



June 14th–18th

US Connect 2021

The Clinical Data
Science Conference

The Case for Pandemic Disrupted Studies & Challenges Implementing CDISC and FDA COVID-19 Guidelines for NDA Submissions

Presented by Vidya Muthukumar, Senior Data Strategist, IQVIA Biotech

Agenda

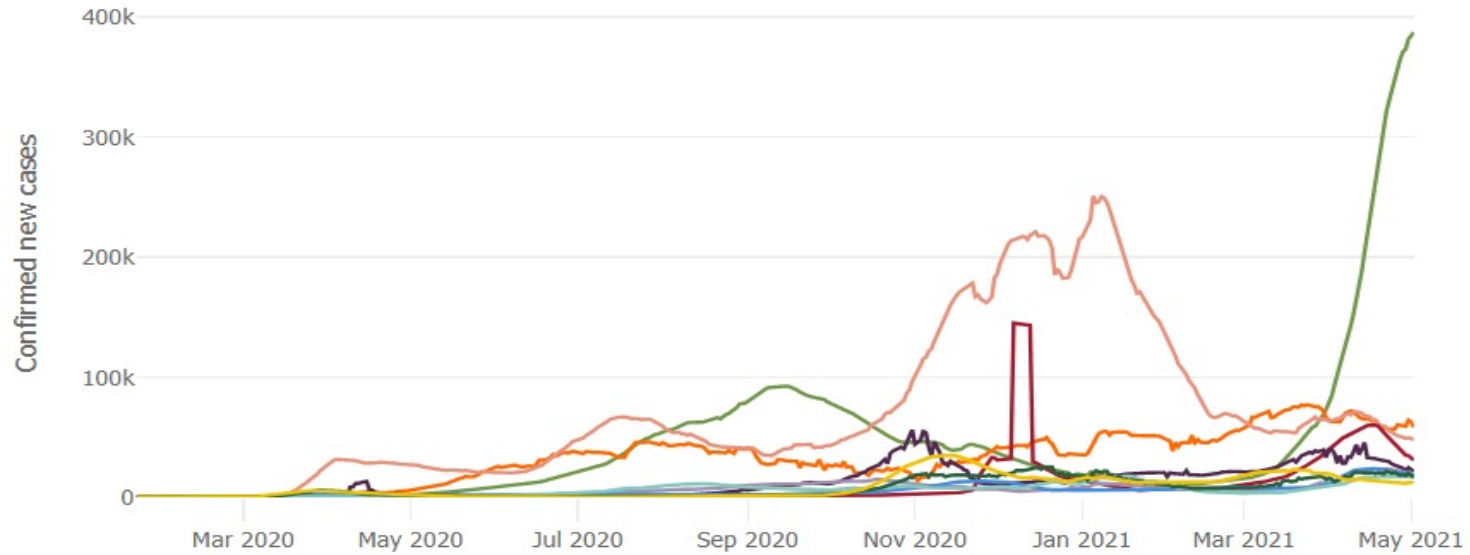
- ❖ Taking Stock of COVID-19 YTD
- ❖ FDA and CDISC COVID-19 Guidelines for NDA
- ❖ Fast Tracked NDA Submissions During COVID-19
- ❖ Timeline in Putting It All Together
- ❖ Complexities in Preparing Submission Data During COVID-19
- ❖ Challenges During Pandemic Submission
- ❖ Solutions
- ❖ Questions



❖ Taking Stock of COVID-19 YTD

DAILY CONFIRMED NEW CASES (7-DAY MOVING AVERAGE)

Outbreak evolution for the current most affected countries



Click any country below to hide/show from the graph:

India

Brazil

United States

Turkey

France

Argentina

Iran

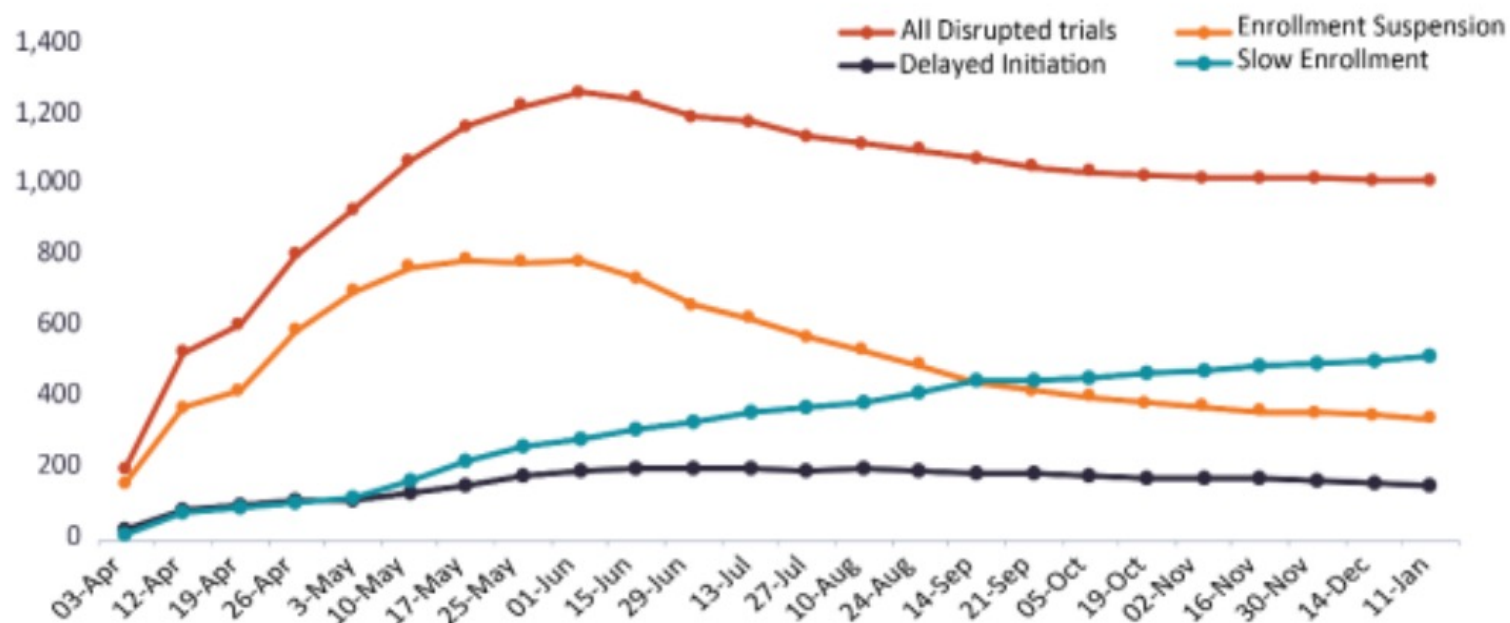
Colombia

Germany

Italy



Global clinical trial disruptions from April 2020 to January 2021



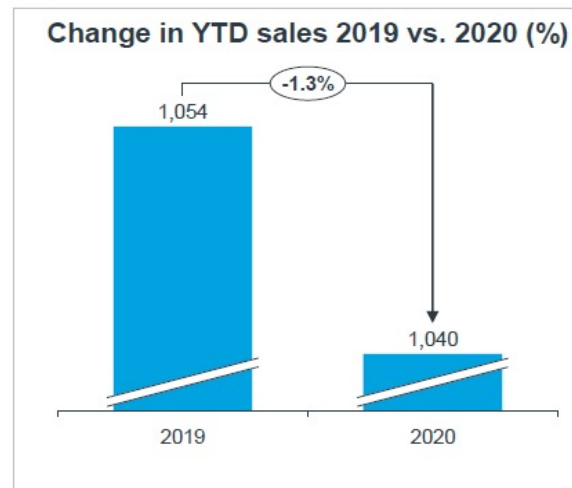
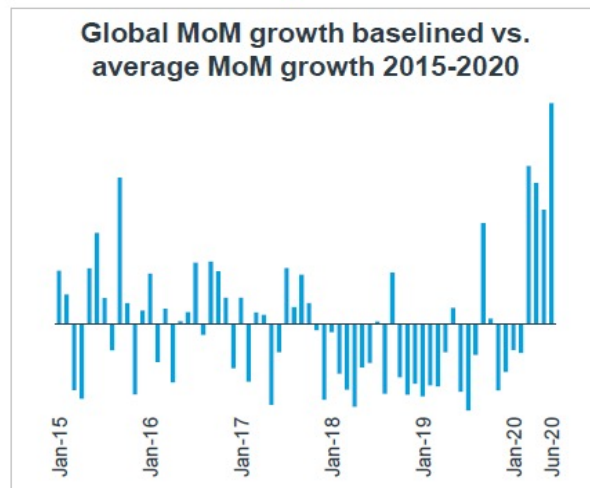
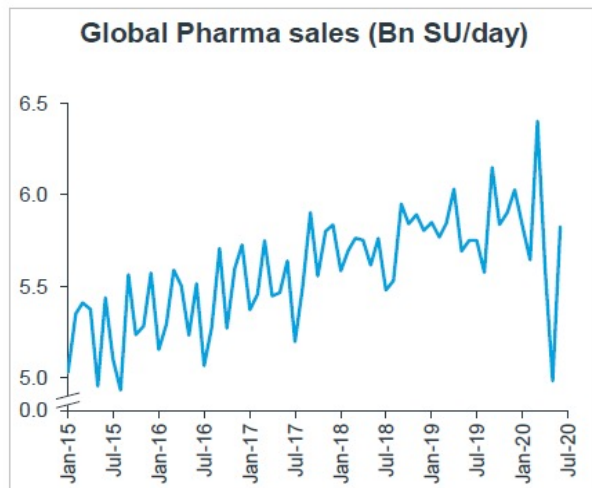
Source: GlobalData, Pharma Intelligence Center (Accessed January, 2021)



GlobalData.

