



# NOBLE HEALTH

ANTIMICROBIAL SOLUTIONS FOR HEALTHCARE  
USING X-STATIC® & IONIC+™



# The Mission

These are unprecedented times. There have never been more hospitalizations and never before have healthcare workers been at such risk.

Our mission is simple:

**We want to keep healthcare workers and their patients safe from secondary infection.**

Secondary infection from soft surfaces in the healthcare environment are preventable.

We can help with EPA-registered antimicrobial products that are:

- **Proven and tested**
- **Require no behavior modification**
- **Cost effective when compared to human and financial cost of secondary infection**



# The Definition: Microbes

Microscopic organisms that are among the earliest known life forms.



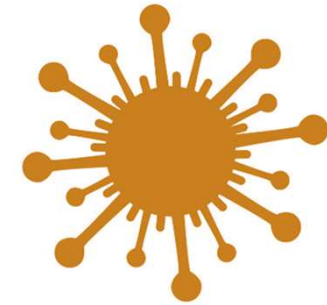
## Bacteria

Ubiquitous one-celled organisms.



## Fungi

Eukaryotic single-celled or multinucleate organisms.



## Viruses

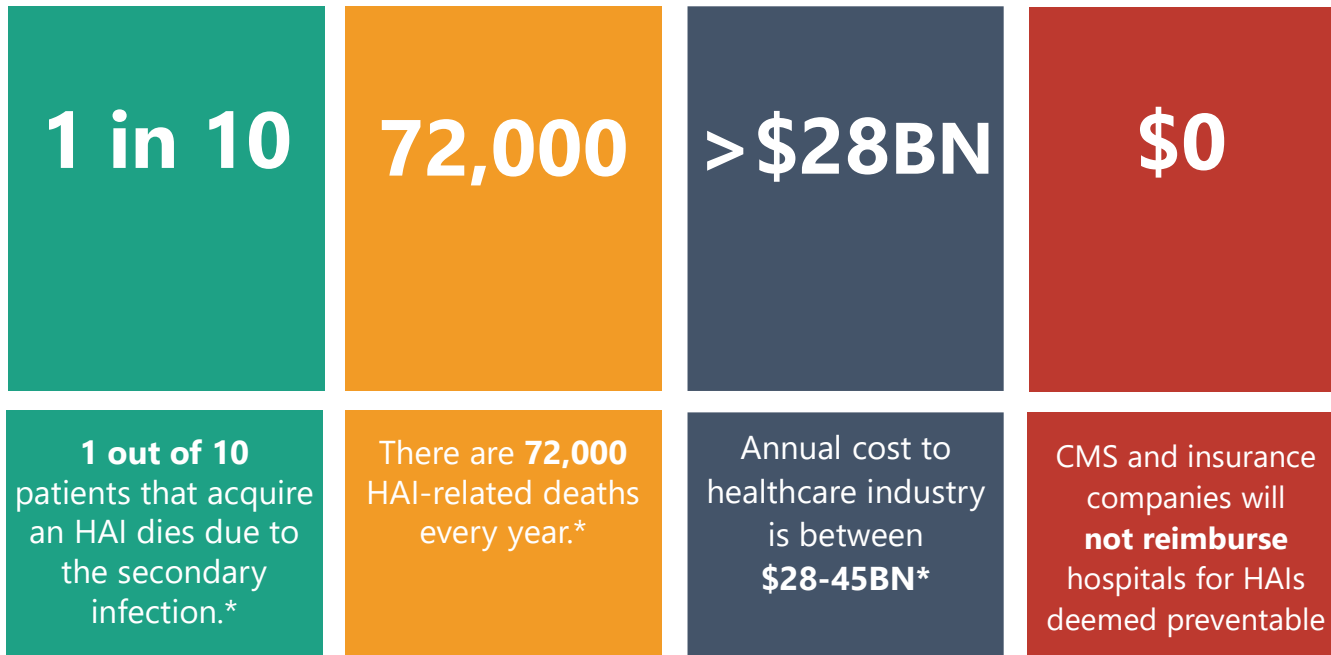
Infectious agent that replicates only within the cells of living hosts.

Microorganisms include **bacteria**, **fungi**, and **viruses**.

Though we are registered with the EPA as an antimicrobial, the EPA and FIFRA only allow for discussing article efficacy for bacteria and fungi. No company can state viral claims to consumers at this time.

