How hand hygiene impacts hospital infection rates

A study published in BMJ, which coincided with the World Health Organization SAVE LIVES: Clean Your Hands campaign on the 5 May 2012, reveals that the campaign played a significant role in reducing rates of some healthcare associated infections in hospitals across England and Wales.

The purpose of the study was to evaluate the impact of the Cleanyourhands campaign on rates of hospital procurement of alcohol hand rub and soap, report trends in selected healthcare associated infections, and investigate the association between infections and procurement.

Bedside alcohol hand rub, materials promoting hand hygiene and institutional engagement, regular hand hygiene audits, were installed from 1 December 2004 and rates for each trust of hospital procurement of alcohol hand rub and liquid soap and levels of Staphylococcus aureus bacteraemia (meticillin resistant (MRSA) and meticillin sensitive (MSSA)) and Clostridium difficile infection for each trust was obtained.

The results found that combined procurement of soap and alcohol hand rub tripled from 21.8 to 59.8 mL per patient bed day; procurement rose in association with each phase of the campaign. Rates fell for MRSA bacteraemia (1.88 to 0.91 cases per 10,000 bed days) and C difficile infection (16.75 to 9.40 cases); however, MSSA bacteraemia rates did not fall.

Increased procurement of alcohol hand rub was independently associated with reduced MRSA bacteraemia, but only in the last four quarters of the study and the publication of the Health Act 2006 was strongly associated with reduced MRSA bacteraemia.

The study concluded that the Cleanyourhands campaign was associated with sustained increases in hospital procurement of alcohol rub and soap, which the results suggest has an important role in reducing rates of some healthcare associated infections. National interventions for infection control undertaken in the context of a high profile political drive can reduce selected healthcare associated infections.

Patients contacted over infection concerns at dental practice

Nearly 1,000 patients at a dental practice in Aberdeen have been contacted by NHS Grampian due to concerns regarding their infection control procedures.

According to a report, the patients at the Bridge of Don Dental Clinic and Research Centre in Silverburn Crescent, Bridge of Don have been sent advisory letters after an inspection in March found that infection control procedures at the practice, including those for instrument decontamination, did not meet national standards.

A spokeswoman for NHS Grampian said in a report: “The letter reassures patients that the risk of infection is low. However, any patient who remains concerned can contact NHS 24 helpline 08000 28 28 16 between 8.00am and 10.00pm where they can get further advice about health concerns including for blood borne viruses such as hepatitis B, C and HIV.

“Letters have been sent to patients registered at the independent practice between January, when it opened, and 10 April, the date of a follow up inspection which found infection control procedures were satisfactory and now followed national standards.”

She added: “Dr Xenouf Gkouzis is the only dentist now working in the practice. He is registered in the UK with the General Dental Council and is authorised to treat NHS patients in Grampian. This incident is not related to him.”

Dr Maria Rossi, consultant in Public Health Medicine at NHS Grampian, said: “We are working closely with local and national experts and have concluded there is a low risk of infection to patients. As our priority is always for the safety and welfare of patients, we felt it was important to write to inform them of this incident. The letter emphasises that no action is required by the patient, but tests will be available if anyone remains concerned regarding the letter and after calling the helpline.”

Ray Watkins is Consultant in Dental Public Health at NHS Grampian. He added: “While this is an independent practice, it is expected to comply with national infection control standards. We are unable to confirm that these standards were adhered to prior to April 10 when a follow-up visit, procedures were found to be satisfactory.”

“The practice has co-operated with the investigation, and will continue to be monitored.”
By now, all dental practices must comply with the essential requirements of Health Technical Memorandum 01-05 Decontamination in Dental Practice (aka HTM 01-05). If they do not, they are in breach of CQC Regulation 12, Outcome 8. HTM 01-05 was produced (in the words of the Department of Health) “in response to emerging evidence around the effectiveness of decontamination in primary care dental practices and the possibility of prion transmission through protein contamination of dental instruments.”

In brief, the essential requirements of HTM 01-05 are that:

• Regardless of the technology used, the cleaned instruments, prior to sterilisation, should be free of visible contaminants when inspected with a magnification device. Instruments should be reprocessed using a validated decontamination cycle including: cleaning/washing (in terms of manual cleaning, this includes having a written protocol, a validated steam steriliser, and at the end of the reprocessing cycle they should be in a sterilised state).

