

Which interventions are most fruitful in controlling endemic *C. difficile* infections in gastroenterology patients including a ribotype 027 outbreak?

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C. difficile infections in gastroenterology

- Generally gastroenterology patients high risk population for developing *C. difficile* infections:
 - Hepatological diseases 3-fold increased risk
 - Inflammatory bowel disease 4.8-fold increased risk
 - Increased exposure to factors known to be associated with increased risk:
 - Advanced age
 - Antibiotic exposure
 - Use of proton pump inhibitors
 - Hospitalisation
- *C. difficile* infection incidence identified as recurring problem within gastroenterology at The Pennine Acute Hospitals NHS Trust:
 - More evident with centralisation of service
 - Accounted for 12.5% Trust total in 2015/16

C. difficile PCR ribotype 027

- Earliest recorded isolate in Parisian Hospital 1985
- Major outbreak in USA 2003
- Sharp rise in incidence in UK between 2005 and 2008
- At The Pennine Acute Hospitals NHS Trust:
 - Observed sporadically before 2014
 - In 2014 noted that an outbreak had occurred
 - Involved gastroenterology ward
 - Index patient treated in USA hospital
 - MVLA found 7 samples analysed to be “indistinguishable” termed “Oldham 027 lineage”
 - Unable to confirm association with USA 027 lineage
 - This lineage only observed on two other occasions in UK

