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**Searching for suicide methods: accessibility of information about helium as a method of suicide on the Internet.**

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## **Abstract**

**Background:** Helium gas suicides have increased in England&Wales; easy-to-access descriptions of this method on the Internet may have contributed to this rise.

**Aim:** To investigate the availability of information about using helium as a method of suicide and trends in searching about this method on the Internet

**Methods:** We analysed trends in a) Google searching (2004 to 2014) and b) hits on a Wikipedia article describing helium as a method of suicide (2013-2014). We also investigated the extent to which helium was described as a method of suicide on web pages and discussion forums identified via Google.

**Results:** We found no evidence of rises in Internet searching about suicide using helium. News stories about helium suicides were associated with increased search activity. The Wikipedia article may have been temporarily maliciously altered to increase awareness of suicide using helium around the time of a celebrity suicide. Approximately one third of the links retrieved using Google searches for suicide methods mentioned helium.

**Conclusion:** Information about helium as a suicide method is readily available on the Internet; the Wikipedia article describing its use was highly accessed following celebrity suicides. Availability of online information about this method may contribute to rises in helium suicides.

## Introduction

The use of helium inhalation as a method of suicide has increased rapidly in England and Wales in the last decade, rising from five deaths in 2001-2 to 89 in 2010-11 [Gunnell et al 2014].

Several other countries have reported recent rises in the use of this method (see for example [Austin et al 2011, Cantrell & Lucas 2014]). The widespread adoption of this method could lead to increases not only in method-specific suicide rates but also overall suicides [Thomas et al 2011]. Such increases occurred in East Asia with marked rises in carbon monoxide poisoning suicides using barbecue charcoal fumes in the 2000s following high profile media reports describing use of this method [Chang et al 2014].

An individual's choice of suicide method is a key determinant of whether their suicide attempt will be fatal. The majority of people who attempt or complete suicide are suffering from mental health problems [Hawton & van Heeringen 2009]; people who survive a suicide attempt are usually assessed by mental health professionals and referred for appropriate treatment. Those who die following the use of a high-lethality method have no 'second chance'.

Helium was first widely recommended as a method of suicide in 2000 in a supplement to "Final Exit" - a book intended as a guide for people with terminal illness who wished to end their lives [Humphry D 1991]. There is widespread concern that the book, and methods recommended in the book, have been used by those with potentially treatable mental illness wishing to take their lives. In a recent study we found that four of the eight cases of helium suicide we identified from Coroners' records had evidence that information found on the Internet played a role in their choice of method [Gunnell et al 2014]. To the best of our knowledge none of these individuals had terminal medical illnesses.

An individual's awareness of a particular method and its acceptability to them (i.e. its cognitive availability) influences the likelihood that it is used [Florentine and Crane 2010]. Key influences on cognitive availability are the widespread availability of information about a method, leading to common knowledge about its use, and the high profile reporting of the method by the media e.g. following a celebrity suicide [Chen et al 2014]. Helium is a relatively rarely used suicide method, accounting for <2% of suicides in 2010-2011 in England & Wales. Whilst there have

been a few news reports of suicides using helium, there have been no high profile deaths in the UK. Despite this, the number of suicides using this method is increasing. To investigate the role of the Internet in the growth in use of this method we investigated a) temporal trends in searching for information about the method; b) the accessibility of information on suicide using helium on the Internet; and c) the content of web-pages identified using search terms we thought likely to be used by suicidal individuals seeking information on suicide methods.

## Methods

### *Google searches*

We used Google trends [<http://www.google.com/trends/>] to investigate worldwide and UK trends in searches using the term “helium suicide” in the period 2004-2014. On the date when we extracted the data (8 September 2014), Google trends provided monthly search data for the UK between January 2004 and August 2014, as well as worldwide weekly data between 4 January 2004 and 6 September 2014. We used the search term “helium suicide” as it appeared to be the most frequently used term from a review of searches on a selection of alternatives identified as related searches in worldwide Google trends.

