200 BIND

Contents

Key aims and principles of standards
The role of variant Crentzfeldi-Dallatio bus similarity woll
Contributor contact details
Woodhead Publishing Series in Biomaterials
Acknowledgements and dedication
Fundamentals of decontamination in hospitals and healthcare
The importance of decontamination in hospitals
and healthcare
J. T. WALKER, Public Health England, UK
Introduction
Microbial resistance and infection control
Current water system contamination issues
The impact of prion discovery on sterilisation techniques
Conclusion
References
The history of decontamination in hospitals
S. W. B. NEWSOM and G. L. RIDGWAY, Clinical
Microbiologists (retired), UK
Conclusion WILL begins diffestioned and with the
Introduction
Healthcare-acquired infection (HAI)
Key figures in decontamination control
Heat for sterilisation and disinfection
Chemical disinfectants
Testing disinfectant activity
European Medical Devices Directives
Incidents of contamination as a result of human error
Conclusion
Acknowledgements
References and further reading

V

vi	Contents	
3	The role of standards in decontamination R. BANCROFT, Albert Browne Ltd, UK	42
3.1	Introduction	42
3.2	Relationship of standards to law and guidance	43
3.3	Key aims and principles of standards	45
3.4	Types of standard	46
3.5	Vienna Agreement	46
3.6	European standards	47
3.7	International standards	48
3.8	How standards are drafted	48
3.9	How to read and understand a standard	51
3.10	Accessing the most relevant standards and guidance	
	documents	52
3.11	Conclusion and future trends	53
3.12	Sources of further information and advice	53
3.13	References	54
3.14	Appendix: standards in decontamination	54
4	Infection control in Europe	60
	S. BRUSAFERRO, University of Udine, Italy	
4.1	Introduction	60
4.2	Data available in Europe	63
4.3	Standards for structures and organizations	68
4.4	Training of personnel	69
4.5	Conclusion and future trends	85
4.6	Acknowledgements	87
4.7	References	87
4.8	Appendix: abbreviations	91
5	Future trends in decontamination in hospitals	
5	and healthcare	92
	IT WALKER Public Health England IIK	
		2,1
5.1	Introduction	92
5.2	Decontamination in water systems	94
5.3	Use of biocides	99
5.4	Control of microorganisms in the built environment	100
5.5	Hand hygiene	101
5.6	Hand contact sites and environmental cleaning	101
5.7	Manual cleaning	102
5.8	Automated decontamination systems	102
5.9	Decontamination of prions	103
5.10	References	106

Part II	Decontamination practices in hospitals and healthcare	113
6	Decontamination in primary care: dental and hospital perspectives	115
	A. SMITH, Glasgow Dental Hospital and School, UK	
6.1	Introduction	115
6.2	Historic background of dental surgery	116
6.3 6.4	Potential evidence of infections associated with dentistry The role of variant Creutzfeldt–Jakob disease (vCJD)	117
	in raising standards	119
6.5	Challenges associated with dental instrument	279
	decontamination	121
6.6	Instrument decontamination processes for dental surgery	124
6.7	Centralization of dental instrument reprocessing	127
6.8	Quality management systems (QMS)	130
6.9	Future trends	134
6.10	Conclusion	134
6.11	Sources of further information and advice	137
6.12	References	137
7	The role of the nurse in decontamination R. GALLAGHER, Royal College of Nursing, UK	142
7.1	Introduction	142
7.2	Regulatory standards and decontamination	143
7.3	Key principles	144
7.4	Challenges associated with nursing and contamination	145
7.5	Provision of cleaning services	150
7.6	Management of cleaning services	151
7.7	Decontamination of patient equipment	157
7.8	Conclusion	163
7.9	Sources of further information and advice	163
7.10	References	164
8	Minimising microbial contamination in dental unit water systems and microbial control in	
	dental hospitals	166
	D. C. COLEMAN, M. J. O'DONNELL, A. S. MILLER and M. A. BOYLE, University of Dublin, Ireland	
Q 1	Historical development of the dental chair unit	166
8.1 8.2	Dental unit waterlines (DUWLs)	167

