Working with you to make Sheffield HEALTHIER

NHS Sheffield Clinical Commissioning Group

Sheffield Community Clostridium difficile Annual Report 2016-17

Governing Body meeting

7 September 2017

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Purpose of Paper

This report provides analysis of the C Difficile community cases during the year 2016-17 and compares data from 2014-15 and 2015-16 where possible.

Key Issues

- Identifies key risk factors for C.difficile acquisition
- The results illustrate the complex nature of Community Associated C.difficile infection, with many factors still unknown including potential community reservoirs and trigger factors.
- It also identifies the ongoing need for further research into this area in order that we can see a clear reduction in the rates of C.difficile infection both in hospital and in the community.

Is your report for Approval / Consideration / Noting

Consideration and support

Recommendations / Action Required by Governing Body

The Governing Body is asked to:

- Support the continued need for Root Cause Analysis (RCA) to be undertaken on all C.difficile cases
- Support the recommendation that through the RCA process establish for patients on a PPI whether there is a relevant clinical indication for it. Information will be provided as part of RCA process and also in GP Bulletin.

Governing Body Assurance Framework

Which of the CCG's objectives does this paper support?
AF 2. To improve the quality and equality of healthcare in Sheffield.
AF 2.1 Providers delivering poor quality care and not meeting quality targets.

Are there any Resource Implications (including Financial, Staffing etc)?
No, this work is part of the remit of the IPC team and Consultant Microbiologist as Infection Control Doctor for the CCG.
Have you carried out an Equality Impact Assessment and is it attached?
Please attach if completed. Please explain if not, why not It is not required.
Have you involved patients, carers and the public in the preparation of the report?
No, as not necessary to do so.

NHS
Sheffield
Clinical Commissioning Group

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1.0 Introduction

1.1 NHS Sheffield Clinical Commissioning Group (CCG) remains committed to reducing the incidence of Clostridium Difficile (C.difficile) in both acute and community settings. This report provides analysis of the community cases for the full year 2016-17 and also compares the previous 2 years in order to identify any themes and trends.

1.2 The Department of Health target for reducing C.difficile in Sheffield continues to be a challenge for both acute and community and the CCG has an action plan in place which is reviewed and updated on a regular basis by the Antimicrobial Stewardship Group. (See appendix 1)

2.0 Definition and Methodology

2.1 C.difficile is a gram positive, spore forming, toxin producing organism commonly found in children less than 2 years. It is also seen in the stools of approximately 3-5% of adults. In children it is symptomless, even when producing toxin, but in adults it can be the cause of C.difficile associated Diarrhoea (CDAD) which ranges from mild symptoms all the way to life-threatening colitis. As such it has an appreciable mortality rate especially in the >65's which tends to rise with age.

2.2 Community associated cases of C.difficile are defined as GP samples taken in community, or occurring within 72 hours of admission to hospital.

2.3 Root Cause Analysis (RCA) is a mandatory process following identification of a case, and data for this report has been obtained via the RCA process.

2.4 All GP Practices that have a patient with a community case of C.difficile are sent a letter and a copy of the RCA which advises if the C.difficile case was a lapse in care (avoidable) or no lapse in care (unavoidable) and identifies if there is any shared learning for the future.

2.5 The main focus of this report is the community C.difficile cases - specifically those with a previous admission within 56 days and those community cases with no recent hospital admission, in order that comparisons can be made.

3.0 Findings

3.1 The CCG 16-17 target was 194 cases and end of year performance was 218, which is 24 cases over last year's target. Performance is also 12 cases over the total for 2015-16 (n=206) and 6 cases over the total for 2014-15 (n=212). There are no penalties for the CCG. While this increase is disappointing, in line with acute trust management and monitoring of cases, the priority is focusing on the lapses in care. For the CCG the overall trend of a very small number of lapses in care continues.

Table 1 provides a breakdown of the cases within the CCG over the last 3 years:

Table 1 - Total C.difficile cases April 2016 to March 2017 (n= 218)

Month	STH	Community attributable but admission to STH (or other hospital) within last 56 days	Community no recent Hospital admission	Other	Sheffield CCG Total
April	6	5	9		20
May	4	8	1		13
June	5	6	5		16
July	8	9	4	1 SCH	22
August	6	10	4		20
September	7	3	8		18
October	4	5	11		20
November	6	5	4	1 SCH & 1 RDGH	17
December	12	6	5		23
January	8	3	4		15
February	8	5	4	1 (SCH)	18
March	4	9	3		16
Annual Total	**78**	**74**	**62**	**4**	**218**
Percentage of total	**36%**	**34%**	**28%**	**2%**	
2015-16 Annual Total	62	59	83	2	206
2015-16 percentage	30%	29%	40%	1%	
2014-15 Annual Total	74	67	67	2	212
2014-15 percentage	34%	32%	32%	2%	

3.2 Key risk factors for C.difficile acquisition

There were 136 community cases (see 2.2 for definition) and the following pie charts detail the key risk factors (in addition to recent hospital admission) for these:

- Aged 65 and over
- Antibiotic exposure - where antibiotics were prescribed prior to a positive C.difficile test
- Proton Pump Inhibitors (PPI) or anti-ulcer medication was prescribed
- Recurrence of cases

See appendix 2 for the breakdown of the key risk factors over the past 3 years.

3.2.1 Charts 1a & 1b show the breakdown of patient ages

Chart 1a

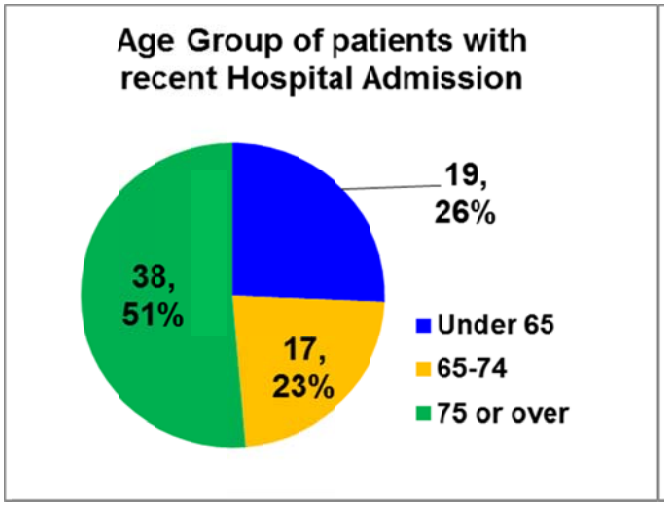
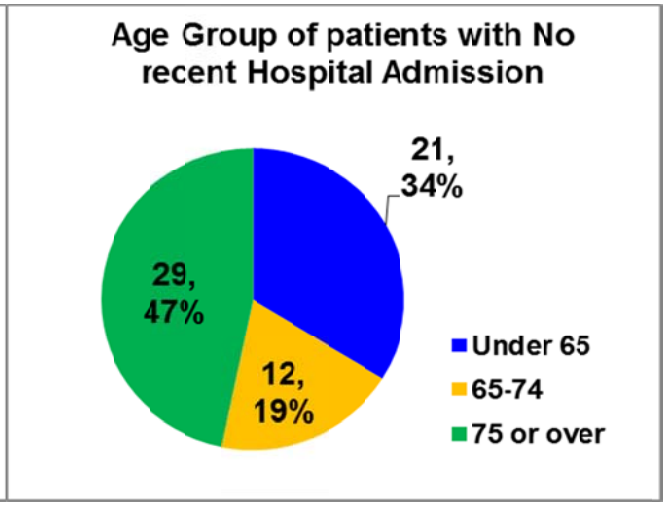


