15TH NATIONAL CONVENTION ON STATISTICS
03-05 OCTOBER 2022

Organized by the Philippine Statistical System Spearheaded by the Philippine Statistics Authority

Open Science Practices of the UP Pandemic Response Team

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Open Data
Crowne Plaza Galleria Manila
05 October 2022, 8:30am-10:00am

Flow of Presentation

1. Open Science and Open Data
2. Open Data Policies in the Philippines
3. The UP Pandemic Response Team
4. Open Science Activities of the UP Pandemic Response Team
5. Challenges and Recommendations with Open Data

Open Science and Open Data

Vital Elements of Open Science (ISC 2020)

- Open Access to the Record of Science
- Open Data
- Engagement with Society
- Digital Enablement

Open Data (OKF 2022)

Legally Open

Technically Open

Open Data Policies in the Philippines

Legal Bases

1. Section 28, Article II of the 1987 Philippine Constitution
2. Section 7, Article III of the same Constitution
3. Republic Act No. 10173, the Data Privacy Act of 2012
4. Executive Order 43, s. 2011, "Pursuing our Social Contract with the Filipino People through the Reorganization of the Cabinet Clusters"
5. Commitments in the Open Government Partnership Organization
6. Executive Order 2, s. 2016, Freedom of Information Program

(Specific case) Republic Act No. 11332, Mandatory Reporting of Notifiable Diseases and Health Events of Public Health Concern Act of 2018

List of Portals

1. Open Data Philippines (ODP) Portal (https://data.gov.ph/)
2. OpenSTAT (https://openstat.psa.gov.ph/)
3. The PhilGEPS Open Data page (https://www.philgeps.gov.ph/CmsHomePages/open_data_grid)
4. The Freedom of Information portal (https://www.foi.gov.ph/)
5. The DOH Data Drop (https://bit.ly/DataDropPH)

The UP Pandemic Response Team

Composition

Leaders:

- Dr Teodoro Herbosa, Former Executive Vice President, UP System
- Dr Alfredo Mahar Lagmay, Executive Director, UP Resilience Institute

Who we are

- 200+ experts and volunteers from the whole UP System, from Baguio to Davao
- spanning multiple fields: political scientists, statisticians, mathematicians, geographers, geologists, medical doctors, linguists, economists, etc.

Secretariat: UP Resilience Institute

Projects (non-exhaustive):

1. Development of a Web-based Decision Support System for Policymakers and the Public,
2. Geospatial Analysis and Visualization of COVID-19 Outbreak in the Philippines,
3. Modeling/Simulation of the Effect of Different Interventions on the Spread of SARS-COV-2 virus in Different Demographic Scales,
4. Assessment of the Socioeconomic Impacts of the COVID-19 Outbreak in Selected Communities,
5. Development of Knowledge Products on COVID-19 for Risk and Crisis Communication,
6. Determining our Capacity Threshold for COVID-19 through Analysis and Projection of Needs and Resources,
7. Development of National Policies for Emerging and Re-emerging Diseases, and
8. Queuing Study on Selected Checkpoints in and around Metro Manila.

Collaborations

- IATF and NTF-COVID-19
- DILG thru Memorandum dated April 28, 2020
- National University of Singapore, UC Davis, University College London, as well as local institutions
- Forecast-based Warning, Analysis and Response Network (FOREWARN)

Open Science Activities of the UP Pandemic Response Team

Policy Notes with Technical Details

POLICY NOTE NO. 2

Modified Community Quarantine beyond April 30: Analysis and Recommendations

UP COVID-19 Pandemic Response Team

Problem Situation

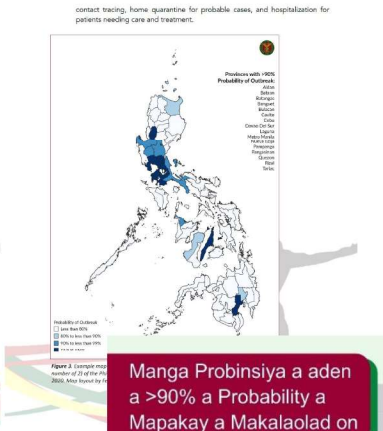
The extension of the Luzon-wide Enhanced Community Quarantine (ECLQ) raises the question on how effective the ECQ has been to contain the spread of COVID-19. If it is, how should it be implemented after April 30 without unnecessarily paralyzing local economies over a long period of time?

It is important to tackle this question at this time because LGUs rely upon national directives for policy and decision-making. Crafting of guidelines for an extended ECQ requires foresight, one that is informed by scientific data on estimates of the effectiveness of pandemic control strategies. It requires key metrics that are primarily epidemiological in nature and must be infused with as many scientific points of view as possible. Here, we show the effect of differences in population density of communities in the analysis of the transmission of COVID-19 to help national and local officials make informed decisions whether to extend, lift, or relax community quarantine.

