



Competitive Intelligence: How to Optimize Pipeline and Clinical Trials Data Analysis?

The International Conference on Search, Data and Text
Mining and Visualization
Anne Trincot, April 2019



Contents

- ① Introduction
- ② BizInt and Vantage Point solutions
- ③ VALEM360
- ④ Conclusion



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Objectives

Two methods to optimize Data Visualization for Competitive Intelligence:

- ① Pipeline and Clinical Trials Data Analysis with BizInt and VantagePoint Solutions
- ② Global Data Visualizations for a particular Disease: VALEM360 In-house development

Drug development journey and data sources



IP

PubMed
National Library of Medicine

Trialtrove
Pharma intelligence | informa

Adis Insight

Evaluate[®]
Intelligent Life Science

Clarivate Analytics

OncologyPipeline
Every trial, result and timeline that matters

Pharma intelligence
informa

BIOWORLD™ TODAY
THE DAILY BIOPHARMACEUTICAL NEWS SOURCE

NIH U.S. National Library of Medicine
ClinicalTrials.gov

EUROPEAN MEDICINES AGENCY
SCIENCE · MEDICINES · HEALTH

DRG
DECISION RESOURCES GROUP

Pharmaprojects

GlobalData.
Decode the Future

Scrip
Pharma intelligence





FDA
U.S Food and Drug Administration

Integrity
A Cortellis solution
Empowering knowledge-based drug discovery and development





IMS Health & Quintiles are now
IQVIA™

SERVIER

Pipeline Databases

				
Coverage	Since 1988	NA	Since 1980	Since 1995
Users	Researchers, Translational researcher	R&D, BD&L	R&D, marketing, strategy	R&D, regulatory, marketing, strategy
Advantages	Patent information	Deals Patents	Link with TrialTrove	Regulatory Information
Disadvantage	Warning – active status	Updates	No information from public research	Updates
Dataviz	basic	yes	yes	yes

Clinical Trial Databases or Registries

	 U.S. National Library of Medicine <i>ClinicalTrials.gov</i>	 European Clinical Trials Database EudraCT	 International Clinical Trials Registry Platform Search Portal	 Trialtrove Pharma intelligence informa
Coverage	US, World	Europe	World	World
Advantages	The Oldest and Most Well-known	Well-known in Europe	Data from Emergent countries	More exhaustive Link with Pharmaprojects Tagged data
Disadvantage	Not exhaustive	Not exhaustive	Old Website Not exhaustive	Not free of charge
Dataviz	no	no	no	yes




 **SERVIER**

ABOUT CLINICAL TRIALS FIND CLINICAL TRIALS DATA REQUEST PORTAL OUR COMMITMENTS IN R&D

Servier Clinical Trial Data

The Servier clinical registry provides data protocol and results from our Phase I to IV clinical studies

Search in study title **SEARCH →**

 **SERVIER**



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Data Visualizations offered by our suppliers

FUNNEL

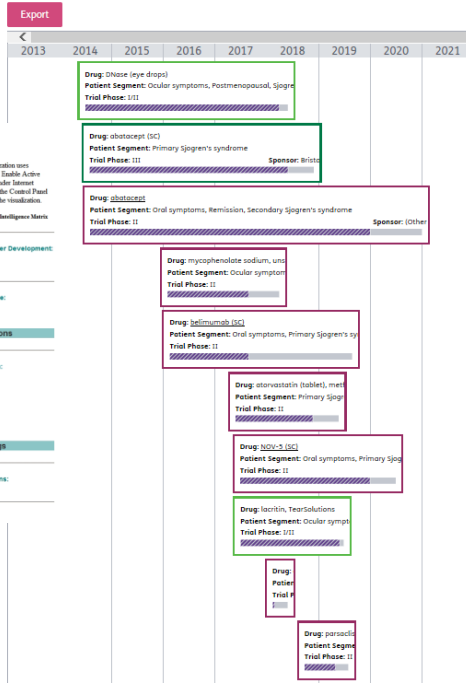
This visualization uses JavaScript. Enable Active Scripting under Internet Options in the Control Panel to display the visualization.

Drug Count: Highest Development Status: **Phase II** Development History: **Preclinical**

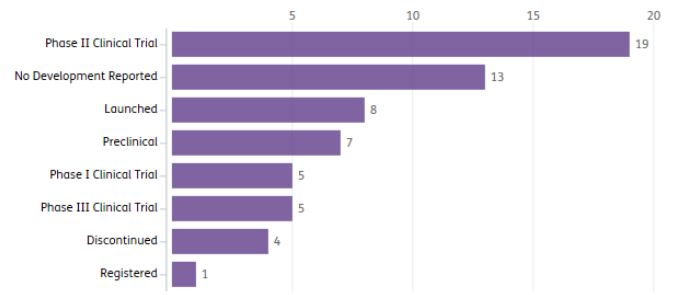
Higher Development Status by: **10**



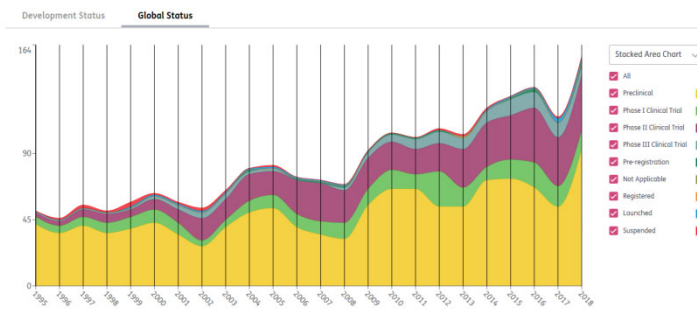
Phases
 I II I/II II II/III III III/IV IV
 Showing 10 trials. Those trials without start and enrollment close dates are not available in this view.



