bio·logis

Genetic Information Management

Genetic Information Management System – GIMS.pharma

Efficient translation of genetic data into clinical practice

Who we are

bio·logis

genetic information management

- founded 2013
- located at
  Frankfurt Innovation Center
  Germany
- 25 highly qualified team players with background in
  - Software Development
  - Bioinformatics
  - Human Genetics

bio·logis

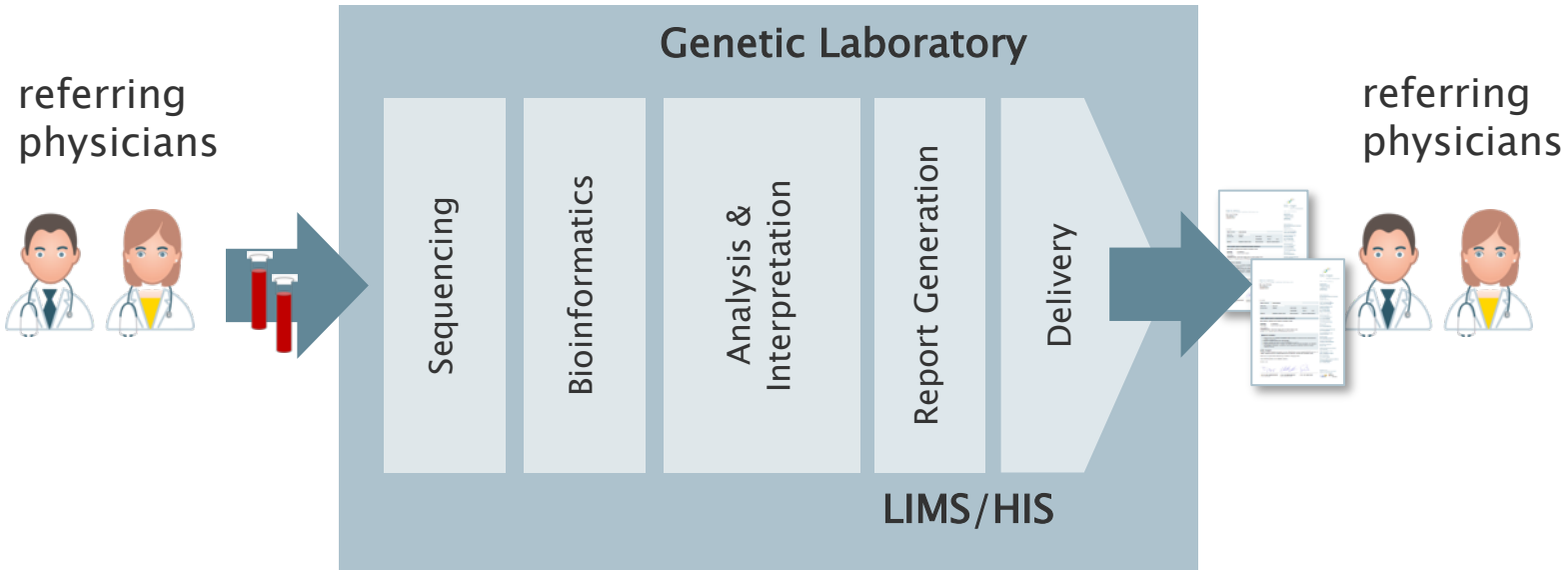
genetic information management

Our goal:
Support implementation of genetic diagnostics
into clinical practice

Our offer:
IT-tools and services
for management and curation of clinically
relevant interpretations of genetic variants.
Creation of a virtual space for a human “Interpretome”

