

# HISTORY OF PHARMACY SIG NEWSLETTER

## *Pharmacy Chronicles: Past, Present, and Future*

### **WELCOME MESSAGE FROM THE CHAIR, HISTORY OF PHARMACY SPECIAL INTEREST GROUP**

#### **Dear Readers,**

I was asked to provide a message since this is the first newsletter with me as the History of Pharmacy SIG chair. As an introduction, I had a long and varied career before entering academia full-time. I was in the military; was a nuclear pharmacist, worked in home health and served as President of the National Home Infusion Association; was a clinical manager and consultant pharmacist in long term care (and continue to consult two nursing homes); and my primary employment before joining Feik School of Pharmacy (FSOP) was hospital pharmacy management.

I think there are many things that today's pharmacy profession can learn from its past. Have you been practicing long enough to recall when pharmacy was America's most trusted profession? Reference the attached promotional coffee mug

(back when such giveaways weren't against the rules). Our last year as number one was 1996. Since then, nursing has primarily ruled the roost and COVID has likely cemented their claim to number one for years to come. I wonder if today's students realize that we were number one and how we got there? My impression is that it was the pharmacists who were active community members practicing at corner drugstores. Those days are gone and if



we ever want to regain the top spot, it will be the result of an expansion of services. Today's impression of the profession is a pharmacist working behind the counter in a chain community pharmacy. As we transition to more clinical roles, can we regain that level of the public's trust?

While I'm on my soapbox, let's discuss "How do we preserve our history?" Feik School of Pharmacy is consistently a top performer when it comes to graduating Hispanic pharmacists. I have always thought that conveying the past to students was important. With our Hispanic graduates, what message do we send if we don't discuss their rich heritage and Texas' early Hispanic practitioners? One of the first things I did as a new faculty member was to develop a list of older Hispanic pharmacists and send them a questionnaire regarding how and why they entered the profession. What I discovered was I was probably five years too late in asking those questions because the first generation of Hispanic pharmacists had died with no one memorializing their history. There were a few survivors who entered the profession in the 1950s but not enough to provide more than some limited anecdotal information.

I'm betting that most members of the History of Pharmacy SIG have obtained at a few collectible

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## Meet the Editors

## Editor



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Thank you ...

The Editors would like to thank the volunteers who performed the peer reviews and editing for this year.

*Rebecca Anderson*  
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*Paul Jungnickel*  
*Karen Nagel-Edwards*  
*Megan Undeberg*  
*Scott Wisneski*



## Message from the Editor

**Welcome** We are very pleased to present the 11<sup>th</sup> issue of the History of Pharmacy SIG Newsletter *Pharmacy Chronicles: Past, Present, and Future*. As we continue to emerge from our COVID-19-induced isolation of the past almost two years, this issue represents our fifth year of presenting peer-reviewed articles for your reading pleasure. Also, we must grate-

fully acknowledge our peer reviewers who respond quickly and with constructive comments to the authors, resulting in a higher quality publication. We always welcome volunteers to be peer reviewers (just drop us an email); we appreciate your efforts and the burden is light.

Of course, we would not have a publication without

the time, effort and expertise of all of the authors who have provided insightful and interesting stories that enhance our professional history and spotlight so many contributors over the years. For our readers, don't forget to encourage your students to add to our pages. Their perspective can often provide a fresh look at the past and benefit both student and teacher.

As a further incentive to authors, we remind you that in the Spring, we reached an agreement with the American Institute of the History of Pharmacy to further share our content on their website, thus increasing the exposure for our authors.

In our current issue we have a number of articles on a variety of topics. Some

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**James A. Dasher**  
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Chair



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**S I G O F F I C E R S**

# ANNOUNCEMENTS

## Message from the Chair...

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pharmacy items. My office is full of “pharmacy stuff”. I just counted, and I have 65 pharmacist figurines (and probably that many more at home). I also have numerous collectible items, many of museum quality. What happens to this collection when I die because no one else in my family is a pharmacist? FSOP has a very nice pharmacy museum and as I’ve told the Dean when I leave, my collection stays, and I’ll likely add most of the items currently on display at my home. Have you thought about what will happen to your items in the future? Just food for thought.

I’m excited about this year and looking forward to attending the AACP meeting in person. The History of Pharmacy SIG is working on a presentation that we think will be timely and interesting (more to follow). Feel free to reach out to me if you have thoughts or comments on things the SIG might do. We need to be a viable organization that serves a purpose.

Sincerely,

—Tony Dasher,  
SIG Chair

## Message from the Editor...

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of the topics include a famous politician with pharmacist roots; a couple of articles addressing current and past infectious epidemics/pandemics, another perspective on a true pharmacist hero in the harshest of times; the first licensed pharmacist in the U.S.; and a further slice of pharmacy in cinema, starring Charles Coburn and Rock Hudson (only my contemporaries will recognize the names) set in a pharmacy in small town America during the 1920’s, among other articles.

We welcome a short, newsy piece of trivia or a full article for peer review (1500-2000 words). Pictures are always good! To volunteer, contribute or just have a question, please feel free to contact either Cathy Taglieri or Bernie Olin. We are always happy to hear from you.

—Bernie Olin, PharmD., Auburn University,  
Harrison School of Pharmacy



## What is it?

### Pharmacy History - What is It?

By Michael Hegener



Over the years, various substances were prescribed for their purported aphrodisiac effects. Some of the more prominently utilized ones were cantharides (Spanish fly), yohimbe, and damiana. With the possible exception of damiana, these substances did exert

a pharmacological effect to cause sexual stimulation, but they weren’t without serious adverse effects.

Cantharides comes from the Spanish fly, also known as cantharis vericatoria beetle. Cantharidin is a powerful irritant and vesicant. When taken internally in small doses, it enters the urine and inflames the urethra, which may result in an (albeit painful) erection. If too much was taken, it could cause bloody stools, convulsions, and severe gastroenteritis.

Yohimbe, derived from the bark of the African tree *Pausinystalia johimbe*, was promoted for inducing erection. It is thought to elicit this effect via the sympathetic nervous system, by blocking alpha 2 receptors (thereby blocking negative feedback mechanisms). Yo-

himbe can still be purchased at dietary supplement retailers today, however its efficacy for erectile dysfunction is not well substantiated and its medical use is not recommended.

Damiana is a small, mint-like plant. Though not well studied, it was thought to elicit its aphrodisiac effects at the CNS level. It was commonly combined with nux vomica (strychnine), iron, and phosphorus to help with impotence. Notice that the labels even advertise that it is an aphrodisiac.

While most find the use of these substances as aphrodisiacs comical today, their use was based on the scientific knowledge available at the time.

*\*This is a historical summary and not to be interpreted as medical advice.*



## ADVOCATE FOR HISTORY OF PHARMACY IN THE ACPE STANDARDS 2025!

AACP has started work on the 2025 Standards for Accreditation! Please reach out to ACPE to share your thoughts on the necessity of continuing to include teaching the History of Pharmacy in Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree, “Standards 2025.”

Please add your comments to the online portal: [https://acpe-accredit.formstack.com/forms/standards\\_revision](https://acpe-accredit.formstack.com/forms/standards_revision) open until 12/31/2021 or send an email to J. Gregory Boyer, PhD at [gboyer@acpe-accredit.org](mailto:gboyer@acpe-accredit.org) or write a letter to Accreditation Council for Pharmacy Education (ACPE), Draft Standards 2025, 135 South LaSalle Street, Suite 4100, Chicago, IL 60603-4810.



### AMERICAN INSTITUTE OF THE HISTORY OF PHARMACY UPDATE

Greetings from the American Institute of the History of Pharmacy! Here is a summary of happenings at the Institute over the past six months:

**AIHP Establishes Strategic Priorities:** AIHP’s Board of Directors have set the following [four strategic priorities](#) to focus the work of the Institute over the next three years: (1) Increase the accessibility of AIHP’s historical collections; (2) Increase AIHP’s operating revenues by at least \$50,000 annually; (3) Increase partnerships and collaborations with pharmacy, pharmaceutical, and historical organizations; and (4) Integrate and promote diversity, equity, and inclusion in all aspects of AIHP’s programs and operations. [A 16-point action plan](#) to implement these priorities includes deepening AIHP’s ties with the AACP History of Pharmacy Special Interest Group.

**AIHP Submits Comments to ACPE Supporting History of Pharmacy Instruction in PharmD Curriculum:** In response to ACPE’s requests for comments as it begins revising the standards for PharmD programs, AIHP has submitted a letter urging retention of instruction in the history of pharmacy among the required elements in the PharmD curriculum. The letter states that “[i]t is essential to require the history of pharmacy in the Doctor of Pharmacy curricula to establish the foundation of the profession as we chart new directions in the future.” The letter was drafted by a task force comprised of Institute members, most of whom are also active HOP SIG members. AIHP encourages HOP SIG members to [submit comments to ACPE](#) in support of history of pharmacy instruction requirements.

