INOVIO
POWERING DNA MEDICINES™

Powering a New Decade of DNA Medicines

March 2022

Nasdaq:INO

Forward-Looking Statements

This presentation includes statements that are, or may be deemed, “forward-looking statements,”” within the meaning of Section 27A of the Securities Act of 1933, as amended. All statements, other than statements of historical facts, included in this presentation regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as “may,” “might,” “will,” “objective,” “intend,” “should,” “could,” “can,” “would,” “expect,” “believe,” “anticipate,” “project,” “target,” “design,” “estimate,” “predict,” “opportunity,” “proposition,” “strategy,” “potential,” “plan” or the negative of these terms and similar expressions intended to identify forward-looking statements.

You should not place undue reliance on these forward-looking statements. Forward-looking statements include, but are not limited to, statements about: the timing and success of preclinical studies and clinical trials; the ability to obtain and maintain regulatory approval of our product candidates; the scope, progress, expansion and costs of developing and commercializing our product candidates; our expectations regarding the amount and timing of our expenses and revenue; the sufficiency of our cash resources, plans for the use of our cash resources and needs for additional financing; our ability to adequately manufacture our product candidates; our ability to obtain and maintain intellectual property protection for our product candidates; our expectations regarding competition; the size and growth of the potential markets for our product candidates and the ability to serve those markets; the rate and degree of market acceptance of any of our product candidates; our anticipated growth strategies; the anticipated trends and challenges in our business and the market in which we operate; our ability to establish and maintain development partnerships; our ability to attract or retain key personnel; our expectations regarding federal, state and foreign regulatory requirements; regulatory developments in the United States and foreign countries and other factors that are described in the “Risk Factors” and “Management's Discussion and Analysis of Financial Condition and Results of Operations” sections of our Annual Report on Form 10-K for the year ended December 31, 2021, which has been filed with the Securities and Exchange Commission (SEC) and are available on the SEC's website at www.sec.gov.

In addition, the forward-looking statements included in this presentation represent INOVIO's views as of the date hereof. INOVIO anticipates that subsequent events and developments may cause its views to change. However, while INOVIO may elect to update these forward-looking statements at some point in the future, the company specifically disclaims any obligation to do so, except as may be required by law. These forward-looking statements should not be relied upon as representing INOVIO's views as of any date subsequent to the date of this presentation.

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Powering DNA Medicines

INOVIO is focused on bringing to market precisely designed DNA medicines and vaccines to help protect people from infectious diseases and to help treat people with cancer, and conditions associated with HPV

Precisely designed plasmids delivered through **proprietary smart device**

Extensive patent portfolio protecting technology platform

Designed to **treat and prevent cancers & infectious diseases**

Targets multiple antigenic sequences; combining multiple antigens into single vial

Clinically demonstrated **cross-reactive T cell immune responses**

Well-tolerated in more than 15,000 administrations (~5k participants)

No frozen storage issues (room temp storage >1 yr.)

No anti-vector response; ability to readminister and boost

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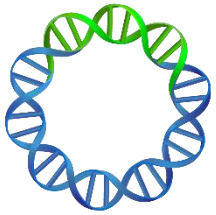
INOVIO's Proprietary Technology

OPTIMIZED PLASMID DESIGN AND DELIVERY TECHNOLOGY

PRECISELY DESIGNED PLASMIDS (SynCon®)



PROPRIETARY SMART DEVICES (CELLECTRA®)

Intramuscular Device for Pre-Cancers & Cancers

Intradermal Device for Vaccines

IN VIVO

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INOVIO DNA Medicines Pipeline

* Advaccine funding 50% of INNOVATE Phase 3 Clinical Trial

INTERNALLY FUNDED

EXTERNALLY FUNDED

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COVID-19
& Infectious Diseases

INOVIO DNA Platform Key Attributes

INOVIO's DNA platform is an important novel vaccine technology, as it provides favorable CD8 T cell response, boostability, and thermostability.

SELECT DIMENSIONS	ADVANTAGES	ONGOING AND FUTURE PANDEMIC IMPACT
CD8+ RESPONSE	Drives **CD8+ responses** – likely to mitigate the threat of new circulating strains	T-cell responses may be an **effective countermeasure** for the **next pathogen**
ANTIBODY RESPONSE	Binding antibodies & neutralizing antibodies **at all doses and age groups**	Platform can direct **cross-neutralizing responses**
BOOSTABILITY	Can be **re-administered multiple times**, leading to potentially increased CD8 response	Opportunity for **homologous and heterologous boosting**
SAFETY, TOLERABILITY, REACTOGENICITY	**Well-tolerated** in 5,000+ participants and 15,000+ doses	Immunogenic with **minimal side effects** and no increased reactogenicity with boosting
STORAGE AND TRANSPORTATION	**Reduced reliance on cold chain** - stores at 2-8° C for 5 years and at ambient for 1 year	**No frozen cold chain requirement** – simplified logistics for mass vaccinations and remote locations
RAPID DESIGN AND MANUFACTURE	INOVIO's DNA medicines can be **designed quickly** through optimized SynCon® technology	**Quick response to emerging threats** with clinical trials started in 3 months
COMMERCIAL READINESS	Invested in **manufacturing** equipment, manufacturing capacity **reservations**, and operational **infrastructure**	Prepared to **manufacture** volumes within a **short period**

