

Biometrics against Bioterrorism; Steps for Trans- national Countermeasure Strategies

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Summary

Biometric provides a comprehensive defence capability against threats from adversaries which increases its robustness. This can be done by using a detector to detect virus, bacteria, other micro organisms and biotoxins. It is expected to provide the complete safety of the individual and the country.

Introduction

Due to various factors like advances in biomedical technology, emerging infectious diseases research and other related activities, knowledge, materials, and equipment needed for manufacturing biological weapons are spreading rather rapidly. Consequently, fears relating to mass casualty terrorism and gross violations of Biological Weapons Convention (BWC) are also rising. Unlike nuclear weapons, where at least 5–15 kilograms of fissile material is required to build a rudimentary fission bomb, no such barrier exists for biological weapons. The dual-use nature of the equipment and supplies make biological weapon programs easy to hide under the guise of legitimate biomedical activities. Only small quantities of pathogens are required for seed stocks, and biological agents emit no detectable signal, making them virtually impossible to detect remotely. There is a general term, biometrics, which includes processes for verification and identification of individual or a group to ensure safety and security for the general public from any threat. Biometrics involves the autonomous recognition of human's physical and behavioral characteristics through sensory mechanism. Biometric provides a comprehensive defence capability against threats from adversaries which increases its robustness. This can be done by using a detector to detect virus, bacteria, other micro organisms and biotoxins. It is expected to provide the complete safety of the individual and the country.

History

Biometrics has become a critically important topic of research for scientist, researchers and engineers after 9/11. Following the fears of Anthrax and other agents' usage, there is a heightened level of attention to this kind of

threats and more measures are being put in place in order to avert these threats. It is needless to stress that biometrics plays a major role in serving the purpose. On the other hand, India relies heavily on the traditional security apparatus of the police and other security agencies to deal with many security challenges including cross border terrorism, illegal migration and monetary exchanges. Since 26/11, there is a need to do more with reference to maritime security as well. These kinds of threats make it necessary for the Indian security system to adapt biometric applications. However, despite this, research and development activities in this field are lagging behind in India as not many institutes are involved in biometrics research. Therefore, its time India brings strong institutional support for research and development in this area since it can play a crucial role in counter-terror strategies.

Developed countries like the United States are paying much attention to add biotechnology to their biometrics approach. This can be observed by looking at the advancement of biotechnology in the United States. It is estimated that by the end of the 20th Century, biotechnology contributed nearly half a million jobs and \$47 billion in business revenue annually to the US economy.¹ Similarly, China now has about 20,000 people working in 200 biotechnology laboratories.² Mostly laboratories like these work towards developing defence mechanism against biological attacks.

Using biotechnology in identifying a biological attack

Biotechnology applications are extremely useful for tracking the source of any biological attacks and also for taking further action against the culprits of that attack. However, the complexity of the system would require advance setup of coordination efforts between different agencies of the

government and outside. This is because a large count of known viruses and bacteria can be used in attacks and there can be unknown new microorganisms used for the same. These can cause disease in humans, animals and crops. Even the worst case is that the terrorists can project their attack from the subtle to the apocalyptic. Therefore, the first task would be to bring about congruence in the disease-surveillance data from a variety of government and public health sources towards determining which areas might get affected and to what degree. An effective defence requires setting priorities which includes indentifying the most likely near-term threats and implementing research, detection and response agendas designed to be able to better manage future threat scenarios.

Biometrics is a source that is rich in profiling information related to the biology like all DNA synthesis orders from all suppliers worldwide. Importantly, anticipation of potential terrorist strategies, analyses of the symptoms related to all the probable diseases etc forms the basis for a promising technology. A biometric system makes use of various sensory mechanisms to assess both identity and physiological state of an agent. It also includes checking the symptoms of the individual by face recognition and diagnostic tests. These data are then transferred to data management body where it is matched with disease surveillance data. In case an emergency situation is identified as a biological attack, the next step is to identify the source organism which leads to the next step of speedy disbursement of necessary antibiotics and drugs in the affected areas. Fumigation of the ozone and other disinfectants are immediately used in the disease prone area. Improved international disease surveillance might also detect the presence of covert biological weapon programs in the event of an accident that infects the local population.

