CAROLINE L. PANKHURST
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Basic Guide to INFECTION PREVENTION AND CONTROL IN DENTISTRY

SECOND EDITION

with website

WILEY Blackwell

Basic Guide to Infection Prevention and Control in Dentistry

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BASIC GUIDE TO INFECTION PREVENTION AND CONTROL IN DENTISTRY

Second Edition

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Foreword

Infection prevention and control is everybody's business. In the current era where we confront exotic infections practically every few months, the dental practitioner, which includes each and every member of the dental team, has to be highly conversant and current with the principles and practice of infection control.

The second edition of *Basic Guide to Prevention and Infection Control* is a fitting and comprehensive guide to this rapidly and relentlessly evolving discipline. Both authors are doyens and acclaimed experts of their practice and they have left no stone unturned to provide the reader with a most readable, comprehensive and contemporaneous guide to the subject.

Being engaged in infection control seminars and discussions worldwide, what never ceases to amaze me is the rapidity with which new legislation on infection control evolves in various jurisdictions. This necessarily means that the practitioner has to be fully conversant with the up-to-the-minute legislation, and how and why such pronouncements are made by the regulatory authorities. This book could be considered *the* most wide-ranging exposition of the legislative architecture of dental infection control as currently practised in the United Kingdom. It will nevertheless serve also as a masterful guide for any reader anywhere interested in infection prevention and control.

Written in a very lucid style and a logical manner, the book covers all conceivable aspects of infection control ranging from risk assessment to managing amalgam waste. Admirably, the authors accomplish their goal essentially in 200 pages of text and figures!

I enjoyed perusing the narrative and the ample illustrations that complement the lucid text. I wish this book the success it truly deserves!

December 2016

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Preface

This book was written as a practical guide to infection control and prevention in dentistry. The principles of infection control and prevention are universal, and are applicable to the same standard whatever your role in the dental team. Therefore. this book was written to be of value for those in training and all members of the dental team delivering primary and secondary dental care.

It is easy to dismiss infection prevention and control as just being about instrument sterilization and hand hygiene. In reality, infection control, if it is to be relevant and effective, has to take into account psychological attitudes, social norms and prevailing geopolitical dimensions, which is what makes the topic so interesting and dynamic. The science and evidence base underpinning infection control are also universal but standards for delivery and guidelines do vary between countries.

Since the first edition of this book, devolution within the United Kingdom has resulted in restructuring of healthcare with, in some instances, nation-specific legislation and guidance. Reference to these variations can be found by following the hyperlinks cited on the companion website, and in the chapter on legislation. We are delighted to acknowledge that we have a community of readers around the world, so throughout the text and on the companion website we have tried to reflect both national and international approaches to health initiatives in infection control and prevention. Therefore, the reader is guided to the major international sources of advice and guidelines on both infectious diseases and infection control initiatives produced by the World Health Organization, the European Centre for Disease Prevention and Control and the Centers for Disease Control and Prevention in the USA.

Acknowledgements

We would like to thank Dr John Philpott-Howard and Mrs Janet Davies for their most helpful comments and insights during the preparation of this book.

About the companion website

This book is accompanied by a companion website:

www.wiley.com/go/pankhurst/infection-prevention

The website includes:

- Interactive multiple choice questions (MCQs)
- Further reading and useful websites
- Videos

Chapter 1

Essentials of infection control

WHY DO WE NEED INFECTION CONTROL IN DENTISTRY?

Dentists and other members of the dental team are exposed to a wide variety of potentially infectious micro-organisms in their clinical working environment. The transmission of infectious agents from person to person or from inanimate objects within the clinical environment which results in infection is known as *cross-infection*.

The protocols and procedures involved in the prevention and control of infection in dentistry are directed to reduce the possibility or *risk* of cross-infection occurring in the dental clinic, thereby producing a safe environment for both patients and staff. In the UK, all employers have a legal obligation under the Health and Safety at Work Act 1974 to ensure that all their employees are appropriately trained and proficient in the procedures necessary for working safely. They are also required by the *Control of Substances Hazardous to Health* (COSHH) *Regulations 2002* to review every procedure carried out by their employees which involves contact with a substance hazardous to health, including pathogenic micro-organisms. Employers and their employees are also responsible in law to ensure that any person on the premises, including patients, contractors and visitors, is not placed at any *avoidable risk*, as far as is reasonably practicable.

