Multi-Modal BioInformatics Solution for Ovarian Cancer

NASDAQ: VRML  January 2020
This presentation contains forward-looking statements, as defined in the Private Securities Litigation Reform Act of 1995. Words such as “may,” “expects,” “intends,” “anticipates,” “believes,” “estimates,” “plans,” “seeks,” “could,” “should,” “continue,” “will,” “potential,” “projects” and similar expressions are intended to identify such forward-looking statements.

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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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Our Mission

Enable Early Ovarian Cancer Detection for All Ages and Ethnicities

Vermillion®
Investment Highlights

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

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

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

**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.
- **Strong IP and FDA-Cleared Science (2010-2018)**
- **Bioinformatic Tools + Current Standard of Care (2016)**
- **Guidelines (2016-2018)**
- **Payers (2018-2019)**
- **2nd Generation OVA1 Plus Launch (Q4’18)**
- **Expand Commercial Infrastructure (2019-20)**
- **Save Lives & Replace Standard of Care**

Completed
Large Benign and Malignant Mass Market

Technology Today

VRML Portfolio

Cost $%

$22B

$0.8B

$5.2B

Total Cost: $28B

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 TAM: 20M

None

2-4 X/yr CA125
(Only Option)

2X/yr CA125
(Only Option)

(OVA1, Overa)
(FDA Cleared)

(OVA1, Overa)
(FDA Cleared)

EndoCHECK
(2022)

OvaNEX
(2021)

Ova Inherit

Portfolio Expansion
Vermillion, Inc. InnOvation Pipeline

Q4 2018
- Portfolio Expansion
  - ASPIRA GenetiX
    - Hereditary Cancer Carrier Screening
Q3 2019
- Ova1 Plus
- 2020
- OvaNEX
  - A watch and wait test for women with adnexal masses
2020-2021
- EndoCHECK
  - A companion diagnostic to identify women with Endometriosis, PCOS etc.
2022-23
- OvalInherit
  - Research Trial begins: 2020
  - Ovarian Asymptomatic Risk Screening

A multifactorial assessment of gynecological cancer risk
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>59%</td>
<td>29%</td>
</tr>
<tr>
<td>(Stage IV) Unstaged</td>
<td>6%</td>
<td>24%</td>
</tr>
</tbody>
</table>

\(^{(1)}\) www.SEER.Cancer.gov.
## Root Cause: Inadequate Tools

<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>▪ Low sensitivity</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

Level A Guideline
Pelvic Mass Transvaginal Ultrasound (TVUS) Assessment
(0.5M – 1M Patients)

- Clearly Benign (27%)
  - Watchful Waiting / Management of Symptoms

- Clearly Malignant (3%)
  - CA-125 & Immediate Referral to Gynecological Oncologist

Level B Unclear Results (CA-125)
~70% of Cases (~400K Patients)

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))

(1) Based on management estimates and analysis.
(2) www.SEER.Cancer.gov.
A low false negative rate is critical for patient care

### Current State: Early Stage False Negative Rate 31-59%

<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)&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>68.6</td>
<td>31.4</td>
</tr>
<tr>
<td>Ultrasound alone&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>41.2&lt;sup&gt;(9)&lt;/sup&gt;</td>
<td>58.8</td>
</tr>
<tr>
<td>CA125 alone&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>62.8</td>
<td>37.2</td>
</tr>
<tr>
<td>ROMA (Ca125 &amp; HE4)&lt;sup&gt;(3-4)&lt;/sup&gt;</td>
<td>63.6</td>
<td>36.4</td>
</tr>
<tr>
<td>OVA1® alone&lt;sup&gt;(5)&lt;/sup&gt;</td>
<td>91.4</td>
<td>8.6</td>
</tr>
</tbody>
</table>

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

Demonstration of Improvement - Reducing False Negatives by **Over 72%**
Improved Early Stage Detection: OVA1 Plus vs Standard of Care (Stage I + II)

94% Improvement in Rate of Cancer Missed with OVA1

- CA-125 II*: 63% detected, 37% missed
- CA-125 II plus Clinical Assessment: 69% detected, 31% missed
- Modified ACOG**: 77% detected, 23% missed
- OVA1: 87% detected, 13% missed
- OVA1+ plus Clinical Assessment: 98% detected, 2% missed
Our Solution = OVA1\textsuperscript{®} + OVERA\textsuperscript{®} (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 +
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 (95%CI)</th>
<th>Overa (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\(^{(1,2)}\)

- **Total ovarian cancer-related costs** = $5B total U.S. and $46.4B total global\(^{(3)}\)
- 84% Decrease in Cost Burden
  - Late Stage: $224,922 → $197,757
  - Early-Stage: $35,754

- 81% Decrease in Cost Burden
  - Late Stage: $197,757 → $37,195
  - Early-Stage: $35,754

---

(1) 24-Month Average Reimbursement for Early and Late Stage Cancer.
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><strong>79.2</strong></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><strong>33.3</strong></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 progress for pre- and post-menopausal women, to achieve 90% sensitivity obtained for Caucasian women**

1 ASPIRA Labs Data on File, Combined OVA1 and OVA500 studies.
OVA1 Plus Improves Early Stage Detection

<table>
<thead>
<tr>
<th>Sensitivity Across All Ovarian Cancer Stages&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>CA-125 II</th>
<th>OVA1 Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Stage II</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Stage III</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Stage IV</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sensitivity Across Menopausal Status&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-menopausal</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Post-menopausal</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sensitivity Across Histological Subtypes&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epithelial ovarian cancer</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Non-epithelial cancer</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Low malignant potential</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Metastatic</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other gyn cancer</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Sensitivity Across All Ethnicities&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian and African American</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

