Derma-Keri; Dermoplast; Karmosan; Nutraplus; Uramol; ***NZ:*** Aquacare; Nutraplus; ***Philipp.:*** Nutraplus; ***Port.:*** Eucerin Pele Seca†; Rebladerm†; Ureadin 10 and 20; ***Singapore:*** Aqurea; Balneum Intensiv; Euderm†; Excipial U; Nutraplus; UO; Urecare†; ***Spain:*** Nutraplus†; ***Swed.:*** Calmuril; Canoderm; Caress; Fenuril; Karbaderm†; Karbasal; Monilen; ***Switz.:*** Carbamide Emulsion; Eucerin peau seche; Excipial U; Linola Uree; Nutraplus; Vita-Merfen Soins dermatologiques†; ***Thai.:*** Balneum Intensiv†; Nutraplus; ***Turk.:*** Excipial; Nutraplus; Urederm; ***UK:*** Aquadrate; Nutraplus; ***USA:*** Aquacare; Carmol; Gormel; Hydro 40; Kerafoam; Keralac; Kerol; Lanaphilic; Nutraplus; Rinnovi; Ultra Mide; Umecta; Ureacin; Ureaphil; Vanamide; ***Venez.:*** Aquaphar; Dermisol; Uricrim.

Multi-ingredient: ***Arg.:*** Acilac; Akerat; Aloebel; Cremisona†; Cremsor N; Hidrolac; Lactiderm; Lactiderm HC†; Lactocrem; Masivol Urea; Onixol†; Oxidermos; Sadeltan F†; Turgent Colageno; Turgent Emulsion; Ureadin Facial; Urecrem Hidro; Vansame; ***Austral.:*** Aussie Tan Skin Moisturiser; Calmurid; Curaderm†; Dermadrate; Psor-Asist; SP Cream†; ***Austria:*** Aleot; Calmurid; Calmurid HC; Canesten Bifonazol comp; Fungiderm comp†; Ichth-Oestren; Keratosis; Keratosis forte; Mirfulan; Optiderm; ***Belg.:*** Calmurid†; ***Braz.:*** Donnagel; Oticerim; Oto-Biotic†; Tricolpex; Tricomax; Vagi Biotic; Vagi-Sulfa; ***Canad.:*** Amino-Cerv; Hydrophil; Kerasal; Uremol-HC; ***Chile:*** Akerat; Mycosporan Onycoset†; Ureadin 30; Ureadin Facial; Ureadin Forte; Ureadin Pediatrics; Ureadin Rx DB; Ureadin Rx PS; Ureadin Rx RD; ***Cz.:*** Betacorton U; Kerasal; Mycospor Sada na Nehty; ***Fin.:*** Calmuril; Wicaran; Wicarba; Wicnecarb; Wicnevit; ***Fr.:*** Akerat; Amycor Onychoset; Body Peel; Charlieu Topicrem; Day Peel; Liperol; Night Peel; Pedi-Relax Anti-callosites†; Provictol†; PSO; Topic 10; ***Ger.:*** Balisa VAS; Brand- u. Wundgel-Medice N; Calmurid†; Canesten Extra Nagelset; Carbamid + VAS; Fungidexan; Hydrodexan; Kelofibrase†; Mirfulan; Mycospor Nagelset†; Nubral 4†; Nubral Forte†; Oestrugol N†; Optiderm; Psoradexan; Psorigerb N†; Remederm; Ureata S†; Ureotop + VAS; ***Gr.:*** Lyoderm; Urecortin; ***Hong Kong:*** Balneum Intensiv Plus; Dermadrate; ***Hung.:*** Reseptyl-Urea; Squa-med; ***India:*** Cotaryl; ***Indon.:*** Foothy; ***Irl.:*** Alphaderm; Calmurid; Calmurid HC; ***Israel:*** Agispor Onychoset; Calmurid; Calmurid HC†; Derma-Care; Keratospor; U-Lactin Foot Cream; U-Lactin Forte; ***Ital.:*** Altadrine; Eudermico†; Ipso Urea; Keraflex; Optiderm; Verunec; Xerial; ***Malaysia:*** Balneum Intensiv Plus; Ucort; ***Mex.:*** Eucerin Piel Seca/Resecat; Hidribet 5†; Hidribet†; Lowila; Mycospor Onicoset; Suavene; Urader Lactato; Ureaderm Lactato; ***Neth.:*** Calmurid; Calmurid HC; Symbial; ***NZ:*** Calmurid†; Dermadrate; ***Philipp.:*** Remederm; ***Pol.:*** Hasceral; Keratolit; Mycospor Onychoset; Optiderm; SolcoKerasal; Sterovag; ***Port.:*** Calmurid; Carmitol; Creme Laser Hidrante; Hidratoderme†; Mycosport†; U Lactin; Ureadin; Ureadin 10 Plus; Ureadin Facial; Ureadin Forte; Ureadin Maos; ***Rus.:*** Mycospor (Микоспор); ***S.Afr.:*** Calmurid HC†; Covancaine; Mycospor Onycho-set; ***Singapore:*** Balneum Intensiv Plus; Dermadrate; Topicrem; U-Lactin; ***Spain:*** Cortisdin Urea; Kanapomada; Mycospor Onicoset; ***Swed.:*** Fenuril-Hydrokortison; ***Switz.:*** Acne Gel; Antikeloides Creme; Betacortone; Calmurid; Calmurid HC†; Carbamide + VAS; Carbamide Creme; Kerasal; Klyx Magnum; Optiderm; Sebo Creme; Sebo-Psor; Turexan Capilla; Turexan Lotion; ***Thai.:*** Balneum Intensiv Plus†; Gynestin; ***Turk.:*** Betacorton; Kerasal; Mycospor; Ureacort; ***UK:*** Alphaderm; Antipeol; Balneum Plus; Calmurid; Calmurid HC; Cymex; E45 Itch Relief; St James Balm; Vesagex Heelbalm; ***USA:*** Accuzyme; AllanEnzyme; AllanfillEnzyme; Amino-Cerv; Ethezyme; Gladase; Gladase-C; Hydrocerin Plus; Kovia; Panafil; Panafil-White; Pap-Urea; Rosula; Rosula NS; Ziox; Zoderm; ***Venez.:*** Akerat; Caduril; Hidribet; Hidribet 5/5; Mycospor Onicoset; Pantonic; Pelset Plus; Ureaderm Lactato; Urimet†; Urisalic†.

