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Health and Government Operations Committee

Subcommittees

Estates and Trusts

Health Facilities and Occupations

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Testimony in Support of HB1256
Maryland Department of Health – Gene Synthesis Providers and Manufacturers of Gene Synthesis Equipment – Certification

Chair Pendergrass, Vice Chair Pena-Melnyk, and esteemed colleagues of the Health and Government Operations Committee,

HB1256 creates a series of guidelines and certification recommendations for gene synthesis providers and manufacturers of gene synthesis equipment. Additionally, it requires gene sequencing and screening for any person seeking treatment. Numerous organizations, businesses, and individuals utilize synthetic genome to reimagine the treatment of both medical and cosmetic conditions. This legislation assures that gene synthesis organizations are selling specimens and equipment that meet necessary standards to safeguard genetic material.

As the technology continues to evolve, federal and state officials must ensure that the process by which genes are synthesized, sold, and utilized is safe. These safeguards are known as biosecurity. The movement toward biosecurity was spearheaded in 2020 by California, which passed the first set of mandates in the country requiring proper consumer screening and restricting bad-faith actors' ability to access genetic material to make dangerous and pathogenic viruses. Additionally, while many bio labs already follow the actions outlined in this bill, it is vital to set a baseline by which all labs must operate, leveling the playing field in the gene synthesis market.

As outlined by Dr. Rachel West and Dr. Gigi Kwik Gronvall of John Hopkins University in *Nature Biotechnology* (see attachment 1), "It is no longer sufficient for voluntary participation in guidance to oversee a matter of national and international biosecurity. Governments around the world should follow California's example by strengthening biosecurity rules that require synthetic DNA sequence screening."

I have received several questions regarding the intent of this legislation. Therefore, I sent these inquiries to a technical expert who responded to the bill's more complex issues and scientific scope. For a more in-depth understanding of this legislation, please see the questions and answers supplied in attachment 2.

As our state and country move into this new healthcare and treatment territory, I encourage my colleagues to remain diligent in order to ensure that we are protecting our citizens' safety and well-being. I urge the committee to pass a favorable report on HB1256.

Sincerely,

Karen Lewis Young

Delegate Karen Lewis Young, District 3A

Attachment 1: Nature Biotechnology | Volume 38 | September 2020

Check for updates

correspondence

California shows the way for biosecurity in commercial gene synthesis

To the Editor — On 21 January, California took a major step to increase biosecurity in commercial gene synthesis, introducing legislation that requires all scientists purchasing gene synthesis products to use companies that perform screening on customers and the sequences they order. If enacted, this legislation would make it a competitive advantage for companies to take biosecurity seriously. Here, we argue that the US federal government and other governments should emulate California's actions.

Assembly member Rudy Salas (assembly district 32) introduced the legislation, which requires not only that customers use companies that perform biosecurity screening but also that companies offering DNA synthesis services in California perform sequence screening[1]. These restrictions would make it harder for a potential nefarious actor to access genetic material for making pathogenic viruses de novo, such as smallpox, Ebola or influenza. The de novo synthesis of known pathogens, particularly small viruses, is listed as one of the most pressing biodefense risks by a 2018 report from the National Academies of Sciences, Engineering and Medicine[2].

Many commercial gene synthesis companies already voluntarily screen customer orders to make sure that they are both selling to scientists working in regulated research institutions and not selling anything that could be potentially harmful. In 2010, the US Department of Health and Human Services issued voluntary guidance for companies, including steps to take if there is a sequence or customer of concern[3].

Because it costs time and money to perform biosecurity screening, responsible companies that voluntarily take this step have until now been at a competitive business disadvantage[4]. The California legislation seeks to tackle this by requiring that all DNA synthesis companies undertake sequence screening, thus leveling the playing field. The California legislation also has a mechanism for eventually requiring screening of smaller gene synthesis products than the current Department of Health and Human Services guidance calls for, a necessary step to keep up with advances in biotechnology[5].

Of course, there are limits to how much California can do by itself, as this legislation would apply only to California state funds and California gene synthesis companies. Although California is a biotech giant, with several gene synthesis companies, gene synthesis is international, with a global market valued at over $200 million in 2017 and projected growth to over $600 million by 2022 worldwide[6].

It is time for the US federal government and other governments to put in place regulations that ensure DNA sequences of pathogenic agents do not fall into the wrong hands. It is no longer sufficient for voluntary participation in guidance to oversee a matter of national and international biosecurity. Governments around the world should follow California's example by strengthening biosecurity rules that require synthetic DNA sequence screening.

