13075/ijomeh.1896.00816)

**ISSN:** 1896-494X

**Place of Publication:** Poland

**PubMedID:** 28584319

**Accession Number:** 28584319

Available at [International journal of occupational medicine and environmental health](http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=28584319) - from EBSCO (MEDLINE Complete)

Available at [International journal of occupational medicine and environmental health](http://openurl.ebscohost.com/linksvc/linking.aspx?genre=article&issn=1232-1087&volume=30&issue=4&spage=617) - from EBSCO (Biomedical Reference Collection - Comprehensive)

Available at [International journal of occupational medicine and environmental health](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1232-1087&volume=30&issue=4&spage=617) - from ProQuest (Health Research Premium) - NHS Version

Available at [International journal of occupational medicine and environmental health](http://ijomeh.eu/pdf-63925-11969?filename=Identification%20and.pdf) - from Unpaywall

**Keywords: Subject Terms:** Air Microbiology; Ambulances; Bacteria -- isolation & purification; Colony Count, Microbial; Emergency Medical Services; Environmental Monitoring -- methods; Fungi -- isolation & purification; Occupational Exposure -- statistics & numerical data; Poland; Workplace; Yeasts -- isolation & purification; Index Medicus; \*Air Microbiology; \*Ambulances; \*Bacteria -- isolation & purification; Colony Count, Microbial; \*Emergency Medical Services; Environmental Monitoring -- methods; \*Fungi -- isolation & purification; \*Occupational Exposure -- statistics & numerical data; Poland; Workplace; \*Yeasts -- isolation & purification; Index Medicus

**Abstract:**OBJECTIVESAssessment of microbial air quality and surface contamination in ambulances and administration offices as a control place without occupational exposure to biological agents; based on quantitative and qualitative analysis of bacteria, yeasts and filamentous fungi found in collected samples.MATERIAL AND METHODSThe sampling was done by wet cyclone technology using the Coriolis recon apparatus, imprint and swab methods, respectively. In total, 280 samples from 28 ambulances and 10 offices in Warszawa were tested. Data was analyzed using Shapiro-Wilk normality test, Kruskal-Wallis test with α = 0.05. P value ≤ 0.05 was considered as significant.RESULTSThe levels of air contamination were from 0 to 2.3×101 colony-forming unit (CFU)/m3 for bacteria and for yeast and filamentous fungi were from 0 to 1.8×101 CFU/m3. The assessment of office space air samples has shown the following numbers of microorganisms: bacteria from 3.0×101 to 4.2×101 CFU/m3 and yeast and filamentous fungi from 0 to 1.9×101 CFU/m3. For surface contamination the mean bacterial count in ambulances has been between 1.0×101 and 1.3×102 CFU/25 cm2 and in offices - between 1.1×101 and 8.5×101 CFU/25 cm2. Mean fungal count has reached the level from 2.8×100 to 4.2×101 CFU/25 cm2 in ambulances and 1.3×101 to 5.8×101 CFU/25 cm2 in offices. The qualitative analysis has revealed the presence of Acinetobacter spp. (surfaces), coagulase - negative Staphylococci (air and surfaces), Aspergillus and Penicillium genera (air and surfaces).CONCLUSIONSThe study has revealed a satisfactory microbiological quantity of analyzed air and surface samples in both study and control environments. However, the presence of potentially pathogenic microorganisms in the air and on surfaces in ambulances may endanger the medical emergency staff and patients with infection. Disinfection and cleaning techniques therefore should be constantly developed and implemented. Int J Occup Med Environ Health 2017;30(4):617-627.

**Database:** Medline

**18. Hygiene in the emergency medical services (EMS) calls for attention**

**Author(s):** Vikke H.S.; Kolmos H.J.; Giebner M.

**Source:** BMJ Open; May 2017; vol. 7

**Publication Date:** May 2017

**Publication Type(s):** Conference Abstract

**DOI:** [http://dx.doi.org/10.1136/bmjopen-2017-EMSabstracts.20](http://doi.org/10.1136/bmjopen-2017-EMSabstracts.20)

**ISSN:** 2044-6055

**Place of Publication:** Netherlands

**Publisher:** BMJ Publishing Group

**Accession Number:** 617217911

Available at [BMJ Open](http://europepmc.org/search?query=(DOI:10.1136/bmjopen-2017-EMSabstracts.20)) - from Europe PubMed Central - Open Access

