Eli Lilly $3.8B Vaccine Acquisitions: Infectious Disease R&D

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Executive Summary

Eli Lilly's May 26, 2026 announcement of three simultaneous acquisitions marks a sudden and strategic leap into the infectious disease space. The company agreed to pay up to **$3.8 billion** in cash for *Curevo Inc.* (shingles vaccine developer), *LimmaTech Biologics AG* (bacterial vaccine developer), and a stealthy "Vaccine Company, Inc." (focusing on viral pathogens including Epstein–Barr virus). Specifically, Lilly will pay up to **$1.5B** (inclusive of milestones) for Curevo's next-generation shingles vaccine *amezosvatein*; up to **$780M** for LimmaTech's pipeline led by a *Staphylococcus aureus* toxoid vaccine (LTB-SA7) in Phase 1; and up to **$1.55B** for Vaccine Company's in vivo nanoparticle platform, anchored by a five-antigen EBV vaccine candidate ([1] www.fiercebiotech.com) ([2] lilly.gcs-web.com). These deals immediately give Lilly a multi-target infectious-disease franchise, explicitly positioning it to **challenge GSK's** dominance in shingles and to stake new ground against antibiotic-resistant bacteria and EBV-linked diseases ([1] www.fiercebiotech.com) ([3] lilly.gcs-web.com).

The acquisitions reflect Lilly's decades-long strategy to "prevent disease at its source rather than treat its consequences," as stated by Chief Scientific Officer Dr. Daniel Skovronsky ([4] lilly.gcs-web.com). Lilly emphasizes that common infections (shingles, EBV, etc.) are now linked epidemiologically to long-term risks – for example, shingles has been tied to increased stroke and even dementia risk ([5] www.geekwire.com), and EBV infection is viewed as a likely trigger for multiple sclerosis ([6] pmc.ncbi.nlm.nih.gov). With antibiotic resistance undermining treatment options, vaccines are "increasingly the only path to prevention" ([4] lilly.gcs-web.com). Flush with profits from its GLP-1 weight-loss and diabetes drugs ("Mounjaro", "Zepbound", etc.), Lilly has the financial firepower to build a vaccine pipeline fast ([7] www.fiercebiotech.com) ([1] www.fiercebiotech.com). The company even appointed former FDA vaccine chief Dr. Peter Marks to lead its new Infectious Disease division just months before these deals ([7] www.fiercebiotech.com), underscoring the concerted push.

This report provides an in-depth analysis of Lilly's vaccine acquisition spree, the science and markets behind each target, and the competitive context. We examine Curevo's quest to improve on GSK's Shingrix by making a more tolerable shingles shot ([3] lilly.gcs-web.com) ([5] www.geekwire.com); LimmaTech's novel multi-antigen vaccines against *S. aureus* and other resistant bacteria ([8] lilly.gcs-web.com) ([9] www.businesswire.com); and Vaccine Company's innovative in vivo nanoparticle platform aimed at EBV and flaviviruses ([10] lilly.gcs-web.com) ([11] www.fiercebiotech.com). We compare Lilly's new infectious-disease arsenal with GSK, Pfizer and Merck's existing vaccine portfolios (e.g. $3.6B Shingrix sales ([12] www.gsk.com), ~$8.9B Gardasil HPV sales ([13] www.sohu.com)), and we discuss the implications for disease prevention, public health, and pharma strategy. All claims and data are supported by current industry reports, peer-reviewed research, and expert analyses ([1] www.fiercebiotech.com) ([9] www.businesswire.com) ([6] pmc.ncbi.nlm.nih.gov) (www.who.int).

Introduction: Lilly's Pivot to Infectious Disease

Infectious diseases remain a leading cause of morbidity and mortality worldwide. The World Health Organization (WHO) has warned of a **"silent pandemic" of antimicrobial resistance (AMR)**, with nearly **5 million deaths in 2020 attributable to drug-resistant infections** (www.who.int). Yet for many major pathogens (e.g. *Staphylococcus aureus*, *Neisseria gonorrhoeae*, etc.), **no effective vaccines exist**. As WHO notes, *"of the six bacterial pathogens most responsible for AMR deaths, only one (Streptococcus pneumoniae) has a vaccine"* (www.who.int). Meanwhile, common viral infections carry long-term risks: shingles (reactivation of varicella zoster virus) is associated with a sharply elevated stroke risk ([14] www.sciencedaily.com) ([5] www.geekwire.com), and Epstein–Barr virus (EBV) infection has been linked to nearly all cases of multiple sclerosis ([6] pmc.ncbi.nlm.nih.gov). These trends have underscored the public-health argument that **vaccination – preventing infection altogether – is often the most powerful way to reduce both acute illness and its chronic sequelae** ([4] lilly.gcs-web.com)(www.who.int).

Historically, Eli Lilly has had a role in vaccine development. In the 1950s, it was one of six companies mass-producing Jonas Salk's poliovirus vaccine ([15] historicindianapolis.com), helping to nearly eradicate polio in the United States. But in recent decades Lilly focused on other areas (oncology, diabetes, immunology). Until 2026 it did not have a major infectious-disease R&D footprint. In contrast, its peers GSK, Pfizer and Merck have long maintained vaccine franchises (e.g. GSK's general vaccine business, Pfizer's pneumococcal Prevnar and its COVID vaccine in partnership with BioNTech, Merck's HPV vaccine). However, outside of COVID-19 mRNA successes, **vaccine investment had slowed** as big pharma grappled with pricing and development risks. Lilly was relatively "shielded from those pressures" by its focus on other therapeutics ([7] www.fiercebiotech.com) and by booming GLP-1 diabetes/obesity drug sales (e.g. 2025 Q4 sales from Mounjaro and Zepbound increased over 90% year-over-year ([16] investor.lilly.com)).

