Antimicrobial/Antiseptic Summary Table

	Acetic Acid Sol'n 0.25 - 3%	Chlor-hexidine (CHG) 0.5%	CHG Sol'n 2.0% w 70% alcohol	Dakin's Sol'n 0.025% - 0.5%	Honey-Medical Grade	Hypo-chlorous Acid 0.033%	Iodine 0.90% Cadexomer Iodine	Iodine 1.0%	Iodine 10% Sol'n	Iodoform Gauze	Methylene Blue / Gentian Violet
Product	Compounded	Bactigras	Solution	compounded	Medi-honey	Vashe	Iodosorb	Inadine	Solution	Iodoform	Hydrofera Blue
Microorganism Legend: *Aerobic											
Bacteria											
Gram Positive											
* Staph. Aureus	+	+	+	+	+	+	+	+	+		+
MRSA	+	+	+	+	+	+	+	+	+		+
VRSA											
Staph Multiple Species			+			+	+				+
Enterococcus				+	+	+	+		+		+
VRE+		+		+	+	+	+		+		+
* Beta Hemolytic Strep Group A											
Beta Hemolytic Strep Group B						+	+ Group G	+	+		
Staph Epidermidi -coagulase negative					+		+				+
Strep Pyogenes					+						+
*Corynebacterium Diptheriod											
Clostridium Perfringens											
Gram Negative											
E.Coli	+	+		+	+	+			+		+
Endospores				+		+			+		
Klebsiella	+	+		+	+	+	+				
* Pseudomonas *aerugionosa*	+	+			+	+	+	+		+	+
Pseudomonas *florescens*									+	+	+
Acinetobacter					+	+					
Leptiospiria											
Neisseria											
Bacteriodes *Enterobacter cloacae*											+
Proteus *Mirabilis,Vulgaris*	+			+		+					+
Serratia marcescens	+					+					+
Amoebic Cysts									+		
Spores			+	+		+		+	+		
Fungus	+		+	+		+		+	+		+
Viruses			+	+		+			+		
Yeast	+	+ C. Albicans				+		+	+		+
Time of Onset	15-30 secs		3-10 hours	2 mins		15 secs			30 mins		
Cytotoxicity	Potential	Low		Potential		No			Potential	Low	Low
Resistance	No						Low	Rare	Rare		
Considerations & Precautions	Cytotoxic in vitro, maybe not in vivo; biofilm - limited activity.	Caution with infants<2 mos.	To be used as a cleanser prior to a CSWC procedure. Rinse after use. May used to maintain dry eschar when client sensitive to Povidone Iodine. Caution with CHG allergies/ sensitivities.	High pH causes skin irritation; Used to debride & as an antiseptic for infected wounds until wound bed clean.	Do not use for 3rd degree burns/full thickness wounds	Effective cleanser and debrider. Soak in wound bed 3 minutes.	No > 50gm / dressing. No >150gm/wk Monitor Lithium blood work. Caution with thyroid and renal conditions	Thyroid disease/ conditions Do not use for packing. May be used to maintain dry eschar wounds.	Thyroid disease / conditions. Not to be used in open wounds more than 7-10 days.	Non-woven cloth saturated with Iodine solution. Releases 96% iodine; may cause dis-comfort and pain when in contact with wound. Not for 3rd degree/full thickness burns.	CHG compatible. Changes when turns white, may be in wound up to 7 days.

