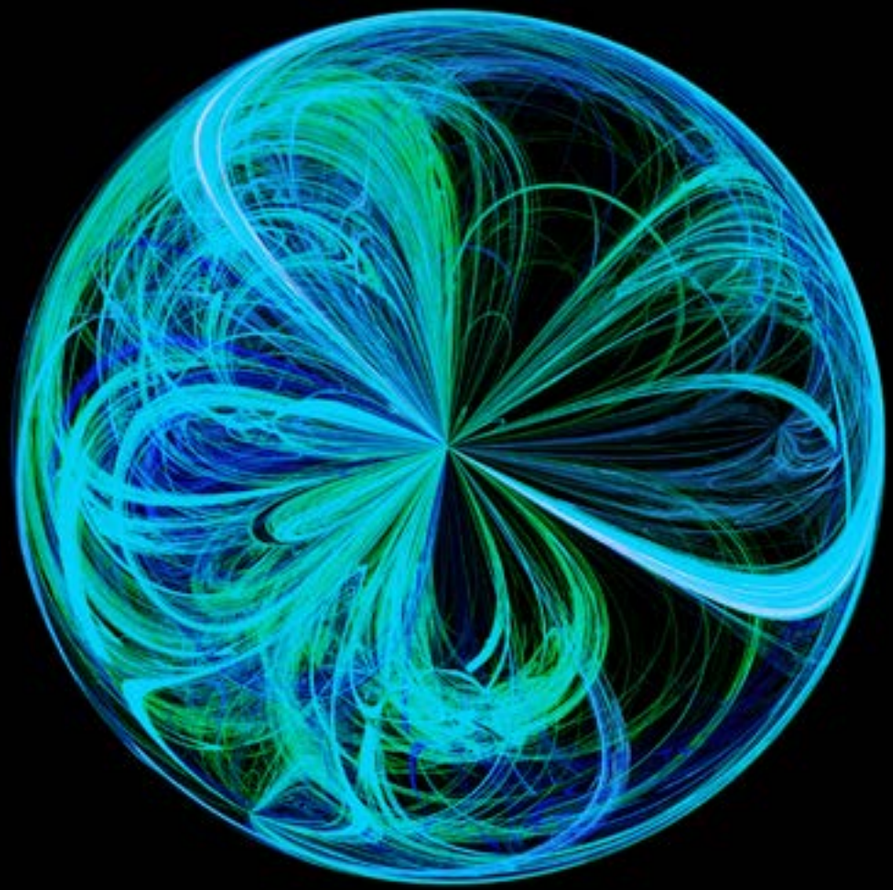
Deloitte.



Reshaped forever

The ongoing evolution of life sciences regulation in the wake of COVID-19

A report for executives, regulators, and other stakeholders in the industry

MAKING AN IMPACT THAT MATTERS since 1845

Introduction

The seismic tremors of the COVID-19 pandemic have faded, but aftershocks linger. To respond to the health emergency, regulators and the life sciences industry crafted a wide range of new regulations, relationships, and processes, both to bring new COVID-19 vaccines and treatments to fruition in an expedited manner and to maintain the orderly flow of products needed at all times to promote healthy populations. Now, as emergency declarations are gradually ending and the worst of the pandemic recedes, the life sciences industry and its regulators face the challenges of deciding which of these relationships and processes were effective, efficient, and valuable, worthy of adoption into an evolving medical ecosystem as they return to business as usual.

The Global Regulatory Intelligence Team (GRIT) at Deloitte has dedicated itself to advancing that assessment. In December 2021, this team published *Never the same again: How COVID-19 created seismic change in life sciences regulations,*[1] a broad look at the global pandemic response. That report offered a deep exploration of how the relationships and collaboration among life sciences companies, national health authorities, and supranational organizations had changed—and how those changes might affect the industry's future.

This report is an update and expansion on that effort. It chronicles developments since the those described in *Never the same again,* including the end of health emergencies in several jurisdictions and the continuing process of moving new vaccines, drugs, and biological products from emergency use authorization (EUA) to full commercial authorization. And it expands the scope of GRIT's analysis beyond the original five jurisdictions (China, the European Union, India, Japan, and the United States) by reporting on five additional nations—Argentina, Canada, Colombia, Mexico, and the United Kingdom (see sidebar, "Widening the scope").

As this report shows, the lessons of the pandemic response can help create a life sciences industry that is more agile, more innovative, and better able to serve the physical and mental health of populations around the globe. It is incumbent upon all participants in this industry—life sciences companies and health authorities alike—to examine and learn from the COVID-19 experience and its aftermath. GRIT is dedicated to bringing its global experience, analysis, and insights to that process to help the life sciences ecosystem continually improve.

PRINTING INSTRUCTIONS

Widening the scope

This report is an update and expansion on ***Never the same again: How COVID-19 created seismic change in life sciences regulations,*** published in December 2021 by Deloitte's Global Regulatory Intelligence Team (GRIT). It expands the scope of GRIT's analysis beyond the original five jurisdictions covered in that paper by reporting on five additional nations.

Covered in previous report

India China EU USA Japan

Added to this analysis

Canada UK Argentina Colombia Mexico

Executive summary and outlook

The new shape of the global regulatory landscape

Health emergencies: Seeking lessons

The approach taken on declaring public health emergencies varied widely around the globe, and that variability persisted as emergency conditions waned and official declarations are ending.

Among the 10 jurisdictions reviewed in this report, three (Canada, China, and the United Kingdom) did not declare national health emergencies, relying instead on other existing authorities or new legislation to address the COVID-19 pandemic. Three countries declared emergencies but have revoked them or allowed them to expire (Colombia, Mexico, and Japan). Three still had emergencies in place in the first quarter of 2023 (Argentina, India, and United States). On May 5, 2023, the World Health Organization (WHO) declared the end of the pandemic. In the United States, the emergency ended on May 11, 2023, after repeated extensions.

In the European Union (EU), member states took different approaches to declaring emergencies.[2] The EU has done more than other jurisdictions to address its emergency powers. New regulations effective in March 2022 reinforce the role of the European Medicines Agency (EMA) in crisis preparedness and management for medicinal products and medical devices.[3] The regulations also formally establish the Emergency Task Force (ETF) as an advisory and support body for public health emergencies. The ETF is tasked with accelerated assessment of scientific evidence on vaccines and medicines targeting an emergency.[4]

Moving forward

- Governments and health authorities will want to continue to examine and apply lessons learned from the health emergency. Jurisdictions with clearer lines of authority and stronger relationships across governmental lines (e.g., interdepartmental relations on the national level, or relations between national and state or provincial regulators) were better equipped to mount a whole-of-government response to the pandemic. Such lines of authority and relationships are best developed under non-emergency conditions. So too are contingency plans and processes for the next crisis. While individual regulatory agencies can undertake their own efforts, whole-of-government reviews could be more effective in assessing the record of emergency powers and responses during the COVID-19 pandemic and shaping the response to the next health crisis.

- Life sciences companies, individually and collectively through their trade associations, can provide analysis, thought leadership, and feedback on those efforts. Life sciences companies also need to monitor developments and adapt their own processes to prepare for future emergencies.

Figure 1. Ending the public health emergencies

Jurisdiction	Health emergency start–end dates	Comments
North America		
Canada	No national emergency Provinces: March 12, 2020 – Ongoing	Did not declare national emergency. Provincial emergency declarations started March 2020 and are ongoing. National "interim orders" generally issued for one year; many renewed into 2022.
United States	January 31, 2020–May 11, 2023	National health emergency ended May 11, 2023.
Latin America		
Argentina	March 12, 2020–December 31, 2023 (announced)	Emergency in force until December 2023.
Colombia	March 12, 2020–June 30, 2022	Emergency ended in June 2022.
Mexico	March 30, 2020–April 30, 2020	Lockdown and national emergency ended June 2020; various states extended emergencies into 2022, but all have ended.
Europe		
European Union	January 30, 2020 – N/A	The European Commission has stated that the EU is in "post-emergency" phase. The EU's emergency status follows the WHO, which declared COVID-19 was no longer a public health emergency on May 5, 2023. Many member states declared their own emergencies in February and March 2020; these emergencies largely ended by August 2022.
United Kingdom	N/A	Did not declare national emergency. Most temporary provisions of the Coronavirus Act 2020 (passed March 25, 2020) expired by March 2022.
APAC		
China	N/A	Did not declare national emergency. States enforced response measures. "Zero COVID" approach dropped in December 2022.
India	March 25, 2020–November 30, 2021	COVID emergency declared under Disaster Management Act of 2005.
Japan	April 7–May 2, 2020, January 7–March 1, 2021, April 23–July 1, 2021, July 12–September 30, 2021	Four brief states of emergency; all ended by September 2021.

Source: Deloitte analysis. See country reports for details and references.

Inspections: Deploying technology in risk-based approach

Health authority inspections almost ground to a halt in many jurisdictions during the first wave of the pandemic in 2020. The number of inspections has rebounded since but has not yet reached pre-pandemic levels in several of the 10 jurisdictions explored in this report.

The nature of inspections, however, has changed markedly. By necessity, regulators adopted a risk-based approach to setting inspection priorities. Remote inspections—utilizing document production, remote access to data and relevant electronic systems, video tours of facilities, and video interviews of personnel—moved rapidly from tentative processes to normal procedure under pandemic conditions. Hybrid inspections mixing remote and in-person techniques also became more common, even in countries that had not performed virtual inspections prior to the pandemic (e.g., Japan). Regulators in Argentina, Canada, China, the United States, and the United Kingdom were among those issuing new guidance on remote or hybrid inspections. These approaches offer promise for smaller markets (e.g., Colombia), where travel to distant, rural facilities has long posed barriers to inspections.

Regulators have stated their intention to continue to build on the hybrid approach: EMA has noted its potential to remain as a complementary tool in the post-pandemic future. The US Food and Drug Administration (FDA) has issued draft guidance to formalize use of the remote regulatory assessments (RRAs) that have evolved to supplement onsite inspections during the pandemic[5] and is expected to seek legislative authority to expand its power to mandate remote records requests.

The pandemic also spurred growth in global cooperation on good manufacturing practices (GMP) and good distribution practices (GDP) inspections. Canada and the EU announced a joint recognition agreement to reduce the need to inspect facilities in each other's jurisdictions. A working group of the International Coalition of Medicines Regulatory Authorities (ICMRA)[6] oversaw remote inspections in the EU. China has launched the process to join the Pharmaceutical Inspection Co-operation Scheme (PIC/S).[7] PIC/S and the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH)[8] can be expected to play a growing role in setting and coordinating standards for GMP and GDP inspections.

Moving forward

- Regulators are likely to maintain or increase use of remote and hybrid inspections, to take advantage of efficiencies, reduced costs, and flexibility. As pandemic conditions ease, these techniques are likely to evolve with time but unlikely to subside fully, potentially setting new norms for frequency of inspections. Life sciences companies can plan to invest in the connectivity, systems, and processes that can facilitate and support remote and hybrid inspections.
- Life sciences companies, individually and collectively, should consider pursuing cost-benefit analyses and offer detailed feedback on the advantages and pitfalls of remote and hybrid inspections. Companies may consider engaging with regulators to help inform standards and set clear parameters for use of different inspection approaches.
- Life sciences companies and regulators could benefit from continued global streamlining of inspection standards and inspection visits, which can avoid duplication and promote uniformity and efficiencies. Organizations such as PIC/S and ICH can support such efforts, as can the use of mutual recognition arrangements globally. For device manufacturers, expansion of the Medical Device Single Audit Program (MDSAP) beyond its current five member nations (Australia, Brazil, Canada, Japan, and the United States) has the potential to reduce the number of regulatory audits.
- Life sciences companies should consider lending intellectual support to efforts to harmonize inspection standards globally. They also can work with international bodies to coordinate offshore inspections and sharing of inspection results to help reduce the total number and burden of inspections.