Available at [BMJ Open](http://bmjopen.bmj.com/lookup/doi/10.1136/bmjopen-2017-EMSabstracts.20) - from HighWire - Free Full Text

Available at [BMJ Open](https://bmjopen.bmj.com/content/bmjopen/7/Suppl_3/A8.2.full.pdf) - from Unpaywall

**Keywords: Subject Terms:** ambulance; attention; bivariate analysis; clinical trial; colony forming unit; controlled clinical trial; controlled study; crew member; cross-sectional study; Denmark; emergency health service; Enterobacteriaceae; Enterococcus; explanatory variable; female; human; hygiene; male; microbial contamination; nonhuman; pathogen load; single blind procedure; Staphylococcus aureus; ambulance; \*attention; bivariate analysis; clinical trial; colony forming unit; controlled clinical trial; controlled study; crew member; cross-sectional study; Denmark; \*emergency health service; Enterobacteriaceae; Enterococcus; explanatory variable; female; human; \*hygiene; male; microbial contamination; nonhuman; pathogen load; single blind procedure; Staphylococcus aureus

**Abstract:**Aim Contaminated environmental surfaces are known to provide an important potential source for transmission of healthcare associated pathogens1 and prehospital treatment appears related to increased risk of infection.2 Nevertheless, few studies present and discuss prehospital hygiene, resulting in limited knowledge and understanding of related challenges. Our aim was to assess microbial contamination and influencing factors. Methods A nationwide, semi-blinded, cross-sectional study conducted in Denmark from August to November 2016. Using a combined swab/agar method, samples from environment, equipment and personnel were randomly collected from 80 ambulances and crew, in-between patient courses, after cleaning. Focus was colony forming units (cfu) and healthcare associated pathogens. In addition, explanatory variables e.g. hours from last thorough cleaning, area of service (rural/city) and number of patient courses within the shift, were collected and used in bivariate analyses. Results 800 sites, showed an average of 11.3 cfu/cm2 (environmental sites 5.01 cfu/cm2, hands 11.1 cfu/cm2 and uniforms 30.6 cfu/cm2). Staphylococcus aureus, Enterococcus and Enterobacteriaceae were found on 10, 3.4 and 0.5% of the imprints, respectively. One imprint was MRSA, two were VRE but none was ESBL, and we found no correlation between the explanatory variables and the degree of microbial burden. Conclusion Microbial contamination and related challenges in the EMS calls for further attention. Several sites were contaminated with healthcare associated pathogens, but neither time from cleaning, number of patients nor area of service were of influence on the degree of contamination. Future research on hygienic challenges and routes of transmission is recommended.

**Database:** EMBASE

**19. Detection and characterization of surface microbial contamination in emergency ambulances.**

**Author(s):** Varona-Barquin, Aketza; Ballesteros-Peña, Sendoa; Lorrio-Palomino, Sergio; Ezpeleta, Guillermo; Zamanillo, Verónica; Eraso, Elena; Quindós, Guillermo

**Source:** American journal of infection control; Jan 2017; vol. 45 (no. 1); p. 69-71

**Publication Date:** Jan 2017

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article

**DOI:** [http://dx.doi.org/10.1016/j.ajic.2016.05.024](http://doi.org/10.1016/j.ajic.2016.05.024)

**ISSN:** 1527-3296

**Place of Publication:** United States

**PubMedID:** 27566871

**Accession Number:** 27566871

**Keywords: Subject Terms:** Ambulances; Bacteria -- isolation & purification; Cross-Sectional Studies; Emergency Service, Hospital; Environmental Microbiology; Humans; Spain; Index Medicus; \*Ambulances; \*Bacteria -- isolation & purification; Cross-Sectional Studies; \*Emergency Service, Hospital; \*Environmental Microbiology; Humans; Spain; Index Medicus

**Abstract:**A cross-sectional study was performed in 10 emergency basic life support ambulances operating in Bilbao, Spain, to assess surface bacterial contamination. Presence of clinically relevant bacterial contamination suggests that disinfection of the studied basic life support ambulances was not optimal and represents a potential risk of infection for the patients transferred in them. It is critical to implement existing infection control and prevention protocols to resolve this issue.

