

# Using Cigarette Equivalents to Estimate Nicotine Consumption Among Poly Tobacco Users

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## Background

- In the United States, 19.3% of adults use tobacco products, with 3.7% are poly-tobacco product (PTP) users. Around 14% U.S. adults have used e-cigarettes, hookahs, cigars, and/or smokeless tobacco in the past 30 days.
- PTP use hinders tobacco treatment by adding difficulty in estimating the amount of nicotine the tobacco user ingested. There is no clinical practice protocol to guide tobacco treatment specialists on estimating the appropriate dosages for nicotine replacement therapy for PTP users.

















## Purpose

- **The purpose of this study was** to develop an estimate of the consumed/ingested nicotine amounts from different forms of tobacco using the number of cigarette equivalents.

## Method

- We conducted a literature search for nicotine content (NC), nicotine yield, cotinine level, and plasma nicotine concentration (PNC) for cigars, cigarillos, snus, smokeless tobacco, hookahs, pipes, and e-cigarettes. Average NC, yield, or plasma concentration found in one cigarette was used to estimate the number of cigarette-equivalents for each of these products.

## Results

Tobacco Product	Nicotine Equivalent	Number of Cigarettes Equivalents
<b>Cigars</b>  Based on average total nicotine content from cigars weighing between 3.4g and 21.4g, with total nicotine content ranging between 46mg and 211mg, respectively.	88mg/Cigar	<b>5 X</b> 
<b>Cigarillos/Little cigars</b>  Based on average total nicotine content from cigars weighing between 0.53g and 2.75g, with total nicotine contents between 5.9mg and 19.6mg, respectively.	13.7mg/Cigarillo or Little Cigar	<b>0.74 X</b> 
<b>1 can of Snus (loose)</b>  Based on 1 can of snus containing 19mg nicotine per 1 gram and weighing 42g.	14.3ng/ml of plasma nicotine for a single portion (1gram)	<b>32 X</b> 
<b>1 can of Snus (Pouches)</b>  Based on 1 can of snus containing 12.7 mg nicotine per 1 gram and weighing 42g.	12.1 ng/ml of plasma nicotine for a single portion (1g/a pouch)	<b>27 X</b> 
<b>1 can of loose Smokeless Tobacco (dip, spit, chew, or snuff)</b>  Based on the average nicotine yield in a 34g can, found in fine cut original, long cut straight, long cut wintergreen, and long cut mint tobacco forms from common smokeless tobacco commercial brands (Copenhagen, Skoal, Kodiak, and Grizzly).	8.4mg of free/unprotonated nicotine for a single portion (1g/pouch)	<b>124 X</b> 
<b>1 Session Hookah using flavored tobacco</b>  Based on smoking an average of 20g of flavored tobacco per session (45 minutes session with an average of 90 puffs).	67mg/session	<b>20 X</b> 
<b>1 bowl of Pipe tobacco</b>  Based on the average nicotine content found in a 3g bowl of pipe tobacco (38mg/g).	114mg/bowl	<b>6 X</b> 
<b>E-cig (vaping)</b>  Based on <i>times</i> of ad lib vaping, using an average liquid strength (18mg/ml). Each <i>time</i> of ad lib vaping (using new generation devices) was estimated by smoking around 15 puffs or lasting around 10 minutes.	18mg/ml (medium-strength liquid)	<b>0.3 X</b> 

## Conclusion

- Knowledge of cigarette-equivalents estimations may be useful for tobacco treatment specialists in establishing appropriate nicotine replacement therapy dosage for PTP users. Additionally, cigarettes-equivalents is an objective approach for researchers to assessing nicotine consumption for PTP users.