

Need for the Development of Point-of-Care Diagnostics to Combat Infectious Diseases in Farm Animals

Tripti Jain¹, Sharad Mishra^{2*}

¹Animal Biotechnology Centre, Chhattisgarh Kamdhenu Vishwavidyalaya, Chhattisgarh, India

²College of Veterinary Science & Animal Husbandary, Durg and Director, Chhattisgarh, India

Editorial

Received date: 04/05/2018

Accepted date: 08/05/2018

Published date: 11/05/2018

*For Correspondence

Sharad Mishra, Professor & Head (L.P.M.), Incharge (I.L.F.C.), College of Veterinary Science & Animal Husbandary, Durg and Director, Kamdhenu & Panchgavya Research & Extension Center, Chhattisgarh Kamdhenu Vishwavidyalaya, Chhattisgarh, India.

E-mail: lpmsharad@rediffmail.com

Point-of-care (POC) tests are the transportable version of assays that deliver clinically relevant information at or near the site of treatment without the requirement for a clinical laboratory. In general POC testing involves any test which is done anywhere outside the core clinical laboratory. POC test may be mentioned as a pen-side test, near patient test, remote test, satellite test, rapid and point of use diagnostics. A wide variety of people including laboratory professionals, healthcare practitioners to layperson can perform the POC test. It is often performed with the use of portable and handheld devices and test kits. POC devices come in the array of formats- basic dipstick, handheld device to molecular analyzers. Although in absence of portable devices, bench top analyzers or equipment can also be used to perform the test.

Nowadays technologies have been developed to make POC tests simple and cost-effective. At present, results from clinical laboratories are now supplemented by tests performed outside of the laboratory i.e., POC test. Due to growing need for faster test results, there is increasing trend of POC tests in different areas. Over the years, POC testing is continuously moving forward than earlier. POC test has become recognized worldwide and already signified its vital role in public health i.e. glucose monitoring devices to manage diabetes and many more. POC testing has been emphasized as the standard requirement of care in the disaster situation.

The driving idea behind POC test is to make available the quick and convenient diagnostics directly to the patient/ healthcare without the need of the clinical laboratory. Immediate results provide better prompt clinical management of disease or ailment. There is an increase in trend of the market for POC test due to their potential operational benefits i.e., it delivers immediate results, rather than in hours or days so that quicker and better decisions can be made regarding treatment and prevention of disease. One can receive immediate follow-up testing or treatments. It is worthwhile to move attention on preventive health care, early diagnosis and handling chronic conditions in long-term. There is an emergent need for rapid mass screening for infectious diseases. POC tests are useful for screening of those diseases particularly in remote or resource-limited areas where there is no access to the clinical laboratory. Derived from emerging applications in resource-limited areas, recently multiplexed POC testing has become more vital for pen side testing, which is the simultaneous on-site detection of multiple analytes from a single sample/ assay permitting a rapid, cost-effective and reliable diagnosis. POC tests for infectious diseases can also lead to earlier treatment means the better recovery in turn prevention of spread means better preventive health care. In case of an epidemic when the time is of prime importance, POC tests provide quick and direct evidence about causative agent. Looking into the importance of POC testing in infectious disease, it is the fastest emerging area of POC testing. These tests for infectious diseases are envisioned for quick diagnosis so that can be followed by timely treatment in turn limited spread and for prevention of outbreaks. Thus POC test is suitable for preliminary or emergency disease screening and for use in facilities with limited resources. They also allow point-of-care testing in primary care for things that previously only a laboratory test could measure. In dairy farms, the infection-causing sexually transmitted reproductive disorder causing abortion and infertility, zoonotic diseases, respiratory syndrome, and mastitis are the area of interest where innovative multiplex POC tests may possibly help. When POC testing is used as part of a long-term health care policy, it can result in smoother and more efficient diagnosis and treatment in turn better control of diseases. It is most valuable when POC tests are regarded as a preliminary step in a testing range which ultimately leads to corresponding tests in a clinical laboratory.

Although POC tests are intended to be relatively simple, quick, cheap and convenient sometimes they are not accurate. One should handle the POC test carefully following test directions and be acquainted with the test and detection system. The convenience of POC doesn't allow the user to apply beyond proposed purpose or misread the results. Person handling POC test should be careful enough when comparing test results from different tests. Follow up diagnosis is important due to the lower sensitivity of some POC tests otherwise that may result in missing some early infections. While speed and convenience are advantages of POC tests, specificity and sensitivity of POC test results may equal to clinical laboratory test results. POC tests may provide a narrower range of results when compared to complete laboratory diagnoses, so POC test must be followed by a laboratory test. In the present scenario, POC test is the valuable tool for testing at point-of-care but must be coordinated with central laboratory tests to be best benefited.

To make them more efficient, there is need to design and develop POC test fulfilling following demands-low sample consumption or the ability to measure in non-invasive samples, quick and simple, long shelf life with extended reagent storage, comparable test results with clinical laboratory findings ensuring international quality standards, cheap and portable readout systems along with disposable test strips or cartridges, equipment-free or Smartphone-based devices (for the resource-poor settings), capable of simultaneous on site quantification of various analytes from a single sample, capable of distinguishing all possible subtypes of infectious agent.