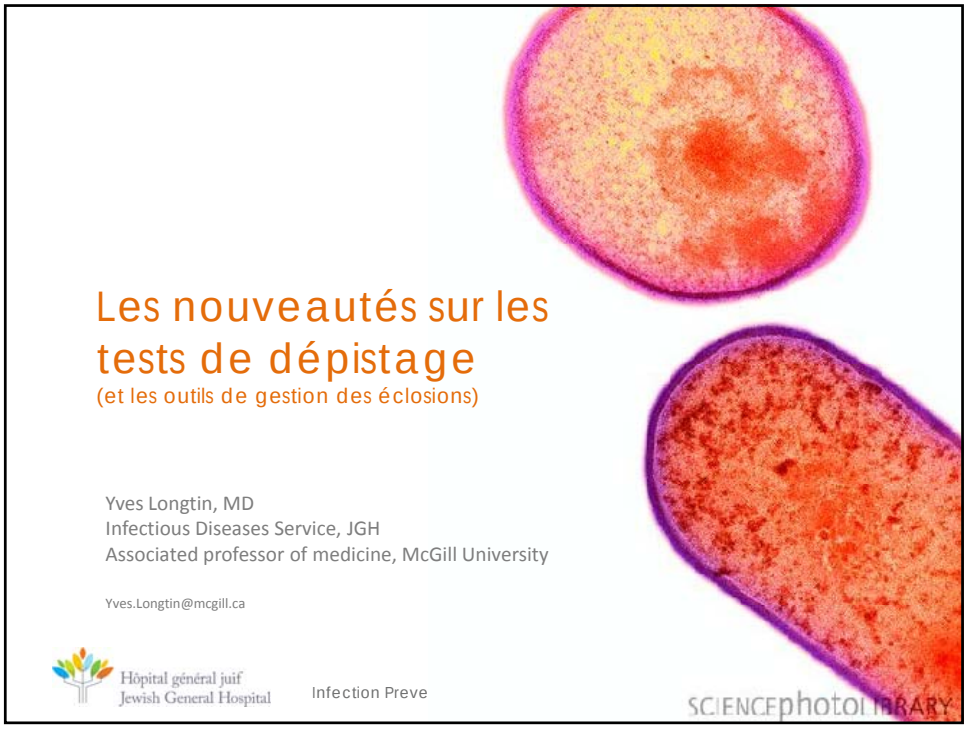
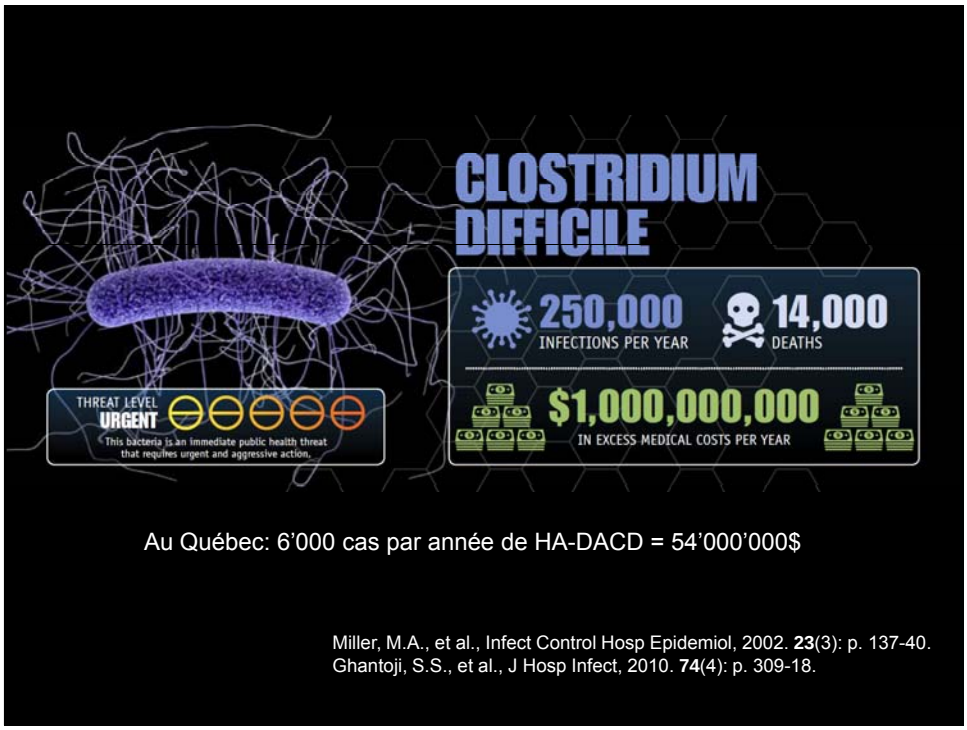
Cette présentation a été effectuée le 26 novembre 2013, au cours des « 4es Journées sur la prévention des infections nosocomiales (Jour 2) - 10 ans de prévention et de contrôle des infections : qu'avons-nous appris pour guider nos actions? » dans le cadre des 17es Journées annuelles de santé publique (JASP 2013). L'ensemble des présentations est disponible sur le site Web des JASP à la section Archives au : http// jasp.inspq.qc.ca/.

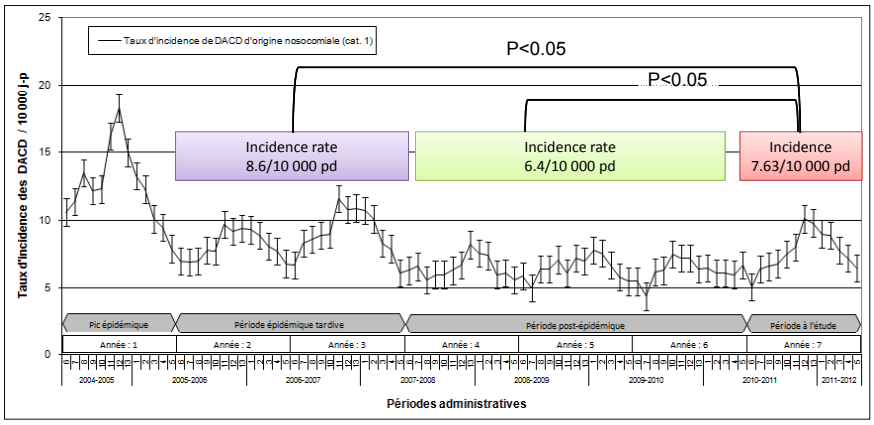




Au Québec: 6'000 cas par année de HA-DACD = 54'000'000$

Miller, M.A., et al., Infect Control Hosp Epidemiol, 2002. **23**(3): p. 137-40.
Ghantoji, S.S., et al., J Hosp Infect, 2010. **74**(4): p. 309-18.

Taux de DACD, 2004-2011



Évolution périodique des taux d'incidence des DACD d'origine nosocomiale [IC 95 %] dans 87 installations ayant participé à toutes les années de surveillance

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Quel(s) facteur(s) sont responsables de l'augmentation?

- Nouvelle souche?
- Co-circulation pathogènes?
- Utilisation antibiotiques?
- Burnout de la prévention des infections?
- Nouveaux tests diagnostics?