COVID-19 has induced a significant fluctuation in pharma sales across the globe with varying impact across drug classes

Global Pharma Sales in Standard Units – Retail + Hospital market



- Increased use of **generic medicines** during the COVID-19 pandemic could reflect a shift in healthcare priorities
- COVID-19 occurred in the same period as a shift towards **biosimilars** but it may be a coincidence



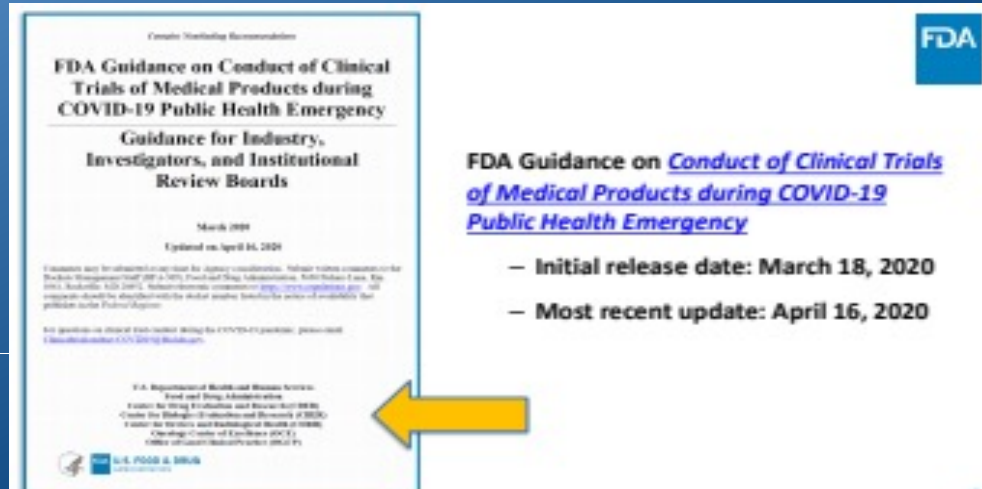
- **Biologic medicines and branded drug sales** have seen reduced use during the COVID-19 pandemic
- Impact of COVID-19 is most pronounced in **primary care medicine** usage

Source: IQVIA European Thought Leadership, MIDAS MTH Jun 2020

COVID-19 EU5 Webinar – Sept 2020 | Copyright 2020 IQVIA. All rights reserved.

FDA and CDISC COVID-19 Guidelines for NDA

- ❑ Interim User Guide for COVID-19
- ❑ CDISC Document: Guidance for Ongoing Studies Disrupted by COVID-19 Pandemic v1.0
- ❑ FDA - Study Data Technical Conformance Guide
- ❑ FDA Guidance on Conduct of Clinical Trials of Medical Products During the COVID-19 Public Health Emergency



FDA Guidance on Conduct of Clinical Trials of Medical Products during COVID-19 Public Health Emergency

- Initial release date: March 18, 2020
- Most recent update: April 16, 2020

ADaM Guidance for Ongoing Studies Disrupted by the COVID-19 Pandemic provides recommendations for addressing the analysis needs for data capturing epidemic/pandemic impacts on ongoing clinical trials and provides example ADSL and OCCDS datasets. - *Forthcoming*



**Interim User Guide
for COVID-19**

Version 1.0



**Guidance for Ongoing Studies
Disrupted by COVID-19 Pandemic**

Version 1.0

Contains Nonbinding Recommendations

**Statistical Considerations for Clinical
Trials During the COVID-19 Public
Health Emergency**

Guidance for Industry

June 2020

COVID-19 Interim User Guide Topics

- Risk Factors
 - Pre-existing Medical Conditions
 - Personal Protective Equipment (PPE)
 - Travel
 - Contacts
 - Substance Use
 - Exposure to Animals
- Onset of Disease
- Signs and Symptoms
- Laboratory Test Results
- Diagnostics and Virology
 - Virus Identification
 - Antibody Testing
 - SARS-CoV-2 Viral Load
- Vital Signs and Urine Output
- Concomitant Medications
- Respiratory Findings
 - Imaging
 - Pulmonary Function Tests
- Cardiac Events/Findings
- Hospitalization
- Procedures
 - Assisted Ventilation and Oxygen Treatments
 - Renal Treatment
- Vaccines
- Questionnaires, Ratings, and Scales

- Listing of COVID-19 Related Impacts as Part of CSR
- Relationships to COVID-19
- Protocol Deviations
- Disposition
- Missed Visits
- Missed Assessments
- Changes to Drug Accountability
- Changes to Adverse Event Data Collection
- Changes in Exposure
- Transfer to Another Site
- Trial Summary to Provide Pandemic Relationship

4 Protocol Deviations

COVID-19 disruptions may lead to protocol deviations at the site level. The SDTMIG DV domain represents deviations at the subject level, but does not provide a mechanism for representing deviations using a site identifier. In addition, a deviation at the site level might not affect all subjects at that site (e.g., subjects who have completed the study, future subjects). A site-level deviation can be represented in DV in 2 ways, as illustrated by the following examples.

Example 1

In this example, when a protocol deviation that affected subjects occurred at a site, the sponsor determined which subjects were affected by the deviation and recorded the deviation for each subject at the site. The sponsor used DVCAT = "SITE DEVIATION" to identify site-level deviations.

Rows 1, 2, 4, 8: Show subjects who were affected by a site shutdown due to a flooded basement, a problem not related to COVID-19.

Rows 3, 5-7, 9: Show subjects who were affected when all transportation in the country was down due to COVID-19.

dv.xpt

Row	STUDYID	DOMAIN	USUBJID	DVSEQ	DVREFID	DVSPID	DVTERM	DVDECODE	DVCAT	DVSCAT	EPOCH	DVSTDTCT	DVENDTCT	DVREAS	DVPRELI
1	CVD-3	DV	300	1			Site shut down		SITE DEVIATION		TREATMENT	2020-02-17	2020-02-20	Flooded basement	
2	CVD-3	DV	301	1			Site shut down		SITE DEVIATION		TREATMENT	2020-02-17	2020-02-20	Flooded basement	
3	CVD-3	DV	301	2			Site shut down		SITE DEVIATION		TREATMENT	2020-04-06	2020-04-18	All transportation in country down due to COVID-19	Y
4	CVD-3	DV	303	1			Site shut down		SITE DEVIATION		TREATMENT	2020-02-17	2020-02-20	Flooded basement	
5	CVD-3	DV	306	1			Site shut down		SITE DEVIATION		TREATMENT	2020-04-06	2020-04-18	All transportation in country down due to COVID-19	Y
6	CVD-3	DV	307	1			Site shut down		SITE DEVIATION		TREATMENT	2020-04-06	2020-04-18	All transportation in country down due to COVID-19	Y
7	CVD-3	DV	309	1			Site shut down		SITE DEVIATION		TREATMENT	2020-04-06	2020-04-18	All transportation in country down due to COVID-19	Y
8	CVD-3	DV	312	1			Site shut down		SITE DEVIATION		TREATMENT	2020-02-17	2020-02-20	Flooded basement	
9	CVD-3	DV	312	2			Site shut down		SITE DEVIATION		TREATMENT	2020-04-06	2020-04-18	All transportation in country down due to COVID-19	Y

DV NSV Metadata

Variable	Label	Type	Codelist	Role	Origin	Comment
DVREAS	Reason for Deviation	text	DVCODES	Non-standard Record Qualifier	CRF	DVCODES is a sponsor-defined codelist.
DVPRELI	Epi/Pandemic Related Indicator	text	NY	Non-standard Record Qualifier	CRF	



World Health Organization



CORE CASE RECORD FORM

PARTICIPANT IDENTIFICATION #: [] [] [] -- [] [] [] []

DEMOGRAPHICS	
Clinical centre name:	DM.SITEID Country: DM.COUNTRY {ISO-3166-1 Alpha-3}
Enrolment date:	[D] [D] [M] [M] [2] [0] [Y] [Y] DM.RFICDTC
Ethnic group (check all that apply):	☐ Arab ☐ Black ☐ East Asian ☐ South Asian ☐ West Asian ☐ Latin American ☐ White ☐ Aboriginal/First Nations ☐ Other: RACE {RACE} RACE1 RACE2, etc. {RACEC}
Employed as a Healthcare Worker?	☐ YES ☐ NO ☐ N/A ERTESTCD {ERTESTCD} ERORRES
Employed in a microbiology laboratory?	☐ YES ☐ NO ☐ N/A ERTESTCD {ERTESTCD} ERORRES
Sex at Birth:	☐ Male ☐ Female ☐ Not specified SCTESTCD {SCTESTCD} SCORRES
Estimated Age	[] [] [] years OR [] [] months AGE AGEU {AGEU}
Pregnant?	☐ YES ☐ NO ☐ Unknown ☐ N/A If YES: Gestational weeks assessment: [] [] [] weeks MHTERM (MHPRESP)/MHOCCUR {NY} RPTSTCD {RPTSTCD}="Estimated Gestational Age" on mother's ID RPORRES RPORRESU {AGEU}

Example from COVID-19 Interim User Guide

6.1 Virus Identification

Identification of viruses from a collected sample is represented in the Microbiology Specimen (MB) domain.

Example 1

This example shows the results of tests to detect SARS-CoV-2, the virus that causes COVID-19, in 2 different subjects.

Row 1: Shows a subject who tested positive for SARS-CoV-2 by quantitative reverse transcriptase polymerase chain reaction (PCR) of an endotracheal fluid specimen.