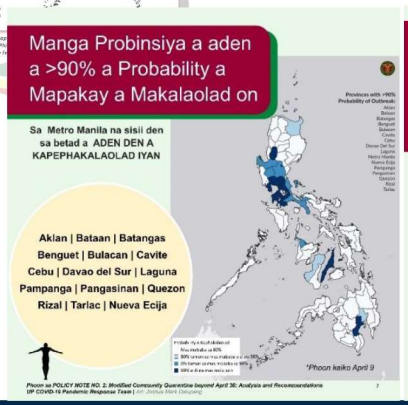
Is the Luzon-wide ECQ effective?

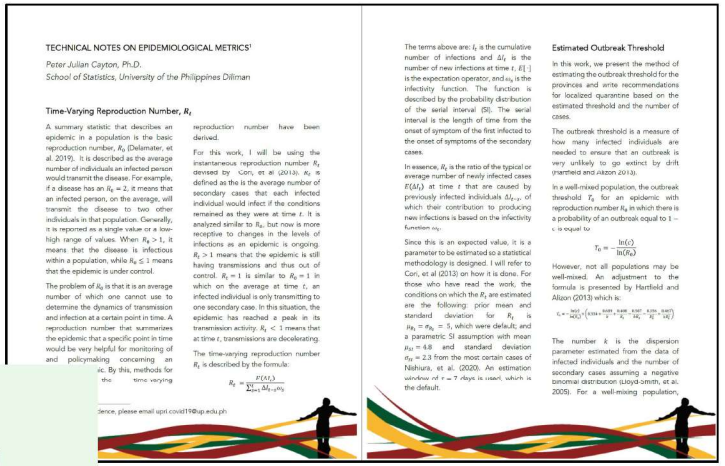
Time-series analysis shows it now takes a little longer for the number of confirmed cases to double in number. What took 3 days for the total number of cases to double now takes about 6 days to happen (Figure 1). Based on these trends, one can estimate about 1,000 to 44,000 possible cases reported by the end of April 2020. In general, this indicates the relative success of the ECQ—along with other interventions—in containing the spread of the virus. However, we must not simply rely on the number of cases as a means to project courses of actions.

*Represents confirmed cases and does not include undetected, asymptomatic and mild cases



contact tracing, home quarantine for probable cases, and hospitalization for patients needing care and treatment.





TECHNICAL NOTES ON EPIDEMIOLOGICAL METRICS[1]

Peter Julian Cayton, Ph.D.
School of Statistics, University of the Philippines Diliman

Time-Varying Reproduction Number, R_t

A summary statistic that describes an epidemic in a population is the basic reproduction number, R_0 (Delamater, et al. 2019). It is described as the average number of individuals an infected person would transmit the disease. For example, if a disease has an $R_0 = 2$, it means that an infected person, on the average, will transmit the disease to two other individuals in that population. Generally, it is reported as a single value or a low-high range of values. When $R_0 > 1$, it means that the disease is infectious within a population, while $R_0 \leq 1$ means that the epidemic is under control.

The problem of R_0 is that it is an average number of which one cannot use to determine the dynamics of transmission and infection at a certain point in time. A reproduction number that summarizes the epidemic that a specific point in time would be very helpful for monitoring of and policymaking concerning an ...ic. By this, methods for the ... time varying reproduction number have been derived.

For this work, I will be using the instantaneous reproduction number R_t devised by Cori, et al (2013). R_t is defined as the is the average number of secondary cases that each infected individual would infect if the conditions remained as they were at time t. It is analyzed similar to R_0, but now is more receptive to changes in the levels of infections as an epidemic is ongoing. $R_t > 1$ means that the epidemic is still having transmissions and thus out of control. $R_t = 1$ is similar to $R_0 = 1$ in which on the average at time t, an infected individual is only transmitting to one secondary case. In this situation, the epidemic has reached a peak in its transmission activity. $R_t < 1$ means that at time t, transmissions are decelerating.

The time-varying reproduction number R_t is described by the formula:

$$R_t = \frac{I(\Delta I_t)}{\sum_{s=1} \Delta I_{t-s} w_s}$$

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The terms above are: I_t is the cumulative number of infections and ΔI_t is the number of new infections at time t, $E[\,]$ is the expectation operator, and w_s is the infectivity function. The function is described by the probability distribution of the serial interval (SI). The serial interval is the length of time from the onset of symptom of the first infected to the onset of symptoms of the secondary cases.

In essence, R_t is the ratio of the typical or average number of newly infected cases $E(\Delta I_t)$ at time t that are caused by previously infected individuals ΔI_{t-s}, of which their contribution to producing new infections is based on the infectivity function w_s.

