Illumina's Proposed Re-Acquisition of GRAIL, Inc.
Vertical Foreclosure and Efficiencies Analysis

January 26, 2021

CONFIDENTIAL TREATMENT REQUESTED
CONTAINS PROPRIETARY BUSINESS INFORMATION
NOT SUBJECT TO FREEDOM OF INFORMATION ACT REQUESTS

Executive Summary

This submission provides additional evidence demonstrating that (A) there is no basis to conclude that Illumina Inc.'s ("Illumina") acquisition of the portion of GRAIL that it does not already own will lead to any form of vertical anticompetitive effects and (B) the proposed acquisition will create meaningful, cognizable, merger-specific efficiencies, and accelerate development and wide-scale adoption of GRAIL's multi-cancer screening test, as well as GRAIL's other cancer screening tests.

Part I of this paper demonstrates that there are no vertical harms arising from the transaction. In particular:

- Illumina has extended long-term supply agreements to customers developing or selling next-generation sequencing ("NGS")-based oncology tests, including to customers who are developing cancer screening tests. These agreements alone eliminate any theoretical vertical concerns.

- Illumina is and will remain dedicated to enabling the success of all of its customers, as its demonstrated financial incentives and longstanding strategy are to catalyze adoption and growth of NGS clinical applications (*see* § I.C). [redacted]

- Illumina has no incentive and no intention to diminish the competitiveness of any customer, including those that are or may be developing NGS-based screening tests. A hypothetical foreclosure strategy would result in significant harm to the merged firm in the form of lost sales and lost goodwill.[2]

- Consistent with its financial incentives, Illumina has a track record of supporting all its customers, has no history of raising the prices of its sequencing products (to the contrary, Illumina's innovation has steadily decreased prices) and has never attempted to use its upstream position to divert sales from customers to Illumina's own downstream tests or to GRAIL, in which Illumina has a significant economic stake. Illumina's behavior in non-invasive prenatal testing ("NIPT"), where Illumina is already vertically integrated, demonstrates Illumina's core strategy of expanding downstream markets. Likewise, in cancer therapy selection, where Illumina is vertically integrated,

[redacted]

[2] In this submission, we use the term "foreclosure" to refer to withholding, diminishing the quality or raising the cost of the upstream input.

Illumina has continued to support its customers who have competing offerings in therapy selection.

Part II of this submission discusses the cognizable, merger-specific efficiencies that will arise from the transaction.[3] In particular:

- Illumina's reacquisition of the portions of GRAIL that it does not already own will result in the elimination of double marginalization and lower prices of its cancer screening tests to patients (*see* § II.A).

- Illumina will increase the certainty and speed of GRAIL's tests reaching commercial scale. To commercialize at scale, GRAIL must overcome unprecedented obstacles, including obtaining FDA approval for the first-of-its-kind multi-cancer screening test, and even once that is attained, obtaining Medicare and private payor coverage. No NGS-based cancer screening test has been submitted for regulatory approval, and no blood-based cancer screening test of any kind has ever achieved Medicare or private payor coverage. Illumina has the depth of experience, expertise and capabilities, developed over many years as a pioneer in sequencing, to minimize the risks of delays (*see* § II.B). Acceleration in GRAIL's scaled launch will save lives and create substantial economic value (*see* § II.C).

- The merger will result in R&D synergies, which create the potential for medical breakthroughs within and beyond oncology that would be unlikely absent the merger.

In short, as demonstrated below, there is no basis to challenge the proposed merger. The merger is decidedly procompetitive, will save lives, and should be permitted to close promptly.

I. The Proposed Transaction Does Not Raise Any Vertical Concerns.

A. Introduction.

The proposed merger is a purely vertical transaction. Illumina is active only in cancer therapy selection (through its TruSight Oncology ("TSO") 500 test), and is not developing tests in any other oncology application and has no plans to do so. GRAIL is not developing and has no plans to develop a therapy selection test. As discussed in GRAIL's January 20, 2021, submission, GRAIL is developing a pre-diagnosis cancer screening test for asymptomatic individuals called Galleri. GRAIL is also adapting the technology used in its Galleri test for use in other patient populations, specifically, as a screening test in asymptomatic individuals who have already been treated for cancer—a minimal residual disease ("MRD") test—which will test for the recurrence of cancer, and a screening test in potentially symptomatic individuals to help confirm a diagnosis of

[3] This submission incorporates economic analysis by Compass Lexecon in §§ II.A & II.C.

cancer, known as diagnostic aid to cancer ("DAC") test. None of GRAIL's tests are commercialized [redacted]

In purely vertical transactions such as this, the FTC's "competitive effects analysis has focused on assessing the merger's impact on competition in the downstream market, through considering potential foreclosure or raising the cost of rivals' access to the upstream input."[5] Here, the "upstream inputs" are Illumina's NGS instruments and sequencing consumables (also known as "core consumables"), and the downstream products are GRAIL's pre-commercial NGS-based cancer screening tests.

Although Section 7 requires "making a prediction about the future", and deals with probabilities, *United States v. AT&T*, 310 F. Supp. 3d 161, 189-91 (D.D.C. 2018), it does not permit blocking a merger based on speculative "possibilities", *id.*, or "guesswork", and it does not permit ignoring the actual facts. *FTC v. Rag-Stiftung*, 436 F. Supp. 3d 278, 311 (D.D.C. 2020) ("[A]ntitrust theory and speculation cannot trump facts, and even Section 13(b) cases must be resolved on the basis of the record evidence relating to the market and its probable future." (quoting *FTC v. Arch Coal*, 329 F. Supp. 2d 109, 116-17 (D.D.C. 2004))). Indeed, the Commission has not hesitated to close investigations when an assertion of competitive harm would require "excessive speculation".[6] In light of the evidence to the contrary discussed below, there is no basis to assert that the proposed merger is likely to substantially lessen competition in any relevant market.

First, there are enormous regulatory and payor obstacles to blood-based cancer screening tests achieving wide scale adoption, and it will require the efforts of multiple test developers to overcome those obstacles (*see infra* § I.C). It is to GRAIL's advantage, and therefore Illumina's post-merger, that these test developers are devoting their resources to proving the utility and safety of NGS-based cancer screening to

---

[4] A Summary of Procompetitive, Lifesaving Benefits and Efficiencies To Be Created by the Illumina-GRAIL Transaction at 12, Submitted by GRAIL on January 21, 2021.

[5] Fed. Trade Comm'n, *Commentary on Vertical Merger Enforcement* § 2(A) (2020), https://www.ftc.gov/system/files/documents/reports/federal-trade-commissions-commentary-vertical-merger-enforcement/p180101verticalmergercommentary_1.pdf, ILMN-VALORPUBLIC_00000536.

[6] *See, e.g.*, Statement of Commissioner Sheila F. Anthony, Synopsys Inc./Avant! Corp., File No. 021-0049, https://www.ftc.gov/sites/default/files/documents/cases/2002/07/advantanthonystmnt.htm (last visited Jan. 25, 2021), ILMN-VALORPUBLIC_00000907.

regulators, payors, policymakers and the broader healthcare community. Illumina has no incentive to thwart those efforts, which would harm both Illumina and GRAIL.

Second, there is no question that Illumina's incentives as an NGS platform provider, both financial and strategic, contradict any approach that would result in vertical foreclosure of GRAIL's potential rivals (*see infra* § I.D). Illumina's strategy is, and has always been, to catalyze the adoption and sales of its NGS platform by enabling its customers to develop NGS-based tests. As discussed below, Illumina's ordinary-course documents, market analyst reports and even the FTC's 2019 assessment of the NGS market suggest that by the time GRAIL and other test developers are able to offer cancer screening tests at a commercial scale, Illumina will face multiple sources of serious competition that will result in customers switching platforms. Such switching would dramatically accelerate if Illumina attempted a vertical foreclosure strategy, causing Illumina to lose even greater profitable sales of its sequencing products. The damage to Illumina would be exacerbated by the fact that Illumina could not efficiently target a foreclosure strategy at just tests that may compete with GRAIL's, but would impact tests that are outside GRAIL's future segments, and thus for which the possibility of diversion is nil.

Third, there are significant differences between the screening and MRD tests in development by other companies and GRAIL's tests, and similarities between other NGS-based tests (*e.g.*, Guardant's colon cancer screening test) and screening tests using other modalities (*e.g.*, PCR, proteomics, imaging). Thus, it is unlikely, and speculative to predict, that the value of upstream sales Illumina would surely lose from an attempted foreclosure strategy would be outweighed by the value of diverted downstream sales.

Fourth, Illumina's track record undercuts any foreclosure theory. Illumina is already vertically integrated in NIPT and cancer therapy selection, and has continued to support its customers in those two areas while it competes with them (*see infra* § I.E). In both of those areas, Illumina's customers are thriving, as is competition. This track record further demonstrates that Illumina's incentives are to support all customers, including downstream competitors.

B. Illumina's Long-Term Supply Agreements Eliminate Any Theoretical Vertical Concerns.

As discussed *infra*, Illumina will have no incentive to attempt to foreclose any customers post-merger because doing so would be wholly inconsistent with Illumina's financial and strategic interests. Nonetheless, in light of the FTC's concerns, Illumina has offered long-term supply agreements to its clinical oncology customers with terms that defeat any theoretical concerns that the merged company has the ability or incentive to foreclose. *See AT&T*, 310 F. Supp. at 240 (rejecting the government's projections of vertical harm that "have not and will not occur in the real world due to Turner's actual affiliate agreements"). Indeed, guarantees of continued supply were a key reason why the FTC was unsuccessful the last time it litigated a vertical merger challenge more than forty years ago. *Fruehauf Corp. v. FTC*, 603 F.2d 345, 354-55 (2d

Cir. 1979) (rejecting the FTC's input foreclosure theory in part because there was "no evidence shedding doubt" on the upstream firm's representation that it would continue to "allocate[] its production pro rata among its customers in accordance with their regular volume of purchases").

These agreements are for at least a five year term, and as long as 12 years for customers who have requested it. Specifically, these long-term supply agreements guarantee the following terms to Illumina's clinical oncology customers, including customers developing cancer screening tests:

- That they will have access to the same pricing for Illumina's NGS products as any similarly situated customer, including GRAIL;
- That they will have access to the same overall commercial terms for Illumina's NGS products as any similarly situated customer, including GRAIL;
- That they will have access to product service and support services in accordance with Illumina's customary practices;
- That they will have access to Illumina's sequencing platforms, including the current most cutting-edge platforms (*e.g.*, NextSeq and NovaSeq) and any future platforms for purchase in accordance with Illumina's customary practices;
- That they will have access to any NGS product that Illumina makes available for pre-release testing (*e.g.*, alpha or beta testing) in a clinical trial or validation context to any similarly situated customer, including GRAIL;
- In the event that Illumina is experiencing a supply shortage of any NGS product, Illumina will allocate existing supply in an equitable manner among its customers (including GRAIL) and shall not favor GRAIL over its other customers;
- That any confidential information that the customer shares with Illumina shall only be used as reasonably necessary to perform Illumina's contractual obligations, and shall be firewalled from any GRAIL personnel;[7]

[7] Even before Illumina sent these terms to its customers, Illumina's merger plans assumed GRAIL would join Illumina as separate division with appropriate firewalls. With the supply agreements, Illumina is contractually committed to establishing those firewalls. Thus, post-merger, the division of Illumina that will include GRAIL will not have "access to and control of sensitive business information about its . . . downstream

- That these commitments are not contingent on any purchase commitments by the customer, and the customer may unilaterally terminate the supply agreement at any time; and

- Illumina shall have no right to cease shipping its NGS products at any time solely on the basis of an alleged claim of infringement of any IP rights of Illumina.

