



LABORATORY MEDICINE:

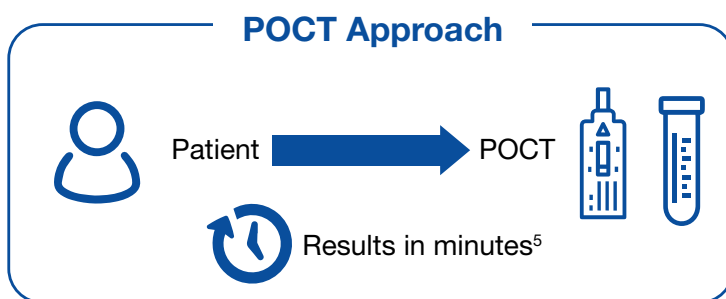
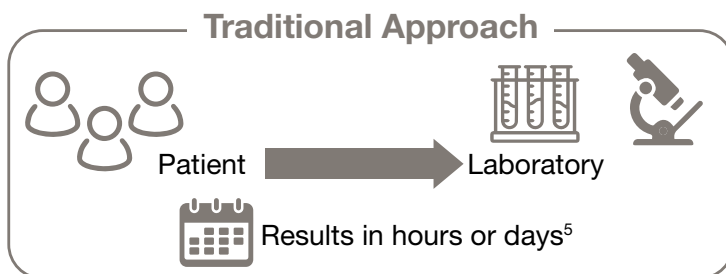
Advantages of Point-of-Care Testing (POCT)

Point-of-Care Testing (POCT) refers to diagnostic tests performed at or near the patient, such as in clinical settings, ambulances, or the patient's residence. The typical context for POCT is when traditional lab testing cannot provide results soon enough for patient management¹.

POCT has evolved to include the use of portable and benchtop analyzers, test strips, cartridges and kits, a wide variety of analytes, and numerous specimen types, including blood^{2,3}.

The technology enables diagnostic evaluation without the reliance on laboratory infrastructure, averting the requirement for sample transport, and reducing processing times⁴.

In general, POCT technologies are as accurate and precise as analyzers in centralized laboratories⁵.



POCT has significantly improved patient morbidity and mortality, and is considered to be an essential component of a number of clinical disciplines^{6,7,8}. It can reduce costs, enhance workflow efficiency, and improve patient care⁹.

The adoption of POCT delivers on the *Quadruple Aim*



Improve patient outcomes

Positive clinical outcomes from POCT have been reported worldwide⁴. POCT reduced the 30-day readmission rate for acute coronary syndrome from 10.4% to 4.2%, and hospital death rates from 15.8% to 9.8%³.



Improve health of general population

Point-of-care units have a real potential to reduce morbidity and mortality in all population groups⁴.



Improve healthcare sustainability

POCT speeds patient care, potentially reducing wait times in the ED, and easing lab workload, thus increasing efficiency and saving money⁹.

The employment of POCT has resulted in significant improvement in clinical outcomes, operational improvements, and economic benefits⁴.



Improve care team well-being

POCT is typically performed by non-laboratory-trained individuals, such as nurses, physicians, respiratory therapists, perfusionists, anesthesia assistants, midwives, and paramedics, as well as patients¹⁰. Laboratory staff provide necessary quality assurance oversight. Nurses report that it can significantly increase job satisfaction⁹.

The Value of Point-of-Care Testing: Illustrative Examples

Bedside POCT in critical ED patients

POCT in critically ill ED patients significantly reduces bedside test turnaround time (TAT)¹¹.

Physicians and nurses are satisfied with POCT in critical care ED: 92% report great overall value¹¹.

Improvements with POCT

Use of POCT reduces the median time to completion of IV contrast¹¹.

When widely used, POCT is associated with greater reductions in ED length of stay (LOS)¹¹.

-46%

-60%

81 MINUTE TAT REDUCTION

112 MINUTE LOS REDUCTION

Point-of-Care Testing Related to Cardiovascular Disease

A European study found that decreased procedure costs far outweigh the cost of a POCT¹².

In the ED, a rapid test of cardiac markers can reduce delays¹³, with estimated savings of over \$1,000 per day per patient¹⁴.

Improvements with POCT

Significant procedure cost savings⁴.

Reduced inpatient stays in coronary care units¹².

-55.6%

-38.4%

\$69,003 SAVINGS

2 DAY REDUCTION

Evaluation and Management of Acute Dyspnea

POCT measurement of B-type natriuretic peptide (BNP) in ED improved treatment of acute dyspnea, reducing total cost of treatment¹⁵.

A study in Alberta, utilizing POCT reduced ECHOs and hospitalization, saving \$990,543 per annum¹⁶.

Improvements with POCT

Reduced hospitalization¹⁴.

Reduced time to discharge¹⁴.

-12%





-27.3%

75% HOSPITALIZATION IN BNP GROUP

3 DAYS IN BNP GROUP

In the United States in 2020, there were more than 130 analytes that could be assayed by a waived POCT device, with other non-waived analytes performed at the point-of-service due to the availability of smaller, robust instruments¹⁸.

