

Can we justify the use of a CD4 Point of Care test in a time of austerity?

Pizzo E^{1*}, Jones CB², Obi A³, Mackie N³, Bailey AC³

1.Imperial College Business School ; 2.Imperial College London; 3.Imperial College Healthcare NHS Trust
* Corresponding author: Pizzo E. PhD, e.pizzo@imperial.ac.uk

1. Background and Aims

The monitoring of absolute CD4 T-cell levels remains an important prognostic marker in the management of HIV-infected individuals. Point of care tests for CD4 cell count have been developed and may be useful for streamlining patient pathways.

The aim of this study was to assess the costs associated with use of a new CD4 POCT as compared to the standard laboratory assay.

2. Methods

Object: new pathway incorporating a PIMA (Alere Medical) CD4 POCT versus standard care pathway using a laboratory CD4 assay

Prospective study: in two phases: 1) Pathway mapping and collection of data on current pathway
2) Implementation of PIMA CD4 and collection of data on new pathway

Patients: Newly diagnosed and stable patients (CD4>350, not on antiretrovirals), attending a London HIV service.

Data collection: Self-completed questionnaire to all patients to capture relevant socio-demographic and clinical information, service utilization, time spent in clinic and private costs; Administrative data and a work diary to monitor clinical activities.

Perspective: organisation and patients perspective

Costs: 1) Clinical costs: costs data associated with each pathway and activity (staff pay, overhead costs, materials)
2) Patients' private costs: productivity loss, transport costs and other costs.

Transport costs were extrapolated over a year for both PIMA and laboratory testing pathways, utilising the expected number of planned patient visits both prior to and following the introduction of PIMA testing.

Clinical pathway data were compared to assess the impact of POCT in terms of costs and outcomes using STATA 12.

3. Results

In total 199 patients (43 new diagnoses, 156 stable off treatment) were recruited of whom 87.4% were male and 77.4% Men who have sex with Men.

The level of satisfaction with the current CD4 testing was high, but higher following the introduction of the POCT (p<0.001).

There was no difference in reported anxiety about CD4 testing in the stable participants (p=0.544). However, among new participants there was a trend towards decreased anxiety following the introduction of POCT (p=0.11).

3.1 Clinical costs

The POCT pathway was more expensive per test for the clinic than the laboratory assay, even allowing for reduced recall rates (11% to 0%) with associated savings of staff time. This increased cost relates to the cost of the test itself and the increased amount of healthcare worker time needed to perform the test in comparison with a standard venepuncture (tab. 1).

Tab. 1 Clinical costs of the two pathways

	Recalls (%)	Unitary cost of test	Unitary cost of staff time	Total unitary cost	1 Year cost
Laboratory CD4 testing	35% (new) 6% (stable)	£ 25.97	£ 5.26	£ 31.23	£ 234.88
POCT CD4 testing	0	£ 35.00	£ 8.88	£ 43.88	£ 264.96
<i>difference POCT-Lab</i>		£ 9.03	£ 3.62	£ 12.65	£ 30.08

3.2 Patients time in clinic and productivity loss

3.2 Patients time in clinic and productivity loss

Patient reported length of time in clinic fell significantly with the introduction of the new POCT: from 140 to 70 minutes (median) for new patients (p<0.001) and from 60 to 46 minutes for stable patients (p<0.001).

36% of participants reported taking time off work to attend for CD4 testing (median 2.75 hours) (tab.2). The median hourly wage among those employed was £15 per hour (11.7% were unemployed) but the reported monetary value of one hour lost is on average £ 27.38, for an average productivity loss of £ 7.26 (lab' testing) and £4.38 (PIMA testing) per patient per visit.

Tab. 2 Patients reported time taken off work – Value of time

	Time taken off work (average hours)	Monetary value of one hour lost (cohort data)	Average total productivity lost (value*time)	Average productivity lost assuming average wage
Laboratory CD4 testing-stable patients	3.78	£ 21.25	£ 80.50	£ 130.71
Laboratory CD4 testing-new patients	4.7	£ 33.08	£ 155.48	£ 128.71
Laboratory CD4 testing	3.92	£ 23.22	£ 6.55/patient	£ 7.26/patient
POCT CD4 testing stable patients	2.81	£ 25.34	£ 71.41	£ 77.17
POCT CD4 testing -new patients	2.95	£ 57.75	£ 170.36	£ 80.78
POCT CD4 testing	2.75	£ 32.28	£ 7.55/patient	£ 4.38 /patient
Average (all patients)	3.31	£ 27.38	£ 5.99/patient	£ 5.74/patient

3.3 Patients transport cost

The median travel time and cost for a single visit was not different between PIMA and laboratory phases of the study (tab.3). However, over one year the patients undergoing POCT will save in transport time and cost due to fewer visits and recalls (tab.4).

Tab. 3 Patients reported transport time and costs for a single visit

	Time transport (av.minutes)	Average transport cost (return)	Transport costs over one year
Laboratory CD4 testing- stable pat.	42.88	£ 5.66	£ 23.01
Laboratory CD4 testing-new patients	48.43	£ 6.13	£ 54.16
Laboratory CD4 testing	43.79	£ 5.72	£ 26.94
POCT CD4 testing stable patients	46.72	£ 5.91	£ 11.83
POCT CD4 testing -new patients	32.50	£ 7.05	£ 35.28
POCT CD4 testing	43.28	£ 6.21	£ 18.00
Average (all patients)	43.54	£ 5.97	£ 22.28

4. Conclusions

Over one year, the clinical cost of the POCT pathway is higher compared to the laboratory testing (£ 30.08 more) (tab.1).

However, when patients' productivity loss and transport costs were included, over a one year time horizon, POCT saved £12.02 per patient overall (Lab testing £298.47, POCT testing £310.49) and is therefore highly cost effective.

3.4 Total cost for 1 year testing

In one year the total cost of each pathway including clinical and private costs is higher for the laboratory pathway. (tab. 4)

Tab. 4 Total costs over one year (per patient)

	Visits/recalls	Product. loss	Transport costs	TOTAL COST
Laboratory CD4- stable pat.	4 visits/6% rec.	£ 15.59	£ 23.01	£ 273.47
Laboratory CD4-new pat.	8 visits/35%rec.	£ 227.31	£ 54.16	£ 516.43
Laboratory CD4 testing		£ 48.67	£ 26.94	£ 310.49
POCT CD4-stable patients	2 visits/no rec.	£ 5.94	£ 11.83	£ 282.72
POCT CD4-new patients	5 visits/no rec.	£ 40.39	£ 35.28	£ 340.63
POCT CD4 testing		£ 15.51	£ 18.00	£ 298.47
Difference POCT- Lab		-£ 33.17	-£ 8.94	-£ 12.03

Disclosure

This article presents independent research commissioned by the National Institute for Health Research (NIHR) under the Collaborations for Leadership in Applied Health Research and Care (CLAHRC) programme for North West London. Support was received from the host institution and from Alere Medical who supplied POC testing equipment and cartridges free for the study. The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

References

- Herbert et al. Sexually transmitted infections (2012); 88, 413-417
- Larson et al. JID (2012); 61; e13-e17
- Jani et al. Lancet (2011); 378; 1572-79