[redacted]

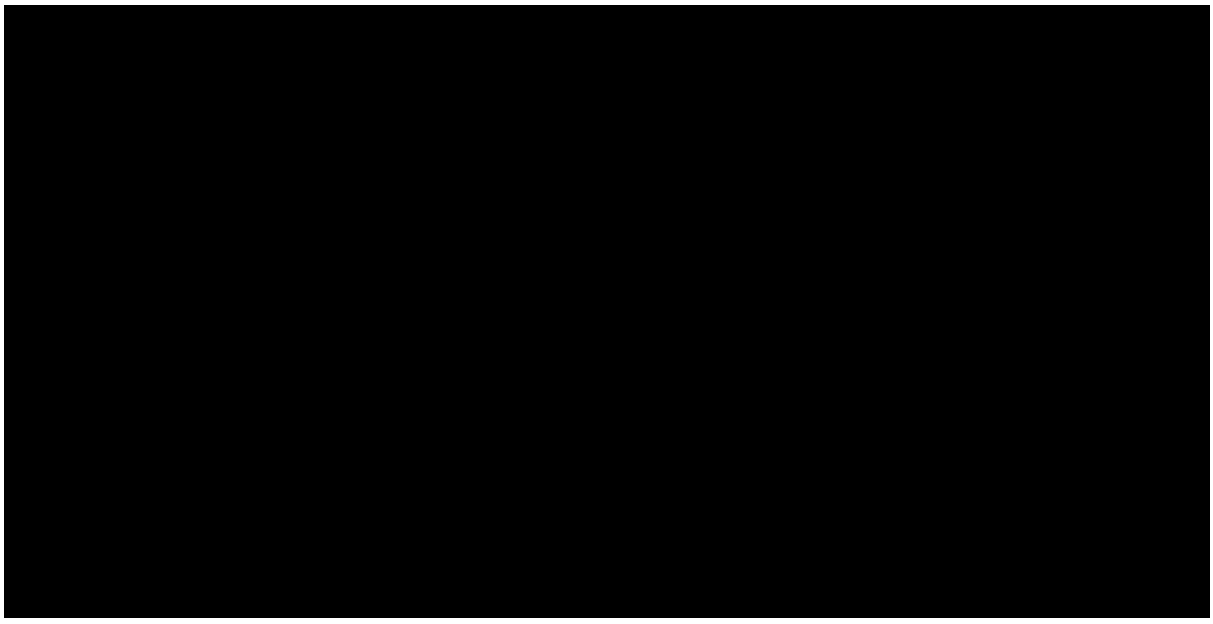
[redacted]

---

rivals that was unavailable to it before the merger". Fed. Trade Comm'n, *Commentary on Vertical Merger Enforcement* § 4 (2020), https://www.ftc.gov/system/files/documents/reports/federal-trade-commissions-commentary-vertical-merger-enforcement/p180101verticalmergercommentary_1.pdf, ILMN-VALORPUBLIC_00000536. [redacted]

[redacted]

[redacted]



[redacted]

[redacted]

C. Illumina's Incentives Are To Continue To Catalyze the Growth of NGS-Based Clinical Oncology Applications To Increase Sales of Its Sequencing Products.

An analysis of Illumina's post-merger incentives must start with an understanding of Illumina's long-term strategic goals, and the importance of its customers to achieving those goals. Illumina's core strategy is to catalyze development and expansion of sequencing into new applications. By increasing demand for sequencing tests, Illumina grows its opportunity to sell more sequencing products. As discussed below, that growth will come from the development and adoption of NGS-based clinical oncology applications by Illumina's customers, in particular in early cancer screening.

Today, there is ***no*** commercially available NGS-based cancer screening test on the market, and the use case for such tests is not yet proven or widely accepted by healthcare institutions or practitioners. Patients today rely ***exclusively*** on cancer screening tests using other modalities, such as PCR, imaging or proteomics, and many cancers have no screening options at all. [redacted] Such hurdles include obtaining regulatory approval and payor coverage, and convincing health care providers to prescribe NGS-based tests in lieu of existing screening tests that use other modalities. (*See also infra* § II.) Illumina recognizes the value of its oncology customers because they are using their resources, clinical expertise and relationships with stakeholders in regulatory and medical communities to grow the NGS clinical oncology space and overcome these hurdles. Thus, those customers are critically important to Illumina's strategic objectives, and will remain so post-merger. Therefore, as discussed in this section, Illumina has ***no*** incentive to foreclose any customer, including those developing tests that may compete with

[redacted]

[redacted]

GRAIL's tests in the future. *Cf. United States v. AT&T*, 310 F. Supp. 3d 161, 179, 243-44 (D.D.C. 2018) (rejecting the government's theory of vertical harm where the merged firm's business model was based on "distribut[ing] its [product] as broadly as possible", which rendered foreclosure implausible).

i. *The future of NGS growth is in clinical diagnostics, specifically NGS-based cancer testing.*

NGS is a relatively new technology platform. In 2003, when Illumina was a fledgling company, it cost more than $100 million to sequence the complete human genome as part of the Human Genome Project. In the years since then, Illumina has driven innovation in NGS, bringing the cost of sequencing a complete genome down to less than $1000. In doing so, Illumina has enabled an entirely new category of applications—NGS-based clinical diagnostic applications, including whole genome sequencing or deep-sequencing-based applications.[14] It is widely understood that the future of NGS is in clinical diagnostic applications, where NGS has enormous potential to improve human health and disease management.[15] To date, NGS has only scratched the surface of that potential. Illumina has invested substantial resources over many years to make NGS a more attractive technology for clinical applications.

In the past decade, Illumina has also transformed itself from an NGS innovator focused primarily on serving research markets, into a supplier of NGS systems that can also be used to transform disease management through cutting-edge clinical testing.[16] To do so, Illumina has had to build the R&D, manufacturing, quality control and other capabilities that are necessary to serve customers developing tests and positioning to operate in highly regulated clinical markets at scale. Among other things, it has achieved FDA authorization for two sequencing systems so that its customers can develop FDA-authorized content on Illumina's systems for clinical use; has designed a portfolio of consumables that meet the stringent requirements for clinical applications;[17]

[redacted]

[15] Illumina defines "clinical" as consumables, sequencers and software used with patient samples to inform patient management.

[redacted]

[17] Such requirements include continuity of supply, single-lot shipments (to reduce variability between lots), kit lot testing (ensuring that each component in a kit is manufactured and tested with other components in that kit), extended guaranteed shelf life, advanced change notification (six month notice before any significant changes are made to the product), compliance with Good Manufacturing Practices and ISO standards,

has built operational capabilities that meet regulated manufacturing and supply requirements; and is constantly innovating and investing in R&D to launch new products and product improvements that will enable clinical test developers to create and produce new clinical solutions on Illumina's systems. Illumina recognizes that its customers are the key to the success of this strategy, and to Illumina eventually seeing the gains from this multi-year, resource-intensive investment in future clinical expansion.[18]

The future growth of NGS will be driven by the development and adoption of NGS-based clinical oncology applications. [redacted] NGS growth "is expected to be driven primarily by continued adoption in clinical settings . . . especially for clinical oncology where liquid [blood] biopsies [as opposed to tumor or tissue biopsies] are utilized across the patient journey from early (asymptomatic) detection (in trial stages at GRAIL, Freenome, etc.) to therapy selection (e.g., Guardant Health, Foundation Medicine), or therapy monitoring and cancer recurrence testing (e.g., Natera)".[20]

Given the global explosion of cancer, and the urgent need for innovative tools to defeat it, the total addressable market for NGS-based clinical oncology tests is potentially massive. [redacted]

---

and certificates of analysis (a quality assurance certificate that ascertains the product has met its predetermined product release specifications and quality requirements).

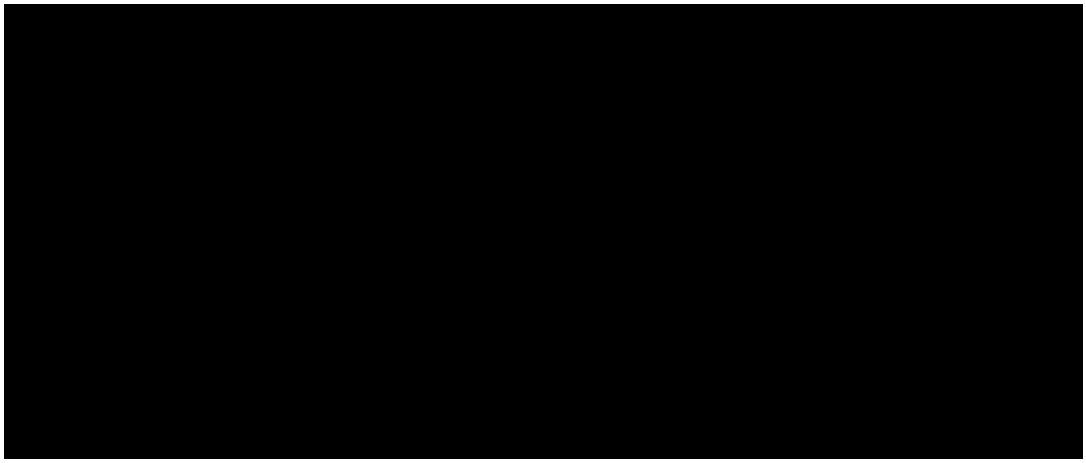
[redacted]

[redacted]

[20] ILMN-FTCVALOR_00132527 (DeciBio Next Generation Sequencing (NGS) Market Size, Growth and Trends (2017-2023), dated Dec. 4, 2020, 6th Edition) at -530.

[redacted]

Indeed, Illumina formed GRAIL in 2015 with the specific goal of jump-starting the development of transformational NGS-based cancer tests.



At the time, Illumina believed that "no customer has the ability to implement a pan-cancer screening test responsibly and economically anytime in the next 5 years"; therefore, to accelerate the growth of the segment, Illumina "felt an imperative to organize an entity" focused on that moon-shot mission.[23] Since then, Illumina has continued to drive down the cost of sequencing, and, over the last few years, test

[23] FTCVALOR_00132025 (2016 JP Morgan Healthcare Conference Presentation, dated Jan. 11, 2016) at -031.

developers have commenced and made significant progress on development of NGS-based cancer screening tests, as described below.

ii. *Illumina has many customers in clinical oncology, including four who are known to be developing cancer screening tests.*

To Illumina's knowledge, four of its customers are developing pre-diagnosis cancer screening tests in the U.S., in addition to GRAIL—Guardant, Thrive, Exact and Freenome. Thrive and Exact recently merged. [redacted]

Guardant "is a liquid biopsy pioneer in cancer testing with a clear first mover advantage, favorable research and clinical adoption dynamics, and a highly anticipated product pipeline."[24] Guardant has a leading therapy selection test (Guardant360), which it commercialized in 2014. Guardant obtained FDA approval for Guardant360 in August 2020. Guardant also markets genomic profiling panels (GuardantOmni), which it commercialized in 2017.[25] It is developing a blood-based MRD assay (Lunar 1) using genomic and methylation signatures, which it launched in 2018 for research use, and in late 2019 for investigational use. Last year, Guardant and NRG Oncology, a renowned National Cancer Institute, initiated a study to validate the clinical utility of Guardant's Lunar 1 MRD test in predicting stage II colon cancer patients that require adjuvant chemotherapy.[26] In 2019, Guardant launched its 10,000 patient Eclipse clinical trial to evaluate the performance characteristics of a blood-based test (Lunar 2) to detect colorectal cancer early. Both Lunar studies are reported to "have shown encouraging early data, with [Guardant] making solid progress towards assay optimization, proving clinical utility . . . and eventual commercialization".[27]

Thrive was launched from an NGS-based liquid biopsy screening platform (CancerSEEK) developed in 2016 by researchers at Johns Hopkins University and the

---

[24] ILMN-FTCVOL_05333301 (Morgan Stanley Report, dated Sept. 9, 2020) at -318.

[25] *Id.* at -432.

[26] *Guardant Health and NRG Oncology Initiate Randomized Trial to Investigate Circulating Tumor DNA Guided Adjuvant Therapy in Stage II Colon Cancer* (Jan. 12, 2020), https://investors.guardanthealth.com/press-releases/press-releases/2020/Guardant-Health-and-NRG-Oncology-Initiate-Randomized-Trial-to-Investigate-Circulating-Tumor-DNA-Guided-Adjuvant-Therapy-in-Stage-II-Colon-Cancer/default.aspx, ILMN-VALORPUBLIC_00000489.

[27] ILMN-FTCVOL_05333301 (Morgan Stanley Report, dated Sept. 9, 2020) at -417.

Ludwig Center, a pioneer in the field of cancer genomics.[28] Thrive has maintained close ties and continues to collaborate with these institutions. Last year, working with Johns Hopkins and Geisinger Health, Thrive conducted the first-ever prospective, interventional study to use a blood test to screen for multiple types of cancers in a real-world population.[29] The study enrolled more than 10,000 women with no prior history of cancer. One analyst recently described Thrive's "clinical study [as] already ahead of others in [the] multi-cancer field."[30]

Exact is an established pioneer in non-invasive screening with its innovative, PCR-based colon cancer screening test called Cologuard and has partnered with Mayo Clinic and now, with the Thrive merger, Johns Hopkins. Exact has stated that it intends to leverage its strengths from its "unique position having built a company around Cologuard . . . coupled with [its] global organizations", "highly capable labs" and "IT infrastructure", to help Thrive navigate the "hurdles" of "FDA approval, Medicare coverage, [and] guideline inclusion", and get a multi-cancer test to market faster.[31]

Freenome is a biotech startup backed by Google and other high-caliber investors. It raised $270 million in August 2020, bringing its total financing to $500 million since it launched in 2016. Last year, it launched its PREEMPT clinical trial for colorectal cancer screening. Earlier this month, Freenome released results from a prospective, multi-clinical study that one KOL at the Cleveland Clinic observed "reflects significant progress in the development of blood-based cancer screening".[32] Freenome has also announced that it would develop a multi-omic (*i.e.*, using multiple modalities, including DNA, RNA, protein) therapy selection assay to identify large B-cell lymphoma patients likely to respond to an antibody therapy from AD Therapeutic.

