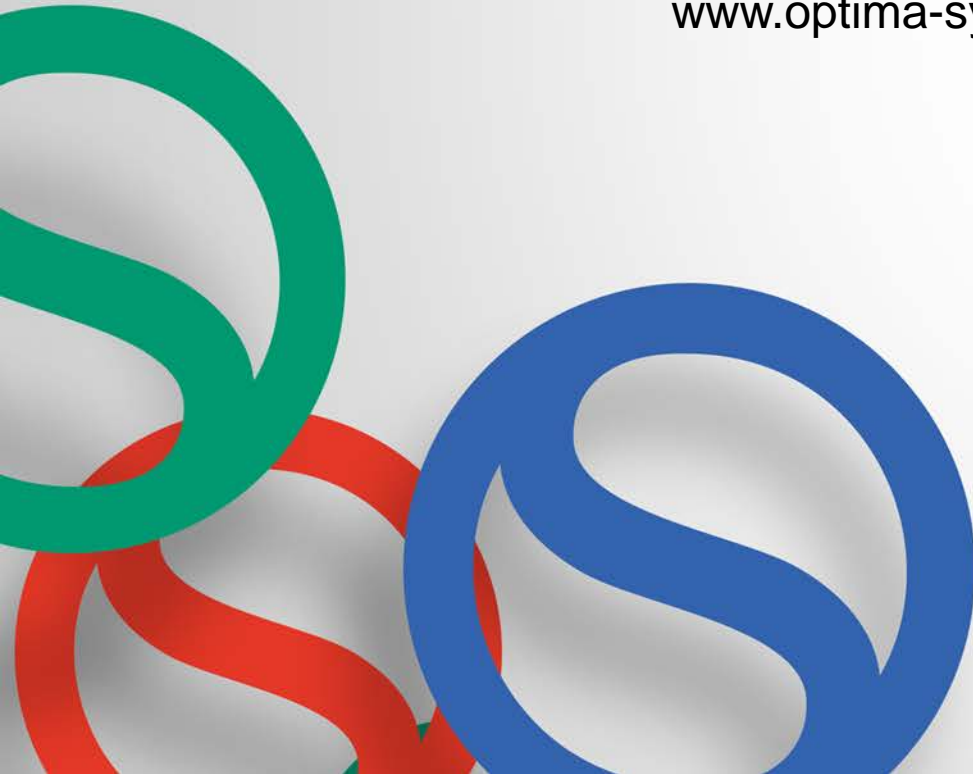


APL Really Can Make Us Healthy(er)

Paul Grosvenor
Managing Director

Optima Systems Ltd

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www.optima-systems.co.uk



COSMOS Original Concept (1/2)

To be able to view data with no preconceptions

To make the data understandable

To be a little bit different

Top down approach

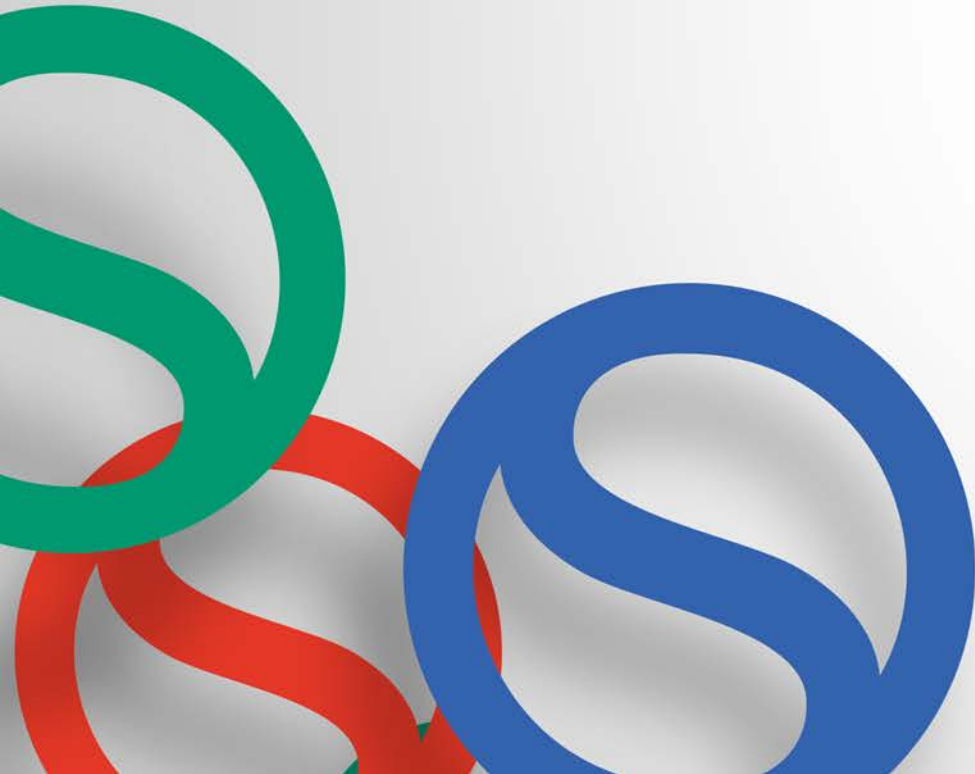


COSMOS Original Concept (2/2)

Decided to base our approach on

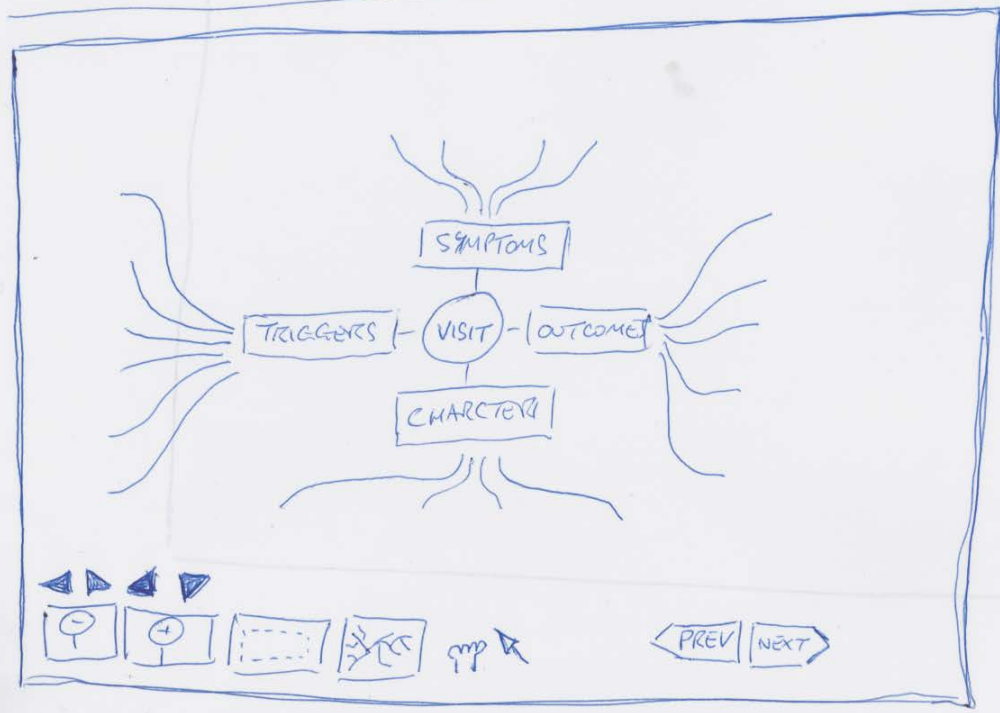
Neural Networks

Netmap



Original COSMOS Design "Spec" (Circa 2011)