Since this is an expected value, it is a parameter to be estimated so a statistical methodology is designed. I will refer to Cori, et al (2013) on how it is done. For those who have read the work, the conditions on which the R_t are estimated are the following: prior mean and standard deviation for R_t is $\mu_R = \sigma_R = 5$, which were default; and a parametric SI assumption with mean $\mu_{SI} = 4.8$ and standard deviation $\sigma_{SI} = 2.3$ from the most certain cases of Nishiura, et al. (2020). An estimation window of $\tau = 7$ days is used, which is the default.

Estimated Outbreak Threshold

In this work, we present the method of estimating the outbreak threshold for the provinces and write recommendations for localized quarantine based on the estimated threshold and the number of cases.

The outbreak threshold is a measure of how many infected individuals are needed to ensure that an outbreak is very unlikely to go extinct by drift (Hartfield and Alizon 2013).

In a well-mixed population, the outbreak threshold T_R for an epidemic with reproduction number R_0 in which there is a probability of an outbreak equal to $1 - c$ is equal to:

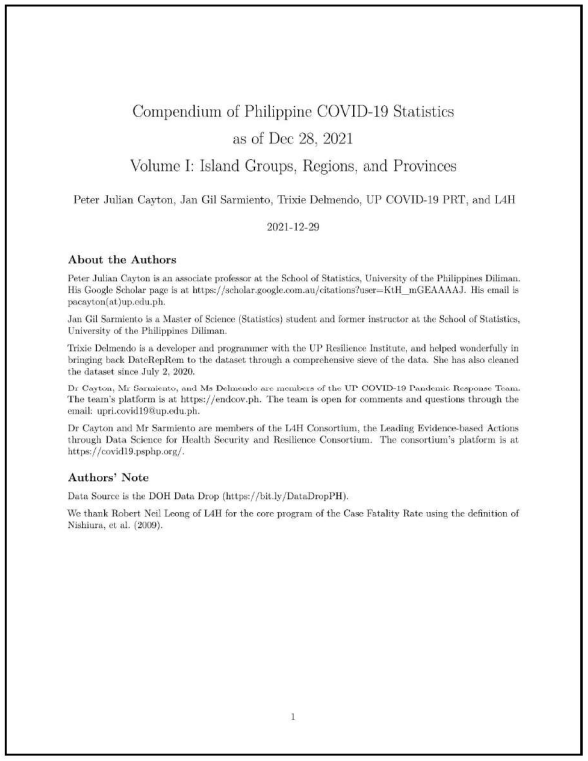
$$T_R = -\frac{\ln(c)}{\ln(R_0)}$$

However, not all populations may be well-mixed. An adjustment to the formula is presented by Hartfield and Alizon (2013) which is:

$$C_c = \frac{\ln(c)}{\ln(R_0)} \left(1 + \frac{R_0(R_0-1)}{k} + \frac{R_0(R_0-1)(2R_0-1)}{2k^2} + \frac{R_0(R_0-1)(3R_0^2-3R_0-1)}{3k^3}\right)$$

The number k is the dispersion parameter estimated from the data of infected individuals and the number of secondary cases assuming a negative binomial distribution (Lloyd-Smith, et al. 2005). For a well-mixing population,

Compendium of COVID-19 Statistics



Compendium of Philippine COVID-19 Statistics

as of Dec 28, 2021

Volume I: Island Groups, Regions, and Provinces

Peter Julian Cayton, Jan Gil Sarmiento, Trixie Delmendo, UP COVID-19 PRT, and L4H

2021-12-29

About the Authors

Peter Julian Cayton is an associate professor at the School of Statistics, University of the Philippines Diliman. His Google Scholar page is at https://scholar.google.com.au/citations?user=KtH_mGEAAAAJ. His email is pacayton(at)up.edu.ph.

Jan Gil Sarmiento is a Master of Science (Statistics) student and former instructor at the School of Statistics, University of the Philippines Diliman.

Trixie Delmendo is a developer and programmer with the UP Resilience Institute, and helped wonderfully in bringing back DateRepRem to the dataset through a comprehensive sieve of the data. She has also cleaned the dataset since July 2, 2020.

Dr Cayton, Mr Sarmiento, and Ms Delmendo are members of the UP COVID-19 Pandemic Response Team. The team's platform is at https://endcov.ph. The team is open for comments and questions through the email: upri.covid19@up.edu.ph.

Dr Cayton and Mr Sarmiento are members of the L4H Consortium, the Leading Evidence-based Actions through Data Science for Health Security and Resilience Consortium. The consortium's platform is at https://covid19.pshp.org/.

Authors' Note

Data Source is the DOH Data Drop (https://bit.ly/DataDropPH).