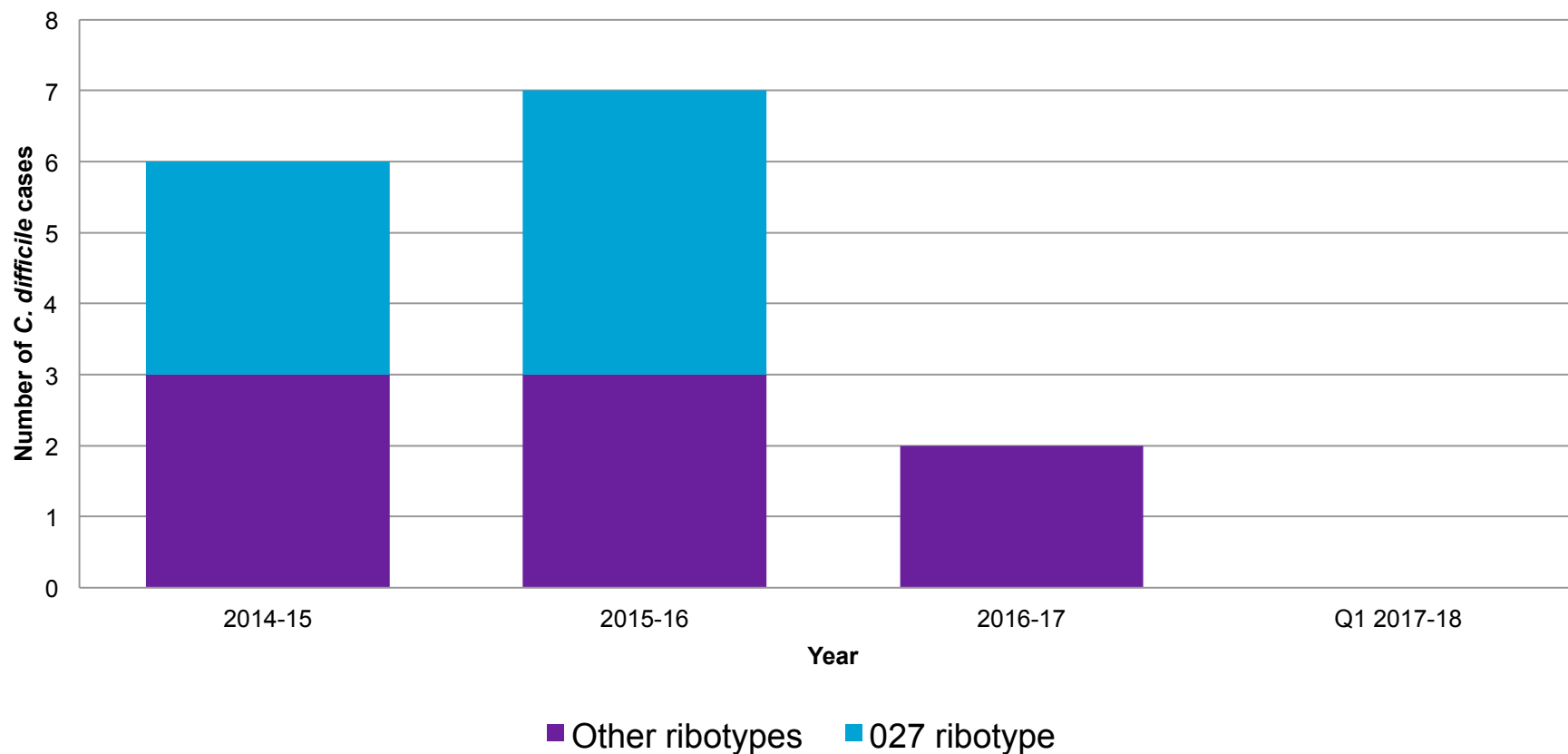
Interventions

- Intensive phase April to July 2016
 - Deep clean of ward
 - Introduction of weekly multidisciplinary meetings
- Continued phase April 2016 to March 2017:
 - Infection control interventions:
 - Increased ward cleaning frequency and intensity
 - Increased infection control monitoring and auditing
 - Introduction of *C. difficile* risk assessment form
 - Pharmacy and microbiology interventions:
 - Daily clinical pharmacy services provided to the ward by the sites antimicrobial pharmacist
 - Increased auditing of antibiotic prescribing compliance
 - Introduction of a ward specific antibiotic prescribing guideline

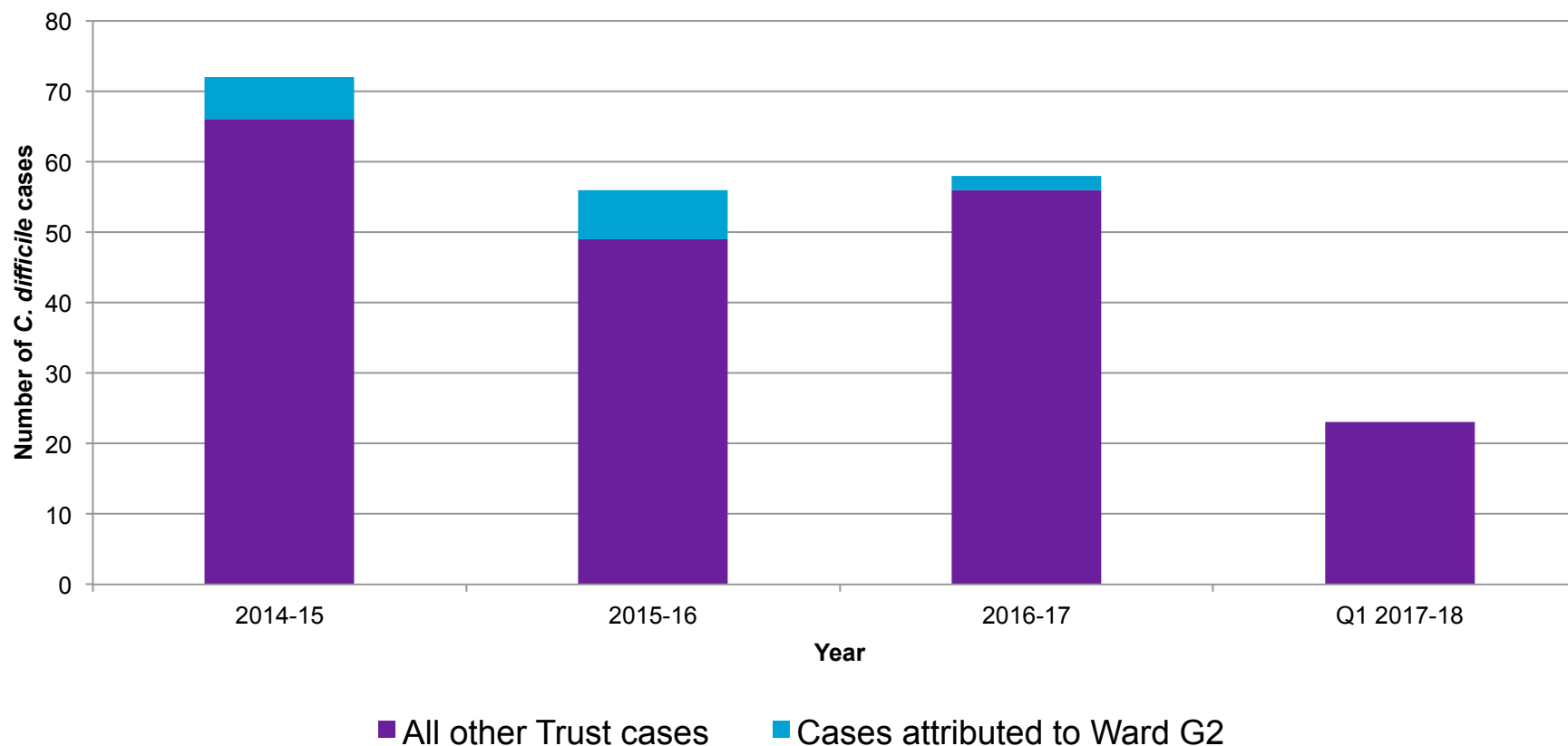
Impact of interventions on *C. difficile* rates

