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# Helicobacter Pylori Infection Rate Decreases in Symptomatic Children: A Retrospective Analysis of 13 Years (1993-2005) from a Gastroenterology Clinic in West Virginia

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*HELICOBACTER PYLORI* INFECTION RATE IN SYMPTOMATIC CHILDREN IN WEST VIRGINIA: A RETROSPECTIVE ANALYSIS OF THE LAST 13 YEARS (1993-2005)

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## ABSTRACT

Background: The rate of *Helicobacter pylori* (*Hp*) is expected to decrease with improved economic conditions. We investigated the annual trend of *Hp* infection rate in symptomatic children referred to the pediatric gastroenterology clinics in Huntington WV., in the last 13 years.

Methods: A retrospective analysis of all children diagnosed endoscopically with *Hp* infection between Jan. 1993- Dec. 2005 at our pediatric gastroenterology clinic, was performed, and the annual infection rate was calculated.

Results: A total of 1743 upper endoscopy reports were reviewed, of which **245??** were diagnosed with *Hp* infection. The mean annual rate was **12.9% (median: 13.3%; range: 7.8-18%)**. A significant decrease in the *Hp* infection prevalence was noted between the first 7 years to the last 6 years of the study period (**2000-2005 vs. 1993-1999; p=0.001**).

Conclusion: The incidence of *Hp* infection in symptomatic children in our clinic is decreasing. A national multi-center study will be needed to assess whether this drop is a local phenomenon or a national trend.

## INTRODUCTION

*Helicobacter pylori* (*Hp*) infection is a very common infectious disease, with an estimated 50% of the world's population being infected (1). A low socioeconomic status, poverty level, and a low hygiene status are recognized as the major risk factors for this infection (2). Concurring with this statement, a higher rate of *Hp* infection was reported in children from the developing countries compared to the developed countries (3). Moreover, with improving economy and socioeconomic conditions, a decrease in *Hp* infection rate is expected. Indeed, relying on serological data available from the last several decades, a decline in the infection rate among asymptomatic children from developed and developing countries was reported (4, 5). Similar data was also reported in adults (6, 7, 8). On the other hand, others (9) reported an increase in the rate of *Hp* infection in American children (Bogalusa project), especially in the African-American ethnic group. Unfortunately, in those studies, the diagnostic test which considered to be the gold standard for *Hp* infection in children (histology; 10, 11), was not used. **Indeed, using the proper diagnostic test, a Japanese study showed a direct relationship between reduction in *Hp* infection and gastric malignancy (12).** To our knowledge, there are no published longitudinal studies from the United States which assess the infection trend in children using histology as the diagnostic test. In the present study, we utilized histology as the test to determine the rate of *Hp* infection in symptomatic children who had upper endoscopy procedure in our clinic during the last 13 years (1993-2005).

## METHODS

### Patient population:

All the pediatric endoscopic procedures, performed between Jan. 1993- Dec. 2005, on symptomatic children, at the gastroenterology clinic, at Marshall University, Huntington, WV. were retrospectively reviewed. Only the first diagnostic upper endoscopic procedures were evaluated for this study. Charts were evaluated for demographic and histological data. To avoid false positive results (RR), the positive *Hp* infection was defined as the presence of *Hp* organisms and inflammation in the gastric mucosa (*Hp*-associated gastritis).

### Endoscopic procedure:

During endoscopic procedures, at least two biopsies from the gastric antrum and/or gastric body were obtained in each procedure to assess the presence of *Hp* organisms. Mucosal inflammation and *Hp* organisms were determined by Hematoxylin-eosin and Giemsa staining, respectively. For all procedures, at least 2 gastric mucosal biopsies were available for histological assessment. All biopsies were read by experienced pathologists. The rapid urease test (CLO-test) data was not included in this study because it was not performed routinely in all patients during the early years of the study period.

