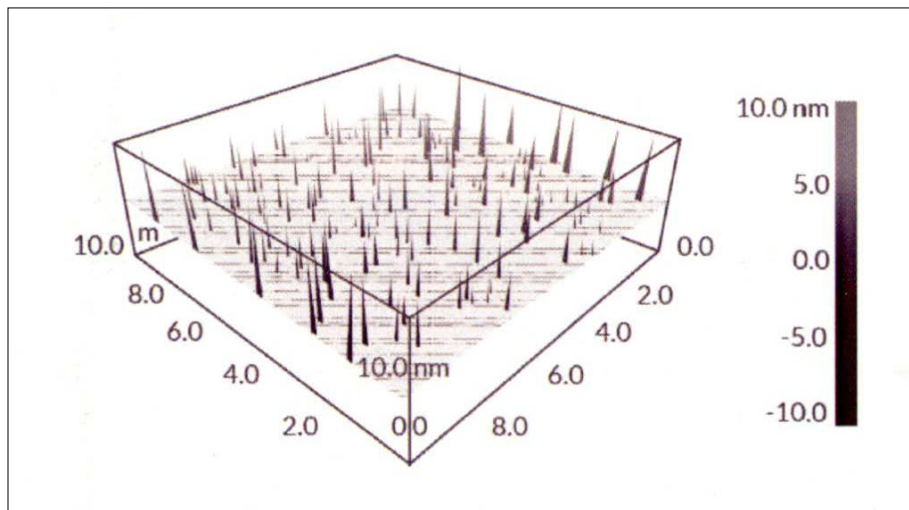
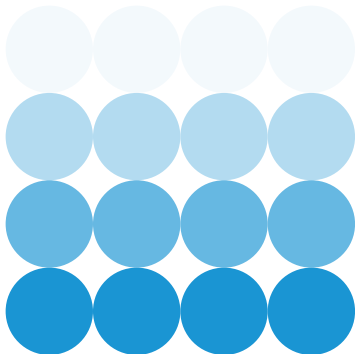


Hospitals Warring With Microbes Have a Powerful New Weapon!

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The Future of Infection Control: a Disruptive Nanotechnology Device

Industry Alert™ focuses on emerging medical devices and systems that improve patient care. Our latest featured device will save more lives immediately than any device we have written about in 18 years; yet it is one of the smallest medical devices we have ever showcased.

Microbes and Viruses Kill People

Amid a flu epidemic as widespread as in 2017/2018, all healthcare facilities are scrambling to find ways to stop further spread of the H3N2 influenza and deal with other hospital-acquired infections (HAIs).

According to the NIH, “Approximately 2 million patients per year develop HAIs, or about 5% of acute hospital admissions. The last decade alone has seen an estimated 36% increase in HAIs. The estimated 100,000 deaths per year associated with HAIs rank this as the sixth leading cause of death in the United States.

In a recent study capturing additional underlying expenses, the excess hospital cost

of HAIs across the nation was estimated to be between 28 and 45 billion dollars annually.”¹

That’s a huge cost to treat and mitigate 1.7 million healthcare-associated infections a year that could have been prevented in the first place.

Taxpayer money will be spent to solve this problem, the only question is on what solution and how effective will any solution prove to be.

Hospitals are budgeting to address the problem, but may actually overlook the most effective solution because they are unaware that nanotechnology microbe shields exist to solve it.²

¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2881841/>

² Jul 20, 2017 - Section 3008 of the Patient Protection and Affordable Care Act (ACA) established the Hospital-Acquired Condition (HAC) Reduction Programs. See <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/index.html>.

Given that by their very nature many HAIs are considered preventable, it is hardly surprising that the CMS policy covers 3 types of common infection sites: (1) selected surgical site infections, (2) vascular catheter-associated infections, and, (3) catheter-associated urinary tract infections.³

Once it's known that a viable solution exists, not adopting it could create liability issues in any provider setting.

Infections Are Public Enemy No. 1

Microbes and viruses are not just problems in hospitals, they are problems everywhere that people use cash machines, use debit/credit cards, go to school, work, live or travel. Prevention starts with people knowing how to protect themselves.