We are bridging the gap
between genetic knowledge
and clinical implementation

Genetic Diagnostics: Workflow

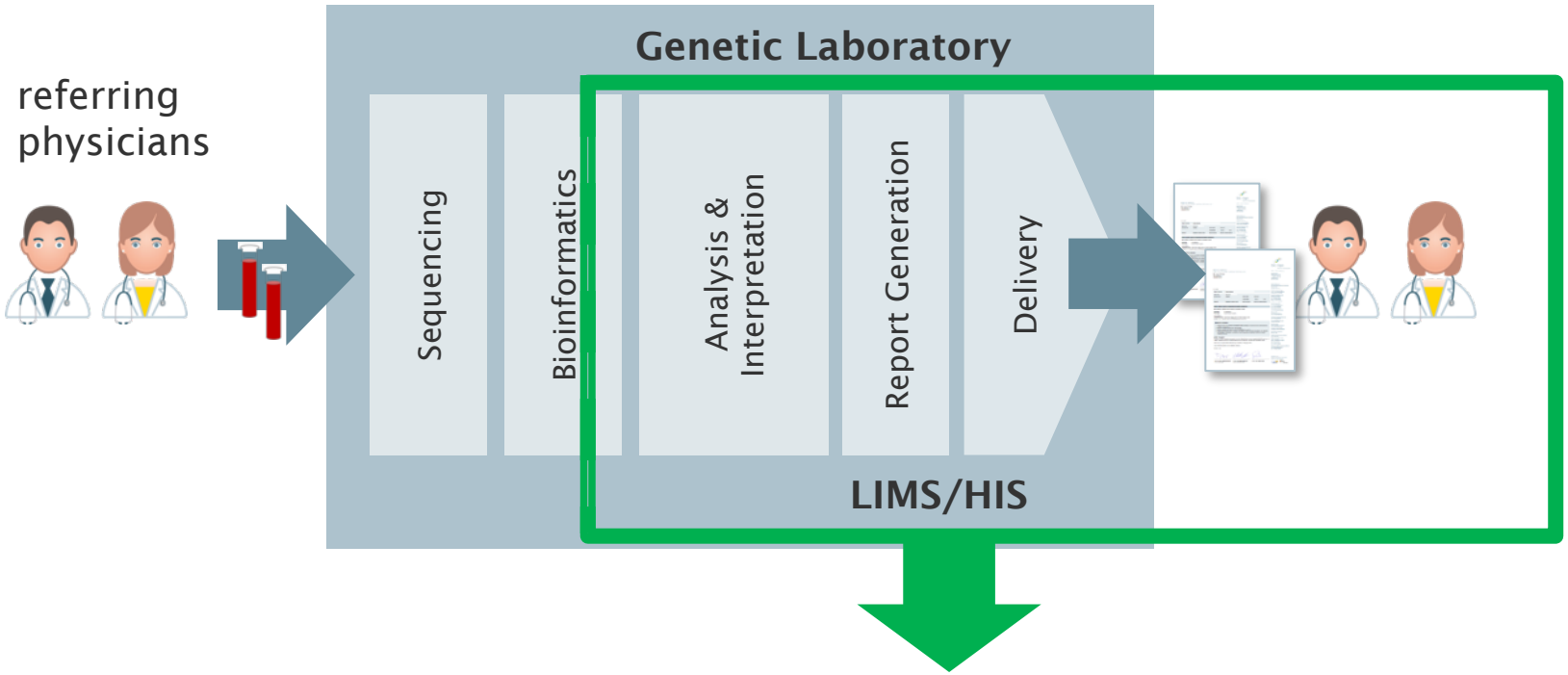


Problem: highly fragmented manual processes consuming time & money

actually NO ONE workflow available for processing of complex genetic diagnostics

bio.logis delivers the solutions to overcome this situation stepwise

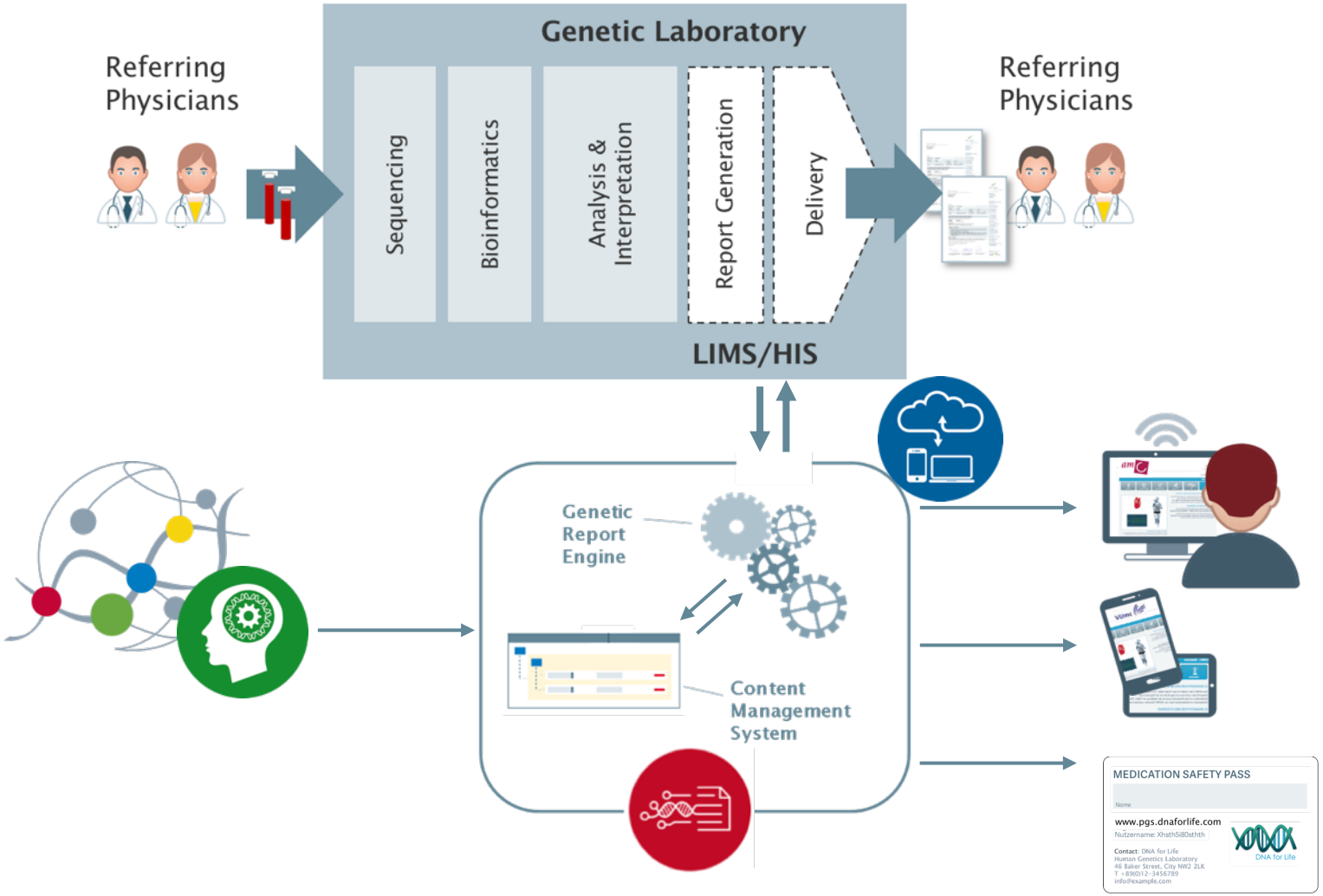
Genetic Diagnostics: Workflow



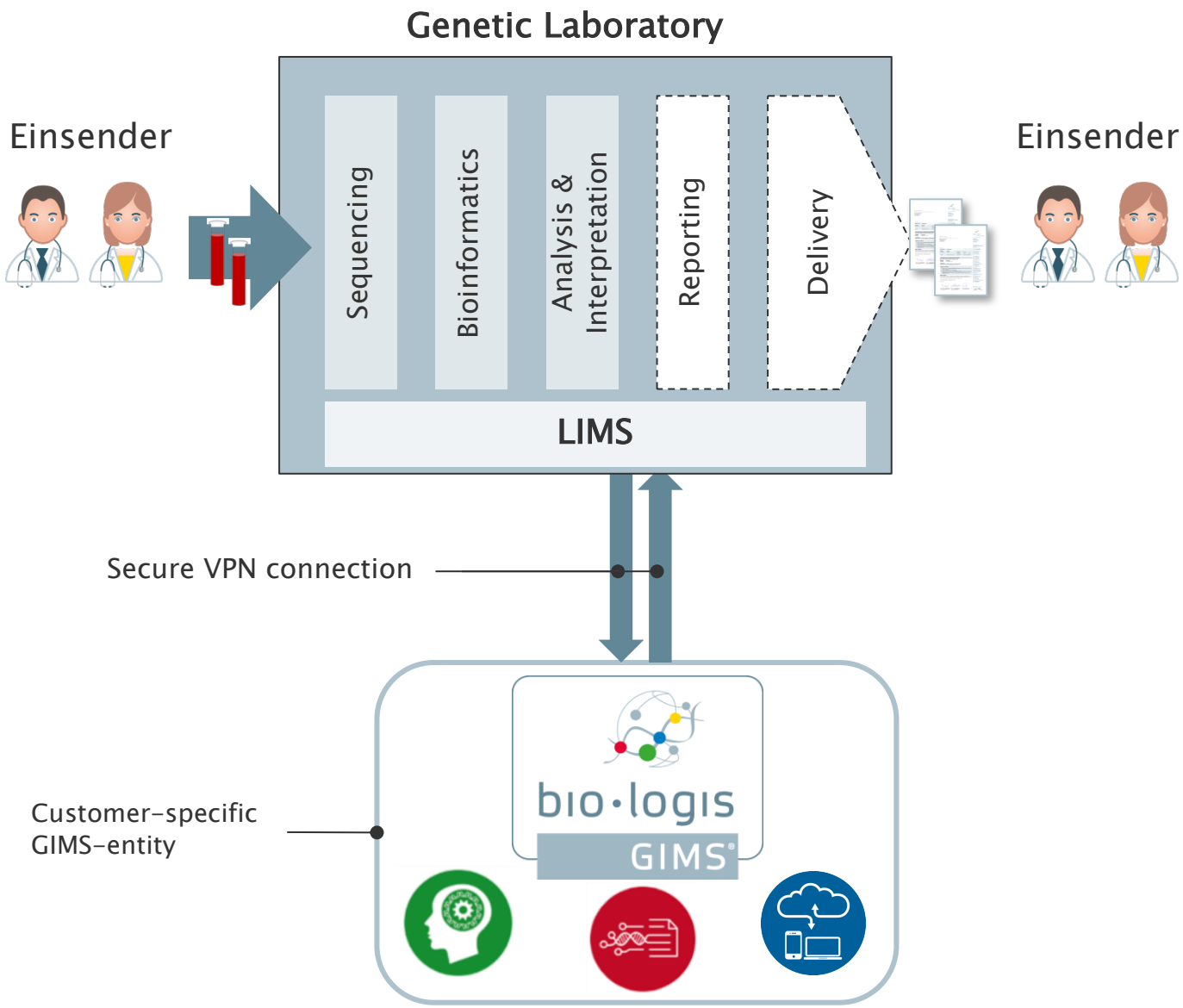
Genetic Information Management System

bio·logis GIMS®

GIMS®: Genetic Information Management System



GIMS Integration



First focus area:

Pharmacogenetics

Finding the right drug and dosage for patients based on their individual genetic make-up

Why is it not used in clinical practice?

What is needed

Efficient and standardized translation of analysis results into clinical recommendations

Digital decision support at Point of Care

Use Case

U-PGx | Ubiquitous Pharmacogenomics

upgx.eu

U-PGx | Ubiquitous Pharmacogenomics

News / Events Participating organisations Work packages Contact

WE WANT TO MAKE EFFECTIVE TREATMENT OPTIMIZATION ACCESSIBLE TO EVERY EUROPEAN CITIZEN

TELL ME MORE

OUR FOCUS

We want to improve the safety and efficacy of pharmacotherapy for every European patient by enabling clinical pharmacogenomics

SHARED EUROPEAN GUIDELINES

Maintenance and dissemination of pharmacogenomics guidelines in the European Union