Antimicrobial/Antiseptic Summary Table

	Polyhexa-methylene Biguanide	Silver Ionic							Silver Nano-crystal line	Silver Sulphate	Silver Sulpha diazine	Sodium Hypo-chlorite 0.057%
Product Microorganism Legend: *Aerobic	PMHB gauze/ foam	Aquacel Ag+ Extra & Surgical	Biatain Ag+ Adhesive/ Non-adhesive	Mepilex Transfer Ag+	Silvasorb	Calcicare	Ag+ Powder	Silvercel	Acticoat / Acticoat Flex	UrgoTul Ag+	Flamazine	Anasept
Bacteria												
Gram Positive												
* Staph. Aureus	+	+	+	+	+	+	+		+	+	+	+
MRSA	+	+	+	+	+	+	+	+	+	+	+	+
VRSA												
Staph. Multiple Species		+					+		+		+	
Enterococcus	+	+			+		+		+		+	+
VRE+	+	+	+	+	+	+	+	+	+	+		+
* Beta hemolytic Strep Group A		+		+			+					
Beta hemolytic Strep Group B							+		+	+		
Staph.Epidermidis - coagulase negative	+	+		+			+		+			
Strep. Pyogenes		+		+			+	+	+			
*Corynebacterium Diptheriod											+	
Colostridium perfringens		+									+	+
Gram Negative												
E.Coli	+	+		+	+	+	+	+	+	+	+	+
Endospores		+										+
Klebsiella (any species)	+	+		+	+		+	+	+		+	+
Pseudomonas *aerugionosa,*	+	+	+	+	+	+	+	+	+		+	+
Pseudomonas *Florescens*	+								+		+	+
Acinetobacter	+	+	+	+	+ Cloacae	+	+ Cloacae		+	+	+	+
Leptiospiria												
Neisseria												
Bacteriodes *Enterobacter cloacae*	+			+					+			
Proteus Mirabilis	+			+			+		+		+	+
Serratia marcescens	+			+	+		+		+		+	+
Amoebic Cysts												
Spores		+	+ A.basiliensis									+
Fungus	+	+		+	+ A.Niger	+	+ A. Niger		+		+	+
Viruses										+		+
Yeast	+	+	+ C. Albicans	+	+ Epider-mophyton, Tricophyton, Microsporunim	+	+ C.Albicans	+ C.Albicans	+		+	+
Time of Onset				24 hours								
Cytotoxicity												No
Resistance	Low											
Consideration & Precautions	Supplied in variety of formats; good for packing abscesses	Allergies/ sensitive to product components.	Allergies/ sensitive to product components.	Allergies/ sensitive to product compon-ents.	Allergies/ sensitive to product compon-ents.	Allergies/ sensitive to product component	Allergies/ sensitive to product compon-ents		Allergies/ sensitive to product compon-ents.	Allergies/ sensitive to product compon ents.	Use with caution for clients with severe hepatic and /or renal impairment.	Aids in debriding slough and biofilm. Do not use with Maggot Debridem't Therapy.

Literature Resources: Antimicrobials/Antiseptics for Wound Care

Acetic Acid

Acetic acid of various strengths has a long history of use in the clinical setting. As a household product and ease of access in the home setting, acetic acid has remained in use. Acetic acid 5% is mixed into three strengths: 0.25%, 1% and 3%. To compound the required solution follow steps approved by your agency and the Product Information Sheet.

Canadian Agency for Drugs and Technologies in Health. (2015 December). *Acetic acid for wound care: Clinical effectiveness and guidelines*. https://www.cadth.ca/sites/default/files/pdf/htis/dec-2015/RB0945%20Acetic%20Acid%20for%20Wounds%20Final.pdf

Lipsky BA, Hoey C. Topical antimicrobial therapy for treating chronic wounds. Clin Infect Dis [Internet]. 2009 Nov 15 [cited 2017 Mar 8];49(10):1541-9. https://academic.oup.com/cid/article-lookup/doi/10.1086/644732

Sibbald, R. G., Orsted, H. L., Coutts, P. M., & Keast, D. H. (2006). Best practice recommendations for preparing the wound bed: Update 2006. https://www.woundscanada.ca/docman/public/wound-care-canada-magazine/2006-vol-4-no-1/258-wcc-2006-vol4n1-best-practice-recommendations-for-preparing-the-wound-bed-update-2006/file (Acetic Acid, p. 22).