Do you use a bank cash machine, a debit card terminal at any retail or food store, go to any playground or public spot that has "hands on" experiences? Do your kids? If so, you are exposed to a plethora of microbes and viruses delivered by every other person who has been there before you and touched the same things in the last 3 weeks. Even if devices are decontaminated every night (which they are not), they are recontaminated as soon as the first customer the next morning uses them.

What is needed is a micro-organism shield that kills bacteria as it is presented by bank customers using the ATM.

Do you have a mobile smart phone or a touch-screen tablet or PC? How about a TV remote control, or a refrigerator or oven door handle, or a microwave oven keypad? There is a lot in your household to disinfect and this technology will work there.

Do you use a shopping cart at Costco or Sam's Club. These are some of the notoriously germey objects you encounter all the time. Have you taken a taxi, Uber, subway train or airplane recently? If so, you've been exposed to the germs of every other passenger before you. Think airplane tray tables are clean or seat headrests?

Has anyone coughed or sneezed in your car? Is your steering wheel contaminated? Do your kids go to school or play on playgrounds? How confident are you that your child has adhered to the proper hand hygiene protocols you have stressed while they are at school?

MRSA Not Just in Hospitals Anymore

Until recently, most MRSA infections were found in hospitals or long-term care facilities. They cause blood stream infections that too often result in death. Collectively, these are known as health-care-associated MRSA, or HA-MRSA.

More recently a newer strain of MRSA has emerged in communities in sanctuary cities that have high illegal immigrant populations. It's called community-associated MRSA, or CA-MRSA. Even average citizens need to take extra precautions to reduce their risks of infection. Elderly and populations with COPD are especially at risk.

The microbe-shield nanotechnology helps average people ward off infections in their homes, schools, workplaces and communities. (See https://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_epidemiology/dc/mrsa.html).

The New 2018 Flu Pandemic

"In the spring of 2009, a new influenza A (H1N1) virus (CDC 2009 H1N1 Flu website) emerged to cause illness in people. This virus was very different from the human influenza A (H1N1) viruses circulating at that time.

This year's flu vaccine is of marginal help since it was formulated for the wrong virus types. This has allowed a new pandemic to emerge in the US. More people are ending up admitted to hospitals where they also face HA-MRSA infections with an immune system already under attack.

This Winter's virus has caused the first influenza pandemic [outbreak] in more than 40 years.

That virus (often called "2009 H1N1") has now replaced the H1N1 virus that was previously circulating in humans."⁴

In 2018, the entire US is facing the first new influenza pandemic that has already responsible

for 14% of deaths in Texas.⁵ Other states with disproportionate elderly populations (FL, LA, TX, AZ) will be affected.

Conditions of Participation Modified

As a result of the pandemic, the Center for Medicare/Medicaid Services (CMS) on 1/13/2018 issued updates to their Conditions for Participation to all providers who receive Medicare/Medicaid funds. It mandates reducing HAIs to improve quality and save lives. Therefore, finding a cost-effective and practical means to reduce pathogens is not longer optional. There is a solution.

Hospitals Face Special Challenges

Technologies like oximeters, ventilators and portable or transport monitors, even stretchers that are used on multiple patients are potential vectors to spread infections if they are not properly decontaminated during and between patient uses. The use of disposable ventilator breathing circuits isn't enough, the rest of the ventilator also needs to be properly decontaminated. The nano-technology described herein can solve that problem.

There are also inherent challenges with medical facilities approaching this need to decrease not only influenza but pneumonia, urinary tract infections, and others. The hospital is an excellent virus and microbe incubator. Using disinfectant or sterilants as cleaners tend to create super-strains of whatever pathogens they don't kill.

Many studies have confirmed the potential hazards posed by microorganisms on hospital surfaces, including Boyce et al. [14] who as early as 1997 brought to attention the discovery that staff entering the room of an MRSA positive patient, could subsequently be found with MRSA contamination on their gloves, despite having had no direct contact with that patient.

This confirms that a residing microbial population on a surface can lead to cross-contamination and ultimately provide potential for infection dissemination. Effective cleaning and disinfection is therefore essential in breaking the chain of healthcare infection.⁶

⁵ <https://www.google.com/search?q=what+virus+type+is+the+flu&ie=utf-8&oe=utf-8&client=firefox-b-1>

⁶ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3509563/> Antimicrobial Efficacy of a Novel Eucalyptus Oil, Chlorhexidine Digluconate and Isopropyl Alcohol Biocide Formulation. PMC3509563/ Int J Mol Sci. 2012; 13(11): 14016-14025. Published online 2012 Oct 30. Emma Hendry,1 Barbara Conway,2 and Tony Worthington1,*

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2881841/> ibid.

