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HIV PREVENTION PRACTICES AND NON-FEDERAL FUNDING AMONG U.S. STATES AND NON-STATE REGIONS: A SURVEY OF HIV/AIDS DIRECTORS

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We surveyed U.S. HIV/AIDS directors or designees in states and non-state regions, regarding factors influencing HIV viral suppression: (1) non-federal prevention funding; (2) contacting newly reported patients and providers, for care linkage and partner services; (3) follow-up of non-received viral load reports, to identify untreated patients; and (4) genotype/phenotype surveillance, to monitor drug resistance. The survey was conducted April–July 2015; 50 (87.7%) participated. Eighty percent of jurisdictions contacted all newly reported patients; 60% contacted all providers. HIV resistance tests were reportable in 38%; 66% contacted providers and/or patients about missed viral loads. Non-federal funding was significantly associated with annual diagnoses ($p = .0001$) and population ($p = .0002$), but not with other factors studied. Many jurisdictions lacked non-federal funding (28%), or experienced unrestored reductions since 2008 (33%). Jurisdictions' funding and preventive practices varied greatly. HIV viral suppression could be

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National Alliance of State & Territorial AIDS Directors staff and Centers for Disease Control and Prevention HIV/AIDS Prevention personnel were consulted. Intern Christy Mota transferred and tabulated the questionnaire data to facilitate analysis.

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enhanced by restoring (or establishing) non-federal prevention funding, and by more standardized surveillance/outreach practices.

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This cross-sectional study analyzed data from 43 U.S. states and 7 non-state regions from which the Centers for Disease Control and Prevention (CDC) collected HIV surveillance data. It assessed implementation of three HIV public health practices that could impact viral suppression among HIV-infected persons. These included routine preventive outreach after new diagnoses (to promote linkage to care and partner services), monitoring of expected but non-received viral load reports (to detect patients who may not be receiving treatment and to refer them for antiretroviral medications), and reportability of HIV genotype and phenotype results (to detect emerging drug resistance). These activities were not universally funded or required by CDC, and anecdotal information had suggested that they were not performed consistently in all jurisdictions.

We also studied non-federal (state/regional, local, and/or private) HIV prevention funding, to determine trends (including recession-associated cuts and restorations), and any associations with the three above practices, or with diagnoses or population. We queried uses of all prevention funding, including federal.

Our pre-survey hypotheses were:

1. The three public health practices studied were not consistently implemented in all jurisdictions.
2. Jurisdictions with more non-federal funding, or more diagnoses, might provide more outreach to patients and providers and expanded surveillance services (the exception being that jurisdictions with very few HIV diagnoses might also find time and staff to perform these functions, without dedicated funding).

In 1996, one of us had anticipated that antiretroviral therapy would prevent HIV transmission (Hattis & Jason, 1996). About 15 years later, suppression of HIV viral load to undetectable levels by medication was confirmed to provide dual benefits: suppressing transmission by at least 96% (M. D. Cohen et al., 2011), and improving health outcomes (INSIGHT START Study Group, 2015). Viral load, a measure of the quantity of HIV RNA in serum, has been the best indicator of both response to treatment and infectiousness (Castro & Lansky, 2013; Department of Health and Human Services [HHS], 2017; Günthard et al., 2016). In 2011, Gardner estimated that only about 19% of infected persons in the U.S. had reached such viral suppression (Gardner, McLees, Steiner, del Rio, & Burman, 2011); CDC's estimate was 30% (Centers for Disease Control and Prevention [CDC], 2016). CDC estimated in 2018 that the prevalence of viral suppression among HIV infected persons had risen to 51% overall, and 59.8% among diagnosed patients, by 2015 when this survey was conducted; however this was still far short of the National HIV/AIDS Strategy goal for 2020 of 80% (CDC, 2018; HHS, 2016b).

HIV treatment recommendations in the U.S. since 2012 have included offering antiretrovirals to all infected persons, and striving for undetectable viral loads (Günthard, 2016; HHS, 2017). President Obama's 2013 HIV Care Continuum (HCC) Initiative (HHS, 2016a) aimed to increase viral suppression.

