



Health Technology in Finland

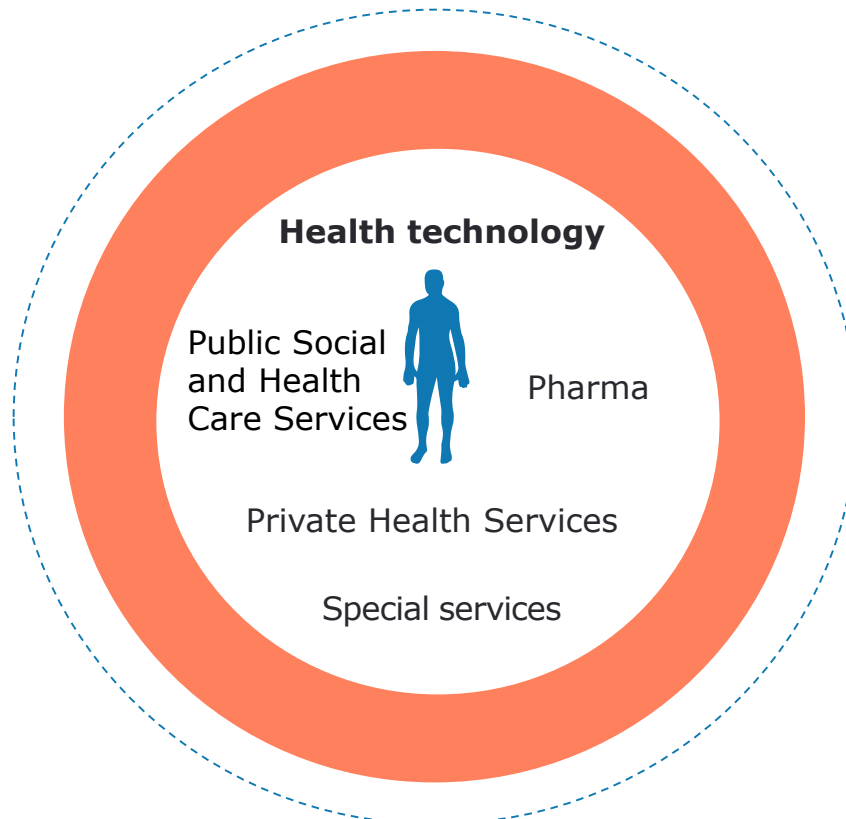
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Health Technology - Important part of Health Sector

Health Technology

Diagnostics
Laboratory Solutions
Monitoring
Imaging
eHealth
Genomics
Biomaterials
Artificial Intelligence
Robotics
Telemedicine
Care
Rehabilitation
Hygiene
Furnishing
Logistics
Services



