



EUCAST

European Committee
on Antimicrobial
Susceptibility Testing

Streptococcus pyogenes

Calibration of zone diameter
breakpoints to MIC values

Version 10.0
January 2026

Streptococcus pyogenes

MIC and zone diameter correlates

- The following histograms present inhibition zone diameter distributions from EUCAST antimicrobial susceptibility testing. In most, the different colours of the bars indicate different MIC values. In some, the colours of the bars indicate a resistance gene or a resistance mechanism.
- The distributions include data for wild-type isolates and for isolates with acquired resistance mechanisms. A large number of isolates with MIC values close to the edge of the wild-type distribution and/or close to EUCAST clinical breakpoints were intentionally included. These distributions can not be used to infer resistance rates or the performance of the tests with routine isolates.
- For some agents, isolates were tested on more than one occasion, including parallel tests with disks and media from several manufacturers. When this is the case, data are presented as both the “number of isolates tested” and the “total number of MIC-zone diameter correlates”, including replicate tests and parallel tests with disks and media from different sources.

Streptococcus pyogenes

Materials and methods

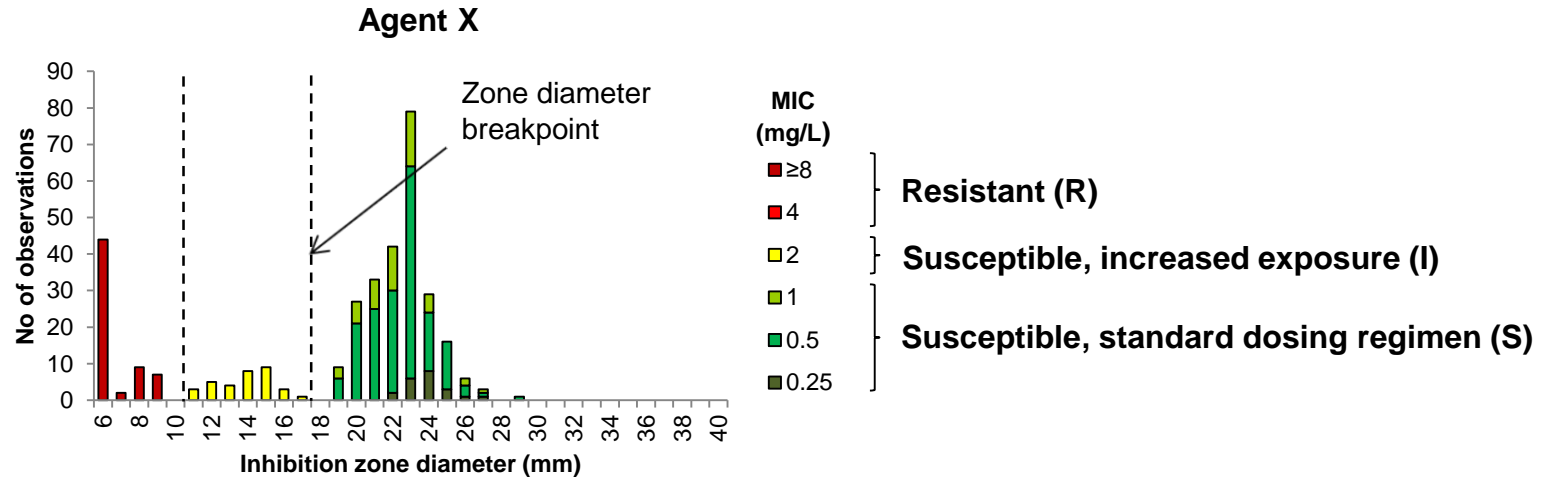
- Antimicrobial susceptibility testing was performed on clinical isolates of *Streptococcus pyogenes*, including isolates with known resistance mechanisms. Disk diffusion was performed on MH-F media according to EUCAST methodology and MIC determination was performed with the ISO broth microdilution method using MH-F broth or gradient tests.
- Several distributions of MIC vs. zone diameter in this presentation are the result of a collaboration between EUCAST, JMI Laboratories (USA) and Laboratory Specialists Inc. (USA).
- This presentation is based on EUCAST Clinical Breakpoint Tables v. 16.0.

Changes from previous version (9.0)

Changes
<ul style="list-style-type: none">• MIC and zone diameter breakpoints changed for trimethoprim-sulfamethoxazole.

Explanation of graphs:

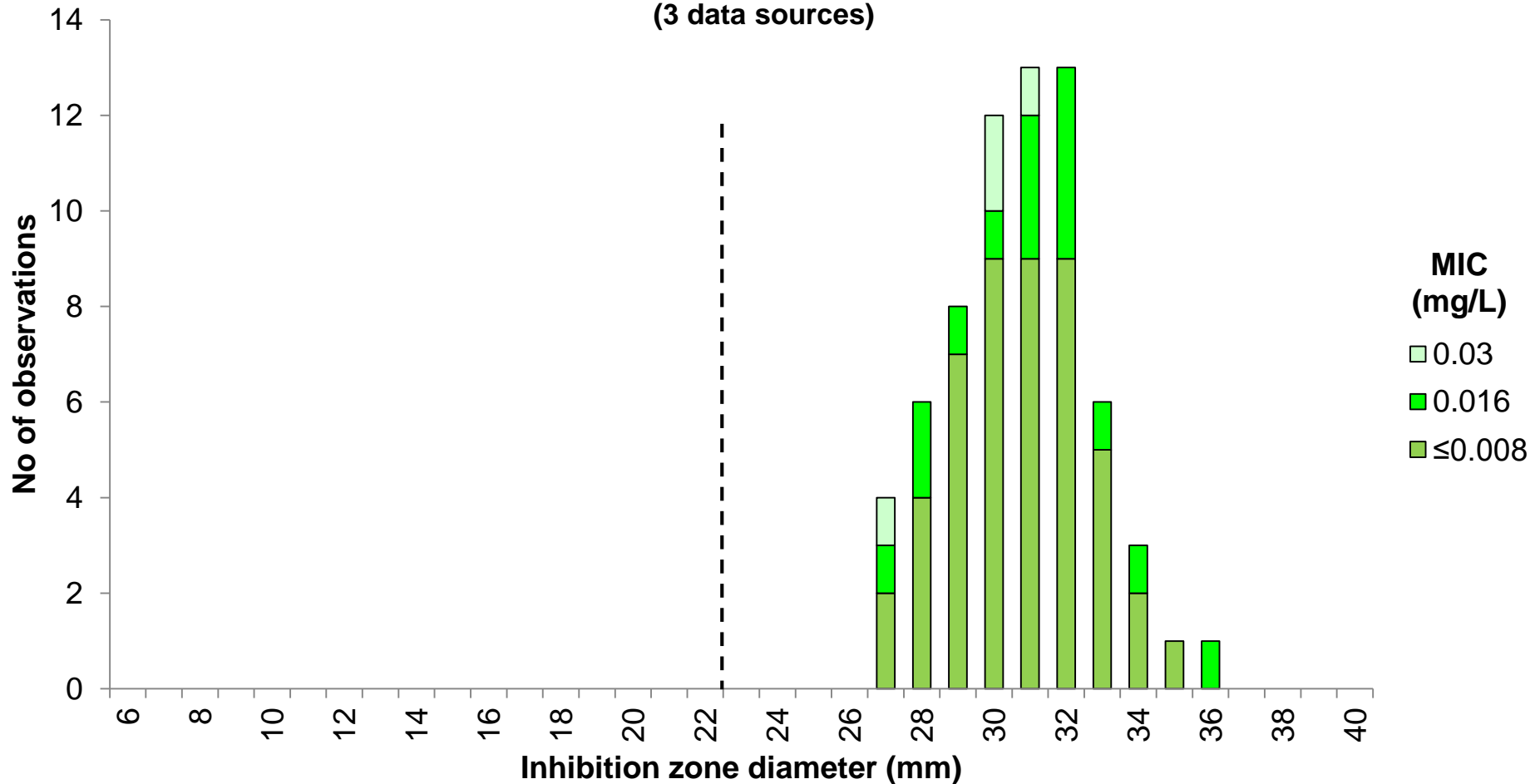
- These graphs show zone diameter distributions with MIC values or resistance mechanisms as coloured bars. Colours are related to current EUCAST MIC breakpoints.



Benzylpenicillin 1 unit vs. MIC

S. pyogenes, 59 isolates (67 correlates)

(3 data sources)



Breakpoints

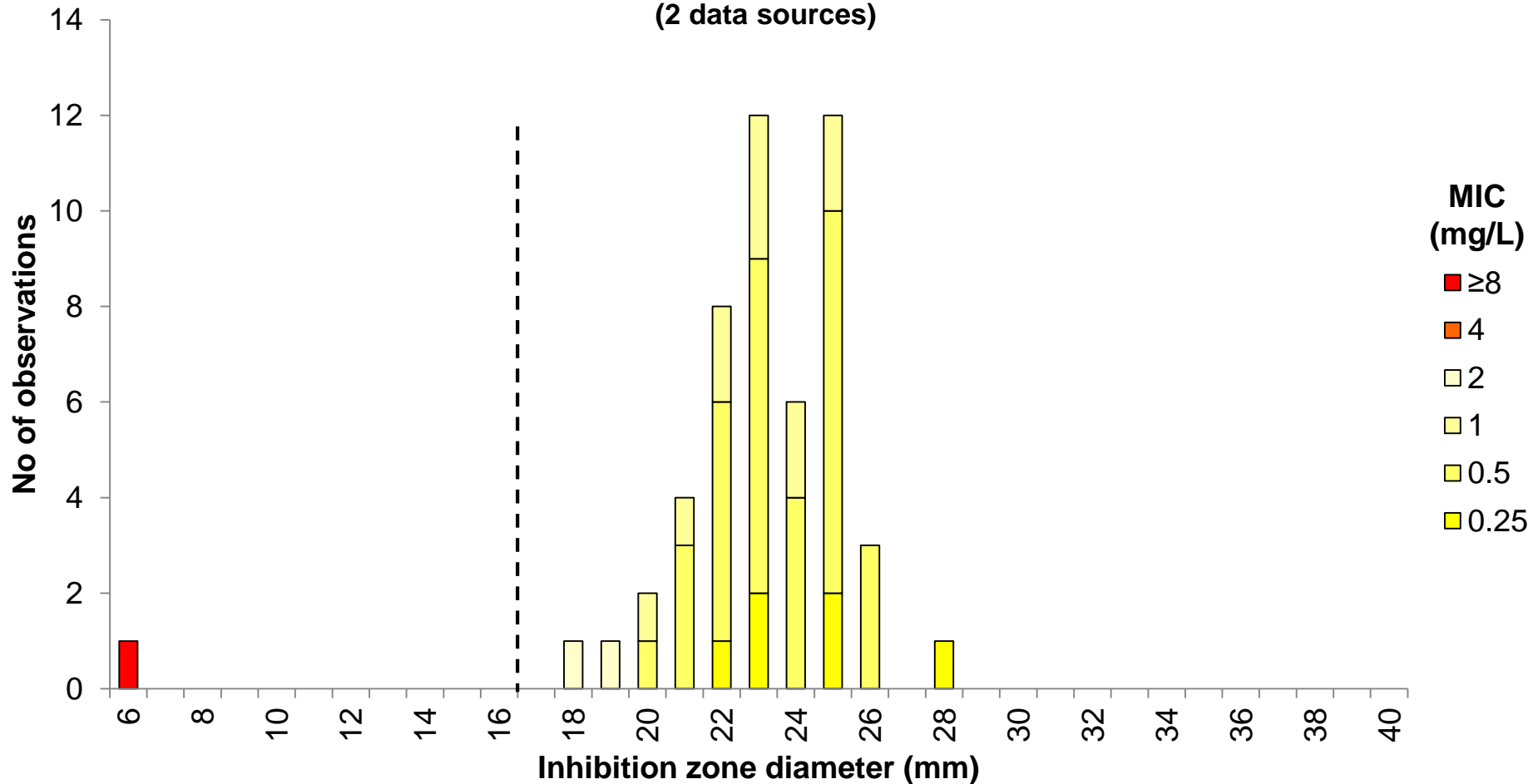
MIC S ≤ 0.03, R > 0.03 mg/L

Zone diameter S ≥ 23, R < 23 mm

Levofloxacin 5 µg vs. MIC

S. pyogenes, 41 isolates (51 correlates)

(2 data sources)



