Digital healthcare solutions –
From big data to clinical impact

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Today, Philips is a leading health technology company focused on improving people's health.
Global healthcare challenges

- Growing and aging population
- Rising chronic diseases
- Spiraling costs
- Too little access
- Too little capacity

Innovation for personalized health, better outcomes, higher efficiency
Trends connected to health technologies

Consumers increasingly engaged in their health

Transition to value-based healthcare

Care shifting to lower-cost settings

Provider and payer landscape consolidating

Precision diagnostics & personalized therapies

Integrated technology; Data-driven care
The Health Continuum is guiding our strategy

Healthy living, Prevention, Diagnosis, Treatment, Home care

Connected care – Leveraging digital solutions
Digital solutions for integrated, continuous care
Delivering clinically rich healthcare informatics across the enterprise

Cloud    Internet of Things    Artificial Intelligence    Sensors
Conversational interfaces    Micro-systems    Robotics    Autonomous systems

Continuous health tracking    Advanced visualization    Context-aware patient monitoring
Home monitoring    Image-guided therapy    Computational pathology    Quantification    Genomics    Adaptive interfaces

Opportunity to gain deeper, denser and more longitudinal insights than ever before
The Data Explosion in Healthcare

Dense data
Pattern recognition in aggregated data sets – across a population

Deep data
From anatomy to cells and molecules

Wide (longitudinal) data
Continuous monitoring over time
Artificial Intelligence can augment healthcare providers to deliver high-quality care and increase operational efficiency

- Finding patterns in large amounts of data that are too complex for a human to detect
- Enabling experts to create hypotheses by adding clinical and domain knowledge
- Allowing for timely interventions using predictive analytics, after critical validation

Challenges in implementation:
- Availability of complete & trustworthy data sets
- Concerns about privacy – legal & ethical challenges
- Confidence in outcomes – AI literacy, education
- Technology challenges – ‘black box’, transparency
AI & Data Science will be a key enabler for Care Everywhere

- **Precision medicine and personalized treatment** enabled by smart algorithms
- **Transition to value-based care** through analytics and pathway optimization
- **Digital Platforms for data-driven solutions** across the care continuum
- **Networked care** patient engagement & coaching via portals & apps
AI is already in Philips Commercial Products/Solutions

- Ultrasound
  - Anatomic Intelligence
  - AI in Lumify
  - HeartModel
  - TrueView

- Clinical IT
  - Neurology
  - Cardiology
  - Peripheral vascular
  - Oncology
  - Radiomics

- Disease Mgt
  - NeuroQuant
  - LCS
  - DynaCAD Breast
  - DynaCAD Prostate
Moving from products to solutions is transformative

It is only a solution if it addresses the customer KPI’s: *becoming an outcomes company*
Addressing the Quadruple aim

Towards new outcome-oriented models of care delivery

Improved health outcomes

Improved patient experience

Improved staff satisfaction

Lower cost of care
Innovative value-added, integrated solutions
Developed to better meet customer needs and capture greater value

Packaged suite of systems, smart devices, software and service

- **Image-guided therapy solutions**
  - Image-guide therapy systems
  - Smart catheters
  - Disease-specific navigation software
  - Cath lab management, services, consulting

- **Early warning of patient deterioration**
  - Monitoring
  - Cableless measurements, biosensors
  - IntelliVue Guardian software
  - Integration, services, consulting

- **Respiratory Drug Management**
  - I-neb Adaptive Aerosol Delivery
  - Drug-specific Aerosol Delivery
  - i-Neb Insight
  - Drug Adherence Management System
Precision Diagnosis
Right-fit treatment selection

AI and advanced analytics applied on images, pathology and genomics supports precision diagnosis and personalized treatment.
Image Guided Therapy

Real-time imaging, nanotechnology, smart catheters, robotics and augmented reality support the surgeon
Smart Catheters

Coronary diseases ——— Arrhythmia ——— Structural heart diseases

- Fractional Flow Reserve (FFR) Ø 0.36 mm
- Intravascular ultrasound (IVUS) Ø 1.0 mm
- Electrophysiology Ø 1.2 mm
- Intracardiac ultrasound (ICE) Ø 3 mm
- Ablation Ø 2.0 mm
Today’s smart catheters

- Obsolete technologies
- Analog instruments
- Point solutions

Next generation smart catheters

- State-of-the-art technologies
- Digitization at the tip
- Open technology platforms
Live 3D ultrasound image with CMUT

- Monolithic integrated CMUT–on-ASIC
- Test array 6×6 mm with 2000 individual elements
- Each element ↔ one membrane and has it’s own transmit and receive circuit
Flex-to-Rigid (F2R) Platform

- Arbitrary shapes
- Extremely flexible
- Miniaturization platform
- Supported by a roadmap
IVUS: Intravascular ultrasound

IVUS for stent sizing & deployment verification
Full patient context: longitudinal data and models

- Genomic profile
- Imaging studies
- Family history
- Clinical and behavioral history
- Lab tests

Digital twin
Summary – Innovations enabled by digital technologies

- Transition to **value-based care** through analytics and pathway optimization
- Precision medicine and personalized treatment enabled by smart algorithms
- Digital Platforms for **data-driven solutions** across the care continuum
- Networked care with active patient engagement & coaching with integrated portals & apps
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