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Integration and co-location of HIV/AIDS, tuberculosis and drug treatment services

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Abstract

Injection drug use (IDU) plays a critical role in the HIV epidemic in several countries throughout the world. In these countries, injection drug users are at significant risk for both HIV and tuberculosis, and active IDU negatively impacts treatment access, adherence and retention. Comprehensive strategies are therefore needed to effectively deliver preventive, diagnostic and curative services to these complex patient populations. We propose that developing co-located integrated care delivery systems should become the focus of national programmes as they continue to scale-up access to antiretroviral medications for drug users. Existing data suggest that such a programme will expand services for each of these diseases; increase detection of tuberculosis (TB) and HIV; improve medication adherence; increase entry into substance use treatment; decrease the likelihood of adverse drug events; and improve the effectiveness of prevention interventions. Key aspects of integration programmes include: co-location of services convenient to the patient; provision of effective substance use treatment, including pharmacotherapies; cross-training of generalist and specialist care providers; and provision of enhanced monitoring of drug-drug interactions and adverse side effects. Central to implementing this agenda will be fostering the political will to fund infrastructure and service delivery, expanding street-level outreach to IDUs, and training community health workers capable of cost effectively delivering these services.

Keywords

HIV; AIDS; Injection drug use; Substance use; Tuberculosis; Health care integration; Health services; Prevention

Introduction

In many communities throughout the world, the HIV/AIDS, tuberculosis (TB) and substance use epidemics are intertwined, each contributing to increased incidence, morbidity and mortality of the other. Injection drug use (IDU) is a leading mode of HIV transmission in parts of Eastern Europe, China (Ouellet et al., 1998), the Russian Federation (Klein, Roberts, & Trace, 2004), and South (Solomon, Chakraborty, & Yepthomi, 2004) and Southeast Asia (Aceijas, Stimson, Hickman, & Rhodes, 2004; World Health Organization, 2005). Among HIV-infected injection drug users, tuberculosis is a leading cause of mortality (Aliyu & Salihu, 2003; Waldrop-Valverde et al., 2006). Both all-cause and TB-associated mortality rates are several-fold higher among HIV-infected drug users than in the general HIV-infected population

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(Corbett et al., 2003; Kourbatova et al., 2006; McShane, 2005; Mosam et al., 2005; Nunn et al., 2005; Sharma, Mohan, & Kadhiravan, 2005). These poor outcomes are largely attributed to the fact that HIV-infected drug users are both less likely to be prescribed highly active antiretroviral therapy (HAART) (Celentano et al., 1998; Strathdee et al., 1998), and, when prescribed, less likely to achieve clinical benefit (Broadhead et al., 2002; Celentano et al., 2001; Loughlin et al., 2004; Lucas, Cheever, Chaisson, & Moore, 2001; Moore, Keruly, & Chaisson, 2004; Rompalo et al., 2001; World Health Organization, 2005). Patients with these diseases thus present serious challenges for adherence, drug dosing, drug interactions, and clinical and laboratory monitoring.

Despite the scope and complexity of the problem, little attention has been paid to developing holistic, comprehensive programmes for these patients. The current health policy paradigm for managing these diseases is fragmented, with services financing and provision separated at international, national and community levels. This paradigm is not fully equipped to address the complexity of care required to effectively treat and care for HIV-infected drug users. Here, we develop an alternative to this paradigm in areas heavily affected by these epidemics. Specifically, we present a rationale for integrating the following three key clinical services:

- Screening, detection and treatment with anti-tuberculosis therapy (ATT) for patients with tuberculosis.
- Voluntary Counselling and Testing (VCT) and comprehensive medical management, including highly active anti-retroviral therapy for HIV/AIDS.
- Screening and treatment of substance use and dependence, including pharmacotherapies for chemical dependence.

