Diagnosis of hepatitis C virus infection: An analysis of Massachusetts surveillance data from 2007-2010

Kerri Barton, MPH, Daniel Church, MPH,
Alfred DeMaria, Jr., MD

Bureau of Infectious Disease

Massachusetts Department of Public Health

Methods

- MDPH regulations require all HCV diagnostic laboratory tests to be reported, with the majority of laboratory test results reported electronically.
- Surveillance laboratory data for HCV cases were extracted from the MDPH surveillance system, MAVEN (Massachusetts Virtual Epidemiologic Network), and analyzed using SAS v9.2.
- Cases with an event date between January 1, 2007 and December 31, 2010 were included in this analysis and followed through January 27, 2012.

HCV laboratory testing*

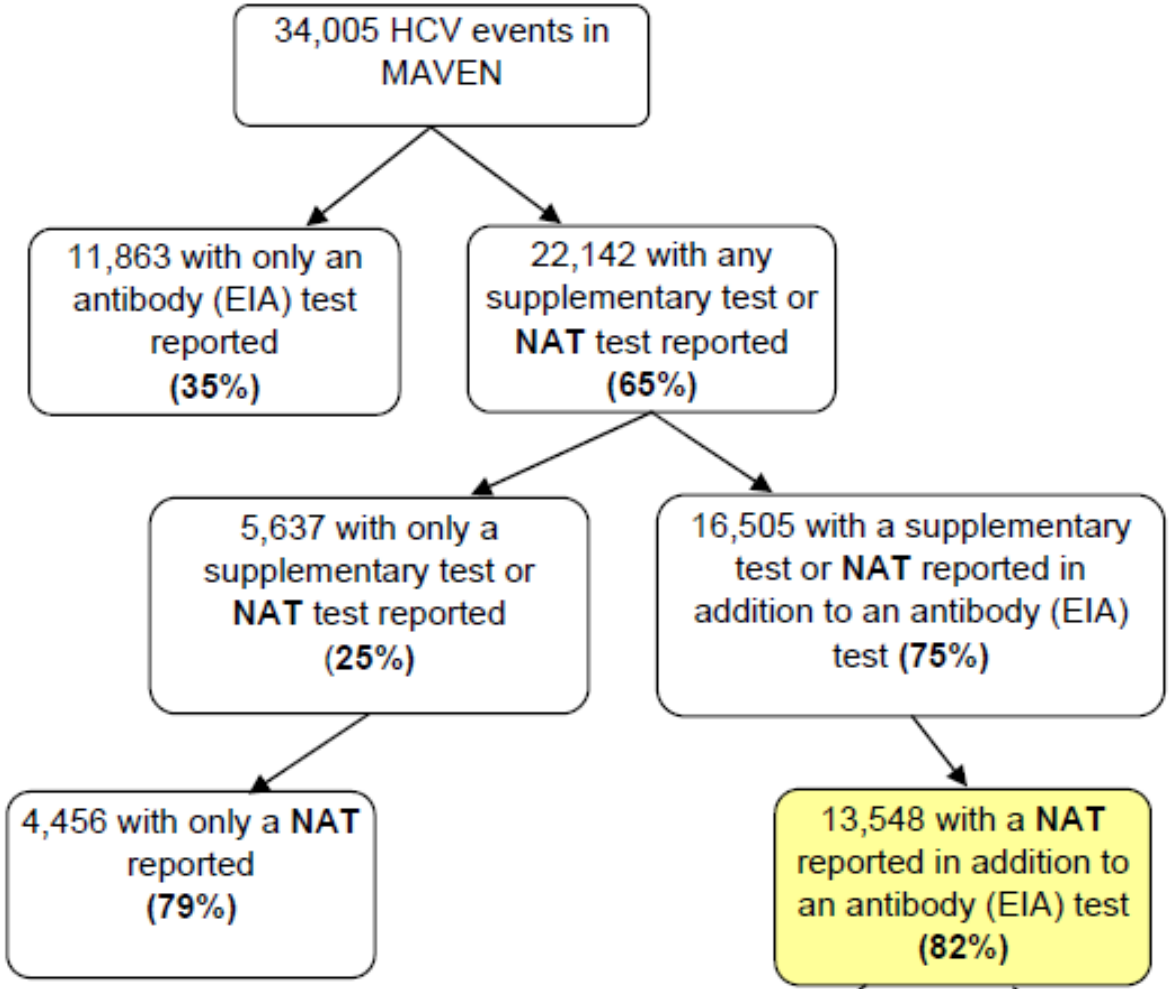
- **Initial testing (detects exposure to hepatitis C virus at one time)**
  - HCV antibody (EIA test)
- **Supplemental testing (confirm exposure to hepatitis C virus at one time)**
  - Signal to cutoff ratio
  - RIBA (Recombinant Immunoblot Assay)
- **Confirmatory testing (confirm active infection with hepatitis C virus)**
  - NAT (Nucleic Acid Testing)
    - RNA, rRNA, viral load
  - Genotyping