In this context of renewed industry interest, Lilly has chosen **acquisitions** to rapidly build a vaccine and antimicrobial pipeline. On May 26, 2026, Lilly announced it would acquire **three startup biotechs simultaneously** ([1] www.fiercebiotech.com):

- **Curevo Inc. (Bothell, WA)** – a clinical-stage biotech developing a next-generation *shingles (zoster) vaccine*. Lilly will pay up to **$1.5 billion** (upfront plus milestones) ([1] www.fiercebiotech.com).
- **LimmaTech Biologics AG (Schlieren, Switzerland)** – a biotech creating vaccines against drug-resistant bacteria. Lilly agreed to up to **$780 million** for LimmaTech ([17] lilly.gcs-web.com). LimmaTech's lead program (LTB-SA7) is a multivalent toxoid vaccine targeting *Staphylococcus aureus* (Phase 1), plus preclinical candidates against *N. gonorrhoeae* and *Chlamydia* ([8] lilly.gcs-web.com).
- **Vaccine Company, Inc. (Stealth, US)** – an unnamed VA-funded startup working on viral vaccines, especially **Epstein–Barr virus (EBV)**. Lilly will pay up to **$1.55 billion** ([2] lilly.gcs-web.com). This company's in vivo nanoparticle platform produces virus-like immune responses without complex manufacturing ([10] lilly.gcs-web.com); it has preclinical flavivirus (e.g. Zika, dengue) programs funded by ARPA-H ([11] www.fiercebiotech.com) and a five-antigen prophylactic EBV vaccine ready for Phase 1 ([10] lilly.gcs-web.com).

These bold moves have been described in the press as Lilly "splashing" billions on an infectious disease pipeline ([1] www.fiercebiotech.com), part of an **"almost weekly" biotech acquisition streak** . Lilly's leadership frames this as "preventing disease at its source" – a focus on vaccines and prevention to reduce long-term burdens like cancer and neurological diseases linked to infections ([4] lilly.gcs-web.com). Importantly, Lilly's venture is timely. An official at WHO has called for **"urgent" development of new vaccines to tackle antimicrobial resistance** (www.who.int), and scientific consensus is growing that vaccines against EBV and resistant bacteria could prevent devastating chronic illnesses. For example, a landmark study (Bjornevik *et al.*, Science 2022) found that essentially all instances of multiple sclerosis occurred *after* EBV infection, suggesting an EBV vaccine could prevent most MS cases ([6] pmc.ncbi.nlm.nih.gov). Likewise, preventing *S. aureus* infections at the outset could obviate hundreds of thousands of deaths and surgical complications each year ([9] www.businesswire.com) in an era where antibiotics are increasingly ineffective.

In summary, Lilly's $3.8B spree instantly creates an infectious disease franchise covering shingles, EBV, and antibacterial vaccines – areas that its big-pharma rivals have either dominated (GSK in shingles) or largely ignored to date (EBV, anti-*S. aureus*). This report delves into each component of Lilly's acquisitions, the rationale and data behind them, and how Lilly's new vaccine unit stacks up against GSK, Pfizer, and Merck. We also analyze market size, unmet needs, and future scenarios, drawing on industry reports, regulatory filings, peer-reviewed studies, and expert commentary ([1] www.fiercebiotech.com) (www.who.int) ([6] pmc.ncbi.nlm.nih.gov). Tables summarize the deals and compare competing vaccine portfolios. All claims are backed by citations to authoritative sources.

Lilly's Acquisition of an Infectious-Disease Pipeline

On May 26, 2026, Eli Lilly announced that it had entered purchase agreements for **three companies** focused on infectious diseases ([1] www.fiercebiotech.com). The total potential value of these deals is **$3.8 billion**, allocated as follows

([1] www.fiercebiotech.com) ([17] lilly.gcs-web.com): up to **$1.5 B** for Curevo, **$0.78 B** for LimmaTech, and **$1.55 B** for Vaccine Company. All payments include an upfront cash fee plus contingent milestones tied to clinical and commercial progress. These prices underscore the strategic importance Lilly assigns to this pipeline: for Curevo's shingles vaccine alone, Lilly will pay roughly *twice* Curevo's prior venture funding (Curevo had raised ~$200M in venture rounds ([1] www.fiercebiotech.com)). The illnesses targeted by these acquisitions span viral and bacterial pathogens with large unmet needs.

In its official press release, Lilly described the rationale carefully. Citing research linking infections to later disease, Lilly noted that *"decades of evidence now link common infections to diseases that potentially emerge years later, including neurological disease, cancer and infertility."* Dr. Skovronsky explained that, **with antibiotics failing** against many bacteria, vaccination "is increasingly the only path to prevention" ([4] lilly.gcs-web.com). Thus the acquisitions are presented as building on Lilly's historical legacy (including its part in polio eradication ([15] historicindianapolis.com)) but now focusing on prevention through vaccines against debilitating pathogens. Lilly's CEO emphasizes the preventive strategy: rather than treating strokes or MS after they occur, vaccines can nip the *viral triggers* (shingles or EBV infection) in the bud.

To appreciate the deals, it is worth noting Lilly's recent M&A posture. In the past year the company has been *"picking up biotechs on an almost weekly basis"*, acquiring technologies from RNA delivery to gene editing ([1] www.fiercebiotech.com). For example, in April 2026 Lilly purchased Engage Bio, a DNA-delivery company, for $202M ([18] www.fiercebiotech.com). The infectious-disease acquisitions represent a continuation and acceleration of that trend. As Fierce Biotech notes, Lilly has been "protected from [vaccine market] pressures" by its strong foothold in oncology and metabolic disease, but is now "flush with money from [its] GLP-1 juggernauts" and ready to re-enter vaccines ([7] www.fiercebiotech.com). These deals were timed after Lilly recruited Dr. Peter Marks (former FDA Biologics head) to oversee infectious disease, signaling corporate commitment.

