

ADAM: Applied Data Analytics in Medicine

- Four Pilot Projects in Healthcare -



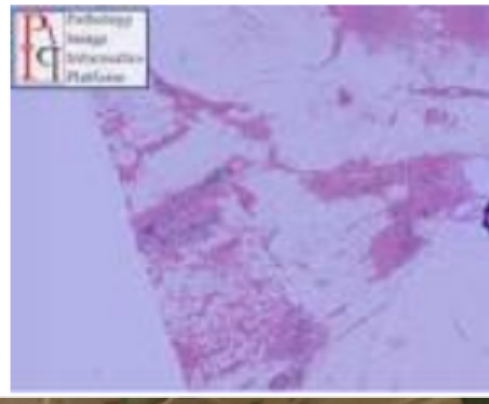
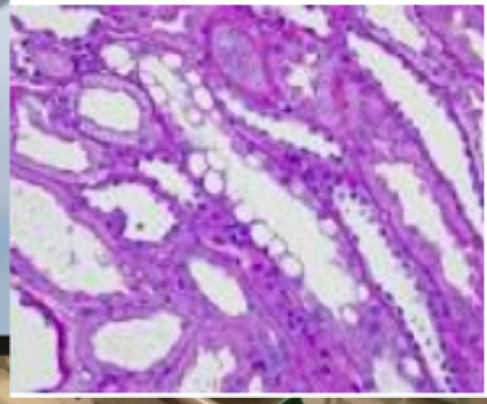
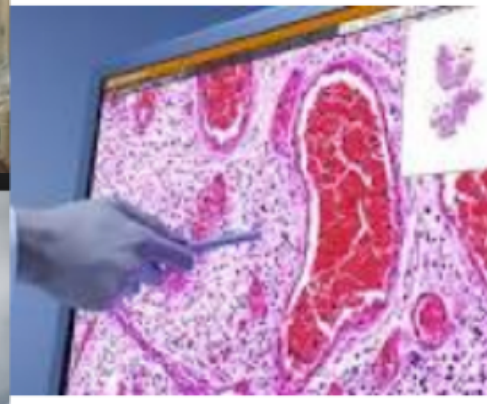
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Big Data / Data Analytics in Healthcare

Hype, relevant, revolution or evolution?





