

Measuring the Impact of Digital Dashboards on IQC/ Maintenance Monitoring: Implementing Formstack & Tableau Data Systems

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Introduction

The recording and monitoring of Internal Quality Control (IQC) and maintenance data in laboratories can be improved by implementing software combining electronic forms (Formstack) that transfer data to a digital dashboard (Tableau) in a streamlined paperless system. Digital dashboards facilitate continuous monitoring of compliance to IQC and maintenance procedures. This project aimed to assess if standardisation and implementation of a digital Internal Quality Control (IQC) and maintenance monitoring system improves compliance with Internal Quality Control (IQC) procedures and standards of ISO 15189 Medical laboratories requirements for quality and competence.

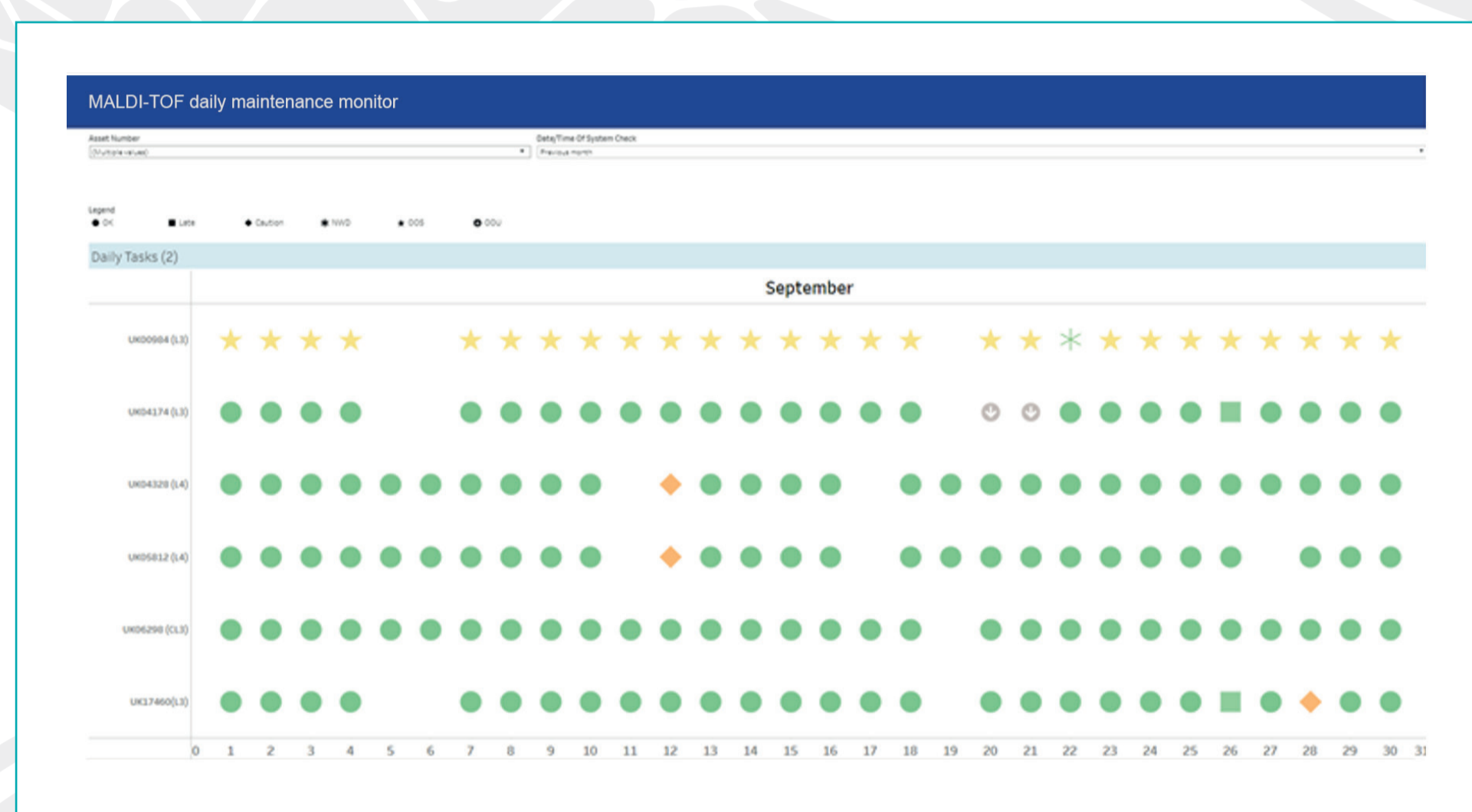


FIGURE 1: Example of a maintenance dashboard in Tableau

Method

Three representative laboratory sections were selected for implementation of digital dashboards including: MALDI-ToF MS (equipment), EliTech (equipment), and the Tissues and Fluids laboratory section. The level of compliance with Internal Quality Control (IQC) and maintenance procedures pre and post implementation of the digital dashboards was analysed statistically using "N-1" Chi-squared test by MedCalc statistical software to establish impact.

Results

A significant increase ($p < 0.05$) in compliance with Internal Quality Control (IQC) procedures was observed across all three sections: MALDI-ToF MS from 50.0% (3/6) to 100.0% (6/6) compliance (see fig 2).

