

Impact of COVID-19 on Quality of Life and Work Productivity Among Symptomatic US Adults Testing Positive for SARS-CoV-2: Interim Analysis of a Nationwide Longitudinal Study

Alon Yehoshua¹, Tianyan Hu¹, Joseph C. Cappelleri¹, Meghan B. Gavaghan¹, Manuela Di Fusco¹, Xiaowu Sun²

¹ Pfizer Inc., New York, NY, United States of America

² CVS Health, Woonsocket, RI, United States of America

INTRODUCTION

- The burden of COVID-19 in the United States remains significant for the 2024-2025 season [1].
- Preliminary estimates of the 2024-2025 season reported that there were ~10 million new COVID-19 cases as of April 12, 2025, along with numerous outpatient visits, hospitalizations, and deaths in the United States [1].
- Studies have found detrimental impact on health-related quality of life and work productivity from COVID-19 [2-6].
- There are limited studies evaluating the humanistic burden of COVID-19 in the post-pandemic period.

OBJECTIVE

- This study evaluated the impact of COVID-19 infection on Health-Related Quality of Life (HRQoL) and Work Productivity and Activity Impairment (WPAI) among US adults for the 2024-2025 respiratory season post pandemic.

METHODS

- Symptomatic US adults testing positive for SARS-CoV-2 at CVS Health were recruited starting 10/24/2024 - 04/15/2025 (CT.gov: NCT05160636).
- Socio-demographics, clinical characteristics, and vaccination status were self-reported via an online survey.
- Patient-reported HRQoL and WPAI outcomes were assessed before infection via recall and at enrollment (Day 1) using validated instruments (EQ-5D-5L, WPAI-GH) [7,8].
 - For the pre-infection baseline, EQ-5D-5L and WPAI were modified to recall the periods prior to COVID-19 symptom onset.
 - On Day 1, WPAI was modified to ask participants questions the past days since onset of COVID-19 symptoms, not including survey day.
- Outcomes were summarized using descriptive statistics for each time point and compared over time using a paired t-test.

RESULTS

- 347 patients with COVID-19 were included in the interim analysis.
 - Mean (SD) age was 45.6 years (14.2), 77.0% were female, 64.6% had at least one comorbidity, and 269 (77.5%) were employed at enrollment.
 - 290 (83.6%) participants were unvaccinated and 57 (16.4%) were vaccinated with 2024-2025 KP.2 BNT162b2 COVID-19 vaccine, with a mean (SD) time since vaccination of 104.8 (45.8) days among those vaccinated. (**Table 2**)
 - Mean (SD) time from onset of COVID-19 symptom to Day 1 was 4.2 (3.6) days.
- At the baseline period prior to infection, participants reported mean (SD) of EQ-Visual Analogue Scale (EQ-VAS) scores and Utility Index (UI) of 88.5 (9.1) and 0.93 (0.09), respectively.
 - The EQ-VAS and UI scores dropped significantly at enrollment relative to baseline, with a mean change of -21.7 (p<0.001) in EQ-VAS and -0.15 (p<0.001) in UI. (**Table 2**)
- Compared with baseline, COVID-19 had a large impact on all WPAI-GH domains at enrollment:
 - The mean change in absenteeism was 55.4% (p<0.001), mean change in presenteeism was 50.8% (p<0.001), mean change in work productivity loss 71.9% (p<0.001) and mean change in activity impairment was 49.9% (p<0.001). (**Table 3**)
 - The mean change in total hours lost due to health was 16.6 (p<0.001) since onset of COVID-19 symptom. (**Table 3**)

Table 2. Summary of HRQoL Scores: mean (SD)

	Pre-infection	Day 1	Change ^a
EQ-VAS	88.5 (9.1)	66.8 (16.9)	-21.7 (15.8)
Utility index	0.93 (0.09)	0.79 (0.18)	-0.15 (0.17)

^a All P values of paired t-test less than 0.001.

Table 1. Patient Characteristics

	Statistics
Total n	347
Age, years, mean (SD)	45.6 (14.2)
Gender, % (n)	
Male	78 (22.5%)
Female	267 (77.0%)
Unknown	2 (0.6%)
Race / Ethnicity, n(%)	
White or Caucasian	266 (76.7%)
Black or African American	22 (6.3%)
Hispanic	36 (10.4%)
Other	23 (6.6%)
US Geographic Region, n(%)	
Northeast	40 (11.5%)
South	193 (55.6%)
Midwest	98 (28.2%)
West	15 (4.3%)
Other/Unknown	1 (0.3%)
Social Vulnerability Index ^a , mean (SD)	0.36 (0.21)
≥1 comorbid condition ^b , n(%)	224 (64.6%)
Vaccination Status, n(%)	
2024-2025 KP.2 BNT162b2 COVID-19 vaccine	57 (16.4%)
Unvaccinated or not up-to-date	290 (83.6%)
Time since 2024-2025 KP.2 BNT162b2 COVID-19 vaccine, days, mean (SD)	104.8 (45.8)
Time from onset of COVID-19 symptom to Day 1, days, mean (SD)	4.2 (3.6)
Antiviral Use (Nirmatrelvir/Ritonavir, Molnupiravir and others), n (%)	186 (53.6%)
Employed, n (%)	269 (77.5%)

