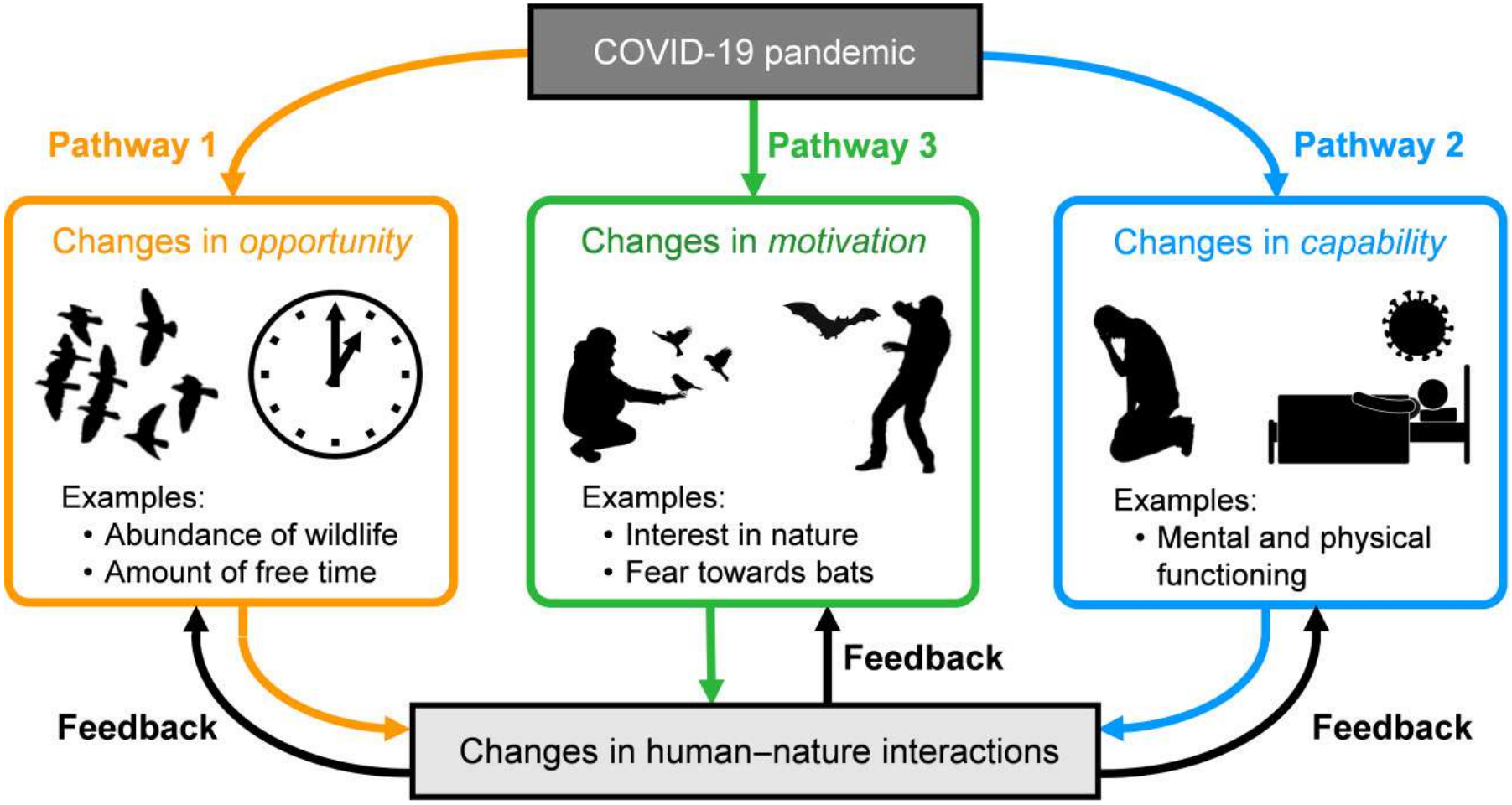
Çevresel Örneklerin Viral Surveyansta Kullanımı

Füsun Can

Koç Üniversitesi Tıp Fakültesi

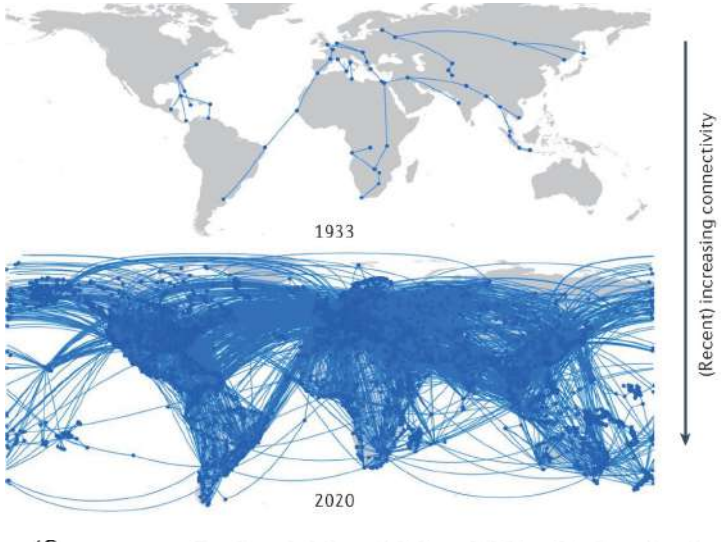
Tıbbi Mikrobiyoloji AD

COVID-19 Pandemisinin Etkileri

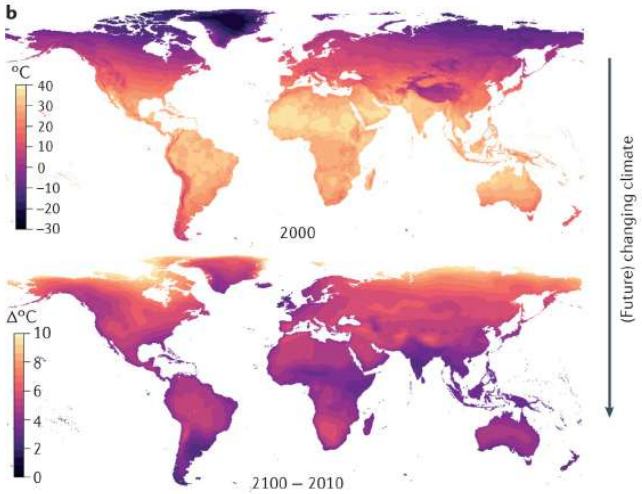


People and Nature, 2021

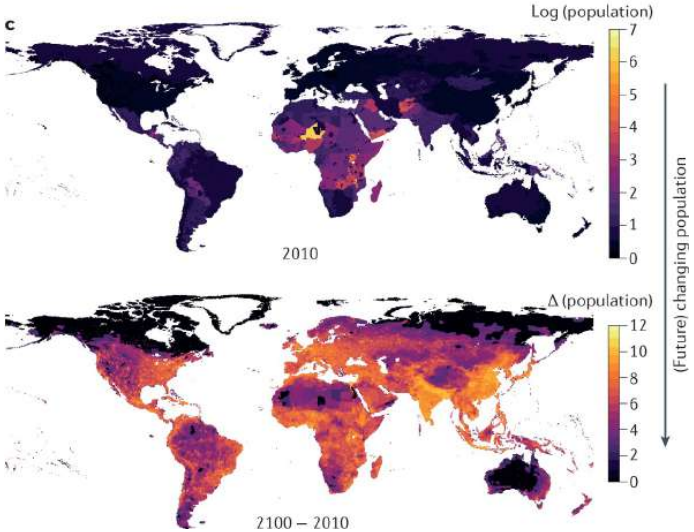
Şehirleşme, seyahat ve iklim değişikliği

