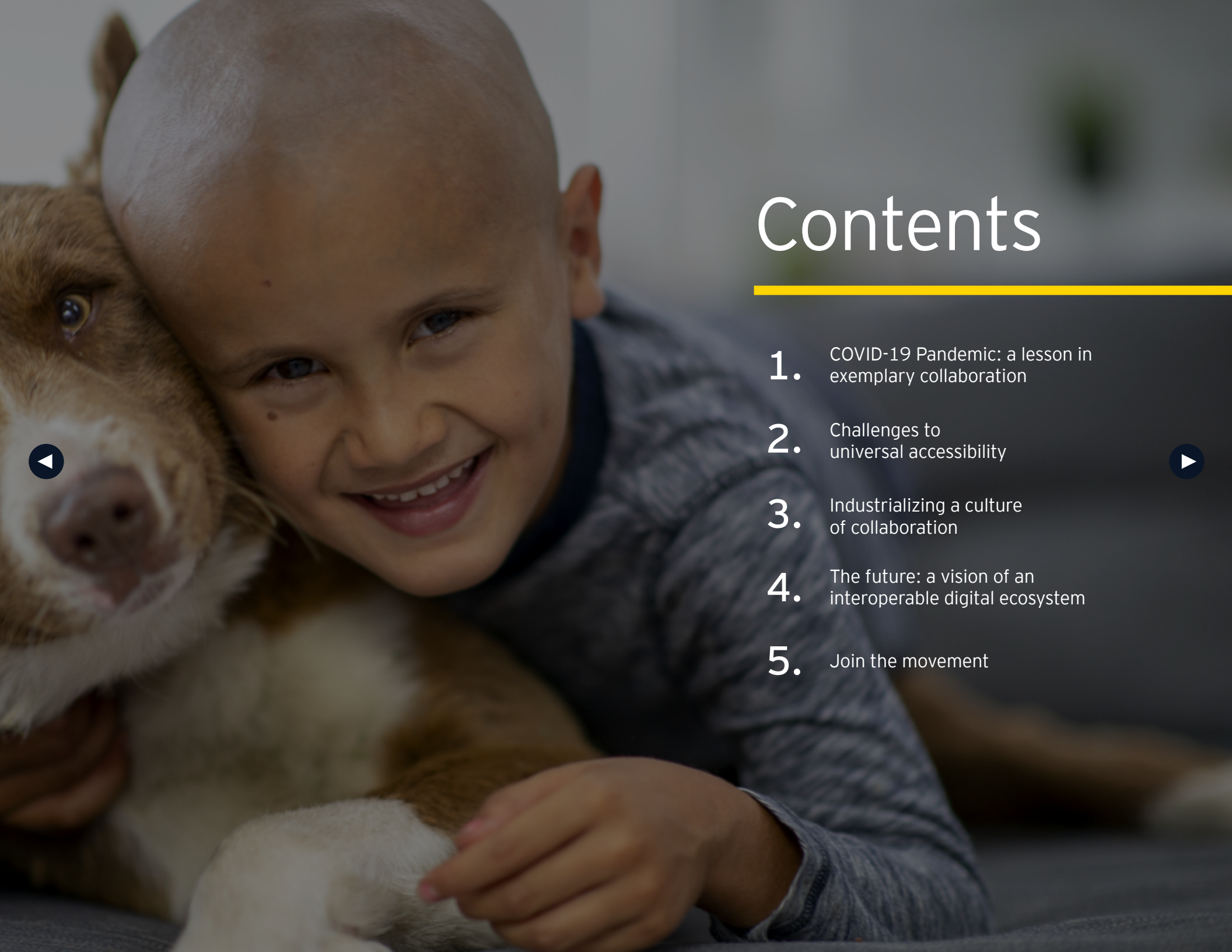
POINTELLIS™

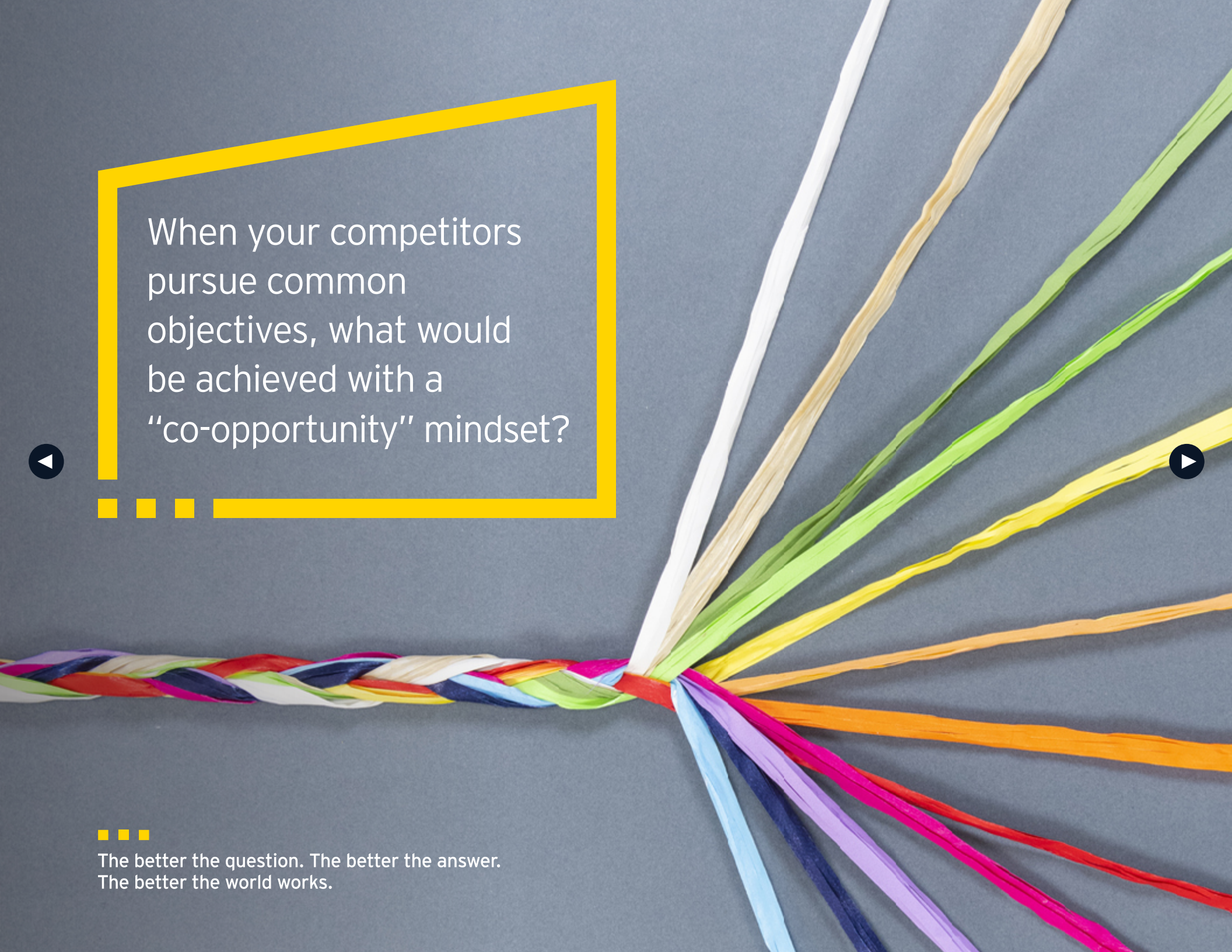
Powered by EY

Industrialized collaboration

The key to scaling advanced therapies



Contents



The better the question. The better the answer.
The better the world works.

“

Not until the COVID-19 pandemic have we witnessed the level of collaboration required to address the cell and gene industry’s current shortcomings. It’s on a whole other level, an industrial one.

Adlai Goldberg
Pointellis™ Solutions Lead
EY Global Digital, Social and Commercial
Innovation Life Sciences Leader

After more than four decades of research and development, the cell and gene therapy (CGT) era has arrived. With it, science now has unprecedented power to create transformative and even curative treatments for cancers, inherited genetic disorders, autoimmune diseases and chronic illnesses, such as heart disease, diabetes, hemophilia and AIDS. But there are barriers to overcome, mountains to be exact.

The life sciences industry is accustomed to delivering “1 for Many” treatments via a one-directional supply chain – from manufacturer to distributor to medical facility to patient. But “N of 1” therapies are more difficult and expensive to produce, with a bidirectional supply chain involving nearly triple the number of steps. Autologous CGTs, where a patient’s own blood or tissue is transformed into a therapy, are especially complicated and present the most risk if there is a single misstep. They depend on upward of 40 coordinated digital and analog handoffs between disparate teams of health care providers, manufacturers, third-party logistics companies (3PLs) and insurers and payers.

