Suubi4Her: A Combination Intervention Addressing HIV Risk Behaviors Among Older Adolescent Girls Transitioning Into Adulthood in Uganda

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Suubi4Her Proposal
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Study Overview. The Suubi4Her program will test the effects of a combination *asset-based financial inclusion intervention (YDAs) with an evidence-based family strengthening intervention to be delivered via multiple family groups (MFG)* to understand the effects and costs associated with a combined intervention versus YDA alone. Specifically, the proposed study addresses three study aims:

Aim 1. Examine whether the *Suubi4Her* intervention is effective in protecting adolescent girls against known HIV risk factors (including economically-motivated sex and intimate partner violence).
Aim 2. Elucidate the effects of the *Suubi4Her* intervention on behavioral health functioning (i.e., depression, self-efficacy and hopelessness) and examine the effects of these variables as potential mechanisms of change, mediating the relationship between each intervention and HIV risk reduction.
Aim 3. Evaluate the cost-effectiveness of each intervention condition.

To address the three aims guiding the proposed study, we will randomize girls (at the school level) to one of three study conditions: **1)** YDA *condition with a 1:1 saving incentive* match rate – for educational purposes and microenterprise development (n=420 participants; n=14 schools); **2)** YDA + *MFG intervention condition* (n=420 participants; n=14 schools); **3)** A control condition receiving standard health and sex education provided in schools (n=420 participants; n=14 schools). We detail the three study arms below.

Matched Savings Accounts (YDA) Intervention. The Suubi4Her matched savings account will be in the form of a Youth Development Account (YDA), where savings are housed at a local bank and deposits made by the adolescent and family are matched, up to a match cap, by the intervention to encourage savings. Each adolescent assigned to a YDA group will receive a YDA held in her own name in a financial institution registered by the Central Bank (Bank of Uganda). We have partnered with Centenary Rural Development Bank and DTB Bank to host the YDAs. Any of the adolescent's family members, relatives, or friends will be allowed and encouraged to contribute towards the YDA. The account will then be matched with money from the study. The maximum family contribution to be matched by the program will be an equivalent of US$10 per month (in Uganda shillings) per family or US$240 for the 24-month intervention period. Girls who save the maximum amount will have a total of $480 at the end of the intervention ($240 in savings plus $240 from the match: a 1:1 match).

Each month, a bank account statement will be generated for every girl to note her accumulated savings. Also, during the intervention period, each girl, with her primary caregiver as a co-signer, will have access to the money in her account (excluding the matching funds). This option is provided in case of an emergency (for example, a family illness). Participants can withdraw their own money—but not the matching funds. When the girls turn 18, they will no longer need co-signers. The matching funds will be kept in a separate account from the participants' own savings. When a girl is ready to pay for school fees, the check for the matching funds will be written in the name of the school she attends. Alternatively, the matching funds may be wire transferred directly to the school's bank account. The student will then contribute her portion of the total cost for the academic term out of her savings account—for which she will be a signatory. The same will apply to girls who want to invest a portion in small business development: the check will be written to the vendors for the wire transfer for the match will be

sent directly to the vendor with the required particulars of the participant). The accounts will be monitored by Drs. Ssewamala (PI) and Nakigozi (in-country Co-I), assisted by the project coordinator and financial manager in Uganda. Experience with our earlier studies indicates the accounts are easy to monitor through monthly bank statements. A participant's access to the matching funds is conditional upon completion of 12 financial management workshops over 12 months.

The matched savings accounts include financial management (FM) workshops and an IGA promotion component. The FM workshops, to be implemented by our collaborating community agency (RTY-Uganda) in collaboration with the financial institutions holding the YDAs, will consist of 12 general workshops that will: a) introduce participants to the notion of asset-building; b) cover asset-building strategies in detail, e.g., saving and investing in IGAs; c) cover specific topics related to saving, e.g., the importance of saving and how it can be done. There will also be asset-specific trainings following the general FM workshops.

Combination Intervention: Youth Development Accounts (YDA) + Multiple Family Groups (MFG). This arm is intended to directly address both the economic needs of the participating adolescent girls as well as their mental health functioning. This combination arm tests whether combining two evidence-based interventions will reduce HIV risk over and above a financial intervention (YDA) or usual care alone. The combined arm will consist of: a) a family monetary savings program using Youth Development Accounts (YDA) (detailed above), and b) a family-based dialogue and training via Multiple Family Groups (MFGs) focused on strengthening family relationships and mental health challenges which frequently accompany adolescent girls' transition to adulthood.

