COVID-19 Global Trends and Analyses

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Professor Mike Toole AM, Scott Umali,
Dr Suman Majumdar

Burnet Institute
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GLOBAL SNAPSHOTS | GLOBAL HEALTH

The Impact of COVID-19 on Poliomyelitis Eradication

Polio vaccination campaigns were halted in both Afghanistan and Pakistan -- the last two countries with endemic wild polio virus (WPV) -- in March 2020 to avoid the risk of COVID-19 transmission to children, caregivers and vaccinators. There were fears that this might lead to a resurgence of cases in both countries. Fortunately, the cancellation of national campaigns coincided with the dry "low season" of WPV transmission. Mass campaigns recommenced in both countries in July as the wet season arrived, a time when transmission usually increases. Mass vaccination campaigns were also cancelled in many other low-and middle-income countries (LMIC) at risk of reintroduction of WPV and/or circulating vaccine-derived poliovirus (cVDPV).

So what was the outcome of this interruption to the global poliovirus eradication Initiative, which began in the late 1980s? In brief, it's been mixed with an increase in WPV1 in Afghanistan and a decrease in Pakistan while there has been a massive increase in cVDPV[1]. As of mid-January, Afghanistan had reported 56 cases of WPV1 in 2020 compared with 29 in 2019 and Pakistan has reported 84 cases compared with 147 in 2019. Combined, this represents a 20 per cent year-on-year decline.

Vaccine derived virus circulates in communities when population immunity is low due to inadequate vaccine coverage. The emergence of cVDPV Type 2 is especially concerning because the current oral vaccine (OPV) used widely in LMICs does not contain Type 2 of the vaccine virus. During 2020, cVDPV1 was reported in Yemen and Malaysia, and cVDP2 was reported in 23 countries (compared with 16 in 2019), all but three in sub-Saharan Africa. In total, 28 cases of cVDPV were reported in 2020 compared with 12 in 2019 and 904 cases of cVDPV2 compared with 366 in 2019.

Monovalent OPV2 remains the primary defence against type 2 circulating vaccine-derived poliovirus outbreaks. Due to availability and production constraints, WHO accelerated the development of novel strains of OPV2. Two such novel vaccines have completed Phase 1/2 trials and have been granted emergency use authorisation[2]. This optimises the strategy to contain cVDPV; however, the **cost of the eradication program will increase**. LMICs are now being asked to provide all children with three doses of bivalent OPV, two doses of inactivated poliovirus vaccine (IPV) and supplementary doses of the novel OPV2 when considered at risk for cVDPV2 transmission. 2021 will be a challenging year of catch-up.

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[1] http://polioeradication.org/polio-today/polio-now/this-week/

[2] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)32629-5/fulltext?dgcid=raven_jbs_etoc_email

The Impact of COVID-9 on Global Food Security

The Food and Agriculture Organization (FAO) Food Price Index averaged 107.5 points in December, 2.2 per cent higher than in November[3]. Over the whole of 2020, the benchmark index, which tracks monthly changes in the international prices of commonly-traded food commodities, averaged 97.9 points, a three-year high and a 3.1 per cent increase from 2019 although still more than 25 per cent below its historical 2011 peak. The FAO Vegetable Oil Price Index gained 4.7 per cent in December to reach its highest level since September 2012. The World Bank has stated that 2020 marked the most severe increase in global food insecurity since the word financial crisis, impacting vulnerable households in almost every country[4].

While global food prices have increased modestly, the primary risks to food security are at the country level: as the coronavirus crisis unfolds, disruptions in domestic food supply chains, other shocks affecting food production, and loss of incomes and remittances are creating strong tensions and food security risks in many countries. Numerous countries are experiencing high food price inflation at the retail level, reflecting supply disruptions due to COVID-19, currency devaluations and other factors.

Higher retail prices, combined with reduced incomes, mean more and more households are having to cut down on the quantity and quality of their food consumption. In November 2020, the U.N. World Food Programme (WFP) estimated that an additional 137 million people could face acute food insecurity by the end of 2020, an 82 per cent increase compared to the pre-COVID estimate of acutely food insecure people in the world[5]. In particular, acute hunger has quadrupled in Latin America and the Caribbean countries where WFP operates. Food security "hot spots" include:

- Fragile and conflict-affected states, where logistics and distribution are difficult even without morbidity and social distancing.
- Countries affected by multiple crises resulting from more frequent extreme weather events (floods, droughts) and pests, such as the desert locusts plague impacting food production in 23 countries.
- The poor and vulnerable, including the 690 million people who were already chronically or acutely food insecure before the COVID-19 crisis.
- Countries with significant currency depreciation (driving up the cost of food imports) and countries seeing other commodity prices collapse (reducing their capacity to import food).