# The Problem

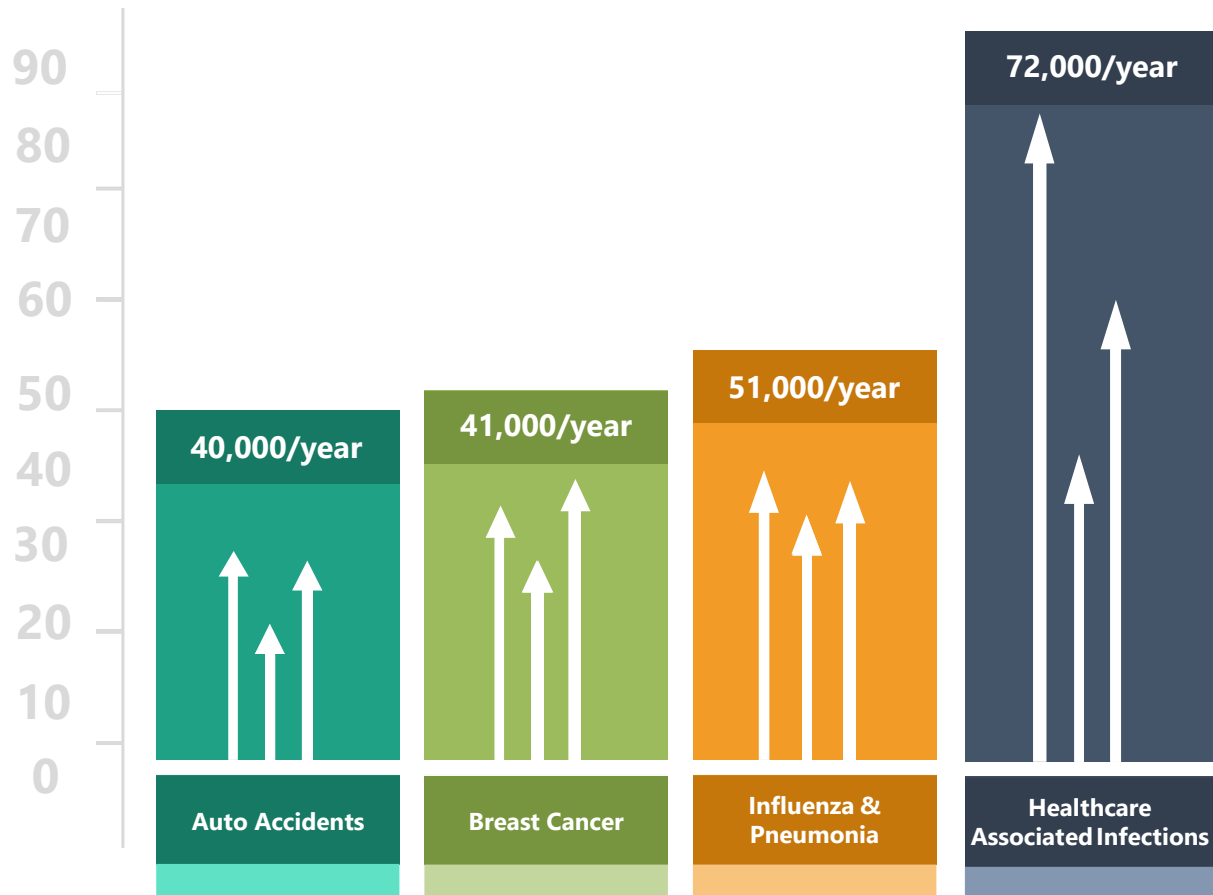
Healthcare Associated Infections (HAIs) Affect Millions of Patients Globally A Year



\*CDC: <https://www.cdc.gov/hai/data/portal/index.html>

# The Scale

HAI's Kill More People Each Year Influenza & Pneumonia, Auto Accidents, and Breast Cancer



# The Increased Risk

The Novel Coronavirus and COVID-19 Have Increased The Numbers

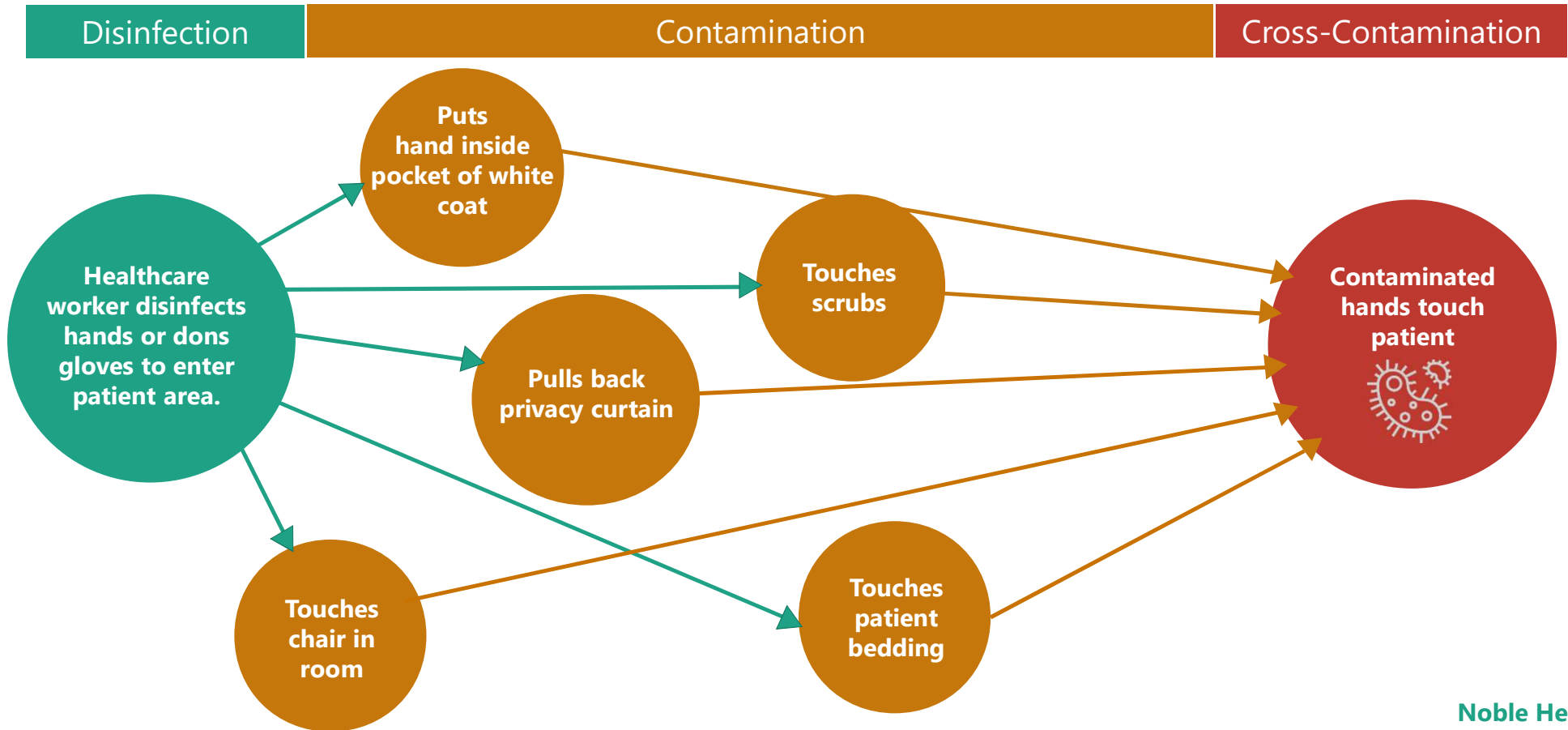
There are an **unprecedented number of hospitalizations** all over the world at this time. In a study published in *The Lancet*\* in March, it was discovered that **one in seven COVID-19 patients develop a secondary infection** while hospitalized.



