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Pharmacy Data as an Alternative Data Source for Implementation of a Data to Care Strategy

Kathy K. Byrd, MD, MPH[a], **Nasima M. Camp, MPH**[b], **Kashif Iqbal, MPH**[a], **Paul J. Weidle, PharmD, MPH**[a]

[a]Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, GA

[b]Department of Health, Research, Informatics, and Technology, ICF, Atlanta, GA.

Abstract

Background: Data to Care (D2C) is a strategy for using health departments' HIV surveillance data (HIV viral load and CD4 laboratory reports) to identify and re-engage not-in-care persons with HIV. In the current D2C model, there is a delay in the identification of persons not in care due to the time interval between recommended monitoring tests (ie, every 3–6 months) and the subsequent reporting of these tests to the health department.

Methods: Pharmacy claims and fulfillment data can be used to identify persons with HIV who have stopped filling antiretroviral therapy and are at risk of falling out of care. Because most antiretrovirals (ARVs) are prescribed as a 30-day supply of medication, these data can be used to identify persons who are not filling their medications on a monthly basis. The use of pharmacy claims data to identify persons not filling ARV prescriptions is an example of how "big data" can be used to conduct a modified D2C model.

Results: Although a D2C strategy using pharmacy data has not been broadly implemented, a few health departments are implementing demonstration projects using this strategy. As the projects progress, processes and outcomes can be evaluated.

Conclusions: Tracking ARV refill data can be a more real-time indicator of poor adherence and can help identify HIV-infected persons at risk of falling out of HIV medical care.

Keywords

Data to Care; HIV; antiretroviral therapy; retention in care; pharmacy

INTRODUCTION

An estimated 38% of new HIV transmissions originate from HIV-diagnosed heterosexual persons and men who have sex with men who are not retained in care.[1] As such, HIV interventions are often aimed at linking, retaining, and reengaging not-in-care persons.[2–7]

Correspondence to: Kathy K. Byrd, MD, MPH, Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, 1600 Clifton Road, MS E-45, Atlanta, GA 30329 (gdn8@cdc.gov).

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Using HIV surveillance data to identify persons with diagnosed HIV who are not in care is one strategy for identifying and re-engaging these persons; this strategy is called Data to Care (D2C). D2C approaches can vary in scope and practice. One D2C strategy is to use HIV viral load and CD4 laboratory reports from a health department's HIV surveillance program to identify persons who either never linked to care after diagnosis or who failed to be retained in care. The health department then offers these persons assistance with linkage to or re-engagement in HIV care.[8] The goals of D2C are to increase the number of persons with HIV who are engaged in HIV care and to increase the number virally suppressed.[8] In the current D2C model (which uses HIV surveillance data), there is a lag between missed laboratory reports and the identification of persons who are not in care, due to the time interval between recommended monitoring tests (ie, every 3–6 months),[9] and the subsequent reporting of these test results to the health department. Delayed data entry into surveillance systems and incomplete laboratory reporting can further delay or impede use of these data. Because of the delays intrinsic to this D2C model, the event identified (failure to be retained in care) has already occurred. More real-time data are needed to support the HIV care continuum.

DISCUSSION

Pharmacy Data for D2C

Prescription data are a source to identify persons with HIV who have stopped filling antiretroviral (ARV) medications and who are at risk of falling out of care. Once a provider has prescribed antiretroviral therapy (ART) for a patient, there are a number of steps that occur between writing the prescription and dispensing the medication. When a pharmacy receives a prescription, a variety of data are entered into the pharmacy management system to process the prescription [eg, patient information (name, contact information), prescriber information (name, contact information, National Provider Identifier), drug information (drug name, National Drug Codes), and third-party payor (primary and secondary insurance coverage, group and member number)]. After the prescription has been processed, the pharmacy electronically submits a claim for payment.[10] Pharmacy claims are often adjudicated for an insurance company by a third-party claims processor or a pharmacy-benefit manager (PBM).[11] Most pharmacy claims that are billed to an insurance company, for an individual patient, can be tracked through a PBM, regardless of where a patient filled the prescription. Because most ARVs are prescribed as a 30-day supply of medication, pharmacy claims data can be used to identify persons who are not filling their ARV prescriptions on a monthly basis. Tracking ARV claims data can, therefore, be a more real-time indicator of poor adherence and can portend poor retention in care.