IMPLEMENTATION AND EVALUATION

Clinical implementation and outcome evaluation of pre-emptive pharmacogenomics in a multitude of European countries

ENABLING TECHNOLOGIES

Development of powerful and barrier-free clinical decision support systems and novel pharmacogenomics methodologies

COMMUNICATION AND EDUCATION

Development of a program to reach out to patients, health care professionals, regulatory agencies, politics and health insurance organisations

U-PGx | Ubiquitous Pharmacogenomics

- EU-funded project within the Horizon 2020 program
- Aiming to support implementation of pharmacogenomics in clinical practice
- bio.logis GIM responsible for implementing GIMS at 7 selected hospitals across Europe

European Commission | Horizon 2020 European Union funding for Research & Innovation

MEDIZINISCHE UNIVERSITÄT WIEN

UNIVERSITY OF LIVERPOOL

CRO AVIANO

Univerza v Ljubljani

Servicio Andaluz de Salud
CONSEJERÍA DE SALUD

ΠΑΝΕΠΙΣΤΗΜΙΑΚΟ ΓΕΝΙΚΟ ΝΟΣΟΚΟΜΕΙΟ ΠΑΤΡΩΝ "ΠΑΝΑΓΙΑ Η ΒΟΗΘΕΙΑ"

LUMC Leids Universitair Medisch Centrum

KNMP

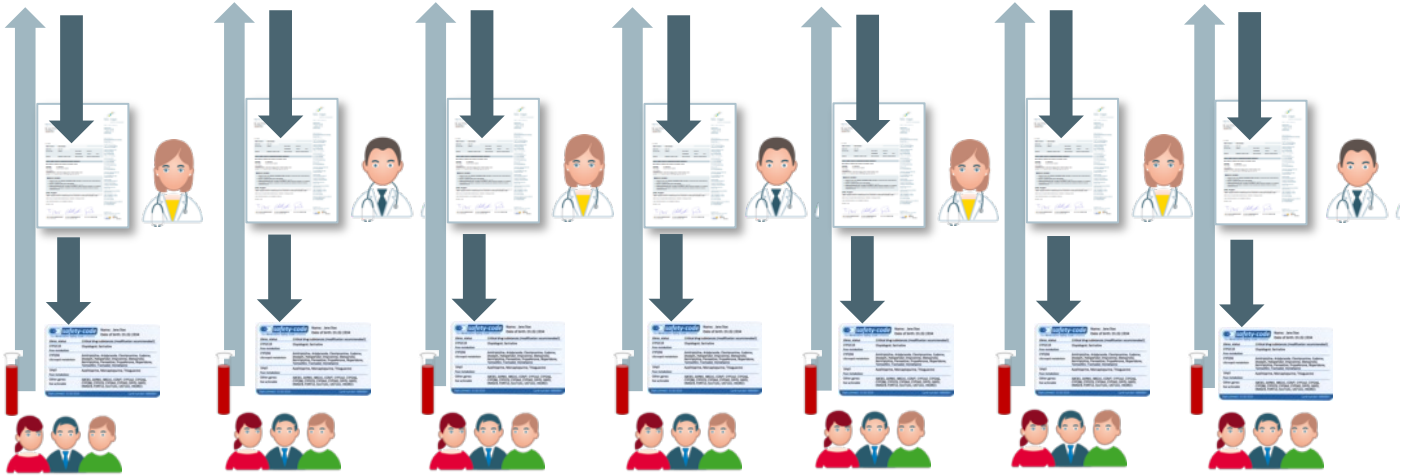
Dosing recommendations

for:	78 drugs
based on:	≈50 variants
in:	13 genes
available:	7 languages

bio·logis GIMS®

Project Sites

Leiden | Liverpool | Vienna | Aviano | Granada | Patras | Ljubljana



Patients

Standardized Genotyping

13 Genes ≈50 Variants

Table 1: Selected pharmacogenes and respective variants (RS number included).