Global Status (8) Sort Desc



Export

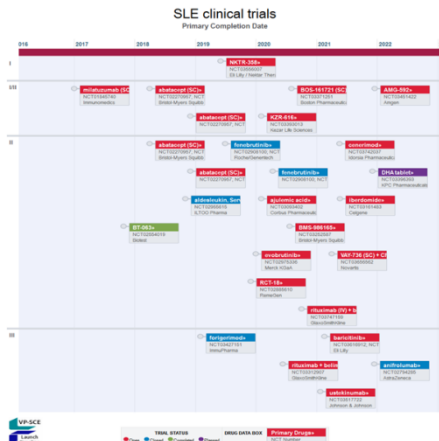


Data Visualization with BizInt and Vantage Point

Tools to improve and hone Data Visualization

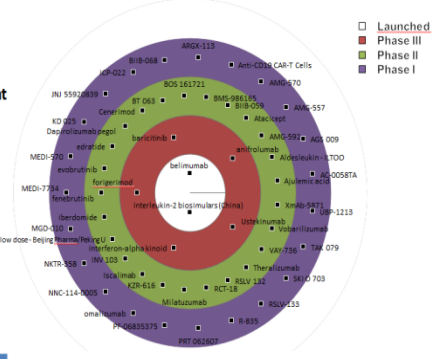
Preclinical	Phase 1	Phase 1/2	Phase 2	Phase 3	Marketed
AMD-300 Transforming growth factor beta	trastuzumab Tyrosine kinase inhibitor	bravado Tubulin inhibitor	abiraterone Androgen receptor antagonist	apalutamide Androgen receptor antagonist	Abacavir and dolutegravir Immunosuppressants
tasquinipin Skeletal myosin II receptor antagonist	bindefelix Oxandrolone 17 receptor antagonist	flomaxone Calcium channel inhibitor	vedolizumab Integrin inhibitor	EC2-001 Cell reagents	Debio-025 TETRI agonist
BLD-200 Cellular protein inhibitor	CM-103 Oxandrolone 17 receptor inhibitor	telatadine Histamine H1 receptor antagonist	AMG 203 Integrin inhibitor	inotuzumab CD20 antibody	intracapsule Antibiotic receptor agonist
C188-9 TGF-β1 transcription factor inhibitor	DPP-101 Carbamidyl transferase 22 agonist	belimumab B-lymphocyte stimulator inhibitor	belimumab B-lymphocyte stimulator inhibitor	belimumab B-lymphocyte stimulator inhibitor	
CEP-350 G2C2C antagonist	cedelizumab G2C2C antagonist	cedelizumab G2C2C antagonist	cedelizumab G2C2C antagonist	cedelizumab G2C2C antagonist	
Elendic Energy G-protein coupled receptor activity	ED-033 G-protein coupled receptor inhibitor	ED-033 G-protein coupled receptor inhibitor	ED-033 G-protein coupled receptor inhibitor	ED-033 G-protein coupled receptor inhibitor	
GS-13781 NADPH oxidase inhibitor	NADPH oxidase inhibitor	NADPH oxidase inhibitor	NADPH oxidase inhibitor	NADPH oxidase inhibitor	
IMD-C803 Underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	
mevastatin HMG-CoA reductase inhibitor	mevastatin HMG-CoA reductase inhibitor	mevastatin HMG-CoA reductase inhibitor	mevastatin HMG-CoA reductase inhibitor	mevastatin HMG-CoA reductase inhibitor	
PF-001 EGFR protein inhibitor	PF-001 EGFR protein inhibitor	PF-001 EGFR protein inhibitor	PF-001 EGFR protein inhibitor	PF-001 EGFR protein inhibitor	
PF-001 Underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	underspecific pharmacological activity	
perin A, Protein immunomodulator	perin A, Protein immunomodulator	perin A, Protein immunomodulator	perin A, Protein immunomodulator	perin A, Protein immunomodulator	
BBB-001 EGFR protein inhibitor	BBB-001 EGFR protein inhibitor	BBB-001 EGFR protein inhibitor	BBB-001 EGFR protein inhibitor	BBB-001 EGFR protein inhibitor	
telatadine Histamine H1 receptor antagonist	telatadine Histamine H1 receptor antagonist	telatadine Histamine H1 receptor antagonist	telatadine Histamine H1 receptor antagonist	telatadine Histamine H1 receptor antagonist	
SM-04755 Wnt pathway inhibitor	SM-04755 Wnt pathway inhibitor	SM-04755 Wnt pathway inhibitor	SM-04755 Wnt pathway inhibitor	SM-04755 Wnt pathway inhibitor	
atumumab (sustained-release) Anti-CD73 antibody	atumumab (sustained-release) Anti-CD73 antibody	atumumab (sustained-release) Anti-CD73 antibody	atumumab (sustained-release) Anti-CD73 antibody	atumumab (sustained-release) Anti-CD73 antibody	
Tegaserod 5-HT4 receptor agonist	Tegaserod 5-HT4 receptor agonist	Tegaserod 5-HT4 receptor agonist	Tegaserod 5-HT4 receptor agonist	Tegaserod 5-HT4 receptor agonist	

Total Scleroderma Market Competitive Landscape Marketed Products and Products in Development with MA



Predicted Approval dates (US)

Stelara (Ustekinumab)	2020
Olumiant (Baricitinib)	2022
Lupuzor (forigerimod)	2024
AMG-592	2026
NKTR-358	2026



Pipeline information

Integrity
A Cortellis solution
Empowering knowledge-based drug discovery and development

Pharmaprojects

Clarivate Analytics

Adis Insight

Clinical trial information

NIH U.S. National Library of Medicine

ClinicalTrials.gov

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BizInt Smart Charts
Drug Development Suite

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Competitive Intelligence
Analysis

Update

Pipeline information

Integrity
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Combination
Old version

Combination
Old version



Competitive Intelligence
Analysis

BizInt Smart Charts
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Smart Charts Edition



