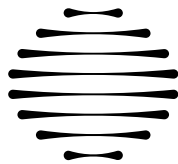


Investing in Global Health Security



GHIC - BARDA Ventures

Year 2 | Venture Partnership Report

August 2023

GHIC - BARDA Ventures Venture Partnership Report

Quick facts
as of 30 June 2023

2021
GHIC-BARDA
Partnership Formed

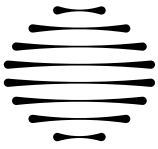
568
Companies Screened

12
Portfolio Investments

\$46.7M
Total Capital Committed to
Investments

\$1.01B
Total Syndicate
Capital Deployed*

*Across the 12 portfolio investments



Global Health Investment Corporation (GHIC)

GHIC, a nonprofit organization, has been investing in global health innovation for over a decade. GHIC aims to catalyze the development of technologies to improve global health through investments in vaccines, therapeutics, diagnostics, medical devices, and other technologies that save and improve lives by mobilizing private, public, and philanthropic capital via innovative partnership models.

GHIC leverages the engagement, networks, and funding of its strategic partners and stakeholders to drive innovation. It has over a decade of experience and expertise investing in innovative health technologies for a healthier, safer world.

At the core of GHIC's mission is a double bottom line investment model—applying traditional life science investing tools to fund lifesaving innovations that generate measurable health impact while also seeking to generate attractive financial returns.

For more information, please visit www.ghicfunds.org



Administration for Strategic Preparedness and Response and the Biomedical Advanced Research and Development Authority (BARDA)

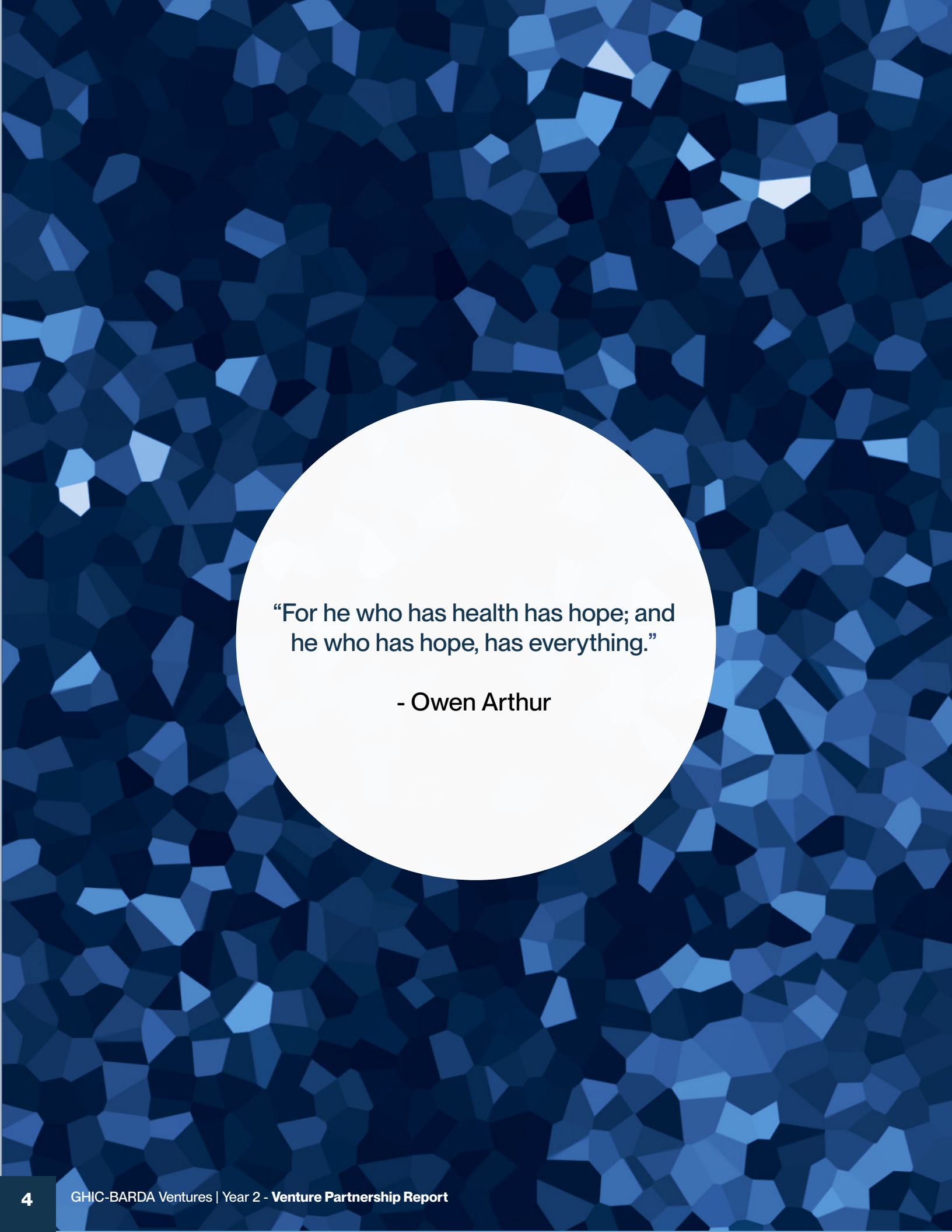
BARDA, part of the Administration for Strategic Preparedness & Response (ASPR) within the U.S. Department of Health and Human Services (HHS), invests in the innovation, advanced research and development, acquisition, and manufacturing of medical countermeasures—vaccines, drugs, therapeutics, diagnostic tools, and medical devices needed to combat health security threats.

