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Niger's HIV Response
**Targeted
Investments**
for a
**Healthy
Future**

Findings from the HIV Allocative Efficiency
and Financial Sustainability Study



June 2014

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Republic of Niger

Niger Allocative Efficiency and Financial Sustainability Study

Niger's HIV response: Targeted investments for a healthy future

June 2014

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Niger's HIV response: Targeted investments for a healthy future

Findings from the HIV allocative efficiency and financial sustainability study

World Bank: Nicole Fraser, Nejma Cheikh, Markus Haacker, Emiko Masaki, Djibrilla Karamoko, Marelize Gorgens

University of New South Wales, contracted by World Bank: Cliff Kerr, Richard Gray, Andrew Shattock, David Wilson

UNAIDS :Luisa Frescura, Claude Konan

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Abbreviations

ANC	Antenatal care
ART	Antiretroviral therapy
ARV	Antiretroviral
BCC	Behavior change communication
CD4	Cluster of differentiation 4
CFA	West African currency (franc)
CHLD	Children aged 0–14 years (Optima model)
CISLS	Coordination Intersectorielle de Lutte contre le SIDA (National AIDS Coordination Authority)
CPN	Consultation prénatale (antenatal care)
DALY	Disability adjusted life year
DHS	Demographic and health survey
e-MTCT	Elimination of mother-to-child transmission
FAD	Females aged 25–49 years (Optima model)
FOLD	Females aged 50+ years (Optima model)
FP	Family planning
FSW	Female sex worker
FYTH	Females aged 15–24 years (Optima model)
GAR	Gross attendance rate
GDP	Gross domestic product
HCT	HIV counseling and testing
HDI	Human development index
IEC	Information- education- communication
IMF	International Monetary Fund
KfW	Kreditanstalt für Wiederaufbau
LRP	Low risk population
MA	Males aged 25–49 years (Optima model)
MARP	Most at risk populations (also called key populations)
MDG	Millennium development goal
MICS	Multiple indicator cluster survey
MIN	Mine workers (Optima model)
MIG	Migrants and mobile populations (Optima model)
MNIH	Maternal, neonatal and infant health
MOLD	Males aged 50+ years (Optima model)
MSM	Men who have sex with men

MSP	Ministère de Sante Publique
MTCT	Mother-to-child transmission
MYTH	Males aged 15–24 years (Optima model)
NASA	National AIDS spending assessment
NDHS	Niger Demographic and Health Survey
NGO	Non-governmental organization
NSP	National strategic plan (2013–17)
ONPPC	Office National des Produits Pharmaceutiques et Chimiques
OVC	Orphan and vulnerable children
PCR	Polymerase chain reaction
PDES	Economic and Social Development Plan (2012–15)
PDS	Health Sector Development Plan (2011–15) also HSS (Health Sector Strategy)
PEP	Post-exposure prophylaxis
PICT	Provider initiated counseling and testing
PLHIV	People living with HIV
PMTCT	Prevention of mother-to-child transmission
PRI	Prisoner (Optima model)
Q1-5	Wealth quintiles 1 (lowest 20%) to 5 (highest 20%)
RBF	Results based financing
RH	Reproductive health
RNM	Resource needs model
SDDCU	Sustainable Development and Inclusive Growth Strategy Niger 2035
SIDA-3	Regional STI/HIV program in 9 West African countries
SM	Social marketing
SRH	Sexual and reproductive health
SSG	Second generation surveillance
STI	Sexually transmitted infection
SW	Sex worker
TB	Tuberculosis
TRU	Truckers (Optima model)
UNI	Uniformed security (Optima model)
UNSW	University of New South Wales
VCT	Voluntary HIV counseling and testing
VPP	Voluntary pooled procurement
WB	World Bank

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Executive Summary

(providing the main conclusions and full policy recommendations)

Niger has seen significant progress in economic development and in the reduction of extreme poverty. The economy grew by over 11% in 2012, thanks to oil, uranium and agricultural production. The percentage of people living on less than USD 1.25/day has been reduced from 66% in 2005 to 44% in 2008, scoring above the sub Saharan African average of 49%. Average income has increased from USD 586 in 2000 to USD 701 in 2012 (expressed as the gross national income [GNI] per capita in purchasing power parity [PPP] terms, constant 2005 international dollar). The positive changes are mirrored by the improved life expectancy at birth, growing from 39.5 years in 1980 to 48.3 years in 2000 and 55.1 years in 2012.

Despite of these encouraging statistics, living conditions for Nigeriens remain challenging. Food insecurity persists even in years when production yields a surplus. About 60% of households are only able to cover their food requirements for three months, and in periods of food shortages, half of the population suffers from malnutrition. Adults, on average, have a mere 1.4 years of formal school education, and as a consequence, Niger has one of the lowest literacy rates in the world in spite of a massive expansion of the education system.

The provision of health services is dominated by the public sector whose services are provided through 829 Integrated Health Centers linked to 2,000 health posts that are managed by community health workers. Higher level care is delivered by 33 district hospitals spread across 42 health districts, nine regional public health departments and six regional hospitals, including several reference hospitals and maternity centers. Approximately 47% of the population lives within five kilometers of a health facility, but in some of the rural health districts access to a health facility is much lower. In Niamey, the capital city, nearly 100% of the population has good geographical access to public sector health provision, which translates into comparatively better service-use statistics than elsewhere. Overall, health sector capacity is insufficient, and is compounded by the doubling of the population every 23 years.

In 2011, health spending accounted for 5.1% of gross domestic product (GDP) (Euro 225 million or (United States Dollar [USD] 303 million), and was dominated by public sector health spending (57% of total) and private out-of-pocket spending (39% of total). External financing accounted for almost one-third of all health spending (World Health Organization [WHO], 2014). Spending on HIV care and treatment accounted for about 1.6% of total health spending, and 2.7% of public health spending in 2011, while HIV/AIDS was responsible for an estimated 1.4% of all Years-of-life-lost in 2010 according to the Burden of Disease Study.

As Niger progresses on its development path, it has an opportunity to review the scale and trajectory of the HIV epidemic, and the investment needed today to appropriately address the current and future disease burden of HIV/AIDS; and to ensure that HIV investments are high-impact, sustainable, and can best support Niger's overall health system and development priorities.

Equally, it is important to explore how the Niger government can contribute its “fair share” to the HIV response, in agreement with the 2013 resolutions made by political leaders at the Abuja Summit: to step up the mobilization of domestic resources to strengthen the health system and ensuring diversified and sustainable financing for health.

The HIV allocative efficiency and financial sustainability study

The main objective of the study was to provide the Government of Niger with a comprehensive analysis of HIV and health financing needs, investment opportunities, and health system development in the context of its HIV National Strategic Plan (NSP) 2013–17. The analysis provides support for HIV policy decision-making, investment scenarios and programmatic targeting and prioritization. In addition, the analysis helps Niger build the case for HIV and health impact investment including delivering estimates of health care savings as a result of these investments.

This analysis was implemented by the World Bank in collaboration with UNAIDS from a request for analytical support from the Government of Niger. The study involved a desk review of HIV- and health-related evidence, epidemic trends and financial modeling. The Optima model (formerly Prevtol) was used to estimate optimal resource allocation during the NSP, and the impact and cost-effectiveness of past HIV investments. A financial commitment framework was used to estimate longer-term costs and savings of the HIV program and the fiscal dimension of HIV in Niger.

In this executive summary, we summarized the main conclusions, insights and the policy recommendations emanating from this analysis.

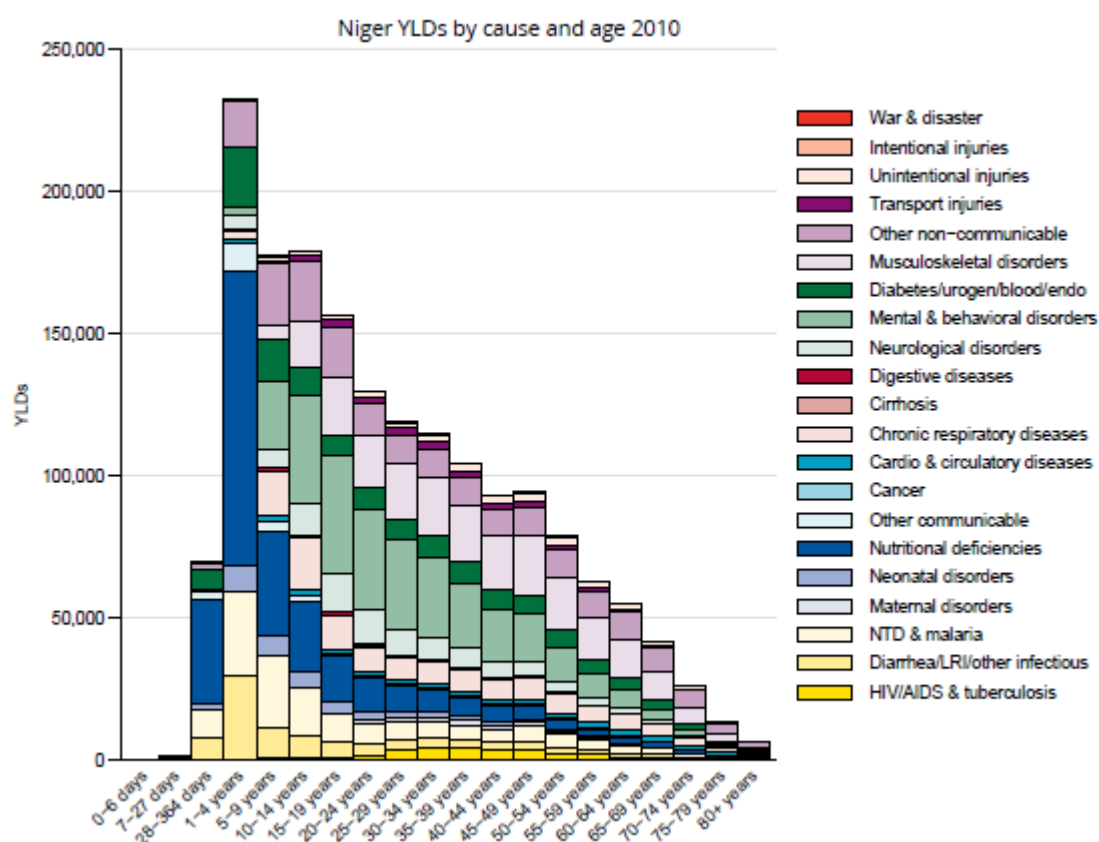
1. Health and development challenges in Niger

Conclusion: The health transition in Niger is in its early stage, with communicable diseases and poverty-related conditions dominating the disease statistics, while malaria and HIV/AIDS are the leading emerging diseases

In Niger, newborn, nutritional and maternal causes such as diarrheal diseases, lower respiratory infections, and protein-energy malnutrition as well as several communicable diseases including malaria, meningitis, measles, and tetanus are leading causes of health loss. Non-communicable diseases are a minor but emerging health issue, responsible for 18% of all disability adjusted life years (DALYs), according to the comprehensive international 2010 Burden of Disease Study.

Rapid demographic growth is a central issue in Niger's development process. The rate of growth has changed very little in the last 20 years and was 3.9% in 2012. On average, women give birth to 5.6 children in urban areas compared to 8.1 children in rural areas. Women who have secondary education have an average of 3.1 fewer births than women who do not, highlighting the profound role education plays in Niger's demography.

HIV/AIDS has, together with malaria, been the leading cause of *emerging* disease burden over the last 20 years. However, compared to other African countries, the burden of HIV/AIDS is relatively small (see Figure 1, combining HIV/AIDS and TB), and is therefore a more manageable public health issue. Nevertheless, several top causes of local disease burden—iron deficiency anemia, malnutrition, TB and diarrhea—interact with the immunocompromised status of HIV-positive individuals and are likely to accelerate disease progression and morbidity.

Figure 1. Years lost due to disability by cause and age, Niger (2010)

Source: IHME/World Bank; Niger profile: <http://www.healthmetricsandevaluation.org/sites/default/files/country-profiles/GBD%20Country%20Report%20-%20Niger.pdf>.

Note: Years lived with disability (YLD) are estimated by weighing the prevalence of different conditions based on severity. The size of the colored portion in each bar represents the number of YLD attributable to each cause. The height of each bar shows which age groups had the most YLDs in 2010. Causes are aggregated.

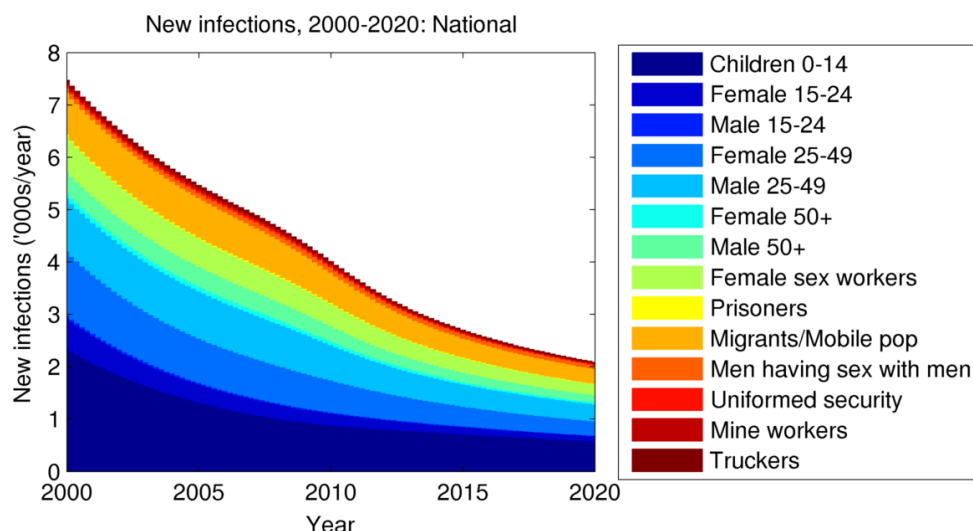
2. HIV epidemic dynamics

Conclusion: The low grade HIV epidemic is in decline, but unless strong action is taken to intervene, there is a possibility that new economic growth-related co-factors such as mining, urbanization, economic development, and migration could result in increases in new infections in future years

Empirical data from HIV surveys suggest a contracting HIV epidemic in Niger: HIV prevalence has decreased rapidly, both in the general population and in key populations. The modest HIV prevalence decreases in urban females may be linked to a combination of risk behaviors in towns (leading to new infections), and the relatively good access to antiretroviral therapy (ART) keeping HIV-positive women alive. The stable HIV prevalence in prisoners suggests a sub-epidemic in correctional facilities with continuing high risk behaviours among prisoners and the possible influence of ART on HIV prevalence levels. The cultural practice of circumcising males has spared Niger from a generalized epidemic, and will continue to reduce the probability of HIV transmission from men to women (this analysis estimated that over 200 million unprotected sexual acts occur every year, or 90% of all sexual acts in Niger).

Modeled epidemic trajectories—which are developed using empirical HIV prevalence data—suggest that HIV transmission has declined sharply, from 8,470 new HIV infections at its peak in 2000 to 1,450 in 2013 (Spectrum 2013). The Optima model predicts that the past HIV incidence decline will continue into the future, provided that that current HIV response is maintained, and that there are no changes in exogenous factors that could influence HIV transmission dynamics (Figure 2, by sub-population).

Figure 2. Optima-estimated trends in HIV incidence by sub-populations, Niger (2000–20).



Source: Optima application Niger, January 2014.

Note: Graph shows estimated new HIV infections per year.

However, the wider context of the HIV epidemic in Niger is changing:

- i. **Urbanization:** Niger's epidemic has always been of an urban type, and the urban population is growing at 6.2% (significantly higher than the national average of 3.9%). Urbanization is often linked to risk behaviours outside the controlling village context, to disrupted family life, poor living conditions and transactional sex for survival or for affording modern consumer goods, especially among young females.
- ii. **Rapid economic growth:** The changing wealth levels, with economic growth at 11%, is associated with higher income levels and the availability of disposable income, which among Niger's men is linked to buying sex (note that HIV is now concentrated in among the wealthiest 40% of men).
- iii. **Mining sector development:** The development of the petroleum and mining sector has resulted in sex workers (SWs) relocating from Niamey—where there are specialist HIV services available for them—to the mining zones and petrol fields. The availability of jobs, infrastructure development and growing economic opportunities encourage migration and mobility, which also create risk contexts for HIV (survey data show a clear link between men's sexual risk behaviors to mobility and being away from home).
- iv. **Low literacy:** Meanwhile, a key factor for protection from HIV risk—school education—has stagnated in Niger, largely due to the very rapid increase in children of school going age. In 2012, HIV prevalence was lowest in the most educated population segment (secondary education or above) with only 0.1% of men and 0.2% of women being HIV infected.

These evolving contextual factors could put past HIV gains at risk if concerted HIV prevention efforts are not maintained.

Recommended policy actions

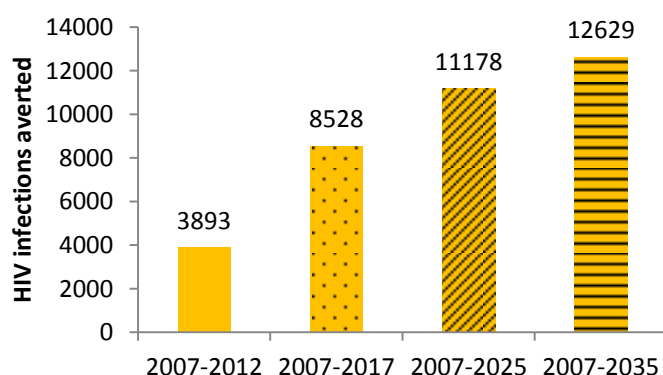
1. **The government must continue to undertake strategic HIV monitoring activities, especially in key populations at higher risk**—this includes female sex workers (FSWs), sex work clients in the mining areas and young urban females. Only if HIV prevalence in these populations is well tracked can the risks of mining industries, urban and economic development be assessed and specific interventions be designed. There is a necessity for vigilance and for excellent strategic information on the epidemic dynamics. HIV prevalence in sex workers should be a key performance indicator of the HIV program.
2. **Social sector investments, especially those in the education sector and in family planning/reproductive health will greatly benefit the HIV program and should be seen as integral part of a broad and powerful response toward mitigating future HIV risks**—improved literacy, better employment opportunities for females, reduced fertility and better reproductive health are all closely linked with the future trajectory of the epidemic.

3. Retrospective impact and cost-effectiveness of past HIV investments

Conclusion: Past HIV investments have contributed significantly to the decline in HIV incidence

The impact of historical HIV expenditures on the prevention of new HIV infections was estimated using the Optima model. It was estimated that HIV spending from 2007–12 averted close to 3,900 infections in those six years (Figure 3). Furthermore, the downstream impact of these prevented infections was much larger, since secondary HIV infections and onward transmission were also averted. By 2035, the spending from 2007–12 will have averted an estimated total of 12,600 infections, at a cost of Euro 3,500 (USD 4,700) per infection if only HIV program spending is considered, and Euro 4,600 (USD 6,200) if all HIV spending—including management and coordination costs—is included. This is slightly higher than some cost-effectiveness ratios in other countries (e.g., men who have sex with men (MSM) program in Thailand, USD 1,600–USD 6,400, and Vietnam HIV program USD 890–USD 1,200 per infection averted), suggesting that it might be possible in future to implement the same programs at a lower cost without compromising their effectiveness.

Figure 3. Number of infections averted by historical HIV spending from 2007–12, Niger (2007–35)



Source: National AIDS spending assessment (NASA) 2007–12, available epidemiological and behavioral data from Niger, and drawing on the relationships between funding, HIV outcomes, and program coverage (Annex A1.6).

Based on the common understanding of how epidemics spread from core groups, second-order investment benefits are particularly high when HIV programs target high HIV incidence populations like FSWs. The modeling findings suggest that incidence reductions were indeed greatest in FSWs (from 3.5% annual HIV incidence in 2000 to 1.1% in 2012), but also had knock-on effects in other populations like sex-work clients and even in low-risk populations. In the absence of other major programs being implemented, it can be reasonably assumed that HIV incidence reduction in FSWs after 2000 can in part be attributed to the regional STI/HIV program in 9 West African countries (SIDA-3) and the Multisectoral STI/HIV/AIDS project 2003-2009 supported by the World Bank¹. However, no evaluation of SIDA-3's impact has been conducted in Niger.

Recommended policy action

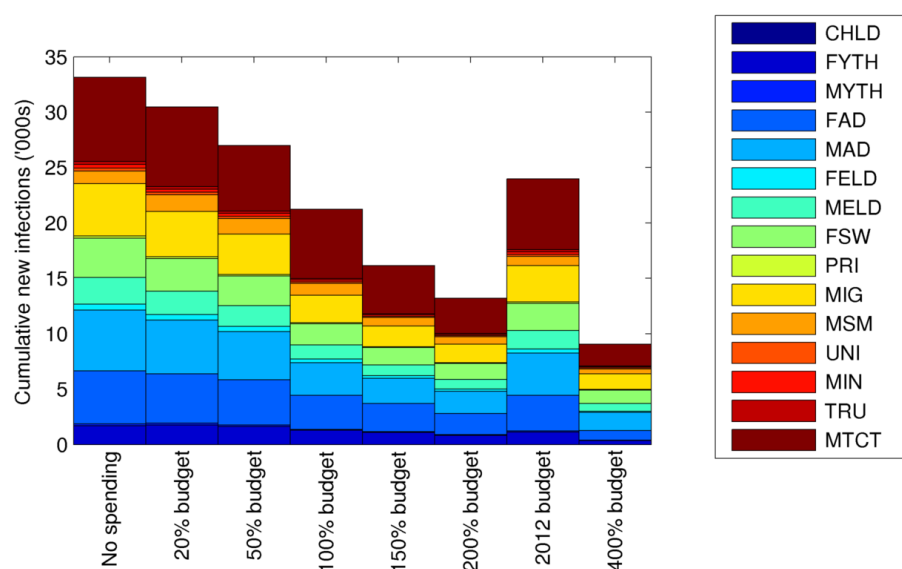
3. **Strengthen capacity for the country to undertake analytical work on the impact and cost-effectiveness of HIV investments through partnerships and capacity building—**
Niger disposes a large body of HIV monitoring data and needs to prioritize evaluation and learning to strive for high-impact, high-return HIV strategies in a resource-constrained health funding environment. Cost-effectiveness and return-on-investment data build powerful economic arguments for HIV investments, and increase our understanding of the best investment choices in a changing epidemic context.

4. Increasing the future impact of Niger's HIV response—"More health for the money"—through more efficient allocation of funds to priority programs

Conclusion: Niger's HIV response can achieve more value for money; with the resources already committed until 2017, the country can achieve an estimated additional 12% reduction in HIV incidence if HIV resources are optimally allocated

Better allocation of HIV resources could increase the number of new HIV infections averted: The modeling analysis on optimal resource allocation during the NSP period of 2013–17 for best HIV incidence reduction was based on the amount of funding already acquired by end 2013 for the four remaining years of the NSP (annual average Euro 4.8 million or USD 6.5 million). Although this amount is lower than the 2012 expenditure of Euro 12.5 million or USD 16.3 million, the optimization predicts that an additional 12% reduction in new HIV infections could be achieved from 2014–25, if resources were allocated differently than in 2012 (Figure 4).

¹ Implementation completion and results report, WorldBank, December 2009. http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2010/01/13/000333038_20100113233224/Rendered/PDF/ICR127500P07161C0disclosed011121101.pdf, accessed 27 May, 2014.

Figure 4. Cumulative infections over 2013–25 that would result from different spending scenarios, Niger

Sources: Spending data from NASA; Niger epidemic, demographic, behavioral and service data in the populated Optima model.

Note: No spending = a continuation of 2012 spending, and optimized spending at various budget levels relative to expected funds available, 2014–17; 2012 budget = 2012 expenditure pattern; 100% budget = Euro 4.8 m/USD 6.5 m per year, based on acquired funding by end 2013; Drug costs are kept constant over time, other costs increase in line with GDP per capita.

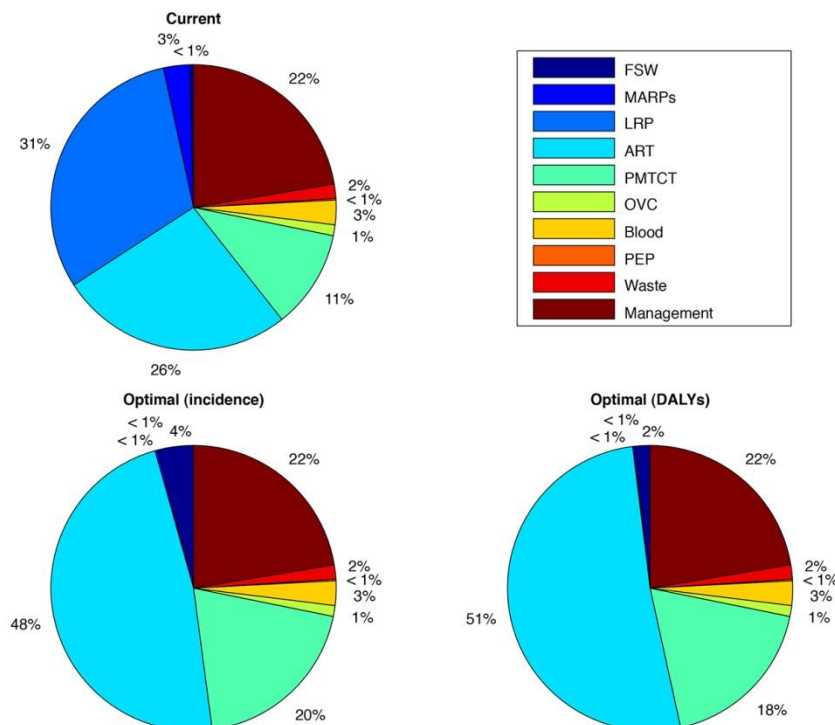
This analysis recommends higher funding allocations for ART, prevention of mother-to-child transmission (PMTCT) and FSW programs; and lower allocations for untargeted activities for low-risk populations (Figure 5). The rapidly escalating management costs forecast in Niger's resource needs model are higher than inflation (currency inflation at 3% plus population growth at 4% combined). An efficiency of about Euro 1.7 million (USD 2.3 million) could be gained from 2014–17 if management costs grew at the inflation rate only. If the cluster of differentiation 4 (CD4) treatment threshold was raised to 500, an approximate estimate of additional resources needed over the four years is 12%. However, this would require more in-depth analysis using detailed program data, unit costs and assumptions on delivery models.

An HIV incidence reduction of 50% is only feasible in the longer-term, according to this analysis

- Halving HIV incidence during the NSP period would be very costly. It is estimated that achieving this HIV prevention goal by the end of 2017 would cost Euro 24 million (USD 32.3 million) per year—500% of the currently acquired budget of an average of Euro 4.8 million (USD 6.5 million) annually from 2014–17- and with optimized program allocations
- In contrast, halving HIV incidence by 2025 is more feasible. It is estimated that this would cost Euro 5.52 million (USD 7.42 million) per year—115% of the average acquired budget of 2014–17, and substantially lower than the total 2012 expenditure of Euro 12.5 million (USD 16.3 million)

Better program (technical) efficiency could save even more funds: there is a large difference in antiretroviral (ARV) prices between the Global Fund procurement system and the government tender system. This is currently not increasing costs by much since most ARVs are purchased by the Global Fund system, and only a small volume of ARVs are purchased via the government system (the small size of these orders is partly responsible for the higher pricing).

Figure 5. Current versus optimal budget allocations for minimizing incidence (left) and DALYs (right) over the period 2014–2025, Niger



Sources: Spending data from NASA; Niger epidemic, demographic, behavioral and service data in the populated Optima model.

Note: Current = 2012 spending pattern; OVC, blood, PEP, waste, and management costs were kept fixed. Condoms are part of the HIV intervention packages for the different populations; FSW = Female sex workers, LRP = low risk populations, a combined group of general population females and males aged 15+ years; MARPs = most at risk populations, a combined group of prisoners, migrants, men who have sex with men, uniformed security/defence personnel, mine workers and truckers; OVC = orphan and vulnerable children; PEP = post-exposure prophylaxis.