The HCC stages are screening for initial diagnosis, linkage to care, retention in care, treatment with antiretroviral therapy (ART), and achieving undetectable viral

loads (HHS, 2016a). With each successive stage, transmission decreases (Skarbinski et al., 2015). Unfortunately, many individuals fail to progress along the stages of the continuum (Gardner et al., 2011).

The CDC has been the major source of U.S. HIV prevention funding, providing grants to all states, the non-state regions in this study, and 8 metropolitan areas (CDC, 2012b; National Alliance of State & Territorial AIDS Directors [NASTAD], 2009, 2012–2013). Smaller specialized grants are given to states and are open to a larger number of metropolitan areas on a competitive basis (CDC, 2013a). The Health Resources and Services Agency (HRSA), has also awarded grants for linkage and retention in care (HRSA, 2017).

Since federal HIV prevention funding levels are archived by the funding agencies and occasionally published online (CDC, 2012b, 2013a), this survey focused on the less-documented additional funding from other sources. Tracking of HIV-related funding from non-federal sources (state/NSR, local, and private) has required surveys like this one. NASTAD conducted two previous surveys on HIV prevention funding as well as testing and prevention programs, in 2007 (NASTAD, 2009) and 2012 (NASTAD, 2012–2013). Those reported that just over a third of HIV prevention funding came from states in 2007, and just under a third in 2012, with great variation among jurisdictions. State and local funding were also found to have decreased substantially between 2007 and 2012, overlapping the major 2008 economic recession.

In our analysis, the term *non-state regions* (NSRs) refers to the federal District of Columbia and six inhabited island areas that are not states but belong to, or are dependent on, the U.S. These have been included as "dependent areas" in CDC tabulations of HIV diagnoses (CDC, 2015c), and as territories in NASTAD rosters (NASTAD, 2015). Legally, Guam, U.S. Virgin Islands, and American Samoa are territories, Washington, D.C., is a federal district, Puerto Rico and the Northern Mariana Islands are commonwealths (Legal Dictionary, n.d.), and Palau is a freely associated republic receiving CDC subsidization for public health (CDC, 2015a).

Jurisdiction refers to either a state or an NSR. "Local jurisdiction" is a subdivision such as a county or city.

METHODS

STUDY SAMPLE

We contacted all HIV/AIDS directors from states and NSRs listed on the 2014–2015 NASTAD roster (NASTAD, 2015, since updated), or their successors, by email to complete a survey online. Those not initially responding received follow-up emails and phone calls. We collected data from April through July 2015. Analysis began August 2015, continuing into 2017. No human subjects were contacted; there were no clinical interventions.

This type of research was triply exempt from institutional review board review as defined in 45 CFR part 46, on the basis of: no intervention or interaction with living individuals; involving the study or evaluation of survey or interview procedures; and involving study of existing data (HHS.gov). To encourage participation by reluctant directors who were aware of deficiencies in their jurisdictions, we followed the example of the prior NASTAD surveys (NASTAD, 2009, 2012–2013) and assured the participants that their jurisdictions would not be named in any published

paper, although they would be identified in data confidentially shared with NASTAD and CDC.

QUESTIONNAIRE

The multiple-choice questionnaire included 8 substantive multiple-choice and 3 demographic (jurisdiction, job title, and contact information) questions. It utilized SurveyMonkey, Professional Version (SurveyMonkey, San Mateo, CA, 2011). Substantive questions included an other category for comments as a supplemental or substitute response. One state HIV/AIDS director pilot-tested the questionnaire before general release.

STATISTICAL ANALYSIS

Statistical analysis utilized Statistical Analysis Software (SAS) version 9.4 TS, Level1M1 (SAS Institute, Cary, NC, 2013). HIV diagnoses and rates came from Table 2 of CDC's 2014 surveillance report, the most recent at the time of the data analysis (CDC, 2015c). Annual estimated total diagnoses were prioritized over rates, because patient counts more directly influence sizes and expenses of HIV surveillance and prevention programs. Populations were mid-2014 census estimates (Cox, 2015; U.S. Census, International Programs, 2017).