BARDA's direct engagement and rapid deployment of funding during times of crisis have positioned the organization as a leader in global health security and response, both within the U.S. government and on the international stage. Over the past seventeen years, BARDA has played a critical role in developing and approving over 80 U.S. Food and Drug Administration (FDA)-approved, licensed, or cleared products to be used in times of emergency, responding to global health threats such as Anthrax, Ebola, H1N1, mpox, , SARS-CoV-2, and Zika.

BARDA Ventures

Utilizing unique authorities granted in the 21st Century Cures Act, BARDA Ventures was established within BARDA's Division of Research, Innovation, and Ventures (DRIVE) to sponsor a venture capital investment partnership from HHS for the first time. Through the BARDA Ventures program, a novel public-private partnership was established with GHIC to invest in medical countermeasures and technologies that address gaps in the response continuum and strengthen preparedness and response to health security threats.

For more information, please visit <https://drive.hhs.gov/ventures.html>



“For he who has health has hope; and
he who has hope, has everything.”

- Owen Arthur

Opening Letter



Labeeb Abboud
Chairman and CEO, GHIC

***“The public, private, and philanthropic sectors have each played important roles in accelerating the development and delivery of new and improved global health products, interventions, and services, to improve health and save lives worldwide.*”**

By blending public, private, and philanthropic funding, mission focused private investment can further expand the financing available to drive impact in the field of global health security”

The COVID-19 pandemic illustrated how the rapid global spread of an infectious disease can have devastating consequences, highlighting the importance of preparedness and response to emerging infectious disease threats and the need for international cooperation in addressing broader global health threats.

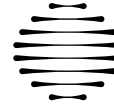
Although there has been remarkable scientific and technical progress supporting the global response to the COVID-19 pandemic, persistent challenges remain in providing equitable access to lifesaving technologies and products. Public-private sector initiatives play an invaluable role in mobilizing resources and supporting innovation to enable effective responses to existing and new health threats.

For the GHIC-BARDA Ventures investment partnership, 2022 was a year of substantial progress. We expanded our team, partnerships,

and investment portfolio, all in pursuit of our mission to improve human health worldwide. We worked closely to source, evaluate and execute a portfolio of mission-aligned investments. We also entered new strategic partnerships and collaborations to support and advance our efforts.

Although no one knows what the next public health emergency will be, we know that the outcome will be determined by our ability to prepare and respond effectively. And the close alignment of public- and private- sector efforts will increase the probability of success. We believe that innovative financing mechanisms, such as the GHIC-BARDA Ventures investment partnership, will play an important role in accelerating the development of mission-relevant technologies and products and strengthening health security and pandemic preparedness and response. In close collaboration with our other partners, we look forward to advancing our work in the coming years to invest in a healthier, safer world for all.

Labeeb M. Abboud



GHIC and BARDA Ventures: *Partners in Global Health Security*

Global health security is a collective imperative encompassing global public health, emergency preparedness and response, and national and individual security.