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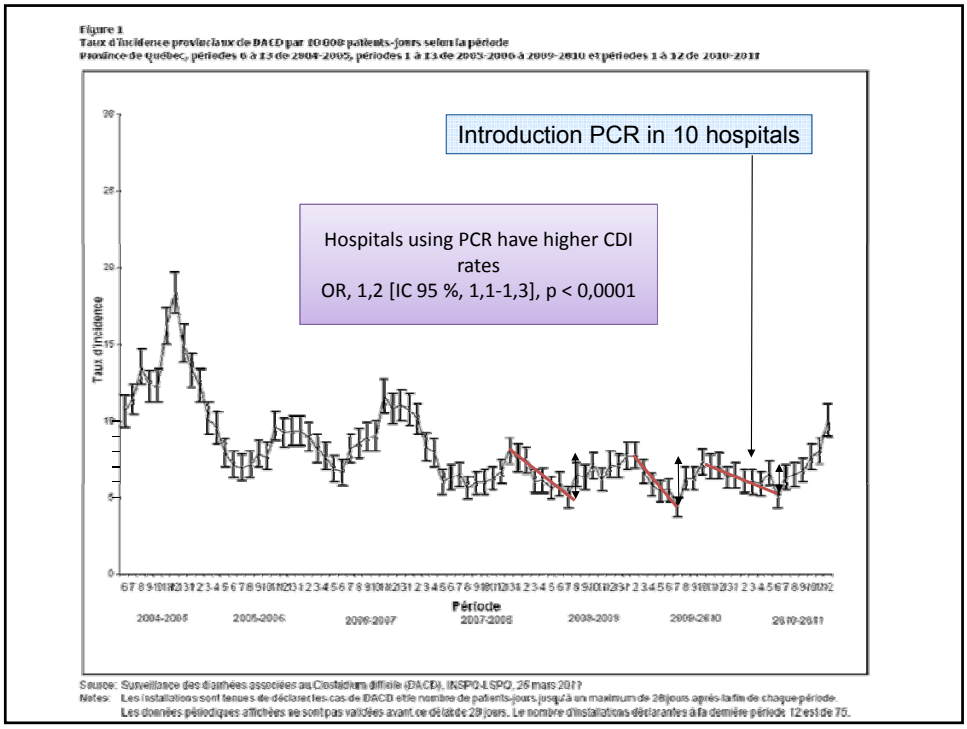
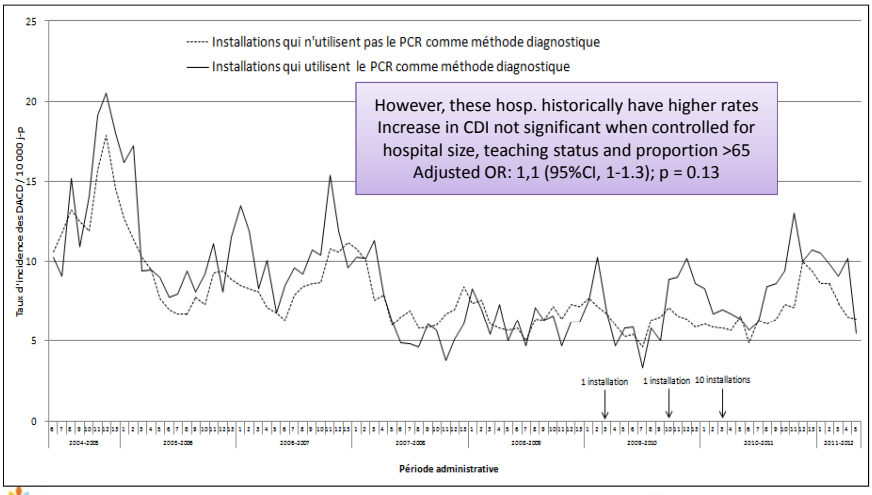


Increase also present in non-PCR institutions



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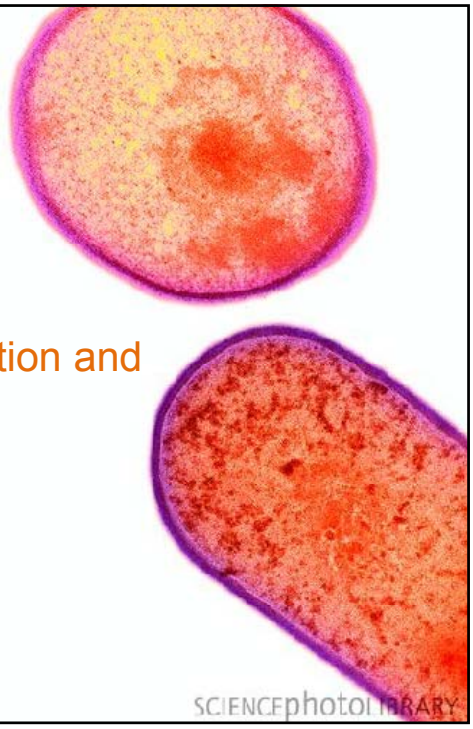
Impact of the type of diagnostic assay on *Clostridium difficile* infection and complication rates



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Infection Preve

Laboratory tests to diagnose CDI

- Wide range of options
- Toxigenic culture
  - Detection of *C.difficile* by anaerobic culture followed by detection of toxin by cell culture cytotoxicity assay
  - The gold standard
  - Rarely used in diagnostic labs
  - Long turnaround time, impractical

Cohen, S.H., et al., Infect Control Hosp Epidemiol, 2010. **31**(5): p. 431-55

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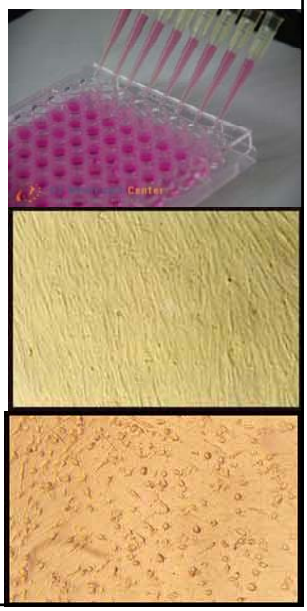
Laboratory tests to diagnose CDI

- Cell culture cytotoxicity assay
  - Often considered the reference standard in non-research setting
  - Very sensitive
    - Sensib 94%
    - Spécif 99%
  - Slow turnaround time (48-72h)
  - Technically more complex than EIA



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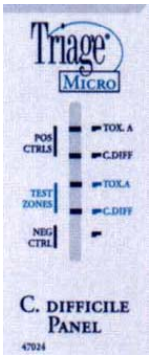
Laboratory tests to diagnose CDI

- Enzyme immunoassay
  - Detect Tox A and Tox B directly from sample
  - Very practical, simple
  - Very short turnaround time
  - Not very sensitive (70-90%)
  - Often combined with GDH detection by EIA
    - More sensitive but less specific



Planche, T., et al., Lancet Infect Dis, 2008. **8**(12): p. 777-84.

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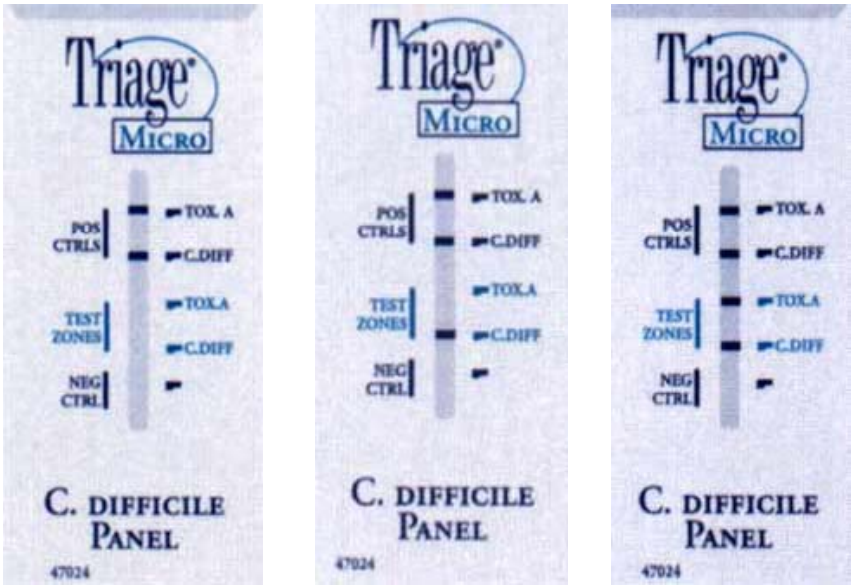

GDH – ToxA - pas de C.difficile

GDH + ToxA - C.difficile non toxigénique

GDH + ToxA + C.difficile toxigénique

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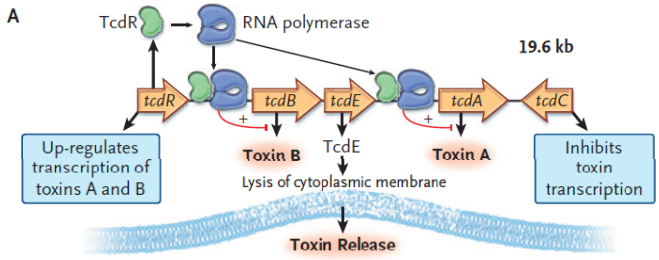
Infection Prevent

Laboratory tests to diagnose CDI

- PCR and LAMP
  - Targeting toxin genes *tcdB* or *tcdA*
  - Rapid, sensitive and specific BUT DIFFERENT(?)



