



CENTER FOR DRUG EVALUATION AND RESEARCH

What's New in Regulatory Science



Issue II- 2023

CONTENTS

COVID-19-Related Efforts	2
Regulatory Science in Action	3
In Press	8
CDER- Research Areas, Tools, and Trainings	9
Upcoming Events	10
Career Opportunities	11

Brought to you by the [Office of Translational Sciences \(OTS\)](#) in collaboration with the [Office of Communications](#) within the [Center for Drug Evaluation and Research \(CDER\)](#)

What's New in Regulatory Science is a quarterly newsletter from the Food and Drug Administration's (FDA's) Center for Drug Evaluation and Research (CDER). It features new developments, opportunities, and initiatives in drug development and regulatory science, with the goal of advancing medical product development.

Please share this message and the [sign-up link](#) with colleagues (select regulatory science as the topic area). If you have comments or questions, please contact us at OTSCcommunications@fda.hhs.gov.



COVID-19- RELATED EFFORTS

FDA has engaged in numerous activities to protect and promote public health during the COVID-19 pandemic. For CDER, these efforts include accelerating development of treatments for COVID-19, maintaining and securing drug supply chains, providing guidance to stakeholders, advising developers on how to handle issues related to clinical trials and keeping the public informed. Previous updates on some of CDER's efforts related to treatment of COVID-19 can be found in the [2020 - 2023](#) issues of the newsletter and in the webpages below:

- [Coronavirus \(COVID-19\) Drugs Web Page](#)
- [FDA's Work to Combat the COVID-19 Pandemic](#)
- [FDA Updates on Hand Sanitizers Consumers Should Not Use](#)
- [COVID-19 Health Care Professional Resources](#)
- [Workshop](#)
- [Summary Report](#)

COVID-19 APPROVALS, EMERGENCY USE AUTHORIZATIONS, AND UPDATES

FDA Approves First Oral Antiviral for Treatment of COVID-19 in Adults

May 25, 2023: The U.S. Food and Drug Administration approved the oral antiviral Paxlovid (nirmatrelvir tablets and ritonavir tablets, co-packaged for oral use) for the treatment of mild-to-moderate COVID-19 in adults who are at high risk for progression to severe COVID-19, including hospitalization or death. [Learn more](#).

REGULATORY SCIENCE IN ACTION

May 10, 2023: FDA Releases Two Discussion Papers to Spur Conversation about Artificial Intelligence and Machine Learning in Drug Development and Manufacturing

The FDA has released a discussion paper, "[Using Artificial Intelligence and Machine Learning in the Development of Drug and Biological Products](#)," to address challenges associated with AI/ML in drug development, such as improper data sharing and cybersecurity risks. To further address the use of AI in drug manufacturing, CDER issued another discussion paper, "[Artificial Intelligence in Drug Manufacturing](#)," as part of the [Framework for Regulatory Advanced Manufacturing Evaluation \(FRAME\) Initiative](#)." [Learn more](#).

June 13, 2023: Accelerating Rare disease Cures (ARC) Program Emerges as a Conduit for Empowering Rare Disease Stakeholders

Last year, CDER launched the Accelerating Rare disease Cures (ARC) Program to help bridge the gap between the complexities of rare disease drug development and the pressing needs of patients. One year later, ARC has emerged as a conduit for empowering rare disease stakeholders (patients, patient advocates, drug developers, and academic researchers) to harness their collective experiences and expertise to drive progress. [Learn more](#).

REGULATORY SCIENCE IMPACT STORIES

FDA shows generic lamotrigine extended-release tablets are bioequivalent to innovator drug



Lamotrigine is one of the most prescribed antiepileptics. To address concerns about the risks of generic-brand substitution of ER lamotrigine products, CDER researchers led an open label, crossover bioequivalence study to compare generic lamotrigine ER tablet (200 mg) to its brand equivalent under fed conditions. They found that the criteria for BE were met. An *in silico* simulation study that focused on formulation differences and the pharmacokinetic profile at steady state while addressing within-subject variability also supported using generic lamotrigine oral products to make treatments less expensive and more widely available. [Learn more.](#)

Gadolinium-based contrast agents for MRI: safety in pregnancy

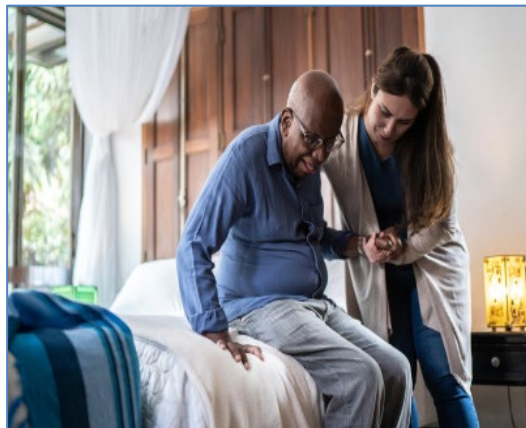


Gadolinium-based contrast agents (GBCAs) may be given to patients undergoing MRI to provide more detailed images. Recently, concerns have been raised as to whether GBCAs are safe during pregnancy. With collaborators at the University of Florida, CDER researchers used health care data to assemble 2 cohorts of patients—782 who had received a GBCA-MRI during pregnancy and 5,209 who underwent MRI while pregnant without the contrast agent—and compared risks of fetal or neonatal death and admission to the NICU shortly after birth. They did not find a statistically significant difference in the risks for either outcome associated with exposure to GBCA-MRI. [Learn more.](#)

