



Public Health
England

Surveillance of *Clostridium difficile*

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C.diff superbug kills one patient in British hospitals every hour

By LAURA COLLINS
Last updated at 10:18 27 April 2008

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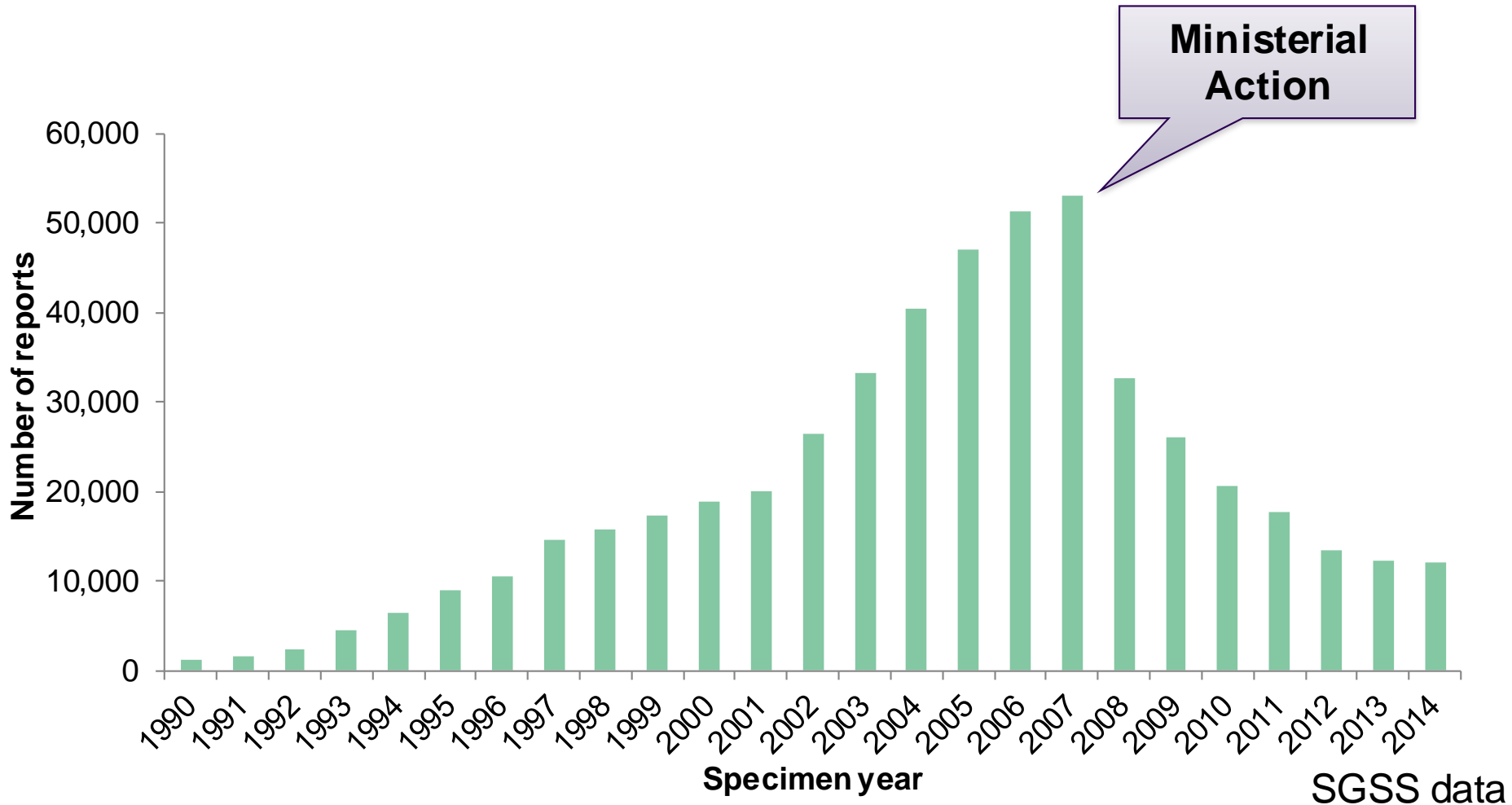
22 August 2013 Last updated at 09:53

MRSA and C. diff deaths fall again

The number of deaths from two hospital infections, MRSA and Clostridium difficile, have continued their long-term downward trend, according to figures for England and Wales.



Voluntary CDI reports, England 1990-2014





CDI Outbreaks

North Manchester outbreak 1991/2,

- 175 cases, 17 deaths
- Ribotype 001

Stoke Mandeville,

- 1st outbreak 2003/04, 174 cases, 19 deaths
- 2nd outbreak 2004/05, 160 cases, 19 deaths
- Ribotype 027

Maidstone & Tunbridge Wells 2005/06

- >500 cases, 60 deaths
- Ribotype 027

Vale of Leven 2007/8

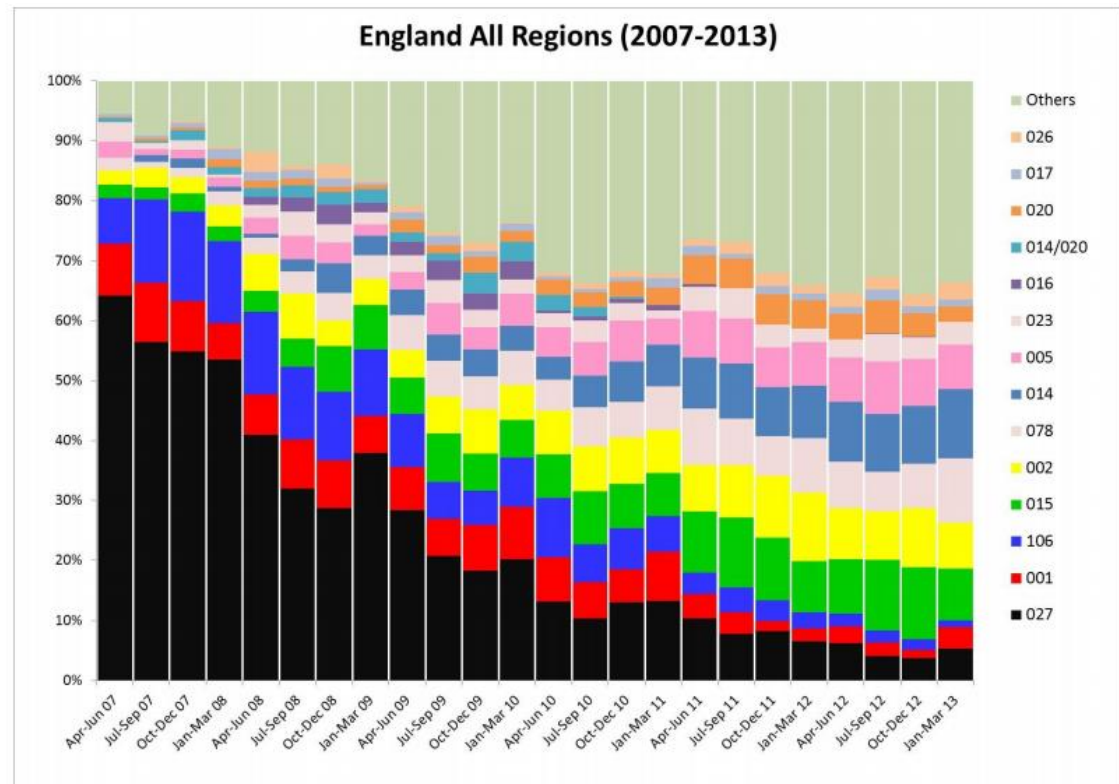
- 143 cases, 34 deaths
- Ribotype 027



Clostridium difficile Ribotyping Network (CDRN)