Breakpoints

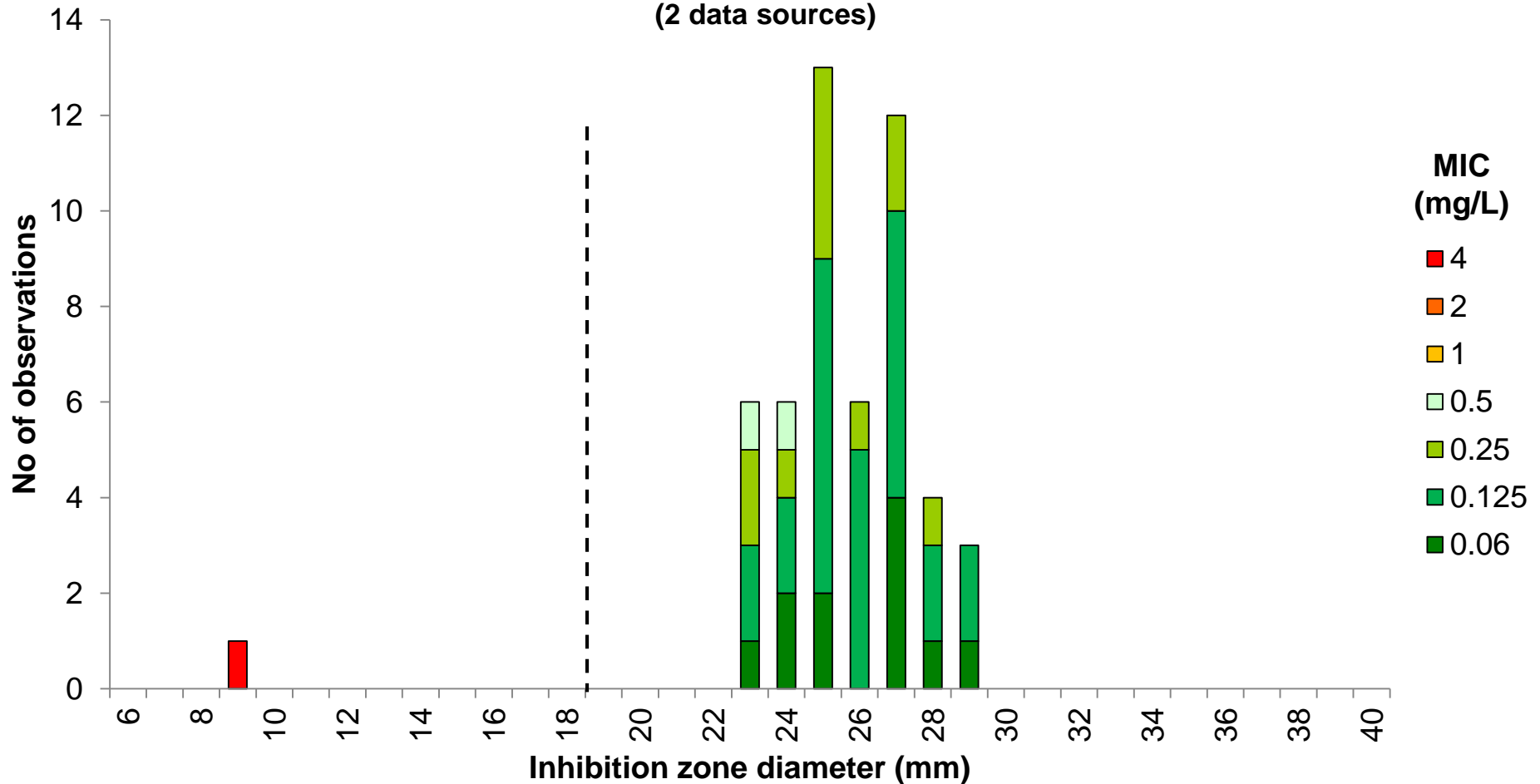
MIC $S \leq 0.001$, $R > 2$ mg/L

Zone diameter $S \geq 50$, $R < 17$ mm

Moxifloxacin 5 µg vs. MIC

S. pyogenes, 41 isolates (51 correlates)

(2 data sources)

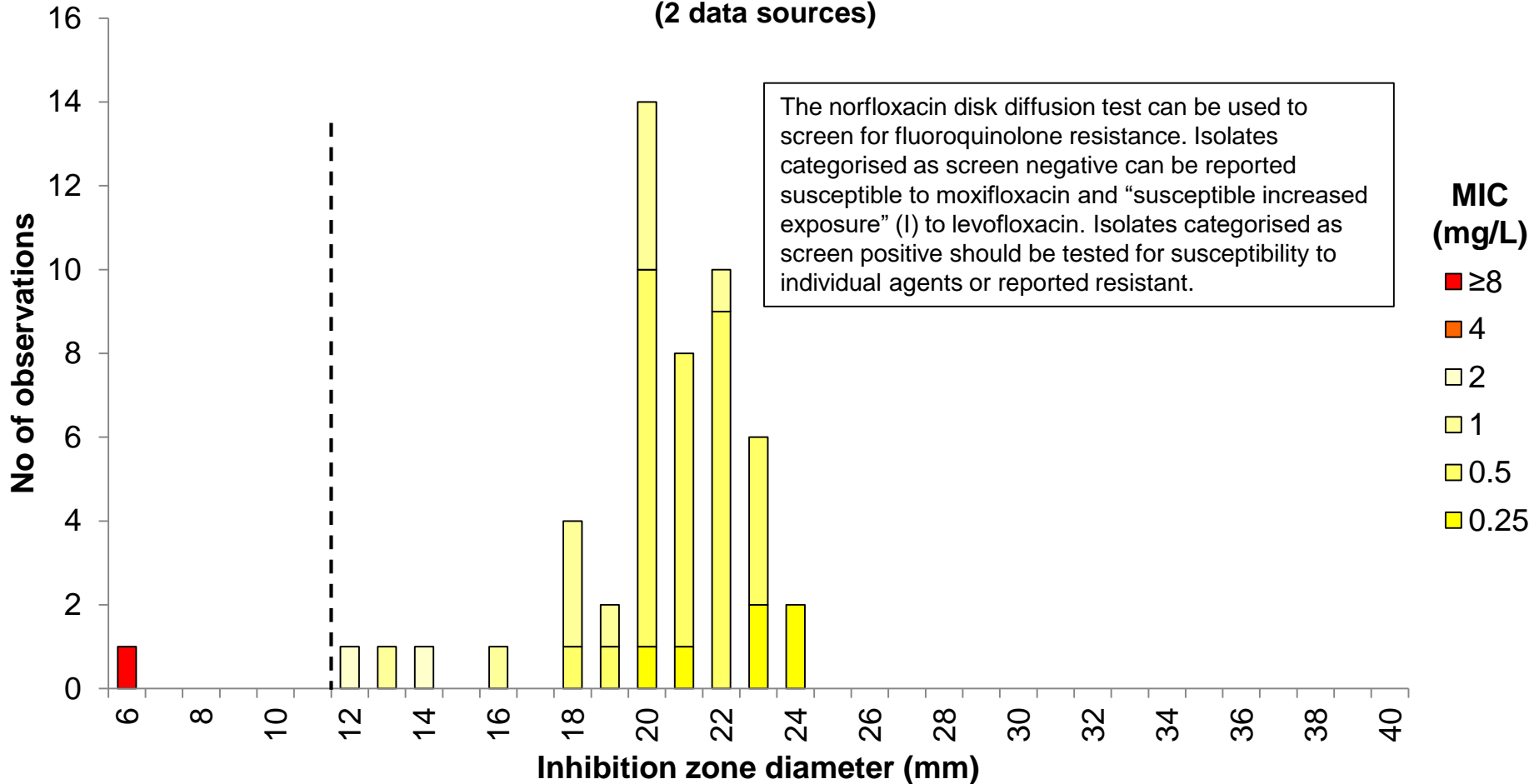


Breakpoints

MIC	$S \leq 0.5$, $R > 0.5$ mg/L
Zone diameter	$S \geq 19$, $R < 19$ mm

Norfloxacin 10 µg vs. Levofloxacin MIC *S. pyogenes*, 41 isolates (51 correlates)

(2 data sources)