With so many players and moving parts, the supply chain is also vulnerable to issues and delays. Patients must wait an average of six to eight weeks for treatments, and 90% of therapies may not be delivered as originally planned. In addition, CGTs come with high price tags, testing the limits of current reimbursement strategies.

Each year, millions of people around the world hear the words, “You have cancer.” The World Health Organization (WHO) predicts the global cancer burden will exceed 27 million new cancer cases per year by 2040, reflecting a 50% increase from the estimated 18.1 million cancer cases in 2018.[1] While there is now the potential to make significant inroads against these and other shattering health statistics, science cannot do it alone.

Scaling next generation therapies requires a next generation effort, what Adlai Goldberg, EY Global Digital, Social and Commercial Innovation Life Sciences Leader, labeled “industrialized collaboration,” where collaboration is woven into and throughout the fabric of the CGT industry.

The COVID-19 pandemic has and continues to show us that when disaster strikes on a global scale and corporate individualism gives way to teamwork, altruism can replace egoism and collaboration can trump competitiveness. As a result, four life-saving vaccines were developed and delivered 10 times faster than one vaccine would normally take.

According to Pharma Intelligence, the active CGT pipeline includes more than 1,800 therapies in the pre-clinical to pre-registration stages, signaling a potential wave of 300 to 400 product approvals between 2022 and 2027. The thousands of CGT patients today will evolve into hundreds of thousands by decade’s end. Can these treatments of last resort be scaled and eventually become treatments of first choice?

1.

COVID-19 Pandemic: a lesson in exemplary collaboration

> I have been very proud to be part of this sector and stand alongside other CEOs and see what the industry has been able to contribute … and where competitive elbows got out the way, and people leant in against the common enemy.
>
> Emma Walmsley, CEO, GlaxoSmithKline, speaking at the Chief Executives for Corporate Purpose's Biopharma CEO Investor Forum, June 2021[2]

Pandemic partnerships underscored the power of collaboration to combat a worldwide health emergency. Ordinarily separate components of the biopharma industry relinquished silos. Biotechnology and pharmaceutical companies, academia and life sciences tools and platform organizations came together to deliver rapid vaccines, diagnostic tools and therapeutics.[3] Memorable partnerships include the Pfizer-BioNTech and University of Oxford-AstraZeneca collaborations on vaccines, and the Genentech-Regeneron effort to develop, manufacture and distribute the therapeutic REGN-COV2.

Many believe that the marriage of science, business and technology bodes well for the future of CGT. It shows that rapid acceleration is possible when organizations band together and play to their strengths, share resources and eliminate redundancies. But possibility doesn't always translate to reality and enthusiasm often wanes. For pandemic best practices in collaboration to truly benefit the CGT field now and in the long run, the industry needs a playbook, one that it can write, evolve and execute together.

2.

Challenges to universal accessibility

> Visibility is foundational to a resilient supply chain with agility built into the extended value chain to enable action.
>
> Glenn Steinberg, EY Global Supply Chain and Operations Leader

Nelson Mandela, Mahatma Gandhi and John F. Kennedy are among the visionaries who changed the world. Mandela was a South African anti-apartheid revolutionary who dedicated his life to achieve the dream of a South African free society. As the leader of India's liberation against British rule, Gandhi championed non-violent resistance. And former US President Kennedy's ambitious plan to put an American on the moon before the end of the decade made Project Apollo a reality by 1969.

But these accomplished leaders couldn't have made an impact without a purpose and a vision of what the future could hold, according to Jeffrey Stier, EY Americas Consulting Purpose & Vision Realized Leader.

"Building on the momentum of collaboration inspired by the COVID-19 pandemic, CGT leaders have an opportunity to articulate and activate a collective, deliberate purpose and vision. That's how movements start," said Stier.

For several years, as part of its purpose of "building a better working world," the EY organization has been studying the CGT landscape and collaborating with private and public sector stakeholders around the globe to identify and manage current and future issues that threaten CGT scalability. Acting as both a convener and advisor, and leading discussions and workshops on the importance and merits of collaboration, EY teams have embarked on what it now calls the "industrialized collaboration movement to advance CGTs." Evolving from the popularized "co-opetition," which combines collaboration, and competition, to "co-opportunity," which focuses on doing the right thing to create opportunities for all involved, its purpose is to help provide CGT universal accessibility. And its vision is one of an interoperable CGT ecosystem.

