

MILKEN
INSTITUTE
FasterCures

Creating a Nonprofit Marketplace for Shelved Drugs

Lessons from a Pilot Project

SUNG HEE CHOE, ANNETTE BAKKER, KAY KOEHLER,
BAIJU SHAH, CAITLYN BARRETT, AND MARCO NIEVO

Introduction

Many promising medicines, despite strong safety data and pharmaceutical characteristics, are discontinued by drug companies for nonscientific reasons, including strategic, organizational, and financial considerations. Gaining access to these shelved drugs—to investigate intended or new indications—is challenging. Meanwhile, patients and families wait for new therapies for their conditions.

A new approach to solving this challenge assigns patient advocacy groups and other nonprofit organizations as matchmakers between discontinued drug assets and capital sources. The lessons learned from piloting this approach offer a potential template for others focused on identifying and accessing discontinued assets for clinical development.

Background

Drug companies routinely review their drug programs and revise their pipelines, weighing opportunity and need against the likelihood of success and potential return on investment. As part of this evaluation, companies must sometimes make difficult decisions to deprioritize programs that no longer fit the corporate strategy. Some development programs are discontinued despite their potential to treat disease.

In an ideal world, discontinued drug programs would be prepped for out-licensing, donation, or divestiture to new owners. But significant informational, operational, and cultural barriers within drug companies can undermine even the best-intentioned efforts. Prominent among these barriers is a deeply rooted cultural mindset to bring assets in and not let assets out. Equally obstructive is a frequent lack of resources to carry the burden of cataloging project information and data for the next owner. Moreover, despite the widespread availability of capital, potentially interested parties—an ecosystem comprising nonprofit organizations, venture capital and angel investors, government, and companies—are not fully aware of one another's resources, which hinders the capacity to partner and strike deals.

In recent years, novel partnerships have been established to further the development of discontinued drug candidates. These partnerships build on the important groundwork laid by initiatives that have sought to create new pathways to revive discontinued assets. In the US, they include the National Institutes of Health's [National Center for Advancing Translational Sciences' New Therapeutic Uses Program](#),² and in the UK, the Medical Research Council.¹

The feasibility of repurposing discontinued therapies was confirmed by the New Therapeutic Uses program, launched in 2012 to support investigations into the use of existing drugs for new indications in eight therapeutic areas.² The program convened research groups from academia and matched them to participating companies. The companies provided active drug and matched placebo along with trial data and supporting materials at no cost to the governmental agency or the parent research institutions. Because the drugs involved had already passed key development steps, including safety in humans, researchers were able to initiate clinical evaluation in as few as three months—in sharp contrast to the decade or more that may elapse between identification of a therapeutic molecule and readiness for clinical trials.

To explore the potential for a new patient-centered approach, the Children's Tumor Foundation (CTF) and CureSearch for Children's Cancer—two leading nonprofit foundations with missions to accelerate the development of new therapies to treat pediatric tumors and rare diseases—joined with FasterCures, a center of the Milken Institute, to pilot the Bridge initiative, designed to provide a nonprofit marketplace for discontinued drugs.

What Makes a Disease Rare?

[Definitions of rare diseases](#)³ are highly dependent on where you live. To simplify diagnosis and management, public health experts accept three generally similar regional definitions. In the US, the FDA defines a rare disease as a condition affecting fewer than 200,000 people—equivalent to 1 in 1,500 Americans. It's estimated that between 25 million and 30 million Americans are currently living with a rare disease. Public health experts in Japan define a rare disease as one affecting fewer than 50,000 people, or 1 in 2,500. Member countries of the European Union accept a prevalence of 1 in 2,000 as a rare disease.

The toll of rare diseases is heavy: Approximately 30 percent of children with rare diseases do not reach their fifth birthday.

The term rare disease generally excludes diseases that, although statistically rare, are not life-threatening, chronically debilitating, or inadequately treated. Worldwide, there may be as many as 7,000 rare diseases.