U.S. National Library of Medicine. (2019). *Acetic Acid: Summary*. https://pubchem.ncbi.nlm.nih.gov/compound/Acetic-acid

Chlorhexidine (CHG)

Chlorhexidine 2% with 70% alcohol is used in wound care, for prep pre and post conservative sharp wound debridement. The combination is necessary to reduce bacterial load.

Chlorhexidine gluconate solution is used as a disinfectant and antiseptic and when used in lower concentrations chlorhexidine is bactericidal. Chlorhexidine 0.05% is compounded by Pharmacy. Chlorhexidine 0.5% with 70% alcohol solution may be used is a preoperative skin disinfection prior to minor surgeries and should be used on intact skin (NICE, 2019). Chlorhexidine 2% in a 70% alcohol solution is widely used as a pre-operative surgical scrub for intact skin to reduce surgical site infection rates in the intraoperative phase (NICE, 2019). In 2019, NICE discussed 4% aqueous Chlorhexidine (preoperative and postoperative skin antisepsis for patients undergoing elective surgery' and 4.0% aqueous Chlorhexidine for 'pre-operative skin preparation to surgery'; however, in both cases relevant instructions are limited to use as a body wash to be used before the person enters the operating theatre.

Edminston, C. C., Bruden, B, Rucinski, M. C., Henen, C., Graham, M. B., & Lewis, B. L. (2013). Reducing the risk of surgical site infections: Does chlorhexidine gluconate provide a risk reduction benefit? *American Journal of Infection Control 41*, S49-S55.

Lipsky BA, Hoey C. Topical antimicrobial therapy for treating chronic wounds. Clin Infect Dis [Internet]. 2009 Nov 15 [cited 2017 Mar 8];49(10):1541-9. https://academic.oup.com/cid/article-lookup/doi/10.1086/644732

National Institute of Clinical Excellence. (2019). *Surgical site infections: Assessment and treatment*. https://www.nice.org.uk/guidance/ng125/chapter/Recommendations

Schmidt, K., Estes, C., McLaren, A., & Spangehl, M. J. (2018). Chlorhexidine antiseptic irrigation eradicates staphylococcus epidermidis from biofilm: An in vitro study. *Clinical Orthopedics and Related Research, 476*(3), 648-653.

Dakin's Solution

Dakin's solution (0.5%) sodium hypochlorite is an antiseptic solution used in the treatment of chronic wounds. Dakin's solution is best used to aid in the removal of necrotic tissue and should not be used on or packed in clean wounds. To compound Dakin's Solution follow agency policy and Product Information Sheet.

Ohio State University Medical Center. (2002). *How to make Dakin's solution*.

Nationwide Children's Hospital. (2018). *How to make Dakin's solution*. https://www.nationwidechildrens.org/family-resources-education/health-wellness-and-safety-resources/helping-hands/dakins-solution

Nationwide Children's Hospital. (2018). *How to make distilled water*. https://www.nationwidechildrens.org/family-resources-education/health-wellness-and-safety-resources/helping-hands/dakins-solution

Rodeheaver, G. T., & Ratcliff, C. R. (2007). Wound cleansing, wound irrigation, wound disinfection. In D. L. Krasner, G. T., Rodeheaver, & T. G. Sibbald (Eds.). *Chronic wound care: A clinical source book for healthcare professionals*. (pp. 331-342).

Sibbald, R. G., Orsted, H. L., Coutts, P. M., & Keast, D. H. (2006). Best practice recommendations for preparing the wound bed: Update 2006. https://www.woundscanada.ca/docman/public/wound-care-canada-magazine/2006-vol-4-no-1/258-wcc-2006-vol4n1-best-practice-recommendations-for-preparing-the-wound-bed-update-2006/file (Dakin's p. 22).

Honey - Medical Grade

Honey used in wound care is produced under sterile conditions and use of pre-prepared products protects the client from using honey that may contain clostridial spores, other pathogens, and in addition antibiotics and pesticides (Nwabudike & Maruhashi, 2017). The Medihoney dressing contains active Leptospermum honey and provides a moist environment conducive to wound healing.

