Nursing Home

Hartford, CT
February 26, 2003

16 Fatalities

Prepared by

Robert F. Duval
Senior Fire Investigator
National Fire Protection Association
ABSTRACT

A fire that broke out in the early morning hours of Wednesday February 26, 2003 in a patient room at a nursing home in Hartford, CT resulted in sixteen fatalities and dozens of injuries. At the time of the fire there were 148 patients being cared for at the facility. The three alarm fire damaged several patients’ rooms and a wing of the facility.

A master box alarm notified the Hartford Fire Department of the fire at the complex at 2:40 a.m. A first alarm assignment responded to the scene and arrived within four minutes and found a fire in a patient room in one wing of the building with staff removing patients from that wing and other affected areas of the facility. A second alarm was struck for this fire at 2:48 a.m. and a third alarm at 2:58 a.m., bringing additional fire and EMS resources to the scene.

Fire fighters and the facility staff were faced with not only a growing fire but with heavy volumes of smoke and numerous non-ambulatory patients exposed to the smoke and heat. Dozens of ambulances responded to the scene to transport patients to hospitals and other facilities.

The fire was declared under control at 3:30 a.m.

When the fire was extinguished the initial death toll was ten patients. This number grew to sixteen in the days following the fire as 6 other victims died from injuries and smoke inhalation suffered during the fire.

Investigators determined that the fire was caused when a patient ignited bedding on her bed in the room of fire origin, with a lighter. Charges were not pursued against this patient as it was determined that she was not competent to stand trial.
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Background</td>
<td></td>
</tr>
<tr>
<td>• Occupancy Classification</td>
<td>5</td>
</tr>
<tr>
<td>• Building Details</td>
<td>5</td>
</tr>
<tr>
<td>• Fire Protection</td>
<td>10</td>
</tr>
<tr>
<td>The Fire</td>
<td></td>
</tr>
<tr>
<td>• Incident Description</td>
<td>11</td>
</tr>
<tr>
<td>• Casualties</td>
<td>12</td>
</tr>
<tr>
<td>• Damage</td>
<td>13</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>• Origin and Cause</td>
<td>17</td>
</tr>
<tr>
<td>• Fire Growth and Spread</td>
<td>17</td>
</tr>
<tr>
<td>• Staff Response</td>
<td>20</td>
</tr>
<tr>
<td>• Applicable Code Sections</td>
<td>21</td>
</tr>
<tr>
<td>▪ Construction</td>
<td>23</td>
</tr>
<tr>
<td>▪ Detection</td>
<td>24</td>
</tr>
<tr>
<td>▪ Extinguishment Requirements</td>
<td>24</td>
</tr>
<tr>
<td>▪ Corridor Walls</td>
<td>25</td>
</tr>
<tr>
<td>▪ Corridor Doors</td>
<td>25</td>
</tr>
<tr>
<td>▪ Smoke Barriers</td>
<td>26</td>
</tr>
<tr>
<td>▪ Operating Features</td>
<td>26</td>
</tr>
<tr>
<td>▪ Smoking</td>
<td>28</td>
</tr>
<tr>
<td>Summary</td>
<td>29</td>
</tr>
<tr>
<td>NFPA Documents</td>
<td>32</td>
</tr>
<tr>
<td>Appendix</td>
<td>33</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

NFPA investigated the Hartford, CT, fire in order to document and analyze significant factors that may have contributed to the occupant fatalities.

The study was conducted by NFPA as part of an ongoing program to investigate technically significant incidents. NFPA's Fire Investigations Department periodically documents and analyzes significant fire events so as to report potential lessons learned in an effort to minimize future loss of life and property.

NFPA became aware of the Hartford, CT fire the day it occurred. NFPA Senior Fire Investigator Robert Duval traveled to Hartford to meet with investigators, fire officers, and fire fighters, to view the scene, interview participants, and perform an on-site study of the incident. The information gathered during the on-site activities and subsequent analysis of that information is the basis for this report. Entry to the fire scene was made through the cooperation of the Connecticut State Fire Marshal’s Office and the Hartford Fire Department.

This report is another of NFPA’s studies of fires having particularly important educational or technical interest. It is a project of NFPA's Fire Investigations Department intended to serve as an aid to researchers, safety specialists, and to the codes and standards development activities conducted by NFPA and other organizations. The opinions expressed and conclusions drawn are those of the NFPA staff who prepared this report and do not, therefore, necessarily represent the official position of NFPA or of the NFPA Technical Committees that develop NFPA codes and standards. (See NFPA Regulations Governing Committee Projects at 6-1.1.)

NFPA codes and standards, including NFPA 101, Life Safety Code and NFPA 5000, Building Construction and Safety Code are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interest to achieve a consensus of the effected interests on fire and other safety issues. NFPA does not determine the content of these standards but, instead, administers the process and establishes rules to promote fairness in the development of consensus.

All information and details regarding the fire safety conditions gathered in this report are based on the best available data and observations made during the on-site data collection phase and on any additional information provided during the report development process. It should be noted that the ability of NFPA Fire Investigations staff to collect all relevant facts and draw definitive conclusions may be limited by a variety of factors, including available time, and access. It is not the author’s intention to comprehensively document this
fire incident from all perspectives. The purpose of the report is not to pass judgment on or fix liability for the loss of life and property resulting from the fire. Rather, the report’s purpose is to identify factors that may have contributed to the loss of life and property and to provide analysis that may serve to better the understanding of how to minimize or prevent these losses in the future.

Current editions of relevant NFPA codes and standards were used as the basis for this analysis so that conditions at the scene of the fire could be compared with current fire protection practices. It is recognized, however, that these codes and standards may not have been in effect during the design, construction and operation of the building. NFPA has not analyzed the building in Hartford regarding its compliance with the local codes and standards in existence when the building was constructed and during its operation. In addition, NFPA reviewed available Health Care Financing Administration (HCFA) inspections reports as well as Licensing and Inspection reports from the Connecticut Department of Public Health, and the Connecticut State Police investigation report from the fire.

The cooperation of the Hartford, CT Fire Department and the Connecticut State Fire Marshal’s Office is greatly appreciated. The writer would also like to extend his appreciation to Connecticut State Fire Marshal John Blaschik, and Hartford Fire Marshal William Abbott for their assistance during the on-scene portion of the investigation and in preparing this report.
II. BACKGROUND

Occupancy Classification


By definition, a nursing home provides twenty-four hour nursing care to occupants who may have mental or physical incapacitation. Such occupants may not have the ability to provide for their own basic needs or safety unless assisted by others.