STUDY	<input type="text" value="DEMO"/>	SYMPTOMS	<input type="text" value="ALL"/>	DISPLAY MODE	<input type="text" value="VERBOSE"/>
COUNTRY	<input type="text" value="ALL"/>	TRIGGERS	<input type="text" value="ALL"/>	CENTRE ON	<input type="text" value="OUTCOMES"/>
REGION	<input type="text" value="ALL"/>	OUTCOMES	<input type="text" value="ALL"/>		<input type="text" value="VISIT"/>
CONDITION	<input type="text" value="CARDIO"/>	CHARACTERISTICS	<input type="text" value="ALL"/>	% <input type="checkbox"/> ACTUAL	<input checked="" type="checkbox"/> AGGREGATE
					COMBINE <input type="checkbox"/>



12345	RECORDS
6	VISITS
5000	VISIT 1
400	VISIT 2
100	VISIT 3
1000	VISIT 4
600	VISIT 5
50	VISIT 9

MAP NAME

Jumping forward to COSMOS today

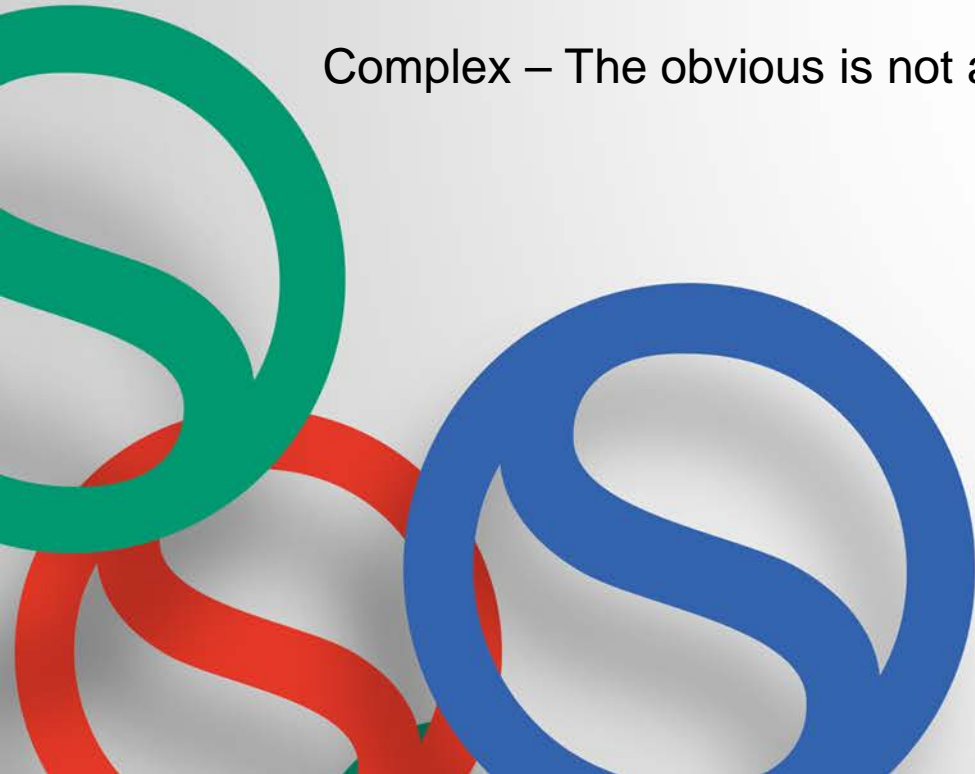
Big data **and** small data

8TB datasets

250M patient visits, 2-3000 cost items per visit

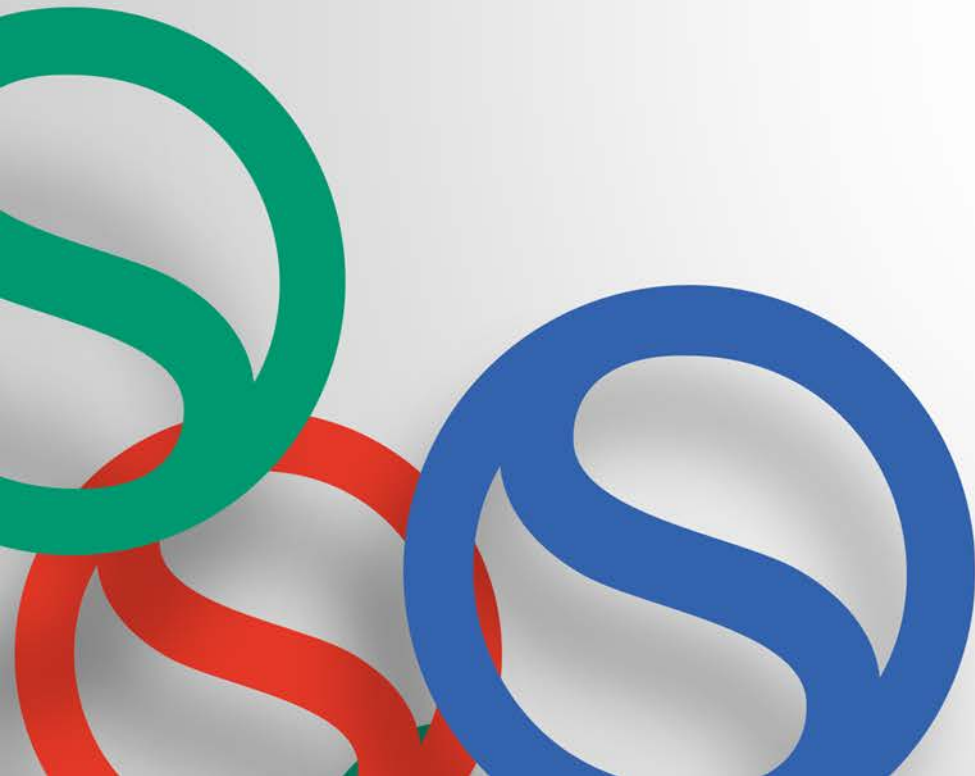
45M unique patients

Complex – The obvious is not always so obvious



Relying on preconceived ideas is a very risky strategy

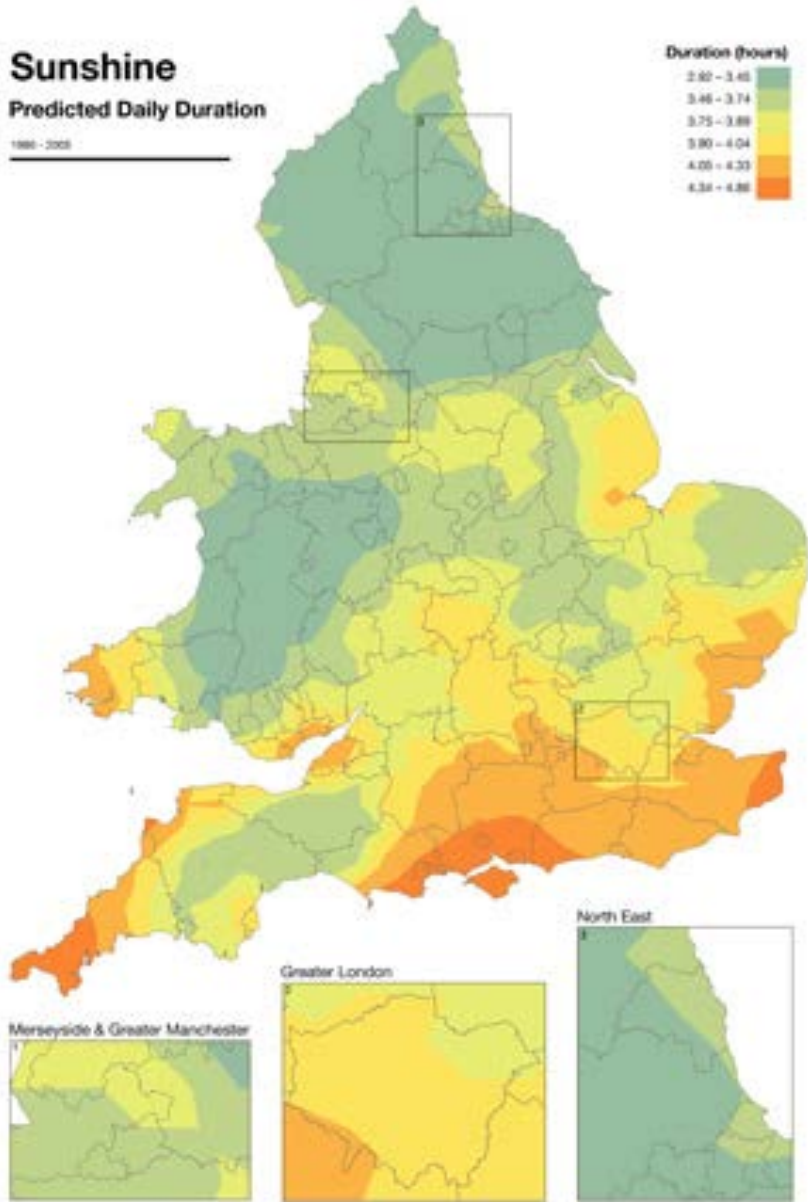
Many (but not all) research projects start from premise which may be flawed from the outset and wastes time in identifying the “real truth”



