

Personalisierte Medizin

Pharmazeutische Gesellschaft Zürich
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Worum es heute geht...

- Definitionen: Was ist mit Personalisierter Medizin gemeint?
- Beispiele: Welche Anwendungen gibt es schon?
- Intentionen: Welche Visionen stecken dahinter?
- Implikationen: Welche Bedeutung hat dies für die Pharmazie?
- Rahmenbedingungen: Welche Initiativen auf Bundesebene bestehen?

Conflict of Interest

by David Waisglass
Gordon Coulthart



“What conflict of interest?!
I work here in my spare time.”

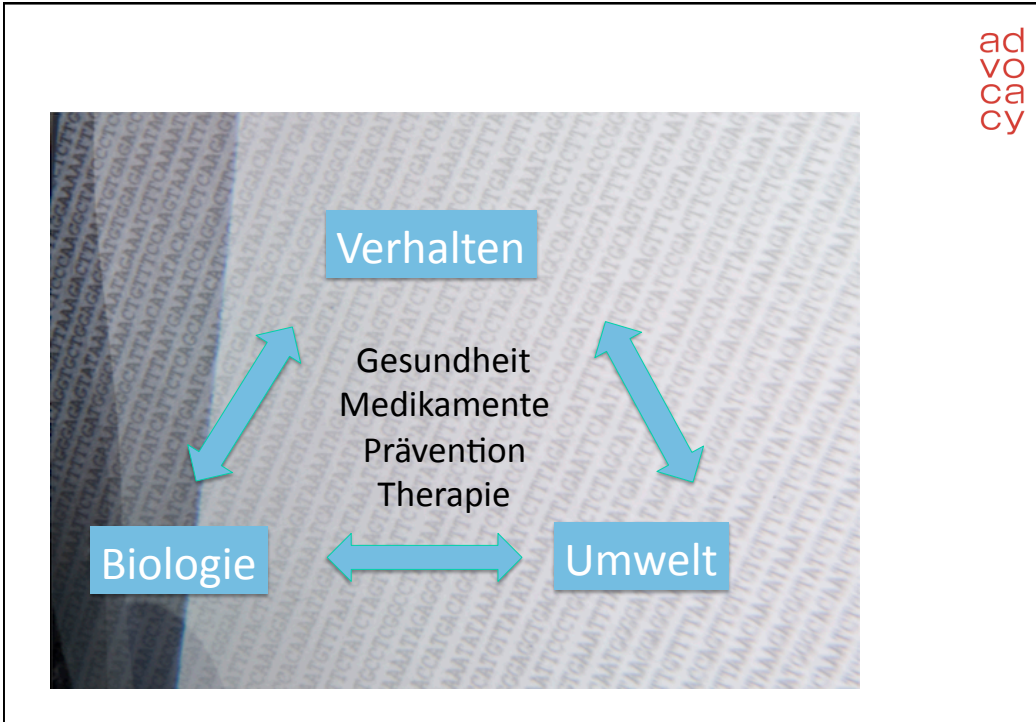
Personalisierte Medizin...

- Viele Definitionen || Unklare Begriffe
- Genomisierte Medizin
- Stratifizierte Medizin
- Präzisionsmedizin
- Individualisierte Medizin
- ESF: It describes a model where the **individual circumstances of a patient** influence notable the **medical treatment** and where the individualised biological profiles will increasingly be used to determine a person's individual healthcare needs

