### Outcome 36: Influenza Vaccination in the Past Year - All Ages

Internal variable name: outc36_flu_vacc

Definition: During the past 12 months, have you had either a flu shot or a flu vaccine that was sprayed in your nose?

#### Predictive models

<table>
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<th>Mixed, demos only</th>
<th>Logit, no area effects</th>
<th>Mixed with area covariates</th>
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<td>Outcome 36: Influenza Vaccination in the Past Year - All Ages</td>
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<td>NH Other vs. NH White</td>
<td>-0.4479***</td>
<td>-0.4712**</td>
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<td>(0.1459)</td>
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<td>Hispanic vs. NH White</td>
<td>-0.4340**</td>
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<td>Female</td>
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<td>Age 18-34 vs. 65+</td>
<td>-1.1418***</td>
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<td>Age 35-44 vs. 65+</td>
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<td>-1.0532***</td>
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<td>Age 45-54 vs. 65+</td>
<td>-0.7925***</td>
<td>-0.8122***</td>
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<td>Age 55-64 vs. 65+</td>
<td>-0.7054***</td>
<td>-0.7092***</td>
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<td>Clinical care z-score, County Rankings</td>
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<td>Area effect variance</td>
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Number of alternative models used to estimate model error = 6.
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<th>Direct 95% CI</th>
<th>SAE composite</th>
<th>SAE CI</th>
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<tr>
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<td>SAE composite</td>
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<td>(46.7%, 54.3%)</td>
</tr>
<tr>
<td>Montgomery County</td>
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<td>(42.5%, 65.5%)</td>
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<td>(55.3%, 62.2%)</td>
</tr>
<tr>
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<td>51141</td>
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<td>(33.1%, 75.6%)</td>
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<td>(45.1%, 51.5%)</td>
</tr>
<tr>
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<td>(48.5%, 53.9%)</td>
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<tr>
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<td>51155</td>
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<td>(48.6%, 53.7%)</td>
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<tr>
<td>Russell County</td>
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<td>(32.6%, 75.2%)</td>
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<td>(45.1%, 52.7%)</td>
</tr>
<tr>
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<td>(32.8%, 60.9%)</td>
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<td>(51.4%, 57.6%)</td>
</tr>
<tr>
<td>Smyth County</td>
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<td>(40.3%, 74.1%)</td>
<td>54.6%</td>
<td>(52.2%, 57.0%)</td>
</tr>
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<td>Tazewell County</td>
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<td>(24.3%, 50.5%)</td>
<td>51.1%</td>
<td>(47.3%, 54.9%)</td>
</tr>
<tr>
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<td>(51.9%, 57.1%)</td>
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<td>(51.9%, 57.4%)</td>
</tr>
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<td>(35.3%, 70.1%)</td>
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<td>(52.3%, 57.3%)</td>
</tr>
<tr>
<td>Bristol City</td>
<td>51520</td>
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<td>(7.5%, 83.0%)</td>
<td>57.2%</td>
<td>(51.9%, 62.3%)</td>
</tr>
<tr>
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<td>(13.8%, 59.3%)</td>
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<td>(54.9%, 59.5%)</td>
</tr>
<tr>
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<td>(51.2%, 62.8%)</td>
</tr>
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<td>(51.6%, 56.9%)</td>
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<td>(0.9%, 95.7%)</td>
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<td>(54.7%, 62.1%)</td>
</tr>
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<td>62.3%</td>
<td>(58.9%, 65.5%)</td>
</tr>
<tr>
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<td>(36.1%, 62.1%)</td>
<td>56.1%</td>
<td>(53.3%, 58.8%)</td>
</tr>
<tr>
<td>County name</td>
<td>County FIPS</td>
<td>Direct estimate</td>
<td>Direct 95% CI</td>
<td>SAE composite</td>
<td>SAE CI</td>
</tr>
<tr>
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</tr>
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<td>(44.5%, 50.7%)</td>
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<td>(42.7%, 51.1%)</td>
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<td>(43.4%, 50.2%)</td>
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<tr>
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<td>(44.5%, 60.4%)</td>
<td>55.9%</td>
<td>(53.8%, 58.0%)</td>
</tr>
<tr>
<td>Cumberland County</td>
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<td>(12.4%, 60.9%)</td>
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<td>(43.3%, 51.1%)</td>
</tr>
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<td>(41.2%, 47.6%)</td>
</tr>
<tr>
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<td>51075</td>
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<td>60.4%</td>
<td>(57.2%, 63.5%)</td>
</tr>
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</tr>
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<td>(47.3%, 53.1%)</td>
</tr>
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<td>(51.9%, 78.4%)</td>