*[Orphan Drugs for Rare Diseases](#)*⁴

The 1983 Orphan Drug Act (ODA) provided special financial incentives for companies developing treatments for rare diseases as defined by the FDA Office of Orphan Products Development. Since passage of the ODA, more than 400 treatments for rare diseases have been approved—compared with fewer than 10 in the decade 1973–1983.

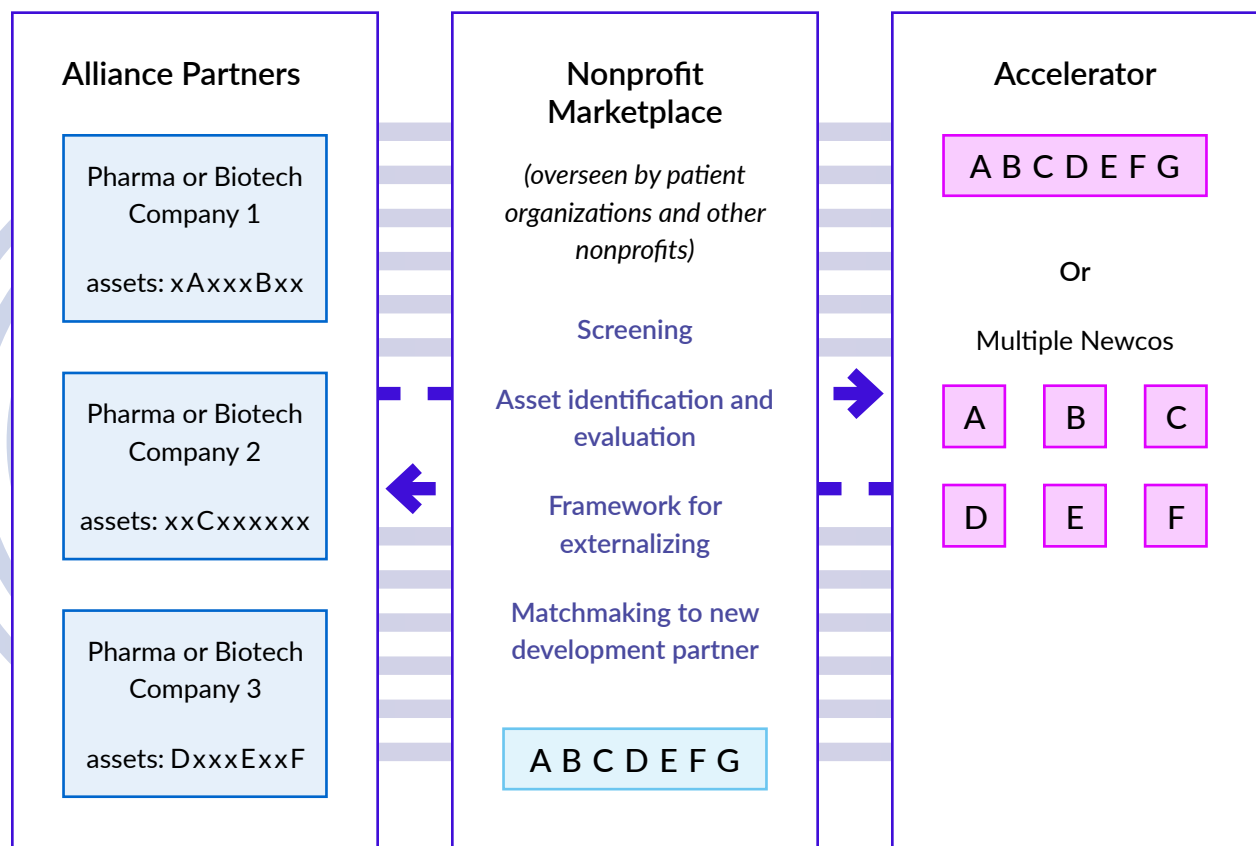
The availability of effective treatments has vastly increased knowledge surrounding many rare diseases. However, despite progress in diagnosis, treatment, and even prevention, there are still no treatments for most of the diseases considered rare. Many of those diseases could be treated by drugs that are recoverable, as described in this paper.