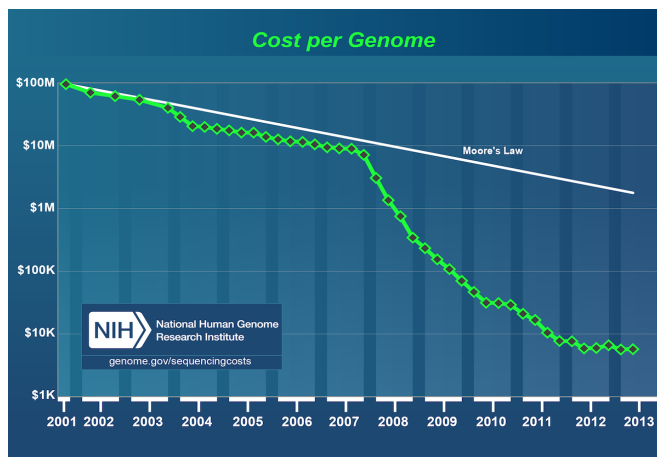


Haupttreiber der Personalisierten Medizin

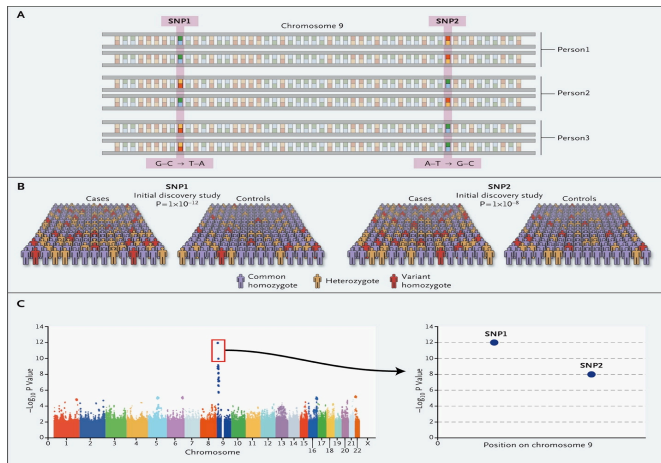
- Molekularbiologie/-omics
- Informations- und Kommunikationstechnologien/Big Data



Dropping Costs in Genome Sequencing

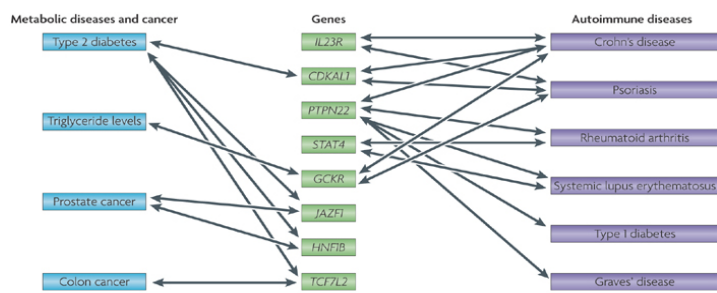


Genome-wide Association Studies (GWAS)



Manolio TA. N Engl J Med 2010;363:166-176.

New Definition of Diseases



Nature Reviews | Genetics

The recent exceptional advances in associating genes with many diseases have led some to suggest that the textbooks of medicine need to be rewritten to account for our enhanced understanding of the interconnectivity of the molecular basis underlying distinct diseases. (Frazer et al)

Genetics of Medication
– One size does NOT fit all



– Activation of thrombosis inhibitor Plavix is dependent on gene variants (CYP2C19)



– Gene variants determine sensitivity to blood thinner Warfarin



– Inflammation inhibitor Vioxx cases liver toxicity and heart failure in certain gene variants

– Genetic information for abacavir, 5-fluorouracil, Irinotecan, azathioprine, 6-Mercaptopurin (Frueh FW et al 2008).

Genetics of Treatment



Google Maps of Health

Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease

15

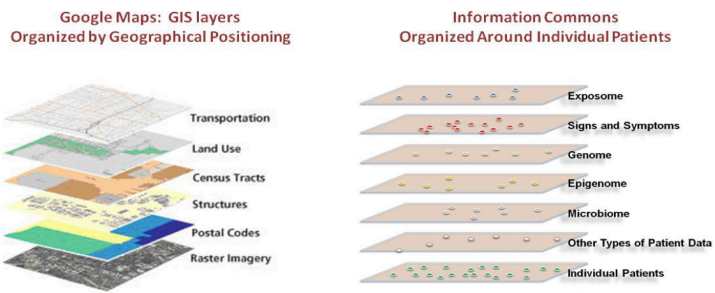
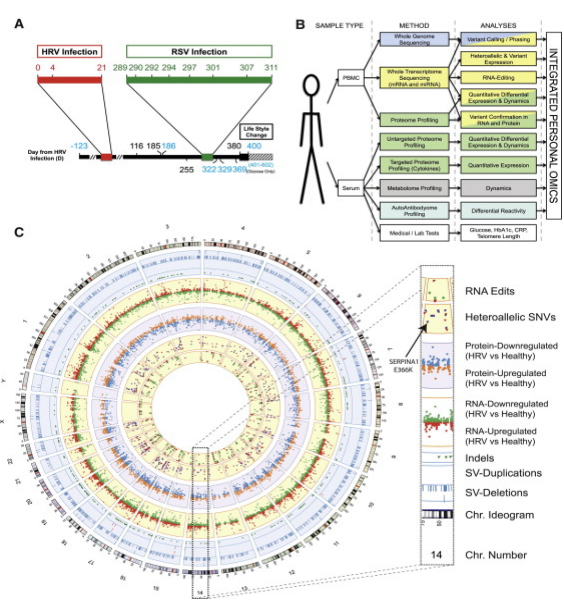


