



Tall building fire safety network

FIREX 22.05.2016





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The Validity of stay put strategies in high rise residential buildings.

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INTRODUCTION



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- 4) 15 years in the fire sector
- 5) 12 years fire risk management experience
- 6) 7 years fire risk management in social housing

Staying in a building
that is on fire is
perfectly safe.
But only if you live
there.

Things we know

1. Most people who die do so in their own home
2. Statistically more deaths occur in purpose built blocks of flats
3. Lakanal House implemented a stay put strategy, 6 people died there
4. Firefighter deaths occur in purpose built blocks, Shirley towers, for instance.
5. Stay Put cannot be safe.

What's the risk?

Exercise

Most likely scenario causing death:

1. What started the fire?
2. What caught fire first?
3. How old was the person that died?
4. Alcohol?
5. Profession?
6. Personal circumstances
7. Was there a fire alarm?
8. What room did they die in?

Deaths by primary ignition source

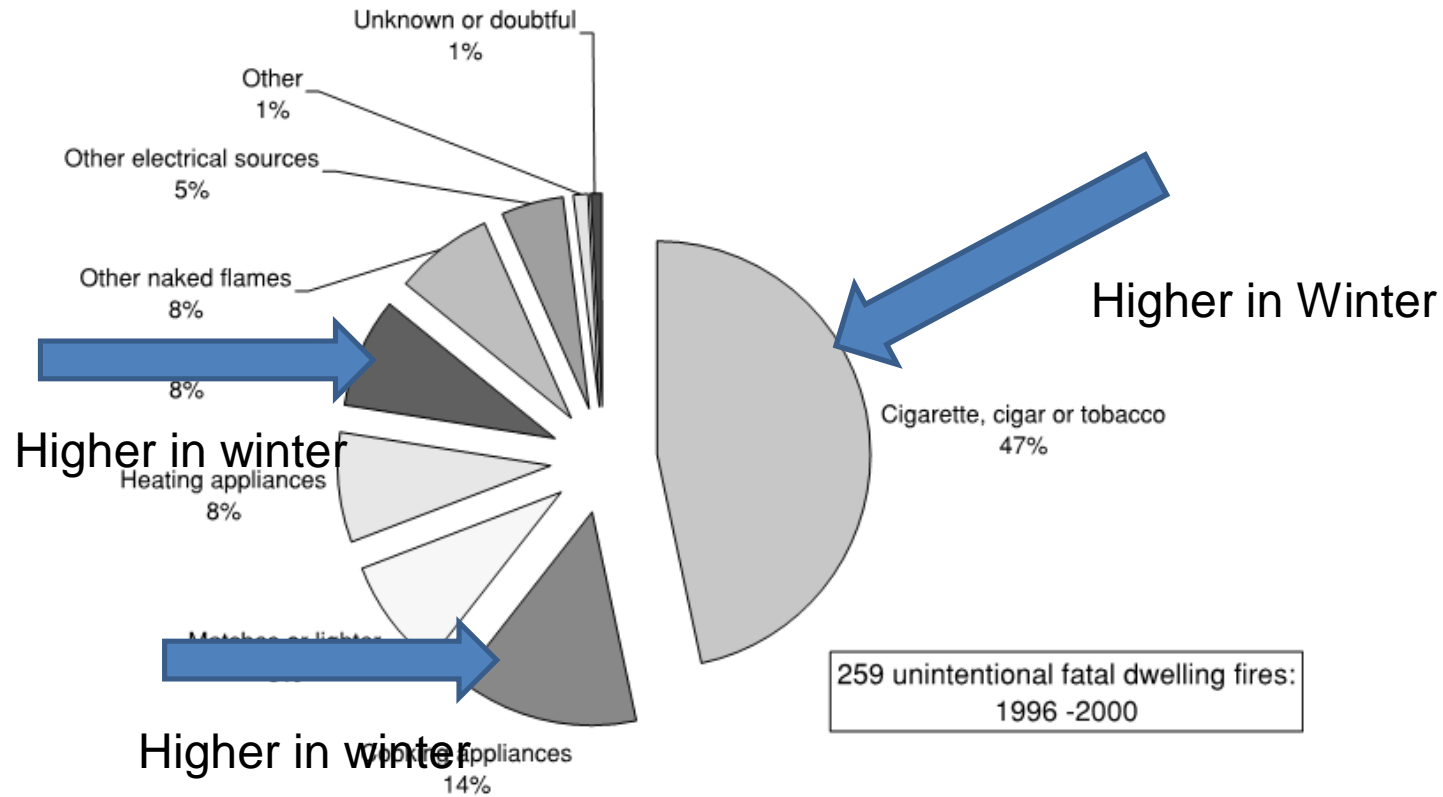
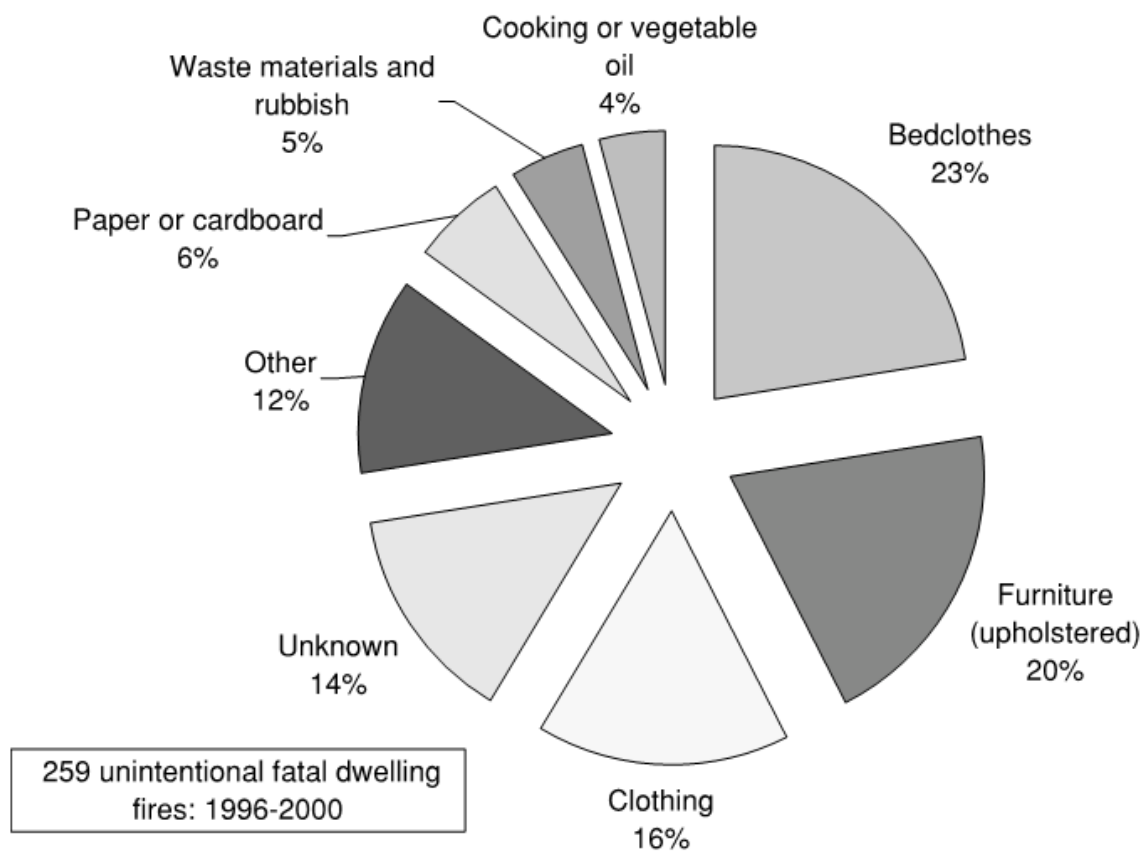
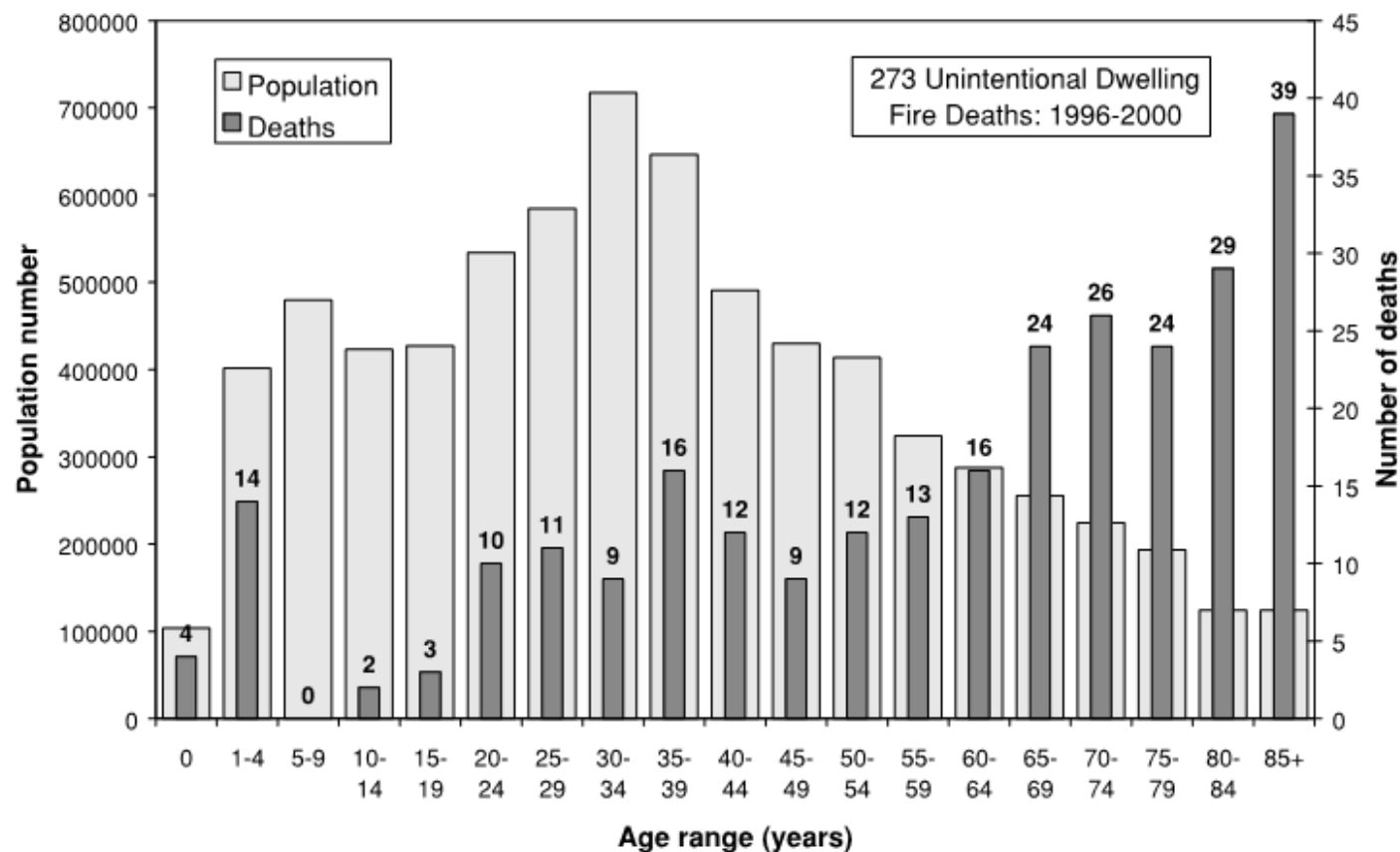


