



National Public Health
Service for Wales

Gwasanaeth Iechyd Cyhoeddus
Cenedlaethol Cymru

NPHS Communicable Disease
Surveillance Centre

Mandatory *Clostridium difficile* **Surveillance**

01/01/05– 30/06/05

Anonymised Version

September 2005

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Introduction

Mandatory surveillance of *Clostridium difficile* in inpatients aged over 65 with diarrhoea in Welsh hospitals was introduced by the Welsh Assembly Government in January 2005. This is the 1st report of the surveillance scheme and covers the period 01/01/2005 to 30/06/2005.

The report contains the following:

1. Tabulated numbers of *C. difficile* and rates per 1000 admissions by NHS Trust in Wales for the period 01/01/2005 – 30/06/2005.
2. Tabulated numbers of *C. difficile* and rates per 1000 admissions by patient age and gender for the period 01/01/2005 – 30/06/2005.
3. Tabulated numbers of *C. difficile* and rates per 1000 admissions for the 10 hospital specialties with the highest number of reports of *C. difficile* for the period 01/01/2005 – 30/06/2005.
4. Monthly rates of *C. difficile* per 1000 admissions for all Wales and for individual Welsh Trusts presented in the form of statistical process control charts (explained in the notes for interpretation) for the period 01/01/2005 – 30/06/2005.

The National *C. difficile* Standards Group Report to the Department of Health (Journal of Hospital Infection, Vol 56 (suppl 1), February 2004) states that the diagnosis of *C. difficile* Associated Diarrhoea (CDAD) requires the detection of *C. difficile* toxins in diarrhoeal stool samples. Therefore, surveillance in Wales is restricted to *C. difficile* in inpatients with diarrhoea. However, very few laboratories are currently able to provide us with information on faecal consistency. To ensure comparability between sites, data from all positive *C. difficile* results from inpatients aged over 65 regardless of faecal consistency, have been presented.

The total *C. difficile* rate per 1000 admissions in inpatients aged over 65 in Wales for the period 01/01/2005 – 30/06/2005 was 16.69, ranging from 4.83 to 37.29. There was no significant difference in the rates in males and females and rates increased with increasing age. The highest numbers of *C. difficile* were reported from the specialties of general medicine and geriatric medicine. In the 10 specialties with the highest numbers of *C. difficile*, the highest rate was in nephrology (86.07) and geriatric medicine (61.66).

C. difficile rates for hospital Trusts in England have recently been published for 2004. Rates for English hospital Trusts are not directly comparable with Welsh data because the English surveillance scheme covers *C. difficile* results from the community as well as from hospital inpatients and the denominator data used is bed days in the 65+ age group. Bed day data are not available by patient age group for Wales, therefore admissions in the over 65s have been used as denominator data. The English report is available at: www.hpa.org.uk/cdr/archives/2005/HCAI_3405_cdifff.pdf. Rates for individual English trusts are available at:

http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4118347&chk=IFi3Za

Please note that these data have been sent to you on a confidential basis. Whilst you can release data from your own Trust at your discretion, please do not release data from other Trusts in Wales and England without permission from their Chief Executives. An anonymous version of this report will be available on the Welsh Healthcare Associated Infection Programme website.

A paper version of parts of this report will be distributed to the Medical Directors and Chief Executives of Welsh NHS Trusts.

Notes for Interpretation of *C. difficile* Data

1. The report covers isolates with specimen dates in the period 01/01/2005 – 30/06/2005.
2. Reports of *C. difficile* were obtained by automatic extraction from laboratory information systems via Datastore for all laboratories in Wales that have Datastore. The 2 laboratories without Datastore, provided us with reports on paper or an electronic file from their Telepath system.
3. Only reports from hospital inpatients aged over 65 have been included. All faecal consistencies have been included to ensure comparability between laboratories, since at this time very few laboratories were able to provide faecal consistencies.
4. Reports of *C. difficile* have been deduplicated: any positive *C. difficile* reports occurring within 28 days of another positive *C. difficile* report from the same patient have been excluded from the data set.
5. The denominator data used are admissions to Welsh hospitals aged over 65. The data was obtained from the Health Solutions Wales database, PEDW, and is specific to the time period of the report.
6. Rates by Trust include numerator and denominator data from all hospitals in the Trust.
7. Laboratories should test specimens for *C. difficile* using either an immunoassay detecting both toxin A and toxin B, or a neutralised cell toxicity assay. One laboratory is currently only testing for toxin A, therefore this may have resulted in a small number of *C. difficile* cases not being identified.
8. The mean is the average rate. The median is the rate in the middle of all the rates.
9. Monthly trend data for Wales and for individual Trusts are presented in the form of statistical process control charts. SPC charts assume that rates within a Trust will be largely similar over time. They allow the distinction between natural variation (rates that fall within the limits) and special cause variation, where something unusual is occurring in a Trust (rates that fall outside the limits). A rate that falls outside the control limits and also certain patterns in the Trend data should lead to a search for the explanation for the situation, which has resulted in the outlier rate or pattern. This could be the result of either a true high or low rate of *C. difficile* or due to reporting biases e.g. incomplete reporting or over-reporting. Further information about SPC charts is provided on the accompanying sheet.
10. Data represents *C. difficile* diagnosed in a Trust; the *C. difficile* was not necessarily acquired in that Trust.
11. Trusts vary in their case mix. Differences in numbers of patients with increased vulnerability to *C. difficile* may contribute to differences in rates in different locations.

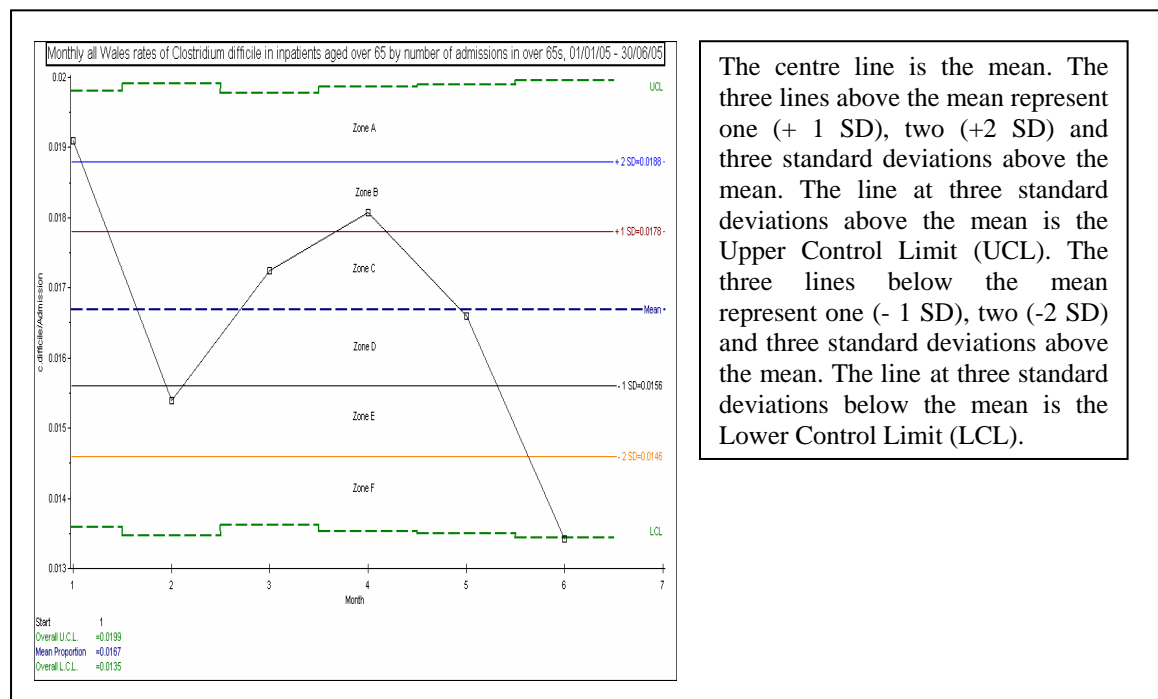
Statistical Process Control Charts

Individual monthly rates of *C. difficile* for all Wales and for individual Trusts have been presented in the form of Statistical Process Control (SPC) P-charts. SPC charts assume that rates within a Trust will be largely similar over time. They present the occurrence of *C. difficile* in a Trust in relation to what would be expected, based on the mean rate for the Trust and calculated statistical process control limits for the time period. These control limits, derived from plus or minus 3 standard deviations from the mean, represent the range of variation in rates of *C. difficile* that might be expected to occur in a Trust due to chance alone. The control limits for a Trust may change from month to month, depending on changes in the sample size ie the number of admissions of patients aged over 65.

