

## How much nicotine kills a human? Tracing back the generally accepted lethal dose to dubious self-experiments in the nineteenth century - Springer

### Journal Article <sup>1)</sup>

The discrepancy between the 60-mg dose and published cases of nicotine intoxication has been noted previously (Matsushima et al. 1995; Metzler et al. 2005), but nonetheless, this value is still accepted without scrutiny and taken as the basis for worldwide safety regulations of tobacco and other nicotine-containing products. Nicotine is a toxic compound that should be handled with care, but the frequent warnings of potential fatalities caused by ingestion of small amounts of tobacco products or diluted nicotine containing solutions are unjustified and need to be revised in light of overwhelming data indicating that more than 0.5 g of oral nicotine is required to kill an adult.

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The literature reports on fatal nicotine intoxications suggest that the lower limit of lethal nicotine blood concentrations is about 2 mg/L, corresponding to 4 mg/L plasma, a concentration that is around 20-fold higher than that caused by intake of 60 mg nicotine. Thus, a careful estimate suggests that the lower limit causing fatal outcomes is 0.5–1 g of ingested nicotine, corresponding to an oral LD50 of 6.5–13 mg/kg. This dose agrees well with nicotine toxicity in dogs, which exhibit responses to nicotine similar to humans (Matsushima et al. 1995).

The mismatch between the generally accepted lethal dose and documented cases of nicotine intoxication raises the question for the genuine source of the 60-mg dose. Literature and Internet searches provided circular and often misleading references to databases or textbooks, which either simply state the dose without reference or refer to another textbook and so on. To give an example, the following statement is found on the webpage of the Centers for Disease Control and Prevention (<http://www.cdc.gov/niosh/idlh/54115.html>): “The fatal human dose has been estimated to be about 50–60 mg (Lazutka et al. 1969).”

However, Lazutka et al. describe the determination of LD50 values for mice and rats and do not even mention human toxicity (Lazutka et al. 1969). The second paper cited on this Web site (Lehman 1949) was actually published in 1949, and neither provides any supporting data (Lehmann 1949).

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[Category-Health and Safety](#), [E-Cigarette](#), [fatal nicotine dose](#), [Folder-E-Cigs](#), [Leans-Positive](#), [lethal dose](#), [Nicotine](#), [RESEARCH](#)

<sup>1)</sup>

Mayer (2013), How much nicotine kills a human? Tracing back the generally accepted lethal dose to dubious self-experiments in the nineteenth century - Springer, <http://link.springer.com/article/10.1007%2Fs00204-013-1127-0/fulltext.html> accessed: 2013-11-09

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