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Trends in Oncology Clinical Trials Launched Before and During the COVID-19 Pandemic

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic due to the novel severe acute respiratory syndrome coronavirus 2 has resulted in significant morbidity and mortality since its genesis in China in late 2019, with an estimated 1 602 500 deaths and 71 541 897 infections throughout the world as of December 12, 2020.[1] The pandemic's direct impact on population health and associated collateral morbidity and mortality resulting from delays in care for disparate conditions have been described elsewhere.[2-6] We evaluated the association between the pandemic and clinical research and development for an as yet non-COVID-19–associated condition, cancer, by studying the initiation of oncology clinical trials over time.

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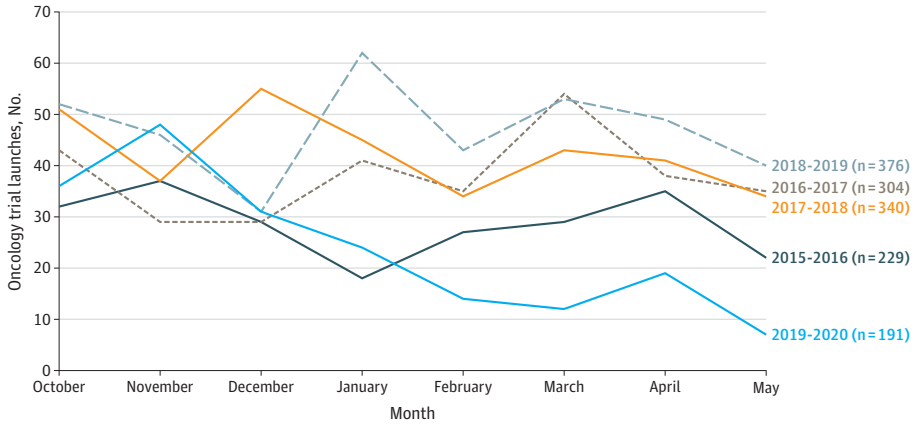
Table. Oncology Trial Launches During the Coronavirus Disease 2019 Pandemic vs Prepandemic Periods[a]

Variable	IRR (95% CI)	Trials launched, No. (%) (N = 1440)
Pandemic period		
No	1 [Reference]	1364 (94.7)
Yes	0.40 (0.28-0.55)	76 (5.3)
Time period		
October 2019 to May 2020	1 [Reference]	191 (13.3)
October 2015 to May 2016	0.75 (0.57-0.98)	229 (15.9)
October 2016 to May 2017	0.99 (0.76-1.29)	304 (21.1)
October 2017 to May 2018	1.11 (0.86-1.44)	340 (23.6)
October 2018 to May 2019	1.23 (0.95-1.58)	376 (26.1)

Abbreviation: IRR, incidence rate ratio.

[a] IRRs are for oncology clinical trials initiated during the pandemic period compared with the prepandemic period, while holding trial launch period constant. Data represent five 8-month periods between October 2015 and May 2020, with the pandemic period defined as the 5 months from January 2020 to May 2020. The rightmost column represents the distribution of trial launches within variables.

Figure. Changes in Numbers of Oncology Clinical Trials Launched During the 40-Month Observation Period



There were 1440 trials of anticancer drugs or agents launched over 5 sequential 8-month study periods (ie, 40 months total). In this study, the 5-month period from January 2020 through May 2020 is considered the coronavirus disease 2019 pandemic period.

Methods

In accordance with 45 CFR §46, this cohort study was exempt from institutional review board review and the need for informed consent because the unit of analysis was the trial (ie, not patients) and the analytical data contained no identifying information regarding trial sponsors, agents, or accrual sites. This study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline. We used operational clinical trial data from the Medidata Enterprise Data Store, which comprises studies using the RAVE electronic data capture platform. In the specific area of oncology, 29% of the world's industry-sponsored interventional trials of oncology drugs or biological agents were hosted by RAVE during the study period. For this cohort study, we aggregated all phase 1 through 4 oncology trials of drugs or biological agents that opened for patient accrual (launched) during the 8 consecutive months of October through May over 5 successive years (ie, 40 months). The 5-month period from January 2020 through May 2020 is considered the pandemic period, and the 35-month period preceding January 2020 is considered the prepandemic period (**Table**).