Figure 1-2: The proposed, individual-centric Information Commons (right panel) is somewhat analogous to a layered Geographical Information System (left panel). In both cases, the bottom layer defines the organization of all the overlays. However, in a GIS, any vertical line through the layers connects related snippets of information since all the layers are organized by geographical position. In contrast, data in each of the higher layers of the Information Commons will overlay on the patient layer in complex ways (e.g., patients with similar microbiomes and symptoms may have very different genome sequences). Source: FPA 2011 (left panel).

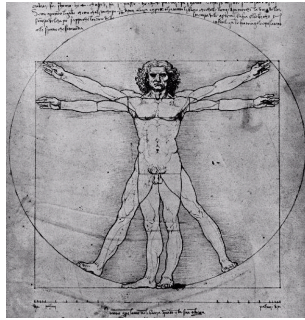
Ref: Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease National Research Council of the National Academies of Sciences, USA 2012



First approaches – integrative personal omics profile (iPOP)

Chen et al, Cell 2012
DOI 10.1016/j.cell.2012.02.009

Verhalten



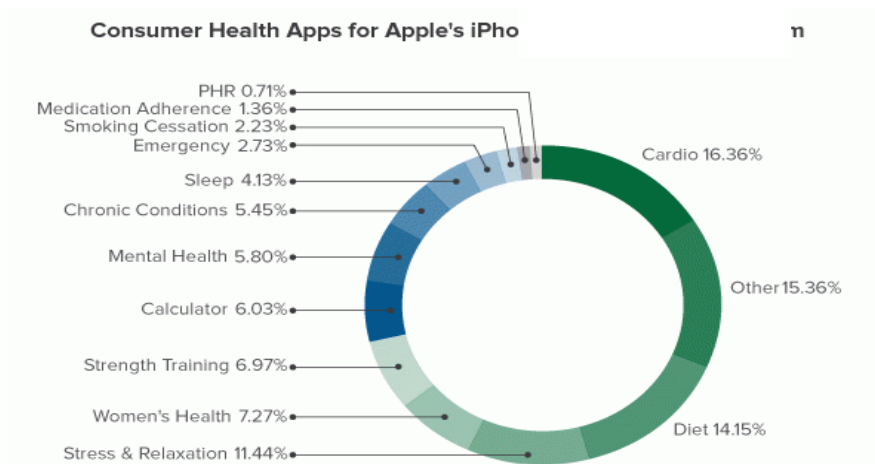
Digital Health Data



Biologie

Umwelt

...Gesundheitsdaten



Herausforderungen der Präzisionsmedizin

- Grosse Datensätze über lange Zeit erfasst
- Grosse Population
- Neue Technologien zur Datenerfassung
- Datenverwaltung und -aufbewahrung
- Neue Algorithmen
- Neue Forschungsformen: kollaborativ, partizipativ, interdisziplinär

Gesundheitsdaten-Krise

- Data silos (Ärzte Spitäler, Apotheken, mobile Apps, Laboratorien)
- Inkompatibilitäten
- Keine Datenaggregation möglich
- Wenig Macht der Datenbesitzer
- Unnötige Kosten/Behandlungen
- Datenstandardisierunginitiativen scheitern (i.e. UK's NHS Connecting for Health)

Hype or Hope?

- PR-Strategie von Industrie und Forschung?
- Auf dem Weg zu einer besseren Medizin und Gesundheitsversorgung?

Der Anfang einer Revolution?