---

[28] *First Study of Multicancer Blood Test to Screen for Cancer Guide Intervention*, Johns Hopkins Medicine (Apr. 29, 2020), www.hopkinsmedicine.org/news/newsroom/news-releases/first-study-of-multicancer-blood-test-to-screen-for-cancer-guide-intervention, ILMN-VALORPUBLIC_00000386.

[29] *Results From DETECT-A – The First Prospective, Interventional Study of a Blood-Based Multicancer Test* (Apr. 28, 2020), www.thrivedetect.com/press-release/the-first-prospective-interventional-study-of-a-blood-based-multicancer-test/, ILMN-VALORPUBLIC_00000926.

[30] ILMN-FTCVALOR_00132671 (SVBLeerink Report, dated Oct. 2, 2020) at -693.

[31] ILMN-FTCVOL_00000766 (Exact Sciences Earnings Call Q3 2020, dated Oct. 27, 2020) at -772–73.

[32] Freenome, *Freenome's Multiomics Blood Test Shows Promising Results in Detecting Colorectal Advanced Adenomas in a Prospective, Multi-Center Clinical Study* (Jan. 12, 2021), www.freenome.com/blood-based-detection-of-advanced-adenomas, ILMN-VALORPUBLIC_00000396.

Illumina has many other clinical oncology customers. Some are developing or selling therapy selection tests that compete with Illumina's TSO500 test, with Illumina's full support (*see infra* § I.E). Many are developing or selling other types of clinical oncology tests in the United States, including tests that: (i) identify whether cancers are becoming resistant to existing cancer treatments—known as resistance response tests; (ii) monitor for the recurrence of cancer after treatment, sometimes known as monitoring or MRD tests, including tumor-naïve (no sequencing of the tumor is required to develop the tests) and tumor-informed (sequencing of the tumor required to develop a "bespoke" assay) versions; or (iii) identify the presence of hereditary markers for cancer (*i.e.*, inherited predisposition to cancer). Still others are developing tests (including screening) in foreign markets. Some may decide to develop screening tests in the future (or are already doing so without Illumina's knowledge).

iii. *NGS-based cancer screening faces tremendous regulatory and payor hurdles; Illumina's clinical oncology customers are important to overcoming these hurdles and progressing this field.*

Illumina's re-acquisition of GRAIL is transformational for both companies. However, it does not change Illumina's strategic imperative to supply test developers with low-cost NGS products that facilitate the expansion of NGS in clinical oncology *as a segment*, including screening. To the contrary, the acquisition is an extension of that strategy and reinforces its importance.

While the clinical oncology segment has enormous potential, given the significant obstacles in its path (discussed *infra* § II), particularly for NGS-based cancer screening, there is considerable uncertainty as to the timing and scale of future growth. [redacted] Post-merger, Illumina will benefit from its customers' efforts to expand NGS-based clinical oncology testing both upstream, as an NGS supplier, and downstream, because those efforts also benefit Galleri. GRAIL has noted the impact that the performance of other tests can have on Galleri's prospects, explaining in its S-1 filing that "[i]f any tests marketed or being developed by our competitors similar to our products do not perform to expectations . . . it may result in lower confidence in early disease detection and post-diagnosis tests in general, which could potentially adversely affect confidence in our products."[34] Thus, the innovators that have initiated clinical studies of screening assays using Illumina platforms, and their collaborators who are leading oncology institutions, are invaluable to Illumina's long-term goal of unlocking the expected growth in clinical oncology. They are advocating and using their significant resources to convince regulators, payors, physicians and patients that NGS is a viable

[redacted]

[34] GRAIL, Inc., Registration Statement (Form S-1) (Sept. 9, 2020) at 120–21, ILMN-VALORPUBLIC_00000625.

platform for cancer screening, as well as MRD and other oncology applications. Those investments drive enormous opportunity for Illumina to make future NGS sales.

Illumina supports the development work of its customers (and will continue to do so post-merger) by supplying at competitive terms NGS products that enable low-cost, high-throughput sequencing, providing technical support, and by supplying any documentation concerning Illumina instruments that may be required by the developer for FDA submissions. [redacted], Illumina recognizes that its customers are key to the growth of the NGS clinical oncology segment across all applications, including screening [redacted]

[redacted]

[redacted]

It is worth noting that Illumina today supports its clinical oncology customers, including those who may become GRAIL competitors, while retaining a significant economic interest in GRAIL's future product and service sales. Illumina founded GRAIL in 2015. In 2017, Illumina reduced its voting share in GRAIL to below 50%, but retained an equity stake, which today is at ~14.5% (~12% on a fully diluted basis). In addition, as partial consideration for Illumina's contributions to the formation of GRAIL, Illumina obtained a right to receive a [redacted] on net sales of GRAIL's

[redacted]

future oncology products and services.[40] Thus, since GRAIL's inception, Illumina has held a significant economic interest in its future sales. During that time, as described above, Freenome, Thrive and Guardant have made enormous progress advancing their respective tests through validation studies and clinical trials on Illumina systems. Illumina recognizes that supplying NGS instruments and consumables that enable such clinical oncology work is critical to future NGS growth. Any attempt to impede that growth would risk deterring investment toward developing NGS applications, and, in turn, lost opportunity for Illumina to grow profitable upstream sales in a segment with enormous potential.

Other industry players recognize that NGS-based cancer screening tests rise and fall together, and that having Illumina as an ally in seeking to pass key legislation (discussed below), in developing a pathway to regulatory approval and in negotiating with payors is a huge benefit to all clinical oncology test developers, just as it is a benefit to GRAIL for other test developers to invest in these efforts. That is particularly true for multi-cancer tests. As Thrive/Exact recently told investors "Guideline groups are much more likely to create a new category of screening if they see that it is a category of more than one, and ultimately, we believe that is great for patients as well" and "***having GRAIL as a participant in solving this problem [of delivering an effective multi-cancer test to market] is a net huge benefit***" because "as you think about going through the guideline process" with "multiple clinical trials, prospective studies, and multiple approaches to solving this problem to get the guideline groups and payors comfortable with [multi-cancer screening]."[41]

[redacted] Invitae has made [redacted] comments in recent public statements.[43] Industry analysts have noted the benefits of the acquisition as well, with

[40] Once [redacted] in cumulative revenues are paid, Illumina is entitled to a [redacted] royalty on each covered sale for an indefinite duration. The royalty may be subject to other adjustments as specified in the supply agreement.

[41] ILMN-FTCVOL_00000766 (Exact Sciences Earnings Call Q3 2020, dated Oct. 27, 2020) at -777, -780.

[redacted]

[43] Transcript of Invitae JP Morgan Presentation, dated Jan. 12, 2021, at 13 (stating that Invitae has no concerns about the transaction because Illumina is "a fantastic partner" that is focused with Invitae on conquering the shared "mission" of "how to drive

one observing that "***the recent acquisition of GRAIL by ILMN has catalyzed the excitement in the market to new highs*** – even ahead of our prior expectations", and "there is an expectation that ***more companies will increasingly pursue liquid biopsy screening as ILMN's acquisition of pre-revenue GRAIL has 'validated' the liquid biopsy early detection theses.***"[44]

[redacted] Growing acceptance of and demand for NGS tests in clinical oncology applications benefits all NGS clinical test developers—including Illumina and GRAIL after this acquisition—in overcoming these obstacles, as the statements above indicate. As noted, that growth also benefits Illumina by increasing its opportunity to sell more profitable NGS products to all customers providing NGS-based clinical oncology applications.

An important example of this interdependent dynamic is the legislation recently introduced in Congress that, if enacted, would "creat[e] a pathway for Medicare to cover new, innovative, FDA-approved screening tests".[45] As discussed in more detail below, GRAIL is relying on the passage of that legislation as its path to Galleri obtaining Medicare reimbursement; if it is not passed, the timeline for Medicare coverage (and therefore broad adoption) for Galleri will lengthen by several years. The efforts of other test developers such as Exact/Thrive to get this legislation enacted—and more generally to demonstrate the clinical and economic value of NGS testing in clinical oncology applications to governments, regulators, payors and the broader medical community—is immeasurably valuable to both Illumina *and* GRAIL.

Any foreclosure strategy would imperil these efforts, [redacted] and put at risk Illumina's profitable future upstream sales to NGS clinical test developers. There is no basis to conclude—and there are numerous reasons to reject the conclusion—that Illumina would attempt such self-defeating conduct post-merger.

---

sequencing more into . . . the clinic, so we get more and more and better diagnosis earlier"), ILMN-VALORPUBLIC_00000001.

[44] ILMN-FTCVALOR_00132671 (SVBLeerink Report, dated Oct. 2, 2020) at -673.

[45] Press Release, *Reps. Sewell, Arrington, Ruiz, and Hudson Introduce Bipartisan Legislation to Remove Barriers to Innovative Multi-Cancer Screening Technology for Medicare Beneficiaries* (Dec. 3, 2020), https://sewell.house.gov/media-center/press-releases/reps-sewell-arrington-ruiz-and-hudson-introduce-bipartisan-legislation, ILMN-VALORPUBLIC_00000620.

D. Illumina Has No Economic Incentive To Attempt To Foreclose or Raise Rivals' Costs Post-Merger.

A "merged firm's incentive to raise its rivals' costs or foreclose rivals from access to the related product depends on the profitability of the strategy".[46] The profitability of a foreclosure strategy depends on the "significance of the merged firm's potential gains in the relevant market and any potential losses from reduced sales of the related product" resulting from the strategy. As discussed below, a foreclosure strategy would likely cause significant losses from reduced sales of Illumina's upstream sequencing products, and there is no basis to predict that those losses would be offset by diversion to GRAIL's tests. Thus, it is implausible that Illumina would attempt any such strategy, even if it were not contractually prohibited from doing so (which it is).

i. *A hypothetical foreclosure strategy would result in lost NGS sales from customers switching to rival platforms.*

It would be economically irrational for Illumina to attempt to foreclose or raise the cost of its NGS products because Illumina would lose actual sequencing business to rival sequencing platforms for multiple years, only for the hope of diverting sales to GRAIL in the distant future. Illumina's current position as a successful sequencing provider is the result of its innovative technology, which enables high throughput and low per-genome cost, and its cultivation of strong relationships with its customers. It faces competition on both fronts. Moreover, as Illumina, other market participants and even the FTC have recognized, in only a matter of years, Illumina will face even greater competitive pressures. [redacted] Those competitive pressures and attendant switching would increase dramatically if (hypothetically) Illumina decreased the quality, increased the cost or withheld any products or services in an ill-conceived attempt to impede the competitiveness of its clinical oncology customers. Given that the downstream segment is pre-commercial and years from reaching scale even in the optimistic case, any analysis of Illumina's post-merger incentives with regard to downstream rivals must take into account the dynamic nature of the upstream segment and its intensifying competitiveness.

Companies developing, or that may decide to develop, NGS-based cancer screening, DAC or MRD tests will have viable substitutes for Illumina's NGS systems, certainly by the time even one of the many developers of cancer screening tests commercially launches a product at scale.[47] [redacted]

---

[46] Fed. Trade Comm'n, *Commentary on Vertical Merger Enforcement* § 3(A)(ii) (2020), https://www.ftc.gov/system/files/documents/reports/federal-trade-commissions-commentary-vertical-merger-enforcement/p180101verticalmergercommentary_1.pdf, ILMN-VALORPUBLIC_00000536.

[47] *Cf.* U.S. Dep't of Just. & Fed. Trade Comm'n, Vertical Merger Guidelines § 4(a)(1) (2020), https://www.ftc.gov/system/files/documents/reports/us-department-

[redacted]

[redacted]

justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf (explaining that a merged firm would not have the ability to foreclose "if rivals could readily switch purchases to alternatives to the related product . . . without any meaningful effect on the price, quality, or availability of products or services in the relevant market"), ILMN-VALORPUBLIC_00001024.