The evolution of an individual CGT, from the patient to the clinician, to apheresis collection, to multifaceted manufacturing and back to the patient, is elaborate, extensive and expensive. This makes upfront planning and economies of scale difficult to achieve, while the human element creates additional challenges for logistics.

With so many stakeholders involved in one treatment journey, the goal is to identify areas of concern within the supply chain so issues can be addressed before they impact the ability to scale and deliver.

EY teams identify three key hurdles for the CGT field:

Eliminating friction points in the supply chain

When steps, stakeholders and systems multiply, there are bound to be issues. EY professionals surveyed representatives of leading manufacturers, hospitals, 3PLs and payers to identify current obstacles in the CGT supply chain.

Wu Wu, Senior Director, EY-Parthenon, Ernst & Young LLP, who led the survey effort, says, "The consensus is that the supply chain is fragmented, labor-intensive and in need of standardization."

75%

of interviewees cited too many different software systems as a significant stumbling block.

Maintaining chain of identity and chain of custody, while reducing the time it takes for therapies to move from "vein-to-vein," are critical for successfully delivering CGTs. The broad supply chain of an autologous CGT involves a multitude of unaffiliated entities and various stakeholders, from health providers, including physicians, nurses, care coordinators and cell collection centers, to drug manufacturers and transportation and logistics providers.

None of these entities today have systems that "talk" to each other. At every step in the supply chain, different organizations use software tools, processes and workflows that are unique to their situations, needs and traditions. Wide usage of manual processes, such as paper, emails and spreadsheets to collect, document and share data is still a common practice. Therefore, supply chain members at each link struggle to effectively, reliably and securely communicate and coordinate.

"From a hospital perspective, our perfect world would be everyone coming together under a common platform," said a hospital director.

In the meantime, manufacturers must integrate and accommodate the different workflows of hospitals, suppliers, logistics providers and payers. They must meticulously plan so that all patients receive their treatments at exactly the right time and place and optimize manufacturing capacity so that more patients can benefit. But they often do not have access to real-time visibility into key patient journey inputs, which could lead to valued manufacturing slots being held unnecessarily.

"It's really hard to move manufacturing slots around. We need to be notified right away if there is a delay, and the more patients, treatments and players, the more problems," said a director at a leading biotech.

Biological material produced for CGTs must be shipped under strict temperature controls within extremely tight timelines, and with a secure and transparent chain of identity and chain of custody. 3PLs are concerned about the current inefficient white glove shipping processes that stem from lack

> From a hospital perspective, our perfect world would be everyone coming together under a common platform.
>
> Hospital director

of collaboration among stakeholders. They call for industry standards to cost-effectively and safely facilitate the anticipated high-volume distribution of the near future.

"Ultimately, we need to move to a point where all stakeholders are accepting and acknowledging that they need to work together, understand demands and streamline processes," said a 3PL managing director, adding, "Bespoke logistics are going to hurt everyone."

Payers blamed lack of visibility around both treatment delays and new, associated costs for making the pre-approval process more difficult and longer. They caution that protracted pre-approvals and re-approval processes resulting from treatment delays, and duplicate data and lack of standardization translate to added time and cost.

Streamlining bespoke manufacturing

When patient numbers are small, processes are highly manual and require numerous skilled operators. But human touchpoints add variability and risk. With the expected uptick of patients, the industry is focused on solutions that scale at 1,000 times the current rate. Automation and technology are going to be key to streamlining processes and reducing manpower and risk.

Companies are investing in technologies and larger production facilities to meet the growing demand for raw materials. They are innovating, from developing processes that help current products scale, to creating entirely new products. They are also using technology to streamline analytical methods used to assess critical quality attributes during development and manufacturing, in an ongoing effort to make quality control faster, less error-prone and more compliant.[4]

Moreover, more and more manufacturers are realizing the power of collaboration in keeping up with the continued influx of new therapies, material demands and processes. However, though vast improvements have been made, the timelines are often too long and the therapies too expensive to reach many patients.[5]