Girls in the combination intervention group (YDA + MFG) will receive: 1) a monetary savings account in the form of a YDA, matched at a rate of 1:1. The YDA will operate exactly the same way as in a YDA-only group—detailed above; 2) in addition to the YDA, each girl will also be invited, together with her caregiving family, to attend 18 60-minute MFG sessions, over the course of 18 months, to be hosted within the community. The 18 sessions include an introductory session and a program evaluation session. Each session will involve 6-12 families. The MFG curriculum will incorporate broad conceptual categories targeting family-level issues and concerns that may impact families' abilities to incorporate new behaviors. Each session will provide numerous opportunities for family members to discuss the realities of family life, as well as perspectives on culture and values, specifically those related to gender. Content is intended to foster both within and between family interaction, learning and communication. Sessions will be facilitated by trained community-level Lay Counselors composed of priests, village health care workers and community extension workers. Training of Lay counselors and having them facilitate the MFG is intended to ensure intervention fidelity, and build capacity to sustain the intervention for the community at study end.

Usual Care: Health and Sex Education and HIV Prevention Curriculum in Secondary Schools. Two curriculums will be delivered in all our participating secondary schools: Life Planning Skills and Adolescent Sexual Reproductive Health. All enrolled participants, both in control and treatment conditions, will be exposed to these curriculums. Specifically, the content related to HIV and sexual risk-taking behaviors will include delaying sex; using condoms and contraception; preventing forced sex; and preventing substance abuse. This curriculum will also include education on gender equality. The content will primarily be delivered via lecture. Generally, Adolescent Sexual Reproductive Health content is and will be dispersed across a range of academic subjects in secondary schools. In each class, students tend to receive information about sexual activity, HIV prevention, and gender relevant topics. Prior to study

implementation, we will hold induction meetings for all teachers involved in the study to ensure uniform delivery of this bolstered usual care.

Study Significance

Adolescence is a particularly vulnerable stage of development with high risk for HIV, STIs and poor mental health functioning. Adolescence is an intense period of development characterized by rapid physical, social and emotional maturation. It requires sufficient family and community support to successfully navigate (WHO, 2014). Financial stress experienced by economically insecure families in low-resource communities compromises the support available to adolescents as they transition to adulthood, putting them at increased risk of experimenting with unhealthy behaviors (McLoyd, 1998; WHO, 2014). Adolescents facing adversity, particularly poverty, exhibit high rates of early and risky sexual behavior, pregnancy, and drug abuse (Ministry of Health Uganda and ORC Macro, 2006; WHO, 2014). Simultaneously, although less researched in high poverty global contexts, adolescents face serious challenges to mental health functioning with trends varying by age and gender. Beginning in adolescence, females suffer more from internalizing disorders, including depression and anxiety and also endure more self-blame, hopelessness, and low self-esteem (Rosenfield & Mouzon, 2013; Thapar, Collishaw, Pine, & Thapar, 2012). Moreover, adolescents affected by AIDS experience even more severe mental health problems than other at-risk groups (Cluver, Gardner, & Operario, 2008; Han, Ssewamala, & Wang, 2013). Indeed, previous studies of AIDS-affected Ugandan adolescents living in poverty show high rates of depression (Han et al., 2013; Ssewamala, Neilands, Waldfogel, & Ismayilova, 2012) anxiety, learning problems,(Curley, Ssewamala, & Han, 2010; Ssewamala & Curley, 2006) and risky sexual behaviors.(Ssewamala, Ismayilova, et al., 2010; Ssewamala, Keun, Neilands, Ismayilova, & Sperber, 2010). Compounded by poverty, the devaluation of self and lack of hope for the future can influence decisions on sexual risk taking and increase HIV risk. Yet, most research on children and families in AIDS-impacted communities in Sub-Saharan Africa (SSA) has primarily focused on meeting the psychosocial needs of younger children,(Jennings, Ssewamala, & Nabunya, 2016; Ssewamala & Curley, 2006; Ssewamala, Karimli, Chang-Keun, & Ismayilova, 2010) failing to consider that addressing families' access to economic resources and strengthening capacity to respond to adolescent mental health may be critical to reducing HIV risk.

SSA remains the world's most affected region in the HIV epidemic (UNAIDS, 2014) with girls accounting for 7 out of 10 new infections among adolescents (ages 15-19 years) (UNICEF, 2016). This gender disparity has increased recognition that adolescent girls need more attention in the fight against HIV/AIDS in the region.