**First issue of *History of Pharmacy and Pharmaceuticals* Published:** After a comprehensive editorial and stylistic revamp, the first issue of AIHP’s rebranded academic journal,

[History of Pharmacy and Pharmaceuticals](#), was recently published. Going forward, the journal will be published semi-annually. A subscription to the journal, now published by the University of Wisconsin Press, is included in your AIHP membership.

**AIHP Opens New Online Exhibit:** The Institute recently opened its latest online digital exhibit, [“Contested Cannabis: A History of Marijuana in Wisconsin and the Wider World.”](#) To mark the opening of the exhibit, the Institute on December 8 hosted an online virtual roundtable discussion. The exhibit explores and explains the history of cannabis, hemp, and marijuana in Wisconsin and across the United States through five themes: Taxonomy; Hemp Agriculture; Pharmacy & Medicine; Propaganda & Education; and De/Criminalization. The exhibit and roundtable were designed to promote public discussion and debate about legislative initiatives to de-criminalize the use and possession of cannabis. We hope you’ll check out the exhibit!

**AIHP Bestows Awards for Pharmacy History Achievements:** AIHP awarded the [2021 George Urdang Medal](#) to Olivier Lafont, a French historian of pharmacy and medicine, for his lifetime achievements in the field of the history of pharmacy and pharmaceuticals. The [2021 AIHP Robert P. Fischelis Award](#) was awarded to Metta Lou Henderson, PhD, for her extraordinary contributions to the Institute and the field of pharmacy history. Dr. Henderson was cited for her pioneering work to develop the history of women in pharmacy and for her donation of the “Metta Lou Henderson Women in Pharmacy Collection” to AIHP’s historical collections.

## YELLOW FEVER IN PHILADELPHIA IN 1793: A FIELD TRIP TO THE LOCAL HISTORICAL SOCIETY

By Madeline King



I reached out to the Historical Society of Pennsylvania to see what documents they may have that related to the 1793 Yellow Fever epidemic that plagued Philadelphia. My main curiosity was how the epidemic was described to the public and what ads may have been published in newspapers about potential treatments and cures. The epidemic is one of the largest in US history, and was likely caused by incoming refugees resulting from the slave revolt in Saint-Dominique. In 1793, before cold weather quelled the epidemic, over 5,000 people in the region had died of Yellow Fever. Philadelphia had experienced prior epidemics of Yellow Fever in 1699 and 1762 as well, however there wouldn't have been many people who were still around by the time the 1793 epidemic occurred.<sup>1</sup>

Due to a Haitian revolt in the 1790s, French soldiers fled to Saint-Dominique, and became affected by local diseases, including Yellow Fever. Ships headed to Philadelphia full of refugees likely carried the Yellow Fever virus along with mosquitoes.<sup>2</sup> After the epidemic started in Philadelphia, many people from the Philadelphia and DC areas left the cities to flee to the countryside in hopes of avoiding the disease.

I was able to review newspaper articles, as well as letters and pamphlets from the era. I found it very interesting to read first hand accounts of the epidemic, as well as see how it

was presented to the public. The first documents I reviewed were newspapers, including Dunlap's American Daily Advertiser and General Adviser. I began with publications in the summer of 1793 when the epidemic began in Philadelphia. The first mention of the disease in the US was from articles in the beginning of September 1793. On September 3, 1793 there was a comment about the port of Baltimore fearing a ship full of sick people coming to its docks. On September 6, 1793, a short entry by I Nathaniel Falconer cautioned pilots in the Delaware River and Bay areas from bringing people from the West Indies to the city of Philadelphia.<sup>3</sup>

Shortly thereafter, there was information published in the newspaper about using vinegar for infectious diseases. Some of the "cures" for yellow fever included: "mercurial sweating purge", (Fig 1) also recommended is "essence and salt of vinegar".<sup>4</sup> The salt and vinegar mixture contained vinegar, antiseptics and aromatics. It was claimed to work on "headaches, faintings, lowness of spirits". Dr. Benjamin Rush, born in Pennsylvania in 1745, became a prominent physician in America during his time. He apprenticed under physicians in the Philadelphia area before leaving for Edinburgh and obtaining a medical degree. Throughout his career as a physician, he trained numerous other physicians, and wrote the first American chemistry textbook. He was a

professor at the College of Philadelphia which eventually merged with the University of Pennsylvania Medical school. His practices during the Yellow Fever epidemic are considered controversial.<sup>1</sup> Dr. Rush was in favor of bloodletting and leech therapy, as many were at the time, but writings describe his techniques as extreme.<sup>1</sup> (Fig 1)



A section titled "Putrid Fever" from a Sept 7th newspaper publication describes that stomach sickness can be alleviated with mint, cloves, or other spices mixed with wine or spirits, and taken with chamomile tea every 2 hours. Additionally, a concoction containing the liquid from boiled bark, mixed with laudanum could be injected every 4 hours. Wine should also be administered; specifically madeira. A few days later, a section by Dr. Rush described prevention of the disease by maintaining a "temperate diet with mainly vegetables, moderation of exercise, along

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## Yellow Fever...

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with warm clothing, cleanliness and an open state of the bowels". Dr. Rush wrote letters to patients and other practitioners with directions for some of his concoctions (Fig 2).

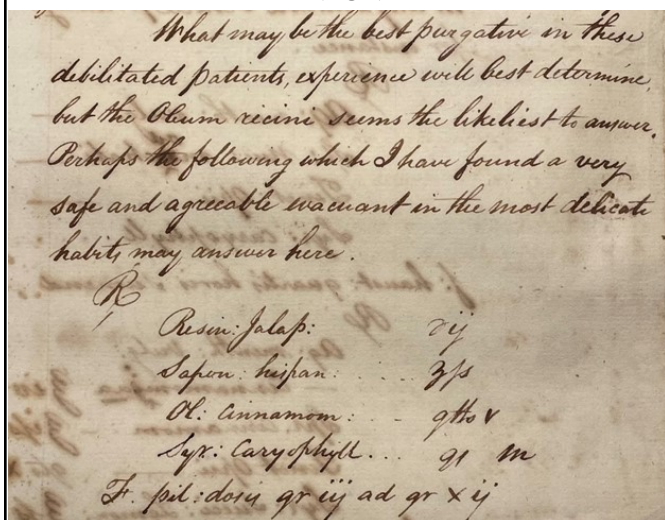


Fig. 2 Original documents from the Rush Collection describing recommended prescriptions

On September 13, a brief article by Dr. Benjamin Rush was published which described his directions for "curing and preventing the yellow fever". He recommended taking a powder containing calomel (mercurous chloride) and Jalap (vegetable laxative) dissolved with sugar and water every 6 hours until 4-5 bowel movements occurred. The concoction is supposed to also induce sweating, and the patient is recom-

mended to lie down after taking it.<sup>3,4</sup> Throughout the epidemic, deaths were recorded by hand. Some of Dr. Rush's documents include names of people who were ill and who died.<sup>6</sup>

Dr. Benjamin Rush also documented changes in temperature in the region and attempted to correlate temperature to the rise and spread of Yellow Fever.<sup>6</sup> It was surprising to see that people were making the connection between disease and weather even in the late 1700s. This was especially surprising since the method of transmission wasn't yet known. There are clear links, today, between weather, climate change, and infectious diseases - particularly mosquito borne.

An article published in 1818 commented on the use of mercury for yellow fever from the 1793 epidemic, and noted that patients who received it died because of the toxicities of mercury rather than the disease itself.<sup>5</sup> The true cause of Yellow Fever wasn't discovered until the late 1880s when Carlos Finlay described trans-

mission by mosquitoes rather than the commonly held belief of the humoral theory. This wasn't truly proven until 1901 by Walter Reed.<sup>2</sup> In 1793, people believed that one of the 4 humors was out of balance when a person was ill (blood, black or yellow bile, and phlegm). The other belief at the time was the "miasma" theory which assumed that foul air transmitted disease.<sup>2</sup>

The Yellow Fever epidemic eventually led to a change in distribution of people throughout the city, and improvements in the water system.<sup>7</sup> Yellow fever also plagued other cities, including Baltimore and New Orleans. It wasn't able to be controlled until the true cause of transmission was discovered in 1901, and later when mosquito and pest control services were developed, as well as more improvements to water and sanitation.

—Madeline King, PharmD,  
BCIDP

Philadelphia College of Pharmacy  
University of the Sciences

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## AIHP WANTS TO DOCUMENT YOUR HISTORY...RELATING TO COVID-19

The American Institute of the History of Pharmacy (AIHP) wants to record and preserve the history that pharmacist are making dealing with the COVID-19 pandemic for the benefit of future historians.