Ustekinumab *(USAN, pINN)*

CNTO-1275; Ustékinumab; Ustekinumabum. Immunoglobulin G1, anti-(human interleukin-12 subunit beta (IL-12B, CLMF p40, NKSF2))(human monoclonal CNTO 1275 γ1-chain), disulfide with human monoclonal CNTO 1275 κ-chain, dimer.

Устекинумаб

CAS — 815610-63-0.

Profile

Ustekinumab is a human monoclonal antibody that binds to interleukins 12 and 23. It is under investigation in the treatment of psoriasis.

◊ References.

1. Krueger GG, *et al*. A human interleukin-12/23 monoclonal antibody for the treatment of psoriasis. *N Engl J Med* 2007; **356:** 580–92.
2. Leonardi CL, *et al*. Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 76-week results from a randomised, double-blind, placebo-controlled trial (PHOENIX 1). *Lancet* 2008; **371:** 1665–74. Correction. *ibid.*; 1838.
3. Papp KA, *et al*. Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 52-week results from a randomised, double-blind, placebo-controlled trial (PHOENIX 2). *Lancet* 2008; **371:** 1675–84.

Zinc Carbonate *(USAN)*

Zinc, carbonato de.

Карбонат Цинка; Углекислый Цинк

$ZnCO_3$ = 125.4.

CAS — 3486-35-9.

Basic Zinc Carbonate

Zinc, carbonato básico de.

Основный Карбонат Цинка; Основный Углекислый Цинк

NOTE. The names zinc carbonate, hydrated zinc carbonate, zinc subcarbonate, and zinc carbonate hydroxide have all been applied to basic zinc carbonate of varying composition occurring naturally or produced by the reaction of a soluble zinc salt with sodium carbonate.

Pharmacopoeias. In *US*.

USP 31 (Zinc Carbonate). It corresponds to $3Zn(OH)_2.2ZnCO_3$ containing the equivalent of not less than 70% ZnO. Store in airtight containers.