Personalising Healthcare

using digital tools



Electronic Patient
Record



Patient Portal



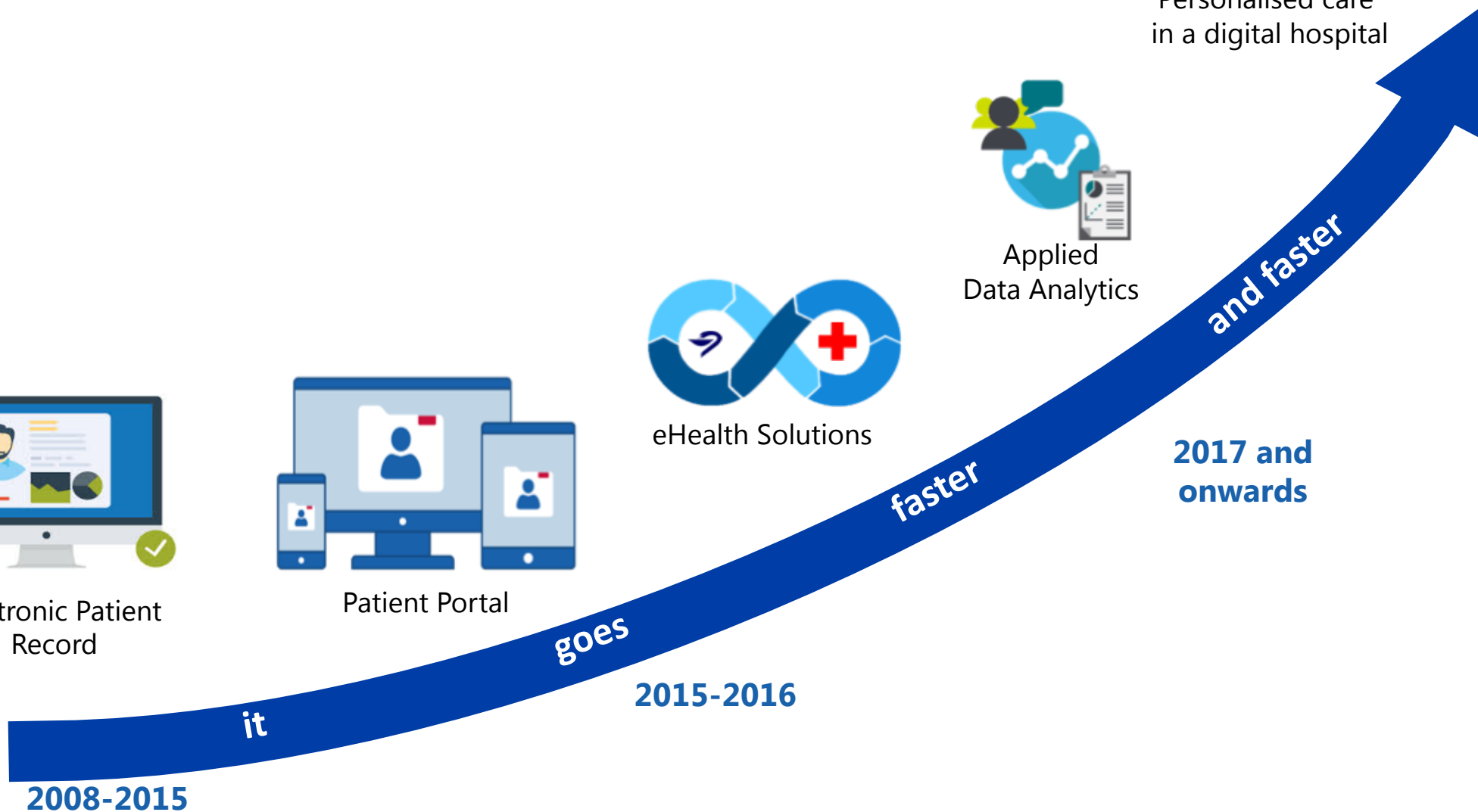
eHealth Solutions



Applied
Data Analytics



Personalised care
in a digital hospital



Experimental Set Up for Data Analytics in Healthcare

The UMC Utrecht has an EHR, a live-patientportal, a Research Data Platform, eHealth pilots, so a lot of **accessible data** available

Essential to make the next step and **use the data** to improve healthcare, now “analytics-technology” gets available

Assignment of Board of Directors

Corporate program with budget: “Experimental set up ADAM”

Together with strong external partners (Companies with data scientists/data analytics experience)



Goals ADAM

Try out data-driven healthcare

- In nine months
- 4 Pilots using healthcare data to give **personalised** advice, **personalised** diagnostics, personalised treatment or personalised monitoring.
- The outcomes of these pilots are preferable **scalable** and directly **applicable in healthcare**.

Assess impact for next steps

- Insight in effort and budget needed for 2018/2019
- **Impact** assessment for **people** (patients, healthcare professionals) and **organisation** (culture, processes, budget, privacy & security and technology).