Contributions may take the form of written or video journals, or audio recordings, photos, videos, artifacts and documents that memorialize stories and experiences and may be uploaded to a special portal on AIHP's website -- [available at this link](#) – through which pharmacists and others can contribute materials for our archives.

Their website portal will allow participants to immediately record their COVID-19 experiences in a textbox and/or upload up to three digital items for preservation in AIHP archives.

Please share this announcement with your colleagues and share on social media.



## Tadeusz Pankiewicz: A Biography of a WWII Pharmacist

BY RACHEL BUCHANAN, ROBIN  
TUMLINSON AND BERNIE R. OLIN

Before officially entering the profession of pharmacy, modern students take the Oath of the Pharmacist.<sup>1</sup> The first vow in this oath is to consider the welfare of humanity and the relief of suffering as their primary concern. The embodiment of the depth and weight of this call can be seen in the life of Tadeusz Pankiewicz. Born on November 21st, 1908 in Sambir, Ukraine, Pankiewicz was a Polish, Roman Catholic pharmacist in the Krakow ghetto during the Nazi occupation of Poland.<sup>2</sup> As the owner and operator of the only pharmacy in the ghetto, he used his position to relieve human suffering and to help his fellow man by methods far beyond the dispensing of medications.

Pankiewicz's father, Jozef, was also a pharmacist and owned the *Apteka Pod Orlem*, or Under the Eagle Pharmacy, in Kraków, Poland. As a boy, Pankiewicz was not interested in pharmacy; however, he continued the work of his father and became a pharmacist after studying at Jagiellonian University in Krakow.<sup>2</sup> Prior to World War II, Under the Eagle Pharmacy was one of four pharmacies serving Gentile and Jewish patients in the area. During the war, Nazi forces in Poland and other occupied territories often segregated Jews into small sections of towns known as Jewish ghettos which were isolated and cut off from the rest of the city by fences and barbed wire. Jewish people were forcibly moved to these ghettos, and conditions were typically overcrowded with insufficient food and rampant disease. The Kraków Ghetto was established in March 1941, with Under the Eagle Pharmacy falling within its border.<sup>3</sup> Pankiewicz was given a

choice to continue working in his family owned pharmacy or to move his pharmacy to the Gentile part of the city.<sup>2,4,5</sup> Pankiewicz realized that relocating to this part of the city would be safer and more profitable for him, but he declined this offer for two reasons which he later recalled in his memoir, *Apteka w getcie krakowskim* or *The Krakow Ghetto Pharmacy*.<sup>6</sup> The first reason was that he did not think that Germany would win the war and that any pharmacy he moved to would be reclaimed by the people who had previously owned it while his own pharmacy would likely be ruined. His second reason was tied to his experience with the people in the Kraków ghetto. He realized that they were in desperate need of his help and, based on the traditions instilled in him by his father, he felt that it was his duty as a pharmacist to stay. In order to continue working in the pharmacy, Pankiewicz had to prove

that he was not Jewish. In a 1985 interview, he recalled having to document his ancestry back four generations, because by Nuremberg Law, any individual with three or more Jewish grandparents was classified as a full Jew regardless of their religious affiliations.<sup>7,8</sup> After receiving permission to keep working, Pankiewicz moved into his pharmacy full-time where he could provide care to his patients day and night. There were also three women-- Irena Drozdzikowska, Helena Krywaniuk, and Aurelia Danek-Czort who worked in the pharmacy but were given permits to travel in and out of the ghetto for work, providing the perfect avenue for smuggling goods and papers across the border. Thus, Under the Eagle Pharmacy became a clearing house for information and goods as well as a safe haven in the center of the ghetto.<sup>2,4,5</sup>

During the two-and-a-half-year occupation, Pankiewicz often provided medications free of charge. The ability to access necessary medicines greatly improved quality of life in the ghetto and helped to prevent even greater spread of disease within the close quarters.<sup>2,4</sup> Without Pankiewicz' insistence to keep his pharmacy open despite great danger to himself, the people in the ghetto would have been forced either to rely on German guards to allow medications in or to risk their lives smuggling medicines through the barbed wire fences. In addition to providing a vital source of medical care, Pankiewicz provided services far beyond compounding and dispensing. For instance, he provided sedatives such as Luminal

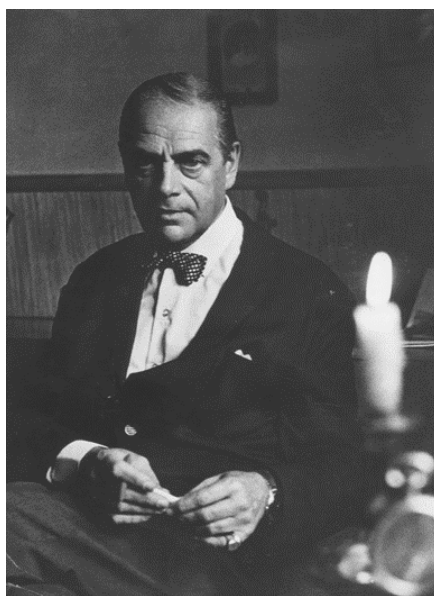


Figure 1: Portrait of Krakaw pharmacist Tadeusz Pankiewicz; Copyright of United States Holocaust Memorial Museum<sup>9</sup>

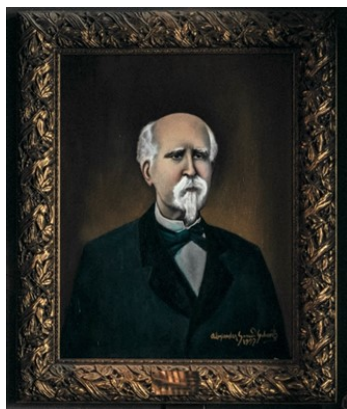
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# The Paris of the South: Home to the U.S.'s First Licensed Pharmacist & More

Rebecca Ortega and Victoria Miller

The New Orleans, Louisiana has one of the strongest city identities in the United States. The city developed its identity throughout its colonial history and has solidified it well into the 21st century via a strong tourism industry. But what exactly is the city known for? New Orleans is known for its Creole culture, jazz music, Mardi Gras (or Carnival) celebrations, voodoo practices, and so much more. Since Louisiana became part of the United States, the city has become an important part of American and pharmacy history and culture. Dating back to the 19th century, New Orleans was also home to the first licensed pharmacist in the United States, Louis Joseph Dufilho, Jr., making his apothecary shop the first to be run on the basis of proven proficiency (a high degree of competence or skill).<sup>1</sup>

Early Life: Louis J. Dufilho, Jr. was born in southern France in 1788 to Jean and Jeanne Marie Bonnet Dufilho, who relocated the family to the city of New Orleans between 1800 and 1803.<sup>2</sup> He attended the School of Pharmacy in Paris, France in a six-year program from 1810-1816 and was 28 years old at graduation. He spent the first 3 years (1810-1813) learning various subjects in the classroom. Then, Dufilho served a three-year apprenticeship under an approved pharmacien, the French word for pharmacist (1814-1816).<sup>3</sup>



**FIGURE 1:** Portrait of Louis Dufilho, Jr. hung in the museum

Dual-track system: Prior to any official licensure requirements in North America within the 1800s, a 'dual-track' system of education in pharmacy existed, namely a "traditional" versus a "modern" track. A traditional track included those who learned pharmacy through apprenticeship with a pharmacist only, whereas a modern track involved formal education and training under an experienced

pharmacist.<sup>4</sup> As a direct result of both France and Spain's control of Louisiana territory between the late 1700s and early 1800s, both tracks were able to co-exist, influencing licensing regulations and normalizing pharmacy education. It was not until Louisiana transitioned from territorial status to statehood that specific licensing regulations started to be enforced.

1804 New Orleans City Ordinance: In 1803, Louisiana joined the United States after Frenchman Napoleon Bonaparte sold it to the United States in the Louisiana Purchase during Thomas Jefferson's presidential administration. Louisiana later became a state in 1812.<sup>5</sup> Keep in mind, 1803 was approximately the same time that Dufilho's family had moved to the United States from France. Now that Louisiana was under U.S. control, there was an opportunity for New Orleans, the state's busiest city at the time, to establish and enforce its own pharmacy regulations. In 1804, Governor William Claiborne signed a New Orleans city ordinance which recognized the dual-track system of education.<sup>3</sup> Medical practitioners and pharmacists were required to register their diplomas with the city (modern track); those who lacked a diploma were required to complete an examination before a health committee (traditional track). Unfortunately, the city struggled to enforce the ordinance. Therefore, little progress was made establishing uniform expectations of pharmacist licensure and examination.

