



BizInt Smart Charts
SINCE 1996

*Challenges in Visualizing
Pharmaceutical Business Information*

April 2013

II-SDV, Nice, France
Diane Webb, President, BizInt Solutions Inc.

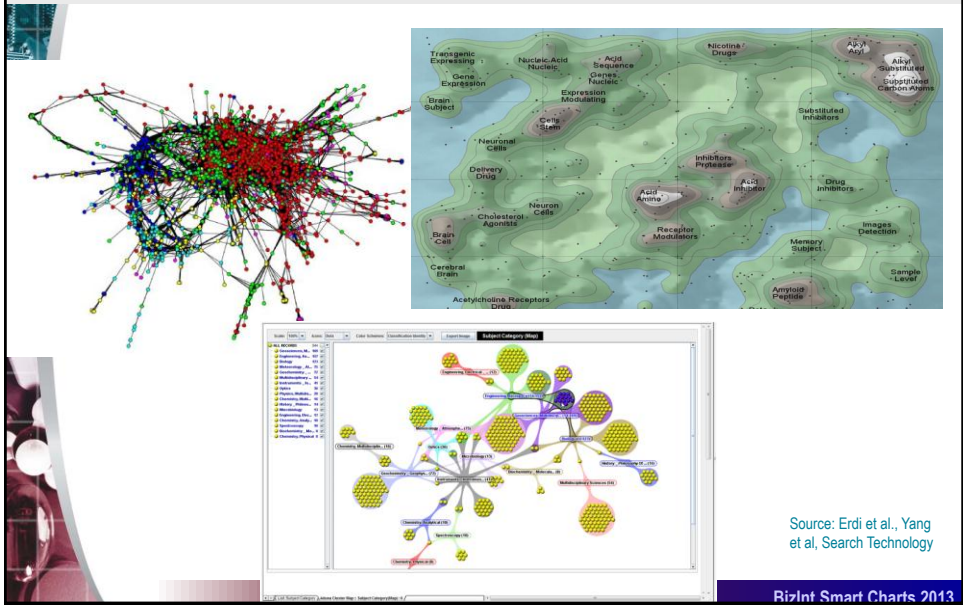
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The Problem:

Visualizations developed for scientific and patent data do not do a good job of “telling the story” when applied to drug pipeline data and often need significant changes.

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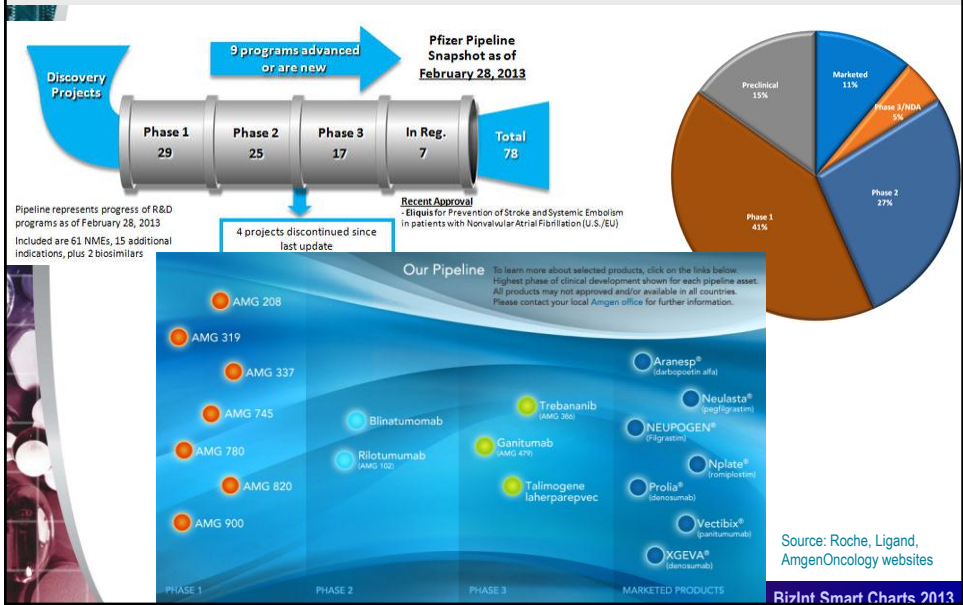
Examples of technical visualizations



Source: Erdi et al., Yang et al, Search Technology

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Examples of pharma pipeline visualizations

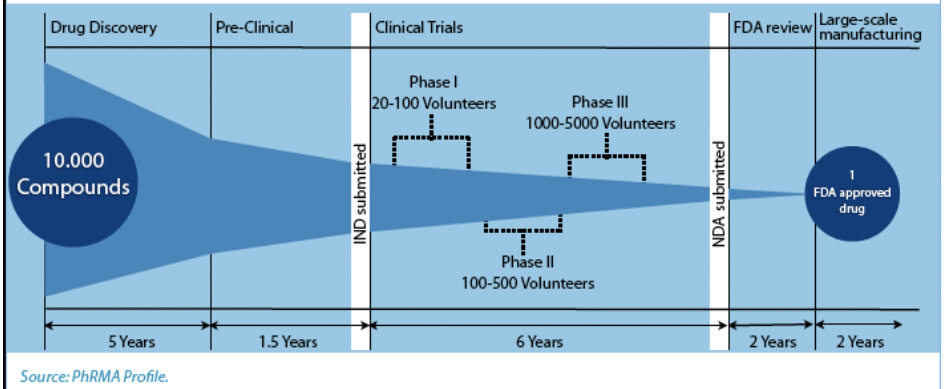


Source: Roche, Ligand, AmgenOncology websites

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The Drug Development “Pipeline”

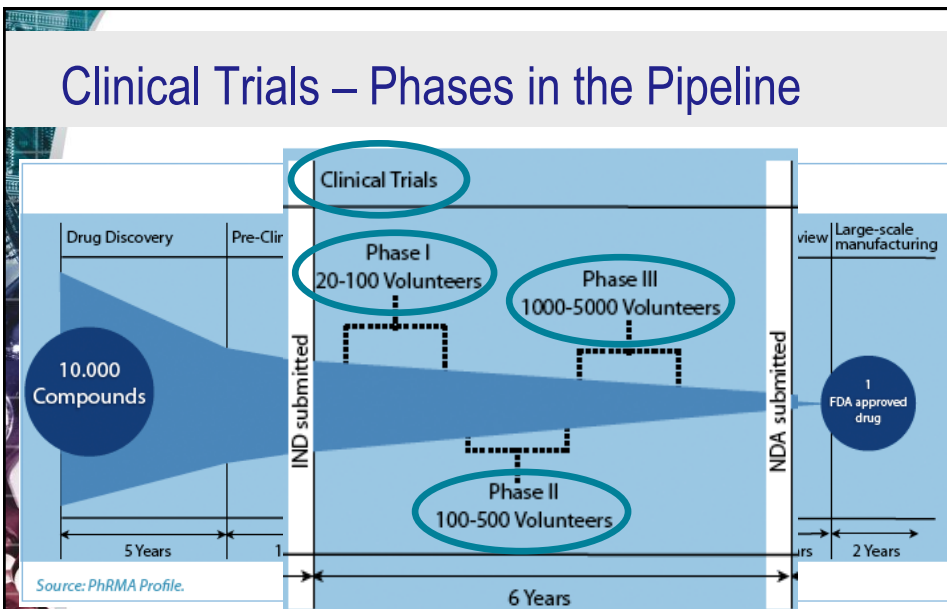
At each stage of the pipeline, companies need information on drugs in development to make both business and research decisions.



