Fatal domestic fires 2003 and 2008 - 2011: a comparison

Abstract

An understanding of the critical factors in fatal domestic fires is indispensable for pursuing an effective fire safety policy. Therefore, the Netherlands Institute for Safety (NIFV)\(^1\) has been collecting data on fatal domestic fires since several years (2003 and 2008 till 2010), on a structural basis. Now, the data of the domestic fires in 2011 are added to this series. The NIFV collects the data in close collaboration with the National Fire Service Documentation Centre (NBDC) and the fire service officers and fire investigation teams involved in the fatal domestic fires. To this end, the fire service officers and fire investigation teams involved fill out a detailed questionnaire for each fatal domestic fire. From the data thus obtained, the NIFV analyses the causes, the conditions and the course of the fatal domestic fires. The study of the fatal domestic fires in 2011 was conducted on the authority of the WODC\(^2\), the Research and Documentation Centre of the Netherlands Ministry of Security and Justice.

In this report the results of the analysis of the fatal domestic fires in 2003, 2008, 2009, 2010 and 2011 are compared and combined. All of these fires were caused by accident: fires caused by intent (arson\(^3\), murder or suicide) were excluded from this study. It should be noted that in combining and comparing the data it is assumed that the effect(s) of any policy measures and other developments in the period concerned, is outweighed by the ‘natural’ variation in the data. The analysis of the fatal domestic fires in 2011 is described in a separate report.\(^4\)

In the years 2003, 2008, 2009, 2010 and 2011 in total 167 (accidental) fatal domestic fires occurred; these caused 184 fatalities. The characteristics of these fires were studied. A number of aspects of the (victims of the) fatal domestic fires was studied in 2008, 2009, 2010 and 2011, but not in 2003. These are, amongst others, the mobility of the victim, the factor crucial for the fatality of the fire (according to the respondents), the moment the victim died, and an number of relationships (‘cross links’) between certain characteristics of the fatal domestic fires (such as the relationship between the presence of smoke detectors and the mobility of the victim). Excluding the fatal domestic fires in 2003, in 2008, 2009, 2010 and 2011 combined 122 fatal domestic fires occurred causing 132 fatalities.

This study only concerns the fatal domestic fires: domestic fires in which no people were killed, were not included in this research.

Conclusions

From the comparison and combination of the results of the studies of the fatal domestic fires in 2003, 2008, 2009, 2010 and 2011, the following conclusions can be drawn.

\(^1\) NIFV: Nederlands Instituut Fysieke Veiligheid (Netherlands Institute for Safety).
\(^2\) WODC: Wetenschappelijk Onderzoek- en Documentatiecentrum (Research and Documentation Centre).
\(^3\) Not included in the definition of ‘arson’ are fires caused by children or adults of unsound mind.
NB: If a conclusion does not concern the fatal domestic fires in 2003, this is explicitly mentioned.

1. The number of fatal domestic fires and victims in the last three years (2009 up to and including 2011) clearly are smaller than in 2003 and 2008. The cause of this difference is unknown; whether this is a coincidence or not, is unknown either.

In 2003 and 2008 45 and 44 fatal domestic fires, respectively, occurred; these fires caused in total 52 and 49 fatalities, respectively. In 2009, 2010 and 2011 22, 30 and 26 fatal domestic fires, respectively, occurred; these fires caused 25, 30 and 28 fatalities, respectively.

2. One of the main causes of fatal domestic fires is smoking.

In each of the years studied, smoking is one of the three main causes of fatal domestic fires. Of all fatal domestic fires combined, smoking is the main cause (N=43, 34% of the fatal domestic fires with known cause, cumulatively).

Each year the cause of a large part of the fatal domestic fires is unknown. In the investigated years this adds up to 39 (cumulatively) of the fatal domestic fires.

3. Fatal domestic fires rather often start in (possibly) foam containing furniture.

In each of the investigated years a relatively large part of the fatal domestic fires started in (upholstered) furniture and beds/mattresses. In the investigated years combined, 31 (27% of the fatal domestic fires for which the object in which the fire started is known, cumulatively) fatal domestic fires started in furniture and 18 (16%, cumulatively) in a bed/mattress.

For 53 (cumulatively) of the fatal domestic fires it is unknown in which object the fire started.

4. Fatal domestic fires caused by smoking, often start in (upholstered) furniture and beds/mattresses.

In each of the years 2008, 2009, 2010 and 2011 the majority of the fires caused by smoking started in furniture and beds/mattresses; in 2003 this relationship was not studied. Of the 32 fires which in total in those years were caused by smoking (33% of the fatal domestic fires with known cause, cumulatively), 27 started in furniture (N=17) and beds/mattresses (N=10).

5. Fatal domestic fires rather often start in the living room and the bedroom.

In each of the investigated years the majority of the fatal domestic fires started in the living room or the bedroom. In the investigated years combined 60 fatal domestic fires (42% of the fatal domestic fires of which is known in which room the fire started, cumulatively) started in the living room, 36 (25%, cumulatively) in the bedroom and 10 (7%, cumulatively) in the bedsitting-
room.

For 23 (cumulatively) of the fatal domestic fires it is unknown in which room the fires started.

6. Fatal domestic fires often occur in flats/apartment buildings and single-family dwellings.

In each of the investigated years fatal domestic fires relatively often occur in these types of dwellings. In the investigated years combined 65 fatal domestic fires (40% of the fatal domestic fires of which the type of dwelling is known, cumulatively) occurred in flats/apartment buildings and 46 (29%, cumulatively) and single-family dwellings.

