

## Decontaminating your dive gear



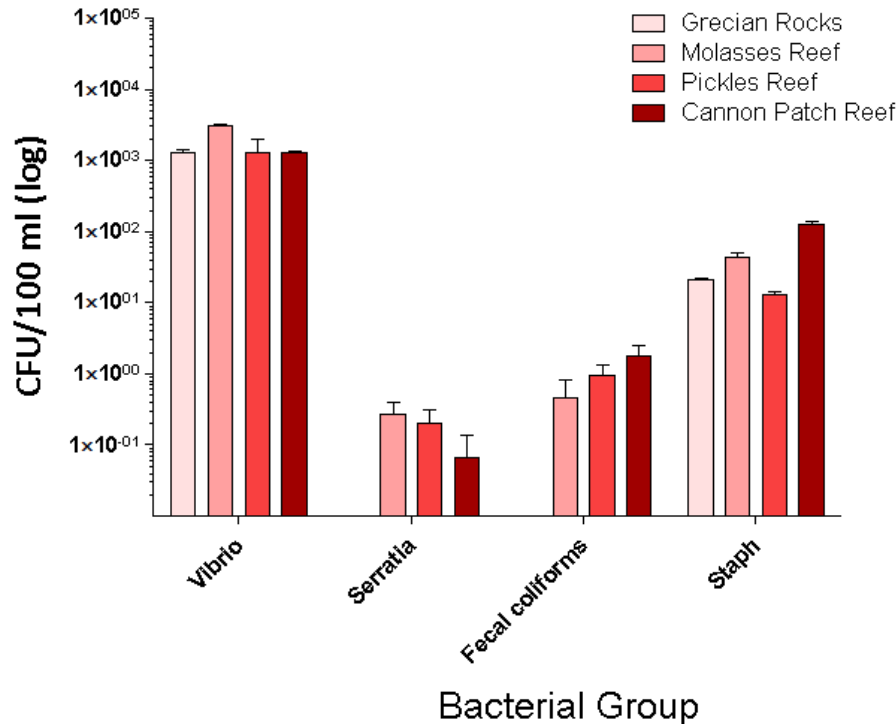
Andy Bruckner  
Research Coordinator, FKNMS

# Why decontaminate

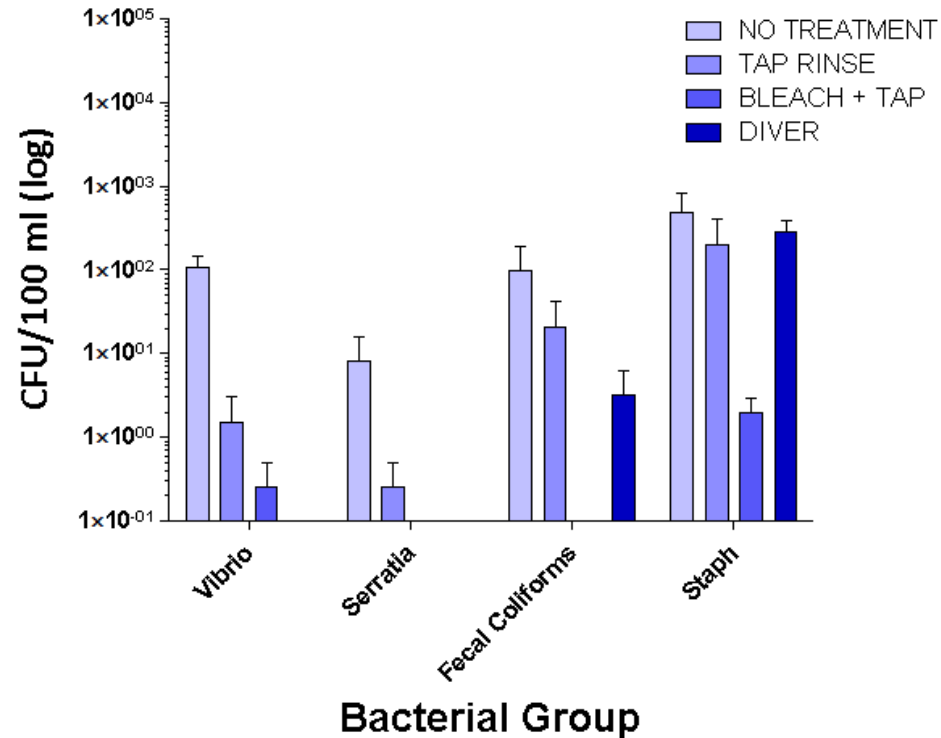
- Wetsuits, booties, gloves, and the internal bladder of BCDs can harbor and proliferate pathogenic bacteria
- Pathogens adhere to other dive and snorkel gear when diver contacts the bottom and touches corals
- Pathogens on dive gear may survive for extended periods and can be transferred among reefs and internationally