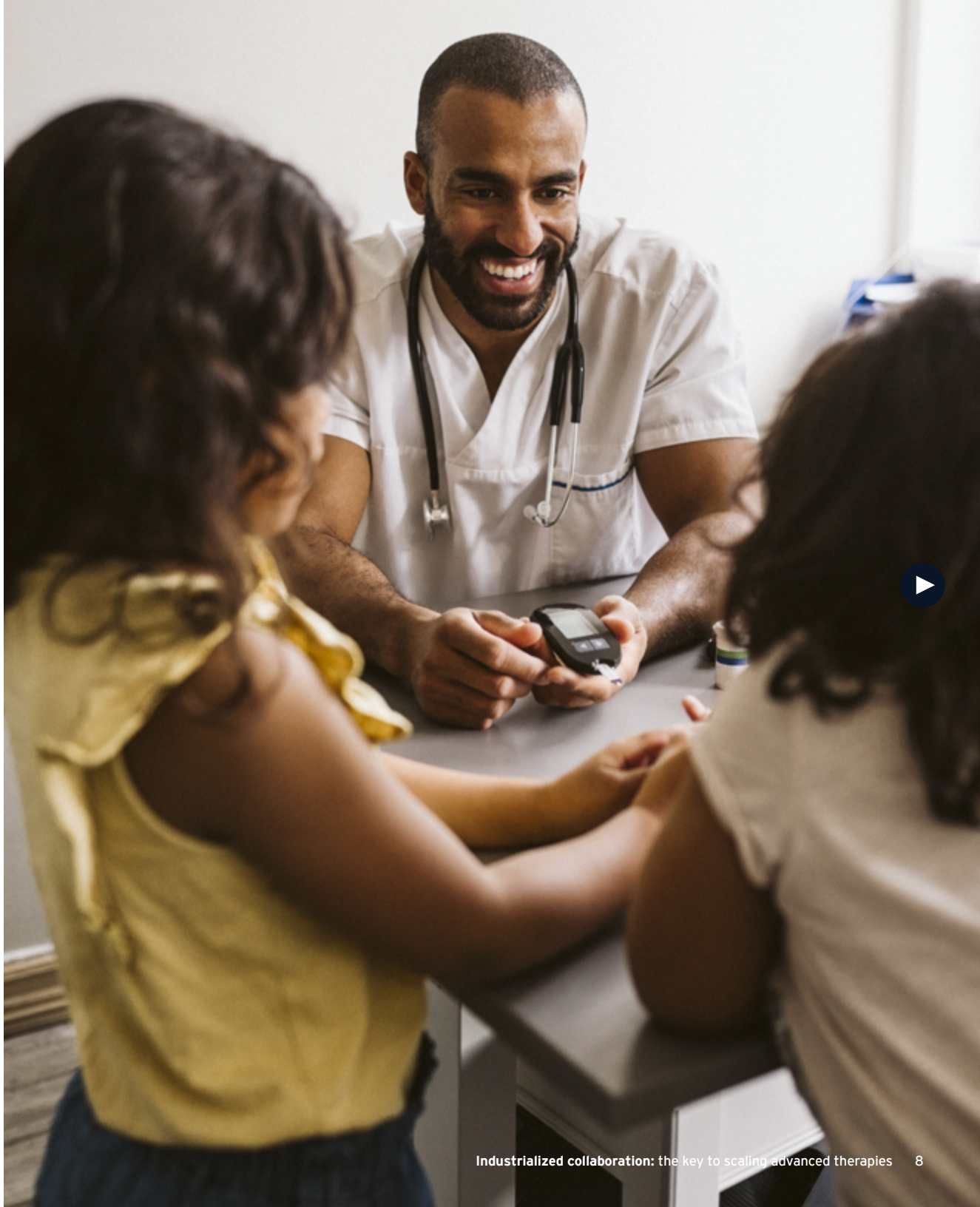
Making advanced therapies affordable for all

While CGTs can deliver tremendous value, they typically come with high price tags, coupled with uncertainty around response durability. Current models of drug pricing, which are based on utilization, don't work, so CGT companies and payers are considering new payment models. These models include:

- Outcomes- or value-based contracts (OBCs or VBCs), which tie a product's performance to emerging evidence of improved patient outcomes
- "Drug mortgages," which allow for patients and payers to stretch out payments of a value-based price over a set period of time [6]
- Subscription-based models, which charge a flat rate for coverage of select therapies, providing predictability, helping offset potentially high upfront costs and saving money in the long run

