CANCER: WHAT'S HAPPENING IN THE LAB THAT WILL CHANGE DIAGNOSIS AND TREATMENT?

When a patient receives a diagnosis of cancer it is life changing. Even after treatment and assurance that you are in remission, the cancer threat is never far away. Every time you go for a screening, the fear returns to haunt that maybe this time they will find additional tumors or cells that are not normal.

According to the World Health Organization (WHO), 8.2 million people die each year from cancer, an estimated 13% of all deaths worldwide. Most alarming regarding cancer is that it is expected there will be a 70% increase in new cases of cancer over the next decade, spread across more than 100 cancer types that exist, each requiring a unique diagnosis and treatment.

It is that unique cancer diagnosis and treatment that was front and center at last week's World Medical Innovation Forum sponsored by Partners Healthcare in Boston, MA. Amazing advances were revealed at this forum, including the "disruptive dozen" emerging technologies that have the potential to revolutionize cancer care over the next decade. Included among these are:

1. Cellular Immunotherapy,
2. Immune Modulators (checkpoint inhibitors) and vaccines,
3. Liquid Biopsy for oncology (a new type of blood test to replace invasive biopsies),
4. Machine Learning and Computational Biology,
5. Epigenetics external modifications to DNA that turn genes "on" or "off." affecting how cells "read" genes,
6. The Microbiome – examination of the microorganisms that live in our bodies,
7. Crisper Genome Editing,
8. Single-cell Molecular Profiling,
9. mHealth,
10. Patient-specific research that enables efficient drug development,
11. Redefining Value in Cancer Care: integrating patients into the decision-making process,
12. Nanotechnology.

It is interesting that among the disruptive dozen, three are patient centered research and initiatives that bring patients into the team for treatment evaluation, decisions and active participation in the discovery of new approaches to cancer:

Number 9, mHealth teams the patient with the provider to use digital smartphones that capture patient-generated information in real time, not only providing answers that might lead to specific treatment, but also to care that can improve the patient's quality of life by helping the patient navigate through complex medical systems and personalized social support.

Number 10 involves novel research strategies that allow individualized testing to predict treatment efficacy based on the patient's medical history.

Number 11 fosters the increasing involvement of patients and patient organizations in the decision-making process to improve value.

Among the highlights of the conference were the penetrating, science-focused sessions on epigenetics which described the complex science behind the regulation of how genetic information is processed and the development of therapies that leverage these alterations to target cancer.

Another key area, immunotherapy, focused on the promise of strategies for the treatment of cancer, highlighting the recent burst in the field of immuno-oncology, cancer research which seeks to understand how to utilize the body's adaptive immune defense against cancer's ability to evolve and evade destruction.

Several fireside chats provided insights into drug pricing, data sharing, collaboration, and patient-driven innovation. Andy Slavitt of CMS talked about the new block payment policies for primary care physicians, who in the end, he noted are responsible for all patient care including cancer.

A lively patient focused fireside chat with Nancy Snyderman, Journalist, and Kathy Giusti, the founder of the Multiple Myeloma Foundation and nationwide patient advocate brought a patient voice to the table., Kathy has been honored and cited by several prestigious organizations including Fortune Magazine's Worlds' 50 Greatest

Leaders and Time Magazine 100 List of the world's most influential people. Kathy was also named an Open Science Champion of Change by the White House in 2015, for her tireless work in educating patients in cancer and their disease and helping fund and develop ways to combat Multiple Myeloma, while battling her own cancer.
Additionally, there were several sessions devoted to discussing the "business" of cancer by panelists from several multinational companies, the pharma industry and key government representatives who outlined the complexity of raising the funding needed to meet the cost and dissemination of these breakthrough technologies and innovations and the need for reform of regulations that can accelerate diagnosis and provide better access to patients.
One theme was apparent throughout the conference – the increasing evidence that cancer is beginning to manifest as a chronic condition rather than a terminal disease. As such, there is much we have to learn about how the cost burden of long term treatment can be made equitable and possible for all patients.