HEALTH TECHNICAL MEMORANDUM 05- 03

FIRECODE

Part A: General fire safety

2011

STATUS IN WALES

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It will eventually be superseded by a new Welsh Health Technical Memorandum

GIG CYMRU NHS WALES
Partneriaeth Cydwasanaethau
Gwasanaethau Cyfleusterau
Shared Services Partnership
Facilities Services

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Shared Services Partnership
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Part A: General fire safety
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Operational provisions manuals - Part A: General fire safety 1827:0.2:Wales

Contents

Overview

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The Firecode Operational provisions manuals include:

* **Part A – General fire safety (available in web format)**
* Part B – Fire detection and alarm systems
* Part C – Textiles and furnishings
* **Part D – Commercial enterprises on healthcare premises (available in web format)**
* Part E – Escape lifts in healthcare premises
* **Part F – The prevention and control of arson in NHS healthcare premises (available in web format)**
* Part G – Laboratories on healthcare premises
* **Part H – Reducing false alarms in healthcare premises (available in web format)**
* Part J – Guidance on fire engineering of healthcare premises
* **Part K – Guidance on fire risk assessments in complex healthcare premises (available in web format)**
* Part L – NHS fire statistics 1994/95–2004/05
* **Part M – Fire safety in atria (available in web format)**

General

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The primary remit of healthcare providers with regard to fire safety is the protection of patients, visitors and health service staff from the effects of fire. For the application of effective fire precautions in healthcare premises, healthcare organisations will need to select a combination of measures to produce a fire-safe design, taking the following points into account:

1. all statutes and guidance relevant to the scheme as a whole;
2. this manual and other associated Firecode manuals;
3. the advice and approval of local building control and fire and rescue authorities;
4. the advice of healthcare staff (estates staff, healthcare fire safety managers and advisers etc).

This manual is an important component of the Firecode suite. It covers a range of general fire safety measures that apply throughout healthcare premises and should be read in conjunction with other manuals in the Firecode suite.

Scope

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This manual is concerned with the importance of general fire precautions that are specific to healthcare premises. In particular, it draws attention to the key role of management:

* in devising and implementing policies and programmes for dealing with the life-threatening situations presented by fire in an extremely vulnerable environment; and
* for ensuring that staff at all levels receive appropriate and regular training in fire safety and evacuation procedures.

The trained staff referred to in this manual are those trained in fire safety procedures and practices appropriate to the workplace.

The important role of staff in fire prevention and in responding promptly and effectively in the event of a fire cannot be over-emphasised. Prompt action is the most crucial element in saving lives and minimising damage to property.

Background

1846

Few people have first-hand experience of a serious fire; yet all appreciate the threat it presents and the terror it brings when an outbreak becomes uncontrollable. This effect is heightened when patients are involved whose observation and mobility are

impaired by illness or disability. A special responsibility therefore devolves on healthcare management in relation to fire safety in their premises.

Statistics on fires occurring in healthcare premises should be treated with caution, as some incidents fail to get reported. Health Technical Memorandum 05-03 Part L – 'NHS fire statistics 1994/5–2004/5' contains more information.

A life-threatening fire is one that results in casualties and/or rescue, or where evacuation is necessary. Fortunately, only a very small proportion of fires in healthcare premises fall into this category. However, the potential for a serious fire indicates the need for adequate staffing in wards, particularly at night.

The dangers of smoke logging resulting from the lack of provision or ineffective use of fire doors and the use of non-flame-retardant bedding and textiles can contribute to the seriousness of a fire. However, comparatively few very serious fires occur, and this is partly attributable to the vigilance, skill and fire safety training of the staff who work in those locations.

Apart from the risk to life, a serious fire disrupts treatment and causes damage to property. While most healthcare fires do not spread beyond the ward or room in which they start, the financial and organisational consequences from fire damage can be considerable, often costing many thousands of pounds, particularly if specialised equipment is involved. With their limited resources, healthcare organisations cannot afford the unnecessary costs of fire damage.

The importance of suitable passive and active fire protection is addressed in Health Technical Memorandum 05-02 – 'Guidance to support functional provisions in healthcare premises'. This form of protection can only be effective after a fire has broken out.

Equal, if not greater, attention should be paid to the prevention of fire and to the need for speedy and effective response to an outbreak. The provision of fire-retardant furniture, furnishings and textiles (see Health Technical Memorandum 05-03 Part C – 'Textiles and furnishings') is another important measure. These measures complement, but are not a substitute for, active and passive fire precautions.

The provision of adequate means of escape for users of the premises is a statutory requirement. Means of escape becomes crucial once a fire has taken hold. In most buildings, the basic principle for escape in the event of fire is that the occupants can always turn their backs to the fire and travel away from it directly by way of circulation spaces, other fire compartments, escape routes and stairways to a place of safety, if necessary outside the building. Alternative escape routes leading directly to a place of safety are necessary. All this follows the principle of progressive horizontal evacuation.

Fire safety in healthcare premises is the concern of all those who work in those premises. Everyone from the chief executive downwards has a responsibility to:

* understand the characteristics of fire, smoke and toxic fumes;
* know the fire hazards of their working environment; and
* practise and promote fire safety and react instinctively should fire occur.

The unpredictability of human behaviour, particularly in an emergency, should not be underestimated. Attention to the detail of fire safety will control the number of outbreaks, save lives, and reduce the resources spent restoring fire-damaged buildings and equipment, thereby improving patient care.

Health Technical Memorandum 05-03 Part L – 'NHS fire statistics 1994/5–2004/5'
Health Technical Memorandum 05-02 – 'Guidance to support functional provisions in healthcare premises'
Health Technical Memorandum 05-03 Part C – 'Textiles and furnishings'

Fire safety policies and staffing levels

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Note

This section should be read in conjunction with the guidance contained in Health Technical Memorandum 05-01 – ‘Managing healthcare fire safety’.

Health Technical Memorandum 05-01 – 'Managing healthcare fire safety'

Fire safety policies

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Chief executives are to have clearly defined fire safety policies for all premises under their control. This will include a carefully prepared programme for dealing with fire prevention, fire-fighting and the movement or evacuation of patients in an emergency. The programme involves the implementation of physical precautionary measures to prevent the occurrence and spread of fires, and the provision of means for dealing with such outbreaks in accordance with statutory and Firecode objectives.

The policies should also include the instruction and cooperation of every member of staff, professional and administrative, to ensure a clear understanding of their role in taking effective emergency action.

Essential to any fire safety policy is the preparation of an operational strategy for immediate implementation when a fire emergency arises. This should define the emergency procedures and is one of the most important features of a fire policy. Staff should be familiar with any policy, operational strategy and emergency procedures.

The operational strategy should be prepared to suit the circumstances of individual premises.

Responsibility for drawing up and maintaining comprehensive fire precautions, safety policies and programmes of improvement rests principally with the fire safety manager. He/she will be assisted by managers at each appropriate level and, where employed, by healthcare fire safety advisers in accordance with the guidance in Health Technical Memorandum 05-01.

Preparation of a fire safety policy requires teamwork because of the complexities of a healthcare organisation, and there should be a multidisciplinary approach to the consideration of proposals for particular premises. Managers and healthcare fire

safety advisers should consult with administrative, medical, nursing and estates experts when formulating or amending fire safety policies.

Senior managers who delegate particular duties to supporting staff should be informed regularly that the arrangements continue to be satisfactory. Difficulties and deficiencies should be brought to their notice without delay.

It is important that policies and plans produced in accordance with the foregoing paragraphs are reviewed regularly so that physical changes in the healthcare organisation's structure, changes of function, procedures and other matters that have a bearing on fire safety can be taken into account promptly.

The healthcare organisation's board has a particular responsibility in respect of all staff, including agency, bank and other part-time staff employed in patient-care areas of healthcare premises.

There should be a procedure in place to ensure that fire safety training is given to such staff immediately at their first attendance in an unfamiliar place of work, such as a ward or department.

Staff should be aware of:

* fire-alarm call points;
* the location of first-aid fire-fighting appliances;
* the boundaries of the fire compartments;
* fire doors; and
* escape routes.