Row 2: Shows a subject who tested negative for SARS-CoV-2 by quantitative reverse transcriptase PCR of a throat swab specimen.

mb.xpt

Row	STUDYID	DOMAIN	USUBJID	MBSEQ	MBREFID	MBGPRID	MBTESTCD	MBTEST	MBTSTDTL	MBORRES	MBSTRESC	MBSPEC	MBLOC	MBMETHOD	VISITNUM	VISIT	MBDTC
1	ABC	MB	ABC-01-601	1	60101	1	SARSCOV2	Severe Acute Resp Syndrome Coronavirus 2	DETECTION	POSITIVE	POSITIVE	ENDOTRACHEAL FLUID		QUANTITATIVE REVERSE TRANSCRIPTASE POLYMERASE CHAIN REACTION	1	SCREENING	2020-03-27T14:15
2	ABC	MB	ABC-01-722	2	72201	1	SARSCOV2	Severe Acute Resp Syndrome Coronavirus 2	DETECTION	NEGATIVE	NEGATIVE	SWABBED MATERIAL	THROAT	QUANTITATIVE REVERSE TRANSCRIPTASE POLYMERASE CHAIN REACTION	1	SCREENING	2011-04-01T10:00

STEP

1 Identify and Review
COVID-19 data elements

STEP

2 Map COVID-19 data
elements to PCORnet,
i2b2/ACT, Sentinel,
OMOP CDMs

STEP

3 Map the COVID-19 data
elements to United States
Core Data for Interoperability
(USCDI)

STEP

4 Map the data elements
to Health Level Seven
(HL7) Fast Healthcare
Interoperability
Resources (FHIR) r4

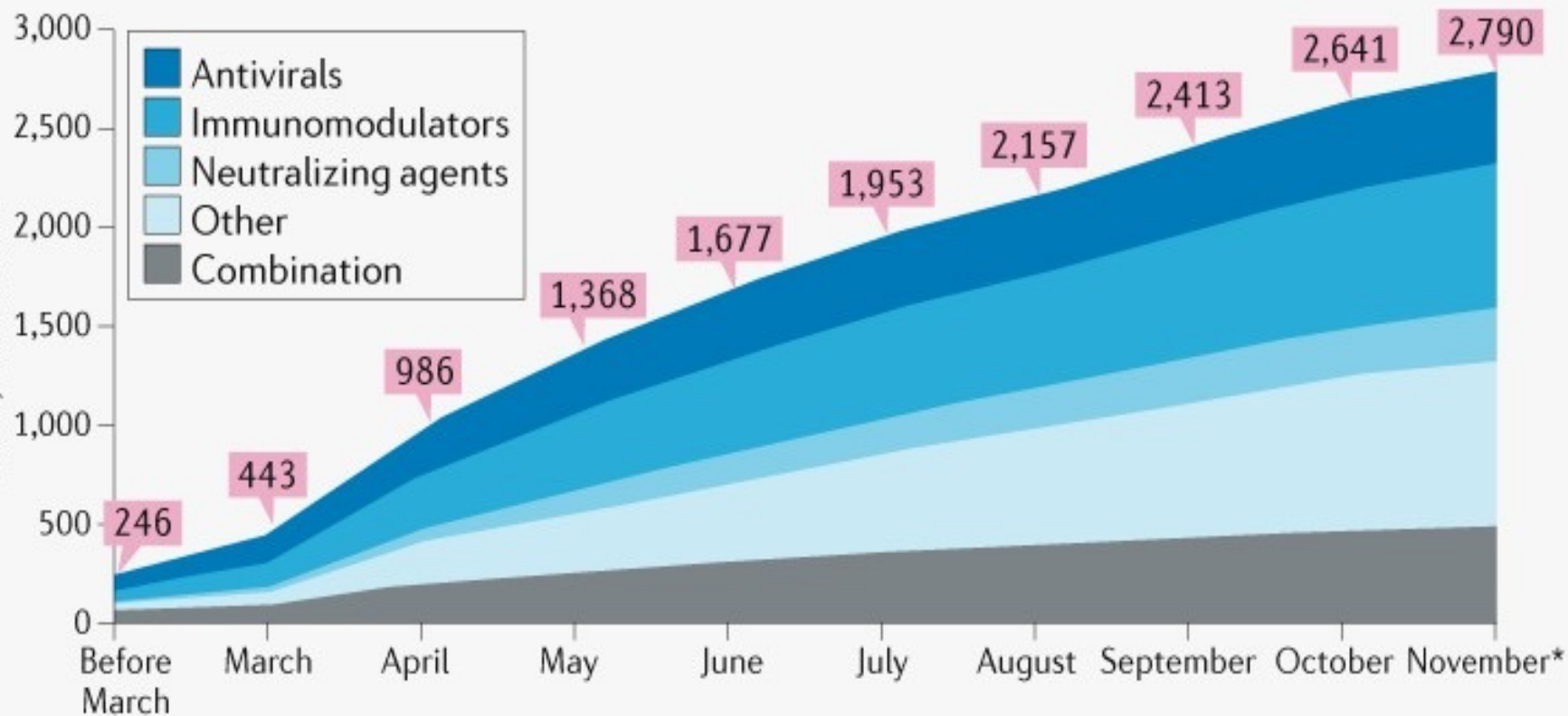
STEP

5 Map the COVID-19 data
elements to
CDISC SDTM Standard and
CDISC COVID-19
companion guide

STEP

6 Validate the mappings
with the Standards
Development Organization
(SDOs) and the technical
leads for each CDM

Distribution of launched COVID-19 trial arms by therapy class, number of trial arms, cumulative



Endpoints by class

Mar 1, 2020 - Apr 30, 2020

Distribution of class over time

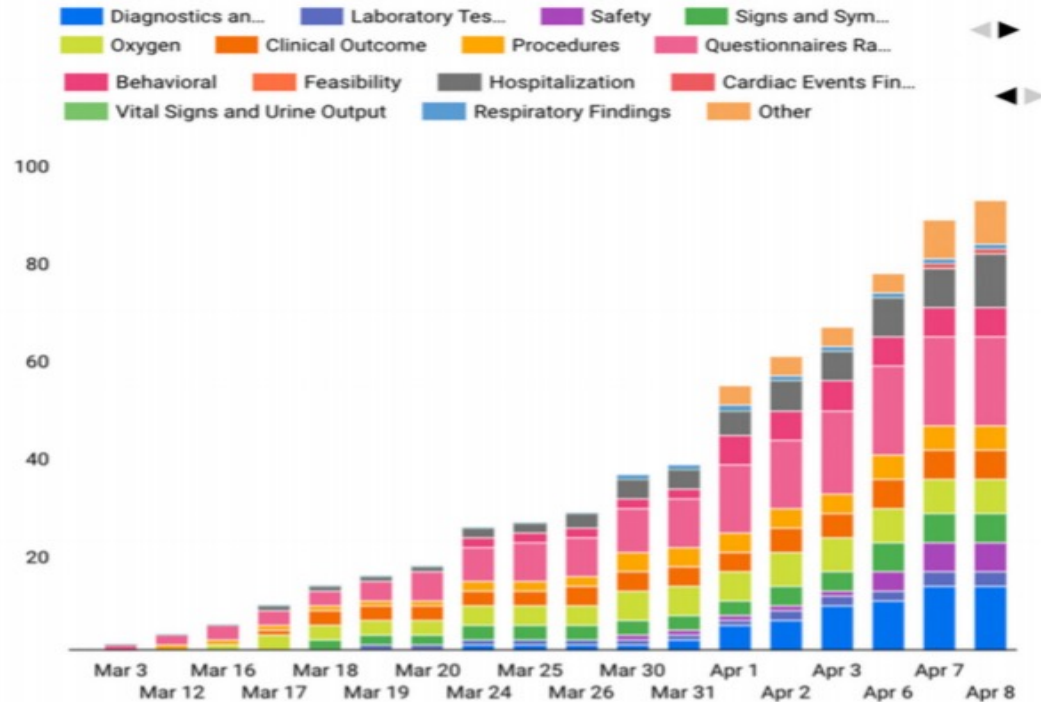


Figure 2. Endpoint class over time.

The bars correspond to the total number of endpoint families on a given date. Each color corresponds to a specific endpoint class.

Focused Population Registries (Medical Associations and Research Collaboratives)



Healthcare Worker Registries & Initiatives



COVID-19 Open Datasets and Use of Intellectual Property



Clinical Trial Study Registries



Patient Reported Outcomes



Surveillance and Trackers



Diagnostic Data



Healthcare Utilization Registry



Point-of-Care (Illustrative)



National Patient Registry



Contact Tracing



Vaccines



Anti-Viral Treatments



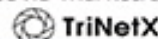
Anti-Body Testing



Molecular Diagnostics (Illustrative)



COVID Trial Recruitment



Fast Tracked Submissions During COVID-19



Fast Track

Expedites the development and review of a therapy when current therapies do not adequately treat the condition.



Breakthrough Therapy

Initial data from clinical trials suggests that the therapy is more effective than existing therapies.



Accelerated Approval

Grants faster approval to therapies based on a predicted positive clinical outcome before the positive clinical outcome, such as reduction of mortality, is seen.

