# Increasing Hepatitis C Virus (HCV) Screening and Confirmatory Testing in the Birth Cohort in a Large Integrated Health System

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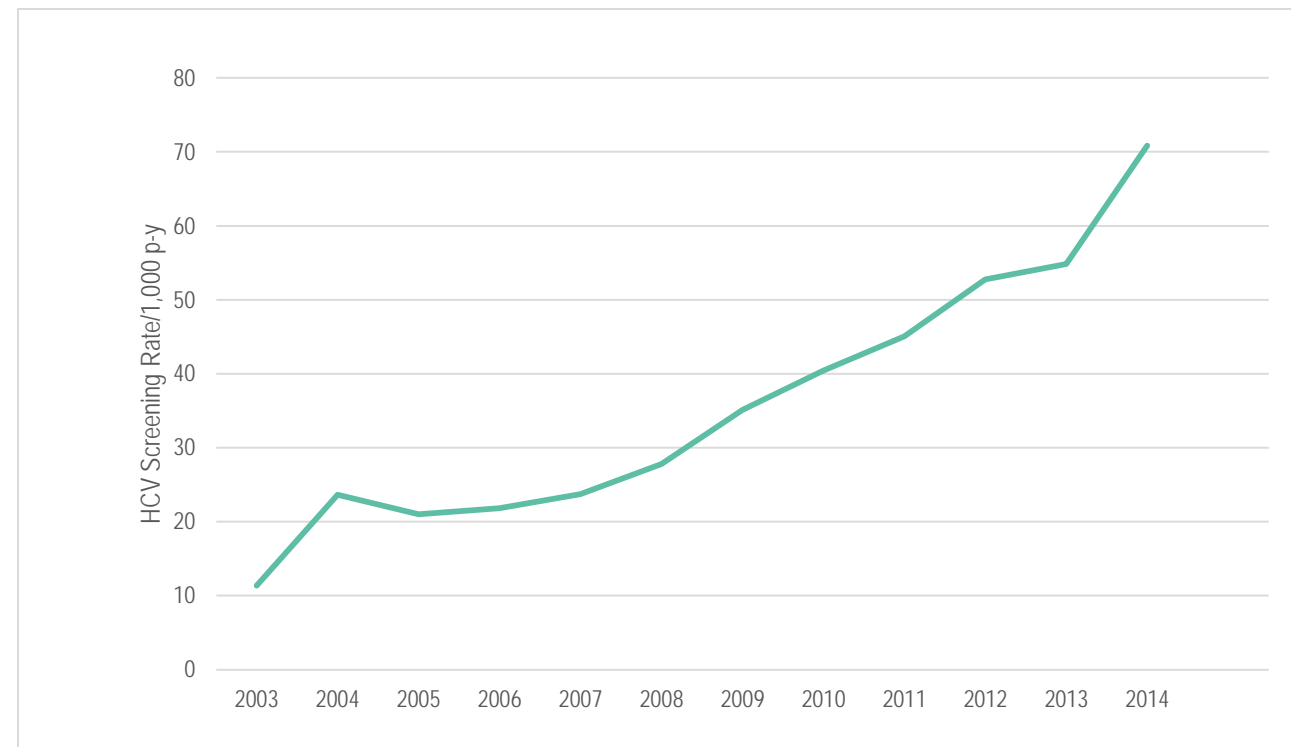
Objective: Describe trends in screening and confirmatory testing in Kaiser Permanente Mid-Atlantic States (KPMAS) relative to the 2013 release of the U.S. Preventative Services Task Force "birth cohort" (born 1945-1965) screening recommendations. A prior study described screening prevalence of 15.8% from 2003-2012.

Methods:

- Cohort study, patients ≥ 18 yrs with ≥8 months of enrollment from 1/1/2003-12/31/2014 and ≥1 clinical visit.
- Annual screening rate estimated as the number antibody (Ab) tested per persons enrolled each year.
- Survival methods used to describe factors associated with time to Ab testing.
- Stratification by Service Area, interactions with time and robust standard errors to address non-proportional hazards.
- Among Ab+, we describe the cumulative probability and predictors of confirmatory RNA or genotype testing.