⁴ <https://www.cdc.gov/flu/about/viruses/types.htm>.

The CDC's (Centers for Disease Control and Prevention) focus on Healthcare-acquired infections (HAIs) research has demonstrated the breakdown shown in Table 1 below for preventable infections as they affect patients receiving medical treatment:

About eleven percent of patients that contract HAIs die during their hospitalizations. More than half of all HAIs occurred outside of the intensive care unit in general wards and throughout the rest of the hospital. Steps must be taken to control and prevent HAIs in all of these settings. Proper and frequent hand washing is a well-know issue; but another major issue is decontamination of handheld devices (like oximeters), portable and IV-pole mounted devices (like infusion pumps and ventilators) and mobile phones that are carried/moved from room-to-room and patient-to-patient. Even if they use disposable accessories, the devices themselves may still be infection vectors. Both hard and porous surfaces must be properly decontaminated.

Research shows that when health-care facilities, care teams, and individual doctors and nurses, are aware of an infection problems and take specific steps to prevent them, rates of some targeted HAIs (e.g., CLABSI) can be reduced by more than 70 percent.

While reducing HAIs is possible, it takes a conscious effort of everyone – clinicians, healthcare facilities and systems, public health, quality improvement groups, and the federal government – working together to save lives. Getting the required level of cooperation on a sustained basis has proven to be a daunting challenge.

Hand washing campaigns alone won't do it. Traditional alcohol based hand sanitizers and regular hand washing are effective as long as you also glove or don't come in contact with any contaminated surfaces after you wash. As soon as you do, your hands pick up any germs on the object you touch and spread them to anything you touch thereafter.

The ideal solution to these issues lie in a strategy that protects all users and patient populations regardless of the 'human elements' of levels of cooperation or adherence to protocols.

Table 1 - HAI Estimates Occurring in US Acute Care Hospitals, 2011

Major Site of Infection	Estimated No.
Pneumonia	157,500
Gastrointestinal Illness	123,100
Urinary Tract Infections	93,300
Primary Bloodstream Infections	71,900
Surgical site infections from any inpatient surgery	157,500
Other types of infections	118,500
Estimated total number of infections in hospitals	721,800
(data courtesy of Executive Briefing Mobile Equipment Disinfection article, pg 18 ...)	

CMS & JCAHO Focus On HAI Reduction

In this 'Day of the Superbug' CMS has become very serious about reducing HAI infections that occur and preventing infections before they occur.

A new infection prevention and control requirement that focuses on the use of standard infection control practices, and patient/caregiver education and teaching is now part of the CMS Conditions of Participation for Ambulatory Surgical Centers (ASCs), Community Mental Health Centers (CMHCs), Comprehensive Outpatient Rehabilitation Facilities (CORFs), Critical Access Hospitals (CAHs), End-Stage Renal Disease Facilities, Federally Qualified Health Centers, Home Health Agencies, Hospices, Hospitals and other healthcare facilities.

It isn't that the above medical facilities don't believe that infections are a serious issue, but when typical workflow is studied at such facilities, reducing infections is not simply a matter of ensuring that staff members are washing their hands frequently (although this remains one of the vanguards of infection prevention).

Staff in medical facilities treat patients continually throughout the day, utilizing shared devices like stethoscopes (chest), otoscopes (ears), pulse oximeters (fingers). Automatic BP monitors use common blood pressure cuffs for each patient, exposing them to whatever pathogens remain from previous uses. Portable and stational medical devices are one of the main issues with prevention of infections.

Decontaminating Hard Versus Soft Surfaces

Unfortunately, what works to disinfect hard surfaces does not does not always work on porous surfaces (i.e. BP Cuffs, and so on).

If you ask BP Cuff manufacturers what is required to decontaminate blood pressure cuffs, you'll be surprised about how impractical their advice is. Some recommend cuffs be removed from circulation, sterilized and allowed to dry overnight. No facility has the spare BP cuff inventory to do this. Consider a doctor's office with 3 exam room per MD that each my have 15 to 20 patients per day. No office changes tubing and cuff between patient exams! It's a ridiculous and impractical suggestion. This puts the onus on healthcare providers to come up with practical and effective procedures. However by treating BP Cuffs with Zoono, the sterilization can be done once a month, which is far more practical and cost effective.