The Bridge Pilot

In 2019, FasterCures launched the Bridge initiative to facilitate more dynamic marketplaces for biomedical innovation. Building on input from its stakeholder community, FasterCures identified a possible mechanism for mobilizing investment in discontinued drug programs: a nonprofit information and matchmaking marketplace, operated by patient advocacy groups and other nonprofit organizations, to match discontinued drugs to new investors. This marketplace is intended to leverage the unique ability of patient advocacy and nonprofit organizations to activate their networks of industry players and investors in the service of their patient communities.

To evaluate the potential of this mechanism in a real-world context, FasterCures enlisted CTF—a rare disease nonprofit research foundation with a mission to drive research, expand knowledge, and advance care for patients with neurofibromatosis—and CureSearch—a nonprofit organization focused on accelerating the pace of pediatric oncology drug development—to collaborate in a pilot approach (the Bridge initiative) targeting neurofibromatosis and pediatric cancer. All pediatric cancers are considered rare diseases; neurofibromatosis is a group of rare conditions characterized by tumors in the nervous system, skin disfigurement, and bone abnormalities, among other signs and symptoms.

Figure 1: Nonprofit Marketplace for Shelved Drugs



Source: Milken Institute, Children's Tumor Foundation, and CureSearch for Children's Cancer (2021)

The nonprofit marketplace is overseen by employees of the three partnering organizations and supported by scientific and business advisors convened by the Bridge team. The core function of the market is to help prioritize drug assets and match the most promising of them to a dedicated development accelerator company or new companies and funds. The marketplace also provides access to services supporting drug development (such as patient registries, clinical networks, and platform trials) and to relationships with key scientific and clinical leaders in research institutions as well as regulatory agencies.

For drug companies, anticipated benefits of working with the nonprofit marketplace are the efficiency of leveraging the vast, active networks of patient organizations to access new potential partners and the expediency of reaching contractual agreements. Expectations for industry partners include collaboration with the nonprofit marketplace in developing frameworks to access information and data on deprioritized assets, evaluate those assets, and externalize promising medicines. All information pertaining to the discussions and assets remains confidential through a bilateral agreement with the Bridge team. The marketplace will work with industry partners to ensure appropriate recognition for participating in the initiative.

Core Elements of the Bridge Initiative

- **Structure:** CTF, CureSearch, and FasterCures signed a memorandum of understanding, by which the three organizations agreed to cooperate in identifying and advancing discontinued drug assets that could have promise for the treatment of children's diseases. Each organization shares the responsibility to build awareness of the initiative, make internal expertise and resources available, and leverage existing relationships in support of the Bridge initiative. CTF and CureSearch share in the economics of the partnership, which could include finders' fees, milestone payments, and royalties.
- **Leadership commitment:** All three organizations agreed to commit time and resources to design and implement this pilot. Board support was essential to ensure alignment with organizational missions.
- **Strong relationships with drug companies:** We needed strong relationships with leaders within drug companies to initiate fruitful conversations and determine where the greatest opportunities existed.
- **Drug target selection:** We assembled a list of desired drug targets and established criteria for selecting drug candidates for the marketplace. Criteria included potential for efficacy in childhood tumors, safety as demonstrated in a Phase I trial, deprioritization for strategic or commercial reasons, and discontinuation within the past five years. Access to the data room and members of the development team provided exponential benefit.
- **Scientific advisors:** We recruited a team of scientific advisors to assist in prioritizing drug targets and evaluating assets. We ensured that the team of advisors was balanced to cover the major scientific areas of neurofibromatosis and/or childhood cancers from the clinical, basic, or translational research perspectives. When identifying advisors, we also considered their expertise in systems biology, developmental therapeutics, and chemistry.
- **Business advisors:** We assembled a group of business advisors with experience in putting together novel transactions in the drug industry. The advisors have expertise in financing and developing drugs and devising private–public partnerships. We also have access to legal services to provide contracting advice. These advisors provide input on transaction structures, potential economics, and legal language as a starting point for the negotiation and development of deprioritized assets.