Recommended policy actions

- Use the epidemic and programmatic intelligence and analytical approaches to identify savings, efficiencies and higher-impact scenarios, to strive towards better value for money in the HIV program**—Niger is unlikely to be able to close its NSP resource gap of almost Euro 45 million (USD 60 million) for the four remaining NSP years. However, this analysis suggests that a greater impact can be obtained from optimal resource allocation across priority programs, and from data-informed geographical targeting. Resource allocation towards the highest risk population—female sex workers—undoubtedly provides value for money. Management and coordination costs need to be contained and functions integrated with HIV and health administration where possible.
- Funding needs to be shifted towards ART, PMTCT and FSW programs, and away from untargeted activities for low-risk populations, with budget splits depending on total resource availability.** Based on empirical data and impact modeling, SW-related investment should be significantly increased to approximately 4% of the annual HIV budget—this is likely to prevent an extra 7,000 new HIV infections over 10 years (with the already acquired NSP resources of Euro 4.8 million/USD 6.5 million annually).
- Review the government procurement system for ARVs to gain efficiency**—although most ARVs are currently purchased through the Voluntary Pooled Procurement system, there

is a need to ensure that better ARV prices can be acquired through the Government tender system, as ARV needs grow because of an increasing number of people eligible for ART.

5. Geographical targeting of priority programs

Conclusion: Niger's HIV response can capitalize better by targeting resources to areas of high HIV burden and transmission hotspots

As HIV epidemics contract, data-informed HIV intervention targeting becomes highly important in order to continue to drive down HIV transmission. Although people on ART are less infectious overall (lower viral load), they represent a HIV reservoir that is growing annually as more people enter the ART program. Some resources must therefore be targeted towards maximizing viral suppression in the ART patient population (such as treatment adherence, and drug resistance monitoring). This analysis estimated that within six years, the number of people living with HIV (PLHIV) in Niamey will increase from under 9,000 to about 12,000, partly due to ART improving the life expectancy of PLHIV.

About 70% of PLHIV live in one of four regions in the South-West covering only one quarter of the country surface area. Agadez and Diffa probably had the lowest PLHIV numbers in 2012 compared to the other regions. Over one half of all PLHIV reside in Niamey, Dosso or Tahoua with circa 26% of these living in Niamey (according to the 2012 study). In the scale-up of PMTCT, a phased approach may be recommended, considering the regional distribution of PLHIV and the urban nature of the epidemic. Data support a PMTCT first phase scale-up in the South-West portion of the country and in towns.

With HIV prevalence at 17% in female sex workers compared to HIV prevalence of below 1% in most populations, targeting areas where sex work takes place is a prerequisite to the success of HIV prevention in Niger (towns, petrol/mining zones, infrastructure construction areas, etc.). There is an estimated 2.3 million unprotected commercial/paid sexual acts each year in Niger (compared to over 200 million regular sexual acts). Condom promotion needs to prioritize this programming gap first, given the disproportionate contribution of sex work to ongoing HIV transmission.

Epidemiological data from prisons suggest that there is increased HIV transmission in these settings with HIV prevalence levels at 2.7%, thus targeting HIV and health resources toward prison populations remains important. There is a lack of data to effectively direct services that target men who have sex with men (MSM), however, it is possible to improve the targeting of male sex workers as a first step. The UNAIDS Investment Framework recognizes that targeting key populations is done in the larger context of reducing stigma and discrimination². The strengthening of an enabling environment is necessary to support the effectiveness and efficiency of program activities which can be affected by barriers to service use due to social exclusion, marginalization and criminalization of key populations.

Recommended policy actions

- 7. Shift resource allocations away from untargeted activities for the largely HIV negative population to populations where an impact on HIV can be gained**—the most important target populations are all types of FSWs, high-risk MSM, people on ART, people living with

² UNAIDS, Investing for results, Results for people. UNAIDS/PCB(30)12.CRP.4. 2012. http://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2012/JC2359_investing_for_results_en.pdf

HIV (PLHIV), people who are diagnosed but are not yet on ART, prison populations, and pregnant women in areas of higher HIV prevalence. Consideration should be given to necessary actions that improve access to services such as the reduction of stigma, discrimination and community mobilization³ in these targeted allocations.

8. **HIV testing and case identification must be targeted where yield is likely to be high**—such as outreach activities and services for key populations, STI clinics, spouses of known PLHIV, and malnutrition screening for infants. For efficiency, HIV testing activities should be accompanied by strengthening the health professional's capacity, covering topics such as nondiscrimination, informed consent, the obligation to treat all, and confidentiality. It is important that health services are welcoming, supportive and efficient, especially for key populations.
9. **Companies, especially those attracting migrant labor and those in the petrol/mining sector, should be required, by regulation, to provide a minimum package of HIV/health services to employees**—in some cases, companies should be required to support interventions in the surrounding communities.

6. Improving the implementation efficiency of programs for female sex workers

Conclusion: Sex work-related interventions have lacked focus and investment, despite their epidemiological, cost-prevention and humanitarian importance. Improvements in the implementation of FSW programs would increase quality, coverage and reach.

An estimated 28,000 FSWs operate in Niger, but there is consensus that the real number may be higher, with hidden SWs remaining uncounted (mapping in four regions counted a mere 3,200 FSWs, illustrating the challenge of understanding the true size of this heterogeneous population). FSWs are 43 times more likely to be HIV-infected than females in the general population—the previous sections have made it clear that HIV prevention services must focus on these populations. According to expenditure statistics, less than 1% of HIV expenditure was for sex work-related interventions. Budget optimization with Optima suggests that if about 4% of the annual budget could be spent on comprehensive, quality services for FSWs, Niger's future HIV incidence, AIDS morbidity and mortality could be minimized and the Government's HIV policy objectives could be achieved.

In the past, especially within the regional SIDA-3 project, FSW HIV prevention service provision and medical follow-up was provided through specialized, adapted services. One such service site has remained, and is in Niamey, and while integration and mainstreaming of services for key populations is a reasonable policy, it has not worked well in Niger. Only 41% of FSW in Niamey are enrolled in the “Suivi medical”, and these are predominantly foreigners who enroll for administrative purposes. The variation in FSW's HIV prevalence in different geographical areas, ranging from zero to 31%, is largely unexplained, although proximity to Nigeria seems to be an important risk factor. A history of violence is associated with highly increased HIV risk (32%), and perpetrators can even include the police who should protect FSWs. Well over half of surveyed

³ UNDP, Understanding and acting on critical enablers and development synergies for strategic investments, 2012. http://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2012/201211_UNAIDS_UNDP_Enablers_and_Synergies_en.pdf

FSWs are divorced (others are widowed or separated), pointing to sex work as a livelihood option for women who are lacking protection and family support.

Importantly, sex for money or gifts is not limited to FSWs but may be a frequent transaction among other female key population members, as well as among young females who practice transactional sex. Female defense and security personnel are many times more likely to be HIV positive than their male colleagues (7.7% versus 0.1%⁴), and the same increased HIV risk applies to female teachers, prisoners and labor migrants. Male circumcision partially protects men from infection, while women experience much higher biological vulnerability to HIV. Female circumcision (2% of adult females have experienced genital mutilation, according to the Niger Demographic and Health Survey [NDHS] 2012) can promote the spread of infections through the use of contaminated objects, and an increased risk of bleeding during sex can amplify the risk of HIV transmission. The increased prevalence of herpes in women who have undergone female genital mutilation could also add to the risk of HIV infection.⁵

FSW data attest to a very rapid acquisition of HIV once females enter the sex industry, with street prostitution less safe than brothel-based sex work. Male sex work is little documented, and MSM are the least understood key population in Niger. Over half of surveyed MSM get paid for sex. Some MSM are married and some identify as bisexual. The MSM epidemic—of unknown scale—is not self-contained and MSM related transmission extends through sexual networks to the general population.

This analysis shows that SWs are a population which is currently underserved and concludes that more investment is required for SW-related interventions. An investment toward preventing not only direct but also downstream infections linked to sex work is expected to have a large impact on the future course of the HIV epidemic, as well as on the human and financial cost of AIDS.

Recommended policy actions

10. **In order to guide programming and targeting of SW interventions, better strategic information on FSW, female key population members, and high risk (soliciting) MSM should be collected**—ongoing FSW mapping and site identification work needs to be further strengthened by taking a programmatic science approach. More needs to be known about FSW typologies, the venue profiles where they find clients, hard-to-reach FSW, sexual risk behaviors—including transactional sex among female defense and security personnel, female teachers, female prisoners and female labor migrants (through oversampling of females in bio-behavioral surveys and qualitative studies), as well as young urban women.
11. **The government, in partnership with non-governmental organizations (NGOs) and the private sector, should offer evidence-informed services that meet the specific needs of sex workers**—an important part of improved service provision is demand creation among SW through strategies such as specially trained peer educators who can gain access to harder-to-reach high risk SWs (due to their young age, working conditions as clandestines, and lack of protection). The ongoing scale-up of SW interventions must work towards ambitious service targets that extend beyond the numbers of SWs known at the outset, reflecting successful demand creation and outreach to clandestine SWs. Police and security forces play an important role in the implementation by ensuring the protection of SWs against discrimination and acts of violence, and hence, contributing to the equitable access by SWs to all health

⁴ Small sample sizes that warrant more investigation, and female oversampling in future BSS activities.

⁵ http://www.who.int/reproductivehealth/topics/fgm/health_consequences_fgm/en/

services. Police and security forces must be sensitized on HIV and on their role in the response to the epidemic, including the handling of cases of sexual violence.

7. Improving the efficiency of implementing Niger's antiretroviral treatment program through better integration with health services

Conclusion: Access to ART is insufficient and AIDS-mortality is high; shifting resources to the ART program will reduce future AIDS deaths and disease, and new HIV infections

By the end of 2012, the estimated ART coverage was 13% in children and 51% in adults, indicating that about 14,000–15,000 HIV infected Nigerians who were eligible were not receiving ARVs. ART coverage is estimated at only 45% in men and 57% in women suggesting that men are more likely to miss out on treatment. This is also linked to very low HIV testing rates in men of 2–3%, and some demographics indicate that HIV testing is particularly low despite elevated HIV prevalence levels in —men in Diffa and Dosso, and in men above 30 years of age.

Low ART access leads to AIDS deaths. The rapid decline of HIV prevalence from 2006 to 2012, particularly in urban men (1.3% to 0.5%), and rural women and men (0.5% to 0.2%, and 0.6% to 0.3% respectively) indicates high AIDS mortality. In countries with high ART access and retention, HIV prevalence tends to stabilize or even increase—although decreases in HIV prevalence are desirable, they should not arise from excessive AIDS mortality. Anecdotal evidence suggests that people delay accessing ART, especially men, who contact health services less frequently. There may be challenges to the retention of ART patients (no documentation identified), and ARV availability at decentralized level has not always been maintained (while there is a surplus of ARVs at central level). Many ART patients will experience food insecurity and malnutrition—the result of a vicious cycle of no farming, no harvest—which can impair drug adherence and treatment success. According to Spectrum, an estimated 3,360 PLHIV died in 2012 due to an AIDS-related cause, and the total cumulative number of AIDS deaths in Niger up to end 2012 is estimated at 68,730.

The insufficient scale-up of the ART program and weaknesses in HIV case finding have to be seen in the context of Niger's health system. Over half of all residents live outside the 5 kilometer catchment area of access to health facilities (however, in Niamey nearly all residents are within a kilometer-5 catchment area). Newborn, nutritional and maternal causes such as diarrheal diseases, lower respiratory infections, and protein-energy malnutrition as well as several communicable diseases including malaria, meningitis, measles and tetanus, remain the top causes of morbidity and mortality. Health sector capacity is insufficient, compounded by the fast population growth which doubles the population every 23 years. However, AIDS (and malaria) are the leading emerging diseases in Niger according to the comprehensive international Burden of Disease Study, and therefore requires attention.

The Optima analysis supports a 50% HIV budget allocation to the ART program (which includes ARVs, laboratory monitoring, psychological and nutrition support, out-patient and in-patient services), almost double the 26% allocation in 2012. While the roll-out of the ART program must be national, a phased scale-up may be justified given the large concentration of PLHIV in four regions (circa 70% of PLHIV in the four regions covering a quarter of the country surface area).

Recommended policy actions

12. **More resources need to be allocated to the ART program to optimize the impact of treatment on HIV incidence and DALYs**—allocating half of the budget to the ART program would allow for investment in program infrastructure (like diagnostic equipment); human resources (including capacity building, and task shifting activities); supply chain strengthening (including management information systems, and ARV prescription decentralization); and patient and adherence monitoring through community-based health workers. ART program efficiency will be greatly improved through closing these resource gaps and through better data along the ART cascade.
13. **With more investment in the ART program, pre-ART services could be innovated and strengthened, and the treatment threshold could be raised to initiate more PLHIV on treatment, especially men**—diagnosing people as HIV positive and then losing them again until their health has seriously deteriorated is a great inefficiency, and contributes to ongoing HIV transmission. There are good linkage and retention practices in pre-ART care⁶ that are documented internationally which can be applied to Niger's context. Gradually switching from the prevention of mother-to-child-transmission (PMTCT) options A and B to option B+ will further help scale up ART.
14. **Institute systematic monitoring of CD4 count at treatment initiation, separately for men and women, to track progress in the implementation of treatment policy (threshold 350 or potentially 500)**—although CD4 capacity is still being strengthened (and is a priority action), systematic recording of this key ART access indicator must be started when CD4 counting is done at treatment initiation, and the indicator must be used for performance monitoring (an increasing CD4 count at initiation shows earlier and better access to treatment). Resolving the technical bottlenecks that are associated with low testing numbers, such as handling the test machine capacity, is an important efficiency improvement.
15. **Provider-initiated counseling and testing must be selectively scaled up for HIV case finding**—this primarily concerns services for STI clients, where HIV yields are higher than in the general population (TB clients are already being tested for co-infection). Once a person has been identified as HIV positive, post-test counseling should focus on getting a commitment from the client for periodic monitoring visits so that the client can be initiated on treatment in agreement with ART eligibility guidelines (a higher CD4 treatment threshold would enable health providers to initiate more PLHIV earlier).

8. Improving the implementation efficiency of the prevention of mother-to-child transmission program through better integration with health services

Conclusion: Elimination of vertical transmission is challenged by poor health-seeking behavior of pregnant women and multiple limitations of the health system

Approximately half of all new HIV infections are vertically transmitted. Niger has committed to eliminating mother-to-child transmission (MTCT), and to keeping mothers alive. This global goal requires a significant scaling up of HIV services, accompanied by intensified sexual and

⁶ http://www.aidstar-one.com/focus_areas/care_and_support/resources/report/PreART_Linkage_Retention

reproductive health interventions, community mobilization and rural service deployment in Niger and elsewhere.

Achieving the virtual elimination of MTCT in Niger has considerable challenges—the MTCT rate needs to be reduced from the rate of approximately 27% in 2013 to below 5%. Although Niger had 651 PMTCT sites in 2012 and saw positive growth in the use of antenatal services (CPN1 at 83%) and assisted deliveries (29%), less than half of pregnant mothers in need of ARVs received the drugs in 2013. HIV diagnosis of exposed infants is almost nonexistent at 1%. There are many missed family planning (FP) opportunities that are also missed opportunities to reduce the vertical transmission of HIV. More than one-third of all non-users of FP visited a health facility over the past 12 months, but did not discuss FP during that visit. These missed FP opportunities are especially a concern in women aged 30–44 years (who have an elevated HIV prevalence compared to younger women), and women living in Niamey (female HIV prevalence of 1.5%).

The success of PMTCT in Niger relies heavily on improving the demand of pregnant women for maternal and neonatal health services. The causes of the high number of those lost-to-follow-up are multifaceted and complex: many women are dependent on their husband's approval to seek and obtain health services; cultural reasons can prevent both men and women from seeing pregnancy as a “disease” state that warrants the intervention of health care providers; the stigma of being HIV positive can prevent women from getting their HIV test results or obtaining the treatment for themselves or their baby; and the cost of accessing antenatal care and assisted delivery—costs can be overwhelming even if it is just for transport or a lost day of work, and especially if the perceived benefits are seen as limited. One field study on maternal health services in Niger also noted that staff attitudes towards patients were often demeaning.⁷

The Government has reviewed the PMTCT situation in detail and identified inefficiencies, constraints and priority actions. One of the main delivery solutions was a scheme where female health workers were assigned at the community level (“*médiatrices communautaires*”), such as for example, in the Arlit district. The recent positive Rwanda experience that involved 15,000 community health workers suggests that investing in linking people to services provides direct health outcomes. Community based workers and community networks can play a role in information, education, demand creation, mobilization and in the provision of basic services.

The optimization analysis suggests that increased investment in PMTCT will help minimize new HIV infections, AIDS deaths and disease. Spending 18%–20% of the HIV budget on PMTCT instead of 11% as spent in 2012, will lead to best reductions in vertically transmitted infections and avert the maximum amount of DALYs. It is estimated that an additional 1,400 vertical HIV infections could be averted over a ten year period if the currently acquired NSP resources were optimally allocated. Using the Option B+ PMTCT regimen could help simplify the service cascade and improve the uptake of PMTCT by removing the need for CD4 counting for treatment initiation. By decreasing the number of necessary interactions with the health system, it theoretically helps to scale-up PMTCT (and would directly contribute to ART targets). The simplified infant prophylaxis protocol and a unified regimen that can be used for the entire adult population would also simplify procurement and supply chain management.⁸ Of course, switching to Option B+ also entails significant financial and organizational investments that need to be thoroughly assessed and costed.

⁷ Chambers, V., and D. Booth, Delivering maternal health—Why is Rwanda doing better than Malawi, Niger and Uganda? ODI briefing paper 74, May 2012.; Olivier de Sardan, J.-P., Providing public goods: local responses to policy incoherence and state failure in Niger. APP Policy Brief 4. London: APP, 2012.

⁸ UNICEF, Key considerations for options B and B+, July 2012, Chewo Luo.
http://www.unicef.org/aids/files/hiv_Key_considerations_options_B.pdf/

Recommended policy actions

16. **Shift more HIV resources to PMTCT, per the optimization analysis, and use these resources to strengthen systems that are shared between PMTCT, maternal health and family planning**—advancement in PMTCT largely relies on progress in the provision of maternal, newborn and child health (MNCH) and family planning. Unless more women use antenatal care (ANC) and delivery services, PMTCT cannot be significantly scaled up. Therefore PMTCT resources must contribute to the broader attempt toward providing better services and building greater demand. A particularly promising shared resource are community-based health workers (médiatrices) who are tasked with the identification of risk pregnancies, and who accompany women, children and families enrolled in treatments (PMTCT regimens, ART, FP, tuberculosis [TB], etc.). The Malawi experience has shown that peer support and defaulter-tracking are important for minimizing loss-to-follow-up, as are extended counseling and ongoing support of women, and effective use of the patient monitoring data.⁹
17. **Use the knowledge about the barriers, bottlenecks and inefficiencies of the current PMTCT intervention to make strategic investments, including a phased introduction of the B+ option**—more evaluation of demand creation strategies in MNCH and FP need to be done, bearing in mind that intervention effects will be heterogeneous¹⁰ (e.g., by literacy level, order of pregnancy, and previous service-user experience). Regular quality monitoring of services is essential toward retaining women during antenatal care and throughout their reproductive years. PMTCT option A should be completely phased out in favor of the more effective option B. Pilot studies of the B+ regimen—a promising option in settings with scarce CD4 cell count testing capacity and high fertility—should be conducted together with systematic and ongoing reviews of retention, using medical record data. Option B+ needs to be fully costed, including community-based activities deemed necessary to make life-long treatment of HIV-infected mothers work over time.
18. **The PMTCT program must expand its integration at all levels**—this study found that PMTCT services would benefit from a higher level of integration with other services and initiatives, especially at the community level: to improve access to services for women; better facilitate referrals and follow-up between services; increase efficiency across the PMTCT cascade; and for health supervision services to fully integrate PMTCT into the broader supervision visits. Finally, an improved and integrated supply chain management for ARVs and for HIV test reagents is required to ensure ANC clients can be diagnosed for HIV and treated at all PMTCT sites without interruptions due to shortages.

⁹ Shaffer, N., et al., Option B+ for prevention of mother-to-child transmission of HIV in resource-constrained settings: great promise but some early caution. *AIDS* 28:599–601. 2014.; Tenthani, L., et al., Retention in care under universal antiretroviral therapy for HIV-infected pregnant and breastfeeding women (Option BR) in Malawi. *AIDS* 28:589–598, 2014.

¹⁰ Takasaki, Y., and R. Sato, Why don't the poor receive antenatal care? Evidence from incentive and information experiments in rural Nigeria, June 21, 2013.

9. Financing the future HIV response in Niger

Conclusion: There is not sufficient funding for implementing the national HIV strategy, however, the total funding needed is not as much as anticipated provided that the funds are directed to the most allocatively-efficient programs, that the programs are implemented in the most technically efficient manner, and that they are integrated within the broader health systems

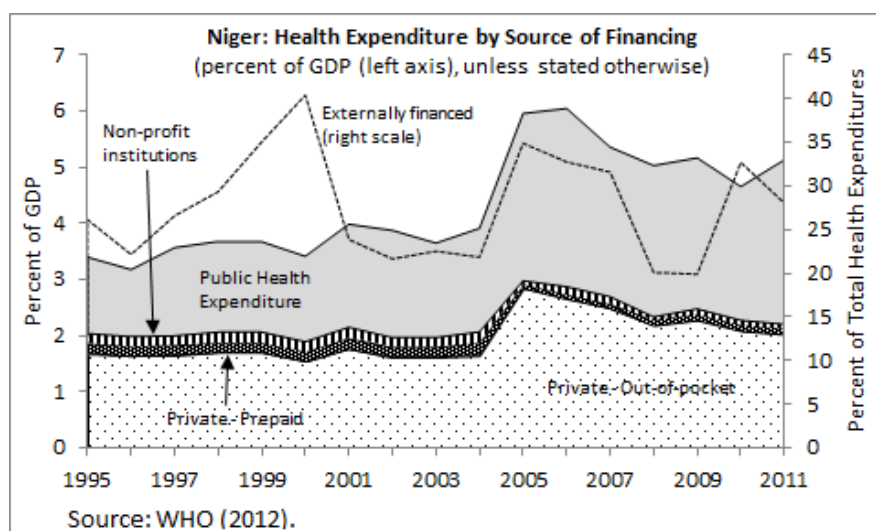
Even if HIV resources were optimally allocated (as suggested in 2.), a financing gap would still remain. For Niger's NSP, the Government's anticipated financing shortfall will be Euro 44.9 million (USD 60.4 million) for the remaining 2014–17 period. This implies that by December 2013, only 35% of the total NSP-projected funding for the four year period was committed from either internal or external sources. But, if funding was optimally allocated, the Government may not need this amount of funding in the future.

In the past and from 2007 to 2011, 90% of the financing response to HIV was driven by external funding, with the most important sources in recent years being the Global Fund, UNICEF, the Government of Germany (Kreditanstalt für Wiederaufbau KfW) and World Bank. In 2012, the share of external funding declined to 67% and public spending dramatically increased through a World Bank IDA loan, which is counted as Government of Niger funding. The average costs of the national HIV response (2007–12 data) was Euro 9.7 million (USD 12.6 million), or 0.24% of GDP, bearing in mind that there were large fluctuations between years.

Annual spending under the provisional NSP budget and the 2012 resource needs model is projected to increase steeply from Euro 10.5 million (USD 14.1 million) in 2014 to Euro 20.2 million (USD 27.2 million) in 2017. The scaling-up of HIV prevention and treatment envisaged under these provisional investment plans would result in a steep decline in HIV incidence and mortality, and an increasing number of people on ART. The decline in HIV incidence would contribute substantially toward containing the long-term costs of the HIV program. It is estimated that one new HIV infection in 2013 results in a future cost of about Euro 2,500 (USD 3,400). This cost will vary with the level of mortality on ART. HIV incidence declines in 2013–17 alone would result in reduced long-term spending commitments equivalent to a saving of Euro 6.3 million (USD 8.4 million). The estimates in this analysis imply that—in addition to the obvious health and social gains—the financial savings achieved by increased HIV investments per the current NSP would offset about one-third of the additional costs of the scaling-up of prevention and treatment efforts. While the costs of the national HIV response per the NSP are projected to increase in absolute terms, the costs are expected to peak at 0.29% of GDP in 2017, and decline to 0.22% of GDP in 2030.

Private out-of-pocket health spending is relatively large, considering the low level of wealth in Niger. In 2011, health spending accounted for 5.1% of GDP (Euro 225 million or USD 303 million) (see Figure 6), which was dominated by the public sector (57% of total) and private out-of pocket spending (39% of total). Out-of-pocket spending accounted for 95% of household health spending. About one-third of all health spending in Niger is externally financed (which is a lower external dependency than HIV spending).

Figure 6. Health expenditure by source of financing, Niger (1995–2011)



In 2011, spending on HIV care and treatment accounted for about 2.7% of public health spending (1.6% of total health spending), which is a considerable share given the many competing financing needs of Niger's health sector. A recent World Bank report on financing for development post-2015¹¹ points to four foundational pillars of development financing: domestic resource mobilization; better and smarter aid; domestic private finance; and external private finance.

Recommended policy actions

19. **Review the NSP budget in the light of this analysis and acquired HIV funding—it is recommended that budget adjustments be made to ensure financing of high impact interventions.** The Government should plan for budget adjustments now in 2014, identify savings and alternative financing mechanisms, and plan for a gradual decrease in funding of HIV interventions which have low epidemic impact.
20. **Evaluate alternative funding sources especially those that generate permanent resource streams and leverage the private sector**—the feasibility and potential revenue from additional resource streams should be investigated, for example: intensify private sector mainstreaming (comprehensive HIV/AIDS workplace programs initiated by HIV business coalition members); explore growing the existing social health insurance (SHI) further, where appropriate, to create fiscal capacity by shifting expenditure from the Government budget (almost 3% of Niamey residents are already members of a SHI); reinforcing public sector mainstreaming; and other measures. The results based financing (RBF) scheme planned for the health sector represents an important opportunity to ensure financing for ARV-based interventions, and to stimulate both demand and supply (see Burundi experience).
21. **The burgeoning private sector is creating tax revenue (but also new or increased risk contexts), so the Government should consider reinvesting a percentage of these fiscal revenues into HIV and health programs**—this process has started, and current analysis demonstrates the importance of a predictable and sustainable resource base for HIV

¹¹ World Bank, Financing for development post-2015, October 2013.
<http://www.worldbank.org/content/dam/Worldbank/document/Poverty%20documents/WB-PREM%20financing-for-development-pub-10-11-13web.pdf>

services. Niger already instituted an airline levy, but other innovative financing modalities to increase domestic financing could be investigated to sustain the HIV response.

22. **Integrate HIV/AIDS into any future health schemes such as Results Based Financing (with PMTCT and ART in the essential service package), or any future Universal Health Coverage scheme**—while HIV/AIDS is not a leading cause of burden of disease in Niger, it is nevertheless a leading *emerging* cause, and services must be available to manage HIV/AIDS and co-morbidities such as poor nutrition in an integrated manner. A vertical approach to HIV is ineffective in such a context and therefore HIV and health investment must be built in a concerted and integrated way.
23. **When advocating for HIV and health investment, the Government of Niger should consider the HIV epidemic potential within the context of unfolding demographic and socio-economic changes**—epidemic drivers and co-factors such as the rapid growth of urban populations, increased labor migration and high fertility may erode some epidemic gains, therefore the country cannot be complacent regarding HIV/AIDS.

