Table S1. Hyperparameter tuning for each regression model. Random search was used to optimize select parameters of the random forest, adaBoost decision tree, and multilayer perceptron models using 5-fold cross validation. The high and low values of the search space are provided as well as parameter values from the best predictor.

|  |  |  |  |
| --- | --- | --- | --- |
| **Random forest** | **max depth** | **max features** | **n estimators** |
| **hi** | 10 | 10 | 40 |
| **tuned** | **182** | **311** | **319** |
| **lo** | 400 | 500 | 1200 |
| **Ada boosted decision tree** | **max depth** | **max features** | **n estimators** |
| **hi** | 10 | 10 | 10 |
| **tuned** | **442** | **476** | **221** |
| **lo** | 700 | 700 | 500 |
| **Multilayer Perceptron** | **hidden layer size** | **max iteration** | n/a |
| **hi** | 50 | 100 | n/a |
| **tuned** | **364** | **123** |  |
| **lo** | 400 | 500 |  |

Table S2. Raw Hemagglutination inhibition titers representing the homologous reference strain titer and heterologous test antigen titers.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pig # | 412 | 413 | 721 | 722 | 233 | 234 | 414 | 415 |
|  | A/swine/Indiana/A00968373/2012 | A/swine/Indiana/A00968373/2012 | A/swine/Iowa/A01480656/2014 | A/swine/Iowa/A01480656/2014 | A/swine/Pennsylvania/A01076777/2010 | A/swine/Pennsylvania/A01076777/2010 | A/swine/Indiana/A01202866/2011 | A/swine/Indiana/A01202866/2011 |
| A/swine/Indiana/A00968373/2012 | 640 | 2560 |  |  |  |  |  |  |
| A/swine/Nebraska/A01672826/2017 | 1280 | 2560 |  |  |  |  |  |  |
| A/swine/Iowa/A01480656/2014 |  |  | 1280 | 2560 |  |  |  |  |
| A/swine/Indiana/A02214844/2017 |  |  | 160 | 80 |  |  |  |  |
| A/swine/Pennsylvania/A01076777/2010 |  |  |  |  | 2560 | 640 |  |  |
| A/swine/North Carolina/A01732197/2016 |  |  |  |  | 320 | 160 |  |  |
| A/swine/Indiana/A01202866/2011 |  |  |  |  |  |  | 5120 | 5120 |
| A/swine/Iowa/A01733626/2016 |  |  |  |  |  |  | 40 | 80 |
| **Log2 Difference** | -1 | 0 | 3 | 5 | 3 | 2 | 7 | 6 |