

Balancing Care and Cost: The utilization of immunohistochemistry to detect *Helicobacter pylori* in gastric biopsies

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Introduction

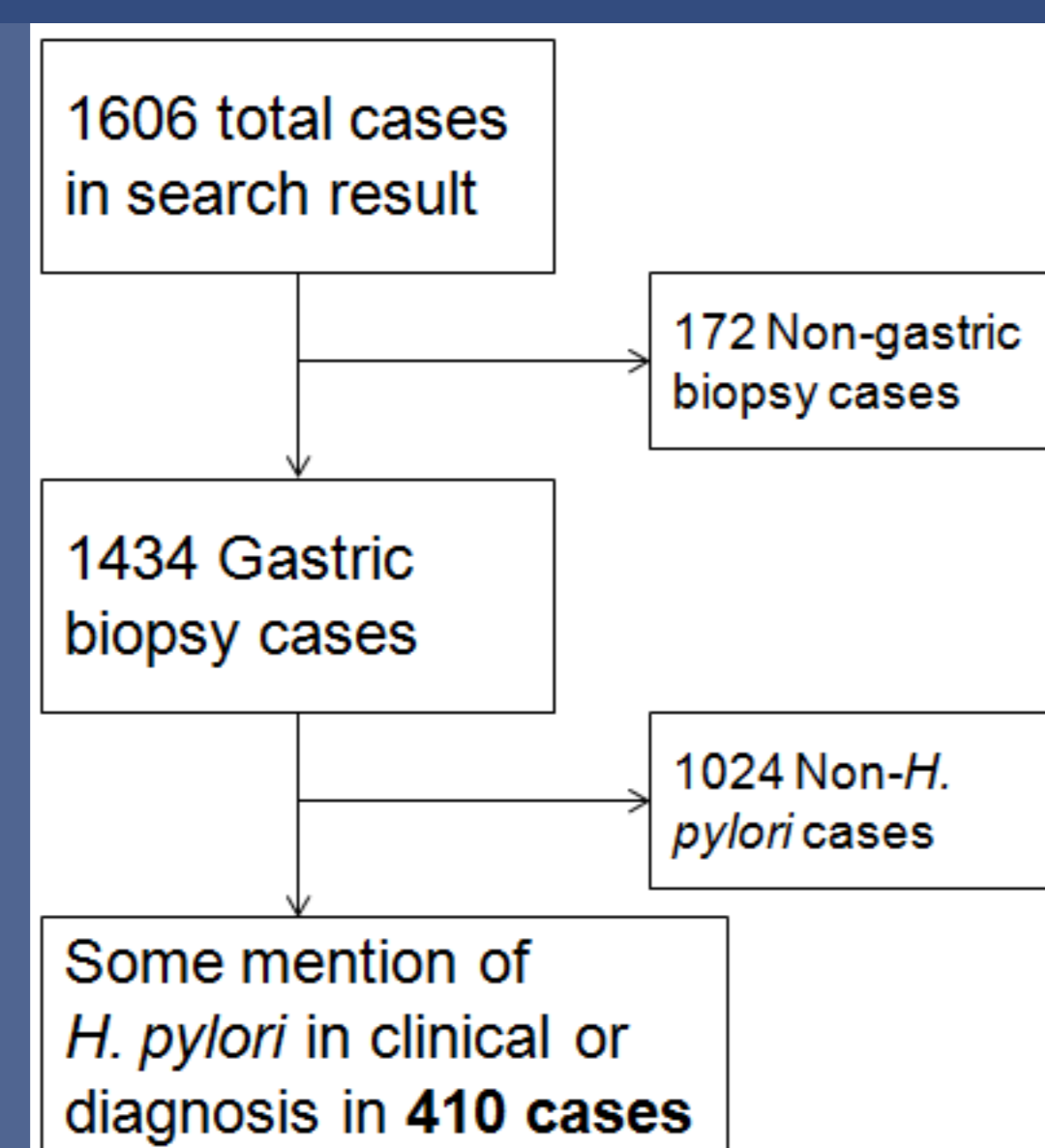
Helicobacter pylori is a main cause of gastritis and peptic ulcer disease, as well as a risk factor for gastric cancer and MALT lymphoma^{1,2}. In patients with *H. pylori* gastritis, detection of the organisms in gastric biopsies leads to appropriate treatment and prevention of disease progression. In most cases, the organisms are visible on biopsies stained with routine hematoxylin and eosin (H&E). The organisms may also be visualized with the use of special stains or immunohistochemical (IHC) stains, which are especially useful to visualize rare organisms or organisms in unusual locations within the biopsies. However, overutilization of special and IHC stains is a potential drain on laboratory resources as well as a source of increased patient costs.