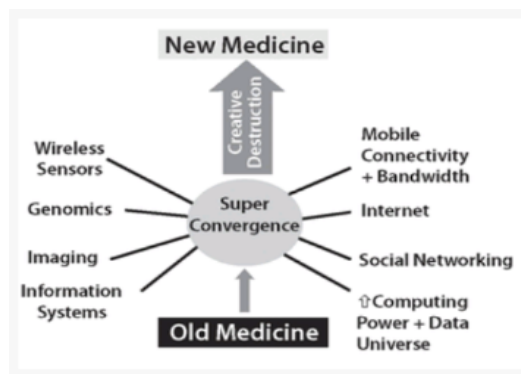
29 years



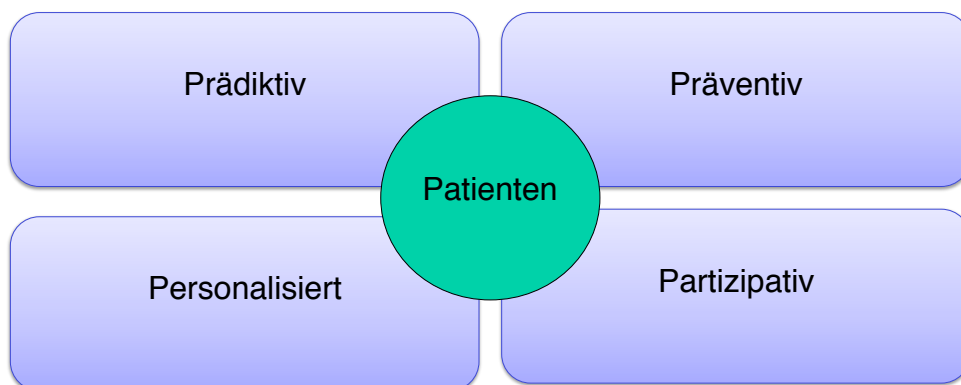
1984 Commodore 64

2013

Transformation der Medizin?



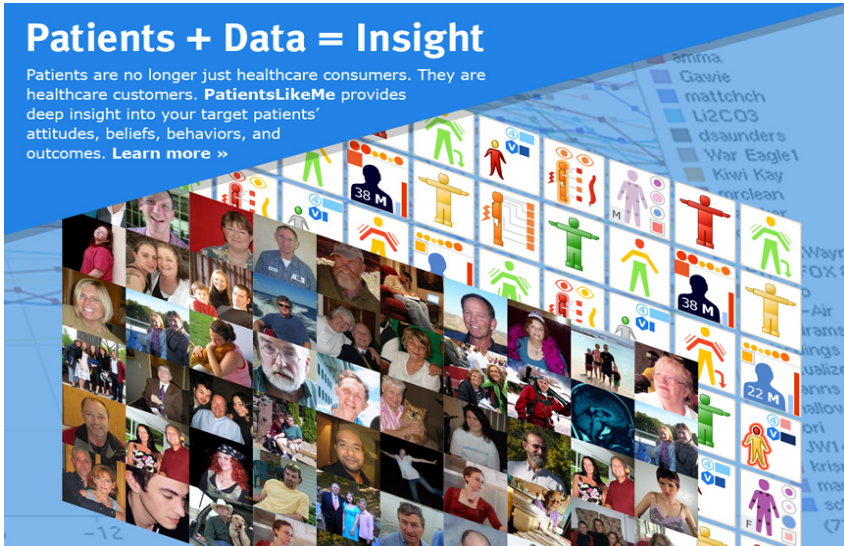
Vision



Demokratisierung der Medizin?