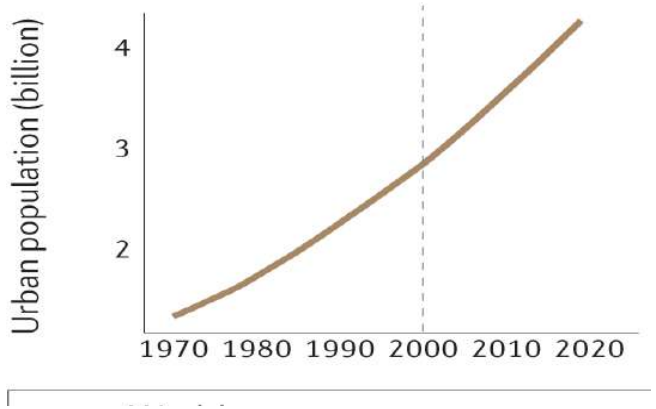


Sıcaklık Değişikliği



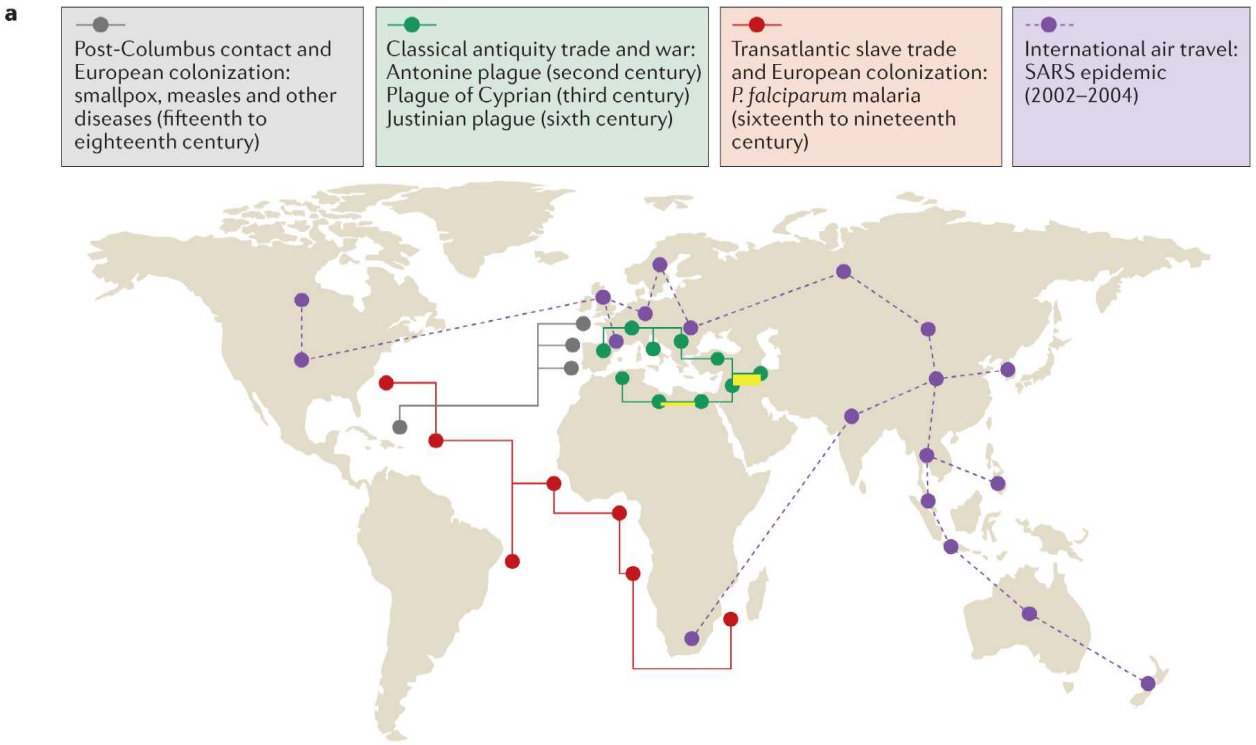
Nüfus değişikliği

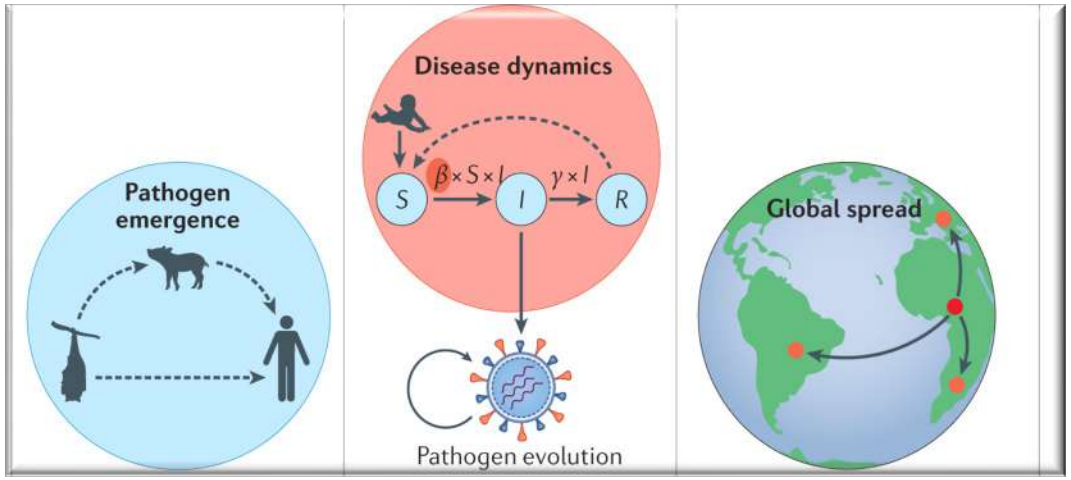


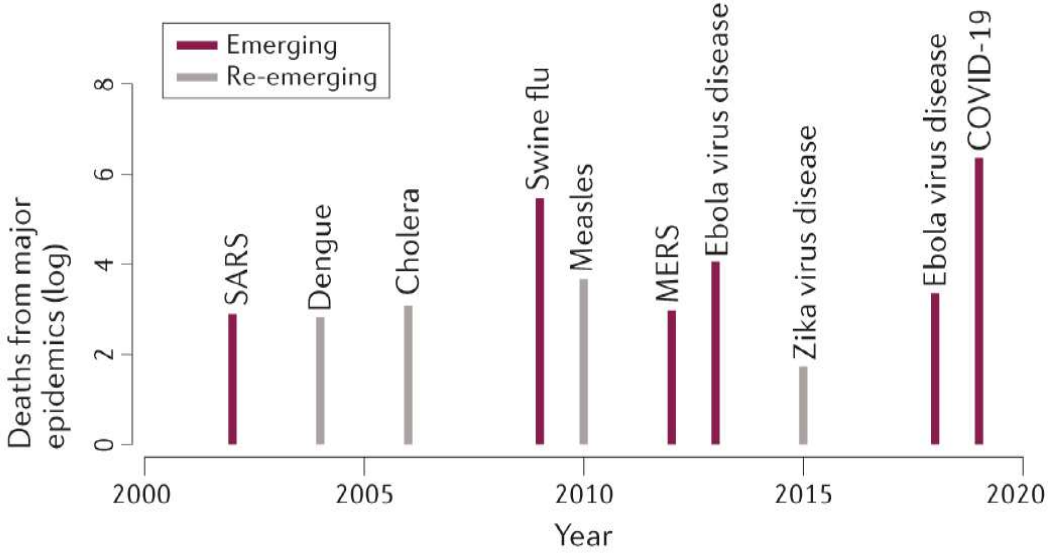


Şehirleşme artıyor Seyahatler artıyor Sıcaklıklar artıyor

Küresel Değişim Çağında Enfeksiyon Hastalıkları







Yeni COVID19 Pandemileri Olabilir mi

1. Bilimsel Evrim
   -Büyük Verilerle çalışmak
   -Serolojik Surveyans
   -Genomik Surveyans
   -AI ve matematik modelleme
2. Erken Tanımlama
   -Etkin Enfeksiyon Kontrol

