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Personalized and Precision Medicine (PPM) as a Unique Healthcare Model to Be Set Up to Secure the Human Healthcare, Wellness and Biosafety through The View of Public Health: An Epidemiological Perspective

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A new systems approach to diseased states and wellness result in a new branch in the healthcare services, namely, personalized and precision medicine (PPM). To achieve the implementation of PPM concept, it is necessary to create a fundamentally new strategy based upon the recognition of biomarkers of hidden abnormalities long before the disease clinically manifests itself. NIH (Bethesda, USA) has included PPM into a List of the Five Greatest Priorities of Development of Medicine and Healthcare Services in XXI Century.

To really understand PPM, we would have to understand the various fields of translational applications that provide the tools to exploit and practice PPM, and genomics- and phenomics-related tools, in particular!

Because of technological advances, digitization increasingly influences health-related business models. And PPM is considered to be an emergent and complex phenomenon that encompasses several industries, has the potential to impact both private and public organizations as well as citizens worldwide but surprisingly has not yet been studied from an ecosystem perspective. So, PPM whilst playing a crucial role in the modern healthcare services, it is already an important topic in public and private health care debates with clear importance in the future.

Improved patient (or persons-at-risk) outcomes with the application of the biomarker tests must consider not only increased survival or quality of life, but also improved clinical decision support (CDS) & making. So, bioinformatics, artificial intelligence (AI), machine learning (ML) and biostatistics will be crucial in translating those Big Data into useful applications, leading to improved diagnosis, prediction, prognostication and treatment. It would be extremely useful to integrate data harvesting from different databanks for

applications such as prediction and personalization of further treatment to thus provide more tailored measures for the patients resulting in improved patient outcomes, reduced adverse events, and more cost effective use of the latest health care resources. So, evaluating the health impact of large scale biological, social, and environmental data is an emerging challenge.

Epidemiology, in turn, is a foundational science of public health and provides important insights for medical practice and disease prevention. Advances in genomics and computing are transforming the capacity for the characterization of biosystems, and researchers are now poised for a precision-focused transformation in the way they prepare for, and respond to, infectious diseases and cancer, in particular.

Network epidemiology generally focuses on infectious diseases, meaning diseases that can spread from one person to another. And the combination of population-level dynamics and a network representing people and their interactions is called network epidemiology, in which the shape of the network - who connects to whom - influences the spread of the disease. To begin, we'll study a simple model of an epidemic without network structure, in order to develop intuition about its dynamics before adapting that model to run over a network.

For instance, a limited supply of vaccines means we cannot rely on the classic vaccination strategy of vaccinate everyone who isn't immuno-compromised. Instead, we can try to exploit the network structure itself, by vaccinating nodes that would either slow down the epidemic (making it take longer paths through the network) or break up the network into smaller components.

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The expanded framework for PPM being proposed would also be applicable beyond the individual for population- or community-level interventions. Those innovative analytical frameworks are required to capture the complex gene-environment interactions and their assessments via IT-technologies and software. Putting PPM-tools in a public health perspective requires an apprehension of the current and future public health challenges. The principles of PPM and efforts to approaching the right health issues in a timely manner can be applied to population health. Doing so will, however, require a careful view and concerted effort to maintain the needs of population health at the forefront of all PPM discussions and investments.

In reality, a new buzzword has crept into the health sciences lexicon: PPM-based public health. The initial drive toward PPM-based public health is occurring, but much more work lies ahead to develop a robust evidentiary foundation for use. PPM and PPM-based Public Health calls for a transdisciplinary approach to support safe and effective deployment of the new enabling diagnostic and therapeutic technologies stressing: not to treat but to get cured!!!

And with the help of computational health sciences and as the knowledge network is developed, patients and providers will be able to see how environmental, social and behavioral factors relate to the patient in front of them. Practitioners, as well as patients themselves, using digital health tools, could contribute patients' personal data to the network, to build scientific evidence about those connections. This knowledge can, in turn, improve individuals'

understanding of their health, empower them to make behavioral changes that prevent disease, and improve their compliance with therapies. With insights into how well individuals understand their health and illnesses, patients' ability to comply with treatment plans and their willingness to share data, practitioners can devise policies and best practices to enable the largest number of people to contribute to and benefit from PPM-related resources.

And thus the latter would need for novel training since the society is in bad need of large-scale dissemination of novel systemic thinking and minding. And upon construction of the new educational platforms in the rational proportions, there would be not a primitive physician created but a medical artist to be able to enrich flow-through medical standards with creative elements to gift for a patient a genuine hope to survive but, in turn, for a person-at-risk – a trust for being no diseased. This is the reason for developing global scientific, clinical, social, and educational projects in the area of PPM to elicit the content of the new branch

Biography

Sergey Suchkov was born in the City of Astrakhan, Russia, in a family of dynasty medical doctors. In 1980, graduated from Astrakhan State Medical University and was awarded with MD. In 1985, Suchkov maintained his PhD as a PhD student of the I.M. Sechenov Moscow Medical Academy and Institute of Medical Enzymology. In 2001, Suchkov maintained his Doctor Degree at the National Institute of Immunology, Russia

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