

Utilizing Electronic Laboratory Reporting Data to Assess the Burden of Hepatitis C in Arizona

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BACKGROUND

An estimated 4 million people in the United States are living with the hepatitis C virus (HCV), attributing to approximately 15,000 liver-related deaths each year. In 1997, HCV became reportable in Arizona and from 1998-2008, HCV data was collected in a statewide surveillance system. However, since 2007, the Arizona Department of Health Services (ADHS) has not had the capacity to conduct complete hepatitis C surveillance and thus monitoring recent HCV trends is difficult. Cases are reported via mail, fax, phone, or electronic laboratory reporting (ELR). A number of commercial laboratories began reporting HCV laboratory results through ELR in 2009. We assessed the use of ELR data to estimate the current disease burden of HCV in Arizona.

METHODS

HCV laboratory results reported through ELR from August 9, 2009 through March 5, 2014 were de-duplicated at the patient level. Cases were classified according to the CSTE/ADHS laboratory case definition*. Descriptive statistics were calculated using SAS version 9.3. As a comparison to the ELR data, HCV data from 1998-2008 was de-duplicated and analyzed.

*Laboratory criteria: HCV RIBA positive; OR

Nucleic acid test (NAT) for HCV RNA positive (including qualitative, quantitative, or genotype testing); OR

Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay as defined by CDC.