Chart 1b



For patient with recent hospital admission = 74

19 (26%) were under 65

17 (23%) 65 to 74

38 (51%) 75 or over

For patients with no recent hospital admission = 62

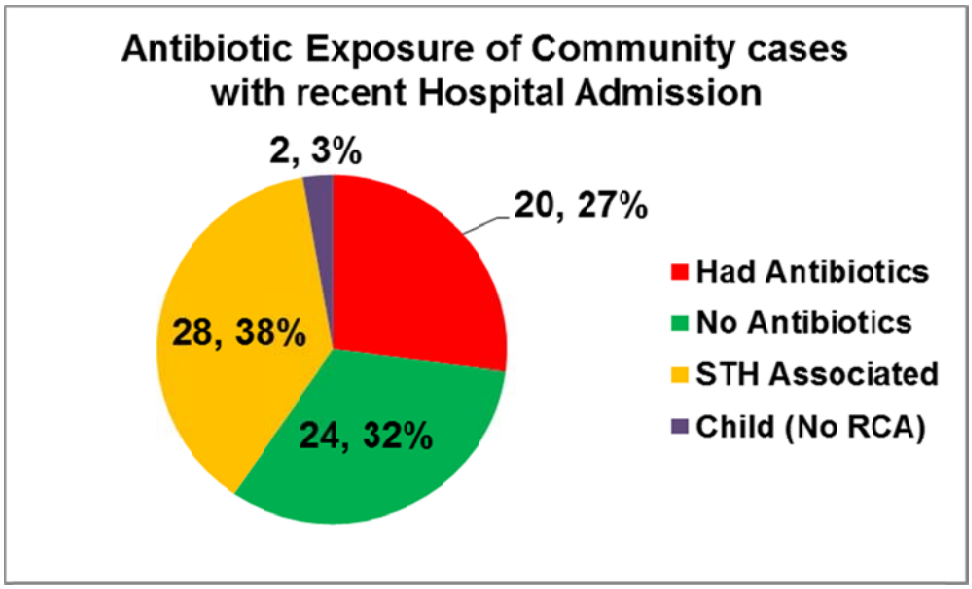
21 (34%) were under 65

12 (19%) 65 to 74

29 (47%) 75 or over

3.2.2 **Antibiotic exposure (total number of community patients =136)**

Chart 2a



74 patients out of the 136 with recent hospital admission (54%)

28 were STH associated see below*. (As a percentage of the 74 cases this is 38%)

46 (62%) were not STH associated of which**:**

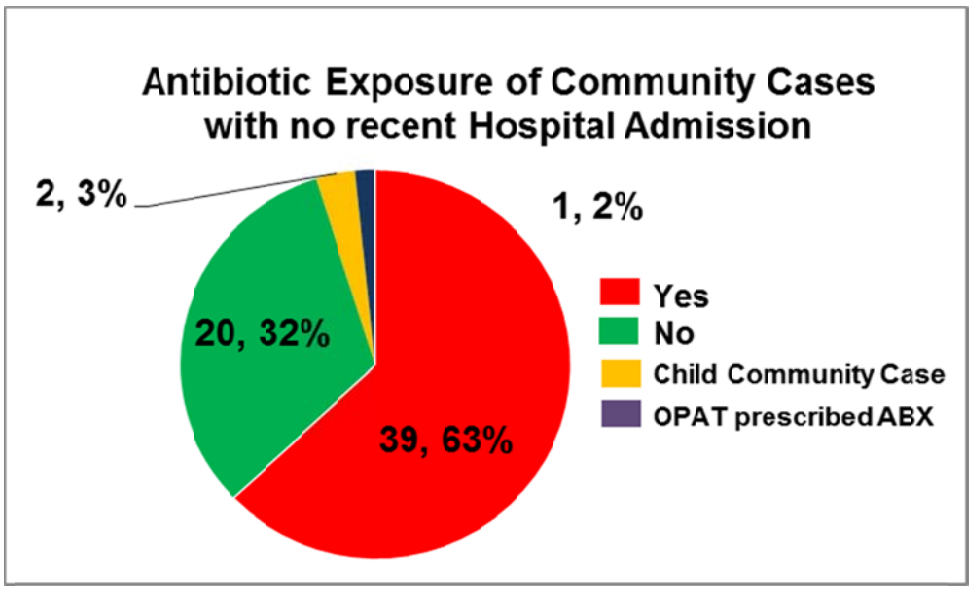
- 20 had antibiotics
- 24 did not
- 2 child cases where RCA was not undertaken. These cases are often complex in nature, may be difficult to establish as true cases of C.difficile infection and the role of antibiotic exposure may be difficult to determine.

*28 assessed as STH associated. These cases were recent hospital discharges within the last 10 days and had either received antibiotics likely to precipitate C.difficile, or were linked to other cases on wards or had had a significant recent length of hospital stay. Therefore a full RCA (including assessment of antibiotic exposure was not undertaken).

Of the 28 cases:

13 were prescribed antibiotics appropriately
5 had no antibiotics during admission
9 had very recent admissions but the antibiotic prescribing is not known (unable to access notes).
1 was same ribotype as another patient so potential cross transmission.

Chart 2b



62 patients out of the 136 had no recent Hospital admission (46%).

- 39 had antibiotics prescribed (63%)
- 20 no antibiotics (32%)
- 2 child community cases (no RCA). (3.3%)
- 1 patient had antibiotics prescribed by OPAT and this was assessed as STH associated but no lapse in care (1.7%)

3.2.3 **Charts 3a & 3b show the number of patients prescribed Co-Amoxiclav exposure**

This remains a risk factor for C.difficile acquisition. 21 cases out of the 59 patients prescribed antibiotics were prescribed Co-Amoxiclav (34%).

6 had a recent hospital admission of which all were assessed as no lapses in care and 15 had no recent hospital admission of which 2 were assessed as a lapse in care (avoidable).

