Multi-Modal BioInformatics Solution for Ovarian Cancer

NASDAQ: VRML | January 2020
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The forward-looking statements reflect the views of the Company as of the date of this presentation and are subject to certain risks, uncertainties and assumptions, including those described in the section entitled “Risk Factors” in the Company’s Annual Report on Form 10-K for the year ended December 31, 2018 and quarterly report on Form 10-Q for the quarter ended September 30, 2019.

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Enable Early Ovarian Cancer Detection for All Ages and Ethnicities
Investment Highlights

**Commercial stage company**
FDA-cleared multi-modal disease management approach to women’s health, with core focus on ovarian cancer

**FDA-cleared Technology**
2nd-generation technology; included in clinical treatment guidelines

**Product Pipeline**
Compelling pipeline of diagnostic bioinformatic product candidates

**Intellectual Property**
Strong intellectual property protecting methods and use

**Managed Care Coverage**
Broad managed care coverage: 2018 CLFS* reimbursement rate of $897

**Experienced Management**
Experienced management team focused on success
Vermillion’s Evolution

OVA1 Plus foundation in place to become NEW Standard of Care

Payer Coverage:
5 out of 10 lives covered in U.S.
Large Benign and Malignant Mass Market

Cost $:

- Pelvic Masses + (Endo + PCOS+ Func. Cysts)
  - TAM: 18.3M
- Pelvic Masses (Benign, cancer, non-gyn)
  - TAM: 500K - 1M
- High Risk Hereditary Ovarian Cancer Monitoring
  - TAM: 300-500K
- Masses to Surgery
  - TAM: 200K
- Ovarian Cancer
  - TAM: 22K
- OC Deaths
  - TAM: 15K

Total Cost: $28B
Total TAM: 20M

Technology Today
- None

VRML Portfolio
- EndoCHECK (2022)
- OvaNEx (2021)
- Ova Inherit
- Ova1 plus
  - (OVA1, Overa) (FDA Cleared)
- Ova1 plus
  - (OVA1, Overa) (FDA Cleared)

Portfolio Expansion
- Pelvic Masses + (Endo + PCOS+ Func. Cysts)
- Pelvic Masses (Benign, cancer, non-gyn)
- High Risk Hereditary Ovarian Cancer Monitoring
- Masses to Surgery
- Ovarian Cancer
- OC Deaths

TAM: 15K

Recurrence Monitoring
(FDA cleared)
Vermillion, Inc. Innovation Pipeline

Portfolio Expansion

2018

Q3 2019 Q4 2019

Ova plus

ASPIRA GenetiX Hereditary Cancer Carrier Screening

A watch and wait test for women with adnexal masses

2021

OvaNEX

AN ASPIRA LABS TECHNOLOGY

A multifactorial assessment of gynecological cancer risk

2022

OvaInherit

Ovarian Asymptomatic Risk Screening

EndoCHECK

A companion diagnostic to identify women with Endometriosis, PCOS etc.
Foundation: Multi-modality vs Single Modality Approach to Care

Cutting Edge Research

Multifactorial assessment of ovarian cancer risk

Our cutting-edge research is working towards earlier and reliable ovarian cancer risk detection to improve patient outcomes.
## Ovarian Cancer: >65% Late Stage, @ Late Stage >70% Mortality Rate

Clinical Need for a Diagnostic Solution with Adequate Predictive Value to:

- Ensure earlier cancer detection
- Accurately identify patients needing timely treatments from gynecologic oncologists

### Presentation Stage and 5-Year Survival Rate (1)

<table>
<thead>
<tr>
<th>Presentation Stage</th>
<th>Incidence</th>
<th>Five Year Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Stage I) Localized</td>
<td>15%</td>
<td>92%</td>
</tr>
<tr>
<td>(Stage II) Regional</td>
<td>21%</td>
<td>75%</td>
</tr>
<tr>
<td>(Stage III) Distant</td>
<td><strong>59%</strong></td>
<td><strong>29%</strong></td>
</tr>
<tr>
<td>(Stage IV) Unstaged</td>
<td>6%</td>
<td>24%</td>
</tr>
</tbody>
</table>