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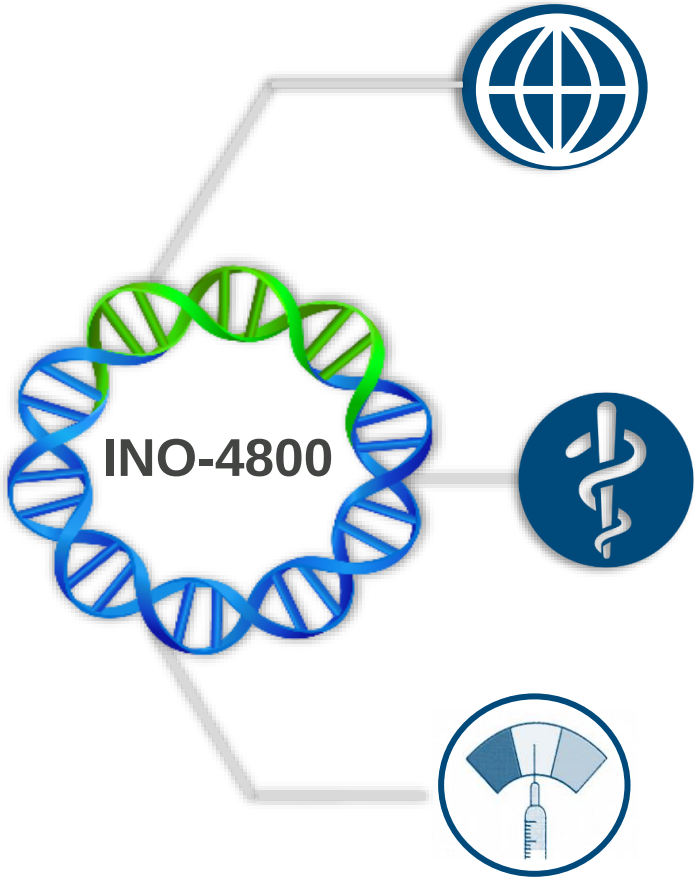
INO-4800 Clinical Pathways & Global Presence



INNOVATE Global Phase 3 Trial

- INOVIO with Advaccine are jointly conducting a global Phase 3 trial for INO-4800
  - Healthy men and non-pregnant women 18 years and older (2.0 mg dose)
  - Focus on countries currently underserved by vaccines in Latin America and Asia
- INOVIO is seeking to amend the primary endpoint of INNOVATE from prevention of virologically confirmed COVID-19 disease to prevention of severe disease
  - While dosing may continue for participants who have already received administration, INOVIO has paused enrollment of new participants in INNOVATE

WHO-Sponsored Solidarity Trial Vaccines

- Global Phase 3 placebo-controlled trial will enroll 40,000 participants
- Trial represents the largest global clinical trial for COVID-19 vaccine candidates
- INO-4800 was selected by the WHO's independent vaccine prioritization advisory group

Heterologous and Homologous Booster Trials with Advaccine in China

- **267-participant heterologous boost Phase 1/2 clinical trial** evaluating safety, tolerability, immunogenicity of INO-4800 in participants who previously received inactivated virus COVID-19 vaccines as a primary vaccine
- **200-participant homologous boost Phase 1/2 clinical trial** evaluating safety, tolerability, immunogenicity of INO-4800 in participants who previously received INO-4800 as a primary vaccine

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INNOVATE Global Phase 3 Trial & WHO Solidarity Trial Vaccines

INOVIO footprint and COVID-19 trial locations

Heterologous Boost – INO-4800

Path Forward

- **Evaluating the feasibility of an additional ex-US heterologous boost trial with INO-4800** as a booster in a non-inferiority clinical trial compared to viral and inactivated COVID-19 vaccines

Global Demand

- Currently licensed vaccines may not meet the global demand for boosters to **address waning protection** from these primary vaccinations

Key Features

- INOVIO's DNA vaccine technology make it a potential booster candidate including:
  - **Cross-reactive T-cell responses**
  - **Tolerability of re-administration**
  - **Thermostability for transport, storage, and distribution**

Boosting Experience

- INOVIO has previous experience with heterologous boosting; Ebola (INO-4201) boost trial ongoing