Potential Impact

The ultimate goal of HIV care and treatment is HIV viral suppression. To achieve viral suppression, a person must be engaged in care and adherent to therapy. Filling ARV prescriptions can be a proxy for adherence to ART, which is a more proximal indicator of viral suppression than retention in care. In addition to nonadherence, persons who fail to fill ARV prescriptions are at risk of viral rebound, development of clinically significant drug resistance, and increased morbidity.[12–19] Given that approximately 20% of persons on ART

fail to fill ARV prescriptions,[20] using real-time pharmacy data to identify persons who fail to fill ARV prescriptions can allow for intervention before a person falling out of care and could have an impact on adherence, viral suppression, and potentially retention in care. The use of pharmacy claims data to identify persons not filling ARVs is an example of how "big data" can be used to conduct a modified D2C model. Once persons are identified as failing to fill ARV prescriptions, the health department can intervene with an escalating set of interventions.

Data Elements

The D2C strategy can use pharmacy claims data from a PBM (which would give the broadest access), an insurer (eg, Medicaid and commercial insurer), or other source. Pharmacy-specific fulfillment data can also be used, particularly if from a retail chain or HIV specialty pharmacy with a large catchment area. At minimum, the database will need patient identifying information (name and contact information), name of ARV medications or National Drug Codes, days of supply for each prescription, prescription fill date, and prescribing provider. The "reverse out date" (the date that indicates when a medication was returned to shelf because a prescription was ordered but not picked up by the patient) is useful additional information; for patients with no ARV claims, this date indicates that a prescription was ordered by a prescriber. If using an insurer's database, the date a person is disenrolled from the insurance plan (if applicable) is also useful additional information, as it is helpful in determining when a person is no longer captured within the database. When considering a potential pharmacy claims or fulfillment database, health departments should determine the number of persons with HIV within the department's jurisdiction, who are covered by the database. Table 1 shows the relative strengths of potential pharmacy claims and fulfillment data sources.

Operational Steps and Decision Points

The initial step of a D2C strategy using pharmacy data is to identify persons with HIV who fail to fill ARV prescriptions. The first decision is whether to identify persons with a history of filling ARVs but who then stopped, or to identify persons with a known diagnosis of HIV but no ARV claims. If the program decides to start by identifying persons with a diagnosis of HIV and no ARV claims, a supplementary database (eg, HIV surveillance and medical diagnosis claims) will be needed for information on HIV status. Lack of ARV prescription claims could indicate a failure to fill prescriptions but could also indicate a variety of other situations such as patient disenrollment from insurance (if using an insurer specific database), migration to an area not covered by the database, change of filling pharmacy or pharmacy network (if using a pharmacy or pharmacy network-specific database), incarceration, or death. Therefore, programs should consider developing a strategy that draws upon multiple data sources to classify persons as either filling or failing to fill prescriptions. Other data sources might include an AIDS Drug Assistance Program (ADAP) database, State Pharmaceutical Assistance Programs, Patient Assistant Programs, and vital records.

Programs will need to define what constitutes a failure to fill ARV prescriptions; for example, will failure to fill be defined as no claim for any ARV, no claim for each previously

filled ARV, or no claim for a complete regimen of ARVs? The health department will also need to decide when, after identifying persons who have failed to fill ARVs, to intervene and at what level to intervene. One strategy is to intervene early with a low-intensity first-line intervention such as calling persons to remind them to pick up their prescriptions.[21–23] Early intervention should be considered due to the risk of viral rebound shortly after interruption of therapy.[12] When determining how early to intervene, health departments should consider if intervening within the specified timeframe (eg, 2 weeks, 30 days of failing to fill) is practical given the anticipated number of persons who might fail to fill during this timeframe, and the amount of resources required. The health department can collaborate with external partners to lessen the workload; for example, the health department might work with filling pharmacies to conduct the first-line intervention. For persons who continue to fail to fill after the first-line intervention, a second-line intervention might be conducted in which prescribers or filling pharmacists provide adherence support. For persons who fail to fill after the second-line intervention, a third-line intervention where the health department uses Disease Intervention Specialists (or similar personnel) to locate individuals in a process similar to the current D2C process would be implemented. Again, the health department will need to determine the timing for the second- and third-line interventions depending on resources. One strategy is to time the interventions at 30-day intervals (ie, persons who fail to fill ARV prescriptions by 30 days receive first-line interventions, persons who are 60 days late in filling prescriptions receive second-line interventions, and persons who are 90 days late receive third-line interventions). If implementing interventions that escalate in intensity, the program will need to decide if a person can receive a higher intensity intervention without receiving a lower level intervention. Built into each intervention should be a mechanism for informing prescribers of their patients' failure to fill prescriptions.