[redacted]

Recent events further demonstrate that the upstream market is growing more competitive, and that competition will only intensify in the future. For example, Thermo Fisher's Ion Torrent sequencing platform is used for a growing number of oncology applications. Last year, LabCorp, an Illumina customer, announced that it would adopt Thermo Fisher's Ion Torrent Genexus Next-Generation Sequencing System and Pan-Cancer Assay for use in oncology research and development.[49] It has been reported that Genetron Health, an oncology innovator based in China, uses Thermo Fisher (as well as BGI) for NGS-based cancer testing, and that OncoCyte in the United States is using Ion Torrent for its development of a liquid biopsy lung cancer diagnosis test.[50] Pacific Biosystems of California ("PacBio"), which offers another sequencing platform, recently announced a multi-year collaboration with Invitae, a leading genomic test developer and a current Illumina customer, to develop a production-scale high-throughput sequencing platform to expand Invitae's whole-genome testing capabilities.[51]

---

[49] *LabCorp to Adopt Thermo Fisher Scientific's Ion Torrent Genexus Next-Generation Sequencing System and Pan-Cancer Assay for Use in Oncology Research and Development* (Jan. 14, 2020), https://www.labcorp.com/newsroom/labcorp-adopt-thermo-fisher-scientifics-ion-torrent-genexus-next-generation-sequencing-system-and, ILMN-VALORPUBLIC_00000499.

[50] *OncoCyte Announces Transition to Ion Torrent Next-Generation Sequencing Platform* (Jan. 3, 2019), https://investors.oncocyte.com/news-releases/2019/01-03-2019-130247838, ILMN-VALORPUBLIC_00000533.

[51] Pacific Biosciences, *Pacific Biosciences and Invitae to Develop Ultra-High-Throughput Clinical Whole Genome Sequencing Platform* (Jan. 13, 2021), www.pacb.com/press_releases/pacific-biosciences-and-invitae-to-develop-ultra-high-

The FTC has stated that "[a]s PacBio has improved the individual sequence read length, cost, and throughput of its products over the years, it has become a closer substitute for Illumina's short-read technology for customers in some projects."[52] [redacted]

As shown in the LabCorp and Invitae examples, customers have entered into partnerships with multiple sequencing providers. By doing so, customers are already modifying and optimizing their respective assays on competing sequencing platforms, and, as needed, may be performing validation studies. By validating more than one platform in parallel—something that may be performed both in the United States as well as abroad where patent laws may be less restrictive—the actual lag time in switching between two different platforms could be reduced to a matter of months.

Illumina expects that there will be even more options for NGS customers in the future, and that customers can and will switch over time. [redacted]

For certain applications—particularly ones that rely on whole-genome sequencing—alternative sequencing platforms are already competitive and are expected

---

throughput-clinical-whole-genome-sequencing-platform/, ILMN-VALORPUBLIC_00000584.

[52] Complaint ¶ 21, Illumina, Inc. & Pacific Biosciences of Cal., Inc., FTC File No. 191-0035 (Dec. 17, 2019), Dkt. No. 9387, ILMN-VALORPUBLIC_00000133. In its 2019 complaint challenging Illumina's proposed acquisition of PacBio, the FTC alleged that Illumina was a monopolist in the upstream market for NGS systems. That allegation is unproven and Illumina contests it. However, even assuming *arguendo* its truth at the time of PacBio, the FTC asserted in that action that the competitive landscape in NGS was evolving even then. Indeed, the FTC alleged that "PacBio's innovations and sequencing advances over the past two years have enabled the company to deliver significantly higher quality sequencing at dramatically lower prices, bringing its offerings closer to those of Illumina in terms of both capability and price." *Id.* ¶ 45. Those allegations were asserted just over a year ago, and, of course, the NGS-based screening segment is still years away.

- [redacted]
- [redacted]

to become more so in the near future.[55] The FTC stated that while "[h]istorically, Illumina's short-read sequencing has been ***cheaper*** than long read on a cost per genome basis . . . , because of the inherent benefits of long-read sequencing over short-read sequencing for certain applications, use cases and projects, customers have been willing to pay a price premium to use PacBio for some sequencing projects. And, ***as PacBio's cost per genome decreases***, ***customers expect to sequence more samples on PacBio and fewer samples on Illumina***."[56] The FTC further noted—against the historical backdrop where Illumina's sequencing costs have decreased—that "[a]s the cost of PacBio's long-read sequencing has decreased and its accuracy and throughput have increased, sequencing volume has shifted from short read to long read, as long read is able to fit the needs of more use cases and projects within several applications."[57] The FTC observed that "[m]arket participants expect this trend to continue for a broader set of projects and use cases."[58] Thus, the FTC has recognized that, even when Illumina is vigorously competing for customers based on cost and other factors, some customers for certain applications—including within clinical oncology—are already expected to switch, and in greater numbers in the future. Any foreclosure strategy would exacerbate these trends and, thus, would make no sense for Illumina.

In addition, any potential foreclosure tactics by Illumina would deter future development on Illumina platforms, compounding the future losses of profitable sales. The potential loss of future test development that has not yet started today is especially significant given that the NGS clinical oncology field is in its infancy, and screening is years from reaching commercial scale even in the optimistic case. (*See infra* § II.) There is significant development work across all clinical oncology applications that has not yet commenced. Much of that work will entail high-throughput sequencing, which Illumina hopes will take place on its platform, including its next-generation

---

[55] Recent papers have noted that long-read sequencers can be used for a range of clinical oncology testing. *See* Yoshitaka Sakamoto, et al., *A New Era of Long-Read Sequencing for Cancer Genomics*, 65 J. Hum. Genetics 3, 3-10 (2020) (noting that long-read technology from PacBio and Oxford Nanopore Technologies ("ONT") can be used in all clinical oncology tests, and more importantly, both PacBio and ONT's sequencers have been used to detect DNA methylations), ILMN-VALORPUBLIC_00000510; *Cancer Research with Nanopore Sequencing Technology*, Oxford Nanopore Technologies, http://nanoporetech.com/applications/cancer-research (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000075; *see also Sequence Cancer Variants with Confidence*, Pacific Biosciences, https://www.pacb.com/research-focus/human/cancer-research/ (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000898.

[56] Complaint ¶ 21, lllumina, Inc. & Pacific Biosciences of Cal., Inc., FTC File No. 191-0035 (Dec. 17, 2019), Dkt. No. 9387 (emphasis added), ILMN-VALORPUBLIC_00000133.

[57] *Id.* ¶ 22.

[58] *Id.*

Lightning system into which it has invested significant capital and resources to compete for future sequencing revenue. A foreclosure strategy would imprudently put at risk the loss of those profitable upstream sales and content development on Illumina's platforms. Thus, while even positing foreclosure at such an early juncture in the development of a future market is an exercise in speculation, the facts, and simple logic, indicate that the incentives work in the opposite direction.

Moreover, Illumina could not efficiently target a hypothetical foreclosure strategy at only screening (including DAC and MRD) tests. Consequently, any such strategy would affect a range of businesses outside of GRAIL's future segments, for which there would be no possibility of diversion to GRAIL. Although Illumina may have an understanding of the types of applications a customer is developing or marketing (*e.g.*, Thrive, Exact, Guardant and Freenome are developing early-detection oncology tests; and Guardant has therapy selection and monitoring tests), [redacted], Illumina's instruments and consumables are multi-use products that can be and often are used by Illumina customers for a variety of sequencing applications. For example, Illumina markets its NovaSeq instrument and consumables, [redacted], as "[f]lexibl[e] for virtually any genome, sequencing method, and scale of project".[60] Thus, in most cases, including clinical oncology, Illumina cannot tell from the type of sequencing products a customer orders for which specific application the customer will be using the product. That is true even for Illumina's customers that are currently focused on oncology. Such a customer might be using the products for therapy selection, genomic profiling panels, cancer monitoring and/or cancer screening, or perhaps development of tests in other fields (*e.g.*, infectious disease) that the customer is planning to enter in the future.

Consequently, if Illumina attempted to raise the price of products purchased by customers developing cancer screening tests (which it cannot do under the supply commitments described above), it would impact ***all*** tests developed or marketed by those customers using those same products, including those that have no possible diversion to GRAIL. Such a strategy would be further complicated by the fact that Illumina uses standard list prices and many of its supply agreements have MFNs.

[redacted]

[60] *A Broad Range of Applications—All on One Platform*, www.illumina.com/systems/sequencing-platforms/novaseq/applications.html (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000015.

Similarly, there is no way Illumina could increase the cost of servicing an instrument, or degrade the quality of such servicing (*e.g.*, by failing to service a downed instrument promptly), without burdening all tests conducted on that instrument. Doing so would put at risk a significant volume of profitable business that Illumina could not reasonably assume it would recoup downstream. Customers that remained on Illumina's platform would potentially be less cost-competitive in their downstream markets, and lose sales to rivals running tests on less-costly non-Illumina platforms, or to competing tests that are not NGS-based. Any analysis of the profitability of a hypothetical foreclosure strategy would need to take into account these broader effects, which would be harmful to Illumina.

ii. *There is no basis to predict any material diversion to GRAIL tests from a hypothetical vertical foreclosure strategy.*

In evaluating vertical mergers, the FTC "assesses whether the merged firm will benefit significantly from responsive changes in rivals' behavior or from their lost sales."[61] That "potential benefit depends on the extent to which any sales lost by rivals would divert to the merged firm's products in the [downstream] market."[62] Here, Illumina losing highly profitable current sales to attempt to divert future sales to GRAIL makes little sense, as the evidence does not support the conclusion that GRAIL would capture a meaningful portion of rivals' lost sales in the future, and Illumina would be foolish to assume otherwise. There also is no basis to predict that, if Illumina attempted to foreclose its upstream NGS products to cancer-screening test developers in the future (which it would not), it would cause a material shift from those tests to GRAIL's tests.

First, the degree of differentiation among cancer tests in development suggests that material diversion to GRAIL's tests is unlikely. With respect to screening tests, GRAIL's Galleri test has demonstrated the potential to detect more than 50 types of cancer through a single blood draw using targeted methylation. As far as Illumina is aware, Galleri is the only test in development that has demonstrated the ability to screen for that many cancers from a single blood draw across all cancer stages. Illumina and GRAIL believe that targeting that many cancers gives Galleri the potential to improve outcomes and reduce cancer mortality at population scale. Other test developers have taken different approaches to cancer screening. In particular, Freenome and Guardant are developing tests that screen only for colorectal cancer, and have indicated that they intend to take a "sequential approach", with the ability to screen for other cancers potentially added over time.[63] [redacted]

---

[61] Fed. Trade Comm'n, *Commentary on Vertical Merger Enforcement* § 3(A)(ii) (2020), https://www.ftc.gov/system/files/documents/reports/federal-trade-commissions-commentary-vertical-merger-enforcement/p180101verticalmergercommentary_1.pdf., ILMN-VALORPUBLIC_00000536.

[62] *Id.*

[63] ILMN-FTCVOL_05333301 (Morgan Stanley Report, dated Sept. 9, 2020) at -424.

[redacted]
Similarly, Guardant's approach has been described as "a more conservative non-binary bet" that Guardant believes "is essential to driving clinical adoption and reimbursement, with [colorectal cancer] being an attractive first indication due to the existence of a well-established (and reimbursed) screening precedent via colonoscopy coupled with lackluster rates of adherence".[65]

Even among multi-cancer screening tests, the extent of future diversion from a hypothetical foreclosure strategy cannot be assumed to be profitable. Besides Galleri, the multi-cancer screening tests being developed in the U.S. are those from Exact and Thrive. Based on publicly available information, the Exact and Thrive tests are currently differentiated from Galleri in a number of ways. Whereas Galleri uses targeted methylation, Thrive's test takes a multi-analyte approach based on mutations and protein markers. Thrive is focused on detecting "the 10 cancers . . .with the highest clinical need".[66] Exact was developing its own multi-cancer screening test based on methylation and protein markers at the time of the merger, and has announced plans to add methylation markers to Thrive's CancerSEEK, potentially using methylation technology from its newly-acquired Base Genomics subsidiary, to improve its sensitivity.[67] As noted above, Exact/Thrive believe that having a "category of more than one" in multi-cancer screening improves the chances of adoption.

In addition, there is significant differentiation among MRD tests. GRAIL's MRD test is essentially a form of its methylation-based screening test that has been adapted for use in patients who have already been treated for cancer and are in remission—a type of screening test for cancer recurrence. Several companies are developing or providing MRD tests in the U.S., including Guardant, Roche, Natera, FMI/Lexent Bio, and Invitae/ArcherDx. Each MRD test being developed by those other companies are currently differentiated from GRAIL's proposed test in a number of ways. Guardant's LUNAR-1 MRD test also detects "tumor-specific genomic alterations" such as single-nucleotide variants (SNVs) and insertions/deletions (indels) in addition to detecting "epigenomic signatures" like methylation.[68] Roche's AVENIO Surveillance

[redacted]

[65] ILMN-FTCVOL_05333301 (Morgan Stanley Report, dated Sept. 9, 2020) at -424.

