



**The Sierra Madre Fire Department has implemented a gurney surface barrier - protection protocol using Path-O-Wrap®. This protocol will help decrease cross-contamination of harmful pathogens, and help to reduce the overuse of chemical cleaning products and implements. This protocol will also increase the life of a gurney mattress, and reduce costs associated with mattress replacement.**

## **A Case Study – January 2018**

### **Background**

It is important for everyone in the business of patient care to keep equipment intact and clean. Much time, effort and expense in medical facilities is devoted to disinfecting potentially contaminated surfaces as well as to preventing bloodborne pathogen exposures<sup>1</sup>. Damaged, worn, or unclean gurney mattresses can pose a risk - exposing both patients and staff to harmful pathogens. An FDA Safety Communication warned: Damaged or worn covers for medical bed mattresses pose a risk of contamination and patient infection<sup>2</sup>.

One piece of equipment used most in the pre-hospital setting is the gurney mattress. Just like all other pieces of equipment it needs to be cleaned after every use. However, this item always seems to become the dirtiest because of direct exposure to patients, and to bodily fluids because of injury, or other medical circumstance. Terminal cleaning of a mattress can be difficult and time consuming, and the exposure to cleaning agents and cleaning implements may cause damage over time. The act of cleaning the mattress may expose an individual to potentially harmful pathogens.

Path-O-Wrap was created because of these concerns. Hospital emergency room staff, EMT's and Paramedics, and many others involved in pre-hospital care have requested a solution to this problem. In speaking with these individuals and groups, many questions were raised on what to do to combat this problem. How do we make the solution easy, and cost effective? How can we get our gurney mattresses back in service faster? How can we keep the mattress clean in the first place? And, how can we increase the life of the of the mattress and reduce need for replacement, and help reduce costs? These were just some of many questions that were asked as well as the request to find a solution.

### **Case Study**

In 2012, the Sierra Madre Fire Department participated in an independent study<sup>3</sup> of a barrier protection product to: 1. Reduce the time it takes to clean a gurney mattress after use, 2. Reduce costs by increasing the potential life of the gurney mattress, 3. Reduce potential wear and tear of a gurney mattress, 4. Reduce the routine direct contact of cleaning solutions on the gurney mattress. 5. Test the film for blood and viral penetration.

On Thursday August 2, 2012, the Sierra Madre Fire Department put into service, two (2), new in the box, polyurethane coated nylon - sealed flat mattresses. Both mattresses were placed into service on the same day, and were placed on separate gurney cots. The gurney cots and the assigned mattresses were rotated on the front-line rescue ambulance in one (1) month, rotating intervals. Gurney (A) remained uncovered for the study period, and gurney (B) was covered with the protective barrier film. The mattresses were monitored by two individuals who were trained in the application and removal of the film, and in the inspection of the gurney mattresses. During the survey period, all of the paramedics and EMT's were instructed to use the cleaning solutions currently in use by the Sierra Madre Fire Department.

The survey was conducted during the following time period: August 1, 2012 through August 31, 2017. During this survey period, the Sierra Madre Fire Department rescue ambulance responded to 3,275 calls for service. Mattress (A) was used to respond to 1,668 calls for service, and Mattress (B) was used to respond to 1,607 calls for service during this survey period.

Mattress (B) was covered with the protective barrier film at the start of each month. A new piece of film was applied to the mattress top and marked at that time. The covered mattress was marked on top of the film with the date and time of application. The information was tracked monthly via an excel spreadsheet. If the film developed any visible tears or other wear, the current protective film was removed, and another piece was applied to the gurney mattress. This removal and reapplication of the film was documented at that time. A new date and time mark was noted on the top of the film at that time).

In addition, this study provided an independent laboratory with samples of the protective film for testing. The tests were conducted to determine if the film is impervious to fluids, and if the film prevented blood and virus penetration. ASTM Method F 1670 (Synthetic Blood Penetration), and ASTM Method F 1671 (Viral Penetration) were used in the respective tests. Testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

## Conclusion

In 2017, the survey was concluded. In a time period of five (5) years, both mattresses were examined for the final time. A total of 3,275 calls for service were responded to by the front-line ambulance. Mattress (A) was used to respond to 1,668 calls for service, and Mattress (B) was used to respond to 1,607 calls for service. During this time period, both mattresses were examined by the two trained monitors, and the data was collected and noted on an excel spreadsheet. Mattress (A) was found to have significant wear and tear in the middle and at the end of the mattress. (see photo A). Mattress (B) was found to be visibly intact with no significant damage or wear marks noted anywhere on the top and sides of the mattress. (see photo B).