	2014/15	2015/16	2016/17	Q1 2017/18
Cases attributed to ward G2	6	7	2	0
Number of ribotype 027 cases attributed to ward G2	3	4	0	0
Percentage contribution to Trust total	8.3	12.5	3.4	0.0

Impact of interventions on *C. difficile* rates



Impact of interventions on *C. difficile* rates



Potential fruitful interventions: Infection Control

Year	Commode cleanliness compliance (%)	Visual infusion phlebitis procedure compliance (%)	Catheter care procedure compliance (%)	Personal protective equipment procedure compliance (%)	Hand hygiene procedure compliance (%)
2015/16	41.7	66.6	61.8	72.7	62.9
2016/17	95.8	86.9	80.2	84.7	84.3
2016/17 Percentage change	↑ 54.1	↑ 20.3	↑ 18.4	↑ 12.0	↑ 21.4

Potential fruitful interventions: Infection Control

Year	Commode cleanliness compliance (%)	Visual infusion phlebitis procedure compliance (%)	Catheter care procedure compliance (%)	Personal protective equipment procedure compliance (%)	Hand hygiene procedure compliance (%)
2016/17	95.8	86.9	80.2	84.7	84.3
Q1 2017/18	66.7	97.0	87.7	89.3	94.0
Q1 2017/18 Percentage change	↓ 29.1	↑ 10.1	↑ 7.5	↑ 4.6	↑ 9.7

Potential fruitful interventions: Pharmacy and microbiology

Year	All antibiotics*	Piperacillin/ tazobactam*	Carbapenems*	“High risk antibiotics”*
2015/16	790.78	109.98	42.76	189.49
2016/17	652.64	146.23	31.81	102.53
2016 / 17 Percentage change	↓ 17.5%	↑ 33.0%	↓ 25.6%	↓ 45.9%

*Expressed as daily defined dose per 1000 bed days occupied

“High risk antibiotics” include: Cephalosporins, quinolones, co-amoxiclav and clindamycin

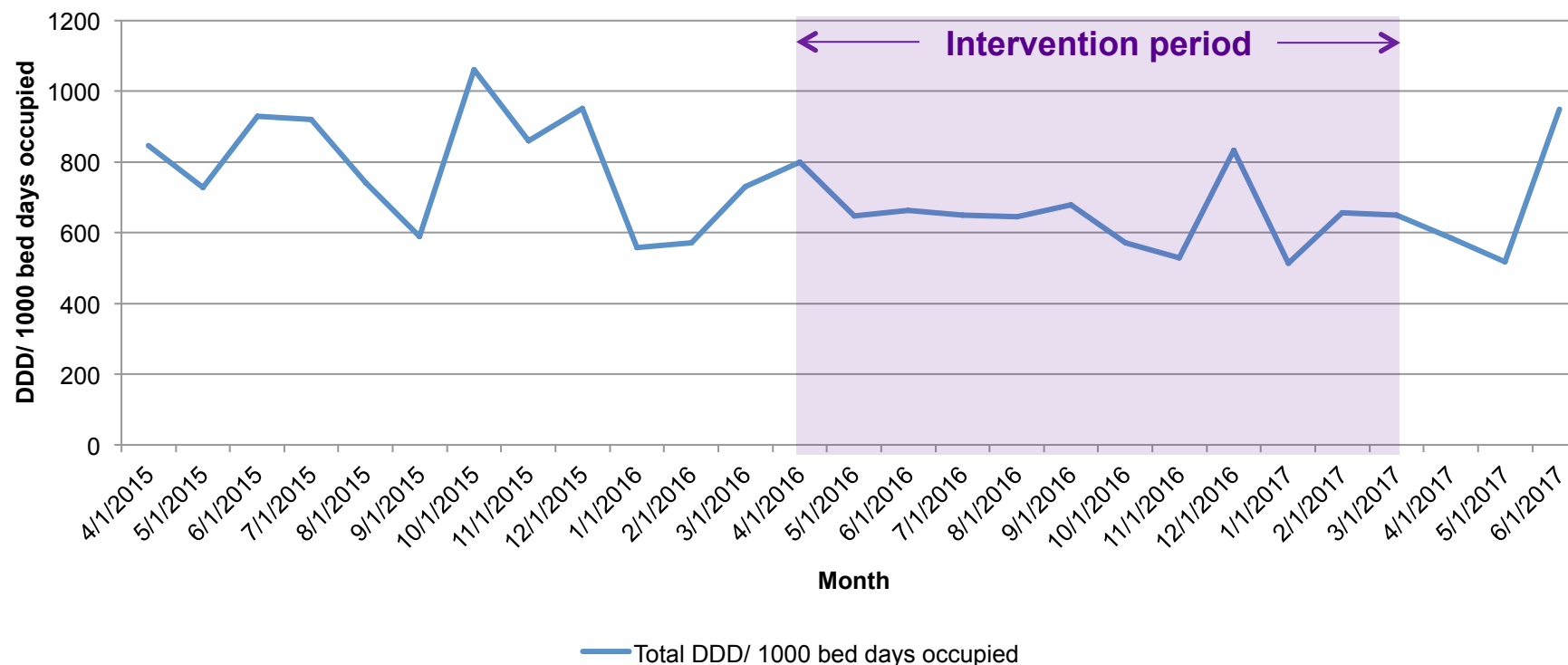
Potential fruitful interventions: Pharmacy and microbiology