Fig. 1. Unintentional fatal dwelling fires by source of ignition.

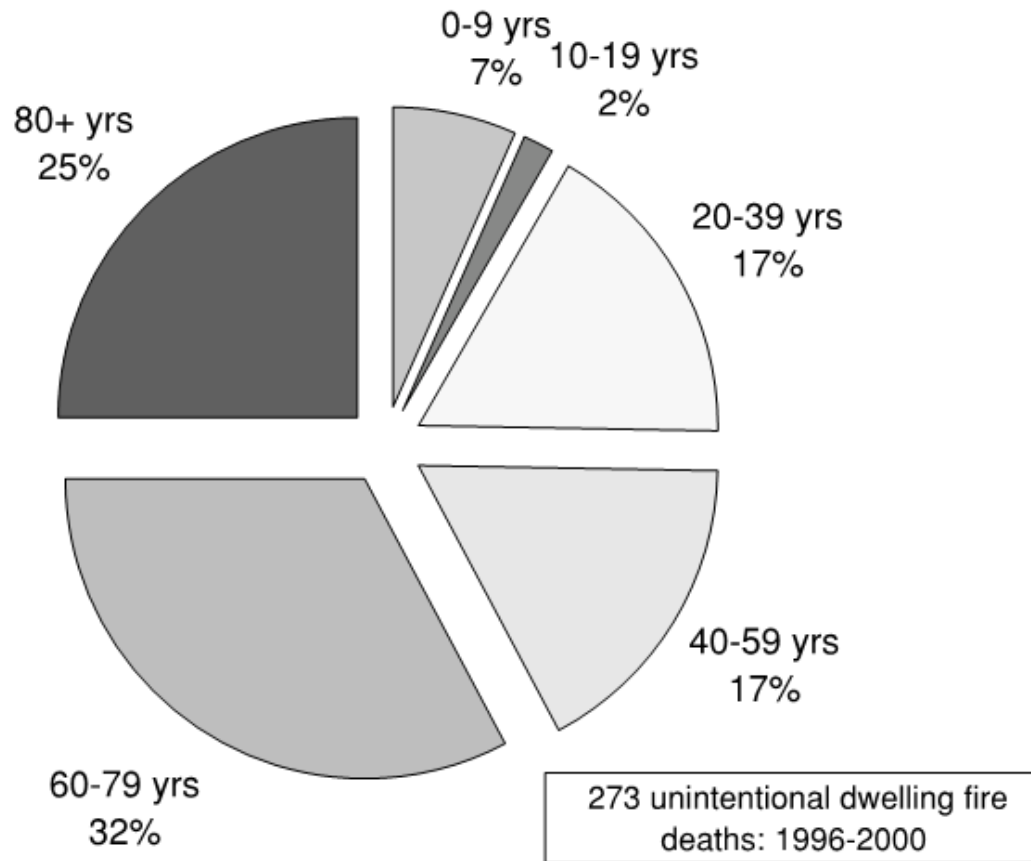
Deaths by first item ignited



Deaths Unintentional vs Age



Deaths based on age



Deaths based on age

- 57% over 60 years old.
- 9% under 20 years old
- More aged 1-4 than aged 5-19
- Aged 80 significantly higher than any other age demographic

Alcohol related deaths

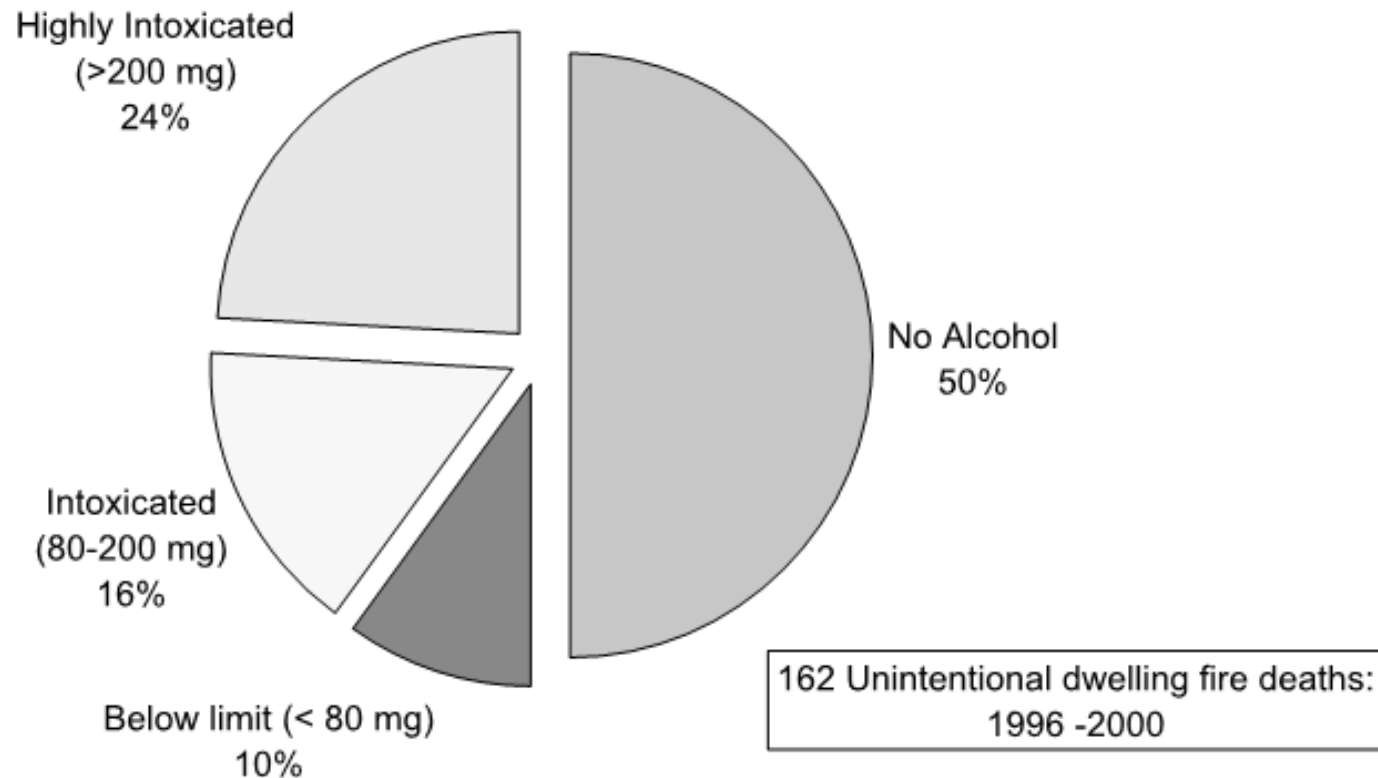


Fig. 13. Unintentional dwelling fire deaths by victims blood alcohol concentration.