They should also be given an explanation of the evacuation strategy for the location.

Staffing levels 1850

The best first line of defence against fire is the presence of an adequate number of staff who have received specialised training in fire safety. This is particularly important at night when:

* levels of activity in a healthcare facility may be reduced;
* staffing levels are lower; and
* detection of an outbreak of fire may be delayed.

Trained staff should be able to respond promptly and effectively to any fire emergency; this is a vital factor in limiting the consequences of an outbreak where dependent patients are involved.

The medical and nursing needs of in-patients usually mean that a minimum of two staff are on duty at all times. However, an adequate number of staff should be available at all times to implement the healthcare organisation's evacuation

strategy, which should not be reliant on external resources. These staff should be trained in the methods of patient evacuation appropriate to the clinical dependency of those under their care. The number of staff may need to be increased:

* if the patients are highly dependent; and/or
* to ensure that there are at least two trained people quickly available at all times (for example during meal breaks) to carry out evacuation procedures in the event of fire.

It is the responsibility of management to achieve an agreed safe level of staffing sufficient to deal with the consequences of a fire in its early stages. All staff (including agency, bank or other part-time staff) should be trained in patient evacuation methods. Any staff member who has not been trained should be under the direction of a fully trained staff member. Unless other specific arrangements have been made, the senior nurse should be responsible for taking the initiative until relieved.

It is the responsibility of management to have an operational policy to ensure that, in the event of fire, additional personnel may be mobilised rapidly to assist in the fire zone.

Where a healthcare organisation has established one or more small premises located remotely from its main sites – perhaps accommodating a few patients under the care of a small number of nursing staff – it should have an operational policy that takes into account the circumstances of the location and which satisfies the guidance in both this manual and Health Technical Memorandum 05-01.

In accordance with the guidance of Health Technical Memorandum 05-01, it may be appropriate to nominate a fire safety manager, who is primarily responsible for ensuring that trained staff will be available should an outbreak of fire occur at any time.

The provision of fire safety advisers is a matter that healthcare organisations should consider in the light of their particular circumstances.

Note

In line with the Regulatory Reform (Fire Safety) Order 2005, Firecode strongly recommends that competent healthcare fire safety advisers are appointed to advise management and to report on the means of fulfilling existing, forthcoming statutory and Firecode obligations in all healthcare premises.

Fire safety audits 6625

Healthcare organisations should confirm annually that their management policies regarding fire safety comply with the provisions of Health Technical Memorandum 05-01.

To fulfill this, NHS organisations must conduct and submit annual fire audits utilising the online Fire Audit Information System. The purpose of the audit is to:

* monitor compliance with statutory requirements and Firecode;
* identify weaknesses in compliance;
* set up remedial programmes; and
* allocate sufficient resources within the framework of their business plans.

The processes for a fire safety audit will differ from those for fire risk assessments as required by the Regulatory Reform (Fire Safety) Order 2005. Risk assessment first identifies fire hazards and the particular risks they present to the occupants of a healthcare facility. Following a thorough assessment of the risks, effective fire precautions are arranged to match the level of fire risk. A fire safety audit would verify that these fire precautions, once in place, are being maintained effectively.

The audit should be systematic and cover all aspects of fire safety including physical precautions, staffing arrangements and management systems. The audit must be carried out by competent staff employed by the healthcare organisation.

Where required, validation checks should be included in the audits. For example:

* documentary evidence supporting the fire precautions policy should be examined;
* the visual integrity of cavity barriers, fire stopping etc should be verified; and
* remedial actions should be initiated where necessary.

Particular aspects covered by the audit include:

* the acceptance of responsibilities set for fire safety, as set out in Health Technical Memorandum 05-01, by the chief executive/board level director etc;
* written fire safety policies for all healthcare premises;
* nomination of a board level director having responsibility for fire safety;
* nomination of a fire safety manager;
* appointment of competent healthcare fire safety advisers;
* a rolling programme for installing and maintaining an adequate level of fire precautions for each of the healthcare organisation’s premises, for inclusion in the annual business plans for each premises;
* a regular review and updating of fire safety policies and emergency procedures;
* risk assessments to ensure compliance with the Regulatory Reform (Fire Safety) Order 2005;
* procedures for reporting serious fires in accordance with Health Technical Memorandum 05-01;

* training of staff in accordance with Health Technical Memorandum 05-01;
* procedures for alerting the fire-and-rescue service in the event of a fire in accordance with Health Technical Memorandum 05-03 Part B – ‘Fire detection and alarm systems’;
* regular testing and recording of the condition and effectiveness of fire alarm and detection systems and extinguishment systems;
* regular checking and recording of the condition of first-aid fire-fighting equipment;
* regular checking of the effectiveness of escape lighting and the presence and validity of fire drawings, indicating means of escape, physical fire precautions etc;
* procedures for issuing “hot work” permits, and the control and use of flammable materials (for example adhesives) within healthcare premises;
* appropriate procedures for consultation with local fire and building control authorities;
* correct procedures for the storage of flammable liquids;
* practice of evacuation techniques involving the use of escape bed lifts (provided in accordance with Health Technical Memorandum 05-03 Part E – ‘Escape lifts in healthcare premises’);
* provisions for commercial premises (see Firecode Operational provisions manual Part D – ‘Commercial enterprises on healthcare premises’);
* fire safety in staff residences (houses in multiple occupation);
* policies for purchasing flame-retardant textiles and furniture (Health Technical Memorandum 05-03 Part C – 'Textiles and furnishings').

Part D: Commercial enterprises on healthcare premises
Online Fire Audit Information System
Health Technical Memorandum 05-03 Part B – ‘Fire detection and alarm systems’
Health Technical Memorandum 05-03 Part E – ‘Escape lifts in healthcare premises’
Health Technical Memorandum 05-03 Part C – 'Textiles and furnishings'
Regulatory Reform (Fire Safety) Order 2005

Competent persons 1857

Wherever a competent person in respect of fire safety is recommended within a Firecode manual, the following definition applies:

Competent person: a person recognised as having sufficient technical training and actual experience, or technical knowledge and other qualities both to understand fully the dangers involved, and to undertake properly the statutory and Firecode provisions referred to in this manual.

Fire prevention 1858

General 7620

The spread of fire can be limited by the incorporation of structural fire precautions and the use of flame-retardant textiles and furnishing materials. However, the likelihood of fires starting can be reduced significantly if suitable preventive measures are adopted.

Good practice in fire prevention is largely a matter of awareness through training of the ways in which fires can start and of the upkeep of orderliness and tidiness in day-to-day activities (that is, good housekeeping).

The fire safety manager (or nominated deputy) should walk through the premises on a regular basis to ensure compliance with this part of the manual.

Healthcare premises contain large quantities of flammable material, but they are not in general considered to constitute a high fire risk. Staff are always on duty and fire incidents are normally discovered quickly, enabling prompt action to be taken. In patient treatment and accommodation areas, for example, no time need be lost if suitable first-aid fire-fighting equipment is provided and staff on duty know how to use it (if it is safe to do so).

Certain locations in healthcare premises (for example laboratories and pharmacies, medical gas stores, main kitchens, laundries, boilerhouses, workshops, stores and shops in foyers) carry higher fire loadings and pose greater fire risks, and it is in such locations that fires may occur, gain a hold and lead to considerable damage. These areas should be located separately, but where they are within or adjacent to areas to which patients or staff have regular access, they require special attention when structural fire precautions, fire alarm and detection facilities, and fire suppression measures are being planned.

Important aspects of fire prevention in healthcare premises include:

* the need to recognise fire risks from the increasing possibility of arson; and
* the application of good-housekeeping practices by all staff.

While smoking is no longer permitted in enclosed buildings, there may be some areas where it is permitted (for example long-stay mental health facilities). In these circumstances, due regard should be taken of the fire risk this poses.

