



# **GAMES FOR HEALTH EUROPE 2025**

## **Digitalization and Smart Use of Data**

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for presentations at the

**GAMES FOR HEALTH EUROPE 2025** CONFERENCE

I herewith confirm that there is not any conflict of interest with the conference organization or any of its sponsors.





# This Presentation

- Dutch Digitalization in Healthcare
- Technologies to accelerate digitalization
  - Privacy Enhancing Technologies (PET), secure data exchange



# Dutch Digitalization in comparison with “leading countries”

(literature & cases)

- **Lack of central authority, vision and leadership** 
- **Fragmented Dutch Healthcare landscape** 
  - Too many stakeholders, lot of discussion “tables”
  - Lack of standards IT systems
  - Unclear responsibilities implementation (ownership)
- **Digital skills & AI knowledge lag behind** 
- **National citizen-focused eHealth platform (legal, powerful Infrastructure for re-use of data (EHDS); politics at a distance)** 
- **National policy, standards interoperability**
- **Nordic healthcare > integrated care, prevention, long-term care**

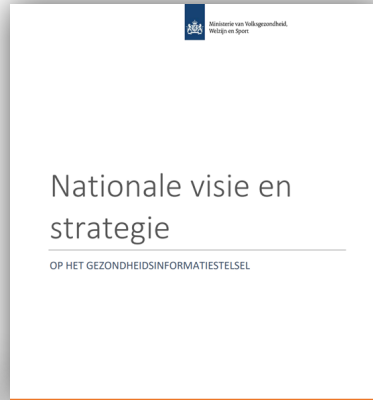
# Barriers for digitalization in Healthcare

- HC fragmented (polder culture hinders coop across borders)
- HC change-resistant-industry
  - IT systems inadequate for data exchange
  - Lack of implementation skills
  - Fear of sharing data (data=gold)
  - Struggle with certification, regulations (MDR, GDPR)
  - Inadequate business models



**Digitalization implies *transformation* of healthcare**

# Initiatives to accelerate digital transformation



# Improving infrastructure for data-exchange

- Overcome jungle of organizations, stakeholders
  - centralized governance
  - clear law and regulations re-use of data (EHDS)
- **Privacy enhancing technologies > smart use of data**
- better use of data > reduced administration, lower costs, personalized care



# Privacy Enhancing Technologies (PET)



**Opportunities for secure re-use of data**



**Share knowledge no data**



**Privacy by design techniques**



**Create Value**



**Examples**



**Federated learning (FL), Multiparty  
Computation (MPC) and Synthetic data (SD)**



# Multi-Party Computation

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**MPC is a ‘toolbox’ of cryptographic techniques.**

- multiple parties to compute data jointly, as if they had a shared database.
- cryptographic protection, the parties can never view each other’s data.
- participating parties decide who is allowed to view the outcome of the computation.
- collective need (multiple partners) for creation of broader, systematic insights on improvements of care processes, overcoming pilot-based knowledge

# Collective need for creation of insights



## Podiatry Dataspace

### Goal

Monitor and improve the effectiveness of preventive treatment of diabetic foot ulcers

### Approach

Combine electronic medical record data from all podiatrists to align protocols and benchmark

Link data from hospitals and general practitioners to achieve **THE BEST TREATMENT PATHWAYS**



## Use case “poverty”

- Prevent poverty
- Understanding high risk factors, providing right care, right place, right moment
- Data encrypted from Central Statistics (CBS), family care, municipalities, physicians, insurance companies to design *secure* prediction models
- Encrypt data > share information



# Experiences MPC-Use Case Brightlands

**To determine what the right care, right place is we need more data**

- primary care, insurances, municipalities, family care, CBS

**With MPC we can encrypt the data and share information**

**We are still legally testing whether we can use the data for this purpose**

**Convincing Legal authorities and trust among partners are critical issues for implementing MPC**

# MPC requires a governance framework

- To ensure **compliance** from all partners (e.g. HC, municipalities, local governance, MPC provider) on which analyses will be performed
- To build **trust** sensitive data will not be shared and remains private
- To **manage** data stewards (control over data) and data scientists (new cases > new insights)
- To define **scope of data analyses** and **roles and responsibilities** of partners (data providers, data beneficiaries, MPC provider) enabling trusted transactions