**Database:** Medline

**20. Providing a Cleaner Ambulance.**

**Author(s):**

**Source:** EMS World; Dec 2016; vol. 45 (no. 12); p. 8-8

**Publication Date:** Dec 2016

**Publication Type(s):** Academic Journal

**ISSN:** 19469365

**Place of Publication:** Nashville, Tennessee

**Publisher:** SouthComm Inc.

**Accession Number:** Some(119917448)

**Keywords: Subject Terms:** Ambulances; Sterilization and Disinfection Equipment and Supplies; Product Evaluation; \*Ambulances; \*Sterilization and Disinfection Equipment and Supplies; \*Product Evaluation

**Abstract:**The article reviews the Ozilla emergency medical services (EMS) Sterilizer from Genlantis.

**Database:** CINAHL

**21. POSAiDA: presence of Staphylococcus aureus/MRSA and Enterococcus/VRE in Danish ambulances. A cross-sectional study.**

**Author(s):** Vikke, Heidi Storm; Giebner, Matthias

**Source:** BMC research notes; Mar 2016; vol. 9 ; p. 194

**Publication Date:** Mar 2016

**Publication Type(s):** Journal Article

**DOI:** [http://dx.doi.org/10.1186/s13104-016-1982-x](http://doi.org/10.1186/s13104-016-1982-x)

**ISSN:** 1756-0500

**Place of Publication:** England

**PubMedID:** 27029410

**Accession Number:** 27029410

Available at [BMC research notes](http://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-016-1982-x) - from BioMed Central

Available at [BMC research notes](https://link.springer.com/10.1186/s13104-016-1982-x) - from SpringerLink - Open Access

Available at [BMC research notes](http://europepmc.org/search?query=(DOI:10.1186/s13104-016-1982-x)) - from Europe PubMed Central - Open Access

Available at [BMC research notes](http://search.ebscohost.com/login.aspx?direct=true&scope=site&site=ehost-live&db=mdc&AN=27029410) - from EBSCO (MEDLINE Complete)

Available at [BMC research notes](https://bmcresnotes.biomedcentral.com/track/pdf/10.1186/s13104-016-1982-x) - from Unpaywall

**Keywords: Subject Terms:** Ambulances; Cross Infection -- microbiology; Cross-Sectional Studies; Denmark; Enterococcus -- isolation & purification; Humans; Methicillin-Resistant Staphylococcus aureus -- isolation & purification; Vancomycin Resistance; Index Medicus; \*Ambulances; \*Cross Infection -- microbiology; Cross-Sectional Studies; Denmark; \*Enterococcus -- isolation & purification; Humans; \*Methicillin-Resistant Staphylococcus aureus -- isolation & purification; \*Vancomycin Resistance; Index Medicus

**Abstract:**BACKGROUNDEvery year approximately one out of ten Danish patients contracts a healthcare associated infection (HAI). Staphylococcus aureus and Enterococcus are prominent in the group of pathogenic bacteria that underlie HAIs, causing unnecessary inconvenience and prolonging hospitalization. Bacterial colonization often occurs due to indirect patient-to-patient transmission, caused by poor hygiene compliance. This study aims to determine the level of contamination with S. aureus/MRSA and Enterococcus/VRE on presumed clean blood pressure cuffs in the Danish ambulances.METHODBlood pressure cuffs were tested for contamination with S. aureus and Enterococcus when being cleaned according to everyday guidelines in this cross-sectional study. Imprints were performed with specific agar plates after cleaning with ethanol wipes. Positive imprints were typed and antibiotic susceptibility was determined.RESULTSBoth S. aureus and Enterococcus were found on blood pressure cuffs thought to be clean, however, to a limited extent. The average level of contamination by S. aureus was 0.54 CFU per 25 cm(2) (SD 1.98). Minimum and maximum values ranged from 0 to 12 CFU per 25 cm(2) and 10% of the 50 samples were positive. The average level of contamination by Enterococcus was 0.06 CFU per 25 cm(2) (SD 0.42). Minimum and maximum values ranged from 0 to 3 CFU per 25 cm(2) and 2% of the 50 samples were positive. All S. aureus isolates were found to be methicillin susceptible S. aureus (MSSA) and the one Enterococcus isolate was identified as Enterococcus faecalis, negative for vancomycin resistance genes.CONCLUSIONStaphylococcus aureus and Enterococcus were detectable on equipment thought to be clean. However, all detected bacteria showed susceptibility towards methicillin or vancomycin. Findings of pathogens after cleaning may be due to cross-contamination, improper cleaning and limited effect of the currently used cleaning procedure and are thought to affect the risk of infection. Therefore, we recommend a thorough evaluation of current cleaning procedures as well as increased focus on and further research into hygiene challenges in a prehospital setting. Future studies should be performed in order to demonstrate the level of bacterial contamination in all areas of the medical service, e.g., the ambulance environment, medical equipment, staff uniform and hand hygiene. Furthermore, in order to establish evidence for different cleaning procedures in situ we recommend testing the effect of different cleaning interventions by interventional designs.