Patients + Data = Insight

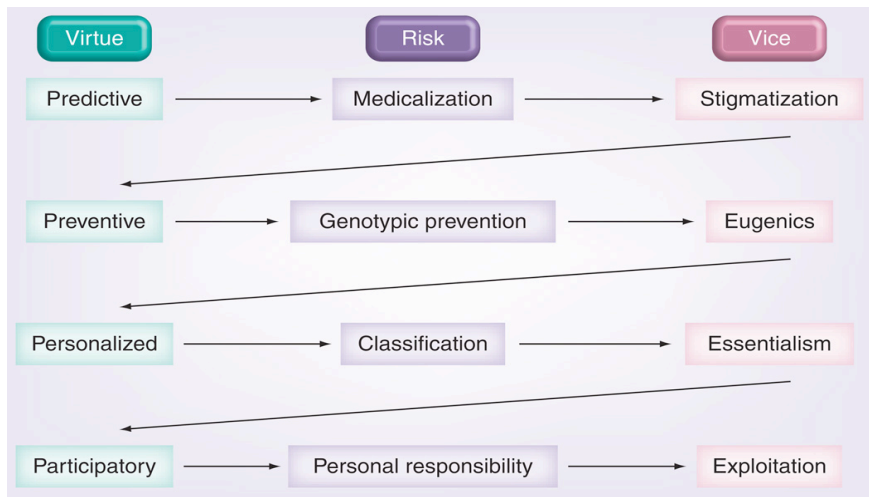
Patients are no longer just healthcare consumers. They are healthcare customers. **PatientsLikeMe** provides deep insight into your target patients' attitudes, beliefs, behaviors, and outcomes. [Learn more >>](#)



...und die Folgen



Ethische und soziale Herausforderungen

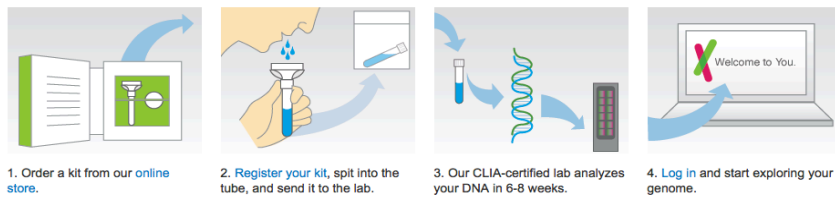


Juengst E. et al. Per Med. 2012 June 1; 9(4): 429-439. doi:10.2217/pme.12.37.

Personal Genome Service™

Get to know your DNA. All it takes is a little bit of spit.

Here's what you do:



Reports

Disease Risk	111	Drug Response	19
Carrier Status	24	Traits	50

Risiken

Elevated Risk ?

NAME	CONFIDENCE	YOUR RISK	AVG. RISK	COMPARED TO AVERAGE
Psoriasis	★★★★	22.4%	11.4%	1.98x
Gallstones	★★★★	11.1%	7.0%	1.58x
Restless Legs Syndrome	★★★★	2.5%	2.0%	1.25x
Exfoliation Glaucoma	★★★★	2.2%	0.7%	2.90x
Ulcerative Colitis	★★★★	1.4%	0.8%	1.85x
Esophageal Squamous Cell Carcinoma (ESCC)	★★★★	0.43%	0.36%	1.21x
Stomach Cancer (Gastric Cardia Adenocarcinoma)	★★★★	0.28%	0.23%	1.22x
Primary Biliary Cirrhosis	★★★★	0.13%	0.08%	1.64x
Male Breast Cancer	★★★			
Bladder Cancer	★★★			

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Risiken

Decreased Risk ?

NAME	CONFIDENCE	YOUR RISK	AVG. RISK	COMPARED TO AVERAGE
Gout	★★★★	17.1%	22.8%	0.75x
Alzheimer's Disease	★★★★	4.3%	7.2%	0.60x
Age-related Macular Degeneration	★★★★	3.2%	6.5%	0.49x
Melanoma	★★★★	2.2%	2.9%	0.75x
Rheumatoid Arthritis	★★★★	1.4%	2.4%	0.60x
Type 1 Diabetes	★★★★	0.11%	1.02%	0.11x
Celiac Disease	★★★★	0.06%	0.12%	0.49x
Thyroid Cancer	★★★			
Pancreatic cancer	★★★			

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Reaktion auf Medikamente

NAME	CONFIDENCE ▾	STATUS
Warfarin (Coumadin®) Sensitivity	★★★★	Increased
Fluorouracil Toxicity	★★★★	Typical
Sulfonylurea Drug Clearance (Type 2 Diabetes Treatment)	★★★★	Typical
Alcohol Consumption, Smoking and Risk of Esophageal Cancer	★★★★	Typical
Abacavir Hypersensitivity	★★★★	Typical
Response to Hepatitis C Treatment	★★★★	Typical
Pseudocholinesterase Deficiency	★★★★	Typical
Phenytoin (Dilantin®) Sensitivity (Epilepsy Drug)	★★★★	Typical
Thiopurine Methyltransferase Deficiency	★★★★	Typical
Clopidogrel (Plavix®) Efficacy	★★★★	Typical

