SIMPIOS

II conferenza nazionale Simpios

PULIZIA, ANTISEPSI E DISINFEZIONE IN AMBITO SANITARIO

Milano, 7 Novembre 2017

CENTRO CONGRESSI STELLINE
corso Magenta, 61 - 20123 Milano (Italy)

Milano, 7 novembre 2017

La sicurezza e la tollerabilità (sterilità dei disinfettanti, i pericoli allergici e tossici dei prodotti)

Alessandra Toletone

Dipartimento Scienze della Salute
Scuola di Scienze Mediche e Farmaceutiche
Scuola di Specializzazione in Medicina del Lavoro
Università degli Studi di Genova

GERMICIDAL AGENTS

ANTISEPTICS

Inhibition of the growth and development of microorganisms (without necessarily killing them) **in living tissues**.

Indications: cleansing of preoperative skin, the cleansing of acute and chronic wounds and also in the treatment of superficial skin infections.

DISINFECTANTS

Destruction of pathogens in the environment (e.g. on work surfaces or operating materials).

Different chemical structures.

HAZARD ASSESSMENT

1. Health care workers are exposed to **multiple different chemicals in health care facilities**, including low level disinfectants, antiseptics, inhaled and topical medications, natural rubber products, sensitizing metals, and lotions and creams.
2. The **degree and frequency of exposure** to the various chemicals to which health care workers are exposed are difficult to assess.
3. Irritant and allergenic properties are related not only to chemical nature, but also to several **environmental factors: concentration, vehicle, occlusion, temperature or altered skin** (mechanical trauma, ulcerations, eczematous lesions, etc.)
4. Products used in health care **have changed** over time.
5. **Several diseases** potentially related to this exposure, such as asthma, **are common in the general public.**

DISINFECTION CATEGORIES

based on the degree of risk of infection

American Journal of Infection Control 44 (2016) e85-e89

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

Occupational health risks associated with the use of germicides in health care

David J. Weber MD, MPH [a,b,c,*], Stephanie A. Consoli RN [b], William A. Rutala PhD, MPH [a,b,c]

[a] Department of Hospital Epidemiology, University of North Carolina Health Care, Chapel Hill, NC
[b] Department of Occupational Health, University of North Carolina Health Care, Chapel Hill, NC
[c] Division of Infectious Diseases, University of North Carolina School of Medicine, Chapel Hill, NC

CRITICAL
items enter sterile tissue and must be sterile

- glutaraldehyde
- ortho-phthalaldehyde
- peracetic acid

SEMICRITICAL
item contact mucous membranes and require high-level disinfection

NONCRITICAL
items come in contact with intact skin and require low-level disinfection

- phenolics
- quaternary ammonium compounds
- chlorine-based products
- hydrogen peroxides

HAND HYGIENE

- waterless alcohol-based products – chlorhexidine – chloroxylenol – hexachlorophene - iodine and iodophors -quaternary ammonium compounds - triclosan

