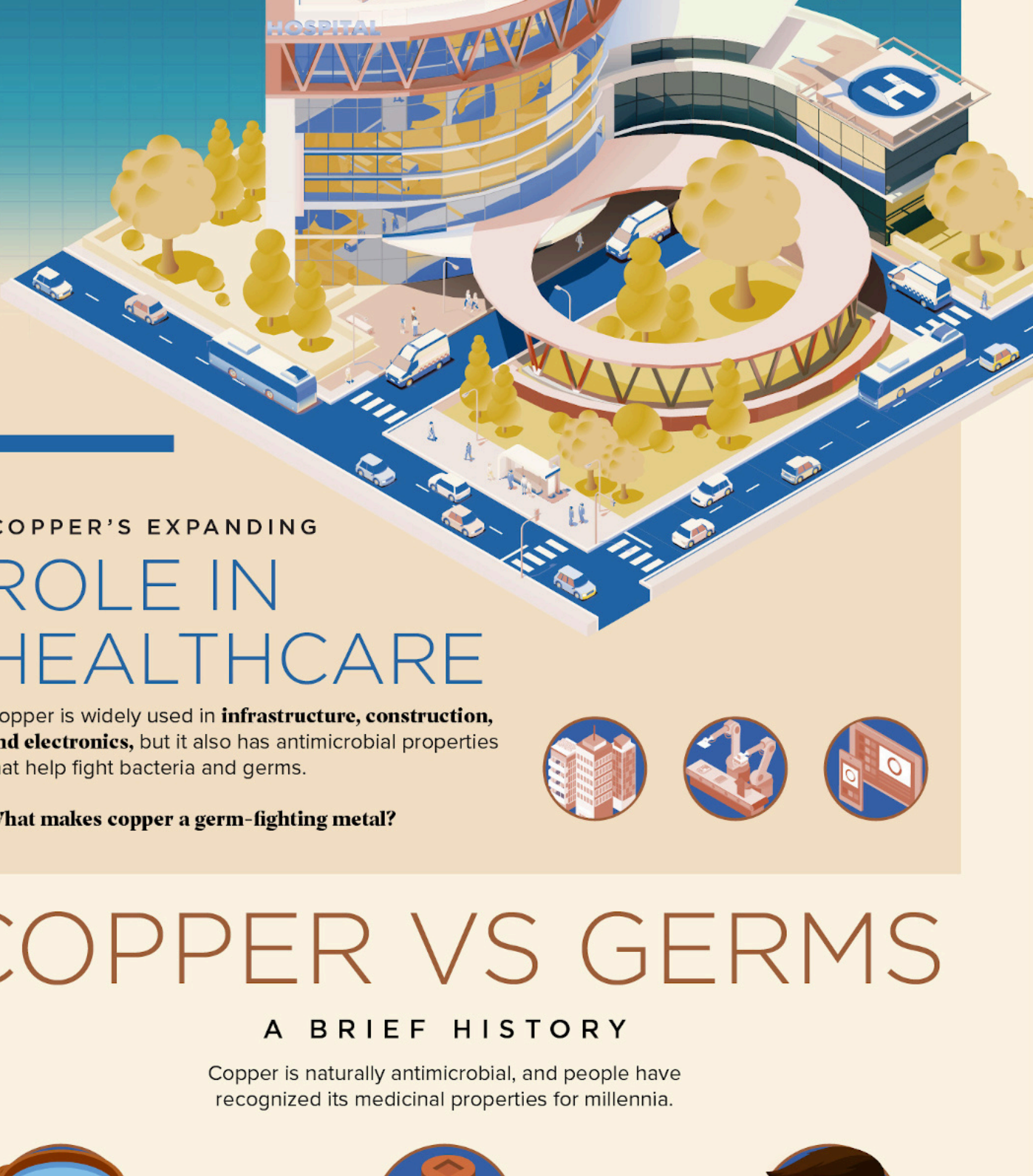


ANTIMICROBIAL COPPER

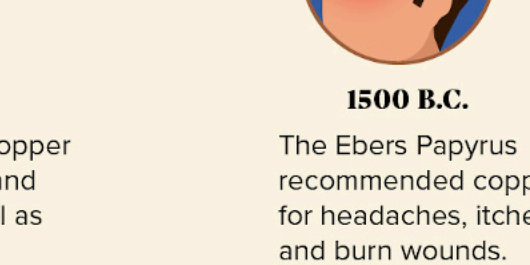
THE GERM-FIGHTING METAL



COPPER'S EXPANDING ROLE IN HEALTHCARE

Copper is widely used in **infrastructure, construction, and electronics**, but it also has antimicrobial properties that help fight bacteria and germs.

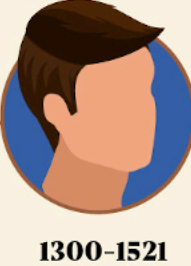
What makes copper a germ-fighting metal?



COPPER VS GERMS

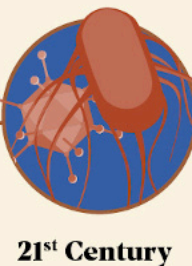
A BRIEF HISTORY

Copper is naturally antimicrobial, and people have recognized its medicinal properties for millennia.



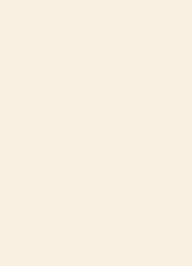
2600-2200 B.C.

The Egyptian Smith Papyrus recorded the first medical use of copper for sterilizing wounds and water.



1600 B.C.

The Chinese used copper coins to treat heart and stomach pain as well as bladder diseases.



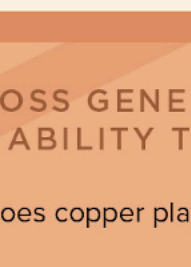
1500 B.C.

The Ebers Papyrus recommended copper for headaches, itches, and burn wounds.