Profile

Zinc carbonate is mildly astringent and protective to the skin and is used topically, mainly in the form of calamine (p.1591), in a variety of skin conditions. In the USA the name calamine is used for zinc oxide (rather than zinc carbonate) with a small proportion of ferric oxide.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Fr.:*** Pygmal†.

Zinc Oxide

Blanc de Zinc; Blanco de zinc; Cinko oksidas; Çinko Oksit; Cinkoxid; Cynku tlenek; Flores de zinc; Flowers of Zinc; Oxid zinečnatý; Sinkkioksidi; Zinc, óxido de; Zinc, oxyde de; Zinci oxidum; Zinci Oxydum; Zincum Oxydatum; Zinkoxid.

Окись Цинка; Цинк Оксид

ZnO = 81.38.

CAS — 1314-13-2.

NOTE. 'Zinc White' is a commercial form of zinc oxide used as a pigment.

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Int.*, *Jpn*, *US*, and *Viet*.

US also includes a neutral zinc oxide.

Ph. Eur. 6.2 (Zinc Oxide). A white or faintly yellowish-white, soft, amorphous powder, free from gritty particles. Practically insoluble in water and in alcohol; it dissolves in dilute mineral acids.

USP 31 (Zinc Oxide). A white or yellowish-white, odourless, amorphous, very fine powder, free from grittiness. It gradually absorbs carbon dioxide from air. Insoluble in water and in alcohol; soluble in dilute acids.

USP 31 (Zinc Oxide, Neutral). It is for use in sunscreen preparations only.

Incompatibility. Black discoloration has been reported when zinc oxide and glycerol are in contact in the presence of light.

Profile

Zinc oxide is mildly astringent and is used topically as a soothing and protective application in eczema and slight excoriations, in wounds, and for haemorrhoids. It is also used with coal tar (p.1616) or ichthammol (p.1599) in the treatment of eczema. Zinc oxide reflects ultraviolet radiation and is used as a physical sunscreen (see p.1576).

In the USA the name calamine is used for zinc oxide with a small proportion of ferric oxide.

Zinc oxide is used as the basis for the production of a number of dental cements. Mixed with phosphoric acid it forms a hard material composed largely of zinc phosphate; mixed with clove oil or eugenol, it is used as temporary dental filling.

For further details of zinc and its salts, see p.1999.

Complications of dental use. Solitary aspergillosis of the maxillary sinus in 29 of 30 patients was associated with zinc oxide from overfilled teeth.[1] Treatment consisted of removal of the fungal ball containing the zinc oxide; no antifungal treatment was necessary. Zinc oxide has been shown to accelerate the growth of *Aspergillus fumigatus*. Further cases have been reported, and adjunctive systemic antifungal treatment has been used.[2]

1. Beck-Mannagetta J, *et al*. Solitary aspergillosis of maxillary sinus, a complication of dental treatment. *Lancet* 1983; **ii:** 1260.
2. Martins WD, Ribeiro Rosa EA. Aspergillosis of the maxillary sinus: review and case report. *Scand J Infect Dis* 2004; **36:** 758–61.

Preparations

BP 2008: Aqueous Calamine Cream; Calamine and Coal Tar Ointment; Calamine Lotion; Coal Tar and Zinc Ointment; Coal Tar Paste; Compound Aluminium Paste; Compound Zinc Paste; Dithranol Paste; Hexachlorophene Dusting Powder; Zinc and Castor Oil Ointment; Zinc and Coal Tar Paste; Zinc and Ichthammol Cream; Zinc and Salicylic Acid Paste; Zinc Cream; Zinc Ointment;

USP 31: Calamine Topical Suspension; Coal Tar Ointment; Compound Resorcinol Ointment; Zinc Oxide and Salicylic Acid Paste; Zinc Oxide Ointment; Zinc Oxide Paste.