665,345 enrolled 1/1/2003- 12/31/2014

123,572 (18.6%) Ab tested → **4,242** (3.4%) Ab+

3,563 (84%) RNA tested → **3,559** (99.9%) RNA/Genotype +

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1. KPMAS Pop 2003-2014

Total KPMAS Pop	Not Birth Cohort	Birth Cohort
665,345	404,522	260,823
Age at Enrollment, mean (sd)	37.5 (17.1)	49.5 (6.53)
Median Household Income[1], mean (sd)	82559.59 (36599.65)	86366.32 (38527.86)
Race[2]		
Black,%	35.3%	36.4%
American Indian/Alaskan Native	0.2%	0.2%
Asian/Pacific Islander	9.8%	9.5%
Hispanic	12.0%	10.9%
Multi-Racial	1.8%	1.8%
White	40.8%	41.2%
Sex, % (n)		
Female	58.1% (235035)	55.0% (143450)
Male	41.9% (169487)	45.0% (117373)
HBV+, % (n)	0.5%(2080)	0.6% (1521)
HIV+, % (n)	0.5% (2051)	0.8% (2032)
Seen by GI/ID (ever), % (n)	11.2% (45400)	16.1% (41920)
MSM, % (n)	1.6% (1101)	1.6% (720)
Illicit Drug Use (ever), % (n)	<0.1%(28)	<0.1%(50)
Elevated ALT[3], % (n)	2.4%(9548)	4.5% (11790)

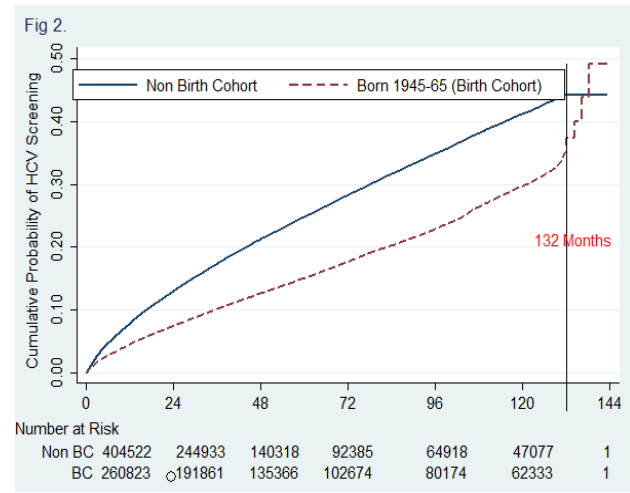1 Derived from 2013 US Census; *U.S. Census Bureau, 2013 American Community Survey.

2 Race from self-report; missing values imputed using the Bayesian Improved Surname Geocoding Algorithm (Elliott, M. et.al. (2008); *Health Services Research*, *43*(5 Pt. 1), 1722-1736.)