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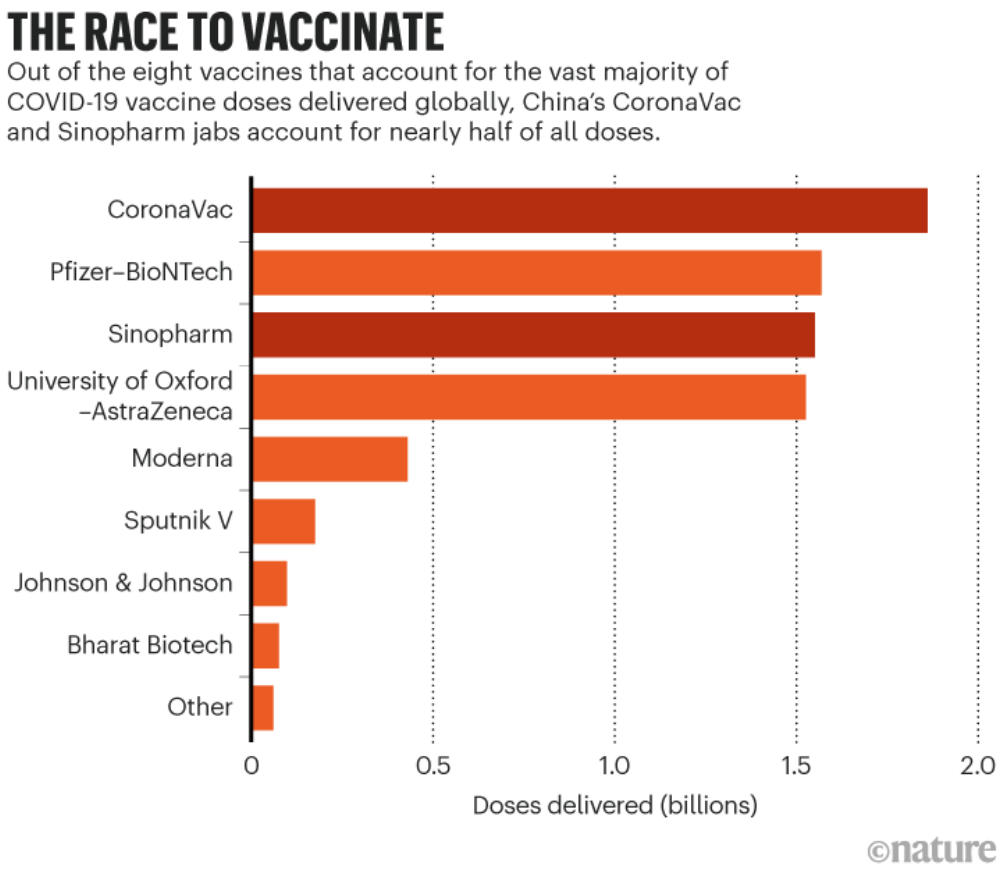
Heterologous Boost Market Potential



Source: Data from Airfinity.

- Booster market is much larger than primary vaccine market
- Inactivated and viral vector vaccines have been administered primarily in Low- and Middle-Income countries
- About 2.4 billion doses of the Chinese vaccines have been administered in China, but almost 1 billion doses have gone to 110 other countries
- Global demand for heterologous boosters cannot be met with currently licensed (EUA or full authorization) for primary series or those not currently licensed but with Phase 3 data efficacy data
- Market reset focused now on heterologous boost

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Infectious Disease Pipeline Progress

INO-4500 for Lassa Fever

- Phase 1b clinical trial
- **Completed enrollment of 220 participants**
- Funded by CEPI
- Conducted in Ghana

INO-4700 for MERS

- Phase 2 clinical trial in approximately 500 participants
- **Completed enrollment for dose-finding stage (192 participants)**
- Funded by the CEPI
- Conducted at sites in Jordan, Lebanon, and Kenya

INO-4201 for Ebola

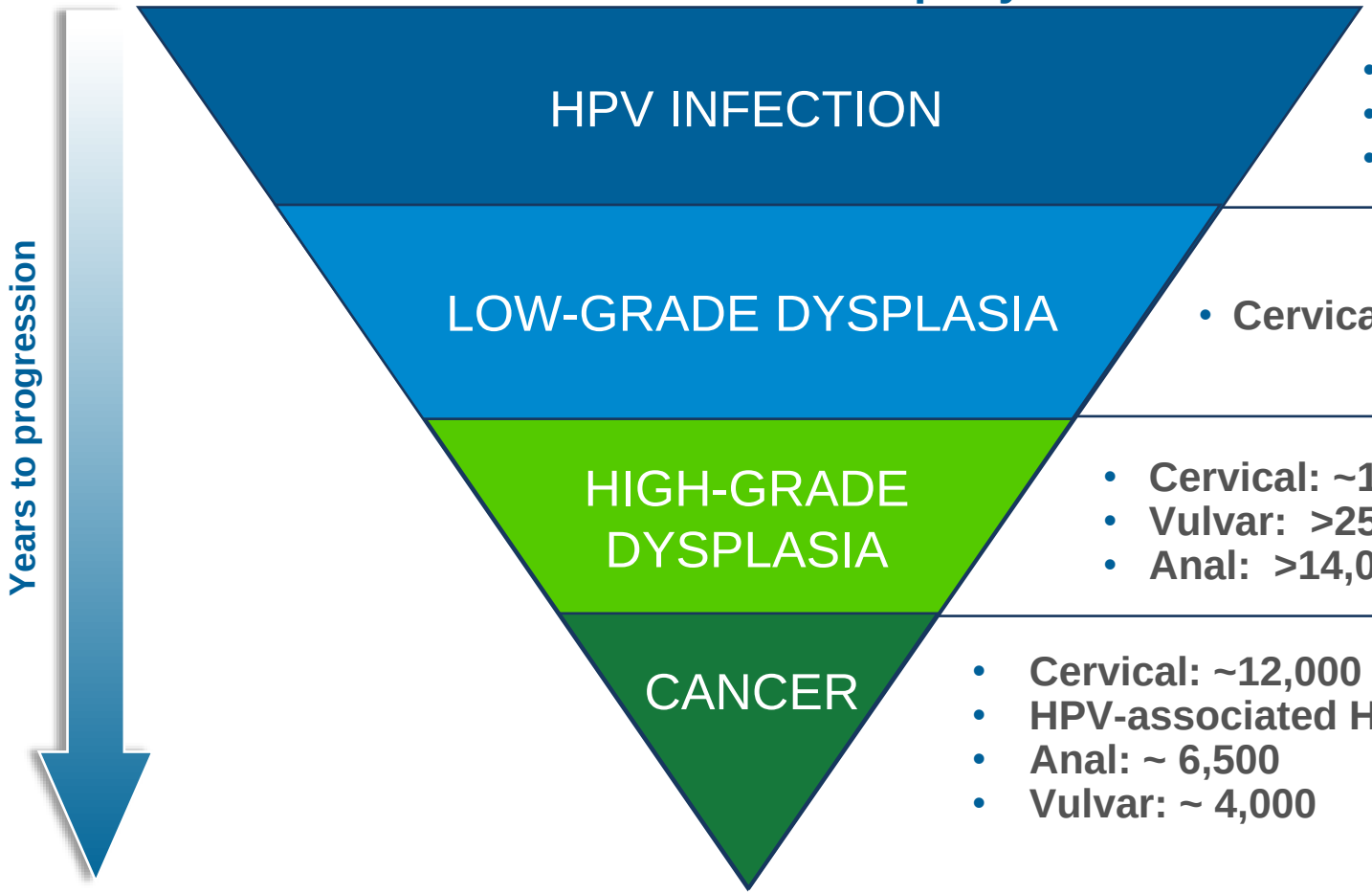
- Phase 1b clinical trial
- **Completed enrollment of 46 participants**
- Funded by DARPA
- Evaluating INO-4201 as a booster in participants previously vaccinated with Ervebo®

