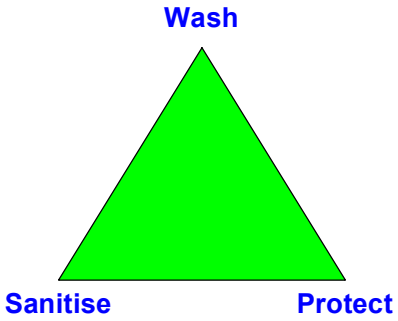
www.ecohydra.com

Products and Benefits

EcoHydra has hand hygiene products that are not only highly effective but also maintain the integrity of the skin, avoiding the pain and distress associated with repeated use of harsh antiseptics. This should engender in users a positive attitude to hand cleansing and better compliance to hand hygiene protocols. The US Center for Disease Control (CDC) cites the number one reason for the lack of adherence to the hand hygiene protocols as "healthcare workers resisting the repeated use of products that irritate and damage the skin". In the UK the NHS clean**your**hands campaign has set targets to raise the average compliance for hand sanitisation from 28% to 76%.

The modern approach to hand hygiene is illustrated in the diagram below, in what EcoHydra calls the Hand Hygiene Triangle.



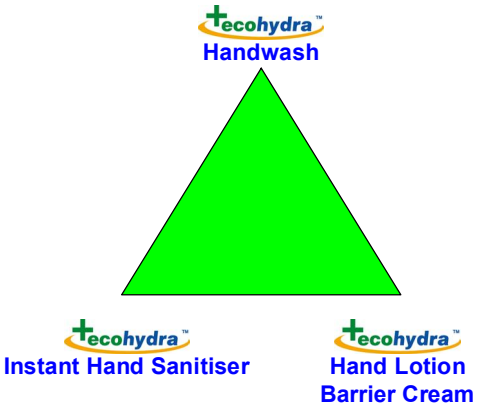
The three corners of the Hand Hygiene Triangle represent the fundamental requirements of any hand hygiene system, and are:

- **Wash:** Running water and a washing agent (e.g. soap) are used together to remove dirt and germs from the hands.
- **Sanitise:** An antiseptic handrub is used without running water to kill germs on the hands.
- **Protect:** A lotion is applied to the hands to condition and moisturise them.

EcoHydra has unique products that meet and exceed these requirements.

The EcoHydra Product Range

EcoHydra's antimicrobial products, utilising BASE Technology™, have a wide range of applications within consumer, commercial and institutional markets. They present a holistic approach to the hand hygiene market and address the needs of the Hand Hygiene Triangle as illustrated below:



The **Instant Hand Sanitiser** is delivered as foam from dispensers of various sizes. In test marketing, 50ml pocket sized foaming dispensers were produced as well as 1,000ml wall-mounted foaming dispensers. It is also possible to dispense as a spray, which can be cheaper to produce but less aesthetic for the user. The product is designed for frequent use and is highly effective, yet does not damage the skin's natural integrity or pH level. It requires no water to rinse, as it dries naturally on the skin and remains active.

The **Handwash** is a liquid soap alternative providing a wet method for washing and disinfecting the hands and arms, without damaging the skin's natural integrity or pH level.

The **Hand Lotion** helps heal dry or chapped skin and prevent infections. It is used as a daily moisturising lotion with additional antimicrobial protection. It soothes and moisturises the skin and is ideal for those who wash hands frequently. The 2002 CDC recommendation added the use of a lotion as part of good hand hygiene practice. The key benefit of EcoHydra's lotion is that it also has an active ingredient that disinfects the hands.

The **Barrier Cream** adds to the Hand Hygiene Triangle. It is a barrier cream with antimicrobial properties and so has a wide range of uses. For the healthcare professional, when used after the Handwash, it prevents bacteria from breeding in the sweaty environment inside gloves, helps with latex allergies and keeps germs away when gloves tear or have small holes. It is ideal for non patient-caring staff who are portering, delivering papers or food, or dealing with waste, and offers them the best possible protection.