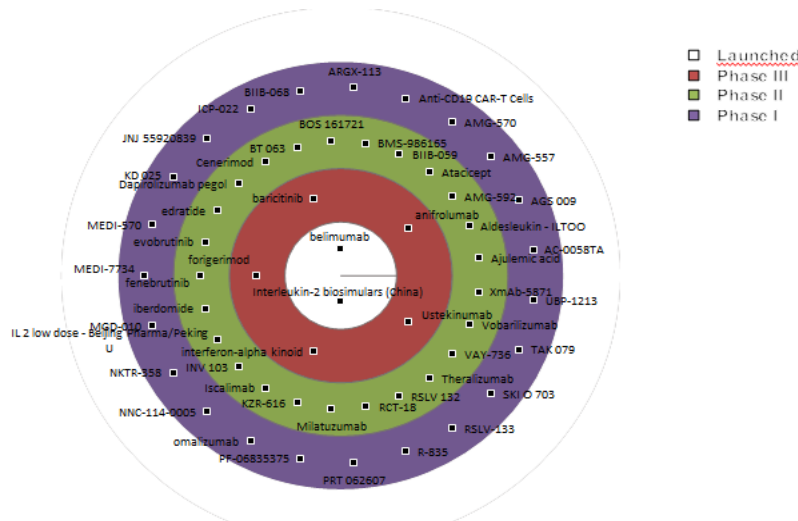
Summarizing pipeline data

Chart visualization

	Primary Drug Name	Common Drug Name	Database	Synonyms	Mechanism of Action	Global Status	Disease Status		Latest Change	Delivery Route	Origin of Material		
							Disease	Status					
1.	A-00X	A-00X	1.1 Pipeline link	A 00X A00X A-00X AAV AQP1 AAV2hAQP1, Kadmon Pharmaceuticals AAVAQP1 AAV-AQP1	Aquaporin stimulant	Phase II Clinical Trial	Xerostomia Radio/chemotherapy- induced injury, unspecified Sjogren's syndrome	Phase II Clinical Trial Phase II Clinical Trial Preclinical	Expected timing of Phase III trial for xerostomia reported per MeiraGTx presentation	Injectable	Biological, nucleic acid, viral vector		
2.	abatacept	abatacept	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline	1.1 Pipeline		
			2.1 Pipeline link	2.2 Adis link	2.3 CORTL link	abatacept abatacept (IV) abatacept (SC) BMS-188667 BMS-188667 (IV) BMS-188667 (SC) CTLA4Ig, BMS CTLA4-Ig, BMS (IV) ONO4164 ONO-4164 ONO4164 (IV) ONO-4164 (IV) ONO4164 (SC) ONO-4164 (SC) Orencia Orencia (IV) Orencia (SC)	CD80 antagonist CD86 antagonist T cell inhibitor Immune checkpoint inhibitor	Launched	Arthritis, rheumatoid Arthritis, juvenile Arthritis, psoriatic Nephritis, lupus Lupus erythematosus, systemic Sjogren's syndrome Dermatomyositis Polymyositis Idiopathic inflammatory myopathy, unspecified Nephrotic syndrome Graft-versus-host disease Ankylosing spondylitis	Launched Launched Launched Phase III Clinical Trial Phase III Clinical Trial Phase III Clinical Trial Phase III Clinical Trial Phase III Clinical Trial Phase II Clinical Trial Phase I Clinical Trial No Development Reported	Results for Phase III trial (IM101-291) for lupus nephritis and Phase III study (IM101-550) for RA reported	Injectable Injectable, intravenous Injectable, subcutaneous	Biological, protein, recombinant