It requires a continuous state of readiness and the ability to effectively respond to emergent threats. While the location or nature of the next health security threat is not known, strengthening preparedness and response capabilities through the development of medical countermeasures and other technologies will help protect the well-being of individuals globally.

Catalyzed by a unique public-private investment partnership, GHIC and BARDA Ventures are using venture capital practices to support the development of medical countermeasures and other technologies to improve global health security.

Mission

To invest in life sciences, biotechnology, and health technology companies developing medical countermeasures and other enabling technologies that strengthen global health security, support health equity, and build resilience to detect, prevent, and respond to future public health threats.

“ Together with our partner GHIC, BARDA Ventures supports entrepreneurs who are advancing the development of medical countermeasures and helping strengthen the nation’s preparedness for future health emergencies. Growing this community of innovators is part of BARDA’s strategy to fortify the nation’s health security. ”

Gary Disbrow, Ph.D.
BARDA Director

Who we are

Global Health Investment Corporation (GHIC), a nonprofit organization, has been investing in global health innovation for over a decade. The Biomedical Advanced Research and Development Authority (BARDA), part of the Administration for Strategic Preparedness & Response (ASPR) within the U.S. Department of Health and Human Services, invests in the innovation, advanced research and development, acquisition, and manufacturing of medical countermeasures. Through the BARDA Ventures program, a novel public-private partnership was established with GHIC to invest in medical countermeasures and technologies that address gaps in the response continuum and strengthen preparedness and response to health security threats.

How we work together

BARDA Ventures and GHIC bring complementary experience and expertise to the partnership to source and evaluate companies developing promising technologies with the potential to strengthen health security and generate financial returns. Utilizing BARDA- provided funding, GHIC structures, negotiates, and executes investments alongside co-funding from additional private investors. As the technologies and companies generate investment returns, proceeds from GHIC’s investments made with BARDA funding will be returned to GHIC for reinvestment and sustainment of mission-aligned solutions.

Our unique value added

GHIC and BARDA Ventures prioritize mission-aligned companies and technologies for investment, focusing strategically on promising technologies and products with the potential to advance solutions to public health challenges and deliver impact. By fostering and supporting innovators and the broader health security ecosystem, we seek to promote new and promising technologies that address unmet public health needs. To facilitate success, we leverage:

- **Our joint expertise** allows us to identify and support technologies that have the potential to improve our ability to respond to global health security threats.
- **Our investment model** complements traditional government grants or contracts and invests in sustainable health security solutions.
- **Our venture capital approach** allows us to move quickly and effectively to support the development of innovative technologies that can improve global health security.

Mission

To invest in life sciences, biotechnology, and health technology companies developing medical countermeasures and other enabling technologies that strengthen global health security, support health equity, and build resilience to detect, prevent, and respond to future public health threats.

Mission Framework

The GHIC-BARDA Ventures investment partnership utilizes a mission framework, informed by BARDA's [2022-2026 Strategic Plan](#) and engagement with BARDA leadership, to identify and assess investment opportunities across the end-to-end continuum of global health security response.



Warn

Technologies to forecast and observe disease trends and outbreaks with actionable insights to better prepare and respond

Early detection of infectious outbreaks is crucial to prevent the spread of disease.

Real-time, digital surveillance systems that aggregate and analyze population-based data improve national capacity to monitor and manage endemic disease burden and risk factors. Investment areas may include next-generation surveillance tools to lower the cost, infrastructure burden, and communication barriers.

Detect

Diagnostic systems with improved capabilities to adapt rapidly to new threats, and bring testing closer to the patient

Early diagnosis and containment of a pathogen or health security threat is paramount to minimize detrimental effects.

Multiplex and pathogen-agnostic diagnostics are being advanced to increase sensitivity detection and simultaneous testing of multiple pathogens, resistance genes, biomarkers, and analytes in one assay. Investment areas may include rapid point-of-person diagnostics, non-invasive technologies, emerging approaches, and improved accessibility profiles that enable the deployment of more diagnostics - at the lab, point of care or beyond.



Protect

Products that can integrate into daily life to protect individuals or the public

Technologies to prevent exposure and transmission for a broad-spectrum of health threats

Improved methods of protection to minimize exposure to chemical, biological or other health threats, prevent or reduce transmission for diseases of pandemic potential and have broad daily hygiene applications that make society better prepared for future emerging threats. Investment areas may include affordable, reusable technology solutions that can be rapidly scaled up and made broadly available without supply vulnerabilities.