Thus, management of the risks associated with cross-infection is important in dentistry. We do not deal in absolutes, but our infection control measures are directed towards reducing, to an acceptable level, the probability or possibility that an infection could be transmitted. This is usually measured against the background infection rate expected in the local population, i.e. the patient,

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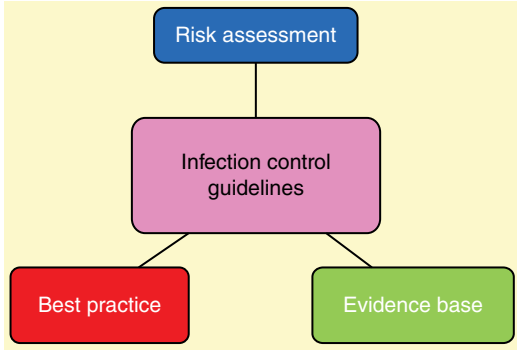

Figure 1.1 Factors influencing the development of infection control guidance in dentistry.

student or member of the dental team is placed at no increased risk of infection when entering the dental environment. Infection control guidance used in dentistry has developed from an assessment of the evidence base, consideration of the best clinical practice and risk assessment (Figure 1.1).

How we manage the prevention of cross-infection and control the risk of spread of infection in the dental clinic is the subject of this book.

RELATIVE RISK AND RISK PERCEPTION

Risk has many definitions, and the dental profession and general public's perception of risk can be widely divergent. This difference in interpretation can impact on how safe the general public perceives treatment in a dental clinic to be, especially following sensational media reports of so-called 'dirty dentists' who are accused of failing to sterilize instruments between patients or wash their hands! For example, risks under personal control, such as driving a car, are often perceived as more acceptable than the risks of travelling by airplane or train, where control is delegated to others. Thus, the public often mistakenly perceives travelling by car to be safer than by air, even though the accident statistics do not support this perception. Unseen risks such as those associated with infection, particularly if they are associated with frightening consequences such as AIDS or MRSA, are predictably most alarming to the profession and the public. Risks can be clinical, environmental, financial, economic or political, as well as those affecting public perception and reputation of the dentist or the team.

What makes risks significant? There are a number of criteria which make risks significant and worthy of concern.

- Potential for actual injury to patients or staff
- Significant occupational health and safety hazard

- The possibility of erosion of reputation or public confidence
- Potential for litigation
- Minor incidents which occur in clusters and may represent trends

Understanding what is implied by the term *hazard* is important when we consider the control of infection. This may be defined as a situation, or substance, including micro-organisms, with the potential to cause harm. Risk assessment must take into account not only the likelihood or probability that a particular hazard may affect the patient or dental staff, but also the severity of the consequences.

RISK ASSESSMENT AND THE MANAGEMENT DECISION-MAKING PROCESS

It is the role of managers of dental practices to manage risk. The Management of Health and Safety at Work Regulations 1999 require employers to carry out a risk assessment as an essential part of a risk management strategy. Infection control is an application of risk management to the dental clinical setting.

> Risk management involves identification, assessment and analysis of risks and the implementation of risk control procedures designed to eliminate or reduce the risk.

Risk control in dentistry is dependent on a single-tier approach, in which all patients are treated without discrimination as though they were potentially infectious. The practical interpretation of this concept, known as Standard Infection Control Precautions (SICPs), treats all body fluids, with the exception of sweat, as a source of infection. SICPs are a series of measures and procedures designed to prevent exposure of staff or patients to infected body fluids and secretions. Specifically, dental healthcare workers (HCWs) employ personal barriers and safe behaviours to prevent the two-way exchange of blood, saliva and respiratory secretions between patient and operator (Box 1.1).

Decisions made within an organization, and within practice, should take into account the potential risks that could directly or indirectly affect a patient's care. If risks are properly assessed, the process can help all healthcare professionals and organizations to set their priorities and improve decision making to reach an optimal balance of risk, benefit and cost. If dental teams systematically identify, assess, learn from and manage all risks and incidents, they will be able to reduce potential and actual risks, and identify opportunities to improve healthcare.

