**Supplementary Appendix**

**This appendix has been provided by the authors to give readers additional information about their work.**

**Supplement to:**

**Determining respiratory syncytial virus seasonality in the United States: the impact of increased molecular testing**

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**Table S1: Investigating the pre-season baseline.** Among consistent reporters for a given surveillance year, this table shows the percentage of reporters that contributed to NREVSS on a given week, and the 4-week moving average of RSV detections for a given week. Season mean and standard deviation (s.d.) are shown.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Week 26 |  | Week 27 |  | Week 28 |  | Week 29 |  | Week 30 |  | Week 31 |  | Week 32 |  | Week 33 |
| % labs | Detections | % labs | Detections | % labs | Detections | % labs | Detections | % labs | Detections | % labs | Detections | % labs | Detections | % labs | Detections |
| Season | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) | reporting | (4wma) |
| 2009-10 | 70.0 | 5.8 | 72.5 | 6.8 | 67.5 | 8.0 | 70.0 | 8.0 | 67.5 | 6.8 | 70.0 | 7.3 | 65.0 | 8.8 | 70.0 | 8.8 |
| 2010-11 | 75.0 | 1.8 | 69.8 | 2.0 | 69.8 | 2.8 | 69.8 | 3.3 | 69.8 | 3.3 | 54.7 | 3.8 | 77.4 | 3.5 | 75.5 | 3.3 |
| 2011-12 | 88.7 | 7.0 | 84.2 | 3.8 | 82.5 | 6.5 | 82.5 | 6.8 | 82.5 | 6.8 | 75.4 | 5.5 | 82.5 | 4.8 | 86.0 | 6.8 |
| 2012-13 | 87.7 | 10.8 | 74.3 | 8.8 | 71.6 | 13.8 | 75.7 | 17.0 | 74.3 | 16.5 | 68.9 | 16.5 | 77.0 | 14.3 | 77.0 | 16.3 |
| 2013-14 | 85.1 | 21.0 | 80.3 | 4.3 | 78.7 | 7.5 | 78.7 | 9.3 | 73.8 | 9.3 | 75.4 | 10.0 | 77.0 | 7.5 | 77.0 | 8.8 |
| 2014-15 | 90.2 | 17.0 | 81.7 | 8.3 | 85.4 | 11.8 | 86.6 | 15.3 | 86.6 | 15.5 | 81.7 | 13.3 | 86.6 | 12.5 | 87.8 | 12.8 |
| Mean | 82.8 | 10.5 | 77.1 | 5.6 | 75.9 | 8.4 | 77.2 | 9.9 | 75.7 | 9.7 | 71.0 | 9.4 | 77.6 | 8.5 | 78.9 | 9.4 |
| SD | 8.3 | 7.3 | 5.7 | 2.7 | 7.3 | 3.9 | 6.7 | 5.2 | 7.4 | 5.3 | 9.2 | 4.8 | 7.3 | 4.2 | 6.7 | 4.6 |