Sunshine

Predicted Daily Duration

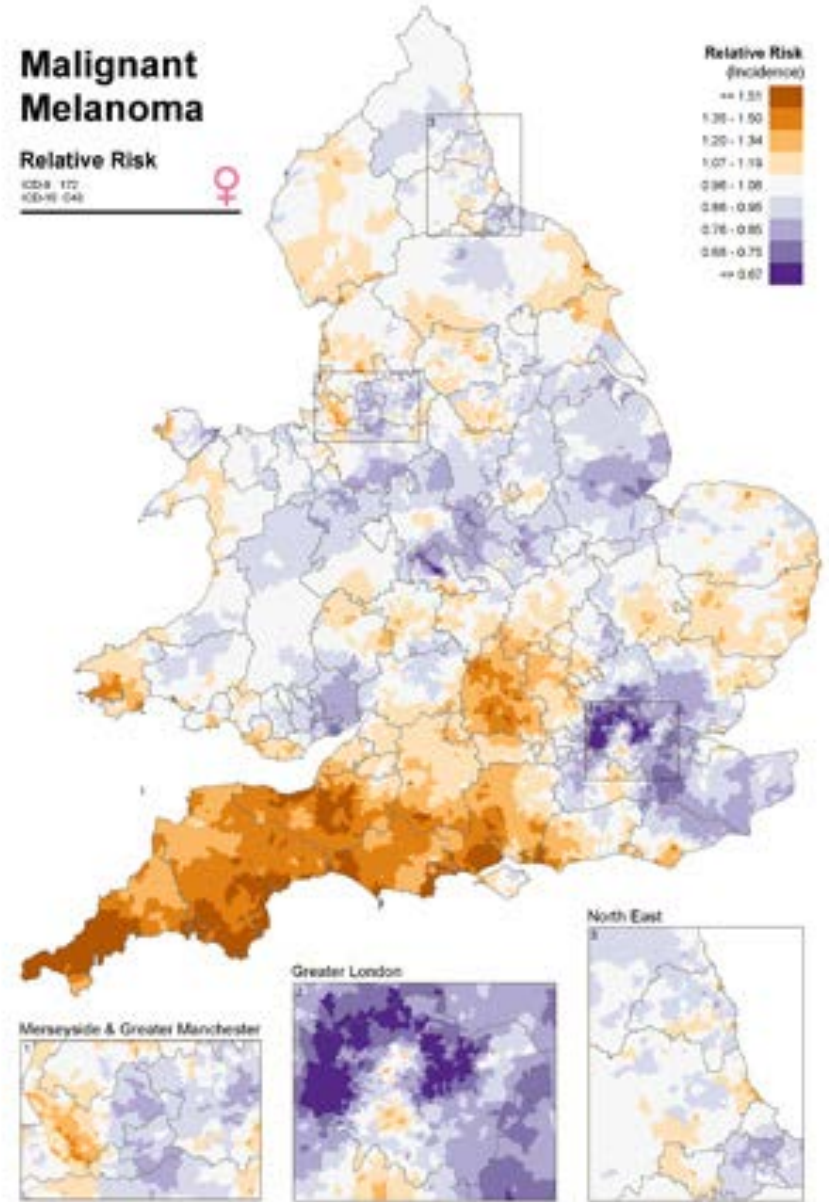
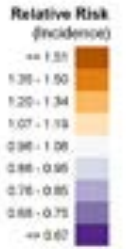
1981 - 2008



Malignant Melanoma

Relative Risk

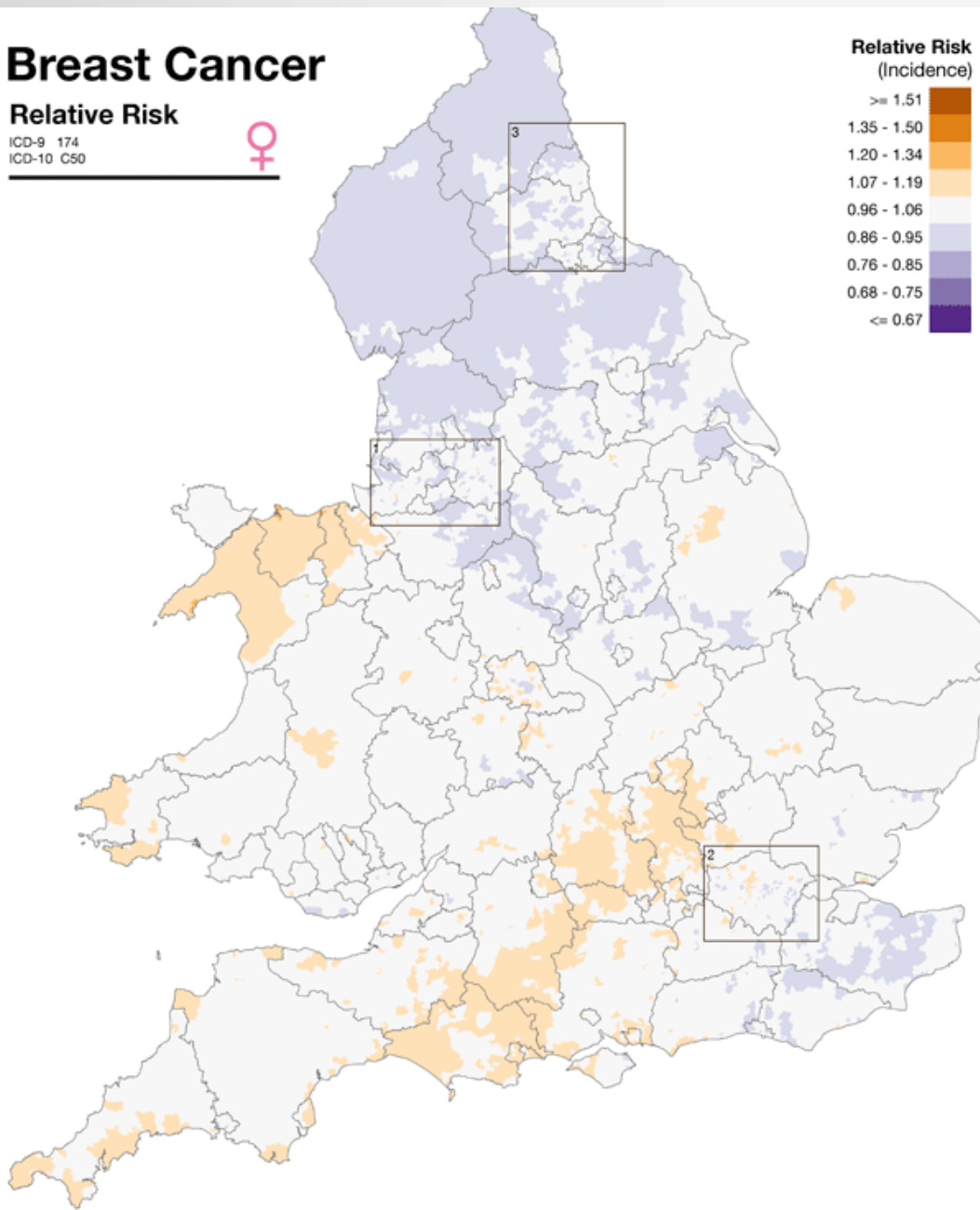
ICD10: C43
ICD9: 172



Breast Cancer

Relative Risk

ICD-9 174
ICD-10 C50



IMPERIAL COLLEGE LONDON

So back to my story

We had expertise in medical data processing

So we targeted;

