



MP03-07

# Urinary Stone Composition in the United States: Data of 98,043 Urinary Stone Analyses

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## Introduction

Urolithiasis is a common urologic disease, with an estimated incidence of 13% in the United States. Incidence and prevalence of urolithiasis are increasing, which could be attributable to various factors such as medical comorbidities and lifestyle habits. Change in chemical composition of stones has been observed as well. There is a paucity of large-scale data on urinary stone composition in the United States.

## Objective

To present characteristics of urinary stone composition, stratified by age and geographic region in the United States.

## Methods

We obtained compositional analyses for all urinary stones submitted to a reference laboratory from July 15, 2016 to Sept. 29, 2019. Stone composition was determined by integrative crystallography. Stones containing >90% of a particular chemical were classified as purely made of that composition. Data was analyzed using Stata 16 (College Station, Texas) software.

Figure 1

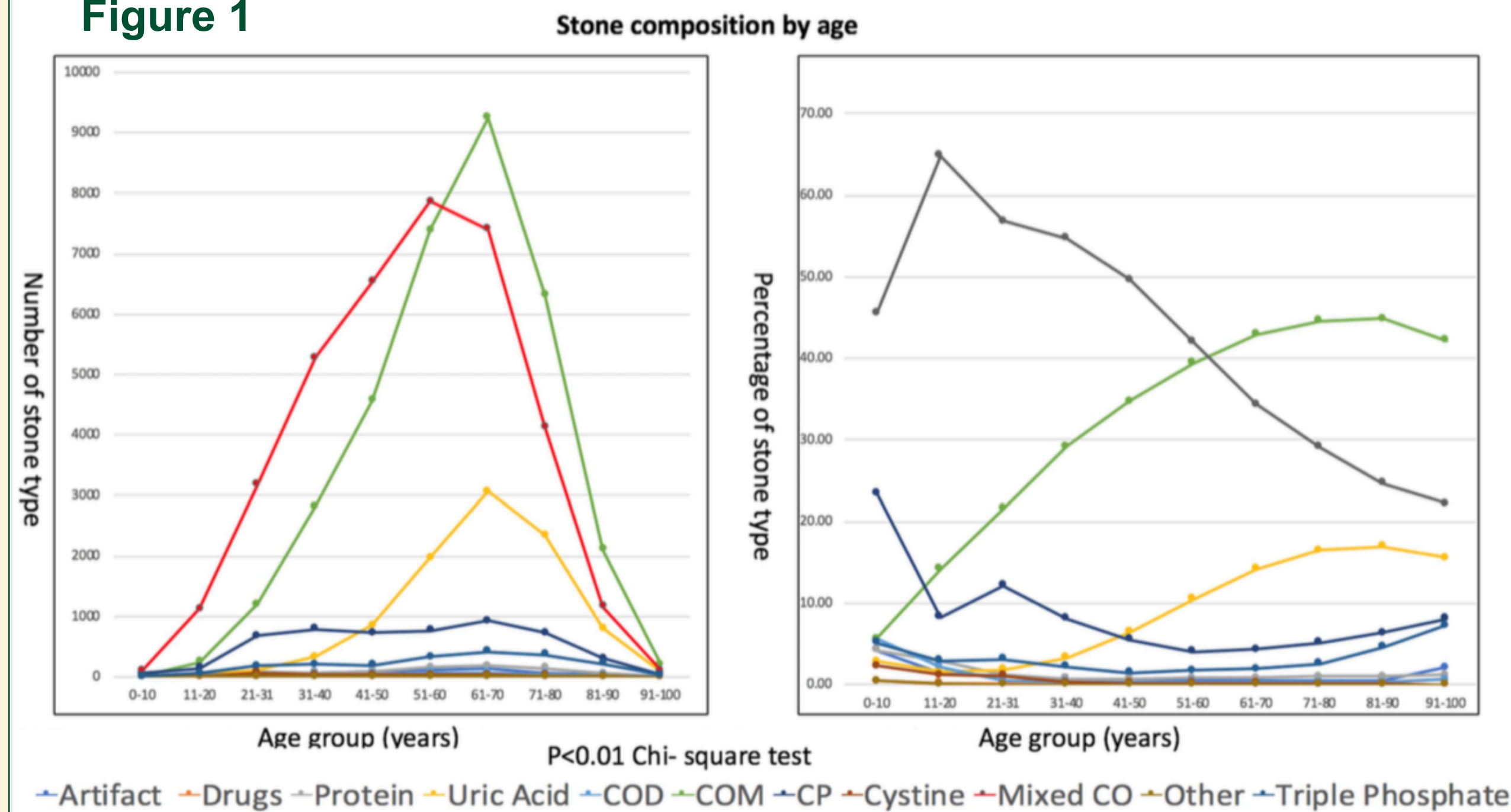


Figure 2

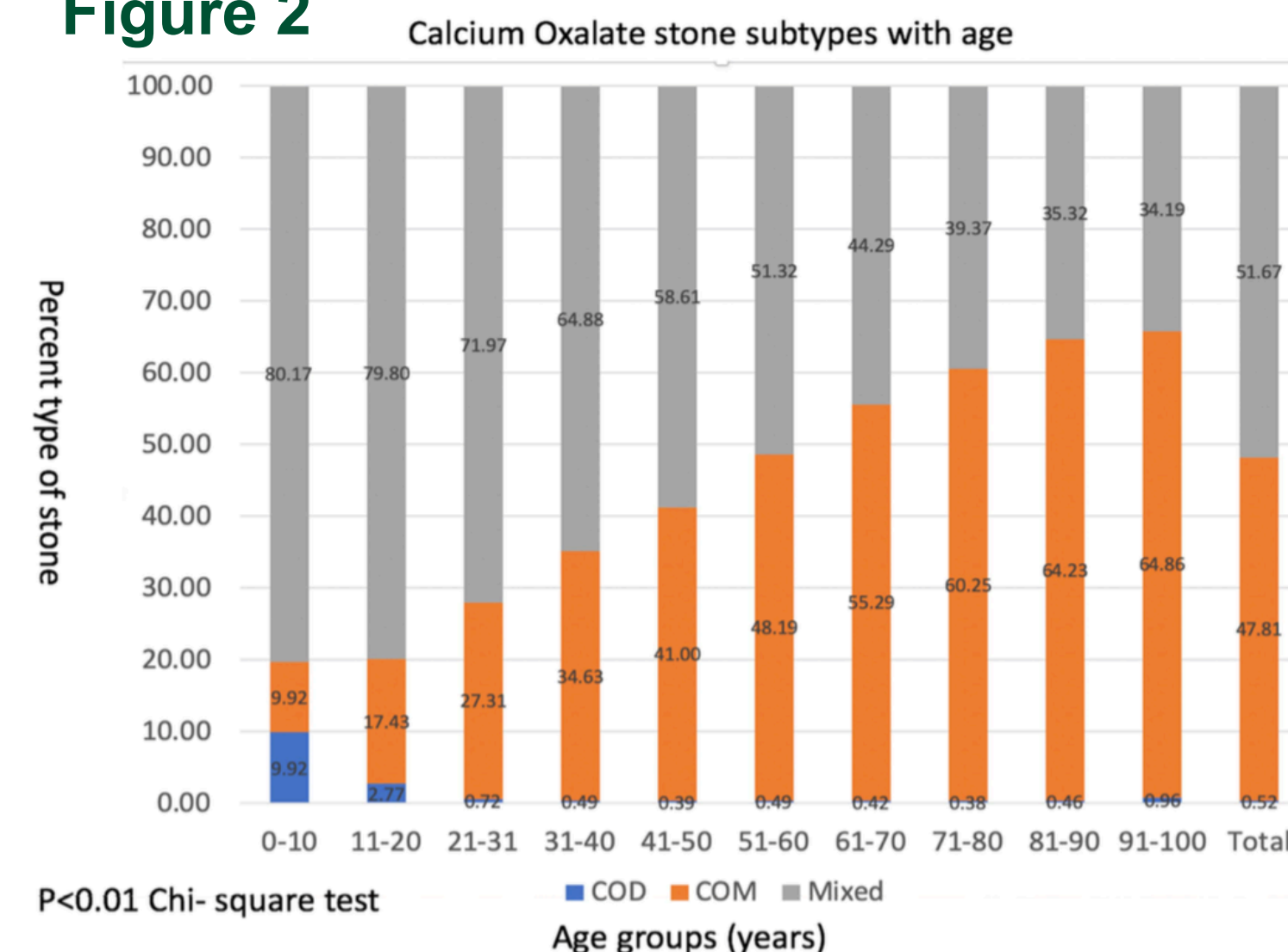
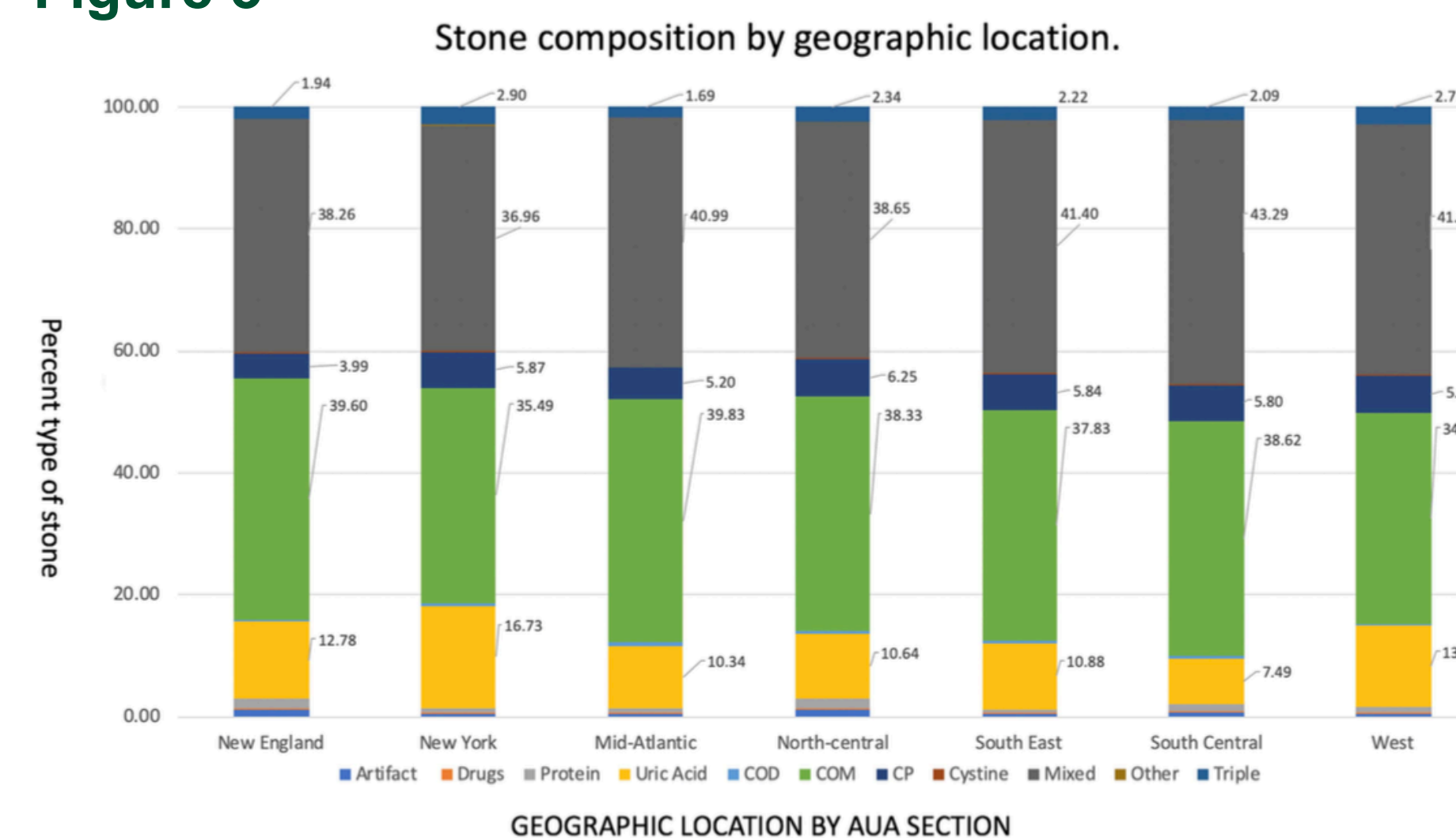