Prevalence of *C. difficile* ribotypes in England by quarter (April 2007-March 2013)

- Decline of ribotype 027
- Emergence of 078
- Other emergent ribotypes
 - 002
 - 005
 - 014/020
 - 015

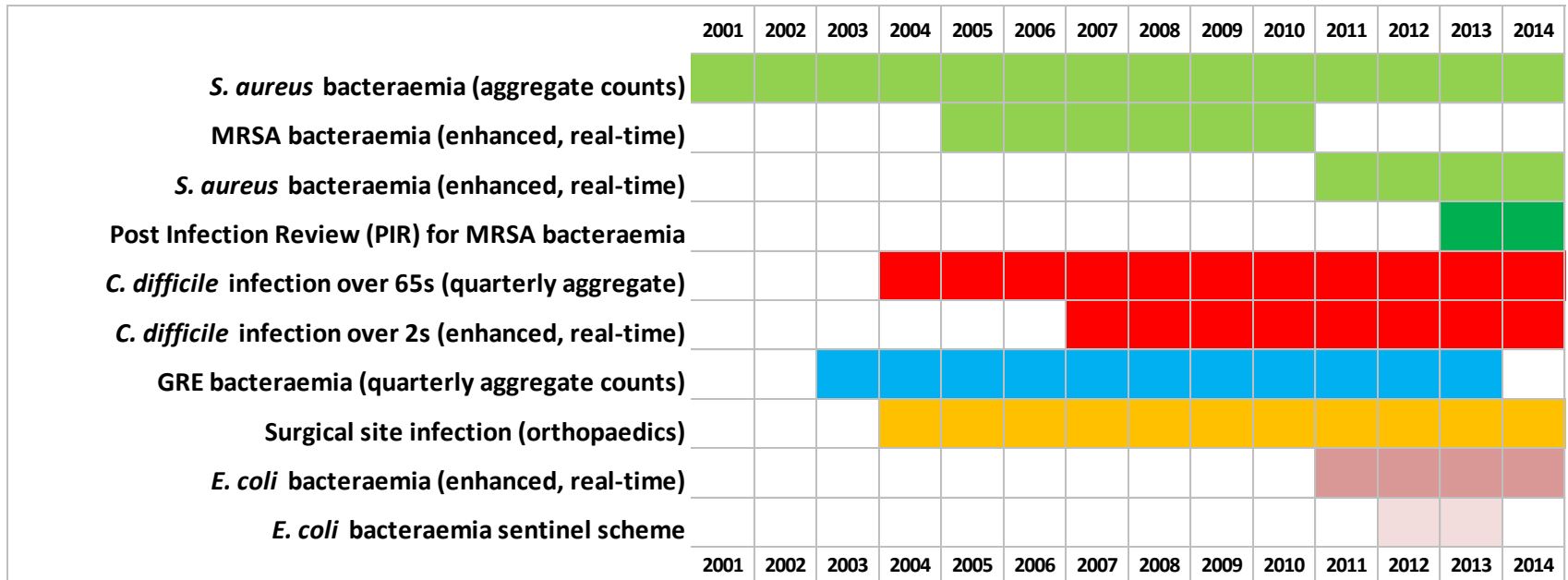


Clostridium difficile Ribotyping Network (CDRN) for England and Northern Ireland 2011-13 Report
<https://www.gov.uk/government/publications/clostridium-difficile-ribotyping-network-cdrn-report>



Mandatory HCAI Surveillance

Summary of developments since 2001:



Current routine voluntary surveillance cannot, on its own, identify HCAs



Case Definition

Any of the following defines a *C. difficile* infection case in patients aged 2 years and above and must be reported to PHE:

1. Diarrhoeal stools (Bristol Stool types 5-7) where the specimen is *C. difficile* toxin positive.
2. Toxic megacolon or ileostomy where the specimen is *C. difficile* toxin positive.
3. Pseudomembranous colitis revealed by lower gastro-intestinal endoscopy or Computed Tomography.
4. Colonic histopathology characteristic of *C. difficile* infection (with or without diarrhoea or toxin detection) on a specimen obtained during endoscopy or colectomy .
5. Faecal specimens collected post-mortem where the specimen is *C. difficile* toxin positive or tissue specimens collected post-mortem where pseudomembranous colitis is revealed or colonic histopathology is characteristic of *C. difficile* infection



C. difficile testing

Variable sensitivity / specificity of tests

2012 - DH published new guidance on testing

2 stage testing algorithm:

- GDH EIA (or NAAT) to screen
- followed by sensitive toxin EIA for positive GDH samples
- Report patients positive for both tests to PHE

Still assumes appropriate sampling of patients

STEP 3: Interpreting Testing Results

The following actions should be taken depending on the test results:

Result of 2 Test Algorithm ¹	Interpretation	Include in Mandatory Reporting to HPA ²
GDH EIA (or NAAT) positive, toxin EIA positive	CDI is likely to be present	Yes
GDH EIA (or NAAT) positive, toxin EIA negative	<i>C. difficile</i> could be present, so may have transmission potential. Patient could be potential <i>C. difficile</i> excretor.	No, but may be suitable for local reporting.
GDH EIA (or NAAT) negative, toxin EIA negative	<i>C. difficile</i> or CDI is very unlikely to be present, so may have transmission potential. Patient could have other potential pathogens.	No

Note¹: A cytotoxin assay may be considered as an alternative to a sensitive toxin EIA, but it yields slower results and this will need to be taken into account in making decisions about infection control.

Note²: unless a repeat sample within 28 days. Please refer to the Mandatory Surveillance Protocol for full case definition and further information.