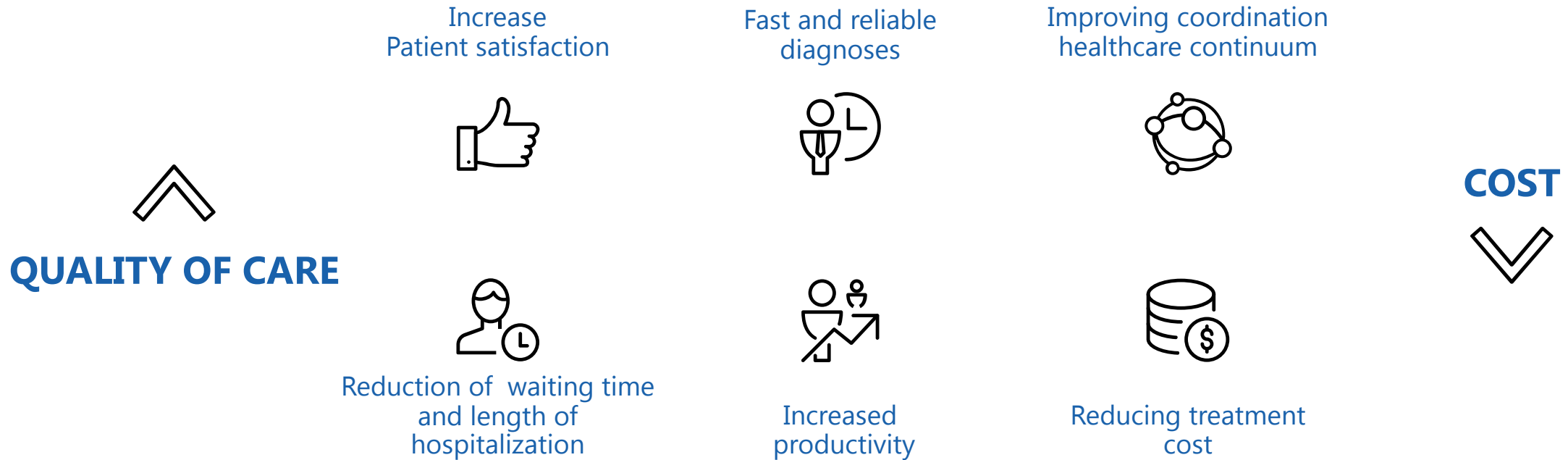
Implement a method

- Try out and implement the **agile way of working**, with clear go/no go moments.



Value of Applied Data Analytics (VBHC)

Improve quality of care and decrease social cost



How did we start



Interviews internal and external

(already “active” UMC Utrecht employees, critical clinicians, Utrecht University, data scientists, ...)