Figure 3



## Results

A total of 99,908 records of stones were analyzed. Of this, 98,043 were categorized as urinary stones and the remaining were non-crystalline physiological particulate matter or artifacts. Common stone types were calcium oxalate (79.33%), uric acid (10.63%), calcium phosphate (5.73%) and triple phosphate (2.22%). Rare variety of stones included predominantly protein (0.93%), cystine (0.26%) and drug induced (0.22%). Incidence of calcium oxalate and uric acid stones increased with age and that of calcium phosphate decreased with age. Amongst patients with calcium oxalate stones, incidence of calcium oxalate monohydrate stones increased with age and that of mixed calcium oxalate and calcium oxalate dihydrate stones decreased with age ( $p<0.01$ ) (Figure 1 and 2). Although the incidence of common stone types was similar, overall association between stone composition and geographical distribution was found to be statistically significant (Figure 3).

## Key of Abbreviations

COM – Calcium Oxalate Monohydrate  
COD – Calcium Oxalate Dihydrate  
Mixed CO – Mixed Calcium Oxalate  
CP – Calcium Phosphate

## Strengths & Limitations

The technique and lab used have high sensitivity and specificity, yielding accurate and reliable information regarding stone composition. Only stones sent for analysis could be analyzed, so spontaneously passed stones or those not collected after intervention are not represented in the data.

## Conclusion:

This series is the largest analysis to date of urinary stone composition in the United States. Age and geographical region were significantly associated with variations in stone composition. Results from this data can be applied to assess etiologies of calculi formation, select appropriate treatment options, and prevent stone recurrence.

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