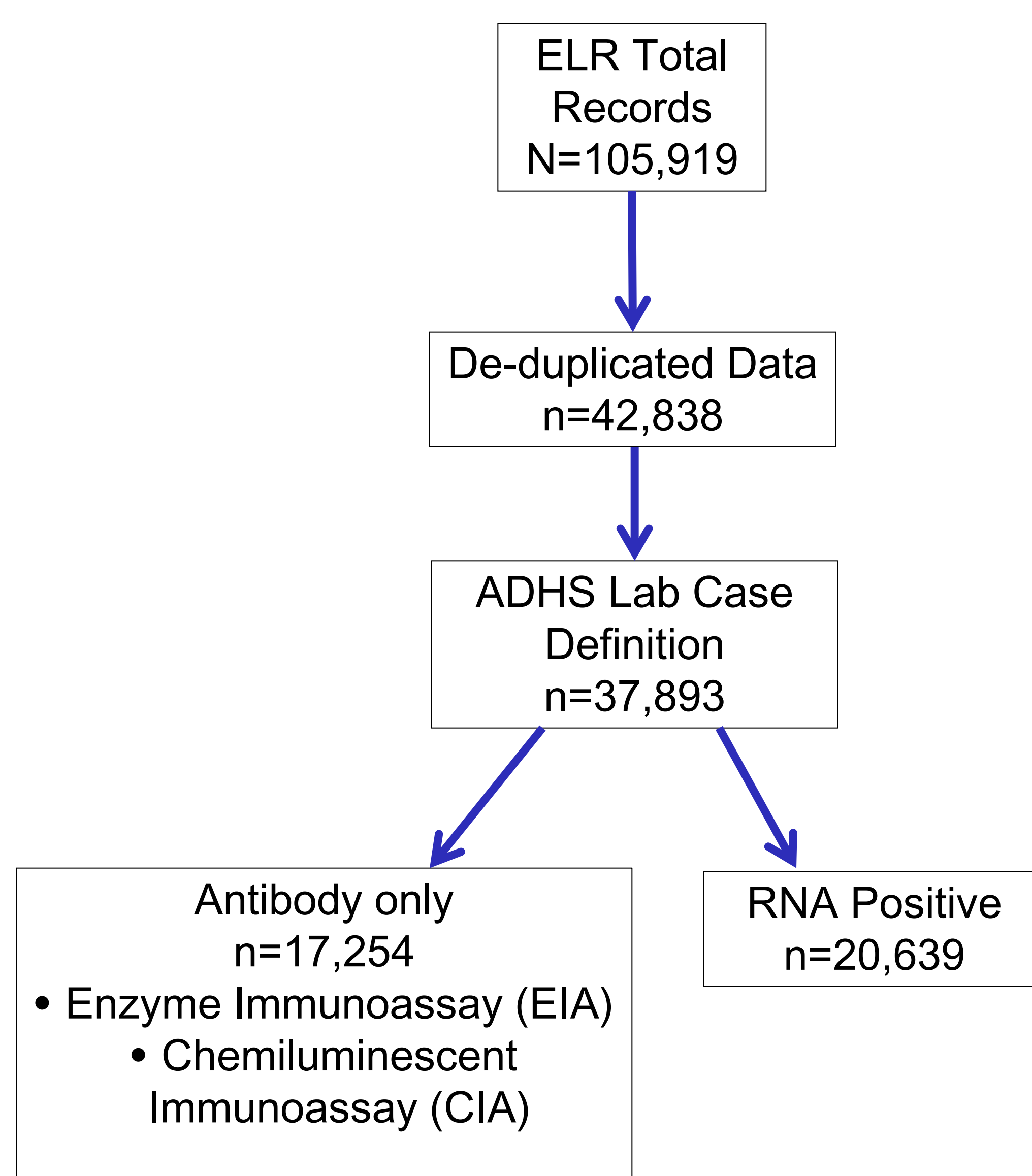


Figure 1. ELR HCV Classification flowchart, 8/2009-3/2014.