Engagement with Industry Partner

In 2020, we were approached by an industry partner with an oncology asset that had been shelved as the result of a strategic decision by the company. This partner is a top-20 biopharmaceutical company with a commitment to patient-centered care and corporate social responsibility. Conventional out-licensing efforts had been unsuccessful.

We entered into a confidentiality agreement with the partner to learn more about the asset. After our preliminary evaluation of publicly available information and a discussion with the individuals involved in the program, we determined that the asset warranted further examination. The company provided access to a data room where project information was cataloged. The data room contained details relating to the asset, including but not limited to toxicology, cross-reactivity, pharmacokinetics, functional characterization, Investigational New Drug Applications, preclinical data, and tumor-specific advisory board summaries. We identified a subset of our scientific advisors and additional advisors who had experience with this drug target to review the data.

Donate or Consign?

From the company's perspective, a challenge was that only one individual possessed detailed knowledge of the drug's development program. It was essential to the company that we minimize the burden on that person's time. This led us to think creatively about how to structure a transaction. We discussed two options, which we referred to as the "donation model" and the "consignment model."

Under the donation model, title to the asset would first transfer to the Bridge initiative. We would work with company staff to prepare pre-reads about the asset for distribution to potential investors and development partners. Parties interested in learning more about the asset would receive a more detailed packet of information and would be invited to a single Q&A session with company staff. Following the due diligence period, the Bridge initiative would put the asset to auction and transfer the asset to the new owner.

Under the consignment model, title to the asset would not transfer to the Bridge initiative, but the partnership would act as the intermediary between the company and interested parties. The Bridge organizations would assume the responsibility for identifying the investors and development partners and assembling this group in a single Q&A session with the company staff.

From the company's perspective, there were multiple benefits to be gained regardless of the model chosen: divestment of a superfluous asset, redirection of a valuable medical treatment, and elevation of the corporate social responsibility profile. The Bridge initiative offered an efficient pathway for externalizing the asset, whereby company resources and staff could be conserved by working with only one entity that would carry out the responsibilities of identifying potential partners. In addition, Bridge offered a way for the company to demonstrate its commitment to corporate social responsibility and its core mission of access to medicine.

Lessons Learned

C-suite champions and alignment required up front: We had promising discussions with individuals at multiple drug companies, but this enthusiasm often did not carry over to the level of the C-suite. Without a C-suite champion, the barriers may be too high to overcome, particularly because the level of resources required for externalization activities may be considerable and viewed as greater than the return to be

gained from any transaction. In the case of the industry partner described above, there was a primary champion and a strong, aligned commitment from members of the C-suite along with key individuals who had both knowledge of the asset from R&D and other essential corporate functions. Most importantly, perhaps, a deeply embedded organizational commitment to corporate social responsibility, which included the importance of making decisions in the best interest of patients, paved the way for potential partnership discussions.

Capital sources: Access to capital is an essential consideration for industry partners. Given the high financial requirements of drug development, any industry partner needs to be assured that sufficient funds will be in place to initiate and sustain development activities. To demonstrate access to capital, we sought letters of intent from investors to review assets that met the criteria of the Bridge initiative. These commitments needed to be secured at the outset of the initiative.

Flexibility in transaction structure: Decisions on a transaction structure were needed to accommodate multiple considerations for our industry partner, including accounting and tax impacts. A clear benefit of the Bridge initiative to potential partners is our ability to customize the development of these terms, including the role of the initiative as convener, matchmaker, or asset recipient, based on industry partner needs. In addition, it is crucial to build in enough intellectual property protection to interest future collaborators.

Corporate social responsibility and ESG as levers: The Bridge initiative was of particular interest to drug companies with a strong commitment to corporate social responsibility and the advancement of material environmental, social, and governance (ESG) issues. Externalizing discontinued assets may serve as a new and alternative route for access to medicine initiatives within companies. Additional value creation for internal and external stakeholders (patients, clinicians, innovators, employees, shareholders, and the general public) may confer long-lasting reputational benefits. Even so, in this case, the option to externalize a shelved asset was viewed as possible only after conventional out-licensing approaches had failed to bear fruit. This may not be the case for every company, however, and approaches allowing for greater flexibility should be explored.