Good housekeeping 7621

Attention to good-housekeeping practices can reduce the likelihood of fire. Some of the particular practices that should be recognised and implemented to protect against fire risks are (this list is not exhaustive):

* orderly methods of stacking in stores where linen, paper or plastic packaging is used, to reduce the risk of fire spread and to assist fire-fighting;
* storage of equipment and packages in designated areas only – not in plantrooms, services voids and shafts, corridors or lobbies;
* regular checks to ensure that storage is never permitted in a healthcare street or an escape route, nor near a fire exit or fire-fighting equipment;
* positively discouraging the drying of items over heaters having radiant heat sources, which can lead to dangerously high temperatures and possible ignition;
* regular checks for the accumulation of rubbish in out-of-sight spaces such as lift wells, behind radiators, basements, dead-end corridors etc. Waste and unauthorised storage ought to be dealt with promptly;
* regular cleaning of workplaces, machinery and equipment spaces, and checks for the accumulation of fluff and grease deposits in laundries, main kitchens and similar areas;
* removal of unfused multiple-point adaptors found in socket-outlets (staff should be warned about their use – see WAG DH Estates & Facilities Alert No (2007) 006);
* prohibition of unauthorised adjustment or repair to electrical equipment, and no use of official, unofficial or private electrical equipment until it has been checked and approved by the appropriate technical staff. The connection of 13-amp plugs should only be undertaken by technical staff;
* implementation of portable appliance testing (PAT);
* regular checking of electrical cables and cords for signs of wear, and the immediate withdrawal from service of any suspect electrical equipment, which should be reported to the officer responsible for electrical maintenance.

Reference should also be made to 'Firecode operational provisions manual Part F: Arson prevention in NHS premises'.

Part F: Arson prevention in NHS premises
WAG DH Estates & Facilities Alert No (2007) 006)

Management of waste 1863

This section relates only to the fire-precaution aspects of waste and its disposal (see Health Technical Memorandum 07-01 – ‘Safe management of healthcare waste’ for general guidance on the management of healthcare waste).

Managers should aim to have policies in place for the safe storage and prompt disposal of waste that accumulates over a 24-hour period.

Waste should be stored in secure receptacles such as imperforate non-flammable or metallic bins, with well-fitting lids.

To deter arson, loaded receptacles should be taken away to designated secure places – remote from patient-care areas – to await disposal.

Unattended waste should not be stored or left in underground tunnels, walkways and basement areas or on stairways and corridors.

Escape routes should be kept clear at all times.

Waste disposal chutes, where provided, should be maintained under constant supervision. Any redundant chutes that connect basement zones with floors above may constitute a serious fire and smoke risk and should be sealed off in the basement and at each floor level with fire- and smoke-resisting seals.

An efficient procedure should be established for the collection and disposal, or recycling, of combustible waste. Such waste might include, for example, packing cases, packaging materials, clinical and food packaging and other waste products left over from works activities etc.

The continuing increase in the use of disposable items, many of which are of a combustible nature, emphasises the need for diligence and for prompt removal to designated places of storage and disposal.

Health Technical Memorandum 07-01 – ‘Safe management of healthcare waste’

Dangerous substances and explosive atmospheres

6681

The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) require employers to control the risks to safety from fire and explosions.

Dangerous substances can put peoples’ safety at risk from fire and explosion. DSEAR puts duties on employers and the self-employed to protect people from risks to their safety from fires, explosions and similar events in the workplace.

Dangerous substances are any substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion. They can be found in nearly all workplaces and include such things as solvents, paints, varnishes, flammable gases, such as liquid petroleum gas (LPG), dusts from machining and sanding operations and dusts from foodstuffs.

Accordingly, employers must:

* find out what dangerous substances are in their workplace and what the fire and explosion risks are;
* put control measures in place to either remove those risks or, where this is not possible, control them;
* put controls in place to reduce the effects of any incidents involving dangerous substances;
* prepare plans and procedures to deal with accidents, incidents and emergencies involving dangerous substances;
* make sure employees are properly informed about and trained to control or deal with the risks from the dangerous substances;
* identify and classify areas of the workplace where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas.

The risks and control measures identified through DSEAR assessments should be interfaced with the fire risk assessments as required by the Regulatory Reform (Fire Safety) Order 2005.

Safe storage of flammable liquids 6683

The safe storage of flammable liquids in healthcare premises should follow the principles contained in the Health and Safety Executive's HSG51 – 'The storage of flammable liquids in containers'. The quantities of flammable and highly-flammable liquids kept in departments should be as small as is reasonably practicable for the day-to-day purposes of the department.

The safe disposal of unwanted small quantities of flammable or highly-flammable liquids should be entrusted to competent persons acting with the knowledge of the healthcare fire safety adviser.

It may be possible to achieve disposal by safely burning highly-flammable liquids in suitable shallow metal trays in the open air, at safe locations remote from buildings, flammable storage areas and drains. The opportunity might be taken to combine this activity with a staff training session in first-aid fire-fighting.

Highly-flammable liquids and many solutions and reagents used in pathology laboratories should never be disposed of down sinks, gulleys and drains, as this practice can cause explosions, injury and damage.

Underground locations 1866

Fires in underground premises (for example ducts, subways) or parts of premises can go unnoticed and – owing to reduced ventilation – can present a special hazard from the resulting build-up of smoke, toxic gases and heat.

The following fire precautions are applicable to underground or windowless premises:

* flammable storage should be arranged in such a way that the fire-risk potential is minimised;
* where possible, access should be arranged directly from the open air;
* areas containing significant fire risks should be segregated by fire-resisting construction from the remainder of the premises, and be equipped with automatic fire detection or, where justified, with fixed fire-fighting equipment appropriate to the assessed risk;
* designated means of escape should be provided for occupants and maintenance staff, and means of giving and receiving fire warnings should be provided as a separate zone off the main healthcare fire-alarm system;
* ventilation systems should be so arranged as to minimise the risk of their spreading fire, smoke and toxic fumes throughout the area or affecting other parts of the premises;
* the local fire authority should be consulted as to the adequacy of smoke outlets and access for fire-fighting.

(See also Health Technical Memorandum 05-02.)

Note

Further guidance can also be found in BS 8313:1997. This gives recommendations for the design, construction, installation and maintenance of fixed ducts in buildings for the accommodation of services, including fire precautions advice.

Health Technical Memorandum 05-02 – 'Guidance in support of functional provisions for healthcare premises'

Lightning protection 7055

The necessity of lightning protection should be determined either at design stage or through the risk assessment process. Where installed, the complete system should be maintained in accordance with the appropriate British/European standard (BS EN 62305-3:2006).

Fire safety training for all staff in healthcare premises 1869

General 1871

The management of fire safety training is dealt with in Health Technical Memorandum 05-01 and is a statutory duty under the Regulatory Reform (Fire Safety) Order 2005 and the Health and Safety at Work etc Act 1974.

Efficient application of fire safety procedures is subject to staff knowing what to do. Healthcare organisations are required, both under law and under the provisions of Firecode, to provide effective training in fire safety and on how to respond to an outbreak of fire. **This applies to all staff without exception.**

Senior medical and managerial staff should lead by example. This is of vital importance, and it is the duty of senior managers of all disciplines to ensure that their staff receive both basic instruction in fire safety and further training appropriate to the specific needs of their workplace.

Every member of staff in premises providing healthcare should:

* understand the characteristics of fire, smoke and toxic fumes;
* know the fire hazards involved in the working environment;
* be aware of the significant findings of relevant fire risk assessments;
* practise and promote fire prevention;
* know instinctively the right action to take if fire breaks out or if smoke is detected;
* be familiar with the evacuation procedures and associated escape routes at their location and at their time of duty;
* take part in practical training sessions, which should include evacuation techniques.

Health Technical Memorandum 05-01 – 'Managing healthcare fire safety'
Regulatory Reform (Fire Safety) Order 2005

Fire safety training 7057

Fire, with smoke and toxic fumes, can develop rapidly and cause confusion and panic. Training should emphasise the need for quick and disciplined responses when a fire is discovered.

All staff, including part-time and agency staff, should attend a local fire-safety training course to include the first-aid fire-fighting and emergency evacuation

procedures appropriate to their workplace. This training should take place immediately on appointment and ideally be repeated at least once more in their first period of 12 months.