**Database:** Medline

**22. Prevalence of nosocomial pathogens in German ambulances: the SEKURE study.**

**Author(s):** Wepler, M; Stahl, W; von Baum, H; Wildermuth, S; Dirks, B; Georgieff, M; Hafner, S

**Source:** Emergency medicine journal : EMJ; May 2015; vol. 32 (no. 5); p. 409-411

**Publication Date:** May 2015

**Publication Type(s):** Research Support, Non-u.s. Gov't Journal Article Observational Study

**DOI:** [http://dx.doi.org/10.1136/emermed-2013-202551](http://doi.org/10.1136/emermed-2013-202551)

**ISSN:** 1472-0213

**Place of Publication:** England

**PubMedID:** 25714107

**Accession Number:** 25714107

Available at [Emergency medicine journal : EMJ](https://go.openathens.net/redirector/nhs?url=https%3A%2F%2Femj.bmj.com%2Flookup%2Fdoi%2F10.1136%2Femermed-2013-202551) - from BMJ Journals

Available at [Emergency medicine journal : EMJ](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48113&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1472-0205&volume=32&issue=5&spage=409) - from ProQuest (Health Research Premium) - NHS Version

**Keywords: Subject Terms:** Agar; Ambulances; Bacteria -- isolation & purification; Cross Infection -- prevention & control; Cross-Sectional Studies; Culture Media; Equipment Contamination; Fungi -- isolation & purification; Humans; Prevalence; Index Medicus; Agar; \*Ambulances; \*Bacteria -- isolation & purification; Cross Infection -- prevention & control; Cross-Sectional Studies; Culture Media; Equipment Contamination; \*Fungi -- isolation & purification; Humans; Prevalence; Index Medicus

**Abstract:**OBJECTIVEThe increasing prevalence of multidrug resistant bacteria is a problem in the inpatient care setting, and in the emergency care system. The aim of this observational, cross-sectional study was to evaluate the prevalence of pathogens on well-defined surfaces in German ambulances that have been designated as 'ready for service'.METHODSAfter informed consent was obtained, ambulance surfaces were sampled with agar plates for microbiological examination during an unannounced visit. A standardised questionnaire was used to obtain information regarding the disinfection protocols used at each rescue station.RESULTSMethicillin resistant staphylococcus aureus contamination was present in 18 sampling surfaces from 11 out of 150 ambulance vehicles (7%) that were designated as ready for service. Contact surfaces directly surrounding patients or staff were most frequently contaminated with pathogens. However, bacterial contamination was not related to annual missions, methods or frequency of disinfection.CONCLUSIONSIn accordance with previous studies, disinfection and cleaning of areas with direct contact to patients or staff seem to be the most challenging. This should also be reflected in disinfection guidelines and the related continuing education.

**Database:** Medline

**23. Microbial Air Quality and Bacterial Surface Contamination in Ambulances During Patient Services.**

**Author(s):** Pipat Luksamijarulkul; Sirikun Pipitsangjan

**Source:** Oman Medical Journal; Mar 2015; vol. 30 (no. 2); p. 104-110

**Publication Date:** Mar 2015

**Publication Type(s):** Academic Journal

**DOI:** [http://dx.doi.org/10.5001/omj.2015.23](http://doi.org/10.5001/omj.2015.23)

**ISSN:** 1999768X

**Publisher:** Oman Medical Specialty Board

**Accession Number:** Some(103067502)

Available at [Oman Medical Journal](http://europepmc.org/search?query=(DOI:10.5001/omj.2015.23)) - from Europe PubMed Central - Open Access

Available at [Oman Medical Journal](https://doi.org/10.5001/omj.2015.23) - from Unpaywall

