unintended consequences that may result from the unselective application of this performance measure,[7,8] it may be prudent to explore metrics that also assess medication overuse to avoid treating those at higher risk for adverse consequences of therapy.

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Analysis and interpretation of data: Dharmarajan, Masoudi, Spertus, Li, Krumholz.
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Editor's Note

Performance Measures: Better Outcomes, Not Better Grades

Performance measures are widely used with the goal of improving care of patients with heart failure and other illnesses. This study by Dharmarajan et al illustrates that performance measures may sometimes have unintended consequences. The authors show that in the enthusiasm to achieve the measure of placing patients with heart failure on β-blocker therapy at hospital discharge, many patients who should not receive β-blockers are getting them, while others who meet the criteria are not. It is likely that there was more thoughtful discussion and decision making behind these decisions that is not captured in administrative data used for this analysis. However, it must also be remembered that the purpose of performance measures is to improve patient care, not to get high grades. Too much focus on meeting a target can distract us from the care of the whole patient.

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Hepatitis C Virus Screening and Prevalence Among US Veterans in Department of Veterans Affairs Care

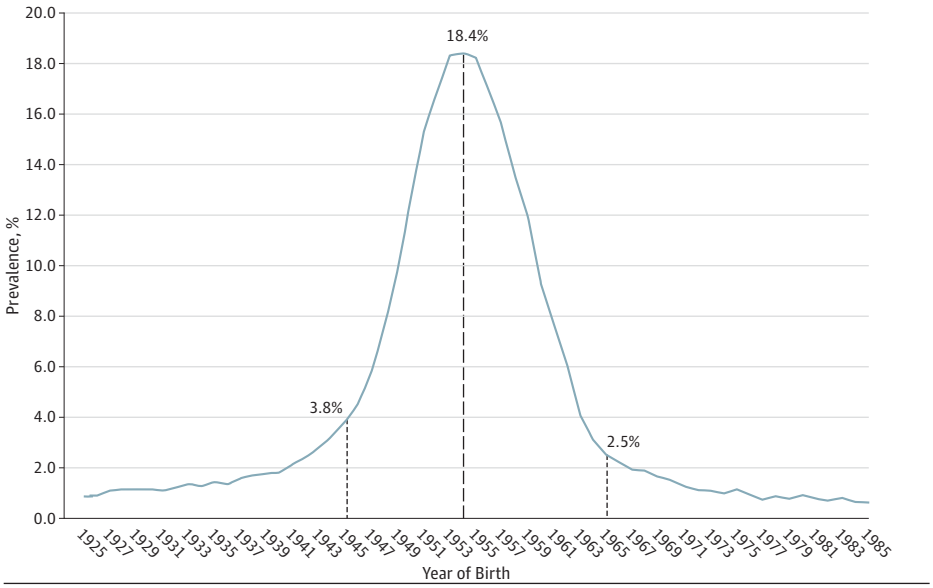
From 2.7 to 3.9 million Americans are living with hepatitis C virus (HCV) infection, and 45% to 85% are unaware they are infected.[1-4] In August 2012, the Centers for Disease Control and Prevention (CDC) began recommending 1-time HCV screening for persons born from 1945 through 1965 because

Table. Prevalence of Anti-HCV and HCV Infection in the Veteran Population in VA Care in 2011