<sup>(2)</sup> 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)

TAM = ~1-1.3M

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

Long-Term Addressable Markets

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

Time

(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

Salesforce Overview

Full-Time Sales Representative Pedigree
• **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
International - Commercial Strategy

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

Sales Volume

2018 Q1 1,818
2018 Q2 1,884
2018 Q3 1,981
2018 Q4 1,996
2019 Q1 2,313
2019 Q2 3,129
2019 Q3 3,602

6 FTEs Territory Sales Rep
SVP Commercial Hired
20 FTEs Territory Sales Rep, Total 30 FTEs

PAMA Rate
Evicore Live
Phase 1 Hiring
Phase 2 Hiring
Ordering Physicians

First Time Physician Orders (New Physicians)

Total Physicians (Distinct Physicians)
## Financial highlights

### Revenues

<table>
<thead>
<tr>
<th>Q3FY19 vs. Q3FY18</th>
<th>Gross profit on OVA1 product revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Product volume increased <strong>82%</strong>&lt;br&gt;  • 3,602 units vs. 1,981 in Q3FY18;</td>
<td>• <strong>53% margin for Q3FY19</strong>, $0.65M vs. $0.26M in Q3FY18, or 35.5% margin</td>
</tr>
<tr>
<td>• Product revenue increased <strong>68%</strong>&lt;br&gt;  • $1.2M vs. $0.7M in Q3FY18</td>
<td>• 50% increase in rate, more than doubling in absolute value</td>
</tr>
<tr>
<td>• Total customers increased by <strong>66%</strong></td>
<td>• We anticipate the gross profit percent will increase as volumes continue to increase</td>
</tr>
<tr>
<td>• New customers increased <strong>59%</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YTD FY19 vs. YTD FY18</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Product volume increased <strong>59%</strong>&lt;br&gt;  • 9,044 units vs. 5,683 units</td>
<td></td>
</tr>
<tr>
<td>• Product revenue increased <strong>58%</strong>&lt;br&gt;  • $3.1M vs. $1.98M YTD FY18</td>
<td></td>
</tr>
<tr>
<td>• Total customers increased by <strong>47%</strong></td>
<td></td>
</tr>
<tr>
<td>• New customers increased <strong>55%</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Balance Sheet

<table>
<thead>
<tr>
<th>Expenses (Q3FY19 vs. Q3FY18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cash balance at 9/30/19 was $14.6M</td>
</tr>
<tr>
<td>• R&amp;D increased $0.2M or 164% primarily due to 3rd-generation serial monitoring product development expense</td>
</tr>
<tr>
<td>• S&amp;M increased $1.1 million, or 81%, primarily due to additional investment in headcount and personnel-related expenses</td>
</tr>
<tr>
<td>• G&amp;M increased $0.25M, or 22%, primarily due to additional headcount and personnel-related expenses</td>
</tr>
</tbody>
</table>
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

### Q3 2018
- **CA-125II Disparity Validation**
  - Q4 2018, presented CA125 disparity data at the Mid-Atlantic Gynecologic Oncology Society

### Q4 2018
- **Expanding Sales Team**
  - Phase 1 hiring completed in Q3 2018 (9 FTE)

### Q1 2019
- **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)

### Q2 2019
- **Expanding Sales Team**
  - Phase 2 hiring completed in Q1 2019 (11 FTE)

### Q3 2019
- **Hereditary Breast and Ovarian Cancer (HBOC) Genetics (June 2019)**
- **Clinical Assessment & Imaging+ Symptom Index (Q3 2019)**

### Q4 2019
- **Launched a National Clinical Study of OC Risk Detection Methods in African American Women**

### 1H 2020
- **Increased Adoption of OVA1 plus & Genetix**

### 2H 2020
- **Expanded Bio-informatics Platform - Beyond Proteins – OVA360 Trial Launch**
- **Decentralized Partnership Expansion**

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### Timeline:

- **Payer Expansion**
- **Pelvic Mass Portfolio Expansion**
- **OVA360**
  - Systemic Dx
  - Focused Dx (TVUS)
  - Family Hx / Genetics
  - Patient Reported Data (Symptom Index)

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[Image of the timeline and diagram]
Compelling Growth Strategies

Leverage the Largest Specimen and Data Repository
- Of gynecologic pelvic mass patients worldwide

Become the Standard of Care for Global Pelvic Mass Risk Assessment

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

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

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

Product Pipeline
Compelling pipeline of diagnostic bioinformatic product candidates

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

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
## Trusted Solution: Care Pathway Guidelines

### Published Evidence

<table>
<thead>
<tr>
<th>Authors</th>
<th>Journal Title and Year</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>
</tbody>
</table>

### OVAI (MIA) Guidelines / Position Statements

1. ACOG Practice Bulletin
   - Number 174, November 2016, page 10
2. National Comprehensive Cancer Network
   - Guidelines, Version 5, 2017
   - Updated Feb 2, 2018
3. Society of Gynecologic Oncology
   - Position Statements Issued 2011 Updated 2013

(1) In 100% of all Key Guidelines
## Protected Solutions: Strong IP

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Ex US</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Granted</strong></td>
<td>20</td>
<td>65</td>
<td>85</td>
</tr>
<tr>
<td><strong>Pending (Approx.)</strong></td>
<td>9</td>
<td>31</td>
<td>40</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td></td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

- Issued patents covering various ovarian cancer biomarkers
- Pending patent applications including OVA1 and Overa products
- Algorithm – kept as trade secret