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<td>(55.8%, 60.9%)</td>
</tr>
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<td>(55.9%, 60.5%)</td>
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<td>(42.0%, 50.2%)</td>
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<td>(47.7%, 52.9%)</td>
</tr>
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<td>(17.6%, 63.0%)</td>
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<td>(50.8%, 57.0%)</td>
</tr>
<tr>
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<td>(46.4%, 52.0%)</td>
</tr>
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<td>(11.5%, 52.4%)</td>
<td>55.5%</td>
<td>(51.8%, 59.1%)</td>
</tr>
<tr>
<td>Prince Edward County</td>
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<td>(31.4%, 74.1%)</td>
<td>51.1%</td>
<td>(47.8%, 54.4%)</td>
</tr>
<tr>
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<td>(31.0%, 69.8%)</td>
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<td>(44.2%, 50.0%)</td>
</tr>
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<td>(46.8%, 53.7%)</td>
</tr>
<tr>
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</tr>
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<td>(44.3%, 53.0%)</td>
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<td>(42.3%, 50.0%)</td>
</tr>
<tr>
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<td>(46.1%, 54.4%)</td>
</tr>
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<td>City</td>
<td>Zip Code</td>
<td>Percentage</td>
<td>Margin (Low, High)</td>
<td>Margin (Low, High)</td>
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</tr>
<tr>
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<td>(35.8%, 56.9%)</td>
<td>(50.2%, 56.0%)</td>
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<tr>
<td>County name</td>
<td>County FIPS</td>
<td>Direct estimate</td>
<td>Direct 95% CI</td>
<td>SAE composite</td>
<td>SAE CI</td>
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<td>-------------</td>
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<td>(29.7%, 58.5%)</td>
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<td>(46.6%, 53.3%)</td>
</tr>
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<td>(52.3%, 58.2%)</td>
</tr>
<tr>
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<td>(43.7%, 74.2%)</td>
<td>56.5%</td>
<td>(53.6%, 59.4%)</td>
</tr>
<tr>
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<td>51093</td>
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<td>(21.5%, 58.9%)</td>
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<td>(50.2%, 55.2%)</td>
</tr>
<tr>
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<td>51095</td>
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<td>(52.9%, 75.8%)</td>
<td>60.2%</td>
<td>(56.9%, 63.4%)</td>
</tr>
<tr>
<td>King and Queen County</td>
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<td>71.5%</td>
<td>(32.6%, 92.9%)</td>
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<td>(46.4%, 59.1%)</td>
</tr>
<tr>
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<td>51101</td>
<td>63.4%</td>
<td>(32.7%, 86.0%)</td>
<td>54.0%</td>
<td>(51.4%, 56.6%)</td>
</tr>
<tr>
<td>Lancaster County</td>
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<td>(38.4%, 84.4%)</td>
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<td>(52.9%, 61.1%)</td>
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<td>57.7%</td>
<td>(53.0%, 62.3%)</td>
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<td>(50.9%, 57.6%)</td>
</tr>
<tr>
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<td>51131</td>
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<td>(25.3%, 68.9%)</td>
<td>54.6%</td>
<td>(50.8%, 58.3%)</td>
</tr>
<tr>
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<td>51133</td>
<td>64.3%</td>
<td>(40.3%, 82.7%)</td>
<td>56.5%</td>
<td>(50.6%, 62.3%)</td>
</tr>
<tr>
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<td>51159</td>
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<td>(25.7%, 59.5%)</td>
<td>54.4%</td>
<td>(49.8%, 58.9%)</td>
</tr>
<tr>
<td>Southampton County</td>
<td>51175</td>
<td>37.8%</td>
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<td>(43.6%, 49.9%)</td>
</tr>
<tr>
<td>Westmoreland County</td>
<td>51193</td>
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<td>(29.3%, 68.4%)</td>
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<td>(45.7%, 53.1%)</td>
</tr>
<tr>
<td>York County</td>
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<td>(44.3%, 73.2%)</td>
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<td>(58.3%, 64.4%)</td>
</tr>
<tr>
<td>Chesapeake City</td>
<td>51550</td>
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<td>(42.0%, 58.2%)</td>
<td>53.8%</td>
<td>(51.6%, 56.0%)</td>
</tr>
<tr>
<td>Franklin City</td>
<td>51620</td>
<td>68.1%</td>
<td>(24.5%, 93.3%)</td>
<td>51.3%</td>
<td>(48.0%, 54.6%)</td>
</tr>
<tr>
<td>Hampton City</td>
<td>51650</td>
<td>45.9%</td>
<td>(36.5%, 55.6%)</td>
<td>50.5%</td>
<td>(47.6%, 53.4%)</td>
</tr>
<tr>
<td>Newport News City</td>
<td>51700</td>
<td>56.8%</td>
<td>(47.1%, 66.0%)</td>
<td>51.6%</td>
<td>(48.8%, 54.3%)</td>
</tr>
<tr>
<td>Norfolk City</td>
<td>51710</td>
<td>48.7%</td>
<td>(40.2%, 57.2%)</td>
<td>49.6%</td>
<td>(47.4%, 51.9%)</td>
</tr>
<tr>
<td>Poquoson City</td>
<td>51735</td>
<td>36.4%</td>
<td>(11.8%, 71.1%)</td>
<td>56.9%</td>
<td>(53.7%, 60.1%)</td>
</tr>
<tr>
<td>Portsmouth City</td>
<td>51740</td>
<td>48.1%</td>
<td>(36.6%, 59.8%)</td>
<td>49.0%</td>
<td>(46.3%, 51.7%)</td>
</tr>
<tr>
<td>Suffolk City</td>
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<td>(38.8%, 64.6%)</td>
<td>52.4%</td>
<td>(49.5%, 55.3%)</td>
</tr>
<tr>
<td>Virginia Beach City</td>
<td>51810</td>
<td>50.3%</td>
<td>(43.3%, 57.3%)</td>
<td>55.3%</td>
<td>(53.6%, 57.0%)</td>
</tr>
<tr>
<td>Williamsburg City</td>
<td>51830</td>
<td>38.8%</td>
<td>(13.2%, 72.5%)</td>
<td>60.6%</td>
<td>(56.0%, 65.0%)</td>
</tr>
</tbody>
</table>
Graphical representation