• Reprocessed dental instruments should be stored in such a way as to ensure restraint of microbiological re-colonisation. These measures should be backed by careful controls on the storage times to which instruments that are less frequently used are subject.

• Practices should audit their decontamination processes quarterly using an audit tool (the use of the Infection Prevention Society/DH audit tool that accompanied the document was strongly recommended).

• Practices should have in place a detailed action plan on how the provision of decontamination services will move towards best practice.

Continue raising clinical governance awareness

Considering that last bullet point in more detail, it is implicit in the guidance that merely meeting the essential requirements of HTM 01-05 is not an end in itself. Instead, practices should continue moving forward with decontamination and aim towards best practice – effectively shooting at ever narrowing goalposts.

By definition, I cannot tell you in detail what best practice is. It will continue to evolve over time as more effective processes are discovered and as better decontamination equipment is produced. Also, you may be close to achieving best practice now or you could be a long way off it.

In moving towards best practice, you may wish to consider some or all of the following upgrades to your practice:

• The use of an automated (HTM 01-05) washer-disinfector

• Separate facilities for decontamination clearly separated from the clinical treatment area. This implies the use of a separate room or rooms which should be used for the purpose of decontamination only and to which access should be restricted to those staff perform-
ing decontamination duties

- Organisation of the reprocessing area into a dirty/clean workflow system with best practice being dirty and clean areas as separate rooms, each with a door and individual air supply and extraction
- Provide suitable storage for instruments, which reduces exposure to air and a possible risk of further contamination
- Minimise worktops – which means less clutter and less to clean – and replace them with glass, so that patients can see immediately that the surgery is clean

To keep abreast of decontamination best practice, I suggest you link up with your PCT, that you always read Dental Tribune and Infection Control Tribune and that you keep an eye on dentistry websites. Also, check out the decontamination equipment manufacturers for new products, liaise with dentistry colleagues and visit the appropriate trade and association stands at shows.

An action plan for best practice

Decontamination best practice cannot simply be a wish list – you need to draw up an action plan for achieving it. At the moment, no timescales have been set for practices to achieve best practice. This makes developing an action plan with targets as to when things will be achieved rather tricky. Bear in mind that you will, at some stage, need to show this action plan to a member of your PCT and talk through it – so it needs to be based on sound thinking, not guess work.

Let’s take the example of separating decontamination rooms. There are many dental practices that use the same room for patient treatment and decontamination and this meets HTM 01-05 essential requirements at this time. The principals or owners of these practices need to decide how they can work towards a separate and controlled decontamination room (or clean/dirty rooms). If it’s merely a question of utilising an unused room or erecting partitions, the timescale for achieving it could be relatively short and will depend on when the finance is likely to be available.

In, for example, a listed building or premises where you are already short of space, the only solutions may be to move or rent/purchase additional premises. Clearly, this will likely be a longer-term aim.

For something a little easier to build into your action plan, consider the purchase of washer-disinfector. You will need to investigate what models are available, which will likely cost and what the installation requirements area. You will also need to consider how, where and when your staff can be trained to use it and how much this will cost. They may well also need training in the use of instrument rotation systems and working in a designated decontamination room.

Although you should check whether your PCT has funds available for the purchase of washer-disinfectors, in England there was no central funding for meeting HTM 01-05 essential requirements and there is certainly none at this time for moving towards decontamination best practice. By contrast, the Scottish Government has made funds available for decontamination improvements, for the maintenance of decontamination equipment and even provided grants for when a practice needs to relocate.

Sample test processes and procedures to evidence the level of compliance

Finally, don’t forget to maintain the daily and weekly checks of equipment and the quarterly checks specified in the Infection Prevention Society/DH audit tool.

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“Sterile” does not mean clean and safe
Dr Mikael Zimmerman discusses disinfection

Most equipment-associated infection is due to inadequate cleaning and disinfection. The most effective stage of any decontamination procedure is thorough cleaning.

Medical devices heavily loaded with microbiological material will be more difficult to sterilise than one lightly contaminated and must therefore be thoroughly cleaned to reduce organic material or bio-burden before disinfection and sterilisation. Washer-disinfectors are the safest and most reliable option.

Automated processors, e.g. washer disinfectors and ultrasonic cleaners, improve the quality of the decontamination process and offer the safest, most reliable option, providing they are suitably monitored and maintained.