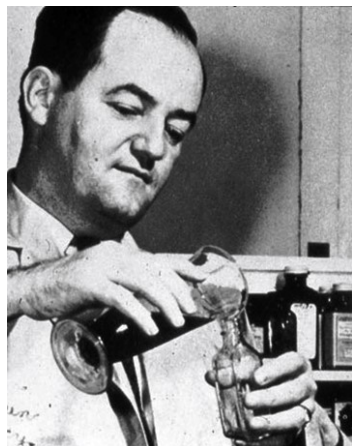
1808 Territorial Act: Another attempt to regulate medical practice occurred in 1808 when the legislature of Orleans passed the Act of 1808 Concerning Physicians, Surgeons, and Apothecaries.<sup>3</sup> However, this act only recognized new practitioners that trained via the modern track of education, not the apothecaries who trained via traditional apprenticeship. This act was stricter in comparison to the 1804 city ordinance. It mandated new practitioners to provide the mayor of New Orleans with proof of a diploma from a university or school in addition to a request to practice. Then, all applicants had to complete a public examination

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# FROM PHARMACIST TO VICE PRESIDENT -- THE LASTING IMPACTS OF HUBERT H. HUMPHREY

BY CREED CARLETON, HARRISON HIGHTOWER AND BERNIE R. OLIN



*Humphrey working as a pharmacist in his father's pharmacy.*  
<https://en.m.wikipedia.org/wiki/File:Humphrey-pharmacy.jpg>

To most people in the United States, he is known for his role in politics. However, in the world of pharmacy Hubert Horatio Humphrey, Jr. is also known as a pharmacist and for authoring an amendment that would become one of the most impactful and important of modern pharmacy practice. Hubert Humphrey spent a large portion of time in the profession while growing up. He took what he learned about people while working as a pharmacist to Washington, D.C. and continued to serve the public just as he had while working with his father in his drug store.

Hubert Humphrey was born in Wallace, South Dakota on May 27, 1911 in a room above the drugstore run by his father, Hubert, Sr.; he attended school in Wallace while growing up. Upon graduating from high school, he had ambitions to go to college at the University of Minnesota; but not long after starting his college education, the Great Depression began. Humphrey's Father's pharmacy began to suffer as it was not generating enough profit to stay afloat with the economic climate of the time, so Humphrey dropped out of school at Minnesota and moved back home to help manage his father's pharmacy. While working here with his father, he attended the Capitol College of Pharmacy in Denver, Colorado and completed a two year pharmaceutical licensure program in only six months.<sup>1,2</sup> After completing his pharmacy education, he worked with his father at the Humphrey Drug Co from 1931 until 1937 when he restarted his original plan; to earn a degree in political science and then enter into politics. In 1939, he graduated from the University of Minnesota and then from

Louisiana State University with a master's degree in political science in 1940.<sup>3</sup> Post graduation, he returned to the University of Minnesota to teach political science as a doctoral student until beginning his political career which in turn, put him into position to make his biggest contributions to the field of pharmacy.

In keeping with his goal to enter the world of politics, Humphrey was elected Mayor of Minneapolis in 1945. Then in 1948, he was elected to the United States Senate. While serving in the Senate, he authored one the most important pieces of pharmacy legislation at that point in U.S. history. In 1951, senator Hubert Humphrey, introduced an amendment to the Federal Food, Drug, and Cosmetic act, originally enacted in 1938, which became known as the "Durham-Humphrey Amendment", named after Senator Humphrey and co-author (and also a pharmacist) Carl Durham from North Carolina. This amendment was significant because it changed several things within the practice of pharmacy that were problematic and put a substan-

tial amount of power and trust in the hands of physicians. This amendment changed a long-standing issue of a lack of distinction between medications. That is, a medication that needed to be sold behind the pharmacy counter with some supervision, and a medication that was safe for a patient to buy over-the-counter and use without supervision or direction. This amendment was the first to mandate that a medication have a label that stated that it was "prescription only" and could not be sold or dispensed unless under the "professional supervision of a practitioner licensed by law to administer such drug". This amendment also gave the pharmacist the right to receive a prescription as a verbal order and gave them the right to refill a prescription as allowed by the physician.<sup>4,5</sup> Prior to this amendment, many potent drugs were available to anyone over-the-counter. This allowed a physician to instruct a patient to go to the pharmacy and purchase a specific drug to treat a specific illness or disease state. There was no check by a pharmacist in the form

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## Ivermectin: A New Meaning to “Horse Pill”

BY MARY DOUGLASS SMITH AND SARA ISLER THOMAS

### Introduction:

Though pharmacists have familiarity with many types of antiparasitic drugs from education and experience, one has gained popularity and even notoriety in the last year as an emerging treatment for COVID-19. Ivermectin's history began five decades ago and a look at its changes in indication and demand illustrates how consumers have been interested in new uses for old medications.

### History and current use:

Ivermectin was derived from an older class of drugs, avermectins, that was the result of the discovery of the *Streptomyces avermectinus* microorganism first discovered in soil in the 1970s by the microbiologist Satoshi Omura in Japan.<sup>1</sup> This unique site near a golf course in the Shizuoka region of Japan continues to be the only source of the microorganism. The strain showed anthelmintic activity in mice with little toxicity. Omura, a proponent of isolating antibiotic agents from natural organisms, would later win the Nobel Prize in Medicine along with William C. Campbell for discovering avermectin and its implications on worldwide health.<sup>1</sup>

Ivermectin shows potent activity against a broad spectrum of parasitic nematodes and arthropods. It binds strongly to glutamate-gated chloride ion channels located in invertebrate

nerve and muscle cells.<sup>2</sup> This causes hyperpolarization of the nerve or muscle cells and ultimately death of the parasite. Due to its great potency against parasites, ivermectin became very popular amongst veterinarians for the use of onchocerciasis and gastrointestinal roundworm infections in pets and livestock. Ivermectin is available in different formulations for animals, including oral tablet, injection, oral paste, oral solution, topical pour-on and spot-on solutions, and sprays. It is FDA-approved for heartworm prevention, removal of hookworms, and control of other parasites depending on the type of animal being treated. Brand names available are Heartgard and Ivermectin with oral tablets between 55-272 mcg dosed once a month. These formulations are supplied in three dosage strengths in separate packaging based on the weight of the animal for easy dosing of one tablet each month. The injection preparations are 10 mg/mL and available in 50-1000 mL bottles to deliver weight-based doses. For example, a 990-pound cow would receive 9 mL of solution subcutaneously near the shoulder. Oral solutions are 0.08% in 240-5000 mL bottles. There are combination products with clorsulon, pyrantel, and/or praziquantel with brand names Iverhart max, Equimax, and Zimecterin Gold.<sup>3</sup>

Humans can become infected with the

nematode parasite *Onchocerca volvulus* that is transmitted by bites from blackflies and research into ivermectin activity for this disease began in 1982. This disease is known as river blindness and is commonly found in certain African communities near flowing water. The typical oral dose for onchocerciasis in humans is 150 mcg/kg single dose and can be redosed every 3 to 12 months as needed for eradication of the parasite.<sup>1</sup> Because ivermectin does not kill the adult *Onchocerca* parasites that reside in subcutaneous nodules, repeated follow-up and retreatment is usually required until asymptomatic. Ivermectin has been on the World Health Organization (WHO) model list of essential medicines since 1987.<sup>2</sup>

Today ivermectin is available as an oral 3 mg tablet formulation (Stromectol) for the labeled indications of onchocerciasis and intestinal strongyloidiasis due to the nematode parasite *Strongyloides stercoralis* (dosed at 200 mcg/kg).<sup>2</sup> For example, a 70 kg individual would take 5 tablets as a single oral dose for strongyloidiasis and 4 tablets as a single oral dose for onchocerciasis. Adverse effects from Stromectol are limited and include dizziness, pruritus, and nausea in less than 3% of patients. Clinical presentation of avermectin toxicity includes abdominal pain, nausea and vomiting and diarrhea as well as central nervous system effects of

## Pharmacy Through the Lens of Hollywood IV: “Has Anybody Seen My Gal”

By David M. Baker and Uyen N. Busse



The fourth in our leading-role pharmacist character movie articles, the 1950s movie, “Has Anybody Seen My Gal,” portrays a typical community pharmacy in the 1920s.<sup>1</sup> Being a 1950s era production, this is the first color movie in our series; however, it realistically depicts the 1920s when most pharmacies were independent drug stores with a pharmacist as the proprietor.



*Dan Stebbins, soda jerk, demonstrates how to slide an order down the drugstore fountain counter under the watchful eye of John Smith.<sup>2</sup>*

Released: June 25, 1952

Availability: Online, DVD.