Section 1. Introduction

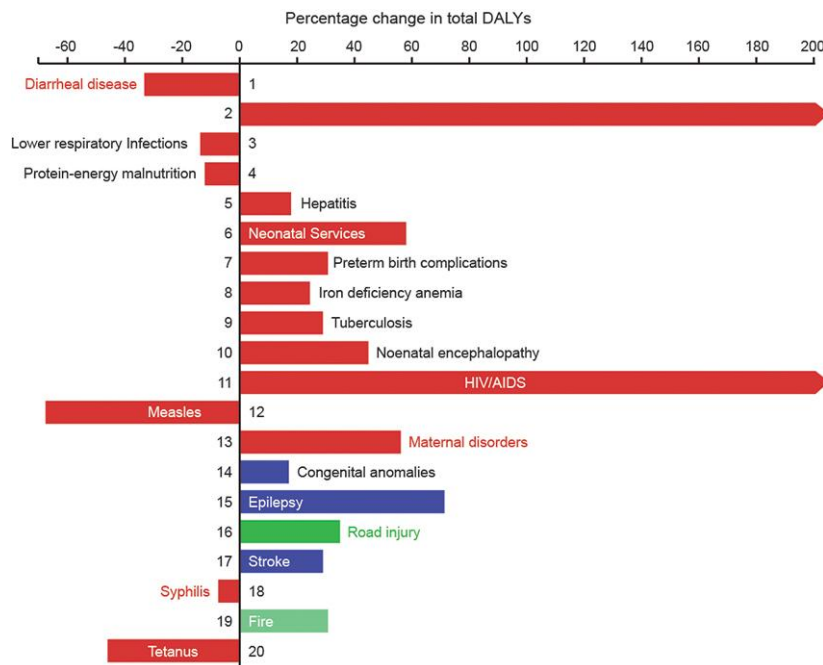
What is the context of this analysis?

Niger's morbidity and mortality statistics are still dominated by communicable diseases while there is, until now, a relatively low burden of disease attributable to non-communicable diseases. The macroeconomy is experiencing positive development, however, a large part of the population are still living in poverty (56% were living on less than USD \$1.25/day in 2008). The majority of the population has poor access to health facilities (53% live further than 5 kilometers from a health service). 40% of all health spending is out-of pocket, despite the low income levels of most people.

Despite Niger being a low HIV prevalence and comparatively low HIV/AIDS burden country, HIV/AIDS is an emerging and significant cause of DALYs in recent years —see Figure 7

- The only rapidly growing cause of DALYs between 1990 and 2010, other than HIV/AIDS, was malaria
- TB is still a public health problem. However, latest World Health Organization (WHO) statistics show a falling incidence trend of 104/100,000¹².

Figure 7. Shifts in leading causes of DALYs in Niger (1990–2010)



Source: Institute of Health Metrics and Evaluation, Human Development Network, The World Bank; The global burden of disease: Generating evidence, guiding policy—Sub-Saharan Africa Regional Edition. Seattle, WA: IHME, 2013.

¹² https://extranet.who.int/sree/Reports?op=Replet&name=%2FWHO_HQ_Reports%2FG2%2FPROD%2FEXT%2FTB-CountryProfile&ISO2=NE&LAN=FR&outtype=pdf

In 2011, HIV/AIDS consumed an estimated 2.7% of public health spending (2011 data), and has therefore become a significant cause of health expenditure in Niger.

At the international level, the HIV funding landscape—and indeed the HIV financing paradigm—has changed

- After a decade of unprecedented HIV investment, external HIV financing has plateaued leading increasingly to domestic resources being expected to sustain and scale-up national responses¹³
- Over the last three decades, it has become apparent that structural factors—such as poverty, limited livelihood options, inequality, and violence—as well as inadequacies in the health system, have compounded and sustained the HIV epidemic, undermining the effectiveness and scale-up of proven HIV interventions¹⁴
- Concurrently, HIV investments have had spill-over effects that have impacted well beyond HIV, having contributed to health sector strengthening and non-HIV outcomes¹⁵
- As a consequence, current discussion has shifted from whether an investment is within (or beyond) the remit of the HIV program, to a broader view on the multiple interactions between HIV, health, and development outcomes
- Beyond 2015, future international efforts will increasingly be directed towards achieving maximum attainable health outcomes equitably and through universal coverage approaches. The thought is that effectively embedding HIV responses into broader national priorities, will further encourage domestic ownership and sustainability¹⁶
- This report adopted some of these new insights by relating Niger's HIV response and financing to the health sector context and its financing, and included the DALY¹⁷ metric in the optimal HIV resource allocation modeling

Why is this analysis needed?

Although HIV is not the major burden of disease in Niger, it is an important emerging source of disease burden. Implementing, integrating, and allocating resources more effectively will potentially save time and money, and free up resources to address other key development challenges.

¹³ Meeting the investment challenge: tipping the dependency balance. Geneva. UNAIDS; 2012; Hecht, R., et al., Financing of HIV/AIDS program scale-up in low-income and middle-income countries, 2009–31. *The Lancet*, 376:1254–1260. 2010; Lule, E., and M. Haacker, The fiscal dimension of HIV/AIDS in Botswana, South Africa, Swaziland, and Uganda, Washington, DC: The World Bank, 2012.

¹⁴ Remme, M., et al., Financing structural interventions: going beyond HIV-only value for money assessments. *AIDS*, 28:425–434. 2014.

¹⁵ Walensky, R. P., and D. R. Kuritzkes, The impact of the President's Emergency Plan for AIDS Relief (PEPFAR) beyond HIV and why it remains essential. *Clinical Infectious Diseases*, 50:272–275; Samb, B., et al., An assessment of interactions between global health initiatives and country health systems. *The Lancet*, 373:2137–2169, 2009.

¹⁶ Global Health 2035: a world converging within a generation conference, 16 January 2014. New York.

¹⁷ DALY (Disability adjusted life years) is a metric which allows comparison across diseases. One DALY can be thought of as one lost year of "healthy" life. The method uses disability weights, discounting and age weighting.

Niger's HIV response is heavily dependent on external funding

- Niger has been heavily reliant on international support, with 95% in 2009, 93% in 2010 and 2011 and 67% in 2012 of HIV program funds covered by external finance (the decrease in 2012 is largely due to the World Bank loan)
- The primary source of international funding in Niger has been the Global Fund. However, in 2012, only 18% of Niger's HIV expenditure was supported by the Global Fund compared to 37%–51% in the three years prior to 2012

Niger may face shortfalls in HIV funding during the NSP period

- The African Union Special Summit in Abuja in July 2013 led to a renewed commitment by Member States to take decisive action toward the elimination of HIV/AIDS by 2030, through increased access to prevention programs, eliminating mother-to-child transmission of HIV while keeping mothers alive, and honoring the earlier "Abuja Commitments"¹⁸
- In line with its commitments, Niger's NSP 2013–17 envisages enacting a service scale-up to meet ambitious HIV service coverage targets, however, the funding that has been acquired falls well short of estimated resource needs
- Niger's Global Fund support is based on the Transitional Funding Mechanism until 2015, and the Kreditanstalt für Wiederaufbau (KfW) funding is only assured until 2014. The World Bank support project 2012–16 focuses its investments in specific geographical and service areas (prevention of HIV among sex workers and their clients, HIV testing and treatment, PMTCT, as well as management and coordination of the HIV response, and piloting output-based financing of HIV services)

Even though HIV incidence has fallen, AIDS care and support costs are considerable in a health system that has multiple investment priorities

- In 2011, health spending accounted for 5.1% of GDP (Euro 225 million/USD 303 million), and about one-third of all health spending was externally financed (WHO, 2014)
- HIV care and treatment spending accounted for about 2.7% of Niger's public health spending in 2011
- There is an incessant flow of new HIV infections and it is estimated that Niger had 46,910 people living with HIV in 2012 (Spectrum, 2013) and spent Euro 3.38 million (2.22 billion CFA/USD 4.41 million) on HIV/AIDS treatment in the same year
- The global goal of eliminating mother-to-child HIV transmission requires a significant scaling up of HIV services accompanied by intensified sexual and reproductive health interventions, community mobilization and rural service deployment

¹⁸ In April 2001, heads of state of African Union countries met in Abuja and pledged to set a target toward allocating at least 15% of their total annual budget to health. At the same time, they urged donor countries to "fulfil the yet-to-be met target of channeling 0.7% of their Gross National Product as official Development Assistance to developing countries".

Now is the right time to promote a smart and sustained investment into Niger's HIV response that strengthens, integrates with, and complements Niger's broader health priorities

- Globally the notion of “shared responsibility” in funding the HIV response has gained momentum. While the Global Fund has restructured its grant mechanisms towards strategic investment for maximum impact, political leaders have agreed to scale up the mobilization of domestic resources to strengthen the health system, and ensure diversified and sustainable financing for health (July 2013 Abuja Summit)

The New Funding Model of the Global Fund is designed to produce a greater impact on the three diseases, to improve funding predictability and reward ambitious vision. Funding eligibility is determined by a country's income level and official disease burden data. The level of allocations are predetermined based on disease burden, income levels and other criteria such as previous grant performance, impact, increasing rates of infection, absorptive capacity, and risk.¹⁹

- In 2012, Niger has already increased its investment in HIV, spending three times more on HIV than in the previous five years combined
- At a time when the global economic environment is stagnating, Niger's economy grew to 11% in 2012, thanks to oil, uranium and agricultural production (International Monetary Fund [IMF] data), and the country's fiscal revenues increased in 2012 relative to 2011. As part of Niger's current economic strategy, the government intends to create fiscal space for development spending (IMF, April 2013). The new national HIV strategy emphasizes the need for diversified revenue streams to finance the growing HIV response, but much of this may depend on whether HIV/AIDS prevention, treatment and support are deemed to be smart investments

What were the objectives of the analysis?

The overarching objective was to provide the Government of Niger with a comprehensive investment case analysis of HIV financing needs, and investment opportunities in the context of burden of disease priorities, health financing and health system strengthening, in order to apprise a HIV response that is efficient, impactful, cost-effective, and financially sustainable.

The specific objectives were:

- Understand the broader health priorities and health financing landscape
- Within the health priority context, estimate the impacts, cost-effectiveness and returns on investment of past HIV expenditure
- Review evidence of HIV implementation efficiencies and determine where efficiency gains could be made to save costs, or scope increased without compromising quality
- Provide an integrated analysis of how, during the current NSP, HIV financing can be best allocated in a way that minimizes HIV incidence, AIDS morbidity and mortality, and reach the 2017 epidemic/health impact targets

¹⁹ http://www.theglobalfund.org/en/fundingmodel/updates/2014-02-04_Eligibility_List_for_2014_now_available/;
<http://www.theglobalfund.org/en/fundingmodel/allocationprocess/>

- Link the evidence on allocative and programmatic efficiency and intervention effectiveness to an analysis of the financial sustainability of the HIV response, based on domestic fiscal resources and evolving availability of external funding
- Determine what the long-term financial consequences and savings of HIV interventions in Niger are, and potentially what future health care costs can be saved through different policy scenarios, to guide policy-makers

Using the Optima model, the analysis (see below) posed the following questions:

1. What is the cost of meeting Niger's 2017 coverage targets?
2. How much money is required to reduce HIV incidence by 50% in the mid-term, if allocated optimally among the basic programs?
3. With the available 2014–17 budget, what is the optimal allocation among the basic HIV programs for best reduction in HIV incidence and DALYs over that period, including follow-on effects until 2025?
 - a. Could accelerated ART scale-up contribute to the 2017 goal?
 - b. Could a change in PMTCT protocol to B+ contribute to the 2017 goal?

What methods were used?

- A Desk review of available data and literature was conducted, comprising: HIV resource tracking data (NASA); National health account data; macroeconomic data; HIV prevalence and sexual behavior reports; Spectrum estimations; data from the Resource Needs Modeling; reports on key populations; HIV policy documents; and HIV program implementation data
- Optima (formerly Prevtool), a mathematical model developed by the University of New South Wales (UNSW) and the World Bank (WB) for estimating HIV incidence in sub-populations was used to calculate the HIV impact and cost-effectiveness of HIV spending; and optimal resource allocation toward achieving best results in the prevention of new HIV infection and HIV-related morbidity and mortality—see Annex 1 for details
- Implementation of a financial commitment analysis that has three building blocks: (1) an epidemiological component; (2) a costing framework for projecting the costs of the national response to HIV; and (3) an economic framework to estimate the costs incurred by new infections. The epidemiological component is harmonized with Spectrum for consistency. The costing framework projects the costs of the national response to HIV/AIDS through calculating the epidemiological estimates and specified coverage rates and the number of people receiving HIV/AIDS services. Unit costs are informed by past expenditure patterns (as documented in the national AIDS spending assessment [NASA] report), budget data, and data from the Resource Needs Model—see Annex 2 for details
- Monetary amounts were expressed in Euros, using the fixed exchange rate of 1 Euro = 655.957 CFA, and using 503.1 for CFA/USD

How are the study findings presented in this report?

- The *Executive summary* presents the main findings by theme and provides the full conclusions and recommendations that are derived from this analysis. The recommendations cover eight areas: (1) Epidemic dynamics; (2) Impact and cost-effectiveness of past HIV

investments; (3) Impact gains through better allocative efficiencies; (4) Geographical targeting of priority programs; (5) Improving the efficiency of programs for female sex workers; (6) Improving the efficiency of the antiretroviral treatment program; (7) Improving the efficiency of the prevention of mother-to-child-transmission program; and (8) Financing the future HIV response in Niger

- **Section 1** (*Introduction*) presents the context and rationale of the analysis, the objectives and the methodological approach taken
- **Section 2** (*Development context, health priorities and health system challenges in Niger*) summarizes the economic and human development state of affairs, national development policy framework, health spending, burden of disease data, as well as the provision and reach of health services.
- **Section 3** (*The state of the HIV epidemic*) reviews the epidemic situation, course and drivers, and the distribution of HIV across population strata. Section 3 provides a brief characterization of key populations with population sizes and locations, and provides comments on risk factors and vulnerability. It presents model estimations on HIV incidence and sources of new infections.
- **Section 4** (*HIV financing, HIV services and programs, and their efficiency*) reviews the data on HIV expenditure and funding sources, and what these investments have delivered in terms of HIV program development and scale-up. It reviews service linkage and integration, unit costs and service utilization.
- **Section 5** (*Impacts from past HIV expenditures and best resource allocations in the current strategic plan period*) presents modeling results of the HIV impact and cost-effectiveness of six years of HIV investments covering 2007–12. It then presents modeling results for optimized resource allocation until 2017, including scenarios for best HIV incidence reduction and maximum number of DALYs averted. The analysis makes assumptions that are based on a range of total HIV resources available, while taking savings from possible efficiency gains into account.
- **Section 6** (*Financing needs and fiscal space implications of HIV investments*) presents results from the fiscal model that was applied to Niger. It summarizes the financing needs and gaps until 2017, the HIV prevention and mortality impacts of investments under the current NSP, and the longer-term fiscal effects of HIV investments.

Section 2. Development context, health priorities and health system challenges in Niger

What is the state of economic and human development?

Macroeconomic situation

Niger is one of the poorest countries in the world with a largely agrarian and subsistence-based economy that is frequently disrupted by extended droughts common to the Sahel region of Africa

- Niger is landlocked, arid and vast, covering an area of 1,267,000 km². The closest port is the Port of Cotonou (in Benin) about 1,000 km away. Thus, most of Niger's foreign trade is conducted overland, with the main transport corridors being Benin, Togo and Côte d'Ivoire via Burkina Faso
- The economy is dependent on the agro-pastoral sector (40%) and the tertiary service sector (43%)
- After a year of food shortages, good harvests in 2010 helped the economy recover and grow, but this was interrupted by another period of drought in late 2011. However, growth was sustained by sizeable investments in the mining and oil sector

Following the trend in the region, Niger has benefitted from positive economic growth and increased fiscal revenues thanks to new mineral resources

- Over the past decade, extractive industries have fuelled economic growth in Africa which, together with continuous demand from China has inflated export prices.²⁰ In 2011, Africa's production accounted for three-quarters of the world's platinum supply, half of its diamonds and chromium, and up to one-fifth of global gold and uranium supplies.²¹ New exploration has identified larger reserves than previously known which is attracting additional foreign investment
- The IMF reported that Niger's economic growth had reached 11% in 2012, thanks to an oil project coming on-stream, higher uranium production and a rebound in agricultural harvest. Over the next 5 years, average real GDP growth is projected to be 6.3% annually (and at 3.1% GDP per capita)—see Table 1
- Fiscal revenues increased in 2012 relative to 2011 but, due to weaknesses in customs and oil revenue, were expected to fall short of program targets (IMF, April 2013)

²⁰ Africa progress report 2013: Equity in Extractives: Stewarding Africa's natural resources for all. http://africaprogresspanel.org/wpcontent/uploads/2013/08/2013_APR_Equity_in_Extractives_25062013_ENG_HR.pdf

²¹ Mineral Yearbooks, USGS, 2011. <http://minerals.usgs.gov/minerals/pubs/country/2011/myb3-sum-2011-africa.pdf>

GDP per capita is on an upward trend, and inflation is below 3%

- In 2013, per capita GDP was at Euro 330 or USD 440
- Despite fluctuations in farm production, inflation, on average, was under control at 2.1%, below the regional limit of 3%
- IMF and World Bank (2013) suggest that Niger faces a moderate risk-of-debt distress. Public debt has declined since 2006 due to restructuring arrangements obtained from the creditor members of the Paris Club, as part of the Heavily Indebted Poor Countries Initiative and the Multilateral Debt Relief Initiative. However, over the last few years, public external debt has increased due to the financing of large resource extraction projects
- As part of Niger's current economic strategy, the government intends to create fiscal space for development spending while tackling revenue weaknesses, implementing multiple measures to rebuild government deposits, employing structural reforms, improving financial development and maintaining debt sustainability

Table 1. Selected macroeconomic data, Niger (2013)

Niger: Selected Macroeconomic Data							
	2007	2008	2009	2010	2011	2012 Proj.	2013 Proj.
Real GDP growth	0.6	9.6	-1.0	10.7	2.2	11.2	6.2
Real GDP per capita growth	-2.9	5.8	-4.3	7.3	-0.9	7.9	3.0
CPI inflation (annual average)	0.1	10.5	1.1	0.9	2.9	0.5	2.1
GDP per capita (Euro)	226.1	257.7	260.6	284.5	292.0	317.5	333.4
GDP per capita (US\$)	310.0	379.3	363.0	377.5	406.3	408.3	440.0
GDP (Euro bn)	3.1	3.7	3.8	4.3	4.6	5.1	5.5
(Percent of GDP)							
Government revenues	22.4	24.3	18.9	18.2	18.1	22.5	24.3
Government expenditures	23.4	22.8	24.3	20.7	19.6	25.1	28.6
Fiscal balance	-1.0	1.5	-5.4	-2.4	-1.5	-2.6	-4.4
Public debt	25.4	21.3	28.1	24.0	27.7	28.8	38.7

Sources: IMF (2013)

Note: bn = billion; CPI = consumer price index; GDP = gross domestic product.

The political and administrative landscape is characterized by a multiparty system and decentralization

- There are 10 major political parties, a president who is elected by popular vote and a prime minister who is appointed by the president. The new constitution was adopted in October 2010
- Niger has established a process of decentralization that has transformed the former regional administrative structures (Départements, Arrondissements) and created Communes for better local governance
- The country is now subdivided into eight administrative regions, 36 Départements and 266 Communes, of which 52 are urban and 214 are rural

Human development

The Nigerien population, estimated at 17.13 million inhabitants in 2012, continues to grow at a very rapid rate of 3.9% (average intercensus 10-year rate), with a total fertility index of 7.6 children per woman in 2012

- The rate of demographic growth has remained virtually unchanged in the last 20 years, and at that rate, the population is expected to double every 23 years
- In rural areas, women give birth to 8.1 children on average, and in urban areas, 5.6 children (NDHS 2012). Zinder and Maradi have exceptionally high indices of 8.5 and 8.4 births per woman respectively. Women with secondary education have on average 3.1 fewer births than women without education
- 23% of births are spaced at less than 24 months (NDHS 2012)
- Women have their first child on average at age 18.6 years, 2.9 years on average after entering their first union

Poverty levels are improving while living conditions remain challenging

- The World Bank poverty indicator shows a positive trend in poverty reduction with a poverty headcount ratio of USD 1.25 a day for 43.6% in 2008, down from 65.9% of the population in 2005, placing Niger above the sub-Saharan Africa average of 49.2% in 2008. However, living conditions remain challenging

Recurring food crises mean that many households, especially in rural areas, are severely affected by under-nutrition

- Food insecurity persists even in years when agricultural production yields a surplus. About 60% of households are only able to cover their food requirements for three months. In periods of food shortages, half of the population suffers from malnutrition
- The situation is often dramatic for children under the age of five with about four out of ten children suffering from chronic under-nutrition and one out of ten children suffering acute under-nutrition. During the 2009–10 food crisis, some 7.1 million people needed food assistance
- The principle challenge is to transition from the cyclical management of recurring food crises to more structured responses, particularly through the “Nigeriens nourishing Nigeriens” (3N) initiative, for promoting sustainable food security and agricultural development

Urban centers are growing and standards of housing and living are mostly inadequate

- The urbanization rate has risen from 16.3% in 2001 to 17.5% in 2005 and to 20.4% in 2010. The city of Niamey had 1.3 million inhabitants in 2011, almost double the number in 2001 (708,000).²² An estimated 57% of the country's urban population lives in Niamey
- The annual growth rate in urban areas (6.2% per year) is about twice the growth rate for the population as a whole. If the current trend continues, the urban population will represent more than 40% of the total population by 2030
- The last ten years were marked by progress made in establishing the institutional and legal framework for urban development in a context of decentralized management. However, major challenges remain in the area of urban planning, housing and habitat

²²

www.citypopulation.de

Sustainable access to drinking water has improved, but remains challenging, especially in rural and periurban areas, while there is considerable under-investment of sanitation facilities in towns

- The percentage of Niger's population using a potable water source increased from 22.3% in 1992 to 50.1% in 2008 (National Survey on Budget and Household Consumption)
- Coverage of drinking water needs increased gradually to 66.5% in 2011, a level still well below the millennium development goal (MDG) target of 80% in 2015
- Principal constraints in this important sector are low investment levels, insufficient maintenance efforts, and lack of water, or poor quality water, or water at great depth in some areas
- More generally, there is an enormous unmet need for the supply of hygiene and sanitation services including garbage collection, and disposal of rain and wastewater

Radio is the only medium able to reach a significant proportion of the population

- 42% of men and 36% of women listen to the radio at least once a week (61% of urban men and 53% of urban women) (NDHS 2012)
- 53% of men and 59% of women are not using any of the main media (radio, television, print) regularly (63% of rural men and 66% of rural women)

Niger's 2012 human development index (HDI) is 0.304, ranking Niger at 186 in this global ranking comparison (UNDP, 2013)

- The index is a composite statistic of education, life expectancy, and income indices that rank countries for their advancement in human development. Niger's HDI has gradually increased from below 0.2 in 1980 to exceed 0.3 by 2010

HDI/Education: Niger's education system has experienced considerable expansion, but the average duration of schooling of adults is only 1.4 years which negatively impacts the human development rank²³

- At the basic cycle 1 level of instruction, the number of pupils increased from 210,000 in 1979 to 1,901,115 in 2010. The gross attendance rate (GAR) has risen to 76% in 2010/11 with a large disparity between boys (85%) and girls (67%), and between urban (99%) and rural (70%) settings
- At the basic cycle 2 level of instruction, the GAR decreases, especially for girls (about 18% in 2010), and there are large disparities between Niger's regions
- Attendance also remains low in the secondary cycle. The GAR was 4% in 2010, at 5.3% for boys and 2.5% for girls (the average GAR for sub-region countries was 16% in 2006)
- In the NDHS 2012, 60% of males and 80% of females had no education, and only 19.5% of males and 8.5% of females had started or completed secondary school

Niger's literacy levels have consistently been very low, due to low school enrolment and poor teaching quality, with only a minority of teachers being appropriately trained

- In 2012, 42% of males and 14% of females were classified as literate (NDHS 2012). In rural areas, only 32% of males and 7% of females were literate (70% males and 45% females in urban areas). Niger has one of the lowest literacy rates in the world

²³ <http://hdrstats.undp.org/en/countries/profiles/NER.html>

- The limited access to, and retention of girls within the educational system minimizes their opportunities in economic life and in decision-making
- There is an urgent need to stimulate demand among vulnerable groups (girls, women, rural residents, etc.), for the promotion of quality instruction, particularly through policy, human resources management, adaptation of teaching programs, and the gradual establishment of suitable school infrastructure (IMF April 2013)

The life expectancy at birth indicator, the health component of the HDI, shows a positive trend over the last 30 years

- In 1980, life expectancy at birth was 39.5 years in Niger. This increased to 48.3 years in 2000 and 55.1 years in 2012

The average per capita income (the economic component of the HDI) is moving in a positive direction, but remains at modest levels

- According to the United Nations Development Programme (UNDP) database, the average income has increased from USD 586 in 2000 to USD 701 in 2012 (expressed as the gross national income [GNI] per capita in purchasing power parity [PPP] terms, constant 2005 international \$). The Gini index, that measures income inequality, was 34.6 in 2008, which is similar to Togo and Algeria
- Two recent poverty profiles indicated that poverty affects rural areas more than urban areas, and is more pronounced among the female population. In addition, the phenomenon takes on endemic dimensions in the Maradi, Dosso, and Tillaberry regions. Although the depth and severity of poverty, as well as social inequities, declined slightly in recent years, they still remain at high levels

National development policy framework

There are three principal strategic documents that are relevant to Niger's future HIV investment strategy and broader social-sector development: the Sustainable Development and Inclusive Growth Strategy (SDDCI NIGER 2035), the Economic and Social Development Plan 2012–15 (PDES), and the Health Sector Development Plan 2011–15 (PDS).

The PDES, adopted in September 2012, is the frame of reference for interventions under the government's medium-term development agenda and is aligned with the MDGs

- It capitalizes on goals and progress attained when implementing the Accelerated Development and Poverty Reduction Strategy, the sectoral strategies, and ministerial action plans
- The PDES forms the basis for the execution of important structural projects, including the Kandadji hydroelectric dam, the exploitation and processing of coal from Salkadamna mines, and investment in transport infrastructure
- Improvements in rail and road infrastructure will reduce economic seclusion by better linking Niger to its neighboring countries. *This progress can put Niger's successes in reducing the transmission of HIV epidemic at risk—through creating hotspots where infrastructure is located, and intensifying the movement of people between low HIV prevalence areas and areas of higher HIV prevalence*

A core objective of the PDES is the improvement in the standard of living by reducing inequalities and the growth of the middle class

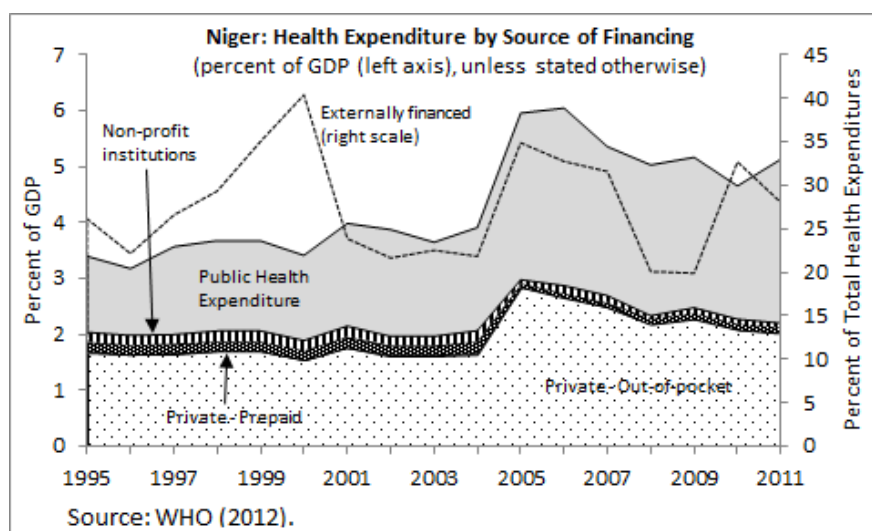
- The middle class is regarded as the most active population in terms of available skilled labor and increased domestic demand, and in particular, household consumption
- *However, epidemic statistics also show that HIV takes hold in the wealthier segments of the population first. The association is likely because of the availability of disposable income which can be used for pleasure-seeking purposes, including commercial sex*

The Health Sector Development Plan 2011–15 (PDS) that was adopted in January 2011, has as its overall objective to contribute toward both the improvement of the population's health status and the attainment of the health MDGs

- The PDS is based on a detailed analysis of the gaps and weaknesses in the public health sector. The insufficient coverage of quality SRH services is identified as a major shortfall, and urgent improvements to services of family planning, maternal health, immunization, integrated management of the sick child, nutrition and PMTCT, feature prominently
- HIV prevalence is a key outcome indicator in the PDS results framework (target level <0.7% which has been achieved in 2012 and needs to be maintained)
- PMTCT is presented as a high-impact intervention for both maternal/newborn health and child health, with a 2015 coverage target of 65%
- ART coverage targets are 30% for children and 75% for adults with advanced infections, and 30% for pregnant women identified as seropositive

How much is spent on health and where does the money come from?

