Scottish Fire Practice Note 11

Reducing unwanted fire signals in healthcare premises

Health Facilities Scotland, July 2006

Contents

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Executive summary

This Scottish Fire Practice Note sets out recommendations and guidance for the reduction of unwanted fire signals (UwFS; see paragraph 1.6) generated by automatic fire detection and alarm systems in healthcare premises.

It is intended for use throughout healthcare premises, including the Acute and Primary Care sectors, detailing statistical data attributed to these types of premises. It is recognised that a large number of premises will not fall into these categories, however the application of recommendations made herein with regard to minimising the number of UwFS will still be relevant to other categories of healthcare premises.

As part of the fire safety management of healthcare premises, the number of unwanted fire signals should be minimised. Unwanted fire signals impact upon the treatment and care of patients and can result in the loss of appointments, disruption to care and treatment regimes, and can significantly affect staff morale.

This document defines and categorises unwanted fire signals. It recommends setting limits on the number of unwanted fire signals based upon number of detectors and size of premises. It outlines the importance placed on fire safety management of all premises. It recommends methods of recording and reporting unwanted fire signals, provides guidance on the avoidance of such signals and highlights common causes such as:

- cooking activities;
- contractors working;
- electrical causes and steam;
- illicit smoking.

The document provides guidance on limiting such occurrences.

This document should form the basis of discussions and liaison with local Fire and Rescue Authorities.

1. Introduction and scope

General application

1.1 This Scottish Fire Practice Note (SFPN) provides guidance in respect of the measures necessary to identify, control and reduce unwanted fire signals (UwFS) in healthcare premises. The guidance is intended to reduce the burden placed on NHSScotland organisations and Fire and Rescue Authorities by avoidable, unnecessary fire calls originating from fire alarm systems.

1.2 This SFPN includes guidance regarding the targets for 'acceptable' levels of UwFS, management of UwFS issues, UwFS causes, and practical guidance for limiting UwFS.

1.3 The recommendations of this Note should be read in conjunction with Scottish Health Technical Memorandum (SHTM) 82 'Alarm and Detection Systems' and British Standard BS 5839 Part 1 (2002) 'Fire detection and fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance'.

1.4 The recommendations of this SFPN cannot take account of all situations that may occur in the full range of healthcare premises. It is therefore incumbent on management and the relevant competent persons to ensure that full consideration has been given to the resolution of any problems.

Definitions

1.5 In order to identify incidents of UwFS correctly it is necessary to define the sources of fire detection and alarm system activation.

1.6 The causes of fire detection and alarm system activation can be broadly classed as one of two incident types: fire or unwanted fire signal. These incidents can be defined as follows:

- fire – can be regarded as an incident resulting in the uncontrolled emission of heat and/or smoke;
- unwanted fire signal – is an incident resulting in the undesirable activation of the fire detection and alarm system.

1.7 Since normal activities may result in the uncontrolled emission of heat and/or smoke resulting in an undesirable activation of the fire detection and alarm system, it is possible for a genuine fire incident to be classed as an unwanted fire signal. For example, making toast may result in the uncontrolled emission of smoke due to breadcrumbs in the toaster being heated; where this results in the activation of the fire detection and alarm system, it should be classed as an unwanted fire signal (see Figure 1).

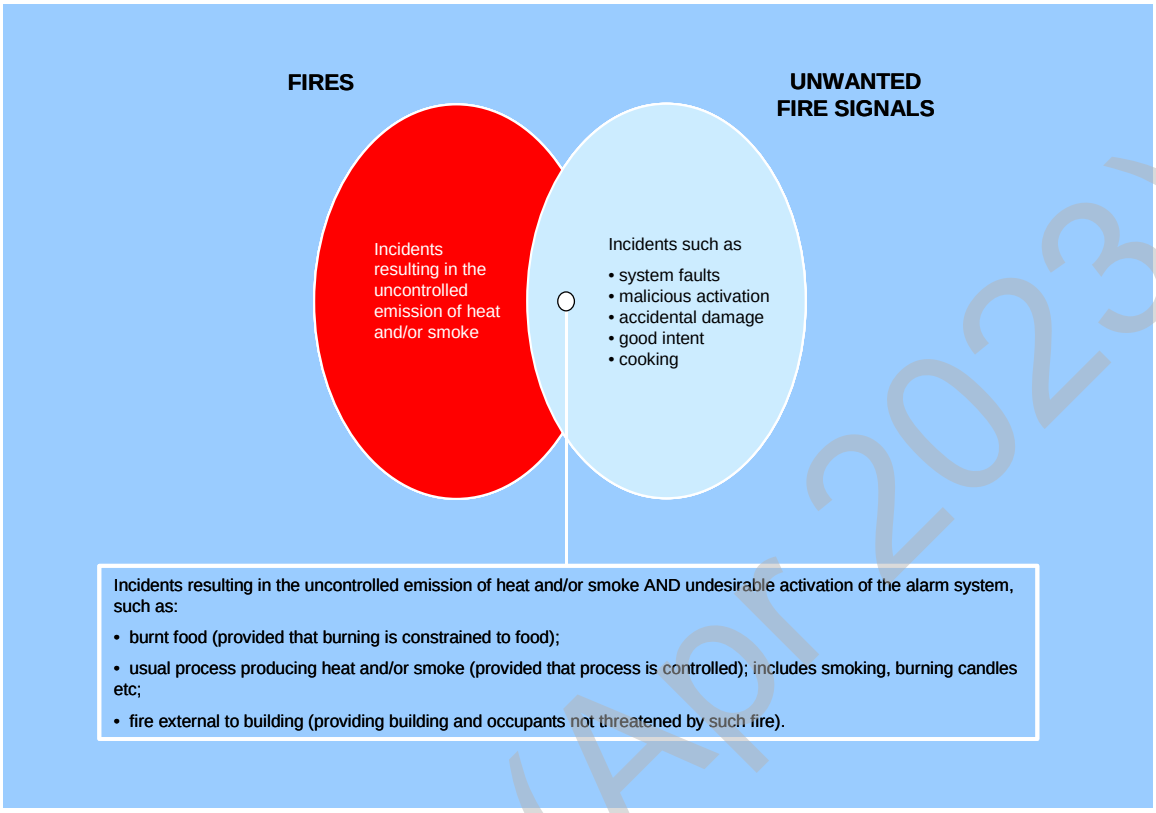

Figure 1: Incident classification

1.8 Determining the classification of incidents is not always clear, as in the case above. The following process diagram (Figure 2) should assist in classifying incident types.