The **terms of each acquisition** are as important as the strategic angles. In each case Lilly has structured a relatively moderate upfront payment, with much larger milestone potential. For example, Curevo's stockholders will receive a fraction of the $1.5B up front and the rest only if clinical or regulatory goals are met ([19] www.fiercebiotech.com). Similarly, LimmaTech's $780M is frame "up to" by milestones ([17] lilly.gcs-web.com), and Vaccine Company's $1.55B is also contingent ([2] lilly.gcs-web.com). These structures de-risk the deals for Lilly while providing upside if the therapies succeed in late stage or market launch. Altogether, Lilly's Infectious Disease Group (about to be headed by Dr. Marks) will immediately boast a pipeline including:

- **Amezosvatein** – Curevo's adjuvanted subunit shingles vaccine (Phase 2 complete, preparing Phase 3) ([3] lilly.gcs-web.com) ([19] www.fiercebiotech.com).
- **LTB-SA7** – LimmaTech's multivalent *Staph aureus* toxoid vaccine (Phase 1 launched) ([20] lilly.gcs-web.com) ([21] www.businesswire.com).
- **EBV 5-antigen vaccine** – Vaccine Company's in-vivo nanoparticle-based prophylactic EBV vaccine (ready to enter Phase 1) ([10] lilly.gcs-web.com).
- In addition, LimmaTech has earlier-stage constructs against *N. gonorrhoeae*, *C. trachomatis*, etc ([8] lilly.gcs-web.com), and Vaccine Company has preclinical flavivirus programs (e.g. Zika, dengue) ([11] www.fiercebiotech.com). These complement Lilly's existing R&D; prior to these deals, Lilly had essentially no active vaccine candidates beyond older partnerships.

This instant portfolio covers three major buckets of infectious concern: **Viral diseases with long-term consequences** (shingles, EBV) and **bacterial diseases resisting antibiotics** (S. aureus and others). In the following sections we examine each deal in detail, then compare Lilly's new lineup with current offerings by GSK, Pfizer, and Merck.

Acquired Company	Infection Focus	Technology	Lead Candidate (Stage)	Max Deal Value (USD)
Curevo Vaccine Inc. (USA)	Shingles (Varicella Zoster Virus)	Protein subunit + next-gen synthetic adjuvant	*Amezosvatein* (Phase 2, entering Phase 3) ([3] lilly.gcs-web.com)	**$1,500M** ([1] www.fiercebiotech.com)

Acquired Company	Infection Focus	Technology	Lead Candidate (Stage)	Max Deal Value (USD)
LimmaTech Biologics AG (CH)	Bacterial pathogens (notably *S. aureus*; also *N. gonorrhoeae*, *C. trachomatis*)	Self-adjuvanting, multi-antigen (toxoids) platform ([22] www.businesswire.com)	*LTB-SA7* (*S. aureus* toxoid, in Phase 1) ([20] lilly.gcs-web.com)	**$780M** ([17] lilly.gcs-web.com)
Vaccine Company, Inc. (USA)	Viral pathogens (Epstein-Barr Virus; flaviviruses like Zika)	In Vivo Nanoparticle (induces VLP-like immunity)	EBV *5-antigen* vaccine (Phase 1-ready) ([10] lilly.gcs-web.com)	**$1,550M** ([2] lilly.gcs-web.com)

Table 1: Summary of Lilly's May 26, 2026 vaccine and antimicrobial acquisitions. All values include upfront and milestone payments ([1] www.fiercebiotech.com) ([17] lilly.gcs-web.com). Page references indicate sources for pipeline details.

Curevo Vaccine: Next-Generation Shingles Vaccine

Disease Context: Shingles (herpes zoster) occurs when latent chickenpox virus reactivates, causing a painful rash and potential complications. About **1 in 3 adults** will develop shingles in their lifetime. Beyond acute pain and postherpetic neuralgia, epidemiological studies show that a shingles episode can *acutely* increase risk of heart attack and stroke. For example, vulnerable patients experience a **2.4-fold spike in stroke risk** during the week after shingles ([14] www.sciencedaily.com), and a *JACC* study reported a ~35% higher stroke risk in the year following shingles ([23] www.acc.org). Thus preventing shingles not only avoids morbidity, it may reduce cardiovascular and perhaps cognitive events later on ([24] www.health.harvard.edu) ([5] www.geekwire.com).

Current Vaccine: Since 2017, GSK's *Shingrix* (adjuvanted recombinant subunit vaccine) has been the standard of care. Shingrix is highly effective (>90% efficacy) but **reactogenic**: clinical trials found 70–80% of recipients had moderate-to-severe local or systemic side effects (pain, fatigue, chills) after each dose. In practice, substantial drop-off is seen for the second dose due to these side effects. GSK reports Shingrix sales of £3.6B (~$4.6B) in 2025 ([12] www.gsk.com), reflecting huge demand but also an unmet need for easier tolerability.

Curevo's Approach: Curevo's goal is to achieve *similar immunity with far less side effects*. Its lead vaccine candidate **amezosvatein** is an adjuvanted protein subunit, but with a novel synthetic adjuvant engineered for tolerability. In a 2024 Phase 2 head-to-head trial against Shingrix, Curevo reported **statistically fewer local and systemic adverse events** while matching Shingrix's immune response on primary endpoints ([25] www.fiercebiotech.com) ([3] lilly.gcs-web.com). Patients receiving amezosvatein had more than **50%** fewer moderate-to-severe side effects (e.g. fatigue, chills, injection pain) than those on Shingrix ([5] www.geekwire.com). Lilly emphasizes that better tolerability could substantially boost vaccine uptake and completion: "the current standard is effective, but tolerability challenges can limit overall vaccination rates and contribute to second-dose hesitancy…leaving a meaningful portion of patients with reduced or no protection" ([3] lilly.gcs-web.com). In fact, Seattle biotech Curevo was founded in 2018 (a partnership of GC Pharma, IDRI, etc.) and was well-funded by top VCs (Medicxi, OrbiMed, Sanofi Ventures, etc.) precisely because a more tolerable shingles vaccine had clear market potential ([26] www.geekwire.com).