Birth Year Cohort	Anti-HCV Screening	Anti-HCV	Anti-HCV Prevalence, %	HCV Infection Testing	HCV Infection	HCV Infection Prevalence, %
National (all cohorts combined)	2 821 410	238 406	8.4	2 862 972	177 903	6.2
<1945	850 413	24 959	2.9	873 797	14 927	1.7
1945-1965	1 519 587	205 202	13.5	1 532 686	157 830	10.3
>1965	451 363	8239	1.8	456 439	5142	1.1
Women						
<1945	14 716	353	2.4	14 803	182	1.2
1945-1965	93 739	6564	7.0	94 433	4569	4.8
>1965	81 345	1150	1.4	81 986	603	0.7
Total	**189 800**	**8067**	**4.3**	**191 222**	**5354**	2.8
Men						
<1945	835 696	24 606	2.9	858 993	14 745	1.7
1945-1965	1 425 841	198 637	13.9	1 438 246	153 260	10.7
>1965	370 014	7088	1.9	374 449	4538	1.2
Total	**2 631 551**	**230 331**	**8.8**	**2 671 688**	**172 543**	6.5
American Indians/ Alaska Natives						
<1945	4801	177	3.7	4798	102	2.1
1945-1965	16 167	1835	11.4	13 131	1312	10.0
>1965	4293	106	2.5	4293	59	1.4
Total	**25 261**	**2118**	**8.4**	**22 222**	**1473**	6.6
Asians						
<1945	5354	102	1.9	5361	47	0.9
1945-1965	9943	493	5.0	9956	341	3.4
>1965	7373	75	1.0	7385	38	0.5
Total	**22 670**	**670**	**3.0**	**22 702**	**426**	1.9
Blacks						
<1945	86 743	6941	8.0	86 721	5141	5.9
1945-1965	332 479	68 090	20.5	330 328	56 722	17.2
>1965	92 748	1374	1.5	93 052	701	0.8
Total	**511 970**	**76 405**	**14.9**	**510 101**	**62 564**	12.3
Hispanics						
<1945	33 149	2039	6.2	56 123	1450	2.6
1945-1965	84 933	15 073	17.7	101 099	11 791	11.7
>1965	42 836	801	1.9	47 076	514	1.1
Total	**160 918**	**17 913**	**11.1**	**204 298**	**13 755**	6.7
Native Hawaiians/ Pacific Islanders						
<1945	5858	170	2.9	5870	92	1.6
1945-1965	10 308	1129	11.0	10 326	852	8.3
>1965	3685	50	1.4	3696	24	0.6
Total	**19 851**	**1349**	**6.8**	**19 892**	**968**	4.9
Whites						
<1945	623 125	13 830	2.2	623 467	7244	1.2
1945-1965	846 463	108 462	12.8	945 582	79 641	8.4
>1965	261 984	5370	2.0	262 386	3564	1.4
Total	**1 731 572**	**127 662**	**7.4**	**1 831 435**	**9449**	4.9
Other ethnicity						
<1945	25 280	576	2.3	25 291	313	1.2
1945-1965	36 384	3639	10.0	36 371	2666	7.3
>1965	9596	184	1.9	9615	107	1.1
Total	**71 260**	**4399**	**6.2**	**71 277**	**3086**	4.3

Abbreviations: HCV, hepatitis C virus; VA, US Department of Veterans Affairs.

Figure. Prevalence of Hepatitis C Virus Infection by Birth Year



this group encompasses 75% of those infected.[5] We assessed the extent to which veterans, particularly those born during the 1945-1965 period, were screened for HCV and estimated HCV prevalence.

Methods | This retrospective cohort analysis used the US Department of Veteran's Affairs (VA) Corporate Data Warehouse, which includes VA laboratory test results from October 1, 1999, onward. The cohort includes veterans with at least 1 VA outpatient visit in 2011. We accepted HCV antibody, viral load, and genotype tests as evidence of screening and calculated rates as of December 31, 2011. Confirmatory RNA testing counted genotype or viral load testing for those with positive antibody test results. Anti-HCV prevalence and HCV infection prevalence were estimated from those veterans with informative laboratory results.

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Results | A total of 5 415 084 veterans had VA outpatient visits in 2011, and 2 889 385 (53.4%) had VA HCV screening. The HCV screening rate was 40.6% for those born before 1945, 63.5% for those born during the 1945-1965 period, and 57.0% for those born after 1965 (eTable in the Supplement). The confirmatory RNA testing rate was 94.7% overall (eTable in the Supplement). Anti-HCV prevalence in over 2.8 million veterans was 8.4% and varied by birth cohort (**Table**). Prevalence of HCV infection was 6.2% and varied by birth cohort: 1.7% for those born before 1945, 10.3% for those born during the 1945-1965 period, and 1.1% for those born after 1965 (Table). By birth year, HCV infection prevalence peaked at 18.4% in those born in 1954 (**Figure**). Prevalence of HCV infection was higher in men (6.5%) than in women (2.8%) and was highest in blacks (12.3%), followed by Hispanics (6.7%) and American Indians/Alaska Natives (6.6%). Within each sex and race/ethnicity group, HCV infection prevalence was highest in those born during the 1945-1965 period, much lower in those born before 1945, and generally lowest in those born after 1965. Among men born from 1945 through 1965, prevalence ranged from 18.2% in blacks to 3.5% in Asians (eFigure 1A in the Supplement); although prevalence in black women was highest (5.7%), prevalence was appreciably lower with less variation across race/ethnicity subgroups in women (eFigure 1B in the Supplement).