Breakpoints

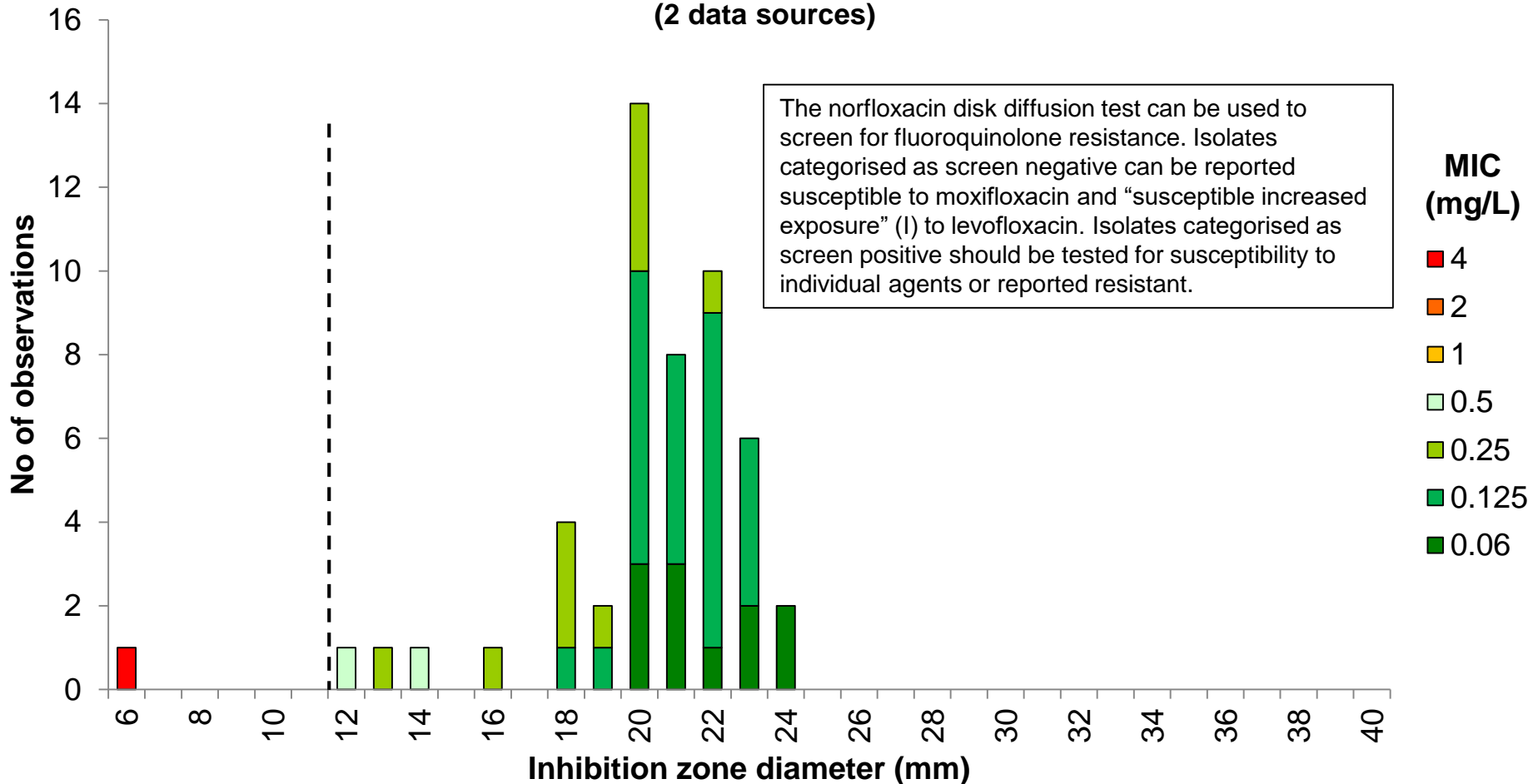
Levofloxacin MIC

$S \leq 0.001$, $R > 2$ mg/L

Norfloxacin zone diameter (screen) $S \geq 12$, $R < 12$ mm

Norfloxacin 10 µg vs. Moxifloxacin MIC *S. pyogenes*, 41 isolates (51 correlates)

(2 data sources)



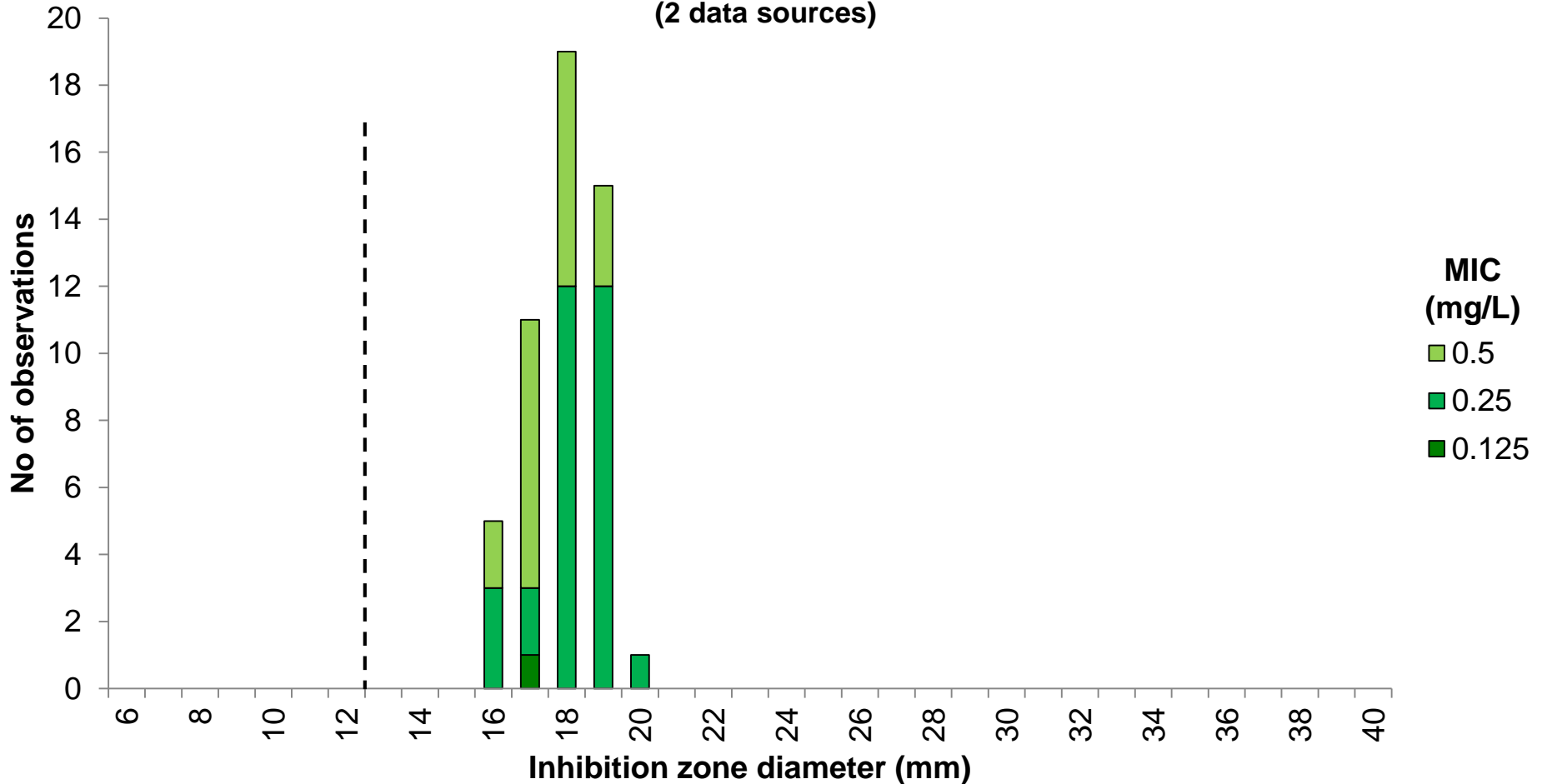
The norfloxacin disk diffusion test can be used to screen for fluoroquinolone resistance. Isolates categorised as screen negative can be reported susceptible to moxifloxacin and “susceptible increased exposure” (I) to levofloxacin. Isolates categorised as screen positive should be tested for susceptibility to individual agents or reported resistant.

Breakpoints
Moxifloxacin MIC $S \leq 0.5$, $R > 0.5$ mg/L
Norfloxacin zone diameter (screen) $S \geq 12$, $R < 12$ mm

Vancomycin 5 µg vs. MIC

S. pyogenes, 41 isolates (51 correlates)

(2 data sources)



Breakpoints

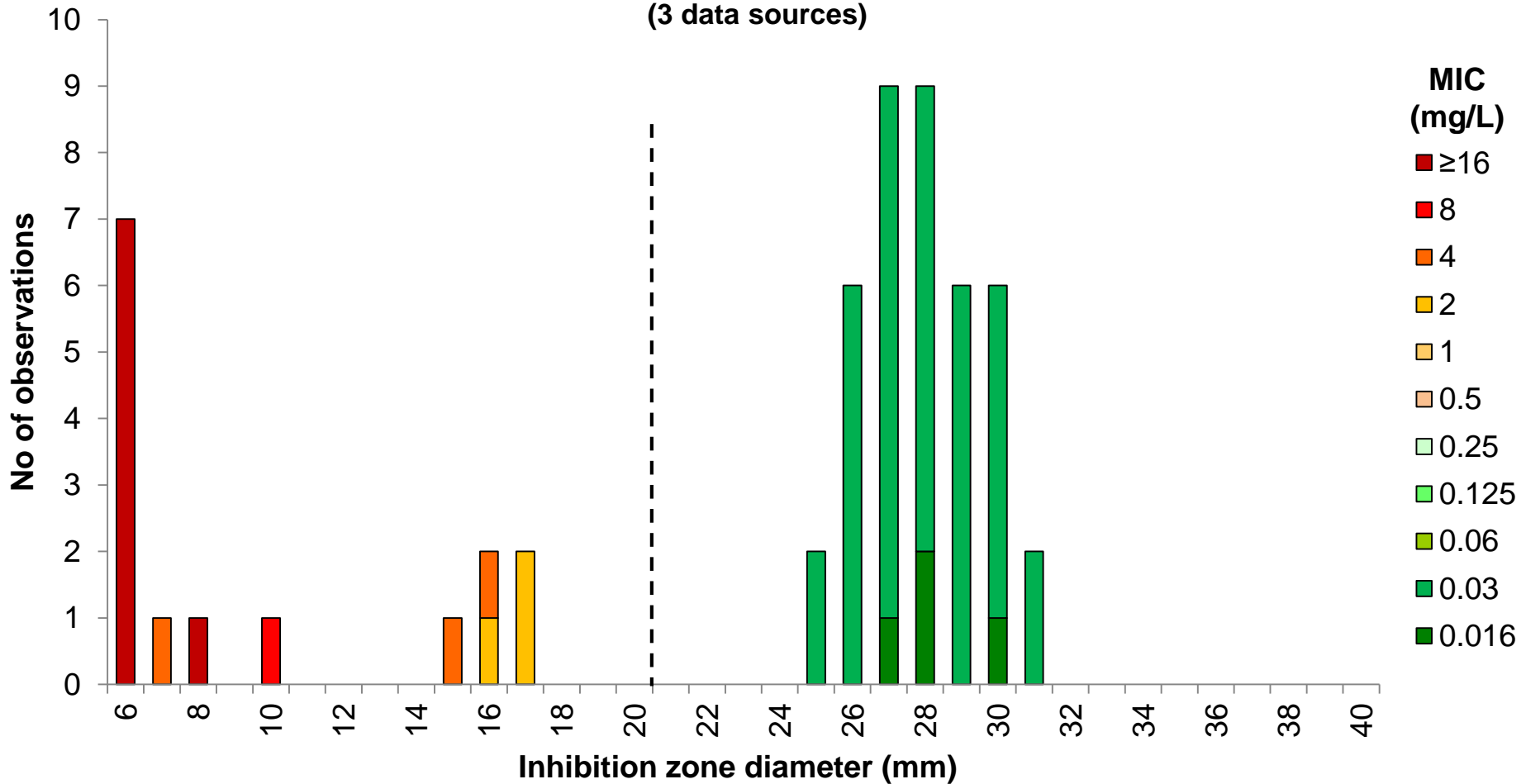
MIC $S \leq 2$, $R > 2$ mg/L

Zone diameter $S \geq 13$, $R < 13$ mm

Erythromycin 15 µg vs. MIC

S. pyogenes, 45 isolates (55 correlates)

(3 data sources)