Data collection agencies

Pharma companies

Clinical research projects



PHASE I

Primarily data visualisation

Typically for companies who;

want to sell their data to other third parties

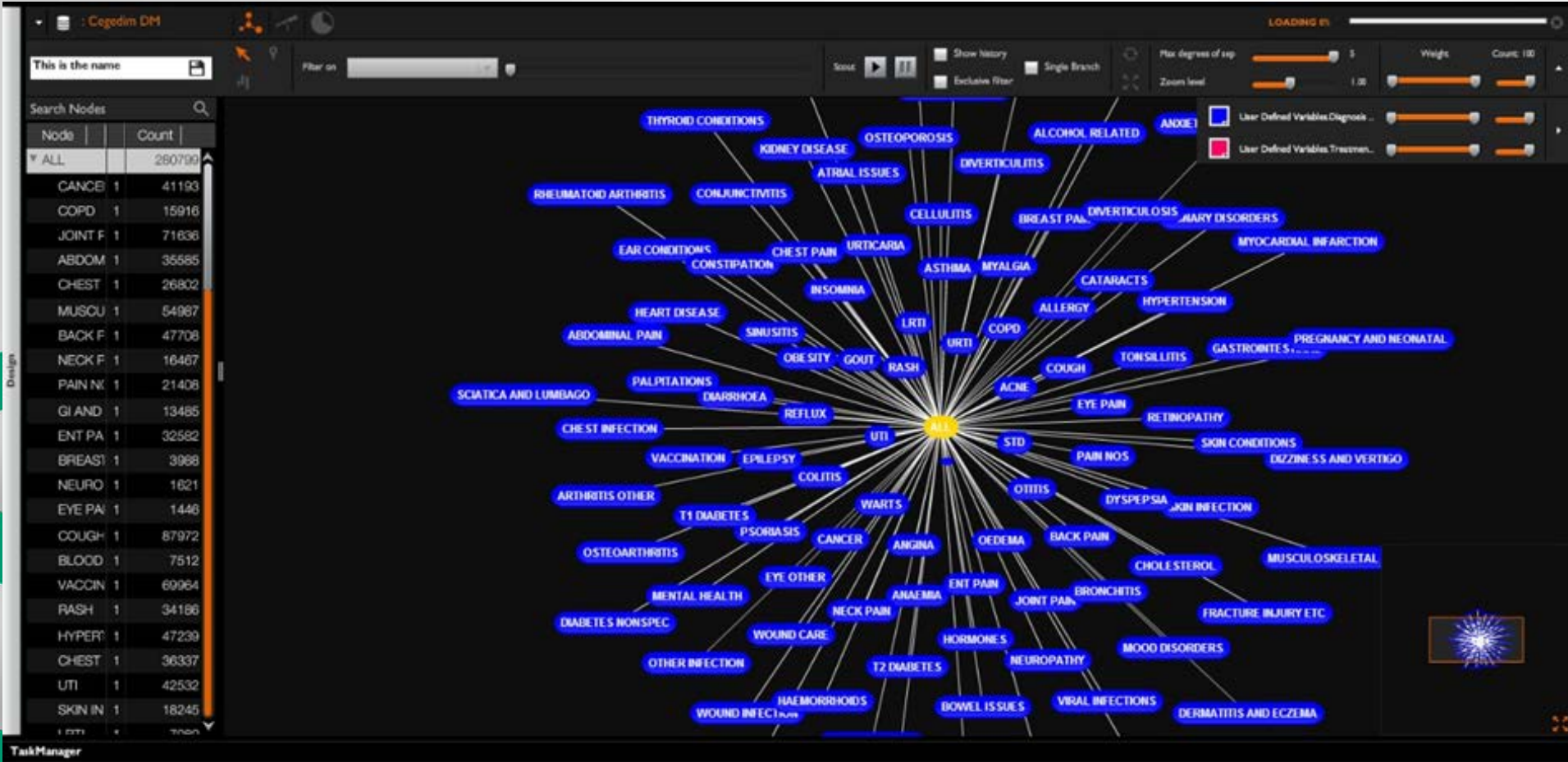
Or understand their own data in-house

Needs to be unique interface

APL – Flash - MiServer



COSMOS Node View screen shot



PHASE II

add some analytics

For those who want to;

understand their data better

Add more functionality to be sold to their clients

Needs to appeal to the scientist



COSMOS Node View screen shot

Search...

PAG test 1

galileo cosmos v3.045

LOADING 0%

Filter on Visit Year 1899 2014

Scout Show history Single Branch Exclusive filter Max degrees of sep 4 Weight Count 23 Zoom level 0.80

Node	Count
ALL	689175
ALL	689175
ALL	689175
ALL	689175
NEOPLASMS	688867
BLOOD AND BLOOD-F	133159
CIRCULATORY SYSTEM	431978
CONGENITAL ANOMAL	20685
DIGESTIVE SYSTEM DI	290004
ENDOCRINE, NUTRITIO	451189
GENITOURINARY SYST	318412
INFECTIOUS AND PAR	154011
INJURY AND POISONIN	173318
MENTAL DISORDERS	260981
MUSCULOSKELETAL S	389945
NEOPLASMS	688867
NERVOUS SYSTEM ANI	290172
PERINATAL PERIOD CC	1065
PREGNACY, CHILDBIR	10262
RESPIRATORY SYSTEM	314412
SKIN AND SUBCUTANE	258309
SUPPLEMENTARY CLA	31860
SUPPLEMENTARY CLA	615466
SYMPTOMS, SIGNS AN	465296
UNMAPPED	649160