Google provides a relative search figure based on search activity for a given period, but does not provide information on the absolute number of searches. The week / month with maximum searching in a given period is given a value of 100 and search volumes for other weeks/months are given relative to this. For example a value of 40 for a particular week indicates that search volumes were 40% the levels seen in the maximum period. Periods with very low search volumes are identified as zero activity.

We identified periods when the number of searches greatly exceeded background rates and carried out further Internet searches to identify events that may have triggered the increased search activity.

In addition to the specific searches outlined above we also searched Google([www.google.co.uk](http://www.google.co.uk)) on 19 January 2014 using 12 different search terms identified in our previous research as terms likely to be used by distressed individuals looking for methods of suicide [Biddle et al BMJ 2008]. These terms were in part derived from qualitative interviews with people who had survived suicide attempts using high-lethality methods and from search terms suggested by Google in relation to searches using similar terms. The terms we used were: (i) suicide; (ii) suicide methods; (iii) suicide sure methods; (iv) most effective methods of suicide; (v) methods of suicide; (vi) ways to commit suicide; (vii) how to commit suicide; (viii) how to kill yourself; (ix)

easy suicide methods; (x) best suicide methods; (xi) pain-free suicide, and (xii) quick suicide. We examined the first 10 hits retrieved using each search term (120 hits in all) and searched the websites / blogs / news stories retrieved for any mention of suicide by helium. We categorized sites using a coding frame we had developed in our previous research [Biddle et al 2008; Derges et al, work in progress], but with additional refinements to reflect changes in the types of material commonly found on the web.

#### *Analysis of trends in accessing the Wikipedia page describing the helium suicide method*

We focused on the Wikipedia article describing helium suicides [[http://en.wikipedia.org/wiki/Suicide\\_bag](http://en.wikipedia.org/wiki/Suicide_bag)] because this was the first hit when searching Google using the search term “helium suicide” in August 2014. We accessed the Wikipedia article describing the method of helium suicide ([http://en.wikipedia.org/wiki/Suicide\\_bag](http://en.wikipedia.org/wiki/Suicide_bag)) on several occasions from November 2013 up to November 2014 to obtain page view statistics which record the number of times a site was accessed in the preceding 30, 60 and 90 days. Due to an oversight we did not record data for a 60 day period 23 March to 21 May 2014. As with our analysis of Google search trends, we identified days / periods when the number of views greatly exceeded the background rates. We then carried out further Internet searches to identify events that may account for the increased number of site visits.

#### *Content analysis of online forums discussing helium as a suicide method*

We conducted a content analysis of the three discussion forums identified by our search of Google where helium was mentioned. Within each forum, we reviewed whether discussions provided information on methods and/or an evaluation of helium as a suicide method. We also assessed whether suicide had been glamourised or linked to a celebrity’s death. The presence of help sites was noted, including those linked to formal or informal help, or peer support. We also recorded sites that were linked to other ‘dedicated’ suicide sites and gauged the degree of site moderation.

### *Statistical analysis*

Trends in Google search were investigated using simple linear regression models. We focused on the following time periods when there were no zero values and trends appeared to be more stable: i) UK: May 2011 and August 2014 (40 months), and ii) worldwide: 25 July 2010 and 6 September 2014 (215 weeks). A month (UK) or week (worldwide) variable was included as an independent variable and Google search activity per month or week as the dependent variable in the models. Cook's distance was used to evaluate potential influential points. We also calculated an annual average of Google search activity to investigate changes in searching. Sensitivity analyses were conducted by excluding major peak values (i.e. a value > 60 for the UK and > 40 worldwide).



## Results

### *Google search trends*

UK trends Figure 1a and Table 1 show UK searching using the term “helium suicide”. Search volume in the UK was low before May 2011; linear regression modeling analysis showed a small reduction in searching between May 2011 and August 2014 – Google search activity decreased 0.34 per month ( $p=0.04$  for linear trend), and the annual average fell from 54 in 2011 to 48 in 2014. There was no evidence of any influential points for the regression model. After excluding major peak values the reduction became smaller and statistically non-significant (0.13 per month;  $p=0.17$  for linear trend). The highest number of searches occurred in August 2012; we identified no high profile UK helium suicides during this month, but on 29 August 2012 the UK’s Office for National Statistics issued a report on drug poisoning in England and Wales [ONS 2012] which included data showing an annual rise in helium deaths. These trends were picked up by several national newspapers [see e.g. <http://www.theguardian.com/society/2012/aug/29/helium-barbiturates-drug-death-statistics>, accessed 13 September 2014].