Kelly CP. N Engl J Med 2008;359:1932-40.

Peterson, L.R., et al., Clin Infect Dis, 2007. **45**(9): p. 1152-60
Deshpande, A., et al., Clin Infect Dis, 2011. **53**(7): p. e81-90

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PCR vs. LAMP

Contents lists available at SciVerse ScienceDirect

Journal of Microbiological Methods

journal homepage: www.elsevier.com/locate/jmicmeth

Note

Comparison of commercial molecular assays for toxigenic *Clostridium difficile* detection in stools: BD GeneOhm Cdiff, XPert C. difficile and *illumi*gene C. difficile

Céline Viala [a], Alban Le Monnier [b], Naouale Maataoui [b], Clotilde Rousseau [a,*], Anne Collignon [a], Isabelle Poilane [a]

[a] Laboratoire de Microbiologie, Hôpital Jean Verdier, Assistance Publique – Hôpitaux de Paris, Bondy, France
[b] Laboratoire de Microbiologie, Centre Hospitalier André Mignot, Le Chesnay, France

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ABSTRACT

Three commercial molecular assays were evaluated for toxigenic *Clostridium difficile* detection in stools. As compared to toxigenic culture, BD GeneOhm Cdiff (BD Diagnostics), XPert C. difficile (Cepheid) and *illumi*gene C. difficile (Meridian Bioscience) demonstrated respectively a sensitivity of 95.5%, 97.8% and 86.7% and a specificity of 97.9%, 97.9% and 100%.

Viala C et al. J. Microbiol. Methods **2012**; 90:83–85.

PCR vs. LAMP

Contents lists available at SciVerse ScienceDirect

Journal of Microbiological Methods

journal homepage: www.elsevier.com/locate/jmicmeth

Note

Table 2
Performances of XPert C. difficile, BD GeneOhm Cdiff and *illumi*gene C. difficile as compared to the gold standard.

	Result	Gold standard (no. samples)		Sensitivity (%) [CI 95%]	Specificity (%) [CI 95%]	Accuracy (%)
		Positive	Negative			
XPert C. difficile	Positive	44	1	97.8	97.9	97.9
	Negative	1	48	[93.5–102.1]	[93.9–101.9]	
BD GeneOhm Cdiff	Positive	43	1	95.5	97.9	96.8
	Negative	2	48	[89.4–101.5]	[93.9–101.9]	
*illumi*gene C. difficile	Positive	39	49	86.7	100	93.6
	Negative	6		[76.8–96.6]		

CI, Confidence Interval.

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Viala C et al. J. Microbiol. Methods **2012**; 90:83–85.

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PCR vs. LAMP

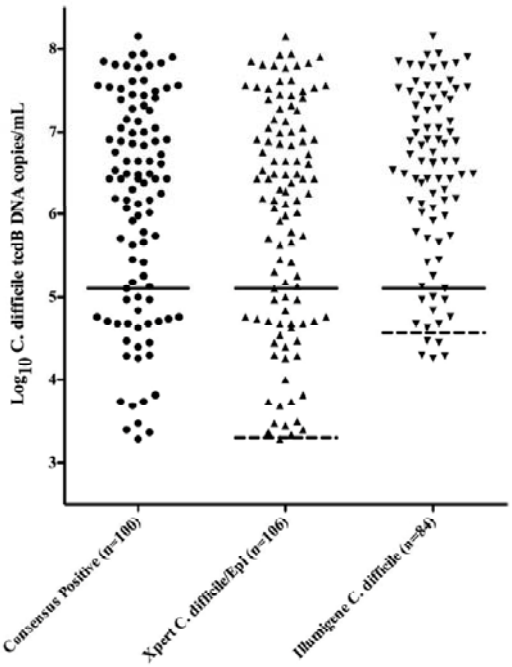

FIG 1 Fecal *C. difficile* concentrations of positive stool samples overall and detected by each test. Black circles (●) are consensus positive samples with toxigenic *C. difficile* detected by ≥2 tests. Upward-pointing triangles (▲) are all samples reported positive by the Xpert *C. difficile*/Epi test. Downward-pointing triangles (▼) are samples reported positive by the illumigene *C. difficile* test. Solid lines represent a 95% sensitivity cutoff for toxin detection (5.10 $\log_{10}$ *C. difficile tcdB* DNA copies/ml) from reference 12. Above this line, 61/73 (83.6%) of samples were toxin positive. Below this line, 24/27 (88.9%) samples were toxin negative. Dashed lines indicate the Xpert and illumigene *C. difficile* DNA LOD values discussed in the text (Xpert, 3.31 $\log_{10}$ *C. difficile tcdB* DNA copies/ml; illumigene, 4.52 $\log_{10}$ *C. difficile tcdB* DNA copies/ml).

Gyorke CE et al. JCM 2013

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Infection Prev

Laboratory tests to diagnose CDI

- Multi-step algorithms
  - GDH detection followed by CCA, toxigenic culture or PCR
  - Sensitive
  - Cost-saving

Wilcox, M.H., et al., J Clin Microbiol, 2010. **48**(12): p. 4347-53

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Quel(s) test(s) choisir?

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L'opinion des Experts

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CDI surveillance

- International guidelines on CDI surveillance
- No guidance is provided regarding the type of laboratory test to diagnose CDI
  - Choice of test is left at the discretion of each participating institution

1. McDonald, L.C., et al., *Recommendations for surveillance of Clostridium difficile-associated disease.* Infect Control Hosp Epidemiol, 2007. **28**(2): p. 140-5.
2. Cohen, S.H., et al., *Clinical practice guidelines for Clostridium difficile infection in adults: 2010 update by SHEA and the IDSA.* Infect Control Hosp Epidemiol, 2010. **31**(5): p. 431-55.

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY MAY 2010, VOL. 31, NO. 5

SHEA-IDSA GUIDELINE

Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA)

Stuart H. Cohen, MD; Dale N. Gerding, MD; Stuart Johnson, MD; Ciaran P. Kelly, MD; Vivian G. Loo, MD; L. Clifford McDonald, MD; Jacques Pepin, MD; Mark H. Wilcox, MD

Since publication of the Society for Healthcare Epidemiology of America position paper on *Clostridium difficile* infection in 1995, significant changes have occurred in the epidemiology and treatment of this infection. *C. difficile* remains the most important cause of healthcare-associated diarrhea and is increasingly important as a community pathogen. A more virulent strain of *C. difficile* has been identified and has been responsible for more-severe cases of disease worldwide. Data reporting the decreased effectiveness of metronidazole in the treatment of severe disease have been published. Despite the increasing quantity of data available, areas of controversy still exist. This guideline updates recommendations regarding epidemiology, diagnosis, treatment, and infection control and environmental management.

Infect Control Hosp Epidemiol 2010; 31(5):431-455

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INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY MAY 2010, VOL. 31, NO. 5

SHEA-IDSA GUIDELINE

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Stuart H. Coher

II. Diagnosis: What is the best testing strategy to diagnose CDI in the clinical laboratory and what are acceptable options?

5. Testing for *C. difficile* or its toxins should be performed only on diarrheal (unformed) stool, unless ileus due to *C. difficile* is suspected (B-II).

Since publication of the
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Infect Control Hosp Epidemiol 2010; 31(5):431-455

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Stuart H. Cohen, MD; Dale N. Gerding, MD; Stuart Johnson, MD; Ciaran P. Kelly, MD; Vivian G. Loo, MD;

9. Enzyme immunoassay (EIA) testing for *C. difficile* toxin A and B is rapid but is less sensitive than the cell cytotoxin assay, and it is thus a suboptimal alternative approach for diagnosis (B-II).