Deaths by profession

Occupation of unintentional dwelling fire death victims

Occupation group ^a	Number of deaths	% of deaths
Retired	151	54
Unemployed	40	14
Child	22	8
Home-maker	10	4
Service & sales ^a	9	3
Associate professional ^a	6	2
Student	5	2
Managers & senior officials ^a	4	1
Machine operators ^a	3	1
Elementary occupations ^{a,b}	3	1
Trades worker ^a	3	1
Secretarial & admin ^a	2	1
Professional ^a	2	1
Unknown	19	7
All unintentional fatal dwelling fires	279	100

^a Occupation groups based on international standard classification of occupations ISCO-88.

^b For example labourers, cleaners, caretakers, porters, etc.

Personal circumstances

Table 8

Personal circumstances of unintentional dwelling fire death victims^a

Personal circumstances of victim	Number of fire deaths	Types of condition mentioned
Alcohol problem	17	Heavy drinkers, alcoholics, alcoholic vagrants
Asleep	9	Intoxicated, smoking in bed or chair
Disabled	58	Arthritis, bedridden, chairbound, frail, infirm, blind or partially sighted, physically disabled, stroke victim, MS, hip replacement, deaf
Ill health	17	Heart condition, epilepsy, diabetic, HIV positive, influenza or cold (could not hear fire or smell smoke), emphysema
Mental illness	15	Dementia, depression, schizophrenic, mentally handicapped, Alzheimers, senile dementia
Social outcast	1	Eccentric bag lady

^aBased on 117 unintentional dwelling fire deaths where the victim's personal circumstances were noted.



Fire alarm situation

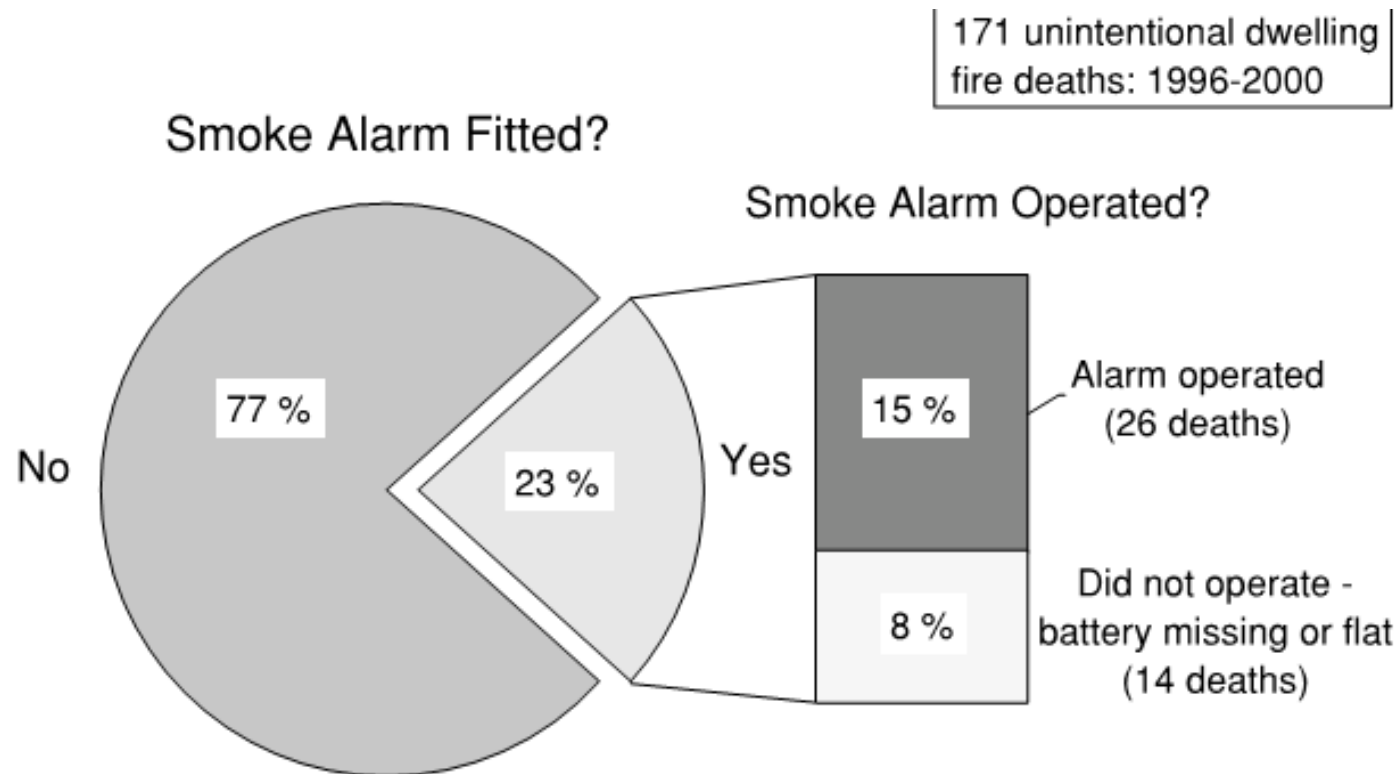


Fig. 18. Unintentional dwelling fire deaths by whether a smoke alarm was fitted.



