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Data Driving Outcomes

SAPHIRe Webinar | 26th Sept 2020

MAKING DATA USEABLE: REGIONAL CONSIDERATIONS, BEST PRACTICES AND EXAMPLES

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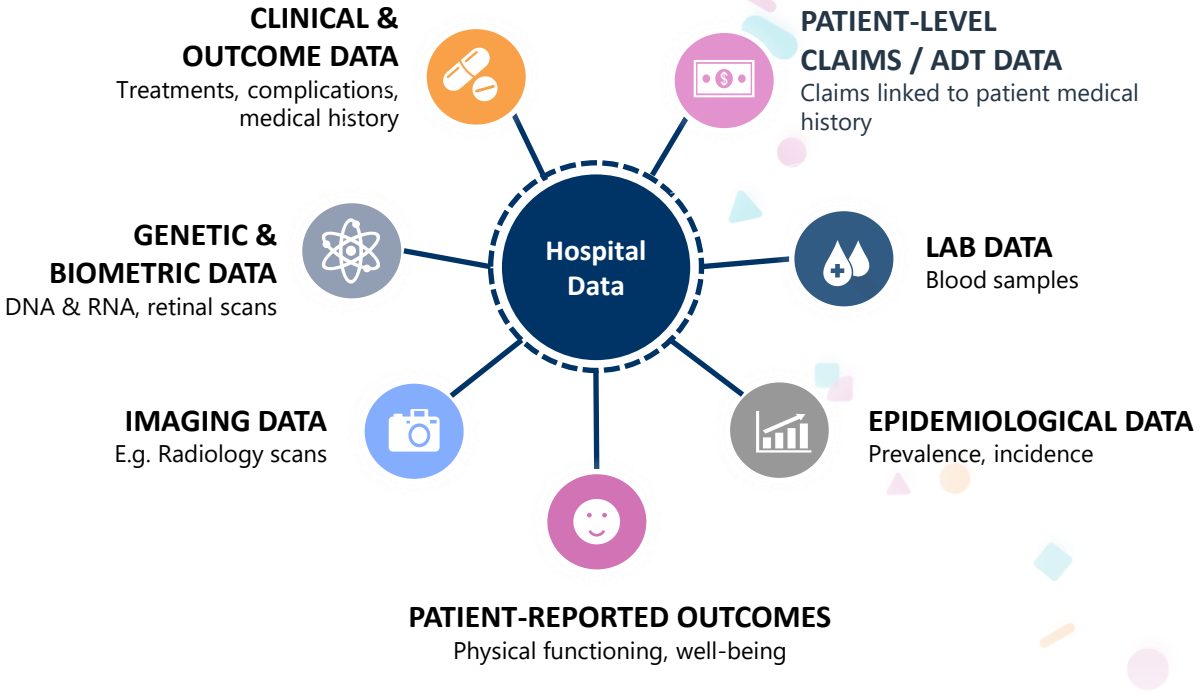
Unlocking hospital data – a major untapped potential for RWE

80% is currently not accessible for secondary use purposes.

Actual sources of RWE

	Accessibility	Relevance
Standard Market Reports Standard market reports		
National Statistics E.g. population and mortality data		
Insurance Claims Data Billing information from hospitals: consumption data		
Expert Interviews Opinions provided by physicians (KOL's)		
Clinical Registries Custom databases concerning specific disease area's		
P4 RWE Trials Specific trials set up for RWE collection		
Hospital Data Data from the hospital information system, including clinical notes, lab reports		

Large Variety of RWE sources in hospitals: Available data is largely unstructured & siloed



Resulting in too many unknowns for every stakeholder

Physician: What is the mortality rate of an intervention for a 65yo male suffering diabetes in our hospital?

Patient: Can I expect the best treatment in this hospital?

Clinical trial center: How many patients in the example pathway match in- & exclusion criteria for study XYZ?

Management: Is the clinical benefit of this therapy justifying the price premium?

Industry: Why is our cancer therapy only prescribed in 35% of the estimated target population?

