PMTCT

1 Scope of programs and activities

1.1 PMTCT Program

Ukraineôs national prevention of mother-to-child HIV transmission (PMTCT) program focuses on providing services based on the November 2007 revised clinical protocols (Ministry of Health of Ukraine 2007a, Ministry of Health of Ukraine 2007b). These services are largely focused on ñProng 3ò of the four-pronged PMTCT strategy, and in general are in line with global guidance for PMTCT strategic interventions, although that global guidance is expected to change in 2013. Annex A outlines Ukraineôs PMTCT services, which are provided primarily in the public sector. The PMTCT protocols also call for PMTCT services to be provided in correctional facilities; require training of medical and non-medical personnel in the provision of PMTCT and social support services for HIV-positive women, their infants, and families; and assign doctors responsibility for assessing treatment adherence among pregnant women (Justice, 2011).

Critical Intervention: Four-pronged strategy to prevent HIV among infants and young children

Prong 1: Prevent HIV among women of reproductive age
Prong 2: Provide appropriate counseling and support to women living with HIV to enable them to prevent unintended pregnancies
Prong 3: For pregnant women living with HIV, ensure HIV testing and access to the antiretroviral drugs that will help mothers' own health and prevent transmission to their babies during pregnancy, delivery and breastfeeding
Prong 4: Integrate HIV care, treatment and support for women found to be HIV-positive and their families

The PMTCT program in Ukraine has shown excellent progress. Its sustained success and continued improvements over the past decade in coverage of key services makes it one of the most successful AIDS response programs in Ukraine. It has also achieved high success relative to other countries. Figure 1 shows data from 2011 for several key indicators, all of which have risen over the past several years (Martsynovskaya 2012).

Whereas there has been good success in delivering Prong 3 services, less attention has been paid to the other three prongs, and there remain challenges even to further sustained progress in Prong 3 that would allow reaching the 2015 goal of <2% mother-to-child transmission rate. Ongoing gaps include late access of services by marginalized women, often tied to stigma; difficulty in accessing multiple systems of care; weak systems of follow up of HIV+ women after delivery; inadequate support for social services to meet the special needs of HIV-infected pregnant women and new mothers; and gaps in health care worker knowledge and attitudes about the needs of this population.

Although there was good progress on some of the recommendations from the external evaluation done in 2007 (UNAIDS Ukraine 2009), several key recommendations, such as national coordination of the PMTCT program and scale up plans for the 4 Prongs of PMTCT have not been implemented.

Financing for Ukraineôs PMTCT program in 2010 was 46,434,045 Hryvnia[1], an 11% increase from 2009, and representing 8% of total national AIDS financing and 36% of HIV prevention financing (similar percentages as 2009) (Ministry of Health of Ukraine 2012). Of these funds, 93% were from public

[1] 1 US dollar = approximately 8 Ukrainian Hryvnia.

sources, 7% from international sources, and <1% from private sources. Of the public funding, 78% was from the central/national level, 21% from the sub-national level, and 1% from other public sources.

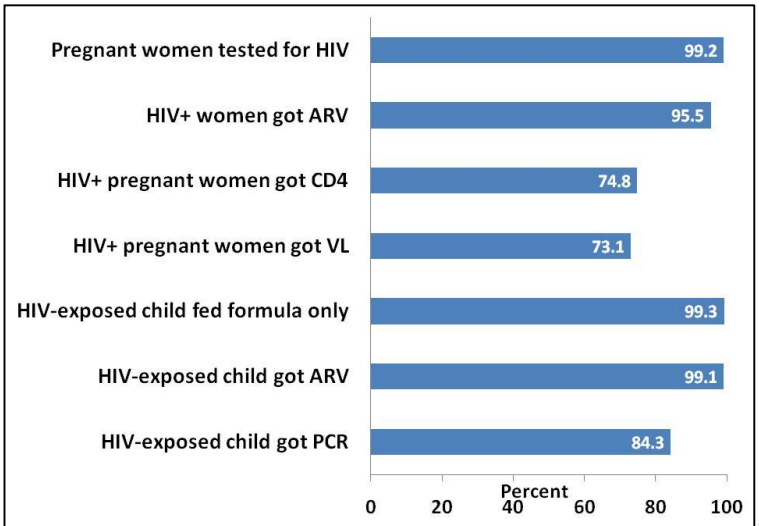

Figure 1. National PMTCT Indicators, Ukraine, 2011 (From Martsynovskaya 2012)

1.2 Importance

Ukraine's PMTCT program is of medium importance to the impact on the epidemic and on reaching Millennium Development Goal 6. Numerically, children (~5% of new infections[2]) and pregnant women (~5% of registered HIV-infected persons[3]) comprise a relatively small proportion of the HIV epidemic in Ukraine, and HIV-infected children are not a major driver of subsequent transmission to others. Nonetheless, PMTCT in Ukraine is important for several reasons. First, with current tools and protocols, virtually all HIV infections in children can be prevented and their HIV-infected mothers can remain healthy. Second, the number of children born at risk for HIV infection each year is growing. Third, the Ukrainian government supports global (UNAIDS, 2011a) and regional (World Health Organization Regional Office for Europe, 2010) goals for eliminating new HIV infections in children (<2% mother-to-child transmission rate) and keeping their mothers alive, and should continue to demonstrate its commitment in making progress towards these goals. Fourth, the interaction of women (and men) with the health care system during pregnancy, delivery, and the postpartum period provides access to otherwise marginalized populations in need of HIV prevention, care, and treatment services. Finally, the nearly universal testing of pregnant women provides unique information on the general population, and a window on changing dynamics of the HIV epidemic. In addition to contributing to the Millennium Development Goal 6, progress in this area also contributes to Goals 4 and 5.