SPC charts allow the distinction to be made between natural variation (rates that fall within the control limits) and special cause variation, where something unusual is occurring in a Trust (rates that fall outside the control limits). If a Trust's rate in any month falls outside its control limits, it means that the rate differs from its mean rate by more than is likely to be due to chance; special circumstances are more likely to operate. Such a result should prompt an investigation into the possible cause, which could be a true high or low rate of *C. difficile* or may have arisen as a result of reporting biases from incomplete or over reporting.

As well as investigating when rates fall outside the control limits, investigations should be prompted when certain trends in the data are observed. These trends are listed below and should be read in conjunction with Figure 1.

Figure 1. Example Statistical Process Control Chart



Trends in an SPC Chart to Prompt an Investigation

1. Eight consecutive values on the same side of the mean ie in zones A, B or C or in zones D, E or F
2. Any 12 of 14 consecutive values on the same side of the mean ie in zones A, B or C or in zones D, E or F
3. Three consecutive values in either the top third or bottom third of the expected range ie in zone A or F
4. Five consecutive values in the top two thirds or bottom two thirds of the expected range, ie in zones A or B or in zones E or F
5. Thirteen consecutive values in the middle thirds of the expected range ie in zones C and D.
6. Eight consecutive values either increasing or decreasing.
7. Cyclic or periodic behaviour.

The occurrence of the above trends should prompt an investigation into their possible causes since Trends 1 to 4 may indicate an improvement or deterioration in infection control, Trend 5 may indicate an improvement in the consistency of application of infection control measures, Trend 6 may indicate improving or deteriorating application of control measures and Trend 7 may indicate an underlying pattern to changes in the application of control measures that repeats itself at regular intervals, such as seasonality.

The overall rate of *C. difficile* for all Welsh Trusts will also be plotted on each Trust's SPC chart, for comparison purposes.

A training course in Statistical Process Control charts was organised by the National Public Health Service in March 2005 and a representative from each of the infection control teams in Wales was invited to attend. If you have difficulty interpreting the SPC charts, members of the ICTs that attended the training course should be able to help.

Clostridium difficile surveillance in hospital inpatients aged >65

Surveillance Period: 01/01/2005 – 30/06/2005

Table 1. Rates per 1000 bed days by NHS Trust

Trust	<i>C. difficile</i>	Admissions	Rate/1000 Admissions
A	23	4761	4.83
B	67	3258	20.56
C	2	382	5.24
D	272	10660	25.52
E	242	15291	15.83
F	14	1856	7.54
G	206	5524	37.29
H	104	6558	15.86
I	74	5703	12.98
J	107	7593	14.09
K	94	5639	16.67
L	138	12247	11.27
M	114	7233	15.76
N	14	1536	9.11
Total Rate	1471	88241	16.67
Mean	105.07	6302.93	15.18
Median	99	5671	14.93
Min	2	382	4.83
Max	272	15291	37.29

Table 2. All Wales Rates per 1000 bed days by Patient Age Group

Age Group	<i>C. difficile</i>	Admissions	Rate/1000 Admissions
66-75	309	34860	8.86
76-85	687	37673	18.24
86-95	428	14630	29.25
96+	47	1078	43.60

Table 3. All Wales Rates per 1000 bed days by Patient Gender

Gender	<i>C. difficile</i>	Admissions	Rate/1000 admissions
Female	853	48217	17.69
Male	617	40023	15.42
Unknown	1		

Table 4. All Wales Rates per 1000 bed days by Hospital Specialty for the 10 specialties with the highest number of *C. difficile* reports

Specialty	<i>C. difficile</i>	Admissions	Rate/1000 admissions
General Medicine	642	39837	16.12
Geriatric Medicine	301	4882	61.66
General Surgery	81	11315	7.16
Trauma/Orthopaedics	54	8584	6.29
Nephrology	42	488	86.07
GP Other than maternity	36	3420	10.53
Urology	30	3752	8.00
Rehabilitation	19	939	20.23
Cardiology	18	2614	6.89
Haematology	16	824	19.42
Others	89		
Unknown	143		

Please do not release the data for NHS Trusts other than your own without permission from their Chief Executive.

TREND DATA

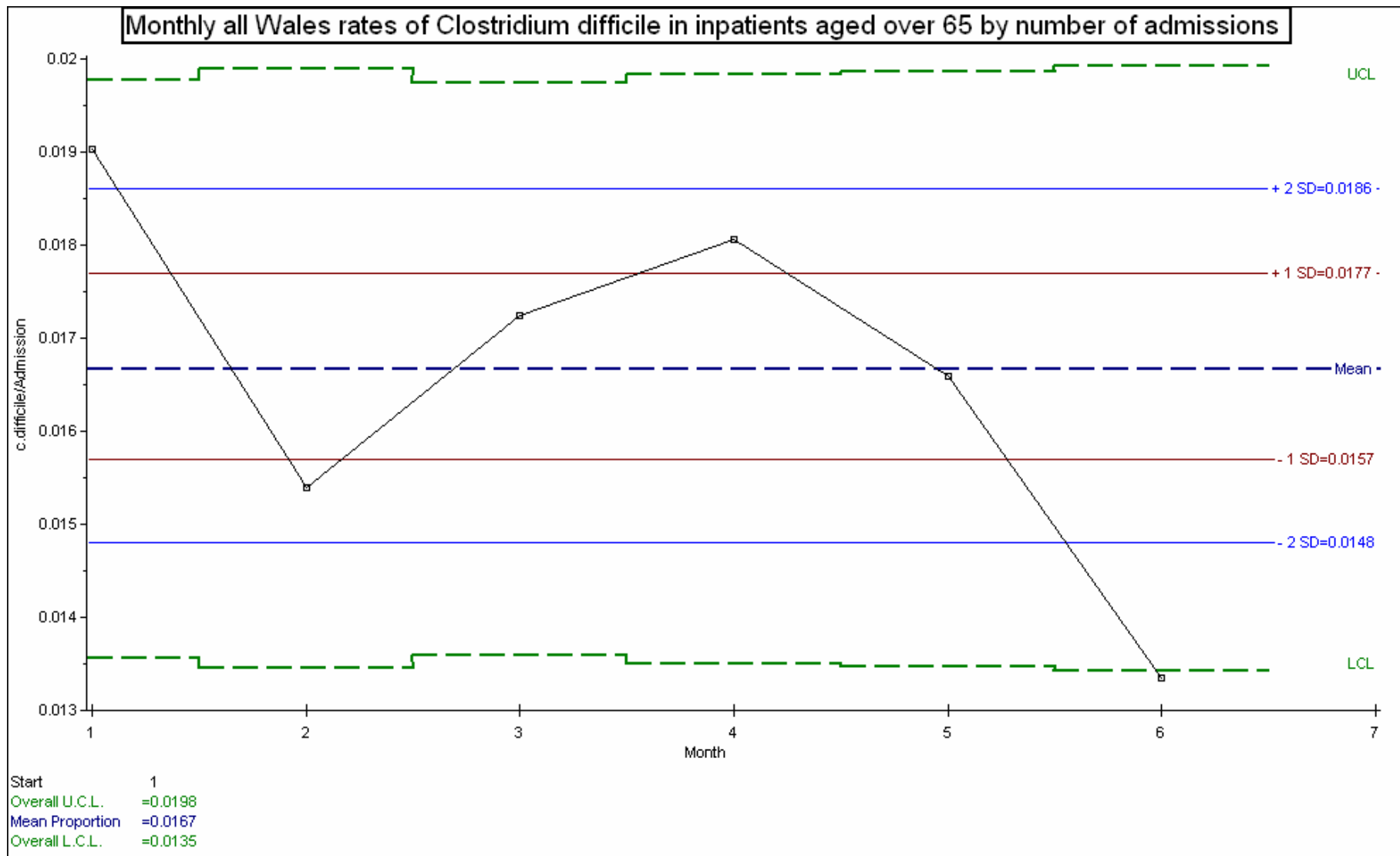
01/01/05 – 30/06/05

**All Wales
Monthly Trend Data**

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Wales

Month	No. <i>C.difficile</i>	No. Admissions	Rate/1000 Admissions
Jan	291	15288	19.03
Feb	219	14225	15.40
Mar	269	15603	17.24
Apr	266	14723	18.07
May	240	14464	16.59
Jun	186	13938	13.34