Deaths by room of origin

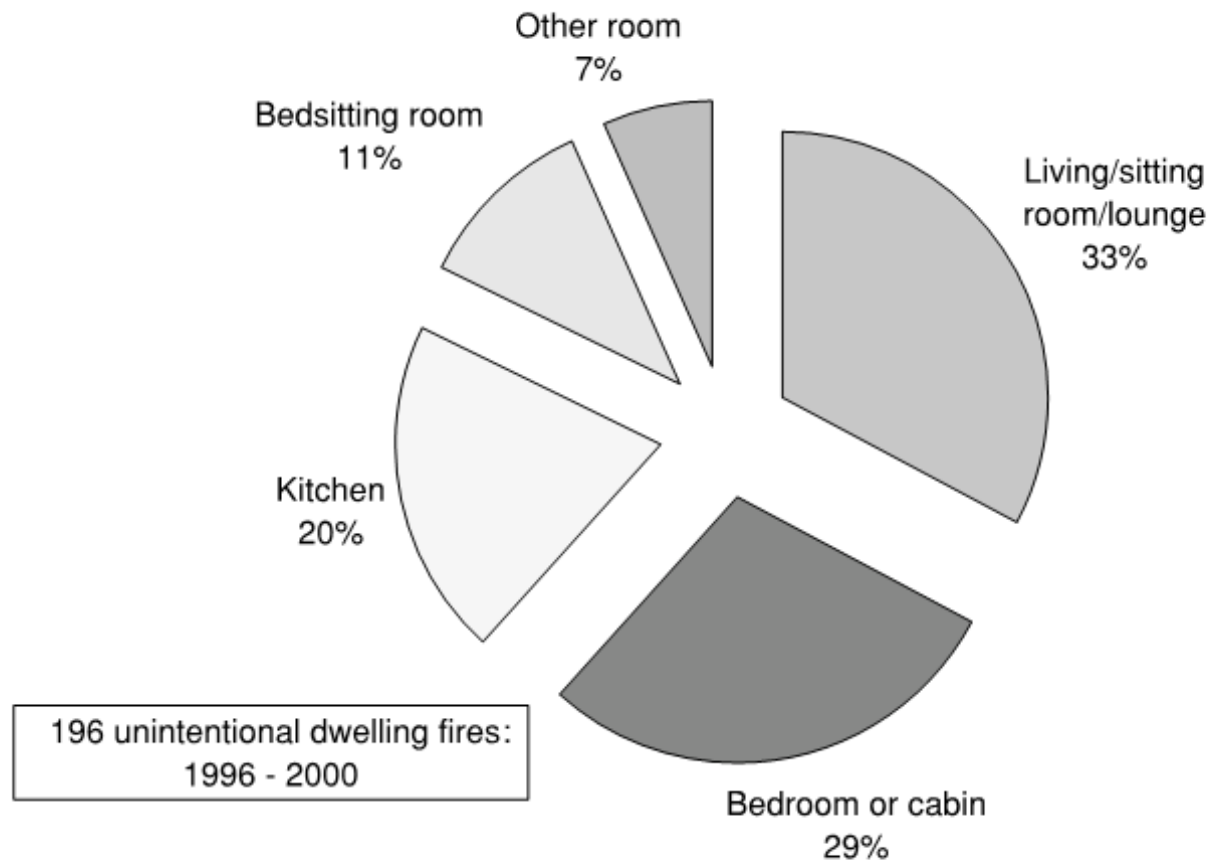


Fig. 19. Unintentional dwelling fire deaths by the room of fire origin.



People do indeed die at home.

- In reality the UK population are safer from the threat of fire in their homes than at anytime in recent history
- In 1979 865 people died in their homes as a result of fire.
- 35 years on they have fallen to 258.
- Cause of reduction?
- Prevalent use of fire alarms
- Improvement to furnishing regulations (flammability of domestic furniture)



More fires in purpose built flats

- In England approximately 10% of people live in a purpose built flat.
- 25% of dwelling fires occur within purpose built blocks of flats. (2009/10)
- As a result, 23% of fire deaths occurred within these types of blocks. (2009/10)
- Deaths vs the number of occupants is disproportionate.
- BUT! This is simply the result of the number of fires within these premises, most of which start accidentally. Not because of the design or the evacuation strategy.