**Table S2: West census region season characteristics determined by different methods, using RSV testing reports from consistent NREVSS reporters, July 2009 – June 2015**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Surveillance**  **Year** | **No. consistent reporters** | **Onset week** | **Peak week** | **Offset week** | **Duration (weeks)** | **% captured within season\*** |
| **Retrospective Slope 10 (RS10)** |  |  |  |  |  |  |
| 2009-10 | 9 | 49 | 5 | 17 | 21 | 94.3 |
| 2010-11 | 12 | 47 | 8 | 19 | 25 | 97.5 |
| 2011-12 | 13 | 47 | 9 | 24 | 30 | 96.4 |
| 2012-13 | 16 | 46 | 5 | 17 | 24 | 97.4 |
| 2013-14 | 17 | 46 | 8 | 22 | 29 | 97.3 |
| 2014-15 | 21 | 46 | 6 | 17 | 24 | 96.8 |
| median | 14.5 | 46.5 | 7.0 | 18.0 | (mean) 25.5 | (mean) 97.0 |
| range | 12 | 3 | 4 | 7 | (s.d.) 3.4 | (s.d.) 1.2 |
| **10-fold baseline (10FB)** |  |  |  |  |  |  |
| 2009-10 | 9 | 45 | 6 | 21 | 29 | 97.8 |
| 2010-11 | 12 | 44 | 8 | 24 | 33 | 99.5 |
| 2011-12 | 13 | 52 | 9 | 20 | 21 | 89.8 |
| 2012-13 | 16 | 46 | 5 | 18 | 25 | 97.7 |
| 2013-14 | 17 | 46 | 8 | 23 | 30 | 97.5 |
| 2014-15 | 21 | 48 | 7 | 17 | 22 | 95.8 |
| median | 14.5 | 46.0 | 7.5 | 20.5 | (mean) 26.7 | 96.4 |
| range | 12 | 8 | 4 | 7 | (s.d.) 4.8 | 3.4 |
| **3% positivity (3PP)** |  |  |  |  |  |  |
| 2009-10 | 9 | 51 | 6 | 15 | 17 | 91.2 |
| 2010-11 | 12 | 50 | 9 | 18 | 21 | 95.1 |
| 2011-12 | 13 | 52 | 7 | 20 | 21 | 89.9 |
| 2012-13 | 16 | 47 | 7 | 19 | 25 | 97.7 |
| 2013-14 | 17 | 50 | 10 | 20 | 23 | 93.9 |
| 2014-15 | 21 | 47 | 7 | 16 | 22 | 96.0 |
| median | 14.5 | 50.0 | 7.0 | 18.5 | (mean) 21.5 | (mean) 93.9 |
| range | 12 | 5 | 4 | 5 | (s.d) 2.7 | (s.d.) 3.0 |
| **Traditional Antigen Method (10PP)** |  |  |  |  |  |  |
| 2009-10 | 37 | 51 | 5 | 15 | 17 | 88.2 |
| 2010-11 | 38 | 48 | 5 | 14 | 19 | 89.9 |
| 2011-12 | 31 | 52 | 8 | 18 | 19 | 84.2 |
| 2012-13 | 32 | 45 | 1 | 14 | 22 | 91.8 |
| 2013-14 | 14 | 51 | 7 | 15 | 17 | 81.0 |
| 2014-15 | 15 | 44 | 5 | 13 | 22 | 90.1 |
| median | 31.5 | 49.5 | 5.0 | 14.5 | (mean) 19.3 | (mean) 87.5 |
| range | 24 | 8 | 7 | 5 | (s.d.) 2.3 | (s.d.) 4.1 |
| s.d. standard deviation; \*based on raw (unadjusted RSV detections) | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Surveillance**  **Year** | **No. consistent reporters** | **Onset week** | **Peak week** | **Offset week** | **Duration (weeks)** | **% captured within season\*** |
| **Retrospective Slope 10 (RS10)** |  |  |  |  |  |  |
| 2009-10 | 13 | 44 | 4 | 16 | 25 | 97.3 |
| 2010-11 | 18 | 47 | 8 | 20 | 26 | 97.7 |
| 2011-12 | 19 | 49 | 8 | 19 | 23 | 95.8 |
| 2012-13 | 21 | 44 | 3 | 18 | 27 | 97.3 |
| 2013-14 | 20 | 44 | 3 | 18 | 27 | 97.2 |
| 2014-15 | 28 | 44 | 7 | 20 | 29 | 98.0 |
| median | 19.5 | 44.0 | 5.5 | 18.5 | (mean) 26.2 | (mean) 98.0 |
| range | 15 | 5 | 5 | 4 | (s.d.) 2.0 | (s.d.) 0.8 |
| **10-fold baseline (10FB)** |  |  |  |  |  |  |
| 2009-10 | 13 | 46 | 5 | 15 | 22 | 95.6 |
| 2010-11 | 18 | 45 | 8 | 25 | 33 | 99.4 |
| 2011-12 | 19 | 50 | 8 | 20 | 23 | 95.9 |
| 2012-13 | 21 | 45 | 3 | 18 | 26 | 96.9 |
| 2013-14 | 20 | 45 | 3 | 19 | 27 | 97.1 |
| 2014-15 | 28 | 43 | 7 | 22 | 32 | 98.7 |
| median | 19.5 | 45.0 | 6.0 | 19.5 | (mean) 27.2 | (mean) 97.3 |
| range | 15 | 7 | 5 | 10 | (s.d.) 4.5 | (s.d.) 1.5 |
| **3% positivity (3PP)** |  |  |  |  |  |  |
| 2009-10 | 13 | 47 | 4 | 16 | 22 | 95.2 |
| 2010-11 | 18 | 49 | 9 | 20 | 24 | 96.9 |
| 2011-12 | 19 | 50 | 9 | 22 | 25 | 96.9 |
| 2012-13 | 21 | 44 | 3 | 17 | 26 | 96.9 |
| 2013-14 | 20 | 45 | 9 | 17 | 25 | 96.1 |
| 2014-15 | 28 | 47 | 6 | 18 | 24 | 95.5 |
| median | 19.5 | 47 | 7.5 | 17.5 | (mean) 24.3 | (mean) 96.2 |
| range | 15 | 6 | 6 | 6 | (s.d.) 1.4 | (s.d.) 0.8 |
| **Traditional Antigen Method (10PP)** |  |  |  |  |  |  |
| 2009-10 | 30 | 49 | 4 | 13 | 17 | 92.5 |
| 2010-11 | 34 | 51 | 9 | 16 | 18 | 92.7 |
| 2011-12 | 35 | 50 | 11 | 16 | 19 | 92.0 |
| 2012-13 | 38 | 47 | 6 | 16 | 22 | 95.5 |
| 2013-14 | 17 | 47 | 8 | 16 | 22 | 91.9 |
| 2014-15 | 14 | 51 | 7 | 16 | 18 | 92.5 |
| median | 32 | 49.5 | 7.5 | 16.0 | (mean) 19.3 | (mean) 92.8 |
| range | 24 | 4 | 7 | 3 | (s.d.) 2.2 | (s.d.) 1.4 |
| s.d. standard deviation; \*basedon on raw (unadjusted RSV detections) | | | | | | |