Chart 3a

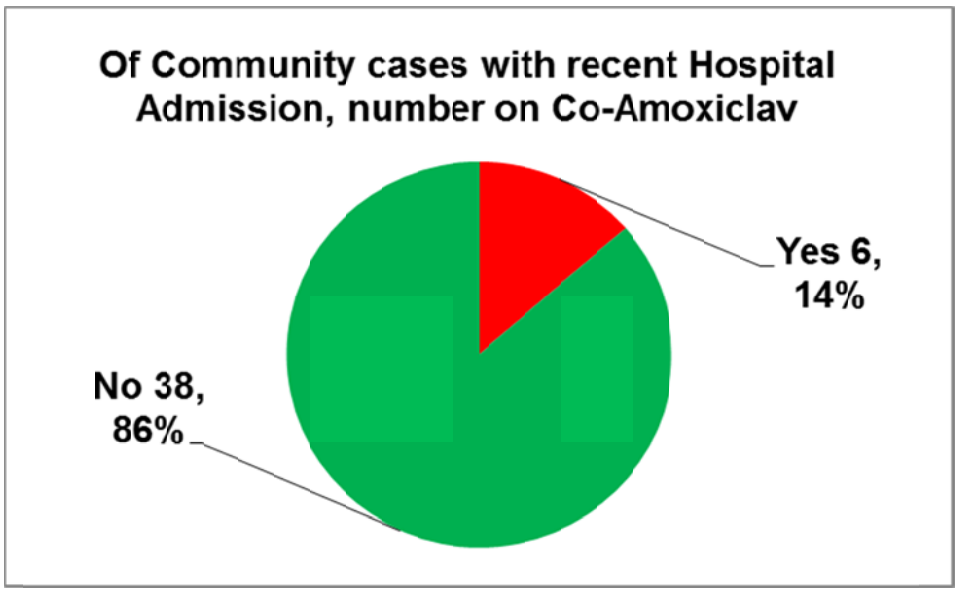


Chart 3b

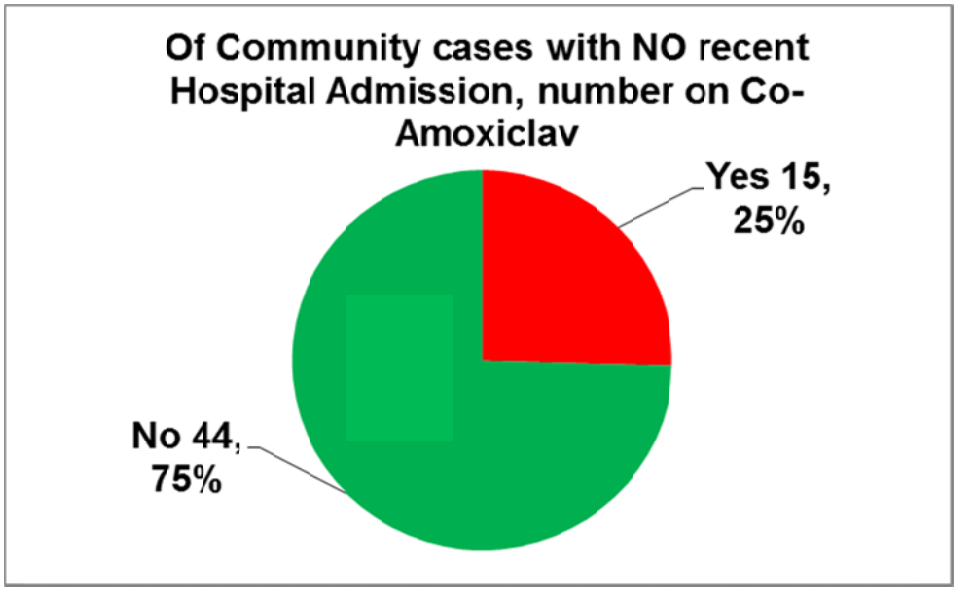
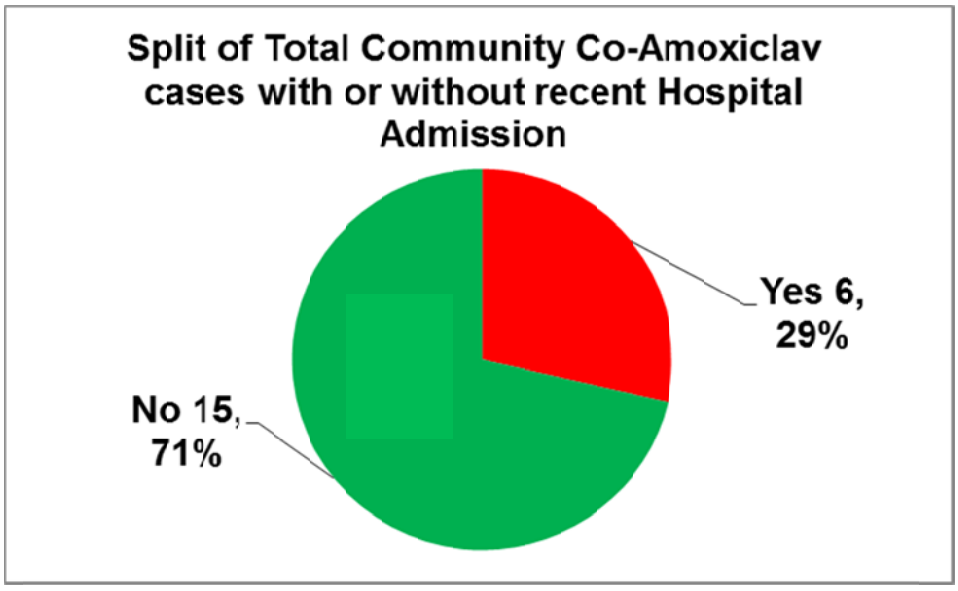


Chart 3c



3.2.4 PPI exposure for those with recent hospital admission / no recent hospital admission

The number for 2016-17 was 52.
52 (50%) out of 104 community cases were prescribed a PPI/Anti-ulcer medication. With 28 out of 52 (54%) having had a recent admission and 24 out of 52 (46%) not having a recent hospital admission.

