

Economic Analysis of HB 18-1121
“No Funding Trafficking Aborted Human Body Parts”

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HB18-1121 terminates state funding to institutions of higher learning that engage “directly or indirectly in the harvesting, trafficking, purchasing, or selling of aborted human body parts” (HB18-1121). This bill would remove general funds appropriated under Section 23-1-104 of the 2016 Colorado Revised Statutes to state universities and colleges that report using aborted human body parts. According to email correspondence with Prime Sponsor, Representative Timothy Leonard, the intent of this bill is to reduce demand by research institutions to end the market for trafficking aborted human body parts. This bill represents an inappropriate action on the part of the state government to interfere in the efficient allocation of research materials. Specifically, the bills reduces the supply of research materials to colleges and universities, thus degrading contributions to medical and biological advancement.

Two qualities on these contributions, nonrivalry and nonexcludability, are characteristics of a public good. Knowledge produced by state universities **is, for the most part, a public good**. It is nonrivalrous, as the use of such knowledge by one person does not reduce the quantity or quality. Furthermore, **university research is generally nonexclusive. A majority of research produced by universities is published**. The act of publication shows intent to open the research to the public both to inform and to test reproducibility.

While the public may read the work, there is some exclusion to the use due to intellectual property laws. Initially, these laws were created to encourage public goods, as assigning property rights to guarantee a short-term monopoly on the IP encourages the creation of public goods. Though this means that research output is not totally nonexclusionary at first, eventually, the monopoly expires leading to a more pure public good.

The bill restricts supply of aborted human body parts, in turn restricting research opportunities and methods available to scientists. This leads to an underprovision of the public goods universities contribute. Positive externalities that are a consequence of medical advancement are diminished through this.

Biological research uses two products of abortion: embryonic stem cells (“eST”) and human fetal tissue (“HFT”). This paper focuses on the use of HFT instead of eST. This is because eST can be reproduced outside of living tissue, so this bill would not restrict their supply. Its principal effect, therefore, would be to restrict the supply of HFT. This paper examines the likely consequences of any such restriction.

HFT is used in biological research into human development and infectious diseases such as HIV/AIDS and Hepatitis B and C (Wadman 2015). Researchers utilize HFT samples to simulate human organs and immune systems in laboratory animals. This enables studies on the human body without the need for developed human subjects. HFT is more effective at accomplishing this than lab-grown eST due to higher cell diversity (Wadman 2015), and is currently a necessity in replicating human biology at various stages of development.

Research by public institutions historically and contemporarily provide positive returns on investment to society. The development of polio vaccines is an example of how public universities have utilized HFT to make discoveries that dramatically improve public health. In 1948, discoveries by John Enders and Thomas H. Weller created the ability to grow polio virus cultures using human embryonic lung tissue (Enders 1949).

These discoveries allowed for polio vaccine research to occur at a much more efficient rate. Four years later, Jonas Salk of the University of Pittsburgh, facilitated by Weller’s cell

culture discovery, created the first vaccine for polio. Within a year, polio cases in the US dropped by nearly 300% (History.com Staff 2010). UNICEF estimated that global polio vaccination continued to prevent around 550,000 deaths annually through the 1990's (UNICEF 1996). These successes have yielded immense economic benefits and general cost reductions in the healthcare industry. Such advances relied on both HFT technologies and public institutions.

Today, HFT is used by public universities in studies of other infectious diseases as well as studies on human development. Notably, Dr. Lishan Su of the University of North Carolina uses HFT to regrow human bone marrow, liver, and thymus cells in mice for study on HIV/AIDS (Wadman 2015). This methodology assisted in studying prophylactic drugs' effectiveness in treating HIV/AIDS both before and after exposure. Two new treatments, pre-exposure prophylactic ("PrEP") and post-exposure prophylactic ("PeP") were developed with the assistance of HFT. PrEP is estimated to reduce the chance of infection by sexual contact by 90% and infection by drug injection by 70% (CDC). PeP has some effect when administered within 72 hours of contact, but the exact effectiveness is unknown. Su's mice are used to study how the herpes simplex virus may change the effectiveness of these drugs in preventing HIV infections.

The public goods that this research provides tackle some of the more pressing issues in medical science. In 2016, there were nearly 40,000 new diagnoses of HIV in the US (HIV.gov). The potential for improvement in societal health is immense. HFT is an integral part to developing treatments for some of the most problematic diseases affecting the US and global populations.

Within Colorado, Dr. Ramesh Akkina of Colorado State University uses HFT in the hopes of developing drugs for HIV that have topical applications (CVMBS). His research requires multicellular systems that can currently only be derived from HFT. Therefore, as

acknowledged by the Vice President of Research at CSU, his research cannot be completed without it. By restricting the use of HFT, any public good that Dr. Akkina's research can provide is lost due to an interference in the HFT market by the state government.

There are four prominent university campuses in Colorado that would lose funding under this bill for their use of HFT: Colorado State University at Fort Collins, the University of Colorado ("CU") Boulder, CU Denver, and CU Anschutz Medical Campus. Respectively, state general funds represented 13.0%, 9.0%, 15.3%, and 23.1% of total operating funds for these campuses in the 2016-2017 fiscal year (Joint Budget Committee 2018). Due to the percentages of funding the state provides, it is likely that this bill will attain the goal of reducing demand for research samples. Considering there is no guaranteed revenue compensation from these research activities, universities would likely comply and cease HFT research for budgetary concerns.

From here, market forces would typically create a reduction in the supply of aborted human body parts to reflect this change in demand, but HFT exchange is not a typical market. Current regulations prevent abortion decisions from being affected by the use, if any, to which aborted fetal material is directed. Under Title 42 of the US Code, Sections 289g-1 and 2, there are several measures taken to prohibit the donation of HFT from having an effect on both the decision to abort a pregnancy and the methods used in the procedure (Colorado Revised Statutes). Most importantly it is illegal to accept donations of HFT when the pregnancy was terminated to provide such a donation. Until after the procedure, information on donations cannot be shared and decisions to donate cannot be made. These existing laws ensure the current supply of HFT is not related to research demand.

In addition, the tissue itself cannot have a price. Tissue is usually donated to independent research supply companies who store and eventually redistribute the samples. Here, suppliers can only charge for shipping and handling; there is never a price for the actual tissue. Therefore, supply of HFT is independent, and HFT donations exist as positive externalities to researchers.

Considering decisions to abort are independent from research demands, this bill would have very little impact on the HFT supply. Instead, it will prevent research demands from being met. Public goods which universities provide are then negatively affected as researchers are unable to conduct practices with HFT, using less productive methods such as using eST. As research effectiveness slows, positive externalities associated with medical research and advancement are also reduced.

The proposed legislation has very few positive economic impacts if any. Instead, it harms the economies of research and public well-being in Colorado. Due to existing legal requirements in the HFT market, the bill cannot accomplish its market goals. Decisions for abortion must be independent from decisions to donate, meaning the bill is ineffective in terms of HFT supply. Rather, restricting supply to universities creates research inefficiencies and diminishes the supply of public goods. This is not the government's place to act.

Public goods that our universities and colleges produce to decline in quality and quantity when such restrictions are applied. If this bill were to pass, expected public health and well-being would suffer. The government should work to protect public goods, as they are equally enjoyed by all in nonrivalry and nonexcludability. HB18-1121 should therefore not be considered for general vote by the state assembly. I urge the committee to postpone the bill indefinitely.

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