MICROBIAL RISK ASSESSMENT OF DENTAL UNIT WATER SYSTEMS (DUWS) IN GENERAL DENTAL PRACTICE (GDP)

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<th>Project type</th>
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<td>1st March 2001</td>
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Co-ordinator

James T. WALKER  
Centre for Applied Microbiology and Research (CAMR)  
Porton Down  
Salisbury  
SP4 0JG  
Tel: 44 1980 612643  
email: jimmy.walker@camr.org.uk

Partners

Ellen FRANDSEN  
University of Aarhus  
Department of Oral Biology, Batholin Building  
University of Aarhus, Wilhelm Meyers Alle Building 240, Denmark.  
Tel: 45 89 42 17 39 Fax: 45 89 19 61 28  
e-mail: EF@microbiology.au.dk

Bob ten CATE  
University of Amsterdam  
Department of Cariology, Academic Centre for Dentistry Amsterdam, University of Amsterdam Louwesweg 1, 1066 EA, Amsterdam, The Netherlands.  
Tel: 31 20 51 88 440 Fax: 31 20 66 92 881.  
e-mail: JM.ten.Cate@acta.nl

Lutz STOESSER  
University of Jena  
Department of Preventative Dentistry  
Nordhaeuser Str. 78  
D-99089, Germany.  
Tel: 49 361 741 1305 Fax: 49 361 741 1105  
e-mail: stoesser@zmkh.ef.uni-jena.de

Rosa ARAUJO  
University of Barcelona  
Department of Microbiology, University of Barcelona, Avinguda Diagonal 08028, Barcelona  
Spain.  
Tel: 34 93 402 1491 Fax: 34 93 411 0592.  
e-mail: araujo@porthos.bio.ub.es

Joanna J. KAMMA  
Technological Educational Institute  
Athens  
Greece.  
Tel: 30 1 4525 935 Fax: 30 1 4525 935.  
e-mail: kvich.tee.gr

Peter GORONCY-BERMES  
Schulke and Mayr GmbH  
Department of Biology, Schulke and Mayr GmbH, Robert Koch Strasse 2, 22851 Germany.  
Tel: 49 40 521 00 552 Fax: 49 40 521 00 577.  
e-mail: Peter.Goroncy-Bermes@AirLiquide.com

Dennis O’MULLANE  
University of Cork Dental School  
Oral Health Services Research Centre,  
University Dental School and Hospital, Wilton, Cork, Ireland  
Tel: 35 3 21 276871 Fax: 35 3 21 545391  
e-mail: oral_health@ucc.ie
SUMMARY

Dental Unit Water Systems (DUWS) are used in dental practices to provide water to irrigate the oral cavity, and have been demonstrated to be heavily contaminated with microorganisms, particularly in dental hospitals. There is currently no EU Commission guideline applied to DUWS. The aim of this EU programme was to investigate the microbial contamination of DUWS in general dental practice in the UK, Denmark, Germany, The Netherlands, Ireland, Greece and Spain by;

(i) carrying out a questionnaire survey on DUWS type in use and GDP attitude to the risk of microbial infection from DUWS,
(ii) evaluate the efficacy of a variety of products based on different classes of active compound using a laboratory model to generate reproducible biofilm on DUWS tubing and,
(iii) applying disinfectants identified from the laboratory model to DUWS in general dental practice for the control of microbial contamination in GDP.

The major findings were that:

- The majority of dentists did not clean, disinfect or analyse the microbial load of their DUWS. Dentists would welcome regular monitoring and advice on cleaning their DUWS.
- The microbial load of DUWS in the different countries ranged from 0 to 4.4 x 10^4 cfu.ml^-1.
- Water supplied by 44% of dental units in this microbiological survey of GDP DUWS failed current European Union potable water guidelines (100 cfu ml^-1) and 51% failed American Dental Association (ADA) recommendations (200 cfu.ml^-1).
- Biofilms were identified as the major source of contamination; therefore effective products should be able to reduce the biofilm load within DUWS.
- Irrespective of overall contamination, pathogens such as *Pseudomonas* spp., enterobacteria, *Legionella* spp. *Mycobacterium* spp. and *Candida* sp. could occasionally
be detected, as could presumptive oral bacteria, indicating possible failure of anti-retraction valves and potential for cross-infection incidents.

The laboratory model was designed and established to investigate products for reducing the microbial load and presence of biofilm on DUWS tubing using a range of commercially available and novel products. Following comparative trials, the products Sterilex Ultra, Alpron, Sanosil, Oxigenal and BioBLUE were selected to be administered to the GDP. The following products were identified as being effective where used in GDP’s:

- Alpron
- Hydrogen-peroxide based products (including Sanosil, HWP Blue, Oxygenal and Dentasept).
- BioBLUE was rated as the next best product
- Ster4spray was limited in efficacy
- Sterilux Ultra was problematic resulting in clogged and blocked DUWS.

The partners in the programme would recommend that:

- The EU adopts the same standard as the ADA in that the water in DUWS should contain < 200 cfu.ml⁻¹.
- Where administered then effective products such as Alpron and the hydrogen peroxide based products should be used.
- The application of products should be carried out in combination with education and training of the staff involved as well as an appropriate monitoring regime as part of the GDP’s cross-infection control strategy.