Summarizing pipeline data

Bullseye Chart



Piano Chart

No Development Reported	Discovery	Preclinical	Preclinical	Phase 1	Phase 1/2
AMG-9191 CAR-T cell (Ica Pharma)	aml-0213 CAR T-cell therapy (Molecular University)	19P-V3 (Phar)	IL13b2 CAR-T (Teva Therapeutics Inc)	2173 CAR-T CD19 T cells (University of Pennsylvania)	aml-0213 CAR T-cell therapy (Molecular University)
aml-0212 CAR T-cell therapy (Saylor College of Medicine)	aml-0219 CAR T-cell therapy (Aide BioPharmaceutics)	AC133-CAR T cells (Universitätsklinikum Koblitz)	IL13b2-CAR-IL13 T cells (Saylor College of Medicine)	aml-0218 CAR T-cell therapy (Saylor College of Medicine)	CAR-T/CD19 cell immunotherapy (Shanghai United Biotech)
IL13b2 antibody, Jans (Jans Therapeutics)	aml-0215/aml-0216 CAR T-cell therapy (Saylor College of Medicine)	aml-0217/aml-0218 CAR T-cell therapy (Saylor College of Medicine)	IL13b2-CAR-IL13 CAR T cells (Saylor College of Medicine)	aml-0219 CAR T-cell therapy (Saylor College of Medicine)	MUC1-CAR-IL13 cell therapy (Pozosdon)
	CYR-002 CAR-T cells (Saylor College of Medicine)	CAR-0133 (Molecular University)	19P-03 (ImmunoDico)	aml-0215 CAR T-cell therapy (Saylor College of Medicine)	
	OT19g450-CD28g-2nd Gen T cells (City of Hope)	CAR-T cell therapy, Buhler-3 (Buhler)	19P-02 (Hanging Vacci)	AM-101 (Auroa Biopharma)	
	CMD-014 (Saylor College of Medicine)	CAR-T CD19, CD3 (Cellular Biomedicine Group)	19P-01 (Hanging Vacci)	AM-102 (Auroa Biopharma)	
	aml-0218/aml-0217 CAR-T therapy (Saylor College of Medicine)	CAR-CD19b T cells (Saylor College of Medicine)	19P-04/CD19b (Molecular University)	CAR-T therapy, Buhler-3 (Buhler Biotechnology (Auroa Biopharma))	
	aml-0216/aml-0215 CAR-T therapy (Saylor College of Medicine)	CD19-aml-0216 CAR-T cells (Saylor College of Medicine)	19P-05 (Vaccin Seiring)	CMD-011 (Saylor College of Medicine)	
	PD-1/4-1B6 T cells (Saylor College of Medicine)	CD19-CAR-Ts (Cytogen Therapeutics)	19P-06 (SI Bph)	CD19-018 (Cytogen Therapeutics)	
	22P-111-CAR T cell therapy (Shanghai United Biotech)	22P-111-CAR T cells (Shanghai United Biotech)	19P-07 (Teva Therapeutics)	CD19-019 (Cytogen Therapeutics)	
	22P-112-CAR-modified T cells (Teva Therapeutics)	22P-112-CAR-modified T cells (Teva Therapeutics)	19P-08 (Teva Therapeutics)	CD19-020 (Cytogen Therapeutics)	
	19P-09 CAR-T (Roger Williams Medical Center)	19P-10 CAR-T (Roger Williams Medical Center)	19P-09 (Teva Therapeutics)	CD19-021 (Cytogen Therapeutics)	
	19P-11 CAR-T (Sorrento)	19P-12 CAR-T (Sorrento)	19P-11 (Teva Therapeutics)	CD19-022 (Cytogen Therapeutics)	
			19P-13 (Teva Therapeutics)	CD19-023 (Cytogen Therapeutics)	
			19P-14 (Teva Therapeutics)	CD19-024 (Cytogen Therapeutics)	
			19P-15 (Teva Therapeutics)	CD19-025 (Cytogen Therapeutics)	
			19P-16 (Teva Therapeutics)	CD19-026 (Cytogen Therapeutics)	
			19P-17 (Teva Therapeutics)	CD19-027 (Cytogen Therapeutics)	
			19P-18 (Teva Therapeutics)	CD19-028 (Cytogen Therapeutics)	
			19P-19 (Teva Therapeutics)	CD19-029 (Cytogen Therapeutics)	
			19P-20 (Teva Therapeutics)	CD19-030 (Cytogen Therapeutics)	
			19P-21 (Teva Therapeutics)	CD19-031 (Cytogen Therapeutics)	
			19P-22 (Teva Therapeutics)	CD19-032 (Cytogen Therapeutics)	
			19P-23 (Teva Therapeutics)	CD19-033 (Cytogen Therapeutics)	
			19P-24 (Teva Therapeutics)	CD19-034 (Cytogen Therapeutics)	
			19P-25 (Teva Therapeutics)	CD19-035 (Cytogen Therapeutics)	
			19P-26 (Teva Therapeutics)	CD19-036 (Cytogen Therapeutics)	
			19P-27 (Teva Therapeutics)	CD19-037 (Cytogen Therapeutics)	
			19P-28 (Teva Therapeutics)	CD19-038 (Cytogen Therapeutics)	
			19P-29 (Teva Therapeutics)	CD19-039 (Cytogen Therapeutics)	
			19P-30 (Teva Therapeutics)	CD19-040 (Cytogen Therapeutics)	
			19P-31 (Teva Therapeutics)	CD19-041 (Cytogen Therapeutics)	
			19P-32 (Teva Therapeutics)	CD19-042 (Cytogen Therapeutics)	
			19P-33 (Teva Therapeutics)	CD19-043 (Cytogen Therapeutics)	
			19P-34 (Teva Therapeutics)	CD19-044 (Cytogen Therapeutics)	
			19P-35 (Teva Therapeutics)	CD19-045 (Cytogen Therapeutics)	
			19P-36 (Teva Therapeutics)	CD19-046 (Cytogen Therapeutics)	
			19P-37 (Teva Therapeutics)	CD19-047 (Cytogen Therapeutics)	
			19P-38 (Teva Therapeutics)	CD19-048 (Cytogen Therapeutics)	
			19P-39 (Teva Therapeutics)	CD19-049 (Cytogen Therapeutics)	
			19P-40 (Teva Therapeutics)	CD19-050 (Cytogen Therapeutics)	
			19P-41 (Teva Therapeutics)	CD19-051 (Cytogen Therapeutics)	
			19P-42 (Teva Therapeutics)	CD19-052 (Cytogen Therapeutics)	
			19P-43 (Teva Therapeutics)	CD19-053 (Cytogen Therapeutics)	
			19P-44 (Teva Therapeutics)	CD19-054 (Cytogen Therapeutics)	
			19P-45 (Teva Therapeutics)	CD19-055 (Cytogen Therapeutics)	
			19P-46 (Teva Therapeutics)	CD19-056 (Cytogen Therapeutics)	
			19P-47 (Teva Therapeutics)	CD19-057 (Cytogen Therapeutics)	
			19P-48 (Teva Therapeutics)	CD19-058 (Cytogen Therapeutics)	
			19P-49 (Teva Therapeutics)	CD19-059 (Cytogen Therapeutics)	
			19P-50 (Teva Therapeutics)	CD19-060 (Cytogen Therapeutics)	
			19P-51 (Teva Therapeutics)	CD19-061 (Cytogen Therapeutics)	
			19P-52 (Teva Therapeutics)	CD19-062 (Cytogen Therapeutics)	
			19P-53 (Teva Therapeutics)	CD19-063 (Cytogen Therapeutics)	
			19P-54 (Teva Therapeutics)	CD19-064 (Cytogen Therapeutics)	
			19P-55 (Teva Therapeutics)	CD19-065 (Cytogen Therapeutics)	
			19P-56 (Teva Therapeutics)	CD19-066 (Cytogen Therapeutics)	
			19P-57 (Teva Therapeutics)	CD19-067 (Cytogen Therapeutics)	
			19P-58 (Teva Therapeutics)	CD19-068 (Cytogen Therapeutics)	
			19P-59 (Teva Therapeutics)	CD19-069 (Cytogen Therapeutics)	
			19P-60 (Teva Therapeutics)	CD19-070 (Cytogen Therapeutics)	

In darker: new status
New product



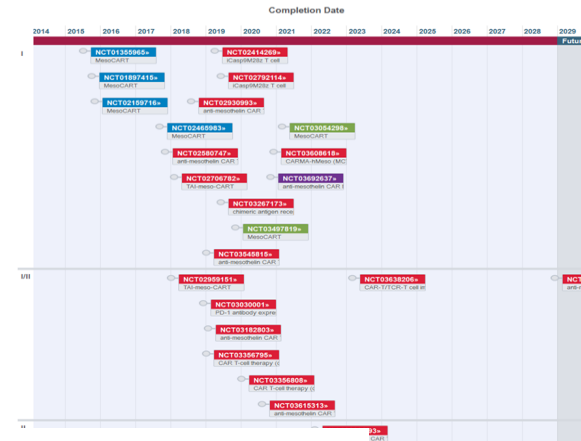
Clinical trial visualizations

Phase I
NCT03644356
MesoCART
NCT03437819
MesoCART
NCT01555955
MesoCART
NCT01987415
MesoCART
NCT02198716
MesoCART
NCT02465953
MesoCART
NCT03414303
IC3ap29/292 T cell
NCT02593747
anti-mesothelin CAR T-cell therapy (PD-1 and TCR knock-out)
NCT02706792
TAI-meso-CART
NCT02792114
IC3ap29/292 T cell
NCT02930995
anti-mesothelin CAR T-cell therapy
NCT02071172
Chimeric antigen receptor T cell
NCT03448815
anti-mesothelin CAR T-cell therapy (PD-1 and TCR knock-out)
NCT03030616
CAR1A-Meso (MCY 811)
NCT03633195
anti-mesothelin CAR T-cell therapy (metastatic pancreatic cancer), Shenzhen BiCellio
NCT03632637
anti-mesothelin CAR NK cell therapy