Emergency use authorizations: Bringing flexibility to 'business as usual'

Prior to the pandemic, jurisdictions' procedures for granting accelerated approval to new vaccines, drugs, or treatments—a status generally known as emergency use authorization (EUA)—varied widely. Those countries that lacked EUA procedures (e.g., Colombia) quickly adopted new regulations specifically for COVID-19 vaccines and treatments. All 10 of the jurisdictions discussed in this report ended up approving vaccines and, in some cases, treatments under EUA-type processes (figure 2). The average number of EUA-approved vaccines, drugs, and biological products in the 10 jurisdictions was 11, with numbers ranging from five vaccines in Colombia to 18 products (four vaccines, 14 drugs or biologics) in the United States. Smaller countries tended to rely upon the WHO and its Emergency Use Listing Procedure or on approvals in peer or larger jurisdictions in granting EUAs.

In many jurisdictions, relatively few EUA products have transitioned to regular commercial approval: Argentina, China, Colombia, and Mexico—for example—have not approved any EUA products for commercial use, and the United States has only transitioned five EUA products (two vaccines and three drugs or biologics) to commercial approval.

Conversely, revocations of drug and vaccine EUAs have been rare, as have been recalls or compliance problems for EUA vaccines or treatments. Those low rates of revocation or recall are a testament to the risk-benefit analysis that, in most cases, preceded the invocation of EUA procedures.

Many countries have intensified their surveillance for adverse reactions. Colombia and India, for example, launched new online platforms for adverse reaction reporting.

Figure 2. Deploying emergency use authorization (EUA)

Jurisdiction	EUA regime	Products* granted EUA	EUA products* granted commercial approval	EUA products* recalled or revoked
North America				
Canada	Interim orders	5 vaccines, 3 drugs	4 vaccines	1 vaccine EUA expired; no products recalled or revoked
United States	EUA	4 vaccines, 14 drugs/biologics	2 vaccines, 3 drugs/biologics	6 drugs revoked
Latin America				
Argentina	Expedited approval	15 vaccines	None	None
Colombia	EUA created for COVID-19	5 vaccines	None	None
Mexico	EUA	15 vaccines	None	None
Europe				
European Union	Conditional marketing authorization (CMA)	5 vaccines	5 vaccines	1 contaminated vaccine batch recalled
United Kingdom	Regulation 174 and CMA	6 vaccines	2 vaccines	None
Asia				
China	Special approval procedure	5 vaccines, 6 drugs	None	None
India	Restricted use in emergency situation	15 vaccines, 2 drugs	2 vaccines	None
Japan	Special approval and emergency approval	8 vaccines under special approval and 1 drug under emergency approval	1 drug	None

Source: Deloitte analysis. See country reports for details and references. * "Products" in this report refers to vaccines, drugs, and biological products. Medical devices and other products are not included.

Emergency use authorizations: Bringing flexibility to 'business as usual' (cont.)

Moving forward

- As COVID-19 products remain important for reducing the spread and severity of outbreaks, regulators can ensure that the pathway from EUA to commercial approval remains open and is clearly understood by all parties for orderly transitions. The transition process could usefully be codified in written guidance that can be used in future health crises.
- Regulators could benefit from examining their own EUA regulations, guidance, and procedures to apply lessons learned from the COVID-19 pandemic and provide more efficiencies and clarity in EUA processes.
- Life sciences companies individually and collectively can offer analysis and feedback on the EUA regulations and process to health authorities and regulators in their country and globally to support those regulators' efforts. These analyses could help strengthen EUA measures used during the pandemic and could help regulators optimize the EUA process to streamline and introduce efficiencies while not compromising patient safety or data integrity.
- Life sciences companies can prepare their organizations for future EUA regimes by enhancing their processes in alignment with health authorities' updated regulations. Companies could also consider investing in systems that support expediting regulatory approval while maintaining safety by digitizing their processes so they are integrated, seamless, and interoperable internally and externally to the health authorities.
- Life sciences companies might consider collaborative efforts to study use of EUA processes to help regulators see ways to expedite product approvals at times of "business as usual."

Regulations: A quantum leap for clinical trials

The COVID-19 pandemic acted as a catalyst on efforts in many jurisdictions to accelerate drug approvals, modernize clinical trials, and advance the use of telemedicine.

Canada and other jurisdictions are applying lessons of the pandemic to efforts to make drug licensing more agile. The European Commission (EC) is preparing to enact legislative revisions to improve timelines and speed patient access to new medications by removing unnecessary steps and reinforcing expertise-driven assessments. The UK government has announced a Life Sciences Vision program intended to apply lessons learned from the COVID-19 response to other daunting health problems, including dementia, cancer, and aging. In India, the government has issued guidelines directing states and union territories to build buffer stocks of drugs used for COVID-19.

In each of the 10 jurisdictions discussed in this report, efforts to modernize clinical trials were launched or accelerated in response to pandemic conditions. Techniques included use of digital tools for finding trial subjects, obtaining subject consent, and monitoring trials; home delivery and administration of trial drugs; and streamlining of trial design and approval. In Europe, EMA launched an online platform to facilitate multinational clinical trials, where sponsors can seek authorization to conduct trials in up to 30 countries with one application.[9] The US FDA has issued draft guidance on use of digital health technologies (DHTs) for gathering data remotely in clinical investigations.[10]

Telemedicine also gained greater regulatory flexibility, particularly in countries (e.g., Japan) where adoption had been low. In India, the government released a national telemedicine platform, called eSanjeevani, for patient-to-provider and provider-to-provider consultations.[11]

Moving forward

- During the pandemic, many regulators increased their agility and accelerated drug and device approvals while maintaining standards for safety and efficacy. Lessons learned from that experience can be applied to "business as usual" conditions. International bodies of health authorities (e.g., ICMRA) can share experiences and best practices from around the globe to improve and harmonize standards.
- Similarly, regulators can benefit from examining their experience and that of their global peers for the latest developments for clinical trials, looking at successful innovations to reduce the patient burden of clinical trial participation, produce more timely data, improve flexibility for patients, and complete trials more quickly.
- Life sciences companies can offer analysis, thought leadership, and feedback to support these efforts. Multinational life sciences companies in particular can share experiences across multiple markets. Collaborative groups of life sciences companies, whether through existing trade groups or ad hoc coalitions, can pool experiences, conduct deeper analysis, and share the burden of representing findings to regulators.
- Life sciences companies can prepare to take advantage of and advance changes in clinical trial techniques, investing in the needed systems to make greater use of technology and flexible trial design.

Collaborations: Strengthening ties in all directions

The urgent need to respond to the COVID-19 pandemic broke down barriers and spurred a wave of collaborative efforts among players in the life sciences ecosystem—health authorities, global bodies, life sciences companies, and others in the health care system. These collaborations were a major focus of Deloitte's 2021 report, *Never the same again.*

As pandemic conditions eased, most of those collaborative relationships appear to have persisted and deepened, including:

Transnational collaborations among regulators and health authorities: Several countries (e.g., Argentina and Mexico) have added new cooperation agreements with regulators in other jurisdictions. International bodies such as the Pan American Health Organization (PAHO), ICMRA, and PIC/S bring health authorities together to share experiences and promote uniform standards. The Access Consortium encourages regulators from six nations on four continents to align policies to facilitate work-sharing and reduce duplication.[12]

Collaborations between regulators and industry: Health authorities have opened new lines of communication and work with life sciences companies in China (development of nucleic acid testing sites and launch of the National Innovation Center for High-Performance Medical Devices); Colombia (collaboration with the Association of Pharmaceutical Research and Development Laboratories [AFRIDO][13] and the COVID-19 Vaccines Global Access Facility [COVAX][14]); Europe (the Medicine Shortages Single Point of Contact [SPOC] Working Party); India (the Indian Council of Medical Research COVID-19 Task Force); and the United States (the National COVID Cohort Collaborative [N3C] sponsored by the National Institutes of Health [NIH] and the FDA's Coronavirus Treatment Acceleration Program [CTAP]), among others.

International collaborations involving health authorities and life sciences companies: The Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership, spearheaded by the US NIH, brings together industry leaders and domestic and international regulators.

Industry collaborations: In the United States, new members have joined Accumulus Synergy, an industry collaboration formed to safely speed up the development of novel therapies and future vaccines.

Moving forward

- Health authorities can continue their efforts to develop and deepen global collaborations, which have been successful in coordinating inspections and accelerating product development and commercialization. Those efforts can emphasize greater use of technology in regulation and inspection, digitizing the regulatory process to help get products to more markets more quickly and effectively.
- Life sciences companies may benefit by engaging with global collaborations to remain abreast of, and help shape, the latest regulatory thinking.
- Life sciences companies, acting individually and collectively, may take advantage of avenues of communication and cooperation with regulators that were expanded by the pandemic. Companies that take the initiative to interact with regulators more frequently and more proactively can position themselves as partners in advance of the next health crisis.

Country reports

Canada: Taking a whole-of-government approach

Canada did not declare a national state of emergency in response to the COVID-19 pandemic.[15] Provinces declared health emergencies, and some are still ongoing.[16] The government addressed urgent needs for health products through measures implemented in a series of one-year "interim orders" (IOs). Continuation of measures was ensured through subsequent IOs or updates to the regulations. These measures authorize a wide range of actions, including prohibiting exportation of certain drugs if those products are in short supply in Canada; facilitating COVID-19–related clinical trials, and granting flexibility to makers of certain products, including drug-based hand sanitizers.[17]

Modernizing inspections

For regulator Health Canada, the pandemic transformed the approach to good manufacturing practices (GMP) inspections. The agency adopted a risk-based approach to determine the need for onsite inspections, implementing remote and hybrid inspections to fill gaps. New procedures employ online document exchange, videoconferencing, and remote reviews. This flexible approach persisted even as onsite inspections resumed in 2021.[18]

New to this report: Canada

Coverage of Canada's COVID-19 response is new to this analysis, added since the publication of Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

As a result, the number of domestic inspections rose to 230 in the first nine months of 2022, but still fell short of the level for the same period in 2019 (263).[19] For foreign facilities, Health Canada has increased its reliance on inspections conducted by trusted foreign regulators, for example striking a joint recognition agreement with the European Union (EU).[20] Health Canada's own foreign inspections have declined sharply, to 78 in the first nine months of 2022, versus 1,065 in the same period in 2019.[21]

Emergency use authorization developments

Health Canada has granted emergency use authorization (EUA) under an IO to five vaccines and three treatments related to COVID-19. Four of these vaccines have since been granted full approval under the Food and Drug Regulations; the EUA for the fifth vaccine has expired.[22] None of the COVID-19 vaccines or antivirals has been subject to recall or compliance failures;[23] however, recalls for drug-based hand sanitizers increased sharply after an IO loosened standards for their production and importation (from one recall in 2019 to 61 in 2020 and 32 in 2021).[24]

Changes in drug regulation

COVID-19 acted as a catalyst to accelerate ongoing regulatory efforts to implement agile licensing of drugs and medical devices and to modernize clinical trials.[25]

In February 2022, temporary clinical trials regulations related to COVID-19 drugs and medical devices were implemented to replace IOs and ensure that agile measures continued until Health Canada could establish a framework through the Clinical Trials Modernization Initiative.[26] Taken together, these measures allow more agile and decentralized conduct of clinical trials, allowing innovative trial designs, quicker timelines, more flexible changes in trial design, and use of remote informed consent and data monitoring.[27] These shifts in the regulator's approach toward decentralized clinical trials have spurred greater use of electronic tools by researchers and trial sponsors.