**Table S3: Midwest census region seasons characteristics determined by different methods, using RSV testing reports form consistent reporters, July 2009 – June 2015.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Surveillance**  **Year** | **No. consistent reporters** | **Onset week** | **Peak week** | **Offset week** | **Duration (weeks)** | **% captured within season\*** |
| **Retrospective Slope 10 (RS10)** |  |  |  |  |  |  |
| 2009-10 | 9 | 39 | 1 | 13 | 27 | 96.4 |
| 2010-11 | 11 | 45 | 7 | 17 | 25 | 94.8 |
| 2011-12 | 11 | 42 | 2 | 16 | 27 | 95.5 |
| 2012-13 | 14 | 43 | 1 | 18 | 28 | 97.2 |
| 2013-14 | 8 | 44 | 2 | 19 | 28 | 97.1 |
| 2014-15 | 13 | 43 | 3 | 18 | 28 | 95.9 |
| median | 11.0 | 43.0 | 2.0 | 17.5 | (mean) 27.2 | (mean) 96.1 |
| range | 6 | 6 | 6 | 6 | (s.d.) 1.2 | (s.d.) 2.4 |
| **10-fold baseline (10FB)** |  |  |  |  |  |  |
| 2009-10 | 9 | 43 | 52 | 11 | 21 | 91.8 |
| 2010-11 | 11 | 43 | 7 | 20 | 30 | 97.5 |
| 2011-12 | 11 | 43 | 3 | 17 | 27 | 95.6 |
| 2012-13 | 14 | 45 | 2 | 18 | 26 | 96.2 |
| 2013-14 | 8 | 46 | 2 | 18 | 25 | 95.8 |
| 2014-15 | 13 | 46 | 3 | 18 | 25 | 93.7 |
| median | 11.0 | 44.3 | 2.7 | 17 | (mean) 25.7 | (mean) 95.1 |
| range | 6 | 3 | 8 | 9 | (s.d.) 2.0 | (s.d.) 2.0 |
| **3% positivity (3PP)** |  |  |  |  |  |  |
| 2009-10 | 9 | 39 | 3 | 15 | 29 | 97.4 |
| 2010-11 | 11 | 46 | 6 | 18 | 25 | 95.3 |
| 2011-12 | 11 | 43 | 4 | 15 | 25 | 94.7 |
| 2012-13 | 14 | 44 | 50 | 17 | 26 | 96.5 |
| 2013-14 | 8 | 45 | 52 | 16 | 24 | 95.2 |
| 2014-15 | 13 | 44 | 9 | 17 | 26 | 94.8 |
| median | 11.0 | 44.0 | 3.5 | 16.5 | (mean) 25.8 | (mean) 95.6 |
| range | 6 | 7 | 12 | 3 | (s.d) 1.7 | (s.d.) 1.1 |
| **Traditional Antigen Method (10PP)** |  |  |  |  |  |  |
| 2009-10 | 33 | 46 | 3 | 10 | 17 | 82.4 |
| 2010-11 | 28 | 47 | 52 | 11 | 17 | 84.2 |
| 2011-12 | 27 | 45 | 52 | 10 | 18 | 88.0 |
| 2012-13 | 25 | 45 | 49 | 9 | 17 | 82.5 |
| 2013-14 | 12 | 48 | 52 | 4 | 9 | 62.0 |
| 2014-15 | 10 | 52 | 1 | 7 | 8 | 57.1 |
| median | 26.0 | 46.5 | 52.0 | 9.5 | (mean) 14.3 | (mean) 76.1 |
| range | 23 | 6 | 7 | 10 | (s.d.) 4.5 | (s.d.) 13.0 |