(1) [www.SEER.Cancer.gov](http://www.SEER.Cancer.gov)
<table>
<thead>
<tr>
<th>Category</th>
<th>Clinical Assessment</th>
<th>Blood Tumor Marker</th>
<th>Tissue Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tools</strong></td>
<td>▪ Physical exam &amp; ultrasound</td>
<td>▪ CA-125 (off-label)</td>
<td>▪ Pre-operative biopsy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ ROMA™ (alternative)</td>
<td></td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>▪ Subjective results to specialists’ interpretation</td>
<td>▪ <strong>Low sensitivity</strong></td>
<td>▪ Biopsy rupture risks (potential tumor spread)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ High false negatives, (pre-menopausal / early-stage)</td>
<td></td>
</tr>
</tbody>
</table>
Level A guideline for pelvic mass assessment results in ~70% unclear results and leads to ineffective care pathway.

**Current Care Pathway**
- Majority of Cases Uncertain
- Clearly Malignant (3%)
- Clearly Benign (27%)
- Watchful Waiting / Management of Symptoms
- Level A Guideline
  - Pelvic Mass Transvaginal Ultrasound (TVUS) Assessment (0.5M – 1M Patients)
- Level B Unclear Results (CA-125)
  - ~70% of Cases (~400K Patients)
- CA-125 & Immediate Referral to Gynecological Oncologist

**Ineffective Care Pathway Results:**
- Late-stage detection (65%)^{(2)}
- Gynecological oncologist referral delay (40%)^{(4)}
- High cost with no improvement in clinical outcomes ($5B^{(3)}$ of U.S. annual costs with 52+% mortality^{(2)})

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1. Based on management estimates and analysis.
A low false negative rate is critical for patient care

<table>
<thead>
<tr>
<th>Standalone Risk Stratification</th>
<th>Early Stage Sensitivity (%)</th>
<th>Early Stage False Negative Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Assessment (CA)(^{(1)})</td>
<td>68.6</td>
<td>31.4</td>
</tr>
<tr>
<td>Ultrasound alone(^{(2)})</td>
<td>41.2(^{(9)})</td>
<td>58.8</td>
</tr>
<tr>
<td>CA125 alone(^{(1)})</td>
<td>62.8</td>
<td>37.2</td>
</tr>
<tr>
<td>ROMA (Ca125 &amp; HE4)(^{(3-4)})</td>
<td>63.6</td>
<td>36.4</td>
</tr>
<tr>
<td>OVA1® alone(^{(5)})</td>
<td>91.4</td>
<td>8.6</td>
</tr>
</tbody>
</table>

**Demonstration of Improvement**
- Reducing False Negatives by **Over 72%**

1. Longoria, TC et al. AJOG Jan 2014, 210(1,): 78.e1-78.e9

**Current State: Early Stage False Negative Rate 31-59%**
Improved Early Stage Detection: OVA1 Plus vs Standard of Care (Stage I + II)

94% Improvement in Rate of Cancer Missed with OVA1
Our Solution = OVA1® + OVERA® (OVA1 +)

- OVA1 evaluates the levels of five ovarian cancer-associated markers in the blood
- Levels combined into single cancer risk score.

- Overa incorporates 2 new markers
- Global Platform
- Specificity +

Multi-variate Index Assay (MIA) in ACOG Guidelines
Positive NCCN and SGO position statements
Improved Specificity: OVA1 Plus - Ova1/Overa Reflex Offering (Q4 2018)