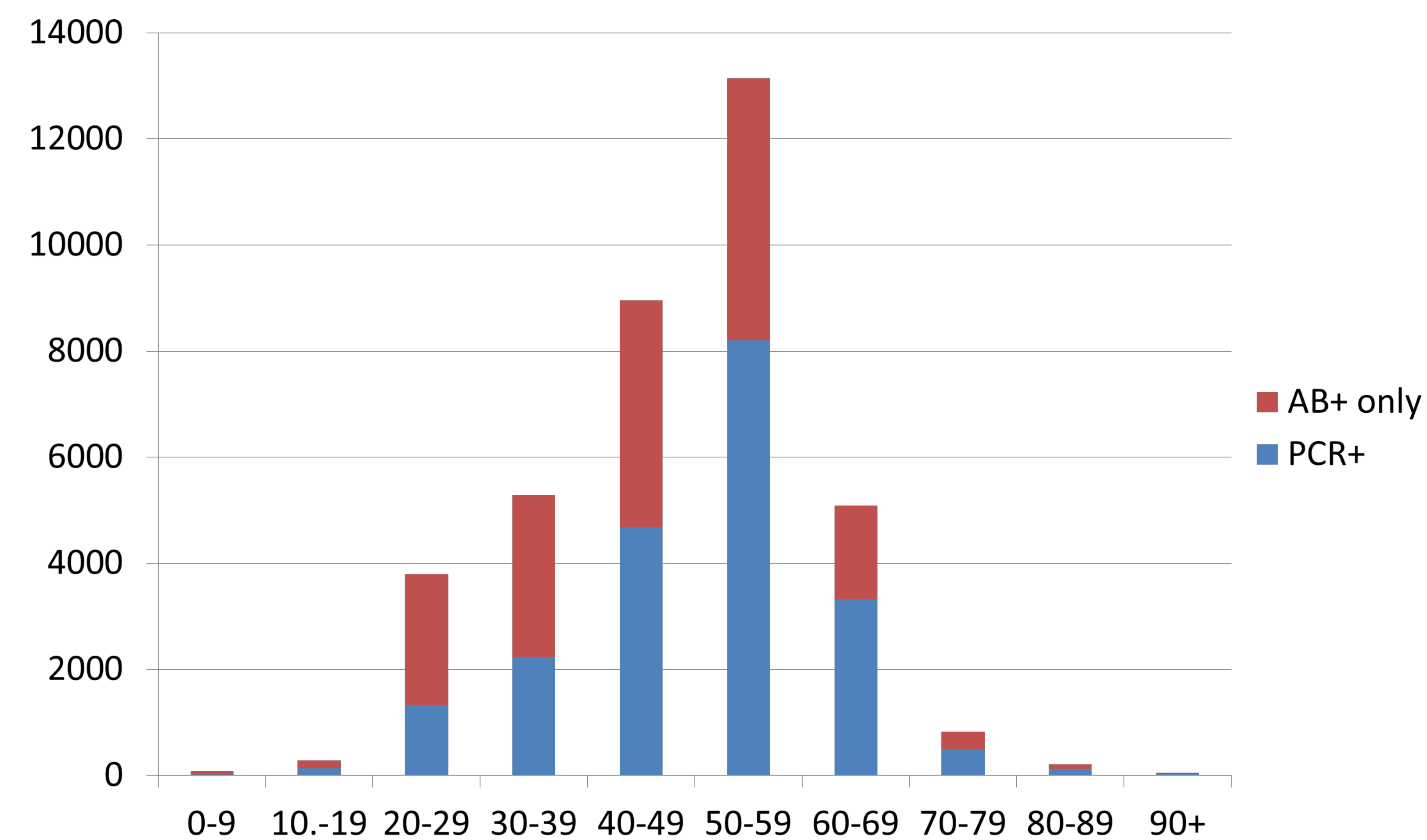


Figure 2. Number of ELR HCV cases by age group, 8/2009-3/2014.