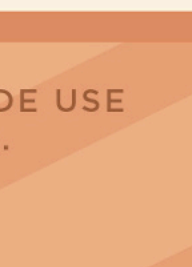
23-79 A.D.

Pliny the Elder, a Roman author, described remedies involving copper for intestinal problems, headaches, and eye problems.



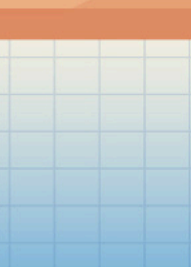
14-37 A.D.

Roman physician Aulus Cornelius Celsus listed several medicinal uses of copper for chronic ulcers and more.



460-380 B.C.

The Hippocratic Collection recommended copper for leg ulcers and the Greeks used copper powder on fresh wounds to prevent infections.



1300-1521

In the New World, the Aztecs prescribed a gargling mixture with copper for sore throats.



21st Century

Scientific studies have proved copper's efficacy against certain bacteria.

Source: Copper Development Association, Smithsonian Magazine

CIVILIZATIONS ACROSS GENERATIONS HAVE MADE USE OF COPPER'S ABILITY TO FIGHT BACTERIA.

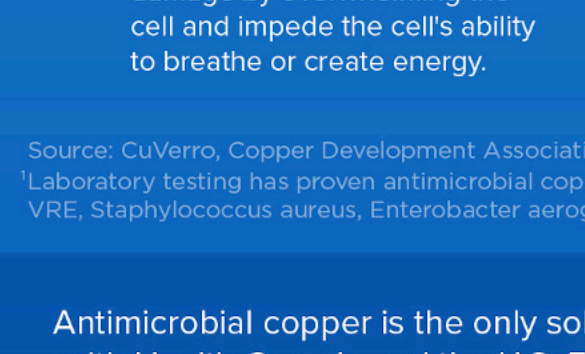
But what role does copper play in modern healthcare?