Phase I/II
NCT01933636
anti-mesothelin CAR T-cell therapy (metastatic cancer)
NCT02968181
TAI-meso-CART
NCT03030001
PD-1 antibody expressing mesothelin-specific chimeric antigen receptor (CAR) T cells
NCT01828603
anti-mesothelin CAR T-cell therapy expressing anti-CTLA-4 + anti-PD-1 ab
NCT03356795
CAR T-cell therapy (cervical cancer)
NCT03356809
CAR T-cell therapy (cervical cancer)
NCT02615310
anti-mesothelin CAR T-cell therapy expressing anti-CTLA-4 + anti-PD-1 ab
NCT03432096
CAR-T/TCR-T cell immunotherapy

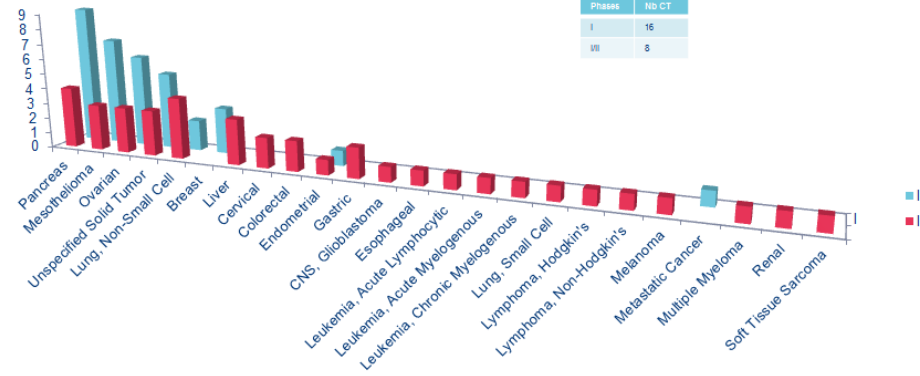
Trial Status

- Closed
- Completed
- Open
- Planned



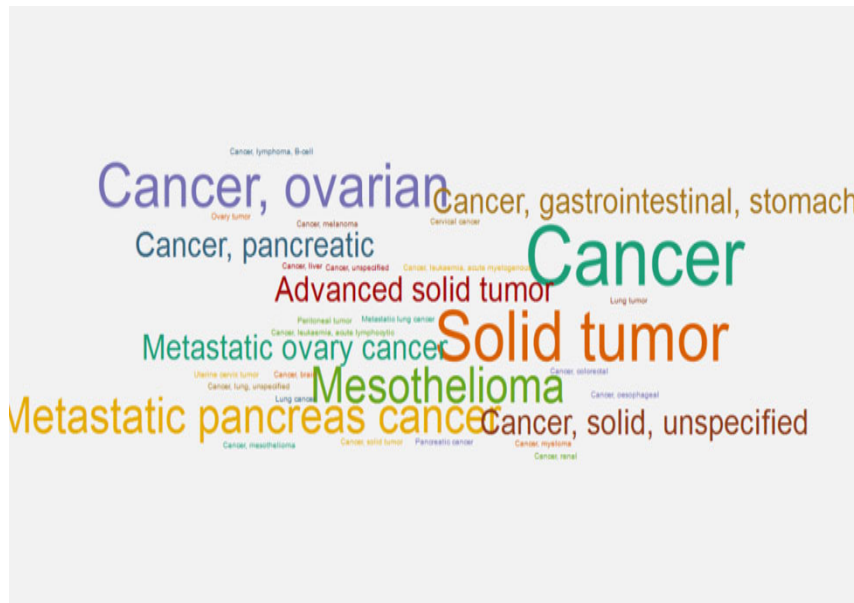
Nb Clinical trials by indication and phase *

* there may be several indications per study

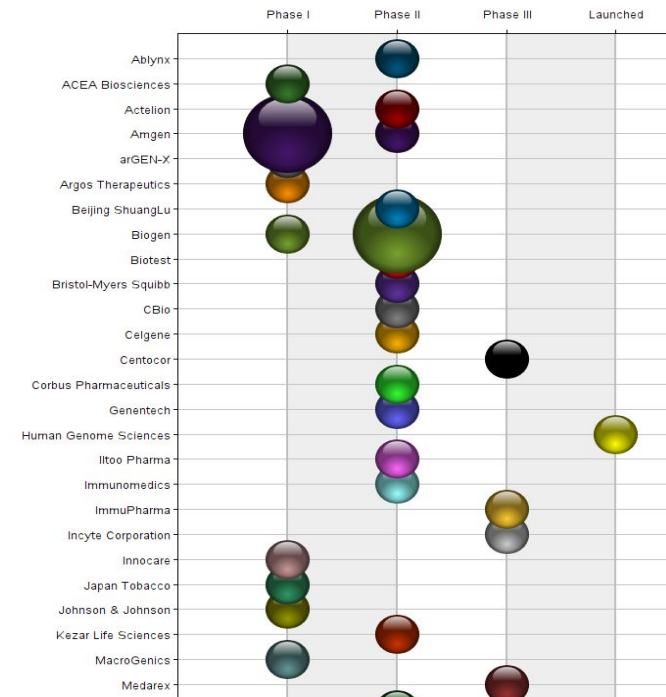


Other Data Visualizations

Word Cloud from List Selection



Bubble Chart





BizInt Smart Charts

Drug Development Suite

BizInt Smart Charts

Reference Rows™

vantage
point
Smart Charts Edition



- ✓ Combination of various sources
- ✓ Helpful to Analyse Pipeline and Clinical Development of our Competitors
- ✓ Some limitations:
 - ✓ Compatibility restriction (for example OncologyPipeline)
 - ✓ Need expertise and time
- ✓ Not usable for Big Data





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Context

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- ✓ **Pancreatic cancer** is a pathology of interest to many R&D and strategic departments, but it is a new disease within the company
- ✓ The objective is to **compile** competitive and environmental data on pancreatic cancer in order to obtain a 360° view of the information
- ✓ The project was **conducted together** with the **Digital Factory - IT Department**

Our investigations

- ✓ **Centralize** the data from different sources and data preparation
- ✓ **Associate** the elements of **treatment decision tree** to each clinical trial, their investigated drugs and study centers
- ✓ **Visualize** data via different interactive tools