Given the complex and multi-dimensional reasons for increased HIV risk among adolescent girls in SSA, and the failure of most single interventions to significantly decrease these rates, UNAIDS and others in the HIV research community have observed an urgent need for strategies to shift towards Combination HIV Prevention (CHP) (Hankins & de Zalduondo, 2010; UNAIDS, 2010). This is the reason for the proposed *Suubi4Her* study aimed at testing the impact of a combination family-based economic empowerment through Youth Development Accounts (YDAs) with an evidence-based family strengthening intervention delivered via multiple family groups (MFG). The study design will allow us to examine and understand the effects and costs associated with each of these interventions individually, and in combination.

The proposed Suubi4Her study uses a combination intervention to address multiple layers of girls' transitions both on the individual and familial levels. Specifically, the *Suubi4Her* study will examine questions regarding impact using both objective and subjective measures, scale-up, and cost of the intervention for an older age group and the extent to which a combination intervention will protect older girls against known HIV risk factors and enhance several

outcomes: financial stability (asset-accumulation), educational achievement (school enrollment, attendance, and attainment), sexual risk-taking behavior, and mental health functioning.

In summary, the proposed study innovates by testing an innovative combination intervention that has a potential to promote sustainable behavioral change among older adolescent girls by use asset-development incentives (savings match) and behavioral economics principals.

Design and Methods. The proposed study examines the effectiveness of: 1) the combined YDA+MFG vs.YDA-alone; 2) YDA + MFG vs. Usual Care; and 3) YDA vs. Usual Care, and determine key factors influencing scale up via a three cluster randomized control trial (RCT). The three groups include: 1) YDA condition with a 1:1 saving incentive match rate; 2) Combined YDA+MFG intervention condition; 3) Usual Care alone.

Assessments. We will have four assessment points: baseline (pre-test), 12, 24, and 36-months post-intervention initiation. All Assessments will take place at the child's home with each lasting about 60 minutes. Although all the children will be attending school, and we expect all of them to be English-speaking (the instructional language in all Ugandan schools), assessments will be conducted in English or Luganda (local language) depending on participants' English proficiency. All interviewers will be fluent in English and Luganda. Questions will be translated from English to Luganda and back-translated by a certified translator from a local University (Department of Languages) following standard procedures. Drs. Ssewamala and Nakigozi (fluent in Luganda and English) will cross-check all translated assessments. All interviewers will receive a highly structured and intensive training conducted by Drs. Ssewamala and Nakigozi. All measures used have been or will be pre-tested and made culturally appropriate to the Ugandan context. For questions measuring sensitive behaviors (i.e., sexual risks), we will use Audio Computer-Assisted Self-Interviews (ACASI) where the participant takes the survey herself on a mini laptop. Non-sensitive questions will be interviewer-administered.

Study Population. A total of 1260 secondary school-going girls (ages 15-17 at enrollment) in their first year of secondary school will be enrolled and followed for the 12 academic terms (through the last year of lower secondary school—Senior 4). To avoid stigma that surrounds being HIV positive in the region, no girl will be excluded by virtue of their HIV status. Rather, girls who test HIV positive during the baseline interviews will be referred for care and support (in the event they are not already in care) to our extensive network of collaborating clinics and NGOs in the study area, depending on the girl's preference. Once a girl has been linked to care, we will follow-up within thirty days to ensure she has been enrolled. We will also verify whether the referred girls are engaged in care during our follow-up interviews. Similarly, girls testing positive for pregnancy will be linked to antenatal care services at an existing health facility of their choice, and will thereafter be followed up by peer mothers for peer support while those testing positive on STIs (Gonorrhea, Trichomonas and Chlamydia) will be linked to STI treatment clinics offering adolescent-friendly services, or to the Rakai Health Sciences Program STD clinic, whichever the participant prefers. Girls will not be excluded for pregnancy status nor STI/STD status.

Selection of Participants

The target population for this study are older adolescent girls (ages 15-17 at enrollment), in secondary school and living within the four districts of Uganda: Masaka, Rakai, Lwengo and Kalungu. HIV prevalence in this region is 9.8%, compared to other regions in Uganda (7.3%).

Inclusion Criteria: Specifically, for an adolescent to be included in the study, she will have to meet the following criteria: (1) female; (2) enrolled in her first year of secondary school (senior

1) in Rakai, Masaka, Lwengo or Kalungu districts; (3) age 15-17 years; (4) living within a family (broadly defined and not an institution or orphanage, as those in institutions have different familial needs).

Exclusion criteria: Girls are ineligible if: (1) they have a cognitive or severe psychiatric impairment that would prevent comprehension of study procedures as assessed during the Informed Consent process (see Recruitment and Consent Section) or; (2) they are unwilling or unable to commit to completing the study.