# Comparison of seawater and swatch recoveries

**Key Largo Field Data  
SEAWATER by Bacterial Group  
8-31-2011 to 9-3-2011**



**Key Largo Field Data  
SWATCH by Bacteria  
8-31-2011 to 9-3-2011**

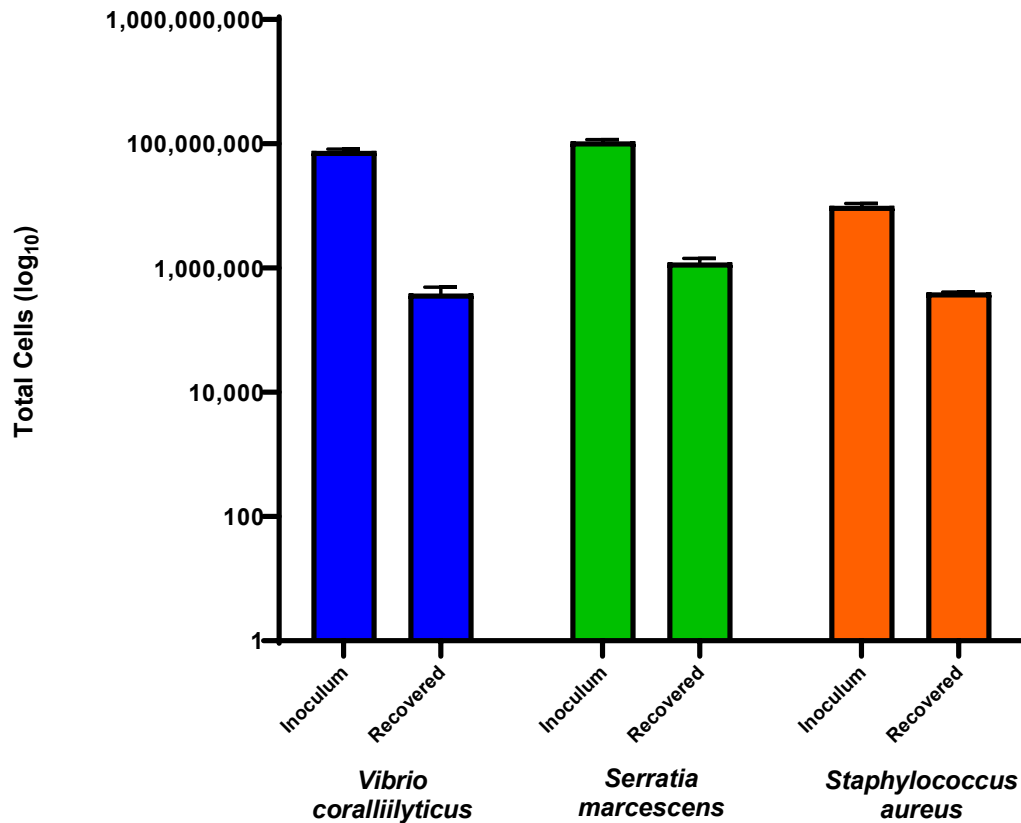


Number of bacteria (per group) in 100 mL of seawater

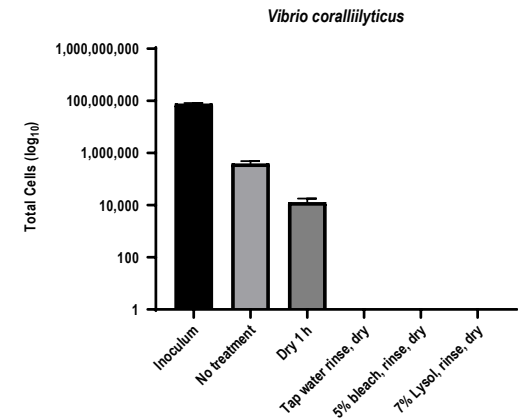
Number of bacteria (per group) recovered from neoprene divesuit swatch exposed in the field

# Bacteria adherence and removal from neoprene

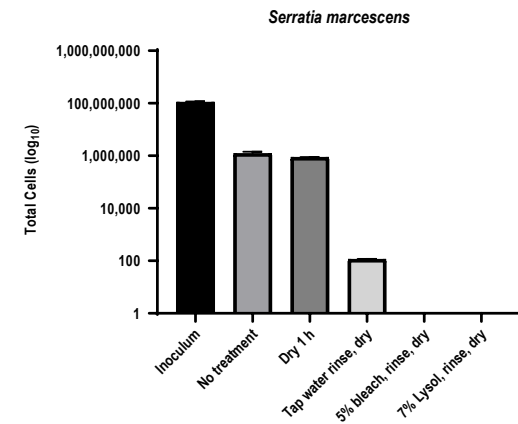
Reversible Binding of Bacteria to Wetsuit Neoprene



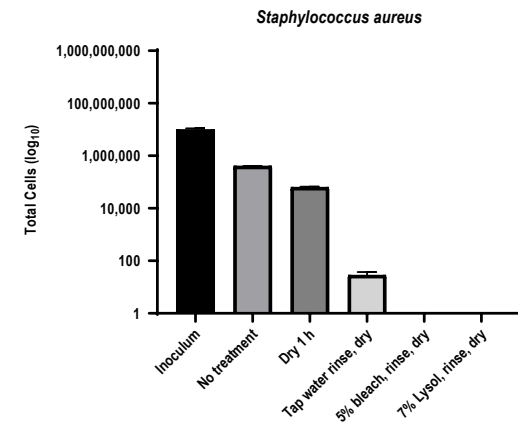
A



B



C



# Ways to minimize contamination

- Proper buoyancy; avoid touching marine organisms and contact bottom
- Remove debris from dive gear between dives
- Wash gear with freshwater between dives and allow to air dry
- Decontaminate gear



## General Guidelines for Disinfection



**DO**

- ✓ Inspect dive gear and equipment and remove debris
- ✓ Move from “cleanest” site to “dirtiest” last
- ✓ Decontaminate dive gear at end of day
- ✓ Decontaminate dive gear between sites, countries, & sensitive areas
- ✓ Properly dispose of disinfectant & rinse waste in sink, tub, or shower

- ✗ Don't leave debris on dive gear
- ✗ Don't move from a diseased to a healthy site
- ✗ Don't forget to disinfect gear between sites, countries, sensitive areas, & end of day
- ✗ Don't dispose disinfectant & rinse waste into ocean or storm drain