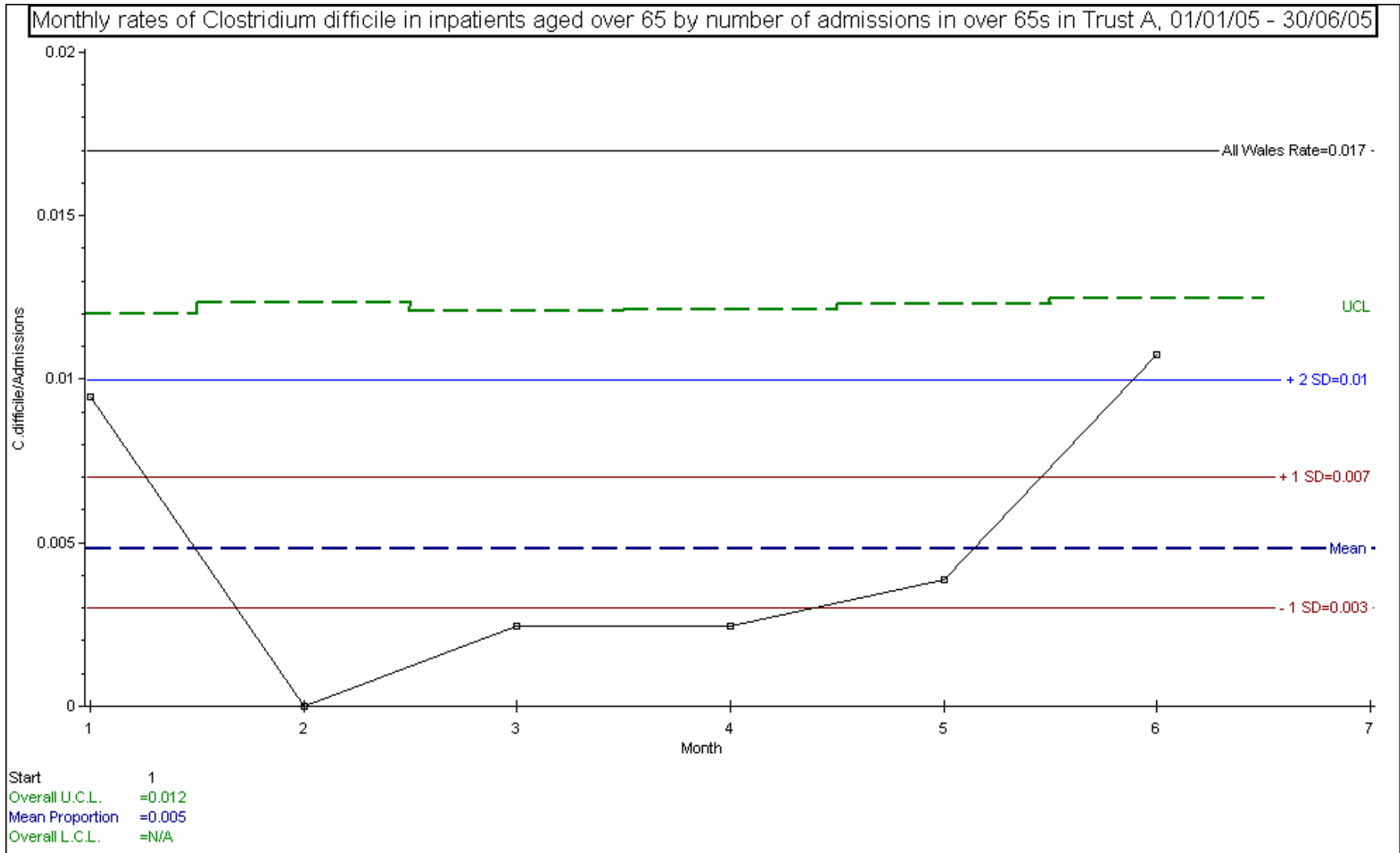


Trust A
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust A

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	8	9.48
Feb	0	0.00
Mar	2	2.43
Apr	2	2.46
May	3	3.87
Jun	8	10.75

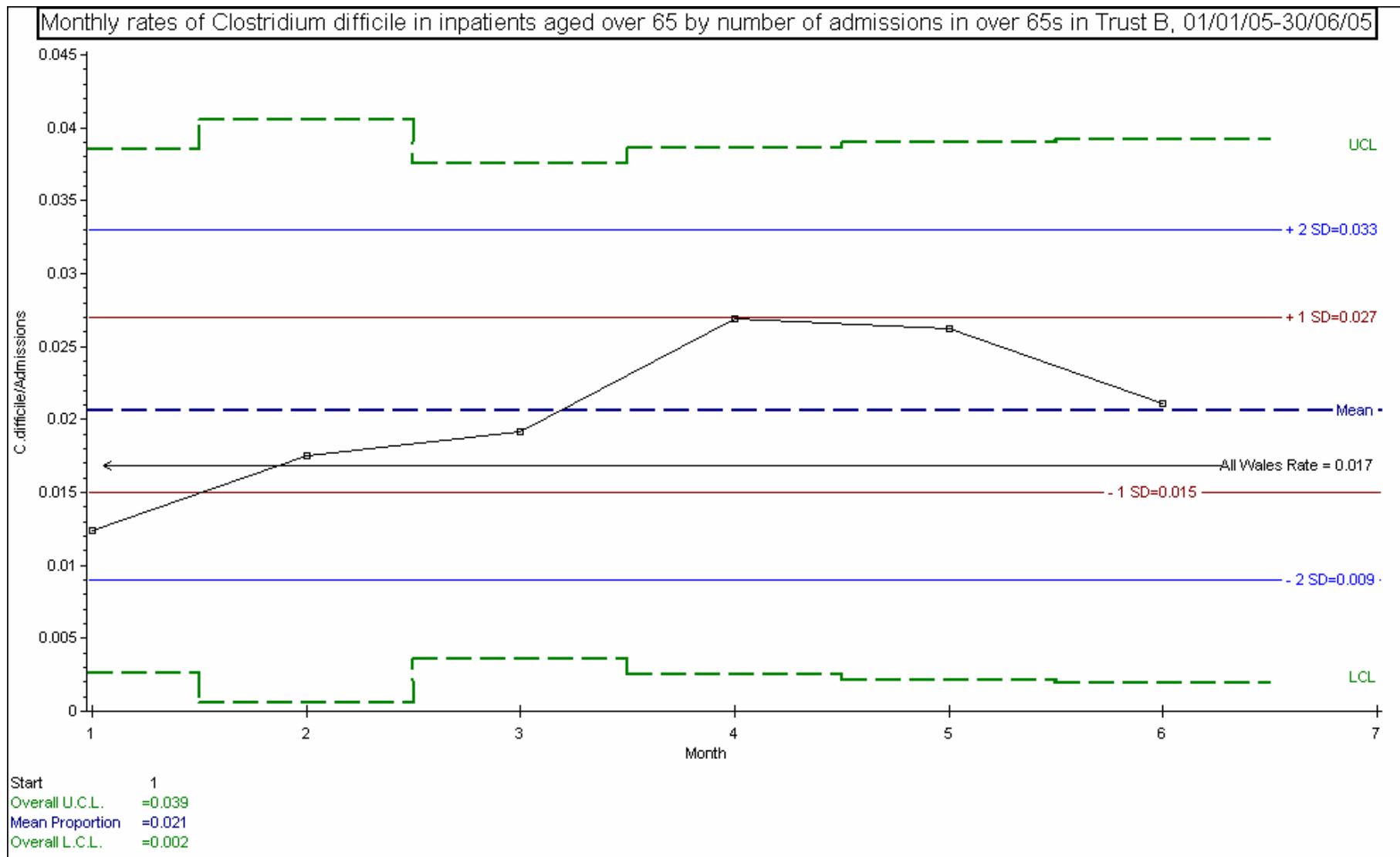


Trust B
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust B

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	7	12.41
Feb	8	17.54
Mar	12	19.20
Apr	15	26.88
May	14	26.27
Jun	11	21.07