We will not exclude girls because of their HIV, STI and/or pregnancy status and the analysis will be adjusted to account for these baseline factors. Girls testing positive for HIV, STI (Gonorrhea, Trichomonas, or Chlamydia) or pregnancy will be referred for care and support (see *Study Population* above). A plethora of services, including access to free antiretroviral therapy (ART), and counseling exist for children and adults living with HIV in the study region. We will follow up with all girls who test positive for HIV or an STI within 30 days of referral, to check on their engagement in care. For girls who test HIV positive, engagement in care will be verified annually using clinical and viral load records.

Study participants will receive their HIV results independently, and then proceed to inform their parent or guardian, upon receipt of the child's consent to do so. Research Assistants will contact girls who test positive 30 days after disclosing their status, to confirm that they have connected with follow up care and have access to comprehensive care services. If not already attending a local clinic, girls will be referred for care to one of the 39 clinics (currently participating in the Suubi+Adherence study) with whom Dr. Ssewamala (PI) and research team have established partnerships within the Greater Masaka Region. Girls testing positive for Gonorrhea, Trichomonas or Chlamydia will be linked to sexually transmitted infection treatment clinics offering adolescent-friendly services, or to the Rakai Health Sciences Program STD clinic, whichever the participant prefers. Girls who are pregnant at the time of enrollment will be linked to antenatal care services at an existing health facility of their choice (within the study area), and will thereafter be followed up by peer mothers for peer support. While *Suubi4Her* is primarily situated within a prevention framework, it will also seek to understand the intervention effects for girls who are HIV positive, adjusting analysis to account for these baseline factors.

Recruitment and Consent

Participation in the study will be voluntary. We will rely on the schools, their Head teachers, local councils, community and church leaders, and local community development & healthcare workers to help with distribution of recruitment fliers. In addition, we will make use of the school academic calendar and recruit participants as they report/register for school. In most cases, participants entering senior 1 do come with their parents or caregivers to meet with the administration to register (normally occurs within the first 1-4 weeks of the academic term). School administrators will give each adolescent (and parent, for adolescents < age 17) a flyer that introduces the project and invites all the caregivers who may have a child eligible for the project to contact the school for details. In addition, Parish Priests, Local Council/village council leaders, local community development and healthcare workers will distribute flyers during their community visits (and at local council village meetings) to inform caregivers whose adolescents meet the inclusion criteria – and adolescents who may not yet have reported to school. Adolescents and caregivers who indicate interest will be invited to come to the school in-person for a one-on-one information meeting with the research team (in-country Co-Is (Dr. Nakigozi and Mr.Mwebembezi) during which they will be given the details of the *Suubi4Her* project, and will be informed verbally and in writing that study participation is voluntary. They will also be

informed of the potential risks and benefits of participating in the program. Dr. Ssewamala (the PI) will join the team during the recruitment and consent process, when in the country.
We will obtain written informed consent from the caregiver for each study participant, and then in a separate step will obtain a written informed assent form from each adolescent who agrees to participate in the study. The research team will perform the consenting process during study recruitment, prior to the baseline assessment. The processes for adult caregivers and youth will be completely separate to avoid any coercion.

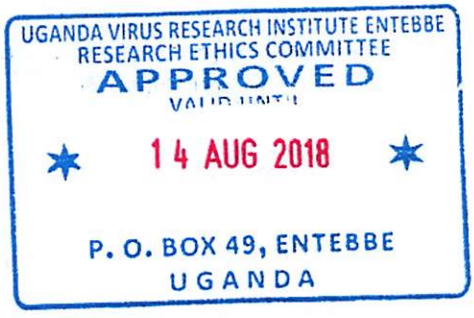
Given the research team's experience with the sets of economic empowerment studies informing this R01, we anticipate that most caregivers may not be English-speaking. For that reason, the caregivers' consent forms will be translated into Luganda (the local language spoken in the study area) from English, and then back-translated into English by a certified translator at a local University (Makerere, Nkozi or Mutesa Royal University, Dept. of Languages). The PI (Dr. Ssewamala), the in-country Co-I (Dr. Nakigozi) and the in-country Project Coordinator (Ms. Mukasa) are all fluent in Luganda. This will be helpful in cross-checking the translated documents.

Additionally, although all the children will be English-speaking (English is the official and instructional language used in schools in Uganda), some may be more comfortable using Luganda (local dialect). Therefore, the assent process will be conducted in English or Luganda (local language) depending on participants' English proficiency. Just like with the caregivers' consent forms, all adolescents' assent forms will be translated from English to Luganda and back-translated by a certified translator from a local university (Makerere, Nkozi or Mutesa 1 Royal University Department of Languages).

