

IMPLEMENTATION

The transition to personalized medicine requires seven key steps to be taken by pharmaceutical companies [5]:

- 01 Recognizing the **urgency** and **necessity** of personalized medicine
- 02 **Digitizing healthcare** using IT systems with **new technologies**
- 03 Imbue **skills** and **principles** of personalized medicine into the **existing healthcare system**
- 04 Using **biomarkers** to further **research and development**
- 05 Forming professional **partnerships** between different **diagnostic** and **development** corporations and industries
- 06  **Educating sales teams** with patient **history**, diagnostic **treatment** methods, and **disease pathways**
- 07 Follow up **market surveillance** to better **focus** future **clinical trials**

*"The **primary goal** and **benefit** of patient-centered care is to **improve individual health outcomes**, not just population health outcomes" [7]*



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Miryam Kaduri, B.Sc, (she/they)
Mechanical Engineering Student | B.Eng
York University | Lassonde School of Engineering



PERSONALIZED MEDICINE

Individualized Care Pharmacogenetics

NAE Grand Challenge 5:
Engineering Better Medicines

WHAT IS IT?

Personalized medicine is a **transformative approach** to medical care that centers around **treating individuals**, rather than having an individual treatment. [5,7]



By ditching one-size-fits-all, prescription driven practices and focusing on **preventative** and **proactive** medicine, we **eliminate** the **trial and error** process of finding the right medication and replace it with **evidence based treatment** strategies using **pharmacogenetics**. [4]

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*"THE RIGHT DRUG,
WITH THE RIGHT DOSE
AT THE RIGHT TIME TO
THE RIGHT PATIENT" [6]*

Knowledge of **patient history** and **risk factors** provides medical care providers with **diagnostic information** that can be harnessed to provide better **patient stratification** and **optimized therapeutic coordination**.

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WHAT'S NEXT?

Pharmacogenetics is helping to develop and better use existing technologies in **molecular medicine**

Monoclonal Antibody (MAb) Therapies

HER2, a gene involved in **breast cancer**, can be targeted by **herceptin** to inhibit growth, and MAb have also been used to target **other diseases** and several types of **cancer**. [3]



Immunotherapy

Modification of **dendritic cells** helps mobilize **endogenous immune systems** to **target tumours** inside the body and eliminate them. [1]

CRISPR-Cas9 Gene Editing

Engineering cells at the genetic level to **edit specific oncogenes** to create tumour specific treatments that are **more effective** for the patient. [2]



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