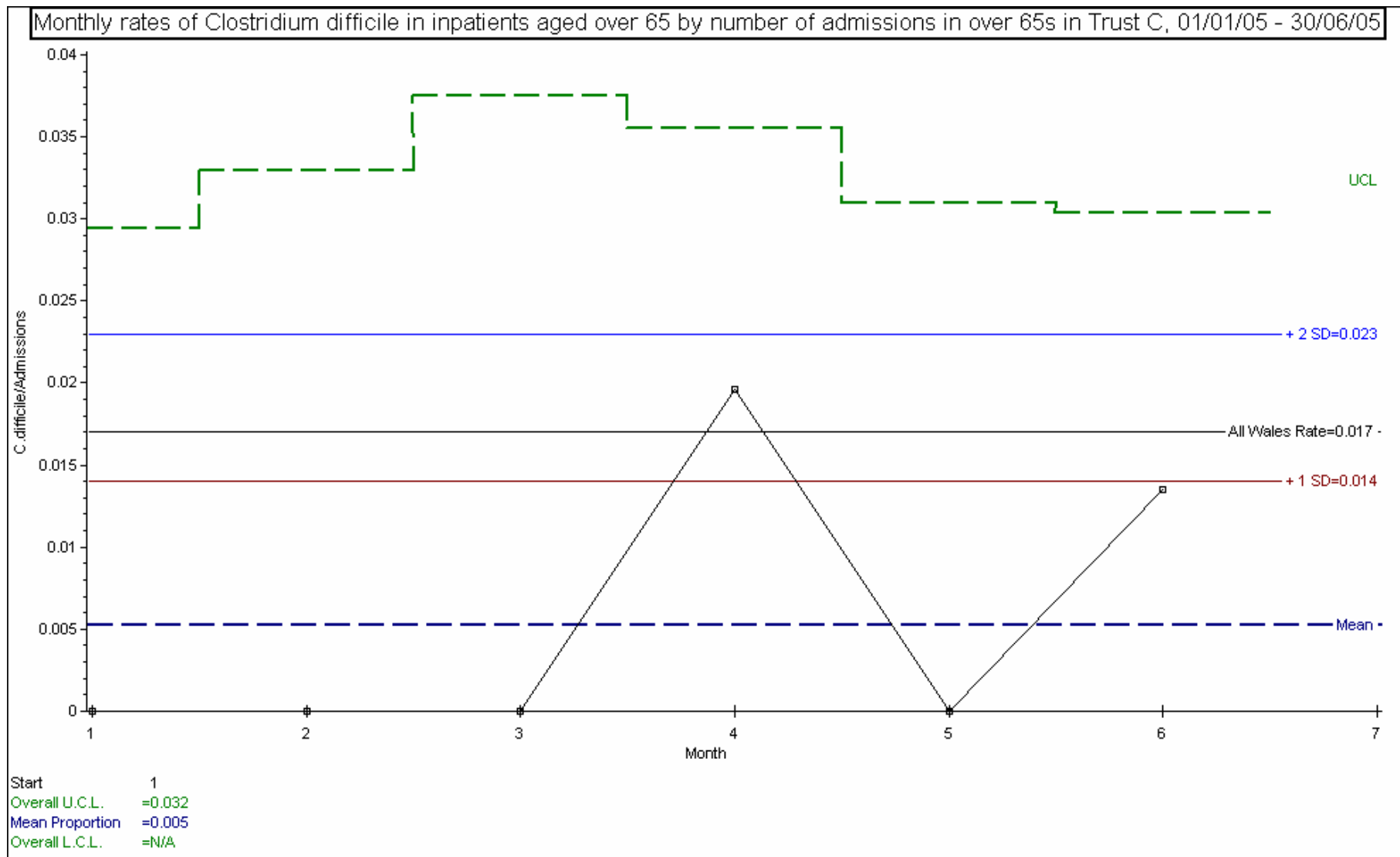


Trust C
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust C

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	0	0.00
Feb	0	0.00
Mar	0	0.00
Apr	1	19.61
May	0	0.00
Jun	1	13.51



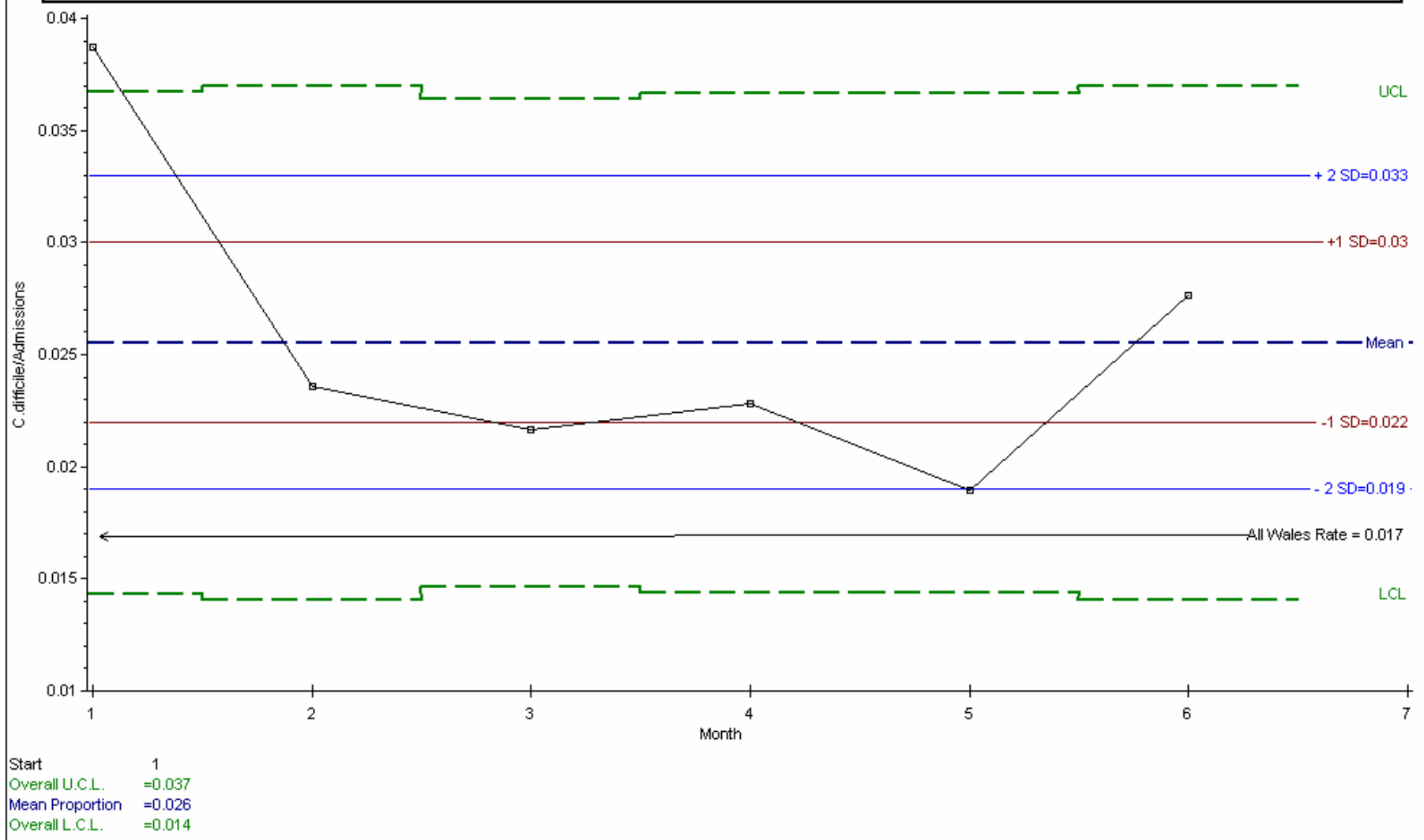
Trust D
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust D

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	69	38.72
Feb	40	23.60
Mar	41	21.68
Apr	41	22.80
May	34	18.94
Jun	47	27.66

Monthly rates of Clostridium difficile in inpatients aged over 65 by number of admissions in over 65s in Trust D, 01/01/2005 - 30/06/2005



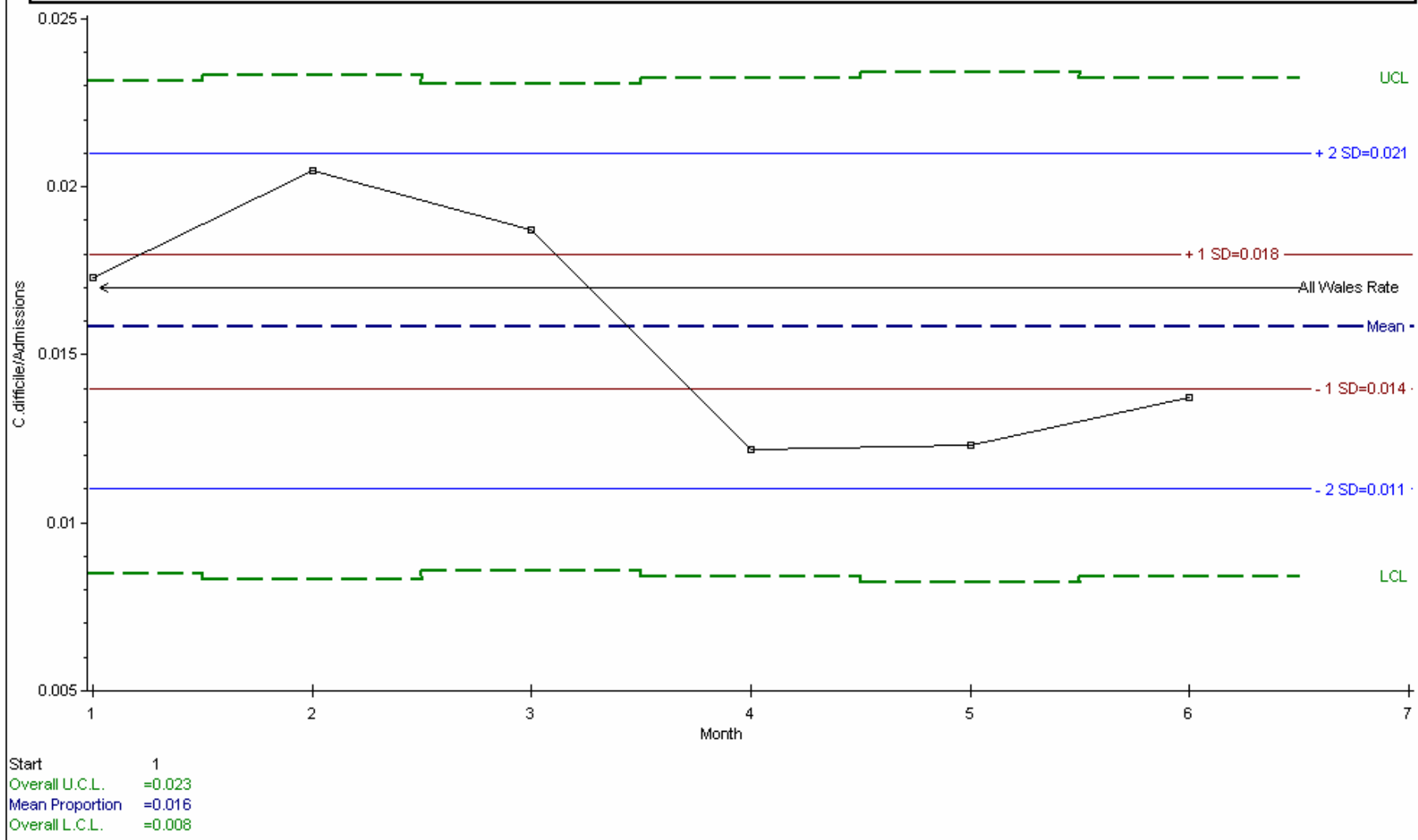
Trust E
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust E