DR. COPPER

STOPPING THE SPREAD

Antimicrobial copper kills 99.9% of bacteria¹ on high-touch surfaces within two hours of exposure. Here's how antimicrobial copper fights germs.

1 Rupturing the Cell
Copper ions breach the bacteria cell's outer membrane upon contact with an antimicrobial copper surface.



2 Disrupting Cell Function
Essential nutrients leak out from holes in the breached membrane wall, weakening the cell. Meanwhile, copper obstructs metabolic activity inside the cell.

3 Eliminating the Germ
Copper ions cause further damage by overwhelming the cell and impede the cell's ability to breathe or create energy.



Source: CuVerro, Copper Development Association
¹Laboratory testing has proven antimicrobial copper's efficacy against the following bacteria: MRSA, VRE, Staphylococcus aureus, Enterobacter aerogenes, Pseudomonas aeruginosa, and E. coli O157:H7.

Antimicrobial copper is the only solid metal registered as a health product with Health Canada and the U.S. Environmental Protection Agency (EPA).

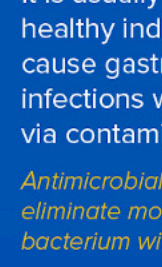
Over 500 antimicrobial copper alloys are registered with the U.S. EPA.

Source: Copper Development Association

WHY COPPER?

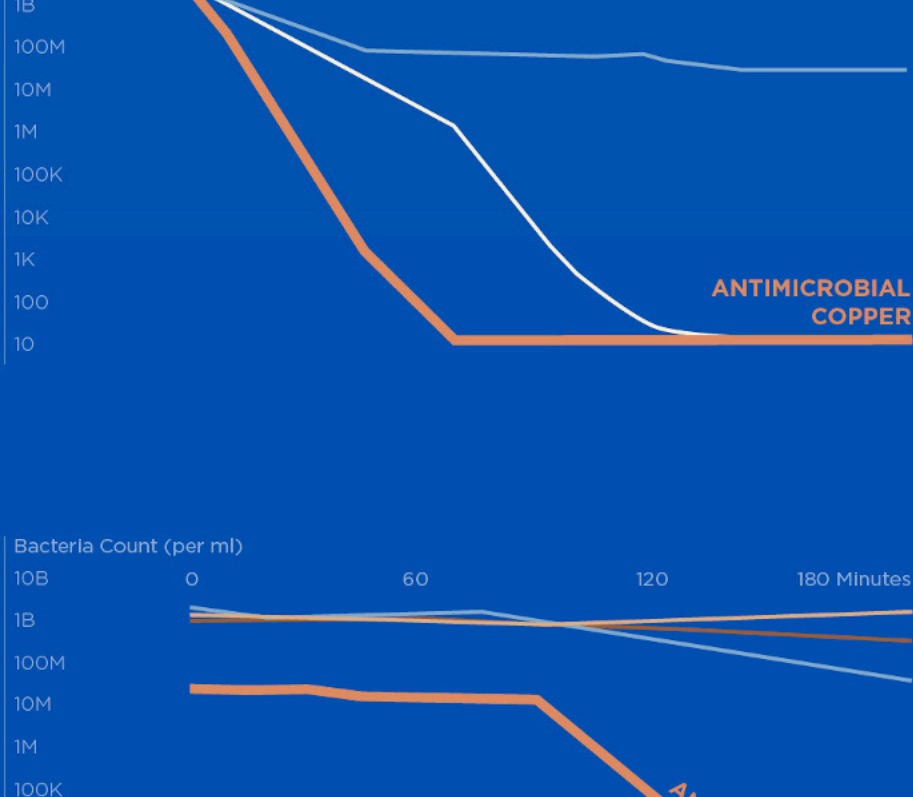
COPPER IS FAR MORE EFFECTIVE AT ELIMINATING BACTERIA¹ THAN OTHER MATERIALS.

