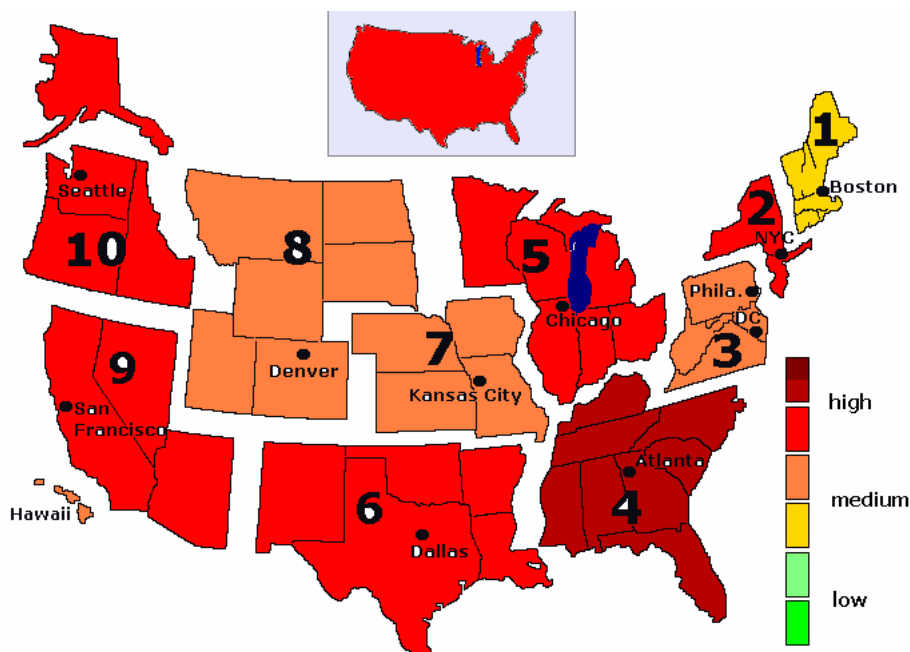


U.S. Flu Forecasts — 2009 Week Week 38 (Produced 24 September)

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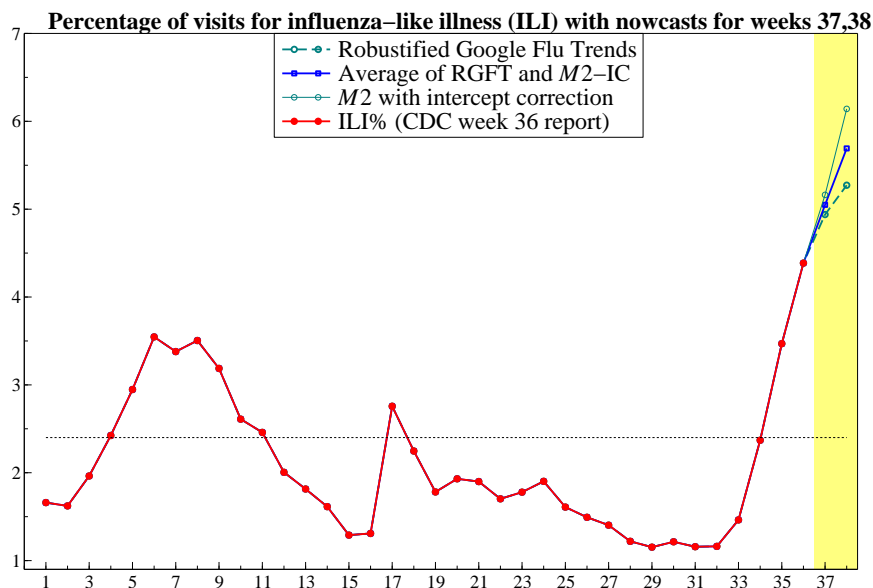
Summary for week Week 38 (Produced 24 September)

- The CDC reports in week 36 that the %weighted ILI (the percentage of outpatient visits for influenza-like illness) stands at 4.39. Google Flu Trends estimates ILI% for week 36 too low at 3.36.
- Google Flu Trends has been revised, resulting in a major revision for the entire history. The week 36 nowcast has changed from 1.10 to 3.36.
- During weeks 37 (ending 19 September) and 38 (ending 26 September), influenza activity in the US has been rising rapidly. **The average week 37 nowcast is 5.0%, for week 38 it is 5.7%.**
- ILI% in the US is more than double the national baseline of 2.4%, and higher than the peak of last season. The rate of increase seems to be slowing down.

*Disclaimer. The results reported here are based on forecast, and are therefore uncertain. These results are my personal opinion, based on extensive modeling, and not endorsed by either the CDC or Google.