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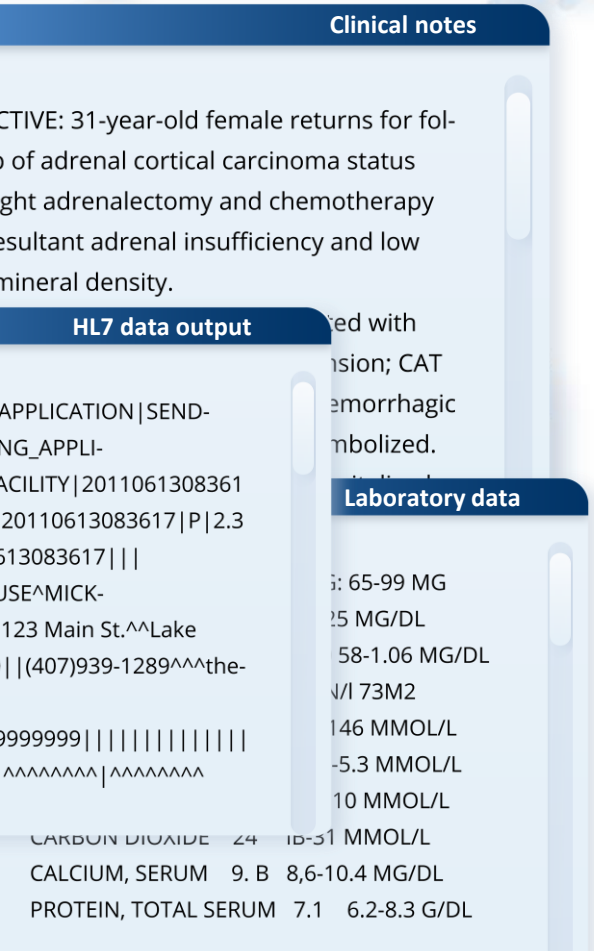
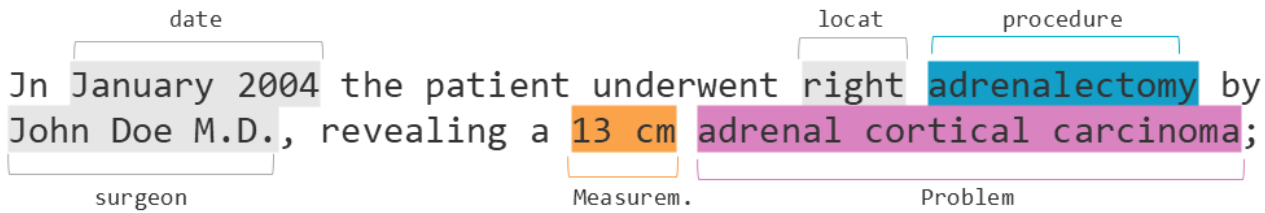
Lynxcare provides an **AI-powered clinical data platform**, enabling hospitals to make use of up to **100% of their data.**

Solution Step 1: Unique data mining technology

Includes unstructured source files for data-enrichment





Targeted NLP algorithms
per disease area

Independent of source
data type & format

>90% accuracy
guaranteed

Solution Step 1: Unique data mining technology
Targeted NLP algorithm & mapping: example

Lynxcare AI reads report and extracts data

I saw your patient at the cardiology consultation on 11-02-2019.

Physical examination: Length: 176 cm (11-02-2019) Weight: 105 kg (11-02-2019) BMI: 33.9 kg/m² (11-02-2019) Heart rate: 79 bpm (11-02-2019) Blood pressure: 131/91 mmHg (11-02-2019) Normal cardiac and pulmonary ulceration

Supplementary examination: 11-02-2019: ECG: Anterior ventricular fibrillation with mean ventricular response 79/min. Slow R progression. Frequent ventricular ectopy

Conclusion: I saw your patient with known cardiomyopathy for control. As you know, he recently underwent a syncope, based on unsuccessful ventricular tachycardia. Since the start up of Cordarone he shows dizziness symptoms. Cordarone is therefore stopped and I try to gradually increase the dose of betalysis. After consultation with colleagues pneumologists also dose reduction long-acting beta 2 sympathicomimetic, symbicort is stopped.

Medication: Pantomed tablet msr 40mg; oral; 1 x per day 1 piece Paracetamol tablet 1000mg; oral; if necessary 4 x per day 1 piece maximum 4 grams paracetamol per day (if < 70 kg maximum 3 grams per day) indication: kick 1 basic analgesia regimen - in case of pain vas > 4 or fever dose at a time: 1 gram interval: 4 hours Aldactone tablet 25mg; oral; 1 x per day 1 piece Ultibro breezhaler inhalpdr 85/43mcg with breezhal; inhalation; 1 x per day 1 piece Xarelto tablet film-coated 20mg; oral; 1 x per day 1 piece

Future appointments: Consultation Cardiology/Dr. John Hickx on 16-04-2019 at 10:30, location: Campus Willowstreet

With collegial greetings.