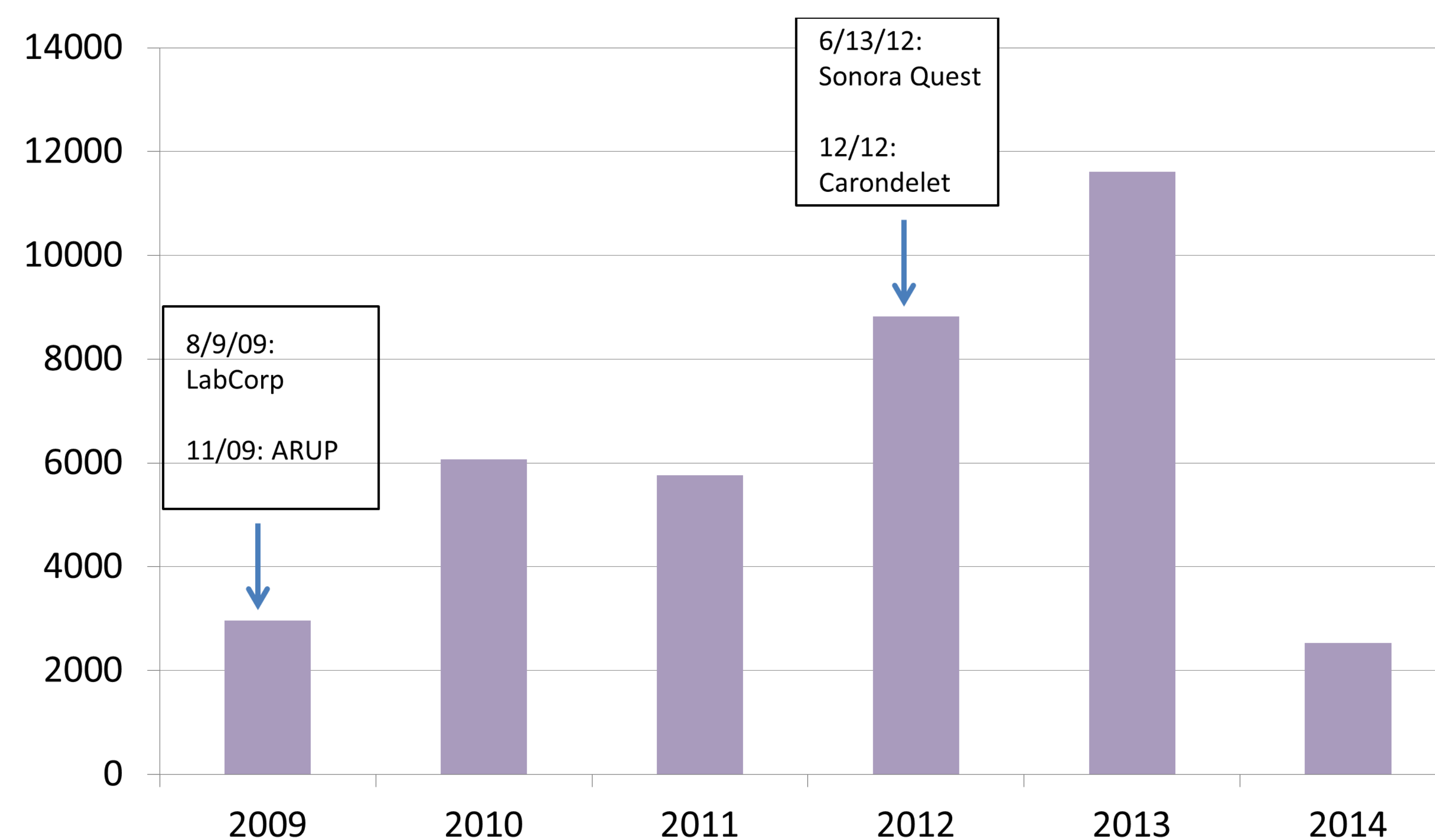


Figure 3. Number of ELR HCV cases by year, 8/2009-3/2014.

