RIKEN Since 1917 MIHub Founded in 2016

Precision Medicine by Personal Life Record

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RIKEN Medical Sciences Innovation Hub Program
RIKEN MIH
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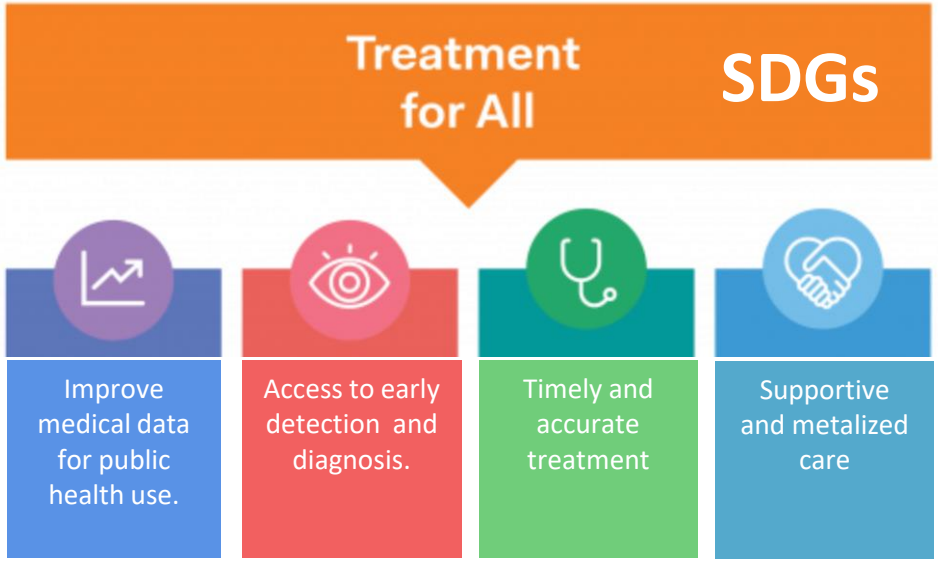
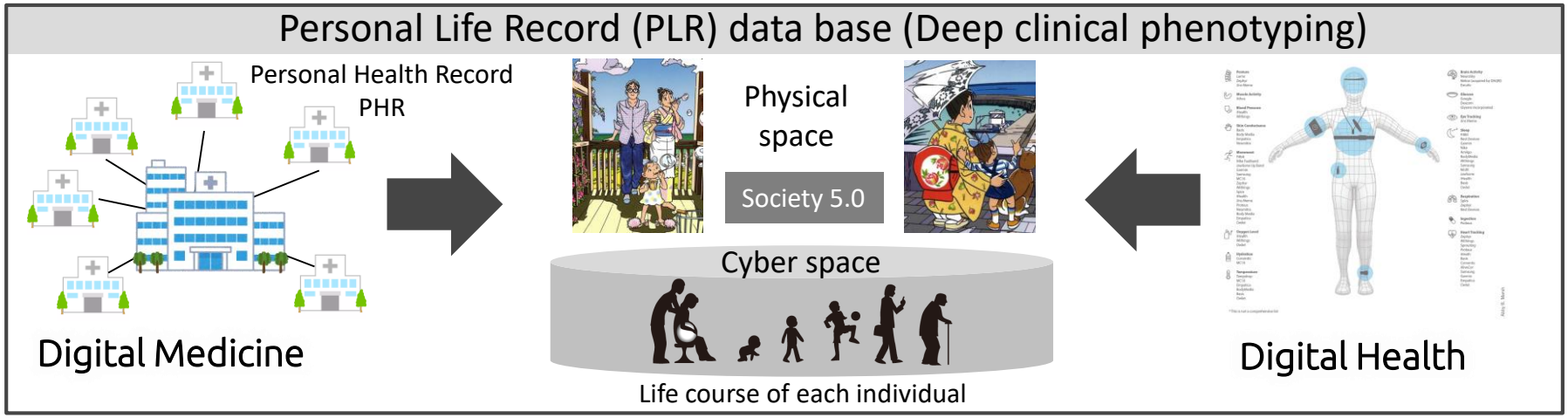
For what ? Toward Universal Health Coverage by PLR