Production Company: Universal International Pictures

Director: Douglas Sirk

Writers: Joseph Hoffman (written for the screen by), Eleanor H. Porter (based on a story by)

Cast:

Piper Laurie - Millicent Blaisdell

Rock Hudson - Dan Stebbins

Charles Coburn - Samuel Fulton / John Smith

Gigi Perreau - Roberta Blaisdell

Lynn Bari - Harriet Blaisdell

William Reynolds - Howard Blaisdell

Larry Gates - Charles Blaisdell

Skip Homeier - Carl Pennock

Paul Harvey - Judge Wilkins

Paul McVey - Lester Pennock

Gloria Holden - Clarissa Pennock

Frank Ferguson - Edward Norton

Forrest Lewis - Martin Quinn<sup>3</sup>



### Movie Summary

The movie opens with Samuel “Sam” Fulton, a wealthy oil tycoon, planning with his attorney to leave his estate to the family of his one true love, whom he credited as the inspiration for his wealth and fortune. Fearing the family might use his money the wrong way, he decides to visit them in Vermont to test them. When he arrives, he runs into Millicent Blaisdell outside a library, the granddaughter named after his past love, and oldest daughter of the Blaisdells. He follows her to the Blaisdell’s Drug Store. There, Sam meets Dan Stebbins, a soda jerk and Millicent’s love interest; and Charles Blaisdell, Millicent’s father and owner of the drug store. As Sam follows Millicent to their house, he meets the rest of the Blaisdells – Harriet, the mother; Roberta, the younger daughter; and Howard, the son.

After meeting the family under the alias of John Smith, Sam lies that he read a newspaper advertisement saying they had a room for rent. At first, the family is reluctant, but eventually they allow him to stay, since they could use the money. Roberta wastes no time welcoming and helping him understand the family dynamic. Later one afternoon, after hearing that Charles intended to evict him, Sam takes a job as a soda jerk at the drugstore in exchange for staying at the Blaisdells’ house.

Through their daily interactions at home and in the drugstore, Sam notices that the Blaisdells are happy, despite their humble finances. Charles teaches his wife and children to be proud of who they are, not placing value on only material things. Yet, Harriet wishes Millicent would marry “up” to upper class Carl Pennock, a wealthy, young, and snobbish man, despite Millicent’s feelings

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(phenobarbital) to keep children quiet and calm when hiding during German raids. Hair dye was supplied in order to help older people appear younger in an effort to evade deportation to concentration camps. Additionally, Pankiewicz would smuggle food, jewelry, and correspondence from outside the ghetto through the pharmacy.<sup>4,5</sup> At one point, it even served as a restaurant to provide food to work crews from the nearby concentration camp.<sup>7,8</sup> Doctors and intellectuals in the ghetto used the pharmacy as a gathering place to read smuggled news and reports to keep up with the outside world.<sup>2,4,5</sup> The window of the pharmacy overlooked Plac Zgody. This was the square where beatings and executions occurred and where the able-bodied Jews were separated from those who would be deported to the camps. Due to this location, Pankiewicz and his employees bore witness to the atrocities committed by the Nazi soldiers, and both Pankiewicz and all of his employees provided vital testimony of these acts after the war.<sup>7,8</sup> Under the Eagle pharmacy was often the last stop on the way to deportation, so the pharmacy also served as a storage site for valuables and as an information center with the most accurate records of who had been taken away. Pankiewicz recalled that the only time he officially closed the pharmacy was to hide neighbors in the basement overnight during roundups for deportation.<sup>7,8</sup> After the raids, Pankiewicz and his employees provided bandages and medication to those who were injured.<sup>5</sup> Towards the end of the war, when the Krakow ghetto was being liquidated, he collected valuable Jewish artifacts and Torah scrolls which he stored until after the war. The Krakow ghetto was finally liquidated in January 1945.<sup>3</sup>

After the conclusion of World War II, Pankiewicz wrote a

book titled *The Krakow Ghetto Pharmacy* which was published in 1947.<sup>6</sup> When asked in an interview why he wrote the book, Pankiewicz replied that he wanted to inform other non-Jews who had little contact what life was really like within the ghetto.<sup>7,8</sup> An excerpt from Pankiewicz's book details what he felt gave the Jewish people the ability to press on despite the persecution they faced: "the faint hope of survival which flickered in the soul of every ghetto resident, this hope worked miracles: it gave people superhuman strength and staying power, and told them to grit their teeth and swallow bitter doses of humiliation. The urge to survive, not the fear of death, was the dominant trait."<sup>6</sup> Later in the interview, Pankiewicz acknowledges that the Jewish people had built him into a small legend but that he "only did what one human should do for other humans who were in a tragic situation."<sup>7,8</sup> Pankiewicz might not have considered himself a hero, but the men and women whose suffering he eased and whose lives he saved very well did.

In 1983, Pankiewicz was recognized with the "Righteous Among the Nations" award by Yad Vashem, the World Holocaust Memorial Center in Jerusalem.<sup>2,4</sup> This is an honor given to non-Jews who risked their lives to save Jewish people during World War II. Each recipient receives a medal and a certificate of honor along with their names commemorated on the Mount of Remembrance in Jerusalem. Under the Eagle Pharmacy remained open until 1967, before being converted to a restaurant. In 1983, it was restored to its original state and converted to a museum for the history of the Krakow Jewish ghetto, first as the Museum of National Remembrance and then as a branch of the Museum of Krakow since 2003. The pharmacy was also briefly featured in the movie *Schindler's List*.<sup>5</sup> Pankiewicz continued working as a pharmacist until the 1980s, and he passed away in

1993 of kidney failure.

Community pharmacies have always served as pillars of the community, as a place where people can go for help and guidance in times of sickness and need. Pharmacists continue to serve as trusted and accessible healthcare providers. The admirable and courageous efforts of Pankiewicz exemplify the highest order of concern for the welfare of his community. He went far beyond the call of duty to provide not only for his patients' health needs, but for their social, spiritual, and physical needs as well. In an interview for the 1985 Holocaust documentary *Shoah*, Pankiewicz said that "they [the Jews in the ghetto] had a lot of trust in me and I in them; I shared their happy and tragic hours as if I were a Jew too. They were very close to me."<sup>7,8</sup> May all pharmacists seek to serve their patients and communities with the selfless and wholehearted vigor of Mr. Pankiewicz.

—**Rachel Buchanan & Robin Tumlinson, PharmD candidates 2022 and Bernie R. Olin PharmD., Associate Clinical Professor Auburn University Harrison School of Pharmacy**



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conducted by four physicians appointed by the mayor.<sup>4</sup> If the applicant passed, a certificate signed by the four examiners and mayor was awarded. Sadly, the 1808 Act did not create any protocol for filing official records of license holders. Another important difference was that it allowed practitioners “who were residing in the territory of Orleans prior to the passage of said act,” to practice, regardless of the training or certification owned by those individuals.<sup>3</sup> The downside to this advantage was that the law did not express how an individual practicing in the area before the act passed should notify the authorities. The passage of the Territorial Act was the first time that traditional apprenticeship was rejected, making a college education the only option for examination. Unfortunately, the act proved to be difficult to enforce yet again by city officials, marking two steps forward and one step back in the pharmacy world.

**1816 Louisiana Act:** In 1816, the same year that Louis Joseph Dufilho, Jr. returned to New Orleans, the new state of Louisiana passed its first state legislation called “An Act Prescribing the Formalities to be Observed in Order to Obtain the Right of Practicing Physician or the Profession of Apothecary Within the State of Louisiana, and for Other Purposes.”<sup>3</sup> It modernized the examination and licensing process of medical practice within the state, and established the formation of a permanent medical board made of four physicians and one apothecary (called Comité Médical) that conducted exams and issued licenses.<sup>4</sup> The idea of a permanent board was more suitable than the previous 1808 Act which required a different committee for each applicant. This Americanized act also legally recognized the traditional apprenticeship which had formerly been rejected by the 1808 Act. Additionally, Louisiana’s act grandfathered individuals given licenses under the 1808 Act, permitting them to practice if they had registered their certificates with the parish clerk’s office.<sup>3</sup> The 1816 ruling lasted until 1852 when a growing spirit of laissez-faire (attitude of letting things take their own course), combined with the influence of deceivers, resulted in all medical legislation being retracted.<sup>4</sup>

**Career:** Dufilho returned from Paris in 1816 and applied for a license to practice pharmacy in the state of Louisiana. He possessed a diploma from the Paris School of Pharmacy, and he passed the three-hour oral exam. On May 11,

1816, Dufilho received his United States-issued pharmacy license.<sup>6</sup> His accomplishment was the beginning of a newly implemented process to receive a license to practice. The licensing process has evolved over the years and thanks to modern technology, fourth year pharmacy students preparing to take licensure exams, like myself, can get a little extra sleep before test day knowing that the format is no longer oral!

**Pharmacy Museum:** Louis formed his apothecary shop in 1823 at 514 Chartres Street, a classic Creole-American townhouse that was typical of French Quarter architecture and still is today. The building not only still stands, but the pharmacy has been fully restored and turned into a historical museum. On the first floor, there are perfumes, cosmetics, voodoo potions, surgical instruments, different dosage forms, viewable prescriptions, compounding practices on display, and walls lined with bottles filled with some of the original “cures” and medicines that were used in the early 1800s (Figure 2).<sup>7</sup> The second floor shows living accommodations and architecture characteristic of Dufilho’s practice and also houses seasonal and special exhibits. On Thursday, October 19, 1950, Dufilho’s shop was officially named La Pharmacie Francois de



FIGURE 2: Bottles filled with medicines or potions used in the 1800s located at the museum



FIGURE 3: Street view of the historic pharmacy museum today, La Pharmacie Francois de Louis J. Dufilho.