From: Updated Guidance on the Diagnosis and Reporting of Clostridium difficile; DH 2012. Gateway reference: 17215



CDI common reporting queries

Clarification on which CDI cases to report:

1. Should Trusts only report a) clinically significant cases or b) all laboratory confirmed cases?

b

2. Do positive cases of CDI which have not been treated for CDI need to be reported?

Yes

3. Report asymptomatic patients tested in error?

Yes

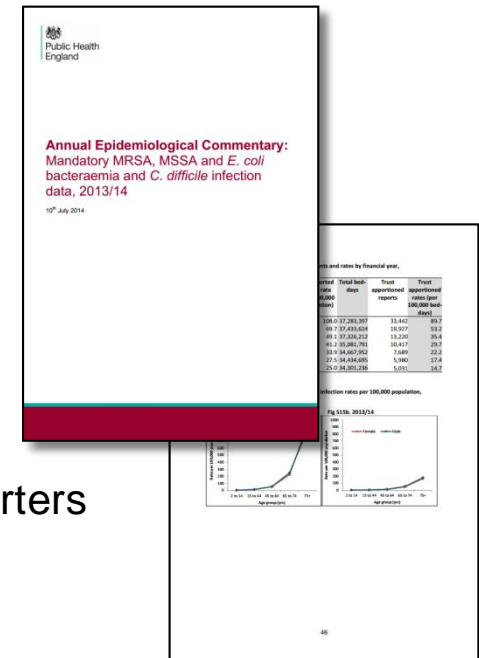


Current Public Reporting of Mandatory HCAI Data

Key outputs for CDI classified as Official Statistics

NHS data

- Annual financial year data publication
 - Counts and rates by Trust and CCG
- Monthly count by Trust, CCG
- Quarterly Epidemiological Commentary
 - Trends in counts and rates over the past 9 quarters

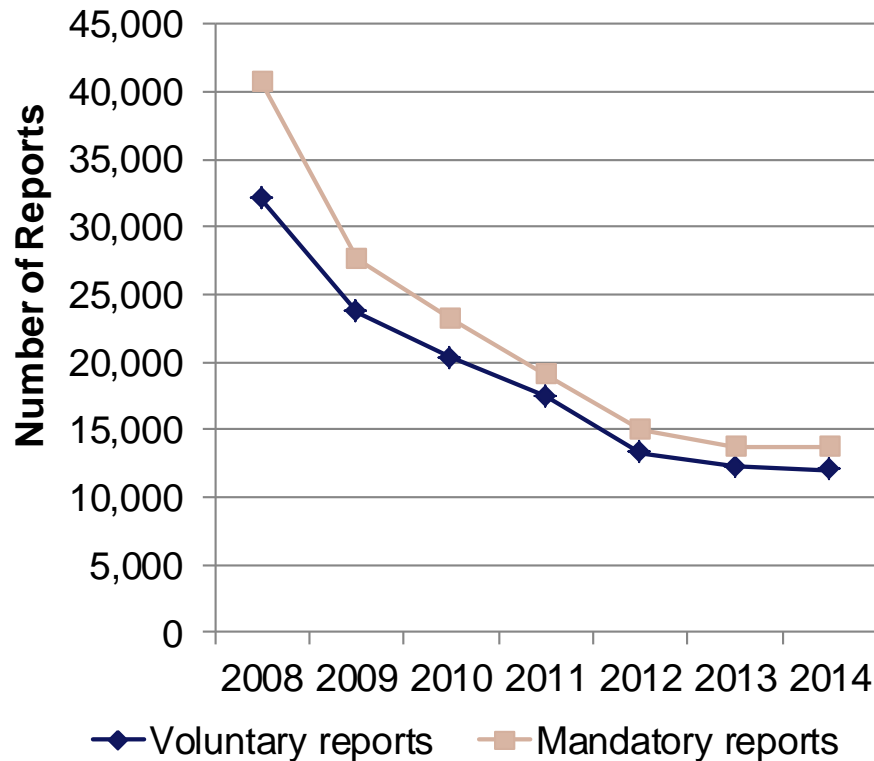


(Weekly data publication of hospital level MRSA and CDI ran from 2010-2012)

