Quantitative Laboratory Results Interpretation
Updated April 2025

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Quantitative Results Interpretation/FAQ
Please note that the quantitative results from laboratory testing that appear on StreetCheck are provided by CFSRE. The following interpretation and summary of quantitative results are not applicable to other laboratories providing laboratory quantitative testing.

Quantitative Results Disclaimer
- The percent by weight results represent the percentage of the drug component(s) in a sample relative to the total weight.
- This result does not indicate the purity, potency, or safety associated with this sample.
- The percentage provided can vary by 10% of the reported value. For example, a sample reported to have 5% fentanyl has a probable range of 0.5 (4.5% - 5.5%). Similarly, a sample reported to have 40% xylazine has a probable range of 4.0 (36% - 44%).

Quantitative Results FAQ
- How much sample is needed for quantification results?
  - 10 mg (2 microscoops) of any substance is ideal. One microscoop is 5 mg. CFSRE will attempt to quantify any powder/pill/crystal/rock sample sent to the laboratory. The most important aspect is that the lab is able to mass the received sample on an analytical balance. If the lab is unable to accurately mass the sample then they will not be able to provide quantitative results.

- What substances are able to be quantified at this time?
  - Not all substances are able to be quantified at this time. The substances that are able to quantified at this time include:
    - Fentanyl | Xylazine | para-Fluorofentanyl | 4-ANPP | Methamphetamine | Cocaine | Lidocaine | Caffeine
  - List of substances that are planned to be quantified in the future:
    - BTMPS | Tramadol | Bromazolam | Heroin | Ketamine | Procaine | Lidocaine | Xylazine | Levamisole | Medetomidine | MDMA | Caffeine | Phenacetin | Methamphetamine | para-Fluorofentanyl | Fentanyl | Quinine | Cocaine | 4-ANPP | Tetracaine | Diphenhydramine
  - CFSRE updates the list of quantifiable substances in response to substances of interest and drug supply trends.

- Why are all substances not quantified?
  - The validation of analytical methods establishes quality expectations, ensuring robust and repeatable results from the analysis. It is a costly and timely process. The quantification methods that have been developed are validated to quantify more than 10 substances/compounds in a given sample. CFSRE developed the existing list to quantify common substances in the drug supply that are of interest to community partners.

- Will more substances be able to be quantified in a single sample in the future?

- ➢ Yes! CFSRE is in the process of moving their quantification analysis process over from a GC-MS method to an LC-QqQ-MS/MS to be implemented in 2025. This will allow for additional substances to be quantified (approximately 18-20 substances total). The list of substances has been prioritized based upon the observations made by CFSRE from 2023 to 2025.

❖ Why does the quantitative result not add up to 100% every time?

- ➢ CFSRE only provides quantification results for the following substances:
  - Fentanyl | Xylazine | para-Fluorofentanyl | 4-ANPP | Methamphetamine | Cocaine | Lidocaine | Caffeine
- ➢ If any substances that are not on the list above are identified, they are not able to directly report quantitative results.
  - However, we are able to retroactively estimate the quantity of the remaining components for some samples. This retroactive quantitative process is dependent on the remaining substances that were identified by lab testing.
    - **Case Scenario 1:** We are able to retroactively quantify other components when all active components identified from the lab are included in the quantified list because we suspect that the remaining weight/sample composition is due to an inactive cut. If a sample has 10% fentanyl, 10% xylazine and there were no other active components identified, then we would presume that the remaining weight/sample composition would be 80% inactive substance. The inactive substance can be best identified via FTIR testing.
    - **Case Scenario 2:** If there are other active components identified outside of the current list of quantifiable substances, it is much more complicated. We cannot hypothesize the exact % of active components outside of the list above. For example, if a sample has 10% fentanyl, 10% xylazine and acetaminophen is detected (a non-quantifiable substance), we cannot infer the percentage of inactive substance because we do not know how much of the sample is acetaminophen. The 80% remaining in the sample could hypothetically be any combination of acetaminophen with inactive cut (e.g. 1% acetaminophen with 79% inactive cut, 20% acetaminophen with 60% inactive cut, 80% acetaminophen, etc.). We are unable to determine the exact distribution of any active components not quantified by the lab. As a result, we would report fentanyl 10%, xylazine 10% and 80% as unknown.
- ➢ Using gas chromatography, we can't consider the salt form of the drug substance. The quantitation is determining the freebase concentration (in mass percentage aka mass fraction aka percent mass), with the understanding that many drugs exist as HCl or citrate salts – it is a limitation. This also means that the calculation of mass percentage may under-represent the percentage of a drug [in salt form]. As an example: If I calculate a sample of methamphetamine is 70% by mass of methamphetamine (freebase). The true % of Meth HCl is found by adjusting the calculated purity by the molecular weight ratio of salt to freebase. For methamphetamine that's 185.69 g/mol ÷ 149.23 g/mol. So, the proportion of Meth HCl is 70% * (185.69/149.23) = 87.1%

