Food and Drug Administration Drug Approval Process

A History and Overview

Christopher Ty Williams, DNP, RN, ACNP-BC, FNP-BC

KEYWORDS

• Food and Drug Administration • Drug review • Drug approval • Expedited reviews

KEY POINTS

- The US Food and Drug Administration (FDA) is a science-based regulatory agency with a public health mission, including the review and surveillance of human and veterinary drugs.
- Before filing a new drug application, 3 phases of investigational clinical trials must be completed. Typically, at least 2 phase 3 clinical trials are required.
- The length of time required to complete preclinical and clinical testing can be 10 to 15 years.
- Decreasing numbers of uninsured Americans and escalating development costs highlight the need to bring drugs to market in a safe, expeditious manner.

INTRODUCTION

From 2010 to mid-2014, the number of uninsured working-aged adults decreased by 16%, or 8 million people.[1] This reduction was associated with the increased availability of subsidized insurance options. Furthermore, working-aged adults have reported increased access to care and decreased stress linked to insurance-related financial burdens.[1] Representing an increase of 12.2% from the previous period, US prescription sales for the period October, 2013 to September, 2014 totaled $360.7 billion dollars.[2] This increase was attributed to the improving US economy and the increased number of individuals who gained insurance through the provisions of the Patient Protection and Affordable Care Act (PPACA) of 2010. In 2015, overall health care spending is estimated to increase 17.6%.[2]

As of 2014, the cost of bringing a new drug to market in the United States can exceed $2.5 billion.[3,4] In an effort to meet consumer and industry demands, the US

Disclosure: The author declares that there are no conflicts of interest.
DNP Program, Vanderbilt University School of Nursing, 461 21st Avenue South, Nashville, TN 37240, USA
E-mail address: christopher.t.williams@vanderbilt.edu

Nurs Clin N Am 51 (2016) 1–11
http://dx.doi.org/10.1016/j.cnur.2015.10.007 **nursing.theclinics.com**
0029-6465/16/$ – see front matter

Food and Drug Administration (FDA) has taken efforts to streamline the new drug testing and approval process, including shortening the median approval time for new drugs from 19 to 10 months.[3] In 2011, the FDA approved 30 new therapeutics (molecular entities and biologics), the most since 2004. Approved drugs consisted of 11 first-in-class agents, including drugs developed to treat unaddressed diseases and to reach new populations.[5] The purpose of this article is to review the FDA's history and milestone legislation and to provide an overview of the FDA's drug development and approval processes.

BACKGROUND

The FDA operates within the US Department of Health and Human Services as a "science-based regulatory agency with a public health mission."[3,6] The FDA has multiple missions, including ensuring public health through monitoring the safety and efficacy of human and veterinary drugs and devices (brand name and generic), as well as developing strategies to increase both safety and efficacy.[6,7] The FDA is also responsible for monitoring and ensuring the safety of foods and cosmetics, including production in sanitary conditions and the use of safe ingredients.[3,6] In addition, tobacco products fall under the jurisdiction of the FDA, which also advocates for smoking cessation and reducing the number of minors who consume tobacco products. The FDA is charged with ensuring the safety of vaccines, biopharmaceuticals, blood products, medical devices, and electromagnetic radiation-emitting devices. Current strategic priorities for the organization, as directed by Congress, include safety and quality, regulatory science, smart regulation, globalization, and stewardship.[6]

Concepts

Safety, efficacy, and effectiveness are key concepts involved in understanding the FDA drug development and approval process. Safety can be measured by evaluating adverse reactions related to drug exposure or by toxicity testing, when the highest tolerable or optimal dose is determined.[8] Efficacy refers to the performance of the drug compared with placebo in a near-ideal environment, such as a clinical trial, in which investigators can control conditions. Similarly, effectiveness provides a real-life description of the action of the drug, which can be affected by comorbidities, medication interactions, and other wide-ranging factors and variables.[8]

Prescription drug labeling information is also commonly known as prescribing information or package inserts. Drug labels are required to provide a summary of safe and effective drug use. They are required to be accurate, with no false or misleading statements or implied claims.[9,10] Although patients may benefit from drug labeling, its primary purpose is to give health care providers the essential information needed to appropriately prescribe the drug.[10]

Importantly, drug labeling does not substitute for FDA-approved patient education materials. In 2006, the FDA reformatted drug-labeling requirements, with input from focus groups, surveys, and public meetings with prescribers.[9] The revision added specific sections (eg, highlights of prescribing information) and reordered and reorganized other sections for clarity and completeness. The adverse reactions section consolidated all risk information and, in efforts to encourage adverse event reporting, includes the telephone number and Web address for the manufacturer and MedWatch, the FDA's adverse reporting system. Furthermore, the adverse reactions from clinical trials are reported separately from postmarket surveillance. Since 2006, all new drug applications (NDAs) must conform to FDA labeling requirements at the time of submission.[9,10]