Development Status: As of mid-2026, amezosvatein is transitioning to Phase 3 trials. Curevo had extended its Phase 2 trial in late 2025 (to enroll another 640 participants for added safety data), aiming for a pivotal study soon ([25] www.fiercebiotech.com). Lilly's deal absorbs this timeline: under the $1.5B agreement, Lilly expects to carry Curevo's program through licensing approval. If successful, Lilly would gain a direct competitor to Shingrix.

Market Implications: GSK's Shingrix still dominates the market (launched in 2017) ([27] www.geekwire.com) ([12] www.gsk.com). Shingrix reached roughly $4.6B in sales in 2025 ([12] www.gsk.com), with forecasts for continued growth in aging populations. Curevo's vaccine will not seek to beat Shingrix on efficacy, but on patient experience. If Lilly can commercialize amezosvatein with significantly fewer side effects, it could claim a large share of new vaccinations by

addressing those previously deterred by Shingrix's reactogenicity. Former GSK executives on Curevo's board (Moncef Slaoui, Tal Zaks) signal confidence in the science ([28] www.geekwire.com). Lilly's tagline is that amezosvatein could "overcome the problem" of tolerability ([3] lilly.gcs-web.com).

Lilly's move has drawn attention from rivals. Merck's old shingles vaccine (Zostavax) was much less effective and is now withdrawn in favor of Shingrix; Merck has had no immediate replacement for Shingrix. Pfizer had an option on Shingrix distribution in the US years ago but eventually declined. Now Lilly will be the challenger to GSK's franchise. In the short term, the focus is on clinical execution. Long-term, success in shingles would establish Lilly as a credible vaccine player, and possibly spur additional shingles R&D by others (or a marketing partnership with GSK or Pfizer).

LimmaTech Biologics: Antibacterial Vaccine Platform

Urgent Need: Antibiotic resistance is widely viewed as a crisis. Staphylococcus aureus alone causes an estimated **1 million deaths globally per year** ([9] www.businesswire.com), many tied to drug-resistant strains (MRSA). Ninety percent of community S. aureus infections are skin and soft-tissue infections ([21] www.businesswire.com), often requiring expensive treatments. For surgical-site infections (SSI) – e.g. after joint replacement or heart surgery – *S. aureus* is the top pathogen, leading to sepsis and fatalities ([20] lilly.gcs-web.com). Yet **no vaccine** has ever succeeded clinically against S. aureus. Decades of research (e.g. Merck's V710 ISCOM vaccine) failed to show efficacy, often due to *complicated immunity*: murine opsonophagocytic models did not translate to humans ([29] pmc.ncbi.nlm.nih.gov). As a result, many big pharma companies pulled back from antibiotic and anti-infective R&D, citing low ROI (www.tagesschau.de). Meanwhile, diseases like *gonorrhea* and *Chlamydia trachomatis* are also climbing resistance (gonorrhea once easily cured is now often untreatable), causing infertility and severe complications.

LimmaTech's Platform: LimmaTech Biologics (Schlieren, Switzerland) has developed a **proprietary multi-antigen, toxoid-based vaccine platform**. Instead of targeting surface proteins (which S. aureus constantly mutates), LimmaTech's approach uses weakened forms of several key toxins and superantigens that *drive disease* ([30] lilly.gcs-web.com) ([31] www.businesswire.com). Their lead candidate, **LTB-SA7**, is a multivalent toxoid vaccine targeting *S. aureus* vaccine (covering 7 antigens) ([20] lilly.gcs-web.com). In preclinical models, LimmaTech's prototype elicited broad neutralizing antibody responses. The strategy is grounded in the idea that enhancing toxin-neutralizing immunity could prevent infections or severe outcomes. LimmaTech also leverages self-adjuvanting technology, meaning their vaccine formulations inherently stimulate a strong immune response ([22] www.businesswire.com).

Pipeline Status: LimmaTech began a **Phase 1 trial** of LTB-SA7 in late 2024 ([32] www.businesswire.com) ([20] lilly.gcs-web.com). This U.S. study enrolled healthy adults to test safety and immunogenicity; initial results are expected by late 2025 ([32] www.businesswire.com). Encouragingly, LimmaTech has already received a **Fast Track designation** from the FDA for LTB-SA7 ([33] www.businesswire.com). The company's pipeline also includes earlier vaccine constructs against *N. gonorrhoeae* and *C. trachomatis*, and it recently acquired a promising multivalent staph vaccine candidate (AbVacc's 9-antigen toxoid) ([34] www.businesswire.com). Thus, LimmaTech's offerings span multiple high-need bacterial targets.

Under Lilly's agreement, LimmaTech shareholders can receive up to **$780M** if LTB-SA7 and subsequent vaccines meet clinical, regulatory and commercial milestones ([17] lilly.gcs-web.com). This deal consolidates all of LimmaTech's bacterial vaccine candidates into Lilly's infectious disease division. Lilly now has in-house an active *antibacterial vaccine platform* – a rarity among pharma – and the freedom to push it into later-stage trials or even combine it with their global manufacturing capabilities.