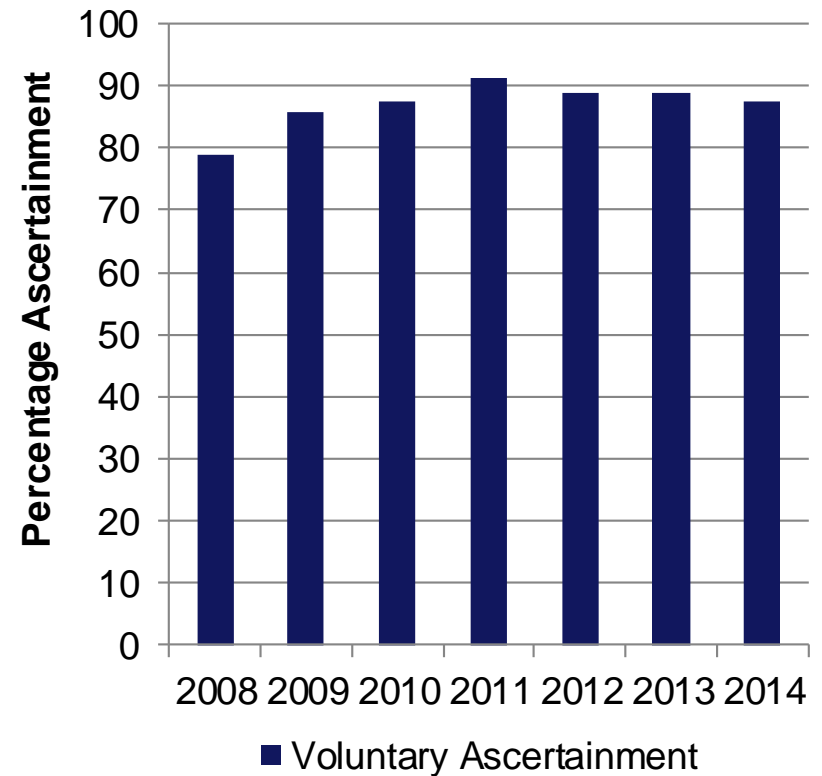


Mandatory vs. Voluntary Data

Mandatory & Voluntary CDI reports



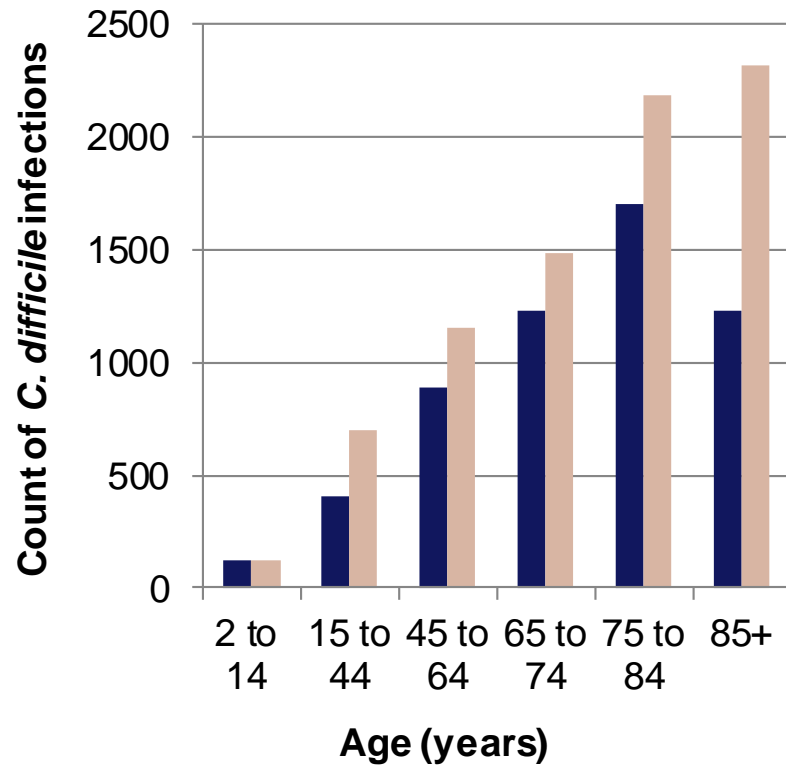
Voluntary Surveillance Ascertainment



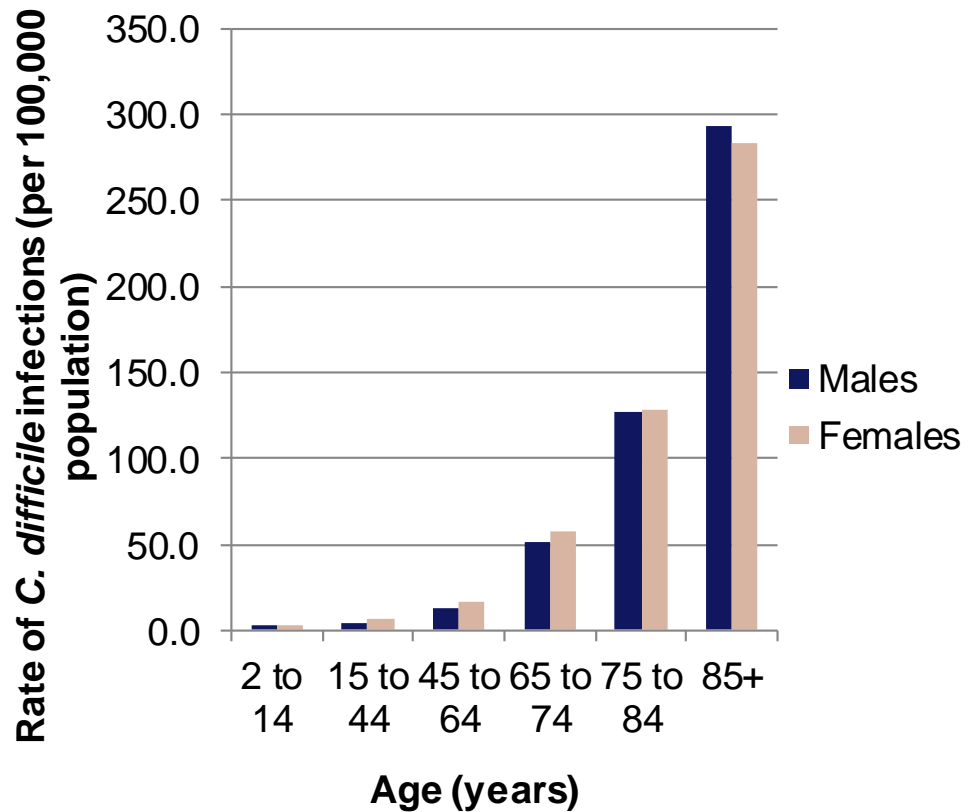


Age and Sex Distribution

***C. difficile* infections in England by age & gender, 2014**



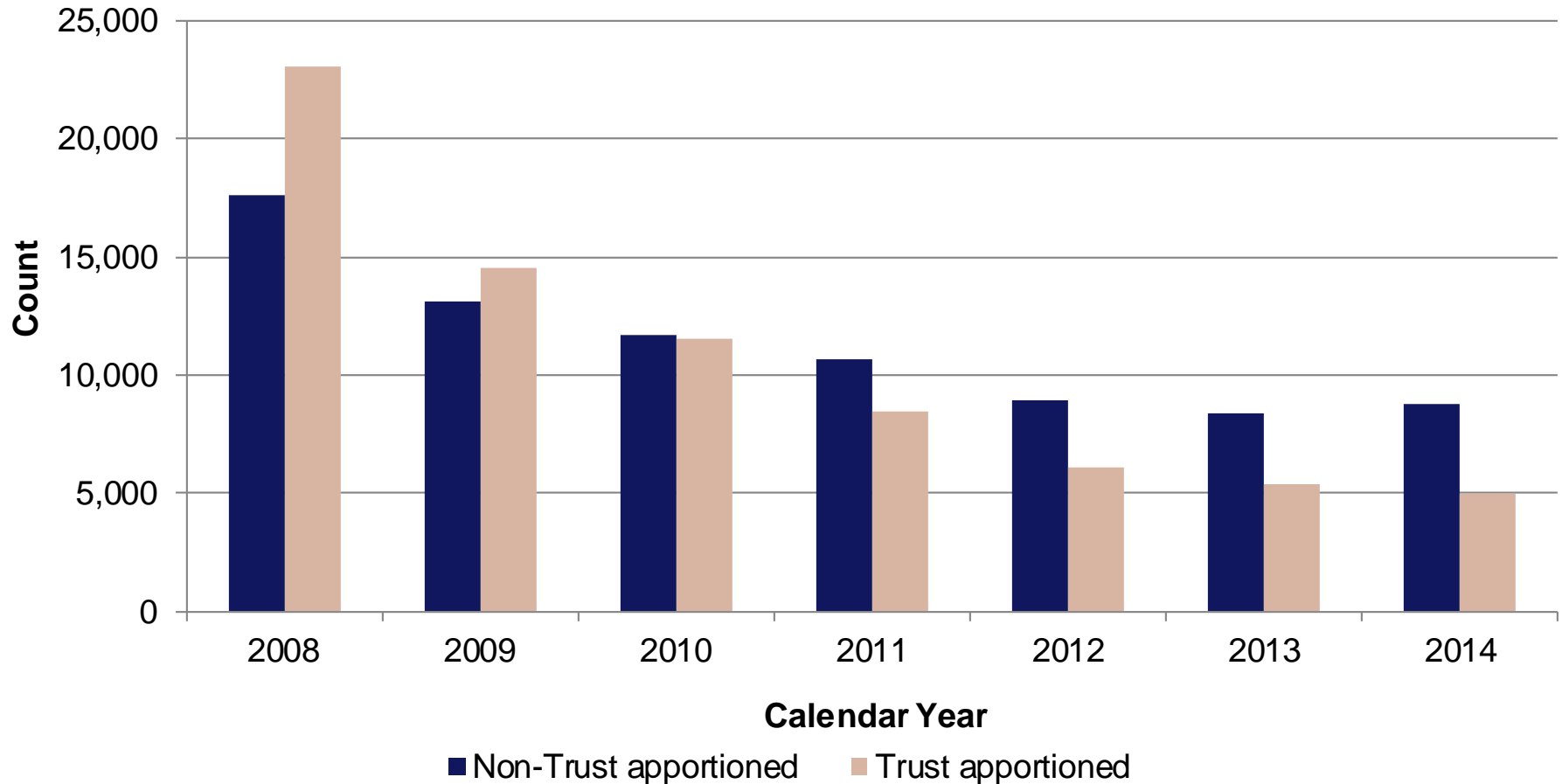
Rate of *C. difficile* infections in England by age & gender, 2014