# Benefits Multi Party Computation (MPC)

**reduce full  
re-identification**

**performing joint  
computations, while  
keeping your own  
data secure**

**keeping control over  
who receives the  
results of the  
computation**

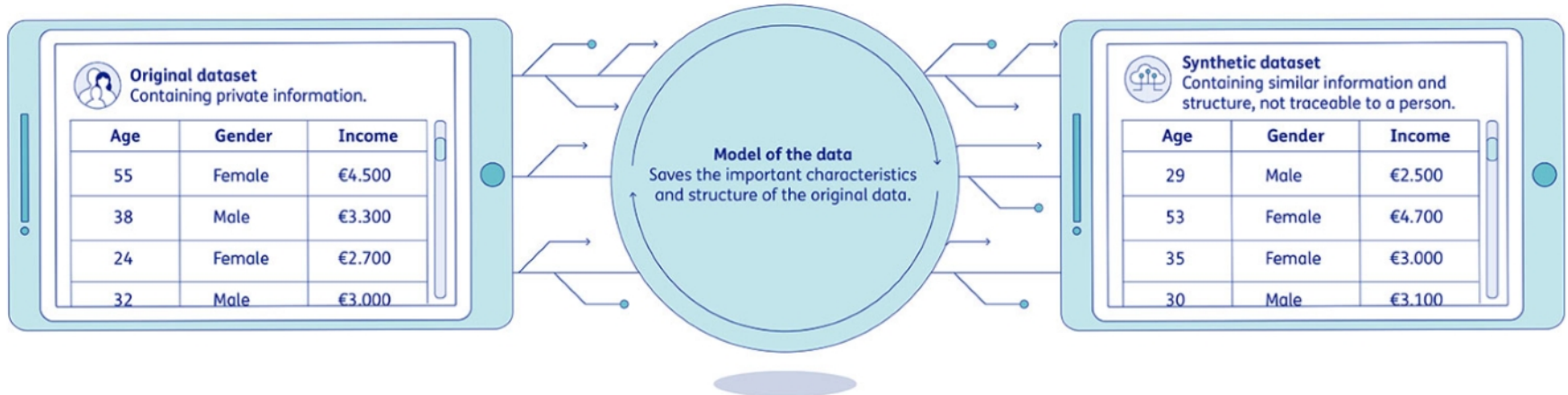
**guarantee  
computation has  
been performed  
correctly**

**computing power,  
decision making in  
minutes instead of  
hours**

**Tailored, overcoming  
a one size fits all  
approach; holistic hc**

# Synthetic Data

- Artificial data generated from original data using ML and AI
- Mimics the characteristics and structure of the original data, while removing privacy sensitive information



# Why Synthetic Data?

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- When data are scarce or should be kept private
- Powerful tool for training (AI-models) and (software) testing, no need to use privacy sensitive data
- Cost-benefits
  - time saving, scalability
  - requirements data (maintain quality, real world data accuracy)
  - legal implications and representativeness
  - documentation (generation and use of SD)
  - regularly check implications for re-identification



# SD in practice

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- SD to enlarge and simulate datasets (data scarcity)
- Accelerate data-driven innovations (overcoming time consuming processes)
- Enlarge data for testing purposes (prediction models)
- Better insight in factors that matter for personalized HC
- SD-expertise: trusted parties
  - e.g., ZorgTTP/BlueGen

Onze diensten Publicaties Referenties Nieuws

## innovatie binnen zorg en welzijn

Datagedreven werken is steeds belangrijker voor beleid, onderzoek en innovatie in zorg en welzijn. Dit maakt het waarborgen van privacy tot een belangrijke uitdaging. Zoekt u de juiste privacybescherming bij samenwerkingen met meerdere datalocaties? Wilt u met vertrouwen werken aan uw waardevolle inzichten en ontwikkelingen? Het team van ZorgTTP zet zich als **Trusted Third Party** in voor een veilige informatiesamenleving.

Veilige samenwerking en data-analyse, zonder dat partijen elkaars data kunnen inzien



# Challenges Synthetic Data

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- Data accuracy
  - Lack of data quality; garbage in-garbage out
  - Lack of representation (inclusive)
- Quality dependent from algorithms to capture relevant statistical properties
  - SD should mirror properties and relationships of RWD (avoid bias, misleading insights, false conclusions)
  - Consistency SD outcome similar to RWD
- Ethical and legal considerations (FAIR data standards)



# PETs Future Proof

**Legal frameworks to  
implement PETs**

**Ethical guidelines for  
FAIR Data**

**Trust and willingness  
to unlock data**

**Data Quality to  
train AI models**

**Data wisdom  
to understand the  
pros and cons of  
PETs**

**Use Cases  
to know efficiency  
and impact of PETs**

**Cost/benefits to  
apply PETs,  
strategies for large  
scale investments**





# Electric city Tokyo

How to design engaging games?



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