Worldwide trends Figure 1b and Table 1 show worldwide search trends for “helium suicide”. There was evidence for a very small reduction in search activity between 25 July 2010 and 6 September 2014 – search activity decreased 0.03 per week ( $p=0.002$  for linear trend), and the annual average fell from 17 in 2010 to 15 in 2014. There was no evidence of any influential points. The results were similar after excluding major peak values. There were a number of clear peaks in search volume. Maximum search activity occurred in May 2011, in this month there were a series of news reports about a 91 year old Californian lady who marketed materials to facilitate helium suicide and an FBI raid on her house [[http://en.wikipedia.org/wiki/Suicide\\_bag](http://en.wikipedia.org/wiki/Suicide_bag), accessed 13 September 2013].

### *Google searches for suicide methods*

Review of the 120 hits identified using the 12 suicide method-related search terms identified 37 hits (30.8% of all hits) that included some reference to helium as a method of suicide. These hits linked to nine different websites. The most frequently occurring link (15 of the 37 hits) was to a site classified in our analysis as a “Dedicated suicide site” which described methods of suicide, without encouraging their use. A further 11 hits were to a Wikipedia page providing factual information about suicide methods– this page includes direct links to the Wikipedia helium suicide page. In 8 of the 12 searches these two pages were the first of the 10 hits retrieved using our search terms. Note: none of our searches included the word “helium”.

Of the remaining hits, six were to three different discussion forums (one of which we classified as encouraging suicide), five were to sites that provided information in a joking style – with most methods being fictional.

### *Analysis of Wikipedia helium suicide page.*

The Wikipedia page describing helium suicides – “suicide bag” was created in December 2008. It includes an artist’s impression of a helium bag and references to a number of sources providing more information about the method as well as the names of gases to use as alternatives to helium and links to a page describing other methods of gas suicide.

Table 2 summarises the number of visits to the site during ten 30 day periods from 23<sup>rd</sup> November 2013 to 21<sup>st</sup> November 2014. On average there were 705 page views per day; an annual view rate of over 250,000. The numbers of views ranged from <300 on some days to 40,824 on 12<sup>th</sup> August 2014. The second highest number of views (>2500) occurred on 7<sup>th</sup> August 2014 and the third peak was on 3 March 2014 when there were over 1500 page views.

The peak on 12<sup>th</sup> August 2014 corresponded with the date when the celebrity Robin Williams’ suicide was announced. Initial reports attributed his death to asphyxia, and it was later confirmed he used hanging as a method of suicide. Views of the Wikipedia web page indicate that an edit to the site was made on the 11th of August to include Robin Williams’ name in the

“see also” section of the site. Although this was removed shortly afterwards, the brief period it was present on the site (<1 hour) led to the marked rise in the number of page views from a background rate of 705 per day up to 40,284 (see box 1).

The peak on 3<sup>rd</sup> March 2014 coincided with the date when the inquest of former 1980s rock musician Matthew Fretton was published in some UK newspapers. Matthew Fretton killed himself using helium. We could identify no prominent helium related event on 7<sup>th</sup> August 2014, the date of the third peak.

#### *Content analysis of online forums discussing helium as a method suicide*

The three discussion forums provided different levels of information and moderation. One discussion forum was a source for writers that included a query about a proposed storyline involving a suicide. The author was seeking information on suicide methods, and one respondent suggested helium. The Wikipedia web site was also suggested as a source of information (but not in relation to helium).

The second forum we categorized as actively promoting suicide. It was an un-moderated Usenet newsgroup providing predominantly technical advice on suicide methods (Usenet, as one of the oldest networks preceding the World Wide Web, is a network that hosts user-lead discussion forums on virtually any topic. As a distributed network it is not controlled by any particular source and is therefore, mostly uncensored. One post requesting practical advice on using helium elicited over 40 responses (up to September 2014) with detailed information including the recommended volume required and how to secure the ‘exit bag’. Another user asks for information on where to purchase equipment. Two posters express confusion about conflicting instructions concerning the amount of helium gas required after reading two books (both of which are accessible on-line). Posts include a link to Wikipedia’s exit bag page. None of the posts offered support in terms of suicide prevention or links to prevention/ help sites, but there were links to related questions about suicide methods.