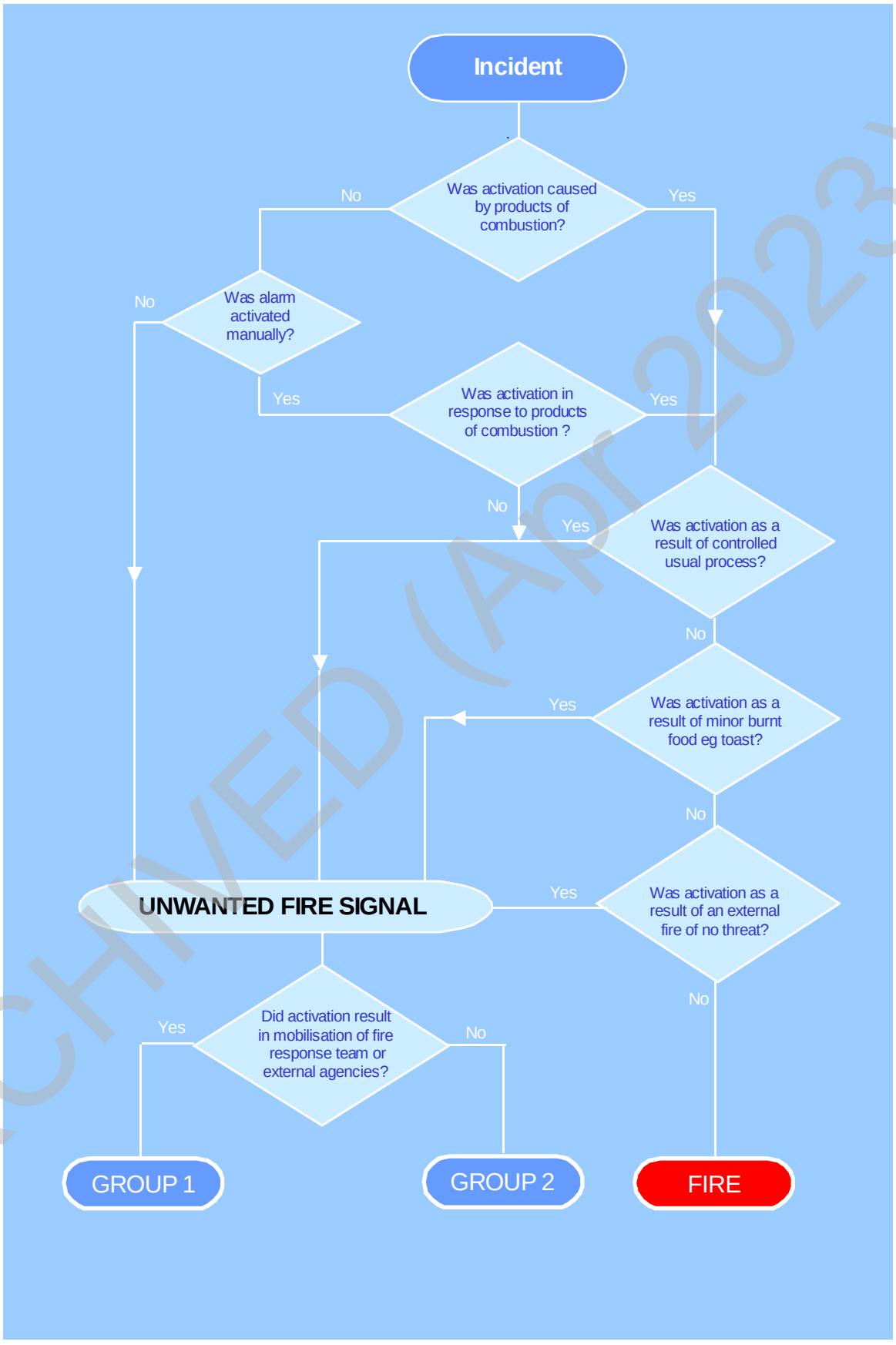

Figure 2: Incident classification decision tree

Categorisation of unwanted fire signals

1.9 Unwanted fire signals should be categorised in order to identify their causes, record and report their occurrence, and allow appropriate actions to be decided on for their reduction. See Appendix A.

1.10 Following any UwFS, an investigation should take place to identify the cause. The table in Appendix A should be used to ascertain the class of cause of the incident. These classes should be used in all UwFS recording and reporting.

1.11 Where any doubt exists, the cause should be recorded as 'unknown' e.g. assumptions should not be made in the absence of other information.

1.12 Further investigation, particularly if repeat activation occurs, should re-categorise the unknown incidents to their true cause.

Acceptable level of unwanted fire signals

1.13 The occurrence of an unwanted fire signal is detrimental to the operation of any healthcare establishment. Such instances lead to disruption of service and patient care, increased costs, and unnecessary risk to those required to respond to the alarm raised. Therefore, no unwanted fire signal is acceptable.

1.14 However, whilst all reasonable means of minimising UwFS should be employed, it is recognised that the complete elimination of UwFS is impossible. It is therefore necessary to determine an acceptable level of UwFS in order for an organisation to measure its performance and respond accordingly to its UwFS rate.

1.15 An organisation's UwFS rate will be influenced by a variety of factors, including

- the number of automatic fire detectors;
- the type of automatic fire detectors;
- the environment in which automatic detectors are installed;
- the activities in the building;
- the degree of control over the activities of third parties (such as contractors);
- the extent to which strong electromagnetic fields are present;
- the level of occupation of the building;
- the propensity for malicious action;
- the location of manual call points.

1.16 The main influence on the rate of UwFS generated by a system is likely to be the number of automatic detectors connected to that system. However, with large, complex sites it is possible that more than one system may be installed. Also, many sites are operated by more than one organisation (management entity). It is therefore reasonable to determine an 'acceptable' ratio of UwFS to

the number of automatic detectors installed per unit, regardless of the number of systems utilised. For the purposes of this document, a unit refers to a site, or part thereof, controlled by a single management entity.

1.17 A unit's performance in managing UwFS should be calculated and graded in order to ascertain its current performance levels and to determine appropriate targets for annual continuous improvement.

1.18 Although incidents which involve the mobilisation of a fire response team and/or external agencies such as the local Fire and Rescue Authority, will have the greatest impact on the delivery of service, all incidents should be reported and recorded regardless of how minor they may be. This will provide a benefit in terms of identifying possible problem areas prior to incidents occurring which do have a significant impact on the delivery of service.

1.19 The unit's performance with regard to UwFS should be considered in accordance with the benchmark standards identified in British Standard 5839 Part 1(2002) 'Fire detection and fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance'.

For units utilising 150 or fewer automatic detectors

1.20 For smaller systems, the expected number of UwFS is comparatively low. Hence, whilst applying the BS 5839 Part1 (2002) benchmarks will result in an apparent grading, the annual continuous improvement targets result in such small reductions in the numbers of UwFS that measurement of performance improvement is not possible in a reasonable time period.

1.21 Therefore, no more than one UwFS per year for every 50 automatic detectors, or part thereof, is deemed 'acceptable'.

1.22 Once this performance level has been attained, performance should be maintained.

1.23 All NHSScotland organisations should put measures in place to minimise UwFS. Each unit should identify their current level of UwFS and set the corresponding continuous improvement target as a key performance indicator within Controls Assurance.

2. Management and responsibilities

2.1 All NHSScotland organisations are required to discharge their responsibilities in respect of fire safety and to identify individuals responsible for ensuring that risks due to fire have been adequately mitigated.

2.2 Research has shown that many of the causes of UwFS are the result of usual processes not being adequately controlled, for example cooking fumes or smoke or fumes from hot-works activating smoke detection. Failure to adequately control such processes could result in the process becoming the cause of a fire incident. Therefore, the process control required to prevent UwFS is also likely to be required to prevent fire.

2.3 Fire safety management should reflect the need to minimise UwFS.

2.4 Notwithstanding the need to minimise UwFS, it is essential that measures put in place to meet this objective do not detract from the level of fire safety afforded to patients and staff.

Roles and responsibilities

2.5 A framework for the management of fire safety is established in 'Firecode'. This document sets out specific responsibilities in respect of fire safety, including the minimisation of UwFS, for those working in healthcare.

2.6 With respect to UwFS, it is the responsibility of each NHS Board to:

- ensure that the organisation sets and monitors performance against key performance indicators for each unit it controls;
- set in place the policies and resources necessary to minimise UwFS in line with performance targets.

2.7 All staff within an organisation have a responsibility to minimise UwFS. It is incumbent on all staff to reduce UwFS wherever possible, by controlling their environment, processes and actions to avoid unnecessary activation of the fire detection and alarm system.

2.8 To this end, the fire safety training regime that is developed should include instruction in the causes of UwFS, means of minimising their occurrence, and actions to be taken to avoid unnecessary disruption. Further instruction should be provided in incident recording, reporting and remedial action.

2.9 An appropriate member of staff should be given the role of 'Responsible Person' as defined in BS 5839: Part 1(2002) 'Fire detection and fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance'. The responsible person is charged with taking responsibility for all aspects of the fire detection and alarm systems. In smaller premises the role of responsible person should be allocated to a

competent person who is aware of the fire safety procedures of the premises, such as the practice or surgery manager.

2.10 The responsible person should co-ordinate sufficient site engineering resources to ensure availability throughout the hours of the unit's operation, with an on-call response at other times. In smaller premises an on-call response may be all that is required.

2.11 The site engineer has to ensure their attendance to the fire detection and alarm system in the event of an alarm or reported fault. The site engineer should gather all relevant data from the fire detection and alarm system following an alarm or fault condition, and in any case, prior to the system's being reset. This information should be passed to the appropriate unit line manager, and details of the incident should be entered into the fire detection and alarm system logbook. In smaller premises, the responsible person should utilise their best endeavours to gather all relevant data from the fire detection and alarm system until the on-call response arrives.