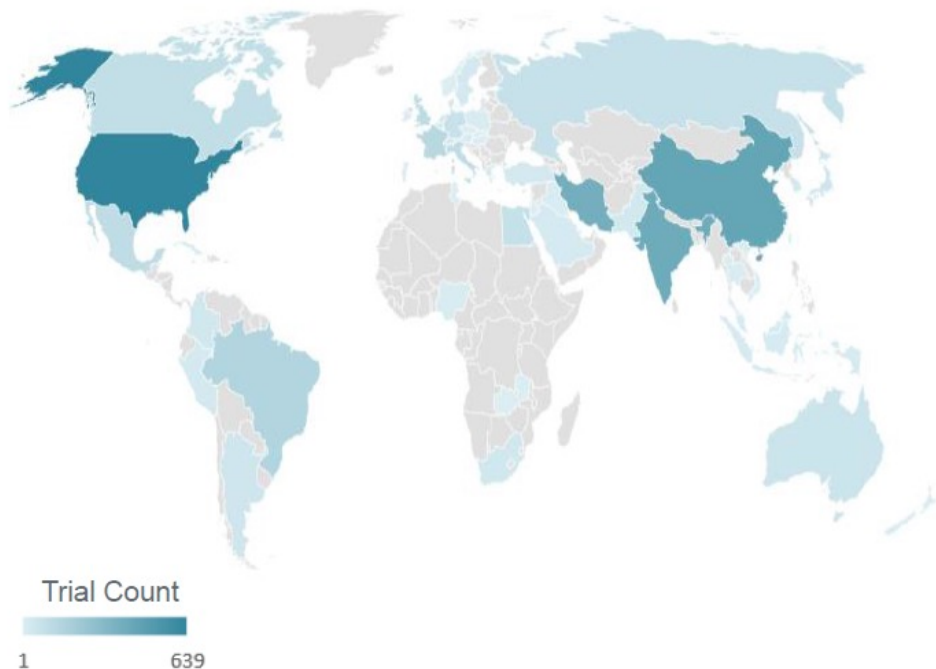


Priority Review

Reduces the time of FDA review from approximately 10 months to 6 months.

COVID-19 clinical trials continue to be initiated, although primarily in countries that continue to experience COVID growth

COVID-19 Trials by Country, since September 2019



More than 3200 new trials have been planned or initiated globally for COVID-19 since January 1, 2020; over 200 have been added in the last four weeks

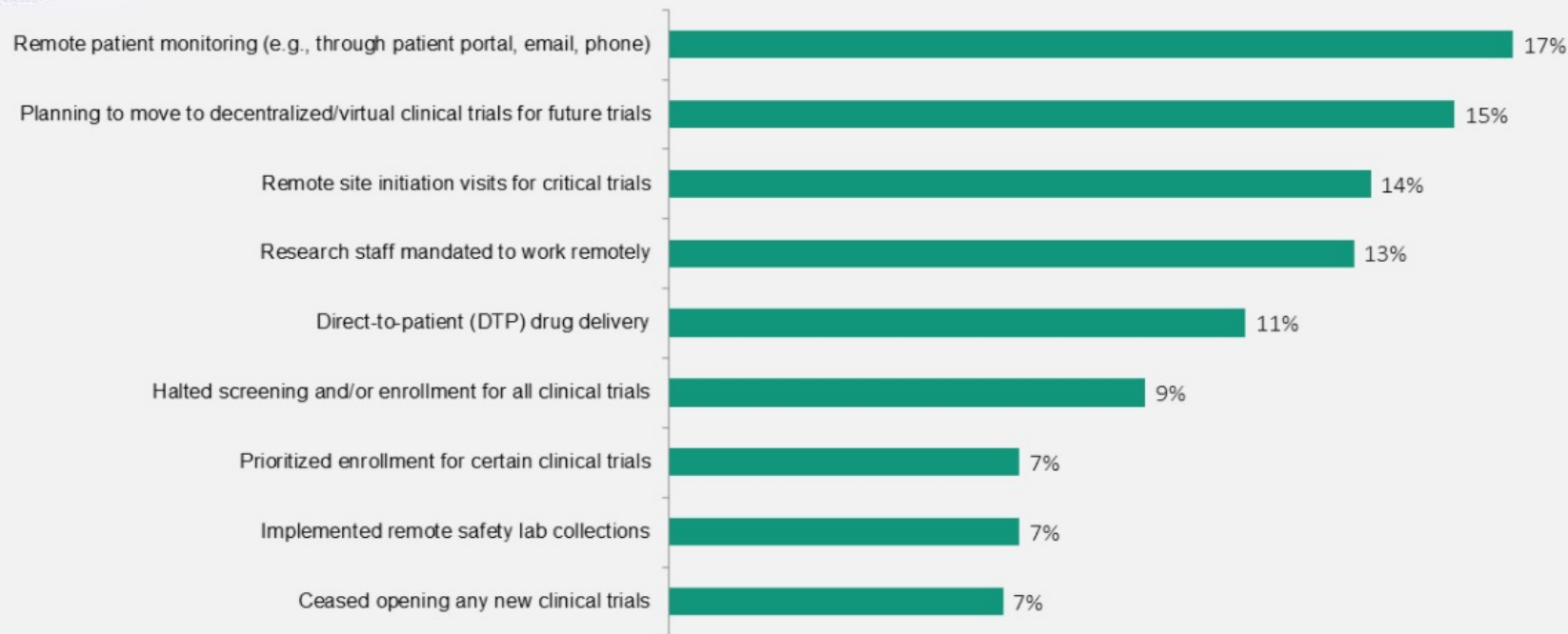
Countries with Largest Number of Trials	Number of Trials	Country Growth Over Past 4 Weeks
China	~445	~2%
United States	~640	~8%
Iran	~390	~5%
France	~130	~11%
Spain	~150	~7%

Note: includes all trials, including Traditional Chinese Medicine

Number of trials, by respective phases and their status through November 17, 2020

Trial Status	I	I/II	II	II/III	III	III/IV	IV	Other	Total
Open	120	84	654	145	324	4	142	3	1476
Planned	118	58	431	95	190	12	71	4	979
Completed	70	45	243	49	127	4	61	5	604
Discontinued	10	5	79	8	41	1	22	0	166

Actions taken to address clinical trial disruptions related to the COVID-19 outbreak



Timeline in Putting It All Together

REGULATORY APPROVAL TIMELINE

Fast-Track Regulatory Approval Timeline



Traditional Regulatory Approval Timeline



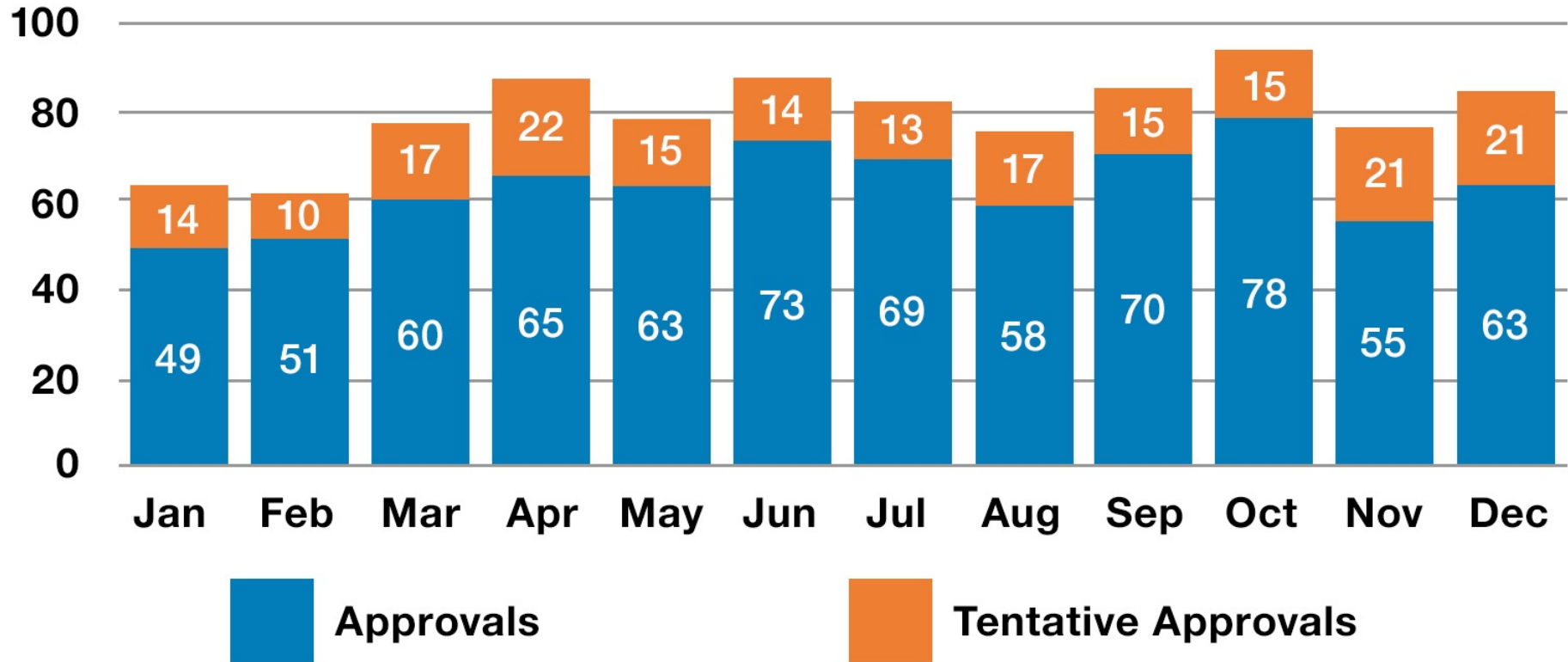
Comparing Timelines for Contracting Activities for COVID-19 & Non-COVID-19 Trials

COVID-19 vs Non-COVID-19 Trials		
Contracting Activity	Business Day Reduction	Completion Speed Increase
Budget Development	3.6 days	3.9x faster
Budget Negotiations	32.3 days	4.5x faster
Contract Negotiations	23.9 days	2.8x faster
Contract Review	2.7 days	3.3x faster
Coverage Analysis	7.1 days	5.9x faster

Study Startup at Sites Shows Faster Turnaround Times for COVID-19

Trials Data from WCG PFS indicates there has been significant progress in turnaround times for study startup at sites for COVID-19 trials. In many cases, initial deliverables were turned around within 24 hours of request, with full contract negotiation completed in 2 to 3 business days of request, showing ability to address the urgent global pandemic and help sponsors meet tight deadlines.

