Supplemental Material

Table 3: ***Findings from Quality Assessment of Studies (n=28)***

Author (Year)	Design	Country	Study Population	Confounding	Overall Assessment	Supporting Commentary
Amadi (2016)	Cohort - Retrospective	Zambia	Study participants were from similar populations, participation≥50%. Sample size justification not reported.	Key potential confounding variables were not measured.	Good Quality	Results suggest a comprehensive community malnutrition program including HIV care can achieve low mortality among a population most affected by HIV.
Duggan (2012)	Controlled	Tanzania	Study groups were similar at baseline, sample size justification was reported.	Method of randomization was adequate, double-blinded design.	Good Quality	Double blinded design and sample size justification eliminates risk of bias.
Edmonds (2016)	Cohort - Prospective	DRC	Study participants were from similar populations, sample size justification and participation rate not reported.	Potential confounding variables were measured and adjusted on exposure and outcome.	Good Quality	Access to HIV care improved, confounding was measured and adjusted to eliminate risk of bias.
Goodson (2013)	Pre-post with no control	Tanzania	Study participants were from similar populations, sample size justification was not reported, and loss to follow up was>20%.	Individual-level data could not determine effects at the group level, confounding not assessed.	Poor Quality	Statistical analyses were not conducted, high LTFU increasing risk of bias. Authors emphasize need for further analyses.
Gupta (2013)	Cohort - Retrospective	Rwanda	Study participants were from similar populations, sample size justification and participation rate not reported.	Key potential confounding variables were not assessed.	Poor Quality	Incomplete data across variables, confounding was not measured, increasing risk of bias.
Herlihy (2015)	Pre-post with no control	Zambia	Study participants were from similar populations, sample size justification was not reported, and loss to follow up was<20%.	Individual-level data could not determine effects at the group level, confounding was assessed.	Fair Quality	No comparison arm was used, incomplete data across variables, integration of HIV into ANC and community based support improved HIV related outcomes.
Horwood (2010)	Cohort - Prospective	South Africa	Study participants were from similar populations, sample size justification provided, and participation rate not reported.	Key potential confounding variables were not assessed.	Fair Quality	Data rely on the accuracy of self-report. Both loss to follow up and confounding were not assessed, increasing risk of bias.

(Contd...)

Table 3: ***(Continued)***

Author (Year)	Design	Country	Study Population	Confounding	Overall Assessment	Supporting Commentary
Kankasa (2009)	Cohort - Prospective	Zambia	Study participants were from similar populations, participation rate≥50%. Sample size justification not reported.	Potential confounding variables were assessed, and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Kim (2012)	Cohort - Retrospective	Malawi	Study participants were from similar populations, sample size justification and participation rate not reported.	Key potential confounding variables were not assessed.	Poor Quality	Conclusions are preliminary. Small sample size, potential confounders were not adjusted for increasing risk of bias.
Kindra (2011)	Controlled	South Africa	Study groups were similar at baseline, sample size justification was reported.	Method of randomization was adequate, double-blinded design.	Good Quality	Double blinded design and sample size justification allows for the elimination of bias.
Levin (2012)	Cohort - Prospective	South Africa	Study participants were from similar populations, participation rate at least 50%. Sample size justification not reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Lilian (2013)	Cohort - Prospective	South Africa	Study participants were from similar populations. Sample size justification was provided, participation rate not reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Mazia (2009)	Pre-post with no control	Swaziland	Study participants were from similar populations, sample size justification was not reported, and loss to follow up was<20%.	Statistical analyses were done pre and post intervention to assess confounding.	Good Quality	Study populations were similar, LTFU<20%, confounding measured and adjusted to eliminate bias.
McCollum (2011)	Cohort - Retrospective	Malawi	Study participants were from similar populations, sample size justification reported, and participation rate not reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
McCollum (2012)	Cohort - Prospective	Malawi	Study participants were from similar populations, participation rate≥50%. Sample size justification reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and sample size justified to eliminate bias.
Mutanga (2012)	Cohort - Retrospective	Zambia	Study participants were from similar populations, sample size justification and participation rate not reported.	Key potential confounding variables were not measured.	Fair Quality	Confounding was not measured, analysis over an insufficient timeframe increases risk of bias.

(Contd...)