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	45	17.30
Feb	51	20.50
Mar	50	18.73
Apr	31	12.17
May	30	12.32
Jun	35	13.74

Monthly rates of Clostridium difficile in inpatients aged over 65 by number of admissions in over 65s in Trust E, 01/01/05 - 30/06/05



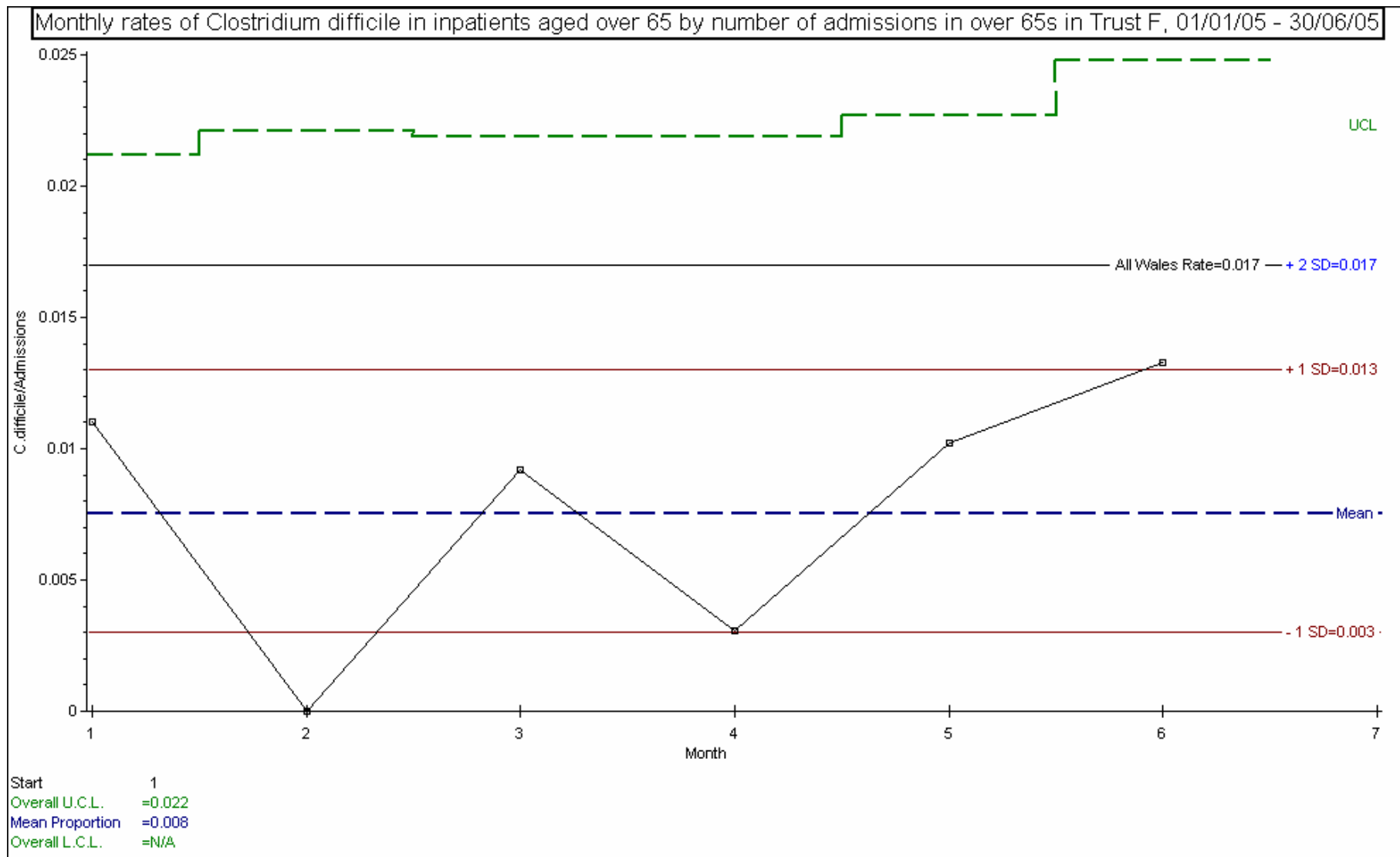
Trust F

Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust F

Month	No. <i>C. difficile</i>	Rate/1000 Admissions
Jan	4	11.02
Feb	0	0.00
Mar	3	9.17
Apr	1	3.06
May	3	10.20
Jun	3	13.27



Trust G

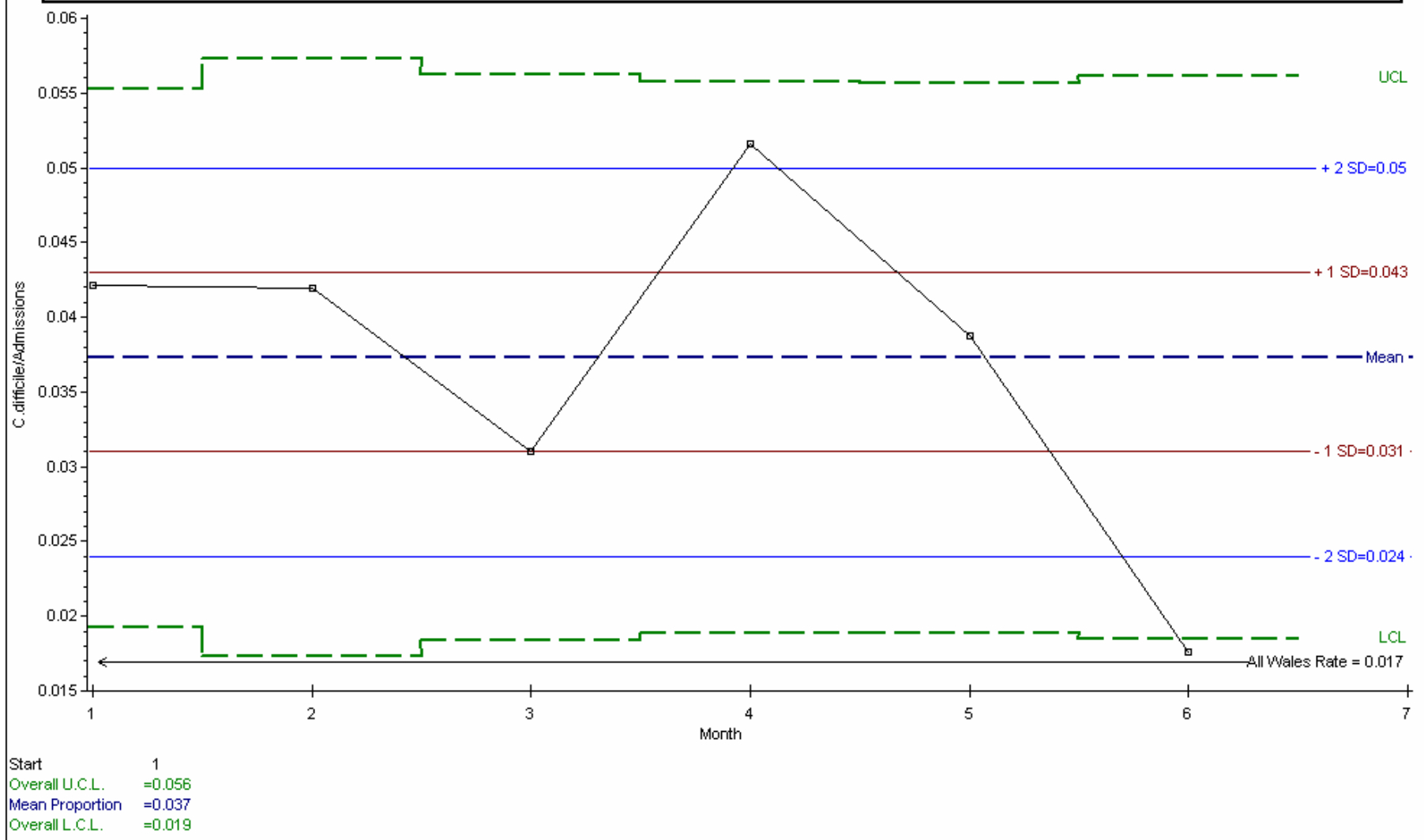
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust G