At the time of the fire 160 residents and staff were on site at the facility. This facility contained 73 rooms with a total of 150 beds at the time of the fire. The census of the facility was 148 residents.

Building Details

The facility was licensed for operation and received its certificate of occupancy and commenced operation in 1970. The building is a single story structure with a partial basement that was configured with 4 wings. (See Diagram 1.) At the time of construction, the Connecticut State Fire Code required that:

Convalescent homes of not more than one story above the basement or ground shall be of noncombustible construction throughout, having a fire-resistant rating of not less than one hour, or be completely protected by a system of automatic sprinklers installed and maintained in accordance with proper and accepted standards. (CT Fire Safety Code [1956] Section 29-40-101(b))

Subsequent to the building’s construction and according to the available information (including the most recent CMS inspection report (Form HCFA-2786P), the facility was given a Type II (111) rating. Construction definitions and descriptions are regulated by NFPA 101, NFPA 220 and NFPA 5000.
The Hartford facility classification is as follows:

<table>
<thead>
<tr>
<th>Type II</th>
<th>Hourly Fire Resistance of:</th>
<th>Hourly Fire Resistance of:</th>
<th>Hourly Fire Resistance of:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Denotes use of Non-combustible materials for Construction Components

- Exterior Walls
- Beams, Girders, Columns and Joists
- Floor to Floor Separations

While the designation of Type II (111) construction was given to the building, photographic evidence (Figures 3 and 8) suggests that a more appropriate classification may have been Type II (000). The referenced photographs do not show any type of fire proofing on either the steel bar joists or the underside of the roof deck. While the use of non-combustible materials were indeed evident, the hourly ratings of these members based on the analysis at the scene suggests that no protection was provided.

The NFPA investigation tried to locate rated ceiling assemblies (circa 1970) that may have provided 1-hour protection but could not locate any. However, based on the available evidence, the lack of a tested assembly appeared to have resulted in little or no difference in the outcome of the fire.

This subtle but potentially important detail is crucial since it can be a deciding factor when determining if this facility, even when defined as existing, would have required an automatic sprinkler system. Table 19.1.6.4 from NFPA 101 only permits Type II unprotected construction for single story facilities that are protected with sprinklers (see section starting on Page 19 of this report).

The building has a wood frame mansard type ornamental roof facade around the perimeter of the structure. The roof deck consists of built-up roof covering materials over corrugated metal panels supported by open web steel bar joists.
Diagram 1 - Facility Layout
Diagram 2 - Room Layout

Exterior walls are constructed of concrete block and brick. Interior walls were arranged as follows.

The patient rooms were situated on each side of an 8 foot wide corridor. As required by NFPA 101: 19.3.6.2, the corridor walls were constructed in such a manner to provide a ½ hour fire resistance rating. Construction of these walls was composed of concrete block (CMU) that extended from the floor slab to the underside of the roof deck. This configuration is intended to help manage smoke movement between the resident room and the corridor.

An analysis of the resident rooms in the wing of the fire origin did not reveal any unusual circumstances. Each pair of patient rooms is separated from the adjacent pair of patient rooms by a concrete block wall extending from the floor slab to the underside of the roof deck. The shared wall between the adjoining patient rooms making up each room set consists of gypsum board on steel studs. This partition extends approximately 6 inches above the
Diagram 3 - Corridor Layout

mineral tile suspended ceiling. This arrangement divides the patient rooms into a series of two room sections each. (See Diagrams 2 and 3)

The entrance door to each patient room was configured to serve directly from the corridor. (See Diagram 3) These room doors were 48 inches wide (leaf width) and were a standard 1-3/4 inch thick solid core wood door. The doors were mounted on a hollow metal frame. The doors were not equipped with a self closing or automatic closing device. They were, however, provided with (positive latching) hardware to maintain the door in the closed position once it was moved to that position.

The resident rooms were served by 8 foot wide corridors in all areas containing sleeping rooms. NFPA 101:19.2.3.4 specifies a minimum corridor width of 4 feet thus the facility provided ample room for relocation of residents during a building emergency. The particular corridor in the wing serving room 202 (room of origin) was subdivided by a smoke barrier. The corridor had a length of 80 feet – 7 inches from the exit discharge door at the end of the corridor to the nurses station. The corridor extended another 53 feet beyond the nurses station to the barrier that subdivided this corridor and the space adjacent to rooms 216 & 315. (See Diagram 3)

Another corridor that served the 100 wing ran perpendicular to this main corridor. It measured 65 feet to the smoke barrier wall that divided that
portion of the wing. This configuration allowed the nurses station to have direct visual supervision to most rooms.

The facility is divided into eleven (11) smoke compartments bounded by smoke barrier walls with a set of doors located across the corridors with such doors arranged to automatically close upon initiation of the building fire alarm system including smoke detector activation at the doors. These doors are also 1-3/4 in. thick solid-core wood doors in hollow metal frames, with each door being 44 in. wide.

Heating and air conditioning was provided through individual, wall-mounted heat pump units in each patient room. The configuration alleviated the need for extensive use of HVAC ducts and routing thus reducing other potential areas for smoke spread. The dining room and lounge areas contained baseboard type hot-water heating.

The facility housed an “Acute Care” area in the 800 wing. This space was reconfigured in 1994 to accommodate patients who may have required a somewhat more advanced level of nursing care. Patient rooms and care areas in the 800 wing were provided with medical gas piping and vacuum piping systems. At the time of the fire, 22 residents were located in this area.

Normal building electrical power was provided through an overhead connection from the local utility grid. The facility was equipped with a diesel fuel-powered emergency generator. Primary utility power was never lost thus the generator never had to start.

Interior finish in corridors and exit passageways was Class A with a flame spread index of ≤25. Interior finish for patient rooms and other occupied spaces was also determined to be Class A with flame spread index of ≤25.

**Fire Protection**

The facility fire alarm system was connected to the Hartford Fire Department through a master box arrangement (#4662). The facility fire detection system consisted of smoke detectors in the corridors, and in common areas.

The alarm system is tested monthly by the facility’s maintenance staff. The system is tested and inspected semi-annually by an outside contractor. All smoke detectors were replaced in December, 2002.