The third forum was an open discussion forum with ill-defined moderation; a request was posted for information on different suicide methods for a “project”. This elicited 25 responses

(by September 2014), one of which included reference to helium, and links to other sources of information on suicide. There was no technical information provided or evaluation of helium as a method, although there was detailed information on other methods, including their evaluation. There were two supportive posts; both suggested the person who posted the message seek psychiatric help – the “project” mentioned in the original post was disbelieved. There was no clear evidence of moderation of the site or links to formal help sites or agencies.

## **Discussion**

It is straightforward to access information about the use of helium for suicide on the Internet. One third of the links we identified using search terms for suicide methods in general included reference to helium as a potential method; none of these search terms included the word helium.

There is no clear evidence that rises in helium suicides in England and Wales have been accompanied by an increased volume of Google searches in relation to this method. However, peaks in Google search activity and views of Wikipedia's site describing helium suicide correspond to high profile news reports associated with the use of helium as a method of suicide. Such reports include celebrity suicides, news stories about the use of helium for suicide and the release of national suicide data. The volume of search activity and site views indicates that the cognitive availability of helium as a method of suicide is likely to be increasing.

Alarmingly it appears that either malicious or mistaken linkage of a recent celebrity suicide to the use of helium as a method of suicide lead to a large increase in the number of views on the Wikipedia site describing helium suicides.

Discussion forums provide a direct path to detailed information on methods including evaluations of different methods as well as specific instructions and advice on using helium. They may be seen as transmitting social ideas about "good" and "bad" methods of suicide and so further add to the cognitive availability of specific methods. Due to the nature of online discussion forums, information is permanently available after posting and Usenet groups continue to receive posts, despite no longer being maintained by their original author. This constitutes an ongoing challenge, especially in forums that do not provide effective site moderation; none of those we identified were clearly moderated or contained links to support agencies such as the Samaritans.

### *Strengths and limitations*

This is the first detailed description of Internet searching and website content in relation to an emerging method of suicide. We used a variety of approaches to investigate the issue. There are however a number of limitations to our analysis. First, it is not possible to determine whether search activity was carried out by at-risk / suicidal individuals or simply by news reporters and other individuals curious to find out more about helium suicide. Second, we only mapped trends in Google searching for a single term “helium suicide”, and we recognize that individuals researching this method may use a range of different search terms. Third, we only analysed trends in searching on a single search engine; nevertheless Google accounts for the majority of searching in the UK (89%) and USA (77%)

[[http://theword.co.uk/info/search\\_engine\\_market.html](http://theword.co.uk/info/search_engine_market.html) - accessed 25 September 2014] and 67% globally (<http://www.netmarketshare.com/search-engine-market-share.aspx?qprid=4&qpcustomd=0> accessed 25 September 2014).

#### *Findings in the context of the research literature*

Several studies have investigated trends in Internet searches for specific methods of suicide and suicide related terms [Chang et al 2011; Page et al 2011]. These studies show that Internet search activity increases following high-profile news coverage of unusual methods of suicide. Furthermore there is some evidence that trends in Internet searching for particular methods of suicide [Hagihara et al 2012] or other suicide related terms [Gunn & Lester 2013; McCarthy M 2010; Yang et al 2011] are associated with trends in suicides rates. However, studies to date have only investigated associations with overall (rather than method-specific) suicide rates, and associations with many different age / gender groups and search terms were investigated – giving rise to possible Type I errors due to multiple hypothesis testing.

Several previous studies have demonstrated the easy accessibility of potentially harmful web pages, particularly those giving detailed descriptions of suicide methods [Biddle et al 2008; Till & Niederkrotenthaler 2014]. Nevertheless the number of ‘protective’ pages - providing help-promoting information - outweighed the number of harmful pages [Till & Niederkrotenthaler 2014].