We thank Robert Neil Leong of L4H for the core program of the Case Fatality Rate using the definition of Nishiura, et al. (2009).

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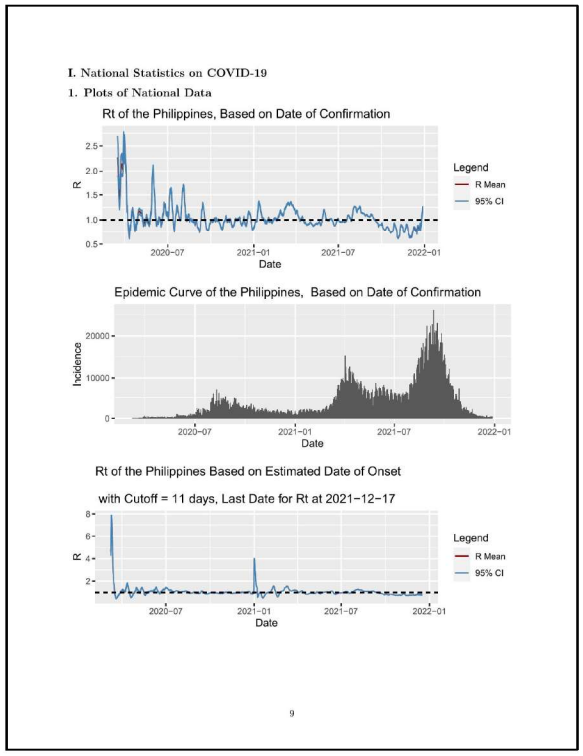