PHASE III

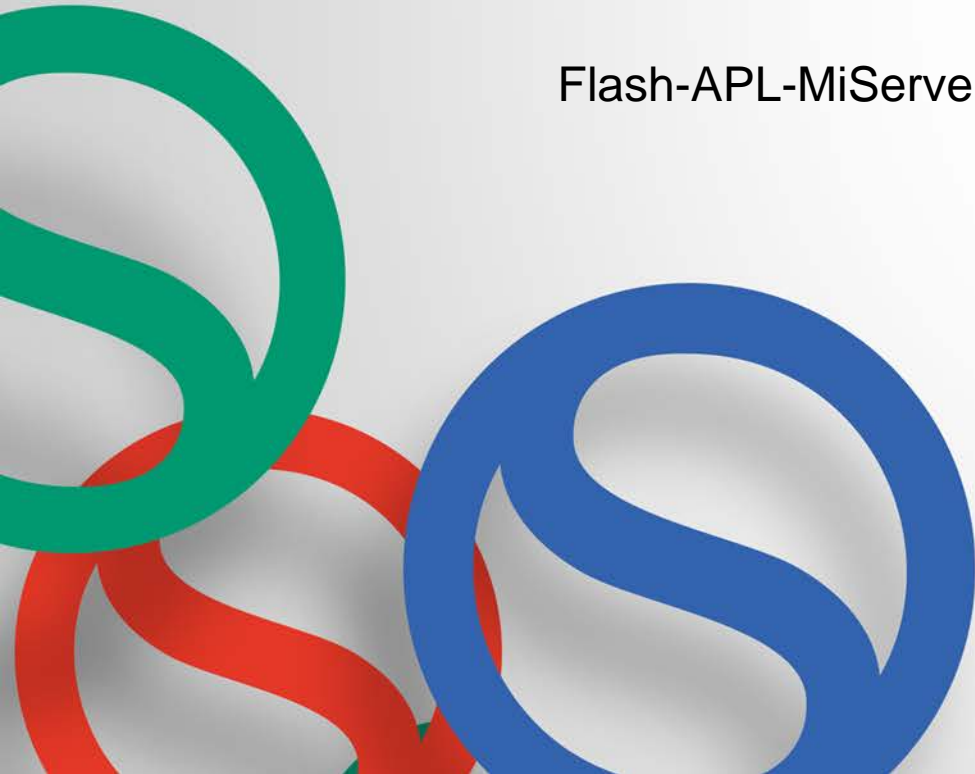
Clinical Trials

Small, complex datasets including images

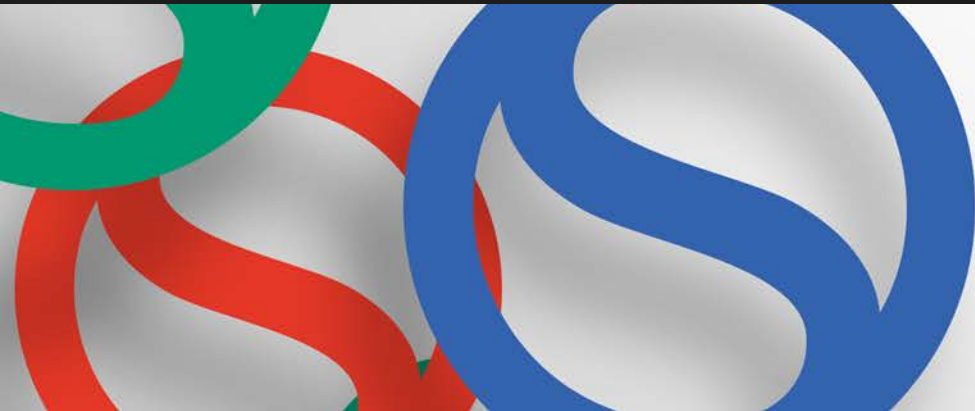
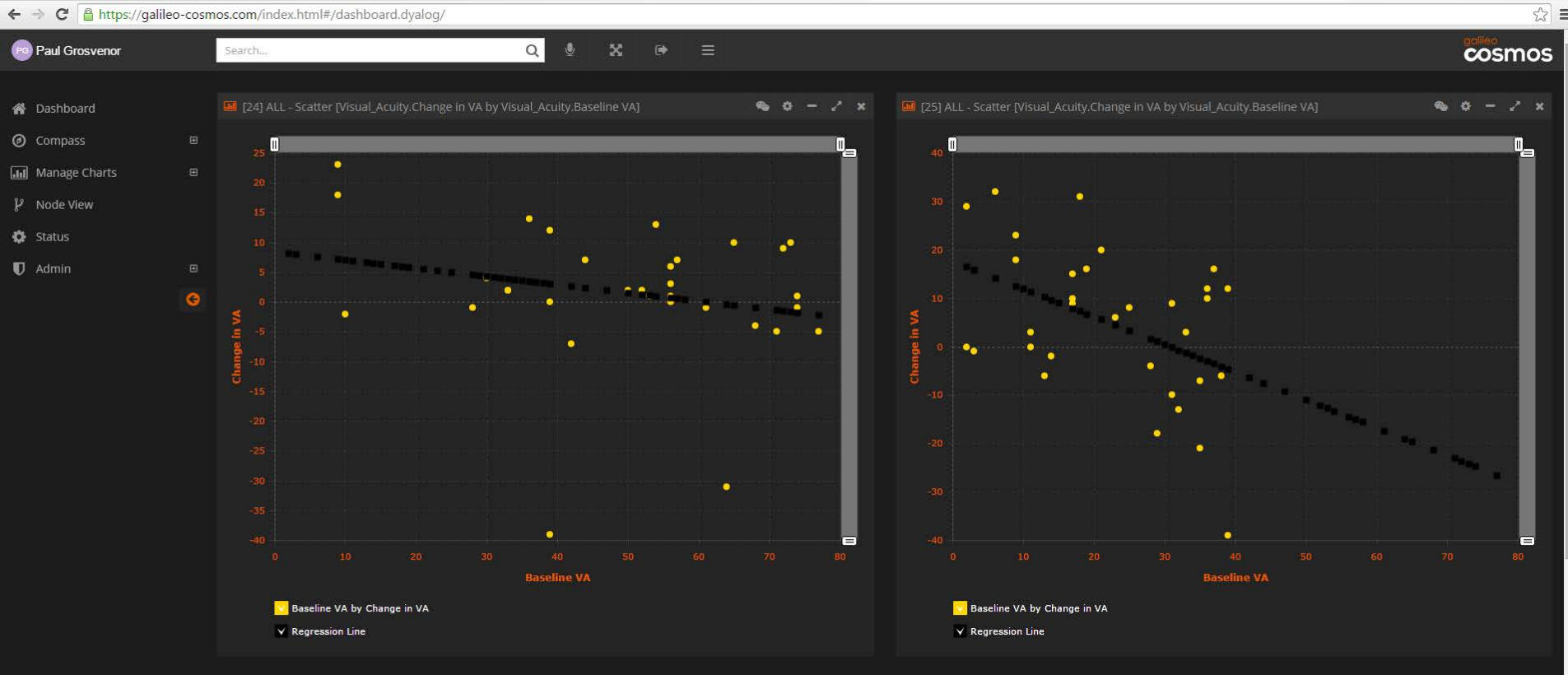
Need for a dashboard to monitor