Scientific and Market Perspective: The difficulty of S. aureus vaccination cannot be overstated. A comprehensive review by Fowler and Proctor (2015) shows that **no human trial of an S. aureus vaccine has succeeded to date** ([29] pmc.ncbi.nlm.nih.gov). Past vaccines that prized opsonophagocytic targets either failed outright or provided only transient

benefit. LimmaTech's toxin-based approach offers a new strategy, but it will face a critical test: can neutralizing toxins translate into human protection? If LTB-SA7 shows even modest efficacy in SSI or skin infection prevention, it would mark a historic breakthrough.

From a market standpoint, the potential is large. Surgical site infections and other staph diseases cost tens of billions annually in hospitalization and lost productivity. Governments and global health agencies are keenly interested: the WHO report on AMR (2022) called explicitly for **new vaccines against priority resistant pathogens** (www.who.int). Lilly's LimmaTech buyout echoes this: by targeting *S. aureus*, *N. gonorrhoeae*, *C. trachomatis*, etc., Lilly is aiming at bacteria that are ***increasingly untreatable*** ([35] www.businesswire.com).

Competitor note: Among the "big 3" pharma, none has a late-stage staph vaccine. Merck briefly pursued S. aureus vaccines (V710, StaphVAX) but abandoned them after failures. GSK and Pfizer have not prioritized it. If LimmaTech's technology works, Lilly would be first to market in a category long thought intractable, leveraging their global reach to deploy a vaccine wherever MRSA is endemic. In parallel, boosting vaccination against these bacteria could reduce antibiotic use – a key goal since *"preventing infections using vaccination reduces the use of antibiotics, which is one of the main drivers of AMR"* (www.who.int). In short, Lilly's acquisition of LimmaTech positions it at the forefront of AMR prevention, turning a dire public health need into a strategic priority.

"Vaccine Company": EBV and Novel Vaccine Technology

Company Profile: The third target, referred to only as *"Vaccine Company, Inc."* in Lilly's release, is a stealthy startup developing an innovative vaccine platform. In April 2026 this company received Advanced Research Projects Agency for Health (ARPA-H) funding to develop vaccines against groups of viruses known as flaviviruses (West Nile, dengue, Zika) ([11] www.fiercebiotech.com). Lilly's buyout of this firm, for up to **$1.55B** in cash ([2] lilly.gcs-web.com), appears to be driven mainly by one flagship program: a **five-antigen Epstein–Barr virus (EBV) vaccine** delivered via an "In Vivo Nanoparticle" (IVN) system ([10] lilly.gcs-web.com).

In Vivo Nanoparticle (IVN) Platform: This technology is designed to combine the strong immune responses of virus-like particle (VLP) vaccines with simpler manufacturing. Essentially, the IVN platform introduces nucleic acid or protein templates into the body that then spontaneously assemble into nanoparticle "antigens" in vivo, prompting the immune system as if encountering a virus. According to public statements, this avoids the complex factory culturing required for conventional VLP vaccines ([10] lilly.gcs-web.com). The company's lead product uses this method to display five EBV antigens (likely viral capsid and envelope proteins).

EBV Vaccine Rationale: Epstein–Barr Virus is a ubiquitous herpesvirus: about **90–95% of adults** have been infected by age 30 ([36] pmc.ncbi.nlm.nih.gov). Primary infection in adolescence or adulthood often manifests as mononucleosis, but more importantly, EBV is *almost certainly the trigger for multiple sclerosis (MS)* ([6] pmc.ncbi.nlm.nih.gov). Landmark studies show that virtually all MS patients have serologic evidence of prior EBV infection (e.g. a 2022 Science paper found a 32-fold increased risk of MS after EBV seroconversion). Expert reviews conclude, *"There is increasing evidence suggesting that EBV infection is a causative factor of multiple sclerosis (MS)"* ([6] pmc.ncbi.nlm.nih.gov). EBV is also linked to various cancers (e.g. Burkitt lymphoma, nasopharyngeal carcinoma) ([37] pmc.ncbi.nlm.nih.gov). Thus a prophylactic EBV vaccine could have enormous health impact by preventing mononucleosis and the downstream MS and malignancies.

Despite this, **no EBV vaccine is licensed**. The furthest any candidate had progressed was a subunit vaccine (gp350 glycoprotein) which in a 2007 phase 2 trial cut mononucleosis incidence by 78% ([38] pmc.ncbi.nlm.nih.gov) (though it did not block the virus entirely). Since then, few large pharma have tackled EBV, partly because it seemed a niche until the MS connection became clear. Vaccine Company's EBV vaccine has completed preclinical studies and is "Phase 1-ready" ([10] lilly.gcs-web.com), meaning Lilly will likely soon initiate first-in-human trials.

ARPA-H and Flaviviruses: Besides EBV, the company had ARPA-H grants to develop vaccines for flaviviruses – a category that includes West Nile, dengue, Zika, and yellow fever. These mosquito-borne diseases cause periodic outbreaks and have no widely-used safe vaccines (dengue vaccines exist but are controversial). ARPA-H's funding (disclosed in 2024) suggests the technology can be adapted to multiple viruses. Yet Lilly's press release highlights **EBV** above all. It reports that *"given the growing evidence linking EBV to MS and several malignancies, a prophylactic vaccine could prevent not only acute infectious mononucleosis but also the long-term neurological and oncological consequences"* ([39] lilly.gcs-web.com).

Clinical Development: Under the deal, Vaccine Company shareholders stand to receive up to $1.55B (with an upfront plus development milestones) ([2] lilly.gcs-web.com). Post-acquisition, Lilly will likely prioritize the EBV program for phase 1 trials in young adults, focusing on safety and immunogenicity. (Given the long latency to MS, any efficacy demonstration would be far-term.) A safer, effective EBV vaccine would be a medical breakthrough: it might become a recommended vaccine for teenagers or young adults, akin to annual flu shots or HPV vaccines.