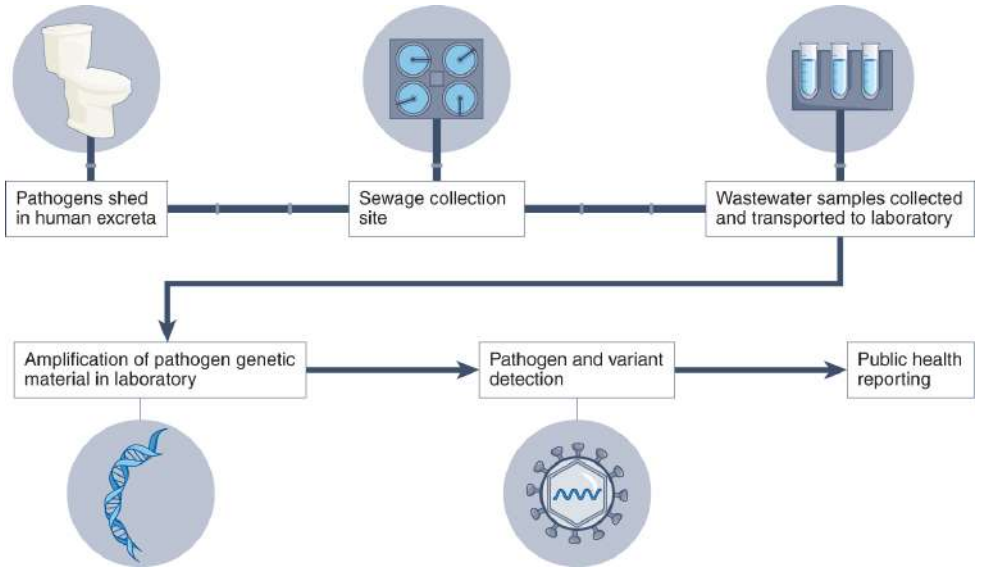
Çevresel Örneklerin Taranması

- İç ortam hava
- Atık su
- Kritik yüzeyler

Klinik veya Çevresel Örnekler ile Sürveyans

Klinik Tarama Testleri	Çevresel Örneklerin Taranması
Hasta bireyleri saptar	Toplum düzeyinde salgınlarının mekansal ve zamansal eğilimlerini ve zirvelerini gösterir
Yorum için çok sayıda örnek gerekr, pahalı	Tek örnek tüm toplum bilgisini verebilir, nispeten ucuz
Yalnız semptomatik kişilerden toplanır, asemptomatik vakaları yakalamaz	Virüs partikülleri saçan tüm enfekte bireyleri (semptomatik, asemptomatik pre-semptomatik ve post-semptomatik vakalar) hedefler.
Gönüllü gerekli, etik izinler	Gönüllü gerekli değil
Test güveninirliği daha yüksek	False negatif ve false pozitif veriler
Salgınlar geç farkedilir	Salgınların erken tanınması olasıdır

Atık Su Bilimi



Diamond, M.B., Keshaviah, A., Bento, A.I. *et al.* . *Nat Med* (2022).

ELSEVIER
The Lancet Infectious Diseases
Volume 15, Issue 10, October 2015, Pages 1236-1242

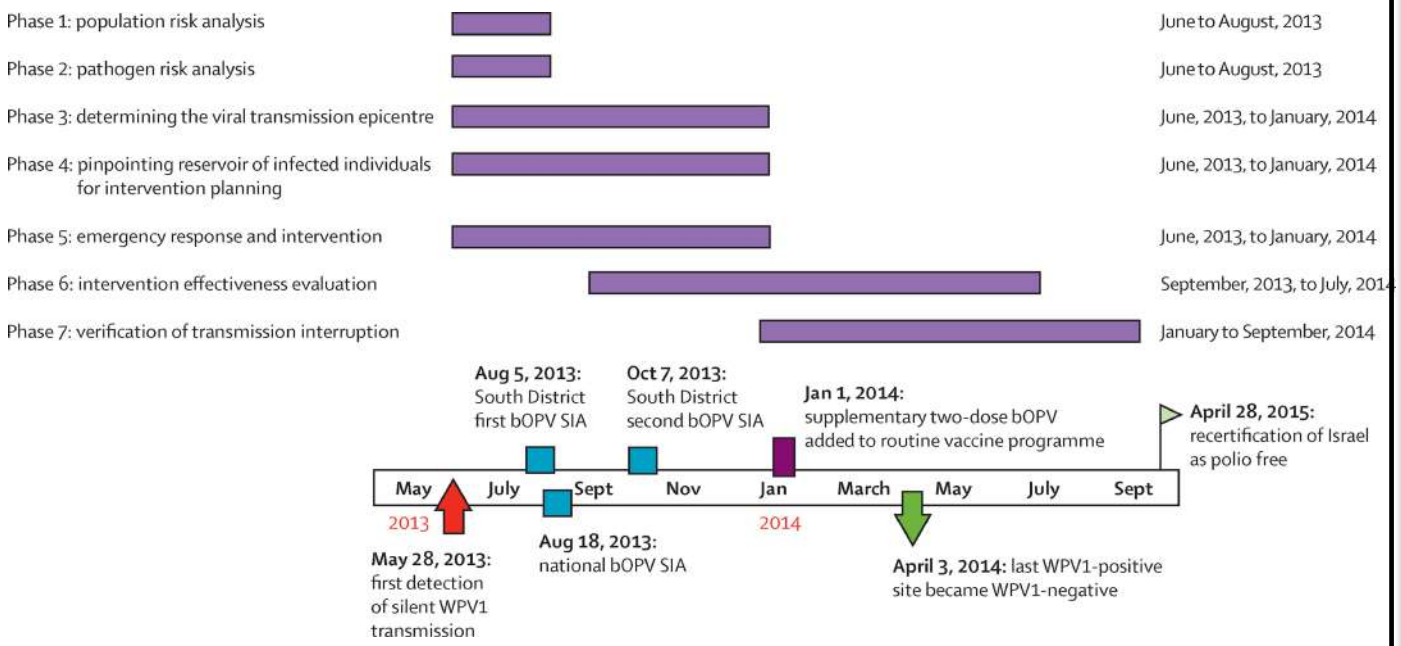
Personal View

The Israeli public health response to wild poliovirus importation

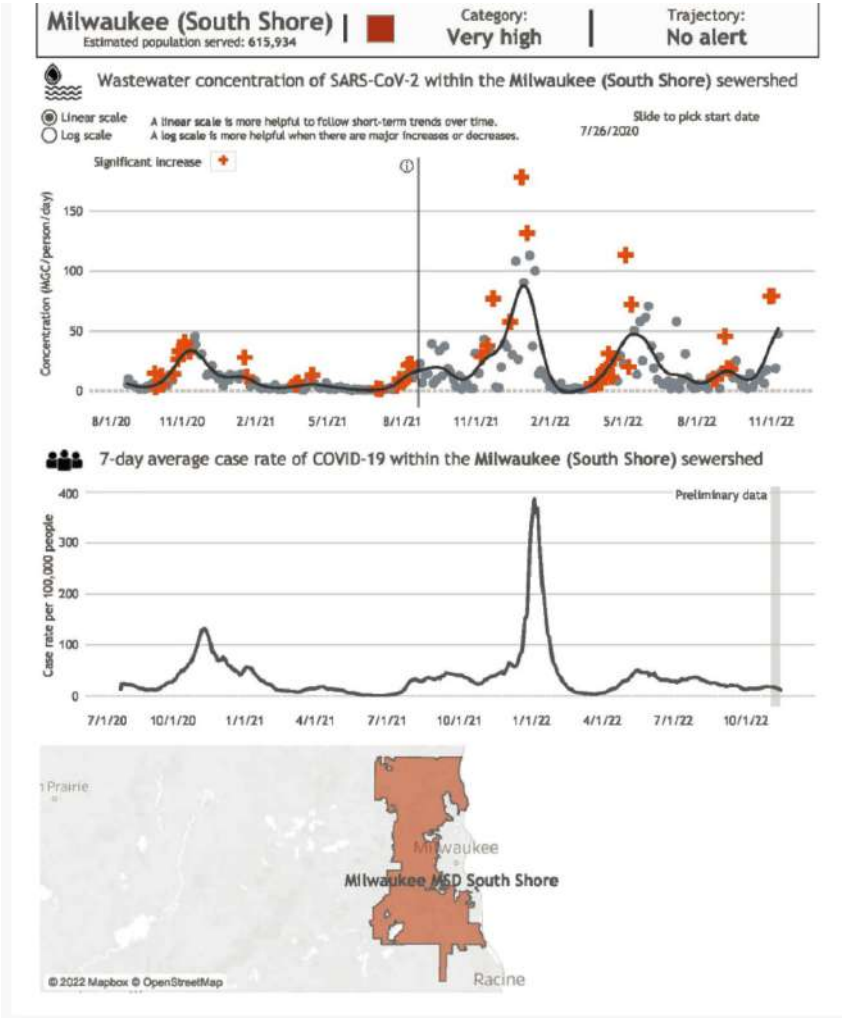
PERSPECTIVES

Silent reintroduction of wild-type poliovirus to Israel, 2013 – risk communication challenges in an argumentative atmosphere