There is growing evidence from person-based studies that individuals using novel methods of suicide have researched the method on-line [Gunnell et al 2014; Chen et al 2013] and that exposure to information about a specific method of suicide may be recalled some time later to inform an individual's choice of method [Biddle et al 2012]. Indeed in our previous study of 22 individuals who had survived 'near-fatal' suicide attempts, thirteen of those we interviewed reported using the Internet as a source of information about their attempt [Biddle et al 2012].

### *Public health and policy implications*

Information about the use of helium as a method of suicide is easily accessible and may have contributed to the increased use of this method in England and Wales. The first page of a search using the term "helium suicide" on Google (accessed on 8 September 2014) included an advert about designing a helium hood. Because of its widespread use to inflate party balloons, helium is easy to purchase both from high street retailers and on-line. Google searches on "helium" lead to pages offering helium canisters for <UK £20 (\$32 US).

There are a number of possible approaches to help prevent further increases in the use of helium for suicide. First, Google has agreed to place helpline numbers at the top of its search page when people search using suicide related terms. In the UK the Samaritans helpline number is given with the following text: "Need help? In the United Kingdom, call 08457 90 90 90. Samaritans." Second, organisations such as Wikipedia might be approached to remove specific pages that may facilitate the use of high lethality methods, particularly if there is evidence of abuse of such pages. Third, Internet Service Providers should be encouraged to regularly review content and remove pro-suicide sites promoting the use of helium and other high lethality methods. Fourth, it is important to proactively engage with traditional news media (e.g. newspapers / TV companies) when helium suicides are reported as news items are commonly not only published in print but also online. The online archives of these news media may therefore become an important source of information about specific suicide methods; they should therefore be urged to edit or remove such material. Fifth, some authors have suggested more proactive surveillance for the use of specific search terms on the Internet – once

identified these could be followed up with direct contacts with the individuals making the searches [Cheng et al 2012]. For example a person searching using terms such as helium suicide who then visits an on-line store to purchase helium might be approached with offers of help. Finally, helium retailers could be approached to voluntarily withdraw or restrict access to small helium canisters – if such voluntary measures were to fail then legislative approaches might be considered to restrict direct to public sales of helium.



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**Conflict of Interest:**

DG is a member of the National Suicide Prevention Advisory Group (England)

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**Table 1 Mean value for Google searching on the term “Helium Suicide” relative to peak searching (value = 100) for 2011-2014 (UK) and 2010-2014 (worldwide)**

<b>Year</b>	<b>Mean search value</b>
<i>UK</i>	
2011 (May-December)	54
2012	54
2013	39
2014 (up to September)	48 p (trend) = 0.04
<i>World wide</i>	
2010 (25 July to December)	17
2011	21
2012	18
2013	15
2014(up to September)	15 p(trend) = 0.002

**Table 2 Number of views of Wikipedia’s web-page describing the helium suicide method for ten 30 day periods 23 November 2013 to 21 November 2014\***

<b>Dates</b>	<b>Total Hits</b>	<b>Mean hits per day</b>
23-Nov. 2013 to 22 Dec. 2013	18496	617
23-Dec. 2013 to 21 Jan. 2014	15427	514
22 Jan. 2014 to 20 Feb. 2014	17545	585
21 Feb. 2014 to 22 Mar. 2014	18687	625
23 Mar. 2014 to 21 May 2014*	-	-
22 May 2014 to 20 June 2014	14183	473
21 June 2014 to 20 July 2014	14069	469
21 July 2014 to 19 Aug. 2014	60517	2017
23 Aug. 2014 to 22 Sept. 2014	20100	670
23 Sept. 2014 to 22 Oct. 2014	18322	611
23 Oct. 2014 to 21 Nov. 2014	14025	468