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Louis J. Dufilho, and the museum's collection was opened to the public (Figure 3).

According to the New Orleans Times Picayune, George Urdang [founding director of the American Institute of the History of Pharmacy (AIHP)] delivered a speech that day and noted that "the opening of the museum emphasized the marked transformation from the 'magic' found in the pharmacies of a century ago to 'the all but magic performed by the pharmacist today'."<sup>8</sup> AIHP eventually launched a program in which plaques would mark historical sites where significant pharmaceutical events took place. In fact, the program's first plaque was dedicated to Dufilho's La Pharmacie Française on October 10, 1963.<sup>9</sup> To this day, the museum gives visitors a glimpse of what pharmacy was like almost 200 years ago!

One of the most unique aspects of New Orleans is the fact that the city has never let its past be forgotten. Essentially, it can be described as a city with a living past since New Orleanians continue to keep cultural traditions and historical narratives alive, with Dufilho's La Pharmacie Française being just one example. Not only is it a physical reminder of the historical evolution of pharmacy in the New World and the laws placed to standardize the practice of the profession, but it is the first pharmacy to be run on the basis of proven competence. Louis Joseph Dufilho, Jr. is credited as the first United States licensed pharmacist. He was a trailblazer for pharmacists in New Orleans and across the nation.

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of a prescription. This was problematic because of the number of drugs available that could cause harm if not taken correctly. The separation of the safer over-the-counter medications from medications that were more likely to cause harm, which were now by prescription only, was a huge step in the legitimization of pharmacy as a practice. It further demonstrated the need for pharmacists. It was a precursor for future legislation that further legitimized the profession of pharmacy. However, it has been argued that it had a negative impact on patients and pharmacists at the time and shifted a great deal more control of medications to the physician. Due to this amendment, patients were limited in self-medication and were required to see a physician in order to be treated. This led to less autonomy and increased healthcare spending for the patient. It also forced a patient to seek out a physician, which was not easy to do since, at this time, there were transportation and geographical barriers for many patients.

In his larger national political life, Humphrey was a proponent for civil rights and for helping poor communities with disparities, specifically in healthcare. Some of his more notable ideas and legislation were centered around these problems. One of his works, titled "The Future of Health Services for the Poor," a journal article that he developed as Vice President to reflect a need he saw in poor communities, addressed the lack of healthcare in poor and underprivileged areas.<sup>6</sup> He saw that poorer people were disproportionately affected by health issues and illnesses and recognized barriers to care. He explored how they could be addressed in order to deliver people the healthcare that they needed and deserved. His idea was to make healthcare more accessible by creating more clinics and placing them closer to the areas in need.<sup>6</sup> This would allow patients easier access to care and allow them to attend their appointments in-

stead of missing them. He also saw the need for healthcare institutions and schools to become more involved in the community to better understand their patients, which improved the care these patients received. He saw that as newly graduated healthcare providers were entering the work environment, they could not adequately communicate with patients from these underprivileged areas due to lower health literacy and level of education.<sup>6</sup> He recognized that this created its own, unique barrier to healthcare. If a patient does not feel comfortable with their provider, then they are less likely to make their appointments or seek out healthcare in the future. His idea to address this issue was to connect the schools and institutions to these impoverished areas in an effort to build a connection and improve their overall health. This would also build their trust with health professionals, and better introduce the healthcare providers to these areas and increase their connection to the people who live in these communities. This thought process was well ahead of its time.

Humphrey was one of the first to address how financial issues could affect health at a community level. He not only recognized that something could be done, but also formulated a plan on how to do so and encouraged these institutions to move towards getting these things accomplished. Using his power and influence as the Vice President of The United States from 1965-1969, Hubert Humphrey addressed issues and risks that had been ignored or unnoticed. His background in healthcare and pharmacy allowed him to look at these problems in healthcare differently and create solutions for them. Because of his challenge to institutions and schools of healthcare, their leaders began to take notice of the issues he presented and work to address them. The National Medical Association accepted his challenge to begin to integrate healthcare in these communities into their practice and their vision.<sup>6,7</sup> This was a big step in his vision of healthcare and a

precursor to future healthcare and assistance in poor communities.

Hubert Humphrey was one of the champions of healthcare of his time. He was a voice for the poor and underserved. Not only did he notice that there needed to be change, he had ideas and plans about how to address the issues. He challenged the people who could create the change to actually do so. He was so influential in the world of pharmacy that in 1978 the American Pharmacists Association named an award in his honor. The Hubert H. Humphrey award is given annually to a pharmacist that has made a major contribution to governmental or legislative service.<sup>8</sup> Former Vice President Humphrey truly was a servant of the people. Someone who decided to forgo his own education in order to return home to help his father and work as a pharmacist, then to teach at different institutions, then to enter public service as a mayor, senator and then Vice President; he spent his entire adult life working for the people.



*Hubert Humphrey, c 1965*

[https://commons.wikimedia.org/wiki/File:Hubert\\_Humphrey\\_1965.jpg](https://commons.wikimedia.org/wiki/File:Hubert_Humphrey_1965.jpg)

Hubert Humphrey died January 13, 1978 of cancer while still holding his senate seat that he had returned to after his loss in a bid for President of the United States in 1968.<sup>2</sup> Although his actual time in the profession of pharmacy was short, Hubert Humphrey used what he had learned while working as a pharmacist and applied them while holding positions of power, all the way to the Vice Presi-

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dizziness, drowsiness, and headache. Severe toxicity can lead to coma, paralysis, aspiration pneumonia and shock. Typically, onset of symptoms occurs within 3 hours of ingestion.<sup>2</sup> Initial treatment is supportive and dependent on symptoms (e.g., airway, breathing, circulation). If the ingestion was within the last hour, gastric lavage or single-dose activated charcoal can be considered.<sup>2</sup> Avermectins have GABA-mimetic effects at large doses, so benzodiazepines and barbiturates should be avoided. Ipecac and cathartics should also be avoided as unbeneficial treatments. The Mazzotti Reaction may occur in patients being treated for onchocerciasis.<sup>2</sup> This symptom complex includes pruritus, edema, urticaria, lymphadenitis, fever and arthralgia that can occur within seven days of treatment and can be life-threatening.

The distribution of ivermectin is wide due to the high lipid solubility and is highly concentrated in the liver and adipose tissue but does not readily cross the blood-brain barrier.<sup>2</sup> There is strong binding to plasma proteins and specific binding for serum albumin. Ivermectin is extensively metabolized through liver microsomes, including CYP3A4 (major), CYP2D6 (minor) and CYP2E1 (minor) and excreted in the feces. Half-life elimination is 18 hours and time to peak for serum concentration is 4 hours.<sup>2</sup>

The topical formulations of ivermectin are indicated for head lice and rosacea.<sup>2</sup> The lotion preparation for head lice, Sklice, was approved by the FDA to

move from prescription only to over the counter (OTC) in October 2020. OTC availability was anticipated during the second quarter of 2021 but has not occurred as of November 2021 and no announcements released from the FDA or manufacturer.<sup>2</sup> A sufficient amount is applied to cover the scalp and hair completely, left on for 10 minutes, and thoroughly rinsed for single-dose use. The cream preparation for rosacea is marketed under the brand name Soolantra and applied to affected areas such as the chin, nose, and cheeks once daily. Adverse effects of topical application may include burning and irritation.<sup>2</sup>

### Antiviral activity

Ivermectin was identified in 2012 as an inhibitor of importin- $\alpha/\beta$ -mediated nuclear import and this inhibits the replication of several RNA viruses.<sup>4</sup> This discovery led to multiple studies conducted to show the antiviral activity of ivermectin against a broad range of RNA and DNA viruses throughout the years, including dengue virus, Venezuelan equine encephalitis virus, influenza, and West Nile Virus.<sup>4</sup> Ivermectin has gained increasing interest as a potential treatment for COVID-19, including a key study by Caly and colleagues in April 2020.<sup>4</sup> This study found ivermectin to be active against SARS-CoV-2 in vitro with a reduction in viral RNA by 5,000-fold. It was hypothesized that ivermectin's nuclear transport inhibition could be effective against infection. A dose of 5  $\mu$ M of ivermectin was tested in infected cells and samples were tested for quantification of viral load. The study found that ivermectin bound to and destabilized viral protein and prevented it from entering the nucleus.<sup>4</sup>

Ivermectin does not have a current indication to treat or prevent COVID-19 infections. Research is currently underway to determine a safe and effective dose of ivermectin in a clinical setting. As of October 15, 2021, there are 80 clinical trials evaluating the use of ivermectin for COVID-19 worldwide. The most studies are occurring in Africa (18 studies) and South America (18), with 8 studies in the United States.<sup>5</sup>

### Search results

A PubMed search performed in September 2021 for the term “ivermectin” resulted in 9,027 results. A closer analysis at the results revealed information about the use of ivermectin over time since 1946. Prior to 1980, there are less than 20 articles with ivermectin, but a notable publication is about avermectins is published in 1979 by Omura and colleagues.<sup>6</sup> The next decade until 1989 revealed several more publications by Omura and Campbell. The majority of the publications continue to be found in veterinary medicine and parasitology journals. The veterinary-based articles focus on both large farm animals (horse, cow, donkey, goat, pig) and small domestic animals (cat, dog).

