

# **Oxygen Fires in Healthcare Facilities**

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## Contents

- **Introduction**
- **What can happen when it goes wrong**
- **Typical timelines for an incident**
- **Lessons learnt from incidents**
- **Risk Assessment and Training**
- **Conclusions**

## Introduction

**Medical Oxygen is an essential for patient therapy in every hospital but:**

- **It introduces an element of risk into the hospital environment**
- **The risk of a fire is significantly higher when oxygen is present**
- **Oxygen is perfectly safe when used correctly**
- **Oxygen training for doctors and nurses in the correct procedures is the key to safety**
- **But.....**

## What happens when it goes wrong

**This incident occurred at Great Ormond Street Hospital in Central London on the 29<sup>th</sup> September 2008**

- **it started at 08.30 in the morning in a four bed intensive care ward in the Cardiac Wing**
- **Paediatric patients were being treated in this area with Berlin Heart machines – where a lot of oxygen is used**
- **It was all over in a matter of minutes**
- **and fortunately no patients were involved or hurt**

## What happened?

## Some interesting pictures

**Great Ormond  
Street Hospital**

**Can you see what  
is wrong with  
these Fire Doors?**

**Great Ormond  
Street Hospital**

Workshop 2012 – Oxygen Safety



**A cylinder – typical  
of the one involved  
in the incident**



**Great Ormond  
Street Hospital**

**What the cylinder  
looked like  
after the  
incident**



**Great Ormond  
Street Hospital**



**What the cylinder  
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**Great Ormond  
Street Hospital**

**What the cylinder  
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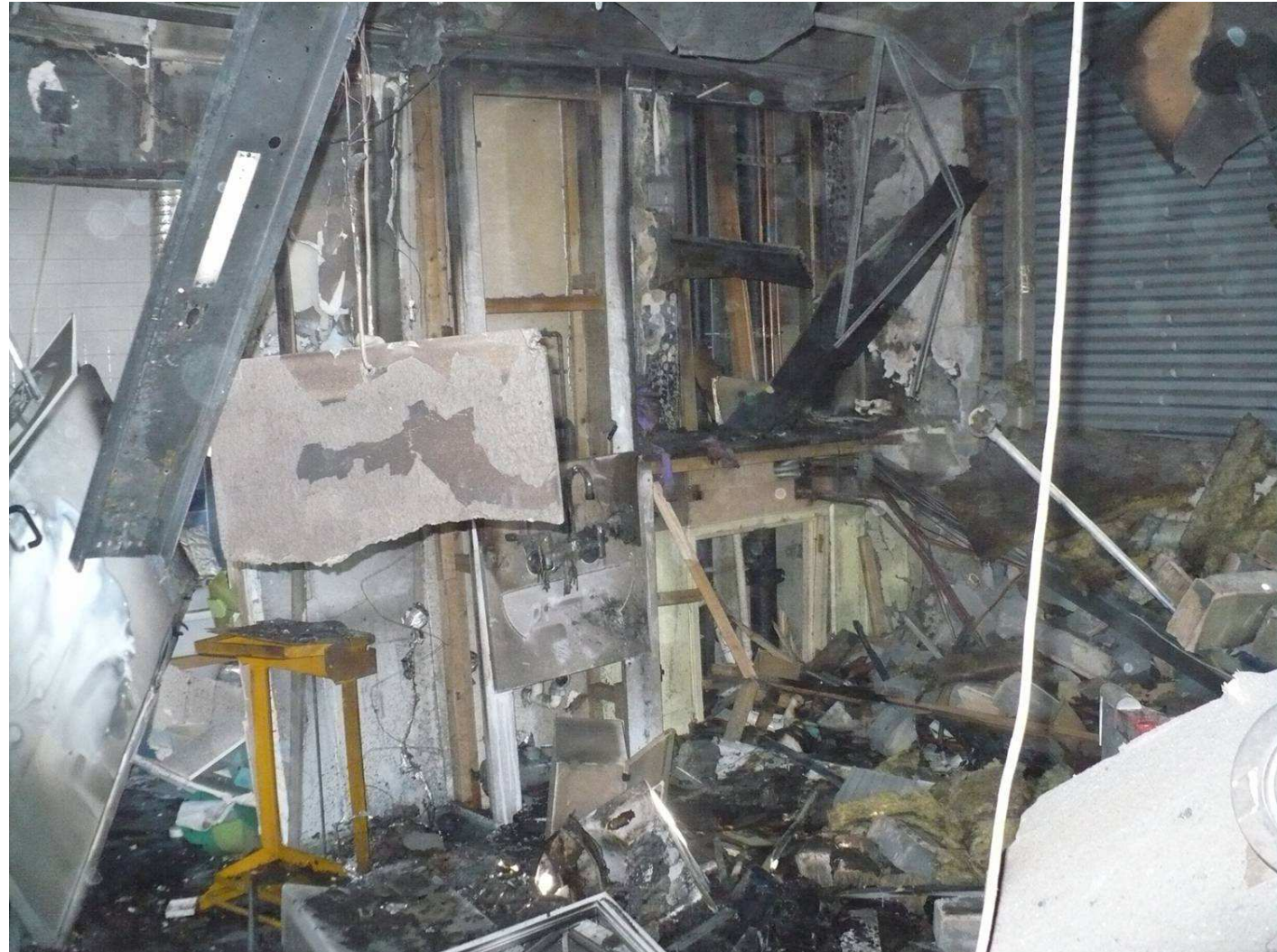
**Great Ormond  
Street Hospital**