Objectives

- To assess the frequency of *H. pylori* infection in BIDMC's patient population.
- To assess the practice of the BIDMC Anatomical Pathology Division in ordering and interpreting IHC for *H. pylori* detection based on the departmental standard operating procedure (SOP).
- To assess the diagnostic yield of *H. pylori* IHC.

Methods

A retrospective review was performed on pathology reports for all patients who had gastric biopsies obtained endoscopically over a 3-months period between June 2017 and August 2017 and accessioned at BIDMC Pathology, obtained through a search of the SoftPath electronic database.



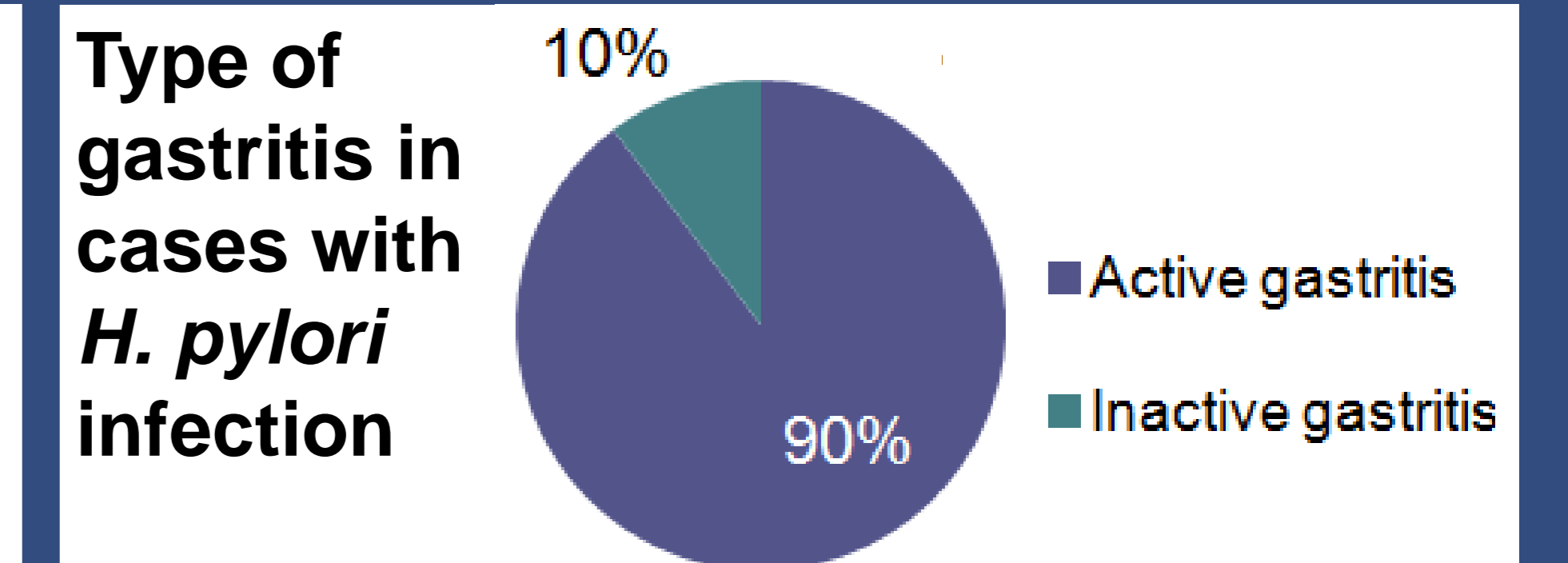
Data Collected:

- Presence or absence of *H. pylori*
- Performance of *H. pylori* IHC
- Type of gastritis (active or inactive)
- Patient history of *H. pylori* infection

Results: Frequency of *H. pylori* Infection

Overall Frequency of *H. pylori* Infection

Method of Detection	# of Cases (%) (n=126)
H&E only	106 (84%)
IHC only	13 (10%)
Both H&E and IHC	7 (6%)