Since publication
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11. Polymerase chain reaction (PCR) testing appears to be rapid, sensitive, and specific and may ultimately address testing concerns. More data on utility are necessary before this methodology can be recommended for routine testing. (B-II)

Since publication n 1995, significant changes have occ use of healthcare-associated diarrh en identified and has been responsi e in the treatment of severe disease h guideline updates recommendations

Infect Control Hosp Epidemiol 2010; 31(5):431-455

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CME

Guidelines for Diagnosis, Treatment, and Prevention of *Clostridium difficile* Infections

Christina M. Surawicz, MD[1], Lawrence J. Brandt, MD[2], David G. Binion, MD[3], Ashwin N. Ananthakrishnan, MD, MPH[4], Scott R. Curry, MD[5], Peter H. Gilligan, PhD[6], Lynne V. McFarland, PhD[7,8], Mark Mellow, MD[9] and Brian S. Zuckerbraun, MD[10]

Clostridium difficile **infection (CDI) is a leading cause of hospital-associated gastrointestinal illness and places a high burden on our health-care system. Patients with CDI typically have extended lengths-of-stay in hospitals, and CDI is a frequent cause of large hospital outbreaks of disease. This guideline provides recommendations for the diagnosis and management of patients with CDI as well as for the prevention and control of outbreaks while supplementing previously published guidelines. New molecular diagnostic stool tests will likely replace current enzyme immunoassay tests. We suggest treatment of patients be stratified depending on whether they have mild-to-moderate, severe, or complicated disease. Therapy with metronidazole remains the choice for mild-to-moderate disease but may not be adequate for patients with severe or complicated disease. We propose a classification of disease severity to guide therapy that is useful for clinicians. We review current treatment options for patients with recurrent CDI and recommendations for the control and prevention of outbreaks of CDI.**

Am J Gastroenterol 2013; 108:478–498; doi:10.1038/ajg.2013.4; published online 26 February 2013

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CME

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Recommendation

1. Only stools from patients with diarrhea should be tested for *C. difficile*. (Strong recommendation, high-quality evidence)

Am J Gastroenterol 2013; 108:478–498; doi:10.1038/ajg.2013.4; published online 26 February 2013

478 PRACTICE GUIDELINES nature publishing group

CME

Guidelines for Diagnosis, Treatment, and Prevention of *Clostridium difficile* Infections

Recommendations

2. Nucleic acid amplification tests (NAATs) for *C. difficile* toxin genes such as PCR are superior to toxins A+B enzyme immunoassay (EIA) as a standard diagnostic test for CDI. (Strong recommendation, moderate-quality evidence)
3. Glutamate dehydrogenase (GDH) screening tests for *C. difficile* can be used in two- or three-step algorithms with subsequent toxin A+B EIA testing, but the sensitivity of such strategies is lower than NAATs. (Strong recommendation, moderate-quality evidence)

A Practical Guidance Document for the Laboratory Detection of Toxigenic *Clostridium difficile*
September 21, 2010*

http://www.asm.org/images/pdf/Clinical/clostridiumdifficile9-21.pdf

A Practical Guidance Document for the Laboratory Detection of Toxigenic *Clostridium difficile*
September 21, 2010*

2. Utilizing toxin A/B EIA for *C.difficile* diagnosis is insensitive and no longer recommended as a stand alone test.
3. Glutamate dehydrogenase (GDH) antigen assays have been found to be good screening tests for *C.difficile* infection (CDI) in many studies with high sensitivity and negative predictive values.
4. Positive GDH assay results must be confirmed. A GDH positive result along with a positive toxin A/B EIA, a positive cytotoxin neutralization, or a positive nucleic acid amplification test (NAAT) result may be reported as positive for toxigenic C. difficile. If the A/B EIA or cytotoxin neutralization assay is used and is negative, specimens should be further tested by either NAAT or toxigenic culture.
5. Laboratories can also use a NAAT to detect *C.difficile* toxin genes as a stand alone diagnostic test.

http://www.asm.org/images/pdf/Clinical/clostridiumdifficile9-21.pdf

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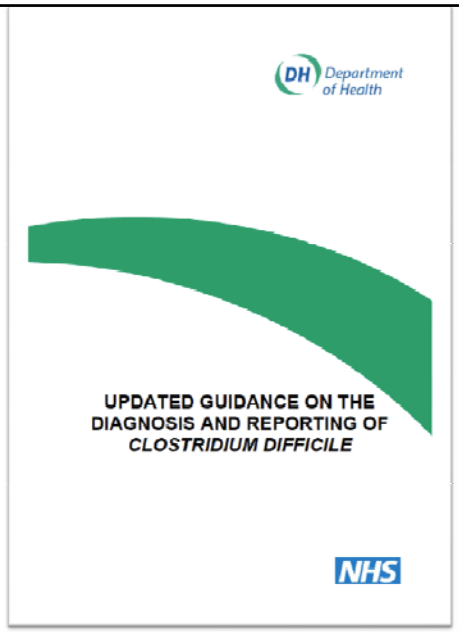

- U.K.
  - Recommend 2-step algorithm
  - Step 1: GDH or NAAT
  - Step 2: EIA or CCA
  - If step 1 + but step 2 – do not report but may consider transmission mitigation measures

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215135/dh_133016.pdf

Tests utilisés au Québec (2010)

TEST	N	NIVEAU DE SENSIBILITÉ
TESTS BASÉS SUR TOXAB EIA	42 (44%)	
GDH TOXAB	9	1
TOX AB	33	1
TESTS AVEC CCNA	36 (37%)	
GDH TOXAB CCNA	7	2
CCNA SEULM	13	2
GDH CCNA	4	2
GDH TOX A CCNA	1	2
TOX AB CCNA	11	2
TESTS BASÉS SUR PCR	10 (11%)	
CCNA PCR	5	?
GDH CCNA PCR	1	?
PCR	3	3
TOX AB PCR	1	?
TOX AB CCNA PCR	1	?
GDH PCR	1	?
AUTRES	6 (6%)	
AUCUN	4	0
GDH SEULM	2	?

C.Frenette, SPIN-CD (2010)

Tests diagnostics

- Types de tests utilisés pour diagnostiquer la DACD à la discrétion de chaque institution
- Sondage réalisé hiver 2012-2013
- Taux de réponse 56% (53/[illegible])

RAPPEL À TOUS LES NON-RÉPONDANTS!

  - 90% (48/53) tests fait localement
  - 10% (5/53) tests envoyés à l'extérieur

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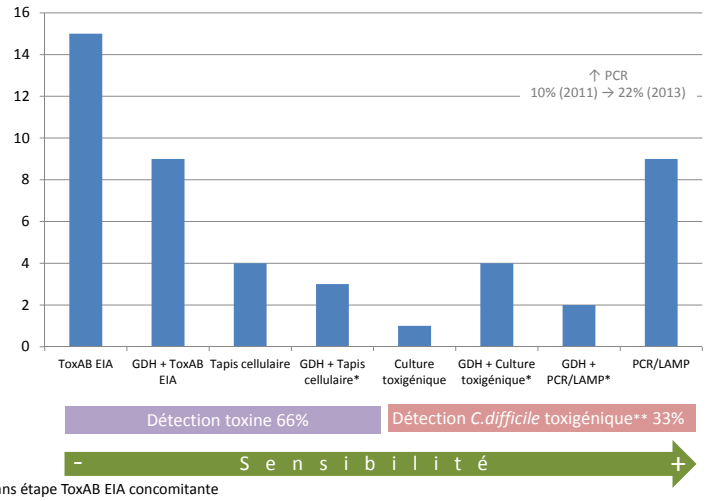
Tests diagnostics au Qc (2012)



* Avec ou sans étape ToxAB EIA concomitante
** Détecte *C.difficile* toxigénique même en absence de toxine dans l'échantillon

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Study objective

- Determine whether incidence and complication rates can vary depending on the type of diagnostic test
  - Single institution (Quebec Heart & Lung Institute)
  - Compare rates obtained by 2 different diagnostic tests:
    - EIA/CCA (used by approximately 70% of hospitals)
    - PCR (used by approximately 10% of Qc hospitals)