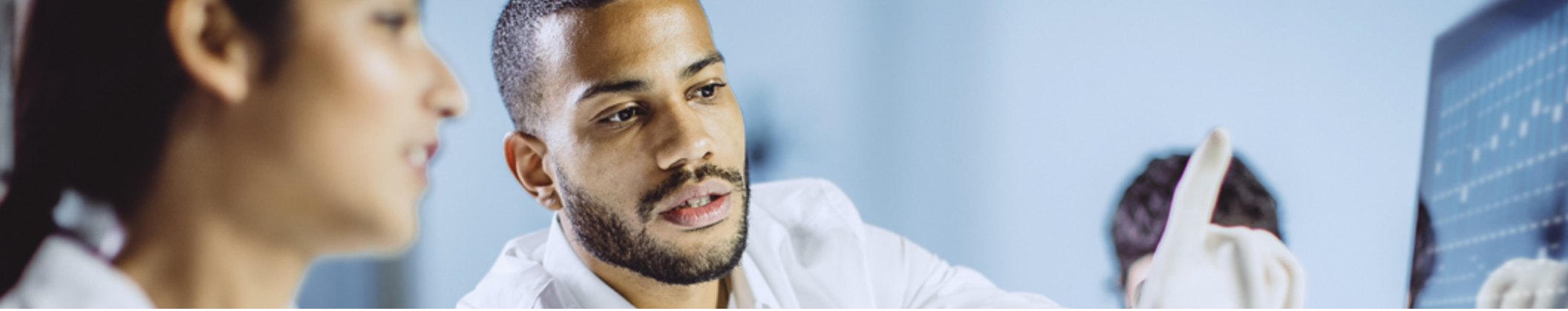
Stakeholders remain concerned that outcomes- or value-based solutions are too risky and too complex to design and measure, considering the patient journey stretches across years of treatments, degrees of illness, health or age, and varying providers and payers.

Furthermore, there is an urgent need, highlighted by the COVID-19 pandemic, to extend essential services and offerings to those who are disadvantaged due to socioeconomic factors, racial injustice, advanced age and other differentiators that are biologic or societal in nature.[7]



3.

Industrializing a culture of collaboration



In the latest of its ongoing discussions with advanced therapy stakeholders, the EY organization hosted a June 2021 Reuter's webinar titled, "Develop a Collaborative Delivery Network for Cell and Gene Therapies." A panel of four professionals from the CGT supply chain – representing biopharma, manufacturing, logistics and technology – shared their thoughts with Goldberg, who moderated.

A good part of the conversation centered on the need to embrace and instill a culture of collaboration. An audience poll revealed that 97% of attendees agree that greater levels of collaboration are essential to successfully scaling CGTs; nearly a third cited industry culture as the biggest barrier.

Orlando Serani, Program Lead, Advanced Cellular Therapies Supply Chain, Johnson & Johnson, believes the industry needs to overcome innate tendencies toward individualism. "Let's face it, this is a competitive industry and sharing is not engrained in our culture. The real friction points are the ones below the surface, the ones that are not traditionally discussed," said Serani.

The panel also discussed what it would take to improve the CGT delivery network so that every patient who can benefit gets the right therapy, at the right time, with few or no bumps in the road.

"We need a global supply chain with functioning interoperability that allows for smooth handovers of information and materials," said Joerg Ahlgrimm, President and Chief Operating Officer, Center for Breakthrough Medicines, a CGT Contract Development and Manufacturing Organization (CDMO).

Dr. David Rhew, Global Chief Medical Officer & Vice President of Healthcare, Microsoft, summarized a way forward: "Think of the cell and gene therapy supply chain as a new kind of airplane that we are building together from the ground up. We must construct it to be structurally sound, but also smart and strong enough to withstand bad weather, bottlenecks, high demand and so on. Digital will provide the foundation, but we have to work together," said Dr. Rhew.

As a result of its extensive research, as well as collaborations with global biopharmaceutical companies and other members of the CGT supply chain, the EY organization saw the need for a digital ecosystem supported by an information exchange to help enable truly individualized CGTs for every patient who can benefit. Given its proven experience with processes and information flow, EY professionals created a cloud-based digital platform solution called Pointellis™.