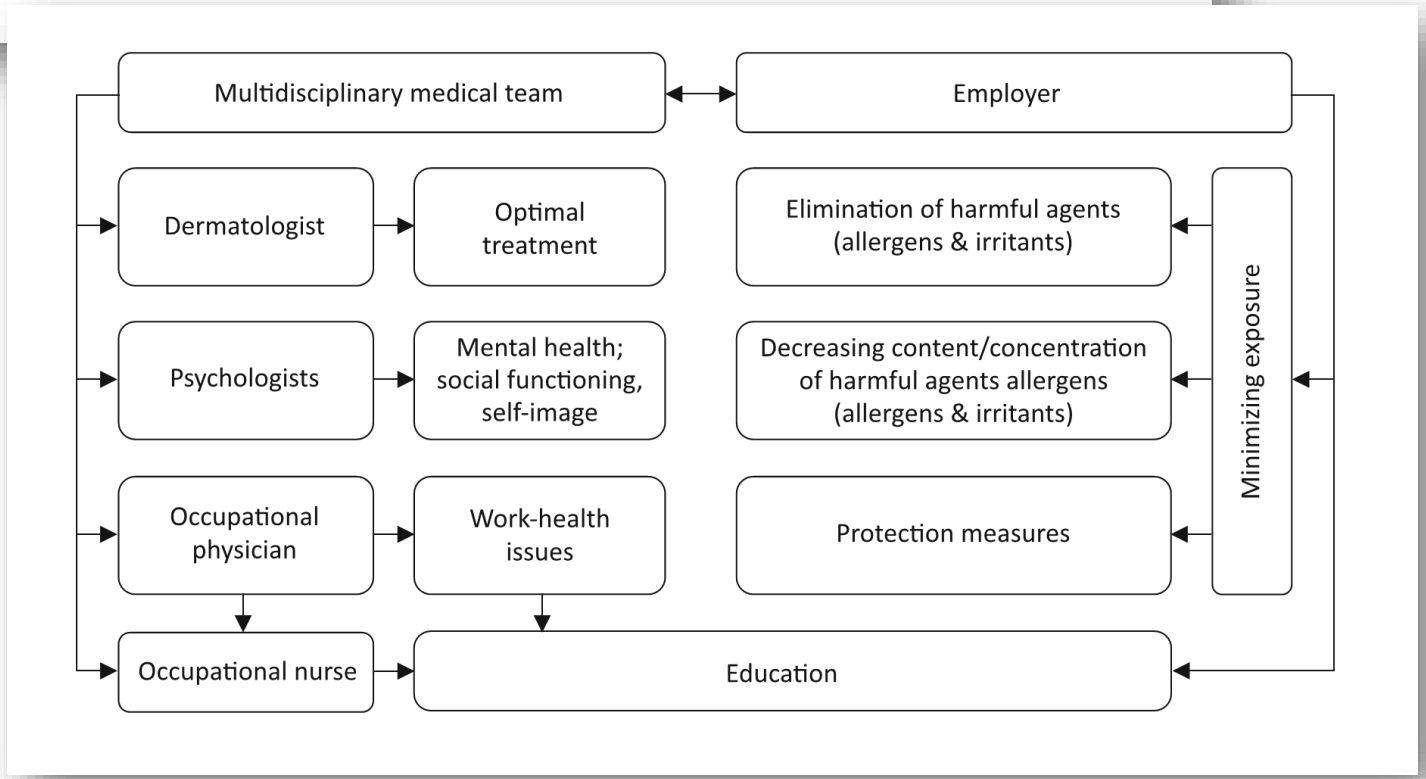
CLINICAL PATTERN

Curr Allergy Asthma Rep (2015) 15: 43
DOI 10.1007/s11882-015-0543-z

OCCUPATIONAL ALLERGIES (JA POOLE, SECTION EDITOR)

Recent Trends in Occupational Contact Dermatitis

Marta Wiszniewska[1] · Jolanta Walusiak-Skorupa[1]



CLINICAL PATTERN

Allergy
EUROPEAN JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY
EAACI
Allergy

POSITION PAPER

EAACI position paper: irritant-induced asthma

O. Vandenplas[1], M. Wiszniewska[2], M. Raulf[3], F. de Blay[4], R. Gerth van Wijk[5], G. Moscato[6], B. Nemery[7], G. Pala[8], S. Quirce[9], J. Sastre[10], V. Schlünssen[11], T. Sigsgaard[11], A. Siracusa[12], S. M. Tarlo[13,14,15], V. van Kampen[3], J.-P. Zock[16,17,18,19] & J. Walusiak-Skorupa[2]

Respiratory Research
BioMed Central

Review

Open Access

EAACI position paper on occupational rhinitis

Gianna Moscato*[1], Olivier Vandenplas[2], Roy Gerth Van Wijk[3], Jean-Luc Malo[4], Luca Perfetti[1], Santiago Quirce[5], Jolanta Walusiak[6], Roberto Castano[4], Gianni Pala[1], Denyse Gautrin[4], Hans De Groot[3], Ilenia Folletti[7], Mona Rita Yacoub[1] and Andrea Siracusa[7]

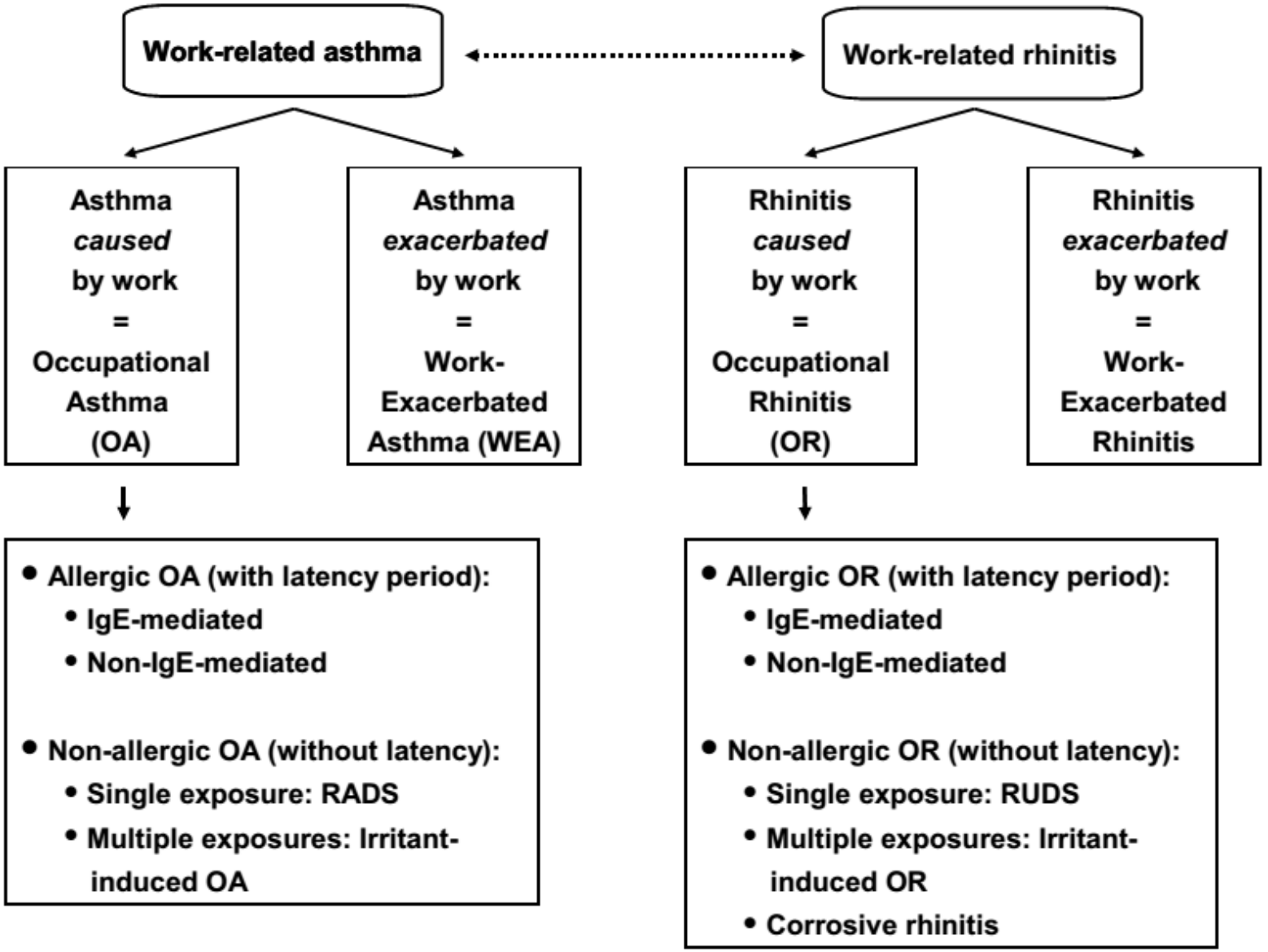


Figure 1
Parallel classification of occupational rhinitis and asthma. The Table classifies occupational rhinitis according to the most recent classification of occupational asthma. RADS, Reactive Airways Dysfunction Syndrome; RUDS, Reactive Upper Airways Dysfunction Syndrome).