MALDI-ToF MS IQC Record

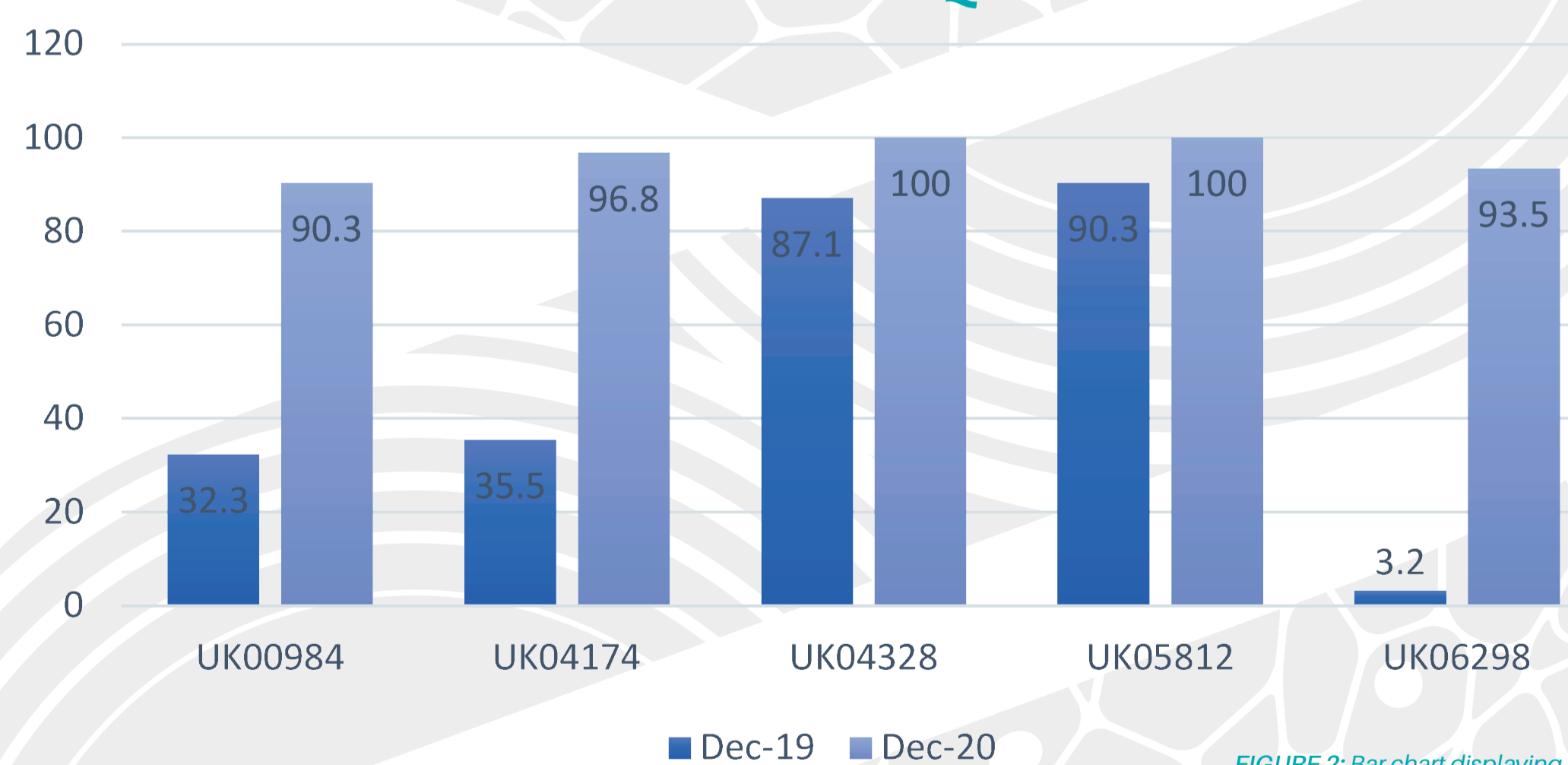


FIGURE 2: Bar chart displaying the frequency of completed IQC and maintenance records for each MALDI-ToF MS for the month of Dec 2019 and Dec 2020

Pre & Post Implementation Compliance with Completions of IQC and Maintenance Records for the MALDI-ToF MS Platforms in Infection Sciences

MALDI-ToF MS platform	Location	Dec-19		Dec-20		Sig.	p value *
		%	n	%	N		
UK00984	L3	32.3	10/31	90.3	28/31	Yes	$p < 0.01$
UK04174	L3	35.5	11/31	96.8	30/31	Yes	$p < 0.01$
UK04328	L4	87.1	27/31	100	31/31	Yes	$p = 0.04$
UK05812	L4	90.3	28/31	100	31/31	No	$p = 0.07$
UK06298	CL3	3.2	1/31	93.5	29/31	Yes	$p < 0.01$