Key aspects of integration programmes include: colocation of services convenient to the patient; provision of screening for each disease; training of outreach workers and case managers, mid-level practitioners and physicians in the management of co-morbid conditions; cross-training of specialist providers in the management of each disease; and provision of enhanced monitoring of drug-drug interactions and adverse side effects. Through these strategies, a more holistic approach to these complex patients can be achieved.

Defining integrated care

We favour the definition provided by Mur-Veeman, Hardy, Steenbergen, and Wistow (2003) for integrated care as “an organisational process of coordination which seeks to achieve seamless and continuous care, tailored to the patients’ needs and based on a holistic view of the patient”. This definition, while useful for thinking about complex disease entities like diabetes, is particularly relevant for patients with multiple co-morbidities for whom severely fragmented care may result if services are not integrated.

We provide three broad levels of healthcare organisation as separate, partial and fully integrated models (see Fig. 1 and Table 1). Separate healthcare sites should work towards increased and more effective communication. Partial integration largely involves collaboration of different programmes in the forms of screening, testing and referral to other services. Full integration, on the other hand, provides “one-stop shopping” to the client, utilizing an integrated team to provide comprehensive screening, testing, treatment and management services for each co-morbidity. The integrated approach affords opportunities for disease screening, case finding and prevention of co-morbid conditions and directly observed therapy. Such treatment collaborations have demonstrated feasibility and cost effectiveness (Coetzee, Hilderbrand, Goemaere, Matthys, & Boelaert, 2004;Currie, Floyd, Williams, & Dye, 2005).

While the fully integrated approach should be viewed as the ideal situation, it may not be attainable immediately due to funding shortfalls or organisational and political constraints. As such, it should be viewed as a goal to be evolved over time. Below, we provide some key aspects of a fully integrated programme. Note, however, that particular aspects may be implemented piecemeal depending upon local conditions, laws and policies (Fig. 2).

Key aspects of integration programmes

Screening and testing for comorbid conditions

A first step towards integration is to develop screening and testing services for each condition. The most studied programmes in this realm are from providing HIV voluntary counselling and testing (VCT) at TB clinics, VCT and tuberculin skin testing at drug treatment programmes (Altarac & Dansky, 1995), and screening for substance use and tuberculosis (Alaei, Alaei, & Mansouri, 2002; Brassard, Bruneau, Schwartzman, Senecal, & Menzies, 2004) at HIV care sites (Table 2).

Both patient- and provider-initiated VCT can be provided at substance use treatment sites (Grusky et al., 2006; Gunn et al., 2005; Lally et al., 2005). There is increasing evidence, however, that opt-out, provider-initiated HIV testing may be more effective at identifying cases of HIV and has been demonstrated to be cost effective (Paltiel et al., 2005; Walensky et al., 2005). In settings where testing facilities are limited, providing HIV screening as well as screening for other infectious diseases (e.g., hepatitis B and C) at health clinics and rehabilitation programmes for drug users is one way to target individuals at greatest risk. To reduce costs and improve acceptability, appropriate use of technologies such as urine or saliva-based HIV testing may be considered (Lee, Lee, Wan, & Wong, 2006).

A major issue with screening drug users for tuberculosis is the high rate of failure to follow-up for readings of tuberculin skin testing. To increase return for tuberculin skin screening among drug users, financial incentives have been used (FitzGerald et al., 1999). Additionally, linkage to other daily treatment programmes can increase uptake. For example, integrating tuberculin skin testing with methadone treatment services can increase uptake because methadone is positively reinforcing. Indeed, integration of screening and chemoprophylaxis for latent tuberculosis at methadone maintenance clinics is likely highly cost effective (Snyder et al., 1999).

Co-location of services

Co-located services are being utilised more extensively as a means towards providing comprehensive care to complex, marginalised patient populations. These are especially useful for IDUs, who have complex preventive, psychosocial and medical needs. Co-location is not simply about physical proximity of distinct services, but rather represents an attempt to integrate the care of patients with multiple co-morbid conditions under the supervision of a single clinical team.