CLINICAL PATTERN

Allergy EUROPEAN JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY

POSITION PAPER

EAACI Position Paper on assessment of cough in the workplace

G. Moscato[1], G. Pala[1], P. Cullinan[2], I. Folletti[3], R. Gerth van Wijk[4], P. Pignatti[1], S. Quirce[5], J. Sastre[6], E. Toskala[7], O. Vandenplas[8], J. Walusiak-Skorupa[9] & J. L. Malo[10]

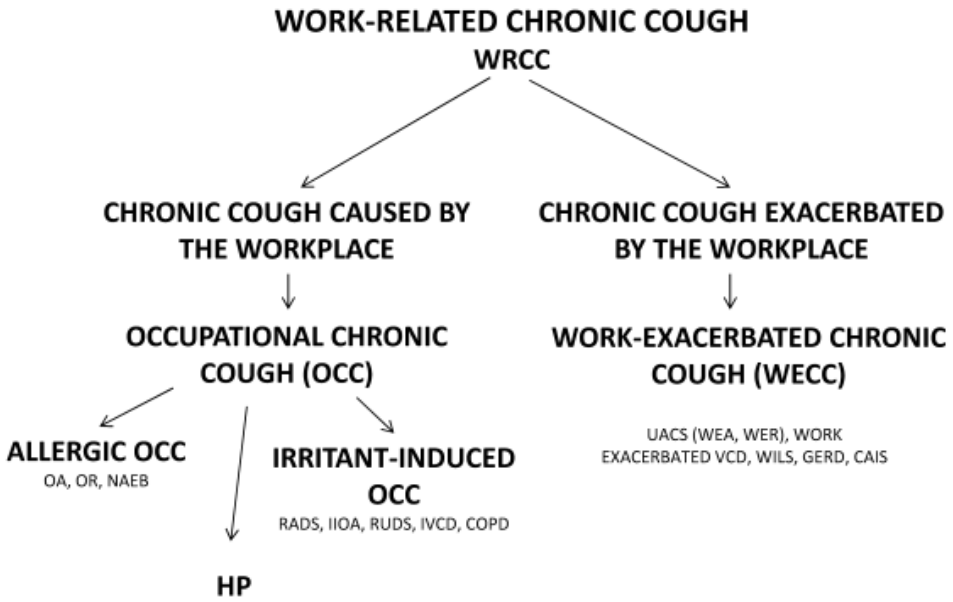


Figure 1 Classification of WRCC. CAIS, cough and airways irritancy syndrome; COPD, chronic obstructive pulmonary disease; ERD, gastroesophageal reflux disease; HP, hypersensitivity pneumonitis; IIOA, irritant-induced asthma; NAEB, nonasthmatic eosinophilic bronchitis; OA, allergic occupational asthma; OR, allergic occupational rhinitis; RADS, reactive airways dysfunction syndrome; RUDS, reactive upper airways dysfunction syndrome; UACS, upper airway cough syndrome; VCD, vocal cord dysfunction; WEA, work-exacerbated asthma; WER, work-exacerbated rhinitis; WILS, work-associated irritable larynx syndrome; work-exacerbated VCD, work-exacerbated vocal cord dysfunction.

CLINICAL PATTERN

REVIEW

CURRENT OPINION

Work-associated irritable larynx syndrome

Jennifer A. Anderson

Occupational Medicine 2010;**60:**546–551
doi:10.1093/occmed/kqq117

Work-associated irritable larynx syndrome

R. F. Hoy[1], M. Ribeiro[1], J. Anderson[2] and S. M. Tarlo[1]

[1]Division of Respiratory Medicine, Toronto Western Hospital, Toronto, Ontario, Canada, [2]Department of Otolaryngology, St Michael's Hospital, Toronto, Ontario, Canada.

Correspondence to: R. F. Hoy, Suite 47, Cabrini Medical Centre, 183 Wattletree Road, Malvern, Victoria, Australia 3144. Tel: +61 3 9509 2242; fax: +61 3 9005 2895; e-mail: drryanhoy@gmail.com

CLINICAL PATTERN

REVIEW

CURRENT OPINION

Anaphylaxis as occupational risk

Gianna Moscato[a], *Gianni Pala*[b], *Mariangiola Crivellaro*[c], *and Andrea Siracusa*[d]

Allergy
EUROPEAN JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY
EAACI

Allergy

POSITION PAPER

Occupational anaphylaxis – an EAACI task force consensus statement

A. Siracusa[1], I. Folletti[2], R. Gerth van Wijk[3], M. F. Jeebhay[4], G. Moscato[5], S. Quirce[6], M. Raulf[7], F. Ruëff[8], J. Walusiak-Skorupa[9], P. Whitaker[10] & S. M. Tarlo[11]

Review article

Eur J Dermatol 2014; 24(1): 3-9

Jean-Marie LACHAPELLE

Department of Dermatology
Catholic University of Louvain
Cliniques Universitaires Saint-Luc
10, Avenue Hippocrate
B-1200 Brussels
Belgium