Antimicrobial Copper Stainless Steel Brass Plastics Stainless Steel Containing Silver



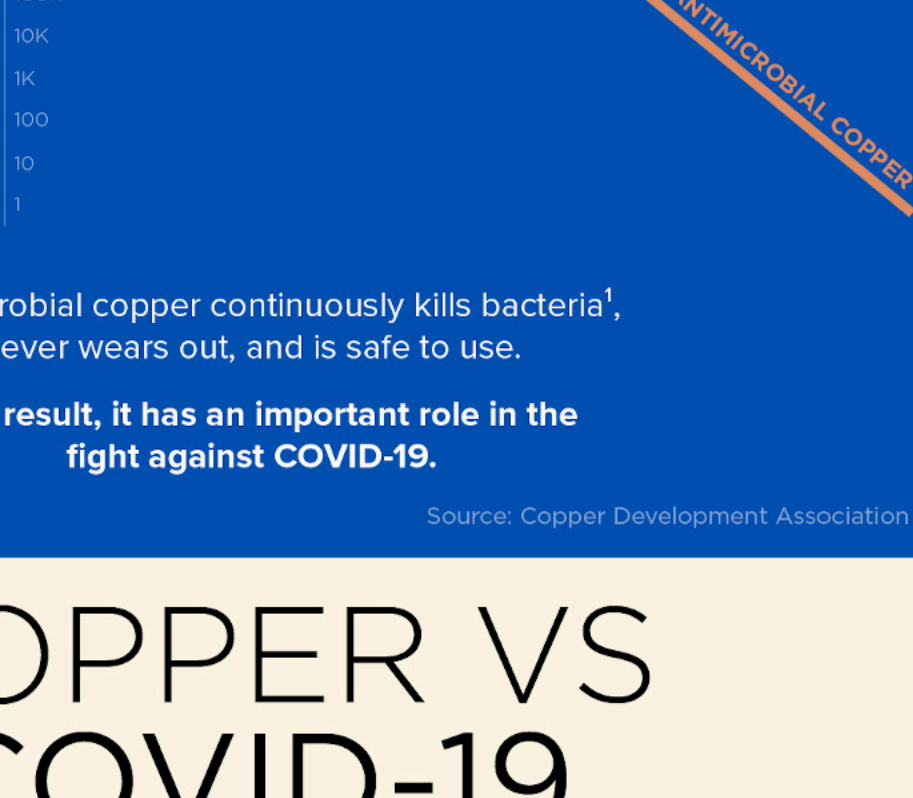
Staphylococcus aureus

A common bacterium that can cause harmful or fatal "staph infections", especially in healthcare settings.
Antimicrobial copper and brass, an alloy of copper, both kill 99.9% of this bacterium within 2 hours.



