**Table S-2.** Laboratory and echocardiogram measurements used as input variables for RNN model, along with the percent of episodes in each dataset with these measurements and the percent of timesteps with imputed values.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable Name** | **Training Set** | | **Validation Set** | | **Test set** | |
| **% Episodes with Meas.** | **% Imputed** | **% Episodes with Meas.** | **% Imputed** | **% Episodes w. Meas.** | **% Imputed** |
| ABG Base excess | 29.294 | 98.688 | 28.376 | 98.721 | 29.808 | 98.724 |
| ABG FiO2 | 20.820 | 99.167 | 21.064 | 99.193 | 21.182 | 99.221 |
| ABG HCO3 | 29.294 | 98.686 | 28.376 | 98.721 | 29.808 | 98.724 |
| ABG O2 sat | 29.294 | 98.683 | 28.376 | 98.721 | 29.808 | 98.725 |
| ABG PCO2 | 29.294 | 98.680 | 28.376 | 98.718 | 29.808 | 98.722 |
| ABG PO2 | 29.294 | 98.679 | 28.376 | 98.717 | 29.808 | 98.722 |
| ABG TCO2 | 29.294 | 98.688 | 28.376 | 98.722 | 29.808 | 98.724 |
| ABG pH | 29.294 | 98.679 | 28.376 | 98.718 | 29.808 | 98.723 |
| ALT | 50.016 | 98.913 | 48.475 | 98.906 | 48.371 | 98.981 |
| AST | 50.016 | 98.913 | 48.475 | 98.906 | 48.371 | 98.981 |
| Albumin Level | 50.227 | 98.902 | 48.911 | 98.898 | 48.658 | 98.973 |
| Alkaline phosphatase | 49.854 | 98.917 | 48.382 | 98.908 | 48.275 | 98.983 |
| Amylase | 4.747 | 99.947 | 4.947 | 99.955 | 5.112 | 99.950 |
| Anti-Xa Heparin | 2.041 | 99.853 | 2.147 | 99.875 | 2.013 | 99.929 |
| Antithrombin III Function | 1.458 | 99.980 | 1.151 | 99.964 | 1.374 | 99.984 |
| Ao max PG | 11.342 | 99.940 | 11.699 | 99.938 | 11.054 | 99.939 |
| B-type Natriuretic Peptide | 4.375 | 99.920 | 4.325 | 99.905 | 4.377 | 99.923 |
| BUN | 85.207 | 97.475 | 84.848 | 97.476 | 85.367 | 97.468 |
| Bands % | 30.379 | 99.408 | 29.932 | 99.435 | 29.361 | 99.416 |
| Basophils % | 68.600 | 98.570 | 67.735 | 98.565 | 68.339 | 98.631 |
| Bicarbonate Serum | 85.256 | 97.459 | 84.848 | 97.463 | 85.367 | 97.448 |
| Bilirubin Conjugated | 7.485 | 99.842 | 7.903 | 99.795 | 6.997 | 99.829 |
| Bilirubin Total | 49.951 | 98.915 | 48.413 | 98.908 | 48.275 | 98.981 |
| Bilirubin Unconjugated | 7.485 | 99.842 | 7.903 | 99.795 | 6.997 | 99.829 |
| Blasts % | 1.523 | 99.959 | 1.400 | 99.963 | 1.374 | 99.970 |
| C-Reactive Protein | 28.905 | 99.459 | 31.083 | 99.407 | 28.722 | 99.467 |
| CBG Base excess | 34.025 | 99.486 | 36.714 | 99.374 | 34.856 | 99.395 |