VOLUME 395, ISSUE 10229, P1054-1062, MARCH 28, 2020 *Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study*

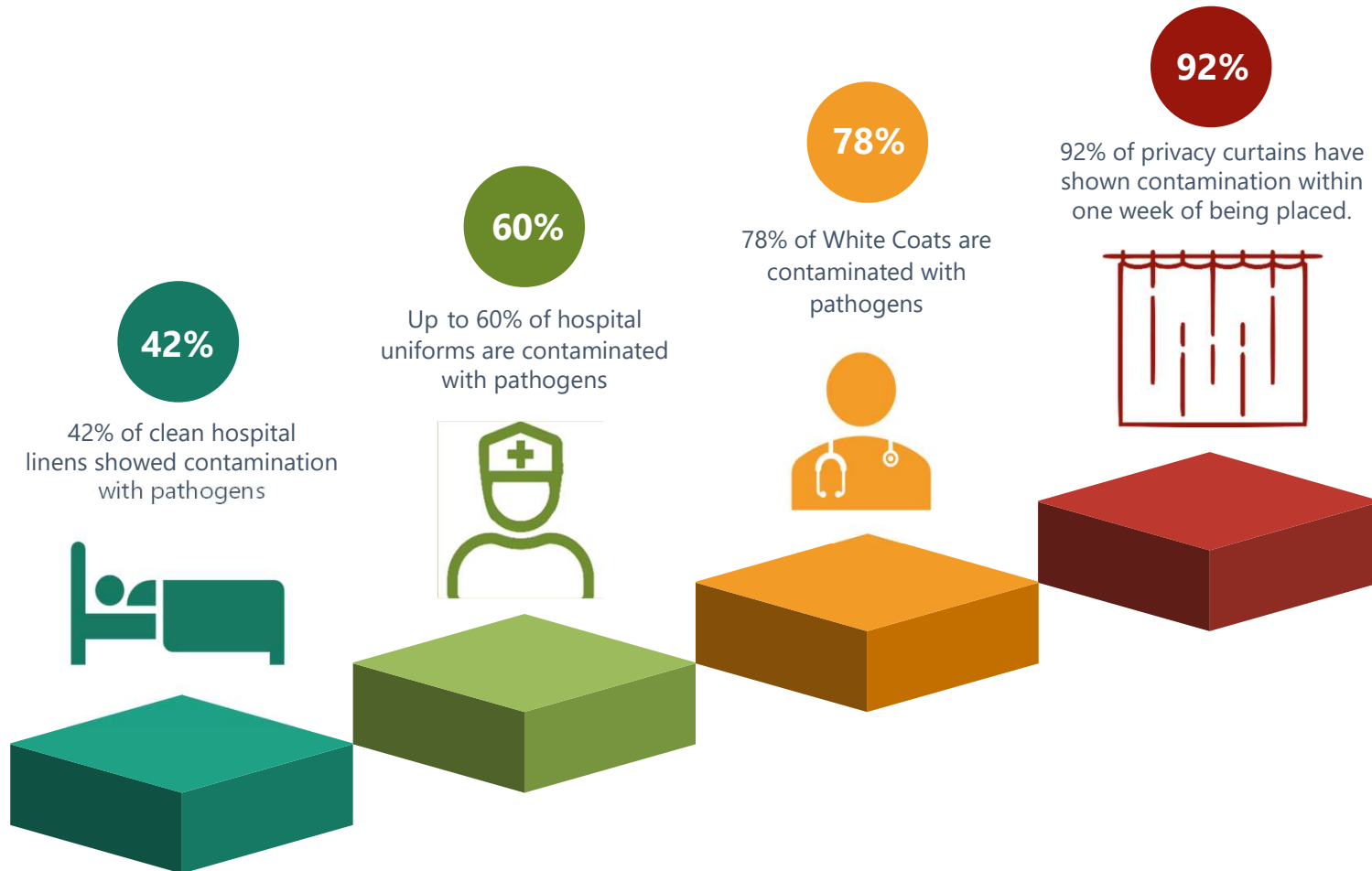
# How Pathogen Transfer Happens

Clean Hands Are Easily Contaminated by All Surfaces Around a Patient



# How Bad Are Pathogens on Surfaces?

Contamination Of Healthcare Worker Clothing and Soft Surfaces





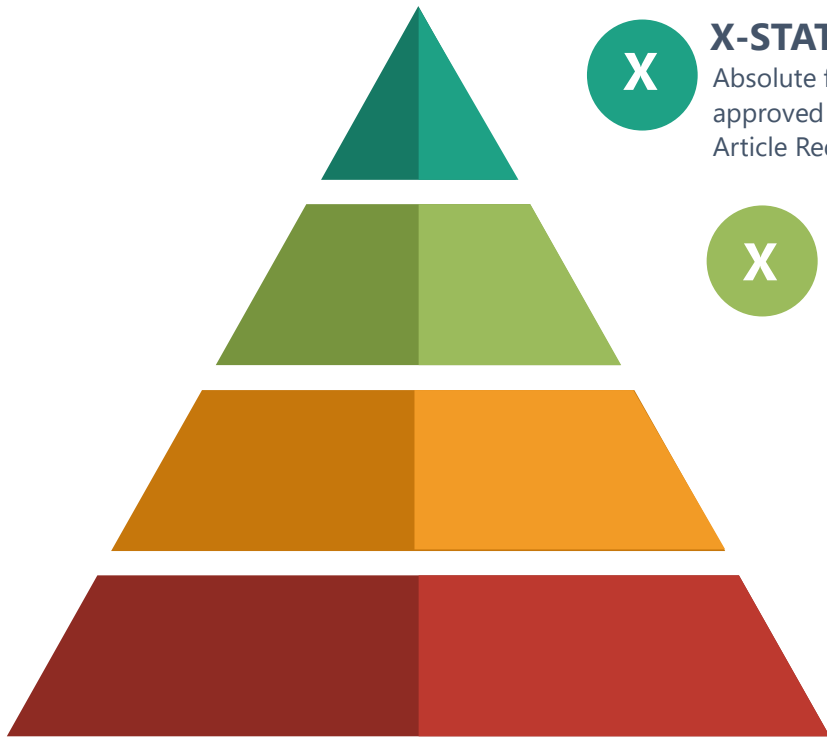
# Pathogen Distribution

Studies Assessing Contamination Of Healthcare Worker Clothing

N	Study	Fabric Type	Pathogen	% Contaminated
40	Ditchburn I, 2006	Ties	Staphylococcus aureus	20%
			<b>Staphylococcus aureus</b>	<b>29%</b>
42	Nurkin S, 2005	Ties	Gram-negative rod	12%
			Aspergillus	2%
57	Perry C, 2001	Nurse uniforms	<b>MRSA</b>	<b>14%</b>
			<b>VRE</b>	<b>38%</b>
100	Wong D, 1991	White coats	Staphylococcus aureus	29%
100	Loh W, 2000	White coats	Staphylococcus aureus	5%
			Acinetobacter	7%
14	Osawa K, 2003	White coats	<b>MRSA</b>	<b>79%</b>
149	Treakle AM, 2008	White coats	Staphylococcus aureus	23%
50	Lopez PJ, 2009	Shirts	Staphylococcus aureus	16%
		Ties	Staphylococcus aureus	26%
103	Uneke CJ, 2010	White coats	Staphylococcus aureus	19%
			Pseudomonas aeruginosa	10%
			Staphylococcus aureus	6%
130	Pandey A, 2010	White coats	<b>E. coli</b>	<b>11%</b>
			Pseudomonas aeruginosa	2%
			Acinetobacter	2%

# Antimicrobial Solutions

An Added Layer of Protection with Silver-Based Noble Biomaterials Antimicrobial Products



## **X-STATIC® Metalized Fabrics & Foams**

Absolute fastest microbial kill rate. Tested effective against human coronavirus. FDA approved for Medical Devices and Wound Care. Conforms with EPA & BPR Treated Article Requirements.



## **X-STATIC® Metalized Fiber and Yarns**

Very fast pathogen kill rate, extremely durable. FDA Approved for Medical Devices. Conforms with EPA & BPR Treated Article Requirements.



## **Ionic+™ Silver Ions In Extruded Yarn & Nonwovens**

Economical and durable. These extruded yarns and fibers contain permanently embedded silver ions. Conforms with EPA & BPR Treated Article Requirements.

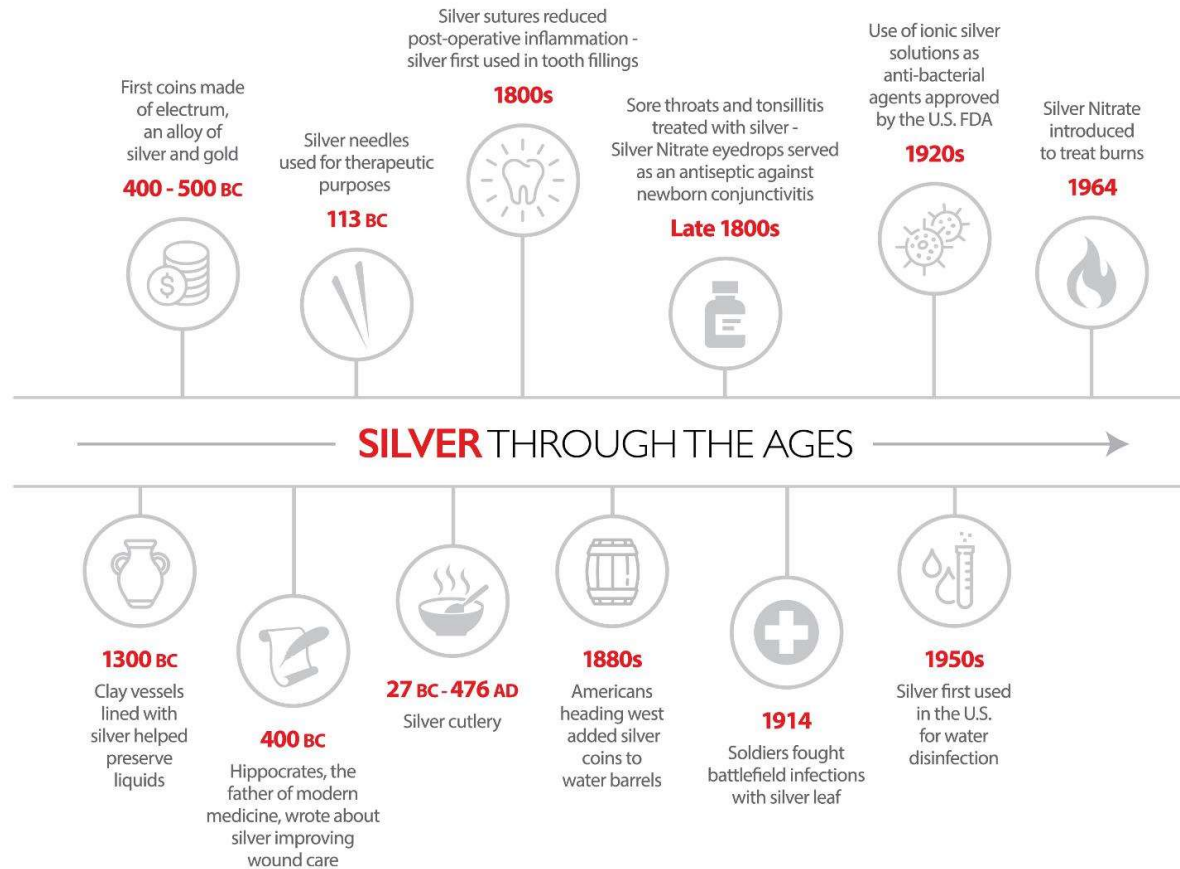


## **Ionic+™ Silver Ions in Topical Treatment**

Economical but not as durable as extrusion or metalized yarn & fiber. Very effective for use in disposable PPE. Conforms with EPA & BPR Treated Article Requirements.

# Silver Used in Healthcare for Millenia

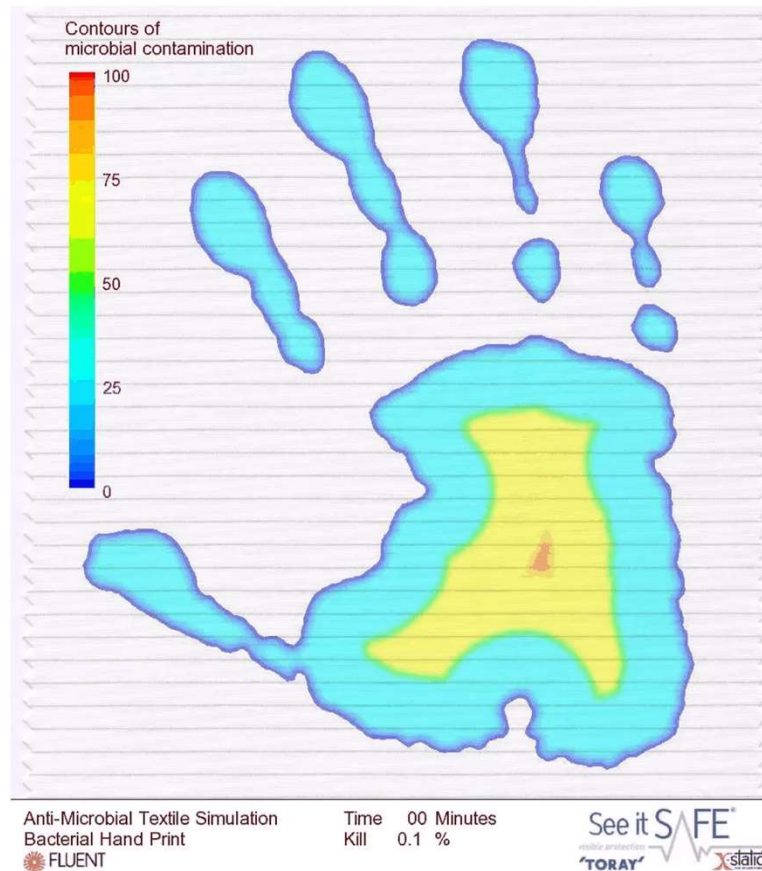
You can attain antibacterial effects with silver ions at significantly lower concentrations than copper and zinc.\*



\*Windler et al., 2013, Udin, 2014 and Turalija et al., 2015

# Noble Antimicrobial Fabric in Action

Simulation of real test results. Time lapse of 99.9% microbial kill rate on fabric in just 59 minutes.



10 minutes = 46.9% killed

20 minutes = 70.6% killed

30 minutes = 84% killed

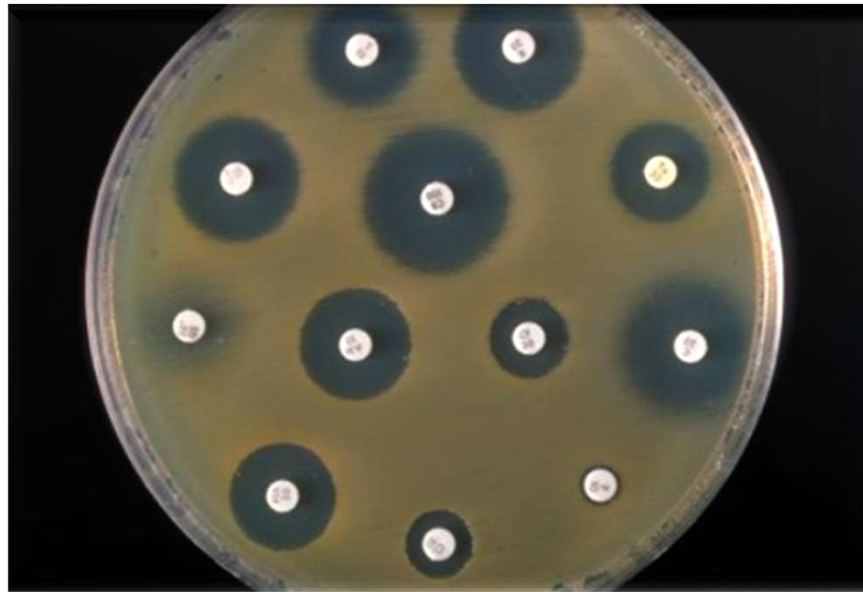
40 minutes = 91.3% killed

59 minutes = 99.9% killed

Noble Health

# Zone of Inhibition

As with antibiotics, silver ions inhibit pathogen growth and reproduction.