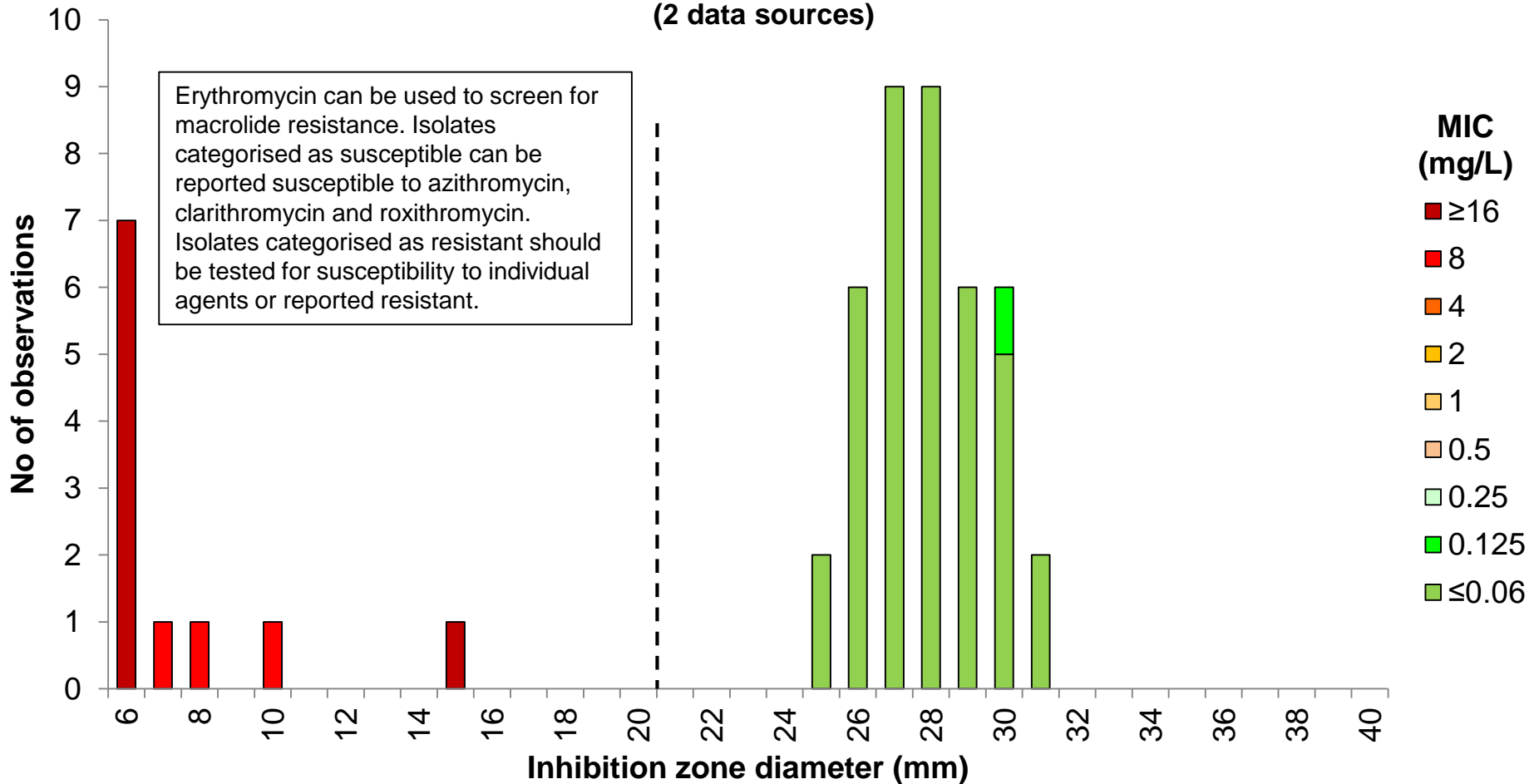
Breakpoints

MIC S ≤ 0.25, R > 0.25 mg/L

Zone diameter S ≥ 21, R < 21 mm

Erythromycin 15 µg vs. Azithromycin MIC *S. pyogenes*, 41 isolates (51 correlates)

(2 data sources)



Breakpoints

Azithromycin MIC

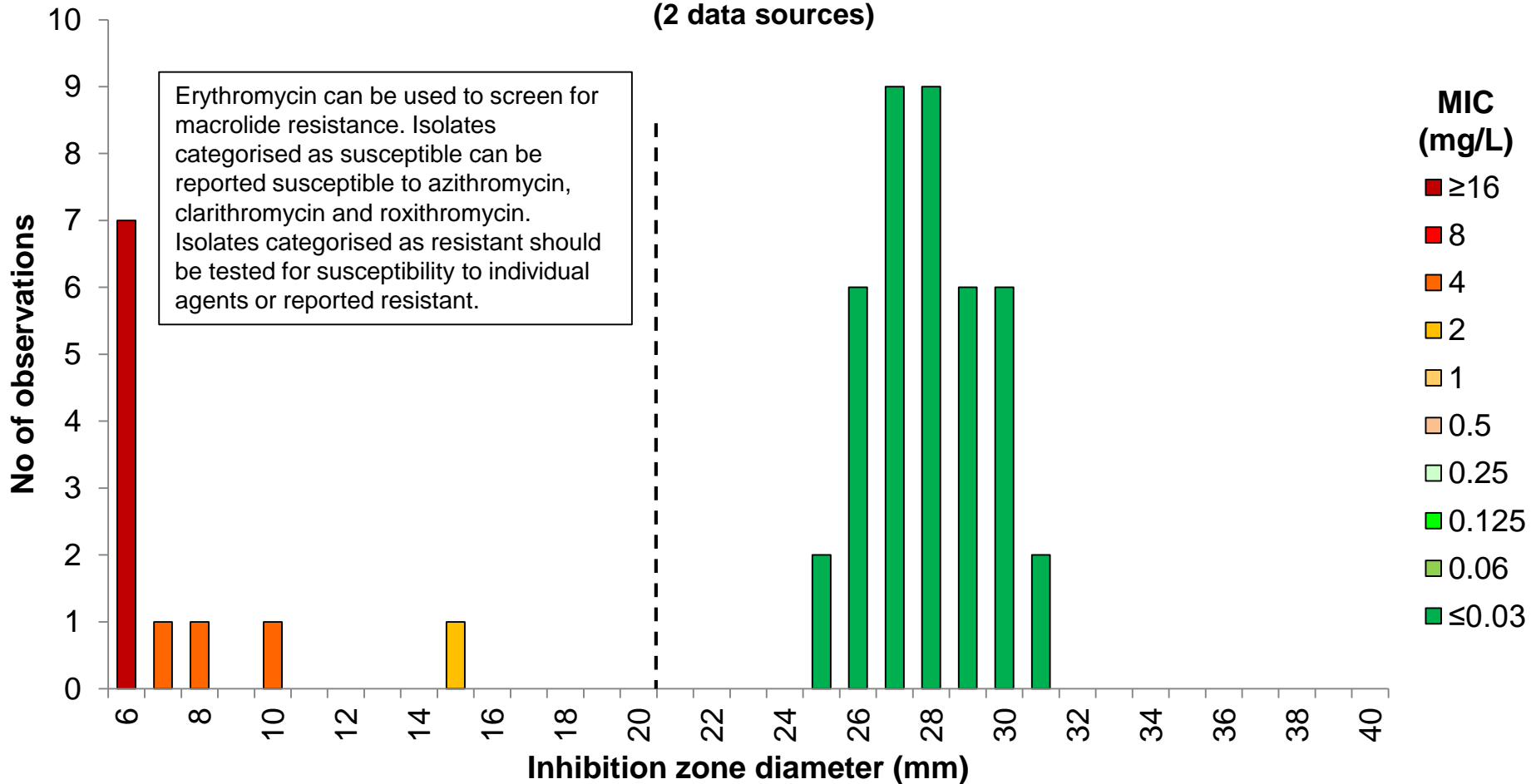
S ≤ 0.25, R > 0.25 mg/L

Erythromycin zone diameter

S ≥ 21, R < 21 mm

Erythromycin 15 µg vs. Clarithromycin MIC *S. pyogenes*, 41 isolates (51 correlates)

(2 data sources)



