

The association between GHB-related web search queries and GHB-induced intoxication cases

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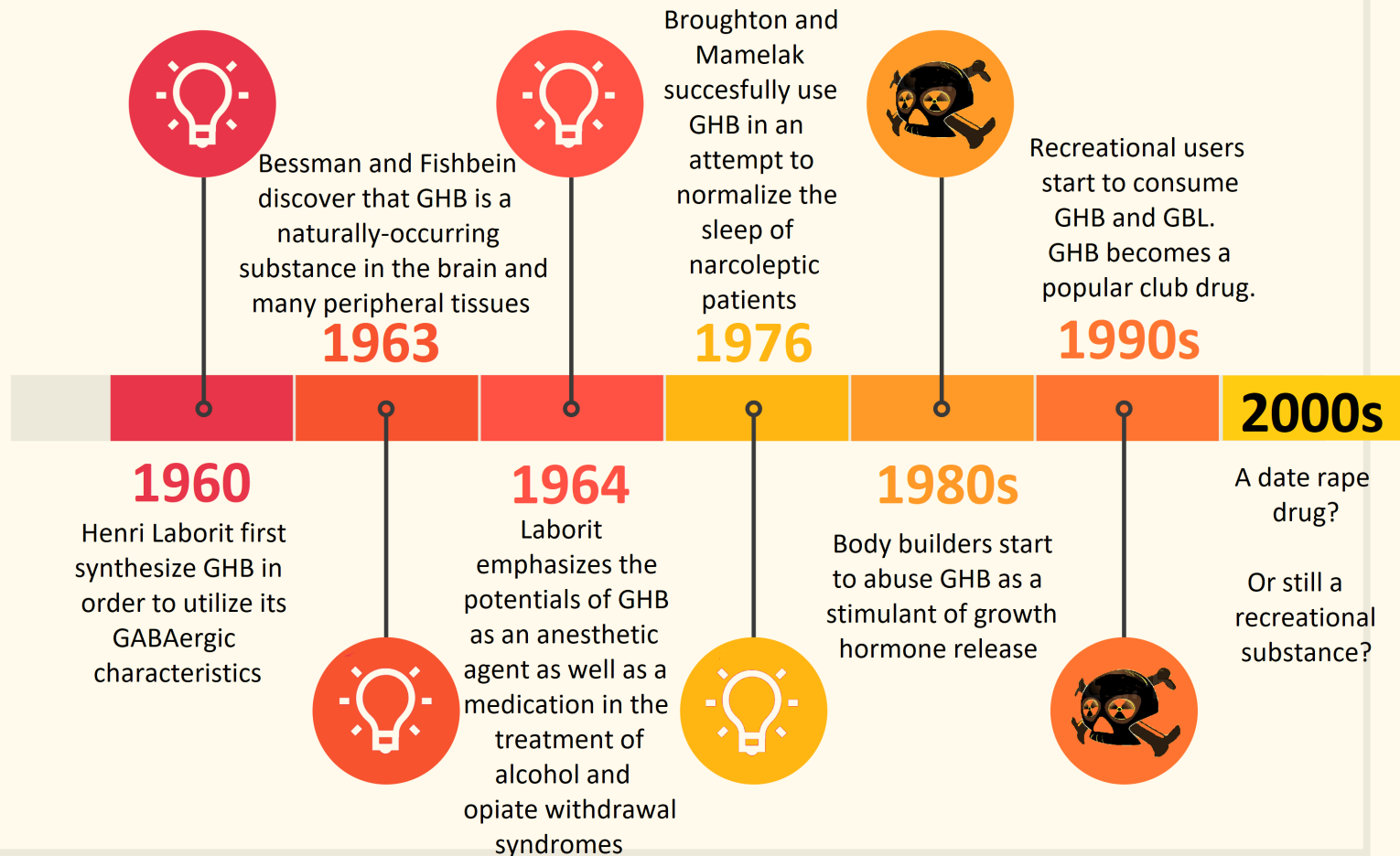
Topics

- 1) A brief overview of **GHB**
- 2) **Web-based forecasting** in addiction research
- 3) **Presenting the study** (aims, methods, results)
- 4) **Discussion**

