CANCER PREVENTION & RESEARCH
INSTITUTE OF TEXAS

Bonds Are an Appropriate Funding Mechanism for CPRIT Research

Texas can use bonds to pay for cancer research and prevention activities because, like traditional infrastructure, full realization of the benefits will not occur for many years, the full cost of getting the "benefits" is too much to absorb on a pay-as-you-go or short term basis, and the benefits are a public good in that they benefit everyone in society.

Government plays a major role in providing traditional infrastructure designed for public use, such as highway and water systems. States and municipalities customarily rely upon long term debt to finance public infrastructure. From an economic perspective, it makes sense to use long term debt for these capital assets because the enduring downstream benefits far exceed the prohibitive cost of initial acquisition.

Capital assets are not always physical; human and intellectual capital are often necessary to create other goods. Innovation and scientific advancement improve economies. The Texas Legislature's use of bond financing to support grants for cancer research and prevention beginning in 2007 is consistent with this concept. Basic research, like a highway system, is valuable to society primarily because of the activity and goods it stimulates downstream. Cancer research satisfies all three criteria for infrastructure resources. First, it is available and multiple users may access the research at the same time without diminishing its value. Second, society derives the value of research from its downstream uses, which in relation to oncology, become drugs, devices, and diagnostics. Third, basic research supports a wide range of downstream uses, including contributing to additional knowledge, sustaining and improving area hospitals, and developing, manufacturing, and distributing cancer screenings, diagnostics, and cures.

Independent economists calculate the direct benefit of CPRIT's $300 million in fiscal year 2017 expenditures to the Texas economy to be $706 million in real gross product and 10,139 jobs. Including secondary benefits these values rise to $10.9 billion in output and over 98,000 jobs. Therefore, similar to traditional infrastructure, the far-reaching value of capital investment in research like CPRIT, is recognized as contributing significantly to economic growth and social welfare.

It takes 15 years, on average, to develop an oncology drug from laboratory discovery to practical application. The market is capable of funding later stages of drug development as the potential treatment clears regulatory hurdles; however, it is less likely to supply private funding for the big, new ideas that are the foundation of today's innovative drugs. Similarly, while a new highway stimulates downstream private market activities far exceeding the capital investment, the market is unlikely to supply the resources necessary to construct the necessary infrastructure on its own.

An example of the value of scientific discoveries as a capital investment in the state's economy through the 20-year timeline and development process for CPRIT Scholar James Allison's discovery to become a lifesaving cancer immunotherapy. His discovery is derived from early

study of the biology of T-cells. The breakthrough came in identifying an antibody that blocked the "checkpoint" protein on T-cells, unleashing the body's immune system to attack tumors.

Not unlike how the construction of a highway system transforms a city's economy, the foundation laid by Dr. Allison's discovery in the 1990s developed into the first checkpoint inhibitor drug, Ipilimumab (known commercially as Yervoy), available in 2011 for the treatment of late-stage melanoma. Today there are immunotherapy drugs available to treat lymphoma, lung, renal, and other forms of cancer, as well as thousands of clinical trials investigating new therapies stemming from Dr. Allison's initial discovery.

For his "entirely new principle for cancer therapy," Dr Allison, recruited to Texas with a CPRIT grant to head MD Anderson's Immunotherapy Department, received the 2018 Nobel Prize in Medicine. Dr. Allison credits basic science for its critical role as "the fundamental foundation for major advances in medical treatment…[W]ithout that early funding of basic science from the government, many of the therapies that currently treat millions of cancer patients worldwide simply wouldn't exist."