2020 Generic Drugs Approved and Tentatively* Approved



*A tentative approval does not allow the applicant to market a generic drug product. A generic drug product is not approved until all patent/exclusivity issues have been resolved.
Source: FDA.gov.

Number of clinical trial registries, stratified by broad indication area among trials stopped due to Covid-19 and trials from a baseline comparator

Indication area	Trials stopped by Covid-19	Trials stopped in Comparator	pp-value
Cardiovascular	226 (11%)	340 (12%)	0.076
Neurologic	168 (8.2%)	198 (7.2%)	0.1
Oncology	425 (21%)	921 (34%)	8.9e-23
Pain	124 (6.1%)	162 (5.9%)	0.41

FDA and CDER continued to support the development of novel drugs, and the potential repurposing of existing therapies, to address COVID-19 public health emergency. The Office of New Drugs (OND) within CDER expedited this effort, working with potential drug sponsors to rapidly move products into clinical trials, while assuring that the trials are properly designed and are appropriately safe.

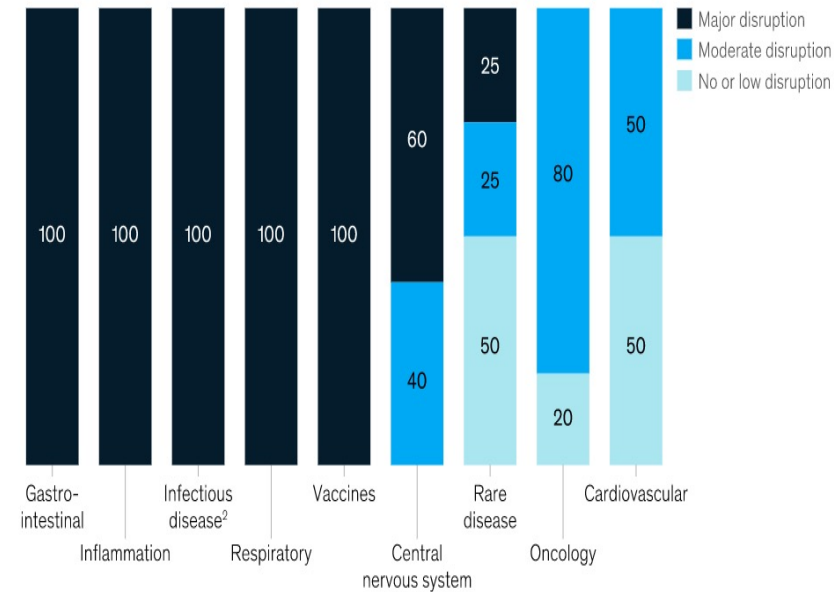
Study and Sample Size	Main Findings
April 23rd, to April 29th, 2020 1,030 subjects	For 69% of respondents, COVID-19 has affected their ability to conduct ongoing trials, while 78% believe that COVID-19 has impacted the initiation of new trials. The top four concerns based on the weighted average of the answers were: ability to enroll patients (3.73); ability to recruit patients (3.66); financial implications for cancelled studies (3.42); and financial implication from delayed milestones (3.29).
March, April and the first two weeks of May 4,667 studies and 186,807 study-sites	A 74% decrease in the average number of new patients entering trials per study-site year-over-year during the first two weeks of May compared to last year. Shows the pandemic continues to have an effect on trial activity and new patients entering trials.
June 15, July 13, 2020 1,030 subjects	In comparison to the pre- COVID-19 baseline (October 31), globally there is around 30% decrease in enrollment of new subjects entering trials by the end of June which was previously higher in April, 2020 (~70% drop). Currently, within different geographic regions, a marked variability has been observed regarding the extent and timing of recovery of patients due to continued fluctuation in the COVID-19 cases, and adoption of regulations over time.
July 13 - August 12, 2020 5,089 studies and 194,506 study sites	By the end of July 2020, there is an improvement in new subject enrollment in clinical trials per study-site worldwide with around -30% for the month of June in comparison to -6% at baseline (pre-COVID-19). The negative effects of COVID-19 on new patients enrollment in clinical trials is expected to continue at different times and varying degree throughout the world which is likely understated.

Complexities in Preparing Submission Data During COVID-19

- ☐ Managing protocol deviations and amendments
- ☐ Deciding whether to suspend, continue, or initiate trials
- ☐ Submitting changes to IND and IDE protocol
- ☐ Conducting remote (virtual) clinic visits
- ☐ Capturing data on protocol and process deviations
- ☐ Delivering low-risk investigational products to home
- ☐ Disposal of unused investigational product
- ☐ Changing site for delivering investigational product
- ☐ Alternative monitoring approaches
- ☐ Obtaining informed consent for patients in isolation
- ☐ Reviewing IND safety reports
- ☐ Collecting electronic signatures and Part 11 compliance
- ☐ Exclusion criteria for “investigational medical products”

The level of disruption varies by therapeutic area.

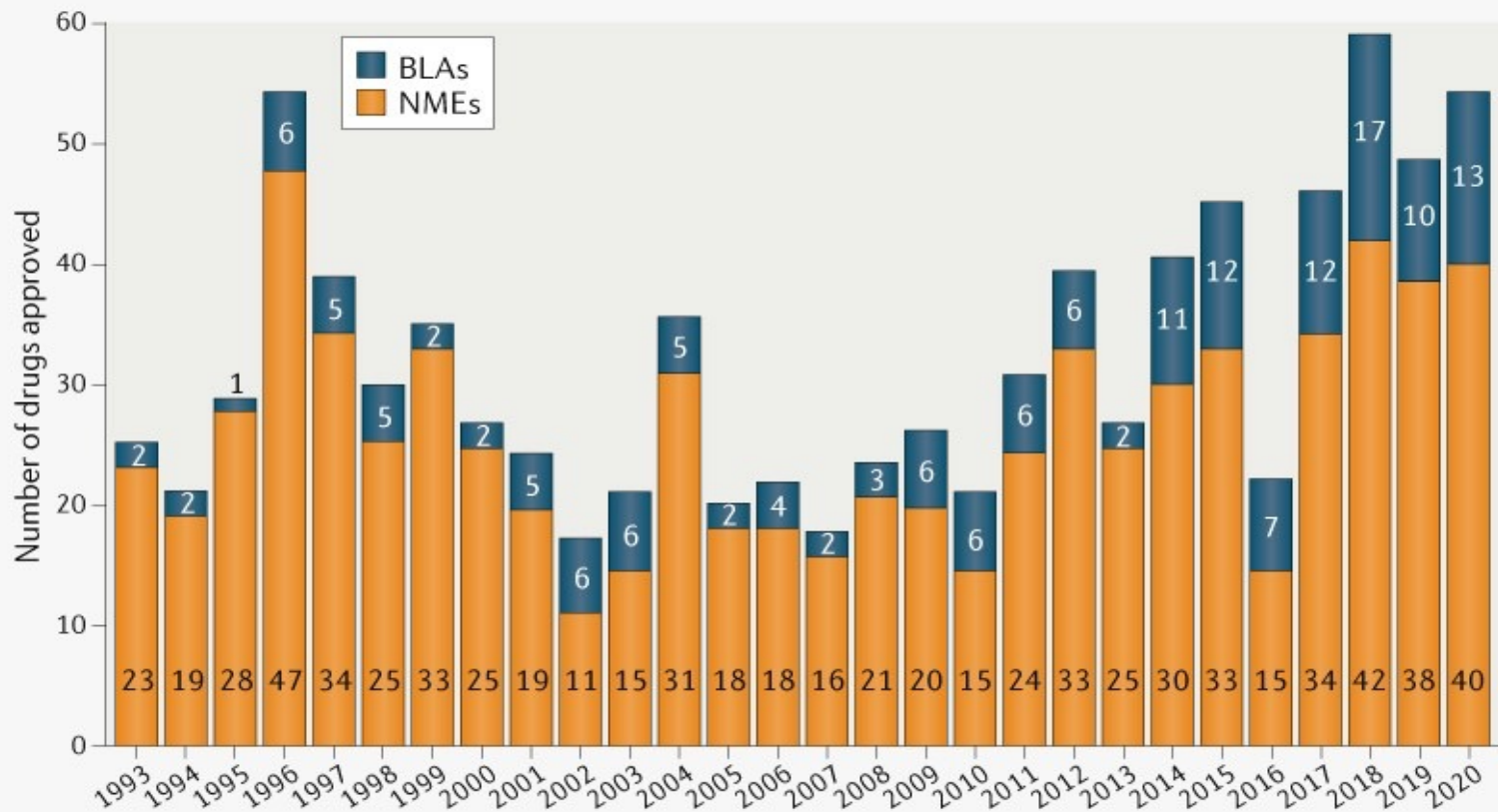
Reported disruption level¹ of clinical trials, by therapeutic area, % of respondents



¹Flow disruption defined as <10% slowing to overall development timeline; moderate disruption defined as 10%–30% slowing to overall development timeline; major disruption defined as >30% slowing to overall development timeline.

²Excluding vaccines.