The duration of this training should reflect the nature of the training and instruction being provided. Thereafter, training should be based on a training-needs analysis, which may require some staff to receive more frequent training. For example, those staff involved in direct patient care will normally require instruction on evacuation more than once a year.

Training for staff on night duty is particularly important in view of the reduced level of staffing which applies at that time. See also Health Technical Memorandum 05-01 and BS 9999:2008 'Code of practice for fire safety in the design, management and use of buildings' for further guidance.

The frequency and duration of refresher fire-safety training should take account of:

* the significant findings of fire risk assessments carried out as a statutory duty under the Regulatory Reform (Fire Safety) Order 2005;
* the fire evacuation strategy for the workplace;
* the need to be familiar with fire evacuation aids;
* changes that may have taken place to the layout of the workplace;
* changes that may have taken place in staffing levels and/or patient care;
* changes to the use of the workplace;
* the role staff are expected to perform in a fire emergency.

Staff should understand the action to take in the event of fire, which will include some or all of the following:

* raise the alarm, inform the main telephone switchboard and request assistance;
* remove patients (and others) in immediate danger to a place of safety;
* fight the fire with approved equipment, but only if it is safe to do so and staff have been properly trained;
* evacuate the area in accordance with the emergency evacuation plan;
* close all doors, windows, hatches etc to prevent further spread of fire, smoke and toxic fumes.

An effective fire-safety training policy will enable staff to learn about and practise basic actions, and to appreciate the wider implications of the fire safety strategy, including:

* the reasons for fire and smoke compartmentation of buildings and for protected escape routes to the open air;

* the importance of ensuring that the intended functions of fire/smoke doors are not prejudiced by the dangerous practice of wedging them in the open position;
* the significant findings of relevant fire risk assessments;
* the dangers of locking fire-exit doors – generally, no fire-exit door on any escape route should be secured by a means requiring the use of a key or digital keypad for egress (see also 'Firecode operational provisions manual Part K: Guidance on fire risk assessments in complex healthcare premises');
* the need for a clear procedure for allowing contractors to work within healthcare premises;
* the need to be familiar with escape routes, site layout, and the internal layout of the premises in which they work and reside, and to recognise the need to keep escape routes free of obstruction and rubbish;
* the potentially fatal consequences of the spread of fire, smoke and toxic gases;
* the fire hazards of their local environment and the need for vigilance;
* how to recognise signs of fire;
* how to raise the alarm, initiate communication with the fire-and-rescue service, and how to activate local procedures for dealing with a fire;
* in general, when and how to undertake first-aid firefighting, where the equipment is located, which equipment to use and how it should be operated;
* the circumstances in which patients (and others) should be removed to a place of safety and how evacuation should be carried out.

The use of e-learning is a rapidly developing area and may offer a number of benefits to an organisation. However, e-learning is not acceptable as the sole means of training staff. E-learning can only be used to support training delivered by a competent fire safety adviser.

In extreme circumstances where a member of staff cannot be made available for training delivered by the fire safety adviser (due, for example, to long-term sickness), the use of e-learning may be considered as a temporary alternative. However, no member of staff should go without training conducted by the fire safety adviser for longer than two years. Therefore, staff should not receive refresher training via e-learning more than once in a two-year period.

Note

With regard to staff working permanent night-duty – this does not constitute extreme circumstances.

E-learning is not acceptable as the sole means of training for the following reasons:

* it does not take account of significant findings from fire risk assessments;
* it does not take account of changes in working practice;
* it cannot adequately train staff in evacuation techniques, particularly those involving patient evacuation;
* it is unlikely to provide for job-specific training.

Additional training should be provided to meet the special needs of particular locations and for those staff who have special responsibilities. Examples are:

* nursing staff and any others who may have to assist in the evacuation of patients should receive instruction and training in appropriate methods of evacuation – that is, techniques for moving and assisting patients (and others) to evacuate quickly in an emergency. The special problems of moving patients from critical care areas and similar locations where highly-dependent people are cared for should be well-rehearsed;
* telephone switchboard operators should be instructed and trained in the actions they should take in the event of fire in the healthcare premises – that is, communicating with the fire-and-rescue service in accordance with guidance in Health Technical Memorandum 05-03 Part B;
* estates staff need to have precise instructions for dealing with the safe control and isolation of services such as gas, water, electricity, ventilation, piped medical gases etc, which they may need to control during a fire. (This also applies to staff in the main kitchens of healthcare premises, for example.)

Consideration should be given to the establishment of a fire-training unit for the purpose of training staff in fire safety procedures. Such a facility may prove economical for a large healthcare site, where a fire-training unit would be under the care of the healthcare fire safety adviser. The unit would supplement the standard training in fire safety and evacuation procedures by providing those parts of fire-safety training that would be impracticable to undertake at a work location.

Trainers 1873

Firecode policy is for chief executives to nominate (and where necessary appoint, for example, competent fire safety advisers) staff with specific roles in fire safety. The Regulatory Reform (Fire Safety) Order 2005 requires the responsible person to appoint one or more competent persons to assist in the undertaking of preventive and protective measures. The responsible person is regarded as the employer.

Under Firecode, the primary responsibility for ensuring that there is an effective policy for training all staff in fire safety procedures rests with the board level director assisted by the fire safety manager, who should receive suitable training prior to assuming their duties.

Staff delivering training should have the necessary competence, and if called upon to do so, should be able to demonstrate their competence.

Regulatory Reform (Fire Safety) Order 2005

Recording and assessing training programmes 1874

The training programme should include practical sessions and fire drills to supplement classroom instruction. Training sessions should be well-publicised, and arrangements made in good time for the release of staff.

In order to identify individual staff members' training needs and to verify that training has been completed (should the need arise), records should be kept of:

* staff attending instruction;
* the dates and duration of the instruction;
* the nature of training given; and
* the names of those attending and those instructing.

Assessing the effectiveness of training schemes is important but often difficult to carry out with certainty. The fire safety manager in conjunction with healthcare fire safety advisers should, on a regular basis (but normally no less than every two years), devise methods of testing staff.

It is likely that the practical performance of staff at training will offer the best indication of the effectiveness of a programme and the degree to which staff have assimilated instruction.

The recording system should enable the fire safety manager to oversee training programmes effectively and check that training goals have been met, including those for part-time, agency and night-duty staff.

Line managers are responsible for recording staff attendance at training sessions.

Any training delivered by e-learning should be completed within one month of the session commencing. Any session not completed within the month should result in the e-learning programme being recommenced.

Fire drills 1904

The effectiveness both of emergency plans for dealing with a fire and of various aspects of fire safety training should be tested by means of practical fire drills, preferably both day and night.

The frequency and organisation of such exercises is a matter for local management. It is recommended that they take place at least once a year and simulate conditions in which at least one of the escape routes is deemed to be obstructed by fire or smoke.

The progress of drills should be monitored by specially-nominated, competent staff.

Records giving details of the drills and their outcome should be kept.

During drills, the member of staff who is told of the supposed outbreak should operate the fire alarm, and thereafter the fire routine should be rehearsed as fully as circumstances allow.

Drills should not endanger those taking part.

Fire hazards in healthcare premises and associated precautions

1876

1905

Certain healthcare locations may carry higher fire risks and therefore require special attention when fire precautions are being planned. This section considers these locations and their associated services in more detail.

Main kitchens 1907

Ventilation and extraction systems 1916

The mechanical ventilation to a hospital main kitchen can exacerbate the consequences of a fire, and its design should be such as to contain any extensive damage from smoke and toxicity, if a fire occurs. The provision of a mechanical ventilation system to the main cooking area of a kitchen is essential, and it should be separate from, and independent of, those serving other hospital departments. See also the Fire Protection Association's 'Catering extract ventilation: a fire risk assessment by the responsible person'.

'Catering extract ventilation: a fire risk assessment by the responsible person'

System design 1917

Generally, all cooking equipment in a main kitchen will need mechanical ventilation to extract heat, vapours and combustion products. Ventilation duct runs, both for supply and extract, should be as short as possible, particularly those provided as extracts for equipment using oils or fats. The latter is to prevent an opportunity for an extensive build-up of precipitation from vapours on internal surfaces.