❖ Why does the quantitative result have a greater than (>) symbol?

- ➢ A substance might be reported by CFSRE as above 100% because of imperfect massing via their analytical balance. This is a rare occurrence and typically associated with single component samples. Any quantifiable substance with a result above 85% is ‘cleaned’ as follows:
  - If a substance is greater than 110% - recoded to “>95%”
  - If a substance is at 100-110% - recoded to “>90%”
  - If a substance is at 86-100% - recoded to “>85%”
  - If a substance is at 85% or below it is reported as is.

- Why might the quantitative results be different from the semi-quant results?
  - CFSRE uses the same vial (sample provided in solution) for semi-quant and quant.
  - There are ionization differences and sample preparation differences that go into each testing type/instrumentation.
  - Absolute correlation is not expected across both result types (semi-quant vs quant).
    - The semi-quant results and quant results in theory should align perfectly but differences in instrumentation and analysis results in discordant results occasionally
  - If the results of quantitative and semi-quantitative report a different primary substance, that is atypical. The situation may inevitably occur when two or more substances are close to the same proportion in a sample. If concerned, please flag the sample as 'Confusing / Conflicting Lab Result(s)' within StreetCheck to notify the lab of a surprising result.
    - Case Scenario A
      - Fentanyl 10 | Xylazine 7 [Semi-Quant Results]
      - Fentanyl 20% | Xylazine 25% [Quant Results]
        - In this example we have the relative parts of fentanyl to xylazine in a 10:7 ratio. If the semi-quant results perfectly translated to the quantitative results we would expect the quant results to be Fentanyl 20% | Xylazine 14%. However, the quant results reported showed slightly higher xylazine than fentanyl. An inversion between the semi-quant and quantitative results are atypical and should be flagged as a Confusing / Conflicting Lab Result.
    - Case Scenario B:
      - Fentanyl 10 | Xylazine 9 [Semi-Quant Results]
      - Fentanyl 20% | Xylazine 2% [Quant Results]
        - In this example we have the relative parts of fentanyl to xylazine in a 10:9 ratio. If the semi-quant results perfectly translated to the quantitative results we would expect the quant results to be Fentanyl 20% | Xylazine 18%. However, the quant results reported showed lower xylazine at 2%. The significant difference in the relative abundance of fentanyl and xylazine across semi-quant and quant results indicates that this sample should be flagged as a Confusing / Conflicting Lab Result.

- What types of substance forms **can** be quantified?
  - Solid substances (i.e. powder, pill, crystal, rock, tablets) can be quantified by the lab if there is sufficient quantity (~10 mg to weigh the substance to complete the quant calculation).

- What types of substance forms **cannot** be quantified?
  - Some sample types are not able to be completely dissolved in an organic or aqueous solvent, thus prohibiting their quantitative analysis. Examples of such samples include biological/botanical materials, complex food products, and tars/oils. NOTE: While tablets generally contain substances that cannot be dissolved, the tablets' active component(s) usually can be extracted – enabling quantitative analysis.
  - Cooker / pipe residue will not be quantified.
  - Gummies / candies and other edible products cannot be confidently quantified because they cannot be fully dissolved in an aqueous or organic solvent.
  - Currently, there is not an established methodology at CFSRE for quantifying liquid samples.

Many thanks to the CFSRE team for reviewing this document to ensure its accuracy.
If you have any questions please contact the MADDS team: (maddsbrandeis@gmail.com)