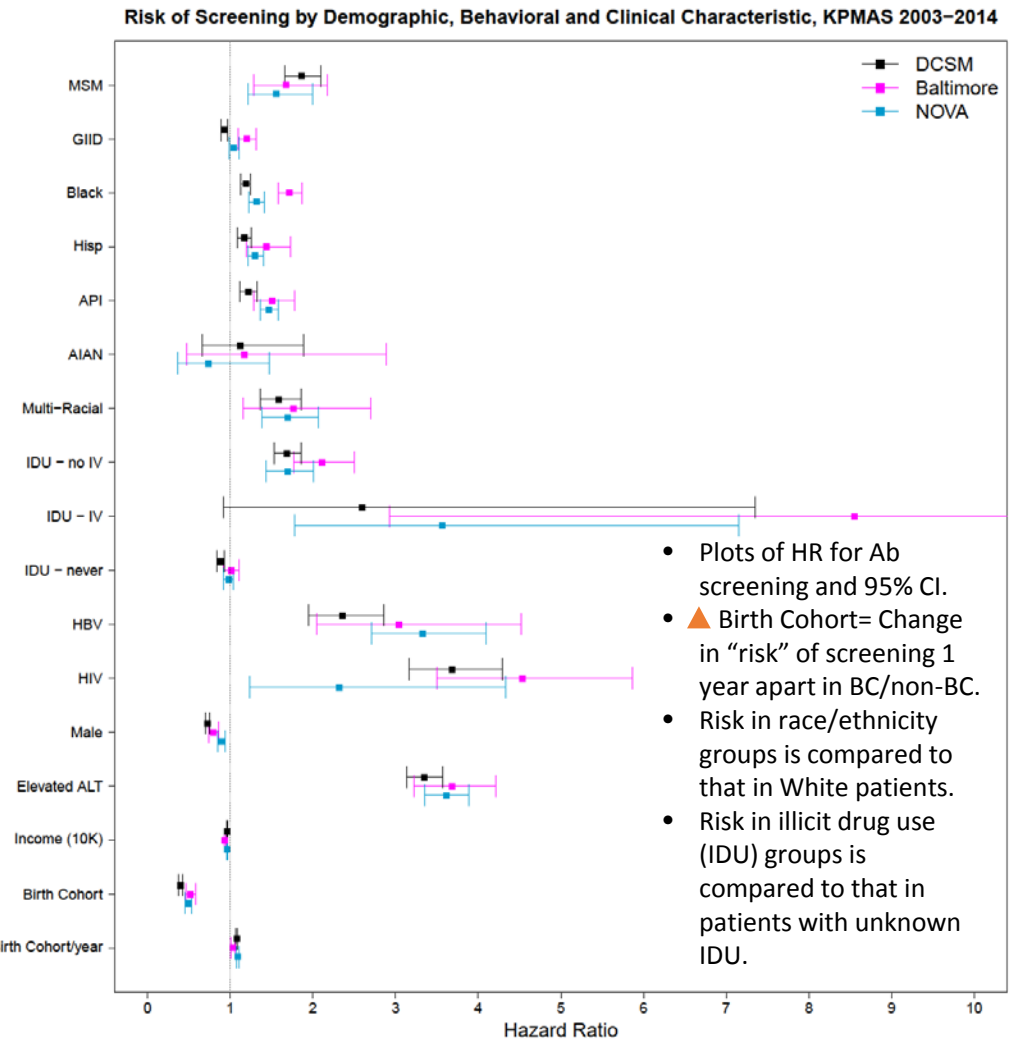3 Alkaline Amino Transferase; elevated = 2 consecutive measures >60 IU/L

2. Screening rates increased over time.
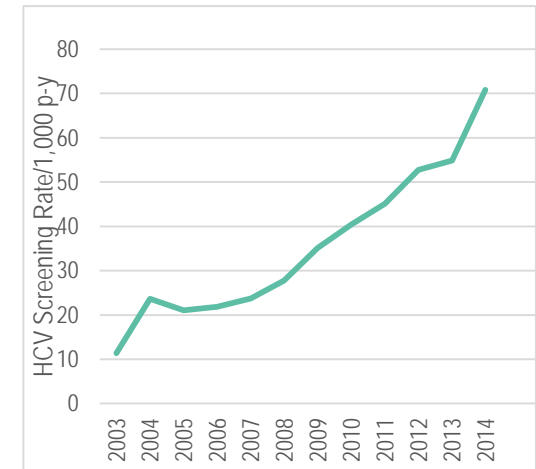
3. By 120 months, **66%** of the non-birth cohort population was left unscreened; compared to **74%** of the birth cohort.

Fig 2.

Number at Risk						
Non BC	404522	244933	140318	92385	64918	47077	1
BC	260823	191861	135366	102674	80174	62333	1

4. Although patients in the birth cohort had a lower screening rate, their **risk of screening increased faster over time** compared to those in the non-birth cohort. Other important predictors of screening included female sex, MSM, Black, Hispanic and Asian Race, IDU, HBV and HIV co-infection, and elevated ALT.

Risk of Screening by Demographic, Behavioral and Clinical Characteristic, KPMAS 2003–2014

- Plots of HR for Ab screening and 95% CI.
- ▲ Birth Cohort= Change in "risk" of screening 1 year apart in BC/non-BC.
- Risk in race/ethnicity groups is compared to that in White patients.
- Risk in illicit drug use (IDU) groups is compared to that in patients with unknown IDU.

5. Among Ab+, 84% received confirmatory testing.

- No significant differences by service area, race (except Asian/PI 50% more likely to be tested), history of drug use, MSM or HBV/HIV status. **Elevated ALT** (aHR=1.13; 95% CI: 1.02, 1.25) was **positively associated with confirmatory testing.** A total of **2.9%** of the screened population had **confirmed HCV**.

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Conclusion:

- High screening prevalence, yet >16% of Ab+ were not confirmed.
- Higher screening rate in non-birth cohort underscores continued focus on risk-based screening.
- Increased screening rate over time in birth-cohort suggests shift.
- More time is needed to confirm this trend, which is part of overall strategy aided by the advent of new DAAs and increased screening outreach.