Analysis Results

Medication:

codeine

Genetic Variants:

• rs3213619 7:87230193 AA
• rs4646437 7:99365083 GG
• rs12777823 10:96405502 GG
• rs1057910 10:96741053 AA
• rs8187710 10:101611294 GG
• rs4149117 12:21011480 GG
• rs2108622 19:15990431 CT
• rs8192726 19:41354496 CC
• rs8192719 19:41518773 CC
• rs28371725 22:42523805 CC
• rs16947 22:42523943 AG
• rs61736512 22:42525134 CC
• rs28371706 22:42525772 GG
• rs1065852 22:42526694 GG

Analysis:

1. Known gene-drug interactions with relevant SNPs:
- rs1057910 (CYP2C9*3): This SNP is found in the CYP2C9 gene and is associated with reduced enzyme activity.
- rs28371725 (CYP2B6*6): This SNP is present in the CYP2B6 gene and results in decreased enzyme function.
- rs16947 (CYP2D6*2): This SNP in the CYP2D6 gene can have functional impacts depending on the presence of other genetic variants.
- rs28371706 (CYP2D6*4): This SNP is associated with reduced or no enzyme activity in the CYP2D6 gene.
- rs1065852 (CYP2D6*10): This SNP in the CYP2D6 gene is linked to reduced enzyme activity.

2. Potential effects on drug metabolism or efficacy based on relevant SNPs:

- Both rs28371706 (CYP2D6*4) and rs1065852 (CYP2D6*10) suggest significantly reduced or non-functional CYP2D6 enzyme activity. Since codeine is primarily metabolized into its active form (morphine) by CYP2D6, the presence of these SNPs likely means poor conversion and reduced efficacy of codeine.
- rs1057910 (CYP2C9*3) and rs28371725 (CYP2B6*6) indicate decreased activity of the respective enzymes. While codeine metabolism mainly involves CYP2D6, these other variants might contribute to altered pharmacokinetics indirectly affecting codeine's overall metabolism and clearance.

3. Recommended dosage adjustments or alternative medications:
- Given the reduced activity associated with CYP2D6 variants (rs28371706 and rs1065852), codeine is likely to be less effective in pain relief for this individual. It is recommended to avoid codeine and instead consider alternative pain medications not dependent on CYP2D6 for activation, such as morphine, hydromorphone, or non-opioid alternatives like acetaminophen or NSAIDs.
- Consultation with a healthcare provider is necessary to adjust the therapeutic approach appropriately.

4. Level of evidence for these recommendations:
- The PharmGKB database and Clinical Pharmacogenomics Implementation Consortium (CPIC) guidelines provide strong evidence (Level 1A) regarding the decreased efficacy and potential risks associated with codeine use in patients with non-functional