**What the cylinder  
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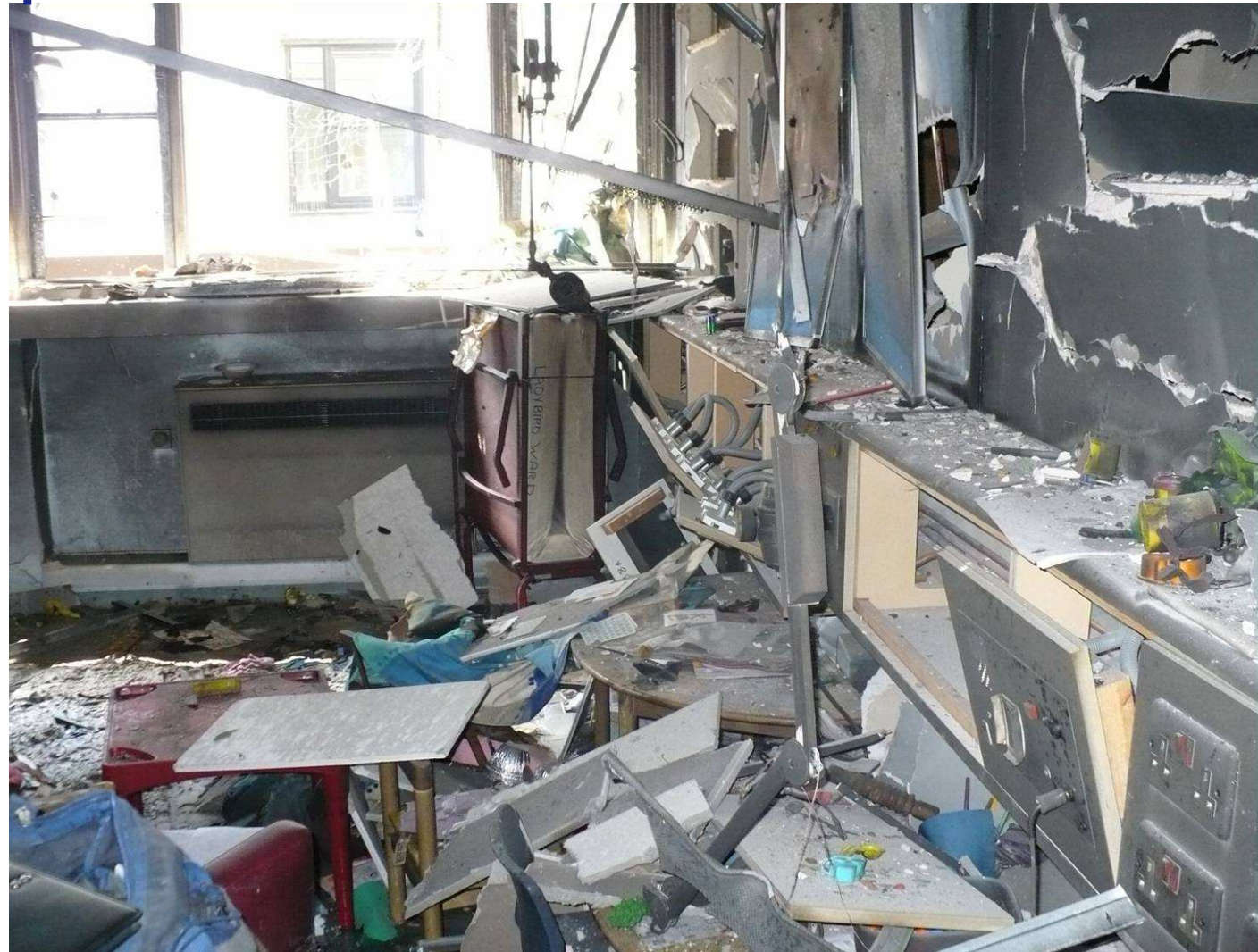
**Great Ormond  
Street Hospital**