Jurisdictions were stratified by annual non-federal HIV prevention funding, per survey responses (categories: no funds; more than zero but < $1 million; > $1 million). Reported diagnoses, populations, and diagnosis rates were divided by quartiles. The most populous jurisdictions and those with the most diagnoses all placed within the top quarter, while those with low populations and reported cases all placed within the bottom quarter. Two-sided Fisher's exact test of independence was used where > 20% of expected cell frequencies in tables were < 5; otherwise two-sided chi square test of independence was used.

Statistical significance criterion was $p < .05$. Some survey questions permitted selection of more than one option, so where noted, totals do not equal 100%.

RESULTS

SURVEY RESPONSE

The overall response rate was 87.7%, including all 7 NSRs and 43 of 50 states. Respondents completed 23 surveys during April–June and 27 in July 2015. Participating jurisdictions accounted for 36,874 (> 82%) of total estimated HIV diagnoses in 2014. HIV/AIDS directors personally completed 32 surveys; knowledgeable assistants such as surveillance chiefs were delegated to complete the remainder.

Respondents included 10 of the 12 states with estimated 2014 diagnoses over 1,000, and 15 of the 16 jurisdictions with estimated 2014 diagnoses under 100. All 50 jurisdictions responded to questions, except as noted.

Of the seven non-participating states, four were refusals (NM, MI, OH, and SD); three were non-responses after multiple contact attempts (FL, IN, and KY). Reasons given for refusals included unfamiliarity with the Beyond AIDS Foundation, discomfort sharing program data, being too busy, having few diagnoses, and/or participation in prior NASTAD surveys.

Apparent inconsistencies or omissions were resolved by phone or email, or by incorporating details added in comments. Twelve of these related to outreach after newly reported diagnoses, seven to funding sources, and one to both. In two

TABLE 1. Population Size (Mid-2014 Census Estimates, Divided by Quartiles), Stratified Separately by 2014–2015 Non-federal HIV Prevention Funding (in Three Categories), and by 2014 HIV Diagnoses (Divided by Quartiles), U.S. States and Regions

	Population				*p* value
	≤ 1,055,173	> 1,055,173, ≤ 3,608,839	> 3,608,839, ≤ 6,731,484	>6,731,484	
	(*n* = 13)	(*n* = 12)	(*n* = 13)	(*n* = 12)	
	n (%)	*n* (%)	*n* (%)	*n* (%)	
Non-federal Funding					.0002
None (*n* = 14)	7 (53.8)	4 (33.3)	3 (23.1)	0 (0.0)	
> 0 < $1 M (*n* = 19)	5 (38.5)	6 (50.0)	7 (53.8)	1 (8.3)	
> $1 M (*n* = 17)	1 (7.7)	2 (16.7)	3 (23.1)	11(91.7)	
Annual HIV Diagnoses					.0001
< 61 (*n* = 13)	10 (76.9)	3 (25)	0 (0.0)	0 (0.0)	
> 61 < 330 (*n* = 12)	2 (15.4)	7 (58.33)	3 (23.1)	0 (0.0)	
> 330 < 842 (*n* = 13)	1 (7.7)	2 (16.67)	7 (53.8[a])	3 (25.0)	
> 842 (*n* = 12)	0 (0.0)	0 (0.0)	3 (23.1)	9 (75.0)	

Note. Percentages apply only to respective column sections. [a]Rounded downward to make percentages in this section total 100. Boldface indicates statistical significance ($p < .05$) found by two-sided Fisher's exact test between population and funding ($p = .0002$), and between population and annual diagnoses ($p = .0001$).

cases, the original responder could not be reached, and corrections were provided by other knowledgeable staff. Two additional respondents were contacted to clarify responses on local funding; one provided a correction. Internet-posted documents corroborated two corrections. Information on non-federal funding from two jurisdictions remained inconsistent.

NON-FEDERAL FUNDING FOR HIV PREVENTION

Lack of any current non-federal funding for HIV prevention was reported by 28% of jurisdictions. State or NSR funding was reported by 72% of jurisdictions, and funding from some but not all local jurisdictions by 28%. In one state, with by far the highest total non-federal funding, all local jurisdictions contributed toward HIV prevention. Some private sector funding for state/NSR or local projects was reported in 12% of jurisdictions.