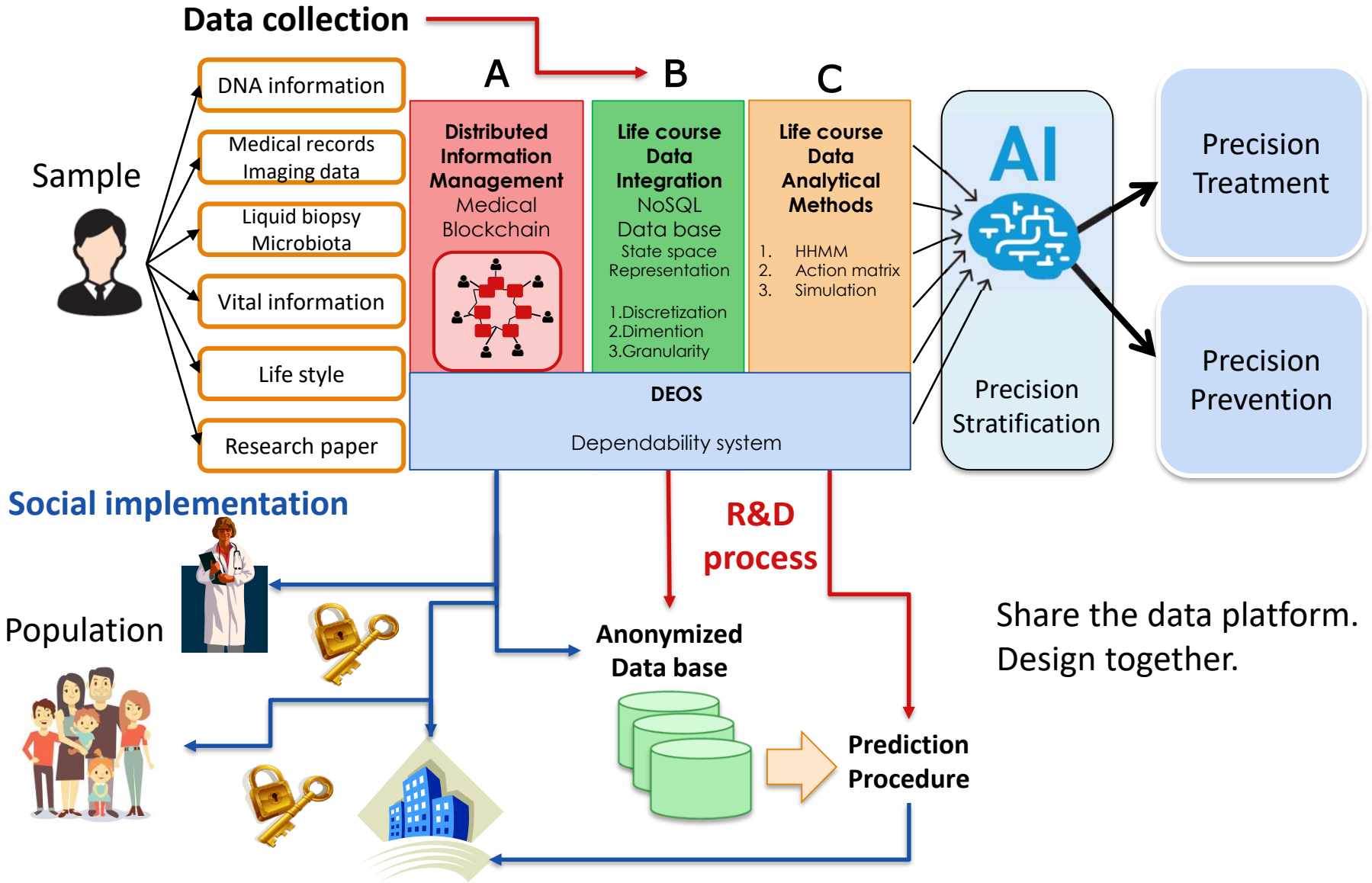


Global Standardization Start from Japan/Germany collaboration

Precision Medicine (Predictive, Preventive, Personalized & Participatory Medicine)