For 6 (cumulatively) of the fatal domestic fires the type of dwelling in which the fire occurred is unknown.

7. A relatively small amount of the dwellings in which a fatal fire occurred, contained a functioning smoke detector(s).

The majority of the victims of the fatal domestic fires in which a functioning smoke detector was present, was limitedly self-reliant.5

21 (18% of the fatal domestic fires for which the presence or absence of smoke detectors was known, cumulatively) of the dwellings in which in the investigated years a fatal fire occurred, contained a functioning smoke detector(s).

In the years 2008, 2009, 2010 and 2011 the victims of 14 of the 17 fatal domestic fires in the presence of a functioning smoke detector, were, for diverse reasons limitedly self-reliant (in 2003 this relationship was not studied).

It should be noted that the investigations do not provide information on the effectiveness of smoke detectors; to obtain such information, a study of the number of people timely escaping a domestic fire due to a smoke detector alarm is required.

8. Each year a relatively large part of the fatal domestic fires strikes people in the age category 60 and older.

In the investigated years combined 75 of the victims (45% of the victims of whom the age is known, cumulatively) were 60 years or older.

This number is relatively high, compared to the age distribution in the Netherlands. According to CBS6 data, on average in the years 2003 and 2008

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5 For 'self-reliant' the following definitions were applied:
- self-reliant is someone who has no visual, hearing or cognitive limitations, nor limitations in mobility;
- limitedly self-reliant is someone who has one or more limitations in visual, hearing and/or cognitive respect and/or with respect to his/her mobility.

With respect to the conclusions on the self-reliance of the victims of the fatal domestic fires, the reservation is made that it can be difficult for the respondents to properly assess this characteristic.
till 2011, 21% of the Dutch people was 60 years or older.

For 19 (cumulatively) of the victims of the fatal domestic fires the age was unknown.

9. Each year, a relatively large part of the fatal domestic fires strikes people who are not or limitedly independently mobile.\(^7\)

In the years 2008, 2009, 2010 and 2011 combined 41 of the victims (39% of the victims of whom the measure of mobility was known, cumulatively) were limitedly or not independently mobile.

For 26 of the victims their measure of mobility was unknown.

10. Fatal domestic fires strike sleeping people as well as people who are awake.

In the investigated years combined 100 of the victims (56% of the victims for whom there measure of alertness was known, cumulatively) were asleep or probably asleep and 78 (44%, cumulatively) of the victims were (probably) awake during the fire. For 6 of the victims this information is unknown.

11. Victims of fatal domestic fires are found both in the room where the fire started as in other rooms of the dwelling.

In the investigated years combined 98 of the victims (64% of the victims for whom this information is known, cumulatively) were found in the room in which the fire started. This indicates that these victims were unable to escape the fire.

In the investigated years this is often the case for fatal domestic fires which started in the living room, the bedroom and the bedsitting-room; cumulatively 67% of the fatal domestic fires which started in these rooms. In the other rooms in which fatal domestic fires started, the victims were found less often, comparatively.

54 victims (36%, cumulatively) were found in a room other than the room in which the fire started. For 32 (cumulatively) of the victims this information is unknown.

12. The respondents particularly mentioned as the factors crucial for the fatal ending of the fire in the years 2008, 2009, 2010 and 2011, the following:

- for the fires in which the victim (probably) was asleep: the velocity of the fire development, limited mobility of the victim and late discovery of the fire;
- for the fires in which the victim (probably) was awake: limited mobility of the victim.

\(^6\) statline.cbs.nl; CBS: Statistics Netherlands, the Dutch national institution for statistics.

\(^7\) With respect to the conclusions on the mobility of the victims of the fatal domestic fires, the reservation is made that it can be difficult for the respondents to properly assess this characteristic.
13. **The victims of fatal domestic fires often died on scene.**

In the investigated years combined 149 of the victims (84% of the victims for whom the place of death is known, cumulatively) died on scene.

For 6 victims this information is unknown.

14. **A large part of the victims of fatal domestic fires probably died before arrival of the fire brigade.**

In the fatal domestic fires in 2008, 2009, 2010 and 2011 83 of the victims (73% of the victims for whom the moment of death is known, cumulatively) probably had already died before the fire brigade arrived on scene.

For 18 victims (cumulatively) the time of death is unknown.

**Recommendations**

1. The base of the research ‘fatal domestic fires’ has some limitations. In order to improve the research, the following is recommended:
   - to register fatal domestic fires always and centrally and to investigate how to realise a conclusive system for registration;
   - to acquire data on fatal domestic fires timely, i.e. shortly after occurrence of fatal domestic fires;
   - to acquire data on fatal domestic fires in a standardised and structured way.

2. It is recommended to structurally study the causes, conditions and course of domestic fires which did not cause fatalities as well. This could provide understanding of the factors critical for surviving a domestic fire and offers the opportunity to study the effectiveness of policy measures. The research ‘fatal domestic fires’ does not give full insight in the effectiveness of policy measures.

3. It is recommended to always and immediately have the scene of a fatal domestic fire investigated by trained fire investigators.

4. Each year a relatively large part of the fatal domestic fires strikes people in the age category 60 and older. It is recommended to investigate what the (combination of) factors are which make people in this age group more vulnerable to fatal domestic fires than people in other age groups.