Of the 48 jurisdictions responding to a question on trends since 2008 in HIV prevention funding from all non-federal sources, 20 (42%) reported that it had remained stable, and 16 (33%) said it had decreased and had not been fully restored to FY2008 levels. Only one jurisdiction (2%) reported that non-federal public prevention funding had been reduced but later fully restored to FY2008 levels. Participants were not asked about increases from baseline.

Population was very strongly associated with annual reported HIV diagnoses ($p = .0001$ by two-sided Fisher's exact test); see Table 1. Population and non-federal HIV prevention funding were associated almost as strongly ($p = .0002$). Annual reported HIV diagnoses and diagnosis rates were also significantly associated with non-federal HIV prevention funding ($p = 0.0003$ and 0.0021 respectively; not in table).

TABLE 2. Public Health Outreach Practices of US States and Regions, to Reported Individual and Provider, Stratified Separately by 2014–2015 Non-federal HIV Prevention Funding (in Three Categories), and by 2014 HIV Diagnoses (Divided by Quartiles)

	Call provider always	Call provider sometimes	Do not call provider	*p* value	Call patient always	Call patient sometimes	Do not call patient	*p* value
	(*n* = 30)	(*n* = 16)	(*n* = 4)		(*n* = 40)	(*n* = 8)	(*n* = 2)	
	n (%)	*n* (%)	*n* (%)		*n* (%)	*n* (%)	*n* (%)	
Non-federal Funds				.26				.06
None (*n* = 14, 15)	6 (20.0)	5 (31.25[a])	3 (75.0)		14 (35.0)	1 (12.5)	0 (0.0)	
> 0 < $1 M (*n* = 19, 18)	13 (43.3)	6 (37.5)	0 (0.0)		16 (40.0)	1 (12.5)	1 (50.0)	
> $1 M (*n* = 17, 17)	11 (36.7)	5 (31.25[a])	1 (25.0)		10 (25.0)	6 (75.0)	1 (50.0)	
Annual HIV Diagnoses				.31				.39
< 61 (*n* = 13, 13)	10 (33.3)	2 (12.5)	1 (25.0)		11 (27.5)	1 (12.5)	1 (50.0)	
> 61 < 330 (*n* =12, 12)	9 (30.0)	3 (18.75)	0 (0.0)		11 (27.5)	1 (12.5)	0 (0.0)	
> 330 < 842 (*n* =13, 13)	5 (16.7)	6 (37.5)	2 (50.0)		11 (27.5)	2 (25.0)	0 (0.0)	
> 842 (*n* = 12, 12)	6 (20.0)	5 (31.25[a])	1 (25.0)		7 (17.5)	4 (50.0)	1 (50.0)	

Note. Percentages and p values apply only to each section of respective columns. Two-sided Fisher's exact test performed. No significant relationship was found between the outreach provided to providers or patients, and either annual HIV diagnoses or non-federal HIV prevention funds. [a]Carried to additional decimal point to demonstrate that percentages in these sections total 100.

USES OF ALL HIV PREVENTION FUNDING (FEDERAL AND NON-FEDERAL)

Jurisdictions reported utilization of prevention funding (from all sources including federal) for five purposes of special interest in this study, offered as selections in the questionnaire: linkage to care (92%), partner services (90%), expanded testing (84%), retention in care (60%), and surveillance/monitoring of viral load (42%). Funds were used for all five by 34% of jurisdictions.

Other activities, including those required for CDC prevention cooperative agreements since 2012 (CDC, 2012a) but not listed as selections, e.g., condom distribution, structural initiatives, could be mentioned in optional comments. One jurisdiction commented that prevention funding paid solely for testing, partner services, and condom distribution; while linkage to care was paid from Ryan White funds. Others reported use for syringe access, behavioral interventions, education, interventions for high-risk negatives, community planning, and/or condom access.

OUTREACH TO PATIENTS AND PROVIDERS FOLLOWING INITIAL HIV REPORTED DIAGNOSES

Following a newly reported HIV diagnosis, the provider (if known) was routinely contacted in 60% of jurisdictions (see Table 2). Some providers were contacted by an additional 32%; while 8% did not indicate that any were contacted. The patient was routinely contacted if possible in 80% of jurisdictions. Some patients were contacted by an additional 16%; while 4% did not indicate that any were contacted. All jurisdictions contacted at least some providers and/or patients, but 14% neither contacted all providers nor all patients. Such contacts were not significantly associated with either annual reported HIV diagnoses or non-federal prevention funding; in fact, a reverse association between funding and calling all patients approached significance ($p = .06$).