Collaborations & Partnerships for ID Programs

HPV Programs

HPV-Associated Diseases Market Overview

HPV-associated conditions per year in US:



- 80M Americans currently infected with HPV
- 14M new infections annually
- ~7M high-risk HPV infections (HPV 16/18)

- Cervical: 1.1M to 1.7M

- Cervical: ~195,000
- Vulvar: >25,000
- Anal: >14,000

- Cervical: ~12,000
- HPV-associated H&N: 18,000
- Anal: ~ 6,500
- Vulvar: ~ 4,000

Sources: US CDC (2018) HPV and Cancer, available at: https://www.cdc.gov/cancer/hpv/statistics/cases.htm (accessed July 22, 2019); Saraiya M, Unger ER, Thompson TD, Lynch CF, Hernandez BY, Lyu CW, Steinau M, Watson M, Wilkinson EJ, Hopenhayn C, Copeland G, Cozen W, Peters ES, Huang Y, Saber MS, Altekruse S, Goodman MT; HPV Typing of Cancers Workgroup. US assessment of HPV types in cancers: implications for current and 9-valent HPV vaccines. J Natl Cancer Inst. 2015 Apr 29;107(6):djv086; Inovio Pharmaceuticals, internal estimates from published data (2015-16, 2017-18); US CDC, personal communication (2015); NCI SEER Cancer Stat Facts: Cervix Uteri, Vulvar, and Anal Cancers – https://seer.cancer.gov/statfacts (accessed 2017-18); *Measured as: Genital Warts – Initial Visits to Physicians' Offices, United States, 1966-2014. Fig. 47; Schiffman M, Solomon D. Findings to date from the ASCUS-LSIL Triage Study (ALTS). Arch Pathol Lab Med. 2003 Aug;127(8):946-9; US CDC. Genital HPV Infection – Fact Sheet.

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Complications of Current Cervical HSIL Standard of Care: Loop Electrosurgical Excision Procedure (LEEP)

Pain[1,2]

- Local anesthetic injections
- Excision
- Post-procedural cramping

Surgical Complications[1,3]

- Disfigurement
- Swelling, drainage, bleeding, numbness, redness, burning
- Opening of suture, itching, scarred skin
- Cervical stenosis

Loss of Reproductive Health

Increased risk of:

- Preterm delivery[6,7]
- Premature rupture of membranes[6,7]
- 2nd trimester miscarriage[8]
- Terminations[8]

[1]Harper DM, et al. J Family Practice. 1994;39:249–256.
[2]Ferenczy A, et al. Obstet Gynecol. 1996;87:332–337.
[3]Mitchell MF, et al. Obstet Gynecol. 1998;92:737–744.
[4]Wright TC, et al. Obstet Gynecol. 1992;79:173–178.
[5]IARC.Colposcopy and Treatment of CIN: A Beginner's Manual. 2003.
[6]Kyrgiou M, et al. Lancet. 2006;367:489–498.
[7]Kyrgiou M, et al. BMJ. 2016;354:i3633.
[8]Kyrgiou M, et al. Cochrane Database Syst Rev. 2015;CD008478.