WHY?

- We protect escape routes within purpose built blocks of flats to a higher degree.
- because each flat is totally enclosed in 1 hours fire resistance, the majority of fires are contained in the room of origin.
- It is rare for anyone to die outside the flat of origin.
- These factors are the basis of the stay put principle



The stay put principle

- When a fire occurs within one dwelling (or less likely the common part) it is usually safe for other residents to stay within their flats
- The principle is undoubtedly successful.
- In 2009/10 of 8,000 fire within this type of premises only 22 incidents required the evacuation of more than 5 people by the fire and rescue service.



A fire in a high rise
residential block
will kill me unless I
evacuate. Wont it?

High Rise Equals High Risk

- There is a common misconception that those living on the upper levels of high rise block of flats are at greater risk from fire than those that live in low rise blocks, houses and bungalows.
- Statistically there is no evidence to support this misconception even though the potential risk might be regarded as higher.
- The issues relating to window escape and fire service intervention limits based on height is taken into account in the design, layout and means of escape in modern blocks of flats.



Demographic input

- Taller blocks do indeed experience more fires than blocks of lower height.
- But the likelihood of death is no higher.
- A fire in a bungalow is more likely to result in a fatality than a fire in a high-rise block of flats
- Therefore, as in all dwelling types, the risk to people from fire in a block of flats is governed primarily by the likelihood of fire occurring and whether smoke alarms are installed, rather than the type, the height of the dwelling above ground or the architectural design of the block.



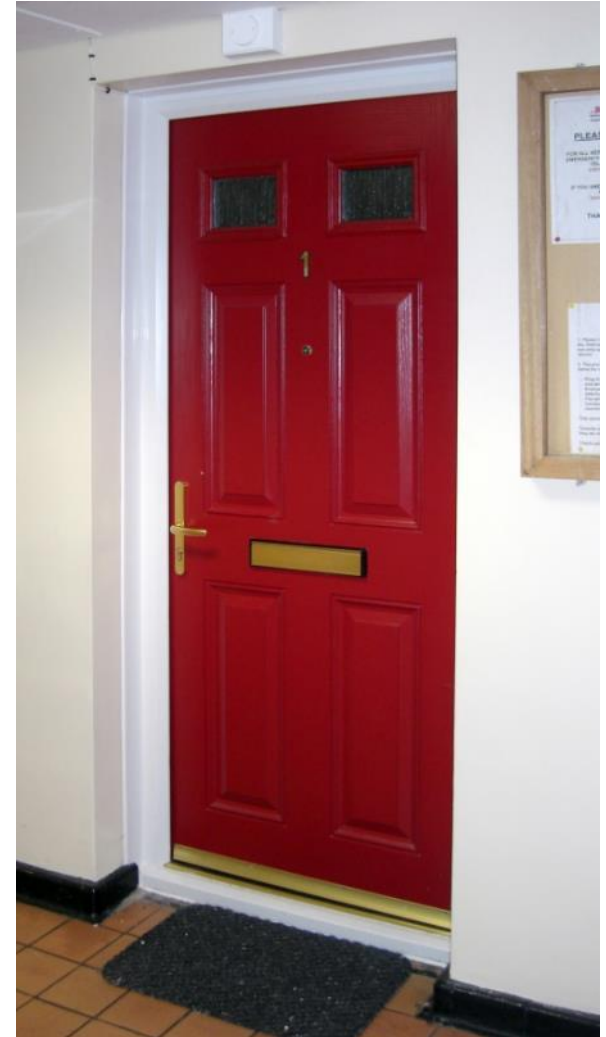
Are building design assumptions a leap to far?

Building design assumptions

- the most likely place of origin of a fire will be in a flat itself
- that there is a high degree of fire separation between flats and the common parts and, therefore, the likelihood of fire and smoke spread beyond the flat of origin is low
- the materials used in the construction of the building or the protection afforded to them are such that fire is unlikely to spread through the fabric of the building (modern construction however leads towards Timber)
- that the use of the common parts, and the nature of any combustible items present, is such that any fire originating in the common parts is unlikely to spread beyond the immediate vicinity
- there will be no external rescue, and residents should be able to escape by themselves.
- These assumptions dictate the appropriate protection for the communal means of escape.

Principles incorporated in the design:

- Front doors to flats need to be fire-resisting and self-closing.
- Corridors leading to stairways need to be enclosed in fire-resisting construction.
- Where there is only escape in one direction along a corridor, the extent of travel in such
- 'dead ends' need to be limited.
- Open decks and balconies need to be limited in extent if escape is only possible in one direction, with fire-resisting construction to protect people passing other flats to reach a stairway.
- Stairways need to be enclosed in fire-resisting construction, with fire-resisting, self-closing doors.