BASE Technology

BASE Technology represents a class of new proprietary formulations incorporating:

B – Benzalkonium Chloride

A – Aloe Vera

S – Surfactants

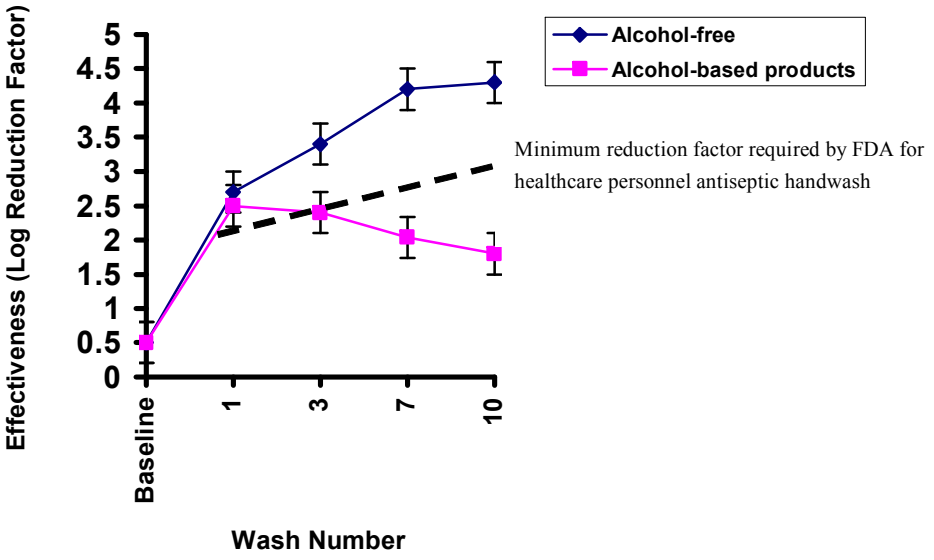
E – Emollients

The specific combination of these components in EcoHydra's product range enables and differentiates its formulation from other products. It is BASE Technology that makes the products non-irritating and non-

damaging to the skin, providing the healthcare sector and general population with a viable hand hygiene solution for the 21st century.

Repeated Use

The following chart is derived from a US study, and compares the antimicrobial effectiveness of an alcohol handrub with an alcohol-free hand sanitiser after repeated use.



*FDA testing protocol listed in Federal Register, Vol. 59(116), June 17, 1994, 21 CFR 333.470. "Effectiveness testing of an antiseptic Handwash or healthcare antiseptic Handwash."

Fire Risk

There is a concern with the growing number of alcohol dispensers in healthcare and factory environments, relating to the risk of fire. This is accentuated by the mixes of gels and alcohol now being sold which, in the event of a container exploding, could prove disastrous. This is supported by reference to concerns in the USA where alcohol gels are Class 1 flammable liquids and are prohibited under NFPA30 and NFPA101 (life Safety Codes). The State of Michigan has banned their use in access corridors while allowing them in patient rooms. Other states are allowing their presence by making a value benefit decision to exempt the products from existing law as there is currently no other alternative. The EcoHydra range brings this alternative to market.

Misuse

Concern exists within the mental health sector regarding leaving alcohol dispensers in the vicinity of confused patients who may drink them. Children may be similarly vulnerable. The recommendation is not to have bedside dispensers but to give staff pocket handrubs. This is a compromise that defeats the objective of hand hygiene protocols, namely that all people in contact with patients should use hand sanitisation, and again opens the door to EcoHydra's product range.

Test Results

The EcoHydra product range has so far undergone the following tests:

1. In vitro tests in an NHS laboratory against the following organisms:
    i. Methicillin Resistant Staphylococcus Aureus (MRSA – HCAI)
    ii. E Coli (food infection)
2. In vitro tests of the Instant Hand Sanitiser based on the European prEN12054 standard in an independent laboratory on the following organisms:
    i. Staphylococcus Epidermidis (HCAI)
    ii. Pseudomonas Aeruginosa (HCAI)
    iii. Methicillin Resistant Staphylococcus Aureus (MRSA – HCAI)
    iv. Methicillin Sensitive Staphylococcus Aureus (MSSA – HCAI)
    v. Enterococcus Faecalis (HCAI)
    vi. Candida Albicans (Thrush)
    vii. Serratia Marcescens (HCAI)
    viii. E Coli (food infection)
    ix. Enterococcus Hirae (HCAI)
3. In vitro tests of the Handwash, the Hand Lotion, and the Barrier Cream, based on the European prEN12054 standard in an independent laboratory on the following organisms:
    i. Staphylococcus Epidermidis (HCAI)
    ii. Pseudomonas Aeruginosa (HCAI)
    iii. Methicillin Resistant Staphylococcus Aureus (MRSA – HCAI)
    iv. Methicillin Sensitive Staphylococcus Aureus (MSSA – HCAI)
    v. Enterococcus Faecalis (HCAI)
    vi. Candida Albicans (Thrush)
    vii. Serratia Marcescens (HCAI)
4. In vivo tests based on the European EN1500 standard in an independent laboratory on the Instant Hand Sanitiser using 15 human volunteers on the following organisms:
    i. E Coli (food infection)
    ii. Staphylococcus Epidermidis (HCAI)
5. Non-standard in vitro and in vivo residual activity tests in an independent laboratory on the Instant Hand Sanitiser.