Meeting with potential external partners



Inventarisation potential projects

14 potential projects presented

4 projects prioritised based on fixed criteria

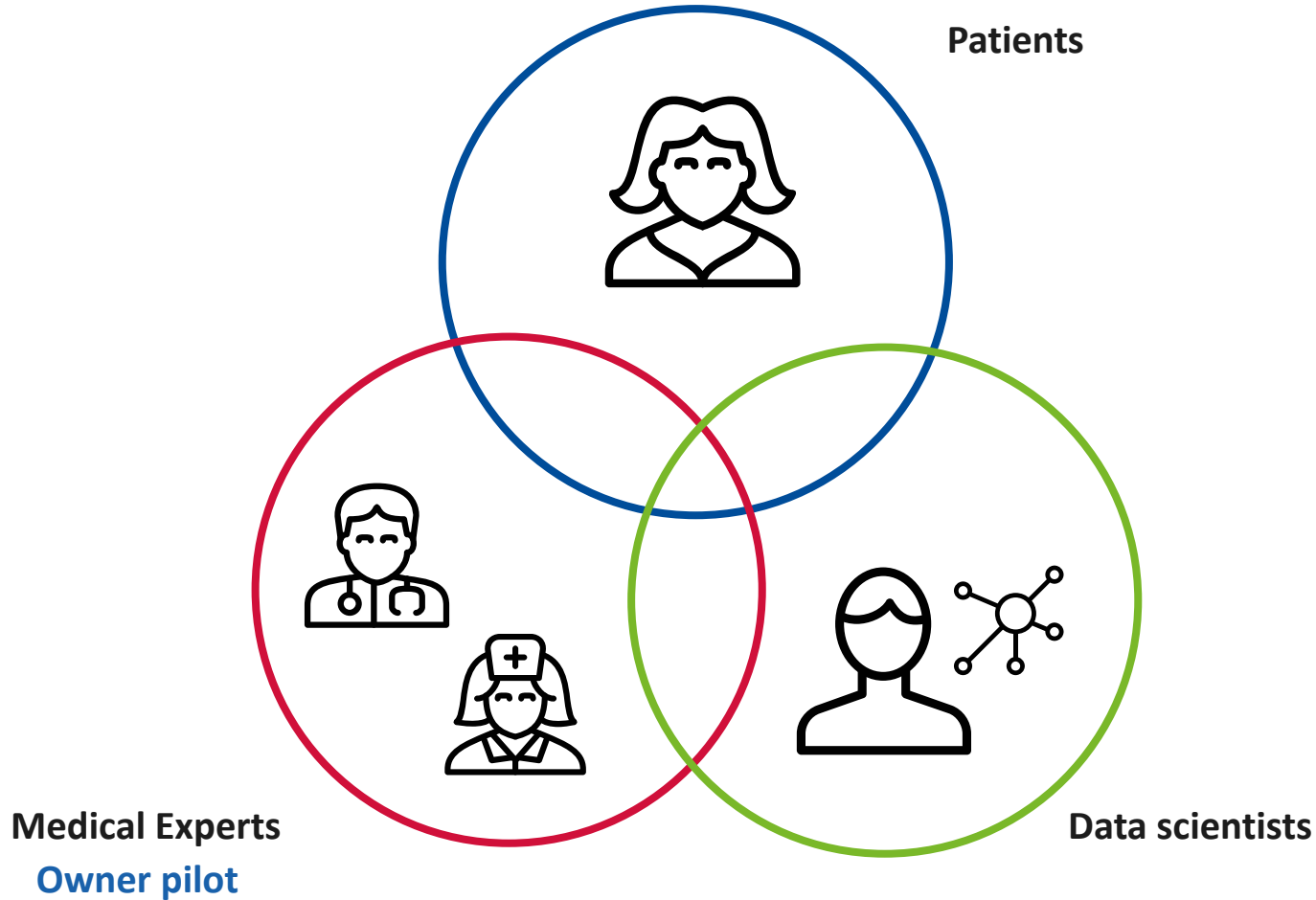


Lessons learned from eHealth projects

Essential processes: legal department, medical ethical issues, privacy & security, etc

Multidisciplinary teams in ADAM

During the process, patients, medical specialists and data scientists work together on solutions



- ● Weekly Project meetings (Scrum)
- ● Week start
- ● Every 4 – 6 weeks Expert sessions
- ● ● Every 4 – 6 weeks Patient groups
- ● ● Pilots
- ● Change assessment



Selected projects and their clinical questions



Rheumatoid arthritis

Is it possible to **predict dynamically** whether and when an individual patient with Rheumatoid Arthritis (RA), who is prescribed biologicals, may get a **flare**?



Psychosis

Is it possible to **predict which antipsychotic** medication prescription will work (or not) for an individual patient who is prescribed antipsychotic drugs?



NICU

- A. Is it possible to **predict the probability of neonatal late-onset** sepsis (LOS) for premature babies (<32 weeks)
- B. Is it possible to **predict the bacterial species** (gram negative / gram positive) in case of suspicion of LOS?



Cardiovascular risk management

What is the **optimal visualization tool for risk profile/score/advice for therapy** according to standard (and how can this be integrated in HiX)?

Pilots and external partners

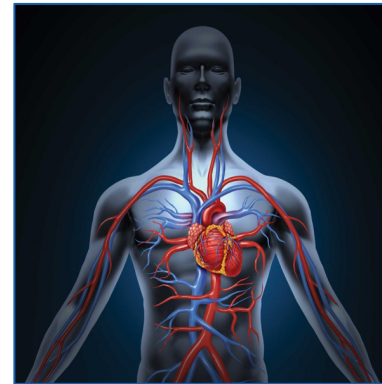
accenture
Project management and impact assessment