Chart 4a

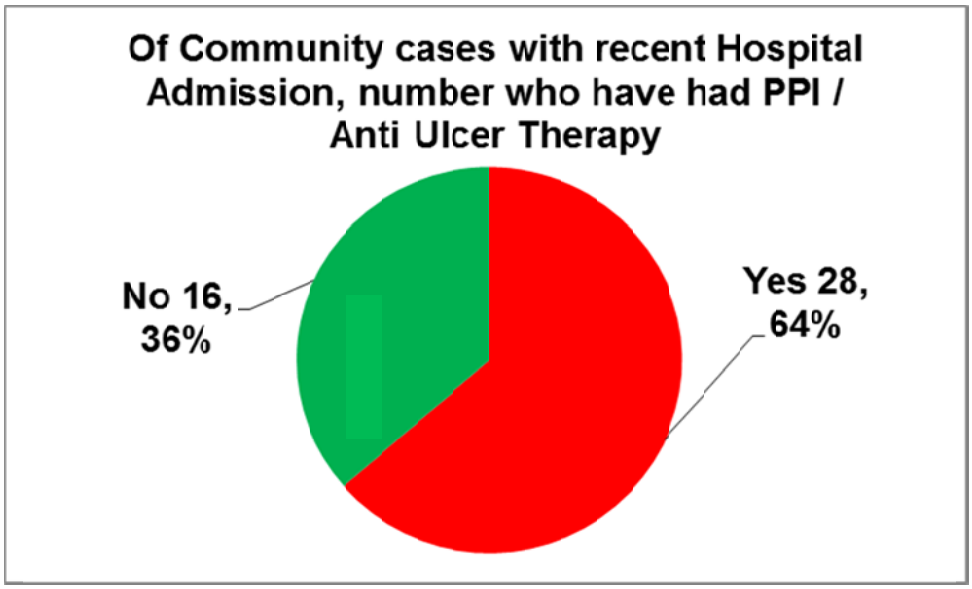


Chart 4b

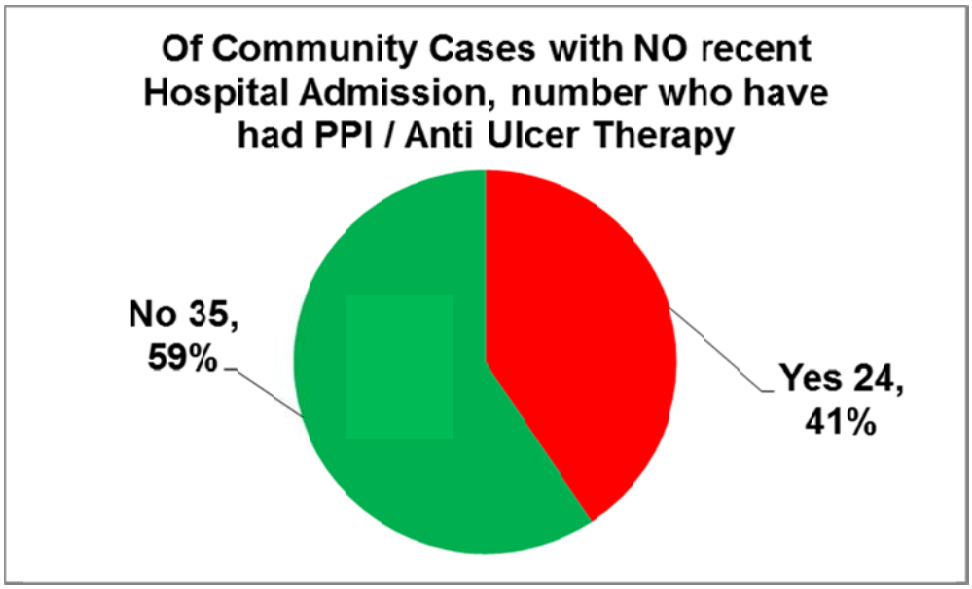
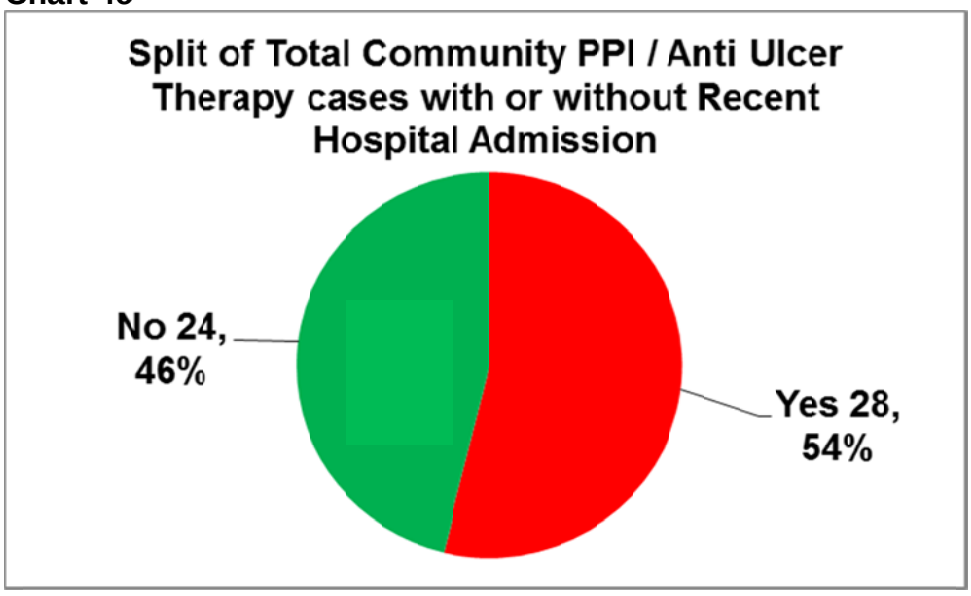


Chart 4c



3.2.5 Recurrence

17 episodes of recurrence were recorded out of 108 patients (16% recurrence rate). 15 patients had 1 episode of recurrence and 1 patient had 2 episodes of recurrence. 9 had a recent hospital admission and 8 had not.

Chart 5a

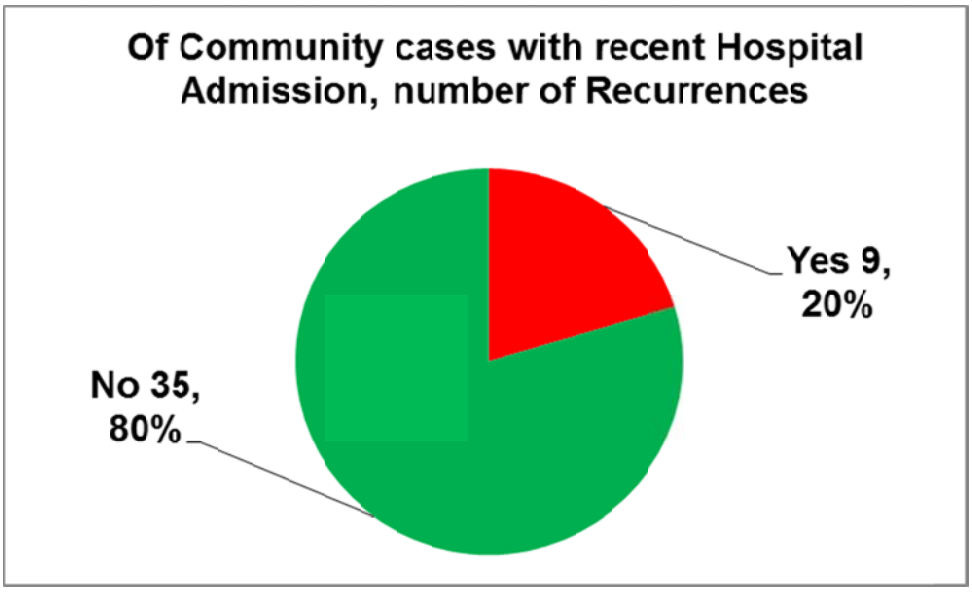


Chart 5b

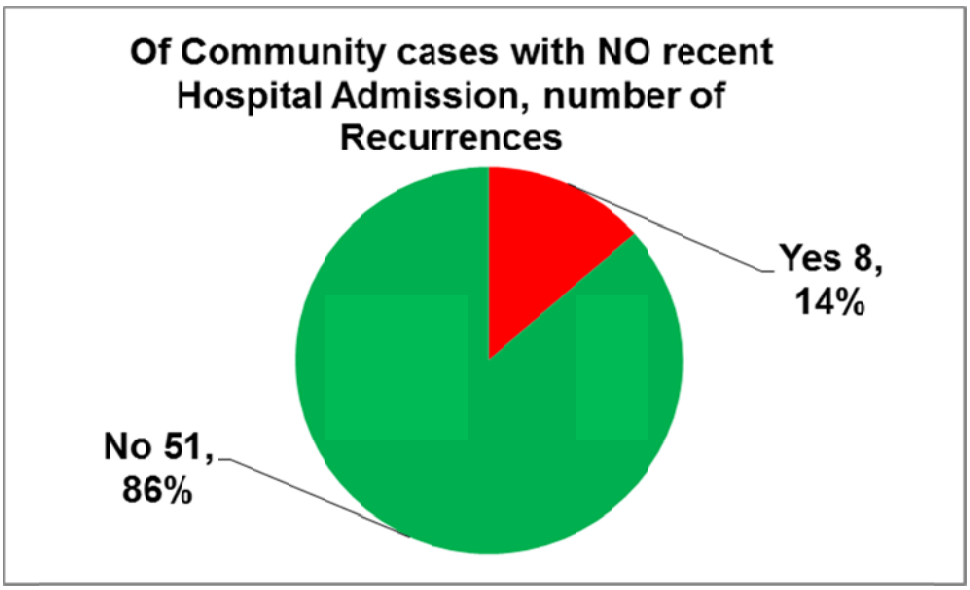
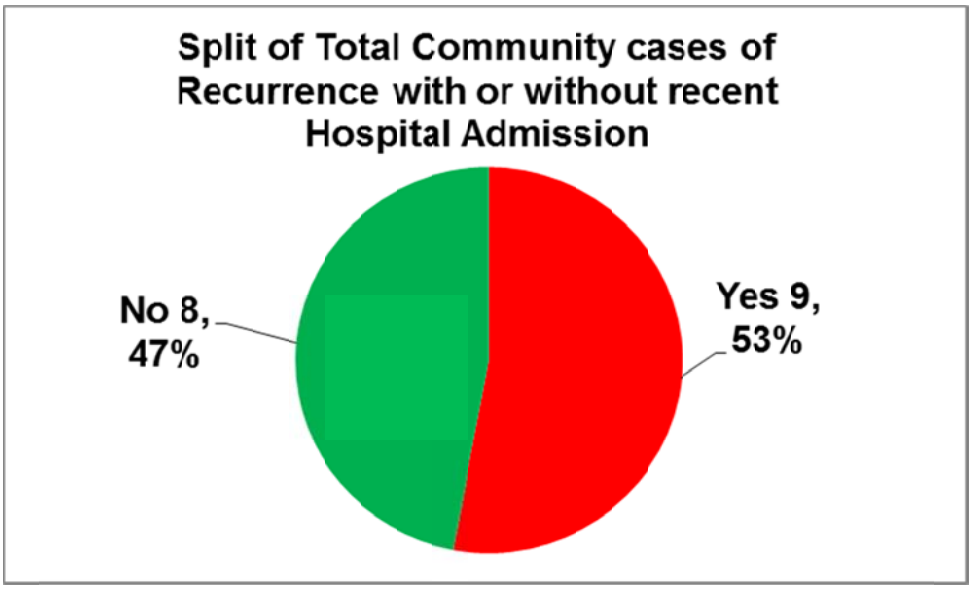