Decontamination is done most simply in a disinfectant which both cleans and disinfects in one stage. In a washer-disinfector the items are first cleaned by rinsing in cold water and then washed in water at less than 70°C. The water temperature then increases to between ±85°C and ±95°C, for one to three minutes, providing thermal disinfection of the load. At the temperature range of ±85°C - ±95°C, pathogenic bacteria are inactivated or killed, but bacterial spores survive. In order to ensure inactivation of viruses, particularly hepatitis virus which is relatively heat tolerant, it is now recommended that the water temperature during the disinfection phase should be just over ±90°C.

Disinfection is generally a less lethal process than sterilisation. It eliminates virtually all recognised pathogenic microorganisms but not necessarily all microbial forms (e.g. bacterial endospores) on inanimate objects. Disinfection does not ensure overkill and therefore disinfection processes lack the margin of safety achieved by sterilisation procedures.

Cleaning and disinfection of instruments should be carried out as soon as possible after use. Dried biological material is much more difficult to remove than fresh deposits. Blood, with its content of iron, acid and sodium chloride, is corrosive.

The type B-cycle
Sterilisation is defined as the use of a physical or chemical procedure to destroy all microbial life, including large numbers of highly resistant bacterial endospores. The sterility requirement for medical products means that the theoretical probability that a living organism will be present on an object after the sterilising process is equal to or less than one in a million, so-called Sterility Assurance Level (SAL) = 10^-6. Sterility may be achieved by various methods: heat, chemical and ionising radiation. The simplest method is heat sterilisation. There are two methods: dry heat sterilisation, i.e. use of dry heat usually a hot air oven or autoclaving, in which most heat (steam) is used.

Regardless of the method, the result of sterilising procedures depends on the number of microorganisms and other biological material present on the article before inactivation and the resistance of microorganisms to the sterilisation process. The result of steam sterilisation is also influenced partly by the kind of material the items are made of, and partly by the shape of the items. It is important to note that packaging material itself is a porous load (paper, textiles) and should be handled as such. All packaged/wrapped goods require sterilising in steam-autoclave processes with pre- and post-vacuum cycles.

Another factor which influences the result of the sterilising procedure is the way in which the chamber is loaded as well as whether the items are packaged and the shape of the package. The goods should not be tightly packed: the steam must be allowed to penetrate all parts of the goods. Residual moisture in the packaging material after sterilisation will act as a potential pathway for microorganisms to penetrate the package.

Steam sterilisation
Saturated steam under pressure is by far the quickest, safest and most efficient and most reliable medium, known for the destruction of all forms of microbial life. The brief exposure to steam destroys the most resistant bacterial species and heat is rapidly achieved because of mass heat transfer as the steam condenses.

In order for the steam to condensate within the whole load to be sterilised, virtually all air must be evacuated during pre-treatment. This can only be achieved with several (at least three (3)) pre-vacuum cycles. So called B-cycle in accordance with EN 13060.

In steam sterilisers with pre- and post-vacuum processes (B-cycle), the sterilisation process is composed by three main phases: pre-treatment, sterilising and post-treatment. During pre-treatment the air is expelled by a number of pulses of vacuum and the introduction of steam. The temperature increases successively, up to the degree at which sterilising is to take place. The actual sterilisation period, which is called holding time, starts when the temperature in all parts of the autoclave chamber and its contents (the load) have reached the sterilising.
temperature. The temperature should then remain constant, within specified temperature band, throughout the whole sterilisation phase (plateau/holding time). In the post-treatment phase, either the steam or the re-vaporised water is evacuated during pre-treatment (pre-vacuum phase) so that the saturated steam can affect the goods during the sterilising phase. If present, trapped air pockets in the goods prevent steam penetration during sterilisation of porous material such as textiles and hollow items.

Steam sterilisation of hollow instruments (with long, narrow lumina) and porous objects always requires several (at least three (3)) pre-vacuum pulses to a defined, pre-set, vacuum level.

Fewer instruments, better control

The type of equipment and the type of procedures in use at the clinic will to a very high extent determine the safety margin of decontamination. A very important issue, that is often foreseen, is the logistics of instruments. A common problem in many dental offices is an overload of instruments, which will contribute to a more difficult and time demanding procedure to keep track of all instruments and to make sure that storage and sterile as well as packaging/wrapping conditions are maintained.

