MICROBIOME-FRIENDLY CLEANING

Safer Daily Cleaning for Home & Healthcare Environments

A science-led approach to surface hygiene that emphasizes **physical pathogen removal** instead of routine dependence on disinfectant chemistry.



The reality of disinfectant-driven resistance is backed by a robust and rapidly expanding body of peer-reviewed literature. Repetitive, sub-lethal exposure to common disinfectants can select for resistance to the chemicals themselves and, in some cases, cross-resistance to medical antibiotics. See the evidence review on pages 4-7.

PHYSICAL REMOVAL	MICROBIOME-FRIENDLY	DAILY CLEANING
99.9%+ bacteria & viruses removed in QCT-3 testing	**No antimicrobial killing action** designed to avoid unnecessary selective pressure	**Apply. Dry. Remove.** a simple repeatable process for high-touch surfaces

Cogent One Health™ works by physically lifting, capturing and removing pathogens from surfaces. The formula also leaves a transparent barrier film designed to help prevent bacterial adhesion and delay biofilm formation.

COGENT ENVIRONMENTAL SOLUTIONS

COGENT ONE HEALTH™

Proven Physical Removal for Everyday Surface Hygiene

Stop relying on chemical disinfectants for every cleaning task - start removing pathogens physically. The Cogent One Health™ Apply-and-Dry method is designed to lift and capture soil and pathogens, with QCT-3 data supporting 99.9%+ removal of bacteria and viruses from hard surfaces and reduced microbial transfer during wiping.



01

APPLY
Spray the surface or use a moistened wipe. The sodium phytate-based formula helps loosen soil. Wipe from cleaner to dirtier areas using consistent pressure.

02

DRY
Use a microfiber cloth or paper towel to lift and capture suspended soil and pathogens. Allow the surface to finish dry and streak-free.

03

REMOVE
Physical wiping removes pathogens from the surface. QCT-3 testing validates 99.9%+ removal and reduced transfer during the wipe test.

Available Formats

		
9506-4 4 × 3.78 L per case	**9506-6** 6 × 946 mL per case	**9506-12** 70-count wipes, 12 per case

WHY PLAIN CLEANERS ARE DIFFERENT

Plain Soaps, Detergents & Antibiotic Resistance

Core conclusion: The evidence summarized in this brochure distinguishes plain detergents and regular soaps from active antimicrobial disinfectants. Plain cleaning products primarily remove soils and microbes mechanically, rather than relying on an antimicrobial killing action.

1

Mechanical Removal, Not Chemical Warfare
Plain soaps and detergents lift, surround and suspend dirt, oils and microbes so they can be removed from the surface. Their cleaning action does not depend on targeting a specific microbial pathway.

2

Less Selective Chemical Pressure
Because routine cleaning can be accomplished without a biocidal mode of action, microbes are not repeatedly challenged by the same toxic mechanism that can favour adaptive responses.

3

Avoiding Persistent Sub-Lethal Exposure
Disinfectant residues can decline to low concentrations over time. The literature reviewed on pages 4-7 examines how repeated sub-lethal exposure can contribute to adaptation and altered susceptibility.

Public Health Context

Major public-health organizations, including the U.S. Food and Drug Administration, the U.S. Centers for Disease Control and Prevention, and Health Canada, support plain soap-and-water cleaning and handwashing as foundational hygiene practices. The appropriate use of disinfectants remains important in specific settings and situations; the focus here is on avoiding unnecessary routine antimicrobial exposure when effective physical cleaning is sufficient.

Clean with purpose.
Use the right level of intervention for the task - effective physical cleaning for routine soil and pathogen removal, and targeted disinfection where protocols require it.

For informational purposes only. This brochure is not medical advice and does not replace facility-specific infection-prevention protocols.

EVIDENCE REVIEW

Disinfectant Exposure & Resistance: What the Literature Shows

The studies below examine the biological effects of repeated or prolonged exposure to disinfectants, especially at sub-lethal concentrations. Together, they describe several mechanisms by which tolerance to disinfectants and altered antibiotic susceptibility can emerge.

1

The Global Picture: Systematic Review (2024)

Study
"Effect of prolonged exposure to disinfectants in the antimicrobial resistance profile of relevant micro-organisms: a systematic review," Journal of Hospital Infection (2024).

Evidence
The review assessed long-term, repeated exposure of pathogens to 17 major disinfectant types.

Findings
Reported adaptation included morphological changes, increased efflux-pump activity and decreased antibiotic susceptibility across clinically relevant organisms including *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*.