Chart 5c



3.2.6 **Lapses in care:**

Between April 2016 – March 2017 of the 104 community cases that had an RCA undertaken, ONLY 2% of cases were assessed as avoidable/lapses in care due to inappropriate prescribing; both due to Co-Amoxiclav and 1 due to potential cross infection; total = 3. See appendix 3

4.0 Analysis and Discussion

4.1 Previous hospital admission

4.1.1 Previous hospital admission remains a well known high risk factor for C.difficile acquisition even if the ward has had no recent cases. Of the 136 community cases, 74 cases (54%) had a recent hospital admission within the last 56 days. When compared to the last 2 years this number and percentage is:

4.1.2 For 2014-15 (n=67) 50% and for 2015-16 (n= 59) 41%. This shows that although the numbers have fluctuated slightly over the last 2 years they have not changed significantly.

4.1.3 A finding of C.difficile Toxin positive is generally classed as an infection as opposed to carriage of C.difficile. STHFT continues to ribotype every acute attributable case and all community cases (commenced in November 2015). Please see appendix 4 for the ribotyping results of 90 patients (please note the STH associated cases have not been included in this section as the focus is on the cases originating in the community. It is difficult to compare the 2 groups as the 2015-16 group contained only 50 results and this group 90. However there are 3 times as many 002 cases (at 15) as there were in 2015-16 (5). This is a very common strain accounting for 10% of all ribotypes so is difficult to quantify. Likewise the 078 ribotype has increased to 11 cases from the 2 seen in 2015-16. None of the cases seen in 2016-17 have been linked by GP Practice. Postcode is used to determine a possible linkage between cases but this is too crude a geographical estimate to establish an environmental factor. However it does reinforce the need to keep ribotyping all cases on a continual basis to achieve a better epidemiological understanding.

4.2 **Cases where antibiotics had been prescribed**

4.2.1 Antibiotic exposure remains a significant risk factor for patients with or without a recent hospital admission. On the RCAs from 2015-16 onwards antibiotic exposure in the community was no longer reviewed for patients with a recent hospital admission that was assessed as acute/STH associated. As such it is difficult to compare 2014-15 figures with 2015-16 onwards for this group.

However, the number of patients with recent hospital admission exposed to antibiotics in 2015-16 and 2016-17 remains the same at 20. For patients with no recent hospital admission the number exposed to antibiotics **has reduced** from 2014-15 (n=47), 2015-16 (=42) to 2016-17 (n=39). This is a relatively small number to make any meaningful claim about but may reflect in some small part the broad spectrum antibiotic prescribing information given to GP Practices in the last few years at PLI events and the update of the Sheffield Formulary Chapter 5.

Of the 2 cases, where antibiotics were inappropriately prescribed, both involved Co-Amoxiclav and had no recent hospital admission. This is a big reduction over the previous 2 years whereby:

2014-15 10 cases were assessed as avoidable in 2014-15 of which 6 involved Cephalosporin’s and 4 Co-Amoxiclav (although 2 of the Co-Amoxiclav cases did not involve GP prescribing).

2015-16 5 cases were assessed as avoidable, 3 involving Co-amoxiclav and 2 involving Cephalosporin’s. This has shown a steady reduction in the number of cases avoidable cases involving antibiotic prescribing.

This is important as the appropriateness of antibiotic prescribing has been the key factor in determining whether C.difficile acquisition has been avoidable or unavoidable in the community, other than 1 other lapse in care in an

intermediate care bed with potential cross infection identified through same ribotype.

4.3 Co-Amoxiclav Exposure

21 (36%), cases out of the 59 patients prescribed antibiotics were prescribed Co-Amoxiclav of which 5 had a recent hospital admission and 15 had not.

Compared with the previous 2 years:

2014-15, 38 cases out of 134 (28%) were prescribed Co-Amoxiclav, 16 had a recent hospital admission and 22 of the cases had not.

2015-16, 25 cases out of 62 (40%) were prescribed Co-Amoxiclav, 7 had recent hospital admission and 18 did not.

This shows a positive continuing downward trend in this broad spectrum antibiotic prescribing, which is mirrored in information provided in appendix 5**.** This may be partially explained by the STHFT microbiology suppressing the reporting of Co-Amoxiclav sensitivities in urine samples received by STHFT Medical Laboratories in the over 65's and replaced it with Pivmecillinam from September 2015. However, unfortunately this reduction in broad spectrum antibiotic prescribing has not yet been accompanied by a reduction in the rate of community C.difficile infection reported over the same time period.

4.4 Proton Pump Inhibitor (PPI) - Anti-ulcer Medication

The total number of community cases on a PPI or anti-ulcer medication is 52 (50%) with 28 having had an admission and 24 not having a recent hospital admission. This compares over the last 2 years to 2014-15 with 60 cases (45%) of which 25 had a recent hospital admission and 35 did not have a recent admission and in 2015-16 to 50 cases (40%), of which 19 cases had a recent hospital admission and 31 did not. This shows that the number of patients on a PPI is remaining relatively stable.

However as highlighted in appendix 5 Sheffield is a relatively high user of PPIs, listed in the top quartile for volume of prescribing per population head (although the item volume and item volume per population head has dropped over the 12 months from April 2016 to April 2017). Local prescribing data derived from practices using SystmOne (75% of the total in Sheffield) reveal that approximately 11.3% of all patients (May to July 2017 data) have a current repeat prescription written for a PPI. This is obviously a significant figure.

4.5 Recurrence of cases

There were 17 recurrent episodes (16%) out of 108 cases, of which 9 had a recent hospital admission and 8 did not.
Of the 17 episodes; 15 patients had 1 episode of recurrence and 1 patient had 2 recurrent episodes.

4.5.1 **Comparing with the previous 2 years:**

2014-15 - there were 12 episodes (8.9%) out of 134 cases. 7 had a recent hospital admission and 5 had not.
Of the 12 episodes; 8 patients had 1 episode of recurrence and 2 patients had 2 recurrent episodes

4.5.2 2015-16 - there were 20 episodes (14%) out of 142 cases. 11 had a recent hospital admission and 9 had not. Of the 20 episodes; 11 patients had 1 recurrent episode, 3 patients had 2 recurrent episodes (= 6) and 1 patient had 3 recurrent episodes (= 3).