In summary, the results of tests carried out so far show the following:

Instant Hand Sanitiser:

- NHS lab tests:

- MRSA: At least 5-log reduction:
  - In 15 sec up to 1:2 dilution.
  - In 1 min at 1:4 dilution.
  - In 5 min at 1:8 dilution.
- E Coli: At least 5-log reduction:
  - In 15 sec up to 1:4 dilution.
  - In 5 min at 1:8 dilution.

- prEN12054:
  - Pass against the 4 standard test organisms:
    - Pseudomonas Aeruginosa
    - Staphylococcus Aureus
    - E Coli
    - Enterococcus Hirae
  - 30 sec log reductions against tested organisms:

Staph Epidermidis	10
Ps. Aeruginosa	6
MRSA	6
Staph Aureus	5
Ent. Faecalis	7
Candida Albicans	4
Serratia Marcescens	5
E. Coli	6
Ent. Hirae	5

- EN1500:
  - Staphylococcus Epidermidis: 5-log reduction in 15 sec.
  - E Coli: 4-log reduction in 15 sec.
  - At 15 sec matches the efficacy of reference alcohol (60% Propan-2-ol rubbed for 1 min).
  - When used for 25% of the time and at 15% of the applied volume, it matches the efficacy of alcohol.
- Residual Activity:
  - Demonstrated in vivo for Staph Epidermidis, Staph Aureus, MRSA and Ent Faecalis
  - Demonstrated in vitro for above plus Ps Aeruginosa and Ser Marcescens

Handwash:

- prEN12054 (diluted to 55% concentration):
  - 30 sec log reductions against tested organisms:

Staph Epidermidis	10
Ps. Aeruginosa	6
MRSA	6
Staph Aureus	5
Ent. Faecalis	7
Candida Albicans	5
Serratia Marcescens	4

Hand Lotion:

- prEN12054:
  - 30 sec log reductions against tested organisms:

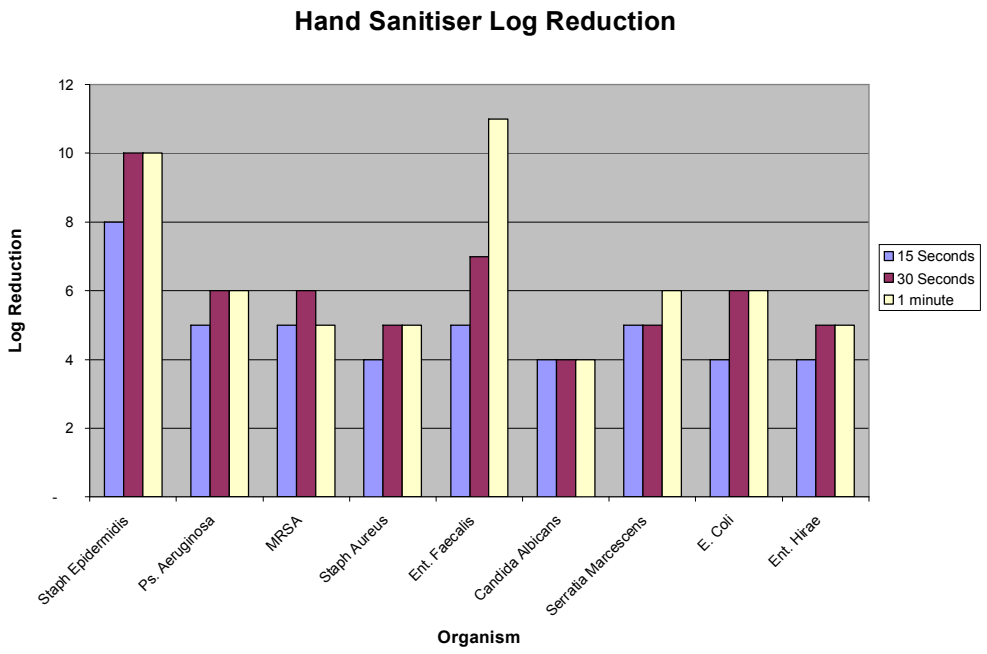
Staph Epidermidis	4
Ps. Aeruginosa	5
MRSA	5
Staph Aureus	5
Ent. Faecalis	5
Candida Albicans	5
Serratia Marcescens	5