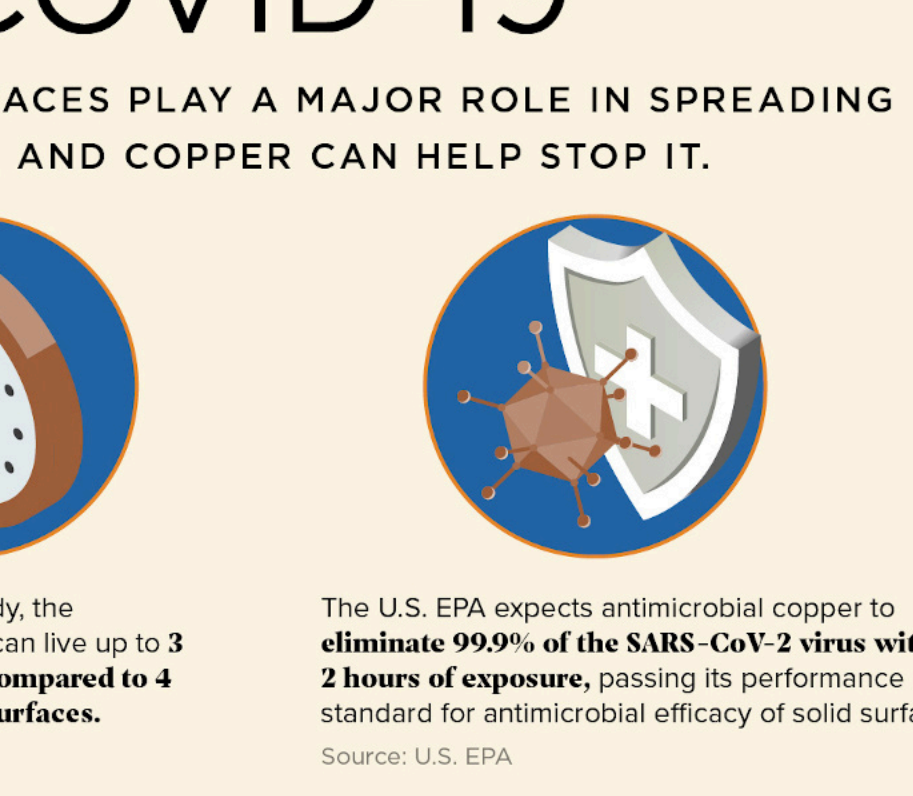
Enterobacter aerogenes

It is usually not harmful to healthy individuals but can cause gastrointestinal infections when contracted via contamination.
Antimicrobial copper and brass eliminate more than 99.9% of this bacterium within two hours.



Escherichia coli or E. coli O157:H7

A toxin-producing bacterium that causes foodborne illnesses and intestinal infections.
Antimicrobial copper kills 99.9% of E. coli within 2 hours of exposure, whereas stainless steel and plastics have almost no effect.



Antimicrobial copper continuously kills bacteria¹, never wears out, and is safe to use.

As a result, it has an important role in the fight against COVID-19.

Source: Copper Development Association

COPPER VS COVID-19

HIGH-TOUCH SURFACES PLAY A MAJOR ROLE IN SPREADING COVID-19, AND COPPER CAN HELP STOP IT.



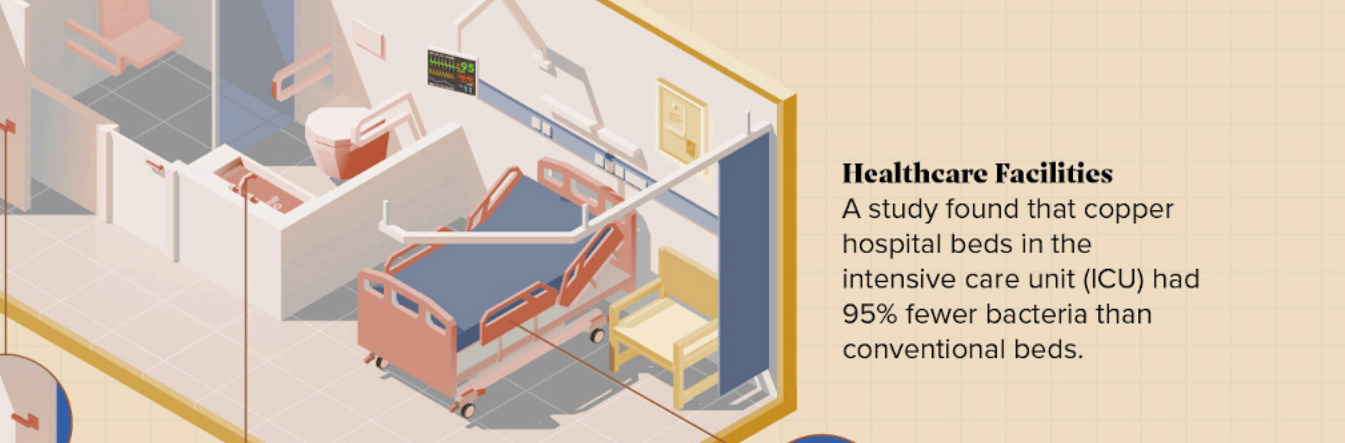
According to a study, the SARS-CoV-2 virus can live up to **3 days on plastics, compared to 4 hours on copper surfaces.**



The U.S. EPA expects antimicrobial copper to **eliminate 99.9% of the SARS-CoV-2 virus within 2 hours of exposure**, passing its performance standard for antimicrobial efficacy of solid surfaces.