Collaborations

Canada's whole-of-government approach empowered government departments to facilitate connections between businesses and decision-makers. For the life sciences industry, collaborations helped identify and track potential health products, while agencies worked with networks of health professionals to share information and consult on health care system priorities. Cooperation extended to manufacturers outside of the health industry (e.g., auto and sports equipment manufacturers that supplied personal protective equipment).[28]

United States: Promoting digital technologies

The United States continued to operate under a COVID-19 public health emergency until recently.[29] In January 2023, the White House announced plans to lift the state of emergency effective May 11.[30] In August 2022, the US Centers for Disease Control and Prevention (CDC) streamlined its COVID-19 guidance to help people cope with continuing outbreaks.[31]

US health authorities continue to stress the value of vaccination against COVID-19, with recent efforts focusing on bivalent boosters to address both the original and omicron strains of SARS-CoV-2.[32] In September 2022, the US Food and Drug Administration (FDA) began authorizing bivalent boosters, culminating in approval in December 2022 for children as young as six months old.[33]

Modernizing inspections

The number of FDA inspections, both foreign and domestic, remained below fiscal 2019's pre-pandemic levels through 2022 (figures 3 and 4). Inspections for devices and biologics rebounded slightly in 2022; the number of drug inspections continued to decline.[34]

New developments in the COVID-19 response in the United States

Earlier COVID-19 responses in the United States were discussed in Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

Figure 3

US FDA inspections (domestic)

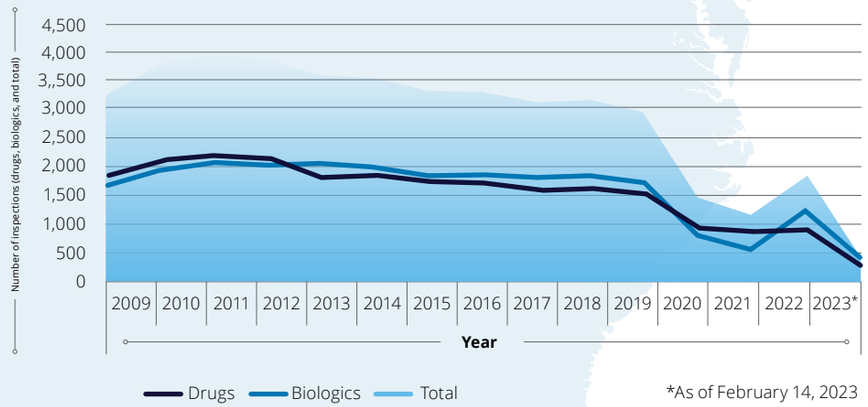
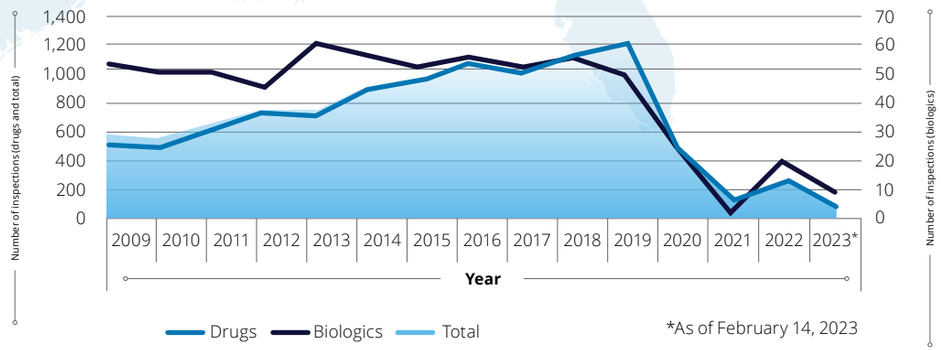


Figure 4

US FDA inspections (foreign)



Source: US Food and Drug Administration (FDA) Data Dashboard, accessed February 14, 2023

United States: Promoting digital technologies (cont.)

The FDA has employed three approaches to supplement onsite inspections: Section 704(a)(4) requests to remotely review documents and records for drugs and biologics only; remote interactive evaluation (RIE) to remotely examine facilities, operations, and data;[35] and remote regulatory assessment (RRA), an offline review of records by inspectors.[36]

In July 2021, the FDA established the FDA Inspectional Affairs Council (FIAC) tasked with enhancing the agency inspection approach.[37] In July 2022, the FDA brought together all three remote strategies (Section 704(a)(4), RIE, and RRA) when it issued draft guidance to formalize use of the RRAs to supplement onsite inspections after the pandemic.[38] The FDA may request or require an RRA when "unstable conditions" preclude travel or when pursuing a regulatory initiative. An RRA may precede or replace an onsite inspection. The FDA states in the draft guidance that the "FDA has noted the value of RRAs and concluded that they should be used for certain scenarios outside the current pandemic and for all types of FDA regulated products."

Emergency use authorization developments

Four vaccines and 14 drugs and biologics received emergency use authorizations (EUAs) during the pandemic. Two vaccines and three drugs and biologics have since received commercial approval while all the other products remain under EUA for the duration of the public health emergency.[39]

The FDA has revoked EUAs for products that have proven to be ineffective in treating COVID-19 (e.g., chloroquine phosphate, hydroxychloroquine sulfate, and monoclonal antibodies sotrovimab and bamlanivimab[40]) or that can no longer be supplied (e.g., Fresenius Kabi's propoven 2% emulsion[41]).

Under the Public Health Service (PHS) Act, an EUA declaration is not dependent on the declaration of a public health emergency; EUAs thus may remain in effect after the emergency ends.[42] To terminate an EUA declaration, the secretary of Health and Human Services (HHS) must publish a notice of termination in the Federal Register to start a transition period and allow for proper disposition of EUA products.

Changes in drug regulation

After the initial pandemic response, the FDA' publication of guidance documents slowed markedly, from 54 guidance documents in calendar 2020 to 17 in 2021 and five in 2022. In March 2022, the FDA published an update to the May 2021 "Emergency use authorization for vaccines to prevent COVID-19," [43] noting that "the pandemic has evolved, and … it may not be feasible to continue to collect placebo-controlled data when an effective vaccine is authorized and available for study participants." [44]

In August 2021, the FDA updated its guidance on "Conduct of clinical trials of medical products during the COVID-19 public health emergency," addressing alternative approaches to maintain trial participant safety and ensure data integrity.[45] In January 2022, the FDA issued draft guidance on use of digital health technologies (DHTs) for gathering data remotely in clinical investigations.[46]

United States: Promoting digital technologies (cont.)

Collaborations

Collaboration among life sciences companies and regulators continues to evolve and strengthen as companies and regulators moved to adopt a dynamic and data-driven approach. What follows are some recent developments among these collaborations:

- In 2022, AstraZeneca and Merck joined Accumulus Synergy, an industry collaboration formed to help industry and regulators build a modernized, tech-savvy, interactive approval system to safely speed up development of novel therapies and future vaccines. Other sponsors of Accumulus Synergy include Amgen, Astellas, Bristol Myers Squibb, GSK, Johnson & Johnson, Eli Lilly, Pfizer, Roche, Sanofi, and Takeda.[47]
- Operation Warp Speed—the initiative that promoted the initial development of COVID-19 vaccines—was disbanded at the end of 2021, with vaccine-related activities handed off to HHS.
- The FDA continued to employ the Coronavirus Treatment Acceleration Program (CTAP) to work with industry, agencies, academics, and others on developing therapeutics for COVID-19. Since its inception, 13 treatments have been authorized for emergency use and two treatments have been approved by the FDA to counteract COVID-19. The FDA has reviewed more than 450 trials under this partnership, and more than 700 drug development programs were in planning as of October 2022.[48]
- The National Institutes of Health (NIH) formalized the creation of the National COVID Cohort Collaborative (N3C) to collect and harmonize non-identifiable clinical data from a wide range of institutions.[49] As of February 2023, the data enclave includes 22.2 billion rows of information based on 2.0 billion clinical observations from 17.8 million people.[50] The N3C represents a collaborative vision for a national data resource that will turn data into knowledge. This collaboration is much needed for researchers to derive meaning from real-world data and further assist the global understanding of the COVID-19 pandemic.[51] Since January 2022, hundreds of publications have used the enclave database.
- The NIH is also continuing its pursuit of the Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership between industry leaders and domestic and international regulators. ACTIV brings NIH together with other US federal agencies; the European Medicines Agency (EMA); and representatives from academia, philanthropic organizations, and numerous biopharmaceutical companies.[52]
- In September 2022, the CDC announced $90 million in five-year grants to five state public health departments to support the Pathogen Genomics Centers of Excellence (PGCoE) network. The network is designed to foster and enhance innovation and technical capacity in pathogen genomics, molecular epidemiology, and bioinformatics to better prevent, control, and respond to microbial threats to public health.[53]

Argentina: Deepening international cooperation

Argentina declared a public health emergency after early cases of COVID-19 were detected in March 2020; the emergency was extended twice and remains in place until December 2023.[54]

Modernizing inspections

A 2020 government audit of Argentina's regulator, the National Administration of Drugs, Foods, and Medical Devices (ANMAT) showed that the pace of inspections had slowed significantly even before the pandemic.[55] Early in the emergency, ANMAT recommended that provincial regulators adopt a risk-based approach to allow virtual inspections, following guidelines of the Pan American Health Organization (PAHO).[56] Data is not available on the number of inspections conducted during the sanitary emergency.

ANMAT coordinates international inspections as a member of the Pharmaceutical Inspection Co-operation Scheme (PIC/S)[57] and the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH).[58]

New to this report: Argentina

Coverage of Argentina's COVID-19 response is new to this analysis, added since the publication of Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

Emergency use authorization developments

Argentina allows expedited approval of medical products that have been approved in specific countries that have strong sanitary surveillance or cooperation agreements to harmonize regulatory standards.[59] ANMAT has granted emergency use authorization (EUA) to 10 vaccines,[60] giving preference to the Russian Sputnik V vaccine in the government's vaccination program.[61] None of the EUA products have transitioned to permanent authorization.[62] No EUA products have been subject to recall or reported compliance issues in Argentina.