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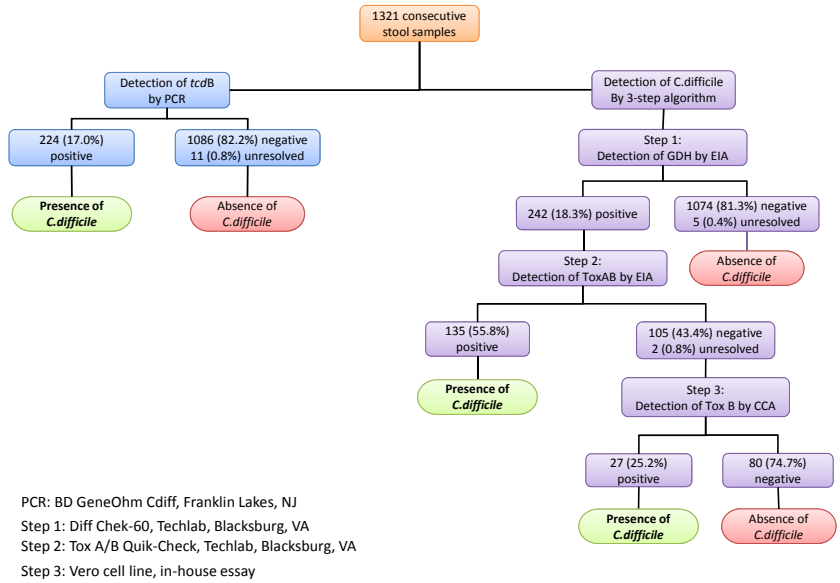

Figure 1. Flow chart of laboratory diagnosis *of C.difficile* in stool samples by PCR and by the 3-step algorithm. Abbreviations: *tcd*B: Toxin B gene; GDH: glutamate deshydrogenase; EIA: enzyme immunoflurescent assay; ToxAB: *C.difficile* toxins A or B; CCA: cell culture cytotoxicity assay

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CDI at IUCPQ

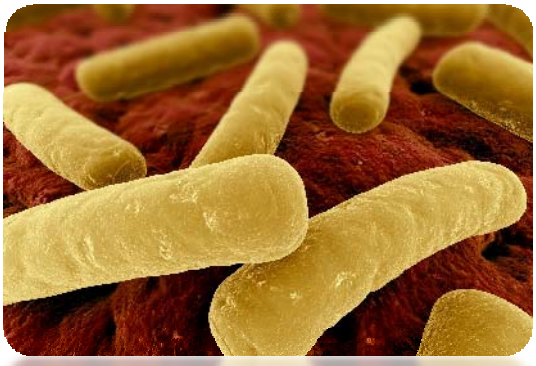

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Table 2. Summary of *C.difficile* infection and incidence rates as detected by PCR and by EIA/CCA algorithm, August 2010 to July 2011

Outcome	CDI detected by PCR	CDI detected by EIA/CCA	P-value
No. patient-days	95 750	95 750	-
No. of analysed stool samples	1321	1321	-
No. of positive samples (%)	224 (17.0)	162 (12.3)	0.001[a]
No. nosocomial cases (%)	85 (6.4)	56 (4.2)	0.01[a]
Incidence density, CDI per 10 000 patient-days (95% CI)	8.9 (7.1-10.9)	5.8 (4.4-7.4)	0.014
No. of periods above government-imposed target (%)	7/13 (53)	4/13 (31)	0.42[b]
Incidence rate ratio[c] (95% CI)	1.52 (1.08-2.13)	1 [Reference]	0.015

[a] By Chi-square test
[b] By Fisher's exact test
[c] Ratio based on Poisson regression analysis

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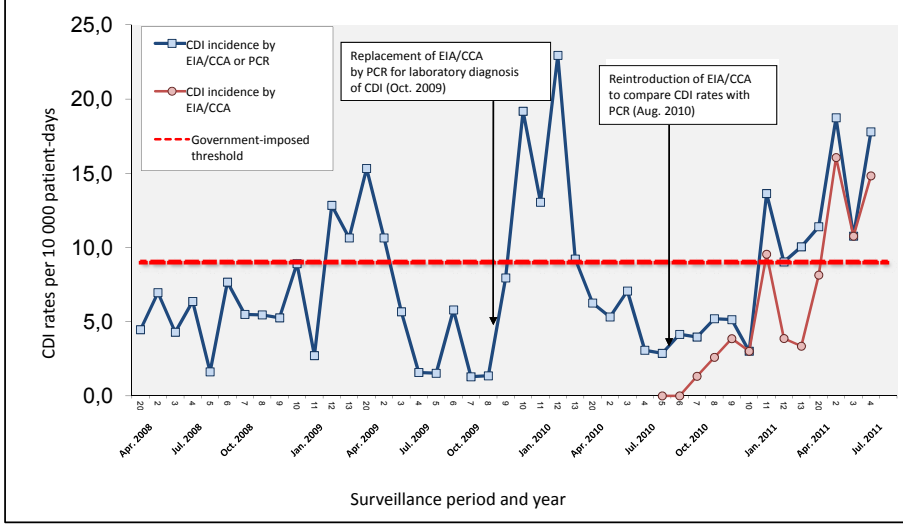

Figure 2. Incidence of hospital-onset *Clostridium difficile* infection (CDI), according to standardized surveillance definition, April 2008- July 2011. A switch from a three-step algorithm detecting glutarate deshydrogenase and Toxins A and B by EIA and cell culture cytotoxin assay (EIA/CCA) to a PCR-based diagnosis of CDI occurred in October 2009 at Quebec Heart and Lung Institute (IUCPQ). EIA/CCA was reintroduced and conducted in parallel with PCR on August 2010 for comparative purposes.

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Table 3. Summary of *C.difficile* infection complication rates as detected by PCR and by EIA/CCA algorithm, August 2010 to July 2011

Complications	CDI detected by PCR	CDI detected by EIA/CCA	P-value
30-day mortality (%)	11/85 (12)	10/56 (16)	0.46[a]
Colectomy (%)	1/85 (1)	1/56 (2)	1.00[b]
Admission to intensive care unit	1/85 (1)	1/56 (2)	1.00[b]
Readmission for CDI (%)	11/85 (12)	11/56 (18)	0.31[a]
Any complication (%)	23/85 (27)	22/56 (39)	0.16[a]

[a] By Chi-square test
[b] By Fisher's exact test

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Table 4. Frequency of complications associated with *Clostridium difficile* infection as detected by PCR only and by both PCR and EIA/CCA algorithm

Complications	CDI Cases detected by PCR but not by EIA/CCA (n=29)	CDI Cases detected by both PCR and EIA/CCA (n=56)	p-value[a]
30-day mortality (%)	1 (3)	10 (18)	0.09
Colectomy (%)	0 (0)	1 (2)	1.00
Admission to intensive care unit (%)	0 (0)	1 (2)	1.00
Readmission for CDI (%)	0 (0)	11 (20)	0.01
Occurrence of ≥ 1 complication (%)	1 (3)	22 (39)[b]	<0.001

[a] By fisher's exact test
[b] One patient with colectomy was admitted to the intensive care unit

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Quelle est la cause de la discordance observée?

↓ sévérité ➔ ↓ quantité ?

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Quelle est la cause de la discordance observée?

- Cultures toxigéniques quantitatives de tous les isolats positifs
  - Comparaison des échantillons
    - Détectés par PCR seulement
    - Détectés par PCR et par EIA/CCA

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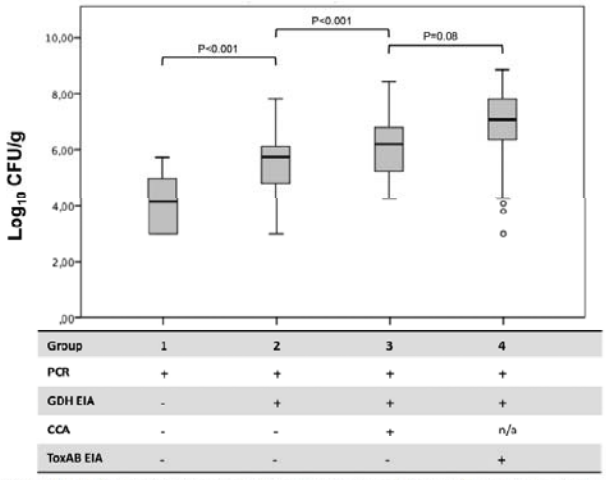

Group	1	2	3	4
PCR	+	+	+	+
GDH EIA	-	+	+	+
CCA	-	-	+	n/a
ToxAB EIA	-	-	-	+

FIG 2 Box plot showing results of a comparison of the *Clostridium difficile* bacterial loads of stool samples detected by various laboratory methods. Bacterial loads are expressed in CFU/g of stool and presented on a logarithmic scale. The horizontal line in each box indicates the median, whereas the top and bottom lines represent the 75th and 25th percentiles, respectively. Error bars represent 95% confidence intervals, and the dots represent outliers. Abbreviations: PCR, detection of *tcdB* gene by PCR; GDH EIA, detection of glutamate dehydrogenase by enzyme immunofluorescent assay; CCA, cell culture cytotoxicity neutralization assay; ToxAB EIA, detection of toxins A and B by enzyme immunofluorescent assay; n/a, not available.