2.12 At the time of every service visit, the system UwFS record should be carefully checked to determine whether:

- since the time of the previous service visit two or more UwFS, other than UwFS caused by good intent, have arisen from any single manual call point or fire detector;
- any persistent cause of UwFS can be identified.

2.13 At least a preliminary investigation should be carried out as part of the service of work if any of the following apply:

- the rate of UwFS over the previous 12 months has exceeded the acceptable levels as shown in paragraphs 1.13- 1.23;
- two or more UwFS have arisen from any single manual call point or fire detector since the time of the last service visit.

Incident recording and reporting

2.14 All incidents of UwFS should be reported to the responsible person as soon as practicable following the incident and, in any case, within 24 hours of the incidents occurring.

2.15 It is generally accepted that up to 80% of the details surrounding an incident are lost within 48 hours of it happening. It is therefore imperative that details surrounding all UwFS incidents are accurately recorded as soon as possible following the incident and, in all cases, within 24 hours of the incident occurring.

2.16 Information recorded and/or displayed by the fire detection and alarm system is vital in positively determining the cause of alarm activation, and in some cases is the only means of establishing the sequence of events. It is important that such information is preserved. Once all relevant information has been recorded, the duty engineer should reset the fire detection and alarm system

followed by, where appropriate, consultation with the Fire and Rescue Authority attending the incident. A subsequent incident in the location of the activated detection device might not sound a further alarm until the system is reset. Following activation and prior to the system being reset, it is imperative that the area in which a device has activated is monitored.

2.17 Appropriate details regarding every UwFS (regardless of how minor the incident) should be recorded. Information recorded should include the following:

- date and time;
- identity and location of device (if known);
- category of UwFS (if known);
- reason for UwFS (if known);
- activity in area (if the reason for the UwFS is known);
- action taken;
- the person responsible for recording the information.

2.18 The local manager should collate all relevant details in the form of briefing as shown in Appendix D. It is important that as much detail as possible is provided, since the details surrounding an incident are vital in determining the correct cause and solution to the UwFS. Wherever possible, agreement should be reached with the Fire and Rescue Authority attending the incident as to the probable cause. The categories shown in Appendix A should be used to identify the cause of the incident. The completed briefing should be submitted to the Fire Safety Co-ordinator/Advisor or responsible person for recording and further action.

Investigation and review

2.19 The Fire Safety Advisor should investigate the circumstances surrounding any UwFS incident in order to positively identify its cause, and to record the cause using the categories shown in Appendix A. Details of the incident should be reported to the NHS Board on a 6 or 12 monthly basis for small and large systems respectively.

2.21 As a minimum, the Fire Safety Co-ordinator should complete all of the details required for the UwFS incident report form (see Appendix D).

2.21 In order for the organisation to adequately address the issue, accurate records of all UwFS should be maintained. The organisation should set in place a mechanism to review the organisation's UwFS performance and action plans to mitigate such incidents.

2.22 In tackling the issue of UwFS, it is important to involve the appropriate stakeholders. These may include:

- Fire Safety Co-ordinator;
- Fire Safety Advisor;
- Staff representative;
- Fire alarm system maintainer;
- Fire alarm system manufacturer;
- Local Fire and Rescue Authority;
- Estates Manager;
- Staff residences representative;
- Planning Department officer;
- Contractors (as appropriate).

This list is not exhaustive; other stakeholders may be required depending on the nature of UwFS and their causes. For example, it may be necessary to include the local authority pest control officer if a number of UwFS are attributable to insect infestations. It is not expected that all stakeholders will attend every meeting, as the attendance at each meeting should be tailored to the main reported causes of UwFS in the organisation.

2.23 In larger organisations, or in organisations where UwFS are a regular problem, it is recommended that a regular meeting be convened with the relevant stakeholders. This meeting should take place at least quarterly.

2.24 The purpose of this meeting is to review the organisation's performance, the main causes of UwFS in that organisation, and the steps necessary to reduce their occurrence.

2.25 The group should compile an action plan to reduce the number and frequency of UwFS in the organisation. Unless actions can be implemented without cost, the plan should be submitted to the NHS Board for prioritisation against other risks and to secure the resources necessary to implement any actions identified. Full consideration should be given to the means of UwFS reduction described in Section 4.

2.26 Once an action plan has been agreed, the group should meet to monitor progress against the action plan and review the UwFS performance improvements achieved.

2.27 Details of UwFS performance, and of any action plans and improvements made, should be included in the annual fire safety report to the NHS Board.

3. Causes of unwanted fire signals

Research findings

3.1 A breakdown of reported UwFS causes in acute healthcare is given in Figure 3. This clearly shows that the major cause of unwanted activation of the fire detection and alarm system (43%) is cooking activities. Therefore, if the cooking process is properly controlled, the number of UwFS should be reduced.

Outside acute healthcare, the breakdown of the causes of UwFS are likely to show some variance, however the main causes and subsequently the recommendations are still valid over the full range of healthcare premises.

3.2 The activities of contractors working on the premises are reported as the second most common cause of UwFS. This would appear to indicate a need for greater control of contractor activities and work areas.

3.3 Reports of electrical causes of UwFS do not allow specific analysis, since the exact cause is not known. Such incidents may result from cabling faults in the fire detection and alarm system, power supply interference or fluctuations, or electro-magnetic interference.

3.4 A further breakdown of the reported causes of UwFS in acute healthcare is given in Figure 4. This illustrates the main causes, highlighting the hospital areas in which the incident occurred.

3.5 The main reported cause of UwFS i.e. cooking, is predominantly exhibited in residences and ward areas. Whilst the numbers of instances of cooking-related UwFS in wards and residences appear similar, ward areas represent a larger proportion of the hospital area and population than residences.

3.6 The response to an alarm in a ward area is likely to directly involve staff that would otherwise be caring for or treating patients, and therefore represents a significant potential for disruption to patient care.

3.7 The UwFS incidents involving contractor activity are reported across the majority of hospital areas, with no significance to the variation between areas when their relative sizes are considered.

3.8 Similarly, instances of electrical causes of UwFS and those caused by steam are reported across the majority of hospital areas, with variations due mainly to the size of respective areas or the use of the particular services.

3.9 Smoking-related UwFS are seen predominantly in ward and other departments (circulation areas). In hospitals, smoking is not permitted by law (except where exclusions apply) and any smoking activity is likely to be illicit, probably in low occupancy areas not under frequent observation. This has the potential to be a

significant fire risk, since carelessly discarded smoking material is a known common cause of fire.

3.10 As a significant number of UwFS are reported as cause unknown, it is not possible to directly reduce these incidents without determining their cause. It is important, therefore, to thoroughly investigate all UwFS to determine their cause and potential solution.

3.11 Incidents involving patients falsely actuating fire alarm systems are reported predominantly in psychiatric wards. It has been reported that psychiatric patients have, in some cases, deliberately activated manual call points or used cigarette lighters and other smoking material to activate automatic fire detection. The majority of these instances are not reported as malicious, since it is often the case that the patient is unaware of the full consequences of their actions.