[66] ILMN-FTCVALOR_00132671 (SVBLeerink Report, dated Oct. 2, 2020) at -691.

[67] ILMN-FTCVOL_00000766 (Exact Sciences Earnings Call Q3 2020, dated Oct. 27, 2020) at -769.

[68] *See Guardant Health and NRG Oncology Initiate Randomized Trial to Investigate Circulating Tumor DNA Guided Adjuvant Therapy in Stage II Colon Cancer* (Jan. 12, 2020), https://investors.guardanthealth.com/press-releases/press-releases/2020/Guardant-Health-and-NRG-Oncology-Initiate-Randomized-Trial-to-Investigate-Circulating-Tumor-DNA-Guided-Adjuvant-Therapy-in-Stage-II-Colon-Cancer/default.aspx ("With a

kits test SNVs, indels, fusions and copy number variations (CNVs) in lung cancer and colorectal cancer patients.[69] Natera and FMI formed a partnership in 2019 to develop ctDNA monitoring assays based on Natera's Signatera platform and FMI's FoundationOne CDx assay.[70] Natera's Signatera uses a tumor-informed approach based on each cancer patient's own tumor genomic signatures, while FMI's FoundationOne CDx is also based on each cancer patient's individual genomic profile, including genomic microsatellite instability (MSI) and tumor mutational burden (TMB).[71] Invitae/ArcherDx uses a similar tumor-informed approach for its Personalized Cancer Monitoring (PCM™) MRD test, in contrast to GRAIL's tumor-naïve approach.[72] Natera believes that the

---

single blood draw, the [LUNAR] assay is simultaneously able to detect both genomic alterations and epigenomic signatures with high clinical sensitivity and specificity."), ILMN-VALORPUBLIC_00000489; *see* Guardant, *39th Annual J.P. Morgan Healthcare Conference Presentation* at 17 (Jan 11, 2021), https://s26.q4cdn.com/594050615/files/doc_presentations/2021/01/GH-JPM-2021-Investor-1.11.21-VFINAL.pdf, ILMN-VALORPUBLIC_00000455.

[69] *See AVENIO ctDNA Surveillance Kit*, https://sequencing.roche.com/en/products-solutions/products/ngs-oncology-assays/ctdna-analysis-kits/ctdna-surveillance-kits.html (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000129.

[70] *See* Cindy Perettie, *A New Partnership To Accelerate The Potential Of Personalized Monitoring In Cancer*, FMI (Sept. 24, 2019), https://www.foundationmedicine.com/blog/a-new-partnership-to-accelerate-the-potential-of-personalized-monitoring-in, ILMN-VALORPUBLIC_00000026; *Foundation Medicine and Natera Partner to Advance Personalized Cancer Monitoring*, PR Newswire (Sept. 24, 2019), https://www.prnewswire.com/news-releases/foundation-medicine-and-natera-partner-to-advance-personalized-cancer-monitoring-300924893.html, ILMN-VALORPUBLIC_00001038.

[71] In a personalized, tumor-informed assay, the DNA from the tumor and normal cells of the cancer patient are sequenced and compared to isolate the genetic alterations that are only present in the patient's tumor. *See*, *e.g.*, *Cancer Tumor Markers vs. Signatera Circulating Tumor DNA Test*, https://www.natera.com/signatera-blog/biomarkers-vs-signatera-cancer-diagnostics, ILMN-VALORPUBLIC_00000078. [redacted] *See also Signatera: FAQs: How is Signatera Different from Current Biomarker Tests?*, https://www.natera.com/oncology/signatera-advanced-cancer-detection/faq/ (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000905. For more on FMI's FoundationOne CDx, see *FoundationOne CDx*, https://www.foundationmedicine.com/test/foundationone-cdx (last visited Jan. 24, 2021), ILMN-VALORPUBLIC_00000391.

[72] *See ArcherDX Enters Collaboration with Bristol Myers Squibb to Apply Personalized Cancer Monitoring (PCM™) to Clinical Research* (June 18, 2020), https://archerdx.com/archerdx-enters-collaboration-with-bristol-myers-squibb-to-apply-

tumor-informed approach enables its test to be "extremely effective at detecting the presence of a very small amount of tumor DNA or remaining cancer in the body during or after treatment".[73]

The extent to which this differentiation among the tests in development (or that may be developed in the future) will impact adoption and, years from now, substitution between, them is impossible to predict with certainty.[74] Given the degree of differentiation, however, it would be highly speculative and baseless to predict that GRAIL's tests would be seen as close substitutes to any such test in the future such that diversion could be assumed to be material. That is particularly so for single-cancer tests. With respect to multi-cancer tests, there will likewise be differentiation, and any potential competition is years away. The extent to which those tests will compete in the future is unknown. In the medium term, Exact/Thrive and GRAIL are focused on the shared goal of clearing the roadblocks to multi-cancer test adoption. The efforts of one help the other. Illumina has no incentive to foreclose Exact/Thrive, [redacted]

Ultimately, once multiple NGS-based cancer screening tests are commercially available—both multi-cancer and single cancer—oncologists and primary care physicians are likely to determine which screening test is best for a patient depending on various criteria. For example, a patient with a predisposition to a specific type of cancer may be better served by a screening test that only screens for that cancer, rather than a multi-cancer test that may have a higher false negative rate for that particular cancer (*i.e.*, a low sensitivity rate). By comparison, a patient with no cancer predisposition may be better served by a multi-cancer test with a very low false positive rate (*i.e.*, a low specificity rate), recognizing the trade-off between minimizing false

---

personalized-cancer-monitoring-pcm-to-clinical-research/ ("PCM provides tumor-informed longitudinal analysis of circulating tumor DNA (ctDNA) found in patient blood where the quantity of ctDNA is a predictor of disease stage and burden."), ILMN-VALORPUBLIC_00000030.

[73] *Cancer Tumor Markers vs. Signatera Circulating Tumor DNA Test* (Nov. 20, 2020), https://www.natera.com/signatera-blog/biomarkers-vs-signatera-cancer-diagnostics, ILMN-VALORPUBLIC_00000078.

[74] The FTC appears to have acknowledged the differentiation among tests in development. Both Thrive and Exact have multi-cancer screening tests in development (indeed, the only two such tests in development besides GRAIL's). Their merger recently closed.

positives and false negatives.[75] The scope of payor reimbursement will also influence these choices.

Second, although Illumina has placed what it sees as a bolder bet on a population-scale solution, with significant potential upside in terms of revenue and lives saved, it is quite possible that the "more conservative" single-cancer test approach will lead to regulatory approvals, Medicare coverage and scaled adoption sooner than Galleri. GRAIL expects that Galleri will be the first NGS-based screening test to "soft launch" in the United States, but scaled adoption is years away, even in the optimistic case (*see infra* § II). It is impossible to predict for how long any single-cancer test might be available at scale while Galleri is not, but it may be several years. Because GRAIL is taking a multi-cancer approach, which is unprecedented as there are no multi-cancer tests with FDA approval or payor coverage, there is significant risk and variability in Galleri's potential growth projections. Moreover, GRAIL is relying on the passage of congressional legislation to obtain coverage from the Centers for Medicare and Medicaid Services to allow for the Medicare program to pay for the test, which will be required if Galleri is to achieve broad payor coverage and scale. If the legislative solution is unsuccessful, the timeline for obtaining Medicare coverage through a recommendation from the U.S. Preventive Services Task Force ("USPSTF") is several years away. To the extent other tests scale before Galleri overcomes these hurdles, which is a very real possibility for the single-cancer tests in development, there could not possibly be any meaningful diversion from those tests to Galleri because Galleri will not have FDA approval or insurance coverage to even be an option for the vast majority of patients who might use any such single-cancer tests.

It is far more likely that any hypothetical foreclosure strategy would drive adoption (and attendant sales) of a non-NGS-based screening modality (*e.g.*, diversion from Guardant's NGS-based colorectal cancer screening test to a PCR-based colorectal cancer screening test such as Exact's Cologuard), or lead to delayed adoption of NGS-based screening tests, to Illumina's detriment. This is particularly true for the single-cancer tests that are currently on track to be commercialized at an earlier stage. Both Guardant and Freenome are pursuing cancer screening tests for colorectal cancer. The colorectal cancer screening landscape shows that more "cutting edge" technologies do not necessarily make for a more effective screening test. For example, while Exact's Cologuard product is based on PCR and has received widespread support, the USPSTF's

[75] As one industry analyst observed, a single-cancer colorectal screening test has a smoother path to approval and adoption in part because it does not have to live up to the specificity standards of a multi-cancer test, meaning it is not as essential to eliminate all false positives. That is because a colorectal test "can reflex to colonoscopy when a patient is positive (either false positive or a true positive), essentially providing a downside protection to the diagnostic test" that "limits the downstream impact to the healthcare system". By contrast, "given the size of the patient population and potential down-stream impact of false positives and overdiagnosis", a multi-cancer test requires near 100% specificity. ILMN-FTCVALOR_00132671 (SVBLeerink Report, dated Oct. 2, 2020) at -673.

draft recommendation suggests that a ***different*** cancer screening test—the fecal immunochemical test or "FIT"—may show fewer "false positive" results.[76] Unlike Cologuard, which detects blood and cancer biomarkers in stool using PCR, FIT detects for the presence of blood using an immunochemical approach in a stool sample. Even though the immunochemistry that FIT uses is simpler and arguably less cutting edge than Cologuard, a recent study has shown that FIT was more effective and less expensive.[77] This example shows that it cannot be assumed that the more cutting-edge screening technology will readily displace less cutting edge screening modalities. There will be competition between them. At the same time that Illumina is supporting cancer screening applications on its NGS platform, platform competitors (such as Roche in PCR) are supporting alternatives on their own modalities. It is in Illumina's strong financial interest to support development of new diagnostic tools on its platform by developers that are competing to displace such modalities and drive adoption of clinical sequencing.

E. Consistent with its Long-Term Strategy, Illumina Has a Track Record of Supporting All Customers, Including Downstream Competitors.

While considering a foreclosure theory in a nascent pre-commercial market is inherently speculative and uncertain, Illumina's behavior in other downstream applications into which it has vertically integrated underscores the very incentives against foreclosure described above.

First, as discussed in our December 31, 2020 submission, Illumina vertically integrated into NIPT through its acquisition of Verinata in 2013. Illumina acquired Verinata with the intention of enabling the growth of an emerging clinical application for its NGS technology, and it has done just that by eliminating an IP barrier to entry that had been impeding the field, driving down sequencing costs and decentralizing Verinata's business model to enable participation in the segment by more third-party labs. As discussed in the December 31st submission, since the acquisition, the

---

[76] *Draft Recommendation Statement: Colorectal Cancer: Screening* (Oct. 27, 2020), https://www.uspreventiveservicestaskforce.org/uspstf/draft-recommendation/colorectal-cancer-screening3#fullrecommendationstart, ILMN-VALORPUBLIC_00001061; *see also* Paula Span, *A Colonoscopy Alternative Comes Home*, N.Y. Times (Jan. 11, 2021), www.nytimes.com/2021/01/11/health/colonoscopy-health-home-testing.html, ILMN-VALORPUBLIC_00000021.

[77] Steffie K. Naber et al., *Cost-Effectiveness of a Multitarget Stool DNA Test for Colorectal Cancer Screening of Medicare Beneficiaries*, 14 PLOS ONE (2019), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0220234 ("Compared to no screening, triennial mtSDNA screening [*i.e.*, Cologuard] reduces CRC incidence and mortality at acceptable costs. However, compared to nearly all other CRC screening strategies reimbursed by CMS it is less effective and considerably more costly, making it an efficient screening option."), ILMN-VALORPUBLIC_00001041.

prices Illumina charges NIPT customers have decreased while NIPT output has exploded and the segment has grown more competitive, with substantial new entry.[78]

Second, as noted, Illumina competes today in the downstream supply of therapy selection tests with its TSO500 test. Illumina launched TSO500 in 2018, and has competed aggressively for downstream sales, including by investing significant resources in adding companion diagnostic (CDx) claims to the TSO500 panel and pursuing FDA approval to market an *in vitro* diagnostic ("IVD") kitted version of the test. While competing aggressively downstream, Illumina has never attempted to foreclose any of its NGS customers developing therapy selection tests. [redacted] Illumina recognizes that the development and commercialization efforts of its customers are critical to expanding access to NGS-based therapy selection testing for labs, clinicians, and patients and growing the clinical oncology content available on Illumina's NGS platforms.