Breakpoints

Clarithromycin MIC

S ≤ 0.25, R > 0.25 mg/L

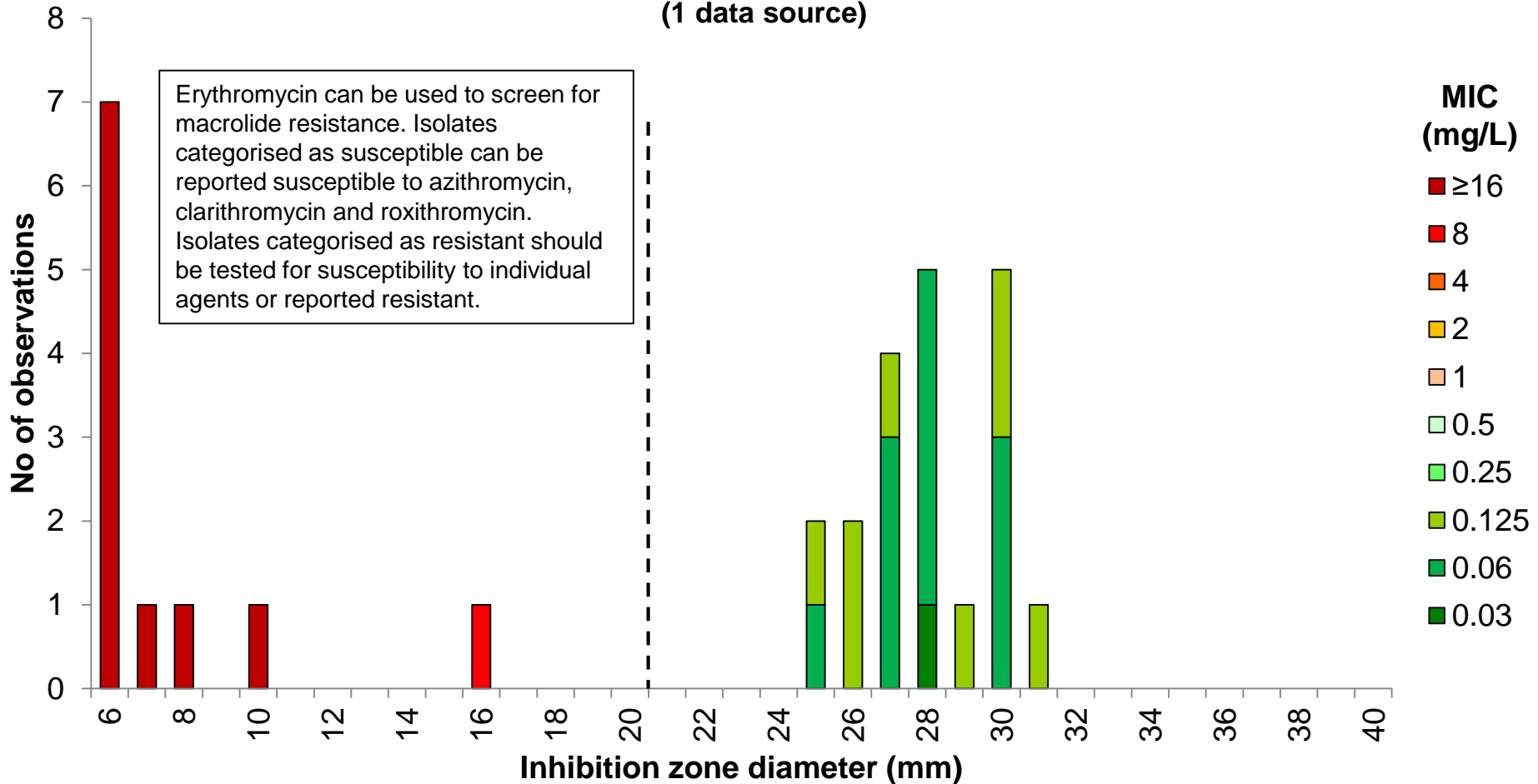
Erythromycin zone diameter

S ≥ 21, R < 21 mm

Erythromycin 15 µg vs. Roxithromycin MIC

S. pyogenes, 31 isolates

(1 data source)



Breakpoints

Roxithromycin MIC

S ≤ 0.5, R > 0.5 mg/L

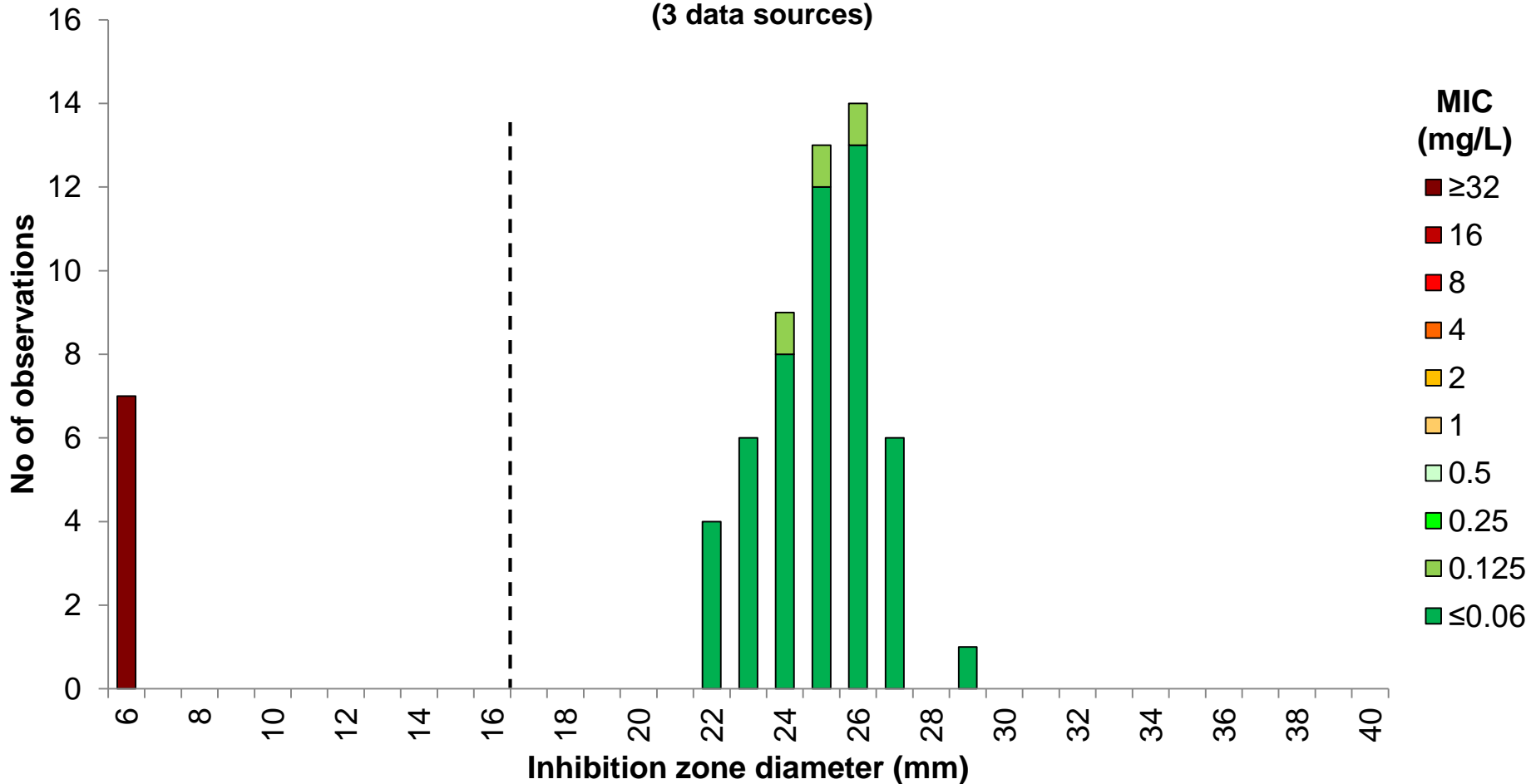
Erythromycin zone diameter

S ≥ 21, R < 21 mm

Clindamycin 2 µg vs. MIC

S. pyogenes, 43 isolates (53 correlates)

(3 data sources)

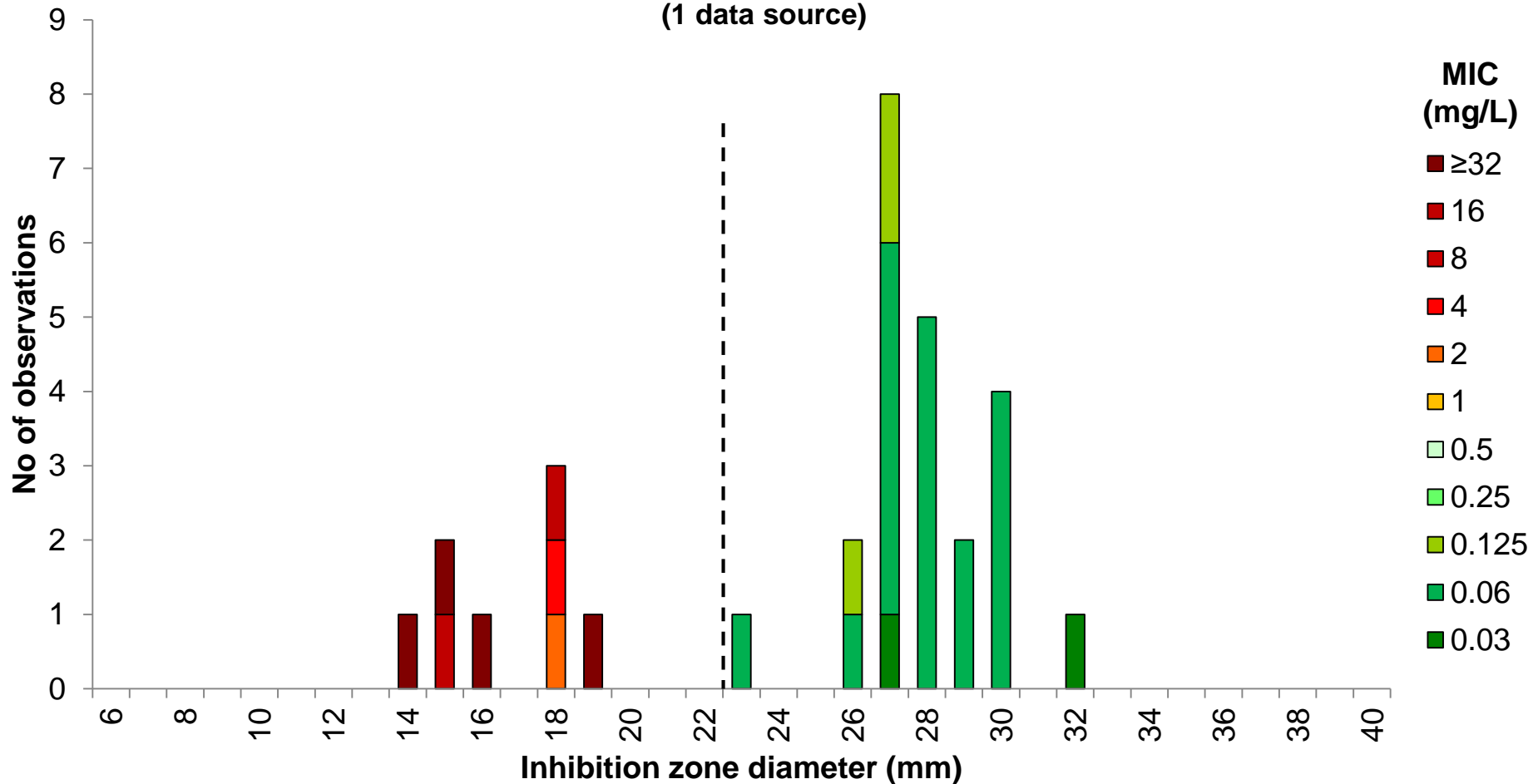


Breakpoints

MIC	S ≤ 0.5, R > 0.5 mg/L
Zone diameter	S ≥ 17, R < 17 mm

Minocycline 30 µg vs. MIC *S. pyogenes*, 31 isolates

(1 data source)