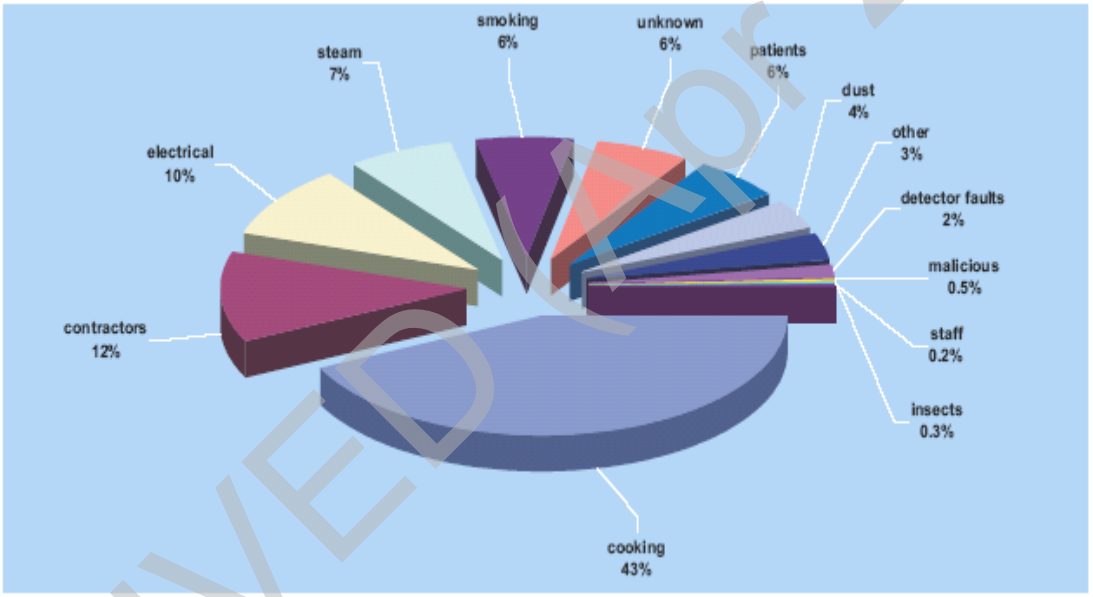

Figure 3: Reported causes of UwFS in acute healthcare

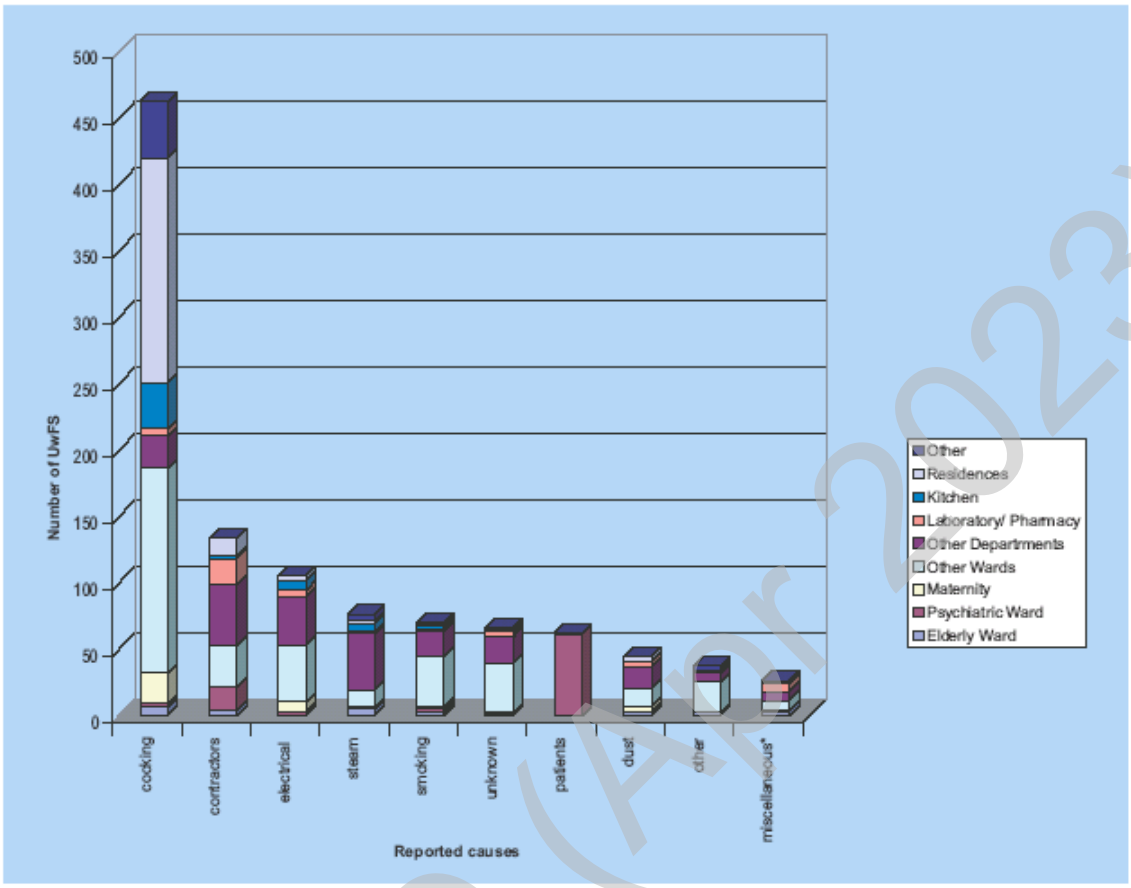

Figure 4: Causes of UwFS and their locations

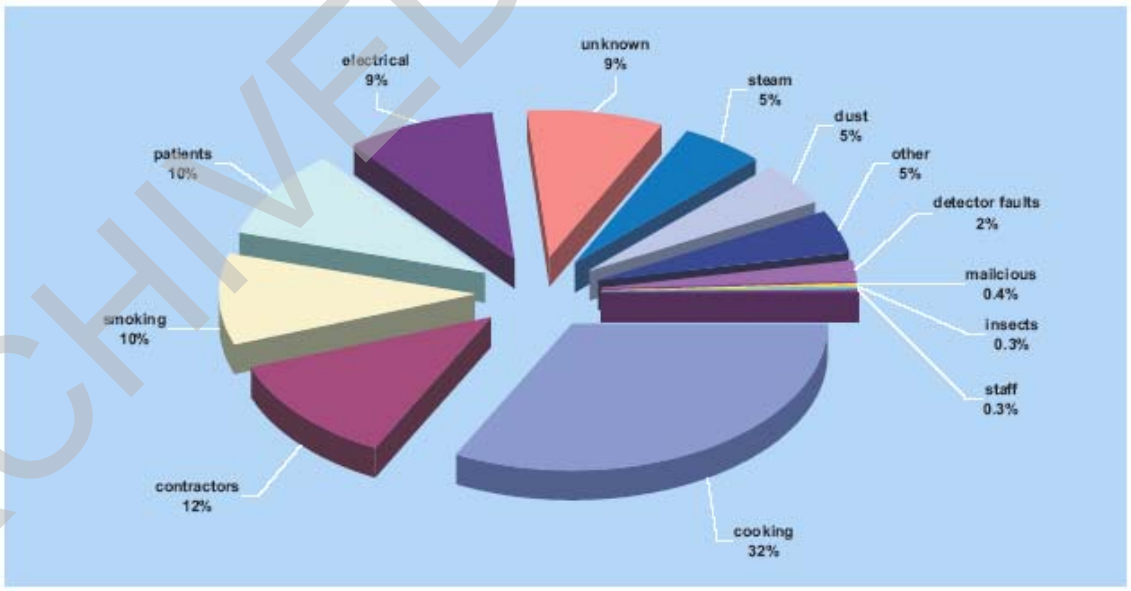

Figure 5 Causes of UwFS in areas accessed by patients

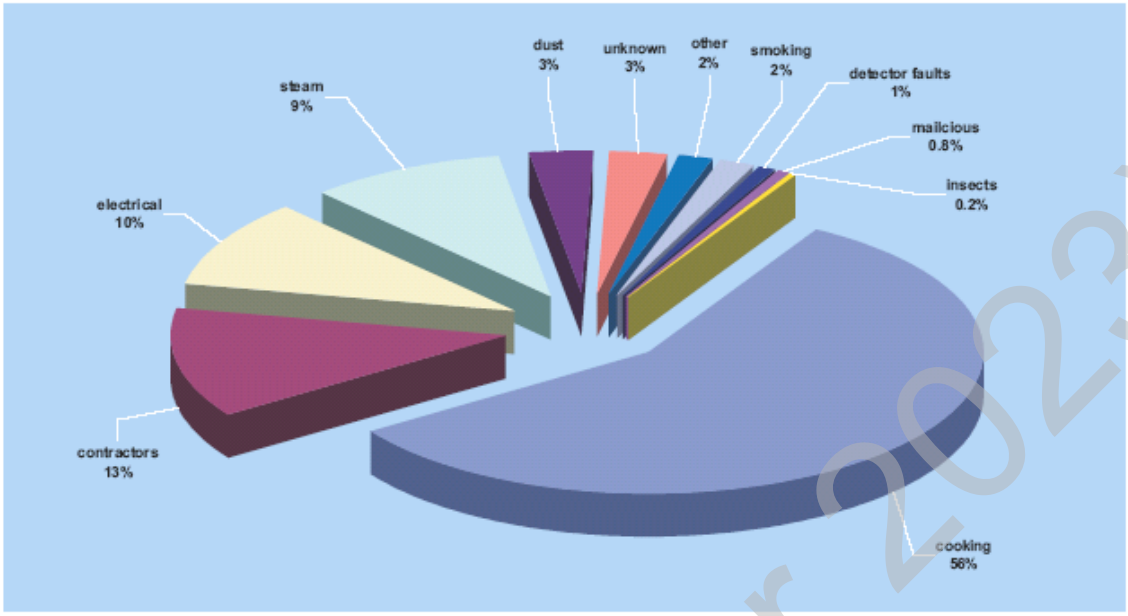

Figure 6: Causes of UwFS in areas not accessed by patients

Main causes of UwFS in areas accessed by patients

3.12 A breakdown of the reported main causes of UwFS in areas accessed by patients is given in Figure 5. For the purpose of this document, areas accessed by patients include all ward areas, operating departments, A&E, outpatient departments, clinics, imaging, and circulation spaces.