- In 2011, health spending accounted for 5.1% of GDP (Euro 225 million or USD 303 million), and was dominated by the public sector (57% of total) and private out-of pocket spending (39% of total)—Figure 8
- According to the NDHS 2012, only 2% of men and women are covered by some medical or social insurance, however, 10% of women in Agadez and Niamey Regions reported having medical/social insurance
- Out-of pocket spending accounted for 95% of household health spending
- External financing accounted for about one-third of all health spending (WHO, 2014)
- Spending on HIV care and treatment accounted for about 1.6% of total health spending, and 2.7% of public health spending in 2011

Figure 8. Health expenditure by source of financing, Niger (1995–2011)

Note: GDP = gross domestic product.

- According to the PDS, the government intends to develop alternative health financing mechanisms, including the promotion of social health insurance (*mutuelles de santé*), and social welfare support for the elderly and destitute
- The free provision of some services is enshrined in laws: pediatric services for children aged 0–5 years (family planning, antenatal care); services for patients with cancer, TB and HIV/AIDS; and caesarean section (kit payable). Minimum and maximum amounts for service fees are also regulated
- In three regions, child delivery at health facilities is also free of charge (UNFPA support). In four regions, services for sex workers are free (World Bank support)

What are the health priorities?

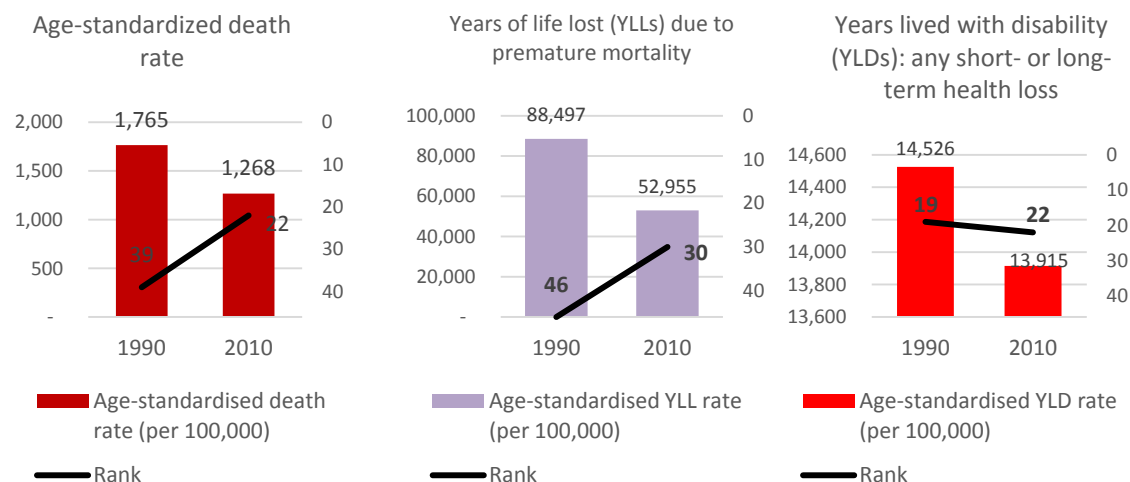
Burden of disease

Communicable, newborn, nutritional and maternal causes such as diarrheal diseases, lower respiratory infections, and protein-energy malnutrition **remained the top drivers of health loss in Niger** (IHME/WB)

- However, in comparison with 46 Sub-Saharan African countries, Niger has progressed significantly in burden of disease indicators and regional ranking—see Figure 9 (left and middle; note that rank 1 is best, and rank 46 is worst)
- Niger is the country in the whole region with the lowest percentage of DALYs attributable to non-communicable diseases (only 18%). However, the STEPS study results suggest that there has been a rapid increase in hypertension and diabetes over the last few years (PDS p. 29)
- Despite progress, Niger had very poor rankings in the regional comparison for years-of-life-lost due to meningitis, measles, tetanus, diarrheal diseases and lower respiratory infections, in 2010

- The country had, by regional comparison, relatively better rankings for road injury, interpersonal violence, diabetes, self-harm, chronic obstructive pulmonary disease, and HIV/AIDS

Figure 9. Burden of disease indicators, Niger (1990, 2010; ranking among 46 countries in Sub-Saharan Africa)



Source: Institute of Health Metrics and Evaluation, Human Development Network; The World Bank; The global burden of disease: Generating evidence, guiding policy—Sub-Saharan Africa Regional Edition. Seattle, WA: IHME, 2013.

Note: A rank of 1 is best, a rank of 46 least.

What is the provision and reach of health services in Niger?

Niger has a policy approach that is focused on primary health care and on the district health system

The provision of health services is dominated by the public sector (Health Sector Strategy, HSS), with:

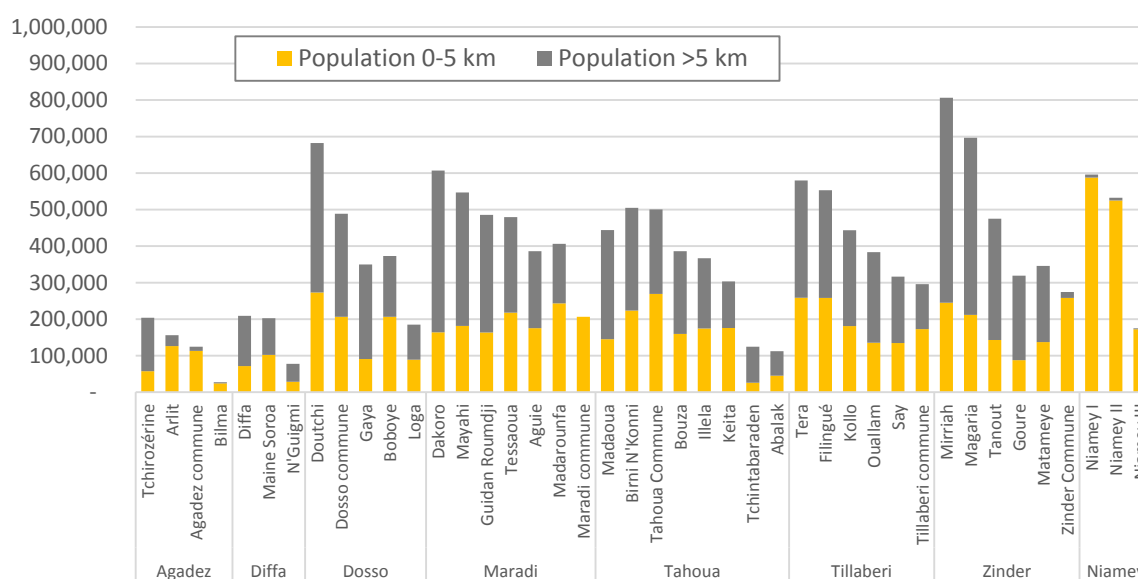
- 829 Integrated Health Centers, each managed by a nurse, and linked to a total of 2,160 health posts managed by community health workers
- 33 district hospitals, spread across 42 health districts
- 9 regional public health departments with 6 regional hospitals, 2 regional maternity reference centers and 7 mother-child centers
- 3 national reference hospitals and a national maternity reference center, of which 3 are in Niamey and one is in Zinder

Approximately 47% of the population lives within 5 kilometers of a health facility (Figure 10)

- In rural and in remote areas, transport costs arising from medical emergencies are a considerable challenge

Service provision by a male nurse is regarded as a barrier for females who use health services

- However, according to the Ministry of Health (MOH) Human Resources Development Plan (2011–20), an increasing percentage of health workers are female—75% of those working and aged under 35 years, and 85% of those who are still in training

Figure 10. Access to health facility by health district, Niger (2011)

Source: Annuaire MSP, 2012

The provision of health services is significantly limited by infrastructure and resource constraints—the following coverage levels were reported in 2011:

- The geographical coverage of the provision of basic health care was estimated at 71% (HSS)²⁴
- The treatment of malnutrition was estimated at 22% (HSS Annex 1)
- Antenatal care consultation CPN4+ was reported at 26%
- Anti-parasite treatment of pregnant women was estimated at 21%
- Detection and treatment of syphilis during pregnancy was reported at 6%
- Assisted delivery was at 29% in 2012 (e-MTCT plan)
- Management of neonatal infection was at 11%
- Diagnosis and treatment of STIs was reported at 37%
- Directly observed treatment supervision for TB was at 58%

Prevalence of modern contraceptive use has increased by about 1% every 5 years among women living in Niamey, in other urban zones, and in rural areas, but remains low overall (NDHS 1998, 2006, 2012)

- Overall, prevalence of modern contraceptives was calculated to be 11% in 2012, and 12% in women who were in a union (married or cohabiting). In urban areas, 27% used modern contraceptives compared to 10% in rural areas. Regionally, contraceptive use was highest in Niamey (32%) and lowest in Tahoua (6%)
- Women obtained modern contraceptives mainly from public sector Integrated Health Centers and health posts, but also from public and private sector pharmacies and mobile chemists

²⁴ This indicator does not include HIV-specific services like PMTCT, ART and HIV testing.

(especially the pill); condoms played a very minor role in contraception with less than 0.1% of women who were in a union reporting using condoms for contraception (DHS 2012)

- The majority of pill users use products that are socially marketed

30% of all women in a union and aged 15–49 years old expressed a demand for family planning (FP), of which just less than half (14%) are satisfied (with contraceptive use) and just over half (16%) are not satisfied (unmet need) (NDHS 2012)

- In 2012, there were 3.1 million women between 15–49 years old who were in union (married or cohabiting), and an estimated 930,000 of these considered themselves to be in need of FP
- An estimated 498,000 women in a union have an unmet FP need (estimations based on NDHS 2012)
- 55% of women and 59% of men have heard a message about FP on the radio within the last month (only 41% of rural women) (NDHS 2012)

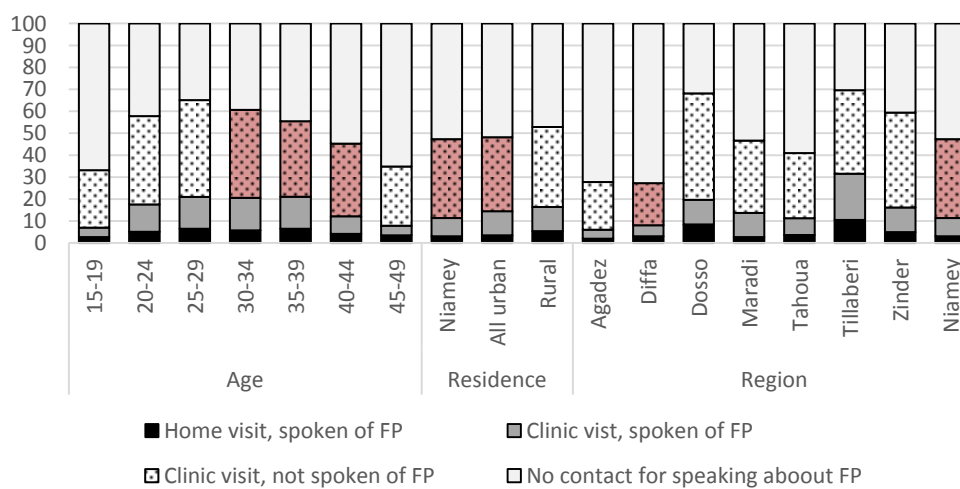
There are significant missed opportunities in health care contacts with non-users of family planning (NDHS 2012)

- 86% of non-users of FP report not having spoken about FP in the last 12 months, neither with a community health worker nor a clinic staff member
- 36% of all non-users of FP have visited a health facility in the past 12 months, but have not discussed FP during that visit (missed FP opportunity)—see Figure 11 (dotted areas)

These missed FP opportunities are also missed opportunities to reduce vertical transmission of HIV (PMTCT prong of family planning)—see Figure 11 (dotted orange areas show strata with higher HIV prevalence). Risks may be higher in:

- **Women aged 30–44 years old** (an elevated HIV prevalence compared to younger women, and many women grand multiparous with five or more births)
- **Women living in the city of Niamey and the other urban areas/towns** (female HIV prevalence of 1.5% and 0.7%, respectively)
- **Women in the regions of Niamey and Diffa** (female HIV prevalence of 1.5% and 0.8%, respectively)

Figure 11. Non-users of family planning: contact with providers, Niger (2012)



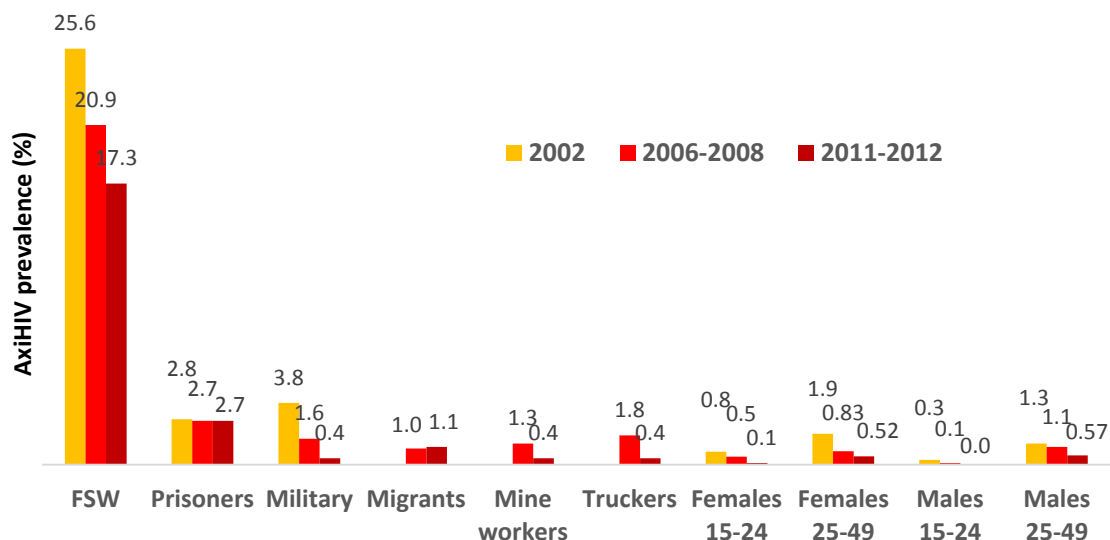
Source: NDHS 2012 Table 5.12 and 15.4

Section 3. The state of the HIV epidemic

What has been the historical course and scale of the epidemic?

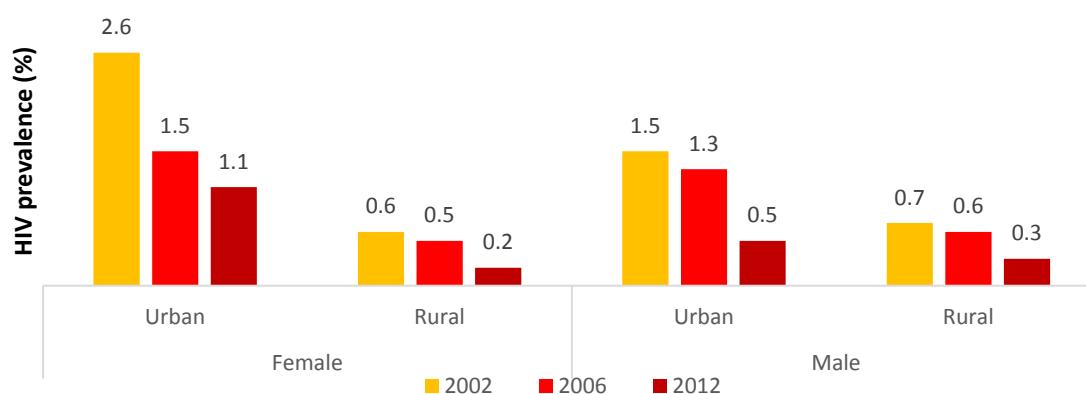
- **Niger's HIV epidemic is contracting.** HIV prevalence data from the general population and key populations at higher risk suggest that the epidemic has become more concentrated over the last ten years. HIV prevalence levels have been decreasing in almost all surveyed populations (Figure 12). Sentinel surveillance data from antenatal care services corroborate the contracting nature of the epidemic, with HIV prevalence in pregnant women declining from 1.7% in 2009 to 0.9% in 2012

Figure 12. HIV prevalence by population, Niger (2002--12)



Sources: Seroprevalence report Care 2002, SSG 2008, SSG 2011, DHS 2006, DHS 2012.

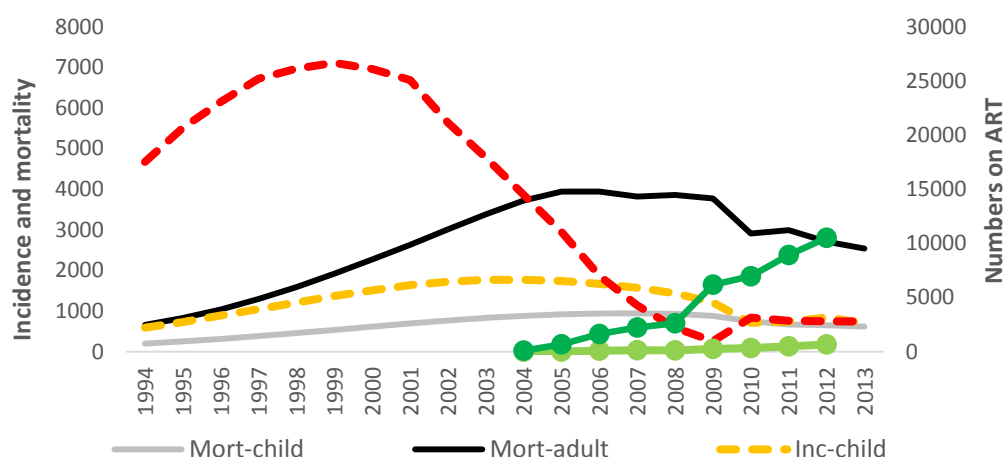
- **The epidemic trend is decreasing in both urban and rural areas (Figure 13).** HIV prevalence has declined least in urban females who are five times more likely to be HIV positive than females who live in rural areas (a higher HIV prevalence prevails in Niamey-based females). ART may play a role in elevated female HIV prevalence, especially in Niamey where there are six ART treatment centers. In 2012, there were nationally 40% more females on ART than males (Rapport annuel ULSS 2012, T8, page 21)

Figure 13. HIV prevalence by sex and residence, Niger (2002, 2006, 2012)

Sources: Sero-prevalence report Care 2002, DHS 2006, DHS 2012

- **Niger shares national borders with several countries which report higher HIV prevalence levels in their populations:** Nigeria, Mali, Benin and Burkina Faso. The first three listed countries also report higher prevalence levels in female sex workers (UNAIDS 2013 global report and aidsinfo.com, stat compiler for DHS data, UNGASS 2012 country reports). Cross-border traffic interactions and mobile populations will impact HIV epidemic dynamics in Niger
- **Near-universal male circumcision (at 99%) contains the epidemic** (male circumcision data from 2006 DHS). The chief role of male circumcision toward reducing the transmission of HIV from females to males has been established beyond any doubt. The Niger experience supports the claim that very high levels of male circumcision prevent a generalized epidemic, despite high risk sexual behaviors and vulnerability of its people. HIV infections are largely contained within females as a result of low transmission efficiency to their male partners that is attributable to male circumcision
- **According to model estimations, HIV incidence has decreased over time from the peak level of 8,470 new HIV infections in 2000 to 1,447 in 2013** (Spectrum 2013). This has resulted in reduced HIV prevalence, that is determined by the incidence of new HIV infections and by AIDS-related mortality
- **Until recently, decreasing HIV incidence has been accompanied by high AIDS-related mortality due to low access to ARV treatment** (Figure 14)
 - Since 2004, ART coverage has been scaled up and in 2012 had reached 51% coverage in adults and 13% in children below 15 years of age (Spectrum 2013)
 - In 2012, an estimated 3,360 PLHIV died due to an AIDS-related cause, and the total cumulative number of AIDS deaths in Niger up to the end of 2012 is estimated at 68,730. High AIDS-related mortality is also suggested by successive demographic and health survey (DHS) data, where a large part of HIV prevalent cases in the 2006 survey are not present in the respective age cohort of the 2012 survey (see also Figure 16)
 - Conditions like iron deficiency anemia and malnutrition and diseases such as diarrhea and TB (see graph in Executive Summary) can be expected to accelerate the progression toward AIDS and death among untreated people living with HIV

Figure 14. New HIV infections, AIDS deaths and ART, Niger (1994–2013)



Source: Spectrum 2013 (revised version)

Note: ART = antiretroviral therapy; Mort = mortality; Inc = incidence.

How is HIV distributed in the population of Niger?

- **The two key populations that continue to have elevated HIV prevalence are female sex workers (FSW) and prisoners**
- **Overall HIV infections are concentrated within certain segments of the female population:** in female sex workers, female members within key populations at higher risk (including female prisoners), and specific female demographics within the general population (see below). Epidemiological data suggest that male circumcision is likely to prevent transmission events from HIV-infected females to males (including from female sex workers [FSWs] to their clients)

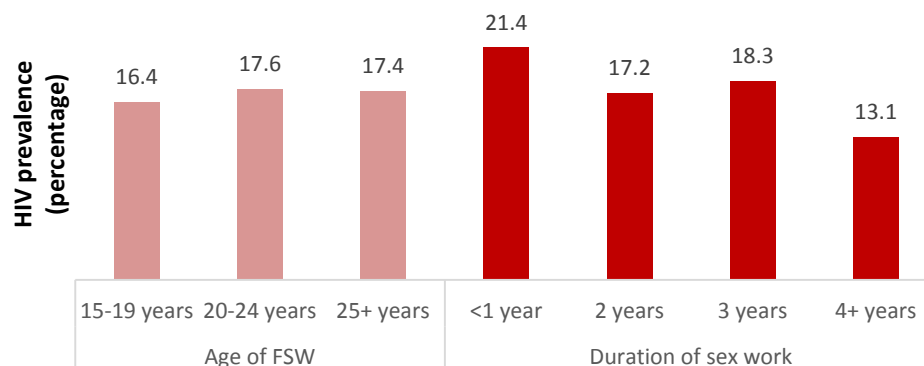
Female sex workers (FSWs)

- **Niger has an estimated 28,000 FSWs who are concentrated in urban and industrial zones such as mining areas and petrol fields (SSG 2011).** Despite declining HIV levels in FSWs, the prevalence differential between FSW and females from the general population is still large (17.3% versus 0.4%, see Figure 12). In 2011/12, HIV infection was 43 times more likely to occur in FSWs than in females from the general population, indicating the high exposure to unprotected sexual acts of FSWs and their high susceptibility to HIV infection
- **Survey data suggests a large regional variation of HIV prevalence in FSWs.** In 2011, levels were highest in FSWs surveyed in Tahoua and Maradi (31%), followed by Agadez (23%), Zinder (21%) and Niamey (19%). Sex workers in Dosso and Tillabéri were found to have below-average HIV prevalence levels (16% and 12%), and there were no HIV infections diagnosed in the 71 FSWs surveyed in Diffa (also 0% in the 2009 survey)
- **FSWs get infected rapidly once they join the sex industry.** FSWs below 20 years of age were as likely to be HIV infected as older FSWs ($p = 0.98$) and FSWs with less than one year of sex work experience had the highest HIV prevalence of all respondents in the 2011 survey—see Figure 15. A 2010 study (CISLS, Cartographie sites prostitutionnelles et MSM, 2010) indicates that younger FSWs tend to work on the street, while women up to 50 years of age tend to work in brothels (maison closes). The number of clients also appears to differ

according to type of site, with bars and restaurants reporting the highest proportion of sex workers reporting >20 clients a day

- The average duration of sex work is 3 years with 41% of SWs working from 1 to 4 years and 28% working for over four years²⁵
- **The majority of women in sex work are divorced** (63%, in the 2010 mapping study). Some women are driven into sex work after becoming widowed, divorced or separated

Figure 15. HIV prevalence by FSW age and duration of sex work, Niger (2011)



Source: SSG 2011, Table 4.6b and annex 13.

Note: FSW = female sex worker.

- **Reported violence is strongly associated with HIV infection.** In 2011, FSWs who reported being victims of violence had a HIV prevalence of 32% whereas those not reporting acts of violence had a HIV prevalence of 14%. Reported use of drugs and/or alcohol was not associated with HIV status

Prisoners

- **There are approximately 11,600 prisoners in Niger's correctional institutions.** It is reported that 3.2% are female.²⁶ The average duration of a prison incarceration is 1–2 years. Prisons represent a risk context for HIV, TB and other diseases. One official source reports conditions of inadequate ventilation, overcrowding, and incidences of death from AIDS, malaria and TB²⁷
- **HIV prevalence in prisoners has remained stable over the last decade.** HIV prevalence has leveled off at between 2.7%–2.8%, but has not followed the decreasing epidemic trend seen in other key populations. In Niamey, 6% and in Diffa 4.3% of prisoners surveyed in 2011 were HIV infected, reminding us that localized epidemics can ignite in risk settings like prisons

²⁵ Animas-Sutura- SongES – RENIP. Résultats de l'étude de cartographie des sites Prostitutionnels de la communauté urbaine de Niamey, 2013.

²⁶ International Center for Prison Studies, World female imprisonment list, second edition. 2012. http://www.prisonstudies.org/sites/prisonstudies.org/files/resources/downloads/wfil_2nd_edition.pdf

²⁷ Bureau of Democracy, Human Rights and Labor, Niger country report, 2012. <http://www.state.gov/j/drl/rls/hrrpt/humanrightsreport/index.htm?year=2012&dliid=204151#wrapper>

- **HIV knowledge has been consistently low in prisoners and may be decreasing** (2011 SSG). A history of STIs is associated with HIV infection

Men who have sex with men (MSM) and male sex work

- **Homosexuality is not socially accepted in Niger and sexual relationships between men are therefore hidden.**²⁸ There are no epidemiological data available on MSM in Niger. Mapping and estimation activities on MSM have assessed the numbers of MSM in individual regions: Circa 200 MSM in Tahoua; circa 150–200 MSM in Zinder; and 89 MSM in Niamey, including in bars, brothels and cinemas (Animas 2013). 10 MSM were identified in Maradi but could not be interviewed
- **In one survey, a high proportion of sampled MSM said they were involved in commercial sexual activities** (2010 data, MSM identified through snowball sampling). In 2010, 64% of interviewed MSM said that they receive payment from male sexual partners. There is a proportion of MSM who identify themselves as bisexual, and some are married, which links any MSM related HIV transmission to the female population

Other key populations that include sex work clients

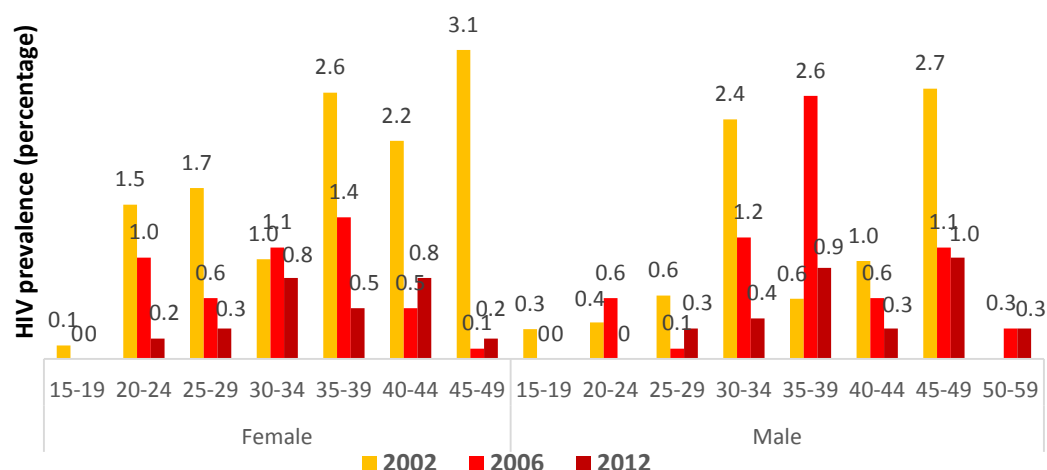
- **HIV in FSW client populations:** Periodic surveys have also been conducted in teachers, truckers, mine workers, labor migrants and the military (see Figure 6 for HIV prevalence data). In all males of the key populations combined, HIV prevalence in 2011 was **0.8%** (24 infections per 2,943 men with bio-behavioral data), which can be considered as the HIV prevalence of “sex work clients”
- **HIV in female members of key populations:** In all females of the key populations combined (excluding FSW), HIV prevalence in 2011 was **1.7%** (7 infections in 405 females with bio-behavioral data)
- **Female members of the key populations have a significantly higher HIV prevalence than male members.** However, female key population samples are small:
 - Military: 7.7% (female – 2/26) versus 0.1% (male – 1/746)
 - Labor migrants: 2.9% (female – 1/35) versus 1% (male – 6/600)
 - Prisoners: 3.6% (female – 2/55) versus 2.6% (male – 14/548)
 - Teachers: 0.7% (female – 2/289) versus 0% (male – 0/226)
- **In men, sexual risk behaviors and use of FSWs services are linked to being away from home, having disposable income, and mobility** (DHS 2012)
- **Overall, few surveyed men report that they have paid for sex**—1.3% of men aged 15–59 years report ever having paid for sex, and 0.5% say they did so in the last 12 months (NDHS 2012). A history of paid sex is more frequent in men living in Niamey (4.6% ever paid for sex), divorced or separated men (3.0%), the wealthiest quintile of men (2.9%), men living in Tillabéri region (2.8%) and men with a secondary or higher education, or who were living in an urban area (both 2.7%)

²⁸ CISLS (2010). La cartographie des professionnelles de sexe et des homosexuels. 17 Février, 2010.

