ENVISION
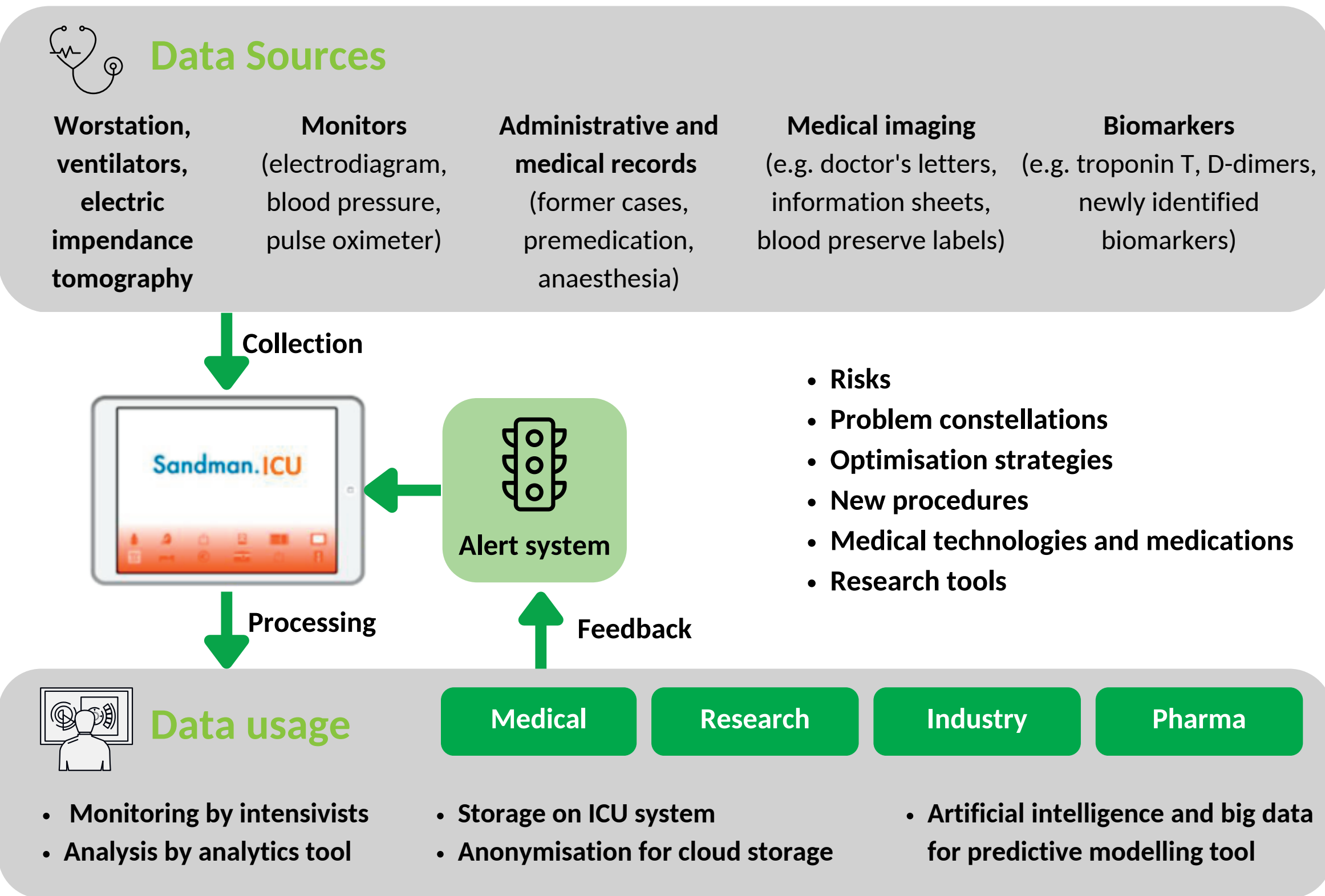
Intelligent plug-and-play digital tool for real-time surveillance of COVID-19 patients and smart decision-making in Intensive Care Units

Data Sources

| Worstation, ventilators, electric impendance tomography | Monitors (electrodiagram, blood pressure, pulse oximeter) | Administrative and medical records (former cases, premedication, anaesthesia) | Medical imaging (e.g. doctor's letters, information sheets, blood preserve labels) | Biomarkers (e.g. troponin T, D-dimers, newly identified biomarkers) |