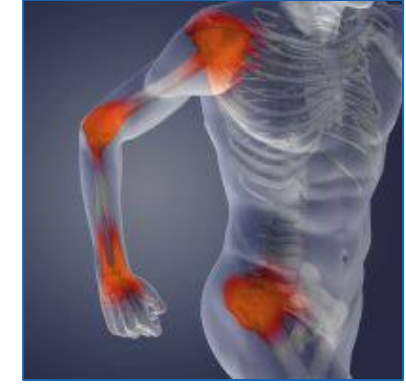
NICU



Psychose



Cardiovascular Risk
Management

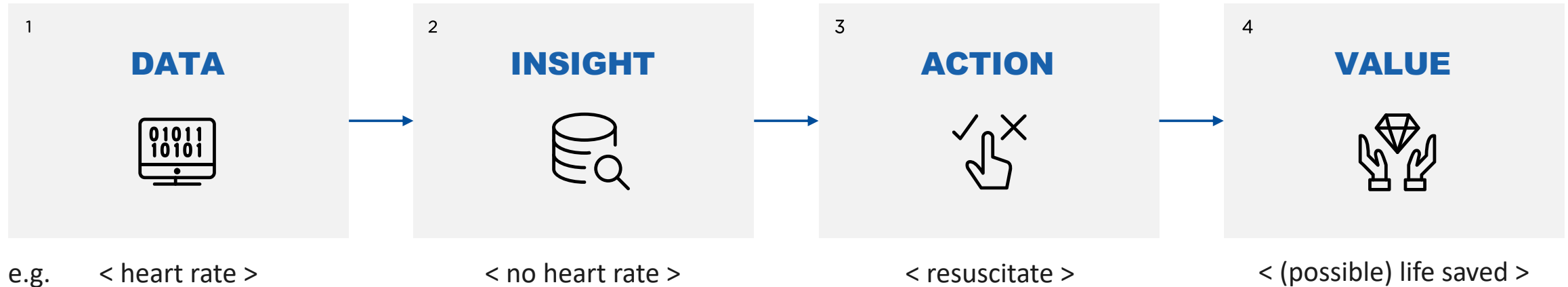


Rheumatoid
arthritis



Analytics value chain

Different projects were selected, each at a different stage in the analytics value chain



NICU

- Data collection incomplete
- Unclear if insights can be created
- Uncharted territory



Psychosis

- Good collection and knowledge of data
- Clinical decision support achievable
- Semi-charted territory



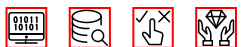
Cardiovascular Risk Management

- Very advanced collection and knowledge of data
- First algorithm available for clinical decision support
- Charted territory



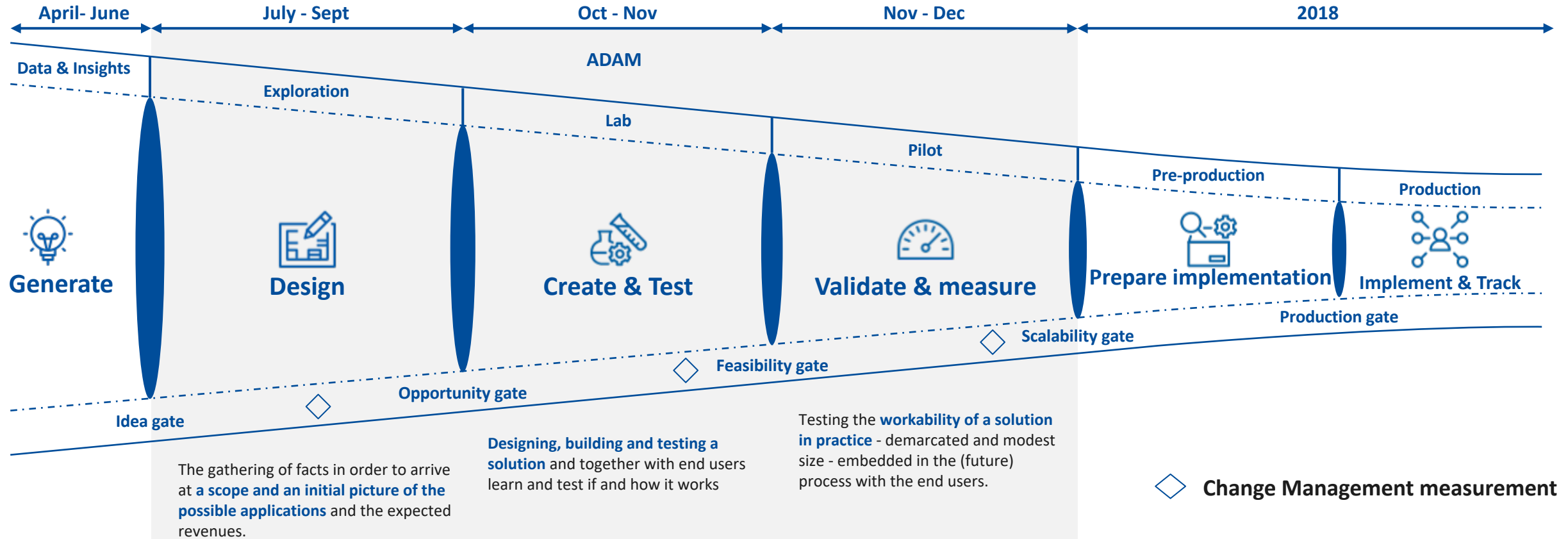
Rheumatoid Arthritis

- Data collection incomplete
- Unclear if insights can be created
- Uncharted territory