Co-location is substantially complicated by substance use. On the one hand, drug users are less likely to utilise government or other conventional health services. Making these services more favourable towards drug users is crucial if integration is going to be centred on existing conventional HIV or TB services. On the other hand, non-drug-using HIV+ or tuberculosis-infected clients may view drug users unfavourably, making it less likely for communities and providers to accommodate drug services. In some cases, the only way to solve this may be to develop integrated services that cater particularly to drug-using clientele. For example, services could build off of existing drug rehabilitation (Gunn et al., 2005) or syringe exchange programmes (Altice, Springer, Buitrago, Hunt, & Friedland, 2003; Altice, Bruce, Walton, & Buitrago, 2005).

Provision of effective substance use treatment

Provision of pharmacotherapy for substance dependence is an expanding and crucial aspect of providing comprehensive care to patients with multiple co-morbid conditions. Currently, the paradigm for this comes from opioid agonist therapies, notably methadone and buprenorphine. Pharmacotherapies for alcohol exist and are in development for stimulants (e.g., cocaine and methamphetamine). The lessons learned through opioid dependence therapy should be directly transferable. In the US and France, programmes integrating buprenorphine and HIV treatment have been piloted and achieved improved clinical outcomes (Altice et al., 2006; Basu, Smith-Rohrberg, Bruce, & Altice, 2006; Carrieri et al., 2003; Lucas, 2004; Sullivan & Fiellin, 2005; Sullivan, Metzger, Fudala, & Fiellin, 2005). In this issue, there are emerging data from the Ukraine demonstrating successful integration of HIV and buprenorphine treatment services as buprenorphine became publicly available (Bruce, Dvoryak, Sylla, & Altice, 2007).

Providing substance use services in the clinical setting produces additional complexities. Substance misusers can be frustrating to treat, and some medical providers may not wish to engage in substance use management. Many providers who are comfortable managing HIV or TB are not comfortable working with drug users, and may themselves have “moral issues” with those who use drugs.

Drug users tend to be amongst society’s most marginalised individuals, and often are the targets of harassment by police. This problem is particularly severe in Central Asia, and likely contributes to the high prevalence of syringe sharing, which reaches up to 70% in some areas (Hunt, Trace, & Bewley-Taylor, 2005; Klein et al., 2004).

Given the often hostile political climate towards substance use in general and substitution therapy in particular (Dworkin et al., 2005), these academic efforts need to be combined with grassroots and international activism. Lessons learned from the international movements to expand access to primary care and to anti-retroviral medications should be applied in developing the political will to translate research findings into legislative and policy changes.

Enhanced monitoring for adverse events

A major benefit of effective, integrated services providing multiple interventions to individual patients is avoiding adverse clinical events and unfavourable drug-drug interactions. Hepatic side effects are prominent among these. For example, in one study of 372 episodes of culture-confirmed tuberculosis among HIV-infected patients (of whom 44% reported IDU as the mode of HIV transmission), 25% of patients had evidence of hepatic disease, and 31% developed elevations of liver transaminases greater than two times the upper limit of normal during anti-tuberculosis therapy (Bruce, Altice, Gourevitch, & Friedland, 2006; Foisy & Akai, 2004). These topics have been explored elsewhere (Narita, Ashkin, Hollender, & Pitchenik, 1998; Price et al., 2001).

Compounding the complexities of drug-drug interactions is the phenomenon of immune reconstitution syndrome (IRS), which occurs in over 30% of patients who receive both HAART and antituberculosis therapy (Bruce & Altice, 2003). Managing IRS effectively requires clinical astuteness to differentiate from clinical failure or other AIDS-associated conditions.