The PI, in-country Co-I (Dr. Nakigozi), the in-country Project Coordinator (Ms. Mukasa), or research assistants will read and explain the consent form to the caregiver. In signing the consent form, the caregiver will be consenting to the adolescent's participation in the study screening and enrollment process (which will include having her blood drawn to ascertain HIV, urine testing to determine pregnancy, and high vaginal swab to establish the status on the three STIs to be tested Gonorrhea, Trichomonas and Chlamydia); recruitment and participation in the study (if inclusion criteria is met); and also authorizing access to the adolescent's school records by the Project Coordinator and/or the PI. Each adolescent will also go through the same process. They will each be read their assent forms before signing.

During the consent process, the Project Coordinator and either the PI (Dr. Ssewamala) or Co-I (Dr. Nakigozi) or research assistant will explain the study procedures to the caregivers. After the team (Project Coordinator and either PI or Co-I) is assured that the caregivers fully understand what would be expected of the adolescent and the caregiving family, the caregiver will be allowed to sign the consent form.

Adolescents will be consented separately from their caregivers. An adolescent to be included on the list of interested participants will sign a standard assent form. The Project Coordinator and either the PI (Dr. Ssewamala) or Co-I (Dr. Nakigozi) or research assistant will read and explain the form to the adolescent, and at the end of each section will solicit and answer any questions from the adolescent. During the consent process, the Project Coordinator or research assistant and either the PI (Dr. Ssewamala) or Co-I (Dr. Nakigozi) will explain the study procedures to the adolescents. After the Project Coordinator and either the PI or Co-I are assured that the adolescent fully understands what would be expected of her and the caregiving family, the adolescent would be allowed to sign the informed assent form.



In both the consent and assent forms, it will be clearly stated that the adolescent can withdraw from the study at any time, for any reason, with no explanation, and would not be penalized in any way. It will state that a participant may refuse to answer any questions at any time, may review any materials, may request that we erase any of their responses and may make inquiries and address complaints to Executive Secretary, Uganda National Council for Science and Technology, Chair of UVRI Research and ethics committee or Chair of the Washington University's Committee for the Protection of Human Subjects. As mentioned earlier, the research team will also inform the participant of any potential risks and benefits of participating in the program. Each participant will receive a copy of the assent/consent form, and both the adolescent minor and her caregiver will be thoroughly briefed regarding the importance of assent/consent being both informed and voluntary.

Potential Risks

There are no major risks involved, however, an adolescent may feel embarrassed or uncomfortable during the recruitment and interview process when answering sensitive and personal questions, with urine collection for pregnancy testing, taking blood for HIV and/or high vaginal swabs for STIs (Gonorrhea, Trichomonas and Chlamydia). The process of blood draw may cause some discomfort, bleeding, or bruising where the needle enters the body, and in very rare cases, fainting or infection. First and foremost, interviewers will make it explicitly known to the participants that they may refuse to answer a question or decline to undergo a procedure, at any time. This will also be explained in writing on the consent/ assent forms. If an adolescent tells the interviewer that she is uncomfortable with a particular topic, that she prefers not to discuss a particular topic, or feels she cannot participate in the biomarker process the interviewer will move on to the next question/part of the interview.

Additionally, for questions measuring sensitive behaviors like sexual risk-taking and mental health, we will use audio computer-assisted self-interviews (ACASI) where the participant takes the survey herself on a mini laptop/iPad. This will provide additional privacy for the participant, can be programmed in multiple languages, and is designed for use by both literate and pre-literate populations. Research assistants will be available for any participant experiencing technical difficulty with the use of the computer-assisted interview.

To minimize risks in blood draw, blood will be collected very carefully by experienced clinicians from Rakai Health Sciences Program (RHSP). The PI, in country Co-I and Project Coordinator will also train all interviewers and research assistants on Good Clinical Practice (GCP) so that sensitive topics and issues are handled appropriately. In the event that a girl tests positive for HIV during the enrollment process, there is potential for emotional distress on the part of the participant and the family. In the event of a positive test, we will follow the established Uganda HIV disclosure guidelines provided by the Ugandan Ministry of Health, which require study participants to receive their HIV results independently, and then proceed to inform their parent or guardian, upon receipt of the child's consent to do so. The same protocol will be followed for girls who test positive on STIs (Gonorrhea, Trichomonas or Chlamydia) and those with a positive pregnancy test. Disclosure will be handled by trained medical personnel and social workers at Rakai Health Sciences Program (RSHP). The same process has been followed in several studies by RHSP. Girls found to be HIV positive will be referred for care and support to our extensive network of collaborating clinics in the study area. Girls who are pregnant will be linked to antenatal care services at an existing health facility of their choice (within the study area), and will thereafter be followed up by peer mothers for peer support. Those testing positive on any of the three STIs (Gonorrhea, Trichomonas or Chlamydia) will be linked to sexually transmitted infection treatment clinics offering adolescent-friendly services, or to the Rakai Health Sciences Program STD clinic, whichever the participant prefers. As mentioned