Illumina's IVD agreements reflect this recognition. Illumina is pursuing an IVD kitted version of TSO500. [redacted] Approvals for kitted diagnostic tests are rigorous and difficult to obtain, both from the FDA and from foreign regulatory bodies. They require careful planning and development, and can take years of clinical and validation studies and regulatory review. Once approved, however, they expand the addressable market for NGS sales by enabling more laboratories to run such tests.[80] [redacted]

[78] *See* Non-Invasive Prenatal Testing ("NIPT") Market Analysis at 9-19, Submitted by Illumina on December 31, 2020.

[redacted]

[80] As far as Illumina is aware, no IVD version of a screening test is being developed, and none is anticipated for the foreseeable future, other than, potentially, in certain foreign markets, for reasons noted below.

[redacted]

[redacted]

Illumina's track record therefore provides a real world demonstration of Illumina's strong incentives to support all customers, including downstream competitors.

II. Illumina's Re-Acquisition of GRAIL Creates Cognizable Merger-Specific Efficiencies.

There is wide-spread "recognition among academics, courts, and antitrust enforcement authorities alike that many vertical mergers create vertical integration efficiencies between purchasers and sellers".[85] Efficiencies are merger-specific when they are (a) likely to be accomplished as a result of the proposed merger and (b) unlikely to be accomplished in the absence of the proposed merger. As discussed below, this transaction will result in a number of cognizable, merger-specific efficiencies. *First*, the merger eliminates double marginalization ("EDM"), which will result in incentives for lower prices for GRAIL's tests and increased output (§ II.A). *Second*, the merger accelerates GRAIL's ability to achieve scale in the U.S. and internationally (§ II.B). The resulting acceleration in GRAIL's timeline will save lives and, therefore, creates significant economic value (§ II.C). *Third*, the merger will result in R&D efficiencies that increase the likelihood of medical breakthroughs within and beyond the field of oncology (§ II.D).

A. The Merger Will Result in Substantial EDM Efficiencies.

It is well-recognized that "vertical mergers often benefit consumers through the elimination of double marginalization, which tends to lessen the risks of competitive harm."[86] Indeed, EDM is a standard benefit associated with vertical mergers.[87] It arises because, pre-merger, the vertically-related firms "each apply their own markups (reflecting their own margins) in pricing their products", and "[t]hose 'stacked' margins are both incorporated into the final price that consumers have to pay for the end product."[88] "By vertically integrating two such firms into one, the merged

---

[85] *United States v. AT&T Inc.*, 310 F. Supp. 3d 161, 193 (D.D.C. 2018) (internal citation and quotation omitted). *See also United States v. Enova*, 107 F. Supp. 2d 10, 17 (D.D.C. 2000) ("[V]ertical mergers often promote efficiencies by consolidating input and output operations under one umbrella."), ILMN-VALORPUBLIC_00000933.

[86] U.S. Dep't of Just. & Fed. Trade Comm'n, *Vertical Merger Guidelines* §§ 1, 6 (2020), https://www.ftc.gov/system/files/documents/reports/us-department-justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf. U.S. Dep't of Just. & Fed. Trade Comm'n, *Vertical Merger Guidelines* §§ 1, 6 (June 30, 2020), https://www.ftc.gov/system/files/documents/reports/us-department-justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf, ILMN-VALORPUBLIC_00001024.

[87] *AT&T Inc.*, 310 F. Supp. 3d at 197-98 (citations omitted), ILMN-VALORPUBLIC_00000933.

[88] *Id.* (citations omitted).

company is able to shrink that total margin . . . leading to lower prices for consumers."[89] EDM is thus a procompetitive benefit of vertical mergers.[90]

The EDM benefits from the proposed merger are significant. As noted, GRAIL has a long-term supply agreement with Illumina pursuant to which GRAIL purchases NGS instruments and consumables that GRAIL needs for its tests. Absent the merger, once GRAIL's tests are commercialized, it would charge a price for its tests that incorporates what GRAIL pays for the NGS products (which includes Illumina's margin from its NGS sales to GRAIL) and GRAIL's own margin from the sale of its tests. In other words, there is a margin from the sale of the upstream product and a margin from the sale of the downstream product. Post-merger, Illumina will not treat the margin that it earns now on GRAIL purchases as a cost and will have an incentive to lower the prices for GRAIL's tests. Illumina would have strong incentives to do lower prices, because those lower prices will increase the number of tests GRAIL sells, which will increase Illumina's overall profits.

Appendix A shows Compass Lexecon's calculations of the magnitude of this EDM and the cost reductions it would enable using realistic assumptions and inputs from Illumina's deal model.[91] As shown, the cost savings from EDM are more than $1 billion over the course of 10 years. Once GRAIL's tests reach commercial scale, the annual EDM cost savings are upwards of $280 million per year. Even with more conservative assumptions, the EDM savings are material—$854 million over 10 years, and upwards of $210 million per year with scale. These savings are significant and likely to have a material impact on the price of GRAIL's tests. In turn, the lower prices enabled by EDM will make GRAIL's life-saving tests accessible to more consumers. The lower

---

[89] *Id.* (citations and internal quotations omitted); *see also* U.S. Dep't of Just. & Fed. Trade Comm'n, *Vertical Merger Guidelines* § 6 (2020), https://www.ftc.gov/system/files/documents/reports/us-department-justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf, ILMN-VALORPUBLIC_00001024.

[90] *AT&T Inc.*, 310 F. Supp. 3d at 197-98, ILMN-VALORPUBLIC_00000933; Fed. Trade Comm'n, *Commentary on Vertical Merger Enforcement* § 3(A)(iii) (2020), https://www.ftc.gov/system/files/documents/reports/federal-trade-commissions-commentary-vertical-merger-enforcement/p180101verticalmergercommentary_1.pdf.2020, ILMN-VALORPUBLIC_00000536.

[91] Illumina's deal model is not intended to nor does it calculate the effects of EDM. The purpose of Illumina's deal model is to confirm for Illumina's board of directors that the price offered to re-acquire GRAIL is justified using the conservative assumptions provided in the model. However, as shown in Appendix A, the inputs used in the model support the conclusion that EDM is significant and will result in lower prices to consumers.

prices are also likely to reduce the cost of GRAIL's tests, which will help convince private payors in the U.S. to reimburse the tests (*infra* § II.B).

Importantly, these significant consumer benefits actually ***understate*** the real-world benefits that will unquestionably result from EDM. That is because Compass Lexecon's analysis shows the consumer savings from lower prices, but does ***not*** reflect the further consumer benefits caused by expanded output. As Compass Lexecon explains in Appendix A, since the markets for GRAIL's tests do not currently exist and will not exist for many years, it is impossible to use actual data to estimate the demand curve for GRAIL's tests, and therefore the precise effects on output from the price reductions enabled from EDM savings. The benefits from EDM are larger than the already significant benefits described above because lower prices will expand output.

In addition to the standard EDM benefits summarized above, the merger will also eliminate the royalty that GRAIL currently owes to Illumina on its net sales of cancer tests and services. With the merger, Illumina/GRAIL will internalize that royalty, as well as Illumina's margin on its NGS sales to GRAIL (*i.e.*, the EDM). The elimination of the royalty alone results in large cost savings and consumer benefits. [redacted] As noted, the benefits in fact would be larger because they do not reflect the benefits from expanded output.

In short, the cost savings and resulting consumer surplus from vertical integration in this merger are substantial. Since lower prices yield greater output, and each unit of output is a test that will save lives and reduce healthcare costs, the surplus from EDM alone will mean that more patients have access to GRAIL's tests, and more lives will be saved, as a direct result of the merger. The impact of EDM alone makes the transaction decisively procompetitive. When this EDM impact is combined with the likely acceleration of regulatory and payor approvals, the attendant impact on patient lives is even more considerable. (*See also* § II.C.)

---

92 [redacted]

B. The Merger Will Enable GRAIL to Scale its Tests More Quickly and With Less Risk.

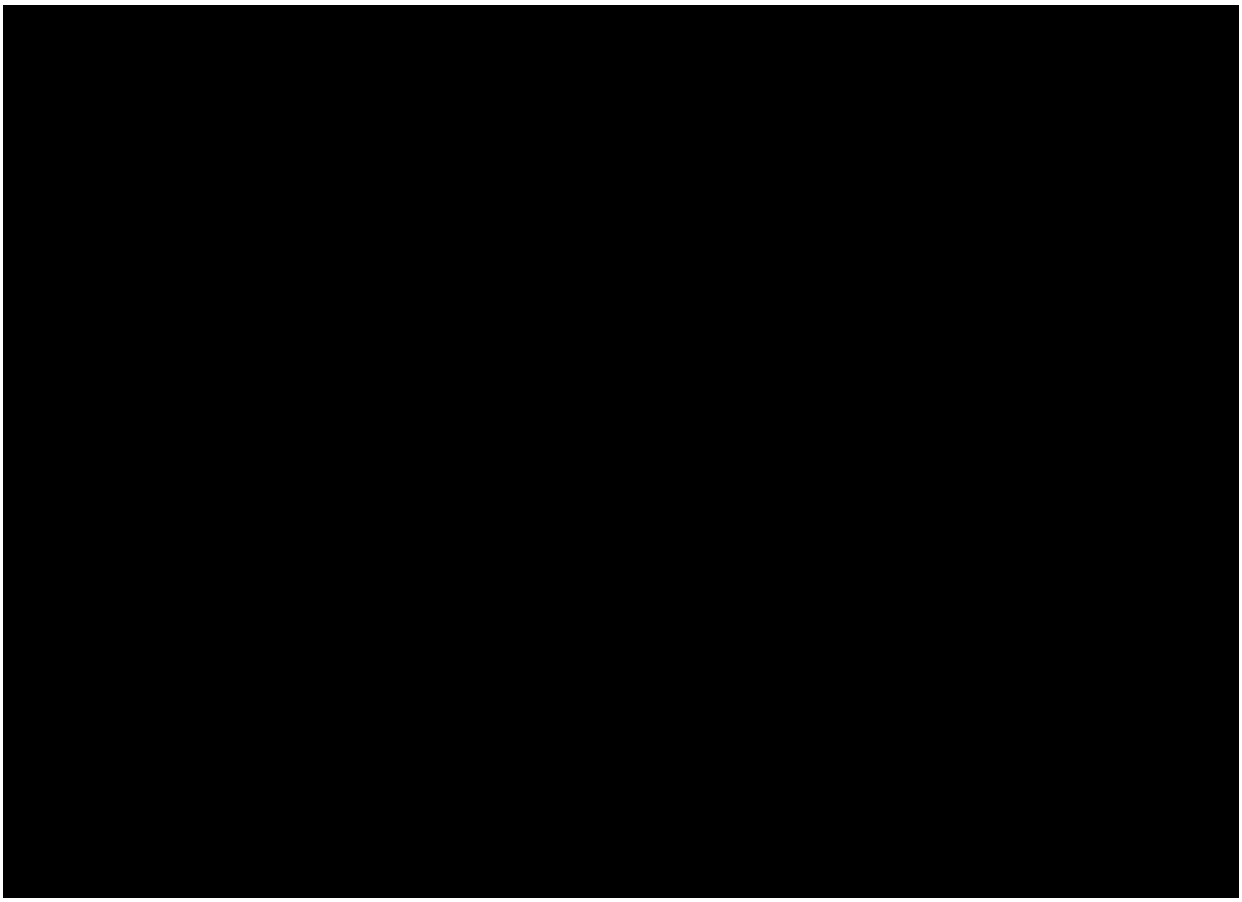
As discussed in GRAIL's January 20th submission, the parties anticipate that the transaction will accelerate and increase the likelihood that GRAIL is successful in scaling its tests in the U.S. and globally by giving GRAIL access to Illumina's expertise, experience and competencies in several critical areas. To understand the benefits that GRAIL will realize from the merger, it is important to appreciate the unprecedented nature of what GRAIL will need to accomplish to commercialize its tests, particularly its multi-cancer screening test Galleri, at scale. GRAIL has made enormous progress in developing Galleri. However, GRAIL has yet to reach any of the regulatory, payor or operational milestones that it will need to commercialize Galleri at scale. GRAIL is in the early stages of preparing its single-site Premarket Approval ("PMA") application for the FDA.[93] Although Galleri has obtained a Breakthrough Device Designation, which allows for increased engagement with the agency on the submissions that GRAIL will need to provide to the FDA for its PMA, the designation does not set any timeline for approval. The PMA process is difficult and time-consuming, and will be particularly challenging here as the FDA has never considered or analyzed, let alone approved, a multi-cancer screening test.