	• • • •
VIII	Contents
VIII	CONCONTO

8.3	Microorganisms identified in DUWL output water	178
8.4	Evidence to date for infection or disease linked sold sold to DUWL biofilm	179
8.5	A microbiological quality standard for DUWL	115
0.5	output water	183
8.6	Management of biofilm contamination of DUWLs	184
8.7	Decontamination of DUWLs in dental hospitals	193
8.8	Management of bacterial contamination of washbasin	
0.0	taps and output water in the dental hospital setting	196
8.9	Outlook for the future	198
8.10	References	199
9	Control of waterborne microorganisms and reducing	
	the threat from Legionella and Pseudomonas	208
	M. C. KELSEY, Whittington Hospital NHS Trust, UK	
9.1	Introduction	208
9.2		208
9.3		213
9.4	Pseudomonas aeruginosa The control of Legionella and Pseudomonas in	215
2.4	water distribution systems	217
9.5	Conclusion	225
9.6		225
9.0	References	220
10	The role of continuous microbial debulking in	
	the hospital environment and its effect on reducing	
	hospital-acquired infections (HAI)	232
	M. G. SCHMIDT, Medical University of South Carolina, USA	7.5
	and J. F. JOHN, Ralph H. Johnson VA Medical Center and	
	Medical University of South Carolina, USA	
	Conclusion with the new part of the second s	
10.1	Introduction	232
10.2	Microbes: a clear and present danger common to the built hospital environment	234
10.3	Alterations to the hospital environment and behavior	204
10.5	mitigate risk	236
10.4	Risk mitigation: impact of the application of continuously	250
10.4	active no-touch solution	237
10.5		231
10.5	Microbial debulking of the environment mitigates	245
10.6	hospital-acquired infection (HAI) risk Conclusions	245
10.6		
10.7	References	248

Contents ix

11	Provision and control of water for healthcare purposes	254
	R. LACEY and G. WALKER, Solutions 42 Ltd, UK	13.8
11.1 11.2	Introduction Water quality and water systems in the healthcare	254
	environment	258
11.3	Water treatment and water purification technology	261
11.4	Water quality monitoring	270
11.5	Specialist departments and their unique requirements	270
116	1 2	
11.6	Water Safety Group: an integrated or multi-modal approach	279
11.7	approach Sustainability and conservation in healthcare water	217
11./	management	283
11.8	Conclusion and future trends	284
11.9		285
11.7	References and further reading	
10	Use of second dependencies toobsologies for	
12	Use of gaseous decontamination technologies for	
	wards and isolation rooms in hospitals and	299
	healthcare settings	235
	T. POTTAGE and J. T. WALKER, Public Health England, UK	
12.1	Introduction and abase of all and an and a solution	299
12.2	Challenges and considerations for gaseous	
	decontamination in a healthcare setting	301
12.3	Validation methods to determine efficacy	309
12.4	Practical use of gaseous decontamination in hospitals	313
12.5	Conclusion and future trends	319
12.6	Sources of further information and advice	320
12.7	References	320
13	Biocides and decontamination agents including	
	sporicides for decontamination in hospitals	325
	E. S. GILCHRIST, NHS Fife, Victoria Hospital, UK and	
	P. J. COLLIER, University of Abertay, UK	
13.1	Introduction	325
13.1	Currently available biocides and sporicides for use	0
13.4	in healthcare and their limitations	329
13.3	Testing standards for actives and sporicides	334
13.4	Incidence of resistance and risk to the hospital patient	338
13.4	Strengths/weaknesses of different disinfectants for	,000
15.5	a range of microorganisms	340
	A I MALMA OI MALAN OVA MOMANDAND	