*p value of <0.05 is significant

ELITECH IQC Record

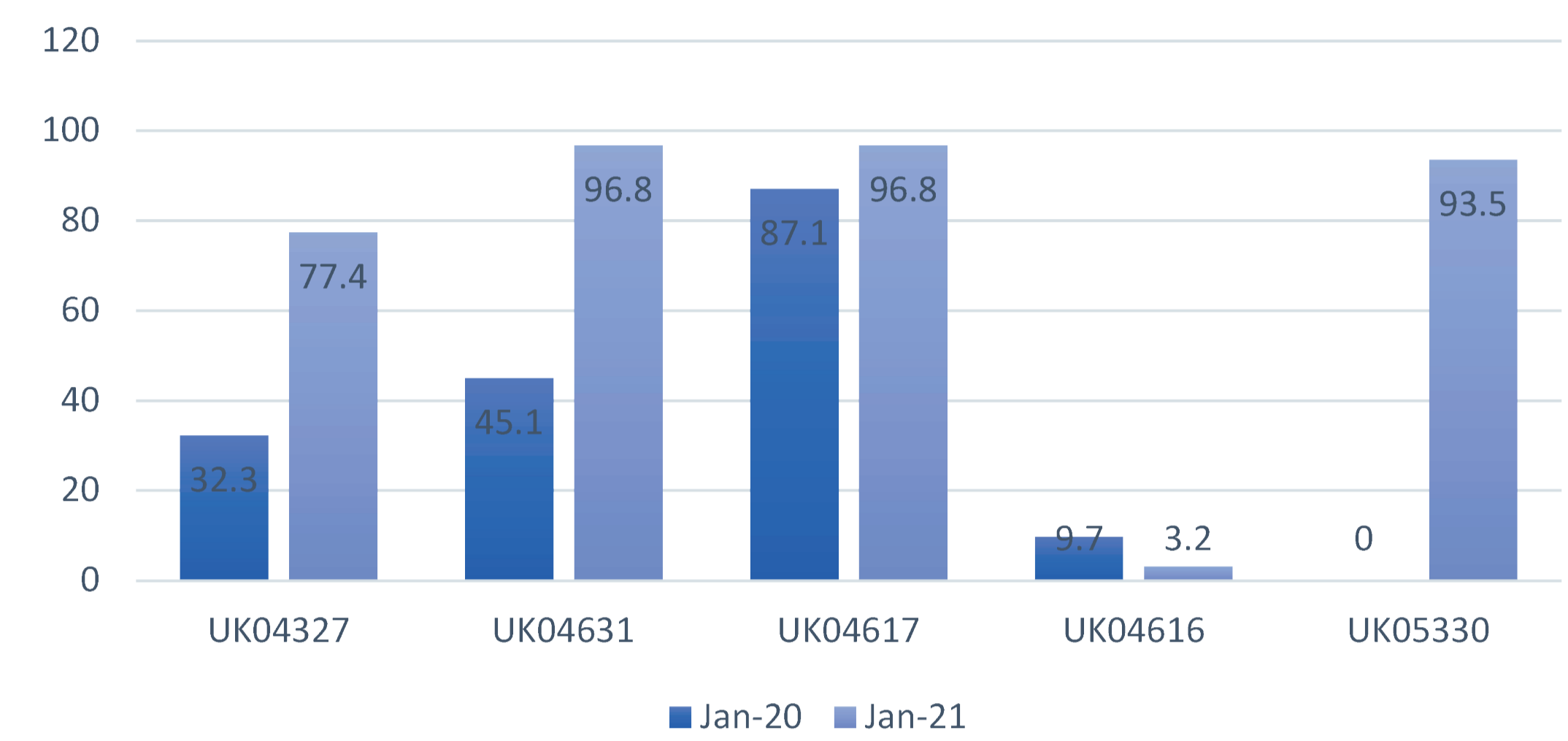


FIGURE 3: Bar chart displaying the comparison of the frequency of EliTech IQC and maintenance records for the month of Jan 2020 and Jan 2021