Collection → **Sandman.ICU**

Alert system

- Risks
- Problem constellations
- Optimisation strategies
- New procedures
- Medical technologies and medications
- Research tools

Processing → Feedback

Data usage

| Medical | Research | Industry | Pharma |

- Monitoring by intensivists
- Analysis by analytics tool
- Storage on ICU system
- Anonymisation for cloud storage
- Artificial intelligence and big data for predictive modelling tool

Sandman.IC
Digital tool for monitoring and decision making

ENVISION aims to deliver an innovative and powerful digital tool for real-time monitoring of COVID-19 patients in Intensive Care Units (ICUs) and smart decision making. The intelligent new app will make the course of the disease more predictable and ease the burden on medical staff. Furthermore, an alert system based on big data would help intensivists to take the right decision at the right time

Rule-based expert systems → AI core analytics tool ← Hybrid system: local storage (private data), central cloud (big data)

- AI layer
- Storage layer
- Anonymisation layer
- Communication layer

Sandman.IC / other sources | hospital information system | open API / HL7 interface | scientific data users

Multi-layer platform with integrated analytics
Versatile clinical tool for diverse applications in treatment and research

Our work will be delivered in six integrated work packages. These WPs will, often in parallel, complete tasks related to:

- research
- governance and scoping
- implementation of results
- innovation
- creation of tools
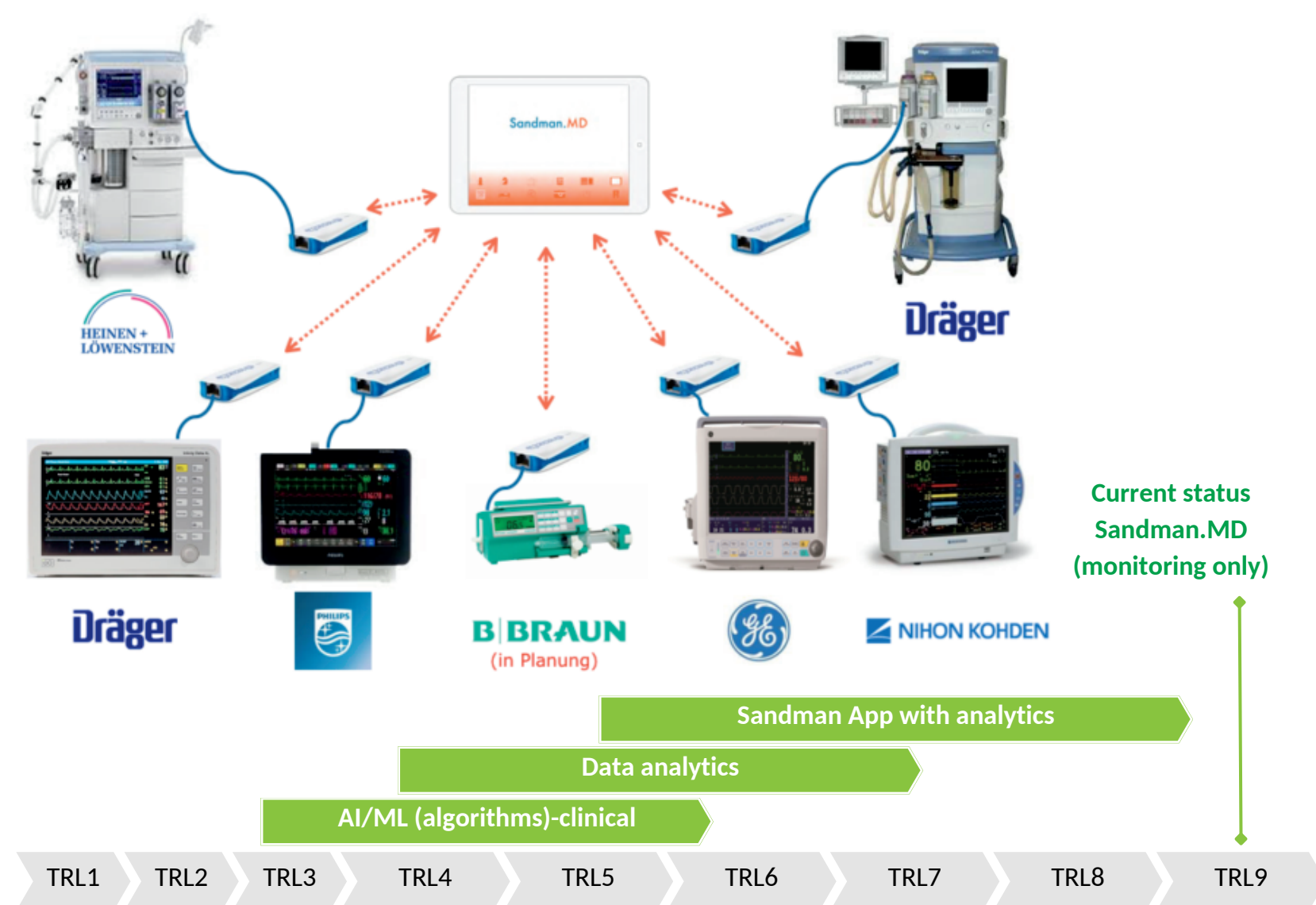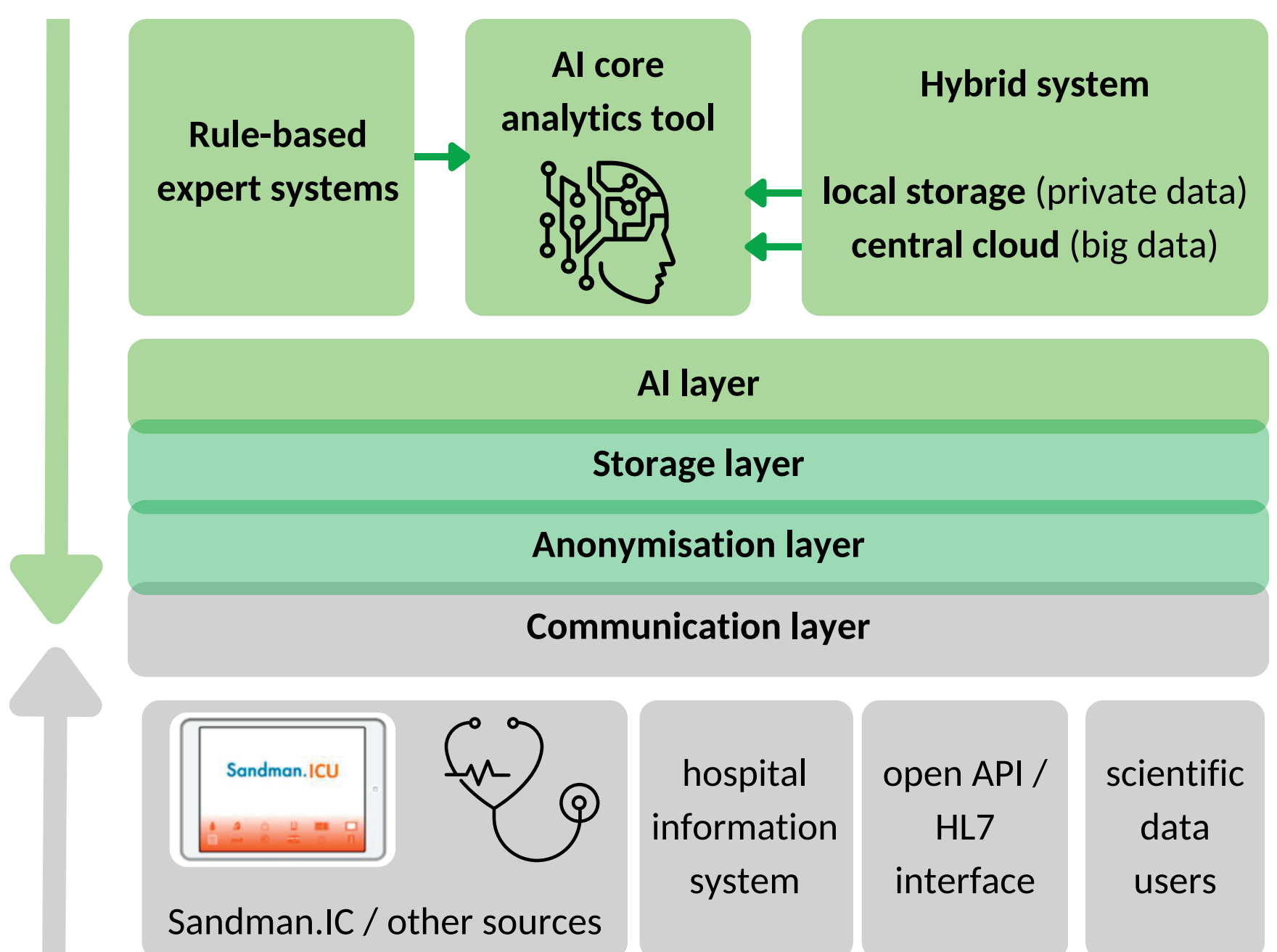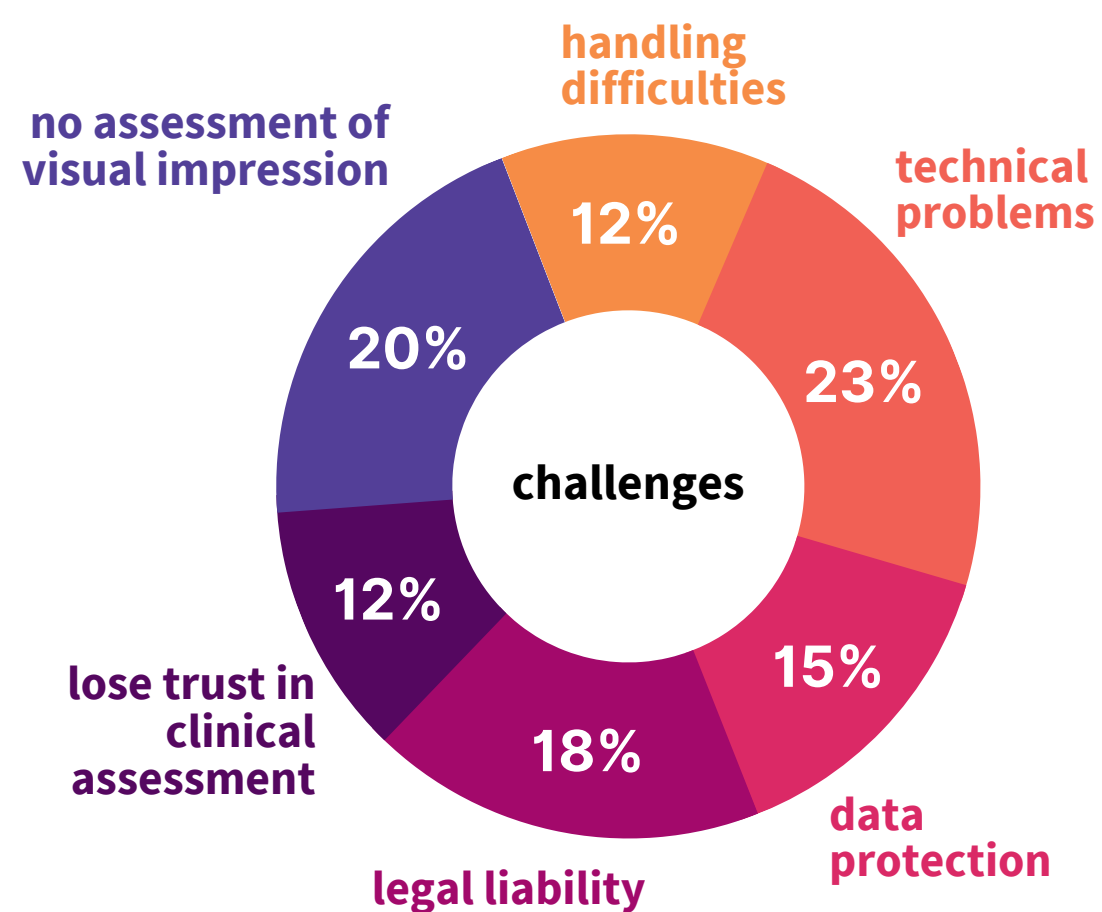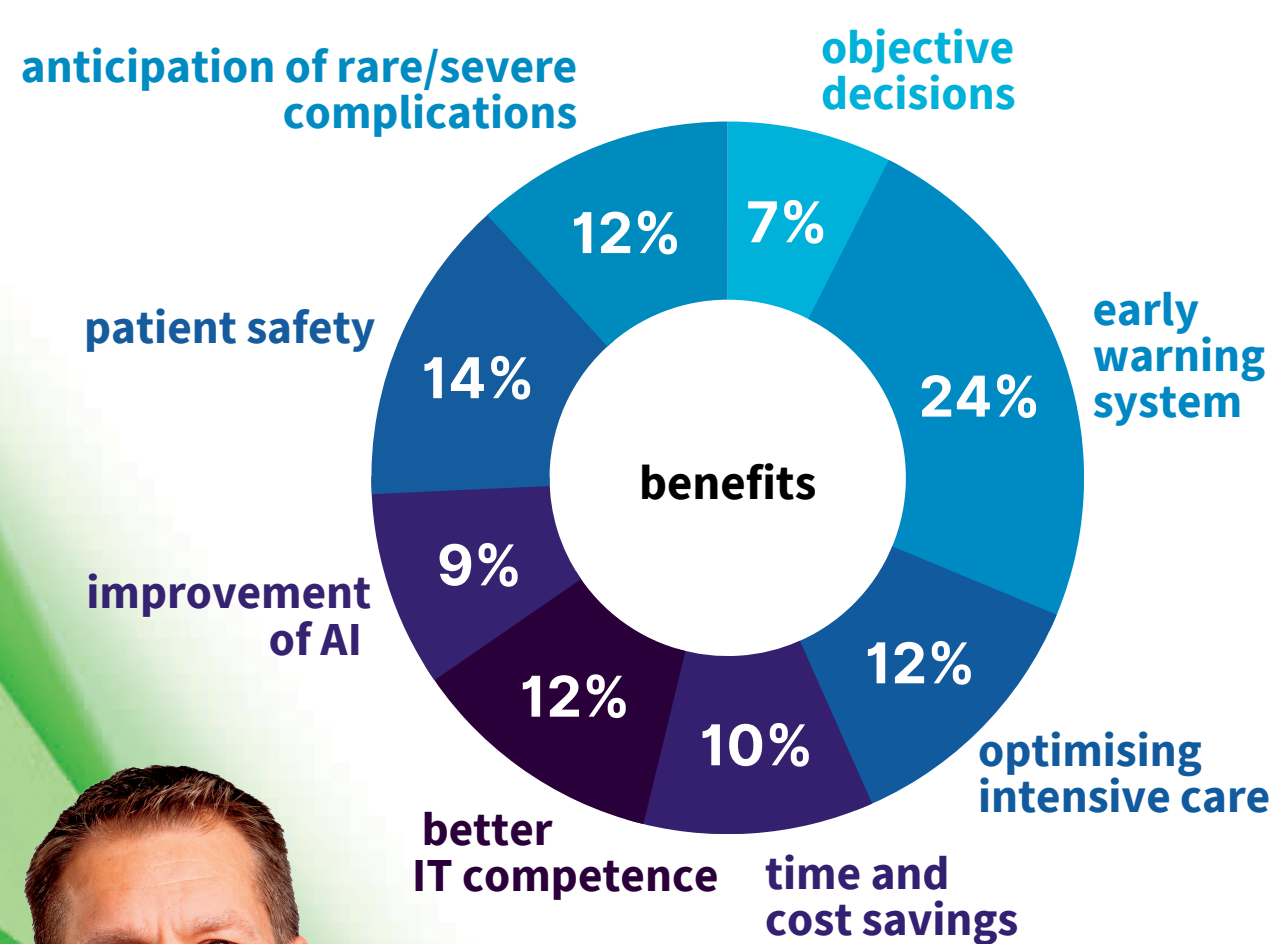- delivery of prototypes
- piloting and market outreach