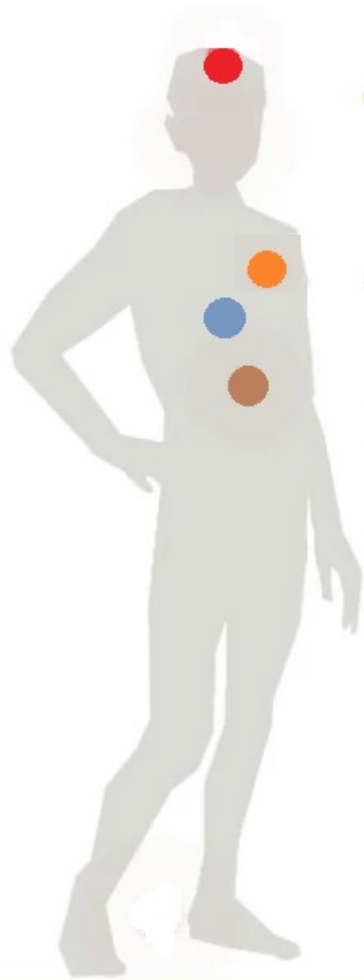
A brief overview of GHB...

Brief history of GHB

Important milestones...



A brief overview of GHB...



- **Cardiovascular problems**
 - Bradycardia
 - Hypotension
 - Hypothermia
- **Respiratory problems**
 - Respiratory acidosis
 - Respiratory depression
- **Gastrointestinal problems**
 - Nausea
 - Vomiting
- **Neurological and psychiatric problems**
 - Unconsciousness
 - Addictive potential
 - Wernicke-Korsakoff syndrome

GHB's dose dependent effects:

As a recreational drug

Lower doses \Rightarrow GHB-specific receptors might mediate stimulant-like effects

(e.g. increased sociability, sexual desire)

As a date rape drug

Higher doses \Rightarrow GABA receptors might mediate depressant-like effects

(e.g. intense sedation)



GHB's main adverse effects

A brief overview of GHB...

- Cardiovascular problems
 - Bradycardia

GHB >260 mg/L

Deep sleep

GHB 156-260 mg/L

Moderate sleep

GHB 52-156 mg/L

Light sleep

GHB <52 mg/L

Wakefulness

- Unconsciousness
- Addictive potential
- Wernicke-Korsakoff syndrome

GHB's dose dependent effects:

Source: Gamma Hydroxy Butyric Acid (GHB) Critical Review Report, 2012

As

Higher doses GABA receptors might mediate depressant-like effects

(e.g. intense sedation)



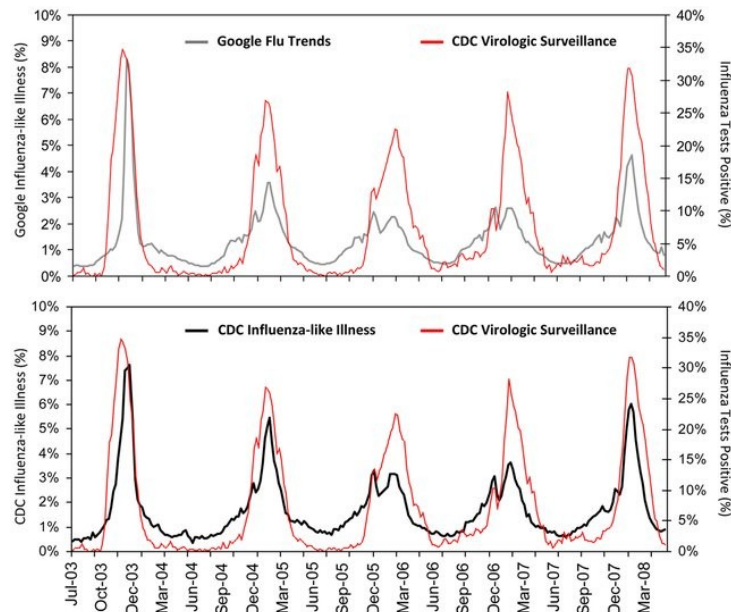
GHB's main adverse effects

Web-based forecasting in addiction research...

- Google Trends as a tool of real-time web-based surveillance

Infectious diseases (e.g. flu, dengue fever, ebola, etc.)