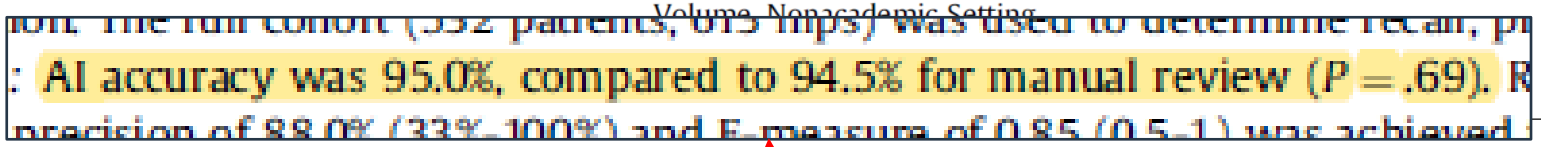
After data extraction: database that can be used for quantitation

Category	CUI	Subcategory	Datapoint
	C0421451	Hospital ID	Patient hospital ID
Demographic factors	C0303434	Demographic data	Data of Birth
	C0932930	Demographic data	Patient sex
Diagnosis	C3343522	Characterization of HF at admission or when first recognized	Diziness
	C3546563	Characterization of HF at admission or when first recognized	Acute pulmonary edema
	C3343532	Characterization of HF at admission or when first recognized	Syncope
Generic clinical status	C3468964	Medication at admission	Pantomed
	C5645679	Medication ad admission	Paracetamol
	C4678324	Medication at admission	Aldactone
	C5567450	Medication at admission	Ultibro
	C4578963	Medication at admission	Xarelto
Exam labs at admission	C3356632	Vital signs	Height
	C3677422	Vital signs	Weight
	C3356632	Vital signs	BMI
	C3356622	Vital signs	Heart rate
...		...	...

Solution Step 1: Unique data mining technology

Peer-reviewed validation shows > 90% accuracy for each data point

>90% accuracy guaranteed



Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Artificial Intelligence and Machine Learning

What Can We Expect Following Anterior Total Hip Arthroplasty on a Regular Operating Table? A Validation Study of an Artificial Intelligence Algorithm to Monitor Adverse Events in a High-Volume, Nonacademic Setting

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ABSTRACT

Background: Quality monitoring is increasingly important to support and assure sustainability of the orthopedic practice. Surgeons in nonacademic settings often lack resources to accurately monitor quality of care. Widespread use of electronic medical records (EMR) provides easier access to medical information, facilitating its analysis. However, manual review of EMRs is highly inefficient. Artificial intelligence (AI) software allows for the development of algorithms for extracting relevant complications from EMRs. We hypothesized that an AI-supported algorithm for complication data extraction would have an accuracy level equal to or higher than manual review after total hip arthroplasty (THA).

Methods: A total of 532 consecutive patients underwent 613 THA between January 1 and December 31, 2017. A random derivation cohort (100 patients, 115 hips) was used to determine accuracy. After generation of a gold standard, the algorithm was compared to manual extraction to validate performance in raw data extraction. The full cohort (532 patients, 613 hips) was used to determine recall, precision, and F-value.

Results: AI accuracy was 95.0%, compared to 94.5% for manual review ($P = .69$). Recall of 96.0% (84.0%-100%), precision of 88.0% (33%-100%) and F-measure of 0.85 (0.5-1) was achieved for all adverse events. No adverse events were recorded in 80.6%, 1.3% required reintervention and 18.1% had "transient" events.

Conclusion: The use of an automated, AI-supported search algorithm for EMRs provided continuous feedback on the quality of care with a performance level comparable to manual data extraction, but with greater speed. New clinical information surfaced, as 18.1% of patients can be expected to have "transient" problems.

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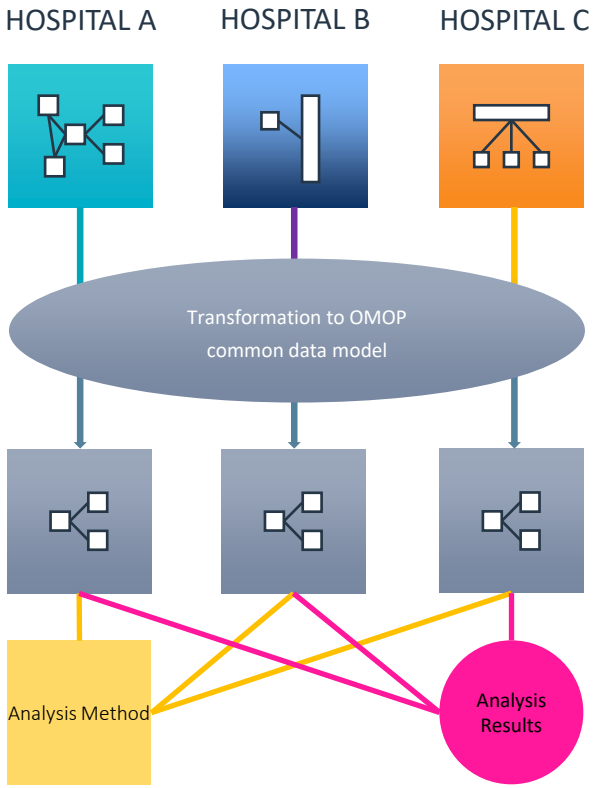
Solution Step 2: Standardize clinical Datawarehouse using
State-of-the-art Common Data Model: OMOP-CDM