Sources
PubMed: pubmed.ncbi.nlm.nih.gov/38740303/

2

Multi-Generational Evolution Study (2023)

Study
"Long-term exposure to food-grade disinfectants causes cross-resistance to antibiotics in Salmonella enterica…" Antimicrobial Resistance & Infection Control (2023).

Evidence
Researchers exposed 27 strains of *Salmonella enterica* to repeated doses of five common disinfectants - including benzalkonium chloride, hydrogen peroxide and sodium hypochlorite - over hundreds of bacterial generations.

Findings
The study mapped genetic changes and reported multi-drug resistance in some exposed strains, including altered susceptibility to clinically important antibiotic classes.

Sources
PMC: pmc.ncbi.nlm.nih.gov/articles/PMC10717106/ | Springer: doi.org/10.1186/s13756-023-01333-w

EVIDENCE REVIEW

Repeated Exposure Can Change Microbial Behaviour

3

Genomic Research on a Hospital Pathogen (2023)

Study
Research investigating *Acinetobacter baumannii* and responses to repeated low-dose exposure to commercial biocides.

Evidence
Genomic and physiological analyses examined how healthcare-associated bacteria respond when repeatedly subjected to sub-lethal concentrations of disinfectant chemicals.

Findings
The work identified membrane-potential disruption and adaptive stress responses as mechanisms that can contribute to increased tolerance and altered antibiotic susceptibility.

Sources
Background summary: connectsci.au/news/news-parent/5095/Impact-of-disinfectants-on-antibiotic-resistance

A useful way to read these studies

The key issue is not that every use of a disinfectant automatically creates antibiotic resistance. The concern is **repeated exposure at concentrations that do not fully eliminate the microbial population**. Under those conditions, surviving organisms may be selected for traits that also affect their response to antibiotics.

SUB-LETHAL EXPOSURE	ADAPTIVE RESPONSE	POTENTIAL CROSS-RESISTANCE
Repeated low-dose contact with a disinfectant.	Efflux pumps, membrane changes, stress responses or genetic mutations may be selected.	Some of the same mechanisms can reduce susceptibility to certain antibiotics.

Design implication for routine cleaning: where a surface can be effectively cleaned through physical removal, a non-biocidal approach can reduce unnecessary antimicrobial exposure while still supporting strong hygiene practices.

EVIDENCE REVIEW

Phenotypic Shifts & Real-World Selection

4

Serial Passage & Phenotypic Shifting (2024)

Study
"Impact of Sublethal Disinfectant Exposure on Antibiotic Resistance Patterns of Pseudomonas aeruginosa" (2024).

Evidence
Fifty clinical isolates of *P. aeruginosa* underwent serial passages through sub-inhibitory concentrations of disinfectants.

Findings
After exposure, the reported diversity of antibiotic-resistance patterns increased, with some variants developing new resistance characteristics.

Sources
PubMed: pubmed.ncbi.nlm.nih.gov/39536720/

5

Real-World Environmental Selection (2025/2026)

Study
"Impact of Exposure to Disinfectants on Presence of Efflux Pump Genes and Antibiotic Resistance Profiles in Escherichia coli Isolates," Microorganisms.

Evidence
The study compared *E. coli* from environments with intensive repetitive disinfection against non-exposed isolates.

Findings
Repeatedly exposed isolates showed greater prevalence of specific quaternary-ammonium resistance genes and higher resistance rates to several antibiotics in the reported dataset.

Sources
PMC: pmc.ncbi.nlm.nih.gov/articles/PMC12735787/ | MDPI: mdpi.com/2076-2607/13/12/2700

SUMMARY

Two Resistance Pathways to Understand

Across the literature, two concepts help explain why disinfectant exposure and antibiotic resistance can become linked.

01	**Cross-resistance** A physiological adaptation that helps a microorganism survive a chemical stressor - such as increased efflux-pump activity - may also reduce susceptibility to an antibiotic.
02	**Co-resistance** Genes associated with disinfectant tolerance and antibiotic resistance can be carried together on the same mobile genetic element. Selection for one trait can therefore help preserve the other.

A Smarter Approach to Daily Cleaning

Cogent One Health™ is positioned as a routine-cleaning option built around **Apply-and-Dry physical removal**. The goal is straightforward: remove soil and pathogens effectively while avoiding unnecessary antimicrobial chemistry for everyday cleaning tasks.







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Selected references: PubMed 38740303; PMC10717106; PubMed 39536720; PMC12735787; PMC12628408; ACS Environmental Science & Technology Water. This brochure summarizes research for informational purposes and should be read alongside the original publications.