



PROJECT DABS

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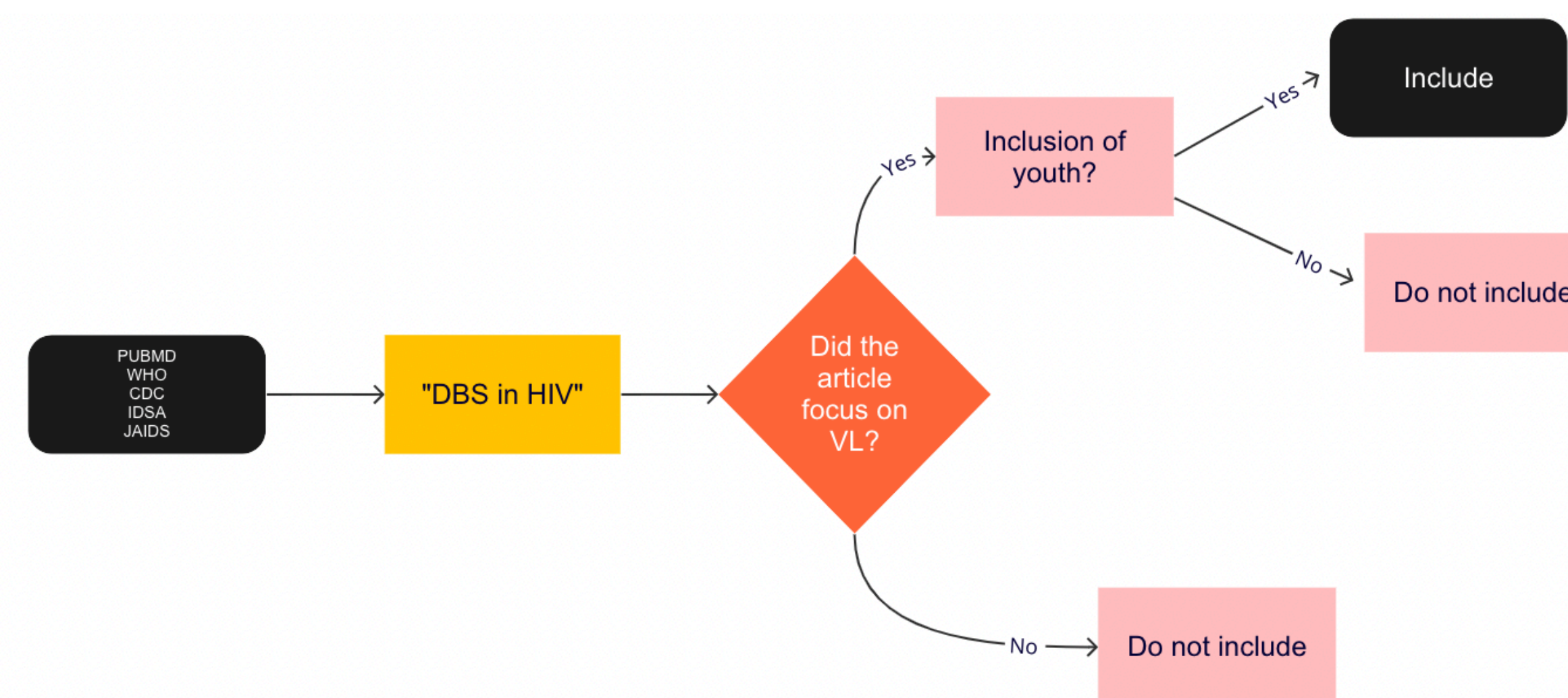
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Introduction