Premenopausal:
- Low Risk < 5.0;
- Intermediate 5.0-7.0;
- Elevated Risk > 7.0

Postmenopausal:
- Low Risk < 4.4;
- Intermediate 4.4-6.0;
- Elevated Risk > 6.5

<table>
<thead>
<tr>
<th></th>
<th>OVA1(^1) (95% CI)</th>
<th>Overa(^1) (95% CI)</th>
<th>OVA1 + (95% CI)</th>
<th>% Diff OVA1 vs OVA1+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>92%</td>
<td>91%</td>
<td>88%</td>
<td>-4%</td>
</tr>
<tr>
<td>Specificity</td>
<td>54%</td>
<td>69%</td>
<td>72%</td>
<td>33%</td>
</tr>
</tbody>
</table>

> 30% improvement in specificity

(2) Reference Ranges established by ASPIRA Labs, Austin Tx.
Early Detection Lowers Total Healthcare Costs

93K Medical Claims Study Demonstrated that the Use of OVA1 Plus Compared to CA-125 II Can Lower Total Costs While Improving Care

Cost Comparison of Early vs. Late Stage Detection\(^{(1,2)}\)

\[\text{Total ovarian cancer-related costs} = \$5B \text{ total U.S. and } \$46.4B \text{ total global}^{(3)}\]

<table>
<thead>
<tr>
<th>Stage</th>
<th>Pre-Menopausal</th>
<th>Post-Menopausal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Stage</td>
<td>$224,922</td>
<td>$197,757</td>
</tr>
<tr>
<td>Early Stage</td>
<td>$35,754</td>
<td>$37,195</td>
</tr>
</tbody>
</table>

\(84\% \text{ Decrease in Cost Burden}\)

\(81\% \text{ Decrease in Cost Burden}\)

\(^{(1\text{)}}\) 24-Month Average Reimbursement for Early and Late Stage Cancer.


\(^{(3\text{)}}\) Lindsey A. Torre, Farhad Islami, Rebecca L. Siegel, Elizabeth M. Ward and Ahmedin Jemal. Cancer Epidemiol Biomarkers Prev April 1 2017 (26) (4) 444-457; DOI: 10.1158/1055-9965.EPI-16-0858; WHO fact sheet.
**OVA1® Superiority over CA125 in African American Women**

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Positive Predictive Value</th>
<th>Negative Predictive Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVA1®</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian (N=868)</td>
<td>93.2</td>
<td>45.3</td>
<td>40.8</td>
<td>94.3</td>
</tr>
<tr>
<td>African American (N=156)</td>
<td>79.2</td>
<td>66.7</td>
<td>30.2</td>
<td>94.6</td>
</tr>
<tr>
<td><strong>CA125</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian (N=868)</td>
<td>74.4</td>
<td>87.6</td>
<td>70.7</td>
<td>89.5</td>
</tr>
<tr>
<td>African American (N=156)</td>
<td>33.3</td>
<td>94.0</td>
<td>50.0</td>
<td>88.6</td>
</tr>
</tbody>
</table>

- CA125 has an unacceptable sensitivity for cancer detection in African American women
- Abstract accepted at American Association for Cancer Research (AACR)
- Aug and Sept 2019 - 2 peer reviewed publications
- **OVA1® shows acceptable sensitivity for cancer detection in African American women, cutoff adjustment is in process for pre- and post-menopausal women, to achieve 90% sensitivity obtained for Caucasian women**¹

¹ ASPIRA Labs Data on File, Combined OVA1 and OVAS00 studies.
OVA1 Plus Improves Early Stage Detection

Comparison of CA-125 II vs. OVA1+

<table>
<thead>
<tr>
<th>Sensitivity Across All Ovarian Cancer Stages (1)</th>
<th>CA-125 II</th>
<th>OVA1+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Stage II</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Stage III</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Stage IV</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

| Sensitivity Across Menopausal Status (1)       |           |       |
| Pre-menopausal                                | X         | ✓     |
| Post-menopausal                               | ✓         | ✓     |

| Sensitivity Across Histological Subtypes (1)   |           |       |
| Epithelial ovarian cancer                      | ✓         | ✓     |
| Non-epithelial cancer                          | X         | ✓     |
| Low malignant potential                        | X         | ✓     |
| Metastatic                                     | ✓         | ✓     |
| Other gyn cancer                               | X         | ✓     |

| Sensitivity Across All Ethnicities (2)         |           |       |
| Caucasian and African American                 | X         | ✓     |