A laundry chute was installed between the first floor and the partial basement area. A single automatic sprinkler, supplied by the domestic water system, was also installed in the laundry chute.
Portable fire extinguishers are located throughout the facility. The attendant nursing staff was provided with classroom type training in the use of the extinguishers. There was an attempt to use the extinguisher located near the room of origin. Normal or typical protocol calls for responding staff to attempt extinguishment after residents are relocated and room doors have been closed to contain or minimize the effects of the fire and smoke. These units are inspected by an outside contractor.

A chemical extinguishing system is installed in the kitchen for protection of the exhaust hood area. This system is inspected and maintained by an outside contractor.
III. THE FIRE

The fire originated in Room 202 in the “200 wing” of the facility. Room 202 housed two patients – one ambulatory and one non-ambulatory.

The fire was discovered at approximately 2:40 a.m. on February 26, 2003 after the ambulatory patient from Room 202 attracted the attention of a nurse at the nurses’ station in the “200 wing”. This patient pointed to Room 202 and indicated that there was fire within the room. The nurse went to investigate and when she entered the room noticed a fire on the unoccupied bed closest to the door. She then activated the manual fire alarm box (pull station) closest to room, and called for assistance from other staff members. According to the facilities emergency plan, staff members, including the nursing supervisor were notified of the fire. Calls to “911” were made by facility staff. Activation of the corridor detectors and pull station also initiated fire department notification via the master box connection.

Staff members began to rescue those patients most seriously exposed by the now growing fire including the other occupant of the room of origin, a non-ambulatory female. Staff members with some efforts moved her down the corridor toward the nurses' station, away from the fire. Staff members continued their attempt to remove patients from immediate danger or to close patient room doors until relieved by fire fighters.

The initial response from the Hartford Fire Department was 3 engines, 2 ladders, a heavy rescue unit (Tactical Unit), and a district chief. The initial fire department unit (Engine 11) arrived at 2:44 a.m. As additional units arrived a water supply was established and hose lines were advanced into the 200 Wing corridor. Other fire units began ventilation operations and assisted in the rescue and removal of those patients in the 200 Wing and adjacent areas.

Due to the magnitude of the rescue and medical situation a second alarm was requested at 2:48 a.m. followed by the third alarm at 2:58 a.m.

Numerous additional EMS units were requested to the scene to assist in patient treatment and transport to local hospitals.

The fire was declared under control at 3:30 a.m.

Casualties

Initially there were ten fatalities at the scene. An additional six residents died as a result of injuries sustained during the fire, in the weeks following the fire. All but one of the fatalities were located in rooms in the 200 wing of the facility. The remaining victim was located in Room 301, just beyond the smoke barrier doors separating the 200 Wing from the 300 Wing.
The cause of death for the fatalities was listed as smoke inhalation and complications from smoke inhalation.

### Table 1- Victim Locations

<table>
<thead>
<tr>
<th>Victim Number</th>
<th>Room Assignment</th>
<th>Action Taken</th>
<th>Location of Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>203</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td>2</td>
<td>301</td>
<td>Removed from room</td>
<td>Note 2</td>
</tr>
<tr>
<td>3</td>
<td>216</td>
<td></td>
<td>Note 1</td>
</tr>
<tr>
<td>4</td>
<td>207-2</td>
<td>None</td>
<td>Room 207 on floor near window</td>
</tr>
<tr>
<td>5</td>
<td>207-1</td>
<td>None</td>
<td>Room 207 on floor near rear door</td>
</tr>
<tr>
<td>6</td>
<td>201</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td>7</td>
<td>212-2</td>
<td>None</td>
<td>Room 212/Bed 2</td>
</tr>
<tr>
<td>8</td>
<td>206</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td>9</td>
<td>202-2</td>
<td>Removed from room</td>
<td>Corridor near rooms 211 &amp; 212</td>
</tr>
<tr>
<td>10</td>
<td>216</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td>11</td>
<td>204-2</td>
<td>None</td>
<td>Room 204/Bed 2</td>
</tr>
<tr>
<td>12</td>
<td>203</td>
<td></td>
<td>Note 1</td>
</tr>
<tr>
<td>13</td>
<td>211</td>
<td></td>
<td>Note 1</td>
</tr>
<tr>
<td>14</td>
<td>211</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td>15</td>
<td>212-1</td>
<td>None</td>
<td>Room 212 on floor near Bed 1</td>
</tr>
<tr>
<td>16</td>
<td>210</td>
<td></td>
<td>Note 2</td>
</tr>
</tbody>
</table>

**Note 1:** Victim pronounced dead on site at location other than room.  
**Note 2:** Victim pronounced dead at local hospital in the days following the fire.

### Damage

Damage from the fire was confined mostly to the 200 Wing of the facility. Smoke and minor water damage extended to adjoining areas of the complex.

The area most extensively damaged is the north end of the 200 wing corridor. The most heavily damaged room was Room 202, the room of fire origin. Fire damage was noted throughout the corridor, and within several rooms where the doors were not closed during the fire. Damage in the rooms in the 200 Wing, where the doors were closed, was much less severe and in some cases there was no damage. Heat and smoke damage extended down the
corridor toward the nurses’ station and up to the south and west smoke barrier doors. Damage due to smoke on the unexposed sides of these smoke barrier doors was light, consisting of soot and smoke staining around the doors and on some horizontal surfaces. (See Figures 1-4)

Figure 1 - View from outside of the building showing the window of the room of origin (NFPA)
Figure 2- The room of origin viewed from the corridor (NFPA)
Figure 3 - 200 Wing Corridor (facing south) from outside the room of origin (NFPA)

Figure 4 - Damage at the 200 Wing nurses station (NFPA)
IV. ANALYSIS

Cause and Origin

Investigators from the Hartford Fire Department and Connecticut State Fire Marshals Office have determined that the fire started in Room 202. The cause of the fire was the ignition of bedding materials on a patient’s bed in that room. The ambulatory occupant of that room is suspected to have ignited the bedding on her own bed with a lighter. This patient was later deemed not competent to stand trial on arson charges. The Connecticut Department of Public Safety, Division of State Police classified the fire as first degree arson.

A disposable lighter, which was illicitly obtained by the resident accused of setting the fire, was considered to be the most likely ignition source. The evidence of the fire originating in Room 202 is strongly based upon the extensive damage and near total consumption of all available combustible in the room. Burn patterns, smoke damage and other signs of fire growth and spread decreased as you moved away from Room 202.