SPOTLIGHT ON CDER SCIENCE

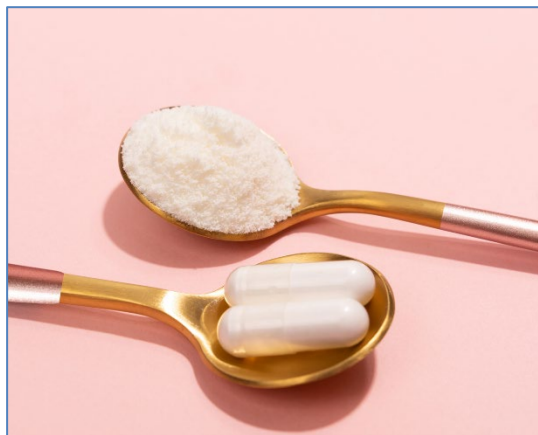
Using Patient-Reported Outcomes to Measure Frailty in Patients with Multiple Myeloma

Frailty is an aging-related syndrome of cumulative physical and physiological decline, which can include symptoms such as weakness and fatigue, greater medical complications, and lower tolerance for medical treatments. Frailty measures that use patient self-reports called patient-reported outcomes can provide scientific information on a patient's experience. In a recent study, FDA and outside researchers explored the role of patient-reported outcomes in helping to assess frailty in patients with multiple myeloma. [Read the Spotlight on CDER Science.](#)



Laboratory Study Shows Oral Antacid Drug Performs Differently When Mixed with Various Food Vehicles

CDER researchers conducted a laboratory study exploring how an oral antacid drug may perform differently when mixed (as granules) into different food vehicles. Researchers focused on pantoprazole sodium, which treats stomach and esophagus problems. These researchers confirmed that a laboratory assessment can detect the effect of the food vehicle on the drug performance, which has implications for evaluating drug safety and efficacy. [Read the Spotlight on CDER Science.](#)





Bispecific Antibodies: An Area of Research and Clinical Applications

Bispecific antibodies (BsAbs) have two distinct binding domains that can bind to two antigens or two epitopes (an antigen part) of the same antigen simultaneously. Over the past two decades, BsAb development has been revolutionized due to genetic engineering approaches that enable a wide variety of molecular structures that offer different advantages and disadvantages. FDA staff have been conducting research to analyze different BsAb molecular formats using physiochemical and biological approaches. The goals of these studies are not to develop drugs, but rather to understand how different formats of BsAbs impact quality aspects (e.g., product characterization, bioassay or potency assay development, and stability). [Read the Spotlight on CDER Science.](#)

PODCASTS

CDER Small Business and Industry Assistance Chronicles Podcasts



[Podcast: Bayesian statistical approaches to advance drug development and evaluation](#)

In this interview, Dr. Jennifer Clark, a lead mathematical statistician in the Office of Biostatistics, discusses the applications of Bayesian statistical approaches in critical aspects of drug evaluation, including determining the safety and efficacy of drugs in children when there is relevant evidence from studies in adults, dose finding (for example, in oncology trials), estimating treatment effects in patient subgroups, and designing and analyzing adaptive clinical trials.

IN PRESS

This section provides highlights of select CDER research recently published in scientific journals. [Click here](#) to see the complete FDA publication list. To view CDER publications on this site, select Drugs under the “Centers” category.



Discordant Clinical and Microbiological Outcomes Are Associated with Late Clinical Relapse in Clinical Trials for Complicated Urinary Tract Infections

CDER researchers analyzed 13 clinical trials of drugs to treat complicated urinary tract infections and concluded that positive urine culture after treatment was associated with increased risk of late clinical failure and that microbiological outcomes are an important component of the endpoint. [Learn more.](#)

PharmBERT: a domain-specific BERT model for drug labels

This study developed PharmBERT by pre-training the general large language model BERT on drug labels. PharmBERT outperformed other BERT-based models in multiple natural language processing tasks in the drug label domain. [Learn more.](#)

Evaluation of Model-Based Bioequivalence Approach for Single Sample Pharmacokinetic Studies

This study compared a model-based approach and the currently recommended method (bootstrap non-compartmental analysis) to establish bioequivalence (BE) for ophthalmic drug products. The authors propose that the model-based BE approach could be a viable consideration for single-sample pharmacokinetic (PK) studies when the PK model is accurately specified. [Learn more.](#)

Transport and Deposition of Beclomethasone Dipropionate Drug Aerosols with Varying Ethanol Concentration in Severe Asthmatic Subjects

Researchers from the University of Iowa and CDER describe a computational fluid dynamics modeling approach to predict lung deposition for different formulations of the corticosteroid beclomethasone dipropionate in asthmatic patients with different lung morphologies. The authors suggest that their approach could potentially inform the selection of co-solvent amounts for inhalation therapies for patients with asthma. [Learn more.](#)

A spike-control approach that evaluates high resolution mass spectrometry-based sequence variant analytical method performance for therapeutic proteins.