Enhanced security

Flash-APL-MiServer-HTML5



COSMOS Node View screen shot



PHASE IV

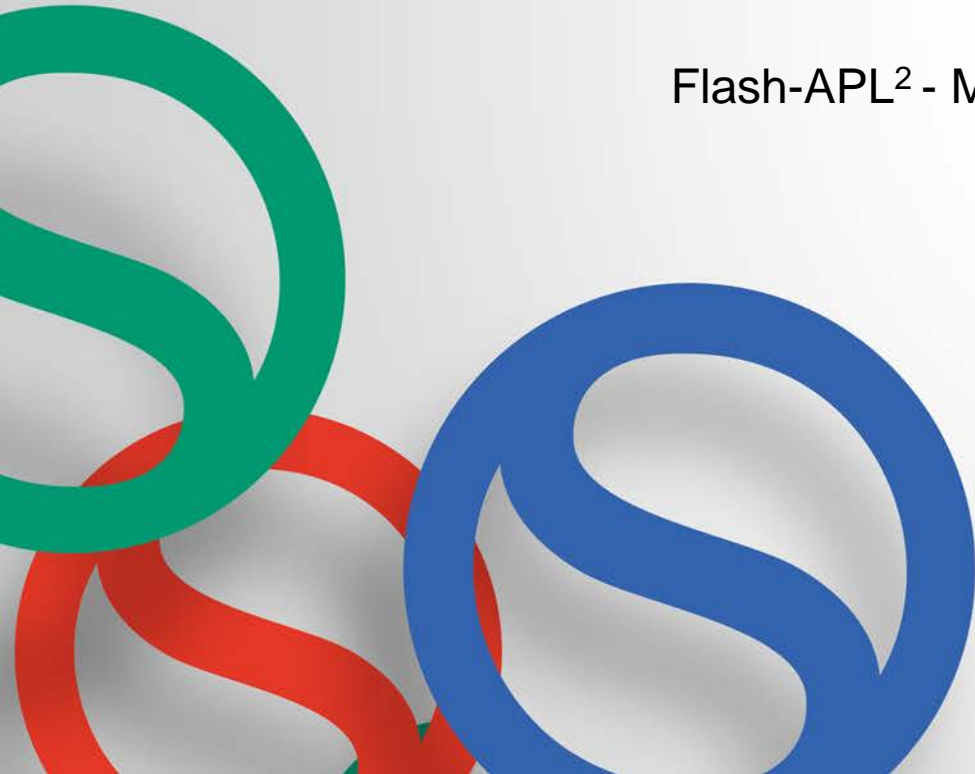
Drug manufacturers

Back to large/complex datasets

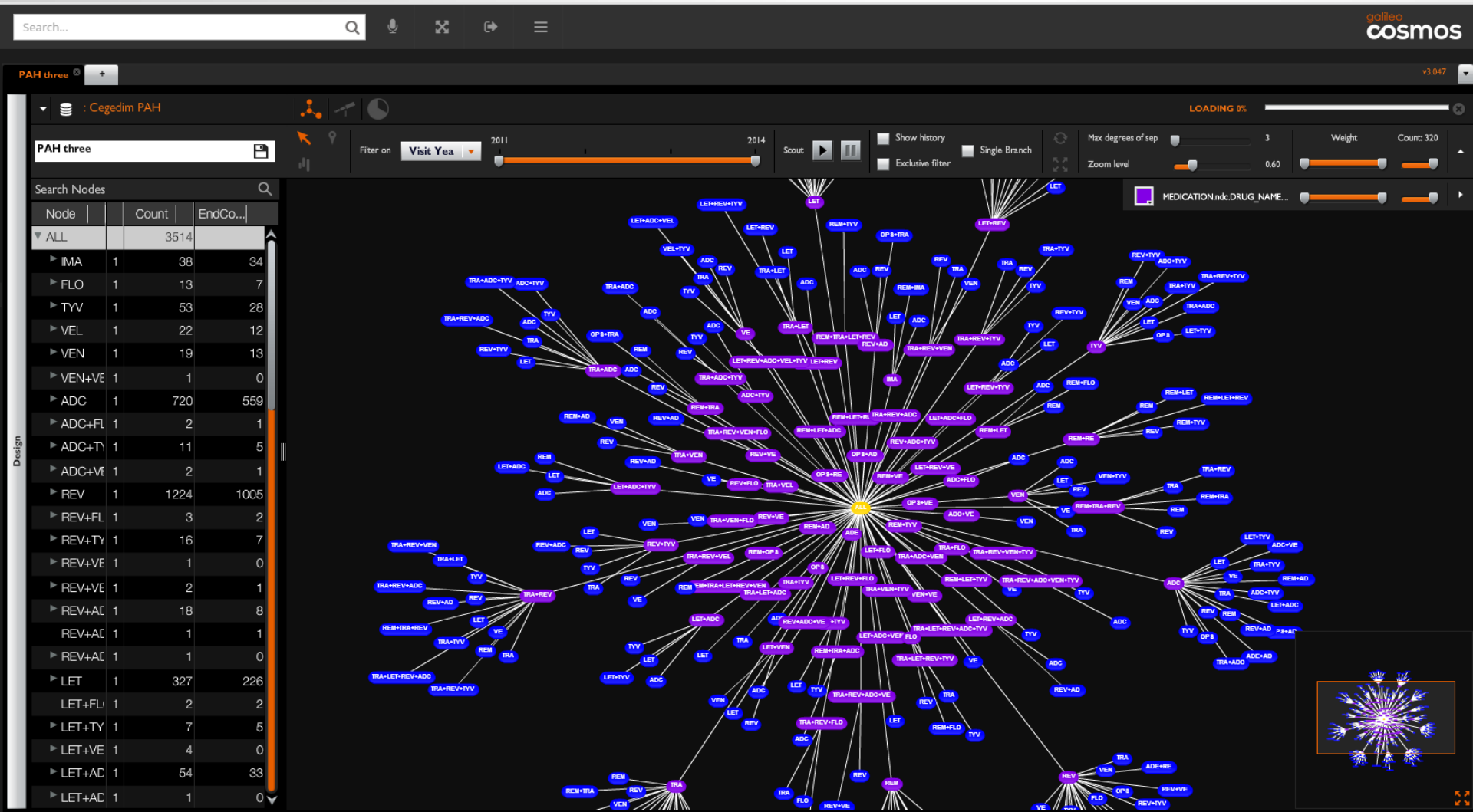
Multiple datasets

Patient flow analysis

Flash-APL² - MiServer - HTML5



COSMOS Patient Flow screen shot



PHASE V

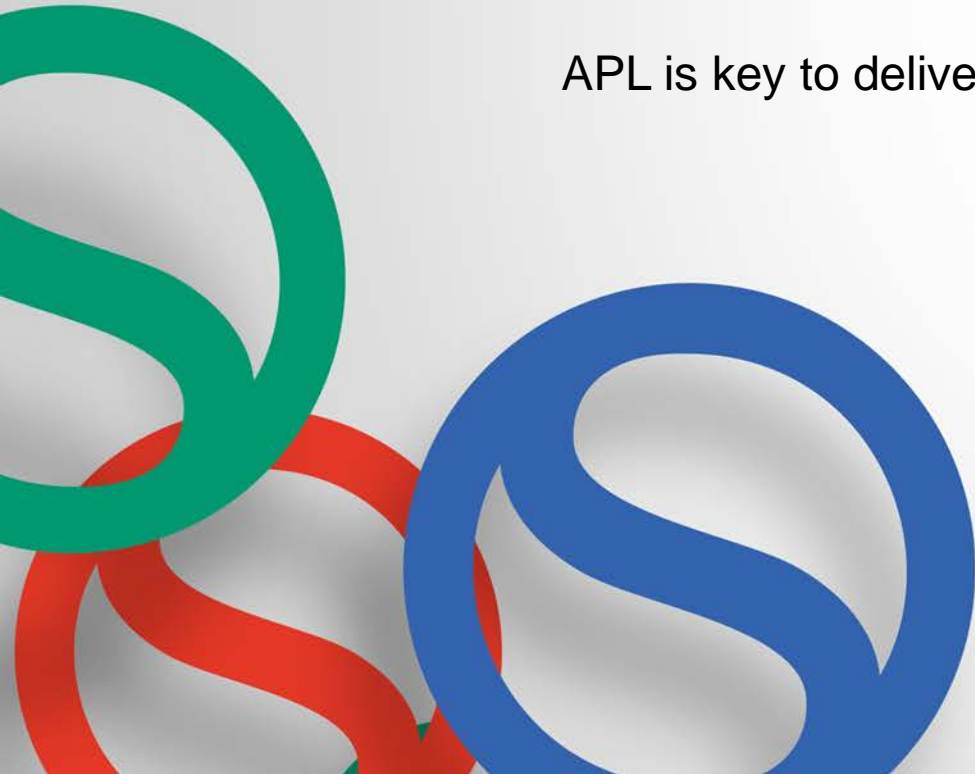
Patient Selection for clinical trials

Now the nub;