^a Social Vulnerability Index is a score that ranges from 0 to 1. Higher values correspond to higher vulnerability. [9]

^b Comorbid conditions include cancers or malignancies (other than skin cancer), cerebrovascular disease, chronic kidney disease, chronic lung conditions, chronic liver disease, endocrine disorders, heart conditions, mental health conditions, Obesity (BMI >30), weakened immune system/ immunocompromised, blood disorders, smoker, or active tuberculosis

Table 3. Summary of WPAI Scores and Total Hours Lost: mean (SD)

	Pre-infection ^a	Day 1 ^b	Change
WPAI score			
Absenteeism	4.3 (17.8)	60.8 (36.3)	+55.4 (39.6) ^c
Presenteeism	6.0 (16.0)	57.1 (28.5)	+50.8 (32.9) ^c
Work productivity loss	9.3 (22.7)	81.6 (24.3)	+71.9 (33.0) ^c
Activity impairment	8.9 (19.0)	58.9 (29.9)	+49.9 (33.2) ^c
Total hours lost due to health problems	2.7 (6.6)	19.1 (14.4)	+16.6 (15.6) ^c

^a Recall period was 7-day prior to COVID-19 symptom onset.

^b Recall period was time since onset of COVID-19 symptoms, not including survey day

^c P values of paired t-test less than 0.001.

DISCUSSION & CONCLUSIONS

- COVID-19 infections are associated with impaired quality of life and substantial detriment in work productivity.
- The QOL and work productivity loss associated with COVID-19 results are consistent with findings from previous seasons [4,5].
- Results reported may be an underestimate of peak burden as there was an average gap of 4.2 days from symptom onset to day 1.
- Key limitations: data collected were self-reported among outpatient population, subject to missingness, recall bias, and selection bias. Findings may not be generalizable to a different season or a different care setting.
- These interim data findings from the 2024-2025 respiratory season reaffirm the persistent burden of COVID-19 in post-pandemic outpatient settings.

References

- Centers for Disease Control and Prevention. Preliminary Estimates of COVID-19 Burden for 2024-2025. Available online: <https://www.cdc.gov/covid/php/surveillance/burden-estimates.html> (accessed on March 20, 2025).
- Poudeh, A.N.; Zhu, S.; Cooper, N.; Roderick, P.; Alwan, N.; Tarrant, C.; Ziauddeen, N.; Yao, G.L. Impact of Covid-19 on health-related quality of life of patients: A structured review. *PLoS One* **2021**, *16*, e0259164.
- Nshimirimana, D.A.; Kokonya, D.; Gitaka, J.; Wesonga, B.; Mativo, J.N.; Rukanikigitero, J.M.V. Impact of COVID-19 on health-related quality of life in the general population: A systematic review and meta-analysis. *PLOS Global Public Health* **2023**, *3*, e0002137.
- Di Fusco, M.; Sun, X.; Moran, M.M.; Coetzer, H.; Zamparo, J.M.; Puzniak, L.; Alvarez, M.B.; Tabak, Y.P.; Cappelleri, J.C. Impact of COVID-19 and effects of BNT162b2 on patient-reported outcomes: quality of life, symptoms, and work productivity among US adult outpatients. *Journal of Patient-Reported Outcomes* **2022**, *6*, 123. doi:<https://doi.org/10.1186/s41687-022-00528-w>.
- Di Fusco, M.; Sun, X.; Anatole-Tardiff, L.; Yehoshua, A.; Coetzer, H.; Alvarez, M.B.; Allen, K.E.; Porter, T.M.; Puzniak, L.; Lopez, S.M.; et al. Impact of bivalent BA. 4/5 BNT162b2 COVID-19 vaccine on acute symptoms, quality of life, work productivity and activity levels among symptomatic US adults testing positive for SARS-CoV-2 at a national retail pharmacy. *Vaccines* **2023**, *11*, 1669. doi:<https://doi.org/10.3390/vaccines11111669>.
- Sell, H.; Schaible, K.; Gouveia-Pisano, J.A.; Yehoshua, A.; Malhotra, D.; Di Fusco, M.; Cha-Silva, A.S.; Andersen, K.M.; Nicholls, L.; Landi, S.N. Economic burden of COVID-19 for employers and employees in the United States. *Journal of Medical Economics* **2024**, *27*, 267-278.
- EuroQol Research Foundation. EQ-5D-5L User Guide, Version 3.0. Available online: <https://euroqol.org/publications/user-guides/> (accessed on September 22, 2024).
- Reilly Associates. WPAI Scoring. Available online: http://www.reillyassociates.net/WPAI_Scoring.html (accessed on September 9, 2024).
- CDC/ATSDR. Social Vulnerability Index. Available online: <https://www.atsdr.cdc.gov/place-health/php/svi/> (accessed on March 20, 2025).

Disclosures

A.Y., T.H., J.C.C., M.G., and M.D.F. are employees of Pfizer and may hold stock or stock options of Pfizer. X.S. is an employee of CVS Health and holds stock of CVS Health.

For more information please contact:
Alon Yehoshua, Pfizer Inc., New York, NY,
10001 USA.
Phone: 805-750-2561
Alon.Yehoshua@pfizer.com
www.pfizer.com