Challenges

Although implementing a D2C program using pharmacy data has the potential for significant impact, there are likely challenges to implementation. The first challenge is getting access to a real-time (or near real-time) pharmacy claims or fulfillment database. Most third-party aggregator data (eg, IMS Health and Truven Health Analytics) are not timely and do not contain patient identifying information and are, therefore, not useful for patient management. Access to pharmacy claims or fulfillment data may require establishment of data sharing agreements, and there may be an associated cost.

Depending on the database, persons who fill ARVs through ADAP may not be identified. In some states, PBMs manage the dispensing of medications for an ADAP's uninsured population, while other states use a central state pharmacy. In the latter case, persons filling through ADAP are unlikely to be identified unless the central pharmacy is used as a supplemental database. If using an insurer's database, another implementation challenge might be patients' changing insurance status. If a person changes insurers (or loses insurance), they can no longer be followed within the database; this problem might be mitigated by using data from a PBM, which contains claims from multiple insurers and some ADAP programs.

Patients can fill prescriptions at any pharmacy that accepts their insurance. Within one pharmacy network, prescriptions can be tracked across partnered pharmacies (eg, retail pharmacies). However, if a patient switches pharmacies (to another chain or independent pharmacy), the previous refill history remains with the first pharmacy. As such, if a pharmacy-specific fulfillment database is used to implement the project, persons who fill outside of the pharmacy network might wrongly be labeled as failing to fill ARV prescriptions. In addition, the program will not work well for persons who have prescriptions with automatic refills through a mail order pharmacy; these persons will always be counted as filling prescriptions despite there being no active patient involvement in doing so. Finally, programs might initially be challenged in engaging the community around this activity because using persons' pharmacy data in this manner might be seen as intrusive. Programs should consider engaging the community and other stakeholders, before implementation, to explain the process, gauge level of support, and adapt programs to address feedback when possible. As programs begin to implement a D2C strategy using pharmacy data, program challenges will be elucidated and processes and outcomes can be evaluated.

CONCLUSIONS

In summary, tracking prescription claims can be a near real-time method to identify persons with HIV who fail to fill ARV prescriptions and who are at risk of falling out of care. A D2C model using pharmacy data may help to minimize treatment interruptions, improve adherence and viral suppression, and keep persons with HIV engaged and retained in care.

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REFERENCES

1. Gopalappa C, Farnham PG, Chen YH, et al. Progression and trans-mission of HIV/AIDS (PATH 2.0). Med Decis Making. 2017;37:224–233. [PubMed: 27646567]
2. Bove JM, Golden MR, Dhanireddy S, et al. Outcomes of a clinic-based surveillance-informed intervention to relink patients to HIV care. J Acquir Immune Defic Syndr 2015;70:262–268. [PubMed: 26068720]
3. Craw JA, Gardner LI, Marks G, et al. Brief strengths-based case management promotes entry into HIV medical care: results of the antiretroviral treatment access study-II. J Acquir Immune Defic Syndr 2008;47:597–606. [PubMed: 18285714]
4. Gardner LI, Giordano TP, Marks G, et al. Enhanced personal contact with HIV patients improves retention in primary care: a randomized trial in 6 US HIV clinics. Clin Infect Dis 2014;59:725–734. [PubMed: 24837481]
5. Gardner LI, Marks G, Craw JA, et al. A low-effort, clinic-wide intervention improves attendance for HIV primary care. Clin Infect Dis 2012;55:1124–1134. [PubMed: 22828593]
6. Gardner LI, Metsch LR, Anderson-Mahoney P, et al. Efficacy of a brief case management intervention to link recently diagnosed HIV-infected persons to care. AIDS 2005;19:423–431. [PubMed: 15750396]
7. Irvine MK, Chamberlin SA, Robbins RS, et al. Improvements in HIV care engagement and viral load suppression following enrollment in a comprehensive HIV care coordination program. Clin Infect Dis 2015; 60:298–310. [PubMed: 25301208]