An item heavily loaded with microbiological material will be more difficult to sterilise than one lightly contaminated. The most effective stage of any decontamination procedure is thorough cleaning and this should accompany or precede all disinfection procedures. The effect of cleaning, disinfection and sterilisation is affected by the design of the cassettes/trays being used. Shadow effects may easily ensue from the use of solid cassettes so that instruments are not being properly cleaned, neither in washer disinfectors nor in ultrasonic bath.

Fastened but free

Instruments should be free and fastened on trays so that ultrasonic waves, water jets and steam can reach every part to clean and inactivate efficiently during the whole procedure of disinfection and sterilisation. Even if fastened the instruments must be free and have no contact points/areas with the locking device.
Patients with a hidden problem are very often those that are not detected by the appropriated standardisation and asepsis. This is why the handling of instruments should be considered as one single unit when they are sterilised.

The quality improvement and the care of the patients is thereby a good way to improve practice economy and quality.

To have fewer instruments in the surgery helps to reduce costs and gives the conditions of safer handling, decontamination and disinfection.

Rationalisation of the handling of instruments during all parts of work - from preparation to sterile keeping – gives the staff liberty to work with quality improvement and to take a greater part in the treatment of patients. Rationalisation of the handling of instruments is thereby a good way to improve practice economy.

Fig 12 Rationalisation of the handling of instruments is a good way to improve practice economy and quality.
Infection control is continually neglected in dental education

*DTT’s Ben Adriaanse interviews Dr Hans de Soet, microbiologist and expert in infection control*

In 2009, a group of microbiologists established the Association for European Safety & Infection Control in Dentistry (AESIC), an organisation that promotes European collaboration for shared knowledge and uniform legislation on infection control and dental hygiene. This March, AESIC and ACTA, an academic centre for dental education in the Netherlands, organised a conference in Amsterdam with the theme ‘Harmonising dental infection prevention guidelines in Europe’. During the conference, steps were taken towards establishing a collaborative working group to collect and share dental infection control guidelines in Europe. Dental Tribune Netherlands spoke with Dr Hans de Soet, microbiologist and expert in infection control at ACTA, and chairperson of the event.

Dental Tribune Netherlands: Dr De Soet, what are your thoughts on the conference in Amsterdam?

Dr Hans de Soet: It was a successful conference. At last year’s European Oral Microbiology workshop, we sensed a need for harmonisation in dental hygiene and infection control. Apparently, there are substantial regulation differences among European countries: in some, these regulations are set up as laws, while in other countries they are merely stipulations. The way in which these guidelines are enforced also varies.

The conference offered lectures on the current situation in the Netherlands, Ireland, Scotland, Germany and Sweden. What is the most noteworthy regarding the current situation in these countries?

I did not observe any fundamental differences. There are, of course, some minor variations. For example, in some countries gloves can be used more than once. Generally, though, the regulations are quite similar.

In Scandinavia, dentists are obligated to record their activities concerning infection control according to 10 stipulations. Each requires a separate record, such as “equipment validation”.

In Scandinavia, dentists are obligated to record their activities concerning infection control according to 10 stipulations. Each requires a separate record, such as “equipment validation”.

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The goal of the conference was to establish a European working group. What activities will this group undertake?

The working group is not primarily concerned with formulating European regulations. We are mainly interested in sharing our thoughts on patient safety. We can all benefit from sharing our knowledge at an academic level and performing research using data from all over Europe. The ultimate goal is to give infection control the place it deserves in academic research programmes.

Once we have finished mapping the current state of infection control, we can determine whether it is possible to formulate regulations at a European level.

The Lancet published a case about an 82-year-old Italian patient who died of Legionella infection after seeing a dentist. The Netherlands has never seen a serious case like this, but if infection control is neglected, we just might. As I indicated, the smaller education budgets force universities to make certain choices. Unfortunately, microbiology is not a priority for most dentists.

The Dutch situation is very good, partly because of its well-functioning government-owned monitoring agency. The England monitoring system is not so robust, and even if the next meeting takes place abroad, the Netherlands will certainly be represented. We have decided to meet once a year. It could well be that the next conference will again take place in Amsterdam because of its central location. In that case, we will definitely play a substantial role again.