Table 3: ***(Continued)***

Author (Year)	Design	Country	Study Population	Confounding	Overall Assessment	Supporting Commentary
Ndondoki (2013)	Cohort - Prospective	Cote d'Ivoire	Study participants were from similar populations, sample size justification and participation rate not reported.	Key potential confounding variables were not measured.	Fair Quality	Low acceptance rate of treatment, Potential confounding variables were not assessed causing increased risk of bias.
Ong'ech (2012)	Cohort - Prospective	Kenya	Study participants were from similar populations, participation at least 50%. Sample size justification not reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Patel (2012)	Cohort - Prospective	Zimbabwe	Study participants were from similar populations, participation at least 50%. Sample size justification not reported.	Key potential confounding variables were not measured.	Fair Quality	Confounding was not assessed leading to increased bias. Authors suggest future research needs to be done.
Patel (2013)	Cohort - Prospective	DRC	Study participants were from similar populations. Sample size justification reported. Participation rate not reported.	Key potential confounding variables were not measured.	Fair Quality	Small sample size limited the power of the statistical analyses, confounding was not measured increasing risk of bias.
Preidis (2013)	Cohort - Prospective	Malawi	Study participants were from similar populations, participation at least 50%. Sample size justification not reported.	Key potential confounding variables were measured and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Rollins (2009)	Cohort - Prospective	South Africa	Study participants were from similar populations, participation at least 50%. Sample size justification not reported.	Key potential confounding variables were not measured.	Fair Quality	Confounding was not assessed, and 4-month timeframe is insufficient in finding an association between exposure and outcome.
Tomlinson (2014)	Controlled	South Africa	Study participants were from similar populations. Sample size justification reported. Unblinded design.	Method of randomization was adequate. Treatment allocation was not concealed which allowed prediction of assignments. Participants and providers were not blinded.	Fair Quality	Study includes self-reports for behaviors which increased bias, neither participants and providers were blinded to the treatment group. Treatment allocation was not concealed, allowing for increased risk of predicted assignments.

(Contd...)

Table 3: ***(Continued)***

Author (Year)	Design	Country	Study Population	Confounding	Overall Assessment	Supporting Commentary
Turan (2015)	Controlled	Kenya	Study participants were from similar populations. Sample size justification not reported. Unblinded design.	Method of randomization was adequate. Treatment allocation was not concealed which allowed prediction of assignments. Participants and providers were not blinded.	Fair Quality	Method of randomization was adequate, unblinded design, high LTFU of study population, incomplete/inconsistent data, and sample size reduced power all increasing the risk of bias.
Wallace (2014)	Qualitative Assessment	Tanzania	Study participants were from similar populations. Sample size justification, timeframe and loss to follow up were not reported.	Potential confounding variables were not measured.	Poor Quality	HIV-infected women were overrepresented in the selection process as compared with the HIV prevalence rate, biasing results toward their specific concerns. Findings are not statistically representative of the populations sampled.
Wang (2015)	Controlled	Zambia	Similarity of study groups was not reported, sample size justification was reported.	Method of randomization was adequate. Unblinded design allowed prediction of assignments.	Fair Quality	Poor data quality, unblinded design, controlled facilities received more supplies than they would have otherwise causing the effect of the two interventions to be underestimated, high risk of bias.
Wanyenze (2009)	Cohort - Retrospective	Uganda	Study participants were from similar populations, sample size justification and participation rate not reported.	Key potential confounding variables were measured, and adjusted for effect on exposure and outcome.	Good Quality	Study populations were similar, confounding measured and adjusted to eliminate bias.
Weigel (2009)	Cohort - Prospective	Malawi	Study participants were from similar populations, sample size justification and participation rate was<50%.	Key potential confounding variables were not measured.	Fair Quality	Study only used aggregated, facility-based data. LTFU and confounding was not assessed increasing risk of bias.

Table 4: Studies Included by Priority Intervention

Author (Year)	Priority Interventions			
	Post-natal follow-up including integrated HIV, neonatal and child survival interventions (n=11)	Integrated immunizations and infant/child HIV testing (n=11)	Nutrition center services integrated with HIV testing and growth monitoring of HIV-exposed children (n=5)	Pediatric inpatient and ambulatory care services integrated with provider initiated HIV testing for ill children (n=12)
Amadi (2016)			•	
Duggan (2012)			•	
Edmonds (2016)	•			
Goodson (2013)		•		
Gupta (2013)	•	•	•	•
Herlihy (2015)	•			
Horwood (2010)	•	•		•
Kankasa (2009)				•
Kim (2012)			•	•
Kindra (2011)	•		•	
Levin (2012)		•		•
Lilian (2013)	•			
Mazia (2009)	•			
McCollum (2011)				•
McCollum (2012)		•		•
Mutanga (2012)		•		•
Ndondoki (2013)	•			
Ong'ech (2012)	•	•		
Patel (2012)		•		
Patel (2013)				•
Preidis (2013)				•
Rollins (2009)		•		
Tomlinson (2014)	•			
Turan (2015)	•			
Wallace (2014)		•		
Wang (2015)		•		
Wanyenze (2009)				•
Weigel (2009)				•

Table 5: Characteristics of Studies Identified (n=28)

