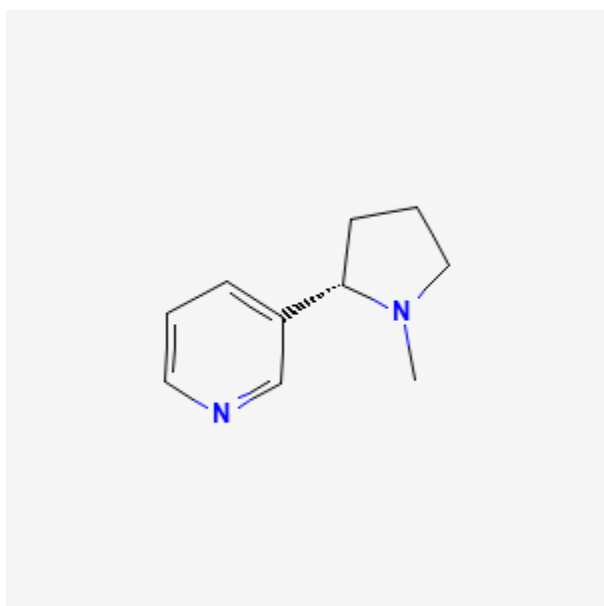




## Nicotine

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CASRN: 54-11-5



## Drug Levels and Effects

### Summary of Use during Lactation

Smoking tobacco reduces milk yield and often results in early cessation of breastfeeding and maternal smoking is a major risk factor for sudden infant death syndrome. Some authors and guidelines have advocated use of nicotine replacement products in smoking mothers to reduce the risk to breastfed infants of inhaled smoke and toxins in maternal cigarette smoke.[1-3] However, others point out that based on animal data, nicotine may increase the risk of sudden infant death syndrome and might interfere with normal infant lung development. These authors recommend against using any form of nicotine in nursing mothers.[4,5] No studies have been performed to resolve these issues. Only nicotine patches have been studied in nursing mothers.

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The Academy of Breastfeeding Medicine considers nicotine replacement products to be compatible with breastfeeding, with the type of product determined by the clinical needs of the breastfeeding mother.[3] The American Academy of Pediatrics recommends the shorter-acting agents over the patches.[6] An alternate smoking cessation product may be preferred during nursing.

## Drug Levels

*Maternal Levels.* Fifteen lactating women who smoked an average of 17 (range 14 to 20) cigarettes daily were studied during smoking and after smoking cessation while using nicotine transdermal patches in decreasing doses of 21, 14 and 7 mg daily. One woman who smoked 6 cigarettes daily was started on the 14 mg daily patch. The women supplied milk samples from before and after each nursing on the day before attending their clinic appointments which were 2 to 3 weeks apart. Milk was analyzed for nicotine and its metabolite cotinine. During smoking, the milk nicotine concentration was about 200 mcg/L. Steady-state milk nicotine concentrations during the 21 mg patch was about 175 mcg/L which was not statistically different from smoking levels. Likewise, milk cotinine levels were not different between smoking and the 21 mg patch. Milk nicotine concentrations were lower than smoking levels with the 14 and 7 mg patches at about 140 and 70 mcg/L, respectively. Cotinine milk levels were also lower with these doses than with smoking. Calculated daily infant nicotine equivalent dosages (nicotine plus cotinine) were as follows: 25.2 mcg/kg with smoking, 23 mcg/kg with the 21 mg patch, 15.8 mcg/kg with the 14 mg patch, and 7.5 mcg/kg with the 7 mg patch. On average, infants ingest 1.9% of the maternal weight-adjusted dosage of nicotine and about 7.8% of the maternal weight-adjusted dosage when cotinine was also considered.[1]

*Infant Levels.* Nine breastfed infants with an average age of 4.8 months (range 2.5 to 21 months) whose mothers were using nicotine patches for smoking cessation had plasma concentrations of cotinine measured during maternal use of a 21 mg nicotine patch. Infant plasma cotinine averaged 22 mcg/L (range 19 to 25 mcg/L), which averaged 13.4% of the simultaneous maternal cotinine plasma concentrations.[1]

## Effects in Breastfed Infants

Maternal smoking is a major risk factor for sudden infant death syndrome (SIDS). Nicotine is thought to be the causative factor by reducing the dopamine content of the carotid bodies and reducing the infant's ability to autoresuscitate during hypoxic episodes.[4]

Nicotine in the breastmilk of smokers also appears to reduce the heart rate variability in male breastfed infants. [7]

In a study of the infants of 5 mothers who were using 21 mg nicotine patches for smoking cessation, the infants' average Denver Developmental age was equivalent to their chronological age.[1]

## Effects on Lactation and Breastmilk

Cigarette smoking reduces milk yield.[8,9] This effect may be caused by nicotine which lowers serum prolactin, [10] although other factors associated with smoking may also play a role.[11,12]

In a study of 15 nursing mothers who were using nicotine patches in decreasing doses from 21 mg to 14 mg to 7 mg over several weeks, their average milk production was 17% lower than average literature values as judged by infant milk intake. The study did not directly compare the milk production of smokers to nonsmokers, however. In this study, infant milk intake during maternal use of the nicotine patch was similar to that during smoking.[1]

## Alternate Drugs to Consider

(Smoking Cessation) [Bupropion](#)

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## Substance Identification

### Substance Name

Nicotine

### CAS Registry Number

54-11-5

### Drug Class

Breast Feeding

Lactation

Milk, Human

Ganglionic Stimulants

Nicotinic Agonists