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Competing interests

The authors declare no competing interests.

Attachment 2: Technical Intent and Scope Questions and Answers

What is included in the definition of Gene Synthesis? Does it include all DNA and RNA constructs, or only complete genes? What about diagnostic probes and primers or controls for DNA and RNA sequencing?
Currently the federal guideline referenced in the bill covers only synthetic dsDNA. Sequences of every length are covered by the guidance (so diagnostic probes or PCR primers for other uses are covered). In sequences of more than 200bp, the criteria is for the sequence to be a best match to a select agent or commerce control list agent over any 200bp stretch. Notably, SARS-CoV-2, which causes COVID-19, is not regulated by the select agent or commerce control lists, which are foundational for the federal guidance. Generally, an emerging disease is not listed as a select agent or commerce control listed agent until it is no longer endemic in the U.S. This avoids burdening clinical specimen transfer and things like diagnostic oligonucleotide ordering. As was the case with SARS-CoV-1, which caused a smaller pandemic in 2003-2004, and which was listed after the end of its natural transmission.
https://www.phe.gov/Preparedness/legal/guidance/syndna/Documents/syndna-guidance.pdf

Why is this bill being advanced at the State as opposed to federal level? How would/will it harmonize with actions that may be taken at the federal level?
There is not a federal law to ensure best practices in the synthetic DNA industry. However, California AB-1966 requires compliance with the federal guidance by recipients of state funds, similarly to that which is being sought in this MD bill (https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB1966). Members of the International Gene Synthesis Consortium (IGSC) also voluntarily comply with the U.S. guidance (https://genesynthesisconsortium.org/wp-content/uploads/IGSCHarmonizedProtocol11-21-17.pdf), but there is not a similar consortium specific to MD or to the enterprise in the entire U.S.. Establishing best practices to ensure that mishaps do not occur that would threaten the development of the MD biotechnology enterprise will help to ensure that our state continues to be a leader in this important and growing field.

How will the state define the regulatory structure/bureaucratic infrastructure to implement this legislation?
The implementation of the requirement that state fund recipients must purchase synthetic nucleotides from MD companies that comply with the federal guidelines or from companies certified by CA can be managed through the mechanisms that already manage compliance with other state requirements by recipients.

How does the proposed framework/legislation ensure that DNA synthesis companies can continue to perform their normal work of providing genes to customers?
DNA synthesis companies should already be complying with the federal guidelines. If they are not compliant, then they are putting both people and the industry itself at risk. The risks associated with the potential delivery of sequences that could allow the synthesis, manipulation, or isolation of select agent or commerce control list pathogens is so great that a mishap would have costs measured in both the health of Marylanders and our biotechnology industry. Compliance requires only that sequences being synthesized for customers be run through an automated database. This is a very low burden and is a small marginal component of the cost of providing synthetic DNA to customers. If companies are given a sufficient lead time (6mo - 1yr) to implement compliance mechanisms, then the establishment of the requirements envisioned in this statute will not adversely affect any business operations.

How will the State address concerns that if an out of State company did not go through the Maryland certification process that Maryland companies would be prohibited from buying

reagents or equipment from them and thereby negatively impact their legitimate and legal business activities?
Only Maryland companies in receipt of state funds are intended to be covered by the legislation. Also, only the purchase of synthetic dsDNA is covered by the federal guidance that is foundational for the proposed legislation. Purchases of equipment or non-dsDNA reagents are not covered. It is important to encourage the growth of the MD biotechnology industry. MD companies who are compliant with the regulations should see a boost in sales as individuals in receipt of state funds (e.g., academic researchers) will be funneled toward their products. This should not be too large a burden for researchers in MD, as the cost per nucleotide across companies varies only slightly and is universally low. For example, companies such as Twist Biosciences and Thermo Fisher sell synthetic dsDNA at low cost and at competitive market rates while also adhering to the federal guidelines.

With Maryland becoming the second state to adopt such legislation we will be putting the industry on notice that MD takes biotechnology seriously and is willing to take proactive steps to ensure that the industry grows safely and securely in our borders. As the COVID-19 pandemic has shown, the types of pathogens that are regulated by the select agents' program and the commerce control list have the potential to disrupt lives, economies, and entire nations. It is critical that MD takes steps to ensure that our businesses are safe from potentially releasing anything similar. This is a reasonable step toward ensuring that our industry is aware of the risks posed by synthetic DNA and of the methodologies to avoid those risks.