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Amadi (2016)	Zambia; facility, peri-urban	Oct 2009 - Sept 2012	Cohort - Retrospective	Community health workers conducted house-to-house screening for under-nutrition, and referred children with malnutrition or illness to a facility-based nutrition center for treatment.	Nutritional services based on malnutrition status	HIV testing was offered to children and their caretakers who accessed nutritional services at the nutrition center; standard HIV testing algorithm by age was used (<18 mo use of DNA-PCR, >18 mo rapid test)
Duggan (2012)	Tanzania; facility, urban	Aug 2004 - May 2008	Controlled	HIV+pregnant women were enrolled at ANC; exclusion of infants born as multiple gestation or with significant medical issues	HIV-exposed infant services; PMTCT services including oral multivitamins	HIV-exposed infants were randomized to receive a daily multivitamins or placebo for 24 mo.
Edmonds (2016)	Democratic Republic of the Congo; urban & rural, facility	Apr 2010- July 2013	Cohort - Prospective	Women and infants were enrolled from 90 ANC/L&D sites, or 2 affiliated C&T centers	ANC/L&D services for HIV+women and HIV-exposed infants provided at C&T centers only	ANC and HIV services as per national standard of care. Difference was in service type (C&T vs ANC/L&D)
Goodson (2013)	Tanzania; facility/ community, urban & rural	Apr 2009- Mar 2010	Pre-post with no control	Mothers bringing infants to first-month immunization visits at 4 urban and 4 rural sites	Routine EPI care and infant feeding education	Determination of the mother's HIV status from her ANC card, offering HIV testing to mothers with unknown HIV status; referring HIV-exposed infants for all follow-up services
Gupta (2013)	Rwanda; facility, rural	Mar 2007- Feb 2010	Cohort - Retrospective	HIV-exposed infants enrolled in the child survival program at 8 health clinics whose mothers elected to replacement feed	PMTCT, HEI services, EPI, nutrition services, MCH services, FP all provided separated by time and/or location	Improved access to health care, ARVs for PMTCT, clean water sources and replacement feeding, home visits by CHW, prevention and treatment of childhood illness, nutritional support, FP, and socioeconomic support

(Contd...)

Table 5: ***(Continued)***

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Herlihy (2015)	Zambia; facility/ community, peri-urban	Dec 2011 - Jun 2013	Pre-post with no control	At 6 government antenatal clinics, pre-intervention data obtained from clinic registers. Post-intervention data from all antiretroviral therapy–naive, HIV-positive pregnant women and their infants presenting to ANC.	ANC services (PMTCT done elsewhere) without lab courier or community-based follow-up	3 components: integrated HIV and ANC (1 location/1 provider), laboratory courier to expedite CD4 counts, and community-based follow-up of women– infant pairs
Horwood (2010)	South Africa; facility, peri-urban	Oct 2007 - Feb 2008	Cohort - Prospective	6 district hospitals and 27 primary health centers: HIV-positive mothers were interviewed in PNW and EPI clinics and data compared with records. Lay counsellors and nurses interviewed.	ANC services (PMTCT done elsewhere)	Integration of PMTCT and ANC services
Kankasa (2009)	Zambia; facility, urban	Jan 2006 - June 2007	Cohort - Prospective	Children hospitalized were routinely offered HIV testing	Hospitalized children were referred to the a freestanding VCT site on the hospital campus	4 HIV counselors routinely offered and performed HIV testing on all stable children hospitalized. Parents of HIV+children identified were offered testing.
Kim (2012)	Malawi; facility, urban	Feb 2007 - Feb 2008	Cohort - Retrospective	All HIV+, treatment-naïve children with uncomplicated malnutrition enrolled in a malnutrition program at a pediatric HIV COE	HIV+, treatment-naïve children with uncomplicated malnutrition were treated for malnutrition and ART was initiated when feasible	HIV+, treatment-naïve children with uncomplicated malnutrition were treated for malnutrition; ART initiated as soon as possible, within 21 days.
Kindra (2011)	South Africa; facility, urban	Dec 2006 - July 2008	Controlled	HIV positive pregnant women and their infants attending ANC at a Community Health center	Routine ANC and PNC services	Breastfeeding mothers were randomized to receive supplementation or non-nutritive household supplies

(Contd...)

Table 5: ***(Continued)***

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Levin (2012)	South Africa; facility, urban	Sept 2010 - Feb 2011	Cohort - Prospective	17-24 month old children accessing any MCH services at 4 primary health centers	Routine MCH services	PITC was offered to all children accessing services; demographic data was obtained and a PMTCT questionnaire was implemented
Lilian (2013)	South Africa; facility, urban	Aug 2008 - Dec 2010	Cohort - Prospective	HIV-exposed infants and their mothers attending hospital-based PMTCT services	PMTCT post-natal services include DNA-PCR testing at 6 weeks	HIV-exposed infants were seen at birth, 2, 4, 6, and 10 weeks of age; were clinically evaluated and had DNA-PCR collected at each visit
Mazia (2009)	Swaziland; facility, urban	Feb 2006 - May 2007	Pre-post with no control	Pregnant and newly delivered postpartum women attending ANC and postnatal clinics at 3 hospitals and 4 MCH clinics, and their infants	PMTCT and ANC/ PNC services with poor quality of ANC services	Strengthening providers' knowledge of standard PNC services, introduction of a post-natal visit within 1 week of delivery
McCollum (2011)	Malawi; facility, urban	Sept 2007 - Dec 2007; Sept 2008 - Dec 2008	Cohort - Retrospective	Children hospitalized who were diagnosed with HIV during that admission	Non-routine HIV testing of hospitalized patients	Routine opt-out PITC for all children hospitalized, with linkage to HIV C&T
McCollum (2012)	Malawi; facility, urban	Feb 2011 - Mar 2011	Cohort - Prospective	Infants attending EPI at one hospital and U5C at another hospital	HIV testing services provided only at U5C	HIV testing services introduced into EPI
Mutanga (2012)	Zambia; facility, urban	Oct 2007- Oct 2010	Cohort - Retrospective	All children entering a large hospital through: general pediatric and isolation wards, admission ward, outpatient clinic, surgical ward, neonatal and L&D wards, child sexual abuse center	VCT and DCT at the chest clinic or for suspected HIV cases in the inpatient department.	PITC integrated into all pediatric facility entry points

(Contd...)