Laboratory monitoring, particularly of hepatitis, providing dosage adjustments for dealing with drug-drug interactions, and dialoguing with patients about adherence to all regimens, are critical for managing co-morbid conditions and avoiding adverse effects. Integrating services can help to reduce duplication of lab tests and to provide more effective dosing, which may decrease costs. Clinical staff and pharmacists must receive adequate training about drug-drug interactions and managing adverse side effects. Some possible strategies include the use of

electronic medication reading devices, point-of-care laboratory diagnostics and standardised clinical screening tools such as the Clinical Opioid Withdrawal Scale.

Cross-training of generalists and specialists

The optimal management of complex patients requires comprehensive cross-training and integration amongst specialists in the fields of HIV, TB and substance use (Abdool-Karim, Abdool-Karim, Friedland, Lalloo, & El-Sadr, 2004). There also remains a need for generalist outreach workers or case managers and clinicians who can manage complex patients. Unless there is one clinician who is responsible for coordinating the overall care of the patient, it is likely that certain conditions will be attributed to the treatment of one of the other co-morbid conditions and not get resolved properly because it is the expectation that someone else must deal with the issue. In an HIV-infected patient with elevated hepatic transaminases, for example, such an adverse effect could easily be attributable to one or more of the agents treating HIV or tuberculosis, to various drug-drug interactions, or to acute or chronic viral hepatitis. Without someone coordinating care, the HIV specialist might wait for the TB specialist to alter the regimen and vice versa and the patient may ultimately go untreated.

There are several important challenges associated with cross-training specialist and generalist providers. Clinicians already overburdened with managing one disease may be reluctant to invest the time to develop clinical proficiency in the other disease or to take-on additional clinical management responsibility. The work culture and philosophy of different disease-based programmes may be vastly different. For example, TB has a well-established standardised system of care, focused on identification and cure of smear-positive using the Directly Observed Therapy-Short Course strategy and public health enforcement measures. In contrast, HIV care tends to be more patient centred.

Evaluation of integration

Effective methodologies for the evaluation of these programmes must be developed. Evaluation can be divided into both programmatic and patient-oriented outcomes, the former dealing with the number and quality of integrated services provided, and the latter assessing the rates of morbidity, mortality and adverse events amongst the different patient populations. Table 3 provides an overview of these key outcomes. It will be critical for integration programmes, as they expand, to prospectively collect these types of outcomes data, both for internal monitoring purposes and for publication and dissemination amongst providers and programme managers worldwide. Without such documentation, it is unlikely that replication efforts will persist.

Model programme: our experience in inner-city America

Integration may be catalysed by generalist providers who realise that, in order to meet the complex needs of their patient population, they need to provide comprehensive services. This has certainly been our experience developing a mobile health care programme in New Haven, CT, USA, where primary health care was made available to IDUs at sites proximate to the local syringe exchange programme.

Initially, VCT, case management and acute care were provided. Upon recognizing the multiple needs of these complex patients, services were expanded to include screening and treatment for HIV/AIDS, sexually transmitted diseases, viral hepatitis, tuberculosis and opioid dependence (Liebman, Pat Lamberti, & Altice, 2002). Treatment for HIV and TB are now supervised as directly administered therapy. Buprenorphine treatment has been integrated into onsite HIV services as well. We have shown in this context that the use of co-located medical and case management services resulted in improved clinical outcomes (Smith-Rohrberg,

Mezger, Walton, Bruce, & Altice, 2006). As individual components are added to existing programmes, the expertise of the generalist staff has also grown, and they have become more adept at managing multiple conditions and at dialoguing with specialists.

Conclusions

The case for integration of HIV/AIDS, tuberculosis and substance use treatment services is strong, potentially allowing clinicians and policymakers alike to treat single patients and populations as whole rather than as fragmented parts. Large resources and considerable political will by capable planners will be needed for infrastructure development of treatment integration-friendly national policies. As more data become available about these programmes, refinements and improvements can be made, hopefully producing rigorous and flexible guidelines for how countries and communities can provide comprehensive, integrated care to their most complex and vulnerable patient populations.

