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COVID-19 Weekly Update
Up to Date Genomics and Precision Health Information on COVID-19

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About COVID-19 Genomics and Precision Public Health Weekly Update

This weekly update contains the latest information and publications on the impact of genomics and precision health technologies on the investigation and control of COVID-19. Items are selected by staff from the CDC Office of Genomics and Precision Public Health daily from the COVID-19 GPH (/PHGKB/coVInfoStartPage.action).

Archived Editions (/PHGKB/coVInfoClip.action?action=archivelist)

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COVID-19 Genomics and Precision Public Health Weekly Update Content

- Pathogen and Human Genomics Studies
- Non-Genomics Precision Health Studies
- News, Reviews and Commentaries

Pathogen and Human Genomics Studies

- Swabs Collected by Patients or Health Care Workers for SARS-CoV-2 Testing.
  (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=17)
  Tu Yuan-Po et al. The New England journal of medicine 2020 07 (5) 494-496

  > Our study shows the clinical usefulness of tongue, nasal, or mid-turbinate samples collected by patients as compared with nasopharyngeal samples collected by health care workers for the diagnosis of Covid-19.

- Immune complement and coagulation dysfunction in adverse outcomes of SARS-CoV-2 infection
  (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=22)
  V Ramlall et al, Nature Medicine, August 3, 2020

  > In a genetic association study of severe disease, we identified putative complement and coagulation-associated loci including missense, eQTL and sQTL variants of complement and coagulation regulators. In addition to providing evidence that complement function modulates outcome, the data point to putative transcriptional genetic markers of susceptibility.

- Genomic heterogeneity and clinical characterization of SARS-CoV-2 in Oregon
  (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=24)
  AK Dowdell et al, MEDRXIV, August 4, 2o020

We report viral sequences from 188 patients across the hospitals and associated clinics in Oregon dating back to the early days of the outbreak. We show a rapid emergence and dominance of Spike D614G-positive variants. We also highlight significant diversity in sequences indicative that these genomes could be utilized for outbreak tracing.

Non-Genomics Precision Health Studies

- Using influenza surveillance networks to estimate state-specific prevalence of SARS-CoV-2 in the United States. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=10)
  Silverman Justin D et al. Science translational medicine 2020 Jun

  The authors estimated the proportion of observed influenza-like illness during the early pandemic that was in excess of the seasonal variation seen in prior years, then adjusted this estimate to take into account subclinical infections. Their model estimated that more than 80% of individuals with SARS-CoV-2 infections in the US went undetected in March 2020.

- Deep transfer learning artificial intelligence accurately stages COVID-19 lung disease severity on portable chest radiographs. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=11)
  Zhu Jocelyn et al. PloS one 2020 (7) e0236621

  This study employed deep-learning convolutional neural networks to stage lung disease severity of Coronavirus Disease 2019) infection on portable chest x-ray with radiologist score of disease severity as ground truth. Deep-learning convolutional neural networks accurately stages disease severity on portable chest x-ray of COVID-19 lung infection.

- Drug treatments for covid-19: living systematic review and network meta-analysis (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=15)
  RAC Siemieniuk et al, BMJ, July 30, 2020

  Glucocorticoids probably reduce mortality and mechanical ventilation in patients with covid-19 compared with standard care. The effectiveness of most interventions is uncertain because most of the randomised controlled trials so far have been small and have important study limitations.

- Characteristics and Outcomes of Contacts of COVID-19 Patients Monitored Using an Automated Symptom Monitoring Tool — Maine, May–June 2020 (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=23)
  A Krueger et al, MMWR, August 3, 2020

  Maine found that using automated symptom monitoring as a part of the state's contact tracing program was well received, with the majority of monitored contacts (96.4%) agreeing to automated symptom monitoring. Automated symptom monitoring promptly identified COVID-19 diagnoses among monitored contacts.

- Application of Social Vulnerability Index to Identify High- risk Population of Contracting COVID-19 Infection: a state-level study. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=32)
  O Estefania et al, MEDRXIV, August 4, 2020

  By applying the social vulnerability index and analyzing data from a total of 102 counties across the state of Illinois, we investigated which factors enhanced the risk of contracting the infection

> and which were related to a lower risk of infection.

