The HIV/Hepatitis Co-infection Epidemic: A Perfect Storm

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HIV and associated blood borne co-infections, HBV and HCV together create an epidemic of co-infections – ‘the perfect storm’ – that overwhelms us with its magnitude and impact on lives worldwide. Recently approved and validated, promising diagnostics and treatment options for HBV and HCV, have for the first time, instilled hope of reverting their global trajectory. With this welcomed change, the global HBV and HCV disease burden stands at the threshold of change. Affordable RNA and DNA-based POC tests for HBV and HCV will help transform the turnaround time with actionable results for many patients.

The cumulative burden of top viral co-infections HIV, Hepatitis C (HCV), Hepatitis B (HBV) is estimated to be around 550 million\(^1\)\(^-\)\(^3\). Many infections remain undetected. In many areas of the world where consistent screening and access to quality diagnostics are an issue, precise estimates are not available. Additional untested populations range from 75%-80% for HBV, 90% for HCV, and about 50% for HIV\(^4\). In the setting of HIV, progression to end stage liver disease/mortality is rapid\(^5\). As a consequence, HIV and associated blood borne co-infections, HBV and HCV, together create an epidemic of co-infections – ‘the perfect storm’ – that overwhelms us with its magnitude and impact on lives worldwide.

Despite dismal statistics, recently approved and validated, promising diagnostics and treatment options for HBV and HCV, have for the first time, instilled hope of reverting their global trajectory. With this welcomed change, the global HBV and HCV disease burden stands at the threshold of change. This situation is akin to HIV in the early 2000 – when, at that time, expanded access to Antiretroviral therapy, heralded a new dawn in global control of HIV infection. With promising developments in devices and treatments, coupled with a global decline in the number of new HIV infections\(^6\), the distant vision of control of co-infections becomes an achievable milestone. As promising as these developments might be, in many areas of the world where access to health care is limited and quality health care is a luxury, much remains to be done. Resource-constrained ground realities, poor infrastructure, as well as gaps in diagnostic care and clinical care continuum refrain from scripting a new destiny of control. Such gaps act as motivators (for action) and barriers that impede an ideal implementation. Some such gaps are:
**Gap 1:** Affordable Screening and Treatment options: In low and middle-income settings, screening guidelines for HBV and HCV are often not in place. And sometimes, even if guidelines exist, they are not consistently implemented because of lack of resources to procure quality assured test kits. Besides, vaccines for HBV are sometimes not widely available for at risk populations. Oftentimes, not enough resources are allocated to vaccinate all at risk populations. In such highly endemic regions of the world, improved access to quality assured screening and quality vaccines could be a cost-effective control policy. And although newer promising treatments continue to be announced for HCV, many of them are too expensive for much of the world’s population and are not available through any national health program. Sometimes, lamivudine for pregnant women and immunoglobulins for their infants need to be provided, if these are not unavailable due to stockouts and erratic supply chain issues or if public health programs do not cover them. In the light of all these issues, advocacy for an affordable pricing policy for endemic regions of the world is much needed.

**Gap 2:** Updated Screening guidelines across global settings: In many developed settings, screening guidelines for select subgroups/at risk sub-populations (i.e., injection drug users, men who have sex with men, immigrants from endemic settings, commercial sex workers, select birth cohorts), are in place. In contrast, in some developing settings, these guidelines are not in existence. Together, at risk populations account for a huge proportion of the global HIV/HCV co-infected populations – with the highest contribution coming from injection drug users. Some populations face a historic lack of access to quality health care (i.e., immigrant from endemic settings and aboriginal populations), and do not seek screening services as a consequence. In urban areas, at risk populations are heavily screened; in contrast, in rural areas, screening rates are abysmal due to lack of knowledge, awareness, and poor motivation to screen. Clear screening guidelines are a good starting point. These create a framework that aid providers in their action plans in encouraging their patients to get screened.

**Gap 3:** Accurate first line screening and simplified confirmatory tests: Newer rapid point-of-care (POC) tests for HBV continue to be developed. Many are comparably high on sensitivity and specificity parameters to confirmatory tests, which make them ideal for use at the POC. In line with HBV, the accuracies of POC tests for HCV first line screening are also very impressively comparable to lab tests. So if used in conjunction with history and physical examination, these accurate, screening tests become diagnostic tests. Some oral- or whole blood-based POC tests for HCV have high enough accuracy and potential to evolve into self-tests. In settings where enough health care professionals are not available or resources to link patients to care can be effectively mobilized, self tests may be a proactive solution to allow populations to take care of their own health.

For regular screening initiatives, first line POC screening tests that are biomarker-based (antibody or antigen) are great and are becoming more affordable. Sometimes, these tests alone are often not enough for patients with a history and profile suggestive of Hepatitis where much more action is desired by the patient. For in the setting of a reactive test result, confirmatory tests (complicated algorithms) are needed to stage, treat and act on their initial
result. In global settings, many confirmatory tests are expensive, and are not currently available, nor provided for by public health programs. Although screening tests have improved in their accuracies, confirmatory algorithms are required to doubly confirm a first line HBV and HCV reactive, and these include DNA and RNA tests that are not available in many health systems. These tests serve to increase the overall costs of screening for HBV and HCV and the screening strategy then, turns out to be more expensive. Therefore, if rapid biomarker based POC screening tests are to be strategically employed in outreach settings and community clinics, the cost of confirmatory testing algorithms needs to be made affordable.

**Gap 4:** Actionable results: Actionable results with an expedited rapid turn-around time are essential to impacting treatment and control of co-infections\(^1\). Besides, trained physicians are needed to interpret and act on the results. Two physicians – infectious disease specialists and hepatologists – must work in conjunction to rapidly interpret, stage, and create a quality clinical management plan for their patients. And although an actionable result and a quality clinical plan is a reality in many tertiary care settings, it is still a distant dream for peri-urban and rural settings. Lack of trained professionals and lack of affordable diagnostics withhold quality care plans.

Affordable RNA and DNA-based POC tests for HBV and HCV will help transform the turnaround time with actionable results for many patients but health care professionals need to become available either virtually or face to face to help patients in need.

To conclude, critical gaps in service delivery exist and need to be plugged to ensure an equitable access to rapid screening, diagnosis and treatment. But, until these are plugged effectively, the objective of reaching out to populations with co-infections is only half met and much remains to be done to morph the vision of control of co-infections into a tangible achievable strategic plan. And until that happens, we may need to effectively tackle ‘the perfect storm – sunshine mixed with a little hurricane.’

**References:**