| CBG FiO2 | 23.963 | 99.709 | 25.233 | 99.650 | 24.026 | 99.669 |
| CBG HCO3 | 34.025 | 99.486 | 36.714 | 99.373 | 34.856 | 99.395 |
| CBG O2 sat | 33.992 | 99.486 | 36.652 | 99.376 | 34.792 | 99.397 |
| CBG PCO2 | 34.041 | 99.484 | 36.714 | 99.373 | 34.856 | 99.395 |
| CBG PO2 | 34.008 | 99.485 | 36.745 | 99.373 | 34.824 | 99.396 |
| CBG TCO2 | 34.025 | 99.486 | 36.714 | 99.373 | 34.856 | 99.395 |
| CBG pH | 34.041 | 99.485 | 36.714 | 99.373 | 34.856 | 99.395 |
| CSF Bands % | 0.535 | 99.997 | 0.498 | 99.998 | 0.671 | 99.996 |
| CSF Glucose | 4.294 | 99.979 | 4.947 | 99.973 | 4.153 | 99.977 |
| CSF Lymphs % | 4.488 | 99.966 | 4.760 | 99.966 | 4.633 | 99.957 |
| CSF Protein | 4.277 | 99.979 | 4.885 | 99.973 | 4.121 | 99.977 |
| CSF RBC | 7.194 | 99.948 | 7.250 | 99.947 | 7.157 | 99.936 |
| CSF Segs % | 3.727 | 99.971 | 4.045 | 99.970 | 3.834 | 99.963 |
| CSF WBC | 7.194 | 99.948 | 7.250 | 99.947 | 7.157 | 99.935 |
| Calcium Ionized | 62.994 | 97.263 | 63.815 | 97.169 | 64.313 | 97.217 |
| Calcium Total | 85.207 | 97.462 | 84.879 | 97.457 | 85.304 | 97.444 |
| Cardiac Rhythm bundle   branch block | 0.843 | 99.908 | 0.778 | 99.965 | 0.735 | 99.943 |
| Cardiac Rhythm normal   sinus | 94.734 | 86.777 | 95.395 | 86.605 | 94.792 | 86.081 |
| Cardiac Rhythm pac | 0.859 | 99.887 | 1.213 | 99.935 | 0.990 | 99.930 |
| Cardiac Rhythm pvc | 3.500 | 99.937 | 3.267 | 99.888 | 3.419 | 99.900 |
| Cardiac Rhythm sinus   bradycardia | 19.750 | 99.408 | 18.824 | 99.382 | 21.022 | 99.258 |
| Cardiac Rhythm sinus   tachycardia | 75.373 | 93.983 | 77.131 | 93.797 | 75.272 | 94.288 |
| Chloride | 85.256 | 97.459 | 84.848 | 97.463 | 85.367 | 97.448 |
| Complement C3 Serum | 0.794 | 99.996 | 0.871 | 99.996 | 1.054 | 99.995 |
| Complement C4 Serum | 0.826 | 99.996 | 0.933 | 99.996 | 1.054 | 99.995 |
| Creatinine | 85.272 | 97.475 | 84.972 | 97.474 | 85.399 | 97.470 |
| Culture Blood\* | 26.183 | 0.000 | 28.376 | 0.000 | 25.591 | 0.000 |
| Culture CSF\* | 7.583 | 0.000 | 7.343 | 0.000 | 7.636 | 0.000 |
| Culture Fungus Blood\* | 5.800 | 0.000 | 5.943 | 0.000 | 5.751 | 0.000 |
| Culture Respiratory\* | 15.603 | 0.000 | 16.646 | 0.000 | 14.760 | 0.000 |
| Culture Urine\* | 18.600 | 0.000 | 20.504 | 0.000 | 18.530 | 0.000 |
| Culture Wound\* | 4.229 | 0.000 | 4.325 | 0.000 | 4.089 | 0.000 |
| D-dimer | 4.067 | 99.902 | 3.018 | 99.931 | 3.578 | 99.923 |