Source: PhRMA Profile.

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Clinical Trials – Phases in the Pipeline



Source: PhRMA Profile.

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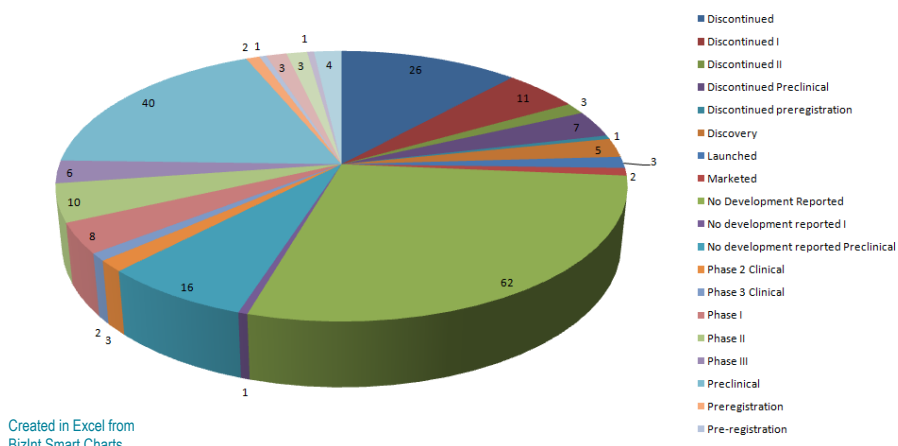
Information on drug pipelines --

- Comes from a variety of sources – company sources, published literature, conferences, industry news, etc.
- **Drug Pipelines Databases** – constructed by teams of editors at several companies, reviewing public and proprietary sources.
- Sold to the pharmaceutical industry for competitive intelligence on drug pipelines.
- Examples: Pharmaprojects, Integrity, R&D Focus

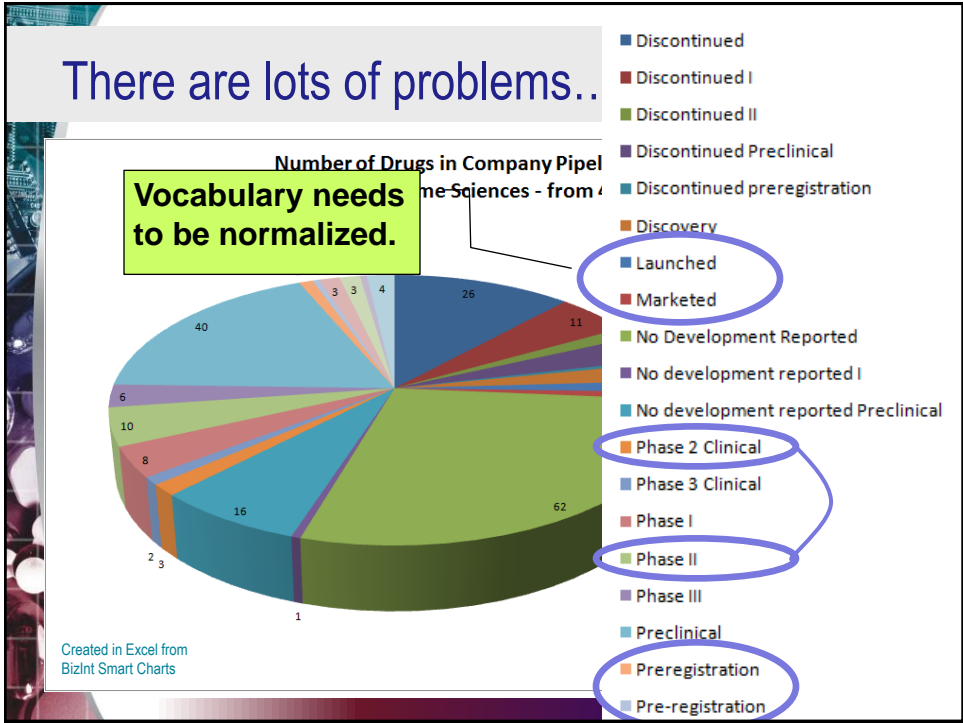
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An example of a company pipeline graph

Number of Drugs in Company Pipeline by Phase -
Human Genome Sciences - from 4 Databases



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Challenges in multi-database reports

	Common Drug Name	Database	Status	Companies
1	FP-1039	Adis R&D Insight	Phase I	Five Prime Therapeutics (Originator) Human Genome Sciences (Licensee)
2	FP-1039	IMS R&D Focus		FivePrime (USA) Human Genome Sciences (USA)
3	FP-1039	Thomson Pharma		FivePrime Therapeutics Inc Human Genome Sciences Inc
4	FP-1039	Citeline Pipeline	Phase II	Five Prime Therapeutics Human Genome Sciences
5	lexatumumab	Thomson Pharma	Phase 2 Clinical	Cambridge Antibody Technology Group plc Human Genome Sciences Inc
6	lexatumumab	Adis R&D Insight	Discontinued I	Cambridge Antibody Technology (Originator) Human Genome Sciences (Licensee)
7	lexatumumab	Citeline Pipeline	No Development Reported	Human Genome Sciences AstraZeneca
8	lexatumumab	IMS R&D Focus	Phase I	Human Genome Sciences (USA)

1. Multiple Records for the Same Drug

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Challenges in multi-database reports

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1	FP-1039	Adis R&D Insight	Phase I	Five Prime Therapeutics (Originator) Human Genome Sciences (Licensee)
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8	lexatumumab	IMS R&D Focus	Phase I	Human Genome Sciences (USA)

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2. Conflicting Data for the Same Drug

Challenges in multi-database reports

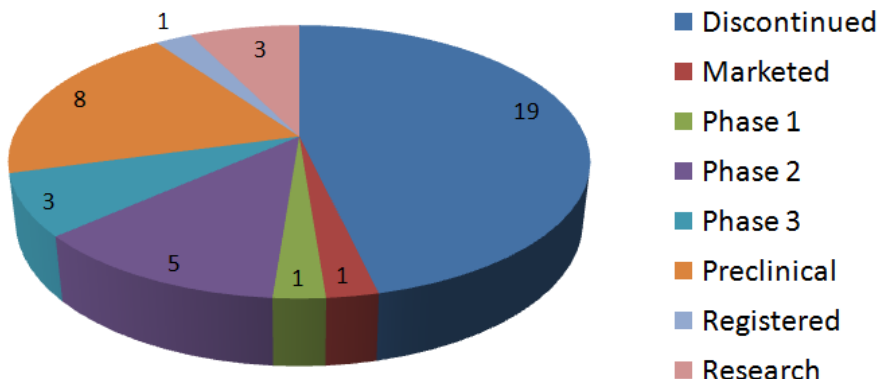
	Common Drug Name	Database	Status	Companies
1	FP-1039	Adis R&D Insight	Phase I	Five Prime Therapeutics (Originator) Human Genome Sciences (Licensee)
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8	lexatumumab	IMS R&D Focus	Phase I	Human Genome Sciences (USA)

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3. Terminology Variation

After cleanup and de-duplication...