Frequency of *H. pylori* Infection by Histological Patterns

	HP positive (%) (n=126)	HP negative (%) (n=284)
Active gastritis (n=177)		
with history of HP infection (n=44)	34 (77.3%)	10 (22.7%)
without history of HP infection (n=133)	79 (59.4%)	54 (40.6%)
Inactive gastritis (n=200)		
with history of HP infection (n=53)	4 (7.4%)	49 (92.5%)
without history of HP infection (n=147)	9 (6.1%)	138 (93.9%)

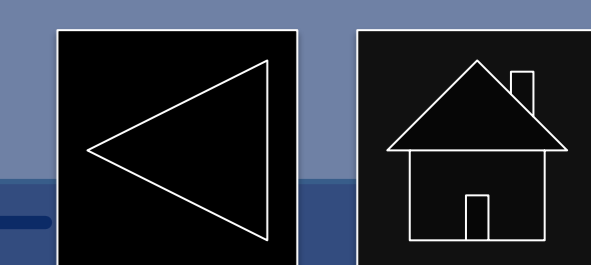
- H. pylori* was detected in 126 cases of 1434 gastric biopsy cases (8.8%).
- H. pylori* is more likely to be detected in active gastritis than in inactive gastritis.
- Patient history of *H. pylori* infection alone is not a very good predictor of whether or not *H. pylori* is likely to be detected (*H. pylori* was detected in 37% of patients with history, and in 27% of patients without history).

References:

- Batts, KP et al. Appropriate use of special stains for identifying *Helicobacter pylori*: recommendations from the Rodger C. Haggitt Gastrointestinal Pathology Society. *Am J Surg Pathol* (2013) 37:e12-e22.
- Glickman, JN et al. *Helicobacter* infections with rare bacteria or minimal gastritis: Expecting the unexpected. *Digestive and Liver Disease* (2015). <http://dx.doi.org/10.1016/j.dld.2015.04.005>.

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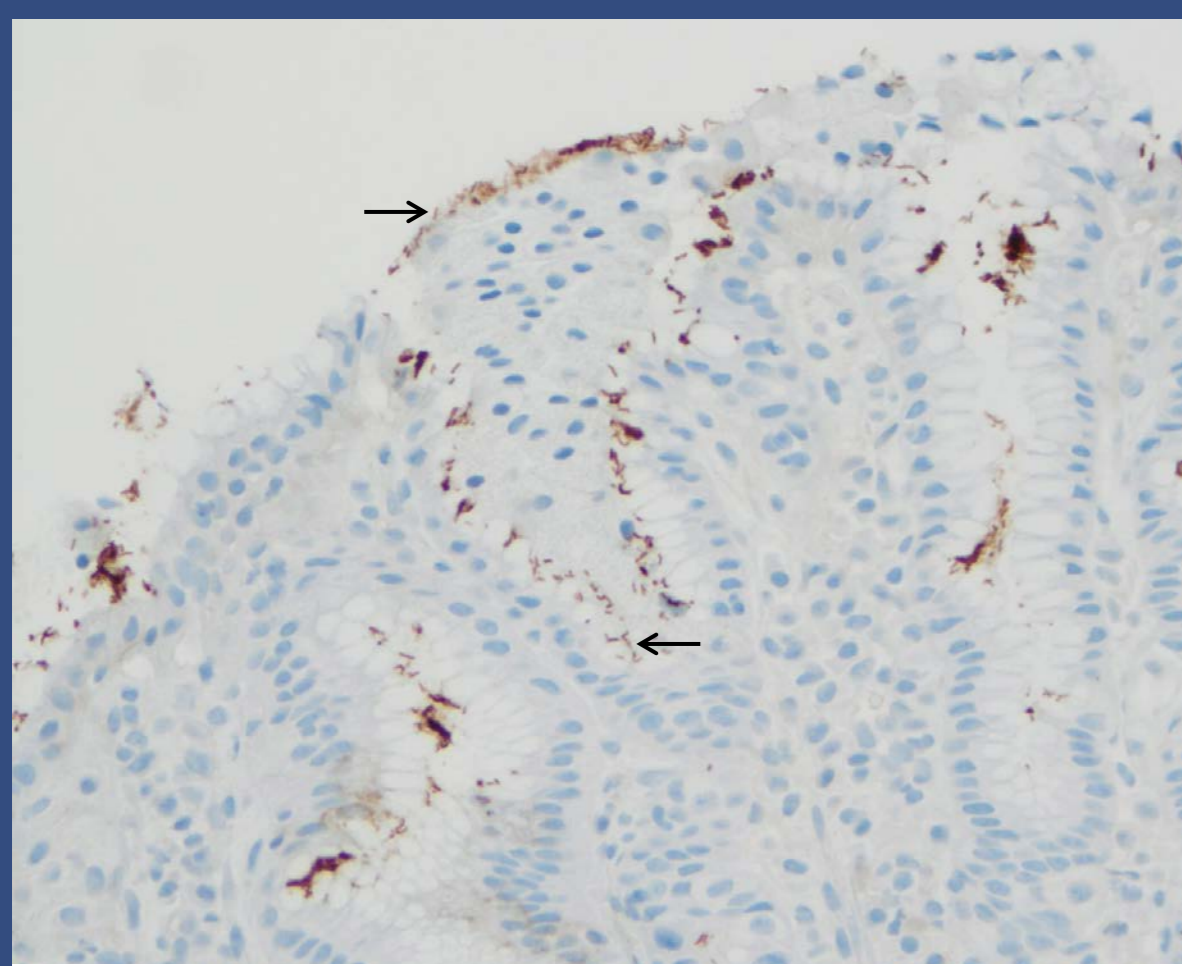


