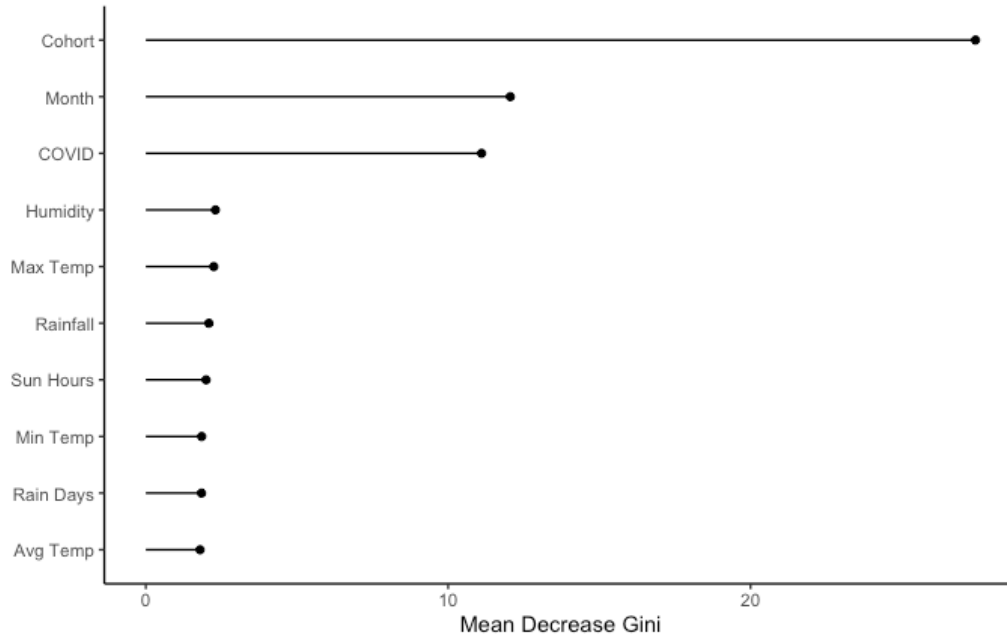
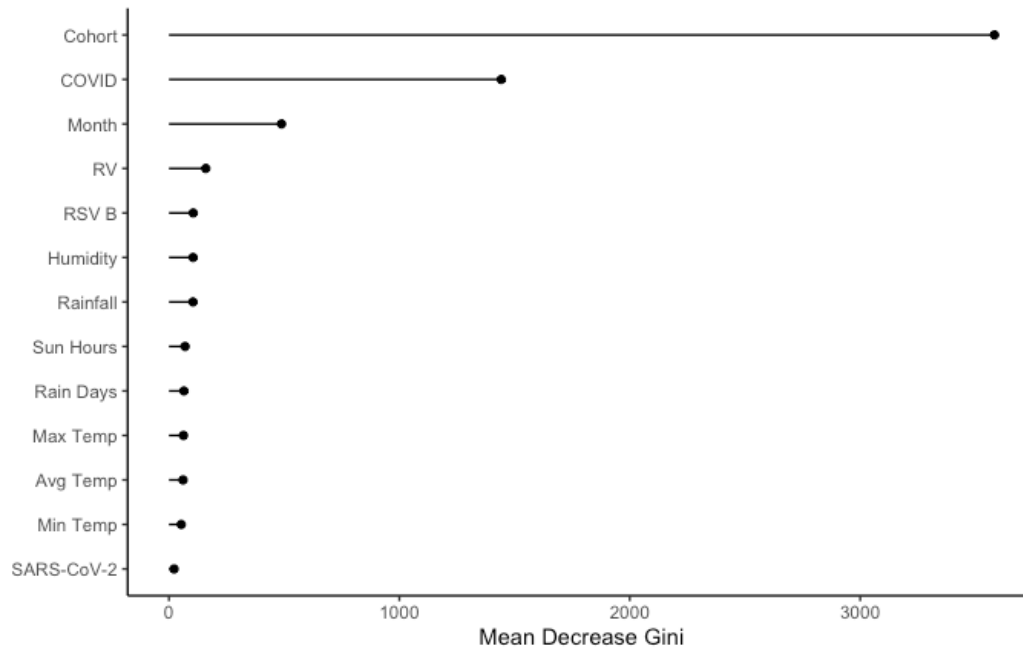


## Supplementary Information

**Supplementary Figure 1.** Mean decrease Gini for each variable included in the random forest analysis of respiratory infection risk by risk factor for adults and children (n=1,989 nasal swabs).