E Kaliner (ehud.kaliner@moh.health.gov.il)[1], J Moran-Gilad[1,2], I Grotto[1,2], E Somekh[3,4], E Kopel[1], M Gdalevich[2,5], E Shimron[6], Y Amikam[6], A Leventhal[1], B Lev[6], R Gamzu[4,6]
1. Public Health Services, Ministry of Health, Jerusalem, Israel
2. Faculty for Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel
3. Paediatric Infectious Diseases, Wolfson Medical Center, Holon, Israel
4. Sackler Faculty of Medicine, Tel-Aviv University, Tel Aviv, Israel
5. South District Health Office, Ministry of Health, Beer Sheva, Israel
6. Ministry of Health, Jerusalem, Israel



CoVID-19 Atık Su Surveyans



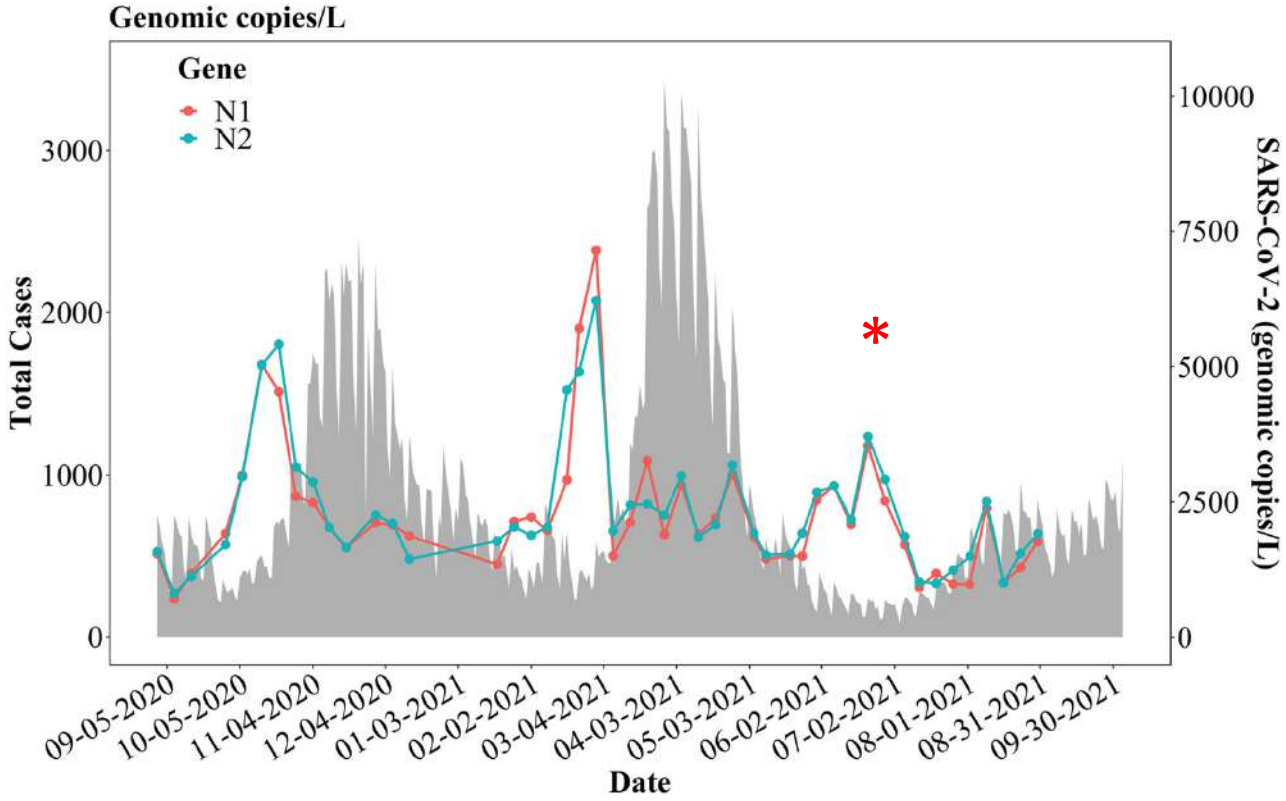
ELSEVIER

Science of The Total Environment

Volume 844, 20 October 2022, 157040

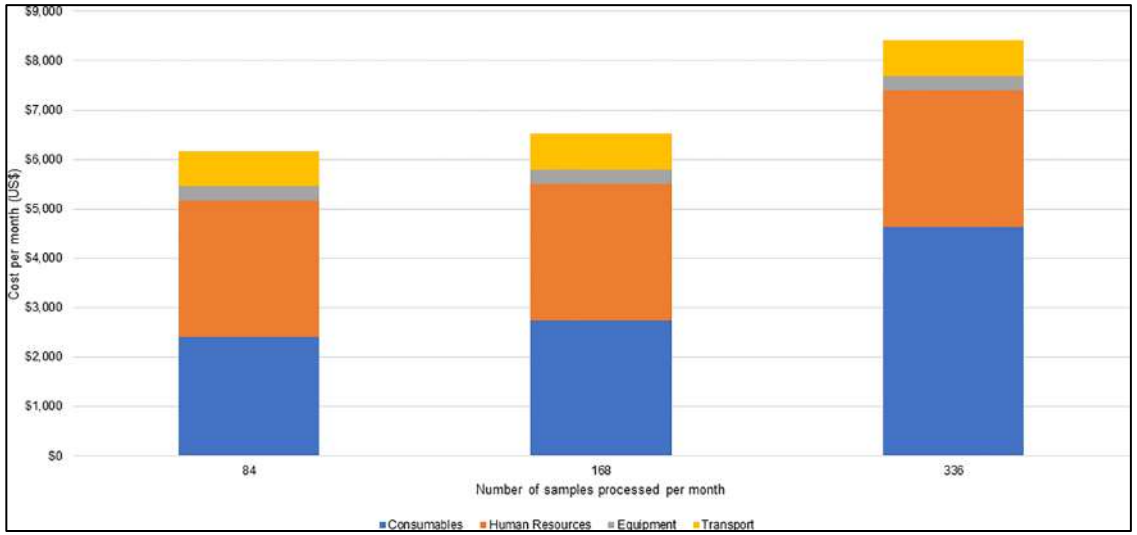
Five-week warning of COVID-19 peaks prior to the Omicron surge in Detroit, Michigan using wastewater surveillance

Liang Zhao [a], Yangyang Zou [a], Yabing Li [a], Brijen Miyani [a], Maddie Spooner [a], Zachary Gentry [a], Sydney Jacobi [a], Randy E. David [b], Scott Withington [b], Stacey McFarlane [c], Russell Faust [d], Johnathon Sheets [e], Andrew Kaye [e], James Broz [e], Anil Gosine [f], Palencia Mobley [f], Andrea W.U. Busch [g], John Norton [g], Irene Xagoraraki [a]