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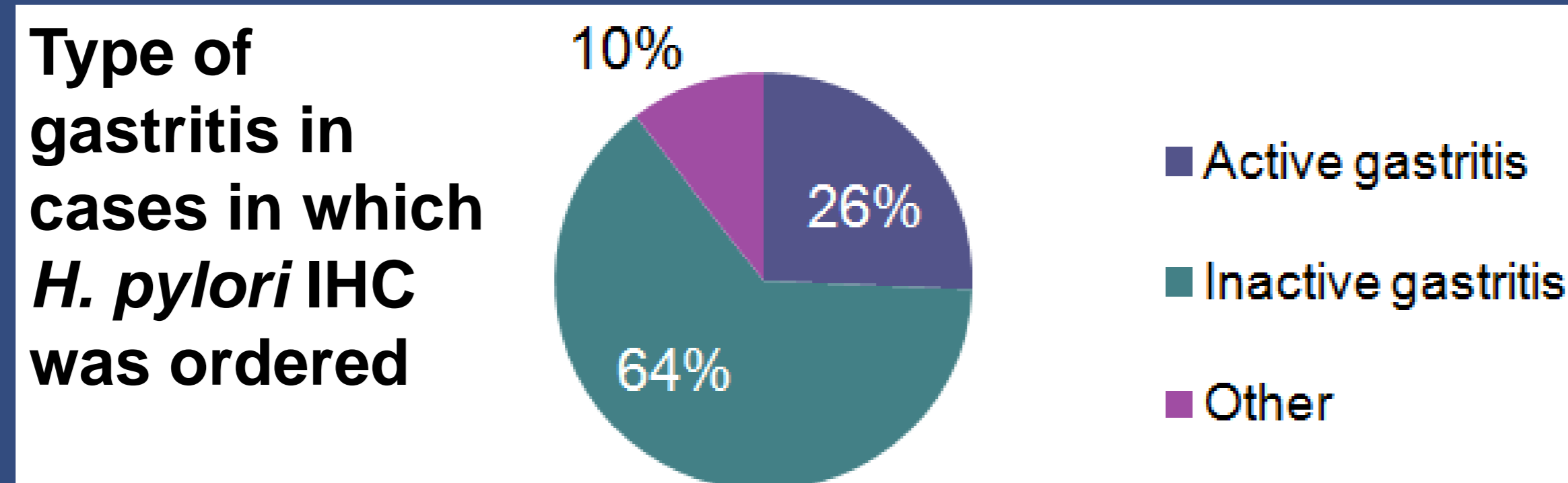
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Results: Utilization of *H. pylori* IHC



IHC stain positive for *H. pylori* (arrows)

- *H. pylori* IHC was ordered in 304 of 410 cases (74%).
- Most of the IHCs were ordered in cases with inactive gastritis.