Tissue & Fluids Section IQC Record

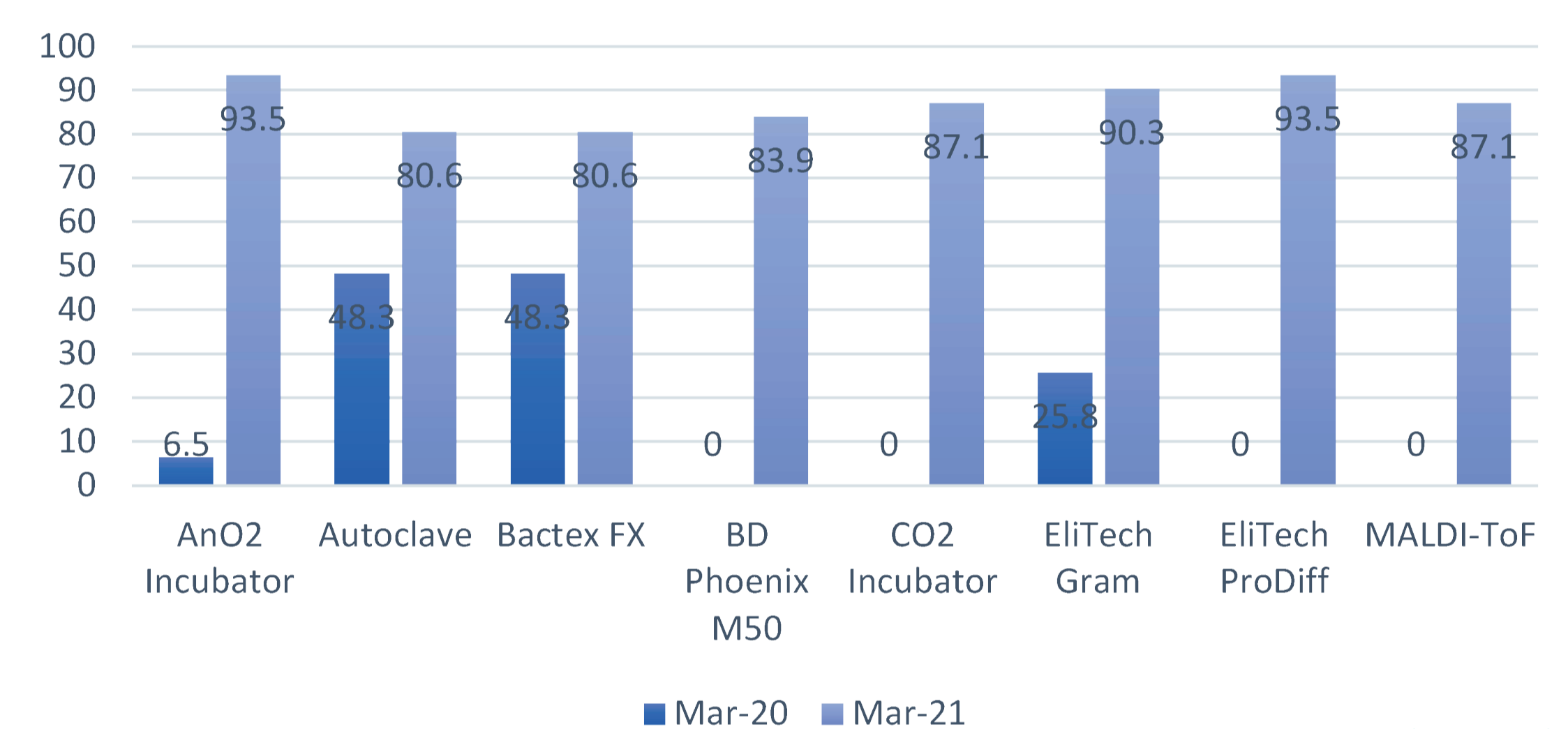


FIGURE 4: Bar chart showing the frequencies of completed Tissues and Fluids section IQC and maintenance records for each equipment in the month of March 2020 and March 2021

Pre & Post Implementation Compliance with Completions of IQC and Maintenance Records for CL3 Tissues and Fluids Section

Equipment	Asset Identifier	Mar-20		Mar-21		Sig.	p value *
		%	n	%	N		
AnO2 Incubator	UK07047	6.5	2/31	93.5	29/31	Yes	$p < 0.01$
Autoclave	UK05092	48.3	15/31	80.6	25/31	Yes	$p < 0.01$
Bactec FX	UK04625	48.3	15/31	80.6	25/31	Yes	$p < 0.01$
	UK04626						
	UK04627						
BD Phoenix M50	UK04633	0	0/31	83.9	26/31	Yes	$p < 0.01$
	UK04632						
CO2 Incubator	UK05359	0	0/31	87.1	27/31	Yes	$p < 0.01$
EliTech Gram stain	UK04631	25.8	8/31	90.3	28/31	Yes	$p < 0.01$
EliTech ProDiff	UK05330	0	0/31	93.5	29/31	Yes	$p < 0.01$
MALDI-ToF	UK06298	0	0/31	87.1	27/31	Yes	$p < 0.01$

*p value of <0.05 is significant

Conclusions

This project has demonstrated that implementing a standardised electronic system for recording and monitoring of Internal Quality Control (IQC) and maintenance activity in the laboratory has led to a significant improvement in compliance with procedures. Future work will focus on implementing the standardised electronic system across all sections in the laboratory which will inevitably lead to improved adherence to ISO 15189.

REFERENCES

1. Formstack.com. Formstack. Published online 2020. Available at: <https://www.formstack.com/> (Accessed: 14 October 2020)
2. Tableau.com. Tableau. Published online 2020. Available at: <https://www.tableau.com/>