The Sandman.IC surveillance tool will be easily adaptable to the needs of other clinical departments. Its multi-layer ICT architecture with its integrated data analytics technology will be set up in a way to make it useful in other sectors and industries. The predictive models established in the ENVISION project can be trained and used for any disease and indication, thereby serving millions of patients.

Clinicians expect numerous benefits from AI systems
SPOTLIGHT - European survey on the acceptance of AI

Clinicians are open to AI applications in their professional field but their concerns must be addressed during system development, selection, and commissioning at points of care.

Our cross-sectional observational study (N = 701) revealed that clinicians rate early warning systems as most beneficial while technical difficulties are the major concern.

benefits
- anticipation of rare/severe complications 12%
- objective decisions 7%
- patient safety 14%
- early warning system 24%
- improvement of AI 9%
- better IT competence 12%
- time and cost savings 10%
- optimising intensive care 12%

challenges
- no assessment of visual impression 20%
- handling difficulties 12%
- technical problems 23%
- data protection 15%
- legal liability 18%
- lose trust in clinical assessment 12%

Current status Sandman.MD (monitoring only)

Sandman App with analytics
Data analytics
AI/ML (algorithms)-clinical

| TRL1 | TRL2 | TRL3 | TRL4 | TRL5 | TRL6 | TRL7 | TRL8 | TRL9 |

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