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Erbliche Eigenschaften

NAME	CONFIDENCE	STATUS ▾
Familial Mediterranean Fever	★★★★	Variant Present
Phenylketonuria	★★★★	Variant Absent
Familial Dysautonomia	★★★★	Variant Absent
Canavan Disease	★★★★	Variant Absent
Hemochromatosis (HFE-related)	★★★★	Variant Absent
Familial Hyperinsulinism (ABCC8-related)	★★★★	Variant Absent
Primary Hyperoxaluria Type 2 (PH2)	★★★★	Variant Absent
Sjögren-Larsson Syndrome <small>new</small>	★★★★	Variant Absent
Rhizomelic Chondrodysplasia Punctata Type 1 (RCDP1)	★★★★	Variant Absent
Torsion Dystonia	★★★★	Variant Absent
Autosomal Recessive Polycystic Kidney Disease	★★★★	Variant Absent

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Eigenschaften/Traits

NAME	CONFIDENCE ▲	OUTCOME
Alcohol Flush Reaction	★★★★	Does Not Flush
Bitter Taste Perception	★★★★	Can Taste
Earwax Type	★★★★	Wet
Eye Color	★★★★	Likely Brown
Hair Curl ✖	★★★★	Straighter Hair on Average
Lactose Intolerance	★★★★	Likely Intolerant
Malaria Resistance (Duffy Antigen)	★★★★	Not Resistant
Male Pattern Baldness ♂	★★★★	Decreased Odds
Muscle Performance	★★★★	Likely Sprinter
Non-ABO Blood Groups	★★★★	See Report



DNA+Gewicht

Abnehmen nach den Genen!
Finden Sie durch eine Genanalyse heraus,
wie Sie am effektivsten abnehmen können.



Nehmen Sie durch Fett oder durch Kohlenhydrate zu?

Lieber mehr Sport oder weniger essen?

Die Antwort steckt in Ihren Genen!

2,5 Mal mehr abnehmen!

DROGERIE
IM BAHNHOF SOLOTHURN

Basler Appell gegen Gentechnologie

AKTUELL | THEMEN | PUBLIKATIONEN | VEREIN | KONTAKT | LINKS

Aktivitäten | Veranstaltungsarchiv


Gentests aus Apotheken, Drogerien und Fitnesszentren: Basler Appell stellt Strafanzeige!

Der Basler Appell gegen Gentechnologie hat heute, Freitag, 8. November, bei der Staatsanwaltschaft Basel-Stadt **Strafanzeige gegen die Anbieter sogenannter "direct-to-consumer" Gentests** gestellt. In Schweizer Apotheken, Drogerien und Fitnessstudios werden solche Tests unter fragwürdigen Umständen angeboten.

Umfangreiche juristische Prüfungen bestärken uns in der Auffassung, dass die Angebote von Gentests, die auf dem freien Markt ohne ärztlichen Vorbehalt und ohne vorgeschriebene Beratung vertrieben werden, gegen die **Strafbestimmungen mehrerer Gesetze verstossen**: Gesetz über genetische Untersuchungen beim Menschen **GUMG**, das Bundesgesetz über Arzneimittel und Medizinprodukte, Heilmittelgesetz **HMG** sowie mutmasslich auch gegen das Bundesgesetz gegen den unlauteren Wettbewerb **UWG**.

Wegen vermuteten Verstosses gegen das Heilmittelgesetz haben wir gleichzeitig eine Aufsichtsanzeige an das Schweizerische Heilmittelinstitut **Swissmedic** übermittelt.

Die **Staatsanwaltschaft und Swissmedic müssen nun prüfen**, ob durch die Abgabe von **direct-to-consumer Gentests** gegen Strafbestimmungen verstossen wird.



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Rolle der Pharmazie

- Personalized medicine is the way of the future as technology improves and we learn more about our genome. **As medication experts, pharmacists have the knowledge and ability to play an important role in individualized therapy decisions. Using genetics to make therapeutic decisions will lead to more positive therapy outcomes and less adverse drug reactions.** However, there is still a lot to determine with regards to how this model will be implemented and whether or not it will be feasible.