**Supplementary Figure 2.** Mean decrease Gini for each variable included in the random forest analysis of severity of symptoms (symptoms scores) by risk factor for adults and children (n=1,989 nasal swabs).



**Supplementary Table 1.** Results of binomial generalized linear mixed model (GLMM) for effects of age class, COVID-19 lockdown, and calendar month on presence/absence of respiratory pathogen infection. Statistically significant effects ( $p < 0.05$ ) are bolded.

| Fixed effects <sup>a</sup>                  | $\beta$       | SE            | Wald $X^2$ test                 | p                 |
|---------------------------------------------|---------------|---------------|---------------------------------|-------------------|
| (intercept)                                 | -3.0087       | 0.5247        | -5.734                          | <0.0001           |
| <b>Forest workers' children<sup>b</sup></b> | <b>0.7753</b> | <b>0.2243</b> | <b>3.457</b>                    | <b>0.0005</b>     |
| <b>Schoolchildren<sup>b</sup></b>           | <b>1.0557</b> | <b>0.2281</b> | <b>4.628</b>                    | <b>&lt;0.0001</b> |
| COVID-19 lockdown                           | -0.1770       | 0.2190        | -0.808                          | 0.4190            |
| Month <sup>c</sup> :                        | -             | -             | -                               | -                 |
| January                                     | 0.8289        | 0.5651        | 1.467                           | 0.1424            |
| February                                    | 0.4842        | 0.5231        | 0.926                           | 0.3546            |
| April                                       | 1.0795        | 0.6474        | 1.668                           | 0.0954            |
| May                                         | 0.5805        | 0.5725        | 1.014                           | 0.3106            |
| <b>June</b>                                 | <b>1.1967</b> | <b>0.5065</b> | <b>2.363</b>                    | <b>0.0182</b>     |
| July                                        | 0.8283        | 0.5043        | 1.642                           | 0.1005            |
| August                                      | 0.6145        | 0.5560        | 1.105                           | 0.2691            |
| <b>September</b>                            | <b>1.1928</b> | <b>0.5131</b> | <b>2.325</b>                    | <b>0.0201</b>     |
| <b>October</b>                              | <b>1.0618</b> | <b>0.5112</b> | <b>2.077</b>                    | <b>0.0378</b>     |
| November                                    | 0.8564        | 0.5084        | 1.684                           | 0.0921            |
| December                                    | 0.9111        | 0.6439        | 1.415                           | 0.1571            |
| Random effect                               | Variance      | SD            | Likelihood ratio test ( $X^2$ ) | p                 |
| Subject                                     | -1.3664       | 0.0753        | -18.15                          | <0.0001           |

<sup>a</sup>The marginal and conditional  $R^2$  of the GLMM were 0.102 and 0.143, respectively.

<sup>b</sup>Reference category for cohort: adult forest workers.

<sup>c</sup>Reference category for month: March, the month with the lowest risk of respiratory infection (see Figure 1).

**Supplementary Table 2.** Results of linear mixed model (LMM) for effects of age class, pathogen richness, and specific viral infections on severity of symptoms (symptoms scores). Statistically significant effects ( $p < 0.05$ ) are bolded.

