



The  
Fertility Society  
of Australia

## Pre-conception Health Special Interest Group



### Effects of caffeine, alcohol and smoking on fertility

There is an increasing body of evidence that lifestyle factors affect fertility. As most lifestyle factors can be modified, providing advice and support in making healthy lifestyle changes can promote fertility. The evidence relating to the effects on fertility of caffeine, alcohol consumption and smoking are discussed here.



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## Evidence review

### Caffeine

Caffeine is commonly found in coffee, tea, some soft drinks and chocolate. Some evidence suggests that the consumption of caffeine, with a possible dose-response effect, may prolong the time to pregnancy and affect the health of a developing foetus, although the mechanism for this is unclear. Caffeine may affect ovulation and corpus luteum functioning through alterations to hormone levels [1] and has been shown to be associated with higher early follicular E2 levels in females [2]. Although some studies have found a positive relationship between caffeine consumption and time to conception [3-6], study results are inconsistent and should be interpreted with caution [7-8].

Most studies have focused on general rather than infertile populations and have relied on the collection of retrospective data, leaving them open to recall bias. However, Willcox et al [3] conducted a prospective study of 104 women attempting pregnancy. Caffeine consumption was recorded at regular intervals as well as daily information regarding menstrual bleeding and intercourse until pregnancy occurred. Women who consumed less than one cup of coffee were twice as likely to become pregnant, per cycle, as moderate coffee drinkers and the risk of not becoming pregnant increased with higher consumption. Other studies have also suggested an association between caffeine intake and increased time to conception that may be dose-response related [9].

There are few studies on the effect of caffeine consumption in infertile populations. Klonoff-Cohen et al [1] conducted a prospective study over five years on couples undertaking assisted reproductive technology (ART) treatment. Increased caffeine consumption was found to be a risk factor for not achieving a live birth (either by not becoming pregnant or by having a miscarriage).

### Alcohol

Alcohol has been shown to affect male and female fertility, but the level of consumption associated with risk is unclear. Although an adverse effect on fertility of any amount of alcohol consumption is highly plausible, studies are limited, as they must generally rely on recall of levels and timing of alcohol consumption [7]. High levels of maternal alcohol consumption are known to be dangerous to the unborn child [10-12], but the effects at lower levels are less certain. The mechanisms by which alcohol could impair fertility are unclear, but in men it can cause impotence, reduce libido and affect sperm quality [13-14].

While most studies have focused on general populations, one prospective study of couples undergoing ART [1] reviewed male and female alcohol consumption in the year prior to treatment as well as during treatment. Both male and female alcohol consumption decreased the chance of a live birth and increased the risk of miscarriage.

In contrast, another study of women undergoing donor insemination found no association between their alcohol consumption and fecundity [15].

### Smoking

There is strong evidence that smoking adversely affects male and female fertility. Smokers are more likely to be infertile [7, 16-17] and women who are exposed to smoking take longer to conceive [18]. Furthermore, maternal smoking increases the risk of low birth weight and birth defects [19] and women who smoke reach menopause earlier than non-smokers [20]. Smoking can also damage sperm DNA. Heavy smoking ( $\geq 20$  cigarettes per day) by fathers at the time of conception increases the child's risk of childhood leukaemia and shortens the reproductive life span of daughters [21-22].

## Summary

Caffeine and alcohol consumption adversely affect fertility, most likely in a dose-dependent way. Both active and passive smoking reduce male and female fertility and are harmful for the growing baby. In ART populations male and female smoking significantly reduce conception and live birth rates and increase the risk of miscarriage.

## Recommendations

Based on existing evidence, it is recommended that women trying to conceive limit their caffeine intake to the equivalent of 1-2 cups of coffee per day [7-8, 23]. It is also recommended that women trying to conceive and pregnant women avoid drinking alcohol [7-8, 23-24]. It is recommended that men and women who smoke and wish to conceive stop smoking. For couples where one or both partners smoke, factual information about the risks of smoking and active support to stop smoking should be offered by health professionals, as pregnancy is a time when smoking cessation advice has been found to be most effective [25].



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