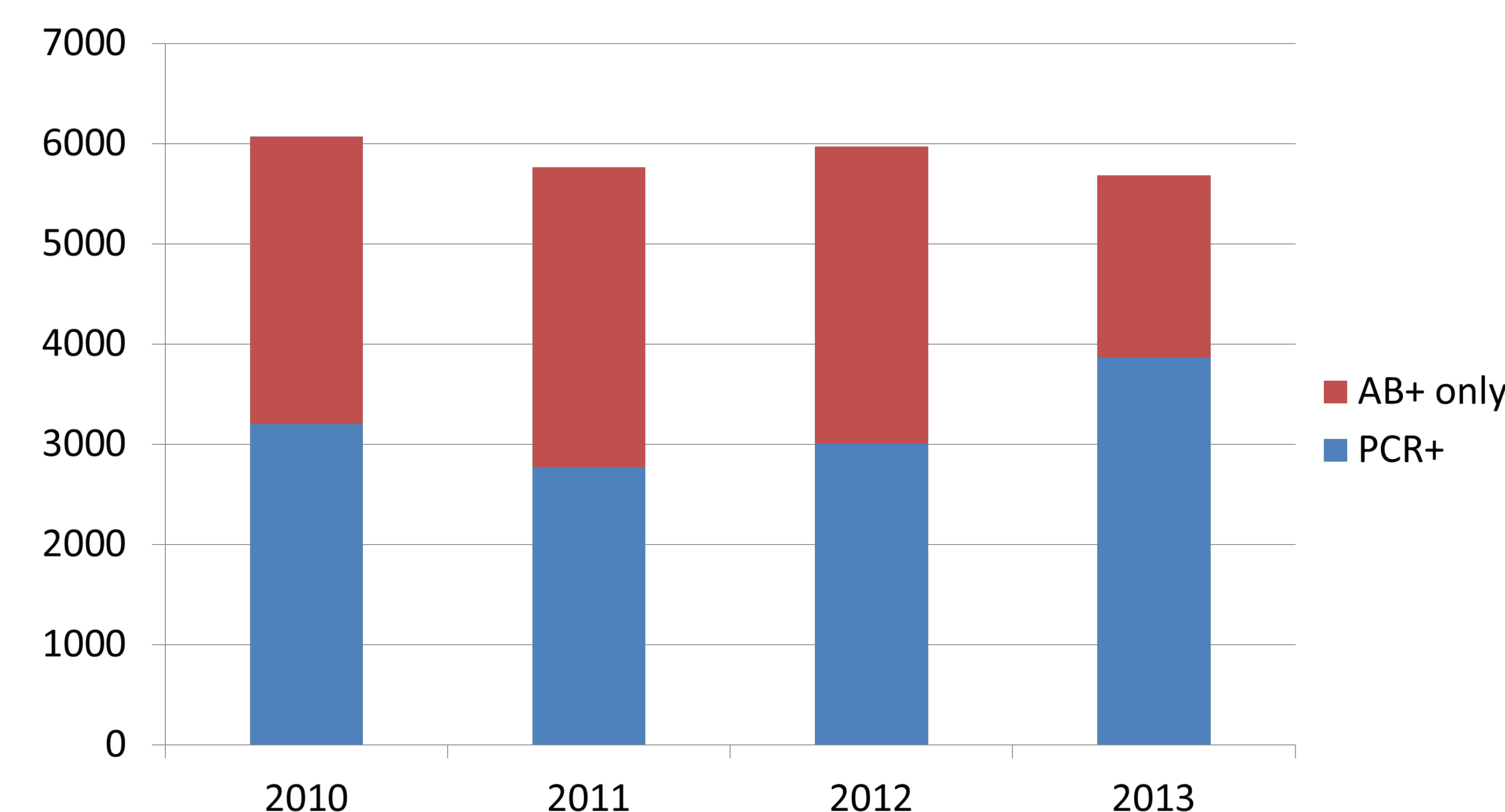


Figure 4. Number of ELR HCV cases by year, ARUP and LabCorp, 2010-2013.