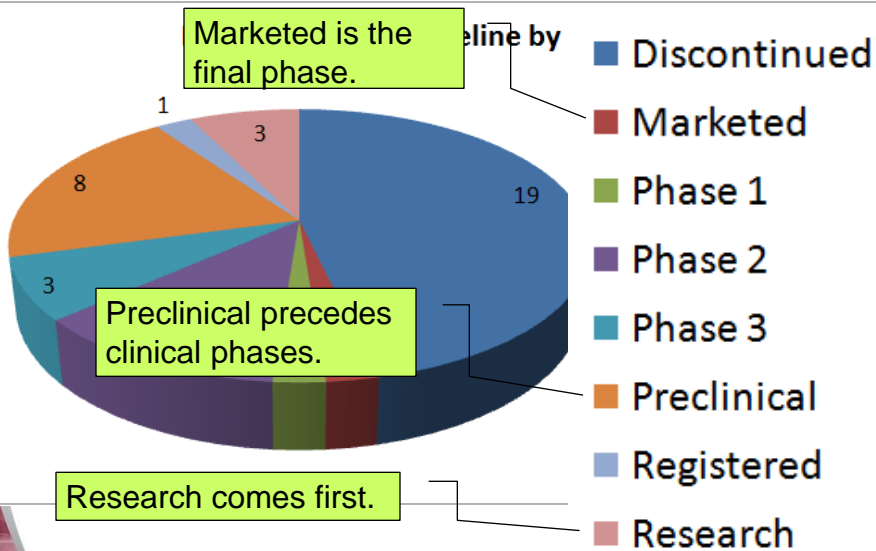
Drugs in the HGS Pipeline by Phase



Created in Excel from BizInt Smart Charts Reference Rows.

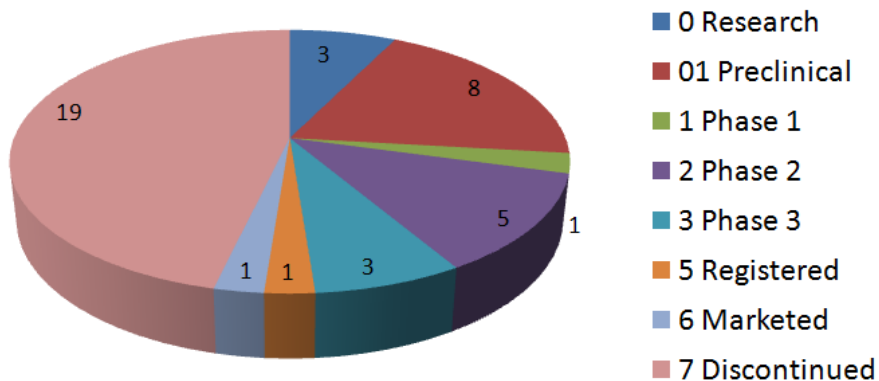
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But the phases are not ordered by time.



We need to order the phases chronologically

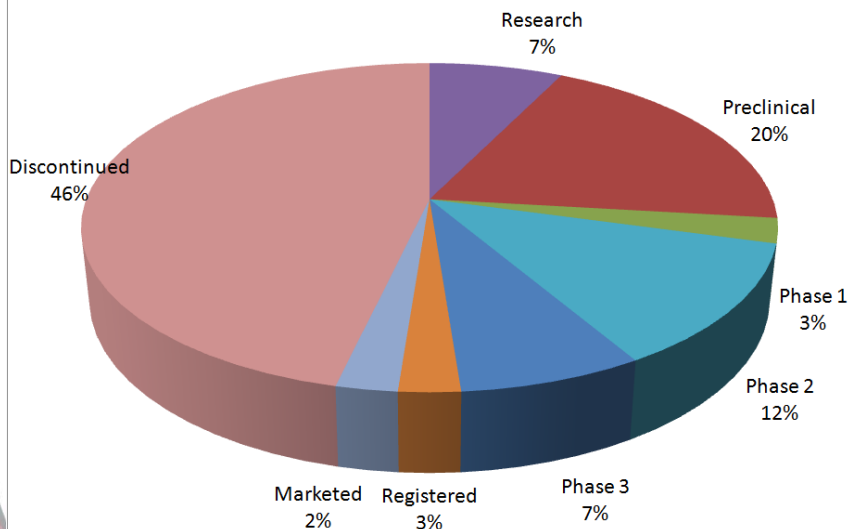
Drugs in the HGS Pipeline by Phase



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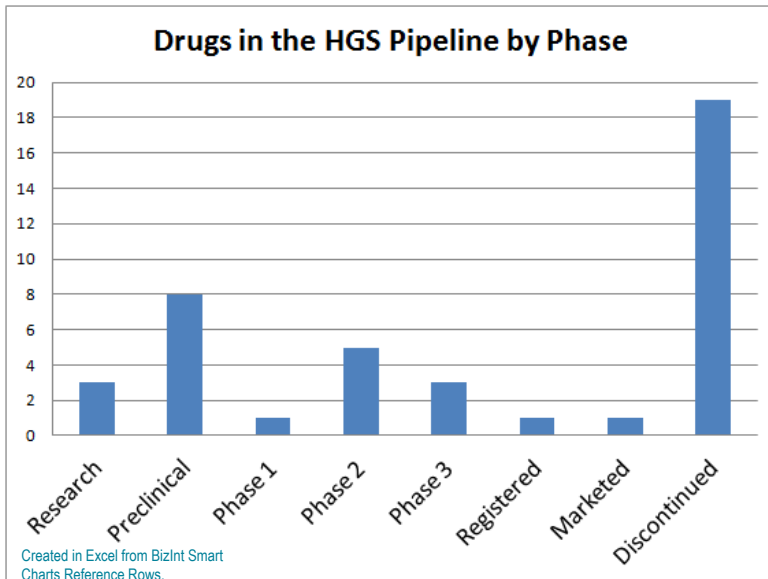
Now we have a meaningful pie graph...

Drugs in the HGS Pipeline by Phase



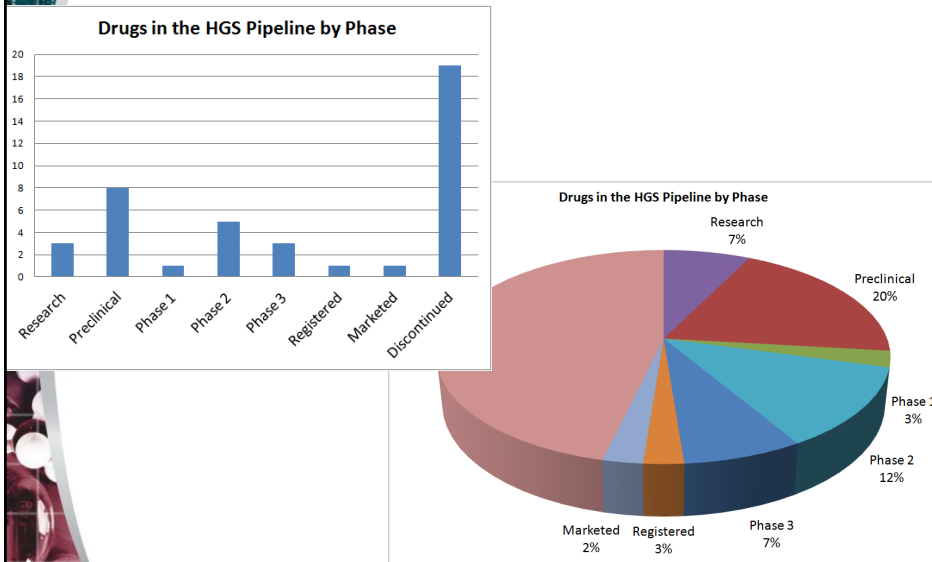
13

Or we could create a pipeline bar graph...