OMOP =
Observational Medical
Outcomes Partnership



1. Open source, internationally validated model for storage of medical data
2. Standardization: Format & Vocabulariy (Snomed CT, Loinc, …
3. Plug and play analytical tools
4. International research collaborations

Sources:
ohdsi.org | devdays.com

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Solution step 3: Data visualization & reporting
The Clinical Value case(s)

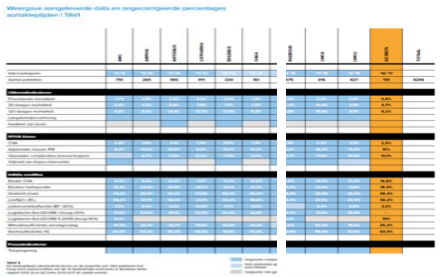
Applications that provide incremental value

growing impact & complexity

Structured & Coded

COLLECT

REPORT & COMPARE



Outcome & quality reports; benchmark; Financial efficiency

growing impact & complexity

Nearly real-time

TREND

MONITOR

Management cockpit: KPI's improvement initiatives; registration needs

growing impact & complexity

aggregated

CONNECT

CLINICAL INSIGHTS

Guidelines adoption; Clinical research; patient identification

harmonized

SHARE

ACROSS HOSPITALS

Research & Life Science partnerships

Solution step 4: Sharing insights across hospitals

Enable RWE data partnerships

The LynxCare data platform is designed to facilitate

sharing of (aggregated) RWE statistics

Standardized OMOP-CDM

Pseudonymization and Anonymization

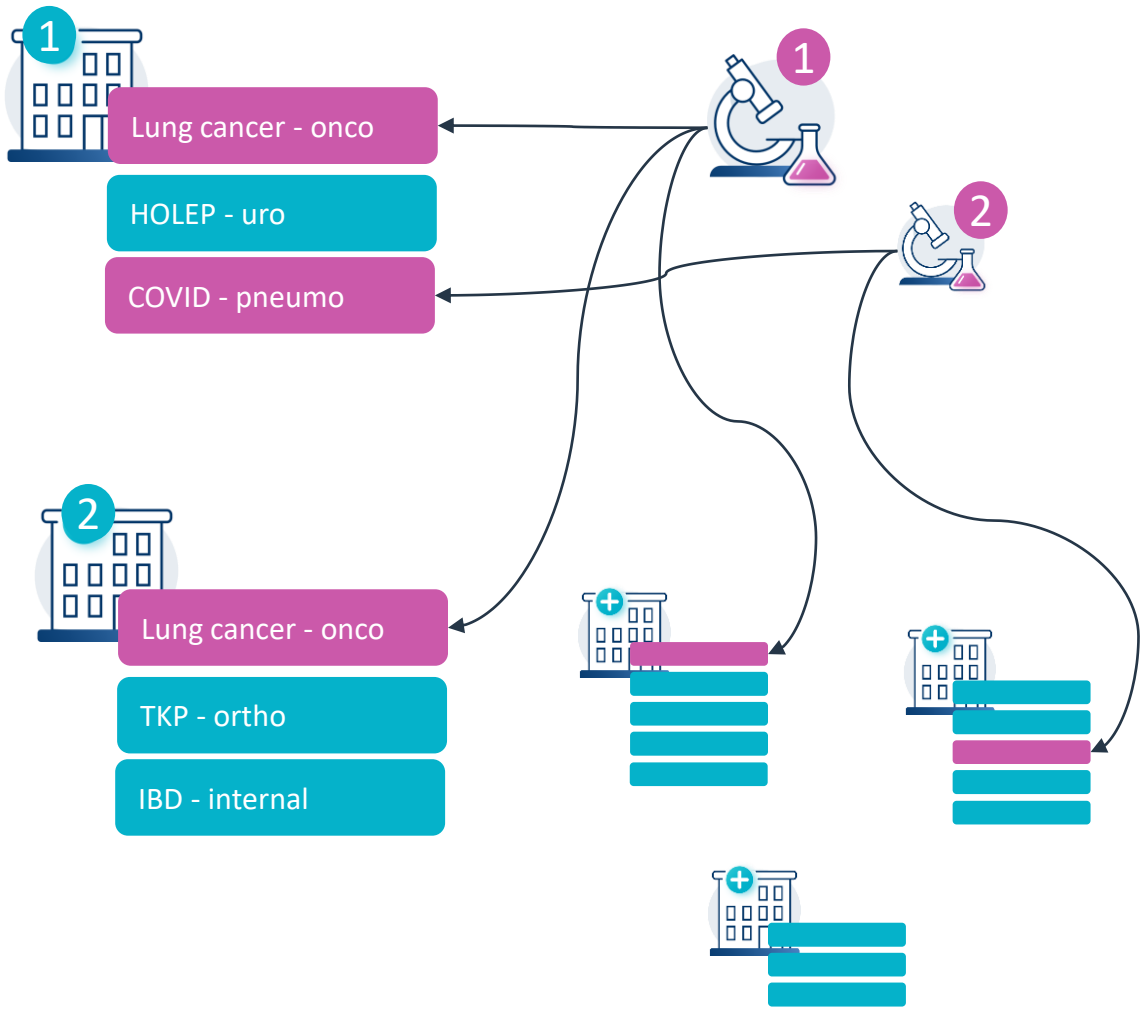
Data aggregation

Each hospital controls which insights can be shared

federated RWE network structure

Value of RWE network

Current: Ad-hoc collaboration framework for data sharing

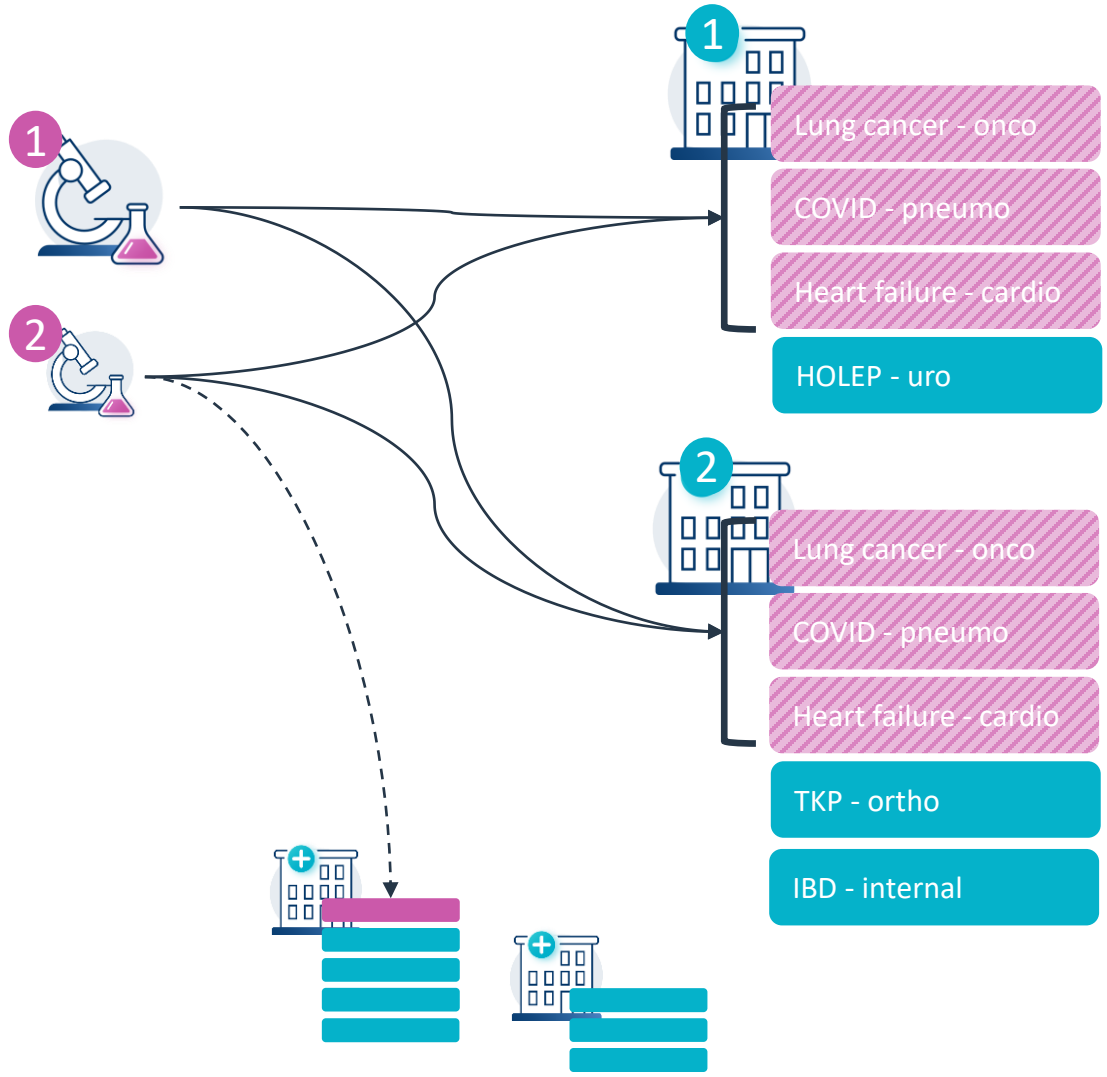


1. **Ad hoc** collaborations (mostly prospective)
2. **Single** disease-area
3. Data **access & approvals** one-by-one
4. **Less cost & time- efficient**