We need MORE data, more datasets, more tests

This is now getting really serious

APL is key to delivering this project



Drug development lifecycle is long & expensive...Patent life is short

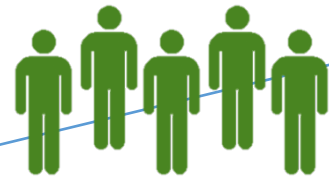
Lab studies

Human Safety
tens

Expanded Safety
hundreds

Efficacy & Safety
thousands

Review
& Approval



Discovery
&
Preclinical

Phase I

Phase II

Phase III

3-6 years
\$335M

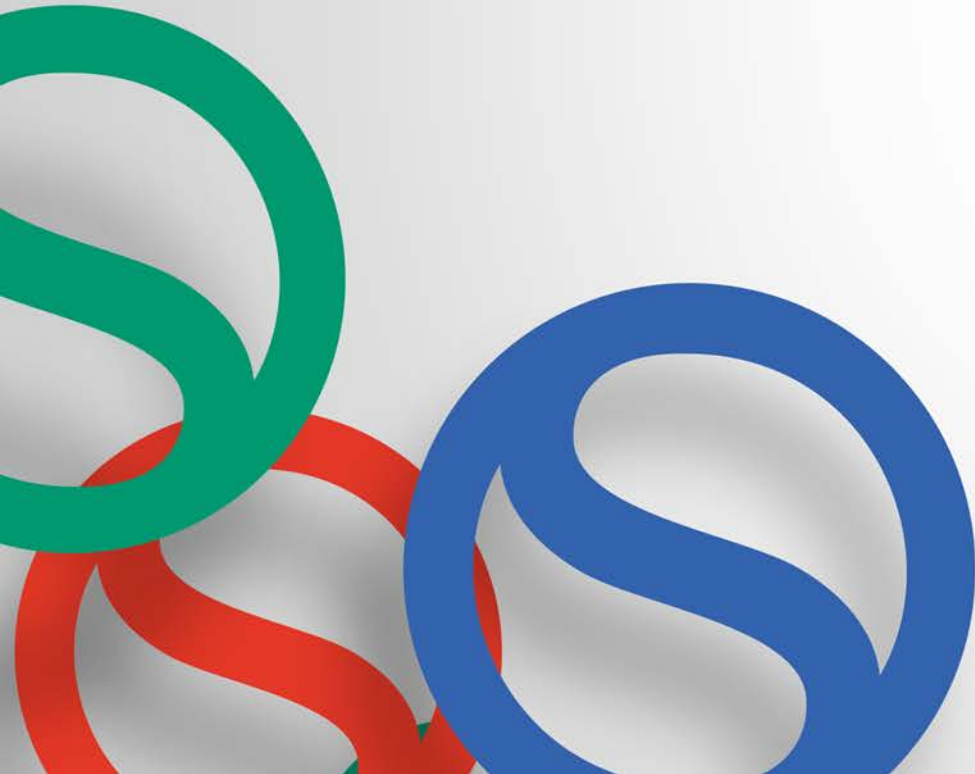
6-7 years
\$467M

1-2 years
\$95M

Question

In the US approximately how many drugs are awaiting Clinical Trials ?

- A) About 200
- B) About 400
- C) About 800



Patient Screening

1.6M new **cancer** patients present per year

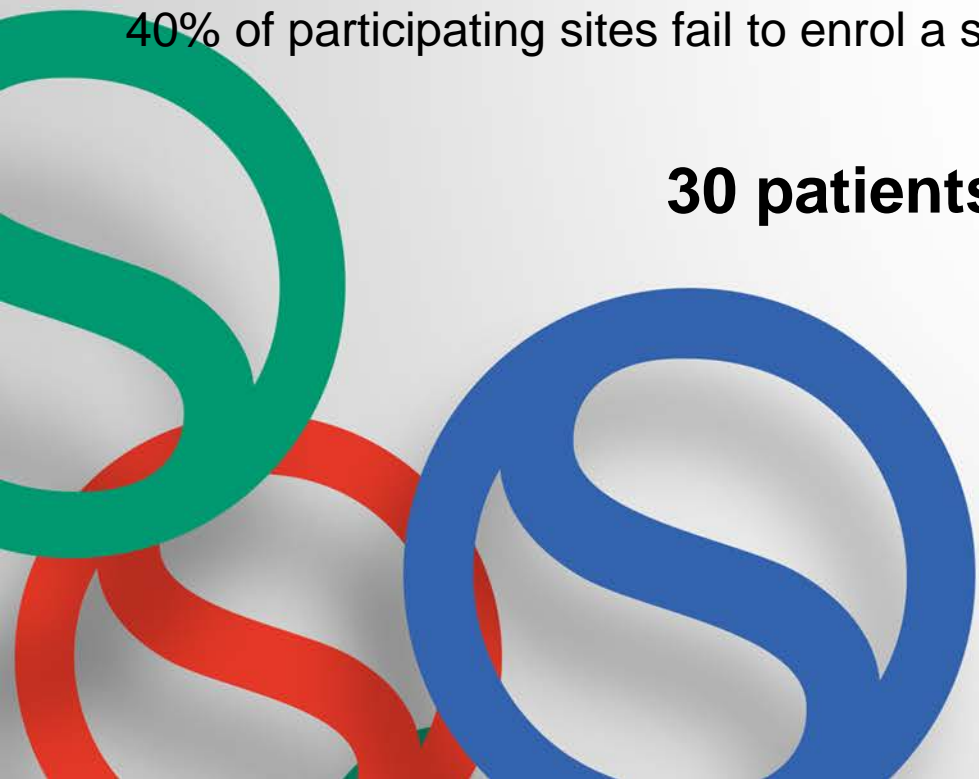
85% of cancer patients are treated in community hospitals

Only 3% ever get access to clinical trials

Even worse only 1.5% for minority populations

40% of participating sites fail to enrol a single patient costing >\$50,000 per site

30 patients per drug (15 for minorities)