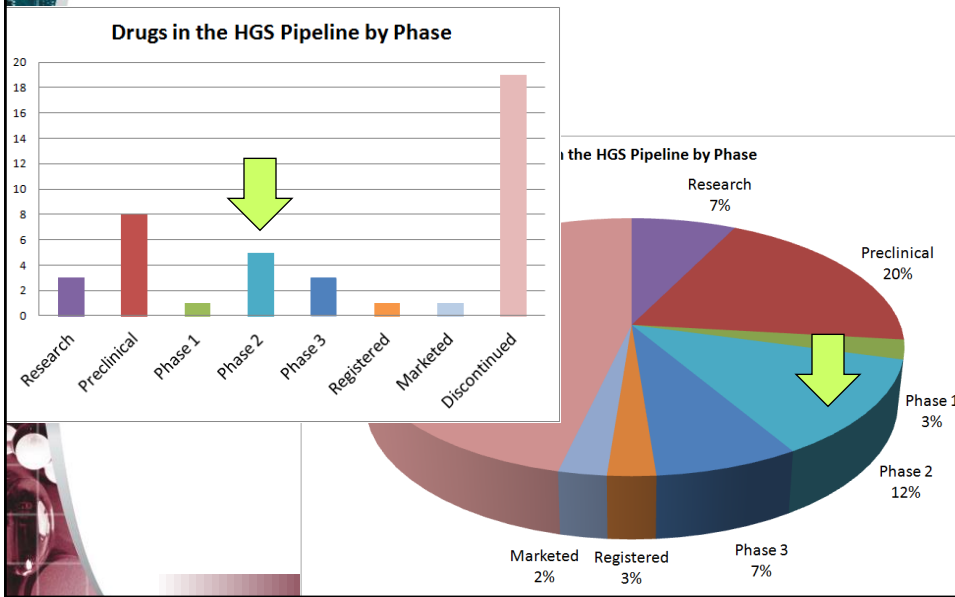
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But the colors aren't consistent by phase.



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So we apply color palette for phases.

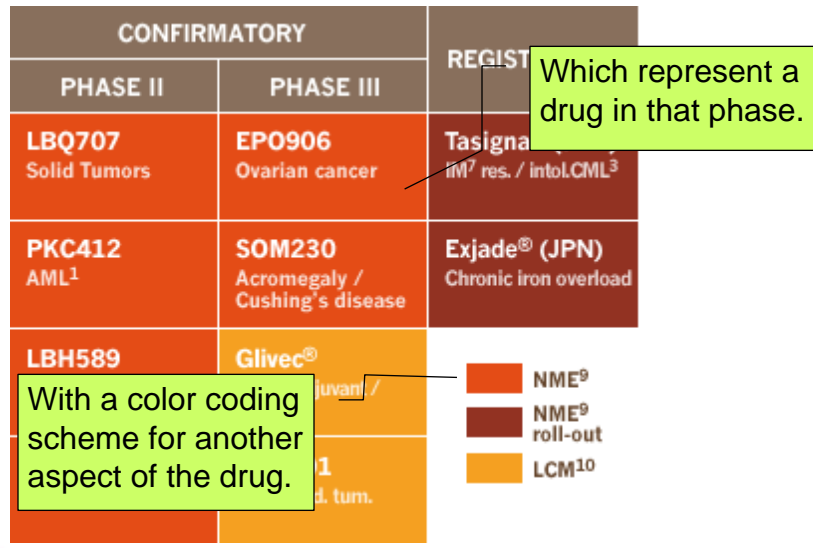


But pipeline bar charts often look like this...

EXPLORATORY	CONFIRMATORY		REGISTRATION
	PHASE II	PHASE III	
HCD122 Hem. tumors	LBQ707 Solid Tumors	EPO906 Ovarian cancer	Tasigna® (JPN) IM ⁷ res. / Intl.CML ²
TKI258 Hem./solid tumors	PKC412 AML ¹	SOM230 Acromegaly / Cushing's disease	Exjade® (JPN) Chronic iron overload
RAF265 Melanoma	LBH589 Hemat. tumors	Glivec® GIST ² adjuvant / CML ³	<div style="display: flex; justify-content: space-around;"> <div style="width: 10px; height: 10px; background-color: #e67e22; border: 1px solid black;"></div> NME⁹</div> <div style="width: 10px; height: 10px; background-color: #8e44ad; border: 1px solid black;"></div> NME ⁹ roll-out

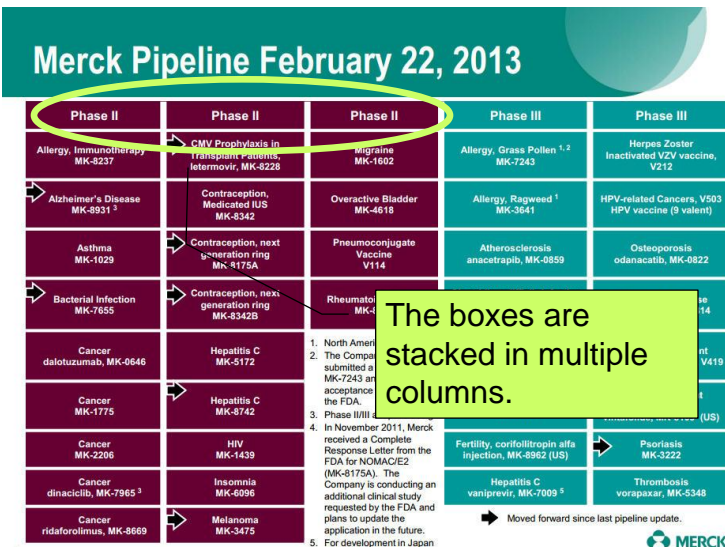
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Each bar/phase is made up of boxes...



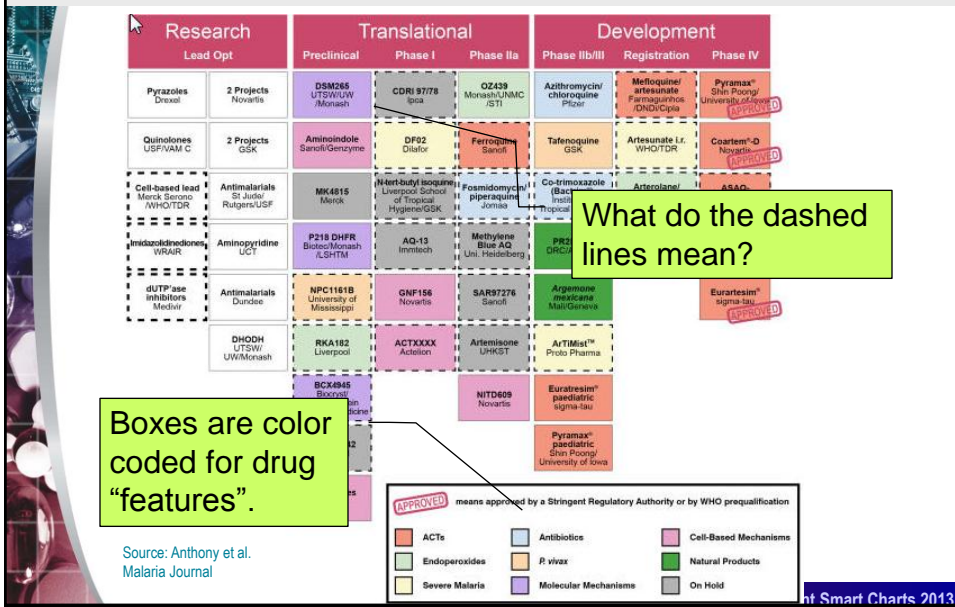
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If there are too many drugs in a phase...