Carter, D. A., Blair, S. E., Cokcetin, N. N., Bouzo, D., Brooks, P., Schothauer, R., & Harry, E. J. (2016). Therapeutic Manuka honey: No longer so alternative. *Frontiers in Microbiology, 7*, 569. doi: 10.3389/fmicb.2016.00569

Hess, C. T. (2013). *Skin and wound care* (7th ed.). Philadelphia, PA: Wolters Kluwer.
Nwabudike, L. C. & Maruhashi, E. (2017). Patient education, self-care and medical grade honey – managing a diabetic foot ulcer. Wounds International, 8(4), 40-41. https://www.woundsinternational.com/resources/details/patient-education-self-care-and-medical-grade-honey-managing-diabetic-ulcer
Wound International. (2011). *Medihoney dressings made easy*. https://www.woundsinternational.com/resources/details/medihoney-dressings-made-easy

Hypochlorous Acid (HOCl) (Vashe)

Prepared hypochlorous acid solution is intended for the management of acute and chronic wounds through cleaning, irrigating, and debriding. Use of this dilute acid supports the removal of biofilms.

Couch, K. S., Miller, C., Cnossen, L. A., Richey, K, J., & Guinn, S. J. (2016). Non-cytoxic wound bed preparation: Vasche hypochlorous acid wound cleansing solution. http://www.steadmed.com/wp-content/uploads/2016/11/Vashe-Wound-Cleansing-Final-final.pdf
Liden, B. A. (2013). Pearls for practice: Hypochlorous acid: Its multiple used in wound care. *Wound Management & Prevention, 59*(9). ISSN 1943-2720. https://www.o-wm.com/article/pearls-practice-hypochlorous-acid-its-multiple-uses-wound-care
Wang, L., Bassiri, M., Najafi, R., Najafi, L., Yang, J., Khosrovi, B., Hwong, W., Barati, E., Belisle, B., Celeri, C., & Robson, M. C. (2007). Hypochlorous acid as a potential wound care agent. *Journal of Burns and Wounds, 6.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1853323/

Iodine

Wounds International. (2011). *Iodine made easy*. https://www.woundsinternational.com/resources/details/iodine-made-easy
Wounds UK. (2018). Evaluation of two non-adherent Poviodine-iodine dressings in clinical practice: Results of qualitative data regarding performance and ease of use. https://www.wounds-uk.com/

Iodoform Gauze

Iodoform gauze has been used as a disinfectant for treatment of infected wounds and in dental surgery (Darvell, 2018). The effectiveness and action mechanism of iodoform gauze for removal of necrotic tissue are unknown (Mizokami et al., 2012). Medline (2019) recommend use of iodoform for packing or wicking including boils and abscesses (p. 1). Although iodoform has been used to prevent or treat wound infection since 1837, there are more effective products available to manage wound infection (Cordrey, 2011), and it may cause toxicity (Nakamura et al., 2011). Iodoform has strong allergic sensitizers, and is incompatible with silver nitrate, metallic salts, strong oxidizers and strong bases (Cordrey, 2010). May cause irritation to eyes, skin and respiratory tract irritation with exposure to the vapour (Derma Sciences, 2005).