Changes in drug regulation

Special regulations were issued in March 2020 to govern clinical trials during the COVID-19 pandemic. These rules allowed increased use of telemedicine, home delivery of investigational products, expedited timelines for evaluations, direct communications between ANMAT and trial sponsors and investigators, and rapid dissemination of trial results.[63] From May 2020 to August 2021 almost one-quarter of all approved clinical trials (61 out of 268) were related to COVID-19.[64]

Collaborations

ANMAT and the Argentinian government have worked with PAHO, the US Food and Drug Administration (FDA), the European Medicines Agency (EMA), and a range of United Nations agencies to harmonize regulations and address the pandemic emergency.[65]

Colombia: Creating new emergency use powers

Colombia declared a health emergency under constitutional powers in March 2020.[66] The emergency was lifted in June 2022.[67] More than 800 health-related administrative orders were issued under the emergency.[68]

Modernizing inspections

Colombia's National Food and Drug Surveillance Institute (INVIMA) instituted virtual inspections of life sciences facilities to cope with the exigencies of the COVID-19 pandemic. Most inspections under the health emergency were remote, with some combining remote and in-person elements.[69] In rural regions, the added efficiency of eliminating official travel was somewhat offset by lack of good telecommunications connectivity.[70] On net, however, the shift resulted in an increase in the number of inspections—from roughly 5,200 in 2019 to 6,000 per year in 2021 and 2022—and INVIMA is expected to continue use of the hybrid inspection approach.[71]

INVIMA collaborates with health authorities in Mexico, Peru, Chile, and other countries on inspections.

New to this report: Colombia

Coverage of Colombia's COVID-19 response is new to this analysis, added since the publication of Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

Emergency use authorization developments

Prior to the pandemic, Colombia did not have regulations allowing emergency use authorization (EUA) of drugs or medical devices. In December 2020, a decree created a one-year emergency authorization, renewable annually, specifically for COVID-19 vaccines and treatments.[72] INVIMA has issued emergency authorizations for five vaccines,[73] usually based on approval by the World Health Organization (WHO) or other nations' regulators. Health care providers were charged with reporting adverse effects for any EUA products. All of these approvals remained in force in January 2023, with no references that products had transitioned from emergency authorization to regular approval in Colombia.

The pandemic has spurred Colombia to enhance post-marketing surveillance of medical products, with two online platforms for reporting adverse drug reactions and other incidents. Only one product released under emergency authorization—an in vitro testing reagent—has been recalled.[74]

Changes in drug regulation

Prior to the pandemic, INVIMA began efforts to use technology to simplify approval of and data collection in clinical trials. These efforts were undermined, however, by two cyberattacks on INVIMA during 2022.[75] A pandemic order broadened the scope of institutions allowed to conduct clinical trials.[76] More than 80 clinical trials on COVID-19 treatments have been performed.[77]

Collaborations

Colombia has established and strengthened connections with life sciences firms through such organizations as the Association of Pharmaceutical Research and Development Laboratories (AFRIDO)[78] and the COVID-19 Vaccines Global Access Facility (COVAX).[79] A number of private firms and funders supported the national campaign in support of COVID-19 vaccination, "Let's get vaccinated and live again" (in Spanish "Vacunémonos y Volamos a Vivir").[80]

Mexico: Expediting and decentralizing clinical trials

The General Health Council of Mexico declared a sanitary emergency and lockdown in March 2020.[81] The lockdown was lifted in April 2020, but other measures (e.g., school suspensions, social distancing, and use of face masks[82]) persisted into 2022 in various states. States have since lifted the emergency.[83]

Modernizing inspections

The number of inspections by Mexico's Federal Commission for the Protection against Sanitary Risks (COFEPRIS) rose during the pandemic, from 1,521 in 2019 to 1,694 in 2020 and 1,894 in 2021.[84] There is little evidence that inspections were carried out virtually or that the procedures for inspections have changed.

COFEPRIS is a member of the Pharmaceutical Inspection Co-operation Scheme (PIC/S) for mutual international recognition of inspections.[85] It also has preexisting cooperative agreements with Colombia, Argentina, Brazil, and other Latin American countries, and reliance agreements with the US Food and Drug Administration (FDA), Health Canada, the European Medicines Agency (EMA), and other regulators.[86]

New to this report: Mexico

Coverage of Mexico's COVID-19 response is new to this analysis, added since the publication of Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

Emergency use authorization developments

Under the sanitary emergency, COFEPRIS has authorized use of 15 vaccines.[87] None of these has transitioned to regular commercial authorization; their ongoing use depends upon continuing acceptance by the regulator.[88] No COVID-19 products have been recalled or taken off the market.[89]

Changes in drug regulation

Before the pandemic, Mexico was considered a leading jurisdiction in Latin America for clinical trials, due to a secure, dynamic, and robust framework regulating such trials.[90] Under the health emergency, COFEPRIS placed a high priority on COVID-19–related trials and established an online platform where trial sponsors could register trial plan modifications. As of late 2022, 113 COVID-19–related trials were underway.[91] The agency also allowed delivery of drugs to test subjects' homes, remote monitoring of trials, and virtual meetings.[92] In March 2021, amended regulations reduced the time required to win approval of clinical trials.[93] These expedited and decentralized approaches are expected to remain in force.

Collaborations

Mexico has a range of collaboration agreements with several countries (e.g., China, Cuba, Denmark, France, and Russia).[94] It also promotes health care and disease prevention among Mexican immigrants to the United States through cooperation between Mexican consulates and local public and nongovernmental organizations.[95]

Private initiatives included an agreement between AstraZeneca and the Carlos Slim Foundation (a Mexican nonprofit organization) for the manufacture of its COVID-19 AZD1222 vaccine in Argentina and Mexico.[96]

European Union: Codifying lessons learned from the pandemic

New developments in the COVID-19 response in the European Union

Earlier COVID-19 responses in the European Union were discussed in Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

The European Commission (EC) has stated that the European Union (EU) is in "post-emergency" phase.[97] The EU's formal emergency status follows the World Health Organization (WHO), which declared that COVID-19 was no longer a public health emergency on May 5, 2023.[98] Each member state (MS) has pursued its own emergency status.

New regulations in the EU have sought to codify lessons learned from the COVID-19 response. Regulation (EU) 2022/123, effective in March 2022, provides a reinforced role for the European Medicines Agency (EMA) in crisis preparedness and management for medicinal products and medical devices.[99] The regulation also formally established the Emergency Task Force (ETF) as an advisory and support body for public health emergencies. The ETF is tasked with accelerated assessment of scientific evidence on vaccines and medicines targeting an emergency.[100]

Modernizing inspections

After a sharp drop in 2020, the pace of good manufacturing practices (GMP) inspections by EMA rebounded in 2021, from 497 inspections in 2019 to 170 in 2020 and 369 in 2021. By contrast, the number of good clinical practices (GCP) inspections continued to fall, from 137 in 2019 to 59 in 2020 and 36 in 2021. Pharmacovigilance inspections rose from nine in 2019 to 16 in 2020 and 15 in 2021.[101]

Remote inspections became normal during the pandemic, and EMA has noted their potential to remain as a complementary tool in the post-pandemic future. Remote oversight was provided by a working group established during the pandemic by the International Coalition of Medicines Regulatory Authorities (ICMRA). Inspectors applied remote approaches for reviewing data, accessing relevant electronic systems, sharing documents, touring facilities, and interviewing subject-matter experts.[102]

Emergency use authorization developments

The measures adopted in February 2020 to accelerate approval of COVID-19 vaccines and treatments remain in place. Under conditional use, the drug's developer submits additional data gathered after the marketing authorization to seek full approval.[103]

As of February 2023, five vaccines had been approved under conditional marketing authorization (CMA). All five received standard marketing authorization after CMA.[104] Two of those were also offered in adapted bivalent forms.[105]

Only one compliance issue has been reported on products granted conditional authorization, the recall of 764,900 doses of Moderna vaccine in January 2022. Contamination was found in only one vial, but the entire batch was recalled as a precautionary measure.[106] In April 2021, the Netherlands' Medicines Evaluation Board temporarily suspended use of the AstraZeneca vaccine due to reports of thrombosis and thrombocytopenia associated with its use.[107] Use of the vaccine resumed, but in July 2021, EMA added a warning for Guillain-Barré syndrome as a potential side effect.[108]

European Union: Codifying lessons learned from the pandemic (cont.)

Changes in drug regulation

EMA recommended 54 medicines with new active substances for marketing authorization in 2021, up 35% from 2020's similar authorizations.[109]

Drawing upon lessons from the pandemic response, the EC in the first quarter of 2023 plans to enact revisions in the EU's legislation governing human medications.[110] The European pharmaceuticals industry described the reforms as a "once-in-a-generation opportunity" to improve timelines and speed patient access to new medications.[111] The European Federation of Pharmaceutical Industries and Associations identified four priority areas for legislative reform:[112]

- Removing unnecessary interfaces between EMA, the EC, and committees to reinforce expertise-driven assessment and enable more agile authorization;
- Expediting pathways for innovation;
- Expanding the role of EMA in the assessment of drug/device combination products; and
- Replacing paper patient information leaflets with electronic versions.

The industry group also called for maintaining the strong collaborations between industry, academia, nongovernmental organizations, and MS and EU regulators that characterized the pandemic response.[113]

The pandemic also hastened efforts to simplify the administration of multinational clinical trials. Pandemic guidance has extended the scope for remote monitoring and source data verification in clinical trials. In January 2022, EMA issued a new clinical trial regulation aimed at harmonizing the assessment and supervision of trials throughout the EU. The regulation is intended to foster innovation, improve transparency, and facilitate the conduct of multinational clinical trials.[114] At the same time, EMA launched the Clinical Trials Information System, an online platform where sponsors can seek authorization for a clinical trial in up to 30 European countries via a single application.[115]

Collaborations

European health authorities and drugmakers have worked together to open lines of communication to detect, report, and prevent or manage shortages of critical medicines. In May 2022, EMA formally established the Medicines Shortage Single Point of Contact (SPOC) Working Party to monitor and report events that could affect the supply of medicines in the EU. All pharmaceutical companies with marketing authorization for medicines were required to register an industry single point of conduct (i-SPOC) to facilitate communications with EMA by September 2022.[116] In the future, EMA envisions developing a digital platform to collect information on supply and demand for medicinal products, creating a centralized EU platform to monitor and manage potential shortages.[117]

United Kingdom: Pursuing a 'life sciences vision'

New to this report: United Kingdom

Coverage of the United Kingdom's COVID-19 response is new to this analysis, added since the publication of Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

The government of the United Kingdom did not declare a national health emergency in response to COVID-19.[118] Instead, Parliament enacted the Coronavirus Act 2020, with a wide range of temporary provisions, most of which expired in March 2022.[119]

Modernizing inspections

The Medicines and Healthcare products Regulatory Agency (MHRA), the United Kingdom's regulator, resumed risk-based onsite inspections of drug and medical device facilities in March 2021. MHRA guidelines laid out standards for a combination of remote and onsite inspection approaches.[120] No further changes in inspection processes have been announced.[121]

The pace of inspections increased in 2022: After averaging 15.5 inspections per month during fiscal year 2021, MHRA reported 19.9 inspections per month during fiscal year 2022.[122] Good manufacturing practices (GMP) and good distribution practices (GDP) certificates have been automatically extended to the end of 2023, although MHRA reserves the right to inspect any site as the need arises.

Emergency use authorization developments

COVID-19 vaccines were initially supplied on a temporary basis in the United Kingdom under Regulation 174 of the Human Medicine Regulations 2012.[123] In January 2021, MHRA created a conditional marketing authorization (CMA) to approve products that lacked comprehensive data for full commercial approval.[124] As of February 2023, six vaccines had been approved under CMA; two of those vaccines had received commercial authorization.[125] No compliance issues have been reported for CMA products.