Reprints: J.-M. Lachapelle
<Jean-marie.Lachapelle@uclouvain.be>

A comparison of the irritant and allergenic properties of antiseptics

Over recent years, interest in the use of antiseptics has been reinforced as these molecules are not concerned by the problem of bacterial resistance. Whereas the *in vitro* efficacy of antiseptics has been well-studied, much less is known regarding their irritant and allergenic properties. This review provides an update on the comparative irritant and allergenic properties of commonly-used antiseptics in medicine nowadays. All antiseptics have irritant properties, especially when they are misused. Povidone-iodine has an excellent profile in terms of allergenicity. Allergic contact dermatitis is uncommon but is often misdiagnosed by practitioners, who confuse allergy and irritation. Chlorhexidine has been incriminated in some cases of allergic contact dermatitis; it is considered a relatively weak allergen, although it may rarely cause immunological contact urticaria and even life-threatening anaphylaxis. Octenidine is considered a safe and efficient antiseptic when used for superficial skin infections, however, aseptic tissue necrosis and chronic inflammation have been reported following irrigation of penetrating hand wounds. Polihexanide is an uncommon contact allergen as regards irritant and/or allergic contact dermatitis but cases of anaphylaxis have been reported. Considering the data available comparing the irritant and allergenic properties of major antiseptics currently in use, it should be acknowledged that all antiseptics may induce cutaneous side-effects. The present article reviews the most recent safety data that can guide consumers' choice.

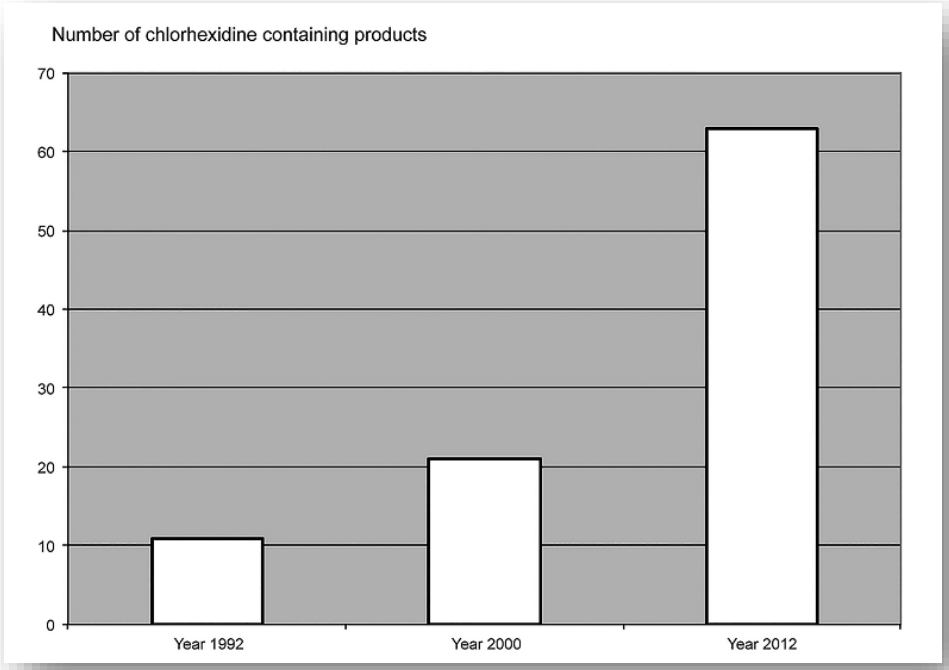
Key words: adaptive immunity, chlorhexidine, hexamidinediisethionate, innate immunity, octenidine, polyhexanide, povidone-iodine, quaternary ammonium compounds, silver dressings, triclosan

Article accepted on 7/29/2013

CHLORHEXIDINE

Synthetic **bis-biguanide**, effective **antiseptic and disinfectant product**, especially in the health-care services; it can be found in a variety of therapeutics, including the over-the-counter products.

Fields of application: peri-operative medicine and anesthesiology, for skin preparation, coating central venous lines and urinary catheters, among others. Furthermore, in the dental field, in urology and gynecology.



Odedra KM et al., Chlorhexidine: an unrecognised cause of anaphylaxis. Postgrad Med J, 2014

CHLORHEXIDINE

Allergic contact dermatitis to chlorhexidine has been well known. **Occupationally-related allergic contact dermatitis** cases have also been reported.

An increasing number of cases of allergic reactions to chlorhexidine, including **anaphylaxis**, has been reported in general population. Rare anaphylactic reactions to chlorhexidine, first reported in 1984, are potentially life-threatening. The phenomenon has been more frequently described in occupational field, especially among Health Care Workers (HCWs) compromising their occupational activity. **It can be considered a new occupational hazard.**

.

CHLORHEXIDINE

The diagnosis of allergic cotact dermatitis is confirmed **by patch testing** (concentration: 0.5% in water). **Prick test** is indicated in case of immediate symptoms, but only in Allergy Centers.

Chlorhexidine-specific IgE serological testing could facilitate the early diagnosis of affected health care workers, avoiding inappropriate investigations and thus reducing the risk of potentially severe allergic reactions in the future.

Furthermore, **Basophil Activation Test (BAT) for Chlorhexidine,** evaluates the expression of the activation marker CD63 on the membrane of basophils. The test is not yet available in the routine.

