

# Utilizing OMICS, RWE, and AI on the way to personalized medicine

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## Background:

With scientific knowledge and technologies advancing at a fast pace, medical practice has undergone a substantial transition. Recognizing the influence of individual genetic variations, three major research areas appear to be of great importance:

- **OMICS technologies** enable in-depth analysis of individual biological data
- **Real-world evidence (RWE)** leverages data from diverse patient populations to provide insights into treatment safety and effectiveness
- **Artificial intelligence (AI)** algorithms allow faster analysis of large-scale datasets, identification of patterns, and prediction of treatment responses

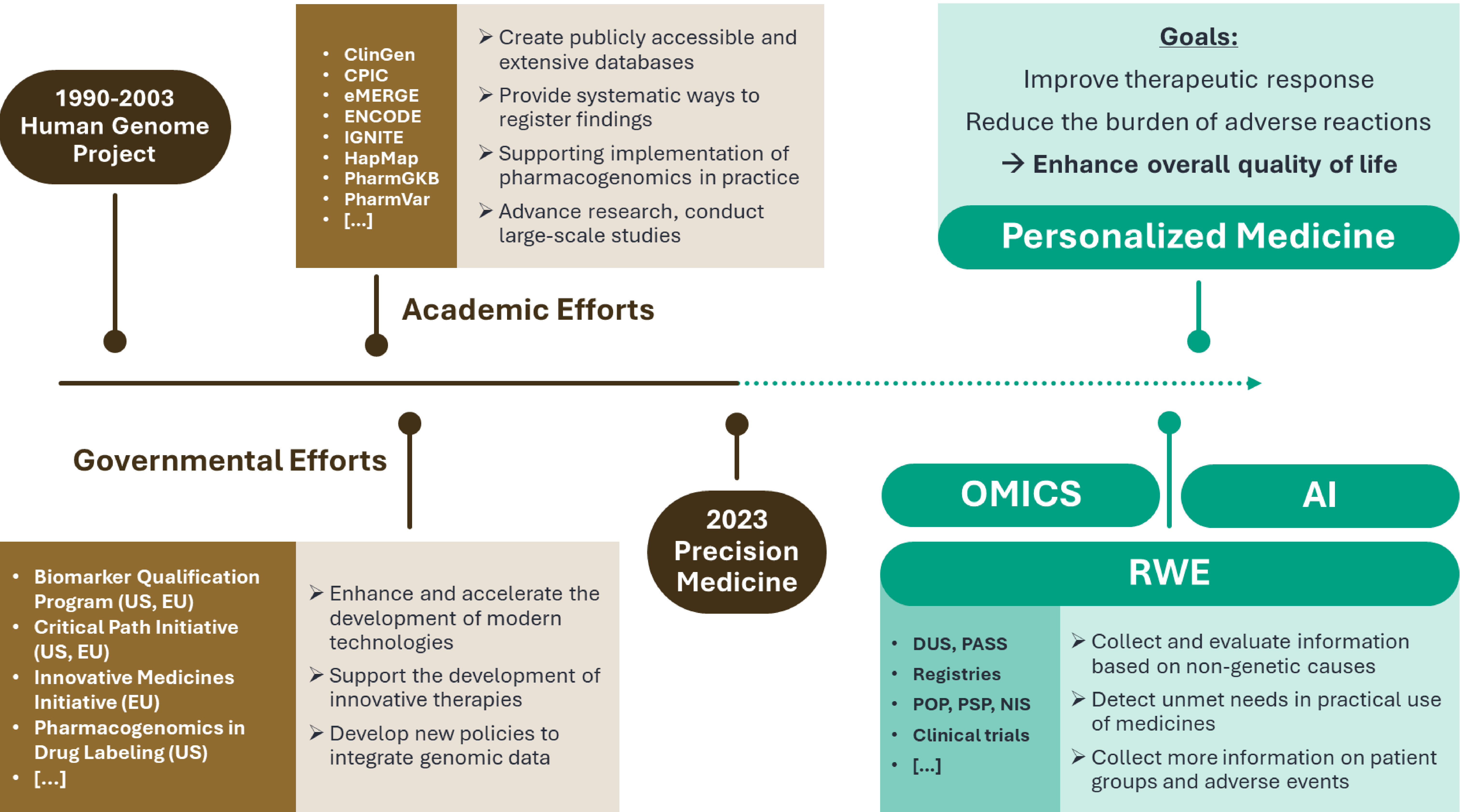
The synergistic integration of these approaches opens up new opportunities in shaping the landscape of personalized medicine.

## Methods:

Literature search and landscape analysis.

## Results:

- 1) The use of genomics in medicine allows more accurate prevention and early diagnosis of diseases as well as more targeted therapies.
- 2) High-quality RWE including clinical-genomic data can inform precision medicine, especially in oncology.
- 3) AI technology can support clinicians in the interpretation of medical scans.



## Conclusion:

The concept of personalized medicine has the potential to:

- **Improve therapeutic response**
- **Reduce the burden of adverse reactions**
- **Enable proactive interventions**

Broadening the scope of future healthcare to include socio- economic and environmental factors and taking a more holistic approach will improve patient outcomes and enhance overall quality of life.

## Acknowledgement:

I (Amélie) am sincerely grateful to my mentors Prof. Andreas Bechthold, Prof. Stefan Günther, and Dr. Anja Langeneckert from the University of Freiburg for their invaluable advice and support.

## References:

1. Bell, J. Predicting disease using genomics. *Nature* 429, 453–456 (2004). <https://doi.org/10.1038/nature02624>
2. Agarwala V, Khozin S, Singal G, et al. Real-World Evidence In Support Of Precision Medicine: Clinico Genomic Cancer Data As A Case Study. *Health Affairs (Project Hope)*. 2018 May;37(5):765-772. doi: 10.1377/hlthaff.2017.1579.
3. Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. *Nature Medicine*, 25(1), 44–56. doi:10.1038/s41591-018-0300-7.