Proprietary Preparations (details are given in Part 3)

Arg.: Balmex†; Caladaryl Panal†; Dermic; Pasta Dermic†; Sinamida-D†; Zincoxid; ***Austral.:*** Curash Anti-Rash; Prickly Heat Powder; Rectogesic; Ungvita†; Zinc Cream White; Zincaband†; Zink'N'Swim†; ***Canad.:*** Aveeno Diaper Rash; Babys Own Ointment†; Egozinc; Infazinc; Johnson's Diaper Rash; Johnson's Medicated†; Triple Care Cream†; Woodward's Diaper Rash; Zincoderm; Zincofax; ***Chile:*** Nenegloss Z; ***Denm.:*** Zipzoc; ***Fin.:*** Zipzoc; ***Fr.:*** Babygella; Filorga Soin Ecran Solaire; Mylange Creme†; Oxyplastine; Senophile†; Veinopress A3 and A4; ***Ger.:*** Cutaninfant†; Desitin†; Fissan-Zinkschuttelmixtur†; Labiosan; Pantederm N; Pinal S†; Retterspitz Heilsalbe ST; Robuvalen†; St. Jakobs-Balsam; Zinkpaste; Zinksalbe Dialon†; Zinksalbe Lichtenstein; ***Hong Kong:*** Desitin Daily Care†; ***India:*** Belle Cream†; ***Irl.:*** Viscopaste; Zipzoc; ***Israel:*** Dyprotex; Lotio Zinc; Lotio Zinci; Zinc Lotion; ***Ital.:*** Ceroxmed Tex; Delicate Skin Pasta; Gelocast; Gelostretch; Milsana; Oz; Scherilan Crema; Sicura3 Fisionorm; Tayderm; Tendignip; Triderm Crema; Triderm Zeta; Varicex; Viscopaste PB7; Zinco All' Acqua†; Zincoderm; ***Mex.:*** Pasta de Lassar; Rosatil BB†; Saniderm; ***Neth.:*** Daroderm Zinkzalf; Zinkolie; Zinkzalf; Zipzoc; ***Philipp.:*** Curash; Desitin; Spectraban 19; ***Port.:*** Lassadermil; Oleo Dermosina Simples†; Zincoderma; Zipzoc; ***Rus.:*** Desitin (Дезитин); ***S.Afr.:*** Clocktower; Johnson's Baby Nappy Rash Ointment; Vernleigh Baby Cream; Viscopaste PB7; ***Singapore:*** Desitin†; ***Spain:*** Anticongestiva; ***Swed.:*** Zipzoc Salvstrumpa; ***Switz.:*** Oxyplastine; Pelsano; Pommade Congo†; ZinCream; ***Thai.:*** Nappy-Hippo; Spectraban; ***UAE:*** Proskin; ***UK:*** Steripaste; Viscopaste PB7; Zincaband; Zipzoc; ***USA:*** Borofax; Delazinc; Diaparene Diaper Rash; Dr Smiths; Nupercainal†; Triple Paste; ***Venez.:*** Lanol-Zinc; Oxyphar.

Multi-ingredient: numerous preparations are listed in Part 3.

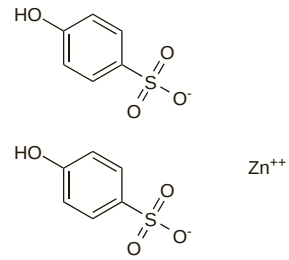
Zinc Phenolsulfonate

4-Hidroxibencenosulfonato de zinc; Phenozin; Zinc, fenosulfonato de; Zinc 4-Hydroxybenzenesulphonate; Zinc Phenolsulphonate. Zinc *p*-hydroxybenzenesulphonate.

Сульфофенолят Цинка; Фенолсульфонат Цинка

$C_{12}H_{10}O_8S_2Zn$ = 411.7.

CAS — 127-82-2.



Profile

Zinc phenolsulfonate has astringent properties and has been used in multi-ingredient preparations applied topically for the treatment of a variety of disorders.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: ***Arg.:*** Gineseptina†; ***Braz.:*** Lerin; Neo Quimica Colirio; Visazul; ***Ital.:*** Antisettico Astringente Sedativo; Oftalmil; ***USA:*** BFI.

Legionnaires' disease (p.176) is commonly transmitted via cooling water in **air conditioning** systems or **hot water** supplies. Hyperchlorination has been attempted to eradicate the organism from contaminated water sources but has been largely ineffective[6,7] and is no longer recommended. Other disadvantages of using chlorine-based systems at these temperatures and concentrations are corrosion of the plumbing system[7] and the production of potentially carcinogenic byproducts.[8] Effective disinfection can be achieved by raising and maintaining the water temperature above 50°, ultraviolet light, and copper-silver ionisation.

