

We are Roche in Greater Munich Pharma & Diagnostics – from Science to Patients

Roche Data Commons – pRED implementation

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Personalized Healthcare

Focus areas for informatics



Personalized Healthcare





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Sensor Data *Digital Biomarker Discovery in Parkinson Disease*







Sensor Data *Digital Biomarker Discovery in Parkinson Disease*

Active Test

Patients are asked to complete **six tests** on the app at the same time each day, ideally in the morning.



Balance Test



Test



Rest Tremor Test



Posture Tremor Test



Patients carry their smartphone around as they go about their daily activities





Data upload

In both the Active Test and Passive Monitoring test, smartphone data is captured & automatically uploaded...

Sensor Data Frequent measurement are key

Importance of Longitudinal Measurement: Patient tremor severity varies from day to day (on/off)





Deuschl et al (1998). *Movement Disorders*







Image Data Understanding the Immune Context of Tumor Treatment



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Genetics Data *Correlating cell drug resistance with underlying NGS data*

= 600+ **EXOME SEQUENCED CELL LINES** 10 IC50 µM Colorectal Veuronal Pancrea: Prostate Uterine/ Ovarian 0.1 Breast Lung GI Hem 0.01 0.001 0.0001 10% of cancer cell lines sensitive to treatment with

drug X

A gene expression signature predicts cell-line sensitivity to drug treatment



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Real-World Data

Identification of exclusion criteria in CIT trials



Real-World Data







UDIS – Understanding Disease Informatics System *pRED's 1st generation MI Platform*



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Driver for new holistic strategy



Data Curation

Standard terminology at data acquisition phase





Data Integration

Integrate different data types (e.g. Imaging & Omics)







Omics-goes-Clinical

Data Provenance Data and workflow mgmt



Data Volume

Store only once Minimize data transfer



Roche Data Commons *Five-layer model*





Roche Data Commons *Service oriented modular approach*





File & Workflow Management Layer 2





File & Workflow Management Arvados platform





Layer 2 Realized by Arvados Open Source Technology

- Open source infrastructure for managing, processing, and sharing genomic and other biomedical data
- Enables data federation, data & workflow provenance, managing and processing petabytes of data

Single Point of Truth (SPoT) Layer 3





Terminology Reference SPoT *Reference SPoT Example*







Roche Data Commons *Support pharma research area*





Cancer Immunotherapy

System Architecture and processing workflow



IRIS Architecture *First realization of Roche Data Commons*





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Doing now what patients need next