I. National Statistics on COVID-19

1. Plots of National Data

Rt of the Philippines, Based on Date of Confirmation

Epidemic Curve of the Philippines, Based on Date of Confirmation

Rt of the Philippines Based on Estimated Date of Onset

with Cutoff = 11 days, Last Date for Rt at 2021-12-17

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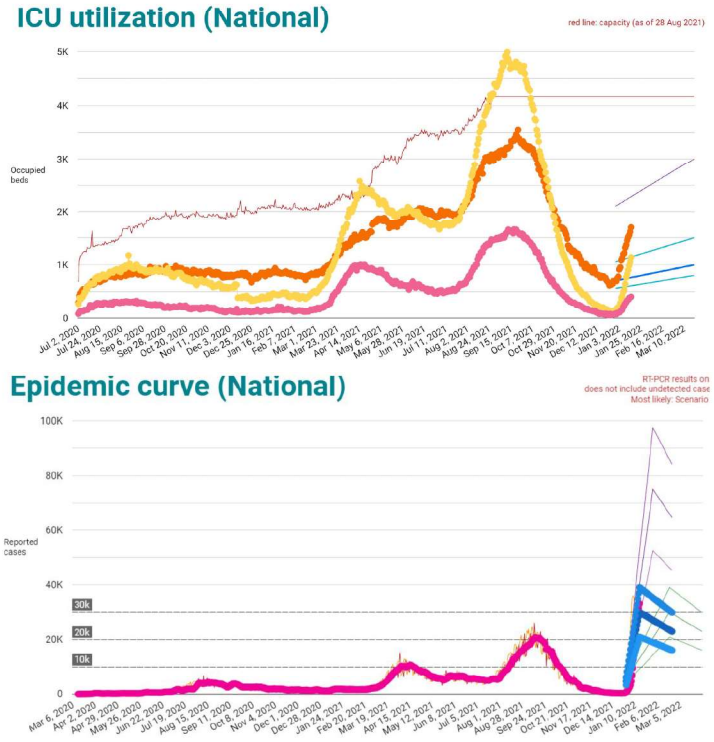
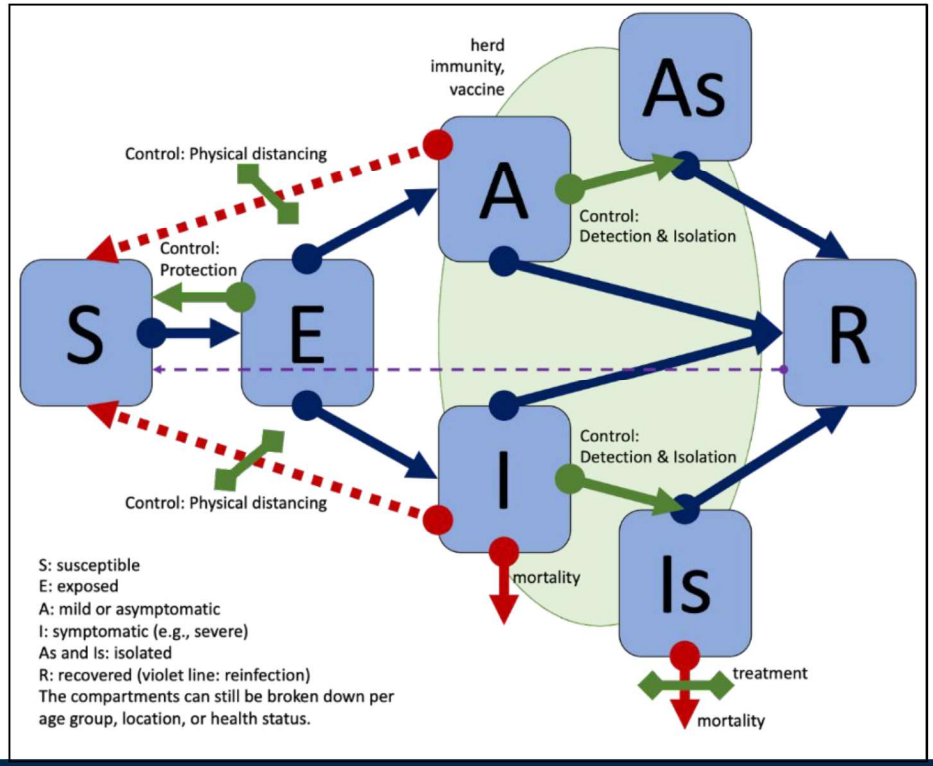
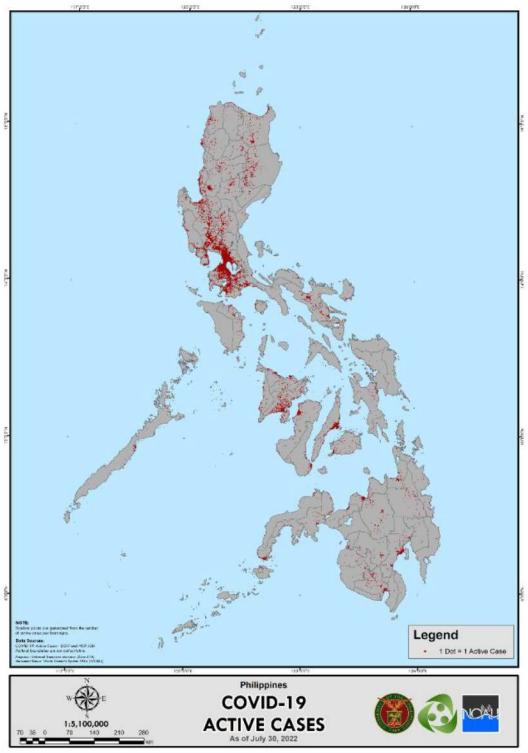
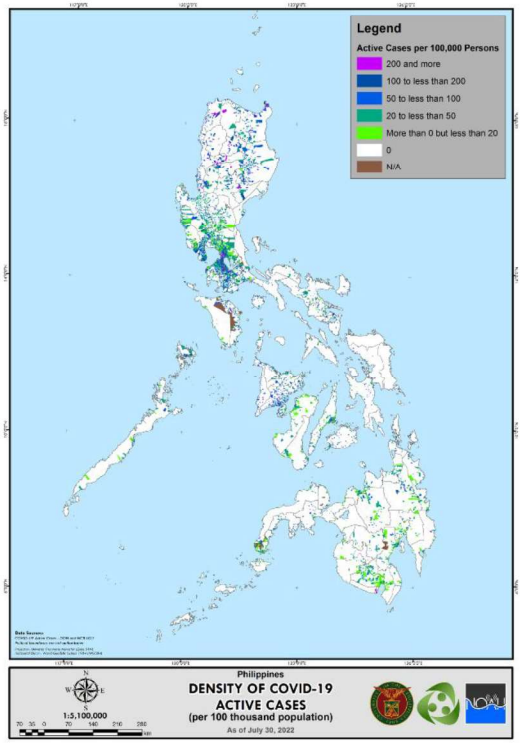
COVID-19 Projections