**Keywords: Subject Terms:** Ambulances; Bacterial Contamination; Microbial Contamination; Equipment Contamination; Cross Sectional Studies; Descriptive Statistics; T-Tests; Wilcoxon Rank Sum Test; P-Value; Pearson's Correlation Coefficient; Staphylococcus; Aspergillus; Colony Count, Microbial; Air Pollution, Indoor; \*Ambulances; \*Bacterial Contamination; \*Microbial Contamination; \*Equipment Contamination; Cross Sectional Studies; Descriptive Statistics; T-Tests; Wilcoxon Rank Sum Test; P-Value; Pearson's Correlation Coefficient; Staphylococcus; Aspergillus; Colony Count, Microbial; Air Pollution, Indoor

**Abstract:**Objectives: We sought to assess microbial air quality and bacterial surface contamination on medical instruments and the surrounding areas among 30 ambulance runs during service. Methods: We performed a cross-sectional study of 106 air samples collected from 30 ambulances before patient services and 212 air samples collected during patient services to assess the bacterial and fungal counts at the two time points. Additionally, 226 surface swab samples were collected from medical instrument surfaces and the surrounding areas before and after ambulance runs. Groups or genus of isolated bacteria and fungi were preliminarily identified by Gram's stain and lactophenol cotton blue. Data were analyzed using descriptive statistics, t-test, and Pearson's correlation coefficient with ap-value of less than 0.050 considered significant. Results: The mean and standard deviation of bacterial and fungal counts at the start of ambulance runs were 318±485cfu/m³ and 522±58 1cfu/m³, respectively. Bacterial counts during patient services were 468±607cfu/m³ and fungal counts were 656±612cfu/m³. Mean bacterial and fungal counts during patient services were significantly higher than those at the start of ambulance runs, p=0.005 and p=0.030, respectively. For surface contamination, the overall bacterial counts before and after patient services were 0.8±0.7cfu/cm² and 1.3±1.1cfu/cm², respectively (p<0.001). The predominant isolated bacteria and fungi were Staphylococcus spp. and Aspergillus spp., respectively. Additionally, there was a significantly positive correlation between bacterial (r=0.3,p<0.010) and fungal counts (r=0.2,p=0.020) in air samples and bacterial counts on medical instruments and allocated areas. Conclusions: This study revealed high microbial contamination (bacterial and fungal) in ambulance air during services and higher bacterial contamination on medical instrument surfaces and allocated areas after ambulance services compared to the start of ambulance runs. Additionally, bacterial and fungal counts in ambulance air showed a significantly positive correlation with the bacterial surface contamination on medical instruments and allocated areas. Further studies should be conducted to determine the optimal intervention to reduce microbial contamination in the ambulance environment.

**Database:** CINAHL

**24. Nosocomial infections in ambulances and effectiveness of ambulance fumigation techniques in Saudi Arabia. Phase I study.**

**Author(s):** Alrazeeni, Daifallah; Al Sufi, Mohammed S

**Source:** Saudi medical journal; Nov 2014; vol. 35 (no. 11); p. 1354-1360

**Publication Date:** Nov 2014

**Publication Type(s):** Clinical Trial, Phase I Journal Article

**ISSN:** 0379-5284

**Place of Publication:** Saudi Arabia

**PubMedID:** 25399212

**Accession Number:** 25399212

Available at [Saudi medical journal](https://www.ncbi.nlm.nih.gov/pubmed/25399212) - from PubMed

Available at [Saudi medical journal](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4362147/) - from PubMed Central

**Keywords: Subject Terms:** Ambulances; Bacillus -- drug effects; Bacillus -- isolation & purification; Cross Infection -- prevention & control; Disinfectants -- pharmacology; Disinfectants -- therapeutic use; Emergency Medical Services; Enterobacteriaceae -- drug effects; Enterobacteriaceae -- isolation & purification; Equipment Contamination -- prevention & control; Fomites -- microbiology; Fumigation -- methods; Humans; Saudi Arabia; Staphylococcus -- drug effects; Staphylococcus -- isolation & purification; Stretchers -- microbiology; Index Medicus; \*Ambulances; Bacillus -- drug effects; Bacillus -- isolation & purification; \*Cross Infection -- prevention & control; Disinfectants -- pharmacology; \*Disinfectants -- therapeutic use; Emergency Medical Services; Enterobacteriaceae -- drug effects; Enterobacteriaceae -- isolation & purification; \*Equipment Contamination -- prevention & control; \*Fomites -- microbiology; \*Fumigation -- methods; Humans; Saudi Arabia; Staphylococcus -- drug effects; Staphylococcus -- isolation & purification; \*Stretchers -- microbiology; Index Medicus