earlier, study participants will receive their HIV results independently, and then proceed to inform their parent or guardian, upon receipt of the child's consent to do so. Research Assistants will contact girls who test positive 30 days after disclosing their status, to confirm that they have connected with follow up care and have access to comprehensive care services.

Protection from Potential Safety/Clinical Risks

The current study has instituted important safeguards to protect the welfare of study participants. The PI (Dr. Ssewamala) and in-country Co-I (Dr. Nakigozi) or designee will train the team members based in Uganda to identify risk factors associated with adverse events. For purposes of this study, adverse events include potential for suicide, homicide, worsening of participant physical health, new or escalating physical/emotional abuse occurring within families, or clinical worsening of participant mental health that may be related to the proposed preventative intervention. Staff members will be instructed that if any adverse event or risk for such event related to a child or adult caregiver involved with the study is identified, participant involvement will be halted immediately and the appropriate personnel contacted. Study staff will be informed of the protocol of rescue procedures in the occurrence of adverse events, which begins with the notification of the in-country Project Coordinator (Ms. Mukasa, a Clinical Psychologist with extensive experience working in the same study regions in Uganda), at an emergency local Ugandan cell phone number (0793888770), and our collaborating Priest in-charge of schools in the study area (Rev. Fr. Joseph Kato Bakulu) at an emergency local Ugandan number (0793888702). The Project Co-Coordinator, Ms. Mukasa, is a native Ugandan, trained in Clinical Psychology from South Eastern Louisiana University (Louisiana, USA). She has advanced clinical training in the delivery of human services, and she is knowledgeable about existing resources that can provide help and support to participants in the study that experience clinical emergencies or are in need of additional interventions that cannot be provided within the research study context. The other Project Co-Coordinator, Ms. Jennifer Nattabi (at 0793-888-701) is a trained Teacher (Makerere University), and a Social Worker (MSW from Washington University, USA). Both Ms. Mukasa and Ms. Nattabi have extensive knowledge coordinating clinical trials. They have both worked on three projects whose preliminary findings and protocols guide this application (Suubi-Maka, Bridges and Suubi+Adherence). In addition, in the occurrence of adverse events, the two Project Coordinators will contact the in-country Co-I (Dr. Nakigozi) immediately at an emergency number (0701-444-074) and Dr. Ssewamala (0793-888-700, if he is in the research study area) once emergency personnel in field have been notified. All study personnel must complete this training before they are permitted to administer any activities in the current study.

Monitoring and Responding to Adverse Events

All study personnel based in Uganda will be trained in identifying indicators of conditions that may jeopardize the welfare of participants and the limits of confidentiality. This training, conducted by the PI (Dr. Ssewamala) and in-country Co-I (Dr. Nakigozi) or designee, includes reviewing possible scenarios and knowledge of key questions used to assess risk. Interview staff are trained to err on the side of caution and told to contact the Project co-Coordinators (Ms. Mukasa, in Uganda—at 0793888770; Ms. Nattabi – at 0793-888-701), the study collaborating priest from Masaka Diocese (Rev. Fr. Joseph Kato Bakulu—also in Uganda at 0793888702), and the in-country Co-I (Dr. Nakigozi at 0701-444-074) all of whom are always available, by telephone, in the event of the need to break confidentiality due to an instance of mandatory reporting. Under the guidance of in-country Co-I (Dr. Nakigozi), the Project Coordinator, and the Collaborating Priest, research staff are trained either to contact the police to ensure safety of participants, or if appropriate, to have emergency personnel take the adolescent to the nearest hospital.