Table 5: ***(Continued)***

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Ndondoki (2013)	Cote d'Ivoire; facility, urban	May 2008 - Oct 2008	Cohort - Prospective	All children aged 6–26 weeks attending post-natal points of care (EPI, weighing or consultation) in three community health centers	HIV testing (including DNA-PCR testing) was done at VCT	Four sequential contacts over a 3 mo period at the post-natal points of care; 1) systematic screening for HIV in mothers; DNA-PCR for HEI; HIV testing for mothers with unknown status, 2) HIV test results given to mothers tested at previous visit; DNA-PCR testing for newly identified HEI; 3) EID results given to caregivers and linkage to ART center; 4) treatment offered at the ART center.
Ong'ech (2012)	Kenya; facility, urban and rural	Apr 2008 - Apr 2010	Cohort - Prospective	HEI at 6–8 weeks of age in 2 hospitals with similar characteristics but different models of service delivery. In the CCC model, HEI received immunization and growth monitoring in MCH but cotrimoxazole prophylaxis and infant HIV testing in the CCC. In the MCH model, all services were provided in the MCH.	N/A	Peer counselors assisted with linkages between MCH and CCC. In the MCH model, immunizations, growth monitoring, and HEI services were in MCH; maternal HIV treatment services were at the CCC. In the CCC model, infants received immunizations and growth monitoring at MCH, and HEI care at the CCC; maternal HIV treatment services were at the CCC.
Patel (2012)	Zimbabwe; community, rural	Feb 2010 - Sept 2011	Cohort - Prospective	OVC under 5 and their families attending 16 rural community-based, community-run ECD play centers.	OVC services for 7-18 year olds, no HIV testing integrated into the community-based services	OVC support services, ECD services, family support groups, health monitoring, HIV testing
Patel (2013)	DRC; facility, urban	Aug 2007 - Nov 2009	Cohort - Prospective	HIV-infected children aged 3–18 years initiating anti-TB treatment at five clinics	TB services without HIV testing and treatment	All children diagnosed with TB and initiated on treatment were offered on-site HIV testing, and those testing HIV positive were started on ART

(Contd...)

Table 5: ***(Continued)***

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Preidis (2013)	Malawi; facility/ community, urban	Jan 2008 - Dec 2008	Cohort - Prospective	Newly identified HIV+children enrolling in services at the pediatric HIV COE	N/A	HIV testing in the community versus on the inpatient wards. All children treated with ART and for co-infections.
Rollins (2009)	South Africa; facility, peri-urban	Nov 2007 - Feb 2008	Cohort - Prospective	Infants brought by their mothers to EPI clinics at three primary health centers	Immunizations only offered at EPI clinic	Integration of HIV testing into EPI clinic
Tomlinson (2014)	South Africa; community, peri-urban	Jun 2008 - Dec 2010	Controlled	All consenting pregnant women aged 17 years or older and their newborns residing in the clusters	CHWs did three home visits; assisted with accessing community welfare grants and getting birth certificates.	CHWs did seven home visits for pregnant and post-partum women; provided care and education aligned with PMTCT, IMCI, lactation counseling and newborn care guidelines. CHWs used motivational interviewing and assisted with social support networks to increase exclusive breastfeeding
Turan (2015)	Kenya; facility, rural	Jun 2009 - Mar 2011	Controlled	At 12 government health facilities, all newly identified HIV+pregnant women not yet on treatment and their infants	ANC and PMTCT services in MCH until definitive infant diagnosis	Integration of ART services (ART initiation and follow up) into ANC/ PMTCT services (same room, same provider) until infant definitive diagnosis is determined

(Contd...)