Changes in drug regulation

The pace of drug approvals lagged in 2021: 35 new drugs were approved, compared to 40 in the European Union and 52 in the United States, according to an analysis by the Imperial College London. Researchers attributed the slower pace to the implementation of Brexit and the separation of MHRA from the European Medicines Agency (EMA).[126]

In July 2021, the UK government announced a Life Sciences Vision program intended to apply lessons learned from the COVID-19 response to other daunting health problems, including dementia, cancer, and aging. The program includes promoting innovative clinical trials to develop breakthrough products and treatments.[127]

Collaborations

Regulators continued to strengthen and deepen their collaboration and alignment through the Access Consortium, whose members include the United Kingdom's MHRA, Australia's Therapeutic Goods Administration, Health Canada, the Health Sciences Authority of Singapore, and Swissmedic. The Access Consortium is currently working toward regulatory innovation that integrates a health care systems approach.[128] The group's mission is to "align our regulations and policies to facilitate work-sharing on medicines and reduce duplication to ensure our populations have access to the health products they need for better health and wellbeing."[129]

China: Increasing use of digital technology

While China never declared a national emergency in response to COVID-19, several regions of China have maintained the highest level of response (Level 1) to the pandemic. Prevention and control measures have evolved significantly, however, since spring 2021. Quarantine periods and testing requirements were reduced in stages.[130] Most notably, China dropped its "Zero COVID" approach in December 2022, as economic concerns and widespread public protests against lockdowns outweighed fears of a renewed outbreak.[131]

Modernizing inspections

The pace of inspections for life sciences facilities has changed little in China compared to other countries: 1,125 inspections were conducted in 2022, compared to 1,196 in the prior year.[132] Virtual inspections have increased, with greater use of digital data collection, remote document reviews, and video investigations. Hubei Province became the first region to issue a formal remote inspection guide in July 2021, followed by several other provinces.[133]

The National Medical Products Administration (NMPA) also published a new approach for drug inspection management in May 2021, standardizing drug and vaccine supervision and replacing the prior standards for good manufacturing practices (GMP) certification.[134] For medical devices, new standards issued in March 2022 promise to increase the frequency of inspections for products subject to the higher levels of supervision.[135]

New developments in the COVID-19 response in China

Earlier COVID-19 responses in China were discussed in Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

China remains relatively independent of international inspection schemes. NMPA launched the process to join the Pharmaceutical Inspection Co-operation Scheme (PIC/S) in September 2021, but full access to the scheme is not expected until 2024 at the earliest.[136]

Emergency use authorization developments

NMPA has not modified its special approval procedure, designed to accelerate drug development in a public health emergency, during the pandemic. A limited number of compounds (five vaccines and six drugs) have been granted emergency use authorization (EUA); none of those products had been approved for commercial use at year-end 2022.[137] Regional health authorities are also trying to expedite the drug approval process.[138] Few compliance issues have been reported for EUA products, although quality recalls have been issued for some protective gear.[139]

Changes in drug regulation

Use of digital technology in conducting and monitoring clinical trials has increased during the pandemic, including using social media to recruit subjects, acquiring permissions digitally, and collecting health data from digitally equipped sensors.[140] In May 2021, the Beijing Municipal Medical Products Administration launched a pilot project with hospitals, pharmaceutical companies, and others to explore decentralized clinical trials.[141]

Collaboration

Health authorities have teamed up with Chinese companies to rapidly build out facilities needed to fight the pandemic—setting up hundreds of nucleic acid testing sites in major cities, for example, to speed up diagnosis and detection of COVID-19 strains.[142] These efforts have not been without pitfalls, as cooperation agreements were suspended with facilities that failed to meet quality and timeliness standards.[143]

The National Innovation Center for High-Performance Medical Devices, established in April 2020, continues to develop as the first national manufacturing innovation center in the field of medical devices. The center is focusing efforts on high-end medical imaging, in vitro diagnosis and vital sign monitoring, implants, and health information systems.[144]

India: Partnering to coordinate pandemic response

New developments in the COVID-19 response in India

Earlier COVID-19 responses in India were discussed in Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

In India, the COVID-19 emergency declared under the Disaster Management Act of 2005 ended in November 2021.[145] The Government of India established working groups in March 2020 to address 11 different aspects of COVID-19 management, ranging from medical emergency planning to ensuring availability of essential medical equipment to coordination with the private sector.[146] The government also implemented measures to contain the spread of COVID, which it adjusted as the pandemic evolved.[147] The Ministry of Health and Family Welfare (MoHFW) issued guidelines for management of COVID in children in June 2021[148] and for management of post-COVID sequelae in October 2021.[149]

Inbound travelers from designated high-risk countries remained subject to testing requirements as of January 2023.[150]

Modernizing inspections

India is a major player in the global pharmaceutical market. Home to more than 10,000 pharmaceutical manufacturing sites, the country manufactures the majority of the world's active ingredients for generic drugs, accounts for more than 60% of global vaccine production, and is the source of more than 90% of the medications used by Americans, according to data from US Pharmacopeia.[151] As a result, India's pharmaceutical industry is highly dependent on inspections by the US Food and Drug Administration (FDA). The suspension of FDA inspections early in the pandemic significantly increased regulatory risk for Indian pharma companies. FDA inspections have resumed, but the pace remains far below pre-pandemic levels. Sixty Indian facilities received "official action indicated" citations from the FDA from September 2019 through September 2022; of those, 50 were still awaiting re-inspection, indicative of the slow pace of inspections.[152]

Responding to concerns about imported drugs, the US Congress in 2021 directed the FDA to supplement its usual announced inspections with a program of unannounced inspections of production facilities in India and China. Those inspections had begun in India by April 2022.[153]

Under an ambitious plan to grow India's pharma business to a value of $130 billion by 2030, pharmaceutical companies are expanding use of a wide range of technologies and raising inspection standards. All new pharma plants must meet standards set by the FDA, the World Health Organization (WHO), and the Pharmaceutical Inspection Co-operation Scheme (PIC/S).[154]

Emergency use authorization developments

India's drug regulations do not specifically create emergency use authorizations (EUAs) but do allow for accelerated approval and "restricted use in emergency situation." India's regulator, the Central Drug Standards Control Organisation (CDSCO), has authorized importation and use of 15 vaccines and two drugs, largely on the strength of EUAs issued by foreign regulators and recognized by the WHO. Two vaccines approved under special situations have received regular commercial approval.[155]

In June 2021, CDSCO issued updated guidance relaxing requirements for post-approval bridging clinical trials and batch testing by India's Central Drugs Laboratory.[156] To improve reporting of adverse events, CDSCO has launched an online reporting platform. There is no official record of recalls or revocations of products released under special situations or EUAs. However, the government released guidance advising physicians to use extreme caution in prescribing certain medications for COVID-19 patients.[157]

India: Partnering to coordinate pandemic response (cont.)

Changes in drug regulation

In July 2021, the government issued guidelines for states and union territories to work with drug manufacturers and the National Pharmaceutical Pricing Authority (NPPA) to build buffer stocks of drugs used for COVID-19.[158] To meet the needs for drugs to address the pandemic, CDSCO allowed importation of drugs with residual shelf lives of less than 60% through late 2022.[159] Under a February 2022 notification, many of the manufacturing, stocking, and distribution norms for phase III clinical trials were relaxed for drugs needed to treat COVID-19 or related diseases.[160]

A 2019 update of clinical trial regulations laid the groundwork for greater use of digital technology in trials, and no formal regulatory changes have occurred since. In July 2021, MoHFW updated its guidelines for telemedicine, stating that they could be applied to clinical trials as well as medical treatment. The ministry also released a national telemedicine platform, called eSanjeevani, for patient-to-provider and provider-to-provider consultations.[161]

Collaborations

Indian health authorities have partnered extensively with the life sciences industry, the scientific community, laboratories, and other groups to coordinate pandemic response and promote vaccination. Key groups include:

- The National Export Group on Vaccine Administration for COVID-19, which acts as the final vetting authority for rollout of vaccination programs;[162]
- The Indian Council of Medical Research COVID-19 Task Force, which brings together experts from inside and outside the government to advise on pandemic response;[163] and
- The Indian SARS-CoV-2 Genomics Consortium, which brings together 54 laboratories to correlate data on genome sequencing with clinical data to help direct public health interventions.[164]

Japan: Adopting remote inspections

Japan declared four states of emergency between April 2020 and September 2021, each one lasting one to four months.[165] The process for emergency declarations has not changed.

Modernizing inspections

Japan's regulator, the Pharmaceuticals and Medical Devices Agency (PMDA), resumed inspections of domestic manufacturing in June 2020. From 2019 to 2021, the number of field inspections declined from 648 to 368.[166] Prior to the pandemic, PMDA did not conduct remote inspections. It launched a trial program for remote good manufacturing practices (GMP) inspections for overseas facilities in December 2020 and conducted 10 such remote inspections in fiscal year 2021.[167] PMDA continued to rely upon the Pharmaceutical Inspection Co-operation Scheme (PIC/S) for GMP data on overseas facilities.

Japan participates in the Medical Device Single Audit Program (MDSAP), a scheme that allows device manufacturers to satisfy the quality management requirements of five nations with one audit. The other participating nations are Australia, Brazil, Canada, and the United States.[168]

New developments in the COVID-19 response in Japan

Earlier COVID-19 responses in Japan were discussed in Deloitte's December 2021 report, ***Never the same again: How COVID-19 created seismic change in life sciences regulations.***

Emergency use authorization developments

Japan's procedures for emergency approvals of drugs and medical devices continue to evolve. In May 2022, the "special approval" process was supplemented with a new law governing "emergency approvals" when speedier action is required to address an infectious disease. Under emergency approval, GMP surveys can be waived and drugs presumed to be effective can be authorized if their safety is confirmed. Unlike special approval, emergency approval can be granted to drugs that have not yet been approved in other jurisdictions.[169] Two drugs, both influenza H1N1 vaccines, had been granted special approval prior to the COVID-19 pandemic.[170] Eight COVID-19 vaccines were granted special approval; one drug received emergency approval. One drug has received commercial approval.[171]

Changes in drug regulation

Efforts to institute remote monitoring of clinical trials were underway prior to the pandemic. Rather than amending regulations to advance further reforms, PMDA has issued guidance through frequently asked questions (FAQs). The FAQs address such questions as delivery of investigational drugs to patients, activities of institutional review boards, and monitoring of prolonged clinical trials. In a survey by the Japan Pharmaceutical Manufacturers Association (JPMA), six companies reported conducting decentralized clinical trials,[172] mixing face-to-face interactions with digital consent and communications and monitoring via wearable devices.[173]

In April 2022, PMDA authorized electronic submission of adverse effect reports through the agency's website.[174] At the same time, a revised policy on telemedicine was issued to allow remote visits for patients' initial contact with physicians, among other changes.[175]

Collaborations

To emphasize a more preventive approach to public health, the Japanese government is launching a "Japan CDC" modeled after the US Centers for Disease Control and Prevention (CDC). The new agency will bring together the National Institute of Infectious Diseases and the National Center for Global Health and Medicine to improve coordination between national and local authorities and to speed the response to disease outbreaks.[176]