Technology integration :Data platform

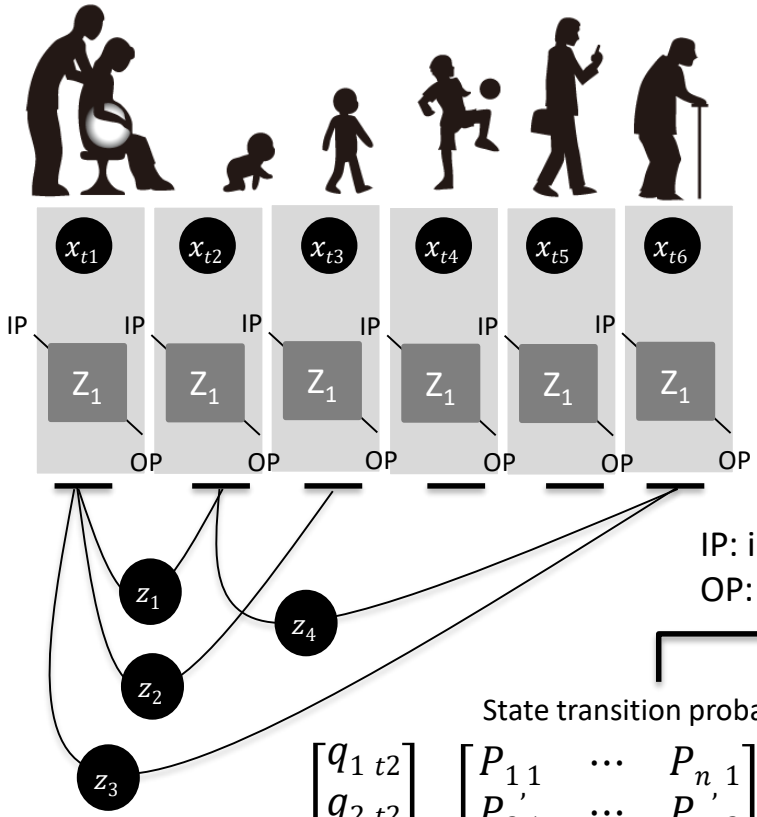


Share the data platform.
Design together.

Basic biology for data integration (collaboration in science)

Open systems science (biomedical)

Discrete time



IP: in put
OP: out put

Complex systems science

Continuous time

$$\begin{cases} \frac{dQ_1}{dt} = f_1(Q_1, Q2, \cdots, Qn) \\ \frac{dQ_2}{dt} = f_1(Q_1, Q2, \cdots, Qn) \\ \vdots \\ \frac{dQ_n}{dt} = f_1(Q_1, Q2, \cdots, Qn) \end{cases}$$

Can't be raised to the Nth power.

State transition probability

$$\begin{bmatrix} q_{1\ t2} \\ q_{2\ t2} \\ \vdots \\ q_{n\ t2} \end{bmatrix} = \begin{bmatrix} P_{1,1} & \cdots & P_{n,1} \\ P_{2,1} & \cdots & P_{n,2} \\ \vdots & & \vdots \\ P_{n,1} & \cdots & P_{n,n} \end{bmatrix} \times \begin{bmatrix} q_{1\ t1} \\ q_{2\ t1} \\ \vdots \\ q_{n\ t1} \end{bmatrix}$$

Future (t2) state　　Present (t1) state

Action matrix

$$\begin{bmatrix} q_{1\ t2} \\ q_{2\ t2} \\ \vdots \\ q_{n\ t2} \end{bmatrix} = \begin{bmatrix} a1 & \cdots & z1 \\ a2 & \cdots & z2 \\ \vdots & \cdots & \vdots \\ an & & zn \end{bmatrix} \times \begin{bmatrix} q_{1\ t1} \\ q_{2\ t1} \\ \vdots \\ q_{n\ t1} \end{bmatrix}$$

Future (t2) state　　Present (t1) state

Dependable system (DEOS) for Precision Medicine

Share the dependable system together.