> **97%**
>
> **of attendees agree that greater levels of collaboration are essential to successfully scaling CGTs; nearly a third cited industry culture as the biggest barrier.**

> Think of the cell and gene therapy supply chain as a new kind of airplane that we are building together from the ground up. We must construct it to be structurally sound, but also smart and strong enough to withstand bad weather, bottlenecks, high demand and so on.
>
> **Dr. David Rhew, Global Chief Medical Officer & Vice President of Healthcare, Microsoft**

Pointellis™ helps facilitate a more collaborative approach through an open, secure data exchange acting as a digital backbone that connects each participant along the CGT supply chain. It forms a secure, trusted and collaborative arena that expedites the timely and transparent flow of data and materials that, in turn, helps the industry minimize dangerous and costly errors. In addition to supporting data collection, management and sharing, Pointellis™ evolves and expands to manage rapid growth and commercialization. It gives stakeholders in the CGT value chain the ability to bring more life-saving therapies to those who will benefit in a more rapid and efficient manner.

Beyond the digital infrastructure, the platform offers a growing suite of applications for frontline workers in the supply chain that have been designed to increase transparency and connect them in ways that can solve their most critical challenges:

Case Assist offers case workers up-to-date information, so they can better address issues and delays between providers, transporters and manufacturers.

Slot Schedule bridges the gap between manufacturing and health care providers, allowing centralized management of treatment scheduling, sequencing and rescheduling, as well as the optimal use of manufacturing slots.

Logistics Organize provides holistic, real-time status of all shipments across the end-to-end journey, flagging issues that need handling in order to keep life-saving treatments on track.

EY professionals estimate that a shared digital infrastructure can save the biopharma industry roughly US$1 billion. Instead of each entity in the supply chain researching, testing and implementing a separate technology solution they can focus on their core competencies and interact on one platform, resulting in cost efficiencies. Moreover, a unified platform can help eliminate siloes and duplication and inform and improve treatments today and tomorrow.

4.

The future: a vision of an interoperable ecosystem

ecosystem

[ēkō sistm]

NOUN

1. A biological community of interacting organisms and their physical environment.

2. A complex network or interconnected system.

While the CGT supply chain is tantamount to an ecosystem, technically, it will only function as one when it is truly interconnected on a global level. For that matter, there will only be a true value chain once the fruits of this interconnection are realized for the benefit of all. For now, the current, collective ecosystem is calling for the following:

- Increased supply chain robustness through digitization and connectivity
- That we take a page from the COVID-19 pandemic about collaboration and information sharing
- That we move from a co-opetition to a co-opportunity mindset toward humanitarian goals
- That we trust each other enough to leverage shared resources, knowing we will each do our best and what is right for patients
- That every patient who can benefit gets the right therapy, at the right time, along a smooth patient journey

The COVID-19 pandemic brought out the best in the biotechnology field, and now the CGT ecosystem has an opportunity to industrialize collaboration to match their transformational innovations, including:

- Driving standards and efficiencies in a value chain that decreases the probability of issues, errors and delays, and lessens time-to-therapy delivery
- Building out digital capabilities that are not duplicative and allow for an interoperable digital ecosystem
- Designing optimal manufacturing and delivery processes through consortia composed of industry and regulatory representatives
- Experimenting with new payment models and finding ways that both incentivize innovation and help ensure equitable distribution of therapies
- Deciphering how to monitor patients long term
- Seeking the input of all stakeholders, including patients and patient advocates

5.

Join the movement

23 December 2021 will mark 50 years since the signing of the National Cancer Act of 1971 by US President Richard Nixon. Since then, science has made significant advancements in the understanding, prevention and treatment of not only cancers, but other major health threats, such as AIDS, hepatitis C and COVID-19. But there is more to be done.

CGTs have shown tremendous promise for fighting serious diseases and the industry is in its infancy. Leaders who not only embrace the full potential of CGTs, but actively collaborate for progress, will make a positive and lasting impact on the lives of people with serious diseases and inferior lifestyle conditions. In doing so, they will put their organizations at the forefront of next generation health and help change the course of medical history.

Please visit Pointellis™ to learn more

[1] Christopher Wild, Elisabate Weiderpass, Bernard Stewart *World Cancer Report: Cancer Research for Cancer Prevention*. Publications.iarc.fr. https://publications.iarc.fr/Non-Series-Publications/World-Cancer-Reports/World-Cancer-Report-Cancer-Research-For-Cancer-Prevention-2020. Published 2021. Accessed 19 August 2021.

[2] Dan Stanton, "Big Pharma collaborative trend to go beyond COVID" *BioProcess International*. Published 2021. Accessed 19 August 2021.