Box 1.1 Summary of standard infection control precautions

- Use of hand hygiene
- Use of gloves
- Use of facial protection (surgical masks, visors or goggles)
- Use of disposable aprons/gowns
- Prevention and management of needlestick and sharps injuries and splash incidents
- Use of respiratory hygiene and cough etiquette
- Management of used surgical drapes and uniforms
- Ensure safe waste management
- Safe handling and decontamination of dental instruments and equipment

Risk assessment has the following benefits for delivery of dental healthcare.

- Strives for the optimal balance of risk by focusing on the reduction or mitigation of risk while supporting and fostering innovation, so that greatest returns can be achieved with acceptable results, costs and risks.
- Supports better decision making through a solid understanding of all risks and their likely impact.
- Enables dentists to plan for uncertainty, with well-considered contingency plans which cope with the impact of unexpected events and increase staff, patient and public confidence in the care that is delivered.
- Helps the dentist comply with published standards and guidelines.
- Highlights weakness and vulnerability in procedures, practices and policy changes.

HOW TO PERFORM A RISK ASSESSMENT IN A DENTAL PRACTICE

A risk assessment in dental practice involves the following steps.

1. Identify the hazards.
2. Decide who might be harmed, and how.
3. Evaluate the risks arising from the hazards and decide whether existing precautions are adequate or whether more needs to be done.
4. Record your findings, focusing on the controls.
5. Review your assessment periodically and revise it if necessary.

Stage 1: Identify the hazards

- Divide your work into manageable categories.
- Concentrate on significant hazards, which could result in serious harm or affect several people.

- Ask your employees for their views; involve the whole dental team.
- Separate activities into operational stages to ensure that there are no hidden hazards.
- Make use of manufacturers' datasheets to help you spot hazards and put risks in their true perspective.
- Review past accidents and ill health records.

Stage 2: Who might be harmed?

- Identify all members of staff at risk from the significant hazard.
- Do not forget people who only come into contact with the hazard infrequently, e.g. maintenance contractors, visitors, general public and people sharing your workplace.
- Highlight those persons particularly at risk who may be more vulnerable, e.g. trainees and students, pregnant women, immunocompromised patients or staff, people with disabilities, inexperienced or temporary workers and lone workers.

Stage 3: Evaluate the level of risk

- The aim is to eliminate or reduce all risks to a low level.
- For each significant hazard, determine whether the remaining risk, after all precautions have been taken, is high, medium or low.
- Concentrate on the greatest risks first.
- Examine how work is actually carried out and identify failures to follow procedures or practices.
- Need to comply with legal requirements and standards.
- The law says that you must do what is reasonably practical to keep your workplace safe.

A numerical evaluation of risk can be made to help prioritize the need for action and allow comparison of relative risk. *Risk* is equal to *hazard severity* multiplied by *likelihood of occurrence*. Assign a score of 1–5 for each, with a total value of 16–25 equating to *high risk*, 9–15 to *medium risk* and >8 to *low risk* (Figure 1.2).

Stage 4: Record your findings

Record the significant findings of your risk assessment and include significant hazards and important conclusions. Look at how current controls and protocols could be modified to reduce the risk further. Recording can be done simply on a spreadsheet or chart. The most important outcome of any risk assessment is the control measures so focus your efforts on making sure that the control measures the dental practice employs to manage the hazards associated with cross-infection and other aspects of health and safety are sensible and effective.

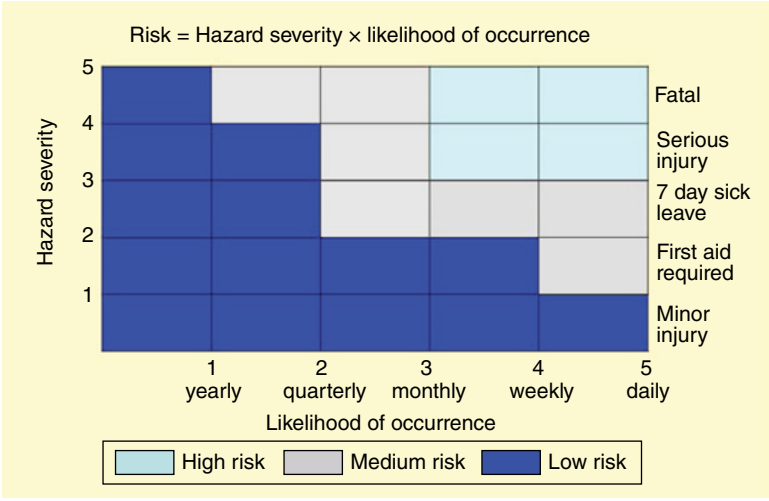

Figure 1.2 Grid showing how hazard severity and likelihood of occurrence are related to risk.