CHLORHEXIDINE

Odedra KM, *et al. Postgrad Med J* 2014;**90**:709–714. doi:10.1136/postgradmedj-2013-1322

Review

Chlorhexidine: an unrecognised cause of anaphylaxis

Katy Mara Odedra, Sophie Farooque

Dermatology

Australasian Journal of Dermatology (2015) 54, 305–306 doi: 10.1111/ajd.12087

SMALL CASE SERIES

Allergic contact dermatitis to chlorhexidine

Ryan Toholka and Rosemary Nixon

Occupational Dermatology Research and Education Centre, Skin and Cancer Foundation, Melbourne, Victoria, Australia

IgE-mediated anaphylaxis from chlorhexidine: diagnostic possibilities

Contact Dermatitis 2006: 55: 301–302

Didier G. Ebo, Chris H. Bridts, and
n J. Stevens

Occupational Medicine 2009;**59**:270–272
Published online 26 March 2009 doi:10.1093/occmed/kqp042

SHORT REPORT

IgE-mediated chlorhexidine allergy: a new occupational hazard?

Vasantha Nagendran[1], Jennifer Wicking[2], Anjali Ekbote[1], Theresa Onyekwe[3] and Lene Heise Garvey[4]

Occupational Medicine 2013;**63**:301–305
Advance Access publication 17 April 2013 doi:10.1093/occmed/kqt035

CASE REPORT

Chlorhexidine—still an underestimated allergic hazard for health care professionals

T. Wittczak[1], W. Dudek[2], J. Walusiak-Skorupa[1], D. Świerczyńska-Machura[2] and C. Pałczyński[1,2]

[1]Department of Occupational Diseases and Toxicology, [2]Centre of Occupational Allergy and Environmental Health, Nofer
stitute of Occupational Medicine, Lodz, Poland.

Acta Anaesthesiol Scand 2003; 47: 720–724
Printed in Denmark. All rights reserved

Copyright © Acta Anaesthesiol Scand 2003

ACTA ANAESTHESIOLOGICA SCANDINAVICA
ISSN 0001-5172

Is there a risk of sensitization and allergy to chlorhexidine in health care workers?

H. Garvey[1], J. Roed-Petersen[2] and B. Husum[1]
h Anaesthesia Allergy Center, Departments of [1]Anaesthesiology and [2]Dermatology, Gentofte University Hospital, Copenhagen, Denmark

CHLORHEXIDINE

Volume 108, n. 3 Maggio - Giugno 2017
Rivista fondata nel 1901 da Luigi Devoto Issn 0025 - 7818
La Medicina del Lavoro
Organo della Società Italiana di Medicina del Lavoro e Igiene Industriale
Medicine, Health and Working Life
Italian Journal of Occupational Health and Industrial Hygiene
www.lamedicinadellavoro.it

Chlorhexidine-induced anaphylaxis occurred at the workplace in an health-care worker: case report and review of the literature

Alessandra Toletone[1*], MD, Guglielmo Dini[1,2], MD, Emanuela Massa[1], MD, Nicola Luigi Bragazzi[3], MD, PhD, Patrizia Pignatti[4], PhD, Susanna Voltolini[5], MD, Paolo Durando[1,2], MD, PhD

[1] *Department of Health Sciences (DISSAL), Postgraduate School in Occupational Medicine, University of Genoa, Italy*

[2] *Occupational Medicine Unit, IRCCS University Hospital San Martino - IST National Institute for Cancer Research, Genoa, Italy*

[3] *Department of Health Sciences (DISSAL), Postgraduate School of Public Health, University of Genoa, Italy*

[4] *Allergy and Immunology Unit, Istituti Clinici Scientifici Maugeri, IRCCS, Pavia, Italy*

[5] *Allergy Unit, IRCCS University Hospital San Martino - IST National Institute for Cancer Research, Genoa, Italy*

POVIDONE – IODINE (PVP-I)

It is used as a **topical antiseptic**, on a very large scale throughout the world, under several trade names.

PVP-I is an iodophor, with a sustained release system that reduces the irritancy of iodine.

It is well demonstrated nowadays that skin exposure causes **irritant rather than allergic contact dermatitis.**

Rare cases of allergic contact dermatitis to PVP-I have been reported in the literature.

The results of **patch tests to PVP-I** (10% pet, i.e., 1% free-iodine), considered positive in the literature, **can** in some cases **be false positives**, due to an irritation to PVP-I (under occlusion).

Immediate immunological reactions to PVP-I (either urticarial or anaphylactic) are considered **exceptional.**

POVIDONE – IODINE (PVP-I)

Contact Dermatitis • **Contact Points**

Anaphylactic reaction to povidone in a skin antiseptic

Florence Castelain[1], Pascal Girardin[1], Laurianne Moumane[1], François Aubin[1,2] and Fabien Pelletier[1,3]

[1]Allergology Unit, Department of Dermatology, University Hospital, 25030 Besançon, France, [2]EA3181, SFR FED 4234 IBCT, University of Franche-Comté, Besançon, France, and [3]Inserm U1098, SFR FED 4234 IBCT, University of Franche-Comté, 25030 Besançon, France

doi:10.1111/cod.12473

Drug and Chemical Toxicology

ISSN: 0148-0545 (Print) 1525-6014 (Online) Journal homepage: http://www.tandfonline.com/loi/idct20

Povidone-iodine-induced cell death in cultured human epithelial HeLa cells and rat oral mucosal tissue

So Sato, Masao Miyake, Akihiro Hazama & Koichi Omori

Allergic contact dermatitis to povidone–iodine

Contact Dermatitis 2009: 60: 348–349

Diana Velázquez, Pamela Zamberk, Ricardo Suárez and Pablo Lázaro

Department of Dermatology, Gregorio Marañón Hospital, Doctor Esquerdo, 46, 28007 Madrid, Spain

Int J Clin Exp Med 2015;8(9):14863-14870
www.ijcem.com /ISSN:1940-5901/IJCEM0012105

Original Article

Experimental study on the toxicity of povidone-iodine solution in brain tissues of rabbits

`hu-Hua Li[1], Yu Wang[2], Hai-Bin Gao[2,3], Kun Zhao[1], Yu-Chen Hou[1], Wei Sun[2,3]

Anaphylaxis from povidone-iodine

*Kobjit D Waran, *Robert A Munsick*

Department of Obstetrics and Gynecology, University Hospital & Outpatient Center, Indiana University Medical Center, Indianapolis, IN 46202, USA

THE LANCET Vol 345 • June 10, 1995

QUATERNARY AMMONIUM COMPOUNDS

A vast family of cationic detergents, mainly used as disinfectants.