**DON'T**

# Plan your dives

HEALTHY

DISEASED

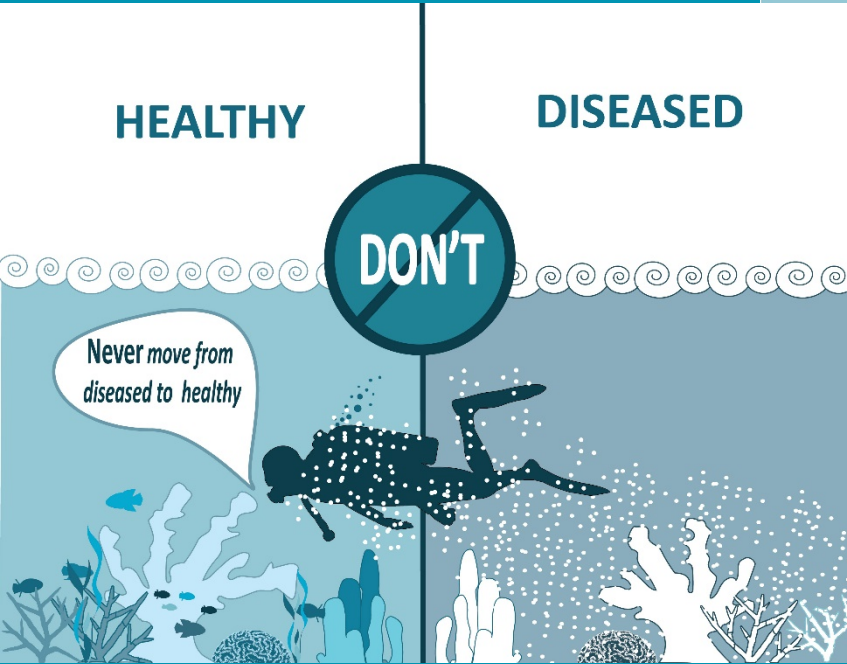
HEALTHY

DISEASED

**DON'T**

*Never move from  
diseased to healthy*

*Always move from  
healthy to diseased*





# FKNMS (Florida)

## Gear - Specific Guidelines for Disinfection

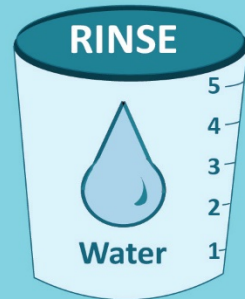


**Soak non-sensitive gear for 10 min  
in a 10% Bleach solution**

**USE IMMEDIATELY AFTER MIXING**

**1 quart of bleach (1/4 gal; 4 cups)  
2 gallons of fresh water**

(e.g., in a 5 gallon bucket)



**Rinse non-sensitive gear in  
fresh water**

(e.g., in a 5 gallon bucket)

**Properly dispose of disinfectant solutions  
and rinse waste into sink, tub, or shower**

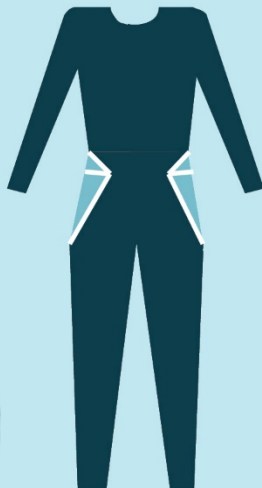
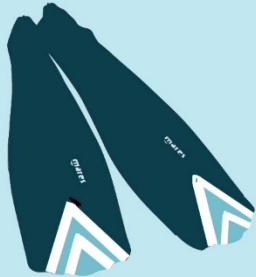


**Allow gear to air dry thoroughly**

**Non-Sensitive Equipment & tools**



# Gear - Specific Guidelines for Disinfection



**Sensitive Dive Gear**



**Soak sensitive gear for 10min in quaternary ammonium disinfectant**

**1% RelyOn (8 tablets 5g ea. / 2 gallon of water)**

**0.5% Virkon (1.3 oz / 2 gallons of water)**

**6.6% Lysol (16 oz / 2 gallons of water)**

(e.g., in a 5 gallon bucket)



**Rinse sensitive dive gear in fresh water by soaking for 10 min**

(e.g., in a 5 gallon bucket)

**Properly dispose of disinfectant solutions and rinse waste into sink, tub, or shower**



**Allow gear to air dry thoroughly**

**BC internal bladders:** Pour ~ 1 quart of ammonium disinfectant solution into mouthpiece of BC's exhaust hose while depressing exhaust button, inflate BC, & gently rotate BCD in all directions (cover all internal parts). Soak for 10 min & then dump waste into a container for proper disposal. Pay attention to wet-suit crevices and folds.