Breakpoints

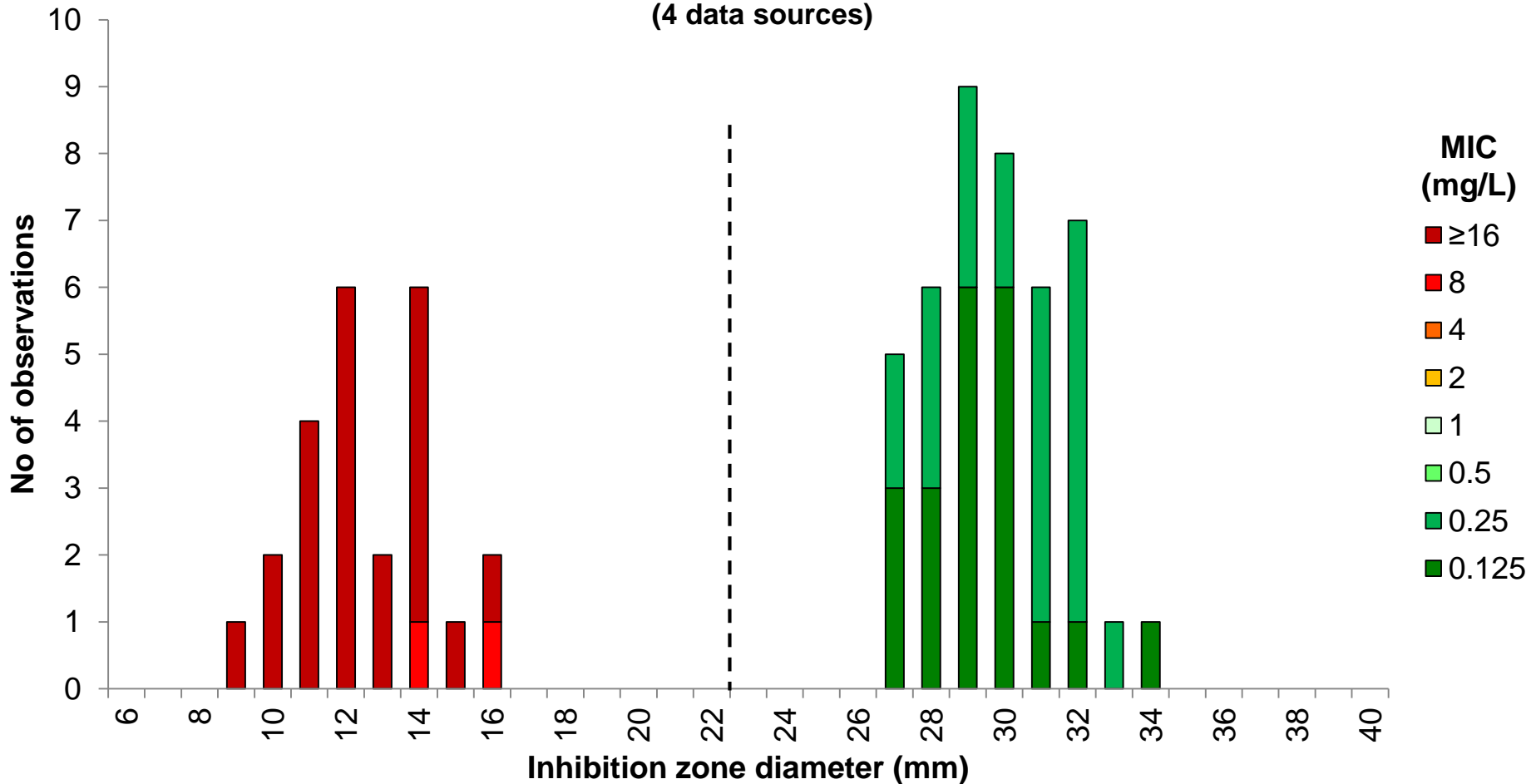
MIC S ≤ 0.5, R > 0.5 mg/L

Zone diameter S ≥ 23, R < 23 mm

Tetracycline 30 µg vs. MIC

S. pyogenes, 57 isolates (67 correlates)

(4 data sources)



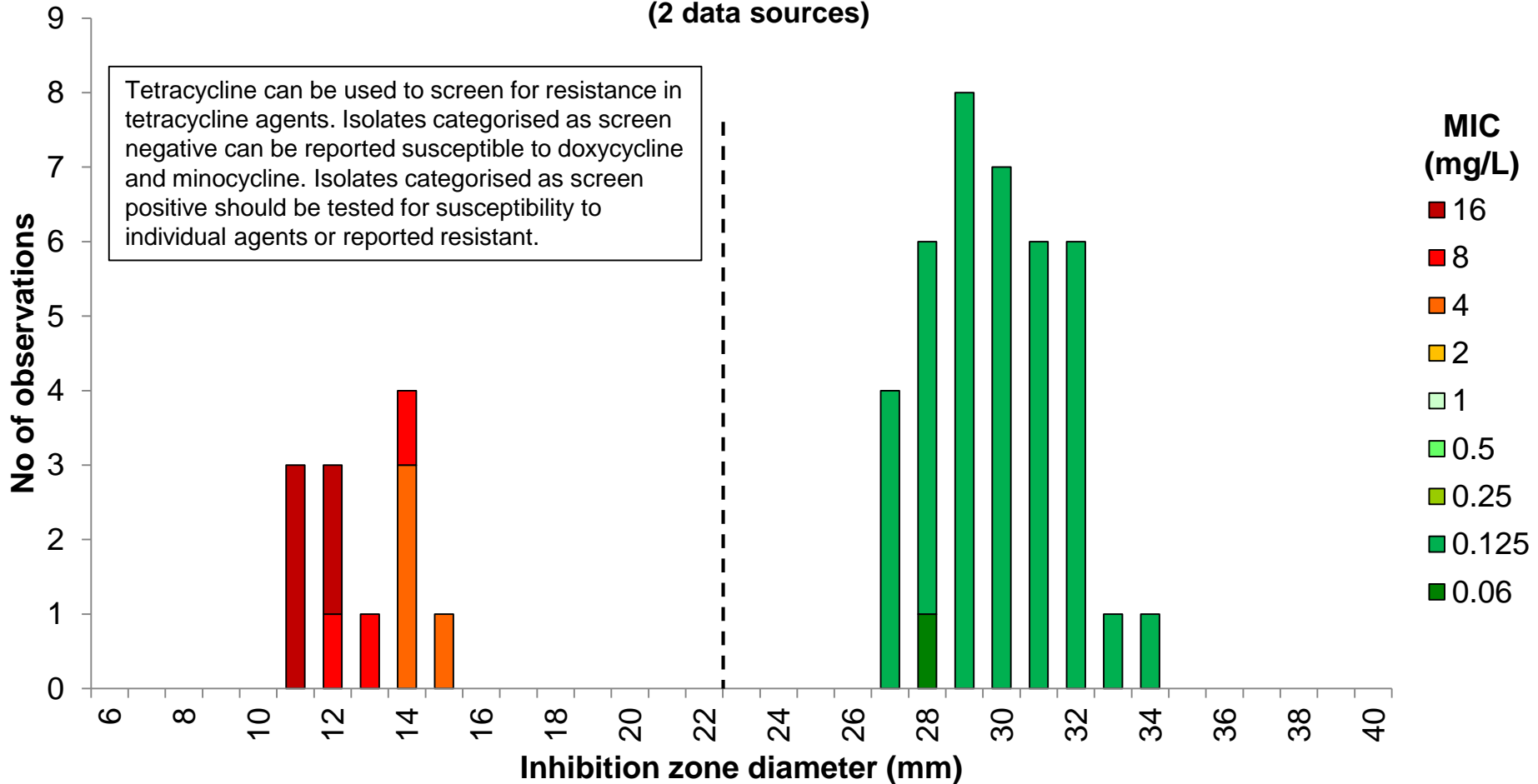
Breakpoints

MIC $S \leq 1, R > 1$ mg/L

Zone diameter $S \geq 23, R < 23$ mm

Tetracycline 30 µg vs. Doxycycline MIC *S. pyogenes*, 41 isolates (51 correlates)

(2 data sources)



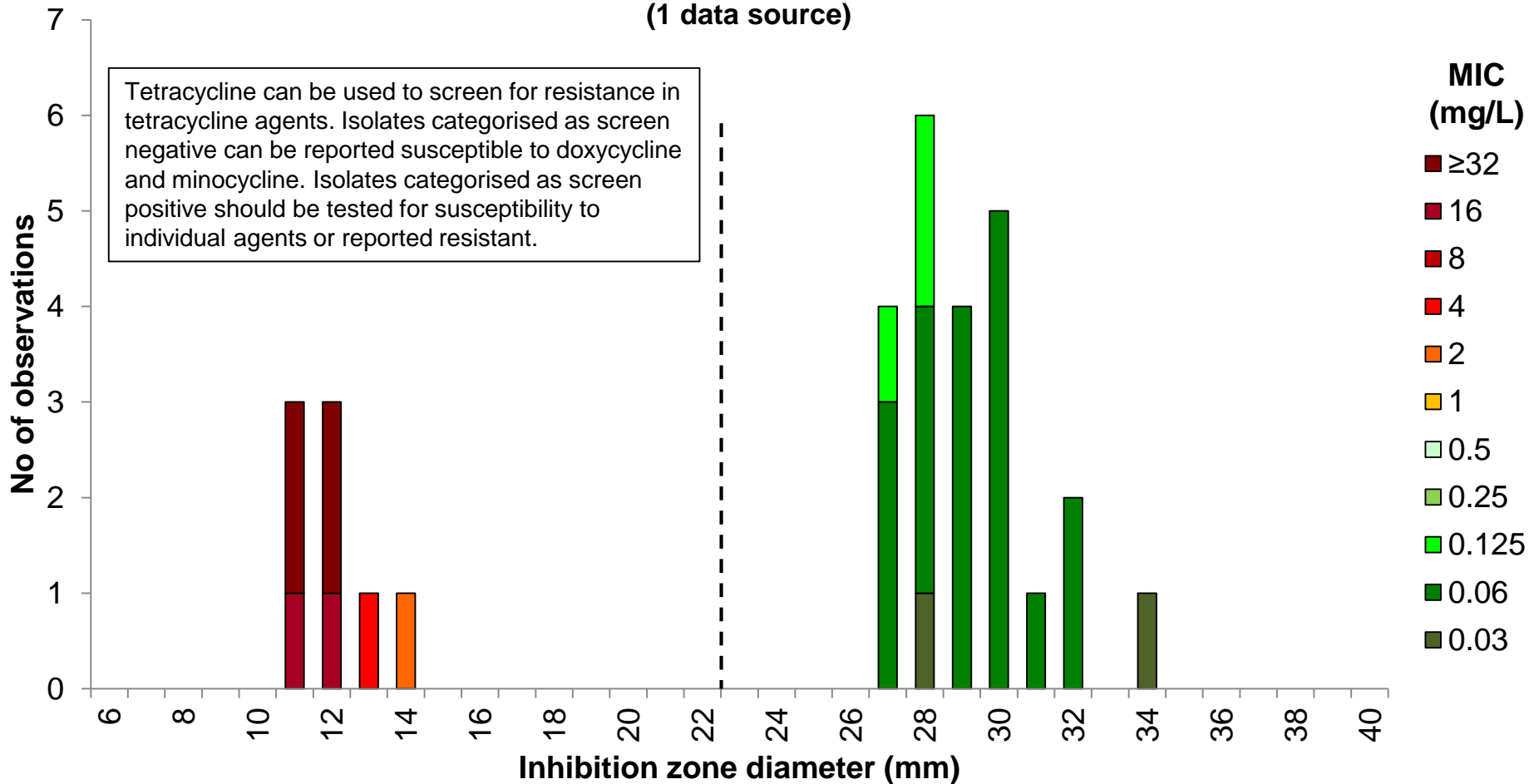
Tetracycline can be used to screen for resistance in tetracycline agents. Isolates categorised as screen negative can be reported susceptible to doxycycline and minocycline. Isolates categorised as screen positive should be tested for susceptibility to individual agents or reported resistant.