General population

- **HIV prevalence has declined in almost all of the 5-year age groups as defined by the DHS**, and in 2012 remained highest in women in their thirties and early forties (up to 0.8%) and in men in their late thirties and forties (up to 1.0%)—see Figure 16. Some of the prevalent HIV cases in these older age groups are attributable to ART provided to individuals with advanced HIV infections. Some HIV positive women will have a history of sex work, given the demographics of FSW, and the turnover of women in the sex industry
- **The age and sex pattern of HIV infection reflects the age mixing pattern of sexual relationships in Niger.** Very few young men are infected compared to young women (who tend to have much older partners/spouses)

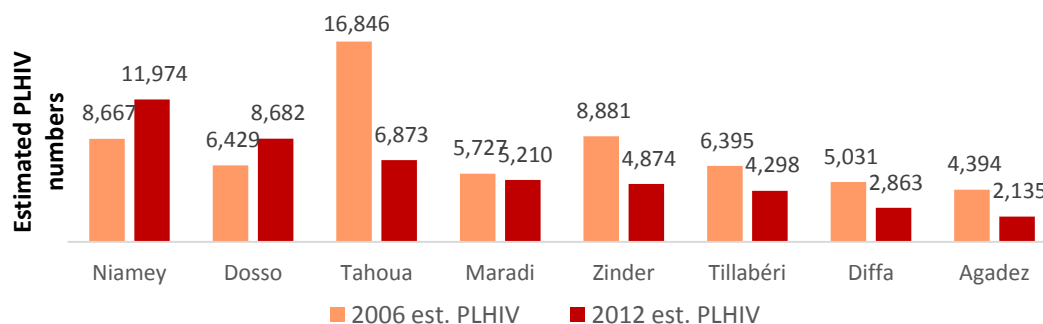
Figure 16. HIV prevalence by age group, Niger (2002, 2006, 2012)



Sources: Care report 2002; NDHS 2006; NDHS 2012 (preliminary).

- **It is estimated that just over a quarter of all PLHIV are in Niamey (an estimated 26% in 2012), and that over half of all PLHIV reside in either Niamey, Dosso or Tahoua** (based on the regional population numbers and the regional HIV prevalence levels 2012—see Figure 17). Two regions, Niamey and Dosso, have seen a rise in PLHIV numbers since 2006. It is estimated that Tahoua had the largest decrease in PLHIV numbers and that Agadez and Diffa have the lowest PLHIV numbers in 2012 compared to the other regions

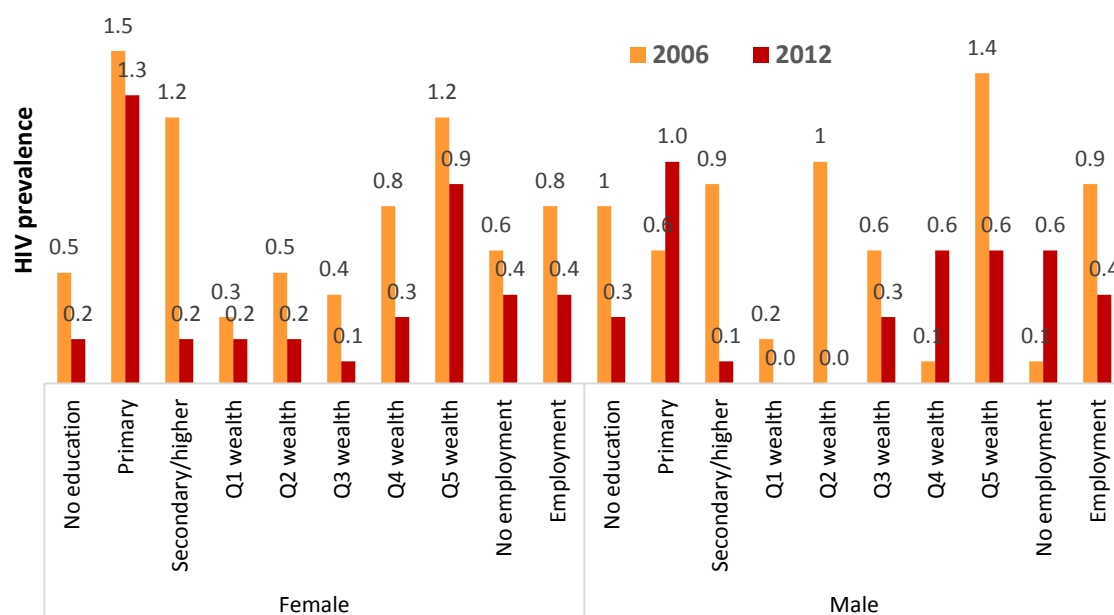
Figure 17. Numbers of people living with HIV by region, Niger (2006, 2012)



Sources: Population estimates based on regional census data, DHS 2006 & 2012, revised Spectrum 2013.
Note: PLHIV = people living with HIV

- **Key demographics with elevated HIV prevalence are** (HIV prevalence DHS 2012):
 - Female residents of Niamey (1.5%)
 - Females who are divorced/separated (1.7%), or widowed (3.2%)²⁹
 - Females away from home at least 1 month per year (1.1%)
 - Females reporting no sexual partner in the past year (1.7%)
 - Females with sexual inception at age 20 years or above (1.7%)
 - Males reporting no sexual partner in past year (1.1%)
 - Individuals with primary education compared to none or no higher education (female: 1.3%, Male: 1.0%)
- **The changes in HIV prevalence between 2006 and 2012 in different population strata of education, wealth and economic activity, suggest a rapidly changing epidemic situation** (Figure 18). Even in the stratum of highest education, HIV prevalence has declined sharply in both females and males, presumably through a combination of lower HIV incidence and high AIDS-related mortality (the scale of the ART program was small until circa 2009)

Figure 18. HIV prevalence by socio-economic strata, Niger (2006, 2012)



Sources: DHS 2006 and 2012.

Note: Q = wealth quintile.

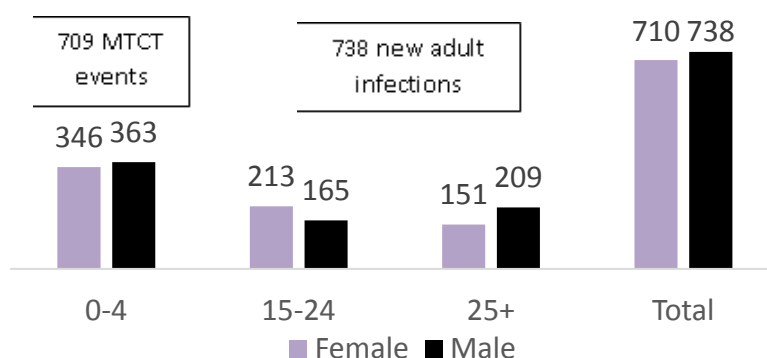
²⁹ Note that in the 2010 FSW survey, 63% of FSW reported being divorced and 4% were widows.

Where do new HIV infections occur?

Incident infections by age and sex

- Niger's epidemic is fuelled by both vertical and sexual transmission. In 2013, it was estimated that 709 new HIV infections occurred in children through mother-to-child transmission, and 738 new infections occurred in adults (Spectrum 2013)—see Figure 19
- Estimated HIV incidence is similar for males and females, but young females and older males have slightly higher incidence due to the age pattern of sexual mixing

Figure 19. Spectrum-estimated HIV incidence by age and sex, Niger (2012)

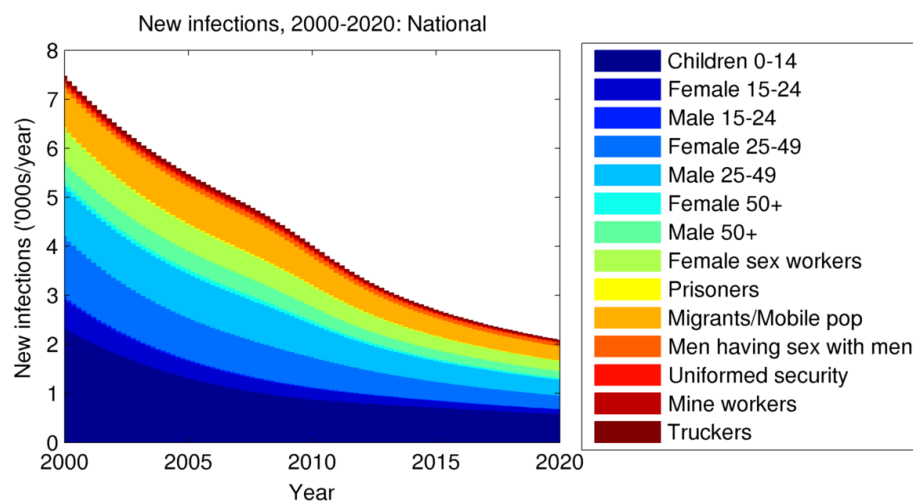


Source: Spectrum 2013 (revised version)
 Note: MTCT = mother-to-child transmission

Incident infections by sub-population

- Using Optima and stratifying the population by demographic, epidemiological and behavioral characteristics into 14 sub-populations, annual new infections in each sub-population were estimated (Figure 20). **In 2012, MTCT and new infections in adults aged 25–49, and in migrants and FSWs, accounted for an estimated 80% of HIV incidence. The largest single contributor to new infections was MTCT**

Figure 20. Optima-estimated trends in HIV incidence by sub-populations, Niger (2000–20)



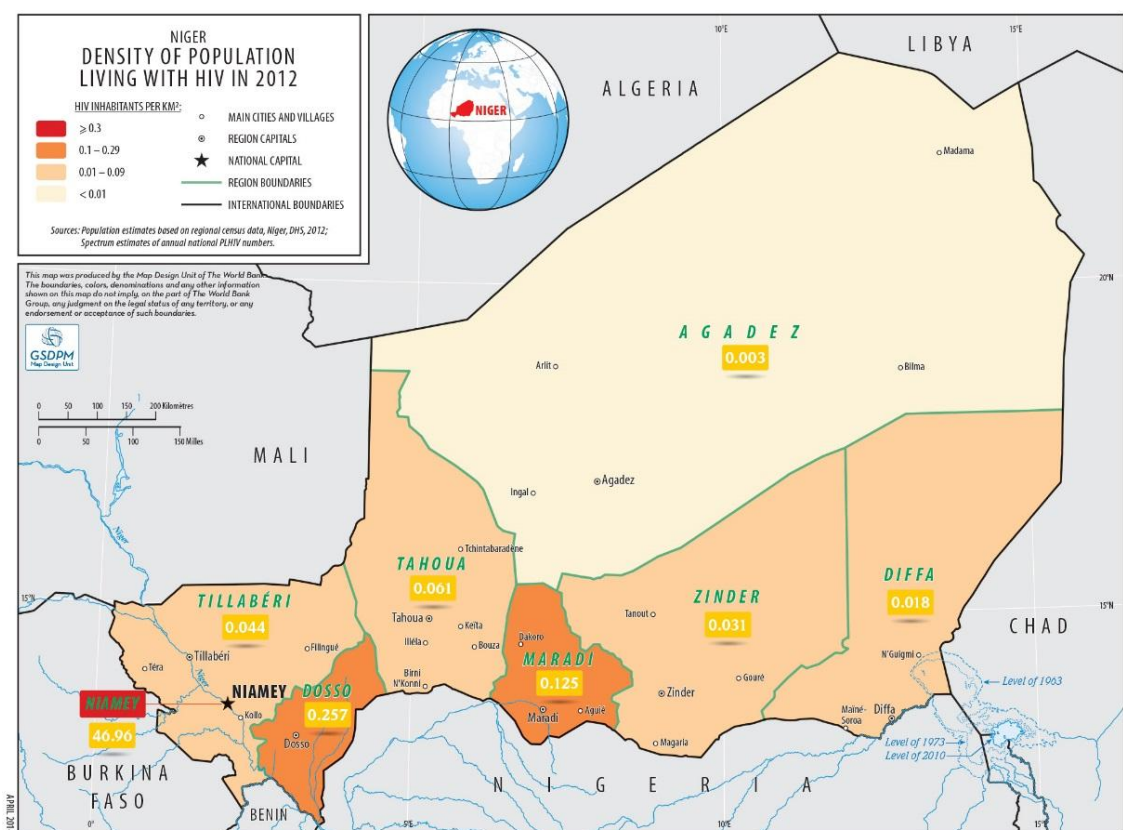
Source: Optima application Niger, January 2014.
 Note: Graph shows estimated new HIV infections per year.

Incident infections by location

There are no direct estimates of the geographical distribution of HIV incidence available, however, there are clues as to where HIV transmission may be occurring.

- The geographical distribution of PLHIV suggests that there may be an important percentage of HIV transmission occurring in the South-West portion of the country—in 2012, an estimated 70% of PLHIV lived in one of four regions in the South-West covering only a quarter of the country surface area (Niamey, Dosso, Maradi, and Tahoua)—Figure 21. If untreated, the infectiousness of PLHIV who are at a more advanced stage of HIV/AIDS can perpetuate the onward transmission to sexual contacts

Figure 21. Concentration of the HIV burden by region, Niger (2012)

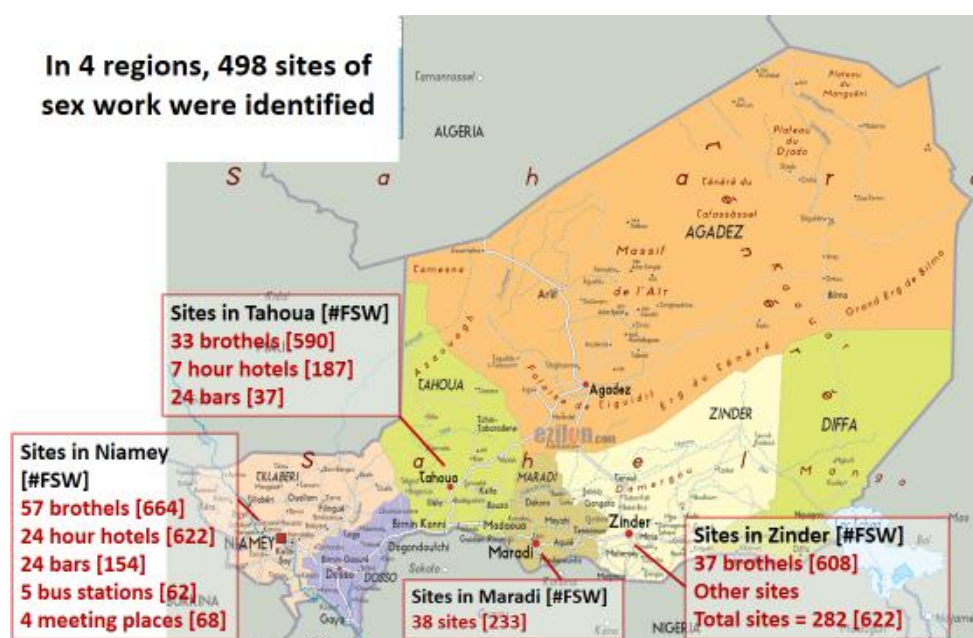


Source: Population estimates based on regional census data, DHS 2012.

Note: People living with HIV (PLHIV) density is given per km²: ≥0.3, 0.1–0.29, 0.01–0.09, et <0.01.

- The role of FSWs in the ongoing transmission of HIV (Figure 20), the geographical distribution of sex work sites (Figure 22), and the evidence of an urban HIV epidemic (Figure 13), all support the notion that urban and industrial zones in Niger remain areas of elevated HIV transmission. In 2013, sex work sites were mapped and characterized into four regions to improve the understanding of hotspots of sex work-related HIV transmission. Over 3,200 FSW were counted in 498 identified sites

Figure 22. Sex work-related hotspots of transmission, Niger (2013)



Source: Cartographie de prostitution, Animas, 2013.

Note: #FSW = number of females sex workers

Section 4. HIV financing, HIV services and programs and their efficiency

How is the HIV response financed, and what has been spent on the different HIV services and programs?

National spending on HIV and AIDS is well documented in NASA reports covering the years 2007 and 2008 (CISLS, 2009) and 2009–12 (CISLS, 2013), that is summarized in Table 2.

Over six years, the costs of the national response to HIV amounted to Euro 58 million (USD 78 million), corresponding to an annual average of Euro 9.7 million (USD 12.6 million), or 0.24% of GDP, over that period, but costs fluctuated dramatically on an annual basis

- There is no clear trend in HIV/AIDS-related spending—it declined by almost one-half between 2007 (Euro 11.4 million/USD 14.8 million) and 2010 (Euro 5.9 million/USD 7.7 million), but has increased steeply since, and had attained the highest level observed so far of (Euro 12.5 million/USD 16.3 million) in 2012

The financing of the HIV response has been dominated by external funding, accounting for almost 90% of HIV spending from 2007 to 2011

- However, much of the increase in HIV/AIDS spending in 2012 was accounted for by public spending (up by Euro 3.4 million/USD 4.5 million) largely due to the new World Bank loan, while external funding declined by Euro 1.4 million/USD 1.8 million
- Consequently, **the share of external funding has declined to 67%, while public funding accounted for 30% of total spending in 2012**
- The most important sources of external support have been the Global Fund (29% of total funding in 2007–12), UNICEF, the Government of Germany (Kreditanstalt für Wiederaufbau [KfW]), and the World Bank loan from 2012 onwards (2012–16)
- Looking ahead, there is—as per 1 January 2014—some uncertainty regarding the level of support Niger can obtain from the Global Fund. The current agreement with KfW is expiring in April 2014, and at the time of writing only USD 2.6 million in Global Fund commitments towards the national HIV/AIDS response remained undisbursed

At least since 2009, most HIV/AIDS services are delivered through the public sector (about two-thirds of all spending), while the private sector accounted for about one-quarter, and international NGOs for one-tenth of the total in 2009–12

- The domestic non-public sector as implementer largely reflects prevention service spending that is delivered through Animas-Sutura³⁰ is and financed by the Government of Germany (KfW)

30 Animas-Sutura is an NGO and social marketing organization established with KfW support. It has become an instrument in the implementation of the national population policy and HIV strategy. Its objective is to distribute condoms and other contraceptives in a way that makes them accessible country-wide.

In 2009–12, most HIV prevention spending was devoted to condom social marketing and distribution (37%), prevention of mother-to-child transmission (19%), voluntary counseling and testing (15%), and measures targeting young people (13%)

- Only 7% of prevention spending was targeted toward “accessible risk populations”, and only 1% was allocated to sex workers
- Expenditure for sex work programs has been low and has fluctuated, with the majority of funding coming from international sources (1.9% in 2009 and 0.9% in 2012 of total prevention spending). This raises questions with respect to allocative efficiency, sustainability and ownership since HIV prevalence among FSW has historically been and remains very high, and there has been a substantial decline of SW investment (65% between 2007 and 2008) when the regional bilateral cooperation project SIDA-3 came to an end³¹

Table 2. HIV/AIDS-related expenditures, Niger (2007–12)

Niger: HIV/AIDS-Related Expenditures, 2007-2012						
	2007	2008	2009	2010	2011	2012
(CFA franc million, unless stated otherwise)						
Total	7495.3	6420.7	5377.9	3862.3	6897.5	8216.8
Prevention	2507.3	1473.1	2089.8	1796.8	3719.5	3791.8
Treatment and Care	2420.1	1770.2	1440.6	687.0	1920.8	2226.7
Social Mitigation	296.3	327.6	402.9	292.8	130.1	130.9
Management, Coordination, Support	2271.7	2849.7	1444.6	1085.7	1127.1	2067.5
By source of financing						
Public domestic sources	286.9	253.5	37.2	53.0	200.5	2443.9
External sources	6247.9	5352.1	5134.7	3583.3	6434.3	5493.7
Multilateral and Bilateral	5689.3	4693.2	4469.1	2833.1	5777.8	4918.9
o/w: GFATM	1500.3	1428.3	2757.1	1216.9	2538.2	1494.0
o/w: UNICEF	105.8	99.9	142.2	133.9	1479.6	953.9
International NGOs	556.1	658.8	665.6	750.1	656.5	574.8
Private sources	960.5	815.1	206.0	226.0	262.7	279.2
By implementing agency/sector						
Public sector	2553.1	2693.7	3498.0	1904.8	4624.6	5600.7
Private sector	3841.1	2657.2	1157.6	1312.8	1775.0	2109.0
International NGOs and Other	1101.1	1069.7	722.3	644.7	497.9	507.2
Total spending (percent of GDP)	0.37	0.27	0.21	0.14	0.23	0.25
o/w: Public domestic sources	0.01	0.01	0.00	0.00	0.01	0.07
Total spending (Euro million)	11.4	9.8	8.2	5.9	10.5	12.5

Sources: CISLS (2009, 2013) for HIV/AIDS spending, IMF (2013) for GDP.

³¹ Batona, G., et al., Challenges and barriers for conducting STI/HIV. Prevention projects targeting female sex workers within national programs in Benin and Niger. Sexually Transmitted Infections, 87: A354. 2011.

What HIV services and programs have been scaled up?

Niger's HIV prevention services have focused on reducing unprotected heterosexual acts and the risk of vertical transmission during pregnancy and birth

- *Homosexual transmission* has had less focus. Although there is evidence that sexual transmission between male partners happens, there are no adapted services for MSM of any coverage and scale
- *HIV transmission through injecting drugs* has not been regarded as a public health issue to date, and there are no specific services developed. Drug trafficking is occurring and the first consultations have been held (e.g., in Agadez) to address the emerging threat of illicit drug use in Niger

Services for sex workers and their clients

Since the end of SIDA-3 in 2007, a regional bilateral cooperation project, medical follow-up of sex workers has been the responsibility of national STI reference centre (Center National de Référence des IST). Service delivery essentially consists of community-based activities (peer education, and condom distribution), linkage to health facilities (STI, HCT), medical follow-up of SWs, and communication activities with SW clients. Actual implementation has, until recently, been patchy and lacking any scale:

- **It is not known what program coverage has been achieved**—in 2008, an estimated 75% of SWs were reached with some prevention activities; in 2011, an estimated 54% were reached with activities (second generation surveillance [SSG] 2011). **It is not known what ART coverage has been achieved among HIV-positive SWs**
- There is no comprehensive, defined standard package with quality-assured, standard operating procedures that can be applied in all parts of the country (except peer education among SWs, which is well defined in terms of content and delivery modalities³²)
- **Services planning has historically not been sufficiently based on strategic information** (such as SW migration, site characteristics and the dynamic nature of hotspots)
- **Services have been irregular and some adapted services have abandoned their specific focus on SWs** (the only adapted service that remained was the Center National de Référence des IST, which ensures the medical follow-up of SWs)
- **SWs have to pay fees for their medical card and for each consultation** even at the adapted service center. The consultation fee increased from FCFA 200 to FCFA 1,500, however, this fee was overturned in the four World Bank-supported regions where consultation is now free for SWs

Only 4 of 10 Niamey sex workers are linked into the medical follow-up program, consisting of screening and treatment services at a health center³³

- The monthly medical monitoring service is only provided for SWs in Niamey. The majority of sex workers accessing the services are foreigners i.e., non-Nigerien

³² CISLS (2011). Directives sur l'identification et la formation des paires éducatrices. Draft Février, 2011.

³³ Animas-Sutura- SongES—RENIP. Resultats de l'étude de cartographie des sites prostitutionnels de la communauté urbaine de Niamey, 2013.

- Barriers to using services cited by respondents of the mapping study are the non-proximity of the health center, poor reception received, slowness of services, and lack of privacy. An additional barrier cited anecdotally in the study related to the need to re-purchase a medical log book after a missed appointment
- Key informants emphasize the challenge that the **vast majority of FSW are clandestine**—not known to the authorities and therefore are difficult to serve and protect

The country has started to systematically define and characterize SW typologies and sites, which represents indispensable strategic information toward tailoring services to the locality and needs

- SW venues and sites are³⁴ bars, “buvettes”, tourist camps, night clubs, restaurants, markets, hotels, “maison closes” and the street
- SWs below 30 years of age tend to work in the street, while “maison closes” tend to include women up to 50 years of age
- The number of clients differs according to type of site, with bars and restaurants having the highest proportions of SWs serving >20 clients a day

Sex workers' condom use has multiple determinants and barriers

- **Client refusal is the chief reason for unprotected commercial sex**—client refusal was responsible for 85% of all unprotected sex acts in a 2010 SW study in Niamey³⁵. This level of client refusal of condom use emphasizes the need to augment risk perception among higher-risk men (SWs in Maradi report that 65% of clients refuse condoms; 72% of SWs permit unprotected sex with clients who refuse to use condoms³⁶)
- SW characteristics such as age, length of time involved in sex work, education and affiliation to venues, determine the motivation to use condoms, and their self-efficacy in defending their wish to use condoms
- **Condoms are often, but not always available**—86% of SW in a recent mapping study say condoms were always available
- The type of sex partner determines condom use—condom use is highest when with commercial partners and lowest with boyfriends (about 23% of SW report using a condom at every sexual act³⁷), and this differential indicates a need for risk counseling of SWs

SW interventions appear to offer significant scope for strengthening scale, coverage and impact.

- Few Nigerien SWs benefit from the full combination package of services

³⁴ CISLS. Cartographie sites prostitutionnelles et MSM, 2010.

³⁵ Barakatou Adamou Yahaya and Gado Moussa, Seroprévalence de la syphilis et du VIH chez les patients IST et les professionnelles du sexe du Center national de référence des IST et du Center national de Dermato Lèpre de Niamey, du 24 mai au 5 juillet 2010, Mémoire de fin d'étude, IPSP, 2010.

³⁶ Souleymane Hamidou Garito, et al., Évaluation de la prévention des IST/VIH/sida en milieu des professionnelles du sexe dans la commune urbaine de Maradi, 2010, mémoire de fin d'étude, IPSP, 2010.

³⁷ CISLS et cabinet national d'expertise en sciences sociales (CNESS-Bozari), Enquête nationale de surveillance de seconde génération sur les IST/VIH/sida au Niger, rapport d'indicateurs, 2008.

- With higher HIV prevalence observed in SW sites bordering Nigeria—due to the associated migratory activities and presence of SW client populations—targeting resources to these SW sites seems especially promising
- Strengthening program monitoring is required to inform management, foster learning and contribute to evaluation activities

Condom promotion and distribution services

Prevention of HIV and STIs through condom use and promotion has been a focus for many years with free distribution, and socially-marketed and commercial condoms being made available.