Delivery on Quadruple Aim

Therapeutic Area	Intervention	Improved Health of General Population	Improved Healthcare Sustainability	Improved Care Team Well-being
 Cardiovascular	Early-stage detection of myocardial infarction ⁵ .	Reduces unnecessary and costly hospital transfers. Patients can receive care in their community ⁵ .	Hospital death rates for acute coronary syndrome dropped from 15.8% to 9.8% ⁴ . 30-day readmission rate for acute coronary syndrome reduced from 10.4% to 4.2% ⁴ .	Enables accurate and prompt diagnosis and risk stratification ⁴ . Allows clinicians to meet turnaround time requirements ⁹ .
 Emergency Department	Rapid blood sample analysis ⁴ .	POCT blood analyzers provide data during patient examination, reducing turnaround time ⁵ . More rapid and informed decisions for diagnosis and treatment of diseases, both acute and chronic ¹⁷ .	Satisfaction of time constraints to meet hospital accreditations ^{18,19} . Shortened hospital stay to 43 minutes per patient, saving \$111 per patient and \$7,350,000 annually ²⁰ .	Decreases the length of stay for patients and increasing the efficiency of the ED overall ⁹ .
 Trauma, Surgical, and Critical Care	Baseline panel of blood tests can be done quickly ⁹ .	Significant reductions in the transfusion of some blood products ⁵ . More efficient determination of the number of blood coagulation-related parameters during surgery ⁴ .	POCT is an essential component of the constant monitoring necessary for trauma patients ⁹ .	POCT blood collection is comfortable and convenient for clinicians ⁹ .
 Remote	Access to testing in remote or rural areas ⁵ .	POCT significantly improved diagnostic accuracy for 43% of rural patients ⁴ . Community pharmacies can be practical venues to screen global infectious diseases ⁵ .	Decreased transfers to base hospital by 62%, and increased hospital discharges by 480% ⁴ . Faster decisions in remote sites with blood taken from a finger stick ⁹ . Remote POCT for cardiac troponin can improve patient care ⁵ .	Enables clinicians to evaluate the patient's status, and to discuss results and treatment plan in a more relevant timeframe ¹⁵ .

References

- ISO 22870:2016. Point-of-care testing (POCT) - requirements for quality and competence. Geneva (CH): International Organization for Standardization; 2016.
- St John A, Price CP. Existing and emerging technologies for point-of-care testing. Clin Biochem Rev. 2014;35(3):155-167.
- Males RG, Stephenson J, Harris P. Cardiac markers and point-of-care testing: a perfect fit. Crit Care Nurs Q. 2001;24(1):54-61. doi:10.1097/00002727-200105000-00010.
- Wong HY, Loredana GM, Parange NA. Review of Health Economics of Point-of-Care Testing Worldwide and Its Efficacy of Implementation in the Primary Health Care Setting in Remote Australia. Risk Management and Healthcare Policy. 2020;13:379-386. Downloaded from https://www.dovepress.com on 2021.07.24.
- Point-of-Care Testing: Summary of Evidence, January 2019 Update. Canadian Agency for Drugs and Technologies in Health (CADTH).
- Price CP. Point of care testing. BMJ. 2001;322(7297):1265-1268. doi:10.1136/bmj.322.7297.1265
- Price CP. Point-of-care testing. Impact on medical outcomes. Clin Lab Med. 2001;21(2):285-303. doi:10.1016/S0272-2712(18)30035-0
- St John A. The evidence to support point-of-care testing. Clin Biochem Rev. 2010;31(3):111-119.
- Quig, Wheatley, O'Hara. 2019. Perspectives On Blood-Based Point-Of-Care Diagnostics. Open Access Emergency Medicine, 291-296. Available from https://www.dovepress.com. Accessed 2021.07.24.
- Shaw JLV. Practical challenges related to point of care testing. Practical Laboratory Medicine. 2016;4:22-9.
- Adam J, Singer, MD, Justin Williams, BS, Maria Taylor, RN, Deborah Le Blanc, RN, Henry C. Thode Jr., PhD. Comprehensive bedside point of care testing in critical ED patients: a before and after study. American Journal of Emergency Medicine 33 (2015) 776-780.
- Spalding GJ, Hartumpf M, Sierig T, et al. Cost reduction of perioperative coagulation management in cardiac surgery: value of 'bedside' thrombelastography (ROTEM). Eur J Cardiothorac Surg. 2007;31(6):1052-1057. doi:10.1016/j.ejcts.2007.02.022
- Arthurs O, Pathayak S, Bewley B, et al. Clinical impact of point-of-care testing using the OMNI-S blood gas analyzer in a neonatal intensive care setting. Point Care. 2010;9(1):21-24.
- Blick KE. Economics of Point-of-Care (POC) testing for cardiac markers and B-Natriuretic Peptide (BNP). Point Care. 2005;4(1):11-14.
- Mueller C, Scholer A, et al. Use of B-Type Natriuretic Peptide in the Evaluation and Management of Acute Dyspnea. The New England Journal of Medicine. Vol 350, No 7. 2004.02.12.
- Chuck A, Jacobs, P. Cost Estimation of Point of Care B-Type Natriuretic Peptide for the Diagnosis of Heart Failure in the Emergency Department: Application to Alberta. Alberta Heritage Foundation for Medical Research, Information Paper #25. 2005.
- Daly, J. The expanding role of point-of-care testing in patient care. Medical Laboratory Observer. 2021.07.23.
- Guidelines Used in Chest Pain Center Accreditation. American College of Cardiology Accreditation Services. https://ovquality.acg.org/accreditation/services/chest-pain-center-accreditation/CPCGuidelines. Accessed 2019.
- Alberts MJ, Latchaw RE, Jagoda A, et al. Revised and updated recommendations for the establishment of primary stroke centers: a summary statement from the brain attack coalition. Stroke. 2011;42(9):2651-2665. doi:10.1161/STROKEAHA.111.615336
- Schilling, UM. Time is money - the economic impact of point of care on the Emergency Department of a Tertiary Care University Hospital. Point Care. 2014;13(1):21-23.