Darvell, B. W. (2018). Iodoform: More Chemistry. *In Materials Science for Dentistry* (10th ed.). https://www.sciencedirect.com/topics/nursing-and-health-professions/iodoform
Derma Sciences. (2005). *Material safety data sheets for Iodoform packing strips*. (pp. 1-4).
Kendall, TYCO Healthcare. (2004, Jan). *Material Safety Data Sheet*. https://www.vanwerthospital.org/docs/default-source/SDS/curity-iodoform-packing-strips.pdf?sfvrsn=2
Medline. (April 26, 2019). *Safety Data Sheet: Curad sterile iodoform packing strips*. (pp. 1-6).
Mizokami, F., Yusuke, M., Katsonori, F., & Zenso, I. (2012). Iodoform gauze removes necrotic tissue from pressure ulcer wounds by fibrinolytic activity. *Biological & Pharmaceutical Bulletin, 35(*7), 1048-1053. https://www.science.gov/topicpages/i/iodoform+packing+strips.html
Nakamura, K., Ionkuchi, R., Fujita, H., Hiuuma, T., Matsubara, T., Tanaka, Y., & Yahagin N, (2011). Intoxication caused by iodoform gauze packing in necrotizing fasciitis. *Journal Japan Intensive Care Medicine, 18*, 629-631.

Methylene Blue/ Gentian Violet

Hollister WoundCare. (2013, December). *The effective use of Hydrofera Blue: Bacteriostatic dressing in difficult-to-heal wounds: An evaluation of six case studies*. http://www.hollister.com/~/media/files/pdfs%E2%80%93for%E2%80%93download/wound%E2%80%93care/hwc-790%E2%80%93hfb_clinical_monograph_reprint_922206_f.pdf

Polyhexamethylene Biguanide (PHMB)

Wounds International. (2017). *PHMB made easy*. https://www.woundsinternational.com/resources/details/phmb-made-easy-wint

Silver: Silver is found in dressings in a number of forms:

- elemental silver – e.g., silver metal, nanocrystalline silver*
- inorganic compound – e.g., silver oxide, silver phosphate, silver chloride, silver sulfate, silver-calcium-sodium phosphate, silver zirconium compound, SSD
- an organic complex – e.g., silver-zinc allantoinate, silver alginate, silver carboxymethylcellulose.

The silver component of dressings may appear:

- as a coating – on one or both external surfaces of the dressing (elemental or nanocrystalline silver)
- within the structure of the dressing – either as a coating on dressing materials (elemental or compound silver), within the spaces of the dressing materials (elemental or compound silver), or as a compound that forms part of the dressing structure (e.g., silver alginate)
    - as a combination of these.

Silver on the surface of the dressing may come into contact with the wound where it exerts the antimicrobial action. Silver within the dressing structure acts on bacteria absorbed into the dressing with wound exudate, but is likely also to diffuse to some extent into the wound. The total amount of silver in dressings varies considerably, but in a wound environment the interaction of silver ions with wound components such as chloride ions and proteins, means that the amount of silver delivered to a wound does not correlate with the amount of silver contained in the dressing. In addition, although in some laboratory experiments very low concentrations, e.g., one part per million (1ppm) of silver ions or less, have been shown to be effective against bacteria, it is unclear how silver content and availability measured in experimental settings relate to clinical performance.

Wounds International. (2012). *Appropriate use of silver dressings in wounds*. https://www.woundsinternational.com/resources/all

Products Not Being Used or Not on Formulary

Hydrogen Peroxide (H_2O_2)

Hydrogen peroxide (3%) is not recommended for wound care as it damages sensitive tissues and delays healing (Brown, 2009). Use of hydrogen peroxide as an antiseptic agent is undocumented, yet H2O2 is effective is dissolving blood clots in wounds under specific conditions (Rodeheaver & Ratliff, 2007). Kramer et al. (2018) classify H2O2 (alone) as obsolete in the recent wound antisepsis update.

Brown, P. (2009). *Quick reference to wound care* (3rd ed.). (pp. 116 & 148).

Canadian Agency for Drugs and Technologies in Health. (2012). Antiseptics versus potable water for wound cleansing: A review of the clinical effectiveness and guidelines. https://www.cadth.ca/media/pdf/htis/dec-2012/RC0412%20Wound%20Cleansing%20Final.pdf

Crow, S., & Thompson, P. J. (2007). Infection control perspectives on wound care (pp. 323-342). In Krasner, D. L., et al (Eds.). *Chronic wound care*. Malvern, PA: HMP Communications.