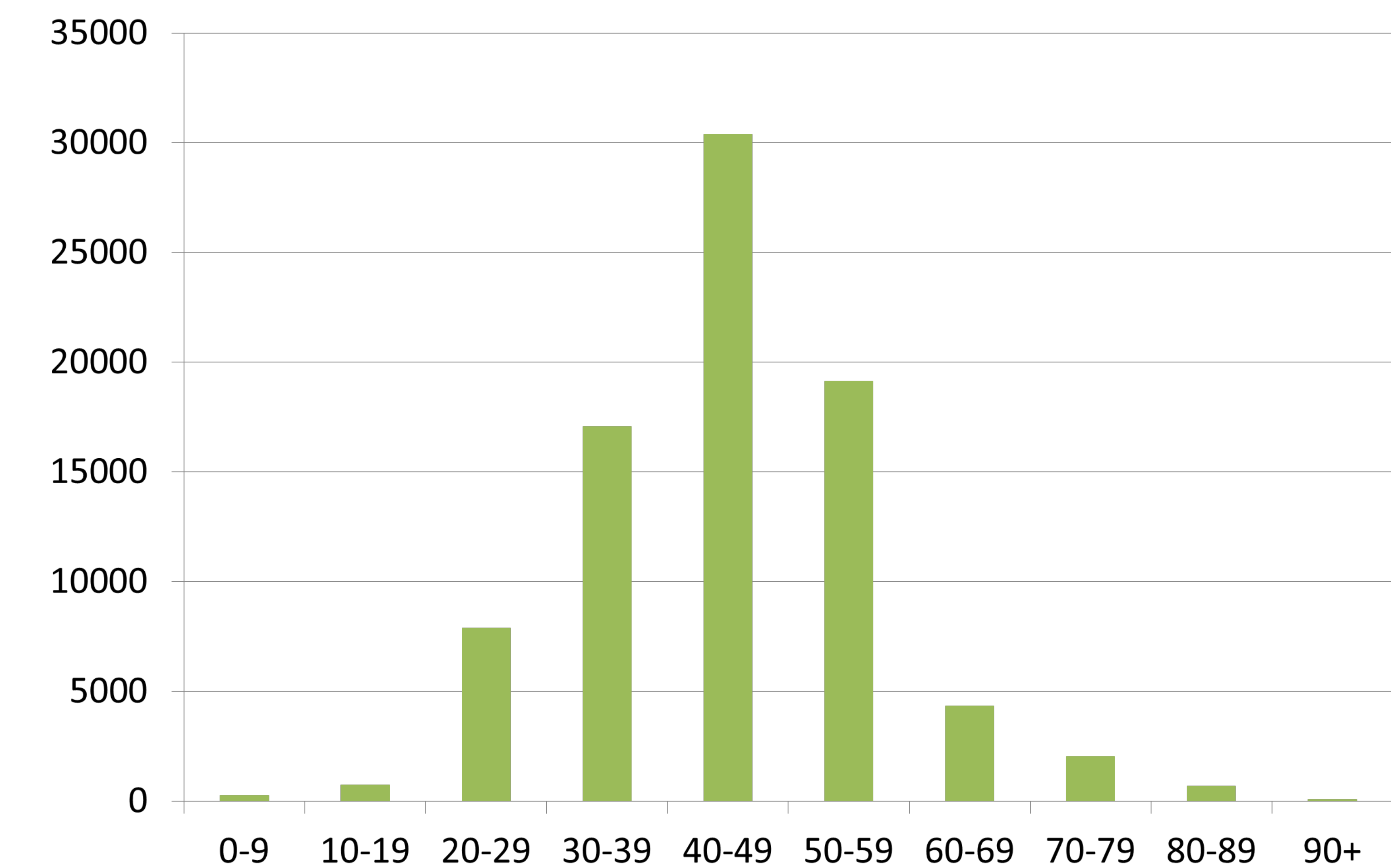


Figure 5. Number of HCV cases by age group, 1998-2008

RESULTS

Demographics.

There were a total of 105,919 HCV ELR records for 42,838 patients. Of these, 37,893 patients met the ADHS laboratory case definition for HCV infection (Figure 1). Sixty-four percent were male. Thirty-five percent of cases were in the 50-59 years old age group (Figure 2). Figure 3 depicts incident and prevalent ELR cases by year. Figure 4 demonstrates the consistency of ELR reports by year when looking at laboratories that began reporting in 2009.

Lab Reports.

17,254 (46%) patients had only antibody tests results. Only 20,639 (54%) patients were confirmed by nucleic acid test (NAT). There were 25,404 positive quantitative PCR results among 16,585 patients. The maximum viral load per patient ranged from 5 IU/mL to over 100,000,000 IU/mL. The median and mean maximum viral loads were 1,170,000 IU/mL and 70,946 IU/mL, respectively. Fifty-eight percent of those with a positive quantitative PCR result had a high maximum viral load (i.e. $\geq 800,000$ IU/mL).

Comparison with 1998-2008 data.

Data reported from 1998-2008 show that 68% of the cases were male and that 37% of cases were in the 40-49 years old age group (Figure 5). Figure 2 and Figure 5 demonstrate the burden of HCV disease amongst the population born between 1945-1965 (baby-boomers).

CONCLUSIONS

Analysis of HCV ELR data indicates a large burden of HCV amongst Arizonans. ELR data alone reflect at least 11,611 HCV incident and prevalent cases reported in 2013 (Figure 3), suggesting that HCV is one of the most commonly reported infectious diseases in the state. In addition, a quarter of the HCV patients reported through ELR had a high viral load. The data indicate the need to educate patients and providers about the importance of confirmatory PCR testing and to link infected persons to care. Preliminary analysis of the 1998-2008 suggest similarities between the two datasets. Analysis of ELR data may provide an alternative source of data to estimate the burden of HCV in Arizona.