Sources

Requests

Results

Combination

Database

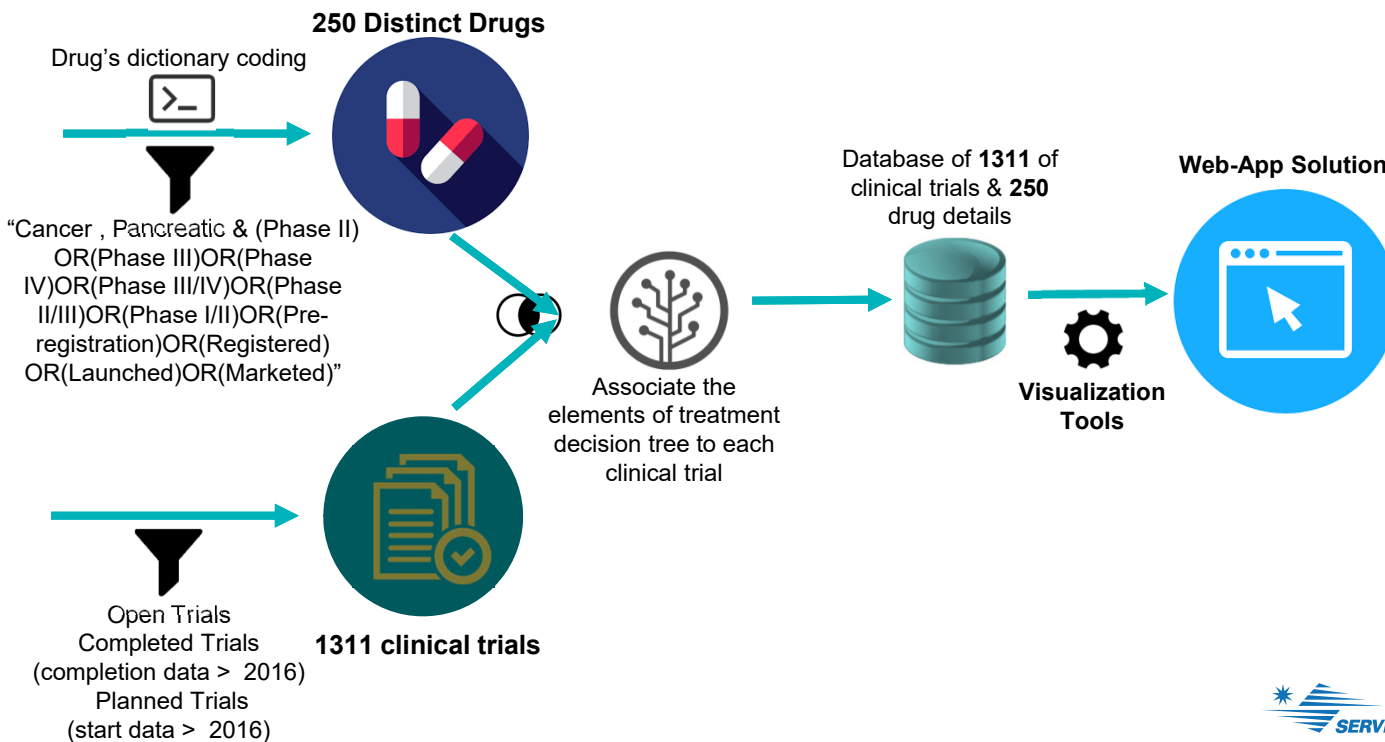
Visualization



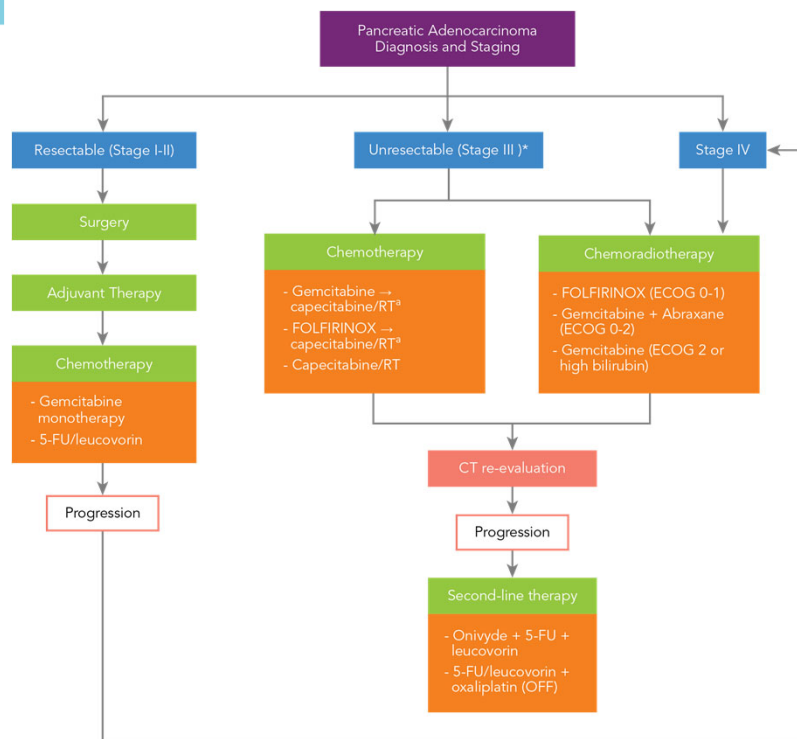
pipeline



Clinical trials



Treatment Decision Tree for Pancreatic Adenocarcinoma: Europe



^a Only as neoadjuvant therapy for borderline resectable (stage III).

* Including borderline resectable.

Note: Last updated August 2017

Associate the elements of treatment decision tree to each clinical trial

Line of Therapy or Operation	Stage (Any combination)	Treatment Tree Position
Adjuvant/ Neoadjuvant	0,I,II,III	Resectable
First line	III	Unresectable
First line	IV	First Line Metastatic
Second line or greater/Refractory/Relapsed	III, IV	Second Line
First line Maintenance/Consolidation	III	Unresectable
First line Maintenance/Consolidation	IV	First Line Metastatic
Second line or greater/Refractory/Relapsed	Any stage	Second Line
First line	II,III	Unresectable
First line	Any stage	First Line Metastatic
Line of therapy N/A	IV	First Line Metastatic
Line of therapy N/A	III	Unresectable