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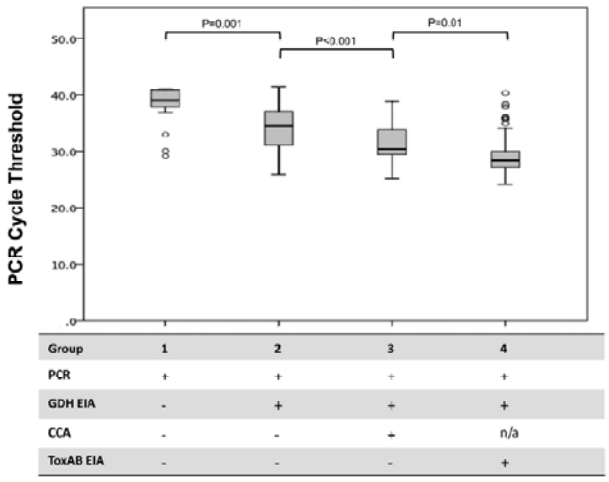

FIG 3 Box plot showing results of a comparison of the *C. difficile* PCR cycle thresholds of stool samples detected by various laboratory methods. The horizontal line in each box indicates the median, whereas the top and bottom lines represent the 75th and 25th percentiles, respectively. Error bars represent 95% confidence intervals, and the dots represent outliers. Abbreviations: PCR, detection of *tcdB* gene by PCR; GDH EIA, detection of glutamate dehydrogenase by enzyme immunofluorescent assay; CCA, cell culture cytotoxicity neutralization assay; ToxAB EIA, detection of toxins A and B by enzyme immunofluorescent assay; n/a, not available.

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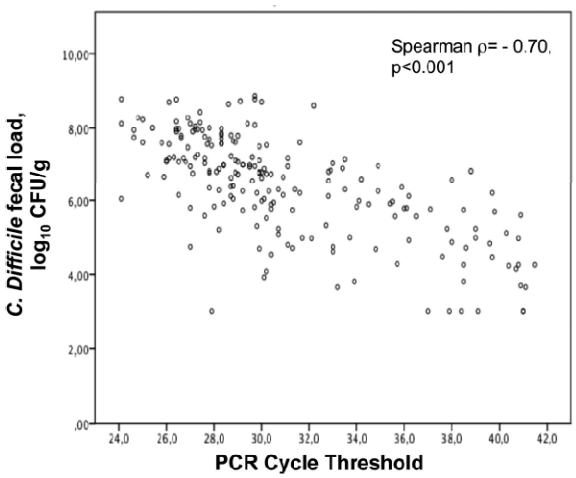

FIG 1 Scatter plot showing the relation between *Clostridium difficile* fecal load determined by quantitative culture and cycle threshold of a PCR detecting the *tcdB* gene. Data are presented on a logarithmic scale.

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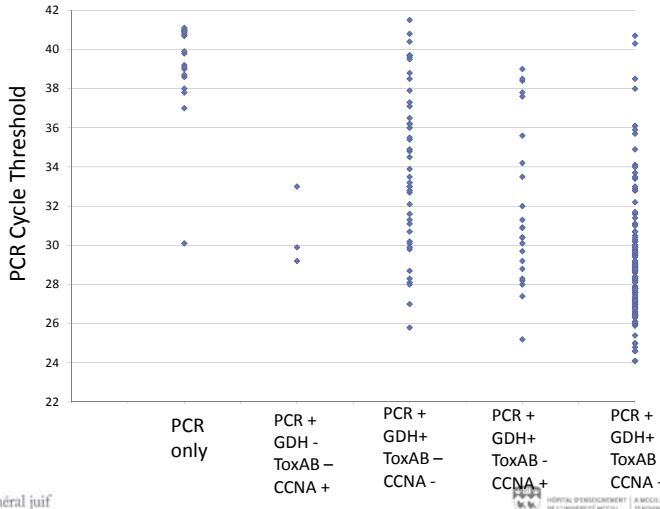
PCR can detect much lower levels of *C.difficile* in stool samples



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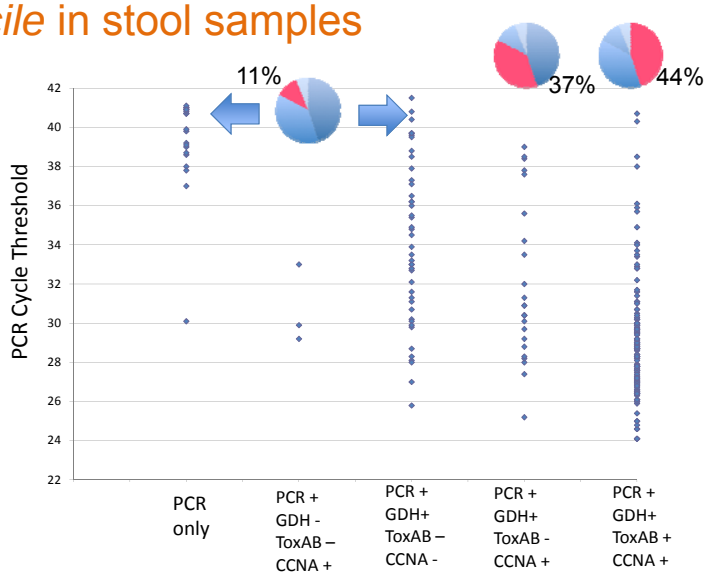
PCR can detect much lower levels of *C.difficile* in stool samples



PCR can detect *C.difficile* in the "asymptomatic range"

Type of patient	C.difficile CFU/g IUCPQ	C.difficile CFU/g Riggs[1]
Symptomatic patient		
GDH+ EIA ToxAB +	3.2 x 10e7	
GDH+ ToxAB – CCNA +	2.9 x 10e6	3.9 x 10e5
GDH+ ToxAB- CCNA -	6.3 x 10e3	
GDH -	4.3 x 10e3	
Asymptomatic patient		2.5 x 10e3

Riggs, M.M., et al., Clin Infect Dis, 2007. **45**(8): p. 992-8.

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How do you define CDI?