Develop



Vaccines and therapeutics, as well as the tools to develop them, that effectively reduce morbidity and mortality

Pandemics are by their nature unpredictable. A wide range of medical countermeasures are needed to effectively prepare for and respond to existing and potential threats.

Given these dynamics, there is a pressing need for next-generation medical countermeasures which can be rapidly developed and scaled or, in some cases, be prepared beforehand and be ready off-the-shelf. Investment areas may include multi-pathogen therapeutics, modular vaccine platforms (like mRNA), vaccines based on conserved pathogen structures, microbial enzymes, and host-based responses, and technologies and innovations having the potential to lower cost and increase accessibility broadly.

Produce



Resilient, surge-capable, flexible manufacturing ecosystem that prioritizes increased domestic capacity at point of demand

During a pandemic the need for medical countermeasures is high and the ability to manufacture them quickly is crucial.

New technologies are being developed that allow for more flexible and scalable manufacturing methods that can be quickly repurposed against novel pathogens with minimal changes to physical infrastructure or established production processes. Investment areas may include technologies that expand production capacity, speed, and redundancy for health security products such as continuous bioprocessing, modular and small-footprint equipment, and compact end-to-end manufacturing lines.

Distribute



Technologies that support infrastructure to enhance, diversify, and strengthen the response to public health emergencies

Resilient supply chains and distribution networks are critical to improve readiness for health security emergencies

Building resilience into supply chains and distribution networks is essential for maintaining preparedness against health security threats and helps facilitate global supply of critical medications and resources. Investment areas may include supply chain technologies (hardware and software) or drug formulation and delivery technologies that can support greater access to critical medical products.