Diagnostic Yield of *H. pylori* IHC

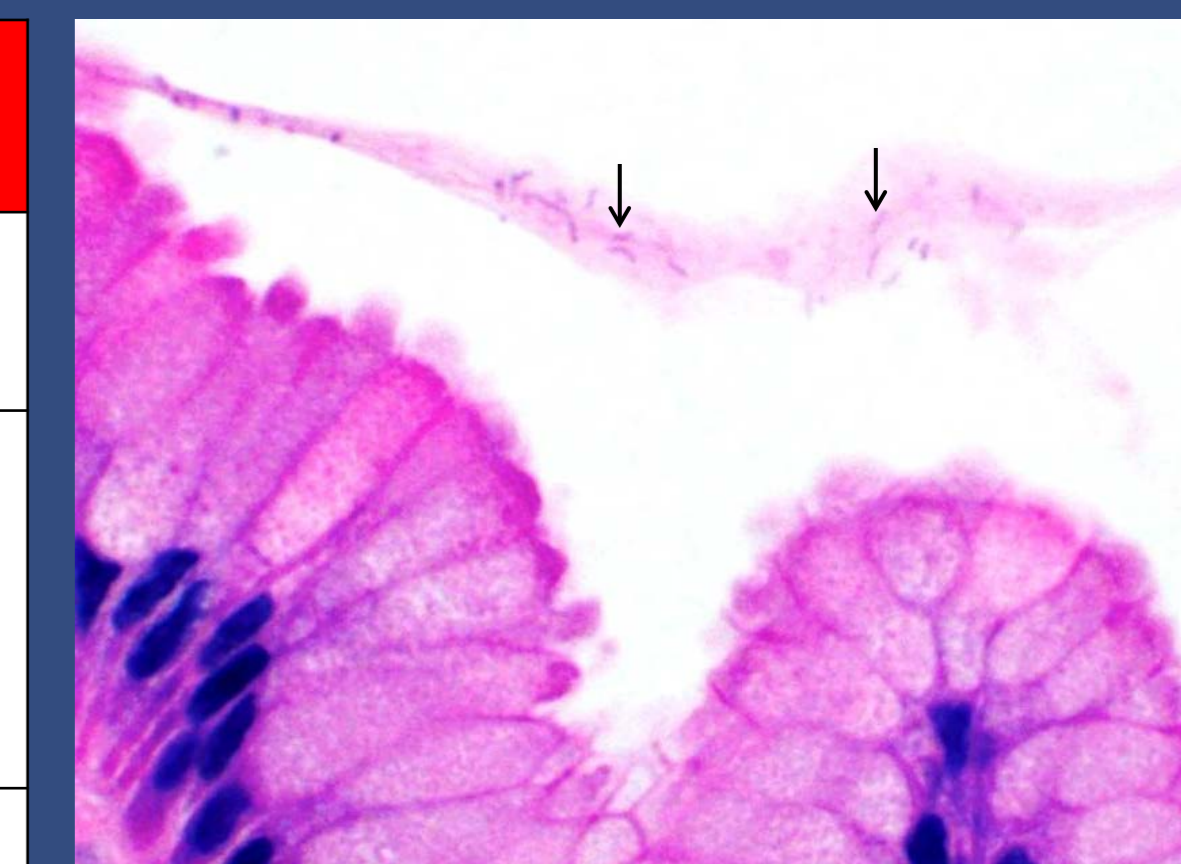
	HP-IHC positive (%)	HP-IHC negative (%)
Total Cases in which HP-IHC was ordered (n=304)	20 (7.2%)	284 (93.4%)
with history of HP infection (n=70)	6 (8.6%)	64 (91.4%)
with active gastritis (n=78)	15 (19.2%)	63 (80.8%)
with inactive gastritis (n=194)	5 (2.6%)	189 (97.4%)
Other diagnoses (n=32)	0 (0%)	32 (100%)
Cardiac mucosa (n=5)	0 (0%)	5 (100%)