The Effects of COVID-19 on the World's Nurses

New evidence gathered by the International Council of Nurses (ICN) suggests COVID-19 is causing widespread trauma among the world's nurses[6]. The number of confirmed COVID-19 related **nurse deaths now exceeds 2,200,** and with high levels of infections in the nursing workforce continuing, overstretched staff are experiencing increasing psychological distress in the face of ever-increasing workloads, continued abuse and protests by anti-vaccinators. An estimated **300,000 healthcare workers** had been infected with the coronavirus worldwide by the end of November 2020[7]. Most are nurses and auxiliary hospital staff.

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[3] http://www.fao.org/news/story/en/item/1366924/icode/

[4] https://www.worldbank.org/en/topic/agriculture/brief/food-security-and-covid-19

[5] https://reliefweb.int/sites/reliefweb.int/files/resources/WFP-0000121038.pdf

[6] https://www.icn.ch/news/covid-19-effect-worlds-nurses-facing-mass-trauma-immediate-danger-profession-and-future-our?s=03

[7] https://www.forbes.com/sites/williamhaseltine/2020/11/17/the-infection-of-hundreds-of-thousands-of-healthcare-workers-worldwide-poses-a-threat-to-national-health-systems/?sh=6009566b3499

ICN's data show that, since the first wave of the pandemic, the proportion of nurses reporting mental health distress has risen from 60 per cent to 80 per cent in many countries. ICN has also gathered studies from every region of the world which confirm rising trauma, anxiety and burnout in the nursing profession.

The COVID-19 Effect – a global snapshot:

- The Japanese Nursing Association says 15 per cent of hospitals across Japan had nurses resigning their jobs, and some 20 per cent of nurses reported that they had experienced discrimination or prejudice amid the spread of the first wave of the pandemic.
- The American Nurses Association reports 51 per cent 'overwhelmed'. Other reports from US show 93 per cent of healthcare workers were experiencing stress, 76 per cent reported exhaustion and burnout, and nurse-to-patient ratios increased three-fold.
- Brazil – 49 per cent of nurses report anxiety and 25 per cent report depression.
- China – 60 per cent of nurses report exhaustion and 90 per cent report anxiety.
- Africa – A survey conducted in 13 countries in Africa revealed 20 per cent of healthcare workers surveyed reported daily depression symptoms during the pandemic, compared to 2 per cent prior to the pandemic.
- Spain – 80 per cent of nurses report symptoms of anxiety and increasing burnout.
- Israel reports over 40 per cent of nurses fear caring for the sick and COVID-19 patients.
- Australia - 61 per cent of healthcare workers report burnout and 28 per cent report depression.

ICN's CEO Howard Catton said "There can be no doubt there will be a large COVID-19 effect on the size of the nursing workforce, which is already heading for a 10 million deficit. Even if only 10 to 15 per cent of the current nursing population quits because of the COVID-19 effect, we could have a potential shortfall of 14 million nurses by 2030, which is the equivalent of half the current nursing workforce."

DIAGNOSIS, EPIDEMIOLOGY AND INFECTION OUTCOMES

Excess Mortality in 35 Countries in 2020

At least 491,000 more people died last year during the coronavirus pandemic than the official COVID-19 death counts report, a review of mortality data in 2020 in 35 countries found[8]. The totals include deaths from COVID-19 as well as those from other causes, likely including people who could not be treated as hospitals became overwhelmed. The highest proportions of excess deaths compared with normal levels (average between 2015 and 2019) were all in South America -- Peru (118 per cent), Bolivia (93 per cent), Ecuador (79 per cent), and Mexico (46 per cent). The only countries that did not report excess mortality were South Korea, Japan, Thailand, Denmark and Norway.

The virus was late to hit Latin America and excess deaths still had not returned to normal levels by the end of the year. Mexico recorded at least 230,800 more deaths than usual compared to the same period in previous years — about two times higher than the reported number of COVID-19 deaths during that time.

Mortality data in the middle of a pandemic are not perfect. In most places, the disparities between the official death counts and the total rise in deaths reflect limited testing for the virus rather than intentional undercounting. Officially, nearly 2 million people have died of the coronavirus worldwide as of 15 January. But the total death numbers offer a more complete portrait of the pandemic, especially because many countries report only those COVID-19 deaths that occur in hospitals.