The obstacles to obtaining widespread reimbursement are, if anything, even more challenging. GRAIL is currently hoping that proposed legislation to amend the Medicare statute will be enacted, which would to allow for coverage of multi-cancer screening tests if they are FDA approved. If such legislation is not enacted, Galleri may obtain Medicare coverage only after receiving an A or B rating from the USPSTF.[94] Obtaining such a rating is an arduous and lengthy process that will extend the timeline to obtain Medicare coverage for Galleri by several years. In addition to Medicare coverage, to make Galleri broadly available in the U.S., GRAIL will need to convince multiple private payors to provide reimbursement for the Galleri test (and eventually, GRAIL's other tests). This will be a significant challenge due to the shorter-term economic modeling used by commercial payors in the U.S., as described below. No payor has agreed to cover a multi-cancer screening test. To convince any payor to do so likely will require risk-sharing agreements or other innovative arrangements that reduce the risk of coverage to the payor and put more risk on GRAIL, a pre-commercial stage company.

---

[93] A Summary of Procompetitive, Lifesaving Benefits and Efficiencies To Be Created by the Illumina-GRAIL Transaction GRAIL at 9-10, Submitted by GRAIL on January 21, 2021.

[94] Congressional Research Service, *Medicare Primer* (May 21, 2020), https://crsreports.congress.gov/product/pdf/R/R40425 at 16, ILMN-VALORPUBLIC_00000084.



[redacted] Illumina is optimally positioned to help GRAIL overcome these obstacles and navigate this unprecedented terrain. As described below, Illumina has achieved FDA authorization, foreign regulatory approvals and successfully negotiated payor coverage for NGS-based tests. It is one of the few companies in the world to accomplish any of these milestones for an NGS-based test, much less all of them. It is also one of the few companies that has successfully manufactured and supplied regulated NGS-based tests at scale. Illumina has spent years building the infrastructure, expertise and resources required to obtain regulatory approvals and payor coverage for its regulated products, and to manufacture and supply them at scale under the demanding quality requirements imposed by the FDA and foreign regulators. Illumina also has significant experience running and scaling NGS testing services at its CLIA-certified laboratories.[101] Moreover, Illumina pioneered NGS, and arguably has the world's foremost expertise in sequencing. NGS is relatively new as a clinical tool, and regulators, payors and healthcare providers do not have much experience with the technology, which is far more complex than other platforms used for diagnostic tests (such as those that are enzyme -or PCR-based). Illumina's experience has been that its deep understanding of NGS is particularly important when it comes to educating regulators, payors and healthcare providers, and addressing their questions and concerns about the technology.

The benefits described in GRAIL's submission and in this section are merger-specific. GRAIL has hired talented leaders experienced with FDA approvals, CMS regulations and payor negotiations. However, GRAIL does not have, and cannot replicate Illumina's regulatory and payor organization, including: (i) its breadth and depth of NGS expertise that has taken decades to develop; (ii) its experience proving the clinical and economic utility of NGS to regulators, governments and payors; (iii) its global operational capabilities; and (iv) its experience with and capabilities to manufacture regulated tests at scale in compliance with both U.S. and international quality and safety requirements. The institutional expertise, experiences and competencies that Illumina can bring to bear to aid GRAIL in its regulatory and commercialization efforts will minimize the chances of delays, and maximize the chances of accelerating Galleri's commercial success at scale. Even if it were assumed that, absent the merger, GRAIL eventually would be able to build the competencies that Illumina has developed from years of investment and experience, there is significant timing and execution risk. Illumina has those competencies already, and with the merger, GRAIL will have access to them swiftly, which will minimize the risks of missteps and

[redacted]

[101] As described below, Illumina has two CLIA-certified laboratories, through which it provides NIPT and direct-to-consumer ("DTC") genomic testing services.

delay. As shown in Part § II.C below, any delays in scaling Galleri will have real costs, whereas the benefits from acceleration are enormous.

The sections below provide additional details regarding Illumina's capabilities, which will benefit GRAIL's efforts to commercialize its tests at scale, as also discussed in detail in GRAIL's submission. It is worth noting that these benefits, each important in their own right, are even more valuable together. For example, Illumina's expertise and experience with regulators and payors make it more likely that Galleri reaches scale more quickly than it would without the merger. To the extent that acceleration to scale increases demand for Galleri even sooner than anticipated, Illumina is well-equipped to ramp up capacity and production to meet that demand (*e.g.*, by using its experienced laboratory operations and CLIA-certified laboratories to enlarge testing capacity).

i. *Illumina's world-class clinical organization and unique expertise will accelerate Galleri's FDA approval and commercial launch at scale.*

Illumina's proven success with regulated clinical NGS tests is the culmination of years of investment and development of institutional know-how across multiple departments. As discussed in this section, this proven success cannot be replicated through hiring the relevant personnel alone, and Illumina's successful track record in obtaining regulatory approval for NGS products, both in the United States and abroad, is unparalleled.

In 2014, Illumina acquired Myraqa, a regulatory and quality consulting firm that specializes in companion diagnostics.[102] [redacted]

[102] ILMN-FTCVALOR_00132101 (Press Release, *Illumina Acquires Myraqa, a Leading IVD and Companion Diagnostic Consulting Firm*, dated July 16, 2014).

[redacted]

[redacted]

Illumina's planning documents for its latest regulatory efforts show how Illumina has relied on the cross-functional clinical competencies that it has developed over years of investment and on-the-ground experience. [redacted] Illumina's documents show these departments working together to identify and efficiently resolve potential issues, mitigate risk and minimize delays.[108]

[redacted]

[redacted]

Bringing Illumina's cross-functional competencies to the combined company is a valuable merger-specific benefit. So too is its unparalleled expertise and understanding of NGS technology. Speedbumps inevitably arise when dealing with complex data sets and novel technologies unfamiliar to regulators, payors and clinicians. GRAIL will undoubtedly confront unanticipated challenges that risk delay as it moves forward with its PMA submission, attempts to obtain Medicare and private payor coverage for its tests, and develops the laboratory operations it will need to scale its tests. Illumina has already undertaken the investment and developed the competencies and experience necessary to support GRAIL in its unprecedented efforts. Moreover, it would be impossible for GRAIL to replicate Illumina's cross-functional competencies on any realistic time scale to benefit Galleri, if ever. Nor could GRAIL replicate Illumina's experience, described below, or its deep institutional expertise and understanding of sequencing technology. The merger gives GRAIL access to these competencies now, at a critical juncture for Galleri, with preliminary FDA discussions underway and Galleri's PMA application in the early stages of development.

ii. *Illumina's significant experience obtaining marketing authorizations for NGS products will help GRAIL minimize the risks of error and delay.*

Illumina is one of the few companies in the world to obtain FDA marketing authorization for any NGS product, and in fact was the first to do so with its MiSeqDx system in 2013. [redacted]

[redacted]

collaboration and dialogue with the FDA, Illumina obtained clearance for the system—the first-ever regulated NGS system. At the same time that Illumina obtained clearance for the MiSeqDx system, Illumina was able to obtain clearance for the first ever FDA authorized NGS-based clinical diagnostic test (the MiSeqDx cystic fibrosis IVD kit).[110] Since then, Illumina has obtained FDA authorization for its NextSeqDx system and its Praxis Extended RAS panel, the first FDA-authorized NGS IVD diagnostic for evaluating RAS mutations in colorectal cancer to determine patient eligibility for treatment with Vectibix chemotherapy.[111]

[redacted] Like GRAIL's Galleri test, Illumina's TSO500 therapy selection test was granted Breakthrough Device Designation status (though a few years earlier)[113] and so Illumina is familiar with that pathway and the additional benefits that potential PMA applicants receive through that designation. [redacted]

Through its past successful and ongoing efforts to obtain FDA authorization for cutting-edge NGS-based clinical diagnostic tests and NGS systems, Illumina has formed a close relationship with the FDA, and established a reputation as a trusted and leading expert in next-generation sequencing. Both Illumina and GRAIL believe that this deep experience and established reputation will help GRAIL in minimizing risk and overcoming obstacles as it navigates the unprecedented regulatory road ahead.

Moreover, Illumina has substantial experience developing and obtaining FDA authorization (and foreign approvals) for kitted IVD versions of NGS-based tests, as it is doing for NIPT and therapy selection. Third-party laboratories can market these kitted tests and run the tests in their labs without having to get their own site-specific FDA approvals. In this way, Illumina has "democratized" therapy selection and NIPT, greatly expanding those markets, enabling entry, and creating new distribution channels

---

[redacted]

[111] *See Praxis Extended RAS Panel*, www.illumina.com/products/by-type/ivd-products/extended-ras-panel.html, ILMN-VALORPUBLIC_00000615.

[redacted]

(Jan. 22, 2019), https://www.illumina.com/company/news-center/feature-articles/fda-grants-breakthrough-device-designation.html, ILMN-VALORPUBLIC_00000923.

that broaden access to those tests. As noted below, Illumina will be developing such kitted versions of GRAIL's tests for international markets because, in many such markets, and unlike the U.S., kitted tests are the only viable commercial model. In the U.S., obtaining FDA approvals for kitted IVD tests is even more rigorous and time-consuming than obtaining a site-specific PMA, which as noted is the plan for Galleri. However, to the extent that Illumina decides to also develop kitted IVD versions of GRAIL's screening and/or monitoring tests for the U.S. in the future, it is optimally positioned to do so with its significant experience and expertise in this area. GRAIL, by contrast, has no experience with developing and obtaining approvals for distributable kitted tests.

iii. *Illumina's pioneering and innovative approach to establishing reimbursement for NGS-based clinical diagnostic tests will accelerate reimbursement for Galleri.*

To make Galleri broadly available in the U.S., it is essential that Galleri obtain coverage from both Medicare and private insurers. This section provides additional detail on the hurdles that GRAIL faces in obtaining coverage from these two areas, and how Illumina's expertise will accelerate GRAIL's ability to obtain such coverage.

[redacted] To demonstrate the difficulty in obtaining Medicare reimbursement, we take the example of Epi proColon blood test. Epigenomics' Epi proColon blood test is a blood-based colon cancer screening test. Like GRAIL's multi-cancer screening test, Epi proColon measures DNA methylation levels to identify the presence of cancer, though Epi proColon is limited to screening for a single cancer using methylated SEPT9 DNA levels. Epigenomics submitted its PMA application to the FDA for its colon cancer screening test in January 2013 and received approval in April 2016.[114] Since then, Epigenomics has been attempting to obtain Medicare coverage for its test, either through a legislative pathway or through USPSTF review.[115] Though Epigenomics submitted legislation that was introduced in both the Senate and the House supporting Medicare reimbursement of FDA-approved blood-based colorectal cancer screening tests in 2018, and the company expected that legislation to pass in 2019, it still

[114] *Epigenomics PMA Approval Order Statement*, https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma_template.cfm?id=p130001, ILMN-VALORPUBLIC_00000349.

[115] Epigenomics, *2018 Annual Report: Detecting Cancer in Blood*, https://www.epigenomics.com/wp-content/uploads/2019/03/EPI_AR2018_E_190326_sec.pdf at 20-21, ILMN-VALORPUBLIC_00000213.

has not been enacted.[116] In January 2021—nearly five years after Epigenomics obtained FDA approval—CMS finally issued its decision on whether it would cover Epi proColon.[117] CMS concluded that while there is evidence sufficient to cover a blood-based biomarker test as an appropriate colorectal cancer screening test once every three years under certain conditions, "[t]he currently available Epi proColon test does not meet the criteria for an appropriate blood-based biomarker CRC screening test. Based on the evidence at this time, we will non-cover the Epi proColon test."[118] In sum, even though Epigenomics had engaged with CMS to provide the data to support its screening test, CMS was only willing to conclude that a ***hypothetical*** blood-based cancer screening test could be covered by Medicare, but was unwilling to cover the specific test before it.

[redacted]

[116] *Id.* at 20-21.

[117] Tamara Syrek Jensen, et al., *Decision Memo for Screening for Colorectal Cancer — Blood-Based Biomarker Tests*, Centers for Medicare & Medicaid Services (Jan. 19, 2021), https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=299&NcaName=Screening+for+Colorectal+Cancer+-+Blood-Based+Biomarker+Tests&ExpandComments=y&CommentPeriod=0&type=Open&bc=AAgAAAAACAAA&, ILMN-VALORPUBLIC_00000148.

[118] *Id.*

[119] ILMN-FTCVOL_03125914 (Early Cancer Detection: Market Access/Health Economic Considerations) at -916.

[redacted]

[redacted]

[121] *The Older Population in the United States: 2019* (Apr. 29, 2020), https://www.census.gov/data/tables/2019/demo/age-and-sex/2019-older-population.html, ILMN-VALORPUBLIC_00000925.