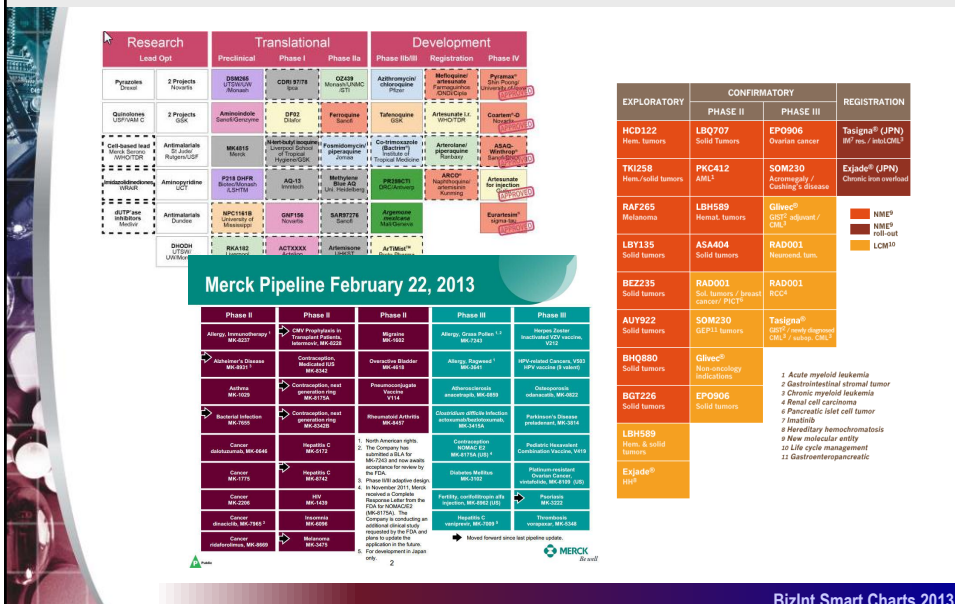


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Many dimensions are overlaid...

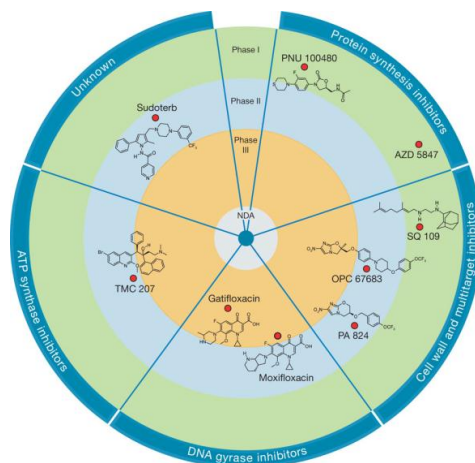


These are not standard bar charts!



Here's a "bull's-eye" pipeline visualization...

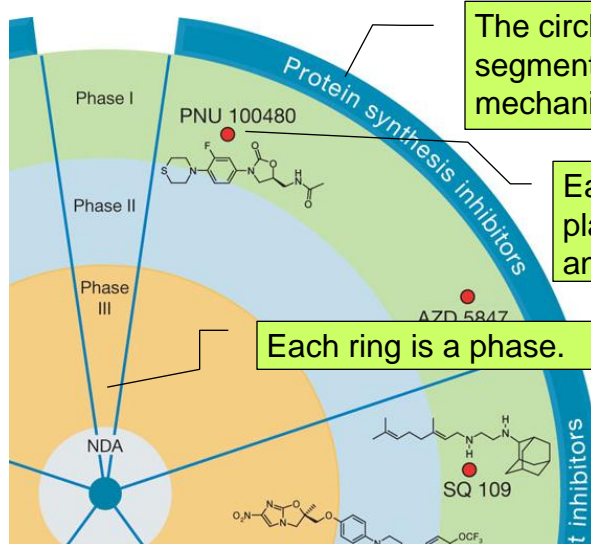
A bull's-eye representation of the current clinical pipeline for TB.



A Koul et al. *Nature* 469, 483-490 (2011) doi:10.1038/nature09657

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Features of a pipeline "bull's-eye"



The circle is divided into segments representing mechanisms (MOA).

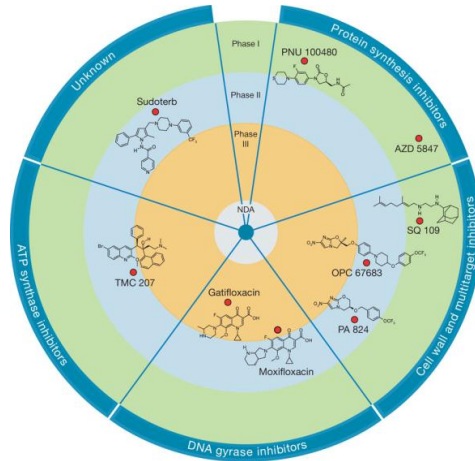
Each drug is placed by phase and MOA.

Each ring is a phase.

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This is not a standard visualization!

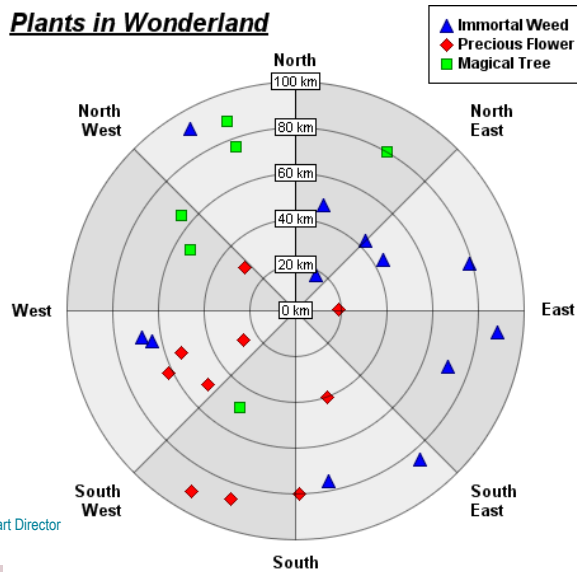
A bull's-eye representation of the current clinical pipeline for TB.



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It has features of a polar scatter chart.

