JPP April 2022: Caffeine

Day 1: Used for centuries as a stimulant, [#caffeine](https://twitter.com/search?q=%23caffeine) was found via coffee bean analysis circa 1820, but is also found in the cocoa bean, guarana seeds, tea leaves etc; caffeine can also be synthesised from uric acid. A methylxanthine, medical uses include neonatal respiratory stimulation & adjunctive analgesia

Day 2: [#caffeine](https://twitter.com/search?q=%23caffeine) + citric acid = caffeine citrate (½ as strong as caffeine base). Caffeine citrate is added to enhance solubility. This is used for apnoea of prematurity in neonates. Oral solution or i.v infusion x1/day 20mg/kg loading, then 5mg/kg/day; adjust as necessary & /monitor concentration.

(cont) #caffeine in OTC analgesics range 30-65mg/tablet; Cochrane supports improved pain relief if [#caffeine](https://twitter.com/search?q=%23caffeine) dose >100mg. Safe total daily dose <400mg/day(½ if pregnant); 1 cup brewed coffee ~100mg. Lots of health claims & does contain antioxidants, but relevant levels only at high doses; it is safer to eat fruit/veg!

Day 3: Kinetics;[#caffeine](https://twitter.com/search?q=%23caffeine) has fast oral absorption/crosses the placenta (check maternal consumption pre-delivery). Hepatic metabolism via CYP1A2, NAT2, xanthine oxidase. Renal excretion; adult t½ 3-7 hrs. Poor metabolism in children; prolonged t½ to 100 hrs at birth (monitor after stopping)

Day 4:[#caffeine](https://twitter.com/search?q=%23caffeine) structure is like adenosine. In neonates caffeine stimulates CNS & respiratory centres & increases basal metabolic rate (BMR). In adults, antagonises central adenosine receptors (A1&2) blocks activation & sleepiness, hence stimulant effect. Dopamine release reinforces pleasure, but also leads to withdrawal symptoms

Day 4(cont) Mixed direct/indirect vascular effects which differ depending on location. [#caffeine](https://twitter.com/search?q=%23caffeine) can cause smooth muscle vaso-constriction or v-dilation. This means cosmetic & increased performance (e.g athletic) uses are hard to predict or quantify. Weight loss (increased BMR/reduced hunger) & lipolysis (e.g cellulite) uses are also unproven

Day 5: ADEs [#caffeine](https://twitter.com/search?q=%23caffeine):Neonates restlessness, vomiting, tachycardia, tremors, seizures + increased risk of GORD. Adults; insomnia, agitation, chest pain, tachycardia, migraine, increased GORD/GI ulceration risk (NOT exhaustive).High doses are diuretic and can cause dehydration; reducing caffeine intake can improve urinary urgency/frequency

Day 6:Little data for drug-drug interactions. [#caffeine](https://twitter.com/search?q=%23caffeine) citrate has one ‘severe’ DDI with fluvoxamine which reduces clearance. SPC states additive effects with other xanthines e.g theophylline & advises avoid concurrent use. 'Consider' impact of enzyme inducers e.g phenytoin & inhibitors e.g cimetidine (NOT exhaustive)

Day 7: [#caffeine](https://twitter.com/search?q=%23caffeine) can affect several medical conditions, for which avoiding or reducing dose may help. Bipolar disorder (avoid), chilblains, urinary incontinence, breast pain, restless legs, migraine (NOT exhaustive). Overdose of [#caffeine](https://twitter.com/search?q=%23caffeine) can lead to death e.g levels over 10grams!

CPD: in addition to the tweets, read the BNFc section on Respiratory stimulants, as well as the monograph on caffeine citrate. Further, the BNF also has information on caffeine in the analgesics section, under ‘compound analgesic preparations’. Another useful source is the Summary of Product Characteristics for caffeine citrate – see links below

<https://bnfc.nice.org.uk/treatment-summary/respiratory-stimulants.html>

<https://bnfc.nice.org.uk/drug/caffeine-citrate.html>

<https://bnf.nice.org.uk/treatment-summary/analgesics.html>

<https://www.medicines.org.uk/emc/product/5145/smpc#PRODUCTINFO>

CPD questions (most but not all answers will be in the tweets). There is only one correct answer per question

1. Caffeine in products is always naturally derived

TRUE or FALSE

1. Caffeine looks chemically similar to adenosine

TRUE or FALSE

1. Caffeine does not cross the placenta

TRUE or FALSE

1. Which is TRUE?
2. Caffeine alone is a strong analgesic
3. Neonatal caffeine citrate concentration needs careful monitoring
4. Caffeine has a longer half-life in children compared to adults
5. The safe daily dose applies to all adults
6. At high doses, caffeine is known to
7. Cause tachycardia
8. Have a calming effect
9. Cause hepatotoxicity
10. Improve hyperglycaemia
11. Caffeine supports analgesia if the dose is over 100mg

TRUE or FALSE

1. Caffeine intake can affect urinary urgency and frequency for some women

TRUE or FALSE

1. Caffeine has multiple drug-drug interactions

TRUE or FALSE

1. Caffeine is the most widely used psychostimulant in the world

TRUE or FALSE

1. In which of the following conditions is caffeine a potential issue, with advice to ‘avoid’?
2. Osteoarthritis
3. Diabetes
4. Asthma
5. Bipolar disorder