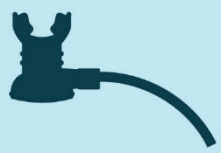
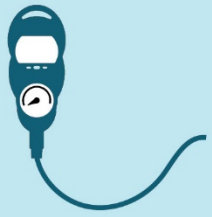
# Quaternary ammonium compounds

- SaniZide, Safetec, Advance TBE, Bi-Arrest 2, Confidence Plus, Dettol
- Broad spectrum of effectiveness against Gram negative and gram positive bacteria, viruses, and fungi.
- Non-corrosive
- 10 minute soak, freshwater rinse
- Contain phenols; need proper disposal





# Gear - Specific Guidelines for Disinfection



Sensitive Equipment



**Soak sensitive equipment for 20 min in anti-bacterial dish soap**

**OdoBan (5 oz per gallon of warm water)**  
(e.g., in a 5 gallon bucket)

**OR clean with an isopropanol alcohol wipe**



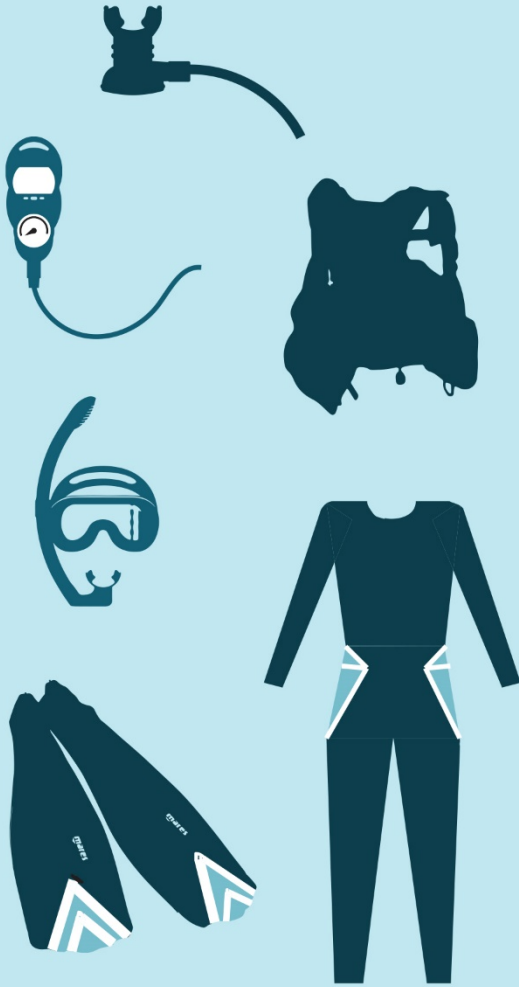
**Rinse sensitive equipment in fresh water thoroughly**

(e.g., in a 5 gallon bucket)  
**Properly dispose of disinfectant solutions and rinse waste into sink, tub, or shower**



**Allow gear to air dry thoroughly**

## Guidelines for Disinfection of Dive Gear



Keep Our Islands Clean!

1



Soak all of your gear for 10 min  
in a 0.1% bleach solution

USE IMMEDIATELY AFTER MIXING

**1/3 Cup of bleach for every  
1 gallon of fresh water**

Don't forget your BC internal bladders!

2



Rinse all of your gear in  
fresh water

(e.g., in a 5 gallon bucket)

Properly dispose of disinfectant solutions by  
rinsing waste into sink or shower. Remember,  
chlorine will break down in the sun!