Kramer, A., Dissemond, J., Kim, S.,Willy, C., Mayer, D., Papke, R., Tuckmann, F., & Assadian, O. (2018). Consensus on wound antisepsis: Update 2018. *Skin Pharmacology and Physiology, 31*, 28-58.

Lu, M., & Hansen, E. N. (2017). Hydrogen peroxide wound irrigation in orthopaedic surgery. Journal of Bone & Joint Infection, 2(1), 3-9. doi: 10.7150/jbji.16690

Rodehever, G. T., & Ratliff, C. R. (2007). Wound cleansing, wound irrigation, wound disinfection. In D. L. Krasner, G. T. Rodeheaver, & R. G. Sibbald (Eds.), *Chronic wound care: A clinical source book for healthcare professionals* (4th ed., pp. 331-342).

Octenidine dihydrochloride (OCT 0.1%). At present this product is not available on the British Columbia formulary.

Kramer, A., Dissemond, J., Kim, S., Willy, C., Mayer, D., Papke, R., Tuchmann, F., & Assadian, O. (2018). *Consensus on wound antisepsis: Update (2018).* https://www.karger.com/Article/Pdf/481545

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Cowling, T., & Jones, S. (2017). *Topical antibiotics for infected wounds: A review of the clinical effectiveness and guidelines*. CADTH: Ottawa. CADTH Rapid Response Report: Summary with critical appraisal.

Edmiston, C. E., Leaper, D., Spencer, M., Truitt, K., Fauerbach, L. L., Graham, D., & Johnson, H. B. (2017). Considering a new domain for antimicrobial stewardship: Topical antibiotics in the open surgical wound. *American Journal of Infection Control, 45*, 1259-1266.

Espisoto, S., Bassetti, M., Concia, E., DeSimone, G., DeRosa, F. G., Grossi, P.,…Viscoli, C. (2017). Diagnosis and management of skin and soft-tissue infections (SSTI). A literature review and consensus statement: An update. *Journal of Chemotherapy, 29*(4), 197-214. doi: 10.1080/1120009X.2017.1311398. Epub 2017 Apr 5.

Heal, C., F., Banks, J. L., Lepper, P. D., Kontopantelis, E., & van Driel, M. L. (2016). Topical antibiotics for preventing surgical site infection in wounds healing by primary intention. *Cochrane Systematic Review*, Nov. 6. 10.1002/14651858.CD011426.pub2

Kalan, L., Zhou, Mi., Labbie, M., Willing, B. (2017). Measuring the microbime of chronic wounds with the use of a topical antimicrobial dressing – A feasibility study. *PLoS One, 12*(11). doi: 10.1371/journal.pone.0187728

Lipsky, B. A., & Hoey, C. (2009). Topical antimicrobial therapy for treating chronic wounds. *Clinical Practice, 49*, 1541-1546.

Lipsky, B. A., Dryden, M., Gottrup, F., Nathwani, D., Seaton, R. A., & Stryja, J. (2016). Antimicrobial stewardship in wound care: A position paper from the British Society for Antimicrobial chemotherapy and European Wound Management Association. *Journal of Antimicrobial Chemotherapy,* 71, 3026-3035.

Sibbald, R. G., & Elliott, J. a. (2017). The role of Inadine in wound care: A consensus document. *International Wounds, 14*(2), 316-321. doi: 10.1111/iwj.12602

Stevens, D. L., Bisno, A. L., Chambers, H. F., Dellinger, E. P., Goldstein, E. J., Gorbach, S. L.,…Wade, J. C. (2014). Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clinical Infectious Diseases, 59*(2), e10-52. doi: 10.1093/cid/ciu444. https://www.ncbi.nlm.nih.gov/pubmed/24973422

Document Creation/Review

This guideline is based on the best evidence-based information available at the time it was published and avoids opinion-based statements, where possible. It was developed by the Provincial Nursing Skin & Wound Committee and has undergone vendor review.

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