Х	Contents

13.6	Future trends	341
13.7	Sources of further information and advice	342
13.8	References	342
14	Decontamination of prions	346
14	G. McDonnell, STERIS Corporation, USA	540
	G. MCDONNELL, STERIS COrporation, USA	
14.1	Introduction	346
14.2	Prion diseases: transmissible spongiform	
	encephalopathies (TSEs)	347
14.3	What are prions?	348
14.4	Clinical transmission risks	349
14.5	Decontamination investigations	351
14.6	Future perspectives	364
14.7	References	365
15	Cleaning and decontamination of the	
10	healthcare environment	370
	S. J. DANCER, Hairmyres Hospital, NHS Lanarkshire, UK	570
	5. J. DANCER, Hammyres Hospital, WHS Lanarkshile, OK	
15.1	Introduction	370
15.2	Pathogen survival time in the hospital environment	371
15.3	Identifying the main reservoirs of microorganisms	372
15.4	Transmission of contaminants by hands during healthcare	374
15.5	The role of cleaning in reducing the infection risk	
	for patients	375
15.6	Contaminated cleaning equipment and fluids	381
15.7	Assessment of environmental cleanliness	382
15.8	Current and future trends	383
15.9	Conclusion	385
15.10	References	385
16	The role of protective clothing in healthcare and	
225	its decontamination	398
	K. LAIRD, K. RILEY, and J. T. WILLIAMS, De Montfort	000
	University, UK	
16.1	Introduction	398
16.2	Disposable clothing	400
16.3	Reusable clothing	401
16.4	Microbiology	403
16.5	Cleansing and disposal	406
16.6	Conclusions and future trends	410
16.7	References	410

17	A guide to no-touch automated room disinfection	413
	(NTD) systems	413
	J. A. OTTER, Kings College London School of Medicine, Guy's and St Thomas' NHS Foundation Trust and	
	Bioquell UK Ltd, UK, S. YEZLI, Bioquell UK Ltd, UK,	
	T. M. PERL, The Johns Hopkins Hospital, USA, F. BARBUT,	
	Hôpital Saint Antoine, France and G. L. FRENCH, Kings College London School of Medicine and Guy's and St Thomas' NHS Foundation Trust, UK	
17.1	Introduction	413
17.2	Reasons to consider a no-touch automated room	
	disinfection (NTD) system	414
17.3	What level of surface contamination is a risk for	
503	transmission?	415
17.4	Limitations of conventional cleaning and disinfection	418
17.5	Overview of NTD systems	420
17.6	When to consider an NTD system	443
17.7	Using, validating and regulating NTD systems	445
17.8	Sources of further information and advice	448
17.9	Conclusion	449
17.10	References	450
10	New technologies to control the processo of	
18	New technologies to control the presence of	461
	microorganisms in hospitals A. P. R. WILSON and G. MOORE, UCLH NHS Foundation	401
	Trust, UK	
18.1	Introduction	461
18.2	Designing out hospital infection	463
18.3	Modifications to ward layout and design	464
18.4	Modifications to the bed space	467
18.5	Modifications to specific surfaces/patient care items	471
18.6	Conclusion and future trends	476
18.7	Sources of further information and advice	477
18.8	References	477
19	Testing strategies and international standards	
	for disinfectants	
	D. ASHWORTH, Klarus Consulting Ltd, UK,	
	M. GREENHALGH, MGCL, UK and C. WOODALL, BluTest	

Laboratories Ltd, UK

Contents xi

xii Contents

19.1	Introduction all moon betamonus doubt-on of solug A	483
19.2	How today's modern efficacy methods differ from those	101
	used historically	484
19.3	The use of disinfectants and the role efficacy testing	105
	has to play in their selection	485
19.4	The use of international standards in practice	486
19.5	Conclusion	497
19.6	References	498
Part III	Decontamination of surgical instruments	12.1
	and endoscopes	501
	disinfection (NTD) system	
20	An overview of current decontamination practices	19.3
4151	of surgical instruments and medical devices	503
	S. HOLMES, Health Facilities Scotland – National Services	
	Scotland, UK	
		503
20.1	Introduction Purpose of decontamination practice of surgical	
20.2	instruments in central decontamination units (CDUs)	504
	Current regulations, standards and guidance	507
20.3	Disk minimization strategy	519
20.4	Risk minimization strategy	521
20.5	Decontamination process Activities impacting on the decontamination process	
20.6	and the quality of sterile instruments	533
20.7	Enture trands	536
20.7		538
20.8 20.9	Acknowledgement References	538
20.9		
21	An overview of the Choice Framework for local	
	Policy and Procedures (CFPP) for decontamination	= 10
	of surgical instruments	548
	N. TOMLINSON, Department of Health (retired), UK and	
	H. ELLIOTT, Department of Health, UK	
01.1	Introduction	548
21.1	Essential quality requirements (EQR) and best	
21.2	practice (BP)	557
21.2	Application of EQR in surgical instrument and	
21.3	endoscope decontamination	560
21.4	Choice Framework for local Policy and Procedures	
21.4	(CFPP) access	561
21.5	Comparing CFPP with the established Health Technical	
21.0	Memorandum (HTM) model	564