Source: McKinsey Clinical Operations Survey (Apr 6, 2020, n = 8)



Nature Reviews | Drug Discovery

Challenges & Trends During Pandemic Submission

- ❑ Delays in patient enrollment or missed study visits resulting from the inability of patients to travel to onsite visits or limitations on nonessential in-office visits or testing

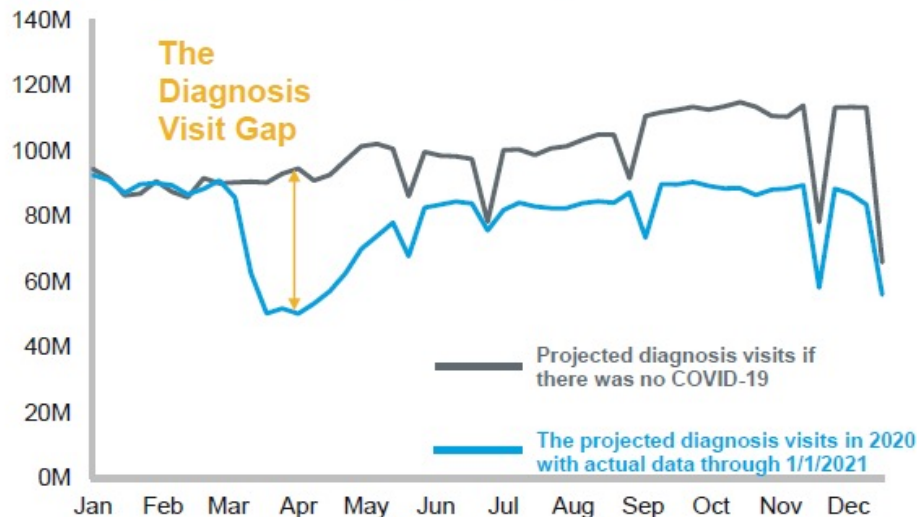
- ❑ Delays in study initiation activities resulting from the inability to perform site selection/initiation visits and/or clinical vendor qualification visits, and subsequent downstream delays in patient enrollment

- ❑ Protocol adherence issues arising from an inability to comply with visit schedules, study procedures, drug administration, and monitoring procedures

- ❑ Delays in clinical material distribution and import/export delays due to limited manufacturing and operations staff, limited or reprioritized hospitals staff, and travel bans

In 2020 there were over 1B diagnosis visits that did not happen

A leading indicator of long-term impact



Total Gap of Diagnosis Visits in 2020

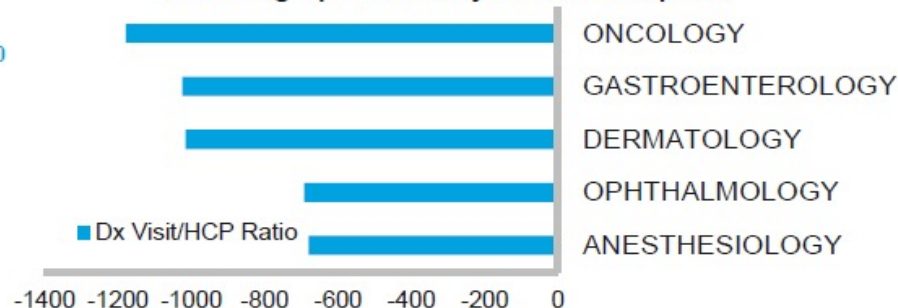
(Unique patient-provider diagnosis events)

-1.01B

% of Expected Diagnosis Visits in 2020

-21.0%

5 Leading Specialties by Dx Visits Gap/HCP



What is the "diagnosis visit gap"?

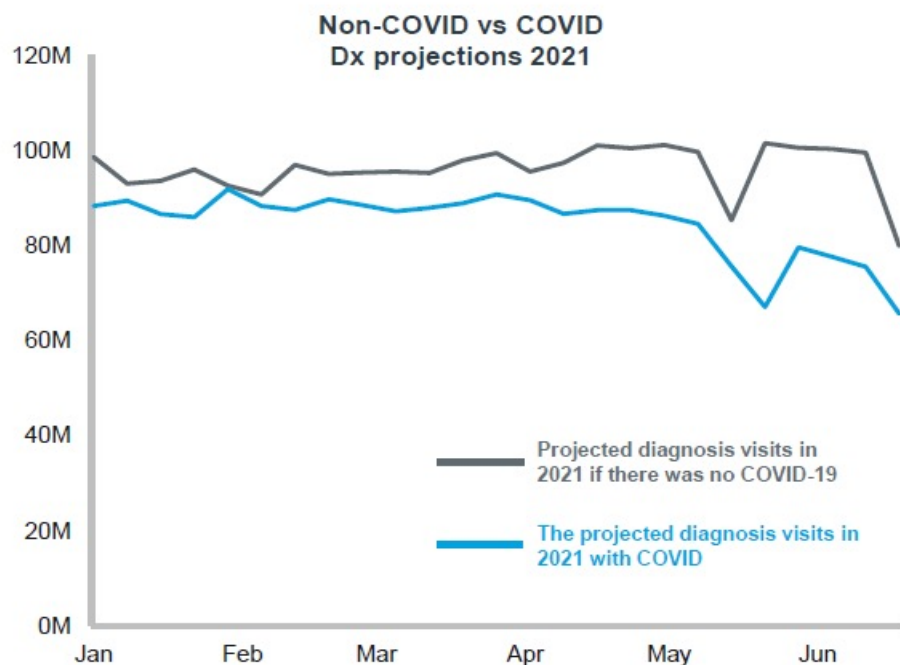
Difference between diagnosis visits¹ expected during a hypothetical non-COVID scenario and the number of diagnosis visits we actually see

COVID-19 Diagnosis Visit Backlog - w/e Jan 29, 2021; Source: IQVIA: Medical Claims Data Analysis, 2020, IQVIA Analysis

¹A diagnosis visit is for one single diagnosis per patient, per HCP; a patient can have more than one diagnosis visit assigned to them, with either more than one diagnosis per doctor or more than one doctor per diagnosis

With no changes in the current market, the gap continues

Vaccine deployment and other triggers will influence whether the gap will close, or a new baseline is set



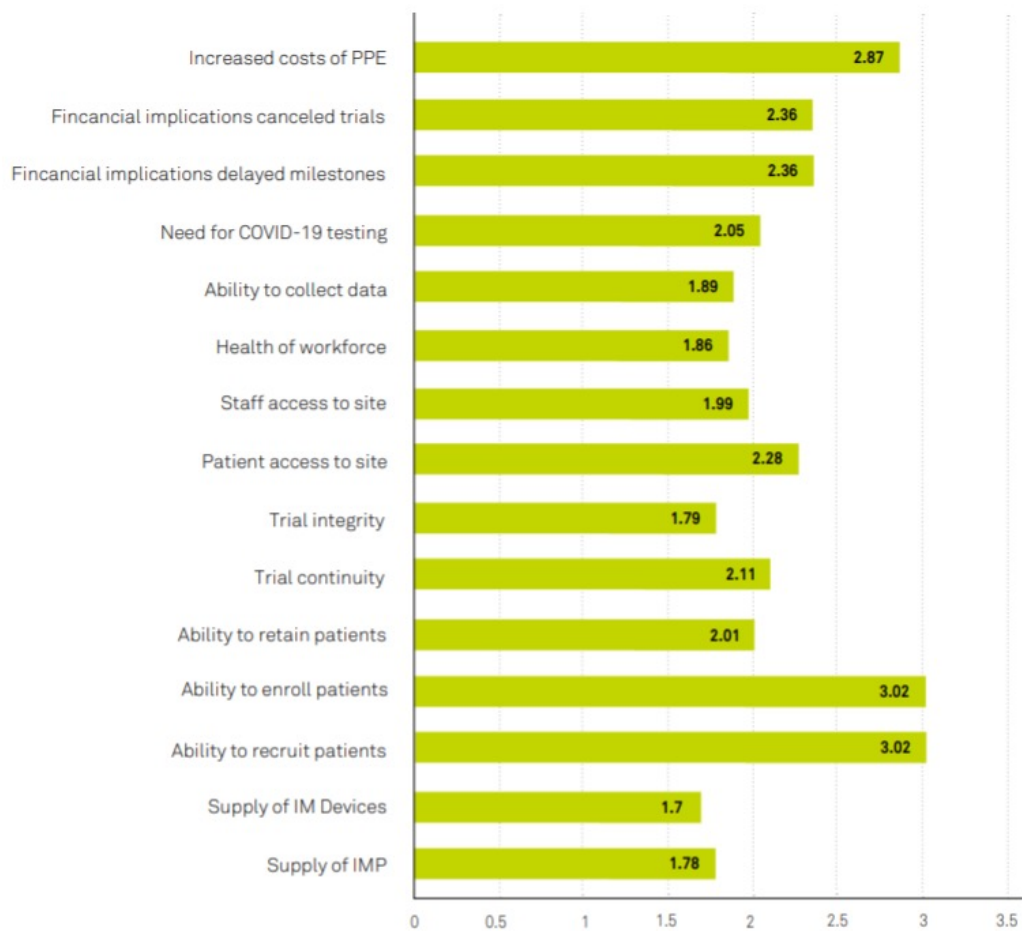
Total projected
Diagnosis Visit
Gap in 2021