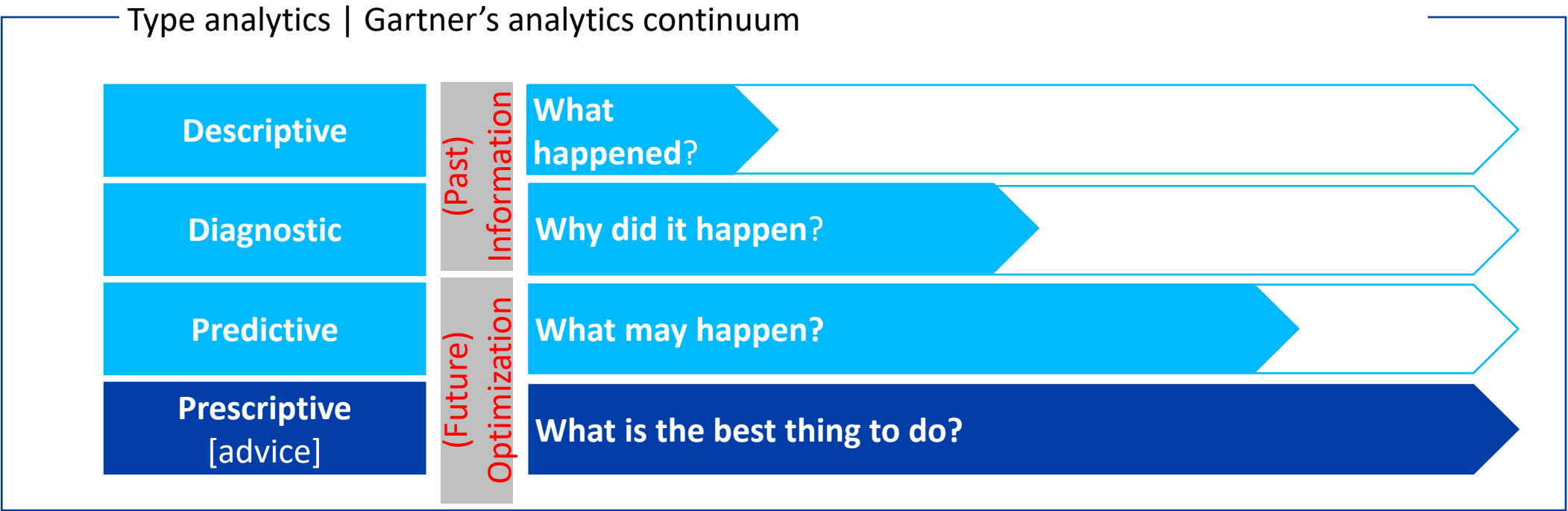


Innovation funnel

Develop and test innovations in an agile, controlled and business case driven way; each stage has its own goals