This shows that the majority of patients tend to have 1 episode of recurrence only. Although there was an increase between 2014-15 & 2015-16, this appears to have plateaued and is still under the national average recurrence rate of approximately 20% (PHE 2013).

5.0 Comparing Sheffield CCG total figures with other CCGs

5.1 This year data has also been collated that compares the total number of CCG cases (community and acute), with CCGs in core cities (as defined by PHE**).** Please see appendix 6. Comparing the core cities CCGs, Sheffield has the third highest numbers above the core Cities average of 175 cases, along with Birmingham and Leeds.

Looking at the core cities table in appendix 6 where core city CCGs are broken down by individual CCGs, 6 are under their target and 10 are above.

6.0 Summary of Performance

6.1 For the total number of CCG cases (all community cases and acute ones) over the last 3 years (2014-17) there has been an increase of just 6 cases.

6.2 For the community cases there has been a small decrease in overall antibiotic prescribing in patients with no recent hospital admission over the last 3 years.
There has been a large decrease in the number of cases prescribed Co-Amoxiclav; from 38 cases in 2014-15 to 20 cases in 2016-17.
There has also been a significant decrease over the last 3 years in the number of avoidable cases/lapses in care due to antibiotic prescribing from 10 in 2014-15 to just 2 in 2016-17. This may be in part due to targeted work in the CCG - information provided at PLI events and the update of the Sheffield Formulary Chapter 5.

The numbers of recurrence, although these have increased from 2014-15 (12 episodes) to 20 in 2015-16, they have not continued to increase in 2016-17 with 17 cases (16%). This however is still under the national average recurrence rate of approximately 20% (PHE 2013).

7.0 Conclusion

7.1 In terms of risk factors, these results broadly support previous findings in that hospital admission and recent hospital admission, remains the most significant

risk factors in C.difficile acquisition. It is noted that the number and percentage of community cases with no recent hospital admission has remained relatively stable in 2014-15 & 2016-17 with a slight increase in 2015-16, although this could be explained by natural variation.

7.2 Antibiotic exposure remains a significant acquisition risk factor for both patients with a recent hospital admission and those without. Although for patients with no recent hospital admission the numbers prescribed antibiotics has fallen slightly over the last 3 years from 47 to 39.

Although antibiotic exposure remains a significant risk factor it must be acknowledged that only 2 cases (2%) out of a potential 104 were found to be avoidable due to inappropriate prescribing. This means that 98% of all community cases were unavoidable.

7.3 In terms of PPI usage, 50% of the community patients were on a PPI or anti-ulcer medication. We know that within the CCG 12.5% of all patients on SystmOne (which is 75% of the GP Practice population) are currently on a PPI. In view of the widespread use of PPIs in Sheffield, this could be a contributory factor in the high C.difficile figure. A recommendation on clinical review and clear clinical indication for PPI prescribing is included in section 8.

7.4 When comparing the CCG cases against the core city CCGs, Sheffield is the third highest core city. It is also notable that the national target for 2016-17 has been unchanged by PHE/NHSE since 2015-16 as there has been a slight national rise in the numbers of C.difficile. It may also reflect that we are approaching an irreducible minimum number of cases. The fact that only 2% of community cases were attributed to inappropriate antibiotic prescribing also supports this point.

7.5 What is also well known is that although there is national guidance on **when** to test patients for the presence of C.difficile toxin (C.difficile Infection Objectives for NHS Organisations in 2017-18 and guidance on sanction implementation March 2017 table 1) the interpretation of when to test patients is variable nationally. This may lead in some areas lead to under testing and under reporting of cases. However Sheffield has a very robust testing procedure and this could also be contributing to a relatively high number of cases. However from a patient safety and quality perspective this is necessary.

7.6 The results illustrate the complex nature of Community Associated C.difficile infection, with many factors still <u>unknown</u> including potential community reservoirs and trigger factors. It also identifies the ongoing need for further research into this area in order that we can see a clear reduction in the rates of C.difficile infection both in hospital and in the community.

8.0 Recommendations

a. All C.difficile cases to continue to be ribotyped in order to gain a better understanding of the epidemiology of community C.difficile.

b. To continue to undertake community RCAs.

c. Continue to review the CCG C.difficile action plan with 6 monthly reviews by the CCG Antimicrobial Stewardship Group.

d. Through the C.difficile RCA process, establish for patients on a PPI whether there is a relevant clinical indication for it. Information will be shared with the GP practice via the RCA and also through the GP Bulletin.

9.0 Bibliography and Reference List:

Department of Health and Health Protection Agency (December 2008) Clostridium infection: How to deal with the problem

NHS England (March 2016) Clostridium difficile infection objectives for NHS organisations 2016-17 and guidance on sanction implementation

Public Health England (May 2013) Updated guidance on the management and treatment of Clostridium difficile infection

Public Health England (October 2014) Management of infection guidance for primary care for consultation and local adaptation.

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Dr Rob Townsend, Consultant Microbiologist, STHFT

On behalf of Penny Brooks, Chief Nurse

17 July 2017

Appendix 1

Working with you to make Sheffield HEALTHIER

NHS Sheffield Clinical Commissioning Group

Sheffield CCG C. difficile Action plan 2017-18 Q1 Update July 2017

Annual Target - 194 cases.

Action	Lead	Deadline	Commentary
1.Root Cause Analysis (RCA)			
1.1 Continue to undertake RCA's on all community attributable cases.	IPCN and Microbiologist	**Continuous G**	2016-17 C.difficile annual Report presented at CCG Clinical Commissioning Committee August 2017.
1.2 Undertake ribotyping on all Sheffield cases (including community) from November 2015 onwards.	Microbiology and IPCN	**Continuous G**	Required to gain a better understanding of the epidemiology of community C.difficile.
1.3 Continue to provide C.difficile advice and support to care homes.	IPCN	**Continuous G**	The PCT continue to contact care homes by phone for community cases of C.difficile.
2.Prescribing Practice			
2.1. Discuss with STHFT Antimicrobial Therapy Team, regarding recommendations for long term prophylaxis of UTI for community patients including measures to address Cefalexin prescribing in this patient cohort.	Meds Management/ Microbiologist	**Completed January 2017** **G**	**The Chapter 5 "Infections" of the formulary has been updated in January 2017 in line with PHE guidance to include** strong wording regarding avoiding where possible other classically used items such as Cefalexin. The chapter also advises about ensuring there is a proven history of UTI's (before starting long

Action	Lead	Deadline	Commentary
			term urinary prophylaxis) as symptoms can be viewed as something else.
2.2 Undertake a brief repeat audit of numbers of Cephalosporin's prescribed in community (numbers/trends only).	Meds management	**March 2016 G**	**Completed 10 May 2016. Shows a downward trend of 50% of Cephalosporin's prescribing in the community from January 2013 to December 2015.**
2.3 Consultant Microbiologist to write an article for inclusion in the GP and Practice Nurse Bulletin on the associated risk of Co-Amoxiclav prescribing	Microbiologist	**Completed July 2016**	**Completed.** Only 3 cases assessed as avoidable in 2015-16 due to Co-Amoxiclav prescribing. The examples have been briefly (anonymously) listed in the Sheffield formulary Good practice points for C.difficile instead of the GP Bulletin.
2.4 Highlight to clinicians the risks of high dose and/or long term treatment (especially with the PPIs) Continue to encourage the regular review of treatment at a minimum frequency of at least once a year.	Meds Management	**Completed but continuous regular review of treatment via Medicines Management support to practice and RCA**	Completed. CCG paper has been updated on the long term risks of PPIs that includes a section on the link with C.diff. An update of the Sheffield Formulary Gastro-Intestinal System chapter acid suppressant section has been revised to advise prescribers to step down PPI where possible and will also include the aforementioned objectives.
2.5 C.difficile RCA process to establish for patient's on a PPI whether there is a relevant clinical indication for the PPI.		**September 2017**	Information to be provided in RCA of those patients on a PPI and also included in GP bulletin. **Not started yet awaiting approval at August AMS group**