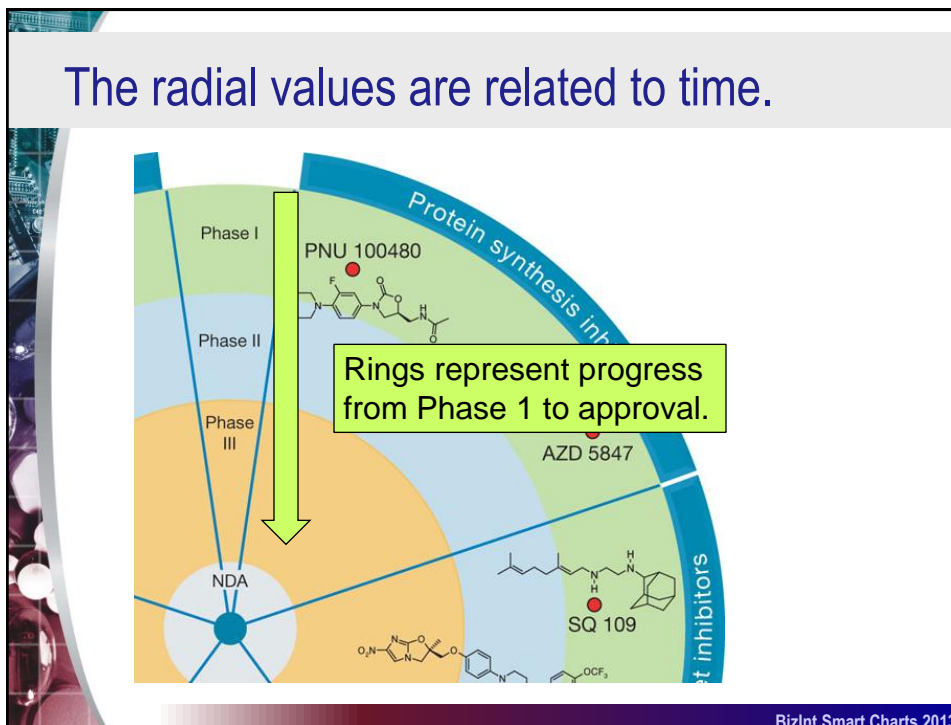
Plants in Wonderland



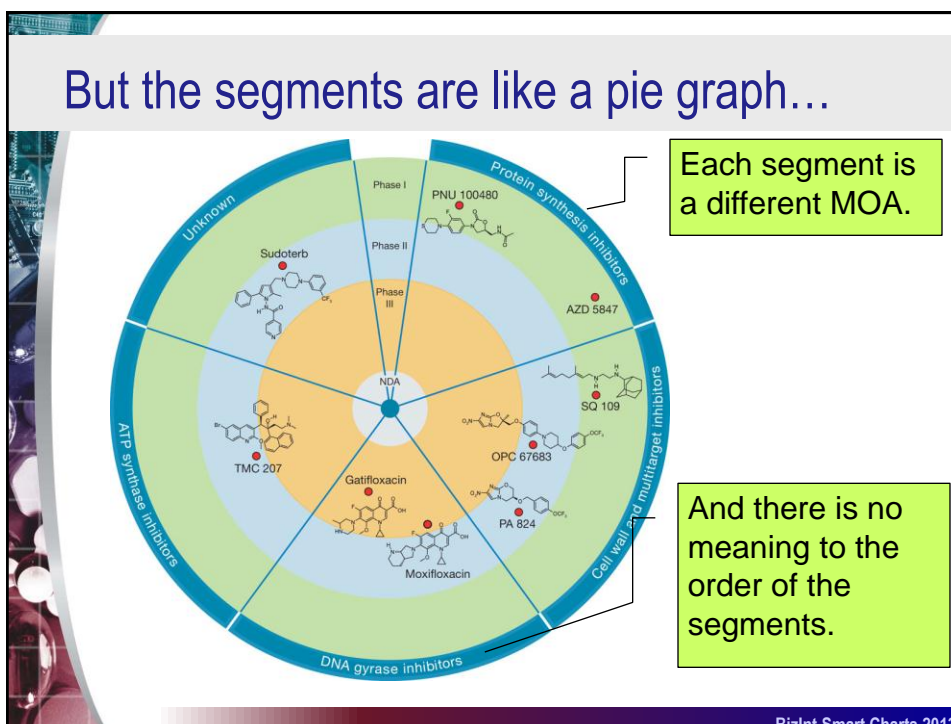
Sample from Chart Director chart library.