(2) From company’s 2019 AACR Abstract 1244, “Ethnic disparity in ovarian malignancy tumor markers: MIA and ROMA.”
Large and Growing Total Addressable Market

Currently Addressable Market

Pelvic Mass Detection:
- Surgical triage or guided referral: ~300-400K U.S. patients
- ~5% VRML market share
- Current/VRML: Ova1 Plus

TAM = 0.3-4 M

Near-Term Addressable Markets

Benign Masses, Non-Ovarian Cancer, Non-Gyn Mass Monitoring:
- ~750K to 1M U.S. patients
- Current: CA-125 2-4x/yr monitoring (off-label)
- VRML: Watch + Wait (2021)

High Risk Hereditary Ovarian Cancer Monitoring:
- ~300K U.S. patients
- Current: CA-125 2-4x/yr monitoring (off-label)
- VRML: TBD

TAM = 1-1.3M

Long-Term Addressable Markets

Endo + PCOS+ Func. Cysts Detection:
- ~17M U.S. patients
- No current solution available / CA-125 used on case by case basis (off label)
- VRML: POC Complete (2022)

Ovarian Cancer Recurring Monitoring:
- ~230K U.S. patients
- Current: CA-125 2-4x/yr monitoring (on-label)
- VRML: TBD

TAM = ~17M

Total TAM = ~18-20M

1 Includes surgical; Based on management estimates and analysis.
Salesforce Expansion
- 20 full-time (“FTE”) territory sales reps
- Top performers in companies with disruptive technology

Marketed directly to gynecologists, gynecology supergroups and healthcare systems
• **Testing Performed in Hospital Systems/Large Gyn Super Group**
  - Increase distribution @ POC (Point of Care)
  - Test performed locally with access to Vermillion risk assessment software via web service
  - OVA1 performed on existing Platform Roche Cobas – installed base of over 10K units globally
Both OVA1/Overa have CE Mark

Philippines
- Large prospective study in process

Israel
- Q4 2018 – Coverage received in Israel by CLALIT
  - 2nd largest integrated delivery network in the world
  - CLALIT (#1 Payer, 50% pop)
- Study in process to validate OVA1 Plus on local population
Vermillion is at a Commercial Inflection Point

- **Commercial Growth Phase**: 2.5x commercial investment Y-o-Y & demonstrated positive Ob-Gyn reception

- **Launch of Decentralized Platform & 2nd Generation/OVA1 Plus**

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- **Phase 1 Hiring**: SVP Commercial Hired
- **Phase 2 Hiring**: 20 FTEs Territory Sales Rep, Total 30 FTEs

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Graphical representation of sales volume over time with key milestones and hires indicated.
Ordering Physicians

First Time Physician Orders (New Physicians)

Total Physicians (Distinct Physicians)
## Financial highlights

### Revenues

**Q3FY19 vs. Q3FY18**
- **Product volume increased 82%**
  - 3,602 units vs. 1,981 in Q3FY18;
- **Product revenue increased 68%**
  - $1.2M vs. $0.7M in Q3FY18
- **Total customers increased by 66%**
- **New customers increased 59%**

**YTD FY19 vs. YTD FY18**
- **Product volume increased 59%**
  - 9,044 units vs. 5,683 units
- **Product revenue increased 58%**
  - $3.1M vs. $1.98M YTD FY18
- **Total customers increased by 47%**
- **New customers increased 55%**

### Gross profit on OVA1 product revenue

- **53% margin for Q3FY19**, $0.65M vs. $0.26M in Q3FY18, or 35.5% margin
- **50% increase in rate, more than doubling in absolute value**
- **We anticipate the gross profit percent will increase as volumes continue to increase**

