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On the role of imaging and data analytics in personalized medicine and population health: a view from Philips

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Healthcare around the world is undergoing dramatic transformations, due primarily to the unsustainable rate of growth in the cost of care. In response, the community must provide better care at a lower cost. Personalized medicine plays an integral part in that.

At Philips we are pursuing a strategy in precision health, which links across the entire care continuum from monitoring of healthy living, to early and definitive diagnosis and prevention, to more precisely therapies, to enabling safer transitions from hospital to home-based care, and ultimately to healthy living again.

Imaging plays a central role in rendering definitive diagnosis and therapy selection. As a biomarker, imaging is needed for localization and staging of many diseases; it can be used to effectively segregate cohorts of patients by prognosis, and it can help select therapies, guide interventions, and monitor the effectiveness of therapies. Significantly, imaging –with its tissue-level view of the patient –wields even greater diagnostic power when combined with cellular-level views of the patient through histopathology, as well as the molecular level view through genomics, molecular pathology, and other ‘omics. To succeed, we need to apply analytics techniques to both extract greater information from each modality, as well as to establish causality between modalities operating at different scales.

The potential to extract greater information content is perhaps more pronounced with PET than any other imaging modality. Introduction of the digital PET (dPET) provides us with unprecedented resolution and CNR, which will likely translate into earlier diagnosis and greater quantification of disease. Yet evidence for improved diagnostic and prognostic value derived from these improvements are still accrued at present, especially in the context of oncology, neurology, and cardiac patients. The use of PET during interventional therapies remains largely unexplored at this time. PET can likely also play a greater role in producing dose maps of chemoembolization therapies. Additionally, the ability of PET to offer physiological and metabolic insights will likely be an important complement to cellular and molecular characterizations of disease.

In short, we believe that imaging in general, and molecular imaging in particular, needs to heed the call for value-based transformation of healthcare. The implication is that, we, as a community, needs to focus on providing greater clinical value in our imaging studies, and developing techniques which are easier to use, protocols which are more repeatable, and findings which are more quantitative and more indicative of pathological or physiological changes in patients.

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