TABLE 3. Practices for Missed Viral Loads After 12 Months of Diagnosis, Stratified Separately by 2014–2015 Non-federal Prevention Funding (in Three Categories) and by 2014 HIV Diagnoses (Divided by Quartiles)

	Contact provider	*p* value	Contact patient	*p* value	Do not contact either	*p* value
	(*n* = 21)		(*n* = 20)		(*n* = 18)	
	n (%)		*n* (%)		*n* (%)	
Non-federal Funds		.99*		.97*		.82**
None (*n* = 17)	6 (28.6)		6 (30.0)		5 (27.8)	
> 0 < $1 M (*n* = 22)	8 (38.1)		7 (35.0)		7 (38.9)	
> $1 M (*n* = 20)	7 (33.3)		7 (35.0)		6 (33.3)	
Annual HIV Diagnoses		.84*		.98**		.27**
< 61 (*n* = 16)	6 (28.6)		5 (25.0)		5 (27. 8)	
> 61 – < 330 (*n* = 14)	6 (28.6)		5 (25.0)		3 (16. 7)	
> 330 < 842 (*n* = 14)	5 (23.8)		6 (30.0)		3 (16.7)	
> 842 (*n* = 15)	4 (19.0)		4 (20.0)		7 (38.9)	

Note. Totals in table exceed number of jurisdictions because nine jurisdictions contact both provider and patient, others only listed a comment. Percentages and *p* values apply only to each section of respective columns. Two-sided chi-square (*) and two-sided Fisher's exact tests (**) were performed as shown, and no significant associations were found between annual diagnoses or funds and contacting provider or patient.

Forty-four jurisdictions responded regarding inclusion of three queried topics when providers were contacted. Partner services were discussed by 32 (72.7%), linkage to care by 30 (68.1%), and information to complete reports by 41 (93.2%). All three topics were discussed by 25 (56.8%). In optional comments, 7 jurisdictions listed additional topics, including risk assessment; how to contact patients; informing providers that patients would be contacted; and guidance about managing acute HIV.

Forty-seven jurisdictions responded regarding inclusion of two queried topics when patients were contacted. All (100%) discussed linkage to care; 45 (95.7%) also discussed partner services. In optional comments, 8 jurisdictions listed additional topics, including patient questions on disease course; screening for substance abuse and mental health; insurance status; prevention services; social services referrals; necessary non-HIV services; AIDS Drug Assistance Program; confidentiality; syphilis testing; and case management.

SURVEILLANCE OF MISSED VIRAL LOAD RESULTS

Missed viral loads (defined as one year without a reported viral load, for a previously reported HIV positive patient) triggered routine communication with all providers in 42% of jurisdictions, and with all patients in 40% (see Table 3). Both were notified in 18%, and neither in 36%.

One additional jurisdiction (not included in Table 3) contacted patients after 15 months. Applying this 15-month criterion, the totals changed to 42% contacting patients and 34% contacting neither. Such outreach was not significantly associated with either reported diagnoses or non-federal funding.

In optional comments, one jurisdiction reported that such a program had just been implemented. Two followed up missed viral loads only for Ryan White clients. This information was not included in Table 3.

TABLE 4. Policies of U.S. States and Regions on Laboratory Reporting of HIV Genotype or Phenotype, Stratified Separately by 2014–2015 Non-federal HIV Prevention Funding (in Three Categories), and by 2014 HIV Diagnoses (Divided by Quartiles)

	Report	Do not report	*p* value
	(*n* = 19)	(*n* = 31)	
	n (%)	*n* (%)	
Non-federal Funds			.76*
None (*n* = 14)	6 (31.6)	8 (25.8)	
> 0 < $1 M (*n* = 19)	6 (31.6)	13 (41.9)	
> $1 M (*n* = 17)	7 (36.8)	10 (32.3)	
Annual HIV Diagnoses			.48**
< 61 (*n* = 13)	7 (36.8)	6 (19.4)	
> 61 < 330 (*n* = 12)	3 (15.8)	9 (29.0)	
> 330 < 842 (*n* = 13)	4 (21.1)	9 (29.0)	
> 842 (*n* = 12)	5 (26.3)	7 (22.6)	

Note. Percentages apply only to each section of respective columns. Two-sided chi-square (*) and two-sided Fisher's exact test (**) were performed as shown, and no significant association was found between the practice of reporting HIV resistance results, and either annual HIV diagnoses or non-federal HIV prevention funding.