**Abstract:**OBJECTIVESTo evaluate infection control and the incidence of bacterial pathogens in Emergency Medical Service (EMS) ambulances in Riyadh, Saudi Arabia. The effectiveness of fumigation techniques used for these ambulances to minimize the spread of infection to transported patients and pre-hospital care providers was also assessed.METHODSBased on previous literature review indicating a higher propensity of microbial load, 3 areas within the ambulance, such as, stretcher handle, oxygen flow meter knob, and interior handle of the rear door were selected for specimen collection. Swab samples were collected both in the day and night shift, after the intended disinfection and cleaning (before and after fumigation). Micro-organisms were identified using standard procedures. This phase-I study was conducted at the Emergency Medical Services Department, Prince Sultan Bin AbdulAziz College of Emergency Medical Services, Al Malaz, King Saud University, Riyadh, Saudi Arabia between October and November 2013, wherein a total of 10 ambulances from the Saudi Red Crescent Authority in Riyadh were selected for inclusion in the study.RESULTSThe specimens from all 10 ambulances showed similar results. In post disinfection and before fumigation, swab samples showed positive cultures that grew moderate to large quantities of environmental and skin flora. However, almost all organisms were susceptible to the fumigation technique.CONCLUSIONThis study confirms the importance of evaluating the frequency and efficiency of various fumigation techniques as an ambulance is a potential reservoir for microbial transmission to patients and staff.

**Database:** Medline

**25. Do We Kill Our Patients?**

**Author(s):** Ludwig, Gary

**Source:** Firehouse; Mar 2014; vol. 39 (no. 3); p. 46-46

**Publication Date:** Mar 2014

**Publication Type(s):** Trade Publication

**ISSN:** 01454064

**Place of Publication:** Nashville, Tennessee

**Publisher:** Endeavor Business Media

**Accession Number:** Some(94849926)

**Keywords: Subject Terms:** Ambulances; Cleaning Compounds; Sterilization and Disinfection Methods; Patient Care Methods; Immunity; Human; Centers for Disease Control and Prevention (U.S.); Infection Prevention and Control; \*Ambulances; \*Cleaning Compounds; \*Sterilization and Disinfection Methods; \*Patient Care Methods; Immunity; Human; Centers for Disease Control and Prevention (U.S.); Infection Prevention and Control

**Abstract:**The article discusses the importance of cleaning and disinfecting ambulances to protect patients. An estimate by the U.S. Centers for Disease Control and Prevention (CDC) shows the number of hospital-associated infections that contributed to deaths annually. An overview of a research study on the contamination of ambulances in an urban setting by methicillin-resistant Staphylococcus aureus (MRSA) is presented. The author suggests complete sterilization of the ambulance to keep it clean.