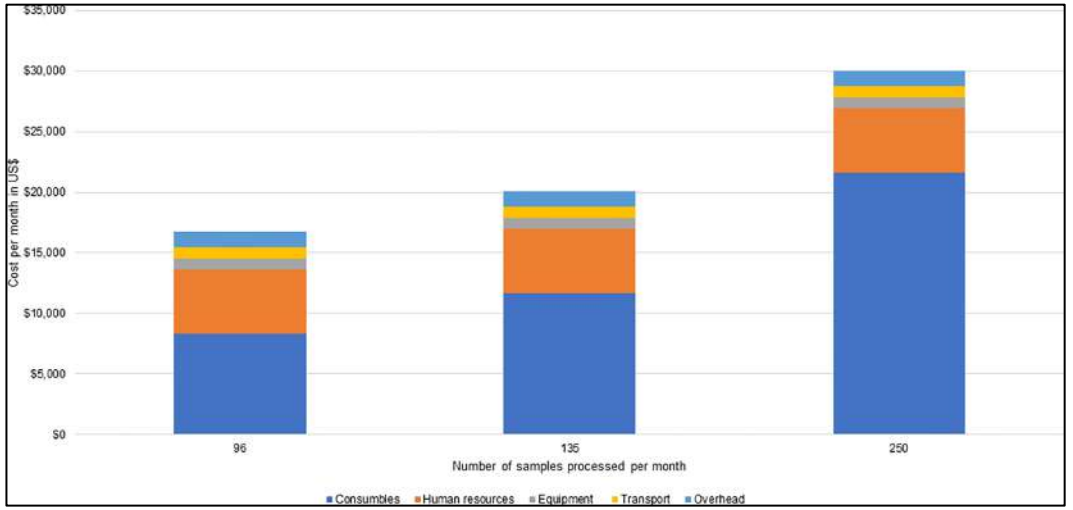


Atık Su Sürveyans Taramasının Maliyeti

Malawi, Katmandu ve Nepal



Blantyre



Nepal

Bölgede kişi başı maliyet: $0.07 - $0.13.

İstanbul için yıllık maliyet: 1.6 milyon dolar

Ngiwira, Plos Global Health, 2022

Science of the Total Environment 852 (2022) 158265

Contents lists available at ScienceDirect

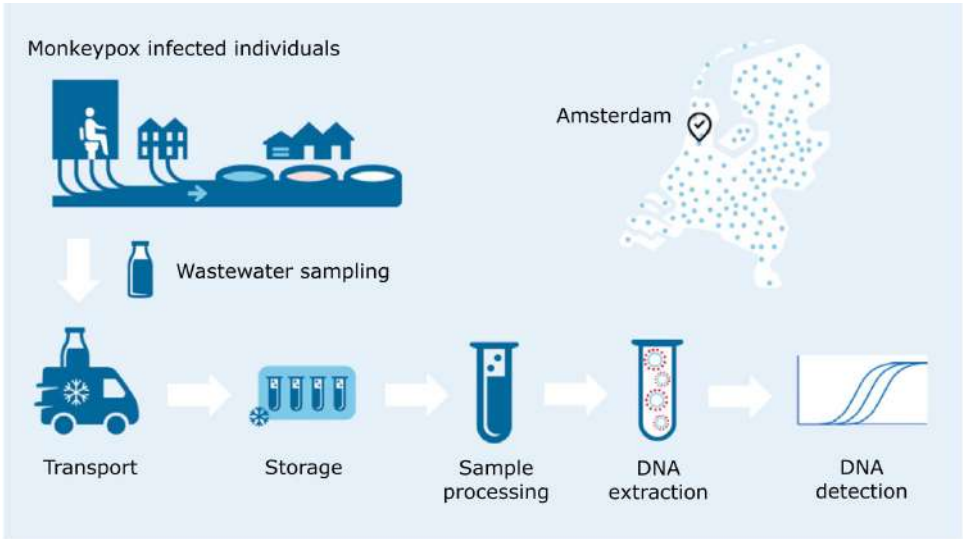
Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

The detection of monkeypox virus DNA in wastewater samples in the Netherlands

Eline F. de Jonge, Céline M. Peterse, Jaap M. Koelewijn, Anne-Merel R. van der Drift, Rudolf F.H.J. van der Beek, Erwin Nagelkerke, Willemijn J. Lodder *

Centre for Infectious Disease Control, National Institute for Public Health and the Environment (RIVM), Bilthoven, the Netherlands



- Atık su surveyans çalışması ile viral salgın riski erken tanımlanabilir
- Bölgesel yoğunluklar izlenebilir

Table 1
Monkeypox virus DNA detection in the wastewater samples taken at different locations from 16 May-3 July 2022 (n = 108). Shown are the average Ct values of the generic and the West-African specific assay, respectively.

	Date	WWTP Amsterdam Westpoort		WWTP Amsterdam West					Schiphol Airport
		CD-1 *64,000*[a]	WWTP 310,762	CD-2 16,000	CD-3 49,000	CD-4 118,000	CD-5 121,000	WWTP 648,560	WWTP-[c]
Week 20	16 May		n.d.					n.d.	
	17 May		n.d.					n.d.	n.d.
	18 May	n.d.		n.d.	n.d.	n.d.	n.d.		n.d.
	19 May								
	20 May		n.d.					n.d.	
	21 May								
	22 May								38.1/39.4
Week 21	23 May		n.d.					n.d.	n.d.
	24 May								n.d.
	25 May	n.d.		n.d.	n.d.	n.d.	n.d.		
	26 May								n.d.
	27 May		n.d.					n.d.	
	28 May		n.d.						
	29 May								38.1/37.4
Week 22	30 May		38.8/39.6						
	31 May		n.d.						n.d.
	1 Jun	n.d.	41.8[b]/42.1[b]	n.d.	n.d.	n.d.	42.9/42.4		39.0/38.0
	2 Jun								
	3 Jun		39.1/37.4					39.5/39.9	
	4 Jun							39.3/39.2	
	5 Jun							40.2/39.3	
Week 23	6 Jun		38.2/37.4					38.7/38.3	n.d.
	7 Jun								n.d.
	8 Jun	n.d.	40.6/38.2	n.d.	39.8/39.2	n.d.	n.d.	n.d.	
	9 Jun		38.6/37.6						n.d.
	10 Jun		40.3/38.6					39.0/39.2	
	11 Jun							38.9/39.1	n.d.
	12 Jun								
Week 24	13 Jun		36.5/36.1					n.d.	
	14 Jun		39.8/38.0					40.0/39.0	n.d.
	15 Jun	n.d.	n.d.	40.6/40.5	37.0/37.0	40.0/37.9	39.0/37.9	39.1/38.4	n.d.
	16 Jun								
	17 Jun		n.d.					n.d.	
	18 Jun								
	19 Jun								40.1/39.5
Week 25	20 Jun		38.8/38.7						n.d.
	21 Jun		37.7/37.7					39.7/40.9	n.d.
	22 Jun	40.9/41.4	35.9/36.6	n.d.	n.d.	39.1/39.8	35.7/35.8	39.3/38.6	
	23 Jun								n.d.
	24 Jun		n.d.					42.1/41.4	
	25 Jun							n.d.	n.d.
	26 Jun								
Week 26	27 Jun		n.d.					39.5/38.9	
	28 Jun		n.d.					38.6/38.3	39.8/38.2
	29 Jun	n.d.	n.d.	n.d.	n.d.	39.4/38.8	39.6/39.6	41.0/40.5	n.d.
	30 Jun								
	1 Jul		40.6/39.4					40.8/40.7	
	2 Jul								
	3 Jul								37.9/38.4
	Total	7	26	7	7	7	7	24	23