[redacted]

[redacted]

[redacted]

This concern about payor adoption is not merely hypothetical. The history of approved drugs and diagnostic tests [redacted] is replete with examples of treatments and tests that, while FDA approved, never achieved widespread adoption because payors refused to cover them or imposed significant hurdles to coverage. [redacted]

[redacted]

[redacted]

[126] Monica M. Toohey, *Prior Authorization of Hepatitis C Medications in NYS Medicaid Fee for Service (FFS) and Medicaid Managed Care*, N.Y. Dep't of Health (Feb. 8, 2018), https://www.hhs.gov/sites/default/files/NYPresentation-Prior-Auth-Feb-2018.pdf, ILMN-VALORPUBLIC_00000518.

[127] *See* Katie Thomas, *Merck to Lower Prices on Some Drugs, but not its Blockbusters*, Boston Bus. J. (July 20, 2018, 8:23 AM),

[redacted]

[redacted] Illumina brings a wealth of experience to payor negotiations and, indeed, is a pioneer in negotiating coverage for NGS-based clinical diagnostic tests using such innovative models. It is ideally suited to aid GRAIL in developing innovative strategies to overcome these challenges.

Illumina has been working with U.S. payors on these issues since 2013 when it entered the NIPT market through its acquisition of Verinata Health.[129] At the time, payors covered NIPT testing primarily for high-risk patients and large payors did not see economic utility in covering average-risk patients.[130] There were many challenges in expanding broader coverage to average-risk patients, including that NIPT was more expensive than payor cost criteria, there was no medical society support and no published evidence supporting such expansion.[131] Illumina set out to change this paradigm, launching a multi-pronged strategy to achieving average-risk reimbursement in

www.bizjournals.com/boston/news/2018/07/20/merck-to-lower-prices-on-some-drugs-but-not-its.html, ILMN-VALORPUBLIC_00000502.

[redacted]

[131] ILMN-FTCVOL_04341652 (Global Market Development, Market Access for Reproductive and Genetic Health Presentation, dated Nov. 26, 2013) at -667-68; ILMN-FTCVALOR_00130551 (ACOG Kick-Off Deck) at -608, Slide 58.

the U.S.[132] As part of that strategy, Illumina spearheaded the formation of the Coalition for Access to Prenatal Screening ("CAPS"), which has worked to educate patients, healthcare providers and insurers about NIPT and has advocated for legislative and reimbursement coverage policy changes.[133] Illumina recognized that to drive coverage and adoption, it would need to demonstrate the clinical and economic value of NIPT in average-risk patients in a real world population study.[134] To that end, in 2018, Illumina negotiated a "historic" value-based contract with Harvard Pilgrim Health Care, pursuant to which Harvard Pilgrim agreed to open coverage for NIPT to average-risk patients and Illumina assumed a portion of the downside financial risk.[135] [redacted] In announcing the agreement, Harvard Pilgrim's Chief Medical Officer remarked that although the company had entered "into innovative outcomes-based agreements for pharmaceuticals, this is the first agreement we have done for an NGS-based screening test, and we hope that it will provide a model for balancing access and affordability for advances in personalized medicine".[138]

Illumina continues to innovate and build on the relationships it has developed over the last several years. [redacted]

[redacted]

[135] ILMN-FTCVOL_03119386 (Illumina, Harvard Pilgrim Sign First-Ever Value-Based Deal for Average Risk NIPT Presentation) at -389.

[redacted]

[138] *Illumina and Harvard Pilgrim Partner on Value-Based Contract* (Feb. 1, 2018), www.illumina.com/company/news-center/feature-articles/illumina--harvard-pilgrim-health-care-partner-on-value-based-con.html, ILMN-VALORPUBLIC_00000497.

[redacted]

[redacted]

Illumina's role in obtaining widespread payor coverage for NIPT has been lauded by other players in the NIPT market. [redacted]

Illumina has also developed relationships with insurers through its efforts to expand coverage for whole genome sequencing ("WGS") in rare and undiagnosed diseases, an area of significant unmet clinical need in children, and for Comprehensive Genomic Profiling in patients diagnosed with advanced cancers that require targeted therapies. In 2018, Illumina partnered with Blue Cross Blue Shield Association ("BCBSA") to determine the availability and clinical understanding of DNA sequencing technologies, genetic testing and precision medicine across the country in an effort to provide patients with expanded access to personalized medicine.[144] This past August, Illumina, BCBSA and the Personalized Medicine Coalition ("PMC") issued a report of their findings, which showed that while wide variation and a lack of clarity in payor coverage policies may present barriers to the utilization of genomic testing, such testing is inconsistently utilized even among states where favorable coverage policies exist.[145]

---

[140] ILMN-FTCVALOR_00132794 (SVBLeerink Report, dated Dec. 1, 2020).

[redacted] ILMN-FTCVALOR_00131899 (Taryn A.G. Quinlan, et al., *Evaluation of Coverage Expansion for Noninvasive Prenatal Testing on Prenatal Screening and Diagnostic Utilization*).

[redacted]

[143] *Id.*

[144] *Illumina Partners with Blue Cross Blue Shield Association* (Nov. 8, 2018), https://www.illumina.com/company/news-center/feature-articles/illumina-partners-with-blue-cross-blue-shield-association-.html, ILMN-VALORPUBLIC_00000493; *see also* ILMN-FTCVOL_02739775 (Market Access Monthly Digest for Jan.-Feb. 2020) at -780.

[145] Deepti Babu, et al., *Understanding Genomic Testing Utilization and Coverage in the US*, Personalized Medicine Coalition (June 2020),

The findings suggest that a broader range of clinical adoption challenges are complicating efforts to integrate genomic testing into clinical work streams and demonstrates that genetic testing is broadly underutilized, resulting in disparities in access and optimal care.[146] This past December, Illumina and Harvard Pilgrim announced another risk-sharing agreement through which Harvard Pilgrim will cover WGS for certain patients in order to evaluate how insurance coverage of WGS impacts patient care and healthcare costs.[147]

Illumina thus has ample experience in successfully confronting and innovating to overcome the unique challenges presented by the U.S. payor system for NGS tests. The experience and innovative models developed by Illumina's market-access team will aid and accelerate GRAIL's efforts to convince commercial payors of the economic benefits of covering Galleri.

iv. *Illumina's experience operating laboratories and manufacturing regulated NGS products at scale will minimize risk and delays in scaling Galleri.*

Illumina is an experienced operator of CLIA-certified laboratories at scale. Through its Illumina Lab Services division, Illumina offers clinical sequencing services at its CLIA-certified laboratories in San Diego and Foster City, California, including NIPT testing and direct-to-consumer ("DTC") genomic testing, as well as more recently COVID testing. The capacity and experienced personnel at these laboratories can be used for Galleri in the event there are delays in constructing and obtaining the required registrations and certifications for GRAIL's planned North Carolina laboratory, or unforeseen issues affecting laboratory operations in the future. Likewise, Illumina's laboratories could be used if demand for Galleri exceeds expectations and additional capacity is needed. [redacted]

Illumina is well-equipped to help GRAIL navigate unforeseen issues that may come up with its laboratory development or operations, and ensure that they do not

---

http://www.personalizedmedicinecoalition.org/Userfiles/PMC-Corporate/file/PMC_Understanding_Genomic_Testing_Utilization_and_Coverage_in_the_US2.pdf, ILMN-VALORPUBLIC_00000587.

[146] *Id.* at 8-17.

[147] *Illumina, Harvard Pilgrim Health Care Ink Risk-Sharing Deal for Whole-Genome Sequencing*, Genomeweb (Dec. 8, 2020), https://www.genomeweb.com/business-news/illumina-harvard-pilgrim-health-care-ink-risk-sharing-deal-whole-genome-sequencing#.YACoCTmSkuU, ILMN-VALORPUBLIC_00000495.

[redacted]

impact GRAIL's ability to provide Galleri and other tests to each patient who needs one. Illumina's laboratory team has experience rapidly scaling testing, which it had to do when its DTC business expanded from processing [redacted] samples annually to [redacted] samples annually over the course of just a few years.[149] Illumina also has experience moving tests from one laboratory to another with minimal down time, as it did when it moved its NIPT business from its Redwood City laboratory to its Foster City laboratory. It has ample experience efficiently procuring laboratory equipment and handling inventory, and dealing with issues that inevitably come up in a clinical laboratory. Thus, if GRAIL needs to move some of its testing between labs, or needs to scale more rapidly than anticipated, it will benefit greatly not just from the capacity available at Illumina's labs, but from collaborating and problem-solving with Illumina's experienced laboratory staff and leadership who have dealt with such issues already.

In addition, Illumina has experience operating at scale within established quality and regulatory compliance frameworks, such as International Organization for Standardization ("ISO") certifications and standards, and current good manufacturing practices ("cGMPs"), with which GRAIL will need to comply under FDA requirements.[150] GRAIL will benefit from Illumina's extensive experience in this area, which will reduce timing risks as GRAIL scales its operations under these complex frameworks.

v. *Illumina will accelerate Galleri's commercialization in international markets, which will yield valuable data that can accelerate test improvement, innovation and U.S. adoption of Galleri.*

[redacted] Importantly, as explained below, this international acceleration benefits not just the patients in those foreign jurisdictions, but also U.S. patients and the U.S. healthcare system.

In addition to supplying customers across the globe, Illumina has significant experience working with foreign regulators, single-payor systems, national medical organizations and other institutions in various international markets in connection with its international expansion of TSO500 and its NIPT tests, as well as its efforts to broaden adoption of whole-genome sequencing in oncology. By contrast,

[redacted]

[150] *See* A Summary of Procompetitive, Lifesaving Benefits and Efficiencies To Be Created by the Illumina-GRAIL Transaction at 10-11, Submitted by GRAIL on January 21, 2021.

[redacted]

GRAIL has virtually no international footprint, [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

Importantly, this international acceleration benefits not just the patients in those foreign jurisdictions, but also U.S. patients and the U.S. healthcare system. The diverse datasets generated from testing patients in different regions of the globe (Asia, Europe, Africa, Latin America, etc.) can be used as evidence of additional clinical validation as part of GRAIL's PMA submission, ***and*** to demonstrate the economic benefits of Galleri to U.S. payors, which cover patient populations with diverse ethnic backgrounds. Thus, international acceleration is likely to further accelerate U.S. adoption of GRAIL's tests.[158]

C. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

D. The Merger Will Create R&D Synergies That May Enable New Discoveries in Oncology and Other Fields.

As described in prior submissions, the parties anticipate that significant R&D synergies can be achieved by combining GRAIL's expertise in methylation, data science and software development with Illumina's complementary expertise in sequencing and bioinformatics.[164] [redacted] Illumina, like GRAIL, also expects that the combination of its expertise and experience with

[redacted]

[164] Invasive Prenatal Testing ("NIPT") Market Analysis at 25, Submitted by Illumina on December 31, 2020; A Summary of Procompetitive, Lifesaving Benefits and Efficiencies To Be Created by the Illumina-GRAIL Transaction at 20, Submitted by GRAIL on January 21, 2021.

[redacted]

infectious diseases will enable GRAIL to develop novel screening tests for diseases outside oncology, [redacted]

The parties believe that such discoveries are significantly more likely with GRAIL as a division of Illumina than with GRAIL as a stand-alone company. As previously described, the Verinata acquisition offers an important example of the R&D synergies and medical discoveries that are possible when rich clinical data like GRAIL's is combined with Illumina's deep sequencing and bioinformatics expertise. There, the transaction resulted in Illumina scientists having the opportunity to study Verinata's patient sample data, which led directly to the formation of GRAIL.[167]

III. Conclusion.

The merger will not result in vertical foreclosure and there is no basis to challenge it. Illumina has no incentive to attempt foreclosure, and the long-term contracts discussed above eliminate even its theoretical possibility. Moreover, the merger will result in significant, merger-specific efficiencies that will result in lower prices and increased output from the elimination of double marginalization, and make it more likely that Galleri receives FDA approval and payor coverage without missteps or delays, which will yield enormous economic benefit through lives saved and reduced cancer treatment costs.

GRAIL is at a critical juncture in its development of Galleri, and its mission is unprecedented. Once GRAIL rejoins Illumina, it will have immediate access to a world-class organization that has the experience, expertise and capabilities to maximize Galleri's chances for timely success. The acceleration effects of the transaction quite literally reduce the lives lost to cancer, one of the most deadly diseases in the United States, not to mention create enormous savings for the healthcare system. As several of the authors of this paper, and perhaps readers, have experienced the devastation wrought by late stage cancer diagnosis, we believe it is both a legal and moral imperative that the FTC permit the parties to consummate their procompetitive reunion without further delay.

---

[166] *Id.*

[167] Non-Invasive Prenatal Testing ("NIPT") Market Analysis at 24-25, Submitted by Illumina on December 31, 2020.