-288.3M

% of Expected
Diagnosis Visits
in 2021

-12.0%

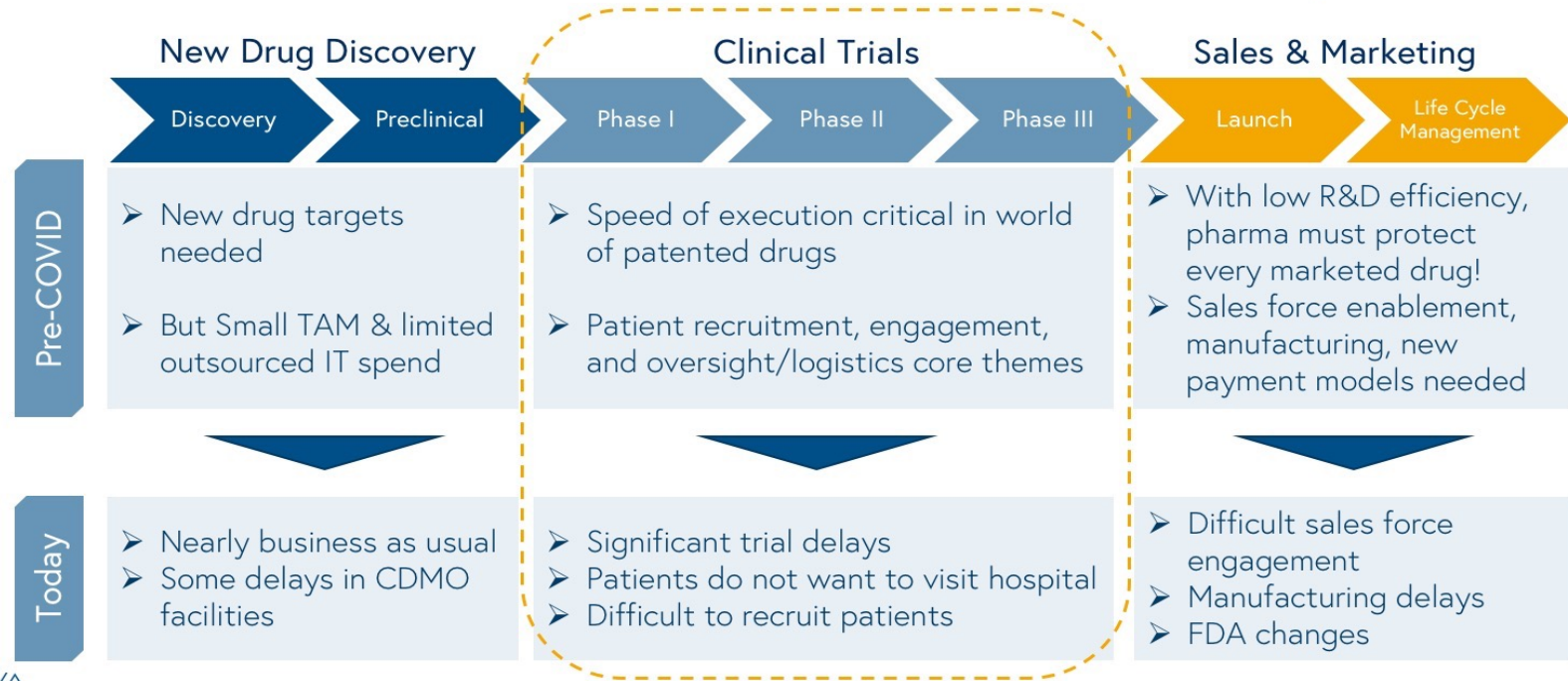
Weighted average of impact of COVID-19 by specific activity



Medidata survey asked sites as to how COVID-19 impacted specific activities within their trial with 5 being severely impacted and 1 being not impacted at all. Generally, the results across all activities were better than what was reported in April with no weighted average results for any activity being moderately or severely impacted by COVID-19. The highest weighted averages for the impact of COVID-19 on ongoing trials were for the sites' ability to recruit patients (3.02) and enroll patients (3.02) and the increasing costs of personal protective equipment (a new question in this survey) was 2.87.

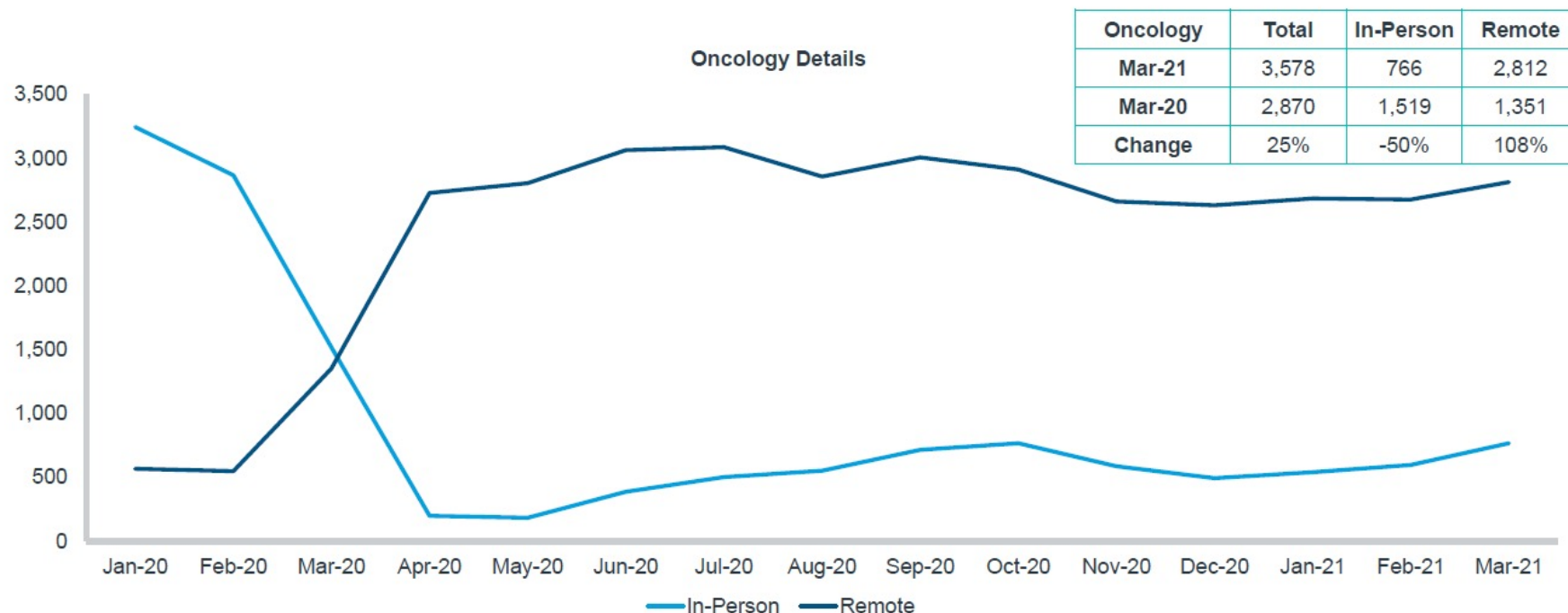
COVID-19 is impacting pharma's core business

Shift in core business activities signaling need for improved efficiency and innovation



Total Oncology details in March were 25% above prior year and continued as largely remote

In-Person details showed growth in March but remained well below last year's level



BrandImpact HCP Network = ~3600 unique HCPs including: Oncology, Specialty and Primary Care; Specialty includes, but not limited to: Allergy, Cardiology, Dermatology, Gastroenterology, Endocrinology, Neurology, Pulmonology, Psychiatry and Rheumatology

Total Specialty details in March were 30% greater than prior year as both remote and in-person were higher

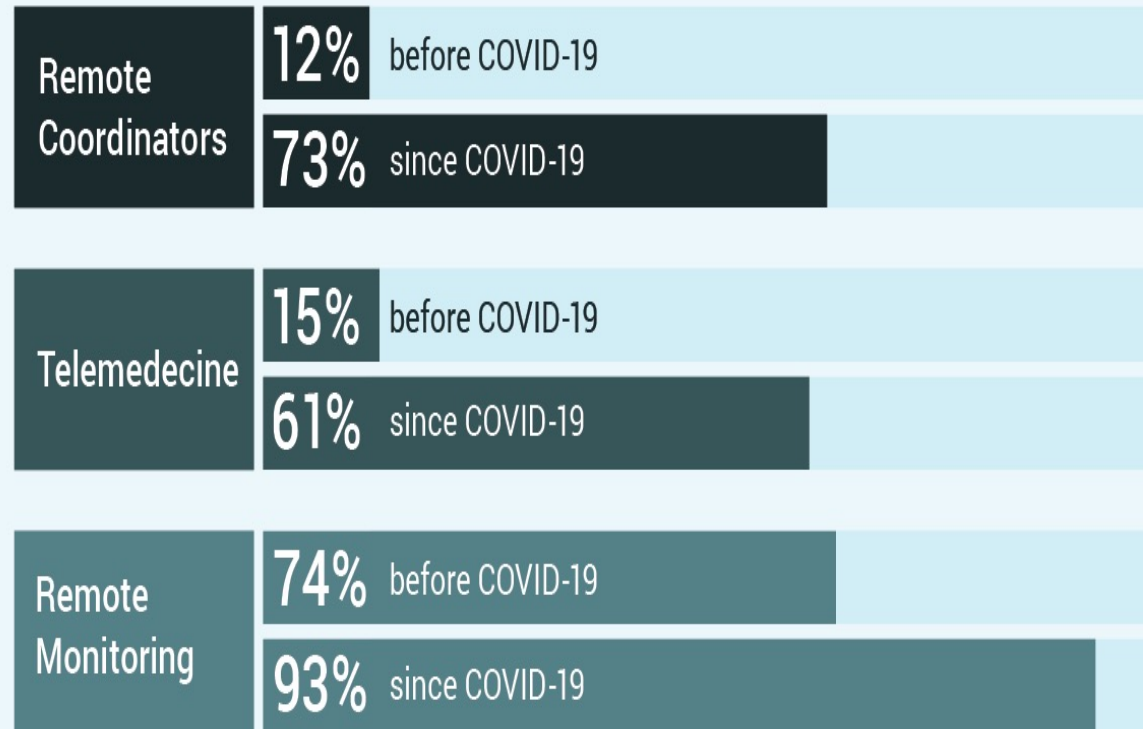
In-Person details accounted for 55% of total Specialty details this year vs. 66% last March



BrandImpact HCP Network = ~3600 unique HCPs including: Oncology, Specialty and Primary Care; Specialty includes, but not limited to: Allergy, Cardiology, Dermatology, Gastroenterology, Endocrinology, Neurology, Pulmonology, Psychiatry and Rheumatology

Solutions

Clinical Research Site Survey Shows Rapid Shift In Acceptance of Virtual Solutions



Source: WCG CenterWatch™

Sites Continue to Embrace New Solutions As Trial Landscape Shifts

Nearly three-quarters (73%) of sites surveyed reported they plan to continue using telemedicine after the pandemic subsides, a major jump from the 12% that said they used virtual visits before the pandemic made them necessary. Almost two-thirds (61%) of sites said they plan to continue using remote coordinators after the pandemic. Pre-pandemic, only 15% used remote coordinators.