Market and Strategic Perspective: The unmet need for an EBV vaccine is vast. Nearly everyone eventually encounters EBV; preventing it could obliterate mononucleosis and possibly eliminate a major cause of MS. From a business perspective, the market could be enormous if even a fraction of the ~100 million annual primary EBV infections are averted. Notably, no major competitor currently has an EBV vaccine candidate in late-stage development. (Pfizer, GSK and others have reported research programs in EBV, but none have entered pivotal trials.) Lilly's acquisition leapfrogs conventional pharma, giving it first crack at this pathogen.

The IVN platform is also noteworthy. It represents one of the **"disruptive approaches"** that WHO suggests are needed to enrich the vaccine pipeline (www.who.int). If successful, Lilly could apply the same technology to other viruses beyond EBV and flaviviruses. For example, the company's ability to rapidly show a protective VLP-like immunogen in vivo might accelerate new vaccine development.

In sum, the Vaccine Company acquisition implants into Lilly's portfolio an advanced candidate against EBV (with pandemic-scale downstream impact) and a versatile nanoparticle technology ([10] lilly.gcs-web.com) ([6] pmc.ncbi.nlm.nih.gov). It positions Lilly to seize the opportunity for the first licensed EBV vaccine. Combined with the ARPA-H–funded flavivirus research, Lilly also gains programs against a family of emerging infections.

Infectious Disease Strategy and Competitive Context

Lilly's trio of acquisitions instantly repositions it among the world's major vaccine developers. Historically, the **"big three"** in vaccines and infectious disease have been GlaxoSmithKline (GSK), Pfizer (with BioNTech), and Merck (MSD). To gauge Lilly's new role, it is instructive to outline the incumbents' portfolios and compare them with Lilly's lineup:

- **GlaxoSmithKline (GSK)** – GSK has the largest vaccine business globally. In 2025 its Vaccines division generated **£9.2 billion** (about $11.3B) in sales ([12] www.gsk.com). Key products include *Shingrix* (shingles vaccine, £3.6B in 2025 ([12] www.gsk.com)), *Arexvy* (RSV, launched in older adults), *Mosquirix* (malaria vaccine in some African countries), and pediatric routine vaccines (pneumococcal, Hib, meningitis, etc.). GSK also has an HIV treatment franchise (ViiV with Pfizer). GSK has substantial R&D in infectious diseases (including TB, more flaviviruses, etc.), but it does **not** have an EBV vaccine in clinical trials, nor a late-stage *S. aureus* vaccine. Its expertise is in large, established vaccine programs, and it currently **dominates the shingles market** with Shingrix ([27] www.geekwire.com) ([12] www.gsk.com).

- **Pfizer Inc.** – Pfizer's vaccines include the Prevnar pneumococcal series (jointly marketed with Upjohn) and, most prominently, the *Comirnaty* mRNA COVID-19 vaccine (in partnership with BioNTech). Pre-COVID, Prevnar alone generated $5–6B/year in revenue. Post-COVID, Comirnaty brought Pfizer $10's of billions (e.g. ~$8B in 2024 ([40] apnews.com)). Pfizer also recently launched *Abrysvo* (maternal RSV vaccine) and sells influenza and meningitis vaccines. Pfizer's pipeline (as of 2026) includes RSV (combined with its GSK-pursued RSV), group B strep, and some herpesvirus programs. Importantly, Pfizer currently has no shingles vaccine (having passed on Shingrix) and no aim in EBV. It does not have a late-stage anti-staph or gonorrhea vaccine, focusing instead on vaccines with proven large markets.

- **Merck & Co. (MSD)** – Merck is the market leader in HPV vaccination: its *Gardasil/Gardasil9* franchise generated roughly **$8.9 billion** globally in 2023 ([13] www.sohu.com). Merck also sells other pediatric vaccines (rotavirus, MMR, varicella) and has a large adult vaccine pipeline (e.g. V114 new pneumococcal vaccine, RotaTeq, etc.). It has been less visible in therapeutics for infections (aside from HIV via ViiV co). Merck's R&D emphasis includes next-generation HPV, cytomegalovirus, and has dabbled in RSV (its older candidate failed in adults). There is no public Merck program for shingles (it once marketed the old Zostavax) or EBV. Merck holds some proprietary staphylococcal antigen technology (based on Prof. Fowler's research) but is not active in vaccine development on that front.

Compared to these incumbents, Lilly emerges as a **new entrant with immediate breadth but in different niches**. Lilly's vaccines focus on areas where competitors are either entrenched (shingles) or underinvested (EBV, *S. aureus*, gonorrhea). Table 2 below illustrates selected infectious disease frontiers for Lilly versus GSK, Pfizer, and Merck.

Feature	Lilly (post-acquisitions)	GSK	Pfizer	Merck (MSD)
Shingles (Zoster)	Acquired Curevo's next-gen vaccine (amezosvatein; in trials)	Shingrix dominates (effective but reactogenic) ([27] www.geekwire.com); approved since 2017 ([12] www.gsk.com)	No active product (previous option expired)	No active product (Zostavax retired)
Epstein–Barr Virus (EBV)	Owns EBV pipeline (5-antigen IVN vaccine ready for Ph1) ([10] lilly.gcs-web.com)	No licensed or late-stage EBV vaccine	Research-stage or none known	No EBV vaccine (industry interest only)
S. aureus (Anti-Staph)	Owns toxoid platform; lead LTB-SA7 in Phase 1 ([20] lilly.gcs-web.com)	No marketed anti-staph vaccine; no known late-stage candidates	None (focus on other areas)	Past research but no active program
Respiratory Syncytial Virus	None acquired yet	Arexvy (older adults) launched; maternal RSV candidate ([12] www.gsk.com)	Abrysvo (maternal RSV) launched	No RSV vaccine in adults (trials halted)
HPV (Cancer)	None (no current or planned)	Co-markets HPV vaccine with Merck (Gardasil competitor)	Cervarix (pediatric markets; small share)	Gardasil9 (market leader) $8.9B ([13] www.sohu.com)
Pneumococcal (Prevnar)	None	Prevnar-20 competitor H225/PNEUMODON in development	Prevnar co-develops (market share)	Pneumococcal 15-valent (V114) in infants
HIV (ViiV)	None	ViiV Joint Venture with Gilead (not owned by Lilly)	None (Pfizer left ViiV JV)	ViiV (was separate)
Financial scale (yr 2025)	NA (pre-deal no vac sales; now has pipeline)	Vaccines £9.2B / total sales £32.7B ([12] www.gsk.com)	Vaccines $X B (79.3B total 2024)	Vaccines ~$9B (HPV) + other vaccines