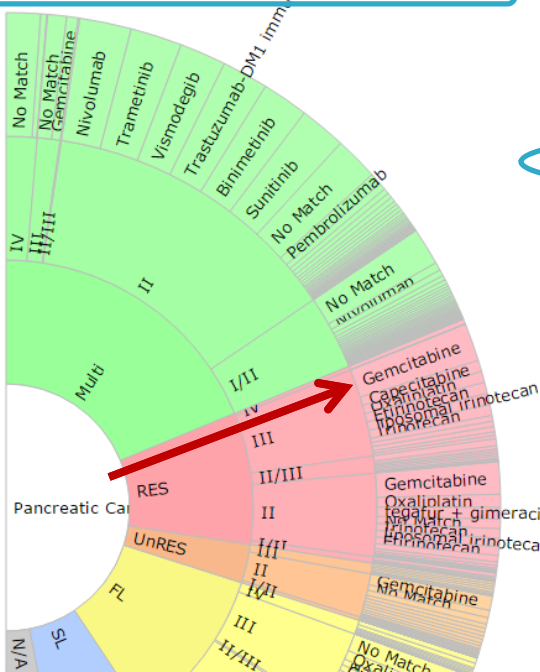
DATAVIZ #1 : The WHEEL

Valem 360

Filter by

Molecule

Phase



Pancreatic Cancer > Resectable > III > Gemcitabine

5293 patients

More details on associated clinical Trials

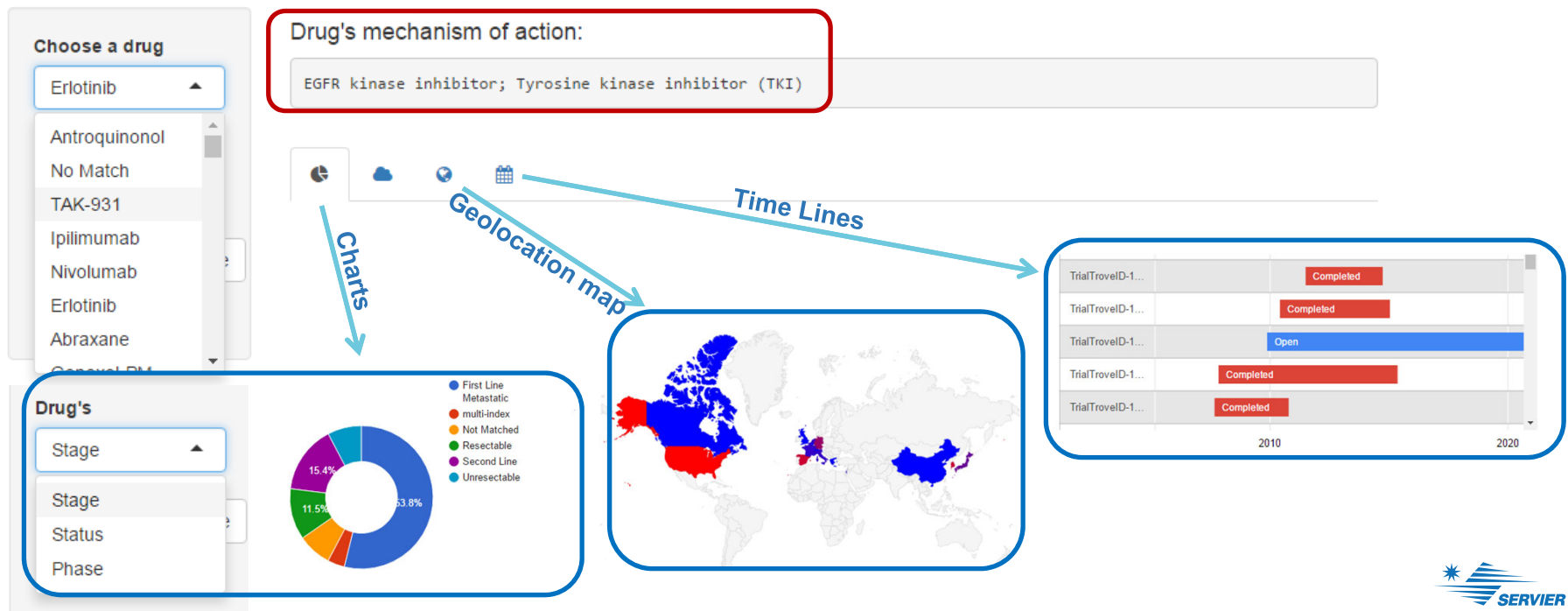
depth : 3
 Pancreatic Cancer > Resectable > III > Gemcitabine
 Show 50 entries

Phase	TrialTrove ID	NCT ID	Title	Status	Primary Endpoints Reported	Sponsor
III	TrialTroveID-269431	NCT02919787	Norwegian Pancreatic Cancer Trial (NorPACT) - 1: Norwegian Multicentre Un-blinded Phase III Randomized Controlled Trial (RCT) Evaluating the Additional Efficacy of Adding Chemotherapy Prior to Resection of a Pancreatic Head Malignancy to Avoid Early Mortality in Those	Open	2021-10-01	["Other Hospital/Academic/M Center"]