2 Strengths and Achievements

Table 1: Major targets and results		
NAP 2009 – 2013 targets	**2013 Target**	**2011 Results**
Mother-to-child HIV transmission rate	<2%	4.7%
Percent of HIV-exposed children having polymerase chain reaction testing	100%	84.3%
Other		
Percent of pregnant women tested for HIV	n/a	99.2%
Percent of HIV-infected pregnant women taking ARV	n/a	94.5%

Program successes to date can be attributed to a number of key factors, as follows.

[2] Based on an estimated 185 children infected in 2011 (3,938 children born to HIV+ mothers X 4.7% transmission rate), as a percentage of the estimated 3,500 total new infections in Ukraine in 2011.
[3] Based on 5,527 registered HIV+ pregnant women as a percentage of the 120,148 registered persons living with HIV infection in 2011.

High-level political commitment and policy support for eliminating mother-to-child transmission. In June 2012, the President signed on to the global and regional effort to eliminate new HIV infections in children and keep their mothers alive by 2015 (UNAIDS, 2011a and World Health Organization Regional Office for Europe, 2010), setting the political stage for achieving these targets. The Minster of Health (vice-Prime Minister) strongly supports this initiative. In addition, comprehensive policies around HIV testing, ARV use, infant feeding, and other aspects of PMTCT have been adopted (Ministry of Health of Ukraine 2007a, Ministry of Health of Ukraine 2007b), health care workers seem to be closely following these policies, and most have adequate budgetary support (Ministry of Health of Ukraine 2012).

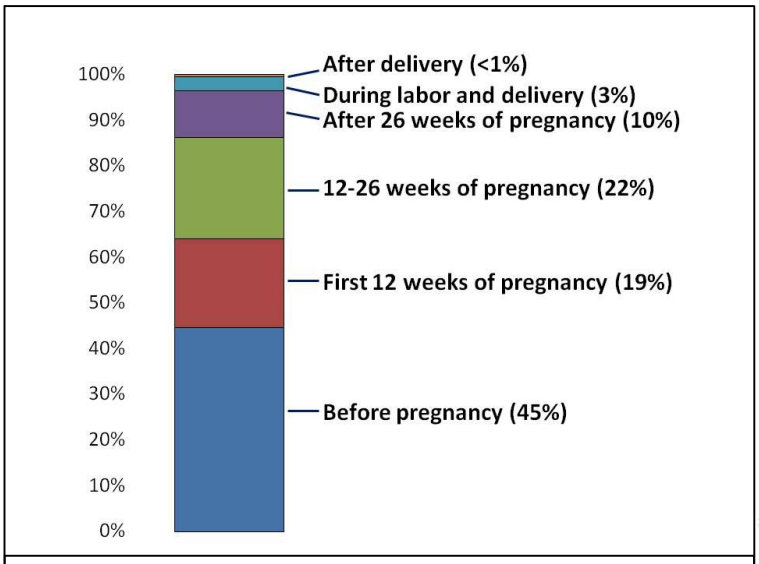

Figure 2. Timing of HIV testing among HIV+ pregnant women, Ukraine 2011 (n=5,527) (From Martsynovskaya 2012).

Excellent scale up and high coverage of HIV testing. PMTCT testing services have been widely decentralized, with all womenôs consultation clinics providing HIV testing and all maternity hospitals having been trained and equipped to provide intrapartum rapid HIV testing. Nearly universal coverage of HIV testing in pregnancy (99.2%) has been achieved during the past several years (including 97.5% of women who had more than one HIV test in 2011). Improvements have also been seen in early awareness of HIV status among pregnant women (see Figure 2). Nearly half of HIV+ women were aware of their HIV infection status prior to pregnancy (an increase from an estimated 25% in 2000/2001 (Thorne et al, 2009), and 64% of HIV+ women had tested positive by the end of the first trimester of pregnancy, in time to start full ARV prophylaxis. This is true even among high risk groupsð among pregnant women who inject drugs, an increasing proportion were aware of their infection status at conceptionð from 31% in 2000/2001 up to 60% in 2008/2009 (Thorne et al, 2012a).

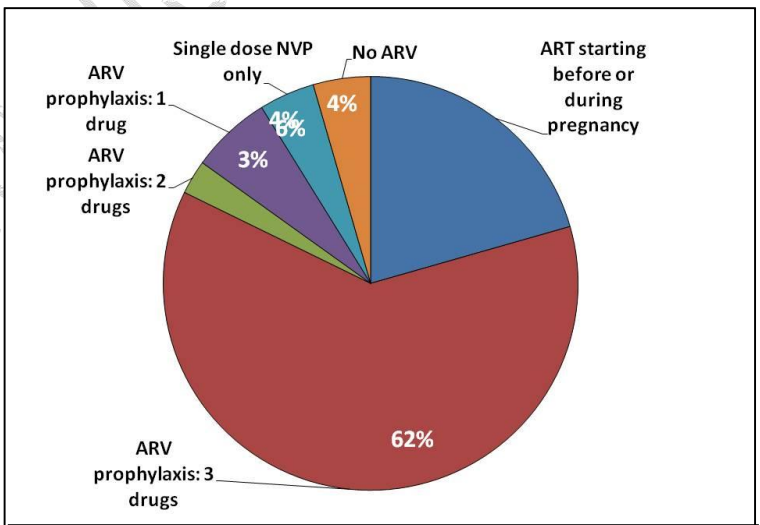

Figure 3. Antiretroviral prophylaxis (ARV) or treatment (ART) during pregnancy among HIV+ women giving birth, Ukraine 2011 (n=3,939) (From Martsynovskaya 2012).