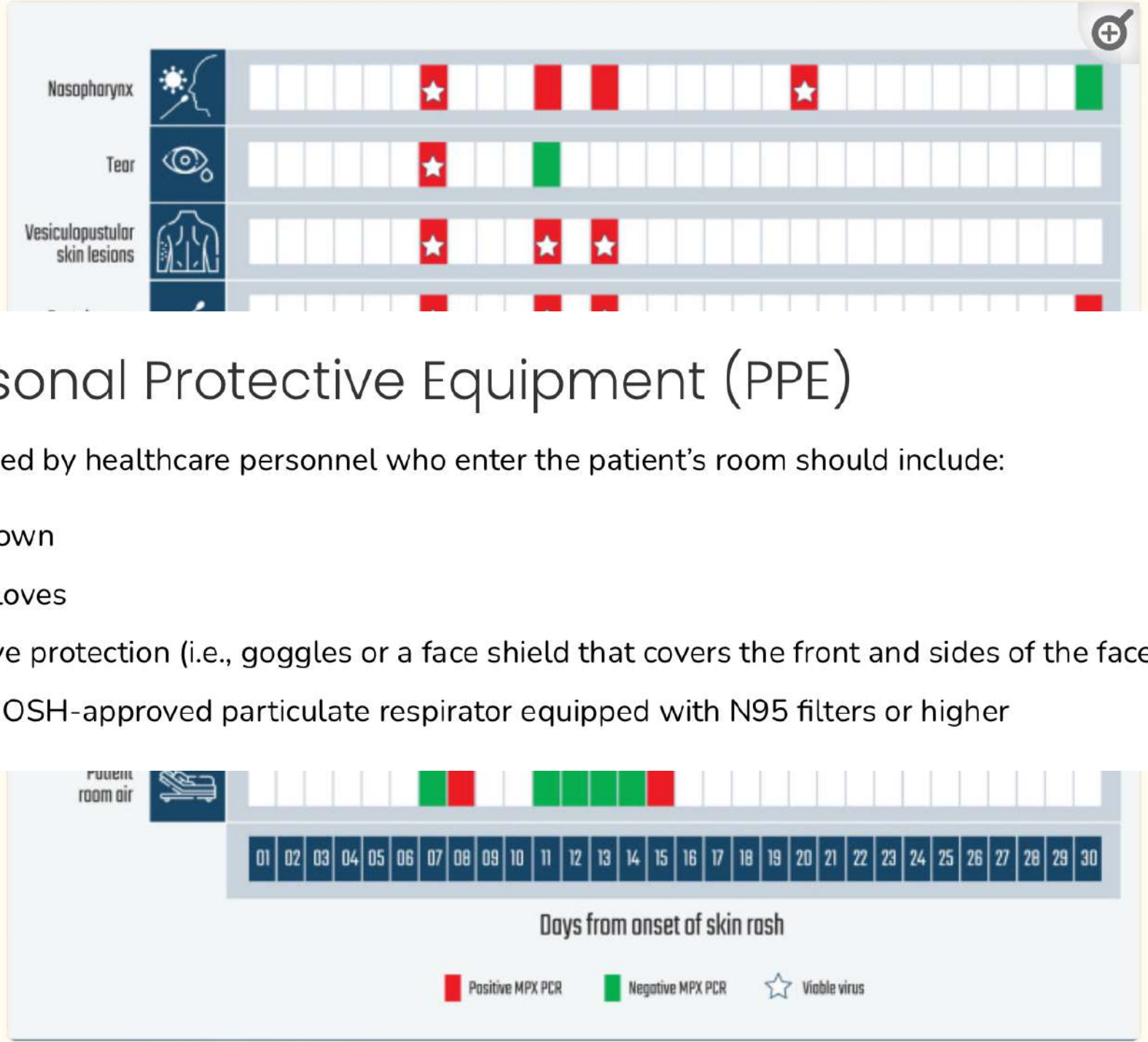
CD: Amsterdam city district; n.d.: sample tested, monkeypox virus DNA not detected.
[a] The number of inhabitants connected to each sampling location.
[b] Results from the 10-times diluted sample when the undiluted sample yielded no result.
[c] No number of inhabitants is associated with the WWTP of Schiphol Airport since it has no permanent inhabitants.

J Infect. 2023 Jan; 86(1):
Published online 2022 O

A complicated case

Mahir Kapmaz,[a,b] Derya
Şiran Keske,[a,b] Mert Kuş

Author



Personal Protective Equipment (PPE)

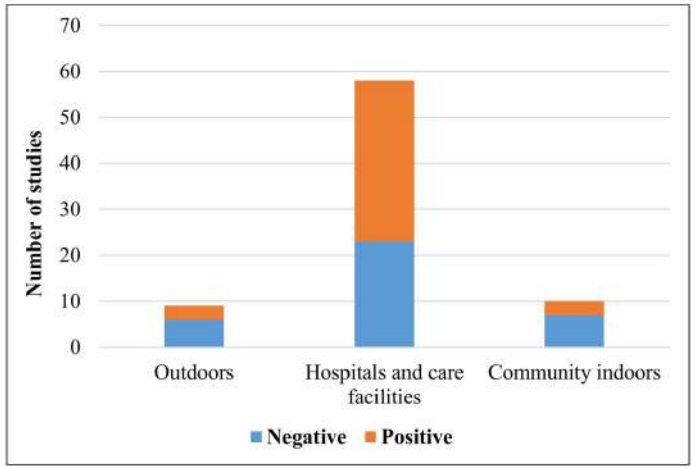
PPE used by healthcare personnel who enter the patient's room should include:

- Gown
- Gloves
- Eye protection (i.e., goggles or a face shield that covers the front and sides of the face)
- NIOSH-approved particulate respirator equipped with N95 filters or higher

Science of The Total Environment
Volume 809, 25 February 2022, 151137

A review on measurements of SARS-CoV-2 genetic material in air in outdoor and indoor environments: Implication for airborne transmission

Adelaide Dinoi [a], Matteo Feltracco [b c], Daniela Chirizzi [d], Sara Trabucco [e], Marianna Conte [a f], Elena Gregoris [b c], Elena Barbaro [b c], Gianfranco La Bella [d], Giuseppina Ciccarese [d], Franco Belosi [e], Giovanna La Salandra [d], Andrea Gambaro [c], Daniele Contini [a]