Remote trial monitoring also is seeing an upward trend, with the number of sites that would allow sponsors or CROs to conduct remote monitoring jumping to 93% from the pre-COVID level of 74%.

The 17-Year History of Decentralized Trials



2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

McAllindon feasibility study for internet trials

BOSTON UNIVERSITY Internet-based RCT for Glucosamine in OA

Lilly tadalafil hybrid trial under FDA IND

UCSF Internet-based RCT for Kava in anxiety/insomnia

US patent for "Trials Over the Internet"
BOSTON UNIVERSITY

Initial internal pitch for **Pfizer** REMOTE trial

mytrus launched to support REMOTE trial

Pfizer REMOTE trial announced: Fully-remote trial of tolterodine under FDA IND enrolling in 10 states

Pfizer REMOTE trial terminated due to enrollment

Pfizer REMOTE trial published
Science 37 launched

Science 37 \$6.5M series A includes dRx (**NOVARTIS**)

SANOFI launches VERKO study of glucose monitor with **CLINPAL**

AOBIOME launches Ph2b virtual trial in acne with **Science 37**

mytrus launches 20,000 patient aspirin trial with PCORI

gsk launches ResearchKit study in RA

Science 37 \$31M series B includes **SANOFI**

medidata acquires **mytrus**

Science 37 \$35M series C includes **AMGEN** & **Google**

NOVARTIS announces 10 studies with **Science 37**
IQVIA launches virtual trial solutions

Boehringer announces partnership with **Science 37**

transparency LS launches VISITOR study

verily launches study platform partnership with 4 pharma

J&J and **PRA Health Sciences** announce CHIEF-HF remote registration trial

Science 37 \$35M raise includes **PPN**

Lightship \$30M series B includes **McKESSON**
COVID-19

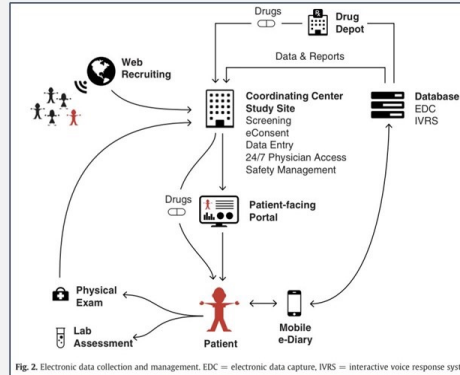


Fig. 2. Electronic data collection and management. EDC = electronic data capture, IVRS = interactive voice response system

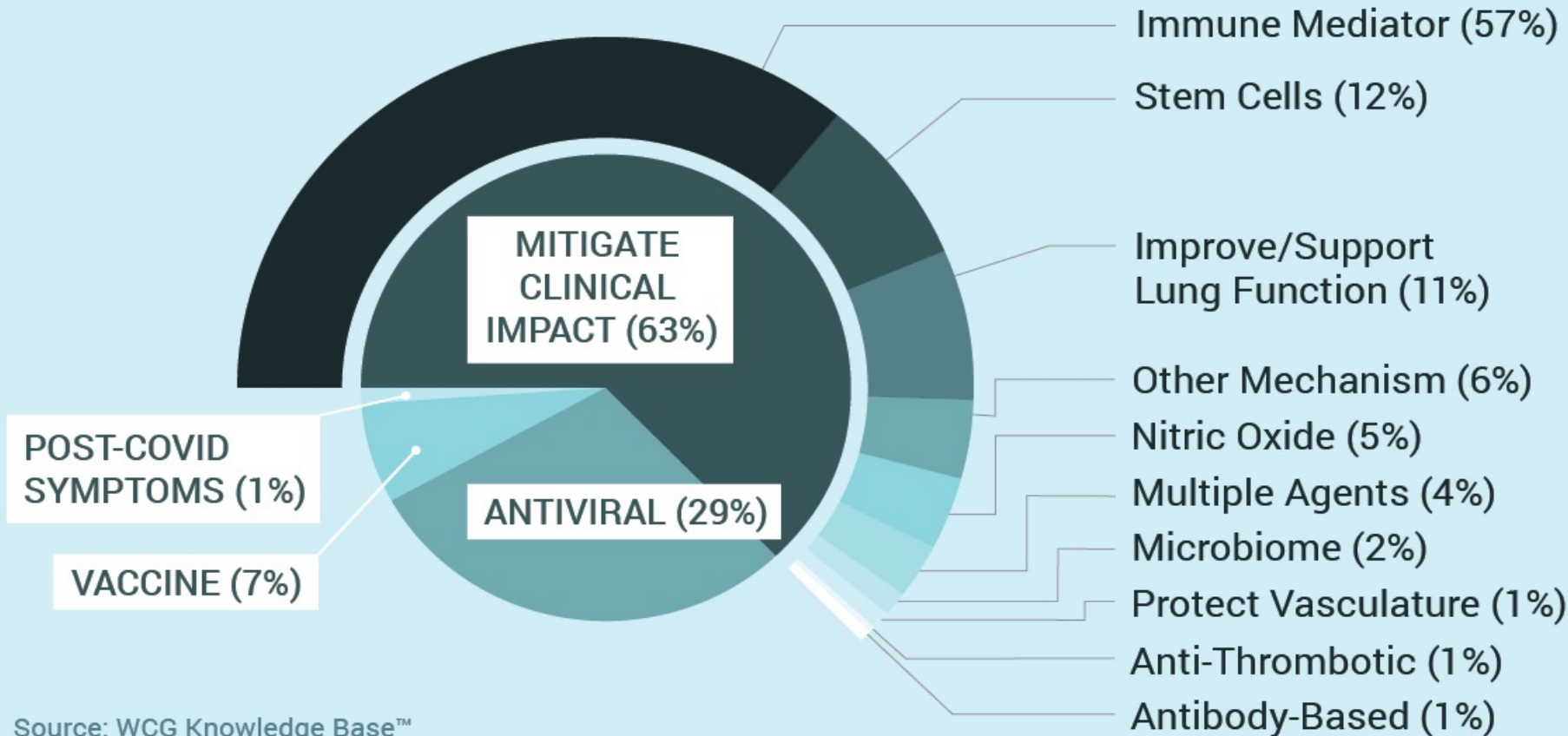
❑ Digital health products have played an important role in the COVID-19 response, from supporting the remote monitoring of patients to enabling continuity in data collection for clinical trials.

❑ FDA issued guidance stating that it does not intend to object to limited modifications to the indications, claims, functionality, or hardware or software of certain non-invasive remote monitoring devices (e.g., BP measurement systems) that are used to support patient monitoring during the pandemic to help reduce the risk of infection from clinical visits.

❑ The FDA has sought to expand access to clinically-appropriate, low-risk digital health tools during the COVID-19 pandemic by stating its intention not to enforce certain regulatory requirements for some devices.

❑ FDA issued guidance to temporarily expand patient access to digital health therapeutics for psychiatric disorders

U.S. Industry-Sponsored Clinical Trials to Mitigate the Clinical Impact of COVID-19, by Primary Mechanism of Action



Recovery approaches to building resilience in trial performance generally fall into two broad categories.

Example interventions, nonexhaustive

Site and patient				Trial and protocol
● Patient outreach and input	● Concierge/SWAT team	● Online assessments/ratings	● Supply augmentation from inactive sites/commercial supply	● Pragmatic end points
● Proactive patient preidentification	● Site-staff augmentation	● Telemedicine consultation	● Comparator and combination-therapy continuity	● Early start of white-space activities
● Patient support (eg, transport)	● Shift sites to pharmacies/minute clinics	● Direct-to-patient diagnostic equipment	● Direct supply distribution (eg, via medical field)	● Biostat review for data integrity
● Site-visit-window extension	● Siteless trials	● Vendor and partner collaboration	● Remote monitoring	● Virtual control-arm supplementation or substitution
● eConsent	● eCOA and ePRO ¹	● Site-to-patient or pharmacy-to-patient drug supply		● Remote-work tools and staff redeployment
● Equipment and financial assistance (eg, personal protective equipment, bridge loans)	● Wearables			● Site rebalancing toward geographies in recovery
	● Home nurse visits			● Creative capacity sourcing in small countries (eg, share across companies)
	● Mobile blood-draw truck			

¹eCOA = electronic clinical outcome assessment; ePRO = electronic patient-reported outcomes.
Source: External expert interviews; web search

Questions?