Flu vaccination past yr
Central Shenandoah and Lord Fairfax HDs

Augusta County: 54.0 | 56.4 | 58.3
Bath County: 45.0 | 49.3 | 53.6
Highland County: 44.5 | 50.0 | 55.5
Rockbridge County: 54.3 | 56.7 | 59.1
Rockingham County: 41.5 | 45.2 | 49.0
Buena Vista City: 54.9 | 57.2 | 59.5
Harrisonburg City: 52.2 | 57.1 | 61.8
Lexington City: 57.7 | 63.0 | 68.0
Staunton City: 59.8 | 62.2 | 64.6
Waynesboro City: 58.1 | 61.9 | 65.6
Clarke County: 47.2 | 51.1 | 55.0
Frederick County: 50.6 | 53.1 | 55.6
Page County: 43.2 | 48.1 | 53.0
Shenandoah County: 49.2 | 52.4 | 55.6
Warren County: 50.5 | 53.3 | 56.0
Winchester City: 56.4 | 58.6 | 61.2

% incidence rate

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Alleghany, Roanoke and Central Virginia HDs

% incidence rate

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Cumberland Plateau and Lenowisco HDs

Buchanan County: 37.6 | 43.5 | 49.6
Dickenson County: 48.3 | 51.7 | 55.1
Russell County: 45.1 | 48.9 | 52.7
Tazewell County: 47.3 | 51.1 | 54.9
Lee County: 46.7 | 50.5 | 54.3
Scott County: 51.4 | 54.5 | 57.6
Wise County: 52.0 | 54.7 | 57.4
Norton City: 54.6 | 58.4 | 62.1

% incidence rate

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Pittsylvania/Danville, Southside and West Piedmont HDs

% incidence rate

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
New River and Mount Rogers HDs

Bland County 52.9 | 56.7 | 60.3
Carroll County 52.8 | 55.3 | 57.3
Grayson County 48.2 | 52.3 | 56.4
Smyth County 52.2 | 54.6 | 57.0
Washington County 51.9 | 54.5 | 57.1
Wythe County 52.3 | 54.8 | 57.3
Bristol City 51.9 | 57.2 | 62.3
Galax City 51.2 | 57.1 | 62.3
Floyd County 44.8 | 48.7 | 52.6
Giles County 47.4 | 50.2 | 53.0
Montgomery County 55.3 | 58.8 | 62.2
Pulaski County 48.6 | 51.2 | 53.3
Radford City 59.0 | 62.3 | 65.5