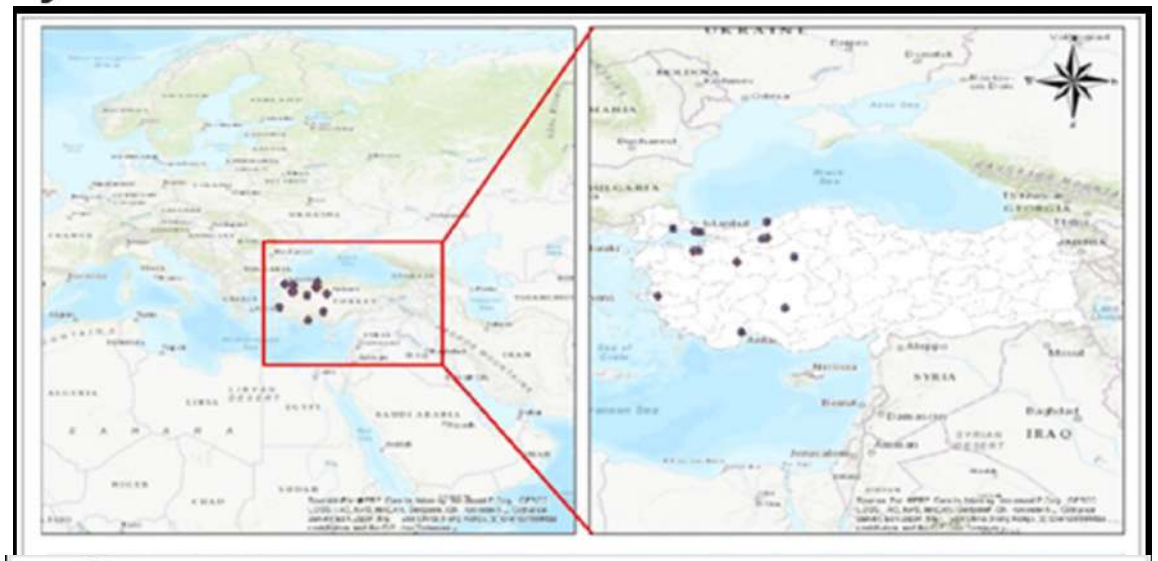


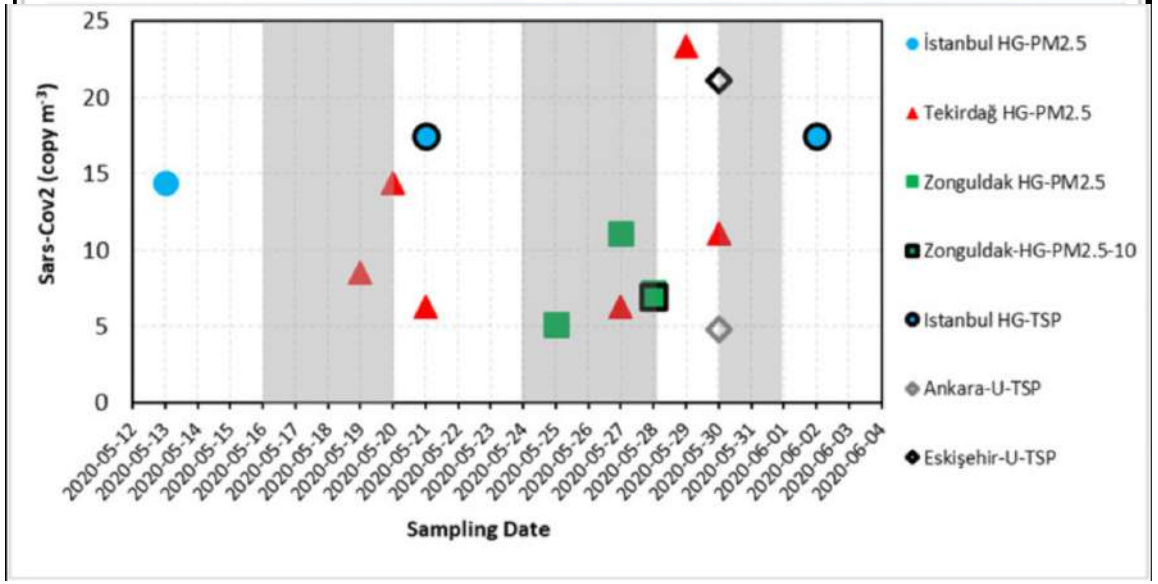
En yüksek hastane iç ortam
Hava toplama sistemi önemli

> Sci Total Environ. 2021 Oct 1:789:147976. doi: 10.1016/j.scitotenv.2021.147976.
Epub 2021 May 25.

Existence of SARS-CoV-2 RNA on ambient particulate matter samples: A nationwide study in Turkey

- 13 Mayıs-14 haziran 2020 203 hava örneği
- RT PCR: RdRp ve N1 gen hedefleri
- Pozitiflik %9.8





Aerosol and Air Quality Research

SHORT COMMUNICATION
https://doi.org/10.4209/aaqr.220388

Omicron Positivity in Air of Hospital Settings Gathered COVID-19 Patients, Vaccinated/Unvaccinated Populations

Zeynep Ece Kuloğlu[1,2], Zeynep Bengi Eren[3*], Bedirhan Haykar[3*], Cansel Vatansever[2], Tayfun Barlas[2], Mert Ahmet Kuskucu[2,4], Gülen Güney-Esken[2], Füsun Can[2,5*]

[1] Koc University School of Medicine, Graduate School of Health Sciences, Istanbul, Turkey
[2] Koc University İsBank Research Center for Infectious Diseases (KUISCID), Istanbul, Turkey
[3] Koc University School of Medicine, Istanbul, Turkey
[4] Department of Medical Microbiology, Cerrahpasa School of Medicine, Istanbul, Turkey
[5] Department of Medical Microbiology, Koc University School of Medicine, Istanbul, Turkey

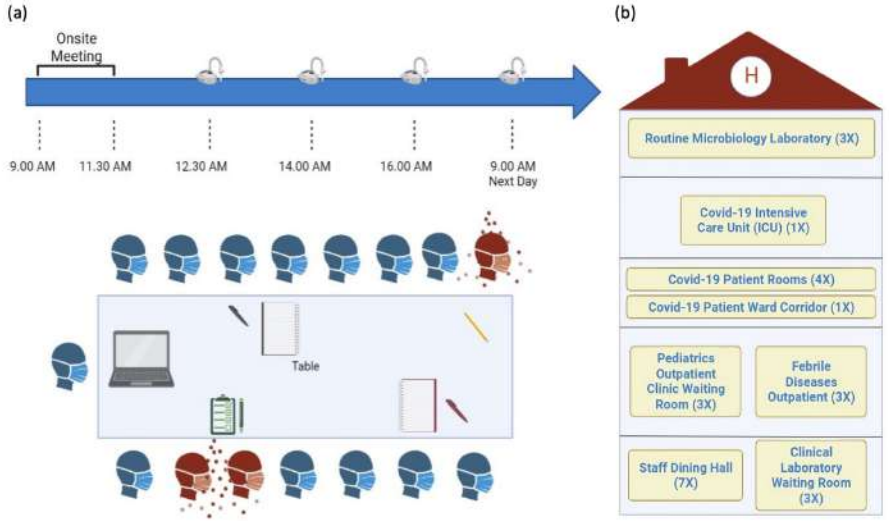
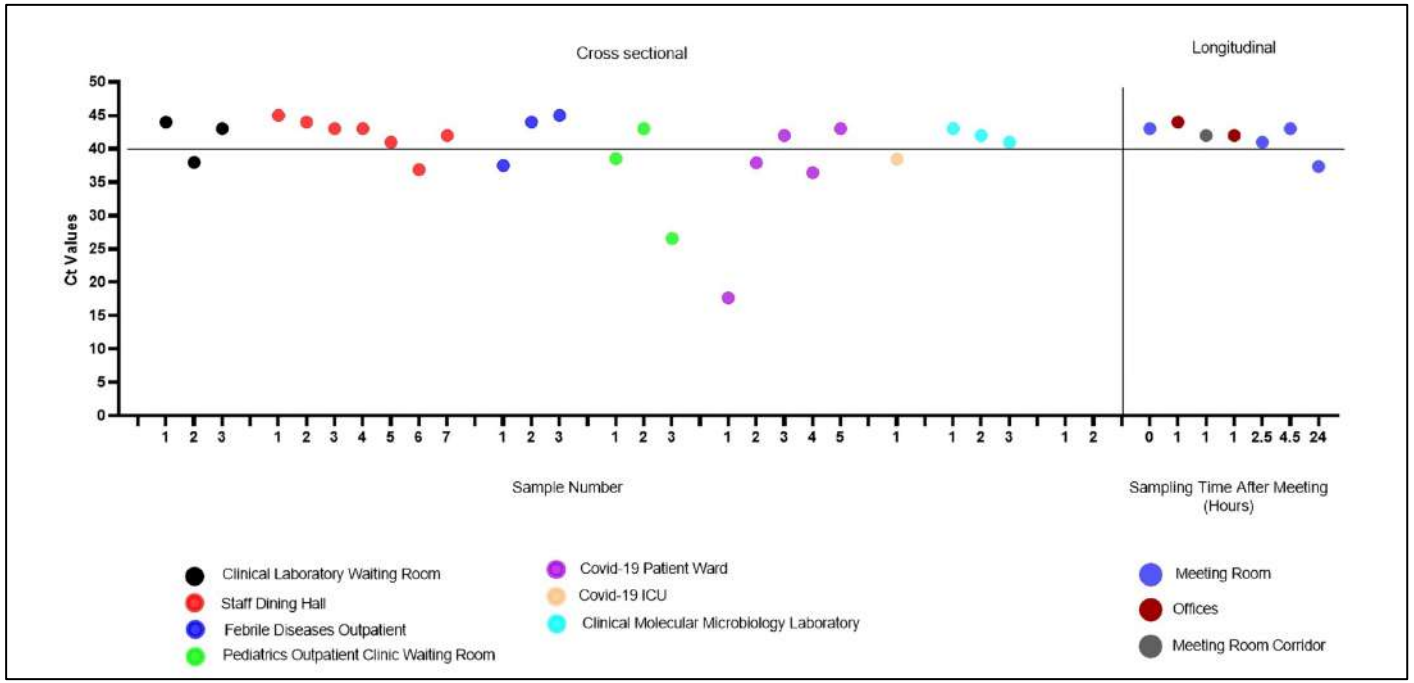


Fig. 1. (a) Distribution of COVID-19 positive participants during the onsite meeting and timings. (b) The cross-sectional sampling areas in the hospital. A central air conditioning system was active in each section.