Some companies may think that, but those that join AESIC adopt a responsible stance, demonstrating their concern for dentistry and their willingness to achieve optimal infection control. We sincerely value their contributions. Aside from that, conferences like this one need funding and we need commercial parties to make large investments in this field.

By the way, AESIC does not define itself to infection control alone. We also discuss infection treatment. Antibiotics are too easily prescribed, even when not necessary or desirable. Students should also be taught the alternatives in infection treatment.

You indicated that infection control in the Netherlands is of a relatively high standard. Does this mean that other countries could benefit more from a European working group?

There is room for improvement, which stresses the need for a European organisation like AESIC, which does not serve political goals, but focuses on science.

The situation in the UK is not ideal either, in that all local authorities perform their own research and establish their own regulations, owing to apparent political considerations. In this case, regulations, owing to apparent shortcomings, are not mandatory in other countries.

Infection control is currently a hot topic in Dutch dentistry, owing to the strict enforcement of equally strict regulations. How does this compare with the rest of Europe?

By comparison, our regulations are well developed: they are extensive, clear and realistic. Although some dentists regard them as too strict, they are actually more flexible than those of some other countries. For instance, Dutch dentists are not obligated to publish an annual record of their activities with reference to patient safety. Dutch regulations are also unique in that they are developed by an independent party.

Regulations also require enforcement. How does foreign regulation enforcement differ from that in the Netherlands?

The Dutch situation is very good, partly because of its well-functioning government-owned monitoring agency. The England monitoring system is not so robust, and even if the next meeting takes place abroad, the Netherlands will certainly be represented. We have decided to meet once a year. It could well be that the next conference will again take place in Amsterdam because of its central location. In that case, we will definitely play a substantial role again.

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Infection control in dentistry are largely based on general medicine, which means that some regulations may be too strict. We lack empirical evidence of the risk of infections like Legionella and MRSA.

Therefore, it is difficult to determine whether and how the regulations should be adjusted: should they be stricter or more flexible? There is some data about MRSA in general medicine, but not in dentistry. Now, we could wait until something goes wrong, or we could cooperate with other dental professionals for whom MRSA is increasingly problematic.

AESIC was set up in 2010. What has the organisation accomplished so far?

Eighteen months is too short for any tangible accomplishments, but we have achieved a wonderful goal in bringing together so many academics and commercial representatives. The latter are of crucial importance too: we can do all this research, but it’s the manufacturers that have to produce the desired devices and products.

AESIC aims to anticipate new developments, enabling it to steer manufacturers in a certain direction. For instance, few dental chairs are equipped with an automatic drainage cleaning system. Were such a system to be made compulsory, manufacturers should be able to anticipate this at an early stage.

Dental manufacturers are probably hoping for very strict regulations on infection control, thus forcing dental practitioners to make large investments in this field.

Some companies may think that, but those that join AESIC adopt a responsible stance, demonstrating their concern for dentistry and their willingness to establish optimal infection control. We sincerely value their contributions. Aside from that, conferences like this one need funding and we need commercial parties to make large investments in this field.

How close are you to establishing a European working group?

We have now inventoried the main similarities and differences between the regulations in European countries. In doing so, a practical problem immediately became apparent: The Netherlands is the only country that has translated its regulations into English. Also, they are often so that we can gather stronger empirical evidence.

Will the Netherlands be represented at subsequent AESIC meetings?

We have decided to meet once a year. It could well be that the next conference will again take place in Amsterdam because of its central location. In that case, we will definitely play a substantial role again.

My colleague Wilma Morsen and I were strongly involved in the organisation of the conference, but even if the next meeting takes place abroad, the Netherlands will certainly be represented.
Protein contamination in the dental surgery

Peter Bacon discusses surface cleaning and disinfection

A s the dental profession is only too well aware, both cleaning and disinfection processes within the dental practice are of paramount concern, not only in relation to CQC and HTM01-05 compliance, but also with regard to staff and patient well-being – which the compliance guidelines are there to ensure and protect.

Protein contamination in the dental surgery is an obvious area for serious concern, since residual soiling on surfaces can harbour pathogens.