3.13 Any activation of the fire detection and alarm system in these areas is likely to directly impact on the provision of treatment and care. Staff who are directly involved in caring for patients may be required to respond initially to the activation of the alarm system. Such response will be necessary whether the alarm is genuine or not, so the potential for disruption to service is significant.

3.14 In areas accessed by patients, the main cause of UwFS has been identified as ad-hoc cooking activities. This is often the result of providing patients with toast or other snacks, particularly between the main catering service meal times. The use of toasters in inappropriate areas, incorrect toaster settings, the failure of automatic toasters to 'pop up', and the lack of cleaning resulting in a build-up of breadcrumbs, have been identified as significant causes of UwFS.

3.15 The second most frequent cause of UwFS in areas accessed by patients is reported to be contractor activity. From the data reported it is not possible to ascertain the proportion of incidents resulting from hot works or other activity, therefore no comparison between the relatively high number of UwFS caused by contractors and potential fire risks can be made.

3.16 Despite the advent of the Smoking, Health and Social Care (Scotland) Act 2005, a potential remains that smoking may take place in buildings where it is legally prohibited.

Patients will be denied the use of tobacco while in hospital in accordance with the legal prohibition. Patients themselves and some visitors may find this denial of the use of tobacco products difficult to deal with. They may also be stressed due to their own infirmity and condition, or that of a family member they are visiting. These and other factors clearly indicate that a potential exists for uncontrolled smoking to take place where it may be hazardous to do so, regardless of the legal imposition requiring them not to smoke in the building.

Specific control measures and further guidance are provided in Section 4, paragraph 4.30.

NHS healthcare organisations should ensure that they comply in full with the requirements of the Smoking, Health and Social Care (Scotland) Act 2005 and the associated guidance contained in *'Smoke Free Scotland; guidance on smoking policies for the NHS, local authorities and care service providers',* which should be adopted as model best practice, available at www.clearingtheairscotland.com.

***NB** It should be noted that Schedule 2 of the Act lists exemptions from the requirement to prohibit smoking, in parts of the following premises:*

- residential accommodation;
- designated rooms in adult care homes;
- adult hospices;
- designated rooms in psychiatric hospitals and units;
- detention or interview rooms that are designated rooms.

The exemption is not a general one covering the whole building and authorities should therefore 'designate' those parts of these types of premises in which smoking will be permitted. The parts of premises designated in this way may be identified in the 'no smoking' policy.

3.17 Incidents of UwFS caused by patients include actuations by psychiatric patients who may be unaware of the full consequences of their actions. Instances have also been reported of UwFS resulting from other patient activity, for example, excessive use of aerosol sprays, or deliberate interference with detection equipment.

Main causes of UwFS in areas not accessed by patients

3.18 A breakdown of the reported main causes of UwFS in areas not accessed by patients is given in Figure 6.

3.19 Whilst an activation of the fire detection and alarm system in these areas is not likely to directly impact on the provision of treatment and care, patient care can be indirectly affected. In some plant areas, activation of the fire detection and alarm system may cause the interruption of fuel supplies used for heating or steam generation. The effects of frequent alarm activation in staff residences

can disrupt staff sleeping which, when continued over time, could lead to a loss of staff performance and morale.

3.20 It is often the case that an alarm activation from these areas invokes the same level of response from external agencies as that for areas where patients are accommodated and therefore represent a significantly greater life risk. This occurs since these areas are often connected to the main site fire detection and alarm system, with no provision for discriminating between patient and non-patient areas, and communicating this distinction to the attending Fire and Rescue Authority.

3.21 The main cause (over 50%) of UwFS in areas not accessed by patients is related to cooking activity. The main source (66%) of UwFS caused by cooking activity is reported to be staff residences, whereas only 13% of cooking-related UwFS are attributed to main kitchens.

3.22 The second most frequent cause of UwFS is the activities of contractors. As with areas accessed by patients, it is not possible to determine the proportion caused as a result of hot works.

3.23 The relatively large number of UwFS reported due to electrical causes tends to indicate that such incidents may result from the influences of plant and equipment rather than the electrical circuits of the fire detection and alarm system.

3.24 The instances of UwFS caused by escaping steam are relatively frequent, due in part to the generation and use of steam predominantly in areas not accessed by patients. In particular, UwFS caused by steam are most often generated within boilerhouses and plantrooms.

4. Limiting unwanted fire signals

System design issues

4.1 All designers should be aware of their responsibilities under the Construction (Design and Management) Regulations.

4.2 From the initial design stages of a project, all efforts should be made to minimise UwFS. This consideration should not be limited to the design of the fire detection and alarm system, but should extend to all design issues that may directly or indirectly contribute to the incidence of UwFS. For example, care should be taken when designing kitchen areas to ensure sufficient extraction of cooking fumes, thus avoiding fumes spilling into adjacent areas and activating nearby automatic fire detection.

4.3 However, the design of the fire detection and alarm system will provide the greatest influence in minimising UwFS. Fire detection and alarm systems should be designed in accordance with SHTM 82 'Alarm and Detection Systems' and BS 5839 Part 1 'Fire detection and Fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance'.

4.4 The advice provided below is not exhaustive, nor is it considered appropriate in all cases. Any proposal for reducing UwFS should be considered by the relevant stakeholders and a risk assessment should be carried out where appropriate, prior to the introduction of measures.

4.5 Measures to limit the number of UwFS may be divided into a number of groups:

- siting and selection of manual call points;
- selection and siting of automatic fire detectors;
- selection of system type;
- protection against electromagnetic interference;
- performance monitoring of newly commissioned systems;
- filtering measures;
- system management;
- regular servicing and maintenance.

Minimising UwFS due to cooking activity

4.6 It is important to ensure that cooking activity is only ever carried out in designated areas in which appropriate automatic detection, such as heat detectors, and appropriate ventilation measures, have been installed.

4.7 Detectors installed in areas adjacent to kitchens, which may be subjected to cooking fumes from the kitchen, should not be of the ionisation chamber type.

4.8 Doors to kitchen areas should not be wedged or otherwise held open, since this may permit cooking fumes to permeate beyond the kitchen and activate nearby automatic smoke detection. In addition, this practice may increase the fire risk to occupants and contravene fire safety legislation.

4.9 In circumstances where it is not desirable or practical to keep kitchen doors closed, alternative measures need to be considered. The use of electro-magnetic hold open devices may be an option. In residential kitchen areas or ward kitchens, these may include the provision of local mains-powered, self-contained smoke detectors in addition to the main detection system, located either in or immediately outside the kitchen. These self-contained detectors are intended to warn local occupants of the presence of smoke prior to the main fire detection and alarm system being activated. This arrangement should be designed to allow nearby occupants to close kitchen doors (or to release hold open devices) and ventilate the kitchen in order to avert an UwFS being generated in the main system. Where such methods are employed it will be necessary to provide staff training to highlight the distinction between the self-contained and main building alarms, and the actions to be taken in the event of either being activated.

4.10 In circumstances such as communal kitchens in staff residences, consideration may be given to devices that automatically turn on a kitchen extractor when any cooking appliances are used. Where such devices are used, the kitchen extractor should continue to run for a pre-set time period after all the cooking appliances have been turned off.