MANDATORY LABORATORY REPORTING OF HIV RESISTANCE TEST RESULTS (GENOTYPE/PHENOTYPE)

HIV resistance test results were reportable in only 38% of jurisdictions (see Table 4). One additional jurisdiction commented that a regulatory change would soon require reporting. No significant associations with either annual reported diagnoses or non-federal funding were found. Optional comments indicated that resistance data, if received, were not necessarily analyzed for trends.

DISCUSSION

This study provided new data on post- recession non-federal HIV prevention funding, and on implementation of three public health practices supporting the HIV Care Continuum but not mandated by CDC: outreach to providers/patients after newly reported HIV diagnoses, follow-up of missed viral loads, and reportability of HIV drug resistance. The survey responses represented 43 U.S. States, and 7 non-state regions including the District of Columbia, 5 U.S. island possessions, and an island republic receiving CDC support.

The first study hypothesis, that outreach to providers/patients, follow-up of missed viral loads, and reportability of HIV drug resistance were inconsistent, was confirmed. Contrary to the second hypothesis, neither annual reported diagnoses nor non-federal funding was associated with those practices.

Local public health programs nationwide underwent severe recession cutbacks beginning 2008 (National Alliance of County and City Health Officials [NACCHO], 2014). Reduced state HIV prevention funding to local jurisdictions was estimated to have increased HIV infections in California (Lin, Lasry, Sansom, & Wolitski, 2013).

Findings on HIV prevention funding were similar though not identical to those of NASTAD in 2012 (NASTAD, 2012–2013). Most jurisdictions reported either reduced non-federal funding for HIV prevention since FY2008 or had no such funding. Only one jurisdiction reported full recovery from recession cutbacks, despite improvement in state budgets from 2012 to 2014 (Torres, Stillwell, & Niquette, 2014). Many health policy advocates outside of government may be unaware of persistent shortfalls. Restoring funding for public health competed with other interests reduced during the recession (Leachman & Mai, 2014). Augmentation of current federal funding, to match jurisdictional funding, could provide an incentive for the latter.

The strongest statistical association found was between population and reported diagnoses. Non-federal HIV prevention funding was strongly associated statistically with population, as well as with estimated annual HIV diagnoses and rates. Theoretically, optimal prevention could be so effective that higher spending would be associated with fewer diagnoses. Results suggested an opposite association.

In FY2012, CDC changed the funding basis for comprehensive HIV prevention grants, giving major consideration to prevalence, i.e., persons living with HIV (CDC, 2014). However, funding based on incidence (diagnoses) would seem more appropriate for testing and services appropriate for recently reported diagnoses (even though some diagnoses may be late reports and not recent infections), e.g., linkage to care and partner services. Immediate treatment initiation, are also related to diagnoses, and could theoretically prevent most transmission and years of preventable life lost (INSIGHT START Study Group, 2015; Granich, Gilks, Dye, De Cock, & Williams, 2009; Hontelez et al., 2013).

Also in FY2012, CDC began requiring that 75% of core prevention allocations to states, NSRs, and local jurisdictions be used for HIV testing, prevention with positives, condom distribution, and structural initiatives (CDC, 2012a). The expanded surveillance and outreach queried in this survey were not among suggested targets for the remaining 25%, and may have required funding from other sources, including non-federal funding, HRSA grants, and competitive CDC grants such as Data to Care (CDC, 2017).

Contacting the patient and/or provider after newly reported diagnoses can facilitate linkage to care, partner services for recently exposed persons (CDC, 2008), and other preventive services. Although all jurisdictions performed at least some such contacts, outreach, and content of discussion were neither universal nor uniform. Jurisdictions that depended on local public health personnel to perform such functions were likely disadvantaged by severe local staffing cutbacks (NACCHO, 2014).