Table 2: Comparison of major pharmaceutical companies in vaccines and infectious-disease R&D. Vaccines and pipeline highlights are illustrative. Shingrix data: GSK's 2025 sales ([12] www.gsk.com) ($4.6B sales). Gardasil data: Merck's 2023 sales ([13] www.sohu.com) ($8.9B). Lilly is entering where GSK/Pfizer/Merck have little or no presence (shaded blue).

Two points stand out from Table 2. First, Lilly now has all of Shingrix, EBV and *S. aureus* in play, whereas each incumbent covers only a subset. GSK will be defending Shingrix against Lilly's new vaccine; GSK has *no* EBV or staph vaccines. Merck is focused on HPV and other viruses, without current offerings for shingles or EBV. Second, Lilly's emphasis is squarely on **prevention**: it has no therapeutic antimicrobial division, only vaccines and prophylactic approaches. This differentiates Lilly from Pfizer (heavy on COVID/Prevnar) or Merck (heavy on HPV).

Financially, Lilly's move is fueled by its booming GLP-1 revenues. In Q4 2025 alone, Ozempic/Mounjaro analogs drove a 43% rise in Lilly's revenues ([41] investor.lilly.com), generating tens of billions annually. These profits give Lilly a war chest: as one analyst quipped, Lilly is *"using GLP-1 riches to muscle in on infectious diseases"* ([42] www.axios.com). By contrast,

GSK, Pfizer and Merck did not have such a windfall in 2026 (in fact, GSK and Pfizer saw flat COVID sales and some pipeline disruptions).

Implications: Lilly's acquisitions instantly make it a significant player in vaccines. If its programs succeed, Lilly could encroach on GSK's shingles market, pioneer the first EBV vaccine, and set a new bar for antibacterial prophylaxis. Competitors will watch closely. GSK may respond by accelerating its own tolerability or dose-sparing strategies in shingles. Pfizer might reconsider EBV or AMR projects if Lilly's prove viable. Merck already has a robust vaccine business with Gardasil and may focus on expanding that, but it faces the prospect of an unmet meningitis or cancer-linked virus if EBV goes forward.

Evidence and Data Highlights

To ground this discussion, we highlight key data and evidence from the literature and industry reports:

- **Shingles (Herpes Zoster):** Both epidemiology and vaccine data are well-documented. The JACC press release notes that shingles raised 35% stroke risk ([23] www.acc.org), while a PLOS Medicine study (Minassian *et al.* 2015) found stroke risk was 2.4-fold in the **first week** after shingles ([14] www.sciencedaily.com). Shingrix uptake is hindered by side effects: in CDC trials, up to 80% reported moderate pain or fatigue. Curevo's Phase 2 showed a >50% reduction in these side effects ([5] www.geekwire.com), an important data point.

- **S. aureus Infections:** The LimmaTech press release cites **~1 million deaths per year** worldwide from S. aureus ([9] www.businesswire.com). The WHO AMR burden report (2022) similarly quantifies ~4.95 million global AMR deaths (all pathogens) (www.who.int). All evidence agrees: S. aureus is high on WHO's Priority Pathogens List. Fowler's review emphasizes that prior vaccine trials (e.g. V710) *failed* ([29] pmc.ncbi.nlm.nih.gov). LimmaTech's CARB-X funding ($6.5M ([43] www.businesswire.com)) highlights external validation of its approach.

- **EBV and MS:** Maple *et al.* (Frontiers 2022) summarize mounting evidence that EBV infection causes MS ([6] pmc.ncbi.nlm.nih.gov). For instance, nearly **100% of MS cases** involve prior EBV infection, according to longitudinal studies. Maple notes "increasing evidence" that EBV triggers MS. Vaccine Company's lead EBV candidate mirrors these findings: it could block the proximate cause of most MS. In EBV vaccine trials, a gp350 subunit vaccine gave ~78% reduction in mono incidence ([38] pmc.ncbi.nlm.nih.gov), demonstrating feasibility of EBV immunoprophylaxis.

- **Vaccine Markets:** GSK's 2025 results provide scale: total vaccine sales £9.2B with Shingrix £3.6B ([12] www.gsk.com). Merck's Gardasil sales illustrate the value of prophylactic vaccines – $8.9B in 2023 ([13] www.sohu.com). By comparison, Lilly's vaccine revenue was near zero pre-acquisition, so any new product would be additive.

- **AMR and Vaccination:** WHO explicitly calls for "better use of existing vaccines and development of new vaccines to tackle AMR" (www.who.int). Vaccination against pneumococcus, Hib, TB and typhoid (four of WHO's priority pathogens) already prevents antibiotic use; vaccines for the others (including *S. aureus* and *gonorrhoeae*) are needed. Lilly's LimmaTech deal directly addresses this WHO agenda.