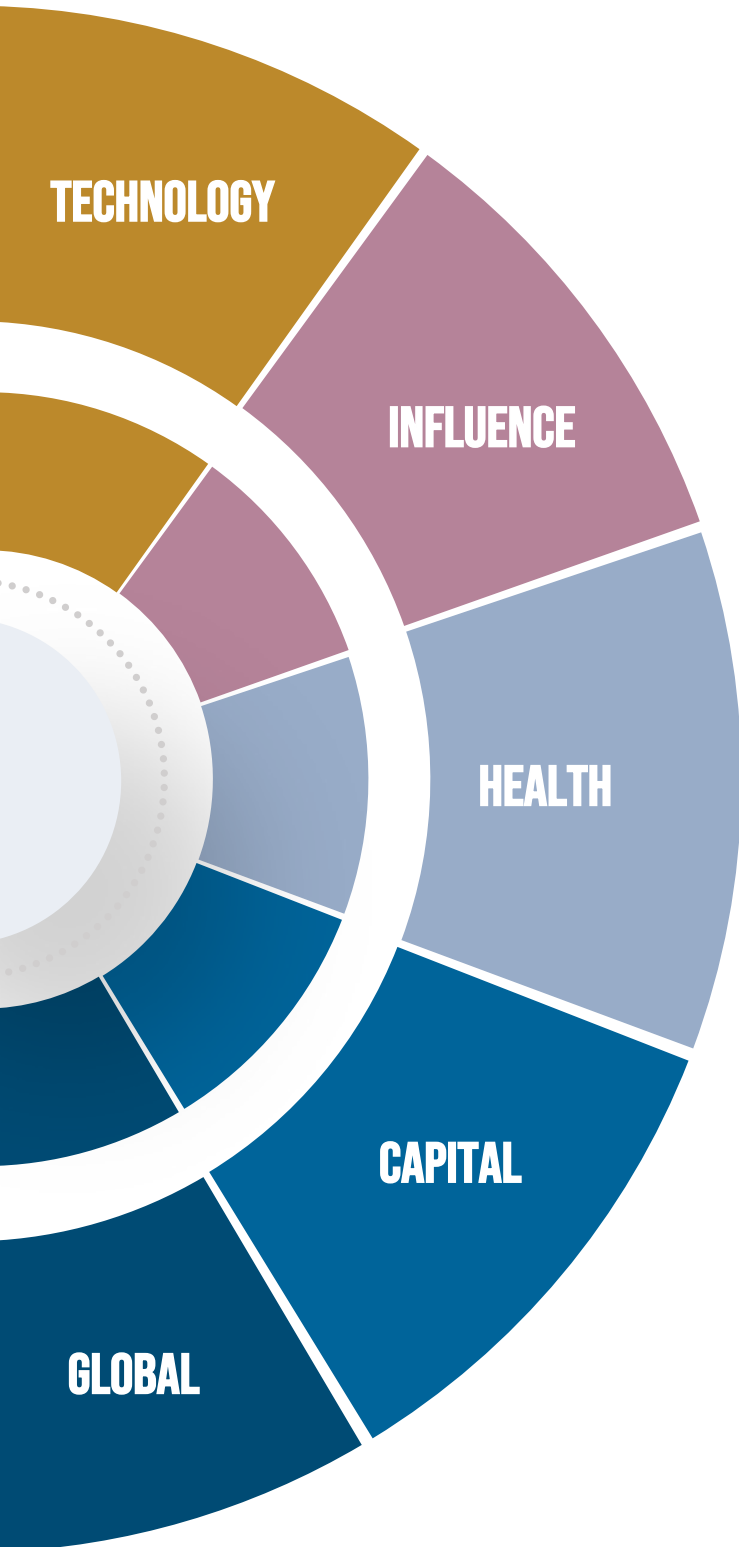
Administer



Next-generation technologies that improve equitable access to medical countermeasures for all

Methods to make vaccines and therapeutics easier to administer and more widely available have the potential to improve vaccine delivery and coverage during a health security emergency.

Many vaccines and drugs are administered via injection (intramuscular, intravenous, or subcutaneous). While these administration methods have been proven to be effective, they also present challenges during health security events and in resource-limited settings. Investing in alternative delivery technologies for vaccines and therapeutics, such as microneedle patches, intranasal or inhalable delivery mechanisms, and oral formulations, can enable self-administration, thus reducing cold chain requirements, physical, and human infrastructure, and costs of administration.



Approach to Impact

An impact management process has been developed to manage, monitor and report on mission impact that contributes to global health security. The process is designed to capture the impact achieved through the GHIC-BARDA Ventures partnership by the portfolio companies that benefits the ultimate beneficiaries (end-users and society).

Impact indicators

A set of indicators based on a theory of change outlines the long-term, systemic impact intended by the investment program.

TECHNOLOGY

Adopted and ready state global health security countermeasures developed from commercially sustainable investments.

INFLUENCE

Expansion of commercial firms, innovation, and an enabling ecosystem in global health security.

HEALTH

Increased safety, security, and quality of health for the global population.

CAPITAL

Sustained investment in global health security and a strengthened case for the role of public-private partnerships and venture investment to pilot and scale innovative ideas.

GLOBAL

Investment in global health security benefitting broader health system frameworks and efforts to combat endemic disease and mitigate present and future risk.

Technology Priorities

Technological advancements have been essential in developing effective public health interventions to broadly improve health security and public health.

The GHIC-BARDA Ventures partnership seeks to identify innovative technologies with mission-focused use cases and commercial market potential that respond to the evolving landscape of health security threats. The profile of technologies relevant to global health security include medical countermeasures (MCMs), global health products, multi-use platforms that can be re-purposed in health emergencies, and enabling technologies that support product development. We seek to invest in companies advancing mission relevant technologies with the following characteristics:

Innovation	Innovative technologies to develop next-generation products that address current and future public health threats.
Sustainability	Sustainable solutions to address health security challenges, including platform technologies and other strategies that provide public health benefit and are commercially viable.
Capabilities	Capabilities to ensure the requisite infrastructure is in place to respond to emerging health threats rapidly and effectively.
Speed	Technologies that accelerate development and deployment of medical countermeasures, including vaccines, therapeutics, and diagnostics, to rapidly respond to evolving health security threats.
Global Access	Technologies that enable equitable access, particularly in resource-limited settings.

Global Health Security Portfolio

Each investment is based on the thesis that supporting innovative technologies will drive scalable and sustainable solutions for global health security. The portfolio contains technologies across a wide range of health security applications with the potential to accelerate the development of medical countermeasures and global health products.