### Balance sheet

- **Cash balance at 9/30/19 was $14.6M**

### Expenses (Q3FY19 vs. Q3FY18)

- **R&D increased $0.2M or 164% primarily due to 3rd-generation serial monitoring product development expense**
- **S&M increased $1.1 million, or 81%, primarily due to additional investment in headcount and personnel-related expenses**
- **G&M increased $0.25M, or 22%, primarily due to additional headcount and personnel-related expenses**
Financial highlights: Gross margin 2018 through Q3 FY19

Adequate Equipment capacity in place to support 10X current volumes – no capex required in short term
Unprecedented reimbursement success

- Cigna added OVA1 to its national preferred coverage list in January 2019
- 51% of the population now under positive coverage

Reimbursement and Market Access

Weighted Average OVA1 Price Per Test

- OVA1 PAMA price set for 2020 – 2022 = $897
- CPT code 81503

### Catalysts Driven Momentum Through 2020

<table>
<thead>
<tr>
<th>Q3 2018</th>
<th>Q4 2018</th>
<th>Q1 2019</th>
<th>Q2 2019</th>
<th>Q3 2019</th>
<th>Q4 2019</th>
<th>1H 2020</th>
<th>2H 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
<td>Expanding Sales Team</td>
</tr>
<tr>
<td>Phase 1 hiring completed in Q3 2018 (9 FTE)</td>
<td>Phase 2 hiring completed in Q1 2019 (11 FTE)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Increased Market Access via Cigna**
- Q1 2019, Cigna added OVA1 to its national preferred coverage list
- 15 M lives added (167M total number covered lives as of Q1 2019)

**Hereditary Breast and Ovarian Cancer (HBOC) Genetics (June 2019)**

**Clinical Assessment & Imaging+ Symptom Index (Q3 2019)**

**Launched a National Clinical Study of OC Risk Detection Methods in African American Women**

**Increased Adoption of OVA1 plus & Genetix**

**Expanded Bio-informatics Platform - Beyond Proteins – OVA360 Trial Launch**

**OVANEX Trial Launch (Watch and Wait)**

**Decentralized Partnership Expansion**

**Payer Expansion**

**Pelvic Mass Portfolio Expansion**

**OVA360**
- Systemic Dx
- Focused Dx (TVUS)
- Family Hx / Genetics
- Patient Reported Data (Symptom Index)

**Data Repository with Bioinformatics Platform**
Compelling Growth Strategies

Expand Distribution Platform
Beyond the U.S. by launching OVA1 Plus while building the clinical utility and health economics foundation

Expand Product Offerings
Offer pelvic disease diagnostic and prognostic solutions from puberty to cure from endometriosis and ovarian cancer

Become the Standard of Care for Global Pelvic Mass Risk Assessment

Leverage the Largest Specimen and Data Repository
Of gynecologic pelvic mass patients worldwide
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<table>
<thead>
<tr>
<th>Published Evidence</th>
<th>OVAI (MIA) Guidelines / Position Statements(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shulman, et al.</td>
<td>Advances in Therapy, 2019</td>
</tr>
<tr>
<td>Fredericks, et al.</td>
<td>Journal of Surgical Oncol, 2019</td>
</tr>
<tr>
<td>Dunton, et al.</td>
<td>Biomarkers in Cancer, 2019, Future Oncology, 2019</td>
</tr>
<tr>
<td>Zhang, et al.</td>
<td>Future Oncology, 2019</td>
</tr>
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</table>

(1) In 100% of all Key Guidelines
<table>
<thead>
<tr>
<th></th>
<th>Granted</th>
<th>Pending (Approx.)</th>
<th>Family</th>
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<tbody>
<tr>
<td></td>
<td>USA</td>
<td>Ex US</td>
<td>Total</td>
</tr>
<tr>
<td>Protected</td>
<td>20</td>
<td>65</td>
<td>85</td>
</tr>
<tr>
<td>Solutions:</td>
<td></td>
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<tr>
<td>Strong IP</td>
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Issued patents covering various ovarian cancer biomarkers

Pending patent applications including OVA1 and Overa products

Algorithm – kept as trade secret