Action	Lead	Deadline	Commentary
3. Commissioning			
3.1 Ensure STHFT deliver their action plan.	IPC Team	**March 2018 Ongoing**	Target 87 cases.
3.2 Monitor and review SCHFT C.difficile cases.	IPC Team	**March 2018 On-going** **G**	Target 3 cases.
3.3 Provide advice and support to care homes - via the annual programme of assurance visits.	IPC Team	**Ongoing/March 2018** **G**	Ongoing

Appendix 2 - Breakdown of the key risk factors of C.difficile acquisition over the last 3 years and this is split by recent hospital admission and no recent admission.

Risk factors	Community attributable recent HA			Community attributable no recent HA		
	2014/15	2015/16	2016/17	2014/15	2015/16	2016/17
Overall number of patients	**67**	**59**	**74**	**67**	**83**	**62**
Age split of patient						
Under 65 years	12 (18%)	14 (24%)	19 (26%)	18 (27%)	25 (30%)	21 (34%)
65-74 years	18 (27%)	6 (10%)	17 (23%)	16 (24%)	12 (15%)	12 (19%)
75 years and over	37 (55%)	39 (66%)	38 (51%)	33 (49%)	46 (55%)	29 (47%)
Antibiotic exposure	**39/67** **45%**	**20/36 see below for patients not assessed** **55%**	**20/44** **45%**	**47/67** **70%**	**42/80 see below for patients not assessed** 52%	**39/59** **66%**
Patient not exposed to antibiotics	**28**	**16**	**24**	**20**	**38**	**20**
Patients not assessed for antibiotic exposure:						
STH associated so not assessed in the community for antibiotic exposure	Not identified as a criteria in the RCAs undertaken in 2014-15	18	28	Not identified as a criteria in the RCAs undertaken in 2014-15	Zero	1
Child community cases so not assessed for antibiotic exposure	Zero	5	2	Zero	3	2
Lapses in care	**4**	**1**	**Zero**	**6**	**4**	**4**
Recurrence	**6**	**9**	**9**	**6**	**9**	**8**
Care home patients Please note all are individual cases no linkage by ribotype	**7**	**8**	**11**	**5**	**9**	**7 + 1***

with other patients except 1*						
PPI exposure Note patients assessed as STH associated or child community cases (where relevant) are not included in denominator figure.	**25/67** **37%**	**19/36 =** **53%**	**28/44 =** **64%**	**35/67** **52%**	**31/80 =** **39%**	**24/59 =** **41%**

Appendix 3 RCA summary table of avoidable cases 2014-15 to 2016-2017

Avoidable Community cases due to in-appropriate prescribing* 2016-17	
Date	**Reason**
June 2016	*NB case not due to in-appropriate prescribing Potential cross infection as same ribotype as another resident in intermediate care bed
September 2016	In appropriate Co-Amoxiclav prescribing for a UTI
September 2016	In appropriate Co-Amoxiclav prescribing for a Lower Respiratory Tract Infection
Avoidable Community cases due to in-appropriate prescribing 2015-16	
Date	**Reason**
August 2015	Long term Prophylactic Cephalexin prescribed for UTIs by both primary and acute care
August 2015	In-appropriate Co-Amoxiclav prescribing when the laboratory report identified resistance to Co-Amoxiclav on sputum sample
August 2015	In appropriate Co-Amoxiclav prescribing (not indicated in Formulary) for a soft tissue infection.
September 2015	Co-Amoxiclav prescribing for UTI. This agent was not identified on the laboratory report sensitivity list.
October 2015	Cephalexin for chest and possible UTI. Patient had history of MRSA also so was not appropriate antibiotic choice.
Potentially Avoidable Community cases due to in-appropriate prescribing 2014-15	
Date	**Reason**
April 2014	Cephalexin prescribed for a UTI. Potentially avoidable due to the prescribing of oral Cephalosporins especially in the elderly, as we generally do not recommend empiric Cephalexin.
April 2014	Potentially avoidable due to multiple antibiotic exposure, especially Cephalosporins/ Cephalexin for breast abscess.
July 2014	Potentially avoidable due to the prescribing of Cefalexin for UTI, which no longer features in the Sheffield formulary
September 2014	Prophylactic Cephalexin for UTI since 2008. This case was avoidable.
October 2014	OPD RHH OPAT Cellulitis to foot. After failing oral antibiotics the patient was referred to Infectious Diseases (ID). Patient managed through OPAT with once daily Ceftriaxone. This RCA is included here because although the GP Practice did not prescribe the Ceftriaxone the (hence was unavoidable from a community perspective) the incomplete antibiotic history provided to OPAT may have contributed to the in-appropriate prescribing choice.
November 2014	Stool sample detected shortly after admission. Had Cephalexin in September but no indication recorded, was changed to Co-Amoxiclav as Cephalexin was causing nausea. Potentially avoidable as no indication recorded in GP notes.
December 2014	Co-Amoxiclav for UTI x3 courses. This case was assessed as avoidable due to the number of courses prescribed.

February 2015	Potentially avoidable due to Co-Amoxiclav x2 courses for leg cellulitis only in formulary for facial cellulitis).
Potentially Avoidable Community cases for other reasons	
Date	**Reason**
December 2014	Co-Amoxiclav for chest infection (only 1 course and not verified by GP)
October 2014	A Healthcare Worker was prescribed Co-amoxiclav for sinusitis but this was not given by GP or acute trust.

Appendix 4 C.difficile community cases ribotype table 2016-17

Date Specimen	Area	Ribo type
23/05/2016	S10	1
21/06/2016	S4	1
04/07/2016	S10	1
29/08/2016	S13	1
08/10/2016	S4	1
07/04/2016	S6	2
08/07/2016	S35	2
14/07/2016	S9	2
14/07/2016	S4	2
01/08/2016	S13	2
27/09/2016	S35	2
28/09/2016	S6	2
04/10/2016	S10	2
14/10/2016	S12	2
18/10/2016	S8	2
28/10/2016	S8	2
17/11/2016	S5	2
17/11/2016	S20	2
18/01/2017	S8	2
14/02/2017	S35	2
04/06/2016	S6	5
08/08/2016	S10	5
17/01/2017	S6	5
27/01/2017	S35	5
06/02/2017	S5	5
13/03/2017	S11	5
16/06/2016	S8	11
07/02/2017	S12	11
22/03/2017	S35	13
01/05/2016	S35	14

Date Specimen	Area	Ribo type
13/07/2016	S35	14
21/08/2016	S5	14
16/09/2016	S20	14
05/10/2016	S35	14
05/12/2016	S12	14
02/07/2016	S6	15
04/08/2016	S35	15
15/09/2016	S12	15
10/10/2016	S10	15
10/11/2016	S8	15
19/12/2016	S20	15
07/02/2017	S6	15
31/03/2017	S11	15
19/07/2016	S6	17
28/12/2016	S11	21
09/08/2016	S17	23
12/09/2016	S12	23
14/09/2016	S13	23
31/10/2016	S26	23
06/12/2016	S35	23
22/08/2016	S11	24
28/04/2016	S5	29
03/09/2016	S10	29
04/09/2016	S2	29
21/10/2016	S6	29
06/01/2017	S2	46
29/04/2016	S2	50
10/06/2016	S2	50
27/09/2016	S36	50
26/10/2016	S17	50