Think about anywhere that patient monitors, IV pumps or various handheld devices are used throughout the hospital, which is just about in every clinical unit, including general wards today. Every control panel or touch screen is a vector to HAIs.

One staff member comes into the room and sets a control. Perhaps two or three others do during a single shift, and then shift changes — three times a day. In a 24-hour period, 5-8 people are touching control panels and patients. Any one who doesn't adhere to hygiene protocols contaminate it and every other hand that touches it spreads the microbes.

Staff don't wash there hands after they touch it, nor do the clean the panel with alcohol after every touch. Even if they did the next staff touch would contaminate it all over again!

Increasingly the monitor control panel is a flat panel display, and many of these don't take well to being wiped with alcohol thousands of times. Plastics break down. If the display is embedded in a medical device, it may not be replaceable, and medical monitors can cost \$5K to 20K dollars each.

Then there are all the transducers and cables, most of which are never decontaminated. Is it any wonder that hospital infections are a major issue of growing importance.

Alcohols & Other Disinfectants

The bactericidal activity of various concentrations of alcohol has been extensively examined against a variety of microorganisms exposed to it.

Alcohols are not recommended for sterilizing medical and surgical materials principally because they lack sporicidal action and they cannot penetrate protein-rich materials and they tend to attack plastics and touch screens widely used in healthcare.

Alcohol has been used successfully to treat surfaces such as stethoscopes, scissors, thermometers, pulse oximeters and other hard surfaces. But alcohol doesn't work that well on porous surfaces.

For porous surface a different approach is required. Even when alcohol does work, it must be applied after every use, and that isn't always practical either.

BME/CE Exposure to Pathogens Unrecognized

Think of the poor biomedical technicians who must repair monitors and other devices that are all highly contaminated with thousands of different types of pathogens when the equipment to be repaired arrives in clinical engineering, or when they go up to the floor to check it out. How can they protect themselves? What can they do to decontaminate the devices they have to work on every day?

The Zoono Nano-Technology Microbe Shield Breakthrough

Zoono has created a totally new, physical approach to infection control. It's a "water-based" nanotechnology "device" that functions as a non-toxic, long-lasting barrier that can simply be sprayed onto a clean (protein-free) surface to incapacitate future pathogens that come in contact with it. It is called the Zoono Microbe Shield.

Look at Figure 1. It is a new, water-based nanotechnology shield (device). The figure is a germ's eye view. This nanotechnology device kills a broad spectrum of organisms and once applied, provides extended effectiveness.

There is a version that bonds to hands (providing 24 hour protection), and a product that bonds to various surfaces (that can provide up to a month's protection). There is even a Wound Version for patient wound care that promotes healing by helping to keep the cleansed wound area free of subsequent contamination.

Kill Times Are Fast — Protection Lasts!

Table 2 below shows, once Zoono's Microbe Shield is applied and dries, its effectiveness is nearly immediate. When used with alcohol or another agent to initially clean a surface, a coating of Zoono causes each germ to be exposed to all those spikes. Organisms that come in contact with this surface, it incapacitates without antibiotics or poisons!

For germs, Zoono it's like falling onto a bed of nails.

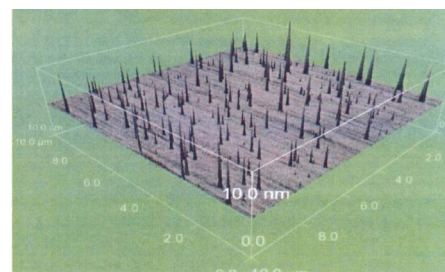


Figure 1. - Nanotechnology Shield

In the picture above, Zoono's Microbe Shield nanometer-size "spike field" is shown at a 10 nanometer magnification, and it's a 'hostile environment' for organisms that come in contact with it. When used for a prolonged period of weeks at a local hospital in NJ, the reduction in infections due to pathogens was significant.

Zoono also makes a MicroFogging solution. Here are some results from a recent trial.

The Protocol: Zoono product was applied both topically and via cold fogging unit and was used in addition to existing hospital and ICU housekeeping protocols.