Benzalkonium chloride is the most widely used quaternary ammonium compound.

Used in topical antiseptics for burns, ointments, and mouth-and hand washes.

They are **irritant**, for instance even as dilute as 0.1% under occlusion, and their **allergenic properties do exist, although they are not so frequent and are masked by their strong irritancy.**

Occupational dermatitis (irritant and/or allergic) in people at risk.

Allergic contact dermatitis of the hands, airborne reactions.

QUATERNARY AMMONIUM COMPOUNDS

Clinical Communications

J ALLERGY CLIN IMMUNOL PRACT
SEPTEMBER/OCTOBER 2015

Importance of specific inhalation challenge in the diagnosis of occupational asthma induced by quaternary ammonium compounds

Mael Bellier, MD[a], Cindy Barnig, MD, PhD[a,b], Jean Marie Renaudin, MD[a], Brigitte Sbinne, BSc[a], François Lefebvre, MD[c], Shanshan Qi, MD[a,b], and Fréderic de Blay, MD[a,b]

STUDIES

DERMATITIS, Vol 27 ■ No 1 ■ January/February, 2016

Benzalkonium Chloride: A Known Irritant and Novel Allergen

Ashley B. Wentworth, MD,* James A. Yiannias, MD,† Mark D.P. Davis, MD,‡ and Jill M. Killian, BS§

Ulcerative contact dermatitis caused by benzethonium chloride

Yu Hirata, Teruki Yanagi, Yasuyuki Yamaguchi, Kazumasa Sato, Satoru Shinkuma, Hiroo Hata and Hiroshi Shimizu

Department of Dermatology, Hokkaido University Graduate School of Medicine, 060-8638 Sapporo, Japan

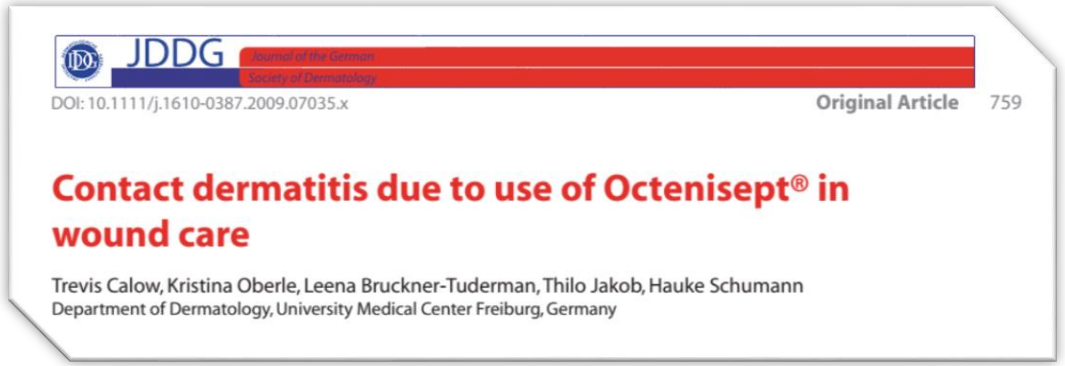
*0.1111/cod.12682

OCTENIDINE

Cationic antibacterial of the bis-pyramidine class.

Skin side effects include **irritation and allergic contact dermatitis**.

Fields of application: moisturizing of chronic wounds and burns, facilitation of the mechanical debridement of wounds and burns and prevention of bacterial infections.



JDDG Journal of the German Society of Dermatology

DOI: 10.1111/j.1610-0387.2009.07035.x Original Article 759

Contact dermatitis due to use of Octenisept® in wound care

Trevis Calow, Kristina Oberle, Leena Bruckner-Tuderman, Thilo Jakob, Hauke Schumann
Department of Dermatology, University Medical Center Freiburg, Germany

Persistent swelling after flushing of an abscess with Octenisept®

Kasuistiken

Unfallchirurg 2012 · 115:1116–1119
DOI 10.1007/s00113-011-2116-5
Online publiziert: 20. November 2011
© Springer-Verlag Berlin Heidelberg 2011

B. Bauer[1] · M. Majic[2] · S. Rauthe[3] · E.-B. Bröcker[1] · A. Kerstan[1]
[1] Klinik und Poliklinik für Dermatologie, Venerologie und Allergologie, Universitätsklinikum Würzburg
[2] Frauenklinik und Poliklinik, Universitätsklinikum Würzburg
[3] Institut für Pathologie, Universität Würzburg

Its potential for allergenicity has not been defined with certainty.

Patch testing: with .1% in water.

POLIEXANIDE (PHMB)

Family of **cationic biguanides**. Available as a solution, a gel and in certain dressings.

Particularly used in the treatment of venous leg ulcers and/or pressure wounds.

Considered an **uncommon contact allergen** in terms of irritant and/or allergic contact dermatitis.

Nevertheless, **cases of severe anaphylaxis have been reported: this is not surprising, since polyhexanide is a polymer of chlorhexidine.**

When this particular event occurs, the tool of investigation for confirming the diagnosis is prick testing, monitored with great caution. Patch testing with 2.5 and/or 5% in water is recommended.