***Disclaimer with this analysis: Not all negative confirmatory tests are sent to MDPH**

Methods, cont'd.

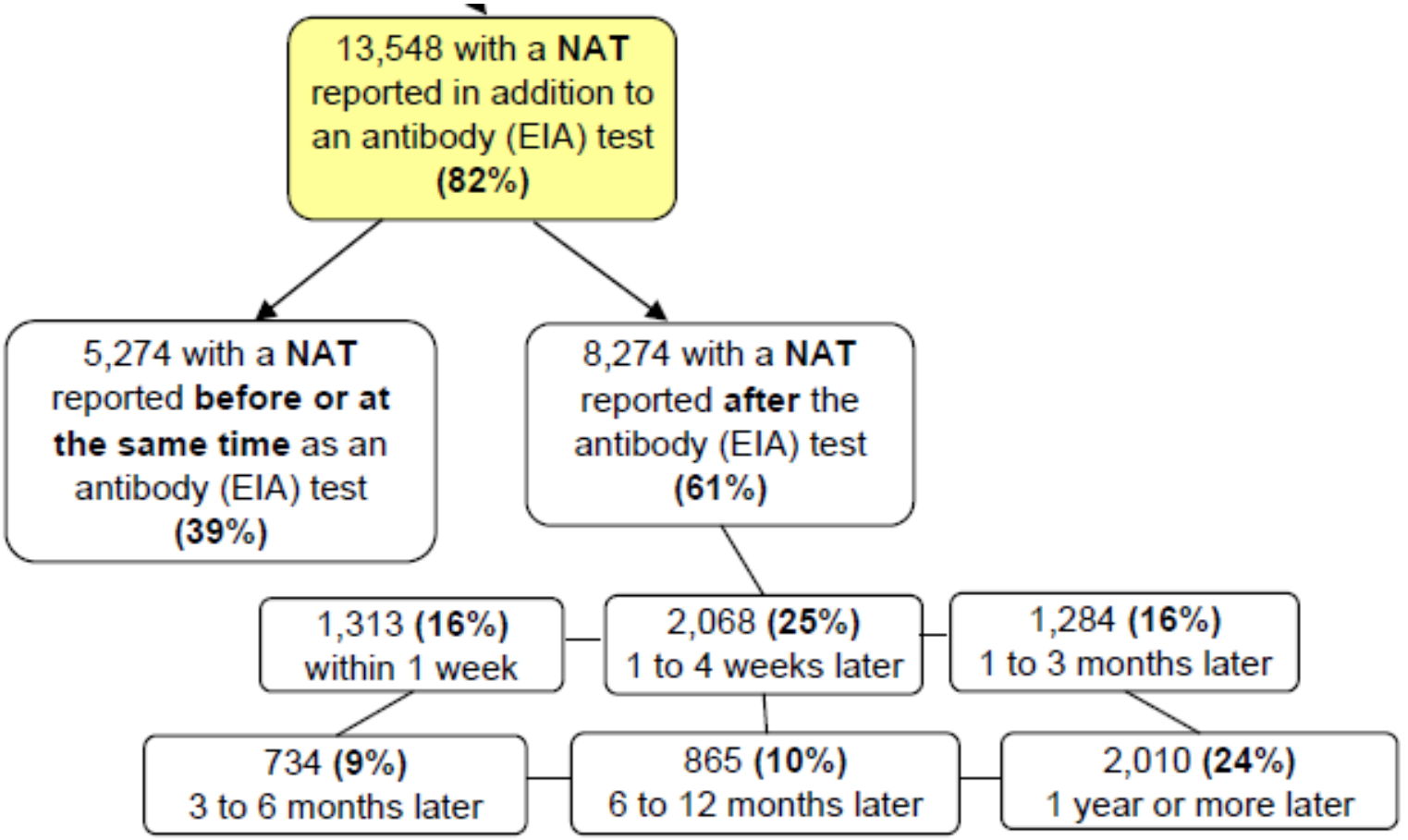
- The time between the first reported antibody test and the first reported Nucleic Acid Test (NAT) was determined for each case, as applicable.
- A multivariate logistic regression model was developed in order to analyze demographic determinants of cases having a reported NAT.