By dosing the fabric correctly (replacing 3-10% of the yarn in a garment) we can create this zone of inhibition all over the garment.

# X-STATIC<sup>®</sup> Technology

Two Decades of Use in Healthcare

## CLINICALLY PROVEN

Several clinical studies performed in hospitals on soft surfaces showed significant reduction of pathogens on fabric.

## NO BEHAVIOR MOD BY STAFF OR PATIENTS IS REQUIRED

Self-cleaning of microbes because the mechanism of action is inherent in the fabric.

## OFFERS PERMANENT PROTECTION

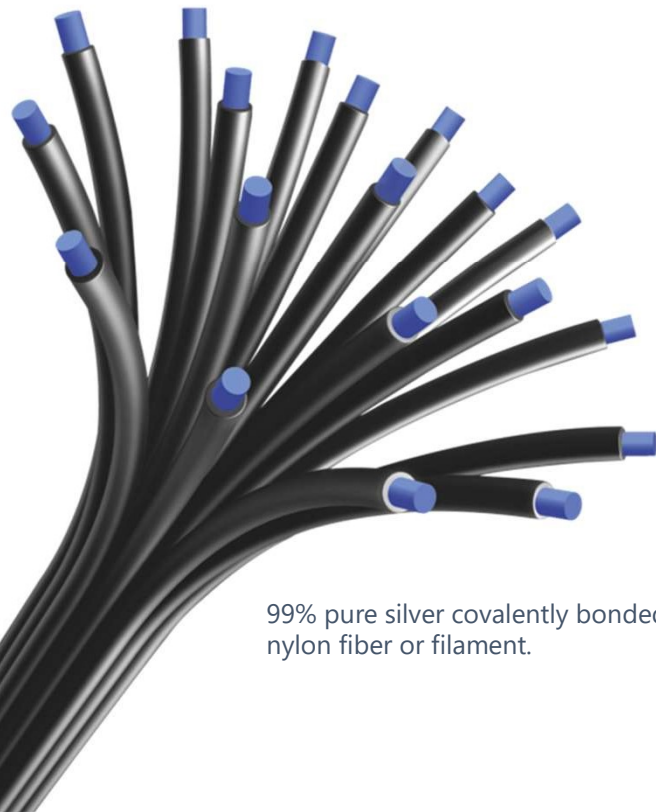
Not a chemical finish; truly lasts the life of the product. Demonstrated effective even at 200 industrial launderings.

## TESTED & SAFE

X-STATIC products are EPA and FDA registered. There are literally millions of garments powered by X-STATIC on the market today.

## PROVIDES ODOR PROTECTION

Effectively eliminates odor, keeping apparel smelling fresher for comfort and confidence during long shifts



99% pure silver covalently bonded to nylon fiber or filament.

# CLINICAL STUDIES

Summary Of Select Key Clinical Studies With X-STATIC® Technology

Study Site / Date	Product Studied	Subject	Key Conclusions
Henry Ford Hospital; 2012	Lab Coats	Contamination of HCW Lab coats by VRE.	<ul style="list-style-type: none"><li>• Three silver coats grew VRE after culturing immediately after removing coat</li><li>• <b>No VRE grew after culturing 3 hours later</b></li></ul>
QMC Hospital; 2008	Privacy Curtains	Test the antimicrobial efficacy of curtains impregnated with Silver Fiber	MRSA contamination found in <b>63% fewer Silver impregnated curtains</b> than the control.
Lister Hospital; 2009	Linens and Patient Pajamas	Use of Silver impregnated fabrics to control MRSA	<b>66.7% of patients in the Silver Fabric group eradicated MRSA</b> , while 0% eradicated MRSA in the control group.
Dr. Zastrow (Physician, Environmental Medicine); 2009	Nurses Uniforms	Antimicrobial efficacy of Uniforms made with Silver Fabric	<ul style="list-style-type: none"><li>• The total germination number on the antimicrobial silver textiles was <b>reduced by 72.2%</b>.</li><li>• The total number of all nosocomial infection pathogens was <b>reduced by an average of 93.6% within 1 hour</b>.</li></ul>

# Ionic+™

Technology that harnesses the power of silver ions to fight microbes on soft surfaces.

## TESTED & PROVEN

Meets standards for ASTM, AATCC, and JIS antimicrobial test methods

## NO BEHAVIOR MOD BY STAFF OR PATIENTS REQUIRED

Self-cleaning of microbes as the mechanism of action is inherent in the fabric

## FLEXIBLE APPLICATION

Weave or knit yarn or add fiber to spun yarn for long-lasting protection, or apply topical for items that are not often washed or are disposable.

## SKIN SAFE

EPA registered active ingredient, Oeko-Tex® 100 certified

## ODOR PROTECTION

Naturally eliminates odor, keeping apparel smelling fresher for comfort and confidence during long shifts



Ionic silver atoms permanently extruded in the fiber or filament.