Excess Deaths in the US during 2020

Since March 2020, at least 400,000 more Americans have died than would have in a normal year. An analysis of mortality data from the US CDC shows how the pandemic is bringing with it unusual patterns of death[9], higher than the official totals of deaths that have been directly linked to the virus. Deaths nationwide were 18 per cent higher than normal from 15 March 2020 to 26 December 2020. The analysis examined deaths from all causes — not just confirmed cases of coronavirus — beginning when the virus took hold in the United States in early 2020.

Excess deaths have peaked three times, so far, as have deaths from COVID-19. There are now excess deaths in every state, with surges in states like California, Colorado, Kansas and Ohio fuelling record death tolls in recent weeks. The highest excess deaths have been in New York City (66 per cent), New Jersey (34 per cent), Arizona (27 per cent), Mississippi (26 per cent), Connecticut, North Dakota, South Dakota and Illinois (25 per cent), Louisiana and Texas (24 per cent), and Washington DC (23 per cent). During the period of the analysis, estimated excess deaths were 21 per cent higher than the official coronavirus fatality count. If this pattern held through 14 January, the total death toll would be about 470,000.

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[8] https://www.nytimes.com/interactive/2020/04/21/world/coronavirus-missing-deaths.html

[9] https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

Excess Deaths in Russia during 2020

Russia's coronavirus death toll is more than triple the official figures previously reported by health authorities, according to the country's statistics agency[10]. The number stood at 55,265 deaths from COVID-19 on 30 December, but the Rosstat federal state statistics service says the true figure is much higher, and reports 186,057 people dying with the disease. This would mean Russia has the third worst death toll to the virus, behind that of the US and Brazil. It is thought that the discrepancy is due to previously reported COVID-19 death figures only included deaths where the virus was found to be a cause after a post-mortem. Russia, meanwhile, has continued to resist a nationwide lockdown, although worsening situations in Moscow and St Petersburg have resulted in the closure of many leisure facilities.

'Long COVID-19': 6-month consequences of patients discharged from hospital

Recently published in The Lancet, this cohort study followed patients with confirmed COVID-19 who had been discharged from a hospital in Wuhan, China between 7 January and 29 May 2020. In total, 1,733 of 2,469 discharged patients with COVID-19 were enrolled after 736 were excluded. Those excluded were patients for whom follow-up would be difficult because of psychotic disorders, dementia, or re-admission to hospital, those who were immobile before or after discharge due to diseases such as osteoarthropathy, stroke or pulmonary embolism, those who declined to participate, those who could not be contacted, and those living outside of Wuhan. A stratified sampling procedure was used to sample patients according to their highest seven-category scale during their hospital stay as 3, 4, and 5–6, to receive pulmonary function test, high resolution CT of the chest, and ultrasonography.

Patients had a median age of 57.0 years and 897 (52 per cent) were men. The follow-up study was completed from 16 June to 3 September 2020, and the median follow-up time after symptom onset was 186.0 (175.0–199.0) days. Fatigue or muscle weakness (63 per cent) and sleep difficulties (26 per cent) were the most common symptoms. Anxiety or depression was reported among 23 per cent of patients. The proportions of median 6-min walking distance less than the lower limit of the normal range were 24 per cent for those at severity scale 3, 22 per cent for severity scale 4, and 29 per cent for severity scale 5–6. The corresponding proportions of patients with pulmonary diffusion impairment were 22 per cent for severity scale 3, 29 per cent for scale 4, and 56 per cent for scale 5–6, and median CT scores were 3.0 for severity scale 3, 4.0 for scale 4, and 5.0 for scale 5–6. Multivariate analysis revealed significant odds ratios for those with severity scales of 5 compared with scales of 3 and 4.

Summary

At 6 months after acute infection, COVID-19 survivors were mainly troubled with fatigue or muscle weakness, sleep difficulties, and anxiety or depression. Patients who were more severely ill during their hospital stay had more severe impaired pulmonary diffusion capacities and abnormal chest imaging manifestations, and are the main target population for intervention of long-term recovery.

[10] https://www.euronews.com/2020/12/29/russia-says-its-covid-19-death-toll-is-more-than-triple-the-number-officially-reported?utm_source=newsletter&utm_medium=en&utm_content=russia-says-its-covid-19-death-toll-is-more-than-triple-the-number-officially-reported&_ope=eyJndWlkIjoiY2VlOTJkODE2MmY2OGUzYjlmYzlmZjBjMmFjN2EzYzIifQ%3D%3D

Prior SARS-CoV-2 Infection is Associated with Protection against Reinfection

Two different studies in the **United Kingdom** have demonstrated that infection with SARS-CoV-2 effectively prevents against reinfection. Both studies were conducted on cohorts of healthcare workers. The **first study** (published as a pre-print) investigated the incidence of SARS-CoV-2 PCR-positive results in seropositive and seronegative healthcare workers (HCWs) attending asymptomatic and symptomatic staff testing at Oxford University Hospitals. Baseline antibody status was determined using anti-spike and/or anti-nucleocapsid IgG assays and staff followed for up to 30 weeks[11].