Cardiovascular Risk Management

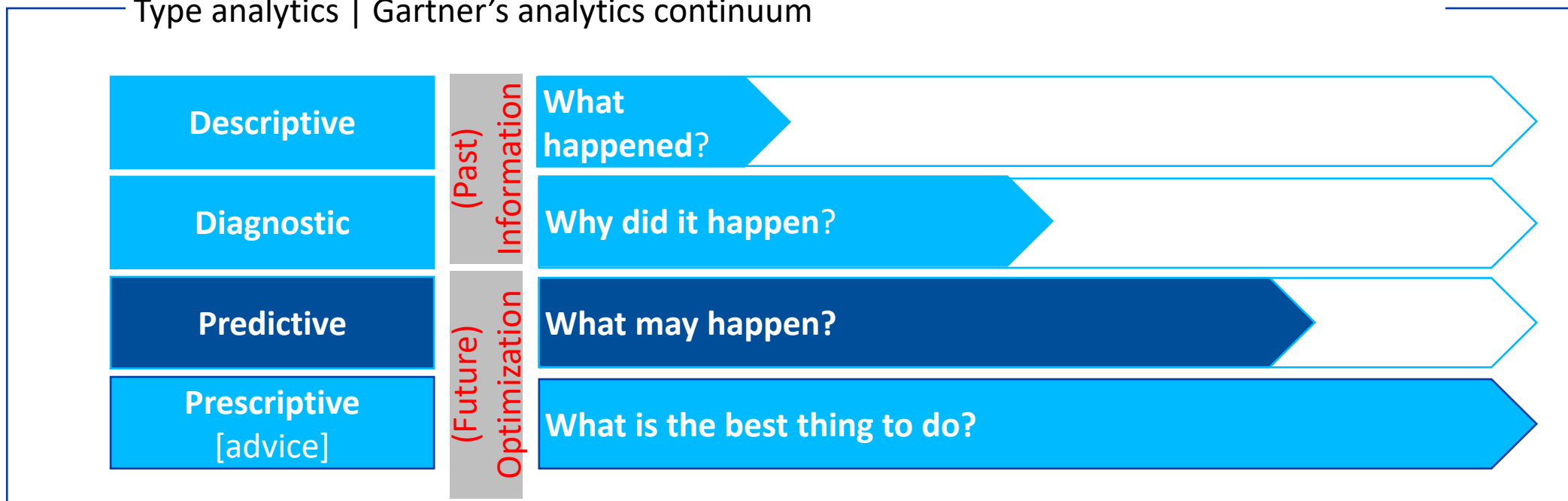


Implemented Dashboard in EPR, personalised advice and therapy based on individual data, recommended standard of care.

Technical solutions applicable to multiple health care issues

Rheumatoid Arthritis

Type analytics | Gartner's analytics continuum

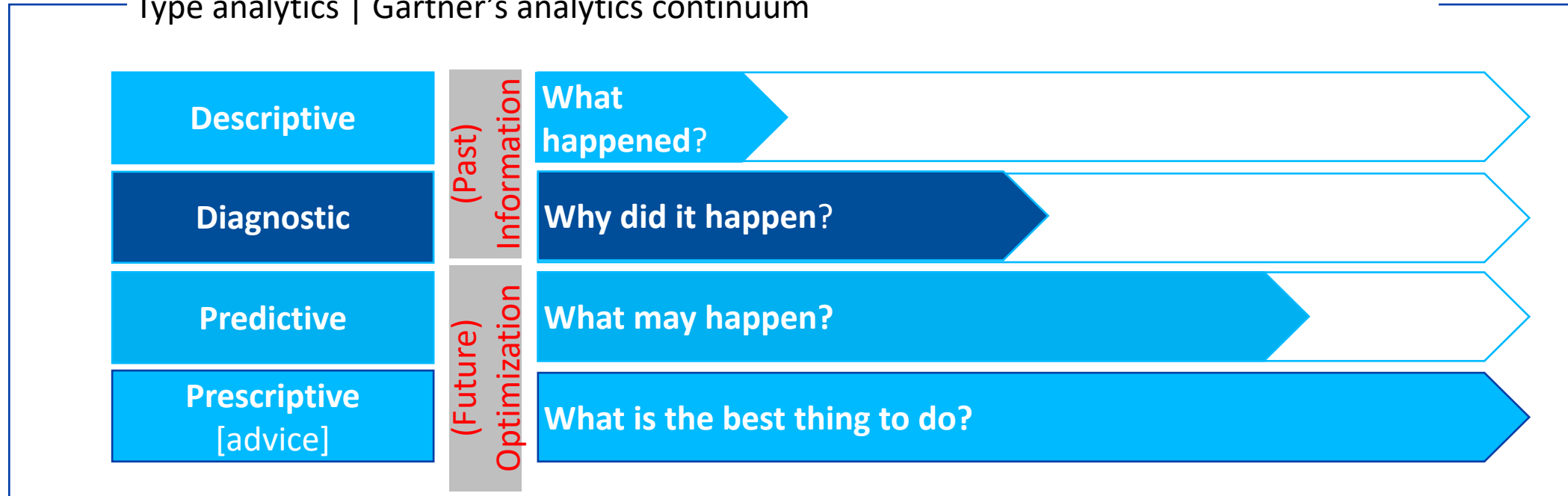


Two models predicting flare (joint modelling 68%; machine learning 75% correct)