Genes	Allele	Major Nucleotide Variation	dbSNP RS ID	Effect on protein	Functional Status
CYP2B6	*6/*9	516G>T	rs3745274	Q172H	Decreased or Inactive
CYP2B6	*4/*16	785A>G	rs2279343	K262R	Decreased or Inactive
CYP2B6	*18	983T>C	rs28399499	I328T	Decreased or Inactive
CYP2C9	*2	430C>T	rs1799853	R144C	Decreased
CYP2C9	*3	1075A>C	rs1057910	I359L	Decreased
CYP2C9	*5	1080C>G	rs28371686	D360E	Decreased
CYP2C9	*11	1003C>T	rs28371685	R335W	Decreased
CYP2C19	*2	681G>A	rs4244285	Splicing defect	Inactive
CYP2C19	*3	636G>A	rs4986893	W212X	Inactive
CYP2C19	*4A/B	1A>G	rs28399504	M1V	Inactive
CYP2C19	*5	1297C>T	rs56337013	R433W	Inactive
CYP2C19	*6	395G>A	rs72552267	R132Q	Inactive
CYP2C19	*8	358T>C	rs41291556	W120R	Inactive or Decreased
CYP2C19	*9	431G>A	rs17884712	R144H	Decreased
CYP2C19	*10	680C>T	rs6413438	P227L	Decreased
CYP2C19	*17	-806C>T[3]	rs12248560	X	Increased
CYP2D6	*xN	Gene duplication or multiplication	X	X	Increased
CYP2D6	*3	2549delA	rs35742686	259Frameshift	Inactive
CYP2D6	*4	1846G>A	rs3892097	Splicing defect	Inactive
CYP2D6	*5	Gene deletion	X	Gene deletion	Inactive
CYP2D6	*6	1707delT	rs5030655	118Frameshift	Inactive
CYP2D6	*8	1758G>T	rs5030865	G169X	Inactive
CYP2D6	*9	2615delAAG	rs5030656	K281 deletion	Decreased
CYP2D6	*10	100C>T	rs1065852	P34S	Decreased
CYP2D6	*14A/B	1758G>A	rs5030865	G169R	Decreased
CYP2D6	*17	1023C>T	rs28371706	T107I	Decreased
CYP2D6	*41	2988G>A	rs28371725	Splicing	Decreased
CYP3A5	*3	6986A>G	rs776746	Splicing defect	Inactive
CYP3A5	*6	14690G>A	rs10264272	Splicing defect	Inactive
CYP3A5	*7	27131_27132insT	rs41303343	346Frameshift	Inactive
DPYD	*2A	IVS14 + 1G>A (1905+1G>A)	rs3918290	X	Inactive
DPYD	*13	1679T>G	rs55886062	I560S	Inactive
DPYD	X	2846A>T	rs67376798	D949V	Decreased
DPYD	X	1236G>A	rs56038477	E412E	Decreased
F5	X	1691G>A	rs6025	R506Q	Decreased
HLA-B	*5701	T>G	rs2395029		Tagging SNP
SLCO1B1	*5/*15/*17	521T>C	rs4149056	V174A	Decreased
TPMT	*2	238G>C	rs1800462	A80P	Inactive
TPMT	*3B	460G>A	rs1800460	A154T	Inactive
TPMT	*3C	719A>G	rs1142345	Y240C	Inactive
UGT1A1	*6	211(G>A)	rs4148323	G71R	Decreased
UGT1A1	*27	686(C>A)	rs35350960	P229Q	Decreased
UGT1A1	*28/*37	A(TA)6TAA>A(TA)7TAA /A(TA)8TAA	rs8175347	X	Decreased
VKORC1	X	1173C>T (C6484T)	rs9934438		Increased sensitivity

[3] Position in genomic DNA sequence is used, since there is no cDNA position for this mutation.

U-PGx | Ubiquitous Pharmacogenomics

78 active ingredients

Antiarrhythmic drugs:

- Amiodarone
- Disopyramide
- Flecainide
- Kinidine
- Propafenone

Anticoagulants:

- Acenocoumarol
- Clopidrogrel
- Phenprocoumon
- Prasugrel
- Ticagrelor
- Warfarin

Antidiabetic drugs:

- Glibenclamide
- Gliclazide
- Glimepiride
- Tolbutamide

Antidepressants:

- Moclobemide

NARI

- Atomoxetine

SSRI

- Citalopram
- Duloxetine
- Escitalopram
- Fluoxetine
- Fluvoxamine
- Paroxetine
- Sertraline
- Venlafaxine

TCA

- Amitriptyline
- Clomipramine
- Doxepin
- Imipramine
- Mirtazapine
- Nortriptyline

Analgetics:

- Codeine
- Oxycodone
- Tramadol

beta Blockers:

- Atenolol
- Bisoprolol
- Carvedilol
- Metoprolol
- Soltalol

HIV therapy:

- Abacavir
- Efavirenz

Immunotherapy:

- Azathioprine
- Tacrolimus

Contraceptives:

- Oestrogen containing drugs

Neuroleptics:

- Aripiprazole
- Clozapine
- Flupentixol
- Fluphenazine
- Haloperidol
- Olanzapine
- Pimozide
- Quetiapine
- Risperidone
- Zuclopenthixol

PPIs:

- Esomeprazole
- Lansoprazole
- Omeprazole
- Pantoprazole
- Rabeprazole

Cholesterol-lowering drugs:

- Atorvastatin
- Fluvastatin
- Simvastatin

Tumor therapy:

- Capecitabine
- Fluorouracil
- Gefitinib
- Irinotecan
- Mercaptopurine
- Tamoxifen
- Tegafur
- Tioguanine

Others:

- Clonidine
- Dexmethylphenidate
- Eliglustat
- Flucloxacillin
- Methylphenidate
- Phenytoin
- Voriconazole
- Siponimod

What is needed

Efficient and standardized translation of analysis results into clinical recommendations

