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Personalized health care: the hope beyond the hype

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Personalised healthcare can be defined as a customisation of the medical provision that accommodates individual differences in all stages in the process, from prevention, to diagnosis and treatment, to post-treatment follow-up. While the term personalized medicine has a broader meaning, and it comes from the explosion of information arising from genome sequencing, the term personalised healthcare refers more to the potential for customization in the provision of healthcare to the citizen.

Despite the fast moving human genome discoveries in a wide proportion of disease having large public health impact, the promise of personalized healthcare has far lagged behind. In a time of limited resources, the multilevel interventions required for such integration might not be perceived as a priority from policy makers. The creation of clinical-public health partnerships and dedicated infrastructures, along with the consumers and providers education, would subtract resources to already ongoing evidence-based and cost-effective public health interventions. Still, public health has an assertive leadership in addressing the promise and pitfalls of human genomics for population health, as recently claimed by Muin Khoury and Collaborators (1). In their paper, authors report that P4 medicine (predictive, personalized, preventive and participatory) can best be realized through a renewed partnership between medicine and public health, purposing the term P5 medicine that integrates the population perspective into the 4 components of P4.

With this thematic issue of the Italian Journal of Public Health, including two commentaries and six thematic papers, we aim to discuss some relevant findings and viewpoints currently surrounding the issue of personalized healthcare. The commentary of Mazzucco et al. reports on a project funded by the Italian Ministry of Health on the education of physicians on genomic medicine, as a cornerstone of a broader implementation of genomics into public health practice (2). Shehata et al. (3) broadly describe the ethical and legal issues related with the provision of Direct-to-Consumer genetic tests in Europe, providing an overview of the different regulatory frameworks. Authors advocate the need for a stronger regulation, in line with the recent claims of several working groups (4).

Among the thematic papers, Dallapiccola et al. (5) discuss the extent to which physician and citizen can trust the genetic prediction of common complex disorders. Except few applications (e.g., pharmacogenomics), authors state clearly that in this context the risk prediction is mostly unreliable, and that citizens must be aware of that. Burton et al. (6) revisited the well-known Goffrey Rose theory on *sick individuals and sick populations* by proposing to segment the population by genetic risk into a number of individual strata. Authors call this approach as "stratified prevention", to highlight that differential preventive interventions may be applied for each genetically defined stratum, eventually arguing that such an approach can lead to improved efficiency, effectiveness and harm minimisation. As personalised health care services and products are health technologies, mainly diagnostics that have a broad impact in the health care systems, Inaki et al. (7) discuss the Health Technology Assessment

perspective within personalized healthcare. Authors suggest that a fine-tuned revision of existing HTA and pharmacoeconomic's guidelines would be recommended, as HTA should be aware that the combination of genetic, clinical and environmental factors (including life style) is crucial for the planning of the future health care services.

In their report, Brettfeld et al. (8) review the genetic and epigenetic interactions in adaptive thermogenesis pathways, closely link with the onset of diabetes. The last two contributions deal with pharmacogenomics. Pea et al. (9) report on the performance and organizational aspects of a tertiary teaching hospital implementing a therapeutic monitoring system to personalise the antimicrobial dosing regimens in different patients' populations. Lastly, Quartuccio et al. (10) show the preliminary results of pharmacogenetic study on the interleukin-6 gene polymorphism in a cohort of patients with rheumatoid arthritis treated with rituximab.

In conclusion, the time when personalized healthcare will be fully implemented is hard to predict, certainly the march of technological advances is accelerating faster than clinical and public health progresses. Six years after the publication of the thematic issue of the Italian Journal of Public Health on public health genomics (11), we acknowledge the large contribution of genomics in both diagnostic and therapeutic fields. The evidence on the extent to which genomic information, however, has provided measurable population health benefits and actionable intelligence to citizens is limited. Public health practitioners are called to make efforts not only to demonstrate when genomics actually improves health, but also to create infrastructure needed to drive health benefits in the future.

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