4.11 The proliferation of automatic toasters in ward areas should be controlled. Organisations should set a policy regarding the type(s) of toaster to be permitted, their use and location. Toasters should only be used in designated areas with appropriate detection measures.

4.12 Consideration should be given to specifying the use of conveyor-type toasters only, since these have been shown to reduce instances of burnt toast and resultant UwFS. The use of personal toasters or other cooking equipment brought into the premises by staff should be prohibited.

Minimising UwFS due to contractor activity

4.13 The activities of contractors should always be controlled in accordance with appropriate permit-to work policies. The area and nature of work should be clearly defined and notified to the Fire Safety Co-ordinator, who will liaise with the responsible person to ensure the appropriate isolation of the fire detection and alarm system.

4.14 A detailed schedule of work to be carried out should be prepared and submitted by the contractor prior to the commencement of works. This schedule should

detail the precise measures the contractor proposes to reduce potential UwFS as a result of the works.

4.15 Particular attention should be paid to works that involve significant amounts of dust. Although isolation of the detection in the area of works will reduce the potential for UwFS whilst the work is being carried out, dust deposited in the detectors during works may cause UwFS when the detection and alarm system is brought back into service or at some point later. Detectors that may be subjected to dust from contractors' works should be covered and sealed from dust prior to the commencement of works, and a full check should be made on completion of works to ensure that all detectors have been uncovered prior to reinstatement of the detection system.

4.16 Contractor activity involving hot-works should be subject to a detailed risk assessment including the likelihood of UwFS. A particular issue has been reported where hot works involving the welding of pipes and ducts have resulted in the transfer of smoke along the pipe or duct to areas remote from the works.

4.17 Care should be taken to ensure that smoke from hot working is appropriately extracted to avoid UwFS. As extracting smoke from hot working may prevent the products of combustion from an associated fire being discovered quickly, consideration should be given to additional safeguards that may be necessary.

4.18 Management controls should be put in place to review a contractor's performance in terms of UwFS generation. Consideration may be given to introducing penalty clauses into works contracts regarding unnecessary alarm actuations by contractors as a result of their activities. A contractor's record of causing UwFS should be taken into account before placing further work with that contractor.

Minimising UwFS due to electrical influences

4.19 Instances of electrical influences causing UwFS are particularly difficult to identify unless system wiring faults or coincidental effects in other electrical systems are observed.

4.20 System wiring faults giving rise to UwFS are relatively small in number, since modern fire detection and alarm systems should discriminate between faults and fire signals from detection devices. However, some instances do occur, and fire alarm system cabling should be properly installed and readily identifiable to minimise damage and inappropriate modification.

4.21 Electrical causes of UwFS are largely due to electro-magnetic interference affecting either the alarm and detection system field wiring or power supplies, or the system devices themselves. Reference should be made to the guidance regarding potential interference in BS 5839 Part 1 'Fire detection and fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance', SHTM 82 'Alarm and Detection Systems' and SHTM 2014 'Abatement of electrical interference'.

4.22 Radio-based detection and alarm systems should be compliant with the Radio Equipment and Telecommunication Terminal Equipment Regulations 2000.

4.23 All system cabling should be installed using appropriately specified cables and installation practices in accordance with BS 5839 Part 1 'Fire detection and fire alarm systems for buildings: Code of practice for system design, installation, commissioning and maintenance', BS 7671 'Requirements for Electrical Installations' and Scottish Health Technical Memoranda (SHTMs) 82 'Alarm and Detection Systems', 2007 'Electrical services supply and distribution' and 2011 'Emergency Electrical services'. Power supplies should be dedicated to the fire detection and alarm system and provided in accordance with BS 5839 Part 1.

4.24 When designing the fire detection and alarm system, detailed consideration should be given to the potential sources of electro-magnetic interference, likely field strengths and frequencies. The system designer should carefully consider the effects of interference on the devices proposed, and should ensure that selected equipment is appropriate for use and will not result in UwFS. The system designer should take due regard of the system manufacturer's instructions and guidance to reduce electromagnetic interference.

4.25 UwFS resulting from electrical influences can be minimised by the choice of good quality equipment which satisfies relevant standards, has third party certification, and has been regularly serviced and maintained in accordance with BS 5839:Part 1 (2002).

Minimising UwFS due to steam

4.26 The majority of steam-related UwFS occur in boilerhouses and plantrooms where steam is generated, used and distributed. Smoke detectors that have been placed inappropriately directly outside bathrooms/shower rooms have also generated a number of UwFS.

4.27 Steam vents should always vent directly to the outside and in any case should not vent in the direct vicinity of smoke or heat detection.

4.28 Care should be taken to ensure that provisions for steam extraction are made wherever steam is used or produced and where there is a possibility of water vapour escape.

4.29 The appropriate detection method should be used, and detectors should be appropriately sited in relation to bathrooms/shower rooms, steam production equipment or equipment which uses steam such as water heaters and autoclaves.

Minimising UwFS due to smoking

4.30 The statutory restriction of smoking by patients, visitors and staff can lead to illicit smoking. This may occur in areas where automatic detection is installed and may lead to UwFS.

4.31 A statutory duty is imposed on units to ensure that the smoking restrictions in buildings (enclosed public spaces as defined) are applied and enforced within the premises for which they are responsible. The restrictions should be strictly applied and enforced in accordance with the guidance contained in 'Smoke free Scotland; guidance on smoking policies for the NHS, local authorities and care service providers', which should be adopted as model best practice.

4.32 Both the person who has control of the premises and the person who was smoking may be guilty of an offence in these circumstances. The following measures should therefore be considered;

- an unambiguous and clear policy should be in place indicating the commitment of the organisation to a 'no smoking' regime. All staff should be made aware of it and the policy should form part of routine staff training;

- prevent or limit access to any area/s where illicit smoking has been identified if this is possible, or increase visual supervision of the area.
  NB: This may not be possible if the space is a circulation space or escape route;

- provide and prominently sited 'no smoking' signage, perhaps supplemented by signage designed to discourage further smoking in the area where it has occurred e.g *'This area is subject to periodic inspection due to illegal smoking'*, or words to similar effect.

  ***NB**:This would be in addition to the signage required in order to comply with the basic requirements of the Act;*

- consider the installation of a self-contained tobacco smoke detector/s that will raise an alarm in the event that it detects tobacco smoke.

  ***NB**: These detectors are now widely available and may be stand alone battery powered units to protect one individual place or networked to provide a remote alarm to a pager/s or manned site such as a switchboard or reception desk. They provide a voice warning to persons in the area that tobacco smoke has been detected and request that cigarettes are extinguished. The content of the voice alert is programmable.*

4.33 The system does not raise a general alarm of fire and is not linked to the normal fire alarm system. No UwFS will be generated by the tobacco alarm, and may indeed prevent the normal fire alarm system activating due to the early detection of tobacco smoke.

Minimising UwFS due to patients

4.34 The instances of patient-activated UwFS occur predominantly in mental health wards. The majority of these are reported to be attempts by patients to gain attention or, where electronic door locks are linked to the alarm system, to abscond.

4.35 Due to the increased fire risks presented by mental health patients who may either inadvertently or deliberately set fires, it is not advisable to reduce the provision of automatic detection in order to minimise UwFS.

4.36 The level of staff supervision in mental health units will minimise instances of patients interfering with the automatic detection.

4.37 Activation of break-glass manual call points is more difficult to control, since the movements needed to activate a call point are less visible and hence more difficult for staff to prevent.

4.38 Where activation of call points by patients gives rise to UwFS, consideration should be given to providing measures such as lift flaps which prevent call point activation unless the flap is lifted. Further measures may utilise devices that activate a localised audible warning when a flap is lifted prior to call point activation. If such measures prove insufficient, a risk assessment should be undertaken to determine the impact of changing vulnerable break-glass call points to key-operated units which can be activated only by staff keyholders.

4.39 Little can be done to prevent UwFS with good intent. These are unlikely to present a significant problem, and it is important that people are never discouraged from operating a manual call point if they suspect that there might be a fire.

Minimising Group 1 classified UwFS

4.40 The mobilisation of external Fire and Rescue Authorities is particularly disruptive and involves a degree of risk. Measures should be taken to ensure that mobilisation of such resources does not occur unnecessarily.