| E/E' lat (MV) | 5.039 | 99.977 | 5.538 | 99.973 | 4.888 | 99.976 |
| E/E' med | 4.132 | 99.981 | 4.512 | 99.979 | 3.802 | 99.981 |
| ESR | 3.305 | 99.973 | 3.640 | 99.975 | 3.514 | 99.974 |
| ESV (MOD-sp4) | 2.268 | 99.988 | 2.614 | 99.985 | 2.364 | 99.988 |
| Eosinophils % | 64.679 | 98.601 | 64.935 | 98.599 | 64.824 | 98.667 |
| FS (MM) | 12.638 | 99.930 | 12.663 | 99.928 | 11.693 | 99.932 |
| Ferritin Level | 3.338 | 99.968 | 3.609 | 99.957 | 3.450 | 99.969 |
| Fibrinogen | 24.368 | 99.447 | 24.642 | 99.373 | 24.345 | 99.401 |
| GGT | 4.699 | 99.877 | 3.765 | 99.905 | 3.866 | 99.917 |
| Glucose | 89.258 | 93.939 | 89.079 | 94.277 | 89.489 | 94.136 |
| Haptoglobin | 1.167 | 99.992 | 1.120 | 99.992 | 1.310 | 99.992 |
| Hematocrit | 87.103 | 95.840 | 86.559 | 95.756 | 86.901 | 95.828 |
| Hemoglobin | 86.536 | 96.161 | 85.625 | 96.079 | 86.198 | 96.195 |
| INR | 40.781 | 99.192 | 40.012 | 99.121 | 39.744 | 99.161 |
| IVSd(MM) | 12.476 | 99.931 | 12.632 | 99.929 | 11.534 | 99.933 |
| Influenza Lab | 20.787 | 99.906 | 22.931 | 99.895 | 22.396 | 99.892 |
| LV-0001 | 9.462 | 99.951 | 9.739 | 99.946 | 9.042 | 99.950 |
| LV-0002 | 1.118 | 99.993 | 1.338 | 99.991 | 1.150 | 99.993 |
| LV-0004 | 0.859 | 99.995 | 0.840 | 99.995 | 0.799 | 99.996 |
| LV-0026 | 0.518 | 99.998 | 0.404 | 99.998 | 0.575 | 99.997 |
| LV-0027 | 0.583 | 99.997 | 0.778 | 99.996 | 0.447 | 99.998 |
| LV-0029 | 0.632 | 99.997 | 0.591 | 99.996 | 0.383 | 99.998 |
| LV-0198 | 0.697 | 99.996 | 0.653 | 99.996 | 0.447 | 99.998 |
| LV-0208 | 1.701 | 99.990 | 1.680 | 99.989 | 1.693 | 99.989 |
| LVIDd (MM) | 12.654 | 99.930 | 12.663 | 99.928 | 11.725 | 99.931 |
| LVIDs (MM) | 12.638 | 99.930 | 12.663 | 99.928 | 11.725 | 99.931 |
| LVPWd (MM) | 12.508 | 99.931 | 12.632 | 99.929 | 11.597 | 99.932 |
| Lactate | 60.450 | 97.725 | 61.014 | 97.647 | 62.045 | 97.705 |
| Lactate Dehydrogenase   Blood | 3.808 | 99.935 | 3.951 | 99.938 | 3.355 | 99.933 |
| Lactic Acid Blood | 1.620 | 99.986 | 1.151 | 99.989 | 1.629 | 99.979 |
| Lipase | 7.469 | 99.900 | 7.094 | 99.915 | 7.348 | 99.909 |
| Lymphocyte % | 70.901 | 98.392 | 70.691 | 98.380 | 71.406 | 98.432 |
| MCH | 80.250 | 98.032 | 79.309 | 98.027 | 79.489 | 98.068 |
| MCHC | 80.250 | 98.032 | 79.309 | 98.027 | 79.489 | 98.068 |
| MCV | 80.250 | 98.032 | 79.309 | 98.027 | 79.489 | 98.068 |
| MV A max vel | 7.599 | 99.963 | 7.872 | 99.961 | 7.668 | 99.963 |