Rapid scale up of services to prevent mother-to-child transmission, including ARV prophylaxis, CD4 and viral load testing, elective cesarean section, and avoidance of breast feeding. Overall, coverage with either ARV prophylaxis or ARV treatment was 94.5% in 2011, with coverage >90% in every region (Martsynovskaya, 2012). Moreover, since changing policy in 2007, there has been an increasing use of triple-drug ARV prophylaxis in pregnancy, with now 82.2% of women on

either full ARV treatment for their own health or on triple-drug ARV prophylaxis (see Figure 3), up from 68.2% in 2010. The European Collaborative Study reports that the use of combination antiretroviral therapy for PMTCT (WHO Option B) increased from 12% of women receiving PMTCT in 2008 to 55% in 2010, and that 91% of pregnant women who were eligible for antiretroviral treatment in 2010 received it (Bailey et al, 2012). The uptake of infant ARV prophylaxis was also high, at 99.1% of HIV-exposed children born in 2011. Delivery was by elective Cesarean section in 22.1% of HIV infected women in 2011, and less than 1% of HIV-infected new mothers breastfed their babies. Steady progress also has been made in scaling up more sophisticated laboratory testing. In 2011, 74.8% of HIV+ pregnant women in Ukraine received a CD4 count and 73.1% received a viral load test. Of the 3,938 children born to HIV-infected mothers, 84.3% had a polymerase chain reaction test to determine their HIV status.

Declining rate of transmission to children. As a result of the increasing coverage of these interventions over the past several years, the rate of mother-child HIV transmission has declined steadily, reaching 4.7% in children born to HIV-infected mothers in 2009, the most recent year in which estimates have been calculated (see Figure 4). Moreover, several regions of Ukraine have reported achieving a transmission rate of <2%, the 2013 national target. Expressed as a case-rate, in 2011 there were an estimated 37 cases of infant HIV infection per 100,000 live births[4]. This compares with approximately 4 in the United States (Taylor A, Little K, Zhang X 2012) and more than 1000 in southern Africa countries[5].

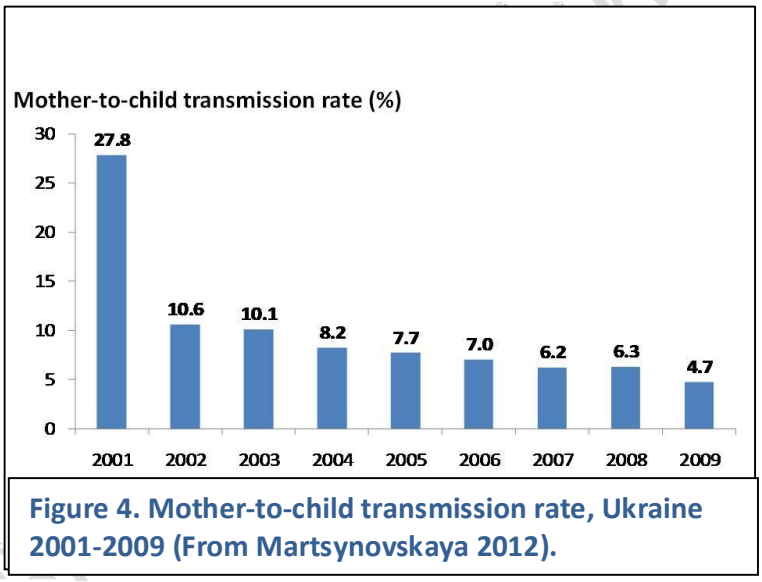

Figure 4. Mother-to-child transmission rate, Ukraine 2001-2009 (From Martsynovskaya 2012).

Network of NGOs that provides key support. A strong NGO system supplements the public health care system in several relevant areas: advocacy to address stigma and discrimination and to increase support for HIV-exposed children, medical and social services for HIV-exposed and infected children, procurement of ARVs and some infant milk formula, and support for assisted reproductive technologies for discordant couples (All-Ukrainian Network of PLWH, 2011). However, these NGOôs are largely dependent on funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria, a funding source which is expected to end soon.

UNICEF pilot model for addiction services in pregnancy. UNICEF is supporting a pilot project in 3 cities that seeks to develop and learn from a model of providing integrated and comprehensive services for drug-dependent pregnant women and their children. A recent assessment of this pilot found that its integrated case management approach ñis contributing to improvements in access to care and treatment and increasing cooperation across medical disciplines.ò(UNICEF Ukraine, 2012)

High pediatric ARV treatment access. With the establishment of the national pediatric clinical care center and other activities, access to pediatric ARV therapy has been excellent. In 2011, 2,268 (94%) of 2,406 eligible children were on ARV treatment. Moreover, access to pediatric ARV formulations and to second line therapy is reported to be good.

[4] Based on an estimated 185 children infected in 2011 (3,938 children born to HIV+ mothers X 4.7% transmission rate), and 502,595 live births in 2011 (See Annex C).
[5] For instance in Namibia, there were an estimated 1,100 new HIV infections in infants born among the approximately 59,000 live births in 2010 (UNAIDS, 2011b).

3 Weaknesses and Challenges

Despite the impressive progress of Ukraine's PMTCT program, there remain challenges that will need to be addressed to achieve the 2013 target of <2% transmission, to further reduce the absolute number of new HIV infections in children in the face of a growing number of HIV-infected pregnant women, and to sustain the program success.

