



## Screen for CEUS:

A new tool for predicting CEUS benefit  
when patients enter the imaging lab:  
The IN-USE Algorithm

### STEP ONE – Determine the following:

- Weight (in kg)
- Age (in years)
- Heart rate (in beats per minute)

### STEP TWO – Proceed with calculation if the above values are within the ranges listed below:

- Weight: 40-182 kg
- Age: 18-100 years
- Heart rate: 40-200 beats per minute

### STEP THREE -- Calculate probability of benefit from CEUS:

- 1) Determine log odds of UEA as follows:
  - a.  $\text{Log odds} = -8.38 + 0.032 \cdot \text{age} + 0.036 \cdot \text{weight} + 0.019 \cdot \text{heart rate}$
- 2) Convert to probability as follows:
  - a. Calculate  $e^{\text{log odds}}$  to convert to odds from log odds
  - b. Calculate probability (p) from odds ( $p / 1-p$ ) as follows:
    - i. Divide odds by (1 + odds) (i.e. to convert an odds of 1/9 to a probability, divide 1/9 by 10/9 to obtain a probability of 0.1)

### STEP FOUR – Determine whether CEUS is recommended:

- 1) If Probability > 75%, consider use of ultrasound contrast
- 2) Final decision, however, should be based on clinical judgment based on all relevant facts and circumstances

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**References:** *Initial derivation:* Fraiche AM, Manning WJ, Nagueh SF, Main ML, Markson LJ, **Strom JB**. Identification of Need for Ultrasound Enhancing Agent Study (the IN-USE Study). J Am Soc Echocardiogr. 2020 12; 33(12):1500-1508. PMID: 32919859; *External validation:* Lehenbauer KR, Kennedy K, Fraiche AM, **Strom JB**, Main ML. External Validation of the Identification of Need for Ultrasound Enhancing Agent Study (the IN-USE Study). J Am Soc Echocardiogr. 2022 Mar 03. PMID: 35247553.

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