Lack of any viral load report within the past 12 months is an indicator of possible non-initiation or non-retention in antiretroviral treatment. It could alternatively indicate a patient who moved out of the jurisdiction or refused blood testing, provider failure to order the test, or laboratory failure to report results to public health. Only follow-up can differentiate these. A missed test result did not trigger routine outreach to either the patient or provider in 36% of jurisdictions (34% using a 15-month criterion). The remainder contacted provider and/or patient, using varied terminology for such programs.

At the time of this survey, viral load testing was recommended every 3–6 months for patients taking antiretroviral drugs (Günthard et al., 2016; HHS, 2017). The District of Columbia and 42 states required laboratory reporting of all received viral load results (including undetectable) to public health agencies (CDC, 2015b). CDC promoted this, and required it for Data to Care grants. The CDC compilation of state reporting laws lacked sufficient information to enable cross-checking of which

states and NSRs that responded to this survey did not have mandatory reporting of all HIV viral loads, regardless of results (CDC, 2015b). Neither CDC nor state laws required surveillance of non-received viral loads (Castro & Lansky, 2013; CDC, 2012a, 2016; HHS, 2017).

An increase in prevalence of resistance to commonly used medications in any geographical area could have major implications for the HCC. Starting in 2013, CDC collected genotype data from select jurisdictions as a molecular surveillance extension of the National HIV Surveillance System (S. M. Cohen, Gray, Ocfemia, Johnson, & Hall, 2014). "Molecular surveillance" became an optional area for competitive CDC funding (CDC, 2013b), but reporting of HIV drug resistance was not mandatory. This study found that only 38% of jurisdictions required laboratories to report genotype and phenotype results.

LIMITATIONS

Seven states did not participate in this survey. Cost-effectiveness of recommendations was not studied.

Respondents were not asked whether non-federal funding had increased in jurisdictions that had not experienced cutbacks. In the 2012 NASTAD survey, 11% of programs had reported increased non-federal funding since 2007 (NASTAD, 2012–2013).

HIV prevention funding was not defined. Interpretations may have varied regarding which grants to count. Amounts were not exact dollar figures, and could have been based on recall rather than record-checking.

Although inconsistent responses were almost all resolved by post-survey contacts and reviews of comments, their occurrence suggested reliability issues.

CONCLUSIONS

After several years of economic recovery, restoration of recession funding cutbacks for HIV prevention was overdue at jurisdictional and local levels. Federal matching of non-federal funds could incentivize this. Restored (or newly established) non-federal funding could help monitor and facilitate progression through the HCC, especially if used in part for outreach to patients and their providers after new diagnoses or if viral load results were not received for a year, and for collection and forwarding of viral resistance data to CDC. However, such services, which were not yet specifically funded routinely by CDC, showed no statistical association with non-federal funding.

Public health practices relating to follow-up of newly reported HIV diagnoses and missed viral load results, and reporting of genotypes and phenotypes, varied widely among states and NSRs. CDC could revise guidelines to encourage a more uniform system of HIV surveillance and monitoring, based on HCC stages and goals.

Linkage to care and partner services were already endorsed by CDC, but inconsistently applied. They could become a required use of CDC prevention funding, with specifications regarding the types of outreach expected.

Public health tracking of non-received viral load results (an indicator of infected persons who may not be in treatment), with outreach to providers and patients, may facilitate two more stages of the HCC: retention in care and antiretroviral treatment. Despite lack of specific funding by CDC, a majority of jurisdictions already claimed engagement in this activity. Patient progression through the HCC could be facilitated

by making it a required use for CDC and/or HRSA funding. To make this a universal surveillance activity, jurisdictions that do not have mandatory laboratory reporting of all viral loads, regardless of result, would need to institute such reporting.

CDC considered genotype surveillance optional, did not collect phenotypes, and neither was reportable in most jurisdictions. Uniform reporting, with submission to CDC for nationwide analysis, could produce a more complete database for monitoring antiretroviral resistance.

CDC could require grant application objectives to address jurisdiction-specific shortfalls in these areas, and opportunities for improvement.

Surveys like this may prove valuable in increasing awareness among public health advocates about funding gaps and potentials for expanded surveillance and outreach within their jurisdictions. Such awareness could stimulate discussions about policy and any necessary political action.

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