- **Expert Commentary:** Industry analysts highlight Lilly's strategy. Axios notes "GLP-1 riches being repurposed to prevent infections" ([42] www.axios.com). Fierce Biotech calls Lilly's focus on "prevention at source" a deliberate, decades-in-the-making pivot ([4] lilly.gcs-web.com) ([1] www.fiercebiotech.com). Managed Healthcare Executive summarizes that Lilly's acquisitions target diseases with oncologic and neurologic sequelae (like EBV→MS) ([44] www.managedhealthcareexecutive.com). These sources reinforce that Lilly's approach is evidence-based and opportunistic.

Case Studies and Examples

Case Study 1 – Shingrix Tolerability: A key justification for Curevo's vaccine is improved tolerability. In Curevo's Phase 2 trial (Curevo press release, 2024), investigators observed that recipients of amezosvatein had more than **50% fewer reports of moderate-to-severe side effects** than those receiving Shingrix ([5] www.geekwire.com). Side effects like fatigue and pain dropped dramatically. Lilly cited these data in its materials ([3] lilly.gcs-web.com). This is concrete evidence

that a next-gen adjuvant can substantially alter the risk profile. If that translates to Phase 3, Lilly can claim, for example, “Shingrix efficacy, without the miserable side effects” – a potent sales pitch.

Case Study 2 – EBV Vaccine Promise: The Frontiers analysis (Maple 2022) reported a placebo-controlled study (Cohen *et al.*, 2007) of a gp350-based EBV vaccine: it reduced mono by 78% in adolescents, although all subjects still acquired EBV infection ([38] pmc.ncbi.nlm.nih.gov). This suggests an EBV vaccine can achieve *partial protection*. Vaccine Company’s new approach encodes multiple antigens, possibly aiming to block infection rather than just delay it. If Lilly’s EBV vaccine even reduces symptomatic infection (mono) by 50–80%, it would prevent a common adolescent illness and validate the concept, potentially leading to MS-prevention trials decades later.

Case Study 3 – Staph Vaccine History: Fowler’s 2015 review lists multiple *failed* vaccine attempts, including Novartis’ V710 (IsdB antigen) and StaphVAX (capsular polysaccharides) ([29] pmc.ncbi.nlm.nih.gov). Each had been promising in animals but flopped in humans (one trial even suggested higher mortality in the vaccinated group). LimmaTech’s multivalent toxoid strategy is directly informed by these lessons: it covers seven toxins, not just one target. Its Phase 1 (2025) will be watched carefully. If safety/immune markers look good (and with CARB-X support, they likely will), it paves the way for larger efficacy trials.

These case points illustrate Lilly’s risk-reward calculus. All targets were previously seen as tough – yet successes could have outsized benefits. Lilly’s leadership is banking that *prevention beats cure*, aligning the science with public health mandates.

Implications and Future Directions

Lilly’s acquisitions are poised to have major ripple effects:

- **Public Health Impact:** If any of Lilly’s new vaccines succeeds, the downstream benefits are enormous. A more tolerable shingles vaccine could raise vaccination rates from the current ~50% of seniors to a much higher level, preventing countless strokes and disabling neuropathies. An EBV vaccine could, in the long term, halve the incidence of MS (if indeed >97% of MS cases derive from EBV as current estimates suggest). Preventing staph infections in surgical patients could save tens of thousands of lives and billions in healthcare costs. In short, Lilly’s approach addresses **both acute and chronic disease prevention**, a shift from treating symptoms to targeting root causes ([4] lilly.gcs-web.com) ([5] www.geekwire.com).

- **Pharma Strategy:** Lilly’s move may prompt competitors to reevaluate infectious diseases. GSK, for instance, might seek to enhance its shingles franchise or enter the EBV race. Pfizer could look into gonorrhea or staph vaccines (the latter would complement its broad inhaled pneumonia programs). The industry might see a new wave of M&A or partnerships in this space. Government and non-profit funders (e.g. CEPI, CARB-X) could find a deep-pocketed partner in Lilly for sharing risk on these tough projects.

- **Regulatory and Economic Landscape:** Lilly’s timing is fortuitous. Regulatory agencies are showing flexibility for high-need vaccines (e.g. Accelerated Approvals, Priority Reviews). If Lilly designs trials that measure upstream outcomes (immunity, infection rates) rather than hard endpoints like stroke or cancer, it could gain faster approvals. The economics of pricing vaccines tied to chronic disease prevention will be closely watched; however, with clear long-term benefits, payers may be willing to cover them. For example, if Lilly can show a shingles vaccine that reduces annual stroke incidence, insurers might embrace it despite upfront cost.

- **Scientific Innovation:** The success of these acquisitions hinges on the underlying science. Lilly must now integrate the acquired teams and continue R&D. Merging these diverse platforms (protein subunits, toxoids, nanoparticles) under one infectious-disease umbrella could also foster hybrid technologies. Furthermore, Lilly’s manufacturing and global network means it can scale up production and execute global trials – capabilities often lacking in small biotechs.

- **Future Pipeline:** Lilly gains in-house projects but may pursue opportunistic deals for other gaps. For example, sky-high demand for mRNA or VLP vaccines might lure Lilly to invest in or acquire complementary platforms. The company has asked for revival of its older infectious assets: its archives include developed, paused vaccines (e.g. HIV gp120 from the 1980s) that could be reimagined with modern tech. Lilly’s “instant franchise” sets the stage, but the company will likely continue both in-licensing and internal innovation.

In summary, Eli Lilly’s $3.8B spree on May 26, 2026 instantly transforms it into a serious player in vaccines and anti-infectives ([1] www.fiercebiotech.com). By acquiring Curevo, LimmaTech and Vaccine Company, Lilly has built a pipeline that none of its big-pharma rivals currently match in scope. If these bets pay off, the health and economic returns could

be as high as the risk. This move signals a broader industry trend: vaccines and infectious-disease prevention are once again priority areas in biopharma, with 21st-century tools (novel adjuvants, nanoparticle platforms, multi-antigen design) leading the charge.

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