Information to be recorded includes the following points.

- Activities or work areas examined
- Hazards identified
- Persons exposed to the hazards
- Evaluation of risks and their prioritization
- Existing control measures and their effectiveness
- What additional precautions are needed and who is to take action and when

Stage 5: Review your assessment

Risk assessment is a continuing process and must be kept up to date to ensure that it takes into account new activities and hazards, changes in processes, methods of work and new employees.

You must document your findings but there is no need to show how you did your assessment, provided you can show that a proper check was made and you *asked who* might be affected, and that you dealt with all the obvious significant hazards, taking into account the *number of people* who could be involved, that the precautions taken are sensible and reasonable, and that the remaining risk is low.

HIERARCHY OF RISK MANAGEMENT CONTROL

Following a risk assessment, it is necessary to implement a plan to control the observed risk. The plan of action must set out in priority order what *additional controls are necessary*, and aim to reduce risks to an acceptable level and

comply with relevant legal requirements. You must also establish a reasonable time scale for completion and decide who is responsible for taking the necessary action.

There is a hierarchy of control options, which can be summarized as:

- elimination (buy in services/goods)
- substitution (use something less hazardous/risky)
- enclosure (enclose to eliminate/control risks)
- guarding/segregation (people/machines)
- safe systems of work (reduce system to an acceptable level)
- written procedures that are known and understood by those affected
- adequate supervision
- identification of training needs and implementation
- information/instruction (signs, handouts, policies)
- personal protective equipment (PPE).

These control measures can be applied as judged appropriate following the findings of the risk assessment, taking into account the legal requirements and standards, affordability and the views of the dental team.

INFECTION CONTROL AND THE LAW

Laws relating to infection control can arise from legal Acts and orders from the individual county or as European Union directives. A distinction must be made between Acts of Parliament, regulations and approved codes of practice and technical advice.

Regulations are laws, approved by the national legislative body. In the UK, the *Health and Safety at Work Act 1974* and in England the *Health and Social Care Act 2008 (Regulated Activities) Regulations 2014* are two primary legislative instruments that embrace all the major regulations, EU directives and technical guidance, for example COSHH, RIDDOR, HTM01-05 (decontamination in primary dental care), HTM07-01 (waste management), etc., that govern the way infection control and cleanliness are achieved in the dental surgery.

The Health and Safety at Work Act and general duties in the management regulations are goal setting and give employers the freedom to decide how to control risks which they identify. However, some risks are so great or the proper control measures so costly that it would not be appropriate to leave the discretion with the employer to decide what to do about regulating them. The Act and Regulations identify these risks and set out specific actions that must be taken. Often, these requirements are absolute – to do something without qualification by deciding whether it is reasonably practicable.

Approved codes of practice (ACOP) offer an interpretation of the Regulations with practical examples of good practice. ACOPs give advice on how to comply with the law by, for example, providing a guide to what is 'reasonably practicable'. For example, if regulations use words like 'suitable and sufficient', an ACOP can illustrate what this requires in particular circumstances. So, if you follow the guidance in the ACOP you will be doing enough to comply with the law. ACOPs have a special *legal status,* which utilizes a reverse burden of proof. 'If employers are prosecuted for a breach of health and safety law, and it is proved that they have not followed the relevant provisions of the ACOP, a court can find them at fault unless they show that they have complied with the law in some other way.'

LEGAL ACTS UNDER WHICH DENTAL PRACTICE IS CONDUCTED

Health and Social Care Act 2008 (Regulated Activities) Regulations 2014

The Health and Social Care Act (HSCA) laid down the framework for provision of new organizational structures and means of commissioning and providing NHS health services in England. The Care Quality Commission (CQC) came into effect on 1 April 2009 and was established by the HSCA to regulate the quality of health and social care. Registration and inspection of dental practices are managed separately in Wales, Scotland and Northern Ireland.

