INTRODUCTION:
The Journal of Bone and Joint Surgery began publishing the level of evidence (LOE) for manuscripts in 2003 [1], requiring authors to better define their research questions and facilitating readers’ data interpretation [2,3]. From 1975 to 2005 the Journal saw a trend towards higher leveled studies [4]. We recently noticed more studies originating from Europe and Asia leading us to hypothesize that significantly more studies are coming from outside of the United States, but also, that the studies originating within the United States are of higher LOE.

METHODS:
All articles published in The Journal of Bone and Joint Surgery (American) in 1980, 1985, 1990, 1995, 2000, 2005, and 2010 were independently evaluated by two reviewers and graded based on country and LOE. For articles published after 2003 we used the level published in the manuscript. All studies that were not Level I-IV evidence were excluded. The data was analyzed with Fischer’s exact test and Pearson’s correlation coefficient.

RESULTS:
One thousand two hundred sixty-one articles were reviewed. There was greater than 99% agreement between the two independent evaluators reviewing LOE. Six articles were evaluated by a third reviewer and a LOE was assigned based on 2/3rds agreement. Eight hundred twenty-one articles met the inclusion criteria (four articles were not included based on discordant evaluations). Thirty-two countries produced the 821 articles. The majority of articles, 618/821 (75.3%), were from North America.

Articles were categorized by publication year and geographic location. In 1980, 91% of the publications in JBJS were from North America (83/91), declining to 57% in 2010 (Graph 1). There has been a significant decrease in the proportion of publications from North America in 2005 and 2010 (p=.03) when compared to the previous 20 years. The overall number of publications from North America appears to be stable (Graph 2). Foreign contributions increased in 2005 and 2010 with Europe and Asia producing more articles in these years (Graphs 1 and 2).

There was a significant increase in the proportion of Level I evidence from 1980 to 2010 (r=.74, p one-tailed=.03 ). When grouped by geographic location (Graph 3), North America trended towards an increase in Level I studies (r=.57, p=.09). There was a significant increase in Level I studies from foreign countries (r=.84, p<.01), with contributions largely from Europe and Asia. There was a significant increase in the proportion of Level II (r=.79, p=.02) and Level III (r=.95, p=.001) evidence studies from 1980 to 2010. A significant increase was observed in North American (Level II: r=.75, p=.03) (Level III: r=.84, p=.01) and foreign groups (Level II: r=.83, p=.01) (Level III: r=.84, p=.01).

The proportion of Level IV studies has been down-trending (r=-.48, p=.14). There has been a statistically significant decrease in Level IV studies originating from North America (r=-.81, p=.01) and statistically significant increase in foreign Level IV studies (r=.70, p=.04).

DISCUSSION:
Consistent with our hypotheses, there has been an increase in the proportion of contributions to JBJS (America) from foreign groups. Over the past 30 years, however, North American groups have produced significantly fewer Level IV studies and have increased the numbers of Level I, II, and III studies. This suggests the online submission process promotes international contributions, and differences in review board policies or expense limitations may permit / prohibit certain projects.

This present study thoroughly evaluated >99% of the clinical publications in JBJS from 1980 to 2010. For more accurate trends, smaller time cohorts and additional orthopaedic journals could be used. Study quality does not necessarily correlate with LOE [5,6], and this should be further evaluated, too.

SIGNIFICANCE:
We demonstrate an international effort towards producing higher leveled orthopaedic literature with direct implications regarding patient care. There is still much room to increase the level (and potentially the quality) of clinical orthopaedic research.