| MV E max vel | 8.717 | 99.956 | 9.179 | 99.952 | 8.850 | 99.955 |
| MV E/A | 7.583 | 99.963 | 7.841 | 99.961 | 7.668 | 99.963 |
| MV Lat Peak A' Vel | 4.861 | 99.977 | 5.569 | 99.973 | 4.760 | 99.977 |
| MV Lat Peak E' Vel | 5.395 | 99.975 | 5.881 | 99.971 | 5.016 | 99.975 |
| MV Lat Peak S' Vel | 5.169 | 99.976 | 5.818 | 99.972 | 4.824 | 99.976 |
| MV dec time | 1.669 | 99.993 | 2.085 | 99.991 | 2.045 | 99.991 |
| MV max PG | 0.470 | 99.998 | 0.373 | 99.998 | 0.479 | 99.998 |
| MV mean PG | 0.437 | 99.998 | 0.311 | 99.998 | 0.415 | 99.998 |
| MVBG Base Excess | 2.236 | 99.977 | 1.991 | 99.973 | 2.300 | 99.971 |
| MVBG FiO2 | 0.535 | 99.997 | 0.436 | 99.998 | 0.511 | 99.996 |
| MVBG HCO3 | 2.236 | 99.977 | 1.991 | 99.973 | 2.300 | 99.971 |
| MVBG O2 Sat | 2.268 | 99.977 | 1.991 | 99.973 | 2.268 | 99.971 |
| MVBG PCO2 | 2.268 | 99.977 | 1.991 | 99.973 | 2.300 | 99.971 |
| MVBG PO2 | 2.268 | 99.977 | 1.991 | 99.973 | 2.268 | 99.971 |
| MVBG TCO2 | 2.236 | 99.977 | 1.991 | 99.973 | 2.300 | 99.971 |
| MVBG pH | 2.268 | 99.977 | 1.991 | 99.973 | 2.300 | 99.971 |
| Macrocytes | 5.638 | 99.945 | 5.352 | 99.946 | 4.952 | 99.946 |
| Magnesium Level | 31.205 | 98.978 | 30.741 | 99.031 | 29.585 | 99.073 |
| Med Peak A' Vel | 3.856 | 99.982 | 4.480 | 99.979 | 3.546 | 99.982 |
| Med Peak E' Vel | 4.472 | 99.979 | 4.729 | 99.977 | 3.834 | 99.980 |
| Med Peak S Vel | 4.342 | 99.980 | 4.729 | 99.977 | 3.706 | 99.981 |
| Metamyelocytes % | 15.797 | 99.716 | 16.490 | 99.736 | 15.240 | 99.710 |
| Monocytes % | 70.674 | 98.418 | 70.380 | 98.406 | 71.086 | 98.461 |
| Myelocytes % | 13.513 | 99.764 | 13.410 | 99.787 | 13.035 | 99.759 |
| Neutrophils % | 70.852 | 98.397 | 70.660 | 98.383 | 71.342 | 98.438 |
| PI max PG | 2.382 | 99.988 | 2.520 | 99.988 | 2.045 | 99.989 |
| PI max vel | 2.382 | 99.988 | 2.520 | 99.988 | 2.045 | 99.989 |
| PT | 40.781 | 99.192 | 40.012 | 99.120 | 39.744 | 99.160 |
| PTT | 40.668 | 99.166 | 39.484 | 99.076 | 39.521 | 99.129 |
| PV V2 max | 9.413 | 99.953 | 10.143 | 99.947 | 8.818 | 99.953 |
| Phosphorus level | 31.416 | 98.901 | 30.927 | 98.972 | 30.128 | 99.015 |
| Platelet Count | 80.282 | 98.004 | 79.371 | 98.000 | 79.553 | 98.030 |
| Potassium | 88.966 | 95.215 | 89.266 | 95.165 | 89.425 | 95.182 |
| Protein Total | 49.838 | 98.917 | 48.382 | 98.908 | 48.307 | 98.983 |
| RBC Blood | 80.250 | 98.032 | 79.309 | 98.027 | 79.489 | 98.068 |
