

a preference for standard-dose or high-dose vaccine [2]. Both early vaccination and preferential administration of high-dose vaccine in retail pharmacies is likely related to reimbursement structure, profit margin, and product availability.

In conclusion, we identified that influenza vaccination in retail pharmacy settings is initiated earlier in the influenza season and that high-dose vaccine is rapidly becoming the primary vaccine administered there to elderly persons, in contrast to other settings. These findings should be considered within the context of the study by Shay et al and in the design of future vaccine effectiveness studies involving retail pharmacy settings. The impact of these trends on vaccine effectiveness remains unknown.

## Notes

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## What Is the Best Model for HIV Primary Care? Assessing the Influence of Provider Type on Outcomes of Chronic Comorbidities in HIV Infection

TO THE EDITOR—We read with great interest the research article from Gallant et al, which demonstrated that comorbidities are common among the aging human immunodeficiency virus (HIV)-infected population and have increased over time [1]. In this case-control analysis, >46 million individuals living with HIV in the United States who received healthcare coverage from commercial, Medicaid, and Medicare payers during 2003–2013 were identified. Diagnoses of hypertension, dyslipidemia, and endocrine disorders were common, and comparison of data from 2003 to 2013 indicated significant increases in prevalence of comorbidities despite payer. This study highlights the importance of the identification and management of noncommunicable diseases among HIV-positive individuals; however, the methods by which to ideally manage these comorbidities in this particular population have yet to be discovered. To provide further insight to this topic, we present a retrospective analysis exploring the relationship between provider type and chronic comorbidities for HIV-positive individuals ≥40 years old (n = 919) with Medicare or commercial healthcare at an HIV clinic, the UCLA Center for Clinical AIDS Research and Education, in 2016.

Our objectives were to compare rates of monitoring and measures of quality of care among HIV-positive individuals with hypertension, type 2 diabetes, and/or hyperlipidemia by provider type: infectious diseases (ID) physician only or an ID physician and primary care physician (PCP). Patients were divided by provider type into 3 groups: (1) ID physician at the HIV clinic, (2) ID physician and PCP at the HIV clinic, and (3) ID physician at the HIV clinic and external PCP. Diagnoses of hyperlipidemia, type 2 diabetes, and/or hypertension were identified from medical records. We evaluated outcomes

of comorbidities, including low-density lipoprotein cholesterol (LDL) level, hemoglobin A1c level, and blood pressure. Optimal control of hyperlipidemia, diabetes, and hypertension was defined as an LDL level of <100 mg/dL, a hemoglobin A1c level of <7.0%, and a blood pressure <130/80 mm Hg, respectively. Bivariate and multivariate statistical analyses were conducted with  $\chi^2$  analysis, the Mann-Whitney *U* test, and logistic regression analyses as appropriate.

Individuals were predominantly male (93.1%) and white (72.0%; Table 1). One hundred sixty-eight (18%) had an ID physician only, 405 (44%) had an ID and PCP at the HIV clinic, and 343 (37%) had an ID physician at the HIV clinic and an external PCP. Individuals who had their PCP at the HIV clinic versus an external PCP were significantly more likely to be seen for a primary care visit in 2016 (381 [94%] vs 143 [42%], respectively;  $P < .001$ ). Five hundred sixteen individuals (56%) received a diagnosis of at least 1 chronic comorbidity, and those with a comorbidity were more likely to have a PCP overall (448 [60%];  $P < .001$ ). Eighty-five percent of individuals with diabetes had optimal control, and the majority of individuals with hypertension and hyperlipidemia had suboptimal control (66% and 55%, respectively). There was a trend toward a greater proportion of individuals reaching lipid targets (47.3% vs 30.3%) in those with a PCP ( $P = .065$ ) and higher rates of screening for hyperlipidemia and diabetes in those who had a PCP visit in 2016 ( $P = .072$  and  $P = .064$ , respectively). Logistic regression analysis showed a trend for individuals to have an LDL level above threshold if they had an ID physician only, compared with those having an ID physician and PCP (odds ratio, 2.12;  $P = .070$ ). There were no significant differences in outcomes associated with hypertension or diabetes, based on provider type.

Our findings support the data in the study by Gallant et al, demonstrating a significant prevalence of non-AIDS-defining comorbidities among

**Table 1. Patient Demographic Characteristics and Comparison of Health Outcomes Between Groups**

Variable	All Groups	Group 1: ID Physician Only	Group 2: ID Physician and PCP at HIV Clinic	Group 3: ID Physician and PCP at separate locations	<i>P</i>
Patients, no. (%)	916 (100)	168 (18)	405 (44)	343 (38)	
Age, y, mean $\pm$ SD	53 $\pm$ 10	50 $\pm$ 10	53 $\pm$ 10	53 $\pm$ 10	<.001
Male sex, no. (%)	851 (93)	145 (92)	380 (94)	317 (92)	<.241
Race, no. (%)					
White	597 (72)	110 (78)	268 (72)	219 (68)	
African American	106 (13)	10 (7)	46 (12)	50 (15)	
Asian	43 (5)	8 (6)	19 (5)	16 (5)	
Native American	3 (0.36)	0 (0)	2 (0.5)	2 (0.3)	
Other	80 (10)	12 (9)	35 (9)	33 (10)	
Non-Hispanic ethnicity	740 (88)	122 (86)	341 (90)	277 (85)	
Diagnosis of $\geq 1$ comorbidity, no. (%)	516 (56)	68 (40)	68 (61)	249 (58)	<.001
Hyperlipidemia, no. (%)	327 (36)	39 (23)	154 (38)	134 (39)	<.001
Hypertension, no. (%)	323 (35)	39 (23)	147 (36)	137 (40)	<.001
Diabetes (type I and II), no. (%)	150 (16)	14 (8)	87 (21)	49 (14)	<.001
Laboratory value, no. (%)					
LDL level >100 mg/dL	76 (53)	23 (69)	72 (55)	57 (50)	.134
HbA1c level >7.0%	30 (5)	2 (15)	16 (17)	5 (11)	.703
Blood pressure >130/80 mm Hg	475 (53)	28 (72)	95 (65)	90 (66)	.745

Abbreviations: CARE, UCLA Center for Clinical AIDS Research and Education; HbA1c, hemoglobin A1c; ID, infectious diseases; LDL, low-density lipoprotein cholesterol; PCP, primary care physician.

individuals living with HIV. All HIV care has historically been provided by specialists, although there is evidence that individuals with PCPs have better health outcomes, compared with those who only see HIV specialists [2]. Recent studies have explored physician's preferences on the management of chronic diseases for individuals with HIV, demonstrating that most desire integration of HIV and primary care services. Furthermore, ID specialists may feel less comfortable treating non-AIDS-defining comorbidities, likely based on provider experience, in addition to lack of adequate clinical resources to ensure comprehensive care for patients [3–5]. Our research findings suggest that primary care services embedded within HIV clinics may improve monitoring and treatment of non-AIDS-defining comorbidities among patients with HIV infection—a vital component in the future of HIV care that could potentially decrease healthcare spending and improve healthcare outcomes among individuals living with HIV.

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