For primary care dental services in England, registration with the CQC as a provider or manager was required from 1 April 2011. It is illegal and therefore a criminal offence for any primary care dental service to carry out any regulated activities unless it is registered with the CQC. Once registered, providers are monitored by the CQC and must comply with any conditions of registration. CQC inspections report on whether the dental services provided are *safe*, *effective*, *caring*, *responsive* and *well led* in relation to a standard set of key lines of enquiry (KLOE), which include 'cleanliness and infection control'. The CQC benchmark for assessing cleanliness and infection control is the HSCA-Approved Code of Practice 2015 which comprises 10 criteria for delivering infection control and prevention across healthcare, including dentistry.

Antimicrobial stewardship in dentistry

Criterion 3 of the HSCA-ACOP relates to antimicrobial stewardship and antimicrobial prescribing. Inclusion of this criterion alongside infection control measures reflects an expedient response to the dramatic rise in antimicrobial resistance worldwide over the last decade, coupled with stagnation in the

Box 1.2 Basic principles for antibiotic stewardship in dental practice

- Systems should be in place to manage and monitor the use of antimicrobials to ensure inappropriate use is minimized.
- Patients should be treated promptly with the correct antibiotic, at the correct dose and duration whilst minimising toxicity (e.g. allergic reactions) and minimising conditions for the selection of resistant bacterial strains.
- These systems should draw on published national and local guidelines, monitoring and audit tools, for example: BNF (DPF), NICE, Faculty of General Dental Practice UK guidance on antimicrobial prescribing for general dental practitioners (Open Standards).
- Providers should ensure that all dental prescribers receive induction and training in antibiotic use and stewardship.

Source: HSCA-ACOP criterion 3.

development of new classes of antibiotics to manage micro-organisms resistant to first-line treatments. In the UK, nearly 70% of dental prescribing of drugs is for antibiotics and research has shown that approximately 50% of dentists overuse antibiotics or are guilty of poor prescribing practices. Box 1.2 outlines the basic principles for setting up antimicrobial stewardship in dental practice.

Health and Safety at Work Act 1974

In the UK, the Health and Safety at Work Act (HSWA) requires a safe working environment and sets the precedent from which all other health and safety regulations follow. Employers have a duty under the law to ensure, 'so far as is reasonably practicable', the health, safety and welfare of their staff and members of the public at their place of work. The HSWA is periodically updated. The *Management of Health and Safety at Work Regulations (MHSWR) 1999* made more explicit what employers are required to do to manage health and safety. MHSWR place the legal responsibility for health and safety primarily with the employer. In particular, this Act required employers to look at the risks in their workplace and take sensible measures to tackle them, i.e. to carry out risk assessments as discussed above. It is the duty of the employer to *consult with staff* on matters which may impact on their health and safety at work, including:

- any change which may substantially affect their health and safety at work, e.g. in procedures, equipment or ways of working
- the employer's arrangements for getting competent people to help him/her satisfy health and safety laws

- the information you have to be given on the likely risks and dangers arising from your work, measures to reduce or get rid of these risks and what you should do if you have to deal with a risk or danger
- the planning of health and safety
- the health and safety consequences of introducing new technology.

The duties of employers under this law include:

- making the workplace safe and without risks to health
- ensuring plant and machinery are safe and that safe systems of work are set and followed
- ensuring articles and substances are moved, stored and used safely
- providing adequate welfare facilities
- giving the information, instruction, training and supervision necessary for the health and safety of staff and the public.

Control of Substances Hazardous to Health Regulations 2002

The law requires employers to control exposure to hazardous substances to prevent ill health. They have to protect both employees and others who may be exposed by complying with the COSHH regulations. COSHH is a useful tool of good management which sets basic measures, with a simple step-by-step approach, that employers, and sometimes employees, must take which will help to assess risks, implement any measures needed to control exposure and establish good working practices.

> Note that hazardous substances include not only chemicals such as mercury, solvents and the materials used in dentistry, but also biological agents such as bacteria and other micro-organisms.

The Regulations require COSHH risk assessment to be made on all the materials used in dental practice.

Under the Regulations, where it is not reasonably practicable to prevent exposure to a substance hazardous to health via elimination or substitution, then the hazard must be adequately controlled by 'applying protection measures appropriate to the activity and consistent with the risk assessment'. Where members of the dental team or students are treating individuals known or suspected to be infected with a micro-organism spread by the air-borne route, then protective measures would include adequate ventilation systems and the provision of suitable personal protective equipment (PPE). The legislation requires employers to provide PPE that affords adequate protection against the risks associated with the task being undertaken. Conversely, COSHH