Poor access and late entry into antenatal care among high-risk pregnant women. In 2011, injecting drug use was identified as risk factor in 19.1% of reproductive-aged women, and 3.5% of pregnant HIV+ women were active drug users (probably an underestimate due to the stigma of admitting drug use, especially in pregnancy) (Martsynovskaya, 2012). Only 29 of 395 (7.3%) of pregnant HIV+ pregnant women who used drugs got substitution maintenance therapy and most opioid dependent pregnant women continued using drugs during pregnancy. Pregnant women who have injected drugs have worse outcomes than other women: more advanced disease (14% vs. 6%), less access, more adverse outcomes (preterm delivery 16% vs. 7%), and a higher mother-to-child transmission rate (Thorne et al, 2012a). They are also 3.5 times more likely to be diagnosed with HIV in labor than other women (Thorne et al, 2012a). Moreover, relatively few HIV+ pregnant women who had injected drugs received ARV prophylaxis (65% compared with 94.5% overall). Other women at high risk, including migrants, refugees, and homeless women, are also marginalized from the health care system. This poor access is a major contributor to HIV infections in children. The European Collaborative Study reports that 42% of transmissions to children in Ukraine occurred among the 8% of HIV+ women who had not taken antiretroviral medications in pregnancy.

Continued stigma against HIV-infected and socially marginalized populations by health care workers. Many pregnant women who have used drugs feel stigmatized and unwelcome in health care facilities so end up rejecting or delaying needed HIV prevention, HIV testing, and MCH services. In addition, although HIV testing of pregnant women has been successfully integrated into the women's consultation centers, some of these centers appear to prioritize immediate referral of HIV+ women to AIDS centers over assuring that women are effectively counseled to understand their diagnosis and the referral process.

Gaps in health systems. Gaps in several health system areas interfere with the effectiveness of the PMTCT program. First, weaknesses in governmental procurement procedures for drugs and commodities along with budget shortages have caused interruptions of supply of drugs for ARV prophylaxis and treatment and of HIV test kits, requiring extraordinary measures to fund these supplies from local budgets. Second, restrictions that limit the distribution of ARV medications by only doctors in the AIDS Centers (rather than dispensing from pharmacies like most other medications) puts a burden on the clinicians to manage this dispensing, and reduces access to medications to women who live far from the AIDS Centers. Third, critical delays have been reported in receiving HIV test results in some rayon centers that rely on central laboratories for testing. Fourth, under-financing of the health system leads to high out-of-pocket expenses for HIV+ women, especially those having cesarean section deliveries. Finally, although there has been good progress, there are still gaps in the provision of CD4, viral load, and early infant diagnostic testing.

Refusal of ARV by some HIV+ pregnant women. Refusal by some HIV+ pregnant women to take ARV medications during pregnancy was reported anecdotally. This is apparently due to cultural beliefs surrounding medications during pregnancy, complicated by lack of understanding by these women of the role of ARV medications in preventing HIV transmission to children and keeping themselves healthy.

Services for high risk and HIV+ women provided by NGOs lack long-term funding.
There does not seem to be any plan for how to fund needed social services and adherence support currently provided to pregnant women, new mothers, and families by Global Fund-supported NGOs once the Global Fund grant ends in 2014.

Upward trend in number of HIV+ pregnant women, especially women infected sexually. (See Section 4)

Weak follow up of HIV-infected women after delivery. (See Section 4)

Multiple, separate systems providing services to HIV-infected women and children. (See Section 4)

4 Key Bottlenecks and Solutions

Table 2. Prioritized bottlenecks (all prongs) and possible solutions (see Annex D for prioritization of bottlenecks)

High priority bottlenecks	Possible solutions
1. New infections occurring in pregnancy and lactation are increasing and going undetected.	Develop and implement protocols for routine HIV testing of male partners of pregnant women to identify discordant couples and for starting immediate ARV therapy for all HIV+ members of discordant couples identified in pregnancy.
	Strengthen protocols for early identification of high-risk pregnant women and integration of oral substitution therapy and other addiction treatment services into antenatal and maternal services to reduce exposure of drug-using and other high-risk pregnant women and new mothers to HIV. Adapt UNICEF-supported pilot to other areas with concentration of drug using pregnant women.
2. Weak follow up systems for HIV+ women postpartum lead to inadequate services and risk of poor health.	Develop and implement protocols for interdisciplinary medical and social monitoring and care for HIV+ women post-partum.
	Establish a priority indicator to track the survival and immune competence of HIV+ mothers at 18 months to focus on follow up of women.
3. Stock outs of HIV test kits, infant formula, and other commodities have interfered with providing proper PMTCT services.	Strengthen the procurement process.
	Assure adequate budgeting for needed commodities.
4. Multiple, separate systems provide services to HIV-infected women and children.	Develop protocols for an effective case management system to support HIV-infected pregnant women
	Develop, implement, and monitor national and region-specific operational plans for the elimination of new HIV infections in children and keeping mothers alive through treatment.

Bottleneck 1. New infections occurring in pregnancy and during lactation are increasing and going undetected. The number of HIV+ women of reproductive age who were reported in Ukraine is steadily increasing. In 2011, 7,146 women were reported, up 61% from the 4,428 women reported in 2005 (Martsynovskaya, 2012). In addition, percentage of reproductive-age women who were infected sexually has increased from 70% in 2005 to 81% in 2011. The percentage of HIV-infected pregnant women who were presumed to have been infected from having injected drugs decreased to only 8% by 2012 (Thorne et al, 2012b). Thus the epidemic of HIV infection among pregnant women is both growing and is dominated by women infected sexually. Moreover, data triangulation exercises have suggested that the vast majority of women who were sexually infected with HIV were infected by partners who were drug users (Abdul-Quader et al, 2012).

Available data suggest that there is a high incidence of HIV infection during pregnancy and the breastfeeding period. In each of the past several years, approximately 200-400 pregnant women tested negative on their first antenatal HIV test but positive on a subsequent test (a roughly estimated 0.2%

annualized incidence rate[6]). This is of special concern because of research demonstrating that the risk of mother-to-child HIV transmission is significantly higher shortly following infection with HIV (Humphrey, 2010). This concern is borne out by the observation in recent years of five cases of HIV infection in children in Crimea whose mothers had negative HIV tests during pregnancy, suggesting that the mothers acquired HIV and transmitted it to their children during breastfeeding.