Table 5: ***(Continued)***

Author (Year)	Country, Study Site, Location	Period of Study	Study Type	Study Enrollment	Standard of Care	Intervention
Wallace (2014)	Tanzania; facility, urban and rural	Apr 2009 - Aug 2010	Qualitative Assessment	Mothers bringing infants to first-month immunization visits at 4 urban and 4 rural sites	Routine EPI care and infant feeding education	Face-to-face interviews with mothers and health care providers involved in integrated services
Wang (2015)	Zambia; facility, rural	Jan 2012 - Mar 2014	Controlled	In 60 facilities	Ad-hoc or opt-in HIV testing at EPI	Two arms: 1) Simple Intervention group, received sensitization meeting and resupply of HIV testing commodities in the event of a stock-out; 2) Comprehensive Intervention group: received the Simple Intervention and opt-out HIV testing, patient and provider flow optimization, mentoring of staff on DNA-PCR sample collection, group pre-test counseling and community awareness campaign each morning at U5C.
Wanyenze (2009)	Uganda; facility, urban	Feb 2005 - Feb 2008	Cohort - Retrospective	Children (and their caregivers) hospitalized in 3 general pediatric wards and 1 nutritional pediatric ward at a tertiary care hospital	No HIV testing services available	All children hospitalized in wards were offered opt-out PITC. Caregivers were also offered testing. All HIV+were referred to the ART center at the hospital (including HEI)
Weigel (2009)	Malawi; facility, urban	Oct 2003 – Sept 2006	Cohort - Prospective	Children hospitalized at a central hospital who providers felt needed an HIV test	Children needing or wanting an HIV test were referred to VCT	Integration of PITC on the general pediatric and nutritional inpatient wards, and referral of HIV+ children to ART clinic for enrollment

Acronyms: ANC, antenatal clinic; ARVs, antiretroviral medications; C&T, HIV care and treatment; CCC, comprehensive HIV care centre; CHW, community health worker; COE, centre of excellence; DCT, Diagnostic HIV Counseling and Testing; DBS, Dried Blood Spot; ECD, early childhood development; EPI, expanded program on immunization; FP, family planning; HEI, HIV-exposed infant; IMCI, integrated management of childhood illness; L&D, labor and delivery; MCH, maternal/child health; OVC, orphans and vulnerable children; PITC, provider-initiated HIV testing and counseling; PMTCT, prevention of mother-to-child transmission of HIV; PNC, postnatal care; TB, tuberculosis; U5C, under-five clinic; VCT, voluntary HIV counseling and testing.

Table 6: Results of Service Integration on Health Outcomes for Children (n=9)

Author (Year)	Population	Results
Amadi (2016)	1859 children	• Integrating HIV testing at nutrition clinics identified 185/1796 (10.3%) children as HIV positive • Mortality rate from severe acute malnutrition was reduced to 4.2% from 3-35% (national estimates) through integrated services
Duggan (2012)	2387 infants (1193 intervention; 1194 control)	• HIV-exposed infants receiving micronutrient supplementation showed significant reduction in morbidities: fewer hospitalizations (P=0.035), episodes of fever (P=0.005), and episodes of fever and cough (P=0.019) compared to a control group who did not receive micronutrient supplementation • No effect on child mortality was observed
Gupta (2013)	1038 infants	• 18 month HEI survival and retention probability were 0.93 (95% CI: 0.91 to 0.94) and 0.88 (95% CI: 0.86 to 0.90) respectively • 27 children (2.6%) tested positive for HIV, 26 of whom were detected before 120 days • Of those tested, 1 infant died and none were LTFU from the program by 18 months • Of the 53 infants who were not tested, 23 (43.4%) died, 6 were LTFU, 5 moved and 5 were suspended • 500 children who tested negative for HIV before 120 days and had a subsequent test after 9 months remained negative
Kim (2012)	140 children	• Increased proportion of children receiving prompt ART (within 21 days) recovered nutritionally (86% vs. 60%, P=0.01) and had higher rates of weight gain (3.6 vs. 1.6 g/k/day; P=0.02) • Prompt ART was associated with increased likelihood of nutritional recovery (OR: 5.4, 95% CI: 2.0 to 14.5)
Kindra (2011)	129 mothers and infants (66 intervention; 63 control)	• Nutritional supplementation had no significant effect on infant outcomes
Lilian (2013)	838 infants born to 829 mothers	• HIV status was determined for 72.3% (606) of 838 enrolled infants with 6.3% (38/606) positive • 30 (79%) HIV-infected infants accessed 6-week testing and initiated antiretroviral therapy at a median age of 16.0 weeks; 14 were in care a median of 68 weeks later • Infant mortality rate was 16 (4/25) compared with national mortality rate of 20% • 8 (21%) HIV-infected infants were not identified by routine testing
Patel (2013)	31 HIV-infected children aged 3-18 years initiating anti-TB treatment	• 87.1% children diagnosed with HIV during TB consultation • 87% children treated for TB and 74.2% initiated ART • Median CD4 count increase of 106 cells/cm^3 was observed (P=0.0145): increase of 113 cells/mm^3among children on ART and of 71.5 cells/mm^3 among those not on ART (P=0.78) • Mean BMI increase during anti-TB treatment was 2.1kg/m^2 overall (P=0.002): 2.2kg/m^2 among children on ART and of 0.72kg/m^2 among those not on ART (P=0.08)

(Contd...)