Trust vs. Non-Trust AppORTioned

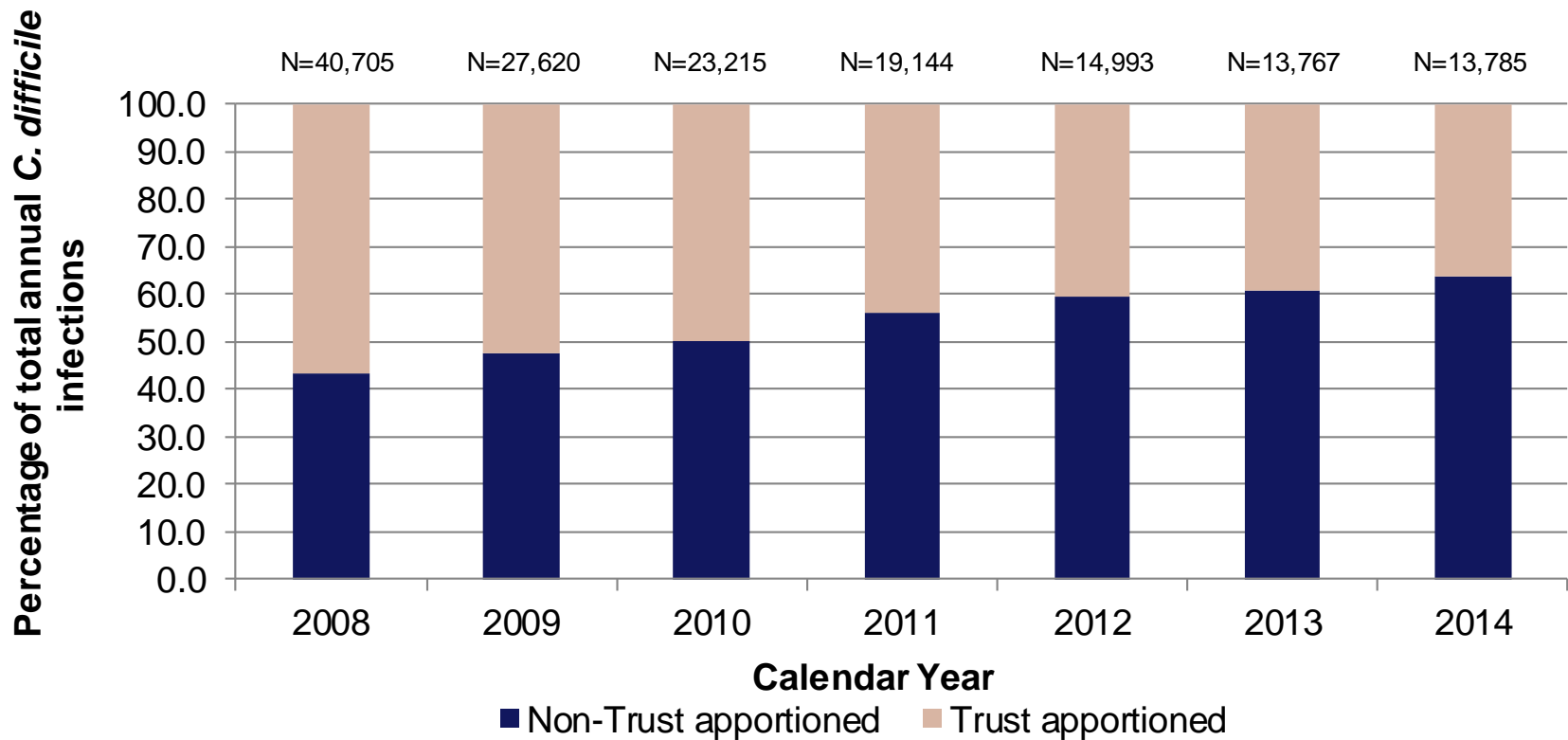
Counts of Trust and non-Trust appORTioned *C. difficile* infections, 2008-2014





Trust vs. Non-Trust AppORTIONED

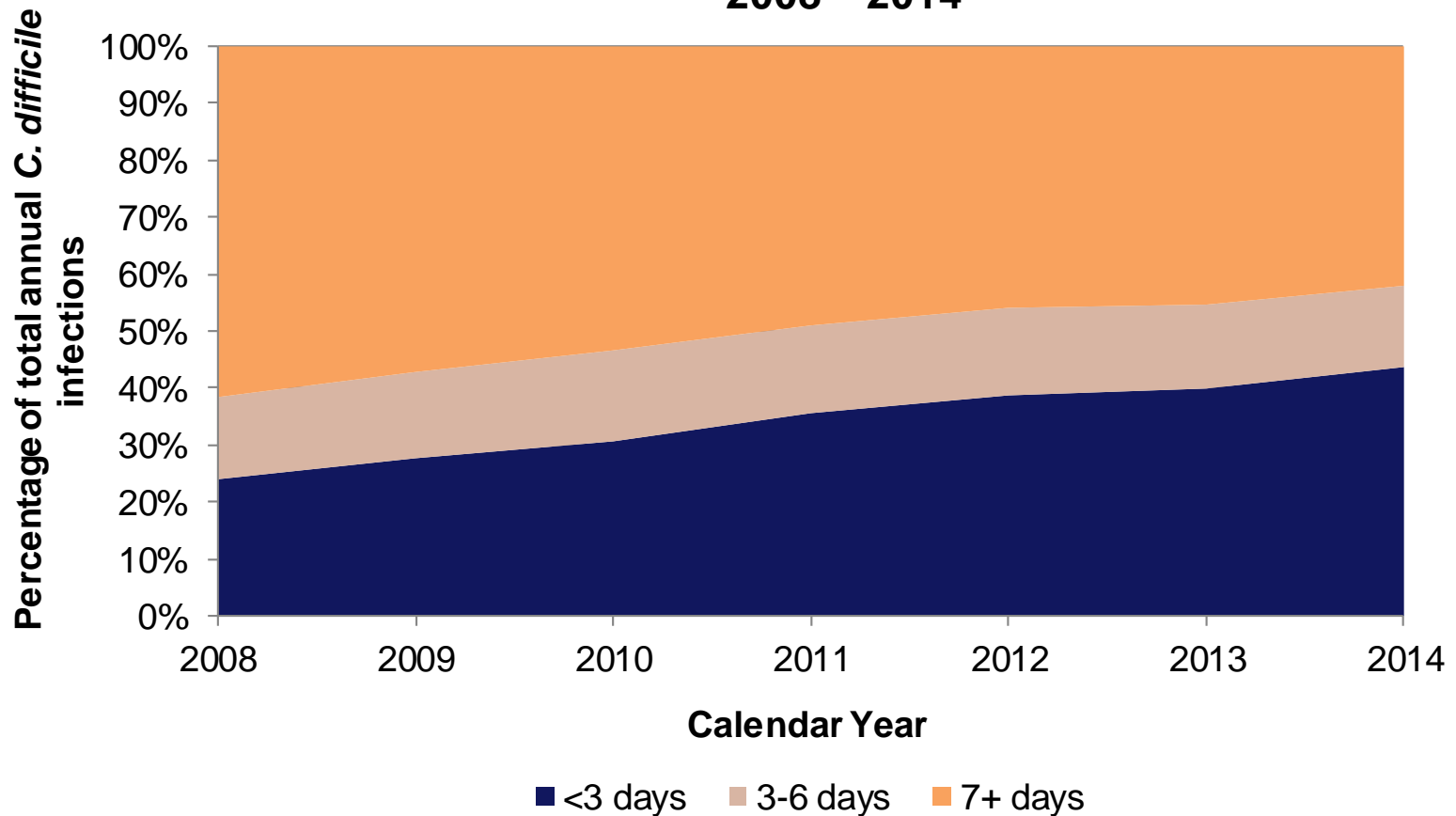
Trends in percentage of Trust vs. non-Trust appORTIONED *C. difficile* infections, 2008-2014