Fire Growth and Spread

The fire began on a patient’s bed in a room at the end of a corridor. The fire initially spread to the sheets and blankets on the bed before spreading to nearby combustible materials such as the bedding, furniture and other items within the room.

As the fire grew, heat began to spread from the room into the corridor. Thick smoke began to fill the corridor, as evidenced by the heavy smoke staining on the corridor walls throughout the smoke compartment. The fire spread to the adjacent patient room as well as into the corridor. A laundry hamper located approximately 40 ft from the room of fire origin in the corridor was consumed in the fire. As the fire spread in the corridor, it also spread into those rooms where the doors to the corridor were open, causing heavy damage in each of the rooms. (See Figures 5-7)

A large portion of the suspended mineral fiber ceiling in a metal grid framework was deformed by the heat and eventually fell, exposing the metal roof deck to the heat of the fire. A large area of oxidation was noted in the north and central portion of the roof deck and its supporting open web bar joists above the corridor ceiling. (See Figure 8)
Figure 5 - Patient room (204) where the door was open during the fire (NFPA)

Figure 6 – Exterior of closed door of patient room. (NFPA)
The fire vented out of the window in the room of origin and briefly entered the wood mansard eave space above the window, before being extinguished by the fire department. Interviews of the nursing staff also indicated that the window in Room 202 was also opened by a staff member during the rescue effort of the non-ambulatory patient.
Staff Response

An integral part of ensuring safety of the residents and patients in a nursing care facility is an executable and well thought out response by the staff. Since many, but not all nursing home patients are incapable of self preservation, the level of protection must also include an appropriate response and reaction by the facility staff.

The night shift staffing levels were typical on the evenings of the fire. Four nurses including the supervisor and 8 certified nursing assistants were on duty at the time of the fire. As previously noted, the nursing staff was notified of the fire event almost immediately by the ambulatory resident accused of setting the fire. Staff response became critical from the time the fire was first ignited.

The night shift nurse working near Room 202 was summoned to that area by the resident who set the fire. Both the nurse and the resident attempted to remove the bedding material and smother the fire. When this attempt was not successful, the nurse then proceeded to activate the manual pull station located near Room 202. A second floor nurse responded with a portable fire extinguisher. An attempt was made by that nurse to extinguish the fire. The first nurse then started a rescued attempt to remove the non-ambulatory patient in the bed near the window. This effort proved futile as the patient’s size precluded the nurse’s ability to move her without assistance. A third nurse arrived shortly thereafter. The non-ambulatory patient from Room 202 was positioned to the floor and an attempt was made to pull her into the corridor. Concurrently, the first nurse opened the bathroom doors that adjoined Room 204. There she proceeded to move the patient located by the room door into a wheelchair. This patient was successfully removed into the corridor and away from the fire.

The same nurse then returned to Room 202 with a comforter. The patient was positioned on the comforter and a “blanket drag” was executed by the nursing staff by taking her through the bathroom, and into Room 204. The patient was eventually located in the corridor near Room 212, as the nurse was nearly overcome by the smoke and heat conditions in the corridor, at that point.

These rescue attempts were executed to the best of the staff ability. Some factors however may have played a role in contributing to the spread of fire and smoke. The indicators are that the corridor doors in Rooms 202 and 204 were never closed. These are the two rooms where the rescues by staff were executed. Further, when the doors to the shared bathroom for Rooms 202 and 204 were opened, they were never closed. This allowed a second avenue for fire and smoke spread from Room 202 into Room 204. In addition, a second patient in Room 204 located in the bed closest to the
window was never removed due to the rapidly deteriorating conditions within the room.

Staff responses and drills are integral to the safety of the occupants. According to a witness statement, several of the certified nursing assistants were asking what to do as the fire was under way. Taking immediate and decisive action is necessary during a fire event that can have rapidly deteriorating conditions in a matter of minutes.


In the aftermath of the 1961 Hartford Hospital fire that killed 16 and the 1963 nursing home fire in Fitchville, Ohio that killed 63, the federal government enacted a law in 1967 requiring all nursing homes and hospitals to conform to NFPA 101® – Life Safety Code® (1967 edition at that time) in order to qualify for Medicare/Medicaid reimbursement. In the time since, the federal government has amended this to require compliance with newer editions (1976 edition, 1985 edition and the 2000 edition).

The analysis in this section is based on the application of the 2003 edition of NFPA 101, Life Safety Code. Except as noted, this analysis does not include an analysis of the fire in terms of other codes that may have been applicable.

The 2003 edition of the Life Safety Code was used for this analysis so that the conditions at this facility on the date of the fire could be compared to the latest edition of the Code. It is recognized that the 2003 edition of the Life Safety Code was not in effect in Hartford, CT, during construction or operation of this facility. At the time of the fire, the State of Connecticut used the 1997 edition of NFPA 101. The Centers for Medicare/Medicaid (CMS) commenced enforcement of NFPA 101 – 2000 edition in September of 2004.

As noted in the scope and purpose of NFPA 101, (see NFPA 101 at section 1.1 and 1.2), the code addresses items related to life safety during fire events and similar emergencies. Occupant safety is achieved through the use of multiple features and systems thereby allowing occupants to escape from the peril in the building by either leaving the building or, when appropriate, by relocating to a safe area within the building. In a health care setting, the ability to relocate occupants within the confines of the building is a preferred option. The non-ambulatory nature of most residents or patients makes them incapable of self preservation thus the Life Safety Code will provide multiple safeguards to protect them.

In Chapter 18 (New Health Care) and Chapter 19 (Existing Health Care), the section entitled operating features establishes a defined set of staff actions that have to be implemented during a fire emergency. While these
operational concerns may also be found in a fire code, NFPA 101 does not address all of the aspects associated with either a building code or a fire code.

The Life Safety Code provides requirements for both new construction and existing buildings. In various chapters there are specific provisions for existing buildings that may differ from those for new construction. For this analysis the following portions of the Code were used:

- Associated sections from the core chapters - Chapters 1 through 11 and
- Chapter 19, Existing Health Care Occupancies.

Health care occupancies, like this facility, provide sleeping accommodations for the occupants. The residents and patients in a nursing home are mostly incapable of self-preservation because of physical or mental disability or age. In other cases, occupants may be under security measures not under their control.