**Database:** CINAHL

Strategy 839841

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| **#** | **Database** | **Search term** | **Results** |
| 1 | Medline | ((emergency OR hospital) ADJ transport\*).ti,ab | 767 |
| 2 | Medline | ((emergency OR hospital) ADJ vehicle\*).ti,ab | 139 |
| 3 | Medline | (ambulance\*).ti,ab | 10153 |
| 4 | Medline | (1 OR 2 OR 3) | 10877 |
| 5 | Medline | ("infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\*).ti,ab | 144353 |
| 6 | Medline | \*DECONTAMINATION/ | 2889 |
| 7 | Medline | \*DISINFECTION/ | 8699 |
| 8 | Medline | \*STERILIZATION/ | 11403 |
| 9 | Medline | \*FUMIGATION/ | 585 |
| 10 | Medline | (5 OR 6 OR 7 OR 8 OR 9) | 158008 |
| 11 | Medline | (4 AND 10) | 112 |
| 12 | Medline | 11 [DT 2014-2020] [Languages English] | 42 |
| 13 | CINAHL | ((emergency OR hospital) ADJ transport\*).ti,ab | 450 |
| 14 | CINAHL | ((emergency OR hospital) ADJ vehicle\*).ti,ab | 118 |
| 15 | CINAHL | (ambulance\*).ti,ab | 6604 |
| 16 | CINAHL | (13 OR 14 OR 15) | 7066 |
| 17 | CINAHL | ("infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\*).ti,ab | 37359 |
| 18 | CINAHL | \*"EQUIPMENT REUSE"/ | 995 |
| 19 | CINAHL | \*FUMIGATION/ | 27 |
| 20 | CINAHL | \*"EQUIPMENT CONTAMINATION"/ | 2399 |
| 21 | CINAHL | \*"INFECTION CONTROL"/ | 18510 |
| 22 | CINAHL | \*"DECONTAMINATION, HAZARDOUS MATERIALS"/ | 666 |
| 23 | CINAHL | (17 OR 18 OR 19 OR 20 OR 21 OR 22) | 52004 |
| 24 | CINAHL | (16 AND 23) | 94 |
| 25 | EMBASE | ((emergency OR hospital) ADJ transport\*).ti,ab | 1091 |
| 26 | EMBASE | ((emergency OR hospital) ADJ vehicle\*).ti,ab | 184 |
| 27 | EMBASE | (ambulance\*).ti,ab | 15227 |
| 28 | EMBASE | (25 OR 26 OR 27) | 16222 |
| 29 | EMBASE | ("infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\*).ti,ab | 203919 |
| 30 | EMBASE | \*DECONTAMINATION/ | 693 |
| 31 | EMBASE | \*FUMIGATION/ | 286 |
| 32 | EMBASE | \*"INFECTION CONTROL"/ | 26822 |
| 33 | EMBASE | \*CLEANING/ | 2654 |
| 35 | EMBASE | (29 OR 30 OR 31 OR 32 OR 33) | 223377 |
| 36 | EMBASE | (28 AND 35) | 178 |
| 37 | EMCARE | ((emergency OR hospital) ADJ transport\*).ti,ab | 419 |
| 38 | EMCARE | ((emergency OR hospital) ADJ vehicle\*).ti,ab | 78 |
| 39 | EMCARE | (ambulance\*).ti,ab | 5807 |
| 40 | EMCARE | (37 OR 38 OR 39) | 6195 |
| 41 | EMCARE | ("infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\*).ti,ab | 41850 |
| 42 | EMCARE | \*DECONTAMINATION/ | 256 |
| 43 | EMCARE | \*FUMIGATION/ | 60 |
| 44 | EMCARE | \*"INFECTION CONTROL"/ | 5506 |
| 45 | EMCARE | \*CLEANING/ | 942 |
| 46 | EMCARE | (41 OR 42 OR 43 OR 44 OR 45) | 44386 |
| 47 | EMCARE | (40 AND 46) | 87 |
| 48 | CINAHL | 24 [DT 2014-2020] [Languages eng] | 40 |
| 49 | EMBASE | 36 [DT 2014-2020] [Languages English] | 75 |
| 50 | EMCARE | 47 [DT 2014-2020] [Languages English] | 35 |
| 53 | PubMed | ((emergency).ti OR (hospital).ti) ADJ (transport\*).ti | 945 |
| 54 | PubMed | ((emergency).ti OR (hospital).ti) ADJ (vehicle\*).ti | 229 |
| 55 | PubMed | (ambulance).ti | 2904 |
| 56 | PubMed | (53 OR 54 OR 55) | 3985 |
| 57 | PubMed | ("infection control" OR fumigation\* OR Decontamin\* OR clean\* OR saniti?\* OR sterili?\*).ti,ab | 150754 |
| 58 | PubMed | (56 AND 57) | 30 |

# Header

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Text Size: 24 point reduce text size to fit header

Left Header: NWAS LIS KNOWLEDGE FOR LIFE banner

Right Header: Title Text

Title Font: Calibri

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# Main Body

# Headings

Text Size: Calibri 14 Point

Text Colour: RGB 89 165 173

Style: **Bold**

Subtitle

Text Size: Calibri 12 Point

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Style: **Bold**

Normal Text

Text Colour: (Automatic) Black

Text Size: 12 point preferred 10 point if required

Text Font: Calibri

Footer

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Text Size: 12 point preferred 10 point if required

Text Font: Calibri

Elements: Page Number Left. Center right, NWAS LIS – Month Year – Version 0.1