Medical textbooks	C.Difficile in gut	→	Symptoms	→ CDI
Real life	C.Difficile in gut	+	Symptoms	→ CDI

Since EIA and CCA turn + at 10^6-10^7 cfu/g: + ≈ →
Since PCR may turn + at 10^3 cfu/g: + ≠ →

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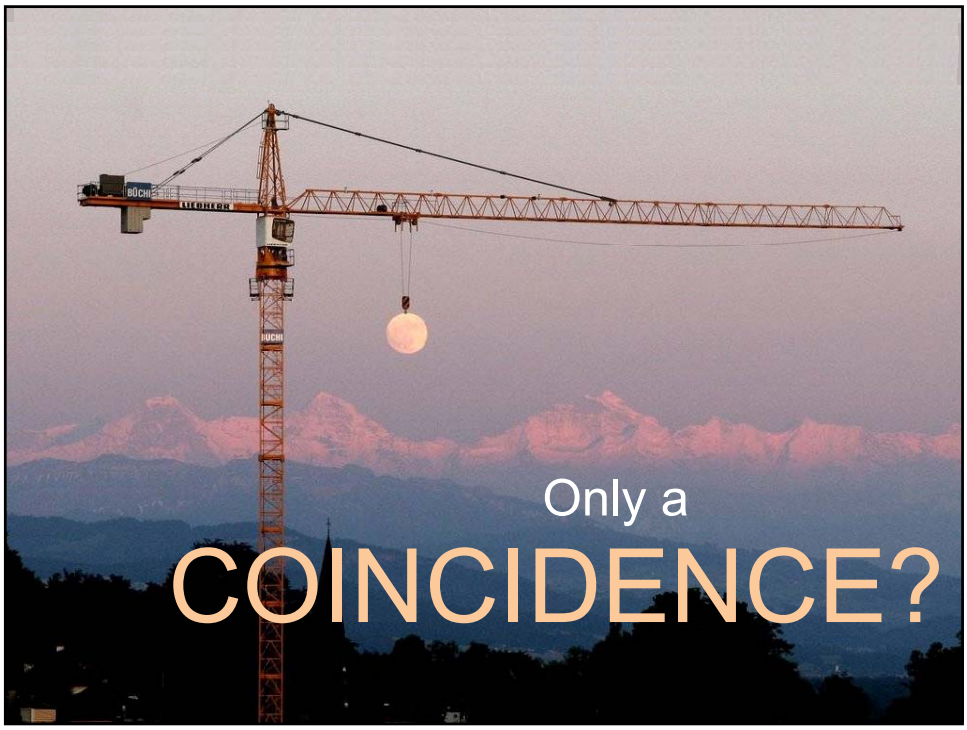

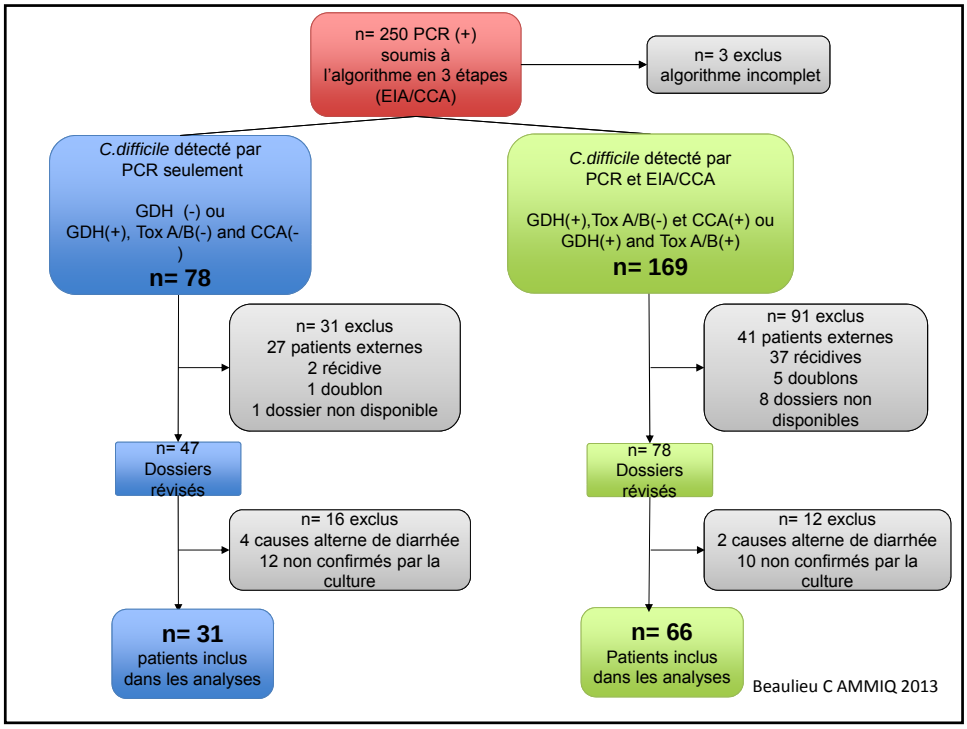

CARACTÉRISTIQUES CLINIQUES DES PATIENTS (1)

Variable analysée	Cohorte entière (%) n=97*	*C.difficile* par PCR seulement (%) n=31*	*C.difficile* par PCR et EIA/CCA (%) n=66*	OR (IC 95%)	valeur P
Caractéristiques démographique					
Sexe féminin	52 (53.6)	15 (43.4)	37 (56.1)	0.74 (0.31-1.73)	0.48
Âge - années (SD)	72.8 (14.1)	65.4(5.5)	76.3 (12.1)	0.94 (0.91-0.98)	**0.001**
Caractéristiques cliniques					
Fièvre >38.3 ˚C	27/93 (29.0)	8/30 (26.7)	19/63n (30.2)	0.84 (0.32-2.22)	0.73
Vomissements	8/91 (8.9)	4/25 (16.0)	4 (6.1)	2.95 (0.68-12.86)	0.14
Insuffisance rénale aiguë	20/91 (22.0)	4/29 (13.8)	16/62 (25.8)	0.46 (0.14-1.53)	0.20
Choc	6 (6.19)	1 (3.2)	5 (7.6)	0.41 (0.05-3.64)	0.42

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CARACTÉRISTIQUES CLINIQUES DES PATIENTS (2)

Variable analysée	Cohorte entière (%) n=97*	*C.difficile* par PCR seulement (%) n=31*	*C.difficile* par PCR et EIA/CCA (%) n=66*	OR (IC 95%)	valeur P
Caractéristiques cliniques					
Nombre moyen de selles la journée du diagnostic (SD)	5.0 (4.4)	7.0 (5.5)	4.2 (3.6)	1.13 (1.02-1.26)	**0.017**
Infection associée aux soins de santé	78 (80.4)	24 (77.4)	54 (79.4)	0.96 (0.35-2.67)	0.94
Usage d'antibiotique lors des 8 dernières semaines	87 (89.7)	28 (90.3)	59 (89.4)	1.11 (0.27-4.61)	0.89
Usage actif d'antibiotiques	35 (36.0)	12 (38.7)	23 (34.8)	1.18 (0.49-2.85)	0.71
Durée moyenne de séjour (SD)	23.8 (14.1)	13.8 (14.8)	20.5 (18.1)	0.98 (0.98-1.00)	0.077
Antécédent de DACD	9/95 (9.5)	1/30 (3.3)	8/65 (87.7)	0.25 (0.03-2.06)	0.20

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CARACTÉRISTIQUES CLINIQUES DES PATIENTS (3)

Variable analysée	Cohorte entière (%) n=97*	*C.difficile* par PCR seulement (%) n=31*	*C.difficile* par PCR et EIA/CCA (%) n=66*	OR (IC 95%)	valeur P
Marqueurs biologiques					
Globules blancs (X10 ^{9} /L) moyenne (SD)	14.1 (7.8)	12.7 (29)	14.8 (7.1)	0.96 (0.90-1.03)	0.22
Neutrophiles (X10 ^{9} /L) moyenne (SD)	11.4 (6.5)	9.4 (4.9)	12.5 (7.0)	0.92 (0.84-0.997)	**0.042**
Cause alterne de diarrhée					
Usage de laxatif	21/79 (26.7)	7/23 (30.4)	14/56 (25.0)	1.31 (0.45-3.84)	0.62
Nutrition entérale	3 (3.1)	2 (6.5)	1/66 (1.5)	4.41 (0.39-50.65)	0.23
Thérapie					
Combinaison au diagnostic	16 (16.5)	0 (0)	16 (23.9)	0.05 (0.003-	**0.04**

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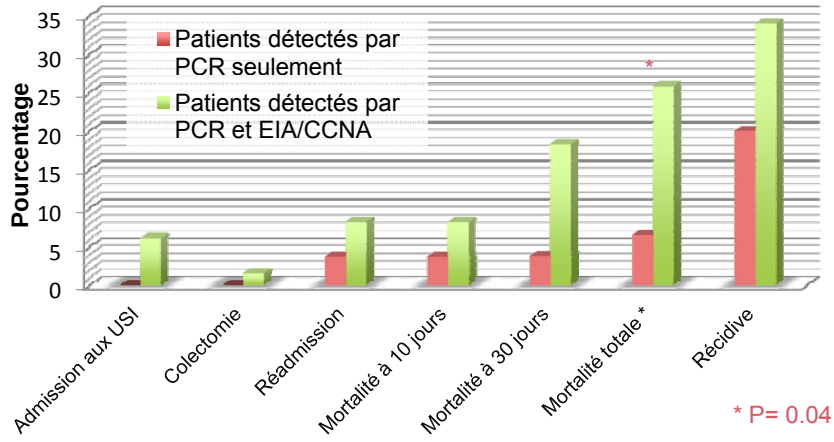
COMPLICATIONS