Table 6: ***(Continued)***

Author (Year)	Population	Results
Preidis (2013)	742 infants and children	• Routine hospital-based PITC identified younger patients (median 25.0 vs 53.5 months), with more severe disease (22.2% vs 7.8% WHO stage IV) compared with CITC • More children identified in the hospital were eligible for ART based on age (47%) vs CITC (24%), and more were on ART 12 months after diagnosis (91.4% PITC vs 75.0% CITC, P=0.005) • Mortality rate for hospital-identified children (15.5%) was double the mortality rate for community-identified children (7.8%) (p<0.0125) • LTFU: 14.7% CITC, 12.9% PITC (p-value: NS) • Transferred out: 22.3% CITC, 25.2% PITC (p-value: NS)
Tomlinson (2014)	3561 mother infant pairs (1659 intervention; 1902 control)	• Infant weight and length-for-age z-scores increased (weight difference 0.09; 95% CI: 0.00–0.18, length difference 0.11; 95% CI: 0.03–0.19) • Prevalence of exclusive breastfeeding at 12 weeks increased among women receiving the intervention (29%) compared with control (15%) (RR 1.92), and there was a trend towards more infants in the intervention arm receiving a DNA-PCR test (73.6% vs 66.6%). • No difference was seen between study arms in HIV-free survival

Table 7: Results of Integration on Service Uptake (n=18)

Author (Year)	Population	Results
Amadi (2016)	1859 children	• 97% of enrolled children received an HIV test, no comparison group used • 66% of children (n=123/185) were initiated on ART, no comparison group used
Edmonds (2016)	1482 newly HIV-diagnosed women; 1142 HIV-exposed infants	• Uptake of the pregnancy and infant packages increased dramatically, 64% (pregnant women) and 31% (infants). • Cumulative incidence of women receiving the pregnancy package at 14 weeks of age was lower at the ANC/L&D sites (66%; 95% CI: 63% to 69%) than the C&T centers (88%; 95% CI: 83% to 92%)
Goodson (2013)	7569 infants, 6074 mothers	• At urban sites, infant vaccine doses given later in life (pentavalent, polio, and measles) increased 12%, 8%, and 11% respectively • At rural sites, first-month vaccine doses decreased 33% and 35% and vaccine doses given later in life decreased 23%, 28%, and 28%, compared to baseline
Gupta (2013)	1038 infants; 634 mothers	• 98.6% HEI (625/634) received sdNVP at birth, and 92.5% of infants were HIV tested within 120 days of birth; • 500 children who tested negative for HIV before 120 days and had a subsequent test after 9 months remained negative. • Improved uptake of treatment for infant diarrheal disease (20.7% of mothers reported that their infant had experienced diarrhea in the past 14 days, 74.3% were managed at a health facility and 37.8% received treatment with oral rehydration solution)

(Contd...)

Table 7: ***(Continued)***

Author (Year)	Population	Results
Herlihy (2015)	510 baseline mother–infant pairs; 624 pregnant women enrolled	• CD4 uptake between women at baseline (50.6%, n=510) versus post-intervention (77.2%, n=624) differed significantly (P<0.01) • 27.5% of women at baseline were initiated on cART compared to 71.5% of women post-intervention • Six-week DBS DNA-PCR results were reported on 41.9% of infants at baseline (n=506) compared with 55.8% (n=553) of infants post intervention (P<0.01)
Levin (2012)	499 infants	• 72% of infants were tested for HIV • Highest rate of consent to infant testing was given by known positive mothers (77.6%); lowest rate of consent was given by mothers with unknown/undisclosed HIV status (33.3%)
Mazia (2009)	356 pregnant and postpartum women and infants at baseline; 346 at endline	• Overall, 20-fold increase in early postnatal visits; Postnatal visits within 3 days increased 20 fold; between 4 and 7 days, 6 fold; 2-6 wks postpartum, 4 fold • Cotrimoxazole prophylaxis for HIV-exposed infants increased from 13% at baseline to 37% at endline • Breastfeeding within one hour of delivery increased by 41% in HIV-positive mothers and 52% in HIV-negative mothers, compared to baseline
McCollum (2011)	7,007 pediatric inpatient infants and children	• A greater proportion of all hospitalized children received HIV testing (81.0% vs 33.3%, P<0.001), accessed inpatient HIV-trained care (7.5% vs 2.4%, P<0.001), enrolled into an outpatient HIV clinic after discharge (3.2% vs 1.3%, P<0.001), and initiated antiretroviral therapy (ART) following hospitalization (1.1% vs 0.6%, P=0.010) compared to NRT (SOC). • Increased proportion of hospitalized HIV-infected and HIV-exposed uninfected children receiving DNA PCR testing (73.5% vs 35.2%, P<0.001) • Intervention did not increase outpatient enrollment or ART initiation of identified HIV-infected children
McCollum (2012)	1757 infants	• Seven fold more children received PITC at immunization clinics (IC) (84.2% vs 11.4%, P<0.001) • A higher percentage of infants attending IC were tested by PCR (100.0% vs 90.3%, P=0.03), and were also 2.5 months younger when tested (3.1 vs 5.6, P<0.001) • Three fold more HIV-exposed infants at IC returned for their PCR result and enrolled into care (78.6% vs 25.0%, P<0.001)
Mutanga (2012)	5074 inpatient children eligible for PITC	• Of total inpatient children eligible for PITC (n=5074), 98.5% of children were counselled, and 98.2% were tested by 36 months; 77.6% of these results were determined by DNA PCR testing in children<18 months old • Of children identified as HIV-infected in the hospital's inpatient and outpatient departments (n=1342), 99.3% were enrolled in HIV care, including initiation on cotrimoxazole prophylaxis
Ong'ech (2012)	363 HIV-exposed infants 6-8 weeks of age (184 enrolled in HIV Comprehensive Care Clinics, CCC); 179 (enrolled in MCH clinics)	• 363 HIV-exposed infants (HEI) were enrolled and followed up to 12 months of age • Infants in the integrated MCH model were 1.14 (at 14- weeks), 1.42 (at 6 months), 1.95 (at 9 months) and 1.29 (at 12 months) times more likely to attend routine postnatal visits, and 2.24 times more likely to have an antibody testing at 1 year than CCC (ART clinic) (95% CI: 1.57-3.18) • Infants in the integrated MCH intervention arm were 1.14 times (95% CI: 1.04 to 1.26) more likely to attend the 14-week immunization visit