Haemodialysis patients are exposed to large quantities of municipal drinking water as it is used for the production of **dialysis** fluids and may also be used for dialyser rinsing and reuse. Many of the chemical substances in the water, such as calcium, sodium, aluminium, chloramines, fluoride, copper, zinc, sulfates, and nitrates are potentially dangerous for dialysis patients, and can lead to acute or chronic poisoning. There is also a microbiological risk associated with the control of bacterial growth in the water treatment and distribution system. Contaminants are therefore removed by water purification systems. Water is pretreated with activated carbon filters to remove chlorine and its derivatives and other suspended particles, and the hardness of the water is decreased with sodium exchange cationic resins, which remove calcium and magnesium. The final purification process then involves the removal of dissolved salts, bacteria, and endotoxins by reverse osmosis. Reverse osmosis membranes need to be regularly disinfected with chemical agents (such as hypochlorite and peracetic acid), heat, or ozone.[9]

1. Backer H. Water disinfections for international and wilderness travelers. *Clin Infect Dis* 2002; **34:** 355–64.
2. WHO. Guidelines for drinking-water quality, third edition, incorporating first addendum: volume 1— recommendations. Geneva: WHO, 2006. Available at: http://www.who.int/water_sanitation_health/dwq/gdwq3/en/print.html (accessed 27/08/08)
3. D'Aquino M, Teves SA. Lemon juice as a natural biocide for disinfecting drinking water. *Bull Pan Am Health Organ* 1994; **28:** 324–30.
4. Dadswell JV. Managing swimming, spa, and other pools to prevent infection. *Commun Dis Rep* 1996; **6** (review 2): R37–R40.
5. WHO. Guidelines for safe recreational waters: volume 2—swimming pools, spas, and similar recreational environments (draft August 2000). Geneva: WHO, 2000.
6. Kurtz JB, *et al.* Legionella pneumophila in cooling water systems: report of a survey of cooling towers in London and a pilot trial of selected biocides. *J Hyg (Camb)* 1982; **88:** 369–81.
7. Helms CM, *et al.* Legionnaires' disease associated with a hospital water system: a five-year progress report on continuous hyperchlorination. *JAMA* 1988; **259:** 2423–7.
8. Morris RD, *et al.* Chlorination, chlorination by-products, and cancer: a meta-analysis. *Am J Public Health* 1992; **82:** 955–63.
9. Pontoriero G, *et al.* The quality of dialysis water. *Nephrol Dial Transplant* 2003;**18** (suppl 7): vii21–vii5.

Hand hygiene

Hospital-acquired infections, including those due to multidrug-resistant pathogens, such as meticillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Staph. aureus*, and vancomycin-resistant enterococci, are a major problem in health care facilities.[1] Hand hygiene is one of the most important factors in preventing such infections, as it prevents transmission of pathogens by contact and the faecal-oral route. However, healthcare workers frequently do not wash their hands, and compliance rarely exceeds 40%.[2] A randomised study[3] to compare the efficacy of an alcohol-based solution for hand rubbing with hand washing with a medicated soap in reducing bacterial hand contamination during routine patient care found that the alcohol-based solution was significantly more effective (83% reduction versus 58%). The authors considered that the difference in efficacy might have been due to the duration of hand washing. Participants rubbed or washed their hands for about 30 seconds, but the recommended duration for hand washing is 30 seconds to 1 minute, a time that was adhered to in less than 35% of instances.

Authorities recommend[1,2] that alcohol-based hand rubs should replace hand washing as the standard for hand hygiene in all situations in which the hands are not visibly soiled. The basis for this is that hand rubbing requires less time, is microbiologically more effective, and is less irritating to skin than traditional hand washing with soap and water. The CDC in the USA advises[4] hand washing with a non-antimicrobial or antimicrobial soap and water when hands are visibly dirty or contaminated with proteinaceous material, blood, or other body fluids and if exposure to *Bacillus anthracis* is suspected or proven. Alcohols, chlorhexidine, iodophores, and other antiseptic agents are not recommended for *B. anthracis* contamination as they have poor activity against the spores. If hands are not visibly soiled, an alcohol-based hand rub may be used. Decontamination of the hands with an antiseptic hand rub or hand wash should occur before direct contact with patients, and before putting on sterile gloves when inserting catheters or other invasive devices that do not require a surgical procedure. Decontamination of the hands should also occur after contact with a patient's intact or non-intact skin, body fluids, mucous membranes, and wound dressings if hands are not visibly soiled. Hands should be decontaminated if moving from a contaminated body site to a clean body site during patient care, after contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient, and after removing gloves. When performing surgical procedures hand hygiene with either an antimicrobial soap or an alcohol-based hand rub with persistent activity is recommended before putting on sterile gloves.