Certain equipment, particularly deep-fat fryers, will require dedicated extract ducting via an overhead canopy. Ducting should be provided with grease-tight access panels for cleaning, at intervals not exceeding 3 m and at changes in direction.

A grease-residue trap should be installed at the base of any vertical riser. Such panels will serve additionally as suitable points of access for fire-fighting.

The best arrangement of extraction system for deep-fat fryers will result from a ducting system that deals with heat and vapour extraction separately from the products of combustion. The two systems should be separated physically from one another, or thermally insulated, to prevent high heat transfers between systems, which may lead to a fire.

The short extract ductwork from equipment using oils or fats, wherever possible, should discharge to the external atmosphere directly above the equipment it serves.

BS 9999 recommends that extract ductwork from kitchens should not be provided with fire-dampers and should discharge directly to open air. Where this is impracticable and extraction systems need to pass through an adjacent fire compartment, specific fire precautions should be applied to ducting in order to maintain the required level of fire separation between compartments. In some

cases, this means that such ductwork should be enclosed within a building services duct, constructed to the highest level of fire-resistance to the structures it penetrates. Alternatively, the necessary fire-resistance may be achieved by designing it into the ductwork material itself by way of either a suitable protected shaft or a suitable protective material.

If fire originates within ducting, it may spread beyond its initial location due to heat radiation or direct contact of the ducting with adjacent combustibles. The routing of extract ductwork should take account of such potential hazards.

A separation of at least 150 mm, but preferably 500 mm, should be maintained between uninsulated ducting and any combustible materials. Permanent notices should be displayed prominently at vulnerable locations to warn of this hazard. Where space is limited, the use of short runs may obviate this requirement.

Ventilated ceilings 1920

Such ceilings are designed to permit the passage of air from the kitchen below to the void above, from where air is extracted to the atmosphere.

Some suspended ceilings include metal cassettes that can trap exhausted airborne grease and other gaseous by-products. A fire hazard can be created in ventilated ceilings by the accumulation of greasy dirt, aggravated by the intrusion of other building services, involving pipework for example, and where cassettes are not cleaned regularly. In view of the problems experienced with these ceilings, their use should only be considered where the recommendations set out in the paragraph below can be achieved.

Provisions to avoid the occurrence of fire in ventilated ceilings and to contain them are as follows:

* the area of a single unit of ventilated ceiling should be not greater than approximately 60 m;
* the free area of ventilation into the void should be not less than 25% of the area of the suspended ceiling, evenly distributed over the entire area;
* each ceiling unit should be completely segregated from any adjacent unit by non-combustible imperforate downstands extending from structural soffit to suspended ceiling. The perimeter of such units or series of units should be segregated by cavity barriers from any other conventional ceiling void by imperforate fire-resisting construction, and should be fire-stopped;
* all cassettes should be easily removable for frequent cleaning, and it should be possible to gain access to each void for the purposes of inspection and cleaning.

Corrosion 1921

The fire integrity of ductwork and any installed parts such as fire-dampers (which may be necessary to maintain the fire separation between fire compartments) may be impaired as a result of corrosion from deposits. They should be protected from the expected conditions by:

* a galvanising process;
* the application of further appropriate protective barriers against corrosion; or
* being constructed of other non-corrosive and non-combustible materials such as stainless steel.

The possibility of galvanic action between dissimilar metals should not be overlooked.

Fire-fighting controls 1924

Suitable provision of extraction equipment can control the removal of hot smoke and gases following a fire, and schemes should be agreed with the local fire authority.

Where fire-dampers are required, effective control of them should be arranged automatically using heat-actuated devices such as fusible links. Faster and more reliable operation will be achieved if fire-detector activation is provided in addition.

Switches designed initially to isolate extraction fans, in order to prevent flames spreading through extraction systems, should be positioned on an exit route and clearly indicated. Preferably, extraction fans should be linked to the automatic fire detection system to ensure that they are automatically stopped in the event of fire.

Maintenance of ventilation systems 1927

A high level of maintenance of extract systems, in particular those serving deep-fat fryers, is necessary in order to prevent fires starting and to restrict their effects should they occur.

Grease-extraction filters can become progressively greater fire hazards with use, and should receive regular inspection and cleaning.

Internal cleaning of ductwork should be undertaken as part of the planned maintenance system. Kitchen canopies are available with self-cleaning/washing filters that reduce the manual maintenance of filters and the build-up of grease deposits. However, they will still require close attention.

The correct functioning of fan motors, fire-dampers (where fitted) and all associated control devices are key elements requiring attention. All the equipment described should be inspected and tested in accordance with the manufacturer’s

instructions. See also the Heating and Ventilation Contractors Association's (HVCA):

* 'TR/19 – Guide to good practice: internal cleanliness of ventilation systems';
* 'DW/172 – Specification for kitchen ventilation systems'.

Refer also to the Loss Prevention Certification Board's 'LPS1263: Requirements for the LPCB approval and listing of the fire performance of kitchen extract systems'.

Hot cooking oils and fats 1928

The main fire hazard arises from overheating of oils and fats in frying equipment. Human error and temperature-monitoring devices failing to control correctly can quickly lead to rapid increases in the temperatures of oils and fats.

Safe cooking in oils and fats takes place generally below 200ºC. Flammable vapours are given off at 200–230ºC, and spontaneous ignition occurs at 310–360ºC. The timescale in moving from a safe condition to a dangerous one is quite short. The flashpoint of oil is reduced by progressive oxidation through repeated use.

Planning and location of a main kitchen 1931

A hospital main kitchen can deliver an almost non-stop service. Consequently, when a new one is planned, early and careful consideration should be given to its location, design and operational policies, including those necessary for fire safety. The same criteria would apply when an existing kitchen is to undergo a major alteration or upgrading.

A main kitchen is assessed as having both a high fire risk and a high fire load centred on its main areas of cooking. However, the "dining room" (taken to include seating areas for cafeteria, snacks and coffee lounge etc) is assessed as having a low fire risk and fire load.

To maintain the low fire risk classification of a dining room, a servery with call-order bars should form an individual subcompartment. In practice, the main kitchen with its supporting services, and the dining room with its supporting services, will in most cases be close together. For fire safety purposes, they should be considered together, as forming the core of the catering department.

Appropriate first-aid fire-fighting equipment should be provided throughout the kitchen area. The selection and specification of such equipment should take account of the kitchen environment and the particular hazards associated with kitchen fires on particular appliances.

New kitchen staff should be trained in fire safety and be familiar with the location of fire-fighting appliances. It is important that all catering staff receive proper

instruction on the correct method of operating fat-fryers safely as detailed in the section below.

Correct use of fat-fryers 1933

Oil or fat should be maintained at correct levels. Overfilling increases splashing when food is lowered into the fat, and low oil or fat levels may prevent the thermostat from working correctly and seriously increase the risk of overheating and fire.

Heating sources should never be left operating when used oil supplying pans or fat is being drained from the pans.

Care is required when solid fat is introduced into empty pans. Until a sufficient quantity of fat has melted to cover the sensitive elements of thermostats, these devices may remain ineffective.

If the type of cooking fat or oil is changed, the new cooking medium may have a different flashpoint from that previously used. Estates staff should be informed when a change is made so that thermostat settings can be checked. Oils and fats of different types should not be mixed.

A high level of regular and effective maintenance is necessary to reduce fire risk. The most reliable apparatus will fail eventually if it is not regularly inspected and overhauled, and if the controls are not correctly adjusted. Incidents have occurred where deep-fat fryers have caught fire when cooking oil has leaked from faulty pans onto the gas burners below, destroying the gas valves and associated control equipment.

Correct functioning of both the normal controlling and the overriding thermostats is extremely important. Operating temperatures should be checked, as should diaphragms of relay valves, which can stiffen with age and fail to shut off gas supplies.

Routine cleaning is necessary, with particular attention being given to the removal of fatty deposits from the hob and surrounding metalwork, the hood, sides and back of the fryer, internal surfaces of ductwork, fan blades and any filters.

