Bringing Personalized Medicine to the Clinic

# Unique Platform & Partnership Model

**David M Jackson PhD – VP, Business Development**

PrimeraDx

# PrimeraDx's Strategy in Personalized Medicine

## Market to clinical lab

- Platform for development of multiplexed, multimodal LDTs
- High-value IVDs

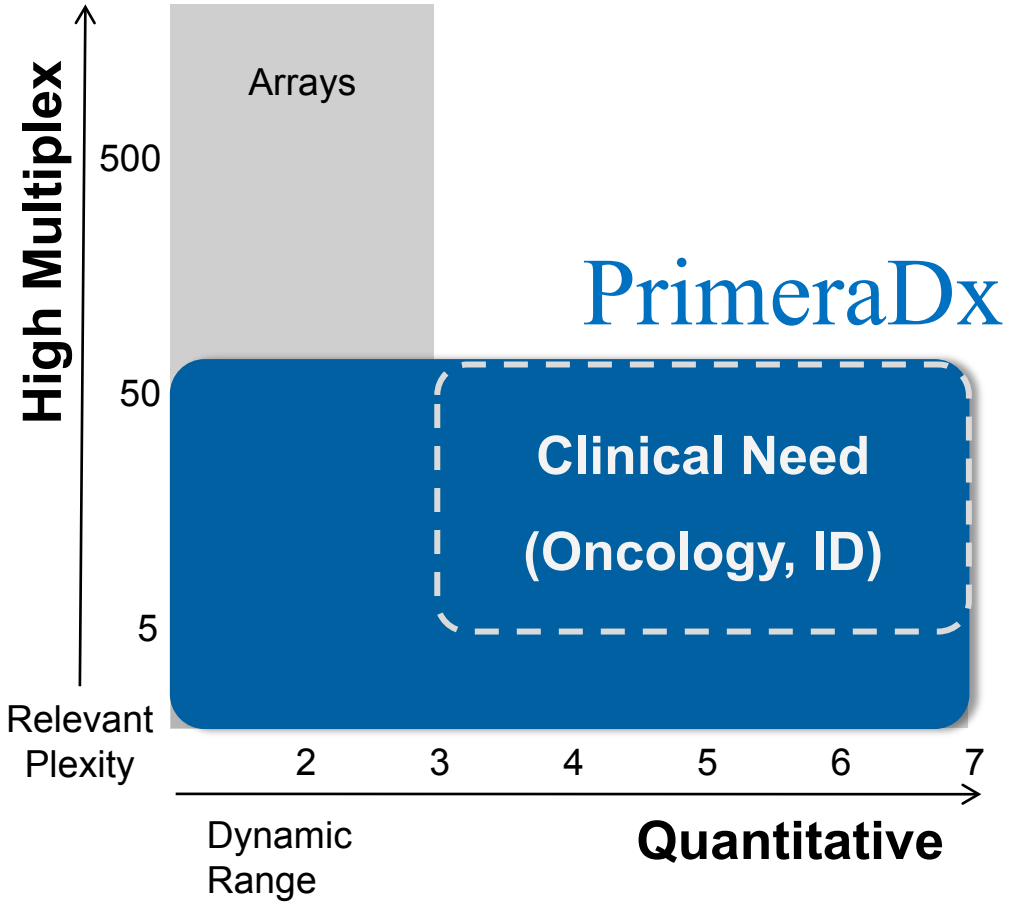
## Develop CDx pipeline with Pharma

- Partner for access to clinical trial specimens, outcomes
- Register high-value IVDs

# Introduction to PrimeraDx's Technology Platform

# Clinical Need for Multiplexing

## ICEPlex Enables Multi-modal, Multiplex, Quantitative Tests



# PrimeraDx is a Product Company

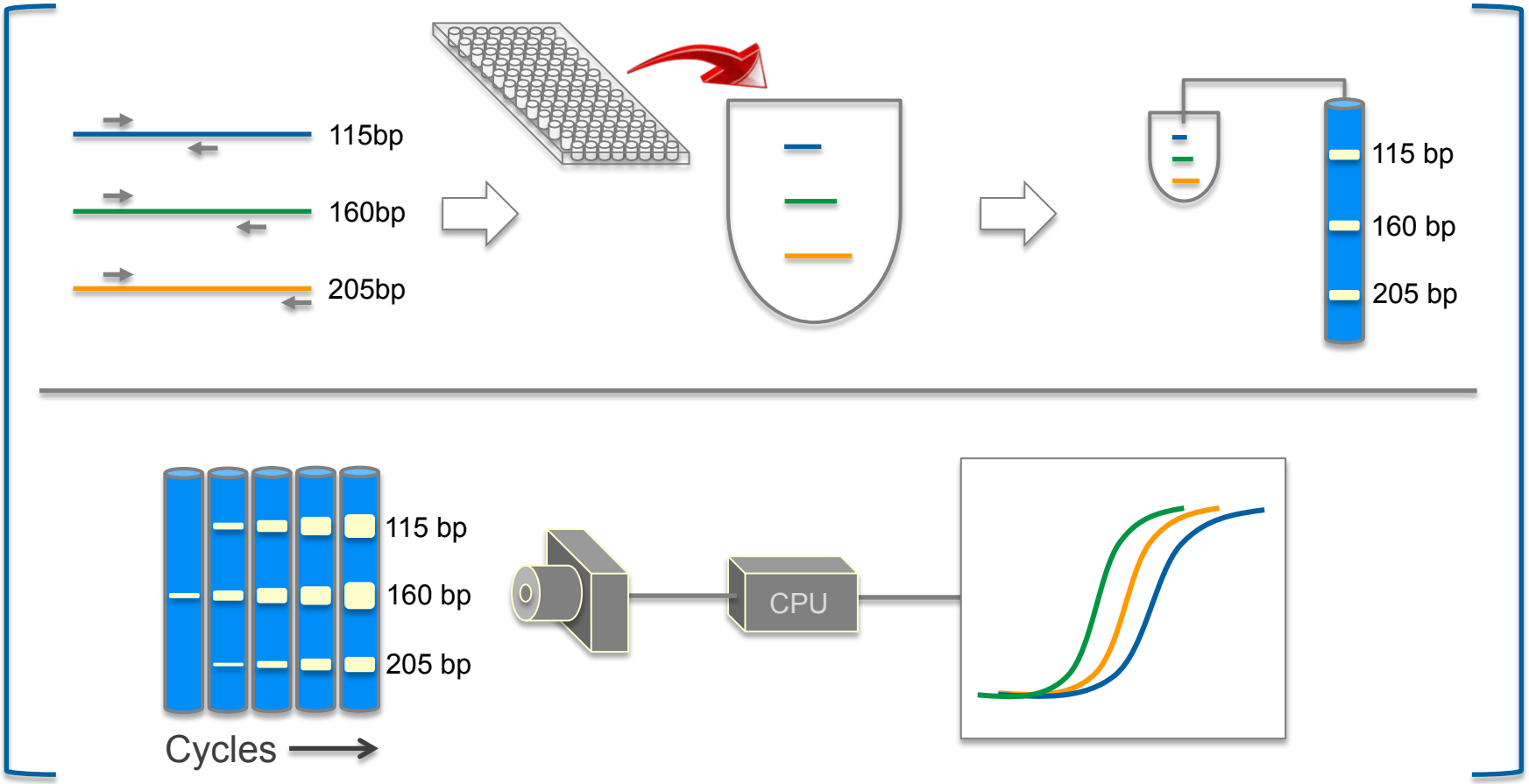
## Enabling Clinical Labs with an Automated Open Platform….

Innovative **Platform**

High Impact **IVDs**


….. and Providing Solutions for Today's Diagnostic Needs

# Next-generation qPCR Chemistry




*Fully automated processes within the ICEPlex*

# Unique Technology Platform

## PrimeraDx is an IVD MDx Product Company

### Next-generation qPCR diagnostic platform

- Assay 50-100 individual markers in one reaction
- Simultaneous quantitative and qualitative capabilities

### High-value MDx IVD test kits

- Oncology and Infectious Disease
- Companion diagnostics

- End-point Qualitative Detection
- Real-time Quantification
- SNP
- Fusion Gene
- Gene copy #
- mRNA
- microRNA
- Controls

**A real-time, multiplex, multi-modal "All in one well" MDx solution**

Only PrimeraDx Can Do This

# Allowing Clinicians to Ask More Than One Question

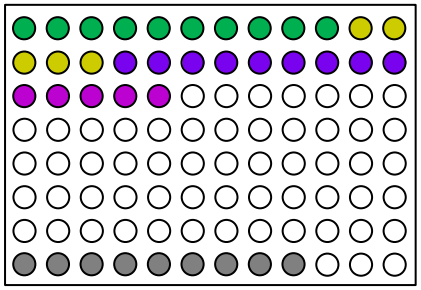
## Simplified Patient Care with a Full Panel in One Well….

**Oncology Multi-Modal Panel:**

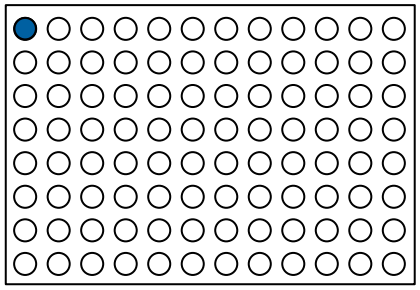
Fusion gene variants
+
Oncogene Gain-of-function SNPs
+
Gene Expression Signature
+
MicroRNAs

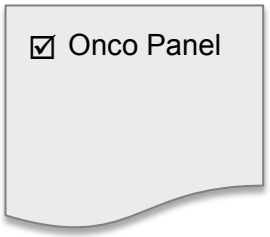
29 Targets
+ 9 Controls

**Several Instruments Required**



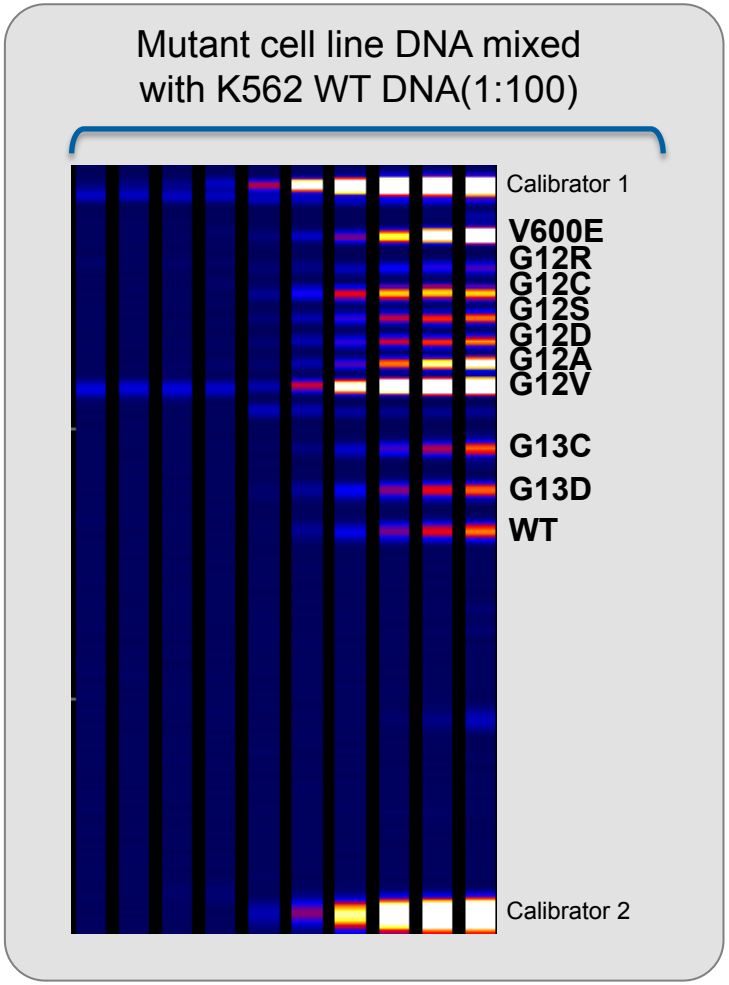

PrimeraDx






…..and All it Takes is a Single Sample, from a Single Slice

# Oncology – Colorectal Cancer KRAS/BRAF Mutation Panel




**KRAS**

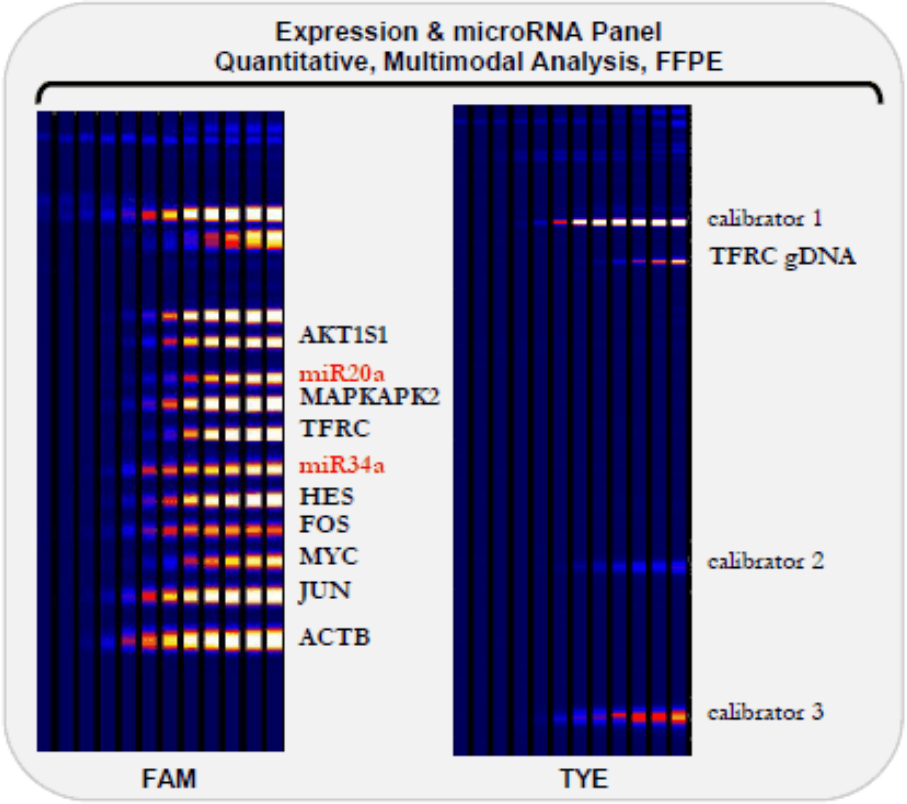
| | |
|---|---|
| WT | GGTGGC |
| G12S | AGTGGC |
| G12R | CGTGGC |
| G12C | TGTGGC |
| G12D | GATGGC |
| G12A | GCTGGC |
| G12V | GTTGGC |
| G13S | GGTAGC |
| G13R | GGTCGC |
| G13C | GGTTGC |
| G13D | GGTGAC |
| G13A | GGTGCC |
| G13V | GGTGTC |

**BRAF**

V600E

ICEPlex system and assays have not been approved by the FDA for IVD. This information is for demonstration purpose only.

# Multi-modal (mRNA + microRNA + DNA from FFPE)




**All in one well**

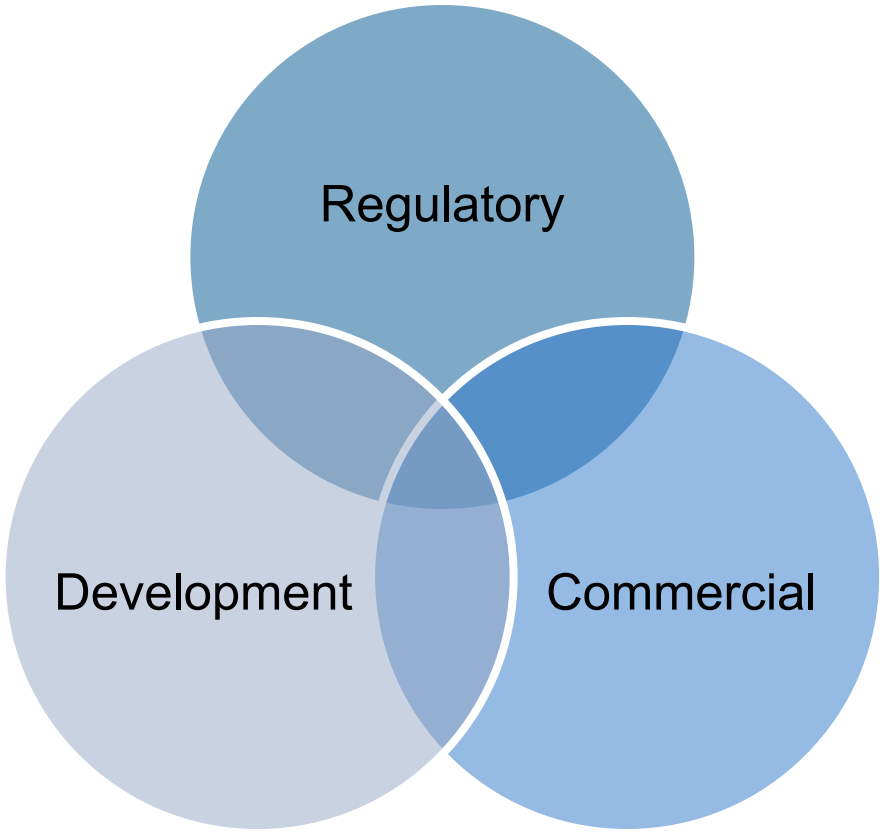
Currently being investigated for complex molecular assays (multimodal multiplex qPCR) supporting drug development with expectation that taking a single assay through regulatory approval will be more feasible

Platform selection is important:
Robust assay performance
Ease of development
Regulatory path
Clinical laboratory accessibility
Meeting the need of the CDx effort

# CDx Partnership Challenges

# Challenges with CDx Partnerships

Rx & Dx Industries are fundamentally misaligned due to completely different business models, regulatory, markets and attendant issues



# FDA's Definition of CDx


## Definition and Use of an IVD Companion Diagnostic Device

An *IVD companion diagnostic device* is an **in vitro diagnostic device** that provides information that is **essential** for **the safe and effective use of a corresponding therapeutic product**. The use of an IVD companion diagnostic device with a particular therapeutic product is stipulated in the instructions for use in the labeling of both the diagnostic device and the corresponding therapeutic product, as well as in the labeling of any generic equivalents of the therapeutic product.

An IVD companion diagnostic device could be essential for the safe and effective use of a corresponding therapeutic product to:

- **Identify patients who are most likely to benefit from a particular therapeutic product**
- Identify patients likely to be at increased risk for serious adverse reactions as a result of treatment with a particular therapeutic product
- Monitor response to treatment for the purpose of adjusting treatment (e.g., schedule, dose, discontinuation) to achieve improved safety or effectiveness

*FDA Draft Guidance – 14Jul11*

# CDx 101

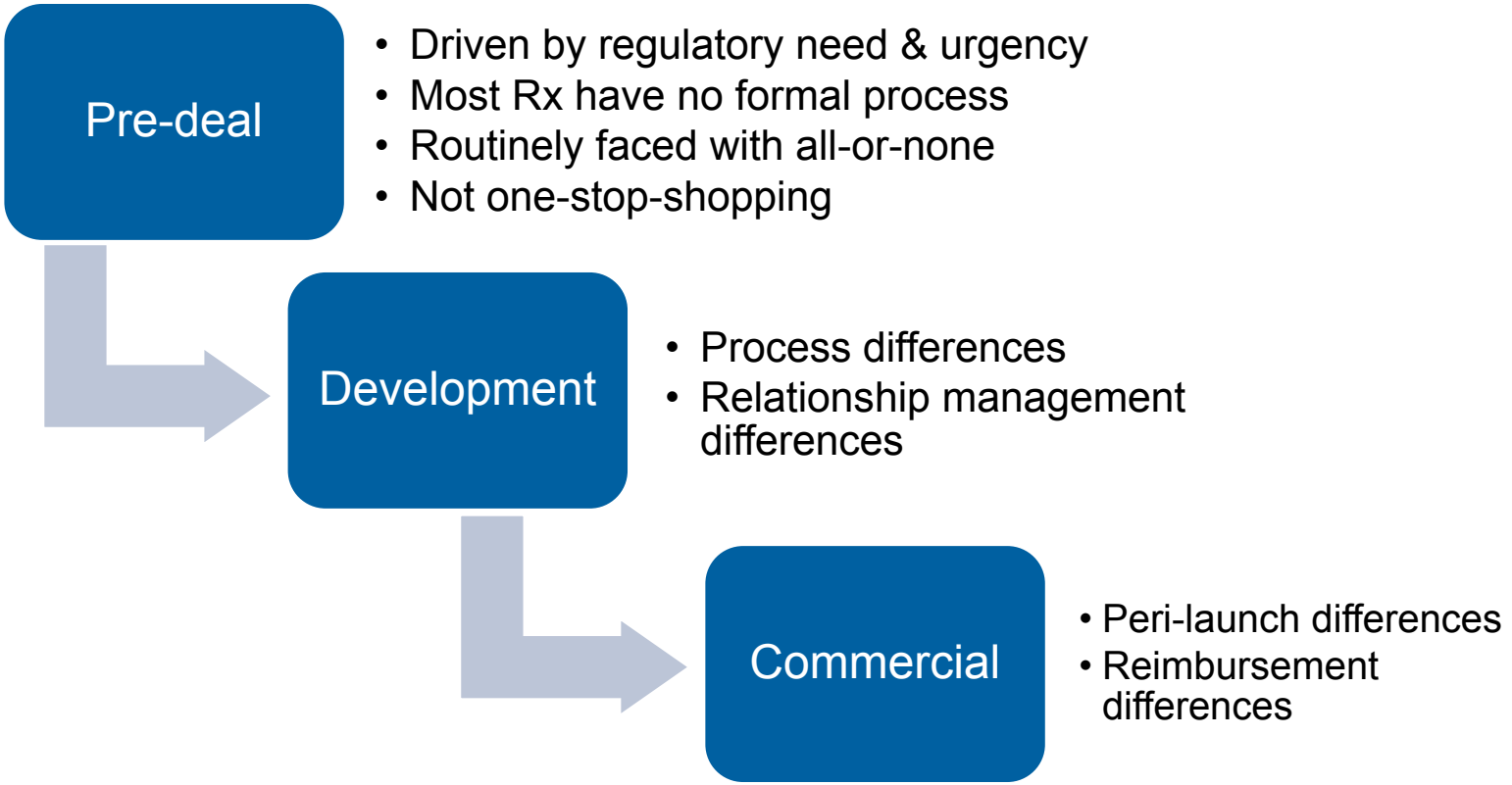
## Dx Partner Must…

- Design & Develop IVD
- Manufacture IVD
- Register IVD
- Deliver IVD to market

## Dx Parner Must Not…

- Delay drug development
- Delay drug registration
- Delay drug launch
- Impede market access

# Staged Challenges



# Creative CDx Partnerships

# PrimeraDx CDx Program Features

| | |
|---|---|
| Modular diagnostic development | • Aligned with clinical development of therapeutic |
| Simplified economics | • Flat-fee structure instead of fee-for-service<br>• Not all-or-none |
| Lab partnered | • Seamless deployment in trials and commercial |

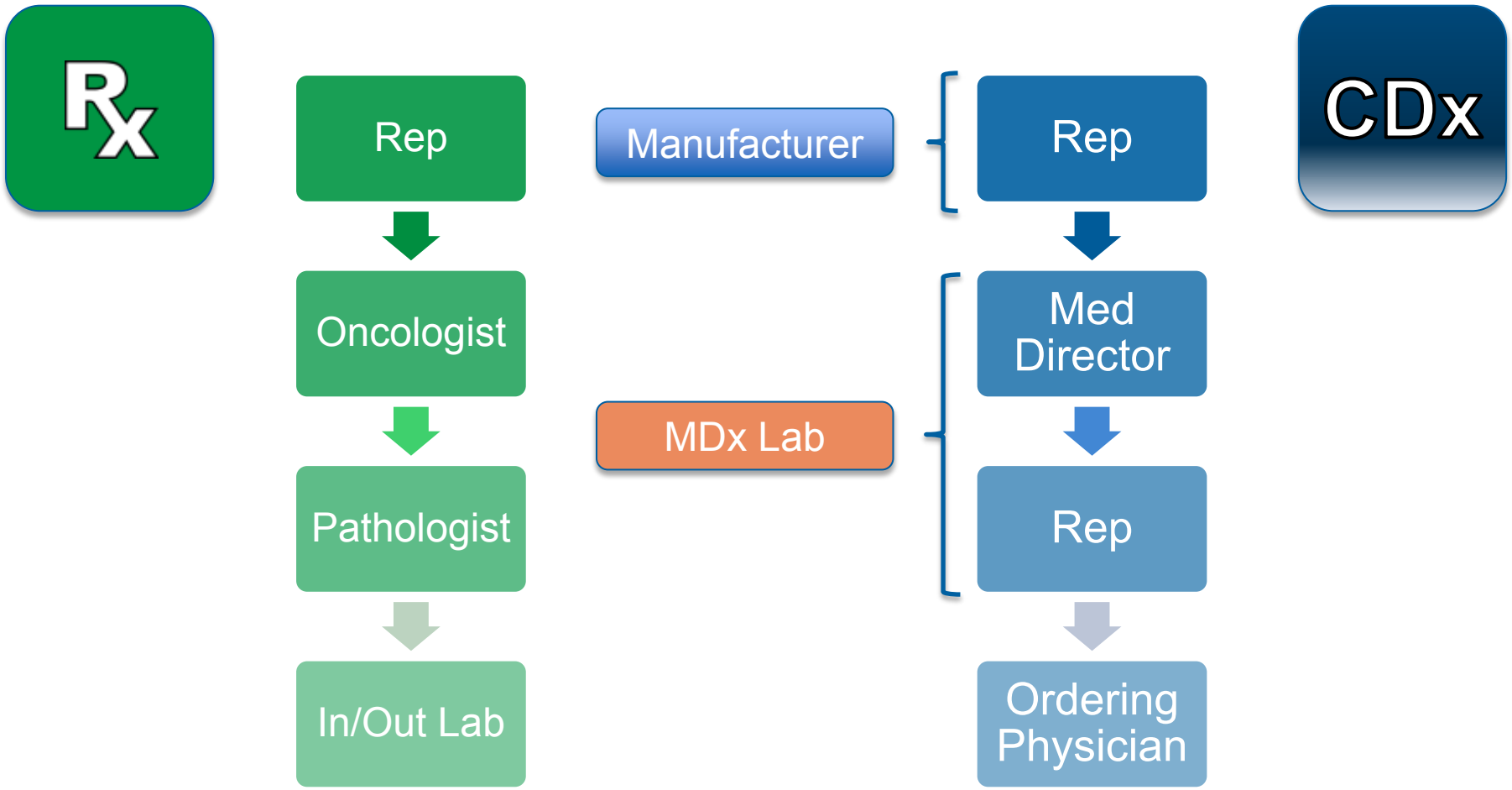
# Modular CDx Program Structure

## Broad benefits to pharma clients:

- Modules align with therapeutic asset clinical development, risks, commitments
- Transactions appropriate to near-term needs

| | Module 1<br>IVD-track CTA | Module 2<br>IUO | Module 3<br>IVD | Module 4<br>Commercial |
|---|---|---|---|---|
| **Features** | • Assay design<br>• Assay development<br>• Under Design Control<br>• Tissue-specific | • Final robustness testing<br>• Transfer to manufacturing<br>• cGMP production lots<br>• IDE status<br>• CE Mark | • Trial support to CLIA CROs<br>• V&V studies<br>• Concordance analyses<br>• PMA preparation and submission<br>• XUS registrations | • Pre-launch conversion from CROs to commercial lab<br>• Facilitate lab partner reimbursement<br>• Support post-approval surveillance trial |
| **Deliverables** | IVD-track assay for use in clinical trial lab | IVD-track IUO for use in registrational trial | • PMA submission<br>• Global registrations | Global distribution |
| **Benefits** | • Identical formulation<br>• Design History File established<br>• Risk of discordance very low<br>• Remains flexible to iterations<br>• Smooth tech transfer | • cGMP lots identical to IVD<br>• Risk of discordance extremely low<br>• Can be deployed at CTLs in parallel to V&V studies<br>• IDE in place for patient selection | • Eliminates risk of off-protocol use of IUO<br>• Risk of discordance extremely low<br>• Discordance tie-breaker not required<br>• PMA submission ahead of NDA | • Use of CROs that also have large lab network commercial capabilities allows smooth conversion at launch<br>• Reimbursement in major territories more streamlined |

# Rx-CDx Commercial Differences



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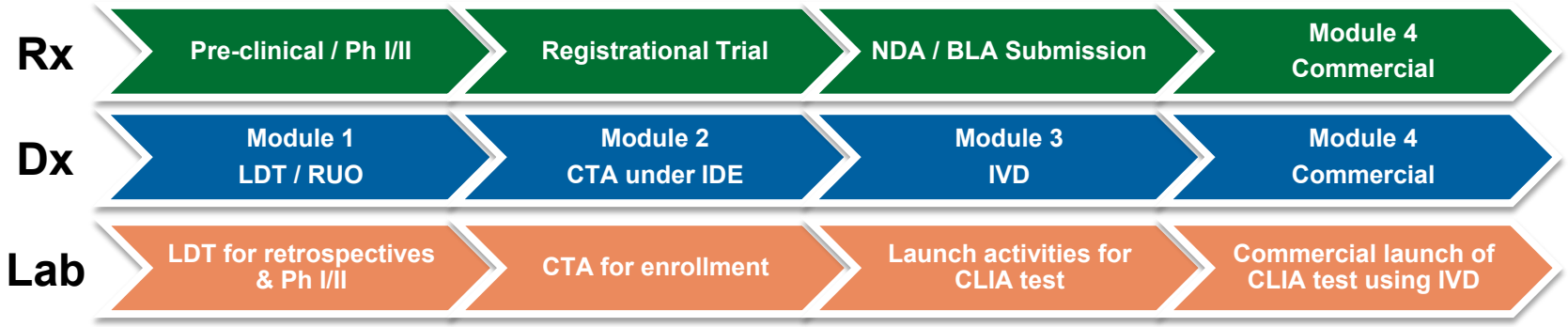
# Rx-Dx-Lab Solution to CDx Development & Commercialization

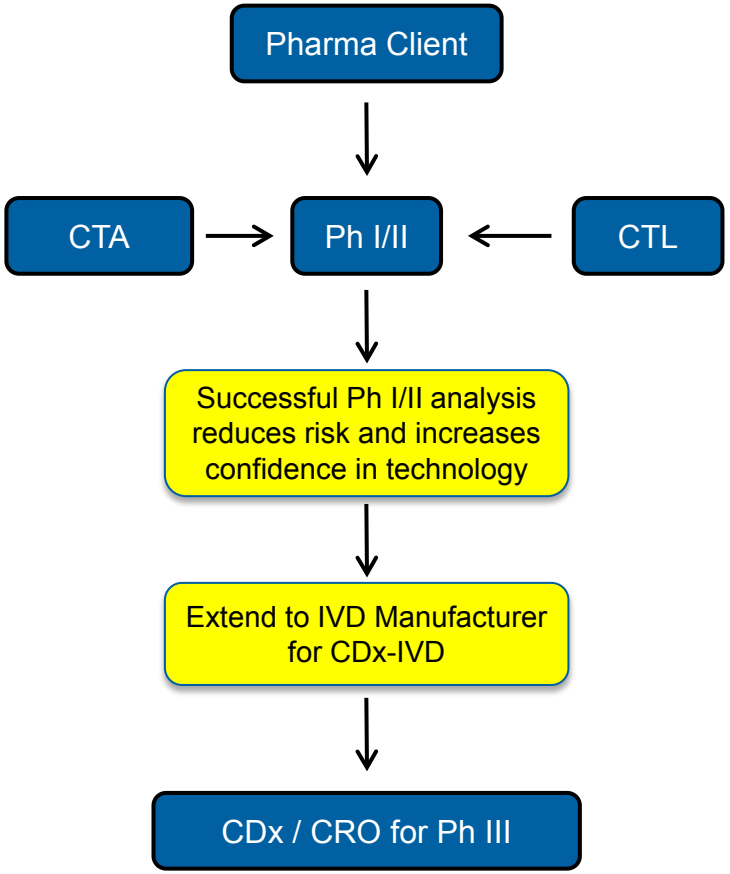



| | | | | |
|---|---|---|---|---|
| **Features** | • LDT / RUO on platform and on protocol for using in early work | • CTA under IDE at designated lab | • Lab prepares for IVD and drug launch during FDA review period | • Lab launches full commercial activities simultaneous with Rx/CDx |
| **Benefits** | • LDT / RUO approximates the proper test so low risk of discordance<br>• Relationship between PDx and Lab independent of Pharma | • Conversion from LDT to CTA is seamless and low risk | • Lab has transparency with Rx/CDx timelines and commercial strategies<br>• Allows reimbursement to be in place at CDx launch | • Launch of Rx/CDx has missing partner to seamlessly migrate from CTA to CLIA<br>• Option to share commercial data and incorporate into strategy |

**Broad benefits to pharma clients:**
- Reduces deal time and tech transfer risk to Lab
- Reduces platform adoption risk for CTA deployment
- Provides ready CDx access solution at commercial launch

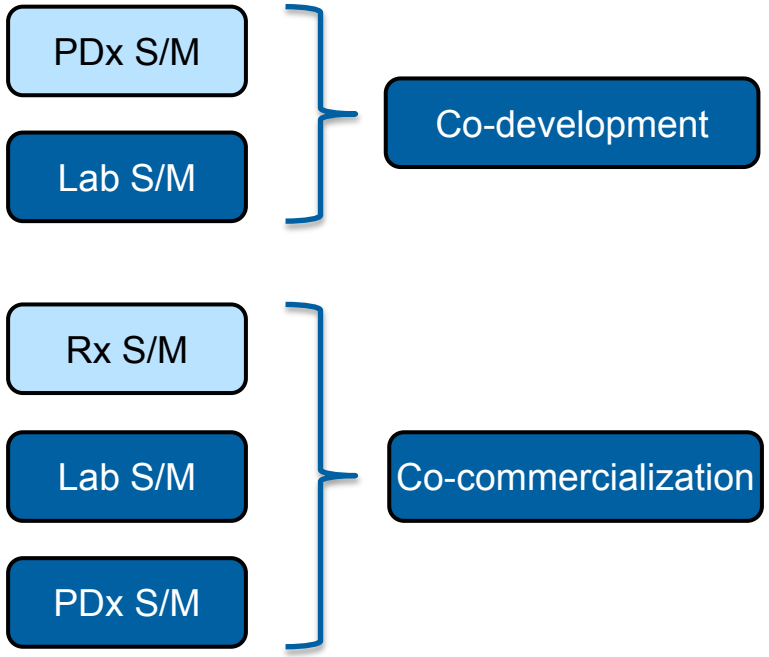
# Clinical Trial Lab Partnering – Development Phase

- CTL + PrimeraDx
  - Assist drug development
  - Address CDx needs
  - IVD-track Clinical Trial Assays (CTAs)
- Collaboration Agreement
  - Co-development of assays
  - Co-marketing of CDx services



# Clinical Lab Partnering – Commercial Phase

- CTL + PrimeraDx
  - Address CDx requirements
    - FDA, etc
    - Trial specimen analyses
  - IVD-track CTAs
- CLIA + PrimeraDx
  - Assist drug commercialization
  - Address CDx access
  - Streamline reimbursement
- Commercialization Agreement(s)
  - Distribution logistics
  - Co-marketing of Rx / CDx-IVD / Lab



# PrimeraDx's Unique CDx Model Balances Risk

## Unique yet conventional platform

- qPCR is well accepted at FDA and practiced globally
- Multiplexed, multimodal tests reduce specimen requirements and multiple registrations

## Modular CDx development

- Development and use of IVD-track CTAs
  - reduces risk of discordance at each stage
  - allows smooth continuation to next phase
  - eliminates need to rebuild test to convert RUO into IUO

## Deal structure

- Modules aligned with clinical drug development budgets
- Flat-fee for milestones instead of fee-for-service shares economic risk
- No requirement for full commitment to PMA at initiation

## Lab partnerships for trials and commercialization

- Enable clinical development with smooth conversion to commercial
- Allow for commercial alignment with therapeutic company in the peri-launch period

PrimeraDx

*The Multiplex PCR Company*