The purpose of this study was to demonstrate that the skin under the catheter is protected with CHG from the gel pad, that CHG is able to migrate under the catheter, and the rate at which this occurs. For this purpose, skin sites of subjects were dressed with antimicrobial CHG dressings over central line catheter sections and studied to determine the rate of migration of chlorhexidine gluconate to the skin under the catheter.

The presence of a vascular access device provides bacteria a point of entry to the body, and places patients at risk for local and systemic infectious complications. A patient’s own skin flora is considered to be a major risk factor for catheter colonization and infection for central venous catheters. The new 3M™ Tegaderm™ CHG (chlorhexidine gluconate) IV Securement Dressing integrates an antimicrobial gel pad with a transparent dressing that is placed over the catheter site. The challenge has been how to provide continuous circumferential antimicrobial protection without requiring manipulation of the catheter.

This study was conducted according to an IRB-approved protocol. The backs of 8 healthy human volunteers were prepped with 2.5 cm catheter sections (Arrow, 7 FR polyurethane double lumen catheter) such that one end extended ~0.5 cm beyond the gel pad and 2 cm were covered by the gel pad. The volunteers were restricted from physical activities that could cause sweating or saturated dressings.

Results are expressed as ratios comparing the signal intensities under the catheter pieces to the intensities directly under the gel pads.

**MALDI (Matrix-assisted laser desorption/ionization) technique:**
A mass spectrometry (MS) method in which a laser beam vaporizes the matrix coated over the sample (tape-skin lawn), ionizing the matrix and the CHG. The intensity of the signal relates to the concentration of CHG that was vaporized and ionized from the sample.

**Microbiological methods**

- Additional research is needed to further refine the methodology and improve the efficiency/uniformity of skin recovery.
- Average CHG ratios on skin under catheters increased with dressing wear time.
- Skin recovered from under the gel pads qualitatively reached a steady CHG level after 2 days wear.
- Skin recovered from under the catheters showed the presence of CHG for all subjects in 24 hours.
- Results are represented as a ratio (%) of the CHG recovered from under the catheter to CHG recovered under the gel pads.
- Skin recovered from under the catheter showed the presence of CHG for all subjects in 24 hours.
- Skin recovered from under the gel pads qualitatively reached a steady CHG level after 2 days wear.
- Average CHG ratios on skin under catheters increased with dressing wear time.
- Additional research is needed to further refine the methodology and improve the efficiency/uniformity of skin recovery.

**Discussion and Conclusions**
Microbiological methods were assessed and lacked precision and sensitivity for this study. Agar methods are not true reflections of what happens on drier sites such as skin; cup scrub methods are applicable for large areas; and swabs have poor recovery. The MALDI analytical method was developed for its potential sensitivity in imaging CHG on skin recovered by tape lifting. The tape-skin samples demonstrated variable CHG recoveries as determined by MALDI analysis. However this variability appears related to the uniformity of the skin lawn on the tape. Too much skin and the CHG signal is reduced and appears buried; too little skin and the signal is also weak. The authors believe the precision of this method can be improved with more uniform skin sampling methods and the mean trends are indicative of substantial CHG migration.

This study was successful in demonstrating the presence of CHG on skin under catheter pieces. The amounts of CHG recovered reflect increasing levels with time, and underestimate the actual amount of CHG on the skin under the catheter. The use of the new 3M™ Tegaderm™ CHG dressing over a catheter site provides continuous circumferential antimicrobial protection without requiring excessive manipulation or intrusion under the catheter.