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VGX-3100 Phase 3 Program: HPV-Associated Cervical HSIL/ Precancerous Dysplasia

TRIAL: VGX-3100

- Targets HPV 16/18 subtypes; E6/E7 oncogenes
- Designed to treat cervical high-grade squamous intraepithelial lesions (HSIL)

Phase 3 consists of 2 studies in parallel:

REVEAL1 (primary) n=201 – Enrollment Closed
Study follow-up through week 88 (as in Phase 2b)
Topline efficacy data reported 1Q21

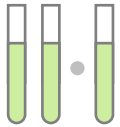
REVEAL2 (confirmatory) n=198 – Enrollment Closed
Study follow-up through week 40
Topline efficacy data expected in Q422

FIRST potential treatment for HPV infection of the cervix

FIRST potential non-invasive treatment for cervical pre-cancer

Primary endpoint:
Regression of HSIL (CIN2/3) AND clearance of HPV 16/18 in the cervix

2:1 Randomized (2:1), double-blind, placebo-controlled



Dosing: month 0, 1, 3 (as in Phase 2b)

6 mo. Primary endpoint measured six months after completion of dosing (as in Phase 2b)

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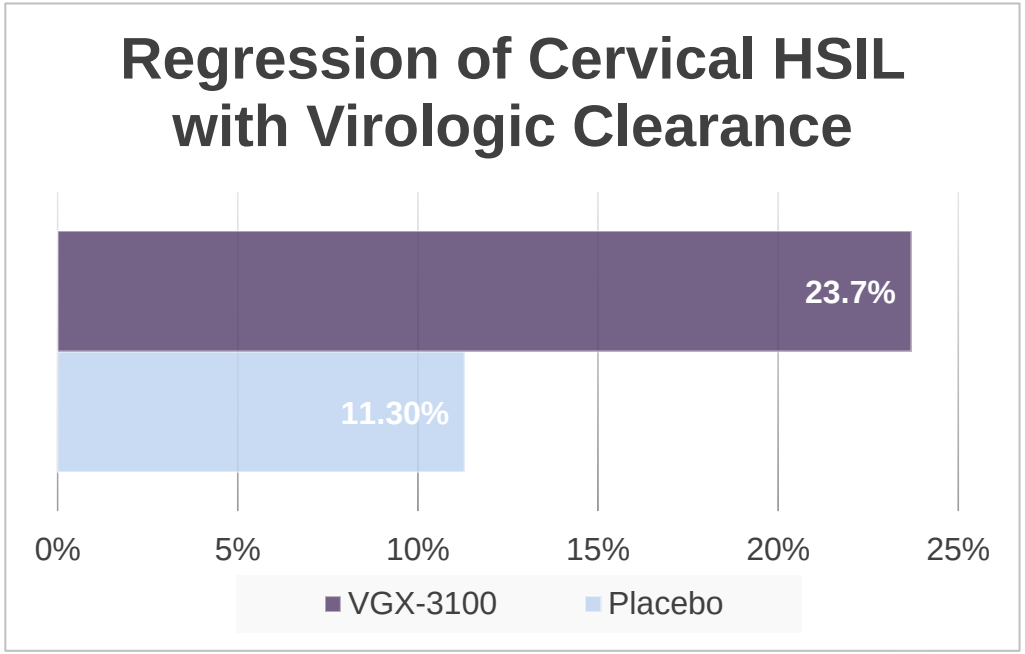
REVEAL1: VGX-3100 Phase 3 Trial for Cervical HSIL Meets Primary & Secondary Efficacy Objectives for All Evaluable Participants

VGX-3100 achieved efficacy endpoints in a **Phase 3** trial in evaluable participants

No treatment-related serious adverse events; most adverse events were mild to moderate and self-resolving

Partnership with QIAGEN to develop **pre-treatment predictive biomarker** to help identify those likely to respond to VGX-3100

- **Achieved statistical significance for primary objective in all evaluable participants:** regression of cervical HSIL combined with virologic clearance of HPV-16/18, 6 months after administration
  - 23.7% (31/131) in treatment group vs. 11.3% (7/62) in placebo group
  - p=0.022; 12.4 difference in percentage, 95%CI: 0.4,22.5
  - mITT includes all participants w/ endpoint data (N=193)*
- **All secondary efficacy objectives achieved**
- REVEAL2 is currently ongoing (**Topline data by Q4 22**)



** mITT, ITT and a third per-protocol (PP) were pre-specified in trial protocol. PP analysis will be performed upon trial completion.*

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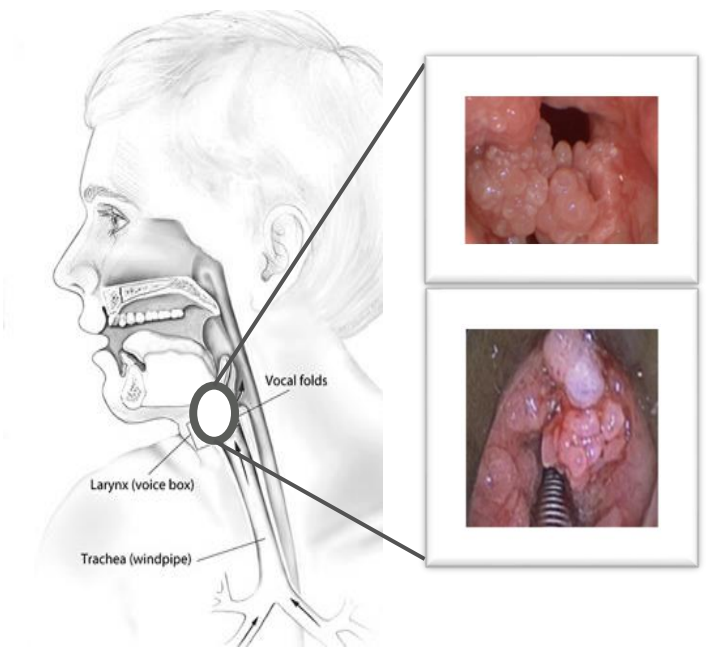
INO-3107 against Recurrent Respiratory Papillomatosis (RRP) caused by HPV 6/11