Digital decision support at Point of Care

The solution

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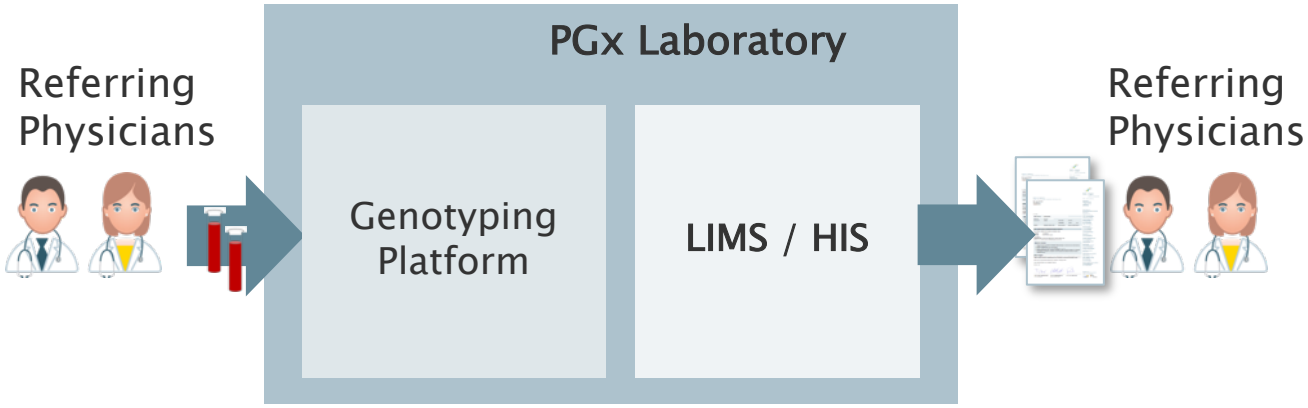
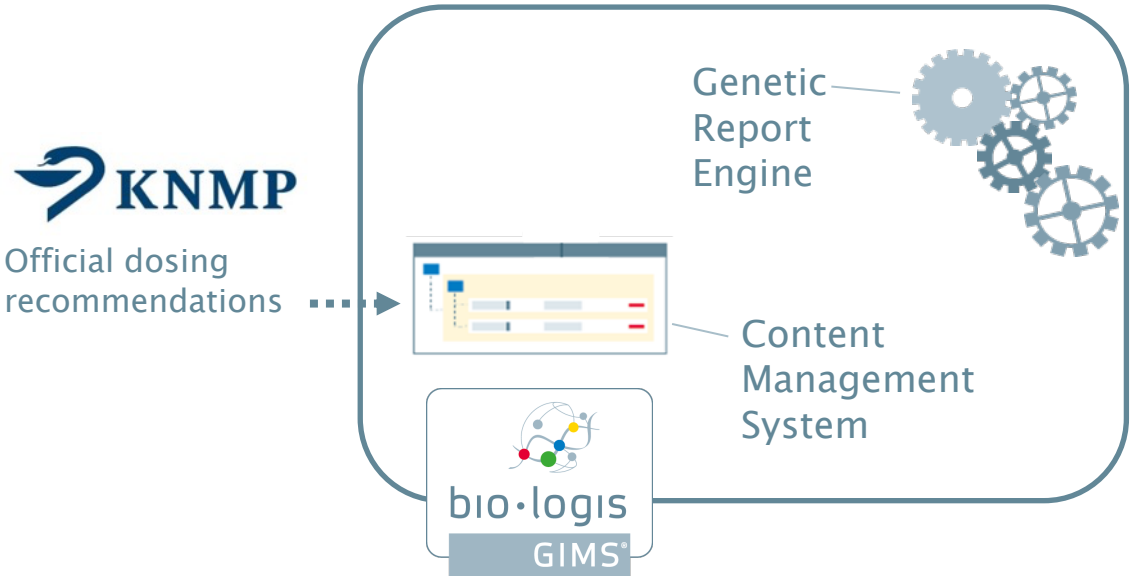

Referring
Physicians
PGx Laboratory
Genotyping
Platform
LIMS / HIS
Referring
Physicians