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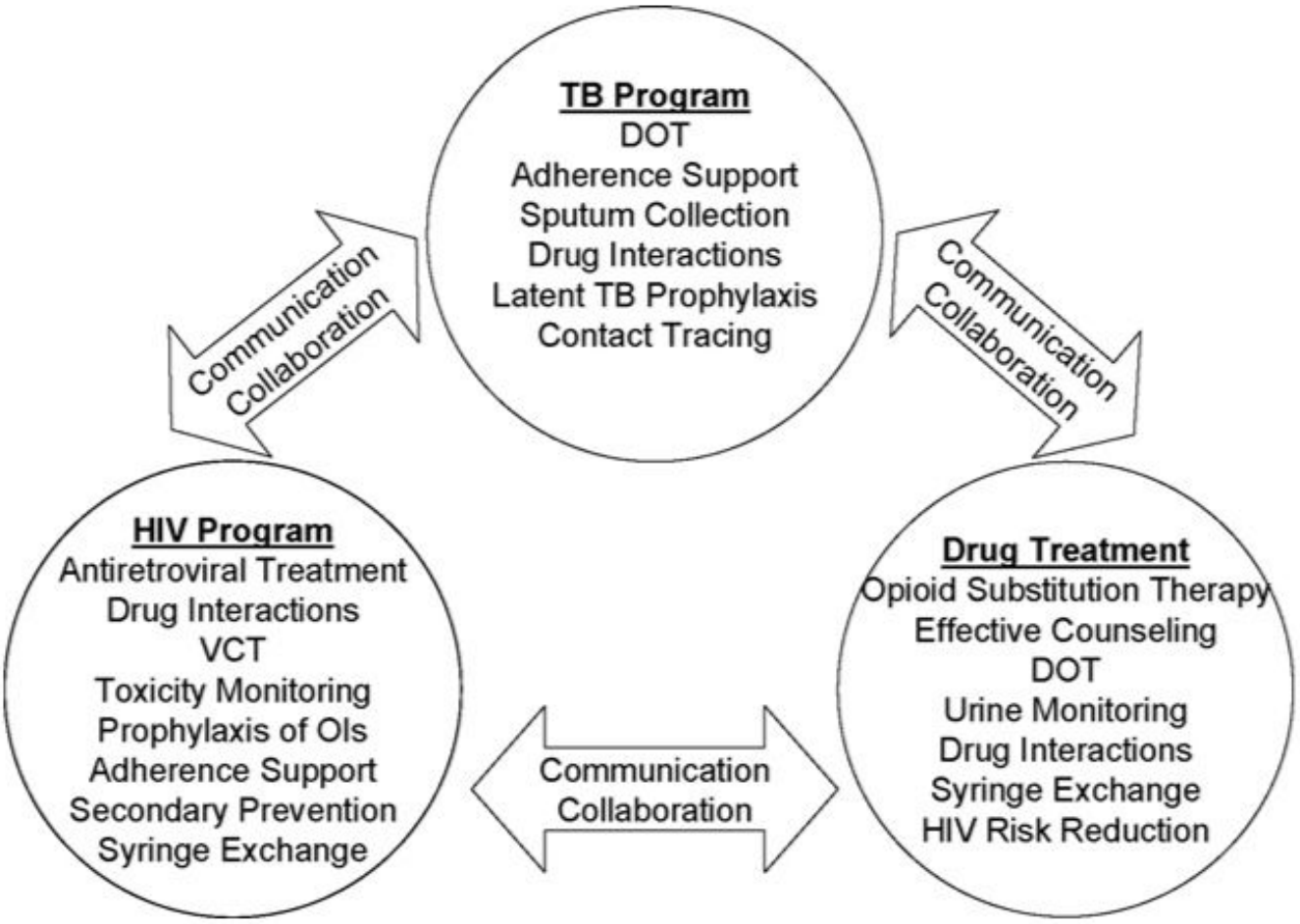

Fig. 1.
Initial approach towards successful integration.

