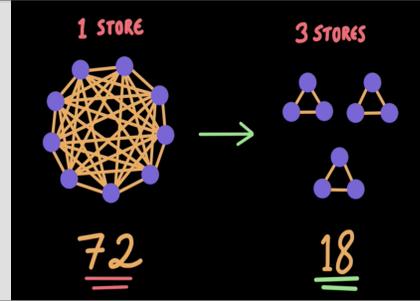


CrowdMeter Results

Learn more at [CrowdMeter.app](https://www.crowdmeter.app)

1 Grocery Store Crowds?

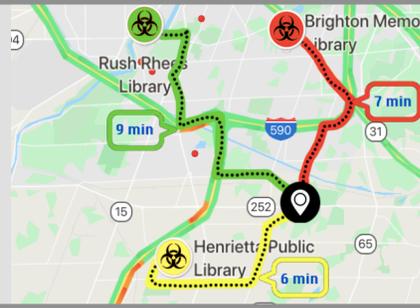
How do people get exposed to COVID? Running errands! We thought spreading people evenly among stores might help reduce transmission risk while shopping.



Confirmed: with nine people (purple dots) at one store, there are 72 transmission opportunities. When those same nine people are split evenly among three stores, the risk drops by a factor of 4. But how do we enable that?

2 Enhanced Maps!

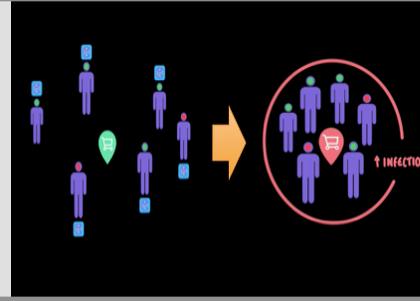
If we showed store crowdedness on navigation apps, some people might choose to drive farther to be safer. We decided to call this "CrowdMeter".



But how could we know for sure if using this app would reduce transmission risks? And what if it somehow backfired?

3 "First, do no harm."

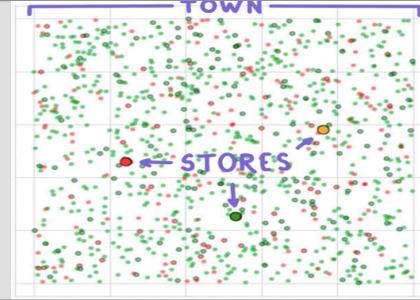
The Hippocratic Oath says, "First, do no harm." If everyone rushed to the safest store, it might suddenly become the most crowded store and increase risk.



Before going live, we needed to ensure that CrowdMeter would not cause harm. But it's hard to predict what will happen because there are so many potential feedback loops. So what could we do?

4 The Sims for COVID

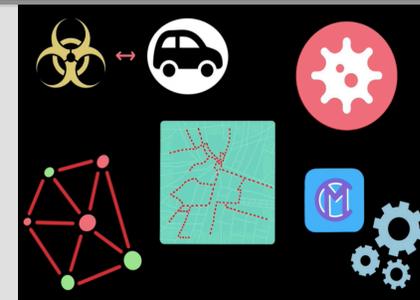
We built a simulator to test CrowdMeter safely in a mocked-up version of the world.



But a simulator is only as good as its assumptions – garbage in, garbage out. What if our simulator were not realistic enough?

5 Bring in Experts

To help ensure realistic results, we invited experts on viruses, epidemics, decision-making, and population flow to join the team as specialist advisors.



In short order, our simulator was ready to begin testing CrowdMeter. So what did we investigate first?