Value of RWE network

Proposed: Continuous collaboration model with Life Sciences industry

1. **Structural** collab. with key “data centers”
2. **10+** disease area’s
3. **Real-time** access & **streamlined** approvals
4. **More cost/ time- efficient**



End-to-end data processing, analytics & research platform

SaaS

Ingest

Secure, real-time **cloud data transfer** through **local gateway**

Process

Targeted, disease-specific algorithms >90% accuracy

State-of-the-art **data engineering environment**

Store

Internationally validated research- grade **data warehouse** (OMOP CDM)

Data coding according to international standards

Data pseudonymization

Visualize

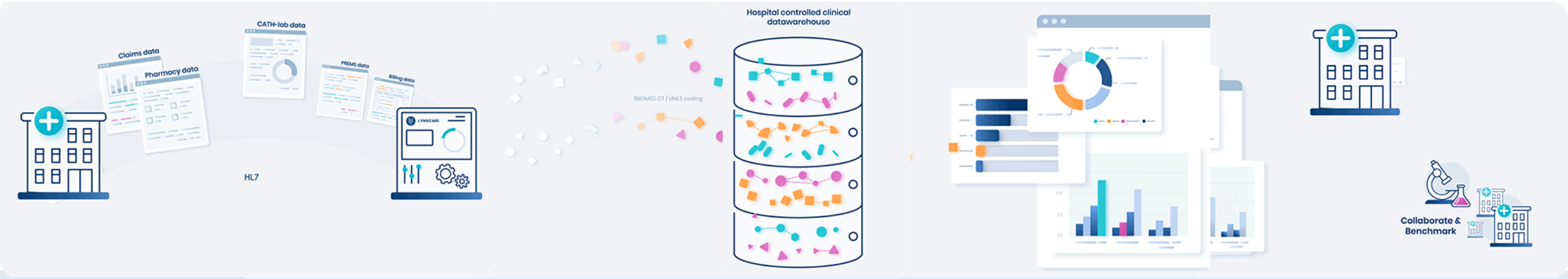
Library of **template dashboards** in 30+ disease area's

Build your own dashboards

Share

Compare to **benchmarks** over participating centers

Participate/ initiate **RWE big-data initiatives**



LynxCare in Data

3 Big Pharma Clients

AstraZeneca · Takeda · J&J

4 Countries EU & USA

32 Connected Hospitals

16 Disease Areas

26,618,309 Datapoints Mined from Clinical Records

129,000 Individual Patient Records

HOSPITAL Use Case — BENCHMARK & RISK ASSESSMENT in CARDIOLOGY

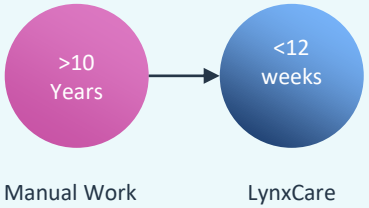
mining legacy data to improve patient outcomes (retrospective)

