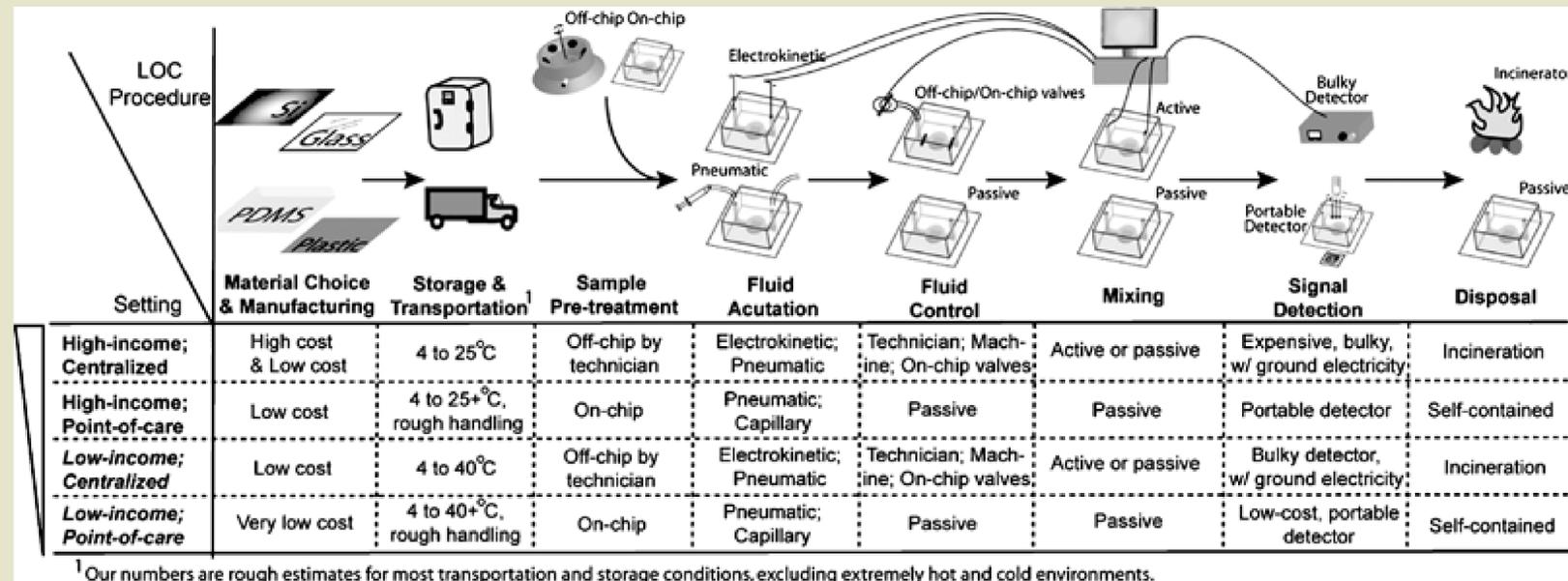


Ayushi Gupta and Autumn Laird

LAB-ON-A-CHIP

Lab-on-a-chip is a miniature device, usually the size of a credit card, with microchannels that handle fluids and carry out the same processes that are primarily handled in the laboratory. These devices are extremely versatile and are able to carry out numerous processes, including diagnostic blood testing for diseases such as cancer and infectious diseases. The tiny microchannels and/or electronic signals allow the chip to take blood samples and separate and purify the blood in order to test for biomarkers. Each step accomplished in a traditional diagnostic lab can be carried out on one tiny device.



SUSTAINABILITY

There are three aspects of sustainability: environmental, economic, and social. The environmental definition of sustainability is being mindful of the earth's limited resources. Lab-on-a-chip is sustainable in this way, as it uses less materials than traditional diagnostic labs. Economically, sustainability is being able to continue to produce the product indefinitely. Because of lab-on-a-chip's cheap nature, it is economically sustainable. Lastly, social sustainability has to do with sustaining quality of life. Lab-on-a-chip has the ability to detect diseases such as cancer early, significantly improving cancer patients' quality of life. Also, the detection of infectious diseases will improve quality of life in developing countries, as significantly less people will die due to infectious diseases.

DETECTING CANCEROUS EXOSOMES

One of the many applications that lab-on-a-chip has in the biomedical engineering field is a chip that can detect cancerous exosomes in the blood. In the blood, there are exosomes, which contain proteins and RNA, that circulate through the body. These exosomes can be important indicators of early stages on cancer. Therefore, bioengineers are working to create a lab-on-a-chip device to detect these exosomes before the cancer can spread to other parts of the body. This would revolutionize the way we diagnose and treat cancer.

IMPACTS OF LAB-ON-A-CHIP

Lab-on-a-chip also has the ability to detect infectious diseases in the blood. This application is especially promising for developing countries, as they do not have the resources to test for these diseases. Not only would this lab-on-a-chip stop the spread of infectious diseases, its small size and low cost allows it to be easily transported to these countries, who need access to diagnostic tools.

