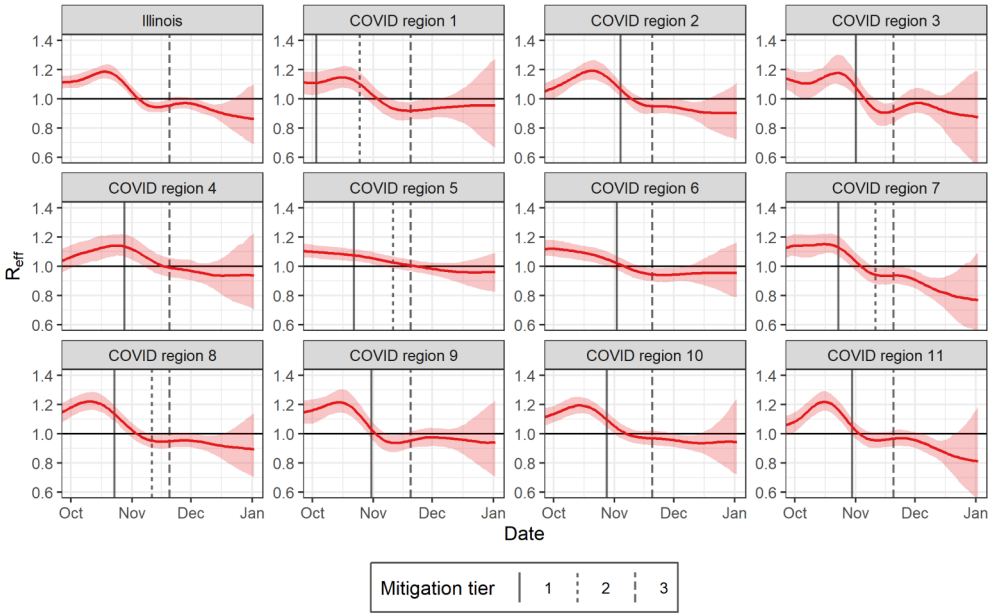
THE UNIVERSITY OF CHICAGO

- In all regions, R_{eff} was at or below 1 as of January 2, indicating that **transmission was steady or declining**. However, hospitalizations in regions 5 and 6, hint at recent upticks in transmission.
- The spread of a variant with higher transmissibility such as B.1.1.7 will require stricter measures than have been implemented in the past in order to reduce mortality and hospital burden.
- Prioritizing vaccines to the most vulnerable age groups (especially older adults and those in congregate facilities) is important to reducing morbidity and mortality, especially with the rise of B.1.1.7.



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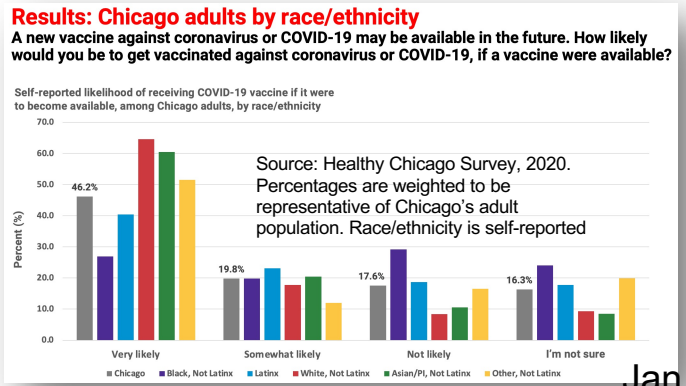
Northwestern University

- How bad are things right now?
  - Test positivity rate has been **increasing for ~2 weeks in all Regions** except Region 5. Hospital census in Regions 6, 8, and 9 is increasing again and previous decreases in most other regions has slowed. Region 4 is still struggling to reduce November highs in med/surg occupancy.
  - **Mobility substantially increased** over the holiday season. Based on mobility alone we expect Rt to further increase in all Regions. It is too early to know whether it is safe to move out of Tier 3.
- How worried should we be about the UK variant (B.1.1.7)?
  - B.1.1.7 is likely already spreading in the US but has not yet been detected in Illinois only because genomic surveillance to date has been limited. It is highly unlikely that our October surge was due to B.1.1.7.
  - If B.1.1.7 becomes predominant locally, **even a stay-at-home order may be insufficient to bring Rt < 1**. We should be prepared with stronger, more effective mitigations, including widespread, high-quality PPE.
- **Quality surveillance with minimal lagging is critical to quickly identify areas with increasing transmission.**
- **Vaccination data** and upcoming timeline are **urgently needed** for models to incorporate vaccine impacts into forecasts.