“CDER researchers describe a way to evaluate analytical procedures designed to detect and quantify unwanted sequence variants in monoclonal antibodies and other recombinant protein-based therapeutics”. [Learn more.](#)

CDER- RESEARCH AREAS, TOOLS AND TRAININGS

1. CDER's Regulatory Science Program Areas

CDER's diverse research programs address a wide variety of critical areas that affect drug safety and manufacturing quality. Learn more at <https://www.fda.gov/drugs/science-and-research-drugs/cders-regulatory-science-program-areas>.

2. Research Tools and Resources

Developing and sharing knowledge and scientific resources with researchers in the public and private sectors is at the heart of what CDER scientists do. Learn more about scientific tools and resources at CDER/FDA at <https://www.fda.gov/drugs/science-and-research-drugs/research-tools-and-resources>.

3. Office of New Drugs- Regulatory Science Research

The Office of New Drugs (OND)-led regulatory science research projects are designed to address knowledge gaps identified during regulatory review of investigational or new drug applications. Learn more about these research programs at <https://www.fda.gov/about-fda/center-drug-evaluation-and-research-cder/office-new-drugs-regulatory-science-research>.

4. Office of Generic Drugs- Science and Research

The Office of Research and Standards within the FDA's Office of Generic Drugs (OGD) supports the Science and Research program established under the Generic Drug User Fee Amendments (GDUFA). In collaboration with industry and the public, FDA creates an annual list of its regulatory science initiatives on generic drugs. Learn more at <https://www.fda.gov/drugs/generic-drugs/science-research>.

5. CDER- Training and Education

Information on learning opportunities for healthcare professionals, researchers in industry and academia, students, and consumers can be accessed at <https://www.fda.gov/Training/ForHealthProfessionals/default.htm>.

UPCOMING EVENTS

Information on upcoming meetings, conferences, and workshops sponsored or co-sponsored by CDER, click [here](#). Some of the events are listed below:

- **September 12-13, 2023: 2023 Scientific Computing Days**
The 11th annual Scientific Computing Days symposium is intended to promote the latest advances in scientific computing technologies and help FDA improve the application of technology and scientific computing in support of its public health mission. This year's theme is "Sharing and Collaboration in the Data Multiverse: Scientific Computing for Public Health Solutions." [Learn more](#).
- **September 26-27, 2023: FDA/PQRI Workshop on the Regulatory Framework for the Utilization of Artificial Intelligence in Pharmaceutical Manufacturing**
This workshop aims to facilitate interaction among AI stakeholders in critical areas for development, implementation, and regulatory consideration, including uses of AI in process development and control, operation of Pharmaceutical Quality Systems, lifecycle approaches, and Current Good Manufacturing Practice. [Learn more](#).
- **October 12, 2023: FDA-CRCG Workshop on Advances in PBPK Modeling and its Regulatory Utility for Oral Drug Product Development**
Participants in this workshop will discuss current challenges and recent experience and advances in developing oral physiologically based pharmacokinetic models to support bio-predictive in vitro testing and the risks associated with extrapolation of bioequivalence from one context to another. [Learn more](#).
- **November 2 – 3, 2023: FDA-CRCG Workshop on Comparative User Interface Assessment for Drug-Device Combination Products: Updates and Challenges in Demonstrating Generic Substitutability**
This goal of this workshop is to share new information that can inform drug-device combination product (DDCP) development, discuss challenges in developing generic DDCPs, and explore potential solutions. [Learn more](#).
- **December 7-8, 2023: FDA-CRCG Workshop on Characterization of Complex Excipients/Formulations**
Participants will discuss scientific principles and newly developed analytical methods to support characterizations of complex excipients and related complex formulations. [Learn more](#).

CAREER OPPORTUNITIES



**You want to make a
difference.**

**FDA wants to hire
You.**

Scientific Internships and Fellowships

Whether you're an undergraduate looking to pursue a career in science, a graduate student seeking experience in regulatory science, a postgraduate looking for fellowship opportunities, or a senior scientist pursuing research experience in your field of expertise, FDA offers you many paths to learning about the exciting field of regulatory science. Click [here](#) for more information.

Employment

FDA continues to recruit and retain a world-class workforce dedicated to protecting and promoting public health. Information on job vacancies, employment events, and hiring programs can be found by following [@FDAJobs on Twitter](#) and by visiting [FDA's LinkedIn page](#), [Jobs at CDER](#), or the [Career Opportunities at CDER](#) webpage. In addition, you can contact OTS directly at CDEROTSHires@fda.hhs.gov. Help us spread the news through your social media networks!