Date Specimen	Area	Ribo type
22/12/2016	S13	50
01/06/2016	S8	57
24/08/2016	S10	57
06/09/2016	S6	62
09/03/2017	S61	64
12/10/2016	S8	70
09/11/2016	S2	77
02/05/2016	S10	78
23/07/2016	S2	78
19/07/2016	S20	78
15/09/2016	S9	78
08/10/2016	S17	78
01/12/2016	S2	78
09/12/2016	S8	78
04/01/2017	S17	78
21/02/2017	S17	78
10/03/2017	S13	78
07/03/2017	S8	78
07/06/2016	S10	87
10/08/2016	S5	101
28/11/2016	S35	115
07/04/2016	S5	126
21/06/2016	S5	126
03/10/2016	S5	126
09/02/2017	S5	126
12/05/2016	S6	154
08/11/2016	S11	255
07/04/2016	S12	335
15/07/2016	S5	339
15/05/2016	S36	511

Appendix 5 Sheffield CCG Broad spectrum antibiotic and PPI Prescribing information

Broad Spectrum Antibiotics

Over the last few years in Sheffield, in line with the national picture, we have seen a reduction in the prescribing of broad spectrum antibiotics (BSA) i.e. cephalosporin's, quinolones and co-amoxiclav. The last 2 years in particular has seen a dramatic reduction in consumption of these antibiotics locally (see table below):

Broad Spectrum Antibiotics % of total antibiotic prescribing **2015/16**	Broad Spectrum Antibiotics % of total antibiotic prescribing **2016/17**
Q1 15/16 14.01%	**Q1 16/17** 10.10%
Q2 15/16 13.60%	**Q2 16/17** 10.26%
Q3 15/16 10.85%	**Q3 16/17** 8.75%
Q4 15/16 10.01%	**Q4 16/17** 8.78%
Average 12.01	**Average 9.40**

This corresponds to a prescription item reduction from 12,207 items during Q1 15/16 down to 8,471 items during Q4 16/17 (a 30.6% reduction in item volume).

However, this reduction in BSA prescribing has not to date been accompanied by a reduction in the rate of community C.difficile infection reported over the same time period locally. The reason for this is not clear.

Proton Pump Inhibitors

Proton Pump Inhibitors (PPIs) are widely prescribed for a variety of gastro-intestinal conditions. National prescribing data available from OpenPrescribing.net indicates that Sheffield is a relatively high user of PPIs, listed in the top quartile for volume of prescribing per population head (see table below):

Total number of items of PPIs prescribed in Sheffield during April 2017: **59,822**	Total number of items of PPIs prescribed in Sheffield during April 2016: **63,878**
Number of items of PPIs prescribed in	Number of items of PPIs prescribed in

Sheffield during April 2017 per 1,000 population: **100.71 (National range 30-145)**	Sheffield during April 2016 per 1,000 population: **108.41 (National range 33-153)**

The data show that although Sheffield is a relatively high prescriber of PPIs, the item volume and item volume per population head has dropped over the 12 month period from April 2016 to April 2017.

Local prescribing data derived from practices using SystmOne (which is 75% of the total in Sheffield) reveal that approximately 11.3% of these patients (between May to July 2017) have a current repeat prescription written for a PPI. This is obviously a significant figure.

The PPIs are known to be associated with the risk of a number of adverse drug reactions including a potential association with increased C.difficile infection rates. In view of the widespread use of PPIs in Sheffield, this could a contributory factor to such infection rates.

Ian Hutchison - Medicines Management Pharmacist, Sheffield CCG.

Appendix 6 CCG Core cities bar chart and table

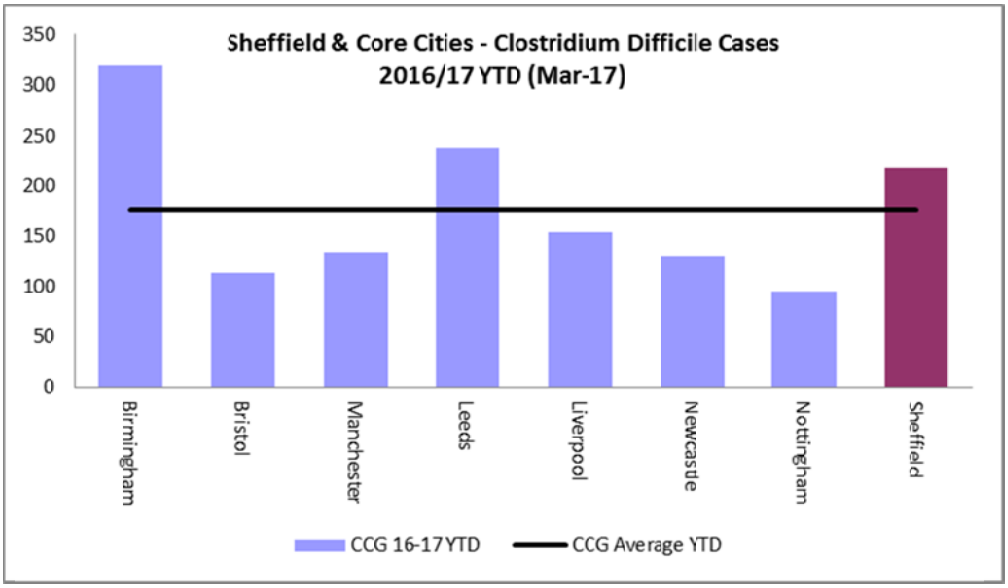

Table of breakdown of 2016-17 Core City and CCGs within it

Core City and CCGs in it	Number of cases in 2016-17	Target for 2016-17	2014-15 Rate (per 100,00 population)	2015-16 Rate	2016-17 Rate **CCG National average Rate = 23.4**
Birmingham Core city consists of:					
Birmingham Cross city CCG	180	183	23.3	22.9	**24.2**
Birmingham South & Central CCG	59	46	20.8	21.32	29.1
Sandwell & Birmingham CCG	114	109	25.6	23.1	23.3
Bristol Core city consists of:					
NHS Bristol CCG	122	131	26.8	29.8	27.1
Manchester Core city consists of:					

Central Manchester CCG	57	41	22.1	20.1	30.1
North Manchester CCG	41	39	26.8	35.2	22.9
South Manchester CCG	48	47	35.2	32.5	29.4
Leeds core city consists of:					
Leeds North CCG	47	58	29.0	32.3	23.4
Leeds South & East	101	104	45.1	43.6	40.4
Leeds West	111	90	30.1	34.8	34.2
Liverpool core city consists of:					
Liverpool CCG	160	138	33.1	33.6	33.4
Newcastle core city consists of:					
Newcastle & Gateshead CCG	141	142	35.8	40.2	28.5
Nottingham core city consists of:					
Nottingham City CCG	58	51	19.0	19.7	18.2
Nottingham North & East CCG	32	47	45.0	21.4	21.4
Nottingham West CCG	13	21	29.5	13.3	11.6
Sheffield core city consists of:					
Sheffield CCG	206	194	37.1 **2nd highest**	36.1 **3rd highest**	38.2 **2nd highest**