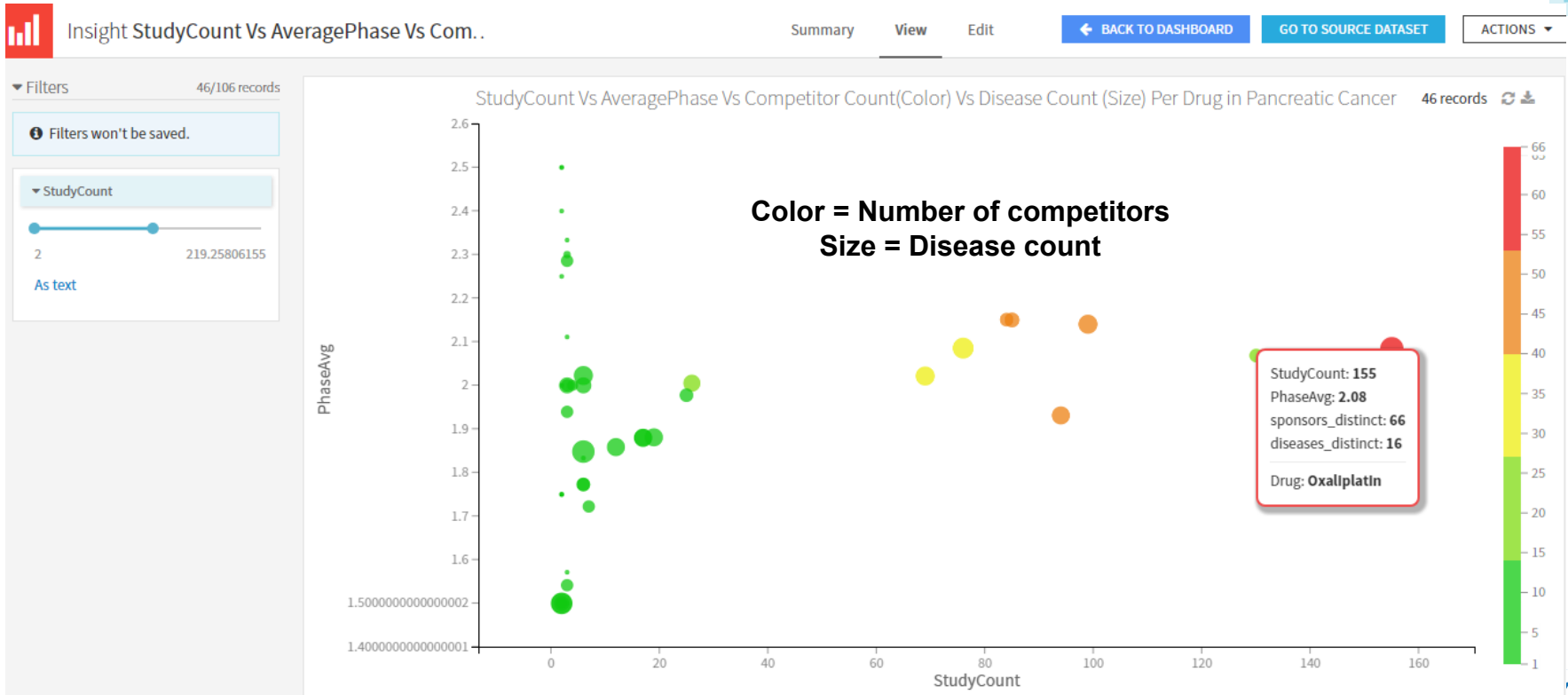


DATAVIZ #2: Dashboard (Drugs2Trials)

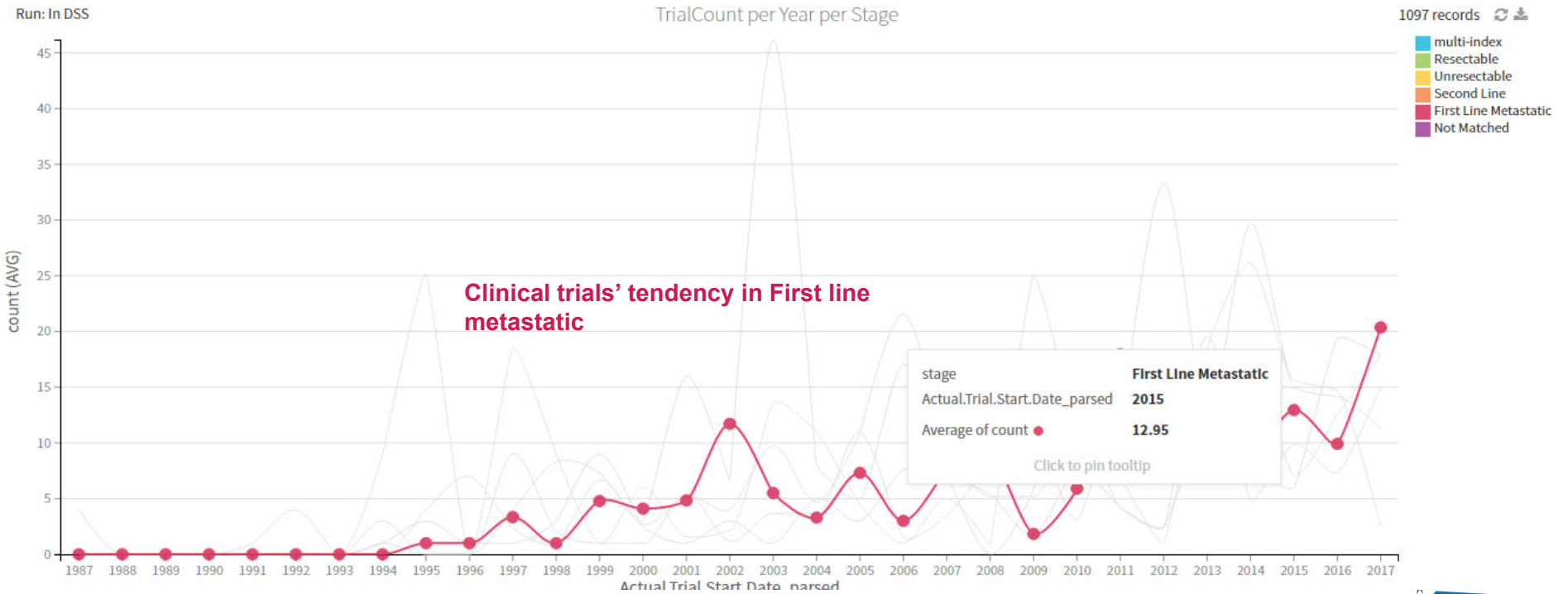
Drugs Profile - Vale360



DATAVIZ #3 : Dashboard (*DrugsByStudyCount*)



DATAVIZ #4 : Dashboard (Trials' *stage* Over Time)



Take Aways

Interesting and enriching **agile working method**

This project has taught us:

- ✓ **Need** to work on **structured data**
- ✓ Structured data extracted from paid databases such as Pharmaprojects or Trialtrove are of **poor quality**: content, coverage, update, metadata
- ✓ **Need to cross-check the information**, to "clean" the data
- ✓ Importance of setting up **dynamic dataviz** to help us analyze the information

VALEM 360 : Conclusion & Perspectives

- ✓ Fast implementation of a data-driven approach
- ✓ Provide a competitive landscape database on pancreatic cancer
- ✓ Different interactive data visualization tools

- ✓ Improve semi-automatic to fully automatic (daily – weekly update) data driven approaches. API solutions
- ✓ Improve used methodology based on business feedback
- ✓ Apply the same method to different pathologies



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Conclusion

Data Visualizations for the Analysis of our Competitive Intelligence

- ✓ Very **Useful** Tools
- ✓ Choose **Relevant Representations**
- ✓ Need **Expertises** in Topics, Information Sources and Data Structures.