Month	No. <i>C.difficile</i>	Rate/1000 admissions
Jan	42	42.13
Feb	34	41.98
Mar	28	31.01
Apr	49	51.63
May	37	38.74
Jun	16	17.58

Monthly rates of Clostridium difficile in inpatients aged over 65 by number of admissions in over 65s in Trust G, 01/01/2005 - 30/06/2005

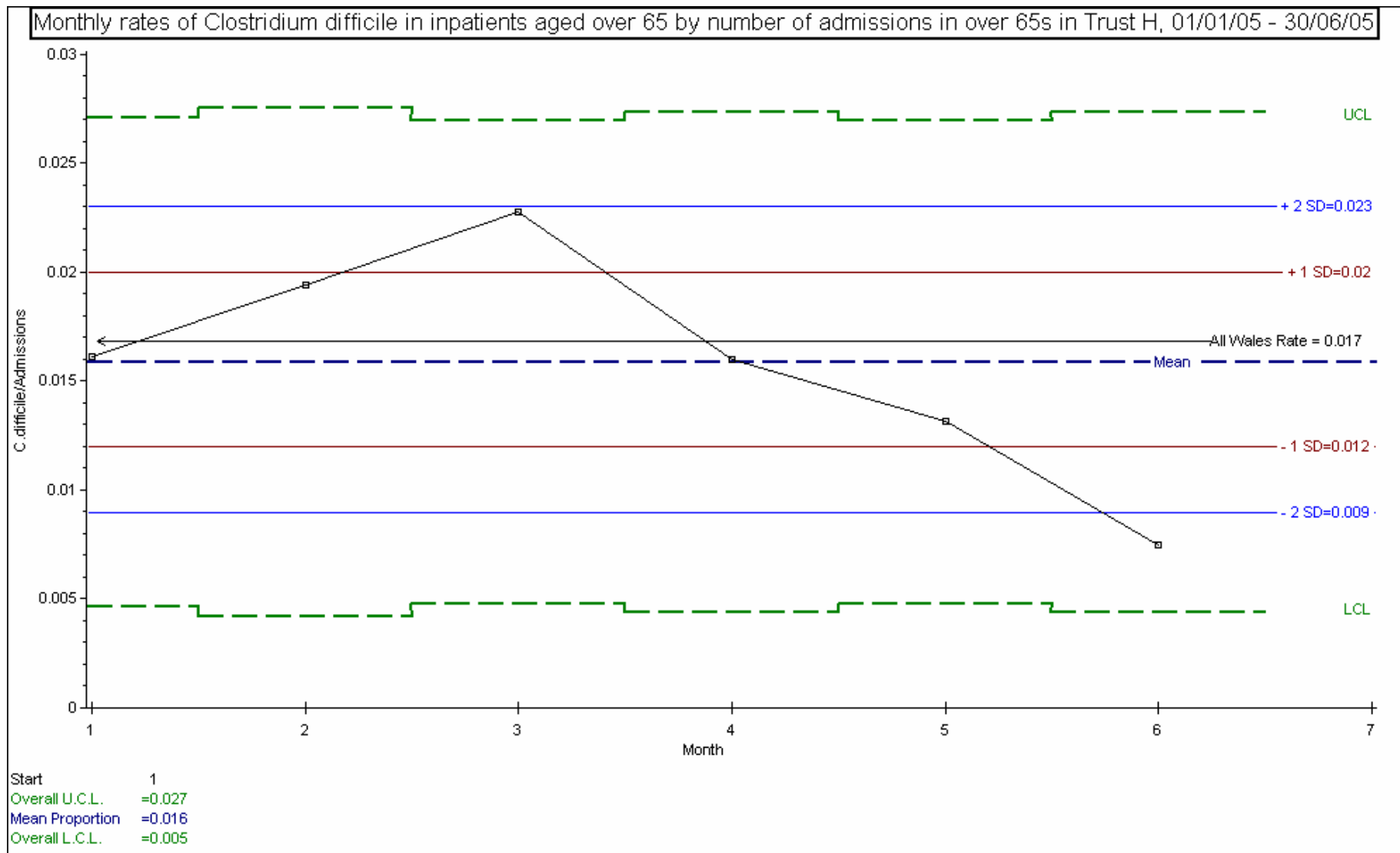


Trust H
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust H

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	18	16.16
Feb	20	19.40
Mar	26	22.75
Apr	17	16.01
May	15	13.15
Jun	8	7.50

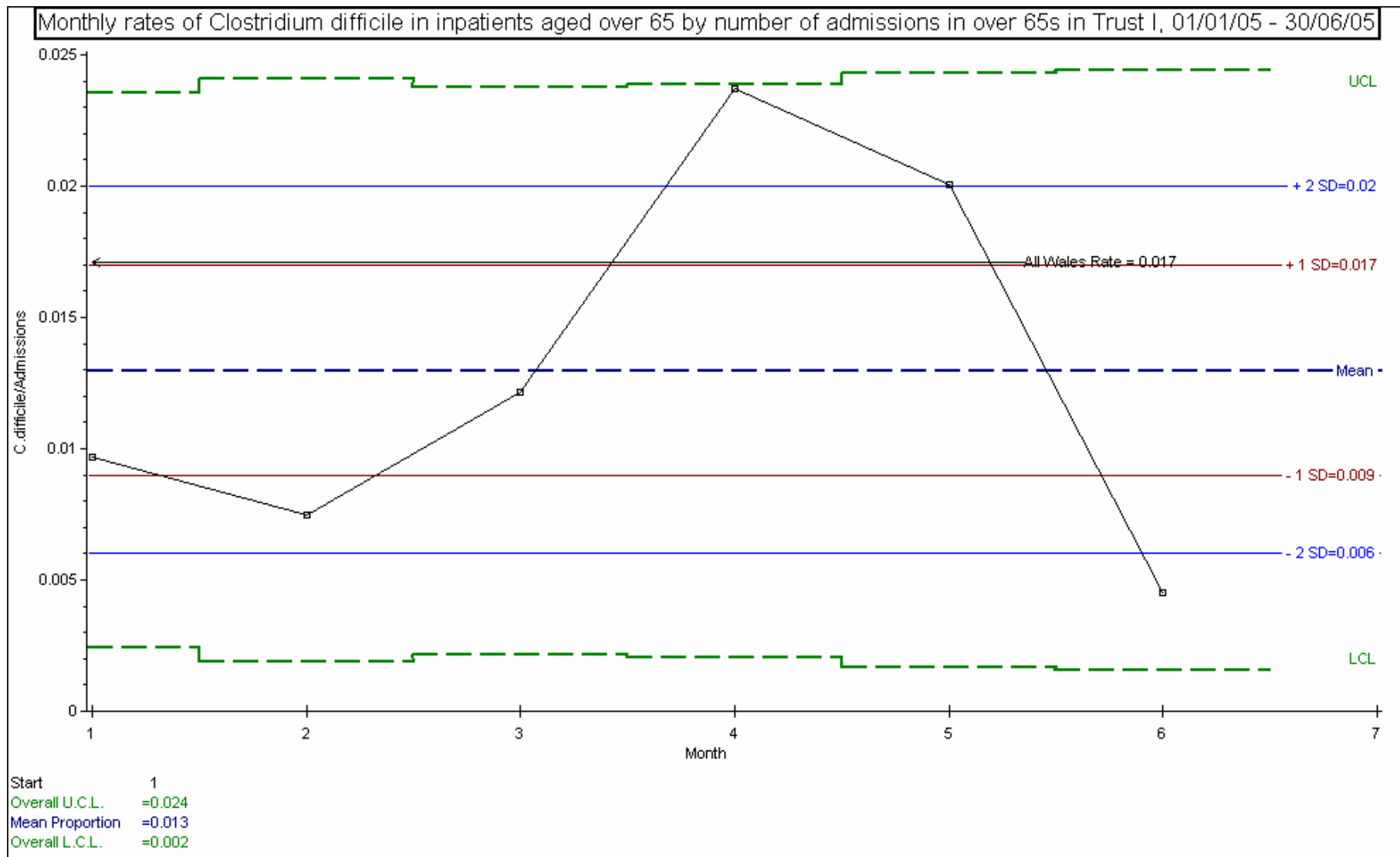


Trust I
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust I

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	10	9.68
Feb	7	7.49
Mar	12	12.17
Apr	23	23.74
May	18	20.07
Jun	4	4.52