- **HPV-associated disease; caused by HPV 6/11**
- Rare, orphan disease with **~15,000 total active cases within the U.S.**, where virtually all of those require surgical procedures
  - **~6,000 new cases per yr. in the U.S.**
- Growths can lead to life-threatening airway obstructions
  - **Standard of care is lifelong surgery (repeated/multiple times per yr.)**
  - Currently, disease is incurable and can only be treated by surgery to remove tumors, which temporarily restores the airway
- RRP may occur in adults as well as in children

Areas affected by Recurrent Respiratory Papillomatosis (RRP)



INO-3107 Update & Catalysts

- **Granted Orphan Drug Designation** in July 2020
- **Completed enrollment of 32 participants** in an open-label, multicenter **Phase 1/2 clinical trial** in participants with HPV 6/11-associated RRP (1Q22)
- Immune responses and **early clinical benefit data from Phase 1/2 trial in 2H22**

Sources: RRP Foundation; Venkatesan et al. Otolaryngol Clin North Am 2013; Ivancic et al. Laryngoscope Investigative Otolaryngol; www.nidcd.nih.gov/health/recurrent-respiratory-papillomatosis; Derkay et al *Arch Otolaryngol Head Neck Surg* (1995); Armstrong et al *Arch Otolarygol Head Neck Surg* (1999); Marsico et al STDs (2014).

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INO-3107 Phase 1/2 Study in RRP – Enrollment Complete

TRIAL: INO-3107 (for HPV 6 and/or 11-caused RRP)

Granted Orphan Drug Designation

Phase 1/2 open-label, multi-center clinical study

x32

Target enrollment

4 doses of vaccine, 3 weeks apart on Day 0, Weeks 3, 6, 9

CELLECTRA-delivered INO-3107 plasmid encoded antigens

Enrollment criteria: Participants who have required at least two surgical interventions per year for the past three years for the removal of associated papilloma(s)

Primary endpoint: A doubling or more in the time between surgical interventions following the first dose of INO-3107 relative to the frequency prior to study therapy

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Immuno-Oncology

INO-5401 for Newly Diagnosed GBM

INO-5401/INO-9012 and Cemiplimab for Newly Diagnosed GBM

- INO-5401 is a DNA medicine composed of plasmids that encode for three tumor-associated antigens: human telomerase (hTERT), Wilms tumor-1 (WT-1), and prostate-specific membrane antigen (PSMA)
- INO-9012 is a synthetic DNA plasmid that encodes for human IL-12 designed to stimulate T cells locally without a systemic effect
- Cemiplimab is a high-affinity, highly potent, human, hinge-stabilized IgG4 monoclonal antibody to the PD-1 receptor
- In this study, INO-5401 and INO-9012 are combined with cemiplimab, in order to create an antigen-specific, activated T cell population
- **INOVIO has shown that INO-5401+INO-9012 with cemiplimab and 40 Gy radiation/TMZ have an acceptable safety profile and are immunogenic**

INO-5401 for Newly Diagnosed GBM in Phase 1/2 Study in Collaboration with Regeneron

INO-5401 (encoding tumor-associated antigens: hTERT, WT1, PSMA) plus **INO-9012**, encoding IL-12

Phase 1b/2 open label study for **newly diagnosed glioblastoma (GBM)**

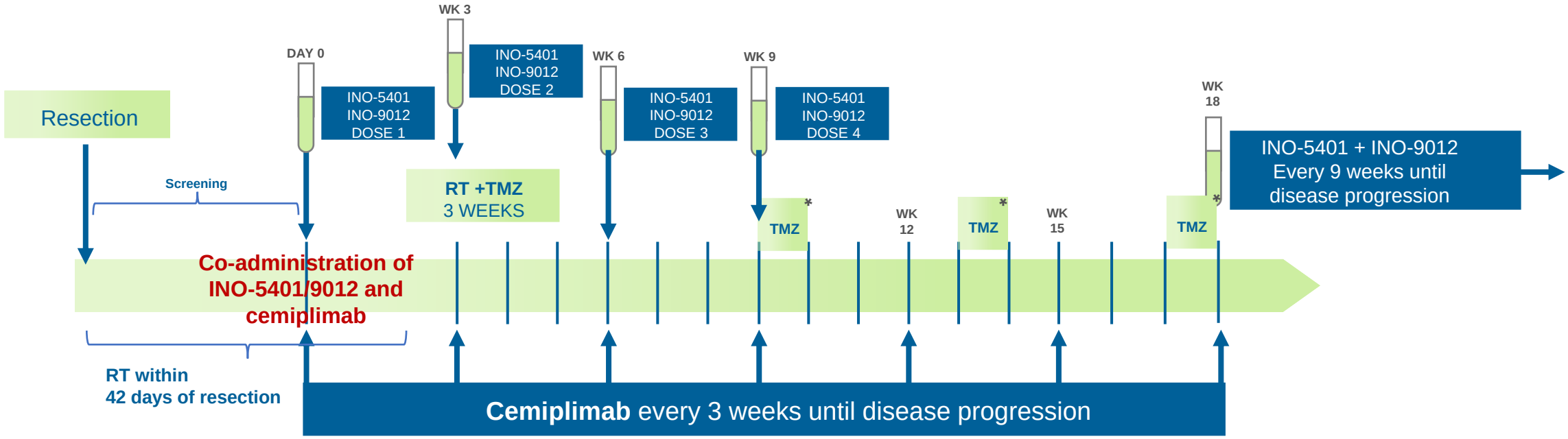
Combination with Regeneron's PD-1 checkpoint inhibitor cemiplimab