Summarized results are as follows:

- Condom use is only significant in commercial (circa 87% use across several surveys) and casual acts (circa 40% use across several surveys), they are virtually excluded from use in regular partnerships (circa 3% use), and play a very minor role in FP
- **There are an estimated 2.32 million unprotected commercial sex acts per year in Niger, which represents the top priority for condom targeting** (see Table 3). It is also estimated that there are over 3 million unprotected casual acts, which is a second priority for the targeting of condom promotion activities for HIV and STI prevention
- Young men increasingly report condom use in casual sex—38% in 2006 (DHS) and 66% in 2011 (SSG) (very few young females report casual sex)
- Condom use data from key populations suggest that more could be done to make sex safer: among those reporting two or more partners, 40% of prisoners, 45% of migrants, 51% of military, 43% of miners, and 64% of truckers, reported condom use at last sex (SSG 2011)
- **In recent years 85%–95% of sex workers reported using condoms with paying clients**, however, it was only 64% with “petits amis” (cartographie PS/HS), who may often be men in regular partnerships with women of low risk behavior, and therefore link these inadvertently to higher risk sexual networks

Table 3. Estimated protected and unprotected sexual acts, Niger (2012)

	Est. total acts	Est. % protected	Est. protected acts	Est. unprotected acts
Regular acts	210.46 m	3%	6.31 m	204.14 m
Casual (non-regular) acts	5.47 m	40%	2.19 m	3.28 m
Commercial (paid) acts	17.91 m	87%	15.58 m	2.33 m
Total	233.84 m	10%	24.08 m	209.75 m

Sources: Estimated values based on reported condom use data (2012 DHS, 2011 SSG), the size of sub-populations (census data) and estimated sexual frequencies by type of partnership.

Note: Est. = estimated.

Social marketing of condoms was launched in 2003 and has led to:

- The ‘Association Nigerienne de Marketing Social: Animas-Sutura’ is the main role player, with medium term financing from KfW (phase 1 2003–2008, phase 2, 2008–12, phase 3, 2013–17)

- At least 44 wholesalers who provide condom outlets with social marketing condom units
- “Foula” condoms dominate the market and are sold in packets of 3 for FCFA 75. Animas-Sutura have distributed 30 million “Foula” condoms
- Targeted condom marketing and distribution located along main transport routes via kiosks and mobile vendors
- Integrated promotion and sales together with socially-marketed malaria and reproductive health (RH) commodities (distribution of oral contraceptive “Sutura” since 2010)

There are certain limitations to the scale-up of condom program activities:

- Many adults disapprove promotion of condom use for youth aged 12–14 years—only 32% of adult females and 48% of adult males are supportive (about half in urban areas)
- In pro-natalist societies, there are often cultural and perception barriers to condom use
- In health facilities, condoms are often stocked as FP commodities and since the demand for condoms as a contraception method is very low, these condoms can expire at the clinic level instead of being made available for HIV/STI prevention. Distribution, especially to remote areas, through the public health system (free condoms) or through the commercial channels (socially marketed condoms) remains a challenge in a vast country with overall weak push-and-pull factors for condom distribution

Services for the Prevention of Mother-to-Child Transmission

In 2011, Niger committed itself to accelerate progress in PMTCT with the goal of virtually eliminating new pediatric HIV infections by 2015. The e-MTCT strategy for 2013–15 presents a clear analysis of the bottlenecks and details a series of actions to reduce the MTCT rate of 27% in 2013 (2013 revised Spectrum data) to less than 5% in 2015. Key results to date are:

- Moving from 7 PMTCT pilot sites in 2003 to 651 PMTCT sites³⁸ in 2012
- Increased assisted deliveries—a SRH objective—to 29.3% in 2012 (up from 18% in 2006), which can help women accessing PMTCT offered in maternity care
- There was an increased attendance for the first prenatal visit (CPN1 = 83% up from 46% in 2006), however, a CPN4 of below 26% in 2012 severely limits PMTCT uptake
- **In 2012, 47% of pregnant women in need received ARVs through the PMTCT program** (revised Spectrum 2013; of 2,847 mothers in need, 1,334 received ARVs—895 for option A and 439 for option B)
- Diagnosis of exposed infants is almost nonexistent at 1%
- The “husband school/écoles des maris” tested with United Nations Population Fund (UNFPA) assistance for SRH purposes—this program is expected to help address some of the challenges in PMTCT scale-up since expectant mothers’ access to assisted delivery is largely dependent on their husband’s approval

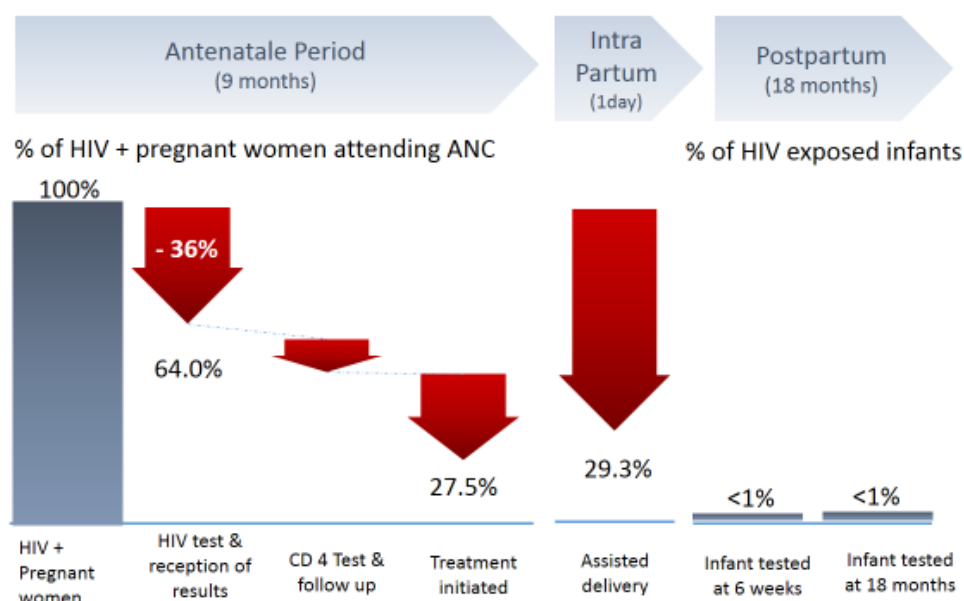
³⁸ A prevention of mother-to-child transmission (PMTCT) site means PMTCT service provision in an Integrated Health Center, a hospital, maternity or any other health facility.

The roll-out of PMTCT services is, in part, in alignment with epidemic evidence

- **Niamey**—where DHS-female HIV prevalence is the highest—had reached the highest rollout of PMTCT in 2012 (89% of eligible health facilities) (e-MTCT strategy 2013)
- **Diffa**—with second highest DHS-female HIV prevalence and third-highest ANC HIV prevalence—had achieved a 82% rollout to eligible health facilities
- **Tillaberi**—with low DHS and ANC female HIV prevalence—had the slowest PMTCT roll-out of 44%; Zinder also had relatively slow roll-out at 71% and somewhat lower DHS and ANC female HIV prevalence, and Agadez' roll-out was at 76%, commensurate with its average female HIV prevalence level
- **However, Dosso**—with highest ANC HIV prevalence of 1.3%—had only reached a 70% roll-out
- **Tahoua**—with second highest ANC HIV prevalence of 1.1%—had only reached 71%
- **Maradi**—with 0% DHS-HIV prevalence and <1% ANC HIV prevalence—had reached a high roll-out of 85%

The efficiency of existing PMTCT sites is constrained by numerous organizational, technical and financial challenges

- Even though 176 new PMTCT sites were created in 2011 within existing integrated health centers, the number of pregnant women tested for HIV decreased that year due to a 6-month shortage of testing kits and reagents
- Scale-up of PMTCT services suffers from a limited and irregular availability of human resources or/and trained professionals, and insufficient number of CD4 and PCR diagnostic tools
- The high rate of utilization of CPN1 (83%) is explained by the additional benefits of the first visit—registration of the birth in the administrative system, and receipt of a mosquito net for malaria prevention. Subsequent attendance for pre-natal care is progressively lower
- Renewed efforts to provide free delivery assistance has raised utilization, but it is still too low, and also affects the follow-up of HIV-exposed infants (in 2012, only 1%, or 669 children out of 5,117 received the ARV treatment they needed, revised Spectrum data)
- The “PMTCT cascade” is illustrated in Figure 23, showing the massive effect that the poor utilization of facility-based antenatal and delivery services has on PMTCT coverage

Figure 23. Summary of efficiency loss along the PMTCT cascade, Niger

Sources: Data from NDHS 2012, PDS, Sentinel surveillance/Spectrum 2013; illustration by authors
 Note: ANC = antenatal care.

Program inefficiencies and bottlenecks have been diagnosed (presented in the e-MTCT strategy) and a series of actions has been identified to address them (Table 4 provides a summary). The two main avenues to scale up PMTCT are:

- Improve access to treatment through the integration and decentralization of services, the delegation of ART prescriptions to primary care providers and improvement of the technical platform (for PCR and CD4 count)
- Achieve community mobilization with a strong focus on the participation of men (potentially via generalization of the “écoles des maris”) to facilitate the higher uptake of services by women, improve the continuum of care, and reduce the number of lost-to-follow-up

Table 4. Key gaps and bottlenecks at each step of the PMTCT cascade, and actions identified in the e-MTCT strategy, Niger

PMTCT cascade	Current status	Bottlenecks identified	Actions identified
Improve ANC uptake	CPN1 >85%, CPN 1–4 <45%.	Cultural barriers, low quality of services provided	<ul style="list-style-type: none"> ▪ Improve support from community networks including men (école des maris) ▪ Improve services via decentralization of tasks and better supply-chain management
Improve HIV testing	Less than 40% coverage	Lack of trained personnel, weak coverage of technical platform for CD4 count, limited number of prescription and follow up centers	<ul style="list-style-type: none"> ▪ Improve technical platform ▪ Improve patient services through increased capacity of health care providers and support from PLHIV networks ▪ Accelerate decentralization and task delegation at district level of prescription sites as well as CD4 counts ▪ Improve supply chain management for treatments and testing materials.
Improve CD4 testing and process to launch treatment	Less than 25% of HIV positive women are under ARV treatment		

PMTCT cascade	Current status	Bottlenecks identified	Actions identified
Improve uptake of assisted delivery	Less than 30% of pregnant women benefit from delivery assisted by trained professional	Cultural barriers	<ul style="list-style-type: none"> Scale-up experience of Arlit district where community mediators facilitated access to PMTCT Promote the involvement of men in SRH/HIV services, in particular via extension of the école des maris
Improve follow up of exposed children	CPoN = 24 %	Lack of communication between the different role players (PMTCT-maternity-prescription site)	<ul style="list-style-type: none"> Implement follow-up process of mother and child from screening to post delivery Involve PLWHIV and communities (women, traditional and religious opinion leaders)
Improve early diagnostic for children	Almost nonexistent	Lack of materials (only one PCR machine currently available and located in Niamey)	<ul style="list-style-type: none"> Improve technical platform (e.g., PCR equipment) Accelerate decentralization and task shifting at district level for ARV prescription
Improve follow up at 18 months	Very low diagnosis for exposed infants (<10% of children are under ART)	<ul style="list-style-type: none"> Lack of providers qualified for newborn follow-up Lack of integrated database to ensure follow-up and transfer between structures/sites 	<ul style="list-style-type: none"> Integration of services with maternal and infant health services to ensure early diagnosis

Source: e-MTCT strategy 2013, MOH.

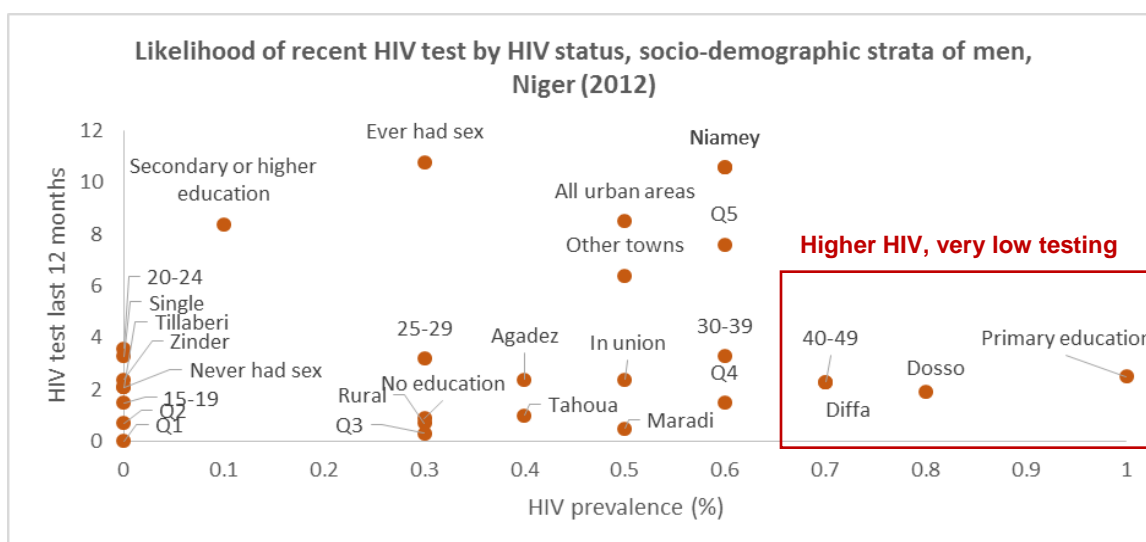
Note: ART = antiretroviral therapy; ARV = antiretroviral; CD4 = cluster of differentiation 4; CPN = consultation prénatale; e-MTCT = elimination of mother-to-child transmission; PCR = polymerase chain reaction; PLHIV = people living with HIV; PMTCT = prevention of mother-to-child transmission.

HIV counseling and testing services

The health sector offers HIV counseling and testing (HCT) in integrated health services, at PMTCT sites, blood transfusion centers and sites for TB testing and treatment. In 2008, there were 172 HCT sites in the country. The following results are summarized:

Annual HIV testing is 4–5 percentage points higher in females than males

- HIV testing is reported by 7–8% of females and by 2–3% of males (NDHS 2012)—the higher testing rates in females are due to PMTCT-related HCT. Figure 24 illustrates the strata of men with high HIV prevalence and low HCT rates. Such analyses can inform better geographic targeting and promotion of HCT services (e.g., men who reside in Dosso and Diffa), and demographics for demand creation (e.g., older men)
- Key populations have higher testing rates overall**, with 76% of sampled FSWs, 61% of the military, 46% of miners, 41% of prisoners, 39% of truckers and 28% of migrants, reporting testing (2011 SSG)
- In 2012, the Government allocated dedicated resources for **provider-initiated counseling and testing** (PICT) demonstrating the intention to target HCT at individuals who are: (a) already in contact with the health sector; and (b) may provide high yields of HIV-positive individuals, especially when applying provider initiated counseling and testing (PICT) to sexually transmitted infection (STIs) and SRH services for adults, and child malnutrition screening

Figure 24. Men: Likelihood of recent HIV test by HIV status in socio-demographic strata, Niger (2012)

Source: NDHS 2012.
Note: % = percentage.

A proportion of women and men who have accepted HIV testing fail to obtain the test result, especially those living in poverty

- Overall, 11% of females don't receive the test result, but this is elevated in women in the three lowest wealth quintiles (>15% don't receive the result) and also in those without school education and living in rural areas (NDHS 2012)
- Although men undergo HIV testing less often, they are more likely to obtain the test results with only 5% not receiving the result. Failure rates are highest in Dosso and Maradi (>10%) and in the lowest wealth quintile (25%, small sample size)

There are reports of stock-out of HIV test reagents at service levels

- According to key informants, stocks at the central level are sufficient, but there are reports of stock-outs at the decentralized level (e.g., in the Maradi region)
- The system of ordering commodities at the decentralized level is not working well, and the cold chain has had some challenges
- There are efforts to strengthen the supply chain logistics for HIV test reagents (and ARVs) with committees at the central and regional level (the "comités d'approvisionnement"), and specific funding to improve the cold chain

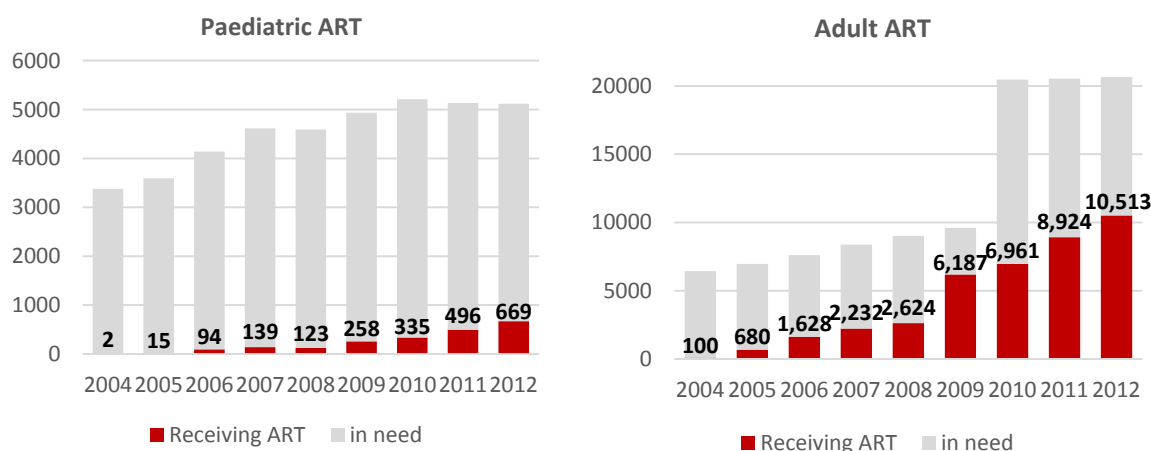
ART services

Public sector ART provision started in 2004 and was gradually scaled up. ARVs are provided free-of-charge in the public health sector. The change in national ART treatment policy in 2010 meant that the number of eligible adults "in need" doubled and relative coverage decreased (change from CD4 200 to CD4 350 treatment eligibility). The following results are highlighted:

- In 2012 there were 15 sites providing ART services with 11,182 adult and pediatric patients on the register—see Figure 25

- **ART coverage in children was 13% and 51% in adults in 2012 (57% in adult women and 45% in adult men), based on Spectrum estimates of ART need, and statistics on ART provision in the program**

Figure 25. Number of ART patients and estimated ART need, Niger (2004–12)



Sources: MSP report 2012 on ART; Spectrum estimates on ART need (revised 2013)

Note: ART = antiretroviral therapy.

ART retention is 70% at 12 months, 65% at 24 months and 59% at 60 months (2013 program statistics). This is lower than the WHO-reported low and middle income country (LMIC) average of 86%, 82% and 72%, respectively (WHO 2013 progress report)

- Retention is similar among male and female ART recipients, and between adult and child recipients (2013 program statistics)
- Confirmed deaths among ART patients are 3.9% at 12 months, 5.4% at 24 months and 7.7% at 60 months (loss-to-follow-up 26%, 30% and 33%, respectively)

Estimation of drug needs suffer from weak routine data and are often based on program targets instead of actual service data

- Supervision documents suggest that at several sites, statistics are not updated, or deaths of ART patients are not reflected in the statistics
- Needs for ARVs, other medicaments and inputs are estimated annually by the APPR group which is technically supported by Solthis. Incomplete data from the ART sites make this exercise difficult. However, attempts are being made to understand the number of new initiations, those lost-to-follow-up, mortality, and actual consumption from each site, with the largest volume of data coming from the Niamey-based ART sites
- The resulting estimates are weak and are not supporting correct drug procurements, with overestimations leading to wastage, and underestimations causing shortages
- Data collection and sharing for informing procurement needs to be urgently strengthened with better data on ARV consumption and the treatment cohorts from each site

Human resource constraints negatively affect the performance of the ART program

- Only 3 out of 8 regions have a pharmacist for the management of the inputs into the ART program (ARVs, other drugs and consumables)

- Personnel in the pharmacies at the decentralized level are insufficiently trained or qualified and this affects the daily management of the supply chain, as well as limiting a full understanding of the drug needs of the treatment cohort

The procurement of ARVs is centrally managed, which allows for a harmonized “drug-procurement-to-match-identified-needs” approach. However, the purchase of ARVs, other drugs, and inputs is not harmonized

- The ONPPC (Office National des Produits Pharmaceutiques et Chimiques) coordinates all procurements on behalf of the Global Fund, other financial partners and the government
- The process of buying ARVs is not unified: Global Fund orders are processed through the Voluntary pooled procurement (VPP) service while government-financed orders use a tender process
- Proforma invoices reveal a large differential in drug prices between these two purchasing mechanisms, and between international prices as per the Clinton Initiative

ARV drugs purchased through the government system cost twice as much as the prices endorsed by the Global Fund, the Clinton Initiative and WHO

- For instance, the cost of one pack of 60 tablets of 3TC/AZT/NVP (150/300/200 mg) costs **Euro 17.15** (11 260 FCFA) as per ONPPC proforma invoice, compared with **Euro 8.59** as per Clinton Initiative. The median cost reported by the Global Fund for West and Central Africa (period 2005–12) for the same pack of tablets is **Euro 8.74** (interquartile range, Euro 7.36–10.58) or 5 735 FCFA (4 830–6 943)³⁹
- The cost of 60 3TC/AZT (150/300 mg) has a proforma invoice price of Euro 13.01 compared to Euro 6.75 as per the Clinton Initiative.
- Other comparisons show the same pattern: 60 NVP 200 mg: Euro 4.40 versus Euro 2.30; 120 LVP/r Euro 59.17 versus Euro 24.16 (ONPPC compared to Clinton Initiative)

The ARV distribution systems underperform and sometimes lead to storage problems and ARV shortages at the sites

- ONPPC is responsible for storage and distribution of ARVs, other drugs and reagents (and has a specific contract with CISLS to ensure the delivery of these commodities to the regions)
- There are, at times, challenges with cold storage of stocks at the central level. Three refrigerated vehicles are being financed by the Global Fund to reduce ONPPC's reliance on the cold chain partners
- At decentralized level, there are issues with the number of depots (only two, in Tahoua and Zinder), which means that all other ART sites need to be serviced directly by the central level every 3 months. Due to delays in the reporting of treatment data and drug requirements, ARV stock-outs have been experienced at the treatment sites. This can occur at times when the central depot is over-stocked
- Storage conditions at the decentralized level can be sub-optimal, which can affect the quality of the products

³⁹ In USD, this is 11.40 per pack (interquartile range USD 9.60–13.80), as per the Aidsplan report “Procurement cost trends for Global Fund commodities: Analysis of trends for selected commodities 2005–12”, Aidsplan working paper, April 2013.

- The “Comites d’approvisionnement” are put in place at the central and decentralized level to remedy the supply chain problems, and the information system, by the Global Fund for HIV, TB and malaria supported by Solthis, will further support the adequate stocking and availability of ARVs, and reagents for ART provision

Comparison of selected unit costs of HIV services

The bottom-up costing exercise of the Resource Needs Model in 2012 provides an insight into unit costs, which can be compared to other countries using the same methodology (Table 5)

- For some services, the unit costs are higher than for the comparison countries Togo and the Democratic Republic of Congo (RDC): The service package for SWs and MSM is costed at a higher level in Niger
- Costs for HCT provision, STI treatment and examination of a woman in PMTCT services are lower in Niger compared to the other countries
- First line ARV costs are higher in Niger than in Togo, but lower than in the RDC (PMTCT and ART services), however, second line ARVs are significantly more expensive in Niger

Table 5. Comparison of some unit costs of HIV/AIDS services (Euro)

Services	RNM Niger	RNM Togo	RNM RDC
Prevention			
Cost per SW service package	59.8	22.2	22.2
Cost per MSM service package	59.8	22.2	54.5
Cost per STI episode treated	7.7	11.5	9.2
Cost per HCT client	3.8	10.7	32.2
Cost per women examined in PMTCT	3.8	6.1	-
Cost per pregnant women treated with ARV	46.8	34.5	76.7
ART			
Annual cost first line	166.4	109.7	189.4
Annual cost second line	913.5	628.2	289.2

Note: 1 Euro = 655.957 CFA (fixed), 1 USD = 503.1 CFA; RNM = Resource Needs Model.

IEC/BCC services

Information- education- communication/behavior change communication (IEC/BCC) activities are designed to increase risk perception and improve the use of HIV prevention methods and services such as condoms, HCT, PMTCT and STI care.

IEC and BCC have been targeted at young people in primary and secondary schools and at youth in out-of-school settings for HIV and STI prevention purposes.

IEC/BCC activities have resulted in the following levels of knowledge, norms and behaviors relating to sexual behaviors:

- Among youth aged 15–24, 65% of males and 46% of females cite condom use as a means to prevent HIV infection (NDHS 2012)

- 80% of young males and 65% of young females know that limiting sexual contacts to one HIV negative partner reduces the risk of HIV
- 54% of young females think that it is justified for a woman to refuse sex with her spouse if she knows he has sex with other women, and 66% think it is justified for a woman to ask for condom use if she knows her spouse has an STI
- However, most women marry early, have much older partners and little or no school education—it is therefore questionable whether they are in a position to negotiate safe marital sex
- Among 15–24 year olds, 1.1% of males and 0.2% of females report having had 2 or more sex partners in the last 12 months, and 1.3% of young men report having paid for sex
- The median age at first sexual encounter is 16 years for females and 23 years for males (self-reported NDHS data 2012)

To what extent are HIV services integrated or linked?

The authorities are aware that linkage and integration are important, and strategy documents state the need for integrated supervision activities and improved integrated monitoring and reporting. At the same time, linkage and referral systems are being discussed and proposals for improvements have been presented. However, this is not a comprehensive review of integration, which encompasses: (a) intra-provider linkages (i.e., integration of services by one provider during one patient consultation); (b) intra-facility integration, which encompasses linkages between services by different providers, at a facility; and (c) inter-facility integration, which is about referrals between facilities. At each health facility (and standalone HIV-service-providing facility), the real challenge is how intra-provider, intra-facility and inter-facility integration can be optimized. In summary, the following observations are made:

General integration of, and linkages with HIV and health programs:

- Social marketing of condoms is integrated with malaria and RH commodities through joint marketing and common sales channels, under the direction of Animas-Sutura
- Free new-born delivery services have raised the assisted delivery rate and have indirectly helped raise PMTCT coverage
- The roll-out and promotion of provider initiated counseling and testing (PICT) helps target HCT (which is very important in a low grade HIV epidemic), and provides opportunities for linking clients to prevention, treatment and care services (functional linkages between HCT and pre-ART/ART is a priority for getting PLHIV into treatment earlier)
- The offer of selected free-of-charge health services by the public sector (especially family planning and antenatal care) holds great potential for increasing the use of HIV and SRH services
- Integration of HCT into child malnutrition screening works (3–4% of children were found to be HIV+, suggesting that such targeted HCT is an important way to improve HIV case finding among children and eventually increase pediatric ART coverage)
- Community-based agents (such as the “médiateurs communautaires”) and community-based organizations can help link people to health services and hold great promise in a country where 53% of people live outside the 5 kilometer (km) catchment area of health facilities. Priority tasks for such community workers should include the identification of risk pregnancies and the accompaniment of women, children and families enrolled in treatments (PMTCT

regimens, ART, FP, TB, etc.). In Malawi, peer support and defaulter tracking were important for minimizing loss-to-follow-up of women on ART, as were extended counseling and ongoing support of women, and effective use of the patient monitoring data.⁴⁰ The Rwanda experience with male and female health workers at community level demonstrates the importance of mobilization and demand creation at grassroots level

- Full integration of the regional HIV coordination into the health sector's coordination structures will support the integration agenda and increase sustainability of both HIV coordination and HIV interventions at the decentralized level (delays in resource flow have disrupted HIV coordination in the past)
- Linkage and joint monitoring between public and the private service providers is poor despite the country's multisectoral approach to HIV/AIDS strategy. For instance, 8% of men and women in Agadez and 3% of men and 6% of women in Niamey have medical insurance from an employer, but private sector HIV service provision is not being reported in the national statistics

Linkages between a package of services for sex workers:

Although it is more difficult to link a package of HIV services for sex workers to general health service delivery, the different components of FSW programs—the bedrock of Niger's HIV response—can and need to be better integrated in the following ways:

- Accessible STI services as a bedrock for ensuring an entry point to service provision for FSWs
- The link between community-based activities for SWs and the adapted services at the facility level is weak, with insufficient collaboration between peer educators and clinic staff. This also applies to the link between VCT services and care/treatment
- Structural interventions need to be linked to a comprehensive service package for SWs to address stigmatization and discrimination which currently limits service use (this also applies to male SWs)
- Integrated HIV workplace interventions, especially in mining and oil companies, are seen as important complementary activities toward making sex work activity safer by providing targeted HIV prevention services to employees (who may be involved in commercial sex due to their income and living situations)
- The integrated services for migrants (OIM-Niger) are considered a useful model for delivering HIV and STI services in an integrated way to key populations by stakeholders in the national HIV response.