Hoods above fat fryers should be constructed of sheet metal with smooth surfaces which can be easily cleaned.

Equipment, working surfaces and structural parts should be maintained at a high level of cleanliness. Care should be taken in the use of cleaning materials, which should not be allowed to come into contact with food products.

Laundries

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Laundries are classified as being a high fire risk. Most serious laundry fires occur during “silent” hours when staff are not present to raise the alarm. Because of the high capital value of laundry plant and equipment and the critical importance of the laundry service, an automatic fire protection system is regarded as necessary, except in the rare circumstances of existing laundries that are nearing the end of their economic life. A fire risk assessment should be used to assess the need for suitable automatic fire suppression.

The selection and specification of fire detection equipment should take account of the laundry environment and the particular hazards associated with laundry fires. For instance, a large proportion of laundry fires originate in smouldering linen, and the early detection of smoke by means of smoke detectors is necessary. This will facilitate the prompt attendance of the fire-and-rescue service and help to avoid a major fire.

Laundries suffer from this form of spontaneous combustion, which is caused by a build-up of heat at the centre of bulk loads of hot linen through the slow oxidation of the textile fabric within the load. Very little smoke or heat may be produced for some time – perhaps a few hours – but eventually the material bursts into flame.

The risk of spontaneous combustion is increased when hot laundry is taken straight from a tumble-dryer or calender and tightly packed in trolleys or trucks. The presence of residues of oil, grease, wax, soap, rubber or similar materials on the fabric will further increase the danger.

With regard to tumble-dried laundry, special attention should be paid to the following operating procedures:

* laundry should not be over-dried in the tumbler;
* laundry should not be left in the tumbler after the drying process is finished, but should be unloaded immediately;
* tumblers should always be unloaded and left in an empty state overnight;
* tumble-dried laundry should be separated and folded as soon as possible after removal from the tumbler. If this cannot be done, the laundry should be removed from the tumbler and spread out in such a way that the heat is quickly lost;
* tumble-dryers should be equipped with a manual, or preferably automatic, means for cooling the load at the end of the drying cycle.

NHS laundries should have instructions for employees, displayed in appropriate positions, on the safe operation of tumble-dryers and the handling of dried loads to reduce the potential for fire. This should also include common areas of residential accommodation for staff where tumble-dryers are provided.

Fluff collects in laundries and, if ignited, will result in the rapid spread of fire. Fluff should not be allowed to accumulate. Regular cleaning of the more accessible places in a laundry should also include the removal of fluff from electric motors, heating coils, tumbler ducts and roof trusses.

The minute textile fibres comprising such fluff or lint are prone to spontaneous ignition when impregnated with oil, wax or other greasy residues, particularly if adjacent to sources of heat. The areas under calender beds and around the operating mechanisms of cabinet-style garment-finishing machines are particular points of danger.

Radioactive substances and registration procedures

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Healthcare organisations are required to register under Section 7 of the Radioactive Substances Act 1993 if they keep and use radioactive material. They should approach the relevant Environment Agency local office to obtain the necessary application forms.

There are a number of departments within healthcare premises which may use radioactive substances (for example radiotherapy, nuclear medicine, radiology, oncology, pathology and pharmacy). Other departments may use radioactive substances for research projects in associated facilities.

Radioactive substances are normally kept in storage facilities, refrigerators, safes etc which can be locked. It is expected that this and the general protection afforded by the construction of these departments will provide effective barriers against fire. Provided that appropriate steps are taken to eliminate the use of flammable materials within rooms, the risk of a fire should be low.

The use of radioactive substances will be embodied within local policies, which should indicate general principles and describe the means for complying with the Ionising Radiations Regulations 1999. These policies should contain contingency plans for any reasonably foreseeable incident and should include any risks associated with an outbreak of fire.

Local fire authorities should be made aware of the normal locations of radioactive sources in healthcare premises and the general nature and activity of the sources involved.

Suitable mandatory notices will indicate the presence of radioactive sources and electrically-powered units that generate radiation (for example X-ray units). The latter would not be considered as risks in fire situations because they would be isolated from their mains power at the incidence of a fire. It is important therefore to identify those locations where there may be genuine. risks from radioactive sources at the time of a fire.

The local fire authority should be kept informed of new or changed practices by means of periodic reviews to maintain the effectiveness of agreed fire emergency procedures.

Fire-and-rescue service personnel will normally be equipped with suitable monitors and protective clothing to safeguard them against anticipated risks, but the need for any further provisions should be considered at time of review.

Any protective equipment used at a fire should be monitored after use for the presence of radioactive contamination and then dealt with in accordance with agreed procedures. Fire safety managers should ensure that suitably qualified healthcare personnel are available to give authoritative advice at times of review and in a fire emergency.

During a fire emergency it may be necessary to evacuate patients who are undergoing treatment or diagnosis by means of radioactive substances. Owing to the presence of a radioactive substance, care should be taken to avoid injury to these patients (or to other patients) while they are being handled.

During an evacuation process, special arrangements should be considered for patients undergoing radiotherapy and the need to segregate them from other patients and staff, particularly those who are pregnant. These special measures should have been examined beforehand and form part of the pre-arranged evacuation strategy.

Radioactive Substances Act 1993
Ionising Radiations Regulations 1999

X-ray film storage

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X-ray film produced in the UK has a cellulose acetate base and is classified “non-flam”, although it will burn slowly.

Before 1941, film made of cellulose nitrate was available. This type of film is highly flammable and explosive at slightly raised temperatures. However, the need to retain such film is decreasing. Storage for only small amounts will be required.

“Non-flam” film has a similar degree of fire risk to products made from paper, and steel cabinets are considered to be the most suitable containers for storage. Naked lights and other igniting agents should not be permitted in the storage area.

If film is not to deteriorate in storage, the storeroom temperature should not fall below approximately 10ºC. Low-temperature-type heating should be used. Electric heaters should be of an enclosed convector type installed at a high level and controlled by a room thermostat.

Cellulose nitrate film, where retention is still required, should be stored in totally enclosed metal containers having tight-fitting lids and should be conspicuously marked “highly flammable” in accordance with the Health and Safety (Safety Signs and Signals) Regulations 1996.

Stocks exceeding 35 kg should be stored in a room of fire-resisting construction of minimum one hour, which is reserved exclusively for this purpose. It should be well-ventilated directly to outside air. The store should preferably be located remotely from all other healthcare buildings, where the fire resistance may then be reduced to half an hour. The facility should be kept cool because nitrate film can decompose after lengthy storage, particularly in a warm temperature. The door to the store should be permanently and conspicuously marked.

Health and Safety (Safety Signs and Signals) Regulations 1996

Physiotherapy departments 5303

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Fires have been attributed to the overheating of physiotherapy wax baths, which have been left switched on overnight to reduce “warming up” time the next day. A time-switch may be used to control the power to socket-outlets supplying wax baths. Timing devices should be regularly checked to ensure that the settings are still correct.

Because of the highly flammable nature of wax, thermal safety devices should form part of these appliances. A thermostat to control the temperature over a range considered safe for the patient (maximum 50ºC) should be provided, with a manually resetting type provided which is pre-set to trip at a safe temperature (60ºC maximum). This will ensure that no overheating occurs when the bath is empty or partly filled.

The temperature limits of control are determined by patient safety as well as fire risk. Operating temperature range should be 45–50ºC. Overheating will occur at 55–60ºC. Automatic detection should be considered where it is normal practice to leave electrical equipment in unattended use.

The sterilizing of physiotherapy wax by heat can constitute a serious fire risk unless carried out in suitable non-combustible surroundings under proper supervision. Suitable fire-extinguishing apparatus should be at hand, for example a 6 litre foam (type AFFF or FFFP) or a 4.5 kg powder-type extinguisher. Staff should be trained in the use of extinguishers.

Magnetic resonance diagnostic equipment

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Strong magnetic fields are generated by magnetic resonance diagnostic equipment and are located within a designated controlled area. Access to the controlled area is restricted to authorised personnel. Unauthorised personnel, including unauthorised staff, should be appropriately screened before entering the controlled area.