## What the hospital ward looked like after the incident



**Great Ormond Street Hospital**

# What the hospital ward looked like after the incident



**Great Ormond Street Hospital**

**With debris and shards of glass  
being  
projected  
over 10  
metres**



**Great Ormond  
Street Hospital**

## What the hospital ward looked like after the incident



**Great Ormond  
Street Hospital**

## The effect on the adjacent wards



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Street Hospital**



## What the hospital ward looked like after the incident



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Street Hospital**

**How far the wall moved  
after the  
explosion -  
almost a  
metre**



**Great Ormond  
Street Hospital**

**How far the wall moved  
after the  
explosion -  
and from  
the other  
side**



**Great Ormond  
Street Hospital**

## The Incident Timelines

- 08.30.00** Cleaner reported being in room and 'noticing' a burning plastic smell
- 08.33.05** Ionisation Fire Detector activated in Ward  
Heavy smoke detected  
Patients immediately evacuated from ward
- 08.34.35** Fire team arrive and call Fire Brigade
- 08.38.50** Evacuation of adjacent areas begins
- 08.42.31** Fire brigade arrives
- 08.43.40** Cylinder explosion in ward - after 10 minutes
- 08.47.00** Fire extinguished and area made secure

## Incident Investigation

- **Television over bed had been left on in ward**  
– believed to be electrical fault that started incident
- **Cylinders bought in by patients left in pushchairs**  
**No controls of number of cylinders in ward**
- **Large quantities of pipeline oxygen used with medical devices in the ward – poorly controlled**
- **Soft toys and combustible material present in area where oxygen was used**
- **Potential oxygen enrichment of soft materials**
- **Once started, oxygen enriched materials would burn quickly**
- **With proximity to patients, cylinders easily involved**

## Incident Investigation

- **Fire believed to have started with electrical fault in television**
- **No clear evidence that oxygen supplied to adjacent medical device had been turned off**
- **Bedding and toys on bed under television had likely to have been in an oxygen enriched condition**
- **Toys caught fire and burned extremely quickly**
- **Cylinder in vicinity of fire became very hot quickly**
- **Failure of cylinder shell leading to massive explosion and releasing large amount of oxygen into fire**
- **Whole incident took only ten minutes before cylinder exploded**

## Lessons Learnt – Oxygen Safety

- **Carry out Risk Assessments to address oxygen safety**
- **Provide oxygen training to all staff - covering how to use oxygen safely and minimise oxygen enrichment**
- **Describe the potential risks with oxygen and fires and need to keep areas clean and tidy**
- **Ensure equipment is used correctly and critical steps logged regularly**
- **Turn off the oxygen when not in use**
- **Always use pipeline supplies to minimise cylinders on ward**
- **Control the number of cylinders on the ward  
- especially those brought in by patients**

## Lessons Learnt – Fire Safety

- **Ensure everyone fire training is up to date**
- **Provide training to staff about the potential risks with oxygen and fires**
- **Keep fire doors closed**
- **Report anything suspicious**
- **Make sure electrical equipment not in use is switched off**



## Conclusions

**What are the important issues when using assessing how to use oxygen safely in hospitals**

- **Rate at which things burn in an oxygen environment**
- **Potential for high oxygen levels in the ward areas**
- **Oxygen enrichment of clothing / soft materials**
- **Amount of energy stored in cylinders**
- **Control of number of cylinders in ward areas**
- **Control the use of oxygen –turn it off when not in use**
- **Control of unnecessary combustible material**
- **Ensuring everyone is aware of the potential risks**

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**Thank You**