3



Allow gear to air dry thoroughly



# USVI

## General Guidelines for Disinfection



**DO**

- ✓ Inspect dive gear and equipment and remove debris
- ✓ Move from “cleanest” site first to “dirtiest” last
- ✓ Decontaminate dive gear at end of day
- ✓ Decontaminate dive gear between sites, islands, & sensitive areas
- ✓ Properly dispose of disinfectant by rinsing waste into sink or shower. Remember, chlorine will break down if left in the sun!

- ✗ Don't leave debris on dive gear
- ✗ Don't move from a diseased to a healthy site
- ✗ Don't forget to disinfect gear between sites, islands, sensitive areas, & end of day

- ✗ Don't use concentrations higher than 0.1%  
More chlorine is wasteful and can be dangerous.

**DON'T**

# Other options

## Chlorhexadine gluconate disinfectant (FGNMS)

- 10% solution in freshwater
- Contains ethyl alcohol and glycerin



# Challenges

- Must be effective
- Avoid damage to gear
- How do you neutralize and dispose of solutions?

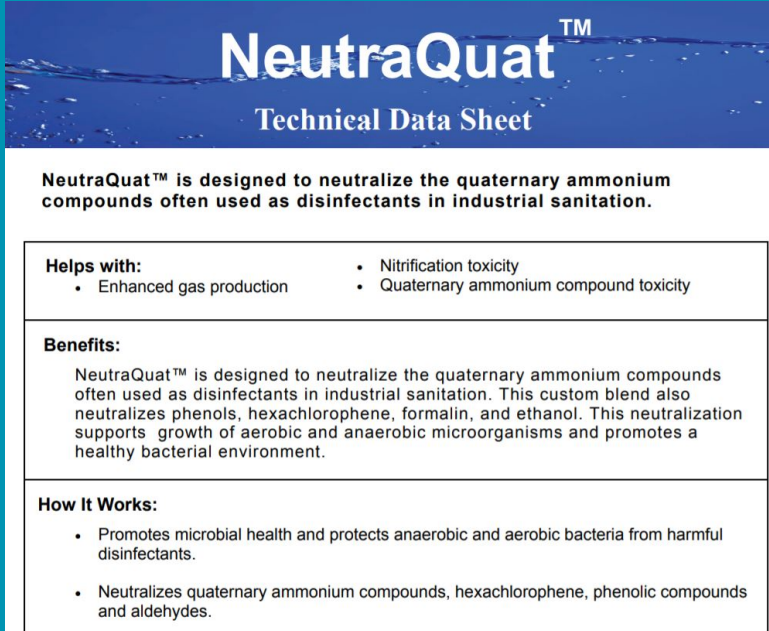
# Disposal

## Bleach:

- Wash bucket can be left in sun for 24 hours then dumped
- Addition of Bisulfate (AntiChlor), Thiosulfate (Bleach Stop) or hydrogen peroxide to neutralize

## Quaternary Ammonia

- NeutraQuat neutralizes phenols



**NeutraQuat<sup>TM</sup>**  
Technical Data Sheet

NeutraQuat<sup>TM</sup> is designed to neutralize the quaternary ammonium compounds often used as disinfectants in industrial sanitation.

<b>Helps with:</b> <ul style="list-style-type: none"><li>• Enhanced gas production</li></ul>	<ul style="list-style-type: none"><li>• Nitrification toxicity</li><li>• Quaternary ammonium compound toxicity</li></ul>
<b>Benefits:</b> <p>NeutraQuat<sup>TM</sup> is designed to neutralize the quaternary ammonium compounds often used as disinfectants in industrial sanitation. This custom blend also neutralizes phenols, hexachlorophene, formalin, and ethanol. This neutralization supports growth of aerobic and anaerobic microorganisms and promotes a healthy bacterial environment.</p>	
<b>How It Works:</b> <ul style="list-style-type: none"><li>• Promotes microbial health and protects anaerobic and aerobic bacteria from harmful disinfectants.</li><li>• Neutralizes quaternary ammonium compounds, hexachlorophene, phenolic compounds and aldehydes.</li></ul>	