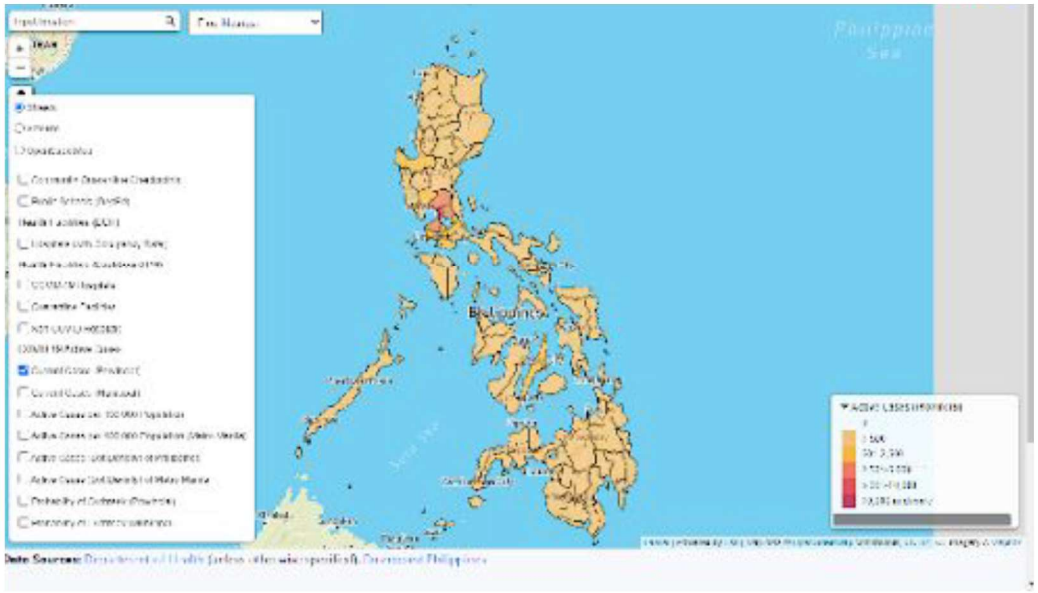




Data Maps

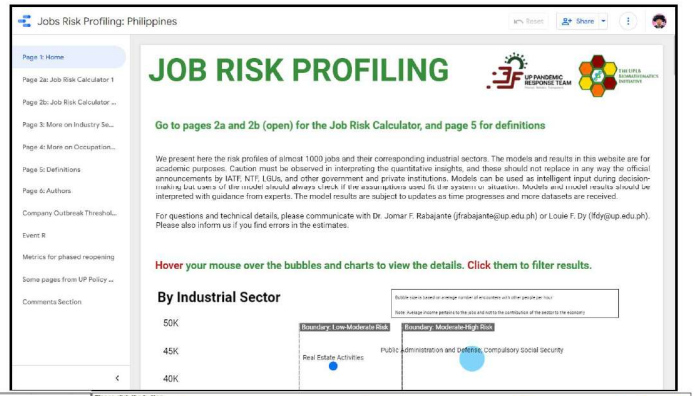

Legend
1 Dot = 1 Active Case
Philippines
COVID-19
ACTIVE CASES
As of July 30, 2022
1:5,100,000

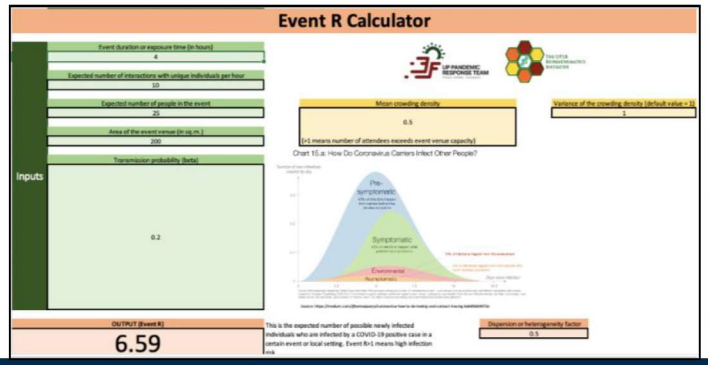

Legend
Active Cases per 100,000 Persons
200 and more
100 to less than 200
50 to less than 100
20 to less than 50
More than 0 but less than 20
0
N/A
Philippines
DENSITY OF COVID-19
ACTIVE CASES
(per 100 thousand population)
As of July 30, 2022
1:5,100,000