(Contd...)

Table 7: ***(Continued)***

Author (Year)	Population	Results
Patel (2012)	697 children	• 90% of children enrolled at the playcenters were fully immunized (n=629), compared with the national coverage estimates of 75% • 410 children tested for HIV (59%); 100% linkage to ART of children who were identified as HIV positive (74/74)
Rollins (2009)	646 eligible mothers, 584 mothers agreed to infant testing and had infants tested, 332 subsequently returned for results	• 646 mothers brought their infants for immunizations • 584 (90.4%) agreed to HIV testing of their infant • 332 (56.8%) subsequently returned for results • 332 of 646 (51.4%) mothers and infants thereby had their HIV status confirmed or reaffirmed by the time the infant was 3 months of age • 9.2% (54/584) of all infants received HIV DNA-PCR testing
Tomlinson (2014)	3561 mother infant pairs: 1659 intervention and 1902 control	• At 12 weeks of infant age, the intervention was effective in almost doubling the rate of exclusive breastfeeding (risk ratio 1.92; 95% CI: 1.59–2.33) • Women in the intervention arm were more likely to take their infant to the clinic within the first week of life (risk ratio 1.10; 95% CI: 1.04–1.18) • Number of infants with an HIV test by six weeks of age (67% vs. 74%, RR1.10) • Higher cotrimoxazole uptake at 12 weeks postpartum (37% vs. 43%, RR 1.17, 95% CI: 0.99–1.37)
Turan (2015)	1172 mothers (HIV+pregnant women)	• Of infants, 63% (intervention) and 54% (control) received an EID test • HIV care enrollment was higher in the intervention sites compared to control sites (69% versus 36%, OR=3.94, 95% CI: 1.14–13.63) • Time to HIV care enrollment was significantly shorter among women in the intervention arm (0 versus 8 days, HR=2.20, 95% CI: 1.62–3.01)
Wang (2015)	60 facilities (20 for each of three study arms: control, simple, and comprehensive intervention)	• Increase in average monthly infant testing in the intervention arm of 16.6% (90% CI: -7%, 46%, P=0.26) and "comprehensive" intervention arm of 10% (90% CI: -10%, 36%, P=0.43) as compared to control arm. • Average number per month of infant DBS tests changed by -0.49 (Control), 0.43 (Simple), and 1.19 tests (Comprehensive) over baseline • Average increase in 6 week tests compared to baseline of (99% (Control)), (658% (Simple)) and (295% (Comprehensive)) sites • Interventions did not have a significant effect on DPT1 immunization uptake, yielding an average of 0.86 more doses of DPT1 per month compared to facilities that did not receive the intervention
Wanyenze (2009)	9687 children	• 92% (8990/9687) caregivers consented to pediatric testing over one year; 96% (8663/8990) had no prior test history • HIV seroprevalence among children was 12.4% on average, and highest on the nutrition ward (30.8%)
Weigel (2009)	3971 children	• Median proportion of children tested per quarter increased from 3.8% (2.7-4.3) to 9.6% (8.8 to 10.0) (p=0.0009) • Proportion of children starting ART increased from 6.9% (4.9-9.3) to 21.1% (19.2-24.2) (p=0.0036) • Providers initiated testing in less than 10% of admitted children

Table 8: Results of Service Integration Acceptability by Caregivers and/or Providers (n=8)