Breakpoints
 Doxycycline MIC $S \leq 1, R > 1$ mg/L
 Tetracycline zone diameter $S \geq 23, R < 23$ mm

Tetracycline 30 µg vs. Minocycline MIC

S. pyogenes, 31 isolates

(1 data source)



Breakpoints

Minocycline MIC

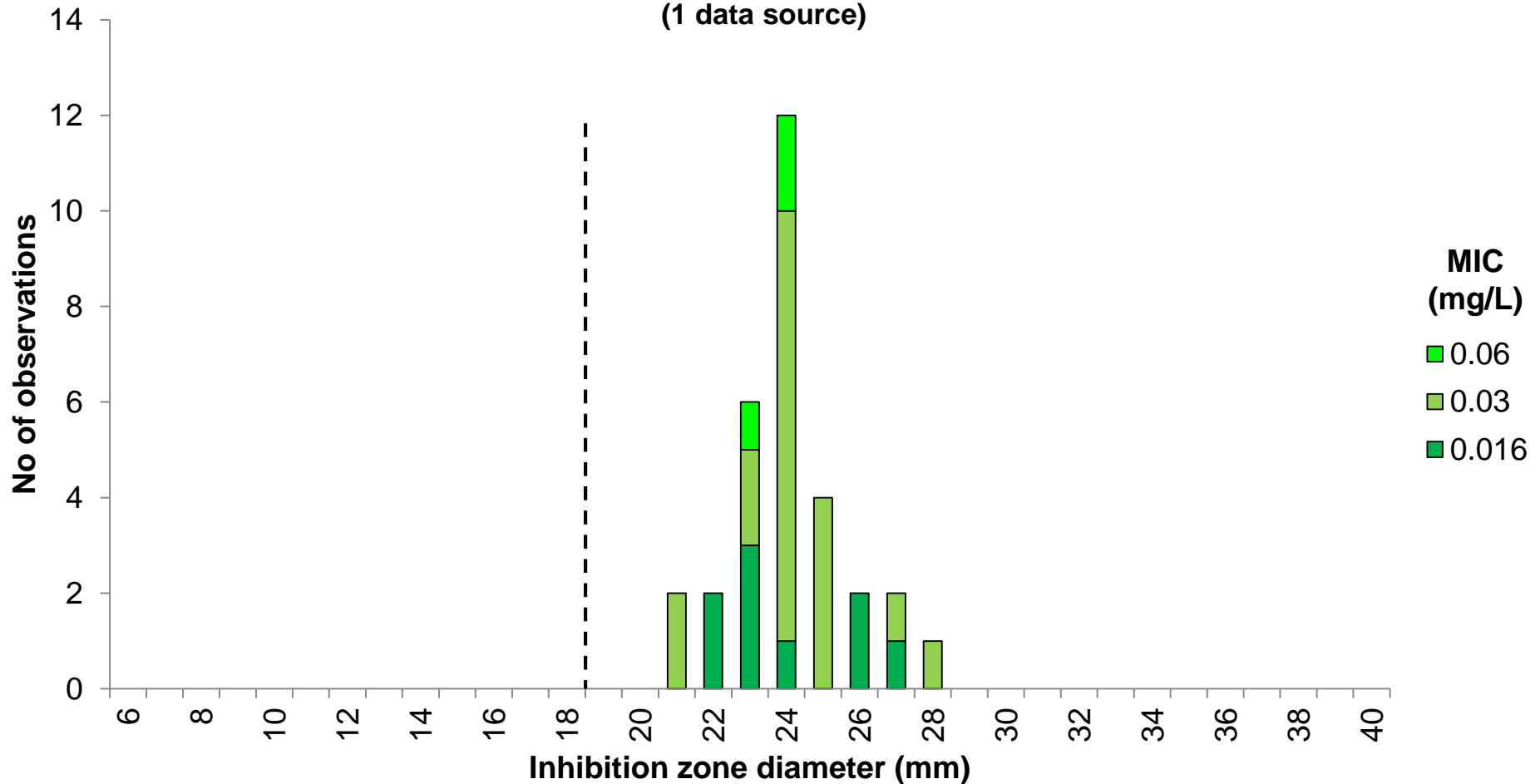
$S \leq 0.5$, $R > 0.5$ mg/L

Tetracycline zone diameter

$S \geq 23$, $R < 23$ mm

Tigecycline 15 µg vs. MIC *S. pyogenes*, 31 isolates

(1 data source)



Breakpoints

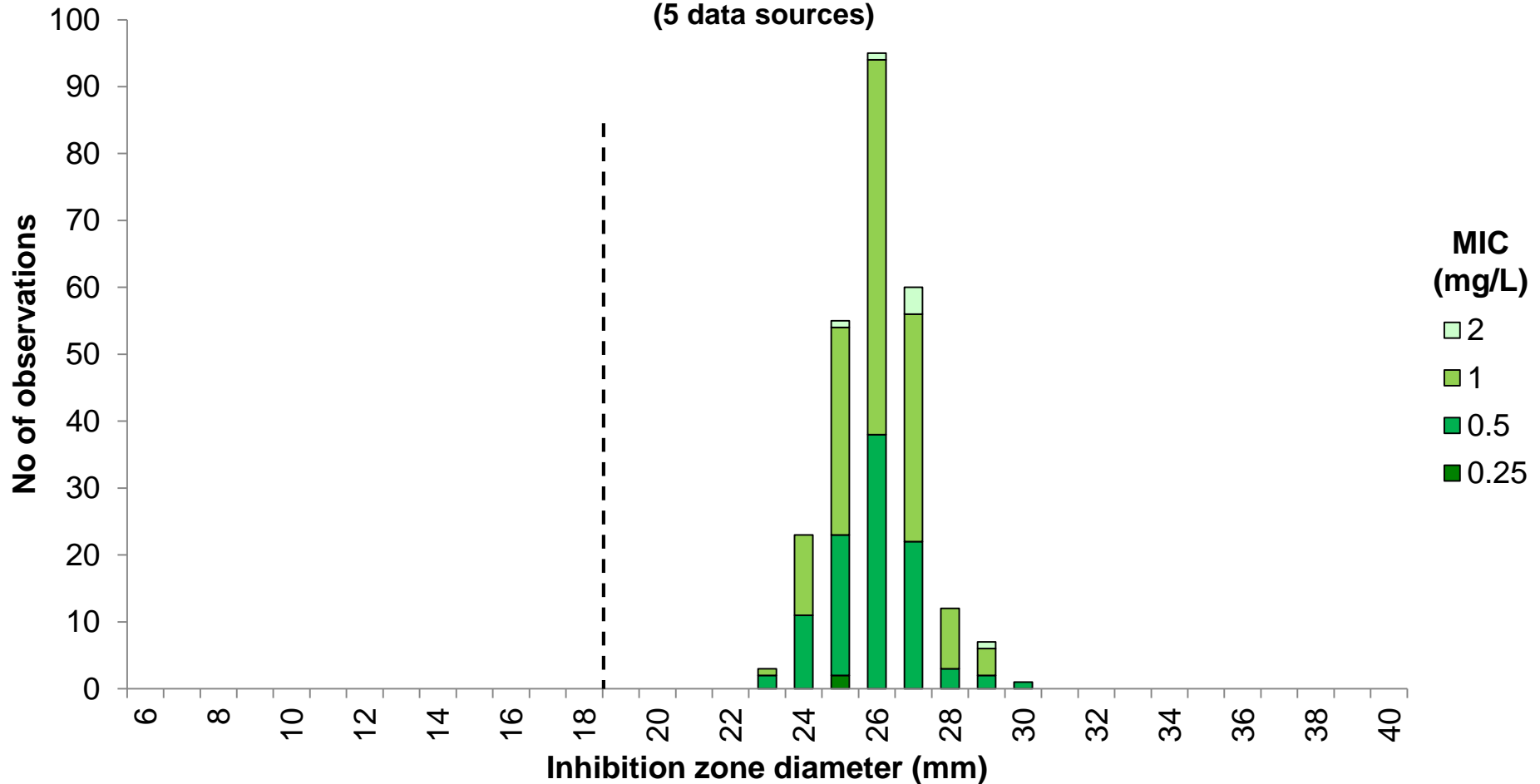
MIC $S \leq 0.125$, $R > 0.125$ mg/L

Zone diameter $S \geq 19$, $R < 19$ mm

Linezolid 10 µg vs. MIC

S. pyogenes, 104 isolates (256 correlates)

(5 data sources)