8. Centers for Disease Control and Prevention. Effective interventions. Available at: https://effectiveinterventions.cdc.gov/en/2018-design/data-to-care/group-1/data-to-care. Accessed August 20, 2018.
9. Gunthard HF, Saag MS, Benson CA, et al. Antiretroviral drugs for treatment and prevention of HIV infection in adults: 2016 recommen-dations of the International Antiviral Society-USA panel. JAMA 2016; 316:191–210. [PubMed: 27404187]
10. Medical Insurance for Pharmacy Technicians. From Prescription to Payment: Becoming a Pharmacy Technician Insurance Specialist. Janet Liles: Mcgraw-Hill; 2010 Available at: http://highered.mcgraw-hill.com/sites/dl/free/0073374164/638139/chapter01.pdf. Accessed July 13, 2018.
11. Health policy brief: pharmacy benefit managers. Health Aff 2017. doi: 10.1377/hpb2017.13.
12. Haberer JE, Musinguzi N, Boum Y II, et al. Duration of antiretroviral therapy adherence interruption is associated with risk of virologic rebound as determined by real-time adherence monitoring in rural Uganda. J Acquir Immune Defic Syndr 2015;70:386–392. [PubMed: 26110445]
13. Jiamsakul A, Kerr SJ, Ng OT, et al. Effects of unplanned treatment interruptions on HIV treatment failure—results from Tahod. Trop Med Int Health. 2016;21:662–674. [PubMed: 26950901]
14. Knobel H, Urbina O, Gonzalez A, et al. Impact of different patterns of nonadherence on the outcome of highly active antiretroviral therapy in patients with long-term follow-up. HIV Med 2009;10:364–369. [PubMed: 19490179]
15. Meresse M, March L, Kouanfack C, et al. Patterns of adherence to antiretroviral therapy and HIV drug resistance over time in the Stratall ANRS 12110/ESTHER trial in Cameroon. HIV Med 2014; 15:478–487. [PubMed: 24589279]
16. Sethi AK, Celentano DD, Gange SJ, et al. Association between adherence to antiretroviral therapy and human immunodeficiency virus drug resistance. Clin Infect Dis 2003;37:1112–1118. [PubMed: 14523777]
17. Tinago W, O'Halloran JA, O'Halloran RM, et al. Characterization of associations and development of atazanavir resistance after unplanned treatment interruptions. HIV Med 2014;15:224–232. [PubMed: 24215370]
18. von Wyl V, Klimkait T, Yerly S, et al. Adherence as a predictor of the development of class-specific resistance mutations: the Swiss HIV Cohort Study. PLoS One 2013;8:e77691. [PubMed: 24147057]
19. Zhang S, van Sighem A, Gras L, et al. Clinical significance of transient HIV type-1 viraemia and treatment interruptions during suppressive antiretroviral treatment. Antivir Ther 2010;15:555–562. [PubMed: 20587848]
20. Iqbal K, Huang YA, Peters P, et al. Antiretroviral treatment among commercially insured persons living with HIV in an era of universal treatment in the United States—2012–2014. AIDS Care. 2018;30:1128–1134. [PubMed: 29925249]
21. Derose SF, Green K, Marrett E, et al. Automated outreach to increase primary adherence to cholesterol-lowering medications. JAMA Intern Med 2013;173:38–43. [PubMed: 23403978]
22. Taitel MS, Mu Y, Gooptu A, et al. Impact of late-to-refill reminder calls on medication adherence in the Medicare Part D population: evaluation of a randomized controlled study. Patient Prefer Adherence. 2017;11: 373–379. [PubMed: 28280310]
23. Abughosh SM, Wang X, Serna O, et al. A pharmacist telephone intervention to identify adherence barriers and improve adherence among nonadherent patients with comorbid hypertension and diabetes in a Medicare Advantage plan. J Manag Care Spec Pharm 2016;22:63–73. [PubMed: 27015053]

TABLE 1.

Relative Strengths of Different Pharmacy Data Sources for Implementing a Data to Care Strategy

	Characteristic				
Data Source	**Proximity to Patient**	**Real-Time ARV Claims Tracking**	**ARV Claims Tracking Across Time**	**Catchment Area**	**Data Elements**
Individual pharmacy	+++	+++	+/−	−	+++
Pharmacy network	+++	+++	+	+/++	+++
Insurer	++	+++	++	++	++
PBM *	+	+++	+++	+++	++
Claims aggregator	−	−	++	+/++	−

Relative strengths are denoted with a “+” sign. For each characteristic, cells with a higher number of “+” signs are considered stronger data sources than those with a lower number. “+++” is considered the strongest source. A “−” sign indicates that a data source is weak in the given characteristic.

* PBM, pharmacy benefits manager.