Contacts

Authors

Valentina Vaguengueim
Risk Advisory
Deloitte Canada
vvaguengueim@deloitte.ca

Gina Rodriguez
Risk Advisory
Deloitte Canada
girodriguez@deloitte.ca

Terence Yifan Cai
Consulting
Deloitte China
tecai@deloitte.com.cn

Lucia Tamayo
Consulting
Deloitte Colombia
lutamayo@deloitte.com

Nadia Goutziers
Risk Advisory
Deloitte Netherlands
nagoutziers@deloitte.nl

Sophia Hanau
Risk Advisory
Deloitte Germany
shanau@deloitte.de

Srikar Desiraju
Risk Advisory
Deloitte India
srdesiraju@deloitte.com

Aastha Bhatia
Risk Advisory
Deloitte India
aasthbhatia@deloitte.com

Jun Craig Hamilton
Deloitte Japan
juncraig.hamilton@tohmatsu.co.jp

Rebecca Heal
Consulting
Deloitte UK
rheal@deloitte.co.uk

Malka Fraiman
Deloitte & Touche LLP
mfraiman@deloitte.com

Kevin Nguyen
Deloitte & Touche LLP
kevinguyen@deloitte.com

Contacts

Executive contributors

Karina Lahnakoski
Risk Advisory
Deloitte Canada
klahnakoski@deloitte.ca

Tingting Pi
Consulting
Deloitte China
tpi@deloitte.com.cn

Aida Demneri
Risk Advisory
Deloitte Netherlands
ademneri@deloitte.nl

Guneet Singh
Risk Advisory
Deloitte India
gunesingh@deloitte.com

Ichiro Matsunaga
Deloitte Japan
ichiro.matsunaga@tohmatsu.co.jp

Hector Cuevas
Tax & Legal
Deloitte Mexico
hcuevas@deloitte.com

Jorge Brito
Tax & Legal
Deloitte Ecuador
jorgebrito@deloitte.com

Andrew Flockhart
Consulting
Deloitte UK
aflockhart@deloitte.co.uk

Oliver Steck
Deloitte & Touche LLP
osteck@deloitte.com

William Greenrose
Deloitte & Touche LLP
wgreenrose@deloitte.com

Contacts

Regional contributors

Canada

Tori Tafferner
Risk Advisory
Deloitte Canada
vtafferner@deloitte.ca

Brenna Boonstra
Risk Advisory
Deloitte Canada
bboonstra@deloitte.ca

Zara Munir
Risk Advisory
Deloitte Canada
zamunir@deloitte.ca

China

Michelle Yue Feng
Consulting
Deloitte China
mifeng@deloitte.com.cn

Clara Sijue Zhang
Consulting
Deloitte China
clarazhang@deloitte.com.cn

European Union

Gillian Quigley
Risk Advisory
Deloitte Ireland
gquigley@deloitte.ie

Tajally Zia
Risk Advisory
Deloitte Italy
tajzia@deloitte.ie

Francesca Aglialoro
Risk Advisory
Deloitte Netherlands
faglialoro@deloitte.nl

Barbora Kolarikova
Risk Advisory
Deloitte Central Europe
bkolarikova@deloittece.com

Amanda Mendia
Risk Advisory
Deloitte France
amendia@deloitte.fr

Valentine Rysenaer
Risk Advisory
Deloitte Belgium
vrysenaer@deloitte.com

Parul Gulati
Risk Advisory
Deloitte Belgium
pagulati@deloitte.com

India

Manpreet Kalra
Risk Advisory
Deloitte India
mankalra@deloitte.com

Contacts

Regional contributors (cont.)

Japan

Minako Akiyama
Deloitte Japan
minako1.akiyama@tohmatsu.co.jp

Hirokazu Kawaguchi
Deloitte Japan
hirokazu.kawaguchi@tohmatsu.co.jp

Yudai Omoto
Deloitte Japan
yudai.omoto@tohmatsu.co.jp

Ryo Ichikawa
Deloitte Japan
ryo.ichikawa@tohmatsu.co.jp

Haruka Anzai
Deloitte Japan
haruka.anzai@tohmatsu.co.jp

Mexico

Alexandro Arias
Tax & Legal
Deloitte Mexico
alarias@deloittemx.com

United Kingdom

Tapish Malik
Consulting
Deloitte UK
tapishmalik@deloitte.co.uk

Louise Wright
Consulting
Deloitte UK
louisewright@deloitte.co.uk

United States

Anil Bhatta
Deloitte Consulting LLP
anilbhatta@deloitte.com

Jaidev Jayakumar
Deloitte & Touche LLP
jajayakumar@deloitte.com

Frederico Brown
Deloitte Consulting LLP
fbrown@deloitte.com

Swati Dharia
Deloitte Consulting LLP
sdharia@deloitte.com

Endnotes

1. Terence Yifan Cai et al., *Never the same again: How COVID-19 created seismic change in life sciences regulations*, Deloitte, December 23, 2021.
2. These approaches were detailed in Deloitte's 2022 report, *Never the same again: How COVID-19 created seismic change in life sciences regulations* (figure 1, p. 6).
3. European Union (EU), EUR-Lex, "Regulation (EU) 2022/123 of the European Parliament and of the Council of 25 January 2022 on a reinforced role for the European Medicines Agency in crisis preparedness and management for medicinal products and medical devices," January 25, 2022.
4. European Medicines Agency (EMA), "Emergency Task Force (ETF)," accessed February 7, 2023.
5. Joanne S. Eglovitch, "FDA describes plans to expand remote regulatory assessments," Regulatory Focus, July 22, 2022.
6. International Coalition of Medicines Regulatory Authorities (ICMRA), "About us," accessed February 16, 2023.
7. Pharmaceutical Inspection Co-operation Scheme (PIC/S), "Members," accessed February 10, 2023.
8. International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH), Homepage, accessed February 10, 2023.
9. EMA, "Clinical Trials Information System," accessed February 7, 2023.
10. FDA, "Digital health technologies for remote data acquisition in clinical investigations," December 2021.
11. Government of India Ministry of Health and Family Welfare (MoHFW), "Telemedicine regulations," press release, July 30, 2021.
12. Access Consortium, "Access Consortium Strategic Plan 2021–2024," accessed February 7, 2023.
13. Association of Pharmaceutical Research and Development Laboratories (AFRIDO), Homepage, accessed February 10, 2023.
14. World Health Organization (WHO), "COVAX: Working for global equitable access to COVID-19 vaccines," accessed February 10, 2023.
15. Department of Justice Canada, "Canada's Emergencies Act," updated February 25, 2022.
16. CP24, "A timeline of events in Canada's fight against COVID-19," December 15, 2020; Mia Rabson, "WHO decision on COVID-19 emergency won't affect Canada's response: Tam," CTV News, January 27, 2023.
17. Health Canada, "Regulations amending certain regulations concerning drugs and medical devices (shortages): Notice," February 26, 2022.
18. Health Canada, "Good manufacturing practices," updated January 16, 2023; Health Canada, "DEL and GMP temporary measures due to COVID-19," updated January 16, 2023.
19. Government of Canada, "Drug & health product inspections," updated November 8, 2016.
20. Health Canada, "Canada and EU recognize good manufacturing practices extra-jurisdictional inspection outcomes before April 1, 2021," updated October 27, 2021.
21. Government of Canada, "Drug & health product inspections."

Endnotes (cont.)

22. Government of Canada, "Drug and vaccine authorizations for COVID-19: List of authorized drugs, vaccines and expanded indications," updated February 17, 2023; Government of Canada, "ARCHIVED Interim order respecting the importation, sale and advertising of drugs for use in relation to COVID-19," updated September 16, 2021.
23. Government of Canada, "Recalls and safety alerts," accessed September 2022; Government of Canada, "Drug & health product inspections"; Health Canada, "Drug and vaccine authorizations for COVID-19."
24. Government of Canada, "Recalls and safety alerts."
25. Government of Canada, "Health product highlights 2021: Helping you maintain and improve your health," updated August 3, 2022; Health Canada, "Regulatory innovation for health products: Overview," updated December 16, 2022.
26. Health Canada, "Management of clinical trials during the COVID-19 pandemic: Notice to clinical trial sponsors," updated January 27, 2023.
27. ***Canada Gazette***, "Clinical Trials for Medical Devices and Drugs Relating to COVID-19 Regulations: SOR/2022-18," Part II, vol. 156, no. 5, February 11, 2022; Health Canada, "Management of clinical trials during the COVID-19 pandemic."
28. Government of Canada, "Health Canada's regulatory response to COVID-19: Access to health products," updated August 8, 2022.
29. Xavier Becerra, "Renewal of determination that a public health emergency exists," US Department of Health and Human Services (HHS), Administration for Strategic Preparedness & Response (ASPR), January 11, 2023.
30. Juliette Cubanski et al., "What happens when COVID-19 emergency declarations end? Implications for coverage, costs, and access," Kaiser Family Foundation, January 31, 2023.
31. Spencer Kimball, "CDC eases Covid guidance as U.S. has more tools to fight the virus and keep people out of the hospital," CNBC, August 11, 2022; US Centers for Disease Control and Prevention (CDC), "CDC streamlines COVID-19 guidance to help the public better protect themselves and understand their risk," press release, August 11, 2022.
32. Alice Park, "FDA experts vote to make all COVID-19 vaccines and boosters bivalent," ***Time***, January 26, 2023.
33. US Food and Drug Administration (FDA), "Coronavirus (COVID-19) update: FDA authorizes updated (bivalent) COVID-19 vaccines for children down to 6 months of age," press release, December 8, 2022; CDC, "COVID Data Tracker: COVID-19 vaccinations in the United States," accessed February 6, 2023.
34. FDA, "FDA Dashboards: Inspections," accessed February 7, 2023.
35. Joanne S. Eglovitch, "Remote interactive evaluations: FDA official discusses lessons learned," ***Regulatory Focus***, April 29, 2022.
36. Jessica Ringel and Amanda J. Klingler, "The pandemic's effect on FDA inspections," ***Chambers and Partners***, August 15, 2022.
37. Regulatory Affairs Professionals Society (RAPS), "FDA 'high-risk' foreign inspections: Post-COVID-19 response to GMP challenges," May 31, 2022.
38. Joanne S. Eglovitch, "FDA describes plans to expand remote regulatory assessments," ***Regulatory Focus***, July 22, 2022.

Endnotes (cont.)