Reporting of adverse events will occur according to a project protocol. For this study, the PI (Dr. Ssewamala) and the in-country Co-I (Dr. Nakigozi), the Project Coordinator (based in Uganda), and the study coordinators (all based in Uganda) will oversee safety and monitoring of adverse events. This group is expected to meet in-person three to four times per year and will have weekly telephone conference calls. In the case of an adverse event, staff will inform the in-country Co-I, Project Coordinators and the Parish Priest immediately and then the U.S. based PI within 24 hours (with substantial efforts made to also inform the PI immediately) of the presence of a possible unanticipated adverse event. Any presence of a possible unanticipated adverse event will be immediately reported and brought to the attention of the Washington University Institutional Review Board along with the UVRI Research and ethics committee and Ugandan National Council of Science and Technology IRB. The IRBs will determine whether it is appropriate to stop the study protocol temporarily or will provide suggestions and/or modifications for the study procedures. Possible modifications may include adding new risks to the consent form and re-consenting all study participants.

Preliminary outcomes data will be examined quarterly by the PI (Dr. Ssewamala) and the Co-Investigators (Drs. Gertrude Nakigozi and Mary M. McKay). If preliminary outcome data indicates harmful impact of the study to the participants (the adolescents), the Washington University IRB committee, the UVRI Research and ethics committee as well as the Uganda National Council of Science and Technology, will be notified and it is possible that the study will be discontinued immediately. However, we do not anticipate any negative effects of participating at this time, as much of the proposed intervention has been tested previously in three sets of studies (Suubi Uganda, Suubi-Maka and Bridges) without adverse events. In addition, findings from our earlier studies guiding this application suggest an association with positive outcomes, including participants being able to save and invest in education, active participation by the children, and enthusiasm by the families and local leaders.

It is important to note that Dr. Ssewamala (PI) is a Social Worker by Training, and Dr. Nakigozi (the in-country Co-I) is a Clinical Medical Doctor. One of the Field Project Coordinators (Ms. Mukasa) is trained clinical psychologist; and the other one, Ms. Nattabi is both a trained Teacher and Social Worker. In addition, the two Field Project Coordinators (Ms. Mukasa and Ms. Nattabi) have extensive professional counseling training and experience. When appropriate this team will be available to speak with those adolescents that experience discomfort with the interview questions and require further attention. In the event that counseling is needed, the project staff will make the appropriate referrals.

Data Management and Integrity to Protect Confidentiality

To protect the integrity of the participants' data, we will adhere to the following procedures. First, we will use participant data only for the purpose of research. The research team will keep all data confidential. We will not share any information or answers we get from the adolescent participants with their caregivers, classmates, friends, teachers, church leaders, or public officials. Second, the Project Coordinators (Ms. Mukasa and Ms. Nattabi) will assign random code numbers to all adolescents participating in the study. This code number is used on all information collected from participants, including questionnaires and computer-assisted interviews. Since the study is a longitudinal one, we maintain lists of participants with links between identifying information and code numbers. Only the Principal Investigator (Dr. Ssewamala), the in-country Co-Investigator (Dr. Nakigozi) and the Project Coordinators have access to these lists, which are kept in locked files. Other study personnel have access, on an as-needed basis, to individual participants' names and code numbers in order to adequately perform their duties. For example, interviewers must label the questionnaires with the correct code number of the participant whom they are interviewing. All personnel must complete

required research training before they are granted access to this identifying information. They must complete the Human Subjects Training sponsored by the National Institute of Mental Health, which complies with federal guidelines delineated in 45 CFR Part 46. Personnel must also sign confidentiality statements that specify that if the participants' confidentiality is breached unintentionally, that personnel will follow the procedures for reporting this breach to the Principal Investigator. The confidentiality statements also state that unintentional or deliberate violations of participants' confidentiality may result in demotion or termination, depending upon the severity of the event. The project personnel also participate in training with the Principal Investigator, in-country Co-Investigator (Dr. Nakigozi) and/or Project Coordinators regarding data safety, confidentiality of participants, limits of confidentiality, and proper administration of the study protocol. We will store all hard copies of data in locked cabinets to which only the PI, the in-country Co-Investigator, and Project Coordinators have access. After completion of an interview with a study participant, data with code numbers is placed in a separate locked filing cabinet only to be retrieved for entry. After research assistants enter data into password protected computer files, only the PI, the in-country Co-Investigator, and the Project Coordinators, and data entry assistant will have access to these files.