	Pre-Clinical	Clinical	Commercial
Threat detection and awareness	<p>Monod Bio Protein biosensor technology offers a novel approach to potentially enable rapid and more sensitive point-of-care diagnosis of new pathogens as they emerge.</p> <p>Jumpcode Genomics Next-generation sequencing (NGS) sample prep company built upon a proprietary platform, which depletes undesired sequences in a sample prior to amplification.</p>	<p>Biolinq Continuous dermal sensing of key health analytes enables real-time health monitoring.</p>	<p>BugSeq Bioinformatics Pathogen-agnostic approaches allow for the identification of any pathogen, including those that are new, and enable a faster public health response from day one of a health security emergency.</p> <p>The Public Health Company Biorisk intelligence and management software platform for enterprise-level tracking and understanding of evolving biosecurity risks.</p>
Development of new medical countermeasures and products	<p>Centivax Universal vaccines that offer a new approach to protection from known and unknown pathogen threat variants.</p>	<p>Endpoint Health Diagnostics-driven therapeutics strategy leverages proprietary clinical data and analysis to develop and deliver precision therapeutics for neglected critical care conditions.</p> <p>Undisclosed Next-generation vaccine development enabled by novel business models and leading science.</p>	

“ The tools we will need to fight tomorrow’s health security threats are still being developed today, by emerging entrepreneurs and innovators in the US and around the world. We need to support them throughout their journey, from idea to commercialization, and that is exactly what this partnership is designed to do. ”

Sandeep Patel
BARDA DRIVE Director

	Pre-Clinical	Clinical	Commercial
Rapid scale-up of manufacturing capacity			<p>Univercells Continuous, distributable bioprocessing technology and specialized services offer lower-cost and smaller-footprint biomanufacturing solutions for the development of resilient public health supply chains, even in resource-constrained environments.</p> <p>Resilience A network of next-generation manufacturing facilities bolsters supply chain strength and offers an opportunity to develop health security-specific medical countermeasures.</p>
Fast and equitable distribution of medical countermeasures		<p>Micron Biomedical “Beyond the needle” delivery of therapeutics and vaccines to enable more efficient distribution and self-administration of critical countermeasures.</p> <p>Vaxess Technologies Microneedle patch-based vaccines with the potential to transform access to valuable biothreat prevention tools.</p>	

Venture Partnership Report

Overview
Mission
Impact
Portfolio

Companies within the Global Health Security Portfolio have made progress across all stages of development including in asset acquisition, clinical development and new partnerships and expanded geographic footprint.

Click the boxes below to learn more.

4Q. 2021

Made investment in:
Biolinq

Biolinq
raises
\$100M

1Q. 2022

Endpoint Health & Grifols Agreement

2Q. 2022

Made investments in:
Endpoint Health
Monod Bio

BugSeq
announces
BARDA
DRIVE Award

Endpoint Health
raises
\$52M

3Q. 2022

Made investments in:
The Public Health Company
Univercells
Vaxess Technologies

Monod Bio
raises
\$25M

4Q. 2022

Made investments in:
Centivax
Bugseq Bioinformatics
Micron Biomedical
Resilience
Undisclosed investment

Endpoint Health unveils
Precision
Immunology
Program

Vaxess
raises
\$27M

Univercells
Vaccine Mfg.
Tech Transfer
in Senegal

Micron Biomedical
raises
\$14M

Centivax
founder
profile

1Q. 2023

Monod Bio
announces
publication in
Nature

Resilience
approved for
\$410M from
the US Dept. of
Defense

Resilience
announces
new funding
and Mfg.
facility in UAE

2Q. 2023

Made investment in:
Jumpcode Genomics

Micron Biomedical
Positive
Clinical
Results

Vaxess
MIMIX-Flu
Phase 1 Trial
Results

Biolinq & Taisho Pharma Strategic Partnership

Jumpcode Genomics
New Research
published in
Cell Reports

Univercells'
Quantoom &
Exothera
Strategic
Partnership

The Public Health Company, BLUE KNIGHT Company



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This report was produced by GHIC as a deliverable under the GHIC – BARDA Ventures partnership and should not be considered an endorsement by US Department of Health and Human Services of the companies or their services mentioned within the report.



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In 2021, GHIC and BARDA launched a novel partnership to invest in life science, biotechnology, and health technology companies developing medical countermeasures and other enabling technologies that strengthen global health security, support health equity, and build resilience to detect, prevent, and respond to future public health threats.

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