The 1990s showed a dramatic increase in the number and variety of publications. Over 1700 articles were published and demonstrated expansion into treatment of humans for onchocerciasis, bancroftian filariasis, and lymphatic filariasis. Taylor and colleagues stated “the recent development of ivermectin has revolutionized our ability to treat this disease. An annual oral dose of only 150 mg/kg completely suppresses the disease manifestations. Programs for the community-

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based mass distribution of ivermectin are now being conducted and promise to control this major blinding scourge.”<sup>7</sup> Merck, the WHO, and other partners established and expanded the Mectizan Donation Program to distribute millions of doses to endemic countries.<sup>7</sup>

Between 2000-2009, there were more than 2100 publications. Most of the studies continue to research use in humans and animals for parasite infections and in 2002, studies were published regarding the use of ivermectin in scabies. By 2007, there was a Cochrane review of treatments for scabies that established ivermectin as an effective oral treatment.<sup>8</sup> In 2004, Drinyaev and colleagues showed that avermectins suppressed tumor growth by 70-80%. They were most effective when injected intraperitoneally after vincristine.<sup>9</sup>

In the 2010s, there were 3407 publications related to ivermectin. Many articles are published promoting the use of ivermectin as a lifesaving medication, including “Ivermectin, ‘wonder drug’ from Japan: the human use perspective” by Crump and Omura.<sup>10</sup> Studies related to antiparasitic uses of ivermectin continue until 2012 when Wagstaff and colleagues published studies examining the antiviral use of ivermectin for HIV-1 and dengue virus.<sup>4</sup> Layton and Thiboutot postulated that oral ivermectin is effective in immunocompromised patients with rosacea-like demodicidosis. The article also states that topical ivermectin may be useful in *Demodex*

folliculorum, a type of mite that lives within hair follicles and can be a potential cause of rosacea.<sup>11</sup>

Since the start of 2020, there are already over 1000 articles about ivermectin. A systematic review and meta-analysis evaluating the safety of high dose ivermectin with trials reporting doses over 200 and 400 mcg/kg. The study concluded that adverse effects after a single dose of up to 800 mcg/kg occur with the same frequency and intensity of approved doses. It did, however, emphasize that the lack of information and blinding in the six studies analyzed was not enough data to support these high doses.<sup>12</sup> Idda and colleagues name ivermectin along with hydroxychloroquine, ritonavir, azithromycin, tocilizumab, lopinavir and chloroquine as the most studied drugs for COVID-19.<sup>13</sup> In May of 2021, a meta-analysis by Kory and colleagues asserts that ivermectin is effective for “large, statistically significant reductions in mortality, time to clinical recovery, and time to viral clearance.” The article was originally accepted by the journal *Frontiers* but was rejected prior to publication. The chief executive editor of *Frontiers* said in a media statement in March 2021 that the objectivity of the paper was scrutinized and that the “article made a series of strong, unsupported claims based on studies with insufficient statistical significance, and at times, without the use of control groups.”<sup>14</sup>

### Recent developments

An examination of the Google search trends shows that interest in “ivermectin” was low in October 2020, but had the maximum search interest, shown by a value of 100, in the week

of August 29 - September 4, 2021.<sup>15</sup> The most common related query was Joe Rogan, an American podcaster, who tested positive for COVID-19 on September 1, 2021 and promoted the efficacy of ivermectin.<sup>15</sup>

The National Poison Data System (NPDS) is the national database of information logged by the poison control centers across the US. These records are self-reported calls from healthcare professionals, emergency response workers and the general public. In October 2021, the American Association of Poison Control Centers released an NPDS bulletin related to the use of ivermectin in the prevention and treatment of COVID-19. From January 1, 2021 to October 3, 2021, there were 1609 ivermectin exposure cases reported to all US Poison Control Centers. By contrast, the same time period in 2020 had 490 cases reported, showing a 228% increase.<sup>16</sup>

In August 2021, the CDC Health Alert Network (HAN) issued an official health advisory regarding the potential risks of the use of ivermectin for prevention or treatment of COVID-19. This advisory was prompted by the increased dispensing of ivermectin by retail pharmacies and use of veterinary formulations available over the counter.<sup>17</sup> The advisory alerted pharmacists to signs of ivermectin overdose including gastrointestinal symptoms, confusion, seizures, and hallucinations. Calls to the poison control centers indicated individuals may ingest products intended for veterinary topical use with higher concentrations or buy products online with an unknown strength and potency.<sup>17</sup>

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## Ivermectin: A New Meaning to “Horse Pill”...

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With the uncertainty of how to properly treat and care for COVID-19 patients, scientists and practitioners continue to look at the repurposing of older medications. This trend is likely to continue not only in response to the pandemic but may extend to other specialty areas where current treatment regimens are deficient or lacking. Pharmacists will likely be called on to share their drug knowledge and expertise as novel treatments are explored with obsolete or antiquated medications.

—*Mary Douglass Smith,*  
*PharmD.*

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*Assistant Professor and*  
*Sara Isler Thomas,*  
*PharmD.*

*Candidate, 2022*  
*Presbyterian College School*  
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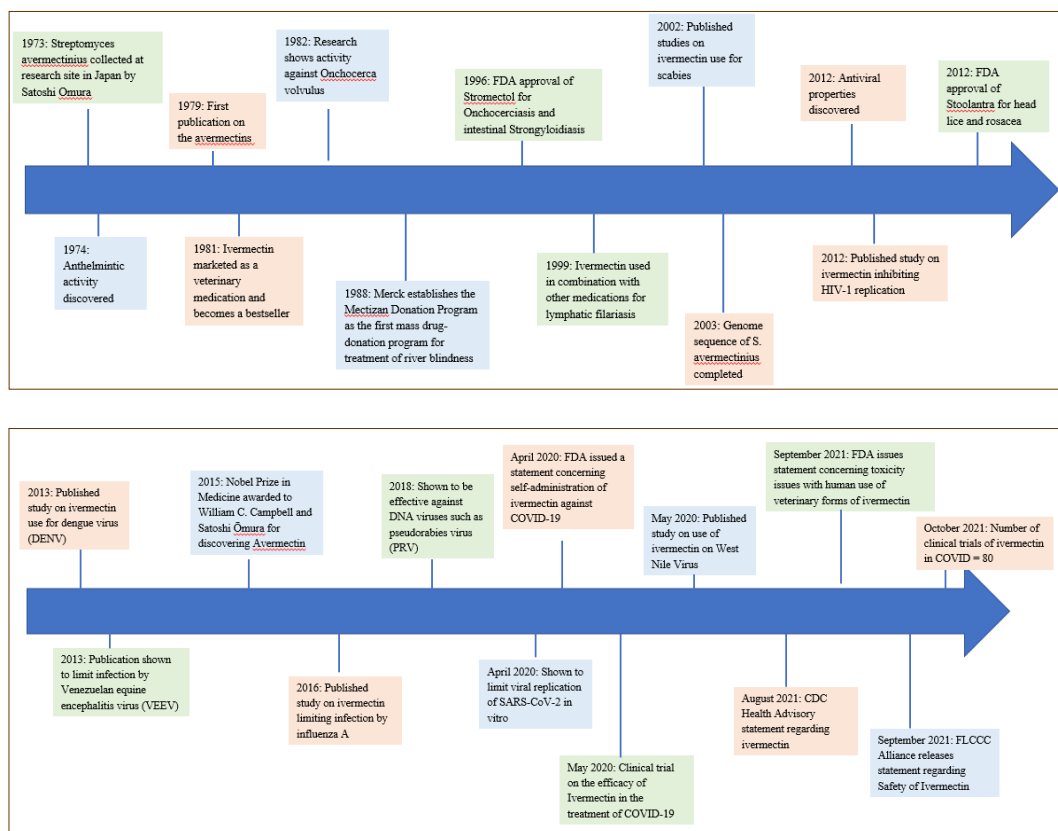
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### Ivermectin Time Line



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## Pharmacy Through the Lens of Hollywood IV: “Has Anybody Seen My Gal”

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toward Dan. Unfortunately, despite Harriet's wishes, Millicent and Dan announce their engagement. While the family celebrates the good news, Mr. Norton, Sam's attorney, visits to inform the family of their \$100,000 inheritance (equivalent to about \$1.6 million today) from an unknown benefactor.<sup>4</sup> In 1928, \$100,000 was a lot of money for a druggist, whose average salary was about \$2,500 per year (equivalent to about \$40,000 today).<sup>4,5</sup> Within weeks of Charles confirming the inheritance is real, Harriet sells the drug store and the house, moving the family into the biggest house in town. Even though Charles disagrees with his wife's decisions, he allows her to do as she wishes. Dan, Millicent's fiancé, soon realizes that he cannot live up to the family's expectations, so he breaks off the engagement.

