Future Role of Non-IO Therapies: The Sad Tale of Neglected Targets and Companies in the Race to IO Domination

- **Lewis H. Bender, MS, MA, MBA,** President and Chief Executive Officer, Intensity Therapeutics, Inc.
- **Axel Hoos, MD, PhD,** Senior Vice President, Therapeutic Area Head R&D, Head Immuno-Oncology, GlaxoSmithKline
- **Russell LaMontagne, MS,** President and Chief Executive Officer, Boston Immune Technologies and Therapeutics
- **Eric Rowinsky, MD,** Executive Chairman and President, RGenix, Inc
- **Joel S. Sandler, PhD,** Associate Principal, Defined Health (*moderator*)
- **Peter Sandor, MD, MBA,** Vice President and Global TA Head Oncology, Marketing Strategy, Astellas Pharma, US, Inc.

What's hot in oncology? A review of 2009 and predictions for 2010

By MaverickNY on December 18, 2009

- **Highlighted drug candidates in 2009?**
  - Afinitor (**mTORi**) and pazopanib (**mTKI**) in RCC
  - Folotyn (**anti-folate**) and Istodax (**HDACi**) in TCLs
  - Arzerra (**anti-CD20 mAb**) in CLL
  - Clolar (**anti-metabolite**) in ALL
  - Yondelis (**DNA intercalater**) in sarcoma
  - Xgeva (**RANKL inhibitor**) for bone mets
- **What to watch for in 2010?**
  - Nilotinib, dasatinib, ponatinib, and omacetaxine (**TKIs**) in CML
  - Clofarabine (**anti-metabolite**) in AML
  - Pixantrone (**anthracycline**) in NHL
  - Ridaforolimus (**mTORi**) in sarcomas
  - Ipilimumab (**anti-CTLA4**) in melanoma
  - Provenge (**vaccine**) in prostate cancer
  - Enzalutamide and abiraterone (**AR antagonists**) in prostate cancer
  - ASA400 (**vascular disrupting agent**) in lung cancer
  - Olaparib (**PARPi**) in breast and ovarian cancers

- **Targeted therapy**
- **Anti-metabolites**
- **Epigenetics**
- **mAbs (non-IO)**
- **Chemo**
- **Hormone tx**
- **Angiogenesis**
- **Immunotherapy**

Only 2 IO assets mentioned

http://pharmastrategyblog.com/2009/12/a-year-in-oncology-.html/

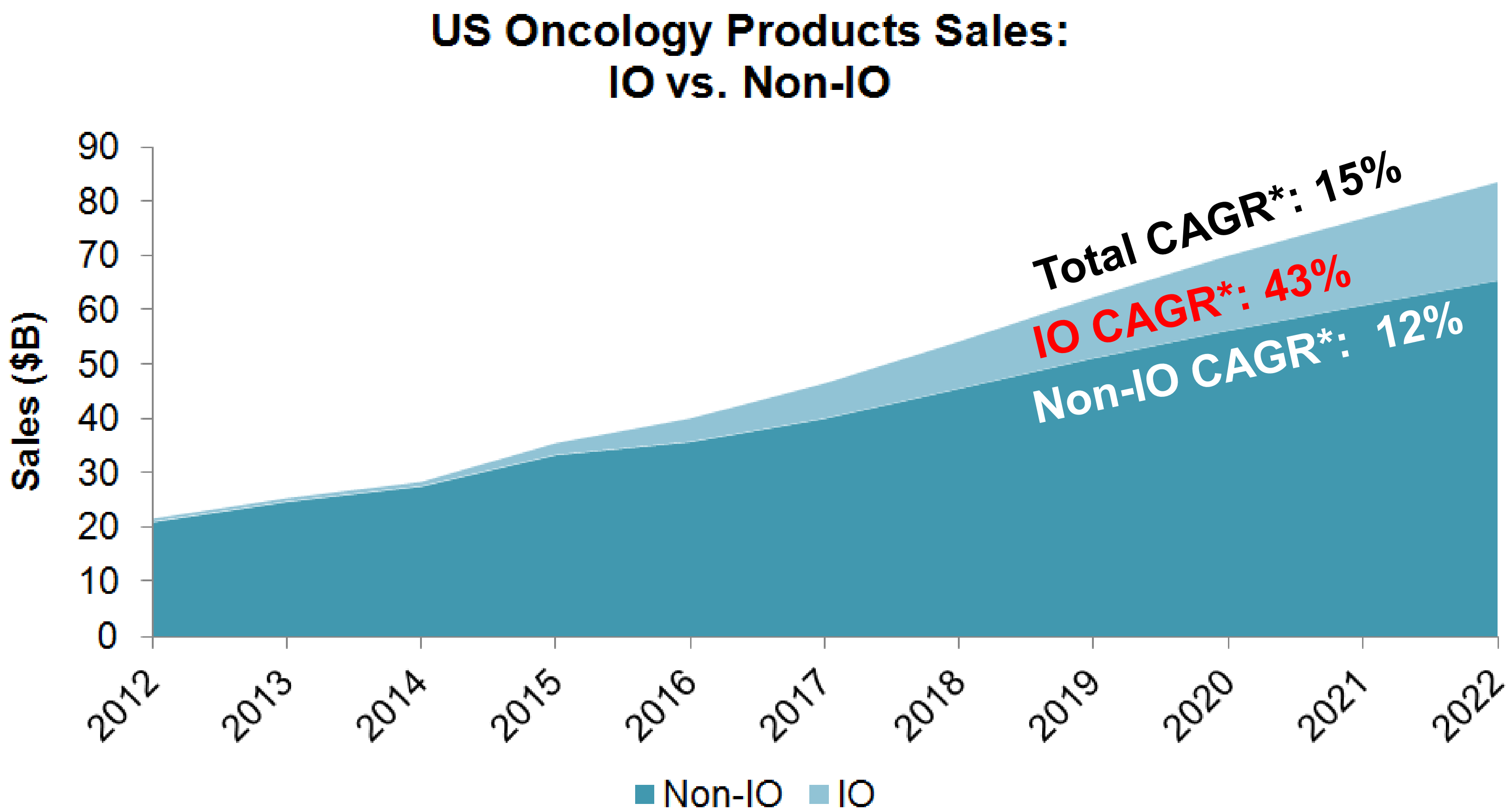
What's Hot at ASCO 2016?

Zosia Chustecka | May 30, 2016

CHICAGO -- So here we go again -- it's late May and already email inboxes are full of announcements about the new clinical data that will be presented at the forthcoming American Society of Clinical Oncology (ASCO) 2016 Annual Meeting, held again in Chicago, June 3-7.

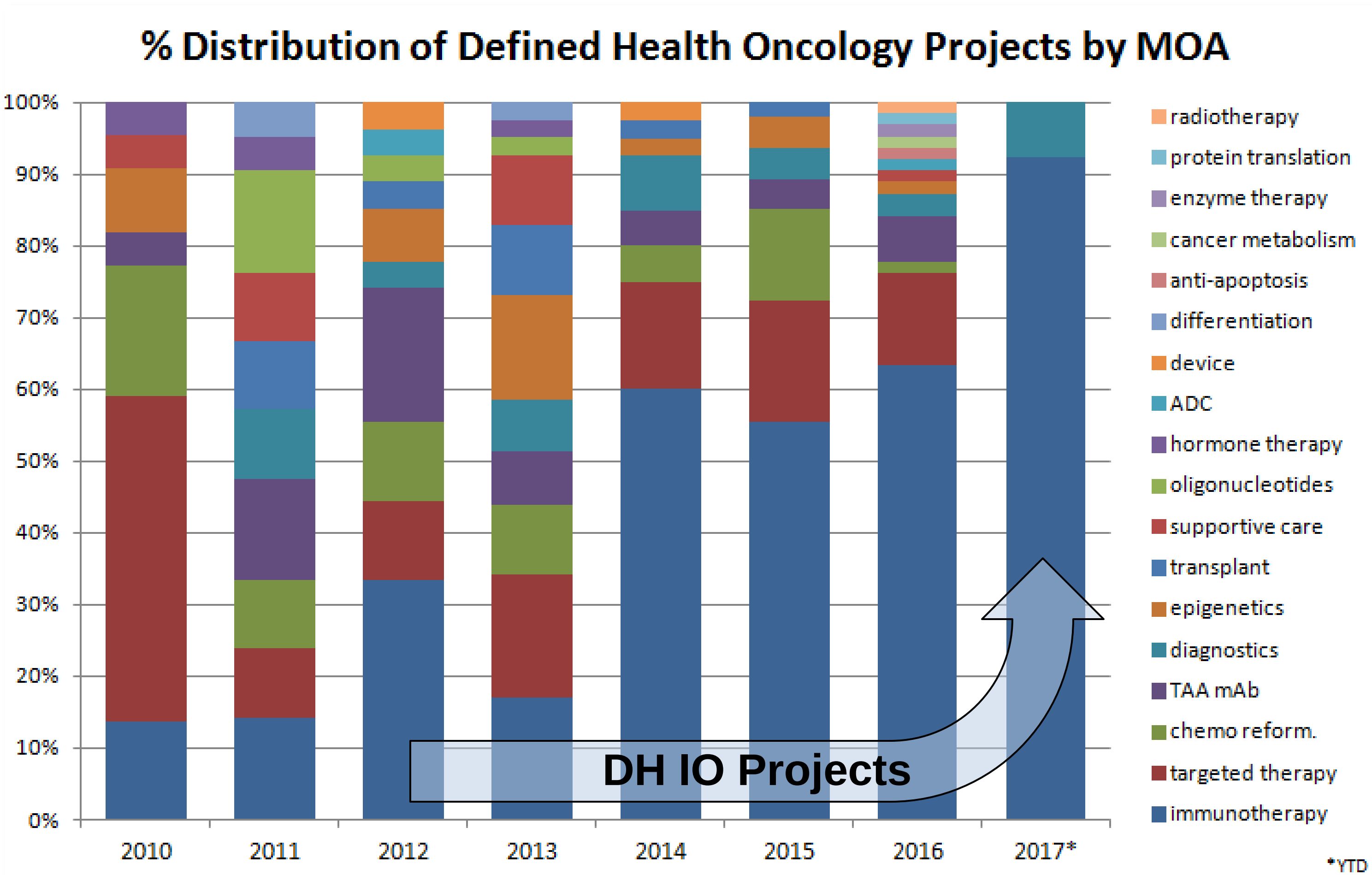
"No recent advance has been more transformative than the rise of immunotherapy, particularly over the past year," commented ASCO president Julie M Vose, MD, MBA. But **what has been seen to date may just be the tip of the iceberg**, as research continues, not only with immunotherapy drugs, but also other ways of manipulating the immune system, most notably with chimeric antigen receptor (CAR) T-cells, which have shown **long-lasting responses in patients** with various hematological cancers.

Non-IO Product Sales Still Dwarf Those of IO, Though Growth Trajectories Tell a Different Story

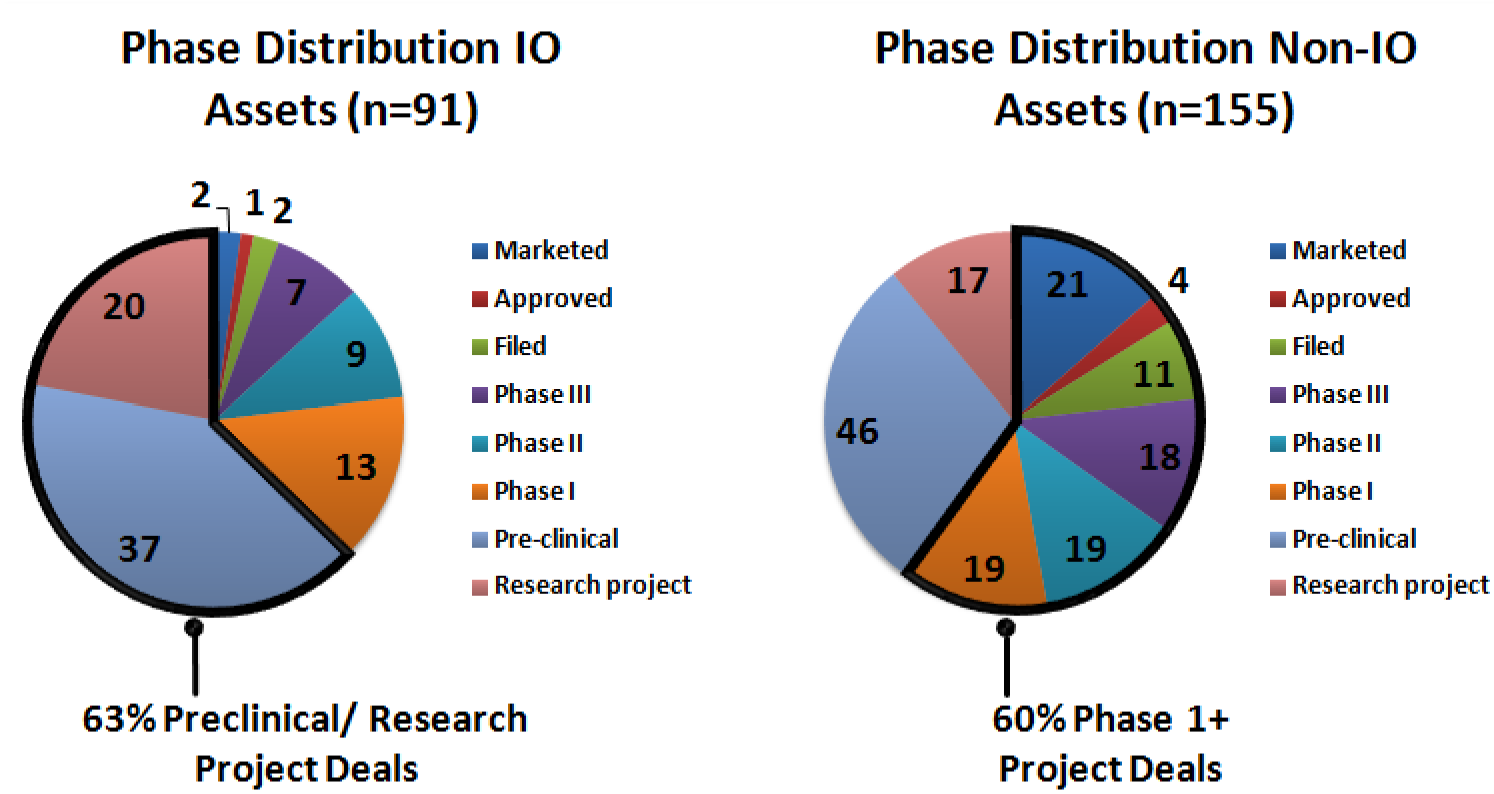


*2012-2022

DH Oncology Project Distribution Reflects the Changing Times



IO Asset Deals Executed Earlier Than Non-IO Deals*



Evaluate Pharma; DH analysis; *2016 data

Market Demand for Non-IO Assets Exists, Though Seemingly Predicated on Overtly Convincing PoC Data

AbbVie Buying Cancer Drug Startup Stemcentrx for $10.2 Billion

Dan Primack
Apr 28, 2016

Celator Parlays Leukemia Drug Data into $1.5B Buyout From Jazz Pharma

Astellas snaps up cancer antibody play Ganymed for up to $1.4B

by *Stacy Lawrence*

BC EXTRA | COMPANY NEWS

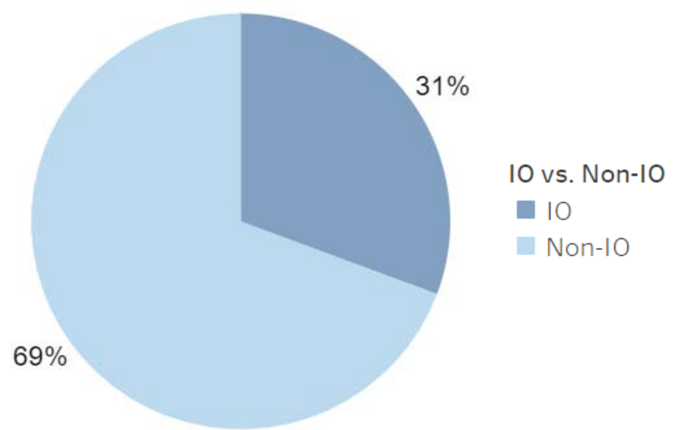
EXELIXIS PARTNERS CABOMETYX WITH BMS, ROCHE FOR COMBO STUDIES

BY BECKY SIMON

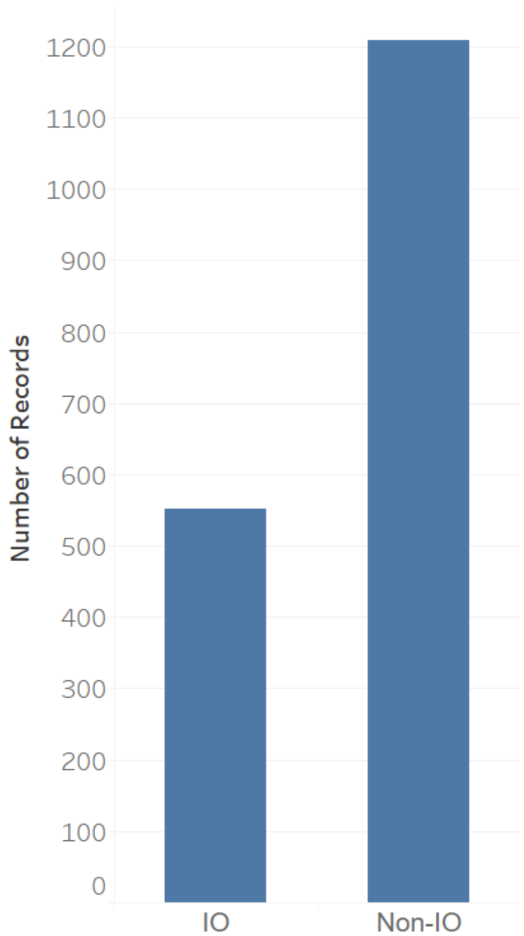
Non-IO Still Dominates the Pipeline, But IO Agents are Making Rapid Inroads

- While IO shows strong market growth and an increasing presence in oncology treatment, Non-IO compounds still constitute the majority of the overall oncology pipeline.
- Within the oncology pipeline, Non-IO and IO compounds are split by approximately two-thirds to one-third, respectively (~1200 Non-IO and ~550 IO agents total).

Oncology Pipeline: IO vs. Non-IO (%)
N=1759



Oncology Pipeline: IO vs. Non-IO (Count)
N=1759



Adis R&D Insight; Clarivate; DH analysis

Key Questions for this Panel

- **General**
  - **Is the IO/non-IO distinction real? What purpose does it serve?**
  - **Tipping points that might determine importance of IO vs. non-IO?**
- **Biotech**
  - **Combine with or compete against IO? Relative merits of each?**
  - **Mileage from demonstrating IO effect of a “non-IO” asset?**
- **Pharma**
  - **Evidence for non-IO needed to drive deal-making?**
  - **Unique roles for non-IO?**
  - **Attractive modalities, areas of biology?**