

# C. difficile Detection Rates in Stool Specimens Using a Two-Step Algorithm

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## Introduction

In April 2009 our laboratory introduced a new two-step testing algorithm for detecting *C. difficile* in liquid stool samples, combining detection of the *C. difficile* common antigen glutamate dehydrogenase (GDH) and toxins (CDT) with Xpert™ *C. difficile* PCR (Cepheid) to detect the toxin B gene. This latter test also detects the binary toxin gene and *tcdC* deletion, which are markers of PCR ribotype 027.

We present our initial experience of the routine use of this algorithm on clinical samples and compare the performance of CDT detection with PCR.

## Method

All patients aged three years or older from whom a liquid stool specimen was received and tested for the presence of *C. difficile* between 23/04/09 and 30/09/09 were included in the analysis.

Following initial screening for GDH and CDT using the *C. DIFF QUIK CHEK COMPLETE*™ (Techlab) test, all GDH-positive samples underwent Xpert™ *C. difficile* PCR (Cepheid).

Samples were inferred to contain toxigenic *C. difficile* organisms if positive results were obtained for GDH and toxin B PCR.

## Results

Over the 6 month period, liquid stool specimens were received from 2636 patients and tested for the presence of *C. difficile*.

Using the *C. DIFF QUIK CHEK COMPLETE*™ test, GDH was detected in 222 (8.7%) of the samples, 77 of which were also positive for CDT. One of these samples was PCR-negative, however *Campylobacter jejuni* had previously been isolated in a recent sample from this patient.

The remaining 76 CDT-positive samples were all PCR-positive for the toxin B gene, with 24 having the molecular features of ribotype 027.

Amongst the 145 GDH-positive but CDT-negative samples, 73 were PCR-positive and eight of these were consistent with ribotype 027.

PCR ribotype 027 was presumptively detected in 32/222 (14.4%) of the GDH-positive samples, and CDT was detected in 24/32 (75.0%) of these. In contrast, CDT was only detected in 52/117 (44.4%) of samples in which only the toxin B PCR component was positive (table 1).

Figure 1. Flow diagram showing the results of each component of the two-step testing algorithm.

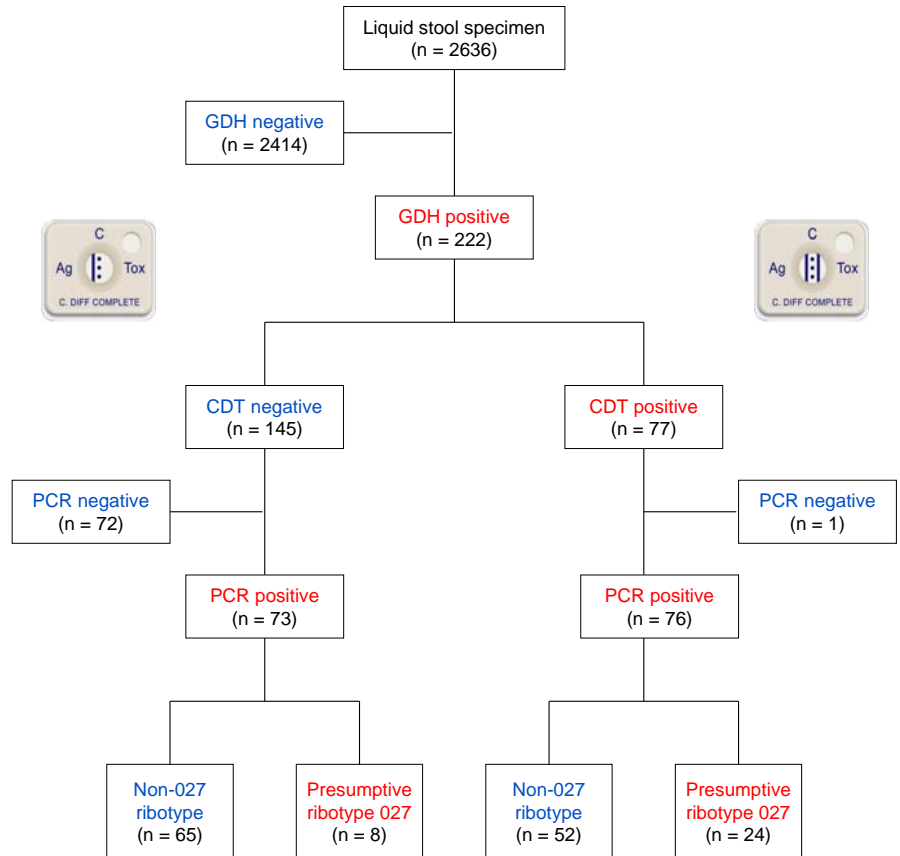


Table 1. Toxin detection in stool samples according to the presence of PCR ribotype 027

		Presumptive PCR Ribotype 027		
		Present	Absent	
<i>C. DIFF QUIK CHEK COMPLETE</i> ™ CDT Component	Positive	24	52	76
	Negative	8	65	73
		32	117	149

## Conclusions

- Using this algorithm 149/2636 (5.7%) of our samples were inferred to contain toxigenic *C. difficile* organisms, and CDT detection alone would have missed 73/149 (49.0%) of these.
- CDT detection rates were significantly higher ( $P = 0.001$ ) in samples with the molecular characteristics of PCR ribotype 027 compared to samples lacking these features. As the *tcdC* deletion results in loss of suppression of CDT production, this observation may be indicative of higher CDT concentrations in stools containing the 027 ribotype.
- In addition to lacking sensitivity, reliance solely on CDT detection may therefore overestimate the relative burden of ribotype 027 by underestimating the contribution of other ribotypes.