| Fixed effects <sup>a</sup>                  | $\beta$       | SE            | 95% CI                | df            | t             | p                 |
|---------------------------------------------|---------------|---------------|-----------------------|---------------|---------------|-------------------|
| (intercept)                                 | 0.7563        | 0.2415        | [0.301, 1.233]        | 153.7         | 3.132         | 0.0021            |
| <b>Forest workers' children<sup>b</sup></b> | <b>1.3368</b> | <b>0.3402</b> | <b>[0.707, 2.037]</b> | <b>157.4</b>  | <b>3.929</b>  | <b>0.0001</b>     |
| <b>Schoolchildren<sup>b</sup></b>           | <b>3.5711</b> | <b>0.2643</b> | <b>[3.053, 4.046]</b> | <b>167.8</b>  | <b>13.509</b> | <b>&lt;0.0001</b> |
| <b>Richness: 1 pathogen<sup>c</sup></b>     | <b>0.4466</b> | <b>0.1747</b> | <b>[0.101, 0.795]</b> | <b>1813.9</b> | <b>2.557</b>  | <b>0.0106</b>     |
| Richness: 2+ pathogens <sup>c</sup>         | 0.7418        | 0.4798        | [-0.134, 1.717]       | 1844.7        | 1.546         | 0.1222            |
| <b>RSV B</b>                                | <b>1.7520</b> | <b>0.6257</b> | <b>[0.592, 3.010]</b> | <b>1775.3</b> | <b>2.800</b>  | <b>0.0052</b>     |
| RV                                          | -0.205        | 0.2079        | [-0.615, 0.191]       | 1808.2        | -0.988        | 0.3232            |
| SARS-CoV-2                                  | 0.5924        | 0.8753        | [-1.114, 2.342]       | 1670.6        | 0.677         | 0.4986            |

<sup>a</sup>The marginal and conditional  $R^2$  of the LMM were 0.336 and 0.531, respectively.

<sup>b</sup>Reference category for cohort: adult forest workers.

<sup>c</sup>Reference category for richness: zero pathogens.

**Supplementary Table 3.** Pathogens detected in paired fecal samples from Kanyawara chimpanzees before and during quarters with observed respiratory clinical signs (n=32 samples from 14 individuals).

| ID  | Respiratory Signs | Quarter | Month | Year | <u>AdV</u> | <u>EV</u> | <u>Spn</u> |
|-----|-------------------|---------|-------|------|------------|-----------|------------|
| AT  |                   | Q4      | NOV   | 2019 |            |           |            |
| AT  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| BB  |                   | Q3      | SEPT  | 2019 |            |           |            |
| BB  | Y                 | Q4      | DEC   | 2019 |            |           |            |
| DL  |                   | Q2      | MAY   | 2019 |            |           |            |
| DL  | Y                 | Q1      | FEB   | 2020 |            |           |            |
| ES  |                   | Q4      | DEC   | 2019 |            |           |            |
| ES  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| ES  |                   | Q2      | MAY   | 2019 |            |           |            |
| ES  | Y                 | Q3      | AUG   | 2019 |            |           |            |
| JU  |                   | Q4      | NOV   | 2019 |            |           |            |
| JU  | Y                 | Q1      | MAR   | 2020 |            |           |            |
| MX  |                   | Q4      | OCT   | 2019 |            |           |            |
| MX  | Y                 | Q1      | MAR   | 2020 |            |           |            |
| OL  |                   | Q2      | APR   | 2019 |            |           |            |
| OL  | Y                 | Q2      | MAY   | 2019 |            |           |            |
| OL  |                   | Q4      | OCT   | 2019 |            |           |            |
| OL  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| OM  |                   | Q4      | OCT   | 2019 |            |           |            |
| OM  | Y                 | Q1      | MAR   | 2020 |            |           |            |
| OTB |                   | Q2      | APR   | 2019 |            |           |            |
| OTB | Y                 | Q1      | MAR   | 2020 |            |           |            |
| PB  |                   | Q4      | NOV   | 2019 |            |           |            |
| PB  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| QK  |                   | Q4      | OCT   | 2019 |            |           |            |
| QK  | Y                 | Q1      | FEB   | 2020 |            |           |            |
| QT  |                   | Q4      | OCT   | 2019 |            |           |            |
| QT  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| QV  |                   | Q4      | OCT   | 2019 |            |           |            |
| QV  | Y                 | Q1      | JAN   | 2020 |            |           |            |
| UN  |                   | Q4      | OCT   | 2019 |            |           |            |
| UN  | Y                 | Q1      | JAN   | 2020 |            |           |            |

Pathogens are adenovirus (AdV), non-rhinovirus enterovirus (EV), and *Streptococcus pneumoniae* (Spn). Black cells indicate positive results for the individuals listed by two-letter abbreviation in the first column. All EV-positive samples were typed to rule out rhinovirus.