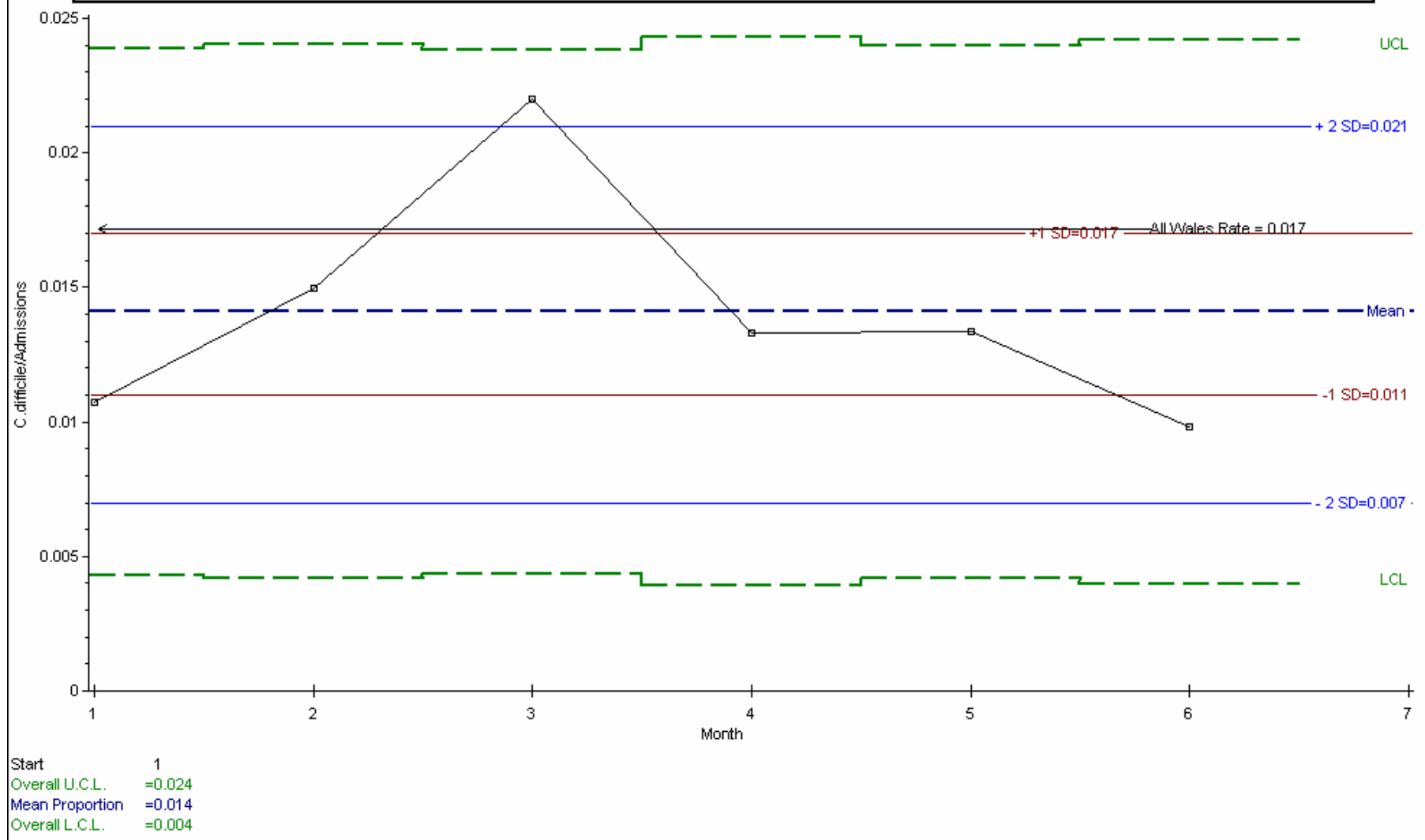
Trust J
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust J

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	14	10.74
Feb	19	14.96
Mar	29	22.00
Apr	16	13.28
May	17	13.33
Jun	12	9.83

Monthly rates of Clostridium difficile in inpatients aged over 65 by number of admissions in over 65s in Trust J, 01/01/05 - 30/06/05



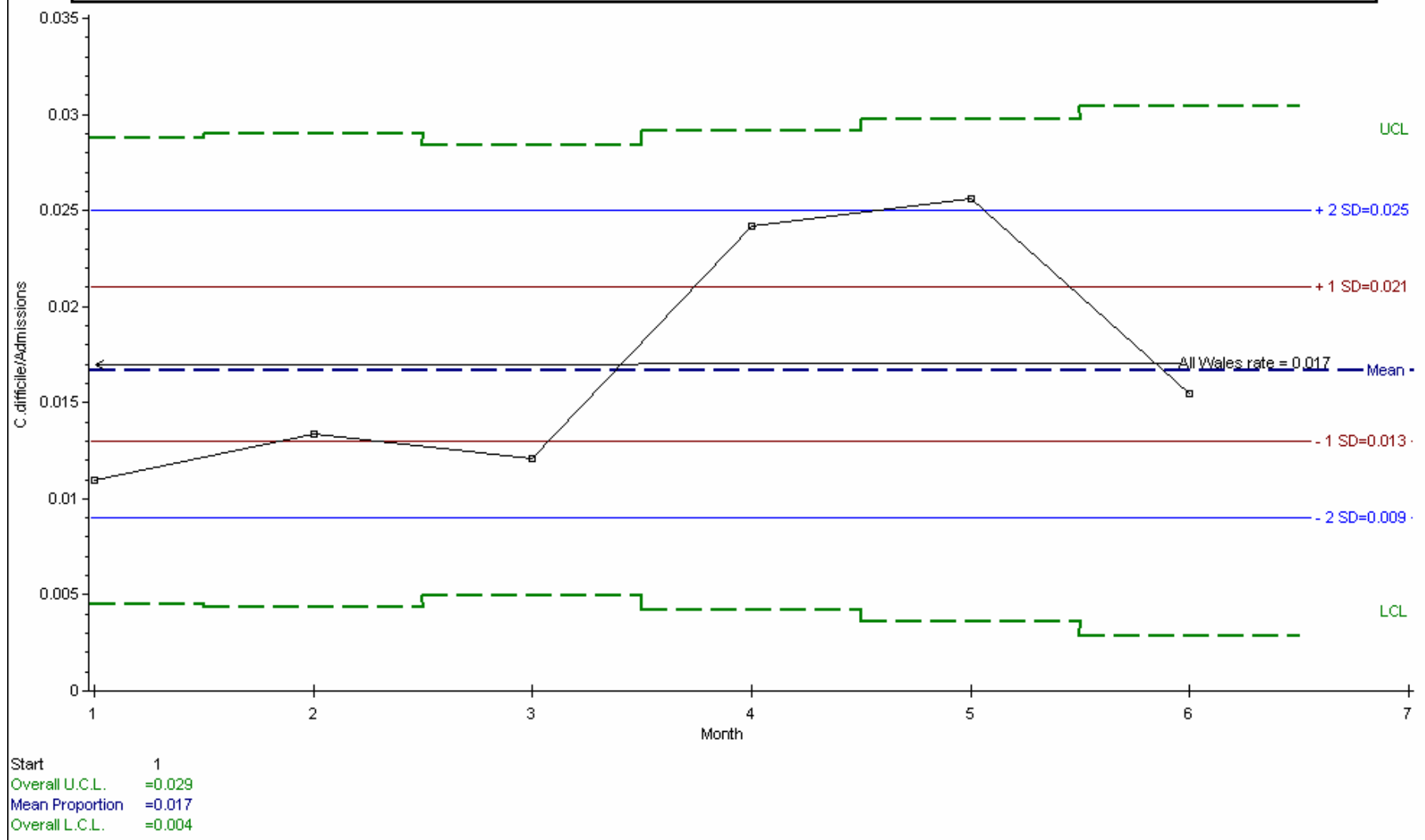
Trust K
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust K