\*data not collected for the 60 day period 23 March-21 May 2014

Figure 1a

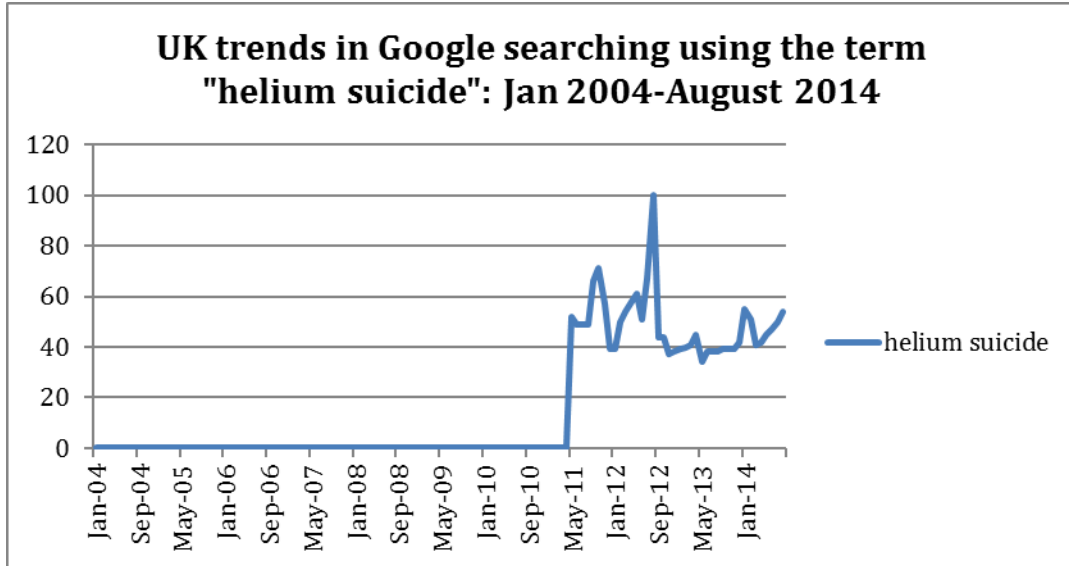
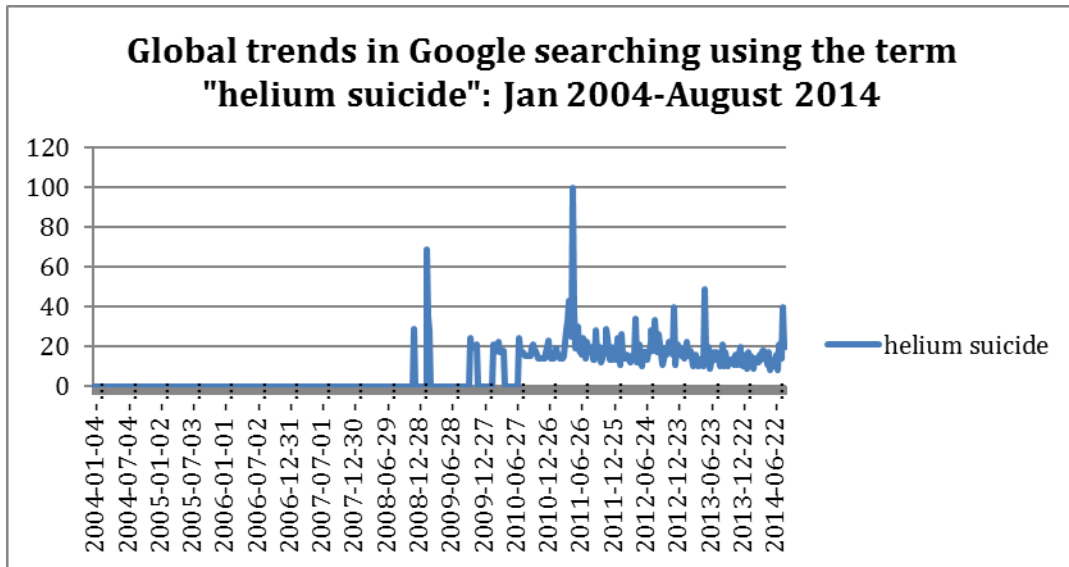


Figure 1b







Box 1. Wikipedia 90 day view statistics: [http://stats.grok.se/en/latest90/Suicide\\_bag](http://stats.grok.se/en/latest90/Suicide_bag) (accessed 17 October 2014)