KNMP
Official dosing
recommendations
Genetic
Report
Engine
Content
Management
System
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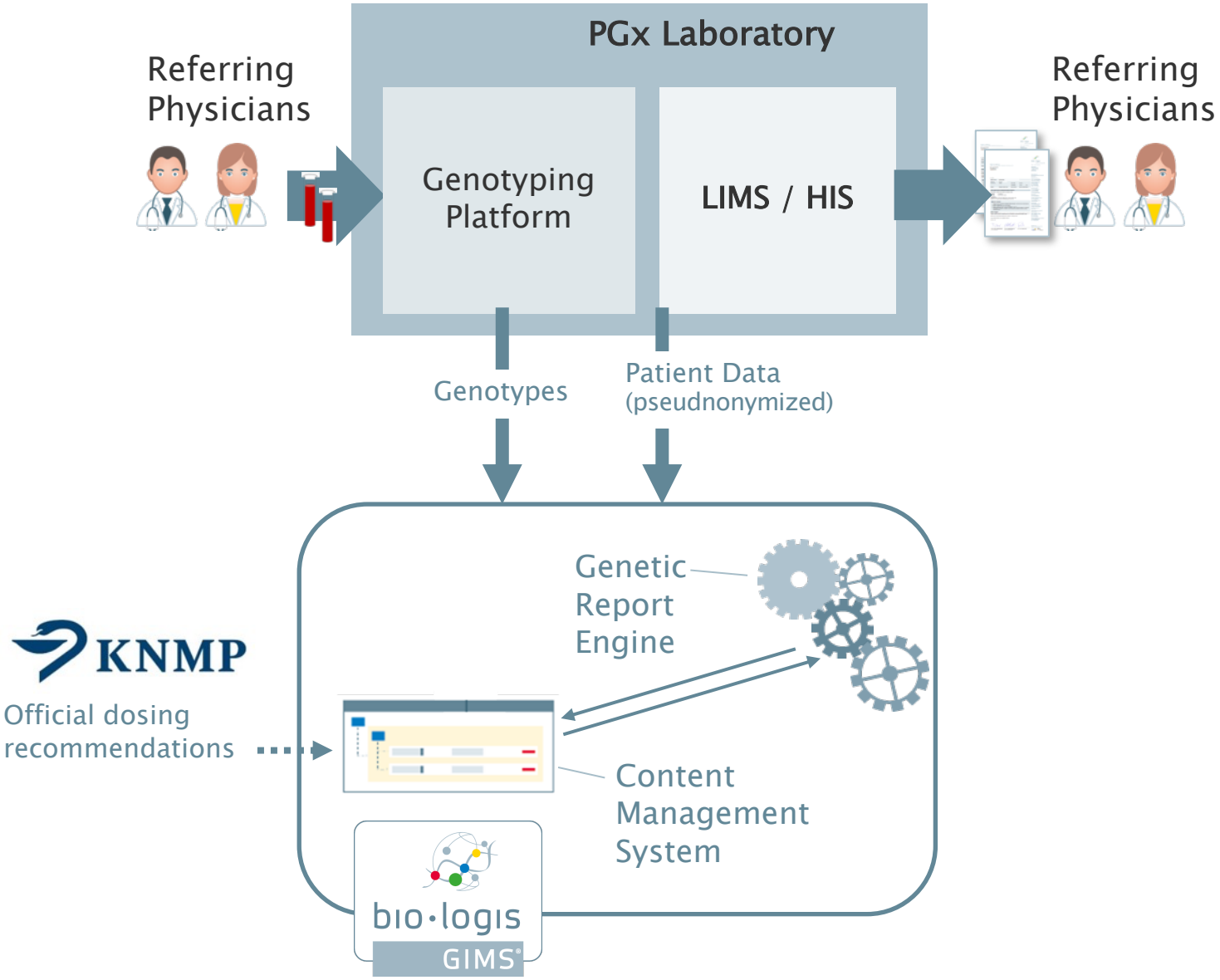
PGx Laboratory
Referring Physicians
Genotyping Platform
LIMS / HIS
Referring Physicians
Genotypes
Patient Data (pseudnonymized)
Genetic Report Engine
KNMP
Official dosing recommendations
Content Management System
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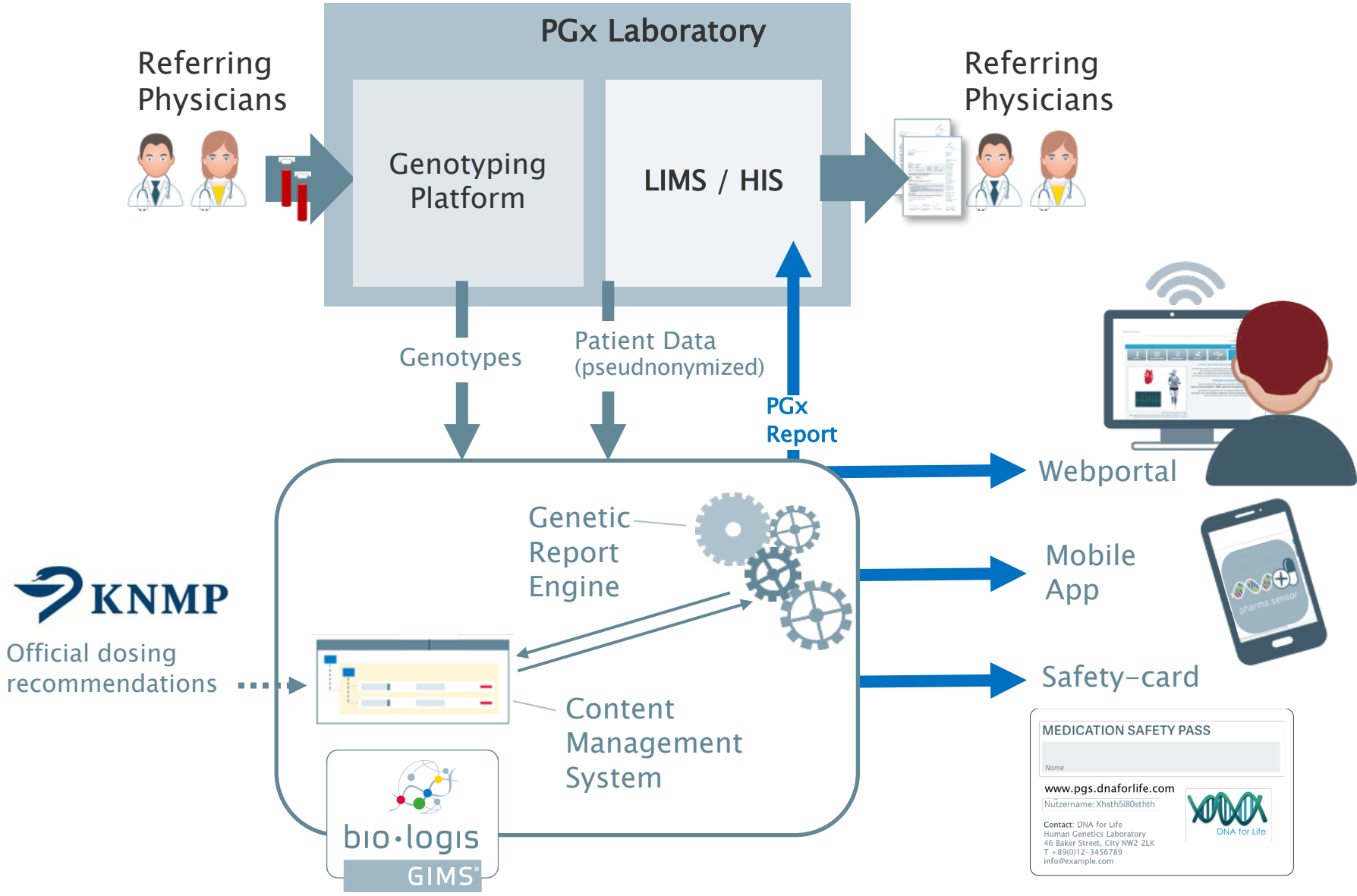
PGx Laboratory
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PGx Report
Webportal
Genetic Report Engine
Mobile App
KNMP
Official dosing recommendations
Content Management System
Safety-card
MEDICATION SAFETY PASS
Name
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Nutzername: Xhsth5i80sthth
Contact: DNA for Life
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DNA for Life
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GIMS

The result:
Knowledge for usage at the Point of Care, in real-time

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Dr. rer. nat. Tatjana Pabst

akkreditiert durch:
College of American Pathologists (CAP)

CAP ACCREDITED
COLLEGE of AMERICAN PATHOLOGISTS

Name / First name:
Date of birth: **24 Jan 1963**

Date of receipt: 18 Apr 2011
Sample number: 100000027
Type of sample: Saliva

Indication: Identification of genetic variants
Date of report: **11 May 2016**

Human genetic report on clinical question: simvastatin intolerance

Analysis of *SLCO1B1* gene

Genotype:
*SLCO1B*1B/*15*
Phenotype:
reduced transport capacity

Interpretation:
Increased simvastatin plasma level possible owing to reduced hepatic uptake.
Elevated risk for myopathy based on *SLCO1B1* genotype (see table 2).

Relevance for medication:

- **Maximum daily simvastatin dose of 40 mg*** (see table 1).
- Monitoring of creatine kinase activity indicated.
  or
- Use alternative medications (e.g. fluvastatin, pravastatin, rosuvastatin) in case of unwanted side effects (see table 1).
- Variants of *CYP2C9* gene are associated with enhanced fluvastatin plasma levels. In case of ADE under fluvastatin therapy genotyping of *CYP2C9* can be considered.