In health care occupancies regulated under NFPA 101, a specific goal is to minimize the need to evacuate the occupants from the building during a fire emergency. (See NFPA 101:19.1.1.3.1 and the Life Safety Code Handbook - 2003.) The movement of occupants away from the immediate area of the fire threat is contemplated. For example, relocation of patients from one smoke compartment to another smoke compartment is a consideration. In multiple story occupancies, moving occupants between floors if necessary is also a consideration. A measure of last resort is to require total evacuation of occupants to the exterior. This action, while very time consuming, may expose the occupants to unfavorable atmospheric conditions, (wind, rain, snow, low temperatures). Additionally, it can remove occupants from proximity to medical equipment, oxygen supplies or medications. The disruption caused by relocation to areas external to the building is only taken in the most extreme circumstances.

The protection scheme provided in a health care environment is different than in most other buildings and occupancies. Dependence on building evacuation is not feasible thus NFPA 101 applies the “Total Concept” approach. (See NFPA 101:19.1.1.3 and the Life Safety Code Handbook - 2003) This approach allows for a protect or defend-in-place strategy, to be applied. The “Total Concept” approach calls for 3 distinct areas to be addressed:

These are:

1) Design, construction, compartmentation
2) Provision for detection, alarm, extinguishment
3) Fire prevention procedures and the planning, training, and drilling programs for the isolation of fire, transfer of occupants to areas of refuse, or evacuation of the building.

An expansion of the total concept approach includes:\(^1\):

A) Prevention of ignition,
B) Detection of fire and notification,
C) Control of fire development,
D) Confinement of effects of fire,
E) Extinguishment of fire, and
F) Provision of refuge and evacuation facilities
G) Staff Reaction

**Construction**


The facility consists of a single story (with a partial basement) encompassing a floor area of approximately 53,000 sq ft.

Officials determined that this facility was not required by Connecticut code, at the time of construction, to be protected by automatic sprinklers.\(^2\)


**19.1.6 Minimum Construction Requirements.**

**19.1.6.4** Health care occupancies shall be limited to the types of building construction shown in Table 19.1.6.4, unless otherwise permitted by 19.1.6.5. (See 8.2.1.)

---


\(^2\) If the construction classification was defined as Type II (000) (See discussion on Page 5-6), the 2003 edition of NFPA 101 would only permit this type of construction in existing health care occupancies to remain if an automatic sprinkler system is provided.
### Table 19.1.6.4 Construction Type Limitations

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>Stories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>I (443)</td>
<td>X</td>
</tr>
<tr>
<td>I (332)</td>
<td>X</td>
</tr>
<tr>
<td>II (222)</td>
<td>X</td>
</tr>
<tr>
<td>II (111)</td>
<td>X</td>
</tr>
<tr>
<td>II (000)</td>
<td>X*</td>
</tr>
<tr>
<td>III (211)</td>
<td>X*</td>
</tr>
<tr>
<td>III (200)</td>
<td>X*</td>
</tr>
<tr>
<td>IV (2HH)</td>
<td>X*</td>
</tr>
<tr>
<td>V (111)</td>
<td>X*</td>
</tr>
<tr>
<td>V (000)</td>
<td>X*</td>
</tr>
</tbody>
</table>

X: Permitted type of construction.
NP: Not permitted.
*Building requires automatic sprinkler protection

(New nursing home facilities are required by Chapter 18 of the Life Safety Code to be equipped with sprinkler protection. (See 19.3.5.1.))

**Detection**

The facility was equipped with smoke detectors in all corridors throughout the building. The smoke detectors were connected to the facility’s fire alarm system.

**Extinguishment Requirements**

This facility was not equipped with automatic sprinkler protection. The Connecticut Fire Code at the time of the building’s construction did not require sprinkler protection in single story nursing facilities of “noncombustible” construction having a fire resistant rating of not less than 1 hour.

NFPA 101: 19.1.6 does require sprinkler protection in such facilities. See additional discussion under “Construction”.

The NFPA Technical Committee on Health Care Occupancies received several proposals for the 2006 edition of NFPA 101 that would require retroactive installation of sprinkler systems in all existing nursing homes. These proposals were approved by the Technical Committee and by the NFPA membership at the June 2005 meeting, and will go before the NFPA Standards Council in July, 2005 for final action.
Since 1991, new nursing home facilities have been required to be provided with sprinkler protection. (See NFPA 101:18.3.5.1.)

Refer to NFPA 101:19.3.5 – Extinguishing Requirements, for additional code requirements.

**Corridor Walls**

The walls of the corridor in the 200 Wing were constructed of concrete block and extended to the underside of the roof deck. Penetrations were sealed with masonry filler.

Corridors measured 8 ft wide throughout. The corridors in the wing of fire origin measured 80 ft - 7 in. in length from the end of the corridor to the nurses' station and another 53 ft in length beyond to the smoke barrier doors. Another corridor perpendicular to the main corridor measured 65 ft in length from the nurses' station to the second set of smoke barrier doors. (See Diagram 3).

Refer to NFPA 101:19.3.6 – Corridors and 19.3.6.2 – Construction of Corridor Walls, for additional code requirements.

**Corridor Doors**

Room doors were 48-inch wide, 1-3/4 in. thick solid-core wood doors in hollow metal frames. The patient room doors were equipped with positive latching mechanisms, however, were not equipped with self-closing devices.

A fundamental action that has to be taken by nursing staff is to close the patient/resident room doors that are in the area of the room of fire origin. Ideally, this would include all rooms within the smoke compartment. This task, however, is dependent upon the severity of the fire, the number of staff available to carry out the patient movement/relocation actions and the ability of the staff to continuously re-enter or remain in the fire area.

In past fire events, the concept of either keeping room doors closed or providing automatically closing doors has normally surfaced as a consideration. Having patient room doors remain in the open position is important for a number of reasons. During normal operations of the facility, it allows the nursing staff to simply notice if anything is out of the ordinary as they walk along the corridor. During a fire emergency, automatic door closers may inadvertently delay locating the room of origin. In other words, if all of the doors close, staff would have to check multiple rooms before locating the room of origin.
Reports made available from the local and state investigations did indicate that not all of the room doors were closed as directed in the fire emergency plan.

Refer to NFPA 101:19.3.6.3 – Corridor Doors, for additional code requirements.