Barrier Cream:

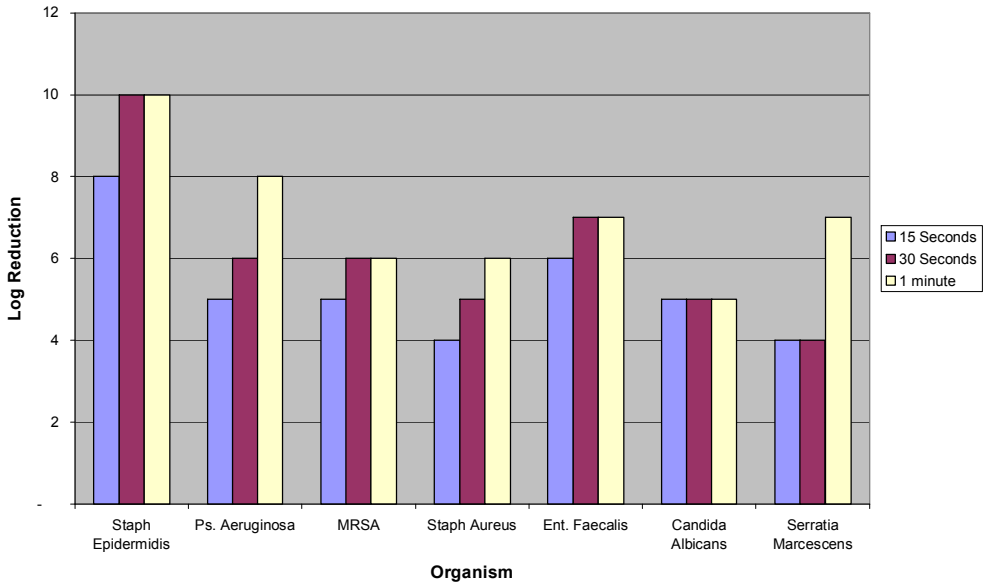
- prEN12054:
  - 30 sec log reductions against tested organisms:

Staph Epidermidis	3
Ps. Aeruginosa	5
MRSA	5
Staph Aureus	7
Ent. Faecalis	5
Candida Albicans	5
Serratia Marcescens	5

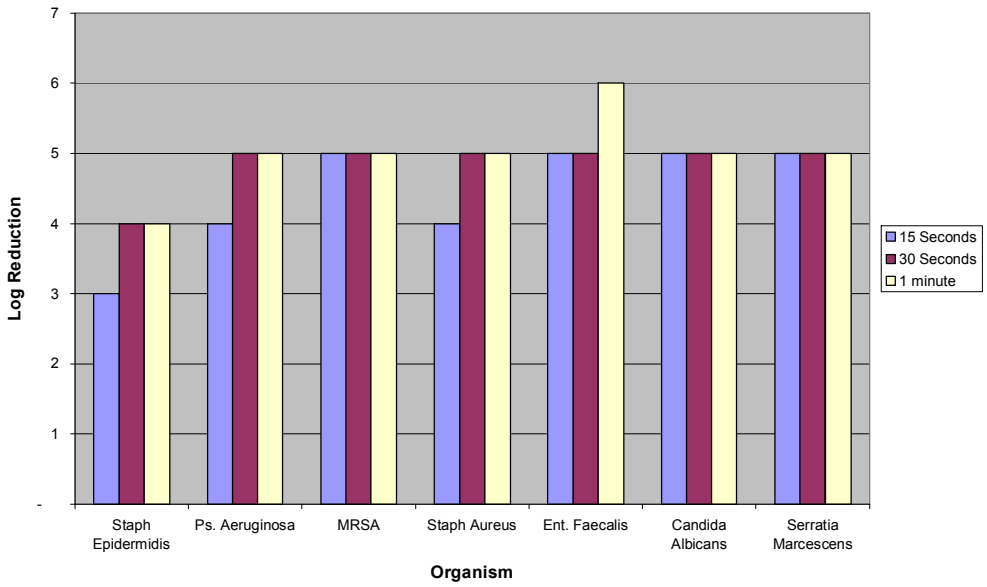
prEN12054 Charts:



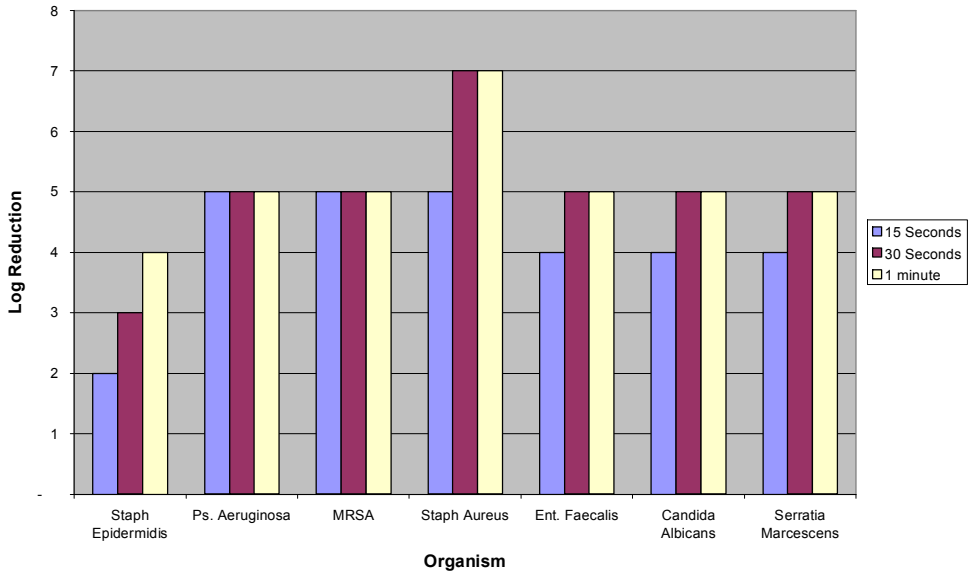
Handwash Log Reduction



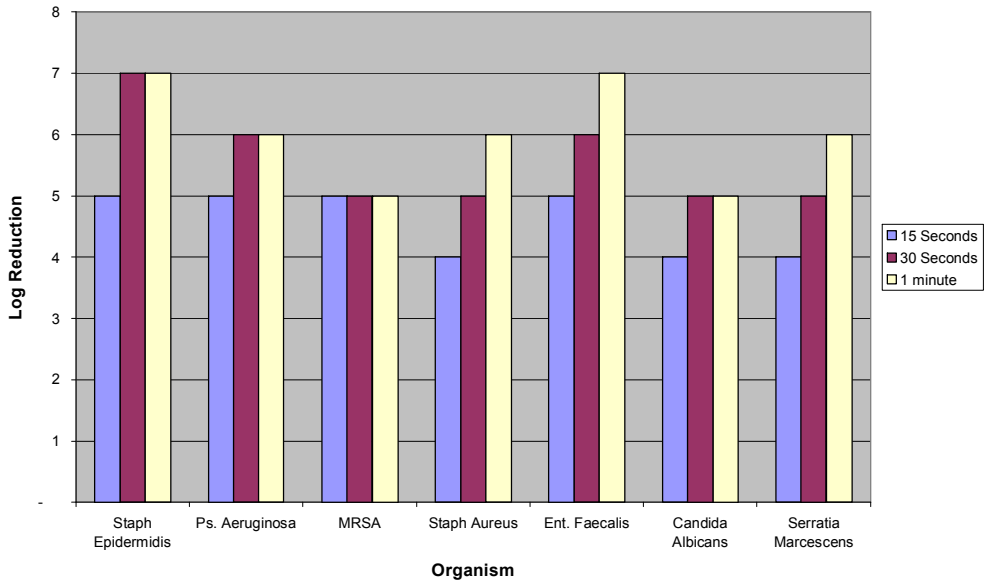
Hand Lotion Log Reduction



Barrier Cream Log Reduction



Average Log Reduction



EN1500 Chart: