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THOMSON REUTERS RECAP

Current Life Sciences Dealmaking Landscape

May 2015



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Contents

- Introduction to Data Source
- Overview of 2014 and Q1 2015 Dealmaking
- Mergers and Acquisitions
- Option to Acquire Structures
- Licenses and JVs of Products and Technologies
- Conclusions

Introduction to Thomson Reuters Life Sciences

Thomson Reuters Business Segments



Financial & Risk

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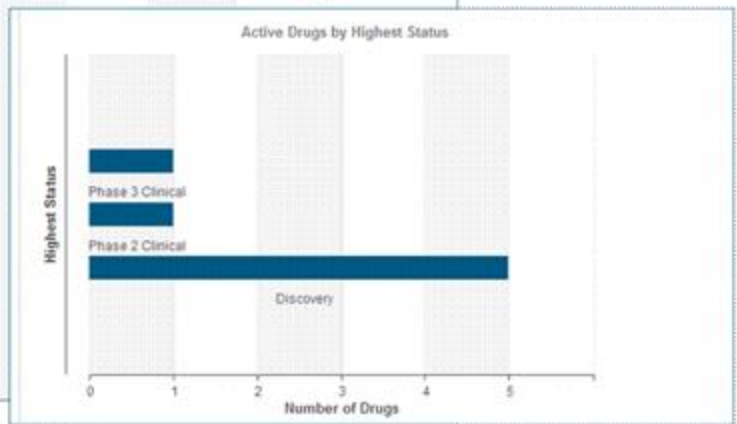
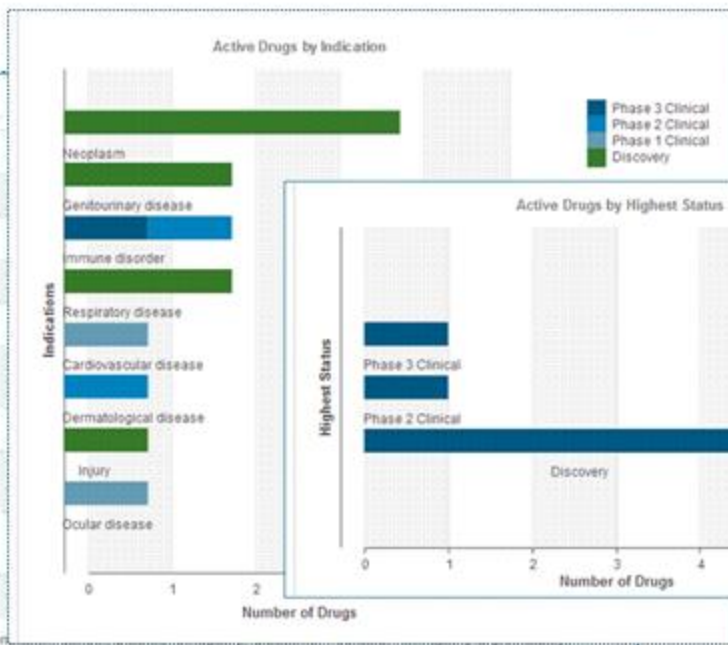


Selected Thomson Reuters IP&S Tools

Intellectual Property	Scientific R&D	Business of Science
<ul style="list-style-type: none">• Derwent World Patents• Thomson Innovation• Saegis Global Trademark Screening• TechStreet Codes and Standards• IP Rules Comprehensive File• Thomson File Histories• MarkMonitor Online Brand Protection• IP Translation and Payment Services	<ul style="list-style-type: none">• Web of Science Research Platform• Science Citation Index• Chinese Science Citation Index• Conference Proceedings Citation Index• BIOSIS Previews• Inspec• Current Contents• EndNote• ScholarOne Grants & Awards	<ul style="list-style-type: none">• Recap Dealbuilder IQ• Cortellis Competitive Intelligence• Cortellis Data Fusion• Cortellis for Regulatory Intelligence• Cortellis for Clinical Trials Intelligence• BioWorld Today• Incidence Prevalence Database• Newport Generic Market Intelligence• CMR GlobalR&D Performance Metrics Program• Integrity• Systems Biology and Systems Toxicology

Cortellis: Company Profiles

Gene Signal SAS		
Snapshot	SNAPSHOT	
Latest Press Releases	Company Name	Gene Signal SAS
Latest Event Transcripts	Parent Company Name	Gene Signal SAS
Broker Research Reports	Website	http://www.genesignal.com/
Company Profile	Country	Switzerland
Financials	Number of Drugs In Active Development	7
Company Contacts	Number of Inactive Drugs	2
Subsidiary Companies	Number of Patents as Owner	13
Drug Switch and Forecasts	Number of Patents as Third Party	0
Drugs	Number of Deals	0
Deals	Key Indications	Lung tumor, Age related macular degener, Rosacea, Wound healing, Bladder cancer, Corneal transplant rejection, Renal tumor
Clinical Trials	Key Target based Actions	Insulin receptor substrate-1 inhibitor, IRS1 gene inhibitor, Insulin receptor substrate-1 modulator, Phosphoinositide 3-kinase
Patents		
Sources		



Gene Signal SAS	
Snapshot	COMPANY PROFILE
Latest Press Releases	SUMMARY
Latest Event Transcripts	Gene Signal, founded in February 2000, is focused on the development of antisense oligonucleotides, proteins and monoclonal antibodies for angiogenesis based diseases of ophthalmology, dermatology, vascular and oncology.
Broker Research Reports	COMPANY LOCATION
Company Profile	In November 2008, Gene Signal relocated the company headquarters to Lausanne, Switzerland [951485]. The company has R&D facilities in Evry, France. The company also has a development center in Montreal, Canada, and administrative offices in Boulogne, France [839185].

CMR Benchmarking Consortium

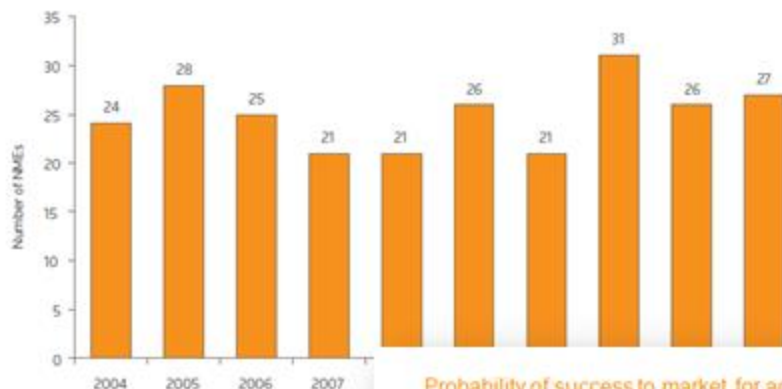


2014 CMR INTERNATIONAL
PHARMACEUTICAL R&D
EXECUTIVE SUMMARY

AUGUST 2014

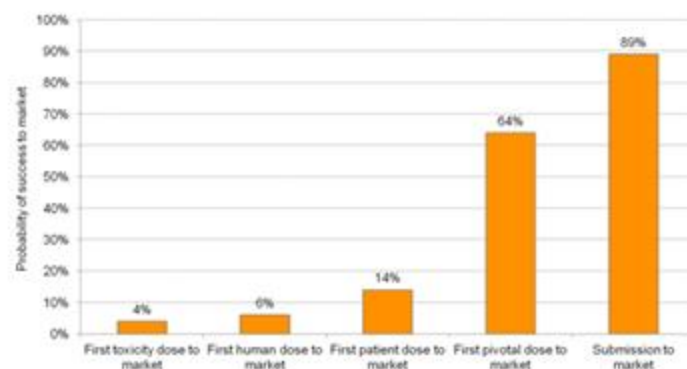


FIGURE 2 – NUMBER OF NME FIRST WORLD LAUNCHES 2004 TO 2013



Source: 2014 CMR International Pharmaceutical

Probability of success to market for active substances



Probabilities of success to market were calculated using success rates between phase for active substances entering phase between 2007 and 2009 and year of assessment 2012.



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Incidence and Prevalence Database

ICD-9 Code: 11.6 Corneal transplant (corneal graft)

Global Incidence & Prevalence Report

Incidence	Prevalence
GERMANY NORTH AMERICA U.S. (10) UNITED KINGDOM (7)	U.S.

* Regional data (e.g. worldwide) often includes countries not mentioned in our index list.

Incidence

UNITED KINGDOM: While the total number of corneal graft operations in the United Kingdom has increased over the past decade, the proportion of lamellar keratoplasty operations under the National Health Service Budget has decreased. During the same period, deep anterior lamellar keratoplasty (EKA) operations increased from 2 to 10%. The proportions of corneal graft operations in the United Kingdom are shown in the following table. The annual numbers of eyes undergoing corneal graft operations in the United Kingdom from April 1, 1999, to March 31, 2009, distinguishing between corneal grafts using donor corneal material supplied by the 2 Corneas Eye Bank, London, and the Bristol Eye Bank, Bristol, England). The total annual number of operations for keratoconus increased from 550 (2006-2007 to 2008-2009) to a plateau of about 550 (2006-2007 to 2008-2009). The number of operations for keratoconus during the study period, at about 25%. The number of operations for keratoconus during the study period (2006-2007), accounting for approximately 6% of all corneal graft operations, increased from 2005 to 2007, accounting for approximately 6% of endothelial failure increased substantially from 7% of all grafts in 2000-2001 and 37.4% of all grafts in 2002-2003 to 7.6% of all grafts in 2008-2009. In contrast, the number of DALK operations increased from 45 in 1999-2000 to 401 (16.0%) in 2008-2009. The number of DALK operations decreased from 2000 to the lowest level of 322 in 2008-2009. In contrast, the number of DALK operations increased more than 5-fold, from 45 in 1999-2000 to 226 in 2008-2009. Expressed as a proportion of the total number of grafts for keratoconus, this represents a decrease from 88.1% in 1999-2000 to 57.1% in 2008-2009 for PK and an increase from 8.8% in 1999-2000 to 40.1% in 2008-2009 for DALK. (Archives of Ophthalmology, V. 130, 5/12: p621)

ICD-9 Code: 11.6 Corneal transplant (corneal graft)

U.S. Patient Discharges

U.S. Hospital Inpatients

11.6 Corneal transplant (corneal graft)

This patient discharge report is an aggregate of any ICD-9 codes between (and including) 11.60-11.69. When multiple codes are included, patient visits are only counted once even if the record contains more than one diagnosis within this range.

A=Total Procedures; B=First-Listed Discharges; C=All-Listed Discharges; D=Average Stay/Days

	2005	2006	2007	2008	2009	2010
A	1,184	393	2,739	539	368	260
B	1,184	77	2,739	250	368	260
C	1,184	393	2,739	539	368	260
D	2.8	1.9	1.7	4.4	1.1	1.6

(Note: Visits under \$500 per year have a relative standard error of +/-30%.)

Source: National Hospital Discharge Survey (NHDS)

In contrast, the number of DALK operations increased more than 5-fold, from 45 in 1999-2000 to 226 in 2008-2009. Expressed as a proportion of the total number of grafts for keratoconus, this represents a decrease from 88.1% in 1999-2000 to 57.1% in 2008-2009 for PK and an increase from 8.8% in 1999-2000 to 40.1% in 2008-2009 for DALK. (Archives of Ophthalmology, V. 130, 5/12: p621)

BioWorld Today

BIOWORLD™
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BioWorld has been acquired by Thomson Reuters

U.S. commercialization of Jetrox finished

Thrombogenics stock rises on the search for sales muscle

Shares in Thrombogenics (tr) surged 10.7 percent during trading Monday, as the company unveiled plans to explore its "strategic options" - investment bank speak for finding a deal or finding a buyer. Thrombogenics is throwing its lot in on its own efforts to commercialize Jetrox (apixant) in the U.S. [more »](#)

MARKET **BIOTECH** **CANCER** **INDUSTRIAL**

- Thrombogenics stock rises on the search for sales muscle
- Spinal zap: Novartis' strongly drug shows in top-line results for sale
- Nanofilm device allows brain tumors easy way out
- Chilean "batpack" price, second-quarter search of Northern is NCM

Top Headlines

EW TONIGHT **EW THIS WEEK**

Post-IPO, Celltech Cor metabolic disease

FDA receptors avoid combination

Therapies series B gene tests turn on pipeline

Phar seeks to boost P-CyRITA data

Thrombogenics stock

CURRENT 800

Latest News

U.S. Sunovion Pharmaceuticals wins "green light" with first new disease crusher	EUROPE Novo Nordisk fund to back hormone-related drugs and diagnostics	IN THE CLINIC Pfully-sequenced Enveda begins phase II HD therapies phase II	DEALS AND M&A Post-ipo Celltech surges on Servier deal	FINANCINGS Concert shares hit a high note on IPO debut	NEWS & VIEWS Lentix setting the way with ultra-low CTS
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BIOWORLD™ TODAY

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JULY 23, 2014

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VOLUME 25, NO. 141

SYNTEC STAGE*

Next step in AML study advances ganetespib to phase III extension

By Randy Osborne, Staff Writer

With its lead cancer drug unpartnered and a new CEO yet to be chosen, Syntex Pharmaceuticals Corp. is advancing the phase II/III AML U-1 trial to test the chemosensitizing mettle of the heat-shock protein 90 inhibitor ganetespib when paired with low-dose cytarabine (Ara-C) in acute myeloid leukemia (AML) or high-risk myelodysplastic syndrome patients who are not eligible for intensive chemotherapy. An interim analysis of results from 50 patients given the combo in the phase II part of the trial, with complete response as its main efficacy outcome, led to the move

[See Syntex, page 2](#)

CBMG taking China's stem cell industry to international stage

By Shannon Ellis, Staff Writer

SHANGHAI - Cellular Biomedicine Group Inc. (CBMG) of Shanghai, has had a busy month, successfully listing on Nasdaq as the first "pureplay" biotech company from China and closing a \$10 million stock transaction.

It also didn't hurt that the company had some good news to share regarding its

[See CBMG, page 4](#)

FINANCINGS

Synlogic scores \$29.4M series A for therapeutic microbes

By Marie Powers, Staff Writer

Synlogic Inc. tucked a \$29.4 million series A into its belt as it aims at the nexus of synthetic biology and the microbiome with the development of therapeutic microbes. Atlas Venture and

[See Synlogic, page 5](#)

U.S. NEWS

Ease communications rules to encourage progress, Congress told

By Michael Fitzhugh, Staff Writer

Policy changes expanding access to patient health data and better fostering collaboration through transparency will be crucial to expediting patient access to new therapies, witnesses told members

[See Policy, page 6](#)

IN THE CLINIC

Biosceptre reports POC phase I cancer data, plans funding round

By Nuolo Moran, Staff Writer

LONDON - Biosceptre Ltd. announced positive results from a U.S. phase I study of its lead antibody, BIL-G10, providing proof of concept for what the company said is a highly specific target found in at

[See Biosceptre, page 7](#)

CHINA

Sinopharm to undergo ownership reform in pilot SASAC program

By Kristine Yang, Staff Writer

HONG KONG - Sinopharm Group, one of the largest biotech companies in China, is likely to undergo major structural reforms as the government kicks off a series of reforms on its state-owned

[See Sinopharm, page 8](#)

THE BIOWORLD BIOME

PSYCHIATRY'S MANHATTAN PROJECT? New research findings, \$650M cash pledge to bolster psychiatric space

By Anette Breinl, Science Editor

Psychiatry's net gains Tuesday: 108 new schizophrenia genetic loci and \$650 million.

The former were published in the July

[See Psychiatry, page 9](#)

NEWS & VIEWS

Therapeutic Proteins' Nazi dispels myths of biosimilars


One of the worries about biosimilar drug development is that the regulatory pathway will be just an onerous as it is for novel drugs, preventing any significant price reductions in biosimilar products. But Sarfaraz K. Niazi, founder, chairman

[See News & Views, page 10](#)

Thomson One Financial Content

Investor Name	% O/S - BCRX-O Most Recent	Pos DC: O Most Recent	Pos Cho: X-O Most Recent	Pos Pos: X-O Most Recent	Pos DC: O Most Recent	Pos Pos: X-O Most Recent	Pos Pos: X-O Most Recent	Equity Assets (\$MM)	Investment Style	Turnover	Investor Sub-Type	Country
Baker Bros. Advisors, LLC	11	6,999,979	1,136,264	20,42	01-Aug-2013	1.30	5,014.99	Hedge Fund	Low	Hedge Fund	USA	
RA Capital Management, LLC	10	5,850,000	100,000	100	31-Jul-2013	1.30	679.28	Hedge Fund	Moderate	Hedge Fund	USA	
Estate of William W Featheringill	5.5	2,968,511	2,965,110		05-01-2013						USA	
Doerr (John I. III)	5.2	2,767,930	0								USA	
RTW Investments, LLC	4.6	2,728,709	2,728,709								USA	
The Vanguard Group, Inc.	3.0	1,813,864	154,155								USA	
TFS Capital LLC	2.7	1,430,731	1,010,902								USA	
Blacklock Institutional Trust Company N.A.	2.4	1,270,668	2,115,837								USA	
TPG Capital, L.P.	2.1	1,169,236	0								USA	
VHCP Management, LLC	1.9	1,015,442	620,452								USA	
Stonehouse (Jon P)	0.9	509,952	242,233								USA	

A Wright Investors' Service Research Report: Oxford BioMedica plc




COMPANY PROFILE

Figures in Pounds Sterling

Company Description

Oxford BioMedica plc (Oxford BioMedica) is a company developing gene-based medicines and therapeutic vaccines. The Company is evaluating product candidates for four ocular indications, including three unlicensed genetic retinal diseases. The Company's technology includes a Lentivector gene delivery system, which has specific advantages for targeting diseases of the central nervous system and the eye, and (S14), which is a target for anti-cancer therapy. Its partnership with Sanofi comprises four Lentivector platform product candidates for four ocular indications: Retinitis Pigmentosa (RP), Stargardt disease, Usher syndrome type 1B, and EnforStat for ocular atrophy. Its manufacturing capabilities cover the entire product lifecycle, from pre-clinical development, to regulatory support, to all future stages of product clinical development.

Stock Chart



Stock Price (4/14/2014): 0.40 p

52 Week Range: 0.25 - 0.50

1 Week: -13.3%

4 Weeks: -20.5%

13 Weeks: 2.6%

12 Months: 2.6%

Revenue / Diluteds (as of 6/30/2013) (in Millions)

Most Recent Qtr: -8.41

Last 12 Months: -1.00

Comparative Business Analysis: Oxford BioMedica plc

Report Date: April 08, 2014

Company Description

Oxford BioMedica plc (Oxford BioMedica) is a biopharmaceutical company developing gene-based medicines and therapeutic vaccines. The Company is evaluating product candidates for four ocular indications, including unlicensed genetic retinal diseases. The Company's technology platform includes a Lentivector gene delivery system, which has specific advantages for targeting diseases of the central nervous system and the eye, and a tumour antigen (S14), which is a target for anti-cancer therapy. Its partnership with Sanofi comprises four Lentivector platform product candidates for four ocular indications: Retinitis Pigmentosa (RP), Stargardt disease, Usher syndrome type 1B, and EnforStat for ocular atrophy. Its manufacturing capabilities cover the entire product lifecycle, from pre-clinical development, to regulatory support, to all future stages of viral vector product clinical development.

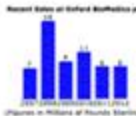
Competitor Analysis

Oxford BioMedica plc operates within the Commercial physical research sector. This analysis compares Oxford BioMedica plc with three other companies: **Cynovate PLC** (2012 sales of 65.33 million (\$613.86 million) of which 100% was in vitro & in silico ADMET/PC), **Eyegene Holdings Plc** (2013 sales: 53.26 million (\$58.93 million) of which 52% was Contract Research Services), and **Revance Group PLC** (2012 sales of 112.07 million (\$520.08 million)). Note: not all of these companies have the same fiscal year; the most recent data for each company are being used.

Sales Analysis

During the year ended December of 2012, sales at Oxford BioMedica plc were 67.74 million (\$661.91 million). This is a very small increase of 0.1% versus 2011, when the company's sales were 67.72 million. Despite this increase, sales are still well below the level achieved in 2010, when Oxford BioMedica plc reported sales of 111.13 million. The sales level in 2012 was fairly close to the level five years ago; in 2007, Oxford BioMedica plc had sales of 67.22 million.

Recent Sales at Oxford BioMedica plc



(Figures in Millions of Pounds Sterling)

The company derives almost all of its revenues in Europe. In 2012, the region's sales were 67.38 million, which is equivalent to 99.6% of total sales. The company currently employs 63, with sales of 67.74 million (\$661.91 million), this equates to sales of US\$10,594 per employee.

Sales Comparisons (Most Recent Fiscal Year)

Company	Year Ended	Sales (mln)	Sales Growth (%)	Emp (US\$)	Largest Region
Oxford BioMedica plc	Dec 2012	7,756	0.5%	135,464	Europe (95.1%)
Cynovate PLC	Dec 2012	6,207	5.3%	169,824	North America (56.9%)
Eyegene Holdings Plc	Jun 2013	5,294	-3.7%	137,105	United States (56.7%)
Revance Group PLC	Sep 2013	12,064	N/A	257,434	N/A

Recent Stock Performance

Recap Dealbuilder Database

12 results.

Search Criteria:

Parties (Licensor[Seller]/Licensee/Buyer)	Date	Type	Size (M)	Upfront (M)	Total Milestones (M)	Royalty	Subject
1 Voyager Therapeutics / Genzyme	02/2015	License	\$845.0	\$65.0	\$745.0		Adeno-associated viral (AAV) gene therapies for severe
2 uniQure / Bristol-Myers Squibb	04/2015	License	\$568.0	\$65.0	CON		
3 Sangamo BioSciences / Biogen Idec	01/2014	License	\$320.0	\$20.0	\$300.0		

Alliance Summary

Avalanche Ocular BioFactory platform to develop gene therapies for ophthalmologic diseases

Licensor (Seller): **Avalanche Biotechnologies** Parent: -- Date: **05/2014**
 Licensee (Buyer): **Regeneron** Parent: -- Amend. Date: --

Primary Therapeutic Area: **Ophthalmic**
 All Therapeutic Areas: Ophthalmic

Indications: **Broad Focus Ophthalmic**

SMART SUMMARY

- Regeneron partnered with Avalanche to discover, develop and commercialize gene therapy products for ophthalmologic diseases using Avalanche Ocular BioFactory platform
- Avalanche Ocular BioFactory is an adeno-associated virus (AAV)-based, next-generation platform for the discovery and development of gene therapy vectors for ophthalmology.
- The parties will collaborate to jointly discover gene therapy vectors and compounds against up to eight undisclosed targets.
- Regeneron will have exclusive worldwide licence rights for each product subsequent to an Investigational New Drug application (IND) FDA.
- Avalanche will have an option to share in development costs and profits for products directed toward two collaboration therapeutic targets by Avalanche.
- Regeneron also received a right of first negotiation for rights to AVA-101 upon completion of the ongoing Phase IIIa trial for wet age-related degeneration (AMD).
- AVA-101 is Avalanche's gene therapy product targeting vascular endothelial growth factor (VEGF) currently under development for wet age-related macular degeneration (AMD).

Avalanche Ocular BioFactory platform to develop gene therapies for ophthalmologic diseases

Licensor: Avalanche Biotechnologies

Rights to develop and market gene therapies against up to eight targets in ophthalmology using Avalanche Ocular BioFactory platform.

- Will collaborate to discover gene therapy vectors and compounds against up to eight undisclosed targets
- Will have an option to share in development costs and profits for products it selects against two targets

Licensor: Regeneron

- Will have rights to products subsequent to an IND filing
- Will have a right of first negotiation for rights to AVA-101 upon Phase IIIa completion

Therapeutic Area: Ophthalmic
Technology: Gene Therapy
Territory: Worldwide

Stage At Signing: Phase II
License Structure: Exclusive
Products/Options: 3

Total Announced Size (USD): CON

Committed Payments:	Contingent Payments:
Upfront: \$2M	Total Milestones (up to): \$540M
Equity: \$5M	Pre-Commercial Sales-based: -
R&D Funding: CON	Back-End Payment: Royalty

Notes: \$2M in initial payment, up to \$540M in milestones, plus tier- to mid-single digit royalties

Date Announced: 05/2014

Contract

Licensor/Seller: Avalanche Biotechnologies	Licensee/Buyer/Parent: Regeneron
Licensee/Buyer/Parent: Regeneron	Licensor/Seller/Parent: Regeneron
Parties: Biotech / Biotech	Subject: Avalanche Ocular BioFactory platform to develop gene therapies for ophthalmologic diseases

Alliance Summary: Open parent Alliance Summary

Alliance Type: Collaboration, Equity, License, Option	Date: 05/2014
Contract Type: Collaboration, License	Filing Date: 05/2014

Contract ID: EX-10.3 3 8729335dex103.htm EX-10.3

Exhibit 10.3

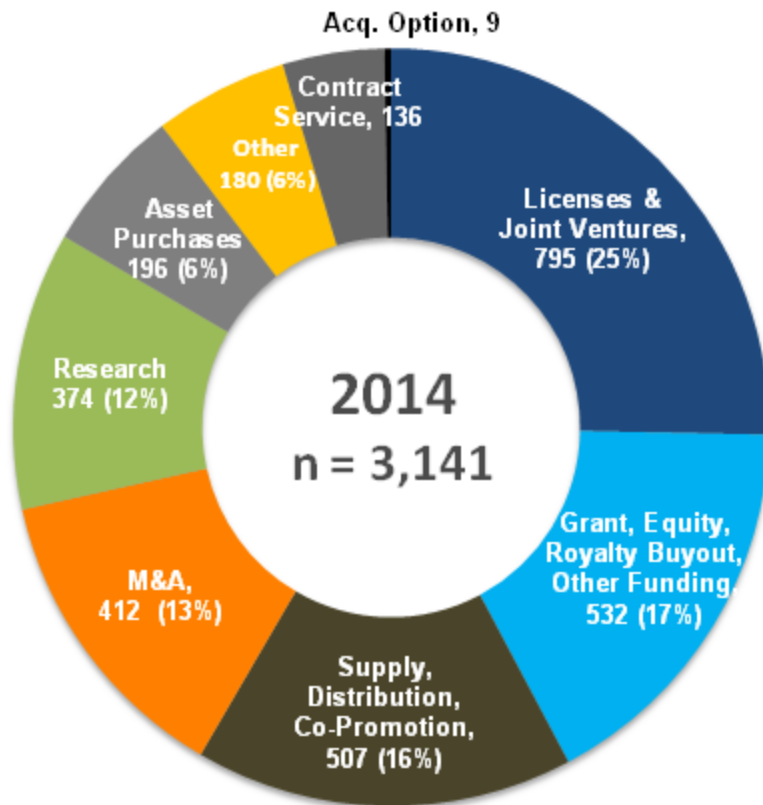
*** Certain information in this document has been omitted and filed separately with the Securities and Exchange Commission. Confidential treatment has been requested with respect to the omitted portions.

RESEARCH COLLABORATION AND LICENSE AGREEMENT
 By and Between
AVALANCHE BIOTECHNOLOGIES, INC.
 and
REGENERON PHARMACEUTICALS, INC.
 Dated As of May 3, 2014

Overview of Today's Dealmaking Landscape

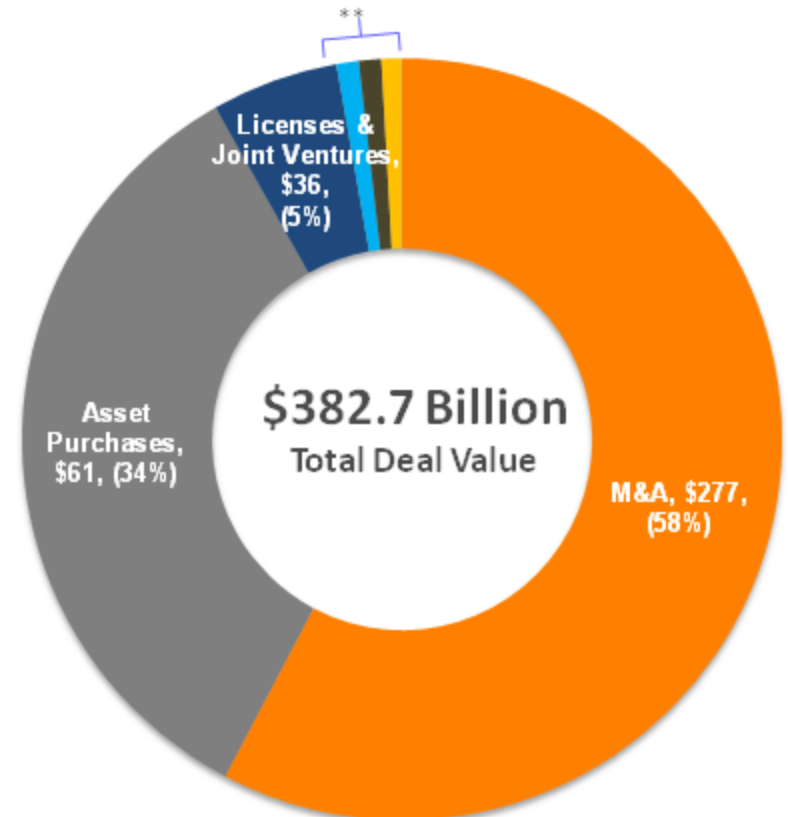
2014 Life Sciences Dealmaking

Deal Volume



NOTE: All dollars throughout presentation are US \$.

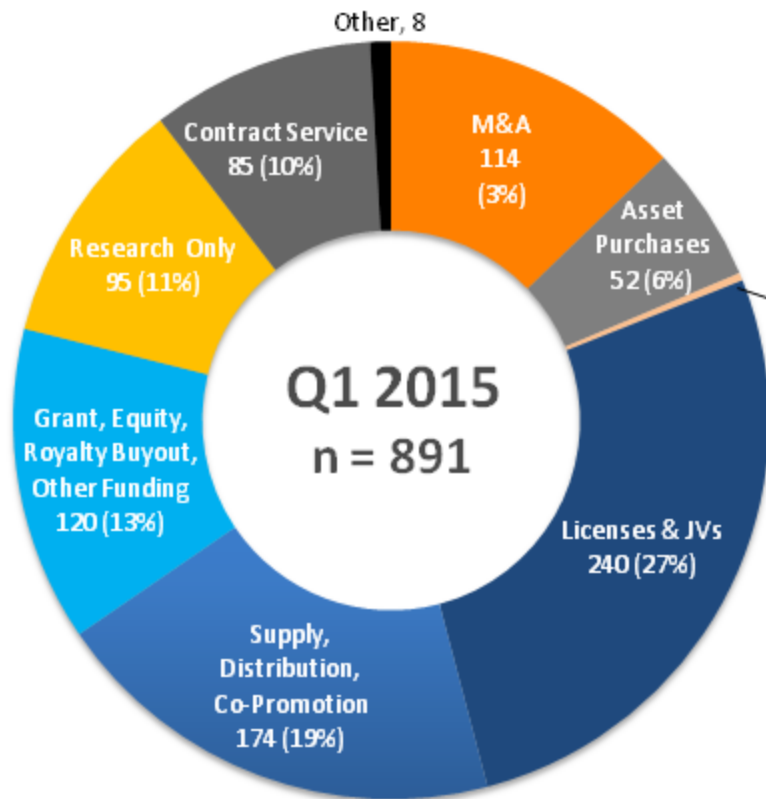
Deal Dollars



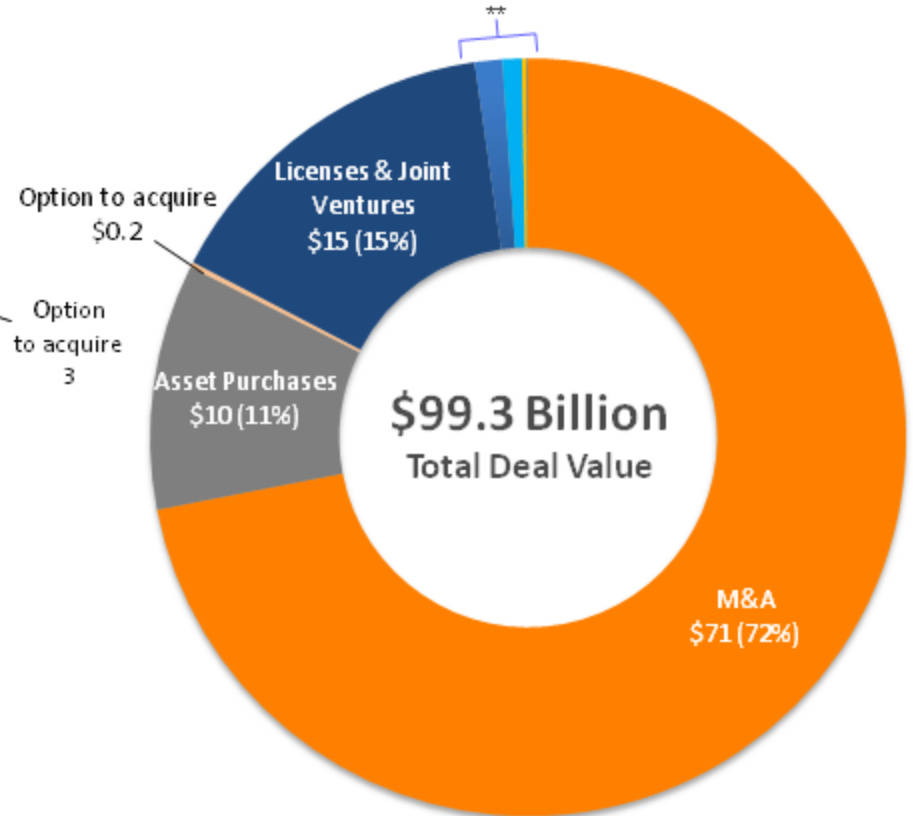
Grant, Equity, Royalty Buyout, Other Funding=\$6B; Supply, Distribution, Co-Promotion=\$1 B; Contract Service=\$.1B; Acq. Option=\$1B; Research=\$24M; Other=\$1

Deals Announced in Q1 2015

Deal Volume

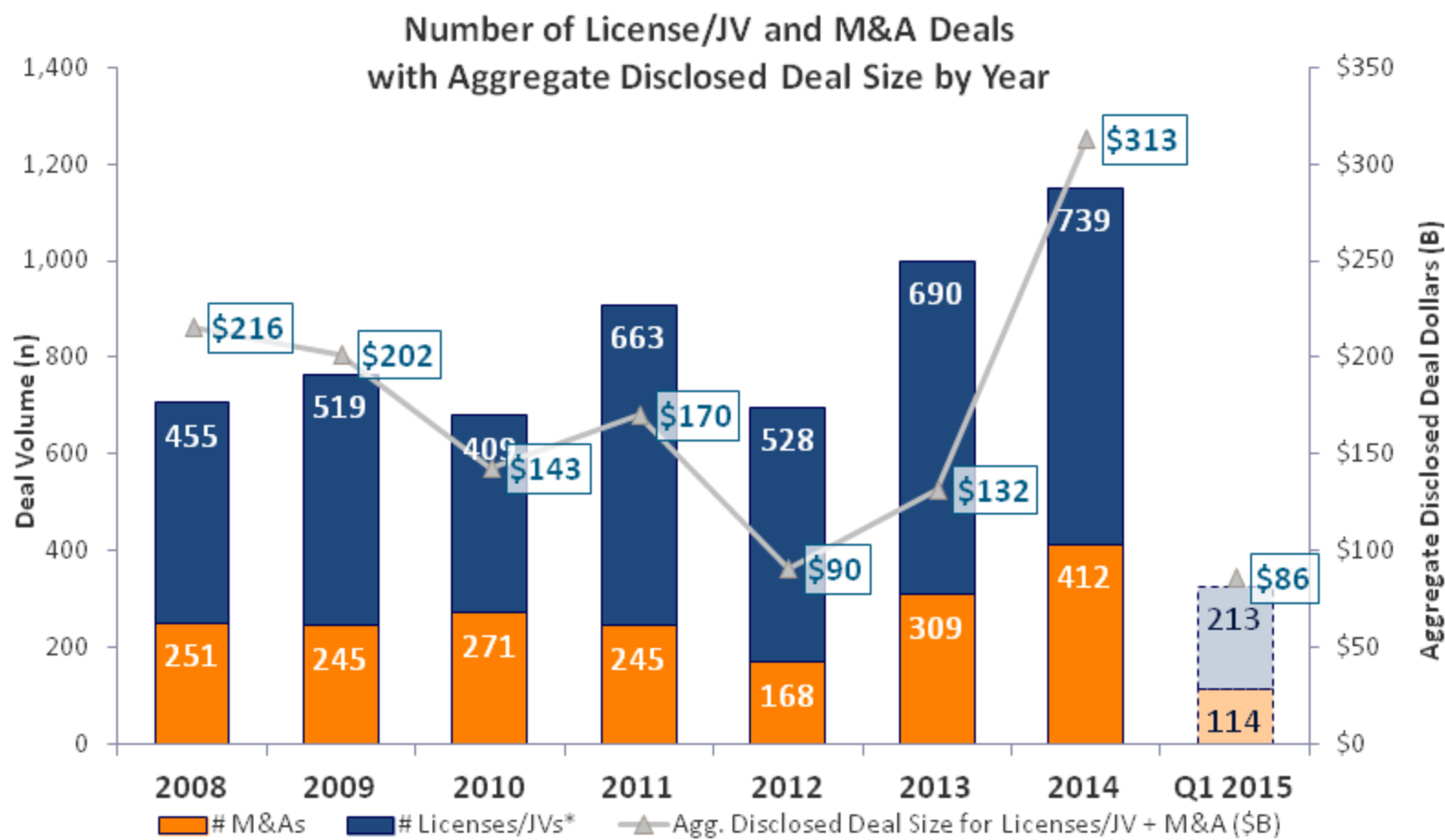


Deal Dollars



** \$1.2B Supply/Distribution/Co-promotion; \$0.8B Grant/Equity/Royalty Buyout/Other Funding; \$0.2B Research only; \$0.1B Contract Services

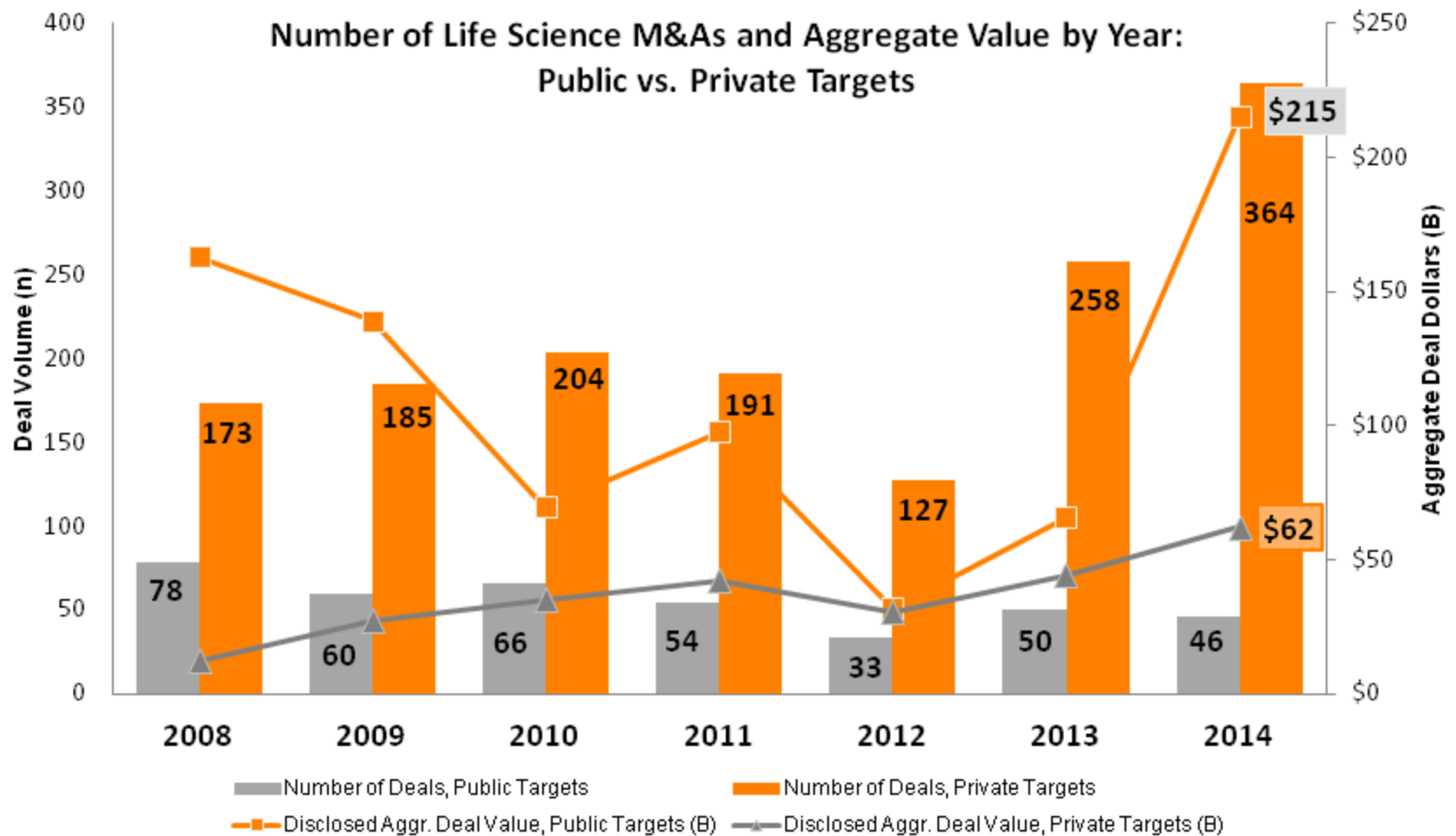
M&A and Product/Technology Licensing/JV Trends Over Time: 2008 to Q1 2015



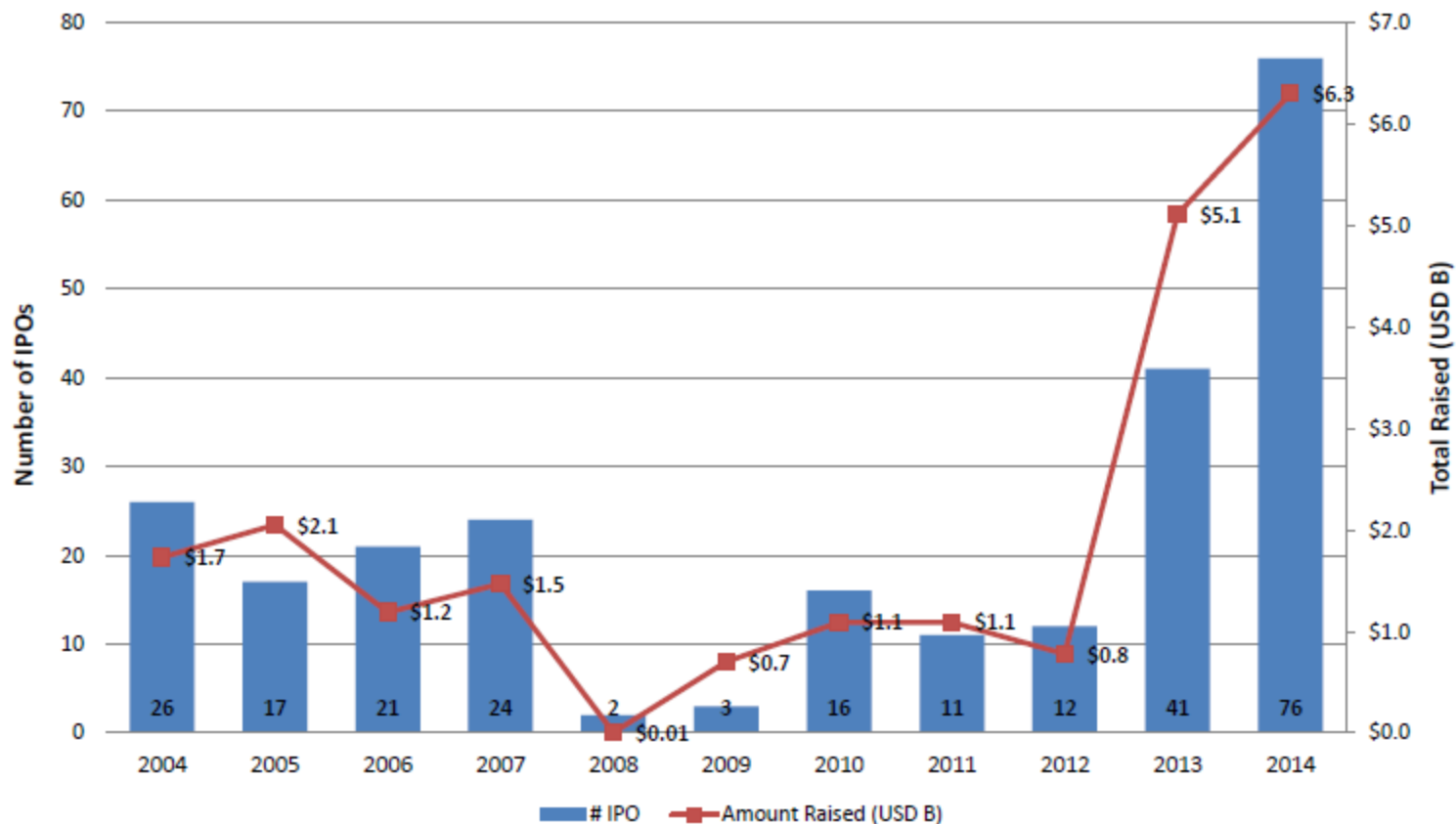
* Chart includes product and technology licenses/JVs only; excludes IP-only licenses. JV = Joint Venture.

Mergers and Acquisitions

Public vs. Private M&A Targets: 2008-2014

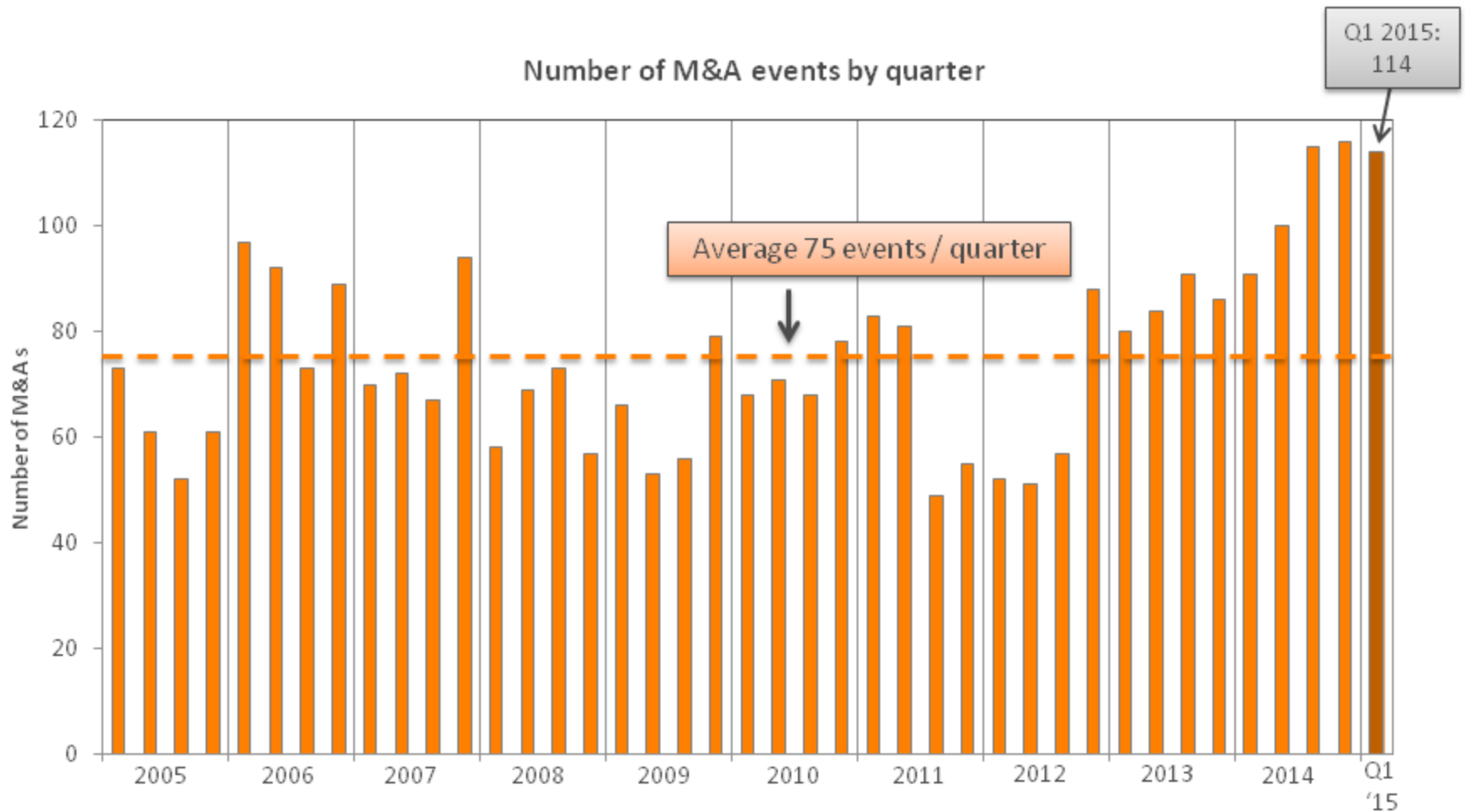


Life Sciences Initial Public Offerings, 2004-2014



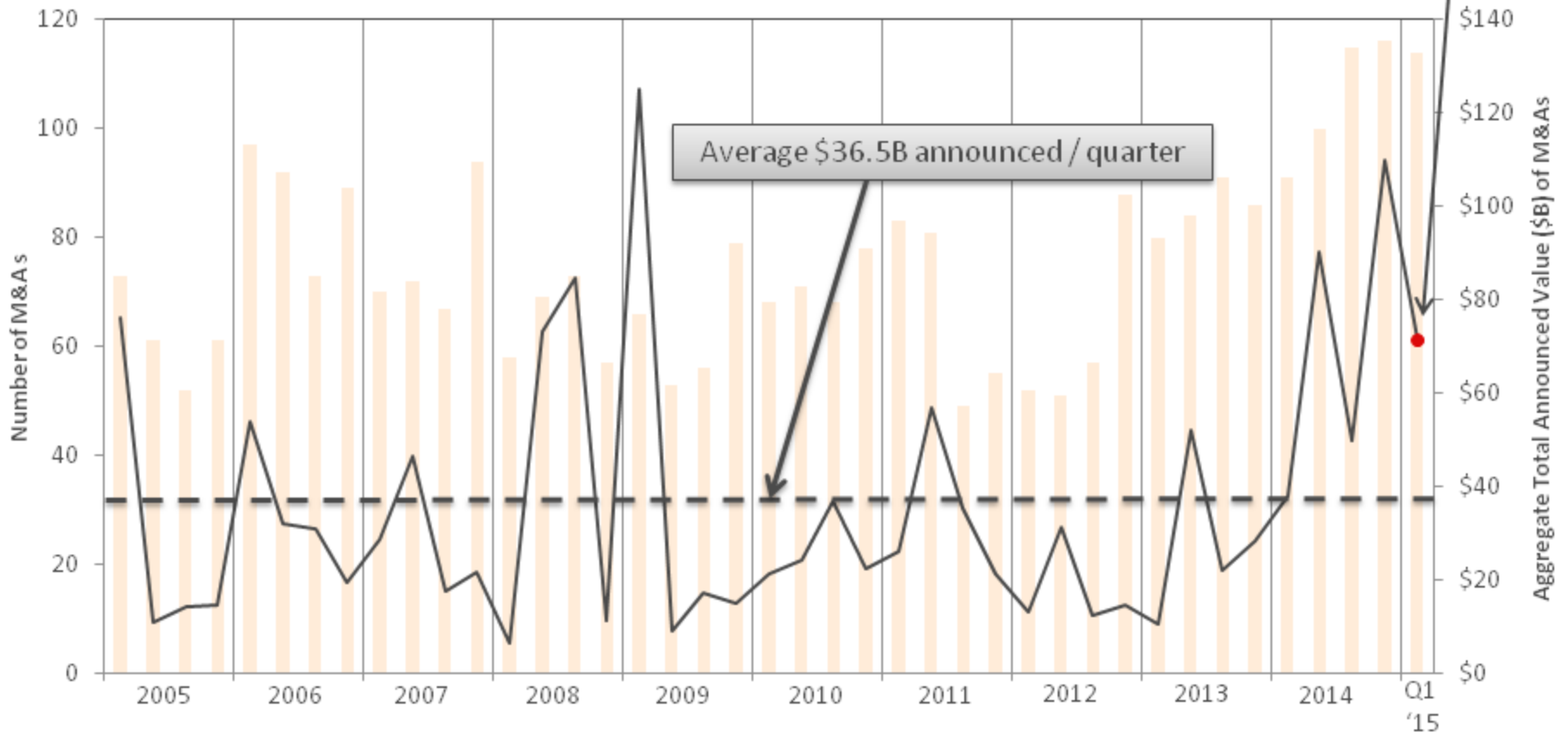
Source: Thomson Eikon

10 Years of M&A by Quarter: Volume



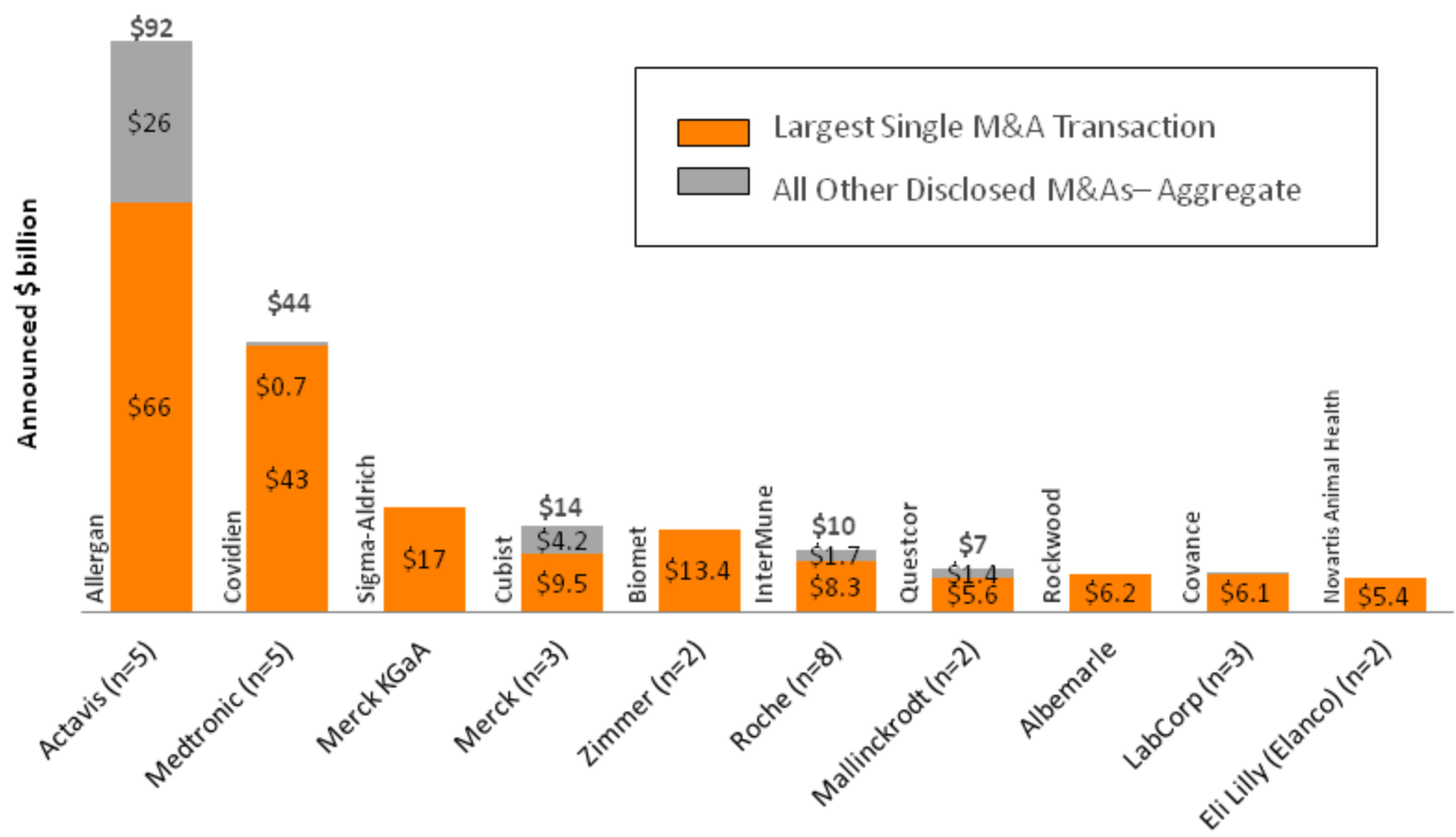
10 Years of M&A by Quarter: Total Deal Value

Aggregate Total Announced Value (\$B) of M&A events by quarter

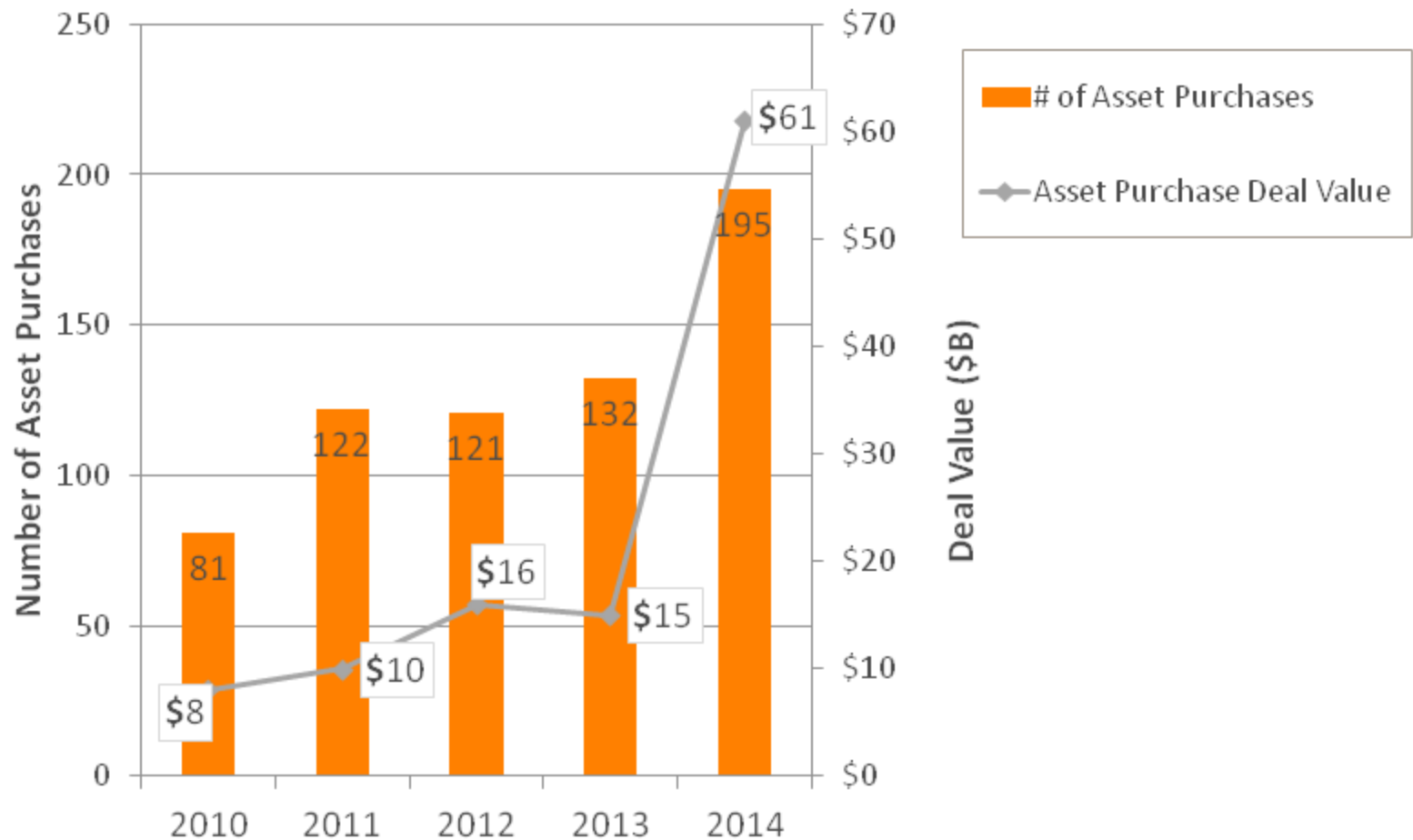


M&A 2014: Deal Dollars of Top Ten Acquirers

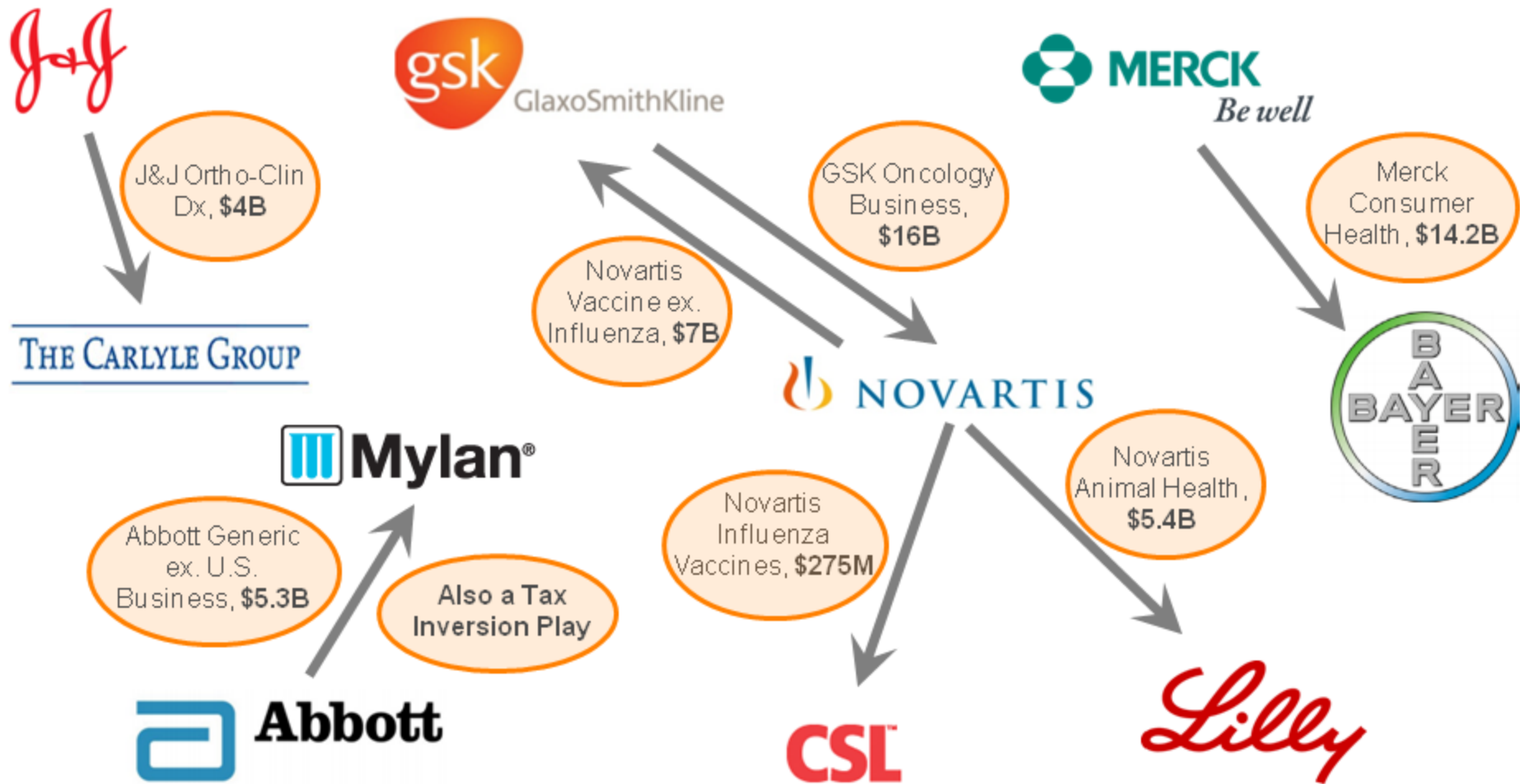
\$214B aggregate disclosed deal dollars in 32 acquisitions by these 10 buyers



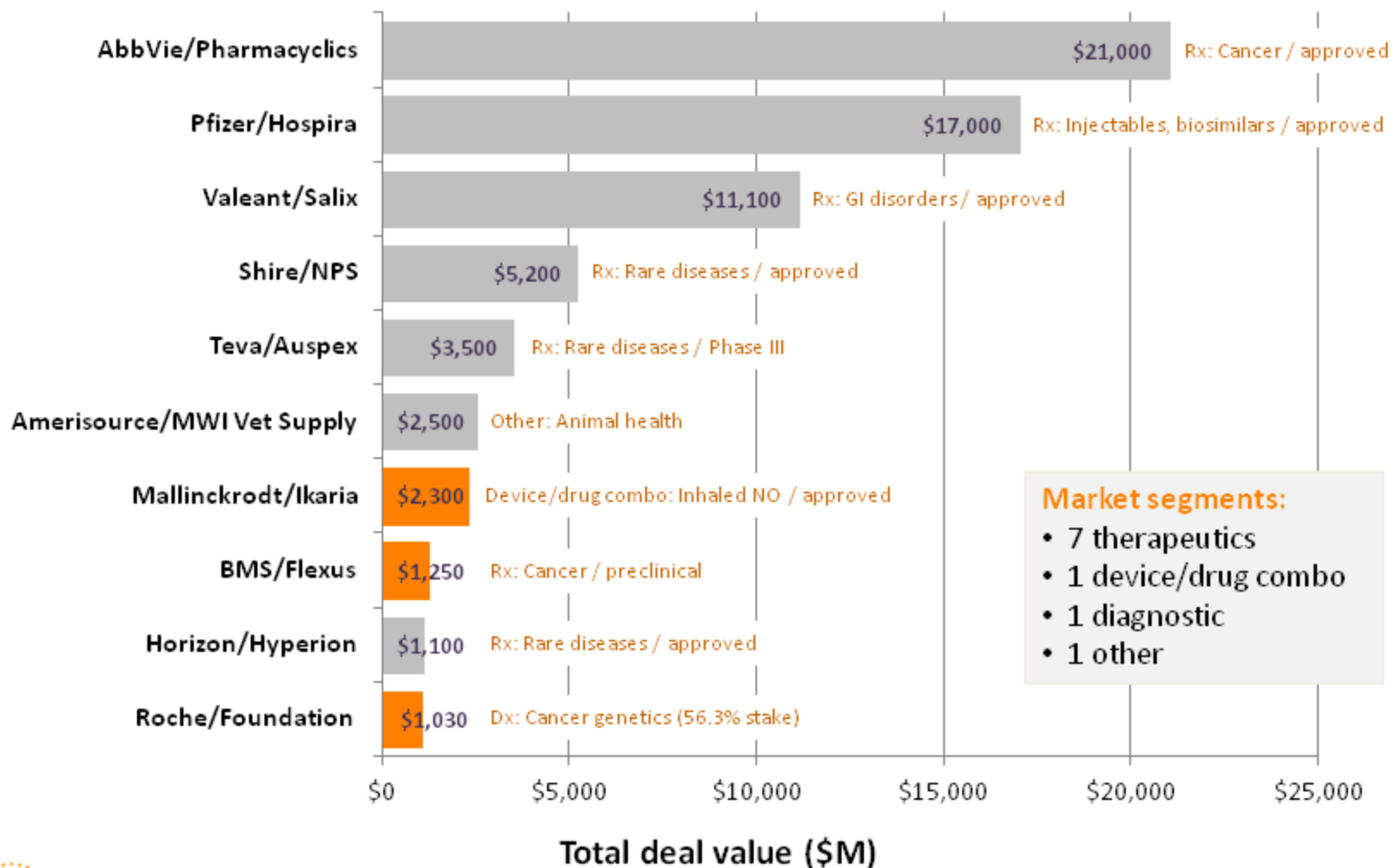
M&A 2014: Asset Swaps and Divestitures



M&A 2014: BigCo Portfolio Rationalization

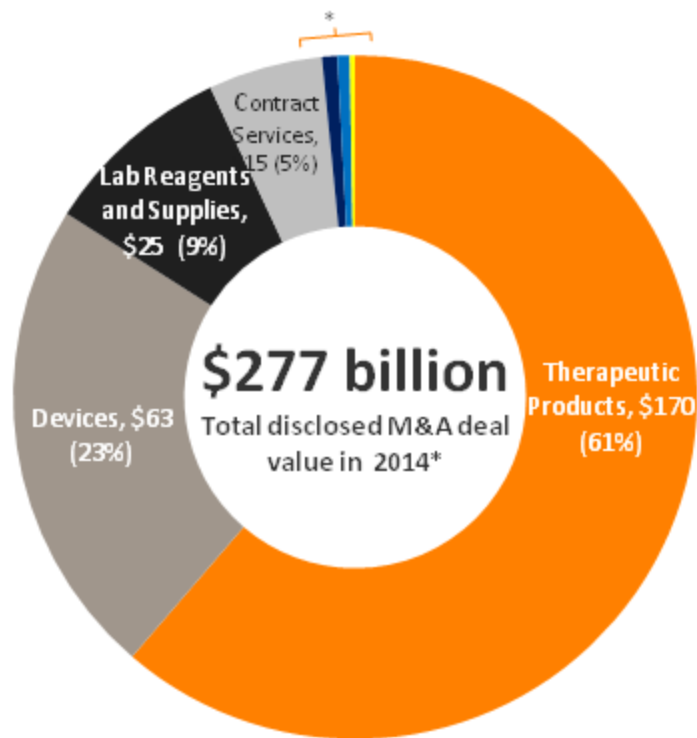


Q1 M&A: Ten Largest Deals of Q1 2015



M&A 2014: Market Segments and Rx Arenas

2014 M&A Deals by Market Segment



*Diagnostics (\$2B), Instruments & Software (\$1.6B) and Tech. Platforms (\$.7B)

**Letters of intent and terminated M&A offers were excluded.

Rx Areas by Aggregate Deal Dollars

Therapeutic Area	Total n	Aggregate \$B
Diversified/ Broad focus	48	\$117.5
Cancer	18	\$2.7
Neurology	16	\$8.2
Infectious Disease	10	\$16.5
Autoimmune/ Inflammatory	6	\$5.6
Other/ Miscellaneous	7	\$5.6
Dermatologic	5	\$0.7
Pulmonary/ Respiratory	4	\$8.9
Ophthalmic	4	\$.1
Endocrine/ Metabolic	3	\$0.6
Gastrointestinal	2	\$2.9
Genitourinary/ Sexual Function	1	\$1.1

M&A 2014: Continued Activity in Infectious Disease Sector

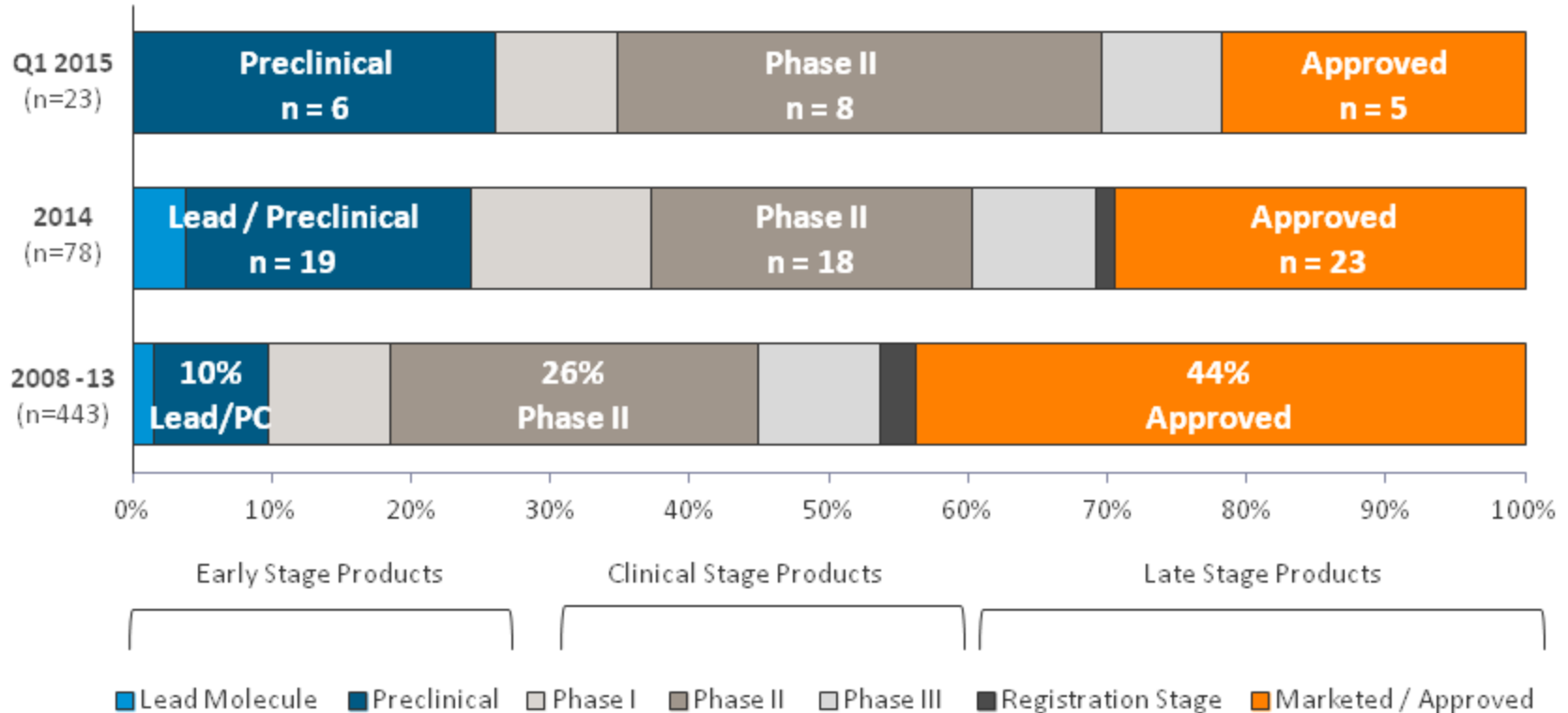
	Acquirer	Target	Total \$M	Lead asset
2014	Merck	Cubist	\$9,500	Bacterial skin infection Rx, Approved
	Merck	Idenix	\$3,850	Hepatitis C, Phase II
	Johnson & Johnson	Alios	\$1,750	RSV, Phase II
	IMPAX	Tower Holdings	\$700	Parasitic infection Rx, Approved
	Actavis	Durata	\$680	Bacterial skin infection Rx, Approved
	Agenus	4-Antibody AG	\$50	mAb against Cytomegalovirus, Phase II
	Ventrus	Assembly		Hepatitis B, Preclinical
	OnCore	Enantigen		Hepatitis B, Preclinical
	Cocrystal	RFS		Hepatitis Virus / Influenza, Unknown
	BLINK	Valneva		Vaccine against Japanese encephalitis, Approved
Q1 2015	GlaxoSmithKline	GlycoVaxyn	\$190	Vaccines for bacterial infections, Phase I
	Valneva	Crucell	\$54	Vaccines (cholera, typhoid, polio, other), Approved
	Biota	Anaconda	\$38	HPV Rx, Phase II
	Karo Bio	Tanomed	\$2.3	Common cold Rx, Unknown stage
	Pfizer	Redvax		CMV vaccine, Preclinical
	Matinas	Aquarius		Nanoparticle amphotericin, Reformulation
	Vaxin	Immune Targeting Systems		Vaccines (HIV, flu, FIV), Phase II
	Tekmira	OnCore		HBV Rx, Preclinical



Q1 M&A vs. History by Status of Lead Rx Asset

While it remains the case that significant M&A activity occurs in Phase II and at approval, 2014 saw a shift to early-stage M&A events that appears to be continuing into Q1

Percent Distribution of Lead Product Stages For Therapeutic Product Company M&As



Recent Contingent Acquisition Structures

Buyer	Seller	Date	Total (\$M)	Upfront (\$M)	Contingent (\$M)	% at risk	Stage	Rx Area
Celyad	OnCyte	Jan 2015	\$207	\$6	\$201	97%	Preclinical	Cancer
Celgene	Quanticel	Apr 2015	\$485	\$100	\$385	79%	Discovery	Cancer
BMS	iPierian	Apr 2014	\$725	\$175	\$550	76%	Preclinical	Neurology
Teva	Labrys	Jun 2014	\$825	\$200	\$625	76%	Phase II	Neurology
Roche	Trophos SA	Jan 2015	\$551	\$141	\$410	74%	Phase III	Diversified
Merck	OncoEthix	Dec 2014	\$375	\$110	\$265	71%	Phase I	Cancer
Biogen Idec	Convergence	Jan 2015	\$675	\$200	\$475	70%	Phase II	Neurology
Genentech	Seragon	Jul 2014	\$1,725	\$725	\$1,000	58%	Phase I	Cancer
Sosei	Heptares	Feb 2015	\$400	\$180	\$220	55%	Phase I	Diversified
Roche	Santaris	Aug 2014	\$450	\$250	\$200	44%	Phase II	Diversified
AMAG	Lumara	Sep 2014	\$1,025	\$600	\$425	41%	Approved	Genitourinary/ Sexual Function
BMS	Flexus	Feb 2015	\$1,250	\$800	\$450	36%	Preclinical	Cancer
BioMarin	Prosensa	Nov 2014	\$890	\$680	\$210	24%	Phase III	Neurology

Cancer target and biomarker discovery and Celgene call option

Licensors

Quantice

- Quantice will use its platform for single-cell genomic analysis platform to identify predictive biomarkers for Celgene investigational drugs.
- Quantice also uses its platform for independent drug discovery, subject to Celgene's Call Option

Single-cell genomic analysis of patient tumor samples to identify predictive biomarkers for Celgene investigational drugs.

Therapeutic Area:

Cancer

Technology:

Biomarkers and Companion Diagnostics

Worldwide

Stage At Signing:

Discovery

License Exclusivity:

Exclusive

#Products/Options:

Multiple - Unknown

Licensee

Celgene

- Undisclosed equity stake in Quantice
- Exclusive option to acquire the company.

Total Announced Size (USD): CON

Committed Payments:

Upfront:

-

Equity:

CON

R&D Funding:

\$45M

Notes:

Celgene will commit \$45M funding during the initial 3.5 year term, extendable with additional funding.

Contingent Payments:

Total Milestones (up to):

-

Pre-Commercial:

-

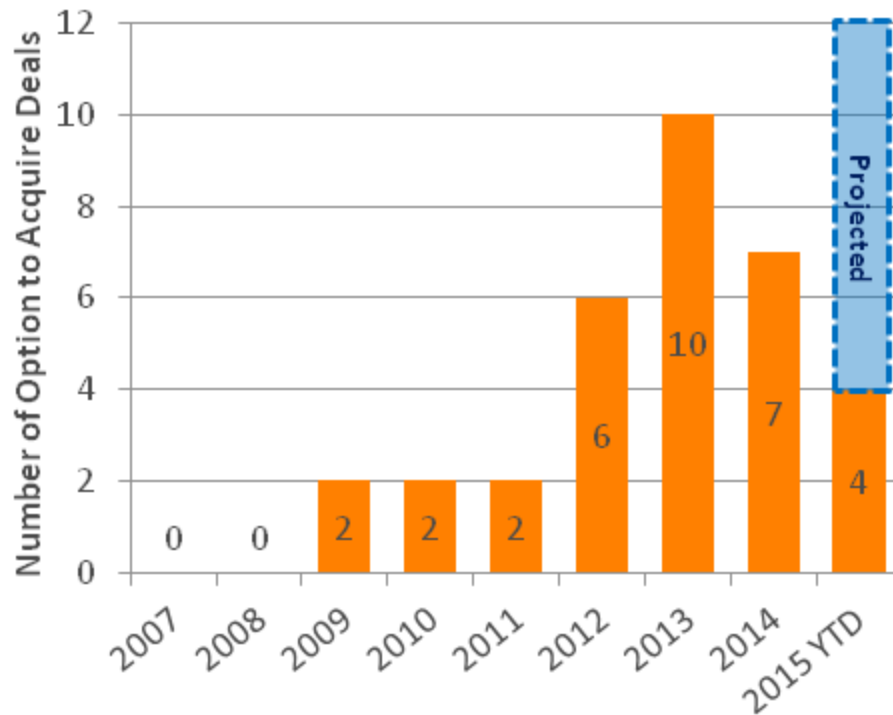
Sales-based:

-

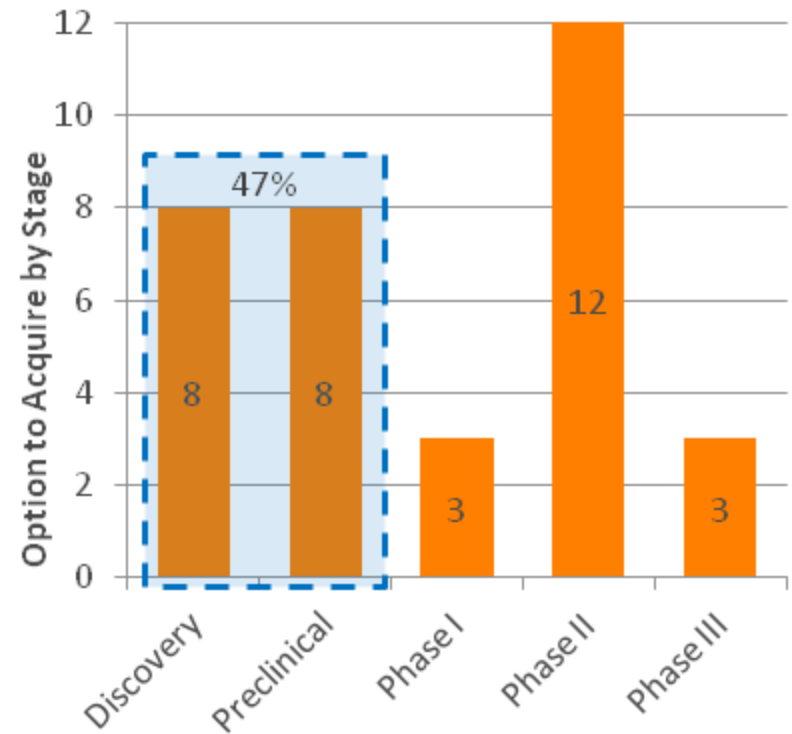
Back-End Payment:

Options to Acquire Development Stage Therapeutic Companies

Options to Acquire by Year, 2007-2015 YTD



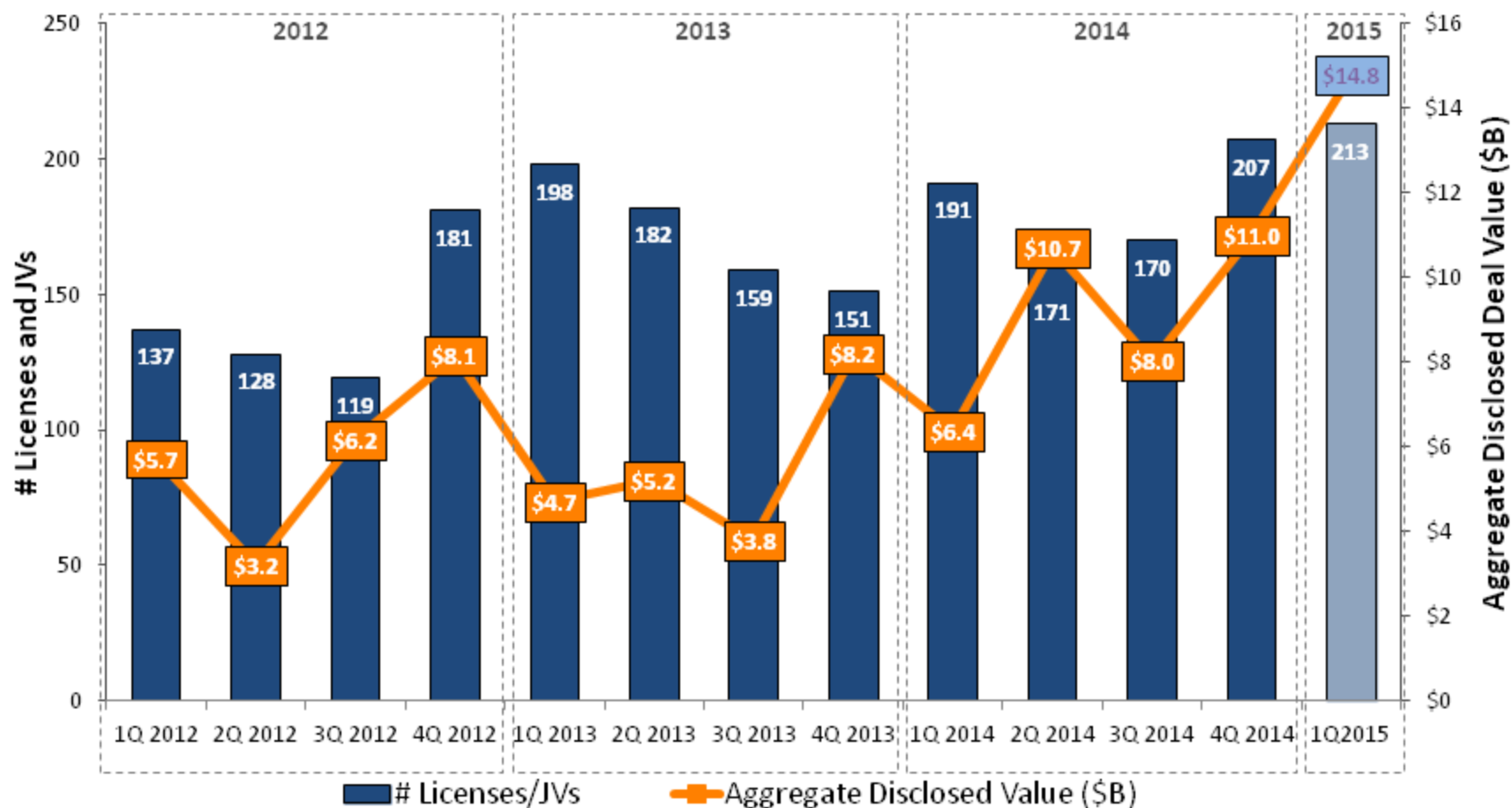
Options to Acquire by Stage, 2007-2015 YTD



Licensing and Joint Ventures

Licenses and Joint Ventures by Quarter

Number and Aggregate Total Disclosed Deal Value of Disclosed Licenses/JVs By Quarter



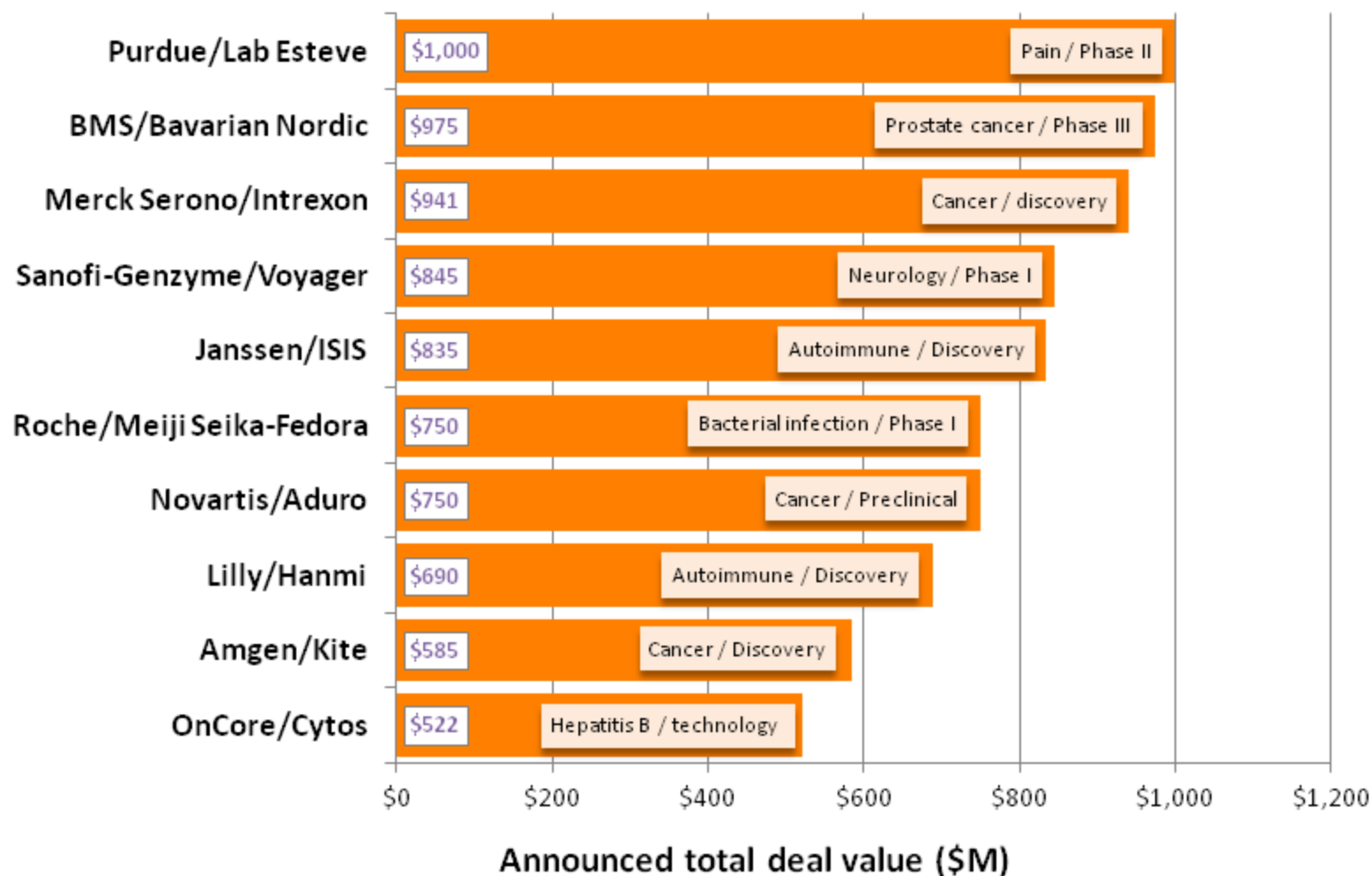
NOTE: This analysis includes all announced licenses and joint ventures for products or technologies. Licenses for intellectual property or data only are excluded. All dollars are USD.

Top Ten 2014 Licensing Transactions by Announced Total Size

Rank	Buyer	Seller	Total Size [US \$ M]	Upfront [US \$M]	Subject	Stage*	Primary Rx Area
1	Dainippon Sumitomo	Edison	\$4,395	\$10 cash + \$50 equity	Expansion of license rights to EPI-589 plus a disc and devt collab for up to 10 new cpds for mitochondrial diseases	Phase I	Neurology
2	Pfizer	Collectis	\$2,855	\$80	Allogeneic CAR-T immunotherapies with 15 Pfizer and 4 Collectis targets	Discovery	Cancer
3	Pfizer	Merck KGaA	\$2,850	\$850	Anti-PD-L1 for cancer; co-promotion of XALKORI (crizotinib) in the U.S. and certain other markets	Phase II; approved	Cancer
4	Celgene	Giuliani/Nogra	\$2,575	\$710	GED-0301 oral oligonucleotide vs SMAD-7 for Crohn's disease and other gastrointestinal indications	Phase II	AI/Inflam
5	Merck	Ablynx	\$2,341	\$27	Nanobody technology to discover nanobody-based immunotherapies	Discovery	Cancer
6	Merck	Bayer	\$2,100	\$1,000	Adempas, BAY102 and other soluble guanylate cyclase (sGC) modulators for cardiovascular diseases	Approved	CV
7	Viking	Ligand	\$1,564	\$29M in Viking equity upon IPO	FBPase, SARM, TR-Beta, EPOR, DGAT-1 programs for T2D, cancer cachexia, dyslipidemia, obesity	Phase II	Endo/Meta
8	AbbVie	Calico	\$1,500 jointly		Discovery of new Rx for age-related diseases including neurodegeneration and cancer, with option to license	Discovery	Diversified
9	BMS	CytomX	\$1,242	\$50	Proteobodies against up to 4 immuno-oncology targets including CTLA-4	Discovery	Cancer
10	Astellas	Proteostasis	\$1,200		Discovery and development of therapies modulating the unfolded protein response with WW a co-promotion option	Discovery	Chromosomal Abnormalities

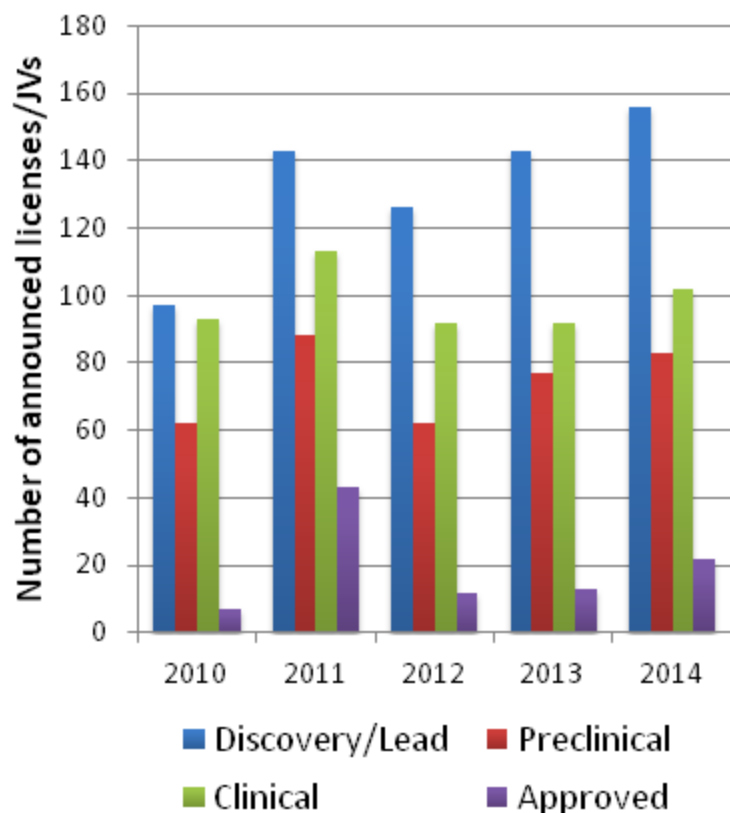
*Stage: Recap classifies clinical development program deals by the highest stage entered by the lead asset at the time of deal signature. E.g., an asset that has completed Phase II but not yet begun Phase III is classified as a Phase II transaction.

Q1 2015 Top 10 Licenses by Total Size

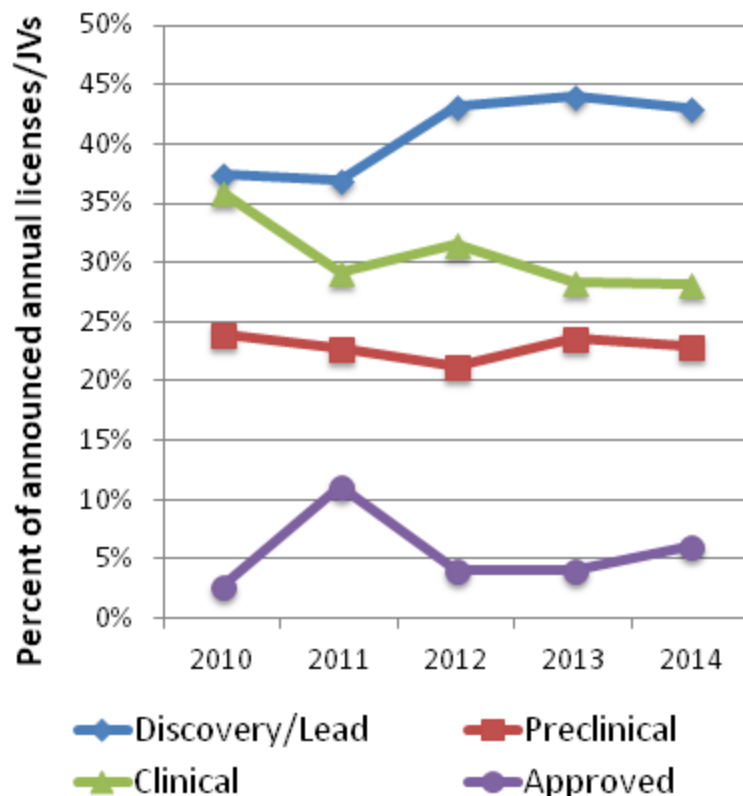


5-year Trend in Number of Therapeutics Licensing Deals by Stage of Lead Asset

Number of annual licenses by stage

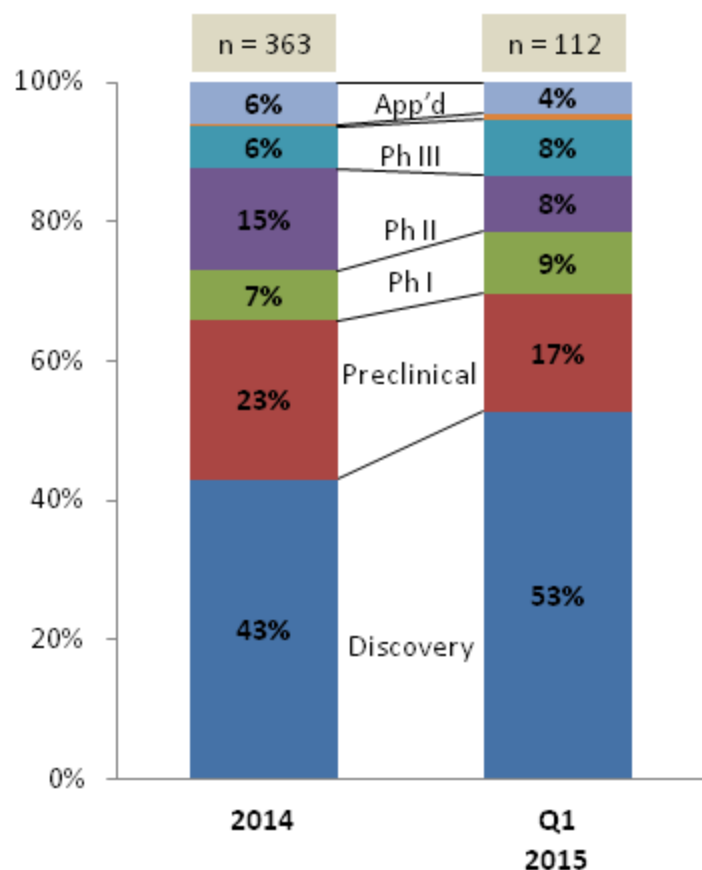


Percent of annual licenses by stage

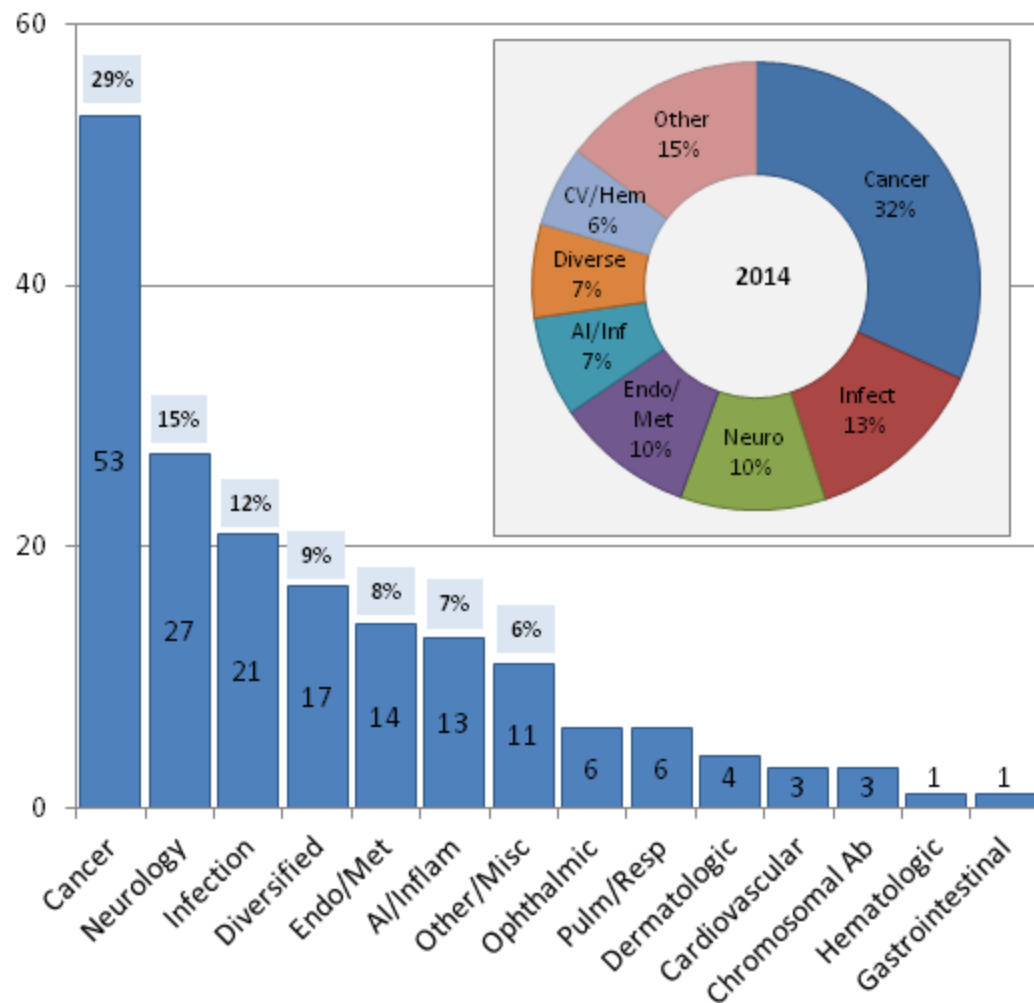


**Stage: Recap classifies clinical development program deals by the highest stage entered by the lead asset at the time of deal signature. E.g., an asset that has completed Phase II but not yet begun Phase III is classified as a Phase II transaction. Charts exclude deals for reformulations of existing drugs, generics, and for which stage at signing was not applicable (diagnostic, device, research tool, etc.) and/or not disclosed.*

Q1 2015 Licenses by Stage and Rx Area



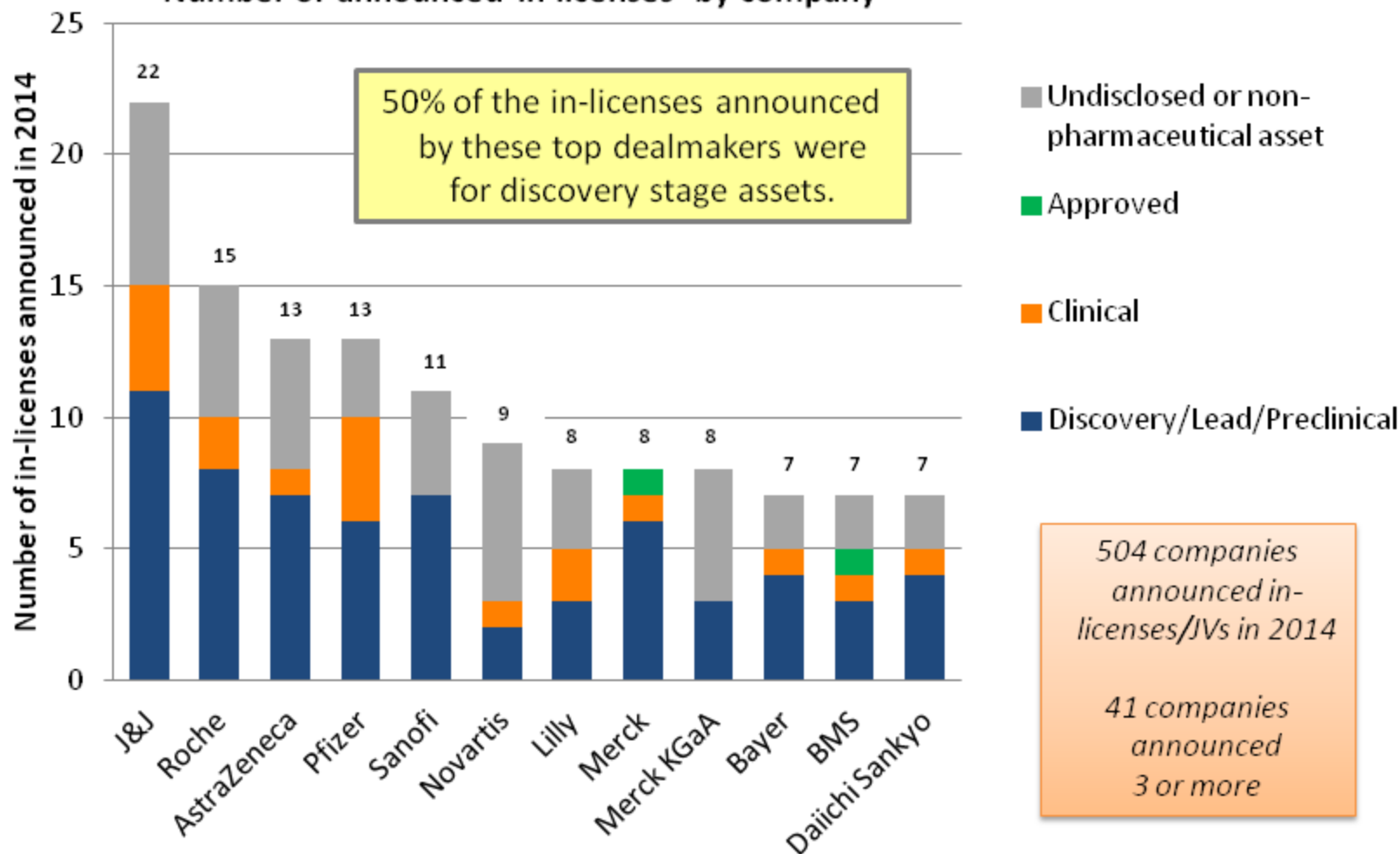
Charts exclude deals for reformulations of existing drugs, generics, and for which stage at signing was not applicable (diagnostic, device, research tool, etc.) and/or not disclosed/



Excludes licenses where Rx area is not applicable or is unknown.

Most Active In-licensors in 2014

Number of announced in-licenses by company



Licensing Deals in 2014 with Upfronts > \$50M

Licensee/ Buyer	Licensor/ Seller	Upfront + Equity (\$M)	Stage at Signing	Primary Rx Area
Merck	Bayer	\$1,000	Approved	CV
Pfizer	Merck KGaA	\$850	Phase II	Cancer
Celgene	Nogra	\$710	Phase II	Autoimm/ Inflam
Pfizer	Opko	\$295	Phase III	Endocrine/ Metabolic
AbbVie	Infinity	\$275	Phase III	Cancer
Novartis ¹	Ophthotech	\$200	Phase III	Ophthalmic
Servier ²	Intarcia	\$171	Reform'n	Endocrine/ Metabolic
Genentech	NewLink	\$150	Phase I	Cancer
Sanofi	MannKind	\$150	Reform'n	Endocrine/ Metabolic
J&J/ Crucell	Bavarian Nordic	\$139 (\$96 cash + \$43 equity)	Preclinical	Infectious Disease
Alexion	Moderna	\$125 (\$100 cash + \$25 equity)	Discovery	Unknown

Licensee/ Buyer	Licensor/ Seller	Upfront + Equity (\$M)	Stage at Signing	Primary Rx Area
J&J/ Janssen	Macro- Genics	\$125 (\$50 cash + \$75 equity)	Preclinical	Cancer
Baxter ³	Merrimack	\$100	Reform'n	Cancer
Biogen Idec	Eisai	\$100	Phase II	Neurology
Daiichi Sankyo ⁴	LOCL	\$100	Reform'n	Neurology
Pfizer	Cellectis	\$80	Discovery	Cancer
Sun	Merck	\$80	Phase III	Diversified
Nant- BioScience	Celgene	\$75	Preclinical	Cancer
Bayer	Orion	\$68	Phase II	Cancer
BMS	CytomX	\$50	Discovery	Cancer
Lilly	Adocia	\$50	Phase II	Endocrine/ Metabolic

All deals are for worldwide rights except:

¹Novartis/Ophthotech is WW ex-US

²Servier/Intarcia is WW ex-US and Japan

³Baxter/Merrimack is WW ex-US and China

⁴Daiichi Sankyo/LOCL is US-only

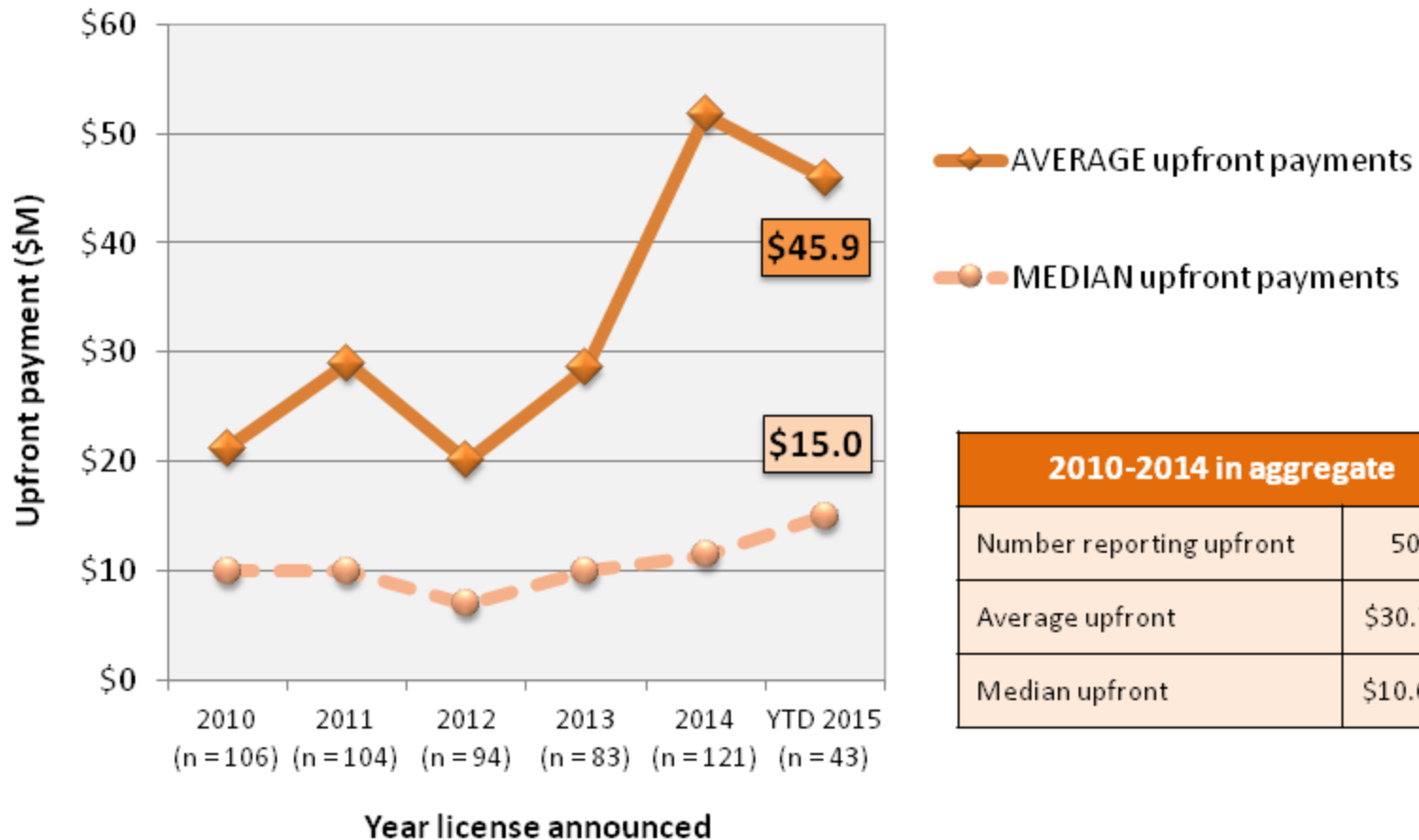


2015 YTD Licenses with Upfronts > \$50M

Licensee	Licensor	Upfront (\$M)	Equity (\$M)	Stage	Rx Area
Celgene	MedImmune / AZ	\$450		Phase III	Cancer
MedImmune / AZ	Innate	\$250		Phase II	Cancer
Novartis	Aduro	\$200	\$25	Preclinical	Cancer
Merck Serono	Intrexon	\$115		Discovery	Cancer
Bayer	ISIS	\$100		Phase II	Cardiovascular
DiaVax	City of Hope	\$100		Phase I	Viral Infect
Merck	NGM	\$94	\$106	Preclinical	Endo/Meta
Genzyme/Sanofi ¹	Voyager	\$65	\$30	Phase I	Neurology
Bristol-Myers Squibb	uniQure	\$65	\$32	Preclinical	Cardiovascular
Bristol-Myers Squibb	Bavarian Nordic	\$60		Phase III	Cancer
Amgen	Kite	\$60		Discovery	Cancer
Lilly	Innovent	\$56		Unknown	Cancer
Hospira	Pfenex	\$51		Biosimilar	Ophthalmic
Lilly ²	Hanmi	\$50		Phase I	AI/Inflam
Merck	Moderna	\$50	\$50	Discovery	Infection

5-year Trend in Upfront License Payments

Upfront payments in licensing transactions by year, 2010-2014

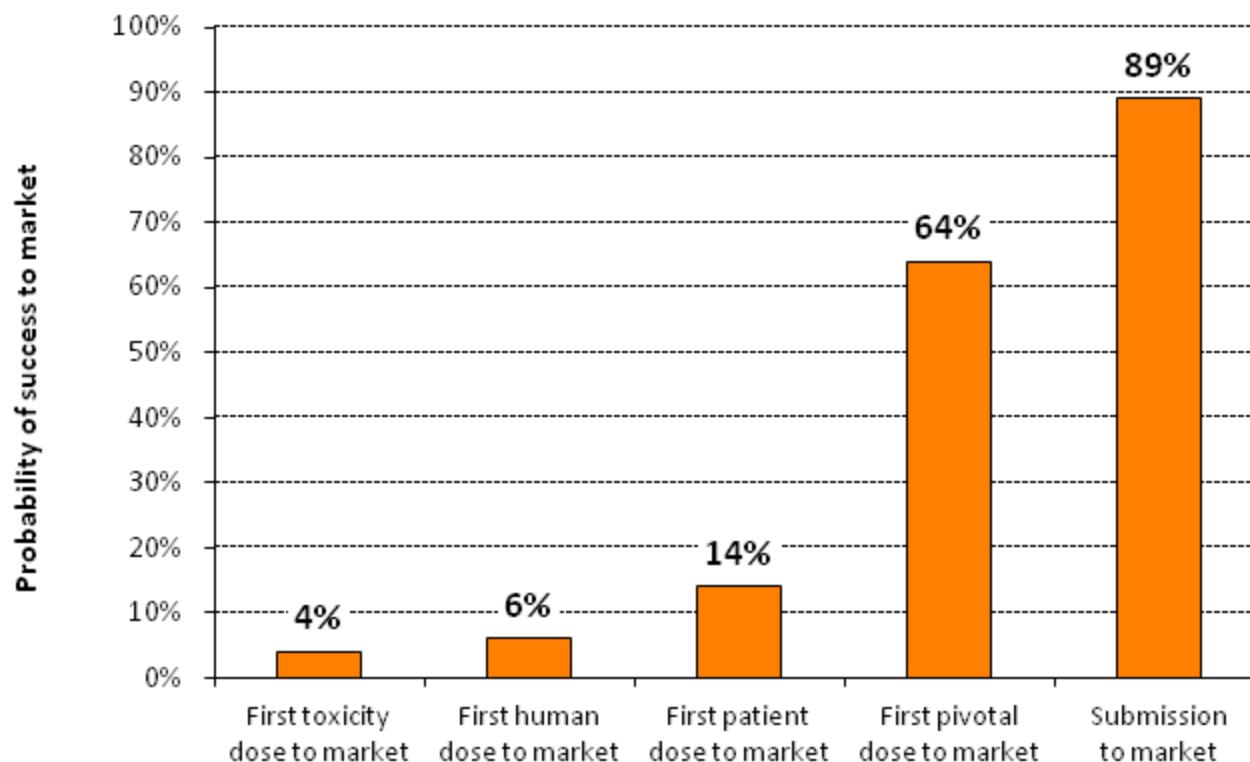


2010-2014 in aggregate	
Number reporting upfront	508
Average upfront	\$30.7 M
Median upfront	\$10.0 M

NOTE: Analysis includes upfront cash payments only. Equity investments and near-term milestones are excluded.

Reduction of Risk with Progression of Stage

Probability of success to market for active substances



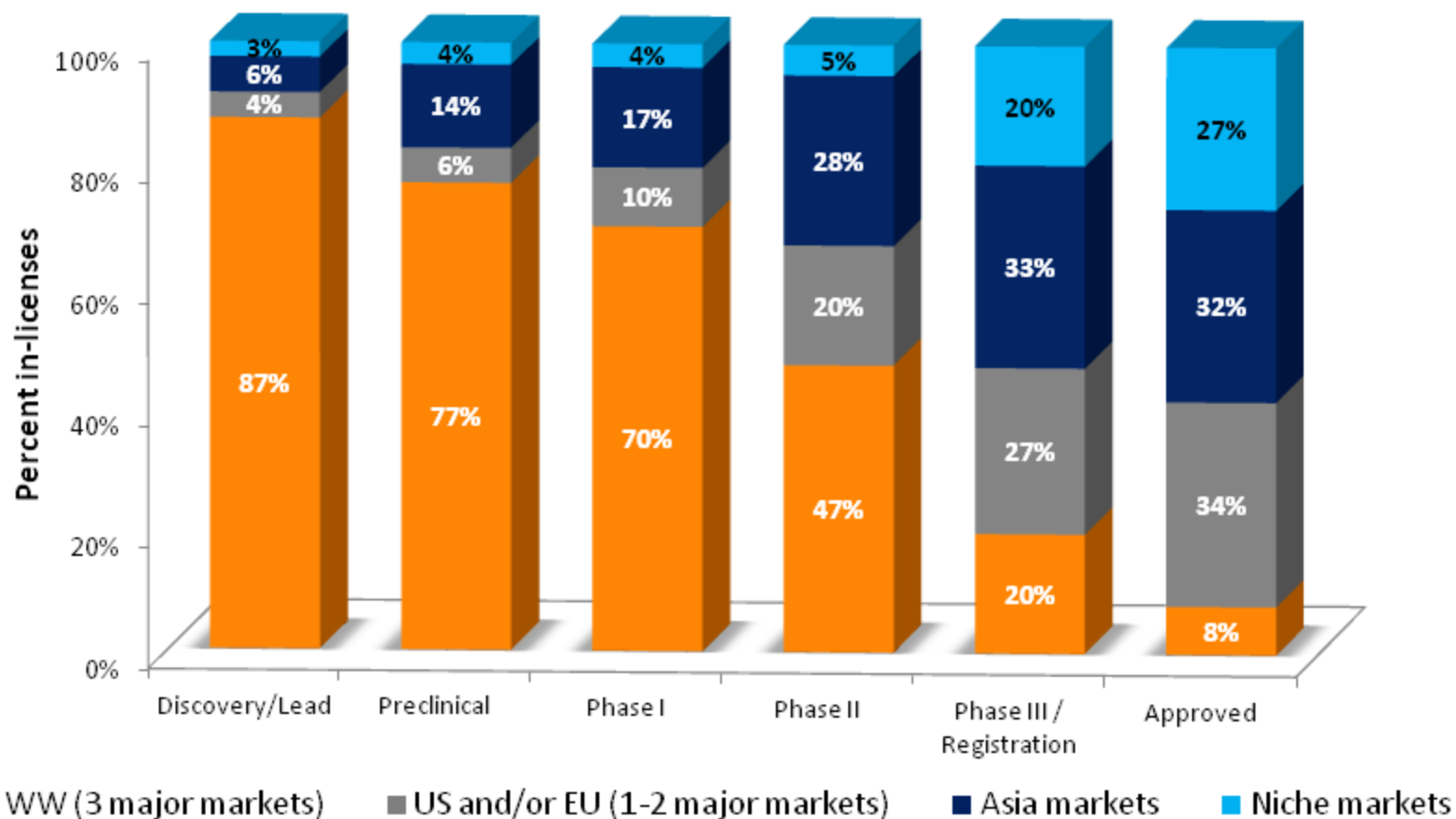
Probabilities of success to market were calculated using success rates between phase for active substances entering phase between 2007 and 2009 and year of assessment 2012.



Source: CMR International, a Thomson Reuters business. CMR is a unique source of data, collected directly from pharmaceutical companies, focusing on global pharmaceutical research and development performance measurements and trends.

Licensed Territory by Stage

Licensed territory by stage of lead asset, 2010-2014



Technology-driven spaces: Selected 2014 T cell immunotherapy licensing transactions

\$80M UP FRONT, \$32M EQUITY INVESTMENT, \$2.8B MILESTONES

Collectis stock surges 50 percent on Pfizer chimeric antigen receptor T-cell cancer deal

By Cormac Sheridan, Staff Writer

Shares in Collectis SA surged more than 50 percent during trading in Paris Wednesday after Pfizer Inc. unveiled a strategic collaboration in cancer based on the French firm's allogeneic chimeric antigen receptor T-cell (CAR T-cell) platform, which will involve an initial outlay of about \$112 million, as well as research funding, milestones that could reach as much as \$2.775 billion in total, and tiered royalties on any products that reach the market.

It's a late, but dramatic entry to the cancer immunotherapy stage for the big pharma

SOON-SHIONG STEPS UP AGAIN

'CAR' lots: \$50M class A joins Conkwest, Sorrento in allogeneic cancer bid

By Randy Osborne, Staff Writer

Another vote for cancer immunotherapy came in the form of \$50 million in class A stock-sale money for Conkwest Inc., including \$48 million from Nantworks Inc. founder and well-known biotech entrepreneur Patrick Soon-Shiong plus

Another 'CAR-T' on the track: Transposagen lures Janssen to global deal

By Marie Powers, Staff Writer

Genome engineering firm Transposagen Biopharmaceuticals Inc. will seek to segue into a long-planned run at drug development as it joins the increasingly crowded race to develop chimeric antigen receptor T cells (CAR-T) through a research collaboration and global license deal with Janssen Biotech Inc., a unit of Johnson & Johnson.

Glaxosmithkline inks \$350M oncology deal with Adaptimmune

By Nuala Moran, Staff Writer

LONDON – Six weeks after divesting its portfolio of marketed cancer drugs, Glaxosmithkline (GSK) plc is stepping up investment in oncology R&D, in a \$350 million deal with T-cell immunotherapy specialist, Adaptimmune Ltd., for its lead program NY-ESO-1.

Money aside, for James Noble, CEO of

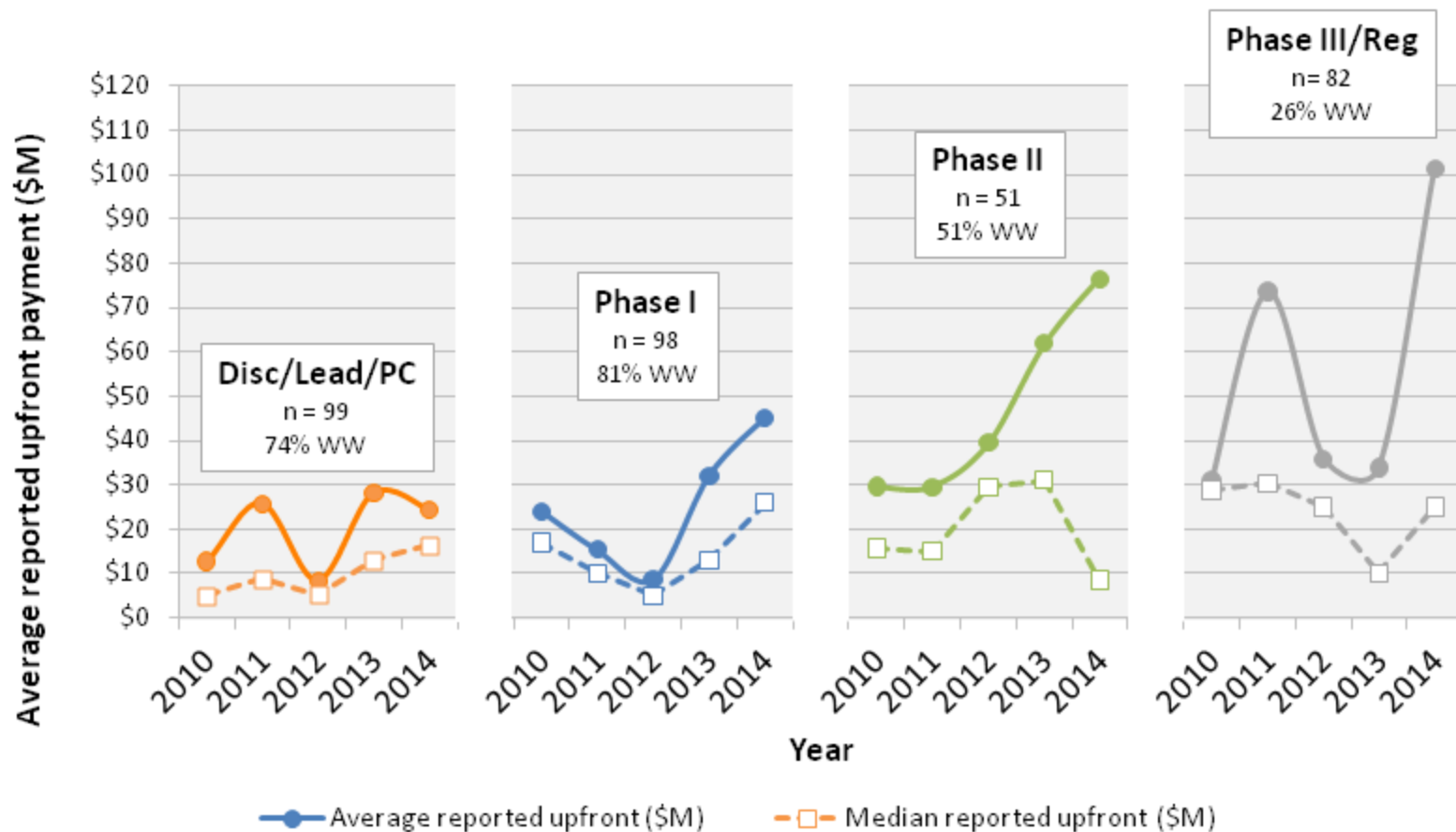
Juno Therapeutics Inc., of Seattle, signed an agreement to obtain a license from Opus Bio Inc., of Greenwich, Conn., for a CAR-T cell product candidate targeting CD22, a protein expressed on most B-cell leukemias and lymphomas. The product candidate was developed by the National Cancer

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5-year Trend in Upfront Payments by Stage

Average and median announced upfront payments by year and stage of lead asset, 2010-2014



Summary: 2014 Activity And Total Deal Value By Stage of Licensed Asset

2014 Licensing/JV Deals by Stage at Signing

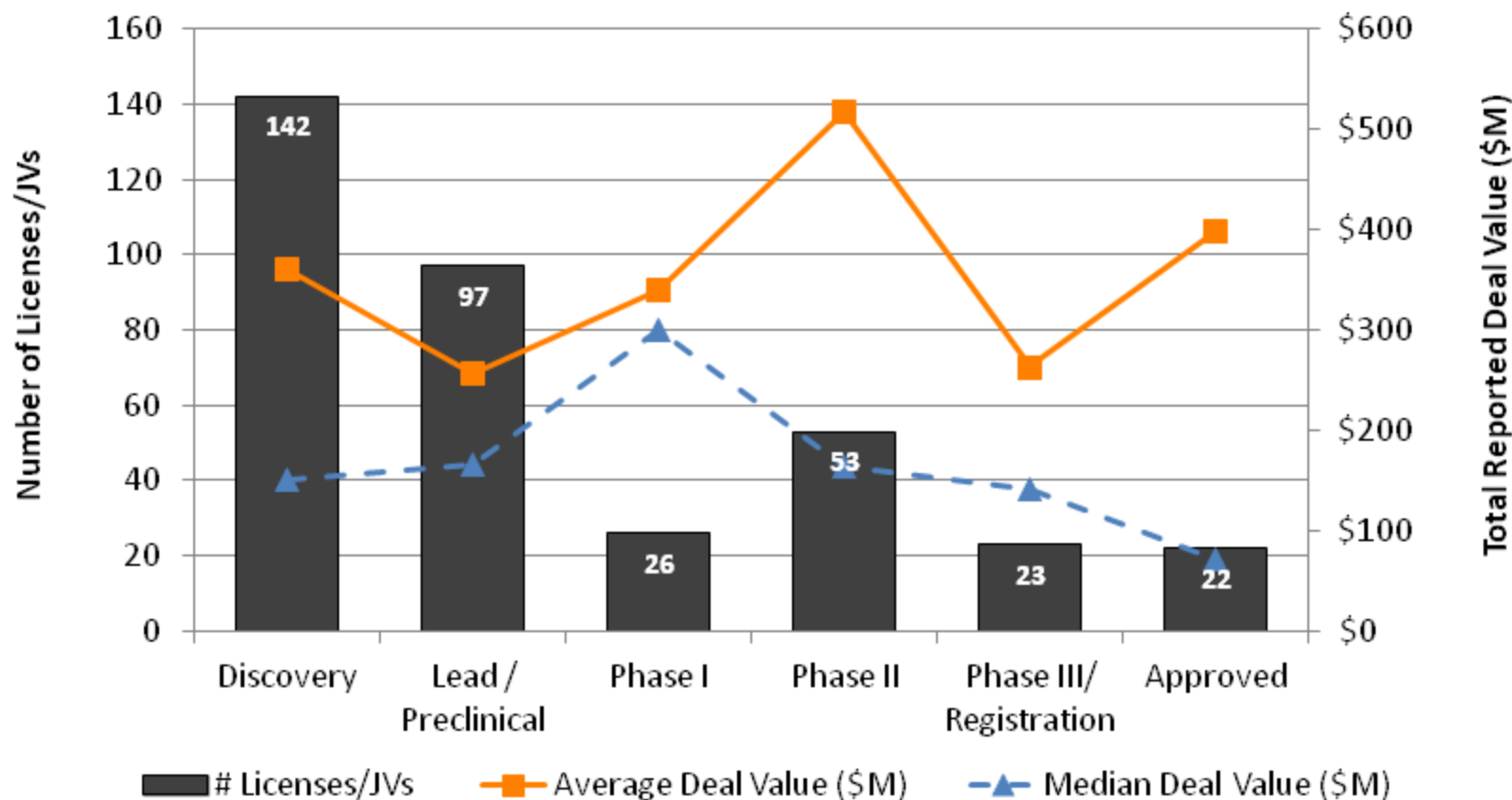


Chart excludes the 366 licenses and JVs in 2014 for which a stage at signing was not applicable and/or not disclosed.

Conclusions

Conclusions

- MOMENTUM!
- Licensing activity up, everywhere but especially in cancer, endocrine/metabolic, and infectious disease
- Licensing values are up, everywhere but especially in Phase II, as measured by biodollars and upfront payments
- Licensing in the early stages has been and remains very active
- Long anticipated megamergers arrived; but in the form of “Tax Inversions” and Asset Swaps as Spec Pharma and Big Pharma look to reposition themselves for the future
- Tail-winds from surging IPO market pushed private target (especially early-stage) M&A deal activity to highest levels seen in over 7 years
- M&A activity, like did licensing deals last year, shifted further upstream



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Act with confidence in a
complex world

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