- Flu activity in 9 regions is above their region-specific baseline, based on week 37 and 38 nowcasts. Only region 1 is below its baseline. (Description corrected 28 Sept.)
- Flu activity in the US this winter will probably be higher than experienced in the previous ten seasons.

Current Influenza Activity



- Robustified Google Flu Trends (RGFT) shows a rapid increase of ILI% in weeks 37 and 38: 4.9% and 5.3% respectively. This uses the revised GFT data.

This is based on the changes in the logit of Google Flu Trends (GFT), applied to the ILI% level reported in the CDC influenza report for week 36.

- The rapid growth of weeks 33-35 is very well described by a linear trend: the logit increased by 0.2, 0.4, 0.6 respectively. This corresponds approximately with increases of 20%, 40% and 60% in flu activity (ILI%). Week 36 shows a slower increase at 0.3. In comparison, during the winter peak in a normal flu season (weeks 50-51 and 3-6), there is an average weekly increase of about 20%. This trend could not be clearly seen two week ago, but is now estimated with high significance in the model M2.

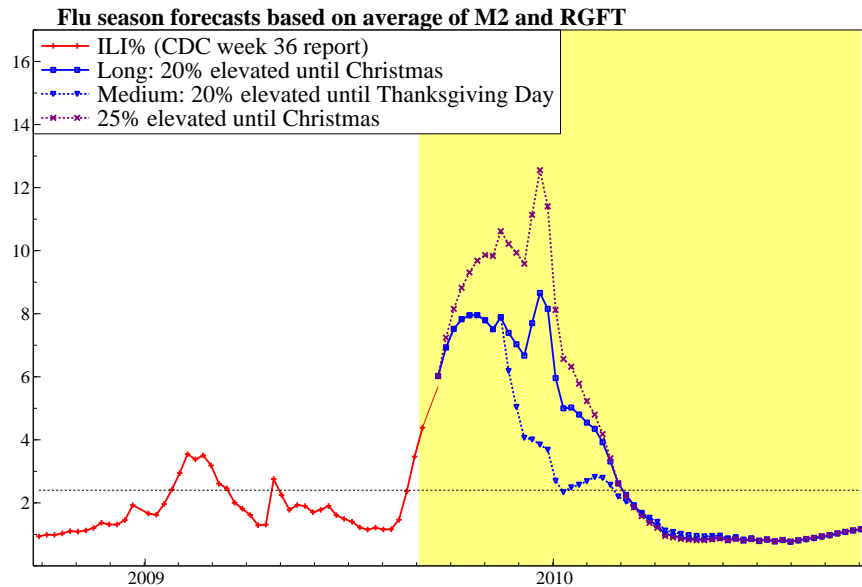
The nowcasts make the assumption that the trend follows a 1,2,3,1.5,1,1 pattern (multiplied by the estimated coefficient of 0.2). Model M2 nowcasts, *based on this trend*, report a rapid increasing ILI%: 5.2% and 6.1% respectively. \hat{p}_i

- The average nowcasts for week 37 and 38, based on pooling a dynamic model with calendar effects (M2) and RGFT, show a rapid increase in ILI%: 5.0% and 5.7% respectively. \hat{b}_i During weeks 27 to 33, RGFT has produced better nowcasts than the pooled model. Historically, the pooled model has performed better.

Expected Influenza Activity

Historically, there tends to be a fairly slow increase in ILI% until Thanksgiving Day. The Thanksgiving holidays are associated with an additional increase of 15%. It is clear that this season is already developing in a very different way.

Flu Season Forecasts of Influenza Activity



The dynamic model $M2$ describes normal flu seasons quite well, but is inappropriate during pandemic flu. For that reason, scenarios are reported.

The one-year ahead forecasts use the average nowcasts for week 37 and 38 as the starting point for forecasting. Then three assumptions are used to capture pandemic flu activity:

- *Medium 20%*: the period of elevated activity lasts until Thanksgiving Day. This is captured by a trend effect estimated over weeks 33 to 37 which is increasing until week 35 then decreasing. From week 38 until Thanksgiving Day 0.2 is added to the intercept (a 20% increase in ILI). This is the dotted blue line. Note that Thanksgiving Day is usually associated with an increase in flu activity.
- *Long 20%*: the period of elevated activity is extended until the week before Christmas, the solid blue line.
- *Long 25%*: the coefficient is increased from 0.2 to 0.25, and runs until the week before Christmas (the dotted purple line).

Note that the dynamics in the model effectuates a moderating effect after a longer period of very rapid increase. If these assumptions hold, very high levels of ILI% should be expected.

References

- www.cdc.gov/flu/weekly/
- www.google.com/flutrends
- Doornik, Jurgen A. (2009), 'Improving the Timeliness of Data on Influenza-like Illnesses using Google Search Data'. Mimeo, University of Oxford.