Conclusions & Next Steps

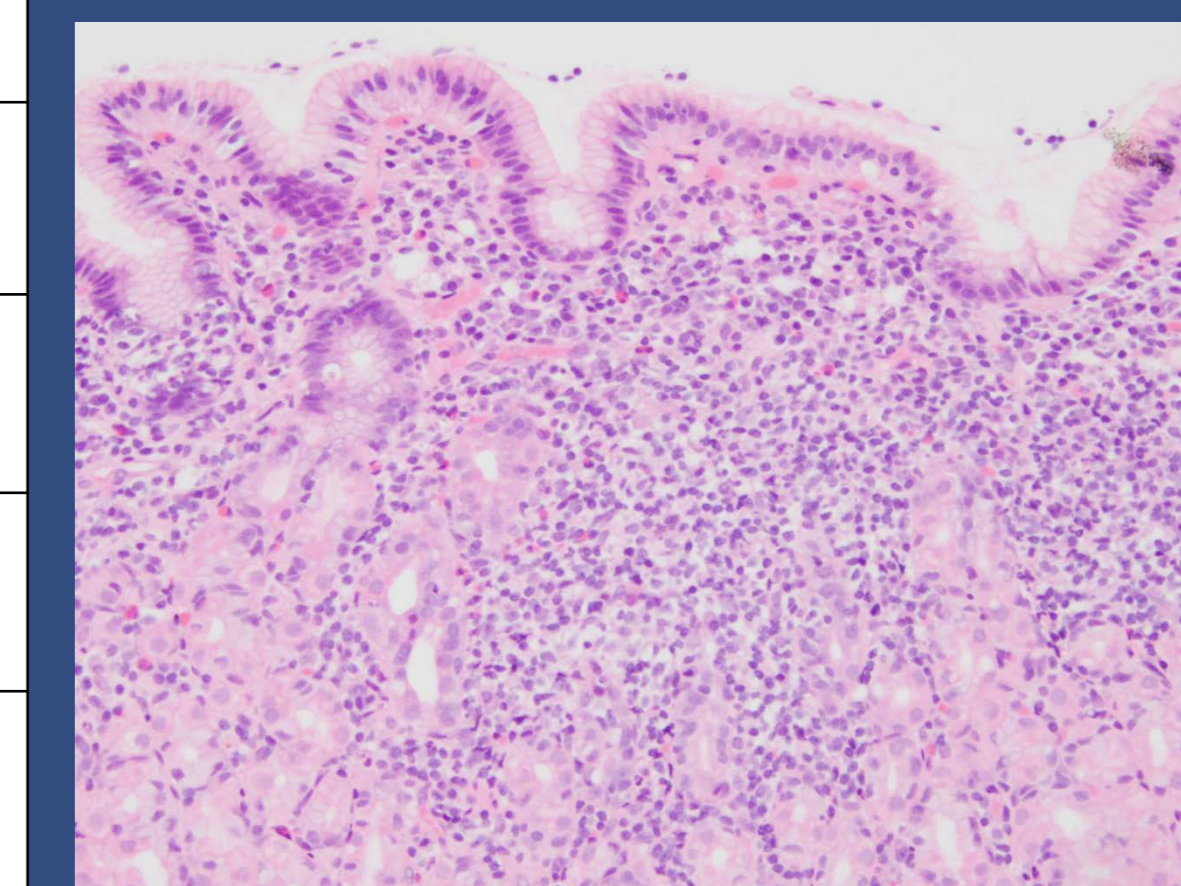
- The diagnostic yield of *H. pylori* IHC is low, especially when performed on patients with milder degrees of chronic inactive gastritis and/or patient's who do not have a history of *H. pylori* infection.
- The SOP for *H. pylori* IHC ordering was revised to clarify the criteria for ordering and recommend a higher threshold, and was implemented in January 2018.
- A repeat study will be performed to determine whether or not there is an interval change to the *H. pylori* IHC ordering practice under the revised SOP.

Revised SOP for *H. pylori* IHC

YES	NO
Chronic active gastritis without <i>H. pylori</i> on H&E	<i>H. pylori</i> visualized on H&E
Substantial chronic inactive gastritis without <i>H. pylori</i> on H&E	Mild or minimal chronic inactive gastritis without <i>H. pylori</i> on H&E (unless other conditions for ordering are met)
Germinal centers	Chemical/reactive gastropathy (without superimposed chronic or chronic active gastritis)
Intraepithelial neutrophils	Normal biopsy
Patient history of <i>H. pylori</i> (unless distal histology is normal)	Inflamed cardia biopsy, when distal gastric biopsies are available
Inflamed cardia biopsy, no distal gastric biopsies	Fundic gland polyp
Unusual patterns of gastritis	Clinician request (unless other conditions for ordering are met)
Bacterial forms indeterminate for <i>H. pylori</i> on H&E	



H. Pylori (arrows) seen on H & E



Gastric mucosa with *substantial* chronic inactive gastritis

References:

1. Batts, KP et al. Appropriate use of special stains for identifying Helicobacter pylori: recommendations from the Rodger C. Haggitt Gastrointestinal Pathology Society. Am J Surg Pathol (2013) 37:e12-e22.
2. Glickman, JN et al. Helicobacter infections with rare bacteria or minimal gastritis: Expecting the unexpected. Digestive and Liver Disease (2015), <http://dx.doi.org/10.1016/j.dld.2015.04.005>.

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