Data Analysis Plan and Statistical Procedures

Primary analyses for Specific Aim 1. For Specific Aim 1, *Examine whether the Suubi4Her intervention is effective in protecting adolescent girls against known HIV risk factors,* we hypothesize that following baseline participants in:

1. **H1A: YDA will have lower odds of STIs and HIV risk behaviors vs. control participants;**
2. **H1B: YDA+MFG will have lower odds of STIs and HIV risk behaviors vs. control participants, and**
3. **H1C: YDA+MFG will have a lower odds of STIs and HIV risk behaviors vs. YDA participants.**

Our primary interest is to estimate the marginal or population-average effects of intervention participation on HIV risk outcomes rather than the effect for a hypothetical average subject or school. Moreover, within-subject and within-school HIV risk outcome correlations are considered nuisance parameters rather than quantities of interest to be modeled explicitly. Accordingly, generalized estimating equations (GEE) will be used to perform the proposed primary analyses to test Hypotheses H1A-H1C. These hypotheses will be tested by three pairwise planned time-averaged comparisons of post-baseline measurements. Alpha (α) will be set at .05/3=.017 for these three planned comparisons to maintain a nominal α=.05. Any additional post-hoc comparisons (e.g., paired comparisons of groups at each time point) will maintain nominal alpha of .05 through the use of simulation-based stepdown multiple comparison methods. The alternating logistic regression (ALR) approach implemented in SAS PROC GENMOD will be used to address the 3-level clustering of observations within participants and participants within schools. Though GEE estimates are consistent even if the correlation structure is misspecified, GEE's statistical efficiency improves as the working correlation structure more closely approximates the actual correlation structure; therefore, various correlation structures suitable for the study's design will be considered (e.g., exchangeable; nested-1). The QIC statistic will be used to select the final correlation structure. Randomization strata indicators will be included as covariates as required by the stratified randomized design to obtain unbiased inferences. Additional covariates (e.g., HIV serostatus) will be included if they improve QIC. Robust Huber-White "sandwich" standard errors will be used to obtain correct inferences even if the chosen correlation structure remains slightly misspecified. GEE case deletion diagnostics (e.g.,

DFBetas, Cook's *D*) will be used to investigate whether influential cases are present; if such cases are found, results will be reported with and without influential cases included.

Primary analyses for Specific Aim 2. For Specific Aim 2, *Elucidate the effects of the Suubi4Her interventions on behavioral health functioning (i.e., depression, self-efficacy and hopelessness) and examine the effects of these variables as potential mechanisms of change, mediating the relationship between each intervention and HIV risk reduction*, we hypothesize that following baseline participants in:

1. **H2A: YDA will have higher mean mental health functioning vs. control participants;**
2. **H2B: YDA+MFG will have higher mean mental health functioning vs. control participants, and**
3. **H2C: YDA+MFG will have higher mental mean health functioning vs. YDA participants.**

The same GEE-based approach as described above in the primary analysis for Specific Aim 1 will be used to test H2A-H2C, except that instead of the odds of a binary outcome being estimated, the GEEs for H2A-H2C will employ appropriate distributions and link functions suitable for modeling the means of continuous mental health outcomes (e.g., normal distribution and identity link function). Robust Huber-White "sandwich" standard errors will be used to obtain correct inferences even if the chosen correlation structure remains slightly misspecified or if residual distributions are not perfectly normal or homoscedastic.

Aim 3: *Evaluate the cost-effectiveness of each intervention condition.* Following standard practice of measuring cost-effectiveness of interventions, we will measure costs on a per person basis. The intervention costs will include all program costs, including not just the YDA savings match, but also all costs incurred for running the program. Research costs will not be included. Data on the savings match costs will be readily available from the management information system. Data on costs of other program elements will be drawn from project administrative records and collected throughout the intervention period. In the analyses, costs from multiple years will be adjusted for inflation, depreciation, and discounting.

We will estimate how much *Combined Intervention (YDA + MFG) vs YDA-alone* increased particular outcomes, such as schooling. The per-person costs of *YDA + MFG, and YDA alone* will then be divided by the relevant effect sizes to produce estimates of cost-effectiveness.

Dissemination. The research team will facilitate learning across stakeholders and maximize use of the evidence generated through dissemination meetings. Uganda is one of only a few SSA countries which have Child and Adolescent Mental Health (CAMH) policy guidelines developed. Ugandan policy recognizes the burden and impact of poor mental health functioning on children, their families, and communities. If findings warrant, this study will leverage these policy guidelines to maximize dissemination of study findings.

Timeline. The first 6 months will be spent hiring and training project staff, preparing study sites, screening and recruitment of participants, as well as refinement of the intervention and assessment protocols. During the next 10 months, we will conduct recruitment of participants, baseline assessment and random assignment to the three study arms. We will also concurrently embark on program delivery, including opening the YDA accounts, launching the MFGs, and financial management trainings. Intervention delivery will continue through month 24. Baseline assessments will be conducted during the first 6 months. We will conduct 12, 24, and 36-months post-intervention initiation assessments between months 18-54. We will devote the last 6 months of the study (month 54-60) to data analysis and dissemination of study findings.

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