The second half of the movie follows the Blaisdells after inheriting the money and trading their humble lifestyle for an upper class one. Harriet enjoys her lavish parties with other wealthy families. Howard gets into gambling and loses large amounts of money, prompting Sam to bail him out. Millicent, heartbroken by Dan and under pressure from her mother, is dating Carl Pennock. Sam, forced to move out of the Blaisdells' old house and now living with Dan in his apartment, still watches over the Blaisdells' children and helps them out of troubles. Helping the Blaisdells' children results in Sam being jailed twice. Dan pays the bail for Sam both times, and informs Sam of his intention to leave town to build a career. Sam does not want Dan to repeat his mistake of leaving his one true love, so he sets up a meeting between Dan and Millicent at the movie

theater.

At the theater, Dan is still determined to leave town, causing Millicent to exclaim her hatred towards the family's new wealth. Heartbroken Millicent is comforted by Sam, attracting the attention of the other moviegoers, who thought they were necking. The rumor reaches Harriet, who is afraid Sam's actions will ruin the family's image. She decides to throw a party to announce Millicent and Carl's engagement.

At the party, Charles learns that his stock market investments have failed and asks Mr. Norton for a loan. Mr. Norton tells Sam, who instructs him to deny the loan. This results in Charles asking his soon to be in-laws for help, but the Pennocks refuse and Carl breaks off the engagement. Charles informs Harriet that the family is now broke. They will have to sell the house to buy back their old house and the drug store. Harriet faints, but the rest of the family is happy.

In the final scene, the family is moving back into their old house; Charles has bought his drugstore back; Millicent is engaged to Dan again; Dan is a partner in the drugstore, and none of them has any money. How the former family home and drugstore were originally sold and then, repurchased with such ease is never explained, just the results are shown. Sam is packed and ready to leave town, leaving the family poor as he found them, except that now they are happy and together without money. Roberta runs in to tell Sam that he won first place in a local art show that she entered him in, and that the press are coming to talk to him. Upon hearing that, Sam bids farewell to the family and leaves with his bags as the press pulls up to the house. As he walks down the snowy sidewalk, Sam realizes that he has become the grandfather to the Blaisdells that he always wished he would be.

### Pharmacy Depiction

The movie, released in 1952, does a good job of recreating a drugstore, circa 1928.<sup>7</sup> The store is rectangular in shape and has large glass window displays, showing and advertising the products sold inside. There is a sign next to the display window with the name of the drugstore, showing the last name of the owner, as at the time most pharmacies were independently owned. A classic symbol of pharmacy in the 1800s and early 1900s, a colored show globe, is visible in the left corner of the display window. Show globes distinguished drugstores from other businesses, and showed off the druggists' chemical prowess. The colors in the different sections of the globe were created by meticulously weighing and mixing chemicals together, demonstrating the abilities of the pharmacist, at a time when many medicines were compounded and not pre-manufactured.<sup>6</sup>

The interior design of the pharmacy is typical of the 1920s, showing glass-enclosed wooden cabinets along the walls with waist-level counters in front of them. In addition, glass cases are visible in the middle of the store. Each cabinet or case contains rows of labelled glass apothecary jars, medicine bottles, and other merchandise. Self-service by customers is not possible, a normal circumstance of the time, as store staff would have to provide any products a customer requested. Only a few manufactured medicines are shown in the pharmacy - the only one mentioned was aspirin.



*Charles Blaisdell, pharmacist, is counseling patient on the phone while his daughter, Millicent, sells Sam a bottle of Aspirin.<sup>2</sup>*

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## Pharmacy Through the Lens of Hollywood IV: “Has Anybody Seen My Gal”

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Speaking of the drug store staff, all of the staff depicted in the movie were adult men, typical of the 1920s.<sup>7</sup> Even being a soda fountain jerk was considered an occupation, and thus, not a job for teenagers, unlike fast food restaurants today.<sup>5</sup> Women were typically not allowed to work outside the home, except in two primary areas: nursing and teaching.<sup>5</sup> Even then, the usual nurse or teacher was a single woman. The role of married women, like Mrs. Blaisdell, was to maintain the home and raise the children.<sup>7</sup>

The Prohibition era, which began on January 16, 1920 after passage of the Eighteenth Amendment and the Volstead Prohibition Enforcement Act, made ethyl alcohol illegal as a beverage throughout the United States.<sup>6</sup> Bars and saloons shut down, leaving people without a place to socialize. The result on drugstores was two-fold, the number of drugstores with a soda fountain dramatically increased, and soda fountains became the place to socialize. The movie captures this period well, showing in the opening scene the patrons dancing to the song “Has Anybody Seen My Gal” in the background while enjoying their cherry floats. Throughout the movie, the drugstore is portrayed as the place for people to meet and exchange news. By having many characters interacting at the drugstore soda fountain, the movie is accurate in its representation of what a drugstore meant for people during Prohibition.

Pharmacists are often not depicted in Hollywood movies like other healthcare professionals, such as

physicians or nurses. In the rare occasions that pharmacists are included in movies, they often serve as a plot device.<sup>8</sup> “Has Anybody Seen My Gal” differs by giving its druggist character, Mr. Blaisdell, background and character traits. At work, he is a caring pharmacist who places patient care first. There are several scenes in which he helps a customer with a medical question, or struggles to manage the store alone, after sending his sole employee to deliver medications to a sick patient. Outside of work, he is a proud father, who works hard to provide for his family and reminds his children to value other than material things. Despite all that, he lets his wife do what she wants with their newfound wealth, despite it going against his values. His inability to confront his wife is the character flaw that makes him a more interesting character.

Overall, the movie provides viewers with an accurate representation of a typical independent drugstore with a soda fountain in the 1920s. It also provides a nuanced representation of the community druggist as a public servant who prioritizes patients’ welfare over monetary gain, while simultaneously being a doting family man. However, the movie is missing one crucial aspect of pharmacy practice in the 1920s: prescription compounding. Approximately 75% of all prescriptions in the 1920s required some compounding; as a result, a pharmacist’s typical daily activity would involve performing the various tasks of pharmaceutical compounding in a well-stocked workroom in the pharmacy.<sup>9</sup> By omitting any depiction of this activity, the audience does not get a full picture of what being a pharmacist in the 1920s was like. Aside from this omission, “Has Anybody Seen My Gal” is an enjoyable comedy, depicting a typical 1920s drugstore, its soda fountain, and a devoted pharmacist-owner that pharmacy-history lovers will want to check out.

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and

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Clinical Staff Pharmacist, Asante  
Rogue Regional Medical Center in  
Medford, Oregon

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## Herbert Humphrey...

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dency. Vice President Humphrey addressed issues that had huge impacts on healthcare and the health of people in the United States. From the Durham-Humphrey amendment to his call on the medical field to help impoverished communities to address health disparities, Hubert Humphrey worked to improve healthcare for everyone.

—Creed Carleton,  
Harrison Hightower, PharmD,  
Candidates 2022 and Bernie R.  
Olin, PharmD.,  
Auburn University,  
Harrison School of Pharmacy

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## Ivermectin: A New Meaning to "Horse Pill"...

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## Pharmacy Chronicles

### American Association of Colleges of Pharmacy **AACP**

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—UNIVERSITY OF KANSAS, AT LAWRENCE, SCHOOL OF  
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#### About the History of Pharmacy SIG

The academic year (2021 – 2022) marks the fourteenth year since the History of Pharmacy Special Interest Group (SIG) was formalized as an AACP SIG.

As an open academic forum, the SIG strives to facilitate the exchange of ideas and innovation among pharmacy faculty across disciplines; to serve broadly as an accurate information resource for teaching, learning, and scholarship pertaining to the evolution and history of the pharmacy profession; to develop and maintain historical collections of artifacts and school or college museums; and to ensure the lessons, the message, and the legacy of the pharmacy profession is preserved to educate future generations of pharmacy students.

The SIG's mission rests on the premise that the history and legacy of the pharmacy profession will always be relevant to all pharmacy practice areas, including current and future scopes of practice. The History of Pharmacy SIG is relevant to you too! Join the History of Pharmacy SIG!!

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