# Deploying aptameric sensing technology for rapid pandemic monitoring


## Abstract

The genome of virulent strains may possess the ability to mutate by means of antigenic shift and/or antigenic drift as well as being resistant to antibiotics with time. The outbreak and spread of these virulent diseases including avian influenza (H1N1), severe acute respiratory syndrome (SARS-Corona virus), cholera (Vibrio cholera), tuberculosis (Mycobacterium tuberculosis), Ebola hemorrhagic fever (Ebola Virus) and AIDS (HIV-1) necessitate urgent attention to develop diagnostic protocols and assays for rapid detection and screening. Rapid and accurate detection of first cases with certainty will contribute significantly in preventing disease transmission and escalation to pandemic levels. As a result, there is a need to develop technologies that can meet the heavy demand of an all-embedded, inexpensive, specific and fast biosensing for the detection and screening of pathogens in active or latent forms to offer quick diagnosis and early treatments in order to avoid disease aggravation and unnecessary late treatment costs. Nucleic acid aptamers are short, single-stranded RNA or DNA sequences that can selectively bind to specific cellular and biomolecular targets. Aptamers, as new-age bioaffinity probes, have the necessary biophysical characteristics for improved pathogen detection. This article seeks to review global pandemic situations in relation to advances in pathogen detection systems. It particularly discusses aptameric biosensing and establishes application opportunities for effective pandemic monitoring. Insights into the application of continuous polymeric supports as the synthetic base for aptamer coupling to provide the needed convective mass transport for rapid screening is also presented.