### Statistics:

**Tests used and softwares: Microsoft Excel (Office 2000 edition) was used for the graphs, and SAS (Windows V8) was used to perform Chi-Square tests and fit logistic regression models.**

## RESULTS

A total of 1743 first diagnostic upper endoscopic procedures were performed in children between Jan. 1993 and Dec. 2005. ***Hp* infection was identified in 245 (12.26%) children, with an average of 24.5 (range 15-41, CI: 18.8-30.2) cases per year (Table 1).** The male to female ratio was 1.1:1.0, and the mean age was  $9.8 \pm 4.6$  years (median 10.0 years; range: 0.08-20). Reflecting the ethnic distribution in our state (13), the vast majority (>95%) of the children were Caucasian. The annual number of procedures has increased from year to year **(90 to 331 procedures from 1993 to 2002), reflecting the increase in the referral of patients to the physicians' practices.**

### Statistical analysis:

The *Hp*- associated gastritis prevalence between the years 1993 and 1999 showed no obvious deviation from the random fluctuations that one might expect from year to year. A dramatic drop was seen from 2000, followed by a reasonably steady set of prevalence values thereafter (Table 1, Figure 1). Moreover, a significant change was detected between the period from 1993-1999 and the period from 2000-2002 (Chi-square test). In fact, without exception, the

plot indicates prevalence rates consistently higher in the years 1993-1999 compared with the years 2000-2002.

## DISCUSSION

*Helicobacter pylori* infection rate is expected to decrease with the improvement of socioeconomic situation and with a better hygienic condition. Utilizing serology as a marker for *Hp* infection, Previous studies have documented the decrease of *Helicobacter pylori* (*Hp*) infection rate with time (4, 5). Unfortunately, those results may be inaccurate for utilizing non-invasive tests rather than the gold standard test (histology). In the present study, using the “gold standard” test, we found a significant reduction in the disease rate documented by histology between the early and the latter years of the study period (1993-1999 vs. 2000-2005).

The incident of a disease is defined as the number of new patients with the disease diagnosed per time period (Kenneth J. Rothman, Epidemiology-an introduction, 2002, Oxford University Press, Inc. NY, NY). If we consider the number of patients who had upper endoscopy in our clinic as the referenced population, our result demonstrated a decrease in the incidence of *Hp* disease along the study period (from an average of 18%/year in the first 7 years to an average of 8%?/year for the last 6 years of the study period). The reason for this decrease may be related to various explanations including: The economic improvement which occurred during the study period in West Virginia. (2) This findings may be related to the common use of serology as the diagnostic test for *Hp* infection in children by the primary care physicians in West Virginia (16). This practice may result in a decrease number of *Hp* positive children diagnosed in our clinic by histology, and give a false impression of a lower rate of *Hp* infection in our clinic. To our knowledge, this is the first and the only retrospective, longitudinal study from the United States, assessing the rate of *Hp* infection by using histology as the “gold standard”. Nevertheless, it is still unknown whether our findings represent a local phenomenon or may reflect a national trend. Further longitudinal studies from different States will be needed to fully appreciate our results.

In the present study we aimed to assess the overall incident trend of *Hp*-infection in symptomatic children referred to our gastroenterology clinics during the last decade. However, we acknowledge few limitations which may impact on conclusion: (1) the study is a

retrospective study and the data was not controlled for use of medications (PPI, bismuth salts, etc) which may affect histological results. Nevertheless, this factor should be evenly distributed throughout the study period thus, cannot explain the difference in incidence rate observed between the two time periods. (2) The study was confined to symptomatic children only. (3) Due to the ethnic homogeneity of our state, over 95% of our patients were Caucasian and other minorities were not represented. Thus, our finding may not reflect other locations with more diverse population.

In summary, a significant decrease in the rate of *Hp*-infection was noted in the West Virginian children during the years 1993-1999 and 2000-2005. This phenomenon is strengthened by the methodology used in this study (gold standard). We do not know whether the decline of *Hp* infection in children noted in our clinic represents a local or a national trend, and further studies to assess this subject is warranted.