| RDW | 80.169 | 98.046 | 79.123 | 98.038 | 79.361 | 98.083 |
| RV-0002 | 1.782 | 99.988 | 1.649 | 99.991 | 2.045 | 99.985 |
| RV-0016 | 6.886 | 99.966 | 7.001 | 99.965 | 5.847 | 99.971 |
| RV-0021 | 7.728 | 99.962 | 7.778 | 99.961 | 7.125 | 99.961 |
| RV-0056 | 1.960 | 99.991 | 2.054 | 99.991 | 1.917 | 99.990 |
| RV-0060 | 1.280 | 99.991 | 1.058 | 99.995 | 1.086 | 99.992 |
| RV-0065 | 5.930 | 99.970 | 6.098 | 99.970 | 5.942 | 99.967 |
| RV-0068 | 0.729 | 99.996 | 0.778 | 99.995 | 0.895 | 99.994 |
| RV-0069 | 0.518 | 99.998 | 0.373 | 99.998 | 0.543 | 99.996 |
| Reticulocyte Count | 3.791 | 99.968 | 4.138 | 99.964 | 3.163 | 99.976 |
| Schistocytes | 16.429 | 99.705 | 16.210 | 99.700 | 15.463 | 99.707 |
| Sodium | 89.015 | 94.746 | 89.266 | 94.989 | 89.521 | 94.903 |
| Spherocytes | 5.055 | 99.943 | 3.796 | 99.952 | 4.026 | 99.942 |
| T4 Free | 3.743 | 99.983 | 3.329 | 99.985 | 3.802 | 99.981 |
| TR max PG | 8.425 | 99.956 | 8.058 | 99.958 | 7.700 | 99.956 |
| TR max vel | 8.425 | 99.956 | 8.058 | 99.958 | 7.700 | 99.956 |
| TSH | 4.115 | 99.982 | 3.360 | 99.985 | 3.962 | 99.980 |
| TV A max vel | 0.697 | 99.997 | 0.653 | 99.997 | 0.607 | 99.997 |
| TV E max vel | 1.377 | 99.994 | 1.213 | 99.995 | 0.990 | 99.995 |
| TV E/A | 0.680 | 99.997 | 0.653 | 99.997 | 0.607 | 99.997 |
| TV Lat Peak A' Vel | 0.680 | 99.997 | 0.809 | 99.997 | 0.575 | 99.997 |
| TV Lat Peak E' Vel | 0.875 | 99.996 | 0.933 | 99.996 | 0.639 | 99.997 |
| TV Lat Peak S' Vel | 1.312 | 99.994 | 1.338 | 99.995 | 1.086 | 99.995 |
| Tei Index LV (LV MPI) | 1.248 | 99.995 | 1.400 | 99.994 | 1.342 | 99.994 |
| Triglycerides | 12.816 | 99.640 | 13.192 | 99.671 | 11.565 | 99.716 |
| VBG Base excess | 30.655 | 98.955 | 31.456 | 98.913 | 31.214 | 98.940 |
| VBG FiO2 | 22.003 | 99.359 | 23.024 | 99.346 | 22.268 | 99.375 |
| VBG HCO3 | 30.655 | 98.954 | 31.456 | 98.913 | 31.214 | 98.939 |
| VBG O2 sat | 30.638 | 98.955 | 31.487 | 98.913 | 31.214 | 98.940 |
| VBG PCO2 | 30.655 | 98.953 | 31.456 | 98.912 | 31.214 | 98.937 |
| VBG PO2 | 30.638 | 98.953 | 31.456 | 98.912 | 31.214 | 98.937 |
| VBG TCO2 | 30.655 | 98.955 | 31.456 | 98.913 | 31.214 | 98.940 |
| VBG pH | 30.655 | 98.953 | 31.456 | 98.912 | 31.214 | 98.937 |
| White Blood Cell Count | 80.250 | 98.032 | 79.309 | 98.025 | 79.489 | 98.068 |

See Table S-5 for acronym expansions (). (\*For a culture variable, % Episodes indicates % of episodes with that culture drawn.)