4.41 Where a delayed call to a Fire and Rescue Authority is employed, alarms within the building where the activation occurs should be sounded immediately. Occupants of the building should evacuate and assemble as per local procedures, and call the Fire and Rescue Authority if appropriate.

4.42 On activation of an alarm, nominated security and/or other support staff should be sent to investigate the incident without compromising their safety. Those staff sent to investigate must have means of readily contacting the central point from which the incident is being controlled. On arrival at the area where the alarm activation occurred, attending staff should communicate the status of the incident immediately to the central control point. This allows the alarm to be cancelled and a call to the Fire and Rescue Authority avoided as appropriate.

4.43 Occupants of residences should be instructed to call the central control point if they are certain that an UwFS has been generated. Nominated staff should still attend to confirm the UwFS incident, and should take on the role of the line manager in gathering information and briefing the nominated responsible person.

4.44 In a large number of organisations, tenancy agreements for staff residences include penalty clauses for those tenants that generate UwFS. Such penalties

are usually financial penalties and/or ultimately eviction. Whilst these measures have shown some success in reducing UwFS, their use may be counter-productive where a delay to allow investigation is employed. Tenants responsible for generating an UwFS will not be inclined to contact the central control point regarding the incident if they are likely to face a fine or eviction. Hence penalties for generating UwFS should be reduced, or in some cases waived, where a tenant acts promptly to avoid an unnecessary call to the Fire and Rescue Authority.

5: References

BS 5839-1:2002, Fire detection and fire alarm systems for buildings, Part 1: Code of practice for system design, installation, commissioning and maintenance, British Standards (2001).

BS 7671, Requirements for Electrical Installations, British Standards (2001).

Firecode in Scotland: Policy and Principles, The Scottish Office.

Fire Practice Note 11, Reducing unwanted fire signals in healthcare premises, NHS Estates.

NHSScotland Firecode, SHTM 86 Version 3, Fire risk assessment in existing hospitals, Health Facilities Scotland (formerly NHSScotland Property and Environment Forum).

NHSScotland Firecode, SHTM 82, Version 2, Alarm and Detection Systems, Health Facilities Scotland (formerly NHSScotland Property and Environment Forum).

Scottish Health Technical Memorandum 2007: Electrical services supply and distribution, Health Facilities Scotland (2001) (formerly NHSScotland Property and Environment Forum).

Scottish Health Technical Memorandum 2011: Emergency electrical services, Health Facilities Scotland (2001) (formerly NHSScotland Property and Environment Forum).

Scottish Health Technical Memorandum 2014: Abatement of electrical interference, Health Facilities Scotland (2001) (formerly NHSScotland Property and Environment Forum).

Appendices

Appendix A: Categorisation of unwanted fire signals

Class		Definition	Examples
1	Malicious	Incident in which the fire alarm system has been activated as the result of the actions of a person who is aware that there is no fire.	Operation of a manual call point or tampering with an automatic detector with the intention of raising a fire alarm signal, knowing that there is no fire.
2	Good intent	Incident in which the fire alarm system has been activated by a person in the belief that there is a fire, when no fire actually exists.	Operation of a manual call point or an evacuation control at the control panel, in the erroneous belief that there is a fire.
3	Accidental damage	Incident in which the fire alarm system has been activated as a result of accidental mechanical damage.	Accidental mechanical damage to an automatic detector, manual call point, extinguishing system component, wiring or control equipment; ingress of water.
4	Alarm activated by patient or public	Incident in which the fire alarm system has been activated as a result of the actions of a person who is not a member of staff when there is no fire.	Fire alarm break glass point or detector activated where the person has not intended to act maliciously.
5	Environmental effect - Cooking fumes	Incident in which the system has responded to a fire-like phenomenon or environmental influence (other than those in 6 to 8).	Unwanted alarm as a result of detection of cooking.
6	Environmental effect - Smoking	Incident in which the system has responded to a fire like phenomenon or environmental influence (other than those in 5, 7 and 8).	Unwanted alarm as a result of detection of smoke from smoking material.
7	Environmental effect - Insects	Incident in which the system has responded to a fire like phenomenon or environmental influence (other than those in 5, 6 and 8).	Unwanted alarm as a result of detection of insects.
8	Environmental effect Other	Incident in which the system has responded to a fire like phenomenon or environmental influence (other than those in 5 to 7).	Unwanted alarm as a result of environmental influences (other than those included in 5 to 7).
9	System fault/design	Incident in which the system has produced a fire alarm signal as a result of an identifiable, diagnosed fault.	Circuit fault. Faulty detector. Unsuitable equipment or positioning.

Class		Definition	Examples
10	Non-compliance of system procedures.	Incident which resulted in inappropriate response to or incorrect action by a person (other than malicious action or accidental damage to the system and/or those in 7).	Test of system without prior notification of an alarm-receiving centre. Not closing off detectors when undertaking construction etc. Not using permit to work, eg hot working under detection.
11	Management procedures not complied with/building not used correctly	Incident which resulted in inappropriate response to incorrect action by person (other than those in 6).	Incorrect building management, such as leaving fire door to kitchens wedged open, actuating adjacent smoke detectors.
12	Bomb alerts	Incident which resulted in inappropriate response to the fire alarm being activated in order to evacuate persons from the premises in the case of a bomb warning or hoax.	Fire alarm activated by building manager following receipt of a bomb alert in order to evacuate the building quickly. The fire alarm should not be used for this purpose. The attendance at the building of the Fire and Rescue Authority would put fire-fighters unnecessarily at risk.
13	Sprinkler alarm - water pressure	Alarm signal arising from fluctuation of pressure within the sprinkler installation.	Increase in pressure of a town's main, pressure surge on start of sprinkler pumps, or loss of pressure in system.
14	Sprinkler alarm – other known causes	Alarm signal arising from a sprinkler installation for a known reason other than damage or water pressure variation.	There will be very few such incidents.
15	Unknown	Alarm signal arising from a source that cannot be reliably identified.	Unwanted alarm as a result of detection for reasons other than those included above.

Appendix B: Location details

Table 1 – Premises types			
List 1 Site		**List 2 Affected parts**	
1	Hospital/Clinic	1	Factory
2	Sheltered Housing	2	Office
3	Health/Residential Care	3	Shop
4	Hotel/Boarding Houses	4	Residential Staff
5	Industrial	5	Residential Public
6	Commercial	6	Residential Patient
7	Recreational	7	Sports
8	Educational	8	Entertainment (incl. cinema, theatre etc)
9	Dispersed Housing	9	Clinical area
10	HIMO (houses in multiple occupation)	10	Communal areas
11	Dwelling	11	Storage area
12	Prison/Police/Fire/Ambulance premises	12	Teaching area
13	Crown/Diplomatic Immunity	13	Food preparation area
		14	Concealed areas (voids etc)
		15	Other Healthcare Area

Table 2 – Area types			
Patient accessed areas		**Non-patient accessed areas**	
P1	General Medical Ward	S1	Catering
P2	General Surgical Ward	S2	Boilerhouse
P3	Mental Health Ward	S3	Plantroom
P4	Orthopaedic Ward	S4	Administration
P5	Paediatric Medical Ward	S5	Residences
P6	Paediatric Surgical Ward	S6	Laundry
P7	Paediatric Intensive Care	S7	Estates Department
P8	Intensive/Critical Care	S8	Medical Records
P9	Out-patient Department	S9	Occupational health
P10	Accident and Emergency	S10	Main stores
P11	Other Ward	S11	Mortuary
P12	Radiology	S12	Switchboard
P13	Pathology	S13	HSDU (hospital sterilizing and disinfecting unit) or central sterile services department
P14	Pharmacy	S14	IT department
P15	Operating theatre	S15	Education
P16	Retail area	S16	Garage
P17	Restaurant	S17	Other
P18	Other		

Table 3 – Rooms			
R1	Single bedroom	R20	Utility room
R2	Multi-bed room	R21	Disposal room
R3	Dayroom	R22	Linen room
R4	Bathroom	R23	Staff room
R5	Consulting/examination room	R24	Classroom
R6	Treatment room	R25	Electrical cupboard
R7	Waiting room/area	R26	Joiner's workshop
R8	Computer room	R27	Plumber's workshop
R9	Sewing room	R28	Engineer's workshop
R10	Gymnasium	R29	EBME (electro-biomedical engineering) workshop
R11	Hydrotherapy pool	R30	Calorifier room
R12	Library	R31	Lift plantroom
R13	Corridor/circulation area	R32	Duct
R14	Dining area	R33	Ceiling void
R15	Local kitchen	R34	Roof space
R16	Catering department kitchen	R35	Service void
R17	Servery	R36	Laboratory
R18	Office	R37	Bedroom (residence)
R19	Storeroom	R38	Other (state)

Appendix C: Incident briefing information

UNWANTED FIRE SIGNAL BRIEFING

Time: ..... **Date**: .....