A total of 12,219 HCWs participated and had anti-spike IgG measured, 11,052 were followed up after negative and 1,246 after positive antibody results including 79 who seroconverted during follow up. 89 PCR-confirmed symptomatic infections occurred in seronegative individuals and no symptomatic infections in those with anti-spike antibodies. Additionally, 76 anti-spike IgG seronegative individuals had PCR-positive tests in asymptomatic screening, compared to 3 seropositive individuals. Overall, positive baseline anti-spike antibodies were associated with lower rates of PCR-positivity (with or without symptoms) -- adjusted **rate ratio 0.24** [95% CI 0.08-0.76, p=0.015].

The **second study** (published in the Journal of Infection) was conducted on a cohort of 11,103 healthcare workers in the Newcastle-upon-Tyne Hospitals. SARS-CoV-2 PCR testing was undertaken on combined nasopharyngeal and oropharyngeal swabs in viral transport medium and nucleocapsid IgG antibody testing was undertaken on the Roche Anti-SARS-CoV-2 IgG assay. Between 10 March and 6 July, 481/3338 (14.4 per cent) symptomatic HCWs tested positive for SARS-CoV-2 by PCR, while SARS-CoV-2 IgG was detected in 937/11,103 (8.4 per cent). Together, these data allowed the researchers to identify 1038 HCWs with evidence of previous infection (positive PCR and/or Ab) and 10,137 without (negative Ab, negative PCR).

From 7 July until 20 November 2020, 2243 HCWs underwent PCR testing for symptoms. 128 had previous confirmed SARS-CoV-2 infection, while 2115 had not. In those previously infected, there was a median of 173 (IQR: 162–229) days from the date of first positive PCR/antibody result to the end of the analysis period. Test positivity rates were 0/128 in those with previous infection compared to 13.7 per cent (290/2115) in those without (P<0.0001 χ2 test). Asymptomatic PCR screening was undertaken on a pilot basis in an additional 481 HCWs, 106 with past infection and 375 without. These HCWs were distinct from the population who underwent symptomatic testing. There were similarly no positive results in the group with previous infection 0/106, compared to 22/375 (5.9%, P = 0.011) positive PCR results in the group without previous infection, consistent with results of symptomatic testing.

Summary
Prior SARS-CoV-2 infection (that generated antibody responses in the Oxford study) offered protection from reinfection for most people in the six months following infection. Further work is required to determine the long-term duration and correlates of post-infection immunity.

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[11] https://www.medrxiv.org/content/10.1101/2020.11.18.20234369v1

Comparison of Saliva and Nasopharyngeal Swab Nucleic Acid Amplification Testing for Detection of SARS-CoV-2

In this systematic review, a search of the MEDLINE and medRxiv databases was conducted to compare the sensitivity and specificity of saliva nucleic acid amplification testing (NAAT) compared to nasopharyngeal NAAT, the current non-invasive standard test for diagnosis of COVID-19[12]. The latter requires trained personnel, limiting its availability. Studies were excluded if the sample contained fewer than 20 participants or was neither random nor consecutive. Eight peer-reviewed studies and eight preprints were included in the meta-analyses (5,922 unique patients). Although the US was the most highly represented country with six studies, they also included studies from Europe, Asia, and Australia.

The reference standard used was always that used by the clinical laboratory for diagnosis of COVID-19 in usual clinical practice. In the primary analysis, the saliva NAAT pooled sensitivity was 83.2 per cent (74.7% - 91.4%) and the pooled specificity was 99.2 per cent (98.2% - 99.8%). The nasopharyngeal swab NAAT had a sensitivity of 84.8 per cent (76.8% - 92.4%) and a specificity of 98.9 per cent (97.4% - 99.8%). Results were similar in secondary analyses.

Summary
These results suggest that saliva NAAT diagnostic accuracy is similar to that of nasopharyngeal swab NAAT.
These findings support larger-scale research on the use of saliva NAAT as an alternative to nasopharyngeal swabs.

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[12] https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2775397

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85 Commercial Road
Melbourne, Australia, 3004

t   +61 3 9282 2111
e   knowc19@burnet.edu.au

burnet.edu.au
@BurnetInstitute
@KnowC19_Burnet

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