En yüksek pozitiflik:

- COVID-19 hasta odaları
- Pediatri polikliniği
- Enfeksiyon hastalıkları poliklinik bekleme alanı

> Environ Microbiol Rep. 2024 Aug;16(4):e13303. doi: 10.1111/1758-2229.13303.

Surveillance of respiratory viruses by aerosol screening in indoor air as an early warning system for epidemics

Zeynep Bengi Eren [1], Cansel Vatansever [2], Berk Kabadayı [1], Bedirhan Haykar [1], Zeynep Ece Kuloğlu [2 3], Sedat Ay [1], Kamila Nurlybayeva [1], Gül Eyikudamacı [2 3], Tayfun Barlas [2], Erhan Palaoğlu [4], Yeşim Beşli [4], Mert Ahmet Kuşkucu [2 5], Önder Ergönül [2 6], Fusun Can [2 5]

Affiliations + expand

PMID: 38982659 PMCID: PMC11233404 DOI: 10.1111/1758-2229.13303

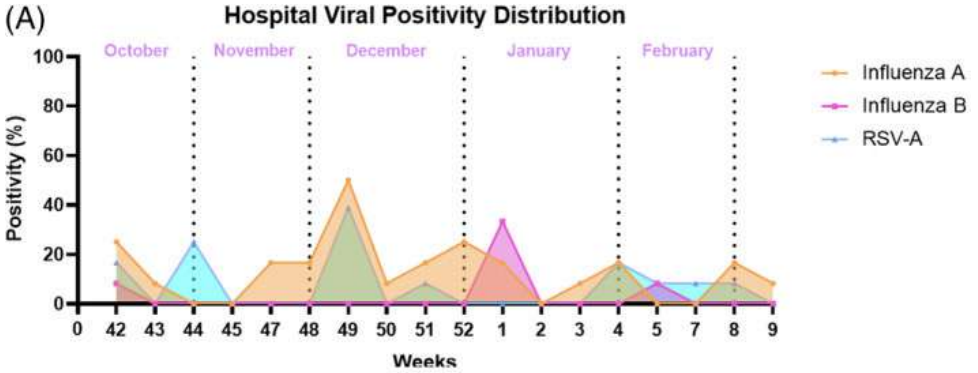
N=276,
17 Ekim 2022, 3 Mart 2023, iç ortam hava
Pozitiflik

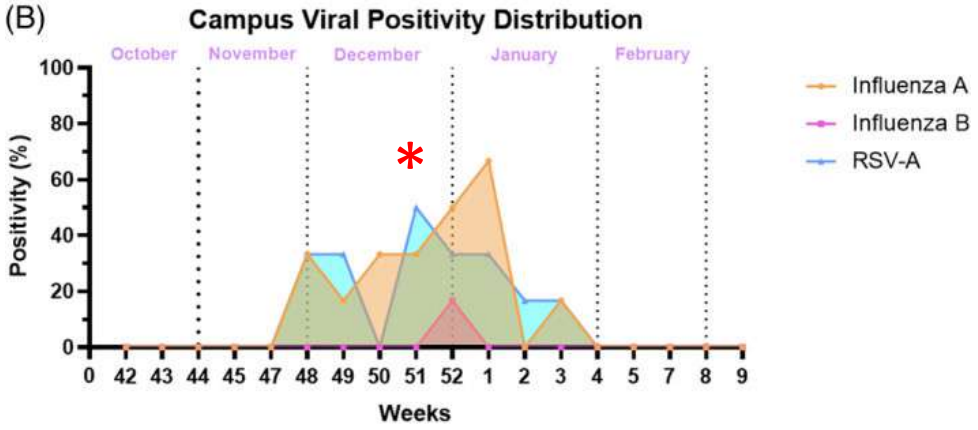
- Kampüs %55
- Hastane %38

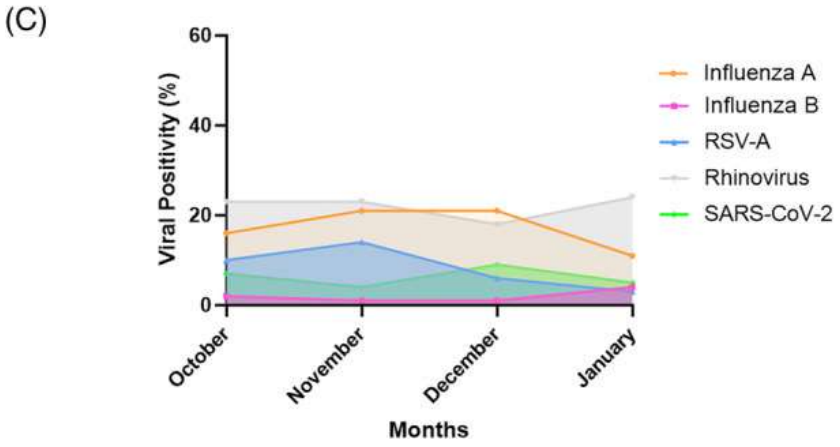
TABLE 1 The positivity of respiratory viruses in indoor air of different areas in campus and hospital.

Main area	Locations	Total positivity (%)	Influenza A positivity (%)	RSV-A positivity (%)	SARS-CoV-2 positivity (%)	Influenza B positivity (%)	Human rhinovirus RNA positivity (%)	Mean, C_t	Room temp.	Mask use[a]	Crowding index[b]
Campus	University student social centre	13.00% (13/100)	30.00% (6/20)	30.00% (6/20)	0.00%	5.00% (1/20)	0.00%	32,835	23.5	No	0.02387775
	University dining hall	11.00% (11/100)	25.00% (5/20)	30.00% (6/20)	0.00%	0.00%	0.00%	32,28	23.5	No	0.02970297
	Medical student classroom	5.00% (5/100)	20.00% (4/20)	5.00% (1/20)	0.00%	0.00%	0.00%	34,402	22.5	No	0.0494382
Hospital	Radiology patient waiting room	8.30% (15/180)	22.20% (8/36)	8.30% (3/36)	2.80% (1/36)	5.60% (2/36)	2.80% (1/36)	34,67	22.1	Yes	0.22962963
	Staff dining hall	6.60% (12/180)	11.10% (4/36)	13.90% (5/36)	8.30% (3/36)	0.00%	0.00%	31,426	22.1	No	0.25806452
	Clinical laboratory patient waiting room	6.10% (11/180)	13.90% (5/36)	8.30% (3/36)	2.80% (1/36)	2.80% (1/36)	2.80% (1/36)	31,382	22.1	Yes	0.18253968
	Student office	4.40% (8/180)	16.70% (6/36)	2.80% (1/36)	0.00%	2.80% (1/36)	0.00%	34,562	22.1	No	0.03162055
	Paediatrics outpatient clinic waiting room	3.30% (6/180)	8.30% (3/36)	5.60% (2/36)	0.00%	2.80% (1/36)	0.00%	32,907	22.1	Yes	0.09545455
	Ear nose throat patient waiting room	1.70% (3/180)	2.80% (1/36)	5.60% (2/36)	0.00%	0.00%	0.00%	33,582	22.1	Yes	0.1080402

Note: Colour shade represents the positivity ratio rates. Hence, darker regions show a higher positivity compared to lighter shaded regions.
[a]The Turkish Ministry of Health has announced the end of mask requirements in all closed areas, except public transportation and healthcare institutions starting 27 April 2022.
[b]The crowding index was calculated by the average number of people divided by the volume (m^3).







Rhinovirus???

Çevresel Örnekler ile Sürveyans

- Eş zamanlı moitorizasyona olanak sağlıyor,
- Virüs tip ve varyantları tesbit edilebiliyor,
- Erken uyarı sistemi olarak kullanılabilir,

- Ancak,
- Deneyimli ekip ve laboratuvar gerektiriyor
- Teknik validasyon önemli
- Lokal ve merkezi yönetimlerin desteği gerekli

Teşekkürler……..