News, Reviews and Commentaries

- Review of Big Data Analytics, Artificial Intelligence and Nature-Inspired Computing Models towards Accurate Detection of COVID-19 Pandemic Cases and Contact Tracing. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=12)
  Agbehadji Israel Edem et al. International journal of environmental research and public health 2020 Jul (15)
- Saliva Samples Slow to Catch On for Large-Scale Coronavirus Testing (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=13)
  J Karrow, Genome Web, July 29, 2020
- Covid's Color Line - Infectious Disease, Inequity, and Racial Justice. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=16)
  Evans Michele K et al. The New England journal of medicine 2020 Jul (5) 408-410
- How does SARS-CoV-2 cause COVID-19? (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=18)
  NJ Matheson, et al, Science, July 31, 2020

> As with all coronaviruses, SARS-CoV-2 cell entry is dependent on its 180-kDa spike (S) protein, which mediates two essential events: binding to ACE2 by the amino-terminal region, and fusion of viral and cellular membranes through the carboxyl-terminal region.

- Reopening Colleges During the Coronavirus Disease 2019 (COVID-19) Pandemic—One Size Does Not Fit All (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=19)
  EH Bradley et al, JAMA Network Open, July 31, 2020
- Utility of Artificial Intelligence Amidst the COVID 19 Pandemic: A Review. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=20)
  Bansal Agam et al. Journal of medical systems 2020 Aug (9) 156
- Cellular immune responses to covid-19. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=21)
  Sewell Herb F et al. BMJ (Clinical research ed.) 2020 Jul m3018
- Big Data-driven personal protective equipment stockpiling framework under Universal Healthcare System for Disease Control and Prevention in the COVID-19 Era. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=25)
  Ma Kevin Sheng-Kai et al. Infection control and hospital epidemiology 2020 Aug 1-4
- How to Think Like an Epidemiologist- Don't worry, a little Bayesian analysis won't hurt you. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=27)
  S Roberts, NY Times, August 4, 2020
- Virus Surveillance and Diagnosis With a CRISPR-Based Platform (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=28)
  T Hampton, JAMA, August 4, 2020
- Deciphering the Role of Host Genetics in Susceptibility to Severe COVID-19. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=29)
  Carter-Timofte Madalina Elena et al. Frontiers in immunology 2020 1606
- Covid-19 apps and wearables are everywhere. Can they actually benefit patients? (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=30)

C Ross, StatNews, August 4, 2020

- Potent neutralizing antibodies target new regions of coronavirus spike (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=31)
  NIH Research Matters, August 4, 2020
- Social Network Analysis of COVID-19 Sentiments: Application of Artificial Intelligence. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=33)
  Hung Man et al. Journal of medical Internet research 2020 Aug
- Big Data, Natural Language Processing, and Deep Learning to Detect and Characterize Illicit COVID-19 Product Sales: An Infoveillance Study on Twitter and Instagram. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=34)
  Mackey Tim et al. JMIR public health and surveillance 2020 Aug
- Statistical issues in the development a COVID-19 prediction models. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=35)
  Collins Gary S et al. Journal of medical virology 2020 Aug
- Telemedicine is booming — but many people still face huge barriers to virtual care (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=36)
  I Isselbacher, StatNews, August 5, 2020
- Coronavirus RNA proofreading: molecular basis and therapeutic targeting (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=37)
  F Robson et al, Molecular Cell, August 5, 2020

  > We review the molecular basis of the CoV proofreading complex and evaluate its potential as a drug target. We also consider existing nucleoside analogues and novel genomic techniques as potential anti-CoV therapeutics that could be used individually or in combination to target the proofreading mechanism.

- Immunology Is Where Intuition Goes to Die Which is too bad because we really need to understand how the immune system reacts to the coronavirus. (/PHGKB/phgHome.action?action=forward&dbsource=covUpdate&id=38)
  E Yong, the Atlantic, August 5, 2020

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