Timing of Detection

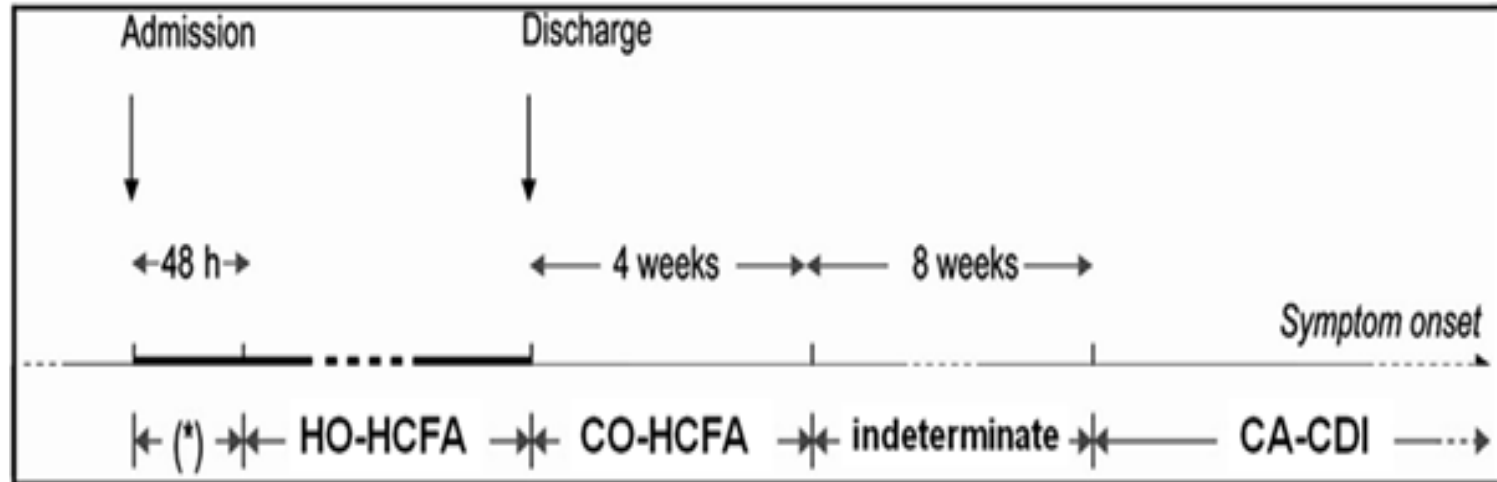
Time to onset among inpatients with *C. difficile* infection, 2008 – 2014





Prior Healthcare Exposure

Timeline for definitions of CDI exposures (Kuijper *et al.*, 2006)



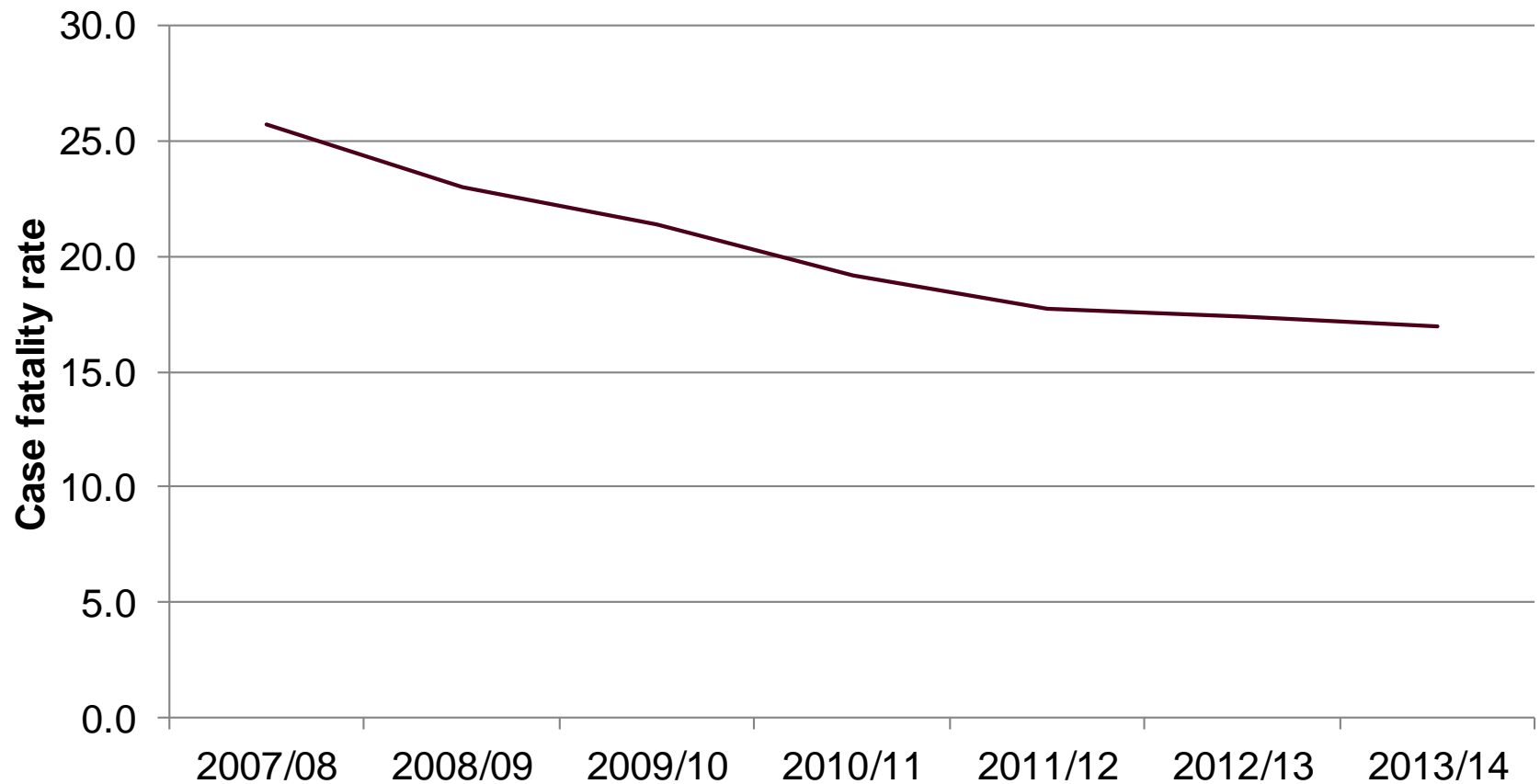
HO-HCFA: Hospital-onset health care facility associated CDI