* P= 0.04

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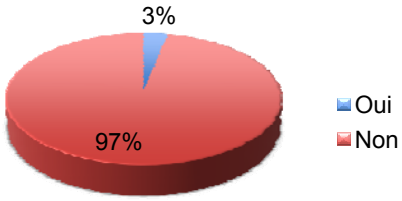
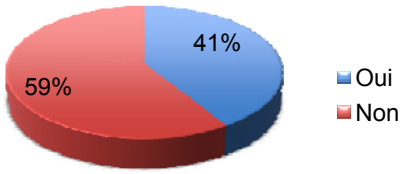
COMPLICATIONS TOTALES À 30

Patients détectés par PCR seulement



Patients détectés par PCR et par EIA/CCNA



P=0.01

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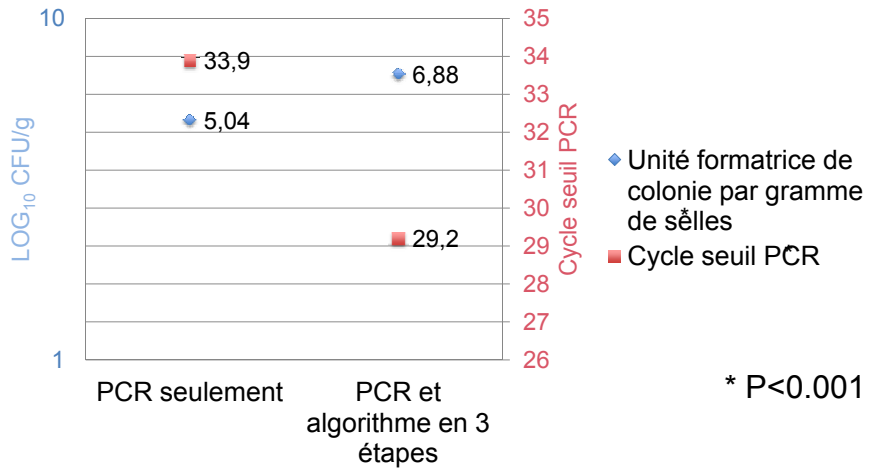
QUANTIFICATION DE *C.DIFFICILE* DANS LES SELLES DES PATIENTS



* P<0.001

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RÉSULTATS DE L'ANALYSE UNIVARIÉE

- Variables significatives
  - Âge (65 vs 72 ans; p=0.001)
  - Neutrophiles (12.7 vs 14.1X 10^9/L; p=0.042)
  - Mortalité au suivi (6.5% vs 19.6%; p=0.039)
  - Complications totales à 30 jours (3.2% vs 22.7 %; p=0.01)
  - Prescription d'une thérapie combinée au diagnostic
  - Nombre de selles

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Importance of presence of Toxin B

	CTA positive	NAAT positive/ CTA negative	CTA and NAAT negative	CTA positive vs NAAT positive/CTA negative p value	CTA positive vs CTA and NAAT negative p value	NAAT positive/CTA negative vs CTA and NAAT negative p value
Number	435	311	3943	..	..	..
Female (%)	243/435 (56%)	174/311 (56%)	2117/3941* (54%)	..	..	..
Mean age (years, SD)	69 (20)	64 (22)	64 (21)	..	..	..
Mean white cell count (×10⁹/L, SD)	12·4 (8·9)	9·9 (6·6)	10·0 (12·0)	<0·0001	<0·0001	0·8633
Mean rise in creatinine (%, SD)	37% (63)	49% (132)	34% (81)	0·0222	0·3018	0·0085
>100% rise in creatinine (%)	40/316 (13%)	30/245 (12%)	321/3163 (9%)	..	..	..
Mean albumin (g/L, SD)	31 (7)	33 (8)	33 (8)	0·0328	<0·0001	0·0456
Albumin <20 g/L (%)	13/344 (4%)	15/258 (6%)	166/3223 (5%)	..	..	..
Died (%)	72/435 (16·6%)	30/311 (9·7%)	349/3943 (8·9%)	0·004	<0·0001	0·506
Mean length of stay before sample (days, SD)	17·9 (29)	13·6 (23)	11·2 (22)	0·0311	<0·0001	0·0978
Mean length of stay after sample (days, SD)	19·4 (25)	16·5 (24)	15·1 (24)	0·1869	0·0010	0·2771
Death rate per 1000 inpatient days	9·03	6·04	6·05	0·0317	0·0018	0·8436

CTA=cytotoxin assay. CC=cytotoxigenic culture. NAAT=nucleic acid amplification test. *Sex was not recorded for two patients in this group.

Table 3: **Clinical characteristics of first episodes of inpatients with available clinical outcome results with use of the result of the CTA and NAAT tests to define diagnostic categories**

Planche TD et al. Lancet Infect Dis. 2013 Nov;13(11):936-45.

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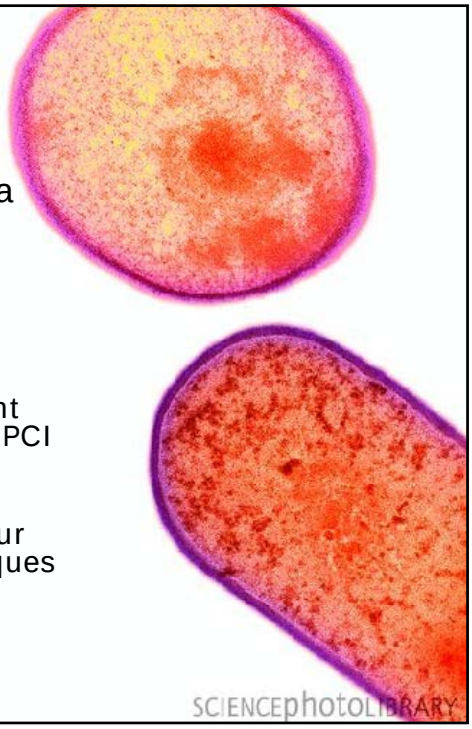
Conclusions

- Tests diagnostics pour la DACD est en évolution
- Méthodes optimales demeurent à préciser
  - Test PCR seuls pourraient être préférables pour la PCI
  - Confirmation par toxine pourrait être requise pour des considérations cliniques



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Infection Preve

Outils de gestion des éclosions

- Éclosions surviennent dans tous les centres hsopitaliers
- Gestion d'éclosion = un défi
- Besoin de créer un outil de gestion propre au C.difficile

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Outils de gestion d'éclosions

- 128 recommandations réparties en 3 catégories :
  - Groupe 1 (Base) : représente les mesures générales qui doivent être appliquées par TOUTES les installations lors de toute éclosion;
  - Groupe 2 (Intensification) : comprend l'ensemble des mesures qui peuvent être amplifiées lorsque l'incidence de la DACD demeure inacceptable malgré la mise en place et l'observance aux mesures du groupe 1. Ce groupe comprend des mesures qui peuvent être mises en place temporairement afin de contrôler une éclosion de DACD;
  - Groupe 3 (mesures exceptionnelles) : comprend des mesures qui peuvent être introduites exceptionnellement lors d'éclosion réfractaire.

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Outils de gestion d'éclosions

- Grands axes de gestion:
  - Hygiène des mains
  - Précautions additionnelles
  - Entretien environnemental
  - Gestion des excréta
  - Contrôle de la source
  - Diagnostic et traitement
  - Usage approprié des médicaments
  - Visiteurs
  - Communication et surveillance
  - Aspects logistiques
  - Outils
    - Liste de vérification – patient avec DACD
    - Grille d'audit du respect des mesures de précaution
    - Lettre aux soignants

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