Source: U.S. EPA

Lifespan* of the COVID-19 Virus on Different Surfaces



*Lifespan refers to the time period after which no viable SARS-CoV-2 was measured in the study. Source: The New England Journal of Medicine (2020)

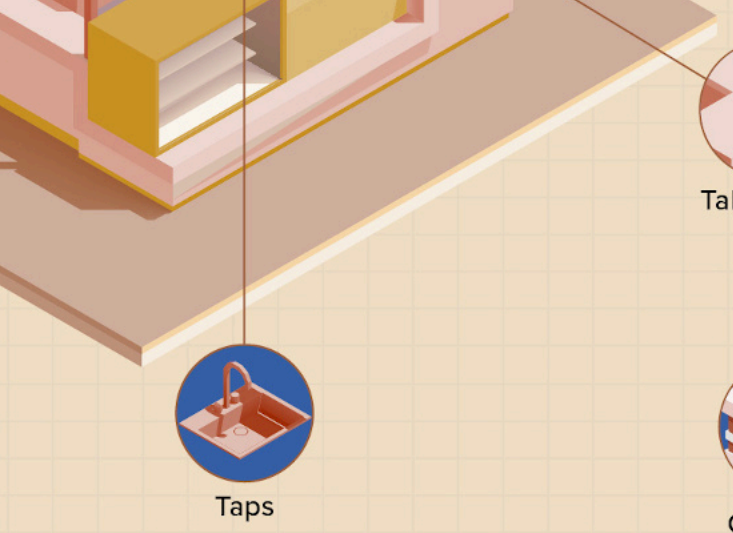
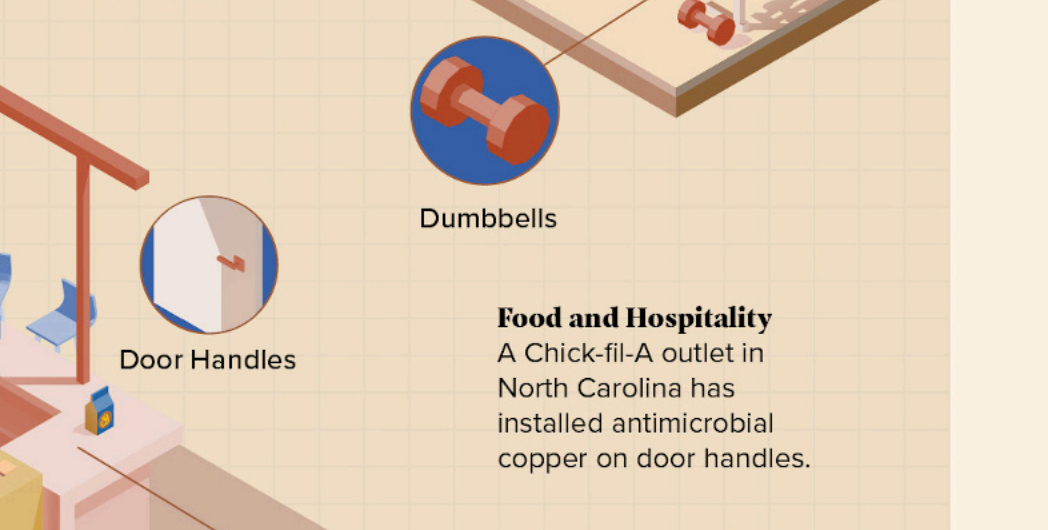
From healthcare to fitness, **every industry can improve hygiene** by installing antimicrobial copper on high-touch surfaces.