% incidence rate

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Chesterfield, Chickahominy, Henrico and Richmond HDs

% incidence rate

- Chesterfield County
- Powhatan County
- Colonial Heights City
- Charles City County
- Goochland County
- Hanover County
- New Kent County
- Henrico County
- Richmond City

53.8 | 55.9 | 58.0
51.9 | 55.5 | 59.1
46.7 | 50.9 | 55.1
46.0 | 49.8 | 53.0
57.2 | 60.4 | 63.5
55.8 | 58.1 | 61.0
50.8 | 53.9 | 57.0
55.9 | 58.2 | 60.5
50.2 | 53.1 | 55.9

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Eastern Shore and Three Rivers HDs

Accomack County: 46.6 | 49.9 | 53.2
Northampton County: 50.8 | 54.6 | 58.4
Essex County: 52.4 | 55.3 | 58.2
Gloucester County: 53.8 | 56.5 | 59.4
King and Queen County: 46.3 | 52.8 | 59.2
King William County: 51.4 | 54.0 | 56.6
Lancaster County: 52.9 | 57.1 | 61.2
Mathews County: 52.9 | 57.7 | 62.3
Middlesex County: 50.9 | 54.3 | 57.6
Northumberland County: 50.5 | 56.5 | 62.3
Richmond County: 49.8 | 54.4 | 58.9
Westmoreland County: 45.7 | 49.4 | 53.1

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Thomas Jefferson and Piedmont HDs

Albemarle County - 59.2 | 61.9 | 64.5
Fluvanna County - 52.1 | 56.0 | 59.9
Greene County - 44.7 | 49.4 | 54.1
Louisa County - 48.3 | 52.0 | 55.7
Nelson County - 52.7 | 55.4 | 58.0
Charlottesville City - 61.4 | 65.0 | 68.4
Amelia County - 44.0 | 47.8 | 51.6
Buckingham County - 42.7 | 46.9 | 51.1
Charlotte County - 43.4 | 46.8 | 50.2
Cumberland County - 43.3 | 47.2 | 51.1
Lunenburg County - 41.9 | 46.0 | 50.1
Nottoway County - 46.4 | 49.2 | 52.0
Prince Edward County - 47.8 | 51.1 | 54.4

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Flu vaccination past yr
Alexandria, Fairfax, Arlington, Loudon, Prince William HDs

Alexandria City
Arlington City
Fairfax County
Fairfax City
Falls Church City
Loudoun County
Prince William County
Manassas City
Manassas Park City

% incidence rate

59.8 | 64.0 | 68.0
67.2 | 70.1 | 72.9
59.1 | 61.1 | 63.0
57.9 | 60.7 | 63.5
69.6 | 75.8 | 81.1
52.3 | 56.2 | 59.1
45.5 | 48.1 | 50.8
42.9 | 47.1 | 51.4
43.1 | 48.1 | 53.2

Text at right: 2-sided 95% LCB | Point Estimate | 2-sided 95% UCB
Gray markers: 95% confidence interval
Additional diagnostics

Direct estimate is inside the 95% SAE Wilson CI: 21 areas.

Direct estimate is outside the 95% SAE Wilson CI: 112 areas.

SAE estimate is inside the 95% direct Wilson CI: 124 areas.

SAE estimate is outside the 95% direct Wilson CI: 9 areas.

SAE Wilson 95% CI is fully inside the 95% direct Wilson CI: 119 areas.

SAE Wilson 95% CI partially overlaps with the 95% direct Wilson CI: 14 areas.

SAE Wilson 95% CI and the 95% direct Wilson CI do not overlap: 0 areas.

SAE standard error is less that the direct standard error: 130 areas.

SAE standard error is greater that the (nonzero) direct standard error: 0 areas.

Direct standard error is zero: 3 areas.

Proportion of SAE variance due to ACS sampling error: min = 2.19%; med = 23.14%; max = 71.37%.

Proportion of SAE variance due to sampling error in regression coefficient estimates: min = 8.37%; med = 61.42%; max = 89.56%.

Proportion of SAE variance due to model selection: min = 0.18%; med = 8.39%; max = 85.70%.

Proportion of SAE variance due to area random effects: <identically zero>