Year	All antibiotics*	Piperacillin/ tazobactam*	Carbapenems*	“High risk antibiotics”*
2016/17	652.64	146.23	31.81	102.53
Q1 2017/18	678.11	143.24	16.06	173.54
Q1 2017/18 Percentage change	↑ 3.9%	↓ 2.0%	↓ 49.5%	↑ 69.3%

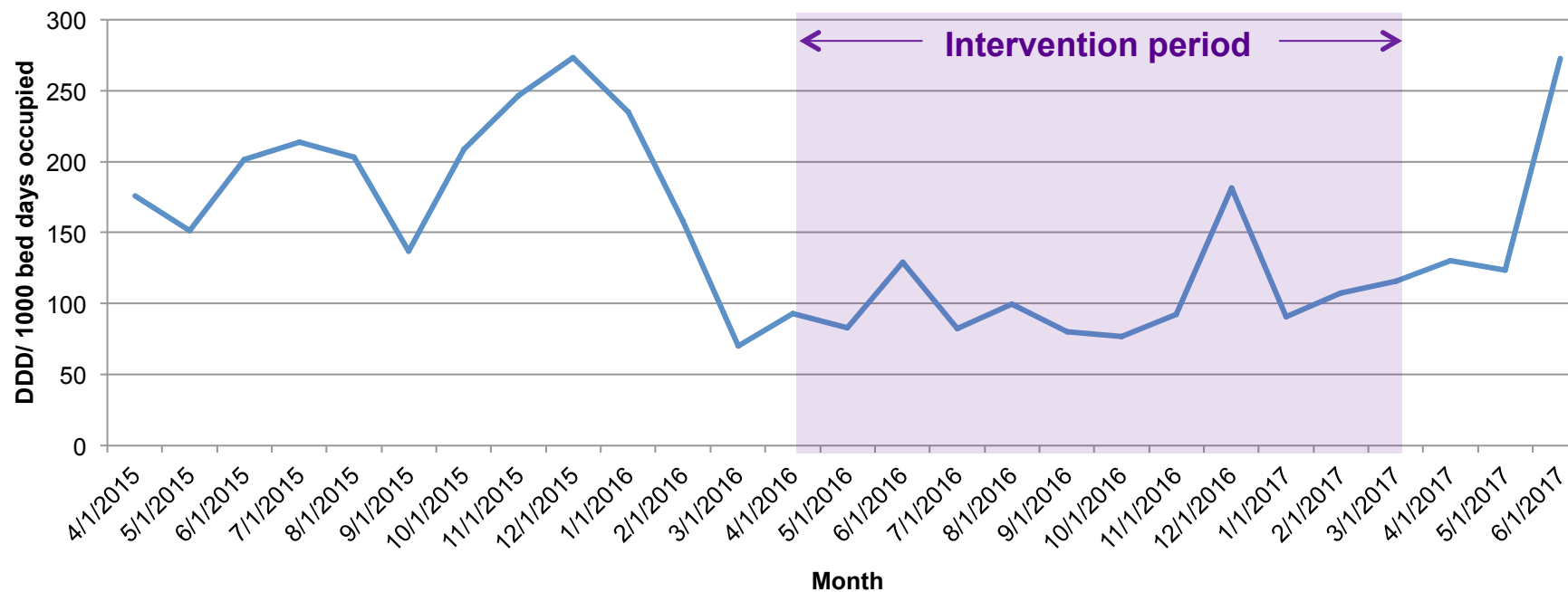
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— Total "high risk" DDD/ 1000 bed days occupied

Conclusions

- Endemic *C. difficile* infections in gastroenterology patients including a ribotype 027 outbreak have been controlled
- Number of interventions introduced concurrently therefore difficult to conclude which is most fruitful.
- Findings indicate that the following facilitate:
 - Improved compliance with infection control procedures
 - Reduction in total antibiotic consumption
 - Reduction in consumption of high risk antibiotics
 - High impact multidisciplinary support essential
- Interventions were non-specific to gastroenterology patients or *C. difficile* PCR ribotype 027 therefore should be applicable to all other specialities moving forward.

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