The strong magnetic field within the controlled area can affect the operation of heart pacemakers and cause a projectile effect on ferromagnetic materials.

Within the controlled area, an inner controlled area may be defined where the magnetic field strength is even stronger. Before entering the inner controlled area, all personnel should take the following precautions:

* they should deposit mechanical watches, credit cards, and ferromagnetic objects at the reception area;
* they should remove from their clothing all ferromagnetic objects such as pins, scissors, keys, tools, hair-grips, certain spectacles that have ferromagnetic parts etc;
* ferromagnetic objects such as tools, gas cylinders, trolleys etc should not be taken into the inner controlled area.

Note

Non-ferrous fire extinguishers are obtainable from a major UK manufacturer to special order.

These restrictions on access to the controlled area have implications for fire safety.

Fire safety procedures which specifically address the problems associated with controlled access should be prepared in advance in association with:

* the responsible person who has day-to-day responsibility for magnetic resonance, as nominated by the chief executive;
* healthcare fire safety advisers;
* the local fire authority;
* the magnetic resonance safety adviser.

The fire safety procedure should consider the effects of a fire in areas adjacent to rooms accommodating the magnetic resonance equipment, in order to specifically

establish a managed “shut-down” procedure, which will make the equipment safe and allow unauthorised personnel safe access into the controlled area.

An authorised person who can take responsibility for the controlled area should be available 24 hours a day to assist the fire-and-rescue service should a fire emergency occur. This could be by means of an on-call basis.

The types of magnet system associated with equipment and their characteristics are listed below:

* **Resistive magnet systems:** in the event of a fire affecting a magnetic resonance diagnostic unit containing a resistive magnet, electric power should be isolated immediately and the unit should be evacuated. When the power is isolated, unauthorised personnel may enter if necessary.
* **Permanent magnet systems**: the field associated with a permanent magnet cannot be switched off. The fringe field is very low compared with other magnets – up to a distance of 1 m from the magnet. Nearer than this, the field strength increases rapidly, giving rise to intense forces on ferromagnetic materials. A prominent warning notice should be placed at the entrance to the controlled area and on the magnet to the effect that the field is permanently energised.
* **Superconducting magnet systems**: these involve the use of liquid helium. With these systems the magnet should be quenched before it is safe for the emergency services to enter the inner controlled area with ferromagnetic material. Prominent warning notices should be provided. Quenching involves the boiling-off of large quantities of helium and should only be carried out by suitably trained and authorised personnel.

The cost and specialist nature of this equipment may be such as to justify the installation of a permanent automatically-operated fire-extinguishing system. Before such a decision is made, the manufacturer of the equipment should be consulted to establish which extinguishing agents are best suited to the characteristics of the equipment.

Note

See also the Medicines and Healthcare products Regulatory Agency’s (MHRA) DB 2007 (03) – ‘Safety guidelines for magnetic resonance imaging equipment in clinical use’ for further information.

‘Safety guidelines for magnetic resonance imaging equipment in clinical use’

Fire hazards during building operations

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Premises undergoing alteration and extension, repair or maintenance, and those under construction, are particularly vulnerable to fire, often from lapses in safety precautions. Some contributory factors are:

* structural fire and smoke barriers such as walls, doors, floors, fire-protective finishes that may be perforated, or ceilings that may be incomplete or temporarily removed. Where necessary, steps should be taken to maintain fire integrity by means of alternative arrangements;
* accumulation of flammable rubbish such as surplus packing materials, wood shavings and sawdust. Some building operations generate fine dust particles, which are potentially explosive;
* unauthorised and dangerous storage and use of combustible building materials that may constitute a temporary high fire load within and adjacent to patient-care areas;
* potentially dangerous processes and techniques during welding, the use of flame-producing equipment, flammable liquids, adhesives etc;
* when fire detection and alarm equipment, and fire-fighting equipment, has not been fully installed or commissioned;
* obstruction of existing escape routes by construction materials and equipment.

Many fires are due to the activities of contractors. Outside contractors present a greater fire risk than healthcare staff because they are not as familiar with the premises as permanent staff. They cannot be expected to fully appreciate the fire risks, the necessary precautions and the appropriate action to take in the event of fire.

Contractors may have to undertake work that may be more hazardous than that normally carried out on the premises. A legal duty exists to ensure that contractors are aware of the particular risks of working in a healthcare environment. The use of permit-to-work systems and “hot work” permits etc is necessary to define the extent of agreed access arrangements, any limitations upon activities and stipulations about fire safety.

Where building work is being carried out in occupied premises, patients, staff and visitors may be put at risk by a fire originating in the area or in adjoining locations. Staff should be warned by the healthcare fire safety adviser of the increased fire and security hazards if remedial physical action is impracticable, and should be

instructed accordingly on any additional measures. The local fire-and-rescue service should be advised of any significant increased risk or particular high hazard.

The site activities of contractors should be strictly supervised and controlled, even during small works and sporadic maintenance visits. Estates staff should ensure that all necessary precautions against fire are taken. The healthcare fire safety adviser should provide guidance and maintain an awareness of such activities to check compliance with the local fire safety policy.

The above risks could apply equally to maintenance activities.

Medical gases

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1977

Specific guidance on fire precautions relating to medical gases is given in Health Technical Memorandum 02-01 – ‘Medical gas pipeline systems’. Guidance is also available from the gas supplier, and any specific recommendations should be followed.

Flammable materials should not be permitted in cylinder stores, manifold rooms or liquid oxygen compounds; however, it may not be possible to avoid the presence of flammable materials in the vicinity of the patient when medical gases are being used.

Flammable materials that may be found near patients include some nail-varnish removers, oil-based lubricants, skin lotions, cosmetic tissues, clothing, bed linen, rubber and plastic articles, alcohols, acetone, certain disinfectants and skin-preparation solutions. Staff should be aware of the fire risks posed by these materials.

An oxygen-enriched atmosphere may be present when medical oxygen or nitrous oxide/oxygen mixtures are used. It should be noted that nitrous oxide also supports combustion.

Ignition sources are numerous and include:

* open flames, burning tobacco and cigarettes, sparks and electrical sparks (including those that may be produced by some children’s toys), high-frequency, short-wave and laser equipment, arcing and excessive temperatures in electrical equipment such as hair-dryers;
* cardiac defibrillator discharge;
* static electricity.

A mixture of breathing gases will support combustion. In an oxygen- or nitrous-oxide-enriched atmosphere, materials not normally considered to be flammable may become flammable (flammable materials ignite and burn more vigorously).

Clothing may become saturated with oxygen or nitrous oxide and become an increased fire risk (when returned to normal ambient air, clothing takes about five minutes to be free of the gas enrichment). Blankets and similar articles should be turned over several times in normal ambient air following suspected oxygen enrichment.

Oil and grease, even in minute quantities, are liable to ignite spontaneously in the presence of high-pressure oxygen or nitrous oxide.

No oil or grease should be used in any part of the medical gas pipeline system. In particular, oil-based lubricants should not be used, and all fittings, pipes etc should be supplied degreased, sealed and labelled for medical gas pipeline systems.

Health Technical Memorandum 02-01 – 'Medical gas pipeline systems'

Fire detection systems 1979

Appropriate fire detection should be installed in plantrooms, medical gas manifold rooms and ready-use medical gas cylinder stores in healthcare premises provided with an automatic fire detection system.

Oxygen therapy – precautions 1983

When oxygen therapy equipment is in use, fire and safety warning signs/labels should be conspicuously displayed at the site of administration to alert the patient, clinical staff and visitors that oxygen is being used, and of the need to take precautions. It may also be worth considering the use of an in-line oxygen arrester where identified as part of a fire risk assessment.

A suggested minimum text for a precautionary sign is:

OXYGEN IN USE

NO SMOKING

NO NAKED FLAMES

The sign should contain the approved graphic symbols for "hazard" and "no smoking".

Oxygen canopies and tents should be labelled, advising that oxygen is in use and that safety precautions relating to its use should be observed. Labels should be attached to the fabric of the canopy/tent in a position to be seen easily by the patient, and also on the exterior in a position to be seen easily by clinical staff and visitors.