[3] John Cumbers, "The Covid-19 Pandemic Has Dramatically Changed How Biopharma Does Business." *Forbes*. https://www.forbes.com/sites/johncumbers/2021/05/19/the-covid-19-pandemic-has-dramatically-changed-how-biopharma-does-business/. Published 2021. Accessed 19 August 2021.

[4] Larissa Warneck, "Tackling the Challenges in Cell and Gene Therapy Manufacturing." *Labiotech.eu*. https://www.labiotech.eu/partner/challenges-cell-gene-therapy-manufacturing/. Published 2020. Accessed 19 August 2021.

[5] James Strachan, "Advanced Therapies: New Year, New Challenges." *The Medicine Maker*. https://themedicinemaker.com/manufacture/what-is-the-greatest-challenge-facing-cell-and-gene-therapy-in-2021. Published 2021. Accessed 19 August 2021.

[6] Elizabeth Gardner, "'Drug mortgages' may be the solution to fund million-dollar cures | Health Evolution." *Health Evolution*. https://www.healthevolution.com/insider/drug-mortgages-may-be-the-solution-to-fund-million-dollar-cures/. Published 2019. Accessed 19 August 2021.

[7] Dr. David Rhew, Ann-Marie Lee, "A Global Focus on Health Equity." *HLTH Matters*. https://www.hlth.com/digital-content/hlth-matters/blog/a-global-focus-on-health-equity. Published 2021. Accessed 19 August 2021.

Contacts

Adlai Goldberg
Pointellis™ Program Leader
EY Global Digital, Social and Commercial Innovation Life Sciences Leader
twitter: @adlaigoldberg
adlai.goldberg@ey.com

Benjamin Diop, PhD
Managing Director, Business Transformation Health Sciences and Wellness, Ernst & Young LLP
benjamin.diop@ey.com

Helen Baxter
Associate Partner, Pointellis™
Ernst & Young LLP
twitter: @hbaxter22
hbaxter@uk.ey.com

Hua Su
Life Science and Healthcare Strategy Leader, EY-Parthenon,
Ernst & Young (China) Advisory Limited
hua.su@parthenon.ey.com

Acknowledgements

Our sincere thanks to the following individuals who assisted in the creation of this report:

- Glenn Steinberg, EY Global Supply Chain and Operations Leader
- Jeffrey Stier, EY Americas Consulting Purpose & Vision Realized Leader
- Wu Wu, Senior Director, EY-Parthenon, Ernst & Young LLP

A special thanks to the following collaborators who have provided their valuable insights on the topic of CGTs:

- Orlando Serani, Program Lead, Advanced Cellular Therapies Supply Chain, Johnson & Johnson
- Dr. David Rhew, Global Chief Medical Officer & Vice President of Healthcare, Microsoft
- Joerg Ahlgrimm, President and Chief Operating Officer, Center for Breakthrough Medicines, a CGT Contract Development and Manufacturing Organization (CDMO)

Additional support without which this report would not have been possible:

- Liliana Coletti, who assisted Adlai Goldberg writing this report.
- Scott Chapski, who edited and proofread the report.
- Erica Dion, who designed the report's layout and visual style.
- Donna Cox-Davies, Dimitra Triantafyllidou, Maya Vautier and Angela Kyn led the public relations and marketing efforts.

EY | Building a better working world

EY exists to build a better working world, helping to create long-term value for clients, people and society and build trust in the capital markets.

Enabled by data and technology, diverse EY teams in over 150 countries provide trust through assurance and help clients grow, transform and operate.

Working across assurance, consulting, law, strategy, tax and transactions, EY teams ask better questions to find new answers for the complex issues facing our world today.

About EY Health Sciences and Wellness

The rise of the empowered consumer, coupled with technology advancements and the emergence of digitally focused entrants, is changing every aspect of health and care delivery. To retain relevancy in today's digitally focused, data-infused ecosystem, all participants in health care today must rethink their business practices, including capital strategy, partnering and the creation of patient-centric operating models.

The EY Health Sciences and Wellness architecture brings together a worldwide network of 34,000 professionals to build data-centric approaches to customer engagement and improved outcomes. We help our clients deliver on their strategic goals; design optimized operating models; and form the right partnerships so they may thrive today and succeed in the health systems of tomorrow. We work across the ecosystem to understand the implications of today's trends, proactively finding solutions to business issues and to seize the upside of disruption in this transformative age.

ey.com

EYG no. 008211-21Gbl
2108-3842015
ED None