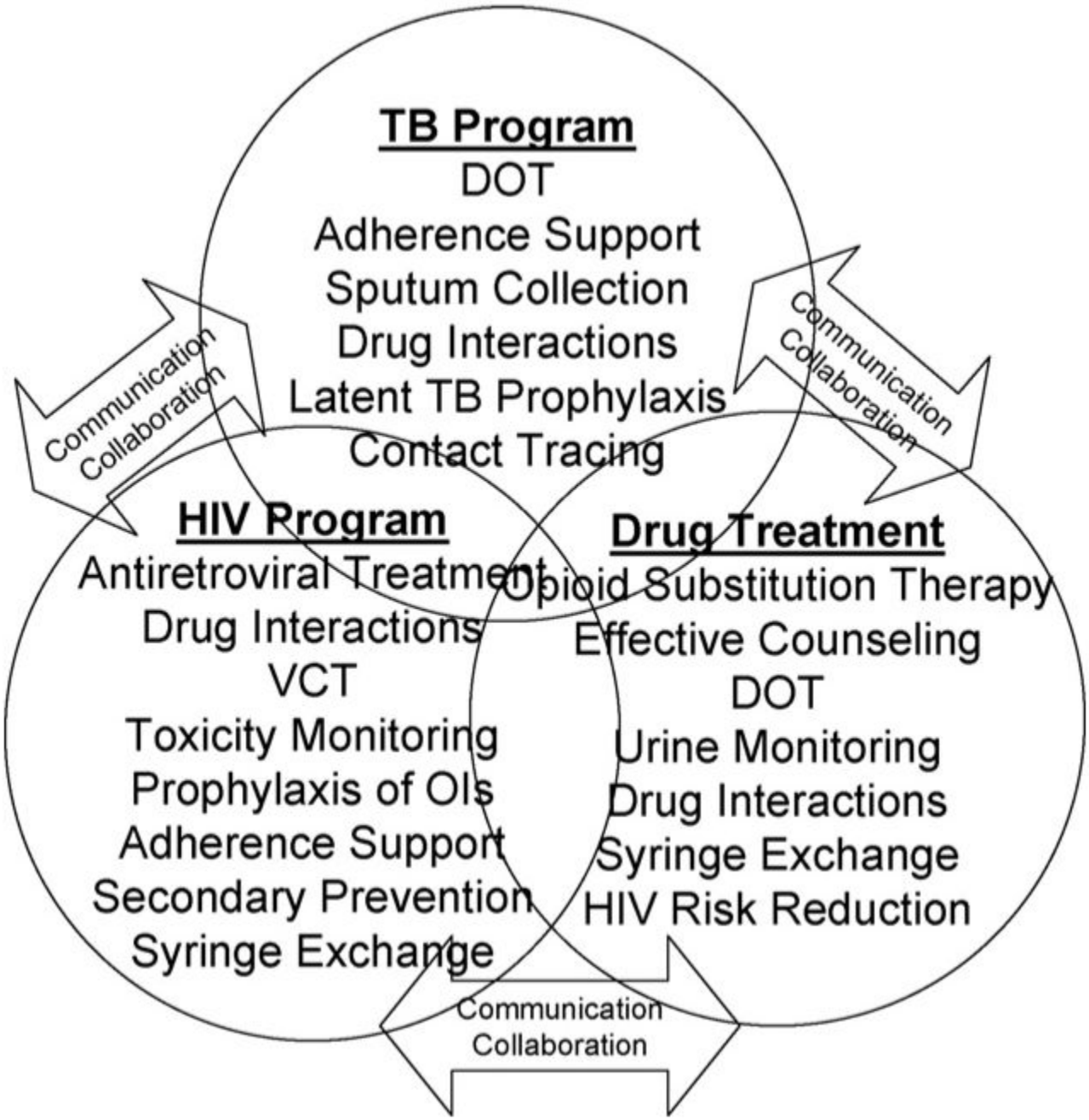

Fig. 2.
Later approach towards successful integration.