Human immunodeficiency disease (HIV) is an infection that attacks and compromises the immune system. The most advanced stage of the disease is Acquired immunodeficiency syndrome (AIDS) and as of 2021, about 34.8 million people are living with HIV. Fortunately, there are treatments that can delay and stave off AIDS called Antiretroviral therapy (ART). It is crucial that a patient's response to the therapy is monitored and has traditionally been done using blood plasma. Even with a better understanding of the virus, and drug therapy since its discovery, HIV/AIDS continues to be a major global health concern, particularly in resource-limited settings where access to accurate and reliable viral load monitoring is limited. Traditional laboratory-based methods for HIV testing and monitoring often require sophisticated infrastructure and trained personnel, making them impractical in such settings. However, the emergence of dried blood spot (DBS) technology has provided a promising alternative that is simple to use, and suitable for resource-limited settings. Although plasma has been the gold standard of viral load (VL) testing, DBS technology offers several advantages, including simplified sample collection, storage, and transportation. In part, this assists in making VL monitoring more accessible in remote areas with limited healthcare infrastructure. In addition to areas of low healthcare infrastructure, DBS technology can bridge the gap between laboratory-based testing and community-level care, facilitating timely monitoring of treatment response and enabling appropriate clinical management. While DBS technology is useful in reaching hard to access patients, it also provides a cost effective alternative to the costly machinery needed to carry out plasma VL testing. DBS is a promising alternative to plasma tests, but there are still concerns regarding the sensitivity. This is thought to be a result of improper storage, mishandling samples, and time between sample collection and testing the sample. The findings of several papers demonstrate the accuracy, cost-effectiveness, and simplicity of DBS technology. The findings have significant implications for scaling up DBS-based monitoring approaches in resource-limited settings, where access to laboratory infrastructure is limited.

Methodology



Results

Schmitz, Mary E et al. "Field Evaluation of Dried Blood Spots for HIV-1 Viral Load Monitoring in Adults and Children Receiving Antiretroviral Treatment in Kenya: Implications for Scale-up in Resource-Limited Settings." <i>Journal of acquired immune deficiency syndromes</i> (1999) vol. 74,4	We conclude that DBS VL testing is a comparable and practical alternative to plasma for quantification of VL among ART-experienced patients in RLS and can support countries to build sustainable routine monitoring systems to achieve the 90% viral suppression global target.
Johannessen, Asgeir et al. "Dried blood spots perform well in viral load monitoring of patients who receive antiretroviral treatment in rural Tanzania." <i>Clinical infectious diseases</i> : an official publication of the Infectious Diseases Society of America vol. 49,6	DBS performed well in monitoring HIV viral loads in patients who received ART in rural Tanzania, although the sensitivity was reduced when viral burden was low.
Johannessen, Asgeir. "Dried blood spots in HIV monitoring: applications in resource-limited settings." <i>Bioanalysis</i> vol. 2,11	Recently, several African countries have started to use DBS in order to expand the accessibility of HIV testing for infants exposed to vertical HIV transmission.

Discussion

Clinical Implications of DBS on HIV Viral Load Monitoring

- DBS offers a convenient and reliable alternative to traditional venous blood sampling for HIV viral load monitoring
- It involves collecting a small volume of blood on filter paper, which can be easily transported and stored without the need for refrigeration
- DBS allows for easy and cost-effective sample collection, particularly in resource-limited settings or remote areas where access to healthcare facilities may be limited
- The stability of HIV RNA in DBS samples allows for reliable viral load measurement, ensuring accurate monitoring of HIV treatment effectiveness
- DBS has been shown to have a comparable performance to plasma-based viral load testing, making it a viable option for routine monitoring and follow-up of HIV patients
- The simplicity of DBS collection and the reduced need for phlebotomy can help overcome barriers such as patient discomfort, fear, or stigma associated with blood draws, leading to improved patient adherence to regular monitoring

Benefits of At-Home DBS for Youth Living with HIV in the US

- At-home DBS provides a convenient and discreet method for HIV viral load monitoring, allowing youth to monitor their viral load without frequent visits to healthcare facilities
- The ability to perform at-home DBS reduces transportation and time-related barriers, particularly for those who face challenges in accessing healthcare due to distance, transportation costs, or scheduling conflicts
- At-home DBS empowers youth with greater control and involvement in their healthcare, promoting self-management and engagement in their treatment plan
- Privacy concerns and stigmatization associated with visiting clinics for blood draws are minimized with at-home DBS, allowing youth to maintain confidentiality about their HIV status
- Regular monitoring through at-home DBS enables early detection of treatment failure or adherence issues, facilitating timely interventions and adjustments to the antiretroviral therapy regimen
- Youth living with HIV can benefit from increased convenience, reduced anxiety, and improved overall well-being by eliminating the need for frequent clinic visits while still ensuring effective viral load management

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