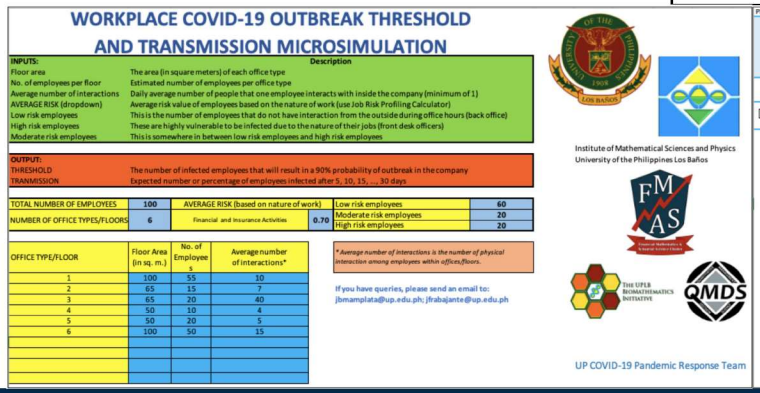


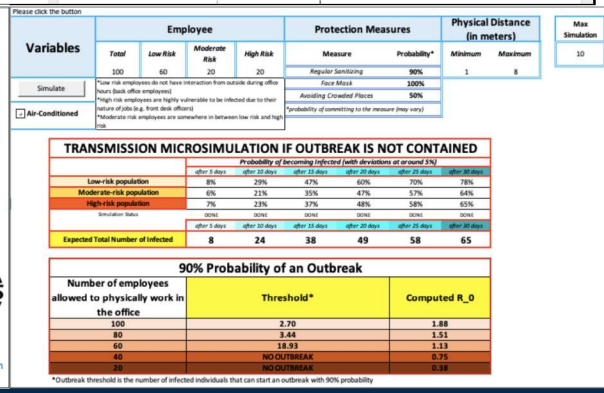
Job Risk Profiling and Event R Risk Calculator

- https://datastudio.google.com/u/0/reporting/1uGMQnM_ky_NQ_mnA7tiQ118wYIxQ_wMR/page/k4rNB



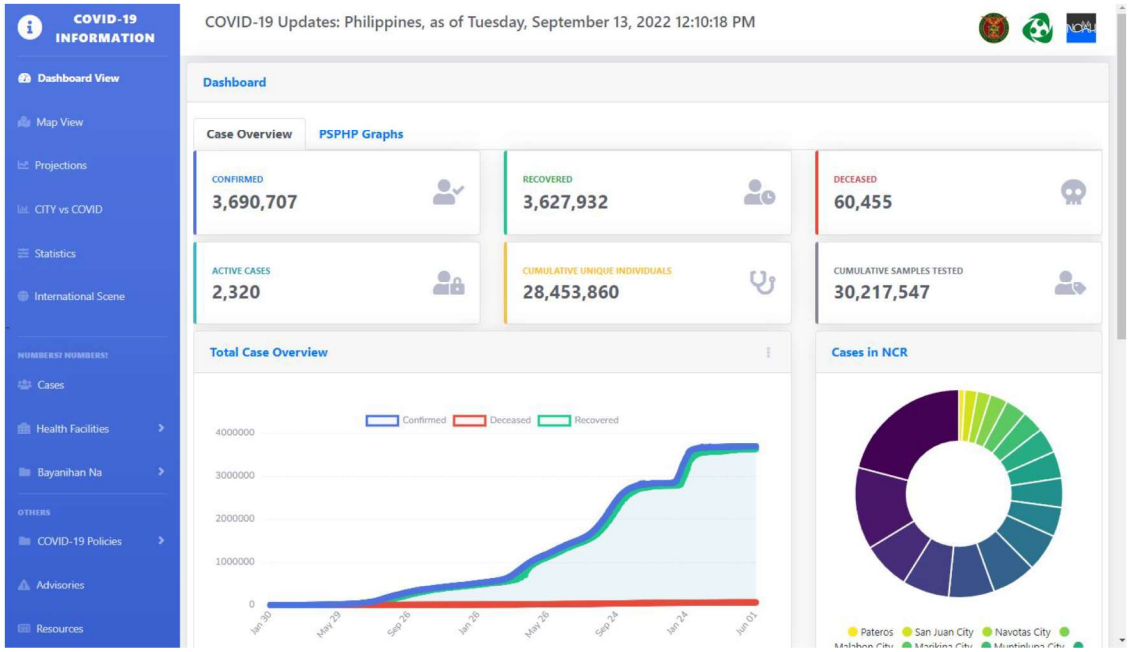




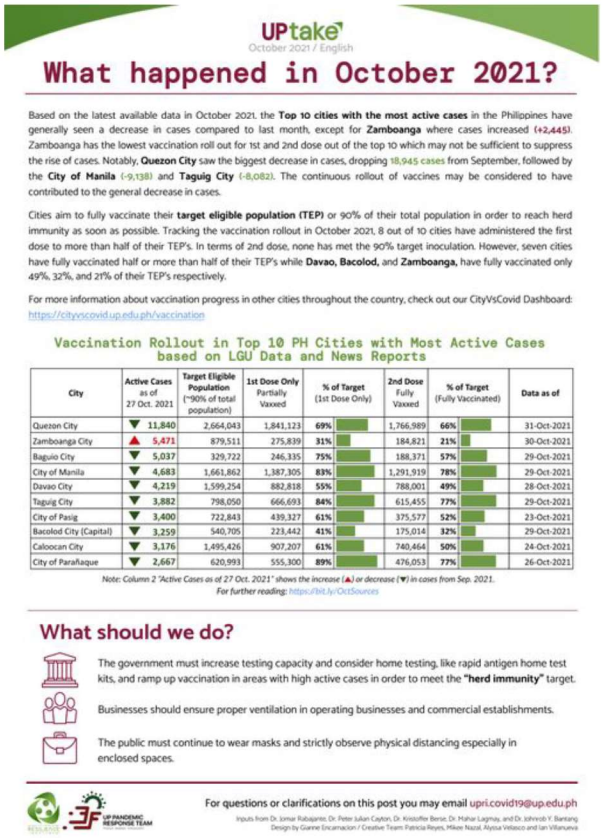


ENDCOV Website

- https://endcov.up.edu.ph/



UPTake



UPtake
October 2021 / English

What happened in October 2021?