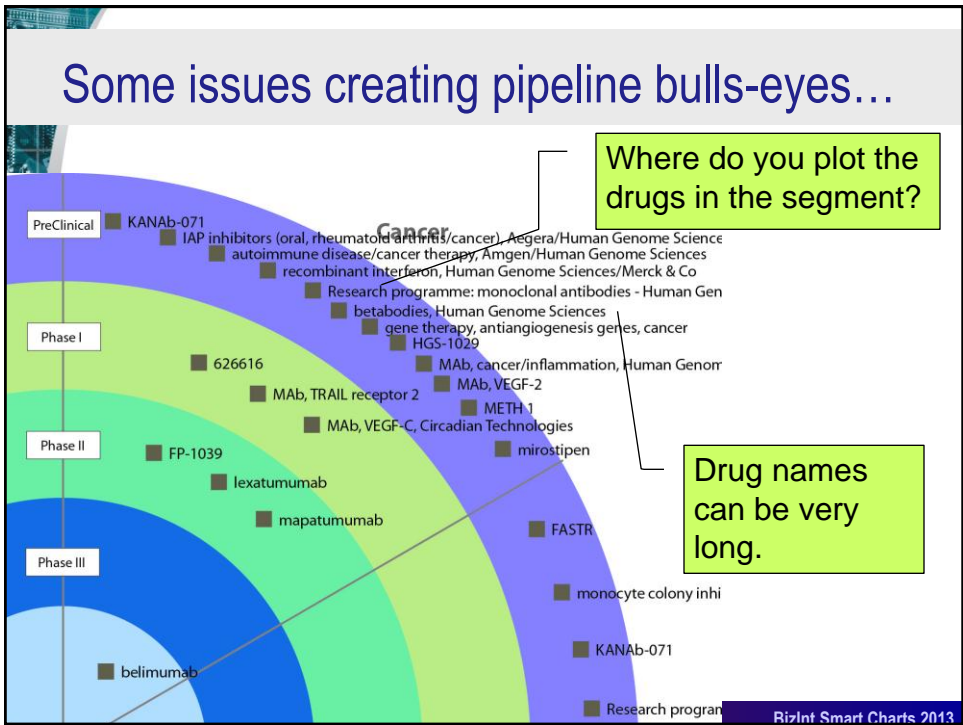
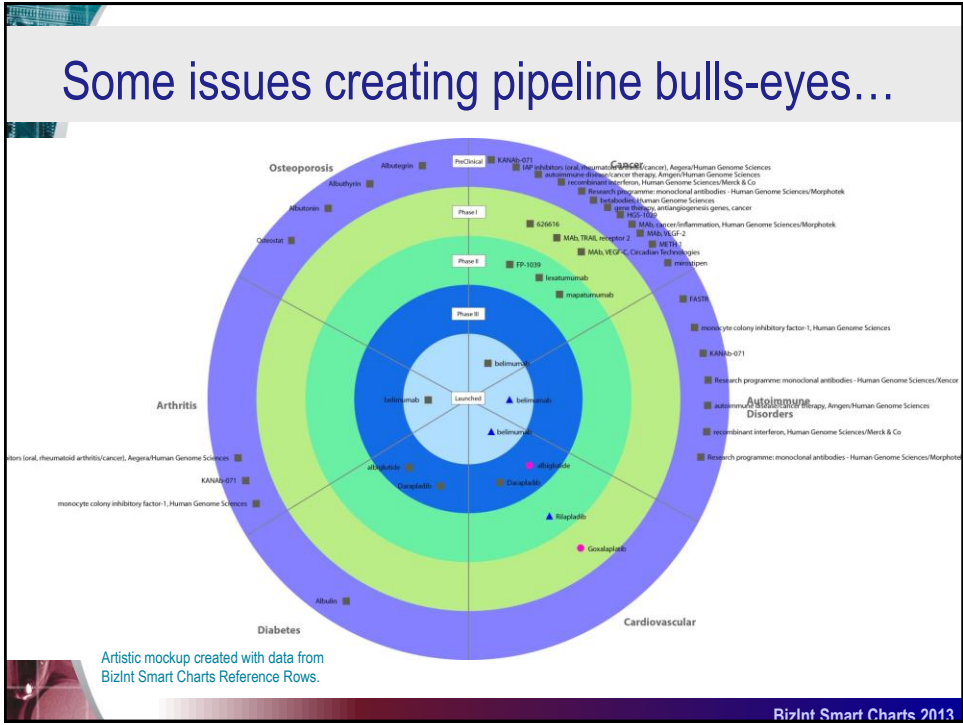
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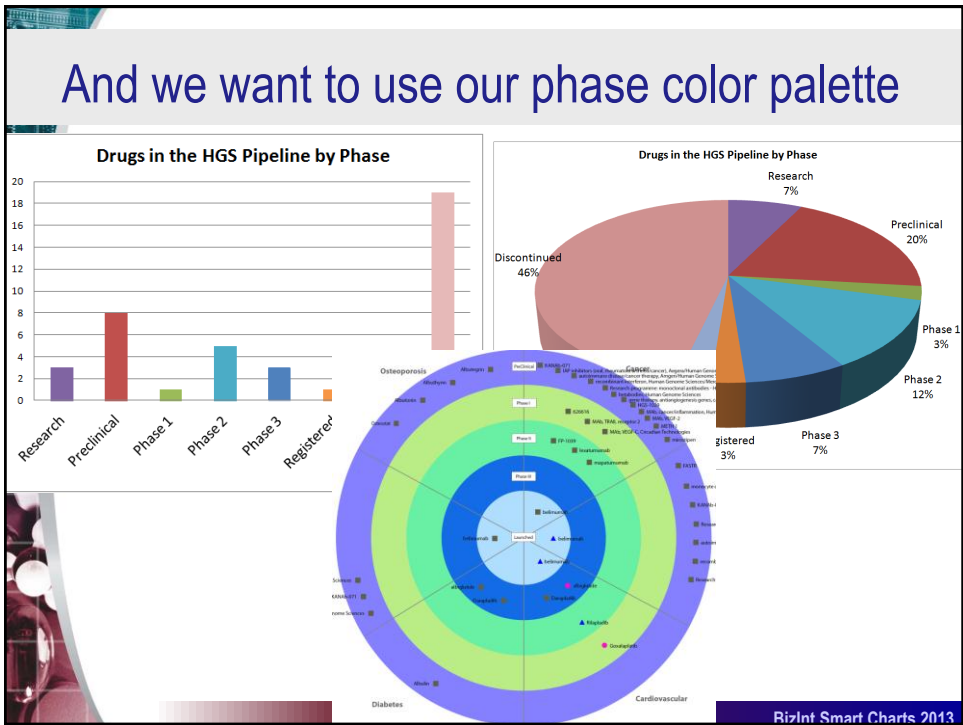
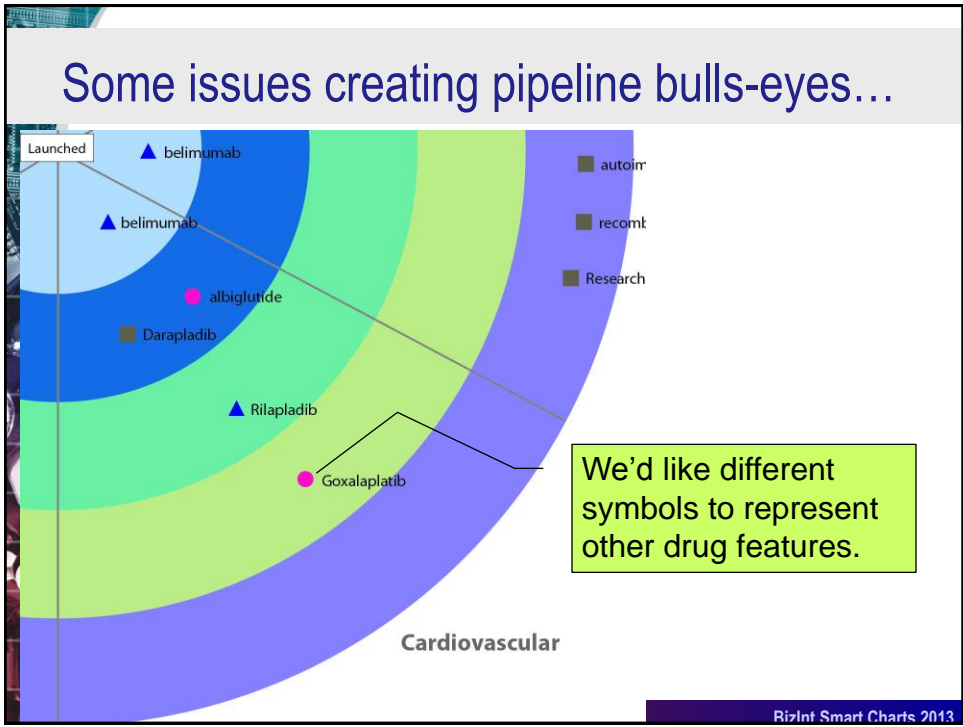
The radial values are related to time.



But the segments are like a pie graph...





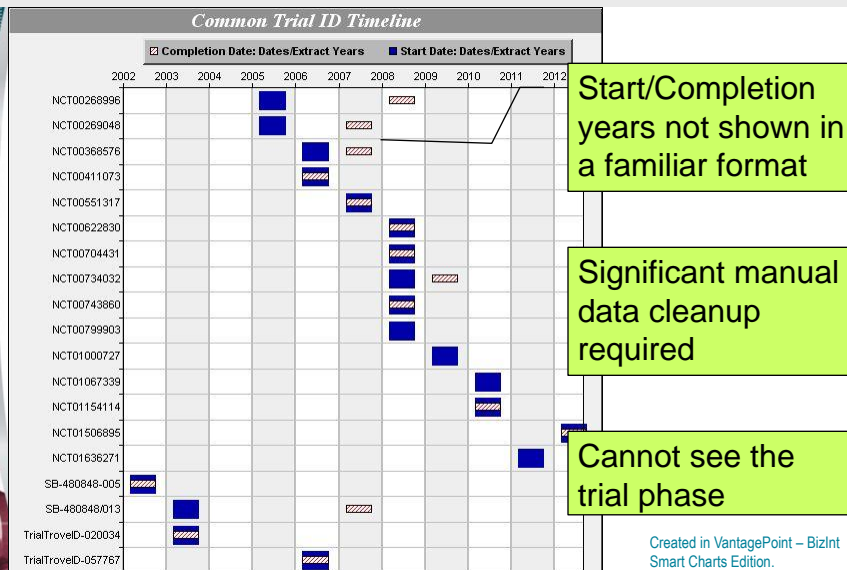


The “phase” in a drug pipeline database...

