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## Analysis of Fire Incidents in Homecare Oxygen Therapy Based on Data Review and Literature

### Introduction

The combination of smoking or open flames together with oxygen is dangerous and can lead to fires. Patients receiving oxygen therapy at home, sometimes do not follow the safety instructions related to using oxygen safely and, as a result, fires may occur.

This Technical Bulletin provides advice to Homecare Service Providers on the mitigation of fires in homecare oxygen therapy based on both a literature review and an analysis of the occurrences of oxygen fire incidents at homecare patients recorded by EIGA members.

### Literature review

EIGA members performed a literature search in MEDLINE from January 2010 to 2019 [1].

The search obtained 715 references, which resulted in 16 fits to the goal. Furthermore, EIGA considered relevant references of the retrieved scientific articles.

Fire incidents during home oxygen therapy is a subject of concern amongst all healthcare authorities and service providers.

The literature emphasizes the importance of education and training of patients and carers provided by healthcare staff and Healthcare Service Providers, with focus on the dangers of combination of oxygen with heat sources, especially smoking during oxygen treatment. Nevertheless, smoking and related material remains the main cause of fire incidents involved Homecare Oxygen Therapy (HOT) [2-9].

Although there are some references on the use of cannula thermal fuses (sometimes called ‘firebreaks’) [2, 10, 11], not enough independent evidence has been found that supports or contradicts the added value of the use of a cannula thermal fuse in the prevention or reduction of fire incidents among patients during HOT.

Notwithstanding this limitation, EIGA collected data over a period between the 1st January 2013 and 31st December 2017 (referred to hereafter as ‘this period’) on the occurrences of fire incidents at patients undergoing HOT, both with and without cannula thermal fuses.

### Data collection and review

Information has been collected over this period by EIGA members related with fire incidents with homecare oxygen therapy patients. Data have been retrieved from 16 countries: Austria, Belgium, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, the Netherlands and the

UK. Patient population was over 2 million (as total number of patients in this period).

This data counted 15 fatalities in Europe, i.e. 0.7 fatalities per 100 000 HOT patients caused by fires. For 7 out of these 15 fatalities the supply source of oxygen was a homecare oxygen concentrator, 6 fatalities had occurred with liquid oxygen therapy, 1 supply source was with gaseous oxygen and for 1 fatality the supply source was unknown.

In Europe between 2013 to 2017, in 12 out of the overall 15 fatalities the patient was a smoker; and 5 were equipped with devices which stop the flow whereas 7 were without devices which stop the flow.

In the United Kingdom, where devices which stop the flow in case of fire are required by the National Health Service (NHS), the fatality rate was 1.7 per 100 000 oxygen therapy patients. With oxygen concentrators the ratio was with 2.6 per 100 000 patients even higher.

In Germany, where devices which stop the flow in case of fire are systematically used for homecare oxygen concentrators since the safety note by Bfarm in 2011 (“BfArM-Bewertung bezüglich Sauerstoffkonzentratoren”, Reference No.: 2676/10 dated 27th September 2011 [12]), the fatality ratio was 1.2 per 100 000 patients. The fatality rate is significantly higher in these two countries (United Kingdom and Germany) where devices which stop the flow are required, compared with the rest of Europe (with a fatality rate of 0.3 per 100 000 patients).

These figures are summarised in the below table.

Fatality rate per 100 000 patients under oxygen concentrator therapy			
	EIGA – UK	EIGA - Germany	EIGA - EU (without Germany and UK)
Fatality rate	2.6	1.2	0.3

Table 1: Fatality rates per 100 000 patients in the United Kingdom, Germany and Europe.

EIGA could not find a correlation between the use of a cannula thermal fuse and a reduction in number of oxygen fires and related fatalities in homecare oxygen therapy.

## Conclusions

Based on literature and well-established experience, the best preventative actions to incidents and fires at homecare oxygen patients is the periodical training of the patient and their family or carer in the safe use of oxygen; in summary for the patients:

- ✓ Never smoke, or let someone else smoke near the patient, whilst using your oxygen equipment.
- ✓ Do not use oxygen therapy near heat sources (indoors and outdoors). Keep a distance of at least 1.5 m.
- ✓ Never apply oils or grease with your oxygen therapy.
- ✓ Use the medical oxygen equipment according to the training, applying strictly the safety recommendation.

Further information is provided in the Good Homecare Practice EIGA Doc 158 [13].

## References

- [1] Using the Pubmed search tool) and SCOPUS. Publications from January 2010 to 2019 were searched using following query: (((fire accident [Title/Abstract]) OR burn [Title/Abstract]) OR fire [Title/Abstract]) AND Oxygen).
- [2] Assimacopoulos EM, Liao J, Heard JP, Kluesner KM, Wilson J, Wibbenmeyer LA. The National Incidence and Resource Utilization of Burn Injuries Sustained While Smoking on Home Oxygen Therapy. *Journal of burn care & research: official publication of the American Burn Association.* 2016;37(1):25-31.
- [3] Al Kassis S, Savetamal A, Assi R, Crombie RE, Ali R, Moores C, et al. Characteristics of patients with injury secondary to smoking on home oxygen therapy transferred intubated to a burn center. *Journal of the American College of Surgeons.* 2014;218(6):1182-6.
- [4] Amani H, Lozano DD, Blome-Eberwein S. Brother, have you got a light? Assessing the need for intubation in patients sustaining burn injury secondary to home oxygen therapy. *Journal of burn care & research: official publication of the American Burn Association.* 2012;33(6): e280-5.
- [5] Carlos WG, Baker MS, McPherson KA, Bosslet GT, Sood R, Torke AM. Smoking-Related Home Oxygen Burn Injuries: Continued Cause for Alarm. *Respiration; international review of thoracic diseases.* 2016;91(2):151-5. 12.
- [6] Litt EJ, Ziesche R, Happak W, Lumenta DB. Burning HOT: revisiting guidelines associated with home oxygen therapy. *International journal of burns and trauma.* 2012;2(3):167-70.
- [7] Murabit A, Tredget EE. Review of burn injuries secondary to home oxygen. *Journal of burn care & research: official publication of the American Burn Association.* 2012;33(2):212-7.
- [8] Vercruyse GA, Ingram WL. A rationale for significant cost savings in patients suffering home oxygen burns: despite many comorbid conditions, only modest care is necessary. *Journal of burn care & research: official publication of the American Burn Association.* 2012;33(6): e268-74.
- [9] Ahrens M. Fires and Burns Involving Home Medical Oxygen. National Fire Protection Association, 2008.
- [10] Wolff KB, Soncrant C, Mills PD, Hemphill RR. Flash Burns While on Home Oxygen Therapy: Tracking Trends and Identifying Areas for Improvement. *American journal of medical quality: the official journal of the American College of Medical Quality.* 2017;32(4):445-52.
- [11] Cooper BG. Home oxygen and domestic fires. *Breathe (Sheff).* 2015;11(1):4-12.
- [12] [https://www.bfarm.de/SharedDocs/Risikoinformationen/Medizinprodukte/DE/Sauerstoffkonzentratoren\\_update.html](https://www.bfarm.de/SharedDocs/Risikoinformationen/Medizinprodukte/DE/Sauerstoffkonzentratoren_update.html)  
Reference No.: 2676/10 dated 27th September 2011
- [13] EIGA Document 158: *Good Homecare Practice* [www.eiga.eu](http://www.eiga.eu)

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