39. FDA, "Emergency Use Authorization," accessed February 3, 2023.
40. Denise H. Hinton, "FDA revocation letter for chloroquine phosphate and hydroxychloroquine sulfate," FDA, June 15, 2020; FDA, "FDA revokes EUAs for two monoclonal antibodies," January 26, 2022.
41. Jacqueline A. O'Shaughnessy, "Revocation of EUA 050 – propoven 2% emulsion," FDA, May 10, 2022.
42. FDA, "FAQs: What happens to EUAs when a public health emergency ends?," updated January 31, 2023.
43. FDA, "Emergency use authorization for vaccines to prevent COVID-19: Guidance for industry," March 31, 2022; FDA, "COVID-19-related guidance documents for industry, FDA staff, and other stakeholders," updated February 1, 2023.
44. FDA, "FDA roundup: April 1, 2022," news release, April 1, 2022.
45. FDA, "FDA guidance on conduct of clinical trials of medical products during the COVID-19 public health emergency," August 2021.
46. FDA, "Digital health technologies for remote data acquisition in clinical investigations," December 2021.
47. Accumulus Synergy, "Merck joins Accumulus Synergy as a sponsor to transform the global drug regulatory submission process," press release, September 20, 2022.
48. FDA, "Coronavirus Treatment Acceleration Program (CTAP)," updated January 24, 2023.
49. US National Institutes of Health (NIH), "National COVID Cohort Collaborative (N3C)," accessed February 7, 2023
50. NIH, "The N3C Data Enclave," accessed February 7, 2023.
51. NIH, "National COVID Cohort Collaborative (N3C)."
52. NIH, "Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV)," accessed February 7, 2023.
53. CDC, "CDC announces $90M funding to support Pathogen Genomics Centers of Excellence (PGCoE) network," press release, September 20, 2022.
54. Información Legislativa y Documental (InfoLEG), "Social Solidarity and Productive Reactivation Law in the Framework of Public Emergency," accessed February 7, 2023; InfoLEG, "Decree DNU 260/2020 National Executive Branch," March 12, 2020; Official Bulletin of the Republic of Argentina, "Health Emergency: Decree 867/2021," December 23, 2021; Argentina National Executive Branch, "Decree 863/2022, Public Emergency in Sanitary Matter: Extension," December 29, 2022.
55. *El Auditor Info*, "ANMAT: Low inspections, lack of personnel and budget under-execution," December 29, 2020.
56. Pan American Health Organization (PAHO), "Administrative controls to guarantee implementation of infection prevention and control measures in the context of COVID-19," June 18, 2020.
57. Pharmaceutical Inspection Co-operation Scheme (PIC/S), "Members."
58. International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH), Homepage.
59. Drug Information Center (CIME), "Authorization for emergency use of COVID-19 vaccines in Argentina," January 2021.
60. National Administration of Drugs, Foods, and Medical Devices (ANMAT), "Vaccines against SARS-CoV-2," accessed February 10, 2023.
61. Argentina Ministry of Health (MS), "Argentina received yesterday 1,044,250 doses of Sputnik V developed by the Richmond laboratory," June 24, 2022.

Endnotes (cont.)

62. ANMAT, Drug information search, accessed January 30, 2023.
63. ANMAT, "Measures and recommendations in clinical pharmacology studies during the COVID-19 pandemic," March 20, 2020.
64. ANMAT, "Authorized clinical studies – COVID19," accessed February 10, 2023.
65. María Florencia Grande Ratti et al., "Effect of COVID-19 pandemic in an emergency department in Argentina," ***Medicina Buenos Aires*** 81, no. 5 (2021): pp. 688–94; ANMAT, "ANMAT signed a collaboration agreement with the European Medicines Agency (EMA)," press release, November 26, 2020; ANMAT, "Meeting between ANMAT authorities and the FDA," May 15, 2019.
66. Government of Colombia, Single Regulatory Information System (SÚN), "Decree 457 of 2020," March 22, 2020.
67. Ministry of Health and Social Protection (MSPS), "Resolution No. 385," March 12, 2020 (in Spanish).
68. MSPS, "Resolution No. 666 of 2022," April 28, 2022 (in Spanish); MSPS, "Measures against the COVID-19 pandemic," accessed February 10, 2023.
69. MSPS, ***Management Report 2021***, March 2022 (in Spanish); National Food and Drug Surveillance Institute (INVIMA), ***Management Report first half 2021*** (in Spanish).
70. BNamericas, "Spotlight: Colombia's vast digital divide between cities and rural areas," November 19, 2021.
71. INVIMA, ***Management Report first half 2019*** (in Spanish); INVIMA, ***Management Report first half 2021*** (in Spanish).
72. Government of Colombia, "Decree 710 of 2021," June 28, 2021 (in Spanish).
73. MSPS, "List of Vaccines COVID-19," accessed February 10, 2023 (in Spanish).
74. Marcela Mercado Reyes et al., "Secondary validation and performance verification of the rapid test 'Gen Body COVID-19 IgM/IgG'," National Institute of Health (INS), accessed February 10, 2023 (in Spanish).
75. INVIMA, "Resolution 2022500003," February 25, 2022 (in Spanish); MSPS, "INVIMA announces administrative measures adopted to guarantee continuity in the provision of services," press release, October 5, 2022 (in Spanish).
76. MSPS, "Resolution No. 730 of 2020," May 7, 2020 (in Spanish).
77. INVIMA, "Clinical studies authorized for COVID-19," accessed February 10, 2023.
78. AFRIDO, Homepage.
79. WHO, "COVAX: Working for global equitable access to COVID-19 vaccines."
80. Juan David Oviedo, "How many donations has Colombia received for emergency care?," Fiscal Observatory of the Pontifical Javeriana University, March 8, 2021 (in Spanish).
81. General Health Council of Mexico (CSG), "AGREEMENT by which the General Health Council recognizes the epidemic of disease caused by the SARS-CoV2 virus (COVID-19) in Mexico, as a serious disease requiring priority attention, as well as establishing the activities for preparation and response to said epidemic," March 23, 2020 (in Spanish).

Endnotes (cont.)

82. Government of Mexico City, "Health emergency," accessed February 9, 2023 (in Spanish).
83. CSG, "AGREEMENT declaring a health emergency due to force majeure, the epidemic of disease generated by the SARS-CoV2 virus (COVID-19)," March 30, 2020 (in Spanish).
84. Federal Commission for the Protection against Sanitary Risks (COFEPRIS) "Verification visits carried out by COFEPRIS," January 26, 2023 (in Spanish).
85. PIC/S, "Members."
86. COFEPRIS, "COFEPRIS Agreements and Arrangements," accessed February 9, 2023 (in Spanish).
87. COFEPRIS, "Authorized COVID-19 vaccines," accessed March 3, 2022 (in Spanish).
88. Ministry of Health, "AGREEMENT establishing the guidelines for the issuance of temporary authorizations for health supplies, for health care establishments and the temporary certification of good manufacturing practices for health supplies that contribute to the eradication and mitigation of the SARS-virus. CoV2 (COVID-19)," March 19, 2021 (in Spanish).
89. COFEPRIS, "Reporting of adverse drug reactions to medications: Instructions for use of e-reporting for health care professionals and patients/consumers," October 10, 2021 (in Spanish).
90. PAHO, "PAHO recognizes COFEPRIS as a National Regulatory Authority of Regional Reference," press release, July 2, 2012 (in Spanish).
91. Statista, "Number of registered clinical studies on COVID-19 in Mexico as of July 2022, by phase," July 13, 2022.
92. COFEPRIS, "Extraordinary measures in relation to clinical trials in the face of the COVID-19 pandemic," April 21, 2020 (in Spanish).
93. COFEPRIS, "COFEPRIS announces changes to investigation protocols processes to expedite response times and promote innovation," March 31, 2021 (in Spanish).
94. Ministry of Health, Progress and Results 2021 (in Spanish).
95. Ibid.
96. Fundación Carlos Slim, "AstraZeneca announces agreement with the Carlos Slim Foundation to supply the COVID-19 vaccine to Latin America," August 12, 2020 (in Spanish).
97. Francesco Guarascio, "Exclusive: EU to move away from emergency phase of COVID pandemic – document," Reuters, April 26, 2022.
98. WHO, "*Statement on the fifteenth meeting of the International Health Regulations (2005) Emergency Committee regarding the coronavirus disease (COVID-19) pandemic*," May 5, 2023
99. EU, EUR-Lex, "Regulation (EU) 2022/123."
100. EMA, "Emergency Task Force (ETF)."
101. EMA, *Annual Report 2021*.
102. EMA, "International regulators' reflections on remote approaches to GCP and GMP regulatory oversight during COVID-19 pandemic," December 13, 2021.
103. EMA, "COVID-19 vaccines: authorized," accessed February 27, 2023.
104. Ibid; EMA, "COVID-19 vaccines," accessed February 27, 2023.
105. EMA, "COVID-19 vaccines."
106. Reuters, "Moderna recalls thousands of COVID vaccine doses in Europe," April 8, 2022.

Endnotes (cont.)

107. Government of the Netherlands (Rijksoverheid), "Temporarily no vaccinations with AstraZeneca as a precaution," news release, March 14, 2021 (in Dutch).

108. Rijksoverheid, "AstraZeneca's corona vaccine," accessed February 7, 2023 (in Dutch).

109. EMA, "Human medicines: Highlights of 2021," February 15, 2022.

110. European Commission, "Revision of the EU general pharmaceuticals legislation," accessed February 7, 2023.

111. European Federation of Pharmaceutical Industries and Associations (EFPIA), ***The EFPIA View***, "A once-in-a-generation opportunity to optimise regulatory timelines to improve time to patient access," November 25, 2021.

112. ***The EFPIA View***, "EFPIA publishes the Evidence MIX (Measures, Insights and eXamples) Report," press release, January 6, 2022; European Federation of Pharmaceutical Industries and Associations (EFPIA), ***Evidence MIX (Measures, Insights, and eXamples): Evaluating the EU Regulatory System,*** January 6, 2022.

113. ***The EFPIA View***, "Pharmaceutical companies to give evidence on responses to Covid-19," September 5, 2022.

114. EMA, "Clinical Trials Regulation," accessed February 7, 2023.

115. EMA, "Clinical Trials Information System," accessed February 7, 2023.

116. EMA, "Call for companies to register their Industry Single Point of Contact (i-SPOC) on supply and availability," June 28, 2022.

117. EMA, "Medicine Shortages Single Point of Contact (SPOC) Working Party," accessed February 7, 2023.

118. University of Cambridge, Bennett Institute for Public Policy, "The history of emergency legislation and the COVID-19 crisis," April 28, 2020.

119. UK Parliament, House of Commons Library, "Expiry of the Coronavirus Act's temporary provisions," March 2, 2022; Legislation.gov.uk, "The Coronavirus Act 2020 (Delay in Expiry: Inquests, Courts and Tribunals, and Statutory Sick Pay) (England and Wales and Northern Ireland) Regulations 2022," March 24, 2022.

120. Medicines and Healthcare products Regulatory Agency (MHRA), "Guidance for industry on MHRA's expectations for return to UK on-site inspections," updated March 19, 2021.

121. MHRA, "Good practice, inspections and enforcement: Detailed information," accessed February 8, 2023.

122. MHRA, MHRA-GMDP search page, accessed September 2022.

123. Legislation.gov.uk, "The Human Medicines Regulations 2012," accessed February 27, 2023.

124. MHRA, "Conditional marketing authorisations, exceptional circumstances marketing authorisations and national scientific advice," December 31, 2020.

125. Deloitte analysis of MHRA regulatory approvals: "Regulatory approval of Pfizer/BioNTech vaccine for COVID-19"; "Regulatory approval of COVID-19 Vaccine Janssen"; "Regulatory approval of COVID-19 Vaccine AstraZeneca"; "Regulatory approval of Spikevax (formerly COVID-19 Vaccine Moderna)"; "Regulatory approval of COVID-19 vaccine Nuvaxovid"; "Regulatory approval of COVID-19 Vaccine Valneva." A seventh vaccine has received Great Britain marketing authorization without first receiving conditional approval; see "Regulatory approval of COVID-19 vaccine VidPrevtyn Beta." All accessed February 27, 2023.

126. Julia Kollewe, "UK approved fewer new drugs than EU and US in year after Brexit transition," ***The Guardian,*** July 14, 2022

Endnotes (cont.)