- Early disease symptoms \rightarrow Attempts of online self-diagnosis \leftrightarrow Disease outbreak (incidence estimation)



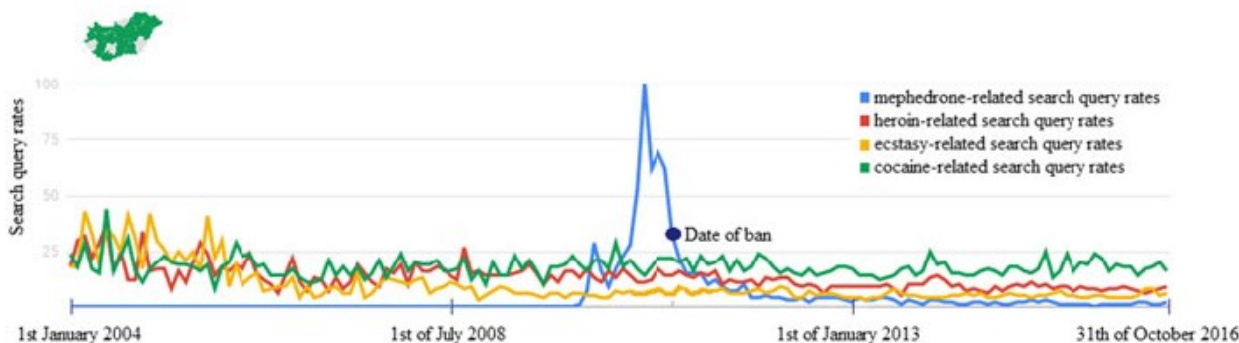
Source: Ortiz et al., 2011

Web-based forecasting in addiction research...

- Google Trends as a tool of real-time web-based surveillance

Addictive behaviors and consequences (e.g. purchase, information source, intoxication)

- NPS legislation ➡ Decreased rate of web searches?
- Online purchase ➡ Increased online activity ➡ Increased rate of intoxication cases?



Source: Kapitány-Fövény and Demetrovics, 2017

The study: Aims

- **Study aims:** to explore the association between GHB-related web interest and GHB-induced intoxication rates

Methods 1.

Toxicological data

- Patients' medical reports of the Clinical Toxicology Ward of Péterfy Sándor Street Hospital Clinic and Casualty Centre
- Medical reports between the 14th of September, 2009 and the 13th of June, 2013 were reviewed
- Every patient who admitted GHB use or of whom the physicians presumed to had used this substance was administered in the database

Methods 2.

Web search queries

- Google Trends' web search queries for "*GHB*" and "*Gina drug*" were registered between 2009 September and 2013 June
- Web search rates were compared with intoxication frequencies using Spearman's rank correlation statistics

Methods 3.

Users' source of purchase

- 60 recreational GHB users (partly from the patient population of the toxicology ward) were asked to provide information on their main source of GHB
- Aim: an attempt to validate the results regarding the connection between web searches and intoxication cases

Results 1.

- Altogether 408 treatment cases were registered from 352 patients

Search term		GHB intoxication rates (Spearman's rank correlation coefficient)
„GHB”	Same month comparison	r= 0.31 (p<0.05)
	One month delayed comparison	r= 0.18 (p>0.05)
„Gina drug”	Same month comparison	r= 0.18 (p>0.05)
	One month delayed comparison	r=0.24 (p>0.05)

Note: significant correlation is boldfaced

Results 2.

- The second study indicated that only 6.7% of the recreational GHB users purchase GHB via the internet
- However, the majority of the toxicology ward's patients could not be assessed

Discussion 1.

- Same month trends in GHB-related intoxication and web search queries might show a moderate significant overlap
- Google Trends may have the potential to be a useful tool in predicting the rate of clinical cases

Limitations

- The applied statistics (rank correlation) cannot test any causality, nor the predictive accuracy of web searches
- We examined the patient records of only one toxicology ward (this cannot be used as a national estimate!)
- Google Trends doesn't track dark net activities!

Discussion 2.

- Web-based marketing was not a relevant type of source among our sample of 60 recreational GHB users
- Other studies found high variability in the rate of online purchase
 - From 14% (Barker et al., 2007) to
 - 59% (Stein et al., 2011) of the assessed samples
- **Future goals:**
 - 1) Test various prediction models (including web search queries) and compare their predictive accuracy in explaining intoxication rates, by using e.g. **Diebold-Mariano test**
 - 2) Assess patients of toxicology wards on-site in order to gain information about their purchase sources

Thank you for your attention!

In case of any further questions:
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