International efforts

a. Diplomatic Coordination:

Efforts by the World Health Organization (WHO) to implement the Global Outbreak Alert and Response Network are well placed and the recently revised WHO International Health Regulations, which require reporting of any disease of international public health concern within 24 hours, when fully implemented, will have public health and security benefits for all nations. These efforts need sustained and global diplomatic and financial backing.³ Ultimately governments around the world must know that this spreading of disease does not depend on boundaries and public health is a great issue for all mainly during international travel and commodity transfer. Also this leads to the development of vaccine against that particular microorganism and to be served to people for their future security.

b. Research Coordination:

Exchanges of best practices at pathogen collections or biocontainment facilities that work with deadly pathogens can be undertaken in order to improve safety and security so that the risks associated with accidents or diversion could be reduced. This would help promote interaction among biomedical practitioners engaged in potentially dangerous research. International association and collaboration among biologists, medical professionals, and public health practitioners would help address emerging infectious diseases and the transparency produced through such collaborations would have, as a collateral benefit, the potential to detect covert activities.

Implementing defensive countermeasures against biological attacks will require not only research but drug development and distribution plan. According to the reports

of the Biotechnology Industry Organization, nearly 100 companies are seriously engaged in advanced research on finding answers to bioterrorism and its effects.⁴ Their research includes using technology facilities to develop new antibiotics, vaccines and antiviral drugs. Some of these are reported to be in the advanced medical trial stages. Research is also in progress in order to develop advanced oral vaccines that are capable of boosting immunity in a shorter period compared to the existing medicines⁵. These developments, if effective will be useful against bioterrorism attacks. Similar research is underway on other diseases as well

Pre-emptive measures can be taken to destroy the weapon before they can be launched, it can be done practically by opening the wings of biological facilities and weapons are easy to find. Research is also underway to identify simpler way to destroy these pathogens. Efforts to improve intelligence on suspect groups or individuals are useful; however, there are no technical fixes in the offing that will allow intelligence agencies to improve their ability to detect covert biological weapon programs in the future.

Conclusion

The best way for the defence is to discover and implement anti factor on organism-by-organism basis so that one can win in this biological arms race.⁶ It will be vital from a strategic perspective to consider carefully what types of biodefence work should be classified. It needs to be debated further whether it would be legal and wise to have classified biodefence research produce genetically modified pathogens that to our knowledge, no adversary has yet created. Claire Fraser once said, "Terrorists could potentially make use of public genome sequences, however it is also argued that

such sequences should remain in the public domain because these ‘maps’ are still relatively rough. Genomics should be used to identify and fight bioterrorism, not to restrict research.⁷ Hence with the advancement of biotechnology, its results and new products should be included to biometrics so that the future biological attack can be easily recognised and may be stopped before it will become epidemic. It is the right time for India to pay attention to the biometric side along with the research in biotechnology. This will certainly make the nation to stand against any future bioterror attack. Vaccines, antibiotics and drugs should also be produced against every new microorganism. There should be complete database of all discovered genome sequences which can help in the research activities of the nation.

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Endnotes:

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⁴ Brower, V. (2003). Biotechnology to fight bioterrorism. *EMBO reports*, vol. 4, no. 3, p. 228.

⁵ *ibid*

⁶ Greninger, C. F. (2004). Biotechnology and Bioterrorism: An Unprecedented World. *Survival*, vol. 46, no. 2, p. 154.

⁷ Brower, V. (2003). Biotechnology to fight bioterrorism. *EMBO reports*, vol. 4, no. 3, p. 229.