THE APPLICATIONS OF ANTIMICROBIAL COPPER

FIGHTING GERMS WITH ANTIMICROBIAL COPPER IS SIMPLE—JUST INSTALL IT AND COPPER DOES THE REST.

Public Transit Vehicles

A trial by TransLink, Teck Resources Ltd., and Vancouver Coastal Health found that copper kills up to 99.9% of bacteria on transit surfaces.

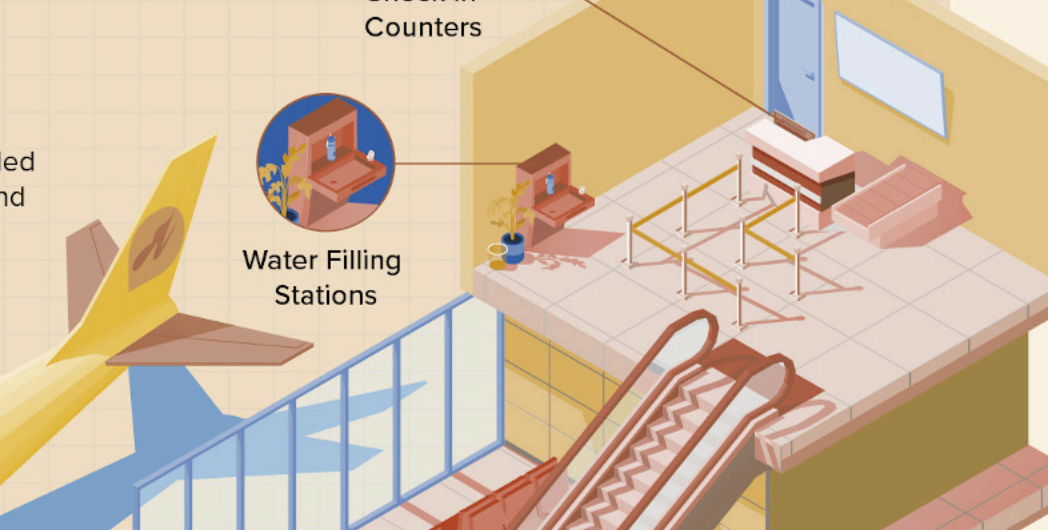


Healthcare Facilities

A study found that copper hospital beds in the intensive care unit (ICU) had 95% fewer bacteria than conventional beds.

Sports Facilities

Training centers of NHL hockey teams Los Angeles Kings and St. Louis Blues use dumbbells and attachments made of antimicrobial copper.