Together, these data suggest that many women are becoming sexually infected with HIV during and following pregnancy. Since most (81%) HIV-infected pregnant women are married or cohabiting (Thorne et al, 2009), it is likely that many are becoming infected from their steady partners. On the other hand, approximately 40% of HIV+ pregnant women have uninfected partners (Saxton et al, 2010), who may be at risk of becoming infected from them. Despite these risks of transmission within discordant couples, no prevention activities are routinely done among the vast majority of persons testing HIV-negative during pregnancy.

Bottleneck 2. Weak follow up systems for HIV+ women postpartum lead to inadequate services and risk of poor health. Gains in child health achieved through the prevention of infant HIV infections in Ukraineôs PMTCT program are at risk if the health of HIV+ new mothers is not maintained. Nationally, approximately 13% of HIV+ pregnant women are already in WHO Stage III or IV, with 6 regions reporting >20% of women in these stages. In addition 40% of HIV+ women are at risk of unwanted pregnancy because of failure to use family planning methods, with lack of affordability of contraceptives an important barrier (Saxton et al, 2010). HIV+ mothers need ongoing medical and social care and support, regular medical monitoring, ARV treatment, screening for co-morbidities (eg, tuberculosis, human papillomavirus, hepatitis B and C), family planning, support for formula feeding (eg, managing breast engorgement, stigma), and help in preventing further transmission to partners, among other support. Yet, current PMTCT protocols do not specifically address the unique needs of new HIV+ mothers, there are no indicators that track womenôs ongoing care and/or health status, and, other than for women in marginalized populations, NGO services do not specifically address this important population.

Bottleneck 3. Stock outs of HIV test kits, infant formula, and other commodities have interfered with providing proper PMTCT services. Weaknesses in governmental procurement procedures for drugs and commodities along with budget shortages have caused interruptions of supply of drugs for ARV prophylaxis and treatment and of HIV test kits, requiring extraordinary measures to fund these supplies from local budgets.

Bottleneck 4. Multiple, separate systems providing services to HIV-infected women and children. Laws and mandates have kept the MCH and HIV systems highly verticalized which complicates the care for HIV+ pregnant women, leading some to default. To receive the set of recommended and needed services during and after pregnancy, HIV+ women must engage with several separate service systems (some of which can be geographically inconvenient for women living outside of oblast centers), including antenatal care, HIV/AIDS services, social services, family planning services, and in some cases addiction, tuberculosis, and other services. These practical and financial barriers not only put a strain on women, but also lead to loss to follow up, and therefore reduced health impact for women who are unable to navigate through all of these systems. Although there are linkages and referral patterns between these services, there is no one person who the woman can turn to for help interacting between systems, or one system accountable for her overall health.

As several examples: 1) By decree, all deliveries of HIV+ women in Kiev city should be done at one specialty maternity house (Maternity Hospital #4); however, clients indicated that this hospital is far away for many women, is stigmatizing to deliver in, and lacks the social services needed by the population it serves. 2) Because of lack of integration between maternal health services and addiction services, delivering women who need oral substitution therapy must be physically transported from the maternity hospital to the addiction center even during the first few days after giving birth in order to get methadone.

[6] Based on 300 infections among an estimated 490,000 women testing HIV-negative on first test, divided by 3 months (the estimated inter-test interval), multiplied by 12 months to determine annualize incidence rate.

3) Although HIV+ women are followed up for their HIV care at AIDS centers, they need to get family planning services at MCH sites.

At the national or regional level, there is no single coordinated plan or single body accountable for achieving the commitment of eliminating new HIV infections in children. Both MCH and HIV programs are involved with different parts of the PMTCT program but it is unclear who the lead for the elimination effort is.

5 Cross cutting issues

5.1 Human Rights and Gender

Human rights and gender issues in the PMTCT area include stigma that prevents women from seeking needed services, ignorance about specific needs of women living with HIV among healthcare providers, womenôs opinions not taken into account in development of operational guidance, various forms of discrimination faced by HIV-infected pregnant women (e.g., transfer of HIV-infected women in labor to referral hospital in Kiev without adequate explanation), weak systems to sustain follow up of women postpartum, and challenges of accessing multiple service systems by HIV-infected pregnant women.

5.2 Sustainability

Several challenges to the sustainability of the PMTCT program include lack of a systematic and coordinated planning process nationally and locally, absence of a plan for supporting critical functions played by the NGO networks including social support and adherence assistance, and periodic breaks in procurement leading to service delivery gaps.

6 Conclusions and Recommendations

6.1 Conclusions

The PMTCT program in Ukraine has shown excellent progress, making it one of the more successful AIDS response programs in Ukraine and the region. However, while the PMTCT program inherited many of the strengths of the MCH system (decentralization, high coverage, broad network of qualified staff), it still suffers from many of the weaknesses of the AIDS prevention and treatment program (narrow focus on specialized medical care, interrupted supplies of drugs and commodities, centralized service delivery in specialized institutions). Moreover, the epidemic of HIV infection among pregnant women is both growing and shifting to becoming largely a sexually transmitted epidemic, posing continued challenges. The excellent response to date has focused on implementing Prong 3, and there are opportunities to do more to prevent new infections in families and to preserve the health of mothers living with HIV for their own benefit and to help raise healthy families.