Principles incorporated in the design:

- Any external stairways need to be suitably separated from the building by fire-resisting construction and doors.
- Any areas, rooms or risers opening onto communal escape corridors and stairways need to be fitted with fire-resisting doors that are self-closing or kept locked shut.
- Arrangements for maintaining stairways clear of smoke need to be provided (through means such as openable windows and vents).
- Additional protection is needed where there is only a single stairway for normal access and for egress in an emergency, normally comprising lobby approach and permanent openings or automatically opening vents for clearing smoke.



Compartmentation

- The compartmentation between flats is similar to the party wall separation between adjoining houses, which prevents fire-spread from one house to another. It also enshrines the principle that a person's actions, while they may affect their own safety, should not endanger their neighbours.
- Compartmentation requires a higher standard of fire resistance than that normally considered necessary simply to protect the escape routes. This is to ensure that a fire should be contained within the flat of fire origin. In the majority of fires in blocks of flats, residents of other flats never need to leave their flats.



History vs the future

- Compartmentation is the essence of the 'stay put' principle. It has underpinned fire safety design standards from even before the 1960s. It still the basis upon which blocks of flats are designed today. In the majority of existing blocks, it remains entirely valid.
- Inevitably, fires do occur in which, for operational reasons, the fire and rescue service decides to evacuate others in the building. Fires have been known to spread beyond the flat of origin to involve other flats. In these cases, total evacuation of the block has sometimes been necessary. Although these fires are rare and due to construction faults.



So what is it then?

Stay Put

- When a fire occurs within a flat, the occupants alert others in the flat, make their way out of the building and summon the fire and rescue service.
- If a fire starts in the common parts, anyone in these areas makes their way out of the building and summons the fire and rescue service.
- All other residents not directly affected by the fire would be expected to 'stay put' and remain in their flat unless directed to leave by the fire and rescue service.
- It is not implied that those not directly involved who wish to leave the building should be prevented from doing so. Nor does this preclude those evacuating a flat that is on fire from alerting their neighbours so that they can also escape if they feel threatened.



The alternative: Simultaneous

- involves evacuating the residents of a number of flats together. It requires a means to alert all of these residents to the need to evacuate, ie a fire detection and alarm system. Purpose-built blocks of flats are not normally provided with such systems.
- Simultaneous evacuation is sometimes applied to buildings converted into blocks of flats where it has not been possible to achieve acceptable levels of compartmentation. In purpose-built blocks of flats, experience has shown that most residents do not need to leave their flats when there is a fire elsewhere. Indeed, they might place themselves at greater risk when they do so.



Over reaction to a misunderstood process

Prove to me its safe

- adopting a precautionary approach whereby, unless it can be proven that the standard of construction is adequate for 'stay put' simultaneous evacuation strategies are adopted, and fire alarm systems fitted retrospectively, in blocks of flats originally designed to support a 'stay put' strategy have been prescribed by assessors and enforcing authorities.
- This is unduly pessimistic, not justified by experience or statistics and it differs from the principles of fire risk assessment. Proposals of fire risk assessors, and requirements of enforcing authorities, based on an abandonment of a 'stay put' policy should be questioned



How are we improving safety in new builds?

Developments in technology and practise

- Many of today's existing buildings pre-date one of the most significant of these, the widespread use of smoke alarms in domestic dwellings.
- Some elements of fire safety design are no longer considered acceptable, eg escape into a neighbour's flat via a linking balcony.
- The approach taken to meeting fire safety principles has changed. For example, smoke containment is now preferred as the means of keeping common escape stairways clear of smoke, while smoke dispersal is deprecated.



Developments in technology and practise

- New forms of smoke control, using mechanical means, rather than natural ventilation, have been introduced. For example, systems using pressurisation to keep escape routes clear, and smoke extract systems are now being used in fire engineering designs for blocks of flats to facilitate extended travel within 'dead ends'.
- Building regulations require blocks over 30m in height to be fitted with sprinklers in the flats and can also provide design freedoms, for example in open plan layouts. Water mist systems are also now available. These too have been developed for domestic and residential applications



Summary and conclusion

- Stay put strategies work, they are statistically sound and historic multifatality fires can be attributed to other factors.
- Modern technologies will further improve the fire precautions within these type of premises implementing these strategies.
- The only issues with stay put strategies are those of management and build quality, not the strategy itself
- Build quality should be improved as should information relating to regulation 38
- Close management of these premises is essential and must be taken seriously for the life of the building.



CLOSING QUESTIONS



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