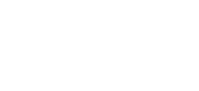
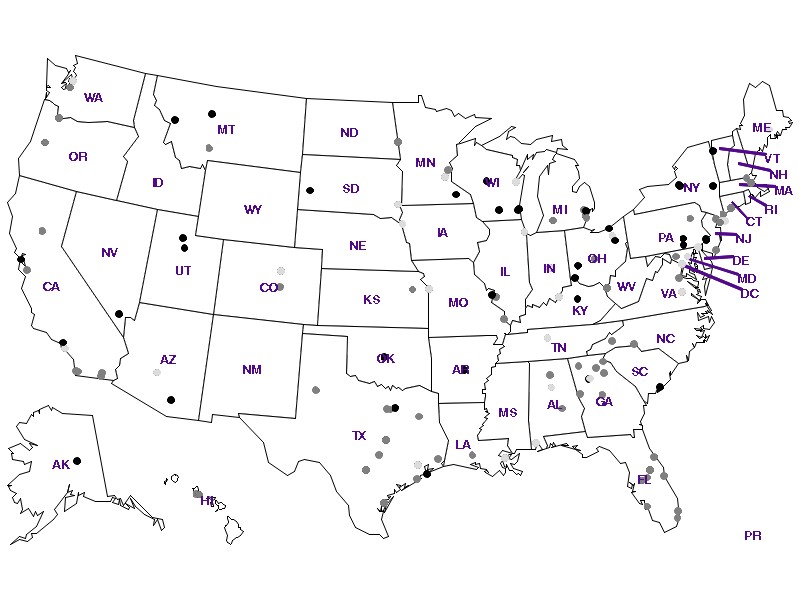
**Table S4: Northeast census region season characteristics determined by different methods, using RSV testing reports from consistent NREVSS reporters, July 2009-June 2015**

s.d. standard deviation; \*based on raw (unadjusted RSV detections)

**Table S5: South census region season characteristics determined by different methods, using RSV testing reports from consistent NREVSS reporters, July 2009-June 2015**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Surveillance**  **Year** | **No. consistent reporters** | **Onset week** | **Peak week** | **Offset week** | **Duration (weeks)** | **% captured within season\*** |
| **Retrospective Slope 10 (RS10)** |  |  |  |  |  |  |
| 2009-10 | 9 | 37 | 52 | 13 | 29 | 97.3 |
| 2010-11 | 12 | 45 | 6 | 15 | 23 | 95.3 |
| 2011-12 | 14 | 38 | 52 | 16 | 31 | 96.6 |
| 2012-13 | 23 | 39 | 52 | 16 | 30 | 95.4 |
| 2013-14 | 16 | 37 | 51 | 17 | 33 | 97.5 |
| 2014-15 | 20 | 39 | 2 | 20 | 34 | 97.8 |
| median | 15.0 | 38.5 | 52 | 16.0 | (mean) 30 | (mean) 96.6 |
| range | 14 | 8 | 7 | 7 | (s.d.) 3.9 | (s.d.) 1.1 |
| **10-fold baseline (10FB)** |  |  |  |  |  |  |
| 2009-10 | 9 | 37 | 51 | 15 | 35 | 98.2 |
| 2010-11 | 12 | 45 | 6 | 17 | 25 | 96.2 |
| 2011-12 | 14 | 37 | 1 | 17 | 33 | 97.4 |
| 2012-13 | 23 | 42 | 52 | 14 | 25 | 92.3 |
| 2013-14 | 16 | 41 | 49 | 14 | 26 | 94.3 |
| 2014-15 | 20 | 40 | 1 | 20 | 33 | 97.4 |
| median | 15.0 | 40.5 | 52.5 | 16.0 | (mean) 29.5 | (mean) 95.9 |
| range | 14 | 8 | 8 | 6 | (s.d.) 4.6 | (s.d.) 2.3 |
| **3% positivity (3PP)** |  |  |  |  |  |  |
| 2009-10 | 9 | 43 | 50 | 12 | 22 | 88.5 |
| 2010-11 | 12 | 46 | 6 | 15 | 22 | 94.7 |
| 2011-12 | 14 | 40 | 51 | 14 | 27 | 94.5 |
| 2012-13 | 23 | 39 | 51 | 16 | 30 | 95.4 |
| 2013-14 | 16 | 39 | 48 | 15 | 29 | 96.0 |
| 2014-15 | 20 | 40 | 1 | 19 | 32 | 97.1 |
| median | 15.0 | 40.0 | 51.0 | 15.0 | (mean) 27.0 | (mean) 94.4 |
| range | 14 | 7 | 8 | 7 | (s.d.) 4.2 | (s.d.) 3.0 |
| **Traditional Antigen Method (10PP)** |  |  |  |  |  |  |
| 2009-10 | 74 | 43 | 52 | 10 | 20 | 84.0 |
| 2010-11 | 82 | 40 | 4 | 12 | 25 | 91.4 |
| 2011-12 | 81 | 44 | 52 | 12 | 21 | 86.5 |
| 2012-13 | 83 | 39 | 1 | 11 | 25 | 89.1 |
| 2013-14 | 44 | 40 | 52 | 10 | 23 | 86.1 |
| 2014-15 | 43 | 41 | 1 | 12 | 24 | 88.2 |
| median | 77.5 | 40.5 | 52.5 | 11.5 | (mean) 23.0 | (mean) 87.5 |
| range | 40 | 5 | 4 | 2 | (s.d.) 2.1 | (s.d.) 3.0 |
| s.d. standard deviation; \*based on raw (unadjusted RSV detections) | | | | | | |