Requirements for Modeling Vaccine Distribution in CityCOVID

- **Vaccination Allocation**
  - Vaccine allocation can be modeled using a daily distribution of vaccines across different groups
    - Age-stratified
    - Vaccine priority categories (1a, 1b, etc.)
  - For historical information data exists (with some caveats about reporting completeness) for the Chicago region from the Chicago Data Portal
  - For future rates, **any data on rollout scenarios including timing, upcoming changes in prioritization, what type of data will be collected**, would make for more grounded forecasts
- **Vaccination Effects on Immunity and Spread**
  - Vaccination can be modeled in a way that takes into account the details of different vaccine administration schedules and associated conferred immunity levels (scheduling multi-dose vaccinations, timing for conferred immunity levels)
  - Transmission in successfully vaccinated individuals (scenarios spanning currently hypothesized possibilities)
  - Assumptions about individuals for whom the vaccination is not effective (for example, only milder versions of COVID-19)
  - **Data on specific types of vaccines administered, schedules used for those, and surveillance data on vaccinated individuals**, will improve the fidelity of model outputs
- **Additional topics for vaccine modeling**
  - **Vaccine Reluctance / Hesitancy**
    - Consider vaccine refusal by vaccination group
    - **Any data on vaccination hesitancy across possible vaccination groups would be helpful** (e.g., image to the right on vaccine hesitancy across race/ethnicity from Healthy Chicago Survey 2020)
  - **COVID Variants (B.1.1.7, 501.V2)**
    - COVID variants can be modeled within CityCOVID
    - **Data on prevalence of variants** will help bound uncertainties about future spread dynamics and any differential effects of vaccination



ILLINOIS

The B.1.17 variant is a potentially serious threat to the spread of COVID-19 in Illinois.

1. A new variant of concern is emerging known as the B.1.17 variant.
2. It was first identified by genetic screening in the UK.
3. It can simply be identified in standard 3-gene PCR tests because it shows up as a "dropout" of the S-gene channel.
4. The transmission is reportedly enhanced by 50% or so.
5. Modeling shows that the R number for most regions of Illinois is currently 0.8-0.9 but too early to tell if there is holiday surge.
6. Thus, when the variant reaches Illinois, current mitigation levels may not be adequate to prevent exponential growth of cases, if the UK estimates are correct.

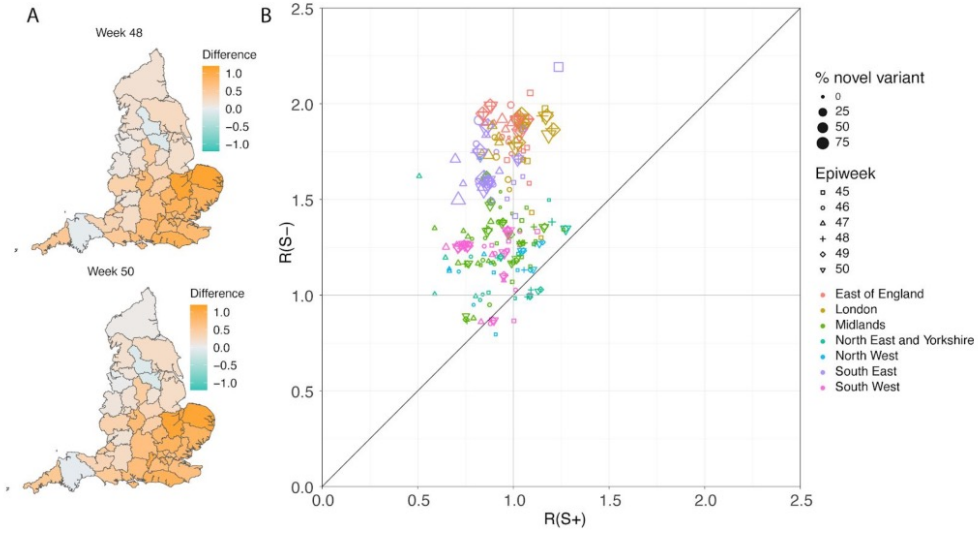


Figure 6: (A) Map of the difference in median R_t estimates for VOC and non-VOC variants for all STPs for weeks 48 and week 50. (B) Scatterplot of the reproduction numbers of VOC (S-) and non-VOC (S+) by STP and week. Point size indicates frequency of the VOC, while shape and colour signify week and NHS region, respectively.

The figure above is taken from Volz et al. (Imperial College Center for Global Infectious Disease Analysis) "Transmission of SARS-CoV-2 Lineage B.1.1.7 in England: Insights from linking epidemiological and genetic data". In different regions of the UK, the B.1.1.7 variant was detected and its R number evaluated relative to the regular COVID strain. The conclusion is that the new strain has a transmission advantage of 1.4-1.8.

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