Turnover

2.6 billion €

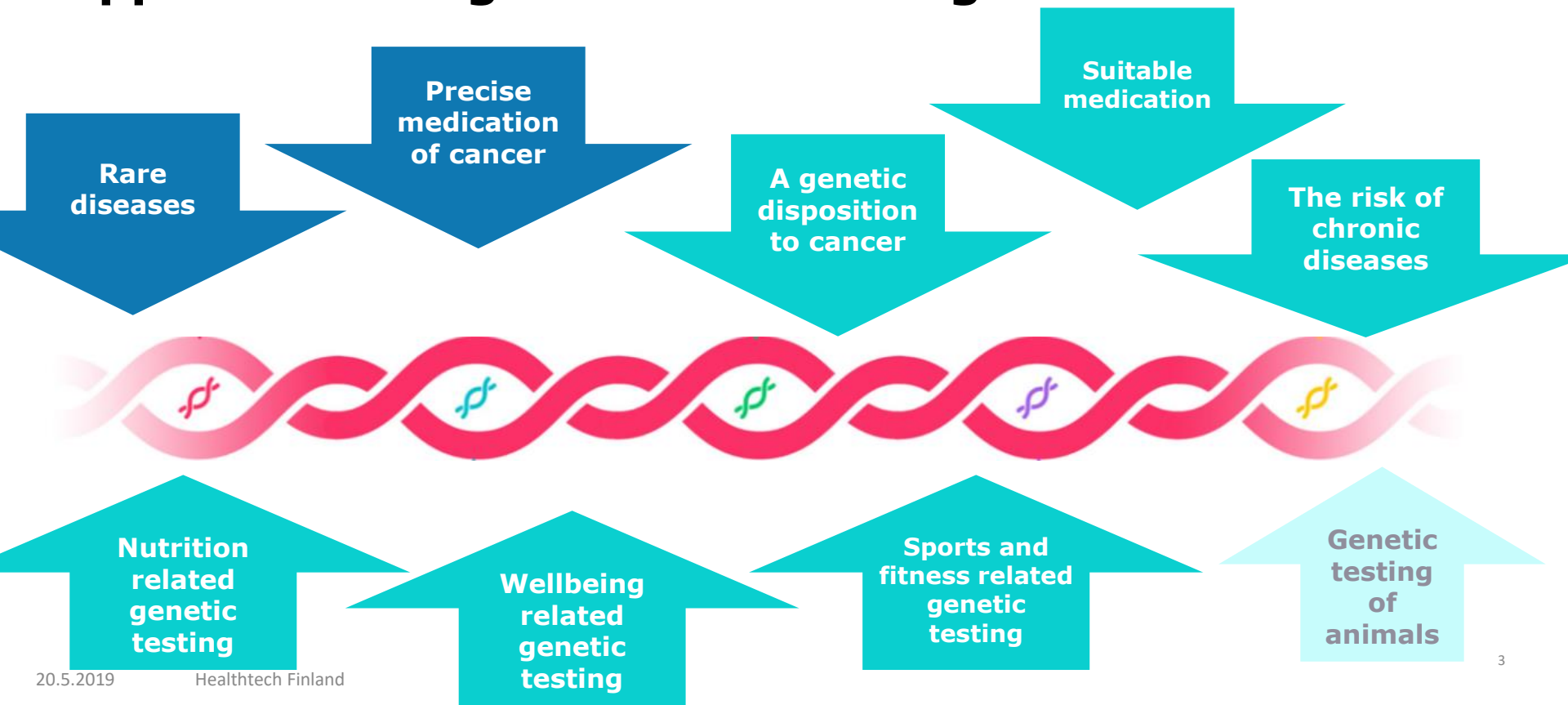
R&D input

10%

12 000
employees



Applications of genomic data and genetic tests





The Genome Industry Special Interest Group of Healthtech Finland is a community of Finnish health tech companies. It aims to accelerate the production and application of genomic data.

Objectives

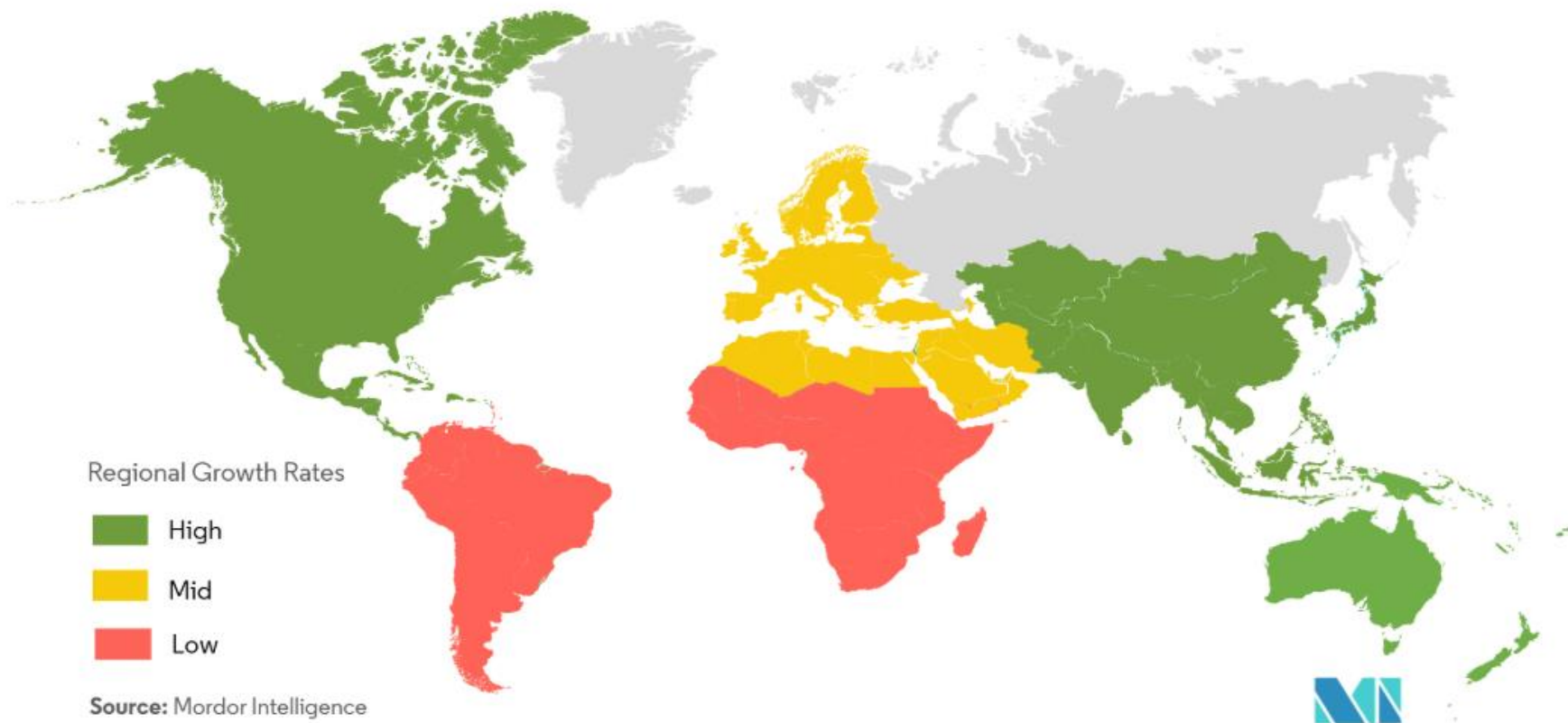
- Growth in turnover and export to be an indicator when evaluating public procurements
- The technologies developed by the companies to be included in public services solutions
- Companies to be seen as desired collaboration partners in public procurements
- Competition to be fair for both private and public companies
- The service solutions for genetics developed and tested on the Finnish market are applicable to the international market, as well.