Results: The use of Zoono, reduced the average TPC across all treated surfaces by 59.8% after 8 hours compared to an average increase of 45.3% within the control areas.

Similarly, 7 days after the Zoono treatment had been applied, the average reduction in TPC was still 31.7% compared to an average increase of 593.9% within the control areas.

Conclusions: The Zoono Microbe Shield product assessed in this study was found to have demonstrated statistically significant efficacy and persistence across 10 weeks, in reducing the total number of pathogens (TPC) on surfaces within the ICU.

Table 2 - The Zoono Microbe Shield's Ultra (Hospital) Product Effectiveness

Product efficacy against common pathogens			
	Contact Time	Percent Reduction	Log Reduction
Enterobacter aerogenes	1 minute	>99.99995%	>6.34
Klebsiella pneumoniae	1 minute	>99.99990%	>6.00
Pseudomonas aeruginosa	1 minute	>99.9998%	>5.85
Streptococcus pyogenes	1 minute	>99.99994%	>6.26
Staphylococcus aureus	1 minute	>99.99996%	>6.36
Candida albicans	1 minute	>99.9998%	>5.90
Candida Tropicalis	1 minute	>99.9997%	>5.60
(Microchem Labs USA, ASTM E2315 Method)			



When Zoono is applied to clean, dry surfaces, it can maintain germ-free conditions for extended periods. It is ready to apply in a convenient water-based dispenser.

Microbe Shield integrates with the facility's current best practices for cleaning and hygiene. In order to apply and maintain a superior hygienic environment a monthly fogging and weekly 'hot spot' touch up is all that's needed. Anyone who can use a trigger sprayer, can use Zoono. There is no big change in workflow or staff training here. The elevated and sustained level of hygiene that Zoono affords can be easily applied and integrated current processes.

Proven in High Germ Environments

Most Zoono products are already approved/cleared in the US market, and additional studies are also being conducted on other products not mentioned here. Zoono is really a group of two different types of products - one for people application and one for surface application.

The hand and wound products have a 24-hour effectiveness when applied to people (skin).

The Microbe Shield (when applied after a disinfectant on porous or hard surfaces), prevents subsequent contamination (and therefore the need for subsequent decontamination) for periods up to 30 days.

Proper Microbe Shield Application

The key is proper application. Read the label. Shake before use. Avoid breathing vapors. Wear gloves.

The Microbe Shield produce a fine mist spray, however for larger surfaces wiping with a micro-fiber wipe is recommended. Microfiber wipes do not absorb the product, wear using a conventional paper towel would. (Wiping with a paper towel or any other absorbent wipe absorb the Microbe Shield and leave the surface unprotected. Product must dry to be effective.

If you don't have microfiber cloths, they are commonly available at most stores today. Be sure to use them instead of cloths or paper towels.

The product should not be sprayed on contaminated surfaces until they have been decontaminated.

With proper application, Microbe Shield can reduce subsequent pathogens contamination in hospitals and thus help to minimize hospital-acquired infections (HAIs).

The Zoono Microbe Shield has already been validated at the Central Jersey VNA for home healthcare applications, and has been used in some NJ grade schools.

Wound Healing (Skin) Applications

Using Zoono on hard and soft device surfaces and on care provider hands is

not the only use. There is a formulation that can be used on wounds, such as pressure sores, abrasions, cuts to minimize bacterial contamination during the healing process. It's called GermFree24 Wound Cleanser by Zoono.

This has application not only in hospitals, in both the acute care and general ward units, but also in Assisted Living facilities, SNFs, Urgent Care centers, medical clinics and physician offices. This is a product that hospital Risk Managers, Housekeeping, Infection Control, BME and Nursing should be made aware of.

We will cover some of these other applications in future issues.

Cost Effectiveness Comparison

Zoono costs about \$0.04 (4 cents) per square foot to apply. Zoono Microbe Shield isn't a replacement for conventional disinfectant products, because Microbe Shield doesn't disinfect; rather, it's used as an adjunct to them to produce a coating that extends their period of effectiveness. This reduces the number of times things would otherwise have to be decontaminated, and saves the labor involved in doing so.