In addition to the findings, a survey was given to the EMT's and Paramedics employed by the Sierra Madre Fire Department. The survey found the EMT's and Paramedics said it takes less time to place the gurney back into service, and the application of the protective film has reduced the direct contact soiling of the mattress during some patient contacts (these patients are those with bleeding, and other bodily fluid discharge). These same EMT's and Paramedics state they have reduced the need to overuse cleaning products on the top of the mattress after a patient with significant soiling was transported.

The independent laboratory testing of the protective film using ASTM Method F 1670 (Synthetic Blood Penetration), and ASTM Method F 1671 (Viral Penetration) were conducted on February 6, 2014, and March 12, 2014 respectively. The protective film samples provided to the independent laboratory passed, with all test method acceptance criteria being met. The testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

The Sierra Madre Fire Department has concluded the protective film did help to reduce the time it takes to clean and place back into service a gurney mattress. And, the protective film reduced wear and tear of the mattress, and reduced visible signs of abrasions and other damage related to daily use. In addition, the need to replace a mattress was reduced by one in the two mattress comparison, thus saving money on replacement.

The use of chemical cleaners was also reduced when used in conjunction with the covered mattress, as any heavy soiling was eliminated by disposing of the protective film in an appropriate medical waste container, leaving the top of the covered mattress with no heavy soiling, allowing for a decrease in the use of the chemical cleaning solutions during the cleaning process between patient use.

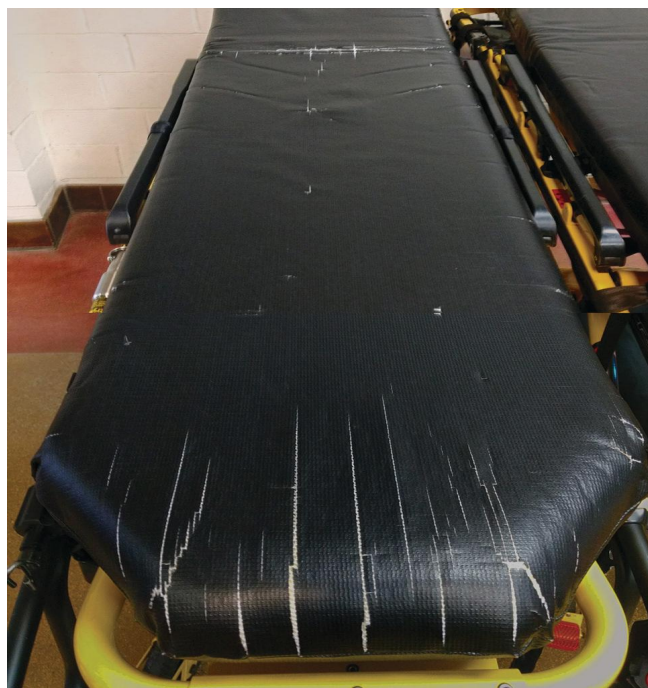


Photo A



Photo B

The Sierra Madre Fire Department will continue to implement a proactive approach to cleaning and disinfecting their equipment, and use the protective barrier film (Path-O-Wrap®) to cover and protect their gurney mattresses.

### **About the Sierra Madre Fire Department**

The Sierra Madre Fire Department is located in the San Gabriel Valley of Southern California. The City of Sierra Madre is located at the base of Mount Wilson, and north-east of the City of Pasadena. The Sierra Madre Fire Department was started in 1921, and services a population of approximately 14,000 residents, and over 4,000 homes. The Sierra Madre fire department is an all-risk - paramedic rescue department, responding to emergency calls for service with an engine company and rescue ambulance.

### **About MedFire Innovations, Inc.**

MedFire Innovations was started with one goal in mind - Protecting those who work in the business of protecting others. MedFire Innovations is dedicated to the development and manufacturing of products designed to help protect Nurses, Doctors, EMT's and Paramedics, and other Healthcare Providers; Firefighters, Police Officers, Rescue Personnel, and Emergency Medical Providers all over the world. MedFire Innovations solves industry problems with simple solutions and innovative designs. Our barrier protective film Path-O-Wrap was developed to help prevent cross-contamination and to reduce potential contact with bloodborne pathogens.

**If you would like more information on this case study, or more information about Path-O-Wrap, please contact Staci Mehl at: [smehl@medfire.com](mailto:smehl@medfire.com)**

### **References:**

1. Bradbury, S.L., Mack, D., Crofts, T., Ellison, R.T. 2014. "Potential Pathogen Exposure from Occult Mattress Damage." *American Journal of Infection Control*, Vol. 42: 421-422.
2. FDA Safety Communication: "Damaged or Worn Covers for Medical Bed Mattresses Pose Risk of Contamination and Patient Infection: 2013" <http://fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm348016.htm>.
3. MedFire Innovations, Inc. Independent laboratory testing of ASTM Method F 1670 (Synthetic Blood Penetration), and ASTM F 1671 (Viral Penetration). 2014.