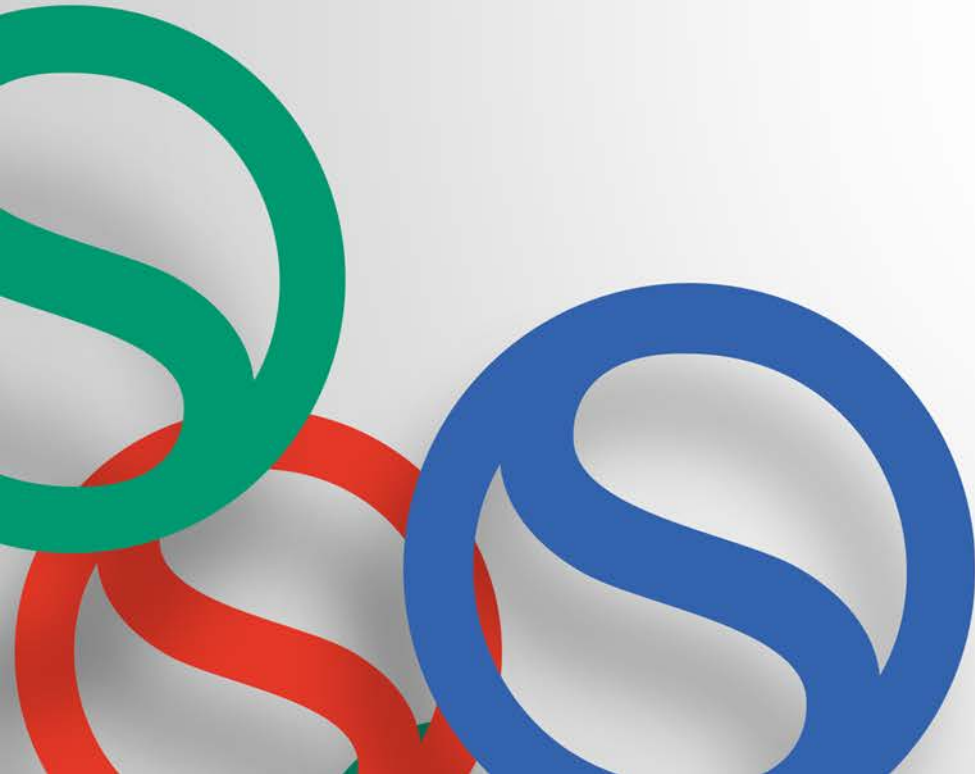


Patient Screening Script

Very complex

Requires many different data sources

Pages and pages of it



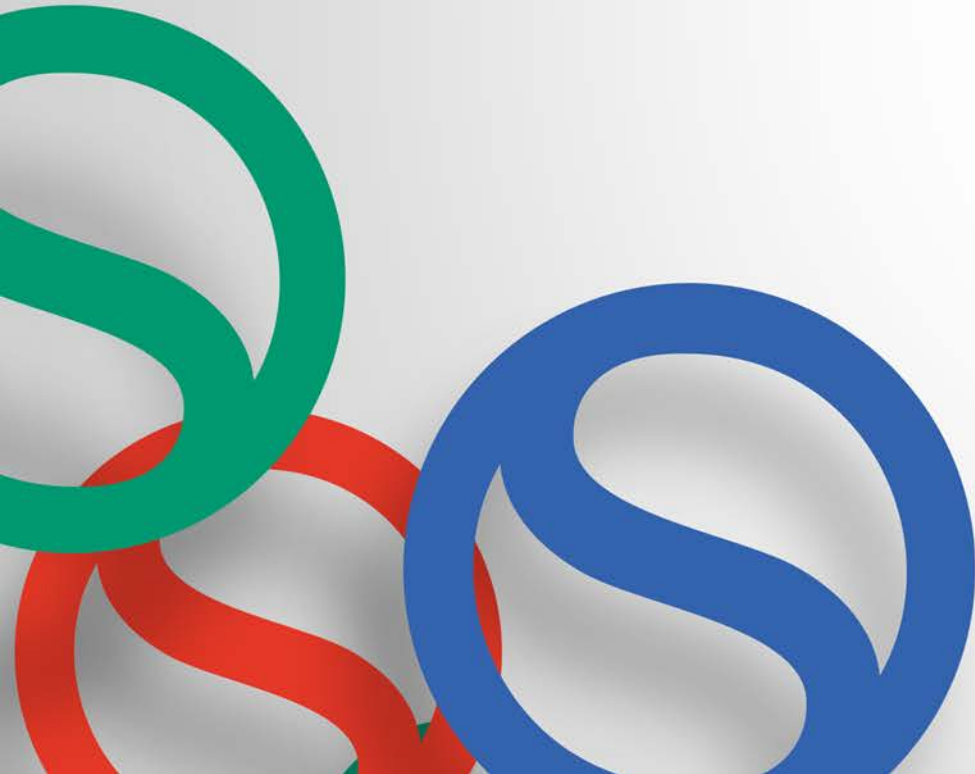
So here we are today

We have the power

We have the flexibility

We have the speed

We have APL

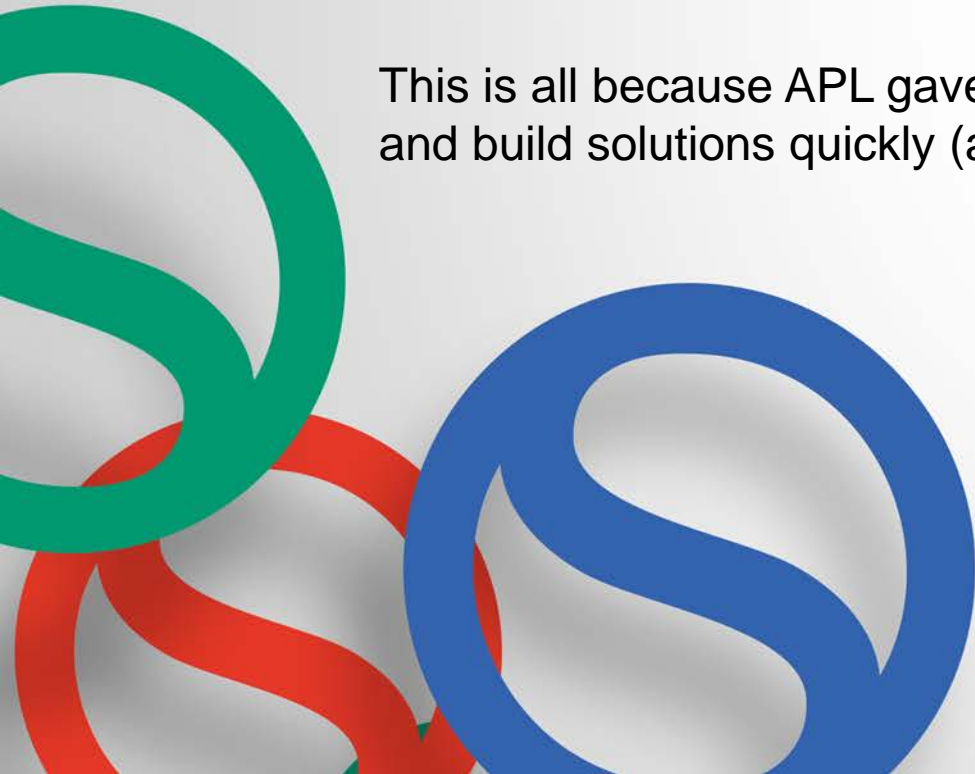


In Conclusion

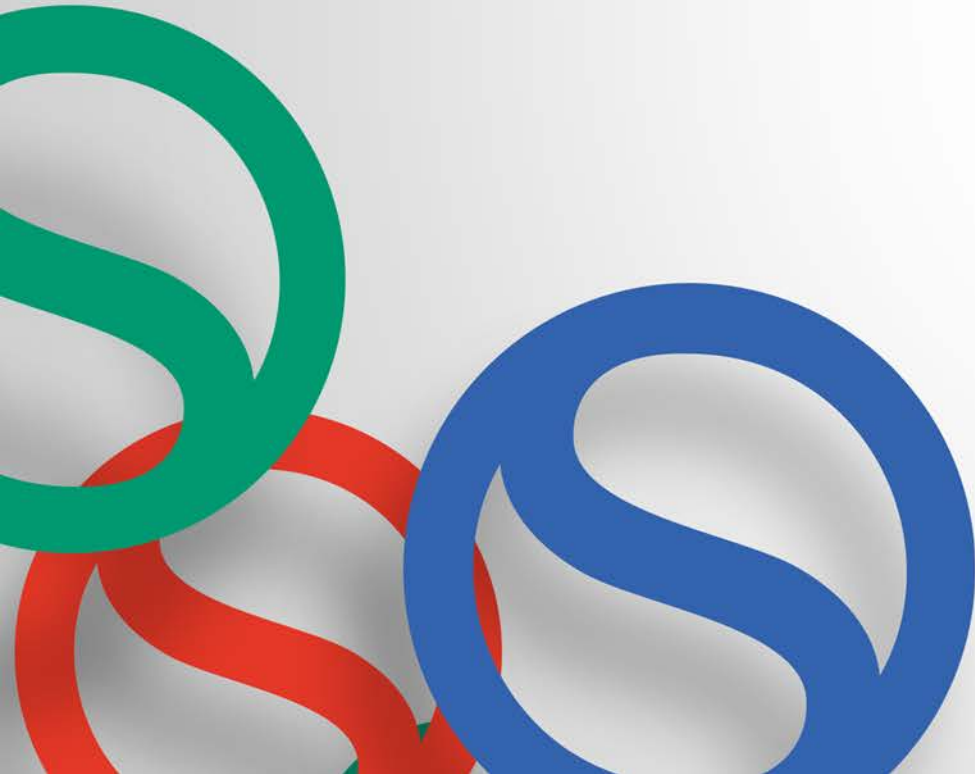
For the very first time we will be able to view, in real time, patient, demographic, genomic, clinical and cost data in the same place at the same time

We will get more of the right patients available for trials, speed up the development process and get the drugs available for patients faster

This is all because APL gave us the ability to prototype and build solutions quickly (and deliver the results)



APL Really Can Make Us Healthy(er)



Thank You