Discussion | Among 5.4 million veterans, which represents the entire Veteran population in VA care and laboratory results spanning 12 years, over half of the entire cohort and two-thirds of those born during the 1945-1965 period had VA HCV screening prior to the updated CDC recommendation. In this highly screened population, anti-HCV prevalence (8.4%) was higher than the previous estimate for the veteran population (5.4%), likely due to the increasing proportion of the high prevalence in the 1945-1965 cohort over time.[6] Anti-HCV prevalence in the 1945-1965 birth cohort (13.5%) was markedly higher than in veterans born before (2.9%) or after (1.8%) and was 4 times higher than the 3.25% anti-HCV prevalence for this birth cohort from NHANES data (National Health and Nutrition Examination Survey).[5] As expected from the elevated anti-HCV prevalence, HCV infection prevalence was elevated in the veteran 1945-1965 birth cohort (10.3%) compared to other veteran birth cohorts and well above the estimated 2.4% prevalence in this birth cohort in the general US population.[5] This high HCV infection prevalence in the 1945-1965 birth cohort substantiates the disproportionate disease burden that underpins the CDC recommendation for birth cohort screening and supports the birth cohort emphasis. The observed high HCV infection prevalence—relative to prior VA estimates and general population

estimates—serves as a reminder of the greater HCV disease burden in the veteran population. Given the high HCV infection prevalence, full adoption of birth cohort screening may reveal substantial numbers of veterans with previously unknown HCV infection.

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Reference Laboratory Values for Digoxin Following Publication of Digitalis Investigation Group (DIG) Trial Data

The translation of new findings into clinical practice is an ongoing challenge for physicians and health systems. The definition of a reference range for serum digoxin concentration (SDC) in patients with heart failure provides an example in which published data have not been incorporated into laboratory practice, which as a result may have an adverse impact on clinical care.

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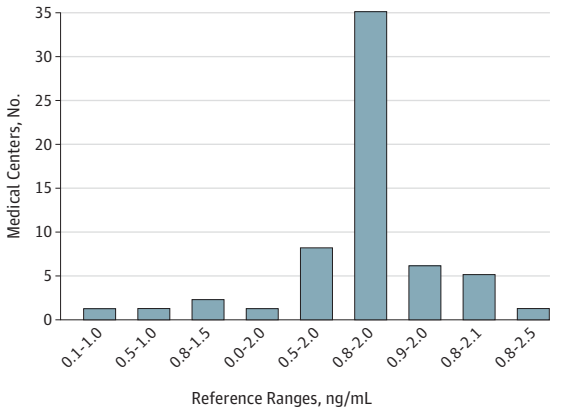
Specifically, in a post hoc analysis from the Digitalis Investigation Group (DIG) heart failure trial, higher mean SDCs were associated with increased mortality; the optimal therapeutic range for clinical benefit among men with a left ventricular ejection fraction of less than 45% was 0.5 to 0.8 ng/mL.[1] A second analysis indicated that SDCs of 1.2 ng/mL or higher may be harmful in women.[2] (To convert digoxin to nanomoles per liter, multiply by 1.281.) In light of these studies, we sought to determine the current practice of reporting SDCs in hospital-based chemical laboratory analyses.

Figure 1. Reference Ranges for Therapeutic Serum Digoxin Concentration Reported by Chemical Laboratory Analyses



To convert digoxin to nanomoles per liter, multiply by 1.281.

Methods | A brief written survey (with telephone follow-up) (eSupplement) was sent to chemistry laboratory directors at hospitals listed in the top 50 for cardiovascular medicine reported by *US News and World Report*[3] and an additional 50 from the top 100 hospitals rated by Thomson-Reuters (now Truven Health Analytics)[4] in 2012. The study was approved by the Saint Louis University institutional review board, St Louis, Missouri.

Results | A total of 60 surveys were completed and returned for analysis (a 60% response rate). Respondents were 27 laboratory directors or assistant directors, 21 supervisors, 11 technicians, and 1 laboratory medicine fellow. Five different commercial assays were used; in the year prior to the survey, 5 laboratories changed their commercial assay citing upgrades in equipment or laboratory processes. No laboratory reported a change in the SDC reference range.

Most respondents defined a therapeutic reference range as 0.8 to 2.0 ng/mL (**Figure 1**); 56 of 60 report SDCs of 2.0 ng/mL or greater as being within the normal range.

A total of 41 laboratories reported the mean SDC evaluated over a period of up to 1 year, most commonly over the prior month (18 of 41). Nearly half (19 of 41) reported mean concentrations of 1.0 ng/mL or greater (**Figure 2**). A subset (33 of 41) reported on the proportion of SDCs higher than various thresholds; a significant number reported levels of 1.5 ng/mL or higher (Figure 2). When asked if SDC correlated with clinical efficacy, most respondents answered "don't know" or "no" (76%); of the sites that answered in the affirmative (24%), only 1 site used a reference range with an upper limit lower than 1.0 ng/mL, whereas 8 listed a range up to 2 ng/mL, 1 each listed 1.5 ng/mL and 1.0 ng/mL, and 2 respondents did not provide a range.