Primary Endpoints:
Safety, tolerability

Secondary Endpoints:
Immunological impact,
PFS and OS

x32
Cohort A:
MGMT Promoter Unmethylated:
32 participants

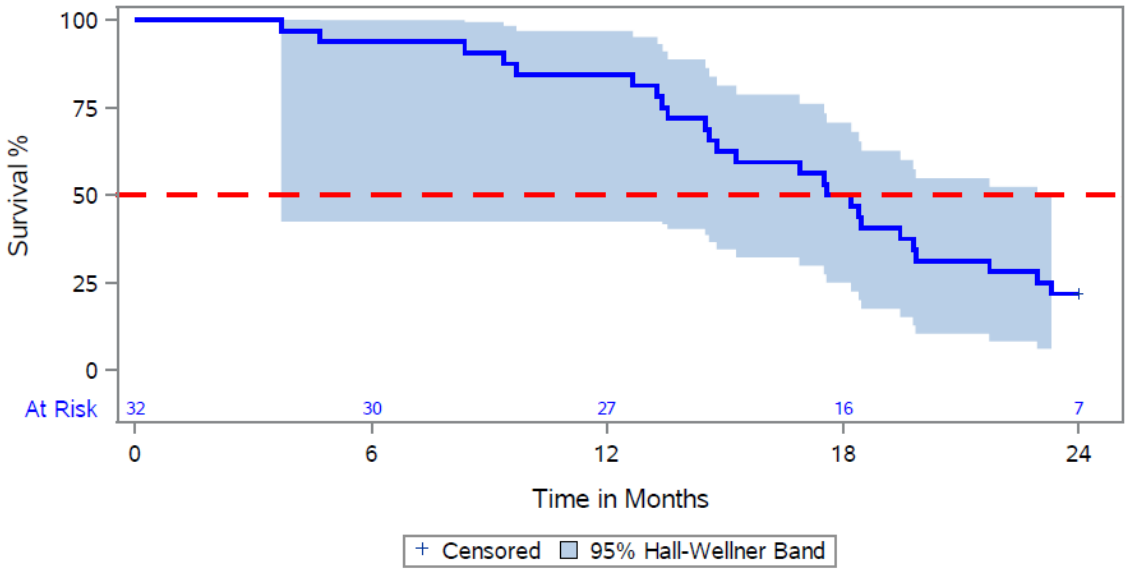
x20
Cohort B:
MGMT Promoter Methylated:
20 participants



Kaplan-Meier Survival Estimates of OS

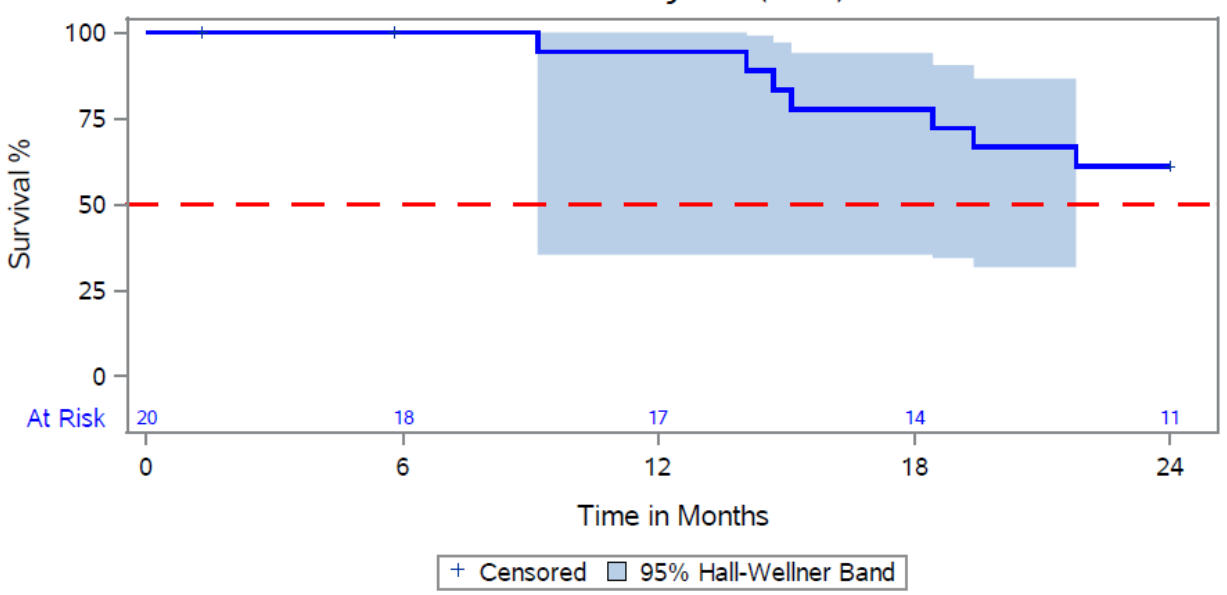
Cohort A:

Figure 16.2.2.3A1: Kaplan-Meier Analysis of Overall Survival
MGMT Unmethylated (mITT)



Cohort B:

Figure 16.2.2.3A2: Kaplan-Meier Analysis of Overall Survival
MGMT Methylated (mITT)



Median OS; unmethylated (A)	17.9 mo. (14.5 – 19.8)	*Historical 14.6-16 mo.*
Median OS; methylated (B)	NR (18.4 – NR)	*Historical 23.2-25 mo.*
Median OS; combined (A+B)	19.5 (16.9 – 23.3)	-

NR: not reached.
Gilbert et al. J Clin Oncol 2013; Gilbert et al. N Eng J Med 2014. Comparison is limited due to differences in study population.
Data was presented at the pre-conference workshop at the 2021 Society for Immunotherapy of Cancer Conference.

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Median OS in GBM-001 is Higher Than Historical Controls

Median OS; unmethylated (A)	17.9 mo. (14.5 – 19.8)	*Historical 14.6-16 mo.*
Median OS; methylated (B)	NR (18.4 – NR)	*Historical 23.2-25 mo.*
Median OS; combined (A+B)	19.5 (16.9 – 23.3)	

Overall Survival at 12 Months	**n Alive/N Total**	**OS12% (95% CI)**
MGMT Unmethylated (Cohort A)	27/32	84.4 (67.2-94.7)
MGMT Methylated (Cohort B)	17/20	85.0 (62.1-96.8)
Combined	44/52	84.6 (71.9-93.1)

Overall Survival at 18 Months	**n Alive/N Total**	**OS18% (95% CI)**
MGMT Unmethylated (Cohort A)	16/32	50 (31.9 - 68.1)
MGMT Methylated (Cohort B)	14/20*	70 (45.7 – 88.1)
Combined	30/52	57.7 (14.5 – 71.3)

Overall Survival at 24 Months	**n Alive/N Total**	**OS24% (95% CI)**
MGMT Unmethylated (Cohort A)	7/32	**21.9** (9.3 - 40)
MGMT Methylated (Cohort B)	11/20*	**55** (31.5 – 76.9)
Combined	18/52	**34.6** (23.1 – 49.1)

NR: not reached. Two participants in Cohort B withdrew consent for additional follow-up at Week 3 and were considered deceased
Gilbert et al. J Clin Oncol 2013; Gilbert et al. N Eng J Med 2014. Comparison is limited due to differences in study population.
Data was presented at the pre-conference workshop at the 2021 Society for Immunotherapy of Cancer Conference.

Management & Financials

Experienced Executive Team and Board of Directors

J. Joseph Kim, Ph.D.
President & CEO

- Decades of biotech/ pharma management
- Merck: hepatitis A and B vaccines manufacturing; HIV vaccine (Ad5) R&D

Peter Kies
CFO

- Ernst & Young
- Experience with growth companies

Jacqueline Shea, Ph.D.
COO

- Former CEO/COO of Aeras
- Held management positions at Emergent BioSolutions and Microscience Ltd.

Laurent Humeau, Ph.D.
CSO

- Extensive R&D leadership exp. in vaccine, cell and gene therapy developments at Intrexon and VIRxSYS

Board of Directors

Simon X. Benito
Chairman of the Board, Former SVP, Merck Vaccine Division

Roger Dansey, M.D.
Former Head of Late-Stage Oncology at Merck & Co.

J. Joseph Kim, Ph.D.
President & CEO, INOVIO Pharmaceuticals

Ann C. Miller, M.D.
Former Head of Sanofi Oncology Global Marketing

Jay Shepard
Former President & CEO, Aravive

David B. Weiner, Ph.D.
Executive VP, Director, Vaccine Center, The Wistar Institute

Wendy L. Yarno, Ph.D.,
Former Executive VP and Chief Marketing Officer, Merck

Lota S. Zoth
Former CFO, MedImmune

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Well-Balanced Pipeline of Milestones Supported by Strong Balance Sheet

NASDAQ:INO

$401.3M
Cash and short-term investments

As of December 31, 2021

217.4M
Common stock shares outstanding

As of December 31, 2021

INO-4800

- ✓ 1Q22: Completed enrollment of heterologous and homologous boost Phase 1/2 trials in China with Advaccine

VGX-3100

- ❑ 4Q22: Report REVEAL2 efficacy data and safety follow-up through week 40

INO-3107

- ❑ 2H22: Phase 1/2 immune responses and early clinical benefit data

INO-5401

- ❑ 2022: Present additional overall survival data including median OS for MGMT-methylated cohort

Platform Development

- ❑ 1H22: Report INO-4500 Lassa Phase 1b data
- ❑ 2H22: Report INO-4201 Ebola Phase 1b booster data
- ❑ 2H22: Initiate COVID-19 dMAb trial

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