<http://blogs.ubc.ca/phar330/2012/02/02/what-is-the-role-of-pharmacists-in-personalized-medicine/>

“Pharmacists: Personalized Medicine Experts in Primary Care”

- Personalizing patients’ medications based on their genetic make-up is starting to enter the clinical arena - the technology and science are ready for integration into the daily clinical practices of primary care providers. It offers the potential for significant advances in optimizing drug therapy outcomes and minimizing adverse drug events.

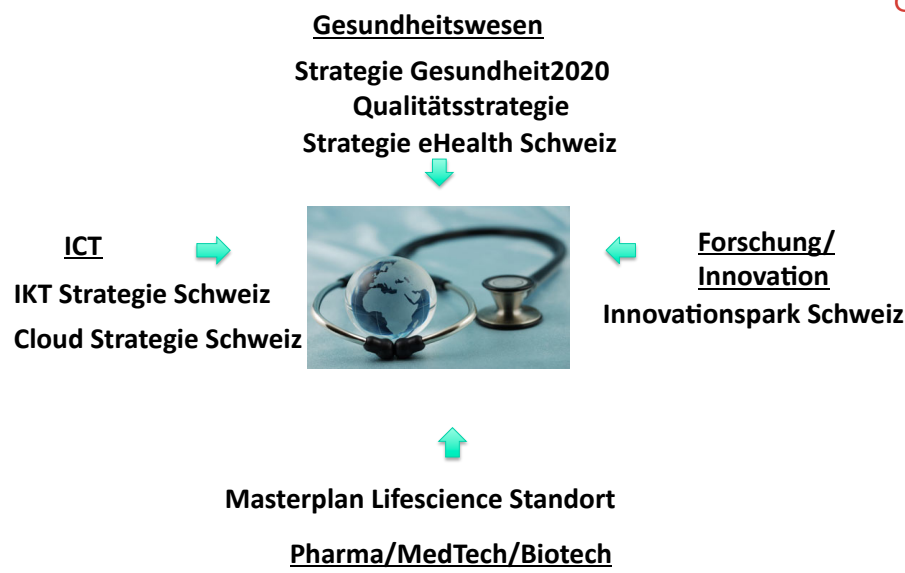
Given their training and accessibility, pharmacists are ideally positioned to bring pharmacogenomics to patients. This project will equip 25 pharmacists in primary care settings (Ontario’s community pharmacies and family health teams) with the required knowledge and skills to become established as personalized medicine experts in their communities.

<http://www.pharmacy.utoronto.ca/newsfeed/mccarthy-personalized-medicine>

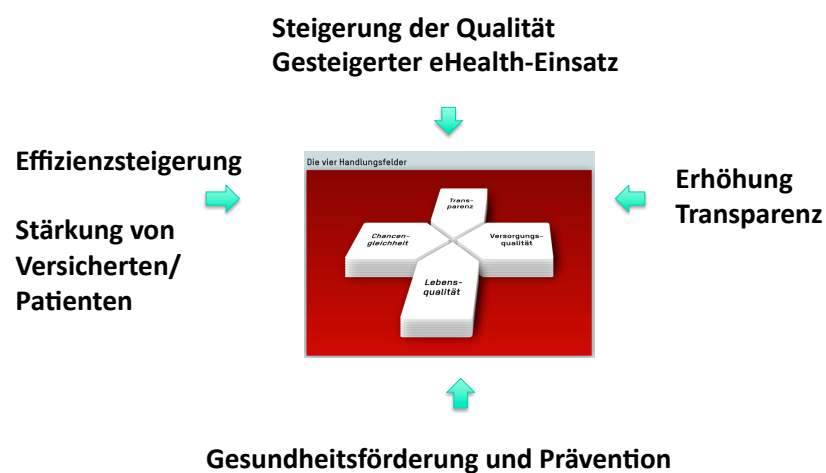
Standortfaktor Personalisierte Medizin



Initiativen des Bundes



Strategie Gesundheit2020



Betroffene Gesetze

- GUMG
- HFG
- HMG
- KVG
- EPDG
- DSG

Danke für Ihre Aufmerksamkeit!

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