Contents xiii

21.6 21.7 21.8 21.9	Conclusions and future trends Sources of further information and advice Acknowledgements References and further reading	578 581 582 582
22	An overview of new technologies for the decontamination of surgical instruments and the quantification of protein residues: low-pressure radiofrequency (RF) gas-plasma decontamination and epifluorescence scanning (EFSCAN) detection H. C. BAXTER, A. C. JONES and R. L. BAXTER, University of Edinburgh, UK	587
22.1 22.2	Introduction Radiofrequency (RF) gas-plasma removal of prion infectivity	587 589
22.3 22.4 22.5	Potential future processes for prion removal RF gas-plasma inactivation of bacterial contamination An example of instrument decontamination using	590 590
22.6 22.7 22.8	low-pressure gas-plasma Monitoring decontamination Epifluorescence scanning (EFSCAN) EFSCAN contamination monitoring for RF gas-plasma	591 591 592
22.9 22.10 22.11	treated instruments Conclusion Acknowledgements References	594 594 595 595
23	Efficacy of current and novel cleaning technologies (ProReveal) for assessing protein contamination on surgical instruments D. PERRETT and N. K. NAYUNI, Barts and The London School of Medicine, UK	598
23.1 23.2 23.3 23.4 23.5 23.6 23.7 23.8	Introduction General principles of protein detection Current general methods of protein detection (ninhydrin, Biuret, dyes): sensitivity, specificity and validation Methods of protein detection based on fluorescence Other possible technologies Strengths and weaknesses of new technologies Conclusion References	598 601 603 607 614 615 617 618

xiv Contents

24	Decontamination of flexible endoscopes P. N. HOFFMAN, Public Health England, UK,	620
	C. R. BRADLEY, Queen Elizabeth Hospital Birmingham,	
	UK and S. J. LINE, Sterilizer Consultants Ltd, UK	
24.1	Introduction	620
24.2	Risk assessment	622
24.3	Flexible endoscope decontamination	625
24.4	Decontamination process	626
24.5	Assessing and selecting endoscope washer-disinfector	010
24.3	(EWD) systems	628
24.6	Water treatment and potential machine	020
24.0	contamination issues	629
24.7	Endoscopy accessories	629
24.8	Tracking and traceability	630
24.9	Recontamination risks and preventative storage	
	of endoscopes	631
24.10	Testing for rinse water contamination	633
24.11	Decontamination facilities	634
24.12	Reasons for decontamination failure	637
24.13	Conclusion	638
24.14	References	638
25	Sterilisation of flexible endoscopes	639
100	M. MIKHAIL, University Hospital of Wales, UK and	
	T. YOUNG, The Postgraduate Medical Institute, Anglia	
	Ruskin University, UK	
25.1	Introduction: key principles of sterilising flexible	
23.1	endoscopes	639
25.2	Why sterilise flexible endoscopes?	640
25.3	Problems associated with sterilisation of flexible	0.0
23.3	endoscopes	642
25.4	Methods used in the sterilisation of endoscopes	642
25.5	Testing effectiveness and application of standards	646
25.6	Example of an 'in use' application	647
25.7	Future trends	648
25.8	Sources of further information and advice	648
25.9	References	649
20.7	Methods of protein detection based on fluorescenes	
	Index	651
	Strengths and weaknesses of new technologiescar free:	