Blood has the potential to carry and transmit viruses such as HIV, HBV and HCV. The risk of transmission of communicable blood-borne viruses might be considered to come only from high risk areas such as accidental sharps injuries, but greater research and advances in the sphere of microbiology now provides evidence that many micro-organisms can survive on a variety of surfaces, making the danger of disease transmission from contaminated surgery surfaces or equipment a genuine threat to patients and staff. In addition, an increasingly mobile population including greatly increased economic migration has resulted in a resurgence of diseases such as TB, which are associated with overcrowding and poor standards of general health.

In order to overcome the potential issue of surface decontamination and the prevention of transmission of pathogens, dental practices must have rigorous infection control policies which establish clear protocols for cleaning and disinfection and document the practice’s adherence to the procedures laid down.

Decontamination is defined as a reduction in the risk of contamination to a level that is acceptable, i.e. controlling the number of microbes in an environment. Within a dental surgery, both cleaning and disinfection are required but although the terms are often confused they are not the same thing. Cleaning involves physical removal of soiling matter from surfaces while disinfection is inactivation of pathogens. Cleaning must take place before disinfection to ensure that bacteria, proteins and other contaminants are removed from surfaces before disinfection takes place, unless a suitable single stage process is in use.

Decontamination of a specific area is aided by the use of commercially available products and many of these agents are based on alcohol. In dentistry, alcohol has been widely adopted as a disinfectant for many years and its efficacy in this role is well documented.

The widespread use of alcohol as a disinfectant in dentistry has been largely driven by its low cost and quick drying properties, where its rapid drying is perceived as critical in achieving a short turn-round time between patients. However, rapid evaporation of alcohol based products also means that by the time the treatment of a surface has been completed, most of the alcohol has evaporated from the wipe or surface, so the areas wiped at the end of the process will be neither cleaned nor effectively disinfect.

A fact frequently overlooked, but one that is highlighted by the HTM 01-05 guidelines, is that alcohol is not effective as a cleaner, particularly where protein based soils are present as is likely to be the case in medical and dental environments.

Section 6.57 of HTM01-05 states: ‘Evidence suggests that the use of commercial bactericidal cleaning agents and wipes is helpful in maintaining cleanliness and may also reduce viral contamination of surfaces. Care should be taken in the use of alcohol wipes, which – though effective against viruses on clean surfaces – may fix protein and biofilm. However, the careful use of water with suitable detergents, including those CE marked for clinical use, is satisfactory provided the surface is dried after such cleaning.

NOTE: Alcohol has been shown to bind blood and protein to stainless steel. The use of alcohol with dental instruments should therefore be avoided.’

Some of the limitations of alcohol are as follows:

- **Protein fixation**
- **Materials incompatibility (particularly PMMA)**
- **Rapid evaporation**
- **Flammability**

If we consider the ideal properties of a combined disinfectant and cleaning agent, most “experts” would agree that the following would be a reasonable, though not exhaustive list:

- **Excellent cleaning action**
- **Broad spectrum microbiocidal action** – some microbes present bigger challenges than others, for example TB
- **Non-toxic** – or at least selectively toxic
- **Short contact time – driven by time pressure and the need for short turnaround between patients**
- **Stability** – some agents have a very short shelf life
- **Ease of use – no complicated making-up requirements**
- **Competitively priced**

As stated in HTM 01-05, alcohol does not clean effectively but will disinfect clean surfaces, therefore, a two-stage process is required when using an alcohol based disinfectant.

1. **Clean** to remove physical soil- ing
2. **Disinfect** with alcohol to inactivate pathogens

This process however is less than desirable from an operational point of view due to the additional time required to carry out two procedures between each patient as well as the additional cost of buying two products and the additional inventory required.

Therefore we have seen in recent years a growing demand for water based combined cleaners and disinfectants. The ideal solution is a carefully formulated water based product that can both remove soiling and disinfect in a single process, greatly reducing the time taken and providing an effective solution.

The properties required in such a combined cleaner and disinfectant would be:

- **Broad spectrum efficacy**
- **Wide surface compatibility**
- **Effective cleaning**
- **CE marked Class 2a (required if a product is to be used to disinfect medical devices)**
- **pH neutral**
- **Two-year shelf life**
- **Low residue**
- **Supplied in all formats (ready to use, concentrate and wipes)**

The ability to deliver all the required features and their associated benefits in a single product will answer the demands of the market and provide a means of ensuring complete compliance with current guidelines.

About the author

Peter Bacon is Technical Director at Dentisan. www.dentisan.co.uk

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