Breakpoints

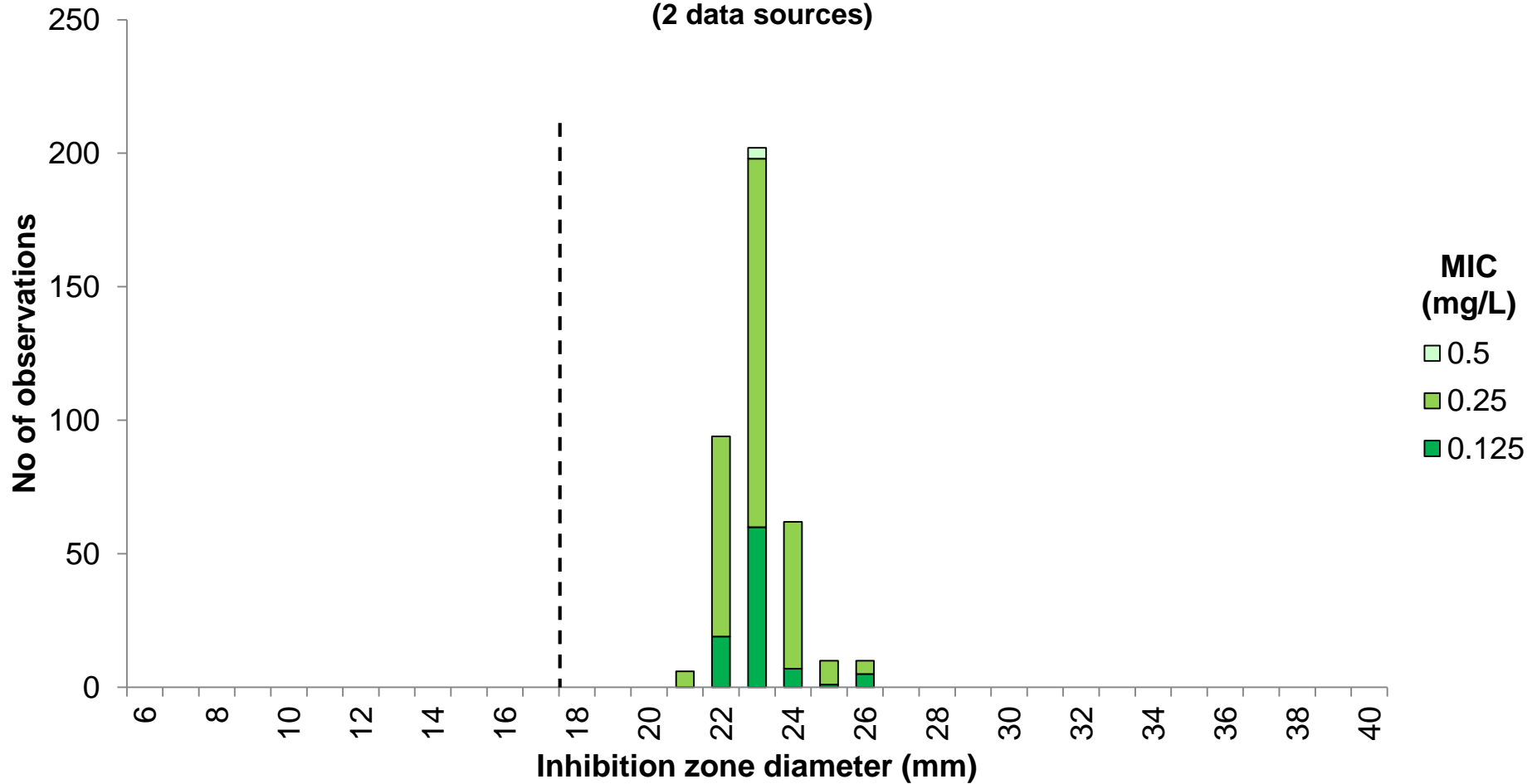
MIC $S \leq 2, R > 2$ mg/L

Zone diameter $S \geq 19, R < 19$ mm

Tedizolid 2 μg vs. MIC

S. pyogenes, 50 isolates (384 correlates)

(2 data sources)



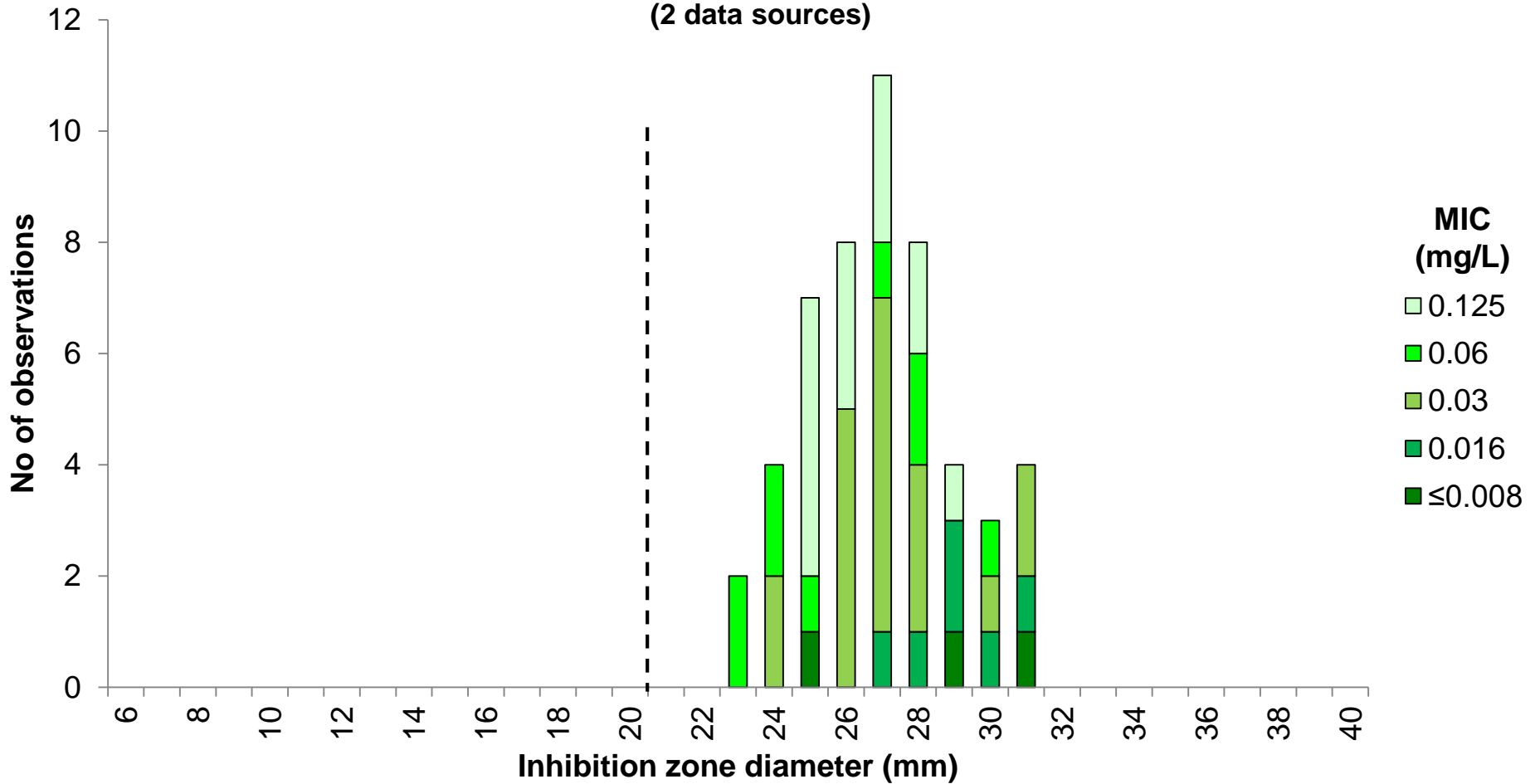
Breakpoints

MIC	$S \leq 0.5$, $R > 0.5$ mg/L
Zone diameter	$S \geq 18$, $R < 18$ mm

Rifampicin 5 μ g vs. MIC

S. pyogenes, 41 isolates (51 correlates)

(2 data sources)



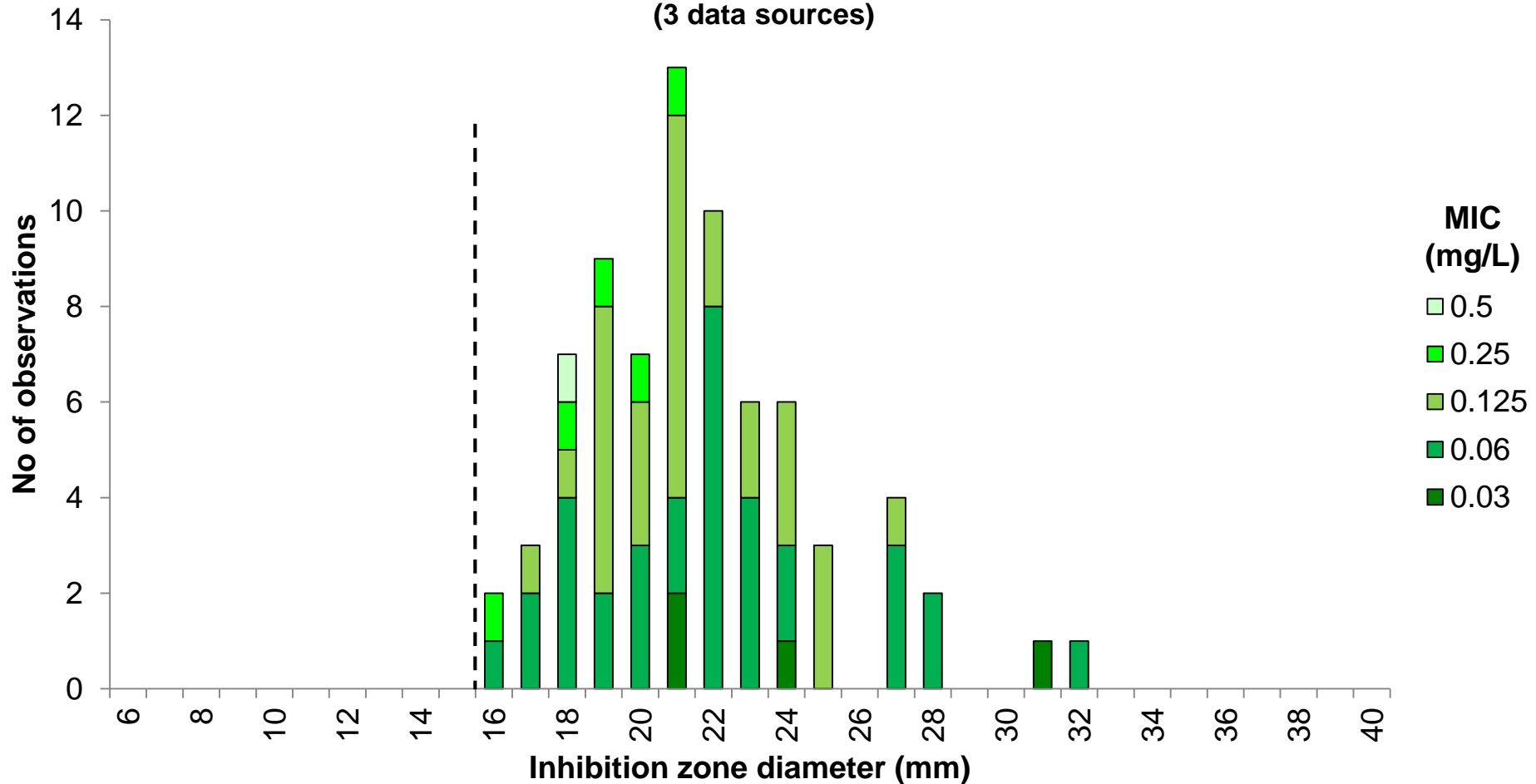
Breakpoints

MIC S ≤ 0.25, R > 0.25 mg/L

Zone diameter S ≥ 21, R < 21 mm

Trimethoprim-sulfamethoxazole 1.25-23.75 µg vs. MIC *S. pyogenes*, 40 isolates (74 correlates)

(3 data sources)



Breakpoints

MIC $S \leq 0.5$, $R > 0.5$ mg/L

Zone diameter $S \geq 16$, $R < 16$ mm



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