

From: [John West](#)
To: [Carol Tillis](#); [Eliane Sousa](#)
Cc: [Richard Chen](#); [Christian Haudenschild](#)
Subject: John West's Board Slides
Date: Wednesday, September 5, 2012 7:10:37 AM
Attachments: [CEO Overview - September 2012.ppt](#)

Eliane,

These are ready to print.

Thank you.

John

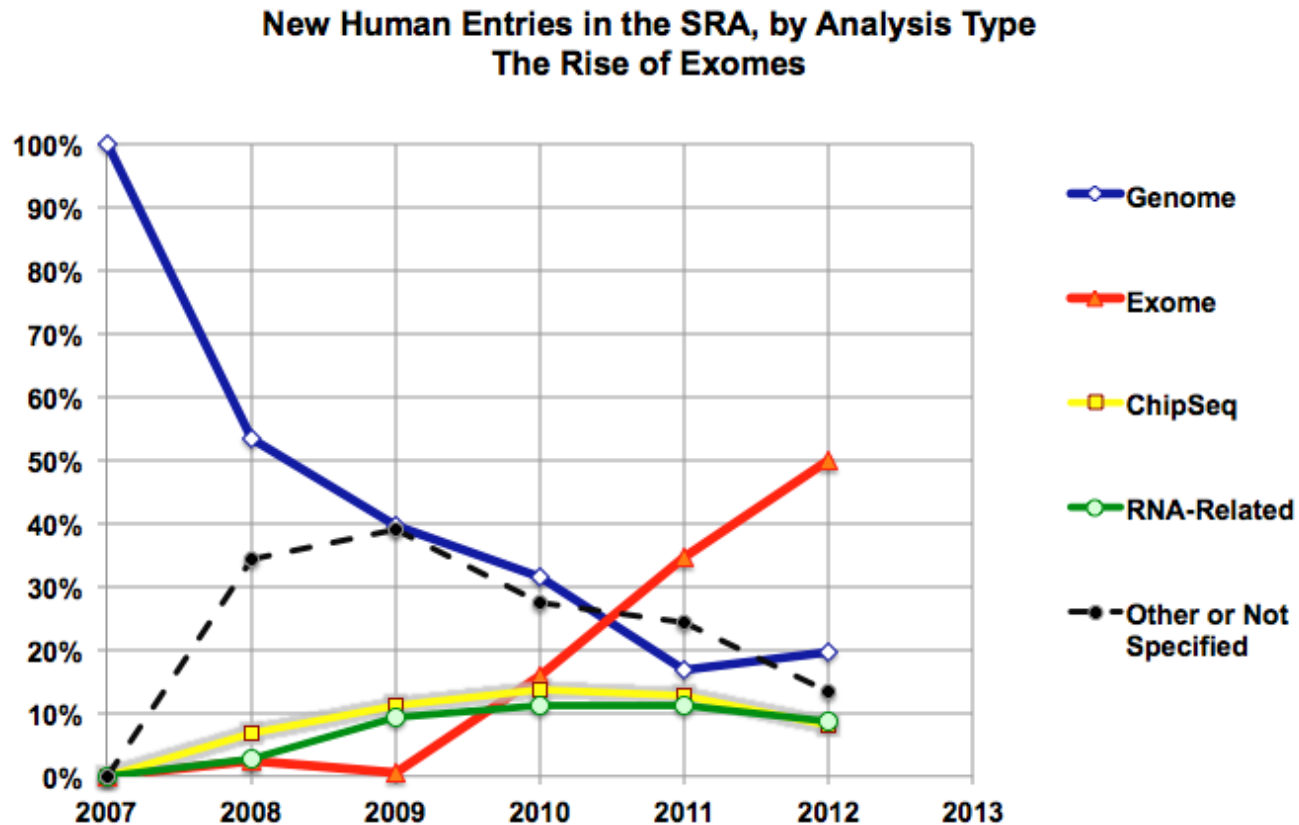
Personalis Board of Directors Meeting CEO Overview

John West
Sept 5th, 2012

Personalis Overview

- R&D achieved target: prototype ready for beta testing at end of August
- First purchase order imminent (\$100k, rare brain disease research)
 - Exome sequencing, pipeline, annotation & case/control analysis
 - Example of rapid potential revenue & transaction size in research market
- New labs operational (HiSeq & MiSeq; Whole genomes & now exomes)
- Increasing attraction of in-house sequencing combined with analysis
 - Implement proprietary content in lab assays, 1st: Exome-plus
 - Turnaround time & CLIA attractive to customers
 - Achieve margin from the lab assay and informatics
 - Positioning towards whole-genome diagnostics, not bioinformatics
 - Proposal to move forward CapEx for 2nd HiSeq (from early 2013)
- Formal Applications submitted for CLIA & CAP accreditation
- Invited presentation : NIST meeting, co-funded by FDA
- Recruiting transitioning to commercial roles
- Cash at 8/31 \$500k above newest budget
- Prepared to discuss Series B scenarios & potential new investors

Exomes Approach 50% of All New Human SRA Entries Whole Genome (including skim-coverage) 20%



Exome Issues

- **Amount of sequencing & cost issues:**
 - Exons are < 3% of the genome
 - Technology for pullout is non-uniform; draws some off target DNA too
 - Compensated by higher average coverage
 - Sample prep prior to exome sequencing is more complex, costly
 - Illumina vs Complete Genomics price war has not touched exomes
 - Net, exome pricing is about 50% of whole genome
- **Technical performance :**
 - Little content outside the exons
 - Coverage non-uniformity due to pullout and PCR-based GC-bias
 - Worse alignment due to short molecules used to match short exons

Exome Issues

- **Personalis Perspectives :**
 - 10x sample throughput per sequencer CapEx investment
 - 48 exomes / HiSeq run vs 5 whole genomes
 - More practical for Personalis to leverage turnaround time
 - Room for reasonable margins
 - Technical challenges are an opportunity to differentiate
 - Ensure forward applicable to whole genome
 - Lower price point assay & higher sample throughput increase the sample volume accessible to our content & bioinformatics offerings

Differentiation of Personalis “Exome-Plus” Service

- **Premium delivery of otherwise full-coverage exome sequencing:**
 - Turn-around time; prep & pullout optimization
- **Custom pullout #1, from standard (short molecule) library prep :**
 - Personalis content outside the exons
 - Proprietary: PharmGKB, VariMed, Regulome
 - Deep intronic splice sites & SV junction sequences
 - Supplementary coverage to fill in the valleys of the standard exome
 - Run on the HiSeq with the normal pullout, at standard read lengths
- **Custom pullout #2, from long molecule (1-2 kbp) library prep :**
 - Run multiplexed on MiSeq, with longer reads
 - Focus on content with alignment-related accuracy problems
 - HLA, Segmental duplications, Expanding repeat diseases, etc

Key Gross Margin Inputs

	Estimated Reagent Cost	Target Pricing
Exome	\$ 600	\$ 2,500
Exome-Plus	\$ 1,000	\$ 3,500
Whole Genome 30x	\$ 4,000	Discuss

Appendix

Slides from July meeting related to revenue plan

Revenue Plan

- Personalis plan changed to begin with Pipeline product vs comprehensive genome interpretation:
 - 100% research market, but accuracy a key requirement for clinical products
 - Headline application, Case / Control studies, inherently require larger #'s of genomes
- Lab as an expanding part of our plan:
 - Direct relationship with the customer
 - Position towards whole-genome molecular diagnostics, vs “a bioinformatics company”
 - Opportunity to implement our IP in physical assays
 - Capture margin of the assay by leveraging our informatics

Revenue Planning

- Multiple assay scales:
 - Whole genome + Personalis “Exome-plus”
 - Just Personalis “Exome-plus”
 - Just a “standard” Exome
 - User provides data
- Revenue Components:
 - Whole genome is 3rd party pass-through, so not in revenue or COGS
 - Base of in-house capacity to generate exomes with/without Personalis content & Personalis Pipeline analysis (linearly scalable with moderate CapEx)
 - Professional services overlay for Rare-Variant-Discovery-Service and Genome-Interpretation-Service products (Experience curve & automation are key to scalability)
- Customer interaction model:
 - Pipeline : Case vs Control, chunks of 48 genomes, > \$100k / transaction
 - RVDS & GIS : Genomes typically in trio or solo units, but customer relationship is to establish a flow, which we aggregate into 48-genome chunks internally

Pricing Ranges of Components in Current Model

- Whole genome sequencing (pass-through) :
 - 20 units, research only, 30x coverage : \$3,400 mid-2012
 - Price of reagents alone to Personalis : \$4,000 – Non-competitive
 - Multiple premium offerings seeking higher unit pricing:
 - 60x coverage : \$6,100
 - CLIA single unit : \$ 7,500 – 9,500
 - Rapid turn-around : \$ 9,500
- Exomes :
 - Not offered by Illumina or Complete Genomics
 - Multiple services, e.g. BGI : \$1,800 – Prices firming
 - Personalis standard exome with Pipeline analysis : \$2,500 / unit (Quantity 48)
 - Personalis “Exome-plus” with Pipeline analysis : \$3,500 / unit (Quantity 48)
- Professional services:
 - Unit = 8 hours genetic counselor + 1 hour MD : \$3,500

Example Pricing, Combining Components

- Case / Control research service:
 - 24 cases + 24 controls
 - Personalis “Exome-Plus” with Pipeline Analysis only
 - $48 \times \$3,500 = \$168\text{k}$ / project
- Rare Variant Discovery Service:
 - Unit is for one trio (parents + child) but contract sought is for flow (N trios per time period)
 - 3 x “Exome-Plus” with 1 day RUO Professional Services
 - $(3 \times \$3,500) + \$3,500 = \$14,000$ (i.e. above Ambry)
- Premium Genome Interpretation Service:
 - Unit is for one genome, but contract sought is for a flow
 - Pass-through Illumina 30x genome + Personalis “Exome-plus” + 2 days Professional Services
 - $\$3,400 + \$3,500 + \$7,000 = \$13,900$ (\$10,500 is recognized as Personalis revenue)
 - Multiple price points with different combinations of components, to address differing customer needs & compete

Top Level Revenue Breakdown by Product

		2012				2013			
		Q4		Q1	Q2	Q3	Q4	Total	
TOTAL REVENUE		\$ 240,000		\$ 1,000,000	\$ 2,000,000	\$ 3,000,000	\$ 4,000,000	\$ 10,000,000	
Pipeline		\$ 240,000		\$ 900,000	\$ 1,600,000	\$ 1,900,000	\$ 2,100,000	\$ 6,500,000	65%
Rare Variant Discovery				\$ 100,000	\$ 300,000	\$ 600,000	\$ 1,000,000	\$ 2,000,000	20%
Genome					\$ 100,000	\$ 500,000	\$ 900,000	\$ 1,500,000	15%

One product intro / quarter

RVDS & GIS (35% of 2013 plan) could slip, depending on Pipeline feedback

PIPELINE	2012		2013				
	Q4		Q1	Q2	Q3	Q4	Total
Basic Exome							
48 per run on hiSec (3/lane)							
\$2,500 AUP per Exome = \$120K/run							
\$600 / sample in reagents & consumables - \$400 sequencing and \$110 in pull-out/sample & \$90 other)							
Max 8 runs / instrument / quarter with a outcome at 7 runs / instrument/qtr (yield)							
# Hi-Seq runs	2		6	10	9	5	30
Revenue in quarter	\$ 240,000		\$ 720,000	\$ 1,200,000	\$ 1,080,000	\$ 600,000	\$ 3,600,000
Total # of exomes	96		288	480	432	240	1,440
Personalis "Exome Plus":							
48 per run on hiSec (3/lane)							
\$3,500 AUP per Exome = \$168K/run							
\$1,000 reagents / sample (incl. custom pullout)							
# Hi-Seq runs	0		1	3	5	9	18
Revenue in quarter			\$ 168,000	\$ 504,000	\$ 840,000	\$ 1,512,000	\$ 3,024,000
Total # of exomes			48	144	240	432	864
TOTAL							
# Hi-Seq runs	2		7	13	14	14	48
Revenue in quarter	\$ 240,000		\$ 888,000	\$ 1,704,000	\$ 1,920,000	\$ 2,112,000	\$ 6,624,000
Total # of exomes	-		48	144	240	432	864