The CrowdMeter Team

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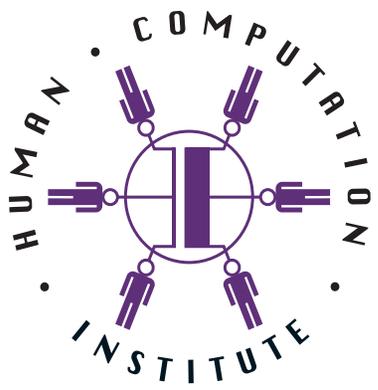
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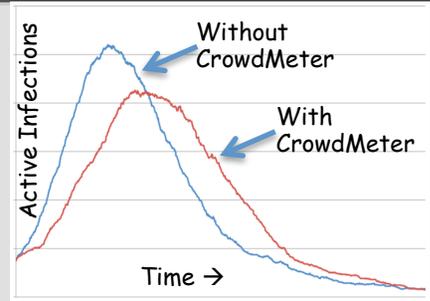
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6 Does it Work?

The first question was “can CrowdMeter help?” Could it actually flatten the curve?

Yes! With only 20% of the population using the app, we saw a big effect.



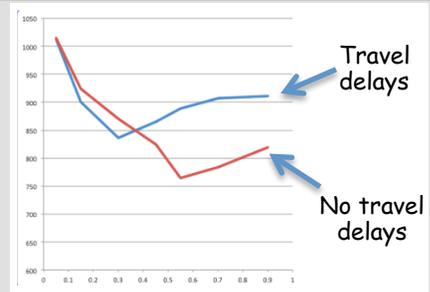
From this result, we knew CrowdMeter could be helpful.

Next we needed to find out if there were any situations in which it might not be safe to use.

7 Overdose Issue?

What about the example of everyone rushing to the safe store? We tested that!

With too many people using CrowdMeter, the benefits diminished.

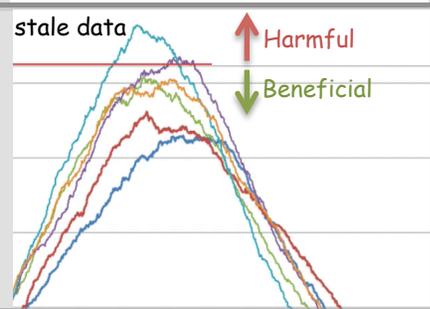


It occurred to us that the reason for this might be due to travel delays, because the crowdedness of a store could change between departure and arrival.

And sure enough, tested without travel delays, the problem went away.

8 Data Freshness?

Seeing this impact of delays in crowdedness information, we realized there was another issue worthy of testing: the crowdedness data available to the CrowdMeter app may be delayed.



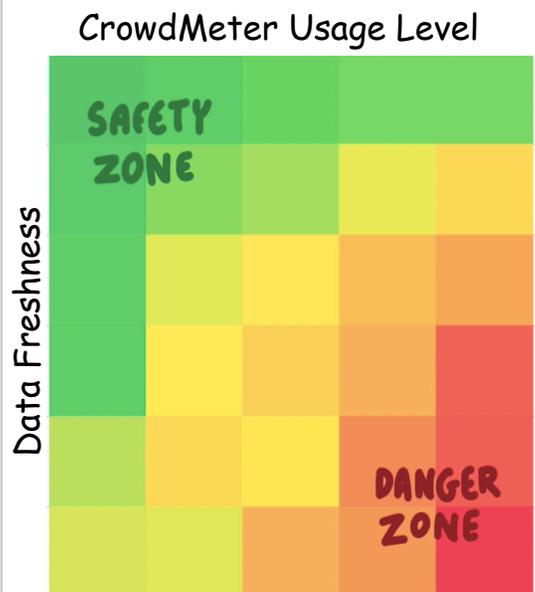
So we ran simulations to see the impacts of different data delays.

Sure enough, if the data delays are great enough, CrowdMeter increases transmission risks.

9 The Sweet Spot!

To identify the range of conditions where CrowdMeter would be either beneficial or harmful, we created a heat map by simulating many combinations of adoption levels and data delays. The green area shows us how CrowdMeter could be most effective.

With this knowledge, we can take steps to ensure only beneficial impacts on society.



10 Next Steps...

- Release a pilot app in the green safe zone.
- Retune our models using CrowdMeter pilot data from the real world.
- Public launch of CrowdMeter v1.0.
- Improve CrowdMeter by suggesting less busy shopping times.
- Improve CrowdMeter by using AI predictions to compensate for stale data.

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