Going forward, Ukraine should:

- build on its progress of preventing mother-child HIV transmission by continuing to increase the coverage and quality of services and by taking steps to ensure program sustainability;
- develop systems to assure ongoing medical and social care and support for new HIV+ mothers to preserve and improve their health and strengthen their role in the family and community; and
- use the successful PMTCT platform to address HIV prevention in high risk women as well as among other sexually active young adults to maximally prevent future HIV infections in children and their families.

6.2 Recommendations

The following 6 recommendations are based on solutions to the priority bottlenecks:

Recommendation 1. Develop and implement protocols for routine HIV testing of male partners of all pregnant women as early in antenatal care as possible to identify discordant couples, and for starting immediate ARV therapy for all HIV+ members of discordant relationships identified in the context of pregnancy. More and more infections in women and children appear to be resulting from transmission from the partners of pregnant women. Identifying discordant couples will allow targeting of prevention interventions to this high risk group. Recent research has shown that antiretroviral treatment that reduces viral load dramatically reduces the risk of sexual transmission of HIV (Cohen et al, 2011). Blocking transmission within couples during pregnancy has the added benefiting of reducing HIV transmission risk to their newborn (Prong 1).

Recommendation 2. Strengthen protocols for early identification of high-risk pregnant women and integration of oral substitution therapy and other addiction treatment services into antenatal and maternal services to reduce exposure of drug-using and other high-risk pregnant women and new mothers to HIV. Although the population of actively drug using pregnant women is relatively small, this is an extremely high-risk and vulnerable group that requires maximal attention to further reduce mother-to-child transmission to <2%. Important components of this approach include linking NGO-supported outreach-based pregnancy testing by with antenatal care, and integrating services for high-risk women into antenatal and maternal services.

Recommendation 3. Develop and implement protocols for an effective case management system that includes interdisciplinary medical and social monitoring and care for HIV+ women post-partum. Women need to be kept in care during and after pregnancy in order to achieve the goal of <2% mother-to-child transmission. This system should include formalizing an interdisciplinary medical and social support team and assignment of a primary case management role to someone on that team. In this effort, practical operational lessons can be learned from the UNICEF-supported pilot model of integrated addiction and antenatal services. Training for pre-test and post-test counseling of pregnant women and cross-training between narcology and obstetrics should be strengthened. The protocols should include regular medical monitoring, ARV treatment, screening for and management of co-morbidities (e.g., tuberculosis, human papillomavirus, viral hepatitis), family planning services and commodities, support for formula feeding, and help in preventing further transmission to others.

Recommendation 4. Establish a priority indicator to track the survival and immune competence of HIV+ mothers at 18 months. More attention must be paid to the health of mothers living with HIV for their own sake as well as their children's. Tracking their health will provide critical information for this effort.

Recommendation 5. Strengthen the procurement process to prevent stock outs of drugs and test kits. Gaps in procurement lead to gaps in service delivery which directly leads to new infections.

Recommendation 6. Build on the political commitment of eliminating pediatric HIV infections and keeping mothers alive by developing, implementing, and monitoring national and region-specific operational plans for achieving these goals. The central government should establish a national uniform set of plan elements, encourage regional plans that allow local variation in activities and partnerships based on local circumstances, and establish a central technical working group to provide technical assistance and guidance to regions in the planning process. Through this process, sustainable support for social services for HIV-infected and women at high risk of infection should be identified.

Table 3. Main bottlenecks, recommendations and expected results

Main bottlenecks	Main recommendations	Expected results
1. New infections occurring in pregnancy and lactation are increasing and going undetected.	1. Develop and implement protocols for routine HIV testing of male partners of all pregnant women as early in antenatal care as possible to identify discordant couples, and for starting immediate ARV therapy for all HIV+ members of discordant relationships identified in the context of pregnancy.	Identifying discordant couples and initiating ART can prevent HIV transmission within discordant couples and to their children, thereby reducing the several hundred incident infections in mothers each year and subsequent transmission to children.

	2. Strengthen protocols for early identification of high-risk pregnant women and integration of oral substitution therapy and other addiction treatment services into antenatal and maternal services	Harm reduction strategies during pregnancy can reduce exposure of drug-using and other high-risk pregnant women and new mothers to HIV thereby reducing HIV infections in women and their children.
2. Weak follow up systems for HIV+ women postpartum lead to inadequate services and risk of poor health.	3. Develop and implement protocols for an effective case management system that includes interdisciplinary medical and social monitoring and care for HIV+ women post-partum.	-Case management will promote comprehensive and coordinated postpartum care for HIV+ new mothers so they receive needed medical and social services, leading to longer healthy survival of mothers Having an indicator will draw attention to the follow up of women as well as allow better understanding of barriers to follow up.
	4. Establish a priority indicator to track the survival and immune competence of HIV+ mothers at 18 months.	
3. Stock outs of HIV test kits, infant formula, and other commodities have interfered with providing proper PMTCT services.	5. Strengthen the procurement process to prevent stock outs of drugs and test kits.	Strong procurement system will result in continuous supply of test kits, drugs, and infant formula to maximize the effectiveness of prong 3 interventions.
4. Multiple, separate systems provide services to HIV-infected women and children.	6. Develop, implement, and monitor national and region-specific operational plans for eliminating pediatric HIV infections and keeping mothers alive.	A strong national plan with coordinated and effective oblast plans with flexibility at the local level to innovatively solve problems based on local situations will lead to comprehensive and coordinated care for HIV+ women and their children.

The following two additional recommendations are future-oriented in order to sustain the successes of the PMTCT program.