The CDC[4] considers that the best antimicrobial efficacy can be achieved with alcohol (ethanol), isopropyl alcohol, and propyl alcohol, as their activity is broad and they are fast acting. Ethanol at high concentrations is the most effective treatment against non-enveloped viruses, whereas propyl alcohol seems to be more effective against the resident bacterial flora. Combinations of alcohols may have a synergistic effect. The antimicrobial efficacy of chlorhexidine (2 to 4%) and triclosan (1 to 2%) is both lower and slower. Bacterial resistance may occur, although the risk is higher for chlorhexidine than triclosan. Even if used in conjunction with hand washing, they are still less effective than the alcohols. Plain soap and water has the lowest efficacy of all.

1. Trampuz A, Widmer AF. Hand hygiene: a frequently missed lifesaving opportunity during patient care. *Mayo Clin Proc* 2004; **79:** 109–16.
2. Widmer AF. Replace hand washing with use of a waterless alcohol hand rub? *Clin Infect Dis* 2000; **31:** 136–43.
3. Girou E, *et al.* Efficacy of handrubbing with alcohol based solution versus standard handwashing with antiseptic soap: randomised clinical trial. *BMJ* 2002; **325:** 362–6.
4. CDC. Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002; **51** (RR-16): 1–45. Also available at: http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf (accessed 15/03/06)

Injection site and catheter care

The need to disinfect the skin before injection is controversial.[1] Routine skin preparation of the injection site by swabbing with antiseptic has been reported to be both ineffective and unnecessary.[2,3] Central venous and arterial catheters, however, require the application of strict aseptic technique and injection site antisepsis to reduce the chance of infection.[4] Disinfection of catheter insertion sites with aqueous chlorhexidine 2% has been reported to be associated with fewer local and systemic infections than site preparation with either 10% povidone-iodine solution or 70% isopropyl alcohol,[5] although this has been challenged.[6] A subsequent study reported lower rates of catheter colonisation and catheter-related infection with an alcoholic solution of chlorhexidine 0.25% and benzalkonium chloride 0.025% than with povidone-iodine 10%.[7] In a study in preterm infants, technique had greater influence on bacterial counts at injection sites than the antiseptic used; chlorhexidine 0.5% in isopropyl alcohol and aqueous povidone-iodine 10% were equally effective, but cleansing with alcoholic chlorhexidine for 30 seconds or for two 10-second periods was more effective than cleansing for 5 or 10 seconds.[8]

The use of catheters impregnated with antiseptics or antibacterials has also been studied. Catheters impregnated with chlorhexidine and sulfadiazine silver on the external luminal surface, appear to be effective in reducing both catheter colonisation and related bloodstream infection in high-risk patients when used within 14 days.[9] Central venous catheters impregnated with minocycline and rifampicin have been reported to be associated with a lower infection rate than standard silicone catheters[10] and those impregnated with chlorhexidine and sulfadiazine silver.[11]

Guidelines have been produced for the prevention of infection associated with both peripheral intravascular and central venous catheterisation.[12-14]