Author (Year)	Population	Results
Goodson (2013)	7569 infants, 6074 mothers	• Interviews with 66 mothers and 16 providers • Mothers perceived integrated services as beneficial; providers trustworthy; • Concerns over privacy; wait times; misconceptions that HTS required to receive immunizations • Providers perceived that integrated services improve access for mothers/children
Kindra (2011)	129 mothers and infants (63 control; 66 intervention)	• Interviews with mothers (n=55) to understand nonadherence to supplement • Mothers reported perceived stigma associated with carrying package of food home • Mothers reported poor taste of supplement (39.4%)
Mazia (2009)	356 pregnant and postpartum women and infants at baseline; 346 at endline	• 356 women interviewed at baseline; 346 women interviewed at endline • Overall increases in women's knowledge and practices due to enhanced provider training • Perceived improvement about quality of care of integrated services
Mutanga (2012)	5074 inpatient children eligible for PITC	• Nurse counsellors reported that counselling is streamlined and easier to conduct because the clinician has already introduced the topic of HIV; clients are more willing to test knowing that ART is available on-site • Hospital staff reported that sensitization training reduced HTS-related stigma by clinicians towards clients • Of children not tested, the most common reason was mothers wanted the consent of male partners, and never returned for their test.
Ndondoki (2013)	3013 infants (6-26 weeks), 2986 mothers	• Theory of routine infant HIV testing accepted by 58% of the mothers, but 61% of mothers did not return for the second contact for infant testing • Perceived disadvantages given by mothers: needing partner consent; concerns of stigma of testing positive; self-stigmatization • Perceived advantages given by mothers: to support the child's health; to allow for early ART initiation; to find out the parent's HIV status
Rollins (2009)	646 eligible mothers, 584 mothers agreed to infant testing and had infants tested, 332 subsequently returned for results	• 78% mothers (503/646) were comfortable with being offered HIV testing • Perceived disadvantages included: reveals status (27.2%); too quick (24%); frightening (19.2%) • Perceived advantages to testing included: confirms status (77%); opportunity for early ART (55%); informs feeding practices (27%) • Counsellors were positive and indicated that testing strategy had benefits for infants and mothers.
Wallace (2014)	64 mothers of infants who received services	• Interviews with 64 mother and 16 providers found nearly 100% mothers and providers across all sites believed integrated services were beneficial and should be scaled up • Mothers perceived benefits: learning their own and their infant's HIV status; starting HIV treatment if needed; protecting herself and her family; reducing HIV-related mortality • Providers perceived benefits: identification of more HIV-positive infants; starting infected infants on treatment; saving mothers time and money
Wang (2015)	60 facilities (20 for each of three study arms: control, simple, and comprehensive intervention)	• Focus group discussions with mothers found generally positive attitudes about testing of children; perceived benefits to children's well-being and their own health • No evidence was found to indicate caregivers would be less inclined to attend an under-five clinic to avoid HIV testing

Table 9: Enablers and Barriers to Service Integration (n=14)

Author (Year)	Population	Results
Edmonds (2016)	1482 newly HIV-diagnosed women; 1142 HIV-exposed infants	Health system enabler: Decentralization; Low-tech tools (Register and data systems)
Herlihy (2015)	510 baseline mother–infant pairs; 624 pregnant women enrolled	Health system enabler: Lay counselors deployed to support active follow up of mother-infant pairs.
Horwood (2010)	872 mothers (392 mothers in PNWs and 480 mothers exiting immunization clinics); 26 lay counsellors and professional nurses	Health system barriers: Lack of clarity on roles and responsibilities of healthcare staff leading to duplication of effort; Record keeping poor as services recalled by mothers were not always recorded (e.g. blood drawn from CD4 or DNA-PCR; nevirapine dosing)
Kankasa (2009)	11,571 infants and children	Health system enablers: Redeployment of HTC staff; testing initiated once ART supplies confirmed. Health system barriers: Acceptance of HTC for infants by hospital staff; commodity availability;
Levin (2012)	499 infants	Health system barriers: Fewer positive infants identified than predicted; possibly due to HIV+mothers attending separate PMTCT clinics where their children were tested.
Mazia (2009)	356 pregnant and postpartum women and infants at baseline; 346 at endline	Health system enablers: Enhanced training improved provider's knowledge and customer service
McCollum (2011)	7,007 pediatric inpatient infants and children	Health system enablers: Integrated settings better used healthcare providers compared to standard of care Health system barriers: High demand on personnel during integrated intervention; High government mandated training fees
Mutanga (2012)	5074 inpatient children eligible for PITC	Health system enablers: Placement of personnel in key locations; task-shifting Health system barriers: Turnaround time for PCR results; distance; poor referral networks; stigma
Patel (2013)	31 HIV-infected children aged 3-18 years initiating anti-TB treatment	Health system enablers: Task shifting to nurses for ART and TB treatment; active tracing of clients LTFU.
Rollins (2009)	646 eligible mothers, 584 mothers agreed to infant testing and had infants tested, 332 subsequently returned for results	Health system enablers: Trainings for healthcare providers; process improvements to results release and follow up Health system barriers: Lack of private space in clinic for HTS.
Wallace (2014)	64 mothers of infants who received services	Health system barriers: Insufficient number of providers
Wang (2015)	60 facilities (20 per 3 study arms)	Health system barriers: Concern from staff over stock levels of HIV test kits at facilities
Wanyenze (2009)	9687 children	Health system enablers: Additional staff hired during study.
Weigel (2009)	3971 children	Health system enablers: Dedicated room for HTC; Additional training for providers on counselling; QA of services through mentoring, regular supervision sessions, spot checks; regular staff meetings to assess performance of PITC; Co-location of services reduced time, cost, and delay of ART initiation