“A Silent Cure”: Going Beyond Biology to Understand Cancer Prevention

An interview with former Damon Runyon Clinical Investigator Li Li, MD, PhD, MPH about the role of prevention in the continuum of cancer care

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Former Damon Runyon Clinical Investigator Li Li, MD, PhD, MPH has been appointed to the U.S. Preventive Services Task Force, a sixteen-member panel of experts that makes recommendations for screenings and other preventive healthcare measures for the entire U.S. population. He spoke with us about the role of prevention in the continuum of cancer care.

You’ve recently been appointed to serve as an expert on the U.S. Preventive Services Task Force. Could you tell us about what that task force does and what role you’ll be playing on it?

LL: The panel consists of sixteen primary care physicians – including experts in family medicine, internal medicine, OB-GYN, pediatrics, nursing, and behavior health – and we make independent and evidence-based recommendations for clinical preventive care for the entire U.S. population.

What’s an example of this kind of recommendation?

LL: It’s very broad. There’s a lot on cancer screening, but also screening for vitamin D deficiency. And, of course, you’ve heard a lot about aspirin. My own research is on aspirin and colon cancer. It’s confusing for the general public, as well as the primary care physician, whether we still recommend baby aspirin for primary prevention of cardiovascular disease and cancer. Those are some of the topics, actually.

The topics can be nominated by anyone in the public. We have what are called top prioritization meetings every month, and based on the public comments, we choose a topic to really dive into, gather the information and evidence, and we do a very comprehensive and systematic review of the evidence. It takes about two years to finish a whole topic.

You are a cancer researcher by training, but much of your research has looked at population-level questions. Why approach cancer research this way?

LL: You can look at [cancer risk] from different angles. You can look at biology, at biomarkers, and you can look at individual-level risk factors. We talk a lot about the individual lifestyle and environmental behavior. But we know that a complex health concern like cancer, or cardiovascular disease or diabetes, is not dictated by just one factor. There are multiple factors in play, from your biology, to your immediate environment and your lifestyle, to your community, and then to the societal and the policy level. For example, since the taxation of cigarettes, the general population smoking rate has dropped tremendously. So to really understand population health, you have to go beyond the single person in terms of biology and genetics.

My career really was supported by Damon Runyon, actually, starting off in the space – in the intersection of a molecule and the population. I'm so grateful for Damon Runyon for looking at my proposal [as a primary care physician], since they usually fund oncologists, pathologists, and so on. The Damon Runyon Clinical Investigator support for my first five years as junior faculty really shaped my career in that space.

How has our understanding of cancer risk has evolved in the past few decades?

LL: When I started my PhD in the early '90s, it was the era of nutrition epidemiology – a lot of people, myself included, focused on how diet impacted health. But in the last 25 years or so, we learned how to decode human genome, and [genomics] brings a different layer. Now we really appreciate the interaction of lifestyle and environment with genetic background. We call this gene and the environment interaction. Actually, my work supported by Damon Runyon Clinical Investigator Award was to focus on diet and DNA, and how that impacts colon cancer risk.

You've studied how people face different levels of cancer risk depending on where they live. How can research help us with that?

LL: Biology actually has a small impact on general health compared to the community environment. To quantify the impact of the community environment, we use what is called the neighborhood deprivation index, which is based on 19 parameters [such as median income and education]. We look at how the NDI impacts both health – in my case, colon cancer risk – and epigenetics. Meaning, not your genes, but gene modification, which impacts protein expression and function in your body. So that's the angle we take. We pose a multi-level monitoring approach to public health disparities.

When people think about cancer research, they tend to think about breakthroughs in treatments. They may not think about prevention as an important aspect of cancer care. But that is really changing in the research world, and you were at the vanguard

LL: I think Damon Runyon had the vision to fund me as an unusual candidate. That was, gosh, in 2001, a long time ago. Damon Runyon really had the long-term vision to view me as part of cancer research workforce. Because you're right – there are two ways to do this. The technology and the breakthroughs, the discovery is exciting. But in the meantime, in the very broad view of the population in terms of cancer health, we all say prevention is the best treatment.

A lot of the time we're talking about "from the bench to the bedside," meaning you have a discovery in the lab and take it to the [patient's] bed to treat disease. But what I do is really "from the bench to the bedside to the sidewalk," meaning that we take what we learn in the lab not just to patients but to average people on the street.

And it's the kind of thing where, if it's having a big impact, then it's a relatively silent impact, because it's working.

Many physicians who have an interest in research have difficulty finding time for their research. In your experience as a physician-scientist, why is it important to have people with clinical and research skills involved in cancer research?

LL: The physician-scientist brings a very unique perspective to cancer research in that they deal with real patients every day. The patient teaches you a lot – the patient can help you form hypotheses that you take to the lab, you do your research, and then the research results go back to the population. The physician-scientist in the best position to do this, what we call bidirectional or transition research.

Damon Runyon, actually, in my mind is the beacon in funding transitional research scientists. So it always has a unique space in my heart.

From your perspective as someone who is very well established, what challenges are early-career cancer researchers facing today? And what can funders, whether that's government or organizations like Damon Runyon, do to encourage talented scientists to stay in research?

LL: One thing I keep in mind myself is that science is a great profession. Think about it. You have a crazy idea and you write it up and somebody gives you free money to find out whether you're wrong or right. So that's the way I look at this, that's the upbeat attitude of our profession.

But indeed, I think it's getting harder and harder for the junior faculties to start their career. Because you have this clinical work cut out for you, it's [about] productivity. Funding has become tighter and tighter. I would say mentoring is the key. When you're starting your career, if you don't have the right mentor who instills confidence in you, it's going to be very hard. So you have to be passionate about it, and then have the mentor. And then you have the right setting to get started.

[In terms of funders,] the investment has to be long-term. As we see from the COVID-19 pandemic, the vaccine came out even better than anybody expected. That's science. Without investing worldwide in this basic science, 20, 30 years ago, we would not be here. Science is incremental, incremental, incremental, and then boom, you have a big discovery. Long-term investment in the infrastructure of a research pipeline, that's the key.

Is there anything else you want to convey to our current Damon Runyon scientists or our donors?

LL: We have to think about cancer as a continuum, all the way from risk reduction, primary prevention, secondary prevention and tertiary prevention, and then to treatment. It's not just about trying to find a miracle treatment for end-stage cancer. It's great to find a cure for cancer but, actually, we do have a cure. It's prevention.

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