Consideration may need to be given to signs in other languages.

Hyperbaric oxygen chambers 1985

Hyperbaric oxygen chambers may be pressurised with oxygen up to three atmospheres (30 psi gauge – 2 Bar). Pressurisation increases the fire risk still further and, in an emergency, it will take an appreciable time to remove an occupant. Therefore, the most stringent fire precautions to avoid ignition are necessary in and around hyperbaric oxygen chambers, including the design of electrical services.

Oxygen that is exhausted or released from hyperbaric oxygen chambers should be dispersed safely to prevent the possibility of high oxygen concentrations in the event of an emergency release of oxygen from the chamber. This can be achieved

by piping outlets direct to the atmosphere or by providing adequate mechanical extract ventilation in areas communicating with chambers.

Fire extinguishers for use in the vicinity of hyperbaric chambers should have sufficient operating pressure to be effective in the higher ambient pressures.

Checklist: preparing for a fire emergency 1986

Knowing what to do 1989

Managers and their staff will be better prepared for a fire emergency if they know:

* how to raise the alarm and call the fire-and-rescue service;
* how to get additional help in a fire emergency;
* how to evacuate their part of the premises;
* the location of fire-fighting equipment in every part of the health building. At each relevant location information should be prominently displayed;
* how to use the fire-fighting equipment in the local workplace, including any special needs and precautions;
* how to deal with hazardous equipment during an emergency (for example gas cylinders);
* who will switch off main supply sources (gas, electricity etc) and activate emergency systems during a fire emergency (records should be kept up-to-date);
* that during a fire in any part of the healthcare premises, telephones should be used for essential calls only.

Escape routes 1992

Managers are recommended to carry out the following actions in conjunction with the healthcare fire safety adviser:

a. Consider the layout of the component parts of each healthcare premises and note the fire compartments, fire doors, escape routes, positions of fire alarm call points, of each.

b. Ensure that the escape routes from each compartment **within** the premises have been agreed with the local fire authority. These should be marked on the plan.

c. Identify with the local fire authority the parts of the healthcare premises and of neighbouring premises which could be used as safe-holding areas so that progressive evacuation can be achieved.

d. Note the location of any secured doors on escape routes and how exit can be achieved quickly at all times:

(i) emergency final exit doors should open outwards;

(ii) sliding or revolving doors are not permitted if they are specially intended as emergency exits (but refer to (iii));

(iii) emergency doors should not be so locked or fastened that they cannot be easily and immediately opened by any person who may require to use them in an emergency.

e. Ascertain what features may obstruct escape routes or hinder evacuation; for example, carpets or non-slip floors along escape routes could slow down evacuation involving ski-sheets/pads.

f. Get to know the designated escape routes and inform staff of any changes that might affect their suitability, even temporarily, due to contractors working etc.

The information obtained from items (a) to (e), if displayed by means of a simple diagram, will help staff gain an appreciation of the escape routes.

Evacuation 2001

The primary aims of evacuation are:

* to remove patients, staff and others from immediate danger;
* to keep the distance of any movement as short as possible;
* to avoid routes which in the particular circumstances may need to be used by fire-and-rescue service personnel and others involved in fire-fighting;
* to remove patients from the vicinity of the fire to a suitable reception area remote from the fire and suitable for their continued treatment, possibly for some hours, and to take a roll-call.

Be prepared – always have a dedicated clipboard and pen immediately available.

These aims are broad guidelines. Fire is unpredictable, and no two fires may be the same. Initiative, common sense, a sound knowledge of emergency procedures and a calm approach to an emergency will do much to ensure a satisfactory outcome.

The knowledge that managers have of the physical constraints of the parts of the healthcare premises for which they are responsible, the capabilities of their staff, and the characteristics of the patients in their charge is essential to the formulation of evacuation plans. The following points will need to be considered when devising a plan (plans will need to be reviewed and modified as necessary to take account of changed circumstances):

a. Estimate the number of patients and staff who will need to be removed from the fire compartment or premises in a fire emergency and the time available for such evacuation.

b. Consider the degree of dependency of patients and estimate the degree of surveillance and assistance they will require.

c. Estimate the number of staff available both during the day and at night to cope with an emergency in each ward or part of the premises.

d. When estimating the number of staff available, consider their capabilities regarding evacuation (that is, physical fitness, training and their likely performance under stress – an especially important consideration for part-time, agency or night staff). Moving vulnerable people in an emergency is always very strenuous work.

e. Consider the patient-handling methods that would be appropriate in an evacuation, bearing in mind building constraints on the escape route and the types of patient. Discuss and agree these with the healthcare fire safety adviser.

f. Identify and note the location of equipment that could be used to aid evacuation.

g. In the light of the preceding factors, estimate the number of extra helpers and their locations required to achieve the safe and speedy removal of all patients.

h. Estimate the number of staff available within the premises who could give assistance in an emergency from elsewhere and be aware of how to summon them.

j. Know how to deal with patients on life-support equipment during an emergency (see Health Technical Memorandum 05-03 Part E).

k. Know how to deal with patients whose behaviour is likely to become obstructive during an evacuation.

m. Practise aspects of the escape plan regularly, techniques, and involve all members of staff (including patient-handling).

n. Be familiar with compartmentation and the principles of progressive horizontal evacuation.

Health Technical Memorandum 05-03 Part E – 'Escape bed lifts'

Fire strategy

2012

2009

A model fire strategy should be set out to cover the following headings:

* **Introduction and overview**: a brief outline of the content of the fire strategy.
* **Design codes and guidance**: an outline of the design codes and guidance used in the development of the scheme. When alternative or fire-engineered solutions have been incorporated, these should be fully discussed in the strategy and, where necessary, justified. Derogations should not be considered acceptable. Variations or deviations from recognised codes of practice should be fully justified in a fire strategy.
* **Description of premises**: a brief description of the premises should be included in the strategy, including the use of each floor and any adjacency issues that might arise.
* **Building occupants**: identify the type of occupant likely to use the building. This should be based on the occupant descriptions contained in Health Technical Memorandum 05-02.
* **Evacuation strategy and methodology**: a variety of strategies might need to be employed in the premises. The strategy should discuss assumptions made by design teams. Methods of evacuation should be discussed in the strategy. Evacuation is a foreseeable event and should be addressed as part of the design phase.
* **Automatic fire systems**: details of the fire alarm and detection system, automatic fire suppression systems and means for securing fire doors and exits electronically should be included in the strategy.
* **Means of escape**: travel distances are set out in Health Technical Memorandum 05-02. There may be occasions where these distances are exceeded. A full explanation and justification should be included in the fire strategy.
* **Fire spread**: this section should address the surface spread of flame provisions and any space separation issues.
* **Fire-and-rescue service access**: full details of the access and facilities for the fire-and-rescue service should be included. The fire-and-rescue service should agree any variations to the provisions of Firecode, which should form a part of the strategy.
* **Ventilation systems**: this should include information about the operation of the system, where the system should be allowed to

continue to operate (for example operating departments) and any cause/effect information.

* **Special considerations**: special considerations might include, for example, the provision of atria, where a fire-engineered solution is the only suitable method to attain adequate fire safety provision. Any such measures should be fully explained in the fire strategy. Third-party review of fire-engineered solutions by a competent fire engineer is always recommended. More information on fire-engineered solutions can be found in Health Technical Memorandum 05-03 Part J – 'Guidance on fire engineering of healthcare premises'.
* **Fire risk assessment**: details of the significant findings of fire risk assessments and details of any action plans to eliminate or reduce identified risks or hazards.

The overall aim of the fire strategy is to ensure that all aspects of fire safety are documented such that at any point in the future, an audit trail is available as to why decisions were made. This will assist in the ongoing fire safety management of the premises and ensure that any future alterations do not negate the original fire safety objectives.

Health Technical Memorandum 05-02 – 'Guidance in support of functional provisions for healthcare premises'
Health Technical Memorandum 05-03 Part J – 'Guidance on fire engineering of healthcare premises'