Market size

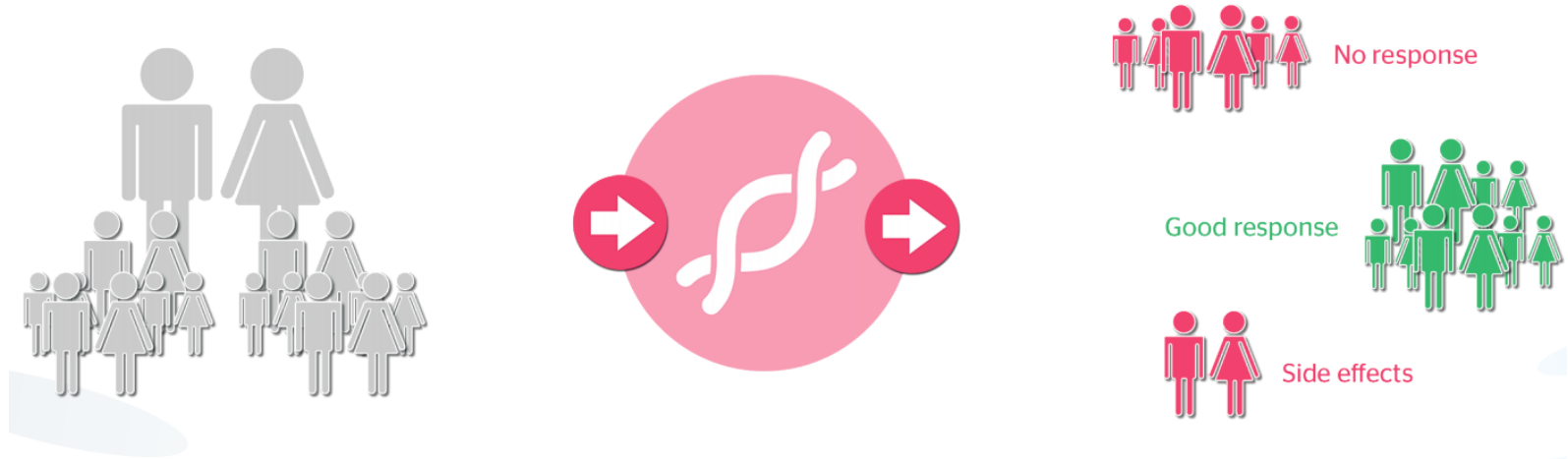
- According to Orian Research, the Global Genetic Testing market is accounted for \$7 749.00 million in 2017 and is expected to reach \$25 948.46 million by 2026 growing at a CAGR of 14.37% during the forecast period.
- Additional services needed are:
 - Interpretation services
 - Integration to electronic patient records
 - Decision support
 - Data storage, security and confidentiality issues

Genetic Testing Market - Growth Rate by Region (2018)



Market

There is no correct dose for a drug, there is a correct dose for a patient



7 %

of FDA drugs

18 %

of US prescriptions

Proper use of drug requires PGx testing

Example: Rxulti (brexipiprazole)

Table 1: Dose adjustments of RXULTI in patients who are CYP2D6 poor metabolisers and for concomitant use with CYP inhibitors

Factors	Adjusted dose
CYP2D6 poor metabolisers	
Known CYP2D6 poor metabolisers	Administer half of the recommended dose
Known CYP2D6 poor metabolisers taking strong/moderate CYP3A4 inhibitors	Administer a quarter of the recommended dose
Patients taking CYP2D6 inhibitors and/or CYP3A4 inhibitors	
Strong CYP2D6 inhibitors	Administer half of the recommended dose
Strong CYP3A4 inhibitors	Administer half of the recommended dose
Strong/moderate CYP2D6 inhibitors with strong/moderate CYP3A4 inhibitors	Administer a quarter of the recommended dose