Results: 2007-2010 HCV lab data



Data as of January 27, 2012 and are subject to change

Results: 2007-2010 HCV lab data



Data as of January 27, 2012 , 2012 and are subject to change

Results, cont'd.

- Age ($p<0.0001$), race ($p<0.0001$), and region of the state ($p<0.0001$) were found to be significant predictors of having a reported NAT compared to having only an antibody test reported
- Younger, non-white, non-urban populations in the state were less likely to have a reported NAT compared to older, white, urban residents

Regression analysis results

	Probable only	**Any Nucleic Acid Test**	**OR (95% confidence interval)**
Age group (890 missing)			
0-14	39 (34%)	76 (66%)	1.25 (0.64-2.45)
15-24	1421 (45%)	1714 (55%)	0.52 (0.47-0.59)
25-34	2654 (43%)	3463 (57%)	0.70 (0.63-0.77)
35-44	2257 (38%)	3611 (62%)	0.84 (0.76-0.94)
45-54	2704 (33%)	5538 (67%)	1.00
55-64	1431 (34%)	2772 (66%)	0.94 (0.83-1.05)
65+	623 (48%)	674 (52%)	0.46 (0.38-0.54)
Gender (2,425 missing)			
Female	3835 (37%)	6522 (63%)	1.00
Male	6034 (35%)	11051 (65%)	0.95 (0.89-1.03)

Data as of January 27, 2012 and are subject to change

	Probable only	Any Nucleic Acid Test	OR (95% confidence interval)
Race (13,043 missing)			
White	3878 (29%)	9407 (71%)	1.00
Black	472 (28%)	1192 (72%)	0.87 (0.77-0.99)
Asian	168 (34%)	330 (66%)	0.65 (0.53-0.80)
Other	497 (36%)	880 (64%)	0.75 (0.67-0.85)
Region (5,793 missing)			
1- West	1140 (32%)	2396 (68%)	0.80 (0.70-0.91)
2- Central	1015 (34%)	1993 (66%)	1.25 (1.06-1.47)
3- Northeast	1458 (33%)	2920 (67%)	1.02 (0.90-1.16)
4a- Metrowest Boston area	384 (29%)	941 (71%)	1.23 (1.02-1.50)
4b- Metro Boston area	1082 (34%)	2122 (66%)	1.16 (1.02-1.33)
4c- Boston	1089 (34%)	2149 (66%)	1.00
5- Southeast	2368 (44%)	3017 (56%)	0.50 (0.46-0.56)

Data as of January 27, 2012 and are subject to change

Conclusions

- The high number of HCV infections reported to MDPH indicates substantial screening and testing efforts by medical providers
- For 47% of reported cases an NAT was not reported, indicating that these cases may not have received appropriate confirmatory testing for HCV infection

Disparities

- Demographic analyses suggest that there are disparities among populations across the state
- HCV provider education is needed, with a focus on appropriate diagnosis to address disparities related to age, race and geography

Contact information

Daniel Church
Daniel.church@state.ma.us
617-983-6830

Kerri Barton
kerri.barton@state.ma.us
617-983-6876