- Represents the furthest progress of clinical trials for one or more indications in one or more markets.
- There may be multiple clinical trials in progress.
- We want to show a **timeline of clinical trials** for a particular drug.
- Sources: ClinicalTrials.gov; Citeline Trialtrove; Adis Clinical Trials Insight

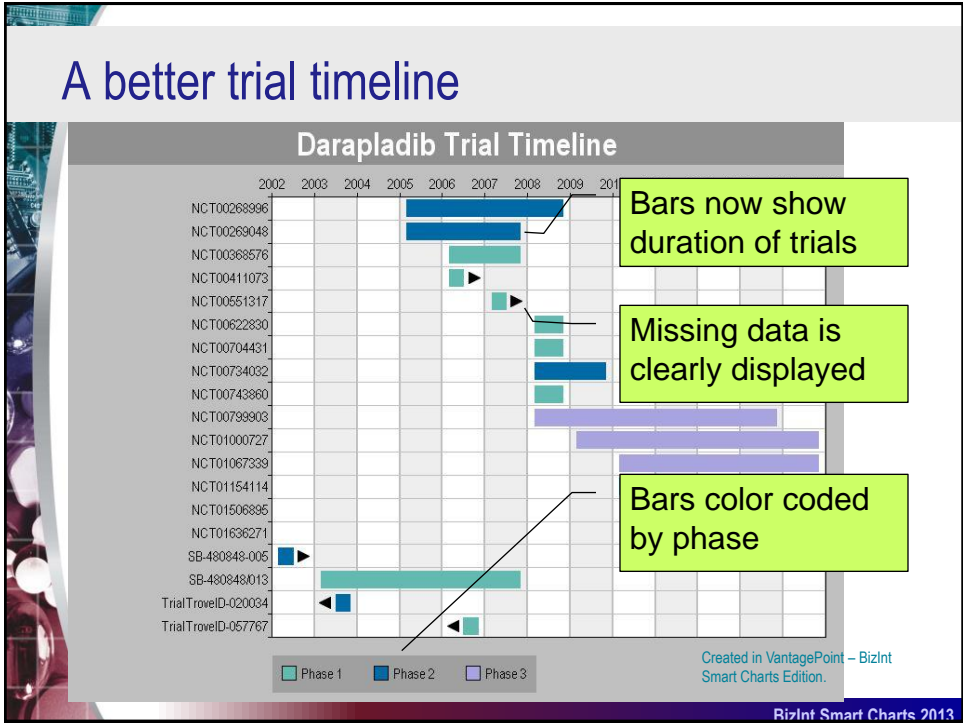
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Applying a standard GANTT visualization

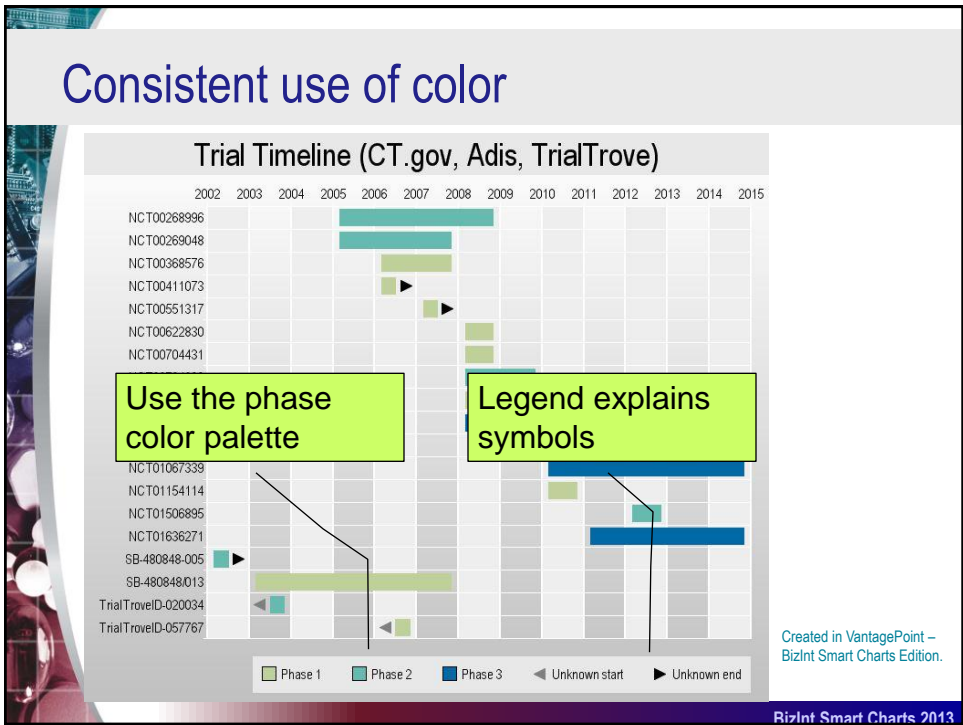


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A better trial timeline

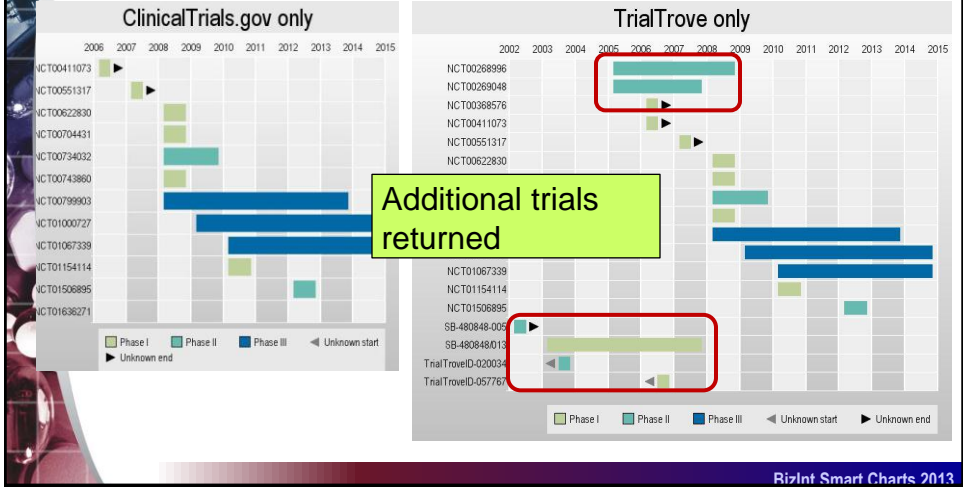


Consistent use of color



Why use multiple sources?

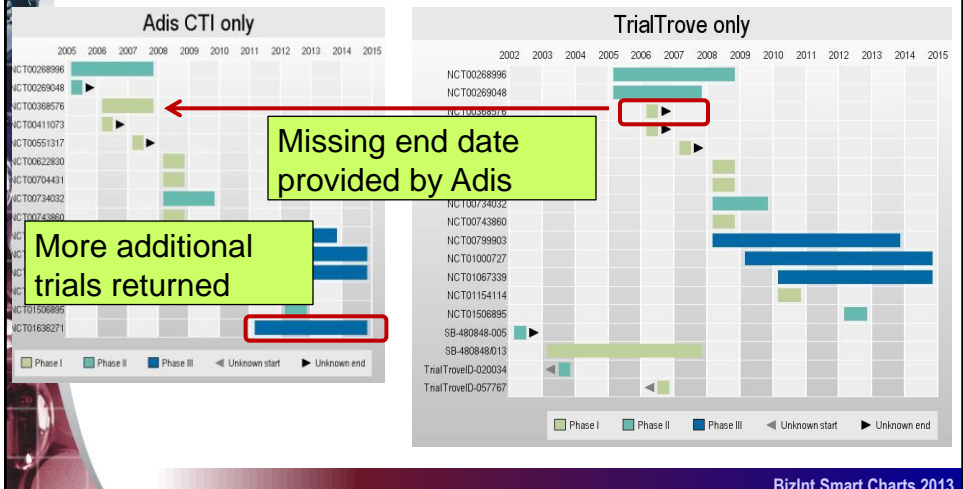
- Indexing differences may return different results.



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Why use multiple sources?

- Take advantage of content variation



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To summarize, pipeline visualizations...

- Require multiple sources for completeness and accuracy.
- Rely on data cleanup and deduplication tools.
- Generally cannot be created with standard visualization libraries.

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And pipeline visualizations...

- Often show discrete rather than aggregate values.
- Often show categorical rather than numeric coordinate values.
- Need consistent use of order and color coding.

Do these visualizations operate at the *exploratory* or *explanatory* levels?

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Slides at:
bizcharts.com/slides

Thank you!

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