CO-HCFA: Community-onset health care facility associated CDI

CA-CDI: Community associated CDI

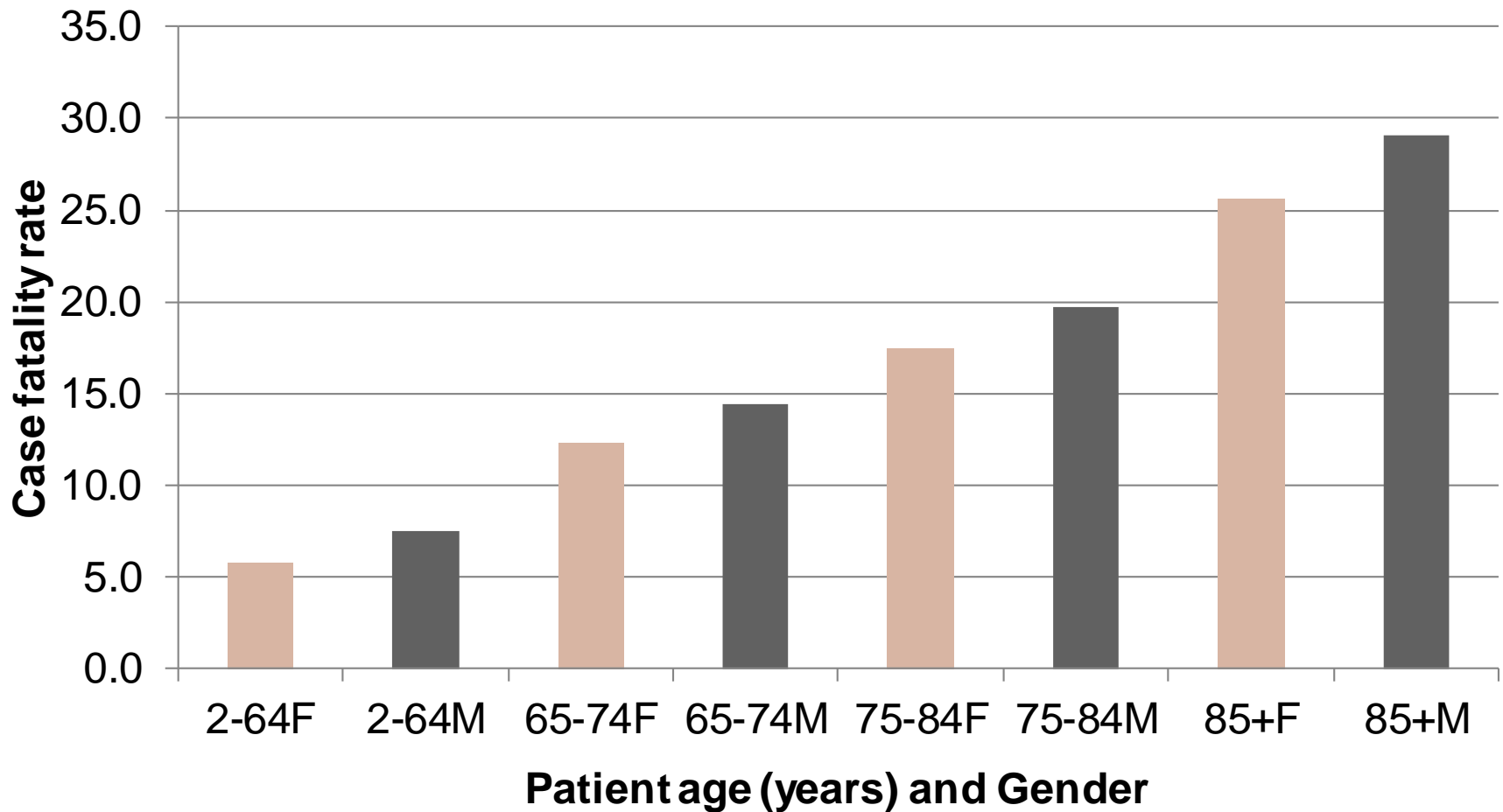


Thirty-Day All-Cause Case Fatality Rate



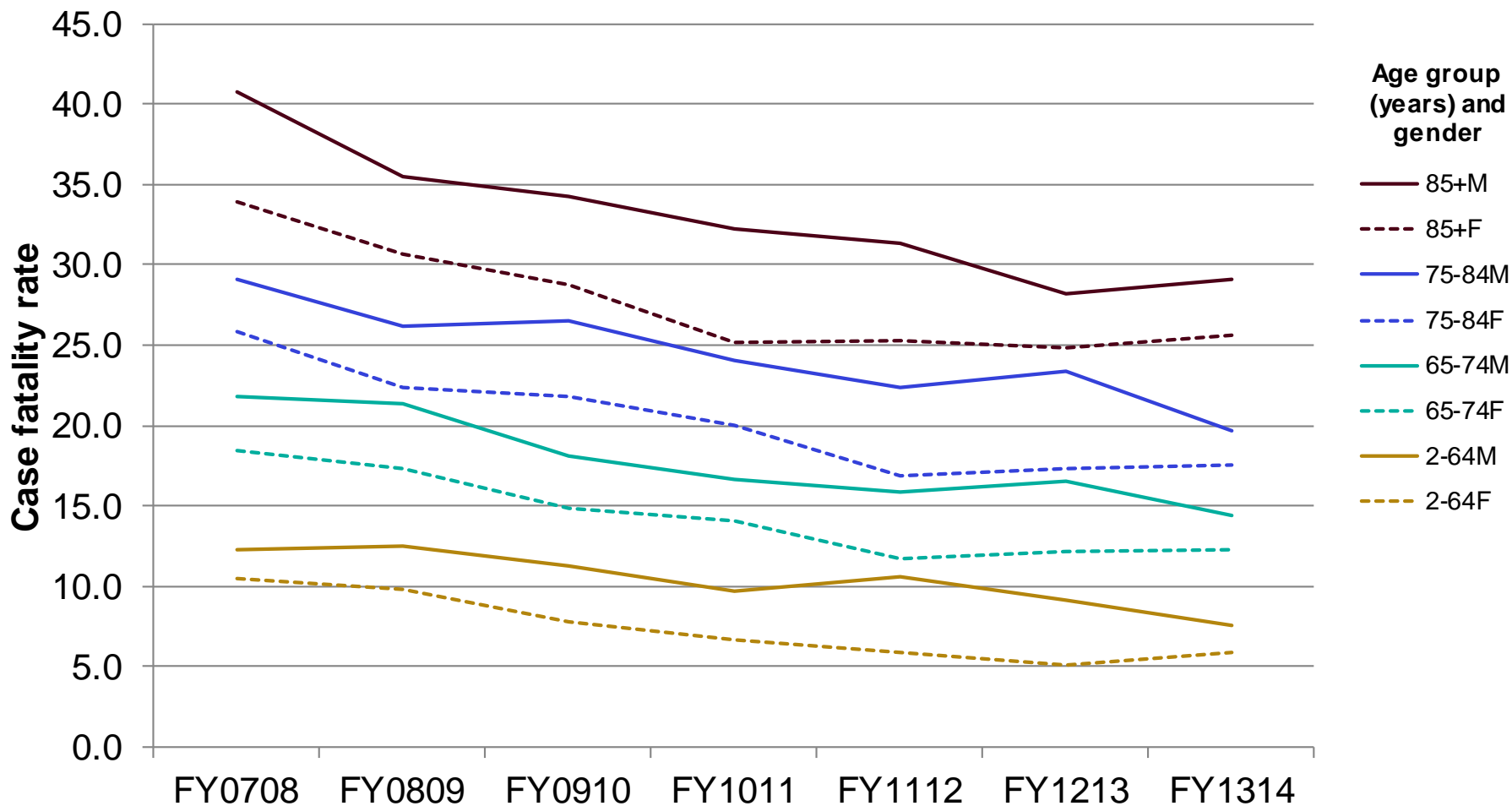


Case Fatality Rate: Age & Sex



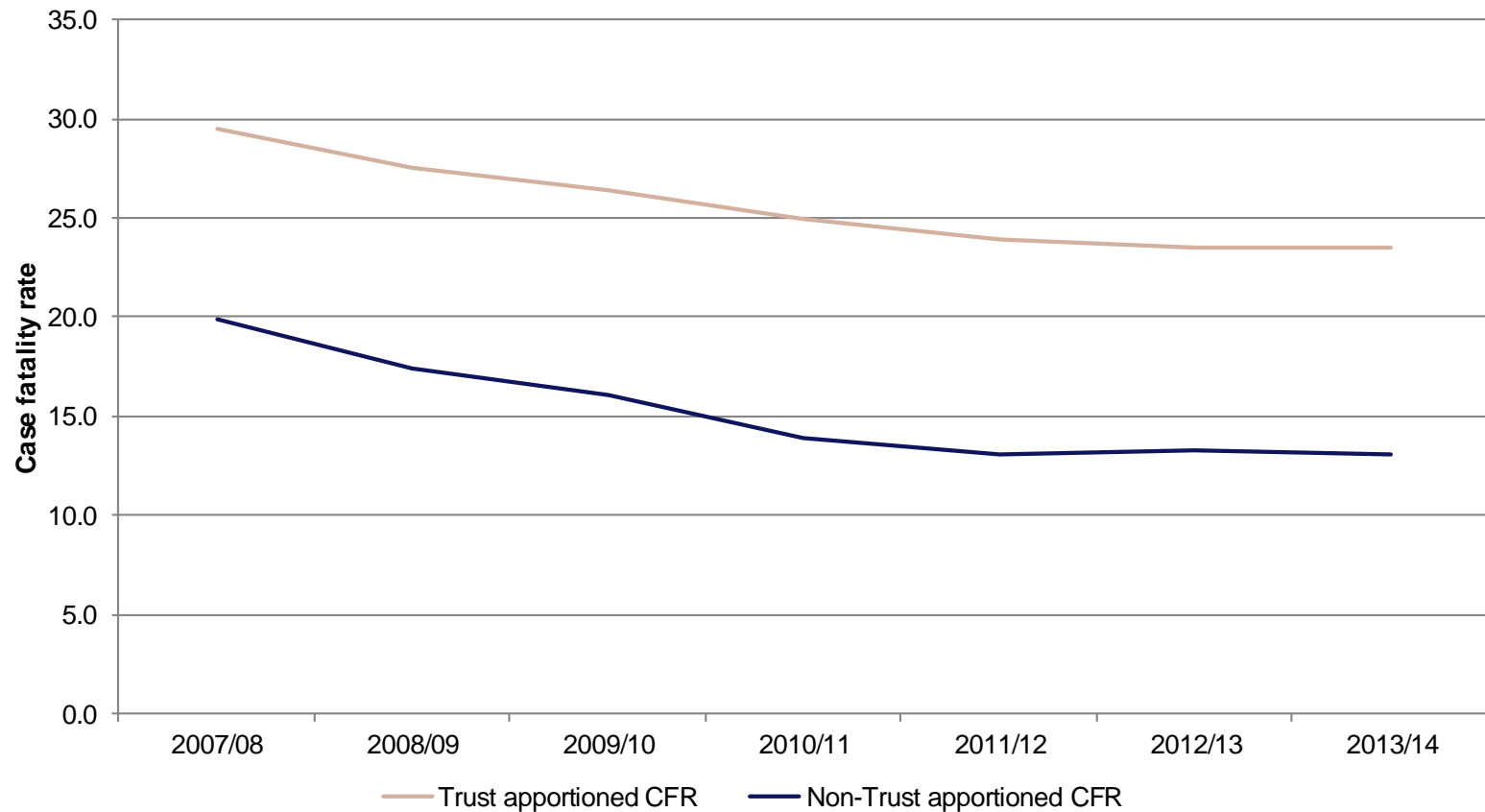


Case Fatality Rate: Age & Sex





Case Fatality Rate: Trust Apportioned vs. Non-Trust Apportioned





Excess Length of Stay (LOS) and Mortality due to CDI

Kleef et al., JHI, 2014

- HA-CDI reduced discharge rate by $\frac{1}{4}$
- Increased in-hospital mortality by 75%
- HA-CDI patient mean excess LOS 7 days
 - In severe cases excess LOS was c. 12 days



Conclusions

- Steady increases through 90s and early 00s
- Big decreases post 2008
- Community onset increasingly important
- Reductions in case fatality rate
- Ribotype distribution changing



Acknowledgments

- NHS (Microbiologists, Infection Control staff, Acute Trusts, CCGs, Area Teams)
- DsPH and LA teams
- PHE (FES and PHECs)
- Department of Health
- PHE mandatory surveillance team