**Smoke Barriers**

The facility was divided into eleven (11) smoke compartments by smoke barrier walls with pairs of doors located across the corridors with such doors arranged to automatically close upon any initiation of the building fire alarm system including smoke detector activation at the doors. These doors are also 1-3/4 inch thick solid-core wood doors hollow metal frames, each 44 inches wide.

The smoke barrier doors closed as designed during the fire and prevented a large amount of smoke from entering adjacent spaces. Only one of the fatalities was from outside of the smoke compartment of the fire’s origin. This male was located in a room immediately adjacent to a set of smoke barrier doors outside of the fire area located in Room 301. Indications are that this resident may had actually been moved towards the lounge between Rooms 214 and 311 (where patients were triaged initially), was exposed to the products of combustion briefly, and was returned back to his room.

Smoke migration beyond the smoke barrier wall was practically non-existent. The required design of the barrier walls met the requirements outlined in NFPA 101:19.3.7. This fire event confirms the importance of the smoke barrier compartmentation rules of NFPA 101 and the overall importance of the roles these barriers play.

Refer to NFPA 101:19.3.7 – Subdivision of Building Spaces, for additional code requirements.

**Operating Features**

The response by the staff was a mix of reactions. The valiant efforts by the three nurses who first responded were extraordinary. The fire had gained a strong hold once efforts commenced to try and save the non-ambulatory occupant in Room 202. Removal of the occupant by way of a wheel chair in the adjacent Room 204 also proved to be difficult, yet it was accomplished. The heat and smoke were too intense, however, to execute a rescue attempt for the other occupant in Room 204.
Although the facility had an emergency plan in place, follow up investigations by the Connecticut Department of Public Health, Division of Health Systems Regulations alleged that some components of the plan were either not properly reviewed or were not properly followed during the fire event. A complicating factor to this allegation was the fact that a state Medicare/Medicaid survey was concluded on 7 February, 2003 – just 19 days before the fire. The results of this survey indicated that no deficiencies had been identified.

Following the fire, a series of unannounced visits were made by the Division of Health Systems Regulation beginning on 26 February, 2003 and continuing through 9 May, 2003. Statements contained in the Division of Health Systems Regulation report, along with statements given to the state police, do indicate a concern with the response of the staff. Statements by the on duty staff do point to evidence that not all of the on duty staff responded, and that some of those that did had to be told what to do.

Staff interviews also had described the procedures for fire drills conducted at the facility. The “drills” were described as a question-answer format whereby staff was queried on what actions were to be taken and what procedures were to be followed. At least one staff had indicated that she had never participated in an executable drill. The operating procedures of the 1985 Life Safety Code, which had been the governing document under CMS regulation at the time of the fire required a participatory drill for all shifts. NFPA 101 (1985 ed): 31-4.1.3 is shown here:

31-4.1.3 Fire exit drills in health care occupancies shall include the transmission of a fire alarm signal and simulation of emergency fire conditions except that the movement of infirm or bed-ridden patients to safe areas or to the exterior of the building is not required. Drills shall be conducted quarterly on each shift to familiarize facility personnel (nurses, interns, maintenance engineers, and administrative staff) with signals and emergency action required under varied conditions. At least twelve drills shall be held every year. When drills are conducted between 9:00 p.m. (2100 hours) and 6:00 a.m. (0600 hours) a coded announcement may be used instead of audible alarms.

Of the 12 facility staff on duty that morning, 7 of the staff either did not respond to the fire area as called for in the plan, or waited to receive further instruction once the mass movement of residents was well underway.

A paper test of the drill procedures is not an adequate test of the staff knowledge. As required by both the 1985 and 2003 editions of NFPA 101, a participatory drill is necessary to permit staff to gain a full understanding, under more realistic conditions, as to what has to be done.
Refer to NFPA 101:19.7 – Operating Features, for additional code requirements.

**Smoking**

While a written smoking policy was in place for the facility, a number of questions arose during the follow up visits by the Division of Health Systems Regulations. The reports issued by both the Connecticut State Police and the Hartford Fire Department attribute the cause of the fire to have been intentional ignition of bedding material with a disposable lighter. In this particular event, there was no evidence that the ambulatory resident in Room 202 was smoking at the time of the fire. However, the fact that an instrument associated with smoking, the disposable lighter, was in her possession is cause for concern.

The facility had a designated smoking area that incorporated several features. These included the non-combustible ashtrays, non-combustible smoking aprons, an affixed lighter that could not be removed from the room, and a protocol requiring supervised smoking allowances for some residents. The facility also employed a classification scheme for its population of smoking residents such as supervised or independent.

Observations by the Division of Health Systems Regulation after the fire noted several instances of resident smoking actions that were inconsistent with the written policies. Changes to the plan, including closer observation and determination of resident smoking habits have since been instituted.

Institutional control of matches and lighters should be given top consideration when instituting a smoking policy or plan for the facility.

Refer to NFPA 101:19.7.4 – Smoking, for additional code requirements.
V. SUMMARY

This fire occurred just over 41 years after Hartford Hospital Fire (December 8, 1961), which killed 7 patients, 4 employees and 5 visitors.

Once again the City of Hartford and the State of Connecticut became the focus as another tragedy in a health care facility struck the region.

The state moved quickly to change legislation regarding the protection of existing nursing home facilities within the state. In addition, follow up surveys by the Connecticut Division of Health Systems after the fire, greatly helped the facility to develop several short term and long term strategies to improve the level of resident care.

On May 23, 2003, the Connecticut House of Representatives passed legislation requiring automatic sprinklers in all nursing homes within the state by a vote of 148-0.

Under the bill passed by the House, all nursing homes would be required to have automatic sprinklers installed throughout by July 2006 - regardless of when the home was constructed. (A 12 month extension was granted by the legislature in June, 2005.)

Among 254 nursing homes in Connecticut, 31 are partially covered by sprinklers and 17 homes contain no sprinklers protection. The remaining nursing homes already contain sprinkler protection.

The wing on which this fire occurred is now equipped with automatic sprinkler protection. Sprinkler protection is also being installed throughout the remainder of the facility, in accordance with the new legislation.

On September 25, 2003 tragedy struck again, this time in Nashville, Tennessee when a fire in another nursing home took 15 lives. A nursing home fire in Glasgow, Scotland resulted in 14 deaths on 21 January 2004.