1. Ayliffe GAJ, *et al. Chemical disinfection in hospitals.* 2nd ed. London: PHLS, 1993.
2. Dann TC. Routine skin preparation before injection: an unnecessary procedure. *Lancet* 1969; **ii:** 96–8.
3. Liauw J, Archer GJ. Swabaholics? *Lancet* 1995; **345:** 1648.
4. Shepherd A, Williams N. Care of long-term central venous catheters. *Br J Hosp Med* 1994; **51:** 598–602.
5. Maki DG, *et al.* Prospective randomised trial of povidone-iodine, alcohol, and chlorhexidine for prevention of infection associated with central venous and arterial catheters. *Lancet* 1991; **338:** 339–43.
6. Segura M, Sitges-Serra A. Intravenous catheter sites and sepsis. *Lancet* 1991; **338:** 1218.
7. Mimoz O, *et al.* Prospective, randomized trial of two antiseptic solutions for prevention of central venous or arterial catheter colonization and infection in intensive care unit patients. *Crit Care Med* 1996; **24:** 1818–23.
8. Malathi I, *et al.* Skin disinfection in preterm infants. *Arch Dis Child* 1993; **69:** 312–16.
9. Veenstra DL, *et al.* Efficacy of antiseptic-impregnated central venous catheters in preventing catheter-related bloodstream infection: a meta-analysis. *JAMA* 1999; **281:** 261–7.
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12. DoH. Guidelines for preventing infections associated with the insertion and maintenance of central venous catheters. *J Hosp Infect* 2001; **47**(suppl): S47–S67. Also available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4005481?IdcService=GET_FILE&dID=14080&Rendition=Web (accessed 27/08/08)
13. O'Grady NP, *et al.* Guidelines for the prevention of intravascular catheter-related infections. *MMWR* 2002; **51** (RR-10): 1–29. Also available at: http://www.cdc.gov/mmwr/PDF/rr/rr5110.pdf (accessed 15/03/06)
14. NICE. Infection control: prevention of healthcare-associated infections in primary and community care (June 2003). Section 5: central venous catheterisation. Available at: http://www.nice.org.uk/nicemedia/pdf/Infection_control_fullguideline.pdf (accessed 27/08/08)

Pre-operative skin disinfection

Skin preparation with antiseptics before surgery is generally carried out in an attempt to reduce the risks of surgical infection (see p.195), but the evidence base for the practice is conflicting. The CDC recommends[1] pre-operative cleaning of skin at the incision site with either iodophores (e.g. povidone-iodine), alcohol-containing products, or chlorhexidine gluconate. While alcohol is considered to be the most effective and rapidly acting skin antiseptic, there are no appropriate studies to assess comparative efficacy. Furthermore, an analysis[2] of randomised studies comparing the use of pre-operative skin antiseptics with no antiseptics and studies comparing different skin antiseptics, found that there was insufficient evidence to conclude whether pre-operative skin antiseptics were effective in preventing postoperative surgical wound infection.

1. Mangram AJ, *et al.* CDC Hospital Infection Control Practices Advisory Committee. Guideline for prevention of surgical site infection, 1999. *Am J Infect Control* 1999; **27:** 97–132. Also available at: http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/SSI.pdf (accessed 15/03/06)
2. Edwards PS, *et al.* Preoperative skin antiseptics for preventing surgical wound infections after clean surgery. Available in The Cochrane Database of Systematic Reviews; Issue 3. Chichester: John Wiley; 2004 (accessed 15/03/06).

Wound disinfection

Antiseptic preparations are widely used to treat or prevent superficial infections and wounds, but their usefulness on broken skin and wounds has been questioned.[1] For further information on wound care, see p.1585. Chlorine-releasing antiseptic solutions are generally regarded as irritant and although there is little direct evidence in patients there is concern that they may delay wound healing. Cetrimide,[2] tosylchloramide sodium,[3] hydrogen peroxide 3%,[4] iodophores,[4] and sodium hypochlorite solutions[2] are all reported to be cytotoxic *in vitro* or in *animal* models. Long-term or repeated use of these antiseptics for wound cleaning should probably be avoided. Chlorhexidine is relatively non-toxic.[2,3]

1. Brown CD, Zitelli JA. A review of topical agents for wounds and methods of wounding: guidelines for wound management. *J Dermatol Surg Oncol* 1993; **19:** 732–7.
2. Thomas S, Hay NP. Wound cleansing. *Pharm J* 1985; **2:** 206.
3. Brennan SS, *et al.* Antiseptic toxicity in wounds healing by secondary intention. *J Hosp Infect* 1986; **8:** 263–7.
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Acridine Derivatives

Acridina, derivados.

Description. Acridine derivatives are a group of quinoline antimicrobial dyes structurally related to acridine.