Insight in present quality of recording disease activity and other variables

Psychosis

Type analytics | Gartner's analytics continuum

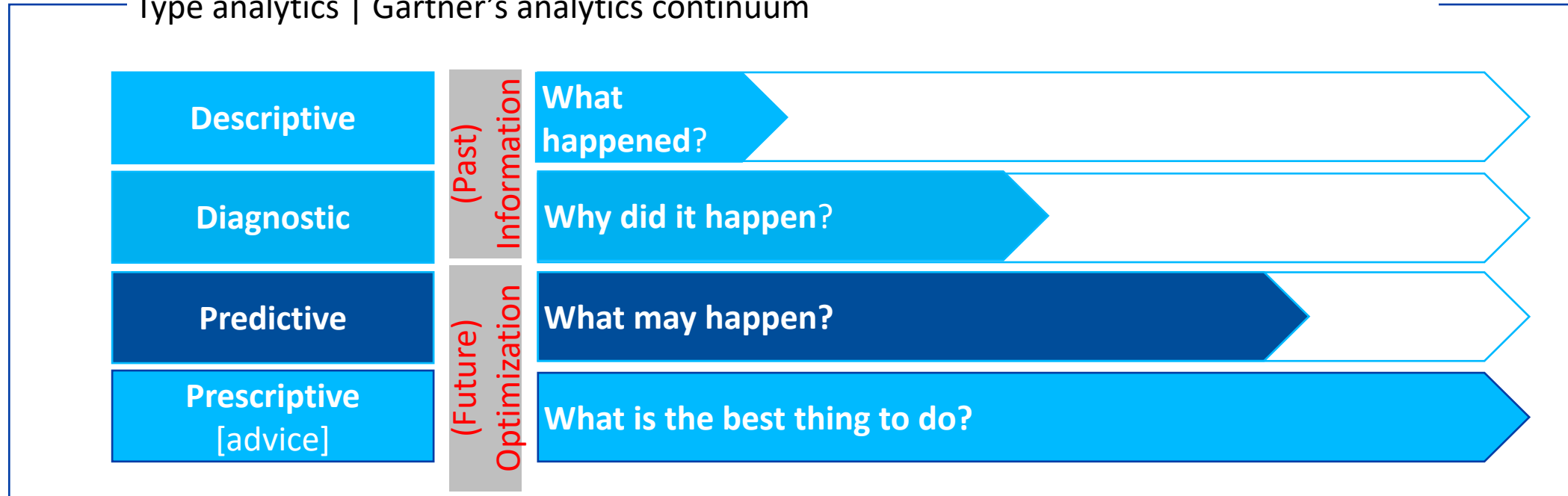


Difficult to make a model: data quality and definition of parameters

Dashboard to support clinician in evaluating therapy and improving quality of data

Neonatal Intensive Care

Type analytics | Gartner's analytics continuum



Model to predict sepsis 12 hours earlier

Models on prediction of positive blood culture and prediction on Gram pos/neg type

Lessons learned so far



People (internal / partners)

- Dedication differences between the external partners
- Challenge to recruit and keep Data Scientists
- (Clinical) stakeholders involvement / commitment is crucial
- Medical specialist and data scientist do not speak the same language
- Careful: causality!

Technology / Infrastructure / Data

- Data knowledge is crucial, but often scattered (medical context, meaning, data lake, architecture...)
- Set up tables in Research Data Platform focused on research (data as in systems)
 - less on "clinical support" (more structure)
- Quality of registration (a lot of unstructured data)
- Multiple "clinical support systems" and data warehouse initiatives within the hospital
- Architecture necessary for real time data analytics

Organization

- It is not an "IT-thing" it is a "Clinical-thing"
- Involve IT as soon as possible
- A corporate program helps to bypass the sometimes chubby organization
- Data Governance



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