Location:..... **Incident duration**: .....

Location of alarm signal: *(select codes from Appendix B)* Table 1 List 1 ☐ Table 1 List 2 ☐ Table 2 ☐ Table 3 ☐

Cause of alarm signal *(select codes from Appendix A)* ☐

Fire Service attendance: Yes ☐ No ☐ **Fire Response Team attendance:** Yes ☐ No ☐

Fire Service classification (if different from above): ☐

Fire Detection System information:

Panel Indicators: *(Tick all those applicable)* Fire ☐ Fault ☐ Pre-Alarm ☐ Warning ☐ Disabled ☐ Power ☐ Zone (number) ☐ Other (Specify) ☐

Panel Text Display:.....

.....

(enter text as displayed on System Panel and append System Printout)

Detector Indication:..... is an indicator visible on the initiating detector? Yes ☐ No ☐

Description of event: .....

.....

.....

.....

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.....

.....

.....

Completed by: .....

Signature: ..... Contact telephone:.....

Position:.....

Forward promptly to the Fire Safety Co-ordinator

Appendix D: UwFS Incident Report Form

REPORT OF INCIDENT

☐ fire ☐ unwanted fire signal

(Refer to Figure 2) unwanted fire signal

To be completed for both types of incident

Summary: ……

……

……

Healthcare organisation: .....

Building of origin: ..... Duration of incident: .....

Age of building: ..... Time of call to Fire Service: .....

Date of incident: ..... Time Fire Service arrived: .....

Time of incident: ..... Estimated cost of damage/disruption: .....

Location details:

Location of alarm signal: Table 1 List 1 ☐ Table 1 List 2 ☐ Table 2 ☐ Table 3 ☐

(select codes from Appendix B)

Unwanted fire signal incident details:

Cause of alarm signal ☐
(select codes from Appendix A)

Fire Service attendance: Yes ☐ No ☐ **Fire Response Team attendance:** Yes ☐ No ☐

Fire Service classification (if different from above): ☐

Fire incident details: *To be completed for fire incident*

.....

.....

Fire discovered by: . *To be completed for fire incident*

☐ Employee ☐ Visitor/passer-by ☐ Patient ☐ Smoke Detector

☐ Heat Detector ☐ Sprinkler ☐ Other (please specify) ……

Method of extinguishment: *To be completed for fire incident*

☐ None ☐ Fire hose ☐ Smothering ☐ CO_2 powder etc

☐ Self extinguished ☐ Dousing with water ☐ Removal ☐ Fire Service

☐ Portable extinguisher ☐ Equipment isolated ☐ Sprinkler

☐ Other (please specify) ……

Materials first ignited *To be completed for fire incident*

- ☐ Raw materials
- ☐ Bedding, mattress
- ☐ Fittings
- ☐ Decoration, soft toys
- ☐ Vegetation
- ☐ Upholstery
- ☐ Food
- ☐ Cleaning materials
- ☐ Clothing on person
- ☐ Other furnishings
- ☐ Electrical insulation
- ☐ Waste
- ☐ Other textiles
- ☐ Structures
- ☐ Lagging
- ☐ Unknown
- ☐ Other (please specify) ……

Spread of fire within room of origin *To be completed for fire incident*

- ☐ Not applicable
- ☐ Stored material
- ☐ Furnishings - linings
- ☐ Furnishings - Fittings
- ☐ Confined to item
- ☐ Equipment
- ☐ Other (please specify) ……

Cause of fire *To be completed for fire incident*

- ☐ Deliberate
- ☐ Water heating
- ☐ Equipment failure – electrical
- ☐ Smoking
- ☐ Cooking appliances
- ☐ Hot work
- ☐ Equipment failure - mechanical
- ☐ Unknown
- ☐ Space heating
- ☐ Lighting
- ☐ Wire and cable – fixed
- ☐ Central heating
- ☐ Naked lights
- ☐ Wire and cables
- ☐ Other (please specify) ……

Spread of smoke beyond room of origin *To be completed for fire incident*

- ☐ Not applicable
- ☐ Adjacent room(s)
- ☐ Stairway(s)
- ☐ Adjacent building(s)
- ☐ Confined to item
- ☐ Street/main corridor
- ☐ Other floor(s)
- ☐ Corridor(s)
- ☐ Adjacent department(s)
- ☐ Roof void(s)
- ☐ Other (please specify) ……

Spread of burning beyond room of origin *To be completed for fire incident*

- ☐ Not applicable
- ☐ Adjacent room(s)
- ☐ Stairway(s)
- ☐ Adjacent building(s)
- ☐ Confined to item
- ☐ Street/main corridor
- ☐ Other floor(s)
- ☐ Corridor(s)
- ☐ Adjacent department(s)
- ☐ Roof void(s)
- ☐ Other (please specify) ……

Route of fire spread *To be completed for fire incident*

- ☐ Not applicable
- ☐ Spaces/voids
- ☐ Open fire doors
- ☐ External
- ☐ Ducts
- ☐ Defective fire stopping
- ☐ Stairways/lifts
- ☐ Other (please specify) ……..

Effects on persons involved:

Extent of evacuation *To be completed for both types of incident*

☐ Unnecessary	☐ Department	☐ Floor	☐ Adjacent building(s)
☐ Room only	☐ Street/main corridor	☐ Other floor(s)	☐ Adjacent room(s)
☐ Adjacent department(s)	☐ Whole building	☐ Other (please specify) ……	

Fire response team *To be completed for both types of incident*

Response team involvement Yes ☐ No ☐ Number in team …… Duration of involvement ……

Answering the following by indicating numbers of persons involved; boxes should be left blank if the answer is 'none'.

Persons involved *To be completed for both types of incident*

Number of people in room of origin	☐ Patients	☐ Staff	☐ Visitors
Number of people evacuated from room	☐ Patients	☐ Staff	☐ Visitors
Number of people evacuated from department	☐ Patients	☐ Staff	☐ Visitors
Number of people evacuated from floor	☐ Patients	☐ Staff	☐ Visitors

Injuries to persons

	Patients			Staff		Visitors	
Injuries caused by	Killed	Injured	Condition aggravated	Killed	Injured	Killed	Injured
Burns							
Smoke Inhalation							
Evacuation							

Near miss information

The following information considers the possible implications had the fire incident spread further. Answer the following by ticking one or more of the options provided.

Area to be next affected *To be completed for fire incident*

☐ Not applicable	☐ Out-patients	☐ Boilerhouse	☐ Laundry
☐ Mental health ward	☐ A & E	☐ Street/main corridor	☐ Estates Department

☐ Elderly Ward	☐ X-ray	☐ Lab/pharmacy	☐ Adjacent building
☐ ITU/SCBU	☐ Main kitchen	☐ Main plantroom	☐ Main stores
☐ Other ward	☐ Admin/offices	☐ Operating department	☐ Medical records
☐ Education	☐ Other (please specify) ……..		

Estimated time before next area evacuated:.....

Estimated duration of evacuation to next area:.....

Additional Comments

Include sequence of events with brief description of building construction (if relevant). Provide sketches if necessary and use additional sheets if required.

To be completed for both types of incident

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For all Fires involving death, injury or damage which results in significant disruption to patient services, please complete and return this form to:

Mr I Grieve
Property Branch
Directorate of Performance Management and Finance
Scottish Executive Health Department
St Andrew's House
Regent Road
Edinburgh
EH1 3DG

Completed by:

Name:..... Position:.....

Signature: ..... Date:.....