PMTCT:

- A strategy of rolling out PMTCT into all of the 857 Integrated Health Centers is being pursued (e-MTCT plan), which is underpinned by the global and regional plans for the virtual elimination of vertical transmission (despite low HIV prevalence in the general population, and correspondingly high costs per vertically transmitted HIV infection averted)

⁴⁰ Shaffer, N., et al., Option B+ for prevention of mother-to-child transmission of HIV in resource-constrained settings: great promise but some early caution. *AIDS* 28:599–601. 2014.; Tenthani, L. et al., Retention in care under universal antiretroviral therapy for HIV-infected pregnant and breastfeeding women ('Option BR') in Malawi. *AIDS* 28:589–598. 2014.

- Government documents emphasize the weak integration of maternal, neonatal and infant health services (MNIH), SRH, FP, ART and PMTCT services (this includes supervision, i.e., visits by district cadres for supervision purposes miss including PMTCT services adequately)
- This weakness leads to missed opportunities to offer the complete service package, including ARV-based interventions, to HIV+ women and children at the same time and in the same place
- The linkage of community based activities targeting men in order to increase utilization of antenatal care—and hence PMTCT—services has been piloted (“école des maris”) and this is locally regarded as a promising intervention, particularly for FP and PMTCT
- The screening of HIV-exposed infants at 6 weeks is infrequent due to lack of integration of this activity into the treatment of the HIV-positive mother (and the underlying problem of very low assisted delivery rates)
- The importance of linking FP, PMTCT and child survival efforts in Niger cannot be overstated. International experience has shown that “wanted pregnancies” benefit from better follow-up in terms of antenatal care, with direct implications on utilization of PMTCT (pers comm. Karusa, UNAIDS)

Section 5. HIV investments: Impacts from past expenditures and best resource allocations in the current Strategic Plan period

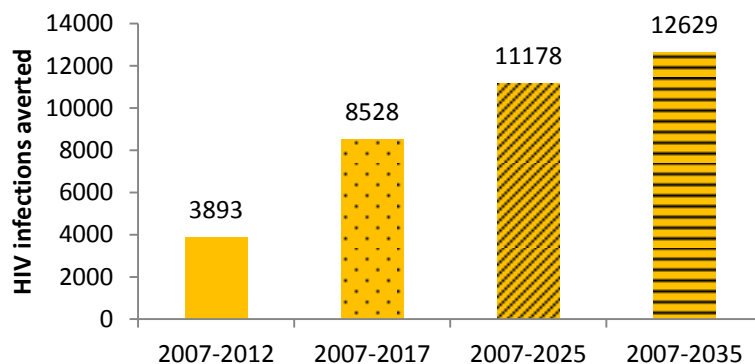
Impact of historical HIV expenditures

Using Optima, the impact of past HIV investments was estimated by comparing the expected number of new HIV infections according to actual conditions with the estimated numbers under the counterfactual scenario of no funding for specific HIV programs. Local data were used to formulate evidence-based assumptions on the relationship between funding, HIV outcomes, and program coverage (Annex A1.6). Optima was used to project epidemic trajectories according to the counterfactual scenarios, and compare these trajectories with the calibrated epidemic trajectory according to actual conditions, resulting in an estimation of the impact of the HIV program.

Historical spending over the period 2007–12 helped reduce HIV incidence and therefore averted new HIV infections (Figure 26)

- Spending from 2007–12 averted close to **3,900 infections** just during that period
- The downstream effects of these prevented infections mean that by 2035, the spending from 2007–12 will have averted a total of **12,600 infections** at a cost of **Euro 3,500 (USD 4,700) per infection averted** if only HIV program spending is considered (see Annex A1.3 for programs included), and **Euro 4,600 (USD 6,200)** if all HIV spending, management and coordination is included
- These second-order, future benefits of the six years of historical spending are therefore much higher than the HIV infections averted while spending was happening from 2007 to 2012

Figure 26. Number of infections averted by historical HIV spending from 2007–12, Niger (2007–35)

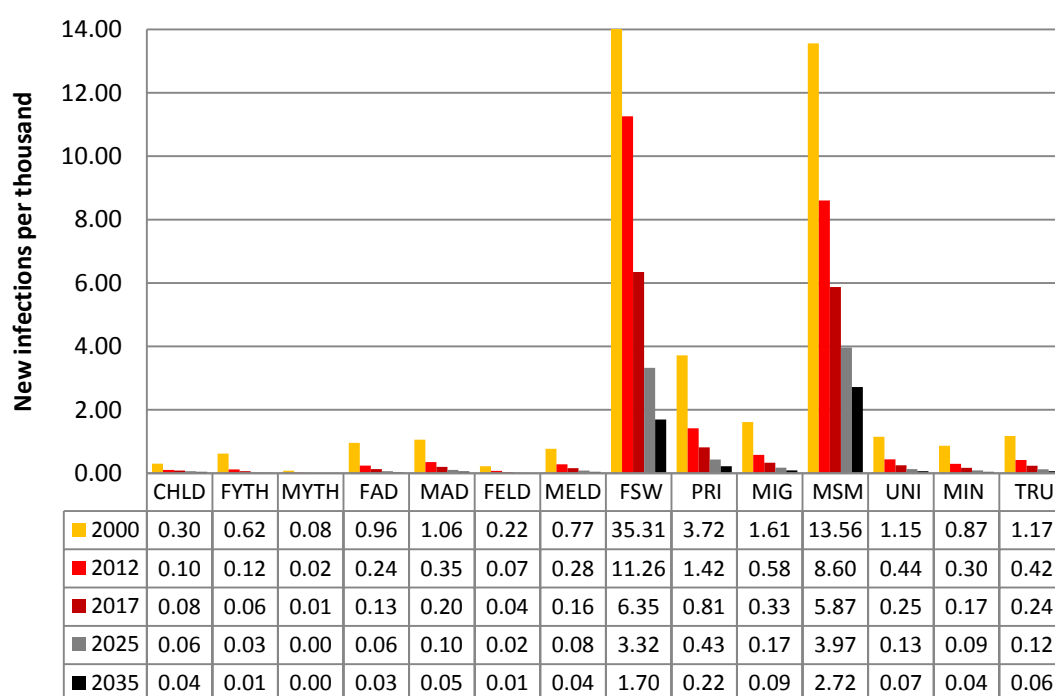


Source: NASA 2007–12, available epidemiological and behavioral data from Niger, and drawing on the relationships between funding, HIV outcomes, and program coverage (Annex A1.6).

The HIV incidence decline occurred across sup-populations and was most dramatic in those with highest HIV incidence in the past (Figure 27)

- The largest HIV risk reduction occurred in FSWs, from an estimated 3.5% HIV incidence in 2000 which dropped to approximately 1.1% in 2012
- Using the best available local and regional data on MSM, the estimated HIV incidence was at 0.9% in 2012 (reduced from 1.4% in 2000). This figure is uncertain given the scarcity of MSM data in Niger. However, the Optima-derived estimations point to this key demographic as a priority population for programming and strategic information strengthening
- The HIV incidence decline is expected to continue into the future as long as HIV program coverage remains at current levels

Figure 27. Estimated infections by population and time, Niger (2000–35)



Sources: Niger epidemic, demographic, behavioral and service data in the populated Optima model, Annex 1 Section A1.2..

Note: Estimations for MSM are based on assumed HIV prevalence data using information from the sub-region and the resulting HIV incidence estimates for MSM are therefore uncertain; The Y axis is truncated, HIV incidence in FW in 2000 are not fully displayed; CHLD = children aged 0–14; FYTH = females aged 15–24; MYTH = males 15–24 years; FAD = females aged 25–49; MAD = males aged 25–49; FELD = females aged 50+; MELD = males aged 50+; FSW = female sex workers; PRI = prisoners; MIG = migrants; MSM = men who have sex with men; UNI = uniformed security/defence personnel; MIN = mine workers; TRU = truckers.

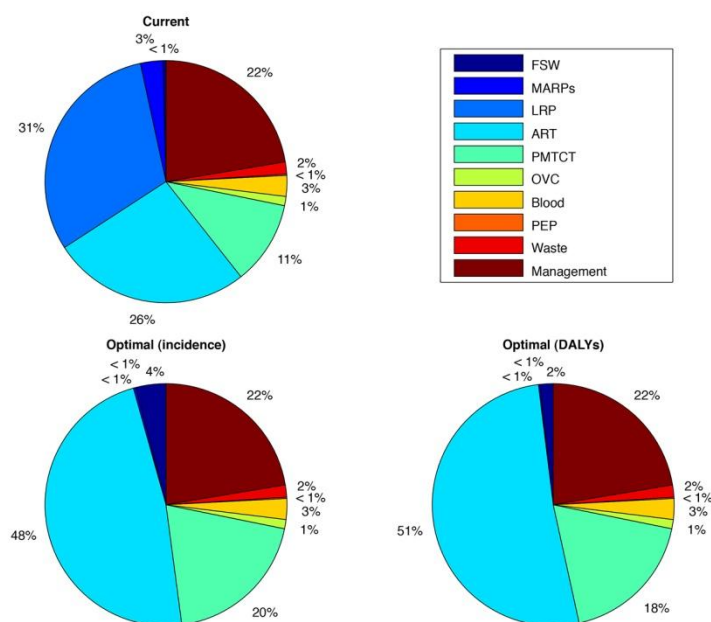
Best resource allocation in the current HIV strategic plan period

One of the key interests of this analytical study was to use the Optima model to determine the allocation of HIV resources or spending required that best meet the objectives of HIV incidence or DALYs reduction (see detailed objectives in Section 1). This optimization was done by combining the information on the relationship between costs and outcomes (Annex A1.6) with a simple optimization algorithm that found the best allocation of resources to meet the objective at hand; in this case, minimization of either HIV incidence or DALYs until 2025 in order to capture longer-term benefits of investments.

There are specific shifts in budget allocation that are required to optimize program impacts on HIV incidence and morbidity/mortality (DALYs)—Figure 28. Note that condoms are included in the intervention packages for the different populations; some community mobilization activities are part of the PMTCT package; HCT is included in ART, SW and PMTCT service packages; and SW interventions include mobilization activities

- Compared to the 2012 spending pattern, spending to minimize either incidence or DALYs would prioritize ART, PMTCT and FSW spending, while reducing spending on the low-risk populations (primarily the general population)
- In Niger's epidemic context, the optimal spending allocations look virtually the same for best reductions in HIV incidence or DALYs, i.e.:
 - **Increased spending on ART from 31% currently to circa 50%**
 - **Increased spending on PMTCT from 11% currently to circa 19%**
 - **Increased spending on FSW interventions from 1% currently to circa 4%**
- These shifts in spending reflect better resource targeting to populations where the majority of new HIV infections occur (especially true for FSWs and their sexual contacts); in addition, they emphasize the relatively high effectiveness of ARV treatment as prevention, since PLHIV on treatment have significantly reduced infectiousness.⁴¹

Figure 28. Current versus optimal budget allocations for minimizing incidence (left) and DALYs (right) over the period 2014–25, Niger



Sources: Spending data from NASA; Niger epidemic, demographic, behavioral and service data in the populated Optima model.

Note: Current = 2012 spending pattern. OVC, blood, PEP, waste, and management costs were kept fixed; Condoms are part of the HIV intervention packages for the different populations. FSW = Female sex workers, MARPs = most at risk populations, a combined group of prisoners, migrants, men having sex with men, uniformed security/defence personnel, mine workers and truckers; LRP = low risk populations, a combined group of general population females and males aged 15+ years; OVC = orphan and vulnerable children; PEP = post-exposure prophylaxis.

⁴¹ Optima and Spectrum used the factor 0.80 for reduction in HIV transmission when on ART (modified from the Spectrum default value of 0.92), based on programmatic effectiveness of ART on viral load reductions in several African ART interventions.

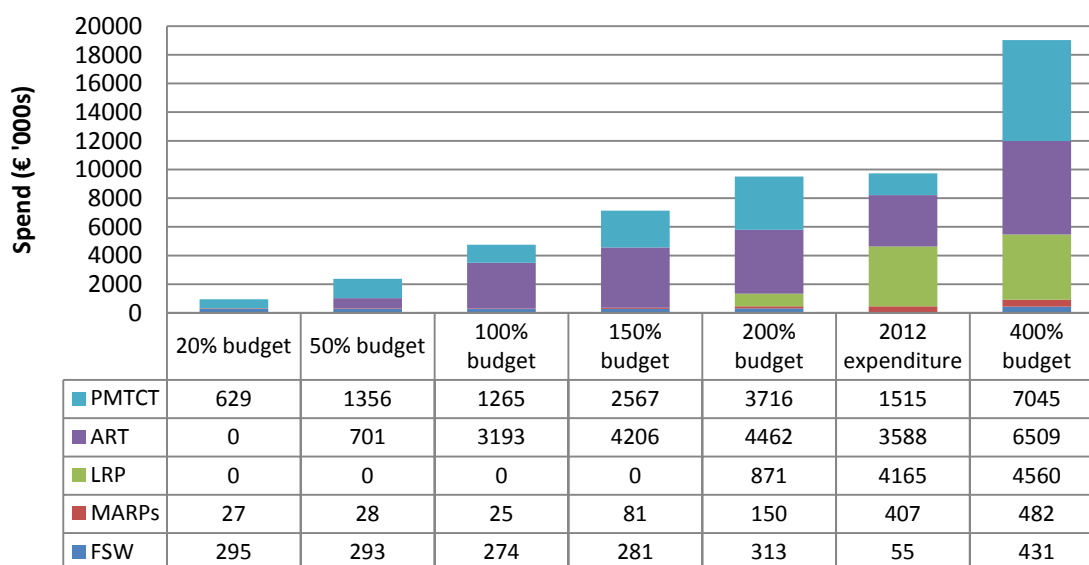
Optimization of the 2014–17 budget (annual average of Euro 4.8 million or USD 6.5 million) for HIV incidence reduction averts an estimated 8,900 additional HIV infections from 2014–25

- Most of the benefit is obtained by increasing funding for FSWs (7,000 extra infections are averted, across all population groups, counting direct and indirect/secondary transmission events), and by increasing funding for PMTCT (which reduces MTCT by 50%, or 1,400 extra infections are averted) and ART (3,400 extra infections are averted)
- These increases require reducing funding for low-risk populations, leading to 3,000 additional infections, but the net benefit is still very positive ($7000 + 1,400 + 3,500 - 3,000 = 8,900$ infections averted)

If HIV funds are either very limited or more abundant, allocations can be guided by an investment cascade which helps prioritize expenditures by HIV impact—Figure 29

- Given limited funds (below that of what has actually been acquired for the NSP period⁴²), PMTCT and ART should be given first priority, followed by FSW spending—this explicit rationing is not desirable since easily preventable HIV infections will occur within such a tight funding context
- With larger budgets (notably larger than the average budget over the period 2014–17), programs for the low-risk population should be given significant funding with spending patterns similar to the 2012 distribution, except with a far greater proportion being allocated to PMTCT

Figure 29. HIV investment cascade, Niger (2014–17)



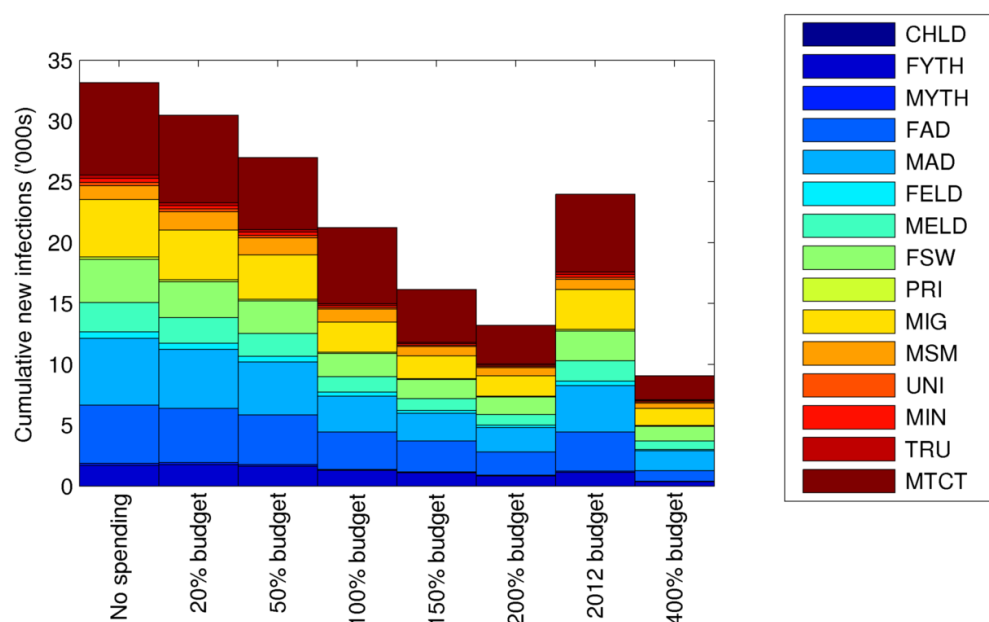
Sources: Spending data from NASA; Niger epidemic, demographic, behavioral and service data in the populated Optima model.

Note: 100% budget = Euro 4.8 m/USD 6.5 m per year, based on acquired funding by the end of 2013; FSW = female sex workers; MARPs = most at risk populations, a combined group of prisoners, migrants, men having sex with men, uniformed security/defence personnel, mine workers and truckers; LRP= low risk populations, a combined group of general population females and males aged 15+ years.

⁴² The yearly average of Euro 4.8 million (USD 6.5 million) is skewed toward the earlier NSP years. Very low funding had been acquired for the years 2016–17 at the time of analysis, so the assumptions of 50% or 20% of the yearly average in the investment cascade are relevant. In turn, 2014 had a higher than average amount of acquired funding, and the investment cascade can provide guidance on prioritization in years with a strong availability of funding.

The reallocation of available funds results in a 12% additional reduction in new HIV infections over the period until 2025 compared to a continuation of the 2012 expenditure pattern, despite the fact that available funds are only roughly half the 2012 budget—Figure 30.

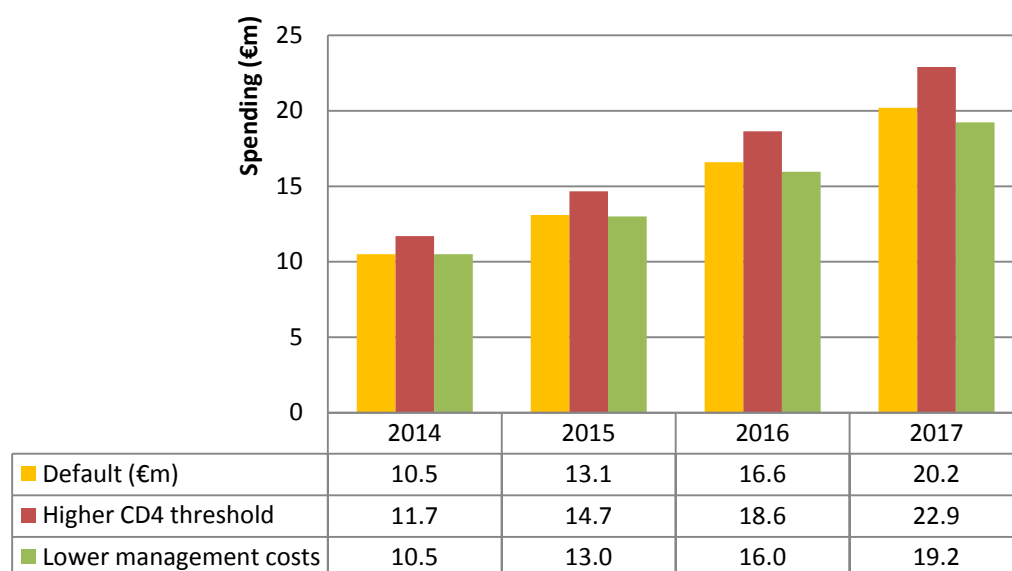
Figure 30. Cumulative infections that would result from different spending scenarios, Niger (2013–25)



Sources: Spending data from NASA; Niger epidemic, demographic, behavioral and service data in the populated Optima model.

Note: No spending = a continuation of 2012 spending, and optimized spending at various budget levels relative to expected funds available 2014–17; 2012 budget = 2012 expenditure pattern; 100% budget = Euro 4.8 m/USD 6.5 m per year, based on acquired funding by end 2013; Drug costs are kept constant over time, other costs increase in line with GDP per capita; CHLD = children aged 0–14; FYTH = females aged 15–24; MYTH = males 15–24 years; FAD = females aged 25–49; MAD = males aged 25–49; FELD = females aged 50+; MELD = males aged 50+; FSW = female sex workers; PRI = prisoners; MIG = migrants; MSM = men who have sex with men; UNI = uniformed security/defence personnel; MIN = mine workers; TRU = truckers.

Optima modeling also provided some broad estimates of additional costs as a result of raising the ART eligibility threshold to CD4 500, and of the savings gained with more modest management cost increases (Figure 31). Compared to the default expenditure for meeting NSP coverage targets, increasing the treatment CD4 threshold to 500 would increase ART coverage cost by an estimated 12% over the four NSP years. By 2017, ART coverage cost would be an extra Euro 2.7 million (USD 3.6 million) annually. Management costs are currently expected to grow far faster than inflation (4% population growth, +3% currency inflation). If these costs grew at the inflation rate instead, Euro 1.7 million (USD 2.3 million) could be saved over the four NSP years, as shown in Figure 31.

Figure 31. Minimum budgets required to meet NSP coverage targets, Niger 2013–17

Sources: National Strategic Plan 2013–17, relationships between funding, HIV outcomes, and program coverage (Annex 1 section A1.6).

Note: Bar groups show different scenarios, Default (current conditions), CD4 threshold for treatment of 500 instead of 350, and lower management costs; Spending: = Euro, million; Drug costs are kept constant over time, other costs increase in line with GDP per capita.

Section 6. Financing needs and fiscal space implications of HIV investments

NSP 2013–17: Financing needs and gaps

The NSP 2013–17 envisages a reduction in the number of new HIV infections by 50%, and a further expansion in access to ARV treatment to at least 80% of eligible people. Annual spending under the NSP is projected to increase steeply from Euro 8.8 million (USD 11.7 million) in 2013 to Euro 18.0 million (USD 23.9 million) in 2017. Table 6 presents the acquired NSP funding, estimated needs and funding gaps

- For the remaining four years of the NSP, only 35% of the total NSP-projected spending of Euro 69.2 million/USD 93.1 million had been secured by December 2013 (leaving a funding gap of Euro 44.9 million/USD 60.4)
- While NSP-projected spending was fully acquired for 2014, only 31%, 6% and 1.5% had been acquired for the years 2015, 2016 and 2017 respectively

Table 6. NSP financing acquired, needed, and financing gap (2014–17)

	(2013)	2014	2015	2016	2017	2014–17
Acquired resources (Euro mn)	(6.3)	11.0	4.0	2.8	0.3	24.4
Required (Euro mn)	(8.8)	10.5	13.1	16.6	20.2	69.2
Financing gap (Euro mn)	(2.5)	-0.5	9.1	13.8	19.9	44.9

Sources: Cartographie des financements, 2013; PSN 2013–17

Note: mn = million

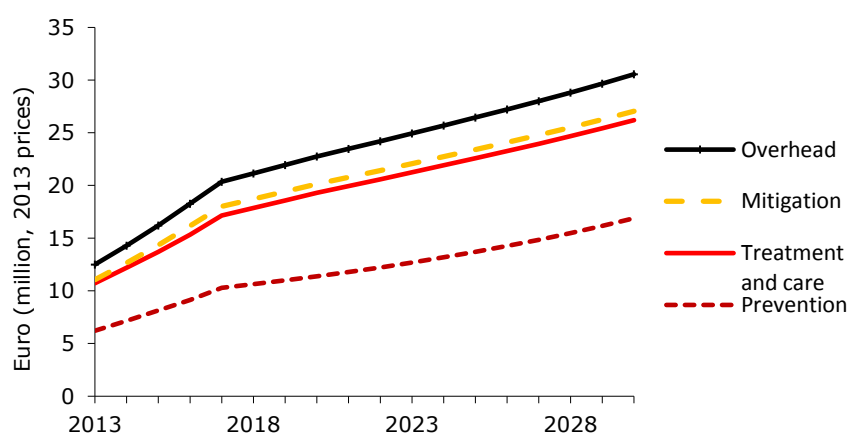
Concerning the longer-term financial consequences of the national response to HIV/AIDS, the cost projections under the NSP do not provide the long term picture.

- **On the expenditure side, the expansion of access to treatment has consequences that extend well beyond 2017.** Individuals who newly access treatment in 2013–17 will require treatment well into the future—the expansion in access to treatment therefore commits financial resources beyond the NSP period
- **From the savings side, the increased investments in HIV prevention and treatment reduce future spending needs that would be associated with future incidence.** A lower number of HIV infections reduce the demand for HIV/AIDS-related services and resulting costs in future years. These future savings need to be taken into account when evaluating the consequences of the NSP absorbing fiscal space

The projected costs of the national response to HIV/AIDS that are based on the costing of the NSP estimates provided by authorities through 2017, but are extended through 2030, are summarized in Figures 32 and 33

- Where the NSP costing assumes an annual inflation rate of 3%, the longer-term estimates have been specified in “real” terms, i.e., without inflation. This change facilitates comparisons over long periods
- Cost assumptions for prevention spending are aligned with the NSP assumptions through 2017. Thereafter, prevention spending is assumed to increase in proportion to the size of the relevant population (e.g., all adults, or—for PMTCT—HIV-positive women), keeping coverage rates of the relevant interventions constant
- For treatment, unit costs were set at set at Euro 310 (USD 400) for first-line ART and Euro 1,110 (USD 1,430) for second-line ART, based on NASA expenditure data for the ART program and the number of patients treated in 2012. This is higher than the assumptions in the NSP/Resource Needs Model costing—which covered ARV drug costs only—in order to include additional costs of a comprehensive ART service such as laboratory monitoring costs, psychosocial counseling, nutritional support and clinical out-patient services
- Social mitigation spending is taken from the NSP costing through 2017, and is assumed to grow in proportion to the relevant population (PLHIV and AIDS orphans, respectively) thereafter
- Overhead expenses are set at 13% of direct costs (or 12% of total costs), in line with the assumptions underlying the NSP.⁴³

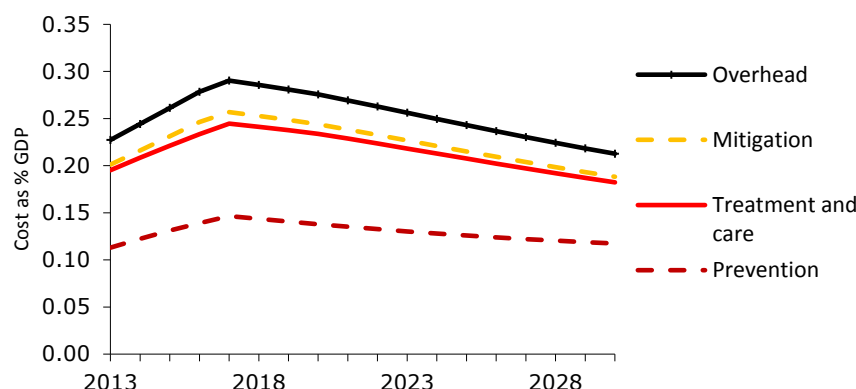
Figure 32. Financial costs of HIV/AIDS, Niger (2010–30, Euro million, 2013 prices)



Source: Fiscal framework model for Niger and authors' estimates.