Zoono is about three times the cost per gallon of conventional disinfectants but overall it saves money because the conventional disinfectants don't have to be used as frequently, which reduces the quantity needed, and reduces the

labor costs with applying it. Its the sustained period of efficacy that makes Zoono really cost effective. Without Zoono, hygiene lasts only until the next pathogens contact the surfaced that has been decontaminated, but with Zoono it can last up to 30 days when applied to surfaces and devices, and up to 24 hours when applied to provider or patient skin.

This extended period of hygiene is particularly helpful in positive and negative pressure isolation areas, in the biomedical engineering department, and for ventilators and other items once they have been processed in central supply.

Measuring effectiveness can be done by culturing and by smart sensors can detect, analyze and quantify at molecular levels contents of different biological origin. They don't discriminate which pathogens, but do indicate protein presence.

Low Environmental Toxicity

Unlike decontamination products that kill pathogens chemically, which may have high toxicity, Zoono has very low toxicity. This is an important consideration when a product is being used continuously for a long period of time, or is widely used by the public. One application applied to the hands or skin kills 99.99% of germs.⁷

BME Departments

BME departments should consider investing in an ATP hand-held scanner, like the one below. It can highlight contaminated surfaces that need to be treated.



0 -30	Considered Food Safe
31 - 100	Considered clean
101 - 200	Caution!
201 - 500	Contaminated
501 - 1000	High Risk of Infection
1000 +	Extreme Risk of Infection

The ATP scanner works much as an airline scanner for explosives does. After swabbing a surface of a medical device, you place the swab in the ATP scanner. Within 15 seconds you will know how "clean" the device was, as indicated by the color scale shown below.

The Green scale would be a good indicator that the device is relatively "clean" and could be coated with the Zoono Microbe Shield and returned to service in a clinical area.

When broken equipment comes into the BME department for repair, you want to decontaminate it first, so swabbed it and then decontaminate it if needed. By all means decontaminated and treat it with Zoono before putting it back back into service. This protects BME staff, and any nursing or other staff who subsequently interact with the repaired device.

This is particularly helpful for those devices that have internal fans for cooling purposes, as they are dust and germ magnets.

BMEs who use Zoono Hand Sanitizer are putting on an invisible shield against becoming contaminated when they work with contaminated devices, similar to wearing latex gloves.

The ATP doesn't discriminate among the various organisms that are present as to their risk, but it will indicate if any (proteins) are present.

If any repaired device is properly decontaminated, there should be no proteins present on its surface.

The ATP device is ideal for busy Biomedical Departments, and should become part of a monthly PM procedure on all medical equipment. If used in conjunction with a modified housekeeping protocol, the impact on reducing HAIs could be profound.

Something needs to be done. There is no reason that 90,000 patients a year should die because they were admitted to a hospital. Zoono, at \$0.04 / sq. ft.

is an excellent and very cost-effect next step in the continuing war against pathogens in the healthcare setting.

Make sure to pass this on to your hospital infection control and house-keeping managers. Do your part to reduce HAIs and keep patients alive!

Family of Solutions

In this article we have discussed a variety of solutions offered by Zoono. Let's recap the products and their uses:

- Zoono Wound Cleanser is used for patient use on skin wounds to keep the area around the wound free of germs; and
- Zoono Microbe Shield is used after decontamination to create a final microbe-static barrier after decontamination. Items it has been sprayed on can be run through dryers (for temperatures up to 160°/320°F; and
- Zoono Hand Sanitizer creates a Microbe Shield after handwashing when the skin is germ free. It's effective up to 24 hours. Not affected by subsequent hand washings. Perfect for anyone who come in contact with contagious patients or contaminated surfaces; and
- We discussed Zoono Ultra Hand Sanitizer that contains both alcohol and the Microbe Shield technology. The product also contains alcohol to decontaminate plus the shield.

Go to the Zoono USA website and sign up for more information. A 30% discounted is currently available for those who sign up for the Zoono mail list. It's a great deal!

Going to HIMSS in Las Vegas in March? Take a bottle along with you. We can guarantee you there are plenty of germs in Las Vegas. You don't want to pick up any of them there. Slot machine handles, keys and money are all loaded with germs from all over the country. Airplanes are flying germ incubators.

If you are immune-compromised, spray some on a mask and wear it on the plane.

Zoono USA is located at 1151 Broad ST. Suite 115, Shrewsbury NJ 07702. Phone is 732-722-8757. Δ

⁷ Zoono has a toxicity (LD50) rating of 12.3, less than a daily dose of Vitamin C.