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	11	10.97
Feb	13	13.35
Mar	13	12.09
Apr	23	24.21
May	22	25.58
Jun	12	15.44

Monthly rates of Clostridium difficile in inpatients aged over 65 by number of admissions in over 65s in Trust K, 01/01/05 - 30/06/05

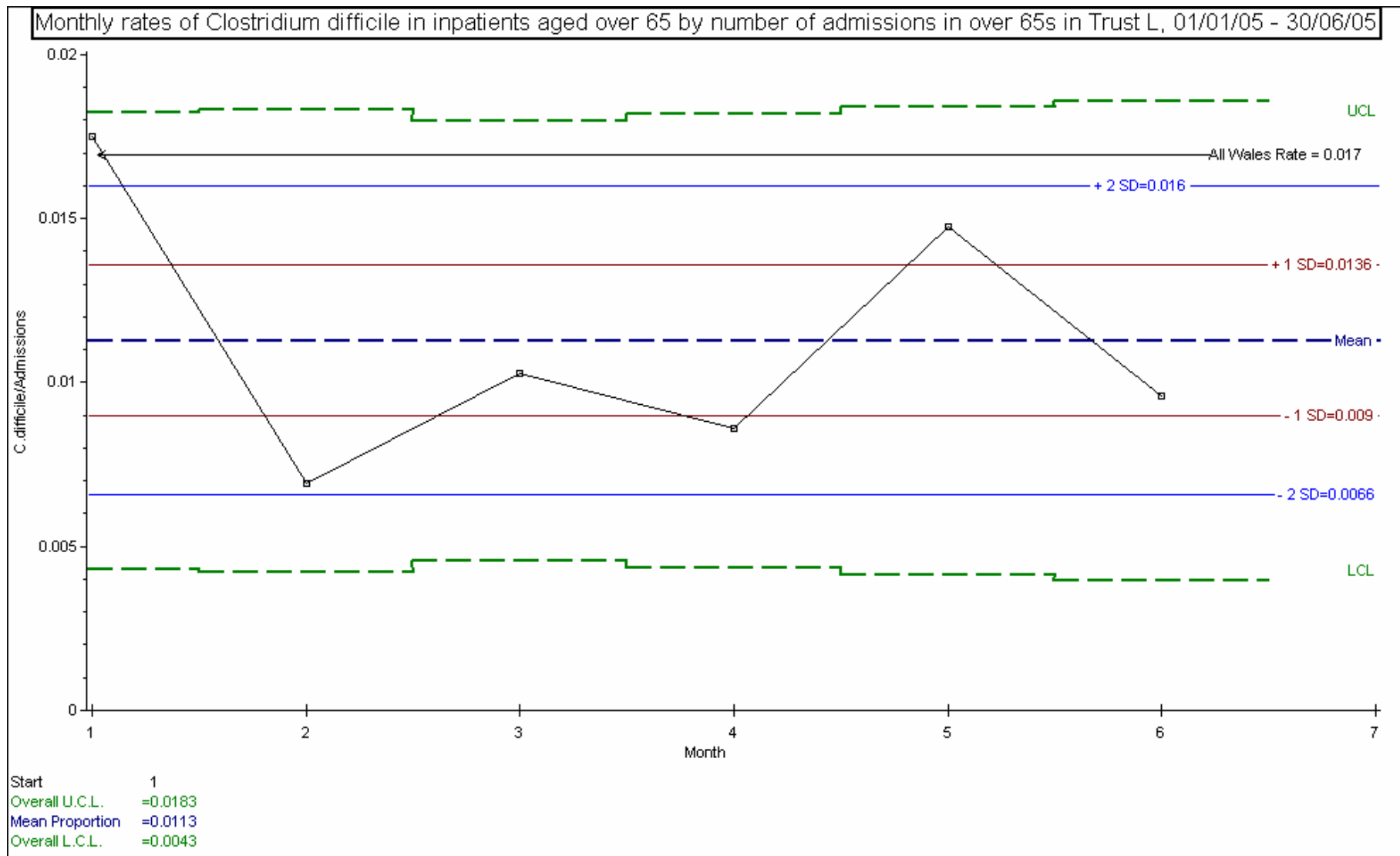


Trust L
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust L

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	36	17.49
Feb	14	6.92
Mar	23	10.29
Apr	18	8.61
May	29	14.75
Jun	18	9.61



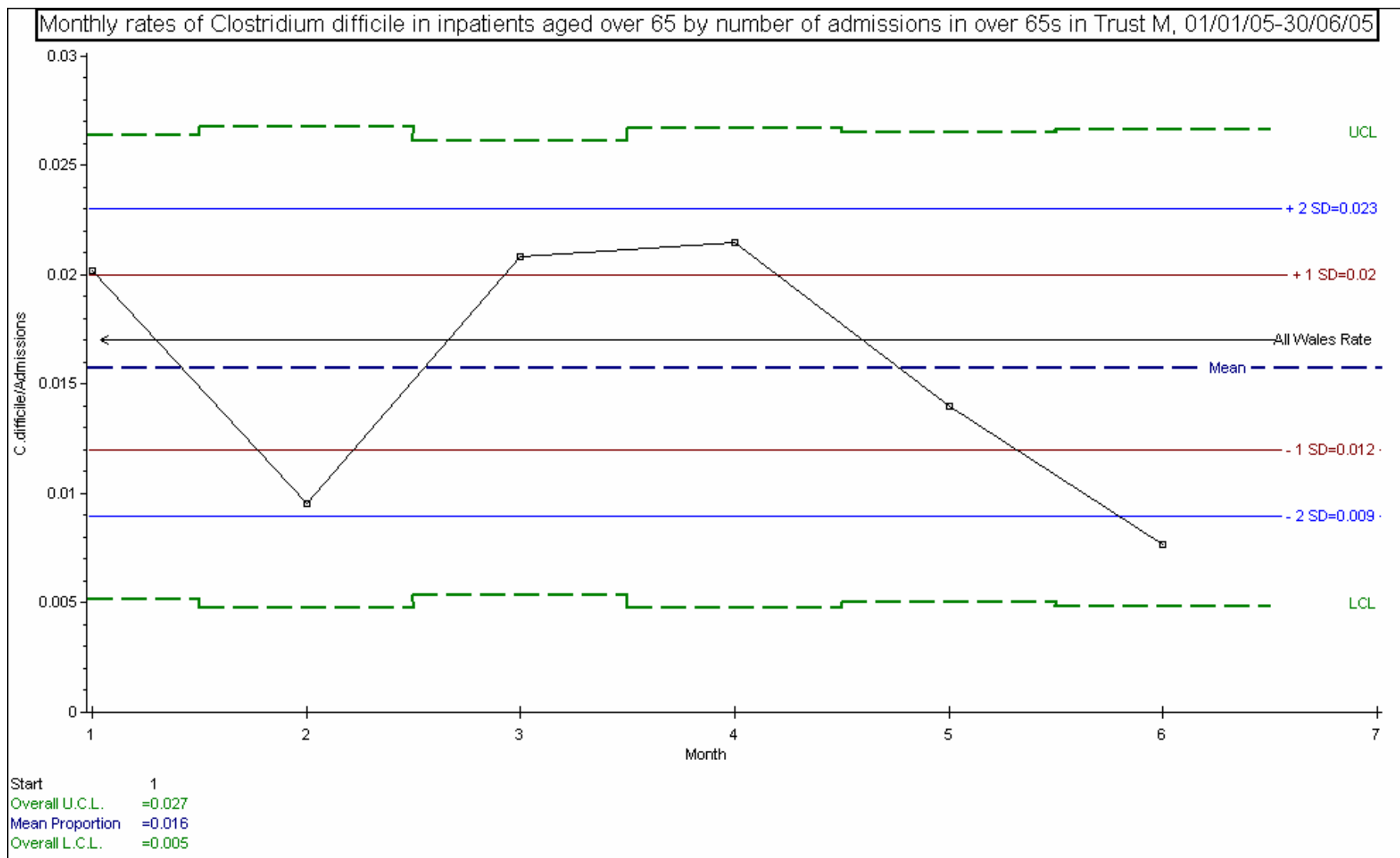
Trust M

Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust M

Month	No. <i>C.difficile</i>	Rate/1000 Admissions
Jan	25	20.21
Feb	11	9.53
Mar	27	20.87
Apr	25	21.51
May	17	14.00
Jun	9	7.68



Trust N
Monthly Trend Data

01/01/2005 – 30/06/2005

Number of *C. difficile* reports in hospital inpatients aged over 65 and rate per 1000 hospital admissions by month in Trust N

Month	No. <i>C.difficile</i>	No. Admissions	Rate/1000 Admissions
Jan	2	308	6.49
Feb	2	246	8.13
Mar	3	268	11.19
Apr	4	242	16.53
May	1	251	3.98
Jun	2	221	9.05