Note: The area between Mitigation and Overhead represents overhead costs.

⁴³ The overhead expenses mark-up that is assumed in the NSP costing is slightly higher (14% of direct costs), but has been adjusted to reflect that the current analysis captures the full cost of care and treatment.

Figure 33. Financial costs of HIV/AIDS, Niger (2010–30, percent of GDP)

Source: Fiscal framework model for Niger and authors' estimates.

Note: The area between Mitigation and Overhead represents overhead costs.; GDP = gross domestic product.

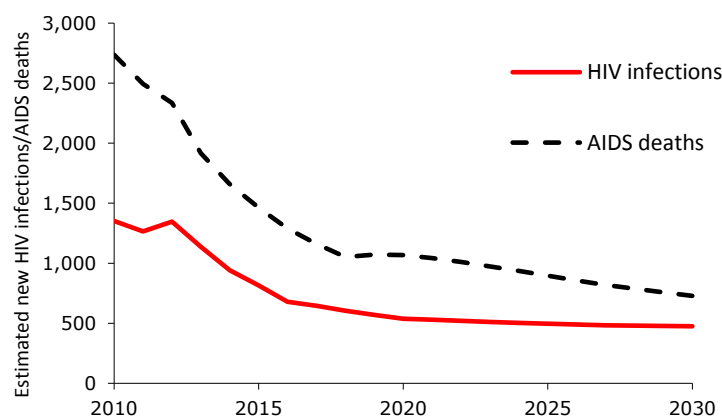
The projected costs of the national response to HIV/AIDS increase steeply during the NSP period and beyond

- The largest driver of costs is increasing HIV prevention spending. This reflects increasing coverage rates of HIV prevention interventions during the NSP, but also high population growth (according to the World Population Profile 2012, the adult population (15+ years) of Niger is projected to grow by 3.6% annually and 88% overall between 2013 and 2030)
- The costs of HIV/AIDS care and treatment increase steeply, as treatment coverage is assumed to increase to 80% during the NSP. Thereafter, the number of people on treatment is projected to keep increasing—a consequence of people who newly need and access treatment, coupled with low mortality rates when on treatment (see in following section and footnote)
- While the costs of the national response to HIV/AIDS are projected to increase in absolute terms, the costs peak at 0.29% of GDP in 2017, and decline to 0.22% of GDP in 2030 (assuming that GDP growth rates above 5%, as projected in the IMF World Economic Outlook, until 2018, can be maintained over this period)

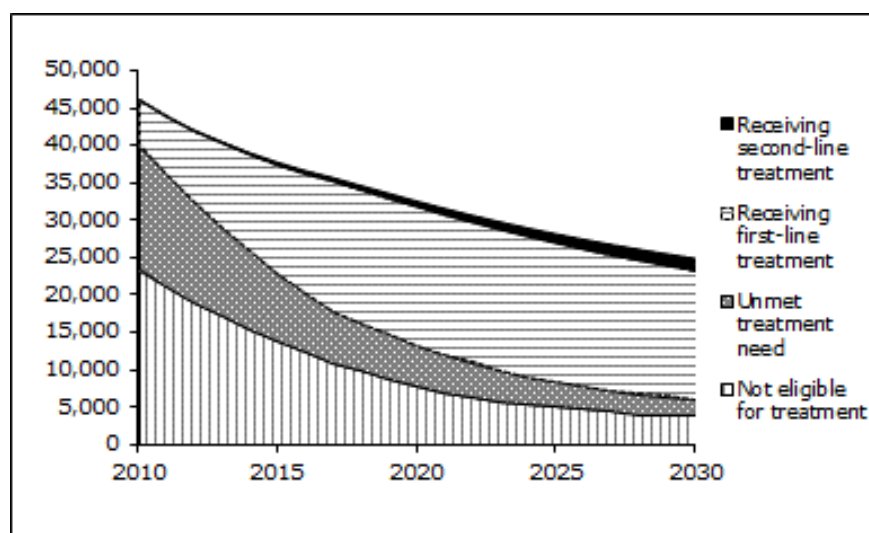
Anticipated impacts of the investments under the NSP 2013–17

The scaling-up of HIV prevention and treatment envisaged under the NSP results in a steep decline in HIV incidence and mortality (Figure 34). While the number of PLHIV declines overall, the number of people receiving ARV treatment increases⁴⁴ (Figure 35).

⁴⁴ The emphasis of the analysis is the long-term financial consequences of the HIV/AIDS program and especially of new HIV infections. While access to second-line treatment plays a small role in Niger at present, the importance may increase over the next year, and (because of higher unit costs) contribute significantly to long-term cost. The current projections therefore make a small allowance for transition to second-line treatment (1% of people on first-line treatment annually).

Figure 34. Modeled HIV incidence and AIDS deaths, Niger (2010–30)

Source: Fiscal framework model for Niger and authors' estimates

Figure 35. People living with HIV and ART, Niger (2010–30)

Source: Fiscal framework model for Niger and authors' estimates

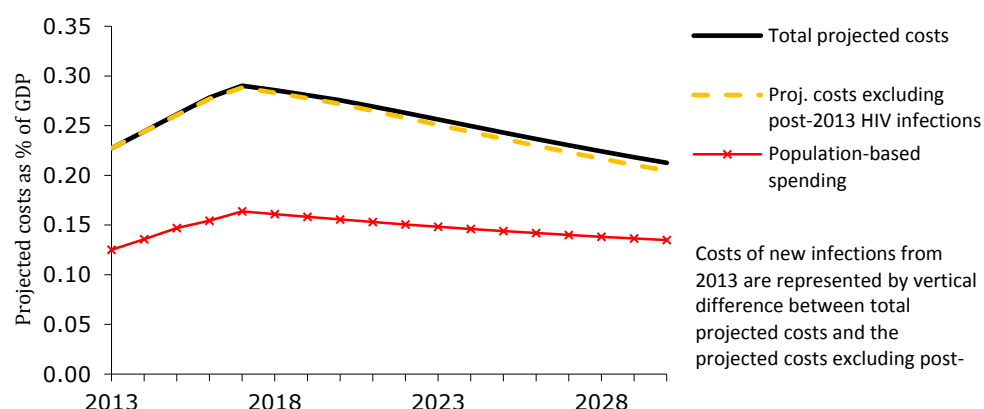
Longer-term costs of responding to HIV and future savings

Until 2030, the costs of the national response to HIV/AIDS will be dominated by prevention spending and the demand from people already living with HIV as of 2013 (Figure 36), for three reasons:

- Low mortality on HIV treatment means that people already receiving treatment in 2013 tend to remain on treatment over a long period

- HIV infections translate into a demand for HIV/AIDS-related services and spending slowly
- Because the NSP is preceded by a period in which HIV incidence was already in decline, the number of new HIV infections—relative to the number of people who were already HIV positive in 2013—is low at the outset of the NSP

Figure 36. Projected HIV costs caused by new and past HIV infections, Niger (2013–30, percent of GDP)



Source: Fiscal framework model for Niger and authors' estimates.

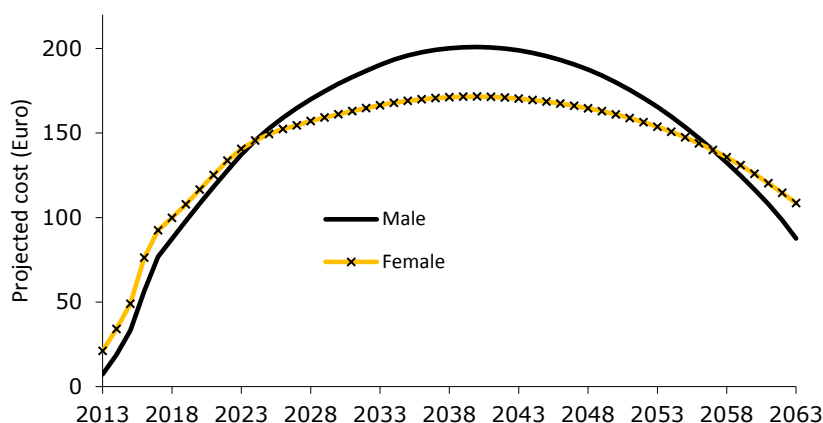
Note: Population-based spending denotes spending that cannot be attributed to people living with HIV (i.e., most prevention spending), and a proportional share of the overhead expenses; GDP = gross domestic product; Proj. = projected.

Nevertheless, new HIV infections result in substantial costs, which extend over a long period (Figure 37). Note that this projection covers a lengthy time horizon, and projections become much less precise as they extend further into the future. The projection does however illustrate the long-term costs and “treatment liability” caused by new infections.

One new HIV infection in 2013 results in a cost of about Euro 2,500 (USD 3,300) for both men and women, applying a discount rate of 5%

- The estimates are sensitive to the assumptions made for mortality on treatment. The Spectrum files for Niger assume very low AIDS-related mortality rates for people receiving ARV treatment, and the estimates may overstate the long-term costs⁴⁵
- Even if mortality rates on ART were higher than those assumed in Spectrum, the long-term costs resulting from one additional HIV infection would be substantial. An additional 1% annually in AIDS-related mortality reduces the estimated cost resulting from each new HIV infection by about 15%.
- The projected costs of one new infection differs between sexes principally due to PMTCT (leading to higher projected cost for females in the short-term), transition to treatment rates (for technical reasons regarding assumptions on treatment coverage, the path of HIV incidence, and certain features of Spectrum, fewer women transition to treatment, therefore the female curve is lower in the mid-term), and survival (it is assumed that survival for female PLHIV is higher, so the cost curve declines more slowly in the long-term for females)

⁴⁵ E.g., for individuals initiating treatment at a CD4 count of 100–199, the Spectrum default parameters for West Africa assume an annual HIV-related mortality of 0.1%–1.1% for women, and 0.6%–1.6% for men.

Figure 37. Cost of one new infection occurring in 2013, Niger

Source: Fiscal framework model for Niger and authors' estimates

The decline in HIV incidence achieved during the course of the NSP (and over the longer period until 2030) contributes substantially toward containing the long-term costs of the HIV program

- The decline in HIV incidence between 2013 and 2017 results in reduced long-term spending commitments, a savings equivalent to Euro 6.3 million (USD 8.4 million)
- The increase in HIV/AIDS-related spending over the same period totals Euro 16.5 million (USD 22.0 million)
- Assuming that the number of new HIV infections would have remained constant without the scaling-up of prevention spending, these estimates imply that—in addition to the obvious health gains—the financial savings achieved by the increases in investment in HIV prevention offset about one-third of the additional scaling-up of long-term prevention and treatment costs

Annex 1. Optima modeling: Analytical Framework and Methods

A1.1. Optimizing budget allocations for impact

The analysis is a result of estimating costs based on cost-coverage curves, and optimizing budget allocations to meet a given objective. Both minimizing new HIV infections and minimizing DALYs were included (see main report for research questions).

In the optimization function, only intervention program costs are reallocated (optimized), while other costs like management/coordination expenditures are fixed and are not included in the optimization of allocations. Drug costs are kept constant over time, while other costs increase in line with GDP per capita.

A1.2. Population groups and transmission pathways

The following populations were defined for the Optima analysis (maximum of 14 are possible):

1. Children aged 0–14 years (CHLD)
2. Females aged 15–24 years (FYTH)
3. Males aged 15–24 years (MYTH)
4. Females aged 25–49 years (FAD)
5. Males aged 25–49 years (MAD)
6. Females aged 50+ years (FOLD)
7. Males aged 50+ years (MOLD)
8. Female sex workers (FSW)
9. Prisoners (PRI)
10. Migrants and mobile populations (MIG)
11. Men who have sex with men (MSM)
12. Uniformed security (UNI)
13. Mine workers (MIN)
14. Truckers (TRU)

We assume HIV transmission between these populations only occurs through sexual partnerships. All male populations were assumed to partner with all female populations, except that males did not pair with females older than themselves, and males paired with females, at most, one age stratification younger than themselves (e.g. males 50+ did not form partnerships with females <24). MSM partnered only with each other.

A1.3. HIV programs included in the analysis

Eight basic HIV prevention and treatment programs were distinguished:

1. Targeted FSW intervention package
2. Prevention services targeted at MARPs like prisoners, military personnel, truckers, migrants, MSM (IEC, BCC, condom promotion, HIV counseling and testing)
3. Prevention services for non-MARPs
4. Public sector condom distribution
5. Social marketing of condoms
6. PMTCT
7. Antiretroviral treatment services
8. OVC support

A1.4. Overview of the Optima methodology

The Optimization and Prioritization Tool Optima (formerly Prevtool) is an extremely flexible population-based HIV model. Optima can assess HIV epidemic trends, resource needs, the cost-effectiveness of past programs, and the impact of potential future programs using a detailed mathematical model of HIV transmission and disease progression. Optima can perform detailed country-specific HIV program evaluations, and can build on the results from other models (like Goals) to assess allocative efficiency and the resources required to achieve complex objectives over varying periods.

Up to 14 arbitrarily defined population groups are available within Optima to describe the specific characteristics of an HIV epidemic. Optima incorporates a model of HIV transmission and progression using a coupled system of ordinary differential equations to track the movement of people between health states and population groups. Individuals are assigned to a given population based on their dominant risk. The model incorporates the effects of different sexual partnership types, condom use, infection stage, CD4 count categories, homosexual and heterosexual partnerships, the extent of male circumcision, diagnosis, first and second line antiretroviral treatment, and treatment failure, on the transmission of HIV and infection progression.

Optima requires detailed demographic, epidemiological, behavioral, clinical, and health economic data which is entered using an Excel spreadsheet. Data entry is flexible, allowing for everything from a separate data point for every population for each year, or a single data point for all populations over the entire simulation period (Optima assumes that parameters with no data are zero). Using available data, we calibrated Optima to accurately represent past and current trends in Niger's HIV epidemic. The model uses healthcare costs and disability-weights specified by CD4 count to perform cost-effectiveness and return-on-investment calculations.

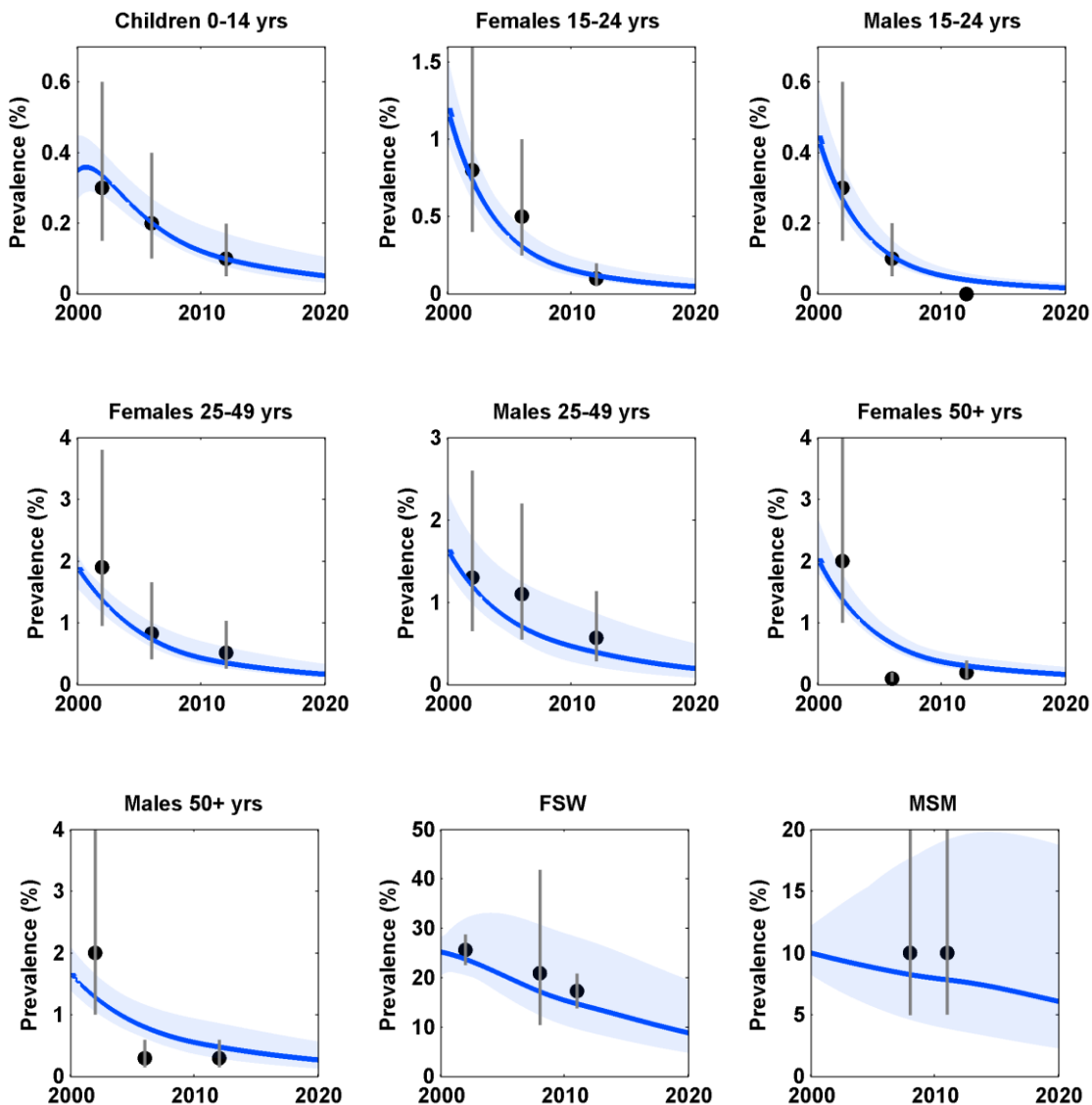
Given available coverage, spending and outcome data for implemented HIV prevention and treatment programs, Optima can determine the optimal allocation of resources or the amount of spending required to meet specified objectives (e.g., minimizing infections, minimizing AIDS deaths) or a combination of objectives. The model also enables additional programmatic scenarios representing the potential introduction of new programs or changes to current program implementation as required.

A1.5. Optima calibration to the HIV epidemic in Niger

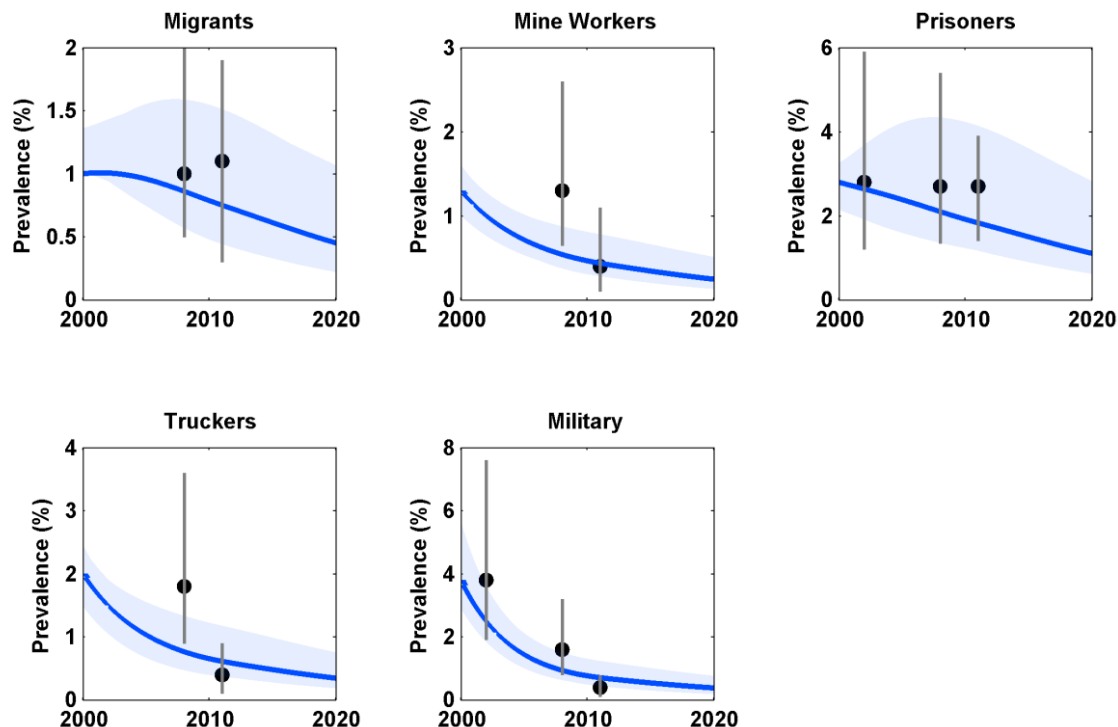
We used all available demographic, epidemiological, behavioral, and clinical data to calibrate the Optima model to the HIV epidemic in Niger (shown in Figure 38 and Figure 39).

In general, prevalence in Niger is declining rapidly in most population groups, due to both reductions in incidence and deaths of people currently living with HIV. Exceptions include MSM, migrants, and prisoners, for whom there are not sufficient data to confidently determine epidemic trends; however, current indications are that prevalence is relatively stable among these groups.

Annex Figure 1. Calibration of model to the HIV epidemic in Niger

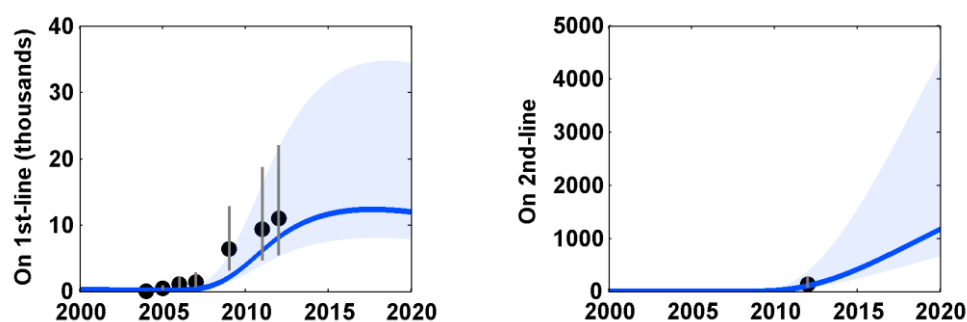


Annex Figure 1. (continued)



Note: Black discs represent available data for HIV prevalence. Lines attached to these discs represent uncertainty bounds, where available. The solid curve is the best fitting simulation and the light band represents the 95% confidence interval for the model outputs. MSM prevalence was assumed based on data from the West Africa region, in the absence of local data.

Annex Figure 2. Calibration of the model to the HIV epidemic in Niger

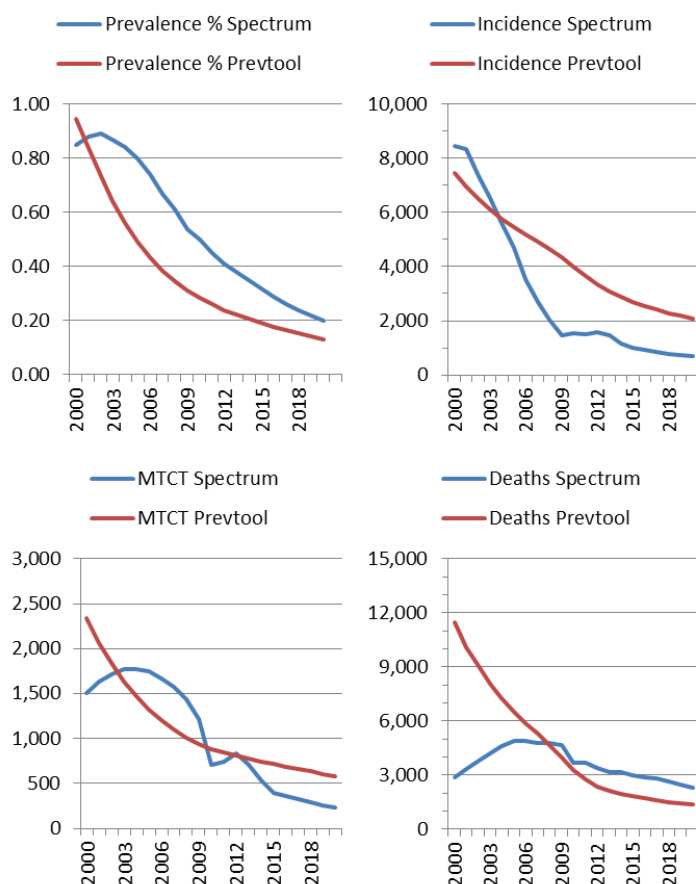


Note: Black discs represent available data for the number of people on first and second line anti-retroviral treatment. Lines attached to these discs represent uncertainty bounds, where available. The solid curve is the best fitting simulation and the light band represents the 95% confidence interval for the model outputs.

A1.6. Comparison between Optima and Spectrum estimates

Part of the calibration process involved aligning the future epidemic trends projected by Optima with estimates from the Spectrum software package. Figure 40 shows how the projections from Optima compare to Spectrum estimates for overall prevalence, overall incidence, mother-to-child transmission and AIDS deaths (revised Niger Spectrum version of 2013).

Annex Figure 3. Comparison of annual new HIV infections, annual mother-to-child transmissions, and annual AIDS deaths estimated by Optima and Spectrum over 2000–20



Note: Prevalence from Optima is the prevalence in the overall population while the HIV prevalence from Spectrum is for population 15 years old and over.

Optima captures the same epidemiological trends as that obtained from the Spectrum software package (revised Niger Spectrum version, 2013). There are differences, however, in the projections from each model, particularly for overall HIV prevalence and annual HIV incidence. The reason for these differences between the models—despite using the same demographic, epidemiological, behavioral and clinical data inputs—is due to differing model structures and modeling assumptions.

Both Spectrum and Optima are deterministic population-based models using similar modeling methods to describe HIV epidemics and assess the effectiveness of HIV prevention programs. Each model describes the transmission of HIV and the resulting change in CD4 count within those infected. Spectrum uses a greater number of CD4 count categories but Optima includes

diagnoses and the impact of testing, first and second line ART and treatment failure, and the impact of treatment on CD4 count. Mortality of HIV-positive people is dependent on the CD4 count in both models with Spectrum using lower death rates than Optima.

The major difference between Spectrum and Optima is the underlying structure of the models. Spectrum uses a generic population structure dividing the overall population into low, medium, and high-risk groups and separate most-at-risk populations with associated partnerships. In this analysis Optima is set up to directly match the characteristics of the Nigerian HIV epidemic and include all populations driving the HIV epidemic (many of which cannot be included in Spectrum)—with transmission able to match the partnership mixing in Niger, rather than using pre-specified partnerships.

A1.7. Relationships between program costs and effects on behavior and program coverage

A central component of our analyses is the relationships between the cost of HIV prevention programs and the resulting population coverage and behavioral outcomes. Such relationships are required to understand how incremental changes in spending ultimately affect HIV epidemics and determine the optimal funding allocation. For each population, we derived a set of relationships directly linking estimated funding to coverage and associated behavioral data. To produce these relationships we used an ecological “top-down” approach to relate program cost and outcomes. Indirect costs have no direct impact on HIV transmission parameters, but changes to HIV programs may affect these costs, for example in the supply of additional condoms. The proportion of funding allocated to indirect costs is assumed to remain the same as the overall HIV program budget changes. A limitation of our approach is the assumption that all changes in behavior are assumed to be due to changes in program funding.

A1.8. NASA expenditure data used in Optima

All NASA data and worksheets came from the national assessments covering the years 2007 to 2012, provided to the authors by the CISLS.

Annex 2. Optima modeling: Additional results on incidence estimations up to 2035

Annex Table 1. Estimated new HIV infections by population for the best-fitting simulation (2012–35)

Population Group	2012	2015	2017	2025	2035
Children 0–14 years	806	714	659	480	338
Females 15–24 years	184	137	117	75	54
Males 15–24 years	17	13	11	8	6
Females 25–49 years	499	379	327	220	161
Males 25–49 years	543	425	376	269	202
Females 50+ years	56	43	38	27	20
Males 50+ years	237	184	164	118	89
Female sex workers	350	273	241	173	132
Prisoners	17	14	12	9	7
Migrants/mobile populations	464	365	324	233	176
Men having sex with men	96	84	80	74	75
Uniformed security	26	21	18	13	10
Mine workers	30	24	21	15	11
Truckers	27	21	19	13	10
Total estimated HIV incidence	3,352	2,697	2,407	1,727	1,291