Based on the latest available data in October 2021, the **Top 10 cities with the most active cases** in the Philippines have generally seen a decrease in cases compared to last month, except for **Zamboanga** where cases increased (+2,445). Zamboanga has the lowest vaccination roll out for 1st and 2nd dose out of the top 10 which may not be sufficient to suppress the rise of cases. Notably, **Quezon City** saw the biggest decrease in cases, dropping 18,945 cases from September, followed by the **City of Manila** (-9,138) and **Taguig City** (-8,082). The continuous rollout of vaccines may be considered to have contributed to the general decrease in cases.

Cities aim to fully vaccinate their **target eligible population (TEP)** or 90% of their total population in order to reach herd immunity as soon as possible. Tracking the vaccination rollout in October 2021, 8 out of 10 cities have administered the first dose to more than half of their TEP's. In terms of 2nd dose, none has met the 90% target inoculation. However, seven cities have fully vaccinated half or more than half of their TEP's while **Davao, Bacolod,** and **Zamboanga,** have fully vaccinated only 49%, 32%, and 21% of their TEP's respectively.

For more information about vaccination progress in other cities throughout the country, check out our CityVsCovid Dashboard: https://cityvscovid.up.edu.ph/vaccination

Vaccination Rollout in Top 10 PH Cities with Most Active Cases based on LGU Data and News Reports

City	Active Cases as of 27 Oct. 2021	Target Eligible Population (~90% of total population)	1st Dose Only Partially Vaxxed	% of Target (1st Dose Only)	2nd Dose Fully Vaxxed	% of Target (Fully Vaccinated)	Data as of
Quezon City	▼ 11,840	2,664,043	1,841,123	69%	1,766,989	66%	31-Oct-2021
Zamboanga City	▲ 5,471	879,511	275,839	31%	184,821	21%	30-Oct-2021
Baguio City	▼ 5,037	329,722	246,335	75%	188,371	57%	29-Oct-2021
City of Manila	▼ 4,683	1,661,862	1,387,305	83%	1,291,919	78%	29-Oct-2021
Davao City	▼ 4,219	1,599,254	882,818	55%	788,001	49%	28-Oct-2021
Taguig City	▼ 3,882	798,050	666,693	84%	615,455	77%	29-Oct-2021
City of Pasig	▼ 3,400	722,843	439,327	61%	375,577	52%	23-Oct-2021
Bacolod City (Capital)	▼ 3,259	540,705	223,442	41%	175,014	32%	29-Oct-2021
Caloocan City	▼ 3,176	1,495,426	907,207	61%	740,464	50%	24-Oct-2021
City of Parañaque	▼ 2,667	620,993	555,300	89%	476,053	77%	26-Oct-2021

Note: Column 2 "Active Cases as of 27 Oct. 2021" shows the increase (▲) or decrease (▼) in cases from Sep. 2021.
For further reading: https://bit.ly/OctSources

What should we do?

The government must increase testing capacity and consider home testing, like rapid antigen home test kits, and ramp up vaccination in areas with high active cases in order to meet the **"herd immunity"** target.

Businesses should ensure proper ventilation in operating businesses and commercial establishments.

The public must continue to wear masks and strictly observe physical distancing especially in enclosed spaces.

For questions or clarifications on this post you may email upri.covid19@up.edu.ph

Inputs from Dr. Jomar Rabajante, Dr. Peter Julian Cayton, Dr. Kristoffer Berse, Dr. Mahar Lagmay, and Dr. Johnrob Y. Bantang
Design by Gianne Encarnacion / Creative Team Patricia Reyes, Mikee Nazal, Alyssa Velasco and Ian Villanueva

Challenges and Recommendations with Open Data in the Philippines

Challenges (non-exhaustive)

- Inconsistencies in the data management and data governance by government agencies responsible for open data
- Timeliness and accuracy of released open data

Recommendations (non-exhaustive)

- Call on other government agencies to share relevant
- Data should be standardized and regularized for machine-readability and accessibility of the general population in keeping with data privacy principles
- Call for open science and scientific cooperation
- Call for evidence-based, accountable, and transparent decision-making

Thank you!

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