General information:
Avoid as possible if you are taking
• statins: Co-medication with substances inhibiting SLCO1B1
• simvastatin: CYP3A4 inhibitors
• fluvastatin, rosuvastatin: CYP2C9 inhibitors (see table 3)

- Validated and targeted clinical recommendations based on guidelines from expert groups like e. g.
  - Clinical Pharmacogenetic Implementation Consortium (CPIC)
  - Dutch Pharmacogenetics Working Group (DPWG)

Medication Safety Pass

Medication Safety Pass

Name

https://pgx-oms/webapp/
Username: xWki3S94mFe2

Department of Genetics
Osbridgeland Medical School
46 Baker Street, City NW2 2LK
T: +99 (0)999 9999
Email: info@example.com

PLEASE NOTE

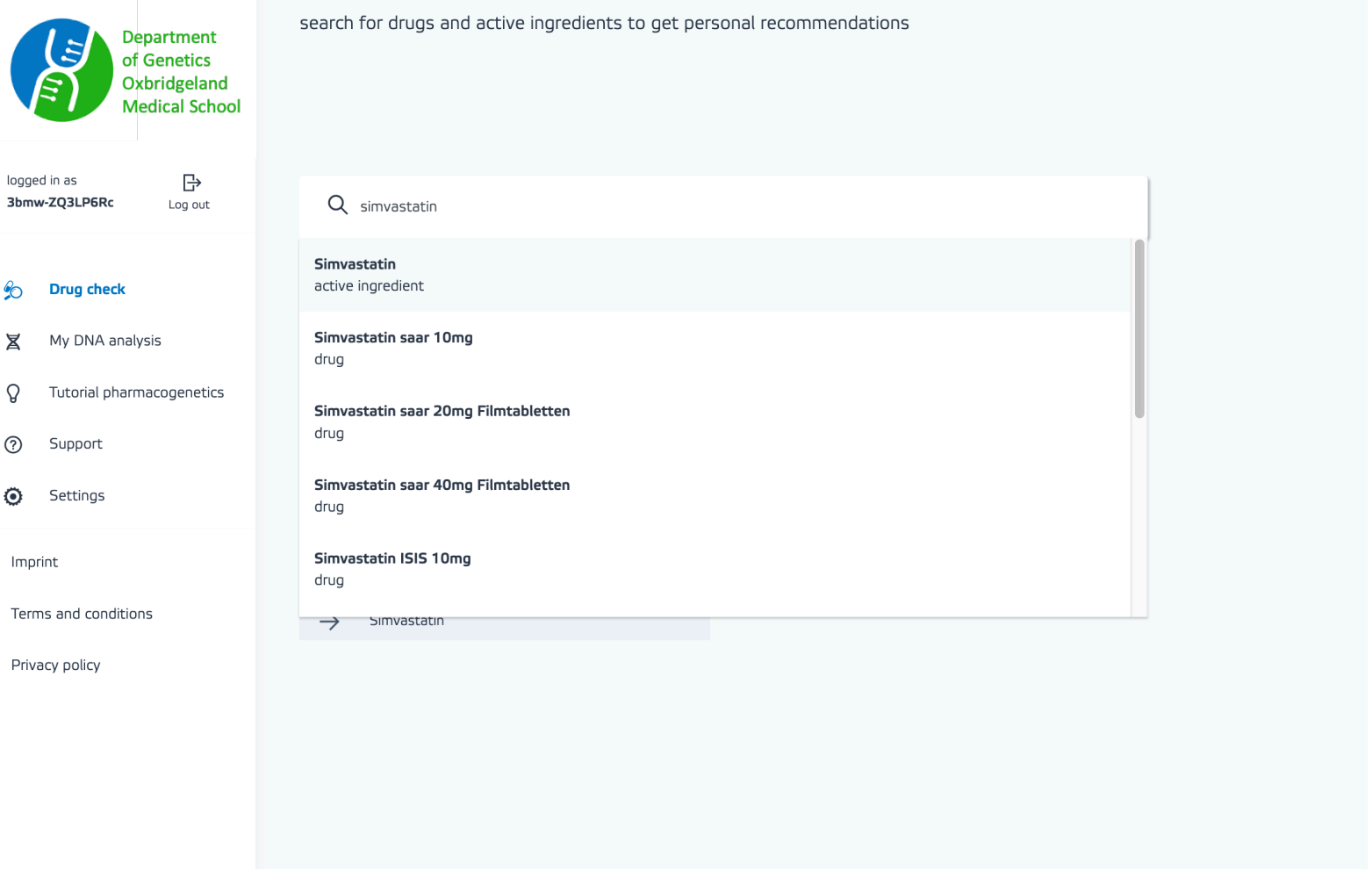
DNA variants are often responsible for too high or low efficacy of drugs and adverse events.

For the owner of this Medication Safety Pass DNA variants have been analyzed which may be important to consider for prescribing medication

Before prescribing:

- Check if personal recommendations are to be considered
- Detailed information available
  - In personal patient account
  - Accessible by using the QR code above

