**Supplemental Figure legends**

**Figure E1.** An example of three animals during a 20 mL·min-1 bleed, showing the activity monitoring operating characteristic (AMOC) curves time to detection (TTD) plotted as a relative probability of being in a bleeding state from 0 (no bleed) to 1 (bleeding). The dotted red vertical lines represent the start of bleeding and the horizontal black dotted lines represent when 80% of all pigs were detected as a false positive rate of 10-2 for models using simple metrics (SM), beat-to-beat (B2B) and waveform (WF) using a (A) universal baseline (None), or (B) personalized baseline (Normalized).

**Figure E2.** AMOC curves showing the average TTD of bleeding onset needed to detect 80% of pigs for the 5 and 20 mL·min-1 cohorts for the SM (top), B2B (middle), and WF (bottom) models using either a universal baseline (left) or personalized baseline (right).

**Figure E3.** Examples of Individual vital detection performance for the 20 mL·min-1 cohort using a (A) universal baseline or (B) personalized baseline. Vitals are grouped into noninvasive measurements (NIM, brown) or measurements from a central venous catheter (CVC, blue), pulmonary artery catheter (PAC, purple), or arterial catheter (ART, red).

**Figure E4.** Individual vital detection performance for a subset of the 20 mL·min-1 cohort using a (A) universal baseline or (B) personalized baseline. Vitals are grouped into noninvasive measurements (NIM, brown) or measurements from a central venous catheter (CVC, blue), pulmonary artery catheter (PAC, purple), or arterial catheter (ART, red). The subset includes only 27 pigs after removing 11 with no stable baseline or data with too many artifacts.