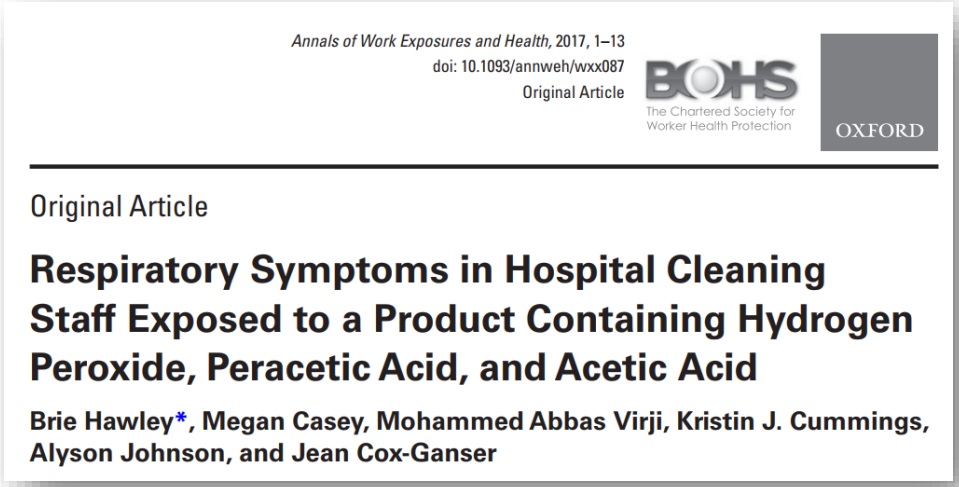
PERACETIC ACID

Strong oxidizer that is produced from the acid-catalyzed reaction between acetic acid and hydrogen peroxide.

Animal studies have demonstrated that peracetic acid can produce **strong local effects on direct contact to the eyes, skin, and respiratory tract.**

Acute nasal and eye irritation are significantly positively associated with increased exposure to the mixture of acetic acid and hydrogen peroxide.

Environmental controls (eg, sealed chambers, appropriate ventilation, use of personal protective equipment) should be used to **minimize exposures.**



Annals of Work Exposures and Health, 2017, 1–13
doi: 10.1093/annweh/wxx087
Original Article

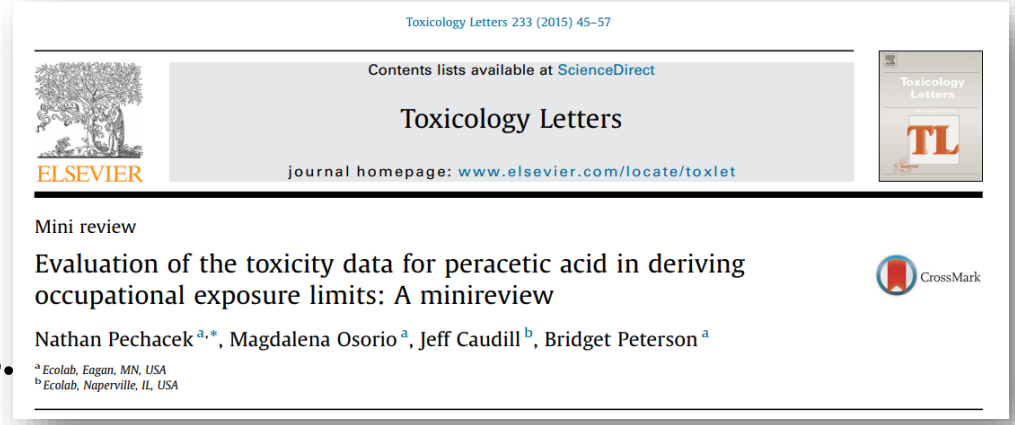
BOHS The Chartered Society for Worker Health Protection

OXFORD

Original Article

Respiratory Symptoms in Hospital Cleaning Staff Exposed to a Product Containing Hydrogen Peroxide, Peracetic Acid, and Acetic Acid

Brie Hawley*, Megan Casey, Mohammed Abbas Virji, Kristin J. Cummings, Alyson Johnson, and Jean Cox-Ganser



Toxicology Letters 233 (2015) 45–57

Contents lists available at ScienceDirect

Toxicology Letters

journal homepage: www.elsevier.com/locate/toxlet

ELSEVIER

Toxicology Letters TL

Mini review

Evaluation of the toxicity data for peracetic acid in deriving occupational exposure limits: A minireview

CrossMark

Nathan Pechacek [a,*], Magdalena Osorio [a], Jeff Caudill [b], Bridget Peterson [a]

[a] Ecolab, Eagan, MN, USA
[b] Ecolab, Naperville, IL, USA

ALDEHYDES

Glutaraldehyde

Chemical sterilant or high-level disinfectant, for temperature-sensitive medical instruments that cannot be steam sterilized, such as endoscopes.

Tissue fixative, embalming fluid, **adhesive in dentistry**, **preservative,** in some cosmetic, toiletry, and household cleaning agents.

Most commonly glutaraldehyde exposure has been linked to **dermatitis and asthma**. Further, exposure may be cause **eye irritation, skin rash, rhinorrhea, headache, cough, and shortness of breath**.

Occupational exposure to glutaraldehyde vapor has been reported to result in **mucous membrane irritation and pulmonary symptoms, including lacrimation, skin irritation, rhinorrhea, upper respiratory tract irritation, cough, and epistaxis. Occasionally asthma.**

ALDEHYDES

Ortho-phthalaldehyde

Aromatic dialdehyde.

Patients instrumented with devices disinfected with ortho-phthalaldehyde have developed **anaphylaxis (i.e., urticarial, angioedema, laryngeal edema, loss of consciousness, chest tightness, convulsions).**

Occasional cases of **occupational asthma or dermatitis** have been reported in HCW.

Formaldehyde (formalin)

Used as a tissue fixative in autopsy rooms and surgical suites.