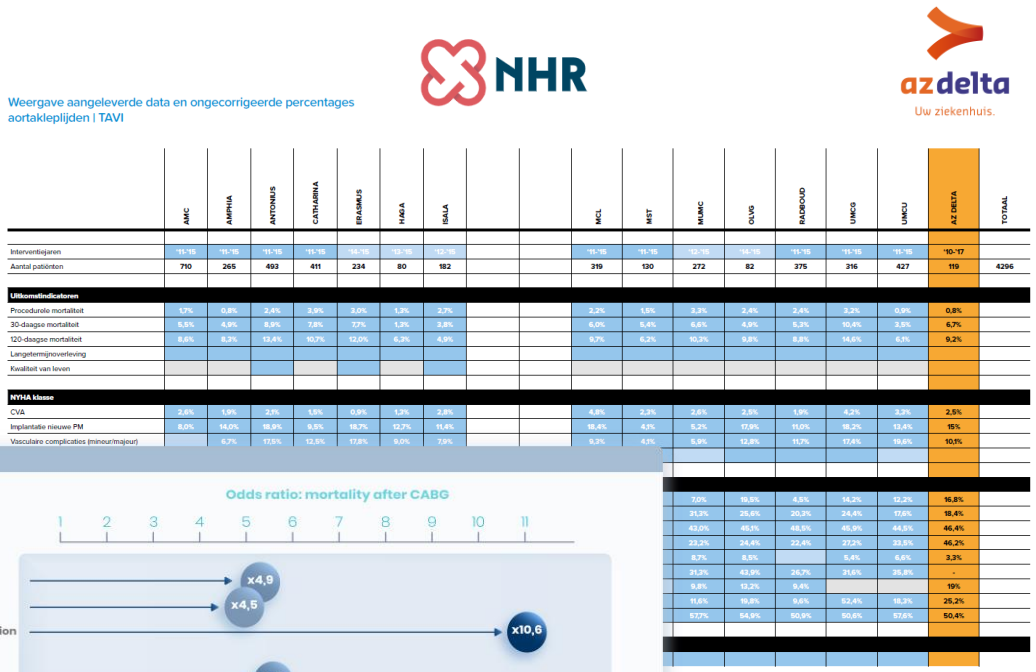
“ The LynxCare data Platform offers hospitals an international benchmark by mining legacy data & comparing with international registries. ”

“We could finally answer questions such as: “How many ablations do we need to treat the patients? What are the predictors of success? And more importantly: what are the predictors of failure?”

Dr. Karl Dujardin, Cardiologist at AZ Delta

48 million data points mined from 8-year history





Collaborative Research Use Case

Near Real-time Insights on Covid-19 in 10 Hospitals

LYNXCARE

Our Team

Clinical team | Data science team | Engineering team

Georges De Feu, CEO

Pharm.D., 3x
successful founder

Emanouil Kazaltzis, CTO

Former IT architect at SAS Analytics, Capco

Dries Hens, CBO

M.D., MBA

Kenny Willems, COO - CFO

Former CFO iMinds (imec), COO Sms-Timing, Deloitte

Supported by a team of **25FTE** from institutions like:

Backed by leading VC’s

BtoV Partners

BtoV Partners is a European venture capital firm focused on early stage investments in digital and industrial technology companies.

Some portfolio companies:

XING

DeepL

Heran Partners

Heran Partners is a Belgian-based investment fund founded by Annie Vereecken together with Katleen Vandersmissen, Joris Mortelmans and Herman Verrelst within the sector of MedTech and Digital Health

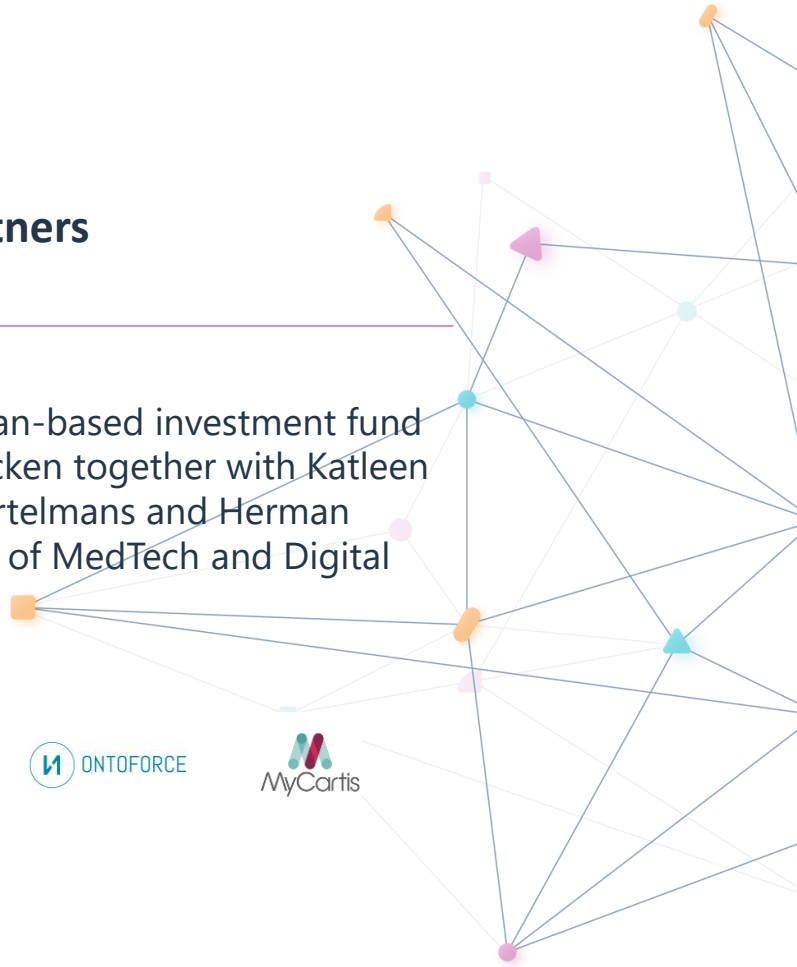
Some portfolio companies:

UGENTEC Automated PCR-analysis

BlueBee

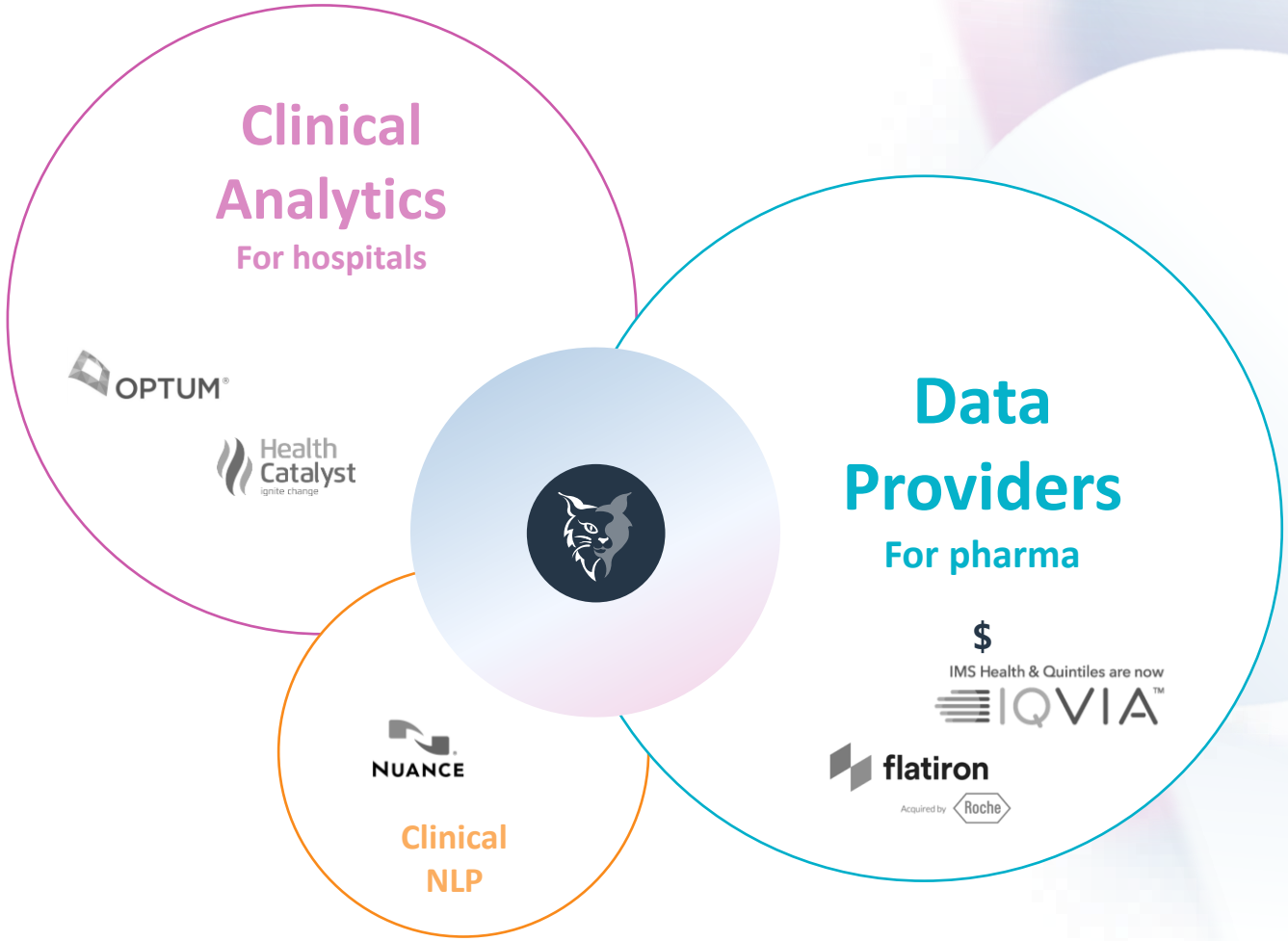
ONTOFORCE

MyCartis



LynxCare RWE hub solution
Unique multi-stakeholder benefits

1. **Clinical insights** for clinicians
2. **RWE data** for Life Sciences industry
3. **Data insights** for hospital mgt
4. Enable **value-based contracts**
5. Data **anonymization and monetization** for **Life Sciences**














Thank you!

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