Cookware

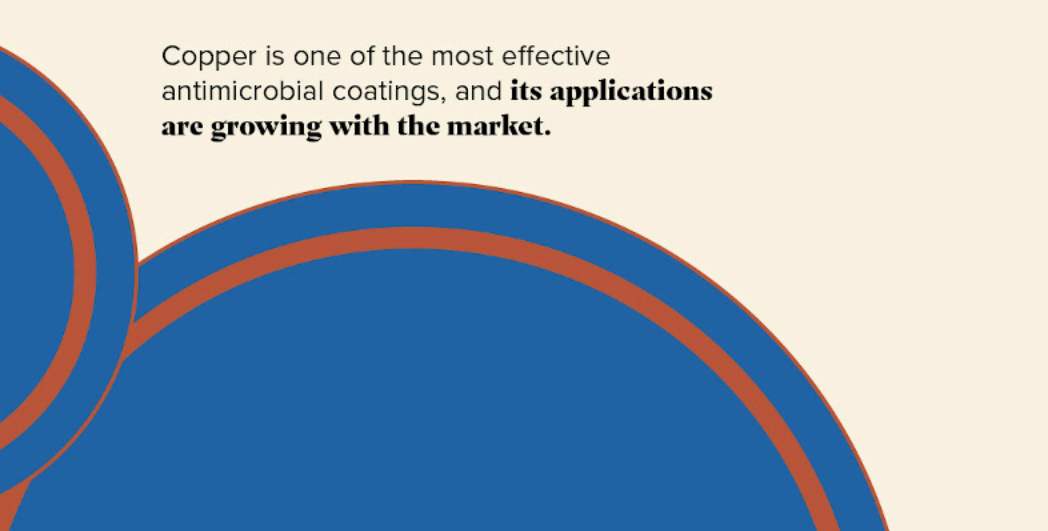


Food and Hospitality

A Chick-fil-A outlet in North Carolina has installed antimicrobial copper on door handles.

Airports

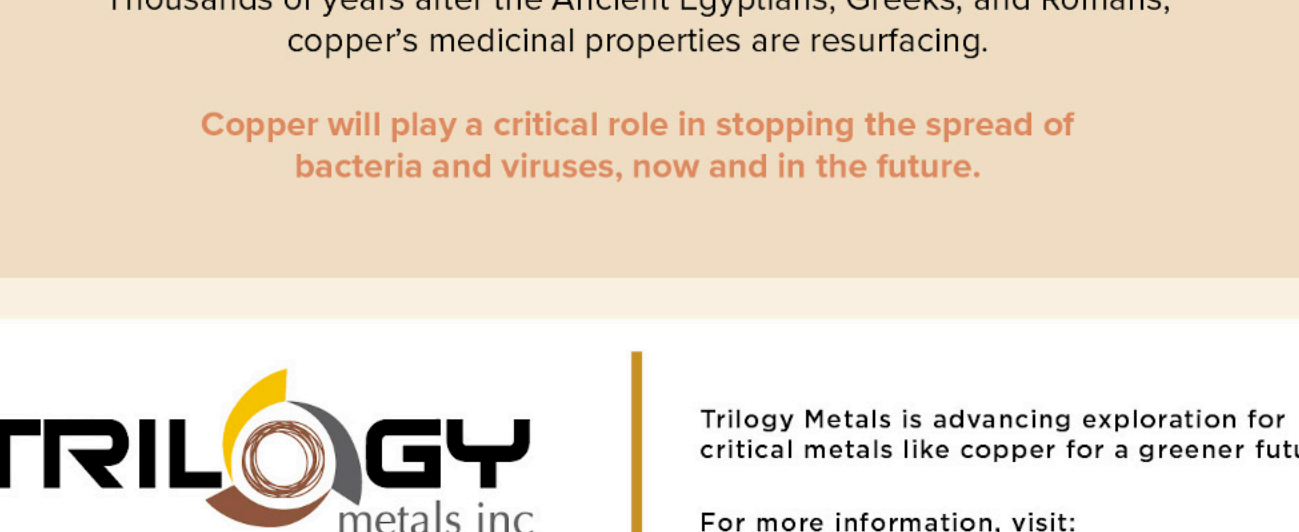
The Congonhas Airport in São Paulo, Brazil, has antimicrobial copper installed at check-in, immigration, and customs counters.



Sources: VanEck, Teck, Copper Development Association, Washington Post

ANTIMICROBIAL COATINGS MARKET SIZE

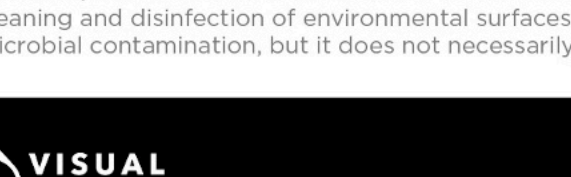
Copper is one of the most effective antimicrobial coatings, and its applications are growing with the market.



Source: Global Market Insights

Thousands of years after the Ancient Egyptians, Greeks, and Romans, copper's medicinal properties are resurfacing.

Copper will play a critical role in stopping the spread of bacteria and viruses, now and in the future.



NYSE-MKT: TMO TSX: TMO

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