The Hartford fire shares common themes with other losses in nursing homes. One element that may have contributed to the outcome is the staff response. As noted, only 5 of the 12 available staff responded to the fire area. At one point, 3 of the 5 staff were involved in a rescue attempt of just one person from Room 202. Additional responding staff may have made a contribution to the efforts to rescue other residents or contain the fire effects by closing additional resident room doors.

Another factor to contemplate is the enforcement of a defined smoking policy. While some facilities are in essence “smoke free”, designated areas, even if
outside, must be properly supervised. Operational procedures established by the facilities on the restriction and control of lighters and matches should also be considered.

Finally, lack of automatic sprinkler protection has been noted in previous nursing home fire losses. Given issues of staff training and response noted in this fire and other factors that may have impeded suppression of the fire and smoke spread, as well as rescue of occupants, this fire calls for careful reconsideration of the need for more widespread use of automatic sprinkler protection in nursing facilities.

It is important to recognize the components and features of this building that did perform exactly as intended. In particular, the design of the smoke barrier walls performed as intended. One fatality was reported on the opposite side of these walls in Room 302. Indications are that this resident had actually been moved towards the lounge between Rooms 214 and 311, was exposed to the products of combustion briefly, and was returned back to his room.

While the fire loss history in nursing homes has been good in the 1990’s and into the early part of 2003, the fire at the Greenwood Center Home and the September 2003 fire at a nursing home in Nashville, TN resulted in two major actions to further improve nursing home fire safety. These actions included NFPA and a US Senate request to the General Accountability Office.

First, the NFPA Technical Committee on Health Care Occupancies has accepted a series of proposals that will mandate the retroactive installation of automatic sprinklers in all existing nursing homes. This proposed change to the 2006 edition of NFPA 101 was voted on by the NFPA membership in June of 2005, and will go before the NFPA Standards Council for final action in July, 2005.

As further indication of the impact that the Hartford and Nashville fires had on the regulators of these facilities, the General Accountability office (GAO) launched a study in December of 2003 to look broadly at the issue of fire safety in the stock of US nursing homes. When the final report was released in July of 2004, the NFPA technical committee was already in the process of revising the code to address those issues relevant to NFPA 101. The major recommendations and actions from the GAO report include:

1. Emphasize inspection and follow up by CMS regional offices
2. Develop better data for CMS inventory of nursing home with/without sprinklers
3. Work with state agencies to establish a current sprinkler data base
4. Review all FSES approvals and waiver allowances
5. Add fire safety deficiency info to the Nursing Home Compare website
6. Consider changes for smoke alarm and sprinkler installation including financing options
7. Ensure detailed fire investigations are conducted following multiple fatality fires


The content of this report and the GAO document will hopefully be used by facility owners and operators, authorities having indications and federal and state regulators to make sure steps are taken to preclude these types of events in the future. Those organizations that develop Codes and Standards, including NFPA Technical Committees, are encouraged to study this report to determine what additional changes may be appropriate to the voluntary consensus codes.
VI. NFPA REFERENCE DOCUMENTS


NFPA 220 - Types of Building Construction
Summaries of NFPA accounts of Nursing Home Facility Fires

Fitchville, Ohio Nursing Home Fire Summary

During the early morning hours of Saturday, November 23, 1963, fire destroyed the Golden Age Nursing Home in Fitchville, Ohio, killing 63 of the home’s 84 elderly patients. The fire, which was found to be caused by defective wiring, spread throughout an undivided attic before it was discovered. Within minutes after discovery of the fire, the building filled with smoke and fire began to break through the ceiling into rooms and corridors.

Most of the victims were non-ambulatory and were trapped in their beds when the fire broke out.

The Golden Age home was located in a remote area approximately 10 miles south of Norwalk, Ohio, and 50 miles west of Akron, Ohio. The nearest fire department was in New London, 7.6 miles away.

At the time of the fire the building was 15 years old and had been converted from a factory into a nursing facility. The facility was designed to accommodate 86 patients. There were 84 patients within the home at the time of the fire.

The approximately 186 foot by 65 foot, single-story building was constructed with concrete block walls and interior partitions. The floor slab was made of concrete. The roof system was constructed of wood joists in a pitched arrangement. Ceilings consisted in part of fiberboard acoustical tile attached to a former combustible ceiling. A central corridor approximately 6-1/2 ft wide ran from the lobby area through the center of the main portion of the facility.

The building contained no automatic sprinklers or fire detection systems. There was also no local manual fire alarm system or emergency lighting. There was no on-site water for fire protection. There were a total of three manual fire extinguishers in the facility.

The unincorporated township of Fitchville had no fire department and contracted fire protection from the nearby town of New London, 7.6 miles to the east. Night telephone calls to the New London Fire Department were received at the local funeral home. The funeral home director would take the calls, start the siren, and then contact the fire chief. He and another man on duty at the funeral home would then telephone the fire fighters.
The Fire

Three attendants were on duty when the usual 4:00 a.m. bed check was made. An electrical heated steam table for warming food was plugged in at approximately 4:45 a.m. It is believed that this appliance caused a malfunction in the electrical system of the facility resulting in a fire that spread unnoticed into the attic space. Shortly before 5:00 a.m. an attendant noticed a bright light outside the main entrance doors. When she went to investigate she noticed that the light was actually a fire in the eaves of the roof near the lobby entrance where the building electrical service entered the building. When she went to attempt to use the phone to contact the fire department, she found that the line was dead. At about the same time, four passers-by stopped after noticing the fire from a nearby roadway.

Attempts were made to battle the fire from the outside with portable fire extinguishers as the staff began to remove patients. A passing motorist was instructed to go to a nearby home to notify the fire department, because the phone was out at the facility. The fire department was notified at 5:00 a.m.

While the fire on the outside of the building appeared small in size, it was spreading unseen throughout the undivided attic space, apparently aided by a strong wind that was blowing parallel to the long dimension of the building. When those battling the fire outside went back into the building, they discovered the building filling rapidly with smoke. Shortly thereafter, the lights reportedly went out.

Staff members and passers-by continued to attempt to remove patients as the fire and smoke worsened. The New London Fire Department arrived at approximately 5:10 a.m. At this point, the entire roof was consumed, and fire fighters found it impossible to enter the building to conduct further rescue attempts. Fire fighters requested additional assistance and battled the fire for several hours until declaring it under control at approximately 12:30 p.m.