**Figure S1: Geographic distribution of consistently reporting laboratories during the 2014-15 surveillance year, by diagnostic category.** Consistently reporting NREVSS laboratories are defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 weeks of the NREVSS year.



* Antigen
* Viral Isolation
* RT-PCR

**Figure S2A: Comparison of PCR and antigen RSV tests by census region.** All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended at week 53; there is therefore a gap in some of the data curves.

PCR

Antigen

West

Midwest

Northeast

South

Month

**Figure S2B: Comparison of PCR and antigen RSV detections by census region**. All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 of 52 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended at week 53; there is therefore a gap in some of the data curves.

Antigen

PCR

West

Midwest

Northeast

South

**Figure S2C: Comparison of PCR and antigen RSV percent positivity by census region.** All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 of 52 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended at week 53; there is therefore a gap in some of the data curves.

PCR

Antigen

West

Midwest

Northeast

South

**Figure S3: RS10 method by census region.** For each region, this figure shows the normalized centered 5-week moving average of the weekly PCR RSV detections, during July—June (left panel) and during July---December (right panel), for each surveillance year. The onset week for each season is depicted by a solid circle of the same color. All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 of 52 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended at week 53; there is therefore a gap in some of the data curves.

Zoomed

Full scale

West

Midwest

Northeast

South

**Figure S4: 10FM method by census region.** For each region, this figure shows the 4-week moving average (4wma) of the weekly PCR RSV detections relative to baseline, during July—June (left panel) and during July – December (right panel), for each surveillance year. Baseline is defined here as the 4 wma or RSV detections at week 29. The onset week for each season is depicted by a solid circle of the same color. The dashed black horizontal lines represent 1-fold detections relative to baseline. All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 of 52 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended at week 53; there is therefore a gap in some of the data curves.

Zoomed

Full scale

West

Midwest

Northeast

South

**Figure S5: Investigating the pre-season baseline for the 10FB method.** These figures show the unadjusted weekly RSV detections (dots) and the 4-week moving average (4wma, smoothed lines), by calendar year. The national panels represent the full year (left panel) and part of the year (right panel).

Zoomed

Full scale

Regional

National

West

Northeast

Midwest

South

**Figure S6: 3PP method by census region.** For each region, this figure show the weekly PCR RSV percent-positivity, during July—June (left panel) and during July—December (right panel), for surveillance year. The onset week for each season is depicted by a solid circle of the same color. The dashed black horizontal lines represent 3%-positivity. All data are limited to consistently reporting NREVSS laboratories, defined here as those that reported an average of ≥10 RSV tests per week annually for at least 30 to 52 weeks of the NREVSS year. Surveillance years started at week 27 except 2009-10 which started at week 26. Calendar years ended at week 52 except 2014 which ended in week 53; there is therefore a gap in some of the data curves.

Full scale

Zoomed

South

West

Midwest

Northeast

South