We compared counts of trials launched during the pandemic period with those launched during the prepandemic period with a negative binomial logistic regression, while holding the trial launch period constant over the 40-month observation period. We used a negative binomial logistic regression because of overdispersion of the count data. The α was .05 and all analyses were 2-sided. Parameters whose confidence intervals did not include 1.00 were considered significant. The study team used Stata statistical software version 14 ML (StataCorp) for all analyses.

Results

Of the 7524 trials hosted on the RAVE platform during the 40-month observation period, 1440 (19.1%) were oncology-directed trials of drugs or biological agents that launched in 91 countries. The distribution of trials launched in each of the 5 sequential 8-month launch periods was as follows: 229, 304, 340, 376, and 191 trials, respectively. The **Figure** depicts the distribution of the absolute number of trial launches by month within each of the 5 launch periods. Results of the negative binomial regression (Table) show a 60% decrease in oncology trial launches during the pandemic period (incidence rate ratio, 0.40; 95% CI, 0.28-0.55) compared with the prepandemic period while holding constant trial launches in each of the 5 observation periods.

Discussion

Compared with the prepandemic period, the COVID-19 pandemic was associated with a 60% decrease in the number of launches of oncology clinical trials of drugs and biologic therapies for 1 global commercial clinical trial platform. The findings extend existing research by suggesting that beyond its direct effect on population morbidity and mortality resulting from infection and less-direct effects associated with decreased health care use for other conditions,[3-6] the COVID-19 pandemic may be associated with longer term indirect effects on population morbidity and mortality through pathways such as arrested drug development. Limitations to the study include the generalizability of the clinical trial database and our inability to identify the precise reasons for the slowdown in trial launches. This large pandemic-associated decrease in trial launches raises concern regarding its potential negative impact on the development of new cancer therapies, and to the extent that these findings are generalizable to other conditions, the momentum of scientific progress for other disease areas as well.

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Author Contributions: Drs Lamont and Katriel had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Lamont, Diamond, Alexander.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Lamont, Rusli.

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Statistical analysis: Lamont, Katriel, Ensign, Liu, Rusli.

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Supervision: Lamont, Diamond.

Conflict of Interest Disclosures: Dr Lamont reported receiving an honorarium from IQVIA. Ms Diamond reported being a paid clinical consultant for Brigham and Women's Hospital and Harvard Medical School's Department of Medicine, Division of Genetics. Dr Alexander reported being past Chair of the US Food and Drug Administration's Peripheral and Central Nervous System Advisory Committee; serving as a paid advisor to IQVIA; being a cofounding principal and equity holder in Monument Analytics, a health care consultancy whose clients include the life sciences industry as well as plaintiffs in opioid litigation; and being a member of OptumRx's National P&T Committee. This arrangement has been reviewed and approved by Johns Hopkins University in accordance with its conflict of interest policies. Dr Alexander was not compensated for his contributions to this project. No other disclosures were reported.

Meeting Presentation: An abstract related to this study was presented as a virtual poster at the American Association for Cancer Research COVID and Cancer Meeting; July 20-22, 2020.

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REFERENCES

1. Johns Hopkins University and Medicine. Coronavirus resource center. Accessed December 12, 2020. https://coronavirus.jhu.edu/

2. Mann DM, Chen J, Chunara R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: evidence from the field. *J Am Med Inform Assoc*. 2020;27(7):1132-1135. doi:10.1093/jamia/ocaa072

3. Lange SJ, Ritchey MD, Goodman AB, et al. Potential indirect effects of the COVID-19 pandemic on use of emergency departments for acute life-threatening conditions—United States, January-May 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(25):795-800. doi:10.15585/mmwr.mm6925e2

4. Weinberger DM, Chen J, Cohen T, et al. Estimation of excess deaths associated with the COVID-19 pandemic in the United States, March to May 2020. *JAMA Intern Med*. 2020;180(10):1336-1344. doi:10.1001/jamainternmed.2020.3391

5. Kaufman HW, Chen Z, Niles J, Fesko Y. Changes in the number of US patients with newly identified cancer before and during the coronavirus disease 2019 (COVID-19) pandemic. *JAMA Netw Open*. 2020;3(8):e2017267. doi:10.1001/jamanetworkopen.2020.17267

6. Ayanian JZ. Tallying the toll of excess deaths from COVID-19. *JAMA Health Forum*. Published online July 1, 2020. doi:10.1001/jamahealthforum.2020.0832