The grim task of identifying the victims continued until the next day. Without the patient records, which were destroyed in the fire, the victims were identified by the location of their beds.

The State of Ohio had adopted regulations to go into effect on February 1, 1961, which would have required this facility and other similar occupancies to install either sprinklers or a fire detection system. The proposed regulations also would have required compliance with the National Electrical Code (NEC). The regulations also called for minimum staffing levels for nursing facilities. However, the regulations were being held up by challenges, which claimed that the provisions would cause hardship to many facilities. Therefore these regulations were not in effect at the time of the fire.
Nursing Home Fire – Marietta, Ohio – Summary


On January 9, 1970, a fire in the Harmar House Convalescent Home, a nursing home in Marietta, Ohio, took the lives of 31 elderly patients.

The facility was a one-story structure, completed in 1966, built in the shape of a cross. The structure was 244 feet long in the north-south direction and 134 feet long in the east-west direction. There was no basement or usable attic space. Patient rooms flank the hallways in the south, west, and north sections. The east section housed the dining room, the kitchen, and the staff dining area. The center section contained the nurses’ station, administrative office, and the medical room. Just northwest of those rooms are the boiler and storage rooms. A television lounge was located in the northeast corner of the facility, with an open porch between the lounge and dining areas. The end of the west section also contained an open porch.

The building was reportedly noncombustible, with the exception of the roof deck. The exterior walls were constructed of brick veneer on gypsum board. The roof deck was plywood on steel trusses supported by steel columns, with an asphalt shingle covering. The concrete floor was covered with nylon carpeting with a sponge rubber backing. The interior nonbearing walls were constructed of gypsum board on steel studs. The interior wall finish was reportedly water-based paint, with the exception of the walls at the head of each patient’s bed, which were was covered with fabric. The ceilings were reportedly noncombustible tile covered with a minimum of four inches of noncombustible insulation. Patient room doors were solid core.

The facility was equipped with a combination rate-of-rise and 136º fixed-temperature fire detection systems with a heat sensor in each room. If one of the sensors operated, an audible alarm sounded at the nurses’ station and activated a light on an annunciator panel, indicating the location of the alarm. The attendant at the nurses’ station would then activate a manual evacuation signal and notify the fire department by phone, because there was no direct connection between the facility and the fire department.

On the night of the fire there were 46 patients in the facility along with 6 employees. A fire alarm sounded at the nurses' station at 9:57 p.m., indicating a fire in the south section of the facility. The nurse at the station at that point sounded the evacuation alarm. Employees in the south section reported seeing smoke issuing from Room 104. Two employees rescued the
occupant of the room and reported seeing the fire burning on the floor in the room. After removing the patient in Room 104, one employee returned to attempt to extinguish the fire. However, the door to the room had been left open and the fire and smoke prevented her from entering the room and reaching the fire. As the other employees attempted to remove other patients, the head nurse ran to a nearby house to phone the fire department.

Fire companies were dispatched from two stations. When the fire fighters arrived, dense smoke was reportedly issuing from windows and doors, as patients were still being carried out of the building. Some fire fighters assisted with the rescue efforts and others attempted to locate the fire. Fire fighters located the fire in Room 104 and were able to extinguish the fire in the room and adjacent corridor area. Dense smoke hampered rescue efforts throughout the facility. Off-duty fire fighters were called to supplement the on-scene forces.

The fire was found to have originated in a plastic wastebasket in Room 104 and was believed to have been started by carelessly discarded smoking materials. The fire completely destroyed the interior of Room 104 and caused considerable heat and smoke damage throughout the remainder of the facility.

The night of the fire 21 of the 46 patients were pronounced dead. Smoke inhalation was listed as the cause of most of the deaths. Eleven others died in the coming days from complications related to the fire. Many of the 21 who perished during the fire were sleeping in rooms with the doors open. Two patients sleeping two rooms away from the room of origin (Room 44102) survived; the door to their room was closed.

The fire department extinguished the fire in a short time with less than 1000 gallons of water.

The significant factors that contributed to the outcome of this fire were found to be:

- Lack of smoke compartmentation in corridors
- Lack of automatic sprinkler protection
- Lack of early warning of the fire (smoke detection)
- Lack of direct connection of the fire alarm to the fire department
Nursing Home Fire – Norfolk, VA 10/5/89 (12 fatalities)

Abstract of NFPA Report

On October 5, 1989, a nursing home fire in Norfolk, Virginia, resulted in the deaths of 12 patients and hospital treatment or relocation of 96 others. The building, built in 1969, is a four-story, nonsprinklered, fire-resistive structure housing 161 elderly patients at the time of the fire. The first floor contained general administrative offices and support facilities, and patient rooms were located on floors two through four. The fire was discovered sometime after 10:00 p.m. by the nursing staff, which who immediately began to evacuate patients, activate the fire alarm system, close patient room doors, and notify the fire department. However, during this process, the fire grew within the patient room of origin and extended into the exit access corridor, forcing the staff to take refuge from the fire.

Norfolk Fire Department received notice of the fire at 10:18 p.m. and fire fighters arrived on the scene within four minutes of the notification. Upon arrival, they observed fire extending from a second floor window and lapping to the floor above. An interior fire attack was begun utilizing the building standpipe system while other fire fighters laddered the building, extended a handline, and “knocked down” the majority of the fire. Severe heat and smoke conditions existed on the fire floor and fire fighters began to realize many of the patients remained in their rooms. Because of these severe conditions, fire fighters began to evacuate patients from the fire floor.

Other arriving fire fighters, summoned by additional alarms, found moderate smoke conditions existing on the third and fourth floors.

Eventually, the entire nursing home was evacuated. Nine patients on the second floor died during the fire; eight of them were within the smoke zone of origin.

Local investigators have listed the probable cause of the fire as careless disposal of smoking materials. An open-flame ignition source ignited bedding materials on a patient’s bed, and soon involved a polyurethane decubitus pad and the bed’s mattress. The fire grew very rapidly while the staff was attempting to complete their emergency procedures. Within an estimated three to four minutes of discovery, flashover conditions were reached in the room of origin and the fire extended into the corridor.

The following are significant factors in this fatal fire incident:

1) The rapid growth and development of the fire within the patient room;
2) The absence of automatic sprinklers that could have prevented full room involvement or flashover;

3) The lack of compartmentation due to the open door to the room of fire origin;

4) The lack of automatic detection and failure of the fire alarm system to function properly.