Recommendation 7. Conduct formative research to explore the feasibility and acceptability of the ñOption B+ò approach (lifetime ARV treatment for all HIV+ pregnant women) by getting input from HIV-infected women, health care workers, and other stakeholders and to design a service delivery model to pilot. The Option B+ approach has much potential but must be closely tailored to context. Information from key stakeholders is needed to guide decision making about such a policy shift to allow evidence-based decisions to be made

Recommendation 8. Adapt the PMTCT monitoring and evaluation system to the next phase of the pediatric HIV elimination effort. Pilot and adapt new priority indicators for 18 month HIV-free survival of children and for 18 month post-partum survival of HIV+ new mothers. Use PMTCT data to improve programs, through local quality improvement approaches, and through conducting epidemiologic investigation and analysis of circumstances of all new HIV infections in children for the purpose of identifying and repairing system weaknesses. Set targets for reducing the case-rate of new HIV infections in children (e.g., number of cases of HIV infection/1000 live births) to better track the impact of ñProngs 1 and 2.ò(See Nesheim et al, 2012 for example.)

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7 Action Plan

Table 3. Action Plan for PMTCT

Main recommendations	Recommended activities by responsible agency		
	Immediate term (3-6 months)	**Short term (6-12 months)**	**Medium term (12-24 months)**
1. Test male partners in ANC and ART for discordant couples		MCH—do rapid assessment of feasibility of testing male partners in ANC	MCH+UAC—develop and pilot protocol for testing male partners and initiating ART
2. Linking high-risk populations with MCH	UAC+MCH—Evaluate UNICEF pilot project (under way)	UAC+MCH—Develop scale up plan for other sites with high prevalence of drug use	
3. Medical/social case management for HIV+ mothers		UAC+MSP+MCH-- formalize an interdisciplinary medical and social support team model and pilot it in several clinical sites	
4. Survival indicator for HIV+ mothers	UAC+CDC—develop with international input an indicator that can be collected at AIDS Centers		UAC—pilot the indicator and begin analysis
5. Strengthen procurement of ARV/tests	MoH—Review procurement systems and adjust as needed		
6. National and regional operational plans	UAC + MCH—Develop outline of national plan	Convene oblast AIDS Centers to launch local plan development process	
7. Formative research to prepare for "B+"	UNICEF, international partners—convene workshop of international experts to review science and operational issues for protocol	UNICEF, international partners—Develop formative research protocol	UNICEF, international partners—Carry out research
8. Adapt M and E to elimination	UAC+CDC—review experience of US and other countries nearing elimination and develop plan for new surveillance elements		

UAC=Ukrainian AIDS Center, MoH; MCH=Maternal and Child Health Department, MoH; MSP=Ministry of Social Policy; CDC=US Centers for Disease Control and Prevention

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Annex A. PMTCT program services provided

- HIV testing is offered to all pregnant women with consent in all womenôs consultation centers (antenatal clinics) at least twice during pregnancyð upon registration for antenatal care, and if the first test is negative, later in pregnancy (e.g., 28 weeks gestation).
- Women who are found to be HIV-positive during antenatal care are referred to the Regional AIDS Center for the following activities:
    - Post-test counseling by doctor that includes discussion of use of condoms, PMTCT, hepatitis B and C transmission, treatment of drug dependency, mode of delivery, and infant feeding
    - Clinical and immunologic evaluation, including CD4 count
    - For women eligible for antiretroviral (ARV) treatment (CD4 count <350), start on zidovudine+lamivudine+lopinavir/ritonavir
    - For women not eligible for ARV treatment (CD4 count Ó350), initiation of triple-drug ARV prophylaxis (generally zidovudine+lamivudine+lopinavir/ritonavir) starting from 24-26 weeksôgestation until delivery, then stop
    - Viral load measurement at 36 weeks gestation to determine mode of delivery
    - Reporting case of HIV infection to Ukrainian AIDS Center
    - HIV testing of partner if available
- HIV+ pregnant women are followed in a ñdual trackòby both the womenôs consultation center, which manages pregnancy-related issues and the AIDS center, which manages HIV-related issues, including adherence assessment.
- Additional services are provided by referral to specialists such as TB doctors or narcologists, as needed, and with NGOs (where available) to provide additional counseling, linkage, and other non-medical services.
- Delivery is recommended by elective cesarean section if the womanôs viral load is unknown or elevated (>1000 copies/ml in 3rd trimester).
- Rapid HIV testing is provided at all maternity houses for women in labor whose HIV status is unknown.
    - Women found to be HIV+ during labor are started on zidovudine and lamivudine during labor and for 7 days postpartum
- Infants born to HIV+ mothers receive zidovudine syrup for 7 or 28 days, depending on the length of mothers antenatal ARV use
- HIV+ women are recommended to substitute formula feeding for breastfeeding, and free formula is provided for 6 months where local budgets allow.
- Infants born to HIV+ women are tested by polymerase chain reaction at 1-2 months and at 3-4 months to determine their infection status.
- HIV-exposed infants are kept under observation until negative 18 month antibody test; some financial support is provided during this observation period.

Annex B. List of places visited

- All-Ukrainian Network of PLWH, Kiev
- International HIV/AIDS Alliance, Kiev
- State AIDS Service, Kiev
- Ukrainian AIDS Center, Ministry of Health, Kiev
- Maternal and Child Health Department, Ministry of Health, Kiev
- Kiev Municipal Maternity Hospital # 4, Kiev
- Kiev Municipal Maternity Hospital #3, Kiev
- Kiev Oblast AIDS Center, Kiev
- Kiev Municipal AIDS Center, Kiev
- Ohmatdyt clinic for HIV positive children, Kiev
- UNAIDS Ukraine, Kiev
- UNICEF Ukraine, Kiev
- WHO Ukraine, Kiev
- UNFPA Ukraine, Kiev
- Crimea Republic AIDS Center, Simferopol
- Simferopol Municipal Maternity Hospital # 2, Simferopol
- Crimean Republican Childrenôs Clinical Infection Hospital, Simferopol
- Childrenôs Center, Simferopol
- Crimean Branch of All-Ukrainian Network of PLWH, Simferopol
- Yevpatoriya Antenatal Clinic, Yevpatoriya
- Yevpatoriya Maternity Hospital, Yevpatoriya
- Bila Tservka Maternity Hospital, Bila Tserkva
- Bila Tservka AIDS Center, Bila Tservka
- Aura+, Bila Tservka