Airborne concentrations of 0.5-2.0 ppm may cause **irritation of the eyes, nose, throat, and respiratory tract in some individuals.**

The European classification, labeling and packaging classified formaldehyde as human **carcinogen Group 1B and mutagen 2,** fostering the re-evaluation of the exposure risk in occupational settings.

ENZYMES CONTAINING PRODUCTS

Journal of Immunotoxicology, 2012; 9(3): 320–326
© 2012 Informa Healthcare USA, Inc.
ISSN 1547-691X print/ISSN 1547-6901 online
DOI: 10.3109/1547691X.2012.659358

informa
healthcare

REVIEW ARTICLE

The toxicology and immunology of detergent enzymes

David Basketter[1], Ninna Berg[2], Francis H. Kruszewski[3], Katherine Sarlo[4], and Beth Concoby[5]

[1]DABMEB Consultancy Ltd, Sharnbrook, Bedfordshire MK44 1PR, UK, [2]Novozymes A/S, Bagsvaerd, Denmark, [3]American Cleaning Institute, Washington DC, USA, [4]Procter & Gamble, Cincinnati, OH, USA, and [5]Genencor, A Danisco Division, Palo Alto, CA, USA

HEXAMIDINE DIISETHIONATE (HEX D)

Limited antiseptic activity.

Several cases of allergic contact dermatitis.

An allergic systemic reaction has been reported.

Papulo-vescicular and diffuse allergic contact dermatitis. Some lesions are purpuric, mimicking leukocyclastic vasculitis.

TRICLOSAN

Antimicrobial agent of the family of diphenylether derivative.

Allergic reactions have been reported. A case of immunological contact urticaria was recently reported.

SILVER DRESSING

The increasing use of silver in health care dressings, is controversial.

Information about the potential allergenic properties of silver dressings is still missing, but **silver is not considered a contact allergen.**

MERCURY COMPOUNDS

More potent and safer antiseptics have advantageously replaced them.

These should be withdrawn from our daily clinical practice.

They have been used for decades but are now completely abandoned because of their toxicological and/or allergenic properties.

FINAL CONSIDERATIONS

Table 1. A comparison of the allergenic properties of major antiseptics in current use.

Antiseptics	Allergic contact dermatitis	Urticarial and/or anaphylactic reactions	Others
Chlorhexidine	Common	Well documented	Not reported
Octenidine	Rare	Not documented	Aseptic tissue necrosis
Polyhexanide	Rare	Severe reactions documented	Not reported
Povidone-iodine	Rare	Exceptional	Not reported

All antiseptics have irritant properties, mainly when they are misused, i.e. on an eczematous skin, under inadequate occlusion or at too high concentrations.

Unprotected exposures to high-level disinfectants may cause dermatitis and respiratory symptoms.

The scientific evidence supports that **dermatitis and respiratory symptoms** (eg, asthma) as a result of chemical exposures, **including low-level disinfectants, are exceedingly rare.** Engineering controls (eg, closed containers, adequate ventilation) and use of personal protective equipment (eg, gloves) should be used to minimize exposure to high-level disinfectants.

Int Arch Occup Environ Health (2014) 87:339–363
DOI 10.1007/s00420-013-0866-9

ORIGINAL ARTICLE

Allergens causing occupational asthma: an evidence-based evaluation of the literature

Xaver Baur · Prudence Bakehe

Taxonomical classification of agents	Strength of evidence per agent (three-star system of RCGP[a])	Total no. of allergic asthma cases per agent, *n*—specific sensitization is not confirmed	References[b]
Biocides			
Chloramine T	(*)	9	Kujala et al. (1995), Blasco et al. (1992, abstract), Bourne et al. (1979)
Glutaraldehyde	–	1	Ong et al. (2004), Quirce et al. (1999), Gannon et al. (1995), Chan-Yeung et al. (1993)
Chlorhexidine	–	–	Waclawski et al. (1989)
Hexachlorophene	–	1	Nagy et al. (1984)
Ortho-phthalaldehyde	–	–	Fujita et al. (2006)
Peracetic acid, hydrogen peroxide	–	–	Cristofari-Marquand et al. (2007)
Detergent enzymes	*[*]	53	Brant et al. (2004), Adisesh et al. (2011, Abstract), Brant et al. (2009), Brant et al. (2006), Cullinan et al. (2000)

Chlorhexidine has occasionally been incriminated in cases of allergic contact dermatitis but is nevertheless considered a relatively rare and weak allergen. On the other hand, it can cause **immunological contact urticaria and even life-threatening anaphylaxis. Caution is advised when considering its use.**

Hypersensitivity to chlorhexidine appears a rare phenomenon, even though it may be overlooked and under-reported. In view of the widespread use of chlorhexidine in health-care settings in order to control infections, and the consequent increased exposure of HCWs, **it is important to better investigate individual and environmental risk factors leading to a possible chlorhexidine-sensitization among employees.**

Polyhexanide is considered an **uncommon contact allergen** referring to irritant and/or allergic contact dermatitis. **Cases of anaphylaxis have been reported.**

Octenidine is considered a safe and efficient antiseptic (very **few cases of irritant and/or allergic contact dermatitis have been reported**) when used for treating superficial skin infections. However, **a particular side effect** has been reported after irrigation of penetrating hand wounds, i.e. **aseptic tissue necrosis** and chronic inflammation, lasting for weeks or even months.

Povidone-iodine has an excellent profile in terms of allergenicity. In other words, **allergic contact dermatitis is uncommon** but it is often misdiagnosed by practitioners, who confuse allergy with irritation. Contact urticaria and anaphylaxis are exceptional, if existing at all.

Alessandra Toletone

alessandra.toletone@edu.unige.it

Dipartimento Scienze della Salute
Scuola di Specializzazione in Medicina del Lavoro
Scuola di Scienze Mediche e Farmaceutiche
Università degli Studi di Genova

Grazie