Genetic Health Record



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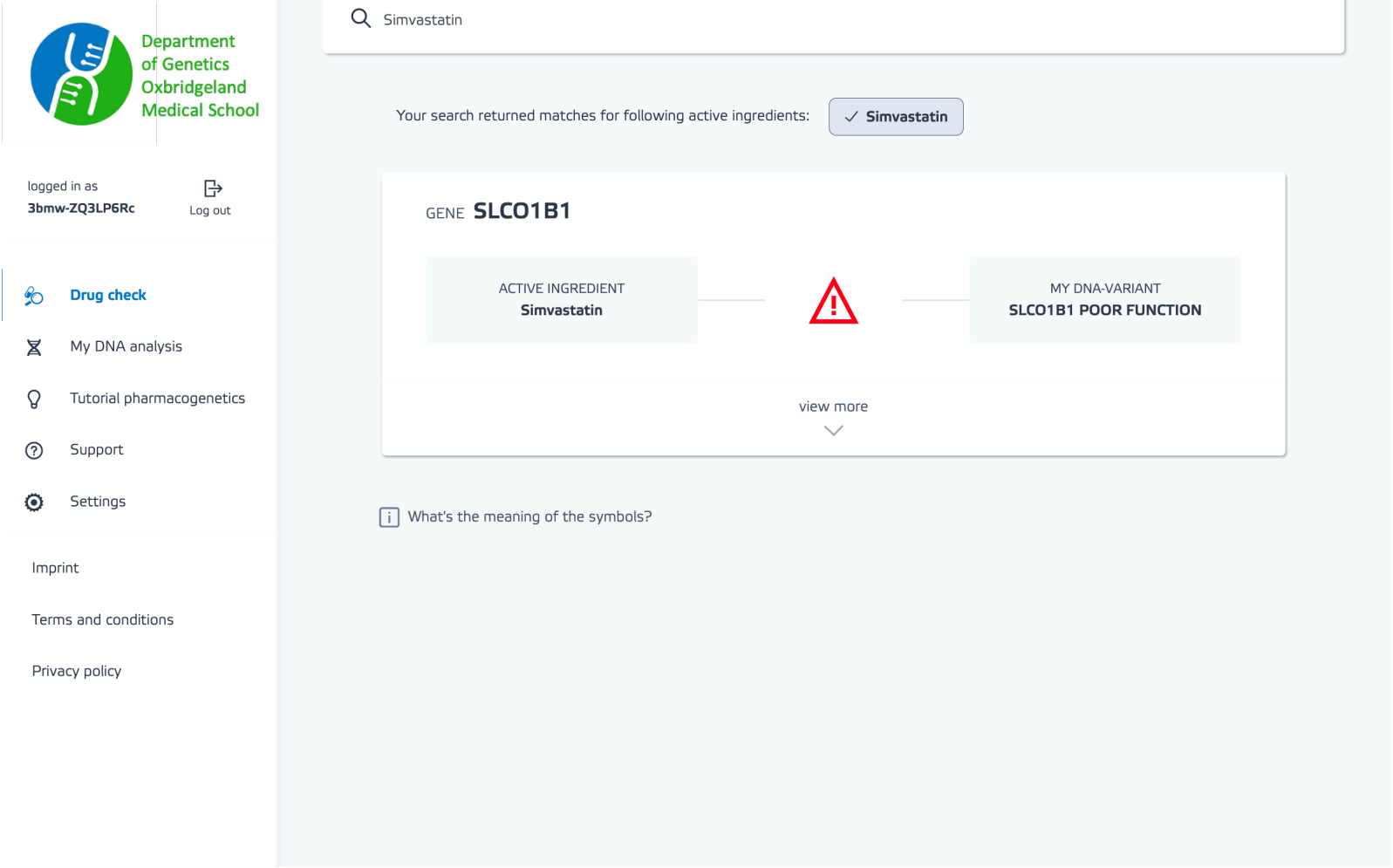
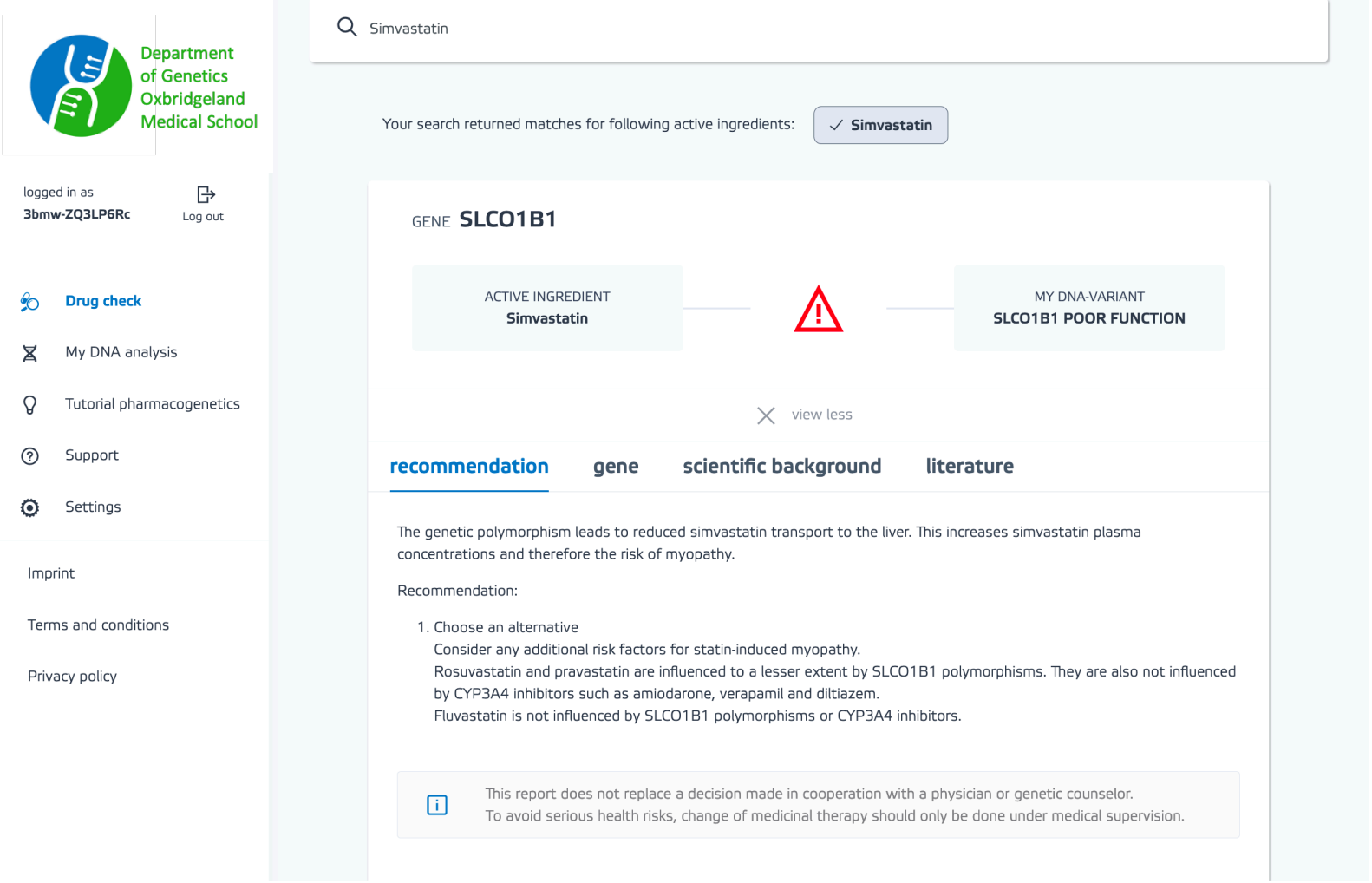
Genetic Health Record



Genetic Health Record



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Mobile App: pharma.sensor

TestFlight 10:54

pharma.sensor

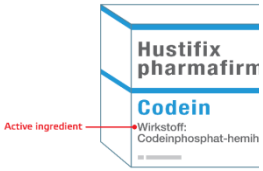
Do I need to consider DNA variants for the drug I am takin

Drug / Active ingredien

Barcode scan

Drug Check:

- enter name in search fiel
  or
- scan barcode on packagi



Drug Check | My DNA | Fa

TestFlight 10:54

pharma.sensor

clomipramine

Gene *CYP2C19* ›

- for this active ingredient you need to consider DNA variants
- considering DNA variants, there are recommendations for
  - adjusting the dose
    and/or
  - prescribing an alternative therapy

If your DNA variants are known, lo in here:

Login

Or:
Test DNA variants and check whether clomipramine is effective

Drug Check | My DNA | Favorites | Setting

Telekom.de 11:05

pharma.sensor

Anafranil 10mg Dolorgiet Dragees

Gene *CYP2D6* ›

Analysis from Department of Genetics Oxbridgeland Medical School

Your result (DNA-variant / phenotype):
CYP2D6 POOR METABOLIZER

The genetic polymorphism leads to decreased metabolic capacity of CYP2D6. This may cause increased plasma concentrations of clomipramine and the active metabolite and decreased concentrations of the potentially cardiotoxic hydroxy metabolites.

Recommendation:

- Indication DEPRESSION:
  1. decrease the dose to 50% of the standard dose

Drug Check | My DNA | Favorites | Settings

Certified as Medical Device & GDPR-proof

translating DNA into health

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