Annex C. Relevant background data

Basic health statistics (2011)

- Population: 45,778,000 (78% Ukrainian, 17% Russian; 69% Urban)
- Gross domestic product per capita: $7,300 USD
- Live births: 502,595
- Reported abortions: 156,193
- Deaths: 664,588
- Infant mortality rate: 9 deaths/1000 infants
- Total fertility rate: 1.46 children born/woman (up from 1.08 in 2001)
- Literacy: 99.3%
- 351 Physicians/100,000
- Attended births: 99%
- Women having 4 or more antenatal care visits: 75%
- Maternal mortality ratio: 32 deaths/100,000 live births

HIV estimates as of beginning of 2012

- Adult HIV prevalence 0.58%
- 230,000 people Ó15 years old living with HIV (137,000 men; 93,000 women)
- 3,500 new HIV infections in 2011
- 22,000 AIDS-related deaths
- 122,000 persons in need of ART (22%)
- Risk group estimates: injecting drug use: 332,500; female sex workers (excludes injecting drug users): 67,500; clients of female sex workers: 234,000

Projections by end of 2015:

- 182,000 people living with HIV infection (72,000 women); 5,800 new HIV infections in 2015; 13,000 AIDS deaths in 2015

Official HIV data (as of the end 2011):

- 120,148 persons living with HIV and registered
- 21,177 new cases of HIV infection reported (46% women; 31% IDU; 9% 15-25 years old)
- 26,720 persons on ARV therapy
- 3,736 AIDS-related deaths
- 4,010 children born to HIV+ mothers
- MTCT rate among 2009 births: 4.7%
- HIV prevalence among persons who inject drugs: women 23.6%; men 20.8%; female sex workers who inject drugs: 40.5%; female sex workers who do not inject drugs: 6.4%
- 7,146 women 15-49 living with HIV (mode of transmission: 19.1% injecting drug use; 80% heterosexual)
- #HIV tests done in pregnancy: 1,102,100, of which 2,873 (0.26%) were positive
- As of 1/1/12, 2,722 HIV-infected children were in care, of which 752 have AIDS.

Annex D. Prioritization of bottlenecks using MAF methodology

Prong 1: Prevent HIV among women of reproductive age

Bottleneck category	Bottlenecks	Overall impact	Overall-near term solution	Priority ranking
Policy and planning	No protocols for addiction services in pregnancy			3
	Insufficient attention to HIV prevention in pregnancy and postpartum			5
Budget and funding	Services for high risk and HIV+ women provided by NGOs lack long-term funding			2
Service delivery/supply	OBGYNs lack knowledge and awareness of issues of narcology and drug use in pregnancy			6
Use/Demand	New infections occurring in pregnancy are going undetected			1
	Pregnant women who use drugs don't have access to addiction services			4

Prong 2: Provide appropriate counseling and support to women living with HIV to enable them to prevent unintended pregnancies

Bottleneck category	Bottlenecks	Overall impact	Overall-near term solution	Priority ranking
Policy and planning	National policy on family planning for HIV+ women is weak			3
Budget and funding	Funding for contraceptive commodities is inadequate; no specific funding for HIV+ women			2
Use/Demand	Family planning services are not available at AIDS Centers where HIV+ women receive care			1

Prong 3: For pregnant women living with HIV, ensure HIV testing and access to the antiretroviral drugs that will help mothers' own health and prevent transmission to their babies during pregnancy, delivery and breastfeeding

Bottleneck category	Bottlenecks	Overall impact	Overall-near term solution	Priority ranking
Policy and planning	Laws and mandates have kept the MCH and HIV systems highly verticalized which complicates the care for HIV+ pregnant women, leading some to default			4
Budget and funding	National budget for purchasing test kits has been inadequate forcing local budgets to cover these costs			2
	Patients must provide large out of pocket expenses for ANC and maternity services			12
Service delivery/supply	Stockouts of HIV test kits, infant formula, and other commodities have interfered with providing proper services			1
	The quality of pre-test and post-test counseling is inadequate, leaving many HIV+ pregnant women inadequately prepared for the services they require			6
	Results of HIV and other tests are often delayed, which delays PMTCT services			7
Use/Demand	Many women who use or used drugs come late for ANC, because they get yelled at, it costs money, and they have other priorities			5
	Women who use drugs are stigmatized by health workers, which discourages them from coming for care			10
	Some women refuse to take ARVs because of myths surrounding taking drugs during pregnancy			9
	Migrants have trouble accessing services because they get sent home			13
	Many HIV+ pregnant women fail to disclose their HIV status			11
	ARVs aren't available at all maternities			8
Decentralization	PMTCT and ART program planning has not been adequately decentralized			3

Prong 4: Integrate HIV care, treatment and support for women found to be HIV-positive and their families

Bottleneck category	Bottlenecks	Overall impact	Overall-near term solution	Priority ranking
Policy and planning	Little attention is paid after delivery of HIV+ women not on ART--no protocols, no data collected, no targets for their health			5
Service delivery/supply	Social services to help HIV+ pregnant women are weak, particularly for drug users			2
	Weak follow up systems for HIV+ women postpartum			1
	CD4 testing is often not available in ANC and maternity			4
	Coverage of EID, viral load testing remains incomplete			3