127. MHRA et al., "Bold new life sciences vision sets path for UK to build on pandemic response and deliver life-changing innovations to patients," press release, July 6, 2021.
128. MHRA, "Guidance: Access Consortium," updated April 6, 2023.
129. Access Consortium, "Access Consortium Strategic Plan 2021–2024."
130. National Health Commission, "Notice on Printing and Distributing the Diagnosis and Treatment Plan for Novel Coronavirus Pneumonia (Ninth Trial Version)," March 14, 2022 (in Chinese).
131. Selina Cheng, "China scraps most Covid testing, quarantine requirements in policy pivot," ***Wall Street Journal*** December 7, 2022.
132. National Medical Products Administration (NMPA), "Statistics on online services," accessed January 2023.
133. Sohu.com, "The Food and Drug Administration issued a document: Off-site inspection guide, here we come!," December 20, 2021 (in Chinese); ***Altitude News***, "During the epidemic prevention and control period, Hainan implemented remote off-site inspections of medical equipment," August 10, 2022 (in Chinese); ***Dazhong Daily Time***, "'Online + Offline'! Pharmaceutical manufacturers in Shandong Province explore remote inspection mode for the first time," May 13, 2022 (in Chinese).
134. Baiao Valley, "The interpretation of the new 'Measures for the Administration of Drug Inspection', which are relevant to pharmaceutical companies?," May 31, 2021 (in Chinese).
135. NMPA, "Guiding opinions of the General Department of the State Food and Drug Administration on strengthening the supervision of the production and operation of medical devices at different levels," September 7, 2022 (in Chinese).
136. Baidu.com, "The State Food and Drug Administration researches and promotes the work of joining PIC/S," June 29, 2022 (in Chinese).
137. NMPA, "Special approval procedures for drugs of the State Food and Drug Administration (Bureau Order No. 21)," November 8, 2005 (in Chinese); Hubei Drug Administration, "The 2021 drug review report is released! The acceptance of innovative drugs increased by 76.1%, and the approval of consistency evaluation increased by 87.18%!," press release, June 2, 2022 (in Chinese).
138. Kan Shaobo, "Yunnan starts the emergency review and approval of preparations and emergency adjustment and use of medical institutions during the epidemic prevention and control period," China Food and Drug Network, February 6, 2020 (in Chinese).
139. Zhongcheng Medical Equipment, "Annual product data | A total of 574 medical device product recalls in 2021," July 2, 2022 (in Chinese).
140. NMPA, "Notice of the Center for Drug Evaluation of the State Food and Drug Administration on releasing the 'Guiding Principles for the Administration of Clinical Trials of Drugs During the Epidemic of New Coronary Pneumonia (Trial)'," July 14, 2020 (in Chinese).
141. Life Garden Management Committee, "Expert workshop on decentralized clinical trial (DCT) pilot work," June 7, 2021 (in Chinese).
142. ***Daily Economic News***, "Meinian Health: The company cooperates with the government to establish long-term nucleic acid testing sites. At present, hundreds of them have been built nationwide and are gradually operating," May 26, 2022 (in Chinese).
143. Dai Wei, "Hefei warns two nucleic acid testing laboratories and suspends cooperation," ***Xinhua News Agency***, April 24, 2022 (in Chinese).

Endnotes (cont.)

144. National Innovation Center for High-Performance Medical Devices, NMED overview, accessed February 8, 2023 (in Chinese).

145. Government of India National Disaster Management Authority, "Order for extending the lockdown period," April 14, 2020.

146. MoHFW, "Ministry of Health & Family Welfare 2020 ACHIEVEMENTS," December 30, 2020.

147. MoHFW, "Effective response in the face of a pandemic: Measures adopted by the Government of India to combat COVID-19," December 24, 2021; MoHFW, "Ministry of Health & Family Welfare 2020 ACHIEVEMENTS."

148. MoHFW, "Guidelines for management of COVID-19 in children (below 18 years)," June 18, 2021.

149. MoHFW, National comprehensive guidelines for management of post-COVID sequelae, accessed February 14, 2023.

150. MoFHW, "Guidelines for international arrivals," December 29, 2022.

151. B.S Sathya Durga, "Modernization of India's pharma manufacturing industry: 'Leader' or 'laggard'," ***PharmTech.com***, August 11, 2022.

152. ***Hindu BusinessLine***, "USFDA inspections are back, but not yet at pre-pandemic levels," September 12, 2022.

153. Joanne S. Eglovitch, "Unannounced FDA inspections have started in India, not China," ***Regulatory Focus***, April 7, 2022.

154. Durga, "Modernization of India's pharma manufacturing industry: 'Leader' or 'laggard.'"

155. Central Drug Standards Control Authority (CDSCO), "Approved COVID-19 vaccines as on 04.10.2022," April 10, 2022.

156. Government of India Directorate General of Health Services, "Guidance for approval COVID-19 vaccines in India for restricted use in emergency situation which are already approved for restricted use by US FDA, EMA, UK MHRA, PMDA Japan or which are listed in WHO Emergency Use Listing (EUL)," CDSCO, June 1, 2021.

157. MoHFW, "Comprehensive guidelines for management of COVID-19 in CHILDREN and ADOLESCENTS (below 18 years)," updated January 17, 2022; Government of India Directorate General of Health Services, "Advisory for rational use of Remdesivir for COVID-19 treatment," MoHFW, accessed February 14, 2023.

158. Government of India Ministry of Chemicals & Fertilizers Department of Pharmaceuticals, ***Annual Report 2021–22.***

159. Government of India Directorate General of Health Services, "Special conditions under which the permission for import of drug with residual shelf life less than 60% is allowed," CDSCO, May 5, 2022.

160. Gireesh Babu, "Centre issues notification on stockpiling of new drug under phase III clinical trial in the wake of Covid-19," ***PharmaBiz.com***, February 12, 2022.

161. MoHFW, "Telemedicine regulations."

162. MoHFW, "New Recommendations of NEGVAC accepted by Union Ministry of Health," May 19, 2021.

163. Indian Council of Medical Research, "Details of National Task Force (NTF) and its research groups meetings on COVID-19 (Diagnostic Group, Epidemiology & Surveillance Working Group (ESWG), Operational Research (OR) Group & Clinical Research Group (CRG))"; Indian Council of Medical Research, "Clinical guidance for management of adult COVID-19 patients," January 14, 2022.

Endnotes (cont.)

164. Ministry of Science and Technology, "Indian SARS-CoV-2 Genomics Consortium," updated January 30, 2023.

165. Government of Japan, "Report on the status of implementation of the state of emergency declaration," June 2020 (in Japanese); "Report on the status of implementation of the state of emergency declaration," October 2021 (in Japanese).

166. Pharmaceuticals and Medical Devices Agency (PMDA), "Reiwa third fiscal year (2021) business performance," accessed February 14, 2023 (in Japanese).

167. PMDA, "Reiwa second fiscal year (2020) business performance," (in Japanese); PMDA, "Reiwa third fiscal year (2021) business performance."

168. United States Food and Drug Administration (FDA), "Medical Device Single Audit Program Frequently Asked Questions," August 22, 2017.

169. Ministry of Health, Labor, and Welfare (MHLW), "Approval review approach in the emergency approval system," accessed February 14, 2023 (in Japanese); MHLW, "FAQs: Emergency approval system for drugs, etc.," accessed February 14, 2023 (in Japanese).

170. Hideki Maeda, "Japan's Special Approval for Emergency System During the COVID-19 Pandemic," ***Clinical Pharmacology & Therapeutics*** 111, no. 3, (March 2022): pp. 551–8.

171. PMDA, "List of newly approved drugs 2020 April to 2021 March," accessed February 14, 2023 (in Japanese); PMDA, "List of newly approved drugs 2021 April to 2022 March," accessed February 14, 2023 (in Japanese); PMDA, "List of newly approved drugs 2022 April to 2022 December," accessed February 14, 2023 (in Japanese).

172. PMDA, "Q&A on conduct of clinical trials," accessed February 14, 2023 (in Japanese).

173. Japan Pharmaceutical Manufacturers Association (JPMA) "Data flow in DCT and ensuring its reliability: Detailed summary of survey results," August 2022 (in Japanese).

174. PMDA, "How to submit pharmaceutical and regenerative medicine product compliance investigation and GCP/GPSP investigation documentation through the gateway system," accessed February 14, 2023 (in Japanese).

175. MHLW, "Guidelines for the appropriate implementation of online medical treatment," April 1, 2022 (in Japanese); Aiko Yamada and Nobuki Wada, "A quick regulatory guide to telehealth services in Japan," ***Healthcare IT News***, June 9, 2022.

176. Yakuji Nippo, "Future of the attention-grabbing Japanese version of the CDC," June 24, 2022 (in Japanese).

Deloitte.

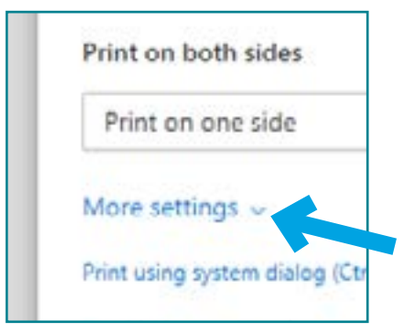
Printing instructions

When printing from your web browser using the default settings, white bars may appear on the top and bottom of a letter-size sheet (8.5"x11"). To avoid this, either print on a legal-size sheet (8.5"x14") or follow the instructions below:

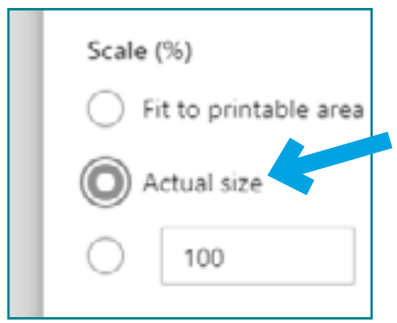
If printing from Microsoft Edge:

1. Click on the print icon

2. Scroll down to "more settings" and click to expand the menu



3. Change "Scale (%)" to "Actual size"

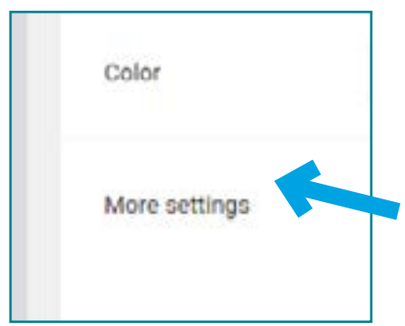


4. Click on the print button to print the document.

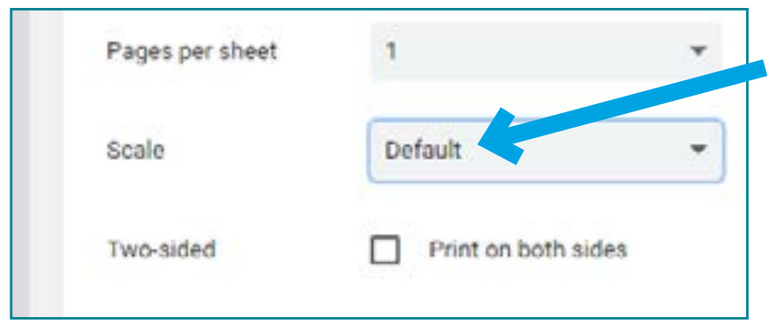
If printing from Google Chrome:

1. Click on the print icon

2. Scroll down to "more settings" and click to expand the menu



3. Change "Scale (%)" to "Default" (if needed)



4. Click on the print button to print the document.

BACK TO BEGINNING