Table 1

Moving towards HIV/TB/drug dependency treatment integration

Separated services	Site integration	Complete integration
Totally separated services	Where models are co-located physically, but not organically	Models are co-located physically as well as organically
Separate services with referral mechanisms in place	Screening on site for co-morbid conditions	Screening on site for co-morbid conditions
	-Routine HIV/TB testing in drug treatment centres	-Routine HIV/TB testing in drug treatment centres
	-Routine HIV/drug dependency screening in TB clinics	-Routine HIV/drug dependency screening in TB clinics
	-Routine TB/drug dependency screening in HIV clinics	-Routine TB/drug dependency screening in HIV clinics
	Specialty clinics operate separately within same physical location OR share administrative systems/staff	Providers cross-trained in HIV/TB/drug dependency management
	Providers cross-trained in HIV/TB/drug dependency management but provide care in their primary specialty area and refer to other co-located programs for management of other conditions	Multiple specialists available on site, working as an integrated team; multi-disciplinary case discussions; shared patient charts and records OR cross-trained provider can manage HIV/TB/drug dependency in their patients with consultation as needed, including: Management of HIV with ARVs TB prophylaxis/treatment Opiate substitution therapy DOT for HIV/TB/opiate substitution provided by same DOT worker
	Memorandums of understanding between programmes to facilitate prioritisation of shared patients	

Table 2

Key characteristics of an integration programme

Characteristic	Rationale	Challenges
Co-located services	Convenience for client	Coordinating multiple providers
	Logistical simplification	Space limitations
Monitoring for adverse drug effects (ADEs)	High incidence of ADEs in co-morbid patients treated for multiple diseases	Limited resources
	Detrimental impact of ADEs on adherence	Lower access to technology
		Staff less accustomed to technology
Cross-training of specialists	Effectively engage specialists in the comprehensive care of patients	Rigidity on the part of staff to new, foreign areas of medicine
	Each specialist can help in educating each other, building team synergy	Defining roles, setting safe limits, and avoiding “turf wars”
		Overcoming stigma providers may hold towards those with “other” condition
Generalist staff	Likely cost effectiveness benefits	Difficulty mastering multiple complex domains of knowledge
	Coherence in care	Training and recruitment
	Improved patient-provider relations	Establishing expertise limits and maintaining specialist referral link ages

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Table 3

Key outcomes in assessing the impact of an integration programme

Programmatic outcomes: screening and testing
Number of TB patients offered, HIV VCT, receiving an HIV test, and detected as HIV+
Number of HIV patients screened for TB
Number of HIV and TB clients screened for substance abuse
Number of patients receiving drug treatment screened for TB
Number of patients receiving drug treatment offered, HIV VCT, receiving an HIV test, and detected as HIV+
Programmatic outcomes: treatment
Number of HIV-positive clients with LTBI receiving chemotherapy
Number of active TB clients with HIV receiving HAART
Number of HIV-positive drug users receiving drug treatment counselling
Number of HIV-positive drug users receiving substitution pharmacotherapy
Number of drug users receiving TB treatment
Programmatic outcomes: staff issues
Number and percent of providers routinely screening/increasing screening for co-morbid conditions
Number and percent of providers participating in cross-training opportunities
Providers' self-reported comfort and satisfaction levels in managing co-morbid conditions
Changes in clinic organisational and communication structures
Patient-oriented outcomes
Urine toxicology positivity rates amongst TB and HIV drug users
Drug treatment entry rates amongst TB and HIV drug users
Morbidity from TB amongst HIV-positive clients
Incidence of ARV-related, TB-related, and substitution pharmacotherapy-related adverse drug events
Incidence of adverse drug events specifically related to drug interactions
Ancillary medication utilisation for the treatment of side effects