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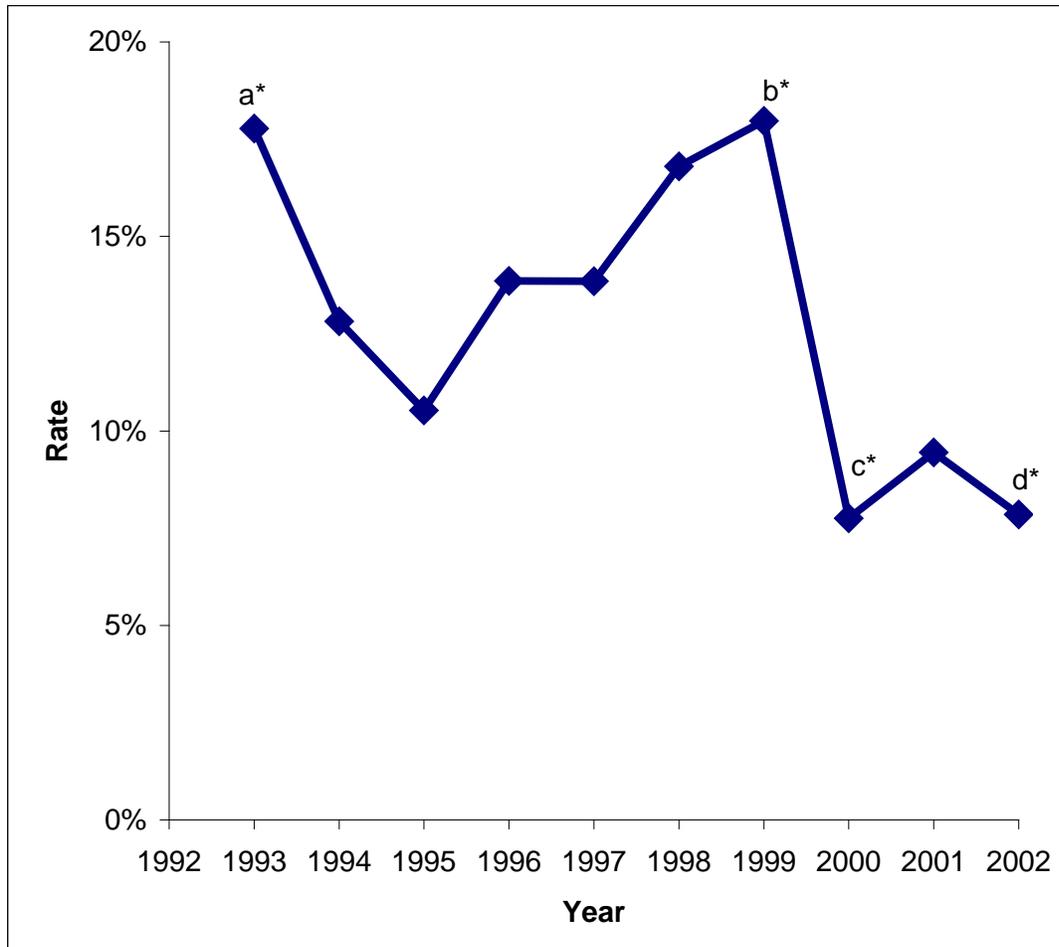
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**Table 1: Hp-Associated Gastritis Annual Rates**

<b>Year</b>	<b>EGD (No.)</b>	<b>Hp+G+* (No.)</b>	<b>Hp+G+* (%)</b>
1993	90	16	17.8
1994	117	15	12.8
1995	152	16	10.5
1996	166	23	13.9
1997	195	27	13.8
1998	244	41	16.8
1999	217	39	18.0
<b>Combined</b>	1181	177	14.8**
2000	232	18	7.8
2001	254	24	9.4
2002	331	26	7.9
<b>Combined</b>	817	68	8.4**
<b>Total</b>	1998	245	12.3

\*Hp+G+ - *H. pylori* positive, Gastritis positive.

\*\*p-value=<0.00001 (CI: 0.3833-0.6918); Chi square test comparing combined 1993-1999 to combined 2000-2002.

**Figure 1: Hp-Associated Gastritis Annual Rates**

\* p-values

0.43, a compared to b

0.73, c compared to d

<0.00001, ab compared to cd