# Why Noble Biomaterials?

Century-Long History in Textiles and Innovation

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The Scranton textile operation started in 1873 with silk and silk sutures and became the first licensed maker of DuPont® Nylon®. Transitioned to innovative metalized solutions in 2000, aimed at healthcare, manufacturing, military, and consumer uses.

Noble Biomaterials is a:

- US FDA registered establishment
- US FDA 510k Medical Device Registrant
- US EPA registered antimicrobial manufacturer
- Essential sole-source technology supplier to Military and Medical industries including:
  - Biomedical Advanced Research and Development Agency (BARDA)
  - Argentum Medical
  - 3M/KCI
  - 3M/Systagenix
  - US Military and Allied Forces

# Noble Regulatory Approvals

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**US Food & Drug Administration**

510k Medical Device Clearances



**US Environmental Protection Agency**

Antimicrobial Registrations



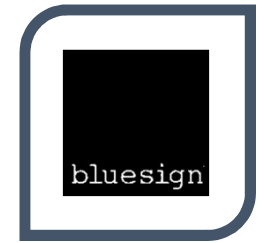
**European Community Certification**

Cleared for use in Class 1, 2 & 3 Medical Devices.



**Oeko-Tex®**

Standard 100 Certification



**bluesign®**

System Partner

# Who Currently Specifies Noble Products?

Hospitals and organizations working to keep healthcare workers and their patients safe from secondary infection include:

- Johns Hopkins
- Cleveland Clinic
- Mass General
- Mayo Clinic
- MD Anderson
- Henry Ford
- VA Hospitals
- NYU
- Healthsouth
- UK National Health Service



# What Can We Help You Create?



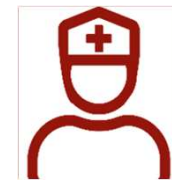
**Antimicrobial  
Privacy  
Curtains**



**Antimicrobial  
Sheets &  
Blankets**



**Antimicrobial  
Masks**



**Antimicrobial  
Hospital  
Uniforms**



**Antimicrobial  
Mattress  
Covers**



**Antimicrobial  
Lab Coats**



**Antimicrobial  
Patient Gowns**



**Antimicrobial  
Scrubs**



**Thank you!**



# OPTIONAL SLIDES



















# Best Practices

And What's Missing

Category	Best Practices for Hygiene
SURVEILLANCE	✓
HAND HYGIENE	✓
CONTACT PRECAUTION	✓
HARD SURFACES	✓
ANTIMICROBIAL SCRUBS	✗
ANTIMICROBIAL SURGICAL GOWNS	✗
ANTIMICROBIAL LAB COATS / WHITE COATS	✗
ANTIMICROBIAL PRIVACY CURTAINS	✗
ANTIMICROBIAL MATTRESS COVERS & BEDDING	✗

# Noble Partnerships

Used by some of the world's most demanding organizations and brands

Noble Health





# **SALES TOOLS AVAILABLE**



# Infection Prevention Campaign Tools

FACE MASK PRODUCT DEVELOPMENT GUIDE

**X-STATIC® METALIZED FABRIC CONSTRUCTION GUIDELINES: ANTIMICROBIAL FACE MASKS**

**HOW IT WORKS**  
The primary principle behind X-STATIC® technology is the release of silver ions (Ag<sup>+</sup>). When you incorporate X-STATIC metalized fabric into face masks, these positively charged silver ions will be released in the presence of moisture (i.e., respiratory moisture) and will act in several ways to inhibit and destroy bacteria on the face of the mask. Additionally, they disrupt the metabolic processes.

**X-STATIC® FIBER OR FILAMENT CONSTRUCTION GUIDELINES: ANTIMICROBIAL FACE MASKS**

**HOW IT WORKS**  
The primary principle behind X-STATIC® technology is the release of silver ions (Ag<sup>+</sup>) from the X-STATIC® fibers. When you incorporate X-STATIC technology into face masks, these positively charged silver ions will be released in the presence of moisture (i.e., respiratory moisture) and will act in several ways to inhibit and destroy bacteria on the face of the mask, preventing the mask from microbial ingress.

**IONIC+™ CONSTRUCTION GUIDELINES: FACE MASKS**

**HOW IT WORKS**  
The primary principle behind Ionic+™ is the release of silver ions (Ag<sup>+</sup>) from the Ionic+™ fibers. When you incorporate Ionic+ antimicrobial technology into face masks, these positively charged silver ions will be released in the presence of moisture (i.e., respiratory moisture) and will act in several ways to inhibit and destroy bacteria on the face of the mask, preventing the mask from microbial ingress.

**IONIC+™ TOPICAL CONSTRUCTION GUIDELINES: FACE MASKS**

**HOW IT WORKS**  
The primary principle behind Ionic+™ is the release of silver ions (Ag<sup>+</sup>) from the Ionic+™ fibers. When you incorporate Ionic+ antimicrobial technology into face masks, these positively charged silver ions will be released in the presence of moisture (i.e., respiratory moisture) and will act in several ways to inhibit and destroy bacteria on the face of the mask, preventing the mask from microbial ingress.

**COMPLIANCE AND CONSTRUCTION**  
As part of the X-STATIC® marketing program, we ensure consistency of quality and performance of products utilizing the technology and brand. In order to ensure regulatory compliance and to use antimicrobial claims, products must conform to the requirements below. Materials must be used in Noble Biomaterials for certification before going to market.

**MINIMUM IONS IN FABRIC (Using Standard Fiber)** Minimum percentage of 100% Ionic+™ (by weight) must also include in the part of the mask that covers the face.