MY TESTS MY MEDICINE KNOWLEDGE BASE

✗ Drugs with genetic variation of some clinical relevance
citalopram, escitalopram

✓ Drugs with genetic variation of minor clinical relevance
antidepressants, cholesterol-lowering drugs, diabetes-related drugs, immunosuppressants, insulin, painkillers, psychiatric drugs, statins, thyroid hormone, vitamins, various cardiovascular drugs

✓ Drugs with no clinically relevant genetic variation
antidepressants, antipsychotics, antiarrhythmics, cardiovascular drugs, chemotherapy, diabetes-related drugs, diuretics, immunosuppressants, insulin, painkillers, psychiatric drugs, statins, thyroid hormone, vitamins, various cardiovascular drugs

GENETIC TEST RESULTS

Drug safety and efficacy (CYP2A2)
CYP2A2 is a liver enzyme which mediates metabolism of several drugs, before an active drug is formed. Inhibiting certain drugs and other enzymes enhance the production of the enzyme. There is some genetic variation concerning CYP2A2 which may affect the efficacy of certain drugs. Environmental and drug exposures are likely more important factors affecting the enzyme activity, though.

Drug safety and efficacy (CYP2B6)
CYP2B6 is a liver enzyme. There is genetic variation concerning its ability, but there is no evidence to clearly understand how this affects drug metabolism. However, the genetic variation of CYP2B6 may affect for example the metabolism of HIV therapeutics.

celcecoxib
Cela... Celec...
A Label-recommended dosing and schedule

CYP2C19 Inhibitor

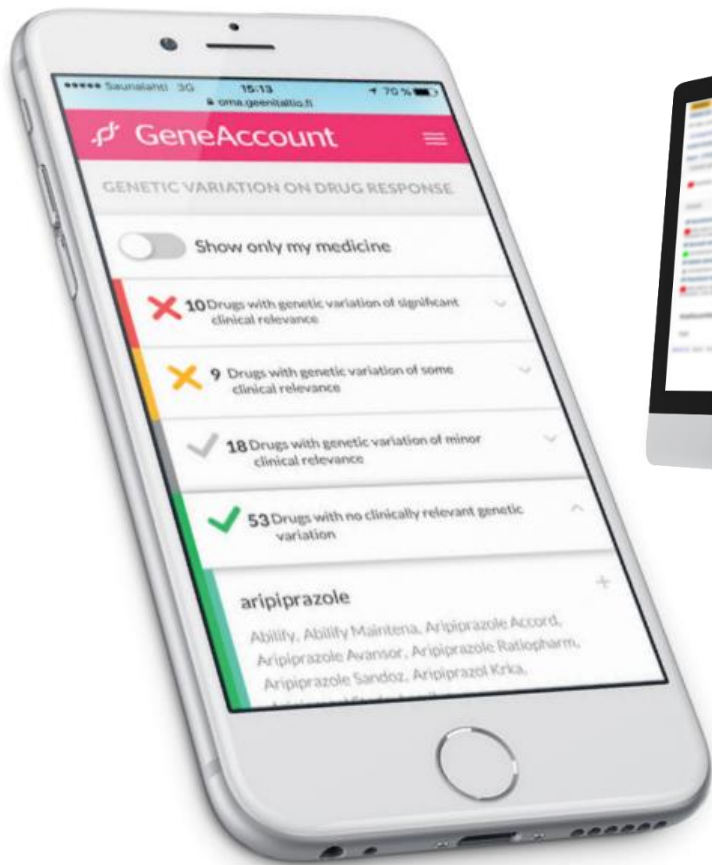
citalopram
Citalopram Orion, Citalopram Ratiopharm, Citalopram Sandoz, Citalopram Teva
W... With this genotype the exposure is likely to be lower than in individuals with the wild-type genotype. Consider an alternative drug if not possible, consider a lower dose if necessary.
CYP2C19 Inhibitor/Modulator
A Label-recommended dosing and schedule
CYP2C19 Inhibitor/Modulator

✗ Drugs with genetic variation of significant clinical relevance
heparin

✗ Drugs with genetic variation of some clinical relevance
citalopram, escitalopram

✓ Drugs with genetic variation of minor clinical relevance
antidepressants, cholesterol-lowering drugs, diabetes-related drugs, immunosuppressants, insulin, painkillers, psychiatric drugs, statins, thyroid hormone, vitamins, various cardiovascular drugs

✓ Drugs with no clinically relevant genetic variation
antidepressants, antipsychotics, antiarrhythmics, cardiovascular drugs, chemotherapy, diabetes-related drugs, diuretics, immunosuppressants, insulin, painkillers, psychiatric drugs, statins, thyroid hormone, vitamins, various cardiovascular drugs



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ABOMICS