Conclusion

Drugs that can improve people's lives should not be sitting on drug company shelves. Finding a development path for promising drugs, regardless of their commercial potential, is simply the right thing to do for society.

This article described a potential path to reviving discontinued drugs, which places patient organizations at the center. As with any new marketplace, there is the "chicken and egg" problem of securing interest, commitments, and partners before a portfolio of assets is assembled. The Bridge initiative benefited from clarity in our vision and objectives, as well as a shared commitment from the participating organizations to draw on expertise, resources, and relationships to facilitate our success. We hope our experience elucidates some of the key considerations of this model to help smooth the path for others.

There is no single or ideal model for solving the challenge of shelved drugs. Other efforts to give new life to discontinued assets are emerging. Future models should consider how to elevate the importance of finding new homes for discontinued drugs, as part of access to medicine strategies, and leverage previously established, public commitments to corporate social responsibility. Pathways and structures that provide

efficiency for industry, patient advocacy organizations, and future partners are also required, as well as transactional structures that balance both philanthropic and traditional financial goals.

To ensure that all good science enters development, industry, investors, and nonprofits must continue to work synergistically in experimenting with myriad approaches to support the financing and development of discontinued assets. Patient-focused organizations understand the barriers to externalizing discontinued assets and are eager to work with companies to navigate these obstacles.

The Bridge team seeks industry and investor partners to collaborate in transforming shelved pharmaceutical assets into treatments. To connect with the team, please contact Allyson Conlin at aconlin@milkeninstitute.org.

Endnotes

1. Ann G. Hayes and David J. Nutt, "Compound Asset Sharing Initiatives between Pharmaceutical Companies, Funding Bodies, and Academia: Learnings and Successes," *Pharmacology Research and Perspectives*, Vol. 7 (4) (August 2019), <https://doi.org/10.1002/prp2.510>.
2. National Institutes of Health, National Center for Advancing Translational Sciences, "Discovering New Therapeutic Uses for Existing Molecules," (Summer 2015), <https://ncats.nih.gov/files/NTU-factsheet.pdf>.
3. National Institutes of Health, National Center for Advancing Translational Sciences, "FAQs About Rare Diseases," Genetic and Rare Diseases Information Center, (August 23, 2021), <https://rarediseases.info.nih.gov/diseases/pages/31/faqs-about-rare-diseases>.
4. Electronic Code of Federal Regulations, "Designation of an Orphan Drug," Title 21, Chapter 1, Subchapter C, Part 316.20, (August 2021), <https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=51cf70689d51f0ea4147c0a8ac649321&rgn=div5&view=text&node=21:5.0.1.1.6&idno=21#sp21.5.316.c>.

About the Milken Institute

The Milken Institute is a nonprofit, nonpartisan think tank. We catalyze practical, scalable solutions to global challenges by connecting human, financial, and educational resources to those who need them. We leverage the expertise and insight gained through research and the convening of top experts, innovators, and influencers from different backgrounds and competing viewpoints to construct programs and policy initiatives. Our goal is to help people build meaningful lives in which they can experience health and well-being, pursue effective education and gainful employment, and access the resources required to create ever-expanding opportunities for themselves and their broader communities.

About FasterCures

FasterCures, a center of the Milken Institute, is working to build a system that is effective, efficient, and driven by a clear vision: patient needs above all else. We believe that transformative and life-saving science should be fully realized and deliver better treatments to the people who need them.

About the Authors

Sung Hee Choe

Senior Director, FasterCures, a center of the Milken Institute

Annette Bakker

President, Children's Tumor Foundation

Kay Koehler

President & CEO, CureSearch for Children's Cancer

Baiju Shah

Senior Advisor, FasterCures

Caitlyn Barrett

National Director of Research and Programs, CureSearch for Children's Cancer

Marco Nievo

Chief Scientific Officer, Children's Tumor Foundation Europe

©2021 Milken Institute

This work is made available under the terms of the Creative Commons Attribution-NonCommercialNoDerivs 3.0 Unported License, available at creativecommons.org/licenses/by-nc-nd/3.0/.