**MAINTAINING CLAIMS USING ONE OR MORE MATERIALS OR IONIC+™ FIBERS ON BOTH CLOTHING AND HOME OR WORK:**

- Ionic+™ has active antimicrobial properties built in to protect the mask.
- This mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- This mask contains Ionic+™, antimicrobial technology to resist microorganism growth on the mask.
- This mask includes Ionic+™ to resist bacterial growth that can impact the mask (such as odors and stains associated with bacterial growth).
- Ionic+™ has active antimicrobial properties built in to protect the mask.
- This mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- The fiber medium within this mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- The fiber medium within this mask includes Ionic+™ to resist bacterial growth that can impact the mask (such as odors and stains associated with bacterial growth).
- Ionic+™ has active antimicrobial properties built in to protect the mask.
- This mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- The fiber medium within this mask includes Ionic+™ to resist bacterial growth that can impact the mask (such as odors and stains associated with bacterial growth).

**MAINTAINING CLAIMS USING ONE OR MORE MATERIALS OR IONIC+™ FIBERS WITH AN ADJUNCTIVE MEDIUM:**

- Ionic+™ in the fiber medium within this mask has active antimicrobial properties built in to protect the mask.
- The fiber medium within this mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- The fiber medium within this mask includes Ionic+™ to resist bacterial growth that can impact the mask (such as odors and stains associated with bacterial growth).
- Ionic+™ has active antimicrobial properties built in to protect the mask.
- This mask contains Ionic+™ and uses an EPA-registered antimicrobial active.
- The fiber medium within this mask includes Ionic+™ to resist bacterial growth that can impact the mask (such as odors and stains associated with bacterial growth).

Disclaimer: The public health claims are general, and the antimicrobial claims do not protect the mask from viral attack.

- X-STATIC Metalized Fabric Mask Guide
- X-STATIC Yarn & Fiber Mask Guide
- IONIC+ Yarn & Fiber Mask Guide
- IONIC+ Topical Mask Guide

White Papers  
(www.infectionpreventiontextiles.com)

**APPROVED CLAIMS: IONIC+™ TECHNOLOGY**

**IONIC+™ ANTIMICROBIAL (ANTI-ODOR) PRODUCTS**

**US MARKETING CLAIMS:**  
IONIC+™ ANTIMICROBIAL (ANTI-ODOR) PRODUCTS

**OVERVIEW**  
The United States Environmental Protection Agency (EPA) has stringent rules regarding language for registered products with which we and the partners who use our technology must comply. For instance, marketing claims must be limited to the protection of the treated Article (the product made with X-STATIC® or IONIC+™) and cannot claim or imply antimicrobial activity beyond protection of the treated Article (the fabric). Also, the antimicrobial claims must be linked to protection from microorganisms that are not contained in public health-related microorganisms. These rules around marketing claims are applicable to packaging, advertising, website and verbal communication, website, and other forms of messaging that state or imply antimicrobial capabilities.

**GUIDELINE BASICS:**

- The claim must be limited to the protection and preservation of the treated article.
- The claim can't be an unqualified claim of "antimicrobial" activity; the antimicrobial protection must be linked to the treated article.
- The claim can't imply or refer to specific health-related microorganisms (i.e., influenza, bot, MRSA, etc.) as those are referred to as "public health claims."
- The claim must not state or suggest general "antibacterial," "bactericidal," or "germicidal" activity which suggests a public-health-related protection.
- The claim can't refer to protection beyond the treated article, such as for personal protection (i.e., "for skin or wound protection"), decontamination, hygiene and the antimicrobial claims for use, odor, etc.)
- The brand names for the product can't include terms indicative of protection from health-related microorganisms.
- The graphics used to present the article can't include or imply protection of public health significance and the antimicrobial claims should not be prominent over other normal product claims (including employee safety for use, odor, etc.)

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## IONIC+ and X-STATIC Expanded Claims Guides

**SOFT SURFACE BACTERIAL CONTAMINATION: CONSIDERATIONS FOR A COMPLETE INFECTION PREVENTION PROGRAM**

**RES A 5**

**NOBLE Biomaterials**

Prepared by  
Raggy Prinz Lindbert  
MS, MTASCI, CIC, CHP



**TECHNICAL DATA**

**NOBLE HEALTH SOLUTIONS TO HEALTHCARE ACQUIRED INFECTIONS**

**NOBLE Biomaterials**

Noble Health Solutions Brochure

**Textile World**

**Chargers And Noble Biomaterials Announce New Strategic Collaboration To Make Antimicrobial Protection**

**WTD**

**Chemical and antimicrobial come back against Covid-19**

**WTD**

**In Focus: Business Incidents**

**Think Tank**

**What Brands Need to Know About Antimicrobial Fabrics and Textiles**

**Joining the BATTLE**

**NOBLE Biomaterials**

**WWD**

**Biotechnology, Fashion Collide in Partnership for Antimicrobial PPE**

**PPE Related Press**

**Chargers and Noble Biomaterials created an antimicrobial mask for health-care industry.**

**WTD**

**Leading Anti-COVID-19**

**Innovation In Textiles**

**Chargers and Noble Biomaterials create antimicrobial-healthcare PPE**

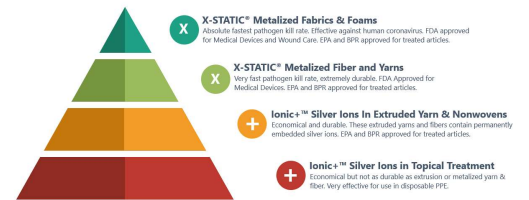
**COVID 19 NANOVIRUS**

**Joining the BATTLE**

**NOBLE Biomaterials**

## Antimicrobial Solutions to HAIs?

Silver-Based Antimicrobial Products Made by Noble Biomaterials



Noble Health

New Sales Deck